

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

## FCC ID: O55634521

**Product:** 6.3 inch 4G Smart Phone  
**Trade Mark:** LOGIC, iSWAG, UNONU  
**Model Number:** L63  
**Family Model:** ACTIV, N63  
**Report No.:** STR211125003006E

### Prepared for

SWAGTEK

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## TEST RESULT CERTIFICATION

<b>Applicant's name</b> .....	SWAGTEK
Address.....	10205 NW 19th Street STE101 Miami, FL 33172
<b>Manufacturer's Name</b> .....	SWAGTEK
Address.....	10205 NW 19th Street STE101 Miami, FL 33172
Product name.....	6.3 inch 4G Smart Phone
Model and/or type reference ..	L63
Family Model:	ACTIV, N63
<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.....	Nov 26 . 2021 ~ Dec 20. 2021
Date of Issue .....	Dec 20. 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:	6.3 inch 4G Smart Phone
Trade Mark	LOGIC, iSWAG, UNONU
Model Name	L63
Family Model	ACTIV, N63
Model Difference	All models have same circuit, RF module, motherboard and antenna, only the appearance and battery cover logo brand and memory are different.
FCC ID:	O55634521
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
SIM Card	SIM 1 and SIM 2 is a chipset unit and tested as a single chipset. The SIM 1 is chosen for test.
Power Class	Class 3
Antenna:	PIFA Antenna
Antenna gain:	-1dBi
Adapter	Model:HB001-B Input: AC 100-240V~50/60Hz 0.2A Output: DC 5V---1.5A
Battery	DC 3.8V, 3800mAh, 14.44Wh
Power supply	DC 3.85V from battery or DC 5V from Adapter.
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.85V) (Note 1)
HW Version	V1.1

SW Version	LOGIC_L63A_GENERIC
** 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: O55634521** 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(m), (g), (h) KDB 971168 D01 Clause 6	Band Edge	PASS	
22.913(a)(2) 27.50 (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 (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 (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	6.3 inch 4G Smart Phone	L63	FCC ID: O55634521	EUT

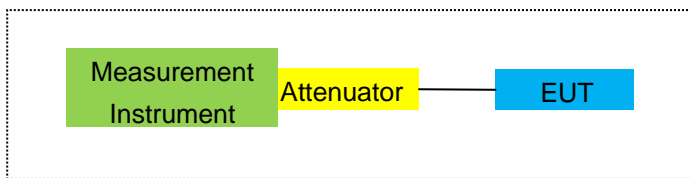
*Note: All the accessories have been used during the test.  
the following "EUT" in setup diagram means EUT system.*

## 2.4 TEST SETUP

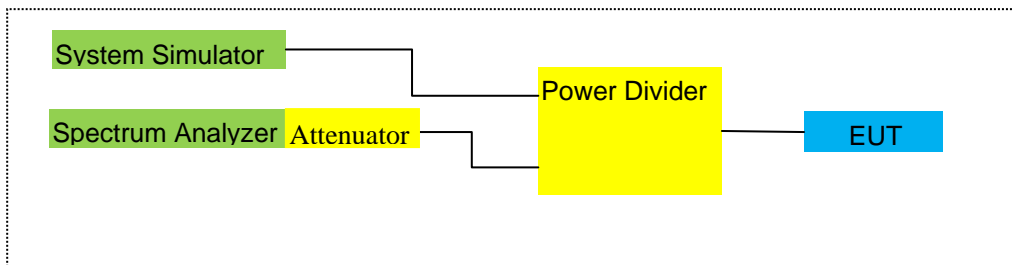
For Radiated Test Cases



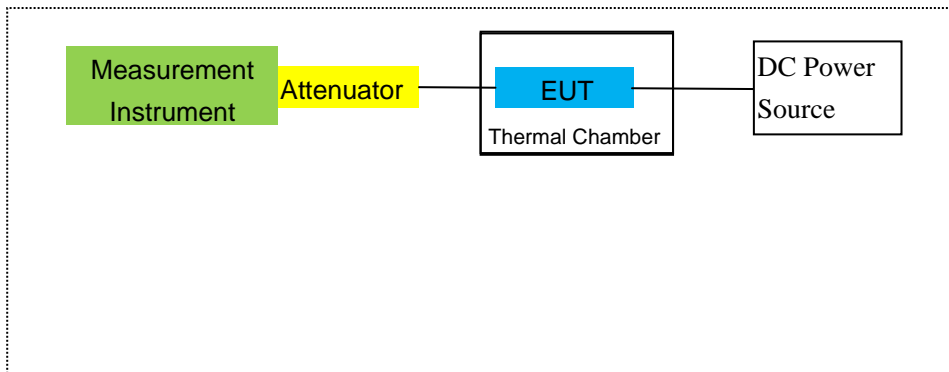
For Conducted Output Power



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	2021.11.07	2022.11.06	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	2020.04.07	2023.04.06	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 Band2
- 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(m)(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.**

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported (LTE Band 2/4/7: above 10GHz).

## 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), (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 Size/RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization	
1.4MHz Band QPSK	1/#Mid	1850.7	-1.35	3.76	28.24	23.13	205.589	Horizontal	Pass
		1880	-1.16	3.91	28.22	23.15	206.538	Horizontal	Pass
		1909.3	-1.07	3.93	28.20	23.20	208.930	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-1.41	3.77	28.23	23.05	201.837	Horizontal	Pass
		1880	-1.26	3.91	28.24	23.07	202.768	Horizontal	Pass
		1908.5	-1.13	3.94	28.25	23.18	207.970	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-1.30	3.77	28.31	23.24	210.863	Horizontal	Pass
		1880	-0.92	3.91	28.22	23.39	218.273	Horizontal	Pass
		1907.5	-0.85	3.94	28.20	23.41	219.280	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-1.16	3.79	28.33	23.38	217.771	Horizontal	Pass
		1880	-0.86	3.95	28.22	23.41	219.280	Horizontal	Pass
		1905	-0.75	3.97	28.19	23.47	222.331	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-1.12	3.79	28.34	23.43	220.293	Horizontal	Pass
		1880	-0.91	3.95	28.22	23.36	216.770	Horizontal	Pass
		1902.5	-0.77	3.97	28.18	23.44	220.800	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-1.11	3.81	28.35	23.43	220.293	Horizontal	Pass
		1880	-0.78	3.96	28.22	23.48	222.844	Horizontal	Pass
		1900	-0.72	4.00	28.16	23.44	220.800	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-2.15	3.76	28.24	22.33	171.002	Vertical	Pass
		1880	-1.72	3.91	28.22	22.59	181.552	Vertical	Pass
		1909.3	-1.53	3.93	28.20	22.74	187.932	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-2.34	3.77	28.23	22.12	162.930	Vertical	Pass
		1880	-2.35	3.91	28.24	21.98	157.761	Vertical	Pass
		1908.5	-1.59	3.94	28.25	22.72	187.068	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-2.68	3.77	28.31	21.86	153.462	Vertical	Pass
		1880	-1.59	3.91	28.22	22.72	187.068	Vertical	Pass
		1907.5	-1.45	3.94	28.20	22.81	190.985	Vertical	Pass
10.0MHz Band	1/#Mid	1855	-2.14	3.79	28.33	22.40	173.780	Vertical	Pass
		1880	-1.83	3.95	28.22	22.44	175.388	Vertical	Pass

