

FCC CFR47 PART 22H, 24E, 27, CERTIFICATION TEST REPORT FCC ID: 2A97SEDANIXROCKYMT1

Product: Edanix

Trade Mark: N/A

Model No.: Rocky_MT1

Family Model: N/A

Report No.: S23020200405006

Issue Date: Mar 14, 2023

Prepared for

Edanix Products Corporation

12500 Vickers Way, Richmond, BC Canada, V6V 1H9

Prepared by

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

Tel. 400-800-6106, 0755-2320 0050, 0755-2320 0090

Website: <http://www.ntek.org.cn>

TEST RESULT CERTIFICATION

Applicant's name	Edanix Products Corporation
Address.....	12500 Vickers Way, Richmond, BC Canada, V6V 1H9
Manufacturer's Name	Edanix Products Corporation
Address.....	12500 Vickers Way, Richmond, BC Canada, V6V 1H9
Product name.....	Edanix
Model and/or type reference ..	Rocky_MT1
Trade Mark.....	N/A
Family Model.....	N/A
Test Sample Number.....	S230202004005
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..... Feb 09, 2023 ~ Mar 14, 2023

Date of Issue Mar 14, 2023

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

Testing Engineer :

Allen bin

(Allen Liu)

Authorized Signatory :

Alex

(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:	Edanix
Trade Mark	N/A
Model Name	Rocky_MT1
Family Model	N/A
Model Difference	N/A
FCC ID:	2A97SEDANIXROCKYMT1
Frequency Bands:	U.S. Bands: ☒ LTE FDD Band 2,4,5,7,12,13,17
Frequency Range:	LTE FDD Band 2 Uplink: 1850MHz-1910MHz, Downlink: 1930MHz-1990MHz; LTE FDD Band 4 Uplink: 1710MHz-1755MHz, Downlink: 2110MHz-2155MHz; LTE FDD Band 5 Uplink: 824MHz-849MHz, Downlink: 869MHz-894MHz; LTE-FDD Band 7 Uplink: 2500MHz-2570MHz, Downlink: 2620MHz-2690MHz; LTE FDD Band 12 Uplink: 699MHz-716MHz, Downlink: 729MHz-746MHz; LTE FDD Band 13 Uplink: 777MHz-787MHz, Downlink: 746MHz-756MHz; LTE FDD Band 17 Uplink: 704MHz-716MHz, Downlink: 734MHz-746MHz;
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:	0.52 dBi;
Adapter	Model: LY-QKDM6-01EU0502000 Input: AC 100-240V, 50/60Hz 0.3A Output: DC 5.0V 2000mA
Battery	DC 3.85V, 4000mAh
Power supply	DC 3.85V from battery or DC 5V from Adapter.
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.85V) (Note 1)

HW Version	T68-MB-V2.0
SW Version	T68.ZXT.Z6501S.128+6.EU.12.0.V001.20230112 (Build numberSP1A.210812.016 release-keys)
** Note1: The High Voltage DC 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: 2A97SEDANIXROCKYMT1** 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 2/4/5/7/12/13/17/25/41

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

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

2. SYSTEM TEST CONFIGURATION

2.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

2.3 CONFIGURATION OF EUT SYSTEM

Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Edanix	Rocky_MT1	FCC ID: 2A97SEDANIXROCKYMT1	EUT

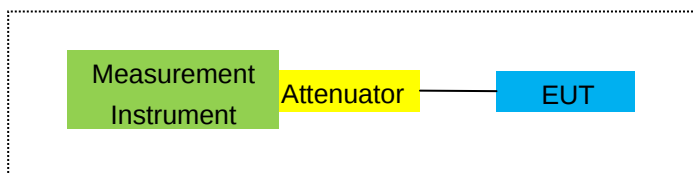
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

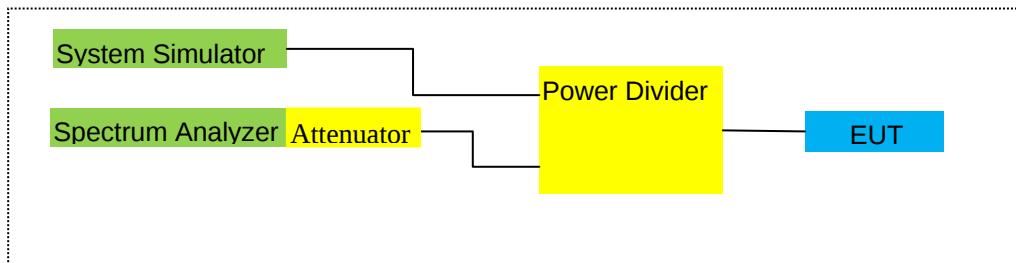
For Radiated Test Cases



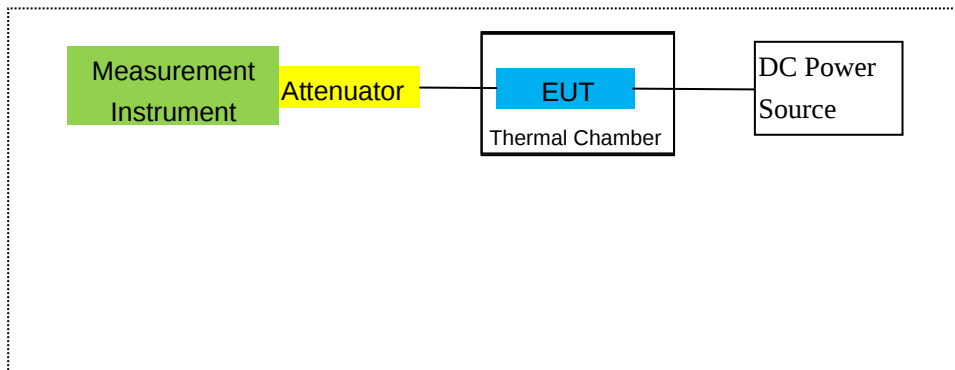
For Conducted Output Power



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	2022.06.16	2023.06.17	1 year
2	Test Receiver	R&S	ESPI	101318	2022.04.06	2023.04.05	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	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2022.11.07	2023.11.06	1 year
7	Amplifier	EM	EM-30180	060538	2022.06.17	2023.06.16	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2022.04.06	2023.04.05	1 year
9	Power Meter	R&S	NRVS	100696	2022.06.17	2023.06.16	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	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	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	2022.04.06	2023.04.05	1 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	Attenuator	MCE	24-10-34	BN9258	2022.04.01	2023.03.31	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2022.04.01	2023.03.31	1 year
24	test receiver	R&S	ESCI	a0304218	2022.04.06	2023.04.05	1 year
25	Communication Tester	R&S	CMU200	A0304247	2022.06.16	2023.06.15	1 year

26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2022.04.06	2023.04.05	1 year
27	DC Power Source	N/A	PS-6005D	20170402923	2020.05.11	2023.05.10	3 year
28	MXG Vector Signal Generator	Agilent	N5182A	MY47070317	2022.06.16	2023.06.15	1 year
29	Communication Tester	R&S	CMW500	148500	2022.06.16	2023.06.15	1 year

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

4. OUTPUT POWER

4.1 OUTPUT POWER MEASUREMENT

LTE Measurement Procedure:

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

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

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

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

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

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

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

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

Test data reference attachment.

5. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

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

MODES TESTED

☐

Band 2/4/5/7/12/13/17

RESULTS

PASS

Test data reference attachment.

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

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

FCC: §22.359

LIMITS

FCC: §22.917, §24.238, §27.53

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

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

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

TEST PROCEDURE

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

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

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

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

MODES TESTED

Band 2/4/5/7/12/13/17

RESULTS

Test data reference attachment.

7. OUT OF BAND EMISSIONS

RULE PART(S)

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

LIMITS

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

TEST PROCEDURE

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

For each out of band emissions measurement:

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

MODES TESTED

- ☐ Band 2/4/5/7/12/13/17
- ☐

7.1 MEASUREMENT METHOD

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

Test data reference attachment.

8. RADIATED MEASUREMENT

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27.50

LIMITS:

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.

27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.

27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

27.50 (h)(2) Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17

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

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

MODES TESTED

Band 2/4/5/7/12/13/17

RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1850.7	-2.89	3.76	28.24	21.59	144.212	Horizontal	Pass
1880		-2.70	3.91	28.22	21.61	144.877	Horizontal	Pass	
1909.3		-2.61	3.93	28.20	21.66	146.555	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-2.95	3.77	28.23	21.51	141.579	Horizontal	Pass
1880		-2.80	3.91	28.24	21.53	142.233	Horizontal	Pass	
1908.5		-2.67	3.94	28.25	21.64	145.881	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-2.84	3.77	28.31	21.70	147.911	Horizontal	Pass
1880		-2.46	3.91	28.22	21.85	153.109	Horizontal	Pass	
1907.5		-2.39	3.94	28.20	21.87	153.815	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-2.70	3.79	28.33	21.84	152.757	Horizontal	Pass
1880		-2.40	3.95	28.22	21.87	153.815	Horizontal	Pass	
1905		-2.29	3.97	28.19	21.93	155.955	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	1857.5	-2.66	3.79	28.34	21.89	154.525	Horizontal	Pass
1880		-2.45	3.95	28.22	21.82	152.055	Horizontal	Pass	
1902.5		-2.31	3.97	28.18	21.90	154.882	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	1860	-2.65	3.81	28.35	21.89	154.525	Horizontal	Pass
1880		-2.32	3.96	28.22	21.94	156.315	Horizontal	Pass	
1900		-2.26	4.00	28.16	21.90	154.882	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	1850.7	-3.46	3.76	28.24	21.02	126.474	Vertical	Pass
1880		-3.16	3.91	28.22	21.15	130.317	Vertical	Pass	
1909.3		-2.99	3.93	28.20	21.28	134.276	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-3.81	3.77	28.23	20.65	116.145	Vertical	Pass
1880		-3.56	3.91	28.24	20.77	119.399	Vertical	Pass	
1908.5		-3.30	3.94	28.25	21.01	126.183	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-3.79	3.77	28.31	20.75	118.850	Vertical	Pass
1880		-3.64	3.91	28.22	20.67	116.681	Vertical	Pass	
1907.5		-3.87	3.94	28.20	20.39	109.396	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-4.15	3.79	28.33	20.39	109.396	Vertical	Pass
1880		-3.11	3.95	28.22	21.16	130.617	Vertical	Pass	
1905		-3.25	3.97	28.19	20.97	125.026	Vertical	Pass	
15.0MHz	1/#Mid	1857.5	-3.49	3.79	28.34	21.06	127.644	Vertical	Pass

