

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

## FCC ID: 2AHZ5MAX3

**Product:** Smartphone  
**Trade Mark:** CUBOT  
**Model Number:** MAX 3  
**Family Model:** N/A  
**Report No.:** S21090805203006

### Prepared for

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## TEST RESULT CERTIFICATION


<b>Applicant's name</b> .....	Shenzhen Huafurui Technology Co., Ltd
Address.....	Unit 1401 14/F, Jin qi zhi gu mansion Liu xian street ,Xili, Nan shan district,Shenzhen, China
<b>Manufacturer's Name</b> .....	Shenzhen Huafurui Technology Co., Ltd
Address.....	Unit 1401 14/F, Jin qi zhi gu mansion Liu xian street ,Xili, Nan shan district,Shenzhen, China
Product name.....	Smartphone
Model and/or type reference ..	MAX 3
Family Model:	N/A
<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.....	Sep 09, 2021~Sep 27, 2021
Date of Issue .....	Sep 27, 2021
Test Result .....	<b>Pass</b>

Testing Engineer :   
 \_\_\_\_\_  
 (Allen Liu)

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:	Smartphone
Trade Mark	CUBOT
Model Name	MAX 3
Family Model	N/A
Model Difference	N/A
FCC ID:	2AHZ5MAX3
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:	FPC Antenna
Antenna gain:	Band 2:0.5dBi, Band 4: 0.5dBi, Band 5: -1.8dBi, Band 7: 1.5dBi, Band 12: -2.3dBi, Band 17: -2.3dBi
Power Supply:	DC 3.85V, 5000mAh from battery or DC 5V from Adapter.
Adapter:	Model: HJ-0502000W2-US Input: 100-240V~50/60Hz 0.3A Output: 5V---2000mA
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.85V) (Note 1)
HW Version	TE839_MAIN_PCB_V1.2
SW Version	CUOBT_MAX 3_B011C_V02_20210701
** Note1: The High Voltage 4.2V and Low Voltage 3.4V 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: 2AHZ5MAX3** 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

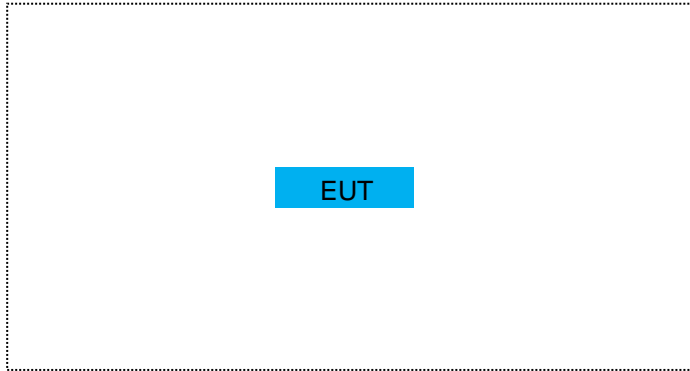
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Smartphone	MAX 3	FCC ID: 2AHZ5MAX3	EUT

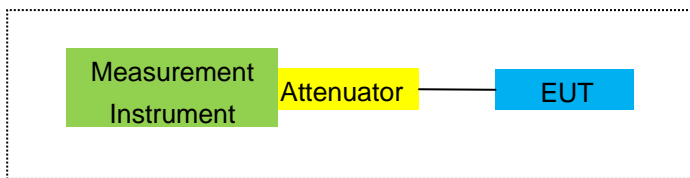
*Note: All the accessories have been used during the test.  
the following "EUT" in setup diagram means EUT system.*

## 2.4 TEST SETUP

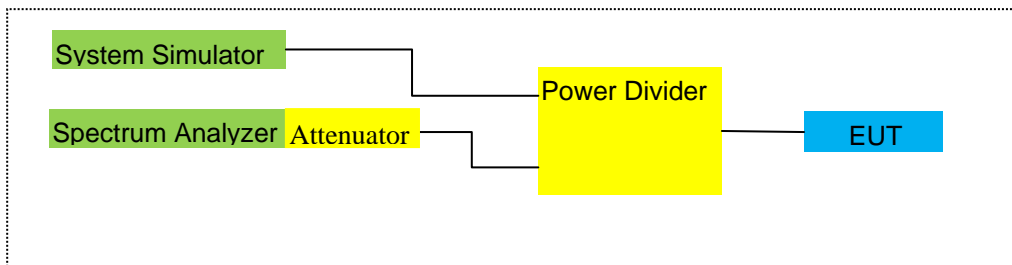
For Radiated Test Cases



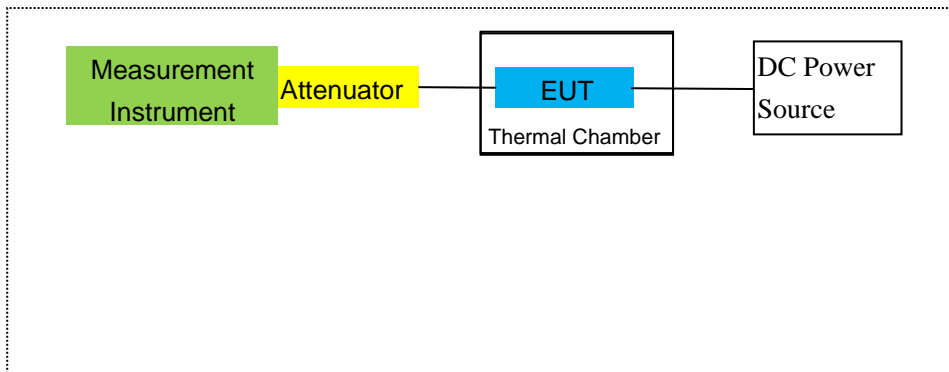
For Conducted Output Power



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	2021.07.01	2022.06.30	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	2021.07.01	2022.06.30	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	2021.07.01	2022.06.30	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	2021.07.01	2022.06.30	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	2021.07.01	2022.06.30	1 year
29	Communication Tester	R&S	CMW500	148500	2021.07.01	2022.06.30	1 year
30	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2021.07.01	2022.06.30	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 CMW500Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

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	-2.78	3.76	28.24	21.70	147.911	Horizontal	Pass					
		1880	-2.59	3.91	28.22	21.72	148.594	Horizontal	Pass					
		1909.3	-2.50	3.93	28.20	21.77	150.314	Horizontal	Pass					
3.0MHz Band QPSK	1/#Mid	1851.5	-2.84	3.77	28.23	21.62	145.211	Horizontal	Pass					
		1880	-2.69	3.91	28.24	21.64	145.881	Horizontal	Pass					
		1908.5	-2.56	3.94	28.25	21.75	149.624	Horizontal	Pass					
5.0MHz Band QPSK	1/#Mid	1852.5	-2.73	3.77	28.31	21.81	151.705	Horizontal	Pass					
		1880	-2.35	3.91	28.22	21.96	157.036	Horizontal	Pass					
		1907.5	-2.28	3.94	28.20	21.98	157.761	Horizontal	Pass					
10.0MHz Band QPSK	1/#Mid	1855	-2.59	3.79	28.33	21.95	156.675	Horizontal	Pass					
		1880	-2.29	3.95	28.22	21.98	157.761	Horizontal	Pass					
		1905	-2.18	3.97	28.19	22.04	159.956	Horizontal	Pass					
15.0MHz Band QPSK	1/#Mid	1857.5	-2.55	3.79	28.34	22.00	158.489	Horizontal	Pass					
		1880	-2.34	3.95	28.22	21.93	155.955	Horizontal	Pass					
		1902.5	-2.20	3.97	28.18	22.01	158.855	Horizontal	Pass					
20.0MHz Band QPSK	1/#Mid	1860	-2.54	3.81	28.35	22.00	158.489	Horizontal	Pass					
		1880	-2.21	3.96	28.22	<b>22.05</b>	160.325	Horizontal	Pass					
		1900	-2.15	4.00	28.16	22.01	158.855	Horizontal	Pass					
1.4MHz Band QPSK	1/#Mid	1850.7	-3.91	3.76	28.24	20.57	114.025	Vertical	Pass					
		1880	-3.33	3.91	28.22	20.98	125.314	Vertical	Pass					
		1909.3	-3.46	3.93	28.20	20.81	120.504	Vertical	Pass					
3.0MHz Band QPSK	1/#Mid	1851.5	-3.79	3.77	28.23	20.67	116.681	Vertical	Pass					
		1880	-3.31	3.91	28.24	21.02	126.474	Vertical	Pass					
		1908.5	-3.28	3.94	28.25	21.03	126.765	Vertical	Pass					
5.0MHz Band QPSK	1/#Mid	1852.5	-3.66	3.77	28.31	20.88	122.462	Vertical	Pass					
		1880	-3.05	3.91	28.22	21.26	133.660	Vertical	Pass					
		1907.5	-3.84	3.94	28.20	20.42	110.154	Vertical	Pass					
10.0MHz Band QPSK	1/#Mid	1855	-3.38	3.79	28.33	21.16	130.617	Vertical	Pass					
		1880	-3.71	3.95	28.22	20.56	113.763	Vertical	Pass					
		1905	-3.53	3.97	28.19	20.69	117.220	Vertical	Pass					

