

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

## FCC ID: 2ANMU-RT7SPUT

**Product:** Tablet  
**Trade Mark:** OUKITEL  
**Model Number:** RT7 TITAN 5G  
**Family Model:** RT7, RT7 S, RT7 Pro, RT7 Ultra, RT7 TITAN  
**Report No.:** S23060602309006  
**Issue Date:** Aug 01, 2023

### Prepared for

SHENZHEN YUNJI INTELLIGENT TECHNOLOGY CO.,LTD  
A2 2F BUILDING ENET NEW INDUSTRIAL PARK, DAFU INDUSTRIAL  
ZONE, GUANLAN, LONGHUA, SHENZHEN CHINA

### Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.  
1&5/F, Building C, 1&2/F, Building E, Fenda Science Park,  
Sanwei Community, Hangcheng Street, Baoan District, Shenzhen ,  
Guangdong, China  
Tel. 400-800-6106, 0755-2320 0050, 0755-2320 0090  
Website:<http://www.ntek.org.cn>

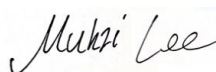
<b>TEST RESULT CERTIFICATION</b>	
<b>Applicant's name</b> .....	SHENZHEN YUNJI INTELLIGENT TECHNOLOGY CO.,LTD
Address .....	A2 2F BUILDING ENET NEW INDUSTRIAL PARK, DAFU INDUSTRIAL ZONE, GUANLAN, LONGHUA,SHENZHEN CHINA
<b>Manufacturer's Name</b> .....	SHENZHEN YUNJI INTELLIGENT TECHNOLOGY CO.,LTD
Address .....	A2 2F BUILDING ENET NEW INDUSTRIAL PARK, DAFU INDUSTRIAL ZONE, GUANLAN, LONGHUA,SHENZHEN CHINA
Product name .....	Tablet
Trade Mark .....	OUKITEL
Model and/or type reference .....	RT7 TITAN 5G
Family Model .....	RT7, RT7 S, RT7 Pro, RT7 Ultra, RT7 TITAN
Test Sample number.....	S230606023011
<b>Standards</b> .....	FCC CFR 47 Part 22H, Part 24E, Part 27
Test procedure.....	ANSI C63.26:2015 ANSI/TIA-603-E-2016

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

This report shall not be reproduced except in full, without the written approval of NTEK, this document may be altered or revised by NTEK, personal only, and shall be noted in the revision of the document.

<b>Date of Test</b> .....	
Date (s) of performance of tests .....	Jun 06, 2023 ~ Aug 01, 2023
Date of Issue .....	Aug 01, 2023
Test Result .....	<b>Pass</b>

Testing Engineer :



(Mukzi Lee)

Authorized Signatory :



(Alex Li)

## TABLE OF CONTENTS

<b>1.1 PRODUCT DESCRIPTION</b> .....	<b>5</b>
<b>1.2 RELATED SUBMITTAL(S) / GRANT (S)</b> .....	<b>6</b>
<b>1.3 TEST METHODOLOGY</b> .....	<b>6</b>
<b>1.4 TEST FACILITY</b> .....	<b>6</b>
<b>MEASUREMENT UNCERTAINTY</b> .....	<b>6</b>
<b>1.5 SPECIAL ACCESSORIES</b> .....	<b>6</b>
<b>1.6 WORST-CASE CONFIGURATION AND MODE</b> .....	<b>7</b>
<b>1.6 SUMMARY OF TEST RESULTS</b> .....	<b>7</b>
<b>2. SYSTEM TEST CONFIGURATION</b> .....	<b>9</b>
<b>2.1 EUT CONFIGURATION</b> .....	<b>9</b>
<b>2.2 EUT EXERCISE</b> .....	<b>9</b>
<b>2.3 CONFIGURATION OF EUT SYSTEM</b> .....	<b>9</b>
<b>2.4 TEST SETUP</b> .....	<b>10</b>
<b>3. TEST AND MEASUREMENT EQUIPMENT</b> .....	<b>11</b>
<b>4. OUTPUT POWER</b> .....	<b>13</b>
<b>4.1 OUTPUT POWER MEASUREMENT</b> .....	<b>13</b>
<b>6. BANDEDGE AND EMISSION MASK</b> .....	<b>16</b>
<b>7. OUT OF BAND EMISSIONS</b> .....	<b>17</b>
<b>7.1 MEASUREMENT METHOD</b> .....	<b>18</b>
<b>8. RADIATED MEASUREMENT</b> .....	<b>19</b>
<b>8.1. RADIATED POWER (ERP &amp; EIRP)</b> .....	<b>19</b>
<b>8.2 LTE BAND 2</b> .....	<b>20</b>
<b>8.3 LTE BAND 4</b> .....	<b>23</b>
<b>8.4 LTE BAND 5</b> .....	<b>26</b>
<b>8.5 LTE BAND 7</b> .....	<b>28</b>
<b>8.6 LTE BAND 12</b> .....	<b>30</b>

<b>8.7 LTE BAND 17 .....</b>	<b>32</b>
<b>9. SPURIOUS RADIATION EMISSION .....</b>	<b>34</b>
<b>9.1 LTE BAND 2.....</b>	<b>36</b>
<b>9.2 LTE BAND 4.....</b>	<b>38</b>
<b>9.3 LTE BAND 5.....</b>	<b>40</b>
<b>9.4 LTE BAND 7.....</b>	<b>42</b>
<b>9.5 LTE BAND 12 .....</b>	<b>44</b>
<b>9.6 LTE BAND 17 .....</b>	<b>46</b>
<b>10. FREQUENCY STABILITY .....</b>	<b>48</b>
<b>10.1 LTE BAND 2 .....</b>	<b>49</b>
<b>10.2 LTE BAND 4 .....</b>	<b>51</b>
<b>10.3 LTE BAND 5 .....</b>	<b>53</b>
<b>10.4 LTE BAND 7 .....</b>	<b>55</b>
<b>10.5 LTE BAND 12 .....</b>	<b>57</b>
<b>10.6 LTE BAND 17 .....</b>	<b>59</b>
<b>11. PEAK-TO-AVERAGE RATIO.....</b>	<b>61</b>
<b>11.1 Description of the PAR Measurement.....</b>	<b>61</b>
<b>11.2 Measuring Instruments.....</b>	<b>61</b>
<b>11.3 Test Procedures.....</b>	<b>61</b>
<b>11.4 Test Setup.....</b>	<b>61</b>

## 1. GENERAL INFORMATION

### 1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Tablet
Trade Mark	OUKITEL
Model Name	RT7 TITAN 5G
Family Model	RT7, RT7 S, RT7 Pro, RT7 Ultra, RT7 TITAN
Model Difference	All the model are the same circuit and RF module,except the model names.
FCC ID:	2ANMU-RT7SPUT
Frequency Bands:	U.S. Bands: <input checked="" type="checkbox"/> LTE FDD Band 2, 4, 5, 7, 12, 17
Frequency Range:	LTE FDD Band 2 Uplink: 1850MHz-1910MHz, Downlink: 1930MHz-1990MHz; LTE FDD Band 4 Uplink: 1710MHz-1755MHz, Downlink: 2110MHz-2155MHz; LTE FDD Band 5 Uplink: 824MHz-849MHz, Downlink: 869MHz-894MHz; LTE-FDD Band 7 Uplink: 2500MHz-2570MHz, Downlink: 2620MHz-2690MHz; LTE FDD Band 12 Uplink: 699MHz-716MHz, Downlink: 729MHz-746MHz; LTE FDD Band 17 Uplink: 704MHz-716MHz, Downlink: 734MHz-746MHz;
Type of Modulation:	QPSK/16QAM
Power Class	Class 3
Antenna:	PIFA Antenna
Antenna gain:	Band 2: 0.15dBi, Band 4: -0.41 dBi, Band 5: -0.5 dBi, Band 7: 2.14 dBi, Band 12: -2.24 dBi, Band 17: -2.24 dBi
Adapter	Model: HJ-PD33W-US Input: 100-240V~50/60Hz 0.8A Output: 5.0V $\overline{\text{---}}$ 3.0A OR 9.0V $\overline{\text{---}}$ 3.0A OR 12.0V $\overline{\text{---}}$ 2.75A 33.0W MAX
Battery	DC 3.87V, 32000mAh, 123.84Wh
Power supply	DC 3.87V from battery or DC 5V from Adapter.
Extreme Vol. Limits:	DC 3.48V to DC 4.26V (Nominal DC 3.87V) (Note 1)
HW Version	TP758_MAIN_PCB_1.1
SW Version	OUKITEL_P07_EEA_V03
** Note1: The High Voltage 4.26V and Low Voltage 3.48V 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-RT7SPUT** 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&5/F, Building C, 1&2/F, Building E, Fenda Science Park,

Sanwei Community, Hangcheng Street, Baoan District, Shenzhen ,Guangdong, China

The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.26:2015& ANSI C63.4: 2014.

