

# **FCC CFR47 PART 22H, 24E, 27 CERTIFICATION TEST REPORT FCC ID: 2ANMU-WP27SPUT**

**Product:** Smart Phone

**Trade Mark:** OUKITEL

**Model Number:** WP27

**Family Model:** WP27 S, WP27 Pro, WP27 Ultra, WP27  
TITAN

**Report No.:** S23071404712006

## **Prepared for**

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**TEST RESULT CERTIFICATION**


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**Address** ..... : A2 2F BUILDING ENET NEW INDUSTRIAL PARK, DAFU INDUSTRIAL ZONE, GUANLAN, LONGHUA SHENZHEN, 518XXX China  
**Manufacturer's Name**..... : SHENZHEN YUNJI INTELLIGENT TECHNOLOGY CO.,LTD  
**Address** ..... : A2 2F BUILDING ENET NEW INDUSTRIAL PARK, DAFU INDUSTRIAL ZONE, GUANLAN, LONGHUA SHENZHEN, 518XXX China  
**Product name**..... : Smart Phone  
**Model and/or type reference** ..... : WP27  
**Family Model:** WP27 S, WP27 Pro, WP27 Ultra, WP27 TITAN  
**Test sample number** : S230714047013  
**Standards**..... : FCC CFR 47 Part 22H, Part 24E, Part 27  
**Test procedure** ..... : ANSI C63.26:2015  
ANSI/TIA-603-E-2016


This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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**Date of Test** .....

Date (s) of performance of tests ..... 17 Jul. 2023 ~ 17 Aug, 2023  
Date of Issue ..... 17 Aug, 2023  
Test Result..... **Pass**

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

Authorized Signatory :   
\_\_\_\_\_  
(Alex Li)

## TABLE OF CONTENTS

<b>1. GENERAL INFORMATION.....</b>	<b>5</b>
1.1 PRODUCT DESCRIPTION .....	5
1.2 RELATED SUBMITTAL(S) / GRANT (S) .....	6
1.3 TEST METHODOLOGY.....	6
1.4 TEST FACILITY.....	6
MEASUREMENT UNCERTAINTY .....	6
1.5 SPECIAL ACCESSORIES.....	6
1.6 WORST-CASE CONFIGURATION AND MODE.....	6
1.6 SUMMARY OF TEST RESULTS .....	7
<b>2. SYSTEM TEST CONFIGURATION .....</b>	<b>9</b>
2.1 EUT CONFIGURATION.....	9
2.2 EUT EXERCISE .....	9
2.3 CONFIGURATION OF EUT SYSTEM.....	9
2.4 TEST SETUP .....	10
<b>3.TEST AND MEASUREMENT EQUIPMENT .....</b>	<b>11</b>
<b>4. OUTPUT POWER.....</b>	<b>13</b>
4.1 OUTPUT POWER MEASUREMENT .....	13
<b>6. BANDEDGE AND EMISSION MASK.....</b>	<b>16</b>
<b>7. OUT OF BAND EMISSIONS .....</b>	<b>17</b>
7.1 MEASUREMENT METHOD .....	18
<b>8. RADIATED MEASUREMENT .....</b>	<b>19</b>
8.1. RADIATED POWER (ERP & EIRP).....	19
8.2 LTE BAND 2.....	20
8.3 LTE BAND 4.....	24
8.4 LTE BAND 5.....	28

<b>8.5 LTE BAND 7</b> .....	<b>30</b>
<b>8.5 LTE BAND 12</b> .....	<b>32</b>
<b>8.6 LTE BAND 17</b> .....	<b>34</b>
<b>9. SPURIOUS RADIATION EMISSION</b> .....	<b>36</b>
<b>9.1 LTE BAND 2</b> .....	<b>38</b>
<b>9.2 LTE BAND 4</b> .....	<b>40</b>
<b>9.3 LTE BAND 5</b> .....	<b>42</b>
<b>9.4 LTE BAND 7</b> .....	<b>44</b>
<b>9.5 LTE BAND 12</b> .....	<b>46</b>
<b>9.6 LTE BAND 17</b> .....	<b>48</b>
<b>10. FREQUENCY STABILITY</b> .....	<b>50</b>
<b>10.1 LTE BAND 2</b> .....	<b>51</b>
<b>10.2 LTE BAND 4</b> .....	<b>53</b>
<b>10.3 LTE BAND 5</b> .....	<b>55</b>
<b>10.4 LTE BAND 7</b> .....	<b>57</b>
<b>10.5 LTE BAND 12</b> .....	<b>59</b>
<b>10.6 LTE BAND 17</b> .....	<b>61</b>
<b>11. PEAK-TO-AVERAGE RATIO</b> .....	<b>63</b>
<b>11.1 Description of the PAR Measurement</b> .....	<b>63</b>
<b>11.2 Measuring Instruments</b> .....	<b>63</b>
<b>11.3 Test Procedures</b> .....	<b>63</b>
<b>11.4 Test Setup</b> .....	<b>63</b>

# 1. GENERAL INFORMATION

## 1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Smart Phone
Trade Mark	OUKITEL
Model Name	WP27
Family Model	WP27 S, WP27 Pro, WP27 Ultra, WP27 TITAN
Model Difference	All models are the same circuit and RF module, except the model name.
FCC ID:	2ANMU-WP27SPUT
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
Antenna:	FPC Antenna
Antenna gain:	Band 2: 0.7dBi, Band 4: 0.4dBi, Band 5: -0.8dBi, Band 7: 1.3dBi, Band 12: -1.3dBi, Band 17: -1.3dBi
Power Supply:	DC 3.87V/8500mAh from battery or DC 5V from Adapter.
Adapter:	Model: HJ-PD33W-US Input: 100-240V~50/60Hz 0.8A Output: 5.0V---3.0A OR 9.0V---3.0A OR 12.0V---2.75A 33.0W MAX
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.87V) (Note 1)
HW Version	LG985_MB_V4.0
SW Version	OUKITEL_WP27_EEA_V03
** 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: 2ANMU-WP27SPUT** 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 C63.46:2015.

**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 C63.46:2015& ANSI C63.4: 2014.

FCC Registration No.:463705

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

**MEASUREMENT UNCERTAINTY**

The reported uncertainty of measurement, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.5dB

**1.5 SPECIAL ACCESSORIES**

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

**1.6 WORST-CASE CONFIGURATION AND MODE**

The worst-case scenario for all measurements is based on the investigation results.

The device has LTE Bands of: Band 2, Band 4, Band 5, Band 7, Band 12, Band 17.

The RB Size was selected to measure for peak or average ERP and EIRP, which was based on the conducted power verification baseline data.

For the fundamental investigation of radiated emissions, the EUT is investigated for vertical and horizontal antenna orientations and X Y and Z orientations of the EUT alone. After the investigations the worst case was determined to be at X orientation for all LTE bands.

### 1.6 SUMMARY OF TEST RESULTS

FCC Part22, Subpart H/ FCC Part24, Subpart E, FCC Part27, Subpart L, KDB 971168 D01 Power Meas License Digital Systems v03			
FCC Rule	Test Item	Verdict	Remark
2.1046	Conducted Output Power	PASS	
22.913(d) 24.232(d) 27.50(d)(5) KDB 971168 D01 Clause 5.7	Peak-to-Average Ratio	PASS	
2.1049 22.917(b) 24.238(b) KDB 971168 D01 Clause 4.2	Occupied Bandwidth	PASS	
2.1051 22.917(a) 24.238(a) 27.53(c), (g), (h) KDB 971168 D01 Clause 6	Band Edge	PASS	
22.913(a)(2) 27.50(b)(10), (c)(10) KDB 971168 D01 Clause 5.6	Effective Radiated Power	PASS	
24.232(c) 27.50(h)(2), (d)(4) KDB 971168 D01 Clause 5.6	Equivalent Isotropic Radiated Power	PASS	
2.1053 22.917(a) 24.238(a) 27.53(c)(g)(h)(m) KDB 971168 D01 Clause 7	Field Strength of Spurious Radiation	PASS	
2.1055 22.355 24.235 27.54 KDB 971168 D01 Clause 9	Frequency Stability for Temperature & Voltage	PASS	

2.1051 22.917(a) 24.238(a) 27.53(c)(g)(h)(m) KDB 971168 D01 Clause 6	Conducted Emission	PASS	
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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	Smart Phone	WP27	FCC ID: 2ANMU-WP27SPUT	EUT

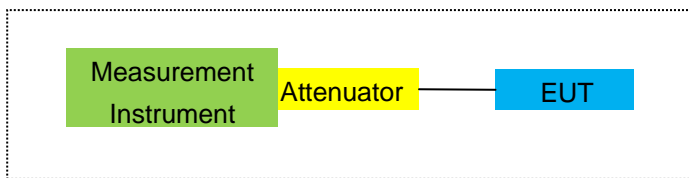
*Note: All the accessories have been used during the test.  
the following "EUT" in setup diagram means EUT system.*

