

# FCC CFR47 PART 22H, 24E, 27 CERTIFICATION TEST REPORT FCC ID: 2A7DX-BV5200PRO

**Product:** smartphone

**Trade Mark:** Blackview

**Model Number:** BV5200 Pro

**Family Model:** N/A

**Report No.:** STR221217003006E

**Issue Date:** Feb 09, 2023

## Prepared for

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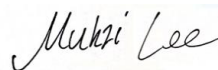
<b>TEST RESULT CERTIFICATION</b>	
<b>Applicant's name</b> .....	DOKE COMMUNICATION (HK) LIMITED
<b>Address</b> .....	RM 1902 EASEY COMM BLDG 253-261 HENNESSY ROAD WANCHAI HK, CHINA
<b>Manufacturer's Name</b> .....	Shenzhen DOKE Electronic Co.,Ltd
<b>Address</b> .....	801, Building3, 7th Industrial Zone, Yulv Community, Yutang Road, Guangming District, Shenzhen, China
<b>Product name</b> .....	smartphone
<b>Model and/or type reference</b> ..	BV5200 Pro
<b>Trade Mark</b> .....	Blackview
<b>Family Model</b> .....	N/A
<b>Standards</b> .....	FCC CFR 47 Part 22H, Part 24E, Part 27
<b>Test procedure</b> .....	ANSI C63.26:2015 ANSI/TIA-603-E-2016

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

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<b>Test Sample Number</b> .....:	T221217003R002
<b>Date of Test</b> .....	
<b>Date (s) of performance of tests</b> .....	Dec 17, 2022 ~ Feb 09, 2023
<b>Date of Issue</b> .....	Feb 09, 2023
<b>Test Result</b> .....	<b>Pass</b>

Testing Engineer :



(Mukzi Lee)

Authorized Signatory :



(Alex Li)

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## 1. GENERAL INFORMATION

### 1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	smartphone
Trade Mark	Blackview
Model Name	BV5200 Pro
Family Model	N/A
Model Difference	N/A
FCC ID:	2A7DX-BV5200PRO
Frequency Bands:	U.S. Bands: <input checked="" type="checkbox"/> LTE FDD Band 2, 4, 5, 7, 12, 13, 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 13 Uplink: 777MHz-787MHz, Downlink: 746MHz-756MHz; 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: 0.6dBi, Band 4: 0.6 dBi, Band 5: 0.3 dBi, Band 7: 0.7 dBi, Band 12: 0.2 dBi, Band 17: 0.2 dBi
Adapter	Model: QZ-01000AA00 Input: 100-240V~50/60Hz 0.3A Output: 5.0V $\overline{\text{---}}$ 2.0A (10.0W)
Battery	DC 3.85V, 5180mAh, 19.943Wh
Power supply	DC 3.85V from battery or DC 5V from adapter
Extreme Vol. Limits:	DC 3.27V to DC 4.43V (Nominal DC 3.85V) ( Note 1 )
HW Version	TE105_MAIN_PCB_V1.1
SW Version	BV5200_Pro_NEU_TE105_V1.0_20221117V01
** Note1: The High Voltage 4.43V and Low Voltage 3.27V 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: 2A7DX-BV5200PRO** filing to comply with the FCC Part 22H&24E &27.

## 1.3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI/TIA-603-E-2016, FCC CFR 47 Part 2, Part 22, Part 24, Part 27, ANSI C63.26:2015.

## 1.4 TEST FACILITY

The test site used to collect the radiated data is located at:

ShenZhen NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126 P.R.China.

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

FCC Registration No.:463705

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

## MEASUREMENT UNCERTAINTY

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

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

## 1.5 SPECIAL ACCESSORIES

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

### 1.6 WORST-CASE CONFIGURATION AND MODE

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

The device has LTE Bands of: Band 2, Band 4, Band 5, Band 7, Band 12, Band 13, 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	smartphone	BV5200 Pro	FCC ID: 2A7DX-BV5200PRO	EUT

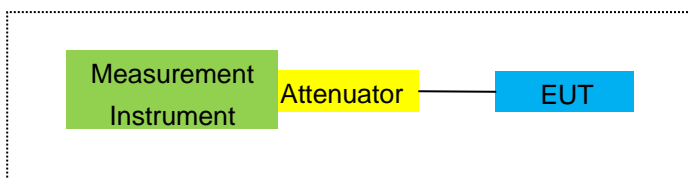
*Note: All the accessories have been used during the test.  
the following "EUT" in setup diagram means EUT system.*

## 2.4 TEST SETUP

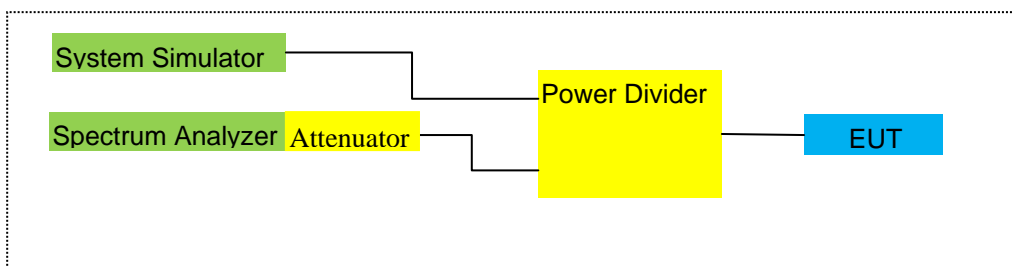
For Radiated Test Cases



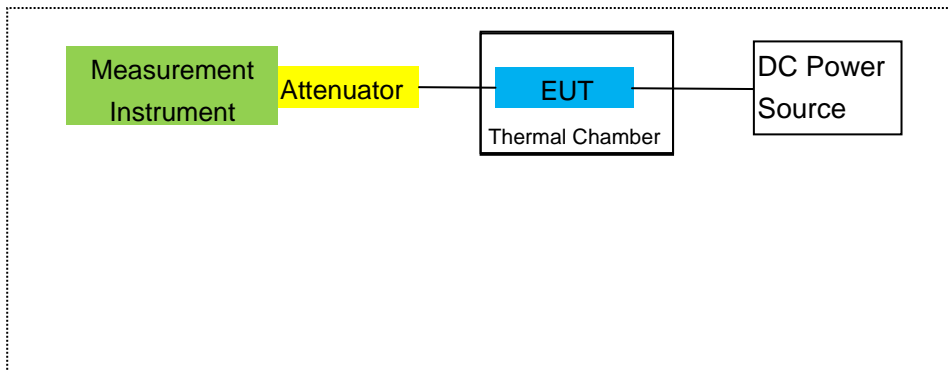
For Conducted Output Power



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	2022.06.16	2023.06.17	1 year
2	Test Receiver	R&S	ESPI	101318	2022.04.06	2023.04.05	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2022.03.30	2023.03.29	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2020.05.11	2023.05.10	3 year
5	Horn Antenna	EM	EM-AH-10180	2011071402	2022.03.31	2023.03.30	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2022.11.07	2023.11.06	1 year
7	Amplifier	EM	EM-30180	060538	2022.06.17	2023.06.16	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2022.04.06	2023.04.05	1 year
9	Power Meter	R&S	NRVS	100696	2022.06.17	2023.06.16	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2022.04.06	2023.04.05	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	2022.04.06	2023.04.05	1 year
15	LISN	R&S	ENV216	101313	2022.04.06	2023.04.05	1 year
16	LISN	EMCO	3816/2	00042990	2022.04.06	2023.04.05	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2022.04.06	2023.04.05	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2022.04.06	2023.04.05	1 year
19	Test Cable	N/A	C01	N/A	2020.05.11	2023.05.10	3 year
20	Test Cable	N/A	C02	N/A	2020.05.11	2023.05.10	3 year
21	Test Cable	N/A	C03	N/A	2020.05.11	2023.05.10	3 year
22	Attenuator	MCE	24-10-34	BN9258	2022.04.01	2023.03.31	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2022.04.01	2023.03.31	1 year
24	test receiver	R&S	ESCI	a0304218	2022.04.06	2023.04.05	1 year
25	Communication Tester	R&S	CMU200	A0304247	2022.06.16	2023.06.15	1 year

26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2022.04.06	2023.04.05	1 year
27	DC Power Source	N/A	PS-6005D	2017040292 3	2020.05.11	2023.05.10	3 year
28	MXG Vector Signal Generator	Agilent	N5182A	MY47070317	2022.06.16	2023.06.15	1 year
29	Communication Tester	R&S	CMW500	148500	2022.06.16	2023.06.15	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 2/4/5/7/12/13/17

