

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

FCC ID: 2AHZ5P80

Product: Smartphone

Trade Mark: CUBOT

Model No.: P80

Family Model: N/A

Report No.: S23021402709006

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Prepared for

Shenzhen Huafurui Technology Co., Ltd

Unit 1401 14/F, Jin qi zhi gu mansion, Liu xian street, Xili, Nan shan district,
Shenzhen, China

Prepared by

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

Tel. 400-800-6106, 0755-2320 0050, 0755-2320 0090

Website: <http://www.ntek.org.cn>

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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Smartphone
Trade Mark	CUBOT
Model Name	P80
Family Model	N/A
Model Difference	N/A
FCC ID:	2AHZ5P80
Frequency Bands:	U.S. Bands: <input checked="" type="checkbox"/> LTE FDD Band 2,4,5,7,12, 17, 66
Frequency Range:	LTE FDD Band 2 Uplink: 1850MHz-1910MHz, Downlink: 1930MHz-1990MHz; LTE FDD Band 4 Uplink: 1710MHz-1755MHz, Downlink: 2110MHz-2155MHz; LTE FDD Band 5 Uplink: 824MHz-849MHz, Downlink: 869MHz-894MHz; LTE-FDD Band 7 Uplink: 2500MHz-2570MHz, Downlink: 2620MHz-2690MHz; LTE FDD Band 12 Uplink: 699MHz-716MHz, Downlink: 729MHz-746MHz; LTE FDD Band 17 Uplink: 704MHz-716MHz, Downlink: 734MHz-746MHz; LTE FDD Band 66 Uplink: 1710MHz-1780MHz, Downlink: 2110MHz-2200MHz;
Type of Modulation:	QPSK/16QAM/64QAM(Only Downlink)
Power Class	Class 3
SIM CARD	SIM 1 and SIM 2 is a chipset unit and tested as a single chipset. The SIM 1 is chosen for test.
Antenna:	PIFA Antenna
Antenna gain:	0.6dBi;
Adapter	Model: HJ-FC018K7-US Input: 100-240V~50/60Hz 0.6A Output: 5.0V---2.0A OR 7.0V---2.0A OR 9.0V---2.0A 18.0W
Battery	DC 3.87V, 5200mAh
Power supply	DC 3.87V from battery or DC 5V from Adapter.
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.87V) (Note 1)
HW Version	G2201W-MT-V1.0
SW Version	CUBOT_P80_D021_V01_20230330

** Note1: The High Voltage DC 4.2V and Low Voltage 3.4V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AHZ5P80** filing to comply with the FCC Part 22H&24E&27.

1.3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI/TIA-603-E-2016, FCC CFR 47 Part 2, Part 22, Part 24, Part 27, ,ANSI C63.26:2015.

1.4 TEST FACILITY

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

ShenZhen NTEK Testing Technology Co., Ltd.

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

The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.26:2015& ANSI C63.4: 2014.

FCC Registration No.:463705

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

MEASUREMENT UNCERTAINTY

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

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

1.5 SPECIAL ACCESSORIES

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

1.6 WORST-CASE CONFIGURATION AND MODE

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

The device has LTE Bands of: Band 2/4/5/7/12/17/66

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.

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	Smartphone	P80	FCC ID: 2AHZ5P80	EUT

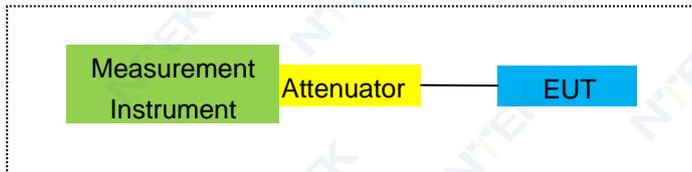
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

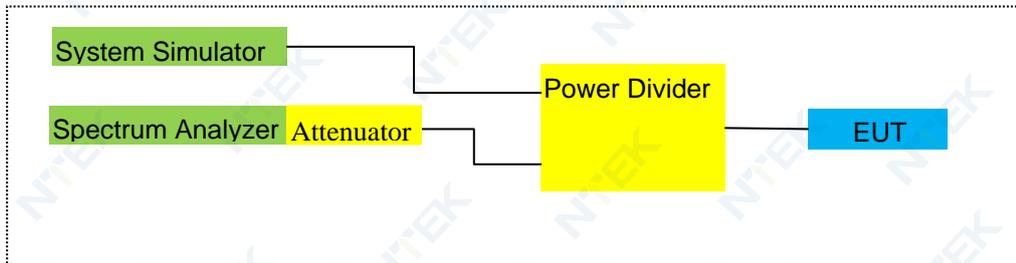
For Radiated Test Cases



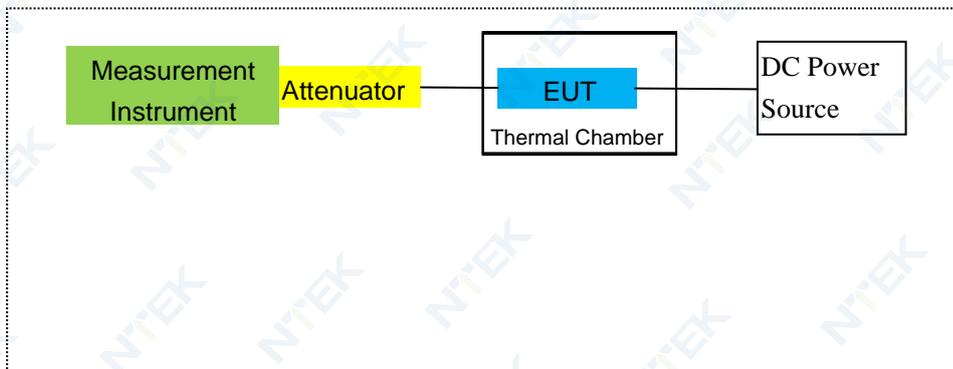
For Conducted Output Power



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	2022.06.16	2023.06.17	1 year
2	Test Receiver	R&S	ESPI	101318	2022.04.06	2023.04.05	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2022.03.30	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-10180	2011071402	2022.03.31	2023.03.30	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2022.11.07	2023.11.06	1 year
7	Amplifier	EM	EM-30180	060538	2022.06.17	2023.06.16	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2022.04.06	2023.04.05	1 year
9	Power Meter	R&S	NRVS	100696	2022.06.17	2023.06.16	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2022.04.06	2023.04.05	1 year
11	Test Cable	N/A	R-01	N/A	2022.06.17	2025.06.16	3 year
12	Test Cable	N/A	R-02	N/A	2022.06.17	2025.06.16	3 year
13	Test Cable	N/A	R-03	N/A	2022.06.17	2025.06.16	3 year
14	Test Receiver	R&S	ESCI	101160	2022.04.06	2023.04.05	1 year
15	LISN	R&S	ENV216	101313	2022.04.06	2023.04.05	1 year
16	LISN	EMCO	3816/2	00042990	2022.04.06	2023.04.05	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2022.04.06	2023.04.05	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2022.04.06	2023.04.05	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	2022.04.01	2023.03.31	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2022.04.01	2023.03.31	1 year
24	test receiver	R&S	ESCI	a0304218	2022.04.06	2023.04.05	1 year
25	Communication Tester	R&S	CMU200	A0304247	2022.06.16	2023.06.15	1 year

26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2022.04.06	2023.04.05	1 year
27	DC Power Source	N/A	PS-6005D	2017040292 3	2020.05.11	2023.05.10	3 year
28	MXG Vector Signal Generator	Agilent	N5182A	MY47070317	2022.06.16	2023.06.15	1 year
29	Communication Tester	R&S	CMW500	148500	2022.06.16	2023.06.15	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

Band 2/4/5/7/12/17/66

RESULTS

PASS

Test data reference attachment.

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53,

FCC: §22.359

LIMITS

FCC: §22.917, §24.238, §27.53

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

(m)(4) For mobile digital stations, 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 as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Show citation box.

(c)(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

TEST PROCEDURE

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

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

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

MODES TESTED

Band 2/4/5/7/12/17/66

RESULTS

Test data reference attachment.

7. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53

LIMITS

1. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.
2. The Band 7/41 emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $55 + 10 \log (P)$ dB.

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

MODES TESTED

- Band 2/4/5/7/12/17/66
-

7.1 MEASUREMENT METHOD

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

Test data reference attachment.

