

FCC CFR47 PART 22H, 24E, 27 CERTIFICATION TEST REPORT FCC ID: 2AM06QPHONE2022

Product: Smart phone
Trade Mark: Virse, Qphone
Model Number: E95
Family Model: 2022
Report No.: STR220420001006E

Prepared for

Qoobex Inc.

1500 Old Northern Blvd, Roslyn New York United States 11576

Prepared by

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TEST RESULT CERTIFICATION

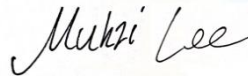
Applicant's name	Qoobex Inc.
Address.....	1500 Old Northern Blvd,Roslyn New York United States11576
Manufacturer's Name	boardour
Address.....	1706 changhong Science and Technology Building, No.18, South 12th Keji Road, Nanshan District, Shenzhen, China
Product name.....	Smart phone
Model and/or type reference ..	E95
Family Model:	2022
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.....	Apr 20, 2022 ~Apr 29, 2022
Date of Issue	Apr 29, 2022
Test Result.....	Pass

Testing Engineer :



(Mukzi Lee)

Authorized Signatory :



(Alex Li)

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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Smart phone
Trade Mark	Virse, Qphone
Model Name	E95
Family Model	2022
Model Difference	All the model are the same circuit and RF module,except the model name and trademark.
FCC ID:	2AMO6QPHONE2022
Frequency Bands:	U.S. Bands: <input checked="" type="checkbox"/> LTE FDD Band 2, 4, 5, 12, 17, 66
Frequency Range:	LTE FDD Band 2 Uplink: 1850MHz-1910MHz, Downlink: 1930MHz-1990MHz; LTE FDD Band 4 Uplink: 1710MHz-1755MHz, Downlink: 2110MHz-2155MHz; LTE FDD Band 5 Uplink: 824MHz-849MHz, Downlink: 869MHz-894MHz; LTE FDD Band 12 Uplink: 699MHz-716MHz, Downlink: 729MHz-746MHz; LTE FDD Band 17 Uplink: 704MHz-716MHz, Downlink: 734MHz-746MHz; LTE FDD Band 66 Uplink: 1710MHz-1780MHz, Downlink: 2110MHz-2200MHz;
Type of Modulation:	QPSK/16QAM
Power Class	Class 3
Antenna:	PIFA Antenna
Antenna gain:	Band 2: 0.6dBi; Band 4: -0.7dBi ; Band 5: -3.47dBi ; Band 12: -3.78dBi ; Band 17: -3.78dBi; Band 66: -0.73dBi;
Power supply	DC 3.87V from battery or DC 5V from Adapter.
Battery	DC 3.87V, 4000mAh, 15.48Wh
Adapter	Model: JK050200-S04US Input: 100-240Vac, 50/60Hz 0.5A Output: 5V---2.0A MAX
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.87V) (Note 1)
HW Version	MT6785
SW Version	RO1

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

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for FCC ID: 2AMO6QPHONE2022 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
2	Conducted Emission Test	± 1.38 dB
3	RF power, conducted	± 0.16 dB
4	Spurious emissions, conducted	± 0.21 dB
5	All emissions, radiated(<1G)	± 4.68 dB
6	All emissions, radiated(>1G)	± 4.89 dB
7	Temperature	± 0.5 °C
8	Humidity	± 2 %
9	Frequency error, conducted	± 0.19 ppm

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, Band 4, Band 5, Band 12, Band 17, Band 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.

1.6 SUMMARY OF TEST RESULTS

FCC Part22, Subpart H/ FCC Part24, Subpart E, FCC Part27, Subpart L, KDB 971168 D01 Power Meas License Digital Systems v03			
FCC Rule	Test Item	Verdict	Remark
2.1046	Conducted Output Power	PASS	
22.913(d) 24.232(d) 27.50(d)(5) KDB 971168 D01 Clause 5.7	Peak-to-Average Ratio	PASS	
2.1049 22.917(b) 24.238(b) KDB 971168 D01 Clause 4.2	Occupied Bandwidth	PASS	
2.1051 22.917(a) 24.238(a) 27.53(m), (g), (h) KDB 971168 D01 Clause 6	Band Edge	PASS	
22.913(a)(2) 27.50 (c)(10) KDB 971168 D01 Clause 5.6	Effective Radiated Power	PASS	

24.232(c) 27.50(h)(2), (d)(4) KDB 971168 D01 Clause 5.6	Equivalent Isotropic Radiated Power	PASS	
2.1053 22.917(a) 24.238(a) 27.53 (g)(h)(m) KDB 971168 D01 Clause 7	Field Strength of Spurious Radiation	PASS	
2.1055 22.355 24.235 27.54 KDB 971168 D01 Clause 9	Frequency Stability for Temperature & Voltage	PASS	
2.1051 22.917(a) 24.238(a) 27.53 (g)(h)(m) KDB 971168 D01 Clause 6	Conducted Emission	PASS	
Remark: 1. "N/A" denotes test is not applicable in this Test Report. 2. All test items were verified and recorded according to the standards and without any deviation during the test. 3. No modifications are made to the EUT during all test items.			

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	Smart phone	E95	FCC ID: 2AM06QPHONE2022	EUT

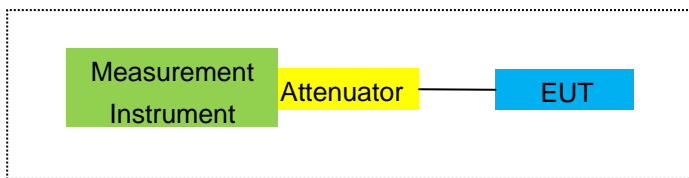
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

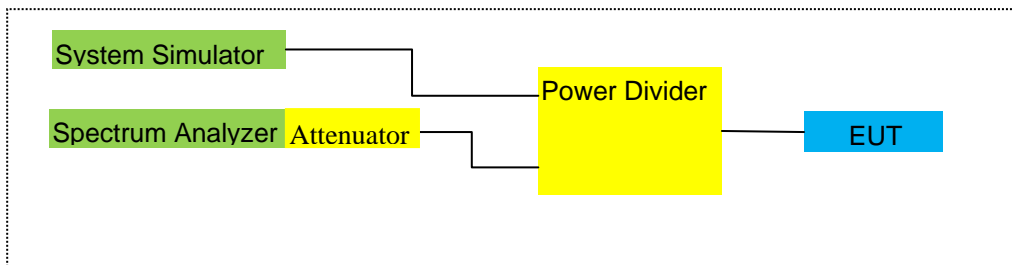
For Radiated Test Cases



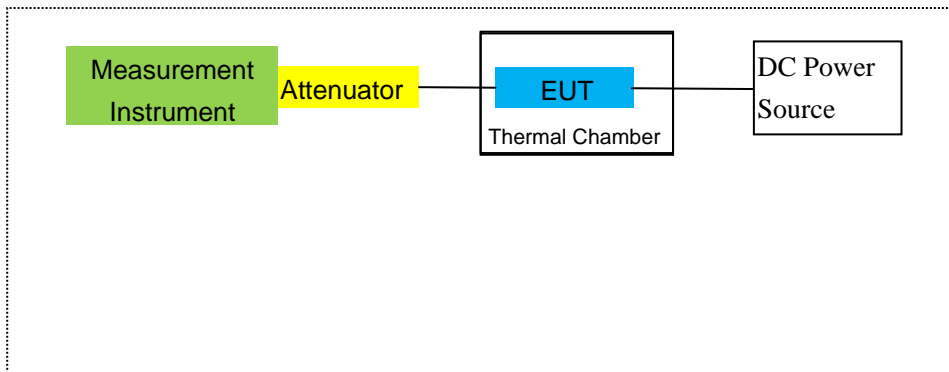
For Conducted Output Power



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	2021.07.01	2022.06.30	1 year
2	Test Receiver	R&S	ESPI	101318	2021.04.27	2022.04.26	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2022.03.30	2023.03.29	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2020.05.11	2023.05.10	3 year
5	Horn Antenna	EM	EM-AH-10180	2011071402	2022.03.31	2023.03.30	3 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2021.07.01	2022.06.30	1 year
7	Amplifier	EM	EM-30180	060538	2021.07.01	2022.06.30	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2022.03.30	2023.03.29	1 year
9	Power Meter	R&S	NRVS	100696	2021.07.01	2022.06.30	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2022.04.06	2023.04.05	1 year
11	Test Cable	N/A	R-01	N/A	2019.08.06	2022.08.05	3 year
12	Test Cable	N/A	R-02	N/A	2019.08.06	2022.08.05	3 year
13	Test Cable	N/A	R-03	N/A	2019.08.06	2022.08.05	3 year
14	Test Receiver	R&S	ESCI	101160	2022.04.06	2023.04.05	1 year
15	LISN	R&S	ENV216	101313	2022.04.06	2023.04.05	1 year
16	LISN	EMCO	3816/2	00042990	2022.04.06	2023.04.05	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2022.04.06	2023.04.05	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2020.05.11	2023.05.10	3 year
19	Test Cable	N/A	C01	N/A	2020.05.11	2023.05.10	3 year
20	Test Cable	N/A	C02	N/A	2020.05.11	2023.05.10	3 year
21	Test Cable	N/A	C03	N/A	2020.05.11	2023.05.10	3 year
22	Spectrum Analyzer	agilent	e4440a	us44300399	2021.04.27	2022.04.26	1 year
23	test receiver	R&S	ESCI	a0304218	2022.04.06	2023.04.05	1 year
24	Communication Tester	R&S	CMU200	A0304247	2022.04.06	2023.04.05	1 year
25	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2022.04.06	2023.04.05	1 year

26	DC Power Source	N/A	PS-6005D	2017040292 3	2020.05.11	2023.05.10	3 year
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Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable& DC Power Source which is scheduled for calibration every 3 years.

