

FCC eCFR 47 PART 22H, 24E, 27L CERTIFICATION TEST REPORT FCC ID: 2AX5VHUB4GNA

Product: Security control panel

Trade Mark: AJAX

Model No.: HB.4G.J-000-NA

Family Model: N/A

Report No.: S24012903202003

Issue Date: Feb 28, 2024

Prepared for

AJAX SYSTEMS CYPRUS HOLDINGS LTD

Ifigeneias, 17, Strovolos, 2007, Nicosia, Cyprus

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name : AJAX SYSTEMS CYPRUS HOLDINGS LTD
Address..... : Ifigeneias, 17, Strovolos, 2007, Nicosia, Cyprus
Manufacturer's Name..... : "AJAX SYSTEMS MANUFACTURING" LIMITED LIABILITY COMPANY
Address..... : Sklyarenka, 5, Kyiv, 04073, Ukraine
Factory (1)..... : "AJAX SYSTEMS MANUFACTURING" LIMITED LIABILITY COMPANY
Address..... : Sklyarenka, 5, Kyiv, 04073, Ukraine
Factory (2)..... : "AJAX TURKEY ELEKTRONİK TİCARET" ANONİM ŞİRKETİ
Address..... : Aydınlı Sb Mah. 4.Sk. Desbaş 6 Blok No: 4 İc Kapi No: Z01 Tuzla / İstanbul
Product name..... : Security control panel
Model and/or type reference .. : HB.4G.J-000-NA
Family Model..... : N/A
Test Sample Number : S240129032002
Date of Test..... : Jan 29, 2024~ Feb 28, 2024
Standards..... : FCC eCFR 47 Part 22H, Part 24E, Part 27L
Test procedure ANSI C63.26:2015

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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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Security control panel
Trade Mark	
Model Name	HB.4G.J-000-NA
Family Model	N/A
Model Difference	N/A
FCC ID:	2AX5VHUB4GNA
Frequency Bands:	U.S. Bands: <input checked="" type="checkbox"/> LTE FDD Band 2,4,5,7,66,
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 66 Uplink: 1710MHz-1780MHz, Downlink: 2110MHz-2200MHz;
Type of Modulation:	QPSK/16QAM/64QAM(Only Downlink)
Power Class	Class 3
Antenna:	Flexible multiband Antenna
Antenna gain:	3 dBi
Battery	DC 3.7V, 3000mAh, 11.1Wh
Adapter	N/A
Power Rating	AC 110–240V, 50/60Hz or DC 3.7V from battery
Extreme Vol. Limits:	DC 3.15V to DC 4.26V (Nominal DC 3.7V) (Note 1)
HW Version	HB3.002.MBR.001v1 HB2.001.PWB.001v4 HB2.002.ANT.001v3
FW Version	NA
SW Version	x.xx
** Note1: The High Voltage DC 4.26V and Low Voltage 3.15V 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: 2AX5VHUB4GNA** filing to comply with the FCC Part 22H&24E&27L.

1.3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, Part 22H, Part 24E, Part 27L,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 2/4/5/7/66

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

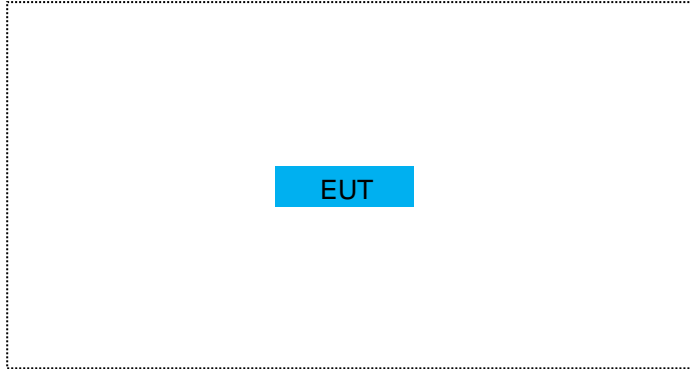
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Security control panel	HB.4G.J-000-NA	FCC ID: 2AX5VHUB4GNA	EUT

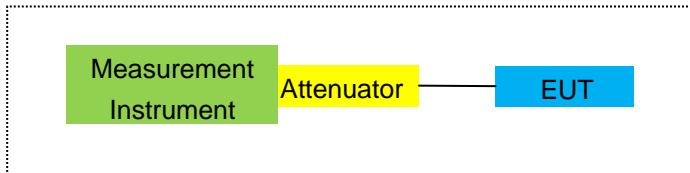
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

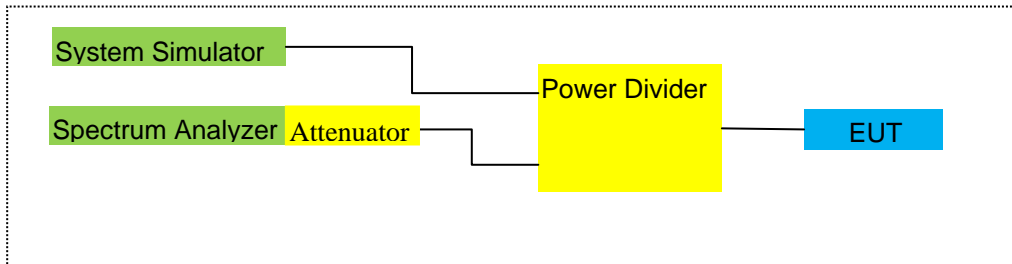
For Radiated Test Cases



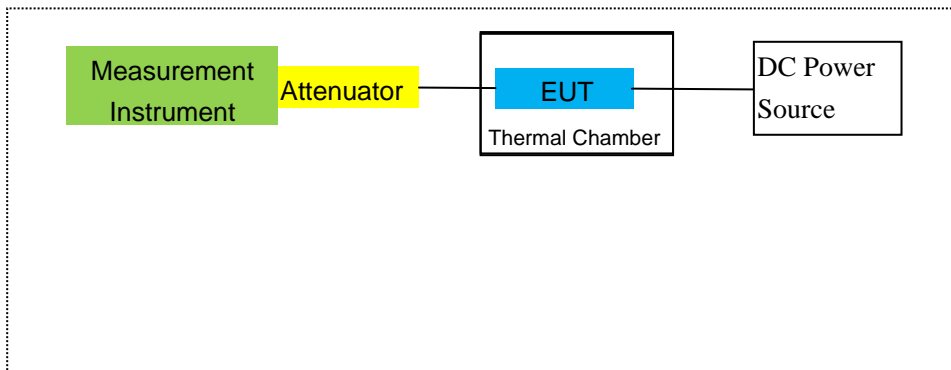
For Conducted Output Power



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	2023.03.27	2024.03.26	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2023.03.16	2024.03.15	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	2022.03.31	2025.03.30	3 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2022.11.07	2025.11.06	3 year
7	Amplifier	EM	EM-30180	060538	2023.05.29	2024.05.28	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2023.11.03	2026.11.02	3 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	2023.05.29	2024.05.28	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	2023.03.27	2024.03.26	1 year
15	LISN	R&S	ENV216	101313	2023.03.27	2024.03.26	1 year
16	LISN	EMCO	3816/2	00042990	2023.03.27	2024.03.26	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2023.03.27	2024.03.26	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2023.03.27	2024.03.26	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	2023.03.27	2024.03.26	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2023.03.27	2024.03.26	1 year
24	test receiver	R&S	ESCI	a0304218	2023.03.27	2024.03.26	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	2023.03.27	2024.03.26	1 year
27	DC Power Source	N/A	PS-6005D	2017040292 3	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	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 2/4/5/7/66

RESULTS

PASS

Test data reference attachment.