QPSK		1905	-2.07	3.97	28.19	22.15	164.059	Vertical	Pass
15.0MHz	1/#Mid	1857.5	-1.81	3.79	28.34	22.74	187.932	Vertical	Pass
Band		1880	-2.00	3.95	28.22	22.27	168.655	Vertical	Pass
QPSK		1902.5	-1.80	3.97	28.18	22.41	174.181	Vertical	Pass
20.0MHz	1/#Mid	1860	-2.65	3.81	28.35	21.89	154.525	Vertical	Pass
Band		1880	-1.41	3.96	28.22	22.85	192.752	Vertical	Pass
QPSK		1900	-1.36	4.00	28.16	22.80	190.546	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 Size/RB Position	Frequency	Result					Polarization	Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Max. EIRP Average (dBm)	Max. EIRP		
							Average (mW)		
1.4MHz Band 16 QAM	1/#Mid	1850.7	-2.47	3.76	28.24	22.01	158.855	Horizontal	Pass
		1880	-1.94	3.91	28.22	22.37	172.584	Horizontal	Pass
		1909.3	-1.87	3.93	28.20	22.40	173.780	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-1.97	3.77	28.23	22.49	177.419	Horizontal	Pass
		1880	-2.05	3.91	28.24	22.28	169.044	Horizontal	Pass
		1908.5	-2.26	3.94	28.25	22.05	160.325	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-1.91	3.77	28.31	22.63	183.231	Horizontal	Pass
		1880	-1.82	3.91	28.22	22.49	177.419	Horizontal	Pass
		1907.5	-1.50	3.94	28.20	22.76	188.799	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-1.96	3.79	28.33	22.58	181.134	Horizontal	Pass
		1880	-1.95	3.95	28.22	22.32	170.608	Horizontal	Pass
		1905	-1.42	3.97	28.19	22.80	190.546	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-1.94	3.79	28.34	22.61	182.390	Horizontal	Pass
		1880	-1.73	3.95	28.22	22.54	179.473	Horizontal	Pass
		1902.5	-1.69	3.97	28.18	22.52	178.649	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-1.83	3.81	28.35	22.71	186.638	Horizontal	Pass
		1880	-1.53	3.96	28.22	22.73	187.499	Horizontal	Pass
		1900	-1.35	4.00	28.16	<b>22.81</b>	190.985	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-3.48	3.76	28.24	21.00	125.893	Vertical	Pass
		1880	-2.53	3.91	28.22	21.78	150.661	Vertical	Pass
		1909.3	-2.65	3.93	28.20	21.62	145.211	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-3.24	3.77	28.23	21.22	132.434	Vertical	Pass
		1880	-3.11	3.91	28.24	21.22	132.434	Vertical	Pass
		1908.5	-2.95	3.94	28.25	21.36	136.773	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-3.62	3.77	28.31	20.92	123.595	Vertical	Pass
		1880	-2.95	3.91	28.22	21.36	136.773	Vertical	Pass
		1907.5	-2.46	3.94	28.20	21.80	151.356	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-3.08	3.79	28.33	21.46	139.959	Vertical	Pass
		1880	-3.16	3.95	28.22	21.11	129.122	Vertical	Pass
		1905	-3.26	3.97	28.19	20.96	124.738	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-3.64	3.79	28.34	20.91	123.310	Vertical	Pass
		1880	-2.48	3.95	28.22	21.79	151.008	Vertical	Pass
		1902.5	-2.49	3.97	28.18	21.72	148.594	Vertical	Pass

20.0MHz		1860	-3.52	3.81	28.35	21.02	126.474	Vertical	Pass
Band 16	1/#Mid	1880	-3.20	3.96	28.22	21.06	127.644	Vertical	Pass
QAM		1900	-2.55	4.00	28.16	21.61	144.877	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 Size/RB Position	Frequency	Result					Polarization	Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Max. EIRP Average (dBm)	Max. EIRP		
							Average (mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-1.26	3.12	27.58	23.20	208.930	Horizontal	Pass
		1732.5	-1.25	3.27	27.61	23.09	203.704	Horizontal	Pass
		1754.3	-1.23	3.29	27.63	23.11	204.644	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-1.43	3.13	27.61	23.05	201.837	Horizontal	Pass
		1732.5	-1.35	3.27	27.61	22.99	199.067	Horizontal	Pass
		1753.5	-1.27	3.30	27.62	23.05	201.837	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-1.20	3.13	27.63	23.30	213.796	Horizontal	Pass
		1732.5	-1.10	3.27	27.61	23.24	210.863	Horizontal	Pass
		1752.5	-0.98	3.30	27.60	23.32	214.783	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-1.14	3.15	27.64	23.35	216.272	Horizontal	Pass
		1732.5	-0.91	3.31	27.61	23.39	218.273	Horizontal	Pass
		1750	-0.93	3.33	27.59	23.33	215.278	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-1.15	3.15	27.65	23.35	216.272	Horizontal	Pass
		1732.5	-0.99	3.31	27.61	23.31	214.289	Horizontal	Pass
		1747.5	-0.93	3.33	27.57	23.31	214.289	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-1.09	3.17	27.66	23.40	218.776	Horizontal	Pass
		1732.5	-0.92	3.32	27.61	23.37	217.270	Horizontal	Pass
		1745	-0.86	3.36	27.56	23.34	215.774	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-1.97	3.12	27.58	22.49	177.419	Vertical	Pass
		1732.5	-2.41	3.27	27.61	21.93	155.955	Vertical	Pass
		1754.3	-2.46	3.29	27.63	21.88	154.170	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-2.05	3.13	27.61	22.43	174.985	Vertical	Pass
		1732.5	-1.64	3.27	27.61	22.70	186.209	Vertical	Pass
		1753.5	-2.22	3.30	27.62	22.10	162.181	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.01	3.13	27.63	22.49	177.419	Vertical	Pass
		1732.5	-1.76	3.27	27.61	22.58	181.134	Vertical	Pass
		1752.5	-1.63	3.30	27.60	22.67	184.927	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-2.41	3.15	27.64	22.08	161.436	Vertical	Pass
		1732.5	-1.92	3.31	27.61	22.38	172.982	Vertical	Pass
		1750	-1.49	3.33	27.59	22.77	189.234	Vertical	Pass