4. OUTPUT POWER

4.1 OUTPUT POWER MEASUREMENT

LTE Measurement Procedure:

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

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

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

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

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

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

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

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

Test data reference attachment.

5. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

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

MODES TESTED

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 12
- LTE Band 17
- LTE Band 66

RESULTS

PASS

Test data reference attachment.

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

FCC: §2.1051, §22.917(a), §24.238(a), §27.53(m) (g)(h)

FCC: §2.1046, §22.913, §24.232

LIMITS

The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P[\text{Watts}])$, where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 7 is as following.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is $65 + 10\log_{10}(P) = -35\text{dBm}$ in a 6.25kHz bandwidth.

Per 27.53(m) for operations in the BRS/EBS bands, 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.

TEST PROCEDURE

The transmitter output was connected to a CMW500Test 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 display line

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

MODES TESTED

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

RESULTS

Test data reference attachment.

7. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.917(a), §24.238(a), §27.53(c)(g)(h)(m)

LIMITS

The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P[\text{Watts}])$, where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 7 is as following.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is $65 + 10\log_{10}(P) = -35\text{dBm}$ in a 6.25kHz bandwidth.

Per 27.53(m) for operations in the BRS/EBS bands, 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.

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

MODES TESTED

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 12
- LTE Band 17
- LTE Band 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(a)(2), §24.232(c) and §27.50 (c)(10)

LIMITS:

22.913(a) (2)- The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
24.232 (c) Mobile and portable stations are limited to 2 watts EIRP.
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 in the 2500–2570 MHz and 2620–2690 MHz bands. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17

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

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

MODES TESTED

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 12
- LTE Band 17
- LTE Band 66

RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
1.4MHz Band QPSK	1/#Mid	1850.7	-3.02	3.76	28.24	21.46	139.959	Horizontal	Pass	
		1880	-2.87	3.91	28.22	21.44	139.316	Horizontal	Pass	
		1909.3	-2.84	3.93	28.20	21.43	138.995	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-2.96	3.77	28.23	21.50	141.254	Horizontal	Pass	
		1880	-2.94	3.91	28.24	21.39	137.721	Horizontal	Pass	
		1908.5	-2.94	3.94	28.25	21.37	137.088	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-3.04	3.77	28.31	21.50	141.254	Horizontal	Pass	
		1880	-2.87	3.91	28.22	21.44	139.316	Horizontal	Pass	
		1907.5	-2.89	3.94	28.20	21.37	137.088	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-3.15	3.79	28.33	21.39	137.721	Horizontal	Pass	
		1880	-2.82	3.95	28.22	21.45	139.637	Horizontal	Pass	
		1905	-2.81	3.97	28.19	21.41	138.357	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	1857.5	-3.06	3.79	28.34	21.49	140.929	Horizontal	Pass	
		1880	-2.92	3.95	28.22	21.35	136.458	Horizontal	Pass	
		1902.5	-2.82	3.97	28.18	21.39	137.721	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	1860	-3.08	3.81	28.35	21.46	139.959	Horizontal	Pass	
		1880	-2.77	3.96	28.22	21.49	140.929	Horizontal	Pass	
		1900	-2.76	4.00	28.16	21.40	138.038	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	1850.7	-3.05	3.76	28.24	21.43	138.995	Vertical	Pass	
		1880	-2.95	3.91	28.22	21.36	136.773	Vertical	Pass	
		1909.3	-2.87	3.93	28.20	21.40	138.038	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-3.06	3.77	28.23	21.40	138.038	Vertical	Pass	
		1880	-2.89	3.91	28.24	21.44	139.316	Vertical	Pass	
		1908.5	-2.87	3.94	28.25	21.44	139.316	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-3.21	3.77	28.31	21.33	135.831	Vertical	Pass	
		1880	-2.96	3.91	28.22	21.35	136.458	Vertical	Pass	
		1907.5	-2.82	3.94	28.20	21.44	139.316	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-3.15	3.79	28.33	21.39	137.721	Vertical	Pass	
		1880	-2.91	3.95	28.22	21.36	136.773	Vertical	Pass	
		1905	-2.82	3.97	28.19	21.40	138.038	Vertical	Pass	
15.0MHz	1/#Mid	1857.5	-3.07	3.79	28.34	21.48	140.605	Vertical	Pass	

Band		1880	-2.79	3.95	28.22	21.48	140.605	Vertical	Pass
QPSK		1902.5	-2.83	3.97	28.18	21.38	137.404	Vertical	Pass
20.0MHz		1860	-3.01	3.81	28.35	21.53	142.233	Vertical	Pass
Band	1/#Mid	1880	-2.76	3.96	28.22	21.50	141.254	Vertical	Pass
QPSK		1900	-2.63	4.00	28.16	21.53	142.233	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 2										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.11	3.76	28.24	20.37	108.893	Horizontal	Pass	
		1880	-4.01	3.91	28.22	20.30	107.152	Horizontal	Pass	
		1909.3	-3.99	3.93	28.20	20.28	106.660	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	1851.5	-4.21	3.77	28.23	20.25	105.925	Horizontal	Pass	
		1880	-3.95	3.91	28.24	20.38	109.144	Horizontal	Pass	
		1908.5	-3.94	3.94	28.25	20.37	108.893	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	1852.5	-4.30	3.77	28.31	20.24	105.682	Horizontal	Pass	
		1880	-3.95	3.91	28.22	20.36	108.643	Horizontal	Pass	
		1907.5	-4.02	3.94	28.20	20.24	105.682	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	1855	-4.15	3.79	28.33	20.39	109.396	Horizontal	Pass	
		1880	-3.97	3.95	28.22	20.30	107.152	Horizontal	Pass	
		1905	-3.91	3.97	28.19	20.31	107.399	Horizontal	Pass	
15.0MHz Band 16 QAM	1/#Mid	1857.5	-4.19	3.79	28.34	20.36	108.643	Horizontal	Pass	
		1880	-3.87	3.95	28.22	20.40	109.648	Horizontal	Pass	
		1902.5	-3.89	3.97	28.18	20.32	107.647	Horizontal	Pass	
20.0MHz Band 16 QAM	1/#Mid	1860	-4.23	3.81	28.35	20.31	107.399	Horizontal	Pass	
		1880	-3.95	3.96	28.22	20.31	107.399	Horizontal	Pass	
		1900	-3.92	4.00	28.16	20.24	105.682	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.20	3.76	28.24	20.28	106.660	Vertical	Pass	
		1880	-3.97	3.91	28.22	20.34	108.143	Vertical	Pass	
		1909.3	-3.92	3.93	28.20	20.35	108.393	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	1851.5	-4.19	3.77	28.23	20.27	106.414	Vertical	Pass	
		1880	-4.04	3.91	28.24	20.29	106.905	Vertical	Pass	
		1908.5	-4.03	3.94	28.25	20.28	106.660	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	1852.5	-4.15	3.77	28.31	20.39	109.396	Vertical	Pass	
		1880	-4.08	3.91	28.22	20.23	105.439	Vertical	Pass	
		1907.5	-4.00	3.94	28.20	20.26	106.170	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	1855	-4.17	3.79	28.33	20.37	108.893	Vertical	Pass	
		1880	-3.95	3.95	28.22	20.32	107.647	Vertical	Pass	
		1905	-3.90	3.97	28.19	20.32	107.647	Vertical	Pass	
15.0MHz Band 16 QAM	1/#Mid	1857.5	-4.27	3.79	28.34	20.28	106.660	Vertical	Pass	
		1880	-3.87	3.95	28.22	20.40	109.648	Vertical	Pass	
		1902.5	-3.82	3.97	28.18	20.39	109.396	Vertical	Pass	

20.0MHz		1860	-4.09	3.81	28.35	20.45	110.917	Vertical	Pass
Band 16	1/#Mid	1880	-3.83	3.96	28.22	20.43	110.408	Vertical	Pass
QAM		1900	-3.73	4.00	28.16	20.43	110.408	Vertical	Pass

