

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

FCC ID: ZSW-30-101

Product: Mobile Phone

Trade Mark: Bmobile

Model Number: BL54

Family Model: BL54 PRO

Report No.: S20091501501005

Issue Date: 03 Nov. 2020

Prepared for

b mobile HK Limited

Flat 18; 14/F Block 1; Golden Industrial Building;16-26 KwaiTak Street;
KwaiChung;New Territories; Hong Kong

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name : b mobile HK Limited
Address: Flat 18; 14/F Block 1; Golden Industrial Building;16-26 KwaiTak Street; KwaiChung;New Territories; Hong Kong
Manufacturer's Name: b mobile HK Limited
Address: Flat 18; 14/F Block 1; Golden Industrial Building;16-26 KwaiTak Street; KwaiChung;New Territories; Hong Kong
Product name: Mobile Phone
Model and/or type reference : BL54
Family Model: BL54 PRO
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 : 15 Sep. 2020 ~03 Nov, 2020

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(Jason Chen)

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(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	Bmobile
Model Name	BL54
Family Model	BL54 PRO
Model Difference	All models are the same circuit and RF module, except the Model
FCC ID:	ZSW-30-101
Frequency Bands:	U.S. Bands: <input checked="" type="checkbox"/> LTE FDD Band 2, 4, 5, 7
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;
Type of Modulation:	QPSK/16QAM
Antenna:	PIFA Antenna
Antenna gain:	Band 2: 0dBi, Band 4: -1dBi, Band 5: -2dBi, Band 7: 1dBi,
Power Supply:	DC 3.8V/2500mAh from battery or DC 5V from Adapter.
Adapter:	Input: 100-240V~50/60Hz 0.2A Output: 5V---1A
Extreme Vol. Limits:	DC 3.4V to DC 4.4V (Nominal DC 3.8V) (Note 1)
HW Version	Bmobile_BL54_HW_V1.0
SW Version	Bmobile_BL54_OM_LATAM_V001
** 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: ZSW-30-101** 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.

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

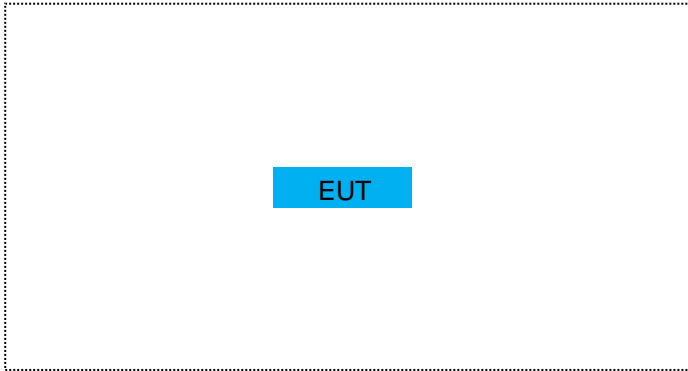
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Mobile Phone	BL54	FCC ID: ZSW-30-101	EUT

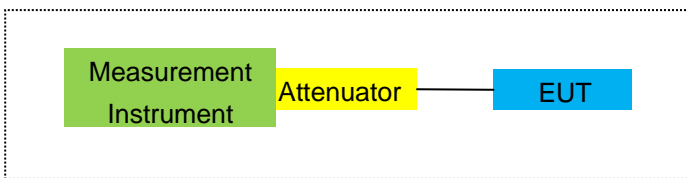
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

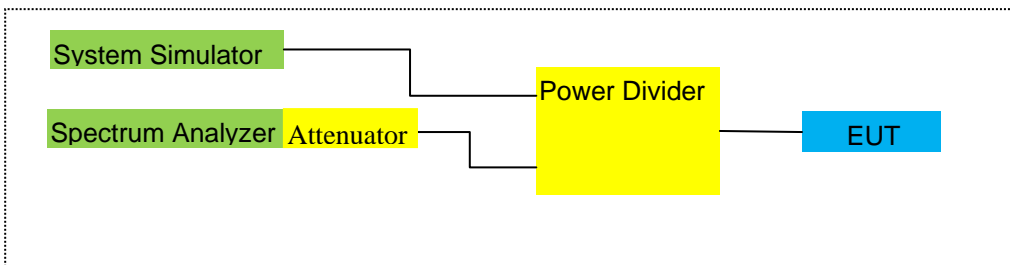
For Radiated Test Cases



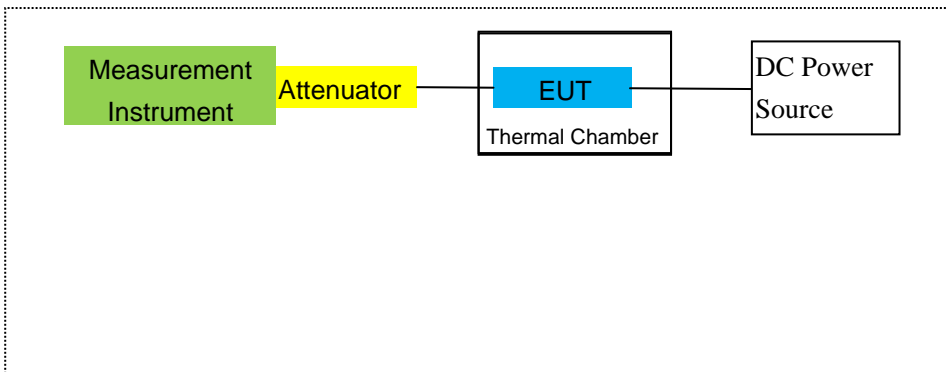
For Conducted Output Power



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 Band2
- LTE Band 4
- LTE Band 5
- LTE Band 7

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

RESULTS

Test data reference attachment.

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

7. OUT OF BAND EMISSIONS

RULE PART(S)

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

LIMITS

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

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

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

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

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

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

TEST PROCEDURE

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

For each out of band emissions measurement:

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

MODES TESTED

- LTE Band2
- LTE Band 4
- LTE Band 5
- LTE Band 7

7.1 MEASUREMENT METHOD

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

Test data reference attachment.

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

8. RADIATED MEASUREMENT

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

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

LIMITS:

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

TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17

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

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

MODES TESTED

- LTE Band2
- LTE Band 4
- LTE Band 5
- LTE Band 7

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	-1.20	3.76	28.24	23.28	212.814	Horizontal	Pass
		1880	-1.01	3.91	28.22	23.30	213.796	Horizontal	Pass
		1909.3	-0.92	3.93	28.20	23.35	216.272	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-1.26	3.77	28.23	23.20	208.930	Horizontal	Pass
		1880	-1.11	3.91	28.24	23.22	209.894	Horizontal	Pass
		1908.5	-0.98	3.94	28.25	23.33	215.278	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-1.15	3.77	28.31	23.39	218.273	Horizontal	Pass
		1880	-0.77	3.91	28.22	23.54	225.944	Horizontal	Pass
		1907.5	-0.70	3.94	28.20	23.56	226.986	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-1.01	3.79	28.33	23.53	225.424	Horizontal	Pass
		1880	-0.71	3.95	28.22	23.56	226.986	Horizontal	Pass
		1905	-0.60	3.97	28.19	23.62	230.144	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-0.97	3.79	28.34	23.58	228.034	Horizontal	Pass
		1880	-0.76	3.95	28.22	23.51	224.388	Horizontal	Pass
		1902.5	-0.62	3.97	28.18	23.59	228.560	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-0.96	3.81	28.35	23.58	228.034	Horizontal	Pass
		1880	-0.63	3.96	28.22	23.63	230.675	Horizontal	Pass
		1900	-0.57	4.00	28.16	23.59	228.560	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-2.13	3.76	28.24	22.35	171.791	Vertical	Pass
		1880	-2.17	3.91	28.22	22.14	163.682	Vertical	Pass
		1909.3	-1.60	3.93	28.20	22.67	184.927	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-1.49	3.77	28.23	22.97	198.153	Vertical	Pass
		1880	-1.35	3.91	28.24	22.98	198.609	Vertical	Pass
		1908.5	-2.21	3.94	28.25	22.10	162.181	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-1.57	3.77	28.31	22.97	198.153	Vertical	Pass
		1880	-2.29	3.91	28.22	22.02	159.221	Vertical	Pass
		1907.5	-1.30	3.94	28.20	22.96	197.697	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	-1.66	3.79	28.33	22.88	194.089	Vertical	Pass
		1880	-2.11	3.95	28.22	22.16	164.437	Vertical	Pass
		1905	-1.53	3.97	28.19	22.69	185.780	Vertical	Pass
15.0MHz	1/#Mid	1857.5	-2.07	3.79	28.34	22.48	177.011	Vertical	Pass

Band QPSK		1880	-2.17	3.95	28.22	22.10	162.181	Vertical	Pass
		1902.5	-1.61	3.97	28.18	22.60	181.970	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	1860	-2.30	3.81	28.35	22.24	167.494	Vertical	Pass
		1880	-1.42	3.96	28.22	22.84	192.309	Vertical	Pass
		1900	-1.38	4.00	28.16	22.78	189.671	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	-2.32	3.76	28.24	22.16	164.437	Horizontal	Pass
		1880	-1.79	3.91	28.22	22.52	178.649	Horizontal	Pass
		1909.3	-1.72	3.93	28.20	22.55	179.887	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-1.82	3.77	28.23	22.64	183.654	Horizontal	Pass
		1880	-1.90	3.91	28.24	22.43	174.985	Horizontal	Pass
		1908.5	-2.11	3.94	28.25	22.20	165.959	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-1.76	3.77	28.31	22.78	189.671	Horizontal	Pass
		1880	-1.67	3.91	28.22	22.64	183.654	Horizontal	Pass
		1907.5	-1.35	3.94	28.20	22.91	195.434	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-1.81	3.79	28.33	22.73	187.499	Horizontal	Pass
		1880	-1.80	3.95	28.22	22.47	176.604	Horizontal	Pass
		1905	-1.27	3.97	28.19	22.95	197.242	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-1.79	3.79	28.34	22.76	188.799	Horizontal	Pass
		1880	-1.58	3.95	28.22	22.69	185.780	Horizontal	Pass
		1902.5	-1.54	3.97	28.18	22.67	184.927	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-1.68	3.81	28.35	22.86	193.197	Horizontal	Pass
		1880	-1.38	3.96	28.22	22.88	194.089	Horizontal	Pass
		1900	-1.20	4.00	28.16	22.96	197.697	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-3.46	3.76	28.24	21.02	126.474	Vertical	Pass
		1880	-2.93	3.91	28.22	21.38	137.404	Vertical	Pass
		1909.3	-2.31	3.93	28.20	21.96	157.036	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-3.29	3.77	28.23	21.17	130.918	Vertical	Pass
		1880	-2.70	3.91	28.24	21.63	145.546	Vertical	Pass
		1908.5	-3.09	3.94	28.25	21.22	132.434	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-3.04	3.77	28.31	21.50	141.254	Vertical	Pass
		1880	-2.68	3.91	28.22	21.63	145.546	Vertical	Pass
		1907.5	-2.67	3.94	28.20	21.59	144.212	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-3.47	3.79	28.33	21.07	127.938	Vertical	Pass
		1880	-3.12	3.95	28.22	21.15	130.317	Vertical	Pass
		1905	-2.26	3.97	28.19	21.96	157.036	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-3.44	3.79	28.34	21.11	129.122	Vertical	Pass
		1880	-2.57	3.95	28.22	21.70	147.911	Vertical	Pass
		1902.5	-3.11	3.97	28.18	21.10	128.825	Vertical	Pass

20.0MHz Band 16 QAM	1/#Mid	1860	-2.89	3.81	28.35	21.65	146.218	Vertical	Pass
		1880	-3.03	3.96	28.22	21.23	132.739	Vertical	Pass
		1900	-2.98	4.00	28.16	21.18	131.220	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	-2.11	3.12	27.58	22.35	171.791	Horizontal	Pass
		1732.5	-2.10	3.27	27.61	22.24	167.494	Horizontal	Pass
		1754.3	-2.08	3.29	27.63	22.26	168.267	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-2.28	3.13	27.61	22.20	165.959	Horizontal	Pass
		1732.5	-2.20	3.27	27.61	22.14	163.682	Horizontal	Pass
		1753.5	-2.12	3.30	27.62	22.20	165.959	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.05	3.13	27.63	22.45	175.792	Horizontal	Pass
		1732.5	-1.95	3.27	27.61	22.39	173.380	Horizontal	Pass
		1752.5	-1.83	3.30	27.60	22.47	176.604	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-1.99	3.15	27.64	22.50	177.828	Horizontal	Pass
		1732.5	-1.76	3.31	27.61	22.54	179.473	Horizontal	Pass
		1750	-1.78	3.33	27.59	22.48	177.011	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-2.00	3.15	27.65	22.50	177.828	Horizontal	Pass
		1732.5	-1.84	3.31	27.61	22.46	176.198	Horizontal	Pass
		1747.5	-1.78	3.33	27.57	22.46	176.198	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-1.94	3.17	27.66	22.55	179.887	Horizontal	Pass
		1732.5	-1.77	3.32	27.61	22.52	178.649	Horizontal	Pass
		1745	-1.71	3.36	27.56	22.49	177.419	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-2.58	3.12	27.58	21.88	154.170	Vertical	Pass
		1732.5	-2.67	3.27	27.61	21.67	146.893	Vertical	Pass
		1754.3	-2.95	3.29	27.63	21.39	137.721	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.00	3.13	27.61	21.48	140.605	Vertical	Pass
		1732.5	-3.25	3.27	27.61	21.09	128.529	Vertical	Pass
		1753.5	-2.72	3.30	27.62	21.60	144.544	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.73	3.13	27.63	21.77	150.314	Vertical	Pass
		1732.5	-3.09	3.27	27.61	21.25	133.352	Vertical	Pass
		1752.5	-2.31	3.30	27.60	21.99	158.125	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-2.87	3.15	27.64	21.62	145.211	Vertical	Pass
		1732.5	-2.34	3.31	27.61	21.96	157.036	Vertical	Pass
		1750	-2.71	3.33	27.59	21.55	142.889	Vertical	Pass