15.0MHz		1857.5	-3.14	3.79	28.34	21.41	138.357	Vertical	Pass
Band	1/#Mid	1880	-3.77	3.95	28.22	20.50	112.202	Vertical	Pass
QPSK		1902.5	-3.29	3.97	28.18	20.92	123.595	Vertical	Pass
20.0MHz		1860	-3.93	3.81	28.35	20.61	115.080	Vertical	Pass
Band	1/#Mid	1880	-3.59	3.96	28.22	20.67	116.681	Vertical	Pass
QPSK		1900	-3.20	4.00	28.16	20.96	124.738	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1850.7	-3.90	3.76	28.24	20.58	114.288	Horizontal	Pass
		1880	-3.37	3.91	28.22	20.94	124.165	Horizontal	Pass
		1909.3	-3.30	3.93	28.20	20.97	125.026	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-3.40	3.77	28.23	21.06	127.644	Horizontal	Pass
		1880	-3.48	3.91	28.24	20.85	121.619	Horizontal	Pass
		1908.5	-3.69	3.94	28.25	20.62	115.345	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-3.34	3.77	28.31	21.20	131.826	Horizontal	Pass
		1880	-3.25	3.91	28.22	21.06	127.644	Horizontal	Pass
		1907.5	-2.93	3.94	28.20	21.33	135.831	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-3.39	3.79	28.33	21.15	130.317	Horizontal	Pass
		1880	-3.38	3.95	28.22	20.89	122.744	Horizontal	Pass
		1905	-2.85	3.97	28.19	21.37	137.088	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-3.37	3.79	28.34	21.18	131.220	Horizontal	Pass
		1880	-3.16	3.95	28.22	21.11	129.122	Horizontal	Pass
		1902.5	-3.12	3.97	28.18	21.09	128.529	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-3.26	3.81	28.35	21.28	134.276	Horizontal	Pass
		1880	-2.96	3.96	28.22	21.30	134.896	Horizontal	Pass
		1900	-2.78	4.00	28.16	<b>21.38</b>	137.404	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.76	3.76	28.24	19.72	93.756	Vertical	Pass
		1880	-4.12	3.91	28.22	20.19	104.472	Vertical	Pass
		1909.3	-4.65	3.93	28.20	19.62	91.622	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-4.83	3.77	28.23	19.63	91.833	Vertical	Pass
		1880	-4.00	3.91	28.24	20.33	107.895	Vertical	Pass
		1908.5	-4.79	3.94	28.25	19.52	89.536	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-4.27	3.77	28.31	20.27	106.414	Vertical	Pass
		1880	-3.99	3.91	28.22	20.32	107.647	Vertical	Pass
		1907.5	-4.45	3.94	28.20	19.81	95.719	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-4.55	3.79	28.33	19.99	99.770	Vertical	Pass
		1880	-4.05	3.95	28.22	20.22	105.196	Vertical	Pass
		1905	-4.01	3.97	28.19	20.21	104.954	Vertical	Pass
15.0MHz Band 16	1/#Mid	1857.5	-4.82	3.79	28.34	19.73	93.972	Vertical	Pass
		1880	-4.37	3.95	28.22	19.90	97.724	Vertical	Pass

QAM		1902.5	-3.84	3.97	28.18	20.37	108.893	Vertical	Pass
20.0MHz	1/#Mid	1860	-4.50	3.81	28.35	20.04	100.925	Vertical	Pass
Band 16		1880	-4.81	3.96	28.22	19.45	88.105	Vertical	Pass
QAM		1900	-4.07	4.00	28.16	20.09	102.094	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						Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Gain	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)	Average	Average			
						(dBm)	(mW)			
1.4MHz Band QPSK	1/#Mid	1710.7	-1.36	3.12	27.58	23.10	204.174	Horizontal	Pass	
		1732.5	-1.35	3.27	27.61	22.99	199.067	Horizontal	Pass	
		1754.3	-1.33	3.29	27.63	23.01	199.986	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	1711.5	-1.53	3.13	27.61	22.95	197.242	Horizontal	Pass	
		1732.5	-1.45	3.27	27.61	22.89	194.536	Horizontal	Pass	
		1753.5	-1.37	3.30	27.62	22.95	197.242	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	1712.5	-1.30	3.13	27.63	23.20	208.930	Horizontal	Pass	
		1732.5	-1.20	3.27	27.61	23.14	206.063	Horizontal	Pass	
		1752.5	-1.08	3.30	27.60	23.22	209.894	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	1715	-1.24	3.15	27.64	23.25	211.349	Horizontal	Pass	
		1732.5	-1.01	3.31	27.61	23.29	213.304	Horizontal	Pass	
		1750	-1.03	3.33	27.59	23.23	210.378	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	1717.5	-1.25	3.15	27.65	23.25	211.349	Horizontal	Pass	
		1732.5	-1.09	3.31	27.61	23.21	209.411	Horizontal	Pass	
		1747.5	-1.03	3.33	27.57	23.21	209.411	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	1720	-1.19	3.17	27.66	<b>23.30</b>	213.796	Horizontal	Pass	
		1732.5	-1.02	3.32	27.61	23.27	212.324	Horizontal	Pass	
		1745	-0.96	3.36	27.56	23.24	210.863	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	1710.7	-1.77	3.12	27.58	22.69	185.780	Vertical	Pass	
		1732.5	-2.08	3.27	27.61	22.26	168.267	Vertical	Pass	
		1754.3	-1.72	3.29	27.63	22.62	182.810	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	1711.5	-2.21	3.13	27.61	22.27	168.655	Vertical	Pass	
		1732.5	-2.04	3.27	27.61	22.30	169.824	Vertical	Pass	
		1753.5	-1.67	3.30	27.62	22.65	184.077	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	1712.5	-1.96	3.13	27.63	22.54	179.473	Vertical	Pass	
		1732.5	-2.42	3.27	27.61	21.92	155.597	Vertical	Pass	
		1752.5	-2.44	3.30	27.60	21.86	153.462	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	1715	-2.29	3.15	27.64	22.20	165.959	Vertical	Pass	
		1732.5	-2.08	3.31	27.61	22.22	166.725	Vertical	Pass	
		1750	-2.09	3.33	27.59	22.17	164.816	Vertical	Pass	