Note:

SG Level= Signal generator output

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

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	Max. EIRP	Polarization Of Max. ERP	
						Average (dBm)	Average (mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-4.48	3.12	27.58	19.98	99.541	Horizontal	Pass
		1732.5	-4.36	3.27	27.61	19.98	99.541	Horizontal	Pass
		1754.3	-4.32	3.29	27.63	20.02	100.462	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-4.44	3.13	27.61	20.04	100.925	Horizontal	Pass
		1732.5	-4.34	3.27	27.61	20.00	100.000	Horizontal	Pass
		1753.5	-4.30	3.30	27.62	20.02	100.462	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-4.47	3.13	27.63	20.03	100.693	Horizontal	Pass
		1732.5	-4.35	3.27	27.61	19.99	99.770	Horizontal	Pass
		1752.5	-4.42	3.30	27.60	19.88	97.275	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-4.59	3.15	27.64	19.90	97.724	Horizontal	Pass
		1732.5	-4.33	3.31	27.61	19.97	99.312	Horizontal	Pass
		1750	-4.32	3.33	27.59	19.94	98.628	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-4.49	3.15	27.65	20.01	100.231	Horizontal	Pass
		1732.5	-4.28	3.31	27.61	20.02	100.462	Horizontal	Pass
		1747.5	-4.34	3.33	27.57	19.90	97.724	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-4.60	3.17	27.66	19.89	97.499	Horizontal	Pass
		1732.5	-4.31	3.32	27.61	19.98	99.541	Horizontal	Pass
		1745	-4.25	3.36	27.56	19.95	98.855	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-4.47	3.12	27.58	19.99	99.770	Vertical	Pass
		1732.5	-4.40	3.27	27.61	19.94	98.628	Vertical	Pass
		1754.3	-4.43	3.29	27.63	19.91	97.949	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-4.52	3.13	27.61	19.96	99.083	Vertical	Pass
		1732.5	-4.33	3.27	27.61	20.01	100.231	Vertical	Pass
		1753.5	-4.37	3.30	27.62	19.95	98.855	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-4.56	3.13	27.63	19.94	98.628	Vertical	Pass
		1732.5	-4.31	3.27	27.61	20.03	100.693	Vertical	Pass
		1752.5	-4.42	3.30	27.60	19.88	97.275	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-4.60	3.15	27.64	19.89	97.499	Vertical	Pass
		1732.5	-4.40	3.31	27.61	19.90	97.724	Vertical	Pass
		1750	-4.31	3.33	27.59	19.95	98.855	Vertical	Pass

15.0MHz Band QPSK	1/#Mid	1717.5	-4.47	3.15	27.65	20.03	100.693	Vertical	Pass
		1732.5	-4.41	3.31	27.61	19.89	97.499	Vertical	Pass
		1747.5	-4.29	3.33	27.57	19.95	98.855	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	1720	-4.44	3.17	27.66	20.05	101.158	Vertical	Pass
		1732.5	-4.25	3.32	27.61	20.04	100.925	Vertical	Pass
		1745	-4.13	3.36	27.56	20.07	101.625	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclus ion
			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	-5.35	3.12	27.58	19.11	81.470	Horizontal	Pass
		1732.5	-5.34	3.27	27.61	19.00	79.433	Horizontal	Pass
		1754.3	-5.21	3.29	27.63	19.13	81.846	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-5.42	3.13	27.61	19.06	80.538	Horizontal	Pass
		1732.5	-5.23	3.27	27.61	19.11	81.470	Horizontal	Pass
		1753.5	-5.23	3.30	27.62	19.09	81.096	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-5.50	3.13	27.63	19.00	79.433	Horizontal	Pass
		1732.5	-5.20	3.27	27.61	19.14	82.035	Horizontal	Pass
		1752.5	-5.22	3.30	27.60	19.08	80.910	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-5.43	3.15	27.64	19.06	80.538	Horizontal	Pass
		1732.5	-5.29	3.31	27.61	19.01	79.616	Horizontal	Pass
		1750	-5.23	3.33	27.59	19.03	79.983	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-5.38	3.15	27.65	19.12	81.658	Horizontal	Pass
		1732.5	-5.22	3.31	27.61	19.08	80.910	Horizontal	Pass
		1747.5	-5.15	3.33	27.57	19.09	81.096	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-5.49	3.17	27.66	19.00	79.433	Horizontal	Pass
		1732.5	-5.33	3.32	27.61	18.96	78.705	Horizontal	Pass
		1745	-5.21	3.36	27.56	18.99	79.250	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-5.44	3.12	27.58	19.02	79.799	Vertical	Pass
		1732.5	-5.23	3.27	27.61	19.11	81.470	Vertical	Pass
		1754.3	-5.21	3.29	27.63	19.13	81.846	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-5.47	3.13	27.61	19.01	79.616	Vertical	Pass
		1732.5	-5.24	3.27	27.61	19.10	81.283	Vertical	Pass
		1753.5	-5.32	3.30	27.62	19.00	79.433	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-5.53	3.13	27.63	18.97	78.886	Vertical	Pass
		1732.5	-5.29	3.27	27.61	19.05	80.353	Vertical	Pass
		1752.5	-5.23	3.30	27.60	19.07	80.724	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-5.48	3.15	27.64	19.01	79.616	Vertical	Pass
		1732.5	-5.28	3.31	27.61	19.02	79.799	Vertical	Pass
		1750	-5.16	3.33	27.59	19.10	81.283	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-5.40	3.15	27.65	19.10	81.283	Vertical	Pass
		1732.5	-5.16	3.31	27.61	19.14	82.035	Vertical	Pass
		1747.5	-5.19	3.33	27.57	19.05	80.353	Vertical	Pass

20.0MHz		1720	-5.35	3.17	27.66	19.14	82.035	Vertical	Pass
Band 16	1/#Mid	1732.5	-5.12	3.32	27.61	19.17	82.604	Vertical	Pass
QAM		1745	-5.05	3.36	27.56	19.15	82.224	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.4 LTE BAND 5

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	824.7	2.34	2.01	19.68	2.15	17.86	61.094	Horizontal	Pass
		836.5	2.19	2.01	19.77	2.15	17.80	60.256	Horizontal	Pass
		848.3	2.23	2.02	19.82	2.15	17.88	61.376	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	825.5	2.25	2.01	19.70	2.15	17.79	60.117	Horizontal	Pass
		836.5	2.25	2.01	19.77	2.15	17.86	61.094	Horizontal	Pass
		847.5	2.16	2.02	19.81	2.15	17.80	60.256	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	826.5	2.30	2.01	19.71	2.15	17.85	60.954	Horizontal	Pass
		836.5	2.31	2.01	19.77	2.15	17.92	61.944	Horizontal	Pass
		846.5	2.31	2.02	19.79	2.15	17.93	62.087	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	829	2.25	2.01	19.73	2.15	17.82	60.534	Horizontal	Pass
		836.5	2.31	2.01	19.77	2.15	17.92	61.944	Horizontal	Pass
		844	2.17	2.02	19.78	2.15	17.78	59.979	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	824.7	2.29	2.01	19.68	2.15	17.81	60.395	Vertical	Pass
		836.5	2.25	2.01	19.77	2.15	17.86	61.094	Vertical	Pass
		848.3	2.20	2.02	19.82	2.15	17.85	60.954	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	825.5	2.27	2.01	19.70	2.15	17.81	60.395	Vertical	Pass
		836.5	2.32	2.01	19.77	2.15	17.93	62.087	Vertical	Pass
		847.5	2.15	2.02	19.81	2.15	17.79	60.117	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	826.5	2.25	2.01	19.71	2.15	17.80	60.256	Vertical	Pass
		836.5	2.15	2.01	19.77	2.15	17.76	59.704	Vertical	Pass
		846.5	2.23	2.02	19.79	2.15	17.85	60.954	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	829	2.39	2.01	19.73	2.15	17.96	62.517	Vertical	Pass
		836.5	2.33	2.01	19.77	2.15	17.94	62.230	Vertical	Pass
		844	2.33	2.02	19.78	2.15	17.94	62.230	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. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	824.7	1.21	2.01	19.68	2.15	16.73	47.098	Horizontal	Pass
		836.5	1.19	2.01	19.77	2.15	16.80	47.863	Horizontal	Pass
		848.3	1.03	2.02	19.82	2.15	16.68	46.559	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	1.21	2.01	19.70	2.15	16.75	47.315	Horizontal	Pass
		836.5	1.13	2.01	19.77	2.15	16.74	47.206	Horizontal	Pass
		847.5	1.12	2.02	19.81	2.15	16.76	47.424	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	1.11	2.01	19.71	2.15	16.66	46.345	Horizontal	Pass
		836.5	1.14	2.01	19.77	2.15	16.75	47.315	Horizontal	Pass
		846.5	1.20	2.02	19.79	2.15	16.82	48.084	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	829	1.20	2.01	19.73	2.15	16.77	47.534	Horizontal	Pass
		836.5	1.15	2.01	19.77	2.15	16.76	47.424	Horizontal	Pass
		844	1.07	2.02	19.78	2.15	16.68	46.559	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	824.7	1.19	2.01	19.68	2.15	16.71	46.881	Vertical	Pass
		836.5	1.08	2.01	19.77	2.15	16.69	46.666	Vertical	Pass
		848.3	1.04	2.02	19.82	2.15	16.69	46.666	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	1.14	2.01	19.70	2.15	16.68	46.559	Vertical	Pass
		836.5	1.10	2.01	19.77	2.15	16.71	46.881	Vertical	Pass
		847.5	1.10	2.02	19.81	2.15	16.74	47.206	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	1.26	2.01	19.71	2.15	16.81	47.973	Vertical	Pass
		836.5	1.14	2.01	19.77	2.15	16.75	47.315	Vertical	Pass
		846.5	1.18	2.02	19.79	2.15	16.80	47.863	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	829	1.27	2.01	19.73	2.15	16.84	48.306	Vertical	Pass
		836.5	1.23	2.01	19.77	2.15	16.84	48.306	Vertical	Pass
		844	1.23	2.02	19.78	2.15	16.84	48.306	Vertical	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

