

FCC CFR47 PART 22H, 24E, 27 CERTIFICATION TEST REPORT FCC ID: 2ACHW-GT78VN

Product: Rugged Android Tablet
Trade Mark: ARBOR
Model Number: GT78-VN
Family Model: GT78-VNAG, GT78V-VNB, GT78-VNC,
GT78V-VND, GT78V-VN*, P78P-E,
GT78-VNxxxxxxxxxx (x=0-9, a-z, A-Z and
"-")
Report No.: S21091802204006

Prepared for

ARBOR Technology Corp.
10F., No.700, Zhongzheng Rd., Zhonghe Dist., New Taipei City 235,
Taiwan

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 : ARBOR Technology Corp.

Address..... : 10F., No.700, Zhongzheng Rd., Zhonghe Dist., New Taipei City 235, Taiwan

Manufacturer's Name..... : ARBOR Technology Corp.

Address..... : 10F., No.700, Zhongzheng Rd., Zhonghe Dist., New Taipei City 235, Taiwan

Product name..... : Rugged Android Tablet

Model and/or type reference .. : GT78-VN

Family Model: GT78-VNAG, GT78V-VNB, GT78-VNC, GT78V-VND, GT78V-VN*, P78P-E, GT78-VNxxxxxxxxxx (x=0-9, a-z, A-Z and "-")

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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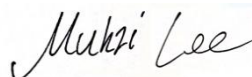
Date of Test

Date (s) of performance of tests..... Nov 05 . 2021 ~ Dec 07. 2021

Date of Issue Dec 07. 2021

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:	Rugged Android Tablet
Trade Mark	ARBOR
Model Name	GT78-VN
Family Model	GT78-VNAG, GT78V-VNB, GT78-VNC, GT78V-VND, GT78V-VN*, P78P-E, GT78-VNxxxxxxxxxx
Model Difference	Only the memory size, appearance color and customer LOGO are different between all series models and the main inspection model GT78-VNxxxxxxxxxx (x=0-9, a-z, A-Z and "-")
FCC ID:	2ACHW-GT78VN
Frequency Bands:	U.S. Bands: ☒ LTE FDD Band 2,4,5,7,12,17 ☒ LTE TDD Band 41
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 17 Uplink: 704MHz-716MHz, Downlink: 734MHz-746MHz; LTE TDD Band 41 Uplink&Downlink: 2560MHz-2660MHz,(Note2)
Type of Modulation:	QPSK/16QAM
Antenna:	FPC Antenna
Antenna gain:	-3 dBi
Adapter:	Model: HJ-0502000W2-US Input: AC 100-240V~50/60Hz 0.3A Output: DC 5V---2000mA
Battery:	DC 3.8V, 6200mAh, 23.56Wh
Power supply:	DC 3.8V from battery or DC 5V from Adapter.
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.8V) (Note 1)
HW Version	GT78VN_MB_R0.2
SW Version	N/A
** 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.	

Note2 Band 41

Bandwidth	Low		Mid		High	
[MHz]	Frequency	Channle	Frequency	Channle	Frequency	Channle
5	2562.5	40315	2610	40790	2657.5	41265
10	2565	40340	2610	40790	2655	41240
15	2567.5	40365	2610	40790	2652.5	41215
20	2570	40390	2610	40790	2650	41190

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2ACHW-GT78VN** 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% ($U = 2U_c(y)$)	2.5dB
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(9KHz~30MHz)	$\pm 6\text{dB}$
5	All emissions, radiated(30MHz~1GHz)	$\pm 2.64\text{dB}$
6	All emissions, radiated(1GHz~6GHz)	$\pm 2.40\text{dB}$
7	All emissions, radiated(>6GHz)	$\pm 2.52\text{dB}$
8	Temperature	$\pm 0.5^\circ\text{C}$
9	Humidity	$\pm 2\%$

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 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

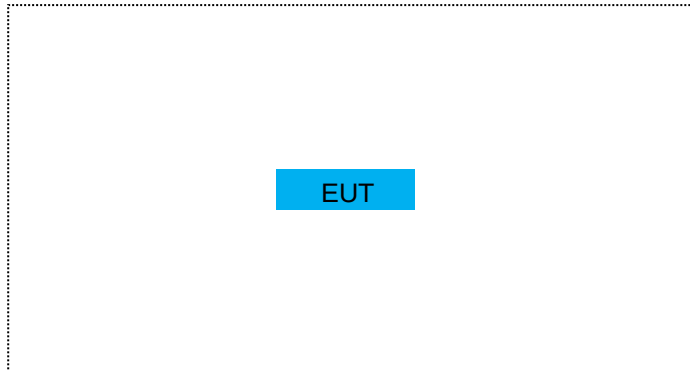
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Rugged Android Tablet	GT78-VN	FCC ID: 2ACHW-GT78VN	EUT

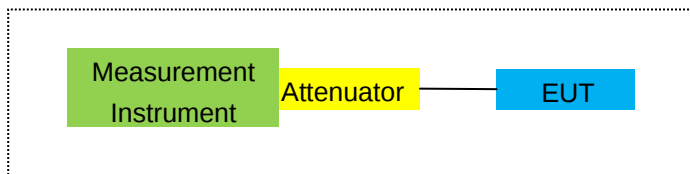
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

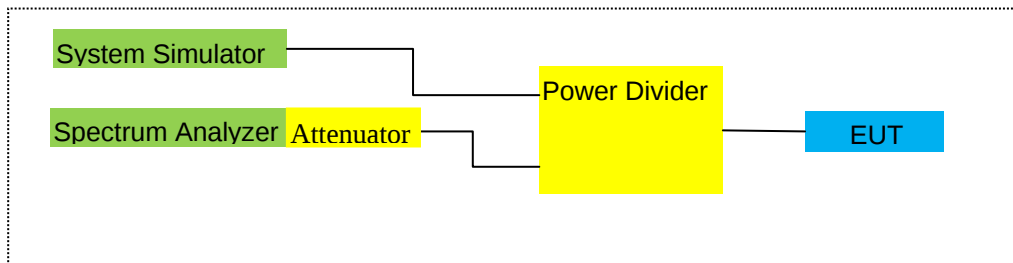
For Radiated Test Cases



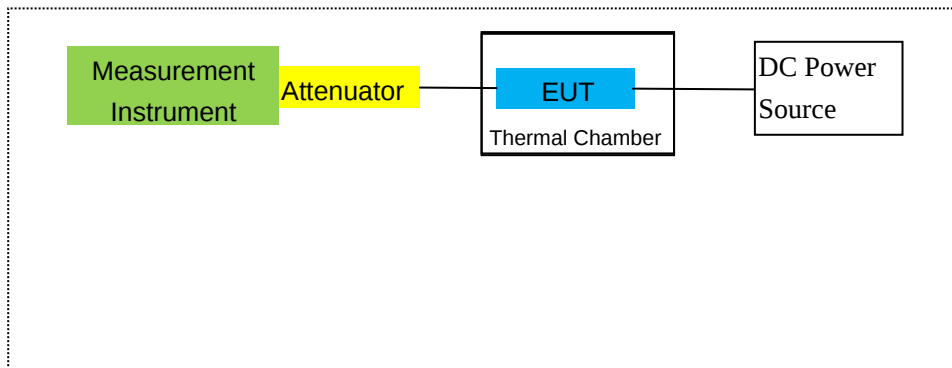
For Conducted Output Power



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	2021.03.29	2022.03.28	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	2021.03.29	2022.03.28	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2020.11.19 2021.11.07	2021.11.18 2022.11.06	1 year
7	Amplifier	EM	EM-30180	060538	2021.07.01	2022.06.30	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2021.04.27	2022.04.26	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	2021.04.27	2022.04.26	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	2019.06.28	2022.06.27	3 year
14	Test Receiver	R&S	ESCI	101160	2021.04.27	2022.04.26	1 year
15	LISN	R&S	ENV216	101313	2021.04.27	2022.04.26	1 year
16	LISN	EMCO	3816/2	00042990	2021.04.27	2022.04.26	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2021.04.27	2022.04.26	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2021.04.27	2022.04.26	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	2021.07.01	2022.06.30	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2021.04.27	2022.04.26	1 year
24	test receiver	R&S	ESCI	a0304218	2021.04.27	2022.04.26	1 year
25	Communication Tester	R&S	CMU200	A0304247	2021.07.01	2022.06.30	1 year
26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2021.04.27	2022.04.26	1 year

27	DC Power Source	N/A	PS-6005D	2017040292 3	2020.05.11	2023.05.10	3 year
28	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2021.07.01	2022.06.30	1 year
29	Communication Tester	R&S	CMW500	148500	2021.07.01	2022.06.30	1 year
30	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2021.07.01	2022.06.30	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