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

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

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 2/4/5/7/66

RESULTS

Test data reference attachment.

7. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §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 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 2/4/5/7/66

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.

24.232(c) The maximum output power of the transmitter for mobile and portable stations are limited to 2 watts EIRP.

TEST PROCEDURE

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 2/4/5/7/66

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 Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1850.7	-0.06	3.76	28.24	24.42	276.694	Horizontal	Pass
		1880	1.92	3.91	28.22	26.23	419.759	Horizontal	Pass
		1909.3	1.68	3.93	28.20	25.95	393.550	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	0.76	3.77	28.23	25.22	332.660	Horizontal	Pass
		1880	2.35	3.91	28.24	26.68	465.586	Horizontal	Pass
		1908.5	1.95	3.94	28.25	26.26	422.669	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-0.19	3.77	28.31	24.35	272.270	Horizontal	Pass
		1880	1.45	3.91	28.22	25.76	376.704	Horizontal	Pass
		1907.5	1.36	3.94	28.20	25.62	364.754	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-0.08	3.79	28.33	24.46	279.254	Horizontal	Pass
		1880	1.80	3.95	28.22	26.07	404.576	Horizontal	Pass
		1905	1.89	3.97	28.19	26.11	408.319	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-0.23	3.79	28.34	24.32	270.396	Horizontal	Pass
		1880	1.67	3.95	28.22	25.94	392.645	Horizontal	Pass
		1902.5	1.75	3.97	28.18	25.96	394.457	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	0.19	3.81	28.35	24.73	297.167	Horizontal	Pass
		1880	1.91	3.96	28.22	26.17	414.000	Horizontal	Pass
		1900	1.88	4.00	28.16	26.04	401.791	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	0.73	3.76	28.24	25.21	331.894	Vertical	Pass
		1880	1.40	3.91	28.22	25.71	372.392	Vertical	Pass
		1909.3	1.25	3.93	28.20	25.52	356.451	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	1.04	3.77	28.23	25.50	354.813	Vertical	Pass
		1880	1.34	3.91	28.24	25.67	368.978	Vertical	Pass
		1908.5	1.50	3.94	28.25	25.81	381.066	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	1.33	3.77	28.31	25.87	386.367	Vertical	Pass
		1880	1.02	3.91	28.22	25.33	341.193	Vertical	Pass
		1907.5	1.39	3.94	28.20	25.65	367.282	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	1.26	3.79	28.33	25.80	380.189	Vertical	Pass
		1880	1.33	3.95	28.22	25.60	363.078	Vertical	Pass
		1905	1.32	3.97	28.19	25.54	358.096	Vertical	Pass

15.0MHz Band QPSK	1/#Mid	1857.5	0.90	3.79	28.34	25.45	350.752	Vertical	Pass
		1880	1.73	3.95	28.22	26.00	398.107	Vertical	Pass
		1902.5	0.82	3.97	28.18	25.03	318.420	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	1860	0.74	3.81	28.35	25.28	337.287	Vertical	Pass
		1880	1.52	3.96	28.22	25.78	378.443	Vertical	Pass
		1900	1.32	4.00	28.16	25.48	353.183	Vertical	Pass

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result					Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)		
1.4MHz Band 16 QAM	1/#Mid	1850.7	-0.27	3.76	28.24	24.21	263.633	Horizontal	Pass
		1880	1.07	3.91	28.22	25.38	345.144	Horizontal	Pass
		1909.3	0.62	3.93	28.20	24.89	308.319	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	0.13	3.77	28.23	24.59	287.740	Horizontal	Pass
		1880	1.20	3.91	28.24	25.53	357.273	Horizontal	Pass
		1908.5	1.34	3.94	28.25	25.65	367.282	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-0.58	3.77	28.31	23.96	248.886	Horizontal	Pass
		1880	0.83	3.91	28.22	25.14	326.588	Horizontal	Pass
		1907.5	0.68	3.94	28.20	24.94	311.889	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-0.57	3.79	28.33	23.97	249.459	Horizontal	Pass
		1880	0.99	3.95	28.22	25.26	335.738	Horizontal	Pass
		1905	0.85	3.97	28.19	25.07	321.366	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-0.78	3.79	28.34	23.77	238.232	Horizontal	Pass
		1880	0.91	3.95	28.22	25.18	329.610	Horizontal	Pass
		1902.5	0.94	3.97	28.18	25.15	327.341	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-0.40	3.81	28.35	24.14	259.418	Horizontal	Pass
		1880	1.11	3.96	28.22	25.37	344.350	Horizontal	Pass
		1900	1.12	4.00	28.16	25.28	337.287	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	0.07	3.76	28.24	24.55	285.102	Vertical	Pass
		1880	0.25	3.91	28.22	24.56	285.759	Vertical	Pass
		1909.3	0.08	3.93	28.20	24.35	272.270	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-0.27	3.77	28.23	24.19	262.422	Vertical	Pass
		1880	-0.20	3.91	28.24	24.13	258.821	Vertical	Pass
		1908.5	-0.17	3.94	28.25	24.14	259.418	Vertical	Pass
5.0MHz	1/#Mid	1852.5	0.19	3.77	28.31	24.73	297.167	Vertical	Pass

Band 16 QAM		1880	-0.09	3.91	28.22	24.22	264.241	Vertical	Pass
		1907.5	0.24	3.94	28.20	24.50	281.838	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-0.38	3.79	28.33	24.16	260.615	Vertical	Pass
		1880	0.24	3.95	28.22	24.51	282.488	Vertical	Pass
		1905	0.46	3.97	28.19	24.68	293.765	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	0.19	3.79	28.34	24.74	297.852	Vertical	Pass
		1880	0.02	3.95	28.22	24.29	268.534	Vertical	Pass
		1902.5	0.73	3.97	28.18	24.94	311.889	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	0.31	3.81	28.35	24.85	305.492	Vertical	Pass
		1880	0.19	3.96	28.22	24.45	278.612	Vertical	Pass
		1900	0.69	4.00	28.16	24.85	305.492	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 (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1710.7	1.63	3.12	27.58	26.09	406.443	Horizontal	Pass
		1732.5	0.37	3.27	27.61	24.71	295.801	Horizontal	Pass
		1754.3	1.28	3.29	27.63	25.62	364.754	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	1.87	3.13	27.61	26.35	431.519	Horizontal	Pass
		1732.5	0.91	3.27	27.61	25.25	334.965	Horizontal	Pass
		1753.5	1.65	3.30	27.62	25.97	395.367	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	1.00	3.13	27.63	25.50	354.813	Horizontal	Pass
		1732.5	0.14	3.27	27.61	24.48	280.543	Horizontal	Pass
		1752.5	1.25	3.30	27.60	25.55	358.922	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	0.91	3.15	27.64	25.40	346.737	Horizontal	Pass
		1732.5	0.47	3.31	27.61	24.77	299.916	Horizontal	Pass
		1750	1.84	3.33	27.59	26.10	407.380	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	0.72	3.15	27.65	25.22	332.660	Horizontal	Pass
		1732.5	0.33	3.31	27.61	24.63	290.402	Horizontal	Pass
		1747.5	1.76	3.33	27.57	26.00	398.107	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	0.77	3.17	27.66	25.26	335.738	Horizontal	Pass
		1732.5	0.56	3.32	27.61	24.85	305.492	Horizontal	Pass
		1745	2.02	3.36	27.56	26.22	418.794	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	0.58	3.12	27.58	25.04	319.154	Vertical	Pass
		1732.5	0.80	3.27	27.61	25.14	326.588	Vertical	Pass
		1754.3	1.08	3.29	27.63	25.42	348.337	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	1.11	3.13	27.61	25.59	362.243	Vertical	Pass
		1732.5	1.21	3.27	27.61	25.55	358.922	Vertical	Pass
		1753.5	0.87	3.30	27.62	25.19	330.370	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	0.93	3.13	27.63	25.43	349.140	Vertical	Pass
		1732.5	0.94	3.27	27.61	25.28	337.287	Vertical	Pass
		1752.5	1.60	3.30	27.60	25.90	389.045	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	0.83	3.15	27.64	25.32	340.408	Vertical	Pass
		1732.5	0.76	3.31	27.61	25.06	320.627	Vertical	Pass
		1750	1.62	3.33	27.59	25.88	387.258	Vertical	Pass

