

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

FCC ID: 2BKKN-Y-002

Product: Gps Tracker

Trade Mark: 精追

Model No.: Y-002

Family Model: Y-003, Y-011, Y-012, Y-013, Y-014, Y-015,
Y-106, Y-017

Report No.: S24062900901002

Issue Date: Jul. 23, 2024

Prepared for

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TEST RESULT CERTIFICATION

Applicant's name : Shenzhen Yanyi Technology Co. Ltd

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Manufacturer's Name..... : Shenzhen Yanyi Technology Co. Ltd

Address..... : 505, Building C, Xintang Wisdom Park, Bantian Street, Longgang District, Shenzhen, Guangdong, China

Product name..... : Gps Tracker

Model and/or type reference .. : Y-002

Trade Mark..... : 精追

Family Model..... : Y-003, Y-011, Y-012, Y-013, Y-014, Y-015, Y-106, Y-017

Test Sample Number..... S240629009001

Standards..... : FCC CFR 47 Part 22H, Part 24E, Part 27

Test procedure ANSI C63.26:2015
ANSI/TIA-603-E-2016

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date (s) of performance of tests..... Jun. 29, 2024 ~ Jul. 23, 2024

Date of Issue Jul. 23, 2024

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

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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Gps Tracker
Trade Mark	精追
Model Name	Y-002
Family Model	Y-003, Y-011, Y-012, Y-013, Y-014, Y-015, Y-106, Y-017
Model Difference	All models are the same circuit and RF module, except for appearances.
FCC ID:	2BKKN-Y-002
Frequency Bands:	U.S. Bands: ☒ 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, LTE FDD Band 66 Uplink: 1710MHz-1780MHz, Downlink: 2110MHz-2200MHz;
Type of Modulation:	QPSK/16QAM/64QAM(Only Downlink)
Power Class	Class 3
SIM Card:	SIM 1 and SIM 2 is a chipset unit and tested as a single chipset. The SIM 1 is chosen for test.
Antenna:	PIFA Antenna
Antenna gain:	Band 2: 0.8 dBi, Band 4: 0.8dBi, Band 5: 0.3 dBi, Band 7: 1.0dBi, Band 66: 0.8dBi,
Adapter	N/A
Battery	DC 3.7V, 250mAh, 0.925Wh
Power supply	DC 3.7V from battery or DC 9-90V from DC port
Extreme Vol. Limits:	DC 3.15V to DC 4.26V (Nominal DC 3.7V) (Note 1)
HW Version	N/A
SW Version	N/A
** 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: 2BKKN-Y-002** filing to comply with the FCC Part 22H&24E&27

1.3 TEST METHODOLOGY

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

1.4 TEST FACILITY

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

ShenZhen NTEK Testing Technology Co., Ltd.

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

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

FCC Registration No.:463705

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

MEASUREMENT UNCERTAINTY

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

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

1.5 SPECIAL ACCESSORIES

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

1.6 WORST-CASE CONFIGURATION AND MODE

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

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

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	Gps Tracker	Y-002	FCC ID: 2BKKN-Y-002	EUT

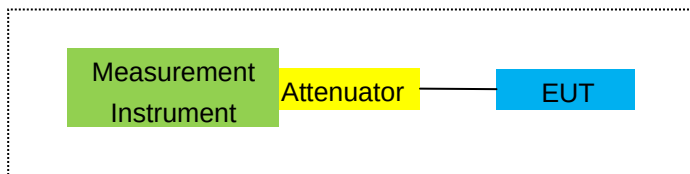
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

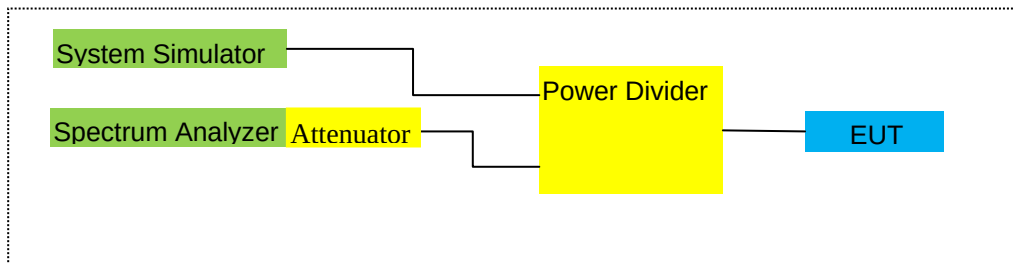
For Radiated Test Cases



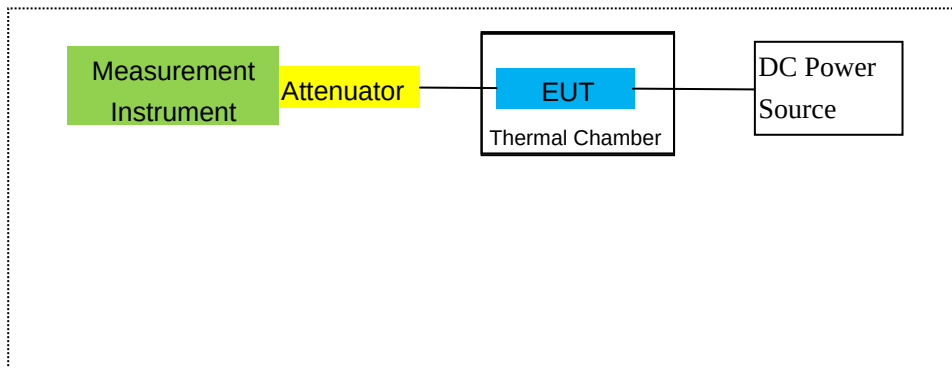
For Conducted Output Power



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	2024.04.26	2025.04.25	1 year
2	Test Receiver	R&S	ESPI	101318	2024.03.12	2025.03.11	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2024.03.11	2025.03.10	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2023.05.06	2026.05.05	3 year
5	Horn Antenna	EM	EM-AH-10180	2011071402	2024.05.12	2027.05.11	3 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2024.05.12	2027.05.11	3 year
7	Amplifier	EM	EM-30180	060538	2024.04.26	2025.04.25	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2024.03.12	2025.03.11	1 year
9	Power Meter	R&S	NRVS	100696	2024.04.26	2025.04.25	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2024.03.12	2025.03.11	1 year
11	Test Cable	N/A	R-01	N/A	2022.06.17	2025.06.16	3 year
12	Test Cable	N/A	R-02	N/A	2022.06.17	2025.06.16	3 year
13	Test Cable	N/A	R-03	N/A	2022.06.17	2025.06.16	3 year
14	Test Receiver	R&S	ESCI	101160	2024.03.12	2025.03.11	1 year
15	LISN	R&S	ENV216	101313	2024.03.12	2025.03.11	1 year
16	LISN	EMCO	3816/2	00042990	2024.03.12	2025.03.11	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2024.03.12	2025.03.11	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2024.03.12	2025.03.11	1 year
19	Test Cable	N/A	C01	N/A	2023.05.06	2026.05.05	3 year
20	Test Cable	N/A	C02	N/A	2023.05.06	2026.05.05	3 year
21	Test Cable	N/A	C03	N/A	2023.05.06	2026.05.05	3 year
22	Attenuator	MCE	24-10-34	BN9258	2024.03.12	2025.03.11	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2024.03.12	2025.03.11	1 year
24	test receiver	R&S	ESCI	a0304218	2024.03.12	2025.03.11	1 year
25	Communication Tester	R&S	CMU200	A0304247	2023.05.06	2026.05.05	3 year

26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2024.03.12	2025.03.11	1 year
27	DC Power Source	N/A	PS-6005D	20170402923	2023.05.06	2026.05.05	3 year
28	MXG Vector Signal Generator	Agilent	N5182A	MY47070317	2024.04.25	2025.04.24	1 year
29	Communication Tester	R&S	CMW500	148500	2024.04.26	2025.04.25	1 year

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable& DC Power Source which is scheduled for calibration every 3 years.

