

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

## FCC ID: 2AT9T-3096

**Product:** Mobile Phone  
**Trade Mark:** ulefone  
**Model Number:** GQ3096  
**Family Model:** Power Armor 13, Power Armor 13E, Power  
Armor 13S  
**Report No.:** STR210510003006E

### Prepared for

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### Prepared by

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## TEST RESULT CERTIFICATION

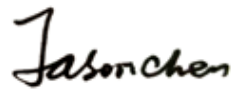
<b>Applicant's name</b> .....	Shenzhen Ulefone Technology Co., Ltd.
Address.....	7 A01, Building A, Block 1, Anhongji Tianyao Plaza, Longhua District, Shenzhen, 518110 China
<b>Manufacturer's Name</b> .....	Shenzhen Ulefone Technology Co., Ltd.
Address.....	7 A01, Building A, Block 1, Anhongji Tianyao Plaza, Longhua District, Shenzhen, 518110 China
Product name.....	Mobile Phone
Model and/or type reference ..	GQ3096
Family Model:	Power Armor 13, Power Armor 13E, Power Armor 13S
<b>Standards</b> .....	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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<b>Date of Test</b> .....	
Date (s) of performance of tests.....	May 10, 2021 ~Jun 07, 2021
Date of Issue .....	Jun 08, 2021
Test Result .....	<b>Pass</b>

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# 1. GENERAL INFORMATION

## 1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Mobile Phone
Trade Mark	ulefone
Model Name	GQ3096
Family Model	Power Armor 13, Power Armor 13E, Power Armor 13S
Model Difference	All models are the same circuit and RF module, except the model name.
FCC ID:	2AT9T-3096
Frequency Bands:	U.S. Bands: <input checked="" type="checkbox"/> LTE FDD Band 2, 4, 5, 7, 12, 17
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;
Type of Modulation:	QPSK/16QAM
Power Class	Class 3
Antenna:	PIFA Antenna
Antenna gain:	Band 2: 0.6dBi, Band 4: 0.6dBi, Band 5: 0.3dBi, Band 7: 0.6dBi, Band 12: 0.2dBi, Band 17: 0.2dBi
Power Supply:	DC 3.85V/13200mAh from battery or DC 5V from Adapter.
Adapter:	Model: HJ-PD33W-US Input: 100-240V~50/60Hz 0.8A Output: 5.0V---3.0A OR 9.0V---3.0A OR 11.0V---3.0A 33.0W
Extreme Vol. Limits:	DC 3.6V to DC 4.4V (Nominal DC 3.85V) (Note 1)
HW Version	S7-02
SW Version	Power Armor 13_TF1_EEA_V01
** Note1: The High Voltage 4.4V and Low Voltage 3.6V 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: 2AT9T-3096** 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
2	Conducted Emission Test	$\pm 1.38$ dB
3	RF power, conducted	$\pm 0.16$ dB
4	Spurious emissions, conducted	$\pm 0.21$ dB
5	All emissions, radiated(<1G)	$\pm 4.68$ dB
6	All emissions, radiated(>1G)	$\pm 4.89$ dB
7	Temperature	$\pm 0.5$ °C
8	Humidity	$\pm 2$ %
9	Frequency error, conducted	$\pm 0.19$ ppm

### 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, Band 17

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.

### 1.6 SUMMARY OF TEST RESULTS

FCC Part22, Subpart H/ FCC Part24, Subpart E, FCC Part27, Subpart L, KDB 971168 D01 Power Meas License Digital Systems v03			
FCC Rule	Test Item	Verdict	Remark
2.1046	Conducted Output Power	PASS	
22.913(d) 24.232(d) 27.50(d)(5) KDB 971168 D01 Clause 5.7	Peak-to-Average Ratio	PASS	
2.1049 22.917(b) 24.238(b) KDB 971168 D01 Clause 4.2	Occupied Bandwidth	PASS	
2.1051 22.917(a) 24.238(a) 27.53(c), (g), (h) KDB 971168 D01 Clause 6	Band Edge	PASS	
22.913(a)(2) 27.50(b)(10), (c)(10) KDB 971168 D01 Clause 5.6	Effective Radiated Power	PASS	
24.232(c) 27.50(h)(2), (d)(4) KDB 971168 D01 Clause 5.6	Equivalent Isotropic Radiated Power	PASS	



2.1053 22.917(a) 24.238(a) 27.53(c)(g)(h)(m) KDB 971168 D01 Clause 7	Field Strength of Spurious Radiation	PASS	
2.1055 22.355 24.235 27.54 KDB 971168 D01 Clause 9	Frequency Stability for Temperature & Voltage	PASS	
2.1051 22.917(a) 24.238(a) 27.53(c)(g)(h)(m) KDB 971168 D01 Clause 6	Conducted Emission	PASS	
Remark: 1. "N/A" denotes test is not applicable in this Test Report. 2. All test items were verified and recorded according to the standards and without any deviation during the test. 3. No modifications are made to the EUT during all test items.			

## 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

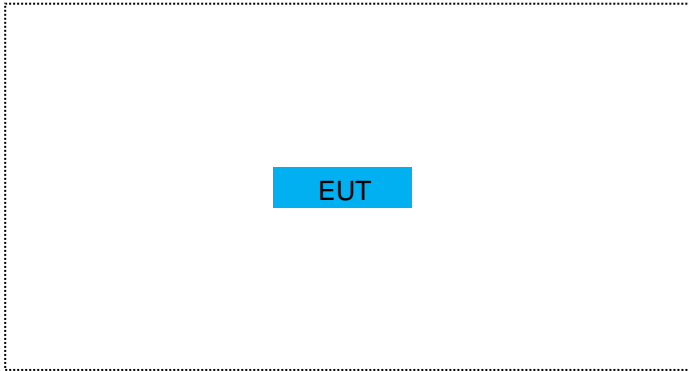
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Mobile Phone	GQ3096	FCC ID: 2AT9T-3096	EUT

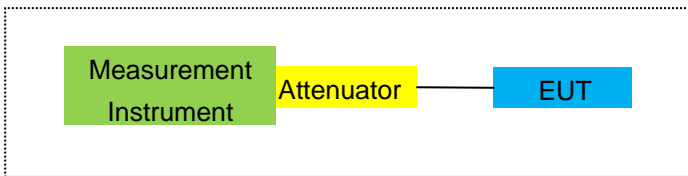
*Note: All the accessories have been used during the test.  
the following "EUT" in setup diagram means EUT system.*

