

FCC CFR47 PART 22H, 24E, 27 CERTIFICATION TEST REPORT FCC ID: 2ARTX-Z4PLUS

Product: Mobile Phone

Trade Mark: LAVA

Model Number: Z4 PLUS

Family Model: N/A

Report No.: S23081500201005

Prepared for

LAVA International Limited

A-56, Sector 64, Noida 201301, U.P. India

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name..... : LAVA International Limited

Address : A-56, Sector 64, Noida 201301, U.P. India

Manufacturer's Name..... : LAVA International Limited

Address : A-154 D, Sector-63, Noida, Gautam Buddha Nagar, Uttar Pradesh, 201301

Product name : Mobile Phone

Model and/or type reference : Z4 PLUS

Family Model: N/A

Test sample number S230815002001

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 15 Aug. 2023 ~ 28 Aug. 2023

Date of Issue 28 Aug. 2023

Test Result **Pass**

Testing Engineer :



(Allen Liu)

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:	Mobile Phone
Trade Mark	LAVA
Model Name	Z4 PLUS
Family Model	N/A
Model Difference	N/A
FCC ID:	2ARTX-Z4PLUS
Frequency Bands:	U.S. Bands: ☒ LTE FDD Band 2, 4, 5, 7, 12, 13, 17, 38, 66
Frequency Range:	LTE FDD Band 2 Uplink: 1850MHz-1910MHz, Downlink: 1930MHz-1990MHz; LTE FDD Band 4 Uplink: 1710MHz-1755MHz, Downlink: 2110MHz-2155MHz; LTE FDD Band 5 Uplink: 824MHz-849MHz, Downlink: 869MHz-894MHz; LTE-FDD Band 7 Uplink: 2500MHz-2570MHz, 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; TDD Band 38: Uplink & Downlink: 2570 MHz to 2620 MHz LTE FDD Band 66 Uplink: 1710MHz-1780MHz, Downlink: 2110MHz-2200MHz;
Type of Modulation:	QPSK/16QAM
Antenna:	PIFA Antenna
Antenna gain:	B2: -1.8 dBi,B4: -1.8 dBi,B5: -2.9 dBi,B7: -1.2 dBi, B12:-3.0 dBi, B13: -3.0 dBi, B17: -3.0dBi,B38:-1 dBi,B66: -1.8 dBi,
Power Supply:	DC 3.75V/4000mAh from battery or DC 5V from Adapter.
Adapter:	Model: HJ-0501500-US Input: 100-240V~50/60Hz 0.3A Output: 5.0V $\overline{\text{---}}$ 1.5A 7.5W
Extreme Vol. Limits:	DC 3.4V to DC 4.4V (Nominal DC 3.75V) (Note 1)

HW Version	LAVA_Z4_Plus_HW_V001
SW Version	LAVA_Z4_Plus_TIGO_LATAM_V001
** Note1: The High Voltage 4.4V 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: 2ARTX-Z4PLUS** 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 C63.46:2015.

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 C63.46:2015& 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

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 7, Band 12, Band 13, Band 17, Band 38, Band 66.

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

For the fundamental investigation of radiated emissions, the EUT is investigated for vertical and horizontal antenna orientations and X Y and Z orientations of the EUT alone. After the investigations

the worst case was determined to be at X orientation for all LTE bands.

1.6 SUMMARY OF TEST RESULTS

FCC Part22, Subpart H/ FCC Part24, Subpart E, FCC Part27, Subpart L, KDB 971168 D01 Power Meas License Digital Systems v03			
FCC Rule	Test Item	Verdict	Remark
2.1046	Conducted Output Power	PASS	
22.913(d) 24.232(d) 27.50(d)(5) KDB 971168 D01 Clause 5.7	Peak-to-Average Ratio	PASS	
2.1049 22.917(b) 24.238(b) KDB 971168 D01 Clause 4.2	Occupied Bandwidth	PASS	
2.1051 22.917(a) 24.238(a) 27.53(c), (g), (h) KDB 971168 D01 Clause 6	Band Edge	PASS	
22.913(a)(2) 27.50(b)(10), (c)(10) KDB 971168 D01 Clause 5.6	Effective Radiated Power	PASS	
24.232(c) 27.50(h)(2), (d)(4) KDB 971168 D01 Clause 5.6	Equivalent Isotropic Radiated Power	PASS	
2.1053 22.917(a) 24.238(a) 27.53(c)(g)(h)(m) KDB 971168 D01 Clause 7	Field Strength of Spurious Radiation	PASS	
2.1055 22.355 24.235 27.54 KDB 971168 D01 Clause 9	Frequency Stability for Temperature & Voltage	PASS	

2.1051 22.917(a) 24.238(a) 27.53(c)(g)(h)(m) KDB 971168 D01 Clause 6	Conducted Emission	PASS	
Remark: 1. "N/A" denotes test is not applicable in this Test Report. 2. All test items were verified and recorded according to the standards and without any deviation during the test. 3. No modifications are made to the EUT during all test items.			

2. SYSTEM TEST CONFIGURATION

2.1 EUT CONFIGURATION

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

2.2 EUT EXERCISE

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

2.3 CONFIGURATION OF EUT SYSTEM

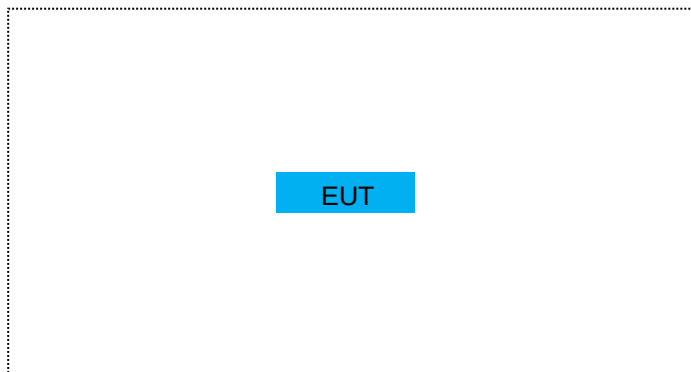
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Mobile Phone	Z4 PLUS	FCC ID: 2ARTX-Z4PLUS	EUT

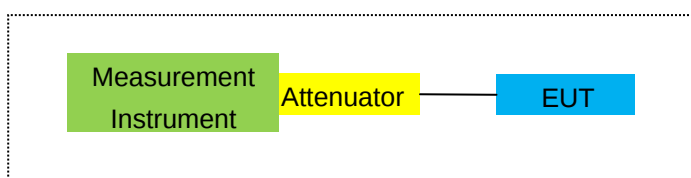
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

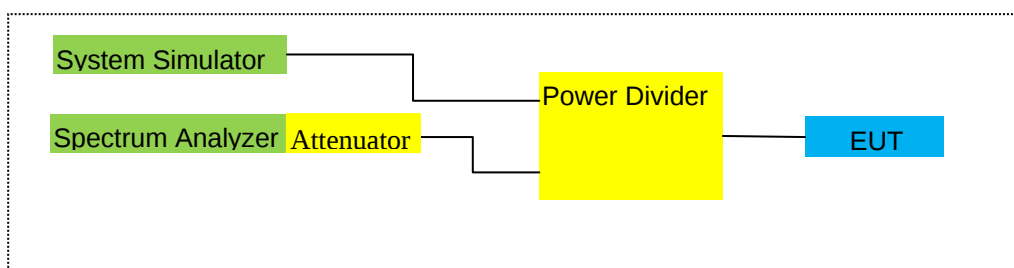
For Radiated Test Cases



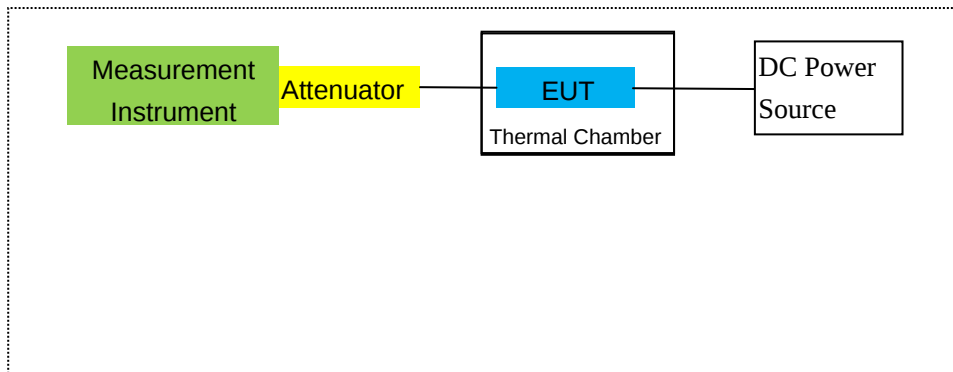
For Conducted Output Power



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	2023.05.29	2024.05.28	1 year
2	Test Receiver	R&S	ESPI	101318	2023.03.27	2024.03.26	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2023.03.27	2024.03.26	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2023.05.06	2026.05.05	3 year
5	Horn Antenna	EM	EM-AH-10180	2011071402	2023.03.27	2024.03.26	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2023.05.29	2024.05.28	1 year
7	Amplifier	EM	EM-30180	060538	2023.05.29	2024.05.28	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2023.03.27	2024.03.26	1 year
9	Power Meter	R&S	NRVS	100696	2023.05.29	2024.05.28	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2023.03.27	2024.03.26	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	2023.03.27	2024.03.26	1 year
15	LISN	R&S	ENV216	101313	2023.03.27	2024.03.26	1 year
16	LISN	EMCO	3816/2	00042990	2023.03.27	2024.03.26	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2023.03.27	2024.03.26	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2023.03.27	2024.03.26	1 year
19	Test Cable	N/A	C01	N/A	2023.05.06	2026.05.05	3 year
20	Test Cable	N/A	C02	N/A	2023.05.06	2026.05.05	3 year
21	Test Cable	N/A	C03	N/A	2023.05.06	2026.05.05	3 year
22	Attenuator	MCE	24-10-34	BN9258	2023.03.27	2024.03.26	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2023.03.27	2024.03.26	1 year
24	test receiver	R&S	ESCI	a0304218	2023.03.27	2024.03.26	1 year
25	Communication Tester	R&S	CMU200	A0304247	2023.05.29	2024.05.28	1 year

26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2023.03.27	2024.03.26	1 year
27	DC Power Source	N/A	PS-6005D	20170402923	2023.05.06	2026.05.05	3 year
28	MXG Vector Signal Generator	Agilent	N5182A	MY47070317	2023.05.29	2024.05.28	1 year
29	Communication Tester	R&S	CMW500	148500	2023.05.29	2024.05.28	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 Band2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 17
- LTE Band 38
- LTE Band 66

RESULTS

PASS

Test data reference attachment.

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

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

FCC: §2.1046, §22.913, §24.232

LIMITS

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

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

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

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

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

Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth.

TEST PROCEDURE

The transmitter output was connected to a CMW500Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

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

Set display line

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

MODES TESTED

- ☐ LTE Band 2/4/5/7/12/13/17/38/66

RESULTS

Test data reference attachment.

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

7. OUT OF BAND EMISSIONS

RULE PART(S)

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

LIMITS

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

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

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

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

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

Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth.

TEST PROCEDURE

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

For each out of band emissions measurement:

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

MODES TESTED

- ☐ LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 17

LTE Band 38

LTE Band 66

7.1 MEASUREMENT METHOD

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

Test data reference attachment.

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

8. RADIATED MEASUREMENT

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913(a)(2), §24.232(c) and §27.50 (h)(2), (b)(10), (c)(10), (d)(4)

LIMITS:

22.913(a) (2)- The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232 (c) Mobile and portable stations are limited to 2 watts EIRP.