15.0MHz		1717.5	-2.09	3.15	27.65	22.41	174.181	Vertical	Pass
Band	1/#Mid	1732.5	-1.89	3.31	27.61	22.41	174.181	Vertical	Pass
QPSK		1747.5	-1.87	3.33	27.57	22.37	172.584	Vertical	Pass
20.0MHz		1720	-2.56	3.17	27.66	21.93	155.955	Vertical	Pass
Band	1/#Mid	1732.5	-2.44	3.32	27.61	21.85	153.109	Vertical	Pass
QPSK		1745	-2.06	3.36	27.56	22.14	163.682	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 Size/RB Position	Frequency	Result					Polarization	Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Max. EIRP Average (dBm)	Max. EIRP		
							Average (mW)		
1.4MHz Band 16 QAM	1/#Mid	1710.7	-2.07	3.12	27.58	22.39	173.380	Horizontal	Pass
		1732.5	-1.92	3.27	27.61	22.42	174.582	Horizontal	Pass
		1754.3	-1.92	3.29	27.63	22.42	174.582	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.01	3.13	27.61	22.47	176.604	Horizontal	Pass
		1732.5	-2.14	3.27	27.61	22.20	165.959	Horizontal	Pass
		1753.5	-2.36	3.30	27.62	21.96	157.036	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-1.84	3.13	27.63	22.66	184.502	Horizontal	Pass
		1732.5	-1.80	3.27	27.61	22.54	179.473	Horizontal	Pass
		1752.5	-1.49	3.30	27.60	22.81	190.985	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-1.91	3.15	27.64	22.58	181.134	Horizontal	Pass
		1732.5	-2.10	3.31	27.61	22.20	165.959	Horizontal	Pass
		1750	-1.48	3.33	27.59	22.78	189.671	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-1.71	3.15	27.65	22.79	190.108	Horizontal	Pass
		1732.5	-1.77	3.31	27.61	22.53	179.061	Horizontal	Pass
		1747.5	-1.79	3.33	27.57	22.45	175.792	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-1.66	3.17	27.66	22.83	191.867	Horizontal	Pass
		1732.5	-1.67	3.32	27.61	22.62	182.810	Horizontal	Pass
		1745	-1.48	3.36	27.56	22.72	187.068	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-3.24	3.12	27.58	21.22	132.434	Vertical	Pass
		1732.5	-3.35	3.27	27.61	20.99	125.603	Vertical	Pass
		1754.3	-3.22	3.29	27.63	21.12	129.420	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-3.04	3.13	27.61	21.44	139.316	Vertical	Pass
		1732.5	-3.07	3.27	27.61	21.27	133.968	Vertical	Pass
		1753.5	-3.25	3.30	27.62	21.07	127.938	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-3.13	3.13	27.63	21.37	137.088	Vertical	Pass
		1732.5	-2.58	3.27	27.61	21.76	149.968	Vertical	Pass
		1752.5	-2.77	3.30	27.60	21.53	142.233	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-3.05	3.15	27.64	21.44	139.316	Vertical	Pass
		1732.5	-2.61	3.31	27.61	21.69	147.571	Vertical	Pass
		1750	-3.20	3.33	27.59	21.06	127.644	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-3.22	3.15	27.65	21.28	134.276	Vertical	Pass
		1732.5	-2.80	3.31	27.61	21.50	141.254	Vertical	Pass
		1747.5	-3.02	3.33	27.57	21.22	132.434	Vertical	Pass

20.0MHz		1720	-3.33	3.17	27.66	21.16	130.617	Vertical	Pass
Band 16	1/#Mid	1732.5	-2.71	3.32	27.61	21.58	143.880	Vertical	Pass
QAM		1745	-3.25	3.36	27.56	20.95	124.451	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 Size/RB Position	Frequency	Result						Polarization	Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP		
								Average (mW)		
1.4MHz Band QPSK	1/#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	22.81	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	6.42	2.01	19.68	2.15	21.94	156.315	Vertical	Pass
		836.5	5.64	2.01	19.77	2.15	21.25	133.352	Vertical	Pass
		848.3	5.38	2.02	19.82	2.15	21.03	126.765	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	5.76	2.01	19.77	2.15	21.37	137.088	Vertical	Pass
		847.5	5.50	2.02	19.81	2.15	21.14	130.017	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	826.5	5.90	2.01	19.71	2.15	21.45	139.637	Vertical	Pass
		836.5	5.65	2.01	19.77	2.15	21.26	133.660	Vertical	Pass
		846.5	5.49	2.02	19.79	2.15	21.11	129.122	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	829	6.00	2.01	19.73	2.15	21.57	143.549	Vertical	Pass
		836.5	5.96	2.01	19.77	2.15	21.57	143.549	Vertical	Pass
		844	5.55	2.02	19.78	2.15	21.16	130.617	Vertical	Pass

Radiated Power (ERP) for Band 5											
Mode	RB Size/RB Position	Frequency	Result							Polarization	Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP			
								Average (mW)			
1.4MHz Band 16 QAM	1/#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	22.29	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	6.02	2.01	19.68	2.15	21.54	142.561	Vertical	Pass	
		836.5	4.78	2.01	19.77	2.15	20.39	109.396	Vertical	Pass	
		848.3	6.19	2.02	19.82	2.15	21.84	152.757	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	5.94	2.01	19.70	2.15	21.48	140.605	Vertical	Pass	
		836.5	5.61	2.01	19.77	2.15	21.22	132.434	Vertical	Pass	
		847.5	6.17	2.02	19.81	2.15	21.81	151.705	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	6.28	2.01	19.71	2.15	21.83	152.405	Vertical	Pass	
		836.5	6.35	2.01	19.77	2.15	21.96	157.036	Vertical	Pass	
		846.5	6.08	2.02	19.79	2.15	21.70	147.911	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	829	4.88	2.01	19.73	2.15	20.45	110.917	Vertical	Pass	
		836.5	5.48	2.01	19.77	2.15	21.09	128.529	Vertical	Pass	
		844	4.42	2.02	19.78	2.15	20.03	100.693	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 Size/RB Position	Frequency	Result						Polarization	Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Max. EIRP Average (dBm)	Max. EIRP			
							Average (mW)			
5.0MHz Band QPSK	1/#Mid	2502.5	-0.89	4.54	27.75	22.32	170.608	Horizontal	Pass	
		2535	-0.72	4.69	27.72	22.31	170.216	Horizontal	Pass	
		2567.5	-0.65	4.71	27.71	22.35	171.791	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	2505	-0.82	4.55	27.76	22.39	173.380	Horizontal	Pass	
		2535	-0.63	4.69	27.72	22.40	173.780	Horizontal	Pass	
		2565	-0.55	4.72	27.70	22.43	174.985	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	2507.5	-0.83	4.55	27.77	22.39	173.380	Horizontal	Pass	
		2535	-0.69	4.69	27.72	22.34	171.396	Horizontal	Pass	
		2562.5	-0.59	4.72	27.69	22.38	172.982	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	2510	-0.77	4.57	27.78	22.44	175.388	Horizontal	Pass	
		2535	-0.59	4.73	27.72	22.40	173.780	Horizontal	Pass	
		2560	-0.55	4.75	27.68	22.38	172.982	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	2502.5	-2.12	4.54	27.75	21.09	128.529	Vertical	Pass	
		2535	-2.52	4.69	27.72	20.51	112.460	Vertical	Pass	
		2567.5	-1.70	4.71	27.71	21.30	134.896	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	2505	-2.40	4.55	27.76	20.81	120.504	Vertical	Pass	
		2535	-2.53	4.69	27.72	20.50	112.202	Vertical	Pass	
		2565	-2.47	4.72	27.70	20.51	112.460	Vertical	Pass	
15.0MHz Band QPSK	1/#Mid	2507.5	-1.77	4.55	27.77	21.45	139.637	Vertical	Pass	
		2535	-2.10	4.69	27.72	20.93	123.880	Vertical	Pass	
		2562.5	-1.48	4.72	27.69	21.49	140.929	Vertical	Pass	
20.0MHz Band QPSK	1/#Mid	2510	-2.08	4.57	27.78	21.13	129.718	Vertical	Pass	
		2535	-1.63	4.73	27.72	21.36	136.773	Vertical	Pass	
		2560	-2.29	4.75	27.68	20.64	115.878	Vertical	Pass	