15.0MHz		1717.5	-2.64	3.15	27.65	21.86	153.462	Vertical	Pass
Band	1/#Mid	1732.5	-2.23	3.31	27.61	22.07	161.065	Vertical	Pass
QPSK		1747.5	-2.30	3.33	27.57	21.94	156.315	Vertical	Pass
20.0MHz		1720	-2.73	3.17	27.66	21.76	149.968	Vertical	Pass
Band	1/#Mid	1732.5	-1.57	3.32	27.61	22.72	187.068	Vertical	Pass
QPSK		1745	-1.55	3.36	27.56	22.65	184.077	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
						Average	Average		
						(dBm)	(mW)		
1.4MHz Band 16 QAM	1/#Mid	1710.7	-2.17	3.12	27.58	22.29	169.434	Horizontal	Pass
		1732.5	-2.02	3.27	27.61	22.32	170.608	Horizontal	Pass
		1754.3	-2.02	3.29	27.63	22.32	170.608	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.11	3.13	27.61	22.37	172.584	Horizontal	Pass
		1732.5	-2.24	3.27	27.61	22.10	162.181	Horizontal	Pass
		1753.5	-2.46	3.30	27.62	21.86	153.462	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-1.94	3.13	27.63	22.56	180.302	Horizontal	Pass
		1732.5	-1.90	3.27	27.61	22.44	175.388	Horizontal	Pass
		1752.5	-1.59	3.30	27.60	22.71	186.638	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-2.01	3.15	27.64	22.48	177.011	Horizontal	Pass
		1732.5	-2.20	3.31	27.61	22.10	162.181	Horizontal	Pass
		1750	-1.58	3.33	27.59	22.68	185.353	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-1.81	3.15	27.65	22.69	185.780	Horizontal	Pass
		1732.5	-1.87	3.31	27.61	22.43	174.985	Horizontal	Pass
		1747.5	-1.89	3.33	27.57	22.35	171.791	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-1.76	3.17	27.66	<b>22.73</b>	187.499	Horizontal	Pass
		1732.5	-1.77	3.32	27.61	22.52	178.649	Horizontal	Pass
		1745	-1.58	3.36	27.56	22.62	182.810	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-3.33	3.12	27.58	21.13	129.718	Vertical	Pass
		1732.5	-3.43	3.27	27.61	20.91	123.310	Vertical	Pass
		1754.3	-3.17	3.29	27.63	21.17	130.918	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-3.39	3.13	27.61	21.09	128.529	Vertical	Pass
		1732.5	-3.27	3.27	27.61	21.07	127.938	Vertical	Pass
		1753.5	-2.79	3.30	27.62	21.53	142.233	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.89	3.13	27.63	21.61	144.877	Vertical	Pass
		1732.5	-3.43	3.27	27.61	20.91	123.310	Vertical	Pass
		1752.5	-3.49	3.30	27.60	20.81	120.504	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-3.02	3.15	27.64	21.47	140.281	Vertical	Pass
		1732.5	-3.06	3.31	27.61	21.24	133.045	Vertical	Pass
		1750	-3.45	3.33	27.59	20.81	120.504	Vertical	Pass
15.0MHz Band 16	1/#Mid	1717.5	-3.43	3.15	27.65	21.07	127.938	Vertical	Pass
		1732.5	-3.46	3.31	27.61	20.84	121.339	Vertical	Pass

QAM		1747.5	-3.30	3.33	27.57	20.94	124.165	Vertical	Pass
20.0MHz	1/#Mid	1720	-3.51	3.17	27.66	20.98	125.314	Vertical	Pass
Band 16		1732.5	-3.24	3.32	27.61	21.05	127.350	Vertical	Pass
QAM		1745	-2.88	3.36	27.56	21.32	135.519	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 (dB)	Max. EIRP	Max. EIRP			
			(dBm)				Average	Average			
				(dBm)	(dBm)						
1.4MHz Band QPSK	3/#Mid	824.7	7.17	2.01	19.68	2.15	22.69	185.780	Horizontal	Pass	
		836.5	7.05	2.01	19.77	2.15	22.66	184.502	Horizontal	Pass	
		848.3	6.85	2.02	19.82	2.15	22.50	177.828	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	6.94	2.01	19.70	2.15	22.48	177.011	Horizontal	Pass	
		836.5	6.84	2.01	19.77	2.15	22.45	175.792	Horizontal	Pass	
		847.5	6.71	2.02	19.81	2.15	22.35	171.791	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	7.22	2.01	19.71	2.15	22.77	189.234	Horizontal	Pass	
		836.5	7.10	2.01	19.77	2.15	22.71	186.638	Horizontal	Pass	
		846.5	6.94	2.02	19.79	2.15	22.56	180.302	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	829	7.24	2.01	19.73	2.15	<b>22.81</b>	190.985	Horizontal	Pass	
		836.5	7.19	2.01	19.77	2.15	22.80	190.546	Horizontal	Pass	
		844	7.09	2.02	19.78	2.15	22.70	186.209	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	824.7	5.62	2.01	19.68	2.15	21.14	130.017	Vertical	Pass	
		836.5	6.36	2.01	19.77	2.15	21.97	157.398	Vertical	Pass	
		848.3	5.45	2.02	19.82	2.15	21.10	128.825	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	5.45	2.01	19.70	2.15	20.99	125.603	Vertical	Pass	
		836.5	6.12	2.01	19.77	2.15	21.73	148.936	Vertical	Pass	
		847.5	6.11	2.02	19.81	2.15	21.75	149.624	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	5.85	2.01	19.71	2.15	21.40	138.038	Vertical	Pass	
		836.5	5.40	2.01	19.77	2.15	21.01	126.183	Vertical	Pass	
		846.5	5.44	2.02	19.79	2.15	21.06	127.644	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	829	5.91	2.01	19.73	2.15	21.48	140.605	Vertical	Pass	
		836.5	5.61	2.01	19.77	2.15	21.22	132.434	Vertical	Pass	
		844	5.69	2.02	19.78	2.15	21.30	134.896	Vertical	Pass	

Radiated Power (ERP) for Band 5										
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	3/#Mid	824.7	6.32	2.01	19.68	2.15	21.84	152.757	Horizontal	Pass
		836.5	6.25	2.01	19.77	2.15	21.86	153.462	Horizontal	Pass
		848.3	6.09	2.02	19.82	2.15	21.74	149.279	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	6.40	2.01	19.70	2.15	21.94	156.315	Horizontal	Pass
		836.5	6.11	2.01	19.77	2.15	21.72	148.594	Horizontal	Pass
		847.5	5.59	2.02	19.81	2.15	21.23	132.739	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	6.72	2.01	19.71	2.15	22.27	168.655	Horizontal	Pass
		836.5	6.49	2.01	19.77	2.15	22.10	162.181	Horizontal	Pass
		846.5	6.24	2.02	19.79	2.15	21.86	153.462	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	829	6.72	2.01	19.73	2.15	<b>22.29</b>	169.434	Horizontal	Pass
		836.5	6.44	2.01	19.77	2.15	22.05	160.325	Horizontal	Pass
		844	5.98	2.02	19.78	2.15	21.59	144.212	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	824.7	5.17	2.01	19.68	2.15	20.69	117.220	Vertical	Pass
		836.5	4.46	2.01	19.77	2.15	20.07	101.625	Vertical	Pass
		848.3	5.33	2.02	19.82	2.15	20.98	125.314	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	5.22	2.01	19.70	2.15	20.76	119.124	Vertical	Pass
		836.5	5.05	2.01	19.77	2.15	20.66	116.413	Vertical	Pass
		847.5	5.66	2.02	19.81	2.15	21.30	134.896	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	6.26	2.01	19.71	2.15	21.81	151.705	Vertical	Pass
		836.5	5.28	2.01	19.77	2.15	20.89	122.744	Vertical	Pass
		846.5	4.68	2.02	19.79	2.15	20.30	107.152	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	829	5.50	2.01	19.73	2.15	21.07	127.938	Vertical	Pass
		836.5	5.49	2.01	19.77	2.15	21.10	128.825	Vertical	Pass
		844	5.67	2.02	19.78	2.15	21.28	134.276	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						Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Gain	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)	Average	Average			
						(dBm)	(mW)			
5.0MHz Band QPSK	1/#Mid	2502.5	-1.54	4.54	27.75	21.67	146.893	Horizontal	Pass	
		2535	-1.37	4.69	27.72	21.66	146.555	Horizontal	Pass	
		2567.5	-1.30	4.71	27.71	21.70	147.911	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	2505	-1.47	4.55	27.76	21.74	149.279	Horizontal	Pass	
		2535	-1.28	4.69	27.72	21.75	149.624	Horizontal	Pass	
		2565	-1.20	4.72	27.70	21.78	150.661	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	2507.5	-1.48	4.55	27.77	21.74	149.279	Horizontal	Pass	
		2535	-1.34	4.69	27.72	21.69	147.571	Horizontal	Pass	
		2562.5	-1.24	4.72	27.69	21.73	148.936	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	2510	-1.42	4.57	27.78	<b>21.79</b>	151.008	Horizontal	Pass	
		2535	-1.24	4.73	27.72	21.75	149.624	Horizontal	Pass	
		2560	-1.20	4.75	27.68	21.73	148.936	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	2502.5	-3.18	4.54	27.75	20.03	100.693	Vertical	Pass	
		2535	-2.78	4.69	27.72	20.25	105.925	Vertical	Pass	
		2567.5	-2.23	4.71	27.71	20.77	119.399	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	2505	-2.42	4.55	27.76	20.79	119.950	Vertical	Pass	
		2535	-2.34	4.69	27.72	20.69	117.220	Vertical	Pass	
		2565	-2.82	4.72	27.70	20.16	103.753	Vertical	Pass	
15.0MHz Band QPSK	1/#Mid	2507.5	-3.02	4.55	27.77	20.20	104.713	Vertical	Pass	
		2535	-2.65	4.69	27.72	20.38	109.144	Vertical	Pass	
		2562.5	-2.96	4.72	27.69	20.01	100.231	Vertical	Pass	
20.0MHz Band QPSK	1/#Mid	2510	-2.91	4.57	27.78	20.30	107.152	Vertical	Pass	
		2535	-2.51	4.73	27.72	20.48	111.686	Vertical	Pass	
		2560	-2.19	4.75	27.68	20.74	118.577	Vertical	Pass	

