

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

FCC ID: 2AOWK3093

Product: Mobile Phone

Trade Mark: ulefone

Model Number: GQ3093

Family Model: Armor X8, Armor X8S, Armor X8E,
Armor X8P, Armor X8A, Armor X8T,
Armor X8 Pro, Armor X8 lite,
Armor X8 Plus

Report No.: STR200721001006E

Prepared for

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TEST RESULT CERTIFICATION

Applicant's name : Shenzhen Gotron Electronic CO.,LTD.
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Manufacturer's Name : Shenzhen Gotron Electronic CO.,LTD.
Address : 518, 5F, R&D building, Tsinghua Hi-Tech park, Nanshan district, Shenzhen 518057 P.R.China
Product name : Mobile Phone
Model and/or type reference : GQ3093
Family Model: Armor X8, Armor X8S, Armor X8E, Armor X8P, Armor X8A, Armor X8T, Armor X8 Pro, Armor X8 lite, Armor X8 Plus
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 : 21 Jul. 2020 ~ 20 Aug, 2020
Date of Issue : 20 Aug, 2020
Test Result : Pass

Testing Engineer : Mary Hu
(Mary Hu)
Technical Manager : Jason Chen
(Jason Chen)
Authorized Signatory : 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:	Mobile Phone
Trade Mark	ulefone
Model Name	GQ3093
Family Model	Armor X8, Armor X8S, Armor X8E, Armor X8P, Armor X8A, Armor X8T, Armor X8 Pro, Armor X8 lite, Armor X8 Plus
Model Difference	All the model are the same circuit and RF module,except the Model names.
FCC ID:	2AOWK3093
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
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:	Band 2: 0.8dBi, Band 4: 0.8dBi, Band 5: 0.5dBi, Band 7: 0.8dBi, Band 12: 0.4dBi,Band 17: 0.4dBi,
Power Supply:	DC 3.855V/5080mAh from battery or DC 5V from Adapter.
Adapter:	Model: HJ-0502000W2-US Input: 100-240V~50/60Hz 0.3A Output: 5V $\overline{\text{---}}$ 2000mA
Extreme Vol. Limits:	DC 3.4V to DC 4.4V (Nominal DC 3.855V) (Note 1)
HW Version	P2N_02
SW Version	Armor X8_SH1_EEA_V01

** Note1: The High Voltage 4.4V 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: 2AOWK3093** filing to comply with the FCC Part 22H&24E &27.

1.3 TEST METHODOLOGY

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

1.4 TEST FACILITY

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

ShenZhen NTEK Testing Technology Co., Ltd.

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

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

FCC Registration No.:463705

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

MEASUREMENT UNCERTAINTY

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

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

1.5 SPECIAL ACCESSORIES

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

1.6 WORST-CASE CONFIGURATION AND MODE

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

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

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

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

1.6 SUMMARY OF TEST RESULTS

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

2.1051 22.917(a) 24.238(a) 27.53(c)(g)(h)(m) KDB 971168 D01 Clause 6	Conducted Emission	PASS	
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Remark:

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

2. SYSTEM TEST CONFIGURATION

2.1 EUT CONFIGURATION

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

2.2 EUT EXERCISE

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

2.3 CONFIGURATION OF EUT SYSTEM

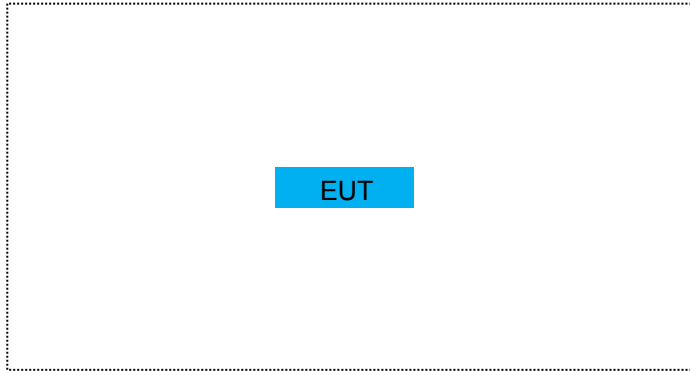
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Mobile Phone	GQ3093	FCC ID: 2AOWK3093	EUT

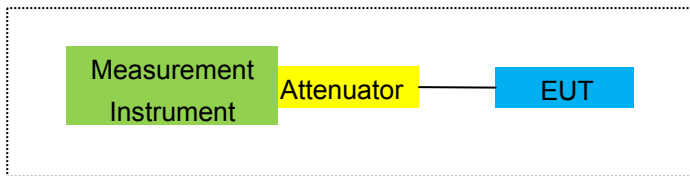
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

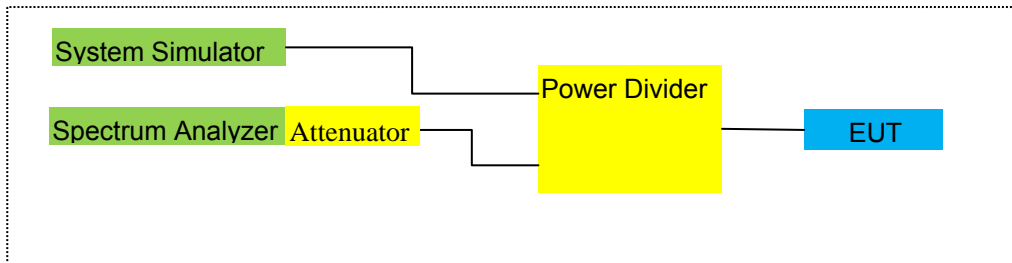
For Radiated Test Cases



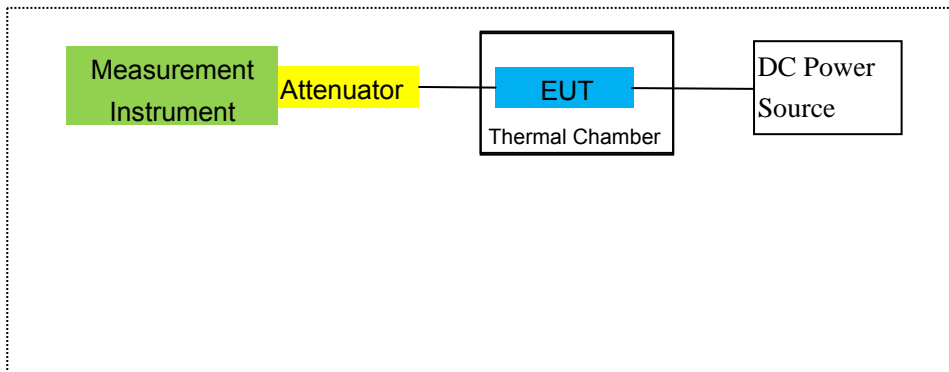
For Conducted Output Power



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	1 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	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	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	3 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	3 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	≤ 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	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	≤ 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 CMW500Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

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

Set display line

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

MODES TESTED

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

RESULTS

Test data reference attachment.

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

7. OUT OF BAND EMISSIONS

RULE PART(S)

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

LIMITS

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

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

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

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

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

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

TEST PROCEDURE

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

For each out of band emissions measurement:

Set display line

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

MODES TESTED

LTE 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.