- ☐ LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 17
- LTE Band 41

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

- ☐ LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 17
- LTE Band 41

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

- ☐ LTE Band 2/4/5/12/17/41
- ☐

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

☐ LTE Band 2/4/5/7/12/17/41

RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max.	Max.	Polarization Of Max. ERP	
						EIRP	EIRP		
						Average (dBm)	Average		
							(mW)		
1.4MHz	1/#Mid	1850.7	-1.80	3.76	28.24	22.68	185.353	Horizontal	Pass
Band		1880	-1.74	3.91	28.22	22.57	180.717	Horizontal	Pass
QPSK		1909.3	-1.60	3.93	28.20	22.67	184.927	Horizontal	Pass
3.0MHz	1/#Mid	1851.5	-1.88	3.77	28.23	22.58	181.134	Horizontal	Pass
Band		1880	-1.65	3.91	28.24	22.68	185.353	Horizontal	Pass
QPSK		1908.5	-1.74	3.94	28.25	22.57	180.717	Horizontal	Pass
5.0MHz	1/#Mid	1852.5	-2.01	3.77	28.31	22.53	179.061	Horizontal	Pass
Band		1880	-1.62	3.91	28.22	22.69	185.780	Horizontal	Pass
QPSK		1907.5	-1.68	3.94	28.20	22.58	181.134	Horizontal	Pass
10.0MHz	1/#Mid	1855	-1.87	3.79	28.33	22.67	184.927	Horizontal	Pass
Band		1880	-1.66	3.95	28.22	22.61	182.390	Horizontal	Pass
QPSK		1905	-1.63	3.97	28.19	22.59	181.552	Horizontal	Pass
15.0MHz	1/#Mid	1857.5	-1.97	3.79	28.34	22.58	181.134	Horizontal	Pass
Band		1880	-1.70	3.95	28.22	22.57	180.717	Horizontal	Pass
QPSK		1902.5	-1.64	3.97	28.18	22.57	180.717	Horizontal	Pass
20.0MHz	1/#Mid	1860	-1.97	3.81	28.35	22.57	180.717	Horizontal	Pass
Band		1880	-1.65	3.96	28.22	22.61	182.390	Horizontal	Pass
QPSK		1900	-1.59	4.00	28.16	22.57	180.717	Horizontal	Pass
1.4MHz	1/#Mid	1850.7	-1.80	3.76	28.24	22.68	185.353	Vertical	Pass
Band		1880	-1.73	3.91	28.22	22.58	181.134	Vertical	Pass
QPSK		1909.3	-1.65	3.93	28.20	22.62	182.810	Vertical	Pass
3.0MHz	1/#Mid	1851.5	-1.83	3.77	28.23	22.63	183.231	Vertical	Pass
Band		1880	-1.63	3.91	28.24	22.70	186.209	Vertical	Pass
QPSK		1908.5	-1.73	3.94	28.25	22.58	181.134	Vertical	Pass
5.0MHz	1/#Mid	1852.5	-1.92	3.77	28.31	22.62	182.810	Vertical	Pass
Band		1880	-1.78	3.91	28.22	22.53	179.061	Vertical	Pass
QPSK		1907.5	-1.60	3.94	28.20	22.66	184.502	Vertical	Pass
10.0MHz	1/#Mid	1855	-1.93	3.79	28.33	22.61	182.390	Vertical	Pass
Band		1880	-1.57	3.95	28.22	22.70	186.209	Vertical	Pass
QPSK		1905	-1.52	3.97	28.19	22.70	186.209	Vertical	Pass

15.0MHz	Band QPSK	1857.5	-1.85	3.79	28.34	22.70	186.209	Vertical	Pass
		1880	-1.71	3.95	28.22	22.56	180.302	Vertical	Pass
		1902.5	-1.66	3.97	28.18	22.55	179.887	Vertical	Pass
20.0MHz	Band QPSK	1860	-1.84	3.81	28.35	22.70	186.209	Vertical	Pass
		1880	-1.51	3.96	28.22	22.75	188.365	Vertical	Pass
		1900	-1.45	4.00	28.16	22.71	186.638	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)

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP	Polarization Of Max. ERP	
							Average		
							(mW)		
1.4MHz Band 16 QAM	1/#Mid	1850.7	-2.88	3.76	28.24	21.60	144.544	Horizontal	Pass
		1880	-2.74	3.91	28.22	21.57	143.549	Horizontal	Pass
		1909.3	-2.64	3.93	28.20	21.63	145.546	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-2.87	3.77	28.23	21.59	144.212	Horizontal	Pass
		1880	-2.73	3.91	28.24	21.60	144.544	Horizontal	Pass
		1908.5	-2.62	3.94	28.25	21.69	147.571	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-2.98	3.77	28.31	21.56	143.219	Horizontal	Pass
		1880	-2.74	3.91	28.22	21.57	143.549	Horizontal	Pass
		1907.5	-2.59	3.94	28.20	21.67	146.893	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-2.86	3.79	28.33	21.68	147.231	Horizontal	Pass
		1880	-2.57	3.95	28.22	21.70	147.911	Horizontal	Pass
		1905	-2.64	3.97	28.19	21.58	143.880	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-2.93	3.79	28.34	21.62	145.211	Horizontal	Pass
		1880	-2.71	3.95	28.22	21.56	143.219	Horizontal	Pass
		1902.5	-2.59	3.97	28.18	21.62	145.211	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-2.87	3.81	28.35	21.67	146.893	Horizontal	Pass
		1880	-2.71	3.96	28.22	21.55	142.889	Horizontal	Pass
		1900	-2.57	4.00	28.16	21.59	144.212	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-2.92	3.76	28.24	21.56	143.219	Vertical	Pass
		1880	-2.67	3.91	28.22	21.64	145.881	Vertical	Pass
		1909.3	-2.70	3.93	28.20	21.57	143.549	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-2.88	3.77	28.23	21.58	143.880	Vertical	Pass
		1880	-2.63	3.91	28.24	21.70	147.911	Vertical	Pass
		1908.5	-2.70	3.94	28.25	21.61	144.877	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-3.00	3.77	28.31	21.54	142.561	Vertical	Pass
		1880	-2.69	3.91	28.22	21.62	145.211	Vertical	Pass
		1907.5	-2.58	3.94	28.20	21.68	147.231	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-2.92	3.79	28.33	21.62	145.211	Vertical	Pass
		1880	-2.63	3.95	28.22	21.64	145.881	Vertical	Pass
		1905	-2.55	3.97	28.19	21.67	146.893	Vertical	Pass
15.0MHz Band 16	1/#Mid	1857.5	-2.94	3.79	28.34	21.61	144.877	Vertical	Pass
		1880	-2.68	3.95	28.22	21.59	144.212	Vertical	Pass

QAM		1902.5	-2.64	3.97	28.18	21.57	143.549	Vertical	Pass
20.0MHz	1/#Mid	1860	-2.80	3.81	28.35	21.74	149.279	Vertical	Pass
Band 16		1880	-2.53	3.96	28.22	21.73	148.936	Vertical	Pass
QAM		1900	-2.45	4.00	28.16	21.71	148.252	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	Cable	Antenna	Max.	Max.	Polarization	
			Level	Loss	Gain	EIRP	EIRP	Of Max. ERP	
			(dBm)	(dBm)	(dB)	Average	Average		
						(dBm)	(mW)		
1.4MHz	1/#Mid	1710.7	-1.29	3.12	27.58	23.17	207.491	Horizontal	Pass
Band		1732.5	-1.18	3.27	27.61	23.16	207.014	Horizontal	Pass
QPSK		1754.3	-1.21	3.29	27.63	23.13	205.589	Horizontal	Pass
3.0MHz	1/#Mid	1711.5	-1.37	3.13	27.61	23.11	204.644	Horizontal	Pass
Band		1732.5	-1.25	3.27	27.61	23.09	203.704	Horizontal	Pass
QPSK		1753.5	-1.12	3.30	27.62	23.20	208.930	Horizontal	Pass
5.0MHz	1/#Mid	1712.5	-1.42	3.13	27.63	23.08	203.236	Horizontal	Pass
Band		1732.5	-1.23	3.27	27.61	23.11	204.644	Horizontal	Pass
QPSK		1752.5	-1.18	3.30	27.60	23.12	205.116	Horizontal	Pass
10.0MHz	1/#Mid	1715	-1.44	3.15	27.64	23.05	201.837	Horizontal	Pass
Band		1732.5	-1.20	3.31	27.61	23.10	204.174	Horizontal	Pass
QPSK		1750	-1.18	3.33	27.59	23.08	203.236	Horizontal	Pass
15.0MHz	1/#Mid	1717.5	-1.37	3.15	27.65	23.13	205.589	Horizontal	Pass
Band		1732.5	-1.14	3.31	27.61	23.16	207.014	Horizontal	Pass
QPSK		1747.5	-1.05	3.33	27.57	23.19	208.449	Horizontal	Pass
20.0MHz	1/#Mid	1720	-1.45	3.17	27.66	23.04	201.372	Horizontal	Pass
Band		1732.5	-1.23	3.32	27.61	23.06	202.302	Horizontal	Pass
QPSK		1745	-1.17	3.36	27.56	23.03	200.909	Horizontal	Pass
1.4MHz	1/#Mid	1710.7	-1.29	3.12	27.58	23.17	207.491	Vertical	Pass
Band		1732.5	-1.19	3.27	27.61	23.15	206.538	Vertical	Pass
QPSK		1754.3	-1.20	3.29	27.63	23.14	206.063	Vertical	Pass
3.0MHz	1/#Mid	1711.5	-1.43	3.13	27.61	23.05	201.837	Vertical	Pass
Band		1732.5	-1.28	3.27	27.61	23.06	202.302	Vertical	Pass
QPSK		1753.5	-1.21	3.30	27.62	23.11	204.644	Vertical	Pass
5.0MHz	1/#Mid	1712.5	-1.47	3.13	27.63	23.03	200.909	Vertical	Pass
Band		1732.5	-1.24	3.27	27.61	23.10	204.174	Vertical	Pass
QPSK		1752.5	-1.20	3.30	27.60	23.10	204.174	Vertical	Pass
10.0MHz	1/#Mid	1715	-1.40	3.15	27.64	23.09	203.704	Vertical	Pass
Band		1732.5	-1.25	3.31	27.61	23.05	201.837	Vertical	Pass
QPSK		1750	-1.14	3.33	27.59	23.12	205.116	Vertical	Pass