## 2.4 TEST SETUP

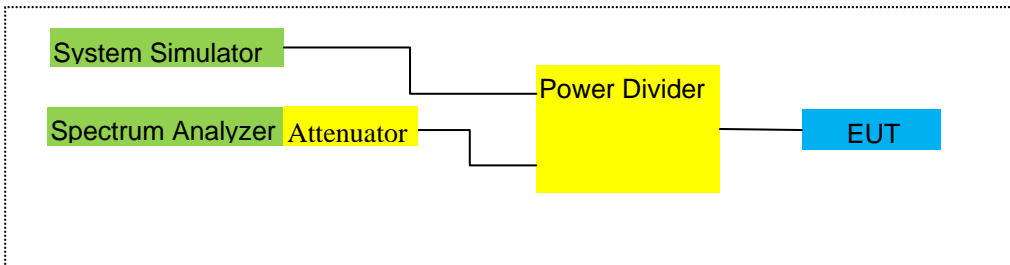
For Radiated Test Cases



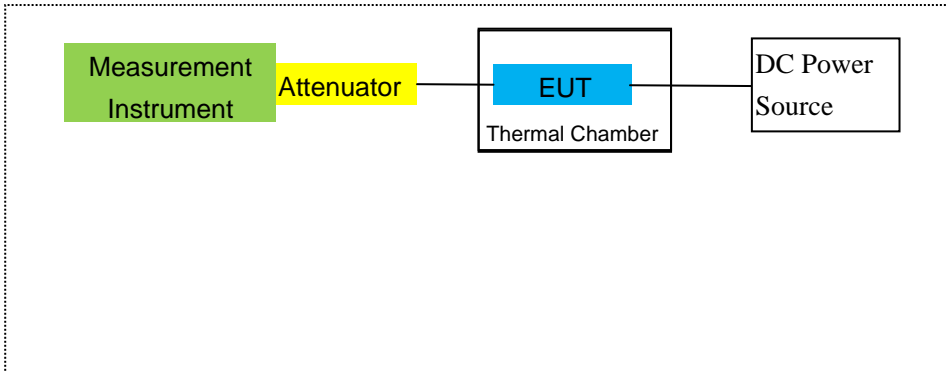
For Conducted Output Power



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	2020.07.13	2021.07.12	1 year
2	Test Receiver	R&S	ESPI	101318	2021.04.27	2022.04.26	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2021.03.29	2022.03.28	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	2021.03.29	2022.03.28	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2020.11.20	2021.11.19	1 year
7	Amplifier	EM	EM-30180	060538	2020.07.13	2021.07.12	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2021.04.27	2022.04.26	1 year
9	Power Meter	R&S	NRVS	100696	2020.07.13	2021.07.12	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2021.04.27	2022.04.26	1 year
11	Test Cable	N/A	R-01	N/A	2019.08.06	2022.08.05	3 year
12	Test Cable	N/A	R-02	N/A	2019.08.06	2022.08.05	3 year
13	Test Cable	N/A	R-03	N/A	2019.06.28	2022.06.27	3 year
14	Test Receiver	R&S	ESCI	101160	2021.04.27	2022.04.26	1 year
15	LISN	R&S	ENV216	101313	2021.04.27	2022.04.26	1 year
16	LISN	EMCO	3816/2	00042990	2021.04.27	2022.04.26	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2021.04.27	2022.04.26	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2021.04.27	2022.04.26	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	2020.05.11	2021.05.10	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2021.04.27	2022.04.26	1 year
24	test receiver	R&S	ESCI	a0304218	2021.04.27	2022.04.26	1 year
25	Communication Tester	R&S	CMU200	A0304247	2020.07.13	2021.07.12	1 year
26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2021.04.27	2022.04.26	1 year

27	DC Power Source	N/A	PS-6005D	2017040292 3	2020.05.11	2023.05.10	3 year
28	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2020.07.13	2021.07.12	1 year
29	Communication Tester	R&S	CMW500	148500	2020.05.11	2021.05.10	1 year
30	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2020.07.13	2021.07.12	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

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 17

### RESULTS

**PASS**

Test data reference attachment.



## 6. BANDEDGE AND EMISSION MASK

### RULE PART(S)

FCC: §2.1051, §22.917(a), §24.238(a), §27.53(c)(g)(h)(m)

FCC: §2.1046, §22.913, §24.232

### LIMITS

The minimum permissible attenuation level of any spurious emission is  $43 + \log_{10}(P[\text{Watts}])$ , where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 7 is as following.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is  $65 + 10\log_{10}(P) = -35\text{dBm}$  in a 6.25kHz bandwidth.

Per 27.53(m) for operations in the BRS/EBS bands, 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.

### 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 display line

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

### MODES TESTED

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

### RESULTS

Test data reference attachment.

## 7. OUT OF BAND EMISSIONS

### RULE PART(S)

FCC: §2.1051, §22.917(a), §24.238(a), §27.53(c)(g)(h)(m)

### LIMITS

The minimum permissible attenuation level of any spurious emission is  $43 + \log_{10}(P[\text{Watts}])$ , where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 7 is as following.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is  $65 + 10\log_{10}(P) = -35\text{dBm}$  in a 6.25kHz bandwidth.

Per 27.53(m) for operations in the BRS/EBS bands, 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.

### 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
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

### MODES TESTED

- LTE Band2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 17

### 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(a)(2), §24.232(c) and §27.50 (h)(2), (b)(10), (c)(10), (d)(4)

#### LIMITS:

22.913(a) (2)- The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.  
24.232 (c) Mobile and portable stations are limited to 2 watts EIRP.  
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 in the 2500–2570 MHz and 2620–2690 MHz bands. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

#### 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 Band2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 17

#### 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)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP		
							Average (mW)		
1.4MHz Band QPSK	1/#Mid	1850.7	-2.04	3.76	28.24	22.44	175.388	Horizontal	Pass
		1880	-1.12	3.91	28.22	23.19	208.449	Horizontal	Pass
		1909.3	-1.90	3.93	28.20	22.37	172.584	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-1.13	3.77	28.23	23.33	215.278	Horizontal	Pass
		1880	-1.14	3.91	28.24	23.19	208.449	Horizontal	Pass
		1908.5	-1.29	3.94	28.25	23.02	200.447	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-2.21	3.77	28.31	22.33	171.002	Horizontal	Pass
		1880	-1.57	3.91	28.22	22.74	187.932	Horizontal	Pass
		1907.5	-0.97	3.94	28.20	23.29	213.304	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-1.31	3.79	28.33	23.23	210.378	Horizontal	Pass
		1880	-1.43	3.95	28.22	22.84	192.309	Horizontal	Pass
		1905	-0.75	3.97	28.19	23.47	222.331	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-2.27	3.79	28.34	22.28	169.044	Horizontal	Pass
		1880	-0.78	3.95	28.22	23.49	223.357	Horizontal	Pass
		1902.5	-0.60	3.97	28.18	23.61	229.615	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-0.97	3.81	28.35	23.57	227.510	Horizontal	Pass
		1880	-1.88	3.96	28.22	22.38	172.982	Horizontal	Pass
		1900	-1.03	4.00	28.16	23.13	205.589	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-1.29	3.76	28.24	23.19	208.449	Vertical	Pass
		1880	-0.56	3.91	28.22	23.75	237.137	Vertical	Pass
		1909.3	-1.33	3.93	28.20	22.94	196.789	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-1.99	3.77	28.23	22.47	176.604	Vertical	Pass
		1880	-1.33	3.91	28.24	23.00	199.526	Vertical	Pass
		1908.5	-0.67	3.94	28.25	23.64	231.206	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-0.76	3.77	28.31	23.78	238.781	Vertical	Pass
		1880	-0.44	3.91	28.22	23.87	243.781	Vertical	Pass
		1907.5	-0.78	3.94	28.20	23.48	222.844	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	-1.60	3.79	28.33	22.94	196.789	Vertical	Pass
		1880	-1.80	3.95	28.22	22.47	176.604	Vertical	Pass

QPSK		1905	-2.53	3.97	28.19	21.69	147.571	Vertical	Pass
15.0MH z Band QPSK	1/#Mid	1857.5	-2.39	3.79	28.34	22.16	164.437	Vertical	Pass
		1880	-1.11	3.95	28.22	23.16	207.014	Vertical	Pass
		1902.5	-1.73	3.97	28.18	22.48	177.011	Vertical	Pass
20.0MH z Band QPSK	1/#Mid	1860	-2.07	3.81	28.35	22.47	176.604	Vertical	Pass
		1880	-2.04	3.96	28.22	22.22	166.725	Vertical	Pass
		1900	-0.10	4.00	28.16	<b>24.06</b>	254.683	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					Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP		
							Average (mW)		
1.4MHz Band 16 QAM	1/#Mid	1850.7	-2.44	3.76	28.24	22.04	159.956	Horizontal	Pass
		1880	-2.21	3.91	28.22	22.10	162.181	Horizontal	Pass
		1909.3	-1.94	3.93	28.20	22.33	171.002	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-2.63	3.77	28.23	21.83	152.405	Horizontal	Pass
		1880	-1.06	3.91	28.24	23.27	212.324	Horizontal	Pass
		1908.5	-2.24	3.94	28.25	22.07	161.065	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-2.66	3.77	28.31	21.88	154.170	Horizontal	Pass
		1880	-1.45	3.91	28.22	22.86	193.197	Horizontal	Pass
		1907.5	-1.90	3.94	28.20	22.36	172.187	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-1.62	3.79	28.33	22.92	195.884	Horizontal	Pass
		1880	-2.22	3.95	28.22	22.05	160.325	Horizontal	Pass
		1905	-1.59	3.97	28.19	22.63	183.231	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-1.81	3.79	28.34	22.74	187.932	Horizontal	Pass
		1880	-1.22	3.95	28.22	23.05	201.837	Horizontal	Pass
		1902.5	-1.44	3.97	28.18	22.77	189.234	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-1.50	3.81	28.35	23.04	201.372	Horizontal	Pass
		1880	-1.68	3.96	28.22	22.58	181.134	Horizontal	Pass
		1900	-1.99	4.00	28.16	22.17	164.816	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-1.84	3.76	28.24	22.64	183.654	Vertical	Pass
		1880	-1.95	3.91	28.22	22.36	172.187	Vertical	Pass
		1909.3	-1.90	3.93	28.20	22.37	172.584	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-1.53	3.77	28.23	22.93	196.336	Vertical	Pass
		1880	-1.32	3.91	28.24	23.01	199.986	Vertical	Pass
		1908.5	-2.12	3.94	28.25	22.19	165.577	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-2.02	3.77	28.31	22.52	178.649	Vertical	Pass
		1880	-1.73	3.91	28.22	22.58	181.134	Vertical	Pass
		1907.5	-1.70	3.94	28.20	22.56	180.302	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-2.26	3.79	28.33	22.28	169.044	Vertical	Pass
		1880	-2.32	3.95	28.22	21.95	156.675	Vertical	Pass
		1905	-2.32	3.97	28.19	21.90	154.882	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-2.02	3.79	28.34	22.53	179.061	Vertical	Pass
		1880	-2.95	3.95	28.22	21.32	135.519	Vertical	Pass
		1902.5	-2.00	3.97	28.18	22.21	166.341	Vertical	Pass