## 2.4 TEST SETUP

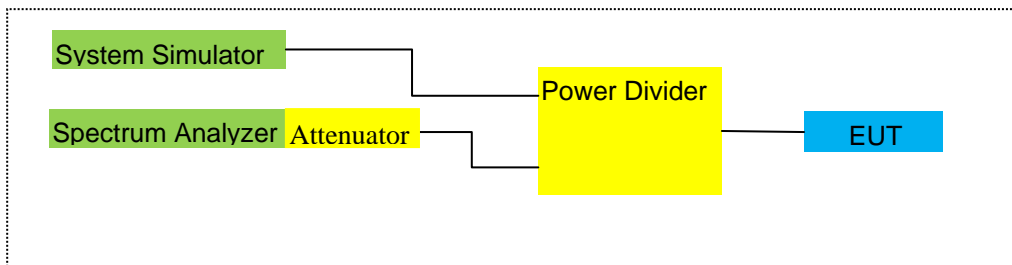
For Radiated Test Cases



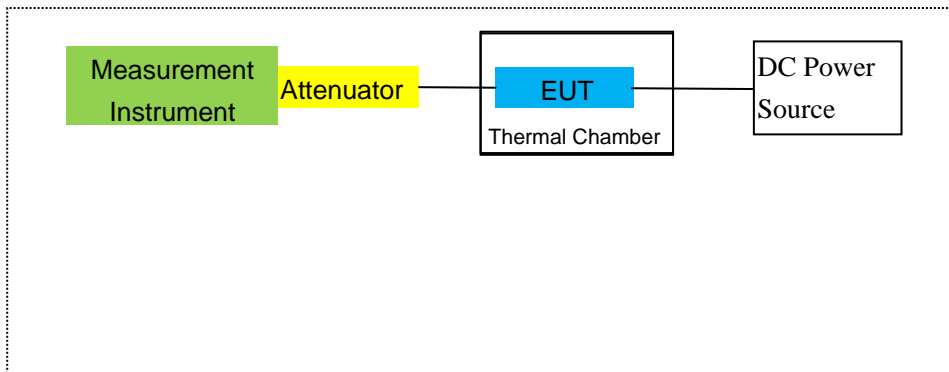
For Conducted Output Power



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	2023.05.29	2024.05.28	1 year
2	Test Receiver	R&S	ESPI	101318	2023.03.27	2024.03.26	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2023.03.27	2024.03.26	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2023.05.06	2026.05.05	3 year
5	Horn Antenna	EM	EM-AH-10180	2011071402	2023.03.27	2024.03.26	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2023.05.29	2024.05.28	1 year
7	Amplifier	EM	EM-30180	060538	2023.05.29	2024.05.28	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2023.03.27	2024.03.26	1 year
9	Power Meter	R&S	NRVS	100696	2023.05.29	2024.05.28	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2023.03.27	2024.03.26	1 year
11	Test Cable	N/A	R-01	N/A	2022.06.17	2025.06.16	3 year
12	Test Cable	N/A	R-02	N/A	2022.06.17	2025.06.16	3 year
13	Test Cable	N/A	R-03	N/A	2022.06.17	2025.06.16	3 year
14	Test Receiver	R&S	ESCI	101160	2023.03.27	2024.03.26	1 year
15	LISN	R&S	ENV216	101313	2023.03.27	2024.03.26	1 year
16	LISN	EMCO	3816/2	00042990	2023.03.27	2024.03.26	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2023.03.27	2024.03.26	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2023.03.27	2024.03.26	1 year
19	Test Cable	N/A	C01	N/A	2023.05.06	2026.05.05	3 year
20	Test Cable	N/A	C02	N/A	2023.05.06	2026.05.05	3 year
21	Test Cable	N/A	C03	N/A	2023.05.06	2026.05.05	3 year
22	Attenuator	MCE	24-10-34	BN9258	2023.03.27	2024.03.26	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2023.03.27	2024.03.26	1 year
24	test receiver	R&S	ESCI	a0304218	2023.03.27	2024.03.26	1 year
25	Communication Tester	R&S	CMU200	A0304247	2023.05.29	2024.05.28	1 year

26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2023.03.27	2024.03.26	1 year
27	DC Power Source	N/A	PS-6005D	2017040292 3	2023.05.06	2026.05.05	3 year
28	MXG Vector Signal Generator	Agilent	N5182A	MY47070317	2023.05.29	2024.05.28	1 year
29	Communication Tester	R&S	CMW500	148500	2023.05.29	2024.05.28	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(c)(g)(h)(m)

FCC: §2.1046, §22.913, §24.232

### LIMITS

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

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

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

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

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

Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth.

### TEST PROCEDURE

The transmitter output was connected to a CMW500Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

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

Set display line

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

### MODES TESTED

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

### RESULTS

Test data reference attachment.

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



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

## 8. RADIATED MEASUREMENT

### 8.1. RADIATED POWER (ERP & EIRP)

#### RULE PART(S)

FCC: §2.1046, §22.913(a)(2), §24.232(c) and §27.50 (h)(2), (b)(10), (c)(10), (d)(4)

#### LIMITS:

22.913(a) (2)- The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.  
24.232 (c) Mobile and portable stations are limited to 2 watts EIRP.  
27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.  
27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.  
27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.  
27.50 (h)(2) Mobile and other user stations in the 2500–2570 MHz and 2620–2690 MHz bands. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

#### TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17

KDB 971168 v02r01 RF power output using broadband peak and average power meter method.

KDB 971168 D01 Power Meas License Digital Systems v02r01, "Measurement Guidance for Certification of Licensed Digital Transmitters"

#### MODES TESTED

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

#### RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
			1.4MHz Band QPSK	1/#Mid	1850.7	-2.82	3.76	28.24		
		1880	-2.63	3.91	28.22	21.68	147.231	Horizontal	Pass	
		1909.3	-2.54	3.93	28.20	21.73	148.936	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-2.88	3.77	28.23	21.58	143.880	Horizontal	Pass	
		1880	-2.73	3.91	28.24	21.60	144.544	Horizontal	Pass	
		1908.5	-2.60	3.94	28.25	21.71	148.252	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-2.77	3.77	28.31	21.77	150.314	Horizontal	Pass	
		1880	-2.39	3.91	28.22	21.92	155.597	Horizontal	Pass	
		1907.5	-2.32	3.94	28.20	21.94	156.315	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-2.63	3.79	28.33	21.91	155.239	Horizontal	Pass	
		1880	-2.33	3.95	28.22	21.94	156.315	Horizontal	Pass	
		1905	-2.22	3.97	28.19	22.00	158.489	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	1857.5	-2.59	3.79	28.34	21.96	157.036	Horizontal	Pass	
		1880	-2.38	3.95	28.22	21.89	154.525	Horizontal	Pass	
		1902.5	-2.24	3.97	28.18	21.97	157.398	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	1860	-2.58	3.81	28.35	21.96	157.036	Horizontal	Pass	
		1880	-2.25	3.96	28.22	<b>22.01</b>	158.855	Horizontal	Pass	
		1900	-2.19	4.00	28.16	21.97	157.398	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	1850.7	-3.89	3.76	28.24	20.59	114.551	Vertical	Pass	
		1880	-3.28	3.91	28.22	21.03	126.765	Vertical	Pass	
		1909.3	-3.39	3.93	28.20	20.88	122.462	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-3.71	3.77	28.23	20.75	118.850	Vertical	Pass	
		1880	-3.88	3.91	28.24	20.45	110.917	Vertical	Pass	
		1908.5	-3.19	3.94	28.25	21.12	129.420	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-4.00	3.77	28.31	20.54	113.240	Vertical	Pass	
		1880	-3.06	3.91	28.22	21.25	133.352	Vertical	Pass	
		1907.5	-3.21	3.94	28.20	21.05	127.350	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-3.44	3.79	28.33	21.10	128.825	Vertical	Pass	
		1880	-3.17	3.95	28.22	21.10	128.825	Vertical	Pass	
		1905	-3.07	3.97	28.19	21.15	130.317	Vertical	Pass	
15.0MHz Band QPSK	1/#Mid	1857.5	-3.40	3.79	28.34	21.15	130.317	Vertical	Pass	

Band		1880	-3.26	3.95	28.22	21.01	126.183	Vertical	Pass
QPSK		1902.5	-3.27	3.97	28.18	20.94	124.165	Vertical	Pass
20.0MHz	1/#Mid	1860	-3.18	3.81	28.35	21.36	136.773	Vertical	Pass
Band		1880	-3.05	3.96	28.22	21.21	132.130	Vertical	Pass
QPSK		1900	-3.33	4.00	28.16	20.83	121.060	Vertical	Pass