15.0MHz Band QPSK	1/#Mid	1717.5	-2.63	3.15	27.65	21.87	153.815	Vertical	Pass
		1732.5	-2.88	3.31	27.61	21.42	138.676	Vertical	Pass
		1747.5	-2.67	3.33	27.57	21.57	143.549	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	1720	-3.01	3.17	27.66	21.48	140.605	Vertical	Pass
		1732.5	-2.68	3.32	27.61	21.61	144.877	Vertical	Pass
		1745	-2.93	3.36	27.56	21.27	133.968	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	-2.92	3.12	27.58	21.54	142.561	Horizontal	Pass
		1732.5	-2.77	3.27	27.61	21.57	143.549	Horizontal	Pass
		1754.3	-2.77	3.29	27.63	21.57	143.549	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.86	3.13	27.61	21.62	145.211	Horizontal	Pass
		1732.5	-2.99	3.27	27.61	21.35	136.458	Horizontal	Pass
		1753.5	-3.21	3.30	27.62	21.11	129.122	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.69	3.13	27.63	21.81	151.705	Horizontal	Pass
		1732.5	-2.65	3.27	27.61	21.69	147.571	Horizontal	Pass
		1752.5	-2.34	3.30	27.60	21.96	157.036	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-2.76	3.15	27.64	21.73	148.936	Horizontal	Pass
		1732.5	-2.95	3.31	27.61	21.35	136.458	Horizontal	Pass
		1750	-2.33	3.33	27.59	21.93	155.955	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-2.56	3.15	27.65	21.94	156.315	Horizontal	Pass
		1732.5	-2.62	3.31	27.61	21.68	147.231	Horizontal	Pass
		1747.5	-2.64	3.33	27.57	21.60	144.544	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-2.51	3.17	27.66	21.98	157.761	Horizontal	Pass
		1732.5	-2.52	3.32	27.61	21.77	150.314	Horizontal	Pass
		1745	-2.33	3.36	27.56	21.87	153.815	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-4.10	3.12	27.58	20.36	108.643	Vertical	Pass
		1732.5	-4.17	3.27	27.61	20.17	103.992	Vertical	Pass
		1754.3	-4.27	3.29	27.63	20.07	101.625	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-4.42	3.13	27.61	20.06	101.391	Vertical	Pass
		1732.5	-3.35	3.27	27.61	20.99	125.603	Vertical	Pass
		1753.5	-4.11	3.30	27.62	20.21	104.954	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-3.99	3.13	27.63	20.51	112.460	Vertical	Pass
		1732.5	-3.46	3.27	27.61	20.88	122.462	Vertical	Pass
		1752.5	-3.33	3.30	27.60	20.97	125.026	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-4.29	3.15	27.64	20.20	104.713	Vertical	Pass
		1732.5	-4.24	3.31	27.61	20.06	101.391	Vertical	Pass
		1750	-3.60	3.33	27.59	20.66	116.413	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-4.22	3.15	27.65	20.28	106.660	Vertical	Pass
		1732.5	-4.06	3.31	27.61	20.24	105.682	Vertical	Pass
		1747.5	-4.21	3.33	27.57	20.03	100.693	Vertical	Pass

20.0MHz Band 16 QAM	1/#Mid	1720	-3.51	3.17	27.66	20.98	125.314	Vertical	Pass
		1732.5	-4.01	3.32	27.61	20.28	106.660	Vertical	Pass
		1745	-3.94	3.36	27.56	20.26	106.170	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.4 LTE BAND 5

