FCC eCFR 47 PART 22H, 24E, 27L CERTIFICATION TEST REPORT

FCC ID: 2AX5VHUBPNA1AFA

Product: Security control panel

Trade Mark: AJAX

Model No.: HBP.J-000-NA/AFA

Family Model: HBP.J-001-NA/AFA

Report No.: S25021903004003

Issue Date: May 22, 2025

Prepared for

AJAX SYSTEMS CYPRUS HOLDINGS LTD

Ifigeneias, 17, Strovolos, 2007, Nicosia, Cyprus

Prepared by

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Tel. 0755-2320 0050 Website:http://www.ntek.org.cn

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 Ic Kapi No: Z01 Tuzla / Istanbul
Product name..... :	Security control panel
Model and/or type reference .. :	HBP.J-000-NA/AFA
Family Model..... :	HBP.J-001-NA/AFA
Test Sample Number ..... :	S250219030004
Date of Test..... :	Feb. 20, 2025 ~ May 22, 2025
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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Prepared By :	Gavan Zhang	Reviewed By :	Aaron Cheng	Approved By :	Alex Li
	Gavan Zhang (Project Engineer)		Aaron Cheng (Supervisor)		Alex Li (Manager)

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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	AJAX
Model Name	HBP.J-000-NA/AFA
Family Model	HBP.J-001-NA/AFA
Model Difference	All models are the same circuit and RF module, while additional models are supposed to be sold without casing.
FCC ID:	2AX5VHUBPNA1AFA
Frequency Bands:	U.S. Bands: ☒LTE FDD Band 2,4,12
Frequency Range:	LTE FDD Band 2 Uplink: 1850MHz-1910MHz, Downlink: 1930MHz-1990MHz; LTE FDD Band 4 Uplink: 1710MHz-1755MHz, Downlink: 2110MHz-2155MHz; LTE FDD Band 12 Uplink: 699MHz-716MHz, Downlink: 729MHz-746MHz;
Type of Modulation:	QPSK/16QAM/64QAM(Only Downlink)
Power Class	Class 3
Antenna:	Antenna 1: Planar_Multiband Antenna Antenna 2: External Antenna
Antenna gain:	Antenna 1 : -0.55dBi Antenna 2 : 0dBi
Adapter	N/A
Battery	N/A
Power Rating	DC 12V
Extreme Vol. Limits:	DC 10.8V to DC 13.2V (Nominal DC 12V)（Note 1）
HW Version	HB2.009.MBR.001v4
FW Version	NA
SW Version	x.xx
** Note1: The High Voltage 13.2V and Low Voltage 10.8V 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: 2AX5VHUBPNA1AFA** 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 2/4/12

The RB Size was selected to measure for peak or average ERP and EIRP, which was based on the conducted power verification baseline data.

For the fundamental investigation of radiated emissions, the EUT is investigated for vertical and horizontal antenna orientations and X Y and Z orientations of the EUT alone. After the investigations the worst case was determined to be at X orientation for all LTE bands.

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

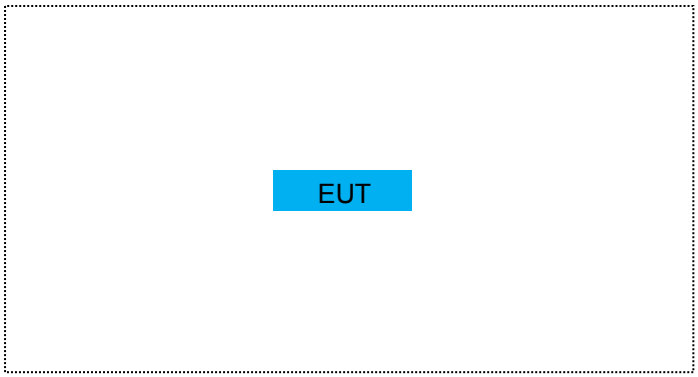
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Security control panel	HBP.J-000-NA/AFA	FCC ID: 2AX5VHUBPNA1AFA	EUT

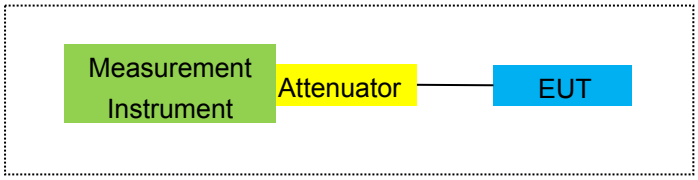
Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.

