

FCC CFR47 PART 22H, 24E, 27 CERTIFICATION TEST REPORT FCC ID: 2AT9T-5009AF1

Product: Mobile Phone

Trade Mark: ulefone

Model No.: GQ5009

Family Model: Note 18 Ultra, Note 18, Note 18 Pro, Note 18E, Note 18S, Note 18 Lite, Note 18s, Note 18s Pro

Report No.: S24032202401006

Issue Date: Apr 25, 2024

Prepared for

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TEST RESULT CERTIFICATION

Applicant's name : Shenzhen Ulefone Technology Co., Ltd.

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Manufacturer's Name..... : Shenzhen Gotron Electronic CO.,LTD.

Address..... : 7B01, Building A, Block 1, Anhongji Tianyao Plaza, Longhua District, Shenzhen City, Guangdong Province China

Product name..... : Mobile Phone

Model and/or type reference .. : GQ5009

Trade Mark..... : ulefone

Family Model..... : Note 18 Ultra, Note 18, Note 18 Pro, Note 18E, Note 18S, Note 18 Lite, Note 18s, Note 18s Pro

Test Sample Number..... S240322024001

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 25, 2024 ~ Apr 25, 2024

Date of Issue Apr 25, 2024

Test Result..... **Pass**

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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Mobile Phone
Trade Mark	ulefone
Model Name	GQ5009
Family Model	Note 18 Ultra, Note 18, Note 18 Pro, Note 18E, Note 18S, Note 18 Lite, Note 18s, Note 18s Pro
Model Difference	All models are the same circuit and RF module, except the Model Name.
FCC ID:	2AT9T-5009AF1
Frequency Bands:	U.S. Bands: ☒ LTE FDD Band 2,4,5,7,12,17,41
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 41 Uplink: 2496MHz-2690MHz,
Type of Modulation:	QPSK/16QAM/64QAM(Only Downlink)
Power Class	Class 3
Antenna:	PIFA Antenna
Antenna gain:	Band 2:0dBi;Band 4:-1.5dBi;Band 5:-4.35dBi;Band 7:-0.79dBi Band 12:-3.74dBi;Band 17:-3.74dBi;Band 41:-0.79dBi;
Adapter	Model: HJ-FC038K7-US Input: 100-240V~50/60Hz 0.6A Output: 5.0V~3.0A 15.0W OR 9.0V~2.0A 18.0W OR 12.0V~1.5A 18.0W
Battery	DC 3.87V, 5450mAh / 21.09Wh
Power supply	DC 3.87V from battery or DC 5V from adapter
Extreme Vol. Limits:	DC 3.4V to DC 4.4V (Nominal DC 3.87V) (Note 1)
HW Version	N/A
SW Version	N/A
** Note1: The High Voltage DC 4.4V and Low Voltage DC 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: 2AT9T-5009AF1** 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% ($U = 2U_c(y)$)	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 2/4/5/7/12/17/41

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

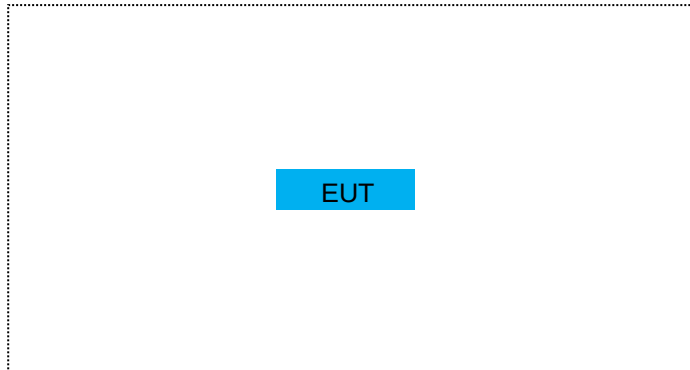
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Mobile Phone	GQ5009	FCC ID: 2AT9T-5009AF1	EUT

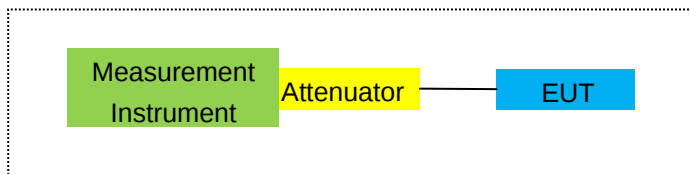
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

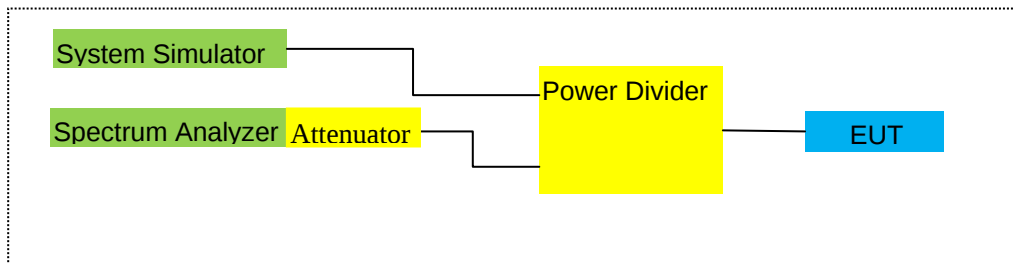
For Radiated Test Cases



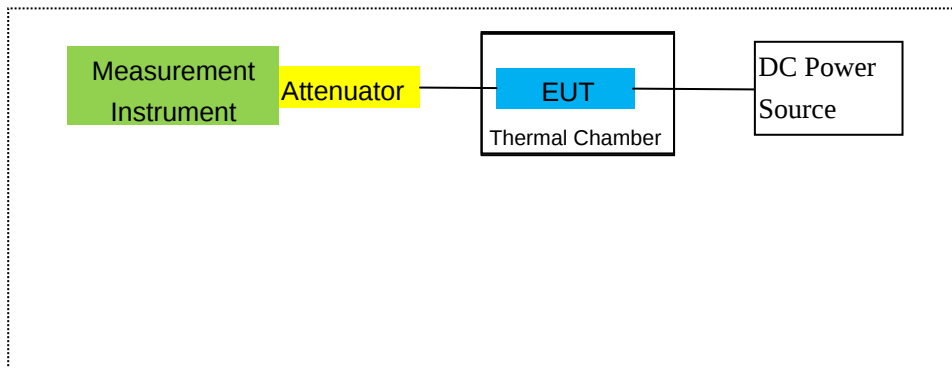
For Conducted Output Power



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	2023.05.29	2024.05.28	1 year
2	Test Receiver	R&S	ESPI	101318	2024.03.12	2025.03.11	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2024.03.11	2025.03.10	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2023.05.06	2026.05.05	3 year
5	Horn Antenna	EM	EM-AH-10180	2011071402	2024.03.12	2025.03.11	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2023.05.29	2024.05.28	1 year
7	Amplifier	EM	EM-30180	060538	2023.05.29	2024.05.28	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2024.03.12	2025.03.11	1 year
9	Power Meter	R&S	NRVS	100696	2023.05.29	2024.05.28	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2024.03.12	2025.03.11	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	2024.03.12	2025.03.11	1 year
15	LISN	R&S	ENV216	101313	2024.03.12	2025.03.11	1 year
16	LISN	EMCO	3816/2	00042990	2024.03.12	2025.03.11	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2024.03.12	2025.03.11	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2024.03.12	2025.03.11	1 year
19	Test Cable	N/A	C01	N/A	2023.05.06	2026.05.05	3 year
20	Test Cable	N/A	C02	N/A	2023.05.06	2026.05.05	3 year
21	Test Cable	N/A	C03	N/A	2023.05.06	2026.05.05	3 year
22	Attenuator	MCE	24-10-34	BN9258	2024.03.12	2025.03.11	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2024.03.12	2025.03.11	1 year
24	test receiver	R&S	ESCI	a0304218	2024.03.12	2025.03.11	1 year
25	Communication Tester	R&S	CMU200	A0304247	2023.05.29	2024.05.28	1 year

26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2024.03.12	2025.03.11	1 year
27	DC Power Source	N/A	PS-6005D	20170402923	2023.05.06	2026.05.05	3 year
28	MXG Vector Signal Generator	Agilent	N5182A	MY47070317	2023.05.29	2024.05.28	1 year
29	Communication Tester	R&S	CMW500	148500	2023.05.29	2024.05.28	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 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
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 2/4/5/7/12/17/41

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 than $43 + 10 \log (P)$ 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 2/4/5/7/12/17/41