4. OUTPUT POWER

4.1 OUTPUT POWER MEASUREMENT

LTE Measurement Procedure:

All LTE bands conducted power peak and average are obtained from the CMW500 telecommunication test set. The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS_01".³

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 ¹	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

Test data reference attachment.

5. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

MODES TESTED

☐

Band 2/4/5/7/66

RESULTS

PASS

Test data reference attachment.

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53, and §90.691

FCC: §22.359

LIMITS

FCC: §22.917, §24.238, §27.53

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

(m)(4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Show citation box.

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

FCC: §90.691 Emission mask requirements for EA-based systems.

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

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, §22.901, §22.917, §24.238, §27.53 and §90.691

LIMITS

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

TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

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

MODES TESTED

- ☐ Band 2/4/5/7/66
- ☐

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 and §90.635

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.

90.635(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17

KDB 971168 v02r01 RF power output using broadband peak and average power meter method.

KDB 971168 D01 Power Meas License Digital Systems v02r01, "Measurement Guidance for Certification of Licensed Digital Transmitters"

MODES TESTED

☐ Band 2/4/5/7/66

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	-1.52	3.76	28.24	22.96	197.697	Horizontal	Pass
		1880	-0.71	3.91	28.22	23.60	229.087	Horizontal	Pass
		1909.3	-0.64	3.93	28.20	23.63	230.675	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-1.34	3.77	28.23	23.12	205.116	Horizontal	Pass
		1880	-0.90	3.91	28.24	23.43	220.293	Horizontal	Pass
		1908.5	-1.44	3.94	28.25	22.87	193.642	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-0.87	3.77	28.31	23.67	232.809	Horizontal	Pass
		1880	-0.56	3.91	28.22	23.75	237.137	Horizontal	Pass
		1907.5	-0.93	3.94	28.20	23.33	215.278	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-1.42	3.79	28.33	23.12	205.116	Horizontal	Pass
		1880	-0.64	3.95	28.22	23.63	230.675	Horizontal	Pass
		1905	-1.09	3.97	28.19	23.13	205.589	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-1.58	3.79	28.34	22.97	198.153	Horizontal	Pass
		1880	-1.16	3.95	28.22	23.11	204.644	Horizontal	Pass
		1902.5	-1.31	3.97	28.18	22.90	194.984	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-1.08	3.81	28.35	23.46	221.820	Horizontal	Pass
		1880	-0.49	3.96	28.22	23.77	238.232	Horizontal	Pass
		1900	-0.93	4.00	28.16	23.23	210.378	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-2.62	3.76	28.24	21.86	153.462	Vertical	Pass
		1880	-1.90	3.91	28.22	22.41	174.181	Vertical	Pass
		1909.3	-2.17	3.93	28.20	22.10	162.181	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-1.67	3.77	28.23	22.79	190.108	Vertical	Pass
		1880	-1.91	3.91	28.24	22.42	174.582	Vertical	Pass
		1908.5	-2.10	3.94	28.25	22.21	166.341	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-1.90	3.77	28.31	22.64	183.654	Vertical	Pass
		1880	-2.13	3.91	28.22	22.18	165.196	Vertical	Pass
		1907.5	-1.98	3.94	28.20	22.28	169.044	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	-1.88	3.79	28.33	22.66	184.502	Vertical	Pass
		1880	-1.56	3.95	28.22	22.71	186.638	Vertical	Pass
		1905	-1.81	3.97	28.19	22.41	174.181	Vertical	Pass
15.0MHz Band	1/#Mid	1857.5	-2.32	3.79	28.34	22.23	167.109	Vertical	Pass
		1880	-2.25	3.95	28.22	22.02	159.221	Vertical	Pass

QPSK		1902.5	-2.05	3.97	28.18	22.16	164.437	Vertical	Pass
20.0MHz	1/#Mid	1860	-2.11	3.81	28.35	22.43	174.985	Vertical	Pass
Band		1880	-2.12	3.96	28.22	22.14	163.682	Vertical	Pass
QPSK		1900	-1.53	4.00	28.16	22.63	183.231	Vertical	Pass

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 16 QAM	1/#Mid	1850.7	-2.19	3.76	28.24	22.29	169.434	Horizontal	Pass
		1880	-1.66	3.91	28.22	22.65	184.077	Horizontal	Pass
		1909.3	-1.63	3.93	28.20	22.64	183.654	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-2.28	3.77	28.23	22.18	165.196	Horizontal	Pass
		1880	-2.38	3.91	28.24	21.95	156.675	Horizontal	Pass
		1908.5	-1.77	3.94	28.25	22.54	179.473	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-2.54	3.77	28.31	22.00	158.489	Horizontal	Pass
		1880	-1.71	3.91	28.22	22.60	181.970	Horizontal	Pass
		1907.5	-2.17	3.94	28.20	22.09	161.808	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-1.94	3.79	28.33	22.60	181.970	Horizontal	Pass
		1880	-2.05	3.95	28.22	22.22	166.725	Horizontal	Pass
		1905	-1.71	3.97	28.19	22.51	178.238	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-1.98	3.79	28.34	22.57	180.717	Horizontal	Pass
		1880	-2.27	3.95	28.22	22.00	158.489	Horizontal	Pass
		1902.5	-2.30	3.97	28.18	21.91	155.239	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-1.96	3.81	28.35	22.58	181.134	Horizontal	Pass
		1880	-1.93	3.96	28.22	22.33	171.002	Horizontal	Pass
		1900	-1.41	4.00	28.16	22.75	188.365	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-3.45	3.76	28.24	21.03	126.765	Vertical	Pass
		1880	-3.22	3.91	28.22	21.09	128.529	Vertical	Pass
		1909.3	-3.27	3.93	28.20	21.00	125.893	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-2.93	3.77	28.23	21.53	142.233	Vertical	Pass
		1880	-3.39	3.91	28.24	20.94	124.165	Vertical	Pass
		1908.5	-2.71	3.94	28.25	21.60	144.544	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-3.21	3.77	28.31	21.33	135.831	Vertical	Pass
		1880	-2.64	3.91	28.22	21.67	146.893	Vertical	Pass
		1907.5	-2.78	3.94	28.20	21.48	140.605	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-3.25	3.79	28.33	21.29	134.586	Vertical	Pass
		1880	-2.67	3.95	28.22	21.60	144.544	Vertical	Pass
		1905	-3.05	3.97	28.19	21.17	130.918	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-3.64	3.79	28.34	20.91	123.310	Vertical	Pass
		1880	-3.27	3.95	28.22	21.00	125.893	Vertical	Pass
		1902.5	-2.58	3.97	28.18	21.63	145.546	Vertical	Pass