8. RADIATED MEASUREMENT

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27.50

LIMITS:

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

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. 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

Band 2/4/5/7/12/17/66

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 Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
			1.4MHz Band QPSK	1/#Mid	1850.7	-3.09	3.76	28.24		
		1880	-2.90	3.91	28.22	21.41	138.357	Horizontal	Pass	
		1909.3	-2.81	3.93	28.20	21.46	139.959	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-3.15	3.77	28.23	21.31	135.207	Horizontal	Pass	
		1880	-3.00	3.91	28.24	21.33	135.831	Horizontal	Pass	
		1908.5	-2.87	3.94	28.25	21.44	139.316	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-3.04	3.77	28.31	21.50	141.254	Horizontal	Pass	
		1880	-2.66	3.91	28.22	21.65	146.218	Horizontal	Pass	
		1907.5	-2.59	3.94	28.20	21.67	146.893	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-2.90	3.79	28.33	21.64	145.881	Horizontal	Pass	
		1880	-2.60	3.95	28.22	21.67	146.893	Horizontal	Pass	
		1905	-2.49	3.97	28.19	21.73	148.936	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	1857.5	-2.86	3.79	28.34	21.69	147.571	Horizontal	Pass	
		1880	-2.65	3.95	28.22	21.62	145.211	Horizontal	Pass	
		1902.5	-2.51	3.97	28.18	21.70	147.911	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	1860	-2.85	3.81	28.35	21.69	147.571	Horizontal	Pass	
		1880	-2.52	3.96	28.22	21.74	149.279	Horizontal	Pass	
		1900	-2.46	4.00	28.16	21.70	147.911	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	1850.7	-4.25	3.76	28.24	20.23	105.439	Vertical	Pass	
		1880	-3.34	3.91	28.22	20.97	125.026	Vertical	Pass	
		1909.3	-3.82	3.93	28.20	20.45	110.917	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-3.88	3.77	28.23	20.58	114.288	Vertical	Pass	
		1880	-3.26	3.91	28.24	21.07	127.938	Vertical	Pass	
		1908.5	-3.60	3.94	28.25	20.71	117.761	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-3.93	3.77	28.31	20.61	115.080	Vertical	Pass	
		1880	-4.06	3.91	28.22	20.25	105.925	Vertical	Pass	
		1907.5	-4.04	3.94	28.20	20.22	105.196	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-3.56	3.79	28.33	20.98	125.314	Vertical	Pass	
		1880	-4.13	3.95	28.22	20.14	103.276	Vertical	Pass	
		1905	-4.07	3.97	28.19	20.15	103.514	Vertical	Pass	
15.0MHz Band QPSK	1/#Mid	1857.5	-3.46	3.79	28.34	21.09	128.529	Vertical	Pass	

Band		1880	-3.22	3.95	28.22	21.05	127.350	Vertical	Pass
QPSK		1902.5	-3.63	3.97	28.18	20.58	114.288	Vertical	Pass
20.0MHz	1/#Mid	1860	-4.11	3.81	28.35	20.43	110.408	Vertical	Pass
Band		1880	-3.42	3.96	28.22	20.84	121.339	Vertical	Pass
QPSK		1900	-3.10	4.00	28.16	21.06	127.644	Vertical	Pass

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.21	3.76	28.24	20.27	106.414	Horizontal	Pass
		1880	-3.68	3.91	28.22	20.63	115.611	Horizontal	Pass
		1909.3	-3.61	3.93	28.20	20.66	116.413	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-3.71	3.77	28.23	20.75	118.850	Horizontal	Pass
		1880	-3.79	3.91	28.24	20.54	113.240	Horizontal	Pass
		1908.5	-4.00	3.94	28.25	20.31	107.399	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-3.65	3.77	28.31	20.89	122.744	Horizontal	Pass
		1880	-3.56	3.91	28.22	20.75	118.850	Horizontal	Pass
		1907.5	-3.24	3.94	28.20	21.02	126.474	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-3.70	3.79	28.33	20.84	121.339	Horizontal	Pass
		1880	-3.69	3.95	28.22	20.58	114.288	Horizontal	Pass
		1905	-3.16	3.97	28.19	21.06	127.644	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-3.68	3.79	28.34	20.87	122.180	Horizontal	Pass
		1880	-3.47	3.95	28.22	20.80	120.226	Horizontal	Pass
		1902.5	-3.43	3.97	28.18	20.78	119.674	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-3.57	3.81	28.35	20.97	125.026	Horizontal	Pass
		1880	-3.27	3.96	28.22	20.99	125.603	Horizontal	Pass
		1900	-3.09	4.00	28.16	21.07	127.938	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.97	3.76	28.24	19.51	89.331	Vertical	Pass
		1880	-4.84	3.91	28.22	19.47	88.512	Vertical	Pass
		1909.3	-4.86	3.93	28.20	19.41	87.297	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-4.39	3.77	28.23	20.07	101.625	Vertical	Pass
		1880	-5.12	3.91	28.24	19.21	83.368	Vertical	Pass
		1908.5	-4.40	3.94	28.25	19.91	97.949	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-4.71	3.77	28.31	19.83	96.161	Vertical	Pass
		1880	-4.72	3.91	28.22	19.59	90.991	Vertical	Pass
		1907.5	-4.97	3.94	28.20	19.29	84.918	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-5.36	3.79	28.33	19.18	82.794	Vertical	Pass
		1880	-4.59	3.95	28.22	19.68	92.897	Vertical	Pass
		1905	-4.45	3.97	28.19	19.77	94.842	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-4.54	3.79	28.34	20.01	100.231	Vertical	Pass
		1880	-4.77	3.95	28.22	19.50	89.125	Vertical	Pass
		1902.5	-4.19	3.97	28.18	20.02	100.462	Vertical	Pass

20.0MHz		1860	-4.90	3.81	28.35	19.64	92.045	Vertical	Pass
Band 16	1/#Mid	1880	-4.65	3.96	28.22	19.61	91.411	Vertical	Pass
QAM		1900	-4.56	4.00	28.16	19.60	91.201	Vertical	Pass

Note:

SG Level= Signal generator output

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

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			Average	Average		
						(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-3.00	3.12	27.58	21.46	139.959	Horizontal	Pass
		1732.5	-2.99	3.27	27.61	21.35	136.458	Horizontal	Pass
		1754.3	-2.97	3.29	27.63	21.37	137.088	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.17	3.13	27.61	21.31	135.207	Horizontal	Pass
		1732.5	-3.09	3.27	27.61	21.25	133.352	Horizontal	Pass
		1753.5	-3.01	3.30	27.62	21.31	135.207	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.94	3.13	27.63	21.56	143.219	Horizontal	Pass
		1732.5	-2.84	3.27	27.61	21.50	141.254	Horizontal	Pass
		1752.5	-2.72	3.30	27.60	21.58	143.880	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-2.88	3.15	27.64	21.61	144.877	Horizontal	Pass
		1732.5	-2.65	3.31	27.61	21.65	146.218	Horizontal	Pass
		1750	-2.67	3.33	27.59	21.59	144.212	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-2.89	3.15	27.65	21.61	144.877	Horizontal	Pass
		1732.5	-2.73	3.31	27.61	21.57	143.549	Horizontal	Pass
		1747.5	-2.67	3.33	27.57	21.57	143.549	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-2.83	3.17	27.66	21.66	146.555	Horizontal	Pass
		1732.5	-2.66	3.32	27.61	21.63	145.546	Horizontal	Pass
		1745	-2.60	3.36	27.56	21.60	144.544	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-4.35	3.12	27.58	20.11	102.565	Vertical	Pass
		1732.5	-3.62	3.27	27.61	20.72	118.032	Vertical	Pass
		1754.3	-4.11	3.29	27.63	20.23	105.439	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-4.02	3.13	27.61	20.46	111.173	Vertical	Pass
		1732.5	-4.02	3.27	27.61	20.32	107.647	Vertical	Pass
		1753.5	-3.31	3.30	27.62	21.01	126.183	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-3.77	3.13	27.63	20.73	118.304	Vertical	Pass
		1732.5	-3.94	3.27	27.61	20.40	109.648	Vertical	Pass
		1752.5	-4.03	3.30	27.60	20.27	106.414	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-4.28	3.15	27.64	20.21	104.954	Vertical	Pass
		1732.5	-3.33	3.31	27.61	20.97	125.026	Vertical	Pass
		1750	-4.11	3.33	27.59	20.15	103.514	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-3.99	3.15	27.65	20.51	112.460	Vertical	Pass

Band		1732.5	-4.07	3.31	27.61	20.23	105.439	Vertical	Pass
QPSK		1747.5	-3.54	3.33	27.57	20.70	117.490	Vertical	Pass
20.0MHz	1/#Mid	1720	-4.14	3.17	27.66	20.35	108.393	Vertical	Pass
Band		1732.5	-3.46	3.32	27.61	20.83	121.060	Vertical	Pass
QPSK		1745	-4.06	3.36	27.56	20.14	103.276	Vertical	Pass

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Factor	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			Average	Average		
				(dB)	(dBm)	(mW)			
1.4MHz Band 16 QAM	1/#Mid	1710.7	-3.81	3.12	27.58	20.65	116.145	Horizontal	Pass
		1732.5	-3.66	3.27	27.61	20.68	116.950	Horizontal	Pass
		1754.3	-3.66	3.29	27.63	20.68	116.950	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-3.75	3.13	27.61	20.73	118.304	Horizontal	Pass
		1732.5	-3.88	3.27	27.61	20.46	111.173	Horizontal	Pass
		1753.5	-4.10	3.30	27.62	20.22	105.196	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-3.58	3.13	27.63	20.92	123.595	Horizontal	Pass
		1732.5	-3.54	3.27	27.61	20.80	120.226	Horizontal	Pass
		1752.5	-3.23	3.30	27.60	21.07	127.938	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-3.65	3.15	27.64	20.84	121.339	Horizontal	Pass
		1732.5	-3.84	3.31	27.61	20.46	111.173	Horizontal	Pass
		1750	-3.22	3.33	27.59	21.04	127.057	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-3.45	3.15	27.65	21.05	127.350	Horizontal	Pass
		1732.5	-3.51	3.31	27.61	20.79	119.950	Horizontal	Pass
		1747.5	-3.53	3.33	27.57	20.71	117.761	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-3.40	3.17	27.66	21.09	128.529	Horizontal	Pass
		1732.5	-3.41	3.32	27.61	20.88	122.462	Horizontal	Pass
		1745	-3.22	3.36	27.56	20.98	125.314	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-5.23	3.12	27.58	19.23	83.753	Vertical	Pass
		1732.5	-4.36	3.27	27.61	19.98	99.541	Vertical	Pass
		1754.3	-4.32	3.29	27.63	20.02	100.462	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-4.40	3.13	27.61	20.08	101.859	Vertical	Pass
		1732.5	-4.46	3.27	27.61	19.88	97.275	Vertical	Pass
		1753.5	-4.25	3.30	27.62	20.07	101.625	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-4.71	3.13	27.63	19.79	95.280	Vertical	Pass
		1732.5	-4.83	3.27	27.61	19.51	89.331	Vertical	Pass
		1752.5	-4.25	3.30	27.60	20.05	101.158	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-4.44	3.15	27.64	20.05	101.158	Vertical	Pass
		1732.5	-5.17	3.31	27.61	19.13	81.846	Vertical	Pass
		1750	-4.28	3.33	27.59	19.98	99.541	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-4.49	3.15	27.65	20.01	100.231	Vertical	Pass
		1732.5	-4.41	3.31	27.61	19.89	97.499	Vertical	Pass
		1747.5	-4.79	3.33	27.57	19.45	88.105	Vertical	Pass