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 2/4/5/7/12/17/41
- ☐

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 2/4/5/7/12/17/41

RESULTS

Pass

8.2 LTE BAND 2

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 QPSK	1/#Mid	1850.7	-3.08	3.76	28.24	21.40	138.038	Horizontal	Pass
		1880	-2.89	3.91	28.22	21.42	138.676	Horizontal	Pass
		1909.3	-2.80	3.93	28.20	21.47	140.281	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-3.14	3.77	28.23	21.32	135.519	Horizontal	Pass
		1880	-2.99	3.91	28.24	21.34	136.144	Horizontal	Pass
		1908.5	-2.86	3.94	28.25	21.45	139.637	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-3.03	3.77	28.31	21.51	141.579	Horizontal	Pass
		1880	-2.65	3.91	28.22	21.66	146.555	Horizontal	Pass
		1907.5	-2.58	3.94	28.20	21.68	147.231	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-2.89	3.79	28.33	21.65	146.218	Horizontal	Pass
		1880	-2.59	3.95	28.22	21.68	147.231	Horizontal	Pass
		1905	-2.48	3.97	28.19	21.74	149.279	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-2.85	3.79	28.34	21.70	147.911	Horizontal	Pass
		1880	-2.64	3.95	28.22	21.63	145.546	Horizontal	Pass
		1902.5	-2.50	3.97	28.18	21.71	148.252	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-2.84	3.81	28.35	21.70	147.911	Horizontal	Pass
		1880	-2.51	3.96	28.22	21.75	149.624	Horizontal	Pass
		1900	-2.45	4.00	28.16	21.71	148.252	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-3.62	3.76	28.24	20.86	121.899	Vertical	Pass
		1880	-3.34	3.91	28.22	20.97	125.026	Vertical	Pass
		1909.3	-4.03	3.93	28.20	20.24	105.682	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-3.56	3.77	28.23	20.90	123.027	Vertical	Pass
		1880	-4.11	3.91	28.24	20.22	105.196	Vertical	Pass
		1908.5	-3.20	3.94	28.25	21.11	129.122	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-4.35	3.77	28.31	20.19	104.472	Vertical	Pass
		1880	-3.38	3.91	28.22	20.93	123.880	Vertical	Pass
		1907.5	-3.83	3.94	28.20	20.43	110.408	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	-3.58	3.79	28.33	20.96	124.738	Vertical	Pass
		1880	-3.60	3.95	28.22	20.67	116.681	Vertical	Pass
		1905	-3.62	3.97	28.19	20.60	114.815	Vertical	Pass
15.0MHz	1/#Mid	1857.5	-4.32	3.79	28.34	20.23	105.439	Vertical	Pass

Band		1880	-4.02	3.95	28.22	20.25	105.925	Vertical	Pass
QPSK		1902.5	-3.17	3.97	28.18	21.04	127.057	Vertical	Pass
20.0MHz	1/#Mid	1860	-4.31	3.81	28.35	20.23	105.439	Vertical	Pass
Band		1880	-3.15	3.96	28.22	21.11	129.122	Vertical	Pass
QPSK		1900	-3.95	4.00	28.16	20.21	104.954	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 1880 1909.3	-4.20 -3.67 -3.60	3.76 3.91 3.93	28.24 28.22 28.20	20.28 20.64 20.67	106.660 115.878 116.681	Horizontal Horizontal Horizontal	Pass Pass Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5 1880 1908.5	-3.70 -3.78 -3.99	3.77 3.91 3.94	28.23 28.24 28.25	20.76 20.55 20.32	119.124 113.501 107.647	Horizontal Horizontal Horizontal	Pass Pass Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5 1880 1907.5	-3.64 -3.55 -3.23	3.77 3.91 3.94	28.31 28.22 28.20	20.90 20.76 21.03	123.027 119.124 126.765	Horizontal Horizontal Horizontal	Pass Pass Pass
10.0MHz Band 16 QAM	1/#Mid	1855 1880 1905	-3.69 -3.68 -3.15	3.79 3.95 3.97	28.33 28.22 28.19	20.85 20.59 21.07	121.619 114.551 127.938	Horizontal Horizontal Horizontal	Pass Pass Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5 1880 1902.5	-3.67 -3.46 -3.42	3.79 3.95 3.97	28.34 28.22 28.18	20.88 20.81 20.79	122.462 120.504 119.950	Horizontal Horizontal Horizontal	Pass Pass Pass
20.0MHz Band 16 QAM	1/#Mid	1860 1880 1900	-3.56 -3.26 -3.08	3.81 3.96 4.00	28.35 28.22 28.16	20.98 21.00 21.08	125.314 125.893 128.233	Horizontal Horizontal Horizontal	Pass Pass Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7 1880 1909.3	-5.12 -4.97 -4.86	3.76 3.91 3.93	28.24 28.22 28.20	19.36 19.34 19.41	86.298 85.901 87.297	Vertical Vertical Vertical	Pass Pass Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5 1880 1908.5	-4.40 -4.74 -5.01	3.77 3.91 3.94	28.23 28.24 28.25	20.06 19.59 19.30	101.391 90.991 85.114	Vertical Vertical Vertical	Pass Pass Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5 1880 1907.5	-5.14 -4.34 -4.25	3.77 3.91 3.94	28.31 28.22 28.20	19.40 19.97 20.01	87.096 99.312 100.231	Vertical Vertical Vertical	Pass Pass Pass
10.0MHz Band 16 QAM	1/#Mid	1855 1880 1905	-5.03 -5.12 -4.82	3.79 3.95 3.97	28.33 28.22 28.19	19.51 19.15 19.40	89.331 82.224 87.096	Vertical Vertical Vertical	Pass Pass Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5 1880 1902.5	-4.99 -4.89 -4.43	3.79 3.95 3.97	28.34 28.22 28.18	19.56 19.38 19.78	90.365 86.696 95.060	Vertical Vertical Vertical	Pass Pass Pass

20.0MHz	1/#Mid	1860	-4.51	3.81	28.35	20.03	100.693	Vertical	Pass
Band 16		1880	-4.49	3.96	28.22	19.77	94.842	Vertical	Pass
QAM		1900	-4.75	4.00	28.16	19.41	87.297	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	Antenna	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	Loss	Factor	Average	Average	Of Max. ERP	
				(dBm)	(dB)	(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-2.99	3.12	27.58	21.47	140.281	Horizontal	Pass
		1732.5	-2.98	3.27	27.61	21.36	136.773	Horizontal	Pass
		1754.3	-2.96	3.29	27.63	21.38	137.404	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.16	3.13	27.61	21.32	135.519	Horizontal	Pass
		1732.5	-3.08	3.27	27.61	21.26	133.660	Horizontal	Pass
		1753.5	-3.00	3.30	27.62	21.32	135.519	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.93	3.13	27.63	21.57	143.549	Horizontal	Pass
		1732.5	-2.83	3.27	27.61	21.51	141.579	Horizontal	Pass
		1752.5	-2.71	3.30	27.60	21.59	144.212	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-2.87	3.15	27.64	21.62	145.211	Horizontal	Pass
		1732.5	-2.64	3.31	27.61	21.66	146.555	Horizontal	Pass
		1750	-2.66	3.33	27.59	21.60	144.544	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-2.88	3.15	27.65	21.62	145.211	Horizontal	Pass
		1732.5	-2.72	3.31	27.61	21.58	143.880	Horizontal	Pass
		1747.5	-2.66	3.33	27.57	21.58	143.880	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-2.82	3.17	27.66	21.67	146.893	Horizontal	Pass
		1732.5	-2.65	3.32	27.61	21.64	145.881	Horizontal	Pass
		1745	-2.59	3.36	27.56	21.61	144.877	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-4.26	3.12	27.58	20.20	104.713	Vertical	Pass
		1732.5	-3.90	3.27	27.61	20.44	110.662	Vertical	Pass
		1754.3	-3.37	3.29	27.63	20.97	125.026	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.67	3.13	27.61	20.81	120.504	Vertical	Pass
		1732.5	-3.69	3.27	27.61	20.65	116.145	Vertical	Pass
		1753.5	-3.42	3.30	27.62	20.90	123.027	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-3.51	3.13	27.63	20.99	125.603	Vertical	Pass
		1732.5	-3.83	3.27	27.61	20.51	112.460	Vertical	Pass
		1752.5	-3.90	3.30	27.60	20.40	109.648	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-4.07	3.15	27.64	20.42	110.154	Vertical	Pass
		1732.5	-3.77	3.31	27.61	20.53	112.980	Vertical	Pass
		1750	-3.82	3.33	27.59	20.44	110.662	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-3.77	3.15	27.65	20.73	118.304	Vertical	Pass

Band		1732.5	-3.60	3.31	27.61	20.70	117.490	Vertical	Pass
QPSK		1747.5	-3.47	3.33	27.57	20.77	119.399	Vertical	Pass
20.0MHz	1/#Mid	1720	-4.25	3.17	27.66	20.24	105.682	Vertical	Pass
Band		1732.5	-3.40	3.32	27.61	20.89	122.744	Vertical	Pass
QPSK		1745	-3.76	3.36	27.56	20.44	110.662	Vertical	Pass