20.0MHz	1/#Mid	1860	-3.24	3.81	28.35	21.30	134.896	Vertical	Pass
Band 16		1880	-3.39	3.96	28.22	20.87	122.180	Vertical	Pass
QAM		1900	-2.78	4.00	28.16	21.38	137.404	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	-0.24	3.12	27.58	24.22	264.241	Horizontal	Pass
		1732.5	-0.05	3.27	27.61	24.29	268.534	Horizontal	Pass
		1754.3	-0.23	3.29	27.63	24.11	257.632	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-0.60	3.13	27.61	23.88	244.343	Horizontal	Pass
		1732.5	0.41	3.27	27.61	24.75	298.538	Horizontal	Pass
		1753.5	-0.16	3.30	27.62	24.16	260.615	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-0.08	3.13	27.63	24.42	276.694	Horizontal	Pass
		1732.5	0.43	3.27	27.61	24.77	299.916	Horizontal	Pass
		1752.5	0.19	3.30	27.60	24.49	281.190	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-0.52	3.15	27.64	23.97	249.459	Horizontal	Pass
		1732.5	-0.43	3.31	27.61	23.87	243.781	Horizontal	Pass
		1750	0.50	3.33	27.59	24.76	299.226	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-0.21	3.15	27.65	24.29	268.534	Horizontal	Pass
		1732.5	0.00	3.31	27.61	24.30	269.153	Horizontal	Pass
		1747.5	0.02	3.33	27.57	24.26	266.686	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-0.32	3.17	27.66	24.17	261.216	Horizontal	Pass
		1732.5	0.45	3.32	27.61	24.74	297.852	Horizontal	Pass
		1745	0.30	3.36	27.56	24.50	281.838	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-1.42	3.12	27.58	23.04	201.372	Vertical	Pass
		1732.5	-1.03	3.27	27.61	23.31	214.289	Vertical	Pass
		1754.3	-0.64	3.29	27.63	23.70	234.423	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-0.92	3.13	27.61	23.56	226.986	Vertical	Pass
		1732.5	-1.39	3.27	27.61	22.95	197.242	Vertical	Pass
		1753.5	-1.24	3.30	27.62	23.08	203.236	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-1.02	3.13	27.63	23.48	222.844	Vertical	Pass
		1732.5	-0.85	3.27	27.61	23.49	223.357	Vertical	Pass
		1752.5	-0.98	3.30	27.60	23.32	214.783	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-0.76	3.15	27.64	23.73	236.048	Vertical	Pass
		1732.5	-0.89	3.31	27.61	23.41	219.280	Vertical	Pass
		1750	-0.77	3.33	27.59	23.49	223.357	Vertical	Pass

15.0MHz Band QPSK	1/#Mid	1717.5	-0.94	3.15	27.65	23.56	226.986	Vertical	Pass
		1732.5	-1.49	3.31	27.61	22.81	190.985	Vertical	Pass
		1747.5	-0.45	3.33	27.57	23.79	239.332	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	1720	-0.99	3.17	27.66	23.50	223.872	Vertical	Pass
		1732.5	-1.46	3.32	27.61	22.83	191.867	Vertical	Pass
		1745	-0.90	3.36	27.56	23.30	213.796	Vertical	Pass

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 16 QAM	1/#Mid	1710.7	-1.12	3.12	27.58	23.34	215.774	Horizontal	Pass
		1732.5	-0.97	3.27	27.61	23.37	217.270	Horizontal	Pass
		1754.3	-0.85	3.29	27.63	23.49	223.357	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-1.46	3.13	27.61	23.02	200.447	Horizontal	Pass
		1732.5	-1.45	3.27	27.61	22.89	194.536	Horizontal	Pass
		1753.5	-1.27	3.30	27.62	23.05	201.837	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-1.26	3.13	27.63	23.24	210.863	Horizontal	Pass
		1732.5	-0.92	3.27	27.61	23.42	219.786	Horizontal	Pass
		1752.5	-0.80	3.30	27.60	23.50	223.872	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-1.62	3.15	27.64	22.87	193.642	Horizontal	Pass
		1732.5	-1.04	3.31	27.61	23.26	211.836	Horizontal	Pass
		1750	-0.61	3.33	27.59	23.65	231.739	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-0.82	3.15	27.65	23.68	233.346	Horizontal	Pass
		1732.5	-1.36	3.31	27.61	22.94	196.789	Horizontal	Pass
		1747.5	-0.73	3.33	27.57	23.51	224.388	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-1.33	3.17	27.66	23.16	207.014	Horizontal	Pass
		1732.5	-0.65	3.32	27.61	23.64	231.206	Horizontal	Pass
		1745	-0.52	3.36	27.56	23.68	233.346	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-1.98	3.12	27.58	22.48	177.011	Vertical	Pass
		1732.5	-1.87	3.27	27.61	22.47	176.604	Vertical	Pass
		1754.3	-2.51	3.29	27.63	21.83	152.405	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-1.95	3.13	27.61	22.53	179.061	Vertical	Pass
		1732.5	-1.72	3.27	27.61	22.62	182.810	Vertical	Pass
		1753.5	-1.69	3.30	27.62	22.63	183.231	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.05	3.13	27.63	22.45	175.792	Vertical	Pass
		1732.5	-1.79	3.27	27.61	22.55	179.887	Vertical	Pass
		1752.5	-2.09	3.30	27.60	22.21	166.341	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-1.95	3.15	27.64	22.54	179.473	Vertical	Pass
		1732.5	-1.89	3.31	27.61	22.41	174.181	Vertical	Pass
		1750	-1.97	3.33	27.59	22.29	169.434	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-2.46	3.15	27.65	22.04	159.956	Vertical	Pass
		1732.5	-1.53	3.31	27.61	22.77	189.234	Vertical	Pass
		1747.5	-1.71	3.33	27.57	22.53	179.061	Vertical	Pass

