

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

## FCC ID: 2APMJBV4900

**Product:** Smart Phone

**Trade Mark:** Blackview

**Model Number:** BV4900

**Family Model:** N/A

**Report No.:** STR201103001005E

### Prepared for

Shenzhen DOKE Electronic Co., Ltd  
13th Floor, Weidonglong commercial building B, Meilong avenue,  
Longhua New District, Shenzhen, China

### Prepared by

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  
Tel.: 400-800-6106, 0755-3699 5508  
Website: <http://www.ntek.org.cn>

TEST RESULT CERTIFICATION

Applicant's name : Shenzhen DOKE Electronic Co., Ltd
Address : 13th Floor, Weidonglong commercial building B, Meilong avenue, Longhua New District, Shenzhen, China
Manufacturer's Name : Shenzhen DOKE Electronic Co.,Ltd
Address : 8th floor, building 3, hanhaida science and technology innovation park, yulv village, guangming new district, shenzhen city, guangdong province
Product name : Smart Phone
Model and/or type reference : BV4900
Family Model: N/A
Standards : FCC CFR 47 Part 22H, Part 24E, Part 27
Test procedure : ANSI C63.46:2015
ANSI/TIA-603-E-2016

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

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Date of Test

Date (s) of performance of tests : 03 Nov. 2020 ~28 Nov, 2020

Date of Issue : 28 Nov, 2020

Test Result : Pass

Testing Engineer : [Signature: Cheng Jiawen]
(Cheng Jiawen)

Technical Manager : [Signature: Jason Chen]
(Jason Chen)

Authorized Signatory : [Signature: Alex]
(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:	Smart Phone
Trade Mark	Blackview
Model Name	BV4900
Family Model	N/A
Model Difference	N/A
FCC ID:	2APMJBV4900
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
SIM Card	SIM 1 and SIM 2 is a chipset unit and tested as a single chipset. The SIM 1 is chosen for test.
Antenna:	PIFA Antenna
Antenna gain:	0.5dBi
Power Supply:	DC 3.85V/5580mAh from battery or DC 5V from Adapter.
Adapter:	Model: HJ-0501000E1-US Input: 100-240V~50/60Hz 0.2A Output: 5V---1000mA
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.85V) (Note 1)
HW Version	HCT-ZN128MB-B3
SW Version	BV4900_US_ZN128e_V1.0
** Note1: The High Voltage 4.2V and Low Voltage 3.4V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.	

## 1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2APMJBV4900** filing to comply with the FCC Part 22H&24E &27.

## 1.3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI/TIA-603-E-2016, FCC CFR 47 Part 2, Part 22, Part 24, Part 27, ANSI C63.46:2015.

## 1.4 TEST FACILITY

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

ShenZhen NTEK Testing Technology Co., Ltd.

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

The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.46:2015& ANSI C63.4: 2014.

FCC Registration No.:463705

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

## MEASUREMENT UNCERTAINTY

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

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

## 1.5 SPECIAL ACCESSORIES

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

**1.6 WORST-CASE CONFIGURATION AND MODE**

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

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

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

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

**1.6 SUMMARY OF TEST RESULTS**

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

2.1053 22.917(a) 24.238(a) 27.53(c)(g)(h)(m) KDB 971168 D01 Clause 7	Field Strength of Spurious Radiation	PASS	
2.1055 22.355 24.235 27.54 KDB 971168 D01 Clause 9	Frequency Stability for Temperature & Voltage	PASS	
2.1051 22.917(a) 24.238(a) 27.53(c)(g)(h)(m) KDB 971168 D01 Clause 6	Conducted Emission	PASS	
Remark: 1. "N/A" denotes test is not applicable in this Test Report. 2. All test items were verified and recorded according to the standards and without any deviation during the test. 3. No modifications are made to the EUT during all test items.			



## 2. SYSTEM TEST CONFIGURATION

### 2.1 EUT CONFIGURATION

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

### 2.2 EUT EXERCISE

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

### 2.3 CONFIGURATION OF EUT SYSTEM

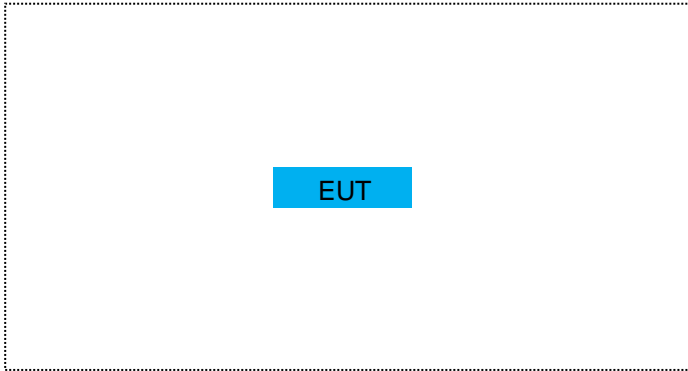
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Smart Phone	BV4900	FCC ID: 2APMJBV4900	EUT

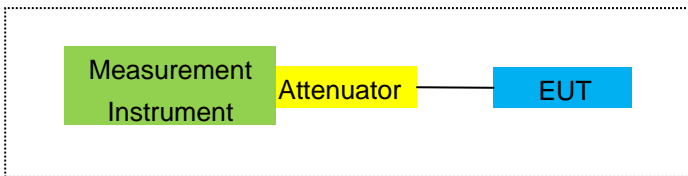
*Note: All the accessories have been used during the test.  
the following "EUT" in setup diagram means EUT system.*

**2.4 TEST SETUP**

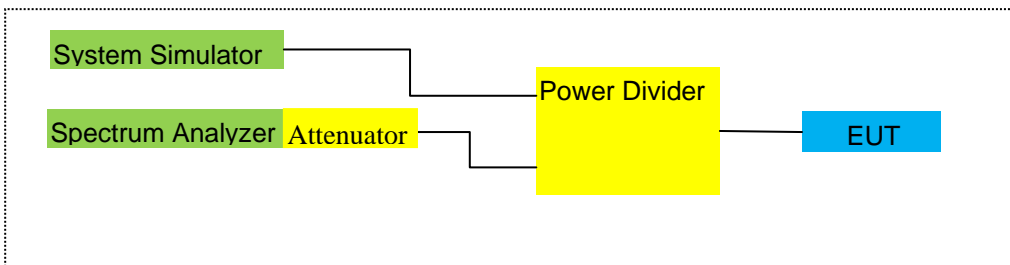
For Radiated Test Cases



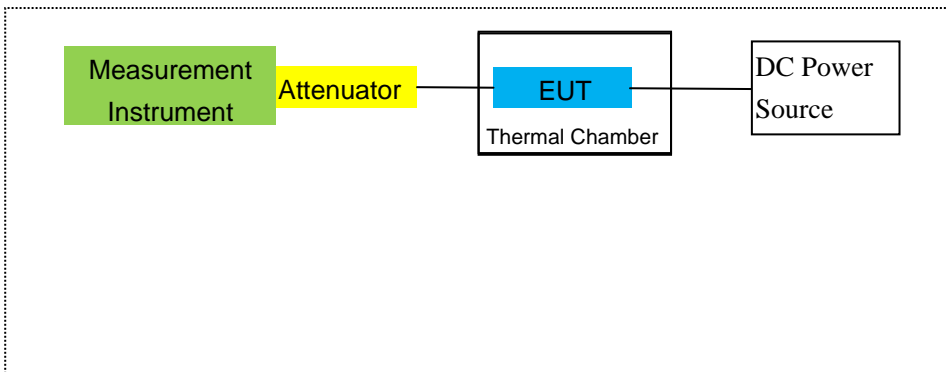
For Conducted Output Power



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	2020.07.13	2021.07.12	1 year
2	Test Receiver	R&S	ESPI	101318	2020.05.11	2021.05.10	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2020.04.11	2021.04.10	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	2020.04.11	2021.04.10	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2019.12.10	2020.12.09	1 year
7	Amplifier	EM	EM-30180	060538	2020.07.13	2021.07.12	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2020.05.11	2021.05.10	1 year
9	Power Meter	R&S	NRVS	100696	2020.07.13	2021.07.12	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2020.05.11	2021.05.10	1 year
11	Test Cable	N/A	R-01	N/A	2019.08.06	2022.08.05	3 year
12	Test Cable	N/A	R-02	N/A	2020.07.13	2021.07.12	1 year
13	Test Cable	N/A	R-03	N/A	2019.06.28	2022.06.27	3 year
14	Test Receiver	R&S	ESCI	101160	2020.05.11	2021.05.10	1 year
15	LISN	R&S	ENV216	101313	2020.05.11	2021.05.10	1 year
16	LISN	EMCO	3816/2	00042990	2020.05.11	2021.05.10	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2020.05.11	2021.05.10	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2020.04.11	2021.04.10	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	2021.05.10	1 year
22	Attenuator	MCE	24-10-34	BN9258	2020.05.11	2021.05.10	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2020.05.11	2021.05.10	1 year
24	test receiver	R&S	ESCI	a0304218	2020.05.11	2021.05.10	1 year
25	Communication Tester	R&S	CMU200	A0304247	2020.07.13	2021.07.12	1 year
26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2020.05.11	2021.05.10	1 year

27	DC Power Source	N/A	PS-6005D	2017040292 3	2020.07.13	2021.07.12	1 year
28	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2020.07.13	2021.07.12	1 year
29	Communication Tester	R&S	CMW500	148500	2020.05.11	2021.05.10	1 year

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable& DC Power Source which is scheduled for calibration every 3 years.

