

# FCC CFR47 PART 22H, 24E, 27 CERTIFICATION TEST REPORT

## FCC ID: 2AOWK-3109

**Product:** Tablet

**Trade Mark:** ulefone

**Model No.:** GQ3109

**Family Model:** Armor Pad, Armor Pad Pro,  
Armor Pad Lite

**Report No.:** STR221208002006E

**Issue Date:** Feb 22, 2023

### Prepared for

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**TEST RESULT CERTIFICATION**

**Applicant's name** ..... : Shenzhen Gotron Electronic CO.,LTD.  
**Address**..... : 7B01, Building A, Block 1, Anhongji Tianyao Plaza, Longhua District,  
Shenzhen City, Guangdong Province China  
**Manufacturer's Name**..... : Shenzhen Gotron Electronic CO.,LTD.  
**Address**..... : 7B01, Building A, Block 1, Anhongji Tianyao Plaza, Longhua District,  
Shenzhen City, Guangdong Province China  
**Product name**..... : Tablet  
**Model and/or type reference** .. : GQ3109  
**Trade Mark**..... : ulefone  
**Family Model**..... : Armor Pad, Armor Pad Pro, Armor Pad Lite  
**Test Sample Number**..... T221208001R003  
**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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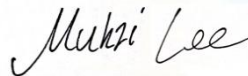
**Date of Test** .....

Date (s) of performance of tests..... Dec 08, 2022 ~ Feb 22, 2023

Date of Issue ..... Feb 22, 2023

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

Testing Engineer :



(Mukzi Lee)

Authorized Signatory :



(Alex Li)

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# 1. GENERAL INFORMATION

## 1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Tablet
Trade Mark	ulefone
Model Name	GQ3109
Family Model	Armor Pad, Armor Pad Pro, Armor Pad Lite
Model Difference	All the model are the same circuit and RF module,only color and model name are different.
FCC ID:	2AOWK-3109
Frequency Bands:	U.S. Bands: <input checked="" type="checkbox"/> LTE FDD Band 2,4,5,7,12,17,41
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; LTE FDD Band 17 Uplink: 704MHz-716MHz, Downlink: 734MHz-746MHz; LTE FDD Band 41 Uplink: 2540MHz-2650MHz,
Type of Modulation:	QPSK/16QAM/64QAM(Only Downlink)
Power Class	Class 3
Antenna:	PIFA Antenna
Antenna gain:	Band 2: -0.18 dBi, Band 4: -0.68 dBi, Band 5: -0.86 dBi, Band 7: 1.06 dBi, Band 12: -4.05 dBi, Band 17: -4.05 dBi, Band 41: 1.57 dBi
Adapter	Model: HJ-FC038K7-US Input: 100-240V~50/60Hz 0.6A Output: 5V---3.0A OR 9V---2.0A OR 12V---1.5A
Battery	DC 3.85V, 7650mAh,29.45Wh
Power supply	DC 3.85V from battery or DC 5V from adapter
Extreme Vol. Limits:	DC 3.27V to DC 4.43V (Nominal DC 3.85V) (Note 1)
HW Version	MB_TP787_A1_V1.1
SW Version	Armor Pad_SH1_EEA_V1
<p>** Note1: The High Voltage DC 4.43V and Low Voltage 3.27V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.</p>	

**1.2 RELATED SUBMITTAL(S) / GRANT (S)**

This submittal(s) (test report) is intended for **FCC ID: 2AOWK-3109** filing to comply with the FCC Part 22H&24E&27&90S.

**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 2/4/5/7/12/17/41

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

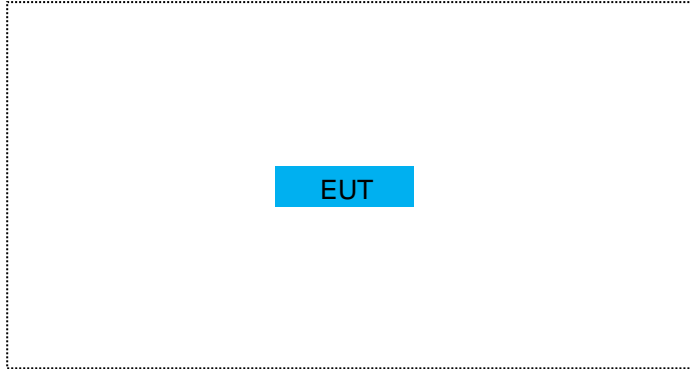
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Tablet	GQ3109	FCC ID: 2AOWK-3109	EUT

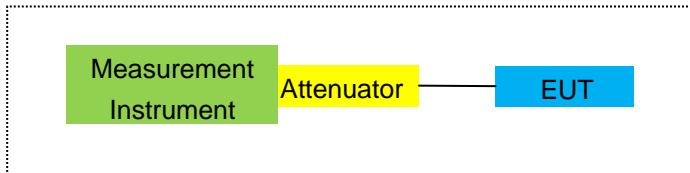
*Note: All the accessories have been used during the test.  
the following “EUT” in setup diagram means EUT system.*

## 2.4 TEST SETUP

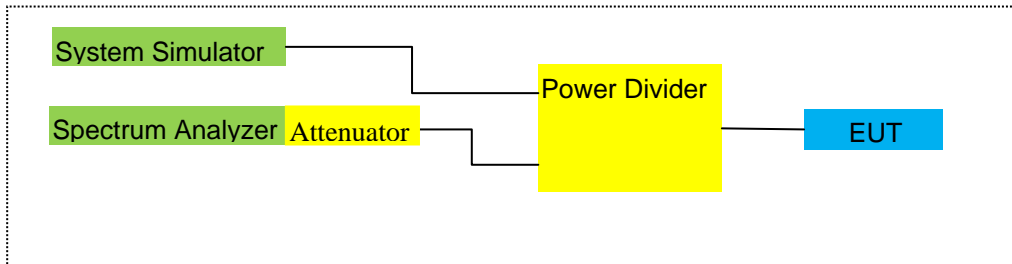
For Radiated Test Cases



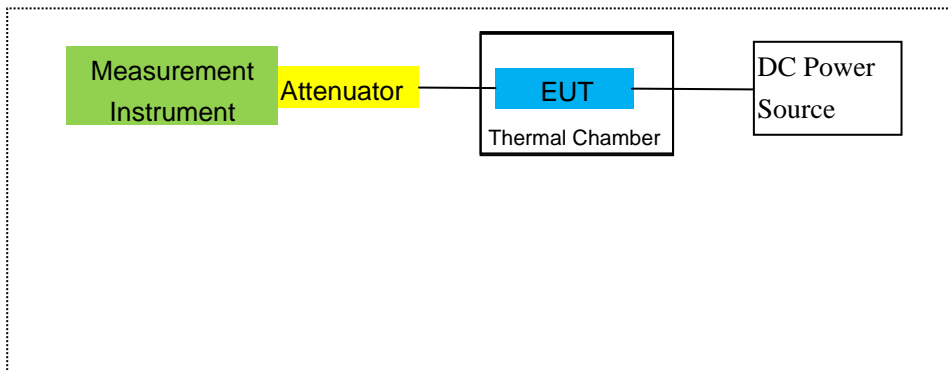
For Conducted Output Power



For Peak-to Average Ratio, Occupied Bandwidth, Conducted Band edge and Conducted Spurious Emission



For Frequency Stability



Note: EUT built-in battery-powered, the battery is fully-charged.



### 3. TEST AND MEASUREMENT EQUIPMENT

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

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	MXA Signal Analyzer	Agilent	N9020A	MY49100060	2022.06.16	2023.06.17	1 year
2	Test Receiver	R&S	ESPI	101318	2022.04.06	2023.04.05	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2022.03.30	2023.03.29	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2020.05.11	2023.05.10	3 year
5	Horn Antenna	EM	EM-AH-10180	2011071402	2022.03.31	2023.03.30	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2022.11.07	2023.11.06	1 year
7	Amplifier	EM	EM-30180	060538	2022.06.17	2023.06.16	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2022.04.06	2023.04.05	1 year
9	Power Meter	R&S	NRVS	100696	2022.06.17	2023.06.16	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2022.04.06	2023.04.05	1 year
11	Test Cable	N/A	R-01	N/A	2022.06.17	2025.06.16	3 year
12	Test Cable	N/A	R-02	N/A	2022.06.17	2025.06.16	3 year
13	Test Cable	N/A	R-03	N/A	2022.06.17	2025.06.16	3 year
14	Test Receiver	R&S	ESCI	101160	2022.04.06	2023.04.05	1 year
15	LISN	R&S	ENV216	101313	2022.04.06	2023.04.05	1 year
16	LISN	EMCO	3816/2	00042990	2022.04.06	2023.04.05	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2022.04.06	2023.04.05	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2022.04.06	2023.04.05	1 year
19	Test Cable	N/A	C01	N/A	2020.05.11	2023.05.10	3 year
20	Test Cable	N/A	C02	N/A	2020.05.11	2023.05.10	3 year
21	Test Cable	N/A	C03	N/A	2020.05.11	2023.05.10	3 year
22	Attenuator	MCE	24-10-34	BN9258	2022.04.01	2023.03.31	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2022.04.01	2023.03.31	1 year
24	test receiver	R&S	ESCI	a0304218	2022.04.06	2023.04.05	1 year
25	Communication Tester	R&S	CMU200	A0304247	2022.06.16	2023.06.15	1 year

26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2022.04.06	2023.04.05	1 year
27	DC Power Source	N/A	PS-6005D	2017040292 3	2020.05.11	2023.05.10	3 year
28	MXG Vector Signal Generator	Agilent	N5182A	MY47070317	2022.06.16	2023.06.15	1 year
29	Communication Tester	R&S	CMW500	148500	2022.06.16	2023.06.15	1 year

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable& DC Power Source which is scheduled for calibration every 3 years.

## 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	$\leq 1$
			5	>6	$\leq 1$
			10	>6	$\leq 1$
			15	>8	$\leq 1$
			20	>10	$\leq 1$
NS_04	6.6.2.2.2	41	5	>6	$\leq 1$
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10, 15, 20	$\geq 50$	$\leq 1$
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	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
NS_08	6.6.3.3.3	19	10, 15	> 44	$\leq 3$
NS_09	6.6.3.3.4	21	10, 15	> 40	$\leq 1$
				> 55	$\leq 2$
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 <sup>1</sup>	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

Band 2/4/5/7/12/17/41

### 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: §22.917, §24.238, §27.53

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.

