

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

FCC ID: 2AOWK-5002

Product: 5G Smart Phone

Trade Mark: ulefone

Model Number: GQ5002

Family Model: Armor 12 5G, Armor 12T 5G, Armor 12P 5G,
Armor 12E 5G, Armor 12S 5G, Armor 10 5G,
Armor 11 5G, Armor 11T 5G, Armor 13 5G

Report No.: STR210706002006E

Prepared for

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Prepared by

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TEST RESULT CERTIFICATION

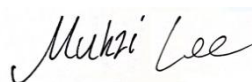
Applicant's name :	Shenzhen Gotron Electronic CO.,LTD.
Address :	7B01, Building A, Block 1, Anhongji Tianyao Plaza, Longhua District, Shenzhen City, Guangdong Province China
Manufacturer's Name :	Shenzhen Gotron Electronic CO.,LTD.
Address :	7B01, Building A, Block 1, Anhongji Tianyao Plaza, Longhua District, Shenzhen City, Guangdong Province China
Product name :	5G Smart Phone
Model and/or type reference :	GQ5002
Family Model:	Armor 12 5G, Armor 12T 5G, Armor 12P 5G, Armor 12E 5G, Armor 12S 5G, Armor 10 5G, Armor 11 5G, Armor 11T 5G, Armor 13 5G
Standards :	FCC CFR 47 Part 22H, Part 24E, Part 27
Test procedure :	ANSI C63.26:2015 ANSI/TIA-603-E-2016

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

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Date of Test :	
Date (s) of performance of tests :	Jul 06. 2021 ~Sep 07, 2021
Date of Issue :	Sep 07, 2021
Test Result :	Pass

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:	5G Smart Phone
Trade Mark	ulefone
Model Name	GQ5002
Family Model	Armor 12 5G, Armor 12T 5G, Armor 12P 5G, Armor 12E 5G, Armor 12S 5G, Armor 10 5G, Armor 11 5G, Armor 11T 5G, Armor 13 5G
Model Difference	All the model are the same circuit and RF module,except the Model names.
FCC ID:	2AOWK-5002
Frequency Bands:	U.S. Bands: ☒ LTE FDD Band 2, 4, 5, 7, 12, 17
Frequency Range:	LTE FDD Band 2 Uplink: 1850MHz-1910MHz, Downlink: 1930MHz-1990MHz; LTE FDD Band 4 Uplink: 1710MHz-1755MHz, Downlink: 2110MHz-2155MHz; LTE FDD Band 5 Uplink: 824MHz-849MHz, Downlink: 869MHz-894MHz; LTE-FDD Band 7 Uplink: 2500MHz-2570MHz, Downlink: 2620MHz-2690MHz; LTE FDD Band 12 Uplink: 699MHz-716MHz, Downlink: 729MHz-746MHz; LTE FDD Band 17 Uplink: 704MHz-716MHz, Downlink: 734MHz-746MHz;
Type of Modulation:	QPSK/16QAM
Power Class	Class 3
Antenna:	PIFA Antenna
Antenna gain:	Band 2: 0.3dBi, Band 4: 0.3dBi, Band 5: -1.7dBi, Band 7: 0.4dBi, Band 12: -2.6dBi, Band 17: -2.6dBi
Power Supply:	DC 3.85V/ 5180mAh, 19.94Wh from battery or DC 5V from Adapter.
Adapter:	Model: HJ-FC038K7-US Input: AC 100-240V~50/60Hz 0.6A Output: DC 5.0V---3.0A DC 9.0V---2.0A DC 12.0V---1.5A
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.85V) (Note 1)
HW Version	A200-04

SW Version	Armor 12 5G_AH1_EEA_V01
** 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: 2AOWK-5002** 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	$\pm 1.38\text{dB}$
3	RF power, conducted	$\pm 0.16\text{dB}$
4	Spurious emissions, conducted	$\pm 0.21\text{dB}$
5	All emissions, radiated(<1G)	$\pm 4.68\text{dB}$
6	All emissions, radiated(>1G)	$\pm 4.89\text{dB}$
7	Temperature	$\pm 0.5^{\circ}\text{C}$
8	Humidity	$\pm 2\%$
9	Frequency error, conducted	$\pm 0.19\text{ ppm}$

1.5 SPECIAL ACCESSORIES

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

1.6 WORST-CASE CONFIGURATION AND MODE

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

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

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

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

1.6 SUMMARY OF TEST RESULTS

FCC Part22, Subpart H/ FCC Part24, Subpart E, FCC Part27, Subpart L, KDB 971168 D01 Power Meas License Digital Systems v03			
FCC Rule	Test Item	Verdict	Remark
2.1046	Conducted Output Power	PASS	
22.913(d) 24.232(d) 27.50(d)(5) KDB 971168 D01 Clause 5.7	Peak-to-Average Ratio	PASS	
2.1049 22.917(b) 24.238(b) KDB 971168 D01 Clause 4.2	Occupied Bandwidth	PASS	
2.1051 22.917(a) 24.238(a) 27.53(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	5G Smart Phone	GQ5002	FCC ID: 2AOWK-5002	EUT

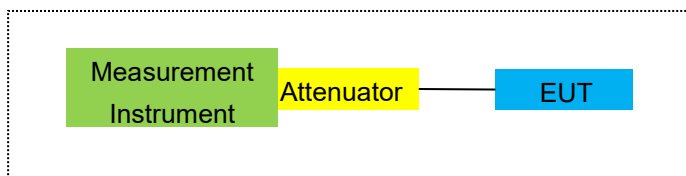
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

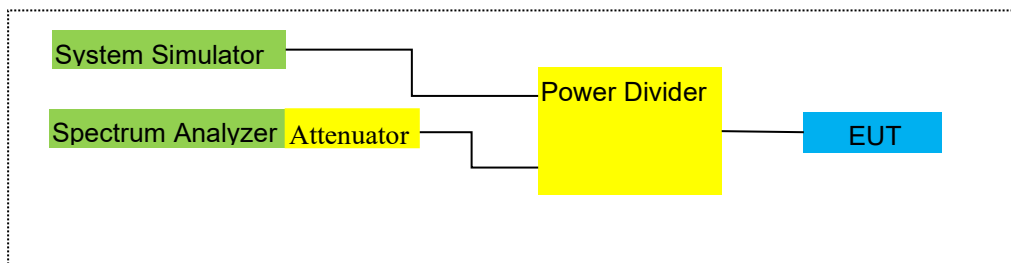
For Radiated Test Cases



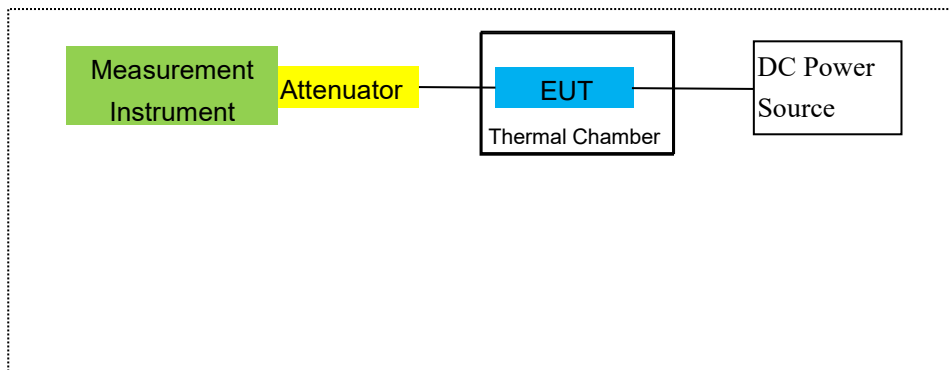
For Conducted Output Power



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 2021.07.01	2021.07.12 2022.06.30	1 year
2	Test Receiver	R&S	ESPI	101318	2021.04.27	2022.04.26	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2021.03.29	2022.03.28	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2020.05.11	2023.05.10	3 year
5	Horn Antenna	EM	EM-AH-1018 0	2011071402	2021.03.29	2022.03.28	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2020.11.20	2021.11.19	1 year
7	Amplifier	EM	EM-30180	060538	2020.07.13 2021.07.01	2021.07.12 2022.06.30	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2021.04.27	2022.04.26	1 year
9	Power Meter	R&S	NRVS	100696	2020.07.13 2021.07.01	2021.07.12 2022.06.30	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.0 5	2021.04.27	2022.04.26	1 year
11	Test Cable	N/A	R-01	N/A	2019.08.06	2022.08.05	3 year
12	Test Cable	N/A	R-02	N/A	2019.08.06	2022.08.05	3 year
13	Test Cable	N/A	R-03	N/A	2019.06.28	2022.06.27	3 year
14	Test Receiver	R&S	ESCI	101160	2021.04.27	2022.04.26	1 year
15	LISN	R&S	ENV216	101313	2021.04.27	2022.04.26	1 year
16	LISN	EMCO	3816/2	00042990	2021.04.27	2022.04.26	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2021.04.27	2022.04.26	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2021.04.27	2022.04.26	1 year
19	Test Cable	N/A	C01	N/A	2020.05.11	2023.05.10	3 year
20	Test Cable	N/A	C02	N/A	2020.05.11	2023.05.10	3 year
21	Test Cable	N/A	C03	N/A	2020.05.11	2023.05.10	3 year
22	Attenuator	MCE	24-10-34	BN9258	2021.07.01	2022.06.30	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2021.04.27	2022.04.26	1 year
24	test receiver	R&S	ESCI	a0304218	2021.04.27	2022.04.26	1 year
25	Communication Tester	R&S	CMU200	A0304247	2020.07.13 2021.07.01	2021.07.12 2022.06.30	1 year