FCC Registration No.:463705

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

## MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.5dB
2	Conducted Emission Test	$\pm 1.38$ dB
3	RF power, conducted	$\pm 0.16$ dB
4	Spurious emissions, conducted	$\pm 0.21$ dB
5	All emissions, radiated(<1G)	$\pm 4.68$ dB
6	All emissions, radiated(>1G)	$\pm 4.89$ dB
7	Temperature	$\pm 0.5$ °C
8	Humidity	$\pm 2$ %
9	Frequency error, conducted	$\pm 0.19$ ppm

## 1.5 SPECIAL ACCESSORIES

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

**1.6 WORST-CASE CONFIGURATION AND MODE**

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

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

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

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

**1.6 SUMMARY OF TEST RESULTS**

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

2.1053 22.917(a) 24.238(a) 27.53(g)(h)(m) KDB 971168 D01 Clause 7	Field Strength of Spurious Radiation	PASS	
2.1055 22.355 24.235 27.54 KDB 971168 D01 Clause 9	Frequency Stability for Temperature & Voltage	PASS	
2.1051 22.917(a) 24.238(a) 27.53(g)(h)(m) KDB 971168 D01 Clause 6	Conducted Emission	PASS	

Remark:

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



## 2. SYSTEM TEST CONFIGURATION

### 2.1 EUT CONFIGURATION

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

### 2.2 EUT EXERCISE

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

### 2.3 CONFIGURATION OF EUT SYSTEM

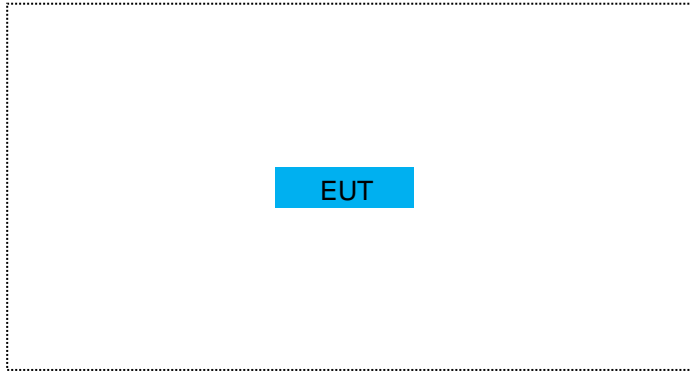
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Tablet	RT7 TITAN 5G	FCC ID: 2ANMU-RT7SPUT	EUT

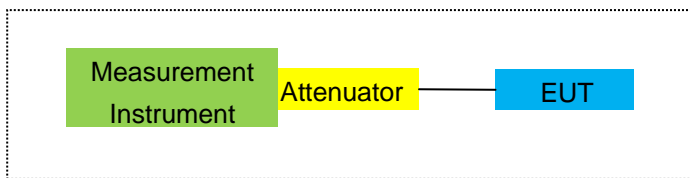
*Note: All the accessories have been used during the test.  
the following "EUT" in setup diagram means EUT system.*

## 2.4 TEST SETUP

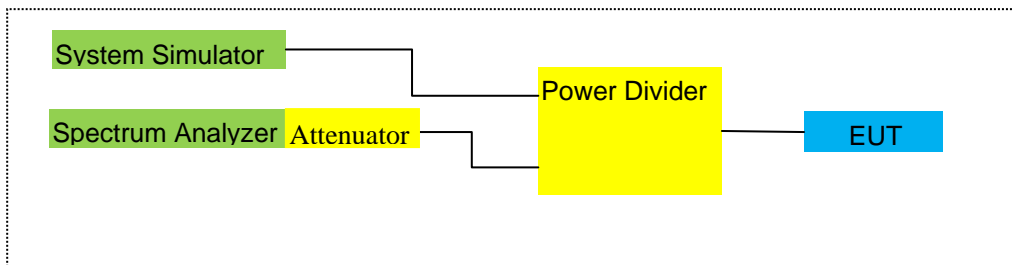
For Radiated Test Cases



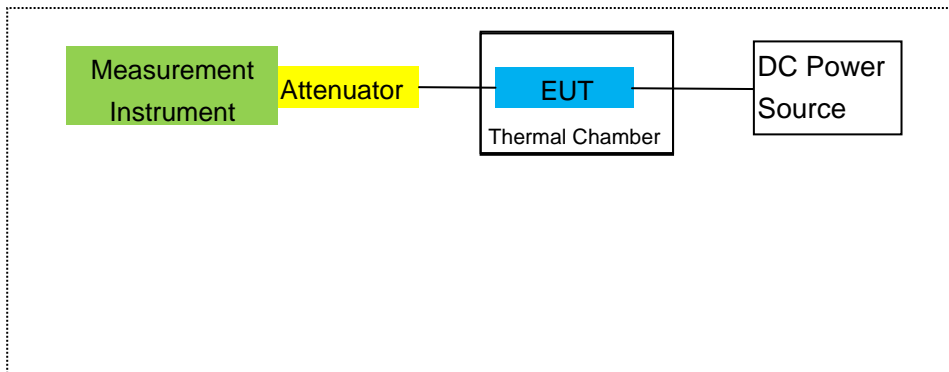
For Conducted Output Power



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	2023.03.16	2024.03.15	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	2022.03.31	2025.03.30	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2022.11.07	2023.11.06	1 year
7	Amplifier	EM	EM-30180	060538	2023.05.29	2024.05.28	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2022.11.04	2023.11.05	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	2023.05.29	2024.05.28	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 Band 2/4/5/7/12/17

### RESULTS

**PASS**

Test data reference attachment.

## 6. BANDEDGE AND EMISSION MASK

### RULE PART(S)

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

FCC: §2.1046, §22.913, §24.232

### LIMITS

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

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

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

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

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

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

### TEST PROCEDURE

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

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

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

Set display line

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

### MODES TESTED

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

### RESULTS

Test data reference attachment.



## 7. OUT OF BAND EMISSIONS

### RULE PART(S)

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

### LIMITS

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

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

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

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

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

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

### TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

Set display line

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

### MODES TESTED

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

## 7.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

### **Test data reference attachment.**

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

## 8. RADIATED MEASUREMENT

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

#### RULE PART(S)

FCC: §2.1046, §22.913(a)(2), §24.232(c) and §27.50 (h)(2), (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 Band 2/4/5/7/12/17

#### 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)	Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP		
							Average (mW)		
1.4MHz Band QPSK	1/#Mid	1850.7	-2.13	3.76	28.24	22.35	171.791	Horizontal	Pass
		1880	-1.93	3.91	28.22	22.38	172.982	Horizontal	Pass
		1909.3	-1.90	3.93	28.20	22.37	172.584	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-2.15	3.77	28.23	22.31	170.216	Horizontal	Pass
		1880	-2.02	3.91	28.24	22.31	170.216	Horizontal	Pass
		1908.5	-1.88	3.94	28.25	22.43	174.985	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-2.22	3.77	28.31	22.32	170.608	Horizontal	Pass
		1880	-1.91	3.91	28.22	22.40	173.780	Horizontal	Pass
		1907.5	-1.98	3.94	28.20	22.28	169.044	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-2.20	3.79	28.33	22.34	171.396	Horizontal	Pass
		1880	-1.84	3.95	28.22	22.43	174.985	Horizontal	Pass
		1905	-1.83	3.97	28.19	22.39	173.380	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-2.11	3.79	28.34	22.44	175.388	Horizontal	Pass
		1880	-1.86	3.95	28.22	22.41	174.181	Horizontal	Pass
		1902.5	-1.77	3.97	28.18	22.44	175.388	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-2.21	3.81	28.35	22.33	171.002	Horizontal	Pass
		1880	-1.82	3.96	28.22	22.44	175.388	Horizontal	Pass
		1900	-1.72	4.00	28.16	22.44	175.388	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-2.11	3.76	28.24	22.37	172.584	Vertical	Pass
		1880	-1.98	3.91	28.22	22.33	171.002	Vertical	Pass
		1909.3	-1.91	3.93	28.20	22.36	172.187	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-2.02	3.77	28.23	22.44	175.388	Vertical	Pass
		1880	-1.88	3.91	28.24	22.45	175.792	Vertical	Pass
		1908.5	-1.95	3.94	28.25	22.36	172.187	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-2.25	3.77	28.31	22.29	169.434	Vertical	Pass
		1880	-2.03	3.91	28.22	22.28	169.044	Vertical	Pass
		1907.5	-1.82	3.94	28.20	22.44	175.388	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	-2.21	3.79	28.33	22.33	171.002	Vertical	Pass
		1880	-1.87	3.95	28.22	22.40	173.780	Vertical	Pass
		1905	-1.84	3.97	28.19	22.38	172.982	Vertical	Pass

