

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

## **FCC ID: ZSW-30-115**

**Product:** Mobile Phone  
**Trade Mark:** Bmobile  
**Model Number:** BL40  
**Family Model:** N/A  
**Report No.:** S21082300601005

### **Prepared for**

b mobile HK Limited

Flat 18; 14/F Block 1; Golden Industrial Building;16-26 Kwai Tak Street; Kwai  
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### TEST RESULT CERTIFICATION

<b>Applicant's name</b> .....	b mobile HK Limited
<b>Address</b> .....	Flat 18; 14/F Block 1; Golden Industrial Building;16-26 Kwai Tak Street; Kwai Chung;New Territories; Hong Kong, China
<b>Manufacturer's Name</b> .....	b mobile HK Limited
<b>Address</b> .....	Flat 18; 14/F Block 1; Golden Industrial Building;16-26 Kwai Tak Street; Kwai Chung;New Territories; Hong Kong, China
<b>Product name</b> .....	Mobile Phone
<b>Model and/or type reference</b> ..	BL40
<b>Family Model:</b>	N/A
<b>Standards</b> .....	FCC CFR 47 Part 22H, Part 24E, Part 27
<b>Test procedure</b> .....	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.....	Aug 24, 2021 ~ Sep 13, 2021
Date of Issue .....	Sep 14, 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:	Mobile Phone
Trade Mark	Bmobile
Model Name	BL40
Family Model	N/A
Model Difference	N/A
FCC ID:	ZSW-30-115
Frequency Bands:	U.S. Bands: <input checked="" type="checkbox"/> LTE FDD Band 2, 4, 5, 7
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;
Type of Modulation:	QPSK/16QAM
Power Class	Class 3
Antenna:	PIFA Antenna
Antenna gain:	0.8dBi
Power Supply:	DC 3.8V/ 1500mAh from battery or DC 5V from Adapter.
Adapter:	Input: AC 100-240V~50-60Hz 0.15A Output: DC 5.0V---500mA
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.8V) ( Note 1 )
HW Version	Bmobile_BL40_HW_V1.0
SW Version	Bmobile_BL40_TEM_PE_V001
** 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: ZSW-30-115** 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	±1.38dB
3	RF power, conducted	±0.16dB
4	Spurious emissions, conducted	±0.21dB
5	All emissions, radiated(<1G)	±4.68dB
6	All emissions, radiated(>1G)	±4.89dB
7	Temperature	±0.5°C
8	Humidity	±2%
9	Frequency error, conducted	±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

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**

<b>FCC Part22, Subpart H/ FCC Part24, Subpart E, FCC Part27, Subpart L, KDB 971168 D01 Power Meas License Digital Systems v03</b>			
<b>FCC Rule</b>	<b>Test Item</b>	<b>Verdict</b>	<b>Remark</b>
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	
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Remark:

1. "N/A" denotes test is not applicable in this Test Report.
2. All test items were verified and recorded according to the standards and without any deviation during the test.
3. No modifications are made to the EUT during all test items.

## 2. SYSTEM TEST CONFIGURATION

### 2.1 EUT CONFIGURATION

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

### 2.2 EUT EXERCISE

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

### 2.3 CONFIGURATION OF EUT SYSTEM

Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Mobile Phone	BL40	FCC ID: ZSW-30-115	EUT

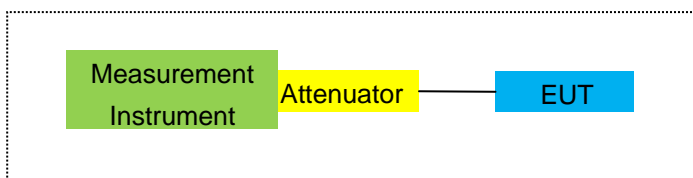
*Note: All the accessories have been used during the test.  
the following "EUT" in setup diagram means EUT system.*

## 2.4 TEST SETUP

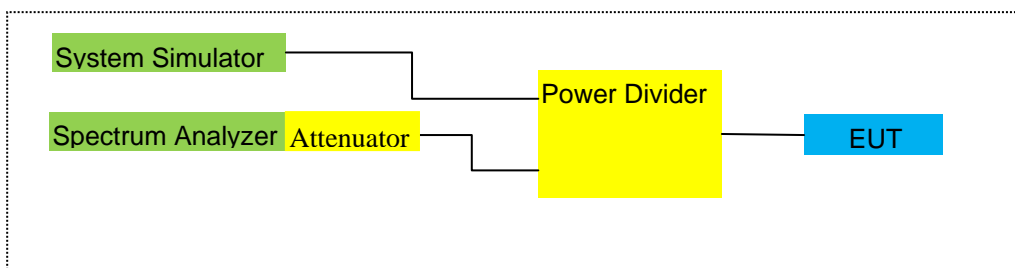
For Radiated Test Cases



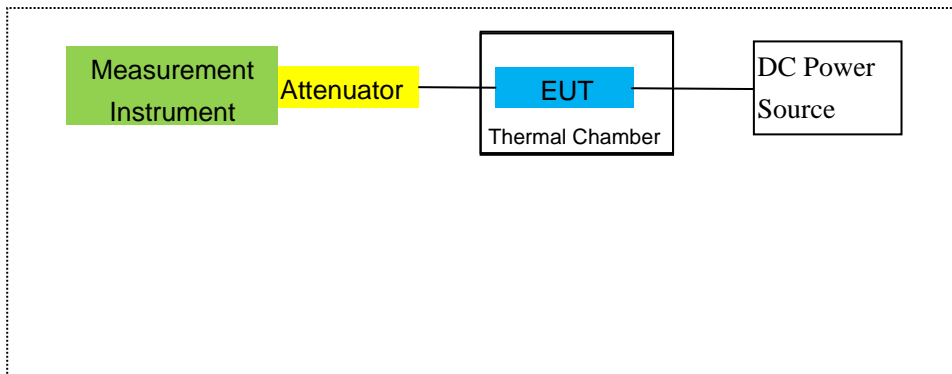
For Conducted Output Power



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	2020.11.19	2021.11.18	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	2021.07.01	2022.06.30	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