15.0MHz Band QPSK	1/#Mid	1717.5	0.80	3.15	27.65	25.30	338.844	Vertical	Pass
		1732.5	1.16	3.31	27.61	25.46	351.560	Vertical	Pass
		1747.5	1.48	3.33	27.57	25.72	373.250	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	1720	0.83	3.17	27.66	25.32	340.408	Vertical	Pass
		1732.5	1.47	3.32	27.61	25.76	376.704	Vertical	Pass
		1745	1.12	3.36	27.56	25.32	340.408	Vertical	Pass

Radiated Power (EIRP) for Band 4										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
1.4MHz Band 16 QAM	1/#Mid	1710.7	0.72	3.12	27.58	25.18	329.610	Horizontal	Pass	
		1732.5	-0.34	3.27	27.61	24.00	251.189	Horizontal	Pass	
		1754.3	0.18	3.29	27.63	24.52	283.139	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	1711.5	1.27	3.13	27.61	25.75	375.837	Horizontal	Pass	
		1732.5	0.12	3.27	27.61	24.46	279.254	Horizontal	Pass	
		1753.5	0.61	3.30	27.62	24.93	311.172	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	1712.5	0.53	3.13	27.63	25.03	318.420	Horizontal	Pass	
		1732.5	-0.48	3.27	27.61	23.86	243.220	Horizontal	Pass	
		1752.5	0.62	3.30	27.60	24.92	310.456	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	1715	0.33	3.15	27.64	24.82	303.389	Horizontal	Pass	
		1732.5	-0.10	3.31	27.61	24.20	263.027	Horizontal	Pass	
		1750	0.68	3.33	27.59	24.94	311.889	Horizontal	Pass	
15.0MHz Band 16 QAM	1/#Mid	1717.5	0.27	3.15	27.65	24.77	299.916	Horizontal	Pass	
		1732.5	-0.40	3.31	27.61	23.90	245.471	Horizontal	Pass	
		1747.5	1.06	3.33	27.57	25.30	338.844	Horizontal	Pass	
20.0MHz Band 16 QAM	1/#Mid	1720	0.18	3.17	27.66	24.67	293.089	Horizontal	Pass	
		1732.5	-0.12	3.32	27.61	24.17	261.216	Horizontal	Pass	
		1745	1.34	3.36	27.56	25.54	358.096	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	1710.7	-0.21	3.12	27.58	24.25	266.073	Vertical	Pass	
		1732.5	0.59	3.27	27.61	24.93	311.172	Vertical	Pass	
		1754.3	-0.23	3.29	27.63	24.11	257.632	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	1711.5	-0.01	3.13	27.61	24.47	279.898	Vertical	Pass	
		1732.5	0.65	3.27	27.61	24.99	315.500	Vertical	Pass	
		1753.5	0.58	3.30	27.62	24.90	309.030	Vertical	Pass	
5.0MHz	1/#Mid	1712.5	0.07	3.13	27.63	24.57	286.418	Vertical	Pass	

Band 16		1732.5	-0.19	3.27	27.61	24.15	260.016	Vertical	Pass
QAM		1752.5	0.46	3.30	27.60	24.76	299.226	Vertical	Pass
10.0MHz	1/#Mid	1715	-0.44	3.15	27.64	24.05	254.097	Vertical	Pass
Band 16		1732.5	-0.27	3.31	27.61	24.03	252.930	Vertical	Pass
QAM		1750	0.34	3.33	27.59	24.60	288.403	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-0.16	3.15	27.65	24.34	271.644	Vertical	Pass
Band 16		1732.5	0.60	3.31	27.61	24.90	309.030	Vertical	Pass
QAM		1747.5	0.72	3.33	27.57	24.96	313.329	Vertical	Pass
20.0MHz	1/#Mid	1720	-0.41	3.17	27.66	24.08	255.859	Vertical	Pass
Band 16		1732.5	0.63	3.32	27.61	24.92	310.456	Vertical	Pass
QAM		1745	0.12	3.36	27.56	24.32	270.396	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 (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	3/#Mid	824.7	10.74	2.01	19.68	2.15	26.26	422.669	Horizontal	Pass
		836.5	10.49	2.01	19.77	2.15	26.10	407.380	Horizontal	Pass
		848.3	10.27	2.02	19.82	2.15	25.92	390.841	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	825.5	11.08	2.01	19.70	2.15	26.62	459.198	Horizontal	Pass
		836.5	10.81	2.01	19.77	2.15	26.42	438.531	Horizontal	Pass
		847.5	10.60	2.02	19.81	2.15	26.24	420.727	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	826.5	10.43	2.01	19.71	2.15	25.98	396.278	Horizontal	Pass
		836.5	10.09	2.01	19.77	2.15	25.70	371.535	Horizontal	Pass
		846.5	9.96	2.02	19.79	2.15	25.58	361.410	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	829	10.78	2.01	19.73	2.15	26.35	431.519	Horizontal	Pass
		836.5	10.48	2.01	19.77	2.15	26.09	406.443	Horizontal	Pass
		844	10.41	2.02	19.78	2.15	26.02	399.945	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	824.7	9.23	2.01	19.68	2.15	24.75	298.538	Vertical	Pass
		836.5	9.59	2.01	19.77	2.15	25.20	331.131	Vertical	Pass
		848.3	9.56	2.02	19.82	2.15	25.21	331.894	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	825.5	10.00	2.01	19.70	2.15	25.54	358.096	Vertical	Pass
		836.5	10.26	2.01	19.77	2.15	25.87	386.367	Vertical	Pass
		847.5	8.44	2.02	19.81	2.15	24.08	255.859	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	826.5	10.23	2.01	19.71	2.15	25.78	378.443	Vertical	Pass
		836.5	8.65	2.01	19.77	2.15	24.26	266.686	Vertical	Pass
		846.5	8.56	2.02	19.79	2.15	24.18	261.818	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	829	10.41	2.01	19.73	2.15	25.98	396.278	Vertical	Pass
		836.5	9.63	2.01	19.77	2.15	25.24	334.195	Vertical	Pass
		844	9.41	2.02	19.78	2.15	25.02	317.687	Vertical	Pass