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 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/ RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1850.7	1.29	3.76	28.24	25.77	377.572	Horizontal	Pass
		1880	1.46	3.91	28.22	25.77	377.572	Horizontal	Pass
		1909.3	1.52	3.93	28.20	25.79	379.315	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	1.32	3.77	28.23	25.78	378.443	Horizontal	Pass
		1880	1.43	3.91	28.24	25.76	376.704	Horizontal	Pass
		1908.5	1.52	3.94	28.25	25.83	382.825	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	1.28	3.77	28.31	25.82	381.944	Horizontal	Pass
		1880	1.62	3.91	28.22	25.93	391.742	Horizontal	Pass
		1907.5	1.66	3.94	28.20	25.92	390.841	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	1.34	3.79	28.33	25.88	387.258	Horizontal	Pass
		1880	1.59	3.95	28.22	25.86	385.478	Horizontal	Pass
		1905	1.65	3.97	28.19	25.87	386.367	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	1.28	3.79	28.34	25.83	382.825	Horizontal	Pass
		1880	1.59	3.95	28.22	25.86	385.478	Horizontal	Pass
		1902.5	1.61	3.97	28.18	25.82	381.944	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	1.49	3.851	28.35	26.03	400.867	Horizontal	Pass
		1880	1.62	3.96	28.22	25.88	387.258	Horizontal	Pass
		1900	1.91	4.00	28.16	26.07	404.576	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-1.56	3.76	28.24	22.92	195.884	Vertical	Pass
		1880	0.30	3.91	28.22	24.61	289.068	Vertical	Pass
		1909.3	0.19	3.93	28.20	24.46	279.254	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	0.22	3.77	28.23	24.68	293.765	Vertical	Pass
		1880	-0.59	3.91	28.24	23.74	236.592	Vertical	Pass
		1908.5	0.23	3.94	28.25	24.54	284.446	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-0.40	3.77	28.31	24.14	259.418	Vertical	Pass
		1880	-1.18	3.91	28.22	23.13	205.589	Vertical	Pass
		1907.5	-0.90	3.94	28.20	23.36	216.770	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	-0.55	3.79	28.33	23.99	250.611	Vertical	Pass
		1880	0.44	3.95	28.22	24.71	295.801	Vertical	Pass
		1905	-0.78	3.97	28.19	23.44	220.800	Vertical	Pass
15.0MHz Band	1/#Mid	1857.5	-0.62	3.79	28.34	23.93	247.172	Vertical	Pass
		1880	-0.17	3.95	28.22	24.10	257.040	Vertical	Pass

QPSK		1902.5	-0.42	3.97	28.18	23.79	239.332	Vertical	Pass
20.0MHz	1/#Mid	1860	-0.57	3.851	28.35	23.97	249.459	Vertical	Pass
Band		1880	-0.97	3.96	28.22	23.49	213.304	Vertical	Pass
QPSK		1900	-0.57	4.00	28.16	23.59	228.560	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 Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1850.7	0.11	3.76	28.24	24.59	287.740	Horizontal	Pass
		1880	0.48	3.91	28.22	24.79	301.301	Horizontal	Pass
		1909.3	0.17	3.93	28.20	24.44	277.971	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	0.50	3.77	28.23	24.96	313.329	Horizontal	Pass
		1880	0.64	3.91	28.24	24.97	314.051	Horizontal	Pass
		1908.5	0.07	3.94	28.25	24.38	274.157	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	0.37	3.77	28.31	24.91	309.742	Horizontal	Pass
		1880	0.90	3.91	28.22	25.21	331.894	Horizontal	Pass
		1907.5	0.76	3.94	28.20	25.02	317.687	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	0.27	3.79	28.33	24.81	302.691	Horizontal	Pass
		1880	0.50	3.95	28.22	24.77	299.916	Horizontal	Pass
		1905	0.26	3.97	28.19	24.48	280.543	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	0.43	3.79	28.34	24.98	314.775	Horizontal	Pass
		1880	0.59	3.95	28.22	24.86	306.196	Horizontal	Pass
		1902.5	0.59	3.97	28.18	24.80	301.995	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	0.18	3.851	28.35	24.72	296.483	Horizontal	Pass
		1880	1.06	3.96	28.22	25.32	340.408	Horizontal	Pass
		1900	0.53	4.00	28.16	24.69	294.442	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-0.74	3.76	28.24	23.74	236.592	Vertical	Pass
		1880	-1.59	3.91	28.22	22.72	187.068	Vertical	Pass
		1909.3	-1.77	3.93	28.20	22.50	177.828	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-2.52	3.77	28.23	21.94	156.315	Vertical	Pass
		1880	-2.10	3.91	28.24	22.23	167.109	Vertical	Pass
		1908.5	-0.85	3.94	28.25	23.46	221.820	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-2.39	3.77	28.31	22.15	164.059	Vertical	Pass
		1880	-0.85	3.91	28.22	23.46	221.820	Vertical	Pass
		1907.5	-1.90	3.94	28.20	22.36	172.187	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-1.46	3.79	28.33	23.08	203.436	Vertical	Pass
		1880	-0.71	3.95	28.22	23.56	226.986	Vertical	Pass
		1905	-1.00	3.97	28.19	23.42	209.894	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-2.07	3.79	28.34	22.48	177.011	Vertical	Pass
		1880	-2.36	3.95	28.22	21.91	155.239	Vertical	Pass
		1902.5	-0.90	3.97	28.18	23.31	214.289	Vertical	Pass

20.0MHz		1860	-2.20	3.851	28.35	22.34	171.396	Vertical	Pass
Band 16	1/#Mid	1880	-1.12	3.96	28.22	23.14	206.063	Vertical	Pass
QAM		1900	-0.72	4.00	28.16	23.44	220.800	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/ RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1#Mid	1710.7	0.77	3.12	27.58	25.23	333.426	Horizontal	Pass
		1732.5	1.02	3.47	27.61	25.36	343.558	Horizontal	Pass
		1754.3	0.83	3.49	27.63	25.17	328.852	Horizontal	Pass
3.0MHz Band QPSK	1#Mid	1711.5	1.00	3.13	27.61	25.48	353.183	Horizontal	Pass
		1732.5	1.07	3.47	27.61	25.41	347.536	Horizontal	Pass
		1753.5	1.09	3.30	27.62	25.41	347.536	Horizontal	Pass
5.0MHz Band QPSK	1#Mid	1712.5	0.79	3.13	27.63	25.29	338.065	Horizontal	Pass
		1732.5	1.02	3.47	27.61	25.36	343.558	Horizontal	Pass
		1752.5	1.02	3.30	27.60	25.32	340.408	Horizontal	Pass
10.0MHz Band QPSK	1#Mid	1715	0.77	3.15	27.64	25.26	335.738	Horizontal	Pass
		1732.5	0.93	3.31	27.61	25.23	333.426	Horizontal	Pass
		1750	1.00	3.33	27.59	25.26	335.738	Horizontal	Pass
15.0MHz Band QPSK	1#Mid	1717.5	0.76	3.15	27.65	25.26	335.738	Horizontal	Pass
		1732.5	1.15	3.31	27.61	25.45	350.752	Horizontal	Pass
		1747.5	1.06	3.33	27.57	25.30	338.844	Horizontal	Pass
20.0MHz Band QPSK	1#Mid	1720	1.12	3.17	27.66	25.61	363.915	Horizontal	Pass
		1732.5	0.98	3.32	27.61	25.27	336.512	Horizontal	Pass
		1745	1.08	3.36	27.56	25.28	337.287	Horizontal	Pass
1.4MHz Band QPSK	1#Mid	1710.7	-1.58	3.12	27.58	22.88	194.089	Vertical	Pass
		1732.5	-0.68	3.47	27.61	23.66	232.274	Vertical	Pass
		1754.3	-0.76	3.49	27.63	23.58	228.034	Vertical	Pass
3.0MHz Band QPSK	1#Mid	1711.5	-1.51	3.13	27.61	22.97	198.153	Vertical	Pass
		1732.5	-0.86	3.47	27.61	23.48	222.844	Vertical	Pass
		1753.5	-0.78	3.30	27.62	23.54	225.944	Vertical	Pass
5.0MHz Band QPSK	1#Mid	1712.5	-1.44	3.13	27.63	23.06	202.302	Vertical	Pass
		1732.5	-1.35	3.47	27.61	22.99	199.067	Vertical	Pass
		1752.5	-0.81	3.30	27.60	23.49	223.357	Vertical	Pass
10.0MHz Band QPSK	1#Mid	1715	-1.15	3.15	27.64	23.34	215.774	Vertical	Pass
		1732.5	-0.55	3.31	27.61	23.75	237.137	Vertical	Pass
		1750	-0.94	3.33	27.59	23.32	214.783	Vertical	Pass
15.0MHz	1#Mid	1717.5	-0.74	3.15	27.65	23.76	237.684	Vertical	Pass