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

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

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

27.50 (h)(2) Mobile and other user stations in the 2500–2570 MHz and 2620–2690 MHz bands. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17

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

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

MODES TESTED

- ☐ LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 17
- LTE Band 38
- LTE Band 66

RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP	Polarization Of Max. ERP	
							Average		
							(mW)		
1.4MHz Band QPSK	1/#Mid	1850.7	-3.53	3.76	28.24	20.95	124.451	Horizontal	Pass
1880		-3.34	3.91	28.22	20.97	125.026	Horizontal	Pass	
1909.3		-3.25	3.93	28.20	21.02	126.474	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-3.59	3.77	28.23	20.87	122.180	Horizontal	Pass
1880		-3.44	3.91	28.24	20.89	122.744	Horizontal	Pass	
1908.5		-3.31	3.94	28.25	21.00	125.893	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-3.48	3.77	28.31	21.06	127.644	Horizontal	Pass
1880		-3.10	3.91	28.22	21.21	132.130	Horizontal	Pass	
1907.5		-3.03	3.94	28.20	21.23	132.739	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-3.34	3.79	28.33	21.20	131.826	Horizontal	Pass
1880		-3.04	3.95	28.22	21.23	132.739	Horizontal	Pass	
1905		-2.93	3.97	28.19	21.29	134.586	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	1857.5	-3.30	3.79	28.34	21.25	133.352	Horizontal	Pass
1880		-3.09	3.95	28.22	21.18	131.220	Horizontal	Pass	
1902.5		-2.95	3.97	28.18	21.26	133.660	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	1860	-3.29	3.81	28.35	21.25	133.352	Horizontal	Pass
1880		-2.96	3.96	28.22	21.30	134.896	Horizontal	Pass	
1900		-2.90	4.00	28.16	21.26	133.660	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	1850.7	-4.41	3.76	28.24	20.07	101.625	Vertical	Pass
1880		-4.18	3.91	28.22	20.13	103.039	Vertical	Pass	
1909.3		-3.81	3.93	28.20	20.46	111.173	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-4.67	3.77	28.23	19.79	95.280	Vertical	Pass
1880		-3.86	3.91	28.24	20.47	111.429	Vertical	Pass	
1908.5		-4.27	3.94	28.25	20.04	100.925	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-4.32	3.77	28.31	20.22	105.196	Vertical	Pass
1880		-4.45	3.91	28.22	19.86	96.828	Vertical	Pass	
1907.5		-3.75	3.94	28.20	20.51	112.460	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-4.55	3.79	28.33	19.99	99.770	Vertical	Pass
1880		-3.88	3.95	28.22	20.39	109.396	Vertical	Pass	
1905		-3.58	3.97	28.19	20.64	115.878	Vertical	Pass	

15.0MHz	1/#Mid	1857.5	-4.79	3.79	28.34	19.76	94.624	Vertical	Pass
Band		1880	-4.05	3.95	28.22	20.22	105.196	Vertical	Pass
QPSK		1902.5	-4.22	3.97	28.18	19.99	99.770	Vertical	Pass
20.0MHz	1/#Mid	1860	-4.60	3.81	28.35	19.94	98.628	Vertical	Pass
Band		1880	-4.45	3.96	28.22	19.81	95.719	Vertical	Pass
QPSK		1900	-3.55	4.00	28.16	20.61	115.080	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Factor 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 Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP	Polarization Of Max. ERP		
										Average
										(mW)
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.65	3.76	28.24	19.83	96.161	Horizontal	Pass	
		1880	-4.12	3.91	28.22	20.19	104.472	Horizontal	Pass	
		1909.3	-4.05	3.93	28.20	20.22	105.196	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	1851.5	-4.15	3.77	28.23	20.31	107.399	Horizontal	Pass	
		1880	-4.23	3.91	28.24	20.10	102.329	Horizontal	Pass	
		1908.5	-4.44	3.94	28.25	19.87	97.051	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	1852.5	-4.09	3.77	28.31	20.45	110.917	Horizontal	Pass	
		1880	-4.00	3.91	28.22	20.31	107.399	Horizontal	Pass	
		1907.5	-3.68	3.94	28.20	20.58	114.288	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	1855	-4.14	3.79	28.33	20.40	109.648	Horizontal	Pass	
		1880	-4.13	3.95	28.22	20.14	103.276	Horizontal	Pass	
		1905	-3.60	3.97	28.19	20.62	115.345	Horizontal	Pass	
15.0MHz Band 16 QAM	1/#Mid	1857.5	-4.12	3.79	28.34	20.43	110.408	Horizontal	Pass	
		1880	-3.91	3.95	28.22	20.36	108.643	Horizontal	Pass	
		1902.5	-3.87	3.97	28.18	20.34	108.143	Horizontal	Pass	
20.0MHz Band 16 QAM	1/#Mid	1860	-4.01	3.81	28.35	20.53	112.980	Horizontal	Pass	
		1880	-3.71	3.96	28.22	20.55	113.501	Horizontal	Pass	
		1900	-3.53	4.00	28.16	20.63	115.611	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	1850.7	-5.34	3.76	28.24	19.14	82.035	Vertical	Pass	
		1880	-5.47	3.91	28.22	18.84	76.560	Vertical	Pass	
		1909.3	-4.66	3.93	28.20	19.61	91.411	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	1851.5	-4.86	3.77	28.23	19.60	91.201	Vertical	Pass	
		1880	-5.37	3.91	28.24	18.96	78.705	Vertical	Pass	
		1908.5	-5.62	3.94	28.25	18.69	73.961	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	1852.5	-5.31	3.77	28.31	19.23	83.753	Vertical	Pass	
		1880	-4.84	3.91	28.22	19.47	88.512	Vertical	Pass	
		1907.5	-5.14	3.94	28.20	19.12	81.658	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	1855	-5.14	3.79	28.33	19.40	87.096	Vertical	Pass	
		1880	-4.89	3.95	28.22	19.38	86.696	Vertical	Pass	
		1905	-5.27	3.97	28.19	18.95	78.524	Vertical	Pass	
15.0MHz Band 16 QAM	1/#Mid	1857.5	-5.62	3.79	28.34	18.93	78.163	Vertical	Pass	
		1880	-4.75	3.95	28.22	19.52	89.536	Vertical	Pass	
		1902.5	-4.92	3.97	28.18	19.29	84.918	Vertical	Pass	

20.0MHz	1/#Mid	1860	-5.13	3.81	28.35	19.41	87.297	Vertical	Pass
Band 16		1880	-4.71	3.96	28.22	19.55	90.157	Vertical	Pass
QAM		1900	-5.16	4.00	28.16	19.00	79.433	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Factor 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 Loss (dBm)	Antenna Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			Average	Average		
						(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-3.44	3.12	27.58	21.02	126.474	Horizontal	Pass
		1732.5	-3.43	3.27	27.61	20.91	123.310	Horizontal	Pass
		1754.3	-3.41	3.29	27.63	20.93	123.880	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.61	3.13	27.61	20.87	122.180	Horizontal	Pass
		1732.5	-3.53	3.27	27.61	20.81	120.504	Horizontal	Pass
		1753.5	-3.45	3.30	27.62	20.87	122.180	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-3.38	3.13	27.63	21.12	129.420	Horizontal	Pass
		1732.5	-3.28	3.27	27.61	21.06	127.644	Horizontal	Pass
		1752.5	-3.16	3.30	27.60	21.14	130.017	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-3.32	3.15	27.64	21.17	130.918	Horizontal	Pass
		1732.5	-3.09	3.31	27.61	21.21	132.130	Horizontal	Pass
		1750	-3.11	3.33	27.59	21.15	130.317	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-3.33	3.15	27.65	21.17	130.918	Horizontal	Pass
		1732.5	-3.17	3.31	27.61	21.13	129.718	Horizontal	Pass
		1747.5	-3.11	3.33	27.57	21.13	129.718	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-3.27	3.17	27.66	21.22	132.434	Horizontal	Pass
		1732.5	-3.10	3.32	27.61	21.19	131.522	Horizontal	Pass
		1745	-3.04	3.36	27.56	21.16	130.617	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-4.08	3.12	27.58	20.38	109.144	Vertical	Pass
		1732.5	-4.26	3.27	27.61	20.08	101.859	Vertical	Pass
		1754.3	-3.76	3.29	27.63	20.58	114.288	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-4.69	3.13	27.61	19.79	95.280	Vertical	Pass
		1732.5	-4.43	3.27	27.61	19.91	97.949	Vertical	Pass
		1753.5	-3.92	3.30	27.62	20.40	109.648	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-4.43	3.13	27.63	20.07	101.625	Vertical	Pass
		1732.5	-4.66	3.27	27.61	19.68	92.897	Vertical	Pass
		1752.5	-3.79	3.30	27.60	20.51	112.460	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-4.69	3.15	27.64	19.80	95.499	Vertical	Pass
		1732.5	-4.22	3.31	27.61	20.08	101.859	Vertical	Pass
		1750	-4.48	3.33	27.59	19.78	95.060	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-4.76	3.15	27.65	19.74	94.189	Vertical	Pass

Band		1732.5	-4.60	3.31	27.61	19.70	93.325	Vertical	Pass
QPSK		1747.5	-4.46	3.33	27.57	19.78	95.060	Vertical	Pass
20.0MHz	1/#Mid	1720	-4.33	3.17	27.66	20.16	103.753	Vertical	Pass
Band		1732.5	-3.73	3.32	27.61	20.56	113.763	Vertical	Pass
QPSK		1745	-3.86	3.36	27.56	20.34	108.143	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Factor 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	Antenna	Max.	Max.	Polarization	
			(dBm)	Loss	Factor	EIRP	EIRP	Of Max.	
				(dBm)	(dB)	Average	Average	ERP	
						(dBm)	(mW)		
1.4MHz	1/#Mid	1710.7	-4.25	3.12	27.58	20.21	104.954	Horizontal	Pass
Band 16		1732.5	-4.10	3.27	27.61	20.24	105.682	Horizontal	Pass
QAM		1754.3	-4.10	3.29	27.63	20.24	105.682	Horizontal	Pass
3.0MHz	1/#Mid	1711.5	-4.19	3.13	27.61	20.29	106.905	Horizontal	Pass
Band 16		1732.5	-4.32	3.27	27.61	20.02	100.462	Horizontal	Pass
QAM		1753.5	-4.54	3.30	27.62	19.78	95.060	Horizontal	Pass
5.0MHz	1/#Mid	1712.5	-4.02	3.13	27.63	20.48	111.686	Horizontal	Pass
Band 16		1732.5	-3.98	3.27	27.61	20.36	108.643	Horizontal	Pass
QAM		1752.5	-3.67	3.30	27.60	20.63	115.611	Horizontal	Pass
10.0MHz	1/#Mid	1715	-4.09	3.15	27.64	20.40	109.648	Horizontal	Pass
Band 16		1732.5	-4.28	3.31	27.61	20.02	100.462	Horizontal	Pass
QAM		1750	-3.66	3.33	27.59	20.60	114.815	Horizontal	Pass
15.0MHz	1/#Mid	1717.5	-3.89	3.15	27.65	20.61	115.080	Horizontal	Pass
Band 16		1732.5	-3.95	3.31	27.61	20.35	108.393	Horizontal	Pass
QAM		1747.5	-3.97	3.33	27.57	20.27	106.414	Horizontal	Pass
20.0MHz	1/#Mid	1720	-3.84	3.17	27.66	20.65	116.145	Horizontal	Pass
Band 16		1732.5	-3.85	3.32	27.61	20.44	110.662	Horizontal	Pass
QAM		1745	-3.66	3.36	27.56	20.54	113.240	Horizontal	Pass
1.4MHz	1/#Mid	1710.7	-5.69	3.12	27.58	18.77	75.336	Vertical	Pass
Band 16		1732.5	-5.46	3.27	27.61	18.88	77.268	Vertical	Pass
QAM		1754.3	-4.86	3.29	27.63	19.48	88.716	Vertical	Pass
3.0MHz	1/#Mid	1711.5	-5.06	3.13	27.61	19.42	87.498	Vertical	Pass
Band 16		1732.5	-5.04	3.27	27.61	19.30	85.114	Vertical	Pass
QAM		1753.5	-5.47	3.30	27.62	18.85	76.736	Vertical	Pass
5.0MHz	1/#Mid	1712.5	-5.59	3.13	27.63	18.91	77.804	Vertical	Pass
Band 16		1732.5	-5.66	3.27	27.61	18.68	73.790	Vertical	Pass
QAM		1752.5	-4.79	3.30	27.60	19.51	89.331	Vertical	Pass
10.0MHz	1/#Mid	1715	-5.35	3.15	27.64	19.14	82.035	Vertical	Pass
Band 16		1732.5	-5.20	3.31	27.61	19.10	81.283	Vertical	Pass
QAM		1750	-5.16	3.33	27.59	19.10	81.283	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-5.82	3.15	27.65	18.68	73.790	Vertical	Pass
Band 16		1732.5	-5.16	3.31	27.61	19.14	82.035	Vertical	Pass
QAM		1747.5	-4.69	3.33	27.57	19.55	90.157	Vertical	Pass