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (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/#Midd	824.7	6.19	2.01	19.68	2.15	21.71	148.252	Horizontal	Pass
		836.5	6.07	2.01	19.77	2.15	21.68	147.231	Horizontal	Pass
		848.3	5.87	2.02	19.82	2.15	21.52	141.906	Horizontal	Pass
3.0MHz Band QPSK	1/#Midd	825.5	5.96	2.01	19.70	2.15	21.50	141.254	Horizontal	Pass
		836.5	5.86	2.01	19.77	2.15	21.47	140.281	Horizontal	Pass
		847.5	5.73	2.02	19.81	2.15	21.37	137.088	Horizontal	Pass
5.0MHz Band QPSK	1/#Midd	826.5	6.24	2.01	19.71	2.15	21.79	151.008	Horizontal	Pass
		836.5	6.12	2.01	19.77	2.15	21.73	148.936	Horizontal	Pass
		846.5	5.96	2.02	19.79	2.15	21.58	143.880	Horizontal	Pass
10.0MHz Band QPSK	1/#Midd	829	6.26	2.01	19.73	2.15	21.83	152.405	Horizontal	Pass
		836.5	6.21	2.01	19.77	2.15	21.82	152.055	Horizontal	Pass
		844	6.11	2.02	19.78	2.15	21.72	148.594	Horizontal	Pass
1.4MHz Band QPSK	1/#Midd	824.7	5.36	2.01	19.68	2.15	20.88	122.462	Vertical	Pass
		836.5	5.32	2.01	19.77	2.15	20.93	123.880	Vertical	Pass
		848.3	5.12	2.02	19.82	2.15	20.77	119.399	Vertical	Pass
3.0MHz Band QPSK	1/#Midd	825.5	4.50	2.01	19.70	2.15	20.04	100.925	Vertical	Pass
		836.5	4.68	2.01	19.77	2.15	20.29	106.905	Vertical	Pass
		847.5	5.31	2.02	19.81	2.15	20.95	124.451	Vertical	Pass
5.0MHz Band QPSK	1/#Midd	826.5	4.47	2.01	19.71	2.15	20.02	100.462	Vertical	Pass
		836.5	4.63	2.01	19.77	2.15	20.24	105.682	Vertical	Pass
		846.5	4.56	2.02	19.79	2.15	20.18	104.232	Vertical	Pass
10.0MHz Band QPSK	1/#Midd	829	4.72	2.01	19.73	2.15	20.29	106.905	Vertical	Pass
		836.5	5.02	2.01	19.77	2.15	20.63	115.611	Vertical	Pass
		844	5.36	2.02	19.78	2.15	20.97	125.026	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	5.34	2.01	19.68	2.15	20.86	121.899	Horizontal	Pass
		836.5	5.27	2.01	19.77	2.15	20.88	122.462	Horizontal	Pass
		848.3	5.11	2.02	19.82	2.15	20.76	119.124	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	5.42	2.01	19.70	2.15	20.96	124.738	Horizontal	Pass
		836.5	5.13	2.01	19.77	2.15	20.74	118.577	Horizontal	Pass
		847.5	4.61	2.02	19.81	2.15	20.25	105.925	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	5.74	2.01	19.71	2.15	21.29	134.586	Horizontal	Pass
		836.5	5.51	2.01	19.77	2.15	21.12	129.420	Horizontal	Pass
		846.5	5.26	2.02	19.79	2.15	20.88	122.462	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	829	5.74	2.01	19.73	2.15	21.31	135.207	Horizontal	Pass
		836.5	5.46	2.01	19.77	2.15	21.07	127.938	Horizontal	Pass
		844	5.00	2.02	19.78	2.15	20.61	115.080	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	824.7	4.61	2.01	19.68	2.15	20.13	103.039	Vertical	Pass
		836.5	3.59	2.01	19.77	2.15	19.20	83.176	Vertical	Pass
		848.3	4.25	2.02	19.82	2.15	19.90	97.724	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	5.15	2.01	19.70	2.15	20.69	117.220	Vertical	Pass
		836.5	4.47	2.01	19.77	2.15	20.08	101.859	Vertical	Pass
		847.5	5.06	2.02	19.81	2.15	20.70	117.490	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	4.82	2.01	19.71	2.15	20.37	108.893	Vertical	Pass
		836.5	5.07	2.01	19.77	2.15	20.68	116.950	Vertical	Pass
		846.5	5.34	2.02	19.79	2.15	20.96	124.738	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	829	4.71	2.01	19.73	2.15	20.28	106.660	Vertical	Pass
		836.5	4.49	2.01	19.77	2.15	20.10	102.329	Vertical	Pass
		844	4.17	2.02	19.78	2.15	19.78	95.060	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	1.61	4.54	27.75	24.82	303.389	Horizontal	Pass
		2535	1.78	4.69	27.72	24.81	302.691	Horizontal	Pass
		2567.5	1.85	4.71	27.71	24.85	305.492	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	1.68	4.55	27.76	24.89	308.319	Horizontal	Pass
		2535	1.87	4.69	27.72	24.90	309.030	Horizontal	Pass
		2565	1.95	4.72	27.70	24.93	311.172	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	1.67	4.55	27.77	24.89	308.319	Horizontal	Pass
		2535	1.81	4.69	27.72	24.84	304.789	Horizontal	Pass
		2562.5	1.91	4.72	27.69	24.88	307.610	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	1.73	4.57	27.78	24.94	311.889	Horizontal	Pass
		2535	1.91	4.73	27.72	24.90	309.030	Horizontal	Pass
		2560	1.95	4.75	27.68	24.88	307.610	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-0.11	4.54	27.75	23.10	204.174	Vertical	Pass
		2535	0.02	4.69	27.72	23.05	201.837	Vertical	Pass
		2567.5	0.05	4.71	27.71	23.05	201.837	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	0.22	4.55	27.76	23.43	220.293	Vertical	Pass
		2535	0.92	4.69	27.72	23.95	248.313	Vertical	Pass
		2565	0.03	4.72	27.70	23.01	199.986	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-0.02	4.55	27.77	23.20	208.930	Vertical	Pass
		2535	0.72	4.69	27.72	23.75	237.137	Vertical	Pass
		2562.5	0.68	4.72	27.69	23.65	231.739	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	0.30	4.57	27.78	23.51	224.388	Vertical	Pass
		2535	0.22	4.73	27.72	23.21	209.411	Vertical	Pass
		2560	0.81	4.75	27.68	23.74	236.592	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	0.92	4.54	27.75	24.13	258.821	Horizontal	Pass
		2535	1.23	4.69	27.72	24.26	266.686	Horizontal	Pass
		2567.5	1.15	4.71	27.71	24.15	260.016	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	1.03	4.55	27.76	24.24	265.461	Horizontal	Pass
		2535	1.02	4.69	27.72	24.05	254.097	Horizontal	Pass
		2565	0.75	4.72	27.70	23.73	236.048	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	0.85	4.55	27.77	24.07	255.270	Horizontal	Pass
		2535	0.88	4.69	27.72	23.91	246.037	Horizontal	Pass
		2562.5	1.27	4.72	27.69	24.24	265.461	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	0.97	4.57	27.78	24.18	261.818	Horizontal	Pass
		2535	1.30	4.73	27.72	24.29	268.534	Horizontal	Pass
		2560	1.20	4.75	27.68	24.13	258.821	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	0.68	4.54	27.75	23.89	244.906	Vertical	Pass
		2535	-0.18	4.69	27.72	22.85	192.752	Vertical	Pass
		2567.5	-0.86	4.71	27.71	22.14	163.682	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-0.76	4.55	27.76	22.45	175.792	Vertical	Pass
		2535	-0.34	4.69	27.72	22.69	185.780	Vertical	Pass
		2565	-0.92	4.72	27.70	22.06	160.694	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-0.45	4.55	27.77	22.77	189.234	Vertical	Pass
		2535	0.66	4.69	27.72	23.69	233.884	Vertical	Pass
		2562.5	0.05	4.72	27.69	23.02	200.447	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	0.21	4.57	27.78	23.42	219.786	Vertical	Pass
		2535	0.73	4.73	27.72	23.72	235.505	Vertical	Pass
		2560	-0.30	4.75	27.68	22.63	183.231	Vertical	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 Band2
LTE Band 4
- LTE Band 5
LTE Band 7

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	-45.41	4.04	33.51	-15.94	-13	-2.94	Horizontal
3701.4	-53.22	4.04	33.51	-23.75	-13	-10.75	Vertical
5552.1	-48.44	5.24	35.84	-17.84	-13	-4.84	Vertical
5552.1	-53.37	5.24	35.84	-22.77	-13	-9.77	Horizontal
203.0	-44.05	1.43	16.02	-29.46	-13	-16.46	Vertical
449.1	-38.26	1.30	17.99	-21.57	-13	-8.57	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-51.17	4.04	33.56	-21.65	-13	-8.65	Horizontal
3760.0	-46.02	4.04	33.56	-16.50	-13	-3.50	Vertical
5640.0	-47.06	5.24	35.91	-16.39	-13	-3.39	Vertical
5640.0	-49.22	5.24	35.91	-18.55	-13	-5.55	Horizontal
195.6	-41.85	1.62	16.97	-26.50	-13	-13.50	Vertical
376.4	-39.36	1.74	15.98	-25.13	-13	-12.13	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-50.29	4.04	34.00	-20.33	-13	-7.33	Horizontal
3818.6	-50.79	4.04	34.00	-20.83	-13	-7.83	Vertical
5727.9	-47.91	5.24	36.04	-17.11	-13	-4.11	Vertical
5727.9	-50.96	5.24	36.04	-20.16	-13	-7.16	Horizontal
177.2	-40.19	1.42	17.29	-24.32	-13	-11.32	Vertical
273.1	-35.20	1.50	17.90	-18.79	-13	-5.79	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	-53.96	4.07	33.54	-24.49	-13	-11.49	Horizontal
3720.0	-44.55	4.07	33.54	-15.08	-13	-2.08	Vertical
5580.0	-46.91	5.28	35.86	-16.33	-13	-3.33	Vertical
5580.0	-53.40	5.28	35.86	-22.82	-13	-9.82	Horizontal
179.9	-38.57	1.58	16.89	-23.25	-13	-10.25	Vertical
346.6	-35.95	1.76	17.26	-20.45	-13	-7.45	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-52.43	4.04	33.56	-22.91	-13	-9.91	Horizontal
3760.0	-45.58	4.04	33.56	-16.06	-13	-3.06	Vertical
5640.0	-48.77	5.24	35.91	-18.10	-13	-5.10	Vertical
5640.0	-50.32	5.24	35.91	-19.65	-13	-6.65	Horizontal
181.1	-38.98	1.46	16.27	-24.17	-13	-11.17	Vertical
336.6	-38.47	1.59	15.15	-24.91	-13	-11.91	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-49.96	4.04	34.00	-20.00	-13	-7.00	Horizontal
3800.0	-48.97	4.04	34.00	-19.01	-13	-6.01	Vertical
5700.0	-46.64	5.24	36.04	-15.84	-13	-2.84	Vertical
5700.0	-50.34	5.24	36.04	-19.54	-13	-6.54	Horizontal
202.7	-39.12	1.36	17.39	-23.08	-13	-10.08	Vertical
464.1	-34.23	1.66	15.39	-20.50	-13	-7.50	Horizontal

