

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

FCC ID: ZSW-30-121

Product: Mobile Phone

Trade Mark: Bmobile

Model Number: BL65

Family Model: N/A

Report No.: S22032105001005

Prepared for

b mobile HK Limited

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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 Kwai Tak Street; Kwai Chung; New Territories; Hong Kong, China
Manufacturer's Name	b mobile HK Limited
Address.....	Flat 18; 14/F Block 1; Golden Industrial Building;16-26 Kwai Tak Street; Kwai Chung; New Territories; Hong Kong, China
Product name.....	Mobile Phone
Model and/or type reference ..	BL65
Family Model:	N/A
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.....	Mar 22, 2022 ~ Apr 11, 2022
Date of Issue	Apr 12, 2022
Test Result	Pass

Testing Engineer : 

 (Allen Liu)

Authorized Signatory : 

 (Alex Li)

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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Mobile Phone
Trade Mark	Bmobile
Model Name	BL65
Family Model	N/A
Model Difference	N/A
FCC ID:	ZSW-30-121
Frequency Bands:	U.S. Bands: <input checked="" type="checkbox"/> LTE FDD Band 2, 4, 5, 7, 12
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;
Type of Modulation:	QPSK/16QAM
Power Class	Class 3
Antenna:	PIFA Antenna
Antenna gain:	1dBi
Adapter	Input: AC 100-240V~50/60Hz 0.3A Output: DC 5V---2000mA
Battery	DC 3.85V, 4000mAh, 15.4Wh
Power supply	DC 3.85V from battery or DC 5V from Adapter.
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.85V) (Note 1)
HW Version	Bmobile_BL65_HW_V1.0
SW Version	Bmobile_BL65_0M_LATAM_V001
** Note1: The High Voltage 4.2V and Low Voltage 3.4V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.	

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: ZSW-30-121** 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 expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.5dB
2	Conducted Emission Test	± 1.38 dB
3	RF power, conducted	± 0.16 dB
4	Spurious emissions, conducted	± 0.21 dB
5	All emissions, radiated(<1G)	± 4.68 dB
6	All emissions, radiated(>1G)	± 4.89 dB
7	Temperature	± 0.5 °C
8	Humidity	± 2 %
9	Frequency error, conducted	± 0.19 ppm

1.5 SPECIAL ACCESSORIES

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

1.6 WORST-CASE CONFIGURATION AND MODE

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

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

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(m), (g), (h) KDB 971168 D01 Clause 6	Band Edge	PASS	
22.913(a)(2) 27.50(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(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(g)(h)(m) KDB 971168 D01 Clause 6	Conducted Emission	PASS	

Remark:

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

2. SYSTEM TEST CONFIGURATION

2.1 EUT CONFIGURATION

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

2.2 EUT EXERCISE

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

2.3 CONFIGURATION OF EUT SYSTEM

Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Mobile Phone	BL65	FCC ID: ZSW-30-121	EUT

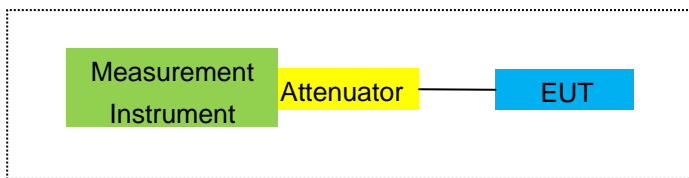
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

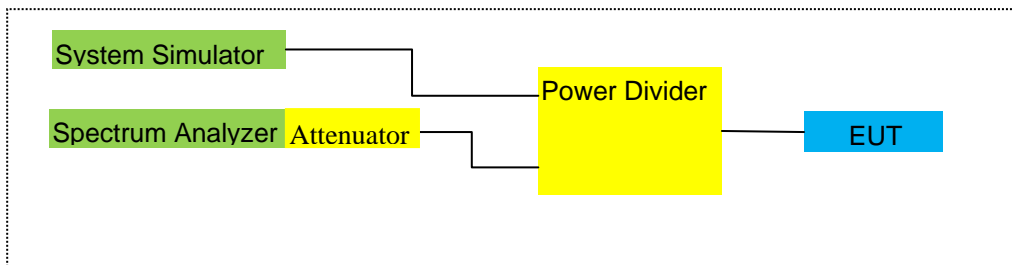
For Radiated Test Cases



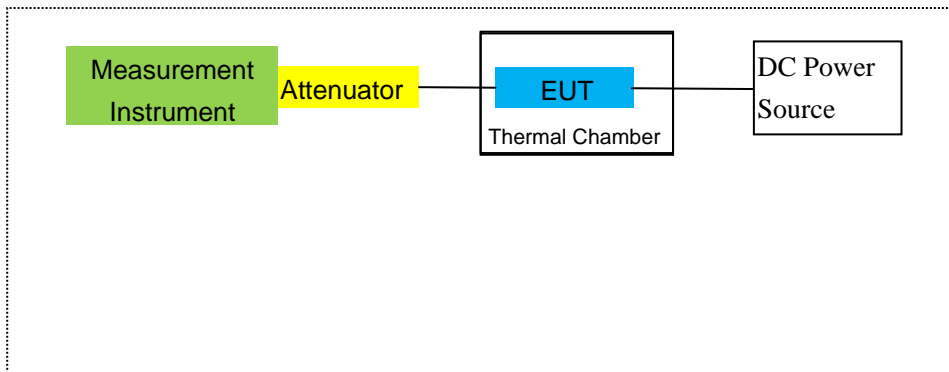
For Conducted Output Power



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	2021.07.01	2022.06.30	1 year
2	Test Receiver	R&S	ESPI	101318	2021.04.27	2022.04.26	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2021.03.29 2022/03/30	2022.03.28 2023.03.29	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2020.05.11	2023.05.10	3 year
5	Horn Antenna	EM	EM-AH-1018 0	2011071402	2021.03.29 2022/03/30	2022.03.28 2023.03.29	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2021.11.07	2022.11.06	1 year
7	Amplifier	EM	EM-30180	060538	2021.07.01	2022.06.30	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2021.04.27	2022.04.26	1 year
9	Power Meter	R&S	NRVS	100696	2021.07.01	2022.06.30	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.0 5	2021.04.27	2022.04.26	1 year
11	Test Cable	N/A	R-01	N/A	2019.08.06	2022.08.05	3 year
12	Test Cable	N/A	R-02	N/A	2019.08.06	2022.08.05	3 year
13	Test Cable	N/A	R-03	N/A	2019.06.28	2022.06.27	3 year
14	Test Receiver	R&S	ESCI	101160	2021.04.27	2022.04.26	1 year
15	LISN	R&S	ENV216	101313	2021.04.27	2022.04.26	1 year
16	LISN	EMCO	3816/2	00042990	2021.04.27	2022.04.26	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2021.04.27	2022.04.26	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2021.04.27	2022.04.26	1 year
19	Test Cable	N/A	C01	N/A	2020.05.11	2023.05.10	3 year
20	Test Cable	N/A	C02	N/A	2020.05.11	2023.05.10	3 year
21	Test Cable	N/A	C03	N/A	2020.05.11	2023.05.10	3 year
22	Attenuator	MCE	24-10-34	BN9258	2020.04.07	2023.04.06	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2021.04.27	2022.04.26	1 year
24	test receiver	R&S	ESCI	a0304218	2021.04.27	2022.04.26	1 year
25	Communication Tester	R&S	CMU200	A0304247	2021.07.01	2022.06.30	1 year

26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2021.04.27	2022.04.26	1 year
27	DC Power Source	N/A	PS-6005D	2017040292 3	2020.05.11	2023.05.10	3 year
28	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2021.07.01	2022.06.30	1 year
29	Communication Tester	R&S	CMW500	148500	2021.07.01	2022.06.30	1 year
30	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2021.07.01	2022.06.30	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

RESULTS

PASS

Test data reference attachment.