20.0MHz		1720	-5.40	3.17	27.66	19.09	81.096	Vertical	Pass
Band 16	1/#Mid	1732.5	-5.21	3.32	27.61	19.08	80.910	Vertical	Pass
QAM		1745	-4.66	3.36	27.56	19.54	89.950	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Factor 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	Cable	Antenna	Correction	Max. EIRP	Max.	Polarization	
			Level	Loss	Factor		EIRP	Of Max.		
			(dBm)	(dBm)	(dB)		Average	Average	ERP	
						(dB)	(dBm)	(mW)		
1.4MHz	Band 3/#Mid QPSK	824.7	5.86	2.01	19.68	2.15	21.38	137.404	Horizontal	Pass
		836.5	5.74	2.01	19.77	2.15	21.35	136.458	Horizontal	Pass
		848.3	5.54	2.02	19.82	2.15	21.19	131.522	Horizontal	Pass
3.0MHz	Band 1/#Mid QPSK	825.5	5.63	2.01	19.70	2.15	21.17	130.918	Horizontal	Pass
		836.5	5.53	2.01	19.77	2.15	21.14	130.017	Horizontal	Pass
		847.5	5.40	2.02	19.81	2.15	21.04	127.057	Horizontal	Pass
5.0MHz	Band 1/#Mid QPSK	826.5	5.91	2.01	19.71	2.15	21.46	139.959	Horizontal	Pass
		836.5	5.79	2.01	19.77	2.15	21.40	138.038	Horizontal	Pass
		846.5	5.63	2.02	19.79	2.15	21.25	133.352	Horizontal	Pass
10.0MHz	Band 1/#Mid QPSK	829	5.93	2.01	19.73	2.15	21.50	141.254	Horizontal	Pass
		836.5	5.88	2.01	19.77	2.15	21.49	140.929	Horizontal	Pass
		844	5.78	2.02	19.78	2.15	21.39	137.721	Horizontal	Pass
1.4MHz	Band 1/#Mid QPSK	824.7	4.71	2.01	19.68	2.15	20.23	105.439	Vertical	Pass
		836.5	4.64	2.01	19.77	2.15	20.25	105.925	Vertical	Pass
		848.3	4.95	2.02	19.82	2.15	20.60	114.815	Vertical	Pass
3.0MHz	Band 1/#Mid QPSK	825.5	4.89	2.01	19.70	2.15	20.43	110.408	Vertical	Pass
		836.5	4.90	2.01	19.77	2.15	20.51	112.460	Vertical	Pass
		847.5	4.97	2.02	19.81	2.15	20.61	115.080	Vertical	Pass
5.0MHz	Band 1/#Mid QPSK	826.5	4.89	2.01	19.71	2.15	20.44	110.662	Vertical	Pass
		836.5	4.62	2.01	19.77	2.15	20.23	105.439	Vertical	Pass
		846.5	4.49	2.02	19.79	2.15	20.11	102.565	Vertical	Pass
10.0MHz	Band 1/#Mid QPSK	829	4.78	2.01	19.73	2.15	20.35	108.393	Vertical	Pass
		836.5	4.31	2.01	19.77	2.15	19.92	98.175	Vertical	Pass
		844	4.85	2.02	19.78	2.15	20.46	111.173	Vertical	Pass

Radiated Power (ERP) for Band 5

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG	Cable	Antenna	Correction	Max. EIRP	Max.	Polarization	
			Level	Loss	Factor		EIRP	Of Max.		
			(dBm)	(dBm)	(dB)		Average	Average	ERP	
						(dB)	Average	Average		
							(dBm)	(mW)		
1.4MHz	3/#Mid	824.7	5.01	2.01	19.68	2.15	20.53	112.980	Horizontal	Pass
Band 16		836.5	4.94	2.01	19.77	2.15	20.55	113.501	Horizontal	Pass
QAM		848.3	4.78	2.02	19.82	2.15	20.43	110.408	Horizontal	Pass
3.0MHz	1/#Mid	825.5	5.09	2.01	19.70	2.15	20.63	115.611	Horizontal	Pass
Band 16		836.5	4.80	2.01	19.77	2.15	20.41	109.901	Horizontal	Pass
QAM		847.5	4.28	2.02	19.81	2.15	19.92	98.175	Horizontal	Pass
5.0MHz	1/#Mid	826.5	5.41	2.01	19.71	2.15	20.96	124.738	Horizontal	Pass
Band 16		836.5	5.18	2.01	19.77	2.15	20.79	119.950	Horizontal	Pass
QAM		846.5	4.93	2.02	19.79	2.15	20.55	113.501	Horizontal	Pass
10.0MHz	1/#Mid	829	5.41	2.01	19.73	2.15	20.98	125.314	Horizontal	Pass
Band 16		836.5	5.13	2.01	19.77	2.15	20.74	118.577	Horizontal	Pass
QAM		844	4.67	2.02	19.78	2.15	20.28	106.660	Horizontal	Pass
1.4MHz	1/#Mid	824.7	3.88	2.01	19.68	2.15	19.40	87.096	Vertical	Pass
Band 16		836.5	3.82	2.01	19.77	2.15	19.43	87.700	Vertical	Pass
QAM		848.3	3.34	2.02	19.82	2.15	18.99	79.250	Vertical	Pass
3.0MHz	1/#Mid	825.5	3.33	2.01	19.70	2.15	18.87	77.090	Vertical	Pass
Band 16		836.5	3.35	2.01	19.77	2.15	18.96	78.705	Vertical	Pass
QAM		847.5	3.38	2.02	19.81	2.15	19.02	79.799	Vertical	Pass
5.0MHz	1/#Mid	826.5	3.39	2.01	19.71	2.15	18.94	78.343	Vertical	Pass
Band 16		836.5	4.94	2.01	19.77	2.15	20.55	113.501	Vertical	Pass
QAM		846.5	4.10	2.02	19.79	2.15	19.72	93.756	Vertical	Pass
10.0MHz	1/#Mid	829	4.20	2.01	19.73	2.15	19.77	94.842	Vertical	Pass
Band 16		836.5	4.40	2.01	19.77	2.15	20.01	100.231	Vertical	Pass
QAM		844	3.51	2.02	19.78	2.15	19.12	81.658	Vertical	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

Max. EIRP Average (dBm)= Factor 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	Cable	Antenna	Max.	Max.	Polarization	
			Level	Loss	Factor	EIRP	EIRP	Of Max.	
			(dBm)	(dBm)	(dB)	Average	Average	ERP	
						(dBm)	(mW)		
5.0MHz	1/#Mid	2502.5	-1.72	4.54	27.75	21.49	140.929	Horizontal	Pass
Band		2535	-1.55	4.69	27.72	21.48	140.605	Horizontal	Pass
QPSK		2567.5	-1.48	4.71	27.71	21.52	141.906	Horizontal	Pass
10.0MHz	1/#Mid	2505	-1.65	4.55	27.76	21.56	143.219	Horizontal	Pass
Band		2535	-1.46	4.69	27.72	21.57	143.549	Horizontal	Pass
QPSK		2565	-1.38	4.72	27.70	21.60	144.544	Horizontal	Pass
15.0MHz	1/#Mid	2507.5	-1.66	4.55	27.77	21.56	143.219	Horizontal	Pass
Band		2535	-1.52	4.69	27.72	21.51	141.579	Horizontal	Pass
QPSK		2562.5	-1.42	4.72	27.69	21.55	142.889	Horizontal	Pass
20.0MHz	1/#Mid	2510	-1.60	4.57	27.78	21.61	144.877	Horizontal	Pass
Band		2535	-1.42	4.73	27.72	21.57	143.549	Horizontal	Pass
QPSK		2560	-1.38	4.75	27.68	21.55	142.889	Horizontal	Pass
5.0MHz	1/#Mid	2502.5	-2.97	4.54	27.75	20.24	105.682	Vertical	Pass
Band		2535	-2.85	4.69	27.72	20.18	104.232	Vertical	Pass
QPSK		2567.5	-2.70	4.71	27.71	20.30	107.152	Vertical	Pass
10.0MHz	1/#Mid	2505	-3.11	4.55	27.76	20.10	102.329	Vertical	Pass
Band		2535	-3.05	4.69	27.72	19.98	99.541	Vertical	Pass
QPSK		2565	-2.99	4.72	27.70	19.99	99.770	Vertical	Pass
15.0MHz	1/#Mid	2507.5	-3.13	4.55	27.77	20.09	102.094	Vertical	Pass
Band		2535	-2.63	4.69	27.72	20.40	109.648	Vertical	Pass
QPSK		2562.5	-2.75	4.72	27.69	20.22	105.196	Vertical	Pass
20.0MHz	1/#Mid	2510	-3.31	4.57	27.78	19.90	97.724	Vertical	Pass
Band		2535	-2.65	4.73	27.72	20.34	108.143	Vertical	Pass
QPSK		2560	-2.37	4.75	27.68	20.56	113.763	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	-2.41	4.54	27.75	20.80	120.226	Horizontal	Pass
Band 16		2535	-2.10	4.69	27.72	20.93	123.880	Horizontal	Pass
QAM		2567.5	-2.18	4.71	27.71	20.82	120.781	Horizontal	Pass
10.0MHz	1/#Mid	2505	-2.30	4.55	27.76	20.91	123.310	Horizontal	Pass
Band 16		2535	-2.31	4.69	27.72	20.72	118.032	Horizontal	Pass
QAM		2565	-2.58	4.72	27.70	20.40	109.648	Horizontal	Pass
15.0MHz	1/#Mid	2507.5	-2.48	4.55	27.77	20.74	118.577	Horizontal	Pass
Band 16		2535	-2.45	4.69	27.72	20.58	114.288	Horizontal	Pass
QAM		2562.5	-2.06	4.72	27.69	20.91	123.310	Horizontal	Pass
20.0MHz	1/#Mid	2510	-2.36	4.57	27.78	20.85	121.619	Horizontal	Pass
Band 16		2535	-2.03	4.73	27.72	20.96	124.738	Horizontal	Pass
QAM		2560	-2.13	4.75	27.68	20.80	120.226	Horizontal	Pass
5.0MHz	1/#Mid	2502.5	-4.26	4.54	27.75	18.95	78.524	Vertical	Pass
Band 16		2535	-4.00	4.69	27.72	19.03	79.983	Vertical	Pass
QAM		2567.5	-2.83	4.71	27.71	20.17	103.992	Vertical	Pass
10.0MHz	1/#Mid	2505	-3.75	4.55	27.76	19.46	88.308	Vertical	Pass
Band 16		2535	-3.46	4.69	27.72	19.57	90.573	Vertical	Pass
QAM		2565	-2.42	4.72	27.70	20.56	113.763	Vertical	Pass
15.0MHz	1/#Mid	2507.5	-2.76	4.55	27.77	20.46	111.173	Vertical	Pass
Band 16		2535	-2.54	4.69	27.72	20.49	111.944	Vertical	Pass
QAM		2562.5	-3.58	4.72	27.69	19.39	86.896	Vertical	Pass
20.0MHz	1/#Mid	2510	-3.12	4.57	27.78	20.09	102.094	Vertical	Pass
Band 16		2535	-4.30	4.73	27.72	18.69	73.961	Vertical	Pass
QAM		2560	-2.56	4.75	27.68	20.37	108.893	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Factor 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	Cable	Antenna	Correction	Max. EIRP	Max.	Polarization		
			Level	Loss	Factor		EIRP	Of Max.			
			(dBm)	(dBm)	(dB)		Average	Average	ERP		
						(dB)	(dBm)	(mW)			
1.4MHz	Band QPSK	1/#Mid	699.7	6.23	1.91	19.21	2.15	21.38	137.404	Vertical	Pass
		707.5	6.15	1.91	19.26	2.15	21.35	136.458	Vertical	Pass	
		715.3	5.93	1.93	19.34	2.15	21.19	131.522	Vertical	Pass	
3.0MHz	Band QPSK	1/#Mid	700.5	6.02	1.91	19.21	2.15	21.17	130.918	Vertical	Pass
		707.5	5.94	1.91	19.26	2.15	21.14	130.017	Vertical	Pass	
		714.5	5.78	1.93	19.34	2.15	21.04	127.057	Vertical	Pass	
5.0MHz	Band QPSK	1/#Mid	701.5	6.29	1.91	19.23	2.15	21.46	139.959	Vertical	Pass
		707.5	6.20	1.91	19.26	2.15	21.40	138.038	Vertical	Pass	
		713.5	5.99	1.92	19.33	2.15	21.25	133.352	Vertical	Pass	
10.0MHz	Band QPSK	1/#Mid	704	6.31	1.91	19.25	2.15	21.50	141.254	Vertical	Pass
		707.5	6.29	1.91	19.26	2.15	21.49	140.929	Vertical	Pass	
		711	6.14	1.92	19.32	2.15	21.39	137.721	Vertical	Pass	
1.4MHz	Band QPSK	1/#Mid	699.7	5.33	1.91	19.21	2.15	20.48	111.686	Horizontal	Pass
		707.5	5.36	1.91	19.26	2.15	20.56	113.763	Horizontal	Pass	
		715.3	4.49	1.93	19.34	2.15	19.75	94.406	Horizontal	Pass	
3.0MHz	Band QPSK	1/#Mid	700.5	4.66	1.91	19.21	2.15	19.81	95.719	Horizontal	Pass
		707.5	5.21	1.91	19.26	2.15	20.41	109.901	Horizontal	Pass	
		714.5	5.00	1.93	19.34	2.15	20.26	106.170	Horizontal	Pass	
5.0MHz	Band QPSK	1/#Mid	701.5	5.31	1.91	19.23	2.15	20.48	111.686	Horizontal	Pass
		707.5	4.81	1.91	19.26	2.15	20.01	100.231	Horizontal	Pass	
		713.5	4.78	1.92	19.33	2.15	20.04	100.925	Horizontal	Pass	
10.0MHz	Band QPSK	1/#Mid	704	5.42	1.91	19.25	2.15	20.61	115.080	Horizontal	Pass
		707.5	4.48	1.91	19.26	2.15	19.68	92.897	Horizontal	Pass	
		711	5.39	1.92	19.32	2.15	20.64	115.878	Horizontal	Pass	