15.0MHz	1/#Mid	1717.5	-1.35	3.15	27.65	23.15	206.538	Vertical	Pass
Band		1732.5	-1.22	3.31	27.61	23.08	203.236	Vertical	Pass
QPSK		1747.5	-1.07	3.33	27.57	23.17	207.491	Vertical	Pass
20.0MHz	1/#Mid	1720	-1.27	3.17	27.66	23.22	209.894	Vertical	Pass
Band		1732.5	-1.06	3.32	27.61	23.23	210.378	Vertical	Pass
QPSK		1745	-0.95	3.36	27.56	23.25	211.349	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)

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Gain	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	Average	Average	Of Max. ERP	
						(dBm)	(mW)		
1.4MHz Band 16 QAM	1/#Mid	1710.7	-2.01	3.12	27.58	22.45	175.792	Horizontal	Pass
		1732.5	-1.96	3.27	27.61	22.38	172.982	Horizontal	Pass
		1754.3	-1.87	3.29	27.63	22.47	176.604	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.03	3.13	27.61	22.45	175.792	Horizontal	Pass
		1732.5	-1.99	3.27	27.61	22.35	171.791	Horizontal	Pass
		1753.5	-1.93	3.30	27.62	22.39	173.380	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.12	3.13	27.63	22.38	172.982	Horizontal	Pass
		1732.5	-1.90	3.27	27.61	22.44	175.388	Horizontal	Pass
		1752.5	-1.89	3.30	27.60	22.41	174.181	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-2.13	3.15	27.64	22.36	172.187	Horizontal	Pass
		1732.5	-1.86	3.31	27.61	22.44	175.388	Horizontal	Pass
		1750	-1.82	3.33	27.59	22.44	175.388	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-2.02	3.15	27.65	22.48	177.011	Horizontal	Pass
		1732.5	-1.80	3.31	27.61	22.50	177.828	Horizontal	Pass
		1747.5	-1.79	3.33	27.57	22.45	175.792	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-2.01	3.17	27.66	22.48	177.011	Horizontal	Pass
		1732.5	-1.92	3.32	27.61	22.37	172.584	Horizontal	Pass
		1745	-1.87	3.36	27.56	22.33	171.002	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-1.96	3.12	27.58	22.50	177.828	Vertical	Pass
		1732.5	-1.90	3.27	27.61	22.44	175.388	Vertical	Pass
		1754.3	-1.91	3.29	27.63	22.43	174.985	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.10	3.13	27.61	22.38	172.982	Vertical	Pass
		1732.5	-1.95	3.27	27.61	22.39	173.380	Vertical	Pass
		1753.5	-1.93	3.30	27.62	22.39	173.380	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.03	3.13	27.63	22.47	176.604	Vertical	Pass
		1732.5	-1.98	3.27	27.61	22.36	172.187	Vertical	Pass
		1752.5	-1.97	3.30	27.60	22.33	171.002	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-1.99	3.15	27.64	22.50	177.828	Vertical	Pass
		1732.5	-1.93	3.31	27.61	22.37	172.584	Vertical	Pass
		1750	-1.83	3.33	27.59	22.43	174.985	Vertical	Pass
15.0MHz Band 16	1/#Mid	1717.5	-2.01	3.15	27.65	22.49	177.419	Vertical	Pass
		1732.5	-1.90	3.31	27.61	22.40	173.780	Vertical	Pass

QAM		1747.5	-1.80	3.33	27.57	22.44	175.388	Vertical	Pass
20.0MHz	1/#Mid	1720	-1.97	3.17	27.66	22.52	178.649	Vertical	Pass
Band 16		1732.5	-1.78	3.32	27.61	22.51	178.238	Vertical	Pass
QAM		1745	-1.68	3.36	27.56	22.52	178.649	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 (dBm)	Antenna Gain (dB)	Correction	Max. ERP	Max. ERP	Polarization Of Max. ERP	
			(dBm)				Average	Average		
							(dB)	(dBm)		
1.4MHz	3/#Mid	824.7	6.40	2.01	19.68	2.15	21.92	155.597	Horizontal	Pass
Band		836.5	6.32	2.01	19.77	2.15	21.93	155.955	Horizontal	Pass
QPSK		848.3	6.32	2.02	19.82	2.15	21.97	157.398	Horizontal	Pass
3.0MHz	1/#Mid	825.5	6.39	2.01	19.70	2.15	21.93	155.955	Horizontal	Pass
Band		836.5	6.25	2.01	19.77	2.15	21.86	153.462	Horizontal	Pass
QPSK		847.5	6.27	2.02	19.81	2.15	21.91	155.239	Horizontal	Pass
5.0MHz	1/#Mid	826.5	6.41	2.01	19.71	2.15	21.96	157.036	Horizontal	Pass
Band		836.5	6.39	2.01	19.77	2.15	22.00	158.489	Horizontal	Pass
QPSK		846.5	6.26	2.02	19.79	2.15	21.88	154.170	Horizontal	Pass
10.0MHz	1/#Mid	829	6.32	2.01	19.73	2.15	21.89	154.525	Horizontal	Pass
Band		836.5	6.19	2.01	19.77	2.15	21.80	151.356	Horizontal	Pass
QPSK		844	6.32	2.02	19.78	2.15	21.93	155.955	Horizontal	Pass
1.4MHz	1/#Mid	824.7	6.41	2.01	19.68	2.15	21.93	155.955	Vertical	Pass
Band		836.5	6.34	2.01	19.77	2.15	21.95	156.675	Vertical	Pass
QPSK		848.3	6.32	2.02	19.82	2.15	21.97	157.398	Vertical	Pass
3.0MHz	1/#Mid	825.5	6.44	2.01	19.70	2.15	21.98	157.761	Vertical	Pass
Band		836.5	6.27	2.01	19.77	2.15	21.88	154.170	Vertical	Pass
QPSK		847.5	6.23	2.02	19.81	2.15	21.87	153.815	Vertical	Pass
5.0MHz	1/#Mid	826.5	6.35	2.01	19.71	2.15	21.90	154.882	Vertical	Pass
Band		836.5	6.38	2.01	19.77	2.15	21.99	158.125	Vertical	Pass
QPSK		846.5	6.28	2.02	19.79	2.15	21.90	154.882	Vertical	Pass
10.0MHz	1/#Mid	829	6.45	2.01	19.73	2.15	22.02	159.221	Vertical	Pass
Band		836.5	6.40	2.01	19.77	2.15	22.01	158.855	Vertical	Pass
QPSK		844	6.42	2.02	19.78	2.15	22.03	159.588	Vertical	Pass

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. ERP	Max. ERP	Polarization	
			(dBm)	(dBm)	(dB)		Average	Average	Of Max. ERP	
							(dBm)	(mW)		
1.4MHz Band 16 QAM	3/#Mid	824.7	5.68	2.01	19.68	2.15	21.20	131.826	Horizontal	Pass
		836.5	5.46	2.01	19.77	2.15	21.07	127.938	Horizontal	Pass
		848.3	5.46	2.02	19.82	2.15	21.11	129.122	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	5.60	2.01	19.70	2.15	21.14	130.017	Horizontal	Pass
		836.5	5.46	2.01	19.77	2.15	21.07	127.938	Horizontal	Pass
		847.5	5.41	2.02	19.81	2.15	21.05	127.350	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	5.57	2.01	19.71	2.15	21.12	129.420	Horizontal	Pass
		836.5	5.42	2.01	19.77	2.15	21.03	126.765	Horizontal	Pass
		846.5	5.47	2.02	19.79	2.15	21.09	128.529	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	829	5.52	2.01	19.73	2.15	21.09	128.529	Horizontal	Pass
		836.5	5.43	2.01	19.77	2.15	21.04	127.057	Horizontal	Pass
		844	5.51	2.02	19.78	2.15	21.12	129.420	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	824.7	5.64	2.01	19.68	2.15	21.16	130.617	Vertical	Pass
		836.5	5.50	2.01	19.77	2.15	21.11	129.122	Vertical	Pass
		848.3	5.50	2.02	19.82	2.15	21.15	130.317	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	5.54	2.01	19.70	2.15	21.08	128.233	Vertical	Pass
		836.5	5.45	2.01	19.77	2.15	21.06	127.644	Vertical	Pass
		847.5	5.44	2.02	19.81	2.15	21.08	128.233	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	5.61	2.01	19.71	2.15	21.16	130.617	Vertical	Pass
		836.5	5.49	2.01	19.77	2.15	21.10	128.825	Vertical	Pass
		846.5	5.55	2.02	19.79	2.15	21.17	130.918	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	829	5.69	2.01	19.73	2.15	21.26	133.660	Vertical	Pass
		836.5	5.62	2.01	19.77	2.15	21.23	132.739	Vertical	Pass
		844	5.62	2.02	19.78	2.15	21.23	132.739	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 (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	1/#Mid	2502.5	-6.04	4.54	27.75	17.17	52.119	Horizontal	Pass
		2535	-5.76	4.69	27.72	17.27	53.333	Horizontal	Pass
		2567.5	-5.81	4.71	27.71	17.19	52.360	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-5.95	4.55	27.76	17.26	53.211	Horizontal	Pass
		2535	-5.75	4.69	27.72	17.28	53.456	Horizontal	Pass
		2565	-5.80	4.72	27.70	17.18	52.240	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-6.00	4.55	27.77	17.22	52.723	Horizontal	Pass
		2535	-5.75	4.69	27.72	17.28	53.456	Horizontal	Pass
		2562.5	-5.71	4.72	27.69	17.26	53.211	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-5.92	4.57	27.78	17.29	53.580	Horizontal	Pass
		2535	-5.76	4.73	27.72	17.23	52.845	Horizontal	Pass
		2560	-5.71	4.75	27.68	17.22	52.723	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-5.98	4.54	27.75	17.23	52.845	Vertical	Pass
		2535	-5.82	4.69	27.72	17.21	52.602	Vertical	Pass
		2567.5	-5.81	4.71	27.71	17.19	52.360	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-5.99	4.55	27.76	17.22	52.723	Vertical	Pass
		2535	-5.85	4.69	27.72	17.18	52.240	Vertical	Pass
		2565	-5.69	4.72	27.70	17.29	53.580	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-6.07	4.55	27.77	17.15	51.880	Vertical	Pass
		2535	-5.78	4.69	27.72	17.25	53.088	Vertical	Pass
		2562.5	-5.84	4.72	27.69	17.13	51.642	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-5.88	4.57	27.78	17.33	54.075	Vertical	Pass
		2535	-5.69	4.73	27.72	17.30	53.703	Vertical	Pass
		2560	-5.58	4.75	27.68	17.35	54.325	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band 16 QAM	1/#Mid	2502.5	-6.78	4.54	27.75	16.43	43.954	Horizontal	Pass
		2535	-6.58	4.69	27.72	16.45	44.157	Horizontal	Pass
		2567.5	-6.60	4.71	27.71	16.40	43.652	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-6.78	4.55	27.76	16.43	43.954	Horizontal	Pass
		2535	-6.67	4.69	27.72	16.36	43.251	Horizontal	Pass
		2565	-6.62	4.72	27.70	16.36	43.251	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-6.87	4.55	27.77	16.35	43.152	Horizontal	Pass
		2535	-6.70	4.69	27.72	16.33	42.954	Horizontal	Pass
		2562.5	-6.49	4.72	27.69	16.48	44.463	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-6.72	4.57	27.78	16.49	44.566	Horizontal	Pass
		2535	-6.63	4.73	27.72	16.36	43.251	Horizontal	Pass
		2560	-6.53	4.75	27.68	16.40	43.652	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-6.75	4.54	27.75	16.46	44.259	Vertical	Pass
		2535	-6.62	4.69	27.72	16.41	43.752	Vertical	Pass
		2567.5	-6.58	4.71	27.71	16.42	43.853	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-6.87	4.55	27.76	16.34	43.053	Vertical	Pass
		2535	-6.54	4.69	27.72	16.49	44.566	Vertical	Pass
		2565	-6.57	4.72	27.70	16.41	43.752	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-6.77	4.55	27.77	16.45	44.157	Vertical	Pass
		2535	-6.56	4.69	27.72	16.47	44.361	Vertical	Pass
		2562.5	-6.55	4.72	27.69	16.42	43.853	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-6.67	4.57	27.78	16.54	45.082	Vertical	Pass
		2535	-6.47	4.73	27.72	16.52	44.875	Vertical	Pass
		2560	-6.42	4.75	27.68	16.51	44.771	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