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

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

FCC: §2.1046, §22.913, §24.232

LIMITS

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

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

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

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

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

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

TEST PROCEDURE

The transmitter output was connected to a CMW500Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

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

Set display line

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

MODES TESTED

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

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

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: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported (LTE Band 2/4/7: above 10GHz).

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

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/#Mid	1850.7	-2.22	3.76		
		1880	-2.03	3.91	28.22	22.28	169.044	Horizontal	Pass
		1909.3	-1.94	3.93	28.20	22.33	171.002	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-2.28	3.77	28.23	22.18	165.196	Horizontal	Pass
		1880	-2.13	3.91	28.24	22.20	165.959	Horizontal	Pass
		1908.5	-2.00	3.94	28.25	22.31	170.216	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-2.17	3.77	28.31	22.37	172.584	Horizontal	Pass
		1880	-1.79	3.91	28.22	22.52	178.649	Horizontal	Pass
		1907.5	-1.72	3.94	28.20	22.54	179.473	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-2.03	3.79	28.33	22.51	178.238	Horizontal	Pass
		1880	-1.73	3.95	28.22	22.54	179.473	Horizontal	Pass
		1905	-1.62	3.97	28.19	22.60	181.970	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-1.99	3.79	28.34	22.56	180.302	Horizontal	Pass
		1880	-1.78	3.95	28.22	22.49	177.419	Horizontal	Pass
		1902.5	-1.64	3.97	28.18	22.57	180.717	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-1.98	3.81	28.35	22.56	180.302	Horizontal	Pass
		1880	-1.65	3.96	28.22	22.61	182.390	Horizontal	Pass
		1900	-1.59	4.00	28.16	22.57	180.717	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-3.19	3.76	28.24	21.29	134.586	Vertical	Pass
		1880	-2.52	3.91	28.22	21.79	151.008	Vertical	Pass
		1909.3	-2.66	3.93	28.20	21.61	144.877	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-2.92	3.77	28.23	21.54	142.561	Vertical	Pass
		1880	-2.47	3.91	28.24	21.86	153.462	Vertical	Pass
		1908.5	-2.35	3.94	28.25	21.96	157.036	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-3.35	3.77	28.31	21.19	131.522	Vertical	Pass
		1880	-2.69	3.91	28.22	21.62	145.211	Vertical	Pass
		1907.5	-2.57	3.94	28.20	21.69	147.571	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	-2.79	3.79	28.33	21.75	149.624	Vertical	Pass
		1880	-2.73	3.95	28.22	21.54	142.561	Vertical	Pass
		1905	-3.13	3.97	28.19	21.09	128.529	Vertical	Pass

15.0MHz		1857.5	-3.38	3.79	28.34	21.17	130.918	Vertical	Pass
Band	1/#Mid	1880	-2.33	3.95	28.22	21.94	156.315	Vertical	Pass
QPSK		1902.5	-3.13	3.97	28.18	21.08	128.233	Vertical	Pass
20.0MHz		1860	-3.45	3.81	28.35	21.09	128.529	Vertical	Pass
Band	1/#Mid	1880	-3.08	3.96	28.22	21.18	131.220	Vertical	Pass
QPSK		1900	-3.23	4.00	28.16	20.93	123.880	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	Of Max. ERP		
							Average (mW)			
1.4MHz Band 16 QAM	1/#Mid	1850.7	-3.34	3.76	28.24	21.14	130.017	Horizontal	Pass	
		1880	-2.81	3.91	28.22	21.50	141.254	Horizontal	Pass	
		1909.3	-2.74	3.93	28.20	21.53	142.233	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	1851.5	-2.84	3.77	28.23	21.62	145.211	Horizontal	Pass	
		1880	-2.92	3.91	28.24	21.41	138.357	Horizontal	Pass	
		1908.5	-3.13	3.94	28.25	21.18	131.220	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	1852.5	-2.78	3.77	28.31	21.76	149.968	Horizontal	Pass	
		1880	-2.69	3.91	28.22	21.62	145.211	Horizontal	Pass	
		1907.5	-2.37	3.94	28.20	21.89	154.525	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	1855	-2.83	3.79	28.33	21.71	148.252	Horizontal	Pass	
		1880	-2.82	3.95	28.22	21.45	139.637	Horizontal	Pass	
		1905	-2.29	3.97	28.19	21.93	155.955	Horizontal	Pass	
15.0MHz Band 16 QAM	1/#Mid	1857.5	-2.81	3.79	28.34	21.74	149.279	Horizontal	Pass	
		1880	-2.60	3.95	28.22	21.67	146.893	Horizontal	Pass	
		1902.5	-2.56	3.97	28.18	21.65	146.218	Horizontal	Pass	
20.0MHz Band 16 QAM	1/#Mid	1860	-2.70	3.81	28.35	21.84	152.757	Horizontal	Pass	
		1880	-2.40	3.96	28.22	21.86	153.462	Horizontal	Pass	
		1900	-2.22	4.00	28.16	21.94	156.315	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.00	3.76	28.24	20.48	111.686	Vertical	Pass	
		1880	-3.41	3.91	28.22	20.90	123.027	Vertical	Pass	
		1909.3	-3.54	3.93	28.20	20.73	118.304	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	1851.5	-4.13	3.77	28.23	20.33	107.895	Vertical	Pass	
		1880	-3.65	3.91	28.24	20.68	116.950	Vertical	Pass	
		1908.5	-3.49	3.94	28.25	20.82	120.781	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	1852.5	-4.22	3.77	28.31	20.32	107.647	Vertical	Pass	
		1880	-4.01	3.91	28.22	20.30	107.152	Vertical	Pass	
		1907.5	-3.46	3.94	28.20	20.80	120.226	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	1855	-4.06	3.79	28.33	20.48	111.686	Vertical	Pass	
		1880	-3.91	3.95	28.22	20.36	108.643	Vertical	Pass	
		1905	-4.07	3.97	28.19	20.15	103.514	Vertical	Pass	
15.0MHz Band 16 QAM	1/#Mid	1857.5	-4.03	3.79	28.34	20.52	112.720	Vertical	Pass	
		1880	-4.29	3.95	28.22	19.98	99.541	Vertical	Pass	
		1902.5	-3.43	3.97	28.18	20.78	119.674	Vertical	Pass	