20.0MHz	1/#Mid	1720	-1.82	3.17	27.66	22.67	184.927	Vertical	Pass
Band 16		1732.5	-2.27	3.32	27.61	22.02	159.221	Vertical	Pass
QAM		1745	-1.83	3.36	27.56	22.37	172.584	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. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	3/#Mid	824.7	5.85	2.01	19.68	2.15	21.37	137.088	Horizontal	Pass
		836.5	6.00	2.01	19.77	2.15	21.61	144.877	Horizontal	Pass
		848.3	6.19	2.02	19.82	2.15	21.84	152.757	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	825.5	6.13	2.01	19.70	2.15	21.67	146.893	Horizontal	Pass
		836.5	6.03	2.01	19.77	2.15	21.64	145.881	Horizontal	Pass
		847.5	5.91	2.02	19.81	2.15	21.55	142.889	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	826.5	6.11	2.01	19.71	2.15	21.66	146.555	Horizontal	Pass
		836.5	5.75	2.01	19.77	2.15	21.36	136.773	Horizontal	Pass
		846.5	6.05	2.02	19.79	2.15	21.67	146.893	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	829	5.89	2.01	19.73	2.15	21.46	139.959	Horizontal	Pass
		836.5	6.26	2.01	19.77	2.15	21.87	153.815	Horizontal	Pass
		844	6.56	2.02	19.78	2.15	22.17	164.816	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	824.7	5.31	2.01	19.68	2.15	20.83	121.060	Vertical	Pass
		836.5	5.56	2.01	19.77	2.15	21.17	130.918	Vertical	Pass
		848.3	5.62	2.02	19.82	2.15	21.27	133.968	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	825.5	4.79	2.01	19.70	2.15	20.33	107.895	Vertical	Pass
		836.5	5.22	2.01	19.77	2.15	20.83	121.060	Vertical	Pass
		847.5	4.71	2.02	19.81	2.15	20.35	108.393	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	826.5	4.80	2.01	19.71	2.15	20.35	108.393	Vertical	Pass
		836.5	4.83	2.01	19.77	2.15	20.44	110.662	Vertical	Pass
		846.5	5.62	2.02	19.79	2.15	21.24	133.045	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	829	5.22	2.01	19.73	2.15	20.79	119.950	Vertical	Pass
		836.5	4.83	2.01	19.77	2.15	20.44	110.662	Vertical	Pass
		844	5.61	2.02	19.78	2.15	21.22	132.434	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. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	3/#Mid	824.7	5.18	2.01	19.68	2.15	20.70	117.490	Horizontal	Pass
		836.5	4.74	2.01	19.77	2.15	20.35	108.393	Horizontal	Pass
		848.3	5.15	2.02	19.82	2.15	20.80	120.226	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	5.08	2.01	19.70	2.15	20.62	115.345	Horizontal	Pass
		836.5	5.37	2.01	19.77	2.15	20.98	125.314	Horizontal	Pass
		847.5	5.07	2.02	19.81	2.15	20.71	117.761	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	4.80	2.01	19.71	2.15	20.35	108.393	Horizontal	Pass
		836.5	5.01	2.01	19.77	2.15	20.62	115.345	Horizontal	Pass
		846.5	4.87	2.02	19.79	2.15	20.49	111.944	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	829	5.14	2.01	19.73	2.15	20.71	117.761	Horizontal	Pass
		836.5	5.27	2.01	19.77	2.15	20.88	122.462	Horizontal	Pass
		844	4.81	2.02	19.78	2.15	20.42	110.154	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	824.7	4.76	2.01	19.68	2.15	20.28	106.660	Vertical	Pass
		836.5	4.34	2.01	19.77	2.15	19.95	98.855	Vertical	Pass
		848.3	4.00	2.02	19.82	2.15	19.65	92.257	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	4.57	2.01	19.70	2.15	20.11	102.565	Vertical	Pass
		836.5	4.65	2.01	19.77	2.15	20.26	106.170	Vertical	Pass
		847.5	4.58	2.02	19.81	2.15	20.22	105.196	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	4.38	2.01	19.71	2.15	19.93	98.401	Vertical	Pass
		836.5	4.04	2.01	19.77	2.15	19.65	92.257	Vertical	Pass
		846.5	4.49	2.02	19.79	2.15	20.11	102.565	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	829	4.49	2.01	19.73	2.15	20.06	101.391	Vertical	Pass
		836.5	4.56	2.01	19.77	2.15	20.17	103.992	Vertical	Pass
		844	3.79	2.02	19.78	2.15	19.40	87.096	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

ERP(dBm)=EIRP-2.15

8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
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	
5.0MHz Band QPSK	1/#Mid	2502.5	-0.59	4.54	27.75	22.62	182.810	Horizontal	Pass
		2535	-0.72	4.69	27.72	22.31	170.216	Horizontal	Pass
		2567.5	-0.49	4.71	27.71	22.51	178.238	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-0.73	4.55	27.76	22.48	177.011	Horizontal	Pass
		2535	-0.57	4.69	27.72	22.46	176.198	Horizontal	Pass
		2565	-0.18	4.72	27.70	22.80	190.546	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-0.84	4.55	27.77	22.38	172.982	Horizontal	Pass
		2535	-0.78	4.69	27.72	22.25	167.880	Horizontal	Pass
		2562.5	-0.78	4.72	27.69	22.19	165.577	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-0.64	4.57	27.78	22.57	180.717	Horizontal	Pass
		2535	-0.36	4.73	27.72	22.63	183.231	Horizontal	Pass
		2560	-0.47	4.75	27.68	22.46	176.198	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-2.03	4.54	27.75	21.18	131.220	Vertical	Pass
		2535	-1.61	4.69	27.72	21.42	138.676	Vertical	Pass
		2567.5	-1.05	4.71	27.71	21.95	156.675	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-1.40	4.55	27.76	21.81	151.705	Vertical	Pass
		2535	-1.68	4.69	27.72	21.35	136.458	Vertical	Pass
		2565	-1.65	4.72	27.70	21.33	135.831	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-1.39	4.55	27.77	21.83	152.405	Vertical	Pass
		2535	-1.65	4.69	27.72	21.38	137.404	Vertical	Pass
		2562.5	-1.38	4.72	27.69	21.59	144.212	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-1.85	4.57	27.78	21.36	136.773	Vertical	Pass
		2535	-1.54	4.73	27.72	21.45	139.637	Vertical	Pass
		2560	-1.47	4.75	27.68	21.46	139.959	Vertical	Pass

Radiated Power (EIRP) for Band 7									
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	
5.0MHz Band 16 QAM	1/#Mid	2502.5	-2.10	4.54	27.75	21.11	129.122	Horizontal	Pass
		2535	-1.98	4.69	27.72	21.05	127.350	Horizontal	Pass
		2567.5	-1.27	4.71	27.71	21.73	148.936	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-1.58	4.55	27.76	21.63	145.546	Horizontal	Pass
		2535	-1.34	4.69	27.72	21.69	147.571	Horizontal	Pass
		2565	-1.07	4.72	27.70	21.91	155.239	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-2.02	4.55	27.77	21.20	131.826	Horizontal	Pass
		2535	-1.39	4.69	27.72	21.64	145.881	Horizontal	Pass
		2562.5	-1.72	4.72	27.69	21.25	133.352	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-2.19	4.57	27.78	21.02	126.474	Horizontal	Pass
		2535	-1.87	4.73	27.72	21.12	129.420	Horizontal	Pass
		2560	-1.67	4.75	27.68	21.26	133.660	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-2.26	4.54	27.75	20.95	124.451	Vertical	Pass
		2535	-2.40	4.69	27.72	20.63	115.611	Vertical	Pass
		2567.5	-2.26	4.71	27.71	20.74	118.577	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-2.51	4.55	27.76	20.70	117.490	Vertical	Pass
		2535	-2.87	4.69	27.72	20.16	103.753	Vertical	Pass
		2565	-2.42	4.72	27.70	20.56	113.763	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-3.06	4.55	27.77	20.16	103.753	Vertical	Pass
		2535	-2.93	4.69	27.72	20.10	102.329	Vertical	Pass
		2562.5	-2.70	4.72	27.69	20.27	106.414	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-2.83	4.57	27.78	20.38	109.144	Vertical	Pass
		2535	-2.04	4.73	27.72	20.95	124.451	Vertical	Pass
		2560	-2.47	4.75	27.68	20.46	111.173	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)