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

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

16QAM 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	-48.40	4.04	33.51	-18.93	-13	-5.93	Horizontal
3701.4	-47.43	4.04	33.51	-17.96	-13	-4.96	Vertical
5552.1	-49.93	5.24	35.84	-19.33	-13	-6.33	Vertical
5552.1	-53.54	5.24	35.84	-22.94	-13	-9.94	Horizontal
192.9	-39.53	1.43	16.02	-24.94	-13	-11.94	Vertical
266.6	-39.79	1.30	17.99	-23.10	-13	-10.10	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-51.15	4.04	33.56	-21.63	-13	-8.63	Horizontal
3760.0	-48.62	4.04	33.56	-19.10	-13	-6.10	Vertical
5640.0	-50.63	5.24	35.91	-19.96	-13	-6.96	Vertical
5640.0	-49.49	5.24	35.91	-18.82	-13	-5.82	Horizontal
208.3	-34.87	1.62	16.97	-19.52	-13	-6.52	Vertical
288.9	-41.61	1.74	15.98	-27.38	-13	-14.38	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-51.65	4.04	34.00	-21.69	-13	-8.69	Horizontal
3818.6	-51.25	4.04	34.00	-21.29	-13	-8.29	Vertical
5727.9	-49.32	5.24	36.04	-18.52	-13	-5.52	Vertical
5727.9	-50.42	5.24	36.04	-19.62	-13	-6.62	Horizontal
210.5	-36.94	1.42	17.29	-21.07	-13	-8.07	Vertical
378.9	-38.78	1.50	17.90	-22.37	-13	-9.37	Horizontal

16QAM 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	-50.28	4.07	33.54	-20.81	-13	-7.81	Horizontal
3720.0	-50.23	4.07	33.54	-20.76	-13	-7.76	Vertical
5580.0	-47.12	5.28	35.86	-16.54	-13	-3.54	Vertical
5580.0	-50.08	5.28	35.86	-19.50	-13	-6.50	Horizontal
193.1	-35.85	1.58	16.89	-20.53	-13	-7.53	Vertical
276.5	-35.89	1.76	17.26	-20.39	-13	-7.39	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-47.80	4.04	33.56	-18.28	-13	-5.28	Horizontal
3760.0	-46.89	4.04	33.56	-17.37	-13	-4.37	Vertical
5640.0	-50.77	5.24	35.91	-20.10	-13	-7.10	Vertical
5640.0	-53.92	5.24	35.91	-23.25	-13	-10.25	Horizontal
184.1	-36.72	1.46	16.27	-21.91	-13	-8.91	Vertical
337.9	-36.27	1.59	15.15	-22.71	-13	-9.71	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-53.95	4.04	34.00	-23.99	-13	-10.99	Horizontal
3800.0	-44.86	4.04	34.00	-14.90	-13	-1.90	Vertical
5700.0	-44.80	5.24	36.04	-14.00	-13	-1.00	Vertical
5700.0	-51.55	5.24	36.04	-20.75	-13	-7.75	Horizontal
212.8	-34.33	1.36	17.39	-18.29	-13	-5.29	Vertical
336.7	-44.14	1.66	15.39	-30.41	-13	-17.41	Horizontal

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

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	-45.98	4.02	29.80	-20.20	-13	-7.20	Horizontal
3421.4	-52.56	4.02	29.80	-26.78	-13	-13.78	Vertical
5132.1	-49.00	5.24	35.84	-18.40	-13	-5.40	Vertical
5132.1	-52.20	5.24	35.84	-21.60	-13	-8.60	Horizontal
180.0	-42.26	1.68	16.04	-27.90	-13	-14.90	Vertical
430.6	-39.27	1.78	17.74	-23.31	-13	-10.31	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-47.73	4.03	30.00	-21.76	-13	-8.76	Horizontal
3465.0	-47.75	4.03	30.00	-21.78	-13	-8.78	Vertical
5197.5	-44.90	5.25	35.86	-14.29	-13	-1.29	Vertical
5197.5	-52.25	5.25	35.86	-21.64	-13	-8.64	Horizontal
182.1	-44.76	1.72	17.69	-28.79	-13	-15.79	Vertical
236.0	-43.35	1.62	16.02	-28.94	-13	-15.94	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-47.70	4.05	30.01	-21.74	-13	-8.74	Horizontal
3508.6	-53.49	4.05	30.01	-27.53	-13	-14.53	Vertical
5262.9	-47.88	5.26	35.86	-17.28	-13	-4.28	Vertical
5262.9	-52.05	5.26	35.86	-21.45	-13	-8.45	Horizontal
207.0	-35.25	1.80	16.69	-20.36	-13	-7.36	Vertical
356.6	-38.06	1.75	16.66	-23.16	-13	-10.16	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	-49.92	4.02	29.80	-24.14	-13	-11.14	Horizontal
3440.0	-53.50	4.02	29.80	-27.72	-13	-14.72	Vertical
5160.0	-48.22	5.24	35.84	-17.62	-13	-4.62	Vertical
5160.0	-53.98	5.24	35.84	-23.38	-13	-10.38	Horizontal
207.2	-39.63	1.57	17.26	-23.94	-13	-10.94	Vertical
354.0	-34.32	1.78	16.35	-19.75	-13	-6.75	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-51.33	4.03	30.00	-25.36	-13	-12.36	Horizontal
3465.0	-47.22	4.03	30.00	-21.25	-13	-8.25	Vertical
5197.5	-51.30	5.25	35.86	-20.69	-13	-7.69	Vertical
5197.5	-52.73	5.25	35.86	-22.12	-13	-9.12	Horizontal
176.7	-39.88	1.44	17.95	-23.37	-13	-10.37	Vertical
394.0	-39.25	1.65	16.09	-24.81	-13	-11.81	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-52.52	2.91	27.68	-27.75	-13	-14.75	Horizontal
3490.0	-53.28	2.91	27.68	-28.51	-13	-15.51	Vertical
5235.0	-53.30	5.26	35.86	-22.70	-13	-9.70	Vertical
5235.0	-53.24	5.26	35.86	-22.64	-13	-9.64	Horizontal
178.4	-43.68	1.61	16.85	-28.44	-13	-15.44	Vertical
435.2	-38.49	1.61	15.19	-24.91	-13	-11.91	Horizontal