15.0MHz		1857.5	-2.17	3.79	28.34	22.38	172.982	Vertical	Pass
Band	1/#Mid	1880	-1.83	3.95	28.22	22.44	175.388	Vertical	Pass
QPSK		1902.5	-1.76	3.97	28.18	22.45	175.792	Vertical	Pass
20.0MHz		1860	-2.07	3.81	28.35	22.47	176.604	Vertical	Pass
Band	1/#Mid	1880	-1.81	3.96	28.22	22.45	175.792	Vertical	Pass
QPSK		1900	-1.70	4.00	28.16	22.46	176.198	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 2										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
1.4MHz	1/#Mid	1850.7	-3.08	3.76	28.24	21.40	138.038	Horizontal	Pass	
Band 16		1880	-2.84	3.91	28.22	21.47	140.281	Horizontal	Pass	
QAM		1909.3	-2.76	3.93	28.20	21.51	141.579	Horizontal	Pass	
3.0MHz	1/#Mid	1851.5	-2.98	3.77	28.23	21.48	140.605	Horizontal	Pass	
Band 16		1880	-2.83	3.91	28.24	21.50	141.254	Horizontal	Pass	
QAM		1908.5	-2.79	3.94	28.25	21.52	141.906	Horizontal	Pass	
5.0MHz	1/#Mid	1852.5	-3.14	3.77	28.31	21.40	138.038	Horizontal	Pass	
Band 16		1880	-2.85	3.91	28.22	21.46	139.959	Horizontal	Pass	
QAM		1907.5	-2.83	3.94	28.20	21.43	138.995	Horizontal	Pass	
10.0MHz	1/#Mid	1855	-3.05	3.79	28.33	21.49	140.929	Horizontal	Pass	
Band 16		1880	-2.77	3.95	28.22	21.50	141.254	Horizontal	Pass	
QAM		1905	-2.68	3.97	28.19	21.54	142.561	Horizontal	Pass	
15.0MHz	1/#Mid	1857.5	-3.13	3.79	28.34	21.42	138.676	Horizontal	Pass	
Band 16		1880	-2.87	3.95	28.22	21.40	138.038	Horizontal	Pass	
QAM		1902.5	-2.71	3.97	28.18	21.50	141.254	Horizontal	Pass	
20.0MHz	1/#Mid	1860	-3.04	3.81	28.35	21.50	141.254	Horizontal	Pass	
Band 16		1880	-2.82	3.96	28.22	21.44	139.316	Horizontal	Pass	
QAM		1900	-2.74	4.00	28.16	21.42	138.676	Horizontal	Pass	
1.4MHz	1/#Mid	1850.7	-2.98	3.76	28.24	21.50	141.254	Vertical	Pass	
Band 16		1880	-2.83	3.91	28.22	21.48	140.605	Vertical	Pass	

QAM		1909.3	-2.76	3.93	28.20	21.51	141.579	Vertical	Pass
3.0MHz	1/#Mid	1851.5	-2.95	3.77	28.23	21.51	141.579	Vertical	Pass
Band 16		1880	-2.90	3.91	28.24	21.43	138.995	Vertical	Pass
QAM		1908.5	-2.89	3.94	28.25	21.42	138.676	Vertical	Pass
5.0MHz	1/#Mid	1852.5	-3.09	3.77	28.31	21.45	139.637	Vertical	Pass
Band 16		1880	-2.94	3.91	28.22	21.37	137.088	Vertical	Pass
QAM		1907.5	-2.76	3.94	28.20	21.50	141.254	Vertical	Pass
10.0MHz	1/#Mid	1855	-3.12	3.79	28.33	21.42	138.676	Vertical	Pass
Band 16		1880	-2.81	3.95	28.22	21.46	139.959	Vertical	Pass
QAM		1905	-2.73	3.97	28.19	21.49	140.929	Vertical	Pass
15.0MHz	1/#Mid	1857.5	-3.05	3.79	28.34	21.50	141.254	Vertical	Pass
Band 16		1880	-2.83	3.95	28.22	21.44	139.316	Vertical	Pass
QAM		1902.5	-2.73	3.97	28.18	21.48	140.605	Vertical	Pass
20.0MHz	1/#Mid	1860	-2.99	3.81	28.35	21.55	142.889	Vertical	Pass
Band 16		1880	-2.70	3.96	28.22	21.56	143.219	Vertical	Pass
QAM		1900	-2.57	4.00	28.16	21.59	144.212	Vertical	Pass

Note:

SG Level= Signal generator output

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

### 8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result					Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Factor	Max. EIRP	Max. EIRP		
			(dBm)	(dBm)	(dB)	Average	Average		
						(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-2.17	3.12	27.58	22.29	169.434	Horizontal	Pass
		1732.5	-2.15	3.27	27.61	22.19	165.577	Horizontal	Pass
		1754.3	-2.08	3.29	27.63	22.26	168.267	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-2.22	3.13	27.61	22.26	168.267	Horizontal	Pass
		1732.5	-2.18	3.27	27.61	22.16	164.437	Horizontal	Pass
		1753.5	-2.08	3.30	27.62	22.24	167.494	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.32	3.13	27.63	22.18	165.196	Horizontal	Pass
		1732.5	-2.08	3.27	27.61	22.26	168.267	Horizontal	Pass
		1752.5	-2.13	3.30	27.60	22.17	164.816	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-2.29	3.15	27.64	22.20	165.959	Horizontal	Pass
		1732.5	-2.14	3.31	27.61	22.16	164.437	Horizontal	Pass
		1750	-2.08	3.33	27.59	22.18	165.196	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-2.33	3.15	27.65	22.17	164.816	Horizontal	Pass
		1732.5	-2.10	3.31	27.61	22.20	165.959	Horizontal	Pass
		1747.5	-2.07	3.33	27.57	22.17	164.816	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-2.38	3.17	27.66	22.11	162.555	Horizontal	Pass
		1732.5	-2.12	3.32	27.61	22.17	164.816	Horizontal	Pass
		1745	-2.04	3.36	27.56	22.16	164.437	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-2.21	3.12	27.58	22.25	167.880	Vertical	Pass
		1732.5	-2.17	3.27	27.61	22.17	164.816	Vertical	Pass
		1754.3	-2.12	3.29	27.63	22.22	166.725	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-2.34	3.13	27.61	22.14	163.682	Vertical	Pass
		1732.5	-2.12	3.27	27.61	22.22	166.725	Vertical	Pass
		1753.5	-2.11	3.30	27.62	22.21	166.341	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.28	3.13	27.63	22.22	166.725	Vertical	Pass
		1732.5	-2.21	3.27	27.61	22.13	163.305	Vertical	Pass
		1752.5	-2.11	3.30	27.60	22.19	165.577	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-2.34	3.15	27.64	22.15	164.059	Vertical	Pass
		1732.5	-2.15	3.31	27.61	22.15	164.059	Vertical	Pass
		1750	-2.07	3.33	27.59	22.19	165.577	Vertical	Pass

15.0MHz		1717.5	-2.26	3.15	27.65	22.24	167.494	Vertical	Pass
Band	1/#Mid	1732.5	-2.08	3.31	27.61	22.22	166.725	Vertical	Pass
QPSK		1747.5	-1.99	3.33	27.57	22.25	167.880	Vertical	Pass
20.0MHz		1720	-2.17	3.17	27.66	22.32	170.608	Vertical	Pass
Band	1/#Mid	1732.5	-1.98	3.32	27.61	22.31	170.216	Vertical	Pass
QPSK		1745	-1.86	3.36	27.56	22.34	171.396	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 4										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Factor	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)	Average	Average			
						(dBm)	(mW)			
1.4MHz		1710.7	-3.10	3.12	27.58	21.36	136.773	Horizontal	Pass	
Band 16	1/#Mid	1732.5	-2.91	3.27	27.61	21.43	138.995	Horizontal	Pass	
QAM		1754.3	-2.99	3.29	27.63	21.35	136.458	Horizontal	Pass	
3.0MHz		1711.5	-3.13	3.13	27.61	21.35	136.458	Horizontal	Pass	
Band 16	1/#Mid	1732.5	-2.93	3.27	27.61	21.41	138.357	Horizontal	Pass	
QAM		1753.5	-2.95	3.30	27.62	21.37	137.088	Horizontal	Pass	
5.0MHz		1712.5	-3.13	3.13	27.63	21.37	137.088	Horizontal	Pass	
Band 16	1/#Mid	1732.5	-2.89	3.27	27.61	21.45	139.637	Horizontal	Pass	
QAM		1752.5	-2.98	3.30	27.60	21.32	135.519	Horizontal	Pass	
10.0MHz		1715	-3.02	3.15	27.64	21.47	140.281	Horizontal	Pass	
Band 16	1/#Mid	1732.5	-2.82	3.31	27.61	21.48	140.605	Horizontal	Pass	
QAM		1750	-2.81	3.33	27.59	21.45	139.637	Horizontal	Pass	
15.0MHz		1717.5	-3.16	3.15	27.65	21.34	136.144	Horizontal	Pass	
Band 16	1/#Mid	1732.5	-2.91	3.31	27.61	21.39	137.721	Horizontal	Pass	
QAM		1747.5	-2.91	3.33	27.57	21.33	135.831	Horizontal	Pass	
20.0MHz		1720	-3.07	3.17	27.66	21.42	138.676	Horizontal	Pass	
Band 16	1/#Mid	1732.5	-2.85	3.32	27.61	21.44	139.316	Horizontal	Pass	
QAM		1745	-2.86	3.36	27.56	21.34	136.144	Horizontal	Pass	
1.4MHz		1710.7	-2.99	3.12	27.58	21.47	140.281	Vertical	Pass	
Band 16	1/#Mid	1732.5	-2.88	3.27	27.61	21.46	139.959	Vertical	Pass	