Band		1880	-3.00	3.95	28.22	21.27	133.968	Vertical	Pass
QPSK		1902.5	-3.89	3.97	28.18	20.32	107.647	Vertical	Pass
20.0MHz	1/#Mid	1860	-3.47	3.81	28.35	21.07	127.938	Vertical	Pass
Band		1880	-3.86	3.96	28.22	20.40	109.648	Vertical	Pass
QPSK		1900	-3.27	4.00	28.16	20.89	122.744	Vertical	Pass

Radiated Power (EIRP) for Band 2										
Mode	RB/RB SIZE	Frequency	Result						Conclusion	
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP	Polarization Of Max. ERP		
							Average			
							(mW)			
1.4MHz	Band 16 QAM	1/#Mid	1850.7	-4.01	3.76	28.24	20.47	111.429	Horizontal	Pass
1880			-3.48	3.91	28.22	20.83	121.060	Horizontal	Pass	
1909.3			-3.41	3.93	28.20	20.86	121.899	Horizontal	Pass	
3.0MHz	Band 16 QAM	1/#Mid	1851.5	-3.51	3.77	28.23	20.95	124.451	Horizontal	Pass
1880			-3.59	3.91	28.24	20.74	118.577	Horizontal	Pass	
1908.5			-3.80	3.94	28.25	20.51	112.460	Horizontal	Pass	
5.0MHz	Band 16 QAM	1/#Mid	1852.5	-3.45	3.77	28.31	21.09	128.529	Horizontal	Pass
1880			-3.36	3.91	28.22	20.95	124.451	Horizontal	Pass	
1907.5			-3.04	3.94	28.20	21.22	132.434	Horizontal	Pass	
10.0MHz	Band 16 QAM	1/#Mid	1855	-3.50	3.79	28.33	21.04	127.057	Horizontal	Pass
1880			-3.49	3.95	28.22	20.78	119.674	Horizontal	Pass	
1905			-2.96	3.97	28.19	21.26	133.660	Horizontal	Pass	
15.0MHz	Band 16 QAM	1/#Mid	1857.5	-3.48	3.79	28.34	21.07	127.938	Horizontal	Pass
1880			-3.27	3.95	28.22	21.00	125.893	Horizontal	Pass	
1902.5			-3.23	3.97	28.18	20.98	125.314	Horizontal	Pass	
20.0MHz	Band 16 QAM	1/#Mid	1860	-3.37	3.81	28.35	21.17	130.918	Horizontal	Pass
1880			-3.07	3.96	28.22	21.19	131.522	Horizontal	Pass	
1900			-2.89	4.00	28.16	21.27	133.968	Horizontal	Pass	
1.4MHz	Band 16 QAM	1/#Mid	1850.7	-5.10	3.76	28.24	19.38	86.696	Vertical	Pass
1880			-4.88	3.91	28.22	19.43	87.700	Vertical	Pass	
1909.3			-4.91	3.93	28.20	19.36	86.298	Vertical	Pass	
3.0MHz	Band 16 QAM	1/#Mid	1851.5	-4.37	3.77	28.23	20.09	102.094	Vertical	Pass
1880			-4.97	3.91	28.24	19.36	86.298	Vertical	Pass	
1908.5			-4.94	3.94	28.25	19.37	86.497	Vertical	Pass	
5.0MHz	Band 16 QAM	1/#Mid	1852.5	-4.90	3.77	28.31	19.64	92.045	Vertical	Pass
1880			-4.92	3.91	28.22	19.39	86.896	Vertical	Pass	
1907.5			-4.08	3.94	28.20	20.18	104.232	Vertical	Pass	
10.0MHz	Band 16 QAM	1/#Mid	1855	-4.93	3.79	28.33	19.61	91.411	Vertical	Pass
1880			-4.03	3.95	28.22	20.24	105.682	Vertical	Pass	
1905			-4.71	3.97	28.19	19.51	89.331	Vertical	Pass	
15.0MHz	Band 16 QAM	1/#Mid	1857.5	-4.42	3.79	28.34	20.13	103.039	Vertical	Pass
1880			-4.11	3.95	28.22	20.16	103.753	Vertical	Pass	
1902.5			-4.66	3.97	28.18	19.55	90.157	Vertical	Pass	

20.0MHz	1/#Mid	1860	-4.87	3.81	28.35	19.67	92.683	Vertical	Pass
Band 16		1880	-4.38	3.96	28.22	19.88	97.275	Vertical	Pass
QAM		1900	-4.57	4.00	28.16	19.59	90.991	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable	Antenna	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	Loss	Factor	Average	Average	Of Max. ERP	
				(dBm)	(dB)	(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-2.80	3.12	27.58	21.66	146.555	Horizontal	Pass
		1732.5	-2.79	3.27	27.61	21.55	142.889	Horizontal	Pass
		1754.3	-2.77	3.29	27.63	21.57	143.549	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-2.97	3.13	27.61	21.51	141.579	Horizontal	Pass
		1732.5	-2.89	3.27	27.61	21.45	139.637	Horizontal	Pass
		1753.5	-2.81	3.30	27.62	21.51	141.579	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.74	3.13	27.63	21.76	149.968	Horizontal	Pass
		1732.5	-2.64	3.27	27.61	21.70	147.911	Horizontal	Pass
		1752.5	-2.52	3.30	27.60	21.78	150.661	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-2.68	3.15	27.64	21.81	151.705	Horizontal	Pass
		1732.5	-2.45	3.31	27.61	21.85	153.109	Horizontal	Pass
		1750	-2.47	3.33	27.59	21.79	151.008	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-2.69	3.15	27.65	21.81	151.705	Horizontal	Pass
		1732.5	-2.53	3.31	27.61	21.77	150.314	Horizontal	Pass
		1747.5	-2.47	3.33	27.57	21.77	150.314	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-2.63	3.17	27.66	21.86	153.462	Horizontal	Pass
		1732.5	-2.46	3.32	27.61	21.83	152.405	Horizontal	Pass
		1745	-2.40	3.36	27.56	21.80	151.356	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-3.84	3.12	27.58	20.62	115.345	Vertical	Pass
		1732.5	-3.43	3.27	27.61	20.91	123.310	Vertical	Pass
		1754.3	-3.37	3.29	27.63	20.97	125.026	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.53	3.13	27.61	20.95	124.451	Vertical	Pass
		1732.5	-3.40	3.27	27.61	20.94	124.165	Vertical	Pass
		1753.5	-3.72	3.30	27.62	20.60	114.815	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-3.26	3.13	27.63	21.24	133.045	Vertical	Pass
		1732.5	-4.02	3.27	27.61	20.32	107.647	Vertical	Pass
		1752.5	-3.21	3.30	27.60	21.09	128.529	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-3.62	3.15	27.64	20.87	122.180	Vertical	Pass
		1732.5	-3.88	3.31	27.61	20.42	110.154	Vertical	Pass
		1750	-3.68	3.33	27.59	20.58	114.288	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-3.39	3.15	27.65	21.11	129.122	Vertical	Pass

Band		1732.5	-3.66	3.31	27.61	20.64	115.878	Vertical	Pass
QPSK		1747.5	-3.86	3.33	27.57	20.38	109.144	Vertical	Pass
20.0MHz	1/#Mid	1720	-4.09	3.17	27.66	20.40	109.648	Vertical	Pass
Band		1732.5	-3.45	3.32	27.61	20.84	121.339	Vertical	Pass
QPSK		1745	-3.39	3.36	27.56	20.81	120.504	Vertical	Pass