### 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 2/4/5/7/12/13/17

### 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 2/4/5/7/12/13/17

## 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 2/4/5/7/12/13/17

#### 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	-5.66	3.76	28.24	18.82	76.208	Horizontal	Pass
		1880	-5.42	3.91	28.22	18.89	77.446	Horizontal	Pass
		1909.3	-5.48	3.93	28.20	18.79	75.683	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-5.60	3.77	28.23	18.86	76.913	Horizontal	Pass
		1880	-5.51	3.91	28.24	18.82	76.208	Horizontal	Pass
		1908.5	-5.46	3.94	28.25	18.85	76.736	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-5.70	3.77	28.31	18.84	76.560	Horizontal	Pass
		1880	-5.57	3.91	28.22	18.74	74.817	Horizontal	Pass
		1907.5	-5.49	3.94	28.20	18.77	75.336	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-5.79	3.79	28.33	18.75	74.989	Horizontal	Pass
		1880	-5.38	3.95	28.22	18.89	77.446	Horizontal	Pass
		1905	-5.36	3.97	28.19	18.86	76.913	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-5.81	3.79	28.34	18.74	74.817	Horizontal	Pass
		1880	-5.45	3.95	28.22	18.82	76.208	Horizontal	Pass
		1902.5	-5.35	3.97	28.18	18.86	76.913	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-5.66	3.81	28.35	18.88	77.268	Horizontal	Pass
		1880	-5.40	3.96	28.22	18.86	76.913	Horizontal	Pass
		1900	-5.34	4.00	28.16	18.82	76.208	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-5.72	3.76	28.24	18.76	75.162	Vertical	Pass
		1880	-5.44	3.91	28.22	18.87	77.090	Vertical	Pass
		1909.3	-5.38	3.93	28.20	18.89	77.446	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-5.69	3.77	28.23	18.77	75.336	Vertical	Pass
		1880	-5.51	3.91	28.24	18.82	76.208	Vertical	Pass
		1908.5	-5.53	3.94	28.25	18.78	75.509	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-5.68	3.77	28.31	18.86	76.913	Vertical	Pass
		1880	-5.44	3.91	28.22	18.87	77.090	Vertical	Pass
		1907.5	-5.43	3.94	28.20	18.83	76.384	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	-5.69	3.79	28.33	18.85	76.736	Vertical	Pass
		1880	-5.42	3.95	28.22	18.85	76.736	Vertical	Pass
		1905	-5.46	3.97	28.19	18.76	75.162	Vertical	Pass

15.0MHz		1857.5	-5.70	3.79	28.34	18.85	76.736	Vertical	Pass
Band	1/#Mid	1880	-5.41	3.95	28.22	18.86	76.913	Vertical	Pass
QPSK		1902.5	-5.35	3.97	28.18	18.86	76.913	Vertical	Pass
20.0MHz		1860	-5.62	3.81	28.35	18.92	77.983	Vertical	Pass
Band	1/#Mid	1880	-5.32	3.96	28.22	18.94	78.343	Vertical	Pass
QPSK		1900	-5.22	4.00	28.16	18.94	78.343	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)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP			
							Average			
							(mW)			
1.4MHz		1850.7	-6.70	3.76	28.24	17.78	59.979	Horizontal	Pass	
Band 16	1/#Mid	1880	-6.55	3.91	28.22	17.76	59.704	Horizontal	Pass	
QAM		1909.3	-6.40	3.93	28.20	17.87	61.235	Horizontal	Pass	
3.0MHz		1851.5	-6.60	3.77	28.23	17.86	61.094	Horizontal	Pass	
Band 16	1/#Mid	1880	-6.45	3.91	28.24	17.88	61.376	Horizontal	Pass	
QAM		1908.5	-6.55	3.94	28.25	17.76	59.704	Horizontal	Pass	
5.0MHz		1852.5	-6.66	3.77	28.31	17.88	61.376	Horizontal	Pass	
Band 16	1/#Mid	1880	-6.49	3.91	28.22	17.82	60.534	Horizontal	Pass	
QAM		1907.5	-6.52	3.94	28.20	17.74	59.429	Horizontal	Pass	
10.0MHz		1855	-6.76	3.79	28.33	17.78	59.979	Horizontal	Pass	
Band 16	1/#Mid	1880	-6.49	3.95	28.22	17.78	59.979	Horizontal	Pass	
QAM		1905	-6.34	3.97	28.19	17.88	61.376	Horizontal	Pass	
15.0MHz		1857.5	-6.73	3.79	28.34	17.82	60.534	Horizontal	Pass	
Band 16	1/#Mid	1880	-6.46	3.95	28.22	17.81	60.395	Horizontal	Pass	
QAM		1902.5	-6.40	3.97	28.18	17.81	60.395	Horizontal	Pass	
20.0MHz		1860	-6.82	3.81	28.35	17.72	59.156	Horizontal	Pass	
Band 16	1/#Mid	1880	-6.40	3.96	28.22	17.86	61.094	Horizontal	Pass	
QAM		1900	-6.30	4.00	28.16	17.86	61.094	Horizontal	Pass	
1.4MHz		1850.7	-6.71	3.76	28.24	17.77	59.841	Vertical	Pass	
Band 16	1/#Mid	1880	-6.41	3.91	28.22	17.90	61.660	Vertical	Pass	

QAM		1909.3	-6.46	3.93	28.20	17.81	60.395	Vertical	Pass
3.0MHz	1/#Mid	1851.5	-6.60	3.77	28.23	17.86	61.094	Vertical	Pass
Band 16		1880	-6.46	3.91	28.24	17.87	61.235	Vertical	Pass
QAM		1908.5	-6.41	3.94	28.25	17.90	61.660	Vertical	Pass
5.0MHz	1/#Mid	1852.5	-6.65	3.77	28.31	17.89	61.518	Vertical	Pass
Band 16		1880	-6.46	3.91	28.22	17.85	60.954	Vertical	Pass
QAM		1907.5	-6.38	3.94	28.20	17.88	61.376	Vertical	Pass
10.0MHz	1/#Mid	1855	-6.65	3.79	28.33	17.89	61.518	Vertical	Pass
Band 16		1880	-6.42	3.95	28.22	17.85	60.954	Vertical	Pass
QAM		1905	-6.45	3.97	28.19	17.77	59.841	Vertical	Pass
15.0MHz	1/#Mid	1857.5	-6.66	3.79	28.34	17.89	61.518	Vertical	Pass
Band 16		1880	-6.49	3.95	28.22	17.78	59.979	Vertical	Pass
QAM		1902.5	-6.32	3.97	28.18	17.89	61.518	Vertical	Pass
20.0MHz	1/#Mid	1860	-6.62	3.81	28.35	17.92	61.944	Vertical	Pass
Band 16		1880	-6.31	3.96	28.22	17.95	62.373	Vertical	Pass
QAM		1900	-6.24	4.00	28.16	17.92	61.944	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	Antenna Factor	Max. EIRP	Max. EIRP		
			(dBm)	(dBm)	(dB)	Average	Average		
						(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-1.19	3.12	27.58	23.27	212.324	Horizontal	Pass
		1732.5	-0.99	3.27	27.61	23.35	216.272	Horizontal	Pass
		1754.3	-1.00	3.29	27.63	23.34	215.774	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-1.21	3.13	27.61	23.27	212.324	Horizontal	Pass
		1732.5	-1.08	3.27	27.61	23.26	211.836	Horizontal	Pass
		1753.5	-0.94	3.30	27.62	23.38	217.771	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-1.28	3.13	27.63	23.22	209.894	Horizontal	Pass
		1732.5	-0.97	3.27	27.61	23.37	217.270	Horizontal	Pass
		1752.5	-0.94	3.30	27.60	23.36	216.770	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-1.24	3.15	27.64	23.25	211.349	Horizontal	Pass
		1732.5	-0.95	3.31	27.61	23.35	216.272	Horizontal	Pass
		1750	-1.00	3.33	27.59	23.26	211.836	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-1.11	3.15	27.65	23.39	218.273	Horizontal	Pass
		1732.5	-1.03	3.31	27.61	23.27	212.324	Horizontal	Pass
		1747.5	-0.96	3.33	27.57	23.28	212.814	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-1.18	3.17	27.66	23.31	214.289	Horizontal	Pass
		1732.5	-0.91	3.32	27.61	23.38	217.771	Horizontal	Pass
		1745	-0.83	3.36	27.56	23.37	217.270	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-1.09	3.12	27.58	23.37	217.270	Vertical	Pass
		1732.5	-0.97	3.27	27.61	23.37	217.270	Vertical	Pass
		1754.3	-1.07	3.29	27.63	23.27	212.324	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-1.17	3.13	27.61	23.31	214.289	Vertical	Pass
		1732.5	-1.08	3.27	27.61	23.26	211.836	Vertical	Pass
		1753.5	-0.94	3.30	27.62	23.38	217.771	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-1.11	3.13	27.63	23.39	218.273	Vertical	Pass
		1732.5	-1.11	3.27	27.61	23.23	210.378	Vertical	Pass
		1752.5	-0.91	3.30	27.60	23.39	218.273	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-1.17	3.15	27.64	23.32	214.783	Vertical	Pass
		1732.5	-0.96	3.31	27.61	23.34	215.774	Vertical	Pass
		1750	-0.93	3.33	27.59	23.33	215.278	Vertical	Pass