### 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

### 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

### 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

#### RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1850.7	-0.26	3.76	28.24	24.22	264.241	Horizontal	Pass
		1880	0.40	3.91	28.22	24.71	295.801	Horizontal	Pass
		1909.3	-0.33	3.93	28.20	23.94	247.742	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	0.29	3.77	28.23	24.75	298.538	Horizontal	Pass
		1880	0.33	3.91	28.24	24.66	292.415	Horizontal	Pass
		1908.5	-0.21	3.94	28.25	24.10	257.040	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-0.27	3.77	28.31	24.27	267.301	Horizontal	Pass
		1880	0.32	3.91	28.22	24.63	290.402	Horizontal	Pass
		1907.5	-0.42	3.94	28.20	23.84	242.103	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-0.61	3.79	28.33	23.93	247.172	Horizontal	Pass
		1880	0.26	3.95	28.22	24.53	283.792	Horizontal	Pass
		1905	0.55	3.97	28.19	24.77	299.916	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-0.25	3.79	28.34	24.30	269.153	Horizontal	Pass
		1880	-0.41	3.95	28.22	23.86	243.220	Horizontal	Pass
		1902.5	-0.15	3.97	28.18	24.06	254.683	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	0.08	3.81	28.35	24.62	289.734	Horizontal	Pass
		1880	0.00	3.96	28.22	24.26	266.686	Horizontal	Pass
		1900	1.19	4.00	28.16	<b>25.35</b>	342.768	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-0.15	3.76	28.24	24.33	271.019	Vertical	Pass
		1880	-0.31	3.91	28.22	24.00	251.189	Vertical	Pass
		1909.3	0.40	3.93	28.20	24.67	293.089	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-0.66	3.77	28.23	23.80	239.883	Vertical	Pass
		1880	0.05	3.91	28.24	24.38	274.157	Vertical	Pass
		1908.5	-0.01	3.94	28.25	24.30	269.153	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-0.48	3.77	28.31	24.06	254.683	Vertical	Pass
		1880	-0.27	3.91	28.22	24.04	253.513	Vertical	Pass
		1907.5	0.12	3.94	28.20	24.38	274.157	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	-0.16	3.79	28.33	24.38	274.157	Vertical	Pass
		1880	-0.40	3.95	28.22	23.87	243.781	Vertical	Pass
		1905	0.29	3.97	28.19	24.51	282.488	Vertical	Pass

15.0MHz		1857.5	0.01	3.79	28.34	24.56	285.759	Vertical	Pass
Band	1/#Mid	1880	0.35	3.95	28.22	24.62	289.734	Vertical	Pass
QPSK		1902.5	-0.30	3.97	28.18	23.91	246.037	Vertical	Pass
20.0MHz		1860	-0.21	3.81	28.35	24.33	271.019	Vertical	Pass
Band	1/#Mid	1880	0.07	3.96	28.22	24.33	271.019	Vertical	Pass
QPSK		1900	0.45	4.00	28.16	24.61	289.068	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	Polarization Of Max. ERP	
							Average		
							(mW)		
1.4MHz Band 16 QAM	1/#Mid	1850.7	-0.70	3.76	28.24	23.78	238.781	Horizontal	Pass
		1880	-0.53	3.91	28.22	23.78	238.781	Horizontal	Pass
		1909.3	-0.74	3.93	28.20	23.53	225.424	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-1.24	3.77	28.23	23.22	209.894	Horizontal	Pass
		1880	-1.45	3.91	28.24	22.88	194.089	Horizontal	Pass
		1908.5	-0.60	3.94	28.25	23.71	234.963	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-0.75	3.77	28.31	23.79	239.332	Horizontal	Pass
		1880	-0.55	3.91	28.22	23.76	237.684	Horizontal	Pass
		1907.5	-0.62	3.94	28.20	23.64	231.206	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-1.33	3.79	28.33	23.21	209.411	Horizontal	Pass
		1880	-0.73	3.95	28.22	23.54	225.944	Horizontal	Pass
		1905	-1.04	3.97	28.19	23.18	207.970	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-0.73	3.79	28.34	23.82	240.991	Horizontal	Pass
		1880	-1.18	3.95	28.22	23.09	203.704	Horizontal	Pass
		1902.5	-0.71	3.97	28.18	23.50	223.872	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-1.28	3.81	28.35	23.26	211.836	Horizontal	Pass
		1880	-1.40	3.96	28.22	22.86	193.197	Horizontal	Pass
		1900	-0.76	4.00	28.16	23.40	218.776	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-1.46	3.76	28.24	23.02	200.447	Vertical	Pass
		1880	-1.40	3.91	28.22	22.91	195.434	Vertical	Pass
		1909.3	-0.49	3.93	28.20	23.78	238.781	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-0.62	3.77	28.23	23.84	242.103	Vertical	Pass
		1880	-0.89	3.91	28.24	23.44	220.800	Vertical	Pass
		1908.5	-0.99	3.94	28.25	23.32	214.783	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-1.58	3.77	28.31	22.96	197.697	Vertical	Pass
		1880	-0.91	3.91	28.22	23.40	218.776	Vertical	Pass
		1907.5	-0.42	3.94	28.20	23.84	242.103	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-0.81	3.79	28.33	23.73	236.048	Vertical	Pass
		1880	-1.31	3.95	28.22	22.96	197.697	Vertical	Pass
		1905	-0.48	3.97	28.19	23.74	236.592	Vertical	Pass
15.0MHz Band 16	1/#Mid	1857.5	-0.75	3.79	28.34	23.80	239.883	Vertical	Pass
		1880	-0.57	3.95	28.22	23.70	234.423	Vertical	Pass