Band		1732.5	-0.98	3.31	27.61	23.32	214.783	Vertical	Pass
QPSK		1747.5	-1.36	3.33	27.57	22.88	194.089	Vertical	Pass
20.0MHz	1/#Mid	1720	-0.97	3.17	27.66	23.52	224.905	Vertical	Pass
Band		1732.5	-1.07	3.32	27.61	23.42	209.894	Vertical	Pass
QPSK		1745	-0.54	3.36	27.56	23.66	232.274	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 Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1710.7	-0.28	3.12	27.58	24.18	261.818	Horizontal	Pass
		1732.5	-0.14	3.47	27.61	24.20	263.027	Horizontal	Pass
		1754.3	-0.03	3.49	27.63	24.31	269.774	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-0.30	3.13	27.61	24.18	261.818	Horizontal	Pass
		1732.5	0.24	3.47	27.61	24.58	287.078	Horizontal	Pass
		1753.5	0.20	3.30	27.62	24.52	283.139	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	0.31	3.13	27.63	24.81	302.691	Horizontal	Pass
		1732.5	0.08	3.47	27.61	24.42	276.694	Horizontal	Pass
		1752.5	0.29	3.30	27.60	24.59	287.740	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-0.48	3.15	27.64	24.01	251.768	Horizontal	Pass
		1732.5	0.14	3.31	27.61	24.44	277.971	Horizontal	Pass
		1750	0.04	3.33	27.59	24.30	269.153	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	0.10	3.15	27.65	24.60	288.403	Horizontal	Pass
		1732.5	-0.03	3.31	27.61	24.27	267.301	Horizontal	Pass
		1747.5	0.16	3.33	27.57	24.40	275.423	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	0.48	3.17	27.66	24.97	314.051	Horizontal	Pass
		1732.5	0.10	3.32	27.61	24.39	274.789	Horizontal	Pass
		1745	0.10	3.36	27.56	24.30	269.153	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-1.82	3.12	27.58	22.64	183.654	Vertical	Pass
		1732.5	-1.56	3.47	27.61	22.78	189.671	Vertical	Pass
		1754.3	-2.03	3.49	27.63	22.31	170.216	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.58	3.13	27.61	21.90	154.882	Vertical	Pass
		1732.5	-2.53	3.47	27.61	21.81	151.705	Vertical	Pass
		1753.5	-1.66	3.30	27.62	22.66	184.502	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-1.93	3.13	27.63	22.57	180.717	Vertical	Pass
		1732.5	-2.26	3.47	27.61	22.08	161.436	Vertical	Pass
		1752.5	-2.18	3.30	27.60	22.12	162.930	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-1.82	3.15	27.64	22.67	184.927	Vertical	Pass
		1732.5	-2.22	3.31	27.61	22.08	161.436	Vertical	Pass
		1750	-1.53	3.33	27.59	22.73	187.499	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-2.46	3.15	27.65	22.04	159.956	Vertical	Pass
		1732.5	-2.20	3.31	27.61	22.10	162.181	Vertical	Pass
		1747.5	-2.25	3.33	27.57	21.99	158.125	Vertical	Pass

20.0MHz		1720	-1.97	3.17	27.66	22.52	178.649	Vertical	Pass
Band 16	1/#Mid	1732.5	-1.52	3.32	27.61	22.77	189.234	Vertical	Pass
QAM		1745	-1.61	3.36	27.56	22.59	181.552	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 Position	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	3/#Mid	824.7	9.58	2.01	19.68	2.15	25.10	323.594	Horizontal	Pass
		836.5	9.54	2.01	19.77	2.15	25.15	327.341	Horizontal	Pass
		848.3	9.20	2.02	19.82	2.15	24.85	305.492	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	825.5	9.77	2.01	19.70	2.15	25.31	339.625	Horizontal	Pass
		836.5	9.60	2.01	19.77	2.15	25.21	331.894	Horizontal	Pass
		847.5	9.38	2.02	19.81	2.15	25.02	317.687	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	826.5	9.66	2.01	19.71	2.15	25.21	331.894	Horizontal	Pass
		836.5	9.64	2.01	19.77	2.15	25.25	334.965	Horizontal	Pass
		846.5	9.47	2.02	19.79	2.15	25.09	322.849	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	829	9.76	2.01	19.73	2.15	25.33	341.193	Horizontal	Pass
		836.5	9.43	2.01	19.77	2.15	25.04	319.154	Horizontal	Pass
		844	9.38	2.02	19.78	2.15	24.99	315.500	Horizontal	Pass

1.4MHz Band QPSK	1/#Mid	824.7	7.88	2.01	19.68	2.15	23.40	218.776	Vertical	Pass
		836.5	7.79	2.01	19.77	2.15	23.40	218.776	Vertical	Pass
		848.3	7.83	2.02	19.82	2.15	23.48	222.844	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	825.5	7.64	2.01	19.70	2.15	23.18	207.970	Vertical	Pass
		836.5	7.07	2.01	19.77	2.15	22.68	185.353	Vertical	Pass
		847.5	7.14	2.02	19.81	2.15	22.78	189.671	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	826.5	7.82	2.01	19.71	2.15	23.37	217.270	Vertical	Pass
		836.5	7.08	2.01	19.77	2.15	22.69	185.780	Vertical	Pass
		846.5	7.01	2.02	19.79	2.15	22.63	183.431	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	829	7.34	2.01	19.73	2.15	22.91	195.434	Vertical	Pass
		836.5	7.48	2.01	19.77	2.15	23.09	203.704	Vertical	Pass
		844	7.14	2.02	19.78	2.15	22.75	188.365	Vertical	Pass