## 4. OUTPUT POWER

### 4.1 OUTPUT POWER MEASUREMENT

#### LTE Measurement Procedure:

All LTE bands conducted power peak and average are obtained from the CMW500 telecommunication test set. The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3**

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS\_01".3

**Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)**

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks ( $N_{RB}$ )	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	$\leq 1$
			5	>6	$\leq 1$
			10	>6	$\leq 1$
			15	>8	$\leq 1$
			20	>10	$\leq 1$
NS_04	6.6.2.2.2	41	5	>6	$\leq 1$
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10, 15, 20	$\geq 50$	$\leq 1$
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
NS_08	6.6.3.3.3	19	10, 15	> 44	$\leq 3$
NS_09	6.6.3.3.4	21	10, 15	> 40	$\leq 1$
				> 55	$\leq 2$
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 <sup>1</sup>	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

Test data reference attachment.

## 5. OCCUPIED BANDWIDTH

### RULE PART(S)

FCC: §2.1049

### LIMITS

For reporting purposes only

### TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

### MODES TESTED

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

### RESULTS

#### **PASS**

Test data reference attachment.

## 6. BANDEDGE AND EMISSION MASK

### RULE PART(S)

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

FCC: §2.1046, §22.913, §24.232

### LIMITS

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

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

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

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

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

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

### TEST PROCEDURE

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

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

Set display line

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

### MODES TESTED

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

### RESULTS

Test data reference attachment.

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



## 7. OUT OF BAND EMISSIONS

### RULE PART(S)

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

### LIMITS

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

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

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

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

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

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

### TEST PROCEDURE

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

For each out of band emissions measurement:

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

### MODES TESTED

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

## 7.1 MEASUREMENT METHOD

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

Test data reference attachment.

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

## 8. RADIATED MEASUREMENT

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

#### RULE PART(S)

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

#### LIMITS:

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

#### TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17

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

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

#### MODES TESTED

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

#### RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB/ RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1850.7	-1.95	3.76	28.24	22.53	179.061	Horizontal	Pass
		1880	-0.78	3.91	28.22	23.53	225.424	Horizontal	Pass
		1909.3	-1.87	3.93	28.20	22.40	173.780	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-0.97	3.77	28.23	23.49	223.357	Horizontal	Pass
		1880	-0.98	3.91	28.24	23.35	216.272	Horizontal	Pass
		1908.5	-1.22	3.94	28.25	23.09	203.704	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-1.96	3.77	28.31	22.58	181.134	Horizontal	Pass
		1880	-1.40	3.91	28.22	22.91	195.434	Horizontal	Pass
		1907.5	-0.76	3.94	28.20	23.50	223.872	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-1.26	3.79	28.33	23.28	212.814	Horizontal	Pass
		1880	-1.23	3.95	28.22	23.04	201.372	Horizontal	Pass
		1905	-0.43	3.97	28.19	23.79	239.332	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-1.93	3.79	28.34	22.62	182.810	Horizontal	Pass
		1880	-0.50	3.95	28.22	23.77	238.232	Horizontal	Pass
		1902.5	-0.27	3.97	28.18	23.94	247.742	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-0.90	3.81	28.35	23.64	231.206	Horizontal	Pass
		1880	-1.87	3.96	28.22	22.39	173.380	Horizontal	Pass
		1900	-0.86	4.00	28.16	23.30	213.796	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-1.26	3.76	28.24	23.22	209.894	Vertical	Pass
		1880	-0.48	3.91	28.22	23.83	241.546	Vertical	Pass
		1909.3	-1.03	3.93	28.20	23.24	210.863	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-1.68	3.77	28.23	22.78	189.671	Vertical	Pass
		1880	-1.09	3.91	28.24	23.24	210.863	Vertical	Pass
		1908.5	-0.48	3.94	28.25	23.83	241.546	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-0.67	3.77	28.31	23.87	243.781	Vertical	Pass
		1880	-0.21	3.91	28.22	24.10	257.040	Vertical	Pass
		1907.5	-0.52	3.94	28.20	23.74	236.592	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	-1.52	3.79	28.33	23.02	200.447	Vertical	Pass
		1880	-1.78	3.95	28.22	22.49	177.419	Vertical	Pass
		1905	-2.35	3.97	28.19	21.87	153.815	Vertical	Pass
15.0MHz Band	1/#Mid	1857.5	-2.12	3.79	28.34	22.43	174.985	Vertical	Pass
		1880	-1.08	3.95	28.22	23.19	208.449	Vertical	Pass

QPSK		1902.5	-1.61	3.97	28.18	22.60	181.970	Vertical	Pass
20.0MHz	1/#Mid	1860	-1.90	3.81	28.35	22.64	183.654	Vertical	Pass
Band		1880	-1.86	3.96	28.22	22.40	173.780	Vertical	Pass
QPSK		1900	0.22	4.00	28.16	24.38	274.157	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

Radiated Power (EIRP) for Band 2									
Mode	RB/ RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1850.7	-2.43	3.76	28.24	22.05	160.325	Horizontal	Pass
		1880	-2.05	3.91	28.22	22.26	168.267	Horizontal	Pass
		1909.3	-1.61	3.93	28.20	22.66	184.502	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-2.49	3.77	28.23	21.97	157.398	Horizontal	Pass
		1880	-1.93	3.91	28.24	22.40	173.780	Horizontal	Pass
		1908.5	-1.95	3.94	28.25	22.36	172.187	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-2.43	3.77	28.31	22.11	162.555	Horizontal	Pass
		1880	-2.16	3.91	28.22	22.15	164.059	Horizontal	Pass
		1907.5	-1.67	3.94	28.20	22.59	181.552	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-2.47	3.79	28.33	22.07	161.065	Horizontal	Pass
		1880	-2.20	3.95	28.22	22.07	161.065	Horizontal	Pass
		1905	-1.52	3.97	28.19	22.70	186.209	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-2.62	3.79	28.34	21.93	155.955	Horizontal	Pass
		1880	-2.15	3.95	28.22	22.12	162.930	Horizontal	Pass
		1902.5	-2.22	3.97	28.18	21.99	158.125	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-2.38	3.81	28.35	22.16	164.437	Horizontal	Pass
		1880	-1.62	3.96	28.22	22.64	183.654	Horizontal	Pass
		1900	-1.77	4.00	28.16	22.39	173.380	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-2.58	3.76	28.24	21.90	154.882	Vertical	Pass
		1880	-1.64	3.91	28.22	22.67	184.927	Vertical	Pass
		1909.3	-1.72	3.93	28.20	22.55	179.887	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-2.19	3.77	28.23	22.27	168.655	Vertical	Pass
		1880	-2.27	3.91	28.24	22.06	160.694	Vertical	Pass
		1908.5	-1.78	3.94	28.25	22.53	179.061	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-1.91	3.77	28.31	22.63	183.231	Vertical	Pass
		1880	-2.46	3.91	28.22	21.85	153.109	Vertical	Pass
		1907.5	-1.64	3.94	28.20	22.62	182.810	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-2.15	3.79	28.33	22.39	173.380	Vertical	Pass
		1880	-2.03	3.95	28.22	22.24	167.494	Vertical	Pass
		1905	-2.25	3.97	28.19	21.97	157.398	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-1.98	3.79	28.34	22.57	180.717	Vertical	Pass
		1880	-2.69	3.95	28.22	21.58	143.880	Vertical	Pass
		1902.5	-1.73	3.97	28.18	22.48	177.011	Vertical	Pass

20.0MHz		1860	-1.73	3.81	28.35	22.81	190.985	Vertical	Pass
Band 16	1/#Mid	1880	-1.54	3.96	28.22	22.72	187.068	Vertical	Pass
QAM		1900	-1.64	4.00	28.16	22.52	178.649	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