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Gain	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)	Average	Average		
					(dBm)	(mW)			
5.0MHz Band 16 QAM	1/#Mid	2502.5	-2.23	4.54	27.75	20.98	125.314	Horizontal	Pass
		2535	-1.92	4.69	27.72	21.11	129.122	Horizontal	Pass
		2567.5	-2.00	4.71	27.71	21.00	125.893	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-2.12	4.55	27.76	21.09	128.529	Horizontal	Pass
		2535	-2.13	4.69	27.72	20.90	123.027	Horizontal	Pass
		2565	-2.40	4.72	27.70	20.58	114.288	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-2.30	4.55	27.77	20.92	123.595	Horizontal	Pass
		2535	-2.27	4.69	27.72	20.76	119.124	Horizontal	Pass
		2562.5	-1.88	4.72	27.69	21.09	128.529	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-2.18	4.57	27.78	21.03	126.765	Horizontal	Pass
		2535	-1.85	4.73	27.72	<b>21.14</b>	130.017	Horizontal	Pass
		2560	-1.95	4.75	27.68	20.98	125.314	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-3.15	4.54	27.75	20.06	101.391	Vertical	Pass
		2535	-3.15	4.69	27.72	19.88	97.275	Vertical	Pass
		2567.5	-2.93	4.71	27.71	20.07	101.625	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-3.40	4.55	27.76	19.81	95.719	Vertical	Pass
		2535	-2.62	4.69	27.72	20.41	109.901	Vertical	Pass
		2565	-2.80	4.72	27.70	20.18	104.232	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-3.67	4.55	27.77	19.55	90.157	Vertical	Pass
		2535	-3.38	4.69	27.72	19.65	92.257	Vertical	Pass
		2562.5	-2.12	4.72	27.69	20.85	121.619	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-3.44	4.57	27.78	19.77	94.842	Vertical	Pass
		2535	-2.86	4.73	27.72	20.13	103.039	Vertical	Pass
		2560	-3.36	4.75	27.68	19.57	90.573	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	Antenna Gain	Correction	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)		Average	Average			
							(dBm)	(mW)			
1.4MHz Band QPSK	1/#Mid	699.7	7.98	1.91	19.21	2.15	23.13	205.589	Vertical	Pass	
		707.5	7.90	1.91	19.26	2.15	23.10	204.174	Vertical	Pass	
		715.3	7.68	1.93	19.34	2.15	22.94	196.789	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	7.77	1.91	19.21	2.15	22.92	195.884	Vertical	Pass	
		707.5	7.69	1.91	19.26	2.15	22.89	194.536	Vertical	Pass	
		714.5	7.53	1.93	19.34	2.15	22.79	190.108	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	8.04	1.91	19.23	2.15	23.21	209.411	Vertical	Pass	
		707.5	7.95	1.91	19.26	2.15	23.15	206.538	Vertical	Pass	
		713.5	7.74	1.92	19.33	2.15	23.00	199.526	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	704	8.06	1.91	19.25	2.15	<b>23.25</b>	211.349	Vertical	Pass	
		707.5	8.04	1.91	19.26	2.15	23.24	210.863	Vertical	Pass	
		711	7.89	1.92	19.32	2.15	23.14	206.063	Vertical	Pass	
1.4MHz Band QPSK	1/#Mid	699.7	6.37	1.91	19.21	2.15	21.52	141.906	Horizontal	Pass	
		707.5	6.37	1.91	19.26	2.15	21.57	143.549	Horizontal	Pass	
		715.3	6.74	1.93	19.34	2.15	22.00	158.489	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	7.17	1.91	19.21	2.15	22.32	170.608	Horizontal	Pass	
		707.5	7.01	1.91	19.26	2.15	22.21	166.341	Horizontal	Pass	
		714.5	6.41	1.93	19.34	2.15	21.67	146.893	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	7.03	1.91	19.23	2.15	22.20	165.959	Horizontal	Pass	
		707.5	6.86	1.91	19.26	2.15	22.06	160.694	Horizontal	Pass	
		713.5	6.96	1.92	19.33	2.15	22.22	166.725	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	704	6.32	1.91	19.25	2.15	21.51	141.579	Horizontal	Pass	
		707.5	6.80	1.91	19.26	2.15	22.00	158.489	Horizontal	Pass	
		711	6.99	1.92	19.32	2.15	22.24	167.494	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	7.98	1.91	19.21	2.15	22.93	196.336	Vertical	Pass
		707.5	7.90	1.91	19.26	2.15	22.90	194.984	Vertical	Pass
		715.3	7.68	1.93	19.34	2.15	22.74	187.932	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	7.77	1.91	19.21	2.15	22.72	187.068	Vertical	Pass
		707.5	7.69	1.91	19.26	2.15	22.69	185.780	Vertical	Pass
		714.5	7.53	1.93	19.34	2.15	22.59	181.552	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	8.04	1.91	19.23	2.15	23.01	199.986	Vertical	Pass
		707.5	7.95	1.91	19.26	2.15	22.95	197.242	Vertical	Pass
		713.5	7.74	1.92	19.33	2.15	22.80	190.546	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	704	8.06	1.91	19.25	2.15	<b>23.05</b>	201.837	Vertical	Pass
		707.5	8.04	1.91	19.26	2.15	23.04	201.372	Vertical	Pass
		711	7.89	1.92	19.32	2.15	22.94	196.789	Vertical	Pass
1.4MHz Band 16 QAM	1/#Mid	699.7	6.66	1.91	19.21	2.15	22.13	163.305	Horizontal	Pass
		707.5	6.57	1.91	19.26	2.15	21.29	134.586	Horizontal	Pass
		715.3	7.07	1.93	19.34	2.15	21.27	133.968	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	7.09	1.91	19.21	2.15	21.71	148.252	Horizontal	Pass
		707.5	6.48	1.91	19.26	2.15	21.64	145.881	Horizontal	Pass
		714.5	7.02	1.93	19.34	2.15	21.63	145.546	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	6.58	1.91	19.23	2.15	21.44	139.316	Horizontal	Pass
		707.5	7.03	1.91	19.26	2.15	21.34	136.144	Horizontal	Pass
		713.5	6.55	1.92	19.33	2.15	21.26	133.660	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	704	6.87	1.91	19.25	2.15	21.90	154.882	Horizontal	Pass
		707.5	7.09	1.91	19.26	2.15	22.18	165.196	Horizontal	Pass
		711	6.61	1.92	19.32	2.15	21.41	138.357	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							Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
5.0MHz Band QPSK	1/#Mid	706.5	8.44	1.91	19.23	2.15	23.61	229.615	Vertical	Pass	
		710	8.30	1.91	19.26	2.15	23.50	223.872	Vertical	Pass	
		713.5	8.20	1.92	19.33	2.15	23.46	221.820	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	709	8.45	1.91	19.25	2.15	<b>23.64</b>	231.206	Vertical	Pass	
		710	8.40	1.91	19.26	2.15	23.60	229.087	Vertical	Pass	
		711	8.36	1.92	19.32	2.15	23.61	229.615	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	706.5	6.69	1.91	19.23	2.15	21.86	153.462	Horizontal	Pass	
		710	7.25	1.91	19.26	2.15	22.45	175.792	Horizontal	Pass	
		713.5	6.23	1.92	19.33	2.15	21.49	140.929	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	709	6.68	1.91	19.25	2.15	21.87	153.815	Horizontal	Pass	
		710	6.41	1.91	19.26	2.15	21.61	144.877	Horizontal	Pass	
		711	7.66	1.92	19.32	2.15	22.91	195.434	Horizontal	Pass	