26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2021.04.27	2022.04.26	1 year
27	DC Power Source	N/A	PS-6005D	20170402923	2020.05.11	2023.05.10	3 year
28	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2020.07.13	2021.07.12	1 year
					2021.07.01	2022.06.30	
29	Communication Tester	R&S	CMW500	148500	2020.07.13	2021.07.12	1 year
					2021.07.01	2022.06.30	

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	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50	≤ 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 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 ¹	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.

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

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.

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
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/R B SIZE	Frequenc y	Result						Conclusio n
			SG Level (dBm)	Cable Loss (dBm)	Antenn a Gain (dB)	Max. EIRP Averag e (dBm)	Max. EIRP	Polarizatio n Of Max. ERP	
							Averag e		
							(mW)		
1.4MHz Band QPSK	1/#Mid	1850.7	-6.30	3.76	28.24	18.18	65.766	Horizontal	Pass
		1880	-6.12	3.91	28.22	18.19	65.917	Horizontal	Pass
		1909.3	-6.15	3.93	28.20	18.12	64.863	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-6.38	3.77	28.23	18.08	64.269	Horizontal	Pass
		1880	-6.21	3.91	28.24	18.12	64.863	Horizontal	Pass
		1908.5	-6.20	3.94	28.25	18.11	64.714	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-6.35	3.77	28.31	18.19	65.917	Horizontal	Pass
		1880	-6.27	3.91	28.22	18.04	63.680	Horizontal	Pass
		1907.5	-6.11	3.94	28.20	18.15	65.313	Horizontal	Pass
10.0MH z Band QPSK	1/#Mid	1855	-6.48	3.79	28.33	18.06	63.973	Horizontal	Pass
		1880	-6.11	3.95	28.22	18.16	65.464	Horizontal	Pass
		1905	-6.10	3.97	28.19	18.12	64.863	Horizontal	Pass
15.0MH z Band QPSK	1/#Mid	1857.5	-6.37	3.79	28.34	18.18	65.766	Horizontal	Pass
		1880	-6.21	3.95	28.22	18.06	63.973	Horizontal	Pass
		1902.5	-6.12	3.97	28.18	18.09	64.417	Horizontal	Pass
20.0MH z Band QPSK	1/#Mid	1860	-6.40	3.81	28.35	18.14	65.163	Horizontal	Pass
		1880	-6.08	3.96	28.22	18.18	65.766	Horizontal	Pass
		1900	-5.98	4.00	28.16	18.18	65.766	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-6.32	3.76	28.24	18.16	65.464	Vertical	Pass
		1880	-6.15	3.91	28.22	18.16	65.464	Vertical	Pass
		1909.3	-6.16	3.93	28.20	18.11	64.714	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-6.33	3.77	28.23	18.13	65.013	Vertical	Pass
		1880	-6.17	3.91	28.24	18.16	65.464	Vertical	Pass
		1908.5	-6.18	3.94	28.25	18.13	65.013	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-6.47	3.77	28.31	18.07	64.121	Vertical	Pass
		1880	-6.14	3.91	28.22	18.17	65.615	Vertical	Pass
		1907.5	-6.22	3.94	28.20	18.04	63.680	Vertical	Pass
10.0MH z Band	1/#Mid	1855	-6.37	3.79	28.33	18.17	65.615	Vertical	Pass
		1880	-6.22	3.95	28.22	18.05	63.826	Vertical	Pass

QPSK		1905	-6.17	3.97	28.19	18.05	63.826	Vertical	Pass
15.0MH	1/#Mid	1857.5	-6.44	3.79	28.34	18.11	64.714	Vertical	Pass
z Band		1880	-6.12	3.95	28.22	18.15	65.313	Vertical	Pass
QPSK		1902.5	-6.09	3.97	28.18	18.12	64.863	Vertical	Pass
20.0MH	1/#Mid	1860	-6.48	3.81	28.35	18.06	63.973	Vertical	Pass
z Band		1880	-6.22	3.96	28.22	18.04	63.680	Vertical	Pass
QPSK		1900	-5.96	4.00	28.16	18.20	66.069	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP	Polarization Of Max. ERP	
							Average (mW)		
1.4MHz Band 16 QAM	1/#Mid	1850.7	-7.36	3.76	28.24	17.12	51.523	Horizontal	Pass
		1880	-7.22	3.91	28.22	17.09	51.168	Horizontal	Pass
		1909.3	-7.15	3.93	28.20	17.12	51.523	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-7.32	3.77	28.23	17.14	51.761	Horizontal	Pass
		1880	-7.23	3.91	28.24	17.10	51.286	Horizontal	Pass
		1908.5	-7.12	3.94	28.25	17.19	52.360	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-7.43	3.77	28.31	17.11	51.404	Horizontal	Pass
		1880	-7.13	3.91	28.22	17.18	52.240	Horizontal	Pass
		1907.5	-7.23	3.94	28.20	17.03	50.466	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-7.39	3.79	28.33	17.15	51.880	Horizontal	Pass
		1880	-7.12	3.95	28.22	17.15	51.880	Horizontal	Pass
		1905	-7.05	3.97	28.19	17.17	52.119	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-7.47	3.79	28.34	17.08	51.050	Horizontal	Pass
		1880	-7.08	3.95	28.22	17.19	52.360	Horizontal	Pass
		1902.5	-7.15	3.97	28.18	17.06	50.816	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-7.40	3.81	28.35	17.14	51.761	Horizontal	Pass
		1880	-7.09	3.96	28.22	17.17	52.119	Horizontal	Pass
		1900	-7.06	4.00	28.16	17.10	51.286	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-7.33	3.76	28.24	17.15	51.880	Vertical	Pass
		1880	-7.18	3.91	28.22	17.13	51.642	Vertical	Pass
		1909.3	-7.12	3.93	28.20	17.15	51.880	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-7.30	3.77	28.23	17.16	52.000	Vertical	Pass
		1880	-7.18	3.91	28.24	17.15	51.880	Vertical	Pass
		1908.5	-7.16	3.94	28.25	17.15	51.880	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-7.42	3.77	28.31	17.12	51.523	Vertical	Pass
		1880	-7.11	3.91	28.22	17.20	52.481	Vertical	Pass
		1907.5	-7.17	3.94	28.20	17.09	51.168	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-7.40	3.79	28.33	17.14	51.761	Vertical	Pass
		1880	-7.21	3.95	28.22	17.06	50.816	Vertical	Pass
		1905	-7.11	3.97	28.19	17.11	51.404	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-7.48	3.79	28.34	17.07	50.933	Vertical	Pass
		1880	-7.20	3.95	28.22	17.07	50.933	Vertical	Pass
		1902.5	-7.12	3.97	28.18	17.09	51.168	Vertical	Pass