Radiated Power (EIRP) for Band 7										
Mode	RB Size/RB Position	Frequency	Result						Polarization	Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
5.0MHz Band 16 QAM	1/#Mid	2502.5	-1.58	4.54	27.75	21.63	145.546	Horizontal	Pass	
		2535	-1.27	4.69	27.72	21.76	149.968	Horizontal	Pass	
		2567.5	-1.35	4.71	27.71	21.65	146.218	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	2505	-1.47	4.55	27.76	21.74	149.279	Horizontal	Pass	
		2535	-1.48	4.69	27.72	21.55	142.889	Horizontal	Pass	
		2565	-1.75	4.72	27.70	21.23	132.739	Horizontal	Pass	
15.0MHz Band 16 QAM	1/#Mid	2507.5	-1.65	4.55	27.77	21.57	143.549	Horizontal	Pass	
		2535	-1.62	4.69	27.72	21.41	138.357	Horizontal	Pass	
		2562.5	-1.23	4.72	27.69	21.74	149.279	Horizontal	Pass	
20.0MHz Band 16 QAM	1/#Mid	2510	-1.53	4.57	27.78	21.68	147.231	Horizontal	Pass	
		2535	-1.20	4.73	27.72	21.79	151.008	Horizontal	Pass	
		2560	-1.30	4.75	27.68	21.63	145.546	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	2502.5	-2.00	4.54	27.75	21.21	132.130	Vertical	Pass	
		2535	-2.16	4.69	27.72	20.87	122.180	Vertical	Pass	
		2567.5	-2.72	4.71	27.71	20.28	106.660	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	2505	-1.82	4.55	27.76	21.39	137.721	Vertical	Pass	
		2535	-2.63	4.69	27.72	20.40	109.648	Vertical	Pass	
		2565	-1.77	4.72	27.70	21.21	132.130	Vertical	Pass	
15.0MHz Band 16 QAM	1/#Mid	2507.5	-1.90	4.55	27.77	21.32	135.519	Vertical	Pass	
		2535	-3.12	4.69	27.72	19.91	97.949	Vertical	Pass	
		2562.5	-2.41	4.72	27.69	20.56	113.763	Vertical	Pass	
20.0MHz Band 16 QAM	1/#Mid	2510	-3.17	4.57	27.78	20.04	100.925	Vertical	Pass	
		2535	-1.50	4.73	27.72	21.49	140.929	Vertical	Pass	
		2560	-1.59	4.75	27.68	21.34	136.144	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 Size/RB Position	Frequency	Result							Polarization	Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP			
								Average (mW)			
1.4MHz Band QPSK	1/#Mid	699.7	7.54	1.91	19.21	2.15	23.46	221.820	Vertical	Pass	
		707.5	7.46	1.91	19.26	2.15	23.43	220.293	Vertical	Pass	
		715.3	7.24	1.93	19.34	2.15	23.27	212.324	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	7.33	1.91	19.21	2.15	23.25	211.349	Vertical	Pass	
		707.5	7.25	1.91	19.26	2.15	23.22	209.894	Vertical	Pass	
		714.5	7.09	1.93	19.34	2.15	23.12	205.116	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	7.60	1.91	19.23	2.15	23.54	225.944	Vertical	Pass	
		707.5	7.51	1.91	19.26	2.15	23.48	222.844	Vertical	Pass	
		713.5	7.30	1.92	19.33	2.15	23.33	215.278	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	704	7.62	1.91	19.25	2.15	23.58	228.034	Vertical	Pass	
		707.5	7.60	1.91	19.26	2.15	23.57	227.510	Vertical	Pass	
		711	7.45	1.92	19.32	2.15	23.47	222.331	Vertical	Pass	
1.4MHz Band QPSK	1/#Mid	699.7	6.31	1.91	19.21	2.15	22.71	186.638	Horizontal	Pass	
		707.5	6.10	1.91	19.26	2.15	22.39	173.380	Horizontal	Pass	
		715.3	6.39	1.93	19.34	2.15	22.24	167.494	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	6.16	1.91	19.21	2.15	22.38	172.982	Horizontal	Pass	
		707.5	6.40	1.91	19.26	2.15	22.41	174.181	Horizontal	Pass	
		714.5	6.07	1.93	19.34	2.15	22.65	184.077	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	6.68	1.91	19.23	2.15	21.92	155.597	Horizontal	Pass	
		707.5	6.00	1.91	19.26	2.15	22.61	182.390	Horizontal	Pass	
		713.5	5.77	1.92	19.33	2.15	21.90	154.882	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	704	6.31	1.91	19.25	2.15	21.82	152.055	Horizontal	Pass	
		707.5	6.07	1.91	19.26	2.15	22.06	160.694	Horizontal	Pass	
		711	5.80	1.92	19.32	2.15	22.08	161.436	Horizontal	Pass	



Radiated Power (ERP) for Band 12											
Mode	RB Size/RB Position	Frequency	Result							Polarization	Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)			
			1.4MHz Band 16 QAM	1/#Mid	699.7	7.12	1.91	19.21	2.15		
		707.5	7.04	1.91	19.26	2.15	22.24	167.494	Vertical	Pass	
		715.3	6.82	1.93	19.34	2.15	22.08	161.436	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	700.5	6.91	1.91	19.21	2.15	22.06	160.694	Vertical	Pass	
		707.5	6.83	1.91	19.26	2.15	22.03	159.588	Vertical	Pass	
		714.5	6.67	1.93	19.34	2.15	21.93	155.955	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	701.5	7.18	1.91	19.23	2.15	22.35	171.791	Vertical	Pass	
		707.5	7.09	1.91	19.26	2.15	22.29	169.434	Vertical	Pass	
		713.5	6.88	1.92	19.33	2.15	22.14	163.682	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	704	7.20	1.91	19.25	2.15	22.39	173.380	Vertical	Pass	
		707.5	7.18	1.91	19.26	2.15	22.38	172.982	Vertical	Pass	
		711	7.03	1.92	19.32	2.15	22.28	169.044	Vertical	Pass	
1.4MHz Band 16 QAM	1/#Mid	699.7	6.26	1.91	19.21	2.15	21.41	138.357	Horizontal	Pass	
		707.5	5.66	1.91	19.26	2.15	20.86	121.899	Horizontal	Pass	
		715.3	5.33	1.93	19.34	2.15	20.59	114.551	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	700.5	5.74	1.91	19.21	2.15	20.89	122.744	Horizontal	Pass	
		707.5	5.87	1.91	19.26	2.15	21.07	127.938	Horizontal	Pass	
		714.5	6.22	1.93	19.34	2.15	21.48	140.605	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	701.5	6.25	1.91	19.23	2.15	21.42	138.676	Horizontal	Pass	
		707.5	5.58	1.91	19.26	2.15	20.78	119.674	Horizontal	Pass	
		713.5	5.88	1.92	19.33	2.15	21.14	130.017	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	704	5.49	1.91	19.25	2.15	20.68	116.950	Horizontal	Pass	
		707.5	5.52	1.91	19.26	2.15	20.72	118.032	Horizontal	Pass	
		711	5.40	1.92	19.32	2.15	20.65	116.145	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 Size/RB Position	Frequency	Result							Polarization	Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP			
								Average (mW)			
5.0MHz Band QPSK	1/#Mid	706.5	7.58	1.91	19.23	2.15	22.75	188.365	Vertical	Pass	
		710	7.44	1.91	19.26	2.15	22.64	183.654	Vertical	Pass	
		713.5	7.34	1.92	19.33	2.15	22.60	181.970	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	709	7.59	1.91	19.25	2.15	22.78	189.671	Vertical	Pass	
		710	7.54	1.91	19.26	2.15	22.74	187.932	Vertical	Pass	
		711	7.50	1.92	19.32	2.15	22.75	188.365	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	706.5	7.30	1.91	19.23	2.15	22.47	176.604	Horizontal	Pass	
		710	6.09	1.91	19.26	2.15	21.29	134.586	Horizontal	Pass	
		713.5	6.94	1.92	19.33	2.15	22.20	165.959	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	709	6.93	1.91	19.25	2.15	22.12	162.930	Horizontal	Pass	
		710	7.20	1.91	19.26	2.15	22.40	173.780	Horizontal	Pass	
		711	5.57	1.92	19.32	2.15	20.82	120.781	Horizontal	Pass	