Radiated Power (ERP) for Band 5

Mode	RB/ RB Position	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	3/#Mid	824.7	8.38	2.01	19.68	2.15	23.90	245.471	Horizontal	Pass
		836.5	8.41	2.01	19.77	2.15	24.02	252.348	Horizontal	Pass
		848.3	8.18	2.02	19.82	2.15	23.853	241.546	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	8.34	2.01	19.70	2.15	23.858	244.343	Horizontal	Pass
		836.5	8.80	2.01	19.77	2.15	24.41	276.058	Horizontal	Pass
		847.5	8.42	2.02	19.81	2.15	24.06	254.683	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	8.74	2.01	19.71	2.15	24.29	268.534	Horizontal	Pass
		836.5	8.72	2.01	19.77	2.15	24.33	271.019	Horizontal	Pass
		846.5	8.69	2.02	19.79	2.15	24.31	269.774	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	829	8.94	2.01	19.73	2.15	24.51	282.488	Horizontal	Pass
		836.5	8.67	2.01	19.77	2.15	24.28	267.917	Horizontal	Pass
		844	8.30	2.02	19.78	2.15	23.91	246.037	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	824.7	6.39	2.01	19.68	2.15	21.91	155.239	Vertical	Pass
		836.5	6.64	2.01	19.77	2.15	22.25	167.880	Vertical	Pass
		848.3	5.91	2.02	19.82	2.15	21.56	143.419	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	6.99	2.01	19.70	2.15	22.53	179.061	Vertical	Pass
		836.5	6.66	2.01	19.77	2.15	22.27	168.655	Vertical	Pass
		847.5	7.80	2.02	19.81	2.15	23.44	220.800	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	6.20	2.01	19.71	2.15	21.75	149.624	Vertical	Pass
		836.5	7.84	2.01	19.77	2.15	23.45	221.309	Vertical	Pass
		846.5	7.64	2.02	19.79	2.15	23.46	211.836	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	829	6.40	2.01	19.73	2.15	21.97	157.398	Vertical	Pass
		836.5	7.82	2.01	19.77	2.15	23.43	220.293	Vertical	Pass
		844	6.74	2.02	19.78	2.15	22.35	171.791	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/ RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	1/#Mid	2502.5	-1.56	4.54	27.75	21.65	146.218	Horizontal	Pass
		2535	-0.84	4.69	27.72	22.19	165.577	Horizontal	Pass
		2567.5	-1.30	4.71	27.71	21.70	147.911	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-1.65	4.55	27.76	21.56	143.419	Horizontal	Pass
		2535	-1.15	4.69	27.72	21.88	154.170	Horizontal	Pass
		2565	-1.74	4.72	27.70	21.24	133.045	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-1.46	4.55	27.77	21.76	149.968	Horizontal	Pass
		2535	-1.30	4.69	27.72	21.73	148.936	Horizontal	Pass
		2562.5	-1.59	4.72	27.69	21.38	137.404	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-0.62	4.57	27.78	22.59	181.552	Horizontal	Pass
		2535	-1.36	4.73	27.72	21.63	145.546	Horizontal	Pass
		2560	-1.60	4.75	27.68	21.33	135.831	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-1.95	4.54	27.75	21.26	133.660	Vertical	Pass
		2535	-0.69	4.69	27.72	22.34	171.396	Vertical	Pass
		2567.5	-1.00	4.71	27.71	22.00	158.489	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-2.41	4.55	27.76	20.80	120.226	Vertical	Pass
		2535	-2.11	4.69	27.72	20.92	123.595	Vertical	Pass
		2565	-1.92	4.72	27.70	21.06	127.644	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-1.24	4.55	27.77	21.98	157.761	Vertical	Pass
		2535	-2.05	4.69	27.72	20.98	125.314	Vertical	Pass
		2562.5	-1.56	4.72	27.69	21.41	138.357	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-2.04	4.57	27.78	21.17	130.918	Vertical	Pass
		2535	-2.04	4.73	27.72	20.95	124.451	Vertical	Pass
		2560	-1.92	4.75	27.68	21.01	126.183	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/ RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band 16 QAM	1/#Mid	2502.5	-2.17	4.54	27.75	21.04	127.057	Horizontal	Pass
		2535	-1.29	4.69	27.72	21.74	149.279	Horizontal	Pass
		2567.5	-1.59	4.71	27.71	21.41	138.357	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-2.72	4.55	27.76	20.49	111.944	Horizontal	Pass
		2535	-1.59	4.69	27.72	21.44	139.316	Horizontal	Pass
		2565	-1.82	4.72	27.70	21.16	130.617	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-1.94	4.55	27.77	21.28	134.276	Horizontal	Pass
		2535	-1.77	4.69	27.72	21.26	133.660	Horizontal	Pass
		2562.5	-2.00	4.72	27.69	20.97	125.026	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-1.26	4.57	27.78	21.95	156.675	Horizontal	Pass
		2535	-1.70	4.73	27.72	21.29	134.586	Horizontal	Pass
		2560	-1.95	4.75	27.68	20.98	125.314	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-2.93	4.54	27.75	20.28	106.660	Vertical	Pass
		2535	-1.68	4.69	27.72	21.35	136.458	Vertical	Pass
		2567.5	-1.42	4.71	27.71	21.58	143.8580	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-2.53	4.55	27.76	20.68	116.950	Vertical	Pass
		2535	-2.23	4.69	27.72	20.80	120.226	Vertical	Pass
		2565	-1.59	4.72	27.70	21.39	137.721	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-2.57	4.55	27.77	20.65	116.145	Vertical	Pass
		2535	-1.66	4.69	27.72	21.37	137.088	Vertical	Pass
		2562.5	-2.44	4.72	27.69	20.53	112.980	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-2.31	4.57	27.78	20.90	123.027	Vertical	Pass
		2535	-1.82	4.73	27.72	21.17	130.918	Vertical	Pass
		2560	-2.17	4.75	27.68	20.76	119.124	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 Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	699.7	7.17	1.91	19.21	2.15	22.32	170.608	Vertical
		707.5	6.61	1.91	19.26	2.15	21.81	151.705	Vertical
		715.3	6.59	1.93	19.34	2.15	21.85	153.109	Vertical
3.0MHz Band QPSK	1/#Mid	700.5	7.44	1.91	19.21	2.15	22.59	181.552	Vertical
		707.5	6.74	1.91	19.26	2.15	21.94	156.315	Vertical
		714.5	6.65	1.93	19.34	2.15	21.91	155.239	Vertical
5.0MHz Band QPSK	1/#Mid	701.5	7.34	1.91	19.23	2.15	22.51	178.238	Vertical
		707.5	6.75	1.91	19.26	2.15	21.95	156.675	Vertical
		713.5	6.88	1.92	19.33	2.15	22.14	163.682	Vertical
10.0MHz Band QPSK	1/#Mid	704	7.43	1.91	19.25	2.15	22.62	182.810	Vertical
		707.5	6.74	1.91	19.26	2.15	21.94	156.315	Vertical
		711	6.76	1.92	19.32	2.15	22.01	158.855	Vertical
1.4MHz Band QPSK	1/#Mid	699.7	5.89	1.91	19.21	2.15	21.04	127.057	Horizontal
		707.5	6.21	1.91	19.26	2.15	21.41	138.357	Horizontal
		715.3	6.12	1.93	19.34	2.15	21.38	137.404	Horizontal
3.0MHz Band QPSK	1/#Mid	700.5	6.60	1.91	19.21	2.15	21.75	149.624	Horizontal
		707.5	6.20	1.91	19.26	2.15	21.40	138.038	Horizontal
		714.5	5.58	1.93	19.34	2.15	20.84	121.339	Horizontal
5.0MHz Band QPSK	1/#Mid	701.5	6.58	1.91	19.23	2.15	21.75	149.624	Horizontal
		707.5	7.05	1.91	19.26	2.15	22.25	167.880	Horizontal
		713.5	5.64	1.92	19.33	2.15	20.90	123.027	Horizontal
10.0MHz Band QPSK	1/#Mid	704	6.41	1.91	19.25	2.15	21.60	144.544	Horizontal
		707.5	6.23	1.91	19.26	2.15	21.43	138.995	Horizontal
		711	6.08	1.92	19.32	2.15	21.33	135.831	Horizontal

Radiated Power (EIRP) for Band 12											
Mode	RB/ RB Position	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)			
1.4MHz Band 16 QAM	1/#Midd	699.7	6.38	1.91	19.21	2.15	21.53	142.233	Vertical	Pass	
		707.5	6.33	1.91	19.26	2.15	21.53	142.233	Vertical	Pass	
		715.3	6.23	1.93	19.34	2.15	21.49	140.929	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Midd	700.5	6.32	1.91	19.21	2.15	21.47	140.281	Vertical	Pass	
		707.5	6.77	1.91	19.26	2.15	21.97	157.398	Vertical	Pass	
		714.5	6.53	1.93	19.34	2.15	21.79	151.008	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Midd	701.5	7.01	1.91	19.23	2.15	22.18	165.196	Vertical	Pass	
		707.5	6.73	1.91	19.26	2.15	21.93	155.955	Vertical	Pass	
		713.5	6.64	1.92	19.33	2.15	21.90	154.882	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Midd	704	7.09	1.91	19.25	2.15	22.28	169.044	Vertical	Pass	
		707.5	6.59	1.91	19.26	2.15	21.79	151.008	Vertical	Pass	
		711	6.31	1.92	19.32	2.15	21.56	143.419	Vertical	Pass	
1.4MHz Band 16 QAM	1/#Midd	699.7	6.13	1.91	19.21	2.15	21.28	134.276	Horizontal	Pass	
		707.5	5.56	1.91	19.26	2.15	20.76	119.124	Horizontal	Pass	
		715.3	6.05	1.93	19.34	2.15	21.31	135.207	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Midd	700.5	6.07	1.91	19.21	2.15	21.22	132.434	Horizontal	Pass	
		707.5	5.30	1.91	19.26	2.15	20.50	112.202	Horizontal	Pass	
		714.5	5.78	1.93	19.34	2.15	21.04	127.057	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Midd	701.5	5.30	1.91	19.23	2.15	20.47	111.429	Horizontal	Pass	
		707.5	6.06	1.91	19.26	2.15	21.26	133.660	Horizontal	Pass	
		713.5	5.28	1.92	19.33	2.15	20.54	113.440	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Midd	704	5.38	1.91	19.25	2.15	20.57	114.025	Horizontal	Pass	
		707.5	5.49	1.91	19.26	2.15	20.69	117.220	Horizontal	Pass	
		711	5.81	1.92	19.32	2.15	21.06	127.644	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)