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	3/#Mid	824.7	10.00	2.01	19.68	2.15	25.52	356.451	Horizontal	Pass
		836.5	9.85	2.01	19.77	2.15	25.46	351.560	Horizontal	Pass
		848.3	9.20	2.02	19.82	2.15	24.85	305.492	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	10.52	2.01	19.70	2.15	26.06	403.645	Horizontal	Pass
		836.5	10.10	2.01	19.77	2.15	25.71	372.392	Horizontal	Pass
		847.5	9.53	2.02	19.81	2.15	25.17	328.852	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	10.04	2.01	19.71	2.15	25.59	362.243	Horizontal	Pass
		836.5	9.49	2.01	19.77	2.15	25.10	323.594	Horizontal	Pass
		846.5	9.36	2.02	19.79	2.15	24.98	314.775	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	829	10.36	2.01	19.73	2.15	25.93	391.742	Horizontal	Pass
		836.5	9.76	2.01	19.77	2.15	25.37	344.350	Horizontal	Pass
		844	9.36	2.02	19.78	2.15	24.97	314.051	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	824.7	9.45	2.01	19.68	2.15	24.97	314.051	Vertical	Pass
		836.5	8.73	2.01	19.77	2.15	24.34	271.644	Vertical	Pass
		848.3	8.93	2.02	19.82	2.15	24.58	287.078	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	10.32	2.01	19.70	2.15	25.86	385.478	Vertical	Pass
		836.5	8.82	2.01	19.77	2.15	24.43	277.332	Vertical	Pass
		847.5	9.76	2.02	19.81	2.15	25.40	346.737	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	10.25	2.01	19.71	2.15	25.80	380.189	Vertical	Pass
		836.5	9.93	2.01	19.77	2.15	25.54	358.096	Vertical	Pass
		846.5	8.80	2.02	19.79	2.15	24.42	276.694	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	829	9.32	2.01	19.73	2.15	24.89	308.319	Vertical	Pass
		836.5	9.75	2.01	19.77	2.15	25.36	343.558	Vertical	Pass
		844	9.75	2.02	19.78	2.15	25.36	343.558	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 Loss	Antenna Gain	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	Average	Average	Of Max. ERP	
						(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	3.33	4.54	27.75	26.54	450.817	Horizontal	Pass
		2535	2.86	4.69	27.72	25.89	388.150	Horizontal	Pass
		2567.5	2.14	4.71	27.71	25.14	326.588	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	3.18	4.55	27.76	26.39	435.512	Horizontal	Pass
		2535	2.93	4.69	27.72	25.96	394.457	Horizontal	Pass
		2565	2.01	4.72	27.70	24.99	315.500	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	2.72	4.55	27.77	25.94	392.645	Horizontal	Pass
		2535	2.70	4.69	27.72	25.73	374.111	Horizontal	Pass
		2562.5	1.68	4.72	27.69	24.65	291.743	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	3.25	4.57	27.78	26.46	442.588	Horizontal	Pass
		2535	3.05	4.73	27.72	26.04	401.791	Horizontal	Pass
		2560	2.12	4.75	27.68	25.05	319.890	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	2.08	4.54	27.75	25.29	338.065	Vertical	Pass
		2535	2.53	4.69	27.72	25.56	359.749	Vertical	Pass
		2567.5	2.32	4.71	27.71	25.32	340.408	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	2.47	4.55	27.76	25.68	369.828	Vertical	Pass
		2535	2.78	4.69	27.72	25.81	381.066	Vertical	Pass
		2565	2.92	4.72	27.70	25.90	389.045	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	2.54	4.55	27.77	25.76	376.704	Vertical	Pass
		2535	2.22	4.69	27.72	25.25	334.965	Vertical	Pass
		2562.5	2.91	4.72	27.69	25.88	387.258	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	2.77	4.57	27.78	25.98	396.278	Vertical	Pass
		2535	2.73	4.73	27.72	25.72	373.250	Vertical	Pass
		2560	3.04	4.75	27.68	25.97	395.367	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Gain	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			Average	Average		
				(dBm)	(dB)	(dBm)	(mW)		
5.0MHz Band 16 QAM	1/#Mid	2502.5	2.72	4.54	27.75	25.93	391.742	Horizontal	Pass
		2535	2.22	4.69	27.72	25.25	334.965	Horizontal	Pass
		2567.5	1.71	4.71	27.71	24.71	295.801	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	2.73	4.55	27.76	25.94	392.645	Horizontal	Pass
		2535	1.12	4.69	27.72	24.15	260.016	Horizontal	Pass
		2565	0.95	4.72	27.70	23.93	247.172	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	2.22	4.55	27.77	25.44	349.945	Horizontal	Pass
		2535	2.09	4.69	27.72	25.12	325.087	Horizontal	Pass
		2562.5	0.92	4.72	27.69	23.89	244.906	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	2.33	4.57	27.78	25.54	358.096	Horizontal	Pass
		2535	2.50	4.73	27.72	25.49	353.997	Horizontal	Pass
		2560	1.42	4.75	27.68	24.35	272.270	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	0.95	4.54	27.75	24.16	260.615	Vertical	Pass
		2535	1.27	4.69	27.72	24.30	269.153	Vertical	Pass
		2567.5	1.81	4.71	27.71	24.81	302.691	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	1.97	4.55	27.76	25.18	329.610	Vertical	Pass
		2535	2.62	4.69	27.72	25.65	367.282	Vertical	Pass
		2565	2.99	4.72	27.70	25.97	395.367	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	2.29	4.55	27.77	25.51	355.631	Vertical	Pass
		2535	2.22	4.69	27.72	25.25	334.965	Vertical	Pass
		2562.5	1.68	4.72	27.69	24.65	291.743	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	1.02	4.57	27.78	24.23	264.850	Vertical	Pass
		2535	1.71	4.73	27.72	24.70	295.121	Vertical	Pass
		2560	2.39	4.75	27.68	25.32	340.408	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.9 LTE BAND 66

Radiated Power (EIRP) for Band 66									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1710.7	1.94	3.76	28.24	26.42	438.531	Horizontal	Pass
		1745	2.14	3.91	28.22	26.45	441.570	Horizontal	Pass
		1779.3	1.92	3.93	28.2	26.19	415.911	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	2.18	3.77	28.23	26.64	461.318	Horizontal	Pass
		1745	2.61	3.91	28.24	26.94	494.311	Horizontal	Pass
		1778.5	2.12	3.94	28.25	26.43	439.542	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	1.44	3.77	28.31	25.98	396.278	Horizontal	Pass
		1745	1.98	3.91	28.22	26.29	425.598	Horizontal	Pass
		1777.5	1.62	3.94	28.2	25.88	387.258	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	1.39	3.79	28.33	25.93	391.742	Horizontal	Pass
		1745	2.17	3.95	28.22	26.44	440.555	Horizontal	Pass
		1775	2.10	3.97	28.19	26.32	428.549	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	1.19	3.79	28.34	25.74	374.973	Horizontal	Pass
		1745	2.11	3.95	28.22	26.38	434.510	Horizontal	Pass
		1772.5	1.83	3.97	28.18	26.04	401.791	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	1.50	3.81	28.35	26.04	401.791	Horizontal	Pass
		1745	2.37	3.96	28.22	26.63	460.257	Horizontal	Pass
		1770	2.08	4	28.16	26.24	420.727	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	1.14	3.76	28.24	25.62	364.754	Vertical	Pass
		1745	1.04	3.91	28.22	25.35	342.768	Vertical	Pass
		1779.3	1.38	3.93	28.2	25.65	367.282	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	0.62	3.77	28.23	25.08	322.107	Vertical	Pass
		1745	1.22	3.91	28.24	25.55	358.922	Vertical	Pass
		1778.5	1.37	3.94	28.25	25.68	369.828	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	1.33	3.77	28.31	25.87	386.367	Vertical	Pass
		1745	0.76	3.91	28.22	25.07	321.366	Vertical	Pass
		1777.5	1.19	3.94	28.2	25.45	350.752	Vertical	Pass
10.0MHz	1/#Mid	1715	0.63	3.79	28.34	25.18	329.610	Vertical	Pass