**Note:**

SG Level= Signal generator output

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

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

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result					Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)		
1.4MHz Band 16 QAM	1/#Mid	1850.7	-3.94	3.76	28.24	20.54	113.240	Horizontal	Pass
		1880	-3.41	3.91	28.22	20.90	123.027	Horizontal	Pass
		1909.3	-3.34	3.93	28.20	20.93	123.880	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-3.44	3.77	28.23	21.02	126.474	Horizontal	Pass
		1880	-3.52	3.91	28.24	20.81	120.504	Horizontal	Pass
		1908.5	-3.73	3.94	28.25	20.58	114.288	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-3.38	3.77	28.31	21.16	130.617	Horizontal	Pass
		1880	-3.29	3.91	28.22	21.02	126.474	Horizontal	Pass
		1907.5	-2.97	3.94	28.20	21.29	134.586	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-3.43	3.79	28.33	21.11	129.122	Horizontal	Pass
		1880	-3.42	3.95	28.22	20.85	121.619	Horizontal	Pass
		1905	-2.89	3.97	28.19	21.33	135.831	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-3.41	3.79	28.34	21.14	130.017	Horizontal	Pass
		1880	-3.20	3.95	28.22	21.07	127.938	Horizontal	Pass
		1902.5	-3.16	3.97	28.18	21.05	127.350	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-3.30	3.81	28.35	21.24	133.045	Horizontal	Pass
		1880	-3.00	3.96	28.22	21.26	133.660	Horizontal	Pass
		1900	-2.82	4.00	28.16	<b>21.34</b>	136.144	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.95	3.76	28.24	19.53	89.743	Vertical	Pass
		1880	-4.07	3.91	28.22	20.24	105.682	Vertical	Pass
		1909.3	-4.65	3.93	28.20	19.62	91.622	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-4.53	3.77	28.23	19.93	98.401	Vertical	Pass
		1880	-4.74	3.91	28.24	19.59	90.991	Vertical	Pass
		1908.5	-4.71	3.94	28.25	19.60	91.201	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-4.45	3.77	28.31	20.09	102.094	Vertical	Pass
		1880	-4.00	3.91	28.22	20.31	107.399	Vertical	Pass
		1907.5	-4.55	3.94	28.20	19.71	93.541	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-4.20	3.79	28.33	20.34	108.143	Vertical	Pass
		1880	-4.35	3.95	28.22	19.92	98.175	Vertical	Pass
		1905	-4.28	3.97	28.19	19.94	98.628	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-4.71	3.79	28.34	19.84	96.383	Vertical	Pass
		1880	-4.24	3.95	28.22	20.03	100.693	Vertical	Pass
		1902.5	-4.04	3.97	28.18	20.17	103.992	Vertical	Pass

20.0MHz		1860	-4.74	3.81	28.35	19.80	95.499	Vertical	Pass
Band 16	1/#Mid	1880	-4.67	3.96	28.22	19.59	90.991	Vertical	Pass
QAM		1900	-4.50	4.00	28.16	19.66	92.470	Vertical	Pass

**Note:**

SG Level= Signal generator output

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

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

### 8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Factor	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	Average	Average	Of Max. ERP	
						(dBm)	(mW)		
1.4MHz Band QPSK	1#Mid	1710.7	-2.73	3.12	27.58	21.73	148.936	Horizontal	Pass
		1732.5	-2.72	3.27	27.61	21.62	145.211	Horizontal	Pass
		1754.3	-2.70	3.29	27.63	21.64	145.881	Horizontal	Pass
3.0MHz Band QPSK	1#Mid	1711.5	-2.90	3.13	27.61	21.58	143.880	Horizontal	Pass
		1732.5	-2.82	3.27	27.61	21.52	141.906	Horizontal	Pass
		1753.5	-2.74	3.30	27.62	21.58	143.880	Horizontal	Pass
5.0MHz Band QPSK	1#Mid	1712.5	-2.67	3.13	27.63	21.83	152.405	Horizontal	Pass
		1732.5	-2.57	3.27	27.61	21.77	150.314	Horizontal	Pass
		1752.5	-2.45	3.30	27.60	21.85	153.109	Horizontal	Pass
10.0MHz Band QPSK	1#Mid	1715	-2.61	3.15	27.64	21.88	154.170	Horizontal	Pass
		1732.5	-2.38	3.31	27.61	21.92	155.597	Horizontal	Pass
		1750	-2.40	3.33	27.59	21.86	153.462	Horizontal	Pass
15.0MHz Band QPSK	1#Mid	1717.5	-2.62	3.15	27.65	21.88	154.170	Horizontal	Pass
		1732.5	-2.46	3.31	27.61	21.84	152.757	Horizontal	Pass
		1747.5	-2.40	3.33	27.57	21.84	152.757	Horizontal	Pass
20.0MHz Band QPSK	1#Mid	1720	-2.56	3.17	27.66	<b>21.93</b>	155.955	Horizontal	Pass
		1732.5	-2.39	3.32	27.61	21.90	154.882	Horizontal	Pass
		1745	-2.33	3.36	27.56	21.87	153.815	Horizontal	Pass
1.4MHz Band QPSK	1#Mid	1710.7	-3.99	3.12	27.58	20.47	111.429	Vertical	Pass
		1732.5	-3.38	3.27	27.61	20.96	124.738	Vertical	Pass
		1754.3	-3.13	3.29	27.63	21.21	132.130	Vertical	Pass
3.0MHz Band QPSK	1#Mid	1711.5	-3.43	3.13	27.61	21.05	127.350	Vertical	Pass
		1732.5	-3.36	3.27	27.61	20.98	125.314	Vertical	Pass
		1753.5	-3.30	3.30	27.62	21.02	126.474	Vertical	Pass
5.0MHz Band QPSK	1#Mid	1712.5	-3.46	3.13	27.63	21.04	127.057	Vertical	Pass
		1732.5	-3.02	3.27	27.61	21.32	135.519	Vertical	Pass
		1752.5	-3.83	3.30	27.60	20.47	111.429	Vertical	Pass
10.0MHz Band QPSK	1#Mid	1715	-4.06	3.15	27.64	20.43	110.408	Vertical	Pass
		1732.5	-3.12	3.31	27.61	21.18	131.220	Vertical	Pass
		1750	-3.10	3.33	27.59	21.16	130.617	Vertical	Pass
15.0MHz	1#Mid	1717.5	-3.51	3.15	27.65	20.99	125.603	Vertical	Pass



Band		1732.5	-3.87	3.31	27.61	20.43	110.408	Vertical	Pass
QPSK		1747.5	-3.54	3.33	27.57	20.70	117.490	Vertical	Pass
20.0MHz	1/#Mid	1720	-3.61	3.17	27.66	20.88	122.462	Vertical	Pass
Band		1732.5	-3.65	3.32	27.61	20.64	115.878	Vertical	Pass
QPSK		1745	-3.06	3.36	27.56	21.14	130.017	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			Average	Average		
						(dBm)	(mW)		
1.4MHz Band 16 QAM	1/#Mid	1710.7	-3.54	3.12	27.58	20.92	123.595	Horizontal	Pass
		1732.5	-3.39	3.27	27.61	20.95	124.451	Horizontal	Pass
		1754.3	-3.39	3.29	27.63	20.95	124.451	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-3.48	3.13	27.61	21.00	125.893	Horizontal	Pass
		1732.5	-3.61	3.27	27.61	20.73	118.304	Horizontal	Pass
		1753.5	-3.83	3.30	27.62	20.49	111.944	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-3.31	3.13	27.63	21.19	131.522	Horizontal	Pass
		1732.5	-3.27	3.27	27.61	21.07	127.938	Horizontal	Pass
		1752.5	-2.96	3.30	27.60	21.34	136.144	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-3.38	3.15	27.64	21.11	129.122	Horizontal	Pass
		1732.5	-3.57	3.31	27.61	20.73	118.304	Horizontal	Pass
		1750	-2.95	3.33	27.59	21.31	135.207	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-3.18	3.15	27.65	21.32	135.519	Horizontal	Pass
		1732.5	-3.24	3.31	27.61	21.06	127.644	Horizontal	Pass
		1747.5	-3.26	3.33	27.57	20.98	125.314	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-3.13	3.17	27.66	<b>21.36</b>	136.773	Horizontal	Pass
		1732.5	-3.14	3.32	27.61	21.15	130.317	Horizontal	Pass
		1745	-2.95	3.36	27.56	21.25	133.352	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-4.32	3.12	27.58	20.14	103.276	Vertical	Pass
		1732.5	-4.62	3.27	27.61	19.72	93.756	Vertical	Pass
		1754.3	-4.35	3.29	27.63	19.99	99.770	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-4.83	3.13	27.61	19.65	92.257	Vertical	Pass
		1732.5	-4.46	3.27	27.61	19.88	97.275	Vertical	Pass
		1753.5	-4.03	3.30	27.62	20.29	106.905	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-4.30	3.13	27.63	20.20	104.713	Vertical	Pass
		1732.5	-4.36	3.27	27.61	19.98	99.541	Vertical	Pass
		1752.5	-4.74	3.30	27.60	19.56	90.365	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-4.15	3.15	27.64	20.34	108.143	Vertical	Pass
		1732.5	-4.21	3.31	27.61	20.09	102.094	Vertical	Pass
		1750	-4.00	3.33	27.59	20.26	106.170	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-4.70	3.15	27.65	19.80	95.499	Vertical	Pass
		1732.5	-4.32	3.31	27.61	19.98	99.541	Vertical	Pass
		1747.5	-4.79	3.33	27.57	19.45	88.105	Vertical	Pass

20.0MHz		1720	-4.66	3.17	27.66	19.83	96.161	Vertical	Pass
Band 16	1/#Mid	1732.5	-4.39	3.32	27.61	19.90	97.724	Vertical	Pass
QAM		1745	-4.08	3.36	27.56	20.12	102.802	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