2.4 TEST SETUP

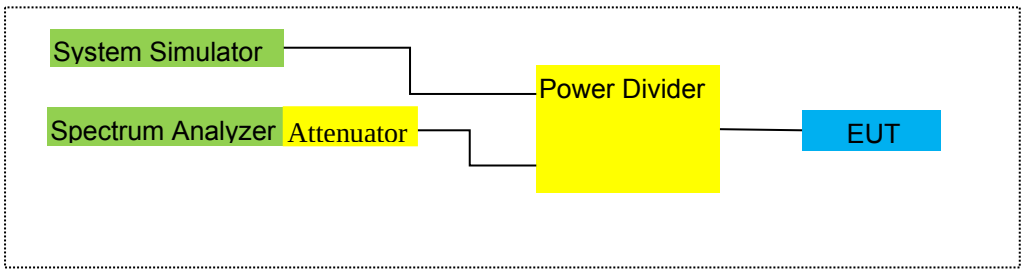
For Radiated Test Cases



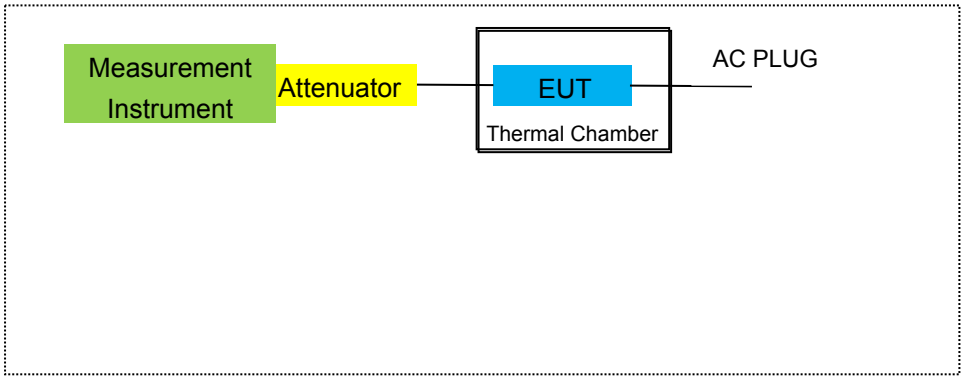
For Conducted Output Power



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	2025.04.17	2026.04.16	1 year
2	Test Receiver	R&S	ESPI	101318	2025.04.17	2026.04.16	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2024.05.12 2025.05.11	2025.05.11 2026.05.10	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2024.04.26	2027.04.25	3 year
5	Broadband Horn Antenna	SCHWARZBECK	BBHA 9120 D	2816	2024.05.18	2027.05.17	3 year
6	Broadband Horn Antenna	SCHWARZBECK	BBHA 9120 D	2817	2024.05.12	2027.05.11	3 year
7	Amplifier	EM	EM-30180	060538	2025.04.25	2026.04.24	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2025.03.11	2026.03.10	1 year
9	Power Meter	R&S	NRVS	100696	2025.04.25	2026.04.24	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2025.04.25	2026.04.24	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	2025.04.16	2026.04.15	1 year
15	LISN	R&S	ENV216	101313	2025.04.16	2026.04.15	1 year
16	LISN	EMCO	3816/2	00042990	2025.04.25	2026.04.24	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2025.03.11	2026.03.10	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2025.03.11	2026.03.10	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	Spectrum Analyzer	agilent	e4440a	MY41000130	2025.04.24	2026.04.23	1 year
23	test receiver	R&S	ESCI	a0304218	2025.03.11	2026.03.10	1 year
24	Communication Tester	R&S	CMU200	A0304247	2025.03.11	2026.03.10	1 year

25	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2025.03.11	2026.03.10	1 year
26	DC Power Source	N/A	PS-6005D	20170402923	2024.04.25	2027.04.24	3 year
27	Log-Periodic Antenna	SCHWARZBECK	VULB 9162	584	2025.04.19	2026.04.18	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.

Measurement Software

Item	Manufacturer	Software Name	Software Version	Description
1	MWRFtest	MTS 8200	2.0	RF Conducted Test
2	Farad	EZ-EMC_RE	AIT-03A	RadiatedTest
3	Farad	EZ-EMC_CE	AIT-03A	AC Conducted Test

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 2/4/12

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 that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.Show citation box.

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

TEST PROCEDURE

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

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

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

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

MODES TESTED

Band 2/4/12

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 2/4/12

7.1 MEASUREMENT METHOD

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

Test data reference attachment.

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 2/4/12

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 (dBi)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz		1850.7	-1.62	3.76	28.24	22.86	193.197	Horizontal	Pass
Band	1/#Mid	1880	-1.26	3.91	28.22	23.05	201.837	Horizontal	Pass
QPSK		1909.3	-1.23	3.93	28.20	23.04	201.372	Horizontal	Pass
3.0MHz		1851.5	-1.66	3.77	28.23	22.80	190.546	Horizontal	Pass
Band	1/#Mid	1880	-1.33	3.91	28.24	23.00	199.526	Horizontal	Pass
QPSK		1908.5	-1.41	3.94	28.25	22.90	194.984	Horizontal	Pass
5.0MHz		1852.5	-1.76	3.77	28.31	22.78	189.671	Horizontal	Pass
Band	1/#Mid	1880	-1.40	3.91	28.22	22.91	195.434	Horizontal	Pass
QPSK		1907.5	-1.30	3.94	28.20	22.96	197.697	Horizontal	Pass
10.0MHz		1855	-1.41	3.79	28.33	23.13	205.589	Horizontal	Pass
Band	1/#Mid	1880	-1.13	3.95	28.22	23.14	206.063	Horizontal	Pass
QPSK		1905	-1.12	3.97	28.19	23.10	204.174	Horizontal	Pass
15.0MHz		1857.5	-1.54	3.79	28.34	23.01	199.986	Horizontal	Pass
Band	1/#Mid	1880	-1.13	3.95	28.22	23.14	206.063	Horizontal	Pass
QPSK		1902.5	-1.30	3.97	28.18	22.91	195.434	Horizontal	Pass
20.0MHz		1860	-1.45	3.81	28.35	23.09	203.704	Horizontal	Pass
Band	1/#Mid	1880	-1.04	3.96	28.22	**23.22**	209.894	Horizontal	Pass
QPSK		1900	-1.12	4.00	28.16	23.04	201.372	Horizontal	Pass
1.4MHz		1850.7	-2.42	3.76	28.24	22.06	160.694	Vertical	Pass
Band	1/#Mid	1880	-1.98	3.91	28.22	22.33	171.002	Vertical	Pass
QPSK		1909.3	-1.58	3.93	28.20	22.69	185.780	Vertical	Pass
3.0MHz		1851.5	-2.43	3.77	28.23	22.03	159.588	Vertical	Pass
Band	1/#Mid	1880	-1.76	3.91	28.24	22.57	180.717	Vertical	Pass
QPSK		1908.5	-1.62	3.94	28.25	22.69	185.780	Vertical	Pass
5.0MHz		1852.5	-2.37	3.77	28.31	22.17	164.816	Vertical	Pass
Band	1/#Mid	1880	-1.91	3.91	28.22	22.40	173.780	Vertical	Pass
QPSK		1907.5	-1.67	3.94	28.20	22.59	181.552	Vertical	Pass
10.0MHz		1855	-2.49	3.79	28.33	22.05	160.325	Vertical	Pass
Band	1/#Mid	1880	-2.08	3.95	28.22	22.19	165.577	Vertical	Pass
QPSK		1905	-2.03	3.97	28.19	22.19	165.577	Vertical	Pass
15.0MHz		1857.5	-1.94	3.79	28.34	22.61	182.390	Vertical	Pass
Band	1/#Mid	1880	-2.11	3.95	28.22	22.16	164.437	Vertical	Pass
QPSK		1902.5	-1.84	3.97	28.18	22.37	172.584	Vertical	Pass