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 Of Max.	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	ERP	
							(dBm)	(mW)		
1.4MHz	1/#Mid	699.7	6.35	1.91	19.21	2.15	21.50	141.254	Vertical	Pass
Band 16		707.5	6.27	1.91	19.26	2.15	21.47	140.281	Vertical	Pass
QAM		715.3	6.05	1.93	19.34	2.15	21.31	135.207	Vertical	Pass
3.0MHz	1/#Mid	700.5	6.14	1.91	19.21	2.15	21.29	134.586	Vertical	Pass
Band 16		707.5	6.06	1.91	19.26	2.15	21.26	133.660	Vertical	Pass
QAM		714.5	5.90	1.93	19.34	2.15	21.16	130.617	Vertical	Pass
5.0MHz	1/#Mid	701.5	6.41	1.91	19.23	2.15	21.58	143.880	Vertical	Pass
Band 16		707.5	6.32	1.91	19.26	2.15	21.52	141.906	Vertical	Pass
QAM		713.5	6.11	1.92	19.33	2.15	21.37	137.088	Vertical	Pass
10.0MHz	1/#Mid	704	6.43	1.91	19.25	2.15	21.62	145.211	Vertical	Pass
Band 16		707.5	6.41	1.91	19.26	2.15	21.61	144.877	Vertical	Pass
QAM		711	6.26	1.92	19.32	2.15	21.51	141.579	Vertical	Pass
1.4MHz	1/#Mid	699.7	4.93	1.91	19.21	2.15	20.08	101.859	Horizontal	Pass
Band 16		707.5	5.56	1.91	19.26	2.15	20.76	119.124	Horizontal	Pass
QAM		715.3	5.19	1.93	19.34	2.15	20.45	110.917	Horizontal	Pass
3.0MHz	1/#Mid	700.5	4.67	1.91	19.21	2.15	19.82	95.940	Horizontal	Pass
Band 16		707.5	4.72	1.91	19.26	2.15	19.92	98.175	Horizontal	Pass
QAM		714.5	4.85	1.93	19.34	2.15	20.11	102.565	Horizontal	Pass
5.0MHz	1/#Mid	701.5	5.51	1.91	19.23	2.15	20.68	116.950	Horizontal	Pass
Band 16		707.5	5.35	1.91	19.26	2.15	20.55	113.501	Horizontal	Pass
QAM		713.5	5.34	1.92	19.33	2.15	20.60	114.815	Horizontal	Pass
10.0MHz	1/#Mid	704	4.96	1.91	19.25	2.15	20.15	103.514	Horizontal	Pass
Band 16		707.5	5.03	1.91	19.26	2.15	20.23	105.439	Horizontal	Pass
QAM		711	4.66	1.92	19.32	2.15	19.91	97.949	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)

8.7 LTE BAND 13

Radiated Power (ERP) for Band 13										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG	Cable	Antenna		Max. EIRP	Max.	Polarization	
			Level	Loss	Factor	Correction		EIRP	Of Max.	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	ERP	
5.0MHz Band QPSK	25/0	779.5	6.34	1.91	19.23	2.15	21.51	141.58	Horizontal	Pass
		782	6.19	1.91	19.26	2.15	21.39	137.72	Horizontal	Pass
		784.5	5.04	1.92	19.33	2.15	20.30	107.15	Horizontal	Pass
10.0MHz Band QPSK	50/0	782	6.49	1.91	19.26	2.15	21.69	147.57	Horizontal	Pass
5.0MHz Band QPSK	25/0	779.5	4.69	1.91	19.23	2.15	19.86	96.83	Vertical	Pass
		782	4.87	1.91	19.26	2.15	20.07	101.62	Vertical	Pass
		784.5	5.19	1.92	19.33	2.15	20.45	110.92	Vertical	Pass
10.0MHz Band QPSK	50/0	782	5.20	1.91	19.26	2.15	20.40	109.65	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	6.22	1.91	19.23	2.15	21.39	137.72	Horizontal	Pass
Band 16		782	5.31	1.91	19.26	2.15	20.51	112.46	Horizontal	Pass
QAM		784.5	5.02	1.92	19.33	2.15	20.28	106.66	Horizontal	Pass
10.0MHz	50/0	782	6.21	1.91	19.26	2.15	21.41	138.36	Horizontal	Pass
Band 16										
QAM										
5.0MHz	25/0	779.5	5.29	1.91	19.23	2.15	20.46	111.17	Vertical	Pass
Band 16		782	4.69	1.91	19.26	2.15	19.89	97.50	Vertical	Pass
QAM		784.5	4.64	1.92	19.33	2.15	19.90	97.72	Vertical	Pass
10.0MHz	50/0	782	5.43	1.91	19.26	2.15	20.63	115.61	Vertical	Pass
Band 16										
QAM										

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

TYPE BAND 17

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG	Cable	Antenna	Correction	Max. EIRP	Max.	Polarization	
			Level	Loss	Factor		EIRP	Of Max.		
			(dBm)	(dBm)	(dB)		Average	Average	ERP	
						(dB)	(dBm)	(mW)		
5.0MHz	1/#Mid	706.5	6.69	1.91	19.23	2.15	21.86	153.462	Vertical	Pass
Band		710	6.55	1.91	19.26	2.15	21.75	149.624	Vertical	Pass
QPSK		713.5	6.45	1.92	19.33	2.15	21.71	148.252	Vertical	Pass
10.0MHz	1/#Mid	709	6.70	1.91	19.25	2.15	21.89	154.525	Vertical	Pass
Band		710	6.65	1.91	19.26	2.15	21.85	153.109	Vertical	Pass
QPSK		711	6.61	1.92	19.32	2.15	21.86	153.462	Vertical	Pass
5.0MHz	1/#Mid	706.5	6.11	1.91	19.23	2.15	21.28	134.276	Horizontal	Pass
Band		710	6.44	1.91	19.26	2.15	21.64	145.881	Horizontal	Pass
QPSK		713.5	5.28	1.92	19.33	2.15	20.54	113.240	Horizontal	Pass
10.0MHz	1/#Mid	709	5.97	1.91	19.25	2.15	21.16	130.617	Horizontal	Pass
Band		710	5.93	1.91	19.26	2.15	21.13	129.718	Horizontal	Pass
QPSK		711	4.57	1.92	19.32	2.15	19.82	95.940	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	
			(dBm)	(dBm)	(dB)		Average	Average	Of Max. ERP	
							(dBm)	(mW)		
5.0MHz	1/#Mid	706.5	6.28	1.91	19.23	2.15	21.45	139.637	Vertical	Pass
Band 16		710	6.19	1.91	19.26	2.15	21.39	137.721	Vertical	Pass
QAM		713.5	5.99	1.92	19.33	2.15	21.25	133.352	Vertical	Pass
10.0MHz	1/#Mid	709	5.82	1.91	19.25	2.15	21.01	126.183	Vertical	Pass
Band 16		710	6.35	1.91	19.26	2.15	21.55	142.889	Vertical	Pass
QAM		711	6.08	1.92	19.32	2.15	21.33	135.831	Vertical	Pass
5.0MHz	1/#Mid	706.5	5.05	1.91	19.23	2.15	20.22	105.196	Horizontal	Pass
Band 16		710	5.56	1.91	19.26	2.15	20.76	119.124	Horizontal	Pass
QAM		713.5	4.83	1.92	19.33	2.15	20.09	102.094	Horizontal	Pass
10.0MHz	1/#Mid	709	4.91	1.91	19.25	2.15	20.10	102.329	Horizontal	Pass
Band 16		710	4.75	1.91	19.26	2.15	19.95	98.855	Horizontal	Pass
QAM		711	5.02	1.92	19.32	2.15	20.27	106.414	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

8.9 LTE BAND 38

Radiated Power (EIRP) for Band 38									
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)		
5.0MHz Band QPSK	25/0	2572.5	-2.12	4.95	27.79	19.74	94.189	Vertical	Pass
		2595	-2.64	4.88	27.71	20.50	112.202	Vertical	Pass
		2617.5	-2.58	4.93	27.95	20.14	103.276	Vertical	Pass
5.0MHz Band 16 QAM	25/0	2572.5	-2.37	4.81	27.73	20.46	111.173	Vertical	Pass
		2595	-2.47	4.95	27.81	20.35	108.393	Vertical	Pass
		2617.5	-2.59	5.03	27.69	20.47	111.429	Vertical	Pass
10.0MHz Band QPSK	50/0	2575	-2.98	5.01	27.86	19.79	95.280	Vertical	Pass
		2595	-2.6	5	27.65	20.63	115.611	Vertical	Pass
		2615	-2.67	4.87	27.89	20.13	103.039	Vertical	Pass
10.0MHz Band 16 QAM	50/0	2575	-2.71	4.77	27.78	20.06	101.391	Vertical	Pass
		2595	-2.38	4.87	27.87	20.17	103.992	Vertical	Pass
		2615	-2.56	4.94	27.77	20.67	116.681	Vertical	Pass
15.0MHz Band QPSK	75/0	2577.5	-2.9	4.89	27.88	19.99	99.770	Vertical	Pass
		2595	-2.32	4.87	27.84	20.23	105.439	Vertical	Pass
		2612.5	-2.52	4.92	27.93	19.89	97.499	Vertical	Pass
15.0MHz Band 16 QAM	75/0	2577.5	-2.53	4.75	27.78	20.16	103.753	Vertical	Pass
		2595	-2.53	4.98	27.82	20.52	112.720	Vertical	Pass
		2612.5	-2.6	4.95	27.83	20.26	106.170	Vertical	Pass
20.0MHz Band QPSK	100/0	2580	-2.53	4.86	27.8	20.55	113.501	Vertical	Pass
		2595	-2.37	4.79	27.83	21.32	135.519	Vertical	Pass
		2610	-2.68	4.89	27.87	19.93	98.401	Vertical	Pass
20.0MHz Band 16 QAM	100/0	2580	-2.87	4.95	27.73	20.56	113.763	Vertical	Pass
		2595	-2.88	4.91	27.71	20.51	112.460	Vertical	Pass
		2610	-2.81	4.96	27.92	20.27	106.414	Vertical	Pass