8.6 LTE BAND 17

Radiated Power (ERP) for Band 17										
Mode	RB/ RB Position	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	1/#Mid	706.5	9.37	1.91	19.23	2.15	24.54	284.446	Vertical	Pass
		710	9.48	1.91	19.26	2.15	24.68	293.765	Vertical	Pass
		713.5	9.39	1.92	19.33	2.15	24.65	291.743	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	709	9.54	1.91	19.25	2.15	24.73	297.167	Vertical	Pass
		710	9.11	1.91	19.26	2.15	24.31	269.774	Vertical	Pass
		711	9.08	1.92	19.32	2.15	24.33	271.019	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	706.5	8.11	1.91	19.23	2.15	23.48	212.814	Horizontal	Pass
		710	8.76	1.91	19.26	2.15	23.96	248.886	Horizontal	Pass
		713.5	9.06	1.92	19.33	2.15	24.32	270.396	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	709	8.12	1.91	19.25	2.15	23.31	214.289	Horizontal	Pass
		710	8.48	1.91	19.26	2.15	23.68	233.346	Horizontal	Pass
		711	8.69	1.92	19.32	2.15	23.94	247.742	Horizontal	Pass

Radiated Power (ERP) for Band 17										
Mode	RB/ RB Position	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna 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	8.86	1.91	19.23	2.15	24.03	252.930	Vertical	Pass
		710	8.75	1.91	19.26	2.15	23.95	248.313	Vertical	Pass
		713.5	8.89	1.92	19.33	2.15	24.15	260.016	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	709	8.10	1.91	19.25	2.15	23.49	213.304	Vertical	Pass
		710	8.99	1.91	19.26	2.15	24.19	262.422	Vertical	Pass
		711	8.12	1.92	19.32	2.15	23.37	217.270	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	706.5	7.69	1.91	19.23	2.15	22.86	193.197	Horizontal	Pass
		710	7.99	1.91	19.26	2.15	23.19	208.449	Horizontal	Pass
		713.5	7.62	1.92	19.33	2.15	22.88	194.089	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	709	7.89	1.91	19.25	2.15	23.08	203.436	Horizontal	Pass
		710	7.23	1.91	19.26	2.15	22.43	174.985	Horizontal	Pass
		711	7.97	1.92	19.32	2.15	23.42	209.894	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 $43 + 10 \text{ Log}_{10}(p)$, 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	-49.77	4.04	33.51	-20.30	-13	-7.30	Horizontal
3701.4	-53.43	4.04	33.51	-23.96	-13	-10.96	Vertical
5552.1	-52.12	5.24	35.84	-21.52	-13	-8.52	Vertical
5552.1	-51.29	5.24	35.84	-20.69	-13	-7.69	Horizontal
188.1	-36.18	1.43	16.02	-21.59	-13	-8.59	Vertical
372.7	-37.00	1.30	17.99	-20.31	-13	-7.31	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-49.06	4.04	33.56	-19.54	-13	-6.54	Horizontal
3760.0	-45.64	4.04	33.56	-16.12	-13	-3.12	Vertical
5640.0	-53.02	5.24	35.91	-22.35	-13	-9.35	Vertical
5640.0	-52.30	5.24	35.91	-21.63	-13	-8.63	Horizontal
202.9	-44.78	1.62	16.97	-29.43	-13	-16.43	Vertical
363.6	-39.74	1.74	15.98	-25.51	-13	-12.51	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-46.36	4.04	34.00	-16.40	-13	-3.40	Horizontal
3818.6	-50.70	4.04	34.00	-20.74	-13	-7.74	Vertical
5727.9	-49.64	5.24	36.04	-18.84	-13	-5.84	Vertical
5727.9	-52.28	5.24	36.04	-21.48	-13	-8.48	Horizontal
209.4	-35.50	1.42	17.29	-19.63	-13	-6.63	Vertical
437.7	-40.89	1.50	17.90	-24.48	-13	-11.48	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	-46.66	4.07	33.54	-17.19	-13	-4.19	Horizontal
3720.0	-46.74	4.07	33.54	-17.27	-13	-4.27	Vertical
5580.0	-52.28	5.28	35.86	-21.70	-13	-8.70	Vertical
5580.0	-51.05	5.28	35.86	-20.47	-13	-7.47	Horizontal
196.4	-40.88	1.58	16.89	-25.56	-13	-12.56	Vertical
415.7	-41.06	1.76	17.26	-25.56	-13	-12.56	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-53.45	4.04	33.56	-23.73	-13	-10.73	Horizontal
3760.0	-48.29	4.04	33.56	-18.77	-13	-5.77	Vertical
5640.0	-50.07	5.24	35.91	-19.40	-13	-6.40	Vertical
5640.0	-49.32	5.24	35.91	-18.65	-13	-5.65	Horizontal
180.1	-37.20	1.46	16.27	-22.39	-13	-9.39	Vertical
453.1	-40.19	1.59	15.15	-26.63	-13	-13.63	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-52.79	4.04	34.00	-22.83	-13	-9.83	Horizontal
3800.0	-44.70	4.04	34.00	-14.74	-13	-1.74	Vertical
5700.0	-49.53	5.24	36.04	-18.73	-13	-5.73	Vertical
5700.0	-53.856	5.24	36.04	-23.06	-13	-10.06	Horizontal
193.5	-35.90	1.36	17.39	-19.86	-13	-6.86	Vertical
395.1	-37.04	1.66	15.39	-23.31	-13	-10.31	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)