Band QPSK		1745	1.62	3.95	28.22	25.89	388.150	Vertical	Pass
		1775	0.82	3.97	28.18	25.03	318.420	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	1.02	3.81	28.35	25.56	359.749	Vertical	Pass
		1745	1.42	3.96	28.22	25.68	369.828	Vertical	Pass
		1772.5	1.28	4	28.16	25.44	349.945	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	1720	0.48	3.79	28.34	25.03	318.420	Vertical	Pass
		1745	1.48	3.95	28.22	25.75	375.837	Vertical	Pass
		1770	1.51	3.97	28.18	25.72	373.250	Vertical	Pass

Radiated Power (EIRP) for Band 66									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1710.7	1.08	3.76	28.24	25.56	359.749	Horizontal	Pass
		1745	1.40	3.91	28.22	25.71	372.392	Horizontal	Pass
		1779.3	0.92	3.93	28.2	25.19	330.370	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	1.71	3.77	28.23	26.17	414.000	Horizontal	Pass
		1745	1.56	3.91	28.24	25.89	388.150	Horizontal	Pass
		1778.5	1.64	3.94	28.25	25.95	393.550	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	0.99	3.77	28.31	25.53	357.273	Horizontal	Pass
		1745	1.35	3.91	28.22	25.66	368.129	Horizontal	Pass
		1777.5	1.04	3.94	28.2	25.30	338.844	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	0.88	3.79	28.33	25.42	348.337	Horizontal	Pass
		1745	1.51	3.95	28.22	25.78	378.443	Horizontal	Pass
		1775	0.93	3.97	28.19	25.15	327.341	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	0.74	3.79	28.34	25.29	338.065	Horizontal	Pass
		1745	1.39	3.95	28.22	25.66	368.129	Horizontal	Pass
		1772.5	1.00	3.97	28.18	25.21	331.894	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	0.79	3.81	28.35	25.33	341.193	Horizontal	Pass
		1745	1.69	3.96	28.22	25.95	393.550	Horizontal	Pass
		1770	1.30	4	28.16	25.46	351.560	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	0.54	3.76	28.24	25.02	317.687	Vertical	Pass
		1745	1.01	3.91	28.22	25.32	340.408	Vertical	Pass
		1779.3	0.43	3.93	28.2	24.70	295.121	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	1.27	3.77	28.23	25.73	374.111	Vertical	Pass
		1745	-0.08	3.91	28.24	24.25	266.073	Vertical	Pass
		1778.5	0.31	3.94	28.25	24.62	289.734	Vertical	Pass

5.0MHz	Band 16 QAM	1712.5	0.85	3.77	28.31	25.39	345.939	Vertical	Pass
		1745	1.21	3.91	28.22	25.52	356.451	Vertical	Pass
		1777.5	-0.19	3.94	28.2	24.07	255.270	Vertical	Pass
10.0MHz	Band 16 QAM	1715	-0.45	3.79	28.34	24.10	257.040	Vertical	Pass
		1745	0.67	3.95	28.22	24.94	311.889	Vertical	Pass
		1775	0.59	3.97	28.18	24.80	301.995	Vertical	Pass
15.0MHz	Band 16 QAM	1717.5	0.41	3.81	28.35	24.95	312.608	Vertical	Pass
		1745	0.04	3.96	28.22	24.30	269.153	Vertical	Pass
		1772.5	1.66	4	28.16	25.82	381.944	Vertical	Pass
20.0MHz	Band 16 QAM	1720	0.58	3.79	28.34	25.13	325.837	Vertical	Pass
		1745	1.52	3.95	28.22	25.79	379.315	Vertical	Pass
		1770	-0.04	3.97	28.18	24.17	261.216	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 2/4/5/7/66

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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3701.4	-53.63	4.04	33.51	-24.16	-13	-11.16	Horizontal
3701.4	-50.25	4.04	33.51	-20.78	-13	-7.78	Vertical
5552.1	-48.38	5.24	35.84	-17.78	-13	-4.78	Vertical
5552.1	-49.11	5.24	35.84	-18.51	-13	-5.51	Horizontal
198.2	-35.78	1.43	16.02	-21.19	-13	-8.19	Vertical
347.0	-35.42	1.30	17.99	-18.73	-13	-5.73	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-51.63	4.04	33.56	-22.11	-13	-9.11	Horizontal
3760.0	-49.14	4.04	33.56	-19.62	-13	-6.62	Vertical
5640.0	-48.45	5.24	35.91	-17.78	-13	-4.78	Vertical
5640.0	-49.57	5.24	35.91	-18.90	-13	-5.90	Horizontal
182.1	-37.29	1.62	16.97	-21.94	-13	-8.94	Vertical
461.2	-34.72	1.74	15.98	-20.49	-13	-7.49	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-51.60	4.04	34.00	-21.64	-13	-8.64	Horizontal
3818.6	-50.35	4.04	34.00	-20.39	-13	-7.39	Vertical
5727.9	-52.88	5.24	36.04	-22.08	-13	-9.08	Vertical
5727.9	-49.10	5.24	36.04	-18.30	-13	-5.30	Horizontal
209.9	-40.77	1.42	17.29	-24.90	-13	-11.90	Vertical
237.2	-34.73	1.50	17.90	-18.32	-13	-5.32	Horizontal