### 8.4 LTE BAND 5

Radiated Power (ERP) for Band 5											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)	(dB)	Average	Average			
							(dBm)	(mW)			
1.4MHz Band QPSK	3/#Mid	824.7	6.57	2.01	19.68	2.15	22.09	161.808	Horizontal	Pass	
		836.5	6.45	2.01	19.77	2.15	22.06	160.694	Horizontal	Pass	
		848.3	6.25	2.02	19.82	2.15	21.90	154.882	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	6.34	2.01	19.70	2.15	21.88	154.170	Horizontal	Pass	
		836.5	6.24	2.01	19.77	2.15	21.85	153.109	Horizontal	Pass	
		847.5	6.11	2.02	19.81	2.15	21.75	149.624	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	6.62	2.01	19.71	2.15	22.17	164.816	Horizontal	Pass	
		836.5	6.50	2.01	19.77	2.15	22.11	162.555	Horizontal	Pass	
		846.5	6.34	2.02	19.79	2.15	21.96	157.036	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	829	6.64	2.01	19.73	2.15	<b>22.21</b>	166.341	Horizontal	Pass	
		836.5	6.59	2.01	19.77	2.15	22.20	165.959	Horizontal	Pass	
		844	6.49	2.02	19.78	2.15	22.10	162.181	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	824.7	5.47	2.01	19.68	2.15	20.99	125.603	Vertical	Pass	
		836.5	5.73	2.01	19.77	2.15	21.34	136.144	Vertical	Pass	
		848.3	4.84	2.02	19.82	2.15	20.49	111.944	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	5.04	2.01	19.70	2.15	20.58	114.288	Vertical	Pass	
		836.5	5.50	2.01	19.77	2.15	21.11	129.122	Vertical	Pass	
		847.5	5.56	2.02	19.81	2.15	21.20	131.826	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	5.47	2.01	19.71	2.15	21.02	126.474	Vertical	Pass	
		836.5	5.17	2.01	19.77	2.15	20.78	119.674	Vertical	Pass	
		846.5	5.51	2.02	19.79	2.15	21.13	129.718	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	829	5.54	2.01	19.73	2.15	21.11	129.122	Vertical	Pass	
		836.5	5.59	2.01	19.77	2.15	21.20	131.826	Vertical	Pass	
		844	5.41	2.02	19.78	2.15	21.02	126.474	Vertical	Pass	

**Radiated Power (ERP) for Band 5**

Radiated Power (ERP) for Band 5											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)	(dB)	Average	Average			
							(dBm)	(mW)			
1.4MHz Band 16 QAM	3#/Mid	824.7	5.72	2.01	19.68	2.15	21.24	133.045	Horizontal	Pass	
		836.5	5.65	2.01	19.77	2.15	21.26	133.660	Horizontal	Pass	
		848.3	5.49	2.02	19.82	2.15	21.14	130.017	Horizontal	Pass	
3.0MHz Band 16 QAM	1#/Mid	825.5	5.80	2.01	19.70	2.15	21.34	136.144	Horizontal	Pass	
		836.5	5.51	2.01	19.77	2.15	21.12	129.420	Horizontal	Pass	
		847.5	4.99	2.02	19.81	2.15	20.63	115.611	Horizontal	Pass	
5.0MHz Band 16 QAM	1#/Mid	826.5	6.12	2.01	19.71	2.15	21.67	146.893	Horizontal	Pass	
		836.5	5.89	2.01	19.77	2.15	21.50	141.254	Horizontal	Pass	
		846.5	5.64	2.02	19.79	2.15	21.26	133.660	Horizontal	Pass	
10.0MHz Band 16 QAM	1#/Mid	829	6.12	2.01	19.73	2.15	<b>21.69</b>	147.571	Horizontal	Pass	
		836.5	5.84	2.01	19.77	2.15	21.45	139.637	Horizontal	Pass	
		844	5.38	2.02	19.78	2.15	20.99	125.603	Horizontal	Pass	
1.4MHz Band 16 QAM	1#/Mid	824.7	4.24	2.01	19.68	2.15	19.76	94.624	Vertical	Pass	
		836.5	5.28	2.01	19.77	2.15	20.89	122.744	Vertical	Pass	
		848.3	4.40	2.02	19.82	2.15	20.05	101.158	Vertical	Pass	
3.0MHz Band 16 QAM	1#/Mid	825.5	5.83	2.01	19.70	2.15	21.37	137.088	Vertical	Pass	
		836.5	4.79	2.01	19.77	2.15	20.40	109.648	Vertical	Pass	
		847.5	4.27	2.02	19.81	2.15	19.91	97.949	Vertical	Pass	
5.0MHz Band 16 QAM	1#/Mid	826.5	5.19	2.01	19.71	2.15	20.74	118.577	Vertical	Pass	
		836.5	5.67	2.01	19.77	2.15	21.28	134.276	Vertical	Pass	
		846.5	4.26	2.02	19.79	2.15	19.88	97.275	Vertical	Pass	
10.0MHz Band 16 QAM	1#/Mid	829	4.38	2.01	19.73	2.15	19.95	98.855	Vertical	Pass	
		836.5	4.37	2.01	19.77	2.15	19.98	99.541	Vertical	Pass	
		844	5.51	2.02	19.78	2.15	21.12	129.420	Vertical	Pass	

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

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

### 8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Factor	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	Average	Average	Of Max. ERP	
						(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	-1.01	4.54	27.75	22.20	165.959	Horizontal	Pass
		2535	-0.84	4.69	27.72	22.19	165.577	Horizontal	Pass
		2567.5	-0.77	4.71	27.71	22.23	167.109	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-0.94	4.55	27.76	22.27	168.655	Horizontal	Pass
		2535	-0.75	4.69	27.72	22.28	169.044	Horizontal	Pass
		2565	-0.67	4.72	27.70	22.31	170.216	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-0.95	4.55	27.77	22.27	168.655	Horizontal	Pass
		2535	-0.81	4.69	27.72	22.22	166.725	Horizontal	Pass
		2562.5	-0.71	4.72	27.69	22.26	168.267	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-0.89	4.57	27.78	<b>22.32</b>	170.608	Horizontal	Pass
		2535	-0.71	4.73	27.72	22.28	169.044	Horizontal	Pass
		2560	-0.67	4.75	27.68	22.26	168.267	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-1.88	4.54	27.75	21.33	135.831	Vertical	Pass
		2535	-2.00	4.69	27.72	21.03	126.765	Vertical	Pass
		2567.5	-2.24	4.71	27.71	20.76	119.124	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-2.28	4.55	27.76	20.93	123.880	Vertical	Pass
		2535	-2.17	4.69	27.72	20.86	121.899	Vertical	Pass
		2565	-1.65	4.72	27.70	21.33	135.831	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-2.14	4.55	27.77	21.08	128.233	Vertical	Pass
		2535	-2.05	4.69	27.72	20.98	125.314	Vertical	Pass
		2562.5	-1.91	4.72	27.69	21.06	127.644	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-1.95	4.57	27.78	21.26	133.660	Vertical	Pass
		2535	-2.01	4.73	27.72	20.98	125.314	Vertical	Pass
		2560	-1.81	4.75	27.68	21.12	129.420	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP	Max. EIRP	Polarization	
			(dBm)			Average	Average	Of Max. ERP	
						(dBm)	(mW)		
5.0MHz	Band 16 QAM	2502.5	-1.70	4.54	27.75	21.51	141.579	Horizontal	Pass
		2535	-1.39	4.69	27.72	21.64	145.881	Horizontal	Pass
		2567.5	-1.47	4.71	27.71	21.53	142.233	Horizontal	Pass
10.0MHz	Band 16 QAM	2505	-1.59	4.55	27.76	21.62	145.211	Horizontal	Pass
		2535	-1.60	4.69	27.72	21.43	138.995	Horizontal	Pass
		2565	-1.87	4.72	27.70	21.11	129.122	Horizontal	Pass
15.0MHz	Band 16 QAM	2507.5	-1.77	4.55	27.77	21.45	139.637	Horizontal	Pass
		2535	-1.74	4.69	27.72	21.29	134.586	Horizontal	Pass
		2562.5	-1.35	4.72	27.69	21.62	145.211	Horizontal	Pass
20.0MHz	Band 16 QAM	2510	-1.65	4.57	27.78	21.56	143.219	Horizontal	Pass
		2535	-1.32	4.73	27.72	<b>21.67</b>	146.893	Horizontal	Pass
		2560	-1.42	4.75	27.68	21.51	141.579	Horizontal	Pass
5.0MHz	Band 16 QAM	2502.5	-3.41	4.54	27.75	19.80	95.499	Vertical	Pass
		2535	-3.00	4.69	27.72	20.03	100.693	Vertical	Pass
		2567.5	-3.42	4.71	27.71	19.58	90.782	Vertical	Pass
10.0MHz	Band 16 QAM	2505	-3.42	4.55	27.76	19.79	95.280	Vertical	Pass
		2535	-2.94	4.69	27.72	20.09	102.094	Vertical	Pass
		2565	-2.19	4.72	27.70	20.79	119.950	Vertical	Pass
15.0MHz	Band 16 QAM	2507.5	-2.69	4.55	27.77	20.53	112.980	Vertical	Pass
		2535	-3.27	4.69	27.72	19.76	94.624	Vertical	Pass
		2562.5	-2.17	4.72	27.69	20.80	120.226	Vertical	Pass
20.0MHz	Band 16 QAM	2510	-2.50	4.57	27.78	20.71	117.761	Vertical	Pass
		2535	-2.36	4.73	27.72	20.63	115.611	Vertical	Pass
		2560	-3.26	4.75	27.68	19.67	92.683	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