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable	Antenna	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	Loss	Factor	Average	Average	Of Max. ERP	
				(dBm)	(dB)	(dBm)	(mW)		
1.4MHz	1/#Mid	1710.7	-3.61	3.12	27.58	20.85	121.619	Horizontal	Pass
Band 16		1732.5	-3.46	3.27	27.61	20.88	122.462	Horizontal	Pass
QAM		1754.3	-3.46	3.29	27.63	20.88	122.462	Horizontal	Pass
3.0MHz	1/#Mid	1711.5	-3.55	3.13	27.61	20.93	123.880	Horizontal	Pass
Band 16		1732.5	-3.68	3.27	27.61	20.66	116.413	Horizontal	Pass
QAM		1753.5	-3.90	3.30	27.62	20.42	110.154	Horizontal	Pass
5.0MHz	1/#Mid	1712.5	-3.38	3.13	27.63	21.12	129.420	Horizontal	Pass
Band 16		1732.5	-3.34	3.27	27.61	21.00	125.893	Horizontal	Pass
QAM		1752.5	-3.03	3.30	27.60	21.27	133.968	Horizontal	Pass
10.0MHz	1/#Mid	1715	-3.45	3.15	27.64	21.04	127.057	Horizontal	Pass
Band 16		1732.5	-3.64	3.31	27.61	20.66	116.413	Horizontal	Pass
QAM		1750	-3.02	3.33	27.59	21.24	133.045	Horizontal	Pass
15.0MHz	1/#Mid	1717.5	-3.25	3.15	27.65	21.25	133.352	Horizontal	Pass
Band 16		1732.5	-3.31	3.31	27.61	20.99	125.603	Horizontal	Pass
QAM		1747.5	-3.33	3.33	27.57	20.91	123.310	Horizontal	Pass
20.0MHz	1/#Mid	1720	-3.20	3.17	27.66	21.29	134.586	Horizontal	Pass
Band 16		1732.5	-3.21	3.32	27.61	21.08	128.233	Horizontal	Pass
QAM		1745	-3.02	3.36	27.56	21.18	131.220	Horizontal	Pass
1.4MHz	1/#Mid	1710.7	-4.82	3.12	27.58	19.64	92.045	Vertical	Pass
Band 16		1732.5	-4.67	3.27	27.61	19.67	92.683	Vertical	Pass
QAM		1754.3	-4.28	3.29	27.63	20.06	101.391	Vertical	Pass
3.0MHz	1/#Mid	1711.5	-4.71	3.13	27.61	19.77	94.842	Vertical	Pass
Band 16		1732.5	-5.01	3.27	27.61	19.33	85.704	Vertical	Pass
QAM		1753.5	-4.05	3.30	27.62	20.27	106.414	Vertical	Pass
5.0MHz	1/#Mid	1712.5	-4.50	3.13	27.63	20.00	100.000	Vertical	Pass
Band 16		1732.5	-4.33	3.27	27.61	20.01	100.231	Vertical	Pass
QAM		1752.5	-4.00	3.30	27.60	20.30	107.152	Vertical	Pass
10.0MHz	1/#Mid	1715	-4.80	3.15	27.64	19.69	93.111	Vertical	Pass
Band 16		1732.5	-4.51	3.31	27.61	19.79	95.280	Vertical	Pass
QAM		1750	-4.82	3.33	27.59	19.44	87.902	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-5.15	3.15	27.65	19.35	86.099	Vertical	Pass
Band 16		1732.5	-4.06	3.31	27.61	20.24	105.682	Vertical	Pass
QAM		1747.5	-4.61	3.33	27.57	19.63	91.833	Vertical	Pass

20.0MHz		1720	-4.56	3.17	27.66	19.93	98.401	Vertical	Pass
Band 16	1/#Mid	1732.5	-4.20	3.32	27.61	20.09	102.094	Vertical	Pass
QAM		1745	-4.83	3.36	27.56	19.37	86.497	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

8.4 LTE BAND 5

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	Of Max.	
							(dBm)	(mW)	ERP	
1.4MHz	3/#Mid	824.7	6.50	2.01	19.68	2.15	22.02	159.221	Horizontal	Pass
Band		836.5	6.38	2.01	19.77	2.15	21.99	158.125	Horizontal	Pass
QPSK		848.3	6.18	2.02	19.82	2.15	21.83	152.405	Horizontal	Pass
3.0MHz	1/#Mid	825.5	6.27	2.01	19.70	2.15	21.81	151.705	Horizontal	Pass
Band		836.5	6.17	2.01	19.77	2.15	21.78	150.661	Horizontal	Pass
QPSK		847.5	6.04	2.02	19.81	2.15	21.68	147.231	Horizontal	Pass
5.0MHz	1/#Mid	826.5	6.55	2.01	19.71	2.15	22.10	162.181	Horizontal	Pass
Band		836.5	6.43	2.01	19.77	2.15	22.04	159.956	Horizontal	Pass
QPSK		846.5	6.27	2.02	19.79	2.15	21.89	154.525	Horizontal	Pass
10.0MHz	1/#Mid	829	6.57	2.01	19.73	2.15	22.14	163.682	Horizontal	Pass
Band		836.5	6.52	2.01	19.77	2.15	22.13	163.305	Horizontal	Pass
QPSK		844	6.42	2.02	19.78	2.15	22.03	159.588	Horizontal	Pass
1.4MHz	1/#Mid	824.7	5.09	2.01	19.68	2.15	20.61	115.080	Vertical	Pass
Band		836.5	5.54	2.01	19.77	2.15	21.15	130.317	Vertical	Pass
QPSK		848.3	5.36	2.02	19.82	2.15	21.01	126.183	Vertical	Pass
3.0MHz	1/#Mid	825.5	5.33	2.01	19.70	2.15	20.87	122.180	Vertical	Pass
Band		836.5	5.03	2.01	19.77	2.15	20.64	115.878	Vertical	Pass
QPSK		847.5	4.95	2.02	19.81	2.15	20.59	114.551	Vertical	Pass
5.0MHz	1/#Mid	826.5	5.34	2.01	19.71	2.15	20.89	122.744	Vertical	Pass
Band		836.5	5.42	2.01	19.77	2.15	21.03	126.765	Vertical	Pass
QPSK		846.5	5.08	2.02	19.79	2.15	20.70	117.490	Vertical	Pass
10.0MHz	1/#Mid	829	4.75	2.01	19.73	2.15	20.32	107.647	Vertical	Pass
Band		836.5	5.40	2.01	19.77	2.15	21.01	126.183	Vertical	Pass
QPSK		844	5.66	2.02	19.78	2.15	21.27	133.968	Vertical	Pass

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	Of Max. ERP	
							(dBm)	(mW)		
1.4MHz	3/#Mid	824.7	5.65	2.01	19.68	2.15	21.17	130.918	Horizontal	Pass
Band 16		836.5	5.58	2.01	19.77	2.15	21.19	131.522	Horizontal	Pass
QAM		848.3	5.42	2.02	19.82	2.15	21.07	127.938	Horizontal	Pass
3.0MHz	1/#Mid	825.5	5.73	2.01	19.70	2.15	21.27	133.968	Horizontal	Pass
Band 16		836.5	5.44	2.01	19.77	2.15	21.05	127.350	Horizontal	Pass
QAM		847.5	4.92	2.02	19.81	2.15	20.56	113.763	Horizontal	Pass
5.0MHz	1/#Mid	826.5	6.05	2.01	19.71	2.15	21.60	144.544	Horizontal	Pass
Band 16		836.5	5.82	2.01	19.77	2.15	21.43	138.995	Horizontal	Pass
QAM		846.5	5.57	2.02	19.79	2.15	21.19	131.522	Horizontal	Pass
10.0MHz	1/#Mid	829	6.05	2.01	19.73	2.15	21.62	145.211	Horizontal	Pass
Band 16		836.5	5.77	2.01	19.77	2.15	21.38	137.404	Horizontal	Pass
QAM		844	5.31	2.02	19.78	2.15	20.92	123.595	Horizontal	Pass
1.4MHz	1/#Mid	824.7	5.50	2.01	19.68	2.15	21.02	126.474	Vertical	Pass
Band 16		836.5	5.42	2.01	19.77	2.15	21.03	126.765	Vertical	Pass
QAM		848.3	4.74	2.02	19.82	2.15	20.39	109.396	Vertical	Pass
3.0MHz	1/#Mid	825.5	4.77	2.01	19.70	2.15	20.31	107.399	Vertical	Pass
Band 16		836.5	4.22	2.01	19.77	2.15	19.83	96.161	Vertical	Pass
QAM		847.5	4.78	2.02	19.81	2.15	20.42	110.154	Vertical	Pass
5.0MHz	1/#Mid	826.5	5.56	2.01	19.71	2.15	21.11	129.122	Vertical	Pass
Band 16		836.5	5.68	2.01	19.77	2.15	21.29	134.586	Vertical	Pass
QAM		846.5	4.26	2.02	19.79	2.15	19.88	97.275	Vertical	Pass
10.0MHz	1/#Mid	829	5.70	2.01	19.73	2.15	21.27	133.968	Vertical	Pass
Band 16		836.5	4.65	2.01	19.77	2.15	20.26	106.170	Vertical	Pass
QAM		844	4.33	2.02	19.78	2.15	19.94	98.628	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable	Antenna	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	Loss	Factor	Average	Average	Of Max. ERP	
				(dBm)	(dB)	(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	-1.27	4.54	27.75	21.94	156.315	Horizontal	Pass
		2535	-1.10	4.69	27.72	21.93	155.955	Horizontal	Pass
		2567.5	-1.03	4.71	27.71	21.97	157.398	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-1.20	4.55	27.76	22.01	158.855	Horizontal	Pass
		2535	-1.01	4.69	27.72	22.02	159.221	Horizontal	Pass
		2565	-0.93	4.72	27.70	22.05	160.325	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-1.21	4.55	27.77	22.01	158.855	Horizontal	Pass
		2535	-1.07	4.69	27.72	21.96	157.036	Horizontal	Pass
		2562.5	-0.97	4.72	27.69	22.00	158.489	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-1.15	4.57	27.78	22.06	160.694	Horizontal	Pass
		2535	-0.97	4.73	27.72	22.02	159.221	Horizontal	Pass
		2560	-0.93	4.75	27.68	22.00	158.489	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-2.61	4.54	27.75	20.60	114.815	Vertical	Pass
		2535	-2.85	4.69	27.72	20.18	104.232	Vertical	Pass
		2567.5	-2.05	4.71	27.71	20.95	124.451	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-2.51	4.55	27.76	20.70	117.490	Vertical	Pass
		2535	-1.92	4.69	27.72	21.11	129.122	Vertical	Pass
		2565	-2.47	4.72	27.70	20.51	112.460	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-2.15	4.55	27.77	21.07	127.938	Vertical	Pass
		2535	-2.87	4.69	27.72	20.16	103.753	Vertical	Pass
		2562.5	-2.54	4.72	27.69	20.43	110.408	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-2.56	4.57	27.78	20.65	116.145	Vertical	Pass
		2535	-1.91	4.73	27.72	21.08	128.233	Vertical	Pass
		2560	-2.11	4.75	27.68	20.82	120.781	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable	Antenna	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	Loss	Factor	Average	Average	Of Max. ERP	
				(dBm)	(dB)	(dBm)	(mW)		
5.0MHz	1/#Mid	2502.5	-1.96	4.54	27.75	21.25	133.352	Horizontal	Pass
Band 16		2535	-1.65	4.69	27.72	21.38	137.404	Horizontal	Pass
QAM		2567.5	-1.73	4.71	27.71	21.27	133.968	Horizontal	Pass
10.0MHz	1/#Mid	2505	-1.85	4.55	27.76	21.36	136.773	Horizontal	Pass
Band 16		2535	-1.86	4.69	27.72	21.17	130.918	Horizontal	Pass
QAM		2565	-2.13	4.72	27.70	20.85	121.619	Horizontal	Pass
15.0MHz	1/#Mid	2507.5	-2.03	4.55	27.77	21.19	131.522	Horizontal	Pass
Band 16		2535	-2.00	4.69	27.72	21.03	126.765	Horizontal	Pass
QAM		2562.5	-1.61	4.72	27.69	21.36	136.773	Horizontal	Pass
20.0MHz	1/#Mid	2510	-1.91	4.57	27.78	21.30	134.896	Horizontal	Pass
Band 16		2535	-1.58	4.73	27.72	21.41	138.357	Horizontal	Pass
QAM		2560	-1.68	4.75	27.68	21.25	133.352	Horizontal	Pass
5.0MHz	1/#Mid	2502.5	-3.09	4.54	27.75	20.12	102.802	Vertical	Pass
Band 16		2535	-2.68	4.69	27.72	20.35	108.393	Vertical	Pass
QAM		2567.5	-2.49	4.71	27.71	20.51	112.460	Vertical	Pass
10.0MHz	1/#Mid	2505	-3.26	4.55	27.76	19.95	98.855	Vertical	Pass
Band 16		2535	-2.39	4.69	27.72	20.64	115.878	Vertical	Pass
QAM		2565	-3.77	4.72	27.70	19.21	83.368	Vertical	Pass
15.0MHz	1/#Mid	2507.5	-2.61	4.55	27.77	20.61	115.080	Vertical	Pass
Band 16		2535	-2.28	4.69	27.72	20.75	118.850	Vertical	Pass
QAM		2562.5	-2.23	4.72	27.69	20.74	118.577	Vertical	Pass
20.0MHz	1/#Mid	2510	-3.01	4.57	27.78	20.20	104.713	Vertical	Pass
Band 16		2535	-2.10	4.73	27.72	20.89	122.744	Vertical	Pass
QAM		2560	-2.88	4.75	27.68	20.05	101.158	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.6 LTE BAND 12