8.6 LTE BAND 12

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. ERP	Max. ERP	Polarization	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	Of Max. ERP	
							(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	699.7	7.80	1.91	19.21	2.15	22.95	197.242	Vertical	Pass
		707.5	7.78	1.91	19.26	2.15	22.98	198.609	Vertical	Pass
		715.3	7.65	1.93	19.34	2.15	22.91	195.434	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	700.5	7.84	1.91	19.21	2.15	22.99	199.067	Vertical	Pass
		707.5	7.76	1.91	19.26	2.15	22.96	197.697	Vertical	Pass
		714.5	7.74	1.93	19.34	2.15	23.00	199.526	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	701.5	7.73	1.91	19.23	2.15	22.90	194.984	Vertical	Pass
		707.5	7.65	1.91	19.26	2.15	22.85	192.752	Vertical	Pass
		713.5	7.62	1.92	19.33	2.15	22.88	194.089	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	704	7.64	1.91	19.25	2.15	22.83	191.867	Vertical	Pass
		707.5	7.69	1.91	19.26	2.15	22.89	194.536	Vertical	Pass
		711	7.75	1.92	19.32	2.15	23.00	199.526	Vertical	Pass
1.4MHz Band QPSK	1/#Mid	699.7	7.74	1.91	19.21	2.15	22.89	194.536	Horizontal	Pass
		707.5	7.71	1.91	19.26	2.15	22.91	195.434	Horizontal	Pass
		715.3	7.65	1.93	19.34	2.15	22.91	195.434	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	700.5	7.80	1.91	19.21	2.15	22.95	197.242	Horizontal	Pass
		707.5	7.68	1.91	19.26	2.15	22.88	194.089	Horizontal	Pass
		714.5	7.59	1.93	19.34	2.15	22.85	192.752	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	701.5	7.75	1.91	19.23	2.15	22.92	195.884	Horizontal	Pass
		707.5	7.79	1.91	19.26	2.15	22.99	199.067	Horizontal	Pass
		713.5	7.59	1.92	19.33	2.15	22.85	192.752	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	704	7.82	1.91	19.25	2.15	23.01	199.986	Horizontal	Pass
		707.5	7.84	1.91	19.26	2.15	23.04	201.372	Horizontal	Pass
		711	7.77	1.92	19.32	2.15	23.02	200.447	Horizontal	Pass

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Gain	Correction	Max. ERP	Max. ERP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average		
							(dBm)	(mW)		
1.4MHz Band 16 QAM	1/#Mid	699.7	7.07	1.91	19.21	2.15	22.22	166.725	Vertical	Pass
		707.5	7.08	1.91	19.26	2.15	22.28	169.044	Vertical	Pass
		715.3	7.01	1.93	19.34	2.15	22.27	168.655	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	7.14	1.91	19.21	2.15	22.29	169.434	Vertical	Pass
		707.5	7.06	1.91	19.26	2.15	22.26	168.267	Vertical	Pass
		714.5	6.99	1.93	19.34	2.15	22.25	167.880	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	7.01	1.91	19.23	2.15	22.18	165.196	Vertical	Pass
		707.5	6.96	1.91	19.26	2.15	22.16	164.437	Vertical	Pass
		713.5	6.90	1.92	19.33	2.15	22.16	164.437	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	704	7.11	1.91	19.25	2.15	22.30	169.824	Vertical	Pass
		707.5	6.95	1.91	19.26	2.15	22.15	164.059	Vertical	Pass
		711	6.91	1.92	19.32	2.15	22.16	164.437	Vertical	Pass
1.4MHz Band 16 QAM	1/#Mid	699.7	7.00	1.91	19.21	2.15	22.15	164.059	Horizontal	Pass
		707.5	7.03	1.91	19.26	2.15	22.23	167.109	Horizontal	Pass
		715.3	7.00	1.93	19.34	2.15	22.26	168.267	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	7.09	1.91	19.21	2.15	22.24	167.494	Horizontal	Pass
		707.5	6.96	1.91	19.26	2.15	22.16	164.437	Horizontal	Pass
		714.5	7.02	1.93	19.34	2.15	22.28	169.044	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	7.02	1.91	19.23	2.15	22.19	165.577	Horizontal	Pass
		707.5	7.07	1.91	19.26	2.15	22.27	168.655	Horizontal	Pass
		713.5	6.92	1.92	19.33	2.15	22.18	165.196	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	704	7.12	1.91	19.25	2.15	22.31	170.216	Horizontal	Pass
		707.5	7.11	1.91	19.26	2.15	22.31	170.216	Horizontal	Pass
		711	7.07	1.92	19.32	2.15	22.32	170.608	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 17

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG	Cable	Antenna		Max.	Max.	Polarization	
			Level	Loss	Gain		ERP	ERP	Of Max.	
			(dBm)	(dBm)	(dB)		Average	Average	ERP	
						Correction				
						(dB)	(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	706.5	7.83	1.91	19.23	2.15	23.00	199.526	Vertical	Pass
		710	7.80	1.91	19.26	2.15	23.00	199.526	Vertical	Pass
		713.5	7.61	1.92	19.33	2.15	22.87	193.642	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	709	7.75	1.91	19.25	2.15	22.94	196.789	Vertical	Pass
		710	7.75	1.91	19.26	2.15	22.95	197.242	Vertical	Pass
		711	7.62	1.92	19.32	2.15	22.87	193.642	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	706.5	7.81	1.91	19.23	2.15	22.98	198.609	Horizontal	Pass
		710	7.79	1.91	19.26	2.15	22.99	199.067	Horizontal	Pass
		713.5	7.59	1.92	19.33	2.15	22.85	192.752	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	709	7.86	1.91	19.25	2.15	23.05	201.837	Horizontal	Pass
		710	7.81	1.91	19.26	2.15	23.01	199.986	Horizontal	Pass
		711	7.78	1.92	19.32	2.15	23.03	200.909	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. ERP	Max. ERP	Polarization Of Max. ERP	
							Average	Average		
							(dBm)	(mW)		
5.0MHz Band 16 QAM	1/#Mid	706.5	6.33	1.91	19.23	2.15	21.50	141.254	Vertical	Pass
		710	6.24	1.91	19.26	2.15	21.44	139.316	Vertical	Pass
		713.5	6.17	1.92	19.33	2.15	21.43	138.995	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	709	6.27	1.91	19.25	2.15	21.46	139.959	Vertical	Pass
		710	6.21	1.91	19.26	2.15	21.41	138.357	Vertical	Pass
		711	6.13	1.92	19.32	2.15	21.38	137.404	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	706.5	6.20	1.91	19.23	2.15	21.37	137.088	Horizontal	Pass
		710	6.19	1.91	19.26	2.15	21.39	137.721	Horizontal	Pass
		713.5	6.11	1.92	19.33	2.15	21.37	137.088	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	709	6.36	1.91	19.25	2.15	21.55	142.889	Horizontal	Pass
		710	6.34	1.91	19.26	2.15	21.54	142.561	Horizontal	Pass
		711	6.27	1.92	19.32	2.15	21.52	141.906	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)

