

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

FCC ID: 2AOWK-GQ3092

Product: Mobile Phone
Trade Mark: ulefone
Model Number: GQ3092
Family Model: Note 9, Note 9P, Note 9 Pro, Note 9 Lite,
Note 9 Plus, Note 9T, Note 9E, Note 9S
Report No.: STR200514002007E

Prepared for

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Prepared by

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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 : GQ3092
Family Model: Note 9, Note 9P, Note 9 Pro, Note 9 Lite, Note 9 Plus, Note 9T, Note 9E, Note 9S
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 : 14 May, 2020 ~ 06 Jul, 2020
Date of Issue : 09 Jul, 2020
Test Result : Pass

Testing Engineer : Cheng Jiawen (Cheng Jiawen)
Technical Manager : Jason chen (Jason Chen)
Authorized Signatory : Sam . chen (Sam Chen)

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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	GQ3092
Family Model	Note 9, Note 9P, Note 9 Pro, Note 9 Lite, Note 9 Plus, Note 9T, Note 9E, Note 9S
Model Difference	All models are the same circuit and RF module, except the model name.
FCC ID:	2AOWK-GQ3092
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:	FPC Antenna
Antenna gain:	LTE FDD Band 2: 1.53dBi LTE FDD Band 4: 1dBi LTE FDD Band 5: 0.35dBi LTE FDD Band 7: 1.21dBi LTE FDD Band 12: 0.18dBi LTE FDD Band 17: 0.18dBi
Power Supply:	DC 3.85V/4500mAh from Battery or DC 5V from USB Port.
Adapter:	Model: HJ-0502000W2-US Input: 100-240V~50/60Hz 0.3A Output: 5V---2000mA

Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.85V) (Note 1)
HW Version	HCT_M629MB_A2
SW Version	Note 9P_SH1_EEA_V01
** Note1: The High Voltage DC 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-GQ3092** 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

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

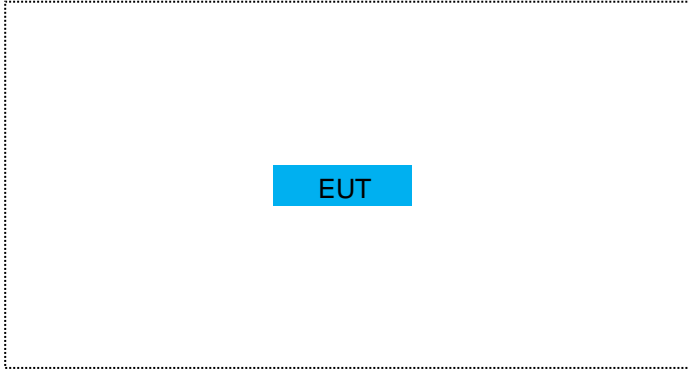
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Mobile Phone	GQ3092	FCC ID: 2AOWK-GQ3092	EUT

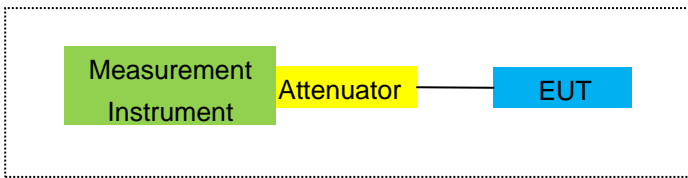
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

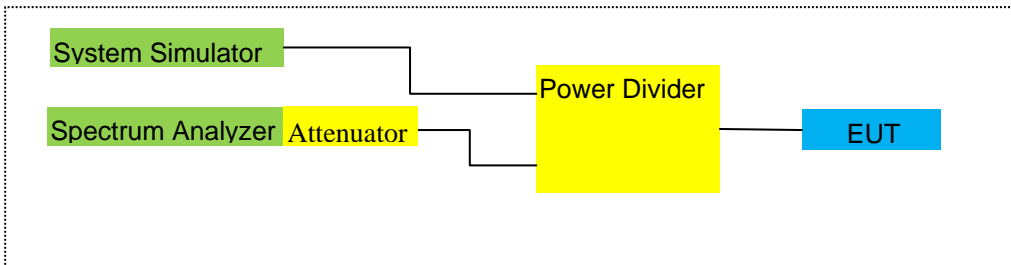
For Radiated Test Cases



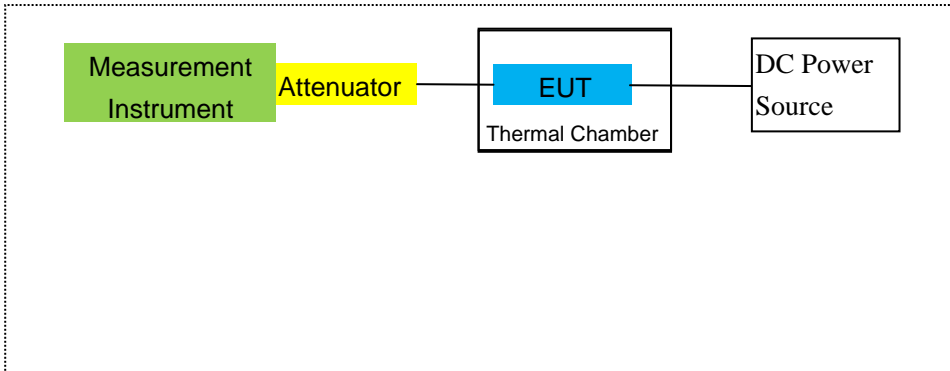
For Conducted Output Power



For Peak-to Average Ratio, Occupied Bandwidth, Conducted Band edge and Conducted Spurious Emission



For Frequency Stability



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	2019.08.28	2020.08.27	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-1018 0	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	2019.08.06	2020.08.05	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	2019.08.06	2020.08.05	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.0 5	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	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	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	2019.08.06	2020.08.05	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	2020.05.11	2023.05.10	3 year
28	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2019.08.06	2020.08.05	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)

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/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
1.4MHz Band QPSK	1/#Midd	1850.7	-1.69	3.76	28.24	22.79	190.108	Horizontal	Pass	
		1880	-0.93	3.91	28.22	23.38	217.771	Horizontal	Pass	
		1909.3	-1.96	3.93	28.20	22.31	170.216	Horizontal	Pass	
3.0MHz Band QPSK	1/#Midd	1851.5	-0.97	3.77	28.23	23.49	223.357	Horizontal	Pass	
		1880	-1.27	3.91	28.24	23.06	202.302	Horizontal	Pass	
		1908.5	-1.38	3.94	28.25	22.93	196.336	Horizontal	Pass	
5.0MHz Band QPSK	1/#Midd	1852.5	-1.83	3.77	28.31	22.71	186.638	Horizontal	Pass	
		1880	-1.54	3.91	28.22	22.77	189.234	Horizontal	Pass	
		1907.5	-0.73	3.94	28.20	23.53	225.424	Horizontal	Pass	
10.0MHz Band QPSK	1/#Midd	1855	-1.51	3.79	28.33	23.03	200.909	Horizontal	Pass	
		1880	-1.25	3.95	28.22	23.02	200.447	Horizontal	Pass	
		1905	-0.71	3.97	28.19	23.51	224.388	Horizontal	Pass	
15.0MHz Band QPSK	1/#Midd	1857.5	-1.88	3.79	28.34	22.67	184.927	Horizontal	Pass	
		1880	-0.77	3.95	28.22	23.50	223.872	Horizontal	Pass	
		1902.5	-0.46	3.97	28.18	23.75	237.137	Horizontal	Pass	
20.0MHz Band QPSK	1/#Midd	1860	-1.04	3.81	28.35	23.50	223.872	Horizontal	Pass	
		1880	-1.54	3.96	28.22	22.72	187.068	Horizontal	Pass	
		1900	-0.71	4.00	28.16	23.45	221.309	Horizontal	Pass	
1.4MHz Band QPSK	1/#Midd	1850.7	-1.03	3.76	28.24	23.45	221.309	Vertical	Pass	
		1880	-0.62	3.91	28.22	23.69	233.884	Vertical	Pass	
		1909.3	-1.51	3.93	28.20	22.76	188.799	Vertical	Pass	
3.0MHz Band QPSK	1/#Midd	1851.5	-1.63	3.77	28.23	22.83	191.867	Vertical	Pass	
		1880	-1.11	3.91	28.24	23.22	209.894	Vertical	Pass	
		1908.5	-0.63	3.94	28.25	23.68	233.346	Vertical	Pass	
5.0MHz Band QPSK	1/#Midd	1852.5	-0.71	3.77	28.31	23.83	241.546	Vertical	Pass	
		1880	-0.46	3.91	28.22	23.85	242.661	Vertical	Pass	
		1907.5	-0.48	3.94	28.20	23.78	238.781	Vertical	Pass	
10.0MHz Band	1/#Midd	1855	-1.41	3.79	28.33	23.13	205.589	Vertical	Pass	
		1880	-1.42	3.95	28.22	22.85	192.752	Vertical	Pass	