20.0MHz		1860	-1.96	3.81	28.35	22.58	181.134	Vertical	Pass
Band 16	1/#Mid	1880	-0.82	3.96	28.22	<b>23.44</b>	220.800	Vertical	Pass
QAM		1900	-1.68	4.00	28.16	22.48	177.011	Vertical	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	Max. EIRP	Polarization Of Max. ERP	
						Average (dBm)	Average (mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-1.49	3.12	27.58	22.97	198.153	Horizontal	Pass
		1732.5	-1.27	3.27	27.61	23.07	202.768	Horizontal	Pass
		1754.3	-1.65	3.29	27.63	22.69	185.780	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-2.65	3.13	27.61	21.83	152.405	Horizontal	Pass
		1732.5	-2.74	3.27	27.61	21.60	144.544	Horizontal	Pass
		1753.5	-2.75	3.30	27.62	21.57	143.549	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.09	3.13	27.63	22.41	174.181	Horizontal	Pass
		1732.5	-3.11	3.27	27.61	21.23	132.739	Horizontal	Pass
		1752.5	-1.18	3.30	27.60	23.12	205.116	Horizontal	Pass
10.0MHz z Band QPSK	1/#Mid	1715	-1.82	3.15	27.64	22.67	184.927	Horizontal	Pass
		1732.5	-1.27	3.31	27.61	23.03	200.909	Horizontal	Pass
		1750	-0.94	3.33	27.59	23.32	214.783	Horizontal	Pass
15.0MHz z Band QPSK	1/#Mid	1717.5	-2.12	3.15	27.65	22.38	172.982	Horizontal	Pass
		1732.5	-1.29	3.31	27.61	23.01	199.986	Horizontal	Pass
		1747.5	-1.38	3.33	27.57	22.86	193.197	Horizontal	Pass
20.0MHz z Band QPSK	1/#Mid	1720	-2.44	3.17	27.66	22.05	160.325	Horizontal	Pass
		1732.5	-1.21	3.32	27.61	23.08	203.236	Horizontal	Pass
		1745	-1.39	3.36	27.56	22.81	190.985	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-1.18	3.12	27.58	23.28	212.814	Vertical	Pass
		1732.5	-1.98	3.27	27.61	22.36	172.187	Vertical	Pass
		1754.3	-2.54	3.29	27.63	21.80	151.356	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-1.01	3.13	27.61	23.47	222.331	Vertical	Pass
		1732.5	-0.75	3.27	27.61	23.59	228.560	Vertical	Pass
		1753.5	-1.19	3.30	27.62	23.13	205.589	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.59	3.13	27.63	21.91	155.239	Vertical	Pass
		1732.5	-1.91	3.27	27.61	22.43	174.985	Vertical	Pass
		1752.5	-2.47	3.30	27.60	21.83	152.405	Vertical	Pass
10.0MHz z Band	1/#Mid	1715	-2.36	3.15	27.64	22.13	163.305	Vertical	Pass
		1732.5	-2.32	3.31	27.61	21.98	157.761	Vertical	Pass

QPSK		1750	-1.27	3.33	27.59	22.99	199.067	Vertical	Pass
15.0MH	1/#Mid	1717.5	-2.13	3.15	27.65	22.37	172.584	Vertical	Pass
z Band		1732.5	-1.75	3.31	27.61	22.55	179.887	Vertical	Pass
QPSK		1747.5	-2.27	3.33	27.57	21.97	157.398	Vertical	Pass
20.0MH	1/#Mid	1720	-1.82	3.17	27.66	22.67	184.927	Vertical	Pass
z Band		1732.5	-0.59	3.32	27.61	<b>23.70</b>	234.423	Vertical	Pass
QPSK		1745	-1.00	3.36	27.56	23.20	208.930	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						Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP	Max. EIRP			
			(dBm)			Average (dBm)	Average (mW)			
1.4MHz Band 16 QAM	1/#Mid	1710.7	-2.48	3.12	27.58	21.98	157.761	Horizontal	Pass	
		1732.5	-1.31	3.27	27.61	23.03	200.909	Horizontal	Pass	
		1754.3	-2.70	3.29	27.63	21.64	145.881	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.70	3.13	27.61	21.78	150.661	Horizontal	Pass	
		1732.5	-3.79	3.27	27.61	20.55	113.501	Horizontal	Pass	
		1753.5	-2.37	3.30	27.62	21.95	156.675	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.36	3.13	27.63	22.14	163.682	Horizontal	Pass	
		1732.5	-2.72	3.27	27.61	21.62	145.211	Horizontal	Pass	
		1752.5	-1.97	3.30	27.60	22.33	171.002	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	1715	-2.43	3.15	27.64	22.06	160.694	Horizontal	Pass	
		1732.5	-2.50	3.31	27.61	21.80	151.356	Horizontal	Pass	
		1750	-2.87	3.33	27.59	21.39	137.721	Horizontal	Pass	
15.0MHz Band 16 QAM	1/#Mid	1717.5	-2.78	3.15	27.65	21.72	148.594	Horizontal	Pass	
		1732.5	-1.39	3.31	27.61	22.91	195.434	Horizontal	Pass	
		1747.5	-2.27	3.33	27.57	21.97	157.398	Horizontal	Pass	
20.0MHz Band 16 QAM	1/#Mid	1720	-1.66	3.17	27.66	22.83	191.867	Horizontal	Pass	
		1732.5	-1.72	3.32	27.61	22.57	180.717	Horizontal	Pass	
		1745	-2.35	3.36	27.56	21.85	153.109	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	1710.7	-2.20	3.12	27.58	22.26	168.267	Vertical	Pass	
		1732.5	-2.04	3.27	27.61	22.30	169.824	Vertical	Pass	
		1754.3	-2.41	3.29	27.63	21.93	155.955	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.49	3.13	27.61	21.99	158.125	Vertical	Pass	
		1732.5	-3.70	3.27	27.61	20.64	115.878	Vertical	Pass	
		1753.5	-2.89	3.30	27.62	21.43	138.995	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.61	3.13	27.63	21.89	154.525	Vertical	Pass	
		1732.5	-2.28	3.27	27.61	22.06	160.694	Vertical	Pass	
		1752.5	-2.63	3.30	27.60	21.67	146.893	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	1715	-2.32	3.15	27.64	22.17	164.816	Vertical	Pass	
		1732.5	-2.55	3.31	27.61	21.75	149.624	Vertical	Pass	
		1750	-1.65	3.33	27.59	22.61	182.390	Vertical	Pass	
15.0MHz Band 16 QAM	1/#Mid	1717.5	-2.06	3.15	27.65	22.44	175.388	Vertical	Pass	
		1732.5	-2.61	3.31	27.61	21.69	147.571	Vertical	Pass	
		1747.5	-1.84	3.33	27.57	22.40	173.780	Vertical	Pass	

20.0MHz		1720	-1.89	3.17	27.66	22.60	181.970	Vertical	Pass
Band 16	1/#Mid	1732.5	-1.22	3.32	27.61	<b>23.07</b>	202.768	Vertical	Pass
QAM		1745	-1.51	3.36	27.56	22.69	185.780	Vertical	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							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss (dBm)	Antenna Gain (dB)	Correction	Max. EIRP	Max. EIRP			
			(dBm)			(dB)	Average	Average			
						(dBm)	(dBm)	(mW)			
1.4MHz Band QPSK	1/#Mid	824.7	6.09	2.01	19.68	2.15	21.61	144.877	Horizontal	Pass	
		836.5	5.94	2.01	19.77	2.15	21.55	142.889	Horizontal	Pass	
		848.3	5.89	2.02	19.82	2.15	21.54	142.561	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	6.87	2.01	19.70	2.15	22.41	174.181	Horizontal	Pass	
		836.5	6.64	2.01	19.77	2.15	22.25	167.880	Horizontal	Pass	
		847.5	7.09	2.02	19.81	2.15	22.73	187.499	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	6.90	2.01	19.71	2.15	22.45	175.792	Horizontal	Pass	
		836.5	6.12	2.01	19.77	2.15	21.73	148.936	Horizontal	Pass	
		846.5	6.60	2.02	19.79	2.15	22.22	166.725	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	829	6.21	2.01	19.73	2.15	21.78	150.661	Horizontal	Pass	
		836.5	7.20	2.01	19.77	2.15	22.81	190.985	Horizontal	Pass	
		844	5.91	2.02	19.78	2.15	21.52	141.906	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	824.7	7.40	2.01	19.68	2.15	22.92	195.884	Vertical	Pass	
		836.5	6.74	2.01	19.77	2.15	22.35	171.791	Vertical	Pass	
		848.3	6.05	2.02	19.82	2.15	21.70	147.911	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	5.80	2.01	19.70	2.15	21.34	136.144	Vertical	Pass	
		836.5	6.83	2.01	19.77	2.15	22.44	175.388	Vertical	Pass	
		847.5	6.62	2.02	19.81	2.15	22.26	168.267	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	6.55	2.01	19.71	2.15	22.10	162.181	Vertical	Pass	
		836.5	5.34	2.01	19.77	2.15	20.95	124.451	Vertical	Pass	
		846.5	7.31	2.02	19.79	2.15	22.93	196.336	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	829	7.05	2.01	19.73	2.15	22.62	182.810	Vertical	Pass	
		836.5	7.40	2.01	19.77	2.15	<b>23.01</b>	199.986	Vertical	Pass	
		844	5.96	2.02	19.78	2.15	21.57	143.549	Vertical	Pass	