15.0MHz	1/#Mid	1717.5	-1.19	3.15	27.65	23.31	214.289	Vertical	Pass
Band		1732.5	-0.99	3.31	27.61	23.31	214.289	Vertical	Pass
QPSK		1747.5	-0.88	3.33	27.57	23.36	216.770	Vertical	Pass
20.0MHz	1/#Mid	1720	-1.08	3.17	27.66	23.41	219.280	Vertical	Pass
Band		1732.5	-0.86	3.32	27.61	23.43	220.293	Vertical	Pass
QPSK		1745	-0.76	3.36	27.56	23.44	220.800	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	Antenna Factor	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)	Average	Average			
						(dBm)	(mW)			
1.4MHz	1/#Mid	1710.7	-2.08	3.12	27.58	22.38	172.982	Horizontal	Pass	
Band 16		1732.5	-2.08	3.27	27.61	22.26	168.267	Horizontal	Pass	
QAM		1754.3	-1.97	3.29	27.63	22.37	172.584	Horizontal	Pass	
3.0MHz	1/#Mid	1711.5	-2.21	3.13	27.61	22.27	168.655	Horizontal	Pass	
Band 16		1732.5	-2.04	3.27	27.61	22.30	169.824	Horizontal	Pass	
QAM		1753.5	-2.04	3.30	27.62	22.28	169.044	Horizontal	Pass	
5.0MHz	1/#Mid	1712.5	-2.26	3.13	27.63	22.24	167.494	Horizontal	Pass	
Band 16		1732.5	-2.12	3.27	27.61	22.22	166.725	Horizontal	Pass	
QAM		1752.5	-2.06	3.30	27.60	22.24	167.494	Horizontal	Pass	
10.0MHz	1/#Mid	1715	-2.22	3.15	27.64	22.27	168.655	Horizontal	Pass	
Band 16		1732.5	-2.00	3.31	27.61	22.30	169.824	Horizontal	Pass	
QAM		1750	-1.90	3.33	27.59	22.36	172.187	Horizontal	Pass	
15.0MHz	1/#Mid	1717.5	-2.15	3.15	27.65	22.35	171.791	Horizontal	Pass	
Band 16		1732.5	-1.97	3.31	27.61	22.33	171.002	Horizontal	Pass	
QAM		1747.5	-1.89	3.33	27.57	22.35	171.791	Horizontal	Pass	
20.0MHz	1/#Mid	1720	-2.15	3.17	27.66	22.34	171.396	Horizontal	Pass	
Band 16		1732.5	-2.06	3.32	27.61	22.23	167.109	Horizontal	Pass	
QAM		1745	-1.96	3.36	27.56	22.24	167.494	Horizontal	Pass	
1.4MHz	1/#Mid	1710.7	-2.20	3.12	27.58	22.26	168.267	Vertical	Pass	
Band 16		1732.5	-2.03	3.27	27.61	22.31	170.216	Vertical	Pass	



QAM		1754.3	-2.04	3.29	27.63	22.30	169.824	Vertical	Pass
3.0MHz	1/#Mid	1711.5	-2.20	3.13	27.61	22.28	169.044	Vertical	Pass
Band 16		1732.5	-1.99	3.27	27.61	22.35	171.791	Vertical	Pass
QAM		1753.5	-2.05	3.30	27.62	22.27	168.655	Vertical	Pass
5.0MHz	1/#Mid	1712.5	-2.24	3.13	27.63	22.26	168.267	Vertical	Pass
Band 16		1732.5	-2.11	3.27	27.61	22.23	167.109	Vertical	Pass
QAM		1752.5	-1.97	3.30	27.60	22.33	171.002	Vertical	Pass
10.0MHz	1/#Mid	1715	-2.12	3.15	27.64	22.37	172.584	Vertical	Pass
Band 16		1732.5	-1.93	3.31	27.61	22.37	172.584	Vertical	Pass
QAM		1750	-1.91	3.33	27.59	22.35	171.791	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-2.22	3.15	27.65	22.28	169.044	Vertical	Pass
Band 16		1732.5	-2.03	3.31	27.61	22.27	168.655	Vertical	Pass
QAM		1747.5	-1.94	3.33	27.57	22.30	169.824	Vertical	Pass
20.0MHz	1/#Mid	1720	-2.06	3.17	27.66	22.43	174.985	Vertical	Pass
Band 16		1732.5	-1.85	3.32	27.61	22.44	175.388	Vertical	Pass
QAM		1745	-1.76	3.36	27.56	22.44	175.388	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)	Antenna Factor (dB)	Correction	Max. EIRP	Max. EIRP			
			(dBm)			(dB)	Average	Average			
							(dBm)	(mW)			
1.4MHz Band QPSK	3/#Mid	824.7	6.36	2.01	19.68	2.15	21.88	154.170	Horizontal	Pass	
		836.5	6.26	2.01	19.77	2.15	21.87	153.815	Horizontal	Pass	
		848.3	6.33	2.02	19.82	2.15	21.98	157.761	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	6.37	2.01	19.70	2.15	21.91	155.239	Horizontal	Pass	
		836.5	6.32	2.01	19.77	2.15	21.93	155.955	Horizontal	Pass	
		847.5	6.34	2.02	19.81	2.15	21.98	157.761	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	6.38	2.01	19.71	2.15	21.93	155.955	Horizontal	Pass	
		836.5	6.35	2.01	19.77	2.15	21.96	157.036	Horizontal	Pass	
		846.5	6.38	2.02	19.79	2.15	22.00	158.489	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	829	6.31	2.01	19.73	2.15	21.88	154.170	Horizontal	Pass	
		836.5	6.31	2.01	19.77	2.15	21.92	155.597	Horizontal	Pass	
		844	6.33	2.02	19.78	2.15	21.94	156.315	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	824.7	6.33	2.01	19.68	2.15	21.85	153.109	Vertical	Pass	
		836.5	6.34	2.01	19.77	2.15	21.95	156.675	Vertical	Pass	
		848.3	6.25	2.02	19.82	2.15	21.90	154.882	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	6.40	2.01	19.70	2.15	21.94	156.315	Vertical	Pass	
		836.5	6.36	2.01	19.77	2.15	21.97	157.398	Vertical	Pass	
		847.5	6.30	2.02	19.81	2.15	21.94	156.315	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	6.33	2.01	19.71	2.15	21.88	154.170	Vertical	Pass	
		836.5	6.28	2.01	19.77	2.15	21.89	154.525	Vertical	Pass	
		846.5	6.23	2.02	19.79	2.15	21.85	153.109	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	829	6.44	2.01	19.73	2.15	22.01	158.855	Vertical	Pass	
		836.5	6.41	2.01	19.77	2.15	22.02	159.221	Vertical	Pass	
		844	6.39	2.02	19.78	2.15	22.00	158.489	Vertical	Pass	