8.8 LTE BAND 41

Radiated Power (EIRP) for Band 41									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			Average	Average		
						(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2562.5	0.55	4.54	27.75	23.76	237.684	Horizontal	Pass
		2610	0.73	4.69	27.72	23.76	237.684	Horizontal	Pass
		2657.5	0.66	4.71	27.71	23.66	232.274	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2565	0.54	4.55	27.76	23.75	237.137	Horizontal	Pass
		2610	0.69	4.69	27.72	23.72	235.505	Horizontal	Pass
		2655	0.72	4.72	27.70	23.70	234.423	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2567.5	0.47	4.55	27.77	23.69	233.884	Horizontal	Pass
		2610	0.69	4.69	27.72	23.72	235.505	Horizontal	Pass
		2652.5	0.68	4.72	27.69	23.65	231.739	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2570	0.44	4.57	27.78	23.65	231.739	Horizontal	Pass
		2610	0.67	4.73	27.72	23.66	232.274	Horizontal	Pass
		2650	0.80	4.75	27.68	23.73	236.048	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2562.5	0.47	4.54	27.75	23.68	233.346	Vertical	Pass
		2610	0.70	4.69	27.72	23.73	236.048	Vertical	Pass
		2657.5	0.78	4.71	27.71	23.78	238.781	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2565	0.49	4.55	27.76	23.70	234.423	Vertical	Pass
		2610	0.75	4.69	27.72	23.78	238.781	Vertical	Pass
		2655	0.77	4.72	27.70	23.75	237.137	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2567.5	0.42	4.55	27.77	23.64	231.206	Vertical	Pass
		2610	0.72	4.69	27.72	23.75	237.137	Vertical	Pass
		2652.5	0.71	4.72	27.69	23.68	233.346	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2570	0.61	4.57	27.78	23.82	240.991	Vertical	Pass
		2610	0.83	4.73	27.72	23.82	240.991	Vertical	Pass
		2650	0.90	4.75	27.68	23.83	241.546	Vertical	Pass

Radiated Power (EIRP) for Band 41									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			Average	Average		
						(dBm)	(mW)		
5.0MHz Band 16 QAM	1/#Mid	2502.5	2498.5	4.54	27.75	22.70	186.209	Horizontal	Pass
		2535	2593	4.69	27.72	22.76	188.799	Horizontal	Pass
		2567.5	2687.5	4.71	27.71	22.69	185.780	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	2501	4.55	27.76	22.73	187.499	Horizontal	Pass
		2535	2593	4.69	27.72	22.67	184.927	Horizontal	Pass
		2565	2685	4.72	27.70	22.64	183.654	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	2503.5	4.55	27.77	22.70	186.209	Horizontal	Pass
		2535	2593	4.69	27.72	22.75	188.365	Horizontal	Pass
		2562.5	2682.5	4.72	27.69	22.69	185.780	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	2506	4.57	27.78	22.69	185.780	Horizontal	Pass
		2535	2593	4.73	27.72	22.65	184.077	Horizontal	Pass
		2560	2680	4.75	27.68	22.76	188.799	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	2498.5	4.54	27.75	22.76	188.799	Vertical	Pass
		2535	2593	4.69	27.72	22.71	186.638	Vertical	Pass
		2567.5	2687.5	4.71	27.71	22.70	186.209	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	2501	4.55	27.76	22.72	187.068	Vertical	Pass
		2535	2593	4.69	27.72	22.74	187.932	Vertical	Pass
		2565	2685	4.72	27.70	22.74	187.932	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	2503.5	4.55	27.77	22.68	185.353	Vertical	Pass
		2535	2593	4.69	27.72	22.70	186.209	Vertical	Pass
		2562.5	2682.5	4.72	27.69	22.74	187.932	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	2506	4.57	27.78	22.81	190.985	Vertical	Pass
		2535	2593	4.73	27.72	22.81	190.985	Vertical	Pass
		2560	2680	4.75	27.68	22.84	192.309	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

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

LIMIT

§22.917 (e) and §24.238 (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
- ☐ LTE Band 4
- ☐ LTE Band 5
- ☐ LTE Band 12
- ☐ LTE Band 17
- ☐ LTE Band 41

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	-51.91	4.04	33.51	-22.44	-13	-9.44	Horizontal
3701.4	-44.43	4.04	33.51	-14.96	-13	-1.96	Vertical
5552.1	-53.04	5.24	35.84	-22.44	-13	-9.44	Vertical
5552.1	-53.07	5.24	35.84	-22.47	-13	-9.47	Horizontal
190.3	-38.06	1.43	16.02	-23.47	-13	-10.47	Vertical
450.8	-35.87	1.30	17.99	-19.18	-13	-6.18	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-46.84	4.04	33.56	-17.32	-13	-4.32	Horizontal
3760.0	-47.07	4.04	33.56	-17.55	-13	-4.55	Vertical
5640.0	-45.68	5.24	35.91	-15.01	-13	-2.01	Vertical
5640.0	-51.03	5.24	35.91	-20.36	-13	-7.36	Horizontal
175.9	-42.17	1.62	16.97	-26.82	-13	-13.82	Vertical
433.4	-43.40	1.74	15.98	-29.17	-13	-16.17	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-49.32	4.04	34.00	-19.36	-13	-6.36	Horizontal
3818.6	-46.43	4.04	34.00	-16.47	-13	-3.47	Vertical
5727.9	-47.92	5.24	36.04	-17.12	-13	-4.12	Vertical
5727.9	-49.57	5.24	36.04	-18.77	-13	-5.77	Horizontal
195.4	-44.09	1.42	17.29	-28.22	-13	-15.22	Vertical
231.9	-42.26	1.50	17.90	-25.85	-13	-12.85	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	-50.78	4.07	33.54	-21.31	-13	-8.31	Horizontal
3720.0	-52.58	4.07	33.54	-23.11	-13	-10.11	Vertical
5580.0	-44.41	5.28	35.86	-13.83	-13	-0.83	Vertical
5580.0	-50.16	5.28	35.86	-19.58	-13	-6.58	Horizontal
189.6	-35.12	1.58	16.89	-19.80	-13	-6.80	Vertical
277.6	-38.72	1.76	17.26	-23.22	-13	-10.22	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-45.54	4.04	33.56	-16.02	-13	-3.02	Horizontal
3760.0	-49.88	4.04	33.56	-20.36	-13	-7.36	Vertical
5640.0	-46.73	5.24	35.91	-16.06	-13	-3.06	Vertical
5640.0	-50.18	5.24	35.91	-19.51	-13	-6.51	Horizontal
176.6	-34.57	1.46	16.27	-19.76	-13	-6.76	Vertical
467.0	-38.76	1.59	15.15	-25.20	-13	-12.20	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-49.40	4.04	34.00	-19.44	-13	-6.44	Horizontal
3800.0	-47.81	4.04	34.00	-17.85	-13	-4.85	Vertical
5700.0	-47.70	5.24	36.04	-16.90	-13	-3.90	Vertical
5700.0	-50.55	5.24	36.04	-19.75	-13	-6.75	Horizontal
182.1	-40.48	1.36	17.39	-24.44	-13	-11.44	Vertical
324.6	-34.77	1.66	15.39	-21.04	-13	-8.04	Horizontal

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

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

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

9.2 LTE BAND 4

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-49.69	4.02	29.80	-23.91	-13	-10.91	Horizontal
3421.4	-45.12	4.02	29.80	-19.34	-13	-6.34	Vertical
5132.1	-49.01	5.24	35.84	-18.41	-13	-5.41	Vertical
5132.1	-53.31	5.24	35.84	-22.71	-13	-9.71	Horizontal
210.0	-36.87	1.68	16.04	-22.51	-13	-9.51	Vertical
410.8	-41.98	1.78	17.74	-26.02	-13	-13.02	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-46.77	4.03	30.00	-20.80	-13	-7.80	Horizontal
3465.0	-45.87	4.03	30.00	-19.90	-13	-6.90	Vertical
5197.5	-47.08	5.25	35.86	-16.47	-13	-3.47	Vertical
5197.5	-49.53	5.25	35.86	-18.92	-13	-5.92	Horizontal
187.6	-35.72	1.72	17.69	-19.75	-13	-6.75	Vertical
266.5	-35.57	1.62	16.02	-21.16	-13	-8.16	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-48.60	4.05	30.01	-22.64	-13	-9.64	Horizontal
3508.6	-46.07	4.05	30.01	-20.11	-13	-7.11	Vertical
5262.9	-47.45	5.26	35.86	-16.85	-13	-3.85	Vertical
5262.9	-51.90	5.26	35.86	-21.30	-13	-8.30	Horizontal
187.7	-36.26	1.80	16.69	-21.37	-13	-8.37	Vertical
331.6	-41.88	1.75	16.66	-26.98	-13	-13.98	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	-53.21	4.02	29.80	-27.43	-13	-14.43	Horizontal
3440.0	-44.40	4.02	29.80	-18.62	-13	-5.62	Vertical
5160.0	-50.87	5.24	35.84	-20.27	-13	-7.27	Vertical
5160.0	-50.73	5.24	35.84	-20.13	-13	-7.13	Horizontal
200.1	-39.34	1.57	17.26	-23.65	-13	-10.65	Vertical
463.8	-41.48	1.78	16.35	-26.91	-13	-13.91	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-51.20	4.03	30.00	-25.23	-13	-12.23	Horizontal
3465.0	-48.87	4.03	30.00	-22.90	-13	-9.90	Vertical
5197.5	-48.15	5.25	35.86	-17.54	-13	-4.54	Vertical
5197.5	-51.58	5.25	35.86	-20.97	-13	-7.97	Horizontal
183.8	-41.75	1.44	17.95	-25.24	-13	-12.24	Vertical
329.8	-36.11	1.65	16.09	-21.67	-13	-8.67	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-50.64	2.91	27.68	-25.87	-13	-12.87	Horizontal
3490.0	-51.32	2.91	27.68	-26.55	-13	-13.55	Vertical
5235.0	-48.39	5.26	35.86	-17.79	-13	-4.79	Vertical
5235.0	-50.95	5.26	35.86	-20.35	-13	-7.35	Horizontal
182.5	-42.64	1.61	16.85	-27.40	-13	-14.40	Vertical
272.4	-44.71	1.61	15.19	-31.13	-13	-18.13	Horizontal