### 8.5 LTE BAND 12

Radiated Power (ERP) for Band 12											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)	(dB)	Average	Average			
							(dBm)	(mW)			
1.4MHz Band QPSK	1/#Mid	699.7	6.94	1.91	19.21	2.15	22.09	161.808	Vertical	Pass	
		707.5	6.86	1.91	19.26	2.15	22.06	160.694	Vertical	Pass	
		715.3	6.64	1.93	19.34	2.15	21.90	154.882	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	6.73	1.91	19.21	2.15	21.88	154.170	Vertical	Pass	
		707.5	6.65	1.91	19.26	2.15	21.85	153.109	Vertical	Pass	
		714.5	6.49	1.93	19.34	2.15	21.75	149.624	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	7.00	1.91	19.23	2.15	22.17	164.816	Vertical	Pass	
		707.5	6.91	1.91	19.26	2.15	22.11	162.555	Vertical	Pass	
		713.5	6.70	1.92	19.33	2.15	21.96	157.036	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	704	7.02	1.91	19.25	2.15	<b>22.21</b>	166.341	Vertical	Pass	
		707.5	7.00	1.91	19.26	2.15	22.20	165.959	Vertical	Pass	
		711	6.85	1.92	19.32	2.15	22.10	162.181	Vertical	Pass	
1.4MHz Band QPSK	1/#Mid	699.7	6.18	1.91	19.21	2.15	21.33	135.831	Horizontal	Pass	
		707.5	5.39	1.91	19.26	2.15	20.59	114.551	Horizontal	Pass	
		715.3	5.33	1.93	19.34	2.15	20.59	114.551	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	5.85	1.91	19.21	2.15	21.00	125.893	Horizontal	Pass	
		707.5	5.80	1.91	19.26	2.15	21.00	125.893	Horizontal	Pass	
		714.5	6.09	1.93	19.34	2.15	21.35	136.458	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	5.34	1.91	19.23	2.15	20.51	112.460	Horizontal	Pass	
		707.5	5.66	1.91	19.26	2.15	20.86	121.899	Horizontal	Pass	
		713.5	5.54	1.92	19.33	2.15	20.80	120.226	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	704	5.98	1.91	19.25	2.15	21.17	130.918	Horizontal	Pass	
		707.5	5.45	1.91	19.26	2.15	20.65	116.145	Horizontal	Pass	
		711	5.87	1.92	19.32	2.15	21.12	129.420	Horizontal	Pass	



Radiated Power (ERP) for Band 12											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)	(dB)	Average	Average			
							(dBm)	(mW)			
1.4MHz	Band 16 QAM	699.7	7.04	1.91	19.21	2.15	22.19	165.577	Vertical	Pass	
		707.5	6.96	1.91	19.26	2.15	22.16	164.437	Vertical	Pass	
		715.3	6.74	1.93	19.34	2.15	22.00	158.489	Vertical	Pass	
3.0MHz	Band 16 QAM	700.5	6.83	1.91	19.21	2.15	21.98	157.761	Vertical	Pass	
		707.5	6.75	1.91	19.26	2.15	21.95	156.675	Vertical	Pass	
		714.5	6.59	1.93	19.34	2.15	21.85	153.109	Vertical	Pass	
5.0MHz	Band 16 QAM	701.5	7.10	1.91	19.23	2.15	22.27	168.655	Vertical	Pass	
		707.5	7.01	1.91	19.26	2.15	22.21	166.341	Vertical	Pass	
		713.5	6.80	1.92	19.33	2.15	22.06	160.694	Vertical	Pass	
10.0MHz	Band 16 QAM	704	7.12	1.91	19.25	2.15	<b>22.31</b>	170.216	Vertical	Pass	
		707.5	7.10	1.91	19.26	2.15	22.30	169.824	Vertical	Pass	
		711	6.95	1.92	19.32	2.15	22.20	165.959	Vertical	Pass	
1.4MHz	Band 16 QAM	699.7	5.51	1.91	19.21	2.15	20.66	116.413	Horizontal	Pass	
		707.5	5.76	1.91	19.26	2.15	20.96	124.738	Horizontal	Pass	
		715.3	5.86	1.93	19.34	2.15	21.12	129.420	Horizontal	Pass	
3.0MHz	Band 16 QAM	700.5	6.07	1.91	19.21	2.15	21.22	132.434	Horizontal	Pass	
		707.5	5.89	1.91	19.26	2.15	21.09	128.529	Horizontal	Pass	
		714.5	5.93	1.93	19.34	2.15	21.19	131.522	Horizontal	Pass	
5.0MHz	Band 16 QAM	701.5	5.95	1.91	19.23	2.15	21.12	129.420	Horizontal	Pass	
		707.5	6.22	1.91	19.26	2.15	21.42	138.676	Horizontal	Pass	
		713.5	5.89	1.92	19.33	2.15	21.15	130.317	Horizontal	Pass	
10.0MHz	Band 16 QAM	704	5.36	1.91	19.25	2.15	20.55	113.501	Horizontal	Pass	
		707.5	6.18	1.91	19.26	2.15	21.38	137.404	Horizontal	Pass	
		711	5.34	1.92	19.32	2.15	20.59	114.551	Horizontal	Pass	

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

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

### 8.6 LTE BAND 17

Radiated Power (ERP) for Band 17											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)		Average	Average			
							(dBm)	(mW)			
5.0MHz Band QPSK	1/#Mid	706.5	7.23	1.91	19.23	2.15	22.40	173.780	Vertical	Pass	
		710	7.09	1.91	19.26	2.15	22.29	169.434	Vertical	Pass	
		713.5	6.99	1.92	19.33	2.15	22.25	167.880	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	709	7.24	1.91	19.25	2.15	<b>22.43</b>	174.985	Vertical	Pass	
		710	7.19	1.91	19.26	2.15	22.39	173.380	Vertical	Pass	
		711	7.15	1.92	19.32	2.15	22.40	173.780	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	706.5	6.37	1.91	19.23	2.15	21.54	142.561	Horizontal	Pass	
		710	5.62	1.91	19.26	2.15	20.82	120.781	Horizontal	Pass	
		713.5	6.62	1.92	19.33	2.15	21.88	154.170	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	709	5.17	1.91	19.25	2.15	20.36	108.643	Horizontal	Pass	
		710	5.88	1.91	19.26	2.15	21.08	128.233	Horizontal	Pass	
		711	5.29	1.92	19.32	2.15	20.54	113.240	Horizontal	Pass	

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)		Average	Average		
							(dB)	(dBm)		
5.0MHz	1/#Mid	706.5	6.58	1.91	19.23	2.15	21.75	149.624	Vertical	Pass
Band 16		710	6.49	1.91	19.26	2.15	21.69	147.571	Vertical	Pass
QAM		713.5	6.29	1.92	19.33	2.15	21.55	142.889	Vertical	Pass
10.0MHz	1/#Mid	709	6.12	1.91	19.25	2.15	21.31	135.207	Vertical	Pass
Band 16		710	6.65	1.91	19.26	2.15	<b>21.85</b>	153.109	Vertical	Pass
QAM		711	6.38	1.92	19.32	2.15	21.63	145.546	Vertical	Pass
5.0MHz	1/#Mid	706.5	5.95	1.91	19.23	2.15	21.12	129.420	Horizontal	Pass
Band 16		710	5.38	1.91	19.26	2.15	20.58	114.288	Horizontal	Pass
QAM		713.5	5.38	1.92	19.33	2.15	20.64	115.878	Horizontal	Pass
10.0MHz	1/#Mid	709	5.33	1.91	19.25	2.15	20.52	112.720	Horizontal	Pass
Band 16		710	5.57	1.91	19.26	2.15	20.77	119.399	Horizontal	Pass
QAM		711	5.79	1.92	19.32	2.15	21.04	127.057	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

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

## 9. SPURIOUS RADIATION EMISSION

### RULE PART(S)

FCC: §2.1051, §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 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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3701.4	-52.55	4.04	33.51	-23.08	-13	-10.08	Horizontal
3701.4	-48.41	4.04	33.51	-18.94	-13	-5.94	Vertical
5552.1	-48.31	5.24	35.84	-17.71	-13	-4.71	Vertical
5552.1	-49.59	5.24	35.84	-18.99	-13	-5.99	Horizontal
185.2	-42.75	1.43	16.02	-28.16	-13	-15.16	Vertical
369.1	-34.53	1.30	17.99	-17.84	-13	-4.84	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-51.06	4.04	33.56	-21.54	-13	-8.54	Horizontal
3760.0	-53.65	4.04	33.56	-24.13	-13	-11.13	Vertical
5640.0	-51.87	5.24	35.91	-21.20	-13	-8.20	Vertical
5640.0	-50.71	5.24	35.91	-20.04	-13	-7.04	Horizontal
198.8	-40.86	1.62	16.97	-25.51	-13	-12.51	Vertical
328.6	-44.00	1.74	15.98	-29.77	-13	-16.77	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-50.70	4.04	34.00	-20.74	-13	-7.74	Horizontal
3818.6	-50.02	4.04	34.00	-20.06	-13	-7.06	Vertical
5727.9	-51.33	5.24	36.04	-20.53	-13	-7.53	Vertical
5727.9	-51.29	5.24	36.04	-20.49	-13	-7.49	Horizontal
191.1	-35.46	1.42	17.29	-19.59	-13	-6.59	Vertical
275.9	-36.23	1.50	17.90	-19.82	-13	-6.82	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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720.0	-51.76	4.07	33.54	-22.29	-13	-9.29	Horizontal
3720.0	-47.88	4.07	33.54	-18.41	-13	-5.41	Vertical
5580.0	-52.94	5.28	35.86	-22.36	-13	-9.36	Vertical
5580.0	-49.68	5.28	35.86	-19.10	-13	-6.10	Horizontal
180.9	-37.00	1.58	16.89	-21.68	-13	-8.68	Vertical
352.3	-43.62	1.76	17.26	-28.12	-13	-15.12	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-48.92	4.04	33.56	-19.40	-13	-6.40	Horizontal
3760.0	-44.88	4.04	33.56	-15.36	-13	-2.36	Vertical
5640.0	-53.91	5.24	35.91	-23.24	-13	-10.24	Vertical
5640.0	-49.40	5.24	35.91	-18.73	-13	-5.73	Horizontal
208.6	-37.81	1.46	16.27	-23.00	-13	-10.00	Vertical
277.4	-37.26	1.59	15.15	-23.70	-13	-10.70	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-47.74	4.04	34.00	-17.78	-13	-4.78	Horizontal
3800.0	-51.70	4.04	34.00	-21.74	-13	-8.74	Vertical
5700.0	-52.74	5.24	36.04	-21.94	-13	-8.94	Vertical
5700.0	-51.98	5.24	36.04	-21.18	-13	-8.18	Horizontal
183.4	-44.19	1.36	17.39	-28.15	-13	-15.15	Vertical
365.9	-37.20	1.66	15.39	-23.47	-13	-10.47	Horizontal