(c)(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;

FCC: §90.691 Emission mask requirements for EA-based systems.

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $116 \log_{10}(f/6.1)$  decibels or  $50 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

**TEST PROCEDURE**

The transmitter output was connected to a CMW500 Test 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

Set a marker to point the corresponding band edge frequency in each test case.

Set resolution bandwidth to at least 1% of emission bandwidth.

**MODES TESTED**

Band 2/4/5/7/12/17/41

**RESULTS**

Test data reference attachment.

## 7. OUT OF BAND EMISSIONS

### RULE PART(S)

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

### LIMITS

1. 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.
2. The Band 7/41 emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $55 + 10 \log (P)$  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 RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

### **MODES TESTED**

- Band 2/4/5/7/12/17/41
- 

### 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, §27.50 and §90.635

#### 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.

27.50 (h)(2) Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

90.635(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

#### 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

- Band 2/4/5/7/12/17/41

#### RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result					Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP		
							Average (mW)		
1.4MHz Band QPSK	1/#Mid	1850.7	-3.31	3.76	28.24	21.17	130.918	Horizontal	Pass
		1880	-3.09	3.91	28.22	21.22	132.434	Horizontal	Pass
		1909.3	-3.00	3.93	28.20	21.27	133.968	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-3.24	3.77	28.23	21.22	132.434	Horizontal	Pass
		1880	-3.13	3.91	28.24	21.20	131.826	Horizontal	Pass
		1908.5	-3.08	3.94	28.25	21.23	132.739	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-3.24	3.77	28.31	21.30	134.896	Horizontal	Pass
		1880	-3.04	3.91	28.22	21.27	133.968	Horizontal	Pass
		1907.5	-2.97	3.94	28.20	21.29	134.586	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-3.24	3.79	28.33	21.30	134.896	Horizontal	Pass
		1880	-2.95	3.95	28.22	21.32	135.519	Horizontal	Pass
		1905	-3.00	3.97	28.19	21.22	132.434	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-3.25	3.79	28.34	21.30	134.896	Horizontal	Pass
		1880	-2.98	3.95	28.22	21.29	134.586	Horizontal	Pass
		1902.5	-2.96	3.97	28.18	21.25	133.352	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-3.39	3.81	28.35	21.15	130.317	Horizontal	Pass
		1880	-3.00	3.96	28.22	21.26	133.660	Horizontal	Pass
		1900	-3.01	4.00	28.16	21.15	130.317	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-3.21	3.76	28.24	21.27	133.968	Vertical	Pass
		1880	-3.13	3.91	28.22	21.18	131.220	Vertical	Pass
		1909.3	-3.05	3.93	28.20	21.22	132.434	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-3.26	3.77	28.23	21.20	131.826	Vertical	Pass
		1880	-3.03	3.91	28.24	21.30	134.896	Vertical	Pass
		1908.5	-3.08	3.94	28.25	21.23	132.739	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-3.30	3.77	28.31	21.24	133.045	Vertical	Pass
		1880	-3.05	3.91	28.22	21.26	133.660	Vertical	Pass
		1907.5	-2.94	3.94	28.20	21.32	135.519	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	-3.29	3.79	28.33	21.25	133.352	Vertical	Pass
		1880	-2.98	3.95	28.22	21.29	134.586	Vertical	Pass
		1905	-2.97	3.97	28.19	21.25	133.352	Vertical	Pass

15.0MHz Band QPSK	1/#Mid	1857.5	-3.33	3.79	28.34	21.22	132.434	Vertical	Pass
		1880	-3.09	3.95	28.22	21.18	131.220	Vertical	Pass
		1902.5	-2.99	3.97	28.18	21.22	132.434	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	1860	-3.22	3.81	28.35	21.32	135.519	Vertical	Pass
		1880	-2.91	3.96	28.22	21.35	136.458	Vertical	Pass
		1900	-2.82	4.00	28.16	21.34	136.144	Vertical	Pass

Radiated Power (EIRP) for Band 2										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP	Average (mW)		
							Average			
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.50	3.76	28.24	19.98	99.541	Horizontal	Pass	
		1880	-4.23	3.91	28.22	20.08	101.859	Horizontal	Pass	
		1909.3	-4.17	3.93	28.20	20.10	102.329	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	1851.5	-4.37	3.77	28.23	20.09	102.094	Horizontal	Pass	
		1880	-4.32	3.91	28.24	20.01	100.231	Horizontal	Pass	
		1908.5	-4.23	3.94	28.25	20.08	101.859	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	1852.5	-4.50	3.77	28.31	20.04	100.925	Horizontal	Pass	
		1880	-4.32	3.91	28.22	19.99	99.770	Horizontal	Pass	
		1907.5	-4.25	3.94	28.20	20.01	100.231	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	1855	-4.42	3.79	28.33	20.12	102.802	Horizontal	Pass	
		1880	-4.28	3.95	28.22	19.99	99.770	Horizontal	Pass	
		1905	-4.19	3.97	28.19	20.03	100.693	Horizontal	Pass	
15.0MHz Band 16 QAM	1/#Mid	1857.5	-4.55	3.79	28.34	20.00	100.000	Horizontal	Pass	
		1880	-4.27	3.95	28.22	20.00	100.000	Horizontal	Pass	
		1902.5	-4.10	3.97	28.18	20.11	102.565	Horizontal	Pass	
20.0MHz Band 16 QAM	1/#Mid	1860	-4.49	3.81	28.35	20.05	101.158	Horizontal	Pass	
		1880	-4.28	3.96	28.22	19.98	99.541	Horizontal	Pass	
		1900	-4.14	4.00	28.16	20.02	100.462	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.38	3.76	28.24	20.10	102.329	Vertical	Pass	
		1880	-4.21	3.91	28.22	20.10	102.329	Vertical	Pass	
		1909.3	-4.29	3.93	28.20	19.98	99.541	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	1851.5	-4.42	3.77	28.23	20.04	100.925	Vertical	Pass	
		1880	-4.23	3.91	28.24	20.10	102.329	Vertical	Pass	
		1908.5	-4.20	3.94	28.25	20.11	102.565	Vertical	Pass	
5.0MHz	1/#Mid	1852.5	-4.47	3.77	28.31	20.07	101.625	Vertical	Pass	

Band 16		1880	-4.30	3.91	28.22	20.01	100.231	Vertical	Pass
QAM		1907.5	-4.19	3.94	28.20	20.07	101.625	Vertical	Pass
10.0MHz	1/#Mid	1855	-4.47	3.79	28.33	20.07	101.625	Vertical	Pass
Band 16		1880	-4.21	3.95	28.22	20.06	101.391	Vertical	Pass
QAM		1905	-4.18	3.97	28.19	20.04	100.925	Vertical	Pass
15.0MHz	1/#Mid	1857.5	-4.49	3.79	28.34	20.06	101.391	Vertical	Pass
Band 16		1880	-4.21	3.95	28.22	20.06	101.391	Vertical	Pass
QAM		1902.5	-4.24	3.97	28.18	19.97	99.312	Vertical	Pass
20.0MHz	1/#Mid	1860	-4.37	3.81	28.35	20.17	103.992	Vertical	Pass
Band 16		1880	-4.14	3.96	28.22	20.12	102.802	Vertical	Pass
QAM		1900	-4.01	4.00	28.16	20.15	103.514	Vertical	Pass

**Note:**

SG Level= Signal generator output

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

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss (dBm)	Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			Average (dBm)	Average (mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-4.35	3.12	27.58	20.11	102.565	Horizontal	Pass
		1732.5	-4.24	3.27	27.61	20.10	102.329	Horizontal	Pass
		1754.3	-4.29	3.29	27.63	20.05	101.158	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-4.41	3.13	27.61	20.07	101.625	Horizontal	Pass
		1732.5	-4.38	3.27	27.61	19.96	99.083	Horizontal	Pass
		1753.5	-4.30	3.30	27.62	20.02	100.462	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-4.47	3.13	27.63	20.03	100.693	Horizontal	Pass
		1732.5	-4.26	3.27	27.61	20.08	101.859	Horizontal	Pass
		1752.5	-4.35	3.30	27.60	19.95	98.855	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-4.44	3.15	27.64	20.05	101.158	Horizontal	Pass
		1732.5	-4.28	3.31	27.61	20.02	100.462	Horizontal	Pass
		1750	-4.28	3.33	27.59	19.98	99.541	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-4.42	3.15	27.65	20.08	101.859	Horizontal	Pass
		1732.5	-4.32	3.31	27.61	19.98	99.541	Horizontal	Pass
		1747.5	-4.16	3.33	27.57	20.08	101.859	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-4.47	3.17	27.66	20.02	100.462	Horizontal	Pass
		1732.5	-4.30	3.32	27.61	19.99	99.770	Horizontal	Pass
		1745	-4.11	3.36	27.56	20.09	102.094	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-4.35	3.12	27.58	20.11	102.565	Vertical	Pass
		1732.5	-4.33	3.27	27.61	20.01	100.231	Vertical	Pass
		1754.3	-4.22	3.29	27.63	20.12	102.802	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-4.40	3.13	27.61	20.08	101.859	Vertical	Pass
		1732.5	-4.32	3.27	27.61	20.02	100.462	Vertical	Pass
		1753.5	-4.28	3.30	27.62	20.04	100.925	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-4.44	3.13	27.63	20.06	101.391	Vertical	Pass
		1732.5	-4.30	3.27	27.61	20.04	100.925	Vertical	Pass
		1752.5	-4.20	3.30	27.60	20.10	102.329	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-4.48	3.15	27.64	20.01	100.231	Vertical	Pass
		1732.5	-4.31	3.31	27.61	19.99	99.770	Vertical	Pass
		1750	-4.26	3.33	27.59	20.00	100.000	Vertical	Pass

15.0MHz Band QPSK	1/#Mid	1717.5	-4.46	3.15	27.65	20.04	100.925	Vertical	Pass
		1732.5	-4.26	3.31	27.61	20.04	100.925	Vertical	Pass
		1747.5	-4.23	3.33	27.57	20.01	100.231	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	1720	-4.32	3.17	27.66	20.17	103.992	Vertical	Pass
		1732.5	-4.15	3.32	27.61	20.14	103.276	Vertical	Pass
		1745	-4.03	3.36	27.56	20.17	103.992	Vertical	Pass