QAM		1902.5	-0.48	3.97	28.18	23.73	236.048	Vertical	Pass
20.0MHz	1/#Mid	1860	-0.98	3.81	28.35	23.56	226.986	Vertical	Pass
Band 16		1880	0.05	3.96	28.22	<b>24.31</b>	269.774	Vertical	Pass
QAM		1900	-0.69	4.00	28.16	23.47	222.331	Vertical	Pass

Note:

SG Level= Signal generator output

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



### 8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
						Average	Average		
						(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	0.08	3.12	27.58	24.54	284.446	Horizontal	Pass
		1732.5	0.09	3.27	27.61	24.43	277.332	Horizontal	Pass
		1754.3	0.11	3.29	27.63	24.45	278.612	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-0.09	3.13	27.61	24.39	274.789	Horizontal	Pass
		1732.5	-0.01	3.27	27.61	24.33	271.019	Horizontal	Pass
		1753.5	0.07	3.30	27.62	24.39	274.789	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	0.14	3.13	27.63	24.64	291.072	Horizontal	Pass
		1732.5	0.24	3.27	27.61	24.58	287.078	Horizontal	Pass
		1752.5	0.36	3.30	27.60	24.66	292.415	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	0.20	3.15	27.64	24.69	294.442	Horizontal	Pass
		1732.5	0.43	3.31	27.61	24.73	297.167	Horizontal	Pass
		1750	0.41	3.33	27.59	24.67	293.089	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	0.19	3.15	27.65	24.69	294.442	Horizontal	Pass
		1732.5	0.35	3.31	27.61	24.65	291.743	Horizontal	Pass
		1747.5	0.41	3.33	27.57	24.65	291.743	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	0.25	3.17	27.66	<b>24.74</b>	297.852	Horizontal	Pass
		1732.5	0.42	3.32	27.61	24.71	295.801	Horizontal	Pass
		1745	0.48	3.36	27.56	24.68	293.765	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-0.99	3.12	27.58	23.47	222.331	Vertical	Pass
		1732.5	-0.69	3.27	27.61	23.65	231.739	Vertical	Pass
		1754.3	-0.69	3.29	27.63	23.65	231.739	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-0.34	3.13	27.61	24.14	259.418	Vertical	Pass
		1732.5	-0.49	3.27	27.61	23.85	242.661	Vertical	Pass
		1753.5	-0.20	3.30	27.62	24.12	258.226	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-1.02	3.13	27.63	23.48	222.844	Vertical	Pass
		1732.5	-0.94	3.27	27.61	23.40	218.776	Vertical	Pass
		1752.5	-0.46	3.30	27.60	23.84	242.103	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-1.25	3.15	27.64	23.24	210.863	Vertical	Pass
		1732.5	-1.02	3.31	27.61	23.28	212.814	Vertical	Pass
		1750	-0.72	3.33	27.59	23.54	225.944	Vertical	Pass

15.0MHz		1717.5	-0.82	3.15	27.65	23.68	233.346	Vertical	Pass
Band	1/#Mid	1732.5	-0.81	3.31	27.61	23.49	223.357	Vertical	Pass
QPSK		1747.5	-0.83	3.33	27.57	23.41	219.280	Vertical	Pass
20.0MHz		1720	-0.36	3.17	27.66	24.13	258.821	Vertical	Pass
Band	1/#Mid	1732.5	-0.60	3.32	27.61	23.69	233.884	Vertical	Pass
QPSK		1745	-0.70	3.36	27.56	23.50	223.872	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	-0.76	3.12	27.58	23.70	234.423	Horizontal	Pass
		1732.5	-0.61	3.27	27.61	23.73	236.048	Horizontal	Pass
		1754.3	-0.61	3.29	27.63	23.73	236.048	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-0.70	3.13	27.61	23.78	238.781	Horizontal	Pass
		1732.5	-0.83	3.27	27.61	23.51	224.388	Horizontal	Pass
		1753.5	-1.05	3.30	27.62	23.27	212.324	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-0.53	3.13	27.63	23.97	249.459	Horizontal	Pass
		1732.5	-0.49	3.27	27.61	23.85	242.661	Horizontal	Pass
		1752.5	-0.18	3.30	27.60	24.12	258.226	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-0.60	3.15	27.64	23.89	244.906	Horizontal	Pass
		1732.5	-0.79	3.31	27.61	23.51	224.388	Horizontal	Pass
		1750	-0.17	3.33	27.59	24.09	256.448	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-0.40	3.15	27.65	24.10	257.040	Horizontal	Pass
		1732.5	-0.46	3.31	27.61	23.84	242.103	Horizontal	Pass
		1747.5	-0.48	3.33	27.57	23.76	237.684	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-0.35	3.17	27.66	24.14	259.418	Horizontal	Pass
		1732.5	-0.02	3.32	27.61	<b>24.27</b>	267.301	Horizontal	Pass
		1745	-0.17	3.36	27.56	24.03	252.930	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-1.34	3.12	27.58	23.12	205.116	Vertical	Pass
		1732.5	-1.83	3.27	27.61	22.51	178.238	Vertical	Pass
		1754.3	-1.93	3.29	27.63	22.41	174.181	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-1.77	3.13	27.61	22.71	186.638	Vertical	Pass
		1732.5	-1.90	3.27	27.61	22.44	175.388	Vertical	Pass
		1753.5	-2.06	3.30	27.62	22.26	168.267	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.07	3.13	27.63	22.43	174.985	Vertical	Pass
		1732.5	-1.49	3.27	27.61	22.85	192.752	Vertical	Pass
		1752.5	-1.25	3.30	27.60	23.05	201.837	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-2.22	3.15	27.64	22.27	168.655	Vertical	Pass
		1732.5	-1.87	3.31	27.61	22.43	174.985	Vertical	Pass
		1750	-1.63	3.33	27.59	22.63	183.231	Vertical	Pass
15.0MHz Band 16	1/#Mid	1717.5	-1.74	3.15	27.65	22.76	188.799	Vertical	Pass
		1732.5	-2.01	3.31	27.61	22.29	169.434	Vertical	Pass