20.0MHz	1/#Mid	1860	-1.65	3.81	28.35	22.89	194.536	Vertical	Pass
Band		1880	-2.24	3.96	28.22	22.02	159.221	Vertical	Pass
QPSK		1900	-2.03	4.00	28.16	22.13	163.305	Vertical	Pass

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dBi)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1850.7	-2.49	3.76	28.24	21.99	158.125	Horizontal	Pass
		1880	-1.78	3.91	28.22	22.53	179.061	Horizontal	Pass
		1909.3	-2.40	3.93	28.20	21.87	153.815	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-2.82	3.77	28.23	21.64	145.881	Horizontal	Pass
		1880	-2.40	3.91	28.24	21.93	155.955	Horizontal	Pass
		1908.5	-2.75	3.94	28.25	21.56	143.219	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-2.86	3.77	28.31	21.68	147.231	Horizontal	Pass
		1880	-2.52	3.91	28.22	21.79	151.008	Horizontal	Pass
		1907.5	-2.78	3.94	28.20	21.48	140.605	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-2.69	3.79	28.33	21.85	153.109	Horizontal	Pass
		1880	-2.37	3.95	28.22	21.90	154.882	Horizontal	Pass
		1905	-2.44	3.97	28.19	21.78	150.661	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-2.89	3.79	28.34	21.66	146.555	Horizontal	Pass
		1880	-2.53	3.95	28.22	21.74	149.279	Horizontal	Pass
		1902.5	-2.49	3.97	28.18	21.72	148.594	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-2.59	3.81	28.35	21.95	156.675	Horizontal	Pass
		1880	-1.69	3.96	28.22	**22.57**	180.717	Horizontal	Pass
		1900	-1.85	4.00	28.16	22.31	170.216	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-3.37	3.76	28.24	21.11	129.122	Vertical	Pass
		1880	-2.81	3.91	28.22	21.50	141.254	Vertical	Pass
		1909.3	-3.10	3.93	28.20	21.17	130.918	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-3.44	3.77	28.23	21.02	126.474	Vertical	Pass
		1880	-3.12	3.91	28.24	21.21	132.130	Vertical	Pass
		1908.5	-2.40	3.94	28.25	21.91	155.239	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-3.12	3.77	28.31	21.42	138.676	Vertical	Pass
		1880	-2.76	3.91	28.22	21.55	142.889	Vertical	Pass
		1907.5	-3.17	3.94	28.20	21.09	128.529	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-3.18	3.79	28.33	21.36	136.773	Vertical	Pass
		1880	-2.28	3.95	28.22	21.99	158.125	Vertical	Pass
		1905	-2.98	3.97	28.19	21.24	133.045	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-3.46	3.79	28.34	21.09	128.529	Vertical	Pass
		1880	-3.11	3.95	28.22	21.16	130.617	Vertical	Pass
		1902.5	-2.76	3.97	28.18	21.45	139.637	Vertical	Pass