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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-44.13	4.02	29.80	-18.35	-13	-5.35	Horizontal
3421.4	-51.59	4.02	29.80	-25.81	-13	-12.81	Vertical
5132.1	-49.91	5.24	35.84	-19.31	-13	-6.31	Vertical
5132.1	-49.62	5.24	35.84	-19.02	-13	-6.02	Horizontal
211.6	-43.87	1.68	16.04	-29.51	-13	-16.51	Vertical
313.4	-36.45	1.78	17.74	-20.49	-13	-7.49	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-51.36	4.03	30.00	-25.39	-13	-12.39	Horizontal
3465.0	-44.88	4.03	30.00	-18.91	-13	-5.91	Vertical
5197.5	-50.33	5.25	35.86	-19.72	-13	-6.72	Vertical
5197.5	-51.21	5.25	35.86	-20.60	-13	-7.60	Horizontal
179.0	-38.27	1.72	17.69	-22.30	-13	-9.30	Vertical
293.3	-42.25	1.62	16.02	-27.84	-13	-14.84	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-51.08	4.05	30.01	-25.12	-13	-12.12	Horizontal
3508.6	-53.90	4.05	30.01	-27.94	-13	-14.94	Vertical
5262.9	-47.09	5.26	35.86	-16.49	-13	-3.49	Vertical
5262.9	-53.95	5.26	35.86	-23.35	-13	-10.35	Horizontal
185.6	-40.59	1.80	16.69	-25.70	-13	-12.70	Vertical
433.2	-42.97	1.75	16.66	-28.07	-13	-15.07	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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440.0	-50.39	4.02	29.80	-24.61	-13	-11.61	Horizontal
3440.0	-49.94	4.02	29.80	-24.16	-13	-11.16	Vertical
5160.0	-53.77	5.24	35.84	-23.17	-13	-10.17	Vertical
5160.0	-53.41	5.24	35.84	-22.81	-13	-9.81	Horizontal
180.3	-35.28	1.57	17.26	-19.59	-13	-6.59	Vertical
265.8	-40.89	1.78	16.35	-26.32	-13	-13.32	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-51.07	4.03	30.00	-25.10	-13	-12.10	Horizontal
3465.0	-51.04	4.03	30.00	-25.07	-13	-12.07	Vertical
5197.5	-53.90	5.25	35.86	-23.29	-13	-10.29	Vertical
5197.5	-51.56	5.25	35.86	-20.95	-13	-7.95	Horizontal
182.5	-42.23	1.44	17.95	-25.72	-13	-12.72	Vertical
417.1	-41.72	1.65	16.09	-27.28	-13	-14.28	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-47.27	2.91	27.68	-22.50	-13	-9.50	Horizontal
3490.0	-50.24	2.91	27.68	-25.47	-13	-12.47	Vertical
5235.0	-47.30	5.26	35.86	-16.70	-13	-3.70	Vertical
5235.0	-49.76	5.26	35.86	-19.16	-13	-6.16	Horizontal
188.3	-40.92	1.61	16.85	-25.68	-13	-12.68	Vertical
235.4	-36.74	1.61	15.19	-23.16	-13	-10.16	Horizontal

### 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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-51.05	2.78	27.50	-26.33	-13	-13.33	Horizontal
1649.4	-47.50	2.78	27.50	-22.78	-13	-9.78	Vertical
2474.1	-49.28	2.90	27.80	-24.38	-13	-11.38	Vertical
2474.1	-49.53	2.90	27.80	-24.63	-13	-11.63	Horizontal
195.9	-43.19	1.76	17.59	-27.36	-13	-14.36	Vertical
419.5	-41.09	1.63	15.87	-26.85	-13	-13.85	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-48.93	2.80	27.48	-24.25	-13	-11.25	Horizontal
1673.0	-49.69	2.80	27.48	-25.01	-13	-12.01	Vertical
2509.5	-46.41	2.91	27.70	-21.62	-13	-8.62	Vertical
2509.5	-50.69	2.91	27.70	-25.90	-13	-12.90	Horizontal
212.4	-37.41	1.61	15.68	-23.34	-13	-10.34	Vertical
408.2	-38.78	1.59	17.52	-22.86	-13	-9.86	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-46.20	2.82	27.43	-21.59	-13	-8.59	Horizontal
1696.6	-48.46	2.82	27.43	-23.85	-13	-10.85	Vertical
2544.9	-46.89	2.92	27.74	-22.07	-13	-9.07	Vertical
2544.9	-53.68	2.92	27.74	-28.86	-13	-15.86	Horizontal
190.3	-36.10	1.69	16.67	-21.11	-13	-8.11	Vertical
237.0	-43.56	1.70	17.18	-28.08	-13	-15.08	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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1658.0	-48.58	2.78	27.50	-23.86	-13	-10.86	Horizontal
1658.0	-53.71	2.78	27.50	-28.99	-13	-15.99	Vertical
2487.0	-47.93	2.90	27.80	-23.03	-13	-10.03	Vertical
2487.0	-53.11	2.90	27.80	-28.21	-13	-15.21	Horizontal
184.3	-39.21	1.71	15.57	-25.35	-13	-12.35	Vertical
368.9	-38.08	1.34	16.40	-23.02	-13	-10.02	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-52.99	2.80	27.48	-28.31	-13	-15.31	Horizontal
1673.0	-49.51	2.80	27.48	-24.83	-13	-11.83	Vertical
2509.5	-50.79	2.91	27.70	-26.00	-13	-13.00	Vertical
2509.5	-53.84	2.91	27.70	-29.05	-13	-16.05	Horizontal
209.1	-38.80	1.44	17.04	-23.20	-13	-10.20	Vertical
449.6	-38.85	1.76	17.62	-22.99	-13	-9.99	Horizontal
Test Results for High Channel 844MHz							
1688.0	-51.29	2.82	27.43	-26.68	-13	-13.68	Horizontal
1688.0	-53.67	2.82	27.43	-29.06	-13	-16.06	Vertical
2532.0	-50.14	2.92	27.74	-25.32	-13	-12.32	Vertical
2532.0	-53.07	2.92	27.74	-28.25	-13	-15.25	Horizontal
195.6	-41.48	1.74	17.70	-25.52	-13	-12.52	Vertical
256.8	-39.27	1.41	17.46	-23.21	-13	-10.21	Horizontal

### 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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-63.59	5.23	35.81	-33.01	-25	-8.01	Horizontal
5005.0	-64.49	5.23	35.81	-33.91	-25	-8.91	Vertical
7507.5	-61.42	5.67	36.85	-30.24	-25	-5.24	Vertical
7507.5	-63.32	5.67	36.85	-32.14	-25	-7.14	Horizontal
202.5	-46.05	1.73	17.97	-29.81	-25	-4.81	Vertical
406.7	-53.92	1.38	15.11	-40.19	-25	-15.19	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-63.39	5.23	35.82	-32.80	-25	-7.80	Horizontal
5070.0	-59.02	5.23	35.82	-28.43	-25	-3.43	Vertical
7605.0	-59.47	5.67	36.85	-28.29	-25	-3.29	Vertical
7605.0	-62.55	5.67	36.85	-31.37	-25	-6.37	Horizontal
199.6	-54.42	1.77	16.17	-40.01	-25	-15.01	Vertical
333.4	-45.61	1.63	15.21	-32.03	-25	-7.03	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-64.88	5.24	35.83	-34.29	-25	-9.29	Horizontal
5135.0	-62.58	5.24	35.83	-31.99	-25	-6.99	Vertical
7702.5	-62.90	5.68	36.87	-31.71	-25	-6.71	Vertical
7702.5	-60.46	5.68	36.87	-29.27	-25	-4.27	Horizontal
210.1	-48.79	1.58	17.56	-32.81	-25	-7.81	Vertical
327.3	-51.84	1.45	16.58	-36.71	-25	-11.71	Horizontal