QAM		1747.5	-1.22	3.33	27.57	23.02	200.447	Vertical	Pass
20.0MHz	1/#Mid	1720	-1.65	3.17	27.66	22.84	192.309	Vertical	Pass
Band 16		1732.5	-1.33	3.32	27.61	22.96	197.697	Vertical	Pass
QAM		1745	-1.07	3.36	27.56	23.13	205.589	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)	(mW)						
1.4MHz Band QPSK	3/#Mid	824.7	8.39	2.01	19.68	2.15	23.91	246.037	Horizontal	Pass	
		836.5	8.27	2.01	19.77	2.15	23.88	244.343	Horizontal	Pass	
		848.3	8.07	2.02	19.82	2.15	23.72	235.505	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	8.16	2.01	19.70	2.15	23.70	234.423	Horizontal	Pass	
		836.5	8.06	2.01	19.77	2.15	23.67	232.809	Horizontal	Pass	
		847.5	7.93	2.02	19.81	2.15	23.57	227.510	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	8.44	2.01	19.71	2.15	23.99	250.611	Horizontal	Pass	
		836.5	8.32	2.01	19.77	2.15	23.93	247.172	Horizontal	Pass	
		846.5	8.16	2.02	19.79	2.15	23.78	238.781	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	829	8.46	2.01	19.73	2.15	<b>24.03</b>	252.930	Horizontal	Pass	
		836.5	8.41	2.01	19.77	2.15	24.02	252.348	Horizontal	Pass	
		844	8.31	2.02	19.78	2.15	23.92	246.604	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	824.7	7.67	2.01	19.68	2.15	23.19	208.449	Vertical	Pass	
		836.5	6.87	2.01	19.77	2.15	22.48	177.011	Vertical	Pass	
		848.3	7.17	2.02	19.82	2.15	22.82	191.426	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	6.95	2.01	19.70	2.15	22.49	177.419	Vertical	Pass	
		836.5	7.47	2.01	19.77	2.15	23.08	203.236	Vertical	Pass	
		847.5	7.34	2.02	19.81	2.15	22.98	198.609	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	7.05	2.01	19.71	2.15	22.60	181.970	Vertical	Pass	
		836.5	6.69	2.01	19.77	2.15	22.30	169.824	Vertical	Pass	
		846.5	7.11	2.02	19.79	2.15	22.73	187.499	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	829	7.27	2.01	19.73	2.15	22.84	192.309	Vertical	Pass	
		836.5	7.02	2.01	19.77	2.15	22.63	183.231	Vertical	Pass	
		844	7.26	2.02	19.78	2.15	22.87	193.642	Vertical	Pass	

Radiated Power (ERP) for Band 5												
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion	
			SG Level	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP	Max. EIRP	Average			Average
			(dBm)				(dBm)	(mW)				
1.4MHz Band 16 QAM	3/#Mid	824.7	7.59	2.01	19.68	2.15	23.11	204.644	Horizontal	Pass		
		836.5	7.52	2.01	19.77	2.15	23.13	205.589	Horizontal	Pass		
		848.3	7.36	2.02	19.82	2.15	23.01	199.986	Horizontal	Pass		
3.0MHz Band 16 QAM	1/#Mid	825.5	7.67	2.01	19.70	2.15	23.21	209.411	Horizontal	Pass		
		836.5	7.38	2.01	19.77	2.15	22.99	199.067	Horizontal	Pass		
		847.5	6.86	2.02	19.81	2.15	22.50	177.828	Horizontal	Pass		
5.0MHz Band 16 QAM	1/#Mid	826.5	7.99	2.01	19.71	2.15	23.54	225.944	Horizontal	Pass		
		836.5	7.76	2.01	19.77	2.15	23.37	217.270	Horizontal	Pass		
		846.5	7.51	2.02	19.79	2.15	23.13	205.589	Horizontal	Pass		
10.0MHz Band 16 QAM	1/#Mid	829	7.99	2.01	19.73	2.15	<b>23.56</b>	226.986	Horizontal	Pass		
		836.5	7.71	2.01	19.77	2.15	23.32	214.783	Horizontal	Pass		
		844	7.25	2.02	19.78	2.15	22.86	193.197	Horizontal	Pass		
1.4MHz Band 16 QAM	1/#Mid	824.7	7.11	2.01	19.68	2.15	22.63	183.231	Vertical	Pass		
		836.5	7.44	2.01	19.77	2.15	23.05	201.837	Vertical	Pass		
		848.3	7.46	2.02	19.82	2.15	23.11	204.644	Vertical	Pass		
3.0MHz Band 16 QAM	1/#Mid	825.5	7.66	2.01	19.70	2.15	23.20	208.930	Vertical	Pass		
		836.5	6.08	2.01	19.77	2.15	21.69	147.571	Vertical	Pass		
		847.5	6.38	2.02	19.81	2.15	22.02	159.221	Vertical	Pass		
5.0MHz Band 16 QAM	1/#Mid	826.5	7.14	2.01	19.71	2.15	22.69	185.780	Vertical	Pass		
		836.5	6.08	2.01	19.77	2.15	21.69	147.571	Vertical	Pass		
		846.5	6.62	2.02	19.79	2.15	22.24	167.494	Vertical	Pass		
10.0MHz Band 16 QAM	1/#Mid	829	6.46	2.01	19.73	2.15	22.03	159.588	Vertical	Pass		
		836.5	7.05	2.01	19.77	2.15	22.66	184.502	Vertical	Pass		
		844	6.05	2.02	19.78	2.15	21.66	146.555	Vertical	Pass		