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	Of Max. ERP	
							(dBm)	(mW)		
1.4MHz	Band QPSK	699.7	6.68	1.91	19.21	2.15	21.83	152.405	Vertical	Pass
		707.5	6.60	1.91	19.26	2.15	21.80	151.356	Vertical	Pass
		715.3	6.38	1.93	19.34	2.15	21.64	145.881	Vertical	Pass
3.0MHz	Band QPSK	700.5	6.47	1.91	19.21	2.15	21.62	145.211	Vertical	Pass
		707.5	6.39	1.91	19.26	2.15	21.59	144.212	Vertical	Pass
		714.5	6.23	1.93	19.34	2.15	21.49	140.929	Vertical	Pass
5.0MHz	Band QPSK	701.5	6.74	1.91	19.23	2.15	21.91	155.239	Vertical	Pass
		707.5	6.65	1.91	19.26	2.15	21.85	153.109	Vertical	Pass
		713.5	6.44	1.92	19.33	2.15	21.70	147.911	Vertical	Pass
10.0MHz	Band QPSK	704	6.76	1.91	19.25	2.15	21.95	156.675	Vertical	Pass
		707.5	6.74	1.91	19.26	2.15	21.94	156.315	Vertical	Pass
		711	6.59	1.92	19.32	2.15	21.84	152.757	Vertical	Pass
1.4MHz	Band QPSK	699.7	5.16	1.91	19.21	2.15	20.31	107.399	Horizontal	Pass
		707.5	5.48	1.91	19.26	2.15	20.68	116.950	Horizontal	Pass
		715.3	5.64	1.93	19.34	2.15	20.90	123.027	Horizontal	Pass
3.0MHz	Band QPSK	700.5	5.80	1.91	19.21	2.15	20.95	124.451	Horizontal	Pass
		707.5	5.00	1.91	19.26	2.15	20.20	104.713	Horizontal	Pass
		714.5	4.96	1.93	19.34	2.15	20.22	105.196	Horizontal	Pass
5.0MHz	Band QPSK	701.5	5.29	1.91	19.23	2.15	20.46	111.173	Horizontal	Pass
		707.5	5.30	1.91	19.26	2.15	20.50	112.202	Horizontal	Pass
		713.5	5.16	1.92	19.33	2.15	20.42	110.154	Horizontal	Pass
10.0MHz	Band QPSK	704	5.07	1.91	19.25	2.15	20.26	106.170	Horizontal	Pass
		707.5	5.84	1.91	19.26	2.15	21.04	127.057	Horizontal	Pass
		711	5.37	1.92	19.32	2.15	20.62	115.345	Horizontal	Pass

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG	Cable	Antenna		Max.	Max.	Polarization	
			Level	Loss	Factor	Correction	EIRP	EIRP	Of Max.	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	ERP	
						(dBm)	(mW)			
1.4MHz	1/#Mid	699.7	6.58	1.91	19.21	2.15	21.73	148.936	Vertical	Pass
Band 16		707.5	6.50	1.91	19.26	2.15	21.70	147.911	Vertical	Pass
QAM		715.3	6.28	1.93	19.34	2.15	21.54	142.561	Vertical	Pass
3.0MHz	1/#Mid	700.5	6.37	1.91	19.21	2.15	21.52	141.906	Vertical	Pass
Band 16		707.5	6.29	1.91	19.26	2.15	21.49	140.929	Vertical	Pass
QAM		714.5	6.13	1.93	19.34	2.15	21.39	137.721	Vertical	Pass
5.0MHz	1/#Mid	701.5	6.64	1.91	19.23	2.15	21.81	151.705	Vertical	Pass
Band 16		707.5	6.55	1.91	19.26	2.15	21.75	149.624	Vertical	Pass
QAM		713.5	6.34	1.92	19.33	2.15	21.60	144.544	Vertical	Pass
10.0MHz	1/#Mid	704	6.66	1.91	19.25	2.15	21.85	153.109	Vertical	Pass
Band 16		707.5	6.64	1.91	19.26	2.15	21.84	152.757	Vertical	Pass
QAM		711	6.49	1.92	19.32	2.15	21.74	149.279	Vertical	Pass
1.4MHz	1/#Mid	699.7	5.68	1.91	19.21	2.15	20.83	121.060	Horizontal	Pass
Band 16		707.5	5.51	1.91	19.26	2.15	20.71	117.761	Horizontal	Pass
QAM		715.3	4.87	1.93	19.34	2.15	20.13	103.039	Horizontal	Pass
3.0MHz	1/#Mid	700.5	5.29	1.91	19.21	2.15	20.44	110.662	Horizontal	Pass
Band 16		707.5	5.24	1.91	19.26	2.15	20.44	110.662	Horizontal	Pass
QAM		714.5	5.69	1.93	19.34	2.15	20.95	124.451	Horizontal	Pass
5.0MHz	1/#Mid	701.5	5.29	1.91	19.23	2.15	20.46	111.173	Horizontal	Pass
Band 16		707.5	5.17	1.91	19.26	2.15	20.37	108.893	Horizontal	Pass
QAM		713.5	5.46	1.92	19.33	2.15	20.72	118.032	Horizontal	Pass
10.0MHz	1/#Mid	704	5.00	1.91	19.25	2.15	20.19	104.472	Horizontal	Pass
Band 16		707.5	5.58	1.91	19.26	2.15	20.78	119.674	Horizontal	Pass
QAM		711	4.91	1.92	19.32	2.15	20.16	103.753	Horizontal	Pass

Note:

SG Level= Signal generator output

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

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

8.7 LTE BAND 13

Radiated Power (ERP) for Band 13										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG	Cable	Antenna		Max.	Max.	Polarization	
			Level	Loss	Factor	Correction	EIRP	EIRP	Of Max.	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	ERP	
							(dBm)	(mW)		
5.0MHz	25/0	779.5	6.77	1.91	19.23	2.15	21.94	156.31	Horizontal	Pass
Band		782	6.63	1.91	19.26	2.15	21.83	152.41	Horizontal	Pass
QPSK		784.5	6.53	1.92	19.33	2.15	21.79	151.01	Horizontal	Pass
10.0MHz	50/0	782	6.78	1.91	19.25	2.15	21.97	157.40	Horizontal	Pass
Band			6.73	1.91	19.26	2.15	21.93	155.96	Horizontal	Pass
QPSK			6.69	1.92	19.32	2.15	21.94	156.31	Horizontal	Pass
5.0MHz	25/0	779.5	5.14	1.91	19.23	2.15	20.31	107.40	Vertical	Pass
Band		782	5.50	1.91	19.26	2.15	20.70	117.49	Vertical	Pass
QPSK		784.5	5.78	1.92	19.33	2.15	21.04	127.06	Vertical	Pass
10.0MHz	50/0	782	4.93	1.91	19.25	2.15	20.12	102.80	Vertical	Pass
Band			4.92	1.91	19.26	2.15	20.12	102.80	Vertical	Pass
QPSK			6.37	1.92	19.32	2.15	21.62	145.21	Vertical	Pass