20.0MHz Band 16 QAM	1/#Mid	1860	-7.44	3.81	28.35	17.10	51.286	Vertical	Pass
		1880	-7.16	3.96	28.22	17.10	51.286	Vertical	Pass
		1900	-7.10	4.00	28.16	17.06	50.816	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/R B SIZE	Frequenc y	Result						Conclusio n
			SG Level (dBm)	Cable Loss (dBm)	Antenn a Gain (dB)	Max. EIRP	Max. EIRP	Polarizatio n Of Max. ERP	
						Averag e	Averag e		
			(dBm)			(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-2.55	3.12	27.58	21.91	155.239	Horizontal	Pass
		1732.5	-2.43	3.27	27.61	21.91	155.239	Horizontal	Pass
		1754.3	-2.37	3.29	27.63	21.97	157.398	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-2.56	3.13	27.61	21.92	155.597	Horizontal	Pass
		1732.5	-2.40	3.27	27.61	21.94	156.315	Horizontal	Pass
		1753.5	-2.36	3.30	27.62	21.96	157.036	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.54	3.13	27.63	21.96	157.036	Horizontal	Pass
		1732.5	-2.41	3.27	27.61	21.93	155.955	Horizontal	Pass
		1752.5	-2.43	3.30	27.60	21.87	153.815	Horizontal	Pass
10.0MH z Band QPSK	1/#Mid	1715	-2.53	3.15	27.64	21.96	157.036	Horizontal	Pass
		1732.5	-2.43	3.31	27.61	21.87	153.815	Horizontal	Pass
		1750	-2.26	3.33	27.59	22.00	158.489	Horizontal	Pass
15.0MH z Band QPSK	1/#Mid	1717.5	-2.50	3.15	27.65	22.00	158.489	Horizontal	Pass
		1732.5	-2.42	3.31	27.61	21.88	154.170	Horizontal	Pass
		1747.5	-2.34	3.33	27.57	21.90	154.882	Horizontal	Pass
20.0MH z Band QPSK	1/#Mid	1720	-2.53	3.17	27.66	21.96	157.036	Horizontal	Pass
		1732.5	-2.33	3.32	27.61	21.96	157.036	Horizontal	Pass
		1745	-2.31	3.36	27.56	21.89	154.525	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-2.60	3.12	27.58	21.86	153.462	Vertical	Pass
		1732.5	-2.34	3.27	27.61	22.00	158.489	Vertical	Pass
		1754.3	-2.36	3.29	27.63	21.98	157.761	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-2.56	3.13	27.61	21.92	155.597	Vertical	Pass
		1732.5	-2.43	3.27	27.61	21.91	155.239	Vertical	Pass
		1753.5	-2.38	3.30	27.62	21.94	156.315	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.65	3.13	27.63	21.85	153.109	Vertical	Pass
		1732.5	-2.44	3.27	27.61	21.90	154.882	Vertical	Pass
		1752.5	-2.44	3.30	27.60	21.86	153.462	Vertical	Pass
10.0MH z Band	1/#Mid	1715	-2.51	3.15	27.64	21.98	157.761	Vertical	Pass
		1732.5	-2.34	3.31	27.61	21.96	157.036	Vertical	Pass

QPSK		1750	-2.33	3.33	27.59	21.93	155.955	Vertical	Pass
15.0MH	1/#Mid	1717.5	-2.65	3.15	27.65	21.85	153.109	Vertical	Pass
z Band		1732.5	-2.38	3.31	27.61	21.92	155.597	Vertical	Pass
QPSK		1747.5	-2.32	3.33	27.57	21.92	155.597	Vertical	Pass
20.0MH	1/#Mid	1720	-2.56	3.17	27.66	21.93	155.955	Vertical	Pass
z Band		1732.5	-2.37	3.32	27.61	21.92	155.597	Vertical	Pass
QPSK		1745	-2.37	3.36	27.56	21.83	152.405	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
						Average (dBm)	Average (mW)		
1.4MHz Band 16 QAM	1/#Mid	1710.7	-3.08	3.12	27.58	21.38	137.404	Horizontal	Pass
		1732.5	-2.97	3.27	27.61	21.37	137.088	Horizontal	Pass
		1754.3	-3.07	3.29	27.63	21.27	133.968	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-3.10	3.13	27.61	21.38	137.404	Horizontal	Pass
		1732.5	-3.02	3.27	27.61	21.32	135.519	Horizontal	Pass
		1753.5	-3.00	3.30	27.62	21.32	135.519	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-3.18	3.13	27.63	21.32	135.519	Horizontal	Pass
		1732.5	-3.11	3.27	27.61	21.23	132.739	Horizontal	Pass
		1752.5	-2.93	3.30	27.60	21.37	137.088	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-3.11	3.15	27.64	21.38	137.404	Horizontal	Pass
		1732.5	-2.93	3.31	27.61	21.37	137.088	Horizontal	Pass
		1750	-2.91	3.33	27.59	21.35	136.458	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-3.26	3.15	27.65	21.24	133.045	Horizontal	Pass
		1732.5	-3.05	3.31	27.61	21.25	133.352	Horizontal	Pass
		1747.5	-2.99	3.33	27.57	21.25	133.352	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-3.11	3.17	27.66	21.38	137.404	Horizontal	Pass
		1732.5	-3.02	3.32	27.61	21.27	133.968	Horizontal	Pass
		1745	-2.97	3.36	27.56	21.23	132.739	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-3.07	3.12	27.58	21.39	137.721	Vertical	Pass
		1732.5	-3.00	3.27	27.61	21.34	136.144	Vertical	Pass
		1754.3	-3.04	3.29	27.63	21.30	134.896	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-3.17	3.13	27.61	21.31	135.207	Vertical	Pass
		1732.5	-2.95	3.27	27.61	21.39	137.721	Vertical	Pass
		1753.5	-2.97	3.30	27.62	21.35	136.458	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-3.28	3.13	27.63	21.22	132.434	Vertical	Pass
		1732.5	-3.02	3.27	27.61	21.32	135.519	Vertical	Pass
		1752.5	-3.03	3.30	27.60	21.27	133.968	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-3.18	3.15	27.64	21.31	135.207	Vertical	Pass
		1732.5	-2.95	3.31	27.61	21.35	136.458	Vertical	Pass
		1750	-2.88	3.33	27.59	21.38	137.404	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-3.18	3.15	27.65	21.32	135.519	Vertical	Pass
		1732.5	-3.06	3.31	27.61	21.24	133.045	Vertical	Pass
		1747.5	-2.98	3.33	27.57	21.26	133.660	Vertical	Pass

20.0MHz Band 16 QAM	1/#Mid	1720	-3.16	3.17	27.66	21.33	135.831	Vertical	Pass
		1732.5	-2.93	3.32	27.61	21.36	136.773	Vertical	Pass
		1745	-2.87	3.36	27.56	21.33	135.831	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.4 LTE BAND 5

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss (dBm)	Antenna Gain (dB)	Correction	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			(dB)	Average	Average		
							(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	824.7	3.25	2.01	19.68	2.15	18.77	75.336	Horizontal	Pass
		836.5	3.23	2.01	19.77	2.15	18.84	76.560	Horizontal	Pass
		848.3	3.13	2.02	19.82	2.15	18.78	75.509	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	825.5	3.22	2.01	19.70	2.15	18.76	75.162	Horizontal	Pass
		836.5	3.19	2.01	19.77	2.15	18.80	75.858	Horizontal	Pass
		847.5	3.21	2.02	19.81	2.15	18.85	76.736	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	826.5	3.23	2.01	19.71	2.15	18.78	75.509	Horizontal	Pass
		836.5	3.13	2.01	19.77	2.15	18.74	74.817	Horizontal	Pass
		846.5	3.24	2.02	19.79	2.15	18.86	76.913	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	829	3.16	2.01	19.73	2.15	18.73	74.645	Horizontal	Pass
		836.5	3.25	2.01	19.77	2.15	18.86	76.913	Horizontal	Pass
		844	3.16	2.02	19.78	2.15	18.77	75.336	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	824.7	3.25	2.01	19.68	2.15	18.77	75.336	Vertical	Pass
		836.5	3.25	2.01	19.77	2.15	18.86	76.913	Vertical	Pass
		848.3	3.17	2.02	19.82	2.15	18.82	76.208	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	825.5	3.22	2.01	19.70	2.15	18.76	75.162	Vertical	Pass
		836.5	3.24	2.01	19.77	2.15	18.85	76.736	Vertical	Pass
		847.5	3.17	2.02	19.81	2.15	18.81	76.033	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	826.5	3.18	2.01	19.71	2.15	18.73	74.645	Vertical	Pass
		836.5	3.16	2.01	19.77	2.15	18.77	75.336	Vertical	Pass
		846.5	3.18	2.02	19.79	2.15	18.80	75.858	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	829	3.33	2.01	19.73	2.15	18.90	77.625	Vertical	Pass
		836.5	3.15	2.01	19.77	2.15	18.76	75.162	Vertical	Pass
		844	3.26	2.02	19.78	2.15	18.87	77.090	Vertical	Pass