Radiated Power (ERP) for Band 5											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP	Max. EIRP			
			(dBm)				Average	Average			
							(dBm)	(mW)			
1.4MHz Band 16 QAM	1/#Mid	824.7	5.80	2.01	19.68	2.15	21.32	135.519	Horizontal	Pass	
		836.5	5.46	2.01	19.77	2.15	21.07	127.938	Horizontal	Pass	
		848.3	5.24	2.02	19.82	2.15	20.89	122.744	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	5.27	2.01	19.70	2.15	20.81	120.504	Horizontal	Pass	
		836.5	5.58	2.01	19.77	2.15	21.19	131.522	Horizontal	Pass	
		847.5	5.57	2.02	19.81	2.15	21.21	132.130	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	5.46	2.01	19.71	2.15	21.01	126.183	Horizontal	Pass	
		836.5	5.09	2.01	19.77	2.15	20.70	117.490	Horizontal	Pass	
		846.5	5.69	2.02	19.79	2.15	21.31	135.207	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	829	5.31	2.01	19.73	2.15	20.88	122.462	Horizontal	Pass	
		836.5	5.12	2.01	19.77	2.15	20.73	118.304	Horizontal	Pass	
		844	4.79	2.02	19.78	2.15	20.40	109.648	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	824.7	5.58	2.01	19.68	2.15	21.10	128.825	Vertical	Pass	
		836.5	4.62	2.01	19.77	2.15	20.23	105.439	Vertical	Pass	
		848.3	4.85	2.02	19.82	2.15	20.50	112.202	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	4.93	2.01	19.70	2.15	20.47	111.429	Vertical	Pass	
		836.5	5.17	2.01	19.77	2.15	20.78	119.674	Vertical	Pass	
		847.5	4.84	2.02	19.81	2.15	20.48	111.686	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	4.66	2.01	19.71	2.15	20.21	104.954	Vertical	Pass	
		836.5	5.54	2.01	19.77	2.15	21.15	130.317	Vertical	Pass	
		846.5	5.64	2.02	19.79	2.15	21.26	133.660	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	829	5.27	2.01	19.73	2.15	20.84	121.339	Vertical	Pass	
		836.5	5.76	2.01	19.77	2.15	<b>21.37</b>	137.088	Vertical	Pass	
		844	5.23	2.02	19.78	2.15	20.84	121.339	Vertical	Pass	

Note:

ERP=EIRP-2.15

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	Max. EIRP	Polarization Of Max. ERP	
						Average (dBm)	Average (mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	0.78	4.54	27.75	23.99	250.611	Horizontal	Pass
		2535	1.17	4.69	27.72	24.20	263.027	Horizontal	Pass
		2567.5	1.45	4.71	27.71	24.45	278.612	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	0.67	4.55	27.76	23.88	244.343	Horizontal	Pass
		2535	-0.28	4.69	27.72	22.75	188.365	Horizontal	Pass
		2565	0.15	4.72	27.70	23.13	205.589	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	1.06	4.55	27.77	24.28	267.917	Horizontal	Pass
		2535	0.99	4.69	27.72	24.02	252.348	Horizontal	Pass
		2562.5	0.29	4.72	27.69	23.26	211.836	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	0.37	4.57	27.78	23.58	228.034	Horizontal	Pass
		2535	0.09	4.73	27.72	23.08	203.236	Horizontal	Pass
		2560	1.49	4.75	27.68	24.42	276.694	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	0.50	4.54	27.75	23.71	234.963	Vertical	Pass
		2535	0.34	4.69	27.72	23.37	217.270	Vertical	Pass
		2567.5	-0.03	4.71	27.71	22.97	198.153	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	0.62	4.55	27.76	23.83	241.546	Vertical	Pass
		2535	0.72	4.69	27.72	23.75	237.137	Vertical	Pass
		2565	-0.29	4.72	27.70	22.69	185.780	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	0.87	4.55	27.77	24.09	256.448	Vertical	Pass
		2535	0.25	4.69	27.72	23.28	212.814	Vertical	Pass
		2562.5	0.85	4.72	27.69	23.82	240.991	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	1.24	4.57	27.78	24.45	278.612	Vertical	Pass
		2535	1.04	4.73	27.72	24.03	252.930	Vertical	Pass
		2560	1.61	4.75	27.68	<b>24.54</b>	284.446	Vertical	Pass

Radiated Power (EIRP) for Band 7										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP	Max. EIRP			
			(dBm)			Average (dBm)	Average (mW)			
5.0MHz Band 16 QAM	1/#Mid	2502.5	-0.94	4.54	27.75	22.27	168.655	Horizontal	Pass	
		2535	-0.51	4.69	27.72	22.52	178.649	Horizontal	Pass	
		2567.5	0.03	4.71	27.71	23.03	200.909	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	2505	0.28	4.55	27.76	23.49	223.357	Horizontal	Pass	
		2535	-0.25	4.69	27.72	22.78	189.671	Horizontal	Pass	
		2565	0.05	4.72	27.70	23.03	200.909	Horizontal	Pass	
15.0MHz Band 16 QAM	1/#Mid	2507.5	-0.12	4.55	27.77	23.10	204.174	Horizontal	Pass	
		2535	-0.23	4.69	27.72	22.80	190.546	Horizontal	Pass	
		2562.5	0.16	4.72	27.69	23.13	205.589	Horizontal	Pass	
20.0MHz Band 16 QAM	1/#Mid	2510	0.09	4.57	27.78	23.30	213.796	Horizontal	Pass	
		2535	0.28	4.73	27.72	23.27	212.324	Horizontal	Pass	
		2560	-0.88	4.75	27.68	22.05	160.325	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	2502.5	-0.61	4.54	27.75	22.60	181.970	Vertical	Pass	
		2535	-0.25	4.69	27.72	22.78	189.671	Vertical	Pass	
		2567.5	-0.47	4.71	27.71	22.53	179.061	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	2505	-0.54	4.55	27.76	22.67	184.927	Vertical	Pass	
		2535	-0.99	4.69	27.72	22.04	159.956	Vertical	Pass	
		2565	0.21	4.72	27.70	23.19	208.449	Vertical	Pass	
15.0MHz Band 16 QAM	1/#Mid	2507.5	0.12	4.55	27.77	23.34	215.774	Vertical	Pass	
		2535	0.27	4.69	27.72	23.30	213.796	Vertical	Pass	
		2562.5	-0.04	4.72	27.69	22.93	196.336	Vertical	Pass	
20.0MHz Band 16 QAM	1/#Mid	2510	0.33	4.57	27.78	<b>23.54</b>	225.944	Vertical	Pass	
		2535	0.13	4.73	27.72	23.12	205.116	Vertical	Pass	
		2560	-0.09	4.75	27.68	22.84	192.309	Vertical	Pass	

Note:

SG Level= Signal generator output

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



8.5 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	7.00	1.91	19.21	2.15	22.15	164.059	Vertical	Pass	
		707.5	6.44	1.91	19.26	2.15	21.64	145.881	Vertical	Pass	
		715.3	5.62	1.93	19.34	2.15	20.88	122.462	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	6.90	1.91	19.21	2.15	22.05	160.325	Vertical	Pass	
		707.5	6.29	1.91	19.26	2.15	21.49	140.929	Vertical	Pass	
		714.5	5.65	1.93	19.34	2.15	20.91	123.310	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	6.21	1.91	19.23	2.15	21.38	137.404	Vertical	Pass	
		707.5	6.83	1.91	19.26	2.15	22.03	159.588	Vertical	Pass	
		713.5	5.94	1.92	19.33	2.15	21.20	131.826	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	704	6.67	1.91	19.25	2.15	21.86	153.462	Vertical	Pass	
		707.5	6.80	1.91	19.26	2.15	22.00	158.489	Vertical	Pass	
		711	6.63	1.92	19.32	2.15	21.88	154.170	Vertical	Pass	
1.4MHz Band QPSK	1/#Mid	699.7	6.58	1.91	19.21	2.15	21.73	148.936	Horizontal	Pass	
		707.5	6.09	1.91	19.26	2.15	21.29	134.586	Horizontal	Pass	
		715.3	6.37	1.93	19.34	2.15	21.63	145.546	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	6.30	1.91	19.21	2.15	21.45	139.637	Horizontal	Pass	
		707.5	6.25	1.91	19.26	2.15	21.45	139.637	Horizontal	Pass	
		714.5	6.52	1.93	19.34	2.15	21.78	150.661	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	6.79	1.91	19.23	2.15	21.96	157.036	Horizontal	Pass	
		707.5	6.86	1.91	19.26	2.15	22.06	160.694	Horizontal	Pass	
		713.5	6.87	1.92	19.33	2.15	22.13	163.305	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	704	7.04	1.91	19.25	2.15	<b>22.23</b>	167.109	Horizontal	Pass	
		707.5	5.59	1.91	19.26	2.15	20.79	119.950	Horizontal	Pass	
		711	6.08	1.92	19.32	2.15	21.33	135.831	Horizontal	Pass	

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 (dB)	Max. EIRP	Max. EIRP			
			(dBm)				Average	Average			
							(dBm)	(mW)			
1.4MHz Band 16 QAM	1/#Mid	699.7	5.60	1.91	19.21	2.15	20.75	118.850	Vertical	Pass	
		707.5	5.18	1.91	19.26	2.15	20.38	109.144	Vertical	Pass	
		715.3	4.31	1.93	19.34	2.15	19.57	90.573	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	700.5	5.56	1.91	19.21	2.15	20.71	117.761	Vertical	Pass	
		707.5	5.63	1.91	19.26	2.15	20.83	121.060	Vertical	Pass	
		714.5	5.28	1.93	19.34	2.15	20.54	113.240	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	701.5	5.68	1.91	19.23	2.15	20.85	121.619	Vertical	Pass	
		707.5	5.47	1.91	19.26	2.15	20.67	116.681	Vertical	Pass	
		713.5	5.35	1.92	19.33	2.15	20.61	115.080	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	704	6.01	1.91	19.25	2.15	21.20	131.826	Vertical	Pass	
		707.5	5.52	1.91	19.26	2.15	20.72	118.032	Vertical	Pass	
		711	6.22	1.92	19.32	2.15	<b>21.47</b>	140.281	Vertical	Pass	
1.4MHz Band 16 QAM	1/#Mid	699.7	5.38	1.91	19.21	2.15	20.53	112.980	Horizontal	Pass	
		707.5	5.86	1.91	19.26	2.15	21.06	127.644	Horizontal	Pass	
		715.3	5.53	1.93	19.34	2.15	20.79	119.950	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	700.5	5.88	1.91	19.21	2.15	21.03	126.765	Horizontal	Pass	
		707.5	5.82	1.91	19.26	2.15	21.02	126.474	Horizontal	Pass	
		714.5	5.92	1.93	19.34	2.15	21.18	131.220	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	701.5	5.72	1.91	19.23	2.15	20.89	122.744	Horizontal	Pass	
		707.5	5.70	1.91	19.26	2.15	20.90	123.027	Horizontal	Pass	
		713.5	4.96	1.92	19.33	2.15	20.22	105.196	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	704	5.39	1.91	19.25	2.15	20.58	114.288	Horizontal	Pass	
		707.5	6.24	1.91	19.26	2.15	21.44	139.316	Horizontal	Pass	
		711	5.77	1.92	19.32	2.15	21.02	126.474	Horizontal	Pass	

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

8.6 LTE BAND 17

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)				Average	Average		
				(dBm)	(dB)	(dB)	(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	706.5	5.63	1.91	19.23	2.15	20.80	120.226	Vertical	Pass
		710	6.24	1.91	19.26	2.15	21.44	139.316	Vertical	Pass
		713.5	6.58	1.92	19.33	2.15	21.84	152.757	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	709	4.84	1.91	19.25	2.15	20.03	100.693	Vertical	Pass
		710	6.18	1.91	19.26	2.15	21.38	137.404	Vertical	Pass
		711	7.10	1.92	19.32	2.15	<b>22.35</b>	171.791	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	706.5	6.23	1.91	19.23	2.15	21.40	138.038	Horizontal	Pass
		710	6.96	1.91	19.26	2.15	22.16	164.437	Horizontal	Pass
		713.5	5.99	1.92	19.33	2.15	21.25	133.352	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	709	6.64	1.91	19.25	2.15	21.83	152.405	Horizontal	Pass
		710	6.71	1.91	19.26	2.15	21.91	155.239	Horizontal	Pass
		711	6.77	1.92	19.32	2.15	22.02	159.221	Horizontal	Pass

Radiated Power (ERP) for Band 17											
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)				Average	Average			
						(dB)	(dBm)	(mW)			
5.0MHz Band 16 QAM	1/#Mid	706.5	5.88	1.91	19.23	2.15	21.05	127.350	Vertical	Pass	
		710	6.40	1.91	19.26	2.15	21.60	144.544	Vertical	Pass	
		713.5	5.87	1.92	19.33	2.15	21.13	129.718	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	709	5.76	1.91	19.25	2.15	20.95	124.451	Vertical	Pass	
		710	4.94	1.91	19.26	2.15	20.14	103.276	Vertical	Pass	
		711	6.03	1.92	19.32	2.15	21.28	134.276	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	706.5	4.90	1.91	19.23	2.15	20.07	101.625	Horizontal	Pass	
		710	5.94	1.91	19.26	2.15	21.14	130.017	Horizontal	Pass	
		713.5	5.51	1.92	19.33	2.15	20.77	119.399	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	709	5.47	1.91	19.25	2.15	20.66	116.413	Horizontal	Pass	
		710	6.47	1.91	19.26	2.15	<b>21.67</b>	146.893	Horizontal	Pass	
		711	6.01	1.92	19.32	2.15	21.26	133.660	Horizontal	Pass	

Note:

ERP=EIRP-2.15

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: §2.1051, §22.917(a), §24.238(a), §27.53(c)(g)(h)(m)

### LIMIT

For Band 7, the minimum permissible attenuation level of any spurious emission is  $55 + \log_{10}(P)$  [Watts].

The minimum permissible attenuation level of any spurious emission is  $43 + \log_{10}(P)$  [Watts], where P is the transmitter power in Watts.

### 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  
LTE Band 4
- LTE Band 5  
LTE Band 7  
LTE Band 12  
LTE Band 17

**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	-45.52	4.04	33.51	-16.05	-13	-3.05	Horizontal
3701.4	-47.79	4.04	33.51	-18.32	-13	-5.32	Vertical
5552.1	-53.48	5.24	35.84	-22.88	-13	-9.88	Vertical
5552.1	-53.34	5.24	35.84	-22.74	-13	-9.74	Horizontal
184.5	-43.87	1.43	16.02	-29.28	-13	-16.28	Vertical
459.5	-42.10	1.30	17.99	-25.41	-13	-12.41	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-50.38	4.04	33.56	-20.86	-13	-7.86	Horizontal
3760.0	-46.39	4.04	33.56	-16.87	-13	-3.87	Vertical
5640.0	-56.41	5.24	35.91	-25.74	-13	-12.74	Vertical
5640.0	-52.88	5.24	35.91	-22.21	-13	-9.21	Horizontal
212.9	-42.45	1.62	16.97	-27.10	-13	-14.10	Vertical
365.3	-44.84	1.74	15.98	-30.61	-13	-17.61	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-52.91	4.04	34.00	-22.95	-13	-9.95	Horizontal
3818.6	-52.64	4.04	34.00	-22.68	-13	-9.68	Vertical
5727.9	-51.80	5.24	36.04	-21.00	-13	-8.00	Vertical
5727.9	-50.20	5.24	36.04	-19.40	-13	-6.40	Horizontal
208.2	-38.08	1.42	17.29	-22.21	-13	-9.21	Vertical
307.5	-34.40	1.50	17.90	-17.99	-13	-4.99	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	-48.13	4.07	33.54	-18.66	-13	-5.66	Horizontal
3720.0	-54.66	4.07	33.54	-25.19	-13	-12.19	Vertical
5580.0	-53.69	5.28	35.86	-23.11	-13	-10.11	Vertical
5580.0	-51.17	5.28	35.86	-20.59	-13	-7.59	Horizontal
194.0	-35.42	1.58	16.89	-20.10	-13	-7.10	Vertical
290.1	-41.37	1.76	17.26	-25.87	-13	-12.87	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-49.40	4.04	33.56	-19.88	-13	-6.88	Horizontal
3760.0	-48.94	4.04	33.56	-19.42	-13	-6.42	Vertical
5640.0	-50.91	5.24	35.91	-20.24	-13	-7.24	Vertical
5640.0	-49.75	5.24	35.91	-19.08	-13	-6.08	Horizontal
195.6	-38.94	1.46	16.27	-24.13	-13	-11.13	Vertical
283.1	-36.08	1.59	15.15	-22.52	-13	-9.52	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-48.17	4.04	34.00	-18.21	-13	-5.21	Horizontal
3800.0	-48.24	4.04	34.00	-18.28	-13	-5.28	Vertical
5700.0	-54.16	5.24	36.04	-23.36	-13	-10.36	Vertical
5700.0	-49.26	5.24	36.04	-18.46	-13	-5.46	Horizontal
186.9	-40.45	1.36	17.39	-24.41	-13	-11.41	Vertical
440.2	-36.69	1.66	15.39	-22.96	-13	-9.96	Horizontal

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

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.