### 8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/ RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1710.7	-1.16	3.12	27.58	23.30	213.796	Horizontal	Pass
		1732.5	-0.93	3.27	27.61	23.41	219.280	Horizontal	Pass
		1754.3	-1.36	3.29	27.63	22.98	198.609	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-2.38	3.13	27.61	22.10	162.181	Horizontal	Pass
		1732.5	-2.67	3.27	27.61	21.67	146.893	Horizontal	Pass
		1753.5	-2.71	3.30	27.62	21.61	144.877	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-1.79	3.13	27.63	22.71	186.638	Horizontal	Pass
		1732.5	-2.81	3.27	27.61	21.53	142.233	Horizontal	Pass
		1752.5	-0.95	3.30	27.60	23.35	216.272	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-1.77	3.15	27.64	22.72	187.068	Horizontal	Pass
		1732.5	-1.02	3.31	27.61	23.28	212.814	Horizontal	Pass
		1750	-0.60	3.33	27.59	23.66	232.274	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-2.08	3.15	27.65	22.42	174.582	Horizontal	Pass
		1732.5	-1.09	3.31	27.61	23.21	209.411	Horizontal	Pass
		1747.5	-1.08	3.33	27.57	23.16	207.014	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-2.20	3.17	27.66	22.29	169.434	Horizontal	Pass
		1732.5	-0.92	3.32	27.61	23.37	217.270	Horizontal	Pass
		1745	-1.31	3.36	27.56	22.89	194.536	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-0.95	3.12	27.58	23.51	224.388	Vertical	Pass
		1732.5	-1.95	3.27	27.61	22.39	173.380	Vertical	Pass
		1754.3	-2.34	3.29	27.63	22.00	158.489	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-0.81	3.13	27.61	23.67	232.809	Vertical	Pass
		1732.5	-0.67	3.27	27.61	23.67	232.809	Vertical	Pass
		1753.5	-1.05	3.30	27.62	23.27	212.324	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.41	3.13	27.63	22.09	161.808	Vertical	Pass
		1732.5	-1.61	3.27	27.61	22.73	187.499	Vertical	Pass
		1752.5	-2.40	3.30	27.60	21.90	154.882	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-2.17	3.15	27.64	22.32	170.608	Vertical	Pass
		1732.5	-2.28	3.31	27.61	22.02	159.221	Vertical	Pass
		1750	-1.11	3.33	27.59	23.15	206.538	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-2.13	3.15	27.65	22.37	172.584	Vertical	Pass



Band		1732.5	-1.75	3.31	27.61	22.55	179.887	Vertical	Pass
QPSK		1747.5	-2.06	3.33	27.57	22.18	165.196	Vertical	Pass
20.0MHz	1/#Mid	1720	-1.49	3.17	27.66	23.00	199.526	Vertical	Pass
Band		1732.5	-0.55	3.32	27.61	23.74	236.592	Vertical	Pass
QPSK		1745	-0.80	3.36	27.56	23.40	218.776	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

Radiated Power (EIRP) for Band 4									
Mode	RB/ RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1710.7	-2.16	3.12	27.58	22.30	169.824	Horizontal	Pass
		1732.5	-2.25	3.27	27.61	22.09	161.808	Horizontal	Pass
		1754.3	-2.49	3.29	27.63	21.85	153.109	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.56	3.13	27.61	21.92	155.597	Horizontal	Pass
		1732.5	-3.48	3.27	27.61	20.86	121.899	Horizontal	Pass
		1753.5	-2.17	3.30	27.62	22.15	164.059	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.23	3.13	27.63	22.27	168.655	Horizontal	Pass
		1732.5	-2.71	3.27	27.61	21.63	145.546	Horizontal	Pass
		1752.5	-1.70	3.30	27.60	22.60	181.970	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-2.38	3.15	27.64	22.11	162.555	Horizontal	Pass
		1732.5	-2.33	3.31	27.61	21.97	157.398	Horizontal	Pass
		1750	-2.77	3.33	27.59	21.49	140.929	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-2.54	3.15	27.65	21.96	157.036	Horizontal	Pass
		1732.5	-2.19	3.31	27.61	22.11	162.555	Horizontal	Pass
		1747.5	-2.22	3.33	27.57	22.02	159.221	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-2.37	3.17	27.66	22.12	162.930	Horizontal	Pass
		1732.5	-1.58	3.32	27.61	22.71	186.638	Horizontal	Pass
		1745	-2.34	3.36	27.56	21.86	153.462	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-2.09	3.12	27.58	22.37	172.584	Vertical	Pass
		1732.5	-1.76	3.27	27.61	22.58	181.134	Vertical	Pass
		1754.3	-2.29	3.29	27.63	22.05	160.325	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.46	3.13	27.61	22.02	159.221	Vertical	Pass
		1732.5	-3.51	3.27	27.61	20.83	121.060	Vertical	Pass
		1753.5	-2.55	3.30	27.62	21.77	150.314	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.49	3.13	27.63	22.01	158.855	Vertical	Pass
		1732.5	-2.26	3.27	27.61	22.08	161.436	Vertical	Pass
		1752.5	-2.55	3.30	27.60	21.75	149.624	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-2.11	3.15	27.64	22.38	172.982	Vertical	Pass
		1732.5	-2.47	3.31	27.61	21.83	152.405	Vertical	Pass
		1750	-1.60	3.33	27.59	22.66	184.502	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-2.01	3.15	27.65	22.49	177.419	Vertical	Pass
		1732.5	-2.38	3.31	27.61	21.92	155.597	Vertical	Pass
		1747.5	-1.50	3.33	27.57	22.74	187.932	Vertical	Pass

20.0MHz		1720	-1.58	3.17	27.66	22.91	195.434	Vertical	Pass
Band 16	1/#Mid	1732.5	-1.94	3.32	27.61	22.35	171.791	Vertical	Pass
QAM		1745	-1.48	3.36	27.56	22.72	187.068	Vertical	Pass

**Note:**

SG Level= Signal generator output

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

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

### 8.4 LTE BAND 5

Radiated Power (ERP) for Band 5										
Mode	RB/ RB Position	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	824.7	6.32	2.01	19.68	2.15	21.84	152.757	Horizontal	Pass
		836.5	5.95	2.01	19.77	2.15	21.56	143.219	Horizontal	Pass
		848.3	6.22	2.02	19.82	2.15	21.87	153.815	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	825.5	6.96	2.01	19.70	2.15	22.50	177.828	Horizontal	Pass
		836.5	6.88	2.01	19.77	2.15	22.49	177.419	Horizontal	Pass
		847.5	7.17	2.02	19.81	2.15	22.81	190.985	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	826.5	7.10	2.01	19.71	2.15	22.65	184.077	Horizontal	Pass
		836.5	6.47	2.01	19.77	2.15	22.08	161.436	Horizontal	Pass
		846.5	6.88	2.02	19.79	2.15	22.50	177.828	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	829	6.27	2.01	19.73	2.15	21.84	152.757	Horizontal	Pass
		836.5	7.35	2.01	19.77	2.15	22.96	197.697	Horizontal	Pass
		844	6.14	2.02	19.78	2.15	21.75	149.624	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	824.7	6.57	2.01	19.68	2.15	22.09	161.808	Vertical	Pass
		836.5	6.93	2.01	19.77	2.15	22.54	179.473	Vertical	Pass
		848.3	6.20	2.02	19.82	2.15	21.85	153.109	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	825.5	6.00	2.01	19.70	2.15	21.54	142.561	Vertical	Pass
		836.5	6.98	2.01	19.77	2.15	22.59	181.552	Vertical	Pass
		847.5	6.65	2.02	19.81	2.15	22.29	169.434	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	826.5	6.58	2.01	19.71	2.15	22.13	163.305	Vertical	Pass
		836.5	5.43	2.01	19.77	2.15	21.04	127.057	Vertical	Pass
		846.5	6.52	2.02	19.79	2.15	22.14	163.682	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	829	7.30	2.01	19.73	2.15	22.87	193.642	Vertical	Pass
		836.5	6.54	2.01	19.77	2.15	22.15	164.059	Vertical	Pass
		844	6.23	2.02	19.78	2.15	21.84	152.757	Vertical	Pass

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

Mode	RB/ RB Position	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	824.7	6.01	2.01	19.68	2.15	21.53	142.233	Horizontal	Pass
		836.5	5.72	2.01	19.77	2.15	21.33	135.831	Horizontal	Pass
		848.3	5.49	2.02	19.82	2.15	21.14	130.017	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	5.41	2.01	19.70	2.15	20.95	124.451	Horizontal	Pass
		836.5	5.70	2.01	19.77	2.15	21.31	135.207	Horizontal	Pass
		847.5	5.82	2.02	19.81	2.15	21.46	139.959	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	5.48	2.01	19.71	2.15	21.03	126.765	Horizontal	Pass
		836.5	5.38	2.01	19.77	2.15	20.99	125.603	Horizontal	Pass
		846.5	5.82	2.02	19.79	2.15	21.44	139.316	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	829	5.63	2.01	19.73	2.15	21.20	131.826	Horizontal	Pass
		836.5	5.12	2.01	19.77	2.15	20.73	118.304	Horizontal	Pass
		844	4.95	2.02	19.78	2.15	20.56	113.763	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	824.7	5.63	2.01	19.68	2.15	21.15	130.317	Vertical	Pass
		836.5	4.78	2.01	19.77	2.15	20.39	109.396	Vertical	Pass
		848.3	5.04	2.02	19.82	2.15	20.69	117.220	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	4.99	2.01	19.70	2.15	20.53	112.980	Vertical	Pass
		836.5	5.28	2.01	19.77	2.15	20.89	122.744	Vertical	Pass
		847.5	5.18	2.02	19.81	2.15	20.82	120.781	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	4.76	2.01	19.71	2.15	20.31	107.399	Vertical	Pass
		836.5	5.60	2.01	19.77	2.15	21.21	132.130	Vertical	Pass
		846.5	5.67	2.02	19.79	2.15	21.29	134.586	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	6.08	2.01	19.77	2.15	21.69	147.571	Vertical	Pass
		844	5.30	2.02	19.78	2.15	20.91	123.310	Vertical	Pass