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss (dBm)	Antenna Gain (dB)	Correction	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			(dB)	Average	Average		
							(dBm)	(mW)		
1.4MHz Band 16 QAM	1/#Mid	824.7	2.44	2.01	19.68	2.15	17.96	62.517	Horizontal	Pass
		836.5	2.30	2.01	19.77	2.15	17.91	61.802	Horizontal	Pass
		848.3	2.26	2.02	19.82	2.15	17.91	61.802	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	2.42	2.01	19.70	2.15	17.96	62.517	Horizontal	Pass
		836.5	2.33	2.01	19.77	2.15	17.94	62.230	Horizontal	Pass
		847.5	2.21	2.02	19.81	2.15	17.85	60.954	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	2.38	2.01	19.71	2.15	17.93	62.087	Horizontal	Pass
		836.5	2.32	2.01	19.77	2.15	17.93	62.087	Horizontal	Pass
		846.5	2.35	2.02	19.79	2.15	17.97	62.661	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	829	2.29	2.01	19.73	2.15	17.86	61.094	Horizontal	Pass
		836.5	2.31	2.01	19.77	2.15	17.92	61.944	Horizontal	Pass
		844	2.38	2.02	19.78	2.15	17.99	62.951	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	824.7	2.41	2.01	19.68	2.15	17.93	62.087	Vertical	Pass
		836.5	2.38	2.01	19.77	2.15	17.99	62.951	Vertical	Pass
		848.3	2.30	2.02	19.82	2.15	17.95	62.373	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	2.42	2.01	19.70	2.15	17.96	62.517	Vertical	Pass
		836.5	2.26	2.01	19.77	2.15	17.87	61.235	Vertical	Pass
		847.5	2.31	2.02	19.81	2.15	17.95	62.373	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	2.39	2.01	19.71	2.15	17.94	62.230	Vertical	Pass
		836.5	2.23	2.01	19.77	2.15	17.84	60.814	Vertical	Pass
		846.5	2.32	2.02	19.79	2.15	17.94	62.230	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	829	2.26	2.01	19.73	2.15	17.83	60.674	Vertical	Pass
		836.5	2.36	2.01	19.77	2.15	17.97	62.661	Vertical	Pass
		844	2.24	2.02	19.78	2.15	17.85	60.954	Vertical	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/R B SIZE	Frequenc y	Result						Conclusio n
			SG Level (dBm)	Cable Loss (dBm)	Antenn a Gain (dB)	Max. EIRP	Max. EIRP	Polarizatio n Of Max. ERP	
						Averag e	Averag e		
						(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	-0.60	4.54	27.75	22.61	182.390	Horizontal	Pass
		2535	-0.47	4.69	27.72	22.56	180.302	Horizontal	Pass
		2567.5	-0.33	4.71	27.71	22.67	184.927	Horizontal	Pass
10.0MH z Band QPSK	1/#Mid	2505	-0.59	4.55	27.76	22.62	182.810	Horizontal	Pass
		2535	-0.48	4.69	27.72	22.55	179.887	Horizontal	Pass
		2565	-0.29	4.72	27.70	22.69	185.780	Horizontal	Pass
15.0MH z Band QPSK	1/#Mid	2507.5	-0.63	4.55	27.77	22.59	181.552	Horizontal	Pass
		2535	-0.36	4.69	27.72	22.67	184.927	Horizontal	Pass
		2562.5	-0.39	4.72	27.69	22.58	181.134	Horizontal	Pass
20.0MH z Band QPSK	1/#Mid	2510	-0.60	4.57	27.78	22.61	182.390	Horizontal	Pass
		2535	-0.35	4.73	27.72	22.64	183.654	Horizontal	Pass
		2560	-0.30	4.75	27.68	22.63	183.231	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-0.63	4.54	27.75	22.58	181.134	Vertical	Pass
		2535	-0.46	4.69	27.72	22.57	180.717	Vertical	Pass
		2567.5	-0.44	4.71	27.71	22.56	180.302	Vertical	Pass
10.0MH z Band QPSK	1/#Mid	2505	-0.57	4.55	27.76	22.64	183.654	Vertical	Pass
		2535	-0.43	4.69	27.72	22.60	181.970	Vertical	Pass
		2565	-0.42	4.72	27.70	22.56	180.302	Vertical	Pass
15.0MH z Band QPSK	1/#Mid	2507.5	-0.63	4.55	27.77	22.59	181.552	Vertical	Pass
		2535	-0.34	4.69	27.72	22.69	185.780	Vertical	Pass
		2562.5	-0.29	4.72	27.69	22.68	185.353	Vertical	Pass
20.0MH z Band QPSK	1/#Mid	2510	-0.64	4.57	27.78	22.57	180.717	Vertical	Pass
		2535	-0.44	4.73	27.72	22.55	179.887	Vertical	Pass
		2560	-0.37	4.75	27.68	22.56	180.302	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
						Average (dBm)	Average (mW)		
5.0MHz Band 16 QAM	1/#Mid	2502.5	-1.29	4.54	27.75	21.92	155.597	Horizontal	Pass
		2535	-1.04	4.69	27.72	21.99	158.125	Horizontal	Pass
		2567.5	-1.06	4.71	27.71	21.94	156.315	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-1.33	4.55	27.76	21.88	154.170	Horizontal	Pass
		2535	-1.09	4.69	27.72	21.94	156.315	Horizontal	Pass
		2565	-1.11	4.72	27.70	21.87	153.815	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-1.23	4.55	27.77	21.99	158.125	Horizontal	Pass
		2535	-1.16	4.69	27.72	21.87	153.815	Horizontal	Pass
		2562.5	-1.01	4.72	27.69	21.96	157.036	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-1.32	4.57	27.78	21.89	154.525	Horizontal	Pass
		2535	-1.04	4.73	27.72	21.95	156.675	Horizontal	Pass
		2560	-1.01	4.75	27.68	21.92	155.597	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-1.30	4.54	27.75	21.91	155.239	Vertical	Pass
		2535	-1.16	4.69	27.72	21.87	153.815	Vertical	Pass
		2567.5	-1.14	4.71	27.71	21.86	153.462	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-1.24	4.55	27.76	21.97	157.398	Vertical	Pass
		2535	-1.10	4.69	27.72	21.93	155.955	Vertical	Pass
		2565	-1.13	4.72	27.70	21.85	153.109	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-1.27	4.55	27.77	21.95	156.675	Vertical	Pass
		2535	-1.15	4.69	27.72	21.88	154.170	Vertical	Pass
		2562.5	-1.08	4.72	27.69	21.89	154.525	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-1.26	4.57	27.78	21.95	156.675	Vertical	Pass
		2535	-1.10	4.73	27.72	21.89	154.525	Vertical	Pass
		2560	-0.96	4.75	27.68	21.97	157.398	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.5 LTE BAND 12

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	Of Max. ERP	
							(dBm)	(mW)		
1.4MHz	1/#Mid	699.7	1.39	1.91	19.21	2.15	16.54	45.082	Horizontal	Pass
Band		707.5	1.31	1.91	19.26	2.15	16.51	44.771	Horizontal	Pass
QPSK		715.3	1.33	1.93	19.34	2.15	16.59	45.604	Horizontal	Pass
3.0MHz	1/#Mid	700.5	1.37	1.91	19.21	2.15	16.52	44.875	Horizontal	Pass
Band		707.5	1.38	1.91	19.26	2.15	16.58	45.499	Horizontal	Pass
QPSK		714.5	1.31	1.93	19.34	2.15	16.57	45.394	Horizontal	Pass
5.0MHz	1/#Mid	701.5	1.29	1.91	19.23	2.15	16.46	44.259	Horizontal	Pass
Band		707.5	1.38	1.91	19.26	2.15	16.58	45.499	Horizontal	Pass
QPSK		713.5	1.33	1.92	19.33	2.15	16.59	45.604	Horizontal	Pass
10.0MHz	1/#Mid	704	1.37	1.91	19.25	2.15	16.56	45.290	Horizontal	Pass
Band		707.5	1.32	1.91	19.26	2.15	16.52	44.875	Horizontal	Pass
QPSK		711	1.19	1.92	19.32	2.15	16.44	44.055	Horizontal	Pass
1.4MHz	1/#Mid	699.7	1.42	1.91	19.21	2.15	16.57	45.394	Vertical	Pass
Band		707.5	1.32	1.91	19.26	2.15	16.52	44.875	Vertical	Pass
QPSK		715.3	1.19	1.93	19.34	2.15	16.45	44.157	Vertical	Pass
3.0MHz	1/#Mid	700.5	1.30	1.91	19.21	2.15	16.45	44.157	Vertical	Pass
Band		707.5	1.40	1.91	19.26	2.15	16.60	45.709	Vertical	Pass
QPSK		714.5	1.20	1.93	19.34	2.15	16.46	44.259	Vertical	Pass
5.0MHz	1/#Mid	701.5	1.41	1.91	19.23	2.15	16.58	45.499	Vertical	Pass
Band		707.5	1.35	1.91	19.26	2.15	16.55	45.186	Vertical	Pass
QPSK		713.5	1.17	1.92	19.33	2.15	16.43	43.954	Vertical	Pass
10.0MHz	1/#Mid	704	1.22	1.91	19.25	2.15	16.41	43.752	Vertical	Pass
Band		707.5	1.33	1.91	19.26	2.15	16.53	44.978	Vertical	Pass
QPSK		711	1.24	1.92	19.32	2.15	16.49	44.566	Vertical	Pass