Radiated Power (ERP) for Band 13										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG	Cable	Antenna		Max.	Max.	Polarization	
			Level	Loss	Factor	Correction	EIRP	EIRP	Of Max.	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	ERP	
							(dBm)	(mW)		
5.0MHz	25/0	779.5	6.97	1.91	19.23	2.15	22.14	163.68	Horizontal	Pass
Band 16		782	6.83	1.91	19.26	2.15	22.03	159.59	Horizontal	Pass
QAM		784.5	6.73	1.92	19.33	2.15	21.99	158.12	Horizontal	Pass
10.0MHz	50/0	782	6.98	1.91	19.25	2.15	22.17	164.82	Horizontal	Pass
Band 16			6.93	1.91	19.26	2.15	22.13	163.31	Horizontal	Pass
QAM			6.89	1.92	19.32	2.15	22.14	163.68	Horizontal	Pass
5.0MHz	25/0	779.5	5.44	1.91	19.23	2.15	20.61	115.08	Vertical	Pass
Band 16		782	5.77	1.91	19.26	2.15	20.97	125.03	Vertical	Pass
QAM		784.5	6.68	1.92	19.33	2.15	21.94	156.31	Vertical	Pass
10.0MHz	50/0	782	4.79	1.91	19.25	2.15	19.98	99.54	Vertical	Pass
Band 16			6.45	1.91	19.26	2.15	21.65	146.22	Vertical	Pass
QAM			5.65	1.92	19.32	2.15	20.90	123.03	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)

8.8 LTE BAND 17

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG	Cable	Antenna	Correction	Max.	Max.	Polarization	
			Level	Loss	Factor		EIRP	EIRP	Of Max.	
			(dBm)	(dBm)	(dB)		Average	Average	ERP	
5.0MHz Band QPSK	1/#Mid	706.5	7.04	1.91	19.23	2.15	22.21	166.341	Vertical	Pass
		710	6.90	1.91	19.26	2.15	22.10	162.181	Vertical	Pass
		713.5	6.80	1.92	19.33	2.15	22.06	160.694	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	709	7.05	1.91	19.25	2.15	22.24	167.494	Vertical	Pass
		710	7.00	1.91	19.26	2.15	22.20	165.959	Vertical	Pass
		711	6.96	1.92	19.32	2.15	22.21	166.341	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	706.5	5.50	1.91	19.23	2.15	20.67	116.681	Horizontal	Pass
		710	6.20	1.91	19.26	2.15	21.40	138.038	Horizontal	Pass
		713.5	6.01	1.92	19.33	2.15	21.27	133.968	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	709	5.74	1.91	19.25	2.15	20.93	123.880	Horizontal	Pass
		710	5.89	1.91	19.26	2.15	21.09	128.529	Horizontal	Pass
		711	6.77	1.92	19.32	2.15	22.02	159.221	Horizontal	Pass

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization Of Max.	
			(dBm)	(dBm)	(dB)		Average	Average	ERP	
							(dBm)	(mW)		
5.0MHz	1/#Mid	706.5	6.39	1.91	19.23	2.15	21.56	143.219	Vertical	Pass
Band 16		710	6.30	1.91	19.26	2.15	21.50	141.254	Vertical	Pass
QAM		713.5	6.10	1.92	19.33	2.15	21.36	136.773	Vertical	Pass
10.0MHz	1/#Mid	709	5.93	1.91	19.25	2.15	21.12	129.420	Vertical	Pass
Band 16		710	6.46	1.91	19.26	2.15	21.66	146.555	Vertical	Pass
QAM		711	6.19	1.92	19.32	2.15	21.44	139.316	Vertical	Pass
5.0MHz	1/#Mid	706.5	4.91	1.91	19.23	2.15	20.08	101.859	Horizontal	Pass
Band 16		710	5.16	1.91	19.26	2.15	20.36	108.643	Horizontal	Pass
QAM		713.5	4.97	1.92	19.33	2.15	20.23	105.439	Horizontal	Pass
10.0MHz	1/#Mid	709	5.24	1.91	19.25	2.15	20.43	110.408	Horizontal	Pass
Band 16		710	5.03	1.91	19.26	2.15	20.23	105.439	Horizontal	Pass
QAM		711	4.88	1.92	19.32	2.15	20.13	103.039	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

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

LIMIT

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

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

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

TEST PROCEDURE

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

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

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

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

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

MODES TESTED

LTE Band 2/4/5/7/12/13/17

RESULTS

PASS

9.1 LTE BAND 2

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

Test Results for Low Channel 1850.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3701.4	-50.15	4.04	33.51	-20.68	-13	-7.68	Horizontal
3701.4	-52.60	4.04	33.51	-23.13	-13	-10.13	Vertical
5552.1	-53.41	5.24	35.84	-22.81	-13	-9.81	Vertical
5552.1	-52.20	5.24	35.84	-21.60	-13	-8.60	Horizontal
178.3	-35.31	1.43	16.02	-20.72	-13	-7.72	Vertical
414.5	-35.52	1.30	17.99	-18.83	-13	-5.83	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-53.00	4.04	33.56	-23.48	-13	-10.48	Horizontal
3760.0	-47.78	4.04	33.56	-18.26	-13	-5.26	Vertical
5640.0	-49.21	5.24	35.91	-18.54	-13	-5.54	Vertical
5640.0	-53.93	5.24	35.91	-23.26	-13	-10.26	Horizontal
183.6	-40.02	1.62	16.97	-24.67	-13	-11.67	Vertical
407.9	-35.85	1.74	15.98	-21.62	-13	-8.62	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-51.40	4.04	34.00	-21.44	-13	-8.44	Horizontal
3818.6	-47.23	4.04	34.00	-17.27	-13	-4.27	Vertical
5727.9	-48.02	5.24	36.04	-17.22	-13	-4.22	Vertical
5727.9	-51.98	5.24	36.04	-21.18	-13	-8.18	Horizontal
207.2	-42.10	1.42	17.29	-26.23	-13	-13.23	Vertical
344.3	-40.82	1.50	17.90	-24.41	-13	-11.41	Horizontal

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

Test Results for Low Channel 1860MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720.0	-50.50	4.07	33.54	-21.03	-13	-8.03	Horizontal
3720.0	-46.27	4.07	33.54	-16.80	-13	-3.80	Vertical
5580.0	-52.00	5.28	35.86	-21.42	-13	-8.42	Vertical
5580.0	-49.39	5.28	35.86	-18.81	-13	-5.81	Horizontal
209.4	-43.24	1.58	16.89	-27.92	-13	-14.92	Vertical
245.4	-39.36	1.76	17.26	-23.86	-13	-10.86	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-49.68	4.04	33.56	-20.16	-13	-7.16	Horizontal
3760.0	-51.38	4.04	33.56	-21.86	-13	-8.86	Vertical
5640.0	-52.71	5.24	35.91	-22.04	-13	-9.04	Vertical
5640.0	-52.74	5.24	35.91	-22.07	-13	-9.07	Horizontal
206.8	-38.92	1.46	16.27	-24.11	-13	-11.11	Vertical
237.0	-40.61	1.59	15.15	-27.05	-13	-14.05	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-51.13	4.04	34.00	-21.17	-13	-8.17	Horizontal
3800.0	-48.69	4.04	34.00	-18.73	-13	-5.73	Vertical
5700.0	-48.98	5.24	36.04	-18.18	-13	-5.18	Vertical
5700.0	-52.22	5.24	36.04	-21.42	-13	-8.42	Horizontal
185.5	-40.71	1.36	17.39	-24.67	-13	-11.67	Vertical
295.9	-41.87	1.66	15.39	-28.14	-13	-15.14	Horizontal

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

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

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

9.2 LTE BAND 4

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-52.38	4.02	29.80	-26.60	-13	-13.60	Horizontal
3421.4	-46.79	4.02	29.80	-21.01	-13	-8.01	Vertical
5132.1	-49.17	5.24	35.84	-18.57	-13	-5.57	Vertical
5132.1	-52.85	5.24	35.84	-22.25	-13	-9.25	Horizontal
211.0	-37.06	1.68	16.04	-22.70	-13	-9.70	Vertical
290.1	-39.25	1.78	17.74	-23.29	-13	-10.29	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-47.33	4.03	30.00	-21.36	-13	-8.36	Horizontal
3465.0	-53.81	4.03	30.00	-27.84	-13	-14.84	Vertical
5197.5	-49.33	5.25	35.86	-18.72	-13	-5.72	Vertical
5197.5	-53.20	5.25	35.86	-22.59	-13	-9.59	Horizontal
185.0	-39.24	1.72	17.69	-23.27	-13	-10.27	Vertical
452.7	-39.07	1.62	16.02	-24.66	-13	-11.66	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-52.05	4.05	30.01	-26.09	-13	-13.09	Horizontal
3508.6	-49.52	4.05	30.01	-23.56	-13	-10.56	Vertical
5262.9	-49.14	5.26	35.86	-18.54	-13	-5.54	Vertical
5262.9	-52.37	5.26	35.86	-21.77	-13	-8.77	Horizontal
189.3	-34.22	1.80	16.69	-19.33	-13	-6.33	Vertical
259.8	-40.68	1.75	16.66	-25.78	-13	-12.78	Horizontal