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

16QAM 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	-46.40	4.02	29.80	-20.62	-13	-7.62	Horizontal
3421.4	-51.17	4.02	29.80	-25.39	-13	-12.39	Vertical
5132.1	-50.26	5.24	35.84	-19.66	-13	-6.66	Vertical
5132.1	-51.04	5.24	35.84	-20.44	-13	-7.44	Horizontal
184.9	-40.33	1.68	16.04	-25.97	-13	-12.97	Vertical
341.0	-44.96	1.78	17.74	-29.00	-13	-16.00	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-52.93	4.03	30.00	-26.96	-13	-13.96	Horizontal
3465.0	-50.32	4.03	30.00	-24.35	-13	-11.35	Vertical
5197.5	-49.87	5.25	35.86	-19.26	-13	-6.26	Vertical
5197.5	-50.83	5.25	35.86	-20.22	-13	-7.22	Horizontal
194.4	-37.88	1.72	17.69	-21.91	-13	-8.91	Vertical
323.9	-34.51	1.62	16.02	-20.10	-13	-7.10	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-53.36	4.05	30.01	-27.40	-13	-14.40	Horizontal
3508.6	-53.41	4.05	30.01	-27.45	-13	-14.45	Vertical
5262.9	-49.85	5.26	35.86	-19.25	-13	-6.25	Vertical
5262.9	-50.75	5.26	35.86	-20.15	-13	-7.15	Horizontal
194.5	-40.45	1.80	16.69	-25.56	-13	-12.56	Vertical
317.8	-34.98	1.75	16.66	-20.08	-13	-7.08	Horizontal

16QAM 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	-49.68	4.02	29.80	-23.90	-13	-10.90	Horizontal
3440.0	-47.86	4.02	29.80	-22.08	-13	-9.08	Vertical
5160.0	-45.03	5.24	35.84	-14.43	-13	-1.43	Vertical
5160.0	-49.91	5.24	35.84	-19.31	-13	-6.31	Horizontal
195.8	-40.52	1.57	17.26	-24.83	-13	-11.83	Vertical
432.1	-34.21	1.78	16.35	-19.64	-13	-6.64	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-48.07	4.03	30.00	-22.10	-13	-9.10	Horizontal
3465.0	-44.52	4.03	30.00	-18.55	-13	-5.55	Vertical
5197.5	-46.66	5.25	35.86	-16.05	-13	-3.05	Vertical
5197.5	-49.80	5.25	35.86	-19.19	-13	-6.19	Horizontal
189.1	-40.03	1.44	17.95	-23.52	-13	-10.52	Vertical
416.3	-39.98	1.65	16.09	-25.54	-13	-12.54	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-45.78	2.91	27.68	-21.01	-13	-8.01	Horizontal
3490.0	-53.36	2.91	27.68	-28.59	-13	-15.59	Vertical
5235.0	-51.44	5.26	35.86	-20.84	-13	-7.84	Vertical
5235.0	-52.74	5.26	35.86	-22.14	-13	-9.14	Horizontal
198.1	-44.84	1.61	16.85	-29.60	-13	-16.60	Vertical
399.1	-40.73	1.61	15.19	-27.15	-13	-14.15	Horizontal

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

9.3 LTE BAND 5

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

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-44.34	2.78	27.50	-19.62	-13	-6.62	Horizontal
1649.4	-53.12	2.78	27.50	-28.40	-13	-15.40	Vertical
2474.1	-47.72	2.90	27.80	-22.82	-13	-9.82	Vertical
2474.1	-49.48	2.90	27.80	-24.58	-13	-11.58	Horizontal
190.9	-44.32	1.76	17.59	-28.49	-13	-15.49	Vertical
439.1	-36.03	1.63	15.87	-21.79	-13	-8.79	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-50.92	2.80	27.48	-26.24	-13	-13.24	Horizontal
1673.0	-52.55	2.80	27.48	-27.87	-13	-14.87	Vertical
2509.5	-50.46	2.91	27.70	-25.67	-13	-12.67	Vertical
2509.5	-50.92	2.91	27.70	-26.13	-13	-13.13	Horizontal
184.9	-39.59	1.61	15.68	-25.52	-13	-12.52	Vertical
322.6	-42.74	1.59	17.52	-26.82	-13	-13.82	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-47.30	2.82	27.43	-22.69	-13	-9.69	Horizontal
1696.6	-51.85	2.82	27.43	-27.24	-13	-14.24	Vertical
2544.9	-49.94	2.92	27.74	-25.12	-13	-12.12	Vertical
2544.9	-53.20	2.92	27.74	-28.38	-13	-15.38	Horizontal
210.7	-38.60	1.69	16.67	-23.61	-13	-10.61	Vertical
242.4	-37.17	1.70	17.18	-21.69	-13	-8.69	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	-49.44	2.78	27.50	-24.72	-13	-11.72	Horizontal
1658.0	-48.71	2.78	27.50	-23.99	-13	-10.99	Vertical
2487.0	-50.04	2.90	27.80	-25.14	-13	-12.14	Vertical
2487.0	-49.19	2.90	27.80	-24.29	-13	-11.29	Horizontal
209.1	-37.19	1.71	15.57	-23.33	-13	-10.33	Vertical
429.8	-39.36	1.34	16.40	-24.30	-13	-11.30	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-52.64	2.80	27.48	-27.96	-13	-14.96	Horizontal
1673.0	-45.14	2.80	27.48	-20.46	-13	-7.46	Vertical
2509.5	-45.06	2.91	27.70	-20.27	-13	-7.27	Vertical
2509.5	-49.65	2.91	27.70	-24.86	-13	-11.86	Horizontal
175.2	-42.53	1.44	17.04	-26.93	-13	-13.93	Vertical
288.8	-36.97	1.76	17.62	-21.11	-13	-8.11	Horizontal
Test Results for High Channel 844MHz							
1688.0	-44.19	2.82	27.43	-19.58	-13	-6.58	Horizontal
1688.0	-46.03	2.82	27.43	-21.42	-13	-8.42	Vertical
2532.0	-50.58	2.92	27.74	-25.76	-13	-12.76	Vertical
2532.0	-50.56	2.92	27.74	-25.74	-13	-12.74	Horizontal
193.5	-37.12	1.74	17.70	-21.16	-13	-8.16	Vertical
419.4	-44.88	1.41	17.46	-28.82	-13	-15.82	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_pl (dBm)
 Over Limit= : P_{Mea}(dBm)-Limit(dBm)

16QAM 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	-47.58	2.78	27.50	-22.86	-13	-9.86	Horizontal
1649.4	-47.06	2.78	27.50	-22.34	-13	-9.34	Vertical
2474.1	-44.42	2.90	27.80	-19.52	-13	-6.52	Vertical
2474.1	-50.26	2.90	27.80	-25.36	-13	-12.36	Horizontal
199.8	-38.60	1.76	17.59	-22.77	-13	-9.77	Vertical
447.9	-41.82	1.63	15.87	-27.58	-13	-14.58	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-51.98	2.80	27.48	-27.30	-13	-14.30	Horizontal
1673.0	-45.93	2.80	27.48	-21.25	-13	-8.25	Vertical
2509.5	-53.41	2.91	27.70	-28.62	-13	-15.62	Vertical
2509.5	-50.40	2.91	27.70	-25.61	-13	-12.61	Horizontal
191.0	-44.50	1.61	15.68	-30.43	-13	-17.43	Vertical
242.2	-35.62	1.59	17.52	-19.70	-13	-6.70	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-49.10	2.82	27.43	-24.49	-13	-11.49	Horizontal
1696.6	-50.28	2.82	27.43	-25.67	-13	-12.67	Vertical
2544.9	-51.75	2.92	27.74	-26.93	-13	-13.93	Vertical
2544.9	-50.61	2.92	27.74	-25.79	-13	-12.79	Horizontal
210.9	-41.00	1.69	16.67	-26.01	-13	-13.01	Vertical
232.2	-39.48	1.70	17.18	-24.00	-13	-11.00	Horizontal