QPSK		1905	-2.16	3.97	28.19	22.06	160.694	Vertical	Pass
15.0MHz Band QPSK	1/#Midd	1857.5	-2.05	3.79	28.34	22.50	177.828	Vertical	Pass
		1880	-1.22	3.95	28.22	23.05	201.837	Vertical	Pass
		1902.5	-1.84	3.97	28.18	22.37	172.584	Vertical	Pass
20.0MHz Band QPSK	1/#Midd	1860	-1.72	3.81	28.35	22.82	191.426	Vertical	Pass
		1880	-1.81	3.96	28.22	22.45	175.792	Vertical	Pass
		1900	-0.20	4.00	28.16	23.96	249.000	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					Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP		
							Average		
							(mW)		
1.4MHz Band 16 QAM	1/#Midd	1850.7	-3.11	3.76	28.24	21.37	137.088	Horizontal	Pass
		1880	-3.08	3.91	28.22	21.23	132.739	Horizontal	Pass
		1909.3	-2.73	3.93	28.20	21.54	142.561	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Midd	1851.5	-3.27	3.77	28.23	21.19	131.522	Horizontal	Pass
		1880	-1.87	3.91	28.24	22.46	176.198	Horizontal	Pass
		1908.5	-2.91	3.94	28.25	21.40	138.038	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Midd	1852.5	-3.08	3.77	28.31	21.46	139.959	Horizontal	Pass
		1880	-2.13	3.91	28.22	22.18	165.196	Horizontal	Pass
		1907.5	-2.86	3.94	28.20	21.40	138.038	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Midd	1855	-2.23	3.79	28.33	22.31	170.216	Horizontal	Pass
		1880	-2.94	3.95	28.22	21.33	135.831	Horizontal	Pass
		1905	-2.27	3.97	28.19	21.95	156.675	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Midd	1857.5	-2.23	3.79	28.34	22.32	170.608	Horizontal	Pass
		1880	-2.05	3.95	28.22	22.22	166.725	Horizontal	Pass
		1902.5	-2.39	3.97	28.18	21.82	152.055	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Midd	1860	-2.30	3.81	28.35	22.24	167.494	Horizontal	Pass
		1880	-2.29	3.96	28.22	21.97	157.398	Horizontal	Pass
		1900	-2.73	4.00	28.16	21.43	138.995	Horizontal	Pass
1.4MHz Band 16	1/#Midd	1850.7	-2.74	3.76	28.24	21.74	149.279	Vertical	Pass
		1880	-2.85	3.91	28.22	21.46	139.959	Vertical	Pass

QAM		1909.3	-2.81	3.93	28.20	21.46	139.959	Vertical	Pass
3.0MHz Band 16 QAM	1/#Midd	1851.5	-1.98	3.77	28.23	22.48	177.011	Vertical	Pass
		1880	-2.14	3.91	28.24	22.19	165.577	Vertical	Pass
		1908.5	-2.59	3.94	28.25	21.72	148.594	Vertical	Pass
5.0MHz Band 16 QAM	1/#Midd	1852.5	-2.50	3.77	28.31	22.04	159.956	Vertical	Pass
		1880	-2.49	3.91	28.22	21.82	152.055	Vertical	Pass
		1907.5	-2.61	3.94	28.20	21.65	146.218	Vertical	Pass
10.0MHz z Band 16 QAM	1/#Midd	1855	-2.75	3.79	28.33	21.79	151.008	Vertical	Pass
		1880	-2.75	3.95	28.22	21.52	141.906	Vertical	Pass
		1905	-3.09	3.97	28.19	21.13	129.718	Vertical	Pass
15.0MHz z Band 16 QAM	1/#Midd	1857.5	-2.65	3.79	28.34	21.90	154.882	Vertical	Pass
		1880	-3.40	3.95	28.22	20.87	122.180	Vertical	Pass
		1902.5	-2.61	3.97	28.18	21.60	144.544	Vertical	Pass
20.0MHz z Band 16 QAM	1/#Midd	1860	-2.49	3.81	28.35	22.05	160.325	Vertical	Pass
		1880	-1.72	3.96	28.22	22.54	179.597	Vertical	Pass
		1900	-3.20	4.00	28.16	20.96	124.738	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 SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
			1.4MHz Band QPSK	1/#Midd	1710.7	-0.61	3.12	27.58		
		1732.5	-0.40	3.27	27.61	23.94	247.742	Horizontal	Pass	
		1754.3	-0.92	3.29	27.63	23.42	219.786	Horizontal	Pass	
3.0MHz Band QPSK	1/#Midd	1711.5	-2.17	3.13	27.61	22.31	170.216	Horizontal	Pass	
		1732.5	-2.30	3.27	27.61	22.04	159.956	Horizontal	Pass	
		1753.5	-1.97	3.30	27.62	22.35	171.791	Horizontal	Pass	
5.0MHz Band QPSK	1/#Midd	1712.5	-1.65	3.13	27.63	22.85	192.752	Horizontal	Pass	
		1732.5	-2.78	3.27	27.61	21.56	143.219	Horizontal	Pass	
		1752.5	-0.58	3.30	27.60	23.72	235.505	Horizontal	Pass	
10.0MHz Band QPSK	1/#Midd	1715	-1.24	3.15	27.64	23.25	211.349	Horizontal	Pass	
		1732.5	-0.74	3.31	27.61	23.56	226.986	Horizontal	Pass	
		1750	-0.61	3.33	27.59	23.65	231.739	Horizontal	Pass	
15.0MHz Band QPSK	1/#Midd	1717.5	-1.24	3.15	27.65	23.26	211.836	Horizontal	Pass	
		1732.5	-0.94	3.31	27.61	23.36	216.770	Horizontal	Pass	
		1747.5	-0.78	3.33	27.57	23.46	221.820	Horizontal	Pass	
20.0MHz Band QPSK	1/#Midd	1720	-1.89	3.17	27.66	22.60	181.970	Horizontal	Pass	
		1732.5	-0.74	3.32	27.61	23.55	226.464	Horizontal	Pass	
		1745	-0.90	3.36	27.56	23.30	213.796	Horizontal	Pass	
1.4MHz Band QPSK	1/#Midd	1710.7	-0.84	3.12	27.58	23.62	230.144	Vertical	Pass	
		1732.5	-1.67	3.27	27.61	22.67	184.927	Vertical	Pass	
		1754.3	-1.91	3.29	27.63	22.43	174.985	Vertical	Pass	
3.0MHz Band QPSK	1/#Midd	1711.5	-0.62	3.13	27.61	23.86	243.220	Vertical	Pass	
		1732.5	-0.11	3.27	27.61	24.23	264.850	Vertical	Pass	
		1753.5	-0.88	3.30	27.62	23.44	220.800	Vertical	Pass	
5.0MHz Band QPSK	1/#Midd	1712.5	-2.16	3.13	27.63	22.34	171.396	Vertical	Pass	
		1732.5	-1.56	3.27	27.61	22.78	189.671	Vertical	Pass	
		1752.5	-1.92	3.30	27.60	22.38	172.982	Vertical	Pass	
10.0MHz Band	1/#Midd	1715	-1.84	3.15	27.64	22.65	184.077	Vertical	Pass	
		1732.5	-1.49	3.31	27.61	22.81	190.985	Vertical	Pass	