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss (dBm)	Antenna Gain (dB)	Correction	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			(dB)	Average	Average		
							(dBm)	(mW)		
1.4MHz	1/#Mid	699.7	0.00	1.91	19.21	2.15	15.15	32.734	Horizontal	Pass
Band 16		707.5	-0.01	1.91	19.26	2.15	15.19	33.037	Horizontal	Pass
QAM		715.3	0.01	1.93	19.34	2.15	15.27	33.651	Horizontal	Pass
3.0MHz	1/#Mid	700.5	0.01	1.91	19.21	2.15	15.16	32.810	Horizontal	Pass
Band 16		707.5	-0.04	1.91	19.26	2.15	15.16	32.810	Horizontal	Pass
QAM		714.5	-0.01	1.93	19.34	2.15	15.25	33.497	Horizontal	Pass
5.0MHz	1/#Mid	701.5	-0.01	1.91	19.23	2.15	15.16	32.810	Horizontal	Pass
Band 16		707.5	-0.03	1.91	19.26	2.15	15.17	32.885	Horizontal	Pass
QAM		713.5	-0.07	1.92	19.33	2.15	15.19	33.037	Horizontal	Pass
10.0MHz	1/#Mid	704	-0.03	1.91	19.25	2.15	15.16	32.810	Horizontal	Pass
Band 16		707.5	0.00	1.91	19.26	2.15	15.20	33.113	Horizontal	Pass
QAM		711	-0.08	1.92	19.32	2.15	15.17	32.885	Horizontal	Pass
1.4MHz	1/#Mid	699.7	0.10	1.91	19.21	2.15	15.25	33.497	Vertical	Pass
Band 16		707.5	0.08	1.91	19.26	2.15	15.28	33.729	Vertical	Pass
QAM		715.3	-0.10	1.93	19.34	2.15	15.16	32.810	Vertical	Pass
3.0MHz	1/#Mid	700.5	0.02	1.91	19.21	2.15	15.17	32.885	Vertical	Pass
Band 16		707.5	-0.04	1.91	19.26	2.15	15.16	32.810	Vertical	Pass
QAM		714.5	0.00	1.93	19.34	2.15	15.26	33.574	Vertical	Pass
5.0MHz	1/#Mid	701.5	-0.02	1.91	19.23	2.15	15.15	32.734	Vertical	Pass
Band 16		707.5	-0.02	1.91	19.26	2.15	15.18	32.961	Vertical	Pass
QAM		713.5	-0.01	1.92	19.33	2.15	15.25	33.497	Vertical	Pass
10.0MHz	1/#Mid	704	-0.05	1.91	19.25	2.15	15.14	32.659	Vertical	Pass
Band 16		707.5	-0.01	1.91	19.26	2.15	15.19	33.037	Vertical	Pass
QAM		711	-0.07	1.92	19.32	2.15	15.18	32.961	Vertical	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

8.6 LTE BAND 17

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			Level				Average	Average		
			(dBm)				(dBm)	(mW)		
5.0MHz Band QPSK	1/##Mid	706.5	0.88	1.91	19.23	2.15	16.05	40.272	Vertical	Pass
		710	0.95	1.91	19.26	2.15	16.15	41.210	Vertical	Pass
		713.5	0.91	1.92	19.33	2.15	16.17	41.400	Vertical	Pass
10.0MHz Band QPSK	1/##Mid	709	0.96	1.91	19.25	2.15	16.15	41.210	Vertical	Pass
		710	0.88	1.91	19.26	2.15	16.08	40.551	Vertical	Pass
		711	0.89	1.92	19.32	2.15	16.14	41.115	Vertical	Pass
5.0MHz Band QPSK	1/##Mid	706.5	1.02	1.91	19.23	2.15	16.19	41.591	Horizontal	Pass
		710	0.96	1.91	19.26	2.15	16.16	41.305	Horizontal	Pass
		713.5	0.86	1.92	19.33	2.15	16.12	40.926	Horizontal	Pass
10.0MHz Band QPSK	1/##Mid	709	0.98	1.91	19.25	2.15	16.17	41.400	Horizontal	Pass
		710	0.84	1.91	19.26	2.15	16.04	40.179	Horizontal	Pass
		711	0.92	1.92	19.32	2.15	16.17	41.400	Horizontal	Pass

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)				Average	Average		
							(dBm)	(mW)		
5.0MHz Band 16 QAM	1/#Mid	706.5	0.58	1.91	19.23	2.15	15.75	37.584	Vertical	Pass
		710	0.56	1.91	19.26	2.15	15.76	37.670	Vertical	Pass
		713.5	0.50	1.92	19.33	2.15	15.76	37.670	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	709	0.50	1.91	19.25	2.15	15.69	37.068	Vertical	Pass
		710	0.59	1.91	19.26	2.15	15.79	37.931	Vertical	Pass
		711	0.44	1.92	19.32	2.15	15.69	37.068	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	706.5	0.61	1.91	19.23	2.15	15.78	37.844	Horizontal	Pass
		710	0.45	1.91	19.26	2.15	15.65	36.728	Horizontal	Pass
		713.5	0.42	1.92	19.33	2.15	15.68	36.983	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	709	0.52	1.91	19.25	2.15	15.71	37.239	Horizontal	Pass
		710	0.57	1.91	19.26	2.15	15.77	37.757	Horizontal	Pass
		711	0.49	1.92	19.32	2.15	15.74	37.497	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

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

LIMIT

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

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

TEST PROCEDURE

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

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

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

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

- a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than $43 + 10 \log_{10}(p)$, dB; and
- b. for mobile subscriber equipment, the attenuation shall not be less than $43 + 10 \log_{10}(p)$, dB at the channel edges and $55 + 10 \log_{10}(p)$ 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	-44.28	4.04	33.51	-14.81	-13	-1.81	Horizontal
3701.4	-47.53	4.04	33.51	-18.06	-13	-5.06	Vertical
5552.1	-53.64	5.24	35.84	-23.04	-13	-10.04	Vertical
5552.1	-53.91	5.24	35.84	-23.31	-13	-10.31	Horizontal
198.3	-37.65	1.43	16.02	-23.06	-13	-10.06	Vertical
340.8	-39.59	1.30	17.99	-22.90	-13	-9.90	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-46.69	4.04	33.56	-17.17	-13	-4.17	Horizontal
3760.0	-53.68	4.04	33.56	-24.16	-13	-11.16	Vertical
5640.0	-52.13	5.24	35.91	-21.46	-13	-8.46	Vertical
5640.0	-52.67	5.24	35.91	-22.00	-13	-9.00	Horizontal
179.6	-36.05	1.62	16.97	-20.70	-13	-7.70	Vertical
290.3	-36.39	1.74	15.98	-22.16	-13	-9.16	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-44.01	4.04	34.00	-14.05	-13	-1.05	Horizontal
3818.6	-44.47	4.04	34.00	-14.51	-13	-1.51	Vertical
5727.9	-49.73	5.24	36.04	-18.93	-13	-5.93	Vertical
5727.9	-51.79	5.24	36.04	-20.99	-13	-7.99	Horizontal
205.5	-34.24	1.42	17.29	-18.37	-13	-5.37	Vertical
469.5	-41.32	1.50	17.90	-24.91	-13	-11.91	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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720.0	-51.34	4.07	33.54	-21.87	-13	-8.87	Horizontal
3720.0	-46.03	4.07	33.54	-16.56	-13	-3.56	Vertical
5580.0	-44.34	5.28	35.86	-13.76	-13	-0.76	Vertical
5580.0	-51.11	5.28	35.86	-20.53	-13	-7.53	Horizontal
176.3	-44.55	1.58	16.89	-29.23	-13	-16.23	Vertical
271.3	-36.73	1.76	17.26	-21.23	-13	-8.23	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-44.64	4.04	33.56	-15.12	-13	-2.12	Horizontal
3760.0	-53.01	4.04	33.56	-23.49	-13	-10.49	Vertical
5640.0	-51.05	5.24	35.91	-20.38	-13	-7.38	Vertical
5640.0	-50.48	5.24	35.91	-19.81	-13	-6.81	Horizontal
202.8	-40.35	1.46	16.27	-25.54	-13	-12.54	Vertical
353.9	-38.96	1.59	15.15	-25.40	-13	-12.40	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-49.83	4.04	34.00	-19.87	-13	-6.87	Horizontal
3800.0	-50.66	4.04	34.00	-20.70	-13	-7.70	Vertical
5700.0	-50.85	5.24	36.04	-20.05	-13	-7.05	Vertical
5700.0	-49.05	5.24	36.04	-18.25	-13	-5.25	Horizontal
208.1	-40.53	1.36	17.39	-24.49	-13	-11.49	Vertical
308.1	-36.75	1.66	15.39	-23.02	-13	-10.02	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (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)