Radiated Power (ERP) for Band 5											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP		
			(dBm)				Average	Average			
							(dBm)	(mW)			
1.4MHz Band 16 QAM	3/#Mid	824.7	5.58	2.01	19.68	2.15	21.10	128.825	Horizontal	Pass	
		836.5	5.53	2.01	19.77	2.15	21.14	130.017	Horizontal	Pass	
		848.3	5.46	2.02	19.82	2.15	21.11	129.122	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	5.59	2.01	19.70	2.15	21.13	129.718	Horizontal	Pass	
		836.5	5.53	2.01	19.77	2.15	21.14	130.017	Horizontal	Pass	
		847.5	5.49	2.02	19.81	2.15	21.13	129.718	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	5.55	2.01	19.71	2.15	21.10	128.825	Horizontal	Pass	
		836.5	5.43	2.01	19.77	2.15	21.04	127.057	Horizontal	Pass	
		846.5	5.44	2.02	19.79	2.15	21.06	127.644	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	829	5.44	2.01	19.73	2.15	21.01	126.183	Horizontal	Pass	
		836.5	5.46	2.01	19.77	2.15	21.07	127.938	Horizontal	Pass	
		844	5.55	2.02	19.78	2.15	21.16	130.617	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	824.7	5.68	2.01	19.68	2.15	21.20	131.826	Vertical	Pass	
		836.5	5.53	2.01	19.77	2.15	21.14	130.017	Vertical	Pass	
		848.3	5.54	2.02	19.82	2.15	21.19	131.522	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	5.51	2.01	19.70	2.15	21.05	127.350	Vertical	Pass	
		836.5	5.49	2.01	19.77	2.15	21.10	128.825	Vertical	Pass	
		847.5	5.51	2.02	19.81	2.15	21.15	130.317	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	5.51	2.01	19.71	2.15	21.06	127.644	Vertical	Pass	
		836.5	5.48	2.01	19.77	2.15	21.09	128.529	Vertical	Pass	
		846.5	5.54	2.02	19.79	2.15	21.16	130.617	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	829	5.66	2.01	19.73	2.15	21.23	132.739	Vertical	Pass	
		836.5	5.63	2.01	19.77	2.15	21.24	133.045	Vertical	Pass	
		844	5.64	2.02	19.78	2.15	21.25	133.352	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	Antenna Factor	Max. EIRP	Max. EIRP		
			(dBm)	(dBm)	(dB)	Average	Average		
						(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	0.25	4.54	27.75	23.46	221.820	Horizontal	Pass
		2535	0.44	4.69	27.72	23.47	222.331	Horizontal	Pass
		2567.5	0.44	4.71	27.71	23.44	220.800	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	0.24	4.55	27.76	23.45	221.309	Horizontal	Pass
		2535	0.31	4.69	27.72	23.34	215.774	Horizontal	Pass
		2565	0.43	4.72	27.70	23.41	219.280	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	0.11	4.55	27.77	23.33	215.278	Horizontal	Pass
		2535	0.32	4.69	27.72	23.35	216.272	Horizontal	Pass
		2562.5	0.50	4.72	27.69	23.47	222.331	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	0.15	4.57	27.78	23.36	216.770	Horizontal	Pass
		2535	0.38	4.73	27.72	23.37	217.270	Horizontal	Pass
		2560	0.54	4.75	27.68	23.47	222.331	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	0.22	4.54	27.75	23.43	220.293	Vertical	Pass
		2535	0.41	4.69	27.72	23.44	220.800	Vertical	Pass
		2567.5	0.36	4.71	27.71	23.36	216.770	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	0.29	4.55	27.76	23.50	223.872	Vertical	Pass
		2535	0.39	4.69	27.72	23.42	219.786	Vertical	Pass
		2565	0.42	4.72	27.70	23.40	218.776	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	0.17	4.55	27.77	23.39	218.273	Vertical	Pass
		2535	0.33	4.69	27.72	23.36	216.770	Vertical	Pass
		2562.5	0.35	4.72	27.69	23.32	214.783	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	0.32	4.57	27.78	23.53	225.424	Vertical	Pass
		2535	0.56	4.73	27.72	23.55	226.464	Vertical	Pass
		2560	0.62	4.75	27.68	23.55	226.464	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	-1.04	4.54	27.75	22.17	164.816	Horizontal	Pass
		2535	-0.94	4.69	27.72	22.09	161.808	Horizontal	Pass
		2567.5	-0.92	4.71	27.71	22.08	161.436	Horizontal	Pass
10.0MHz z Band 16 QAM	1/#Mid	2505	-1.08	4.55	27.76	22.13	163.305	Horizontal	Pass
		2535	-0.89	4.69	27.72	22.14	163.682	Horizontal	Pass
		2565	-0.89	4.72	27.70	22.09	161.808	Horizontal	Pass
15.0MHz z Band 16 QAM	1/#Mid	2507.5	-1.11	4.55	27.77	22.11	162.555	Horizontal	Pass
		2535	-0.85	4.69	27.72	22.18	165.196	Horizontal	Pass
		2562.5	-0.79	4.72	27.69	22.18	165.196	Horizontal	Pass
20.0MHz z Band 16 QAM	1/#Mid	2510	-1.14	4.57	27.78	22.07	161.065	Horizontal	Pass
		2535	-0.80	4.73	27.72	22.19	165.577	Horizontal	Pass
		2560	-0.76	4.75	27.68	22.17	164.816	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-1.09	4.54	27.75	22.12	162.930	Vertical	Pass
		2535	-0.91	4.69	27.72	22.12	162.930	Vertical	Pass
		2567.5	-0.88	4.71	27.71	22.12	162.930	Vertical	Pass
10.0MHz z Band 16 QAM	1/#Mid	2505	-1.05	4.55	27.76	22.16	164.437	Vertical	Pass
		2535	-0.86	4.69	27.72	22.17	164.816	Vertical	Pass
		2565	-0.82	4.72	27.70	22.16	164.437	Vertical	Pass
15.0MHz z Band 16 QAM	1/#Mid	2507.5	-1.13	4.55	27.77	22.09	161.808	Vertical	Pass
		2535	-0.91	4.69	27.72	22.12	162.930	Vertical	Pass
		2562.5	-0.82	4.72	27.69	22.15	164.059	Vertical	Pass
20.0MHz z Band 16 QAM	1/#Mid	2510	-1.01	4.57	27.78	22.20	165.959	Vertical	Pass
		2535	-0.77	4.73	27.72	22.22	166.725	Vertical	Pass
		2560	-0.70	4.75	27.68	22.23	167.109	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 (EIRP) for Band 12									
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 QPSK	1/#Mid	699.7	6.16	1.91	19.21	2.15	21.31	135.207	Vertical
		707.5	6.09	1.91	19.26	2.15	21.29	134.586	Vertical
		715.3	5.99	1.93	19.34	2.15	21.25	133.352	Vertical
3.0MHz Band QPSK	1/#Mid	700.5	6.22	1.91	19.21	2.15	21.37	137.088	Vertical
		707.5	6.10	1.91	19.26	2.15	21.30	134.896	Vertical
		714.5	6.05	1.93	19.34	2.15	21.31	135.207	Vertical
5.0MHz Band QPSK	1/#Mid	701.5	6.20	1.91	19.23	2.15	21.37	137.088	Vertical
		707.5	6.04	1.91	19.26	2.15	21.24	133.045	Vertical
		713.5	6.05	1.92	19.33	2.15	21.31	135.207	Vertical
10.0MHz Band QPSK	1/#Mid	704	6.20	1.91	19.25	2.15	21.39	137.721	Vertical
		707.5	6.13	1.91	19.26	2.15	21.33	135.831	Vertical
		711	5.99	1.92	19.32	2.15	21.24	133.045	Vertical
1.4MHz Band QPSK	1/#Mid	699.7	6.17	1.91	19.21	2.15	21.32	135.519	Horizontal
		707.5	6.12	1.91	19.26	2.15	21.32	135.519	Horizontal
		715.3	6.02	1.93	19.34	2.15	21.28	134.276	Horizontal
3.0MHz Band QPSK	1/#Mid	700.5	6.19	1.91	19.21	2.15	21.34	136.144	Horizontal
		707.5	6.16	1.91	19.26	2.15	21.36	136.773	Horizontal
		714.5	6.05	1.93	19.34	2.15	21.31	135.207	Horizontal
5.0MHz Band QPSK	1/#Mid	701.5	6.07	1.91	19.23	2.15	21.24	133.045	Horizontal
		707.5	6.15	1.91	19.26	2.15	21.35	136.458	Horizontal
		713.5	6.09	1.92	19.33	2.15	21.35	136.458	Horizontal
10.0MHz Band QPSK	1/#Mid	704	6.23	1.91	19.25	2.15	21.42	138.676	Horizontal
		707.5	6.21	1.91	19.26	2.15	21.41	138.357	Horizontal
		711	6.19	1.92	19.32	2.15	21.44	139.316	Horizontal

Radiated Power (EIRP) for Band 12									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Factor	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			Average	Average		
				(dBm)	(dB)	(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	699.7	5.05	1.91	19.21	2.15	20.20	104.713	Vertical
		707.5	4.88	1.91	19.26	2.15	20.08	101.859	Vertical
		715.3	4.86	1.93	19.34	2.15	20.12	102.802	Vertical
3.0MHz Band QPSK	1/#Mid	700.5	4.91	1.91	19.21	2.15	20.06	101.391	Vertical
		707.5	4.95	1.91	19.26	2.15	20.15	103.514	Vertical
		714.5	4.93	1.93	19.34	2.15	20.19	104.472	Vertical
5.0MHz Band QPSK	1/#Mid	701.5	4.95	1.91	19.23	2.15	20.12	102.802	Vertical
		707.5	4.92	1.91	19.26	2.15	20.12	102.802	Vertical
		713.5	4.87	1.92	19.33	2.15	20.13	103.039	Vertical
10.0MHz Band QPSK	1/#Mid	704	4.99	1.91	19.25	2.15	20.18	104.232	Vertical
		707.5	4.87	1.91	19.26	2.15	20.07	101.625	Vertical
		711	4.80	1.92	19.32	2.15	20.05	101.158	Vertical
1.4MHz Band QPSK	1/#Mid	699.7	4.95	1.91	19.21	2.15	20.10	102.329	Horizontal
		707.5	4.86	1.91	19.26	2.15	20.06	101.391	Horizontal
		715.3	4.92	1.93	19.34	2.15	20.18	104.232	Horizontal
3.0MHz Band QPSK	1/#Mid	700.5	4.96	1.91	19.21	2.15	20.11	102.565	Horizontal
		707.5	4.95	1.91	19.26	2.15	20.15	103.514	Horizontal
		714.5	4.91	1.93	19.34	2.15	20.17	103.992	Horizontal
5.0MHz Band QPSK	1/#Mid	701.5	4.89	1.91	19.23	2.15	20.06	101.391	Horizontal
		707.5	4.87	1.91	19.26	2.15	20.07	101.625	Horizontal
		713.5	4.85	1.92	19.33	2.15	20.11	102.565	Horizontal
10.0MHz Band QPSK	1/#Mid	704	5.02	1.91	19.25	2.15	20.21	104.954	Horizontal
		707.5	5.02	1.91	19.26	2.15	20.22	105.196	Horizontal
		711	4.97	1.92	19.32	2.15	20.22	105.196	Horizontal