20.0MHz		1720	-5.30	3.17	27.66	19.19	82.985	Vertical	Pass
Band 16	1/#Mid	1732.5	-5.10	3.32	27.61	19.19	82.985	Vertical	Pass
QAM		1745	-4.35	3.36	27.56	19.85	96.605	Vertical	Pass

Note:

SG Level= Signal generator output

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

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

8.4 LTE BAND 5

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	Of Max. ERP	
							(dBm)	(mW)		
1.4MHz Band QPSK	3/#Mid	824.7	6.30	2.01	19.68	2.15	21.82	152.055	Horizontal	Pass
		836.5	6.18	2.01	19.77	2.15	21.79	151.008	Horizontal	Pass
		848.3	5.98	2.02	19.82	2.15	21.63	145.546	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	825.5	6.07	2.01	19.70	2.15	21.61	144.877	Horizontal	Pass
		836.5	5.97	2.01	19.77	2.15	21.58	143.880	Horizontal	Pass
		847.5	5.84	2.02	19.81	2.15	21.48	140.605	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	826.5	6.35	2.01	19.71	2.15	21.90	154.882	Horizontal	Pass
		836.5	6.23	2.01	19.77	2.15	21.84	152.757	Horizontal	Pass
		846.5	6.07	2.02	19.79	2.15	21.69	147.571	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	829	6.37	2.01	19.73	2.15	21.94	156.315	Horizontal	Pass
		836.5	6.32	2.01	19.77	2.15	21.93	155.955	Horizontal	Pass
		844	6.22	2.02	19.78	2.15	21.83	152.405	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	824.7	5.27	2.01	19.68	2.15	20.79	119.950	Vertical	Pass
		836.5	4.78	2.01	19.77	2.15	20.39	109.396	Vertical	Pass
		848.3	4.62	2.02	19.82	2.15	20.27	106.414	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	825.5	5.42	2.01	19.70	2.15	20.96	124.738	Vertical	Pass
		836.5	5.45	2.01	19.77	2.15	21.06	127.644	Vertical	Pass
		847.5	5.10	2.02	19.81	2.15	20.74	118.577	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	826.5	5.37	2.01	19.71	2.15	20.92	123.595	Vertical	Pass
		836.5	4.96	2.01	19.77	2.15	20.57	114.025	Vertical	Pass
		846.5	5.42	2.02	19.79	2.15	21.04	127.057	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	829	4.82	2.01	19.73	2.15	20.39	109.396	Vertical	Pass
		836.5	5.48	2.01	19.77	2.15	21.09	128.529	Vertical	Pass
		844	4.54	2.02	19.78	2.15	20.15	103.514	Vertical	Pass

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	Of Max. ERP	
							(dBm)	(mW)		
1.4MHz	Band 16 QAM	824.7	5.45	2.01	19.68	2.15	20.97	125.026	Horizontal	Pass
		836.5	5.38	2.01	19.77	2.15	20.99	125.603	Horizontal	Pass
		848.3	5.22	2.02	19.82	2.15	20.87	122.180	Horizontal	Pass
3.0MHz	Band 16 QAM	825.5	5.53	2.01	19.70	2.15	21.07	127.938	Horizontal	Pass
		836.5	5.24	2.01	19.77	2.15	20.85	121.619	Horizontal	Pass
		847.5	4.72	2.02	19.81	2.15	20.36	108.643	Horizontal	Pass
5.0MHz	Band 16 QAM	826.5	5.85	2.01	19.71	2.15	21.40	138.038	Horizontal	Pass
		836.5	5.62	2.01	19.77	2.15	21.23	132.739	Horizontal	Pass
		846.5	5.37	2.02	19.79	2.15	20.99	125.603	Horizontal	Pass
10.0MHz	Band 16 QAM	829	5.85	2.01	19.73	2.15	21.42	138.676	Horizontal	Pass
		836.5	5.57	2.01	19.77	2.15	21.18	131.220	Horizontal	Pass
		844	5.11	2.02	19.78	2.15	20.72	118.032	Horizontal	Pass
1.4MHz	Band 16 QAM	824.7	3.69	2.01	19.68	2.15	19.21	83.368	Vertical	Pass
		836.5	3.67	2.01	19.77	2.15	19.28	84.723	Vertical	Pass
		848.3	3.72	2.02	19.82	2.15	19.37	86.497	Vertical	Pass
3.0MHz	Band 16 QAM	825.5	5.04	2.01	19.70	2.15	20.58	114.288	Vertical	Pass
		836.5	4.63	2.01	19.77	2.15	20.24	105.682	Vertical	Pass
		847.5	3.68	2.02	19.81	2.15	19.32	85.507	Vertical	Pass
5.0MHz	Band 16 QAM	826.5	4.72	2.01	19.71	2.15	20.27	106.414	Vertical	Pass
		836.5	4.46	2.01	19.77	2.15	20.07	101.625	Vertical	Pass
		846.5	4.26	2.02	19.79	2.15	19.88	97.275	Vertical	Pass
10.0MHz	Band 16 QAM	829	4.15	2.01	19.73	2.15	19.72	93.756	Vertical	Pass
		836.5	3.87	2.01	19.77	2.15	19.48	88.716	Vertical	Pass
		844	3.64	2.02	19.78	2.15	19.25	84.140	Vertical	Pass

Note:

SG Level= Signal generator output

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

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable	Antenna	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	Loss	Factor	Average	Average	Of Max. ERP	
				(dBm)	(dB)	(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	-1.28	4.54	27.75	21.93	155.955	Horizontal	Pass
		2535	-1.11	4.69	27.72	21.92	155.597	Horizontal	Pass
		2567.5	-1.04	4.71	27.71	21.96	157.036	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-1.21	4.55	27.76	22.00	158.489	Horizontal	Pass
		2535	-1.02	4.69	27.72	22.01	158.855	Horizontal	Pass
		2565	-0.94	4.72	27.70	22.04	159.956	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-1.22	4.55	27.77	22.00	158.489	Horizontal	Pass
		2535	-1.08	4.69	27.72	21.95	156.675	Horizontal	Pass
		2562.5	-0.98	4.72	27.69	21.99	158.125	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-1.16	4.57	27.78	22.05	160.325	Horizontal	Pass
		2535	-0.98	4.73	27.72	22.01	158.855	Horizontal	Pass
		2560	-0.94	4.75	27.68	21.99	158.125	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-3.04	4.54	27.75	20.17	103.992	Vertical	Pass
		2535	-2.41	4.69	27.72	20.62	115.345	Vertical	Pass
		2567.5	-2.05	4.71	27.71	20.95	124.451	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-3.04	4.55	27.76	20.17	103.992	Vertical	Pass
		2535	-2.89	4.69	27.72	20.14	103.276	Vertical	Pass
		2565	-2.80	4.72	27.70	20.18	104.232	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-2.26	4.55	27.77	20.96	124.738	Vertical	Pass
		2535	-2.43	4.69	27.72	20.60	114.815	Vertical	Pass
		2562.5	-2.66	4.72	27.69	20.31	107.399	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-2.43	4.57	27.78	20.78	119.674	Vertical	Pass
		2535	-2.06	4.73	27.72	20.93	123.880	Vertical	Pass
		2560	-2.73	4.75	27.68	20.20	104.713	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Factor	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			Average	Average		
				(dBm)	(mW)				
5.0MHz Band 16 QAM	1/#Mid	2502.5	-1.97	4.54	27.75	21.24	133.045	Horizontal	Pass
		2535	-1.66	4.69	27.72	21.37	137.088	Horizontal	Pass
		2567.5	-1.74	4.71	27.71	21.26	133.660	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-1.86	4.55	27.76	21.35	136.458	Horizontal	Pass
		2535	-1.87	4.69	27.72	21.16	130.617	Horizontal	Pass
		2565	-2.14	4.72	27.70	20.84	121.339	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-2.04	4.55	27.77	21.18	131.220	Horizontal	Pass
		2535	-2.01	4.69	27.72	21.02	126.474	Horizontal	Pass
		2562.5	-1.62	4.72	27.69	21.35	136.458	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-1.92	4.57	27.78	21.29	134.586	Horizontal	Pass
		2535	-1.59	4.73	27.72	21.40	138.038	Horizontal	Pass
		2560	-1.69	4.75	27.68	21.24	133.045	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-4.02	4.54	27.75	19.19	82.985	Vertical	Pass
		2535	-2.08	4.69	27.72	20.95	124.451	Vertical	Pass
		2567.5	-3.87	4.71	27.71	19.13	81.846	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-3.51	4.55	27.76	19.70	93.325	Vertical	Pass
		2535	-3.78	4.69	27.72	19.25	84.140	Vertical	Pass
		2565	-3.71	4.72	27.70	19.27	84.528	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-2.61	4.55	27.77	20.61	115.080	Vertical	Pass
		2535	-2.26	4.69	27.72	20.77	119.399	Vertical	Pass
		2562.5	-3.37	4.72	27.69	19.60	91.201	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-2.57	4.57	27.78	20.64	115.878	Vertical	Pass
		2535	-3.67	4.73	27.72	19.32	85.507	Vertical	Pass
		2560	-3.76	4.75	27.68	19.17	82.604	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.6 LTE BAND 12