**Note:**

$ERP = EIRP - 2.15$

SG Level= Signal generator output

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

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

8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/ RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	1/#Mid	2502.5	0.48	4.54	27.75	23.69	233.884	Horizontal	Pass
		2535	1.13	4.69	27.72	24.16	260.615	Horizontal	Pass
		2567.5	1.04	4.71	27.71	24.04	253.513	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	0.39	4.55	27.76	23.60	229.087	Horizontal	Pass
		2535	-0.35	4.69	27.72	22.68	185.353	Horizontal	Pass
		2565	0.09	4.72	27.70	23.07	202.768	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	0.78	4.55	27.77	24.00	251.189	Horizontal	Pass
		2535	0.91	4.69	27.72	23.94	247.742	Horizontal	Pass
		2562.5	0.24	4.72	27.69	23.21	209.411	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	0.06	4.57	27.78	23.27	212.324	Horizontal	Pass
		2535	-0.12	4.73	27.72	22.87	193.642	Horizontal	Pass
		2560	1.42	4.75	27.68	24.35	272.270	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	0.37	4.54	27.75	23.58	228.034	Vertical	Pass
		2535	0.17	4.69	27.72	23.20	208.930	Vertical	Pass
		2567.5	-0.36	4.71	27.71	22.64	183.654	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	0.60	4.55	27.76	23.81	240.436	Vertical	Pass
		2535	0.70	4.69	27.72	23.73	236.048	Vertical	Pass
		2565	-0.51	4.72	27.70	22.47	176.604	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	0.57	4.55	27.77	23.79	239.332	Vertical	Pass
		2535	0.15	4.69	27.72	23.18	207.970	Vertical	Pass
		2562.5	0.51	4.72	27.69	23.48	222.844	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	1.18	4.57	27.78	24.39	274.789	Vertical	Pass
		2535	1.04	4.73	27.72	24.03	252.930	Vertical	Pass
		2560	1.28	4.75	27.68	24.21	263.633	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/ RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band 16 QAM	1/#Mid	2502.5	-1.27	4.54	27.75	21.94	156.315	Horizontal	Pass
		2535	-0.57	4.69	27.72	22.46	176.198	Horizontal	Pass
		2567.5	-0.19	4.71	27.71	22.81	190.985	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-0.06	4.55	27.76	23.15	206.538	Horizontal	Pass
		2535	-0.32	4.69	27.72	22.71	186.638	Horizontal	Pass
		2565	-0.29	4.72	27.70	22.69	185.780	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-0.30	4.55	27.77	22.92	195.884	Horizontal	Pass
		2535	-0.47	4.69	27.72	22.56	180.302	Horizontal	Pass
		2562.5	0.13	4.72	27.69	23.10	204.174	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-0.09	4.57	27.78	23.12	205.116	Horizontal	Pass
		2535	0.00	4.73	27.72	22.99	199.067	Horizontal	Pass
		2560	-1.16	4.75	27.68	21.77	150.314	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-0.77	4.54	27.75	22.44	175.388	Vertical	Pass
		2535	-0.48	4.69	27.72	22.55	179.887	Vertical	Pass
		2567.5	-0.78	4.71	27.71	22.22	166.725	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-0.83	4.55	27.76	22.38	172.982	Vertical	Pass
		2535	-1.31	4.69	27.72	21.72	148.594	Vertical	Pass
		2565	0.09	4.72	27.70	23.07	202.768	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-0.23	4.55	27.77	22.99	199.067	Vertical	Pass
		2535	-0.04	4.69	27.72	22.99	199.067	Vertical	Pass
		2562.5	-0.38	4.72	27.69	22.59	181.552	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	0.13	4.57	27.78	23.34	215.774	Vertical	Pass
		2535	0.13	4.73	27.72	23.12	205.116	Vertical	Pass
		2560	-0.10	4.75	27.68	22.83	191.867	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

8.5 LTE BAND 12

Radiated Power (ERP) for Band 12									
Mode	RB/ RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	699.7	7.27	1.91	19.21	2.15	22.42	174.582	Vertical
		707.5	6.45	1.91	19.26	2.15	21.65	146.218	Vertical
		715.3	5.68	1.93	19.34	2.15	20.94	124.165	Vertical
3.0MHz Band QPSK	1/#Mid	700.5	7.01	1.91	19.21	2.15	22.16	164.437	Vertical
		707.5	6.60	1.91	19.26	2.15	21.80	151.356	Vertical
		714.5	5.85	1.93	19.34	2.15	21.11	129.122	Vertical
5.0MHz Band QPSK	1/#Mid	701.5	6.23	1.91	19.23	2.15	21.40	138.038	Vertical
		707.5	6.92	1.91	19.26	2.15	22.12	162.930	Vertical
		713.5	5.94	1.92	19.33	2.15	21.20	131.826	Vertical
10.0MHz Band QPSK	1/#Mid	704	6.80	1.91	19.25	2.15	21.99	158.125	Vertical
		707.5	6.83	1.91	19.26	2.15	22.03	159.588	Vertical
		711	6.89	1.92	19.32	2.15	22.14	163.682	Vertical
1.4MHz Band QPSK	1/#Mid	699.7	6.88	1.91	19.21	2.15	22.03	159.588	Horizontal
		707.5	6.29	1.91	19.26	2.15	21.49	140.929	Horizontal
		715.3	6.49	1.93	19.34	2.15	21.75	149.624	Horizontal
3.0MHz Band QPSK	1/#Mid	700.5	6.57	1.91	19.21	2.15	21.72	148.594	Horizontal
		707.5	6.57	1.91	19.26	2.15	21.77	150.314	Horizontal
		714.5	6.65	1.93	19.34	2.15	21.91	155.239	Horizontal
5.0MHz Band QPSK	1/#Mid	701.5	6.84	1.91	19.23	2.15	22.01	158.855	Horizontal
		707.5	7.20	1.91	19.26	2.15	22.40	173.780	Horizontal
		713.5	7.03	1.92	19.33	2.15	22.29	169.434	Horizontal
10.0MHz Band QPSK	1/#Mid	704	7.33	1.91	19.25	2.15	22.52	178.649	Horizontal
		707.5	5.93	1.91	19.26	2.15	21.13	129.718	Horizontal
		711	6.10	1.92	19.32	2.15	21.35	136.458	Horizontal



Radiated Power (EIRP) for Band 12											
Mode	RB/ RB Position	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor Gain (dB)	Correct ion (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)			
1.4MHz Band 16 QAM	1/#Mi d	699.7	5.95	1.91	19.21	2.15	21.10	128.825	Vertical	Pass	
		707.5	5.34	1.91	19.26	2.15	20.54	113.240	Vertical	Pass	
		715.3	4.42	1.93	19.34	2.15	19.68	92.897	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mi d	700.5	5.82	1.91	19.21	2.15	20.97	125.026	Vertical	Pass	
		707.5	5.93	1.91	19.26	2.15	21.13	129.718	Vertical	Pass	
		714.5	5.35	1.93	19.34	2.15	20.61	115.080	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mi d	701.5	5.77	1.91	19.23	2.15	20.94	124.165	Vertical	Pass	
		707.5	5.79	1.91	19.26	2.15	20.99	125.603	Vertical	Pass	
		713.5	5.69	1.92	19.33	2.15	20.95	124.451	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mi d	704	6.07	1.91	19.25	2.15	21.26	133.660	Vertical	Pass	
		707.5	5.85	1.91	19.26	2.15	21.05	127.350	Vertical	Pass	
		711	6.27	1.92	19.32	2.15	21.52	141.906	Vertical	Pass	
1.4MHz Band 16 QAM	1/#Mi d	699.7	5.64	1.91	19.21	2.15	20.79	119.950	Horizontal	Pass	
		707.5	6.11	1.91	19.26	2.15	21.31	135.207	Horizontal	Pass	
		715.3	5.80	1.93	19.34	2.15	21.06	127.644	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mi d	700.5	5.95	1.91	19.21	2.15	21.10	128.825	Horizontal	Pass	
		707.5	6.16	1.91	19.26	2.15	21.36	136.773	Horizontal	Pass	
		714.5	6.13	1.93	19.34	2.15	21.39	137.721	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mi d	701.5	5.78	1.91	19.23	2.15	20.95	124.451	Horizontal	Pass	
		707.5	5.71	1.91	19.26	2.15	20.91	123.310	Horizontal	Pass	
		713.5	4.98	1.92	19.33	2.15	20.24	105.682	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mi d	704	5.53	1.91	19.25	2.15	20.72	118.032	Horizontal	Pass	
		707.5	6.28	1.91	19.26	2.15	21.48	140.605	Horizontal	Pass	
		711	6.08	1.92	19.32	2.15	21.33	135.831	Horizontal	Pass	