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 13

Radiated Power (ERP) for Band 13										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)				Average	Average		
				(dBm)	(dB)	(dB)	(dBm)	(mW)		
5.0MHz Band 16 QAM	1/#Mid	779.5	6.59	1.95	19.23	2.15	21.72	148.594	Vertical	Pass
		782	6.59	1.95	19.26	2.15	21.75	149.624	Vertical	Pass
		784.5	6.46	1.96	19.33	2.15	21.68	147.231	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	782	6.57	1.95	19.25	2.15	21.72	148.594	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	779.5	6.66	1.95	19.23	2.15	21.79	151.008	Horizontal	Pass
		782	6.52	1.95	19.26	2.15	21.68	147.231	Horizontal	Pass
		784.5	6.46	1.96	19.33	2.15	21.68	147.231	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	782	6.52	1.95	19.26	2.15	21.68	147.231	Horizontal	Pass



Radiated Power (ERP) for Band 13											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP			
			(dBm)				Average	Average			
							(dBm)	(mW)			
5.0MHz Band 16 QAM	1/#Mid	779.5	6.12	1.95	19.23	2.15	21.25	133.352	Vertical	Pass	
		782	6.09	1.95	19.26	2.15	21.25	133.352	Vertical	Pass	
		784.5	6.02	1.96	19.33	2.15	21.24	133.045	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	782	5.98	1.95	19.25	2.15	21.13	129.718	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	779.5	6.02	1.95	19.23	2.15	21.15	130.317	Horizontal	Pass	
		782	6.05	1.95	19.26	2.15	21.21	132.130	Horizontal	Pass	
		784.5	6.04	1.96	19.33	2.15	21.26	133.660	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	782	6.05	1.95	19.26	2.15	21.21	132.130	Horizontal	Pass	

8.8 LTE BAND 17

Radiated Power (ERP) for Band 17											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
5.0MHz Band QPSK	1/#Mid	706.5	6.03	1.91	19.23	2.15	21.20	131.826	Vertical	Pass	
		710	6.01	1.91	19.26	2.15	21.21	132.130	Vertical	Pass	
		713.5	5.90	1.92	19.33	2.15	21.16	130.617	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	709	5.98	1.91	19.25	2.15	21.17	130.918	Vertical	Pass	
		710	5.96	1.91	19.26	2.15	21.16	130.617	Vertical	Pass	
		711	6.05	1.92	19.32	2.15	21.30	134.896	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	706.5	6.04	1.91	19.23	2.15	21.21	132.130	Horizontal	Pass	
		710	6.10	1.91	19.26	2.15	21.30	134.896	Horizontal	Pass	
		713.5	6.04	1.92	19.33	2.15	21.30	134.896	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	709	6.15	1.91	19.25	2.15	21.34	136.144	Horizontal	Pass	
		710	6.11	1.91	19.26	2.15	21.31	135.207	Horizontal	Pass	
		711	6.06	1.92	19.32	2.15	21.31	135.207	Horizontal	Pass	

Radiated Power (ERP) for Band 13											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
5.0MHz Band 16 QAM	1/#Mid	706.5	5.46	1.91	19.23	2.15	20.63	115.611	Vertical	Pass	
		710	5.44	1.91	19.26	2.15	20.64	115.878	Vertical	Pass	
		713.5	5.43	1.92	19.33	2.15	20.69	117.220	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	709	5.44	1.91	19.25	2.15	20.63	115.611	Vertical	Pass	
		710	5.35	1.91	19.26	2.15	20.55	113.501	Vertical	Pass	
		711	5.45	1.92	19.32	2.15	20.70	117.490	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	706.5	5.39	1.91	19.23	2.15	20.56	113.763	Horizontal	Pass	
		710	5.50	1.91	19.26	2.15	20.70	117.490	Horizontal	Pass	
		713.5	5.30	1.92	19.33	2.15	20.56	113.763	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	709	5.55	1.91	19.25	2.15	20.74	118.577	Horizontal	Pass	
		710	5.51	1.91	19.26	2.15	20.71	117.761	Horizontal	Pass	
		711	5.48	1.92	19.32	2.15	20.73	118.304	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 2/4/5/7/12/13/17

**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	-45.65	4.04	33.51	-16.18	-13	-3.18	Horizontal
3701.4	-48.17	4.04	33.51	-18.70	-13	-5.70	Vertical
5552.1	-52.94	5.24	35.84	-22.34	-13	-9.34	Vertical
5552.1	-51.38	5.24	35.84	-20.78	-13	-7.78	Horizontal
206.1	-40.67	1.43	16.02	-26.08	-13	-13.08	Vertical
244.0	-42.97	1.30	17.99	-26.28	-13	-13.28	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-47.82	4.04	33.56	-18.30	-13	-5.30	Horizontal
3760.0	-51.07	4.04	33.56	-21.55	-13	-8.55	Vertical
5640.0	-50.87	5.24	35.91	-20.20	-13	-7.20	Vertical
5640.0	-49.63	5.24	35.91	-18.96	-13	-5.96	Horizontal
196.3	-34.27	1.62	16.97	-18.92	-13	-5.92	Vertical
298.7	-41.26	1.74	15.98	-27.03	-13	-14.03	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-44.76	4.04	34.00	-14.80	-13	-1.80	Horizontal
3818.6	-49.51	4.04	34.00	-19.55	-13	-6.55	Vertical
5727.9	-50.59	5.24	36.04	-19.79	-13	-6.79	Vertical
5727.9	-49.91	5.24	36.04	-19.11	-13	-6.11	Horizontal
211.0	-34.72	1.42	17.29	-18.85	-13	-5.85	Vertical
459.4	-44.32	1.50	17.90	-27.91	-13	-14.91	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	-48.55	4.07	33.54	-19.08	-13	-6.08	Horizontal
3720.0	-49.68	4.07	33.54	-20.21	-13	-7.21	Vertical
5580.0	-49.78	5.28	35.86	-19.20	-13	-6.20	Vertical
5580.0	-52.54	5.28	35.86	-21.96	-13	-8.96	Horizontal
199.9	-35.30	1.58	16.89	-19.98	-13	-6.98	Vertical
386.8	-34.15	1.76	17.26	-18.65	-13	-5.65	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-49.70	4.04	33.56	-20.18	-13	-7.18	Horizontal
3760.0	-47.56	4.04	33.56	-18.04	-13	-5.04	Vertical
5640.0	-51.11	5.24	35.91	-20.44	-13	-7.44	Vertical
5640.0	-51.25	5.24	35.91	-20.58	-13	-7.58	Horizontal
200.4	-40.92	1.46	16.27	-26.11	-13	-13.11	Vertical
369.0	-38.02	1.59	15.15	-24.46	-13	-11.46	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-52.27	4.04	34.00	-22.31	-13	-9.31	Horizontal
3800.0	-50.09	4.04	34.00	-20.13	-13	-7.13	Vertical
5700.0	-44.83	5.24	36.04	-14.03	-13	-1.03	Vertical
5700.0	-49.40	5.24	36.04	-18.60	-13	-5.60	Horizontal
196.4	-43.69	1.36	17.39	-27.65	-13	-14.65	Vertical
362.5	-38.35	1.66	15.39	-24.62	-13	-11.62	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)**

<b>Test Results for Low Channel 1710.7MHz</b>							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-44.49	4.02	29.80	-18.71	-13	-5.71	Horizontal
3421.4	-53.57	4.02	29.80	-27.79	-13	-14.79	Vertical
5132.1	-48.82	5.24	35.84	-18.22	-13	-5.22	Vertical
5132.1	-52.70	5.24	35.84	-22.10	-13	-9.10	Horizontal
209.6	-44.46	1.68	16.04	-30.10	-13	-17.10	Vertical
293.1	-43.72	1.78	17.74	-27.76	-13	-14.76	Horizontal
<b>Test Results for Mid Channel 1732.5MHz</b>							
3465.0	-51.48	4.03	30.00	-25.51	-13	-12.51	Horizontal
3465.0	-47.46	4.03	30.00	-21.49	-13	-8.49	Vertical
5197.5	-53.54	5.25	35.86	-22.93	-13	-9.93	Vertical
5197.5	-49.60	5.25	35.86	-18.99	-13	-5.99	Horizontal
202.9	-38.65	1.72	17.69	-22.68	-13	-9.68	Vertical
308.0	-40.79	1.62	16.02	-26.38	-13	-13.38	Horizontal
<b>Test Results for High Channel 1754.3MHz</b>							
3508.6	-46.49	4.05	30.01	-20.53	-13	-7.53	Horizontal
3508.6	-50.69	4.05	30.01	-24.73	-13	-11.73	Vertical
5262.9	-53.58	5.26	35.86	-22.98	-13	-9.98	Vertical
5262.9	-49.01	5.26	35.86	-18.41	-13	-5.41	Horizontal
210.1	-37.64	1.80	16.69	-22.75	-13	-9.75	Vertical
370.3	-44.44	1.75	16.66	-29.54	-13	-16.54	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	-45.82	4.02	29.80	-20.04	-13	-7.04	Horizontal
3440.0	-50.77	4.02	29.80	-24.99	-13	-11.99	Vertical
5160.0	-44.16	5.24	35.84	-13.56	-13	-0.56	Vertical
5160.0	-50.83	5.24	35.84	-20.23	-13	-7.23	Horizontal
178.7	-36.18	1.57	17.26	-20.49	-13	-7.49	Vertical
385.9	-44.43	1.78	16.35	-29.86	-13	-16.86	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-46.24	4.03	30.00	-20.27	-13	-7.27	Horizontal
3465.0	-45.97	4.03	30.00	-20.00	-13	-7.00	Vertical
5197.5	-49.64	5.25	35.86	-19.03	-13	-6.03	Vertical
5197.5	-51.38	5.25	35.86	-20.77	-13	-7.77	Horizontal
206.9	-35.18	1.44	17.95	-18.67	-13	-5.67	Vertical
309.1	-40.05	1.65	16.09	-25.61	-13	-12.61	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-46.14	4.05	27.68	-22.51	-13	-9.51	Horizontal
3490.0	-45.60	4.05	27.68	-21.97	-13	-8.97	Vertical
5235.0	-50.61	5.26	35.86	-20.01	-13	-7.01	Vertical
5235.0	-53.31	5.26	35.86	-22.71	-13	-9.71	Horizontal
198.1	-43.87	1.61	16.85	-28.63	-13	-15.63	Vertical
416.4	-35.58	1.61	15.19	-22.00	-13	-9.00	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