Radiated Power (ERP) for Band 17											
Mode	RB Size/RB Position	Frequency	Result							Polarization	Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP			
								Average (mW)			
5.0MHz Band 16 QAM	1/#Mid	706.5	7.28	1.91	19.23	2.15	22.45	175.792	Vertical	Pass	
		710	7.19	1.91	19.26	2.15	22.39	173.380	Vertical	Pass	
		713.5	6.99	1.92	19.33	2.15	22.25	167.880	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	709	6.82	1.91	19.25	2.15	22.01	158.855	Vertical	Pass	
		710	7.35	1.91	19.26	2.15	22.55	179.887	Vertical	Pass	
		711	7.08	1.92	19.32	2.15	22.33	171.002	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	706.5	5.92	1.91	19.23	2.15	21.09	128.529	Horizontal	Pass	
		710	6.19	1.91	19.26	2.15	21.39	137.721	Horizontal	Pass	
		713.5	6.06	1.92	19.33	2.15	21.32	135.519	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	709	6.07	1.91	19.25	2.15	21.26	133.660	Horizontal	Pass	
		710	6.30	1.91	19.26	2.15	21.50	141.254	Horizontal	Pass	
		711	5.68	1.92	19.32	2.15	20.93	123.880	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 (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 Band2  
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	-51.16	4.04	33.51	-21.69	-13	-8.69	Horizontal
3701.4	-49.99	4.04	33.51	-20.52	-13	-7.52	Vertical
5552.1	-51.78	5.24	35.84	-21.18	-13	-8.18	Vertical
5552.1	-51.06	5.24	35.84	-20.46	-13	-7.46	Horizontal
201.8	-36.81	1.43	16.02	-22.22	-13	-9.22	Vertical
298.4	-35.39	1.30	17.99	-18.70	-13	-5.70	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-48.96	4.04	33.56	-19.44	-13	-6.44	Horizontal
3760.0	-49.07	4.04	33.56	-19.55	-13	-6.55	Vertical
5640.0	-49.80	5.24	35.91	-19.13	-13	-6.13	Vertical
5640.0	-52.20	5.24	35.91	-21.53	-13	-8.53	Horizontal
183.5	-41.22	1.62	16.97	-25.87	-13	-12.87	Vertical
314.4	-44.28	1.74	15.98	-30.05	-13	-17.05	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-48.43	4.04	34.00	-18.47	-13	-5.47	Horizontal
3818.6	-44.84	4.04	34.00	-14.88	-13	-1.88	Vertical
5727.9	-47.30	5.24	36.04	-16.50	-13	-3.50	Vertical
5727.9	-51.21	5.24	36.04	-20.41	-13	-7.41	Horizontal
210.3	-43.41	1.42	17.29	-27.54	-13	-14.54	Vertical
318.3	-40.08	1.50	17.90	-23.67	-13	-10.67	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	-44.28	4.07	33.54	-14.81	-13	-1.81	Horizontal
3720.0	-49.71	4.07	33.54	-20.24	-13	-7.24	Vertical
5580.0	-49.96	5.28	35.86	-19.38	-13	-6.38	Vertical
5580.0	-52.12	5.28	35.86	-21.54	-13	-8.54	Horizontal
203.7	-34.75	1.58	16.89	-19.43	-13	-6.43	Vertical
257.3	-44.04	1.76	17.26	-28.54	-13	-15.54	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-46.84	4.04	33.56	-17.32	-13	-4.32	Horizontal
3760.0	-48.52	4.04	33.56	-19.00	-13	-6.00	Vertical
5640.0	-51.55	5.24	35.91	-20.88	-13	-7.88	Vertical
5640.0	-51.18	5.24	35.91	-20.51	-13	-7.51	Horizontal
206.8	-44.14	1.46	16.27	-29.33	-13	-16.33	Vertical
286.8	-37.06	1.59	15.15	-23.50	-13	-10.50	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-48.40	4.04	34.00	-18.44	-13	-5.44	Horizontal
3800.0	-46.24	4.04	34.00	-16.28	-13	-3.28	Vertical
5700.0	-49.04	5.24	36.04	-18.24	-13	-5.24	Vertical
5700.0	-53.56	5.24	36.04	-22.76	-13	-9.76	Horizontal
192.2	-40.84	1.36	17.39	-24.80	-13	-11.80	Vertical
430.1	-42.62	1.66	15.39	-28.89	-13	-15.89	Horizontal

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

## 9.2 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	-47.99	4.02	29.80	-22.21	-13	-9.21	Horizontal
3421.4	-50.22	4.02	29.80	-24.44	-13	-11.44	Vertical
5132.1	-51.73	5.24	35.84	-21.13	-13	-8.13	Vertical
5132.1	-53.13	5.24	35.84	-22.53	-13	-9.53	Horizontal
177.0	-37.35	1.68	16.04	-22.99	-13	-9.99	Vertical
371.1	-34.90	1.78	17.74	-18.94	-13	-5.94	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-50.91	4.03	30.00	-24.94	-13	-11.94	Horizontal
3465.0	-52.53	4.03	30.00	-26.56	-13	-13.56	Vertical
5197.5	-51.85	5.25	35.86	-21.24	-13	-8.24	Vertical
5197.5	-52.56	5.25	35.86	-21.95	-13	-8.95	Horizontal
191.4	-41.20	1.72	17.69	-25.23	-13	-12.23	Vertical
297.1	-34.61	1.62	16.02	-20.20	-13	-7.20	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-45.65	4.05	30.01	-19.69	-13	-6.69	Horizontal
3508.6	-52.50	4.05	30.01	-26.54	-13	-13.54	Vertical
5262.9	-45.22	5.26	35.86	-14.62	-13	-1.62	Vertical
5262.9	-53.16	5.26	35.86	-22.56	-13	-9.56	Horizontal
188.3	-41.37	1.80	16.69	-26.48	-13	-13.48	Vertical
453.9	-38.85	1.75	16.66	-23.95	-13	-10.95	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	-49.30	4.02	29.80	-23.52	-13	-10.52	Horizontal
3440.0	-51.07	4.02	29.80	-25.29	-13	-12.29	Vertical
5160.0	-44.87	5.24	35.84	-14.27	-13	-1.27	Vertical
5160.0	-49.77	5.24	35.84	-19.17	-13	-6.17	Horizontal
176.0	-39.05	1.57	17.26	-23.36	-13	-10.36	Vertical
283.8	-40.81	1.78	16.35	-26.24	-13	-13.24	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-52.53	4.03	30.00	-26.56	-13	-13.56	Horizontal
3465.0	-46.55	4.03	30.00	-20.58	-13	-7.58	Vertical
5197.5	-46.34	5.25	35.86	-15.73	-13	-2.73	Vertical
5197.5	-53.04	5.25	35.86	-22.43	-13	-9.43	Horizontal
197.9	-36.96	1.44	17.95	-20.45	-13	-7.45	Vertical
335.8	-37.75	1.65	16.09	-23.31	-13	-10.31	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-51.00	2.91	27.68	-26.23	-13	-13.23	Horizontal
3490.0	-44.97	2.91	27.68	-20.20	-13	-7.20	Vertical
5235.0	-47.89	5.26	35.86	-17.29	-13	-4.29	Vertical
5235.0	-49.28	5.26	35.86	-18.68	-13	-5.68	Horizontal
184.7	-35.31	1.61	16.85	-20.07	-13	-7.07	Vertical
290.8	-34.27	1.61	15.19	-20.69	-13	-7.69	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