Radiated Power (ERP) for Band 12											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG	Cable	Antenna	Correction	Max.	Max.			
			Level	Loss	Factor		EIRP	EIRP			
			(dBm)	(dBm)	(dB)		Average	Average			
			(dB)	(dBm)	(mW)						
1.4MHz Band QPSK	1/#Mid	699.7	6.67	1.91	19.21	2.15	21.82	152.055	Vertical	Pass	
		707.5	6.59	1.91	19.26	2.15	21.79	151.008	Vertical	Pass	
		715.3	6.37	1.93	19.34	2.15	21.63	145.546	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	6.46	1.91	19.21	2.15	21.61	144.877	Vertical	Pass	
		707.5	6.38	1.91	19.26	2.15	21.58	143.880	Vertical	Pass	
		714.5	6.22	1.93	19.34	2.15	21.48	140.605	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	6.73	1.91	19.23	2.15	21.90	154.882	Vertical	Pass	
		707.5	6.64	1.91	19.26	2.15	21.84	152.757	Vertical	Pass	
		713.5	6.43	1.92	19.33	2.15	21.69	147.571	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	704	6.75	1.91	19.25	2.15	21.94	156.315	Vertical	Pass	
		707.5	6.73	1.91	19.26	2.15	21.93	155.955	Vertical	Pass	
		711	6.58	1.92	19.32	2.15	21.83	152.405	Vertical	Pass	
1.4MHz Band QPSK	1/#Mid	699.7	5.88	1.91	19.21	2.15	21.03	126.765	Horizontal	Pass	
		707.5	5.36	1.91	19.26	2.15	20.56	113.763	Horizontal	Pass	
		715.3	5.41	1.93	19.34	2.15	20.67	116.681	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	5.64	1.91	19.21	2.15	20.79	119.950	Horizontal	Pass	
		707.5	5.35	1.91	19.26	2.15	20.55	113.501	Horizontal	Pass	
		714.5	5.73	1.93	19.34	2.15	20.99	125.603	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	5.82	1.91	19.23	2.15	20.99	125.603	Horizontal	Pass	
		707.5	5.00	1.91	19.26	2.15	20.20	104.713	Horizontal	Pass	
		713.5	4.96	1.92	19.33	2.15	20.22	105.196	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	704	5.21	1.91	19.25	2.15	20.40	109.648	Horizontal	Pass	
		707.5	5.31	1.91	19.26	2.15	20.51	112.460	Horizontal	Pass	
		711	5.82	1.92	19.32	2.15	21.07	127.938	Horizontal	Pass	

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	Of Max. ERP	
							(dBm)	(mW)		
1.4MHz Band 16 QAM	1/#Mid	699.7	6.83	1.91	19.21	2.15	21.98	157.761	Vertical	Pass
		707.5	6.75	1.91	19.26	2.15	21.95	156.675	Vertical	Pass
		715.3	6.53	1.93	19.34	2.15	21.79	151.008	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	6.62	1.91	19.21	2.15	21.77	150.314	Vertical	Pass
		707.5	6.54	1.91	19.26	2.15	21.74	149.279	Vertical	Pass
		714.5	6.38	1.93	19.34	2.15	21.64	145.881	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	6.89	1.91	19.23	2.15	22.06	160.694	Vertical	Pass
		707.5	6.80	1.91	19.26	2.15	22.00	158.489	Vertical	Pass
		713.5	6.59	1.92	19.33	2.15	21.85	153.109	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	704	6.91	1.91	19.25	2.15	22.10	162.181	Vertical	Pass
		707.5	6.89	1.91	19.26	2.15	22.09	161.808	Vertical	Pass
		711	6.74	1.92	19.32	2.15	21.99	158.125	Vertical	Pass
1.4MHz Band 16 QAM	1/#Mid	699.7	6.05	1.91	19.21	2.15	21.20	131.826	Horizontal	Pass
		707.5	5.64	1.91	19.26	2.15	20.84	121.339	Horizontal	Pass
		715.3	5.96	1.93	19.34	2.15	21.22	132.434	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	5.17	1.91	19.21	2.15	20.32	107.647	Horizontal	Pass
		707.5	5.11	1.91	19.26	2.15	20.31	107.399	Horizontal	Pass
		714.5	6.01	1.93	19.34	2.15	21.27	133.968	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	5.58	1.91	19.23	2.15	20.75	118.850	Horizontal	Pass
		707.5	5.95	1.91	19.26	2.15	21.15	130.317	Horizontal	Pass
		713.5	5.75	1.92	19.33	2.15	21.01	126.183	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	704	5.19	1.91	19.25	2.15	20.38	109.144	Horizontal	Pass
		707.5	5.26	1.91	19.26	2.15	20.46	111.173	Horizontal	Pass
		711	5.54	1.92	19.32	2.15	20.79	119.950	Horizontal	Pass

Note:

SG Level= Signal generator output

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

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

8.7 LTE BAND 17

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)		Average	Average	Of Max. ERP	
							(dB)	(dBm)	(mW)	
5.0MHz Band QPSK	1/#Mid	706.5	6.63	1.91	19.23	2.15	21.80	151.356	Vertical	Pass
		710	6.49	1.91	19.26	2.15	21.69	147.571	Vertical	Pass
		713.5	6.39	1.92	19.33	2.15	21.65	146.218	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	709	6.64	1.91	19.25	2.15	21.83	152.405	Vertical	Pass
		710	6.59	1.91	19.26	2.15	21.79	151.008	Vertical	Pass
		711	6.55	1.92	19.32	2.15	21.80	151.356	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	706.5	4.75	1.91	19.23	2.15	19.92	98.175	Horizontal	Pass
		710	4.91	1.91	19.26	2.15	20.11	102.565	Horizontal	Pass
		713.5	4.56	1.92	19.33	2.15	19.82	95.940	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	709	4.45	1.91	19.25	2.15	19.64	92.045	Horizontal	Pass
		710	4.77	1.91	19.26	2.15	19.97	99.312	Horizontal	Pass
		711	6.15	1.92	19.32	2.15	21.40	138.038	Horizontal	Pass

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)		Average	Average		
							(dB)	(dBm)		
5.0MHz	Band 16 QAM	706.5	5.98	1.91	19.23	2.15	21.15	130.317	Vertical	Pass
		710	5.89	1.91	19.26	2.15	21.09	128.529	Vertical	Pass
		713.5	5.69	1.92	19.33	2.15	20.95	124.451	Vertical	Pass
10.0MHz	Band 16 QAM	709	5.52	1.91	19.25	2.15	20.71	117.761	Vertical	Pass
		710	6.05	1.91	19.26	2.15	21.25	133.352	Vertical	Pass
		711	5.78	1.92	19.32	2.15	21.03	126.765	Vertical	Pass
5.0MHz	Band 16 QAM	706.5	5.32	1.91	19.23	2.15	20.49	111.944	Horizontal	Pass
		710	5.16	1.91	19.26	2.15	20.36	108.643	Horizontal	Pass
		713.5	4.71	1.92	19.33	2.15	19.97	99.312	Horizontal	Pass
10.0MHz	Band 16 QAM	709	5.05	1.91	19.25	2.15	20.24	105.682	Horizontal	Pass
		710	5.17	1.91	19.26	2.15	20.37	108.893	Horizontal	Pass
		711	4.80	1.92	19.32	2.15	20.05	101.158	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

8.8 LTE BAND 66

Radiated Power (EIRP) for Band 66									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1#Mid	1710.7	-2.54	3.76	28.24	21.94	156.315	Horizontal	Pass
		1745	-2.40	3.91	28.22	21.91	155.239	Horizontal	Pass
		1779.3	-2.27	3.93	28.2	22.00	158.489	Horizontal	Pass
3.0MHz Band QPSK	1#Mid	1711.5	-2.60	3.77	28.23	21.86	153.462	Horizontal	Pass
		1745	-2.51	3.91	28.24	21.82	152.055	Horizontal	Pass
		1778.5	-2.53	3.94	28.25	21.78	150.661	Horizontal	Pass
5.0MHz Band QPSK	1#Mid	1712.5	-2.50	3.77	28.31	22.04	159.956	Horizontal	Pass
		1745	-2.18	3.91	28.22	22.13	163.305	Horizontal	Pass
		1777.5	-2.24	3.94	28.2	22.02	159.221	Horizontal	Pass
10.0MHz Band QPSK	1#Mid	1715	-2.39	3.79	28.33	22.15	164.059	Horizontal	Pass
		1745	-2.12	3.95	28.22	22.15	164.059	Horizontal	Pass
		1775	-2.13	3.97	28.19	22.09	161.808	Horizontal	Pass
15.0MHz Band QPSK	1#Mid	1717.5	-2.41	3.79	28.34	22.14	163.682	Horizontal	Pass
		1745	-2.22	3.95	28.22	22.05	160.325	Horizontal	Pass
		1772.5	-2.17	3.97	28.18	22.04	159.956	Horizontal	Pass
20.0MHz Band QPSK	1#Mid	1720	-2.38	3.81	28.35	22.16	164.437	Horizontal	Pass
		1745	-2.12	3.96	28.22	22.14	163.682	Horizontal	Pass
		1770	-2.14	4	28.16	22.02	159.221	Horizontal	Pass
1.4MHz Band QPSK	1#Mid	1710.7	-3.42	3.76	28.24	21.06	127.644	Vertical	Pass
		1745	-3.00	3.91	28.22	21.31	135.207	Vertical	Pass
		1779.3	-2.94	3.93	28.2	21.33	135.831	Vertical	Pass
3.0MHz Band QPSK	1#Mid	1711.5	-3.51	3.77	28.23	20.95	124.451	Vertical	Pass
		1745	-2.95	3.91	28.24	21.38	137.404	Vertical	Pass
		1778.5	-3.39	3.94	28.25	20.92	123.595	Vertical	Pass
5.0MHz Band QPSK	1#Mid	1712.5	-3.17	3.77	28.31	21.37	137.088	Vertical	Pass
		1745	-2.89	3.91	28.22	21.42	138.676	Vertical	Pass
		1777.5	-3.52	3.94	28.2	20.74	118.577	Vertical	Pass
10.0MHz Band QPSK	1#Mid	1715	-3.19	3.79	28.34	21.36	136.773	Vertical	Pass
		1745	-3.53	3.95	28.22	20.74	118.577	Vertical	Pass
		1775	-3.52	3.97	28.18	20.69	117.220	Vertical	Pass
15.0MHz	1#Mid	1717.5	-4.11	3.81	28.35	20.43	110.408	Vertical	Pass