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	1/#Mid	1710.7	-3.80	3.12	27.58	20.66	116.413	Horizontal	Pass
Band 16		1732.5	-3.65	3.27	27.61	20.69	117.220	Horizontal	Pass
QAM		1754.3	-3.65	3.29	27.63	20.69	117.220	Horizontal	Pass
3.0MHz	1/#Mid	1711.5	-3.74	3.13	27.61	20.74	118.577	Horizontal	Pass
Band 16		1732.5	-3.87	3.27	27.61	20.47	111.429	Horizontal	Pass
QAM		1753.5	-4.09	3.30	27.62	20.23	105.439	Horizontal	Pass
5.0MHz	1/#Mid	1712.5	-3.57	3.13	27.63	20.93	123.880	Horizontal	Pass
Band 16		1732.5	-3.53	3.27	27.61	20.81	120.504	Horizontal	Pass
QAM		1752.5	-3.22	3.30	27.60	21.08	128.233	Horizontal	Pass
10.0MHz	1/#Mid	1715	-3.64	3.15	27.64	20.85	121.619	Horizontal	Pass
Band 16		1732.5	-3.83	3.31	27.61	20.47	111.429	Horizontal	Pass
QAM		1750	-3.21	3.33	27.59	21.05	127.350	Horizontal	Pass
15.0MHz	1/#Mid	1717.5	-3.44	3.15	27.65	21.06	127.644	Horizontal	Pass
Band 16		1732.5	-3.50	3.31	27.61	20.80	120.226	Horizontal	Pass
QAM		1747.5	-3.52	3.33	27.57	20.72	118.032	Horizontal	Pass
20.0MHz	1/#Mid	1720	-3.39	3.17	27.66	21.10	128.825	Horizontal	Pass
Band 16		1732.5	-3.40	3.32	27.61	20.89	122.744	Horizontal	Pass
QAM		1745	-3.21	3.36	27.56	20.99	125.603	Horizontal	Pass
1.4MHz	1/#Mid	1710.7	-4.99	3.12	27.58	19.47	88.512	Vertical	Pass
Band 16		1732.5	-4.50	3.27	27.61	19.84	96.383	Vertical	Pass
QAM		1754.3	-4.85	3.29	27.63	19.49	88.920	Vertical	Pass
3.0MHz	1/#Mid	1711.5	-5.28	3.13	27.61	19.20	83.176	Vertical	Pass
Band 16		1732.5	-4.34	3.27	27.61	20.00	100.000	Vertical	Pass
QAM		1753.5	-4.78	3.30	27.62	19.54	89.950	Vertical	Pass
5.0MHz	1/#Mid	1712.5	-4.39	3.13	27.63	20.11	102.565	Vertical	Pass
Band 16		1732.5	-4.29	3.27	27.61	20.05	101.158	Vertical	Pass
QAM		1752.5	-4.91	3.30	27.60	19.39	86.896	Vertical	Pass
10.0MHz	1/#Mid	1715	-4.60	3.15	27.64	19.89	97.499	Vertical	Pass
Band 16		1732.5	-4.93	3.31	27.61	19.37	86.497	Vertical	Pass
QAM		1750	-4.42	3.33	27.59	19.84	96.383	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-4.59	3.15	27.65	19.91	97.949	Vertical	Pass
Band 16		1732.5	-4.51	3.31	27.61	19.79	95.280	Vertical	Pass
QAM		1747.5	-4.49	3.33	27.57	19.75	94.406	Vertical	Pass

20.0MHz		1720	-4.62	3.17	27.66	19.87	97.051	Vertical	Pass
Band 16	1/#Mid	1732.5	-4.83	3.32	27.61	19.46	88.308	Vertical	Pass
QAM		1745	-4.73	3.36	27.56	19.47	88.512	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 3/#Mid	824.7	6.31	2.01	19.68	2.15	21.83	152.405	Horizontal	Pass
Band		836.5	6.19	2.01	19.77	2.15	21.80	151.356	Horizontal	Pass
QPSK		848.3	5.99	2.02	19.82	2.15	21.64	145.881	Horizontal	Pass
3.0MHz	Band 1/#Mid	825.5	6.08	2.01	19.70	2.15	21.62	145.211	Horizontal	Pass
Band		836.5	5.98	2.01	19.77	2.15	21.59	144.212	Horizontal	Pass
QPSK		847.5	5.85	2.02	19.81	2.15	21.49	140.929	Horizontal	Pass
5.0MHz	Band 1/#Mid	826.5	6.36	2.01	19.71	2.15	21.91	155.239	Horizontal	Pass
Band		836.5	6.24	2.01	19.77	2.15	21.85	153.109	Horizontal	Pass
QPSK		846.5	6.08	2.02	19.79	2.15	21.70	147.911	Horizontal	Pass
10.0MHz	Band 1/#Mid	829	6.38	2.01	19.73	2.15	21.95	156.675	Horizontal	Pass
Band		836.5	6.33	2.01	19.77	2.15	21.94	156.315	Horizontal	Pass
QPSK		844	6.23	2.02	19.78	2.15	21.84	152.757	Horizontal	Pass
1.4MHz	Band 1/#Mid	824.7	4.69	2.01	19.68	2.15	20.21	104.954	Vertical	Pass
Band		836.5	4.58	2.01	19.77	2.15	20.19	104.472	Vertical	Pass
QPSK		848.3	5.10	2.02	19.82	2.15	20.75	118.850	Vertical	Pass
3.0MHz	Band 1/#Mid	825.5	4.59	2.01	19.70	2.15	20.13	103.039	Vertical	Pass
Band		836.5	5.11	2.01	19.77	2.15	20.72	118.032	Vertical	Pass
QPSK		847.5	5.17	2.02	19.81	2.15	20.81	120.504	Vertical	Pass
5.0MHz	Band 1/#Mid	826.5	5.41	2.01	19.71	2.15	20.96	124.738	Vertical	Pass
Band		836.5	4.67	2.01	19.77	2.15	20.28	106.660	Vertical	Pass
QPSK		846.5	4.64	2.02	19.79	2.15	20.26	106.170	Vertical	Pass
10.0MHz	Band 1/#Mid	829	4.96	2.01	19.73	2.15	20.53	112.980	Vertical	Pass
Band		836.5	4.68	2.01	19.77	2.15	20.29	106.905	Vertical	Pass
QPSK		844	4.94	2.02	19.78	2.15	20.55	113.501	Vertical	Pass

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG	Cable	Antenna	Correction	Max.	Max.	Polarization	
			Level	Loss	Factor		EIRP	EIRP	Of Max. ERP	
			(dBm)	(dBm)	(dB)		Average	Average		
						(dB)	(dBm)	(mW)		
1.4MHz	3/#Mid	824.7	5.46	2.01	19.68	2.15	20.98	125.314	Horizontal	Pass
Band 16		836.5	5.39	2.01	19.77	2.15	21.00	125.893	Horizontal	Pass
QAM		848.3	5.23	2.02	19.82	2.15	20.88	122.462	Horizontal	Pass
3.0MHz	1/#Mid	825.5	5.54	2.01	19.70	2.15	21.08	128.233	Horizontal	Pass
Band 16		836.5	5.25	2.01	19.77	2.15	20.86	121.899	Horizontal	Pass
QAM		847.5	4.73	2.02	19.81	2.15	20.37	108.893	Horizontal	Pass
5.0MHz	1/#Mid	826.5	5.86	2.01	19.71	2.15	21.41	138.357	Horizontal	Pass
Band 16		836.5	5.63	2.01	19.77	2.15	21.24	133.045	Horizontal	Pass
QAM		846.5	5.38	2.02	19.79	2.15	21.00	125.893	Horizontal	Pass
10.0MHz	1/#Mid	829	5.86	2.01	19.73	2.15	21.43	138.995	Horizontal	Pass
Band 16		836.5	5.58	2.01	19.77	2.15	21.19	131.522	Horizontal	Pass
QAM		844	5.12	2.02	19.78	2.15	20.73	118.304	Horizontal	Pass
1.4MHz	1/#Mid	824.7	4.48	2.01	19.68	2.15	20.00	100.000	Vertical	Pass
Band 16		836.5	3.77	2.01	19.77	2.15	19.38	86.696	Vertical	Pass
QAM		848.3	5.44	2.02	19.82	2.15	21.09	128.529	Vertical	Pass
3.0MHz	1/#Mid	825.5	4.56	2.01	19.70	2.15	20.10	102.329	Vertical	Pass
Band 16		836.5	5.32	2.01	19.77	2.15	20.93	123.880	Vertical	Pass
QAM		847.5	5.34	2.02	19.81	2.15	20.98	125.314	Vertical	Pass
5.0MHz	1/#Mid	826.5	5.33	2.01	19.71	2.15	20.88	122.462	Vertical	Pass
Band 16		836.5	4.84	2.01	19.77	2.15	20.45	110.917	Vertical	Pass
QAM		846.5	4.75	2.02	19.79	2.15	20.37	108.893	Vertical	Pass
10.0MHz	1/#Mid	829	4.22	2.01	19.73	2.15	19.79	95.280	Vertical	Pass
Band 16		836.5	5.03	2.01	19.77	2.15	20.64	115.878	Vertical	Pass
QAM		844	4.45	2.02	19.78	2.15	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)