QAM		1754.3	-2.94	3.29	27.63	21.40	138.038	Vertical	Pass
3.0MHz	1/#Mid	1711.5	-3.01	3.13	27.61	21.47	140.281	Vertical	Pass
Band 16		1732.5	-2.89	3.27	27.61	21.45	139.637	Vertical	Pass
QAM		1753.5	-2.89	3.30	27.62	21.43	138.995	Vertical	Pass
5.0MHz	1/#Mid	1712.5	-3.19	3.13	27.63	21.31	135.207	Vertical	Pass
Band 16		1732.5	-2.88	3.27	27.61	21.46	139.959	Vertical	Pass
QAM		1752.5	-2.83	3.30	27.60	21.47	140.281	Vertical	Pass
10.0MHz	1/#Mid	1715	-3.03	3.15	27.64	21.46	139.959	Vertical	Pass
Band 16		1732.5	-2.93	3.31	27.61	21.37	137.088	Vertical	Pass
QAM		1750	-2.83	3.33	27.59	21.43	138.995	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-3.02	3.15	27.65	21.48	140.605	Vertical	Pass
Band 16		1732.5	-2.87	3.31	27.61	21.43	138.995	Vertical	Pass
QAM		1747.5	-2.79	3.33	27.57	21.45	139.637	Vertical	Pass
20.0MHz	1/#Mid	1720	-2.97	3.17	27.66	21.52	141.906	Vertical	Pass
Band 16		1732.5	-2.78	3.32	27.61	21.51	141.579	Vertical	Pass
QAM		1745	-2.67	3.36	27.56	21.53	142.233	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Factor (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)	Factor (dB)	Correction (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP		
			(dBm)				Average	Average			
							(dBm)	(mW)			
1.4MHz Band QPSK	3/#Mid	824.7	6.13	2.01	19.68	2.15	21.65	146.218	Horizontal	Pass	
		836.5	6.00	2.01	19.77	2.15	21.61	144.877	Horizontal	Pass	
		848.3	5.95	2.02	19.82	2.15	21.60	144.544	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	6.05	2.01	19.70	2.15	21.59	144.212	Horizontal	Pass	
		836.5	5.96	2.01	19.77	2.15	21.57	143.549	Horizontal	Pass	
		847.5	6.04	2.02	19.81	2.15	21.68	147.231	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	6.00	2.01	19.71	2.15	21.55	142.889	Horizontal	Pass	
		836.5	6.05	2.01	19.77	2.15	21.66	146.555	Horizontal	Pass	
		846.5	6.00	2.02	19.79	2.15	21.62	145.211	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	829	6.12	2.01	19.73	2.15	21.69	147.571	Horizontal	Pass	
		836.5	6.03	2.01	19.77	2.15	21.64	145.881	Horizontal	Pass	
		844	5.91	2.02	19.78	2.15	21.52	141.906	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	824.7	6.08	2.01	19.68	2.15	21.60	144.544	Vertical	Pass	
		836.5	6.05	2.01	19.77	2.15	21.66	146.555	Vertical	Pass	
		848.3	5.92	2.02	19.82	2.15	21.57	143.549	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	6.05	2.01	19.70	2.15	21.59	144.212	Vertical	Pass	
		836.5	5.97	2.01	19.77	2.15	21.58	143.880	Vertical	Pass	
		847.5	5.97	2.02	19.81	2.15	21.61	144.877	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	6.05	2.01	19.71	2.15	21.60	144.544	Vertical	Pass	
		836.5	6.06	2.01	19.77	2.15	21.67	146.893	Vertical	Pass	
		846.5	5.98	2.02	19.79	2.15	21.60	144.544	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	829	6.13	2.01	19.73	2.15	21.70	147.911	Vertical	Pass	
		836.5	6.10	2.01	19.77	2.15	21.71	148.252	Vertical	Pass	
		844	6.13	2.02	19.78	2.15	21.74	149.279	Vertical	Pass	

Radiated Power (ERP) for Band 5											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss (dBm)	Factor (dB)	Correction (dB)	Max. EIRP	Max. EIRP			
			(dBm)				Average	Average			
							(dBm)	(mW)			
1.4MHz Band 16 QAM	3/#Mid	824.7	5.32	2.01	19.68	2.15	20.84	121.339	Horizontal	Pass	
		836.5	5.16	2.01	19.77	2.15	20.77	119.399	Horizontal	Pass	
		848.3	5.16	2.02	19.82	2.15	20.81	120.504	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	5.28	2.01	19.70	2.15	20.82	120.781	Horizontal	Pass	
		836.5	5.29	2.01	19.77	2.15	20.90	123.027	Horizontal	Pass	
		847.5	5.21	2.02	19.81	2.15	20.85	121.619	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	5.20	2.01	19.71	2.15	20.75	118.850	Horizontal	Pass	
		836.5	5.22	2.01	19.77	2.15	20.83	121.060	Horizontal	Pass	
		846.5	5.19	2.02	19.79	2.15	20.81	120.504	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	829	5.24	2.01	19.73	2.15	20.81	120.504	Horizontal	Pass	
		836.5	5.17	2.01	19.77	2.15	20.78	119.674	Horizontal	Pass	
		844	5.17	2.02	19.78	2.15	20.78	119.674	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	824.7	5.33	2.01	19.68	2.15	20.85	121.619	Vertical	Pass	
		836.5	5.24	2.01	19.77	2.15	20.85	121.619	Vertical	Pass	
		848.3	5.25	2.02	19.82	2.15	20.90	123.027	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	5.35	2.01	19.70	2.15	20.89	122.744	Vertical	Pass	
		836.5	5.21	2.01	19.77	2.15	20.82	120.781	Vertical	Pass	
		847.5	5.23	2.02	19.81	2.15	20.87	122.180	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	5.22	2.01	19.71	2.15	20.77	119.399	Vertical	Pass	
		836.5	5.25	2.01	19.77	2.15	20.86	121.899	Vertical	Pass	
		846.5	5.14	2.02	19.79	2.15	20.76	119.124	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	829	5.37	2.01	19.73	2.15	20.94	124.165	Vertical	Pass	
		836.5	5.29	2.01	19.77	2.15	20.90	123.027	Vertical	Pass	
		844	5.31	2.02	19.78	2.15	20.92	123.595	Vertical	Pass	

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

### 8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result					Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Factor (dB)	Max. EIRP	Max. EIRP		
			(dBm)			Average	Average		
				(dBm)	(dBm)	(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	1.90	4.54	27.75	25.11	324.340	Horizontal	Pass
		2535	2.19	4.69	27.72	25.22	332.660	Horizontal	Pass
		2567.5	2.10	4.71	27.71	25.10	323.594	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	2.01	4.55	27.76	25.22	332.660	Horizontal	Pass
		2535	2.06	4.69	27.72	25.09	322.849	Horizontal	Pass
		2565	2.14	4.72	27.70	25.12	325.087	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	1.93	4.55	27.77	25.15	327.341	Horizontal	Pass
		2535	2.09	4.69	27.72	25.12	325.087	Horizontal	Pass
		2562.5	2.23	4.72	27.69	25.20	331.131	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	2.01	4.57	27.78	25.22	332.660	Horizontal	Pass
		2535	2.12	4.73	27.72	25.11	324.340	Horizontal	Pass
		2560	2.27	4.75	27.68	25.20	331.131	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	1.98	4.54	27.75	25.19	330.370	Vertical	Pass
		2535	2.16	4.69	27.72	25.19	330.370	Vertical	Pass
		2567.5	2.15	4.71	27.71	25.15	327.341	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	2.02	4.55	27.76	25.23	333.426	Vertical	Pass
		2535	2.08	4.69	27.72	25.11	324.340	Vertical	Pass
		2565	2.18	4.72	27.70	25.16	328.095	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	1.97	4.55	27.77	25.19	330.370	Vertical	Pass
		2535	2.04	4.69	27.72	25.07	321.366	Vertical	Pass
		2562.5	2.26	4.72	27.69	25.23	333.426	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	2.07	4.57	27.78	25.28	337.287	Vertical	Pass
		2535	2.26	4.73	27.72	25.25	334.965	Vertical	Pass
		2560	2.33	4.75	27.68	25.26	335.738	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 Of Max. ERP	
			(dBm)			Average	Average		
						(dBm)	(mW)		
5.0MHz Band 16 QAM	1/#Mid	2502.5	1.34	4.54	27.75	24.55	285.102	Horizontal	Pass
		2535	1.57	4.69	27.72	24.60	288.403	Horizontal	Pass
		2567.5	1.59	4.71	27.71	24.59	287.740	Horizontal	Pass
10.0MHz z Band 16 QAM	1/#Mid	2505	1.28	4.55	27.76	24.49	281.190	Horizontal	Pass
		2535	1.51	4.69	27.72	24.54	284.446	Horizontal	Pass
		2565	1.55	4.72	27.70	24.53	283.792	Horizontal	Pass
15.0MHz z Band 16 QAM	1/#Mid	2507.5	1.29	4.55	27.77	24.51	282.488	Horizontal	Pass
		2535	1.44	4.69	27.72	24.47	279.898	Horizontal	Pass
		2562.5	1.50	4.72	27.69	24.47	279.898	Horizontal	Pass
20.0MHz z Band 16 QAM	1/#Mid	2510	1.43	4.57	27.78	24.64	291.072	Horizontal	Pass
		2535	1.62	4.73	27.72	24.61	289.068	Horizontal	Pass
		2560	1.65	4.75	27.68	24.58	287.078	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	1.34	4.54	27.75	24.55	285.102	Vertical	Pass
		2535	1.53	4.69	27.72	24.56	285.759	Vertical	Pass
		2567.5	1.52	4.71	27.71	24.52	283.139	Vertical	Pass
10.0MHz z Band 16 QAM	1/#Mid	2505	1.41	4.55	27.76	24.62	289.734	Vertical	Pass
		2535	1.54	4.69	27.72	24.57	286.418	Vertical	Pass
		2565	1.60	4.72	27.70	24.58	287.078	Vertical	Pass
15.0MHz z Band 16 QAM	1/#Mid	2507.5	1.30	4.55	27.77	24.52	283.139	Vertical	Pass
		2535	1.57	4.69	27.72	24.60	288.403	Vertical	Pass
		2562.5	1.58	4.72	27.69	24.55	285.102	Vertical	Pass
20.0MHz z Band 16 QAM	1/#Mid	2510	1.48	4.57	27.78	24.69	294.442	Vertical	Pass
		2535	1.69	4.73	27.72	24.68	293.765	Vertical	Pass
		2560	1.71	4.75	27.68	24.64	291.072	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.6 LTE BAND 12