### 9.3 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	-47.07	2.78	27.50	-22.35	-13	-9.35	Horizontal
1649.4	-53.66	2.78	27.50	-28.94	-13	-15.94	Vertical
2474.1	-53.29	2.90	27.80	-28.39	-13	-15.39	Vertical
2474.1	-51.83	2.90	27.80	-26.93	-13	-13.93	Horizontal
194.7	-36.69	1.76	17.59	-20.86	-13	-7.86	Vertical
340.5	-34.87	1.63	15.87	-20.63	-13	-7.63	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-53.38	2.80	27.48	-28.70	-13	-15.70	Horizontal
1673.0	-50.75	2.80	27.48	-26.07	-13	-13.07	Vertical
2509.5	-53.38	2.91	27.70	-28.59	-13	-15.59	Vertical
2509.5	-49.35	2.91	27.70	-24.56	-13	-11.56	Horizontal
177.8	-35.85	1.61	15.68	-21.78	-13	-8.78	Vertical
468.9	-42.38	1.59	17.52	-26.46	-13	-13.46	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-44.17	2.82	27.43	-19.56	-13	-6.56	Horizontal
1696.6	-48.30	2.82	27.43	-23.69	-13	-10.69	Vertical
2544.9	-44.51	2.92	27.74	-19.69	-13	-6.69	Vertical
2544.9	-51.74	2.92	27.74	-26.92	-13	-13.92	Horizontal
209.7	-34.85	1.69	16.67	-19.86	-13	-6.86	Vertical
321.1	-40.96	1.70	17.18	-25.48	-13	-12.48	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	-46.13	2.78	27.50	-21.41	-13	-8.41	Horizontal
1658.0	-44.63	2.78	27.50	-19.91	-13	-6.91	Vertical
2487.0	-44.30	2.90	27.80	-19.40	-13	-6.40	Vertical
2487.0	-49.65	2.90	27.80	-24.75	-13	-11.75	Horizontal
194.1	-40.18	1.71	15.57	-26.32	-13	-13.32	Vertical
349.2	-44.43	1.34	16.40	-29.37	-13	-16.37	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-44.33	2.80	27.48	-19.65	-13	-6.65	Horizontal
1673.0	-45.46	2.80	27.48	-20.78	-13	-7.78	Vertical
2509.5	-44.05	2.91	27.70	-19.26	-13	-6.26	Vertical
2509.5	-49.36	2.91	27.70	-24.57	-13	-11.57	Horizontal
183.0	-37.51	1.44	17.04	-21.91	-13	-8.91	Vertical
239.5	-42.86	1.76	17.62	-27.00	-13	-14.00	Horizontal
Test Results for High Channel 844MHz							
1688.0	-48.89	2.82	27.43	-24.28	-13	-11.28	Horizontal
1688.0	-53.37	2.82	27.43	-28.76	-13	-15.76	Vertical
2532.0	-53.84	2.92	27.74	-29.02	-13	-16.02	Vertical
2532.0	-51.86	2.92	27.74	-27.04	-13	-14.04	Horizontal
210.3	-36.19	1.74	17.70	-20.23	-13	-7.23	Vertical
387.1	-42.04	1.41	17.46	-25.98	-13	-12.98	Horizontal

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

### 9.4 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	-60.60	5.23	35.81	-30.02	-25	-5.02	Horizontal
5005.0	-63.08	5.23	35.81	-32.50	-25	-7.50	Vertical
7507.5	-59.96	5.67	36.85	-28.78	-25	-3.78	Vertical
7507.5	-64.70	5.67	36.85	-33.52	-25	-8.52	Horizontal
211.6	-51.86	1.73	17.97	-35.62	-25	-10.62	Vertical
327.8	-52.20	1.38	15.11	-38.47	-25	-13.47	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.96	5.23	35.82	-31.37	-25	-6.37	Horizontal
5070.0	-60.45	5.23	35.82	-29.86	-25	-4.86	Vertical
7605.0	-63.05	5.67	36.85	-31.87	-25	-6.87	Vertical
7605.0	-60.94	5.67	36.85	-29.76	-25	-4.76	Horizontal
209.8	-44.56	1.77	16.17	-30.15	-25	-5.15	Vertical
406.4	-47.81	1.63	15.21	-34.23	-25	-9.23	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-60.88	5.24	35.83	-30.29	-25	-5.29	Horizontal
5135.0	-61.47	5.24	35.83	-30.88	-25	-5.88	Vertical
7702.5	-59.15	5.68	36.87	-27.96	-25	-2.96	Vertical
7702.5	-61.11	5.68	36.87	-29.92	-25	-4.92	Horizontal
209.8	-52.81	1.58	17.56	-36.83	-25	-11.83	Vertical
309.3	-44.61	1.45	16.58	-29.48	-25	-4.48	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	-64.49	5.23	35.82	-33.90	-25	-8.90	Horizontal
5020.0	-63.11	5.23	35.82	-32.52	-25	-7.52	Vertical
7530.0	-60.49	5.67	36.86	-29.30	-25	-4.30	Vertical
7530.0	-61.06	5.67	36.86	-29.87	-25	-4.87	Horizontal
190.7	-53.48	1.63	15.76	-39.35	-25	-14.35	Vertical
240.0	-51.18	1.71	15.44	-37.45	-25	-12.45	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-62.11	5.23	35.82	-31.52	-25	-6.52	Horizontal
5070.0	-59.07	5.23	35.82	-28.48	-25	-3.48	Vertical
7605.0	-64.97	5.67	36.85	-33.79	-25	-8.79	Vertical
7605.0	-59.85	5.67	36.85	-28.67	-25	-3.67	Horizontal
188.4	-52.70	1.79	16.84	-37.64	-25	-12.64	Vertical
277.6	-44.24	1.71	17.64	-28.31	-25	-3.31	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-63.70	5.24	35.83	-33.11	-25	-8.11	Horizontal
5120.0	-63.29	5.24	35.83	-32.70	-25	-7.70	Vertical
7680.0	-61.03	5.70	36.88	-29.85	-25	-4.85	Vertical
7680.0	-59.40	5.70	36.88	-28.22	-25	-3.22	Horizontal
182.0	-44.64	1.79	16.84	-29.58	-25	-4.58	Vertical
417.8	-45.73	1.71	17.64	-29.80	-25	-4.80	Horizontal