Radiated Power (EIRP) for Band 4										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss (dBm)	Factor (dB)	Max. EIRP	Max. EIRP			
			(dBm)			Average	Average			
						(dBm)	(mW)			
1.4MHz Band 16 QAM	1/#Mid	1710.7	-5.27	3.12	27.58	19.19	82.985	Horizontal	Pass	
		1732.5	-5.14	3.27	27.61	19.20	83.176	Horizontal	Pass	
		1754.3	-5.25	3.29	27.63	19.09	81.096	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	1711.5	-5.26	3.13	27.61	19.22	83.560	Horizontal	Pass	
		1732.5	-5.28	3.27	27.61	19.06	80.538	Horizontal	Pass	
		1753.5	-5.25	3.30	27.62	19.07	80.724	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	1712.5	-5.34	3.13	27.63	19.16	82.414	Horizontal	Pass	
		1732.5	-5.20	3.27	27.61	19.14	82.035	Horizontal	Pass	
		1752.5	-5.12	3.30	27.60	19.18	82.794	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	1715	-5.28	3.15	27.64	19.21	83.368	Horizontal	Pass	
		1732.5	-5.12	3.31	27.61	19.18	82.794	Horizontal	Pass	
		1750	-5.12	3.33	27.59	19.14	82.035	Horizontal	Pass	
15.0MHz Band 16 QAM	1/#Mid	1717.5	-5.31	3.15	27.65	19.19	82.985	Horizontal	Pass	
		1732.5	-5.22	3.31	27.61	19.08	80.910	Horizontal	Pass	
		1747.5	-5.06	3.33	27.57	19.18	82.794	Horizontal	Pass	
20.0MHz Band 16 QAM	1/#Mid	1720	-5.41	3.17	27.66	19.08	80.910	Horizontal	Pass	
		1732.5	-5.17	3.32	27.61	19.12	81.658	Horizontal	Pass	
		1745	-5.02	3.36	27.56	19.18	82.794	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	1710.7	-5.28	3.12	27.58	19.18	82.794	Vertical	Pass	
		1732.5	-5.18	3.27	27.61	19.16	82.414	Vertical	Pass	
		1754.3	-5.26	3.29	27.63	19.08	80.910	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	1711.5	-5.27	3.13	27.61	19.21	83.368	Vertical	Pass	
		1732.5	-5.22	3.27	27.61	19.12	81.658	Vertical	Pass	
		1753.5	-5.21	3.30	27.62	19.11	81.470	Vertical	Pass	
5.0MHz	1/#Mid	1712.5	-5.42	3.13	27.63	19.08	80.910	Vertical	Pass	

Band 16		1732.5	-5.28	3.27	27.61	19.06	80.538	Vertical	Pass
QAM		1752.5	-5.19	3.30	27.60	19.11	81.470	Vertical	Pass
10.0MHz	1/#Mid	1715	-5.41	3.15	27.64	19.08	80.910	Vertical	Pass
Band 16		1732.5	-5.20	3.31	27.61	19.10	81.283	Vertical	Pass
QAM		1750	-5.13	3.33	27.59	19.13	81.846	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-5.33	3.15	27.65	19.17	82.604	Vertical	Pass
Band 16		1732.5	-5.15	3.31	27.61	19.15	82.224	Vertical	Pass
QAM		1747.5	-5.15	3.33	27.57	19.09	81.096	Vertical	Pass
20.0MHz	1/#Mid	1720	-5.24	3.17	27.66	19.25	84.140	Vertical	Pass
Band 16		1732.5	-5.05	3.32	27.61	19.24	83.946	Vertical	Pass
QAM		1745	-4.97	3.36	27.56	19.23	83.753	Vertical	Pass

Note:

SG Level= Signal generator output

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

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

### 8.4 LTE BAND 5

Radiated Power (ERP) for Band 5											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss (dBm)	Factor (dB)	Correction (dB)	Max. ERP	Max. ERP			
			(dBm)				Average	Average			
							(dBm)	(mW)			
1.4MHz Band QPSK	1/#Mid	824.7	4.10	2.01	19.68	2.15	19.62	91.622	Horizontal	Pass	
		836.5	4.12	2.01	19.77	2.15	19.73	93.972	Horizontal	Pass	
		848.3	4.02	2.02	19.82	2.15	19.67	92.683	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	4.15	2.01	19.70	2.15	19.69	93.111	Horizontal	Pass	
		836.5	4.07	2.01	19.77	2.15	19.68	92.897	Horizontal	Pass	
		847.5	3.95	2.02	19.81	2.15	19.59	90.991	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	4.11	2.01	19.71	2.15	19.66	92.470	Horizontal	Pass	
		836.5	4.12	2.01	19.77	2.15	19.73	93.972	Horizontal	Pass	
		846.5	4.04	2.02	19.79	2.15	19.66	92.470	Horizontal	Pass	
10.0MHz z Band QPSK	1/#Mid	829	4.08	2.01	19.73	2.15	19.65	92.257	Horizontal	Pass	
		836.5	4.11	2.01	19.77	2.15	19.72	93.756	Horizontal	Pass	
		844	4.07	2.02	19.78	2.15	19.68	92.897	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	824.7	4.12	2.01	19.68	2.15	19.64	92.045	Vertical	Pass	
		836.5	4.07	2.01	19.77	2.15	19.68	92.897	Vertical	Pass	
		848.3	3.94	2.02	19.82	2.15	19.59	90.991	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	4.11	2.01	19.70	2.15	19.65	92.257	Vertical	Pass	
		836.5	4.12	2.01	19.77	2.15	19.73	93.972	Vertical	Pass	
		847.5	4.00	2.02	19.81	2.15	19.64	92.045	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	4.15	2.01	19.71	2.15	19.70	93.325	Vertical	Pass	
		836.5	4.08	2.01	19.77	2.15	19.69	93.111	Vertical	Pass	
		846.5	3.97	2.02	19.79	2.15	19.59	90.991	Vertical	Pass	
10.0MHz z Band QPSK	1/#Mid	829	4.19	2.01	19.73	2.15	19.76	94.624	Vertical	Pass	
		836.5	4.13	2.01	19.77	2.15	19.74	94.189	Vertical	Pass	
		844	4.14	2.02	19.78	2.15	19.75	94.406	Vertical	Pass	



Radiated Power (ERP) for Band 5											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss (dBm)	Factor (dB)	Correction (dB)	Max. ERP	Max. ERP			
			(dBm)				Average	Average			
							(dBm)	(mW)			
1.4MHz Band 16 QAM	1/#Mid	824.7	3.38	2.01	19.68	2.15	18.90	77.625	Horizontal	Pass	
		836.5	3.26	2.01	19.77	2.15	18.87	77.090	Horizontal	Pass	
		848.3	3.28	2.02	19.82	2.15	18.93	78.163	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	3.30	2.01	19.70	2.15	18.84	76.560	Horizontal	Pass	
		836.5	3.32	2.01	19.77	2.15	18.93	78.163	Horizontal	Pass	
		847.5	3.28	2.02	19.81	2.15	18.92	77.983	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	3.28	2.01	19.71	2.15	18.83	76.384	Horizontal	Pass	
		836.5	3.29	2.01	19.77	2.15	18.90	77.625	Horizontal	Pass	
		846.5	3.27	2.02	19.79	2.15	18.89	77.446	Horizontal	Pass	
10.0MHz z Band 16 QAM	1/#Mid	829	3.30	2.01	19.73	2.15	18.87	77.090	Horizontal	Pass	
		836.5	3.20	2.01	19.77	2.15	18.81	76.033	Horizontal	Pass	
		844	3.21	2.02	19.78	2.15	18.82	76.208	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	824.7	3.37	2.01	19.68	2.15	18.89	77.446	Vertical	Pass	
		836.5	3.18	2.01	19.77	2.15	18.79	75.683	Vertical	Pass	
		848.3	3.23	2.02	19.82	2.15	18.88	77.268	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	3.30	2.01	19.70	2.15	18.84	76.560	Vertical	Pass	
		836.5	3.25	2.01	19.77	2.15	18.86	76.913	Vertical	Pass	
		847.5	3.30	2.02	19.81	2.15	18.94	78.343	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	3.28	2.01	19.71	2.15	18.83	76.384	Vertical	Pass	
		836.5	3.26	2.01	19.77	2.15	18.87	77.090	Vertical	Pass	
		846.5	3.18	2.02	19.79	2.15	18.80	75.858	Vertical	Pass	
10.0MHz z Band 16 QAM	1/#Mid	829	3.38	2.01	19.73	2.15	18.95	78.524	Vertical	Pass	
		836.5	3.33	2.01	19.77	2.15	18.94	78.343	Vertical	Pass	
		844	3.33	2.02	19.78	2.15	18.94	78.343	Vertical	Pass	

Note:

SG Level= Signal generator output

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

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result					Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Factor	Max. EIRP	Max. EIRP		
			(dBm)	(dBm)	(dB)	Average	Average		
						(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	-1.97	4.54	27.75	21.24	133.045	Horizontal	Pass
		2535	-1.78	4.69	27.72	21.25	133.352	Horizontal	Pass
		2567.5	-1.68	4.71	27.71	21.32	135.519	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-1.90	4.55	27.76	21.31	135.207	Horizontal	Pass
		2535	-1.70	4.69	27.72	21.33	135.831	Horizontal	Pass
		2565	-1.72	4.72	27.70	21.26	133.660	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-1.87	4.55	27.77	21.35	136.458	Horizontal	Pass
		2535	-1.79	4.69	27.72	21.24	133.045	Horizontal	Pass
		2562.5	-1.76	4.72	27.69	21.21	132.130	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-2.00	4.57	27.78	21.21	132.130	Horizontal	Pass
		2535	-1.64	4.73	27.72	21.35	136.458	Horizontal	Pass
		2560	-1.70	4.75	27.68	21.23	132.739	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-1.96	4.54	27.75	21.25	133.352	Vertical	Pass
		2535	-1.69	4.69	27.72	21.34	136.144	Vertical	Pass
		2567.5	-1.71	4.71	27.71	21.29	134.586	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-1.88	4.55	27.76	21.33	135.831	Vertical	Pass
		2535	-1.73	4.69	27.72	21.30	134.896	Vertical	Pass
		2565	-1.67	4.72	27.70	21.31	135.207	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-2.03	4.55	27.77	21.19	131.522	Vertical	Pass
		2535	-1.70	4.69	27.72	21.33	135.831	Vertical	Pass
		2562.5	-1.63	4.72	27.69	21.34	136.144	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-1.85	4.57	27.78	21.36	136.773	Vertical	Pass
		2535	-1.63	4.73	27.72	21.36	136.773	Vertical	Pass
		2560	-1.53	4.75	27.68	21.40	138.038	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Factor	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)	Average	Average		
			(dBm)	(mW)					
5.0MHz Band 16 QAM	1/#Mid	2502.5	-2.58	4.54	27.75	20.63	115.611	Horizontal	Pass
		2535	-2.39	4.69	27.72	20.64	115.878	Horizontal	Pass
		2567.5	-2.26	4.71	27.71	20.74	118.577	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-2.53	4.55	27.76	20.68	116.950	Horizontal	Pass
		2535	-2.40	4.69	27.72	20.63	115.611	Horizontal	Pass
		2565	-2.33	4.72	27.70	20.65	116.145	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-2.53	4.55	27.77	20.69	117.220	Horizontal	Pass
		2535	-2.31	4.69	27.72	20.72	118.032	Horizontal	Pass
		2562.5	-2.38	4.72	27.69	20.59	114.551	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-2.52	4.57	27.78	20.69	117.220	Horizontal	Pass
		2535	-2.28	4.73	27.72	20.71	117.761	Horizontal	Pass
		2560	-2.31	4.75	27.68	20.62	115.345	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-2.46	4.54	27.75	20.75	118.850	Vertical	Pass
		2535	-2.36	4.69	27.72	20.67	116.681	Vertical	Pass
		2567.5	-2.37	4.71	27.71	20.63	115.611	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-2.52	4.55	27.76	20.69	117.220	Vertical	Pass
		2535	-2.32	4.69	27.72	20.71	117.761	Vertical	Pass
		2565	-2.32	4.72	27.70	20.66	116.413	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-2.62	4.55	27.77	20.60	114.815	Vertical	Pass
		2535	-2.33	4.69	27.72	20.70	117.490	Vertical	Pass
		2562.5	-2.33	4.72	27.69	20.64	115.878	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-2.42	4.57	27.78	20.79	119.950	Vertical	Pass
		2535	-2.20	4.73	27.72	20.79	119.950	Vertical	Pass
		2560	-2.13	4.75	27.68	20.80	120.226	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.6 LTE BAND 12

Radiated Power (ERP) for Band 12											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss (dBm)	Antenna Gain (dB)	Correction	Max. EIRP	Max. EIRP			
			(dBm)			(dB)	Average	Average			
						(dBm)	(mW)				
1.4MHz Band QPSK	1/#Mid	699.7	1.20	1.91	19.21	2.15	16.35	43.152	Vertical	Pass	
		707.5	1.12	1.91	19.26	2.15	16.32	42.855	Vertical	Pass	
		715.3	1.11	1.93	19.34	2.15	16.37	43.351	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	1.28	1.91	19.21	2.15	16.43	43.954	Vertical	Pass	
		707.5	1.21	1.91	19.26	2.15	16.41	43.752	Vertical	Pass	
		714.5	1.07	1.93	19.34	2.15	16.33	42.954	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	1.28	1.91	19.23	2.15	16.45	44.157	Vertical	Pass	
		707.5	1.22	1.91	19.26	2.15	16.42	43.853	Vertical	Pass	
		713.5	1.05	1.92	19.33	2.15	16.31	42.756	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	704	1.09	1.91	19.25	2.15	16.28	42.462	Vertical	Pass	
		707.5	1.10	1.91	19.26	2.15	16.30	42.658	Vertical	Pass	
		711	1.05	1.92	19.32	2.15	16.30	42.658	Vertical	Pass	
1.4MHz Band QPSK	1/#Mid	699.7	1.23	1.91	19.21	2.15	16.38	43.451	Horizontal	Pass	
		707.5	1.20	1.91	19.26	2.15	16.40	43.652	Horizontal	Pass	
		715.3	1.08	1.93	19.34	2.15	16.34	43.053	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	1.29	1.91	19.21	2.15	16.44	44.055	Horizontal	Pass	
		707.5	1.12	1.91	19.26	2.15	16.32	42.855	Horizontal	Pass	
		714.5	1.18	1.93	19.34	2.15	16.44	44.055	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	1.24	1.91	19.23	2.15	16.41	43.752	Horizontal	Pass	
		707.5	1.24	1.91	19.26	2.15	16.44	44.055	Horizontal	Pass	
		713.5	1.02	1.92	19.33	2.15	16.28	42.462	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	704	1.30	1.91	19.25	2.15	16.49	44.566	Horizontal	Pass	
		707.5	1.26	1.91	19.26	2.15	16.46	44.259	Horizontal	Pass	
		711	1.20	1.92	19.32	2.15	16.45	44.157	Horizontal	Pass	

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)				Average	Average		
				(dBm)	(mW)					
1.4MHz Band 16 QAM	1/#Mid	699.7	0.34	1.91	19.21	2.15	15.49	35.400	Vertical	Pass
		707.5	0.34	1.91	19.26	2.15	15.54	35.810	Vertical	Pass
		715.3	0.25	1.93	19.34	2.15	15.51	35.563	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	0.26	1.91	19.21	2.15	15.41	34.754	Vertical	Pass
		707.5	0.31	1.91	19.26	2.15	15.51	35.563	Vertical	Pass
		714.5	0.26	1.93	19.34	2.15	15.52	35.645	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	0.29	1.91	19.23	2.15	15.46	35.156	Vertical	Pass
		707.5	0.32	1.91	19.26	2.15	15.52	35.645	Vertical	Pass
		713.5	0.25	1.92	19.33	2.15	15.51	35.563	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	704	0.35	1.91	19.25	2.15	15.54	35.810	Vertical	Pass
		707.5	0.20	1.91	19.26	2.15	15.40	34.674	Vertical	Pass
		711	0.27	1.92	19.32	2.15	15.52	35.645	Vertical	Pass
1.4MHz Band 16 QAM	1/#Mid	699.7	0.31	1.91	19.21	2.15	15.46	35.156	Horizontal	Pass
		707.5	0.27	1.91	19.26	2.15	15.47	35.237	Horizontal	Pass
		715.3	0.19	1.93	19.34	2.15	15.45	35.075	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	0.37	1.91	19.21	2.15	15.52	35.645	Horizontal	Pass
		707.5	0.25	1.91	19.26	2.15	15.45	35.075	Horizontal	Pass
		714.5	0.29	1.93	19.34	2.15	15.55	35.892	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	0.22	1.91	19.23	2.15	15.39	34.594	Horizontal	Pass
		707.5	0.24	1.91	19.26	2.15	15.44	34.995	Horizontal	Pass
		713.5	0.20	1.92	19.33	2.15	15.46	35.156	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	704	0.41	1.91	19.25	2.15	15.60	36.308	Horizontal	Pass
		707.5	0.38	1.91	19.26	2.15	15.58	36.141	Horizontal	Pass
		711	0.33	1.92	19.32	2.15	15.58	36.141	Horizontal	Pass

**Note:**

SG Level= Signal generator output

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

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

### 8.7 LTE BAND 17

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)		Average	Average		
						(dB)	(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	706.5	1.36	1.91	19.23	2.15	16.53	44.978	Vertical	Pass
		710	1.24	1.91	19.26	2.15	16.44	44.055	Vertical	Pass
		713.5	1.26	1.92	19.33	2.15	16.52	44.875	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	709	1.26	1.91	19.25	2.15	16.45	44.157	Vertical	Pass
		710	1.35	1.91	19.26	2.15	16.55	45.186	Vertical	Pass
		711	1.17	1.92	19.32	2.15	16.42	43.853	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	706.5	1.31	1.91	19.23	2.15	16.48	44.463	Horizontal	Pass
		710	1.29	1.91	19.26	2.15	16.49	44.566	Horizontal	Pass
		713.5	1.27	1.92	19.33	2.15	16.53	44.978	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	709	1.39	1.91	19.25	2.15	16.58	45.499	Horizontal	Pass
		710	1.38	1.91	19.26	2.15	16.58	45.499	Horizontal	Pass
		711	1.34	1.92	19.32	2.15	16.59	45.604	Horizontal	Pass

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)				Average	Average		
				(dB)	(dBm)	(mW)				
5.0MHz Band 16 QAM	1/#Mid	706.5	0.70	1.91	19.23	2.15	15.87	38.637	Vertical	Pass
		710	0.66	1.91	19.26	2.15	15.86	38.548	Vertical	Pass
		713.5	0.57	1.92	19.33	2.15	15.83	38.282	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	709	0.63	1.91	19.25	2.15	15.82	38.194	Vertical	Pass
		710	0.58	1.91	19.26	2.15	15.78	37.844	Vertical	Pass
		711	0.63	1.92	19.32	2.15	15.88	38.726	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	706.5	0.73	1.91	19.23	2.15	15.90	38.905	Horizontal	Pass
		710	0.75	1.91	19.26	2.15	15.95	39.355	Horizontal	Pass
		713.5	0.67	1.92	19.33	2.15	15.93	39.174	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	709	0.78	1.91	19.25	2.15	15.97	39.537	Horizontal	Pass
		710	0.76	1.91	19.26	2.15	15.96	39.446	Horizontal	Pass
		711	0.70	1.92	19.32	2.15	15.95	39.355	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