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-44.97	4.02	29.80	-19.19	-13	-6.19	Horizontal
3421.4	-48.94	4.02	29.80	-23.16	-13	-10.16	Vertical
5132.1	-45.57	5.24	35.84	-14.97	-13	-1.97	Vertical
5132.1	-52.96	5.24	35.84	-22.36	-13	-9.36	Horizontal
212.4	-43.19	1.68	16.04	-28.83	-13	-15.83	Vertical
309.4	-43.75	1.78	17.74	-27.79	-13	-14.79	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-49.42	4.03	30.00	-23.45	-13	-10.45	Horizontal
3465.0	-53.73	4.03	30.00	-27.76	-13	-14.76	Vertical
5197.5	-47.73	5.25	35.86	-17.12	-13	-4.12	Vertical
5197.5	-52.20	5.25	35.86	-21.59	-13	-8.59	Horizontal
206.0	-38.54	1.72	17.69	-22.57	-13	-9.57	Vertical
354.6	-40.42	1.62	16.02	-26.01	-13	-13.01	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-44.48	4.05	30.01	-18.52	-13	-5.52	Horizontal
3508.6	-51.94	4.05	30.01	-25.98	-13	-12.98	Vertical
5262.9	-44.40	5.26	35.86	-13.80	-13	-0.80	Vertical
5262.9	-49.66	5.26	35.86	-19.06	-13	-6.06	Horizontal
179.1	-42.01	1.80	16.69	-27.12	-13	-14.12	Vertical
428.2	-44.67	1.75	16.66	-29.77	-13	-16.77	Horizontal

QPSK EIRP POWER FOR LTE BAND 4 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440.0	-47.56	4.02	29.80	-21.78	-13	-8.78	Horizontal
3440.0	-50.07	4.02	29.80	-24.29	-13	-11.29	Vertical
5160.0	-52.85	5.24	35.84	-22.25	-13	-9.25	Vertical
5160.0	-50.43	5.24	35.84	-19.83	-13	-6.83	Horizontal
206.9	-40.39	1.57	17.26	-24.70	-13	-11.70	Vertical
292.5	-44.20	1.78	16.35	-29.63	-13	-16.63	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-45.50	4.03	30.00	-19.53	-13	-6.53	Horizontal
3465.0	-48.58	4.03	30.00	-22.61	-13	-9.61	Vertical
5197.5	-51.15	5.25	35.86	-20.54	-13	-7.54	Vertical
5197.5	-50.04	5.25	35.86	-19.43	-13	-6.43	Horizontal
191.8	-38.41	1.44	17.95	-21.90	-13	-8.90	Vertical
400.9	-41.06	1.65	16.09	-26.62	-13	-13.62	Horizontal
Test Results for High Channel 1754.3MHz							
3490.0	-52.92	2.91	27.68	-28.15	-13	-15.15	Horizontal
3490.0	-50.10	2.91	27.68	-25.33	-13	-12.33	Vertical
5235.0	-46.78	5.26	35.86	-16.18	-13	-3.18	Vertical
5235.0	-49.77	5.26	35.86	-19.17	-13	-6.17	Horizontal
207.2	-41.15	1.61	16.85	-25.91	-13	-12.91	Vertical
343.9	-41.50	1.61	15.19	-27.92	-13	-14.92	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

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

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

9.3 LTE BAND 5

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

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-44.55	2.78	27.50	-19.83	-13	-6.83	Horizontal
1649.4	-51.45	2.78	27.50	-26.73	-13	-13.73	Vertical
2474.1	-47.33	2.90	27.80	-22.43	-13	-9.43	Vertical
2474.1	-51.33	2.90	27.80	-26.43	-13	-13.43	Horizontal
192.1	-42.59	1.76	17.59	-26.76	-13	-13.76	Vertical
292.6	-34.67	1.63	15.87	-20.43	-13	-7.43	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-47.09	2.80	27.48	-22.41	-13	-9.41	Horizontal
1673.0	-45.63	2.80	27.48	-20.95	-13	-7.95	Vertical
2509.5	-48.82	2.91	27.70	-24.03	-13	-11.03	Vertical
2509.5	-53.10	2.91	27.70	-28.31	-13	-15.31	Horizontal
204.0	-37.81	1.61	15.68	-23.74	-13	-10.74	Vertical
454.1	-42.41	1.59	17.52	-26.49	-13	-13.49	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-53.38	2.82	27.43	-28.77	-13	-15.77	Horizontal
1696.6	-47.34	2.82	27.43	-22.73	-13	-9.73	Vertical
2544.9	-50.19	2.92	27.74	-25.37	-13	-12.37	Vertical
2544.9	-52.11	2.92	27.74	-27.29	-13	-14.29	Horizontal
180.6	-40.96	1.69	16.67	-25.97	-13	-12.97	Vertical
348.8	-39.73	1.70	17.18	-24.25	-13	-11.25	Horizontal

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

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1658.0	-50.45	2.78	27.50	-25.73	-13	-12.73	Horizontal
1658.0	-53.27	2.78	27.50	-28.55	-13	-15.55	Vertical
2487.0	-53.68	2.90	27.80	-28.78	-13	-15.78	Vertical
2487.0	-50.92	2.90	27.80	-26.02	-13	-13.02	Horizontal
194.6	-43.89	1.71	15.57	-30.03	-13	-17.03	Vertical
375.1	-34.89	1.34	16.40	-19.83	-13	-6.83	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-51.70	2.80	27.48	-27.02	-13	-14.02	Horizontal
1673.0	-53.05	2.80	27.48	-28.37	-13	-15.37	Vertical
2509.5	-50.49	2.91	27.70	-25.70	-13	-12.70	Vertical
2509.5	-53.26	2.91	27.70	-28.47	-13	-15.47	Horizontal
192.4	-44.71	1.44	17.04	-29.11	-13	-16.11	Vertical
370.4	-40.02	1.76	17.62	-24.16	-13	-11.16	Horizontal
Test Results for High Channel 848.3MHz							
1688.0	-52.32	2.82	27.43	-27.71	-13	-14.71	Horizontal
1688.0	-49.48	2.82	27.43	-24.87	-13	-11.87	Vertical
2532.0	-49.54	2.92	27.74	-24.72	-13	-11.72	Vertical
2532.0	-53.39	2.92	27.74	-28.57	-13	-15.57	Horizontal
209.2	-36.14	1.74	17.70	-20.18	-13	-7.18	Vertical
242.6	-35.01	1.41	17.46	-18.95	-13	-5.95	Horizontal

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

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

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

9.4 LTE BAND 7

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-60.82	5.23	35.81	-30.24	-25	-5.24	Horizontal
5005.0	-63.29	5.23	35.81	-32.71	-25	-7.71	Vertical
7507.5	-64.96	5.67	36.85	-33.78	-25	-8.78	Vertical
7507.5	-64.59	5.67	36.85	-33.41	-25	-8.41	Horizontal
186.6	-51.26	1.73	17.97	-35.02	-25	-10.02	Vertical
466.3	-48.66	1.38	15.11	-34.93	-25	-9.93	Horizontal
Test Results for Mid Channel 1732.5MHz							
5070.0	-60.19	5.23	35.82	-29.60	-25	-4.60	Horizontal
5070.0	-64.66	5.23	35.82	-34.07	-25	-9.07	Vertical
7605.0	-64.61	5.67	36.85	-33.43	-25	-8.43	Vertical
7605.0	-64.32	5.67	36.85	-33.14	-25	-8.14	Horizontal
193.7	-48.29	1.77	16.17	-33.88	-25	-8.88	Vertical
369.6	-54.60	1.63	15.21	-41.02	-25	-16.02	Horizontal
Test Results for High Channel 1754.3MHz							
5135.0	-62.32	5.24	35.83	-31.73	-25	-6.73	Horizontal
5135.0	-61.39	5.24	35.83	-30.80	-25	-5.80	Vertical
7702.5	-59.25	5.68	36.87	-28.06	-25	-3.06	Vertical
7702.5	-62.87	5.68	36.87	-31.68	-25	-6.68	Horizontal
206.6	-44.85	1.58	17.56	-28.87	-25	-3.87	Vertical
267.9	-53.50	1.45	16.58	-38.37	-25	-13.37	Horizontal