9.2 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	-50.26	4.02	29.80	-24.48	-13	-11.48	Horizontal
3421.4	-45.56	4.02	29.80	-19.78	-13	-6.78	Vertical
5132.1	-54.99	5.24	35.84	-24.39	-13	-11.39	Vertical
5132.1	-52.88	5.24	35.84	-22.28	-13	-9.28	Horizontal
212.4	-43.34	1.68	16.04	-28.98	-13	-15.98	Vertical
430.9	-39.40	1.78	17.74	-23.44	-13	-10.44	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-49.14	4.03	30.00	-23.17	-13	-10.17	Horizontal
3465.0	-53.24	4.03	30.00	-27.27	-13	-14.27	Vertical
5197.5	-54.83	5.25	35.86	-24.22	-13	-11.22	Vertical
5197.5	-49.87	5.25	35.86	-19.26	-13	-6.26	Horizontal
209.8	-39.46	1.72	17.69	-23.49	-13	-10.49	Vertical
455.2	-38.01	1.62	16.02	-23.60	-13	-10.60	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-46.34	4.05	30.01	-20.38	-13	-7.38	Horizontal
3508.6	-46.86	4.05	30.01	-20.90	-13	-7.90	Vertical
5262.9	-48.60	5.26	35.86	-18.00	-13	-5.00	Vertical
5262.9	-49.80	5.26	35.86	-19.20	-13	-6.20	Horizontal
187.6	-42.11	1.80	16.69	-27.22	-13	-14.22	Vertical
366.2	-36.08	1.75	16.66	-21.18	-13	-8.18	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	-52.09	4.02	29.80	-26.31	-13	-13.31	Horizontal
3440.0	-44.81	4.02	29.80	-19.03	-13	-6.03	Vertical
5160.0	-53.97	5.24	35.84	-23.37	-13	-10.37	Vertical
5160.0	-53.96	5.24	35.84	-23.36	-13	-10.36	Horizontal
208.8	-43.22	1.57	17.26	-27.53	-13	-14.53	Vertical
420.9	-43.61	1.78	16.35	-29.04	-13	-16.04	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-46.58	4.03	30.00	-20.61	-13	-7.61	Horizontal
3465.0	-49.55	4.03	30.00	-23.58	-13	-10.58	Vertical
5197.5	-54.17	5.25	35.86	-23.56	-13	-10.56	Vertical
5197.5	-52.55	5.25	35.86	-21.94	-13	-8.94	Horizontal
190.8	-42.43	1.44	17.95	-25.92	-13	-12.92	Vertical
355.2	-40.66	1.65	16.09	-26.22	-13	-13.22	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-47.63	2.91	27.68	-22.86	-13	-9.86	Horizontal
3490.0	-44.41	2.91	27.68	-19.64	-13	-6.64	Vertical
5235.0	-49.34	5.26	35.86	-18.74	-13	-5.74	Vertical
5235.0	-50.44	5.26	35.86	-19.84	-13	-6.84	Horizontal
177.7	-44.73	1.61	16.85	-29.49	-13	-16.49	Vertical
354.8	-37.57	1.61	15.19	-23.99	-13	-10.99	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	-50.72	2.78	27.50	-26.00	-13	-13.00	Horizontal
1649.4	-48.46	2.78	27.50	-23.74	-13	-10.74	Vertical
2474.1	-53.19	2.90	27.80	-28.29	-13	-15.29	Vertical
2474.1	-50.61	2.90	27.80	-25.71	-13	-12.71	Horizontal
192.4	-36.17	1.76	17.59	-20.34	-13	-7.34	Vertical
393.2	-43.67	1.63	15.87	-29.43	-13	-16.43	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-47.72	2.80	27.48	-23.04	-13	-10.04	Horizontal
1673.0	-51.84	2.80	27.48	-27.16	-13	-14.16	Vertical
2509.5	-52.99	2.91	27.70	-28.20	-13	-15.20	Vertical
2509.5	-53.56	2.91	27.70	-28.77	-13	-15.77	Horizontal
190.7	-35.90	1.61	15.68	-21.83	-13	-8.83	Vertical
446.8	-36.25	1.59	17.52	-20.33	-13	-7.33	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-48.75	2.82	27.43	-24.14	-13	-11.14	Horizontal
1696.6	-53.49	2.82	27.43	-28.88	-13	-15.88	Vertical
2544.9	-44.60	2.92	27.74	-19.78	-13	-6.78	Vertical
2544.9	-53.94	2.92	27.74	-29.12	-13	-16.12	Horizontal
196.2	-42.03	1.69	16.67	-27.04	-13	-14.04	Vertical
289.6	-41.11	1.70	17.18	-25.63	-13	-12.63	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	-49.48	2.78	27.50	-24.76	-13	-11.76	Horizontal
1658.0	-44.23	2.78	27.50	-19.51	-13	-6.51	Vertical
2487.0	-44.09	2.90	27.80	-19.19	-13	-6.19	Vertical
2487.0	-52.61	2.90	27.80	-27.71	-13	-14.71	Horizontal
178.7	-40.37	1.71	15.57	-26.51	-13	-13.51	Vertical
439.1	-42.66	1.34	16.40	-27.60	-13	-14.60	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-47.34	2.80	27.48	-22.66	-13	-9.66	Horizontal
1673.0	-45.79	2.80	27.48	-21.11	-13	-8.11	Vertical
2509.5	-53.91	2.91	27.70	-29.12	-13	-16.12	Vertical
2509.5	-49.77	2.91	27.70	-24.98	-13	-11.98	Horizontal
191.4	-41.17	1.44	17.04	-25.57	-13	-12.57	Vertical
458.4	-42.21	1.76	17.62	-26.35	-13	-13.35	Horizontal
Test Results for High Channel 844MHz							
1688.0	-50.35	2.82	27.43	-25.74	-13	-12.74	Horizontal
1688.0	-53.93	2.82	27.43	-29.32	-13	-16.32	Vertical
2532.0	-49.72	2.92	27.74	-24.90	-13	-11.90	Vertical
2532.0	-53.98	2.92	27.74	-29.16	-13	-16.16	Horizontal
197.4	-35.14	1.74	17.70	-19.18	-13	-6.18	Vertical
396.0	-44.76	1.41	17.46	-28.70	-13	-15.70	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)**

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
5005.0	-61.40	5.23	35.81	-30.82	-25	-5.82	Horizontal
5005.0	-63.59	5.23	35.81	-33.01	-25	-8.01	Vertical
7507.5	-61.00	5.67	36.85	-29.82	-25	-4.82	Vertical
7507.5	-61.34	5.67	36.85	-30.16	-25	-5.16	Horizontal
182.6	-48.19	1.73	17.97	-31.95	-25	-6.95	Vertical
380.2	-51.60	1.38	15.11	-37.87	-25	-12.87	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-59.33	5.23	35.82	-28.74	-25	-3.74	Horizontal
5070.0	-64.48	5.23	35.82	-33.89	-25	-8.89	Vertical
7605.0	-59.19	5.67	36.85	-28.01	-25	-3.01	Vertical
7605.0	-61.02	5.67	36.85	-29.84	-25	-4.84	Horizontal
190.7	-44.20	1.77	16.17	-29.79	-25	-4.79	Vertical
301.6	-46.79	1.63	15.21	-33.21	-25	-8.21	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-64.11	5.24	35.83	-33.52	-25	-8.52	Horizontal
5135.0	-60.75	5.24	35.83	-30.16	-25	-5.16	Vertical
7702.5	-64.97	5.68	36.87	-33.78	-25	-8.78	Vertical
7702.5	-60.90	5.68	36.87	-29.71	-25	-4.71	Horizontal
212.0	-49.35	1.58	17.56	-33.37	-25	-8.37	Vertical
423.4	-51.89	1.45	16.58	-36.76	-25	-11.76	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
5020.0	-62.62	5.23	35.82	-32.03	-25	-7.03	Horizontal
5020.0	-63.19	5.23	35.82	-32.60	-25	-7.60	Vertical
7530.0	-60.01	5.67	36.86	-28.82	-25	-3.82	Vertical
7530.0	-64.46	5.67	36.86	-33.27	-25	-8.27	Horizontal
175.8	-53.61	1.63	15.76	-39.48	-25	-14.48	Vertical
376.0	-48.03	1.71	15.44	-34.30	-25	-9.30	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.54	5.23	35.82	-30.95	-25	-5.95	Horizontal
5070.0	-64.59	5.23	35.82	-34.00	-25	-9.00	Vertical
7605.0	-60.09	5.67	36.85	-28.91	-25	-3.91	Vertical
7605.0	-61.23	5.67	36.85	-30.05	-25	-5.05	Horizontal
188.7	-47.93	1.79	16.84	-32.87	-25	-7.87	Vertical
273.1	-46.82	1.71	17.64	-30.89	-25	-5.89	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-63.41	5.24	35.83	-32.82	-25	-7.82	Horizontal
5120.0	-61.97	5.24	35.83	-31.38	-25	-6.38	Vertical
7680.0	-61.50	5.70	36.88	-30.32	-25	-5.32	Vertical
7680.0	-60.29	5.70	36.88	-29.11	-25	-4.11	Horizontal
190.8	-45.39	1.79	16.84	-30.33	-25	-5.33	Vertical
437.2	-47.63	1.71	17.64	-31.70	-25	-6.70	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.