Radiated Power (ERP) for Band 17											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. EIRP	Max. EIRP	Average		
			(dBm)				(dBm)	(dB)			
5.0MHz Band 16 QAM	1/#Mid	706.5	7.79	1.91	19.23	2.15	22.96	197.697	Vertical	Pass	
		710	7.70	1.91	19.26	2.15	22.90	194.984	Vertical	Pass	
		713.5	7.50	1.92	19.33	2.15	22.76	188.799	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	709	7.33	1.91	19.25	2.15	22.52	178.649	Vertical	Pass	
		710	7.86	1.91	19.26	2.15	<b>23.06</b>	202.302	Vertical	Pass	
		711	7.59	1.92	19.32	2.15	22.84	192.309	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	706.5	7.10	1.91	19.23	2.15	22.27	168.655	Horizontal	Pass	
		710	6.57	1.91	19.26	2.15	21.77	150.314	Horizontal	Pass	
		713.5	6.65	1.92	19.33	2.15	21.91	155.239	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	709	7.09	1.91	19.25	2.15	22.28	169.044	Horizontal	Pass	
		710	6.74	1.91	19.26	2.15	21.94	156.315	Horizontal	Pass	
		711	7.16	1.92	19.32	2.15	22.41	174.181	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)**

<b>Test Results for Low Channel 1850.7MHz</b>							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3701.4	-45.39	4.04	33.51	-15.92	-13	-2.92	Horizontal
3701.4	-52.56	4.04	33.51	-23.09	-13	-10.09	Vertical
5552.1	-48.34	5.24	35.84	-17.74	-13	-4.74	Vertical
5552.1	-51.51	5.24	35.84	-20.91	-13	-7.91	Horizontal
179.2	-38.98	1.43	16.02	-24.39	-13	-11.39	Vertical
340.1	-35.34	1.30	17.99	-18.65	-13	-5.65	Horizontal
<b>Test Results for Mid Channel 1880MHz</b>							
3760.0	-44.75	4.04	33.56	-15.23	-13	-2.23	Horizontal
3760.0	-50.14	4.04	33.56	-20.62	-13	-7.62	Vertical
5640.0	-50.62	5.24	35.91	-19.95	-13	-6.95	Vertical
5640.0	-53.80	5.24	35.91	-23.13	-13	-10.13	Horizontal
177.2	-35.95	1.62	16.97	-20.60	-13	-7.60	Vertical
277.1	-39.97	1.74	15.98	-25.74	-13	-12.74	Horizontal
<b>Test Results for High Channel 1909.3MHz</b>							
3818.6	-50.14	4.04	34.00	-20.18	-13	-7.18	Horizontal
3818.6	-52.44	4.04	34.00	-22.48	-13	-9.48	Vertical
5727.9	-46.09	5.24	36.04	-15.29	-13	-2.29	Vertical
5727.9	-49.11	5.24	36.04	-18.31	-13	-5.31	Horizontal
179.8	-38.71	1.42	17.29	-22.84	-13	-9.84	Vertical
232.7	-43.65	1.50	17.90	-27.24	-13	-14.24	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	-50.47	4.07	33.54	-21.00	-13	-8.00	Horizontal
3720.0	-44.44	4.07	33.54	-14.97	-13	-1.97	Vertical
5580.0	-49.45	5.28	35.86	-18.87	-13	-5.87	Vertical
5580.0	-49.26	5.28	35.86	-18.68	-13	-5.68	Horizontal
189.0	-36.41	1.58	16.89	-21.09	-13	-8.09	Vertical
413.8	-36.06	1.76	17.26	-20.56	-13	-7.56	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-46.65	4.04	33.56	-17.13	-13	-4.13	Horizontal
3760.0	-45.97	4.04	33.56	-16.45	-13	-3.45	Vertical
5640.0	-53.07	5.24	35.91	-22.40	-13	-9.40	Vertical
5640.0	-52.57	5.24	35.91	-21.90	-13	-8.90	Horizontal
208.9	-36.22	1.46	16.27	-21.41	-13	-8.41	Vertical
466.7	-44.52	1.59	15.15	-30.96	-13	-17.96	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-46.62	4.04	34.00	-16.66	-13	-3.66	Horizontal
3800.0	-48.56	4.04	34.00	-18.60	-13	-5.60	Vertical
5700.0	-50.15	5.24	36.04	-19.35	-13	-6.35	Vertical
5700.0	-53.11	5.24	36.04	-22.31	-13	-9.31	Horizontal
194.7	-34.48	1.36	17.39	-18.44	-13	-5.44	Vertical
302.1	-39.27	1.66	15.39	-25.54	-13	-12.54	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.