Band		1745	-3.01	3.96	28.22	21.25	133.352	Vertical	Pass
QPSK		1772.5	-2.84	4	28.16	21.32	135.519	Vertical	Pass
20.0MHz	1/#Mid	1720	-3.19	3.79	28.34	21.36	136.773	Vertical	Pass
Band		1745	-3.31	3.95	28.22	20.96	124.738	Vertical	Pass
QPSK		1770	-3.37	3.97	28.18	20.84	121.339	Vertical	Pass

Radiated Power (EIRP) for Band 66									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max.	Max.	Polarization Of Max. ERP	
						EIRP Average (dBm)	EIRP Average (mW)		
1.4MHz Band 16 QAM	1/#Mid	1710.7	-3.37	3.76	28.24	21.11	129.122	Horizontal	Pass
		1745	-2.98	3.91	28.22	21.33	135.831	Horizontal	Pass
		1779.3	-3.16	3.93	28.2	21.11	129.122	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-3.76	3.77	28.23	20.70	117.490	Horizontal	Pass
		1745	-3.01	3.91	28.24	21.32	135.519	Horizontal	Pass
		1778.5	-3.30	3.94	28.25	21.01	126.183	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-3.18	3.77	28.31	21.36	136.773	Horizontal	Pass
		1745	-3.24	3.91	28.22	21.07	127.938	Horizontal	Pass
		1777.5	-2.91	3.94	28.2	21.35	136.458	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-3.23	3.79	28.33	21.31	135.207	Horizontal	Pass
		1745	-2.89	3.95	28.22	21.38	137.404	Horizontal	Pass
		1775	-3.21	3.97	28.19	21.01	126.183	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-3.22	3.79	28.34	21.33	135.831	Horizontal	Pass
		1745	-3.04	3.95	28.22	21.23	132.739	Horizontal	Pass
		1772.5	-2.83	3.97	28.18	21.38	137.404	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-3.05	3.81	28.35	21.49	140.929	Horizontal	Pass
		1745	-2.83	3.96	28.22	21.43	138.995	Horizontal	Pass
		1770	-2.77	4	28.16	21.39	137.721	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-4.58	3.76	28.24	19.90	97.724	Vertical	Pass
		1745	-4.14	3.91	28.22	20.17	103.992	Vertical	Pass
		1779.3	-3.43	3.93	28.2	20.84	121.339	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-4.34	3.77	28.23	20.12	102.802	Vertical	Pass
		1745	-4.81	3.91	28.24	19.52	89.536	Vertical	Pass
		1778.5	-4.41	3.94	28.25	19.90	97.724	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-3.93	3.77	28.31	20.61	115.080	Vertical	Pass
		1745	-3.05	3.91	28.22	21.26	133.660	Vertical	Pass
		1777.5	-3.36	3.94	28.2	20.90	123.027	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-3.59	3.79	28.34	20.96	124.738	Vertical	Pass
		1745	-4.26	3.95	28.22	20.01	100.231	Vertical	Pass
		1775	-4.43	3.97	28.18	19.78	95.060	Vertical	Pass
15.0MHz Band 16	1/#Mid	1717.5	-4.70	3.81	28.35	19.84	96.383	Vertical	Pass
		1745	-3.62	3.96	28.22	20.64	115.878	Vertical	Pass

QAM		1772.5	-2.75	4	28.16	21.41	138.357	Vertical	Pass
20.0MHz		1720	-4.16	3.79	28.34	20.39	109.396	Vertical	Pass
Band 16	1/#Mid	1745	-3.23	3.95	28.22	21.04	127.057	Vertical	Pass
QAM		1770	-4.15	3.97	28.18	20.06	101.391	Vertical	Pass

Note:

SG Level= Signal generator output

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

Factor Gain(dB)=Antenna Gain(dB) + Amplifier Factor (dB)

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53

LIMIT

§22.917 (e) and §24.238 and §90.691 (a): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

§27.53 (g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

§27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

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 2/4/5/7/12/17/66

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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3701.4	-53.12	4.04	33.51	-23.65	-13	-10.65	Horizontal
3701.4	-48.71	4.04	33.51	-19.24	-13	-6.24	Vertical
5552.1	-49.90	5.24	35.84	-19.30	-13	-6.30	Vertical
5552.1	-52.77	5.24	35.84	-22.17	-13	-9.17	Horizontal
181.7	-35.45	1.43	16.02	-20.86	-13	-7.86	Vertical
377.9	-34.43	1.30	17.99	-17.74	-13	-4.74	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-46.74	4.04	33.56	-17.22	-13	-4.22	Horizontal
3760.0	-46.55	4.04	33.56	-17.03	-13	-4.03	Vertical
5640.0	-48.02	5.24	35.91	-17.35	-13	-4.35	Vertical
5640.0	-50.40	5.24	35.91	-19.73	-13	-6.73	Horizontal
194.9	-42.56	1.62	16.97	-27.21	-13	-14.21	Vertical
426.0	-35.22	1.74	15.98	-20.99	-13	-7.99	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-48.97	4.04	34.00	-19.01	-13	-6.01	Horizontal
3818.6	-49.63	4.04	34.00	-19.67	-13	-6.67	Vertical
5727.9	-47.79	5.24	36.04	-16.99	-13	-3.99	Vertical
5727.9	-50.32	5.24	36.04	-19.52	-13	-6.52	Horizontal
204.2	-41.96	1.42	17.29	-26.09	-13	-13.09	Vertical
299.8	-40.02	1.50	17.90	-23.61	-13	-10.61	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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720.0	-48.33	4.07	33.54	-18.86	-13	-5.86	Horizontal
3720.0	-47.50	4.07	33.54	-18.03	-13	-5.03	Vertical
5580.0	-50.02	5.28	35.86	-19.44	-13	-6.44	Vertical
5580.0	-51.14	5.28	35.86	-20.56	-13	-7.56	Horizontal
190.2	-41.98	1.58	16.89	-26.66	-13	-13.66	Vertical
252.7	-36.57	1.76	17.26	-21.07	-13	-8.07	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-45.83	4.04	33.56	-16.31	-13	-3.31	Horizontal
3760.0	-49.98	4.04	33.56	-20.46	-13	-7.46	Vertical
5640.0	-47.96	5.24	35.91	-17.29	-13	-4.29	Vertical
5640.0	-51.73	5.24	35.91	-21.06	-13	-8.06	Horizontal
199.5	-41.43	1.46	16.27	-26.62	-13	-13.62	Vertical
442.1	-35.00	1.59	15.15	-21.44	-13	-8.44	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-46.15	4.04	34.00	-16.19	-13	-3.19	Horizontal
3800.0	-49.85	4.04	34.00	-19.89	-13	-6.89	Vertical
5700.0	-49.80	5.24	36.04	-19.00	-13	-6.00	Vertical
5700.0	-51.95	5.24	36.04	-21.15	-13	-8.15	Horizontal
177.3	-44.78	1.36	17.39	-28.74	-13	-15.74	Vertical
268.6	-37.65	1.66	15.39	-23.92	-13	-10.92	Horizontal

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

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

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

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-44.51	4.02	29.80	-18.73	-13	-5.73	Horizontal
3421.4	-44.36	4.02	29.80	-18.58	-13	-5.58	Vertical
5132.1	-48.05	5.24	35.84	-17.45	-13	-4.45	Vertical
5132.1	-53.69	5.24	35.84	-23.09	-13	-10.09	Horizontal
193.3	-43.23	1.68	16.04	-28.87	-13	-15.87	Vertical
268.3	-39.63	1.78	17.74	-23.67	-13	-10.67	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-45.81	4.03	30.00	-19.84	-13	-6.84	Horizontal
3465.0	-51.17	4.03	30.00	-25.20	-13	-12.20	Vertical
5197.5	-53.18	5.25	35.86	-22.57	-13	-9.57	Vertical
5197.5	-50.23	5.25	35.86	-19.62	-13	-6.62	Horizontal
178.5	-39.98	1.72	17.69	-24.01	-13	-11.01	Vertical
326.8	-38.17	1.62	16.02	-23.76	-13	-10.76	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-45.89	4.05	30.01	-19.93	-13	-6.93	Horizontal
3508.6	-44.58	4.05	30.01	-18.62	-13	-5.62	Vertical
5262.9	-52.42	5.26	35.86	-21.82	-13	-8.82	Vertical
5262.9	-51.76	5.26	35.86	-21.16	-13	-8.16	Horizontal
186.7	-44.81	1.80	16.69	-29.92	-13	-16.92	Vertical
403.6	-36.94	1.75	16.66	-22.04	-13	-9.04	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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440.0	-49.64	4.02	29.80	-23.86	-13	-10.86	Horizontal
3440.0	-45.72	4.02	29.80	-19.94	-13	-6.94	Vertical
5160.0	-50.33	5.24	35.84	-19.73	-13	-6.73	Vertical
5160.0	-51.90	5.24	35.84	-21.30	-13	-8.30	Horizontal
202.8	-34.10	1.57	17.26	-18.41	-13	-5.41	Vertical
387.7	-42.79	1.78	16.35	-28.22	-13	-15.22	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-53.74	4.03	30.00	-27.77	-13	-14.77	Horizontal
3465.0	-46.64	4.03	30.00	-20.67	-13	-7.67	Vertical
5197.5	-49.46	5.25	35.86	-18.85	-13	-5.85	Vertical
5197.5	-53.32	5.25	35.86	-22.71	-13	-9.71	Horizontal
212.0	-38.97	1.44	17.95	-22.46	-13	-9.46	Vertical
374.3	-37.44	1.65	16.09	-23.00	-13	-10.00	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-50.50	2.91	27.68	-25.73	-13	-12.73	Horizontal
3490.0	-47.07	2.91	27.68	-22.30	-13	-9.30	Vertical
5235.0	-51.03	5.26	35.86	-20.43	-13	-7.43	Vertical
5235.0	-49.09	5.26	35.86	-18.49	-13	-5.49	Horizontal
195.3	-36.27	1.61	16.85	-21.03	-13	-8.03	Vertical
253.8	-41.05	1.61	15.19	-27.47	-13	-14.47	Horizontal