20.0MHz Band 16 QAM	1/#Mid	1860	-3.03	3.81	28.35	21.51	141.579	Vertical	Pass
		1880	-2.76	3.96	28.22	21.50	141.254	Vertical	Pass
		1900	-2.94	4.00	28.16	21.22	132.434	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 (dBi)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz		1710.7	-1.63	3.12	27.58	22.83	191.867	Horizontal	Pass
Band	1/#Mid	1732.5	-0.96	3.27	27.61	23.38	217.771	Horizontal	Pass
QPSK		1754.3	-1.30	3.29	27.63	23.04	201.372	Horizontal	Pass
3.0MHz		1711.5	-1.63	3.13	27.61	22.85	192.752	Horizontal	Pass
Band	1/#Mid	1732.5	-1.28	3.27	27.61	23.06	202.302	Horizontal	Pass
QPSK		1753.5	-1.38	3.30	27.62	22.94	196.789	Horizontal	Pass
5.0MHz		1712.5	-1.54	3.13	27.63	22.96	197.697	Horizontal	Pass
Band	1/#Mid	1732.5	-1.21	3.27	27.61	23.13	205.589	Horizontal	Pass
QPSK		1752.5	-1.38	3.30	27.60	22.92	195.884	Horizontal	Pass
10.0MHz		1715	-1.17	3.15	27.64	23.32	214.783	Horizontal	Pass
Band	1/#Mid	1732.5	-0.85	3.31	27.61	23.45	221.309	Horizontal	Pass
QPSK		1750	-1.05	3.33	27.59	23.21	209.411	Horizontal	Pass
15.0MHz		1717.5	-1.29	3.15	27.65	23.21	209.411	Horizontal	Pass
Band	1/#Mid	1732.5	-0.78	3.31	27.61	23.52	224.905	Horizontal	Pass
QPSK		1747.5	-0.78	3.33	27.57	23.46	221.820	Horizontal	Pass
20.0MHz		1720	-1.10	3.17	27.66	23.39	218.273	Horizontal	Pass
Band	1/#Mid	1732.5	-0.68	3.32	27.61	**23.61**	229.615	Horizontal	Pass
QPSK		1745	-0.71	3.36	27.56	23.49	223.357	Horizontal	Pass
1.4MHz		1710.7	-1.88	3.12	27.58	22.58	181.134	Vertical	Pass
Band	1/#Mid	1732.5	-1.42	3.27	27.61	22.92	195.884	Vertical	Pass
QPSK		1754.3	-1.88	3.29	27.63	22.46	176.198	Vertical	Pass
3.0MHz		1711.5	-1.49	3.13	27.61	22.99	199.067	Vertical	Pass
Band	1/#Mid	1732.5	-1.36	3.27	27.61	22.98	198.609	Vertical	Pass
QPSK		1753.5	-1.38	3.30	27.62	22.94	196.789	Vertical	Pass
5.0MHz		1712.5	-1.72	3.13	27.63	22.78	189.671	Vertical	Pass
Band	1/#Mid	1732.5	-1.59	3.27	27.61	22.75	188.365	Vertical	Pass
QPSK		1752.5	-1.44	3.30	27.60	22.86	193.197	Vertical	Pass
10.0MHz		1715	-1.80	3.15	27.64	22.69	185.780	Vertical	Pass
Band	1/#Mid	1732.5	-1.58	3.31	27.61	22.72	187.068	Vertical	Pass
QPSK		1750	-2.05	3.33	27.59	22.21	166.341	Vertical	Pass
15.0MHz		1717.5	-2.00	3.15	27.65	22.50	177.828	Vertical	Pass
Band	1/#Mid	1732.5	-1.44	3.31	27.61	22.86	193.197	Vertical	Pass
QPSK		1747.5	-1.63	3.33	27.57	22.61	182.390	Vertical	Pass

20.0MHz	1/#Mid	1720	-1.87	3.17	27.66	22.62	182.810	Vertical	Pass
Band		1732.5	-2.24	3.32	27.61	22.05	160.325	Vertical	Pass
QPSK		1745	-2.05	3.36	27.56	22.15	164.059	Vertical	Pass

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dBi)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1710.7	-2.78	3.12	27.58	21.68	147.231	Horizontal	Pass
		1732.5	-1.95	3.27	27.61	22.39	173.380	Horizontal	Pass
		1754.3	-2.28	3.29	27.63	22.06	160.694	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.97	3.13	27.61	21.51	141.579	Horizontal	Pass
		1732.5	-2.59	3.27	27.61	21.75	149.624	Horizontal	Pass
		1753.5	-2.55	3.30	27.62	21.77	150.314	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.42	3.13	27.63	22.08	161.436	Horizontal	Pass
		1732.5	-2.30	3.27	27.61	22.04	159.956	Horizontal	Pass
		1752.5	-2.11	3.30	27.60	22.19	165.577	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-2.54	3.15	27.64	21.95	156.675	Horizontal	Pass
		1732.5	-2.14	3.31	27.61	22.16	164.437	Horizontal	Pass
		1750	-2.28	3.33	27.59	21.98	157.761	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-2.65	3.15	27.65	21.85	153.109	Horizontal	Pass
		1732.5	-1.99	3.31	27.61	22.31	170.216	Horizontal	Pass
		1747.5	-2.03	3.33	27.57	22.21	166.341	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-2.49	3.17	27.66	22.00	158.489	Horizontal	Pass
		1732.5	-1.88	3.32	27.61	**22.41**	174.181	Horizontal	Pass
		1745	-2.02	3.36	27.56	22.18	165.196	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-3.40	3.12	27.58	21.06	127.644	Vertical	Pass
		1732.5	-2.87	3.27	27.61	21.47	140.281	Vertical	Pass
		1754.3	-2.53	3.29	27.63	21.81	151.705	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.60	3.13	27.61	21.88	154.170	Vertical	Pass
		1732.5	-2.94	3.27	27.61	21.40	138.038	Vertical	Pass
		1753.5	-2.59	3.30	27.62	21.73	148.936	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-3.10	3.13	27.63	21.40	138.038	Vertical	Pass
		1732.5	-3.17	3.27	27.61	21.17	130.918	Vertical	Pass
		1752.5	-3.26	3.30	27.60	21.04	127.057	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-2.68	3.15	27.64	21.81	151.705	Vertical	Pass
		1732.5	-2.54	3.31	27.61	21.76	149.968	Vertical	Pass
		1750	-2.81	3.33	27.59	21.45	139.637	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-3.37	3.15	27.65	21.13	129.718	Vertical	Pass
		1732.5	-3.24	3.31	27.61	21.06	127.644	Vertical	Pass
		1747.5	-3.13	3.33	27.57	21.11	129.122	Vertical	Pass
20.0MHz	1/#Mid	1720	-2.50	3.17	27.66	21.99	158.125	Vertical	Pass