9.2 LTE BAND 4

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

<b>Test Results for Low Channel 1710.7MHz</b>							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-51.42	4.02	29.80	-25.64	-13	-12.64	Horizontal
3421.4	-48.92	4.02	29.80	-23.14	-13	-10.14	Vertical
5132.1	-53.32	5.24	35.84	-22.72	-13	-9.72	Vertical
5132.1	-51.09	5.24	35.84	-20.49	-13	-7.49	Horizontal
181.7	-34.81	1.68	16.04	-20.45	-13	-7.45	Vertical
401.7	-44.78	1.78	17.74	-28.82	-13	-15.82	Horizontal
<b>Test Results for Mid Channel 1732.5MHz</b>							
3465.0	-49.41	4.03	30.00	-23.44	-13	-10.44	Horizontal
3465.0	-53.30	4.03	30.00	-27.33	-13	-14.33	Vertical
5197.5	-50.49	5.25	35.86	-19.88	-13	-6.88	Vertical
5197.5	-49.34	5.25	35.86	-18.73	-13	-5.73	Horizontal
202.4	-42.06	1.72	17.69	-26.09	-13	-13.09	Vertical
342.9	-35.76	1.62	16.02	-21.35	-13	-8.35	Horizontal
<b>Test Results for High Channel 1754.3MHz</b>							
3508.6	-52.80	4.05	30.01	-26.84	-13	-13.84	Horizontal
3508.6	-49.58	4.05	30.01	-23.62	-13	-10.62	Vertical
5262.9	-47.74	5.26	35.86	-17.14	-13	-4.14	Vertical
5262.9	-49.36	5.26	35.86	-18.76	-13	-5.76	Horizontal
204.1	-37.96	1.80	16.69	-23.07	-13	-10.07	Vertical
235.0	-35.85	1.75	16.66	-20.95	-13	-7.95	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	-47.58	4.02	29.80	-21.80	-13	-8.80	Horizontal
3440.0	-52.58	4.02	29.80	-26.80	-13	-13.80	Vertical
5160.0	-50.93	5.24	35.84	-20.33	-13	-7.33	Vertical
5160.0	-50.46	5.24	35.84	-19.86	-13	-6.86	Horizontal
209.4	-42.68	1.57	17.26	-26.99	-13	-13.99	Vertical
381.0	-44.90	1.78	16.35	-30.33	-13	-17.33	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-45.20	4.03	30.00	-19.23	-13	-6.23	Horizontal
3465.0	-46.79	4.03	30.00	-20.82	-13	-7.82	Vertical
5197.5	-44.95	5.25	35.86	-14.34	-13	-1.34	Vertical
5197.5	-53.83	5.25	35.86	-23.22	-13	-10.22	Horizontal
204.4	-34.36	1.44	17.95	-17.85	-13	-4.85	Vertical
449.8	-42.32	1.65	16.09	-27.88	-13	-14.88	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-44.60	2.91	27.68	-19.83	-13	-6.83	Horizontal
3490.0	-51.43	2.91	27.68	-26.66	-13	-13.66	Vertical
5235.0	-45.31	5.26	35.86	-14.71	-13	-1.71	Vertical
5235.0	-52.61	5.26	35.86	-22.01	-13	-9.01	Horizontal
182.3	-38.75	1.61	16.85	-23.51	-13	-10.51	Vertical
275.5	-40.54	1.61	15.19	-26.96	-13	-13.96	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.

### 9.3 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	-52.78	2.78	27.50	-28.06	-13	-15.06	Horizontal
1649.4	-53.72	2.78	27.50	-29.00	-13	-16.00	Vertical
2474.1	-47.27	2.90	27.80	-22.37	-13	-9.37	Vertical
2474.1	-51.51	2.90	27.80	-26.61	-13	-13.61	Horizontal
202.9	-42.86	1.76	17.59	-27.03	-13	-14.03	Vertical
425.1	-44.03	1.63	15.87	-29.79	-13	-16.79	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-49.42	2.80	27.48	-24.74	-13	-11.74	Horizontal
1673.0	-48.08	2.80	27.48	-23.40	-13	-10.40	Vertical
2509.5	-47.38	2.91	27.70	-22.59	-13	-9.59	Vertical
2509.5	-51.96	2.91	27.70	-27.17	-13	-14.17	Horizontal
186.8	-35.99	1.61	15.68	-21.92	-13	-8.92	Vertical
249.1	-39.22	1.59	17.52	-23.30	-13	-10.30	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-49.36	2.82	27.43	-24.75	-13	-11.75	Horizontal
1696.6	-51.89	2.82	27.43	-27.28	-13	-14.28	Vertical
2544.9	-44.23	2.92	27.74	-19.41	-13	-6.41	Vertical
2544.9	-51.21	2.92	27.74	-26.39	-13	-13.39	Horizontal
207.3	-41.20	1.69	16.67	-26.21	-13	-13.21	Vertical
323.3	-41.93	1.70	17.18	-26.45	-13	-13.45	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	-45.29	2.78	27.50	-20.57	-13	-7.57	Horizontal
1658.0	-44.82	2.78	27.50	-20.10	-13	-7.10	Vertical
2487.0	-46.87	2.90	27.80	-21.97	-13	-8.97	Vertical
2487.0	-52.57	2.90	27.80	-27.67	-13	-14.67	Horizontal
205.7	-40.87	1.71	15.57	-27.01	-13	-14.01	Vertical
386.1	-36.12	1.34	16.40	-21.06	-13	-8.06	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-51.02	2.80	27.48	-26.34	-13	-13.34	Horizontal
1673.0	-53.59	2.80	27.48	-28.91	-13	-15.91	Vertical
2509.5	-45.39	2.91	27.70	-20.60	-13	-7.60	Vertical
2509.5	-53.71	2.91	27.70	-28.92	-13	-15.92	Horizontal
205.0	-42.00	1.44	17.04	-26.40	-13	-13.40	Vertical
317.4	-40.70	1.76	17.62	-24.84	-13	-11.84	Horizontal
Test Results for High Channel 844MHz							
1688.0	-47.34	2.82	27.43	-22.73	-13	-9.73	Horizontal
1688.0	-51.80	2.82	27.43	-27.19	-13	-14.19	Vertical
2532.0	-48.04	2.92	27.74	-23.22	-13	-10.22	Vertical
2532.0	-53.75	2.92	27.74	-28.93	-13	-15.93	Horizontal
177.2	-34.82	1.74	17.70	-18.86	-13	-5.86	Vertical
402.6	-39.81	1.41	17.46	-23.75	-13	-10.75	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.

9.4 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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-61.08	5.23	35.81	-30.50	-25	-5.50	Horizontal
5005.0	-62.32	5.23	35.81	-31.74	-25	-6.74	Vertical
7507.5	-59.06	5.67	36.85	-27.88	-25	-2.88	Vertical
7507.5	-59.95	5.67	36.85	-28.77	-25	-3.77	Horizontal
177.2	-52.84	1.73	17.97	-36.60	-25	-11.60	Vertical
455.9	-48.72	1.38	15.11	-34.99	-25	-9.99	Horizontal
<b>Test Results for Mid Channel 2535MHz</b>							
5070.0	-63.24	5.23	35.82	-32.65	-25	-7.65	Horizontal
5070.0	-64.51	5.23	35.82	-33.92	-25	-8.92	Vertical
7605.0	-60.73	5.67	36.85	-29.55	-25	-4.55	Vertical
7605.0	-64.33	5.67	36.85	-33.15	-25	-8.15	Horizontal
186.0	-50.94	1.77	16.17	-36.53	-25	-11.53	Vertical
454.3	-52.07	1.63	15.21	-38.49	-25	-13.49	Horizontal
<b>Test Results for High Channel 2567.5MHz</b>							
5135.0	-61.80	5.24	35.83	-31.21	-25	-6.21	Horizontal
5135.0	-60.65	5.24	35.83	-30.06	-25	-5.06	Vertical
7702.5	-63.20	5.68	36.87	-32.01	-25	-7.01	Vertical
7702.5	-64.58	5.68	36.87	-33.39	-25	-8.39	Horizontal
190.6	-49.09	1.58	17.56	-33.11	-25	-8.11	Vertical
453.2	-50.97	1.45	16.58	-35.84	-25	-10.84	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	-63.70	5.23	35.82	-33.11	-25	-8.11	Horizontal
5020.0	-61.62	5.23	35.82	-31.03	-25	-6.03	Vertical
7530.0	-64.92	5.67	36.86	-33.73	-25	-8.73	Vertical
7530.0	-61.59	5.67	36.86	-30.40	-25	-5.40	Horizontal
194.5	-44.67	1.63	15.76	-30.54	-25	-5.54	Vertical
348.1	-46.38	1.71	15.44	-32.65	-25	-7.65	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-64.80	5.23	35.82	-34.21	-25	-9.21	Horizontal
5070.0	-60.80	5.23	35.82	-30.21	-25	-5.21	Vertical
7605.0	-62.63	5.67	36.85	-31.45	-25	-6.45	Vertical
7605.0	-59.71	5.67	36.85	-28.53	-25	-3.53	Horizontal
188.8	-52.24	1.79	16.84	-37.18	-25	-12.18	Vertical
260.9	-51.39	1.71	17.64	-35.46	-25	-10.46	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-62.91	5.24	35.83	-32.32	-25	-7.32	Horizontal
5120.0	-62.72	5.24	35.83	-32.13	-25	-7.13	Vertical
7680.0	-59.01	5.70	36.88	-27.83	-25	-2.83	Vertical
7680.0	-63.30	5.70	36.88	-32.12	-25	-7.12	Horizontal
208.7	-47.07	1.79	16.84	-32.01	-25	-7.01	Vertical
441.7	-47.19	1.71	17.64	-31.26	-25	-6.26	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)**