Radiated Power (EIRP) for Band 38									
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)		
5.0MHz	25/0	2572.5	-2.12	4.95	27.79	20.12	102.802	Horizontal	Pass
Band		2595	-2.64	4.88	27.71	20.54	113.240	Horizontal	Pass
QPSK		2617.5	-2.58	4.93	27.95	20.32	107.647	Horizontal	Pass
5.0MHz	25/0	2572.5	-2.37	4.81	27.73	19.87	97.051	Horizontal	Pass
Band 16		2595	-2.47	4.95	27.81	20.19	104.472	Horizontal	Pass
QAM		2617.5	-2.59	5.03	27.69	19.83	96.161	Horizontal	Pass
10.0MHz	50/0	2575	-2.98	5.01	27.86	20.08	101.859	Horizontal	Pass
Band		2595	-2.6	5	27.65	19.70	93.325	Horizontal	Pass
QPSK		2615	-2.67	4.87	27.89	20.26	106.170	Horizontal	Pass
10.0MHz	50/0	2575	-2.71	4.77	27.78	20.29	106.905	Horizontal	Pass
Band 16		2595	-2.38	4.87	27.87	19.85	96.605	Horizontal	Pass
QAM		2615	-2.56	4.94	27.77	19.73	93.972	Horizontal	Pass
15.0MHz	75/0	2577.5	-2.9	4.89	27.88	20.65	116.145	Horizontal	Pass
Band		2595	-2.32	4.87	27.84	20.65	116.145	Horizontal	Pass
QPSK		2612.5	-2.52	4.92	27.93	19.96	99.083	Horizontal	Pass
15.0MHz	75/0	2577.5	-2.53	4.75	27.78	19.92	98.175	Horizontal	Pass
Band 16		2595	-2.53	4.98	27.82	20.66	116.413	Horizontal	Pass
QAM		2612.5	-2.6	4.95	27.83	19.85	96.605	Horizontal	Pass
20.0MHz	100/0	2580	-2.53	4.86	27.8	19.67	92.683	Horizontal	Pass
Band		2595	-2.37	4.79	27.83	21.27	133.968	Horizontal	Pass
QPSK		2610	-2.68	4.89	27.87	19.86	96.828	Horizontal	Pass
20.0MHz	100/0	2580	-2.87	4.95	27.73	20.42	110.154	Horizontal	Pass
Band 16		2595	-2.88	4.91	27.71	21.37	137.088	Horizontal	Pass
QAM		2610	-2.81	4.96	27.92	20.18	104.232	Horizontal	Pass

Note:

SG Level= Signal generator output

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

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

8.10 LTE BAND 66

Radiated Power (EIRP) for Band 66									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
				Loss					
				(dBm)					
1.4MHz Band QPSK	1/#Mid	1710.7	-3.05	3.76	28.24	21.43	138.995	Horizontal	Pass
1745		-2.91	3.91	28.22	21.40	138.038	Horizontal	Pass	
1779.3		-2.78	3.93	28.2	21.49	140.929	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	1711.5	-3.11	3.77	28.23	21.35	136.458	Horizontal	Pass
1745		-3.02	3.91	28.24	21.31	135.207	Horizontal	Pass	
1778.5		-3.04	3.94	28.25	21.27	133.968	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	1712.5	-3.01	3.77	28.31	21.53	142.233	Horizontal	Pass
1745		-2.69	3.91	28.22	21.62	145.211	Horizontal	Pass	
1777.5		-2.75	3.94	28.2	21.51	141.579	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	1715	-2.90	3.79	28.33	21.64	145.881	Horizontal	Pass
1745		-2.63	3.95	28.22	21.64	145.881	Horizontal	Pass	
1775		-2.64	3.97	28.19	21.58	143.880	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	1717.5	-2.92	3.79	28.34	21.63	145.546	Horizontal	Pass
1745		-2.73	3.95	28.22	21.54	142.561	Horizontal	Pass	
1772.5		-2.68	3.97	28.18	21.53	142.233	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	1720	-2.89	3.81	28.35	21.65	146.218	Horizontal	Pass
1745		-2.63	3.96	28.22	21.63	145.546	Horizontal	Pass	
1770		-2.65	4	28.16	21.51	141.579	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	1710.7	-4.48	3.76	28.24	20.00	100.000	Vertical	Pass
1745		-3.73	3.91	28.22	20.58	114.288	Vertical	Pass	
1779.3		-3.73	3.93	28.2	20.54	113.240	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	1711.5	-4.06	3.77	28.23	20.40	109.648	Vertical	Pass
1745		-3.64	3.91	28.24	20.69	117.220	Vertical	Pass	
1778.5		-3.71	3.94	28.25	20.60	114.815	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	1712.5	-4.00	3.77	28.31	20.54	113.240	Vertical	Pass
1745		-4.29	3.91	28.22	20.02	100.462	Vertical	Pass	
1777.5		-3.95	3.94	28.2	20.31	107.399	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	1715	-3.65	3.79	28.34	20.90	123.027	Vertical	Pass
1745		-3.54	3.95	28.22	20.73	118.304	Vertical	Pass	
1775		-3.57	3.97	28.18	20.64	115.878	Vertical	Pass	

15.0MHz	1/#Mid	1717.5	-3.79	3.81	28.35	20.75	118.850	Vertical	Pass
Band		1745	-4.00	3.96	28.22	20.26	106.170	Vertical	Pass
QPSK		1772.5	-3.64	4	28.16	20.52	112.720	Vertical	Pass
20.0MHz	1/#Mid	1720	-4.01	3.79	28.34	20.54	113.240	Vertical	Pass
Band		1745	-3.66	3.95	28.22	20.61	115.080	Vertical	Pass
QPSK		1770	-3.42	3.97	28.18	20.79	119.950	Vertical	Pass

Radiated Power (EIRP) for Band 66									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP	Polarization Of Max. ERP	
							(mW)		
1.4MHz Band 16 QAM	1/#Mid	1710.7	-4.07	3.76	28.24	20.41	109.901	Horizontal	Pass
1745		-3.68	3.91	28.22	20.63	115.611	Horizontal	Pass	
1779.3		-3.86	3.93	28.2	20.41	109.901	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	1711.5	-4.46	3.77	28.23	20.00	100.000	Horizontal	Pass
1745		-3.71	3.91	28.24	20.62	115.345	Horizontal	Pass	
1778.5		-4.00	3.94	28.25	20.31	107.399	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	1712.5	-3.88	3.77	28.31	20.66	116.413	Horizontal	Pass
1745		-3.94	3.91	28.22	20.37	108.893	Horizontal	Pass	
1777.5		-3.61	3.94	28.2	20.65	116.145	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	1715	-3.93	3.79	28.33	20.61	115.080	Horizontal	Pass
1745		-3.59	3.95	28.22	20.68	116.950	Horizontal	Pass	
1775		-3.91	3.97	28.19	20.31	107.399	Horizontal	Pass	
15.0MHz Band 16 QAM	1/#Mid	1717.5	-3.92	3.79	28.34	20.63	115.611	Horizontal	Pass
1745		-3.74	3.95	28.22	20.53	112.980	Horizontal	Pass	
1772.5		-3.53	3.97	28.18	20.68	116.950	Horizontal	Pass	
20.0MHz Band 16 QAM	1/#Mid	1720	-3.75	3.81	28.35	20.79	119.950	Horizontal	Pass
1745		-3.53	3.96	28.22	20.73	118.304	Horizontal	Pass	
1770		-3.47	4	28.16	20.69	117.220	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	1710.7	-3.99	3.76	28.24	20.49	111.944	Vertical	Pass
1745		-4.28	3.91	28.22	20.03	100.693	Vertical	Pass	
1779.3		-3.58	3.93	28.2	20.69	117.220	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	1711.5	-3.86	3.77	28.23	20.60	114.815	Vertical	Pass
1745		-4.46	3.91	28.24	19.87	97.051	Vertical	Pass	
1778.5		-4.46	3.94	28.25	19.85	96.605	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	1712.5	-5.39	3.77	28.31	19.15	82.224	Vertical	Pass
1745		-4.68	3.91	28.22	19.63	91.833	Vertical	Pass	
1777.5		-4.14	3.94	28.2	20.12	102.802	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	1715	-4.31	3.79	28.34	20.24	105.682	Vertical	Pass
1745		-4.98	3.95	28.22	19.29	84.918	Vertical	Pass	
1775		-4.95	3.97	28.18	19.26	84.333	Vertical	Pass	
15.0MHz Band 16	1/#Mid	1717.5	-4.28	3.81	28.35	20.26	106.170	Vertical	Pass
1745		-3.93	3.96	28.22	20.33	107.895	Vertical	Pass	

QAM		1772.5	-3.78	4	28.16	20.38	109.144	Vertical	Pass
20.0MHz	1/#Mid	1720	-4.73	3.79	28.34	19.82	95.940	Vertical	Pass
Band 16		1745	-4.33	3.95	28.22	19.94	98.628	Vertical	Pass
QAM		1770	-5.04	3.97	28.18	19.17	82.604	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

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

LIMIT

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

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

TEST PROCEDURE

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

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

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

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

- a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than $43 + 10 \log_{10}(p)$, 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 7
- LTE Band 12
- LTE Band 13
- LTE Band 17
- LTE Band 38
- LTE Band 66

RESULTS

PASS

9.1 LTE BAND 2

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

Test Results for Low Channel 1850.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3701.4	-49.28	4.04	33.51	-19.81	-13	-6.81	Horizontal
3701.4	-50.53	4.04	33.51	-21.06	-13	-8.06	Vertical
5552.1	-51.23	5.24	35.84	-20.63	-13	-7.63	Vertical
5552.1	-51.97	5.24	35.84	-21.37	-13	-8.37	Horizontal
183.9	-36.77	1.43	16.02	-22.18	-13	-9.18	Vertical
349.5	-34.60	1.30	17.99	-17.91	-13	-4.91	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-53.02	4.04	33.56	-23.50	-13	-10.50	Horizontal
3760.0	-49.99	4.04	33.56	-20.47	-13	-7.47	Vertical
5640.0	-52.02	5.24	35.91	-21.35	-13	-8.35	Vertical
5640.0	-49.65	5.24	35.91	-18.98	-13	-5.98	Horizontal
210.5	-35.60	1.62	16.97	-20.25	-13	-7.25	Vertical
240.7	-44.45	1.74	15.98	-30.22	-13	-17.22	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-53.73	4.04	34.00	-23.77	-13	-10.77	Horizontal
3818.6	-53.22	4.04	34.00	-23.26	-13	-10.26	Vertical
5727.9	-48.81	5.24	36.04	-18.01	-13	-5.01	Vertical
5727.9	-51.63	5.24	36.04	-20.83	-13	-7.83	Horizontal
190.9	-37.73	1.42	17.29	-21.86	-13	-8.86	Vertical
283.6	-40.69	1.50	17.90	-24.28	-13	-11.28	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	-47.81	4.07	33.54	-18.34	-13	-5.34	Horizontal
3720.0	-49.77	4.07	33.54	-20.30	-13	-7.30	Vertical
5580.0	-47.89	5.28	35.86	-17.31	-13	-4.31	Vertical
5580.0	-53.43	5.28	35.86	-22.85	-13	-9.85	Horizontal
190.7	-39.07	1.58	16.89	-23.75	-13	-10.75	Vertical
454.1	-44.31	1.76	17.26	-28.81	-13	-15.81	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-47.27	4.04	33.56	-17.75	-13	-4.75	Horizontal
3760.0	-49.33	4.04	33.56	-19.81	-13	-6.81	Vertical
5640.0	-49.76	5.24	35.91	-19.09	-13	-6.09	Vertical
5640.0	-52.06	5.24	35.91	-21.39	-13	-8.39	Horizontal
183.1	-42.05	1.46	16.27	-27.24	-13	-14.24	Vertical
300.5	-38.01	1.59	15.15	-24.45	-13	-11.45	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-47.75	4.04	34.00	-17.79	-13	-4.79	Horizontal
3800.0	-53.00	4.04	34.00	-23.04	-13	-10.04	Vertical
5700.0	-53.41	5.24	36.04	-22.61	-13	-9.61	Vertical
5700.0	-53.77	5.24	36.04	-22.97	-13	-9.97	Horizontal
199.8	-36.63	1.36	17.39	-20.59	-13	-7.59	Vertical
336.9	-37.31	1.66	15.39	-23.58	-13	-10.58	Horizontal