QPSK		1750	-0.73	3.33	27.59	23.53	225.424	Vertical	Pass
15.0MHz Band QPSK	1/#Midd	1717.5	-1.70	3.15	27.65	22.80	190.546	Vertical	Pass
		1732.5	-1.19	3.31	27.61	23.11	204.644	Vertical	Pass
		1747.5	-1.68	3.33	27.57	22.56	180.302	Vertical	Pass
20.0MHz Band QPSK	1/#Midd	1720	-1.13	3.17	27.66	23.36	216.770	Vertical	Pass
		1732.5	0.63	3.32	27.61	24.92	310.456	Vertical	Pass
		1745	-0.57	3.36	27.56	23.63	230.675	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/#Midd	1710.7	-1.53	3.12	27.58	22.93	196.336	Horizontal	Pass
		1732.5	-0.49	3.27	27.61	23.85	242.661	Horizontal	Pass
		1754.3	-1.53	3.29	27.63	22.81	190.985	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Midd	1711.5	-1.67	3.13	27.61	22.81	190.985	Horizontal	Pass
		1732.5	-2.74	3.27	27.61	21.60	144.544	Horizontal	Pass
		1753.5	-1.56	3.30	27.62	22.76	188.799	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Midd	1712.5	-1.65	3.13	27.63	22.85	192.752	Horizontal	Pass
		1732.5	-1.91	3.27	27.61	22.43	174.985	Horizontal	Pass
		1752.5	-0.98	3.30	27.60	23.32	214.783	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Midd	1715	-1.76	3.15	27.64	22.73	187.499	Horizontal	Pass
		1732.5	-1.33	3.31	27.61	22.97	198.153	Horizontal	Pass
		1750	-2.03	3.33	27.59	22.23	167.109	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Midd	1717.5	-1.85	3.15	27.65	22.65	184.077	Horizontal	Pass
		1732.5	-0.48	3.31	27.61	23.82	240.991	Horizontal	Pass
		1747.5	-1.21	3.33	27.57	23.03	200.909	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Midd	1720	-0.87	3.17	27.66	23.62	230.144	Horizontal	Pass
		1732.5	-0.70	3.32	27.61	23.59	228.560	Horizontal	Pass
		1745	-1.19	3.36	27.56	23.01	199.986	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Midd	1710.7	-1.26	3.12	27.58	23.20	208.930	Vertical	Pass
		1732.5	-1.00	3.27	27.61	23.34	215.774	Vertical	Pass
		1754.3	-1.57	3.29	27.63	22.77	189.234	Vertical	Pass
3.0MHz Band 16 QAM	1/#Midd	1711.5	-1.38	3.13	27.61	23.10	204.174	Vertical	Pass
		1732.5	-2.73	3.27	27.61	21.61	144.877	Vertical	Pass
		1753.5	-2.02	3.30	27.62	22.30	169.824	Vertical	Pass
5.0MHz Band 16 QAM	1/#Midd	1712.5	-1.92	3.13	27.63	22.58	181.134	Vertical	Pass
		1732.5	-1.33	3.27	27.61	23.01	199.986	Vertical	Pass
		1752.5	-1.47	3.30	27.60	22.83	191.867	Vertical	Pass
10.0MHz Band 16 QAM	1/#Midd	1715	-1.16	3.15	27.64	23.33	215.278	Vertical	Pass
		1732.5	-1.47	3.31	27.61	22.83	191.867	Vertical	Pass
		1750	-0.97	3.33	27.59	23.29	213.304	Vertical	Pass
15.0MHz Band	1/#Midd	1717.5	-1.44	3.15	27.65	23.06	202.302	Vertical	Pass
		1732.5	-2.01	3.31	27.61	22.29	169.434	Vertical	Pass

16 QAM		1747.5	-0.88	3.33	27.57	23.36	216.770	Vertical	Pass
20.0MHz Band	1/#Midd	1720	-0.77	3.17	27.66	23.72	235.505	Vertical	Pass
		1732.5	-0.55	3.32	27.61	23.74	236.592	Vertical	Pass
16 QAM		1745	-0.33	3.36	27.56	23.87	243.781	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	Freque ncy	Result							Polarizati on Of Max. ERP	Conclu sion
			SG Level	Cable Loss (dBm)	Anten na Gain (dB)	Corre ction (dB)	Max. ERP	Max. ERP			
			(dBm)				Averag e	Averag e			
							(dBm)	(mW)			
1.4MHz Band QPSK	1/#M id	824.7	7.86	2.01	19.68	2.15	23.38	217.771	Horizontal	Pass	
		836.5	7.73	2.01	19.77	2.15	23.34	215.774	Horizontal	Pass	
		848.3	7.14	2.02	19.82	2.15	22.79	190.108	Horizontal	Pass	
3.0MHz Band QPSK	1/#M id	825.5	8.42	2.01	19.70	2.15	23.96	248.886	Horizontal	Pass	
		836.5	7.85	2.01	19.77	2.15	23.46	221.820	Horizontal	Pass	
		847.5	8.35	2.02	19.81	2.15	23.99	250.611	Horizontal	Pass	
5.0MHz Band QPSK	1/#M id	826.5	8.33	2.01	19.71	2.15	23.88	244.343	Horizontal	Pass	
		836.5	7.89	2.01	19.77	2.15	23.50	223.872	Horizontal	Pass	
		846.5	8.38	2.02	19.79	2.15	24.00	251.189	Horizontal	Pass	
10.0MH z Band QPSK	1/#M id	829	7.81	2.01	19.73	2.15	23.38	217.771	Horizontal	Pass	
		836.5	8.74	2.01	19.77	2.15	24.35	272.270	Horizontal	Pass	
		844	7.26	2.02	19.78	2.15	22.87	193.642	Horizontal	Pass	
1.4MHz Band QPSK	1/#M id	824.7	8.89	2.01	19.68	2.15	24.41	276.058	Vertical	Pass	
		836.5	8.44	2.01	19.77	2.15	24.05	254.097	Vertical	Pass	
		848.3	7.42	2.02	19.82	2.15	23.07	202.768	Vertical	Pass	
3.0MHz Band QPSK	1/#M id	825.5	7.50	2.01	19.70	2.15	23.04	201.372	Vertical	Pass	
		836.5	8.14	2.01	19.77	2.15	23.75	237.137	Vertical	Pass	
		847.5	8.36	2.02	19.81	2.15	24.00	251.189	Vertical	Pass	
5.0MHz Band QPSK	1/#M id	826.5	8.19	2.01	19.71	2.15	23.74	236.592	Vertical	Pass	
		836.5	6.92	2.01	19.77	2.15	22.53	179.061	Vertical	Pass	
		846.5	8.77	2.02	19.79	2.15	24.39	274.789	Vertical	Pass	
10.0MH z Band QPSK	1/#M id	829	8.42	2.01	19.73	2.15	23.99	250.611	Vertical	Pass	
		836.5	8.91	2.01	19.77	2.15	24.52	283.139	Vertical	Pass	
		844	7.73	2.02	19.78	2.15	23.34	215.774	Vertical	Pass	

Note:

SG Level= Signal generator output

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

Radiated Power (ERP) for Band 5											
Mode	RB/ RB SIZE	Freque ncy	Result							Polarizati on Of Max. ERP	Conclu sion
			SG Level	Cable Loss (dBm)	Anten na Gain (dB)	Corre ction (dB)	Max. ERP	Max. ERP			
			(dBm)				Averag e	Averag e			
							(dBm)	(mW)			
1.4MHz Band 16 QAM	1/#M id	824.7	8.41	2.01	19.68	2.15	23.93	247.172	Horizontal	Pass	
		836.5	8.62	2.01	19.77	2.15	24.23	264.850	Horizontal	Pass	
		848.3	7.97	2.02	19.82	2.15	23.62	230.144	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#M id	825.5	8.07	2.01	19.70	2.15	23.61	229.615	Horizontal	Pass	
		836.5	8.48	2.01	19.77	2.15	24.09	256.448	Horizontal	Pass	
		847.5	8.21	2.02	19.81	2.15	23.85	242.661	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#M id	826.5	8.88	2.01	19.71	2.15	24.43	277.332	Horizontal	Pass	
		836.5	7.69	2.01	19.77	2.15	23.30	213.796	Horizontal	Pass	
		846.5	8.73	2.02	19.79	2.15	24.35	272.270	Horizontal	Pass	
10.0MH z Band 16 QAM	1/#M id	829	8.16	2.01	19.73	2.15	23.73	236.048	Horizontal	Pass	
		836.5	7.66	2.01	19.77	2.15	23.27	212.324	Horizontal	Pass	
		844	7.57	2.02	19.78	2.15	23.18	207.970	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#M id	824.7	8.55	2.01	19.68	2.15	24.07	255.270	Vertical	Pass	
		836.5	7.50	2.01	19.77	2.15	23.11	204.644	Vertical	Pass	
		848.3	7.41	2.02	19.82	2.15	23.06	202.302	Vertical	Pass	
3.0MHz Band 16 QAM	1/#M id	825.5	7.88	2.01	19.70	2.15	23.42	219.786	Vertical	Pass	
		836.5	8.26	2.01	19.77	2.15	23.87	243.781	Vertical	Pass	
		847.5	7.69	2.02	19.81	2.15	23.33	215.278	Vertical	Pass	
5.0MHz Band 16 QAM	1/#M id	826.5	7.37	2.01	19.71	2.15	22.92	195.884	Vertical	Pass	
		836.5	8.37	2.01	19.77	2.15	23.98	250.035	Vertical	Pass	
		846.5	8.71	2.02	19.79	2.15	24.33	271.019	Vertical	Pass	
10.0MH z Band 16 QAM	1/#M id	829	8.30	2.01	19.73	2.15	23.87	243.781	Vertical	Pass	
		836.5	8.83	2.01	19.77	2.15	24.44	277.971	Vertical	Pass	
		844	7.75	2.02	19.78	2.15	23.36	216.770	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 7