16QAM 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	-50.97	2.78	27.50	-26.25	-13	-13.25	Horizontal
1658.0	-53.69	2.78	27.50	-28.97	-13	-15.97	Vertical
2487.0	-50.24	2.90	27.80	-25.34	-13	-12.34	Vertical
2487.0	-51.97	2.90	27.80	-27.07	-13	-14.07	Horizontal
202.1	-38.13	1.71	15.57	-24.27	-13	-11.27	Vertical
353.8	-37.98	1.34	16.40	-22.92	-13	-9.92	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-49.79	2.80	27.48	-25.11	-13	-12.11	Horizontal
1673.0	-46.23	2.80	27.48	-21.55	-13	-8.55	Vertical
2509.5	-45.98	2.91	27.70	-21.19	-13	-8.19	Vertical
2509.5	-51.76	2.91	27.70	-26.97	-13	-13.97	Horizontal
176.8	-42.53	1.44	17.04	-26.93	-13	-13.93	Vertical
429.6	-43.21	1.76	17.62	-27.35	-13	-14.35	Horizontal
Test Results for High Channel 844MHz							
1688.0	-49.01	2.82	27.43	-24.40	-13	-11.40	Horizontal
1688.0	-46.93	2.82	27.43	-22.32	-13	-9.32	Vertical
2532.0	-44.43	2.92	27.74	-19.61	-13	-6.61	Vertical
2532.0	-51.86	2.92	27.74	-27.04	-13	-14.04	Horizontal
195.9	-43.67	1.74	17.70	-27.71	-13	-14.71	Vertical
415.8	-35.77	1.41	17.46	-19.71	-13	-6.71	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_pl (dBm)
 Over Limit= : P_{Mea}(dBm)-Limit(dBm)

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	-61.16	5.23	35.81	-30.58	-25	-5.58	Horizontal
5005.0	-62.72	5.23	35.81	-32.14	-25	-7.14	Vertical
7507.5	-60.66	5.67	36.85	-29.48	-25	-4.48	Vertical
7507.5	-60.59	5.67	36.85	-29.41	-25	-4.41	Horizontal
199.2	-50.92	1.73	17.97	-34.68	-25	-9.68	Vertical
281.6	-53.78	1.38	15.11	-40.05	-25	-15.05	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-60.82	5.23	35.82	-30.23	-25	-5.23	Horizontal
5070.0	-62.06	5.23	35.82	-31.47	-25	-6.47	Vertical
7605.0	-64.21	5.67	36.85	-33.03	-25	-8.03	Vertical
7605.0	-59.73	5.67	36.85	-28.55	-25	-3.55	Horizontal
201.1	-45.51	1.77	16.17	-31.10	-25	-6.10	Vertical
375.2	-50.44	1.63	15.21	-36.86	-25	-11.86	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-62.91	5.24	35.83	-32.32	-25	-7.32	Horizontal
5135.0	-59.87	5.24	35.83	-29.28	-25	-4.28	Vertical
7702.5	-61.11	5.68	36.87	-29.92	-25	-4.92	Vertical
7702.5	-60.59	5.68	36.87	-29.40	-25	-4.40	Horizontal
209.2	-51.73	1.58	17.56	-35.75	-25	-10.75	Vertical
282.7	-54.15	1.45	16.58	-39.02	-25	-14.02	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	-61.18	5.23	35.82	-30.59	-25	-5.59	Horizontal
5020.0	-60.99	5.23	35.82	-30.40	-25	-5.40	Vertical
7530.0	-61.36	5.67	36.86	-30.17	-25	-5.17	Vertical
7530.0	-64.14	5.67	36.86	-32.95	-25	-7.95	Horizontal
211.5	-47.61	1.63	15.76	-33.48	-25	-8.48	Vertical
400.6	-47.23	1.71	15.44	-33.50	-25	-8.50	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-59.34	5.23	35.82	-28.75	-25	-3.75	Horizontal
5070.0	-60.04	5.23	35.82	-29.45	-25	-4.45	Vertical
7605.0	-59.79	5.67	36.85	-28.61	-25	-3.61	Vertical
7605.0	-59.17	5.67	36.85	-27.99	-25	-2.99	Horizontal
175.2	-54.11	1.79	16.84	-39.05	-25	-14.05	Vertical
378.3	-52.43	1.71	17.64	-36.50	-25	-11.50	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-59.39	5.24	35.83	-28.80	-25	-3.80	Horizontal
5120.0	-64.94	5.24	35.83	-34.35	-25	-9.35	Vertical
7680.0	-64.54	5.70	36.88	-33.36	-25	-8.36	Vertical
7680.0	-60.60	5.70	36.88	-29.42	-25	-4.42	Horizontal
190.3	-49.78	1.79	16.84	-34.72	-25	-9.72	Vertical
250.6	-49.45	1.71	17.64	-33.52	-25	-8.52	Horizontal

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

16QAM 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	-63.18	5.23	35.81	-32.60	-25	-7.60	Vertical
7507.5	-64.71	5.67	36.85	-33.53	-25	-8.53	Vertical
7507.5	-59.05	5.67	36.85	-27.87	-25	-2.87	Horizontal
211.9	-47.09	1.73	17.97	-30.85	-25	-5.85	Vertical
310.2	-52.74	1.38	15.11	-39.01	-25	-14.01	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.66	5.23	35.82	-31.07	-25	-6.07	Horizontal
5070.0	-60.03	5.23	35.82	-29.44	-25	-4.44	Vertical
7605.0	-60.76	5.67	36.85	-29.58	-25	-4.58	Vertical
7605.0	-62.89	5.67	36.85	-31.71	-25	-6.71	Horizontal
203.8	-48.25	1.77	16.17	-33.84	-25	-8.84	Vertical
280.6	-46.05	1.63	15.21	-32.47	-25	-7.47	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-63.13	5.24	35.83	-32.54	-25	-7.54	Horizontal
5135.0	-64.95	5.24	35.83	-34.36	-25	-9.36	Vertical
7702.5	-59.06	5.68	36.87	-27.87	-25	-2.87	Vertical
7702.5	-64.06	5.68	36.87	-32.87	-25	-7.87	Horizontal
208.5	-51.70	1.58	17.56	-35.72	-25	-10.72	Vertical
365.7	-49.08	1.45	16.58	-33.95	-25	-8.95	Horizontal

16QAM 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	-61.71	5.23	35.82	-31.12	-25	-6.12	Horizontal
5020.0	-64.42	5.23	35.82	-33.83	-25	-8.83	Vertical
7530.0	-64.65	5.67	36.86	-33.46	-25	-8.46	Vertical
7530.0	-63.87	5.67	36.86	-32.68	-25	-7.68	Horizontal
184.8	-45.06	1.63	15.76	-30.93	-25	-5.93	Vertical
315.8	-49.93	1.71	15.44	-36.20	-25	-11.20	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-60.69	5.23	35.82	-30.10	-25	-5.10	Horizontal
5070.0	-59.77	5.23	35.82	-29.18	-25	-4.18	Vertical
7605.0	-62.77	5.67	36.85	-31.59	-25	-6.59	Vertical
7605.0	-63.05	5.67	36.85	-31.87	-25	-6.87	Horizontal
212.6	-49.15	1.79	16.84	-34.09	-25	-9.09	Vertical
371.0	-46.64	1.71	17.64	-30.71	-25	-5.71	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-62.48	5.24	35.83	-31.89	-25	-6.89	Horizontal
5120.0	-64.71	5.24	35.83	-34.12	-25	-9.12	Vertical
7680.0	-61.87	5.70	36.88	-30.69	-25	-5.69	Vertical
7680.0	-62.86	5.70	36.88	-31.68	-25	-6.68	Horizontal
178.2	-49.54	1.79	16.84	-34.48	-25	-9.48	Vertical
234.1	-47.34	1.71	17.64	-31.41	-25	-6.41	Horizontal

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

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 44V.