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

9.5 LTE BAND 12

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

Test Results for Low Channel 699.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-50.70	2.60	27.20	-26.10	-13	-13.10	Horizontal
1399.4	-47.63	2.60	27.20	-23.03	-13	-10.03	Vertical
2099.1	-50.80	2.85	27.54	-26.11	-13	-13.11	Vertical
2099.1	-52.83	2.85	27.54	-28.14	-13	-15.14	Horizontal
202.1	-42.52	1.49	17.78	-26.23	-13	-13.23	Vertical
313.7	-40.26	1.36	17.33	-24.29	-13	-11.29	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-49.66	2.61	27.28	-24.99	-13	-11.99	Horizontal
1415.0	-49.04	2.61	27.28	-24.37	-13	-11.37	Vertical
2122.5	-44.43	2.87	27.59	-19.71	-13	-6.71	Vertical
2122.5	-51.12	2.87	27.59	-26.40	-13	-13.40	Horizontal
211.2	-40.60	1.73	15.74	-26.59	-13	-13.59	Vertical
297.2	-34.47	1.62	15.79	-20.30	-13	-7.30	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-53.38	2.63	27.28	-28.73	-13	-15.73	Horizontal
1430.6	-52.55	2.63	27.28	-27.90	-13	-14.90	Vertical
2145.9	-46.03	2.88	27.60	-21.31	-13	-8.31	Vertical
2145.9	-52.75	2.88	27.60	-28.03	-13	-15.03	Horizontal
199.1	-41.81	1.61	18.00	-25.42	-13	-12.42	Vertical
462.8	-44.31	1.45	15.49	-30.28	-13	-17.28	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	-46.71	2.61	27.26	-22.06	-13	-9.06	Horizontal
1408.0	-46.91	2.61	27.26	-22.26	-13	-9.26	Vertical
2112.0	-51.26	2.87	27.58	-26.55	-13	-13.55	Vertical
2112.0	-52.22	2.87	27.58	-27.51	-13	-14.51	Horizontal
178.7	-40.48	1.31	16.97	-24.82	-13	-11.82	Vertical
409.8	-43.07	1.65	16.70	-28.02	-13	-15.02	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-48.22	2.61	27.28	-23.55	-13	-10.55	Horizontal
1415.0	-49.11	2.61	27.28	-24.44	-13	-11.44	Vertical
2122.5	-51.97	2.87	27.59	-27.25	-13	-14.25	Vertical
2122.5	-53.61	2.87	27.59	-28.89	-13	-15.89	Horizontal
188.2	-44.79	1.72	17.99	-28.52	-13	-15.52	Vertical
347.6	-38.75	1.73	17.94	-22.54	-13	-9.54	Horizontal
Test Results for High Channel 711MHz							
1422.0	-45.10	2.62	27.28	-20.44	-13	-7.44	Horizontal
1422.0	-48.52	2.62	27.28	-23.86	-13	-10.86	Vertical
2133.0	-48.86	2.87	27.60	-24.13	-13	-11.13	Vertical
2133.0	-51.25	2.87	27.60	-26.52	-13	-13.52	Horizontal
191.0	-34.90	1.58	15.93	-20.55	-13	-7.55	Vertical
342.8	-35.42	1.36	15.59	-21.19	-13	-8.19	Horizontal

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

9.6 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	-49.49	2.61	27.28	-24.82	-13	-11.82	Horizontal
1413.0	-51.73	2.61	27.28	-27.06	-13	-14.06	Vertical
2119.5	-48.53	2.87	27.59	-23.81	-13	-10.81	Vertical
2119.5	-52.83	2.87	27.59	-28.11	-13	-15.11	Horizontal
206.2	-36.58	1.71	16.15	-22.14	-13	-9.14	Vertical
330.2	-39.27	1.41	17.32	-23.36	-13	-10.36	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-46.90	2.62	27.30	-22.22	-13	-9.22	Horizontal
1420.0	-45.18	2.62	27.30	-20.50	-13	-7.50	Vertical
2130.0	-44.76	2.87	27.62	-20.01	-13	-7.01	Vertical
2130.0	-52.47	2.87	27.62	-27.72	-13	-14.72	Horizontal
196.7	-40.86	1.42	15.25	-27.04	-13	-14.04	Vertical
405.9	-35.11	1.36	17.19	-19.28	-13	-6.28	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-47.93	2.66	27.28	-23.31	-13	-10.31	Horizontal
1427.0	-46.59	2.66	27.28	-21.97	-13	-8.97	Vertical
2140.5	-49.92	2.88	27.60	-25.20	-13	-12.20	Vertical
2140.5	-49.44	2.88	27.60	-24.72	-13	-11.72	Horizontal
189.1	-43.66	1.32	17.29	-27.69	-13	-14.69	Vertical
239.7	-34.04	1.72	16.89	-18.87	-13	-5.87	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	-45.61	2.62	27.30	-20.93	-13	-7.93	Horizontal
1418.0	-48.65	2.62	27.30	-23.97	-13	-10.97	Vertical
2127.0	-49.06	2.87	27.62	-24.31	-13	-11.31	Vertical
2127.0	-50.53	2.87	27.62	-25.78	-13	-12.78	Horizontal
211.8	-38.63	1.35	16.91	-23.07	-13	-10.07	Vertical
285.1	-36.07	1.62	16.31	-21.38	-13	-8.38	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-45.18	2.62	27.30	-20.50	-13	-7.50	Horizontal
1420.0	-44.70	2.62	27.30	-20.02	-13	-7.02	Vertical
2130.0	-44.44	2.87	27.62	-19.69	-13	-6.69	Vertical
2130.0	-53.20	2.87	27.62	-28.45	-13	-15.45	Horizontal
187.0	-44.10	1.51	17.14	-28.47	-13	-15.47	Vertical
356.9	-37.87	1.77	16.88	-22.76	-13	-9.76	Horizontal
Test Results for High Channel 711MHz							
1422.0	-45.11	2.62	27.30	-20.43	-13	-7.43	Horizontal
1422.0	-48.08	2.62	27.30	-23.40	-13	-10.40	Vertical
2133.0	-44.67	2.87	27.62	-19.92	-13	-6.92	Vertical
2133.0	-50.96	2.87	27.62	-26.21	-13	-13.21	Horizontal
189.5	-34.67	1.78	15.95	-20.50	-13	-7.50	Vertical
342.9	-38.67	1.34	17.95	-22.07	-13	-9.07	Horizontal