Band 16 QAM		1732.5	-3.00	3.32	27.61	21.29	134.586	Vertical	Pass
		1745	-2.34	3.36	27.56	21.86	153.462	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 12

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. ERP Average	Max. ERP Average	Polarization Of Max. ERP	
							(dBm)	(mW)		
1.4MHz		699.7	7.83	1.91	19.21	2.15	22.98	198.609	Horizontal	Pass
Band	1/#Mid	707.5	8.04	1.91	19.26	2.15	23.24	210.863	Horizontal	Pass
QPSK		715.3	8.11	1.93	19.34	2.15	23.37	217.270	Horizontal	Pass
3.0MHz		700.5	7.88	1.91	19.21	2.15	23.03	200.909	Horizontal	Pass
Band	1/#Mid	707.5	8.06	1.91	19.26	2.15	23.26	211.836	Horizontal	Pass
QPSK		714.5	7.74	1.93	19.34	2.15	23.00	199.526	Horizontal	Pass
5.0MHz		701.5	7.7	1.91	19.23	2.15	22.87	193.642	Horizontal	Pass
Band	1/#Mid	707.5	8.21	1.91	19.26	2.15	23.41	219.280	Horizontal	Pass
QPSK		713.5	7.59	1.92	19.33	2.15	22.85	192.752	Horizontal	Pass
10.0MHz		704	7.85	1.91	19.25	2.15	23.04	201.372	Horizontal	Pass
Band	1/#Mid	707.5	8.64	1.91	19.26	2.15	**23.84**	242.103	Horizontal	Pass
QPSK		711	7.7	1.92	19.32	2.15	22.95	197.242	Horizontal	Pass
1.4MHz		699.7	7.27	1.91	19.21	2.15	22.42	174.582	Vertical	Pass
Band	1/#Mid	707.5	7.24	1.91	19.26	2.15	22.44	175.388	Vertical	Pass
QPSK		715.3	7.28	1.93	19.34	2.15	22.54	179.473	Vertical	Pass
3.0MHz		700.5	7.56	1.91	19.21	2.15	22.71	186.638	Vertical	Pass
Band	1/#Mid	707.5	7.71	1.91	19.26	2.15	22.91	195.434	Vertical	Pass
QPSK		714.5	7.43	1.93	19.34	2.15	22.69	185.780	Vertical	Pass
5.0MHz		701.5	7.42	1.91	19.23	2.15	22.59	181.552	Vertical	Pass
Band	1/#Mid	707.5	6.82	1.91	19.26	2.15	22.02	159.221	Vertical	Pass
QPSK		713.5	7.07	1.92	19.33	2.15	22.33	171.002	Vertical	Pass
10.0MHz		704	7.07	1.91	19.25	2.15	22.26	168.267	Vertical	Pass
Band	1/#Mid	707.5	6.95	1.91	19.26	2.15	22.15	164.059	Vertical	Pass
QPSK		711	7.39	1.92	19.32	2.15	22.64	183.654	Vertical	Pass

Radiated Power (ERP) for Band 12										
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	1/#Mid	699.7	6.76	1.91	19.21	2.15	21.91	155.239	Horizontal	Pass
		707.5	7	1.91	19.26	2.15	22.20	165.959	Horizontal	Pass
		715.3	6.64	1.93	19.34	2.15	21.90	154.882	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	6.29	1.91	19.21	2.15	21.44	139.316	Horizontal	Pass
		707.5	7.15	1.91	19.26	2.15	22.35	171.791	Horizontal	Pass
		714.5	7.06	1.93	19.34	2.15	22.32	170.608	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	6.05	1.91	19.23	2.15	21.22	132.434	Horizontal	Pass
		707.5	6.88	1.91	19.26	2.15	22.08	161.436	Horizontal	Pass
		713.5	6.05	1.92	19.33	2.15	21.31	135.207	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	704	6.39	1.91	19.25	2.15	21.58	143.880	Horizontal	Pass
		707.5	7.16	1.91	19.26	2.15	**22.36**	172.187	Horizontal	Pass
		711	6.56	1.92	19.32	2.15	21.81	151.705	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	699.7	6.13	1.91	19.21	2.15	21.28	134.276	Vertical	Pass
		707.5	5.82	1.91	19.26	2.15	21.02	126.474	Vertical	Pass
		715.3	6.24	1.93	19.34	2.15	21.50	141.254	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	6.47	1.91	19.21	2.15	21.62	145.211	Vertical	Pass
		707.5	6.14	1.91	19.26	2.15	21.34	136.144	Vertical	Pass
		714.5	6.73	1.93	19.34	2.15	21.99	158.125	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	6.41	1.91	19.23	2.15	21.58	143.880	Vertical	Pass
		707.5	5.93	1.91	19.26	2.15	21.13	129.718	Vertical	Pass
		713.5	6.17	1.92	19.33	2.15	21.43	138.995	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	704	6.13	1.91	19.25	2.15	21.32	135.519	Vertical	Pass
		707.5	6.28	1.91	19.26	2.15	21.48	140.605	Vertical	Pass
		711	6.25	1.92	19.32	2.15	21.50	141.254	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)