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	-1.27	4.54	27.75	21.94	156.315	Horizontal	Pass
		2535	-1.10	4.69	27.72	21.93	155.955	Horizontal	Pass
		2567.5	-1.03	4.71	27.71	21.97	157.398	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-1.20	4.55	27.76	22.01	158.855	Horizontal	Pass
		2535	-1.01	4.69	27.72	22.02	159.221	Horizontal	Pass
		2565	-0.93	4.72	27.70	22.05	160.325	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-1.21	4.55	27.77	22.01	158.855	Horizontal	Pass
		2535	-1.07	4.69	27.72	21.96	157.036	Horizontal	Pass
		2562.5	-0.97	4.72	27.69	22.00	158.489	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-1.15	4.57	27.78	22.06	160.694	Horizontal	Pass
		2535	-0.97	4.73	27.72	22.02	159.221	Horizontal	Pass
		2560	-0.93	4.75	27.68	22.00	158.489	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-2.36	4.54	27.75	20.85	121.619	Vertical	Pass
		2535	-2.58	4.69	27.72	20.45	110.917	Vertical	Pass
		2567.5	-1.91	4.71	27.71	21.09	128.529	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-2.30	4.55	27.76	20.91	123.310	Vertical	Pass
		2535	-2.74	4.69	27.72	20.29	106.905	Vertical	Pass
		2565	-2.74	4.72	27.70	20.24	105.682	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-2.87	4.55	27.77	20.35	108.393	Vertical	Pass
		2535	-2.15	4.69	27.72	20.88	122.462	Vertical	Pass
		2562.5	-2.04	4.72	27.69	20.93	123.880	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-3.03	4.57	27.78	20.18	104.232	Vertical	Pass
		2535	-2.05	4.73	27.72	20.94	124.165	Vertical	Pass
		2560	-1.99	4.75	27.68	20.94	124.165	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	Factor	Average	Average	Of Max. ERP	
				(dBm)	(dB)	(dBm)	(mW)		
5.0MHz	1#Mid	2502.5	-1.96	4.54	27.75	21.25	133.352	Horizontal	Pass
Band 16		2535	-1.65	4.69	27.72	21.38	137.404	Horizontal	Pass
QAM		2567.5	-1.73	4.71	27.71	21.27	133.968	Horizontal	Pass
10.0MHz	1#Mid	2505	-1.85	4.55	27.76	21.36	136.773	Horizontal	Pass
Band 16		2535	-1.86	4.69	27.72	21.17	130.918	Horizontal	Pass
QAM		2565	-2.13	4.72	27.70	20.85	121.619	Horizontal	Pass
15.0MHz	1#Mid	2507.5	-2.03	4.55	27.77	21.19	131.522	Horizontal	Pass
Band 16		2535	-2.00	4.69	27.72	21.03	126.765	Horizontal	Pass
QAM		2562.5	-1.61	4.72	27.69	21.36	136.773	Horizontal	Pass
20.0MHz	1#Mid	2510	-1.91	4.57	27.78	21.30	134.896	Horizontal	Pass
Band 16		2535	-1.58	4.73	27.72	21.41	138.357	Horizontal	Pass
QAM		2560	-1.68	4.75	27.68	21.25	133.352	Horizontal	Pass
5.0MHz	1#Mid	2502.5	-3.85	4.54	27.75	19.36	86.298	Vertical	Pass
Band 16		2535	-2.84	4.69	27.72	20.19	104.472	Vertical	Pass
QAM		2567.5	-3.68	4.71	27.71	19.32	85.507	Vertical	Pass
10.0MHz	1#Mid	2505	-3.68	4.55	27.76	19.53	89.743	Vertical	Pass
Band 16		2535	-2.76	4.69	27.72	20.27	106.414	Vertical	Pass
QAM		2565	-2.50	4.72	27.70	20.48	111.686	Vertical	Pass
15.0MHz	1#Mid	2507.5	-2.15	4.55	27.77	21.07	127.938	Vertical	Pass
Band 16		2535	-2.20	4.69	27.72	20.83	121.060	Vertical	Pass
QAM		2562.5	-2.07	4.72	27.69	20.90	123.027	Vertical	Pass
20.0MHz	1#Mid	2510	-2.44	4.57	27.78	20.77	119.399	Vertical	Pass
Band 16		2535	-3.37	4.73	27.72	19.62	91.622	Vertical	Pass
QAM		2560	-1.83	4.75	27.68	21.10	128.825	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							Conclusion
			SG	Cable	Antenna	Correction	Max. EIRP	Max.	Polarization	
			Level	Loss	Factor		EIRP	EIRP	Of Max.	
			(dBm)	(dBm)	(dB)		Average	Average	ERP	
						(dB)	(dBm)	(mW)		
1.4MHz	Band QPSK	699.7	6.68	1.91	19.21	2.15	21.83	152.405	Vertical	Pass
		707.5	6.60	1.91	19.26	2.15	21.80	151.356	Vertical	Pass
		715.3	6.38	1.93	19.34	2.15	21.64	145.881	Vertical	Pass
3.0MHz	Band QPSK	700.5	6.47	1.91	19.21	2.15	21.62	145.211	Vertical	Pass
		707.5	6.39	1.91	19.26	2.15	21.59	144.212	Vertical	Pass
		714.5	6.23	1.93	19.34	2.15	21.49	140.929	Vertical	Pass
5.0MHz	Band QPSK	701.5	6.74	1.91	19.23	2.15	21.91	155.239	Vertical	Pass
		707.5	6.65	1.91	19.26	2.15	21.85	153.109	Vertical	Pass
		713.5	6.44	1.92	19.33	2.15	21.70	147.911	Vertical	Pass
10.0MHz	Band QPSK	704	6.76	1.91	19.25	2.15	21.95	156.675	Vertical	Pass
		707.5	6.74	1.91	19.26	2.15	21.94	156.315	Vertical	Pass
		711	6.59	1.92	19.32	2.15	21.84	152.757	Vertical	Pass
1.4MHz	Band QPSK	699.7	5.35	1.91	19.21	2.15	20.50	112.202	Horizontal	Pass
		707.5	5.09	1.91	19.26	2.15	20.29	106.905	Horizontal	Pass
		715.3	4.97	1.93	19.34	2.15	20.23	105.439	Horizontal	Pass
3.0MHz	Band QPSK	700.5	5.19	1.91	19.21	2.15	20.34	108.143	Horizontal	Pass
		707.5	5.87	1.91	19.26	2.15	21.07	127.938	Horizontal	Pass
		714.5	4.95	1.93	19.34	2.15	20.21	104.954	Horizontal	Pass
5.0MHz	Band QPSK	701.5	5.60	1.91	19.23	2.15	20.77	119.399	Horizontal	Pass
		707.5	5.24	1.91	19.26	2.15	20.44	110.662	Horizontal	Pass
		713.5	5.35	1.92	19.33	2.15	20.61	115.080	Horizontal	Pass
10.0MHz	Band QPSK	704	5.82	1.91	19.25	2.15	21.01	126.183	Horizontal	Pass
		707.5	5.45	1.91	19.26	2.15	20.65	116.145	Horizontal	Pass
		711	5.68	1.92	19.32	2.15	20.93	123.880	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	1/#Mid	699.7	6.63	1.91	19.21	2.15	21.78	150.661	Vertical	Pass
Band 16		707.5	6.55	1.91	19.26	2.15	21.75	149.624	Vertical	Pass
QAM		715.3	6.33	1.93	19.34	2.15	21.59	144.212	Vertical	Pass
3.0MHz	1/#Mid	700.5	6.42	1.91	19.21	2.15	21.57	143.549	Vertical	Pass
Band 16		707.5	6.34	1.91	19.26	2.15	21.54	142.561	Vertical	Pass
QAM		714.5	6.18	1.93	19.34	2.15	21.44	139.316	Vertical	Pass
5.0MHz	1/#Mid	701.5	6.69	1.91	19.23	2.15	21.86	153.462	Vertical	Pass
Band 16		707.5	6.60	1.91	19.26	2.15	21.80	151.356	Vertical	Pass
QAM		713.5	6.39	1.92	19.33	2.15	21.65	146.218	Vertical	Pass
10.0MHz	1/#Mid	704	6.71	1.91	19.25	2.15	21.90	154.882	Vertical	Pass
Band 16		707.5	6.69	1.91	19.26	2.15	21.89	154.525	Vertical	Pass
QAM		711	6.54	1.92	19.32	2.15	21.79	151.008	Vertical	Pass
1.4MHz	1/#Mid	699.7	5.07	1.91	19.21	2.15	20.22	105.196	Horizontal	Pass
Band 16		707.5	4.89	1.91	19.26	2.15	20.09	102.094	Horizontal	Pass
QAM		715.3	4.84	1.93	19.34	2.15	20.10	102.329	Horizontal	Pass
3.0MHz	1/#Mid	700.5	5.53	1.91	19.21	2.15	20.68	116.950	Horizontal	Pass
Band 16		707.5	5.27	1.91	19.26	2.15	20.47	111.429	Horizontal	Pass
QAM		714.5	5.68	1.93	19.34	2.15	20.94	124.165	Horizontal	Pass
5.0MHz	1/#Mid	701.5	5.28	1.91	19.23	2.15	20.45	110.917	Horizontal	Pass
Band 16		707.5	5.30	1.91	19.26	2.15	20.50	112.202	Horizontal	Pass
QAM		713.5	5.46	1.92	19.33	2.15	20.72	118.032	Horizontal	Pass
10.0MHz	1/#Mid	704	5.68	1.91	19.25	2.15	20.87	122.180	Horizontal	Pass
Band 16		707.5	5.15	1.91	19.26	2.15	20.35	108.393	Horizontal	Pass
QAM		711	5.19	1.92	19.32	2.15	20.44	110.662	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	Cable	Antenna	Correction	Max. EIRP	Max.	Polarization	
			Level	Loss	Factor		EIRP	EIRP	Of Max.	
			(dBm)	(dBm)	(dB)		Average	Average	ERP	
						(dB)	(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	706.5	6.22	1.91	19.23	2.15	21.39	137.721	Vertical	Pass
		710	6.08	1.91	19.26	2.15	21.28	134.276	Vertical	Pass
		713.5	5.98	1.92	19.33	2.15	21.24	133.045	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	709	6.23	1.91	19.25	2.15	21.42	138.676	Vertical	Pass
		710	6.18	1.91	19.26	2.15	21.38	137.404	Vertical	Pass
		711	6.14	1.92	19.32	2.15	21.39	137.721	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	706.5	5.63	1.91	19.23	2.15	20.80	120.226	Horizontal	Pass
		710	4.39	1.91	19.26	2.15	19.59	90.991	Horizontal	Pass
		713.5	4.18	1.92	19.33	2.15	19.44	87.902	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	709	5.26	1.91	19.25	2.15	20.45	110.917	Horizontal	Pass
		710	5.93	1.91	19.26	2.15	21.13	129.718	Horizontal	Pass
		711	5.81	1.92	19.32	2.15	21.06	127.644	Horizontal	Pass