Radiated Power (EIRP) for Band 7										
Mode	RB/ RB SIZE	Frequency	Result						Polarizati on Of Max. ERP	Conclusion
			SG Level	Cabl e	Antenn a Gain	Max. EIRP	Max. EIRP			
			(dBm)	Loss (dBm)	(dB)	Averag e	Averag e			
			(dBm)	(mW)						
5.0MHz Band QPSK	1/#M id	2502.5	0.25	4.54	27.75	23.46	221.820	Horizontal	Pass	
		2535	0.54	4.69	27.72	23.57	227.510	Horizontal	Pass	
		2567.5	0.94	4.71	27.71	23.94	247.742	Horizontal	Pass	
10.0MH z Band QPSK	1/#M id	2505	-0.01	4.55	27.76	23.20	208.930	Horizontal	Pass	
		2535	-0.55	4.69	27.72	22.48	177.011	Horizontal	Pass	
		2565	-0.16	4.72	27.70	22.82	191.426	Horizontal	Pass	
15.0MH z Band QPSK	1/#M id	2507.5	0.74	4.55	27.77	23.96	248.886	Horizontal	Pass	
		2535	0.66	4.69	27.72	23.69	233.884	Horizontal	Pass	
		2562.5	-0.26	4.72	27.69	22.71	186.638	Horizontal	Pass	
20.0MH z Band QPSK	1/#M id	2510	-0.13	4.57	27.78	23.08	203.236	Horizontal	Pass	
		2535	-0.38	4.73	27.72	22.61	182.390	Horizontal	Pass	
		2560	0.87	4.75	27.68	23.80	239.883	Horizontal	Pass	
5.0MHz Band QPSK	1/#M id	2502.5	-0.07	4.54	27.75	23.14	206.063	Vertical	Pass	
		2535	-0.11	4.69	27.72	22.92	195.884	Vertical	Pass	
		2567.5	-0.25	4.71	27.71	22.75	188.365	Vertical	Pass	
10.0MH z Band QPSK	1/#M id	2505	0.14	4.55	27.76	23.35	216.272	Vertical	Pass	
		2535	0.22	4.69	27.72	23.25	211.349	Vertical	Pass	
		2565	-0.55	4.72	27.70	22.43	174.985	Vertical	Pass	
15.0MH z Band QPSK	1/#M id	2507.5	0.24	4.55	27.77	23.46	221.820	Vertical	Pass	
		2535	0.01	4.69	27.72	23.04	201.372	Vertical	Pass	
		2562.5	0.60	4.72	27.69	23.57	227.510	Vertical	Pass	
20.0MH z Band QPSK	1/#M id	2510	0.66	4.57	27.78	23.87	243.781	Vertical	Pass	
		2535	0.53	4.73	27.72	23.52	224.905	Vertical	Pass	
		2560	1.08	4.75	27.68	24.01	251.768	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 7										
Mode	RB/ RB SIZE	Frequency	Result						Polarizati on Of Max. ERP	Conclusion
			SG Level	Cabl e Loss	Antenn a Gain	Max. EIRP	Max. EIRP	Average		
			(dBm)	(dBm)	(dB)	(dBm)	(mW)			
5.0MHz Band 16 QAM	1/#M id	2502.5	-1.20	4.54	27.75	22.01	158.855	Horizontal	Pass	
		2535	-0.49	4.69	27.72	22.54	179.473	Horizontal	Pass	
		2567.5	0.07	4.71	27.71	23.08	203.002	Horizontal	Pass	
10.0MH z Band 16 QAM	1/#M id	2505	0.19	4.55	27.76	23.40	218.776	Horizontal	Pass	
		2535	-0.43	4.69	27.72	22.60	181.970	Horizontal	Pass	
		2565	-0.25	4.72	27.70	22.73	187.499	Horizontal	Pass	
15.0MH z Band 16 QAM	1/#M id	2507.5	-0.42	4.55	27.77	22.80	190.546	Horizontal	Pass	
		2535	-0.55	4.69	27.72	22.48	177.011	Horizontal	Pass	
		2562.5	0.06	4.72	27.69	23.03	200.909	Horizontal	Pass	
20.0MH z Band 16 QAM	1/#M id	2510	-0.14	4.57	27.78	23.07	202.582	Horizontal	Pass	
		2535	0.08	4.73	27.72	23.07	202.535	Horizontal	Pass	
		2560	-0.73	4.75	27.68	22.20	165.959	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#M id	2502.5	-0.64	4.54	27.75	22.57	180.717	Vertical	Pass	
		2535	-0.36	4.69	27.72	22.67	184.927	Vertical	Pass	
		2567.5	-0.82	4.71	27.71	22.18	165.196	Vertical	Pass	
10.0MH z Band 16 QAM	1/#M id	2505	-0.90	4.55	27.76	22.31	170.216	Vertical	Pass	
		2535	-0.89	4.69	27.72	22.14	163.682	Vertical	Pass	
		2565	0.11	4.72	27.70	23.09	203.610	Vertical	Pass	
15.0MH z Band 16 QAM	1/#M id	2507.5	0.06	4.55	27.77	23.28	212.814	Vertical	Pass	
		2535	-0.07	4.69	27.72	22.96	197.697	Vertical	Pass	
		2562.5	-0.11	4.72	27.69	22.86	193.197	Vertical	Pass	
20.0MH z Band 16 QAM	1/#M id	2510	0.36	4.57	27.78	23.57	227.510	Vertical	Pass	
		2535	0.24	4.73	27.72	23.23	210.378	Vertical	Pass	
		2560	0.10	4.75	27.68	23.03	200.909	Vertical	Pass	

Note:

SG Level= Signal generator output

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

8.6 LTE BAND 12

Radiated Power (ERP) for Band 12											
Mode	RB/ RB SIZE	Freque ncy	Result							Polarizati on Of Max. ERP	Conclu sion
			SG Level (dBm)	Cable Loss (dBm)	Anten na Gain (dB)	Corre ction (dB)	Max. ERP Averag e (dBm)	Max. ERP Averag e (mW)			
1.4MHz Band QPSK	1/#M id	699.7	8.65	1.91	19.21	2.15	23.80	239.883	Vertical	Pass	
		707.5	7.79	1.91	19.26	2.15	22.99	199.067	Vertical	Pass	
		715.3	7.17	1.93	19.34	2.15	22.43	174.985	Vertical	Pass	
3.0MHz Band QPSK	1/#M id	700.5	8.22	1.91	19.21	2.15	23.37	217.270	Vertical	Pass	
		707.5	7.75	1.91	19.26	2.15	22.95	197.242	Vertical	Pass	
		714.5	7.40	1.93	19.34	2.15	22.66	184.502	Vertical	Pass	
5.0MHz Band QPSK	1/#M id	701.5	7.48	1.91	19.23	2.15	22.65	184.077	Vertical	Pass	
		707.5	8.28	1.91	19.26	2.15	23.48	222.844	Vertical	Pass	
		713.5	7.64	1.92	19.33	2.15	22.90	194.984	Vertical	Pass	
10.0MH z Band QPSK	1/#M id	704	7.89	1.91	19.25	2.15	23.08	203.236	Vertical	Pass	
		707.5	8.18	1.91	19.26	2.15	23.38	217.771	Vertical	Pass	
		711	8.18	1.92	19.32	2.15	23.43	220.293	Vertical	Pass	
1.4MHz Band QPSK	1/#M id	699.7	8.26	1.91	19.21	2.15	23.41	219.280	Horizontal	Pass	
		707.5	7.57	1.91	19.26	2.15	22.77	189.234	Horizontal	Pass	
		715.3	7.60	1.93	19.34	2.15	22.86	193.197	Horizontal	Pass	
3.0MHz Band QPSK	1/#M id	700.5	7.60	1.91	19.21	2.15	22.75	188.365	Horizontal	Pass	
		707.5	7.48	1.91	19.26	2.15	22.68	185.353	Horizontal	Pass	
		714.5	8.97	1.93	19.34	2.15	24.23	264.850	Horizontal	Pass	
5.0MHz Band QPSK	1/#M id	701.5	8.08	1.91	19.23	2.15	23.25	211.349	Horizontal	Pass	
		707.5	8.68	1.91	19.26	2.15	23.88	244.343	Horizontal	Pass	
		713.5	8.26	1.92	19.33	2.15	23.52	224.905	Horizontal	Pass	
10.0MH z Band QPSK	1/#M id	704	9.08	1.91	19.25	2.15	24.27	267.301	Horizontal	Pass	
		707.5	7.00	1.91	19.26	2.15	22.20	165.959	Horizontal	Pass	
		711	7.47	1.92	19.32	2.15	22.72	187.068	Horizontal	Pass	