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

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

8.6 LTE BAND 17

Radiated Power (ERP) for Band 17											
Mode	RB/ RB Position	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor Gain (dB)	Correcti on (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)			
5.0MHz Band QPSK	1/#Mid	706.5	5.73	1.91	19.23	2.15	20.90	123.027	Vertical	Pass	
		710	6.40	1.91	19.26	2.15	21.60	144.544	Vertical	Pass	
		713.5	6.69	1.92	19.33	2.15	21.95	156.675	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	709	4.84	1.91	19.25	2.15	20.03	100.693	Vertical	Pass	
		710	6.27	1.91	19.26	2.15	21.47	140.281	Vertical	Pass	
		711	7.45	1.92	19.32	2.15	22.70	186.209	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	706.5	6.53	1.91	19.23	2.15	21.70	147.911	Horizontal	Pass	
		710	7.19	1.91	19.26	2.15	22.39	173.380	Horizontal	Pass	
		713.5	6.19	1.92	19.33	2.15	21.45	139.637	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	709	6.85	1.91	19.25	2.15	22.04	159.956	Horizontal	Pass	
		710	6.75	1.91	19.26	2.15	21.95	156.675	Horizontal	Pass	
		711	6.94	1.92	19.32	2.15	22.19	165.577	Horizontal	Pass	

Radiated Power (ERP) for Band 17										
Mode	RB/ RB Position	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor Gain (dB)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band 16 QAM	1/#Mid	706.5	6.02	1.91	19.23	2.15	21.19	131.522	Vertical	Pass
		710	6.42	1.91	19.26	2.15	21.62	145.211	Vertical	Pass
		713.5	6.08	1.92	19.33	2.15	21.34	136.144	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	709	6.03	1.91	19.25	2.15	21.22	132.434	Vertical	Pass
		710	5.16	1.91	19.26	2.15	20.36	108.643	Vertical	Pass
		711	6.27	1.92	19.32	2.15	21.52	141.906	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	706.5	5.10	1.91	19.23	2.15	20.27	106.414	Horizontal	Pass
		710	6.25	1.91	19.26	2.15	21.45	139.637	Horizontal	Pass
		713.5	5.78	1.92	19.33	2.15	21.04	127.057	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	709	5.76	1.91	19.25	2.15	20.95	124.451	Horizontal	Pass
		710	6.53	1.91	19.26	2.15	21.73	148.936	Horizontal	Pass
		711	6.32	1.92	19.32	2.15	21.57	143.549	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

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

## 9. SPURIOUS RADIATION EMISSION

### RULE PART(S)

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

### LIMIT

For Band 7, the minimum permissible attenuation level of any spurious emission is  $55 + \log_{10}(P)$  [Watts].

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

### TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth in the 1 MHz band immediately outside and adjacent to the channel edge of the equipment. Beyond the 1 MHz band immediately outside the channel edge of the equipment, a resolution bandwidth of 1 MHz shall be employed. A narrower resolution bandwidth is allowed to be used provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1% of the occupied bandwidth as applicable.

The power of any unwanted emissions measured from the channel edge of the equipment shall be attenuated below the transmitter power, P (dBW), as follows:

- a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than  $43 + 10 \text{ Log}_{10}(p)$ , dB; and
- b. for mobile subscriber equipment, the attenuation shall not be less than  $43 + 10 \text{ Log}_{10}(p)$ , dB at the channel edges and  $55 + 10 \text{ Log}_{10}(p)$  at 5.5 MHz away and beyond the channel edges where p in (a) and (b) is the transmitter power measured in watts.

**MODES TESTED**

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

**RESULTS**

PASS

9.1 LTE BAND 2

**QPSK EIRP POWER FOR LTE BAND 2 (1.4MHZ BANDWIDTH)**

Test Results for Low Channel 1850.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3701.4	-53.28	4.04	33.51	-23.81	-13	-10.81	Horizontal
3701.4	-53.98	4.04	33.51	-24.51	-13	-11.51	Vertical
5552.1	-54.01	5.24	35.84	-23.41	-13	-10.41	Vertical
5552.1	-50.70	5.24	35.84	-20.10	-13	-7.10	Horizontal
127.3	-45.58	1.43	15.80	-31.21	-13	-18.21	Vertical
186.8	-46.05	1.45	17.92	-29.58	-13	-16.58	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-53.95	4.04	33.56	-24.43	-13	-11.43	Horizontal
3760.0	-51.06	4.04	33.56	-21.54	-13	-8.54	Vertical
5640.0	-51.61	5.24	35.91	-20.94	-13	-7.94	Vertical
5640.0	-59.01	5.24	35.91	-28.34	-13	-15.34	Horizontal
263.2	-37.52	1.55	15.81	-23.26	-13	-10.26	Vertical
186.3	-44.42	1.45	16.95	-28.92	-13	-15.92	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-55.32	4.04	34.00	-25.36	-13	-12.36	Horizontal
3818.6	-52.04	4.04	34.00	-22.08	-13	-9.08	Vertical
5727.9	-50.80	5.24	36.04	-20.00	-13	-7.00	Vertical
5727.9	-51.56	5.24	36.04	-20.76	-13	-7.76	Horizontal
248.9	-44.28	1.37	15.30	-30.35	-13	-17.35	Vertical
215.5	-36.86	1.72	15.54	-23.04	-13	-10.04	Horizontal

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

Test Results for Low Channel 1860MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720.0	-51.65	4.07	33.54	-22.18	-13	-9.18	Horizontal
3720.0	-48.99	4.07	33.54	-19.52	-13	-6.52	Vertical
5580.0	-54.69	5.28	35.86	-24.11	-13	-11.11	Vertical
5580.0	-51.76	5.28	35.86	-21.18	-13	-8.18	Horizontal
175.7	-43.42	1.45	16.74	-28.13	-13	-15.13	Vertical
120.7	-37.57	1.54	15.62	-23.49	-13	-10.49	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-50.67	4.04	33.56	-21.15	-13	-8.15	Horizontal
3760.0	-51.05	4.04	33.56	-21.53	-13	-8.53	Vertical
5640.0	-56.48	5.24	35.91	-25.81	-13	-12.81	Vertical
5640.0	-54.54	5.24	35.91	-23.87	-13	-10.87	Horizontal
268.9	-43.81	1.55	16.79	-28.57	-13	-15.57	Vertical
225.6	-37.85	1.63	15.72	-23.76	-13	-10.76	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-51.43	4.04	34.00	-21.47	-13	-8.47	Horizontal
3800.0	-52.92	4.04	34.00	-22.96	-13	-9.96	Vertical
5700.0	-49.87	5.24	36.04	-19.07	-13	-6.07	Vertical
5700.0	-52.39	5.24	36.04	-21.59	-13	-8.59	Horizontal
128.6	-41.01	1.50	17.60	-24.91	-13	-11.91	Vertical
261.2	-41.08	1.51	15.63	-26.96	-13	-13.96	Horizontal