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	699.7	4.35	1.91	19.21	2.15	19.50	89.125	Vertical	Pass
		707.5	4.21	1.91	19.26	2.15	19.41	87.297	Vertical	Pass
		715.3	4.16	1.93	19.34	2.15	19.42	87.498	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	700.5	4.35	1.91	19.21	2.15	19.50	89.125	Vertical	Pass
		707.5	4.33	1.91	19.26	2.15	19.53	89.743	Vertical	Pass
		714.5	4.16	1.93	19.34	2.15	19.42	87.498	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	701.5	4.38	1.91	19.23	2.15	19.55	90.157	Vertical	Pass
		707.5	4.32	1.91	19.26	2.15	19.52	89.536	Vertical	Pass
		713.5	4.25	1.92	19.33	2.15	19.51	89.331	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	704	4.31	1.91	19.25	2.15	19.50	89.125	Vertical	Pass
		707.5	4.34	1.91	19.26	2.15	19.54	89.950	Vertical	Pass
		711	4.14	1.92	19.32	2.15	19.39	86.896	Vertical	Pass
1.4MHz Band QPSK	1/#Mid	699.7	4.29	1.91	19.21	2.15	19.44	87.902	Horizontal	Pass
		707.5	4.29	1.91	19.26	2.15	19.49	88.920	Horizontal	Pass
		715.3	4.17	1.93	19.34	2.15	19.43	87.700	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	700.5	4.29	1.91	19.21	2.15	19.44	87.902	Horizontal	Pass
		707.5	4.27	1.91	19.26	2.15	19.47	88.512	Horizontal	Pass
		714.5	4.22	1.93	19.34	2.15	19.48	88.716	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	701.5	4.24	1.91	19.23	2.15	19.41	87.297	Horizontal	Pass
		707.5	4.20	1.91	19.26	2.15	19.40	87.096	Horizontal	Pass
		713.5	4.20	1.92	19.33	2.15	19.46	88.308	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	704	4.42	1.91	19.25	2.15	19.61	91.411	Horizontal	Pass
		707.5	4.37	1.91	19.26	2.15	19.57	90.573	Horizontal	Pass
		711	4.32	1.92	19.32	2.15	19.57	90.573	Horizontal	Pass

Radiated Power (ERP) for Band 12											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)			
1.4MHz Band 16 QAM	1/#Mid	699.7	3.57	1.91	19.21	2.15	18.72	74.473	Vertical	Pass	
		707.5	3.44	1.91	19.26	2.15	18.64	73.114	Vertical	Pass	
		715.3	3.42	1.93	19.34	2.15	18.68	73.790	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	700.5	3.61	1.91	19.21	2.15	18.76	75.162	Vertical	Pass	
		707.5	3.53	1.91	19.26	2.15	18.73	74.645	Vertical	Pass	
		714.5	3.50	1.93	19.34	2.15	18.76	75.162	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	701.5	3.57	1.91	19.23	2.15	18.74	74.817	Vertical	Pass	
		707.5	3.50	1.91	19.26	2.15	18.70	74.131	Vertical	Pass	
		713.5	3.44	1.92	19.33	2.15	18.70	74.131	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	704	3.46	1.91	19.25	2.15	18.65	73.282	Vertical	Pass	
		707.5	3.49	1.91	19.26	2.15	18.69	73.961	Vertical	Pass	
		711	3.37	1.92	19.32	2.15	18.62	72.778	Vertical	Pass	
1.4MHz Band 16 QAM	1/#Mid	699.7	3.60	1.91	19.21	2.15	18.75	74.989	Horizontal	Pass	
		707.5	3.52	1.91	19.26	2.15	18.72	74.473	Horizontal	Pass	
		715.3	3.43	1.93	19.34	2.15	18.69	73.961	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	700.5	3.48	1.91	19.21	2.15	18.63	72.946	Horizontal	Pass	
		707.5	3.44	1.91	19.26	2.15	18.64	73.114	Horizontal	Pass	
		714.5	3.45	1.93	19.34	2.15	18.71	74.302	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	701.5	3.43	1.91	19.23	2.15	18.60	72.444	Horizontal	Pass	
		707.5	3.38	1.91	19.26	2.15	18.58	72.111	Horizontal	Pass	
		713.5	3.39	1.92	19.33	2.15	18.65	73.282	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	704	3.59	1.91	19.25	2.15	18.78	75.509	Horizontal	Pass	
		707.5	3.58	1.91	19.26	2.15	18.78	75.509	Horizontal	Pass	
		711	3.54	1.92	19.32	2.15	18.79	75.683	Horizontal	Pass	

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

8.7 LTE BAND 17

Radiated Power (ERP) for Band 17											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
5.0MHz Band QPSK	1/#Mid	706.5	3.95	1.91	19.23	2.15	19.12	81.658	Vertical	Pass	
		710	3.88	1.91	19.26	2.15	19.08	80.910	Vertical	Pass	
		713.5	3.77	1.92	19.33	2.15	19.03	79.983	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	709	3.85	1.91	19.25	2.15	19.04	80.168	Vertical	Pass	
		710	3.91	1.91	19.26	2.15	19.11	81.470	Vertical	Pass	
		711	3.78	1.92	19.32	2.15	19.03	79.983	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	706.5	3.99	1.91	19.23	2.15	19.16	82.414	Horizontal	Pass	
		710	3.82	1.91	19.26	2.15	19.02	79.799	Horizontal	Pass	
		713.5	3.76	1.92	19.33	2.15	19.02	79.799	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	709	4.02	1.91	19.25	2.15	19.21	83.368	Horizontal	Pass	
		710	4.00	1.91	19.26	2.15	19.20	83.176	Horizontal	Pass	
		711	3.92	1.92	19.32	2.15	19.17	82.604	Horizontal	Pass	



Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor (dB)	Correction (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
							Average	Average		
							(dBm)	(mW)		
5.0MHz Band 16 QAM	1/#Mid	706.5	3.20	1.91	19.23	2.15	18.37	68.707	Vertical	Pass
		710	3.16	1.91	19.26	2.15	18.36	68.549	Vertical	Pass
		713.5	3.10	1.92	19.33	2.15	18.36	68.549	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	709	3.13	1.91	19.25	2.15	18.32	67.920	Vertical	Pass
		710	3.11	1.91	19.26	2.15	18.31	67.764	Vertical	Pass
		711	3.10	1.92	19.32	2.15	18.35	68.391	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	706.5	3.16	1.91	19.23	2.15	18.33	68.077	Horizontal	Pass
		710	3.18	1.91	19.26	2.15	18.38	68.865	Horizontal	Pass
		713.5	3.13	1.92	19.33	2.15	18.39	69.024	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	709	3.30	1.91	19.25	2.15	18.49	70.632	Horizontal	Pass
		710	3.29	1.91	19.26	2.15	18.49	70.632	Horizontal	Pass
		711	3.21	1.92	19.32	2.15	18.46	70.146	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Factor (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 2/4/5/7/12/17

**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	-48.97	4.04	33.51	-19.50	-13	-6.50	Horizontal
3701.4	-52.08	4.04	33.51	-22.61	-13	-9.61	Vertical
5552.1	-45.90	5.24	35.84	-15.30	-13	-2.30	Vertical
5552.1	-53.83	5.24	35.84	-23.23	-13	-10.23	Horizontal
209.2	-36.29	1.43	16.02	-21.70	-13	-8.70	Vertical
400.2	-44.32	1.30	17.99	-27.63	-13	-14.63	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-53.28	4.04	33.56	-23.76	-13	-10.76	Horizontal
3760.0	-53.04	4.04	33.56	-23.52	-13	-10.52	Vertical
5640.0	-49.64	5.24	35.91	-18.97	-13	-5.97	Vertical
5640.0	-49.59	5.24	35.91	-18.92	-13	-5.92	Horizontal
176.0	-38.27	1.62	16.97	-22.92	-13	-9.92	Vertical
401.5	-42.36	1.74	15.98	-28.13	-13	-15.13	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-45.66	4.04	34.00	-15.70	-13	-2.70	Horizontal
3818.6	-44.49	4.04	34.00	-14.53	-13	-1.53	Vertical
5727.9	-48.35	5.24	36.04	-17.55	-13	-4.55	Vertical
5727.9	-53.90	5.24	36.04	-23.10	-13	-10.10	Horizontal
200.8	-38.56	1.42	17.29	-22.69	-13	-9.69	Vertical
378.2	-43.96	1.50	17.90	-27.55	-13	-14.55	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	-50.77	4.07	33.54	-21.30	-13	-8.30	Horizontal
3720.0	-49.01	4.07	33.54	-19.54	-13	-6.54	Vertical
5580.0	-50.10	5.28	35.86	-19.52	-13	-6.52	Vertical
5580.0	-51.85	5.28	35.86	-21.27	-13	-8.27	Horizontal
189.1	-43.32	1.58	16.89	-28.00	-13	-15.00	Vertical
400.4	-38.42	1.76	17.26	-22.92	-13	-9.92	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-47.08	4.04	33.56	-17.56	-13	-4.56	Horizontal
3760.0	-44.51	4.04	33.56	-14.99	-13	-1.99	Vertical
5640.0	-46.70	5.24	35.91	-16.03	-13	-3.03	Vertical
5640.0	-50.97	5.24	35.91	-20.30	-13	-7.30	Horizontal
195.6	-34.48	1.46	16.27	-19.67	-13	-6.67	Vertical
266.2	-44.30	1.59	15.15	-30.74	-13	-17.74	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-46.17	4.04	34.00	-16.21	-13	-3.21	Horizontal
3800.0	-48.25	4.04	34.00	-18.29	-13	-5.29	Vertical
5700.0	-47.54	5.24	36.04	-16.74	-13	-3.74	Vertical
5700.0	-50.02	5.24	36.04	-19.22	-13	-6.22	Horizontal
206.6	-38.26	1.36	17.39	-22.22	-13	-9.22	Vertical
366.9	-42.53	1.66	15.39	-28.80	-13	-15.80	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