20.0MHz		1860	-3.95	3.81	28.35	20.59	114.551	Vertical	Pass
Band 16	1/#Mid	1880	-3.96	3.96	28.22	20.30	107.152	Vertical	Pass
QAM		1900	-4.76	4.00	28.16	19.40	87.096	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	Cable Loss	Antenna Gain	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)	Average	Average			
						(dBm)	(mW)			
1.4MHz Band QPSK	1/#Mid	1710.7	-2.13	3.12	27.58	22.33	171.002	Horizontal	Pass	
		1732.5	-2.12	3.27	27.61	22.22	166.725	Horizontal	Pass	
		1754.3	-2.10	3.29	27.63	22.24	167.494	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	1711.5	-2.30	3.13	27.61	22.18	165.196	Horizontal	Pass	
		1732.5	-2.22	3.27	27.61	22.12	162.930	Horizontal	Pass	
		1753.5	-2.14	3.30	27.62	22.18	165.196	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	1712.5	-2.07	3.13	27.63	22.43	174.985	Horizontal	Pass	
		1732.5	-1.97	3.27	27.61	22.37	172.584	Horizontal	Pass	
		1752.5	-1.85	3.30	27.60	22.45	175.792	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	1715	-2.01	3.15	27.64	22.48	177.011	Horizontal	Pass	
		1732.5	-1.78	3.31	27.61	22.52	178.649	Horizontal	Pass	
		1750	-1.80	3.33	27.59	22.46	176.198	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	1717.5	-2.02	3.15	27.65	22.48	177.011	Horizontal	Pass	
		1732.5	-1.86	3.31	27.61	22.44	175.388	Horizontal	Pass	
		1747.5	-1.80	3.33	27.57	22.44	175.388	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	1720	-1.96	3.17	27.66	22.53	179.061	Horizontal	Pass	
		1732.5	-1.79	3.32	27.61	22.50	177.828	Horizontal	Pass	
		1745	-1.73	3.36	27.56	22.47	176.604	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	1710.7	-2.93	3.12	27.58	21.53	142.233	Vertical	Pass	
		1732.5	-2.78	3.27	27.61	21.56	143.219	Vertical	Pass	
		1754.3	-3.15	3.29	27.63	21.19	131.522	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	1711.5	-2.57	3.13	27.61	21.91	155.239	Vertical	Pass	
		1732.5	-2.44	3.27	27.61	21.90	154.882	Vertical	Pass	
		1753.5	-2.55	3.30	27.62	21.77	150.314	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	1712.5	-2.73	3.13	27.63	21.77	150.314	Vertical	Pass	
		1732.5	-2.99	3.27	27.61	21.35	136.458	Vertical	Pass	
		1752.5	-3.09	3.30	27.60	21.21	132.130	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	1715	-2.69	3.15	27.64	21.80	151.356	Vertical	Pass	
		1732.5	-2.79	3.31	27.61	21.51	141.579	Vertical	Pass	
		1750	-3.12	3.33	27.59	21.14	130.017	Vertical	Pass	

15.0MHz		1717.5	-2.80	3.15	27.65	21.70	147.911	Vertical	Pass
Band	1/#Mid	1732.5	-2.70	3.31	27.61	21.60	144.544	Vertical	Pass
QPSK		1747.5	-2.51	3.33	27.57	21.73	148.936	Vertical	Pass
20.0MHz		1720	-3.48	3.17	27.66	21.01	126.183	Vertical	Pass
Band	1/#Mid	1732.5	-2.93	3.32	27.61	21.36	136.773	Vertical	Pass
QPSK		1745	-2.74	3.36	27.56	21.46	139.959	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	Cable	Antenna	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	Loss	Gain	Average	Average	Of Max. ERP	
			(dBm)	(dB)	(dBm)	(mW)			
1.4MHz Band 16 QAM	1/#Mid	1710.7	-2.94	3.12	27.58	21.52	141.906	Horizontal	Pass
		1732.5	-2.79	3.27	27.61	21.55	142.889	Horizontal	Pass
		1754.3	-2.79	3.29	27.63	21.55	142.889	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.88	3.13	27.61	21.60	144.544	Horizontal	Pass
		1732.5	-3.01	3.27	27.61	21.33	135.831	Horizontal	Pass
		1753.5	-3.23	3.30	27.62	21.09	128.529	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.71	3.13	27.63	21.79	151.008	Horizontal	Pass
		1732.5	-2.67	3.27	27.61	21.67	146.893	Horizontal	Pass
		1752.5	-2.36	3.30	27.60	21.94	156.315	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-2.78	3.15	27.64	21.71	148.252	Horizontal	Pass
		1732.5	-2.97	3.31	27.61	21.33	135.831	Horizontal	Pass
		1750	-2.35	3.33	27.59	21.91	155.239	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-2.58	3.15	27.65	21.92	155.597	Horizontal	Pass
		1732.5	-2.64	3.31	27.61	21.66	146.555	Horizontal	Pass
		1747.5	-2.66	3.33	27.57	21.58	143.880	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-2.53	3.17	27.66	21.96	157.036	Horizontal	Pass
		1732.5	-2.54	3.32	27.61	21.75	149.624	Horizontal	Pass
		1745	-2.35	3.36	27.56	21.85	153.109	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-4.35	3.12	27.58	20.11	102.565	Vertical	Pass
		1732.5	-3.51	3.27	27.61	20.83	121.060	Vertical	Pass
		1754.3	-3.99	3.29	27.63	20.35	108.393	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-3.96	3.13	27.61	20.52	112.720	Vertical	Pass
		1732.5	-3.66	3.27	27.61	20.68	116.950	Vertical	Pass
		1753.5	-3.76	3.30	27.62	20.56	113.763	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-4.42	3.13	27.63	20.08	101.859	Vertical	Pass
		1732.5	-3.92	3.27	27.61	20.42	110.154	Vertical	Pass
		1752.5	-3.68	3.30	27.60	20.62	115.345	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-3.57	3.15	27.64	20.92	123.595	Vertical	Pass
		1732.5	-3.86	3.31	27.61	20.44	110.662	Vertical	Pass
		1750	-4.26	3.33	27.59	20.00	100.000	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-4.42	3.15	27.65	20.08	101.859	Vertical	Pass
		1732.5	-3.69	3.31	27.61	20.61	115.080	Vertical	Pass
		1747.5	-3.86	3.33	27.57	20.38	109.144	Vertical	Pass

20.0MHz		1720	-4.43	3.17	27.66	20.06	101.391	Vertical	Pass
Band 16	1/#Mid	1732.5	-3.51	3.32	27.61	20.78	119.674	Vertical	Pass
QAM		1745	-3.87	3.36	27.56	20.33	107.895	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							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)		Average	Average			
						(dB)	(dBm)	(mW)			
1.4MHz Band QPSK	3/#Mid	824.7	7.18	2.01	19.68	2.15	22.70	186.209	Horizontal	Pass	
		836.5	7.06	2.01	19.77	2.15	22.67	184.927	Horizontal	Pass	
		848.3	6.86	2.02	19.82	2.15	22.51	178.238	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	6.95	2.01	19.70	2.15	22.49	177.419	Horizontal	Pass	
		836.5	6.85	2.01	19.77	2.15	22.46	176.198	Horizontal	Pass	
		847.5	6.72	2.02	19.81	2.15	22.36	172.187	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	7.23	2.01	19.71	2.15	22.78	189.671	Horizontal	Pass	
		836.5	7.11	2.01	19.77	2.15	22.72	187.068	Horizontal	Pass	
		846.5	6.95	2.02	19.79	2.15	22.57	180.717	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	829	7.25	2.01	19.73	2.15	22.82	191.426	Horizontal	Pass	
		836.5	7.20	2.01	19.77	2.15	22.81	190.985	Horizontal	Pass	
		844	7.10	2.02	19.78	2.15	22.71	186.638	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	824.7	5.83	2.01	19.68	2.15	21.35	136.458	Vertical	Pass	
		836.5	6.10	2.01	19.77	2.15	21.71	148.252	Vertical	Pass	
		848.3	6.07	2.02	19.82	2.15	21.72	148.594	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	5.69	2.01	19.70	2.15	21.23	132.739	Vertical	Pass	
		836.5	6.10	2.01	19.77	2.15	21.71	148.252	Vertical	Pass	
		847.5	5.70	2.02	19.81	2.15	21.34	136.144	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	6.02	2.01	19.71	2.15	21.57	143.549	Vertical	Pass	
		836.5	5.57	2.01	19.77	2.15	21.18	131.220	Vertical	Pass	
		846.5	6.05	2.02	19.79	2.15	21.67	146.893	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	829	5.58	2.01	19.73	2.15	21.15	130.317	Vertical	Pass	
		836.5	5.61	2.01	19.77	2.15	21.22	132.434	Vertical	Pass	
		844	6.20	2.02	19.78	2.15	21.81	151.705	Vertical	Pass	