8.5 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. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	699.7	2.46	1.91	19.21	2.15	17.61	57.677	Vertical	Pass
		707.5	2.41	1.91	19.26	2.15	17.61	57.677	Vertical	Pass
		715.3	2.36	1.93	19.34	2.15	17.62	57.810	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	700.5	2.48	1.91	19.21	2.15	17.63	57.943	Vertical	Pass
		707.5	2.49	1.91	19.26	2.15	17.69	58.749	Vertical	Pass
		714.5	2.32	1.93	19.34	2.15	17.58	57.280	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	701.5	2.54	1.91	19.23	2.15	17.71	59.020	Vertical	Pass
		707.5	2.46	1.91	19.26	2.15	17.66	58.345	Vertical	Pass
		713.5	2.35	1.92	19.33	2.15	17.61	57.677	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	704	2.48	1.91	19.25	2.15	17.67	58.479	Vertical	Pass
		707.5	2.34	1.91	19.26	2.15	17.54	56.754	Vertical	Pass
		711	2.41	1.92	19.32	2.15	17.66	58.345	Vertical	Pass
1.4MHz Band QPSK	1/#Mid	699.7	2.55	1.91	19.21	2.15	17.70	58.884	Horizontal	Pass
		707.5	2.50	1.91	19.26	2.15	17.70	58.884	Horizontal	Pass
		715.3	2.36	1.93	19.34	2.15	17.62	57.810	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	700.5	2.43	1.91	19.21	2.15	17.58	57.280	Horizontal	Pass
		707.5	2.42	1.91	19.26	2.15	17.62	57.810	Horizontal	Pass
		714.5	2.36	1.93	19.34	2.15	17.62	57.810	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	701.5	2.42	1.91	19.23	2.15	17.59	57.412	Horizontal	Pass
		707.5	2.36	1.91	19.26	2.15	17.56	57.016	Horizontal	Pass
		713.5	2.30	1.92	19.33	2.15	17.56	57.016	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	704	2.54	1.91	19.25	2.15	17.73	59.293	Horizontal	Pass
		707.5	2.53	1.91	19.26	2.15	17.73	59.293	Horizontal	Pass
		711	2.47	1.92	19.32	2.15	17.72	59.156	Horizontal	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. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	699.7	1.64	1.91	19.21	2.15	16.79	47.753	Vertical	Pass
		707.5	1.62	1.91	19.26	2.15	16.82	48.084	Vertical	Pass
		715.3	1.54	1.93	19.34	2.15	16.80	47.863	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	1.73	1.91	19.21	2.15	16.88	48.753	Vertical	Pass
		707.5	1.71	1.91	19.26	2.15	16.91	49.091	Vertical	Pass
		714.5	1.52	1.93	19.34	2.15	16.78	47.643	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	1.64	1.91	19.23	2.15	16.81	47.973	Vertical	Pass
		707.5	1.66	1.91	19.26	2.15	16.86	48.529	Vertical	Pass
		713.5	1.53	1.92	19.33	2.15	16.79	47.753	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	704	1.59	1.91	19.25	2.15	16.78	47.643	Vertical	Pass
		707.5	1.53	1.91	19.26	2.15	16.73	47.098	Vertical	Pass
		711	1.58	1.92	19.32	2.15	16.83	48.195	Vertical	Pass
1.4MHz Band 16 QAM	1/#Mid	699.7	1.65	1.91	19.21	2.15	16.80	47.863	Horizontal	Pass
		707.5	1.65	1.91	19.26	2.15	16.85	48.417	Horizontal	Pass
		715.3	1.59	1.93	19.34	2.15	16.85	48.417	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	1.66	1.91	19.21	2.15	16.81	47.973	Horizontal	Pass
		707.5	1.59	1.91	19.26	2.15	16.79	47.753	Horizontal	Pass
		714.5	1.53	1.93	19.34	2.15	16.79	47.753	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	1.73	1.91	19.23	2.15	16.90	48.978	Horizontal	Pass
		707.5	1.68	1.91	19.26	2.15	16.88	48.753	Horizontal	Pass
		713.5	1.66	1.92	19.33	2.15	16.92	49.204	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	704	1.77	1.91	19.25	2.15	16.96	49.659	Horizontal	Pass
		707.5	1.73	1.91	19.26	2.15	16.93	49.317	Horizontal	Pass
		711	1.70	1.92	19.32	2.15	16.95	49.545	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

8.6 LTE BAND 17

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	1/#Mid	706.5	1.42	1.91	19.23	2.15	16.59	45.604	Vertical	Pass
		710	1.37	1.91	19.26	2.15	16.57	45.394	Vertical	Pass
		713.5	1.33	1.92	19.33	2.15	16.59	45.604	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	709	1.42	1.91	19.25	2.15	16.61	45.814	Vertical	Pass
		710	1.37	1.91	19.26	2.15	16.57	45.394	Vertical	Pass
		711	1.34	1.92	19.32	2.15	16.59	45.604	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	706.5	1.41	1.91	19.23	2.15	16.58	45.499	Horizontal	Pass
		710	1.40	1.91	19.26	2.15	16.60	45.709	Horizontal	Pass
		713.5	1.28	1.92	19.33	2.15	16.54	45.082	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	709	1.47	1.91	19.25	2.15	16.66	46.345	Horizontal	Pass
		710	1.46	1.91	19.26	2.15	16.66	46.345	Horizontal	Pass
		711	1.38	1.92	19.32	2.15	16.63	46.026	Horizontal	Pass

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
5.0MHz Band 16 QAM	1/#Mid	706.5	0.95	1.91	19.23	2.15	16.12	40.926	Vertical	Pass
		710	0.87	1.91	19.26	2.15	16.07	40.458	Vertical	Pass
		713.5	0.88	1.92	19.33	2.15	16.14	41.115	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	709	0.99	1.91	19.25	2.15	16.18	41.495	Vertical	Pass
		710	0.98	1.91	19.26	2.15	16.18	41.495	Vertical	Pass
		711	0.88	1.92	19.32	2.15	16.13	41.020	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	706.5	0.97	1.91	19.23	2.15	16.14	41.115	Horizontal	Pass
		710	1.00	1.91	19.26	2.15	16.20	41.687	Horizontal	Pass
		713.5	0.90	1.92	19.33	2.15	16.16	41.305	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	709	1.03	1.91	19.25	2.15	16.22	41.879	Horizontal	Pass
		710	1.03	1.91	19.26	2.15	16.23	41.976	Horizontal	Pass
		711	1.01	1.92	19.32	2.15	16.26	42.267	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