Radiated Power (EIRP) for Band 12											
Mode	RB/ RB SIZE	Freque ncy	Result							Polarizati on Of Max. ERP	Conclu sion
			SG Level	Cable Loss (dBm)	Anten na Gain (dB)	Corre ction (dB)	Max. ERP	Max. ERP			
			(dBm)				Averag e	Averag e			
							(dBm)	(mW)			
1.4MHz Band 16 QAM	1/#M id	699.7	7.31	1.91	19.21	2.15	22.46	176.198	Vertical	Pass	
		707.5	6.37	1.91	19.26	2.15	21.57	143.549	Vertical	Pass	
		715.3	6.08	1.93	19.34	2.15	21.34	136.144	Vertical	Pass	
3.0MHz Band 16 QAM	1/#M id	700.5	7.32	1.91	19.21	2.15	22.47	176.604	Vertical	Pass	
		707.5	7.20	1.91	19.26	2.15	22.40	173.780	Vertical	Pass	
		714.5	7.82	1.93	19.34	2.15	23.08	203.236	Vertical	Pass	
5.0MHz Band 16 QAM	1/#M id	701.5	7.97	1.91	19.23	2.15	23.14	206.063	Vertical	Pass	
		707.5	7.87	1.91	19.26	2.15	23.07	202.768	Vertical	Pass	
		713.5	6.95	1.92	19.33	2.15	22.21	166.341	Vertical	Pass	
10.0MH z Band 16 QAM	1/#M id	704	7.20	1.91	19.25	2.15	22.39	173.380	Vertical	Pass	
		707.5	6.97	1.91	19.26	2.15	22.17	164.816	Vertical	Pass	
		711	8.51	1.92	19.32	2.15	23.76	237.684	Vertical	Pass	
1.4MHz Band 16 QAM	1/#M id	699.7	6.87	1.91	19.21	2.15	22.02	159.221	Horizontal	Pass	
		707.5	7.11	1.91	19.26	2.15	22.31	170.216	Horizontal	Pass	
		715.3	7.13	1.93	19.34	2.15	22.39	173.380	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#M id	700.5	8.38	1.91	19.21	2.15	23.53	225.424	Horizontal	Pass	
		707.5	8.05	1.91	19.26	2.15	23.25	211.349	Horizontal	Pass	
		714.5	7.40	1.93	19.34	2.15	22.66	184.502	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#M id	701.5	7.44	1.91	19.23	2.15	22.61	182.390	Horizontal	Pass	
		707.5	7.25	1.91	19.26	2.15	22.45	175.792	Horizontal	Pass	
		713.5	7.73	1.92	19.33	2.15	22.99	199.067	Horizontal	Pass	
10.0MH z Band 16 QAM	1/#M id	704	8.13	1.91	19.25	2.15	23.32	214.783	Horizontal	Pass	
		707.5	8.66	1.91	19.26	2.15	23.86	243.445	Horizontal	Pass	
		711	7.15	1.92	19.32	2.15	22.40	173.780	Horizontal	Pass	

Note:

SG Level= Signal generator output

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

8.7 LTE BAND 17

Radiated Power (ERP) for Band 17											
Mode	RB/ RB SIZE	Frequ ncy	Result							Polarizati on Of Max. ERP	Conclu sion
			SG Level (dBm)	Cable Loss (dBm)	Anten na Gain (dB)	Corre ction (dB)	Max. ERP Averag e (dBm)	Max. ERP Averag e (mW)			
5.0MHz Band QPSK	1/#M id	706.5	5.31	1.91	19.23	2.15	20.48	111.686	Vertical	Pass	
		710	5.90	1.91	19.26	2.15	21.10	128.825	Vertical	Pass	
		713.5	5.89	1.92	19.33	2.15	21.15	130.317	Vertical	Pass	
10.0MH z Band QPSK	1/#M id	709	4.62	1.91	19.25	2.15	19.81	95.719	Vertical	Pass	
		710	5.59	1.91	19.26	2.15	20.79	119.950	Vertical	Pass	
		711	6.39	1.92	19.32	2.15	21.64	145.881	Vertical	Pass	
5.0MHz Band QPSK	1/#M id	706.5	5.90	1.91	19.23	2.15	21.07	127.938	Horizontal	Pass	
		710	6.39	1.91	19.26	2.15	21.59	144.212	Horizontal	Pass	
		713.5	5.40	1.92	19.33	2.15	20.66	116.413	Horizontal	Pass	
10.0MH z Band QPSK	1/#M id	709	6.19	1.91	19.25	2.15	21.38	137.404	Horizontal	Pass	
		710	6.17	1.91	19.26	2.15	21.37	137.088	Horizontal	Pass	
		711	6.54	1.92	19.32	2.15	21.79	151.008	Horizontal	Pass	

Radiated Power (ERP) for Band 17											
Mode	RB/ RB SIZE	Freque ncy	Result							Polarizati on Of Max. ERP	Conclu sion
			SG Level	Cable Loss (dBm)	Anten na Gain (dB)	Corre ction (dB)	Max. ERP	Max. ERP			
			(dBm)				Averag e	Averag e			
							(dBm)	(mW)			
5.0MHz Band 16 QAM	1/#M id	706.5	5.59	1.91	19.23	2.15	20.76	119.124	Vertical	Pass	
		710	5.61	1.91	19.26	2.15	20.81	120.504	Vertical	Pass	
		713.5	5.43	1.92	19.33	2.15	20.69	117.220	Vertical	Pass	
10.0MH z Band 16 QAM	1/#M id	709	5.14	1.91	19.25	2.15	20.33	107.895	Vertical	Pass	
		710	4.47	1.91	19.26	2.15	19.67	92.683	Vertical	Pass	
		711	5.32	1.92	19.32	2.15	20.57	114.025	Vertical	Pass	
5.0MHz Band 16 QAM	1/#M id	706.5	4.54	1.91	19.23	2.15	19.71	93.541	Horizontal	Pass	
		710	5.70	1.91	19.26	2.15	20.90	123.027	Horizontal	Pass	
		713.5	5.82	1.92	19.33	2.15	21.08	128.233	Horizontal	Pass	
10.0MH z Band 16 QAM	1/#M id	709	5.07	1.91	19.25	2.15	20.26	106.170	Horizontal	Pass	
		710	6.66	1.91	19.26	2.15	21.86	153.462	Horizontal	Pass	
		711	5.57	1.92	19.32	2.15	20.82	120.781	Horizontal	Pass	

Note:

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	-52.17	4.04	33.51	-22.70	-13	-9.70	Horizontal
3701.4	-56.55	4.04	33.51	-27.08	-13	-14.08	Vertical
5552.1	-47.68	5.24	35.84	-17.08	-13	-4.08	Vertical
5552.1	-50.87	5.24	35.84	-20.27	-13	-7.27	Horizontal
213.7	-57.29	1.62	17.46	-41.45	-13	-28.45	Vertical
97.9	-71.80	1.56	16.43	-56.93	-13	-43.93	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-50.61	4.04	33.56	-21.09	-13	-8.09	Horizontal
3760.0	-50.48	4.04	33.56	-20.96	-13	-7.96	Vertical
5640.0	-48.77	5.24	35.91	-18.10	-13	-5.10	Vertical
5640.0	-57.34	5.24	35.91	-26.67	-13	-13.67	Horizontal
163.0	-53.33	1.66	16.60	-38.39	-13	-25.39	Vertical
203.7	-62.42	1.44	16.87	-46.99	-13	-33.99	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-52.19	4.04	34.00	-22.23	-13	-9.23	Horizontal
3818.6	-53.28	4.04	34.00	-23.32	-13	-10.32	Vertical
5727.9	-56.32	5.24	36.04	-25.52	-13	-12.52	Vertical
5727.9	-55.32	5.24	36.04	-24.52	-13	-11.52	Horizontal
92.2	-66.09	1.52	15.50	-52.11	-13	-39.11	Vertical
228.1	-49.02	1.51	16.08	-34.45	-13	-21.45	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	-52.09	4.07	33.54	-22.62	-13	-9.62	Horizontal
3720.0	-52.67	4.07	33.54	-23.20	-13	-10.20	Vertical
5580.0	-48.78	5.28	35.86	-18.20	-13	-5.20	Vertical
5580.0	-51.47	5.28	35.86	-20.89	-13	-7.89	Horizontal
182.5	-64.06	1.38	16.92	-48.52	-13	-35.52	Vertical
257.6	-72.04	1.47	17.11	-56.40	-13	-43.40	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-52.69	4.04	33.56	-23.17	-13	-10.17	Horizontal
3760.0	-49.91	4.04	33.56	-20.39	-13	-7.39	Vertical
5640.0	-50.88	5.24	35.91	-20.21	-13	-7.21	Vertical
5640.0	-50.99	5.24	35.91	-20.32	-13	-7.32	Horizontal
182.7	-69.28	1.42	16.59	-54.11	-13	-41.11	Vertical
118.1	-73.97	1.69	17.92	-57.74	-13	-44.74	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-48.91	4.04	34.00	-18.95	-13	-5.95	Horizontal
3800.0	-48.41	4.04	34.00	-18.45	-13	-5.45	Vertical
5700.0	-51.84	5.24	36.04	-21.04	-13	-8.04	Vertical
5700.0	-55.81	5.24	36.04	-25.01	-13	-12.01	Horizontal
265.8	-71.44	1.37	17.18	-55.63	-13	-42.63	Vertical
171.8	-56.49	1.44	15.84	-42.09	-13	-29.09	Horizontal

Note: $P_{Mea}(dBm) = Power(dBm) + ARpl(dBm)$
 . Over Limit = $P_{Mea}(dBm) - Limit(dBm)$
 . We test both H direction and V direction, recorded worst case direction.