Radiated Power (ERP) for Band 5											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. EIRP	Max. EIRP	Average		
			(dBm)	(dBm)	(dB)		(dBm)	(mW)			
						(dB)	(dBm)	(mW)			
1.4MHz Band 16 QAM	3/#Mid	824.7	6.33	2.01	19.68	2.15	21.85	153.109	Horizontal	Pass	
		836.5	6.26	2.01	19.77	2.15	21.87	153.815	Horizontal	Pass	
		848.3	6.10	2.02	19.82	2.15	21.75	149.624	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	6.41	2.01	19.70	2.15	21.95	156.675	Horizontal	Pass	
		836.5	6.12	2.01	19.77	2.15	21.73	148.936	Horizontal	Pass	
		847.5	5.60	2.02	19.81	2.15	21.24	133.045	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	6.73	2.01	19.71	2.15	22.28	169.044	Horizontal	Pass	
		836.5	6.50	2.01	19.77	2.15	22.11	162.555	Horizontal	Pass	
		846.5	6.25	2.02	19.79	2.15	21.87	153.815	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	829	6.73	2.01	19.73	2.15	22.30	169.824	Horizontal	Pass	
		836.5	6.45	2.01	19.77	2.15	22.06	160.694	Horizontal	Pass	
		844	5.99	2.02	19.78	2.15	21.60	144.544	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	824.7	5.31	2.01	19.68	2.15	20.83	121.060	Vertical	Pass	
		836.5	6.37	2.01	19.77	2.15	21.98	157.761	Vertical	Pass	
		848.3	4.61	2.02	19.82	2.15	20.26	106.170	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	5.97	2.01	19.70	2.15	21.51	141.579	Vertical	Pass	
		836.5	4.46	2.01	19.77	2.15	20.07	101.625	Vertical	Pass	
		847.5	5.92	2.02	19.81	2.15	21.56	143.219	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	5.93	2.01	19.71	2.15	21.48	140.605	Vertical	Pass	
		836.5	6.35	2.01	19.77	2.15	21.96	157.036	Vertical	Pass	
		846.5	4.79	2.02	19.79	2.15	20.41	109.901	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	829	5.79	2.01	19.73	2.15	21.36	136.773	Vertical	Pass	
		836.5	4.85	2.01	19.77	2.15	20.46	111.173	Vertical	Pass	
		844	5.34	2.02	19.78	2.15	20.95	124.451	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 SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Gain	Max. EIRP	Max. EIRP	Polarization Of	
			(dBm)	(dBm)	(dB)	Average	Average	Max. ERP	
						(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	-0.41	4.54	27.75	22.80	190.546	Horizontal	Pass
		2535	-0.24	4.69	27.72	22.79	190.108	Horizontal	Pass
		2567.5	-0.17	4.71	27.71	22.83	191.867	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-0.34	4.55	27.76	22.87	193.642	Horizontal	Pass
		2535	-0.15	4.69	27.72	22.88	194.089	Horizontal	Pass
		2565	-0.07	4.72	27.70	22.91	195.434	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-0.35	4.55	27.77	22.87	193.642	Horizontal	Pass
		2535	-0.21	4.69	27.72	22.82	191.426	Horizontal	Pass
		2562.5	-0.11	4.72	27.69	22.86	193.197	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-0.29	4.57	27.78	22.92	195.884	Horizontal	Pass
		2535	-0.11	4.73	27.72	22.88	194.089	Horizontal	Pass
		2560	-0.07	4.75	27.68	22.86	193.197	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-1.90	4.54	27.75	21.31	135.207	Vertical	Pass
		2535	-1.06	4.69	27.72	21.97	157.398	Vertical	Pass
		2567.5	-1.99	4.71	27.71	21.01	126.183	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-1.86	4.55	27.76	21.35	136.458	Vertical	Pass
		2535	-1.81	4.69	27.72	21.22	132.434	Vertical	Pass
		2565	-1.70	4.72	27.70	21.28	134.276	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-1.62	4.55	27.77	21.60	144.544	Vertical	Pass
		2535	-1.93	4.69	27.72	21.10	128.825	Vertical	Pass
		2562.5	-1.66	4.72	27.69	21.31	135.207	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-1.45	4.57	27.78	21.76	149.968	Vertical	Pass
		2535	-1.26	4.73	27.72	21.73	148.936	Vertical	Pass
		2560	-1.53	4.75	27.68	21.40	138.038	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable	Antenna	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	Loss	Gain	Average	Average	Of Max. ERP	
			(dBm)	(dBm)	(dB)	(dBm)	(mW)		
5.0MHz Band 16 QAM	1#Mid	2502.5	-1.10	4.54	27.75	22.11	162.555	Horizontal	Pass
		2535	-0.79	4.69	27.72	22.24	167.494	Horizontal	Pass
		2567.5	-0.87	4.71	27.71	22.13	163.305	Horizontal	Pass
10.0MHz Band 16 QAM	1#Mid	2505	-0.99	4.55	27.76	22.22	166.725	Horizontal	Pass
		2535	-1.00	4.69	27.72	22.03	159.588	Horizontal	Pass
		2565	-1.27	4.72	27.70	21.71	148.252	Horizontal	Pass
15.0MHz Band 16 QAM	1#Mid	2507.5	-1.17	4.55	27.77	22.05	160.325	Horizontal	Pass
		2535	-1.14	4.69	27.72	21.89	154.525	Horizontal	Pass
		2562.5	-0.75	4.72	27.69	22.22	166.725	Horizontal	Pass
20.0MHz Band 16 QAM	1#Mid	2510	-1.05	4.57	27.78	22.16	164.437	Horizontal	Pass
		2535	-0.72	4.73	27.72	22.27	168.655	Horizontal	Pass
		2560	-0.82	4.75	27.68	22.11	162.555	Horizontal	Pass
5.0MHz Band 16 QAM	1#Mid	2502.5	-1.70	4.54	27.75	21.51	141.579	Vertical	Pass
		2535	-1.44	4.69	27.72	21.59	144.212	Vertical	Pass
		2567.5	-1.92	4.71	27.71	21.08	128.233	Vertical	Pass
10.0MHz Band 16 QAM	1#Mid	2505	-3.18	4.55	27.76	20.03	100.693	Vertical	Pass
		2535	-1.43	4.69	27.72	21.60	144.544	Vertical	Pass
		2565	-1.87	4.72	27.70	21.11	129.122	Vertical	Pass
15.0MHz Band 16 QAM	1#Mid	2507.5	-1.59	4.55	27.77	21.63	145.546	Vertical	Pass
		2535	-1.72	4.69	27.72	21.31	135.207	Vertical	Pass
		2562.5	-1.32	4.72	27.69	21.65	146.218	Vertical	Pass
20.0MHz Band 16 QAM	1#Mid	2510	-2.48	4.57	27.78	20.73	118.304	Vertical	Pass
		2535	-2.80	4.73	27.72	20.19	104.472	Vertical	Pass
		2560	-2.01	4.75	27.68	20.92	123.595	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.5 LTE BAND 12