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG	Cable	Antenna	Correction	Max.	Max.	Polarization	
			Level	Loss	Factor		EIRP	EIRP	Of Max.	
			(dBm)	(dBm)	(dB)		Average	Average	ERP	
						(dB)	(dBm)	(mW)		
5.0MHz	1/#Mid QAM	706.5	5.66	1.91	19.23	2.15	20.83	121.060	Vertical	Pass
Band 16		710	5.57	1.91	19.26	2.15	20.77	119.399	Vertical	Pass
		713.5	5.37	1.92	19.33	2.15	20.63	115.611	Vertical	Pass
10.0MHz	1/#Mid QAM	709	5.20	1.91	19.25	2.15	20.39	109.396	Vertical	Pass
Band 16		710	5.73	1.91	19.26	2.15	20.93	123.880	Vertical	Pass
		711	5.46	1.92	19.32	2.15	20.71	117.761	Vertical	Pass
5.0MHz	1/#Mid QAM	706.5	4.98	1.91	19.23	2.15	20.15	103.514	Horizontal	Pass
Band 16		710	4.93	1.91	19.26	2.15	20.13	103.039	Horizontal	Pass
		713.5	4.06	1.92	19.33	2.15	19.32	85.507	Horizontal	Pass
10.0MHz	1/#Mid QAM	709	4.72	1.91	19.25	2.15	19.91	97.949	Horizontal	Pass
Band 16		710	5.01	1.91	19.26	2.15	20.21	104.954	Horizontal	Pass
		711	4.42	1.92	19.32	2.15	19.67	92.683	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 41

Radiated Power (EIRP) for Band 41									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
						Average	Average		
						(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2498.5	-1.48	4.54	27.75	21.73	148.936	Horizontal	Pass
		2593	-1.33	4.69	27.72	21.70	147.911	Horizontal	Pass
		2687.5	-1.21	4.71	27.71	21.79	151.008	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2501	-1.56	4.55	27.76	21.65	146.218	Horizontal	Pass
		2593	-1.42	4.69	27.72	21.61	144.877	Horizontal	Pass
		2685	-1.41	4.72	27.70	21.57	143.549	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2503.5	-1.39	4.55	27.77	21.83	152.405	Horizontal	Pass
		2593	-1.11	4.69	27.72	21.92	155.597	Horizontal	Pass
		2682.5	-1.16	4.72	27.69	21.81	151.705	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2506	-1.00	4.57	27.78	22.21	166.341	Horizontal	Pass
		2593	-1.05	4.73	27.72	21.94	156.315	Horizontal	Pass
		2680	-1.05	4.75	27.68	21.88	154.170	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2498.5	-1.28	4.54	27.75	21.93	155.955	Vertical	Pass
		2593	-1.19	4.69	27.72	21.84	152.757	Vertical	Pass
		2687.5	-1.17	4.71	27.71	21.83	152.405	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2501	-1.26	4.55	27.76	21.95	156.675	Vertical	Pass
		2593	-1.10	4.69	27.72	21.93	155.955	Vertical	Pass
		2685	-1.17	4.72	27.70	21.81	151.705	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2503.5	-2.57	4.55	27.77	20.65	116.145	Vertical	Pass
		2593	-2.68	4.69	27.72	20.35	108.393	Vertical	Pass
		2682.5	-2.32	4.72	27.69	20.65	116.145	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2506	-2.97	4.57	27.78	20.24	105.682	Vertical	Pass
		2593	-1.89	4.73	27.72	21.10	128.825	Vertical	Pass
		2680	-1.96	4.75	27.68	20.97	125.026	Vertical	Pass

Radiated Power (EIRP) for Band 41									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG	Cable Loss (dBm)	Antenna Factor (dB)	Max.	Max.	Polarization Of Max. ERP	
			Level			EIRP	EIRP		
			(dBm)			Average	Average		
						(dBm)	(mW)		
5.0MHz	1/#Mid	2498.5	-1.64	4.54	27.75	21.57	143.549	Horizontal	Pass
Band 16		2593	-1.49	4.69	27.72	21.54	142.561	Horizontal	Pass
QAM		2687.5	-1.37	4.71	27.71	21.63	145.546	Horizontal	Pass
10.0MHz	1/#Mid	2501	-1.72	4.55	27.76	21.49	140.929	Horizontal	Pass
Band 16		2593	-1.58	4.69	27.72	21.45	139.637	Horizontal	Pass
QAM		2685	-1.57	4.72	27.70	21.41	138.357	Horizontal	Pass
15.0MHz	1/#Mid	2503.5	-1.55	4.55	27.77	21.67	146.893	Horizontal	Pass
Band 16		2593	-1.27	4.69	27.72	21.76	149.968	Horizontal	Pass
QAM		2682.5	-1.32	4.72	27.69	21.65	146.218	Horizontal	Pass
20.0MHz	1/#Mid	2506	-1.27	4.57	27.78	21.94	156.315	Horizontal	Pass
Band 16		2593	-1.21	4.73	27.72	21.78	150.661	Horizontal	Pass
QAM		2680	-1.21	4.75	27.68	21.72	148.594	Horizontal	Pass
5.0MHz	1/#Mid	2498.5	-1.44	4.54	27.75	21.77	150.314	Vertical	Pass
Band 16		2593	-1.35	4.69	27.72	21.68	147.231	Vertical	Pass
QAM		2687.5	-1.33	4.71	27.71	21.67	146.893	Vertical	Pass
10.0MHz	1/#Mid	2501	-1.42	4.55	27.76	21.79	151.008	Vertical	Pass
Band 16		2593	-1.26	4.69	27.72	21.77	150.314	Vertical	Pass
QAM		2685	-1.33	4.72	27.70	21.65	146.218	Vertical	Pass
15.0MHz	1/#Mid	2503.5	-3.03	4.55	27.77	20.19	104.472	Vertical	Pass
Band 16		2593	-2.52	4.69	27.72	20.51	112.460	Vertical	Pass
QAM		2682.5	-2.64	4.72	27.69	20.33	107.895	Vertical	Pass
20.0MHz	1/#Mid	2506	-2.61	4.57	27.78	20.60	114.815	Vertical	Pass
Band 16		2593	-2.06	4.73	27.72	20.93	123.880	Vertical	Pass
QAM		2680	-2.12	4.75	27.68	20.81	120.504	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 $43 + 10 \log_{10}(p)$, dB; and
- b. for mobile subscriber equipment, the attenuation shall not be less than $43 + 10 \log_{10}(p)$, dB at the channel edges and $55 + 10 \log_{10}(p)$ 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 2/4/5/7/12/17/41

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	-52.86	4.04	33.51	-23.39	-13	-10.39	Horizontal
3701.4	-50.56	4.04	33.51	-21.09	-13	-8.09	Vertical
5552.1	-48.09	5.24	35.84	-17.49	-13	-4.49	Vertical
5552.1	-53.10	5.24	35.84	-22.50	-13	-9.50	Horizontal
208.7	-37.77	1.43	16.02	-23.18	-13	-10.18	Vertical
433.1	-38.75	1.30	17.99	-22.06	-13	-9.06	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-53.02	4.04	33.56	-23.50	-13	-10.50	Horizontal
3760.0	-53.06	4.04	33.56	-23.54	-13	-10.54	Vertical
5640.0	-50.53	5.24	35.91	-19.86	-13	-6.86	Vertical
5640.0	-52.09	5.24	35.91	-21.42	-13	-8.42	Horizontal
206.1	-44.76	1.62	16.97	-29.41	-13	-16.41	Vertical
324.0	-35.41	1.74	15.98	-21.18	-13	-8.18	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-44.56	4.04	34.00	-14.60	-13	-1.60	Horizontal
3818.6	-44.50	4.04	34.00	-14.54	-13	-1.54	Vertical
5727.9	-49.55	5.24	36.04	-18.75	-13	-5.75	Vertical
5727.9	-52.81	5.24	36.04	-22.01	-13	-9.01	Horizontal
187.0	-35.77	1.42	17.29	-19.90	-13	-6.90	Vertical
403.8	-38.48	1.50	17.90	-22.07	-13	-9.07	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	-53.89	4.07	33.54	-24.42	-13	-11.42	Horizontal
3720.0	-52.36	4.07	33.54	-22.89	-13	-9.89	Vertical
5580.0	-51.19	5.28	35.86	-20.61	-13	-7.61	Vertical
5580.0	-50.80	5.28	35.86	-20.22	-13	-7.22	Horizontal
177.7	-44.39	1.58	16.89	-29.07	-13	-16.07	Vertical
352.2	-44.03	1.76	17.26	-28.53	-13	-15.53	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-49.03	4.04	33.56	-19.51	-13	-6.51	Horizontal
3760.0	-45.60	4.04	33.56	-16.08	-13	-3.08	Vertical
5640.0	-47.47	5.24	35.91	-16.80	-13	-3.80	Vertical
5640.0	-50.12	5.24	35.91	-19.45	-13	-6.45	Horizontal
177.1	-43.47	1.46	16.27	-28.66	-13	-15.66	Vertical
355.1	-39.02	1.59	15.15	-25.46	-13	-12.46	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-51.09	4.04	34.00	-21.13	-13	-8.13	Horizontal
3800.0	-45.70	4.04	34.00	-15.74	-13	-2.74	Vertical
5700.0	-50.34	5.24	36.04	-19.54	-13	-6.54	Vertical
5700.0	-51.62	5.24	36.04	-20.82	-13	-7.82	Horizontal
194.8	-40.04	1.36	17.39	-24.00	-13	-11.00	Vertical
312.9	-36.30	1.66	15.39	-22.57	-13	-9.57	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.