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	-47.69	4.02	29.80	-21.91	-13	-8.91	Horizontal
3421.4	-44.83	4.02	29.80	-19.05	-13	-6.05	Vertical
5132.1	-51.59	5.24	35.84	-20.99	-13	-7.99	Vertical
5132.1	-52.76	5.24	35.84	-22.16	-13	-9.16	Horizontal
211.3	-39.77	1.68	16.04	-25.41	-13	-12.41	Vertical
280.2	-39.02	1.78	17.74	-23.06	-13	-10.06	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-50.35	4.03	30.00	-24.38	-13	-11.38	Horizontal
3465.0	-50.37	4.03	30.00	-24.40	-13	-11.40	Vertical
5197.5	-48.64	5.25	35.86	-18.03	-13	-5.03	Vertical
5197.5	-52.48	5.25	35.86	-21.87	-13	-8.87	Horizontal
202.2	-41.10	1.72	17.69	-25.13	-13	-12.13	Vertical
466.4	-40.30	1.62	16.02	-25.89	-13	-12.89	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-52.55	4.05	30.01	-26.59	-13	-13.59	Horizontal
3508.6	-45.11	4.05	30.01	-19.15	-13	-6.15	Vertical
5262.9	-52.70	5.26	35.86	-22.10	-13	-9.10	Vertical
5262.9	-53.29	5.26	35.86	-22.69	-13	-9.69	Horizontal
189.9	-37.87	1.80	16.69	-22.98	-13	-9.98	Vertical
409.0	-43.40	1.75	16.66	-28.50	-13	-15.50	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	-46.07	4.02	29.80	-20.29	-13	-7.29	Horizontal
3440.0	-46.98	4.02	29.80	-21.20	-13	-8.20	Vertical
5160.0	-53.54	5.24	35.84	-22.94	-13	-9.94	Vertical
5160.0	-49.92	5.24	35.84	-19.32	-13	-6.32	Horizontal
201.4	-40.49	1.57	17.26	-24.80	-13	-11.80	Vertical
330.3	-41.34	1.78	16.35	-26.77	-13	-13.77	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-45.71	4.03	30.00	-19.74	-13	-6.74	Horizontal
3465.0	-53.77	4.03	30.00	-27.80	-13	-14.80	Vertical
5197.5	-51.02	5.25	35.86	-20.41	-13	-7.41	Vertical
5197.5	-53.63	5.25	35.86	-23.02	-13	-10.02	Horizontal
187.0	-44.23	1.44	17.95	-27.72	-13	-14.72	Vertical
243.9	-35.83	1.65	16.09	-21.39	-13	-8.39	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-53.25	2.91	27.68	-28.48	-13	-15.48	Horizontal
3490.0	-47.87	2.91	27.68	-23.10	-13	-10.10	Vertical
5235.0	-49.61	5.26	35.86	-19.01	-13	-6.01	Vertical
5235.0	-51.73	5.26	35.86	-21.13	-13	-8.13	Horizontal
195.5	-34.05	1.61	16.85	-18.81	-13	-5.81	Vertical
247.8	-36.95	1.61	15.19	-23.37	-13	-10.37	Horizontal

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	-51.21	2.78	27.50	-26.49	-13	-13.49	Horizontal
1649.4	-52.81	2.78	27.50	-28.09	-13	-15.09	Vertical
2474.1	-46.90	2.90	27.80	-22.00	-13	-9.00	Vertical
2474.1	-53.14	2.90	27.80	-28.24	-13	-15.24	Horizontal
175.7	-35.83	1.76	17.59	-20.00	-13	-7.00	Vertical
273.6	-39.14	1.63	15.87	-24.90	-13	-11.90	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-46.77	2.80	27.48	-22.09	-13	-9.09	Horizontal
1673.0	-52.36	2.80	27.48	-27.68	-13	-14.68	Vertical
2509.5	-44.82	2.91	27.70	-20.03	-13	-7.03	Vertical
2509.5	-50.14	2.91	27.70	-25.35	-13	-12.35	Horizontal
197.6	-42.42	1.61	15.68	-28.35	-13	-15.35	Vertical
235.2	-38.16	1.59	17.52	-22.24	-13	-9.24	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-53.41	2.82	27.43	-28.80	-13	-15.80	Horizontal
1696.6	-48.54	2.82	27.43	-23.93	-13	-10.93	Vertical
2544.9	-53.74	2.92	27.74	-28.92	-13	-15.92	Vertical
2544.9	-53.01	2.92	27.74	-28.19	-13	-15.19	Horizontal
193.5	-44.45	1.69	16.67	-29.46	-13	-16.46	Vertical
285.1	-40.41	1.70	17.18	-24.93	-13	-11.93	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	-52.16	2.78	27.50	-27.44	-13	-14.44	Horizontal
1658.0	-53.92	2.78	27.50	-29.20	-13	-16.20	Vertical
2487.0	-53.85	2.90	27.80	-28.95	-13	-15.95	Vertical
2487.0	-53.70	2.90	27.80	-28.80	-13	-15.80	Horizontal
181.5	-37.64	1.71	15.57	-23.78	-13	-10.78	Vertical
261.0	-43.57	1.34	16.40	-28.51	-13	-15.51	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-53.45	2.80	27.48	-28.77	-13	-15.77	Horizontal
1673.0	-49.86	2.80	27.48	-25.18	-13	-12.18	Vertical
2509.5	-53.91	2.91	27.70	-29.12	-13	-16.12	Vertical
2509.5	-51.41	2.91	27.70	-26.62	-13	-13.62	Horizontal
186.0	-39.97	1.44	17.04	-24.37	-13	-11.37	Vertical
448.6	-37.12	1.76	17.62	-21.26	-13	-8.26	Horizontal
Test Results for High Channel 844MHz							
1688.0	-52.01	2.82	27.43	-27.40	-13	-14.40	Horizontal
1688.0	-52.38	2.82	27.43	-27.77	-13	-14.77	Vertical
2532.0	-47.88	2.92	27.74	-23.06	-13	-10.06	Vertical
2532.0	-49.44	2.92	27.74	-24.62	-13	-11.62	Horizontal
187.8	-38.55	1.74	17.70	-22.59	-13	-9.59	Vertical
449.2	-38.70	1.41	17.46	-22.64	-13	-9.64	Horizontal

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	-61.46	5.23	35.81	-30.88	-25	-5.88	Horizontal
5005.0	-63.87	5.23	35.81	-33.29	-25	-8.29	Vertical
7507.5	-61.89	5.67	36.85	-30.71	-25	-5.71	Vertical
7507.5	-61.11	5.67	36.85	-29.93	-25	-4.93	Horizontal
196.9	-51.83	1.73	17.97	-35.59	-25	-10.59	Vertical
388.4	-50.14	1.38	15.11	-36.41	-25	-11.41	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.31	5.23	35.82	-30.72	-25	-5.72	Horizontal
5070.0	-62.04	5.23	35.82	-31.45	-25	-6.45	Vertical
7605.0	-63.44	5.67	36.85	-32.26	-25	-7.26	Vertical
7605.0	-63.05	5.67	36.85	-31.87	-25	-6.87	Horizontal
184.9	-49.38	1.77	16.17	-34.97	-25	-9.97	Vertical
353.5	-49.66	1.63	15.21	-36.08	-25	-11.08	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-64.49	5.24	35.83	-33.90	-25	-8.90	Horizontal
5135.0	-64.07	5.24	35.83	-33.48	-25	-8.48	Vertical
7702.5	-62.81	5.68	36.87	-31.62	-25	-6.62	Vertical
7702.5	-61.80	5.68	36.87	-30.61	-25	-5.61	Horizontal
196.8	-53.83	1.58	17.56	-37.85	-25	-12.85	Vertical
448.9	-45.38	1.45	16.58	-30.25	-25	-5.25	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	-64.94	5.23	35.82	-34.35	-25	-9.35	Horizontal
5020.0	-63.04	5.23	35.82	-32.45	-25	-7.45	Vertical
7530.0	-59.85	5.67	36.86	-28.66	-25	-3.66	Vertical
7530.0	-63.63	5.67	36.86	-32.44	-25	-7.44	Horizontal
187.7	-45.18	1.63	15.76	-31.05	-25	-6.05	Vertical
282.4	-46.22	1.71	15.44	-32.49	-25	-7.49	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-60.94	5.23	35.82	-30.35	-25	-5.35	Horizontal
5070.0	-63.14	5.23	35.82	-32.55	-25	-7.55	Vertical
7605.0	-60.40	5.67	36.85	-29.22	-25	-4.22	Vertical
7605.0	-59.80	5.67	36.85	-28.62	-25	-3.62	Horizontal
183.8	-52.65	1.79	16.84	-37.59	-25	-12.59	Vertical
268.2	-46.71	1.71	17.64	-30.78	-25	-5.78	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-63.03	5.24	35.83	-32.44	-25	-7.44	Horizontal
5120.0	-63.22	5.24	35.83	-32.63	-25	-7.63	Vertical
7680.0	-62.83	5.70	36.88	-31.65	-25	-6.65	Vertical
7680.0	-62.02	5.70	36.88	-30.84	-25	-5.84	Horizontal
202.7	-45.51	1.79	16.84	-30.45	-25	-5.45	Vertical
367.1	-45.18	1.71	17.64	-29.25	-25	-4.25	Horizontal

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	-47.06	2.60	27.20	-22.46	-13	-9.46	Horizontal
1399.4	-51.59	2.60	27.20	-26.99	-13	-13.99	Vertical
2099.1	-53.51	2.85	27.54	-28.82	-13	-15.82	Vertical
2099.1	-50.94	2.85	27.54	-26.25	-13	-13.25	Horizontal
203.8	-36.42	1.49	17.78	-20.13	-13	-7.13	Vertical
422.7	-39.21	1.36	17.33	-23.24	-13	-10.24	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-48.31	2.61	27.28	-23.64	-13	-10.64	Horizontal
1415.0	-52.81	2.61	27.28	-28.14	-13	-15.14	Vertical
2122.5	-50.88	2.87	27.59	-26.16	-13	-13.16	Vertical
2122.5	-51.89	2.87	27.59	-27.17	-13	-14.17	Horizontal
209.6	-43.34	1.73	15.74	-29.33	-13	-16.33	Vertical
438.8	-44.23	1.62	15.79	-30.06	-13	-17.06	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-50.24	2.63	27.28	-25.59	-13	-12.59	Horizontal
1430.6	-52.18	2.63	27.28	-27.53	-13	-14.53	Vertical
2145.9	-50.50	2.88	27.60	-25.78	-13	-12.78	Vertical
2145.9	-52.50	2.88	27.60	-27.78	-13	-14.78	Horizontal
197.8	-37.62	1.61	18.00	-21.23	-13	-8.23	Vertical
300.4	-40.38	1.45	15.49	-26.35	-13	-13.35	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	-52.73	2.61	27.26	-28.08	-13	-15.08	Horizontal
1408.0	-46.44	2.61	27.26	-21.79	-13	-8.79	Vertical
2112.0	-47.76	2.87	27.58	-23.05	-13	-10.05	Vertical
2112.0	-49.79	2.87	27.58	-25.08	-13	-12.08	Horizontal
204.5	-36.33	1.31	16.97	-20.67	-13	-7.67	Vertical
233.6	-39.19	1.65	16.70	-24.14	-13	-11.14	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-49.97	2.61	27.28	-25.30	-13	-12.30	Horizontal
1415.0	-52.82	2.61	27.28	-28.15	-13	-15.15	Vertical
2122.5	-46.11	2.87	27.59	-21.39	-13	-8.39	Vertical
2122.5	-53.83	2.87	27.59	-29.11	-13	-16.11	Horizontal
208.2	-42.99	1.72	17.99	-26.72	-13	-13.72	Vertical
302.7	-37.71	1.73	17.94	-21.50	-13	-8.50	Horizontal
Test Results for High Channel 711MHz							
1422.0	-47.23	2.62	27.28	-22.57	-13	-9.57	Horizontal
1422.0	-50.84	2.62	27.28	-26.18	-13	-13.18	Vertical
2133.0	-51.93	2.87	27.60	-27.20	-13	-14.20	Vertical
2133.0	-49.67	2.87	27.60	-24.94	-13	-11.94	Horizontal
195.6	-34.46	1.58	15.93	-20.11	-13	-7.11	Vertical
457.9	-37.66	1.36	15.59	-23.43	-13	-10.43	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