9.2 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	-45.40	4.02	29.80	-19.62	-13	-6.62	Horizontal
3421.4	-51.08	4.02	29.80	-25.30	-13	-12.30	Vertical
5132.1	-50.16	5.24	35.84	-19.56	-13	-6.56	Vertical
5132.1	-53.95	5.24	35.84	-23.35	-13	-10.35	Horizontal
199.9	-38.17	1.68	16.04	-23.81	-13	-10.81	Vertical
271.5	-42.35	1.78	17.74	-26.39	-13	-13.39	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-46.41	4.03	30.00	-20.44	-13	-7.44	Horizontal
3465.0	-44.03	4.03	30.00	-18.06	-13	-5.06	Vertical
5197.5	-47.93	5.25	35.86	-17.32	-13	-4.32	Vertical
5197.5	-50.36	5.25	35.86	-19.75	-13	-6.75	Horizontal
184.3	-37.46	1.72	17.69	-21.49	-13	-8.49	Vertical
406.8	-35.57	1.62	16.02	-21.16	-13	-8.16	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-45.73	4.05	30.01	-19.77	-13	-6.77	Horizontal
3508.6	-44.57	4.05	30.01	-18.61	-13	-5.61	Vertical
5262.9	-44.91	5.26	35.86	-14.31	-13	-1.31	Vertical
5262.9	-51.39	5.26	35.86	-20.79	-13	-7.79	Horizontal
192.2	-36.98	1.80	16.69	-22.09	-13	-9.09	Vertical
291.8	-43.56	1.75	16.66	-28.66	-13	-15.66	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	-49.25	4.02	29.80	-23.47	-13	-10.47	Horizontal
3440.0	-53.40	4.02	29.80	-27.62	-13	-14.62	Vertical
5160.0	-50.02	5.24	35.84	-19.42	-13	-6.42	Vertical
5160.0	-53.71	5.24	35.84	-23.11	-13	-10.11	Horizontal
202.4	-39.68	1.57	17.26	-23.99	-13	-10.99	Vertical
435.4	-44.00	1.78	16.35	-29.43	-13	-16.43	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-50.04	4.03	30.00	-24.07	-13	-11.07	Horizontal
3465.0	-49.71	4.03	30.00	-23.74	-13	-10.74	Vertical
5197.5	-50.01	5.25	35.86	-19.40	-13	-6.40	Vertical
5197.5	-52.20	5.25	35.86	-21.59	-13	-8.59	Horizontal
189.0	-40.20	1.44	17.95	-23.69	-13	-10.69	Vertical
342.2	-34.32	1.65	16.09	-19.88	-13	-6.88	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-44.95	4.05	27.68	-21.32	-13	-8.32	Horizontal
3490.0	-51.86	4.05	27.68	-28.23	-13	-15.23	Vertical
5235.0	-49.19	5.26	35.86	-18.59	-13	-5.59	Vertical
5235.0	-50.87	5.26	35.86	-20.27	-13	-7.27	Horizontal
208.9	-37.93	1.61	16.85	-22.69	-13	-9.69	Vertical
280.8	-35.16	1.61	15.19	-21.58	-13	-8.58	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

9.3 LTE BAND 5

**QPSK EIRP POWER FOR LTE BAND 5 (1.4MHZ BANDWIDTH)**

<b>Test Results for Low Channel 824.7MHz</b>							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-50.13	2.78	27.50	-25.41	-13	-12.41	Horizontal
1649.4	-49.88	2.78	27.50	-25.16	-13	-12.16	Vertical
2474.1	-50.31	2.90	27.80	-25.41	-13	-12.41	Vertical
2474.1	-49.40	2.90	27.80	-24.50	-13	-11.50	Horizontal
178.6	-43.85	1.76	17.59	-28.02	-13	-15.02	Vertical
325.8	-38.38	1.63	15.87	-24.14	-13	-11.14	Horizontal
<b>Test Results For Mid Channel 836.5MHz</b>							
1673.0	-48.77	2.80	27.48	-24.09	-13	-11.09	Horizontal
1673.0	-44.59	2.80	27.48	-19.91	-13	-6.91	Vertical
2509.5	-46.42	2.91	27.70	-21.63	-13	-8.63	Vertical
2509.5	-51.18	2.91	27.70	-26.39	-13	-13.39	Horizontal
197.3	-44.10	1.61	15.68	-30.03	-13	-17.03	Vertical
231.9	-34.50	1.59	17.52	-18.58	-13	-5.58	Horizontal
<b>Test Results for High Channel 848.3MHz</b>							
1696.6	-45.27	2.82	27.43	-20.66	-13	-7.66	Horizontal
1696.6	-47.37	2.82	27.43	-22.76	-13	-9.76	Vertical
2544.9	-49.97	2.92	27.74	-25.15	-13	-12.15	Vertical
2544.9	-51.58	2.92	27.74	-26.76	-13	-13.76	Horizontal
189.8	-39.92	1.69	16.67	-24.93	-13	-11.93	Vertical
307.6	-38.63	1.70	17.18	-23.15	-13	-10.15	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	-53.17	2.78	27.50	-28.45	-13	-15.45	Horizontal
1658.0	-48.38	2.78	27.50	-23.66	-13	-10.66	Vertical
2487.0	-48.78	2.90	27.80	-23.88	-13	-10.88	Vertical
2487.0	-52.35	2.90	27.80	-27.45	-13	-14.45	Horizontal
184.0	-40.55	1.71	15.57	-26.69	-13	-13.69	Vertical
461.3	-35.09	1.34	16.40	-20.03	-13	-7.03	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-49.89	2.80	27.48	-25.21	-13	-12.21	Horizontal
1673.0	-53.93	2.80	27.48	-29.25	-13	-16.25	Vertical
2509.5	-44.70	2.91	27.70	-19.91	-13	-6.91	Vertical
2509.5	-50.27	2.91	27.70	-25.48	-13	-12.48	Horizontal
202.6	-41.50	1.44	17.04	-25.90	-13	-12.90	Vertical
407.6	-37.28	1.76	17.62	-21.42	-13	-8.42	Horizontal
Test Results for High Channel 844MHz							
1688.0	-53.43	2.82	27.43	-28.82	-13	-15.82	Horizontal
1688.0	-47.19	2.82	27.43	-22.58	-13	-9.58	Vertical
2532.0	-44.16	2.92	27.74	-19.34	-13	-6.34	Vertical
2532.0	-50.39	2.92	27.74	-25.57	-13	-12.57	Horizontal
183.2	-39.42	1.74	17.70	-23.46	-13	-10.46	Vertical
318.9	-37.61	1.41	17.46	-21.55	-13	-8.55	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