9.2 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	-50.91	4.02	29.80	-25.13	-13	-12.13	Horizontal
3421.4	-48.37	4.02	29.80	-22.59	-13	-9.59	Vertical
5132.1	-48.73	5.24	35.84	-18.13	-13	-5.13	Vertical
5132.1	-51.02	5.24	35.84	-20.42	-13	-7.42	Horizontal
207.0	-37.80	1.68	16.04	-23.44	-13	-10.44	Vertical
399.4	-38.91	1.78	17.74	-22.95	-13	-9.95	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-51.02	4.03	30.00	-25.05	-13	-12.05	Horizontal
3465.0	-51.15	4.03	30.00	-25.18	-13	-12.18	Vertical
5197.5	-49.11	5.25	35.86	-18.50	-13	-5.50	Vertical
5197.5	-53.27	5.25	35.86	-22.66	-13	-9.66	Horizontal
212.7	-39.86	1.72	17.69	-23.89	-13	-10.89	Vertical
291.5	-43.84	1.62	16.02	-29.43	-13	-16.43	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-52.10	4.05	30.01	-26.14	-13	-13.14	Horizontal
3508.6	-46.00	4.05	30.01	-20.04	-13	-7.04	Vertical
5262.9	-44.90	5.26	35.86	-14.30	-13	-1.30	Vertical
5262.9	-52.31	5.26	35.86	-21.71	-13	-8.71	Horizontal
212.6	-39.97	1.80	16.69	-25.08	-13	-12.08	Vertical
398.4	-43.08	1.75	16.66	-28.18	-13	-15.18	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	-48.31	4.02	29.80	-22.53	-13	-9.53	Horizontal
3440.0	-44.90	4.02	29.80	-19.12	-13	-6.12	Vertical
5160.0	-52.61	5.24	35.84	-22.01	-13	-9.01	Vertical
5160.0	-49.45	5.24	35.84	-18.85	-13	-5.85	Horizontal
186.9	-34.53	1.57	17.26	-18.84	-13	-5.84	Vertical
386.7	-42.30	1.78	16.35	-27.73	-13	-14.73	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-51.17	4.03	30.00	-25.20	-13	-12.20	Horizontal
3465.0	-49.51	4.03	30.00	-23.54	-13	-10.54	Vertical
5197.5	-49.75	5.25	35.86	-19.14	-13	-6.14	Vertical
5197.5	-51.34	5.25	35.86	-20.73	-13	-7.73	Horizontal
201.1	-36.63	1.44	17.95	-20.12	-13	-7.12	Vertical
336.3	-34.15	1.65	16.09	-19.71	-13	-6.71	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-53.69	2.91	27.68	-28.92	-13	-15.92	Horizontal
3490.0	-46.32	2.91	27.68	-21.55	-13	-8.55	Vertical
5235.0	-51.15	5.26	35.86	-20.55	-13	-7.55	Vertical
5235.0	-50.99	5.26	35.86	-20.39	-13	-7.39	Horizontal
191.8	-34.64	1.61	16.85	-19.40	-13	-6.40	Vertical
249.3	-42.44	1.61	15.19	-28.86	-13	-15.86	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	-47.08	2.78	27.50	-22.36	-13	-9.36	Horizontal
1649.4	-50.78	2.78	27.50	-26.06	-13	-13.06	Vertical
2474.1	-48.02	2.90	27.80	-23.12	-13	-10.12	Vertical
2474.1	-50.22	2.90	27.80	-25.32	-13	-12.32	Horizontal
196.1	-36.90	1.76	17.59	-21.07	-13	-8.07	Vertical
311.4	-43.60	1.63	15.87	-29.36	-13	-16.36	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-49.88	2.80	27.48	-25.20	-13	-12.20	Horizontal
1673.0	-50.53	2.80	27.48	-25.85	-13	-12.85	Vertical
2509.5	-51.11	2.91	27.70	-26.32	-13	-13.32	Vertical
2509.5	-50.64	2.91	27.70	-25.85	-13	-12.85	Horizontal
179.0	-36.64	1.61	15.68	-22.57	-13	-9.57	Vertical
281.2	-37.75	1.59	17.52	-21.83	-13	-8.83	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-52.18	2.82	27.43	-27.57	-13	-14.57	Horizontal
1696.6	-47.02	2.82	27.43	-22.41	-13	-9.41	Vertical
2544.9	-47.13	2.92	27.74	-22.31	-13	-9.31	Vertical
2544.9	-50.88	2.92	27.74	-26.06	-13	-13.06	Horizontal
176.5	-35.66	1.69	16.67	-20.67	-13	-7.67	Vertical
440.7	-40.63	1.70	17.18	-25.15	-13	-12.15	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	-48.48	2.78	27.50	-23.76	-13	-10.76	Horizontal
1658.0	-52.81	2.78	27.50	-28.09	-13	-15.09	Vertical
2487.0	-46.89	2.90	27.80	-21.99	-13	-8.99	Vertical
2487.0	-49.57	2.90	27.80	-24.67	-13	-11.67	Horizontal
201.1	-34.51	1.71	15.57	-20.65	-13	-7.65	Vertical
270.8	-34.63	1.34	16.40	-19.57	-13	-6.57	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-49.87	2.80	27.48	-25.19	-13	-12.19	Horizontal
1673.0	-51.81	2.80	27.48	-27.13	-13	-14.13	Vertical
2509.5	-52.02	2.91	27.70	-27.23	-13	-14.23	Vertical
2509.5	-53.82	2.91	27.70	-29.03	-13	-16.03	Horizontal
182.9	-36.89	1.44	17.04	-21.29	-13	-8.29	Vertical
361.1	-34.17	1.76	17.62	-18.31	-13	-5.31	Horizontal
Test Results for High Channel 844MHz							
1688.0	-50.46	2.82	27.43	-25.85	-13	-12.85	Horizontal
1688.0	-53.99	2.82	27.43	-29.38	-13	-16.38	Vertical
2532.0	-47.12	2.92	27.74	-22.30	-13	-9.30	Vertical
2532.0	-51.79	2.92	27.74	-26.97	-13	-13.97	Horizontal
192.2	-41.56	1.74	17.70	-25.60	-13	-12.60	Vertical
353.3	-40.28	1.41	17.46	-24.22	-13	-11.22	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.