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

Test Results for Low Channel 1720MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440.0	-51.36	4.02	29.80	-25.58	-13	-12.58	Horizontal
3440.0	-45.17	4.02	29.80	-19.39	-13	-6.39	Vertical
5160.0	-47.70	5.24	35.84	-17.10	-13	-4.10	Vertical
5160.0	-51.78	5.24	35.84	-21.18	-13	-8.18	Horizontal
207.2	-40.13	1.57	17.26	-24.44	-13	-11.44	Vertical
423.2	-42.51	1.78	16.35	-27.94	-13	-14.94	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-51.73	4.03	30.00	-25.76	-13	-12.76	Horizontal
3465.0	-52.59	4.03	30.00	-26.62	-13	-13.62	Vertical
5197.5	-51.59	5.25	35.86	-20.98	-13	-7.98	Vertical
5197.5	-53.45	5.25	35.86	-22.84	-13	-9.84	Horizontal
193.1	-34.32	1.44	17.95	-17.81	-13	-4.81	Vertical
468.6	-40.09	1.65	16.09	-25.65	-13	-12.65	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-45.97	2.91	27.68	-21.20	-13	-8.20	Horizontal
3490.0	-44.11	2.91	27.68	-19.34	-13	-6.34	Vertical
5235.0	-48.22	5.26	35.86	-17.62	-13	-4.62	Vertical
5235.0	-50.90	5.26	35.86	-20.30	-13	-7.30	Horizontal
197.7	-41.85	1.61	16.85	-26.61	-13	-13.61	Vertical
358.7	-41.09	1.61	15.19	-27.51	-13	-14.51	Horizontal

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

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

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

9.3 LTE BAND 5

QPSK EIRP POWER FOR LTE BAND 5 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-47.32	2.78	27.50	-22.60	-13	-9.60	Horizontal
1649.4	-49.99	2.78	27.50	-25.27	-13	-12.27	Vertical
2474.1	-46.45	2.90	27.80	-21.55	-13	-8.55	Vertical
2474.1	-52.71	2.90	27.80	-27.81	-13	-14.81	Horizontal
180.3	-42.16	1.76	17.59	-26.33	-13	-13.33	Vertical
235.9	-37.08	1.63	15.87	-22.84	-13	-9.84	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-46.75	2.80	27.48	-22.07	-13	-9.07	Horizontal
1673.0	-50.44	2.80	27.48	-25.76	-13	-12.76	Vertical
2509.5	-45.09	2.91	27.70	-20.30	-13	-7.30	Vertical
2509.5	-53.48	2.91	27.70	-28.69	-13	-15.69	Horizontal
201.8	-42.84	1.61	15.68	-28.77	-13	-15.77	Vertical
320.9	-44.27	1.59	17.52	-28.35	-13	-15.35	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-46.68	2.82	27.43	-22.07	-13	-9.07	Horizontal
1696.6	-50.12	2.82	27.43	-25.51	-13	-12.51	Vertical
2544.9	-47.67	2.92	27.74	-22.85	-13	-9.85	Vertical
2544.9	-49.09	2.92	27.74	-24.27	-13	-11.27	Horizontal
192.3	-36.77	1.69	16.67	-21.78	-13	-8.78	Vertical
395.1	-44.09	1.70	17.18	-28.61	-13	-15.61	Horizontal

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

Test Results for Low Channel 829MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1658.0	-49.16	2.78	27.50	-24.44	-13	-11.44	Horizontal
1658.0	-45.21	2.78	27.50	-20.49	-13	-7.49	Vertical
2487.0	-50.23	2.90	27.80	-25.33	-13	-12.33	Vertical
2487.0	-49.56	2.90	27.80	-24.66	-13	-11.66	Horizontal
195.8	-41.18	1.71	15.57	-27.32	-13	-14.32	Vertical
292.6	-42.11	1.34	16.40	-27.05	-13	-14.05	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-47.73	2.80	27.48	-23.05	-13	-10.05	Horizontal
1673.0	-49.75	2.80	27.48	-25.07	-13	-12.07	Vertical
2509.5	-48.29	2.91	27.70	-23.50	-13	-10.50	Vertical
2509.5	-53.01	2.91	27.70	-28.22	-13	-15.22	Horizontal
207.9	-44.47	1.44	17.04	-28.87	-13	-15.87	Vertical
360.8	-36.03	1.76	17.62	-20.17	-13	-7.17	Horizontal
Test Results for High Channel 844MHz							
1688.0	-52.23	2.82	27.43	-27.62	-13	-14.62	Horizontal
1688.0	-49.22	2.82	27.43	-24.61	-13	-11.61	Vertical
2532.0	-45.03	2.92	27.74	-20.21	-13	-7.21	Vertical
2532.0	-51.02	2.92	27.74	-26.20	-13	-13.20	Horizontal
176.2	-44.58	1.74	17.70	-28.62	-13	-15.62	Vertical
273.1	-39.35	1.41	17.46	-23.29	-13	-10.29	Horizontal

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

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

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

9.4 LTE BAND 7

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

Test Results for Low Channel 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-62.17	5.23	35.81	-31.59	-25	-6.59	Horizontal
5005.0	-63.78	5.23	35.81	-33.20	-25	-8.20	Vertical
7507.5	-61.94	5.67	36.85	-30.76	-25	-5.76	Vertical
7507.5	-60.53	5.67	36.85	-29.35	-25	-4.35	Horizontal
189.2	-54.97	1.73	17.97	-38.73	-25	-13.73	Vertical
324.2	-53.99	1.38	15.11	-40.26	-25	-15.26	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.42	5.23	35.82	-30.83	-25	-5.83	Horizontal
5070.0	-63.65	5.23	35.82	-33.06	-25	-8.06	Vertical
7605.0	-60.54	5.67	36.85	-29.36	-25	-4.36	Vertical
7605.0	-62.33	5.67	36.85	-31.15	-25	-6.15	Horizontal
199.4	-53.34	1.77	16.17	-38.93	-25	-13.93	Vertical
356.9	-49.90	1.63	15.21	-36.32	-25	-11.32	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-61.17	5.24	35.83	-30.58	-25	-5.58	Horizontal
5135.0	-62.80	5.24	35.83	-32.21	-25	-7.21	Vertical
7702.5	-64.16	5.68	36.87	-32.97	-25	-7.97	Vertical
7702.5	-63.47	5.68	36.87	-32.28	-25	-7.28	Horizontal
210.1	-50.99	1.58	17.56	-35.01	-25	-10.01	Vertical
369.5	-44.51	1.45	16.58	-29.38	-25	-4.38	Horizontal

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

Test Results for Low Channel 2510MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020.0	-60.28	5.23	35.82	-29.69	-25	-4.69	Horizontal
5020.0	-59.72	5.23	35.82	-29.13	-25	-4.13	Vertical
7530.0	-60.39	5.67	36.86	-29.20	-25	-4.20	Vertical
7530.0	-64.07	5.67	36.86	-32.88	-25	-7.88	Horizontal
200.8	-48.48	1.63	15.76	-34.35	-25	-9.35	Vertical
296.8	-44.30	1.71	15.44	-30.57	-25	-5.57	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-63.88	5.23	35.82	-33.29	-25	-8.29	Horizontal
5070.0	-64.90	5.23	35.82	-34.31	-25	-9.31	Vertical
7605.0	-64.76	5.67	36.85	-33.58	-25	-8.58	Vertical
7605.0	-61.07	5.67	36.85	-29.89	-25	-4.89	Horizontal
180.4	-54.68	1.79	16.84	-39.62	-25	-14.62	Vertical
341.6	-48.54	1.71	17.64	-32.61	-25	-7.61	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-60.71	5.24	35.83	-30.12	-25	-5.12	Horizontal
5120.0	-61.18	5.24	35.83	-30.59	-25	-5.59	Vertical
7680.0	-63.19	5.70	36.88	-32.01	-25	-7.01	Vertical
7680.0	-62.32	5.70	36.88	-31.14	-25	-6.14	Horizontal
184.0	-47.22	1.79	16.84	-32.16	-25	-7.16	Vertical
354.6	-47.58	1.71	17.64	-31.65	-25	-6.65	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

9.5 LTE BAND 12

QPSK EIRP POWER FOR LTE BAND 12 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 699.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-53.74	2.60	27.20	-29.14	-13	-16.14	Horizontal
1399.4	-51.69	2.60	27.20	-27.09	-13	-14.09	Vertical
2099.1	-51.72	2.85	27.54	-27.03	-13	-14.03	Vertical
2099.1	-52.13	2.85	27.54	-27.44	-13	-14.44	Horizontal
202.5	-44.59	1.49	17.78	-28.30	-13	-15.30	Vertical
260.8	-40.35	1.36	17.33	-24.38	-13	-11.38	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-50.37	2.61	27.28	-25.70	-13	-12.70	Horizontal
1415.0	-49.66	2.61	27.28	-24.99	-13	-11.99	Vertical
2122.5	-46.64	2.87	27.59	-21.92	-13	-8.92	Vertical
2122.5	-52.32	2.87	27.59	-27.60	-13	-14.60	Horizontal
212.7	-42.08	1.73	15.74	-28.07	-13	-15.07	Vertical
273.5	-43.76	1.62	15.79	-29.59	-13	-16.59	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-50.71	2.63	27.28	-26.06	-13	-13.06	Horizontal
1430.6	-49.69	2.63	27.28	-25.04	-13	-12.04	Vertical
2145.9	-46.96	2.88	27.60	-22.24	-13	-9.24	Vertical
2145.9	-53.64	2.88	27.60	-28.92	-13	-15.92	Horizontal
186.4	-38.43	1.61	18.00	-22.04	-13	-9.04	Vertical
298.2	-42.08	1.45	15.49	-28.05	-13	-15.05	Horizontal