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	-51.18	4.02	29.80	-25.40	-13	-12.40	Horizontal
3421.4	-50.59	4.02	29.80	-24.81	-13	-11.81	Vertical
5132.1	-50.63	5.24	35.84	-20.03	-13	-7.03	Vertical
5132.1	-55.81	5.24	35.84	-25.21	-13	-12.21	Horizontal
267.2	-68.36	1.36	16.78	-52.94	-13	-39.94	Vertical
230.6	-65.00	1.66	16.00	-50.66	-13	-37.66	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-56.72	4.03	30.00	-30.75	-13	-17.75	Horizontal
3465.0	-57.53	4.03	30.00	-31.56	-13	-18.56	Vertical
5197.5	-53.99	5.25	35.86	-23.38	-13	-10.38	Vertical
5197.5	-58.19	5.25	35.86	-27.58	-13	-14.58	Horizontal
206.4	-65.73	1.40	15.20	-51.93	-13	-38.93	Vertical
228.3	-53.88	1.54	15.56	-39.86	-13	-26.86	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-54.10	4.05	30.01	-28.14	-13	-15.14	Horizontal
3508.6	-57.10	4.05	30.01	-31.14	-13	-18.14	Vertical
5262.9	-55.55	5.26	35.86	-24.95	-13	-11.95	Vertical
5262.9	-51.08	5.26	35.86	-20.48	-13	-7.48	Horizontal
233.4	-60.92	1.44	15.74	-46.62	-13	-33.62	Vertical
265.7	-59.08	1.77	17.37	-43.48	-13	-30.48	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	-55.84	4.02	29.80	-30.06	-13	-17.06	Horizontal
3440.0	-55.91	4.02	29.80	-30.13	-13	-17.13	Vertical
5160.0	-54.82	5.24	35.84	-24.22	-13	-11.22	Vertical
5160.0	-52.93	5.24	35.84	-22.33	-13	-9.33	Horizontal
168.3	-62.64	1.75	17.24	-47.15	-13	-34.15	Vertical
115.9	-69.33	1.43	16.67	-54.09	-13	-41.09	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-53.93	4.03	30.00	-27.96	-13	-14.96	Horizontal
3465.0	-49.69	4.03	30.00	-23.72	-13	-10.72	Vertical
5197.5	-55.83	5.25	35.86	-25.22	-13	-12.22	Vertical
5197.5	-54.09	5.25	35.86	-23.48	-13	-10.48	Horizontal
88.3	-69.98	1.68	16.76	-54.90	-13	-41.90	Vertical
147.9	-49.53	1.47	15.90	-35.10	-13	-22.10	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-54.92	2.91	27.68	-30.15	-13	-17.15	Horizontal
3490.0	-55.59	2.91	27.68	-30.82	-13	-17.82	Vertical
5235.0	-56.16	5.26	35.86	-25.56	-13	-12.56	Vertical
5235.0	-50.68	5.26	35.86	-20.08	-13	-7.08	Horizontal
245.2	-70.84	1.44	15.34	-56.94	-13	-43.94	Vertical
118.0	-58.07	1.50	17.54	-42.03	-13	-29.03	Horizontal

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

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

. We test both H direction and V direction, recorded worst case direction.

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	-52.34	2.78	27.50	-27.62	-13	-14.62	Horizontal
1649.4	-50.71	2.78	27.50	-25.99	-13	-12.99	Vertical
2474.1	-52.46	2.90	27.80	-27.56	-13	-14.56	Vertical
2474.1	-55.62	2.90	27.80	-30.72	-13	-17.72	Horizontal
189.8	-54.11	1.59	15.57	-40.13	-13	-27.13	Vertical
208.0	-50.77	1.55	16.40	-35.92	-13	-22.92	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-51.37	2.80	27.48	-26.69	-13	-13.69	Horizontal
1673.0	-55.43	2.80	27.48	-30.75	-13	-17.75	Vertical
2509.5	-55.63	2.91	27.70	-30.84	-13	-17.84	Vertical
2509.5	-51.08	2.91	27.70	-26.29	-13	-13.29	Horizontal
211.1	-68.38	1.34	15.10	-54.62	-13	-41.62	Vertical
257.9	-49.57	1.48	16.85	-34.20	-13	-21.20	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-49.84	2.82	27.43	-25.23	-13	-12.23	Horizontal
1696.6	-52.42	2.82	27.43	-27.81	-13	-14.81	Vertical
2544.9	-49.62	2.92	27.74	-24.80	-13	-11.80	Vertical
2544.9	-53.24	2.92	27.74	-28.42	-13	-15.42	Horizontal
83.8	-53.30	1.62	15.65	-39.27	-13	-26.27	Vertical
277.8	-65.67	1.56	16.50	-50.73	-13	-37.73	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	-56.88	2.78	27.50	-32.16	-13	-19.16	Horizontal
1658.0	-50.45	2.78	27.50	-25.73	-13	-12.73	Vertical
2487.0	-52.12	2.90	27.80	-27.22	-13	-14.22	Vertical
2487.0	-53.52	2.90	27.80	-28.62	-13	-15.62	Horizontal
239.9	-70.61	1.67	17.14	-55.14	-13	-42.14	Vertical
273.4	-49.51	1.55	17.29	-33.77	-13	-20.77	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-51.21	2.80	27.48	-26.53	-13	-13.53	Horizontal
1673.0	-56.62	2.80	27.48	-31.94	-13	-18.94	Vertical
2509.5	-55.97	2.91	27.70	-31.18	-13	-18.18	Vertical
2509.5	-56.93	2.91	27.70	-32.14	-13	-19.14	Horizontal
86.6	-72.46	1.43	16.60	-57.29	-13	-44.29	Vertical
183.0	-68.23	1.67	17.69	-52.21	-13	-39.21	Horizontal
Test Results for High Channel 844MHz							
1688.0	-51.17	2.82	27.43	-26.56	-13	-13.56	Horizontal
1688.0	-56.95	2.82	27.43	-32.34	-13	-19.34	Vertical
2532.0	-56.82	2.92	27.74	-32.00	-13	-19.00	Vertical
2532.0	-53.31	2.92	27.74	-28.49	-13	-15.49	Horizontal
273.0	-50.94	1.38	16.18	-36.14	-13	-23.14	Vertical
152.8	-68.77	1.69	15.78	-54.68	-13	-41.68	Horizontal

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

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

. We test both H direction and V direction, recorded worst case direction.

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	-63.28	5.23	35.81	-32.70	-25	-7.70	Horizontal
5005.0	-63.56	5.23	35.81	-32.98	-25	-7.98	Vertical
7507.5	-70.69	5.67	36.85	-39.51	-25	-14.51	Vertical
7507.5	-63.42	5.67	36.85	-32.24	-25	-7.24	Horizontal
273.3	-71.65	1.58	16.88	-56.35	-25	-31.35	Vertical
276.1	-68.88	1.75	15.52	-55.11	-25	-30.11	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-70.26	5.23	35.82	-39.67	-25	-14.67	Horizontal
5070.0	-70.12	5.23	35.82	-39.53	-25	-14.53	Vertical
7605.0	-66.54	5.67	36.85	-35.36	-25	-10.36	Vertical
7605.0	-68.39	5.67	36.85	-37.21	-25	-12.21	Horizontal
501.6	-66.99	1.43	17.85	-50.57	-25	-25.57	Vertical
350.0	-80.02	1.60	17.10	-64.52	-25	-39.52	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-72.36	5.24	35.83	-41.77	-25	-16.77	Horizontal
5135.0	-68.91	5.24	35.83	-38.32	-25	-13.32	Vertical
7702.5	-67.08	5.68	36.87	-35.89	-25	-10.89	Vertical
7702.5	-69.24	5.68	36.87	-38.05	-25	-13.05	Horizontal
457.1	-76.62	1.63	15.78	-62.47	-25	-37.47	Vertical
161.2	-75.01	1.69	17.58	-59.12	-25	-34.12	Horizontal

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

Test Results for Low Channel 2510MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020.0	-71.02	5.23	35.82	-40.43	-25	-15.43	Horizontal
5020.0	-65.23	5.23	35.82	-34.64	-25	-9.64	Vertical
7530.0	-71.05	5.67	36.86	-39.86	-25	-14.86	Vertical
7530.0	-64.26	5.67	36.86	-33.07	-25	-8.07	Horizontal
124.4	-64.72	1.72	15.25	-51.19	-25	-26.19	Vertical
547.9	-69.48	1.45	16.53	-54.40	-25	-29.40	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-71.58	5.23	35.82	-40.99	-25	-15.99	Horizontal
5070.0	-65.53	5.23	35.82	-34.94	-25	-9.94	Vertical
7605.0	-64.49	5.67	36.85	-33.31	-25	-8.31	Vertical
7605.0	-74.62	5.67	36.85	-43.44	-25	-18.44	Horizontal
311.7	-73.90	1.52	16.37	-59.05	-25	-34.05	Vertical
403.2	-75.92	1.32	15.65	-61.59	-25	-36.59	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-70.97	5.24	35.83	-40.38	-25	-15.38	Horizontal
5120.0	-65.71	5.24	35.83	-35.12	-25	-10.12	Vertical
7680.0	-72.16	5.70	36.88	-40.98	-25	-15.98	Vertical
7680.0	-66.63	5.70	36.88	-35.45	-25	-10.45	Horizontal
464.8	-69.53	1.49	16.05	-54.97	-25	-29.97	Vertical
567.7	-82.56	1.32	17.22	-66.66	-25	-41.66	Horizontal

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

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

. We test both H direction and V direction, recorded worst case direction.