9.6 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	-74.93	2.61	27.28	-50.26	-40	-10.26	Horizontal
1559.0	-74.78	2.61	27.28	-50.11	-40	-10.11	Vertical
2338.5	-42.88	2.87	27.59	-18.16	-13	-5.16	Vertical
2338.5	-44.83	2.87	27.59	-20.11	-13	-7.11	Horizontal
120.1	-36.58	1.54	15.61	-22.51	-13	-9.51	Vertical
197.8	-36.93	1.51	15.21	-23.23	-13	-10.23	Horizontal
Test Results For Mid Channel 782MHz							
1564.0	-72.28	2.62	27.30	-47.60	-40	-7.60	Horizontal
1564.0	-71.76	2.62	27.30	-47.08	-40	-7.08	Vertical
2346.0	-42.98	2.87	27.62	-18.23	-13	-5.23	Vertical
2346.0	-41.73	2.87	27.62	-16.98	-13	-3.98	Horizontal
131.2	-38.10	1.65	16.17	-23.58	-13	-10.58	Vertical
267.5	-38.96	1.48	16.88	-23.56	-13	-10.56	Horizontal
Test Results for High Channel 784.5MHz							
1569.0	-72.95	2.66	27.28	-48.33	-40	-8.33	Horizontal
1569.0	-70.84	2.66	27.28	-46.22	-40	-6.22	Vertical
2353.5	-43.57	2.88	27.60	-18.85	-13	-5.85	Vertical
2353.5	-39.03	2.88	27.60	-14.31	-13	-1.31	Horizontal
80.8	-38.82	1.54	16.40	-23.96	-13	-10.96	Vertical
155.6	-39.17	1.43	15.77	-24.83	-13	-11.83	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	-70.53	2.62	27.30	-45.85	-40	-5.85	Horizontal
1564.0	-73.48	2.62	27.30	-48.80	-40	-8.80	Vertical
2346.0	-41.96	2.87	27.62	-17.21	-13	-4.21	Vertical
2346.0	-45.30	2.87	27.62	-20.55	-13	-7.55	Horizontal
129.1	-38.49	1.43	17.03	-22.89	-13	-9.89	Vertical
86.9	-34.70	1.62	16.63	-19.69	-13	-6.69	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	-53.75	2.61	27.28	-29.08	-13	-16.08	Horizontal
1413.0	-52.85	2.61	27.28	-28.18	-13	-15.18	Vertical
2119.5	-48.28	2.87	27.59	-23.56	-13	-10.56	Vertical
2119.5	-52.10	2.87	27.59	-27.38	-13	-14.38	Horizontal
175.7	-38.38	1.71	16.15	-23.94	-13	-10.94	Vertical
232.5	-40.34	1.41	17.32	-24.43	-13	-11.43	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-53.22	2.62	27.30	-28.54	-13	-15.54	Horizontal
1420.0	-50.77	2.62	27.30	-26.09	-13	-13.09	Vertical
2130.0	-49.40	2.87	27.62	-24.65	-13	-11.65	Vertical
2130.0	-50.37	2.87	27.62	-25.62	-13	-12.62	Horizontal
199.7	-43.94	1.42	15.25	-30.12	-13	-17.12	Vertical
421.0	-39.68	1.36	17.19	-23.85	-13	-10.85	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-53.49	2.66	27.28	-28.87	-13	-15.87	Horizontal
1427.0	-47.72	2.66	27.28	-23.10	-13	-10.10	Vertical
2140.5	-44.29	2.88	27.60	-19.57	-13	-6.57	Vertical
2140.5	-51.25	2.88	27.60	-26.53	-13	-13.53	Horizontal
190.8	-42.83	1.32	17.29	-26.86	-13	-13.86	Vertical
415.6	-40.59	1.72	16.89	-25.42	-13	-12.42	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	-50.87	2.62	27.30	-26.19	-13	-13.19	Horizontal
1418.0	-52.05	2.62	27.30	-27.37	-13	-14.37	Vertical
2127.0	-46.29	2.87	27.62	-21.54	-13	-8.54	Vertical
2127.0	-52.71	2.87	27.62	-27.96	-13	-14.96	Horizontal
188.4	-39.89	1.35	16.91	-24.33	-13	-11.33	Vertical
447.8	-38.66	1.62	16.31	-23.97	-13	-10.97	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-45.22	2.62	27.30	-20.54	-13	-7.54	Horizontal
1420.0	-50.45	2.62	27.30	-25.77	-13	-12.77	Vertical
2130.0	-48.17	2.87	27.62	-23.42	-13	-10.42	Vertical
2130.0	-50.90	2.87	27.62	-26.15	-13	-13.15	Horizontal
184.1	-41.91	1.51	17.14	-26.28	-13	-13.28	Vertical
243.9	-43.04	1.77	16.88	-27.93	-13	-14.93	Horizontal
Test Results for High Channel 711MHz							
1422.0	-51.97	2.62	27.30	-27.29	-13	-14.29	Horizontal
1422.0	-45.20	2.62	27.30	-20.52	-13	-7.52	Vertical
2133.0	-52.49	2.87	27.62	-27.74	-13	-14.74	Vertical
2133.0	-51.80	2.87	27.62	-27.05	-13	-14.05	Horizontal
190.7	-35.11	1.78	15.95	-20.94	-13	-7.94	Vertical
452.9	-44.15	1.34	17.95	-27.55	-13	-14.55	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.

9.8 LTE BAND 38

QPSK EIRP POWER FOR LTE BAND 38 (5MHZ BANDWIDTH)

Test Results for Low Channel 2572.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5145	-52.58	4.01	27.5	-29.09	-25	-4.09	Horizontal
5145	-51.84	4.01	27.5	-28.35	-25	-3.35	Vertical
7717.5	-53.36	5.09	27.8	-30.65	-25	-5.65	Vertical
7717.5	-55.45	5.09	27.8	-32.74	-25	-7.74	Horizontal
Test Results For Mid Channel 2595MHz							
5190	-51.39	4.1	27.48	-28.01	-25	-3.01	Horizontal
5190	-54.33	4.1	27.48	-30.95	-25	-5.95	Vertical
7785	-52.23	5.42	27.7	-29.95	-25	-4.95	Vertical
7785	-52.81	5.42	27.7	-30.53	-25	-5.53	Horizontal
Test Results for High Channel 2617.5MHz							
5234	-54.24	4.11	27.43	-30.92	-25	-5.92	Horizontal
5234	-53.76	4.11	27.43	-30.44	-25	-5.44	Vertical
7851	-53.65	5.31	27.74	-31.22	-25	-6.22	Vertical
7851	-52.46	5.31	27.74	-30.03	-25	-5.03	Horizontal

QPSK EIRP POWER FOR LTE BAND 38 (20MHZ BANDWIDTH)

Test Results for Low Channel 2580MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5160	-52.03	3.89	27.5	-28.42	-25	-3.42	Horizontal
5160	-53.07	3.89	27.5	-29.46	-25	-4.46	Vertical
7740	-50.69	5.33	27.8	-28.22	-25	-3.22	Vertical
7740	-53.35	5.33	27.8	-30.88	-25	-5.88	Horizontal
Test Results for Mid Channel 2595MHz							
5190	-51.82	4.1	27.48	-28.44	-25	-3.44	Horizontal
5190	-55.25	4.1	27.48	-31.87	-25	-6.87	Vertical
7785	-51.00	5.42	27.7	-28.72	-25	-3.72	Vertical
7785	-53.64	5.42	27.7	-31.36	-25	-6.36	Horizontal
Test Results for High Channel 2610MHz							
5220	-58.12	4.01	27.43	-34.70	-25	-9.70	Horizontal
5220	-57.33	4.01	27.43	-33.91	-25	-8.91	Vertical
7830	-59.02	5.34	27.74	-36.62	-25	-11.62	Vertical
7830	-56.65	5.34	27.74	-34.25	-25	-9.25	Horizontal

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

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

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

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

9.9 LTE BAND 66

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-52.21	4.02	29.80	-26.43	-13	-13.43	Horizontal
3421.4	-50.38	4.02	29.80	-24.60	-13	-11.60	Vertical
5132.1	-49.87	5.24	35.84	-19.27	-13	-6.27	Vertical
5132.1	-51.15	5.24	35.84	-20.55	-13	-7.55	Horizontal
112.6	-52.17	1.52	15.57	-38.12	-13	-25.12	Vertical
220.5	-48.09	1.33	17.14	-32.28	-13	-19.28	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-53.26	4.03	30.00	-27.29	-13	-14.29	Horizontal
3490.0	-51.64	4.03	30.00	-25.67	-13	-12.67	Vertical
5235.0	-52.99	5.25	35.86	-22.38	-13	-9.38	Vertical
5235.0	-51.96	5.25	35.86	-21.35	-13	-8.35	Horizontal
157.3	-44.75	1.53	17.13	-29.15	-13	-16.15	Vertical
213.1	-49.55	1.41	15.95	-35.01	-13	-22.01	Horizontal
Test Results for High Channel 1779.3MHz							
3558.6	-52.60	4.05	30.01	-26.64	-13	-13.64	Horizontal
3558.6	-53.90	4.05	30.01	-27.94	-13	-14.94	Vertical
5337.9	-54.22	5.26	35.86	-23.62	-13	-10.62	Vertical
5337.9	-54.51	5.26	35.86	-23.91	-13	-10.91	Horizontal
170.6	-49.89	1.44	15.51	-35.82	-13	-22.82	Vertical
169.0	-45.41	1.78	15.76	-31.43	-13	-18.43	Horizontal

QPSK EIRP POWER FOR LTE BAND 66 (20MHZ BANDWIDTH)

Test Results for Low Channel 1720MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440.0	-44.44	4.02	29.80	-18.66	-13	-5.66	Horizontal
3440.0	-53.01	4.02	29.80	-27.23	-13	-14.23	Vertical
5160.0	-54.90	5.24	35.84	-24.30	-13	-11.30	Vertical
5160.0	-51.46	5.24	35.84	-20.86	-13	-7.86	Horizontal
268.8	-53.44	1.62	17.02	-38.04	-13	-25.04	Vertical
161.4	-53.24	1.32	17.31	-37.25	-13	-24.25	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-52.38	4.03	30.00	-26.41	-13	-13.41	Horizontal
3490.0	-48.25	4.03	30.00	-22.28	-13	-9.28	Vertical
5235.0	-49.10	5.25	35.86	-18.49	-13	-5.49	Vertical
5235.0	-47.93	5.25	35.86	-17.32	-13	-4.32	Horizontal
159.9	-49.19	1.45	15.17	-35.47	-13	-22.47	Vertical
172.1	-47.91	1.48	17.82	-31.57	-13	-18.57	Horizontal
Test Results for High Channel 1770MHz							
3540.0	-54.54	2.91	27.68	-29.77	-13	-16.77	Horizontal
3540.0	-51.46	2.91	27.68	-26.69	-13	-13.69	Vertical
5310.0	-50.13	5.26	35.86	-19.53	-13	-6.53	Vertical
5310.0	-51.51	5.26	35.86	-20.91	-13	-7.91	Horizontal
197.3	-48.24	1.76	16.38	-33.62	-13	-20.62	Vertical
158.5	-45.99	1.43	17.13	-30.29	-13	-17.29	Horizontal

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

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

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

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

10. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- ☐ Temp. = -30° to $+50^{\circ}\text{C}$
- ☐ Voltage = low voltage, DC 3.4V, Normal, DC 3.75V and High voltage, DC 4.4V.