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

### 8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
						Average	Average		
						(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	0.11	4.54	27.75	23.32	214.783	Horizontal	Pass
		2535	0.28	4.69	27.72	23.31	214.289	Horizontal	Pass
		2567.5	0.35	4.71	27.71	23.35	216.272	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	0.18	4.55	27.76	23.39	218.273	Horizontal	Pass
		2535	0.37	4.69	27.72	23.40	218.776	Horizontal	Pass
		2565	0.45	4.72	27.70	23.43	220.293	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	0.17	4.55	27.77	23.39	218.273	Horizontal	Pass
		2535	0.31	4.69	27.72	23.34	215.774	Horizontal	Pass
		2562.5	0.41	4.72	27.69	23.38	217.771	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	0.23	4.57	27.78	23.44	220.800	Horizontal	Pass
		2535	0.81	4.73	27.72	<b>23.80</b>	239.883	Horizontal	Pass
		2560	0.45	4.75	27.68	23.38	217.771	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-1.15	4.54	27.75	22.06	160.694	Vertical	Pass
		2535	-0.54	4.69	27.72	22.49	177.419	Vertical	Pass
		2567.5	-1.03	4.71	27.71	21.97	157.398	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-0.96	4.55	27.76	22.25	167.880	Vertical	Pass
		2535	-1.11	4.69	27.72	21.92	155.597	Vertical	Pass
		2565	-0.95	4.72	27.70	22.03	159.588	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-1.21	4.55	27.77	22.01	158.855	Vertical	Pass
		2535	-1.12	4.69	27.72	21.91	155.239	Vertical	Pass
		2562.5	-0.86	4.72	27.69	22.11	162.555	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-0.90	4.57	27.78	22.31	170.216	Vertical	Pass
		2535	-0.70	4.73	27.72	22.29	169.434	Vertical	Pass
		2560	-1.00	4.75	27.68	21.93	155.955	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)			Average	Average		
				(dBm)	(dB)	(dBm)	(mW)		
5.0MHz Band 16 QAM	1/#Mid	2502.5	-0.58	4.54	27.75	22.63	183.231	Horizontal	Pass
		2535	-0.27	4.69	27.72	22.76	188.799	Horizontal	Pass
		2567.5	-0.35	4.71	27.71	22.65	184.077	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-0.47	4.55	27.76	22.74	187.932	Horizontal	Pass
		2535	-0.48	4.69	27.72	22.55	179.887	Horizontal	Pass
		2565	-0.75	4.72	27.70	22.23	167.109	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-0.65	4.55	27.77	22.57	180.717	Horizontal	Pass
		2535	-0.62	4.69	27.72	22.41	174.181	Horizontal	Pass
		2562.5	-0.23	4.72	27.69	22.74	187.932	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-0.53	4.57	27.78	22.68	185.353	Horizontal	Pass
		2535	-0.20	4.73	27.72	<b>22.79</b>	190.108	Horizontal	Pass
		2560	-0.30	4.75	27.68	22.63	183.231	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-0.88	4.54	27.75	22.33	171.002	Vertical	Pass
		2535	-2.31	4.69	27.72	20.72	118.032	Vertical	Pass
		2567.5	-0.88	4.71	27.71	22.12	162.930	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-2.29	4.55	27.76	20.92	123.595	Vertical	Pass
		2535	-0.82	4.69	27.72	22.21	166.341	Vertical	Pass
		2565	-0.62	4.72	27.70	22.36	172.187	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-2.50	4.55	27.77	20.72	118.032	Vertical	Pass
		2535	-1.42	4.69	27.72	21.61	144.877	Vertical	Pass
		2562.5	-1.09	4.72	27.69	21.88	154.170	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-2.14	4.57	27.78	21.07	127.938	Vertical	Pass
		2535	-1.70	4.73	27.72	21.29	134.586	Vertical	Pass
		2560	-2.22	4.75	27.68	20.71	117.761	Vertical	Pass

Note:

SG Level= Signal generator output

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



## 9. SPURIOUS RADIATION EMISSION

### RULE PART(S)

FCC: §2.1051, §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

**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	-51.18	4.04	33.51	-21.71	-13	-8.71	Horizontal
3701.4	-48.24	4.04	33.51	-18.77	-13	-5.77	Vertical
5552.1	-48.04	5.24	35.84	-17.44	-13	-4.44	Vertical
5552.1	-50.61	5.24	35.84	-20.01	-13	-7.01	Horizontal
178.9	-44.71	1.43	16.02	-30.12	-13	-17.12	Vertical
287.3	-42.14	1.30	17.99	-25.45	-13	-12.45	Horizontal
<b>Test Results for Mid Channel 1880MHz</b>							
3760.0	-50.08	4.04	33.56	-20.56	-13	-7.56	Horizontal
3760.0	-51.14	4.04	33.56	-21.62	-13	-8.62	Vertical
5640.0	-49.87	5.24	35.91	-19.20	-13	-6.20	Vertical
5640.0	-53.24	5.24	35.91	-22.57	-13	-9.57	Horizontal
190.3	-42.32	1.62	16.97	-26.97	-13	-13.97	Vertical
447.1	-39.72	1.74	15.98	-25.49	-13	-12.49	Horizontal
<b>Test Results for High Channel 1909.3MHz</b>							
3818.6	-50.42	4.04	34.00	-20.46	-13	-7.46	Horizontal
3818.6	-44.91	4.04	34.00	-14.95	-13	-1.95	Vertical
5727.9	-49.56	5.24	36.04	-18.76	-13	-5.76	Vertical
5727.9	-51.84	5.24	36.04	-21.04	-13	-8.04	Horizontal
183.1	-44.66	1.42	17.29	-28.79	-13	-15.79	Vertical
360.4	-43.35	1.50	17.90	-26.94	-13	-13.94	Horizontal