<b>Test Results for Low Channel 699.7MHz</b>							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-52.36	2.60	27.20	-27.76	-13	-14.76	Horizontal
1399.4	-45.69	2.60	27.20	-21.09	-13	-8.09	Vertical
2099.1	-52.16	2.85	27.54	-27.47	-13	-14.47	Vertical
2099.1	-52.91	2.85	27.54	-28.22	-13	-15.22	Horizontal
192.5	-36.70	1.49	17.78	-20.41	-13	-7.41	Vertical
431.9	-41.79	1.36	17.33	-25.82	-13	-12.82	Horizontal
<b>Test Results For Mid Channel 707.5MHz</b>							
1415.0	-47.19	2.61	27.28	-22.52	-13	-9.52	Horizontal
1415.0	-44.30	2.61	27.28	-19.63	-13	-6.63	Vertical
2122.5	-44.34	2.87	27.59	-19.62	-13	-6.62	Vertical
2122.5	-51.05	2.87	27.59	-26.33	-13	-13.33	Horizontal
204.9	-44.09	1.73	15.74	-30.08	-13	-17.08	Vertical
411.4	-40.58	1.62	15.79	-26.41	-13	-13.41	Horizontal
<b>Test Results for High Channel 715.3MHz</b>							
1430.6	-44.66	2.63	27.28	-20.01	-13	-7.01	Horizontal
1430.6	-48.52	2.63	27.28	-23.87	-13	-10.87	Vertical
2145.9	-51.77	2.88	27.60	-27.05	-13	-14.05	Vertical
2145.9	-50.17	2.88	27.60	-25.45	-13	-12.45	Horizontal
200.6	-44.47	1.61	18.00	-28.08	-13	-15.08	Vertical
266.0	-43.05	1.45	15.49	-29.02	-13	-16.02	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	-49.56	2.61	27.26	-24.91	-13	-11.91	Horizontal
1408.0	-48.74	2.61	27.26	-24.09	-13	-11.09	Vertical
2112.0	-49.20	2.87	27.58	-24.49	-13	-11.49	Vertical
2112.0	-53.59	2.87	27.58	-28.88	-13	-15.88	Horizontal
188.5	-36.05	1.31	16.97	-20.39	-13	-7.39	Vertical
270.6	-43.26	1.65	16.70	-28.21	-13	-15.21	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-53.27	2.61	27.28	-28.60	-13	-15.60	Horizontal
1415.0	-48.27	2.61	27.28	-23.60	-13	-10.60	Vertical
2122.5	-44.12	2.87	27.59	-19.40	-13	-6.40	Vertical
2122.5	-52.34	2.87	27.59	-27.62	-13	-14.62	Horizontal
180.8	-40.73	1.72	17.99	-24.46	-13	-11.46	Vertical
316.8	-43.97	1.73	17.94	-27.76	-13	-14.76	Horizontal
Test Results for High Channel 711MHz							
1422.0	-52.89	2.62	27.28	-28.23	-13	-15.23	Horizontal
1422.0	-45.07	2.62	27.28	-20.41	-13	-7.41	Vertical
2133.0	-51.84	2.87	27.60	-27.11	-13	-14.11	Vertical
2133.0	-53.58	2.87	27.60	-28.85	-13	-15.85	Horizontal
205.3	-44.43	1.58	15.93	-30.08	-13	-17.08	Vertical
451.9	-42.70	1.36	15.59	-28.47	-13	-15.47	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)**

<b>Test Results for Low Channel 706.5MHz</b>							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1413.0	-47.89	2.61	27.28	-23.22	-13	-10.22	Horizontal
1413.0	-47.21	2.61	27.28	-22.54	-13	-9.54	Vertical
2119.5	-49.42	2.87	27.59	-24.70	-13	-11.70	Vertical
2119.5	-50.06	2.87	27.59	-25.34	-13	-12.34	Horizontal
183.5	-34.31	1.71	16.15	-19.87	-13	-6.87	Vertical
265.3	-42.66	1.41	17.32	-26.75	-13	-13.75	Horizontal
<b>Test Results For Mid Channel 710MHz</b>							
1420.0	-52.08	2.62	27.30	-27.40	-13	-14.40	Horizontal
1420.0	-45.05	2.62	27.30	-20.37	-13	-7.37	Vertical
2130.0	-48.01	2.87	27.62	-23.26	-13	-10.26	Vertical
2130.0	-53.88	2.87	27.62	-29.13	-13	-16.13	Horizontal
178.1	-44.71	1.42	15.25	-30.89	-13	-17.89	Vertical
434.2	-34.53	1.36	17.19	-18.70	-13	-5.70	Horizontal
<b>Test Results for High Channel 713.5MHz</b>							
1427.0	-47.94	2.66	27.28	-23.32	-13	-10.32	Horizontal
1427.0	-51.00	2.66	27.28	-26.38	-13	-13.38	Vertical
2140.5	-48.16	2.88	27.60	-23.44	-13	-10.44	Vertical
2140.5	-50.38	2.88	27.60	-25.66	-13	-12.66	Horizontal
182.2	-41.49	1.32	17.29	-25.52	-13	-12.52	Vertical
375.4	-37.97	1.72	16.89	-22.80	-13	-9.80	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	-44.47	2.62	27.30	-19.79	-13	-6.79	Horizontal
1418.0	-49.15	2.62	27.30	-24.47	-13	-11.47	Vertical
2127.0	-44.23	2.87	27.62	-19.48	-13	-6.48	Vertical
2127.0	-52.12	2.87	27.62	-27.37	-13	-14.37	Horizontal
204.1	-40.65	1.35	16.91	-25.09	-13	-12.09	Vertical
353.1	-40.95	1.62	16.31	-26.26	-13	-13.26	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-51.79	2.62	27.30	-27.11	-13	-14.11	Horizontal
1420.0	-50.47	2.62	27.30	-25.79	-13	-12.79	Vertical
2130.0	-53.31	2.87	27.62	-28.56	-13	-15.56	Vertical
2130.0	-51.38	2.87	27.62	-26.63	-13	-13.63	Horizontal
202.5	-34.03	1.51	17.14	-18.40	-13	-5.40	Vertical
360.1	-44.70	1.77	16.88	-29.59	-13	-16.59	Horizontal
Test Results for High Channel 711MHz							
1422.0	-53.72	2.62	27.30	-29.04	-13	-16.04	Horizontal
1422.0	-52.63	2.62	27.30	-27.95	-13	-14.95	Vertical
2133.0	-49.24	2.87	27.62	-24.49	-13	-11.49	Vertical
2133.0	-50.26	2.87	27.62	-25.51	-13	-12.51	Horizontal
181.3	-42.91	1.78	15.95	-28.74	-13	-15.74	Vertical
365.8	-38.84	1.34	17.95	-22.24	-13	-9.24	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.