8.8 LTE BAND 41

Radiated Power (EIRP) for Band 41									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss (dBm)	Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			Average (dBm)	Average (mW)		
5.0MHz Band QPSK	1/#Mid	2542.5	-0.87	4.54	27.75	22.34	171.396	Horizontal	Pass
		2595	-0.66	4.69	27.72	22.37	172.584	Horizontal	Pass
		2647.5	-0.65	4.71	27.71	22.35	171.791	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2545	-0.74	4.55	27.76	22.47	176.604	Horizontal	Pass
		2595	-0.62	4.69	27.72	22.41	174.181	Horizontal	Pass
		2645	-0.59	4.72	27.70	22.39	173.380	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2547.5	-0.85	4.55	27.77	22.37	172.584	Horizontal	Pass
		2595	-0.67	4.69	27.72	22.36	172.187	Horizontal	Pass
		2642.5	-0.53	4.72	27.69	22.44	175.388	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2550	-0.75	4.57	27.78	22.46	176.198	Horizontal	Pass
		2595	-0.56	4.73	27.72	22.43	174.985	Horizontal	Pass
		2640	-0.57	4.75	27.68	22.36	172.187	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2542.5	-0.83	4.54	27.75	22.38	172.982	Vertical	Pass
		2595	-0.69	4.69	27.72	22.34	171.396	Vertical	Pass
		2647.5	-0.64	4.71	27.71	22.36	172.187	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2545	-0.83	4.55	27.76	22.38	172.982	Vertical	Pass
		2595	-0.68	4.69	27.72	22.35	171.791	Vertical	Pass
		2645	-0.66	4.72	27.70	22.32	170.608	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2547.5	-0.93	4.55	27.77	22.29	169.434	Vertical	Pass
		2595	-0.65	4.69	27.72	22.38	172.982	Vertical	Pass
		2642.5	-0.61	4.72	27.69	22.36	172.187	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2550	-0.73	4.57	27.78	22.48	177.011	Vertical	Pass
		2595	-0.48	4.73	27.72	22.51	178.238	Vertical	Pass
		2640	-0.44	4.75	27.68	22.49	177.419	Vertical	Pass



Radiated Power (EIRP) for Band 41										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss (dBm)	Factor (dB)	Max. EIRP	Max. EIRP			
			(dBm)			Average (dBm)	Average (mW)			
5.0MHz Band 16 QAM	1/#Mid	2542.5	-1.36	4.54	27.75	21.85	153.109	Horizontal	Pass	
		2595	-1.30	4.69	27.72	21.73	148.936	Horizontal	Pass	
		2647.5	-1.27	4.71	27.71	21.73	148.936	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	2545	-1.39	4.55	27.76	21.82	152.055	Horizontal	Pass	
		2595	-1.26	4.69	27.72	21.77	150.314	Horizontal	Pass	
		2645	-1.27	4.72	27.70	21.71	148.252	Horizontal	Pass	
15.0MHz Band 16 QAM	1/#Mid	2547.5	-1.37	4.55	27.77	21.85	153.109	Horizontal	Pass	
		2595	-1.33	4.69	27.72	21.70	147.911	Horizontal	Pass	
		2642.5	-1.16	4.72	27.69	21.81	151.705	Horizontal	Pass	
20.0MHz Band 16 QAM	1/#Mid	2550	-1.42	4.57	27.78	21.79	151.008	Horizontal	Pass	
		2595	-1.21	4.73	27.72	21.78	150.661	Horizontal	Pass	
		2640	-1.18	4.75	27.68	21.75	149.624	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	2542.5	-1.37	4.54	27.75	21.84	152.757	Vertical	Pass	
		2595	-1.24	4.69	27.72	21.79	151.008	Vertical	Pass	
		2647.5	-1.25	4.71	27.71	21.75	149.624	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	2545	-1.49	4.55	27.76	21.72	148.594	Vertical	Pass	
		2595	-1.20	4.69	27.72	21.83	152.405	Vertical	Pass	
		2645	-1.20	4.72	27.70	21.78	150.661	Vertical	Pass	
15.0MHz Band 16 QAM	1/#Mid	2547.5	-1.49	4.55	27.77	21.73	148.936	Vertical	Pass	
		2595	-1.24	4.69	27.72	21.79	151.008	Vertical	Pass	
		2642.5	-1.27	4.72	27.69	21.70	147.911	Vertical	Pass	
20.0MHz Band 16 QAM	1/#Mid	2550	-1.30	4.57	27.78	21.91	155.239	Vertical	Pass	
		2595	-1.11	4.73	27.72	21.88	154.170	Vertical	Pass	
		2640	-1.05	4.75	27.68	21.88	154.170	Vertical	Pass	

Note:

SG Level= Signal generator output

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

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

## 9. SPURIOUS RADIATION EMISSION

### RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53 and §90.691

### LIMIT

§22.917 (e) and §24.238 and §90.691 (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  $43 + 10 \log_{10}(P)$  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  $43 + 10 \text{ Log}_{10} (p)$ , dB; and
- b. for mobile subscriber equipment, the attenuation shall not be less than  $43 + 10 \text{ Log}_{10} (p)$ , dB at the channel edges and  $55 + 10 \text{ Log}_{10} (p)$  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 2/4/5/7/12/17/41

#### **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
3701.4	-47.35	4.04	33.51	-17.88	-13	-4.88	Horizontal
3701.4	-49.92	4.04	33.51	-20.45	-13	-7.45	Vertical
5552.1	-53.45	5.24	35.84	-22.85	-13	-9.85	Vertical
5552.1	-51.43	5.24	35.84	-20.83	-13	-7.83	Horizontal
196.5	-44.57	1.43	16.02	-29.98	-13	-16.98	Vertical
313.7	-35.16	1.30	17.99	-18.47	-13	-5.47	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-50.49	4.04	33.56	-20.97	-13	-7.97	Horizontal
3760.0	-45.54	4.04	33.56	-16.02	-13	-3.02	Vertical
5640.0	-44.72	5.24	35.91	-14.05	-13	-1.05	Vertical
5640.0	-52.45	5.24	35.91	-21.78	-13	-8.78	Horizontal
191.6	-41.65	1.62	16.97	-26.30	-13	-13.30	Vertical
259.0	-42.30	1.74	15.98	-28.07	-13	-15.07	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-53.96	4.04	34.00	-24.00	-13	-11.00	Horizontal
3818.6	-51.01	4.04	34.00	-21.05	-13	-8.05	Vertical
5727.9	-52.77	5.24	36.04	-21.97	-13	-8.97	Vertical
5727.9	-52.87	5.24	36.04	-22.07	-13	-9.07	Horizontal
180.4	-36.28	1.42	17.29	-20.41	-13	-7.41	Vertical
447.2	-39.96	1.50	17.90	-23.55	-13	-10.55	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
3720.0	-47.29	4.07	33.54	-17.82	-13	-4.82	Horizontal
3720.0	-48.77	4.07	33.54	-19.30	-13	-6.30	Vertical
5580.0	-53.30	5.28	35.86	-22.72	-13	-9.72	Vertical
5580.0	-50.89	5.28	35.86	-20.31	-13	-7.31	Horizontal
198.7	-40.72	1.58	16.89	-25.40	-13	-12.40	Vertical
414.5	-39.09	1.76	17.26	-23.59	-13	-10.59	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-49.60	4.04	33.56	-20.08	-13	-7.08	Horizontal
3760.0	-53.78	4.04	33.56	-24.26	-13	-11.26	Vertical
5640.0	-45.39	5.24	35.91	-14.72	-13	-1.72	Vertical
5640.0	-50.81	5.24	35.91	-20.14	-13	-7.14	Horizontal
177.6	-37.88	1.46	16.27	-23.07	-13	-10.07	Vertical
455.3	-42.52	1.59	15.15	-28.96	-13	-15.96	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-45.89	4.04	34.00	-15.93	-13	-2.93	Horizontal
3800.0	-46.24	4.04	34.00	-16.28	-13	-3.28	Vertical
5700.0	-51.50	5.24	36.04	-20.70	-13	-7.70	Vertical
5700.0	-49.97	5.24	36.04	-19.17	-13	-6.17	Horizontal
175.2	-41.59	1.36	17.39	-25.55	-13	-12.55	Vertical
360.6	-35.23	1.66	15.39	-21.50	-13	-8.50	Horizontal

Note: P<sub>Mea</sub>(dBm)= Power(dBm)+ AR<sub>pl</sub> (dBm)

. Over Limit= : P<sub>Mea</sub>(dBm)-Limit(dBm)

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

**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	-44.53	4.02	29.80	-18.75	-13	-5.75	Horizontal
3421.4	-44.20	4.02	29.80	-18.42	-13	-5.42	Vertical
5132.1	-44.57	5.24	35.84	-13.97	-13	-0.97	Vertical
5132.1	-51.04	5.24	35.84	-20.44	-13	-7.44	Horizontal
213.0	-42.99	1.68	16.04	-28.63	-13	-15.63	Vertical
362.7	-36.52	1.78	17.74	-20.56	-13	-7.56	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-48.87	4.03	30.00	-22.90	-13	-9.90	Horizontal
3465.0	-53.20	4.03	30.00	-27.23	-13	-14.23	Vertical
5197.5	-44.72	5.25	35.86	-14.11	-13	-1.11	Vertical
5197.5	-49.60	5.25	35.86	-18.99	-13	-5.99	Horizontal
205.9	-39.01	1.72	17.69	-23.04	-13	-10.04	Vertical
414.2	-40.49	1.62	16.02	-26.08	-13	-13.08	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-46.20	4.05	30.01	-20.24	-13	-7.24	Horizontal
3508.6	-49.66	4.05	30.01	-23.70	-13	-10.70	Vertical
5262.9	-47.17	5.26	35.86	-16.57	-13	-3.57	Vertical
5262.9	-49.45	5.26	35.86	-18.85	-13	-5.85	Horizontal
193.5	-41.43	1.80	16.69	-26.54	-13	-13.54	Vertical
362.0	-41.01	1.75	16.66	-26.11	-13	-13.11	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
3440.0	-51.91	4.02	29.80	-26.13	-13	-13.13	Horizontal
3440.0	-48.53	4.02	29.80	-22.75	-13	-9.75	Vertical
5160.0	-47.17	5.24	35.84	-16.57	-13	-3.57	Vertical
5160.0	-49.73	5.24	35.84	-19.13	-13	-6.13	Horizontal
211.6	-35.14	1.57	17.26	-19.45	-13	-6.45	Vertical
465.7	-42.67	1.78	16.35	-28.10	-13	-15.10	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-48.77	4.03	30.00	-22.80	-13	-9.80	Horizontal
3465.0	-49.87	4.03	30.00	-23.90	-13	-10.90	Vertical
5197.5	-51.07	5.25	35.86	-20.46	-13	-7.46	Vertical
5197.5	-49.17	5.25	35.86	-18.56	-13	-5.56	Horizontal
203.9	-37.66	1.44	17.95	-21.15	-13	-8.15	Vertical
234.0	-43.38	1.65	16.09	-28.94	-13	-15.94	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-47.76	4.05	27.68	-24.13	-13	-11.13	Horizontal
3490.0	-52.14	4.05	27.68	-28.51	-13	-15.51	Vertical
5235.0	-48.64	5.26	35.86	-18.04	-13	-5.04	Vertical
5235.0	-49.75	5.26	35.86	-19.15	-13	-6.15	Horizontal
181.3	-39.86	1.61	16.85	-24.62	-13	-11.62	Vertical
290.2	-40.61	1.61	15.19	-27.03	-13	-14.03	Horizontal