8.6 LTE BAND 66

Radiated Power (EIRP) for Band 66									
Mode	RB/RB SIZE	Frequency	Result					Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP	Max. EIRP		
						Average (dBm)	Average (mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-0.16	3.76	28.24	24.32	270.396	Horizontal	Pass
		1745	-0.02	3.91	28.22	24.29	268.534	Horizontal	Pass
		1779.3	0.11	3.93	28.2	24.38	274.157	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-0.22	3.77	28.23	24.24	265.461	Horizontal	Pass
		1745	-0.13	3.91	28.24	24.20	263.027	Horizontal	Pass
		1778.5	-0.15	3.94	28.25	24.16	260.615	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-0.12	3.77	28.31	24.42	276.694	Horizontal	Pass
		1745	0.20	3.91	28.22	24.51	282.488	Horizontal	Pass
		1777.5	0.14	3.94	28.2	24.40	275.423	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-0.01	3.79	28.33	24.53	283.792	Horizontal	Pass
		1745	0.26	3.95	28.22	24.53	283.792	Horizontal	Pass
		1775	0.25	3.97	28.19	24.47	279.898	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-0.03	3.79	28.34	24.52	283.139	Horizontal	Pass
		1745	0.16	3.95	28.22	24.43	277.332	Horizontal	Pass
		1772.5	0.21	3.97	28.18	24.42	276.694	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	0.00	3.81	28.35	24.54	284.446	Horizontal	Pass
		1745	0.26	3.96	28.22	24.52	283.139	Horizontal	Pass
		1770	0.24	4	28.16	24.40	275.423	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-1.64	3.76	28.24	22.84	192.309	Vertical	Pass
		1745	-1.24	3.91	28.22	23.07	202.768	Vertical	Pass
		1779.3	-0.95	3.93	28.2	23.32	214.783	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-1.46	3.77	28.23	23.00	199.526	Vertical	Pass
		1745	-0.90	3.91	28.24	23.43	220.293	Vertical	Pass
		1778.5	-0.98	3.94	28.25	23.33	215.278	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-1.34	3.77	28.31	23.20	208.930	Vertical	Pass
		1745	-1.26	3.91	28.22	23.05	201.837	Vertical	Pass
		1777.5	-0.73	3.94	28.2	23.53	225.424	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-1.51	3.79	28.34	23.04	201.372	Vertical	Pass
		1745	-0.52	3.95	28.22	23.75	237.137	Vertical	Pass
		1775	-1.00	3.97	28.18	23.21	209.411	Vertical	Pass

15.0MHz		1717.5	-0.83	3.81	28.35	23.71	234.963	Vertical	Pass
Band	1/#Mid	1745	-1.04	3.96	28.22	23.22	209.894	Vertical	Pass
QPSK		1772.5	-1.08	4	28.16	23.08	203.236	Vertical	Pass
20.0MHz		1720	-1.63	3.79	28.34	22.92	195.884	Vertical	Pass
Band	1/#Mid	1745	-1.05	3.95	28.22	23.22	209.894	Vertical	Pass
QPSK		1770	-0.76	3.97	28.18	23.45	221.309	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	Polarization Of Max. ERP	
							Average		
							(mW)		
1.4MHz Band 16 QAM	1/#Mid	1710.7	-0.99	3.76	28.24	23.49	223.357	Horizontal	Pass
		1745	-0.60	3.91	28.22	23.71	234.963	Horizontal	Pass
		1779.3	-0.78	3.93	28.2	23.49	223.357	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-1.38	3.77	28.23	23.08	203.236	Horizontal	Pass
		1745	-0.63	3.91	28.24	23.70	234.423	Horizontal	Pass
		1778.5	-0.92	3.94	28.25	23.39	218.273	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-0.80	3.77	28.31	23.74	236.592	Horizontal	Pass
		1745	-0.86	3.91	28.22	23.45	221.309	Horizontal	Pass
		1777.5	-0.53	3.94	28.2	23.73	236.048	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-0.85	3.79	28.33	23.69	233.884	Horizontal	Pass
		1745	-0.51	3.95	28.22	23.76	237.684	Horizontal	Pass
		1775	-0.83	3.97	28.19	23.39	218.273	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-0.84	3.79	28.34	23.71	234.963	Horizontal	Pass
		1745	-0.66	3.95	28.22	23.61	229.615	Horizontal	Pass
		1772.5	-0.45	3.97	28.18	23.76	237.684	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-0.67	3.81	28.35	23.87	243.781	Horizontal	Pass
		1745	-0.45	3.96	28.22	23.81	240.436	Horizontal	Pass
		1770	-0.39	4	28.16	23.77	238.232	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-0.83	3.76	28.24	23.65	231.739	Vertical	Pass
		1745	-0.60	3.91	28.22	23.71	234.963	Vertical	Pass
		1779.3	-1.95	3.93	28.2	22.32	170.608	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-0.76	3.77	28.23	23.70	234.423	Vertical	Pass
		1745	-1.70	3.91	28.24	22.63	183.231	Vertical	Pass
		1778.5	-2.15	3.94	28.25	22.16	164.437	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.67	3.77	28.31	21.87	153.815	Vertical	Pass
		1745	-0.88	3.91	28.22	23.43	220.293	Vertical	Pass
		1777.5	-1.01	3.94	28.2	23.25	211.349	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-1.01	3.79	28.34	23.54	225.944	Vertical	Pass
		1745	-0.85	3.95	28.22	23.42	219.786	Vertical	Pass
		1775	-0.66	3.97	28.18	23.55	226.464	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-1.25	3.81	28.35	23.29	213.304	Vertical	Pass

Band 16		1745	-1.04	3.96	28.22	23.22	209.894	Vertical	Pass
QAM		1772.5	-2.12	4	28.16	22.04	159.956	Vertical	Pass
20.0MHz	1/#Mid	1720	-1.47	3.79	28.34	23.08	203.236	Vertical	Pass
Band 16		1745	-2.22	3.95	28.22	22.05	160.325	Vertical	Pass
QAM		1770	-0.84	3.97	28.18	23.37	217.270	Vertical	Pass