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

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

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

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

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-44.83	2.78	27.50	-20.11	-13	-7.11	Horizontal
1649.4	-51.82	2.78	27.50	-27.10	-13	-14.10	Vertical
2474.1	-45.83	2.90	27.80	-20.93	-13	-7.93	Vertical
2474.1	-49.51	2.90	27.80	-24.61	-13	-11.61	Horizontal
186.3	-37.90	1.76	17.59	-22.07	-13	-9.07	Vertical
318.3	-35.85	1.63	15.87	-21.61	-13	-8.61	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-46.59	2.80	27.48	-21.91	-13	-8.91	Horizontal
1673.0	-47.41	2.80	27.48	-22.73	-13	-9.73	Vertical
2509.5	-50.64	2.91	27.70	-25.85	-13	-12.85	Vertical
2509.5	-52.02	2.91	27.70	-27.23	-13	-14.23	Horizontal
176.6	-34.93	1.61	15.68	-20.86	-13	-7.86	Vertical
334.3	-42.70	1.59	17.52	-26.78	-13	-13.78	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-45.09	2.82	27.43	-20.48	-13	-7.48	Horizontal
1696.6	-47.46	2.82	27.43	-22.85	-13	-9.85	Vertical
2544.9	-49.01	2.92	27.74	-24.19	-13	-11.19	Vertical
2544.9	-52.07	2.92	27.74	-27.25	-13	-14.25	Horizontal
193.5	-39.26	1.69	16.67	-24.27	-13	-11.27	Vertical
452.5	-43.83	1.70	17.18	-28.35	-13	-15.35	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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1658.0	-52.61	2.78	27.50	-27.89	-13	-14.89	Horizontal
1658.0	-52.15	2.78	27.50	-27.43	-13	-14.43	Vertical
2487.0	-48.27	2.90	27.80	-23.37	-13	-10.37	Vertical
2487.0	-50.53	2.90	27.80	-25.63	-13	-12.63	Horizontal
195.4	-43.99	1.71	15.57	-30.13	-13	-17.13	Vertical
401.9	-40.57	1.34	16.40	-25.51	-13	-12.51	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-51.33	2.80	27.48	-26.65	-13	-13.65	Horizontal
1673.0	-45.74	2.80	27.48	-21.06	-13	-8.06	Vertical
2509.5	-51.05	2.91	27.70	-26.26	-13	-13.26	Vertical
2509.5	-52.84	2.91	27.70	-28.05	-13	-15.05	Horizontal
203.5	-39.48	1.44	17.04	-23.88	-13	-10.88	Vertical
400.4	-38.38	1.76	17.62	-22.52	-13	-9.52	Horizontal
Test Results for High Channel 844MHz							
1688.0	-44.61	2.82	27.43	-20.00	-13	-7.00	Horizontal
1688.0	-47.52	2.82	27.43	-22.91	-13	-9.91	Vertical
2532.0	-46.16	2.92	27.74	-21.34	-13	-8.34	Vertical
2532.0	-50.10	2.92	27.74	-25.28	-13	-12.28	Horizontal
206.4	-41.27	1.74	17.70	-25.31	-13	-12.31	Vertical
300.1	-42.64	1.41	17.46	-26.58	-13	-13.58	Horizontal

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

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

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

9.4 LTE BAND 7

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

Test Results for Low Channel 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-61.90	5.23	35.81	-31.32	-25	-6.32	Horizontal
5005.0	-61.37	5.23	35.81	-30.79	-25	-5.79	Vertical
7507.5	-63.24	5.67	36.85	-32.06	-25	-7.06	Vertical
7507.5	-61.39	5.67	36.85	-30.21	-25	-5.21	Horizontal
192.4	-48.98	1.73	17.97	-32.74	-25	-7.74	Vertical
438.5	-53.09	1.38	15.11	-39.36	-25	-14.36	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-64.65	5.23	35.82	-34.06	-25	-9.06	Horizontal
5070.0	-59.62	5.23	35.82	-29.03	-25	-4.03	Vertical
7605.0	-64.38	5.67	36.85	-33.20	-25	-8.20	Vertical
7605.0	-60.82	5.67	36.85	-29.64	-25	-4.64	Horizontal
201.2	-45.93	1.77	16.17	-31.52	-25	-6.52	Vertical
327.2	-44.93	1.63	15.21	-31.35	-25	-6.35	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-64.78	5.24	35.83	-34.19	-25	-9.19	Horizontal
5135.0	-63.51	5.24	35.83	-32.92	-25	-7.92	Vertical
7702.5	-64.06	5.68	36.87	-32.87	-25	-7.87	Vertical
7702.5	-62.71	5.68	36.87	-31.52	-25	-6.52	Horizontal
195.2	-51.52	1.58	17.56	-35.54	-25	-10.54	Vertical
403.7	-50.41	1.45	16.58	-35.28	-25	-10.28	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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020.0	-61.13	5.23	35.82	-30.54	-25	-5.54	Horizontal
5020.0	-63.41	5.23	35.82	-32.82	-25	-7.82	Vertical
7530.0	-61.32	5.67	36.86	-30.13	-25	-5.13	Vertical
7530.0	-63.69	5.67	36.86	-32.50	-25	-7.50	Horizontal
187.4	-54.14	1.63	15.76	-40.01	-25	-15.01	Vertical
337.4	-45.94	1.71	15.44	-32.21	-25	-7.21	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-64.70	5.23	35.82	-34.11	-25	-9.11	Horizontal
5070.0	-60.49	5.23	35.82	-29.90	-25	-4.90	Vertical
7605.0	-64.18	5.67	36.85	-33.00	-25	-8.00	Vertical
7605.0	-63.55	5.67	36.85	-32.37	-25	-7.37	Horizontal
192.8	-47.59	1.79	16.84	-32.53	-25	-7.53	Vertical
454.9	-50.42	1.71	17.64	-34.49	-25	-9.49	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-60.58	5.24	35.83	-29.99	-25	-4.99	Horizontal
5120.0	-63.38	5.24	35.83	-32.79	-25	-7.79	Vertical
7680.0	-61.03	5.70	36.88	-29.85	-25	-4.85	Vertical
7680.0	-64.11	5.70	36.88	-32.93	-25	-7.93	Horizontal
201.5	-47.64	1.79	16.84	-32.58	-25	-7.58	Vertical
445.9	-46.05	1.71	17.64	-30.12	-25	-5.12	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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-48.94	2.60	27.20	-24.34	-13	-11.34	Horizontal
1399.4	-52.22	2.60	27.20	-27.62	-13	-14.62	Vertical
2099.1	-52.82	2.85	27.54	-28.13	-13	-15.13	Vertical
2099.1	-49.53	2.85	27.54	-24.84	-13	-11.84	Horizontal
212.3	-44.09	1.49	17.78	-27.80	-13	-14.80	Vertical
437.0	-34.02	1.36	17.33	-18.05	-13	-5.05	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-52.25	2.61	27.28	-27.58	-13	-14.58	Horizontal
1415.0	-51.96	2.61	27.28	-27.29	-13	-14.29	Vertical
2122.5	-53.65	2.87	27.59	-28.93	-13	-15.93	Vertical
2122.5	-52.57	2.87	27.59	-27.85	-13	-14.85	Horizontal
205.7	-41.71	1.73	15.74	-27.70	-13	-14.70	Vertical
450.1	-41.61	1.62	15.79	-27.44	-13	-14.44	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-44.87	2.63	27.28	-20.22	-13	-7.22	Horizontal
1430.6	-53.90	2.63	27.28	-29.25	-13	-16.25	Vertical
2145.9	-48.07	2.88	27.60	-23.35	-13	-10.35	Vertical
2145.9	-52.77	2.88	27.60	-28.05	-13	-15.05	Horizontal
189.3	-38.41	1.61	18.00	-22.02	-13	-9.02	Vertical
432.6	-41.94	1.45	15.49	-27.91	-13	-14.91	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 Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1408.0	-49.39	2.61	27.26	-24.74	-13	-11.74	Horizontal
1408.0	-48.48	2.61	27.26	-23.83	-13	-10.83	Vertical
2112.0	-48.70	2.87	27.58	-23.99	-13	-10.99	Vertical
2112.0	-52.96	2.87	27.58	-28.25	-13	-15.25	Horizontal
194.5	-36.66	1.31	16.97	-21.00	-13	-8.00	Vertical
286.2	-40.30	1.65	16.70	-25.25	-13	-12.25	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-45.78	2.61	27.28	-21.11	-13	-8.11	Horizontal
1415.0	-45.22	2.61	27.28	-20.55	-13	-7.55	Vertical
2122.5	-48.02	2.87	27.59	-23.30	-13	-10.30	Vertical
2122.5	-52.52	2.87	27.59	-27.80	-13	-14.80	Horizontal
188.8	-34.80	1.72	17.99	-18.53	-13	-5.53	Vertical
440.7	-39.44	1.73	17.94	-23.23	-13	-10.23	Horizontal
Test Results for High Channel 711MHz							
1422.0	-44.17	2.62	27.28	-19.51	-13	-6.51	Horizontal
1422.0	-52.05	2.62	27.28	-27.39	-13	-14.39	Vertical
2133.0	-47.68	2.87	27.60	-22.95	-13	-9.95	Vertical
2133.0	-50.23	2.87	27.60	-25.50	-13	-12.50	Horizontal
182.1	-39.79	1.58	15.93	-25.44	-13	-12.44	Vertical
314.2	-34.30	1.36	15.59	-20.07	-13	-7.07	Horizontal