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

Test Results for Low Channel 1860MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720.0	-47.93	4.07	33.54	-18.46	-13	-5.46	Horizontal
3720.0	-53.41	4.07	33.54	-23.94	-13	-10.94	Vertical
5580.0	-52.82	5.28	35.86	-22.24	-13	-9.24	Vertical
5580.0	-51.76	5.28	35.86	-21.18	-13	-8.18	Horizontal
182.0	-36.79	1.58	16.89	-21.47	-13	-8.47	Vertical
258.9	-38.30	1.76	17.26	-22.80	-13	-9.80	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-45.16	4.04	33.56	-15.64	-13	-2.64	Horizontal
3760.0	-50.87	4.04	33.56	-21.35	-13	-8.35	Vertical
5640.0	-50.42	5.24	35.91	-19.75	-13	-6.75	Vertical
5640.0	-50.77	5.24	35.91	-20.10	-13	-7.10	Horizontal
181.1	-36.24	1.46	16.27	-21.43	-13	-8.43	Vertical
266.6	-39.18	1.59	15.15	-25.62	-13	-12.62	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-46.38	4.04	34.00	-16.42	-13	-3.42	Horizontal
3800.0	-53.90	4.04	34.00	-23.94	-13	-10.94	Vertical
5700.0	-51.05	5.24	36.04	-20.25	-13	-7.25	Vertical
5700.0	-53.82	5.24	36.04	-23.02	-13	-10.02	Horizontal
185.9	-39.08	1.36	17.39	-23.04	-13	-10.04	Vertical
459.9	-42.35	1.66	15.39	-28.62	-13	-15.62	Horizontal

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

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

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

9.2 LTE BAND 4

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-44.71	4.02	29.80	-18.93	-13	-5.93	Horizontal
3421.4	-53.28	4.02	29.80	-27.50	-13	-14.50	Vertical
5132.1	-51.03	5.24	35.84	-20.43	-13	-7.43	Vertical
5132.1	-50.54	5.24	35.84	-19.94	-13	-6.94	Horizontal
200.5	-43.94	1.68	16.04	-29.58	-13	-16.58	Vertical
383.6	-37.60	1.78	17.74	-21.64	-13	-8.64	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-45.89	4.03	30.00	-19.92	-13	-6.92	Horizontal
3465.0	-47.20	4.03	30.00	-21.23	-13	-8.23	Vertical
5197.5	-44.43	5.25	35.86	-13.82	-13	-0.82	Vertical
5197.5	-50.17	5.25	35.86	-19.56	-13	-6.56	Horizontal
201.3	-36.33	1.72	17.69	-20.36	-13	-7.36	Vertical
305.5	-43.28	1.62	16.02	-28.87	-13	-15.87	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-52.77	4.05	30.01	-26.81	-13	-13.81	Horizontal
3508.6	-51.50	4.05	30.01	-25.54	-13	-12.54	Vertical
5262.9	-46.42	5.26	35.86	-15.82	-13	-2.82	Vertical
5262.9	-53.42	5.26	35.86	-22.82	-13	-9.82	Horizontal
194.2	-35.01	1.80	16.69	-20.12	-13	-7.12	Vertical
431.0	-35.19	1.75	16.66	-20.29	-13	-7.29	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	-50.07	4.02	29.80	-24.29	-13	-11.29	Horizontal
3440.0	-45.52	4.02	29.80	-19.74	-13	-6.74	Vertical
5160.0	-50.22	5.24	35.84	-19.62	-13	-6.62	Vertical
5160.0	-51.27	5.24	35.84	-20.67	-13	-7.67	Horizontal
190.2	-37.56	1.57	17.26	-21.87	-13	-8.87	Vertical
292.1	-36.99	1.78	16.35	-22.42	-13	-9.42	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-47.75	4.03	30.00	-21.78	-13	-8.78	Horizontal
3465.0	-46.47	4.03	30.00	-20.50	-13	-7.50	Vertical
5197.5	-51.48	5.25	35.86	-20.87	-13	-7.87	Vertical
5197.5	-52.90	5.25	35.86	-22.29	-13	-9.29	Horizontal
192.1	-35.30	1.44	17.95	-18.79	-13	-5.79	Vertical
241.4	-44.48	1.65	16.09	-30.04	-13	-17.04	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-50.43	2.91	27.68	-25.66	-13	-12.66	Horizontal
3490.0	-47.06	2.91	27.68	-22.29	-13	-9.29	Vertical
5235.0	-52.10	5.26	35.86	-21.50	-13	-8.50	Vertical
5235.0	-51.36	5.26	35.86	-20.76	-13	-7.76	Horizontal
190.3	-37.91	1.61	16.85	-22.67	-13	-9.67	Vertical
235.9	-42.56	1.61	15.19	-28.98	-13	-15.98	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	-48.77	2.78	27.50	-24.05	-13	-11.05	Horizontal
1649.4	-46.08	2.78	27.50	-21.36	-13	-8.36	Vertical
2474.1	-45.14	2.90	27.80	-20.24	-13	-7.24	Vertical
2474.1	-51.54	2.90	27.80	-26.64	-13	-13.64	Horizontal
187.7	-34.42	1.76	17.59	-18.59	-13	-5.59	Vertical
329.9	-39.59	1.63	15.87	-25.35	-13	-12.35	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-51.92	2.80	27.48	-27.24	-13	-14.24	Horizontal
1673.0	-49.97	2.80	27.48	-25.29	-13	-12.29	Vertical
2509.5	-50.56	2.91	27.70	-25.77	-13	-12.77	Vertical
2509.5	-51.17	2.91	27.70	-26.38	-13	-13.38	Horizontal
182.1	-44.96	1.61	15.68	-30.89	-13	-17.89	Vertical
287.9	-44.42	1.59	17.52	-28.50	-13	-15.50	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-50.18	2.82	27.43	-25.57	-13	-12.57	Horizontal
1696.6	-46.69	2.82	27.43	-22.08	-13	-9.08	Vertical
2544.9	-52.89	2.92	27.74	-28.07	-13	-15.07	Vertical
2544.9	-52.53	2.92	27.74	-27.71	-13	-14.71	Horizontal
196.6	-38.24	1.69	16.67	-23.25	-13	-10.25	Vertical
367.6	-38.62	1.70	17.18	-23.14	-13	-10.14	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	-50.20	2.78	27.50	-25.48	-13	-12.48	Horizontal
1658.0	-49.99	2.78	27.50	-25.27	-13	-12.27	Vertical
2487.0	-46.24	2.90	27.80	-21.34	-13	-8.34	Vertical
2487.0	-50.25	2.90	27.80	-25.35	-13	-12.35	Horizontal
211.5	-34.65	1.71	15.57	-20.79	-13	-7.79	Vertical
235.0	-38.74	1.34	16.40	-23.68	-13	-10.68	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-52.57	2.80	27.48	-27.89	-13	-14.89	Horizontal
1673.0	-52.45	2.80	27.48	-27.77	-13	-14.77	Vertical
2509.5	-50.37	2.91	27.70	-25.58	-13	-12.58	Vertical
2509.5	-53.50	2.91	27.70	-28.71	-13	-15.71	Horizontal
178.7	-36.30	1.44	17.04	-20.70	-13	-7.70	Vertical
339.4	-42.17	1.76	17.62	-26.31	-13	-13.31	Horizontal
Test Results for High Channel 844MHz							
1688.0	-47.19	2.82	27.43	-22.58	-13	-9.58	Horizontal
1688.0	-52.04	2.82	27.43	-27.43	-13	-14.43	Vertical
2532.0	-44.85	2.92	27.74	-20.03	-13	-7.03	Vertical
2532.0	-52.45	2.92	27.74	-27.63	-13	-14.63	Horizontal
203.1	-43.91	1.74	17.70	-27.95	-13	-14.95	Vertical
421.9	-34.63	1.41	17.46	-18.57	-13	-5.57	Horizontal