9.5 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	-53.14	2.60	27.20	-28.54	-13	-15.54	Horizontal
1399.4	-49.73	2.60	27.20	-25.13	-13	-12.13	Vertical
2099.1	-49.33	2.85	27.54	-24.64	-13	-11.64	Vertical
2099.1	-49.41	2.85	27.54	-24.72	-13	-11.72	Horizontal
211.6	-42.27	1.49	17.78	-25.98	-13	-12.98	Vertical
284.3	-34.63	1.36	17.33	-18.66	-13	-5.66	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-45.75	2.61	27.28	-21.08	-13	-8.08	Horizontal
1415.0	-51.84	2.61	27.28	-27.17	-13	-14.17	Vertical
2122.5	-52.01	2.87	27.59	-27.29	-13	-14.29	Vertical
2122.5	-49.48	2.87	27.59	-24.76	-13	-11.76	Horizontal
175.1	-40.90	1.73	15.74	-26.89	-13	-13.89	Vertical
456.5	-36.06	1.62	15.79	-21.89	-13	-8.89	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-51.53	2.63	27.28	-26.88	-13	-13.88	Horizontal
1430.6	-53.88	2.63	27.28	-29.23	-13	-16.23	Vertical
2145.9	-47.26	2.88	27.60	-22.54	-13	-9.54	Vertical
2145.9	-50.70	2.88	27.60	-25.98	-13	-12.98	Horizontal
206.3	-42.77	1.61	18.00	-26.38	-13	-13.38	Vertical
386.2	-44.24	1.45	15.49	-30.21	-13	-17.21	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	-46.39	2.61	27.26	-21.74	-13	-8.74	Horizontal
1408.0	-53.02	2.61	27.26	-28.37	-13	-15.37	Vertical
2112.0	-53.85	2.87	27.58	-29.14	-13	-16.14	Vertical
2112.0	-50.99	2.87	27.58	-26.28	-13	-13.28	Horizontal
189.3	-44.62	1.31	16.97	-28.96	-13	-15.96	Vertical
435.6	-41.92	1.65	16.70	-26.87	-13	-13.87	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-49.52	2.61	27.28	-24.85	-13	-11.85	Horizontal
1415.0	-45.74	2.61	27.28	-21.07	-13	-8.07	Vertical
2122.5	-47.83	2.87	27.59	-23.11	-13	-10.11	Vertical
2122.5	-49.95	2.87	27.59	-25.23	-13	-12.23	Horizontal
177.2	-44.89	1.72	17.99	-28.62	-13	-15.62	Vertical
338.4	-39.55	1.73	17.94	-23.34	-13	-10.34	Horizontal
Test Results for High Channel 711MHz							
1422.0	-49.57	2.62	27.28	-24.91	-13	-11.91	Horizontal
1422.0	-53.46	2.62	27.28	-28.80	-13	-15.80	Vertical
2133.0	-46.62	2.87	27.60	-21.89	-13	-8.89	Vertical
2133.0	-50.77	2.87	27.60	-26.04	-13	-13.04	Horizontal
195.2	-43.43	1.58	15.93	-29.08	-13	-16.08	Vertical
322.4	-38.34	1.36	15.59	-24.11	-13	-11.11	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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1413.0	-50.17	2.61	27.28	-25.50	-13	-12.50	Horizontal
1413.0	-48.04	2.61	27.28	-23.37	-13	-10.37	Vertical
2119.5	-47.26	2.87	27.59	-22.54	-13	-9.54	Vertical
2119.5	-49.71	2.87	27.59	-24.99	-13	-11.99	Horizontal
175.2	-37.00	1.71	16.15	-22.56	-13	-9.56	Vertical
331.1	-41.60	1.41	17.32	-25.69	-13	-12.69	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-53.30	2.62	27.30	-28.62	-13	-15.62	Horizontal
1420.0	-45.62	2.62	27.30	-20.94	-13	-7.94	Vertical
2130.0	-47.29	2.87	27.62	-22.54	-13	-9.54	Vertical
2130.0	-51.95	2.87	27.62	-27.20	-13	-14.20	Horizontal
196.8	-43.08	1.42	15.25	-29.26	-13	-16.26	Vertical
365.4	-36.73	1.36	17.19	-20.90	-13	-7.90	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-53.34	2.66	27.28	-28.72	-13	-15.72	Horizontal
1427.0	-49.76	2.66	27.28	-25.14	-13	-12.14	Vertical
2140.5	-52.72	2.88	27.60	-28.00	-13	-15.00	Vertical
2140.5	-50.30	2.88	27.60	-25.58	-13	-12.58	Horizontal
190.5	-44.08	1.32	17.29	-28.11	-13	-15.11	Vertical
311.1	-44.59	1.72	16.89	-29.42	-13	-16.42	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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1418.0	-53.54	2.62	27.30	-28.86	-13	-15.86	Horizontal
1418.0	-49.85	2.62	27.30	-25.17	-13	-12.17	Vertical
2127.0	-52.45	2.87	27.62	-27.70	-13	-14.70	Vertical
2127.0	-51.41	2.87	27.62	-26.66	-13	-13.66	Horizontal
176.5	-36.13	1.35	16.91	-20.57	-13	-7.57	Vertical
321.8	-36.35	1.62	16.31	-21.66	-13	-8.66	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-51.89	2.62	27.30	-27.21	-13	-14.21	Horizontal
1420.0	-52.59	2.62	27.30	-27.91	-13	-14.91	Vertical
2130.0	-44.65	2.87	27.62	-19.90	-13	-6.90	Vertical
2130.0	-50.59	2.87	27.62	-25.84	-13	-12.84	Horizontal
178.5	-41.09	1.51	17.14	-25.46	-13	-12.46	Vertical
347.9	-34.62	1.77	16.88	-19.51	-13	-6.51	Horizontal
Test Results for High Channel 711MHz							
1422.0	-44.89	2.62	27.30	-20.21	-13	-7.21	Horizontal
1422.0	-44.03	2.62	27.30	-19.35	-13	-6.35	Vertical
2133.0	-49.54	2.87	27.62	-24.79	-13	-11.79	Vertical
2133.0	-53.64	2.87	27.62	-28.89	-13	-15.89	Horizontal
197.1	-39.97	1.78	15.95	-25.80	-13	-12.80	Vertical
446.2	-34.34	1.34	17.95	-17.74	-13	-4.74	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.

## 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  $\pm 2.5$  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 3.6V, Normal, DC 3.85V and High voltage, DC 4.4V.