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

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

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

9.6 LTE BAND 17

QPSK EIRP POWER FOR LTE BAND 17 (5MHZ BANDWIDTH)

Test Results for Low Channel 706.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1413.0	-46.83	2.61	27.28	-22.16	-13	-9.16	Horizontal
1413.0	-50.93	2.61	27.28	-26.26	-13	-13.26	Vertical
2119.5	-49.20	2.87	27.59	-24.48	-13	-11.48	Vertical
2119.5	-50.02	2.87	27.59	-25.30	-13	-12.30	Horizontal
210.7	-40.73	1.71	16.15	-26.29	-13	-13.29	Vertical
260.7	-42.38	1.41	17.32	-26.47	-13	-13.47	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-47.56	2.62	27.30	-22.88	-13	-9.88	Horizontal
1420.0	-47.96	2.62	27.30	-23.28	-13	-10.28	Vertical
2130.0	-48.41	2.87	27.62	-23.66	-13	-10.66	Vertical
2130.0	-53.06	2.87	27.62	-28.31	-13	-15.31	Horizontal
210.6	-42.70	1.42	15.25	-28.88	-13	-15.88	Vertical
329.4	-43.08	1.36	17.19	-27.25	-13	-14.25	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-44.10	2.66	27.28	-19.48	-13	-6.48	Horizontal
1427.0	-50.71	2.66	27.28	-26.09	-13	-13.09	Vertical
2140.5	-51.94	2.88	27.60	-27.22	-13	-14.22	Vertical
2140.5	-51.86	2.88	27.60	-27.14	-13	-14.14	Horizontal
186.7	-37.30	1.32	17.29	-21.33	-13	-8.33	Vertical
321.2	-34.81	1.72	16.89	-19.64	-13	-6.64	Horizontal

QPSK EIRP POWER FOR LTE BAND 17 (10MHZ BANDWIDTH)

Test Results for Low Channel 709MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1418.0	-46.87	2.62	27.30	-22.19	-13	-9.19	Horizontal
1418.0	-53.28	2.62	27.30	-28.60	-13	-15.60	Vertical
2127.0	-49.00	2.87	27.62	-24.25	-13	-11.25	Vertical
2127.0	-50.80	2.87	27.62	-26.05	-13	-13.05	Horizontal
209.7	-44.87	1.35	16.91	-29.31	-13	-16.31	Vertical
285.3	-43.00	1.62	16.31	-28.31	-13	-15.31	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-52.05	2.62	27.30	-27.37	-13	-14.37	Horizontal
1420.0	-46.71	2.62	27.30	-22.03	-13	-9.03	Vertical
2130.0	-51.90	2.87	27.62	-27.15	-13	-14.15	Vertical
2130.0	-52.90	2.87	27.62	-28.15	-13	-15.15	Horizontal
184.7	-43.55	1.51	17.14	-27.92	-13	-14.92	Vertical
257.0	-43.48	1.77	16.88	-28.37	-13	-15.37	Horizontal
Test Results for High Channel 711MHz							
1422.0	-52.72	2.62	27.30	-28.04	-13	-15.04	Horizontal
1422.0	-52.90	2.62	27.30	-28.22	-13	-15.22	Vertical
2133.0	-44.81	2.87	27.62	-20.06	-13	-7.06	Vertical
2133.0	-50.16	2.87	27.62	-25.41	-13	-12.41	Horizontal
189.0	-35.28	1.78	15.95	-21.11	-13	-8.11	Vertical
386.6	-41.76	1.34	17.95	-25.16	-13	-12.16	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.

9.7 LTE BAND 66
QPSK EIRP POWER FOR LTE BAND 66 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-48.92	4.02	29.80	-23.14	-13	-10.14	Horizontal
3421.4	-45.34	4.02	29.80	-19.56	-13	-6.56	Vertical
5132.1	-51.04	5.24	35.84	-20.44	-13	-7.44	Vertical
5132.1	-49.08	5.24	35.84	-18.48	-13	-5.48	Horizontal
112.6	-48.00	1.52	15.57	-33.95	-13	-20.95	Vertical
220.5	-48.46	1.33	17.14	-32.65	-13	-19.65	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-49.04	4.03	30.00	-23.07	-13	-10.07	Horizontal
3490.0	-52.27	4.03	30.00	-26.30	-13	-13.30	Vertical
5235.0	-49.63	5.25	35.86	-19.02	-13	-6.02	Vertical
5235.0	-53.72	5.25	35.86	-23.11	-13	-10.11	Horizontal
157.3	-47.18	1.53	17.13	-31.58	-13	-18.58	Vertical
213.1	-54.20	1.41	15.95	-39.66	-13	-26.66	Horizontal
Test Results for High Channel 1779.3MHz							
3558.6	-50.56	4.05	30.01	-24.60	-13	-11.60	Horizontal
3558.6	-45.18	4.05	30.01	-19.22	-13	-6.22	Vertical
5337.9	-51.85	5.26	35.86	-21.25	-13	-8.25	Vertical
5337.9	-54.59	5.26	35.86	-23.99	-13	-10.99	Horizontal
170.6	-44.01	1.44	15.51	-29.94	-13	-16.94	Vertical
169.0	-49.65	1.78	15.76	-35.67	-13	-22.67	Horizontal

QPSK EIRP POWER FOR LTE BAND 66 (20MHZ BANDWIDTH)

Test Results for Low Channel 1720MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440.0	-50.25	4.02	29.80	-24.47	-13	-11.47	Horizontal
3440.0	-54.24	4.02	29.80	-28.46	-13	-15.46	Vertical
5160.0	-53.19	5.24	35.84	-22.59	-13	-9.59	Vertical
5160.0	-52.22	5.24	35.84	-21.62	-13	-8.62	Horizontal
268.8	-46.20	1.62	17.02	-30.80	-13	-17.80	Vertical
161.4	-46.31	1.32	17.31	-30.32	-13	-17.32	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-47.58	4.03	30.00	-21.61	-13	-8.61	Horizontal
3490.0	-45.46	4.03	30.00	-19.49	-13	-6.49	Vertical
5235.0	-49.33	5.25	35.86	-18.72	-13	-5.72	Vertical
5235.0	-51.48	5.25	35.86	-20.87	-13	-7.87	Horizontal
159.9	-48.12	1.45	15.17	-34.40	-13	-21.40	Vertical
172.1	-48.49	1.48	17.82	-32.15	-13	-19.15	Horizontal
Test Results for High Channel 1770MHz							
3540.0	-53.13	2.91	27.68	-28.36	-13	-15.36	Horizontal
3540.0	-46.87	2.91	27.68	-22.10	-13	-9.10	Vertical
5310.0	-51.06	5.26	35.86	-20.46	-13	-7.46	Vertical
5310.0	-49.87	5.26	35.86	-19.27	-13	-6.27	Horizontal
197.3	-45.62	1.76	16.38	-31.00	-13	-18.00	Vertical
158.5	-49.38	1.43	17.13	-33.68	-13	-20.68	Horizontal

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

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

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

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

10. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = -30° to $+50^{\circ}\text{C}$
- Voltage = low voltage, DC 3.4V, Normal, DC 3.87V 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 2/4/5/7/12/17/66