9.4 LTE BAND 7

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

Test Results for Low Channel 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-60.54	5.23	35.81	-29.96	-25	-4.96	Horizontal
5005.0	-63.58	5.23	35.81	-33.00	-25	-8.00	Vertical
7507.5	-60.50	5.67	36.85	-29.32	-25	-4.32	Vertical
7507.5	-62.73	5.67	36.85	-31.55	-25	-6.55	Horizontal
193.8	-47.93	1.73	17.97	-31.69	-25	-6.69	Vertical
322.1	-48.93	1.38	15.11	-35.20	-25	-10.20	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-63.89	5.23	35.82	-33.30	-25	-8.30	Horizontal
5070.0	-62.76	5.23	35.82	-32.17	-25	-7.17	Vertical
7605.0	-64.05	5.67	36.85	-32.87	-25	-7.87	Vertical
7605.0	-64.90	5.67	36.85	-33.72	-25	-8.72	Horizontal
207.2	-44.56	1.77	16.17	-30.15	-25	-5.15	Vertical
448.4	-50.81	1.63	15.21	-37.23	-25	-12.23	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-60.54	5.24	35.83	-29.95	-25	-4.95	Horizontal
5135.0	-59.41	5.24	35.83	-28.82	-25	-3.82	Vertical
7702.5	-61.91	5.68	36.87	-30.72	-25	-5.72	Vertical
7702.5	-61.47	5.68	36.87	-30.28	-25	-5.28	Horizontal
202.7	-54.70	1.58	17.56	-38.72	-25	-13.72	Vertical
281.9	-44.25	1.45	16.58	-29.12	-25	-4.12	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	-59.08	5.23	35.82	-28.49	-25	-3.49	Horizontal
5020.0	-60.67	5.23	35.82	-30.08	-25	-5.08	Vertical
7530.0	-62.07	5.67	36.86	-30.88	-25	-5.88	Vertical
7530.0	-64.70	5.67	36.86	-33.51	-25	-8.51	Horizontal
192.3	-52.53	1.63	15.76	-38.40	-25	-13.40	Vertical
371.6	-47.11	1.71	15.44	-33.38	-25	-8.38	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.21	5.23	35.82	-30.62	-25	-5.62	Horizontal
5070.0	-60.27	5.23	35.82	-29.68	-25	-4.68	Vertical
7605.0	-64.71	5.67	36.85	-33.53	-25	-8.53	Vertical
7605.0	-64.69	5.67	36.85	-33.51	-25	-8.51	Horizontal
194.6	-52.92	1.79	16.84	-37.86	-25	-12.86	Vertical
284.9	-51.74	1.71	17.64	-35.81	-25	-10.81	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-60.06	5.24	35.83	-29.47	-25	-4.47	Horizontal
5120.0	-60.27	5.24	35.83	-29.68	-25	-4.68	Vertical
7680.0	-60.11	5.70	36.88	-28.93	-25	-3.93	Vertical
7680.0	-61.28	5.70	36.88	-30.10	-25	-5.10	Horizontal
197.5	-45.01	1.79	16.84	-29.95	-25	-4.95	Vertical
374.8	-46.40	1.71	17.64	-30.47	-25	-5.47	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

9.5 LTE BAND 12

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

Test Results for Low Channel 699.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-51.40	2.60	27.20	-26.80	-13	-13.80	Horizontal
1399.4	-47.55	2.60	27.20	-22.95	-13	-9.95	Vertical
2099.1	-45.68	2.85	27.54	-20.99	-13	-7.99	Vertical
2099.1	-53.88	2.85	27.54	-29.19	-13	-16.19	Horizontal
180.8	-44.48	1.49	17.78	-28.19	-13	-15.19	Vertical
245.2	-35.36	1.36	17.33	-19.39	-13	-6.39	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-49.27	2.61	27.28	-24.60	-13	-11.60	Horizontal
1415.0	-45.74	2.61	27.28	-21.07	-13	-8.07	Vertical
2122.5	-49.57	2.87	27.59	-24.85	-13	-11.85	Vertical
2122.5	-52.99	2.87	27.59	-28.27	-13	-15.27	Horizontal
180.4	-37.43	1.73	15.74	-23.42	-13	-10.42	Vertical
438.4	-37.00	1.62	15.79	-22.83	-13	-9.83	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-44.07	2.63	27.28	-19.42	-13	-6.42	Horizontal
1430.6	-52.28	2.63	27.28	-27.63	-13	-14.63	Vertical
2145.9	-52.22	2.88	27.60	-27.50	-13	-14.50	Vertical
2145.9	-51.82	2.88	27.60	-27.10	-13	-14.10	Horizontal
183.3	-39.94	1.61	18.00	-23.55	-13	-10.55	Vertical
313.9	-43.31	1.45	15.49	-29.28	-13	-16.28	Horizontal

**QPSK EIRP POWER FOR LTE BAND 12 (10MHZ BANDWIDTH)**

Test Results for Low Channel 704MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1408.0	-50.71	2.61	27.26	-26.06	-13	-13.06	Horizontal
1408.0	-51.08	2.61	27.26	-26.43	-13	-13.43	Vertical
2112.0	-49.91	2.87	27.58	-25.20	-13	-12.20	Vertical
2112.0	-50.93	2.87	27.58	-26.22	-13	-13.22	Horizontal
191.9	-42.26	1.31	16.97	-26.60	-13	-13.60	Vertical
386.4	-43.88	1.65	16.70	-28.83	-13	-15.83	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-51.41	2.61	27.28	-26.74	-13	-13.74	Horizontal
1415.0	-47.00	2.61	27.28	-22.33	-13	-9.33	Vertical
2122.5	-45.28	2.87	27.59	-20.56	-13	-7.56	Vertical
2122.5	-53.16	2.87	27.59	-28.44	-13	-15.44	Horizontal
178.8	-39.50	1.72	17.99	-23.23	-13	-10.23	Vertical
270.7	-43.33	1.73	17.94	-27.12	-13	-14.12	Horizontal
Test Results for High Channel 711MHz							
1422.0	-45.64	2.62	27.28	-20.98	-13	-7.98	Horizontal
1422.0	-51.53	2.62	27.28	-26.87	-13	-13.87	Vertical
2133.0	-49.67	2.87	27.60	-24.94	-13	-11.94	Vertical
2133.0	-52.64	2.87	27.60	-27.91	-13	-14.91	Horizontal
190.7	-36.43	1.58	15.93	-22.08	-13	-9.08	Vertical
393.3	-35.16	1.36	15.59	-20.93	-13	-7.93	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

9.6 LTE BAND 17

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

Test Results for Low Channel 706.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1413.0	-46.39	2.61	27.28	-21.72	-13	-8.72	Horizontal
1413.0	-51.69	2.61	27.28	-27.02	-13	-14.02	Vertical
2119.5	-51.80	2.87	27.59	-27.08	-13	-14.08	Vertical
2119.5	-53.39	2.87	27.59	-28.67	-13	-15.67	Horizontal
179.1	-41.27	1.71	16.15	-26.83	-13	-13.83	Vertical
420.6	-43.33	1.41	17.32	-27.42	-13	-14.42	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-44.06	2.62	27.30	-19.38	-13	-6.38	Horizontal
1420.0	-49.11	2.62	27.30	-24.43	-13	-11.43	Vertical
2130.0	-45.35	2.87	27.62	-20.60	-13	-7.60	Vertical
2130.0	-49.23	2.87	27.62	-24.48	-13	-11.48	Horizontal
193.6	-36.25	1.42	15.25	-22.43	-13	-9.43	Vertical
347.9	-41.72	1.36	17.19	-25.89	-13	-12.89	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-48.82	2.66	27.28	-24.20	-13	-11.20	Horizontal
1427.0	-49.67	2.66	27.28	-25.05	-13	-12.05	Vertical
2140.5	-49.49	2.88	27.60	-24.77	-13	-11.77	Vertical
2140.5	-52.24	2.88	27.60	-27.52	-13	-14.52	Horizontal
202.4	-35.16	1.32	17.29	-19.19	-13	-6.19	Vertical
413.4	-39.75	1.72	16.89	-24.58	-13	-11.58	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	-51.19	2.62	27.30	-26.51	-13	-13.51	Horizontal
1418.0	-50.35	2.62	27.30	-25.67	-13	-12.67	Vertical
2127.0	-50.95	2.87	27.62	-26.20	-13	-13.20	Vertical
2127.0	-51.14	2.87	27.62	-26.39	-13	-13.39	Horizontal
204.4	-34.21	1.35	16.91	-18.65	-13	-5.65	Vertical
367.1	-39.01	1.62	16.31	-24.32	-13	-11.32	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-48.87	2.62	27.30	-24.19	-13	-11.19	Horizontal
1420.0	-47.20	2.62	27.30	-22.52	-13	-9.52	Vertical
2130.0	-53.91	2.87	27.62	-29.16	-13	-16.16	Vertical
2130.0	-49.09	2.87	27.62	-24.34	-13	-11.34	Horizontal
204.6	-38.98	1.51	17.14	-23.35	-13	-10.35	Vertical
353.1	-42.85	1.77	16.88	-27.74	-13	-14.74	Horizontal
Test Results for High Channel 711MHz							
1422.0	-44.27	2.62	27.30	-19.59	-13	-6.59	Horizontal
1422.0	-50.09	2.62	27.30	-25.41	-13	-12.41	Vertical
2133.0	-48.61	2.87	27.62	-23.86	-13	-10.86	Vertical
2133.0	-53.25	2.87	27.62	-28.50	-13	-15.50	Horizontal
200.2	-36.38	1.78	15.95	-22.21	-13	-9.21	Vertical
319.9	-39.82	1.34	17.95	-23.22	-13	-10.22	Horizontal

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

## 10. FREQUENCY STABILITY

### RULE PART(S)

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

### LIMITS

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

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

### TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. =  $-30^{\circ}$  to  $+50^{\circ}\text{C}$
- Voltage = low voltage, DC 3.4V, Normal, DC 3.87V and High voltage, DC 4.26V.

### 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 2/4/5/7/12/17

### RESULTS

See the following pages.