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

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

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

9.2 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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-54.15	4.02	29.80	-28.37	-13	-15.37	Horizontal
3421.4	-47.98	4.02	29.80	-22.20	-13	-9.20	Vertical
5132.1	-53.94	5.24	35.84	-23.34	-13	-10.34	Vertical
5132.1	-53.94	5.24	35.84	-23.34	-13	-10.34	Horizontal
199.5	-43.04	1.74	17.15	-27.63	-13	-14.63	Vertical
270.7	-41.28	1.32	17.67	-24.93	-13	-11.93	Horizontal
<b>Test Results for Mid Channel 1732.5MHz</b>							
3465.0	-53.55	4.03	30.00	-27.58	-13	-14.58	Horizontal
3465.0	-53.55	4.03	30.00	-27.58	-13	-14.58	Vertical
5197.5	-52.54	5.25	35.86	-21.93	-13	-8.93	Vertical
5197.5	-47.91	5.25	35.86	-17.30	-13	-4.30	Horizontal
233.3	-43.70	1.39	17.52	-27.57	-13	-14.57	Vertical
218.5	-42.90	1.79	15.48	-29.21	-13	-16.21	Horizontal
<b>Test Results for High Channel 1754.3MHz</b>							
3508.6	-49.32	4.05	30.01	-23.36	-13	-10.36	Horizontal
3508.6	-56.61	4.05	30.01	-30.65	-13	-17.65	Vertical
5262.9	-50.86	5.26	35.86	-20.26	-13	-7.26	Vertical
5262.9	-51.51	5.26	35.86	-20.91	-13	-7.91	Horizontal
122.0	-39.90	1.62	17.98	-23.54	-13	-10.54	Vertical
149.5	-40.53	1.71	17.58	-24.66	-13	-11.66	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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440.0	-54.22	4.02	29.80	-28.44	-13	-15.44	Horizontal
3440.0	-50.80	4.02	29.80	-25.02	-13	-12.02	Vertical
5160.0	-54.54	5.24	35.84	-23.94	-13	-10.94	Vertical
5160.0	-49.00	5.24	35.84	-18.40	-13	-5.40	Horizontal
264.0	-42.94	1.56	17.79	-26.71	-13	-13.71	Vertical
110.7	-42.19	1.60	16.00	-27.79	-13	-14.79	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-52.21	4.03	30.00	-26.24	-13	-13.24	Horizontal
3465.0	-52.47	4.03	30.00	-26.50	-13	-13.50	Vertical
5197.5	-49.45	5.25	35.86	-18.84	-13	-5.84	Vertical
5197.5	-52.91	5.25	35.86	-22.30	-13	-9.30	Horizontal
141.7	-39.00	1.70	15.43	-25.27	-13	-12.27	Vertical
168.3	-46.43	1.73	16.94	-31.22	-13	-18.22	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-56.01	2.91	27.68	-31.24	-13	-18.24	Horizontal
3490.0	-49.59	2.91	27.68	-24.82	-13	-11.82	Vertical
5235.0	-55.88	5.26	35.86	-25.28	-13	-12.28	Vertical
5235.0	-56.90	5.26	35.86	-26.30	-13	-13.30	Horizontal
100.0	-42.64	1.66	17.76	-26.54	-13	-13.54	Vertical
108.5	-42.67	1.50	17.09	-27.08	-13	-14.08	Horizontal

Note: P<sub>Mea</sub>(dBm)= Power(dBm)+ ARpl (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.

9.3 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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-52.46	2.78	27.50	-27.74	-13	-14.74	Horizontal
1649.4	-44.43	2.78	27.50	-19.71	-13	-6.71	Vertical
2474.1	-46.99	2.90	27.80	-22.09	-13	-9.09	Vertical
2474.1	-48.06	2.90	27.80	-23.16	-13	-10.16	Horizontal
270.6	-42.67	1.31	16.91	-27.07	-13	-14.07	Vertical
189.8	-38.95	1.57	17.30	-23.22	-13	-10.22	Horizontal
<b>Test Results For Mid Channel 836.5MHz</b>							
1673.0	-45.82	2.80	27.48	-21.14	-13	-8.14	Horizontal
1673.0	-48.77	2.80	27.48	-24.09	-13	-11.09	Vertical
2509.5	-44.85	2.91	27.70	-20.06	-13	-7.06	Vertical
2509.5	-41.52	2.91	27.70	-16.73	-13	-3.73	Horizontal
185.1	-43.44	1.67	17.58	-27.53	-13	-14.53	Vertical
176.9	-41.83	1.41	17.61	-25.63	-13	-12.63	Horizontal
<b>Test Results for High Channel 848.3MHz</b>							
1696.6	-46.74	2.82	27.43	-22.13	-13	-9.13	Horizontal
1696.6	-48.35	2.82	27.43	-23.74	-13	-10.74	Vertical
2544.9	-48.56	2.92	27.74	-23.74	-13	-10.74	Vertical
2544.9	-49.34	2.92	27.74	-24.52	-13	-11.52	Horizontal
267.7	-47.79	1.60	16.66	-32.73	-13	-19.73	Vertical
214.4	-47.52	1.75	16.79	-32.48	-13	-19.48	Horizontal

**QPSK EIRP POWER FOR LTE BAND 5 (10MHZ BANDWIDTH)**

Test Results for Low Channel 829MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1658.0	-48.15	2.78	27.50	-23.43	-13	-10.43	Horizontal
1658.0	-44.66	2.78	27.50	-19.94	-13	-6.94	Vertical
2487.0	-50.78	2.90	27.80	-25.88	-13	-12.88	Vertical
2487.0	-42.60	2.90	27.80	-17.70	-13	-4.70	Horizontal
140.2	-42.75	1.61	16.93	-27.43	-13	-14.43	Vertical
218.8	-41.60	1.42	17.12	-25.90	-13	-12.90	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-47.70	2.80	27.48	-23.02	-13	-10.02	Horizontal
1673.0	-45.94	2.80	27.48	-21.26	-13	-8.26	Vertical
2509.5	-45.52	2.91	27.70	-20.73	-13	-7.73	Vertical
2509.5	-44.83	2.91	27.70	-20.04	-13	-7.04	Horizontal
98.6	-40.63	1.75	17.30	-25.08	-13	-12.08	Vertical
117.3	-47.77	1.35	17.91	-31.21	-13	-18.21	Horizontal
Test Results for High Channel 844MHz							
1688.0	-43.93	2.82	27.43	-19.32	-13	-6.32	Horizontal
1688.0	-40.98	2.82	27.43	-16.37	-13	-3.37	Vertical
2532.0	-50.40	2.92	27.74	-25.58	-13	-12.58	Vertical
2532.0	-48.27	2.92	27.74	-23.45	-13	-10.45	Horizontal
154.9	-37.19	1.54	15.47	-23.26	-13	-10.26	Vertical
263.7	-43.44	1.40	16.62	-28.22	-13	-15.22	Horizontal

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

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

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

9.4 LTE BAND 7

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

<b>Test Results for Low Channel 2502.5MHz</b>							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-66.02	5.23	35.81	-35.44	-25	-10.44	Horizontal
5005.0	-63.54	5.23	35.81	-32.96	-25	-7.96	Vertical
7507.5	-69.47	5.67	36.85	-38.29	-25	-13.29	Vertical
7507.5	-67.24	5.67	36.85	-36.06	-25	-11.06	Horizontal
346.9	-51.47	1.63	17.28	-35.82	-25	-10.82	Vertical
384.8	-52.50	1.58	15.43	-38.65	-25	-13.65	Horizontal
<b>Test Results for Mid Channel 2535MHz</b>							
5070.0	-68.36	5.23	35.82	-37.77	-25	-12.77	Horizontal
5070.0	-59.10	5.23	35.82	-28.51	-25	-3.51	Vertical
7605.0	-64.57	5.67	36.85	-33.39	-25	-8.39	Vertical
7605.0	-60.52	5.67	36.85	-29.34	-25	-4.34	Horizontal
238.0	-52.02	1.76	17.25	-36.53	-25	-11.53	Vertical
327.4	-55.41	1.43	17.04	-39.80	-25	-14.80	Horizontal
<b>Test Results for High Channel 2567.5MHz</b>							
5135.0	-68.50	5.24	35.83	-37.91	-25	-12.91	Horizontal
5135.0	-61.29	5.24	35.83	-30.70	-25	-5.70	Vertical
7702.5	-64.36	5.68	36.87	-33.17	-25	-8.17	Vertical
7702.5	-65.66	5.68	36.87	-34.47	-25	-9.47	Horizontal
203.0	-52.87	1.62	16.84	-37.65	-25	-12.65	Vertical
429.1	-56.64	1.62	17.82	-40.44	-25	-15.44	Horizontal

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

Test Results for Low Channel 2510MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020.0	-67.07	5.23	35.82	-36.48	-25	-11.48	Horizontal
5020.0	-72.23	5.23	35.82	-41.64	-25	-16.64	Vertical
7530.0	-64.23	5.67	36.86	-33.04	-25	-8.04	Vertical
7530.0	-67.89	5.67	36.86	-36.70	-25	-11.70	Horizontal
419.6	-60.79	1.60	17.58	-44.81	-25	-19.81	Vertical
361.1	-57.48	1.60	15.56	-43.52	-25	-18.52	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-64.61	5.23	35.82	-34.02	-25	-9.02	Horizontal
5070.0	-70.46	5.23	35.82	-39.87	-25	-14.87	Vertical
7605.0	-68.47	5.67	36.85	-37.29	-25	-12.29	Vertical
7605.0	-63.70	5.67	36.85	-32.52	-25	-7.52	Horizontal
363.1	-53.15	1.55	17.50	-37.20	-25	-12.20	Vertical
272.7	-58.58	1.69	17.99	-42.28	-25	-17.28	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-63.91	5.24	35.83	-33.32	-25	-8.32	Horizontal
5120.0	-65.30	5.24	35.83	-34.71	-25	-9.71	Vertical
7680.0	-66.79	5.70	36.88	-35.61	-25	-10.61	Vertical
7680.0	-62.19	5.70	36.88	-31.01	-25	-6.01	Horizontal
469.2	-54.11	1.80	15.93	-39.98	-25	-14.98	Vertical
515.0	-54.17	1.42	16.55	-39.04	-25	-14.04	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.