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

Test Results for Low Channel 2510MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020.0	-61.49	5.23	35.82	-30.90	-25	-5.90	Horizontal
5020.0	-59.50	5.23	35.82	-28.91	-25	-3.91	Vertical
7530.0	-59.94	5.67	36.86	-28.75	-25	-3.75	Vertical
7530.0	-59.11	5.67	36.86	-27.92	-25	-2.92	Horizontal
177.6	-54.13	1.63	15.76	-40.00	-25	-15.00	Vertical
280.9	-52.41	1.71	15.44	-38.68	-25	-13.68	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-63.85	5.23	35.82	-33.26	-25	-8.26	Horizontal
5070.0	-60.64	5.23	35.82	-30.05	-25	-5.05	Vertical
7605.0	-63.84	5.67	36.85	-32.66	-25	-7.66	Vertical
7605.0	-60.59	5.67	36.85	-29.41	-25	-4.41	Horizontal
197.9	-48.96	1.79	16.84	-33.90	-25	-8.90	Vertical
320.1	-48.19	1.71	17.64	-32.26	-25	-7.26	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-61.06	5.24	35.83	-30.47	-25	-5.47	Horizontal
5120.0	-59.86	5.24	35.83	-29.27	-25	-4.27	Vertical
7680.0	-59.44	5.70	36.88	-28.26	-25	-3.26	Vertical
7680.0	-59.29	5.70	36.88	-28.11	-25	-3.11	Horizontal
188.5	-45.88	1.79	16.84	-30.82	-25	-5.82	Vertical
437.8	-45.94	1.71	17.64	-30.01	-25	-5.01	Horizontal

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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-51.96	2.60	27.20	-27.36	-13	-14.36	Horizontal
1399.4	-47.01	2.60	27.20	-22.41	-13	-9.41	Vertical
2099.1	-52.39	2.85	27.54	-27.70	-13	-14.70	Vertical
2099.1	-50.54	2.85	27.54	-25.85	-13	-12.85	Horizontal
201.3	-39.35	1.49	17.78	-23.06	-13	-10.06	Vertical
419.3	-34.88	1.36	17.33	-18.91	-13	-5.91	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-45.96	2.61	27.28	-21.29	-13	-8.29	Horizontal
1415.0	-53.21	2.61	27.28	-28.54	-13	-15.54	Vertical
2122.5	-51.01	2.87	27.59	-26.29	-13	-13.29	Vertical
2122.5	-52.22	2.87	27.59	-27.50	-13	-14.50	Horizontal
201.6	-34.14	1.73	15.74	-20.13	-13	-7.13	Vertical
344.5	-34.30	1.62	15.79	-20.13	-13	-7.13	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-46.76	2.63	27.28	-22.11	-13	-9.11	Horizontal
1430.6	-52.55	2.63	27.28	-27.90	-13	-14.90	Vertical
2145.9	-51.90	2.88	27.60	-27.18	-13	-14.18	Vertical
2145.9	-51.55	2.88	27.60	-26.83	-13	-13.83	Horizontal
186.2	-35.68	1.61	18.00	-19.29	-13	-6.29	Vertical
315.7	-39.79	1.45	15.49	-25.76	-13	-12.76	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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1408.0	-50.30	2.61	27.26	-25.65	-13	-12.65	Horizontal
1408.0	-48.06	2.61	27.26	-23.41	-13	-10.41	Vertical
2112.0	-50.08	2.87	27.58	-25.37	-13	-12.37	Vertical
2112.0	-53.51	2.87	27.58	-28.80	-13	-15.80	Horizontal
182.2	-41.46	1.31	16.97	-25.80	-13	-12.80	Vertical
364.4	-42.66	1.65	16.70	-27.61	-13	-14.61	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-44.27	2.61	27.28	-19.60	-13	-6.60	Horizontal
1415.0	-50.42	2.61	27.28	-25.75	-13	-12.75	Vertical
2122.5	-44.94	2.87	27.59	-20.22	-13	-7.22	Vertical
2122.5	-52.73	2.87	27.59	-28.01	-13	-15.01	Horizontal
179.1	-37.71	1.72	17.99	-21.44	-13	-8.44	Vertical
260.2	-38.18	1.73	17.94	-21.97	-13	-8.97	Horizontal
Test Results for High Channel 711MHz							
1422.0	-52.29	2.62	27.28	-27.63	-13	-14.63	Horizontal
1422.0	-44.75	2.62	27.28	-20.09	-13	-7.09	Vertical
2133.0	-49.24	2.87	27.60	-24.51	-13	-11.51	Vertical
2133.0	-50.06	2.87	27.60	-25.33	-13	-12.33	Horizontal
198.4	-39.49	1.58	15.93	-25.14	-13	-12.14	Vertical
457.9	-38.04	1.36	15.59	-23.81	-13	-10.81	Horizontal

9.6 LTE BAND 17

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

Test Results for Low Channel 706.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1413.0	-47.72	2.61	27.28	-23.05	-13	-10.05	Horizontal
1413.0	-46.79	2.61	27.28	-22.12	-13	-9.12	Vertical
2119.5	-53.67	2.87	27.59	-28.95	-13	-15.95	Vertical
2119.5	-52.01	2.87	27.59	-27.29	-13	-14.29	Horizontal
206.8	-36.74	1.71	16.15	-22.30	-13	-9.30	Vertical
391.9	-42.25	1.41	17.32	-26.34	-13	-13.34	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-51.06	2.62	27.30	-26.38	-13	-13.38	Horizontal
1420.0	-45.62	2.62	27.30	-20.94	-13	-7.94	Vertical
2130.0	-51.41	2.87	27.62	-26.66	-13	-13.66	Vertical
2130.0	-51.21	2.87	27.62	-26.46	-13	-13.46	Horizontal
189.8	-34.95	1.42	15.25	-21.13	-13	-8.13	Vertical
264.9	-44.11	1.36	17.19	-28.28	-13	-15.28	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-44.41	2.66	27.28	-19.79	-13	-6.79	Horizontal
1427.0	-49.97	2.66	27.28	-25.35	-13	-12.35	Vertical
2140.5	-45.38	2.88	27.60	-20.66	-13	-7.66	Vertical
2140.5	-50.93	2.88	27.60	-26.21	-13	-13.21	Horizontal
204.2	-43.52	1.32	17.29	-27.55	-13	-14.55	Vertical
290.8	-38.97	1.72	16.89	-23.80	-13	-10.80	Horizontal



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

Test Results for Low Channel 709MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1418.0	-44.16	2.62	27.30	-19.48	-13	-6.48	Horizontal
1418.0	-50.49	2.62	27.30	-25.81	-13	-12.81	Vertical
2127.0	-49.40	2.87	27.62	-24.65	-13	-11.65	Vertical
2127.0	-51.11	2.87	27.62	-26.36	-13	-13.36	Horizontal
183.2	-44.96	1.35	16.91	-29.40	-13	-16.40	Vertical
248.3	-44.16	1.62	16.31	-29.47	-13	-16.47	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-53.82	2.62	27.30	-29.14	-13	-16.14	Horizontal
1420.0	-45.33	2.62	27.30	-20.65	-13	-7.65	Vertical
2130.0	-49.47	2.87	27.62	-24.72	-13	-11.72	Vertical
2130.0	-49.97	2.87	27.62	-25.22	-13	-12.22	Horizontal
181.0	-43.80	1.51	17.14	-28.17	-13	-15.17	Vertical
276.3	-37.78	1.77	16.88	-22.67	-13	-9.67	Horizontal
Test Results for High Channel 711MHz							
1422.0	-51.75	2.62	27.30	-27.07	-13	-14.07	Horizontal
1422.0	-45.21	2.62	27.30	-20.53	-13	-7.53	Vertical
2133.0	-51.47	2.87	27.62	-26.72	-13	-13.72	Vertical
2133.0	-50.91	2.87	27.62	-26.16	-13	-13.16	Horizontal
179.7	-36.11	1.78	15.95	-21.94	-13	-8.94	Vertical
253.8	-37.42	1.34	17.95	-20.82	-13	-7.82	Horizontal

## 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, DC3.87V 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

QPSK, (20MHz BANDWIDTH)

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
3.4	1880	12.5	0.006641	2.5
3.87	1880	13.8	0.007363	2.5
4.2	1880	13.1	0.006983	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
Normal (25C)	1880	12.8	0.006806	2.5
Extreme (50C)	1880	12.1	0.006411	2.5
Extreme (40C)	1880	13.8	0.007326	2.5
Extreme (30C)	1880	13.1	0.006959	2.5
Extreme (10C)	1880	14.1	0.007490	2.5
Extreme (0C)	1880	11.7	0.006218	2.5
Extreme (-10C)	1880	13.1	0.006942	2.5
Extreme (-20C)	1880	14.6	0.007761	2.5
Extreme (-30C)	1880	14.5	0.007715	2.5

**16QAM, (20MHz BANDWIDTH)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
3.4	1880	9.5	0.005034	2.5
3.87	1880	8.6	0.004595	2.5
4.2	1880	7.7	0.004115	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
Normal (25C)	1880	9.3	0.004959	2.5
Extreme (50C)	1880	8.7	0.004615	2.5
Extreme (40C)	1880	8.1	0.004289	2.5
Extreme (30C)	1880	8.7	0.004633	2.5
Extreme (10C)	1880	8.7	0.004639	2.5
Extreme (0C)	1880	8.4	0.004446	2.5
Extreme (-10C)	1880	8.6	0.004597	2.5
Extreme (-20C)	1880	9.1	0.004860	2.5
Extreme (-30C)	1880	8.3	0.004419	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