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	-51.94	4.02	29.80	-26.16	-13	-13.16	Horizontal
3421.4	-50.51	4.02	29.80	-24.73	-13	-11.73	Vertical
5132.1	-45.79	5.24	35.84	-15.19	-13	-2.19	Vertical
5132.1	-50.74	5.24	35.84	-20.14	-13	-7.14	Horizontal
178.9	-44.10	1.68	16.04	-29.74	-13	-16.74	Vertical
393.6	-38.08	1.78	17.74	-22.12	-13	-9.12	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-50.54	4.03	30.00	-24.57	-13	-11.57	Horizontal
3465.0	-44.16	4.03	30.00	-18.19	-13	-5.19	Vertical
5197.5	-44.86	5.25	35.86	-14.25	-13	-1.25	Vertical
5197.5	-53.11	5.25	35.86	-22.50	-13	-9.50	Horizontal
176.6	-34.48	1.72	17.69	-18.51	-13	-5.51	Vertical
332.3	-38.69	1.62	16.02	-24.28	-13	-11.28	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-51.02	4.05	30.01	-25.06	-13	-12.06	Horizontal
3508.6	-44.94	4.05	30.01	-18.98	-13	-5.98	Vertical
5262.9	-52.21	5.26	35.86	-21.61	-13	-8.61	Vertical
5262.9	-52.91	5.26	35.86	-22.31	-13	-9.31	Horizontal
196.0	-41.88	1.80	16.69	-26.99	-13	-13.99	Vertical
360.4	-40.27	1.75	16.66	-25.37	-13	-12.37	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	-53.68	4.02	29.80	-27.90	-13	-14.90	Horizontal
3440.0	-45.28	4.02	29.80	-19.50	-13	-6.50	Vertical
5160.0	-45.62	5.24	35.84	-15.02	-13	-2.02	Vertical
5160.0	-50.93	5.24	35.84	-20.33	-13	-7.33	Horizontal
175.9	-44.68	1.57	17.26	-28.99	-13	-15.99	Vertical
350.4	-34.66	1.78	16.35	-20.09	-13	-7.09	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-53.92	4.03	30.00	-27.95	-13	-14.95	Horizontal
3465.0	-46.83	4.03	30.00	-20.86	-13	-7.86	Vertical
5197.5	-53.09	5.25	35.86	-22.48	-13	-9.48	Vertical
5197.5	-52.65	5.25	35.86	-22.04	-13	-9.04	Horizontal
197.5	-41.47	1.44	17.95	-24.96	-13	-11.96	Vertical
403.1	-42.10	1.65	16.09	-27.66	-13	-14.66	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-45.22	2.91	27.68	-20.45	-13	-7.45	Horizontal
3490.0	-52.88	2.91	27.68	-28.11	-13	-15.11	Vertical
5235.0	-49.50	5.26	35.86	-18.90	-13	-5.90	Vertical
5235.0	-50.22	5.26	35.86	-19.62	-13	-6.62	Horizontal
191.1	-39.63	1.61	16.85	-24.39	-13	-11.39	Vertical
457.3	-38.32	1.61	15.19	-24.74	-13	-11.74	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	-51.47	2.78	27.50	-26.75	-13	-13.75	Horizontal
1649.4	-45.55	2.78	27.50	-20.83	-13	-7.83	Vertical
2474.1	-46.82	2.90	27.80	-21.92	-13	-8.92	Vertical
2474.1	-49.49	2.90	27.80	-24.59	-13	-11.59	Horizontal
191.4	-44.51	1.76	17.59	-28.68	-13	-15.68	Vertical
322.6	-37.71	1.63	15.87	-23.47	-13	-10.47	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-50.27	2.80	27.48	-25.59	-13	-12.59	Horizontal
1673.0	-53.91	2.80	27.48	-29.23	-13	-16.23	Vertical
2509.5	-52.72	2.91	27.70	-27.93	-13	-14.93	Vertical
2509.5	-51.67	2.91	27.70	-26.88	-13	-13.858	Horizontal
211.5	-42.10	1.61	15.68	-28.03	-13	-15.03	Vertical
278.5	-37.49	1.59	17.52	-21.57	-13	-8.57	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-47.66	2.82	27.43	-23.05	-13	-10.05	Horizontal
1696.6	-52.45	2.82	27.43	-27.84	-13	-14.84	Vertical
2544.9	-50.66	2.92	27.74	-25.84	-13	-12.84	Vertical
2544.9	-51.36	2.92	27.74	-26.54	-13	-13.54	Horizontal
199.2	-43.78	1.69	16.67	-28.79	-13	-15.79	Vertical
317.9	-41.93	1.70	17.18	-26.45	-13	-13.45	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	-49.65	2.78	27.50	-24.93	-13	-11.93	Horizontal
1658.0	-47.12	2.78	27.50	-22.40	-13	-9.40	Vertical
2487.0	-46.15	2.90	27.80	-21.25	-13	-8.25	Vertical
2487.0	-50.13	2.90	27.80	-25.23	-13	-12.23	Horizontal
193.4	-34.27	1.71	15.57	-20.41	-13	-7.41	Vertical
402.3	-43.53	1.34	16.40	-28.47	-13	-15.47	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-44.97	2.80	27.48	-20.29	-13	-7.29	Horizontal
1673.0	-53.33	2.80	27.48	-28.65	-13	-15.65	Vertical
2509.5	-44.24	2.91	27.70	-19.45	-13	-6.45	Vertical
2509.5	-49.21	2.91	27.70	-24.42	-13	-11.42	Horizontal
199.1	-38.38	1.44	17.04	-22.78	-13	-9.78	Vertical
320.0	-37.10	1.76	17.62	-21.24	-13	-8.24	Horizontal
Test Results for High Channel 844MHz							
1688.0	-53.40	2.82	27.43	-28.79	-13	-15.79	Horizontal
1688.0	-45.19	2.82	27.43	-20.58	-13	-7.58	Vertical
2532.0	-50.38	2.92	27.74	-25.56	-13	-12.56	Vertical
2532.0	-50.93	2.92	27.74	-26.11	-13	-13.11	Horizontal
200.5	-40.96	1.74	17.70	-25.00	-13	-12.00	Vertical
296.0	-37.90	1.41	17.46	-21.84	-13	-8.84	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 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-63.51	5.23	35.81	-32.93	-25	-7.93	Horizontal
5005.0	-59.17	5.23	35.81	-28.59	-25	-3.59	Vertical
7507.5	-59.69	5.67	36.85	-28.51	-25	-3.51	Vertical
7507.5	-64.39	5.67	36.85	-33.41	-25	-8.21	Horizontal
196.7	-44.67	1.73	17.97	-28.43	-25	-3.43	Vertical
266.2	-48.52	1.38	15.11	-34.79	-25	-9.79	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-64.86	5.23	35.82	-34.27	-25	-9.27	Horizontal
5070.0	-64.78	5.23	35.82	-34.19	-25	-9.19	Vertical
7605.0	-61.13	5.67	36.85	-29.95	-25	-4.95	Vertical
7605.0	-62.42	5.67	36.85	-31.24	-25	-6.24	Horizontal
199.3	-44.12	1.77	16.17	-29.71	-25	-4.71	Vertical
372.7	-48.36	1.63	15.21	-34.78	-25	-9.78	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-62.90	5.24	35.83	-32.31	-25	-7.31	Horizontal
5135.0	-63.72	5.24	35.83	-33.13	-25	-8.13	Vertical
7702.5	-64.61	5.68	36.87	-33.42	-25	-8.42	Vertical
7702.5	-60.68	5.68	36.87	-29.49	-25	-4.49	Horizontal
188.4	-45.00	1.58	17.56	-29.02	-25	-4.02	Vertical
258.9	-46.61	1.45	16.58	-31.48	-25	-6.48	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	-61.32	5.23	35.82	-30.73	-25	-5.73	Horizontal
5020.0	-60.63	5.23	35.82	-30.04	-25	-5.04	Vertical
7530.0	-64.39	5.67	36.86	-33.40	-25	-8.20	Vertical
7530.0	-63.07	5.67	36.86	-31.88	-25	-6.88	Horizontal
210.6	-44.60	1.63	15.76	-30.47	-25	-5.47	Vertical
240.8	-45.39	1.71	15.44	-31.66	-25	-6.66	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-64.60	5.23	35.82	-34.01	-25	-9.01	Horizontal
5070.0	-63.53	5.23	35.82	-32.94	-25	-7.94	Vertical
7605.0	-63.850	5.67	36.85	-32.62	-25	-7.62	Vertical
7605.0	-60.24	5.67	36.85	-29.06	-25	-4.06	Horizontal
187.3	-46.78	1.79	16.84	-31.72	-25	-6.72	Vertical
456.4	-51.06	1.71	17.64	-35.13	-25	-10.13	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-64.58	5.24	35.83	-33.99	-25	-8.99	Horizontal
5120.0	-62.07	5.24	35.83	-31.48	-25	-6.48	Vertical
7680.0	-64.06	5.70	36.88	-32.88	-25	-7.88	Vertical
7680.0	-60.53	5.70	36.88	-29.35	-25	-4.35	Horizontal
206.0	-45.90	1.79	16.84	-30.84	-25	-5.84	Vertical
287.0	-48.89	1.71	17.64	-32.96	-25	-7.96	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.