9.5 LTE BAND 12

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

Test Results for Low Channel 699.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-50.03	2.60	27.20	-25.43	-13	-12.43	Horizontal
1399.4	-49.82	2.60	27.20	-25.22	-13	-12.22	Vertical
2099.1	-52.68	2.85	27.54	-27.99	-13	-14.99	Vertical
2099.1	-49.95	2.85	27.54	-25.26	-13	-12.26	Horizontal
125.7	-42.08	1.69	16.11	-27.66	-13	-14.66	Vertical
174.3	-42.73	1.80	15.24	-29.29	-13	-16.29	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-46.51	2.61	27.28	-21.84	-13	-8.84	Horizontal
1415.0	-46.32	2.61	27.28	-21.65	-13	-8.65	Vertical
2122.5	-47.13	2.87	27.59	-22.41	-13	-9.41	Vertical
2122.5	-48.83	2.87	27.59	-24.11	-13	-11.11	Horizontal
173.6	-43.49	1.38	15.34	-29.53	-13	-16.53	Vertical
90.5	-40.44	1.56	17.42	-24.58	-13	-11.58	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-47.45	2.63	27.28	-22.80	-13	-9.80	Horizontal
1430.6	-46.95	2.63	27.28	-22.30	-13	-9.30	Vertical
2145.9	-48.90	2.88	27.60	-24.18	-13	-11.18	Vertical
2145.9	-50.24	2.88	27.60	-25.52	-13	-12.52	Horizontal
190.1	-46.26	1.39	15.83	-31.82	-13	-18.82	Vertical
181.2	-39.97	1.70	15.20	-26.47	-13	-13.47	Horizontal

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

<b>Test Results for Low Channel 704MHz</b>							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1408.0	-50.45	2.61	27.26	-25.80	-13	-12.80	Horizontal
1408.0	-44.75	2.61	27.26	-20.10	-13	-7.10	Vertical
2112.0	-51.50	2.87	27.58	-26.79	-13	-13.79	Vertical
2112.0	-47.24	2.87	27.58	-22.53	-13	-9.53	Horizontal
229.2	-45.45	1.63	16.47	-30.61	-13	-17.61	Vertical
236.4	-39.63	1.80	15.48	-25.95	-13	-12.95	Horizontal
<b>Test Results for Mid Channel 707.5MHz</b>							
1415.0	-52.05	2.61	27.28	-27.38	-13	-14.38	Horizontal
1415.0	-48.61	2.61	27.28	-23.94	-13	-10.94	Vertical
2122.5	-43.97	2.87	27.59	-19.25	-13	-6.25	Vertical
2122.5	-41.25	2.87	27.59	-16.53	-13	-3.53	Horizontal
264.5	-43.81	1.77	17.42	-28.16	-13	-15.16	Vertical
250.1	-47.85	1.44	17.04	-32.25	-13	-19.25	Horizontal
<b>Test Results for High Channel 711MHz</b>							
1422.0	-43.16	2.62	27.28	-18.50	-13	-5.50	Horizontal
1422.0	-48.42	2.62	27.28	-23.76	-13	-10.76	Vertical
2133.0	-48.47	2.87	27.60	-23.74	-13	-10.74	Vertical
2133.0	-49.99	2.87	27.60	-25.26	-13	-12.26	Horizontal
277.4	-42.41	1.76	17.59	-26.58	-13	-13.58	Vertical
152.4	-42.60	1.50	16.95	-27.15	-13	-14.15	Horizontal

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

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

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

9.6 LTE BAND 17

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

Test Results for Low Channel 706.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1413.0	-44.95	2.61	27.28	-20.28	-13	-7.28	Horizontal
1413.0	-46.34	2.61	27.28	-21.67	-13	-8.67	Vertical
2119.5	-53.61	2.87	27.59	-28.89	-13	-15.89	Vertical
2119.5	-42.88	2.87	27.59	-18.16	-13	-5.16	Horizontal
139.1	-47.62	1.78	17.49	-31.91	-13	-18.91	Vertical
166.7	-48.47	1.31	17.19	-32.59	-13	-19.59	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-49.64	2.62	27.30	-24.96	-13	-11.96	Horizontal
1420.0	-43.31	2.62	27.30	-18.63	-13	-5.63	Vertical
2130.0	-44.22	2.87	27.62	-19.47	-13	-6.47	Vertical
2130.0	-48.27	2.87	27.62	-23.52	-13	-10.52	Horizontal
277.1	-42.19	1.39	15.27	-28.31	-13	-15.31	Vertical
193.7	-46.69	1.78	17.83	-30.64	-13	-17.64	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-44.75	2.66	27.28	-20.13	-13	-7.13	Horizontal
1427.0	-51.74	2.66	27.28	-27.12	-13	-14.12	Vertical
2140.5	-47.88	2.88	27.60	-23.16	-13	-10.16	Vertical
2140.5	-45.90	2.88	27.60	-21.18	-13	-8.18	Horizontal
257.8	-45.76	1.30	16.46	-30.60	-13	-17.60	Vertical
106.3	-44.03	1.61	16.86	-28.78	-13	-15.78	Horizontal



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

Test Results for Low Channel 709MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1418.0	-45.69	2.62	27.30	-21.01	-13	-8.01	Horizontal
1418.0	-54.24	2.62	27.30	-29.56	-13	-16.56	Vertical
2127.0	-47.36	2.87	27.62	-22.61	-13	-9.61	Vertical
2127.0	-46.39	2.87	27.62	-21.64	-13	-8.64	Horizontal
90.4	-44.92	1.63	15.67	-30.88	-13	-17.88	Vertical
250.8	-48.04	1.54	17.48	-32.10	-13	-19.10	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-48.07	2.62	27.30	-23.39	-13	-10.39	Horizontal
1420.0	-44.39	2.62	27.30	-19.71	-13	-6.71	Vertical
2130.0	-53.79	2.87	27.62	-29.04	-13	-16.04	Vertical
2130.0	-46.55	2.87	27.62	-21.80	-13	-8.80	Horizontal
236.5	-40.40	1.66	16.76	-25.30	-13	-12.30	Vertical
129.5	-37.80	1.69	15.57	-23.92	-13	-10.92	Horizontal
Test Results for High Channel 711MHz							
1422.0	-44.13	2.62	27.30	-19.45	-13	-6.45	Horizontal
1422.0	-49.76	2.62	27.30	-25.08	-13	-12.08	Vertical
2133.0	-50.79	2.87	27.62	-26.04	-13	-13.04	Vertical
2133.0	-45.05	2.87	27.62	-20.30	-13	-7.30	Horizontal
201.6	-39.73	1.35	17.88	-23.20	-13	-10.20	Vertical
147.6	-40.85	1.69	17.76	-24.78	-13	-11.78	Horizontal

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

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

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

## 10. FREQUENCY STABILITY

### RULE PART(S)

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

### LIMITS

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

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

### TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. =  $-30^{\circ}$  to  $+50^{\circ}\text{C}$
- Voltage = low voltage, DC 3.4V, Normal, DC 3.85V 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  
LTE Band 4
- LTE Band 5  
LTE Band 7  
LTE Band 12  
LTE Band 17

## RESULTS

See the following pages.

10.1 LTE BAND 2

QPSK, (20MHz BANDWIDTH)

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
3.4	1880	13.2	0.007000	2.5
3.85	1880	14.0	0.007449	2.5
4.2	1880	13.5	0.007178	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
Normal (25C)	1880	12.4	0.006574	2.5
Extreme (50C)	1880	11.5	0.006094	2.5
Extreme (40C)	1880	14.0	0.007473	2.5
Extreme (30C)	1880	13.4	0.007111	2.5
Extreme (10C)	1880	13.8	0.007360	2.5
Extreme (0C)	1880	12.1	0.006461	2.5
Extreme (-10C)	1880	12.7	0.006771	2.5
Extreme (-20C)	1880	13.6	0.007248	2.5
Extreme (-30C)	1880	15.0	0.007985	2.5

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

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
3.4	1880	9.5	0.005049	2.5
3.85	1880	8.4	0.004485	2.5
4.2	1880	8.4	0.004447	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
Normal (25C)	1880	9.2	0.004897	2.5
Extreme (50C)	1880	9.3	0.004927	2.5
Extreme (40C)	1880	7.8	0.004123566	2.5
Extreme (30C)	1880	9.0	0.004785287	2.5
Extreme (10C)	1880	9.2	0.00486837	2.5
Extreme (0C)	1880	7.9	0.004192944	2.5
Extreme (-10C)	1880	8.6	0.004592013	2.5
Extreme (-20C)	1880	9.0	0.004767356	2.5
Extreme (-30C)	1880	8.1	0.00433034	2.5