8.7 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	-4.41	3.76	28.24	20.07	101.625	Horizontal	Pass	
		1745	-4.28	3.91	28.22	20.03	100.693	Horizontal	Pass	
		1779.3	-4.34	3.93	28.2	19.93	98.401	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	1711.5	-4.41	3.77	28.23	20.05	101.158	Horizontal	Pass	
		1745	-4.32	3.91	28.24	20.01	100.231	Horizontal	Pass	
		1778.5	-4.28	3.94	28.25	20.03	100.693	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	1712.5	-4.55	3.77	28.31	19.99	99.770	Horizontal	Pass	
		1745	-4.36	3.91	28.22	19.95	98.855	Horizontal	Pass	
		1777.5	-4.33	3.94	28.2	19.93	98.401	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	1715	-4.55	3.79	28.33	19.99	99.770	Horizontal	Pass	
		1745	-4.28	3.95	28.22	19.99	99.770	Horizontal	Pass	
		1775	-4.24	3.97	28.19	19.98	99.541	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	1717.5	-4.53	3.79	28.34	20.02	100.462	Horizontal	Pass	
		1745	-4.28	3.95	28.22	19.99	99.770	Horizontal	Pass	
		1772.5	-4.24	3.97	28.18	19.97	99.312	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	1720	-4.55	3.81	28.35	19.99	99.770	Horizontal	Pass	
		1745	-4.20	3.96	28.22	20.06	101.391	Horizontal	Pass	
		1770	-4.23	4	28.16	19.93	98.401	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	1710.7	-4.53	3.76	28.24	19.95	98.855	Vertical	Pass	
		1745	-4.35	3.91	28.22	19.96	99.083	Vertical	Pass	
		1779.3	-4.30	3.93	28.2	19.97	99.312	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	1711.5	-4.47	3.77	28.23	19.99	99.770	Vertical	Pass	
		1745	-4.40	3.91	28.24	19.93	98.401	Vertical	Pass	
		1778.5	-4.36	3.94	28.25	19.95	98.855	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	1712.5	-4.49	3.77	28.31	20.05	101.158	Vertical	Pass	
		1745	-4.34	3.91	28.22	19.97	99.312	Vertical	Pass	
		1777.5	-4.22	3.94	28.2	20.04	100.925	Vertical	Pass	

10.0MHz	Band QPSK	1/#Mid	1715	-4.62	3.79	28.34	19.93	98.401	Vertical	Pass
			1745	-4.31	3.95	28.22	19.96	99.083	Vertical	Pass
			1775	-4.23	3.97	28.18	19.98	99.541	Vertical	Pass
15.0MHz	Band QPSK	1/#Mid	1717.5	-4.56	3.81	28.35	19.98	99.541	Vertical	Pass
			1745	-4.35	3.96	28.22	19.91	97.949	Vertical	Pass
			1772.5	-4.10	4	28.16	20.06	101.391	Vertical	Pass
20.0MHz	Band QPSK	1/#Mid	1720	-4.45	3.79	28.34	20.10	102.329	Vertical	Pass
			1745	-4.20	3.95	28.22	20.07	101.625	Vertical	Pass
			1770	-4.11	3.97	28.18	20.10	102.329	Vertical	Pass

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 Average (dBm)	Max. EIRP			
							Average			
							(mW)			
1.4MHz Band 16 QAM	1/#Mid	1710.7	-5.33	3.76	28.24	19.15	82.224	Horizontal	Pass	
		1745	-5.16	3.91	28.22	19.15	82.224	Horizontal	Pass	
		1779.3	-5.11	3.93	28.2	19.16	82.414	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	1711.5	-5.34	3.77	28.23	19.12	81.658	Horizontal	Pass	
		1745	-5.16	3.91	28.24	19.17	82.604	Horizontal	Pass	
		1778.5	-5.19	3.94	28.25	19.12	81.658	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	1712.5	-5.29	3.77	28.31	19.25	84.140	Horizontal	Pass	
		1745	-5.17	3.91	28.22	19.14	82.035	Horizontal	Pass	
		1777.5	-5.12	3.94	28.2	19.14	82.035	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	1715	-5.34	3.79	28.33	19.20	83.176	Horizontal	Pass	
		1745	-5.00	3.95	28.22	19.27	84.528	Horizontal	Pass	
		1775	-5.08	3.97	28.19	19.14	82.035	Horizontal	Pass	
15.0MHz Band 16 QAM	1/#Mid	1717.5	-5.40	3.79	28.34	19.15	82.224	Horizontal	Pass	
		1745	-5.06	3.95	28.22	19.21	83.368	Horizontal	Pass	
		1772.5	-5.08	3.97	28.18	19.13	81.846	Horizontal	Pass	
20.0MHz Band 16 QAM	1/#Mid	1720	-5.34	3.81	28.35	19.20	83.176	Horizontal	Pass	
		1745	-5.13	3.96	28.22	19.13	81.846	Horizontal	Pass	
		1770	-5.07	4	28.16	19.09	81.096	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	1710.7	-5.26	3.76	28.24	19.22	83.560	Vertical	Pass	
		1745	-5.13	3.91	28.22	19.18	82.794	Vertical	Pass	
		1779.3	-5.09	3.93	28.2	19.18	82.794	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	1711.5	-5.29	3.77	28.23	19.17	82.604	Vertical	Pass	
		1745	-5.15	3.91	28.24	19.18	82.794	Vertical	Pass	
		1778.5	-5.08	3.94	28.25	19.23	83.753	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	1712.5	-5.27	3.77	28.31	19.27	84.528	Vertical	Pass	
		1745	-5.08	3.91	28.22	19.23	83.753	Vertical	Pass	
		1777.5	-5.04	3.94	28.2	19.22	83.560	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	1715	-5.32	3.79	28.34	19.23	83.753	Vertical	Pass	
		1745	-5.04	3.95	28.22	19.23	83.753	Vertical	Pass	
		1775	-5.04	3.97	28.18	19.17	82.604	Vertical	Pass	
15.0MHz Band 16	1/#Mid	1717.5	-5.28	3.81	28.35	19.26	84.333	Vertical	Pass	
		1745	-5.12	3.96	28.22	19.14	82.035	Vertical	Pass	

QAM		1772.5	-4.94	4	28.16	19.22	83.560	Vertical	Pass
20.0MHz	1/#Mid	1720	-5.28	3.79	28.34	19.27	84.528	Vertical	Pass
Band 16		1745	-4.98	3.95	28.22	19.29	84.918	Vertical	Pass
QAM		1770	-4.89	3.97	28.18	19.32	85.507	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

FCC: §2.1051, §22.917(a), §24.238(a), §27.53 (g)(h)(m)

LIMIT

For Band 7, the minimum permissible attenuation level of any spurious emission is $55 + \log_{10}(P)$ [Watts].

The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P)$ [Watts], where P is the transmitter power in Watts.

TEST PROCEDURE

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

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

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

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

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

MODES TESTED

- LTE Band 2
LTE Band 4
- LTE Band 5
LTE Band 12
LTE Band 17
LTE Band 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	-49.31	4.04	33.51	-19.84	-13	-6.84	Horizontal
3701.4	-49.65	4.04	33.51	-20.18	-13	-7.18	Vertical
5552.1	-48.07	5.24	35.84	-17.47	-13	-4.47	Vertical
5552.1	-50.37	5.24	35.84	-19.77	-13	-6.77	Horizontal
196.8	-42.59	1.43	16.02	-28.00	-13	-15.00	Vertical
329.1	-43.35	1.30	17.99	-26.66	-13	-13.66	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-50.71	4.04	33.56	-21.19	-13	-8.19	Horizontal
3760.0	-46.07	4.04	33.56	-16.55	-13	-3.55	Vertical
5640.0	-48.90	5.24	35.91	-18.23	-13	-5.23	Vertical
5640.0	-52.13	5.24	35.91	-21.46	-13	-8.46	Horizontal
193.2	-42.06	1.62	16.97	-26.71	-13	-13.71	Vertical
420.4	-34.57	1.74	15.98	-20.34	-13	-7.34	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-45.99	4.04	34.00	-16.03	-13	-3.03	Horizontal
3818.6	-48.34	4.04	34.00	-18.38	-13	-5.38	Vertical
5727.9	-49.24	5.24	36.04	-18.44	-13	-5.44	Vertical
5727.9	-53.68	5.24	36.04	-22.88	-13	-9.88	Horizontal
201.3	-44.46	1.42	17.29	-28.59	-13	-15.59	Vertical
290.3	-39.20	1.50	17.90	-22.79	-13	-9.79	Horizontal

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

Test Results for Low Channel 1860MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720.0	-45.65	4.07	33.54	-16.18	-13	-3.18	Horizontal
3720.0	-49.49	4.07	33.54	-20.02	-13	-7.02	Vertical
5580.0	-53.11	5.28	35.86	-22.53	-13	-9.53	Vertical
5580.0	-49.85	5.28	35.86	-19.27	-13	-6.27	Horizontal
208.7	-40.08	1.58	16.89	-24.76	-13	-11.76	Vertical
355.7	-34.57	1.76	17.26	-19.07	-13	-6.07	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-49.83	4.04	33.56	-20.31	-13	-7.31	Horizontal
3760.0	-46.33	4.04	33.56	-16.81	-13	-3.81	Vertical
5640.0	-52.48	5.24	35.91	-21.81	-13	-8.81	Vertical
5640.0	-49.60	5.24	35.91	-18.93	-13	-5.93	Horizontal
188.0	-38.92	1.46	16.27	-24.11	-13	-11.11	Vertical
336.3	-35.35	1.59	15.15	-21.79	-13	-8.79	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-44.46	4.04	34.00	-14.50	-13	-1.50	Horizontal
3800.0	-52.60	4.04	34.00	-22.64	-13	-9.64	Vertical
5700.0	-49.57	5.24	36.04	-18.77	-13	-5.77	Vertical
5700.0	-53.17	5.24	36.04	-22.37	-13	-9.37	Horizontal
177.6	-34.68	1.36	17.39	-18.64	-13	-5.64	Vertical
245.2	-42.76	1.66	15.39	-29.03	-13	-16.03	Horizontal