ERP(dBm)=EIRP-2.15

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 log10(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 Log10 (p), dB; and
b. for mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB at the channel edges and 55 + 10 Log10 (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 2/4/12

RESULTS

PASS

9.1 LTE BAND 2

QPSK EIRP POWER FOR LTE BAND 2 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1850.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3701.4	-47.56	4.04	33.51	-18.09	-13	-5.09	Horizontal
3701.4	-49.67	4.04	33.51	-20.20	-13	-7.20	Vertical
5552.1	-45.49	5.24	35.84	-14.89	-13	-1.89	Vertical
5552.1	-49.63	5.24	35.84	-19.03	-13	-6.03	Horizontal
190.1	-34.43	1.43	16.02	-19.84	-13	-6.84	Vertical
287.0	-34.97	1.30	17.99	-18.28	-13	-5.28	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-49.98	4.04	33.56	-20.46	-13	-7.46	Horizontal
3760.0	-50.13	4.04	33.56	-20.61	-13	-7.61	Vertical
5640.0	-51.50	5.24	35.91	-20.83	-13	-7.83	Vertical
5640.0	-49.41	5.24	35.91	-18.74	-13	-5.74	Horizontal
204.1	-43.42	1.62	16.97	-28.07	-13	-15.07	Vertical
308.4	-40.79	1.74	15.98	-26.56	-13	-13.56	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-52.28	4.04	34.00	-22.32	-13	-9.32	Horizontal
3818.6	-50.53	4.04	34.00	-20.57	-13	-7.57	Vertical
5727.9	-51.75	5.24	36.04	-20.95	-13	-7.95	Vertical
5727.9	-53.26	5.24	36.04	-22.46	-13	-9.46	Horizontal
212.7	-43.07	1.42	17.29	-27.20	-13	-14.20	Vertical
247.0	-38.59	1.50	17.90	-22.18	-13	-9.18	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	-47.02	4.07	33.54	-17.55	-13	-4.55	Horizontal
3720.0	-51.50	4.07	33.54	-22.03	-13	-9.03	Vertical
5580.0	-52.92	5.28	35.86	-22.34	-13	-9.34	Vertical
5580.0	-53.82	5.28	35.86	-23.24	-13	-10.24	Horizontal
206.3	-36.29	1.58	16.89	-20.97	-13	-7.97	Vertical
355.9	-44.90	1.76	17.26	-29.40	-13	-16.40	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-47.57	4.04	33.56	-18.05	-13	-5.05	Horizontal
3760.0	-51.12	4.04	33.56	-21.60	-13	-8.60	Vertical
5640.0	-53.60	5.24	35.91	-22.93	-13	-9.93	Vertical
5640.0	-53.40	5.24	35.91	-22.73	-13	-9.73	Horizontal
175.1	-37.70	1.46	16.27	-22.89	-13	-9.89	Vertical
233.4	-39.71	1.59	15.15	-26.15	-13	-13.15	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-44.83	4.04	34.00	-14.87	-13	-1.87	Horizontal
3800.0	-48.52	4.04	34.00	-18.56	-13	-5.56	Vertical
5700.0	-45.49	5.24	36.04	-14.69	-13	-1.69	Vertical
5700.0	-52.41	5.24	36.04	-21.61	-13	-8.61	Horizontal
177.5	-44.67	1.36	17.39	-28.63	-13	-15.63	Vertical
349.2	-42.20	1.66	15.39	-28.47	-13	-15.47	Horizontal

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)

. Over Limit= : PMea(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	-50.55	4.02	29.80	-24.77	-13	-11.77	Horizontal
3421.4	-47.52	4.02	29.80	-21.74	-13	-8.74	Vertical
5132.1	-49.94	5.24	35.84	-19.34	-13	-6.34	Vertical
5132.1	-49.26	5.24	35.84	-18.66	-13	-5.66	Horizontal
183.7	-43.98	1.68	16.04	-29.62	-13	-16.62	Vertical
249.2	-37.69	1.78	17.74	-21.73	-13	-8.73	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-53.83	4.03	30.00	-27.86	-13	-14.86	Horizontal
3465.0	-52.69	4.03	30.00	-26.72	-13	-13.72	Vertical
5197.5	-47.54	5.25	35.86	-16.93	-13	-3.93	Vertical
5197.5	-51.75	5.25	35.86	-21.14	-13	-8.14	Horizontal
179.0	-44.22	1.72	17.69	-28.25	-13	-15.25	Vertical
323.0	-44.29	1.62	16.02	-29.88	-13	-16.88	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-47.22	4.05	30.01	-21.26	-13	-8.26	Horizontal
3508.6	-49.24	4.05	30.01	-23.28	-13	-10.28	Vertical
5262.9	-44.16	5.26	35.86	-13.56	-13	-0.56	Vertical
5262.9	-49.20	5.26	35.86	-18.60	-13	-5.60	Horizontal
207.5	-44.94	1.80	16.69	-30.05	-13	-17.05	Vertical
290.2	-44.47	1.75	16.66	-29.57	-13	-16.57	Horizontal