9.4 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	-63.48	5.23	35.81	-32.90	-25	-7.90	Horizontal
5005.0	-60.63	5.23	35.81	-30.05	-25	-5.05	Vertical
7507.5	-61.76	5.67	36.85	-30.58	-25	-5.58	Vertical
7507.5	-62.95	5.67	36.85	-31.77	-25	-6.77	Horizontal
206.7	-53.72	1.73	17.97	-37.48	-25	-12.48	Vertical
340.1	-47.47	1.38	15.11	-33.74	-25	-8.74	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.02	5.23	35.82	-30.43	-25	-5.43	Horizontal
5070.0	-62.87	5.23	35.82	-32.28	-25	-7.28	Vertical
7605.0	-63.26	5.67	36.85	-32.08	-25	-7.08	Vertical
7605.0	-62.38	5.67	36.85	-31.20	-25	-6.20	Horizontal
192.7	-44.71	1.77	16.17	-30.30	-25	-5.30	Vertical
318.5	-45.62	1.63	15.21	-32.04	-25	-7.04	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-64.80	5.24	35.83	-34.21	-25	-9.21	Horizontal
5135.0	-59.75	5.24	35.83	-29.16	-25	-4.16	Vertical
7702.5	-64.54	5.68	36.87	-33.35	-25	-8.35	Vertical
7702.5	-64.14	5.68	36.87	-32.95	-25	-7.95	Horizontal
186.8	-54.02	1.58	17.56	-38.04	-25	-13.04	Vertical
381.9	-53.92	1.45	16.58	-38.79	-25	-13.79	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	-63.33	5.23	35.82	-32.74	-25	-7.74	Horizontal
5020.0	-62.68	5.23	35.82	-32.09	-25	-7.09	Vertical
7530.0	-61.58	5.67	36.86	-30.39	-25	-5.39	Vertical
7530.0	-61.40	5.67	36.86	-30.21	-25	-5.21	Horizontal
204.2	-49.40	1.63	15.76	-35.27	-25	-10.27	Vertical
305.4	-50.15	1.71	15.44	-36.42	-25	-11.42	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.39	5.23	35.82	-30.80	-25	-5.80	Horizontal
5070.0	-61.81	5.23	35.82	-31.22	-25	-6.22	Vertical
7605.0	-64.43	5.67	36.85	-33.25	-25	-8.25	Vertical
7605.0	-62.12	5.67	36.85	-30.94	-25	-5.94	Horizontal
178.8	-49.43	1.79	16.84	-34.37	-25	-9.37	Vertical
288.0	-44.45	1.71	17.64	-28.52	-25	-3.52	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-62.71	5.24	35.83	-32.12	-25	-7.12	Horizontal
5120.0	-62.44	5.24	35.83	-31.85	-25	-6.85	Vertical
7680.0	-59.04	5.70	36.88	-27.86	-25	-2.86	Vertical
7680.0	-61.91	5.70	36.88	-30.73	-25	-5.73	Horizontal
193.8	-49.52	1.79	16.84	-34.46	-25	-9.46	Vertical
386.4	-48.43	1.71	17.64	-32.50	-25	-7.50	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	-51.68	2.60	27.20	-27.08	-13	-14.08	Horizontal
1399.4	-53.56	2.60	27.20	-28.96	-13	-15.96	Vertical
2099.1	-47.37	2.85	27.54	-22.68	-13	-9.68	Vertical
2099.1	-49.04	2.85	27.54	-24.35	-13	-11.35	Horizontal
179.9	-42.55	1.49	17.78	-26.26	-13	-13.26	Vertical
391.1	-41.51	1.36	17.33	-25.54	-13	-12.54	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-48.51	2.61	27.28	-23.84	-13	-10.84	Horizontal
1415.0	-51.83	2.61	27.28	-27.16	-13	-14.16	Vertical
2122.5	-47.51	2.87	27.59	-22.79	-13	-9.79	Vertical
2122.5	-53.69	2.87	27.59	-28.97	-13	-15.97	Horizontal
196.2	-40.99	1.73	15.74	-26.98	-13	-13.98	Vertical
350.9	-44.89	1.62	15.79	-30.72	-13	-17.72	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-45.52	2.63	27.28	-20.87	-13	-7.87	Horizontal
1430.6	-44.40	2.63	27.28	-19.75	-13	-6.75	Vertical
2145.9	-46.58	2.88	27.60	-21.86	-13	-8.86	Vertical
2145.9	-51.97	2.88	27.60	-27.25	-13	-14.25	Horizontal
183.8	-37.61	1.61	18.00	-21.22	-13	-8.22	Vertical
283.6	-34.13	1.45	15.49	-20.10	-13	-7.10	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	-48.33	2.61	27.26	-23.68	-13	-10.68	Horizontal
1408.0	-53.11	2.61	27.26	-28.46	-13	-15.46	Vertical
2112.0	-49.09	2.87	27.58	-24.38	-13	-11.38	Vertical
2112.0	-50.95	2.87	27.58	-26.24	-13	-13.24	Horizontal
178.6	-34.11	1.31	16.97	-18.45	-13	-5.45	Vertical
390.3	-44.79	1.65	16.70	-29.74	-13	-16.74	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-53.70	2.61	27.28	-29.03	-13	-16.03	Horizontal
1415.0	-46.03	2.61	27.28	-21.36	-13	-8.36	Vertical
2122.5	-49.33	2.87	27.59	-24.61	-13	-11.61	Vertical
2122.5	-50.64	2.87	27.59	-25.92	-13	-12.92	Horizontal
195.0	-44.54	1.72	17.99	-28.27	-13	-15.27	Vertical
433.4	-41.43	1.73	17.94	-25.22	-13	-12.22	Horizontal
Test Results for High Channel 711MHz							
1422.0	-48.63	2.62	27.28	-23.97	-13	-10.97	Horizontal
1422.0	-46.91	2.62	27.28	-22.25	-13	-9.25	Vertical
2133.0	-50.59	2.87	27.60	-25.86	-13	-12.86	Vertical
2133.0	-49.02	2.87	27.60	-24.29	-13	-11.29	Horizontal
186.6	-38.67	1.58	15.93	-24.32	-13	-11.32	Vertical
448.9	-42.57	1.36	15.59	-28.34	-13	-15.34	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	-48.46	2.61	27.28	-23.79	-13	-10.79	Horizontal
1413.0	-49.29	2.61	27.28	-24.62	-13	-11.62	Vertical
2119.5	-53.79	2.87	27.59	-29.07	-13	-16.07	Vertical
2119.5	-52.57	2.87	27.59	-27.85	-13	-14.85	Horizontal
210.5	-42.57	1.71	16.15	-28.13	-13	-15.13	Vertical
353.6	-38.21	1.41	17.32	-22.30	-13	-9.30	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-49.46	2.62	27.30	-24.78	-13	-11.78	Horizontal
1420.0	-53.96	2.62	27.30	-29.28	-13	-16.28	Vertical
2130.0	-46.75	2.87	27.62	-22.00	-13	-9.00	Vertical
2130.0	-52.91	2.87	27.62	-28.16	-13	-15.16	Horizontal
185.8	-37.19	1.42	15.25	-23.37	-13	-10.37	Vertical
319.6	-38.56	1.36	17.19	-22.73	-13	-9.73	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-50.03	2.66	27.28	-25.41	-13	-12.41	Horizontal
1427.0	-52.42	2.66	27.28	-27.80	-13	-14.80	Vertical
2140.5	-48.12	2.88	27.60	-23.40	-13	-10.40	Vertical
2140.5	-53.52	2.88	27.60	-28.80	-13	-15.80	Horizontal
201.9	-41.53	1.32	17.29	-25.56	-13	-12.56	Vertical
260.9	-36.44	1.72	16.89	-21.27	-13	-8.27	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	-52.01	2.62	27.30	-27.33	-13	-14.33	Horizontal
1418.0	-52.21	2.62	27.30	-27.53	-13	-14.53	Vertical
2127.0	-48.86	2.87	27.62	-24.11	-13	-11.11	Vertical
2127.0	-53.08	2.87	27.62	-28.33	-13	-15.33	Horizontal
199.4	-34.04	1.35	16.91	-18.48	-13	-5.48	Vertical
425.2	-43.42	1.62	16.31	-28.73	-13	-15.73	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-48.28	2.62	27.30	-23.60	-13	-10.60	Horizontal
1420.0	-52.13	2.62	27.30	-27.45	-13	-14.45	Vertical
2130.0	-46.63	2.87	27.62	-21.88	-13	-8.88	Vertical
2130.0	-49.69	2.87	27.62	-24.94	-13	-11.94	Horizontal
200.5	-42.04	1.51	17.14	-26.41	-13	-13.41	Vertical
423.4	-35.43	1.77	16.88	-20.32	-13	-7.32	Horizontal
Test Results for High Channel 711MHz							
1422.0	-51.62	2.62	27.30	-26.94	-13	-13.94	Horizontal
1422.0	-46.43	2.62	27.30	-21.75	-13	-8.75	Vertical
2133.0	-53.78	2.87	27.62	-29.03	-13	-16.03	Vertical
2133.0	-49.52	2.87	27.62	-24.77	-13	-11.77	Horizontal
180.5	-41.27	1.78	15.95	-27.10	-13	-14.10	Vertical
401.5	-34.67	1.34	17.95	-18.07	-13	-5.07	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 41

QPSK EIRP POWER FOR LTE BAND 41 (5MHZ BANDWIDTH)

Test Results for Low Channel 2498.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
4997.0	-63.99	5.23	35.81	-33.41	-25	-8.41	Horizontal
4997.0	-62.54	5.23	35.81	-31.96	-25	-6.96	Vertical
7495.5	-63.88	5.67	36.85	-32.70	-25	-7.70	Vertical
7495.5	-60.70	5.67	36.85	-29.52	-25	-4.52	Horizontal
435.3	-48.05	1.38	15.98	-33.45	-25	-8.45	Vertical
465.8	-48.49	1.62	15.66	-34.45	-25	-9.45	Horizontal
Test Results for Mid Channel 2593MHz							
5186.0	-62.10	5.23	35.82	-31.51	-25	-6.51	Horizontal
5186.0	-61.77	5.23	35.82	-31.18	-25	-6.18	Vertical
7779.0	-61.83	5.67	36.85	-30.65	-25	-5.65	Vertical
7779.0	-62.58	5.67	36.85	-31.40	-25	-6.40	Horizontal
510.4	-49.42	1.62	16.17	-34.87	-25	-9.87	Vertical
562.9	-49.46	1.74	17.63	-33.57	-25	-8.57	Horizontal
Test Results for High Channel 2687.5MHz							
5375.0	-63.78	5.24	35.83	-33.19	-25	-8.19	Horizontal
5375.0	-61.69	5.24	35.83	-31.10	-25	-6.10	Vertical
8062.5	-60.58	5.68	36.87	-29.39	-25	-4.39	Vertical
8062.5	-60.78	5.68	36.87	-29.59	-25	-4.59	Horizontal
197.6	-47.06	1.55	15.84	-32.77	-25	-7.77	Vertical
353.1	-46.39	1.51	17.06	-30.84	-25	-5.84	Horizontal

QPSK EIRP POWER FOR LTE BAND 41 (20MHZ BANDWIDTH)

Test Results for Low Channel 2506MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5012.0	-60.05	5.23	35.82	-29.46	-25	-4.46	Horizontal
5012.0	-64.67	5.23	35.82	-34.08	-25	-9.08	Vertical
7518.0	-63.59	5.67	36.86	-32.40	-25	-7.40	Vertical
7518.0	-62.32	5.67	36.86	-31.13	-25	-6.13	Horizontal
128.9	-47.61	1.43	15.51	-33.53	-25	-8.53	Vertical
344.8	-45.03	1.40	16.97	-29.46	-25	-4.46	Horizontal
Test Results for Mid Channel 2593MHz							
5186.0	-61.88	5.23	35.82	-31.29	-25	-6.29	Horizontal
5186.0	-59.23	5.23	35.82	-28.64	-25	-3.64	Vertical
7779.0	-61.11	5.67	36.85	-29.93	-25	-4.93	Vertical
7779.0	-59.99	5.67	36.85	-28.81	-25	-3.81	Horizontal
100.8	-44.74	1.77	16.72	-29.79	-25	-4.79	Vertical
263.5	-44.05	1.31	16.99	-28.37	-25	-3.37	Horizontal
Test Results for High Channel 2680MHz							
5360.0	-59.70	5.24	35.83	-29.11	-25	-4.11	Horizontal
5360.0	-63.48	5.24	35.83	-32.89	-25	-7.89	Vertical
8040.0	-64.24	5.70	36.88	-33.06	-25	-8.06	Vertical
8040.0	-60.08	5.70	36.88	-28.90	-25	-3.90	Horizontal
349.9	-44.93	1.70	15.73	-30.90	-25	-5.90	Vertical
110.3	-45.55	1.75	17.33	-29.97	-25	-4.97	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 4.4V.