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

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	12.4	0.006608	2.5
3.8	1880	14.1	0.007515	2.5
4.4	1880	12.8	0.006827	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	13.1	0.006972	2.5
Extreme (50C)	1880	11.2	0.005936	2.5
Extreme (40C)	1880	13.7	0.007309	2.5
Extreme (30C)	1880	13.1	0.006990	2.5
Extreme (10C)	1880	13.5	0.007181	2.5
Extreme (0C)	1880	12.5	0.006653	2.5
Extreme (-10C)	1880	13.1	0.006970	2.5
Extreme (-20C)	1880	13.7	0.007281	2.5
Extreme (-30C)	1880	15.2	0.008077	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	9.5	0.005051	2.5
3.8	1880	8.5	0.004541	2.5
4.4	1880	7.7	0.004116	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	9.8	0.005234	2.5
Extreme (50C)	1880	8.9	0.004712	2.5
Extreme (40C)	1880	8.5	0.004529009	2.5
Extreme (30C)	1880	8.7	0.004642939	2.5
Extreme (10C)	1880	8.4	0.004488364	2.5
Extreme (0C)	1880	8.2	0.004387822	2.5
Extreme (-10C)	1880	9.4	0.005014485	2.5
Extreme (-20C)	1880	9.0	0.004780677	2.5
Extreme (-30C)	1880	7.9	0.004198847	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	9.2	0.005308	2.5
3.8	1732.5	9.1	0.005277	2.5
4.4	1732.5	8.1	0.004650	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	8.7	0.005016	2.5
Extreme (50C)	1732.5	9.3	0.005349	2.5
Extreme (40C)	1732.5	7.3	0.004215	2.5
Extreme (30C)	1732.5	6.2	0.003598	2.5
Extreme (10C)	1732.5	6.7	0.003893	2.5
Extreme (0C)	1732.5	8.9	0.005142	2.5
Extreme (-10C)	1732.5	8.0	0.004633	2.5
Extreme (-20C)	1732.5	7.2	0.004173	2.5
Extreme (-30C)	1732.5	8.4	0.004829	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	9.6	0.005540	2.5
3.8	1732.5	9.2	0.005333	2.5
4.4	1732.5	8.0	0.004631	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	9.7	0.005598	2.5
Extreme (50C)	1732.5	8.5	0.004884	2.5
Extreme (40C)	1732.5	7.8	0.004480	2.5
Extreme (30C)	1732.5	8.7	0.005035	2.5
Extreme (10C)	1732.5	9.0	0.005166	2.5
Extreme (0C)	1732.5	8.1	0.004650	2.5
Extreme (-10C)	1732.5	9.4	0.005403	2.5
Extreme (-20C)	1732.5	9.2	0.005333	2.5
Extreme (-30C)	1732.5	8.0	0.004589	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	0.007217	2.5
3.8	836.5	7.2	0.008568	2.5
4.4	836.5	4.6	0.005556	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	5.6	0.006750	2.5
Extreme (50C)	836.5	5.6	0.006740	2.5
Extreme (40C)	836.5	6.5	0.007829	2.5
Extreme (30C)	836.5	6.0	0.007150	2.5
Extreme (10C)	836.5	5.0	0.006021	2.5
Extreme (0C)	836.5	4.9	0.005860	2.5
Extreme (-10C)	836.5	6.0	0.007114	2.5
Extreme (-20C)	836.5	6.4	0.007594	2.5
Extreme (-30C)	836.5	6.6	0.007887	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	5.8	0.006902	2.5
3.8	836.5	6.6	0.007936	2.5
4.4	836.5	4.9	0.005853	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	6.3	0.007524	2.5
Extreme (50C)	836.5	5.5	0.006531	2.5
Extreme (40C)	836.5	6.2	0.007427	2.5
Extreme (30C)	836.5	6.8	0.008088	2.5
Extreme (10C)	836.5	5.7	0.006806	2.5
Extreme (0C)	836.5	5.4	0.006443	2.5
Extreme (-10C)	836.5	5.6	0.006640	2.5
Extreme (-20C)	836.5	5.8	0.006964	2.5
Extreme (-30C)	836.5	5.9	0.007016	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	10.4	0.004099	2.5
3.8	2535	8.6	0.003381	2.5
4.4	2535	8.4	0.003300	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	9.6	0.003806	2.5
Extreme (50C)	2535	8.6	0.003403	2.5
Extreme (40C)	2535	8.5	0.003352	2.5
Extreme (30C)	2535	9.2	0.003648	2.5
Extreme (10C)	2535	7.9	0.003109	2.5
Extreme (0C)	2535	8.8	0.003464	2.5
Extreme (-10C)	2535	9.4	0.003689	2.5
Extreme (-20C)	2535	8.5	0.003346	2.5
Extreme (-30C)	2535	8.4	0.003318	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
3.8	2535	6.9	0.002715	2.5
4.4	2535	5.3	0.002072	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	6.0	0.002375	2.5
Extreme (40C)	2535	5.1	0.002025	2.5
Extreme (30C)	2535	6.5	0.002566	2.5
Extreme (10C)	2535	5.6	0.002216	2.5
Extreme (0C)	2535	4.9	0.001944	2.5
Extreme (-10C)	2535	5.2	0.002048	2.5
Extreme (-20C)	2535	5.7	0.002264	2.5
Extreme (-30C)	2535	5.6	0.002216	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.

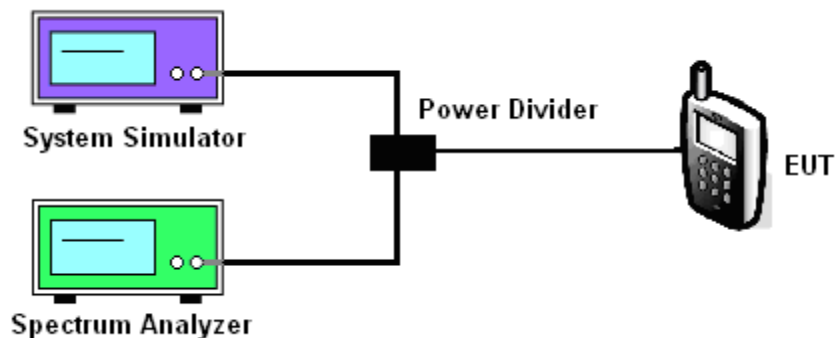
11.2 Measuring Instruments

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
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Test data reference attachment.

----END OF REPORT----