10.1 LTE BAND 2

**Band 2 QPSK, (20MHz BANDWIDTH RB size 100 RB Offset 0)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.8	1880	12.6	0.006712	2.5
3.87	1880	14.1	0.007489	2.5
4.26	1880	13.1	0.006947	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	12.3	0.006522	2.5
Extreme (50C)	1880	11.9	0.006316	2.5
Extreme (40C)	1880	13.4	0.007112	2.5
Extreme (30C)	1880	13.1	0.006987	2.5
Extreme (10C)	1880	13.5	0.007206	2.5
Extreme (0C)	1880	12.0	0.006375	2.5
Extreme (-10C)	1880	12.8	0.006818	2.5
Extreme (-20C)	1880	14.4	0.007657	2.5
Extreme (-30C)	1880	14.7	0.007795	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]
3.48	1880	9.6	0.005084	2.5
3.87	1880	9.3	0.004926	2.5
4.26	1880	7.7	0.004079	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	10.1	0.005365	2.5
Extreme (50C)	1880	8.4	0.004484	2.5
Extreme (40C)	1880	8.0	0.004253797	2.5
Extreme (30C)	1880	9.0	0.004795779	2.5
Extreme (10C)	1880	8.8	0.004661119	2.5
Extreme (0C)	1880	7.8	0.004123191	2.5
Extreme (-10C)	1880	8.9	0.004714586	2.5
Extreme (-20C)	1880	8.5	0.004540763	2.5
Extreme (-30C)	1880	8.2	0.004382081	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]
3.48	1732.5	9.1	0.005231	2.5
3.87	1732.5	8.8	0.005069	2.5
4.26	1732.5	8.2	0.004760	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.8	0.005087	2.5
Extreme (50C)	1732.5	9.3	0.005359	2.5
Extreme (40C)	1732.5	7.0	0.004019	2.5
Extreme (30C)	1732.5	6.0	0.003492	2.5
Extreme (10C)	1732.5	7.6	0.004360	2.5
Extreme (0C)	1732.5	9.8	0.005660	2.5
Extreme (-10C)	1732.5	8.7	0.005000	2.5
Extreme (-20C)	1732.5	6.8	0.003932	2.5
Extreme (-30C)	1732.5	8.9	0.005113	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]
3.48	1732.5	10.1	0.005809	2.5
3.87	1732.5	9.4	0.005417	2.5
4.26	1732.5	8.2	0.004725	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	9.5	0.005461	2.5
Extreme (50C)	1732.5	9.3	0.005365	2.5
Extreme (40C)	1732.5	8.1	0.004664	2.5
Extreme (30C)	1732.5	8.8	0.005094	2.5
Extreme (10C)	1732.5	9.0	0.005182	2.5
Extreme (0C)	1732.5	8.4	0.004838	2.5
Extreme (-10C)	1732.5	9.4	0.005404	2.5
Extreme (-20C)	1732.5	8.8	0.005102	2.5
Extreme (-30C)	1732.5	7.8	0.004502	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]
3.48	836.5	6.0	0.007146	2.5
3.87	836.5	6.2	0.007452	2.5
4.26	836.5	5.2	0.006274	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.2	0.007362	2.5
Extreme (50C)	836.5	6.4	0.007601	2.5
Extreme (40C)	836.5	5.6	0.006746	2.5
Extreme (30C)	836.5	6.0	0.007135	2.5
Extreme (10C)	836.5	5.6	0.006699	2.5
Extreme (0C)	836.5	5.5	0.006536	2.5
Extreme (-10C)	836.5	5.7	0.006866	2.5
Extreme (-20C)	836.5	5.8	0.006920	2.5
Extreme (-30C)	836.5	6.7	0.007972	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]
3.48	836.5	5.8	0.006971	2.5
3.87	836.5	6.6	0.007911	2.5
4.26	836.5	4.6	0.005516	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.1	0.007251	2.5
Extreme (50C)	836.5	5.8	0.006949	2.5
Extreme (40C)	836.5	6.2	0.007452	2.5
Extreme (30C)	836.5	6.6	0.007922	2.5
Extreme (10C)	836.5	5.3	0.006375	2.5
Extreme (0C)	836.5	5.8	0.006878	2.5
Extreme (-10C)	836.5	5.8	0.006876	2.5
Extreme (-20C)	836.5	5.8	0.006896	2.5
Extreme (-30C)	836.5	6.5	0.007788	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]
3.48	2535	10.4	0.004120	2.5
3.87	2535	8.9	0.003519	2.5
4.26	2535	8.4	0.003297	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	9.1	0.003580	2.5
Extreme (50C)	2535	8.7	0.003415	2.5
Extreme (40C)	2535	8.1	0.003185	2.5
Extreme (30C)	2535	8.4	0.003319	2.5
Extreme (10C)	2535	7.9	0.003098	2.5
Extreme (0C)	2535	8.4	0.003312	2.5
Extreme (-10C)	2535	9.3	0.003667	2.5
Extreme (-20C)	2535	9.3	0.003687	2.5
Extreme (-30C)	2535	8.4	0.003316	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]
3.48	2535	6.9	0.002722	2.5
3.87	2535	6.1	0.002406	2.5
4.26	2535	5.5	0.002181	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	5.2	0.002034	2.5
Extreme (40C)	2535	5.7	0.002231	2.5
Extreme (30C)	2535	6.9	0.002722	2.5
Extreme (10C)	2535	5.4	0.002143	2.5
Extreme (0C)	2535	5.3	0.002080	2.5
Extreme (-10C)	2535	5.6	0.002218	2.5
Extreme (-20C)	2535	6.1	0.002405	2.5
Extreme (-30C)	2535	5.6	0.002220	2.5

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



10.5 LTE BAND 12

**Band 12 QPSK, (10MHz BANDWIDTH RB size 50 RB Offset 0)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.48	707.5	8.9	0.012637	2.5
3.87	707.5	10.3	0.014524	2.5
4.26	707.5	8.8	0.012402	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	9.1	0.012922	2.5
Extreme (50C)	707.5	7.3	0.010355	2.5
Extreme (40C)	707.5	7.8	0.011047	2.5
Extreme (30C)	707.5	8.4	0.011940	2.5
Extreme (10C)	707.5	7.4	0.010408	2.5
Extreme (0C)	707.5	9.0	0.012664	2.5
Extreme (-10C)	707.5	8.6	0.012109	2.5
Extreme (-20C)	707.5	8.7	0.012262	2.5
Extreme (-30C)	707.5	7.4	0.010397	2.5

**Band 12 16QAM, (10MHz BANDWIDTH RB size 50 RB Offset 0)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.48	707.5	7.3	0.010329	2.5
3.87	707.5	8.5	0.011990	2.5
4.26	707.5	7.5	0.010566	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.5	0.012014	2.5
Extreme (50C)	707.5	8.6	0.012164	2.5
Extreme (40C)	707.5	9.1	0.012875	2.5
Extreme (30C)	707.5	7.3	0.010319	2.5
Extreme (10C)	707.5	8.7	0.012364	2.5
Extreme (0C)	707.5	7.0	0.009940	2.5
Extreme (-10C)	707.5	7.0	0.009839	2.5
Extreme (-20C)	707.5	9.3	0.013180	2.5
Extreme (-30C)	707.5	8.2	0.011544	2.5

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

## 10.6 LTE BAND 17

### Band 17 QPSK, (10MHz BANDWIDTH RB size 50 RB Offset 0)

#### Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.48	710.0	9.7	0.013606	2.5
3.87	710.0	9.0	0.012691	2.5
4.26	710.0	8.2	0.011585	2.5

#### Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.4	0.013169	2.5
Extreme (50C)	710.0	9.1	0.012778	2.5
Extreme (40C)	710.0	8.0	0.011257	2.5
Extreme (30C)	710.0	8.8	0.012452	2.5
Extreme (10C)	710.0	8.6	0.012084	2.5
Extreme (0C)	710.0	8.3	0.011693	2.5
Extreme (-10C)	710.0	9.1	0.012843	2.5
Extreme (-20C)	710.0	9.3	0.013148	2.5
Extreme (-30C)	710.0	7.7	0.010783	2.5

**Band 17 16QAM, (10MHz BANDWIDTH RB size 50 RB Offset 0)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.48	710.0	10.4	0.014688	2.5
3.87	710.0	8.9	0.012494	2.5
4.26	710.0	8.6	0.012144	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.2	0.013008	2.5
Extreme (50C)	710.0	8.7	0.012239	2.5
Extreme (40C)	710.0	8.4	0.011809	2.5
Extreme (30C)	710.0	8.8	0.012462	2.5
Extreme (10C)	710.0	8.3	0.011701	2.5
Extreme (0C)	710.0	8.6	0.012074	2.5
Extreme (-10C)	710.0	9.9	0.013890	2.5
Extreme (-20C)	710.0	8.4	0.011871	2.5
Extreme (-30C)	710.0	8.1	0.011401	2.5

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

## 11. Peak-to-Average Ratio

### 11.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

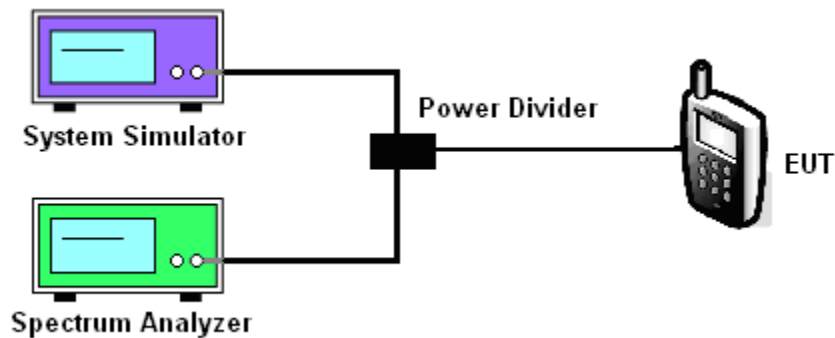
### 11.2 Measuring Instruments

See list of measuring instruments of this test report.

### 11.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. For LTE operating modes:
  - a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
  - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

### 11.4 Test Setup



### MODES TESTED

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

Test data reference attachment.

----END OF REPORT----