Note: P<sub>Mea</sub>(dBm)= Power(dBm)+ AR<sub>pl</sub> (dBm)

Over Limit= : P<sub>Mea</sub>(dBm)-Limit(dBm)

Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

**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	-53.81	2.78	27.50	-29.09	-13	-16.09	Horizontal
1649.4	-48.72	2.78	27.50	-24.00	-13	-11.00	Vertical
2474.1	-46.42	2.90	27.80	-21.52	-13	-8.52	Vertical
2474.1	-49.91	2.90	27.80	-25.01	-13	-12.01	Horizontal
191.9	-36.59	1.76	17.59	-20.76	-13	-7.76	Vertical
365.9	-34.40	1.63	15.87	-20.16	-13	-7.16	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-53.47	2.80	27.48	-28.79	-13	-15.79	Horizontal
1673.0	-51.95	2.80	27.48	-27.27	-13	-14.27	Vertical
2509.5	-48.57	2.91	27.70	-23.78	-13	-10.78	Vertical
2509.5	-53.97	2.91	27.70	-29.18	-13	-16.18	Horizontal
205.8	-40.02	1.61	15.68	-25.95	-13	-12.95	Vertical
445.1	-38.87	1.59	17.52	-22.95	-13	-9.95	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-52.91	2.82	27.43	-28.30	-13	-15.30	Horizontal
1696.6	-53.88	2.82	27.43	-29.27	-13	-16.27	Vertical
2544.9	-46.91	2.92	27.74	-22.09	-13	-9.09	Vertical
2544.9	-50.64	2.92	27.74	-25.82	-13	-12.82	Horizontal
206.3	-40.15	1.69	16.67	-25.16	-13	-12.16	Vertical
268.1	-40.13	1.70	17.18	-24.65	-13	-11.65	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
1658.0	-48.96	2.78	27.50	-24.24	-13	-11.24	Horizontal
1658.0	-51.21	2.78	27.50	-26.49	-13	-13.49	Vertical
2487.0	-46.52	2.90	27.80	-21.62	-13	-8.62	Vertical
2487.0	-50.93	2.90	27.80	-26.03	-13	-13.03	Horizontal
206.1	-37.65	1.71	15.57	-23.79	-13	-10.79	Vertical
434.6	-36.80	1.34	16.40	-21.74	-13	-8.74	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-51.51	2.80	27.48	-26.83	-13	-13.83	Horizontal
1673.0	-49.22	2.80	27.48	-24.54	-13	-11.54	Vertical
2509.5	-51.05	2.91	27.70	-26.26	-13	-13.26	Vertical
2509.5	-50.09	2.91	27.70	-25.30	-13	-12.30	Horizontal
181.8	-40.39	1.44	17.04	-24.79	-13	-11.79	Vertical
412.3	-38.93	1.76	17.62	-23.07	-13	-10.07	Horizontal
Test Results for High Channel 844MHz							
1688.0	-46.84	2.82	27.43	-22.23	-13	-9.23	Horizontal
1688.0	-45.42	2.82	27.43	-20.81	-13	-7.81	Vertical
2532.0	-47.23	2.92	27.74	-22.41	-13	-9.41	Vertical
2532.0	-52.58	2.92	27.74	-27.76	-13	-14.76	Horizontal
178.2	-40.37	1.74	17.70	-24.41	-13	-11.41	Vertical
413.7	-45.00	1.41	17.46	-28.94	-13	-15.94	Horizontal

Note:  $P_{Mea}(dBm) = Power(dBm) + ARpl(dBm)$

. Over Limit = :  $P_{Mea}(dBm) - Limit(dBm)$

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

**9.4 LTE BAND 7**

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

<b>Test Results for Low Channel 2502.5MHz</b>							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-60.67	5.23	35.81	-30.09	-25	-5.09	Horizontal
5005.0	-61.27	5.23	35.81	-30.69	-25	-5.69	Vertical
7507.5	-61.18	5.67	36.85	-30.00	-25	-5.00	Vertical
7507.5	-64.90	5.67	36.85	-33.72	-25	-8.72	Horizontal
178.3	-45.25	1.73	17.97	-29.01	-25	-4.01	Vertical
420.4	-52.11	1.38	15.11	-38.38	-25	-13.38	Horizontal
<b>Test Results for Mid Channel 2535MHz</b>							
5070.0	-62.61	5.23	35.82	-32.02	-25	-7.02	Horizontal
5070.0	-63.80	5.23	35.82	-33.21	-25	-8.21	Vertical
7605.0	-64.90	5.67	36.85	-33.72	-25	-8.72	Vertical
7605.0	-61.59	5.67	36.85	-30.41	-25	-5.41	Horizontal
177.6	-48.73	1.77	16.17	-34.32	-25	-9.32	Vertical
312.6	-51.81	1.63	15.21	-38.23	-25	-13.23	Horizontal
<b>Test Results for High Channel 2567.5MHz</b>							
5135.0	-63.97	5.24	35.83	-33.38	-25	-8.38	Horizontal
5135.0	-59.70	5.24	35.83	-29.11	-25	-4.11	Vertical
7702.5	-62.25	5.68	36.87	-31.06	-25	-6.06	Vertical
7702.5	-63.80	5.68	36.87	-32.61	-25	-7.61	Horizontal
203.4	-50.82	1.58	17.56	-34.84	-25	-9.84	Vertical
457.7	-49.30	1.45	16.58	-34.17	-25	-9.17	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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020.0	-59.12	5.23	35.82	-28.53	-25	-3.53	Horizontal
5020.0	-63.98	5.23	35.82	-33.39	-25	-8.39	Vertical
7530.0	-64.14	5.67	36.86	-32.95	-25	-7.95	Vertical
7530.0	-59.51	5.67	36.86	-28.32	-25	-3.32	Horizontal
177.2	-50.74	1.63	15.76	-36.61	-25	-11.61	Vertical
279.5	-49.59	1.71	15.44	-35.86	-25	-10.86	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-64.38	5.23	35.82	-33.79	-25	-8.79	Horizontal
5070.0	-63.49	5.23	35.82	-32.90	-25	-7.90	Vertical
7605.0	-63.41	5.67	36.85	-32.23	-25	-7.23	Vertical
7605.0	-63.39	5.67	36.85	-32.21	-25	-7.21	Horizontal
187.3	-45.08	1.79	16.84	-30.02	-25	-5.02	Vertical
362.2	-53.99	1.71	17.64	-38.06	-25	-13.06	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-64.66	5.24	35.83	-34.07	-25	-9.07	Horizontal
5120.0	-61.96	5.24	35.83	-31.37	-25	-6.37	Vertical
7680.0	-64.28	5.70	36.88	-33.10	-25	-8.10	Vertical
7680.0	-61.34	5.70	36.88	-30.16	-25	-5.16	Horizontal
206.4	-44.46	1.79	16.84	-29.40	-25	-4.40	Vertical
345.2	-48.81	1.71	17.64	-32.88	-25	-7.88	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value + Cable Loss+ Antenna Factor + 11.74

. Margin = Spurious Emission Level - Limit

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

**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	-53.01	2.60	27.20	-28.41	-13	-15.41	Horizontal
1399.4	-50.41	2.60	27.20	-25.81	-13	-12.81	Vertical
2099.1	-48.76	2.85	27.54	-24.07	-13	-11.07	Vertical
2099.1	-52.82	2.85	27.54	-28.13	-13	-15.13	Horizontal
192.9	-38.77	1.49	17.78	-22.48	-13	-9.48	Vertical
301.1	-36.97	1.36	17.33	-21.00	-13	-8.00	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-51.79	2.61	27.28	-27.12	-13	-14.12	Horizontal
1415.0	-44.66	2.61	27.28	-19.99	-13	-6.99	Vertical
2122.5	-52.10	2.87	27.59	-27.38	-13	-14.38	Vertical
2122.5	-53.69	2.87	27.59	-28.97	-13	-15.97	Horizontal
202.4	-42.96	1.73	15.74	-28.95	-13	-15.95	Vertical
452.2	-44.74	1.62	15.79	-30.57	-13	-17.57	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-53.01	2.63	27.28	-28.36	-13	-15.36	Horizontal
1430.6	-53.16	2.63	27.28	-28.51	-13	-15.51	Vertical
2145.9	-47.52	2.88	27.60	-22.80	-13	-9.80	Vertical
2145.9	-51.35	2.88	27.60	-26.63	-13	-13.63	Horizontal
198.6	-43.23	1.61	18.00	-26.84	-13	-13.84	Vertical
405.8	-39.05	1.45	15.49	-25.02	-13	-12.02	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
1408.0	-46.17	2.61	27.26	-21.52	-13	-8.52	Horizontal
1408.0	-47.01	2.61	27.26	-22.36	-13	-9.36	Vertical
2112.0	-47.66	2.87	27.58	-22.95	-13	-9.95	Vertical
2112.0	-52.08	2.87	27.58	-27.37	-13	-14.37	Horizontal
177.1	-42.32	1.31	16.97	-26.66	-13	-13.66	Vertical
268.3	-40.72	1.65	16.70	-25.67	-13	-12.67	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-48.45	2.61	27.28	-23.78	-13	-10.78	Horizontal
1415.0	-51.64	2.61	27.28	-26.97	-13	-13.97	Vertical
2122.5	-51.97	2.87	27.59	-27.25	-13	-14.25	Vertical
2122.5	-53.34	2.87	27.59	-28.62	-13	-15.62	Horizontal
185.7	-36.34	1.72	17.99	-20.07	-13	-7.07	Vertical
277.6	-36.68	1.73	17.94	-20.47	-13	-7.47	Horizontal
Test Results for High Channel 711MHz							
1422.0	-47.61	2.62	27.28	-22.95	-13	-9.95	Horizontal
1422.0	-50.84	2.62	27.28	-26.18	-13	-13.18	Vertical
2133.0	-48.79	2.87	27.60	-24.06	-13	-11.06	Vertical
2133.0	-52.52	2.87	27.60	-27.79	-13	-14.79	Horizontal
201.5	-36.03	1.58	15.93	-21.68	-13	-8.68	Vertical
414.3	-37.29	1.36	15.59	-23.06	-13	-10.06	Horizontal