9.3 LTE BAND 5

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

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-52.41	2.78	27.50	-27.69	-13	-14.69	Horizontal
1649.4	-53.01	2.78	27.50	-28.29	-13	-15.29	Vertical
2474.1	-44.88	2.90	27.80	-19.98	-13	-6.98	Vertical
2474.1	-50.17	2.90	27.80	-25.27	-13	-12.27	Horizontal
196.9	-44.65	1.76	17.59	-28.82	-13	-15.82	Vertical
446.6	-34.02	1.63	15.87	-19.78	-13	-6.78	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-48.41	2.80	27.48	-23.73	-13	-10.73	Horizontal
1673.0	-50.36	2.80	27.48	-25.68	-13	-12.68	Vertical
2509.5	-51.99	2.91	27.70	-27.20	-13	-14.20	Vertical
2509.5	-52.75	2.91	27.70	-27.96	-13	-14.96	Horizontal
181.7	-36.46	1.61	15.68	-22.39	-13	-9.39	Vertical
411.2	-42.83	1.59	17.52	-26.91	-13	-13.91	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-49.74	2.82	27.43	-25.13	-13	-12.13	Horizontal
1696.6	-52.44	2.82	27.43	-27.83	-13	-14.83	Vertical
2544.9	-46.35	2.92	27.74	-21.53	-13	-8.53	Vertical
2544.9	-49.43	2.92	27.74	-24.61	-13	-11.61	Horizontal
198.1	-35.90	1.69	16.67	-20.91	-13	-7.91	Vertical
400.9	-34.87	1.70	17.18	-19.39	-13	-6.39	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	-53.66	2.78	27.50	-28.94	-13	-15.94	Horizontal
1658.0	-53.39	2.78	27.50	-28.67	-13	-15.67	Vertical
2487.0	-49.01	2.90	27.80	-24.11	-13	-11.11	Vertical
2487.0	-50.72	2.90	27.80	-25.82	-13	-12.82	Horizontal
192.9	-38.49	1.71	15.57	-24.63	-13	-11.63	Vertical
281.7	-35.30	1.34	16.40	-20.24	-13	-7.24	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-44.07	2.80	27.48	-19.39	-13	-6.39	Horizontal
1673.0	-47.10	2.80	27.48	-22.42	-13	-9.42	Vertical
2509.5	-51.08	2.91	27.70	-26.29	-13	-13.29	Vertical
2509.5	-53.45	2.91	27.70	-28.66	-13	-15.66	Horizontal
180.0	-34.72	1.44	17.04	-19.12	-13	-6.12	Vertical
354.7	-41.26	1.76	17.62	-25.40	-13	-12.40	Horizontal
Test Results for High Channel 844MHz							
1688.0	-46.69	2.82	27.43	-22.08	-13	-9.08	Horizontal
1688.0	-49.56	2.82	27.43	-24.95	-13	-11.95	Vertical
2532.0	-50.13	2.92	27.74	-25.31	-13	-12.31	Vertical
2532.0	-53.36	2.92	27.74	-28.54	-13	-15.54	Horizontal
195.3	-41.55	1.74	17.70	-25.59	-13	-12.59	Vertical
232.7	-39.01	1.41	17.46	-22.95	-13	-9.95	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	-60.66	5.23	35.81	-30.08	-25	-5.08	Horizontal
5005.0	-64.25	5.23	35.81	-33.67	-25	-8.67	Vertical
7507.5	-64.91	5.67	36.85	-33.73	-25	-8.73	Vertical
7507.5	-63.66	5.67	36.85	-32.48	-25	-7.48	Horizontal
180.1	-52.21	1.73	17.97	-35.97	-25	-10.97	Vertical
291.0	-45.88	1.38	15.11	-32.15	-25	-7.15	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.21	5.23	35.82	-30.62	-25	-5.62	Horizontal
5070.0	-63.82	5.23	35.82	-33.23	-25	-8.23	Vertical
7605.0	-60.39	5.67	36.85	-29.21	-25	-4.21	Vertical
7605.0	-63.17	5.67	36.85	-31.99	-25	-6.99	Horizontal
206.3	-46.76	1.77	16.17	-32.35	-25	-7.35	Vertical
441.4	-54.08	1.63	15.21	-40.50	-25	-15.50	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-59.95	5.24	35.83	-29.36	-25	-4.36	Horizontal
5135.0	-60.76	5.24	35.83	-30.17	-25	-5.17	Vertical
7702.5	-64.42	5.68	36.87	-33.23	-25	-8.23	Vertical
7702.5	-64.43	5.68	36.87	-33.24	-25	-8.24	Horizontal
185.0	-53.49	1.58	17.56	-37.51	-25	-12.51	Vertical
269.3	-48.17	1.45	16.58	-33.04	-25	-8.04	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	-63.67	5.23	35.82	-33.08	-25	-8.08	Horizontal
5020.0	-59.36	5.23	35.82	-28.77	-25	-3.77	Vertical
7530.0	-59.74	5.67	36.86	-28.55	-25	-3.55	Vertical
7530.0	-62.00	5.67	36.86	-30.81	-25	-5.81	Horizontal
202.9	-53.22	1.63	15.76	-39.09	-25	-14.09	Vertical
374.8	-52.79	1.71	15.44	-39.06	-25	-14.06	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.22	5.23	35.82	-30.63	-25	-5.63	Horizontal
5070.0	-59.01	5.23	35.82	-28.42	-25	-3.42	Vertical
7605.0	-63.87	5.67	36.85	-32.69	-25	-7.69	Vertical
7605.0	-60.09	5.67	36.85	-28.91	-25	-3.91	Horizontal
179.0	-51.57	1.79	16.84	-36.51	-25	-11.51	Vertical
398.6	-48.87	1.71	17.64	-32.94	-25	-7.94	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-62.99	5.24	35.83	-32.40	-25	-7.40	Horizontal
5120.0	-61.49	5.24	35.83	-30.90	-25	-5.90	Vertical
7680.0	-64.68	5.70	36.88	-33.50	-25	-8.50	Vertical
7680.0	-61.10	5.70	36.88	-29.92	-25	-4.92	Horizontal
202.9	-49.26	1.79	16.84	-34.20	-25	-9.20	Vertical
389.9	-44.72	1.71	17.64	-28.79	-25	-3.79	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	-53.34	2.60	27.20	-28.74	-13	-15.74	Horizontal
1399.4	-53.22	2.60	27.20	-28.62	-13	-15.62	Vertical
2099.1	-52.68	2.85	27.54	-27.99	-13	-14.99	Vertical
2099.1	-51.00	2.85	27.54	-26.31	-13	-13.31	Horizontal
200.4	-41.15	1.49	17.78	-24.86	-13	-11.86	Vertical
288.8	-42.91	1.36	17.33	-26.94	-13	-13.94	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-44.60	2.61	27.28	-19.93	-13	-6.93	Horizontal
1415.0	-48.47	2.61	27.28	-23.80	-13	-10.80	Vertical
2122.5	-45.76	2.87	27.59	-21.04	-13	-8.04	Vertical
2122.5	-49.46	2.87	27.59	-24.74	-13	-11.74	Horizontal
189.6	-38.44	1.73	15.74	-24.43	-13	-11.43	Vertical
286.0	-39.99	1.62	15.79	-25.82	-13	-12.82	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-51.27	2.63	27.28	-26.62	-13	-13.62	Horizontal
1430.6	-50.14	2.63	27.28	-25.49	-13	-12.49	Vertical
2145.9	-46.83	2.88	27.60	-22.11	-13	-9.11	Vertical
2145.9	-49.98	2.88	27.60	-25.26	-13	-12.26	Horizontal
191.2	-34.03	1.61	18.00	-17.64	-13	-4.64	Vertical
426.1	-42.51	1.45	15.49	-28.48	-13	-15.48	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	-45.49	2.61	27.26	-20.84	-13	-7.84	Horizontal
1408.0	-52.91	2.61	27.26	-28.26	-13	-15.26	Vertical
2112.0	-50.10	2.87	27.58	-25.39	-13	-12.39	Vertical
2112.0	-53.34	2.87	27.58	-28.63	-13	-15.63	Horizontal
179.9	-42.93	1.31	16.97	-27.27	-13	-14.27	Vertical
288.3	-40.40	1.65	16.70	-25.35	-13	-12.35	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-50.77	2.61	27.28	-26.10	-13	-13.10	Horizontal
1415.0	-45.18	2.61	27.28	-20.51	-13	-7.51	Vertical
2122.5	-48.94	2.87	27.59	-24.22	-13	-11.22	Vertical
2122.5	-51.14	2.87	27.59	-26.42	-13	-13.42	Horizontal
201.6	-39.79	1.72	17.99	-23.52	-13	-10.52	Vertical
248.8	-37.42	1.73	17.94	-21.21	-13	-8.21	Horizontal
Test Results for High Channel 711MHz							
1422.0	-47.08	2.62	27.28	-22.42	-13	-9.42	Horizontal
1422.0	-51.00	2.62	27.28	-26.34	-13	-13.34	Vertical
2133.0	-52.89	2.87	27.60	-28.16	-13	-15.16	Vertical
2133.0	-53.23	2.87	27.60	-28.50	-13	-15.50	Horizontal
203.1	-40.99	1.58	15.93	-26.64	-13	-13.64	Vertical
268.7	-41.72	1.36	15.59	-27.49	-13	-14.49	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 13**