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

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

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

9.2 LTE BAND 4

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-47.37	4.02	29.80	-21.59	-13	-8.59	Horizontal
3421.4	-51.31	4.02	29.80	-25.53	-13	-12.53	Vertical
5132.1	-45.60	5.24	35.84	-15.00	-13	-2.00	Vertical
5132.1	-50.61	5.24	35.84	-20.01	-13	-7.01	Horizontal
199.7	-35.83	1.68	16.04	-21.47	-13	-8.47	Vertical
432.4	-43.35	1.78	17.74	-27.39	-13	-14.39	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-46.92	4.03	30.00	-20.95	-13	-7.95	Horizontal
3465.0	-50.51	4.03	30.00	-24.54	-13	-11.54	Vertical
5197.5	-51.12	5.25	35.86	-20.51	-13	-7.51	Vertical
5197.5	-51.01	5.25	35.86	-20.40	-13	-7.40	Horizontal
205.9	-39.11	1.72	17.69	-23.14	-13	-10.14	Vertical
302.2	-44.69	1.62	16.02	-30.28	-13	-17.28	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-48.70	4.05	30.01	-22.74	-13	-9.74	Horizontal
3508.6	-50.68	4.05	30.01	-24.72	-13	-11.72	Vertical
5262.9	-45.98	5.26	35.86	-15.38	-13	-2.38	Vertical
5262.9	-51.93	5.26	35.86	-21.33	-13	-8.33	Horizontal
188.8	-41.08	1.80	16.69	-26.19	-13	-13.19	Vertical
466.5	-41.17	1.75	16.66	-26.27	-13	-13.27	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	-50.65	4.02	29.80	-24.87	-13	-11.87	Horizontal
3440.0	-48.10	4.02	29.80	-22.32	-13	-9.32	Vertical
5160.0	-52.73	5.24	35.84	-22.13	-13	-9.13	Vertical
5160.0	-53.82	5.24	35.84	-23.22	-13	-10.22	Horizontal
183.3	-44.44	1.57	17.26	-28.75	-13	-15.75	Vertical
271.0	-39.76	1.78	16.35	-25.19	-13	-12.19	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-46.03	4.03	30.00	-20.06	-13	-7.06	Horizontal
3465.0	-50.70	4.03	30.00	-24.73	-13	-11.73	Vertical
5197.5	-53.38	5.25	35.86	-22.77	-13	-9.77	Vertical
5197.5	-49.99	5.25	35.86	-19.38	-13	-6.38	Horizontal
191.4	-40.87	1.44	17.95	-24.36	-13	-11.36	Vertical
250.0	-40.58	1.65	16.09	-26.14	-13	-13.14	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-45.55	4.05	27.68	-21.92	-13	-8.92	Horizontal
3490.0	-45.68	4.05	27.68	-22.05	-13	-9.05	Vertical
5235.0	-51.17	5.26	35.86	-20.57	-13	-7.57	Vertical
5235.0	-53.68	5.26	35.86	-23.08	-13	-10.08	Horizontal
199.5	-41.28	1.61	16.85	-26.04	-13	-13.04	Vertical
305.0	-42.96	1.61	15.19	-29.38	-13	-16.38	Horizontal

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

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

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

9.3 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	-53.94	2.78	27.50	-29.22	-13	-16.22	Horizontal
1649.4	-44.72	2.78	27.50	-20.00	-13	-7.00	Vertical
2474.1	-47.35	2.90	27.80	-22.45	-13	-9.45	Vertical
2474.1	-50.74	2.90	27.80	-25.84	-13	-12.84	Horizontal
213.0	-34.81	1.76	17.59	-18.98	-13	-5.98	Vertical
362.2	-38.42	1.63	15.87	-24.18	-13	-11.18	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-44.73	2.80	27.48	-20.05	-13	-7.05	Horizontal
1673.0	-47.63	2.80	27.48	-22.95	-13	-9.95	Vertical
2509.5	-48.45	2.91	27.70	-23.66	-13	-10.66	Vertical
2509.5	-50.22	2.91	27.70	-25.43	-13	-12.43	Horizontal
199.2	-39.21	1.61	15.68	-25.14	-13	-12.14	Vertical
305.5	-39.90	1.59	17.52	-23.98	-13	-10.98	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-49.85	2.82	27.43	-25.24	-13	-12.24	Horizontal
1696.6	-44.23	2.82	27.43	-19.62	-13	-6.62	Vertical
2544.9	-47.05	2.92	27.74	-22.23	-13	-9.23	Vertical
2544.9	-52.25	2.92	27.74	-27.43	-13	-14.43	Horizontal
202.7	-38.76	1.69	16.67	-23.77	-13	-10.77	Vertical
310.9	-39.83	1.70	17.18	-24.35	-13	-11.35	Horizontal

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

Test Results for Low Channel 829MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1658.0	-45.86	2.78	27.50	-21.14	-13	-8.14	Horizontal
1658.0	-46.10	2.78	27.50	-21.38	-13	-8.38	Vertical
2487.0	-51.19	2.90	27.80	-26.29	-13	-13.29	Vertical
2487.0	-51.89	2.90	27.80	-26.99	-13	-13.99	Horizontal
202.8	-42.21	1.71	15.57	-28.35	-13	-15.35	Vertical
276.9	-40.49	1.34	16.40	-25.43	-13	-12.43	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-52.92	2.80	27.48	-28.24	-13	-15.24	Horizontal
1673.0	-51.94	2.80	27.48	-27.26	-13	-14.26	Vertical
2509.5	-47.85	2.91	27.70	-23.06	-13	-10.06	Vertical
2509.5	-50.59	2.91	27.70	-25.80	-13	-12.80	Horizontal
182.3	-44.02	1.44	17.04	-28.42	-13	-15.42	Vertical
468.0	-40.21	1.76	17.62	-24.35	-13	-11.35	Horizontal
Test Results for High Channel 844MHz							
1688.0	-52.54	2.82	27.43	-27.93	-13	-14.93	Horizontal
1688.0	-52.04	2.82	27.43	-27.43	-13	-14.43	Vertical
2532.0	-44.86	2.92	27.74	-20.04	-13	-7.04	Vertical
2532.0	-53.90	2.92	27.74	-29.08	-13	-16.08	Horizontal
212.9	-40.60	1.74	17.70	-24.64	-13	-11.64	Vertical
297.8	-39.81	1.41	17.46	-23.75	-13	-10.75	Horizontal

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

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

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

9.4 LTE BAND 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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-52.73	2.60	27.20	-28.13	-13	-15.13	Horizontal
1399.4	-52.90	2.60	27.20	-28.30	-13	-15.30	Vertical
2099.1	-52.02	2.85	27.54	-27.33	-13	-14.33	Vertical
2099.1	-52.85	2.85	27.54	-28.16	-13	-15.16	Horizontal
211.7	-39.18	1.49	17.78	-22.89	-13	-9.89	Vertical
321.5	-34.49	1.36	17.33	-18.52	-13	-5.52	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-48.64	2.61	27.28	-23.97	-13	-10.97	Horizontal
1415.0	-46.35	2.61	27.28	-21.68	-13	-8.68	Vertical
2122.5	-49.09	2.87	27.59	-24.37	-13	-11.37	Vertical
2122.5	-52.43	2.87	27.59	-27.71	-13	-14.71	Horizontal
180.3	-36.85	1.73	15.74	-22.84	-13	-9.84	Vertical
428.6	-41.99	1.62	15.79	-27.82	-13	-14.82	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-52.47	2.63	27.28	-27.82	-13	-14.82	Horizontal
1430.6	-47.64	2.63	27.28	-22.99	-13	-9.99	Vertical
2145.9	-51.34	2.88	27.60	-26.62	-13	-13.62	Vertical
2145.9	-50.19	2.88	27.60	-25.47	-13	-12.47	Horizontal
187.1	-36.99	1.61	18.00	-20.60	-13	-7.60	Vertical
275.8	-44.70	1.45	15.49	-30.67	-13	-17.67	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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1408.0	-50.96	2.61	27.26	-26.31	-13	-13.31	Horizontal
1408.0	-51.66	2.61	27.26	-27.01	-13	-14.01	Vertical
2112.0	-44.81	2.87	27.58	-20.10	-13	-7.10	Vertical
2112.0	-52.82	2.87	27.58	-28.11	-13	-15.11	Horizontal
196.4	-42.48	1.31	16.97	-26.82	-13	-13.82	Vertical
270.9	-34.69	1.65	16.70	-19.64	-13	-6.64	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-44.58	2.61	27.28	-19.91	-13	-6.91	Horizontal
1415.0	-44.81	2.61	27.28	-20.14	-13	-7.14	Vertical
2122.5	-52.75	2.87	27.59	-28.03	-13	-15.03	Vertical
2122.5	-49.17	2.87	27.59	-24.45	-13	-11.45	Horizontal
183.0	-37.08	1.72	17.99	-20.81	-13	-7.81	Vertical
418.9	-43.60	1.73	17.94	-27.39	-13	-14.39	Horizontal
Test Results for High Channel 711MHz							
1422.0	-47.61	2.62	27.28	-22.95	-13	-9.95	Horizontal
1422.0	-46.02	2.62	27.28	-21.36	-13	-8.36	Vertical
2133.0	-46.46	2.87	27.60	-21.73	-13	-8.73	Vertical
2133.0	-53.42	2.87	27.60	-28.69	-13	-15.69	Horizontal
185.3	-40.14	1.58	15.93	-25.79	-13	-12.79	Vertical
265.9	-34.63	1.36	15.59	-20.40	-13	-7.40	Horizontal