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

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

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

9.3 LTE BAND 5

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

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-52.38	2.78	27.50	-27.66	-13	-14.66	Horizontal
1649.4	-52.01	2.78	27.50	-27.29	-13	-14.29	Vertical
2474.1	-53.55	2.90	27.80	-28.65	-13	-15.65	Vertical
2474.1	-52.68	2.90	27.80	-27.78	-13	-14.78	Horizontal
205.3	-41.27	1.76	17.59	-25.44	-13	-12.44	Vertical
411.0	-40.21	1.63	15.87	-25.97	-13	-12.97	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-53.73	2.80	27.48	-29.05	-13	-16.05	Horizontal
1673.0	-48.23	2.80	27.48	-23.55	-13	-10.55	Vertical
2509.5	-46.87	2.91	27.70	-22.08	-13	-9.08	Vertical
2509.5	-49.99	2.91	27.70	-25.20	-13	-12.20	Horizontal
212.1	-41.96	1.61	15.68	-27.89	-13	-14.89	Vertical
453.8	-40.84	1.59	17.52	-24.92	-13	-11.92	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-48.76	2.82	27.43	-24.15	-13	-11.15	Horizontal
1696.6	-45.16	2.82	27.43	-20.55	-13	-7.55	Vertical
2544.9	-48.10	2.92	27.74	-23.28	-13	-10.28	Vertical
2544.9	-53.78	2.92	27.74	-28.96	-13	-15.96	Horizontal
208.9	-37.33	1.69	16.67	-22.34	-13	-9.34	Vertical
337.1	-34.48	1.70	17.18	-19.00	-13	-6.00	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	-52.16	2.78	27.50	-27.44	-13	-14.44	Horizontal
1658.0	-52.68	2.78	27.50	-27.96	-13	-14.96	Vertical
2487.0	-44.16	2.90	27.80	-19.26	-13	-6.26	Vertical
2487.0	-49.30	2.90	27.80	-24.40	-13	-11.40	Horizontal
180.6	-39.23	1.71	15.57	-25.37	-13	-12.37	Vertical
384.2	-37.36	1.34	16.40	-22.30	-13	-9.30	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-46.58	2.80	27.48	-21.90	-13	-8.90	Horizontal
1673.0	-46.03	2.80	27.48	-21.35	-13	-8.35	Vertical
2509.5	-47.05	2.91	27.70	-22.26	-13	-9.26	Vertical
2509.5	-52.81	2.91	27.70	-28.02	-13	-15.02	Horizontal
190.5	-36.61	1.44	17.04	-21.01	-13	-8.01	Vertical
260.7	-43.70	1.76	17.62	-27.84	-13	-14.84	Horizontal
Test Results for High Channel 844MHz							
1688.0	-46.53	2.82	27.43	-21.92	-13	-8.92	Horizontal
1688.0	-45.42	2.82	27.43	-20.81	-13	-7.81	Vertical
2532.0	-47.07	2.92	27.74	-22.25	-13	-9.25	Vertical
2532.0	-50.34	2.92	27.74	-25.52	-13	-12.52	Horizontal
188.5	-40.98	1.74	17.70	-25.02	-13	-12.02	Vertical
364.3	-35.67	1.41	17.46	-19.61	-13	-6.61	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 (5MHZ BANDWIDTH)

Test Results for Low Channel 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-61.55	5.23	35.81	-30.97	-25	-5.97	Horizontal
5005.0	-59.26	5.23	35.81	-28.68	-25	-3.68	Vertical
7507.5	-60.13	5.67	36.85	-28.95	-25	-3.95	Vertical
7507.5	-62.05	5.67	36.85	-30.87	-25	-5.87	Horizontal
207.4	-48.24	1.73	17.97	-32.00	-25	-7.00	Vertical
332.1	-49.18	1.38	15.11	-35.45	-25	-10.45	Horizontal
Test Results For Mid Channel 707.5MHz							
5070.0	-59.83	5.23	35.82	-29.24	-25	-4.24	Horizontal
5070.0	-62.27	5.23	35.82	-31.68	-25	-6.68	Vertical
7605.0	-64.73	5.67	36.85	-33.55	-25	-8.55	Vertical
7605.0	-60.98	5.67	36.85	-29.80	-25	-4.80	Horizontal
200.6	-50.02	1.77	16.17	-35.61	-25	-10.61	Vertical
329.1	-45.50	1.63	15.21	-31.92	-25	-6.92	Horizontal
Test Results for High Channel 715.3MHz							
5135.0	-60.11	5.24	35.83	-29.52	-25	-4.52	Horizontal
5135.0	-62.45	5.24	35.83	-31.86	-25	-6.86	Vertical
7702.5	-61.19	5.68	36.87	-30.00	-25	-5.00	Vertical
7702.5	-61.43	5.68	36.87	-30.24	-25	-5.24	Horizontal
184.6	-47.78	1.58	17.56	-31.80	-25	-6.80	Vertical
380.6	-46.24	1.45	16.58	-31.11	-25	-6.11	Horizontal

QPSK EIRP POWER FOR LTE BAND 7 (20MHZ BANDWIDTH)

Test Results for Low Channel 2510MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020.0	-60.17	5.23	35.82	-29.58	-25	-4.58	Horizontal
5020.0	-59.22	5.23	35.82	-28.63	-25	-3.63	Vertical
7530.0	-59.92	5.67	36.86	-28.73	-25	-3.73	Vertical
7530.0	-61.89	5.67	36.86	-30.70	-25	-5.70	Horizontal
194.3	-44.50	1.63	15.76	-30.37	-25	-5.37	Vertical
281.2	-53.82	1.71	15.44	-40.09	-25	-15.09	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-62.25	5.23	35.82	-31.66	-25	-6.66	Horizontal
5070.0	-59.79	5.23	35.82	-29.20	-25	-4.20	Vertical
7605.0	-61.50	5.67	36.85	-30.32	-25	-5.32	Vertical
7605.0	-61.88	5.67	36.85	-30.70	-25	-5.70	Horizontal
193.0	-46.95	1.79	16.84	-31.89	-25	-6.89	Vertical
233.9	-47.86	1.71	17.64	-31.93	-25	-6.93	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-62.79	5.24	35.83	-32.20	-25	-7.20	Horizontal
5120.0	-61.47	5.24	35.83	-30.88	-25	-5.88	Vertical
7680.0	-63.83	5.70	36.88	-32.65	-25	-7.65	Vertical
7680.0	-62.17	5.70	36.88	-30.99	-25	-5.99	Horizontal
208.8	-44.75	1.79	16.84	-29.69	-25	-4.69	Vertical
234.7	-49.64	1.71	17.64	-33.71	-25	-8.71	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.