9.5 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	-52.88	2.60	27.20	-28.28	-13	-15.28	Horizontal
1399.4	-45.84	2.60	27.20	-21.24	-13	-8.24	Vertical
2099.1	-45.42	2.85	27.54	-20.73	-13	-7.73	Vertical
2099.1	-49.84	2.85	27.54	-25.15	-13	-12.15	Horizontal
207.9	-34.02	1.49	17.78	-17.73	-13	-4.73	Vertical
324.8	-41.45	1.36	17.33	-25.48	-13	-12.48	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-48.16	2.61	27.28	-23.49	-13	-10.49	Horizontal
1415.0	-44.11	2.61	27.28	-19.44	-13	-6.44	Vertical
2122.5	-50.01	2.87	27.59	-25.29	-13	-12.29	Vertical
2122.5	-51.31	2.87	27.59	-26.59	-13	-13.59	Horizontal
189.2	-36.09	1.73	15.74	-22.08	-13	-9.08	Vertical
314.9	-40.97	1.62	15.79	-26.80	-13	-13.850	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-47.12	2.63	27.28	-22.47	-13	-9.47	Horizontal
1430.6	-48.20	2.63	27.28	-23.55	-13	-10.55	Vertical
2145.9	-44.63	2.88	27.60	-19.91	-13	-6.91	Vertical
2145.9	-51.30	2.88	27.60	-26.58	-13	-13.58	Horizontal
188.5	-39.48	1.61	18.00	-23.09	-13	-10.09	Vertical
417.1	-35.96	1.45	15.49	-21.93	-13	-8.93	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	-52.51	2.61	27.26	-27.86	-13	-14.86	Horizontal
1408.0	-51.91	2.61	27.26	-27.26	-13	-14.26	Vertical
2112.0	-51.00	2.87	27.58	-26.29	-13	-13.49	Vertical
2112.0	-53.859	2.87	27.58	-29.18	-13	-16.18	Horizontal
191.9	-36.16	1.31	16.97	-20.50	-13	-7.50	Vertical
387.6	-39.59	1.65	16.70	-24.54	-13	-11.54	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-49.70	2.61	27.28	-25.03	-13	-12.03	Horizontal
1415.0	-49.35	2.61	27.28	-24.68	-13	-11.68	Vertical
2122.5	-45.47	2.87	27.59	-20.75	-13	-7.75	Vertical
2122.5	-52.67	2.87	27.59	-27.95	-13	-14.95	Horizontal
185.8	-39.58	1.72	17.99	-23.31	-13	-10.31	Vertical
466.9	-37.50	1.73	17.94	-21.29	-13	-8.29	Horizontal
Test Results for High Channel 711MHz							
1422.0	-49.66	2.62	27.28	-25.00	-13	-12.00	Horizontal
1422.0	-51.52	2.62	27.28	-26.86	-13	-13.856	Vertical
2133.0	-44.46	2.87	27.60	-19.73	-13	-6.73	Vertical
2133.0	-51.15	2.87	27.60	-26.42	-13	-13.42	Horizontal
182.3	-39.89	1.58	15.93	-25.54	-13	-12.54	Vertical
300.7	-41.73	1.36	15.59	-27.50	-13	-14.50	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	-44.63	2.61	27.28	-19.96	-13	-6.96	Horizontal
1413.0	-46.66	2.61	27.28	-21.99	-13	-8.99	Vertical
2119.5	-50.10	2.87	27.59	-25.38	-13	-12.38	Vertical
2119.5	-49.17	2.87	27.59	-24.45	-13	-11.45	Horizontal
196.3	-40.26	1.71	16.15	-25.82	-13	-12.82	Vertical
294.1	-38.35	1.41	17.32	-22.44	-13	-9.44	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-46.35	2.62	27.30	-21.67	-13	-8.67	Horizontal
1420.0	-44.52	2.62	27.30	-19.84	-13	-6.84	Vertical
2130.0	-48.53	2.87	27.62	-23.78	-13	-10.78	Vertical
2130.0	-50.16	2.87	27.62	-25.41	-13	-12.41	Horizontal
199.7	-43.852	1.42	15.25	-30.00	-13	-17.00	Vertical
407.2	-41.09	1.36	17.19	-25.26	-13	-12.26	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-52.42	2.66	27.28	-27.80	-13	-14.80	Horizontal
1427.0	-52.18	2.66	27.28	-27.56	-13	-14.56	Vertical
2140.5	-47.56	2.88	27.60	-22.84	-13	-9.84	Vertical
2140.5	-51.90	2.88	27.60	-27.18	-13	-14.18	Horizontal
191.9	-36.91	1.32	17.29	-20.94	-13	-7.94	Vertical
464.6	-39.17	1.72	16.89	-24.00	-13	-11.00	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	-45.15	2.62	27.30	-20.47	-13	-7.47	Horizontal
1418.0	-45.72	2.62	27.30	-21.04	-13	-8.04	Vertical
2127.0	-50.88	2.87	27.62	-26.13	-13	-13.13	Vertical
2127.0	-49.50	2.87	27.62	-24.75	-13	-11.75	Horizontal
199.3	-38.59	1.35	16.91	-23.03	-13	-10.03	Vertical
397.7	-38.52	1.62	16.31	-23.853	-13	-10.83	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-45.67	2.62	27.30	-20.99	-13	-7.99	Horizontal
1420.0	-50.14	2.62	27.30	-25.46	-13	-12.46	Vertical
2130.0	-49.64	2.87	27.62	-24.89	-13	-11.89	Vertical
2130.0	-53.78	2.87	27.62	-29.03	-13	-16.03	Horizontal
179.6	-38.31	1.51	17.14	-22.68	-13	-9.68	Vertical
235.1	-42.80	1.77	16.88	-27.69	-13	-14.69	Horizontal
Test Results for High Channel 711MHz							
1422.0	-45.89	2.62	27.30	-21.21	-13	-8.21	Horizontal
1422.0	-47.62	2.62	27.30	-22.94	-13	-9.94	Vertical
2133.0	-48.57	2.87	27.62	-23.852	-13	-10.82	Vertical
2133.0	-50.45	2.87	27.62	-25.70	-13	-12.70	Horizontal
186.8	-43.30	1.78	15.95	-29.13	-13	-16.13	Vertical
267.5	-41.57	1.34	17.95	-24.97	-13	-11.97	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 $+50^{\circ}$ C

Voltage = low voltage, DC 3.4V, Normal, DC 3.85V and High voltage, DC 4.4V.