### 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  
LTE Band 4
- LTE Band 5  
LTE Band 7  
LTE Band 12  
LTE Band 17

## 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]
3.6	1880	12.7	0.006767	2.5
3.85	1880	13.9	0.007413	2.5
4.4	1880	13.2	0.007019	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	13.1	0.006980	2.5
Extreme (50C)	1880	11.6	0.006183	2.5
Extreme (40C)	1880	13.2	0.007024	2.5
Extreme (30C)	1880	13.8	0.007331	2.5
Extreme (10C)	1880	13.8	0.007326	2.5
Extreme (0C)	1880	12.4	0.006604	2.5
Extreme (-10C)	1880	13.3	0.007071	2.5
Extreme (-20C)	1880	14.2	0.007539	2.5
Extreme (-30C)	1880	14.4	0.007667	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]
3.6	1880	9.5	0.005055	2.5
3.85	1880	8.7	0.004633	2.5
4.4	1880	8.1	0.004302	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.1	0.004845	2.5
Extreme (50C)	1880	9.0	0.004813	2.5
Extreme (40C)	1880	7.8	0.004167	2.5
Extreme (30C)	1880	9.4	0.004988	2.5
Extreme (10C)	1880	9.1	0.004856	2.5
Extreme (0C)	1880	8.4	0.004443	2.5
Extreme (-10C)	1880	8.5	0.004543	2.5
Extreme (-20C)	1880	9.0	0.004785	2.5
Extreme (-30C)	1880	7.8	0.004167	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]
3.6	1732.5	8.8	0.005080	2.5
3.85	1732.5	8.6	0.004961	2.5
4.4	1732.5	8.2	0.004741	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.8	0.005056	2.5
Extreme (50C)	1732.5	8.6	0.004982	2.5
Extreme (40C)	1732.5	7.8	0.004497	2.5
Extreme (30C)	1732.5	6.4	0.003682	2.5
Extreme (10C)	1732.5	7.6	0.004375	2.5
Extreme (0C)	1732.5	9.6	0.005534	2.5
Extreme (-10C)	1732.5	8.1	0.004679	2.5
Extreme (-20C)	1732.5	7.0	0.004020	2.5
Extreme (-30C)	1732.5	8.8	0.005068	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]
3.6	1732.5	9.7	0.005587	2.5
3.85	1732.5	9.2	0.005284	2.5
4.4	1732.5	7.7	0.004453	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	10.2	0.005876	2.5
Extreme (50C)	1732.5	9.0	0.005180	2.5
Extreme (40C)	1732.5	8.5	0.004905	2.5
Extreme (30C)	1732.5	9.2	0.005301	2.5
Extreme (10C)	1732.5	8.9	0.005128	2.5
Extreme (0C)	1732.5	7.6	0.004396	2.5
Extreme (-10C)	1732.5	8.8	0.005056	2.5
Extreme (-20C)	1732.5	9.3	0.005352	2.5
Extreme (-30C)	1732.5	7.7	0.004440	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]
3.6	836.5	5.6	0.006640	2.5
3.85	836.5	7.0	0.008350	2.5
4.4	836.5	5.0	0.005973	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	5.8	0.006971	2.5
Extreme (50C)	836.5	5.7	0.006811	2.5
Extreme (40C)	836.5	5.7	0.006774	2.5
Extreme (30C)	836.5	6.1	0.007268	2.5
Extreme (10C)	836.5	5.1	0.006050	2.5
Extreme (0C)	836.5	5.7	0.006845	2.5
Extreme (-10C)	836.5	5.9	0.007088	2.5
Extreme (-20C)	836.5	5.7	0.006859	2.5
Extreme (-30C)	836.5	6.7	0.008026	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]
3.6	836.5	5.8	0.006886	2.5
3.85	836.5	6.6	0.007856	2.5
4.4	836.5	4.6	0.005551	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.2	0.007413	2.5
Extreme (50C)	836.5	6.4	0.007608	2.5
Extreme (40C)	836.5	6.1	0.007263	2.5
Extreme (30C)	836.5	6.3	0.007480	2.5
Extreme (10C)	836.5	5.1	0.006145	2.5
Extreme (0C)	836.5	5.3	0.006317	2.5
Extreme (-10C)	836.5	5.3	0.006389	2.5
Extreme (-20C)	836.5	6.1	0.007247	2.5
Extreme (-30C)	836.5	6.4	0.007705	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]
3.6	2535	10.0	0.003942	2.5
3.85	2535	9.2	0.003645	2.5
4.4	2535	8.0	0.003147	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	9.0	0.003561	2.5
Extreme (50C)	2535	8.7	0.003437	2.5
Extreme (40C)	2535	8.4	0.003308	2.5
Extreme (30C)	2535	8.4	0.003332	2.5
Extreme (10C)	2535	8.2	0.003246	2.5
Extreme (0C)	2535	8.7	0.003430	2.5
Extreme (-10C)	2535	9.8	0.003851	2.5
Extreme (-20C)	2535	9.2	0.003640	2.5
Extreme (-30C)	2535	8.4	0.003302	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]
3.6	2535	6.9	0.002722	2.5
3.85	2535	6.5	0.002573	2.5
4.4	2535	5.6	0.002214	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	5.3	0.002071	2.5
Extreme (40C)	2535	5.0	0.001965	2.5
Extreme (30C)	2535	7.2	0.002824	2.5
Extreme (10C)	2535	6.1	0.002400	2.5
Extreme (0C)	2535	5.1	0.002001	2.5
Extreme (-10C)	2535	5.7	0.002233	2.5
Extreme (-20C)	2535	5.5	0.002183	2.5
Extreme (-30C)	2535	5.7	0.002244	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]
3.6	707.5	9.0	0.012764	2.5
3.85	707.5	10.4	0.014652	2.5
4.4	707.5	9.0	0.012753	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.4	0.011933	2.5
Extreme (50C)	707.5	7.7	0.010881	2.5
Extreme (40C)	707.5	7.8	0.010957	2.5
Extreme (30C)	707.5	8.2	0.011581	2.5
Extreme (10C)	707.5	7.6	0.010691	2.5
Extreme (0C)	707.5	8.7	0.012239	2.5
Extreme (-10C)	707.5	8.3	0.011742	2.5
Extreme (-20C)	707.5	9.2	0.012952	2.5
Extreme (-30C)	707.5	8.1	0.011473	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]
3.6	707.5	7.4	0.010458	2.5
3.85	707.5	8.0	0.011264	2.5
4.4	707.5	7.3	0.010303	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	6.5	0.009175	2.5
Extreme (50C)	707.5	5.5	0.007765	2.5
Extreme (40C)	707.5	6.4	0.009110	2.5
Extreme (30C)	707.5	-7.7	-0.010912	2.5
Extreme (10C)	707.5	-8.2	-0.011590	2.5
Extreme (0C)	707.5	2.9	0.004100	2.5
Extreme (-10C)	707.5	-5.2	-0.007292	2.5
Extreme (-20C)	707.5	-8.7	-0.012302	2.5
Extreme (-30C)	707.5	-10.2	-0.014350	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]
3.6	710.0	9.5	0.013344	2.5
3.85	710.0	8.9	0.012494	2.5
4.4	710.0	8.0	0.011256	2.5

#### Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.8	0.013734	2.5
Extreme (50C)	710.0	9.3	0.013046	2.5
Extreme (40C)	710.0	7.9	0.011065	2.5
Extreme (30C)	710.0	8.6	0.012052	2.5
Extreme (10C)	710.0	8.8	0.012369	2.5
Extreme (0C)	710.0	8.1	0.011438	2.5
Extreme (-10C)	710.0	8.8	0.012404	2.5
Extreme (-20C)	710.0	8.8	0.012359	2.5
Extreme (-30C)	710.0	8.1	0.011391	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]
3.6	710.0	10.0	0.014108	2.5
3.85	710.0	9.0	0.012630	2.5
4.4	710.0	8.8	0.012392	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.4	0.013172	2.5
Extreme (50C)	710.0	8.7	0.012311	2.5
Extreme (40C)	710.0	8.2	0.011600	2.5
Extreme (30C)	710.0	9.3	0.013042	2.5
Extreme (10C)	710.0	8.2	0.011566	2.5
Extreme (0C)	710.0	8.5	0.011914	2.5
Extreme (-10C)	710.0	9.2	0.012964	2.5
Extreme (-20C)	710.0	9.0	0.012665	2.5
Extreme (-30C)	710.0	8.2	0.011490	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.

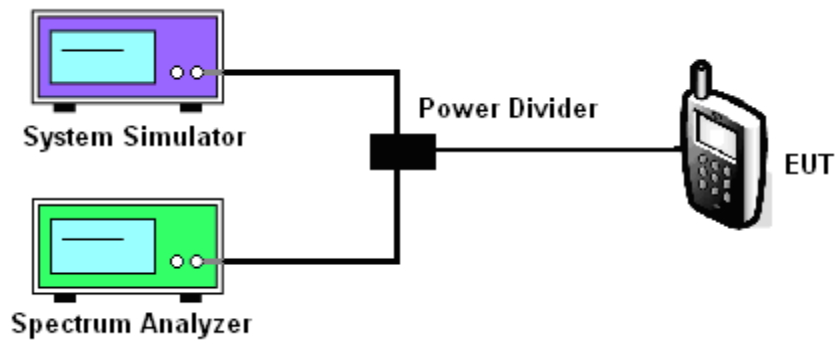
### 11.2 Measuring Instruments

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
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Test data reference attachment.

**----END OF REPORT----**