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

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

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



9.4 LTE BAND 7

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

Test Results for Low Channel 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-62.30	5.23	35.81	-31.72	-25	-6.72	Horizontal
5005.0	-64.71	5.23	35.81	-34.13	-25	-9.13	Vertical
7507.5	-59.91	5.67	36.85	-28.73	-25	-3.73	Vertical
7507.5	-62.82	5.67	36.85	-31.64	-25	-6.64	Horizontal
198.7	-54.76	1.73	17.97	-38.52	-25	-13.52	Vertical
392.6	-49.42	1.38	15.11	-35.69	-25	-10.69	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-62.46	5.23	35.82	-31.87	-25	-6.87	Horizontal
5070.0	-62.77	5.23	35.82	-32.18	-25	-7.18	Vertical
7605.0	-62.63	5.67	36.85	-31.45	-25	-6.45	Vertical
7605.0	-60.01	5.67	36.85	-28.83	-25	-3.83	Horizontal
207.9	-52.07	1.77	16.17	-37.66	-25	-12.66	Vertical
326.7	-48.48	1.63	15.21	-34.90	-25	-9.90	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-61.27	5.24	35.83	-30.68	-25	-5.68	Horizontal
5135.0	-64.00	5.24	35.83	-33.41	-25	-8.41	Vertical
7702.5	-59.86	5.68	36.87	-28.67	-25	-3.67	Vertical
7702.5	-64.47	5.68	36.87	-33.28	-25	-8.28	Horizontal
205.2	-47.15	1.58	17.56	-31.17	-25	-6.17	Vertical
418.8	-48.59	1.45	16.58	-33.46	-25	-8.46	Horizontal

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

Test Results for Low Channel 2510MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020.0	-62.41	5.23	35.82	-31.82	-25	-6.82	Horizontal
5020.0	-61.85	5.23	35.82	-31.26	-25	-6.26	Vertical
7530.0	-59.96	5.67	36.86	-28.77	-25	-3.77	Vertical
7530.0	-64.39	5.67	36.86	-33.20	-25	-8.20	Horizontal
203.5	-46.95	1.63	15.76	-32.82	-25	-7.82	Vertical
427.7	-45.54	1.71	15.44	-31.81	-25	-6.81	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-64.54	5.23	35.82	-33.95	-25	-8.95	Horizontal
5070.0	-61.42	5.23	35.82	-30.83	-25	-5.83	Vertical
7605.0	-59.85	5.67	36.85	-28.67	-25	-3.67	Vertical
7605.0	-59.92	5.67	36.85	-28.74	-25	-3.74	Horizontal
181.7	-50.04	1.79	16.84	-34.98	-25	-9.98	Vertical
296.0	-44.35	1.71	17.64	-28.42	-25	-3.42	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-63.04	5.24	35.83	-32.45	-25	-7.45	Horizontal
5120.0	-64.90	5.24	35.83	-34.31	-25	-9.31	Vertical
7680.0	-61.66	5.70	36.88	-30.48	-25	-5.48	Vertical
7680.0	-59.38	5.70	36.88	-28.20	-25	-3.20	Horizontal
186.8	-46.54	1.79	16.84	-31.48	-25	-6.48	Vertical
390.9	-44.13	1.71	17.64	-28.20	-25	-3.20	Horizontal

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

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

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

## 10. FREQUENCY STABILITY

### RULE PART(S)

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

### LIMITS

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

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

### TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. =  $-30^{\circ}$  to  $+50^{\circ}\text{C}$
- Voltage = low voltage, DC 3.4V, 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 Band 2  
LTE Band 4
- LTE Band 5  
LTE Band 7