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]
3.40	1880	13.3	0.007074	2.5
3.87	1880	12.5	0.006649	2.5
4.20	1880	10.4	0.005532	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	15.6	0.008298	2.5
Extreme (50C)	1880	12.5	0.006649	2.5
Extreme (40C)	1880	9.5	0.005053	2.5
Extreme (30C)	1880	10.9	0.005798	2.5
Extreme (10C)	1880	9.3	0.004953	2.5
Extreme (0C)	1880	10.1	0.005372	2.5
Extreme (-10C)	1880	8.6	0.004574	2.5
Extreme (-20C)	1880	12.1	0.006436	2.5
Extreme (-30C)	1880	12.6	0.006702	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]
3.40	1880	11.3	0.006011	2.5
3.87	1880	12.3	0.006543	2.5
4.20	1880	11.5	0.006117	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	12.3	0.006543	2.5
Extreme (50C)	1880	14.1	0.007500	2.5
Extreme (40C)	1880	11.6	0.00617021	2.5
Extreme (30C)	1880	12.5	0.00664894	2.5
Extreme (10C)	1880	11.5	0.00611702	2.5
Extreme (0C)	1880	13.6	0.00723404	2.5
Extreme (-10C)	1880	11.8	0.0062766	2.5
Extreme (-20C)	1880	11.7	0.0062234	2.5
Extreme (-30C)	1880	14.4	0.00765957	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]
3.40	1732.5	10.3	0.005945	2.5
3.87	1732.5	6.9	0.003983	2.5
4.20	1732.5	5.8	0.003348	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	9.8	0.005657	2.5
Extreme (50C)	1732.5	9.6	0.005541	2.5
Extreme (40C)	1732.5	10.1	0.005830	2.5
Extreme (30C)	1732.5	11.3	0.006522	2.5
Extreme (10C)	1732.5	12.2	0.007042	2.5
Extreme (0C)	1732.5	8.1	0.004675	2.5
Extreme (-10C)	1732.5	6.9	0.003983	2.5
Extreme (-20C)	1732.5	12.5	0.007215	2.5
Extreme (-30C)	1732.5	11.3	0.006522	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]
3.40	1732.5	6.3	0.003636	2.5
3.87	1732.5	12.5	0.007215	2.5
4.20	1732.5	11.4	0.006580	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	7.6	0.004387	2.5
Extreme (50C)	1732.5	14.7	0.008485	2.5
Extreme (40C)	1732.5	12.6	0.007273	2.5
Extreme (30C)	1732.5	11.5	0.006638	2.5
Extreme (10C)	1732.5	10.5	0.006037	2.5
Extreme (0C)	1732.5	12.1	0.006984	2.5
Extreme (-10C)	1732.5	8.6	0.004964	2.5
Extreme (-20C)	1732.5	12.8	0.007388	2.5
Extreme (-30C)	1732.5	14.2	0.008196	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]
3.40	836.5	14.5	0.017334	2.5
3.87	836.5	15.7	0.018769	2.5
4.20	836.5	8.2	0.009803	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	12.2	0.014585	2.5
Extreme (50C)	836.5	15.2	0.018171	2.5
Extreme (40C)	836.5	114.0	0.136282	2.5
Extreme (30C)	836.5	14.3	0.017095	2.5
Extreme (10C)	836.5	13.8	0.016497	2.5
Extreme (0C)	836.5	7.3	0.008727	2.5
Extreme (-10C)	836.5	8.2	0.009803	2.5
Extreme (-20C)	836.5	15.1	0.018051	2.5
Extreme (-30C)	836.5	12.3	0.014704	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]
3.40	836.5	7.4	0.008834	2.5
3.87	836.5	13.5	0.016148	2.5
4.20	836.5	15.2	0.018215	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	7.2	0.008573	2.5
Extreme (50C)	836.5	8.6	0.010238	2.5
Extreme (40C)	836.5	13.0	0.015539	2.5
Extreme (30C)	836.5	8.6	0.010338	2.5
Extreme (10C)	836.5	9.1	0.010877	2.5
Extreme (0C)	836.5	10.6	0.012677	2.5
Extreme (-10C)	836.5	7.6	0.009048	2.5
Extreme (-20C)	836.5	14.6	0.017502	2.5
Extreme (-30C)	836.5	9.3	0.011127	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]
3.40	2535	8.3	0.003274	2.5
3.87	2535	13.3	0.005247	2.5
4.20	2535	9.0	0.003550	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	14.8	0.005838	2.5
Extreme (50C)	2535	9.9	0.003905	2.5
Extreme (40C)	2535	8.9	0.003511	2.5
Extreme (30C)	2535	15.2	0.005996	2.5
Extreme (10C)	2535	11.9	0.004694	2.5
Extreme (0C)	2535	8.9	0.003511	2.5
Extreme (-10C)	2535	8.4	0.003314	2.5
Extreme (-20C)	2535	7.5	0.002959	2.5
Extreme (-30C)	2535	9.6	0.003787	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]
3.40	2535	7.5	0.002945	2.5
3.87	2535	7.3	0.002872	2.5
4.20	2535	10.3	0.004063	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	7.5	0.002961	2.5
Extreme (50C)	2535	8.9	0.003512	2.5
Extreme (40C)	2535	8.2	0.003237	2.5
Extreme (30C)	2535	9.1	0.003605	2.5
Extreme (10C)	2535	15.1	0.005976	2.5
Extreme (0C)	2535	14.8	0.005836	2.5
Extreme (-10C)	2535	15.9	0.006261	2.5
Extreme (-20C)	2535	9.0	0.003541	2.5
Extreme (-30C)	2535	11.5	0.004553	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]
3.40	707.5	14.9	0.021088	2.5
3.87	707.5	12.6	0.017799	2.5
4.20	707.5	12.4	0.017555	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	15.7	0.022196	2.5
Extreme (50C)	707.5	11.3	0.015973	2.5
Extreme (40C)	707.5	13.7	0.019369	2.5
Extreme (30C)	707.5	14.3	0.020218	2.5
Extreme (10C)	707.5	14.1	0.019860	2.5
Extreme (0C)	707.5	10.8	0.015246	2.5
Extreme (-10C)	707.5	9.1	0.012918	2.5
Extreme (-20C)	707.5	15.6	0.021992	2.5
Extreme (-30C)	707.5	8.3	0.011732	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]
3.40	707.5	11.3	0.016000	2.5
3.87	707.5	12.5	0.017675	2.5
4.20	707.5	12.7	0.017933	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	12.4	0.017553	2.5
Extreme (50C)	707.5	10.2	0.014479	2.5
Extreme (40C)	707.5	8.1	0.011471	2.5
Extreme (30C)	707.5	10.6	0.014967	2.5
Extreme (10C)	707.5	14.4	0.020413	2.5
Extreme (0C)	707.5	7.3	0.010319	2.5
Extreme (-10C)	707.5	11.1	0.015651	2.5
Extreme (-20C)	707.5	13.7	0.019346	2.5
Extreme (-30C)	707.5	10.7	0.015099	2.5

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

10.6 LTE BAND 17

Band 17 QPSK, (10MHz BANDWIDTH RB size 50 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	710.0	9.6	0.013511	2.5
3.87	710.0	12.3	0.017387	2.5
4.20	710.0	9.8	0.013739	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	8.1	0.011450	2.5
Extreme (50C)	710.0	9.3	0.013042	2.5
Extreme (40C)	710.0	10.1	0.014246	2.5
Extreme (30C)	710.0	12.0	0.016834	2.5
Extreme (10C)	710.0	14.3	0.020107	2.5
Extreme (0C)	710.0	13.5	0.019036	2.5
Extreme (-10C)	710.0	15.4	0.021671	2.5
Extreme (-20C)	710.0	9.4	0.013279	2.5
Extreme (-30C)	710.0	8.5	0.011989	2.5

Band 17 16QAM, (10MHz BANDWIDTH RB size 50 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	710.0	15.0	0.021122	2.5
3.87	710.0	14.3	0.020170	2.5
4.20	710.0	10.6	0.014919	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.2	0.012904	2.5
Extreme (50C)	710.0	12.7	0.017844	2.5
Extreme (40C)	710.0	12.9	0.018193	2.5
Extreme (30C)	710.0	9.5	0.013391	2.5
Extreme (10C)	710.0	11.4	0.016087	2.5
Extreme (0C)	710.0	8.1	0.011401	2.5
Extreme (-10C)	710.0	9.5	0.013426	2.5
Extreme (-20C)	710.0	12.9	0.018142	2.5
Extreme (-30C)	710.0	7.8	0.011031	2.5

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

10.7 LTE BAND 66

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 66 QPSK, (CH 132322 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.40	1745	15.8	0.00907	2.5
3.87	1745	9.8	0.00561	2.5
4.20	1745	15.8	0.00908	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 66 QPSK, (CH 132322 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1745	9.0	0.00518	2.5
Extreme (50C)	1745	9.7	0.00555	2.5
Extreme (40C)	1745	11.4	0.00651	2.5
Extreme (30C)	1745	8.6	0.00490	2.5
Extreme (10C)	1745	14.2	0.00815	2.5
Extreme (0C)	1745	13.7	0.00787	2.5
Extreme (-10C)	1745	7.2	0.00410	2.5
Extreme (-20C)	1745	12.0	0.00686	2.5
Extreme (-30C)	1745	13.8	0.00792	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 66 16QAM, (CH 132322 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.40	1745	7.8	0.00448	2.5
3.87	1745	7.1	0.00404	2.5
4.20	1745	10.7	0.00616	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 66 16QAM, (CH 132322 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1745	8.3	0.00475	2.5
Extreme (50C)	1745	11.8	0.00676	2.5
Extreme (40C)	1745	12.5	0.00714	2.5
Extreme (30C)	1745	9.5	0.00544	2.5
Extreme (10C)	1745	11.4	0.00655	2.5
Extreme (0C)	1745	13.4	0.00767	2.5
Extreme (-10C)	1745	7.5	0.00432	2.5
Extreme (-20C)	1745	11.3	0.00648	2.5
Extreme (-30C)	1745	11.7	0.00672	2.5

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

11. Peak-to-Average Ratio

11.1 Description of the PAR Measurement

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

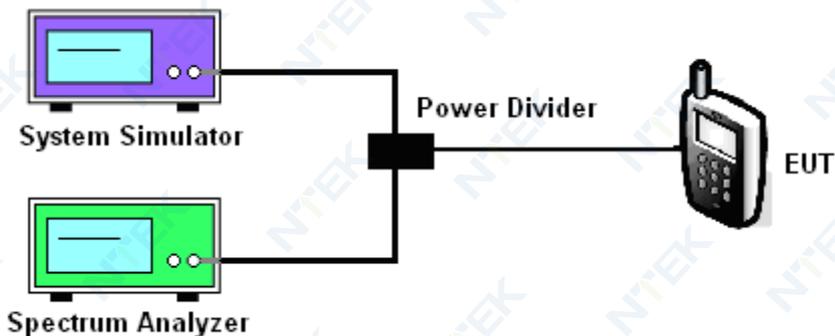
11.2 Measuring Instruments

See list of measuring instruments of this test report.

11.3 Test Procedures

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

11.4 Test Setup



MODES TESTED

LTE Band 2/4/5/7/12/17/66

Test data reference attachment.

----END OF REPORT----