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

## 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 34V, Normal, DC 3.8V 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 Band2  
LTE Band 4
- LTE Band5  
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	8.7	0.00464	2.5
3.8	1880	6.0	0.00320	2.5
4.2	1880	5.9	0.00312	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	6.3	0.00336	2.5
Extreme (50C)	1880	6.6	0.00352	2.5
Extreme (40C)	1880	7.5	0.00399	2.5
Extreme (30C)	1880	8.2	0.00436	2.5
Extreme (10C)	1880	9.2	0.00488	2.5
Extreme (0C)	1880	6.6	0.00353	2.5
Extreme (-10C)	1880	8.1	0.00431	2.5
Extreme (-20C)	1880	8.3	0.00443	2.5
Extreme (-30C)	1880	6.1	0.00325	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	7.7	0.00408	2.5
3.8	1880	6.0	0.00318	2.5
4.2	1880	6.4	0.00340	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	7.6	0.00406	2.5
Extreme (50C)	1880	6.9	0.00368	2.5
Extreme (40C)	1880	5.1	0.00270	2.5
Extreme (30C)	1880	6.6	0.00349	2.5
Extreme (10C)	1880	6.9	0.00365	2.5
Extreme (0C)	1880	5.2	0.00274	2.5
Extreme (-10C)	1880	9.9	0.00525	2.5
Extreme (-20C)	1880	5.4	0.00286	2.5
Extreme (-30C)	1880	6.2	0.00328	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	6.4	0.00370	2.5
3.8	1732.5	5.3	0.00306	2.5
4.2	1732.5	6.7	0.00386	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	4.5	0.00259	2.5
Extreme (50C)	1732.5	9.1	0.00526	2.5
Extreme (40C)	1732.5	6.1	0.00349	2.5
Extreme (30C)	1732.5	6.0	0.00349	2.5
Extreme (10C)	1732.5	6.1	0.00349	2.5
Extreme (0C)	1732.5	9.9	0.00573	2.5
Extreme (-10C)	1732.5	5.3	0.00307	2.5
Extreme (-20C)	1732.5	6.0	0.00346	2.5
Extreme (-30C)	1732.5	5.8	0.00335	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	6.1	0.00353	2.5
3.8	1732.5	6.3	0.00364	2.5
4.2	1732.5	5.5	0.00320	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	-6.4	-0.00367	2.5
Extreme (50C)	1732.5	-3.9	-0.00223	2.5
Extreme (40C)	1732.5	5.2	0.00301	2.5
Extreme (30C)	1732.5	-4.0	-0.00232	2.5
Extreme (10C)	1732.5	6.9	0.00399	2.5
Extreme (0C)	1732.5	4.6	0.00267	2.5
Extreme (-10C)	1732.5	9.2	0.00532	2.5
Extreme (-20C)	1732.5	10.8	0.00626	2.5
Extreme (-30C)	1732.5	6.0	0.00344	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	6.4	0.00763	2.5
3.8	836.5	8.1	0.00971	2.5
4.2	836.5	4.9	0.00586	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.7	0.00798	2.5
Extreme (50C)	836.5	8.6	0.01031	2.5
Extreme (40C)	836.5	9.3	0.01113	2.5
Extreme (30C)	836.5	5.6	0.00664	2.5
Extreme (10C)	836.5	6.9	0.00826	2.5
Extreme (0C)	836.5	4.7	0.00557	2.5
Extreme (-10C)	836.5	3.3	0.00393	2.5
Extreme (-20C)	836.5	5.1	0.00614	2.5
Extreme (-30C)	836.5	6.5	0.00780	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	8.8	0.01053	2.5
3.8	836.5	9.8	0.01166	2.5
4.2	836.5	7.6	0.00909	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.9	0.00821	2.5
Extreme (50C)	836.5	5.8	0.00692	2.5
Extreme (40C)	836.5	3.2	0.00380	2.5
Extreme (30C)	836.5	2.8	0.00334	2.5
Extreme (10C)	836.5	6.4	0.00763	2.5
Extreme (0C)	836.5	2.0	0.00244	2.5
Extreme (-10C)	836.5	9.0	0.01079	2.5
Extreme (-20C)	836.5	6.1	0.00730	2.5
Extreme (-30C)	836.5	5.9	0.00703	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	7.0	0.00275	2.5
3.8	2535	5.9	0.00235	2.5
4.2	2535	7.6	0.00301	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	7.4	0.00290	2.5
Extreme (50C)	2535	6.7	0.00263	2.5
Extreme (40C)	2535	5.9	0.00232	2.5
Extreme (30C)	2535	6.4	0.00254	2.5
Extreme (10C)	2535	6.4	0.00252	2.5
Extreme (0C)	2535	4.9	0.00195	2.5
Extreme (-10C)	2535	9.3	0.00365	2.5
Extreme (-20C)	2535	5.9	0.00234	2.5
Extreme (-30C)	2535	6.3	0.00249	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	5.5	0.00217	2.5
3.8	2535	6.9	0.00271	2.5
4.2	2535	9.1	0.00361	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	7.5	0.00295	2.5
Extreme (50C)	2535	6.4	0.00254	2.5
Extreme (40C)	2535	5.8	0.00228	2.5
Extreme (30C)	2535	3.5	0.00137	2.5
Extreme (10C)	2535	6.8	0.00269	2.5
Extreme (0C)	2535	5.1	0.00201	2.5
Extreme (-10C)	2535	9.6	0.00377	2.5
Extreme (-20C)	2535	10.7	0.00421	2.5
Extreme (-30C)	2535	5.7	0.00226	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	12.8	0.01812	2.5
3.8	707.5	14.0	0.01972	2.5
4.2	707.5	13.1	0.01854	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	-7.0	-0.00983	2.5
Extreme (50C)	707.5	-4.0	-0.00560	2.5
Extreme (40C)	707.5	5.7	0.00801	2.5
Extreme (30C)	707.5	-4.0	-0.00566	2.5
Extreme (10C)	707.5	6.3	0.00886	2.5
Extreme (0C)	707.5	4.5	0.00637	2.5
Extreme (-10C)	707.5	9.0	0.01276	2.5
Extreme (-20C)	707.5	10.5	0.01480	2.5
Extreme (-30C)	707.5	5.7	0.00806	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	10.0	0.01408	2.5
3.8	707.5	5.9	0.00832	2.5
4.2	707.5	4.5	0.00630	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	5.7	0.00805	2.5
Extreme (50C)	707.5	9.7	0.01377	2.5
Extreme (40C)	707.5	6.8	0.00966	2.5
Extreme (30C)	707.5	7.6	0.01070	2.5
Extreme (10C)	707.5	6.3	0.00888	2.5
Extreme (0C)	707.5	5.9	0.00832	2.5
Extreme (-10C)	707.5	7.0	0.00983	2.5
Extreme (-20C)	707.5	8.3	0.01178	2.5
Extreme (-30C)	707.5	6.2	0.00875	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	6.3	0.00886	2.5
3.8	710	4.9	0.00695	2.5
4.2	710	8.2	0.01159	2.5

#### Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710	4.2	0.00590	2.5
Extreme (50C)	710	6.4	0.00908	2.5
Extreme (40C)	710	6.6	0.00932	2.5
Extreme (30C)	710	6.2	0.00875	2.5
Extreme (10C)	710	4.7	0.00667	2.5
Extreme (0C)	710	7.7	0.01088	2.5
Extreme (-10C)	710	5.2	0.00736	2.5
Extreme (-20C)	710	5.8	0.00812	2.5
Extreme (-30C)	710	5.8	0.00819	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	6.0	0.00840	2.5
3.8	710	4.1	0.00571	2.5
4.2	710	3.9	0.00548	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710	5.6	0.00784	2.5
Extreme (50C)	710	4.2	0.00588	2.5
Extreme (40C)	710	3.1	0.00438	2.5
Extreme (30C)	710	3.5	0.00491	2.5
Extreme (10C)	710	6.9	0.00968	2.5
Extreme (0C)	710	4.9	0.00689	2.5
Extreme (-10C)	710	9.8	0.01386	2.5
Extreme (-20C)	710	6.4	0.00896	2.5
Extreme (-30C)	710	6.7	0.00939	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.

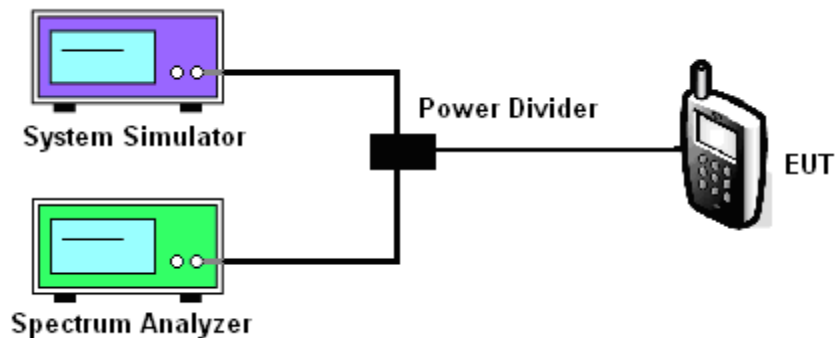
### 11.2 Measuring Instruments

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----