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020.0	-59.67	5.23	35.82	-29.08	-25	-4.08	Horizontal
5020.0	-62.73	5.23	35.82	-32.14	-25	-7.14	Vertical
7530.0	-61.33	5.67	36.86	-30.14	-25	-5.14	Vertical
7530.0	-61.77	5.67	36.86	-30.58	-25	-5.58	Horizontal
203.2	-44.40	1.63	15.76	-30.27	-25	-5.27	Vertical
240.6	-53.14	1.71	15.44	-39.41	-25	-14.41	Horizontal
Test Results for Mid Channel 1732.5MHz							
5070.0	-64.64	5.23	35.82	-34.05	-25	-9.05	Horizontal
5070.0	-63.97	5.23	35.82	-33.38	-25	-8.38	Vertical
7605.0	-63.13	5.67	36.85	-31.95	-25	-6.95	Vertical
7605.0	-61.83	5.67	36.85	-30.65	-25	-5.65	Horizontal
207.5	-45.24	1.79	16.84	-30.18	-25	-5.18	Vertical
308.0	-54.64	1.71	17.64	-38.71	-25	-13.71	Horizontal
Test Results for High Channel 1754.3MHz							
5120.0	-59.33	5.24	35.83	-28.74	-25	-3.74	Horizontal
5120.0	-64.16	5.24	35.83	-33.57	-25	-8.57	Vertical
7680.0	-60.74	5.70	36.88	-29.56	-25	-4.56	Vertical
7680.0	-61.52	5.70	36.88	-30.34	-25	-5.34	Horizontal
193.9	-48.83	1.79	16.84	-33.77	-25	-8.77	Vertical
445.4	-46.47	1.71	17.64	-30.54	-25	-5.54	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.

9.5 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	-53.77	2.60	27.20	-29.17	-13	-16.17	Horizontal
1399.4	-53.14	2.60	27.20	-28.54	-13	-15.54	Vertical
2099.1	-51.71	2.85	27.54	-27.02	-13	-14.02	Vertical
2099.1	-52.78	2.85	27.54	-28.09	-13	-15.09	Horizontal
196.1	-37.91	1.49	17.78	-21.62	-13	-8.62	Vertical
380.4	-44.26	1.36	17.33	-28.29	-13	-15.29	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-45.02	2.61	27.28	-20.35	-13	-7.35	Horizontal
1415.0	-53.48	2.61	27.28	-28.81	-13	-15.81	Vertical
2122.5	-47.80	2.87	27.59	-23.08	-13	-10.08	Vertical
2122.5	-51.21	2.87	27.59	-26.49	-13	-13.49	Horizontal
185.5	-44.80	1.73	15.74	-30.79	-13	-17.79	Vertical
298.0	-43.35	1.62	15.79	-29.18	-13	-16.18	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-46.20	2.63	27.28	-21.55	-13	-8.55	Horizontal
1430.6	-45.86	2.63	27.28	-21.21	-13	-8.21	Vertical
2145.9	-49.80	2.88	27.60	-25.08	-13	-12.08	Vertical
2145.9	-49.38	2.88	27.60	-24.66	-13	-11.66	Horizontal
202.7	-35.16	1.61	18.00	-18.77	-13	-5.77	Vertical
289.1	-41.13	1.45	15.49	-27.10	-13	-14.10	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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1408.0	-46.06	2.61	27.26	-21.41	-13	-8.41	Horizontal
1408.0	-49.98	2.61	27.26	-25.33	-13	-12.33	Vertical
2112.0	-48.98	2.87	27.58	-24.27	-13	-11.27	Vertical
2112.0	-50.34	2.87	27.58	-25.63	-13	-12.63	Horizontal
193.4	-44.70	1.31	16.97	-29.04	-13	-16.04	Vertical
320.3	-41.41	1.65	16.70	-26.36	-13	-13.36	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-50.30	2.61	27.28	-25.63	-13	-12.63	Horizontal
1415.0	-53.64	2.61	27.28	-28.97	-13	-15.97	Vertical
2122.5	-46.21	2.87	27.59	-21.49	-13	-8.49	Vertical
2122.5	-51.66	2.87	27.59	-26.94	-13	-13.94	Horizontal
201.7	-38.45	1.72	17.99	-22.18	-13	-9.18	Vertical
240.5	-39.03	1.73	17.94	-22.82	-13	-9.82	Horizontal
Test Results for High Channel 711MHz							
1422.0	-50.67	2.62	27.28	-26.01	-13	-13.01	Horizontal
1422.0	-49.13	2.62	27.28	-24.47	-13	-11.47	Vertical
2133.0	-47.01	2.87	27.60	-22.28	-13	-9.28	Vertical
2133.0	-52.02	2.87	27.60	-27.29	-13	-14.29	Horizontal
190.3	-36.62	1.58	15.93	-22.27	-13	-9.27	Vertical
434.9	-36.49	1.36	15.59	-22.26	-13	-9.26	Horizontal

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

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	-47.53	2.61	27.28	-22.86	-13	-9.86	Horizontal
1413.0	-47.36	2.61	27.28	-22.69	-13	-9.69	Vertical
2119.5	-46.70	2.87	27.59	-21.98	-13	-8.98	Vertical
2119.5	-53.81	2.87	27.59	-29.09	-13	-16.09	Horizontal
178.4	-41.74	1.71	16.15	-27.30	-13	-14.30	Vertical
385.4	-35.48	1.41	17.32	-19.57	-13	-6.57	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-52.68	2.62	27.30	-28.00	-13	-15.00	Horizontal
1420.0	-49.07	2.62	27.30	-24.39	-13	-11.39	Vertical
2130.0	-45.18	2.87	27.62	-20.43	-13	-7.43	Vertical
2130.0	-49.50	2.87	27.62	-24.75	-13	-11.75	Horizontal
206.9	-44.06	1.42	15.25	-30.24	-13	-17.24	Vertical
307.8	-36.51	1.36	17.19	-20.68	-13	-7.68	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-50.93	2.66	27.28	-26.31	-13	-13.31	Horizontal
1427.0	-51.53	2.66	27.28	-26.91	-13	-13.91	Vertical
2140.5	-45.69	2.88	27.60	-20.97	-13	-7.97	Vertical
2140.5	-52.26	2.88	27.60	-27.54	-13	-14.54	Horizontal
186.9	-44.02	1.32	17.29	-28.05	-13	-15.05	Vertical
433.7	-43.14	1.72	16.89	-27.97	-13	-14.97	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	-50.74	2.62	27.30	-26.06	-13	-13.06	Horizontal
1418.0	-52.21	2.62	27.30	-27.53	-13	-14.53	Vertical
2127.0	-53.43	2.87	27.62	-28.68	-13	-15.68	Vertical
2127.0	-52.46	2.87	27.62	-27.71	-13	-14.71	Horizontal
199.2	-43.90	1.35	16.91	-28.34	-13	-15.34	Vertical
407.9	-40.12	1.62	16.31	-25.43	-13	-12.43	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-52.05	2.62	27.30	-27.37	-13	-14.37	Horizontal
1420.0	-48.77	2.62	27.30	-24.09	-13	-11.09	Vertical
2130.0	-47.32	2.87	27.62	-22.57	-13	-9.57	Vertical
2130.0	-52.67	2.87	27.62	-27.92	-13	-14.92	Horizontal
189.1	-35.74	1.51	17.14	-20.11	-13	-7.11	Vertical
339.1	-36.37	1.77	16.88	-21.26	-13	-8.26	Horizontal
Test Results for High Channel 711MHz							
1422.0	-49.37	2.62	27.30	-24.69	-13	-11.69	Horizontal
1422.0	-52.39	2.62	27.30	-27.71	-13	-14.71	Vertical
2133.0	-45.58	2.87	27.62	-20.83	-13	-7.83	Vertical
2133.0	-49.89	2.87	27.62	-25.14	-13	-12.14	Horizontal
197.2	-35.70	1.78	15.95	-21.53	-13	-8.53	Vertical
320.5	-39.96	1.34	17.95	-23.36	-13	-10.36	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (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 ± 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° to $+50^{\circ}\text{C}$

Voltage = low voltage, DC 3.66V, Normal, DC 3.85V and High voltage, DC 4.43V.

Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to -30°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

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1880	12.6	0.006708	2.5
3.85	1880	13.6	0.007244	2.5
4.2	1880	13.2	0.007020	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	13.0	0.006928	2.5
Extreme (50C)	1880	11.6	0.006178	2.5
Extreme (40C)	1880	13.3	0.007060	2.5
Extreme (30C)	1880	13.8	0.007326	2.5
Extreme (10C)	1880	13.6	0.007249	2.5
Extreme (0C)	1880	11.8	0.006287	2.5
Extreme (-10C)	1880	13.3	0.007073	2.5
Extreme (-20C)	1880	13.9	0.007412	2.5
Extreme (-30C)	1880	14.4	0.007665	2.5

Band 2 16QAM, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1880	9.9	0.005252	2.5
3.85	1880	8.9	0.004708	2.5
4.2	1880	7.9	0.004205	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.2	0.004920	2.5
Extreme (50C)	1880	8.9	0.004748	2.5
Extreme (40C)	1880	8.2	0.004382182	2.5
Extreme (30C)	1880	9.0	0.004800788	2.5
Extreme (10C)	1880	9.0	0.004807367	2.5
Extreme (0C)	1880	8.2	0.004339953	2.5
Extreme (-10C)	1880	9.3	0.004955752	2.5
Extreme (-20C)	1880	9.0	0.004793898	2.5
Extreme (-30C)	1880	8.0	0.004235936	2.5

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

10.2 LTE BAND 4

Band 4 QPSK, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1732.5	8.5	0.004888	2.5
3.85	1732.5	9.0	0.005175	2.5
4.2	1732.5	8.1	0.004696	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.2	0.004741	2.5
Extreme (50C)	1732.5	8.7	0.005047	2.5
Extreme (40C)	1732.5	7.8	0.004483	2.5
Extreme (30C)	1732.5	5.6	0.003253	2.5
Extreme (10C)	1732.5	7.2	0.004176	2.5
Extreme (0C)	1732.5	9.8	0.005646	2.5
Extreme (-10C)	1732.5	7.9	0.004584	2.5
Extreme (-20C)	1732.5	7.0	0.004040	2.5
Extreme (-30C)	1732.5	8.2	0.004738	2.5

Band 4 16QAM, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1732.5	9.6	0.005564	2.5
3.85	1732.5	8.8	0.005081	2.5
4.2	1732.5	8.2	0.004751	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	10.1	0.005830	2.5
Extreme (50C)	1732.5	9.0	0.005175	2.5
Extreme (40C)	1732.5	7.9	0.004585	2.5
Extreme (30C)	1732.5	9.4	0.005449	2.5
Extreme (10C)	1732.5	9.0	0.005201	2.5
Extreme (0C)	1732.5	8.6	0.004950	2.5
Extreme (-10C)	1732.5	9.0	0.005221	2.5
Extreme (-20C)	1732.5	9.1	0.005274	2.5
Extreme (-30C)	1732.5	8.4	0.004836	2.5

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

10.3 LTE BAND 5

Band 5 QPSK, (10MHz BANDWIDTH RB size 50 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	836.5	5.9	0.007083	2.5
3.85	836.5	6.5	0.007758	2.5
4.2	836.5	4.7	0.005580	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	5.8	0.006893	2.5
Extreme (50C)	836.5	5.6	0.006661	2.5
Extreme (40C)	836.5	5.6	0.006738	2.5
Extreme (30C)	836.5	6.2	0.007469	2.5
Extreme (10C)	836.5	5.1	0.006102	2.5
Extreme (0C)	836.5	5.3	0.006280	2.5
Extreme (-10C)	836.5	5.9	0.007097	2.5
Extreme (-20C)	836.5	5.8	0.006977	2.5
Extreme (-30C)	836.5	6.7	0.008039	2.5

Band 5 16QAM, (10MHz BANDWIDTH RB size 50 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	836.5	5.9	0.007079	2.5
3.85	836.5	6.5	0.007830	2.5
4.2	836.5	4.5	0.005436	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.0	0.007216	2.5
Extreme (50C)	836.5	6.1	0.007303	2.5
Extreme (40C)	836.5	5.8	0.006980	2.5
Extreme (30C)	836.5	5.9	0.007084	2.5
Extreme (10C)	836.5	5.5	0.006529	2.5
Extreme (0C)	836.5	5.2	0.006168	2.5
Extreme (-10C)	836.5	6.0	0.007193	2.5
Extreme (-20C)	836.5	5.7	0.006820	2.5
Extreme (-30C)	836.5	6.3	0.007545	2.5

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

10.4 LTE BAND 7

Band 7 QPSK, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	2535	10.1	0.003972	2.5
3.85	2535	8.7	0.003434	2.5
4.2	2535	8.5	0.003347	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	9.8	0.003863	2.5
Extreme (50C)	2535	9.4	0.003707	2.5
Extreme (40C)	2535	8.2	0.003222	2.5
Extreme (30C)	2535	8.7	0.003421	2.5
Extreme (10C)	2535	8.1	0.003182	2.5
Extreme (0C)	2535	8.5	0.003342	2.5
Extreme (-10C)	2535	9.4	0.003702	2.5
Extreme (-20C)	2535	8.7	0.003424	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]
3.4	2535	6.9	0.002722	2.5
3.85	2535	6.4	0.002507	2.5
4.2	2535	5.4	0.002120	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	5.4	0.002128	2.5
Extreme (40C)	2535	5.2	0.002048	2.5
Extreme (30C)	2535	6.9	0.002723	2.5
Extreme (10C)	2535	5.3	0.002098	2.5
Extreme (0C)	2535	5.1	0.001998	2.5
Extreme (-10C)	2535	5.6	0.002214	2.5
Extreme (-20C)	2535	6.4	0.002523	2.5
Extreme (-30C)	2535	6.0	0.002352	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]
3.4	707.5	8.9	0.012574	2.5
3.85	707.5	9.8	0.013783	2.5
4.2	707.5	8.7	0.012250	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.7	0.012242	2.5
Extreme (50C)	707.5	7.5	0.010630	2.5
Extreme (40C)	707.5	7.3	0.010268	2.5
Extreme (30C)	707.5	8.5	0.012064	2.5
Extreme (10C)	707.5	7.1	0.010000	2.5
Extreme (0C)	707.5	8.9	0.012582	2.5
Extreme (-10C)	707.5	7.9	0.011221	2.5
Extreme (-20C)	707.5	9.0	0.012749	2.5
Extreme (-30C)	707.5	7.5	0.010640	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]
3.4	707.5	7.4	0.010400	2.5
3.85	707.5	8.1	0.011387	2.5
4.2	707.5	7.9	0.011126	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
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

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]
3.4	710.0	9.5	0.013338	2.5
3.85	710.0	8.5	0.011924	2.5
4.2	710.0	7.9	0.011142	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	10.2	0.014333	2.5
Extreme (50C)	710.0	8.9	0.012555	2.5
Extreme (40C)	710.0	8.2	0.011574	2.5
Extreme (30C)	710.0	9.4	0.013179	2.5
Extreme (10C)	710.0	9.1	0.012839	2.5
Extreme (0C)	710.0	7.7	0.010867	2.5
Extreme (-10C)	710.0	9.2	0.013016	2.5
Extreme (-20C)	710.0	9.3	0.013121	2.5
Extreme (-30C)	710.0	7.7	0.010827	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]
3.4	710.0	9.8	0.013827	2.5
3.85	710.0	9.3	0.013068	2.5
4.2	710.0	8.9	0.012508	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.2	0.013011	2.5
Extreme (50C)	710.0	9.1	0.012811	2.5
Extreme (40C)	710.0	8.9	0.012474	2.5
Extreme (30C)	710.0	8.6	0.012084	2.5
Extreme (10C)	710.0	8.6	0.012108	2.5
Extreme (0C)	710.0	8.0	0.011265	2.5
Extreme (-10C)	710.0	9.4	0.013224	2.5
Extreme (-20C)	710.0	8.5	0.012015	2.5
Extreme (-30C)	710.0	8.1	0.011382	2.5

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

11. Peak-to-Average Ratio

11.1 Description of the PAR Measurement

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

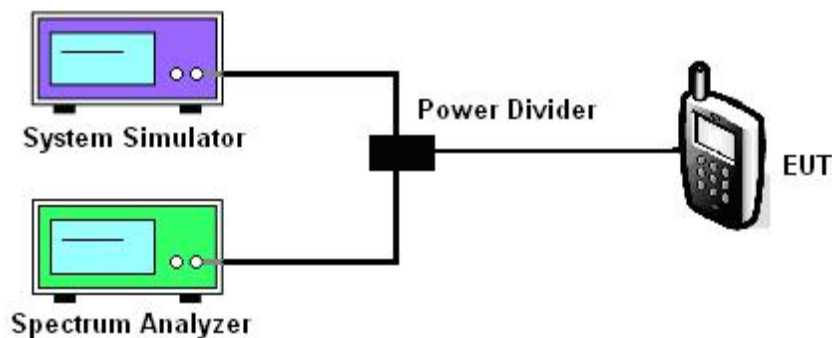
11.2 Measuring Instruments

See list of measuring instruments of this test report.

11.3 Test Procedures

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

11.4 Test Setup



MODES TESTED

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

Test data reference attachment.

----END OF REPORT----