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 $+50^{\circ}$ 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]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1880	13.4	0.007009	2.5
3.85	1880	14.0	0.007463	2.5
4.4	1880	13.7	0.007280	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	12.7	0.006761	2.5
Extreme (50C)	1880	11.1	0.005916	2.5
Extreme (40C)	1880	13.3	0.007068	2.5
Extreme (30C)	1880	13.85	0.007353	2.5
Extreme (10C)	1880	13.7	0.007299	2.5
Extreme (0C)	1880	12.2	0.006492	2.5
Extreme (-10C)	1880	13.4	0.006998	2.5
Extreme (-20C)	1880	13.85	0.007327	2.5
Extreme (-30C)	1880	14.3	0.007595	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1880	10.1	0.005365	2.5
3.85	1880	8.5	0.004503	2.5
4.4	1880	8.3	0.004396	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	9.4	0.005011	2.5
Extreme (50C)	1880	9.2	0.004917	2.5
Extreme (40C)	1880	8.2	0.004338425	2.5
Extreme (30C)	1880	9.4	0.005011897	2.5
Extreme (10C)	1880	9.2	0.004892926	2.5
Extreme (0C)	1880	8.0	0.004267557	2.5
Extreme (-10C)	1880	9.3	0.004957972	2.5
Extreme (-20C)	1880	8.8	0.004699262	2.5
Extreme (-30C)	1880	8.1	0.00431882	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]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1732.5	9.1	0.005229	2.5
3.85	1732.5	8.5	0.004900	2.5
4.4	1732.5	8.3	0.004805	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	8.4	0.004820	2.5
Extreme (50C)	1732.5	9.1	0.005240	2.5
Extreme (40C)	1732.5	7.4	0.004269	2.5
Extreme (30C)	1732.5	5.9	0.003382	2.5
Extreme (10C)	1732.5	7.3	0.004207	2.5
Extreme (0C)	1732.5	9.6	0.005547	2.5
Extreme (-10C)	1732.5	8.0	0.004593	2.5
Extreme (-20C)	1732.5	6.4	0.003706	2.5
Extreme (-30C)	1732.5	8.7	0.005048	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1732.5	9.3	0.005386	2.5
3.85	1732.5	9.3	0.005351	2.5
4.4	1732.5	8.1	0.004666	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	9.3	0.005347	2.5
Extreme (50C)	1732.5	9.2	0.005322	2.5
Extreme (40C)	1732.5	8.2	0.004736	2.5
Extreme (30C)	1732.5	9.2	0.005303	2.5
Extreme (10C)	1732.5	9.4	0.005411	2.5
Extreme (0C)	1732.5	8.0	0.004646	2.5
Extreme (-10C)	1732.5	8.6	0.004977	2.5
Extreme (-20C)	1732.5	8.9	0.005142	2.5
Extreme (-30C)	1732.5	7.6	0.004407	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]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	836.5	6.0	0.007145	2.5
3.85	836.5	6.9	0.008264	2.5
4.4	836.5	4.9	0.005895	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	6.3	0.007496	2.5
Extreme (50C)	836.5	6.2	0.007442	2.5
Extreme (40C)	836.5	6.5	0.007799	2.5
Extreme (30C)	836.5	6.5	0.007817	2.5
Extreme (10C)	836.5	5.1	0.006151	2.5
Extreme (0C)	836.5	5.7	0.006862	2.5
Extreme (-10C)	836.5	6.0	0.007130	2.5
Extreme (-20C)	836.5	5.7	0.006823	2.5
Extreme (-30C)	836.5	6.3	0.007536	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	836.5	5.6	0.006653	2.5
3.85	836.5	6.5	0.007828	2.5
4.4	836.5	4.9	0.005903	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	5.8	0.006905	2.5
Extreme (50C)	836.5	5.9	0.007059	2.5
Extreme (40C)	836.5	6.5	0.007749	2.5
Extreme (30C)	836.5	6.6	0.007887	2.5
Extreme (10C)	836.5	5.2	0.006170	2.5
Extreme (0C)	836.5	5.6	0.006720	2.5
Extreme (-10C)	836.5	5.8	0.006909	2.5
Extreme (-20C)	836.5	5.7	0.006821	2.5
Extreme (-30C)	836.5	6.2	0.007424	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]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2535	9.8	0.003882	2.5
3.85	2535	8.5	0.003371	2.5
4.4	2535	8.3	0.003272	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	9.3	0.003668	2.5
Extreme (50C)	2535	8.6	0.003401	2.5
Extreme (40C)	2535	7.9	0.003128	2.5
Extreme (30C)	2535	9.2	0.003643	2.5
Extreme (10C)	2535	8.1	0.003193	2.5
Extreme (0C)	2535	8.4	0.003309	2.5
Extreme (-10C)	2535	9.6	0.003771	2.5
Extreme (-20C)	2535	8.9	0.003506	2.5
Extreme (-30C)	2535	8.8	0.003484	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2535	6.9	0.002722	2.5
3.85	2535	6.3	0.002495	2.5
4.4	2535	6.0	0.002352	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	6.9	0.002722	2.5
Extreme (50C)	2535	5.1	0.002013	2.5
Extreme (40C)	2535	5.3	0.002082	2.5
Extreme (30C)	2535	6.3	0.002493	2.5
Extreme (10C)	2535	5.4	0.002146	2.5
Extreme (0C)	2535	5.5	0.002171	2.5
Extreme (-10C)	2535	5.1	0.001999	2.5
Extreme (-20C)	2535	6.2	0.002444	2.5
Extreme (-30C)	2535	5.9	0.002332	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]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	707.5	8.4	0.011934	2.5
3.85	707.5	9.7	0.013772	2.5
4.4	707.5	9.0	0.012691	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	707.5	8.7	0.012355	2.5
Extreme (50C)	707.5	7.4	0.010504	2.5
Extreme (40C)	707.5	7.3	0.010357	2.5
Extreme (30C)	707.5	8.2	0.011591	2.5
Extreme (10C)	707.5	7.2	0.010131	2.5
Extreme (0C)	707.5	9.2	0.013043	2.5
Extreme (-10C)	707.5	8.4	0.011930	2.5
Extreme (-20C)	707.5	8.8	0.012399	2.5
Extreme (-30C)	707.5	7.6	0.010674	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 16QAM, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	707.5	7.4	0.010402	2.5
3.85	707.5	8.2	0.011616	2.5
4.4	707.5	7.3	0.010299	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
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]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	710.0	9.7	0.013598	2.5
3.85	710.0	8.4	0.011831	2.5
4.4	710.0	8.0	0.011302	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710.0	9.6	0.013484	2.5
Extreme (50C)	710.0	9.1	0.012773	2.5
Extreme (40C)	710.0	8.4	0.011861	2.5
Extreme (30C)	710.0	9.3	0.013088	2.5
Extreme (10C)	710.0	8.7	0.012217	2.5
Extreme (0C)	710.0	8.1	0.011467	2.5
Extreme (-10C)	710.0	8.7	0.012190	2.5
Extreme (-20C)	710.0	8.7	0.012220	2.5
Extreme (-30C)	710.0	8.4	0.011786	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 16QAM, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	710.0	9.9	0.013907	2.5
3.85	710.0	9.0	0.012617	2.5
4.4	710.0	8.0	0.011292	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710.0	9.1	0.012822	2.5
Extreme (50C)	710.0	8.4	0.011858	2.5
Extreme (40C)	710.0	8.8	0.012330	2.5
Extreme (30C)	710.0	9.3	0.013053	2.5
Extreme (10C)	710.0	7.6	0.010749	2.5
Extreme (0C)	710.0	8.8	0.012329	2.5
Extreme (-10C)	710.0	9.1	0.012847	2.5
Extreme (-20C)	710.0	9.1	0.012817	2.5
Extreme (-30C)	710.0	8.1	0.011474	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.

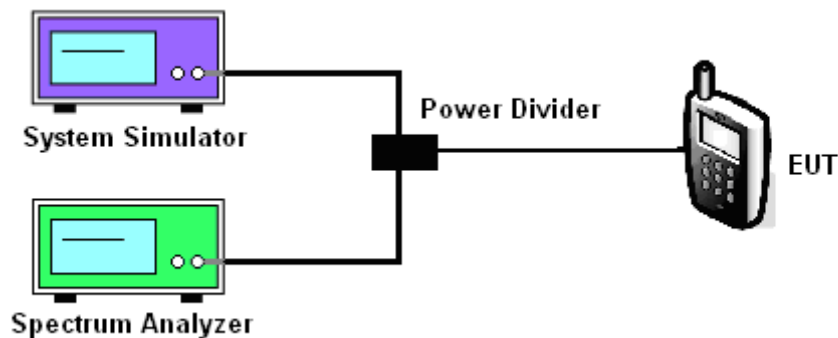
11.2 Measuring Instruments

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

Test data reference attachment.

----END OF REPORT----