9.5 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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-51.77	2.60	27.20	-27.17	-13	-14.17	Horizontal
1399.4	-50.63	2.60	27.20	-26.03	-13	-13.03	Vertical
2099.1	-45.40	2.85	27.54	-20.71	-13	-7.71	Vertical
2099.1	-51.02	2.85	27.54	-26.33	-13	-13.33	Horizontal
202.1	-39.62	1.49	17.78	-23.33	-13	-10.33	Vertical
331.2	-42.69	1.36	17.33	-26.72	-13	-13.72	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-53.74	2.61	27.28	-29.07	-13	-16.07	Horizontal
1415.0	-49.23	2.61	27.28	-24.56	-13	-11.56	Vertical
2122.5	-52.65	2.87	27.59	-27.93	-13	-14.93	Vertical
2122.5	-53.33	2.87	27.59	-28.61	-13	-15.61	Horizontal
208.8	-41.01	1.73	15.74	-27.00	-13	-14.00	Vertical
370.5	-40.21	1.62	15.79	-26.04	-13	-13.04	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-50.31	2.63	27.28	-25.66	-13	-12.66	Horizontal
1430.6	-51.10	2.63	27.28	-26.45	-13	-13.45	Vertical
2145.9	-48.20	2.88	27.60	-23.48	-13	-10.48	Vertical
2145.9	-52.65	2.88	27.60	-27.93	-13	-14.93	Horizontal
185.0	-40.34	1.61	18.00	-23.95	-13	-10.95	Vertical
247.1	-35.34	1.45	15.49	-21.31	-13	-8.31	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	-51.76	2.61	27.26	-27.11	-13	-14.11	Horizontal
1408.0	-51.43	2.61	27.26	-26.78	-13	-13.78	Vertical
2112.0	-45.57	2.87	27.58	-20.86	-13	-7.86	Vertical
2112.0	-51.72	2.87	27.58	-27.01	-13	-14.01	Horizontal
183.2	-43.84	1.31	16.97	-28.18	-13	-15.18	Vertical
325.4	-36.53	1.65	16.70	-21.48	-13	-8.48	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-49.13	2.61	27.28	-24.46	-13	-11.46	Horizontal
1415.0	-46.88	2.61	27.28	-22.21	-13	-9.21	Vertical
2122.5	-44.74	2.87	27.59	-20.02	-13	-7.02	Vertical
2122.5	-53.89	2.87	27.59	-29.17	-13	-16.17	Horizontal
205.6	-39.34	1.72	17.99	-23.07	-13	-10.07	Vertical
358.6	-37.52	1.73	17.94	-21.31	-13	-8.31	Horizontal
Test Results for High Channel 711MHz							
1422.0	-45.14	2.62	27.28	-20.48	-13	-7.48	Horizontal
1422.0	-44.08	2.62	27.28	-19.42	-13	-6.42	Vertical
2133.0	-53.59	2.87	27.60	-28.86	-13	-15.86	Vertical
2133.0	-51.14	2.87	27.60	-26.41	-13	-13.41	Horizontal
183.8	-44.31	1.58	15.93	-29.96	-13	-16.96	Vertical
276.0	-43.27	1.36	15.59	-29.04	-13	-16.04	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 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	-51.98	2.61	27.28	-27.31	-13	-14.31	Horizontal
1413.0	-52.17	2.61	27.28	-27.50	-13	-14.50	Vertical
2119.5	-51.07	2.87	27.59	-26.35	-13	-13.35	Vertical
2119.5	-53.30	2.87	27.59	-28.58	-13	-15.58	Horizontal
195.6	-42.06	1.71	16.15	-27.62	-13	-14.62	Vertical
380.3	-35.55	1.41	17.32	-19.64	-13	-6.64	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-45.63	2.62	27.30	-20.95	-13	-7.95	Horizontal
1420.0	-51.14	2.62	27.30	-26.46	-13	-13.46	Vertical
2130.0	-47.50	2.87	27.62	-22.75	-13	-9.75	Vertical
2130.0	-53.86	2.87	27.62	-29.11	-13	-16.11	Horizontal
205.2	-34.40	1.42	15.25	-20.58	-13	-7.58	Vertical
383.5	-42.38	1.36	17.19	-26.55	-13	-13.55	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-45.75	2.66	27.28	-21.13	-13	-8.13	Horizontal
1427.0	-50.84	2.66	27.28	-26.22	-13	-13.22	Vertical
2140.5	-45.23	2.88	27.60	-20.51	-13	-7.51	Vertical
2140.5	-51.31	2.88	27.60	-26.59	-13	-13.59	Horizontal
202.5	-42.37	1.32	17.29	-26.40	-13	-13.40	Vertical
366.5	-38.93	1.72	16.89	-23.76	-13	-10.76	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	-46.51	2.62	27.30	-21.83	-13	-8.83	Horizontal
1418.0	-46.93	2.62	27.30	-22.25	-13	-9.25	Vertical
2127.0	-53.38	2.87	27.62	-28.63	-13	-15.63	Vertical
2127.0	-50.86	2.87	27.62	-26.11	-13	-13.11	Horizontal
194.7	-39.43	1.35	16.91	-23.87	-13	-10.87	Vertical
369.5	-35.36	1.62	16.31	-20.67	-13	-7.67	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-51.80	2.62	27.30	-27.12	-13	-14.12	Horizontal
1420.0	-47.86	2.62	27.30	-23.18	-13	-10.18	Vertical
2130.0	-53.08	2.87	27.62	-28.33	-13	-15.33	Vertical
2130.0	-49.18	2.87	27.62	-24.43	-13	-11.43	Horizontal
180.5	-42.66	1.51	17.14	-27.03	-13	-14.03	Vertical
305.4	-44.42	1.77	16.88	-29.31	-13	-16.31	Horizontal
Test Results for High Channel 711MHz							
1422.0	-49.12	2.62	27.30	-24.44	-13	-11.44	Horizontal
1422.0	-50.14	2.62	27.30	-25.46	-13	-12.46	Vertical
2133.0	-50.68	2.87	27.62	-25.93	-13	-12.93	Vertical
2133.0	-51.01	2.87	27.62	-26.26	-13	-13.26	Horizontal
179.4	-38.84	1.78	15.95	-24.67	-13	-11.67	Vertical
313.4	-43.27	1.34	17.95	-26.67	-13	-13.67	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 41

QPSK EIRP POWER FOR LTE BAND 41 (5MHZ BANDWIDTH)

Test Results for Low Channel 2562.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5125.0	-64.78	5.13	35.81	-34.10	-25	-9.10	Horizontal
5125.0	-62.55	5.13	35.81	-31.87	-25	-6.87	Vertical
7687.5	-63.13	5.42	36.85	-31.70	-25	-6.70	Vertical
7687.5	-60.37	5.42	36.85	-28.94	-25	-3.94	Horizontal
185.8	-44.28	1.56	17.97	-27.87	-25	-2.87	Vertical
423.6	-51.47	1.33	15.11	-37.69	-25	-12.69	Horizontal
Test Results for Mid Channel 2610MHz							
5220.0	-64.90	5.16	35.82	-34.24	-25	-9.24	Horizontal
5220.0	-62.70	5.16	35.82	-32.04	-25	-7.04	Vertical
7830.0	-59.03	5.53	36.85	-27.71	-25	-2.71	Vertical
7830.0	-60.59	5.53	36.85	-29.27	-25	-4.27	Horizontal
193.3	-45.17	1.77	16.17	-30.76	-25	-5.76	Vertical
308.6	-51.25	1.63	15.21	-37.67	-25	-12.67	Horizontal
Test Results for High Channel 2657.5MHz							
5315.0	-59.78	5.23	35.83	-29.18	-25	-4.18	Horizontal
5315.0	-64.55	5.23	35.83	-33.95	-25	-8.95	Vertical
7972.5	-60.87	5.62	36.87	-29.62	-25	-4.62	Vertical
7972.5	-61.50	5.62	36.87	-30.25	-25	-5.25	Horizontal
180.2	-54.82	1.58	17.56	-38.84	-25	-13.84	Vertical
289.6	-44.08	1.45	16.58	-28.95	-25	-3.95	Horizontal

QPSK EIRP POWER FOR LTE BAND 41 (20MHZ BANDWIDTH)

Test Results for Low Channel 2570MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5140.0	-61.29	5.23	35.82	-30.70	-25	-5.70	Horizontal
5140.0	-59.34	5.23	35.82	-28.75	-25	-3.75	Vertical
7710.0	-60.51	5.67	36.86	-29.32	-25	-4.32	Vertical
7710.0	-59.31	5.67	36.86	-28.12	-25	-3.12	Horizontal
184.3	-53.67	1.55	15.76	-39.46	-25	-14.46	Vertical
315.3	-54.54	1.62	15.44	-40.72	-25	-15.72	Horizontal
Test Results for Mid Channel 2610MHz							
5220.0	-64.61	5.16	35.82	-33.95	-25	-8.95	Horizontal
5220.0	-62.70	5.16	35.82	-32.04	-25	-7.04	Vertical
7830.0	-64.43	5.53	36.85	-33.11	-25	-8.11	Vertical
7830.0	-64.99	5.53	36.85	-33.67	-25	-8.67	Horizontal
187.3	-52.40	1.58	16.84	-37.14	-25	-12.14	Vertical
360.5	-47.01	1.61	17.64	-30.98	-25	-5.98	Horizontal
Test Results for High Channel 2650MHz							
5300.0	-59.31	5.24	35.83	-28.72	-25	-3.72	Horizontal
5300.0	-60.58	5.24	35.83	-29.99	-25	-4.99	Vertical
7950.0	-61.34	5.70	36.88	-30.16	-25	-5.16	Vertical
7950.0	-64.59	5.70	36.88	-33.41	-25	-8.41	Horizontal
192.1	-47.17	1.48	16.84	-31.81	-25	-6.81	Vertical
319.6	-45.12	1.59	17.64	-29.07	-25	-4.07	Horizontal

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 3.8V 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
- LTE Band 4
- LTE Band 5
- LTE Band 12
- LTE Band 17
- LTE Band 41

RESULTS

See the following pages.

10.1 LTE BAND 2

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1880	12.9	0.006870	2.5
3.8	1880	13.6	0.007250	2.5
4.2	1880	13.7	0.007304	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	12.8	0.006788	2.5
Extreme (50C)	1880	11.1	0.005919	2.5
Extreme (40C)	1880	13.9	0.007390	2.5
Extreme (30C)	1880	13.8	0.007366	2.5
Extreme (10C)	1880	13.9	0.007413	2.5
Extreme (0C)	1880	11.7	0.006198	2.5
Extreme (-10C)	1880	13.0	0.006927	2.5
Extreme (-20C)	1880	13.7	0.007286	2.5
Extreme (-30C)	1880	14.3	0.007587	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1880	10.2	0.005444	2.5
3.8	1880	9.4	0.005000	2.5
4.2	1880	8.2	0.004377	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	9.4	0.005001	2.5
Extreme (50C)	1880	8.8	0.004655	2.5
Extreme (40C)	1880	8.3	0.004428999	2.5
Extreme (30C)	1880	8.9	0.00472648	2.5
Extreme (10C)	1880	8.8	0.004662848	2.5
Extreme (0C)	1880	8.4	0.004493577	2.5
Extreme (-10C)	1880	9.5	0.005039078	2.5
Extreme (-20C)	1880	9.4	0.004985055	2.5
Extreme (-30C)	1880	8.2	0.004387901	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