QPSK EIRP POWER FOR LTE BAND 2 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 1860MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720.0	-45.42	4.07	33.54	-15.95	-13	-2.95	Horizontal
3720.0	-49.82	4.07	33.54	-20.35	-13	-7.35	Vertical
5580.0	-47.85	5.28	35.86	-17.27	-13	-4.27	Vertical
5580.0	-53.18	5.28	35.86	-22.60	-13	-9.60	Horizontal
201.9	-42.95	1.58	16.89	-27.63	-13	-14.63	Vertical
294.4	-41.39	1.76	17.26	-25.89	-13	-12.89	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-53.58	4.04	33.56	-24.06	-13	-11.06	Horizontal
3760.0	-49.54	4.04	33.56	-20.02	-13	-7.02	Vertical
5640.0	-45.29	5.24	35.91	-14.62	-13	-1.62	Vertical
5640.0	-52.41	5.24	35.91	-21.74	-13	-8.74	Horizontal
177.6	-43.64	1.46	16.27	-28.83	-13	-15.83	Vertical
332.5	-43.91	1.59	15.15	-30.35	-13	-17.35	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-48.10	4.04	34.00	-18.14	-13	-5.14	Horizontal
3800.0	-45.70	4.04	34.00	-15.74	-13	-2.74	Vertical
5700.0	-51.44	5.24	36.04	-20.64	-13	-7.64	Vertical
5700.0	-51.24	5.24	36.04	-20.44	-13	-7.44	Horizontal
183.6	-37.87	1.36	17.39	-21.83	-13	-8.83	Vertical
398.9	-35.13	1.66	15.39	-21.40	-13	-8.40	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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-46.83	4.02	29.80	-21.05	-13	-8.05	Horizontal
3421.4	-47.24	4.02	29.80	-21.46	-13	-8.46	Vertical
5132.1	-50.85	5.24	35.84	-20.25	-13	-7.25	Vertical
5132.1	-52.46	5.24	35.84	-21.86	-13	-8.86	Horizontal
204.3	-39.95	1.68	16.04	-25.59	-13	-12.59	Vertical
326.2	-34.75	1.78	17.74	-18.79	-13	-5.79	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-44.86	4.03	30.00	-18.89	-13	-5.89	Horizontal
3465.0	-52.81	4.03	30.00	-26.84	-13	-13.84	Vertical
5197.5	-49.69	5.25	35.86	-19.08	-13	-6.08	Vertical
5197.5	-49.39	5.25	35.86	-18.78	-13	-5.78	Horizontal
175.8	-42.71	1.72	17.69	-26.74	-13	-13.74	Vertical
374.6	-44.73	1.62	16.02	-30.32	-13	-17.32	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-53.09	4.05	30.01	-27.13	-13	-14.13	Horizontal
3508.6	-49.76	4.05	30.01	-23.80	-13	-10.80	Vertical
5262.9	-50.25	5.26	35.86	-19.65	-13	-6.65	Vertical
5262.9	-53.07	5.26	35.86	-22.47	-13	-9.47	Horizontal
177.9	-39.24	1.80	16.69	-24.35	-13	-11.35	Vertical
465.2	-35.37	1.75	16.66	-20.47	-13	-7.47	Horizontal

QPSK EIRP POWER FOR LTE BAND 4 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 1720MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440.0	-45.35	4.02	29.80	-19.57	-13	-6.57	Horizontal
3440.0	-47.35	4.02	29.80	-21.57	-13	-8.57	Vertical
5160.0	-52.24	5.24	35.84	-21.64	-13	-8.64	Vertical
5160.0	-50.19	5.24	35.84	-19.59	-13	-6.59	Horizontal
207.9	-44.43	1.57	17.26	-28.74	-13	-15.74	Vertical
434.8	-34.12	1.78	16.35	-19.55	-13	-6.55	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-44.58	4.03	30.00	-18.61	-13	-5.61	Horizontal
3465.0	-50.16	4.03	30.00	-24.19	-13	-11.19	Vertical
5197.5	-46.57	5.25	35.86	-15.96	-13	-2.96	Vertical
5197.5	-51.13	5.25	35.86	-20.52	-13	-7.52	Horizontal
210.6	-36.10	1.44	17.95	-19.59	-13	-6.59	Vertical
356.2	-39.58	1.65	16.09	-25.14	-13	-12.14	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-53.29	2.91	27.68	-28.52	-13	-15.52	Horizontal
3490.0	-50.58	2.91	27.68	-25.81	-13	-12.81	Vertical
5235.0	-45.95	5.26	35.86	-15.35	-13	-2.35	Vertical
5235.0	-49.57	5.26	35.86	-18.97	-13	-5.97	Horizontal
196.6	-34.93	1.61	16.85	-19.69	-13	-6.69	Vertical
344.6	-41.71	1.61	15.19	-28.13	-13	-15.13	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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-48.72	2.78	27.50	-24.00	-13	-11.00	Horizontal
1649.4	-45.95	2.78	27.50	-21.23	-13	-8.23	Vertical
2474.1	-44.53	2.90	27.80	-19.63	-13	-6.63	Vertical
2474.1	-51.09	2.90	27.80	-26.19	-13	-13.19	Horizontal
187.3	-36.89	1.76	17.59	-21.06	-13	-8.06	Vertical
442.1	-42.36	1.63	15.87	-28.12	-13	-15.12	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-49.08	2.80	27.48	-24.40	-13	-11.40	Horizontal
1673.0	-53.10	2.80	27.48	-28.42	-13	-15.42	Vertical
2509.5	-48.87	2.91	27.70	-24.08	-13	-11.08	Vertical
2509.5	-52.59	2.91	27.70	-27.80	-13	-14.80	Horizontal
192.3	-34.98	1.61	15.68	-20.91	-13	-7.91	Vertical
409.2	-44.68	1.59	17.52	-28.76	-13	-15.76	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-46.66	2.82	27.43	-22.05	-13	-9.05	Horizontal
1696.6	-50.99	2.82	27.43	-26.38	-13	-13.38	Vertical
2544.9	-53.38	2.92	27.74	-28.56	-13	-15.56	Vertical
2544.9	-52.28	2.92	27.74	-27.46	-13	-14.46	Horizontal
197.7	-40.46	1.69	16.67	-25.47	-13	-12.47	Vertical
292.1	-41.69	1.70	17.18	-26.21	-13	-13.21	Horizontal

QPSK EIRP POWER FOR LTE BAND 5 (10MHZ BANDWIDTH)