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
3.4	1732.5	8.8	0.005097	2.5
3.87	1732.5	8.8	0.005079	2.5
4.2	1732.5	8.6	0.004962	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
Normal (25C)	1732.5	8.2	0.004736	2.5
Extreme (50C)	1732.5	8.5	0.004891	2.5
Extreme (40C)	1732.5	7.9	0.004541	2.5
Extreme (30C)	1732.5	5.9	0.003413	2.5
Extreme (10C)	1732.5	7.1	0.004102	2.5
Extreme (0C)	1732.5	9.5	0.005479	2.5
Extreme (-10C)	1732.5	8.6	0.004990	2.5
Extreme (-20C)	1732.5	6.8	0.003905	2.5
Extreme (-30C)	1732.5	8.1	0.004666	2.5

**16QAM, (20MHz BANDWIDTH)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
3.4	1732.5	9.7	0.005587	2.5
3.87	1732.5	8.9	0.005141	2.5
4.2	1732.5	8.5	0.004910	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
Normal (25C)	1732.5	9.3	0.005370	2.5
Extreme (50C)	1732.5	8.9	0.005135	2.5
Extreme (40C)	1732.5	7.8	0.004493	2.5
Extreme (30C)	1732.5	8.8	0.005053	2.5
Extreme (10C)	1732.5	8.6	0.004966	2.5
Extreme (0C)	1732.5	8.1	0.004695	2.5
Extreme (-10C)	1732.5	8.9	0.005155	2.5
Extreme (-20C)	1732.5	9.3	0.005368	2.5
Extreme (-30C)	1732.5	8.5	0.004888	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

#### QPSK, (10MHz BANDWIDTH)

##### Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
3.4	836.5	5.4	0.006447	2.5
3.87	836.5	6.3	0.007538	2.5
4.2	836.5	5.2	0.006171	2.5

##### Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
Normal (25C)	836.5	5.8	0.006992	2.5
Extreme (50C)	836.5	6.3	0.007521	2.5
Extreme (40C)	836.5	6.2	0.007460	2.5
Extreme (30C)	836.5	6.0	0.007165	2.5
Extreme (10C)	836.5	5.7	0.006814	2.5
Extreme (0C)	836.5	5.3	0.006332	2.5
Extreme (-10C)	836.5	5.2	0.006162	2.5
Extreme (-20C)	836.5	5.9	0.007022	2.5
Extreme (-30C)	836.5	6.5	0.007747	2.5

**16QAM, (10MHz BANDWIDTH)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
3.4	836.5	5.8	0.006942	2.5
3.87	836.5	6.7	0.008025	2.5
4.2	836.5	5.0	0.005965	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
Normal (25C)	836.5	5.6	0.006713	2.5
Extreme (50C)	836.5	6.1	0.007273	2.5
Extreme (40C)	836.5	5.9	0.007083	2.5
Extreme (30C)	836.5	6.4	0.007629	2.5
Extreme (10C)	836.5	5.3	0.006290	2.5
Extreme (0C)	836.5	5.2	0.006159	2.5
Extreme (-10C)	836.5	5.2	0.006274	2.5
Extreme (-20C)	836.5	6.4	0.007623	2.5
Extreme (-30C)	836.5	6.3	0.007560	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

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
3.4	2535	10.4	0.004085	2.5
3.87	2535	9.2	0.003612	2.5
4.2	2535	8.8	0.003458	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
Normal (25C)	2535	9.6	0.003784	2.5
Extreme (50C)	2535	8.8	0.003463	2.5
Extreme (40C)	2535	8.4	0.003315	2.5
Extreme (30C)	2535	8.9	0.003507	2.5
Extreme (10C)	2535	8.5	0.003358	2.5
Extreme (0C)	2535	8.3	0.003263	2.5
Extreme (-10C)	2535	9.6	0.003801	2.5
Extreme (-20C)	2535	9.3	0.003667	2.5
Extreme (-30C)	2535	8.1	0.003207	2.5

**16QAM, (20MHz BANDWIDTH)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
3.4	2535	7.0	0.002751	2.5
3.87	2535	6.9	0.002705	2.5
4.2	2535	6.0	0.002376	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
Normal (25C)	2535	6.7	0.002657	2.5
Extreme (50C)	2535	5.7	0.002252	2.5
Extreme (40C)	2535	5.4	0.002120	2.5
Extreme (30C)	2535	6.4	0.002539	2.5
Extreme (10C)	2535	6.0	0.002369	2.5
Extreme (0C)	2535	5.5	0.002184	2.5
Extreme (-10C)	2535	5.0	0.001985	2.5
Extreme (-20C)	2535	5.8	0.002304	2.5
Extreme (-30C)	2535	5.8	0.002305	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

QPSK, (10MHz BANDWIDTH)

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
3.4	707.5	9.2	0.012960	2.5
3.87	707.5	9.7	0.013743	2.5
4.2	707.5	8.2	0.011544	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
Normal (25C)	707.5	9.2	0.012933	2.5
Extreme (50C)	707.5	7.4	0.010473	2.5
Extreme (40C)	707.5	7.2	0.010183	2.5
Extreme (30C)	707.5	8.1	0.011505	2.5
Extreme (10C)	707.5	7.2	0.010122	2.5
Extreme (0C)	707.5	9.3	0.013147	2.5
Extreme (-10C)	707.5	8.3	0.011752	2.5
Extreme (-20C)	707.5	9.3	0.013158	2.5
Extreme (-30C)	707.5	7.6	0.010791	2.5

**16QAM, (10MHz BANDWIDTH)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 12 16QAM, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
3.4	707.5	6.9	0.009772	2.5
3.87	707.5	8.4	0.011922	2.5
4.2	707.5	7.0	0.009899	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
Normal (25C)	707.5	6.5	0.009175	2.5
Extreme (50C)	707.5	5.5	0.007765	2.5
Extreme (40C)	707.5	6.4	0.009110	2.5
Extreme (30C)	707.5	-7.7	-0.010912	2.5
Extreme (10C)	707.5	-8.2	-0.011590	2.5
Extreme (0C)	707.5	2.9	0.004100	2.5
Extreme (-10C)	707.5	-5.2	-0.007292	2.5
Extreme (-20C)	707.5	-8.7	-0.012302	2.5
Extreme (-30C)	707.5	-10.2	-0.014350	2.5

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

### 10.6 LTE BAND 17

#### QPSK, (10MHz BANDWIDTH)

##### Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
3.4	710.0	10.2	0.014366	2.5
3.87	710.0	8.5	0.011970	2.5
4.2	710.0	7.8	0.010921	2.5

##### Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
Normal (25C)	710.0	9.3	0.013059	2.5
Extreme (50C)	710.0	9.2	0.012930	2.5
Extreme (40C)	710.0	8.4	0.011811	2.5
Extreme (30C)	710.0	9.1	0.012820	2.5
Extreme (10C)	710.0	8.9	0.012579	2.5
Extreme (0C)	710.0	8.1	0.011349	2.5
Extreme (-10C)	710.0	9.3	0.013089	2.5
Extreme (-20C)	710.0	9.3	0.013099	2.5
Extreme (-30C)	710.0	8.5	0.011957	2.5

**16QAM, (10MHz BANDWIDTH)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 17 16QAM, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
3.4	710.0	10.1	0.014198	2.5
3.87	710.0	9.0	0.012613	2.5
4.2	710.0	8.3	0.011631	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
Normal (25C)	710.0	9.5	0.013312	2.5
Extreme (50C)	710.0	8.6	0.012129	2.5
Extreme (40C)	710.0	8.6	0.012105	2.5
Extreme (30C)	710.0	8.4	0.011877	2.5
Extreme (10C)	710.0	8.1	0.011473	2.5
Extreme (0C)	710.0	8.2	0.011578	2.5
Extreme (-10C)	710.0	9.4	0.013248	2.5
Extreme (-20C)	710.0	9.0	0.012746	2.5
Extreme (-30C)	710.0	7.9	0.011175	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.

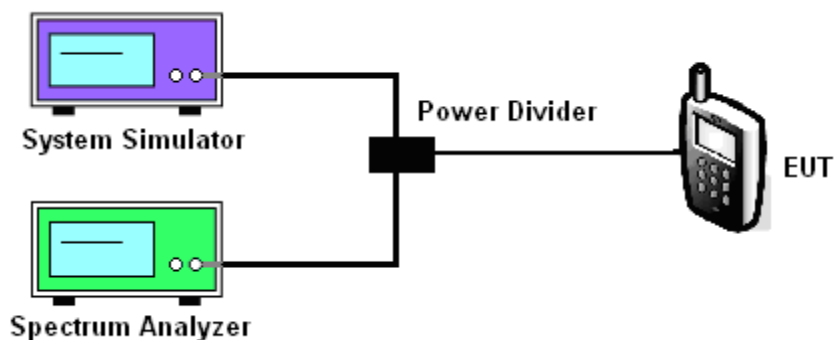
### 11.2 Measuring Instruments

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 GSM/EGPRS operating modes:
  - a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
  - b. Set EUT in maximum power output, and triggered the burst signal.
  - c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.
4. For UMTS 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----