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

Test Results for Low Channel 1720MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3440.0	-49.71	4.02	29.80	-23.93	-13	-10.93	Horizontal
3440.0	-50.09	4.02	29.80	-24.31	-13	-11.31	Vertical
5160.0	-44.09	5.24	35.84	-13.49	-13	-0.49	Vertical
5160.0	-52.86	5.24	35.84	-22.26	-13	-9.26	Horizontal
212.8	-36.98	1.57	17.26	-21.29	-13	-8.29	Vertical
293.4	-42.31	1.78	16.35	-27.74	-13	-14.74	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-51.90	4.03	30.00	-25.93	-13	-12.93	Horizontal
3465.0	-52.63	4.03	30.00	-26.66	-13	-13.66	Vertical
5197.5	-47.59	5.25	35.86	-16.98	-13	-3.98	Vertical
5197.5	-51.41	5.25	35.86	-20.80	-13	-7.80	Horizontal
180.9	-42.58	1.44	17.95	-26.07	-13	-13.07	Vertical
348.3	-44.73	1.65	16.09	-30.29	-13	-17.29	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-46.18	2.91	27.68	-21.41	-13	-8.41	Horizontal
3490.0	-50.30	2.91	27.68	-25.53	-13	-12.53	Vertical
5235.0	-50.43	5.26	35.86	-19.83	-13	-6.83	Vertical
5235.0	-51.87	5.26	35.86	-21.27	-13	-8.27	Horizontal
211.8	-42.75	1.61	16.85	-27.51	-13	-14.51	Vertical
410.3	-37.61	1.61	15.19	-24.03	-13	-11.03	Horizontal

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)

. Over Limit= : PMea(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 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	-45.85	2.60	27.20	-21.25	-13	-8.25	Horizontal
1399.4	-44.85	2.60	27.20	-20.25	-13	-7.25	Vertical
2099.1	-47.32	2.85	27.54	-22.63	-13	-9.63	Vertical
2099.1	-52.29	2.85	27.54	-27.60	-13	-14.60	Horizontal
178.2	-44.74	1.49	17.78	-28.45	-13	-15.45	Vertical
318.1	-44.46	1.36	17.33	-28.49	-13	-15.49	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-48.31	2.61	27.28	-23.64	-13	-10.64	Horizontal
1415.0	-44.74	2.61	27.28	-20.07	-13	-7.07	Vertical
2122.5	-46.85	2.87	27.59	-22.13	-13	-9.13	Vertical
2122.5	-53.21	2.87	27.59	-28.49	-13	-15.49	Horizontal
210.3	-42.59	1.73	15.74	-28.58	-13	-15.58	Vertical
411.7	-36.71	1.62	15.79	-22.54	-13	-9.54	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-48.34	2.63	27.28	-23.69	-13	-10.69	Horizontal
1430.6	-50.19	2.63	27.28	-25.54	-13	-12.54	Vertical
2145.9	-49.39	2.88	27.60	-24.67	-13	-11.67	Vertical
2145.9	-50.32	2.88	27.60	-25.60	-13	-12.60	Horizontal
199.3	-41.63	1.61	18.00	-25.24	-13	-12.24	Vertical
344.3	-36.26	1.45	15.49	-22.23	-13	-9.23	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	-47.65	2.61	27.26	-23.00	-13	-10.00	Horizontal
1408.0	-49.99	2.61	27.26	-25.34	-13	-12.34	Vertical
2112.0	-48.99	2.87	27.58	-24.28	-13	-11.28	Vertical
2112.0	-49.42	2.87	27.58	-24.71	-13	-11.71	Horizontal
205.1	-37.08	1.31	16.97	-21.42	-13	-8.42	Vertical
302.1	-39.90	1.65	16.70	-24.85	-13	-11.85	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-47.42	2.61	27.28	-22.75	-13	-9.75	Horizontal
1415.0	-49.71	2.61	27.28	-25.04	-13	-12.04	Vertical
2122.5	-50.60	2.87	27.59	-25.88	-13	-12.88	Vertical
2122.5	-51.96	2.87	27.59	-27.24	-13	-14.24	Horizontal
183.5	-44.86	1.72	17.99	-28.59	-13	-15.59	Vertical
241.4	-34.54	1.73	17.94	-18.33	-13	-5.33	Horizontal
Test Results for High Channel 711MHz							
1422.0	-48.03	2.62	27.28	-23.37	-13	-10.37	Horizontal
1422.0	-53.08	2.62	27.28	-28.42	-13	-15.42	Vertical
2133.0	-52.39	2.87	27.60	-27.66	-13	-14.66	Vertical
2133.0	-50.65	2.87	27.60	-25.92	-13	-12.92	Horizontal
198.7	-34.88	1.58	15.93	-20.53	-13	-7.53	Vertical
453.1	-43.78	1.36	15.59	-29.55	-13	-16.55	Horizontal

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)

. Over Limit= : PMea(dBm)-Limit(dBm)

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

4G and SRD can be transmitted simultaneously which is the worst data recorded in the report.