Test Results for Low Channel 829MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1658.0	-48.18	2.78	27.50	-23.46	-13	-10.46	Horizontal
1658.0	-50.45	2.78	27.50	-25.73	-13	-12.73	Vertical
2487.0	-51.30	2.90	27.80	-26.40	-13	-13.40	Vertical
2487.0	-50.56	2.90	27.80	-25.66	-13	-12.66	Horizontal
193.4	-41.33	1.71	15.57	-27.47	-13	-14.47	Vertical
268.0	-42.24	1.34	16.40	-27.18	-13	-14.18	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-47.33	2.80	27.48	-22.65	-13	-9.65	Horizontal
1673.0	-44.35	2.80	27.48	-19.67	-13	-6.67	Vertical
2509.5	-47.45	2.91	27.70	-22.66	-13	-9.66	Vertical
2509.5	-51.62	2.91	27.70	-26.83	-13	-13.83	Horizontal
199.5	-39.37	1.44	17.04	-23.77	-13	-10.77	Vertical
319.0	-39.19	1.76	17.62	-23.33	-13	-10.33	Horizontal
Test Results for High Channel 844MHz							
1688.0	-46.99	2.82	27.43	-22.38	-13	-9.38	Horizontal
1688.0	-49.05	2.82	27.43	-24.44	-13	-11.44	Vertical
2532.0	-48.89	2.92	27.74	-24.07	-13	-11.07	Vertical
2532.0	-51.75	2.92	27.74	-26.93	-13	-13.93	Horizontal
189.1	-44.03	1.74	17.70	-28.07	-13	-15.07	Vertical
267.7	-42.67	1.41	17.46	-26.61	-13	-13.61	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	-62.88	5.23	35.81	-32.30	-25	-7.30	Horizontal
5005.0	-60.54	5.23	35.81	-29.96	-25	-4.96	Vertical
7507.5	-62.04	5.67	36.85	-30.86	-25	-5.86	Vertical
7507.5	-63.53	5.67	36.85	-32.35	-25	-7.35	Horizontal
197.7	-54.76	1.73	17.97	-38.52	-25	-13.52	Vertical
251.6	-44.89	1.38	15.11	-31.16	-25	-6.16	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-63.61	5.23	35.82	-33.02	-25	-8.02	Horizontal
5070.0	-64.30	5.23	35.82	-33.71	-25	-8.71	Vertical
7605.0	-63.60	5.67	36.85	-32.42	-25	-7.42	Vertical
7605.0	-59.65	5.67	36.85	-28.47	-25	-3.47	Horizontal
187.5	-52.46	1.77	16.17	-38.05	-25	-13.05	Vertical
463.1	-48.62	1.63	15.21	-35.04	-25	-10.04	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-61.20	5.24	35.83	-30.61	-25	-5.61	Horizontal
5135.0	-60.67	5.24	35.83	-30.08	-25	-5.08	Vertical
7702.5	-62.50	5.68	36.87	-31.31	-25	-6.31	Vertical
7702.5	-61.04	5.68	36.87	-29.85	-25	-4.85	Horizontal
178.3	-50.42	1.58	17.56	-34.44	-25	-9.44	Vertical
358.5	-49.65	1.45	16.58	-34.52	-25	-9.52	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	-62.87	5.23	35.82	-32.28	-25	-7.28	Horizontal
5020.0	-61.09	5.23	35.82	-30.50	-25	-5.50	Vertical
7530.0	-62.62	5.67	36.86	-31.43	-25	-6.43	Vertical
7530.0	-63.87	5.67	36.86	-32.68	-25	-7.68	Horizontal
189.4	-49.98	1.63	15.76	-35.85	-25	-10.85	Vertical
461.4	-47.99	1.71	15.44	-34.26	-25	-9.26	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-59.72	5.23	35.82	-29.13	-25	-4.13	Horizontal
5070.0	-59.08	5.23	35.82	-28.49	-25	-3.49	Vertical
7605.0	-59.34	5.67	36.85	-28.16	-25	-3.16	Vertical
7605.0	-59.72	5.67	36.85	-28.54	-25	-3.54	Horizontal
194.5	-48.40	1.79	16.84	-33.34	-25	-8.34	Vertical
334.3	-48.36	1.71	17.64	-32.43	-25	-7.43	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-61.34	5.24	35.83	-30.75	-25	-5.75	Horizontal
5120.0	-62.80	5.24	35.83	-32.21	-25	-7.21	Vertical
7680.0	-60.70	5.70	36.88	-29.52	-25	-4.52	Vertical
7680.0	-61.21	5.70	36.88	-30.03	-25	-5.03	Horizontal
207.4	-44.36	1.79	16.84	-29.30	-25	-4.30	Vertical
346.7	-47.92	1.71	17.64	-31.99	-25	-6.99	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.

9.8 LTE BAND 66

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

Test Results for Low Channel 1710.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-63.63	4.02	29.80	-37.85	-13	-24.85	Horizontal
3421.4	-59.92	4.02	29.80	-34.14	-13	-21.14	Vertical
5132.1	-61.16	5.24	35.84	-30.56	-13	-17.56	Vertical
5132.1	-59.93	5.24	35.84	-29.33	-13	-16.33	Horizontal
210.0	-50.66	1.52	15.57	-36.61	-13	-23.61	Vertical
274.9	-46.72	1.33	17.14	-30.91	-13	-17.91	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-60.40	4.03	30.00	-34.43	-13	-21.43	Horizontal
3490.0	-64.45	4.03	30.00	-38.48	-13	-25.48	Vertical
5235.0	-61.34	5.25	35.86	-30.73	-13	-17.73	Vertical
5235.0	-61.84	5.25	35.86	-31.23	-13	-18.23	Horizontal
210.3	-50.17	1.53	17.13	-34.57	-13	-21.57	Vertical
354.5	-45.77	1.41	15.95	-31.23	-13	-18.23	Horizontal
Test Results for High Channel 1779.3MHz							
3558.6	-59.95	4.05	30.01	-33.99	-13	-20.99	Horizontal
3558.6	-63.01	4.05	30.01	-37.05	-13	-24.05	Vertical
5337.9	-62.14	5.26	35.86	-31.54	-13	-18.54	Vertical
5337.9	-60.61	5.26	35.86	-30.01	-13	-17.01	Horizontal
206.4	-45.65	1.44	15.51	-31.58	-13	-18.58	Vertical
457.1	-54.72	1.78	15.76	-40.74	-13	-27.74	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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440.0	-59.17	4.02	29.80	-33.39	-13	-20.39	Horizontal
3440.0	-63.42	4.02	29.80	-37.64	-13	-24.64	Vertical
5160.0	-60.92	5.24	35.84	-30.32	-13	-17.32	Vertical
5160.0	-64.03	5.24	35.84	-33.43	-13	-20.43	Horizontal
198.0	-49.02	1.62	17.02	-33.62	-13	-20.62	Vertical
410.2	-53.11	1.32	17.31	-37.12	-13	-24.12	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-59.90	4.03	30.00	-33.93	-13	-20.93	Horizontal
3490.0	-59.68	4.03	30.00	-33.71	-13	-20.71	Vertical
5235.0	-64.75	5.25	35.86	-34.14	-13	-21.14	Vertical
5235.0	-64.01	5.25	35.86	-33.40	-13	-20.40	Horizontal
195.4	-51.91	1.45	15.17	-38.19	-13	-25.19	Vertical
308.1	-51.85	1.48	17.82	-35.51	-13	-22.51	Horizontal
Test Results for High Channel 1770MHz							
3540.0	-59.24	2.91	27.68	-34.47	-13	-21.47	Horizontal
3540.0	-64.22	2.91	27.68	-39.45	-13	-26.45	Vertical
5310.0	-63.67	5.26	35.86	-33.07	-13	-20.07	Vertical
5310.0	-60.14	5.26	35.86	-29.54	-13	-16.54	Horizontal
202.4	-52.68	1.76	16.38	-38.06	-13	-25.06	Vertical
331.8	-50.80	1.43	17.13	-35.10	-13	-22.10	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 3.15V, Normal, DC 3.7V and High voltage, DC 4.26V.