Note:  $P_{Mea}(dBm) = Power(dBm) + ARpl(dBm)$

. Over Limit = :  $P_{Mea}(dBm) - Limit(dBm)$

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

**9.6 LTE BAND 17**

**QPSK EIRP POWER FOR LTE BAND 17 (5MHZ BANDWIDTH)**

Test Results for Low Channel 706.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1413.0	-53.52	2.61	27.28	-28.85	-13	-15.85	Horizontal
1413.0	-44.06	2.61	27.28	-19.39	-13	-6.39	Vertical
2119.5	-52.65	2.87	27.59	-27.93	-13	-14.93	Vertical
2119.5	-50.46	2.87	27.59	-25.74	-13	-12.74	Horizontal
176.6	-36.81	1.71	16.15	-22.37	-13	-9.37	Vertical
314.9	-38.27	1.41	17.32	-22.36	-13	-9.36	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-44.88	2.62	27.30	-20.20	-13	-7.20	Horizontal
1420.0	-46.38	2.62	27.30	-21.70	-13	-8.70	Vertical
2130.0	-52.63	2.87	27.62	-27.88	-13	-14.88	Vertical
2130.0	-52.50	2.87	27.62	-27.75	-13	-14.75	Horizontal
190.8	-39.65	1.42	15.25	-25.83	-13	-12.83	Vertical
297.2	-43.31	1.36	17.19	-27.48	-13	-14.48	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-51.88	2.66	27.28	-27.26	-13	-14.26	Horizontal
1427.0	-52.30	2.66	27.28	-27.68	-13	-14.68	Vertical
2140.5	-51.33	2.88	27.60	-26.61	-13	-13.61	Vertical
2140.5	-52.86	2.88	27.60	-28.14	-13	-15.14	Horizontal
187.7	-37.85	1.32	17.29	-21.88	-13	-8.88	Vertical
461.0	-41.47	1.72	16.89	-26.30	-13	-13.30	Horizontal

**QPSK EIRP POWER FOR LTE BAND 17 (10MHZ BANDWIDTH)**

Test Results for Low Channel 709MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1418.0	-47.95	2.62	27.30	-23.27	-13	-10.27	Horizontal
1418.0	-52.92	2.62	27.30	-28.24	-13	-15.24	Vertical
2127.0	-44.32	2.87	27.62	-19.57	-13	-6.57	Vertical
2127.0	-53.58	2.87	27.62	-28.83	-13	-15.83	Horizontal
175.0	-39.05	1.35	16.91	-23.49	-13	-10.49	Vertical
255.4	-36.66	1.62	16.31	-21.97	-13	-8.97	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-53.91	2.62	27.30	-29.23	-13	-16.23	Horizontal
1420.0	-53.55	2.62	27.30	-28.87	-13	-15.87	Vertical
2130.0	-52.86	2.87	27.62	-28.11	-13	-15.11	Vertical
2130.0	-52.66	2.87	27.62	-27.91	-13	-14.91	Horizontal
176.2	-43.97	1.51	17.14	-28.34	-13	-15.34	Vertical
394.6	-36.76	1.77	16.88	-21.65	-13	-8.65	Horizontal
Test Results for High Channel 711MHz							
1422.0	-47.28	2.62	27.30	-22.60	-13	-9.60	Horizontal
1422.0	-52.05	2.62	27.30	-27.37	-13	-14.37	Vertical
2133.0	-44.37	2.87	27.62	-19.62	-13	-6.62	Vertical
2133.0	-50.90	2.87	27.62	-26.15	-13	-13.15	Horizontal
187.9	-43.24	1.78	15.95	-29.07	-13	-16.07	Vertical
350.6	-35.23	1.34	17.95	-18.63	-13	-5.63	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value + Cable Loss+ Antenna Factor + 11.74  
 . Margin = Spurious Emission Level - Limit  
 . Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

**9.7 LTE BAND 41**

**QPSK EIRP POWER FOR LTE BAND 41 (5MHZ BANDWIDTH)**

<b>Test Results for Low Channel 2542.5MHz</b>							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5085.0	-61.64	5.13	35.81	-30.96	-25	-5.96	Horizontal
5085.0	-59.69	5.13	35.81	-29.01	-25	-4.01	Vertical
7627.5	-59.19	5.42	36.85	-27.76	-25	-2.76	Vertical
7627.5	-59.36	5.42	36.85	-27.93	-25	-2.93	Horizontal
212.0	-45.37	1.56	17.97	-28.96	-25	-3.96	Vertical
352.1	-50.58	1.33	15.11	-36.80	-25	-11.80	Horizontal
<b>Test Results for Mid Channel 2595MHz</b>							
5190.0	-63.71	5.16	35.82	-33.05	-25	-8.05	Horizontal
5190.0	-63.13	5.16	35.82	-32.47	-25	-7.47	Vertical
7785.0	-60.88	5.53	36.85	-29.56	-25	-4.56	Vertical
7785.0	-62.93	5.53	36.85	-31.61	-25	-6.61	Horizontal
176.8	-51.38	1.77	16.17	-36.97	-25	-11.97	Vertical
370.2	-48.83	1.63	15.21	-35.25	-25	-10.25	Horizontal
<b>Test Results for High Channel 2647.5MHz</b>							
5295.0	-63.40	5.23	35.83	-32.80	-25	-7.80	Horizontal
5295.0	-62.34	5.23	35.83	-31.74	-25	-6.74	Vertical
7942.5	-61.05	5.62	36.87	-29.80	-25	-4.80	Vertical
7942.5	-63.78	5.62	36.87	-32.53	-25	-7.53	Horizontal
184.3	-54.01	1.58	17.56	-38.03	-25	-13.03	Vertical
386.9	-48.62	1.45	16.58	-33.49	-25	-8.49	Horizontal



**QPSK EIRP POWER FOR LTE BAND 41 (20MHZ BANDWIDTH)**

Test Results for Low Channel 2550MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5100.0	-64.24	5.23	35.82	-33.65	-25	-8.65	Horizontal
5100.0	-59.91	5.23	35.82	-29.32	-25	-4.32	Vertical
7650.0	-62.50	5.67	36.86	-31.31	-25	-6.31	Vertical
7650.0	-63.65	5.67	36.86	-32.46	-25	-7.46	Horizontal
199.3	-51.00	1.55	15.76	-36.79	-25	-11.79	Vertical
292.0	-45.78	1.62	15.44	-31.96	-25	-6.96	Horizontal
Test Results for Mid Channel 2595MHz							
5190.0	-62.45	5.16	35.82	-31.79	-25	-6.79	Horizontal
5190.0	-61.56	5.16	35.82	-30.90	-25	-5.90	Vertical
7785.0	-62.34	5.53	36.85	-31.02	-25	-6.02	Vertical
7785.0	-60.24	5.53	36.85	-28.92	-25	-3.92	Horizontal
177.6	-45.30	1.58	16.84	-30.04	-25	-5.04	Vertical
434.5	-53.00	1.61	17.64	-36.97	-25	-11.97	Horizontal
Test Results for High Channel 2640MHz							
5280.0	-63.22	5.24	35.83	-32.63	-25	-7.63	Horizontal
5280.0	-61.83	5.24	35.83	-31.24	-25	-6.24	Vertical
7920.0	-62.25	5.70	36.88	-31.07	-25	-6.07	Vertical
7920.0	-64.81	5.70	36.88	-33.63	-25	-8.63	Horizontal
184.6	-44.27	1.48	16.84	-28.91	-25	-3.91	Vertical
436.7	-46.97	1.59	17.64	-30.92	-25	-5.92	Horizontal

Note: P<sub>Mea</sub>(dBm)= Power(dBm)+ AR<sub>pl</sub> (dBm)

Over Limit= : P<sub>Mea</sub>(dBm)-Limit(dBm)

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

Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

## 10. FREQUENCY STABILITY

### RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54, §90.213

### LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  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. =  $-30^{\circ}$  to  $+50^{\circ}\text{C}$
- Voltage = low voltage, DC 3.27V, Normal, DC 3.85V and High voltage, DC 4.43V.

### Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to  $-30^{\circ}\text{C}$  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  $+50^{\circ}\text{C}$  is reached.

### Frequency Stability vs Voltage:

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

### MODES TESTED

LTE Band 2/4/5/7/12/17/41

### RESULTS

See the following pages.

10.1 LTE BAND 2

**Band 2 QPSK, (20MHz BANDWIDTH RB size 100 RB Offset 0)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.27	1880	12.7	0.006770	2.5
3.85	1880	13.4	0.007118	2.5
4.43	1880	13.4	0.007132	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	13.0	0.006891	2.5
Extreme (50C)	1880	11.4	0.006076	2.5
Extreme (40C)	1880	14.0	0.007423	2.5
Extreme (30C)	1880	13.3	0.007089	2.5
Extreme (10C)	1880	14.2	0.007545	2.5
Extreme (0C)	1880	12.2	0.006498	2.5
Extreme (-10C)	1880	12.6	0.006685	2.5
Extreme (-20C)	1880	14.0	0.007427	2.5
Extreme (-30C)	1880	15.0	0.007969	2.5

**Band 2 16QAM, (20MHz BANDWIDTH RB size 100 RB Offset 0)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.27	1880	9.9	0.005278	2.5
3.85	1880	9.2	0.004883	2.5
4.43	1880	7.9	0.004185	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.4	0.005012	2.5
Extreme (50C)	1880	9.3	0.004940	2.5
Extreme (40C)	1880	8.4	0.004457436	2.5
Extreme (30C)	1880	8.7	0.004648825	2.5
Extreme (10C)	1880	9.3	0.004924598	2.5
Extreme (0C)	1880	7.9	0.004191775	2.5
Extreme (-10C)	1880	8.5	0.004526302	2.5
Extreme (-20C)	1880	9.1	0.004844876	2.5
Extreme (-30C)	1880	8.0	0.004244256	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