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	Of Max. ERP	
							(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	699.7	7.54	1.91	19.21	2.15	22.69	185.780	Vertical	Pass
		707.5	7.46	1.91	19.26	2.15	22.66	184.502	Vertical	Pass
		715.3	7.24	1.93	19.34	2.15	22.50	177.828	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	700.5	7.33	1.91	19.21	2.15	22.48	177.011	Vertical	Pass
		707.5	7.25	1.91	19.26	2.15	22.45	175.792	Vertical	Pass
		714.5	7.09	1.93	19.34	2.15	22.35	171.791	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	701.5	7.60	1.91	19.23	2.15	22.77	189.234	Vertical	Pass
		707.5	7.51	1.91	19.26	2.15	22.71	186.638	Vertical	Pass
		713.5	7.30	1.92	19.33	2.15	22.56	180.302	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	704	7.62	1.91	19.25	2.15	22.81	190.985	Vertical	Pass
		707.5	7.60	1.91	19.26	2.15	22.80	190.546	Vertical	Pass
		711	7.45	1.92	19.32	2.15	22.70	186.209	Vertical	Pass
1.4MHz Band QPSK	1/#Mid	699.7	5.99	1.91	19.21	2.15	21.14	130.017	Horizontal	Pass
		707.5	6.33	1.91	19.26	2.15	21.53	142.233	Horizontal	Pass
		715.3	6.03	1.93	19.34	2.15	21.29	134.586	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	700.5	6.48	1.91	19.21	2.15	21.63	145.546	Horizontal	Pass
		707.5	6.18	1.91	19.26	2.15	21.38	137.404	Horizontal	Pass
		714.5	6.37	1.93	19.34	2.15	21.63	145.546	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	701.5	6.29	1.91	19.23	2.15	21.46	139.959	Horizontal	Pass
		707.5	6.78	1.91	19.26	2.15	21.98	157.761	Horizontal	Pass
		713.5	6.14	1.92	19.33	2.15	21.40	138.038	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	704	6.13	1.91	19.25	2.15	21.32	135.519	Horizontal	Pass
		707.5	6.12	1.91	19.26	2.15	21.32	135.519	Horizontal	Pass
		711	6.71	1.92	19.32	2.15	21.96	157.036	Horizontal	Pass

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)		Average	Average		
						(dB)	(dBm)	(mW)		
1.4MHz Band 16 QAM	1/#Mid	699.7	7.67	1.91	19.21	2.15	22.82	191.426	Vertical	Pass
		707.5	7.59	1.91	19.26	2.15	22.79	190.108	Vertical	Pass
		715.3	7.37	1.93	19.34	2.15	22.63	183.231	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	7.46	1.91	19.21	2.15	22.61	182.390	Vertical	Pass
		707.5	7.38	1.91	19.26	2.15	22.58	181.134	Vertical	Pass
		714.5	7.22	1.93	19.34	2.15	22.48	177.011	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	7.73	1.91	19.23	2.15	22.90	194.984	Vertical	Pass
		707.5	7.64	1.91	19.26	2.15	22.84	192.309	Vertical	Pass
		713.5	7.43	1.92	19.33	2.15	22.69	185.780	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	704	7.75	1.91	19.25	2.15	22.94	196.789	Vertical	Pass
		707.5	7.73	1.91	19.26	2.15	22.93	196.336	Vertical	Pass
		711	7.58	1.92	19.32	2.15	22.83	191.867	Vertical	Pass
1.4MHz Band 16 QAM	1/#Mid	699.7	6.04	1.91	19.21	2.15	21.19	131.522	Horizontal	Pass
		707.5	5.92	1.91	19.26	2.15	21.12	129.420	Horizontal	Pass
		715.3	6.17	1.93	19.34	2.15	21.43	138.995	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	6.74	1.91	19.21	2.15	21.89	154.525	Horizontal	Pass
		707.5	6.56	1.91	19.26	2.15	21.76	149.968	Horizontal	Pass
		714.5	6.66	1.93	19.34	2.15	21.92	155.597	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	5.96	1.91	19.23	2.15	21.13	129.718	Horizontal	Pass
		707.5	6.65	1.91	19.26	2.15	21.85	153.109	Horizontal	Pass
		713.5	6.29	1.92	19.33	2.15	21.55	142.889	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	704	6.49	1.91	19.25	2.15	21.68	147.231	Horizontal	Pass
		707.5	6.17	1.91	19.26	2.15	21.37	137.088	Horizontal	Pass
		711	6.55	1.92	19.32	2.15	21.80	151.356	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

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

LIMIT

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

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

TEST PROCEDURE

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

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

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

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

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

MODES TESTED

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

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	-47.24	4.04	33.51	-17.77	-13	-4.77	Horizontal
3701.4	-46.16	4.04	33.51	-16.69	-13	-3.69	Vertical
5552.1	-53.09	5.24	35.84	-22.49	-13	-9.49	Vertical
5552.1	-53.93	5.24	35.84	-23.33	-13	-10.33	Horizontal
197.7	-44.23	1.43	16.02	-29.64	-13	-16.64	Vertical
252.5	-38.55	1.30	17.99	-21.86	-13	-8.86	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-51.64	4.04	33.56	-22.12	-13	-9.12	Horizontal
3760.0	-44.93	4.04	33.56	-15.41	-13	-2.41	Vertical
5640.0	-53.33	5.24	35.91	-22.66	-13	-9.66	Vertical
5640.0	-49.69	5.24	35.91	-19.02	-13	-6.02	Horizontal
182.6	-34.14	1.62	16.97	-18.79	-13	-5.79	Vertical
334.3	-39.56	1.74	15.98	-25.33	-13	-12.33	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-52.67	4.04	34.00	-22.71	-13	-9.71	Horizontal
3818.6	-49.24	4.04	34.00	-19.28	-13	-6.28	Vertical
5727.9	-50.42	5.24	36.04	-19.62	-13	-6.62	Vertical
5727.9	-49.01	5.24	36.04	-18.21	-13	-5.21	Horizontal
204.1	-37.36	1.42	17.29	-21.49	-13	-8.49	Vertical
278.5	-39.19	1.50	17.90	-22.78	-13	-9.78	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	-52.44	4.07	33.54	-22.97	-13	-9.97	Horizontal
3720.0	-46.23	4.07	33.54	-16.76	-13	-3.76	Vertical
5580.0	-45.66	5.28	35.86	-15.08	-13	-2.08	Vertical
5580.0	-49.66	5.28	35.86	-19.08	-13	-6.08	Horizontal
200.1	-34.16	1.58	16.89	-18.84	-13	-5.84	Vertical
282.6	-41.14	1.76	17.26	-25.64	-13	-12.64	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-52.52	4.04	33.56	-23.00	-13	-10.00	Horizontal
3760.0	-50.30	4.04	33.56	-20.78	-13	-7.78	Vertical
5640.0	-51.21	5.24	35.91	-20.54	-13	-7.54	Vertical
5640.0	-49.51	5.24	35.91	-18.84	-13	-5.84	Horizontal
177.1	-37.79	1.46	16.27	-22.98	-13	-9.98	Vertical
430.8	-37.56	1.59	15.15	-24.00	-13	-11.00	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-53.71	4.04	34.00	-23.75	-13	-10.75	Horizontal
3800.0	-52.21	4.04	34.00	-22.25	-13	-9.25	Vertical
5700.0	-45.19	5.24	36.04	-14.39	-13	-1.39	Vertical
5700.0	-50.74	5.24	36.04	-19.94	-13	-6.94	Horizontal
209.3	-42.45	1.36	17.39	-26.41	-13	-13.41	Vertical
450.9	-35.06	1.66	15.39	-21.33	-13	-8.33	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value + Cable Loss+ Antenna Factor + 11.74
 . Margin = Spurious Emission Level - Limit
 . Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