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

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

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

9.5 LTE BAND 17

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

Test Results for Low Channel 706.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1413.0	-49.79	2.61	27.28	-25.12	-13	-12.12	Horizontal
1413.0	-45.83	2.61	27.28	-21.16	-13	-8.16	Vertical
2119.5	-53.06	2.87	27.59	-28.34	-13	-15.34	Vertical
2119.5	-52.49	2.87	27.59	-27.77	-13	-14.77	Horizontal
187.5	-36.96	1.71	16.15	-22.52	-13	-9.52	Vertical
235.8	-43.99	1.41	17.32	-28.08	-13	-15.08	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-52.07	2.62	27.30	-27.39	-13	-14.39	Horizontal
1420.0	-48.75	2.62	27.30	-24.07	-13	-11.07	Vertical
2130.0	-49.38	2.87	27.62	-24.63	-13	-11.63	Vertical
2130.0	-53.65	2.87	27.62	-28.90	-13	-15.90	Horizontal
201.9	-44.84	1.42	15.25	-31.02	-13	-18.02	Vertical
265.3	-42.54	1.36	17.19	-26.71	-13	-13.71	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-53.52	2.66	27.28	-28.90	-13	-15.90	Horizontal
1427.0	-46.96	2.66	27.28	-22.34	-13	-9.34	Vertical
2140.5	-49.05	2.88	27.60	-24.33	-13	-11.33	Vertical
2140.5	-51.06	2.88	27.60	-26.34	-13	-13.34	Horizontal
198.3	-43.76	1.32	17.29	-27.79	-13	-14.79	Vertical
250.5	-41.39	1.72	16.89	-26.22	-13	-13.22	Horizontal

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

Test Results for Low Channel 709MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1418.0	-44.47	2.62	27.30	-19.79	-13	-6.79	Horizontal
1418.0	-49.64	2.62	27.30	-24.96	-13	-11.96	Vertical
2127.0	-46.52	2.87	27.62	-21.77	-13	-8.77	Vertical
2127.0	-50.21	2.87	27.62	-25.46	-13	-12.46	Horizontal
176.6	-38.88	1.35	16.91	-23.32	-13	-10.32	Vertical
370.8	-43.17	1.62	16.31	-28.48	-13	-15.48	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-52.50	2.62	27.30	-27.82	-13	-14.82	Horizontal
1420.0	-52.11	2.62	27.30	-27.43	-13	-14.43	Vertical
2130.0	-45.11	2.87	27.62	-20.36	-13	-7.36	Vertical
2130.0	-49.13	2.87	27.62	-24.38	-13	-11.38	Horizontal
192.7	-37.86	1.51	17.14	-22.23	-13	-9.23	Vertical
422.3	-35.41	1.77	16.88	-20.30	-13	-7.30	Horizontal
Test Results for High Channel 711MHz							
1422.0	-53.75	2.62	27.30	-29.07	-13	-16.07	Horizontal
1422.0	-47.29	2.62	27.30	-22.61	-13	-9.61	Vertical
2133.0	-45.58	2.87	27.62	-20.83	-13	-7.83	Vertical
2133.0	-50.27	2.87	27.62	-25.52	-13	-12.52	Horizontal
175.1	-35.57	1.78	15.95	-21.40	-13	-8.40	Vertical
399.2	-37.41	1.34	17.95	-20.81	-13	-7.81	Horizontal

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

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

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

9.6 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	-59.59	3.84	35.81	-27.62	-13	-14.62	Horizontal
3421.4	-64.60	3.84	35.81	-32.63	-13	-19.63	Vertical
5132.1	-61.51	5.18	36.85	-29.84	-13	-16.84	Vertical
5132.1	-60.72	5.18	36.85	-29.05	-13	-16.05	Horizontal
197.5	-52.69	1.56	17.97	-36.28	-13	-23.28	Vertical
363.5	-54.21	1.33	15.11	-40.43	-13	-27.43	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-64.13	3.87	35.82	-32.16	-13	-19.16	Horizontal
3490.0	-60.68	3.87	35.82	-28.71	-13	-15.71	Vertical
5235.0	-63.67	5.21	36.85	-32.03	-13	-19.03	Vertical
5235.0	-60.40	5.21	36.85	-28.76	-13	-15.76	Horizontal
201.9	-47.58	1.77	16.17	-33.17	-13	-20.17	Vertical
270.3	-47.90	1.63	15.21	-34.32	-13	-21.32	Horizontal
Test Results for High Channel 1779.3MHz							
3558.6	-62.97	3.86	35.83	-31.00	-13	-18.00	Horizontal
3558.6	-59.33	3.86	35.83	-27.36	-13	-14.36	Vertical
5337.9	-64.29	5.24	36.87	-32.66	-13	-19.66	Vertical
5337.9	-61.06	5.24	36.87	-29.43	-13	-16.43	Horizontal
205.2	-49.11	1.58	17.56	-33.13	-13	-20.13	Vertical
235.9	-46.08	1.45	16.58	-30.95	-13	-17.95	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	-61.62	3.84	35.82	-29.64	-13	-16.64	Horizontal
3440.0	-64.54	3.84	35.82	-32.56	-13	-19.56	Vertical
5160.0	-61.72	5.18	36.86	-30.04	-13	-17.04	Vertical
5160.0	-60.12	5.18	36.86	-28.44	-13	-15.44	Horizontal
176.1	-45.52	1.56	15.76	-31.32	-13	-18.32	Vertical
389.4	-51.35	1.33	15.44	-37.24	-13	-24.24	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-59.40	3.87	35.82	-27.43	-13	-14.43	Horizontal
3490.0	-61.72	3.87	35.82	-29.75	-13	-16.75	Vertical
5235.0	-62.13	5.21	36.85	-30.49	-13	-17.49	Vertical
5235.0	-63.30	5.21	36.85	-31.66	-13	-18.66	Horizontal
192.0	-54.19	1.77	16.84	-39.11	-13	-26.11	Vertical
264.4	-48.55	1.63	17.64	-32.54	-13	-19.54	Horizontal
Test Results for High Channel 1770MHz							
3540.0	-62.45	3.86	35.83	-30.48	-13	-17.48	Horizontal
3540.0	-61.23	3.86	35.83	-29.26	-13	-16.26	Vertical
5310.0	-60.78	5.24	36.88	-29.14	-13	-16.14	Vertical
5310.0	-61.71	5.24	36.88	-30.07	-13	-17.07	Horizontal
203.2	-46.80	1.58	16.84	-31.53	-13	-18.53	Vertical
370.8	-48.51	1.45	17.64	-32.32	-13	-19.32	Horizontal

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

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

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

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

10. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = -30° to $+50^{\circ}\text{C}$
- Voltage=low voltage, DC 3.66V, Normal, DC 3.87V and High voltage, DC 4.43V.