**Band 4 QPSK, (20MHz BANDWIDTH RB size 100 RB Offset 0)**
**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.27	1732.5	8.7	0.005010	2.5
3.85	1732.5	8.7	0.005040	2.5
4.43	1732.5	8.6	0.004965	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.7	0.005038	2.5
Extreme (50C)	1732.5	8.4	0.004853	2.5
Extreme (40C)	1732.5	7.3	0.004228	2.5
Extreme (30C)	1732.5	5.9	0.003383	2.5
Extreme (10C)	1732.5	6.8	0.003949	2.5
Extreme (0C)	1732.5	9.8	0.005640	2.5
Extreme (-10C)	1732.5	7.9	0.004570	2.5
Extreme (-20C)	1732.5	6.5	0.003762	2.5
Extreme (-30C)	1732.5	8.1	0.004663	2.5

**Band 4 16QAM, (20MHz BANDWIDTH RB size 100 RB Offset 0)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.27	1732.5	9.8	0.005647	2.5
3.85	1732.5	9.2	0.005299	2.5
4.43	1732.5	7.6	0.004405	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	9.9	0.005693	2.5
Extreme (50C)	1732.5	9.2	0.005283	2.5
Extreme (40C)	1732.5	7.9	0.004537	2.5
Extreme (30C)	1732.5	8.6	0.004974	2.5
Extreme (10C)	1732.5	8.6	0.004939	2.5
Extreme (0C)	1732.5	8.2	0.004762	2.5
Extreme (-10C)	1732.5	8.6	0.004987	2.5
Extreme (-20C)	1732.5	8.8	0.005091	2.5
Extreme (-30C)	1732.5	7.6	0.004415	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

#### Band 5 QPSK, (10MHz BANDWIDTH RB size 50 RB Offset 0)

##### Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.27	836.5	5.6	0.006701	2.5
3.85	836.5	6.2	0.007454	2.5
4.43	836.5	5.0	0.005983	2.5

##### Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	5.9	0.007004	2.5
Extreme (50C)	836.5	6.1	0.007326	2.5
Extreme (40C)	836.5	5.6	0.006747	2.5
Extreme (30C)	836.5	6.8	0.008118	2.5
Extreme (10C)	836.5	5.2	0.006192	2.5
Extreme (0C)	836.5	5.4	0.006396	2.5
Extreme (-10C)	836.5	5.1	0.006127	2.5
Extreme (-20C)	836.5	5.8	0.006879	2.5
Extreme (-30C)	836.5	6.4	0.007670	2.5

**Band 5 16QAM, (10MHz BANDWIDTH RB size 50 RB Offset 0)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.27	836.5	6.2	0.007354	2.5
3.85	836.5	7.1	0.008490	2.5
4.43	836.5	4.9	0.005822	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.2	0.007463	2.5
Extreme (50C)	836.5	6.1	0.007247	2.5
Extreme (40C)	836.5	5.9	0.007051	2.5
Extreme (30C)	836.5	6.5	0.007817	2.5
Extreme (10C)	836.5	5.3	0.006388	2.5
Extreme (0C)	836.5	4.9	0.005848	2.5
Extreme (-10C)	836.5	5.2	0.006157	2.5
Extreme (-20C)	836.5	5.7	0.006762	2.5
Extreme (-30C)	836.5	6.7	0.008013	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

**Band 7 QPSK, (20MHz BANDWIDTH RB size 100 RB Offset 0)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.27	2535	9.6	0.003807	2.5
3.85	2535	8.6	0.003403	2.5
4.43	2535	8.2	0.003254	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	9.0	0.003570	2.5
Extreme (50C)	2535	8.7	0.003430	2.5
Extreme (40C)	2535	8.5	0.003337	2.5
Extreme (30C)	2535	8.5	0.003364	2.5
Extreme (10C)	2535	8.3	0.003283	2.5
Extreme (0C)	2535	8.5	0.003349	2.5
Extreme (-10C)	2535	9.4	0.003702	2.5
Extreme (-20C)	2535	9.1	0.003603	2.5
Extreme (-30C)	2535	8.4	0.003318	2.5

**Band 7 16QAM, (20MHz BANDWIDTH RB size 100 RB Offset 0)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.27	2535	6.9	0.002722	2.5
3.85	2535	6.0	0.002373	2.5
4.43	2535	6.1	0.002388	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	6.9	0.002722	2.5
Extreme (50C)	2535	5.8	0.002274	2.5
Extreme (40C)	2535	5.1	0.001993	2.5
Extreme (30C)	2535	6.7	0.002646	2.5
Extreme (10C)	2535	5.9	0.002328	2.5
Extreme (0C)	2535	5.4	0.002145	2.5
Extreme (-10C)	2535	5.7	0.002246	2.5
Extreme (-20C)	2535	6.2	0.002441	2.5
Extreme (-30C)	2535	5.9	0.002347	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

**Band 12 QPSK, (10MHz BANDWIDTH RB size 50 RB Offset 0**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.27	707.5	8.5	0.012035	2.5
3.85	707.5	10.4	0.014750	2.5
4.43	707.5	8.7	0.012360	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.3	0.011761	2.5
Extreme (50C)	707.5	7.7	0.010931	2.5
Extreme (40C)	707.5	7.8	0.010987	2.5
Extreme (30C)	707.5	8.4	0.011868	2.5
Extreme (10C)	707.5	7.6	0.010761	2.5
Extreme (0C)	707.5	9.1	0.012907	2.5
Extreme (-10C)	707.5	8.6	0.012205	2.5
Extreme (-20C)	707.5	8.7	0.012240	2.5
Extreme (-30C)	707.5	8.1	0.011512	2.5

**Band 12 16QAM, (10MHz BANDWIDTH RB size 50 RB Offset 0)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.27	707.5	6.9	0.009797	2.5
3.85	707.5	7.9	0.011208	2.5
4.43	707.5	7.7	0.010829	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.7	0.012241	2.5
Extreme (50C)	707.5	8.0	0.011297	2.5
Extreme (40C)	707.5	8.7	0.012329	2.5
Extreme (30C)	707.5	8.1	0.011405	2.5
Extreme (10C)	707.5	8.3	0.011787	2.5
Extreme (0C)	707.5	7.7	0.010867	2.5
Extreme (-10C)	707.5	7.2	0.010171	2.5
Extreme (-20C)	707.5	9.1	0.012919	2.5
Extreme (-30C)	707.5	8.0	0.011238	2.5

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

### 10.6 LTE BAND 17

**Band 17 QPSK, (10MHz BANDWIDTH RB size 50 RB Offset 0)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.27	710.0	9.3	0.013164	2.5
3.85	710.0	8.9	0.012532	2.5
4.43	710.0	8.4	0.011829	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.2	0.012985	2.5
Extreme (50C)	710.0	9.1	0.012815	2.5
Extreme (40C)	710.0	8.4	0.011888	2.5
Extreme (30C)	710.0	9.2	0.013004	2.5
Extreme (10C)	710.0	9.3	0.013147	2.5
Extreme (0C)	710.0	7.7	0.010777	2.5
Extreme (-10C)	710.0	9.0	0.012690	2.5
Extreme (-20C)	710.0	8.8	0.012441	2.5
Extreme (-30C)	710.0	7.8	0.011022	2.5

**Band 17 16QAM, (10MHz BANDWIDTH RB size 50 RB Offset 0)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.27	710.0	9.7	0.013640	2.5
3.85	710.0	8.6	0.012095	2.5
4.43	710.0	8.8	0.012353	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.2	0.012961	2.5
Extreme (50C)	710.0	8.8	0.012331	2.5
Extreme (40C)	710.0	8.1	0.011413	2.5
Extreme (30C)	710.0	9.0	0.012719	2.5
Extreme (10C)	710.0	7.8	0.011022	2.5
Extreme (0C)	710.0	8.1	0.011436	2.5
Extreme (-10C)	710.0	9.3	0.013044	2.5
Extreme (-20C)	710.0	8.6	0.012115	2.5
Extreme (-30C)	710.0	8.1	0.011401	2.5

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

10.7 LTE BAND 41

Band 41 QPSK, (20MHz BANDWIDTH RB size 100 RB Offset 0)

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.27	2593	9.8	0.003796	2.5
3.85	2593	9.0	0.003484	2.5
4.43	2593	8.3	0.003185	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2593	9.0	0.003467	2.5
Extreme (50C)	2593	8.8	0.003400	2.5
Extreme (40C)	2593	8.7	0.003369	2.5
Extreme (30C)	2593	9.2	0.003559	2.5
Extreme (10C)	2593	7.9	0.003042	2.5
Extreme (0C)	2593	8.1	0.003119	2.5
Extreme (-10C)	2593	9.7	0.003729	2.5
Extreme (-20C)	2593	8.9	0.003419	2.5
Extreme (-30C)	2593	8.4	0.003236	2.5

**Band 41 16QAM, (20MHz BANDWIDTH RB size 100 RB Offset 0)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.27	2593	6.9	0.002661	2.5
3.85	2593	6.0	0.002302	2.5
4.43	2593	5.3	0.002055	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2593	6.9	0.002661	2.5
Extreme (50C)	2593	5.7	0.002195	2.5
Extreme (40C)	2593	5.9	0.002265	2.5
Extreme (30C)	2593	6.6	0.002534	2.5
Extreme (10C)	2593	6.1	0.002338	2.5
Extreme (0C)	2593	5.2	0.002012	2.5
Extreme (-10C)	2593	5.3	0.002044	2.5
Extreme (-20C)	2593	6.1	0.002364	2.5
Extreme (-30C)	2593	5.9	0.002277	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.

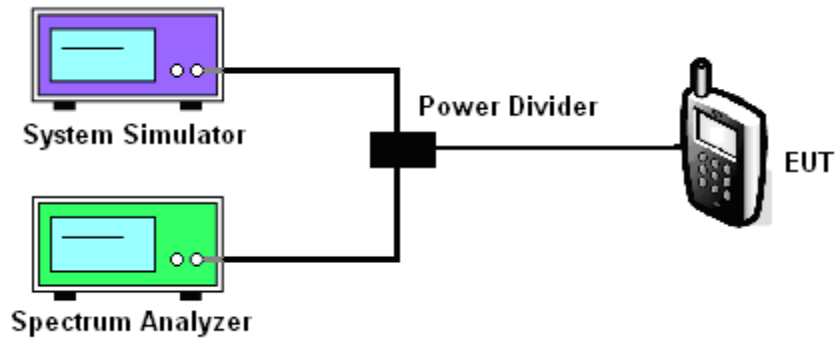
### 11.2 Measuring Instruments

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 LTE 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 Band 2/4/5/7/12/17/41

Test data reference attachment.

----END OF REPORT----