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°C

Voltage =low voltage, DC 10.8V, Normal, DC 12V and High voltage, DC 13.2V.

Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to -30ºC 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 +50ºC is reached.

Frequency Stability vs Voltage:

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

MODES TESTED

LTE Band 2/4/12

RESULTS

See the following pages.

10.1 LTE BAND 2

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
10.8	1880	12.8	0.006816	2.5
12	1880	13.4	0.007139	2.5
13.2	1880	13.0	0.006928	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	12.2	0.006500	2.5
Extreme (50C)	1880	11.9	0.006328	2.5
Extreme (40C)	1880	13.6	0.007216	2.5
Extreme (30C)	1880	13.4	0.007142	2.5
Extreme (10C)	1880	14.1	0.007524	2.5
Extreme (0C)	1880	12.3	0.006544	2.5
Extreme (-10C)	1880	12.6	0.006716	2.5
Extreme (-20C)	1880	14.1	0.007524	2.5
Extreme (-30C)	1880	14.4	0.007677	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]
10.8	1880	9.5	0.005077	2.5
12	1880	9.0	0.004783	2.5
13.2	1880	8.0	0.004235	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.6	0.005112	2.5
Extreme (50C)	1880	8.5	0.004541	2.5
Extreme (40C)	1880	8.4	0.004484179	2.5
Extreme (30C)	1880	9.1	0.004825081	2.5
Extreme (10C)	1880	8.9	0.004713259	2.5
Extreme (0C)	1880	8.0	0.004249255	2.5
Extreme (-10C)	1880	9.3	0.004971171	2.5
Extreme (-20C)	1880	8.7	0.004639015	2.5
Extreme (-30C)	1880	8.2	0.004357944	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]
10.8	1732.5	8.4	0.004850	2.5
12	1732.5	9.4	0.005414	2.5
13.2	1732.5	8.3	0.004765	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.1	0.004704	2.5
Extreme (50C)	1732.5	9.0	0.005193	2.5
Extreme (40C)	1732.5	7.8	0.004475	2.5
Extreme (30C)	1732.5	5.8	0.003321	2.5
Extreme (10C)	1732.5	7.3	0.004213	2.5
Extreme (0C)	1732.5	9.5	0.005484	2.5
Extreme (-10C)	1732.5	8.5	0.004910	2.5
Extreme (-20C)	1732.5	6.6	0.003834	2.5
Extreme (-30C)	1732.5	8.1	0.004668	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]
10.8	1732.5	9.5	0.005473	2.5
12	1732.5	8.4	0.004855	2.5
13.2	1732.5	7.7	0.004439	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	9.4	0.005426	2.5
Extreme (50C)	1732.5	9.1	0.005272	2.5
Extreme (40C)	1732.5	8.6	0.004936	2.5
Extreme (30C)	1732.5	8.7	0.005045	2.5
Extreme (10C)	1732.5	9.0	0.005175	2.5
Extreme (0C)	1732.5	7.9	0.004560	2.5
Extreme (-10C)	1732.5	9.3	0.005374	2.5
Extreme (-20C)	1732.5	8.9	0.005152	2.5
Extreme (-30C)	1732.5	7.6	0.004407	2.5

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

10.3 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]
10.8	707.5	8.8	0.012448	2.5
12	707.5	9.7	0.013729	2.5
13.2	707.5	8.8	0.012449	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.5	0.012073	2.5
Extreme (50C)	707.5	7.6	0.010700	2.5
Extreme (40C)	707.5	7.9	0.011097	2.5
Extreme (30C)	707.5	8.6	0.012175	2.5
Extreme (10C)	707.5	6.9	0.009791	2.5
Extreme (0C)	707.5	9.2	0.013063	2.5
Extreme (-10C)	707.5	8.6	0.012208	2.5
Extreme (-20C)	707.5	8.8	0.012472	2.5
Extreme (-30C)	707.5	7.6	0.010744	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]
10.8	707.5	7.3	0.010277	2.5
12	707.5	8.3	0.011728	2.5
13.2	707.5	7.2	0.010236	2.5

Frequency error vs. Temperature

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

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

11. Peak-to-Average Ratio

11.1 Description of the PAR Measurement

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

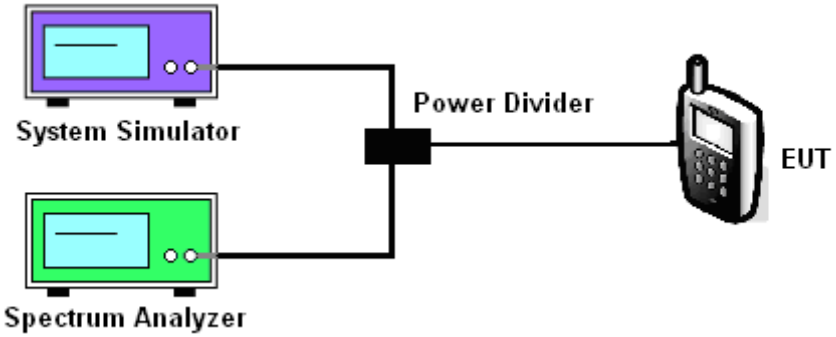
11.2 Measuring Instruments

See list of measuring instruments of this test report.

11.3 Test Procedures

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

11.4 Test Setup



MODES TESTED

LTE Band 2/4/12

Test data reference attachment.

----END OF REPORT----