Frequency Stability vs Temperature:

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

Frequency Stability vs Voltage:

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

MODES TESTED

LTE Band 2/4/5/7/12/17/41

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	12.8	0.006831	2.5
3.87	1880	14.3	0.007601	2.5
4.40	1880	13.2	0.006997	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	12.6	0.006684	2.5
Extreme (50C)	1880	12.1	0.006428	2.5
Extreme (40C)	1880	13.6	0.007223	2.5
Extreme (30C)	1880	13.7	0.007287	2.5
Extreme (10C)	1880	14.2	0.007561	2.5
Extreme (0C)	1880	12.5	0.006662	2.5
Extreme (-10C)	1880	12.7	0.006767	2.5
Extreme (-20C)	1880	13.7	0.007305	2.5
Extreme (-30C)	1880	14.8	0.007848	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	10.1	0.005346	2.5
3.87	1880	8.4	0.004469	2.5
4.40	1880	8.4	0.004461	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.7	0.005154	2.5
Extreme (50C)	1880	8.5	0.004538	2.5
Extreme (40C)	1880	8.1	0.004295	2.5
Extreme (30C)	1880	8.9	0.004711	2.5
Extreme (10C)	1880	8.5	0.004527	2.5
Extreme (0C)	1880	8.2	0.004343	2.5
Extreme (-10C)	1880	9.0	0.004788	2.5
Extreme (-20C)	1880	8.7	0.004645	2.5
Extreme (-30C)	1880	7.8	0.004147	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	8.4	0.004865	2.5
3.87	1732.5	9.1	0.005278	2.5
4.40	1732.5	8.7	0.005000	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.3	0.004777	2.5
Extreme (50C)	1732.5	9.3	0.005363	2.5
Extreme (40C)	1732.5	7.5	0.004335	2.5
Extreme (30C)	1732.5	6.3	0.003623	2.5
Extreme (10C)	1732.5	7.2	0.004185	2.5
Extreme (0C)	1732.5	9.9	0.005688	2.5
Extreme (-10C)	1732.5	8.6	0.004983	2.5
Extreme (-20C)	1732.5	7.1	0.004100	2.5
Extreme (-30C)	1732.5	8.6	0.004978	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	9.5	0.005491	2.5
3.87	1732.5	8.7	0.005026	2.5
4.40	1732.5	8.3	0.004807	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	9.9	0.005714	2.5
Extreme (50C)	1732.5	8.7	0.005027	2.5
Extreme (40C)	1732.5	7.9	0.004562	2.5
Extreme (30C)	1732.5	9.4	0.005411	2.5
Extreme (10C)	1732.5	9.4	0.005397	2.5
Extreme (0C)	1732.5	7.7	0.004441	2.5
Extreme (-10C)	1732.5	9.3	0.005386	2.5
Extreme (-20C)	1732.5	9.2	0.005316	2.5
Extreme (-30C)	1732.5	8.4	0.004830	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	5.8	0.006915	2.5
3.87	836.5	6.7	0.008014	2.5
4.40	836.5	4.8	0.005785	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	5.9	0.006999	2.5
Extreme (50C)	836.5	5.6	0.006709	2.5
Extreme (40C)	836.5	5.6	0.006735	2.5
Extreme (30C)	836.5	6.1	0.007310	2.5
Extreme (10C)	836.5	5.6	0.006701	2.5
Extreme (0C)	836.5	5.5	0.006518	2.5
Extreme (-10C)	836.5	5.9	0.007081	2.5
Extreme (-20C)	836.5	6.5	0.007794	2.5
Extreme (-30C)	836.5	6.6	0.007900	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	5.8	0.006982	2.5
3.87	836.5	6.9	0.008284	2.5
4.40	836.5	4.6	0.005486	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.6	0.007857	2.5
Extreme (50C)	836.5	6.1	0.007285	2.5
Extreme (40C)	836.5	5.9	0.007027	2.5
Extreme (30C)	836.5	6.1	0.007301	2.5
Extreme (10C)	836.5	5.1	0.006042	2.5
Extreme (0C)	836.5	4.9	0.005809	2.5
Extreme (-10C)	836.5	5.4	0.006398	2.5
Extreme (-20C)	836.5	6.3	0.007491	2.5
Extreme (-30C)	836.5	6.0	0.007211	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	10.3	0.004065	2.5
3.87	2535	9.0	0.003534	2.5
4.40	2535	8.5	0.003343	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	9.6	0.003805	2.5
Extreme (50C)	2535	8.7	0.003422	2.5
Extreme (40C)	2535	8.8	0.003464	2.5
Extreme (30C)	2535	9.4	0.003702	2.5
Extreme (10C)	2535	7.6	0.003012	2.5
Extreme (0C)	2535	8.7	0.003444	2.5
Extreme (-10C)	2535	9.1	0.003581	2.5
Extreme (-20C)	2535	9.3	0.003656	2.5
Extreme (-30C)	2535	8.5	0.003366	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	6.3	0.002478	2.5
3.87	2535	6.2	0.002449	2.5
4.40	2535	6.1	0.002420	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	6.6	0.002600	2.5
Extreme (50C)	2535	5.7	0.002255	2.5
Extreme (40C)	2535	5.7	0.002251	2.5
Extreme (30C)	2535	6.8	0.002674	2.5
Extreme (10C)	2535	5.8	0.002287	2.5
Extreme (0C)	2535	5.0	0.001961	2.5
Extreme (-10C)	2535	5.5	0.002154	2.5
Extreme (-20C)	2535	5.9	0.002335	2.5
Extreme (-30C)	2535	5.8	0.002285	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	9.1	0.012830	2.5
3.87	707.5	10.3	0.014528	2.5
4.40	707.5	8.7	0.012355	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	9.0	0.012726	2.5
Extreme (50C)	707.5	7.3	0.010307	2.5
Extreme (40C)	707.5	7.1	0.010017	2.5
Extreme (30C)	707.5	8.4	0.011808	2.5
Extreme (10C)	707.5	7.0	0.009960	2.5
Extreme (0C)	707.5	9.0	0.012766	2.5
Extreme (-10C)	707.5	8.8	0.012412	2.5
Extreme (-20C)	707.5	8.7	0.012309	2.5
Extreme (-30C)	707.5	8.1	0.011437	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	7.3	0.010251	2.5
3.87	707.5	7.9	0.011200	2.5
4.40	707.5	7.7	0.010830	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.

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	10.2	0.014306	2.5
3.87	710.0	9.1	0.012781	2.5
4.40	710.0	7.8	0.010963	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.7	0.013614	2.5
Extreme (50C)	710.0	9.4	0.013189	2.5
Extreme (40C)	710.0	7.8	0.010924	2.5
Extreme (30C)	710.0	9.4	0.013291	2.5
Extreme (10C)	710.0	9.0	0.012627	2.5
Extreme (0C)	710.0	8.1	0.011360	2.5
Extreme (-10C)	710.0	9.0	0.012689	2.5
Extreme (-20C)	710.0	9.0	0.012619	2.5
Extreme (-30C)	710.0	8.3	0.011627	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	10.1	0.014184	2.5
3.87	710.0	8.8	0.012401	2.5
4.40	710.0	8.5	0.011921	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.4	0.013263	2.5
Extreme (50C)	710.0	8.5	0.012012	2.5
Extreme (40C)	710.0	8.6	0.012157	2.5
Extreme (30C)	710.0	8.5	0.011963	2.5
Extreme (10C)	710.0	7.9	0.011147	2.5
Extreme (0C)	710.0	8.5	0.011914	2.5
Extreme (-10C)	710.0	8.9	0.012536	2.5
Extreme (-20C)	710.0	9.1	0.012774	2.5
Extreme (-30C)	710.0	8.0	0.011331	2.5

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

10.7 LTE BAND 41

Band 41 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	2593	8.4	0.003256	2.5
3.87	2593	6.7	0.002573	2.5
4.40	2593	8.0	0.003084	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2593	7.3	0.002821	2.5
Extreme (50C)	2593	4.4	0.001684	2.5
Extreme (40C)	2593	5.5	0.002121	2.5
Extreme (30C)	2593	4.9	0.001899	2.5
Extreme (10C)	2593	6.2	0.002394	2.5
Extreme (0C)	2593	4.8	0.001856	2.5
Extreme (-10C)	2593	9.1	0.003527	2.5
Extreme (-20C)	2593	10.4	0.003994	2.5
Extreme (-30C)	2593	6.4	0.002469	2.5

Band 41 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	2593	8.3	0.003204	2.5
3.87	2593	6.7	0.002572	2.5
4.40	2593	6.7	0.002571	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2593	7.1	0.002738	2.5
Extreme (50C)	2593	4.7	0.001806	2.5
Extreme (40C)	2593	5.6	0.002141	2.5
Extreme (30C)	2593	4.3	0.001676	2.5
Extreme (10C)	2593	6.2	0.002379	2.5
Extreme (0C)	2593	5.2	0.002004	2.5
Extreme (-10C)	2593	9.1	0.003499	2.5
Extreme (-20C)	2593	10.8	0.004169	2.5
Extreme (-30C)	2593	6.1	0.002360	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.

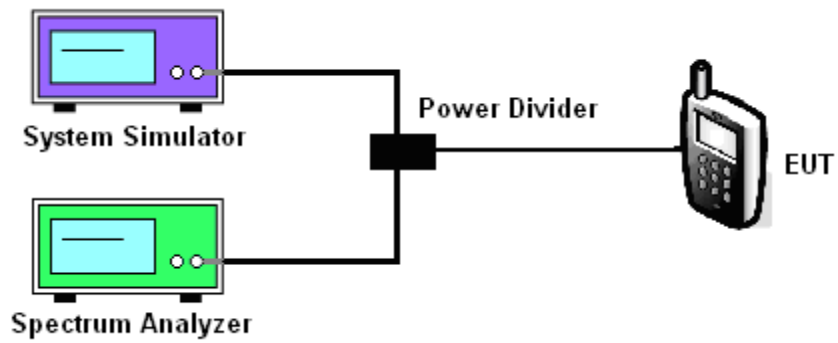
11.2 Measuring Instruments

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 2/4/5/7/12/17/41

Test data reference attachment.

-----END OF REPORT-----