9.2 LTE BAND 4

QPSK EIRP POWER FOR LTE BAND 4 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-51.37	4.02	29.80	-25.59	-13	-12.59	Horizontal
3421.4	-48.52	4.02	29.80	-22.74	-13	-9.74	Vertical
5132.1	-46.73	5.24	35.84	-16.13	-13	-3.13	Vertical
5132.1	-49.77	5.24	35.84	-19.17	-13	-6.17	Horizontal
197.2	-38.46	1.68	16.04	-24.10	-13	-11.10	Vertical
360.1	-37.46	1.78	17.74	-21.50	-13	-8.50	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-47.90	4.03	30.00	-21.93	-13	-8.93	Horizontal
3465.0	-46.99	4.03	30.00	-21.02	-13	-8.02	Vertical
5197.5	-49.52	5.25	35.86	-18.91	-13	-5.91	Vertical
5197.5	-49.28	5.25	35.86	-18.67	-13	-5.67	Horizontal
207.6	-36.91	1.72	17.69	-20.94	-13	-7.94	Vertical
283.1	-38.11	1.62	16.02	-23.70	-13	-10.70	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-45.90	4.05	30.01	-19.94	-13	-6.94	Horizontal
3508.6	-49.12	4.05	30.01	-23.16	-13	-10.16	Vertical
5262.9	-47.76	5.26	35.86	-17.16	-13	-4.16	Vertical
5262.9	-51.62	5.26	35.86	-21.02	-13	-8.02	Horizontal
211.1	-34.49	1.80	16.69	-19.60	-13	-6.60	Vertical
297.1	-35.07	1.75	16.66	-20.17	-13	-7.17	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	-50.78	4.02	29.80	-25.00	-13	-12.00	Horizontal
3440.0	-47.22	4.02	29.80	-21.44	-13	-8.44	Vertical
5160.0	-49.41	5.24	35.84	-18.81	-13	-5.81	Vertical
5160.0	-50.41	5.24	35.84	-19.81	-13	-6.81	Horizontal
202.1	-40.01	1.57	17.26	-24.32	-13	-11.32	Vertical
250.6	-38.28	1.78	16.35	-23.71	-13	-10.71	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-51.03	4.03	30.00	-25.06	-13	-12.06	Horizontal
3465.0	-45.97	4.03	30.00	-20.00	-13	-7.00	Vertical
5197.5	-48.02	5.25	35.86	-17.41	-13	-4.41	Vertical
5197.5	-51.03	5.25	35.86	-20.42	-13	-7.42	Horizontal
193.7	-36.99	1.44	17.95	-20.48	-13	-7.48	Vertical
407.9	-40.83	1.65	16.09	-26.39	-13	-13.39	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-44.16	2.91	27.68	-19.39	-13	-6.39	Horizontal
3490.0	-49.53	2.91	27.68	-24.76	-13	-11.76	Vertical
5235.0	-49.33	5.26	35.86	-18.73	-13	-5.73	Vertical
5235.0	-49.90	5.26	35.86	-19.30	-13	-6.30	Horizontal
192.7	-40.20	1.61	16.85	-24.96	-13	-11.96	Vertical
262.9	-40.56	1.61	15.19	-26.98	-13	-13.98	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value + Cable Loss+ Antenna Factor + 11.74

. Margin = Spurious Emission Level - Limit

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

9.3 LTE BAND 5

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

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-52.77	2.78	27.50	-28.05	-13	-15.05	Horizontal
1649.4	-46.27	2.78	27.50	-21.55	-13	-8.55	Vertical
2474.1	-44.59	2.90	27.80	-19.69	-13	-6.69	Vertical
2474.1	-53.15	2.90	27.80	-28.25	-13	-15.25	Horizontal
195.9	-43.97	1.76	17.59	-28.14	-13	-15.14	Vertical
440.8	-34.69	1.63	15.87	-20.45	-13	-7.45	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-50.06	2.80	27.48	-25.38	-13	-12.38	Horizontal
1673.0	-51.41	2.80	27.48	-26.73	-13	-13.73	Vertical
2509.5	-44.72	2.91	27.70	-19.93	-13	-6.93	Vertical
2509.5	-49.91	2.91	27.70	-25.12	-13	-12.12	Horizontal
199.1	-40.58	1.61	15.68	-26.51	-13	-13.51	Vertical
410.8	-36.10	1.59	17.52	-20.18	-13	-7.18	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-47.54	2.82	27.43	-22.93	-13	-9.93	Horizontal
1696.6	-49.15	2.82	27.43	-24.54	-13	-11.54	Vertical
2544.9	-46.05	2.92	27.74	-21.23	-13	-8.23	Vertical
2544.9	-51.20	2.92	27.74	-26.38	-13	-13.38	Horizontal
195.4	-42.87	1.69	16.67	-27.88	-13	-14.88	Vertical
320.4	-34.52	1.70	17.18	-19.04	-13	-6.04	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	-46.20	2.78	27.50	-21.48	-13	-8.48	Horizontal
1658.0	-46.26	2.78	27.50	-21.54	-13	-8.54	Vertical
2487.0	-49.42	2.90	27.80	-24.52	-13	-11.52	Vertical
2487.0	-52.56	2.90	27.80	-27.66	-13	-14.66	Horizontal
180.2	-35.37	1.71	15.57	-21.51	-13	-8.51	Vertical
258.8	-42.91	1.34	16.40	-27.85	-13	-14.85	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-49.22	2.80	27.48	-24.54	-13	-11.54	Horizontal
1673.0	-47.54	2.80	27.48	-22.86	-13	-9.86	Vertical
2509.5	-49.96	2.91	27.70	-25.17	-13	-12.17	Vertical
2509.5	-50.34	2.91	27.70	-25.55	-13	-12.55	Horizontal
192.6	-37.58	1.44	17.04	-21.98	-13	-8.98	Vertical
453.3	-36.27	1.76	17.62	-20.41	-13	-7.41	Horizontal
Test Results for High Channel 844MHz							
1688.0	-47.53	2.82	27.43	-22.92	-13	-9.92	Horizontal
1688.0	-49.30	2.82	27.43	-24.69	-13	-11.69	Vertical
2532.0	-45.42	2.92	27.74	-20.60	-13	-7.60	Vertical
2532.0	-49.18	2.92	27.74	-24.36	-13	-11.36	Horizontal
198.4	-36.52	1.74	17.70	-20.56	-13	-7.56	Vertical
466.9	-36.99	1.41	17.46	-20.93	-13	-7.93	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value + Cable Loss+ Antenna Factor + 11.74
 . Margin = Spurious Emission Level - Limit
 . Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