**QPSK EIRP POWER FOR LTE BAND 13 (5MHZ BANDWIDTH)**

Test Results for Low Channel 779.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1559.0	-67.35	2.61	27.28	-42.68	-40	-2.68	Horizontal
1559.0	-76.42	2.61	27.28	-51.75	-40	-11.75	Vertical
2338.5	-74.31	2.87	27.59	-49.59	-13	-36.59	Vertical
2338.5	-72.07	2.87	27.59	-47.35	-13	-34.35	Horizontal
178.4	-69.35	1.71	16.15	-54.91	-13	-41.91	Vertical
249.7	-68.93	1.41	17.32	-53.02	-13	-40.02	Horizontal
Test Results For Mid Channel 782MHz							
1564.0	-69.89	2.62	27.30	-45.21	-40	-5.21	Horizontal
1564.0	-71.38	2.62	27.30	-46.70	-40	-6.70	Vertical
2346.0	-67.30	2.87	27.62	-42.55	-13	-29.55	Vertical
2346.0	-67.19	2.87	27.62	-42.44	-13	-29.44	Horizontal
193.2	-67.55	1.42	15.25	-53.73	-13	-40.73	Vertical
333.7	-71.28	1.36	17.19	-55.45	-13	-42.45	Horizontal
Test Results for High Channel 784.5MHz							
1569.0	-77.72	2.66	27.28	-53.10	-40	-13.10	Horizontal
1569.0	-76.31	2.66	27.28	-51.69	-40	-11.69	Vertical
2353.5	-74.73	2.88	27.60	-50.01	-13	-37.01	Vertical
2353.5	-72.04	2.88	27.60	-47.32	-13	-34.32	Horizontal
211.0	-71.58	1.32	17.29	-55.61	-13	-42.61	Vertical
407.5	-69.54	1.72	16.89	-54.37	-13	-41.37	Horizontal



**QPSK EIRP POWER FOR LTE BAND 13 (10MHZ BANDWIDTH)**

Test Results for Channel 782MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1564.0	-72.83	2.62	27.30	-48.15	-40	-8.15	Horizontal
1564.0	-72.20	2.62	27.30	-47.52	-40	-7.52	Vertical
2346.0	-73.39	2.87	27.62	-48.64	-13	-35.64	Vertical
2346.0	-74.81	2.87	27.62	-50.06	-13	-37.06	Horizontal
186.9	-71.91	1.35	16.91	-56.35	-13	-43.35	Vertical
344.3	-74.74	1.62	16.31	-60.05	-13	-47.05	Horizontal

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

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

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

9.7 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	-49.77	2.61	27.28	-25.10	-13	-12.10	Horizontal
1413.0	-53.42	2.61	27.28	-28.75	-13	-15.75	Vertical
2119.5	-50.30	2.87	27.59	-25.58	-13	-12.58	Vertical
2119.5	-52.23	2.87	27.59	-27.51	-13	-14.51	Horizontal
184.4	-44.39	1.71	16.15	-29.95	-13	-16.95	Vertical
250.4	-36.61	1.41	17.32	-20.70	-13	-7.70	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-49.66	2.62	27.30	-24.98	-13	-11.98	Horizontal
1420.0	-44.84	2.62	27.30	-20.16	-13	-7.16	Vertical
2130.0	-52.44	2.87	27.62	-27.69	-13	-14.69	Vertical
2130.0	-50.62	2.87	27.62	-25.87	-13	-12.87	Horizontal
203.5	-38.13	1.42	15.25	-24.31	-13	-11.31	Vertical
239.6	-40.62	1.36	17.19	-24.79	-13	-11.79	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-50.72	2.66	27.28	-26.10	-13	-13.10	Horizontal
1427.0	-52.48	2.66	27.28	-27.86	-13	-14.86	Vertical
2140.5	-48.55	2.88	27.60	-23.83	-13	-10.83	Vertical
2140.5	-53.92	2.88	27.60	-29.20	-13	-16.20	Horizontal
184.0	-39.26	1.32	17.29	-23.29	-13	-10.29	Vertical
436.0	-35.42	1.72	16.89	-20.25	-13	-7.25	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	-44.93	2.62	27.30	-20.25	-13	-7.25	Horizontal
1418.0	-47.79	2.62	27.30	-23.11	-13	-10.11	Vertical
2127.0	-52.01	2.87	27.62	-27.26	-13	-14.26	Vertical
2127.0	-49.80	2.87	27.62	-25.05	-13	-12.05	Horizontal
209.3	-39.18	1.35	16.91	-23.62	-13	-10.62	Vertical
302.0	-34.06	1.62	16.31	-19.37	-13	-6.37	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-52.96	2.62	27.30	-28.28	-13	-15.28	Horizontal
1420.0	-47.34	2.62	27.30	-22.66	-13	-9.66	Vertical
2130.0	-51.70	2.87	27.62	-26.95	-13	-13.95	Vertical
2130.0	-49.82	2.87	27.62	-25.07	-13	-12.07	Horizontal
184.3	-41.90	1.51	17.14	-26.27	-13	-13.27	Vertical
390.8	-39.95	1.77	16.88	-24.84	-13	-11.84	Horizontal
Test Results for High Channel 711MHz							
1422.0	-45.85	2.62	27.30	-21.17	-13	-8.17	Horizontal
1422.0	-51.30	2.62	27.30	-26.62	-13	-13.62	Vertical
2133.0	-44.98	2.87	27.62	-20.23	-13	-7.23	Vertical
2133.0	-50.98	2.87	27.62	-26.23	-13	-13.23	Horizontal
197.7	-42.66	1.78	15.95	-28.49	-13	-15.49	Vertical
254.7	-41.34	1.34	17.95	-24.74	-13	-11.74	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 3.85V and High voltage, DC 4.2V.

### Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to  $-30^{\circ}\text{C}$  and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until  $+50^{\circ}\text{C}$  is reached.

### Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

### MODES TESTED

LTE Band 2/4/5/7/12/13/17

### 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]
3.27	1880	12.8	0.006802	2.5
3.85	1880	14.1	0.007515	2.5
4.43	1880	13.5	0.007197	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	12.3	0.006556	2.5
Extreme (50C)	1880	12.0	0.006369	2.5
Extreme (40C)	1880	13.7	0.007263	2.5
Extreme (30C)	1880	13.3	0.007094	2.5
Extreme (10C)	1880	14.1	0.007491	2.5
Extreme (0C)	1880	12.5	0.006642	2.5
Extreme (-10C)	1880	13.4	0.007149	2.5
Extreme (-20C)	1880	14.1	0.007475	2.5
Extreme (-30C)	1880	15.2	0.008074	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]
3.27	1880	10.0	0.005321	2.5
3.85	1880	8.9	0.004718	2.5
4.43	1880	8.1	0.004291	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	10.1	0.005355	2.5
Extreme (50C)	1880	8.6	0.004565	2.5
Extreme (40C)	1880	7.7	0.004103623	2.5
Extreme (30C)	1880	8.8	0.004687897	2.5
Extreme (10C)	1880	8.6	0.004593753	2.5
Extreme (0C)	1880	7.7	0.004098164	2.5
Extreme (-10C)	1880	9.1	0.004850296	2.5
Extreme (-20C)	1880	8.8	0.004704555	2.5
Extreme (-30C)	1880	7.8	0.004171575	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]
3.27	1732.5	8.5	0.004900	2.5
3.85	1732.5	9.0	0.005208	2.5
4.43	1732.5	8.4	0.004870	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.1	0.004670	2.5
Extreme (50C)	1732.5	8.8	0.005070	2.5
Extreme (40C)	1732.5	7.2	0.004131	2.5
Extreme (30C)	1732.5	5.6	0.003235	2.5
Extreme (10C)	1732.5	7.0	0.004063	2.5
Extreme (0C)	1732.5	9.6	0.005523	2.5
Extreme (-10C)	1732.5	8.1	0.004651	2.5
Extreme (-20C)	1732.5	6.8	0.003936	2.5
Extreme (-30C)	1732.5	8.5	0.004907	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]
3.27	1732.5	9.5	0.005494	2.5
3.85	1732.5	9.0	0.005217	2.5
4.43	1732.5	8.2	0.004756	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	9.8	0.005664	2.5
Extreme (50C)	1732.5	8.4	0.004870	2.5
Extreme (40C)	1732.5	7.9	0.004539	2.5
Extreme (30C)	1732.5	9.4	0.005440	2.5
Extreme (10C)	1732.5	8.9	0.005145	2.5
Extreme (0C)	1732.5	7.9	0.004559	2.5
Extreme (-10C)	1732.5	9.2	0.005336	2.5
Extreme (-20C)	1732.5	8.9	0.005140	2.5
Extreme (-30C)	1732.5	7.8	0.004486	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]
3.27	836.5	6.1	0.007287	2.5
3.85	836.5	6.6	0.007944	2.5
4.43	836.5	5.2	0.006252	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.2	0.007432	2.5
Extreme (50C)	836.5	5.5	0.006622	2.5
Extreme (40C)	836.5	6.1	0.007236	2.5
Extreme (30C)	836.5	6.4	0.007696	2.5
Extreme (10C)	836.5	5.4	0.006448	2.5
Extreme (0C)	836.5	5.8	0.006927	2.5
Extreme (-10C)	836.5	5.3	0.006353	2.5
Extreme (-20C)	836.5	6.2	0.007408	2.5
Extreme (-30C)	836.5	6.3	0.007567	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]
3.27	836.5	5.6	0.006651	2.5
3.85	836.5	7.1	0.008453	2.5
4.43	836.5	4.5	0.005353	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.1	0.007301	2.5
Extreme (50C)	836.5	6.3	0.007539	2.5
Extreme (40C)	836.5	6.3	0.007533	2.5
Extreme (30C)	836.5	6.3	0.007504	2.5
Extreme (10C)	836.5	5.7	0.006790	2.5
Extreme (0C)	836.5	5.6	0.006733	2.5
Extreme (-10C)	836.5	5.5	0.006550	2.5
Extreme (-20C)	836.5	5.7	0.006850	2.5
Extreme (-30C)	836.5	6.8	0.008108	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]
3.27	2535	10.2	0.004033	2.5
3.85	2535	9.2	0.003617	2.5
4.43	2535	8.6	0.003373	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	9.1	0.003598	2.5
Extreme (50C)	2535	9.2	0.003632	2.5
Extreme (40C)	2535	8.8	0.003475	2.5
Extreme (30C)	2535	8.5	0.003339	2.5
Extreme (10C)	2535	7.7	0.003039	2.5
Extreme (0C)	2535	8.1	0.003178	2.5
Extreme (-10C)	2535	9.2	0.003644	2.5
Extreme (-20C)	2535	9.1	0.003580	2.5
Extreme (-30C)	2535	8.5	0.003342	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]
3.27	2535	6.9	0.002722	2.5
3.85	2535	6.7	0.002639	2.5
4.43	2535	5.7	0.002229	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	0.002053	2.5
Extreme (40C)	2535	5.3	0.002085	2.5
Extreme (30C)	2535	7.0	0.002748	2.5
Extreme (10C)	2535	5.9	0.002314	2.5
Extreme (0C)	2535	4.6	0.001821	2.5
Extreme (-10C)	2535	5.0	0.001975	2.5
Extreme (-20C)	2535	5.6	0.002210	2.5
Extreme (-30C)	2535	6.0	0.002350	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]
3.27	707.5	9.1	0.012842	2.5
3.85	707.5	9.9	0.014018	2.5
4.43	707.5	8.6	0.012142	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.9	0.012511	2.5
Extreme (50C)	707.5	7.6	0.010689	2.5
Extreme (40C)	707.5	7.1	0.009991	2.5
Extreme (30C)	707.5	8.1	0.011428	2.5
Extreme (10C)	707.5	7.1	0.009991	2.5
Extreme (0C)	707.5	8.9	0.012520	2.5
Extreme (-10C)	707.5	8.0	0.011345	2.5
Extreme (-20C)	707.5	8.4	0.011922	2.5
Extreme (-30C)	707.5	7.7	0.010850	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]
3.27	707.5	7.8	0.011072	2.5
3.85	707.5	8.5	0.011977	2.5
4.43	707.5	7.2	0.010121	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	9.2	0.012997	2.5
Extreme (50C)	707.5	8.9	0.012566	2.5
Extreme (40C)	707.5	8.5	0.012081	2.5
Extreme (30C)	707.5	7.7	0.010889	2.5
Extreme (10C)	707.5	9.2	0.013001	2.5
Extreme (0C)	707.5	7.4	0.010506	2.5
Extreme (-10C)	707.5	7.3	0.010329	2.5
Extreme (-20C)	707.5	9.0	0.012772	2.5
Extreme (-30C)	707.5	8.1	0.011446	2.5

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

10.6 LTE BAND 13

**Band 13 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]
3.27	782.0	12.4	0.015867	2.5
3.85	782.0	13.5	0.017235	2.5
4.43	782.0	13.4	0.017158	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	782.0	14.1	0.018000	2.5
Extreme (50C)	782.0	13.4	0.017122	2.5
Extreme (40C)	782.0	15.5	0.019842	2.5
Extreme (30C)	782.0	13.8	0.017644	2.5
Extreme (10C)	782.0	13.7	0.017553	2.5
Extreme (0C)	782.0	14.5	0.018532	2.5
Extreme (-10C)	782.0	13.7	0.017561	2.5
Extreme (-20C)	782.0	13.8	0.017688	2.5
Extreme (-30C)	782.0	14.0	0.017872	2.5

**Band 13 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]
3.27	782.0	13.0	0.016567	2.5
3.85	782.0	13.6	0.017409	2.5
4.43	782.0	13.4	0.017199	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	782.0	12.7	0.016248	2.5
Extreme (50C)	782.0	11.8	0.015102	2.5
Extreme (40C)	782.0	13.5	0.017244	2.5
Extreme (30C)	782.0	13.8	0.017617	2.5
Extreme (10C)	782.0	13.7	0.017494	2.5
Extreme (0C)	782.0	11.6	0.014855	2.5
Extreme (-10C)	782.0	12.8	0.016374	2.5
Extreme (-20C)	782.0	13.7	0.017464	2.5
Extreme (-30C)	782.0	14.3	0.018226	2.5

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



## 10.7 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]
3.27	710.0	9.6	0.013483	2.5
3.85	710.0	9.3	0.013032	2.5
4.43	710.0	8.0	0.011213	2.5

#### Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.7	0.013706	2.5
Extreme (50C)	710.0	9.4	0.013205	2.5
Extreme (40C)	710.0	7.7	0.010866	2.5
Extreme (30C)	710.0	9.3	0.013116	2.5
Extreme (10C)	710.0	8.7	0.012300	2.5
Extreme (0C)	710.0	8.0	0.011254	2.5
Extreme (-10C)	710.0	8.5	0.012018	2.5
Extreme (-20C)	710.0	9.1	0.012799	2.5
Extreme (-30C)	710.0	8.2	0.011535	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]
3.27	710.0	9.7	0.013674	2.5
3.85	710.0	8.9	0.012502	2.5
4.43	710.0	8.1	0.011379	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.8	0.013828	2.5
Extreme (50C)	710.0	8.5	0.011934	2.5
Extreme (40C)	710.0	8.4	0.011852	2.5
Extreme (30C)	710.0	8.5	0.011940	2.5
Extreme (10C)	710.0	8.4	0.011813	2.5
Extreme (0C)	710.0	8.5	0.011992	2.5
Extreme (-10C)	710.0	9.4	0.013220	2.5
Extreme (-20C)	710.0	8.5	0.011965	2.5
Extreme (-30C)	710.0	8.6	0.012109	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.

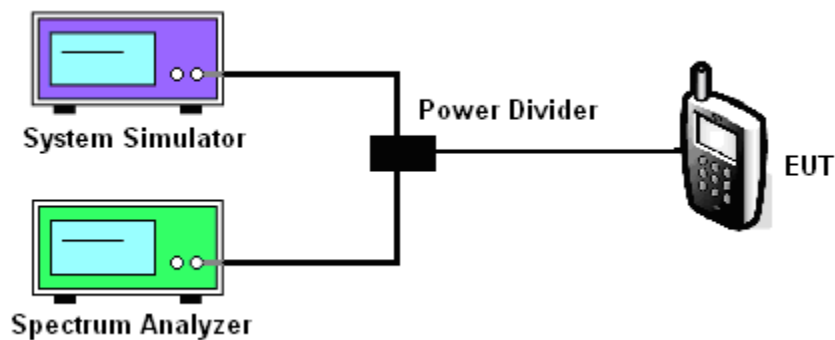
### 11.2 Measuring Instruments

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 2/4/5/7/12/13/17

Test data reference attachment.

----END OF REPORT----