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	-52.75	2.60	27.20	-28.15	-13	-15.15	Horizontal
1399.4	-52.95	2.60	27.20	-28.35	-13	-15.35	Vertical
2099.1	-46.66	2.85	27.54	-21.97	-13	-8.97	Vertical
2099.1	-53.31	2.85	27.54	-28.62	-13	-15.62	Horizontal
223.8	-67.46	1.36	16.23	-52.59	-13	-39.59	Vertical
98.5	-52.16	1.44	17.70	-35.90	-13	-22.90	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-52.58	2.61	27.28	-27.91	-13	-14.91	Horizontal
1415.0	-49.23	2.61	27.28	-24.56	-13	-11.56	Vertical
2122.5	-50.50	2.87	27.59	-25.78	-13	-12.78	Vertical
2122.5	-52.90	2.87	27.59	-28.18	-13	-15.18	Horizontal
128.3	-48.02	1.47	15.83	-33.66	-13	-20.66	Vertical
94.0	-61.83	1.39	15.60	-47.62	-13	-34.62	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-52.87	2.63	27.28	-28.22	-13	-15.22	Horizontal
1430.6	-55.22	2.63	27.28	-30.57	-13	-17.57	Vertical
2145.9	-49.44	2.88	27.60	-24.72	-13	-11.72	Vertical
2145.9	-52.69	2.88	27.60	-27.97	-13	-14.97	Horizontal
84.0	-68.69	1.46	17.46	-52.69	-13	-39.69	Vertical
123.9	-54.82	1.45	16.47	-39.80	-13	-26.80	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	-50.01	2.61	27.26	-25.36	-13	-12.36	Horizontal
1408.0	-50.38	2.61	27.26	-25.73	-13	-12.73	Vertical
2112.0	-48.24	2.87	27.58	-23.53	-13	-10.53	Vertical
2112.0	-59.59	2.87	27.58	-34.88	-13	-21.88	Horizontal
89.4	-65.69	1.64	17.36	-49.97	-13	-36.97	Vertical
241.2	-50.47	1.42	17.63	-34.26	-13	-21.26	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-52.23	2.61	27.28	-27.56	-13	-14.56	Horizontal
1415.0	-56.98	2.61	27.28	-32.31	-13	-19.31	Vertical
2122.5	-54.14	2.87	27.59	-29.42	-13	-16.42	Vertical
2122.5	-56.92	2.87	27.59	-32.20	-13	-19.20	Horizontal
87.3	-57.30	1.38	15.07	-43.61	-13	-30.61	Vertical
274.8	-62.97	1.65	17.29	-47.33	-13	-34.33	Horizontal
Test Results for High Channel 711MHz							
1422.0	-55.24	2.62	27.28	-30.58	-13	-17.58	Horizontal
1422.0	-56.47	2.62	27.28	-31.81	-13	-18.81	Vertical
2133.0	-53.41	2.87	27.60	-28.68	-13	-15.68	Vertical
2133.0	-49.40	2.87	27.60	-24.67	-13	-11.67	Horizontal
137.0	-58.75	1.46	15.62	-44.59	-13	-31.59	Vertical
98.2	-51.82	1.62	16.38	-37.06	-13	-24.06	Horizontal

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

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

. We test both H direction and V direction, recorded worst case direction.

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	-50.13	2.61	27.28	-25.46	-13	-12.46	Horizontal
1413.0	-48.43	2.61	27.28	-23.76	-13	-10.76	Vertical
2119.5	-45.58	2.87	27.59	-20.86	-13	-7.86	Vertical
2119.5	-59.62	2.87	27.59	-34.90	-13	-21.90	Horizontal
258.5	-50.77	1.79	17.04	-35.52	-13	-22.52	Vertical
278.4	-66.08	1.52	16.25	-51.35	-13	-38.35	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-52.93	2.62	27.30	-28.25	-13	-15.25	Horizontal
1420.0	-53.83	2.62	27.30	-29.15	-13	-16.15	Vertical
2130.0	-51.28	2.87	27.62	-26.53	-13	-13.53	Vertical
2130.0	-52.76	2.87	27.62	-28.01	-13	-15.01	Horizontal
135.5	-64.54	1.48	16.30	-49.72	-13	-36.72	Vertical
255.4	-52.76	1.55	17.46	-36.85	-13	-23.85	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-50.14	2.66	27.28	-25.52	-13	-12.52	Horizontal
1427.0	-55.67	2.66	27.28	-31.05	-13	-18.05	Vertical
2140.5	-52.90	2.88	27.60	-28.18	-13	-15.18	Vertical
2140.5	-51.41	2.88	27.60	-26.69	-13	-13.69	Horizontal
94.9	-66.72	1.79	16.84	-51.67	-13	-38.67	Vertical
169.2	-66.39	1.52	15.01	-52.90	-13	-39.90	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	-55.52	2.62	27.30	-30.84	-13	-17.84	Horizontal
1418.0	-56.46	2.62	27.30	-31.78	-13	-18.78	Vertical
2127.0	-48.28	2.87	27.62	-23.53	-13	-10.53	Vertical
2127.0	-56.58	2.87	27.62	-31.83	-13	-18.83	Horizontal
256.9	-63.19	1.39	15.14	-49.44	-13	-36.44	Vertical
222.9	-61.69	1.40	17.69	-45.40	-13	-32.40	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-48.73	2.62	27.30	-24.05	-13	-11.05	Horizontal
1420.0	-49.44	2.62	27.30	-24.76	-13	-11.76	Vertical
2130.0	-49.56	2.87	27.62	-24.81	-13	-11.81	Vertical
2130.0	-52.30	2.87	27.62	-27.55	-13	-14.55	Horizontal
121.6	-67.69	1.75	17.20	-52.24	-13	-39.24	Vertical
105.0	-68.75	1.68	16.42	-54.01	-13	-41.01	Horizontal
Test Results for High Channel 711MHz							
1422.0	-49.34	2.62	27.30	-24.66	-13	-11.66	Horizontal
1422.0	-53.65	2.62	27.30	-28.97	-13	-15.97	Vertical
2133.0	-58.23	2.87	27.62	-33.48	-13	-20.48	Vertical
2133.0	-49.42	2.87	27.62	-24.67	-13	-11.67	Horizontal
211.8	-69.22	1.63	17.50	-53.35	-13	-40.35	Vertical
222.8	-61.27	1.75	16.07	-46.95	-13	-33.95	Horizontal

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

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

. We test both H direction and V direction, recorded worst case direction.

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 3.4V, Normal, DC 3.85V and High voltage, DC 4.2V.

Frequency Stability vs Temperature:

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

Frequency Stability vs Voltage:

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

MODES TESTED

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

RESULTS

See the following pages.