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 2/4/5/7/66

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]
3.15	1880	12.7	0.006770	2.5
3.7	1880	14.1	0.007483	2.5
4.26	1880	13.8	0.007327	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	13.0	0.006903	2.5
Extreme (50C)	1880	11.2	0.005934	2.5
Extreme (40C)	1880	13.9	0.007382	2.5
Extreme (30C)	1880	13.5	0.007183	2.5
Extreme (10C)	1880	14.0	0.007434	2.5
Extreme (0C)	1880	12.5	0.006666	2.5
Extreme (-10C)	1880	13.2	0.007015	2.5
Extreme (-20C)	1880	14.0	0.007423	2.5
Extreme (-30C)	1880	15.0	0.007983	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]
3.15	1880	10.3	0.005462	2.5
3.7	1880	8.5	0.004520	2.5
4.26	1880	7.6	0.004054	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	10.0	0.005295	2.5
Extreme (50C)	1880	8.8	0.004702	2.5
Extreme (40C)	1880	8.1	0.004311038	2.5
Extreme (30C)	1880	9.2	0.004897732	2.5
Extreme (10C)	1880	8.6	0.004549325	2.5
Extreme (0C)	1880	7.7	0.004085711	2.5
Extreme (-10C)	1880	9.5	0.005041611	2.5
Extreme (-20C)	1880	8.9	0.004755777	2.5
Extreme (-30C)	1880	7.7	0.004073386	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]
3.15	1732.5	8.4	0.004875	2.5
3.7	1732.5	8.9	0.005162	2.5
4.26	1732.5	8.4	0.004829	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.3	0.004787	2.5
Extreme (50C)	1732.5	9.4	0.005403	2.5
Extreme (40C)	1732.5	7.1	0.004088	2.5
Extreme (30C)	1732.5	5.9	0.003390	2.5
Extreme (10C)	1732.5	7.1	0.004112	2.5
Extreme (0C)	1732.5	9.8	0.005663	2.5
Extreme (-10C)	1732.5	8.3	0.004774	2.5
Extreme (-20C)	1732.5	7.0	0.004054	2.5
Extreme (-30C)	1732.5	8.3	0.004762	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]
3.15	1732.5	9.6	0.005545	2.5
3.7	1732.5	9.1	0.005225	2.5
4.26	1732.5	7.9	0.004565	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	10.1	0.005851	2.5
Extreme (50C)	1732.5	9.3	0.005370	2.5
Extreme (40C)	1732.5	7.6	0.004395	2.5
Extreme (30C)	1732.5	9.3	0.005373	2.5
Extreme (10C)	1732.5	9.4	0.005419	2.5
Extreme (0C)	1732.5	8.4	0.004873	2.5
Extreme (-10C)	1732.5	8.6	0.004985	2.5
Extreme (-20C)	1732.5	8.4	0.004872	2.5
Extreme (-30C)	1732.5	8.6	0.004951	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]
3.15	836.5	6.3	0.007531	2.5
3.7	836.5	6.4	0.007647	2.5
4.26	836.5	5.1	0.006131	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	5.8	0.006947	2.5
Extreme (50C)	836.5	5.7	0.006781	2.5
Extreme (40C)	836.5	6.4	0.007639	2.5
Extreme (30C)	836.5	6.8	0.008123	2.5
Extreme (10C)	836.5	5.7	0.006801	2.5
Extreme (0C)	836.5	5.1	0.006066	2.5
Extreme (-10C)	836.5	5.1	0.006099	2.5
Extreme (-20C)	836.5	6.1	0.007297	2.5
Extreme (-30C)	836.5	6.1	0.007288	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]
3.15	836.5	5.7	0.006867	2.5
3.7	836.5	7.0	0.008365	2.5
4.26	836.5	4.7	0.005604	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.3	0.007563	2.5
Extreme (50C)	836.5	6.3	0.007503	2.5
Extreme (40C)	836.5	6.1	0.007345	2.5
Extreme (30C)	836.5	6.7	0.008019	2.5
Extreme (10C)	836.5	5.3	0.006361	2.5
Extreme (0C)	836.5	5.7	0.006787	2.5
Extreme (-10C)	836.5	5.8	0.006934	2.5
Extreme (-20C)	836.5	6.2	0.007397	2.5
Extreme (-30C)	836.5	6.4	0.007691	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]
3.15	2535	10.2	0.004029	2.5
3.7	2535	8.5	0.003354	2.5
4.26	2535	8.1	0.003187	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	9.1	0.003602	2.5
Extreme (50C)	2535	8.6	0.003410	2.5
Extreme (40C)	2535	8.3	0.003262	2.5
Extreme (30C)	2535	8.9	0.003492	2.5
Extreme (10C)	2535	8.1	0.003177	2.5
Extreme (0C)	2535	8.4	0.003303	2.5
Extreme (-10C)	2535	9.4	0.003706	2.5
Extreme (-20C)	2535	8.9	0.003522	2.5
Extreme (-30C)	2535	8.0	0.003165	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]
3.15	2535	6.9	0.002722	2.5
3.7	2535	6.7	0.002631	2.5
4.26	2535	5.6	0.002211	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	6.9	0.002722	2.5
Extreme (50C)	2535	5.9	0.002333	2.5
Extreme (40C)	2535	5.4	0.002135	2.5
Extreme (30C)	2535	6.5	0.002552	2.5
Extreme (10C)	2535	5.7	0.002254	2.5
Extreme (0C)	2535	5.0	0.001966	2.5
Extreme (-10C)	2535	5.6	0.002213	2.5
Extreme (-20C)	2535	6.2	0.002437	2.5
Extreme (-30C)	2535	6.0	0.002357	2.5

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

10.8 LTE BAND 66

Band 66 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]
3.15	1745	6.3	0.003604	2.5
3.7	1745	6.9	0.003972	2.5
4.26	1745	7.7	0.004405	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1745	5.7	0.003286	2.5
Extreme (50C)	1745	7.3	0.004171	2.5
Extreme (40C)	1745	6.9	0.003938	2.5
Extreme (30C)	1745	6.9	0.003962	2.5
Extreme (10C)	1745	7.3	0.004188	2.5
Extreme (0C)	1745	6.9	0.003949	2.5
Extreme (-10C)	1745	5.0	0.002893	2.5
Extreme (-20C)	1745	6.1	0.003505	2.5
Extreme (-30C)	1745	5.8	0.003303	2.5

Band 66 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]
3.15	1745	9.0	0.005144	2.5
3.7	1745	7.3	0.004183	2.5
4.26	1745	9.7	0.005565	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1745	8.7	0.004980	2.5
Extreme (50C)	1745	8.2	0.004720	2.5
Extreme (40C)	1745	8.5	0.004865	2.5
Extreme (30C)	1745	8.4	0.004820	2.5
Extreme (10C)	1745	8.5	0.004859	2.5
Extreme (0C)	1745	6.6	0.003801	2.5
Extreme (-10C)	1745	8.8	0.005048	2.5
Extreme (-20C)	1745	8.0	0.004605	2.5
Extreme (-30C)	1745	5.9	0.003396	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.

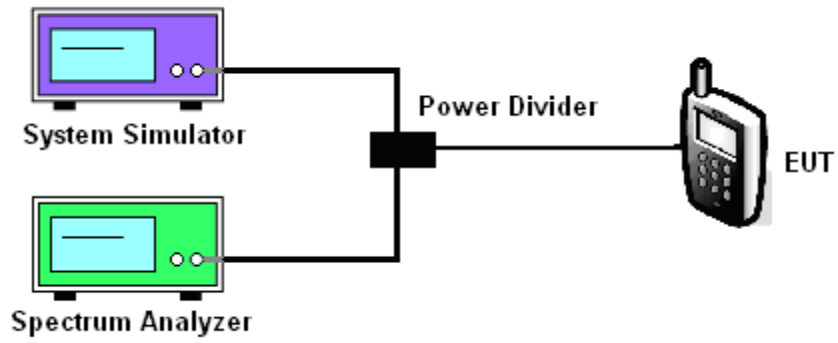
11.2 Measuring Instruments

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 2/4/5/7/66

Test data reference attachment.

----END OF REPORT----