9.4 LTE BAND 7

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

Test Results for Low Channel 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-62.53	5.23	35.81	-31.95	-25	-6.95	Horizontal
5005.0	-64.69	5.23	35.81	-34.11	-25	-9.11	Vertical
7507.5	-61.12	5.67	36.85	-29.94	-25	-4.94	Vertical
7507.5	-61.67	5.67	36.85	-30.49	-25	-5.49	Horizontal
175.4	-51.97	1.73	17.97	-35.73	-25	-10.73	Vertical
239.5	-53.44	1.38	15.11	-39.71	-25	-14.71	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-63.39	5.23	35.82	-32.80	-25	-7.80	Horizontal
5070.0	-63.42	5.23	35.82	-32.83	-25	-7.83	Vertical
7605.0	-62.77	5.67	36.85	-31.59	-25	-6.59	Vertical
7605.0	-64.48	5.67	36.85	-33.30	-25	-8.30	Horizontal
211.3	-48.19	1.77	16.17	-33.78	-25	-8.78	Vertical
364.7	-52.39	1.63	15.21	-38.81	-25	-13.81	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-62.36	5.24	35.83	-31.77	-25	-6.77	Horizontal
5135.0	-59.77	5.24	35.83	-29.18	-25	-4.18	Vertical
7702.5	-64.18	5.68	36.87	-32.99	-25	-7.99	Vertical
7702.5	-64.53	5.68	36.87	-33.34	-25	-8.34	Horizontal
209.0	-48.90	1.58	17.56	-32.92	-25	-7.92	Vertical
254.4	-54.88	1.45	16.58	-39.75	-25	-14.75	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	-63.32	5.23	35.82	-32.73	-25	-7.73	Horizontal
5020.0	-60.01	5.23	35.82	-29.42	-25	-4.42	Vertical
7530.0	-60.82	5.67	36.86	-29.63	-25	-4.63	Vertical
7530.0	-63.06	5.67	36.86	-31.87	-25	-6.87	Horizontal
178.5	-49.85	1.63	15.76	-35.72	-25	-10.72	Vertical
441.4	-50.08	1.71	15.44	-36.35	-25	-11.35	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-62.05	5.23	35.82	-31.46	-25	-6.46	Horizontal
5070.0	-60.87	5.23	35.82	-30.28	-25	-5.28	Vertical
7605.0	-61.85	5.67	36.85	-30.67	-25	-5.67	Vertical
7605.0	-59.58	5.67	36.85	-28.40	-25	-3.40	Horizontal
187.4	-46.06	1.79	16.84	-31.00	-25	-6.00	Vertical
267.9	-45.80	1.71	17.64	-29.87	-25	-4.87	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-62.29	5.24	35.83	-31.70	-25	-6.70	Horizontal
5120.0	-62.86	5.24	35.83	-32.27	-25	-7.27	Vertical
7680.0	-63.70	5.70	36.88	-32.52	-25	-7.52	Vertical
7680.0	-60.67	5.70	36.88	-29.49	-25	-4.49	Horizontal
185.1	-47.03	1.79	16.84	-31.97	-25	-6.97	Vertical
264.6	-49.12	1.71	17.64	-33.19	-25	-8.19	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value + Cable Loss+ Antenna Factor + 11.74
 . Margin = Spurious Emission Level - Limit
 . Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

9.5 LTE BAND 12

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

Test Results for Low Channel 699.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-49.51	2.60	27.20	-24.91	-13	-11.91	Horizontal
1399.4	-44.51	2.60	27.20	-19.91	-13	-6.91	Vertical
2099.1	-52.84	2.85	27.54	-28.15	-13	-15.15	Vertical
2099.1	-49.12	2.85	27.54	-24.43	-13	-11.43	Horizontal
185.7	-39.60	1.49	17.78	-23.31	-13	-10.31	Vertical
258.7	-44.24	1.36	17.33	-28.27	-13	-15.27	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-45.37	2.61	27.28	-20.70	-13	-7.70	Horizontal
1415.0	-48.85	2.61	27.28	-24.18	-13	-11.18	Vertical
2122.5	-49.10	2.87	27.59	-24.38	-13	-11.38	Vertical
2122.5	-53.05	2.87	27.59	-28.33	-13	-15.33	Horizontal
197.8	-38.76	1.73	15.74	-24.75	-13	-11.75	Vertical
442.1	-42.20	1.62	15.79	-28.03	-13	-15.03	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-44.16	2.63	27.28	-19.51	-13	-6.51	Horizontal
1430.6	-44.73	2.63	27.28	-20.08	-13	-7.08	Vertical
2145.9	-50.97	2.88	27.60	-26.25	-13	-13.25	Vertical
2145.9	-49.87	2.88	27.60	-25.15	-13	-12.15	Horizontal
190.4	-38.38	1.61	18.00	-21.99	-13	-8.99	Vertical
285.7	-43.43	1.45	15.49	-29.40	-13	-16.40	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	-47.57	2.61	27.26	-22.92	-13	-9.92	Horizontal
1408.0	-44.85	2.61	27.26	-20.20	-13	-7.20	Vertical
2112.0	-48.77	2.87	27.58	-24.06	-13	-11.06	Vertical
2112.0	-49.11	2.87	27.58	-24.40	-13	-11.40	Horizontal
194.3	-44.92	1.31	16.97	-29.26	-13	-16.26	Vertical
297.9	-35.68	1.65	16.70	-20.63	-13	-7.63	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-44.16	2.61	27.28	-19.49	-13	-6.49	Horizontal
1415.0	-45.42	2.61	27.28	-20.75	-13	-7.75	Vertical
2122.5	-46.36	2.87	27.59	-21.64	-13	-8.64	Vertical
2122.5	-51.70	2.87	27.59	-26.98	-13	-13.98	Horizontal
204.3	-39.61	1.72	17.99	-23.34	-13	-10.34	Vertical
314.5	-39.60	1.73	17.94	-23.39	-13	-10.39	Horizontal
Test Results for High Channel 711MHz							
1422.0	-49.64	2.62	27.28	-24.98	-13	-11.98	Horizontal
1422.0	-53.45	2.62	27.28	-28.79	-13	-15.79	Vertical
2133.0	-51.14	2.87	27.60	-26.41	-13	-13.41	Vertical
2133.0	-50.47	2.87	27.60	-25.74	-13	-12.74	Horizontal
196.4	-44.41	1.58	15.93	-30.06	-13	-17.06	Vertical
319.1	-43.94	1.36	15.59	-29.71	-13	-16.71	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value + Cable Loss+ Antenna Factor + 11.74
 . Margin = Spurious Emission Level - Limit
 . Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

10. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = -30° to $+50^{\circ}\text{C}$
- Voltage = low voltage, DC 34V, 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

RESULTS

See the following pages.