## 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 3.4V, Normal, DC 3.85V and High voltage, DC 4.2V.

### 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]
3.4	1880	12.4	0.006573	2.5
3.85	1880	13.3	0.007082	2.5
4.2	1880	13.0	0.006916	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	13.0	0.006907	2.5
Extreme (50C)	1880	11.5	0.006114	2.5
Extreme (40C)	1880	13.5	0.007180	2.5
Extreme (30C)	1880	13.3	0.007061	2.5
Extreme (10C)	1880	13.8	0.007317	2.5
Extreme (0C)	1880	11.8	0.006298	2.5
Extreme (-10C)	1880	13.4	0.007119	2.5
Extreme (-20C)	1880	14.4	0.007645	2.5
Extreme (-30C)	1880	14.9	0.007930	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]
3.4	1880	9.8	0.005200	2.5
3.85	1880	8.7	0.004640	2.5
4.2	1880	8.4	0.004495	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.5	0.005028	2.5
Extreme (50C)	1880	9.1	0.004851	2.5
Extreme (40C)	1880	7.8	0.004138	2.5
Extreme (30C)	1880	9.1	0.004864	2.5
Extreme (10C)	1880	9.3	0.004941	2.5
Extreme (0C)	1880	7.9	0.004198	2.5
Extreme (-10C)	1880	9.2	0.004889	2.5
Extreme (-20C)	1880	8.6	0.004569	2.5
Extreme (-30C)	1880	8.5	0.004546	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]
3.4	1732.5	8.5	0.004924	2.5
3.85	1732.5	8.9	0.005160	2.5
4.2	1732.5	8.4	0.004851	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	8.7	0.005007	2.5
Extreme (40C)	1732.5	7.1	0.004102	2.5
Extreme (30C)	1732.5	6.0	0.003465	2.5
Extreme (10C)	1732.5	7.2	0.004136	2.5
Extreme (0C)	1732.5	9.6	0.005519	2.5
Extreme (-10C)	1732.5	8.3	0.004802	2.5
Extreme (-20C)	1732.5	6.9	0.003975	2.5
Extreme (-30C)	1732.5	8.5	0.004929	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]
3.4	1732.5	10.1	0.005806	2.5
3.85	1732.5	9.3	0.005392	2.5
4.2	1732.5	8.3	0.004815	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	10.1	0.005803	2.5
Extreme (50C)	1732.5	9.2	0.005304	2.5
Extreme (40C)	1732.5	8.2	0.004745	2.5
Extreme (30C)	1732.5	9.4	0.005450	2.5
Extreme (10C)	1732.5	8.7	0.005009	2.5
Extreme (0C)	1732.5	7.9	0.004546	2.5
Extreme (-10C)	1732.5	9.1	0.005259	2.5
Extreme (-20C)	1732.5	9.1	0.005225	2.5
Extreme (-30C)	1732.5	8.5	0.004883	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]
3.4	836.5	6.3	0.007482	2.5
3.85	836.5	7.1	0.008480	2.5
4.2	836.5	5.2	0.006178	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.1	0.007349	2.5
Extreme (50C)	836.5	6.4	0.007637	2.5
Extreme (40C)	836.5	6.4	0.007669	2.5
Extreme (30C)	836.5	6.8	0.008171	2.5
Extreme (10C)	836.5	5.3	0.006306	2.5
Extreme (0C)	836.5	5.7	0.006823	2.5
Extreme (-10C)	836.5	5.7	0.006859	2.5
Extreme (-20C)	836.5	5.8	0.006891	2.5
Extreme (-30C)	836.5	6.3	0.007512	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]
3.4	836.5	6.2	0.007453	2.5
3.85	836.5	6.8	0.008117	2.5
4.2	836.5	5.2	0.006261	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.6	0.007878	2.5
Extreme (50C)	836.5	6.3	0.007519	2.5
Extreme (40C)	836.5	5.8	0.006945	2.5
Extreme (30C)	836.5	6.1	0.007326	2.5
Extreme (10C)	836.5	4.9	0.005913	2.5
Extreme (0C)	836.5	5.3	0.006329	2.5
Extreme (-10C)	836.5	5.4	0.006474	2.5
Extreme (-20C)	836.5	6.4	0.007706	2.5
Extreme (-30C)	836.5	6.6	0.007947	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]
3.4	2535	9.7	0.003828	2.5
3.85	2535	8.8	0.003455	2.5
4.2	2535	8.5	0.003353	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	9.5	0.003764	2.5
Extreme (50C)	2535	9.0	0.003545	2.5
Extreme (40C)	2535	8.8	0.003458	2.5
Extreme (30C)	2535	9.4	0.003689	2.5
Extreme (10C)	2535	7.8	0.003065	2.5
Extreme (0C)	2535	8.2	0.003233	2.5
Extreme (-10C)	2535	9.0	0.003538	2.5
Extreme (-20C)	2535	8.7	0.003422	2.5
Extreme (-30C)	2535	8.4	0.003309	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]
3.4	2535	6.9	0.002722	2.5
3.85	2535	6.1	0.002392	2.5
4.2	2535	5.5	0.002164	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	6.1	0.002387	2.5
Extreme (40C)	2535	5.5	0.002183	2.5
Extreme (30C)	2535	6.8	0.002700	2.5
Extreme (10C)	2535	5.3	0.002110	2.5
Extreme (0C)	2535	5.2	0.002063	2.5
Extreme (-10C)	2535	5.4	0.002134	2.5
Extreme (-20C)	2535	6.1	0.002426	2.5
Extreme (-30C)	2535	5.7	0.002233	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]
3.4	707.5	8.4	0.011870	2.5
3.85	707.5	10.1	0.014273	2.5
4.2	707.5	8.6	0.012111	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.7	0.012346	2.5
Extreme (50C)	707.5	7.9	0.011128	2.5
Extreme (40C)	707.5	7.5	0.010564	2.5
Extreme (30C)	707.5	8.3	0.011759	2.5
Extreme (10C)	707.5	6.9	0.009813	2.5
Extreme (0C)	707.5	8.5	0.012042	2.5
Extreme (-10C)	707.5	8.6	0.012157	2.5
Extreme (-20C)	707.5	8.8	0.012391	2.5
Extreme (-30C)	707.5	8.0	0.011246	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]
3.4	707.5	7.4	0.010519	2.5
3.85	707.5	8.0	0.011301	2.5
4.2	707.5	7.1	0.010088	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]
3.4	710	9.6	0.013571	2.5
3.85	710	8.8	0.012358	2.5
4.2	710	7.6	0.010763	2.5

#### Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710	10.1	0.014156	2.5
Extreme (50C)	710	8.9	0.012486	2.5
Extreme (40C)	710	7.7	0.010776	2.5
Extreme (30C)	710	8.8	0.012341	2.5
Extreme (10C)	710	9.0	0.012667	2.5
Extreme (0C)	710	8.0	0.011215	2.5
Extreme (-10C)	710	9.4	0.013261	2.5
Extreme (-20C)	710	9.1	0.012795	2.5
Extreme (-30C)	710	7.9	0.011077	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]
3.4	710	9.5	0.013393	2.5
3.85	710	8.4	0.011891	2.5
4.2	710	8.6	0.012103	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710	9.4	0.013292	2.5
Extreme (50C)	710	8.9	0.012534	2.5
Extreme (40C)	710	7.9	0.011194	2.5
Extreme (30C)	710	9.2	0.012958	2.5
Extreme (10C)	710	8.2	0.011489	2.5
Extreme (0C)	710	8.7	0.012311	2.5
Extreme (-10C)	710	9.0	0.012738	2.5
Extreme (-20C)	710	8.7	0.012285	2.5
Extreme (-30C)	710	8.6	0.012176	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.

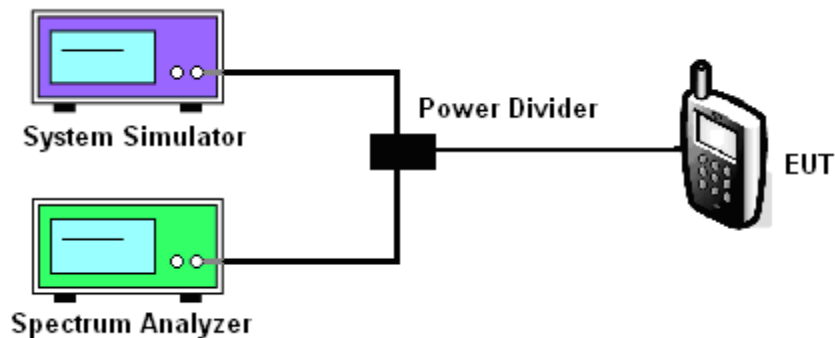
### 11.2 Measuring Instruments

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----