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
LTE Band 4
- LTE Band 5
LTE Band 12
LTE Band 17
LTE Band 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]
3.4	1880	12.4	0.006613	2.5
3.87	1880	13.5	0.007172	2.5
4.2	1880	13.2	0.007003	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	12.9	0.006836	2.5
Extreme (50C)	1880	11.5	0.006140	2.5
Extreme (40C)	1880	13.8	0.007363	2.5
Extreme (30C)	1880	13.7	0.007286	2.5
Extreme (10C)	1880	13.7	0.007269	2.5
Extreme (0C)	1880	12.6	0.006692	2.5
Extreme (-10C)	1880	12.8	0.006832	2.5
Extreme (-20C)	1880	13.7	0.007287	2.5
Extreme (-30C)	1880	14.8	0.007868	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]
3.4	1880	9.4	0.004983	2.5
3.87	1880	8.4	0.004491	2.5
4.2	1880	8.4	0.004456	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.1	0.004861	2.5
Extreme (50C)	1880	9.3	0.004957	2.5
Extreme (40C)	1880	8.4	0.00448256	2.5
Extreme (30C)	1880	9.4	0.005011378	2.5
Extreme (10C)	1880	9.0	0.004762462	2.5
Extreme (0C)	1880	8.4	0.004446029	2.5
Extreme (-10C)	1880	9.1	0.004823747	2.5
Extreme (-20C)	1880	9.1	0.004852451	2.5
Extreme (-30C)	1880	8.2	0.00437279	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]
3.4	1732.5	8.9	0.005164	2.5
3.87	1732.5	9.3	0.005369	2.5
4.2	1732.5	8.5	0.004913	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.7	0.005020	2.5
Extreme (50C)	1732.5	8.5	0.004908	2.5
Extreme (40C)	1732.5	7.1	0.004075	2.5
Extreme (30C)	1732.5	6.2	0.003569	2.5
Extreme (10C)	1732.5	7.5	0.004335	2.5
Extreme (0C)	1732.5	9.8	0.005667	2.5
Extreme (-10C)	1732.5	8.1	0.004666	2.5
Extreme (-20C)	1732.5	7.0	0.004057	2.5
Extreme (-30C)	1732.5	8.3	0.004765	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]
3.4	1732.5	9.5	0.005494	2.5
3.87	1732.5	8.9	0.005159	2.5
4.2	1732.5	8.2	0.004717	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	10.2	0.005872	2.5
Extreme (50C)	1732.5	9.2	0.005311	2.5
Extreme (40C)	1732.5	8.0	0.004622	2.5
Extreme (30C)	1732.5	9.4	0.005431	2.5
Extreme (10C)	1732.5	8.9	0.005152	2.5
Extreme (0C)	1732.5	7.6	0.004390	2.5
Extreme (-10C)	1732.5	9.4	0.005452	2.5
Extreme (-20C)	1732.5	9.1	0.005228	2.5
Extreme (-30C)	1732.5	8.5	0.004925	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]
3.4	836.5	5.8	0.006915	2.5
3.87	836.5	6.7	0.008047	2.5
4.2	836.5	5.0	0.005948	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.2	0.007373	2.5
Extreme (50C)	836.5	5.5	0.006581	2.5
Extreme (40C)	836.5	5.8	0.006954	2.5
Extreme (30C)	836.5	6.4	0.007640	2.5
Extreme (10C)	836.5	5.2	0.006256	2.5
Extreme (0C)	836.5	5.6	0.006681	2.5
Extreme (-10C)	836.5	5.8	0.006889	2.5
Extreme (-20C)	836.5	6.3	0.007513	2.5
Extreme (-30C)	836.5	5.9	0.007112	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]
3.4	836.5	6.1	0.007271	2.5
3.87	836.5	6.4	0.007710	2.5
4.2	836.5	4.7	0.005665	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.4	0.007598	2.5
Extreme (50C)	836.5	5.7	0.006812	2.5
Extreme (40C)	836.5	6.4	0.007640	2.5
Extreme (30C)	836.5	6.2	0.007447	2.5
Extreme (10C)	836.5	5.9	0.007043	2.5
Extreme (0C)	836.5	5.4	0.006420	2.5
Extreme (-10C)	836.5	5.3	0.006294	2.5
Extreme (-20C)	836.5	5.9	0.007099	2.5
Extreme (-30C)	836.5	6.1	0.007267	2.5

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

10.4 LTE BAND 12

Band 12 QPSK, (10MHz BANDWIDTH RB size 50 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	707.5	8.7	0.012261	2.5
3.87	707.5	10.3	0.014610	2.5
4.2	707.5	8.2	0.011644	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	9.2	0.013010	2.5
Extreme (50C)	707.5	7.8	0.011010	2.5
Extreme (40C)	707.5	7.0	0.009960	2.5
Extreme (30C)	707.5	8.6	0.012107	2.5
Extreme (10C)	707.5	7.9	0.011158	2.5
Extreme (0C)	707.5	9.4	0.013302	2.5
Extreme (-10C)	707.5	7.9	0.011205	2.5
Extreme (-20C)	707.5	8.8	0.012494	2.5
Extreme (-30C)	707.5	7.4	0.010416	2.5

Band 12 16QAM, (10MHz BANDWIDTH RB size 50 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	707.5	7.7	0.010864	2.5
3.87	707.5	8.6	0.012093	2.5
4.2	707.5	7.5	0.010626	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	9.0	0.012746	2.5
Extreme (50C)	707.5	8.7	0.012313	2.5
Extreme (40C)	707.5	8.7	0.012272	2.5
Extreme (30C)	707.5	7.3	0.010356	2.5
Extreme (10C)	707.5	8.9	0.012523	2.5
Extreme (0C)	707.5	7.8	0.011005	2.5
Extreme (-10C)	707.5	7.7	0.010859	2.5
Extreme (-20C)	707.5	8.9	0.012645	2.5
Extreme (-30C)	707.5	8.4	0.011900	2.5

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

10.5 LTE BAND 17

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	710.0	9.6	0.013492	2.5
3.87	710.0	8.7	0.012222	2.5
4.2	710.0	8.5	0.012011	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	10.1	0.014227	2.5
Extreme (50C)	710.0	9.0	0.012663	2.5
Extreme (40C)	710.0	8.4	0.011806	2.5
Extreme (30C)	710.0	8.5	0.011995	2.5
Extreme (10C)	710.0	8.8	0.012331	2.5
Extreme (0C)	710.0	7.7	0.010780	2.5
Extreme (-10C)	710.0	9.0	0.012627	2.5
Extreme (-20C)	710.0	9.0	0.012680	2.5
Extreme (-30C)	710.0	8.6	0.012096	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	710.0	9.9	0.013901	2.5
3.87	710.0	8.5	0.011925	2.5
4.2	710.0	8.4	0.011815	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.2	0.012939	2.5
Extreme (50C)	710.0	9.4	0.013183	2.5
Extreme (40C)	710.0	8.5	0.011918	2.5
Extreme (30C)	710.0	8.6	0.012093	2.5
Extreme (10C)	710.0	8.2	0.011514	2.5
Extreme (0C)	710.0	8.2	0.011542	2.5
Extreme (-10C)	710.0	8.9	0.012555	2.5
Extreme (-20C)	710.0	9.4	0.013213	2.5
Extreme (-30C)	710.0	8.8	0.012341	2.5

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

10.6 LTE BAND 66

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1745	6.7	0.003824	2.5
3.8	1745	6.7	0.003843	2.5
4.2	1745	7.2	0.004114	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1745	5.3	0.003026	2.5
Extreme (50C)	1745	7.9	0.004544	2.5
Extreme (40C)	1745	6.3	0.003620	2.5
Extreme (30C)	1745	7.3	0.004183	2.5
Extreme (10C)	1745	7.9	0.004499	2.5
Extreme (0C)	1745	6.4	0.003669	2.5
Extreme (-10C)	1745	5.1	0.002918	2.5
Extreme (-20C)	1745	7.0	0.004002	2.5
Extreme (-30C)	1745	5.6	0.003183	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1745	8.4	0.004785	2.5
3.8	1745	7.2	0.004128	2.5
4.2	1745	9.3	0.005314	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1745	8.8	0.005047	2.5
Extreme (50C)	1745	8.4	0.004790	2.5
Extreme (40C)	1745	8.4	0.004840	2.5
Extreme (30C)	1745	7.8	0.004466	2.5
Extreme (10C)	1745	8.4	0.004839	2.5
Extreme (0C)	1745	6.7	0.003839	2.5
Extreme (-10C)	1745	8.9	0.005103	2.5
Extreme (-20C)	1745	8.3	0.004731	2.5
Extreme (-30C)	1745	6.0	0.003436	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.

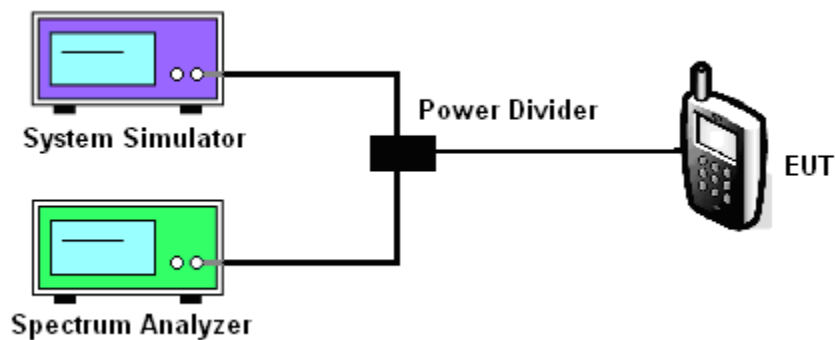
11.2 Measuring Instruments

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 2/4/5/12/17/66
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Test data reference attachment.

----END OF REPORT----