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1732.5	8.5	0.004916	2.5
3.8	1732.5	9.1	0.005279	2.5
4.2	1732.5	8.3	0.004779	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	8.0	0.004643	2.5
Extreme (50C)	1732.5	8.5	0.004924	2.5
Extreme (40C)	1732.5	7.2	0.004170	2.5
Extreme (30C)	1732.5	5.6	0.003248	2.5
Extreme (10C)	1732.5	7.4	0.004243	2.5
Extreme (0C)	1732.5	9.3	0.005385	2.5
Extreme (-10C)	1732.5	8.2	0.004729	2.5
Extreme (-20C)	1732.5	7.2	0.004140	2.5
Extreme (-30C)	1732.5	8.3	0.004779	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1732.5	9.3	0.005383	2.5
3.8	1732.5	8.8	0.005054	2.5
4.2	1732.5	7.7	0.004441	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	9.9	0.005722	2.5
Extreme (50C)	1732.5	9.1	0.005259	2.5
Extreme (40C)	1732.5	7.8	0.004485	2.5
Extreme (30C)	1732.5	8.6	0.004960	2.5
Extreme (10C)	1732.5	9.3	0.005372	2.5
Extreme (0C)	1732.5	7.9	0.004565	2.5
Extreme (-10C)	1732.5	8.8	0.005077	2.5
Extreme (-20C)	1732.5	8.9	0.005140	2.5
Extreme (-30C)	1732.5	8.4	0.004836	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

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	836.5	5.5	0.006555	2.5
3.8	836.5	6.5	0.007776	2.5
4.2	836.5	4.7	0.005597	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	6.2	0.007446	2.5
Extreme (50C)	836.5	5.5	0.006571	2.5
Extreme (40C)	836.5	6.2	0.007365	2.5
Extreme (30C)	836.5	6.4	0.007710	2.5
Extreme (10C)	836.5	4.9	0.005893	2.5
Extreme (0C)	836.5	5.3	0.006383	2.5
Extreme (-10C)	836.5	5.9	0.007069	2.5
Extreme (-20C)	836.5	6.3	0.007554	2.5
Extreme (-30C)	836.5	6.6	0.007945	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	836.5	5.3	0.006337	2.5
3.8	836.5	6.4	0.007666	2.5
4.2	836.5	4.4	0.005291	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	6.2	0.007369	2.5
Extreme (50C)	836.5	6.2	0.007418	2.5
Extreme (40C)	836.5	5.8	0.006979	2.5
Extreme (30C)	836.5	6.4	0.007701	2.5
Extreme (10C)	836.5	5.9	0.007047	2.5
Extreme (0C)	836.5	5.3	0.006362	2.5
Extreme (-10C)	836.5	5.6	0.006711	2.5
Extreme (-20C)	836.5	5.6	0.006728	2.5
Extreme (-30C)	836.5	6.2	0.007455	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

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.66	2535	10.4	0.004096	2.5
3.85	2535	9.3	0.003685	2.5
4.43	2535	8.1	0.003203	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	9.9	0.003897	2.5
Extreme (50C)	2535	8.6	0.003381	2.5
Extreme (40C)	2535	8.4	0.003300	2.5
Extreme (30C)	2535	9.0	0.003544	2.5
Extreme (10C)	2535	8.4	0.003326	2.5
Extreme (0C)	2535	8.2	0.003245	2.5
Extreme (-10C)	2535	9.6	0.003784	2.5
Extreme (-20C)	2535	8.8	0.003472	2.5
Extreme (-30C)	2535	8.3	0.003283	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 16QAM, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	707.5	7.4	0.010453	2.5
3.8	707.5	8.5	0.012057	2.5
4.2	707.5	7.7	0.010838	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	707.5	8.8	0.012482	2.5
Extreme (50C)	707.5	8.8	0.012378	2.5
Extreme (40C)	707.5	8.9	0.012528	2.5
Extreme (30C)	707.5	7.6	0.010713	2.5
Extreme (10C)	707.5	8.7	0.012264	2.5
Extreme (0C)	707.5	7.3	0.010303	2.5
Extreme (-10C)	707.5	7.9	0.011160	2.5
Extreme (-20C)	707.5	8.9	0.012626	2.5
Extreme (-30C)	707.5	8.1	0.011516	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

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	707.5	9.2	0.012965	2.5
3.8	707.5	9.9	0.013927	2.5
4.2	707.5	8.7	0.012266	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	707.5	8.6	0.012088	2.5
Extreme (50C)	707.5	7.1	0.010057	2.5
Extreme (40C)	707.5	7.6	0.010725	2.5
Extreme (30C)	707.5	8.8	0.012392	2.5
Extreme (10C)	707.5	7.7	0.010854	2.5
Extreme (0C)	707.5	9.4	0.013327	2.5
Extreme (-10C)	707.5	8.3	0.011771	2.5
Extreme (-20C)	707.5	8.7	0.012354	2.5
Extreme (-30C)	707.5	7.6	0.010790	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 16QAM, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	707.5	7.4	0.010453	2.5
3.8	707.5	8.5	0.012057	2.5
4.2	707.5	7.7	0.010838	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	707.5	8.8	0.012482	2.5
Extreme (50C)	707.5	8.8	0.012378	2.5
Extreme (40C)	707.5	8.9	0.012528	2.5
Extreme (30C)	707.5	7.6	0.010713	2.5
Extreme (10C)	707.5	8.7	0.012264	2.5
Extreme (0C)	707.5	7.3	0.010303	2.5
Extreme (-10C)	707.5	7.9	0.011160	2.5
Extreme (-20C)	707.5	8.9	0.012626	2.5
Extreme (-30C)	707.5	8.1	0.011516	2.5

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

10.6 LTE BAND 17

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	710.0	9.9	0.013924	2.5
3.8	710.0	8.9	0.012582	2.5
4.2	710.0	8.5	0.011932	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710.0	10.1	0.014172	2.5
Extreme (50C)	710.0	8.5	0.011933	2.5
Extreme (40C)	710.0	7.8	0.010941	2.5
Extreme (30C)	710.0	9.2	0.012905	2.5
Extreme (10C)	710.0	9.1	0.012778	2.5
Extreme (0C)	710.0	7.8	0.010982	2.5
Extreme (-10C)	710.0	9.3	0.013162	2.5
Extreme (-20C)	710.0	8.6	0.012098	2.5
Extreme (-30C)	710.0	7.8	0.010924	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 16QAM, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	710.0	10.3	0.014515	2.5
3.8	710.0	8.4	0.011889	2.5
4.2	710.0	8.4	0.011799	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 16QAM, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710.0	9.3	0.013154	2.5
Extreme (50C)	710.0	9.2	0.012892	2.5
Extreme (40C)	710.0	8.5	0.011982	2.5
Extreme (30C)	710.0	9.1	0.012862	2.5
Extreme (10C)	710.0	7.9	0.011184	2.5
Extreme (0C)	710.0	8.4	0.011891	2.5
Extreme (-10C)	710.0	9.7	0.013681	2.5
Extreme (-20C)	710.0	9.0	0.012719	2.5
Extreme (-30C)	710.0	8.0	0.011216	2.5

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

10.7 LTE BAND 41

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 41 QPSK, (CH 40790 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2610	10.0	0.003860	2.5
3.8	2610	8.8	0.003407	2.5
4.2	2610	7.9	0.003061	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 41 QPSK, (CH 40790 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2610	9.3	0.003568	2.5
Extreme (50C)	2610	8.5	0.003286	2.5
Extreme (40C)	2610	7.9	0.003062	2.5
Extreme (30C)	2610	9.1	0.003501	2.5
Extreme (10C)	2610	8.5	0.003277	2.5
Extreme (0C)	2610	8.4	0.003234	2.5
Extreme (-10C)	2610	9.2	0.003532	2.5
Extreme (-20C)	2610	9.3	0.003570	2.5
Extreme (-30C)	2610	8.8	0.003406	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 41 16QAM, (CH 40790 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2610	6.9	0.002661	2.5
3.8	2610	6.0	0.002321	2.5
4.2	2610	5.2	0.002011	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 41 16QAM, (CH 40790 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2610	6.9	0.002661	2.5
Extreme (50C)	2610	5.4	0.002090	2.5
Extreme (40C)	2610	5.1	0.001970	2.5
Extreme (30C)	2610	6.7	0.002574	2.5
Extreme (10C)	2610	5.2	0.002022	2.5
Extreme (0C)	2610	5.1	0.001948	2.5
Extreme (-10C)	2610	5.5	0.002107	2.5
Extreme (-20C)	2610	5.9	0.002286	2.5
Extreme (-30C)	2610	5.9	0.002274	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.

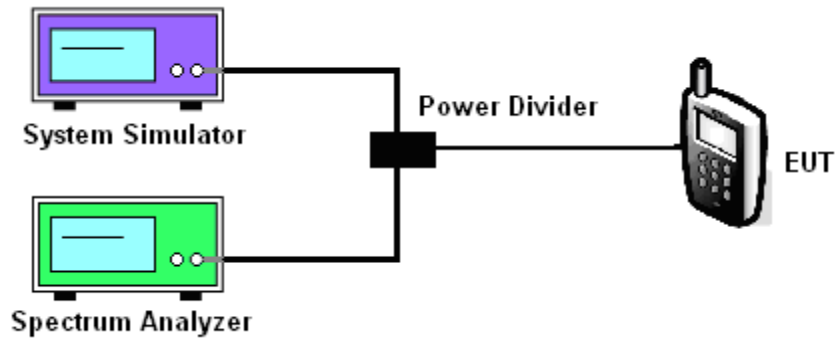
11.2 Measuring Instruments

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
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 17
- LTE Band 41

Test data reference attachment.

----END OF REPORT----