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

10.2 LTE BAND 4

QPSK, (10MHz BANDWIDTH)

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
3.4	1732.5	8.9	0.005134	2.5
3.85	1732.5	8.4	0.004856	2.5
4.2	1732.5	8.9	0.005114	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
Normal (25C)	1732.5	8.7	0.005025	2.5
Extreme (50C)	1732.5	8.7	0.005003	2.5
Extreme (40C)	1732.5	7.1	0.004087	2.5
Extreme (30C)	1732.5	5.5	0.003172	2.5
Extreme (10C)	1732.5	7.3	0.004239	2.5
Extreme (0C)	1732.5	9.8	0.005644	2.5
Extreme (-10C)	1732.5	8.9	0.005122	2.5
Extreme (-20C)	1732.5	6.6	0.003829	2.5
Extreme (-30C)	1732.5	8.4	0.004863	2.5

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

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
3.4	1732.5	10.1	0.005823	2.5
3.85	1732.5	8.6	0.004937	2.5
4.2	1732.5	8.5	0.004929	2.5

**Frequency error vs. Temperature**

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
Normal (25C)	1732.5	9.7	0.005579	2.5
Extreme (50C)	1732.5	8.9	0.005152	2.5
Extreme (40C)	1732.5	8.3	0.004783	2.5
Extreme (30C)	1732.5	9.3	0.005391	2.5
Extreme (10C)	1732.5	8.7	0.004998	2.5
Extreme (0C)	1732.5	7.7	0.004443	2.5
Extreme (-10C)	1732.5	9.3	0.005341	2.5
Extreme (-20C)	1732.5	9.3	0.005358	2.5
Extreme (-30C)	1732.5	7.7	0.004455	2.5

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

10.3 LTE BAND 5

QPSK, (10MHz BANDWIDTH)

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
3.4	836.5	5.4	0.006470	2.5
3.85	836.5	6.2	0.007441	2.5
4.2	836.5	4.7	0.005583	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
Normal (25C)	836.5	6.1	0.007283	2.5
Extreme (50C)	836.5	5.5	0.006560	2.5
Extreme (40C)	836.5	5.8	0.006942	2.5
Extreme (30C)	836.5	6.2	0.007421	2.5
Extreme (10C)	836.5	5.5	0.006616	2.5
Extreme (0C)	836.5	5.7	0.006843	2.5
Extreme (-10C)	836.5	5.2	0.006238	2.5
Extreme (-20C)	836.5	5.8	0.006929	2.5
Extreme (-30C)	836.5	6.0	0.007189	2.5

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

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
3.4	836.5	6.0	0.007165	2.5
3.85	836.5	7.0	0.008367	2.5
4.2	836.5	5.1	0.006126	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
Normal (25C)	836.5	6.6	0.007854	2.5
Extreme (50C)	836.5	6.3	0.007550	2.5
Extreme (40C)	836.5	6.5	0.007773	2.5
Extreme (30C)	836.5	6.4	0.007649	2.5
Extreme (10C)	836.5	5.2	0.006221	2.5
Extreme (0C)	836.5	5.0	0.005937	2.5
Extreme (-10C)	836.5	6.0	0.007167	2.5
Extreme (-20C)	836.5	5.7	0.006794	2.5
Extreme (-30C)	836.5	6.8	0.008096	2.5

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



10.4 LTE BAND 7

QPSK, (20MHz BANDWIDTH)

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
3.4	2535	10.1	0.004000	2.5
3.85	2535	9.1	0.003584	2.5
4.2	2535	8.9	0.003494	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
Normal (25C)	2535	9.0	0.003538	2.5
Extreme (50C)	2535	8.6	0.003403	2.5
Extreme (40C)	2535	8.3	0.003259	2.5
Extreme (30C)	2535	8.6	0.003382	2.5
Extreme (10C)	2535	7.9	0.003128	2.5
Extreme (0C)	2535	8.8	0.003479	2.5
Extreme (-10C)	2535	9.3	0.003668	2.5
Extreme (-20C)	2535	9.2	0.003616	2.5
Extreme (-30C)	2535	8.1	0.003207	2.5

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

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
3.4	2535	6.9	0.002722	2.5
3.85	2535	6.0	0.002369	2.5
4.2	2535	5.3	0.002081	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
Normal (25C)	2535	6.9	0.002722	2.5
Extreme (50C)	2535	6.0	0.002386	2.5
Extreme (40C)	2535	5.6	0.002198	2.5
Extreme (30C)	2535	7.0	0.002748	2.5
Extreme (10C)	2535	5.9	0.002324	2.5
Extreme (0C)	2535	5.2	0.002033	2.5
Extreme (-10C)	2535	5.2	0.002047	2.5
Extreme (-20C)	2535	5.7	0.002259	2.5
Extreme (-30C)	2535	5.7	0.002262	2.5

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

10.5 LTE BAND 12

QPSK, (10MHz BANDWIDTH)

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
3.4	707.5	8.9	0.012511	2.5
3.85	707.5	9.7	0.013701	2.5
4.2	707.5	9.1	0.012799	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
Normal (25C)	707.5	8.4	0.011863	2.5
Extreme (50C)	707.5	7.2	0.010169	2.5
Extreme (40C)	707.5	7.6	0.010697	2.5
Extreme (30C)	707.5	8.4	0.011823	2.5
Extreme (10C)	707.5	7.3	0.010258	2.5
Extreme (0C)	707.5	9.1	0.012809	2.5
Extreme (-10C)	707.5	8.9	0.012559	2.5
Extreme (-20C)	707.5	9.3	0.013204	2.5
Extreme (-30C)	707.5	7.5	0.010572	2.5

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

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 12 16QAM, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
3.4	707.5	7.4	0.010482	2.5
3.85	707.5	8.2	0.011622	2.5
4.2	707.5	7.0	0.009843	2.5

**Frequency error vs. Temperature**

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

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

10.6 LTE BAND 17

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
3.4	710.0	9.7	0.013697	2.5
3.85	710.0	8.7	0.012278	2.5
4.2	710.0	8.5	0.011930	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
Normal (25C)	710.0	9.9	0.013996	2.5
Extreme (50C)	710.0	8.6	0.012089	2.5
Extreme (40C)	710.0	8.0	0.011336	2.5
Extreme (30C)	710.0	8.8	0.012385	2.5
Extreme (10C)	710.0	9.0	0.012648	2.5
Extreme (0C)	710.0	7.7	0.010849	2.5
Extreme (-10C)	710.0	8.5	0.012034	2.5
Extreme (-20C)	710.0	8.6	0.012105	2.5
Extreme (-30C)	710.0	8.4	0.011837	2.5

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

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 17 16QAM, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
3.4	710.0	10.5	0.014769	2.5
3.85	710.0	9.1	0.012863	2.5
4.2	710.0	8.5	0.012028	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)</b>				
Normal (25C)	710.0	8.9	0.012550	2.5
Extreme (50C)	710.0	9.3	0.013079	2.5
Extreme (40C)	710.0	8.8	0.012443	2.5
Extreme (30C)	710.0	9.0	0.012706	2.5
Extreme (10C)	710.0	8.4	0.011850	2.5
Extreme (0C)	710.0	8.1	0.011371	2.5
Extreme (-10C)	710.0	9.9	0.013877	2.5
Extreme (-20C)	710.0	9.4	0.013236	2.5
Extreme (-30C)	710.0	8.3	0.011749	2.5

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

## 11. Peak-to-Average Ratio

### 11.1 Description of the PAR Measurement

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

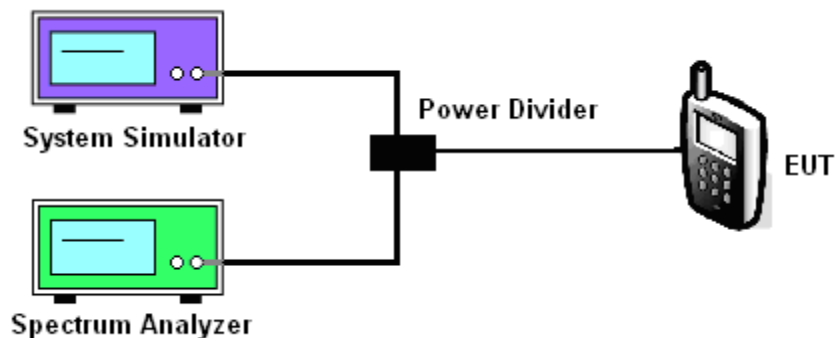
### 11.2 Measuring Instruments

See list of measuring instruments of this test report.

### 11.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. For GSM/EGPRS operating modes:
  - a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
  - b. Set EUT in maximum power output, and triggered the burst signal.
  - c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.
4. For UMTS operating modes:
  - a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
  - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

### 11.4 Test Setup



#### MODES TESTED

- LTE Band 2/4/5/7/12/17
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Test data reference attachment.

----END OF REPORT----