## 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	12.5	0.006624	2.5
3.8	1880	13.4	0.007132	2.5
4.2	1880	13.3	0.007089	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	12.4	0.006602	2.5
Extreme (50C)	1880	11.9	0.006316	2.5
Extreme (40C)	1880	13.3	0.007088	2.5
Extreme (30C)	1880	13.8	0.007346	2.5
Extreme (10C)	1880	13.8	0.007354	2.5
Extreme (0C)	1880	12.0	0.006365	2.5
Extreme (-10C)	1880	13.1	0.006969	2.5
Extreme (-20C)	1880	14.0	0.007439	2.5
Extreme (-30C)	1880	14.3	0.007615	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	9.7	0.005181	2.5
3.8	1880	8.9	0.004747	2.5
4.2	1880	8.5	0.004528	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.5	0.005070	2.5
Extreme (50C)	1880	8.8	0.004705	2.5
Extreme (40C)	1880	8.5	0.004513	2.5
Extreme (30C)	1880	8.6	0.004567	2.5
Extreme (10C)	1880	8.8	0.004667	2.5
Extreme (0C)	1880	7.7	0.004088	2.5
Extreme (-10C)	1880	8.6	0.004588	2.5
Extreme (-20C)	1880	8.6	0.004576	2.5
Extreme (-30C)	1880	8.4	0.004469	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	8.6	0.004949	2.5
3.8	1732.5	8.7	0.005024	2.5
4.2	1732.5	8.9	0.005123	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.7	0.005037	2.5
Extreme (50C)	1732.5	9.1	0.005246	2.5
Extreme (40C)	1732.5	7.0	0.004016	2.5
Extreme (30C)	1732.5	5.8	0.003322	2.5
Extreme (10C)	1732.5	6.9	0.003967	2.5
Extreme (0C)	1732.5	9.9	0.005700	2.5
Extreme (-10C)	1732.5	8.3	0.004817	2.5
Extreme (-20C)	1732.5	6.9	0.003993	2.5
Extreme (-30C)	1732.5	8.1	0.004697	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	9.8	0.005684	2.5
3.8	1732.5	8.5	0.004918	2.5
4.2	1732.5	7.9	0.004580	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	9.8	0.005672	2.5
Extreme (50C)	1732.5	9.1	0.005263	2.5
Extreme (40C)	1732.5	7.9	0.004575	2.5
Extreme (30C)	1732.5	9.5	0.005482	2.5
Extreme (10C)	1732.5	8.7	0.004996	2.5
Extreme (0C)	1732.5	8.5	0.004934	2.5
Extreme (-10C)	1732.5	9.1	0.005278	2.5
Extreme (-20C)	1732.5	8.7	0.005028	2.5
Extreme (-30C)	1732.5	7.7	0.004447	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	5.8	0.006897	2.5
3.8	836.5	7.1	0.008544	2.5
4.2	836.5	5.3	0.006314	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.1	0.007294	2.5
Extreme (50C)	836.5	5.7	0.006785	2.5
Extreme (40C)	836.5	6.1	0.007236	2.5
Extreme (30C)	836.5	6.0	0.007192	2.5
Extreme (10C)	836.5	5.0	0.005934	2.5
Extreme (0C)	836.5	4.8	0.005784	2.5
Extreme (-10C)	836.5	5.7	0.006848	2.5
Extreme (-20C)	836.5	5.7	0.006866	2.5
Extreme (-30C)	836.5	6.2	0.007382	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	5.9	0.007029	2.5
3.8	836.5	6.6	0.007848	2.5
4.2	836.5	4.4	0.005245	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	5.7	0.006816	2.5
Extreme (50C)	836.5	6.2	0.007399	2.5
Extreme (40C)	836.5	6.2	0.007426	2.5
Extreme (30C)	836.5	6.8	0.008167	2.5
Extreme (10C)	836.5	5.6	0.006746	2.5
Extreme (0C)	836.5	5.5	0.006578	2.5
Extreme (-10C)	836.5	5.7	0.006828	2.5
Extreme (-20C)	836.5	5.7	0.006818	2.5
Extreme (-30C)	836.5	6.3	0.007511	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	9.9	0.003896	2.5
3.8	2535	9.2	0.003624	2.5
4.2	2535	8.5	0.003346	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	9.3	0.003656	2.5
Extreme (50C)	2535	9.0	0.003533	2.5
Extreme (40C)	2535	8.5	0.003368	2.5
Extreme (30C)	2535	9.2	0.003643	2.5
Extreme (10C)	2535	7.6	0.003016	2.5
Extreme (0C)	2535	8.4	0.003306	2.5
Extreme (-10C)	2535	9.8	0.003858	2.5
Extreme (-20C)	2535	9.2	0.003647	2.5
Extreme (-30C)	2535	8.2	0.003254	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
3.8	2535	6.1	0.002390	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	5.6	0.002190	2.5
Extreme (40C)	2535	5.8	0.002284	2.5
Extreme (30C)	2535	6.7	0.002641	2.5
Extreme (10C)	2535	6.0	0.002362	2.5
Extreme (0C)	2535	4.9	0.001938	2.5
Extreme (-10C)	2535	4.9	0.001926	2.5
Extreme (-20C)	2535	5.7	0.002253	2.5
Extreme (-30C)	2535	5.8	0.002293	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.

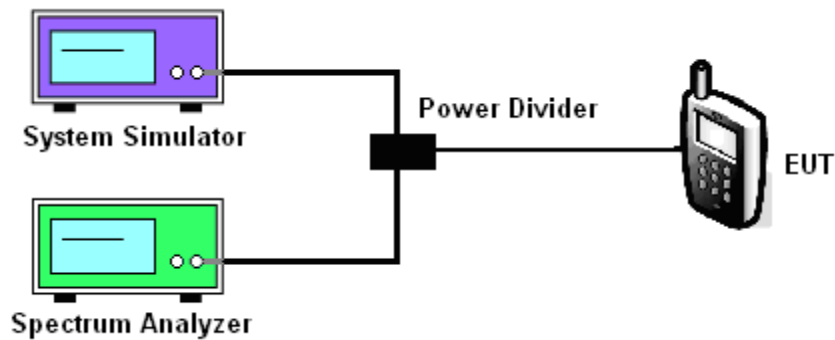
### 11.2 Measuring Instruments

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
- 

Test data reference attachment.

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