QPSK EIRP POWER FOR LTE BAND 12 (10MHZ BANDWIDTH)

Test Results for Low Channel 704MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1408.0	-48.34	2.61	27.26	-23.69	-13	-10.69	Horizontal
1408.0	-48.92	2.61	27.26	-24.27	-13	-11.27	Vertical
2112.0	-51.00	2.87	27.58	-26.29	-13	-13.29	Vertical
2112.0	-50.14	2.87	27.58	-25.43	-13	-12.43	Horizontal
189.4	-39.89	1.31	16.97	-24.23	-13	-11.23	Vertical
313.8	-37.73	1.65	16.70	-22.68	-13	-9.68	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-48.19	2.61	27.28	-23.52	-13	-10.52	Horizontal
1415.0	-52.09	2.61	27.28	-27.42	-13	-14.42	Vertical
2122.5	-44.66	2.87	27.59	-19.94	-13	-6.94	Vertical
2122.5	-53.33	2.87	27.59	-28.61	-13	-15.61	Horizontal
182.4	-41.70	1.72	17.99	-25.43	-13	-12.43	Vertical
440.3	-41.80	1.73	17.94	-25.59	-13	-12.59	Horizontal
Test Results for High Channel 711MHz							
1422.0	-51.41	2.62	27.28	-26.75	-13	-13.75	Horizontal
1422.0	-50.62	2.62	27.28	-25.96	-13	-12.96	Vertical
2133.0	-48.82	2.87	27.60	-24.09	-13	-11.09	Vertical
2133.0	-51.33	2.87	27.60	-26.60	-13	-13.60	Horizontal
183.7	-44.78	1.58	15.93	-30.43	-13	-17.43	Vertical
245.7	-39.46	1.36	15.59	-25.23	-13	-12.23	Horizontal

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

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

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

9.6 LTE BAND 13

QPSK EIRP POWER FOR LTE BAND 13 (5MHZ BANDWIDTH)

Test Results for Low Channel 779.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1559.0	-72.65	2.61	27.28	-47.98	-40	-7.98	Horizontal
1559.0	-70.82	2.61	27.28	-46.15	-40	-6.15	Vertical
2338.5	-44.29	2.87	27.59	-19.57	-13	-6.57	Vertical
2338.5	-43.36	2.87	27.59	-18.64	-13	-5.64	Horizontal
120.1	-36.51	1.54	15.61	-22.44	-13	-9.44	Vertical
197.8	-36.83	1.51	15.21	-23.13	-13	-10.13	Horizontal
Test Results For Mid Channel 782MHz							
1564.0	-72.50	2.62	27.30	-47.82	-40	-7.82	Horizontal
1564.0	-69.59	2.62	27.30	-44.91	-40	-4.91	Vertical
2346.0	-43.33	2.87	27.62	-18.58	-13	-5.58	Vertical
2346.0	-45.02	2.87	27.62	-20.27	-13	-7.27	Horizontal
131.2	-37.32	1.65	16.17	-22.80	-13	-9.80	Vertical
267.5	-34.79	1.48	16.88	-19.39	-13	-6.39	Horizontal
Test Results for High Channel 784.5MHz							
1569.0	-74.46	2.66	27.28	-49.84	-40	-9.84	Horizontal
1569.0	-69.41	2.66	27.28	-44.79	-40	-4.79	Vertical
2353.5	-44.73	2.88	27.60	-20.01	-13	-7.01	Vertical
2353.5	-44.21	2.88	27.60	-19.49	-13	-6.49	Horizontal
80.8	-36.79	1.54	16.40	-21.93	-13	-8.93	Vertical
155.6	-35.92	1.43	15.77	-21.58	-13	-8.58	Horizontal

QPSK EIRP POWER FOR LTE BAND 13 (10MHZ BANDWIDTH)

Test Results for Channel 782MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1564.0	-74.47	2.62	27.30	-49.79	-40	-9.79	Horizontal
1564.0	-74.84	2.62	27.30	-50.16	-40	-10.16	Vertical
2346.0	-44.02	2.87	27.62	-19.27	-13	-6.27	Vertical
2346.0	-43.36	2.87	27.62	-18.61	-13	-5.61	Horizontal
129.1	-37.57	1.43	17.03	-21.97	-13	-8.97	Vertical
86.9	-35.60	1.62	16.63	-20.59	-13	-7.59	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.

9.7 LTE BAND 17

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

Test Results for Low Channel 706.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1413.0	-44.00	2.61	27.28	-19.33	-13	-6.33	Horizontal
1413.0	-47.50	2.61	27.28	-22.83	-13	-9.83	Vertical
2119.5	-49.31	2.87	27.59	-24.59	-13	-11.59	Vertical
2119.5	-49.87	2.87	27.59	-25.15	-13	-12.15	Horizontal
196.0	-37.80	1.71	16.15	-23.36	-13	-10.36	Vertical
311.4	-40.97	1.41	17.32	-25.06	-13	-12.06	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-52.48	2.62	27.30	-27.80	-13	-14.80	Horizontal
1420.0	-44.17	2.62	27.30	-19.49	-13	-6.49	Vertical
2130.0	-53.44	2.87	27.62	-28.69	-13	-15.69	Vertical
2130.0	-51.82	2.87	27.62	-27.07	-13	-14.07	Horizontal
199.4	-37.59	1.42	15.25	-23.77	-13	-10.77	Vertical
306.1	-35.60	1.36	17.19	-19.77	-13	-6.77	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-53.68	2.66	27.28	-29.06	-13	-16.06	Horizontal
1427.0	-47.28	2.66	27.28	-22.66	-13	-9.66	Vertical
2140.5	-46.41	2.88	27.60	-21.69	-13	-8.69	Vertical
2140.5	-52.97	2.88	27.60	-28.25	-13	-15.25	Horizontal
188.7	-37.95	1.32	17.29	-21.98	-13	-8.98	Vertical
233.9	-39.09	1.72	16.89	-23.92	-13	-10.92	Horizontal

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

Test Results for Low Channel 709MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1418.0	-47.89	2.62	27.30	-23.21	-13	-10.21	Horizontal
1418.0	-50.03	2.62	27.30	-25.35	-13	-12.35	Vertical
2127.0	-47.61	2.87	27.62	-22.86	-13	-9.86	Vertical
2127.0	-50.98	2.87	27.62	-26.23	-13	-13.23	Horizontal
201.0	-35.71	1.35	16.91	-20.15	-13	-7.15	Vertical
328.6	-37.60	1.62	16.31	-22.91	-13	-9.91	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-45.25	2.62	27.30	-20.57	-13	-7.57	Horizontal
1420.0	-46.82	2.62	27.30	-22.14	-13	-9.14	Vertical
2130.0	-50.93	2.87	27.62	-26.18	-13	-13.18	Vertical
2130.0	-49.64	2.87	27.62	-24.89	-13	-11.89	Horizontal
193.0	-39.57	1.51	17.14	-23.94	-13	-10.94	Vertical
392.0	-34.61	1.77	16.88	-19.50	-13	-6.50	Horizontal
Test Results for High Channel 711MHz							
1422.0	-45.00	2.62	27.30	-20.32	-13	-7.32	Horizontal
1422.0	-44.51	2.62	27.30	-19.83	-13	-6.83	Vertical
2133.0	-50.59	2.87	27.62	-25.84	-13	-12.84	Vertical
2133.0	-51.90	2.87	27.62	-27.15	-13	-14.15	Horizontal
187.2	-34.93	1.78	15.95	-20.76	-13	-7.76	Vertical
440.9	-34.19	1.34	17.95	-17.59	-13	-4.59	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.

10. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- ☐ Temp. = -30° to $+50^{\circ}\text{C}$
- ☐ Voltage = low voltage, DC 3.4V, Normal, DC 3.85V and High voltage, DC 4.2V.

Frequency Stability vs Temperature:

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

Frequency Stability vs Voltage:

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

MODES TESTED

LTE Band 2/4/5/7/12/13/17

RESULTS

See the following pages.