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53 and §90.691

LIMIT

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

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

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

TEST PROCEDURE

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

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

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

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

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

MODES TESTED

LTE Band 2/4/5/7/66

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	-50.23	4.04	33.51	-20.76	-13	-7.76	Horizontal
3701.4	-45.99	4.04	33.51	-16.52	-13	-3.52	Vertical
5552.1	-47.40	5.24	35.84	-16.80	-13	-3.80	Vertical
5552.1	-53.70	5.24	35.84	-23.10	-13	-10.10	Horizontal
196.5	-40.59	1.43	16.02	-26.00	-13	-13.00	Vertical
303.7	-39.12	1.30	17.99	-22.43	-13	-9.43	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-49.41	4.04	33.56	-19.89	-13	-6.89	Horizontal
3760.0	-44.27	4.04	33.56	-14.75	-13	-1.75	Vertical
5640.0	-51.62	5.24	35.91	-20.95	-13	-7.95	Vertical
5640.0	-50.65	5.24	35.91	-19.98	-13	-6.98	Horizontal
185.0	-40.97	1.62	16.97	-25.62	-13	-12.62	Vertical
331.9	-42.07	1.74	15.98	-27.84	-13	-14.84	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-51.11	4.04	34.00	-21.15	-13	-8.15	Horizontal
3818.6	-52.07	4.04	34.00	-22.11	-13	-9.11	Vertical
5727.9	-53.28	5.24	36.04	-22.48	-13	-9.48	Vertical
5727.9	-51.97	5.24	36.04	-21.17	-13	-8.17	Horizontal
199.7	-37.21	1.42	17.29	-21.34	-13	-8.34	Vertical
435.7	-35.73	1.50	17.90	-19.32	-13	-6.32	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	-48.73	4.07	33.54	-19.26	-13	-6.26	Horizontal
3720.0	-53.08	4.07	33.54	-23.61	-13	-10.61	Vertical
5580.0	-46.31	5.28	35.86	-15.73	-13	-2.73	Vertical
5580.0	-50.99	5.28	35.86	-20.41	-13	-7.41	Horizontal
202.6	-42.05	1.58	16.89	-26.73	-13	-13.73	Vertical
367.4	-40.34	1.76	17.26	-24.84	-13	-11.84	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-51.85	4.04	33.56	-22.33	-13	-9.33	Horizontal
3760.0	-50.15	4.04	33.56	-20.63	-13	-7.63	Vertical
5640.0	-52.82	5.24	35.91	-22.15	-13	-9.15	Vertical
5640.0	-49.87	5.24	35.91	-19.20	-13	-6.20	Horizontal
195.6	-43.52	1.46	16.27	-28.71	-13	-15.71	Vertical
312.0	-35.37	1.59	15.15	-21.81	-13	-8.81	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-47.23	4.04	34.00	-17.27	-13	-4.27	Horizontal
3800.0	-46.83	4.04	34.00	-16.87	-13	-3.87	Vertical
5700.0	-45.96	5.24	36.04	-15.16	-13	-2.16	Vertical
5700.0	-50.72	5.24	36.04	-19.92	-13	-6.92	Horizontal
200.9	-43.94	1.36	17.39	-27.90	-13	-14.90	Vertical
256.4	-43.15	1.66	15.39	-29.42	-13	-16.42	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	-52.53	4.02	29.80	-26.75	-13	-13.75	Horizontal
3421.4	-52.89	4.02	29.80	-27.11	-13	-14.11	Vertical
5132.1	-50.02	5.24	35.84	-19.42	-13	-6.42	Vertical
5132.1	-49.43	5.24	35.84	-18.83	-13	-5.83	Horizontal
197.4	-44.19	1.68	16.04	-29.83	-13	-16.83	Vertical
348.7	-42.59	1.78	17.74	-26.63	-13	-13.63	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-50.31	4.03	30.00	-24.34	-13	-11.34	Horizontal
3465.0	-50.52	4.03	30.00	-24.55	-13	-11.55	Vertical
5197.5	-48.61	5.25	35.86	-18.00	-13	-5.00	Vertical
5197.5	-51.14	5.25	35.86	-20.53	-13	-7.53	Horizontal
212.0	-38.14	1.72	17.69	-22.17	-13	-9.17	Vertical
374.6	-36.68	1.62	16.02	-22.27	-13	-9.27	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-45.41	4.05	30.01	-19.45	-13	-6.45	Horizontal
3508.6	-52.03	4.05	30.01	-26.07	-13	-13.07	Vertical
5262.9	-53.81	5.26	35.86	-23.21	-13	-10.21	Vertical
5262.9	-53.63	5.26	35.86	-23.03	-13	-10.03	Horizontal
198.3	-41.28	1.80	16.69	-26.39	-13	-13.39	Vertical
453.6	-34.78	1.75	16.66	-19.88	-13	-6.88	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	-51.11	4.02	29.80	-25.33	-13	-12.33	Horizontal
3440.0	-45.24	4.02	29.80	-19.46	-13	-6.46	Vertical
5160.0	-49.61	5.24	35.84	-19.01	-13	-6.01	Vertical
5160.0	-51.21	5.24	35.84	-20.61	-13	-7.61	Horizontal
190.7	-42.98	1.57	17.26	-27.29	-13	-14.29	Vertical
402.7	-41.93	1.78	16.35	-27.36	-13	-14.36	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-48.86	4.03	30.00	-22.89	-13	-9.89	Horizontal
3465.0	-49.63	4.03	30.00	-23.66	-13	-10.66	Vertical
5197.5	-49.44	5.25	35.86	-18.83	-13	-5.83	Vertical
5197.5	-49.86	5.25	35.86	-19.25	-13	-6.25	Horizontal
199.6	-35.24	1.44	17.95	-18.73	-13	-5.73	Vertical
326.6	-42.86	1.65	16.09	-28.42	-13	-15.42	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-50.21	2.91	27.68	-25.44	-13	-12.44	Horizontal
3490.0	-48.26	2.91	27.68	-23.49	-13	-10.49	Vertical
5235.0	-48.57	5.26	35.86	-17.97	-13	-4.97	Vertical
5235.0	-53.75	5.26	35.86	-23.15	-13	-10.15	Horizontal
197.3	-41.29	1.61	16.85	-26.05	-13	-13.05	Vertical
431.3	-40.89	1.61	15.19	-27.31	-13	-14.31	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	-50.61	2.78	27.50	-25.89	-13	-12.89	Horizontal
1649.4	-44.40	2.78	27.50	-19.68	-13	-6.68	Vertical
2474.1	-47.81	2.90	27.80	-22.91	-13	-9.91	Vertical
2474.1	-50.52	2.90	27.80	-25.62	-13	-12.62	Horizontal
197.6	-36.41	1.76	17.59	-20.58	-13	-7.58	Vertical
443.0	-41.97	1.63	15.87	-27.73	-13	-14.73	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-45.86	2.80	27.48	-21.18	-13	-8.18	Horizontal
1673.0	-47.64	2.80	27.48	-22.96	-13	-9.96	Vertical
2509.5	-47.72	2.91	27.70	-22.93	-13	-9.93	Vertical
2509.5	-53.76	2.91	27.70	-28.97	-13	-15.97	Horizontal
198.9	-38.67	1.61	15.68	-24.60	-13	-11.60	Vertical
246.4	-43.18	1.59	17.52	-27.26	-13	-14.26	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-52.11	2.82	27.43	-27.50	-13	-14.50	Horizontal
1696.6	-48.79	2.82	27.43	-24.18	-13	-11.18	Vertical
2544.9	-51.87	2.92	27.74	-27.05	-13	-14.05	Vertical
2544.9	-52.92	2.92	27.74	-28.10	-13	-15.10	Horizontal
191.0	-42.66	1.69	16.67	-27.67	-13	-14.67	Vertical
279.8	-36.24	1.70	17.18	-20.76	-13	-7.76	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	-53.36	2.78	27.50	-28.64	-13	-15.64	Horizontal
1658.0	-47.37	2.78	27.50	-22.65	-13	-9.65	Vertical
2487.0	-46.84	2.90	27.80	-21.94	-13	-8.94	Vertical
2487.0	-51.29	2.90	27.80	-26.39	-13	-13.39	Horizontal
175.2	-44.17	1.71	15.57	-30.31	-13	-17.31	Vertical
278.4	-36.26	1.34	16.40	-21.20	-13	-8.20	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-46.12	2.80	27.48	-21.44	-13	-8.44	Horizontal
1673.0	-52.66	2.80	27.48	-27.98	-13	-14.98	Vertical
2509.5	-45.45	2.91	27.70	-20.66	-13	-7.66	Vertical
2509.5	-49.62	2.91	27.70	-24.83	-13	-11.83	Horizontal
182.8	-36.37	1.44	17.04	-20.77	-13	-7.77	Vertical
281.6	-43.49	1.76	17.62	-27.63	-13	-14.63	Horizontal
Test Results for High Channel 844MHz							
1688.0	-51.98	2.82	27.43	-27.37	-13	-14.37	Horizontal
1688.0	-53.28	2.82	27.43	-28.67	-13	-15.67	Vertical
2532.0	-52.00	2.92	27.74	-27.18	-13	-14.18	Vertical
2532.0	-50.91	2.92	27.74	-26.09	-13	-13.09	Horizontal
212.3	-34.96	1.74	17.70	-19.00	-13	-6.00	Vertical
286.4	-44.79	1.41	17.46	-28.73	-13	-15.73	Horizontal