10.1 LTE BAND 2

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1880	-5.97	-0.003176	2.5
3.85	1880	-6.22	-0.003309	2.5
4.2	1880	-7.61	-0.004048	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	-3.04	-0.001617	2.5
Extreme (50C)	1880	-7.05	-0.003750	2.5
Extreme (40C)	1880	-0.94	-0.000500	2.5
Extreme (30C)	1880	-8.21	-0.004367	2.5
Extreme (10C)	1880	-7.45	-0.003963	2.5
Extreme (0C)	1880	-7.52	-0.004000	2.5
Extreme (-10C)	1880	-7.70	-0.004096	2.5
Extreme (-20C)	1880	-8.12	-0.004319	2.5
Extreme (-30C)	1880	-4.77	-0.002537	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	-8.31	-0.004420	2.5
3.85	1880	-6.48	-0.003447	2.5
4.2	1880	-4.26	-0.002266	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	-7.44	-0.003957	2.5
Extreme (50C)	1880	-10.23	-0.005441	2.5
Extreme (40C)	1880	-11.79	-0.006271	2.5
Extreme (30C)	1880	-7.55	-0.004016	2.5
Extreme (10C)	1880	-4.92	-0.002617	2.5
Extreme (0C)	1880	-10.36	-0.005511	2.5
Extreme (-10C)	1880	-3.34	-0.001777	2.5
Extreme (-20C)	1880	-7.20	-0.003830	2.5
Extreme (-30C)	1880	-7.43	-0.003952	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	-26.45	-0.015267	2.5
3.85	1732.5	-27.22	-0.015711	2.5
4.2	1732.5	-23.98	-0.013841	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	-27.24	-0.015723	2.5
Extreme (50C)	1732.5	-25.83	-0.014909	2.5
Extreme (40C)	1732.5	-22.33	-0.012889	2.5
Extreme (30C)	1732.5	-21.39	-0.012346	2.5
Extreme (10C)	1732.5	-21.78	-0.012571	2.5
Extreme (0C)	1732.5	-21.48	-0.012398	2.5
Extreme (-10C)	1732.5	-25.93	-0.014967	2.5
Extreme (-20C)	1732.5	-20.66	-0.011925	2.5
Extreme (-30C)	1732.5	-29.85	-0.017229	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	-8.62	-0.004975	2.5
3.85	1732.5	-9.11	-0.005258	2.5
4.2	1732.5	-9.9	-0.005714	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	-4.41	-0.002545	2.5
Extreme (50C)	1732.5	-6.71	-0.003873	2.5
Extreme (40C)	1732.5	-4.04	-0.002332	2.5
Extreme (30C)	1732.5	-4.53	-0.002615	2.5
Extreme (10C)	1732.5	-4.10	-0.002367	2.5
Extreme (0C)	1732.5	-6.01	-0.003469	2.5
Extreme (-10C)	1732.5	-9.55	-0.005512	2.5
Extreme (-20C)	1732.5	-6.24	-0.003602	2.5
Extreme (-30C)	1732.5	-11.22	-0.006476	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	-6.63	-0.007926	2.5
3.85	836.5	-8.14	-0.009731	2.5
4.2	836.5	-7.60	-0.009085	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	-8.03	-0.009600	2.5
Extreme (50C)	836.5	-1.90	-0.002271	2.5
Extreme (40C)	836.5	-5.76	-0.006886	2.5
Extreme (30C)	836.5	-4.07	-0.004866	2.5
Extreme (10C)	836.5	-8.38	-0.010018	2.5
Extreme (0C)	836.5	-5.24	-0.006264	2.5
Extreme (-10C)	836.5	-4.94	-0.005906	2.5
Extreme (-20C)	836.5	-3.68	-0.004399	2.5
Extreme (-30C)	836.5	-9.85	-0.011775	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	-6.07	-0.007256	2.5
3.85	836.5	-0.19	-0.000227	2.5
4.2	836.5	-7.88	-0.009420	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	-2.46	-0.002941	2.5
Extreme (50C)	836.5	-2.72	-0.003252	2.5
Extreme (40C)	836.5	-3.67	-0.004387	2.5
Extreme (30C)	836.5	-6.28	-0.007507	2.5
Extreme (10C)	836.5	-1.94	-0.002319	2.5
Extreme (0C)	836.5	-4.78	-0.005714	2.5
Extreme (-10C)	836.5	-2.77	-0.003311	2.5
Extreme (-20C)	836.5	-9.79	-0.011704	2.5
Extreme (-30C)	836.5	-8.90	-0.010640	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	-6.79	-0.002679	2.5
3.85	2535	-5.35	-0.002110	2.5
4.2	2535	-5.68	-0.002241	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	-1.13	-0.000446	2.5
Extreme (50C)	2535	-3.94	-0.001554	2.5
Extreme (40C)	2535	-8.40	-0.003314	2.5
Extreme (30C)	2535	-3.59	-0.001416	2.5
Extreme (10C)	2535	-6.96	-0.002746	2.5
Extreme (0C)	2535	-5.60	-0.002209	2.5
Extreme (-10C)	2535	-10.56	-0.004166	2.5
Extreme (-20C)	2535	-6.90	-0.002722	2.5
Extreme (-30C)	2535	-3.90	-0.001538	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	-7.78	-0.003069	2.5
3.85	2535	-5.36	-0.002114	2.5
4.2	2535	-5.39	-0.002126	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	-6.03	-0.002379	2.5
Extreme (50C)	2535	-3.30	-0.001302	2.5
Extreme (40C)	2535	-6.73	-0.002655	2.5
Extreme (30C)	2535	-2.92	-0.001152	2.5
Extreme (10C)	2535	-8.39	-0.003310	2.5
Extreme (0C)	2535	-3.52	-0.001389	2.5
Extreme (-10C)	2535	-11.42	-0.004505	2.5
Extreme (-20C)	2535	-5.69	-0.002245	2.5
Extreme (-30C)	2535	-7.10	-0.002801	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	-9.04	-0.012777	2.5
3.85	707.5	-11.87	-0.016777	2.5
4.2	707.5	-5.26	-0.007435	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	-12.50	-0.017668	2.5
Extreme (50C)	707.5	-9.91	-0.014007	2.5
Extreme (40C)	707.5	-12.48	-0.017640	2.5
Extreme (30C)	707.5	-3.65	-0.005159	2.5
Extreme (10C)	707.5	-12.92	-0.018261	2.5
Extreme (0C)	707.5	-9.70	-0.013710	2.5
Extreme (-10C)	707.5	-8.22	-0.011618	2.5
Extreme (-20C)	707.5	-7.26	-0.010261	2.5
Extreme (-30C)	707.5	-4.26	-0.006021	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	-6.26	-0.008848	2.5
3.85	707.5	-2.36	-0.003336	2.5
4.2	707.5	-9.51	-0.013442	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	-8.33	-0.011774	2.5
Extreme (50C)	707.5	-5.11	-0.007223	2.5
Extreme (40C)	707.5	-6.13	-0.008664	2.5
Extreme (30C)	707.5	-5.98	-0.008452	2.5
Extreme (10C)	707.5	-1.34	-0.001894	2.5
Extreme (0C)	707.5	-8.03	-0.011350	2.5
Extreme (-10C)	707.5	-1.84	-0.002601	2.5
Extreme (-20C)	707.5	-0.35	-0.000495	2.5
Extreme (-30C)	707.5	-3.47	-0.004905	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	-5.73	-0.008070	2.5
3.85	710.0	-0.55	-0.000775	2.5
4.2	710.0	-0.34	-0.000479	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	-6.24	-0.008789	2.5
Extreme (50C)	710.0	-9.56	-0.013465	2.5
Extreme (40C)	710.0	-4.28	-0.006028	2.5
Extreme (30C)	710.0	-7.93	-0.011169	2.5
Extreme (10C)	710.0	-5.83	-0.008211	2.5
Extreme (0C)	710.0	0.02	0.000028	2.5
Extreme (-10C)	710.0	-8.88	-0.012507	2.5
Extreme (-20C)	710.0	-8.69	-0.012239	2.5
Extreme (-30C)	710.0	-7.14	-0.010056	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	-6.29	-0.008859	2.5
3.85	710.0	-9.31	-0.013113	2.5
4.2	710.0	-4.98	-0.007014	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	-1.21	-0.001704	2.5
Extreme (50C)	710.0	-1.02	-0.001437	2.5
Extreme (40C)	710.0	-4.03	-0.005676	2.5
Extreme (30C)	710.0	-4.98	-0.007014	2.5
Extreme (10C)	710.0	-8.57	-0.012070	2.5
Extreme (0C)	710.0	-7.23	-0.010183	2.5
Extreme (-10C)	710.0	-8.58	-0.012085	2.5
Extreme (-20C)	710.0	-0.33	-0.000465	2.5
Extreme (-30C)	710.0	-9.19	-0.012944	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.

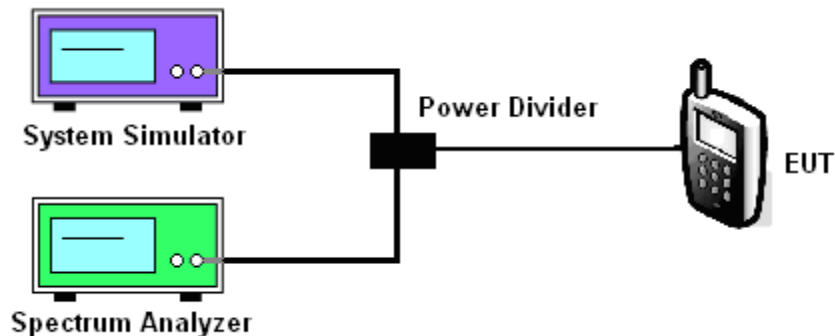
11.2 Measuring Instruments

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 Band2
- LTE Band 4
- LTE Band5
- LTE Band 7
- LTE Band 12
- LTE Band 17

Test data reference attachment.

----END OF REPORT----