10.1 LTE BAND 2

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1880	12.3	0.006544	2.5
3.85	1880	13.5	0.007170	2.5
4.2	1880	13.5	0.007180	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	12.6	0.006689	2.5
Extreme (50C)	1880	11.7	0.006245	2.5
Extreme (40C)	1880	14.2	0.007544	2.5
Extreme (30C)	1880	13.9	0.007368	2.5
Extreme (10C)	1880	14.3	0.007629	2.5
Extreme (0C)	1880	12.6	0.006699	2.5
Extreme (-10C)	1880	12.7	0.006737	2.5
Extreme (-20C)	1880	13.6	0.007257	2.5
Extreme (-30C)	1880	14.6	0.007770	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1880	9.9	0.005283	2.5
3.85	1880	9.3	0.004954	2.5
4.2	1880	7.8	0.004170	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.8	0.005218	2.5
Extreme (50C)	1880	8.6	0.004599	2.5
Extreme (40C)	1880	7.7	0.004092	2.5
Extreme (30C)	1880	8.5	0.004526	2.5
Extreme (10C)	1880	9.0	0.004770	2.5
Extreme (0C)	1880	7.8	0.004142	2.5
Extreme (-10C)	1880	9.2	0.004870	2.5
Extreme (-20C)	1880	9.1	0.004825	2.5
Extreme (-30C)	1880	8.3	0.004401	2.5

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

10.2 LTE BAND 4

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1732.5	9.3	0.005340	2.5
3.85	1732.5	9.2	0.005301	2.5
4.2	1732.5	8.9	0.005133	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	7.9	0.004586	2.5
Extreme (50C)	1732.5	9.1	0.005277	2.5
Extreme (40C)	1732.5	6.9	0.003984	2.5
Extreme (30C)	1732.5	5.8	0.003324	2.5
Extreme (10C)	1732.5	7.6	0.004371	2.5
Extreme (0C)	1732.5	9.7	0.005571	2.5
Extreme (-10C)	1732.5	8.2	0.004734	2.5
Extreme (-20C)	1732.5	6.9	0.004012	2.5
Extreme (-30C)	1732.5	7.9	0.004560	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1732.5	9.7	0.005578	2.5
3.85	1732.5	8.7	0.005035	2.5
4.2	1732.5	8.0	0.004603	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	10.0	0.005759	2.5
Extreme (50C)	1732.5	8.5	0.004912	2.5
Extreme (40C)	1732.5	8.0	0.004605	2.5
Extreme (30C)	1732.5	8.5	0.004910	2.5
Extreme (10C)	1732.5	8.7	0.005036	2.5
Extreme (0C)	1732.5	8.1	0.004669	2.5
Extreme (-10C)	1732.5	9.0	0.005169	2.5
Extreme (-20C)	1732.5	9.2	0.005323	2.5
Extreme (-30C)	1732.5	8.3	0.004774	2.5

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

10.3 LTE BAND 5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	836.5	6.2	0.007405	2.5
3.85	836.5	6.8	0.008168	2.5
4.2	836.5	4.4	0.005317	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.1	0.007320	2.5
Extreme (50C)	836.5	5.8	0.006952	2.5
Extreme (40C)	836.5	5.8	0.006984	2.5
Extreme (30C)	836.5	6.2	0.007424	2.5
Extreme (10C)	836.5	5.0	0.006025	2.5
Extreme (0C)	836.5	4.8	0.005787	2.5
Extreme (-10C)	836.5	5.4	0.006441	2.5
Extreme (-20C)	836.5	5.6	0.006745	2.5
Extreme (-30C)	836.5	6.6	0.007866	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	836.5	5.8	0.006993	2.5
3.85	836.5	6.3	0.007480	2.5
4.2	836.5	4.6	0.005540	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.4	0.007688	2.5
Extreme (50C)	836.5	5.6	0.006696	2.5
Extreme (40C)	836.5	6.4	0.007606	2.5
Extreme (30C)	836.5	6.1	0.007245	2.5
Extreme (10C)	836.5	5.7	0.006850	2.5
Extreme (0C)	836.5	5.1	0.006059	2.5
Extreme (-10C)	836.5	5.9	0.006994	2.5
Extreme (-20C)	836.5	6.5	0.007802	2.5
Extreme (-30C)	836.5	6.2	0.007377	2.5

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

10.4 LTE BAND 7

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	2535	10.0	0.003949	2.5
3.85	2535	8.5	0.003349	2.5
4.2	2535	8.4	0.003307	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	9.4	0.003714	2.5
Extreme (50C)	2535	8.5	0.003359	2.5
Extreme (40C)	2535	8.3	0.003255	2.5
Extreme (30C)	2535	8.7	0.003421	2.5
Extreme (10C)	2535	8.0	0.003148	2.5
Extreme (0C)	2535	8.3	0.003256	2.5
Extreme (-10C)	2535	9.0	0.003564	2.5
Extreme (-20C)	2535	8.8	0.003475	2.5
Extreme (-30C)	2535	8.8	0.003491	2.5

Band 7 16QAM, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	2535	6.9	0.002722	2.5
3.85	2535	6.0	0.002355	2.5
4.2	2535	5.2	0.002060	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	6.9	0.002722	2.5
Extreme (50C)	2535	5.7	0.002255	2.5
Extreme (40C)	2535	5.2	0.002069	2.5
Extreme (30C)	2535	6.6	0.002589	2.5
Extreme (10C)	2535	5.3	0.002100	2.5
Extreme (0C)	2535	5.1	0.002012	2.5
Extreme (-10C)	2535	4.7	0.001873	2.5
Extreme (-20C)	2535	5.5	0.002176	2.5
Extreme (-30C)	2535	5.6	0.002196	2.5

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

10.5 LTE BAND 12

Band 12 QPSK, (10MHz BANDWIDTH RB size 50 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	707.5	8.8	0.012385	2.5
3.85	707.5	10.3	0.014492	2.5
4.2	707.5	9.0	0.012688	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.5	0.012048	2.5
Extreme (50C)	707.5	7.2	0.010226	2.5
Extreme (40C)	707.5	7.0	0.009824	2.5
Extreme (30C)	707.5	8.8	0.012376	2.5
Extreme (10C)	707.5	7.6	0.010763	2.5
Extreme (0C)	707.5	8.9	0.012583	2.5
Extreme (-10C)	707.5	8.5	0.012067	2.5
Extreme (-20C)	707.5	9.2	0.013065	2.5
Extreme (-30C)	707.5	7.4	0.010463	2.5

Band 12 16QAM, (10MHz BANDWIDTH RB size 50 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	707.5	7.4	0.010427	2.5
3.85	707.5	8.7	0.012316	2.5
4.2	707.5	7.7	0.010888	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	6.5	0.009175	2.5
Extreme (50C)	707.5	5.5	0.007765	2.5
Extreme (40C)	707.5	6.4	0.009110	2.5
Extreme (30C)	707.5	-7.7	-0.010912	2.5
Extreme (10C)	707.5	-8.2	-0.011590	2.5
Extreme (0C)	707.5	2.9	0.004100	2.5
Extreme (-10C)	707.5	-5.2	-0.007292	2.5
Extreme (-20C)	707.5	-8.7	-0.012302	2.5
Extreme (-30C)	707.5	-10.2	-0.014350	2.5

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

11. Peak-to-Average Ratio

11.1 Description of the PAR Measurement

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

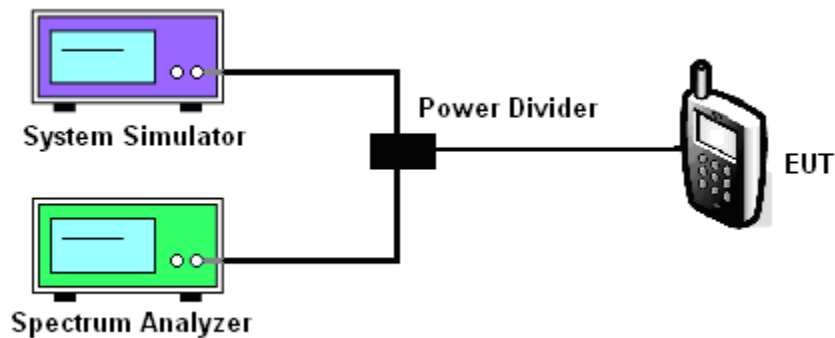
11.2 Measuring Instruments

See list of measuring instruments of this test report.

11.3 Test Procedures

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

11.4 Test Setup



MODES TESTED

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

----END OF REPORT----