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

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

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

9.4 LTE BAND 7

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

Test Results for Low Channel 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-61.26	5.23	35.81	-30.68	-25	-5.68	Horizontal
5005.0	-59.09	5.23	35.81	-28.51	-25	-3.51	Vertical
7507.5	-60.69	5.67	36.85	-29.51	-25	-4.51	Vertical
7507.5	-61.98	5.67	36.85	-30.80	-25	-5.80	Horizontal
202.2	-47.94	1.73	17.97	-31.70	-25	-6.70	Vertical
391.1	-50.03	1.38	15.11	-36.30	-25	-11.30	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-59.32	5.23	35.82	-28.73	-25	-3.73	Horizontal
5070.0	-60.56	5.23	35.82	-29.97	-25	-4.97	Vertical
7605.0	-63.70	5.67	36.85	-32.52	-25	-7.52	Vertical
7605.0	-60.39	5.67	36.85	-29.21	-25	-4.21	Horizontal
179.0	-53.97	1.77	16.17	-39.56	-25	-14.56	Vertical
259.3	-47.59	1.63	15.21	-34.01	-25	-9.01	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-63.85	5.24	35.83	-33.26	-25	-8.26	Horizontal
5135.0	-64.71	5.24	35.83	-34.12	-25	-9.12	Vertical
7702.5	-60.99	5.68	36.87	-29.80	-25	-4.80	Vertical
7702.5	-59.67	5.68	36.87	-28.48	-25	-3.48	Horizontal
178.5	-47.13	1.58	17.56	-31.15	-25	-6.15	Vertical
268.7	-48.67	1.45	16.58	-33.54	-25	-8.54	Horizontal

QPSK EIRP POWER FOR LTE BAND 7 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 2510MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020.0	-64.16	5.23	35.82	-33.57	-25	-8.57	Horizontal
5020.0	-59.14	5.23	35.82	-28.55	-25	-3.55	Vertical
7530.0	-62.34	5.67	36.86	-31.15	-25	-6.15	Vertical
7530.0	-59.47	5.67	36.86	-28.28	-25	-3.28	Horizontal
204.1	-53.50	1.63	15.76	-39.37	-25	-14.37	Vertical
432.4	-52.02	1.71	15.44	-38.29	-25	-13.29	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-60.99	5.23	35.82	-30.40	-25	-5.40	Horizontal
5070.0	-61.35	5.23	35.82	-30.76	-25	-5.76	Vertical
7605.0	-61.18	5.67	36.85	-30.00	-25	-5.00	Vertical
7605.0	-61.49	5.67	36.85	-30.31	-25	-5.31	Horizontal
178.1	-45.66	1.79	16.84	-30.60	-25	-5.60	Vertical
362.7	-50.14	1.71	17.64	-34.21	-25	-9.21	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-63.61	5.24	35.83	-33.02	-25	-8.02	Horizontal
5120.0	-61.07	5.24	35.83	-30.48	-25	-5.48	Vertical
7680.0	-64.93	5.70	36.88	-33.75	-25	-8.75	Vertical
7680.0	-61.20	5.70	36.88	-30.02	-25	-5.02	Horizontal
194.8	-49.39	1.79	16.84	-34.33	-25	-9.33	Vertical
356.5	-46.45	1.71	17.64	-30.52	-25	-5.52	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

9.5 LTE BAND 66

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-52.47	3.84	35.81	-20.50	-13	-7.50	Horizontal
3421.4	-50.84	3.84	35.81	-18.87	-13	-5.87	Vertical
5132.1	-50.94	5.18	36.85	-19.27	-13	-6.27	Vertical
5132.1	-49.64	5.18	36.85	-17.97	-13	-4.97	Horizontal
203.6	-34.19	1.56	17.97	-17.78	-13	-4.78	Vertical
384.4	-44.13	1.33	15.11	-30.35	-13	-17.35	Horizontal
Test Results For Mid Channel 1745MHz							
3490.0	-52.42	3.85	35.82	-20.45	-13	-7.45	Horizontal
3490.0	-49.64	3.85	35.82	-17.67	-13	-4.67	Vertical
5235.0	-50.38	5.21	36.85	-18.74	-13	-5.74	Vertical
5235.0	-52.86	5.21	36.85	-21.22	-13	-8.22	Horizontal
185.4	-41.49	1.77	16.17	-27.08	-13	-14.08	Vertical
324.5	-42.53	1.63	15.21	-28.95	-13	-15.95	Horizontal
Test Results for High Channel 1779.3MHz							
3558.6	-52.83	3.86	35.83	-20.86	-13	-7.86	Horizontal
3558.6	-49.07	3.86	35.83	-17.10	-13	-4.10	Vertical
5337.9	-51.94	5.24	36.87	-20.31	-13	-7.31	Vertical
5337.9	-50.16	5.24	36.87	-18.53	-13	-5.53	Horizontal
188.4	-39.26	1.58	17.56	-23.28	-13	-10.28	Vertical
354.9	-44.70	1.45	16.58	-29.57	-13	-16.57	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	-51.83	3.84	35.82	-19.85	-13	-6.85	Horizontal
3440.0	-49.00	3.84	35.82	-17.02	-13	-4.02	Vertical
5160.0	-52.91	5.18	36.86	-21.23	-13	-8.23	Vertical
5160.0	-49.21	5.18	36.86	-17.53	-13	-4.53	Horizontal
183.7	-38.36	1.56	15.76	-24.16	-13	-11.16	Vertical
329.8	-36.49	1.33	15.44	-22.38	-13	-9.38	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-49.93	3.85	35.82	-17.96	-13	-4.96	Horizontal
3490.0	-51.79	3.85	35.82	-19.82	-13	-6.82	Vertical
5235.0	-50.43	5.21	36.85	-18.79	-13	-5.79	Vertical
5235.0	-52.45	5.21	36.85	-20.81	-13	-7.81	Horizontal
192.8	-35.33	1.77	16.84	-20.25	-13	-7.25	Vertical
240.9	-39.10	1.63	17.64	-23.09	-13	-10.09	Horizontal
Test Results for High Channel 1770MHz							
3540.0	-50.20	3.86	35.83	-18.23	-13	-5.23	Horizontal
3540.0	-50.02	3.86	35.83	-18.05	-13	-5.05	Vertical
5310.0	-49.96	5.24	36.88	-18.32	-13	-5.32	Vertical
5310.0	-51.15	5.24	36.88	-19.51	-13	-6.51	Horizontal
212.0	-40.88	1.58	16.84	-25.61	-13	-12.61	Vertical
376.2	-35.75	1.45	17.64	-19.56	-13	-6.56	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.

10. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54, §90.213

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	12.4	0.006582	2.5
3.7	1880	14.0	0.007451	2.5
4.26	1880	13.1	0.006962	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	12.5	0.006669	2.5
Extreme (50C)	1880	11.9	0.006326	2.5
Extreme (40C)	1880	13.3	0.007056	2.5
Extreme (30C)	1880	13.6	0.007251	2.5
Extreme (10C)	1880	13.5	0.007196	2.5
Extreme (0C)	1880	12.5	0.006626	2.5
Extreme (-10C)	1880	13.0	0.006926	2.5
Extreme (-20C)	1880	14.6	0.007742	2.5
Extreme (-30C)	1880	14.3	0.007632	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	9.7	0.005146	2.5
3.7	1880	9.2	0.004870	2.5
4.26	1880	7.7	0.004122	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.6	0.005095	2.5
Extreme (50C)	1880	9.3	0.004953	2.5
Extreme (40C)	1880	8.1	0.004285861	2.5
Extreme (30C)	1880	8.5	0.004535072	2.5
Extreme (10C)	1880	9.2	0.004896863	2.5
Extreme (0C)	1880	8.4	0.004451116	2.5
Extreme (-10C)	1880	9.3	0.004957424	2.5
Extreme (-20C)	1880	8.9	0.004745033	2.5
Extreme (-30C)	1880	8.2	0.004366901	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	9.3	0.005345	2.5
3.7	1732.5	9.0	0.005212	2.5
4.26	1732.5	8.0	0.004595	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.4	0.004846	2.5
Extreme (50C)	1732.5	8.8	0.005061	2.5
Extreme (40C)	1732.5	7.7	0.004438	2.5
Extreme (30C)	1732.5	6.1	0.003497	2.5
Extreme (10C)	1732.5	7.3	0.004230	2.5
Extreme (0C)	1732.5	9.3	0.005374	2.5
Extreme (-10C)	1732.5	8.9	0.005125	2.5
Extreme (-20C)	1732.5	7.0	0.004033	2.5
Extreme (-30C)	1732.5	8.0	0.004624	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	9.9	0.005710	2.5
3.7	1732.5	8.7	0.005014	2.5
4.26	1732.5	8.0	0.004625	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	10.1	0.005831	2.5
Extreme (50C)	1732.5	8.6	0.004978	2.5
Extreme (40C)	1732.5	7.8	0.004497	2.5
Extreme (30C)	1732.5	9.5	0.005465	2.5
Extreme (10C)	1732.5	8.7	0.005020	2.5
Extreme (0C)	1732.5	8.2	0.004739	2.5
Extreme (-10C)	1732.5	9.3	0.005379	2.5
Extreme (-20C)	1732.5	8.5	0.004892	2.5
Extreme (-30C)	1732.5	8.0	0.004635	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	6.1	0.007327	2.5
3.7	836.5	6.5	0.007809	2.5
4.26	836.5	4.5	0.005355	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.2	0.007363	2.5
Extreme (50C)	836.5	5.9	0.007064	2.5
Extreme (40C)	836.5	6.5	0.007829	2.5
Extreme (30C)	836.5	6.6	0.007858	2.5
Extreme (10C)	836.5	4.9	0.005885	2.5
Extreme (0C)	836.5	4.8	0.005755	2.5
Extreme (-10C)	836.5	5.9	0.007007	2.5
Extreme (-20C)	836.5	5.7	0.006780	2.5
Extreme (-30C)	836.5	6.4	0.007652	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	5.5	0.006625	2.5
3.7	836.5	6.9	0.008211	2.5
4.26	836.5	4.5	0.005333	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.5	0.007816	2.5
Extreme (50C)	836.5	6.3	0.007487	2.5
Extreme (40C)	836.5	6.6	0.007870	2.5
Extreme (30C)	836.5	6.9	0.008216	2.5
Extreme (10C)	836.5	5.9	0.007028	2.5
Extreme (0C)	836.5	4.9	0.005905	2.5
Extreme (-10C)	836.5	5.6	0.006654	2.5
Extreme (-20C)	836.5	5.6	0.006743	2.5
Extreme (-30C)	836.5	6.7	0.008049	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	10.5	0.004136	2.5
3.7	2535	8.9	0.003506	2.5
4.26	2535	8.4	0.003323	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	9.4	0.003699	2.5
Extreme (50C)	2535	9.3	0.003650	2.5
Extreme (40C)	2535	7.9	0.003116	2.5
Extreme (30C)	2535	8.9	0.003507	2.5
Extreme (10C)	2535	7.7	0.003023	2.5
Extreme (0C)	2535	8.3	0.003270	2.5
Extreme (-10C)	2535	9.4	0.003697	2.5
Extreme (-20C)	2535	8.8	0.003455	2.5
Extreme (-30C)	2535	8.0	0.003160	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	6.5	0.002577	2.5
4.26	2535	5.7	0.002236	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	5.5	0.002183	2.5
Extreme (40C)	2535	5.8	0.002287	2.5
Extreme (30C)	2535	6.8	0.002686	2.5
Extreme (10C)	2535	5.6	0.002229	2.5
Extreme (0C)	2535	5.1	0.002017	2.5
Extreme (-10C)	2535	4.8	0.001907	2.5
Extreme (-20C)	2535	6.4	0.002517	2.5
Extreme (-30C)	2535	5.2	0.002069	2.5

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

10.5 LTE BAND 66

Band 12 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	6.6	0.003801	2.5
3.7	1745	6.5	0.003732	2.5
4.26	1745	7.1	0.004064	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1745	5.0	0.002874	2.5
Extreme (50C)	1745	7.5	0.004302	2.5
Extreme (40C)	1745	6.2	0.003575	2.5
Extreme (30C)	1745	6.5	0.003746	2.5
Extreme (10C)	1745	7.2	0.004121	2.5
Extreme (0C)	1745	6.0	0.003440	2.5
Extreme (-10C)	1745	5.8	0.003315	2.5
Extreme (-20C)	1745	6.2	0.003548	2.5
Extreme (-30C)	1745	5.4	0.003103	2.5

Band 12 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	8.1	0.004663	2.5
3.7	1745	7.3	0.004180	2.5
4.26	1745	9.8	0.005618	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1745	8.4	0.004826	2.5
Extreme (50C)	1745	8.5	0.004869	2.5
Extreme (40C)	1745	8.3	0.004730	2.5
Extreme (30C)	1745	8.5	0.004861	2.5
Extreme (10C)	1745	8.2	0.004687	2.5
Extreme (0C)	1745	6.5	0.003723	2.5
Extreme (-10C)	1745	8.1	0.004640	2.5
Extreme (-20C)	1745	8.4	0.004797	2.5
Extreme (-30C)	1745	5.6	0.003220	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.

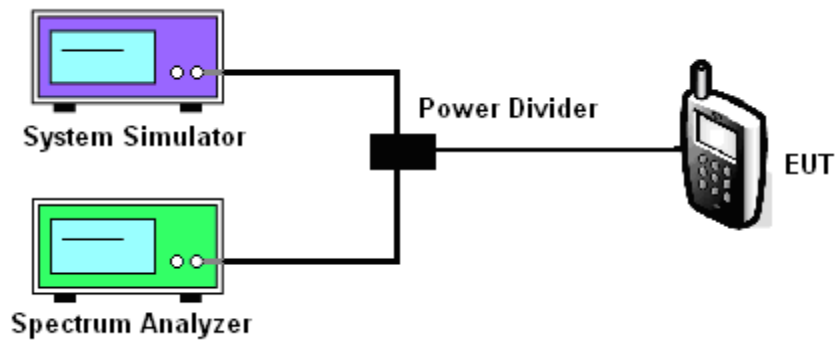
11.2 Measuring Instruments

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-----