10.1 LTE BAND 2

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	1880	15	0.007979	2.5
3.85	1880	13	0.006915	2.5
4.20	1880	5	0.002660	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	16	0.008511	2.5
Extreme (50C)	1880	11	0.005851	2.5
Extreme (40C)	1880	3	0.001596	2.5
Extreme (30C)	1880	15	0.007979	2.5
Extreme (10C)	1880	3	0.001596	2.5
Extreme (0C)	1880	3	0.001596	2.5
Extreme (-10C)	1880	6	0.003191	2.5
Extreme (-20C)	1880	14	0.007447	2.5
Extreme (-30C)	1880	17	0.009043	2.5

Band 2 16QAM, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	1880	5	0.002660	2.5
3.85	1880	5	0.002660	2.5
4.20	1880	15	0.007979	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	13	0.006915	2.5
Extreme (50C)	1880	16	0.008511	2.5
Extreme (40C)	1880	8	0.004255	2.5
Extreme (30C)	1880	3	0.001596	2.5
Extreme (10C)	1880	5	0.002660	2.5
Extreme (0C)	1880	17	0.009043	2.5
Extreme (-10C)	1880	6	0.003191	2.5
Extreme (-20C)	1880	2	0.001064	2.5
Extreme (-30C)	1880	17	0.009043	2.5

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

10.2 LTE BAND 4

Band 4 QPSK, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	1732.5	10	0.005772	2.5
3.85	1732.5	8	0.004618	2.5
4.20	1732.5	12	0.006926	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	12	0.006926	2.5
Extreme (50C)	1732.5	16	0.009235	2.5
Extreme (40C)	1732.5	11	0.006349	2.5
Extreme (30C)	1732.5	6	0.003463	2.5
Extreme (10C)	1732.5	6	0.003463	2.5
Extreme (0C)	1732.5	9	0.005195	2.5
Extreme (-10C)	1732.5	14	0.008081	2.5
Extreme (-20C)	1732.5	14	0.008081	2.5
Extreme (-30C)	1732.5	15	0.008658	2.5

Band 4 16QAM, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	1732.5	12	0.006926	2.5
3.85	1732.5	15	0.008658	2.5
4.20	1732.5	16	0.009235	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	4	0.002309	2.5
Extreme (50C)	1732.5	15	0.008658	2.5
Extreme (40C)	1732.5	9	0.005195	2.5
Extreme (30C)	1732.5	9	0.005195	2.5
Extreme (10C)	1732.5	15	0.008658	2.5
Extreme (0C)	1732.5	8	0.004618	2.5
Extreme (-10C)	1732.5	11	0.006349	2.5
Extreme (-20C)	1732.5	11	0.006349	2.5
Extreme (-30C)	1732.5	10	0.005772	2.5

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

10.3 LTE BAND 5

Band 5 QPSK, (10MHz BANDWIDTH RB size 50 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	836.5	16	0.019127	2.5
3.85	836.5	13	0.015541	2.5
4.20	836.5	5	0.005977	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6	0.007173	2.5
Extreme (50C)	836.5	2	0.002391	2.5
Extreme (40C)	836.5	13	0.015541	2.5
Extreme (30C)	836.5	14	0.016736	2.5
Extreme (10C)	836.5	12	0.014345	2.5
Extreme (0C)	836.5	8	0.009564	2.5
Extreme (-10C)	836.5	7	0.008368	2.5
Extreme (-20C)	836.5	14	0.016736	2.5
Extreme (-30C)	836.5	17	0.020323	2.5

Band 5 16QAM, (10MHz BANDWIDTH RB size 50 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	836.5	14	0.016736	2.5
3.85	836.5	2	0.002391	2.5
4.20	836.5	10	0.011955	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	5	0.005977	2.5
Extreme (50C)	836.5	15	0.017932	2.5
Extreme (40C)	836.5	10	0.011955	2.5
Extreme (30C)	836.5	11	0.013150	2.5
Extreme (10C)	836.5	10	0.011955	2.5
Extreme (0C)	836.5	9	0.010759	2.5
Extreme (-10C)	836.5	16	0.019127	2.5
Extreme (-20C)	836.5	15	0.017932	2.5
Extreme (-30C)	836.5	13	0.015541	2.5

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

10.4 LTE BAND 7

Band 7 QPSK, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	2535	10	0.003945	2.5
3.85	2535	15	0.005917	2.5
4.20	2535	17	0.006706	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	12	0.004734	2.5
Extreme (50C)	2535	5	0.001972	2.5
Extreme (40C)	2535	14	0.005523	2.5
Extreme (30C)	2535	15	0.005917	2.5
Extreme (10C)	2535	9	0.003550	2.5
Extreme (0C)	2535	11	0.004339	2.5
Extreme (-10C)	2535	3	0.001183	2.5
Extreme (-20C)	2535	13	0.005128	2.5
Extreme (-30C)	2535	8	0.003156	2.5

Band 7 16QAM, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	2535	14	0.005523	2.5
3.85	2535	13	0.005128	2.5
4.20	2535	11	0.004339	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	8	0.003156	2.5
Extreme (50C)	2535	17	0.006706	2.5
Extreme (40C)	2535	16	0.006312	2.5
Extreme (30C)	2535	14	0.005523	2.5
Extreme (10C)	2535	2	0.000789	2.5
Extreme (0C)	2535	5	0.001972	2.5
Extreme (-10C)	2535	6	0.002367	2.5
Extreme (-20C)	2535	6	0.002367	2.5
Extreme (-30C)	2535	6	0.002367	2.5

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

10.5 LTE BAND 12

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	707.5	6	0.008481	2.5
3.85	707.5	5	0.007067	2.5
4.20	707.5	11	0.015548	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	15	0.021201	2.5
Extreme (50C)	707.5	11	0.015548	2.5
Extreme (40C)	707.5	4	0.005654	2.5
Extreme (30C)	707.5	16	0.022615	2.5
Extreme (10C)	707.5	14	0.019788	2.5
Extreme (0C)	707.5	16	0.022615	2.5
Extreme (-10C)	707.5	2	0.002827	2.5
Extreme (-20C)	707.5	14	0.019788	2.5
Extreme (-30C)	707.5	12	0.016961	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	707.5	10	0.014134	2.5
3.85	707.5	3	0.004240	2.5
4.20	707.5	9	0.012721	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	15	0.021201	2.5
Extreme (50C)	707.5	2	0.002827	2.5
Extreme (40C)	707.5	8	0.011307	2.5
Extreme (30C)	707.5	8	0.011307	2.5
Extreme (10C)	707.5	3	0.004240	2.5
Extreme (0C)	707.5	13	0.018375	2.5
Extreme (-10C)	707.5	17	0.024028	2.5
Extreme (-20C)	707.5	4	0.005654	2.5
Extreme (-30C)	707.5	15	0.021201	2.5

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

10.6 LTE BAND 13

Band 13 QPSK, (10MHz BANDWIDTH RB size 50 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	782.0	2	0.002817	2.5
3.85	782.0	14	0.019718	2.5
4.20	782.0	8	0.011268	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	782.0	16	0.022535	2.5
Extreme (50C)	782.0	15	0.021127	2.5
Extreme (40C)	782.0	16	0.022535	2.5
Extreme (30C)	782.0	2	0.002817	2.5
Extreme (10C)	782.0	8	0.011268	2.5
Extreme (0C)	782.0	11	0.015493	2.5
Extreme (-10C)	782.0	11	0.015493	2.5
Extreme (-20C)	782.0	14	0.019718	2.5
Extreme (-30C)	782.0	7	0.009859	2.5

Band 13 16QAM, (10MHz BANDWIDTH RB size 50 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	782.0	15	0.021127	2.5
3.85	782.0	4	0.005634	2.5
4.20	782.0	3	0.004225	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	782.0	2	0.002817	2.5
Extreme (50C)	782.0	12	0.016901	2.5
Extreme (40C)	782.0	10	0.014085	2.5
Extreme (30C)	782.0	16	0.022535	2.5
Extreme (10C)	782.0	12	0.016901	2.5
Extreme (0C)	782.0	15	0.021127	2.5
Extreme (-10C)	782.0	13	0.018310	2.5
Extreme (-20C)	782.0	5	0.007042	2.5
Extreme (-30C)	782.0	7	0.009859	2.5

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

10.7 LTE BAND 17

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	710.0	10	0.014085	2.5
3.85	710.0	14	0.019718	2.5
4.20	710.0	12	0.016901	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	15	0.021127	2.5
Extreme (50C)	710.0	6	0.008451	2.5
Extreme (40C)	710.0	3	0.004225	2.5
Extreme (30C)	710.0	9	0.012676	2.5
Extreme (10C)	710.0	11	0.015493	2.5
Extreme (0C)	710.0	17	0.023944	2.5
Extreme (-10C)	710.0	16	0.022535	2.5
Extreme (-20C)	710.0	14	0.019718	2.5
Extreme (-30C)	710.0	15	0.021127	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.40	710.0	5	0.007042	2.5
3.85	710.0	12	0.016901	2.5
4.20	710.0	4	0.005634	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	2	0.002817	2.5
Extreme (50C)	710.0	6	0.008451	2.5
Extreme (40C)	710.0	5	0.007042	2.5
Extreme (30C)	710.0	6	0.008451	2.5
Extreme (10C)	710.0	8	0.011268	2.5
Extreme (0C)	710.0	3	0.004225	2.5
Extreme (-10C)	710.0	3	0.004225	2.5
Extreme (-20C)	710.0	14	0.019718	2.5
Extreme (-30C)	710.0	16	0.022535	2.5

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

11. Peak-to-Average Ratio

11.1 Description of the PAR Measurement

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

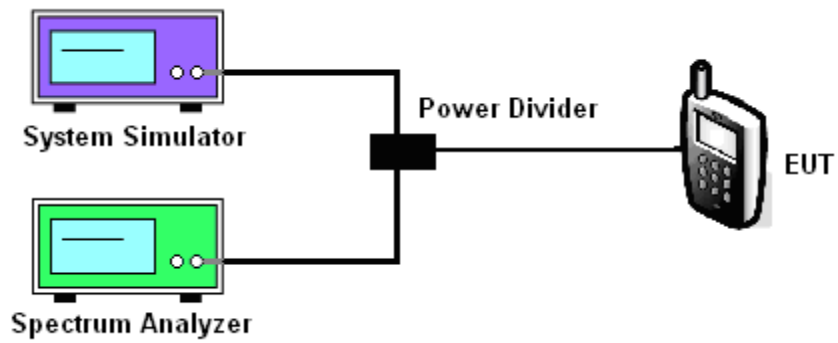
11.2 Measuring Instruments

See list of measuring instruments of this test report.

11.3 Test Procedures

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

11.4 Test Setup



MODES TESTED

LTE Band 2/4/5/7/12/13/17

Test data reference attachment.

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