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 7
- LTE Band 12
- LTE Band 13
- LTE Band 17
- LTE Band 38
- LTE Band 66

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	13.0	0.006922	2.5
3.75	1880	13.8	0.007360	2.5
4.4	1880	13.8	0.007329	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	13.1	0.006971	2.5
Extreme (50C)	1880	11.3	0.006007	2.5
Extreme (40C)	1880	13.3	0.007073	2.5
Extreme (30C)	1880	13.4	0.007110	2.5
Extreme (10C)	1880	14.4	0.007638	2.5
Extreme (0C)	1880	12.1	0.006449	2.5
Extreme (-10C)	1880	12.9	0.006835	2.5
Extreme (-20C)	1880	14.2	0.007543	2.5
Extreme (-30C)	1880	14.3	0.007606	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	9.6	0.005083	2.5
3.75	1880	8.6	0.004559	2.5
4.4	1880	8.3	0.004409	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	9.9	0.005284	2.5
Extreme (50C)	1880	8.9	0.004721	2.5
Extreme (40C)	1880	7.7	0.004078	2.5
Extreme (30C)	1880	8.6	0.004557	2.5
Extreme (10C)	1880	8.9	0.004746	2.5
Extreme (0C)	1880	8.5	0.004544	2.5
Extreme (-10C)	1880	8.9	0.004716	2.5
Extreme (-20C)	1880	8.4	0.004490	2.5
Extreme (-30C)	1880	7.7	0.004089	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	8.9	0.005164	2.5
3.75	1732.5	8.5	0.004911	2.5
4.4	1732.5	8.6	0.004983	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	8.9	0.005116	2.5
Extreme (50C)	1732.5	9.4	0.005404	2.5
Extreme (40C)	1732.5	7.2	0.004179	2.5
Extreme (30C)	1732.5	5.7	0.003300	2.5
Extreme (10C)	1732.5	7.6	0.004371	2.5
Extreme (0C)	1732.5	9.4	0.005435	2.5
Extreme (-10C)	1732.5	8.6	0.004967	2.5
Extreme (-20C)	1732.5	7.1	0.004110	2.5
Extreme (-30C)	1732.5	8.2	0.004752	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	9.7	0.005582	2.5
3.75	1732.5	8.7	0.005011	2.5
4.4	1732.5	7.9	0.004552	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	10.2	0.005875	2.5
Extreme (50C)	1732.5	8.5	0.004905	2.5
Extreme (40C)	1732.5	8.0	0.004589	2.5
Extreme (30C)	1732.5	8.5	0.004923	2.5
Extreme (10C)	1732.5	9.2	0.005334	2.5
Extreme (0C)	1732.5	7.9	0.004574	2.5
Extreme (-10C)	1732.5	8.5	0.004906	2.5
Extreme (-20C)	1732.5	9.1	0.005277	2.5
Extreme (-30C)	1732.5	7.7	0.004461	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	6.2	0.007365	2.5
3.75	836.5	6.7	0.008037	2.5
4.4	836.5	4.4	0.005303	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	5.9	0.007086	2.5
Extreme (50C)	836.5	6.3	0.007515	2.5
Extreme (40C)	836.5	5.7	0.006859	2.5
Extreme (30C)	836.5	6.3	0.007580	2.5
Extreme (10C)	836.5	5.6	0.006703	2.5
Extreme (0C)	836.5	4.9	0.005818	2.5
Extreme (-10C)	836.5	5.3	0.006327	2.5
Extreme (-20C)	836.5	6.1	0.007320	2.5
Extreme (-30C)	836.5	6.1	0.007281	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	5.5	0.006571	2.5
3.75	836.5	7.2	0.008558	2.5
4.4	836.5	5.0	0.005933	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	6.5	0.007714	2.5
Extreme (50C)	836.5	5.8	0.006986	2.5
Extreme (40C)	836.5	5.6	0.006699	2.5
Extreme (30C)	836.5	6.4	0.007692	2.5
Extreme (10C)	836.5	4.9	0.005910	2.5
Extreme (0C)	836.5	5.3	0.006326	2.5
Extreme (-10C)	836.5	5.7	0.006834	2.5
Extreme (-20C)	836.5	5.8	0.006882	2.5
Extreme (-30C)	836.5	6.2	0.007357	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)				
3.4	2535	9.8	0.003864	2.5
3.75	2535	8.9	0.003520	2.5
4.4	2535	8.4	0.003309	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	9.0	0.003534	2.5
Extreme (50C)	2535	9.3	0.003658	2.5
Extreme (40C)	2535	8.9	0.003510	2.5
Extreme (30C)	2535	9.0	0.003545	2.5
Extreme (10C)	2535	8.0	0.003159	2.5
Extreme (0C)	2535	8.5	0.003350	2.5
Extreme (-10C)	2535	9.9	0.003888	2.5
Extreme (-20C)	2535	9.1	0.003597	2.5
Extreme (-30C)	2535	8.5	0.003335	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2535	6.7	0.002655	2.5
3.75	2535	6.6	0.002619	2.5
4.4	2535	5.6	0.002219	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	7.0	0.002779	2.5
Extreme (50C)	2535	6.0	0.002348	2.5
Extreme (40C)	2535	5.1	0.002030	2.5
Extreme (30C)	2535	6.2	0.002453	2.5
Extreme (10C)	2535	5.6	0.002209	2.5
Extreme (0C)	2535	4.9	0.001951	2.5
Extreme (-10C)	2535	4.8	0.001885	2.5
Extreme (-20C)	2535	5.9	0.002343	2.5
Extreme (-30C)	2535	5.3	0.002075	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]
3.4	707.5	8.9	0.012576	2.5
3.75	707.5	10.5	0.014816	2.5
4.4	707.5	8.9	0.012551	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.7	0.012355	2.5
Extreme (50C)	707.5	7.4	0.010470	2.5
Extreme (40C)	707.5	7.1	0.010094	2.5
Extreme (30C)	707.5	8.5	0.012007	2.5
Extreme (10C)	707.5	7.8	0.010986	2.5
Extreme (0C)	707.5	9.3	0.013127	2.5
Extreme (-10C)	707.5	7.9	0.011173	2.5
Extreme (-20C)	707.5	8.8	0.012431	2.5
Extreme (-30C)	707.5	7.4	0.010440	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	707.5	7.4	0.010419	2.5
3.75	707.5	7.9	0.011203	2.5
4.4	707.5	7.0	0.009878	2.5

Frequency error vs. Temperature

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

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

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]
3.4	782.0	12.6	0.017783	2.5
3.75	782.0	13.8	0.019464	2.5
4.4	782.0	13.6	0.019091	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	782.0	14.3	0.020129	2.5
Extreme (50C)	782.0	13.3	0.018752	2.5
Extreme (40C)	782.0	15.5	0.021850	2.5
Extreme (30C)	782.0	14.0	0.019719	2.5
Extreme (10C)	782.0	13.8	0.019382	2.5
Extreme (0C)	782.0	13.7	0.019331	2.5
Extreme (-10C)	782.0	13.6	0.019171	2.5
Extreme (-20C)	782.0	13.7	0.019274	2.5
Extreme (-30C)	782.0	13.2	0.018604	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]
3.4	782.0	12.6	0.017719	2.5
3.75	782.0	14.1	0.019898	2.5
4.4	782.0	13.5	0.018968	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	782.0	13.0	0.018353	2.5
Extreme (50C)	782.0	12.1	0.017002	2.5
Extreme (40C)	782.0	13.2	0.018634	2.5
Extreme (30C)	782.0	13.5	0.018980	2.5
Extreme (10C)	782.0	13.5	0.019072	2.5
Extreme (0C)	782.0	12.0	0.016912	2.5
Extreme (-10C)	782.0	13.3	0.018717	2.5
Extreme (-20C)	782.0	13.9	0.019582	2.5
Extreme (-30C)	782.0	15.1	0.021223	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]
3.4	710.0	10.0	0.014099	2.5
3.75	710.0	9.1	0.012789	2.5
4.4	710.0	8.2	0.011620	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.7	0.013613	2.5
Extreme (50C)	710.0	9.4	0.013222	2.5
Extreme (40C)	710.0	8.4	0.011812	2.5
Extreme (30C)	710.0	8.7	0.012211	2.5
Extreme (10C)	710.0	8.4	0.011878	2.5
Extreme (0C)	710.0	8.1	0.011392	2.5
Extreme (-10C)	710.0	9.1	0.012819	2.5
Extreme (-20C)	710.0	8.8	0.012418	2.5
Extreme (-30C)	710.0	8.3	0.011665	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	710.0	9.7	0.013651	2.5
3.75	710.0	8.5	0.012006	2.5
4.4	710.0	8.4	0.011859	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.0	0.012662	2.5
Extreme (50C)	710.0	9.4	0.013184	2.5
Extreme (40C)	710.0	7.9	0.011129	2.5
Extreme (30C)	710.0	9.1	0.012830	2.5
Extreme (10C)	710.0	8.1	0.011357	2.5
Extreme (0C)	710.0	8.4	0.011882	2.5
Extreme (-10C)	710.0	9.7	0.013673	2.5
Extreme (-20C)	710.0	9.3	0.013064	2.5
Extreme (-30C)	710.0	8.4	0.011878	2.5

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

10.8 LTE BAND 38

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 38 QPSK, (CH 37850 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2595	8.6	0.003323	2.5
3.75	2595	6.8	0.002639	2.5
4.4	2595	7.3	0.002817	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 38 QPSK, (CH 37850 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2595	7.9	0.003032	2.5
Extreme (50C)	2595	4.8	0.001867	2.5
Extreme (40C)	2595	5.0	0.001933	2.5
Extreme (30C)	2595	4.3	0.001644	2.5
Extreme (10C)	2595	6.6	0.002548	2.5
Extreme (0C)	2595	4.5	0.001731	2.5
Extreme (-10C)	2595	10.0	0.003840	2.5
Extreme (-20C)	2595	10.7	0.004137	2.5
Extreme (-30C)	2595	6.5	0.002486	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 38 16QAM, (CH 37850 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2595	8.1	0.003115	2.5
3.75	2595	6.9	0.002650	2.5
4.4	2595	6.9	0.002645	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 38 16QAM, (CH 37850 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2595	7.8	0.003025	2.5
Extreme (50C)	2595	5.2	0.002014	2.5
Extreme (40C)	2595	5.4	0.002085	2.5
Extreme (30C)	2595	4.8	0.001831	2.5
Extreme (10C)	2595	6.8	0.002611	2.5
Extreme (0C)	2595	5.0	0.001928	2.5
Extreme (-10C)	2595	10.0	0.003857	2.5
Extreme (-20C)	2595	11.2	0.004319	2.5
Extreme (-30C)	2595	5.9	0.002260	2.5

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

10.9 LTE BAND 66

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 66 QPSK, (CH 132322 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1745	12.4	0.00713	2.5
3.75	1745	14.1	0.00806	2.5
4.4	1745	13.6	0.00777	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 66 QPSK, (CH 132322 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1745	7.3	0.004185	2.5
Extreme (50C)	1745	4.6	0.002650	2.5
Extreme (40C)	1745	5.0	0.002886	2.5
Extreme (30C)	1745	5.2	0.002988	2.5
Extreme (10C)	1745	6.6	0.003791	2.5
Extreme (0C)	1745	4.9	0.002827	2.5
Extreme (-10C)	1745	10.0	0.005712	2.5
Extreme (-20C)	1745	11.1	0.006375	2.5
Extreme (-30C)	1745	6.3	0.003627	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 66 16QAM, (CH 132322 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1745	12.9	0.007405	2.5
3.75	1745	13.8	0.007880	2.5
4.4	1745	13.2	0.007543	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 66 16QAM, (CH 132322 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1745	7.7	0.004389	2.5
Extreme (50C)	1745	5.2	0.003005	2.5
Extreme (40C)	1745	5.7	0.003244	2.5
Extreme (30C)	1745	5.1	0.002941	2.5
Extreme (10C)	1745	6.1	0.003513	2.5
Extreme (0C)	1745	4.9	0.002824	2.5
Extreme (-10C)	1745	9.6	0.005501	2.5
Extreme (-20C)	1745	11.2	0.006401	2.5
Extreme (-30C)	1745	6.1	0.003480	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.

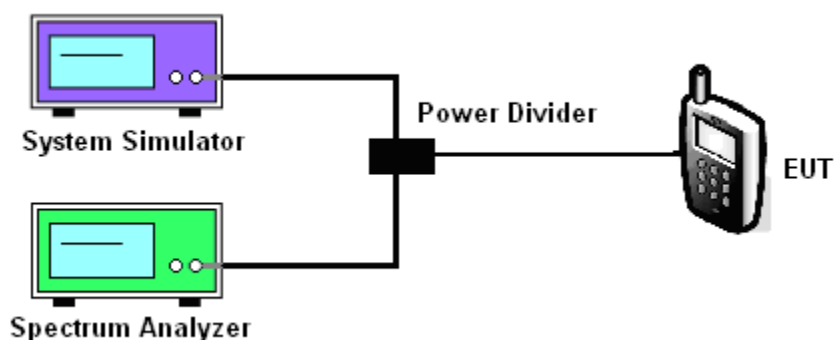
11.2 Measuring Instruments

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 GSM/EGPRS operating modes:
 - a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
 - b. Set EUT in maximum power output, and triggered the burst signal.
 - c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.
4. For UMTS 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 2/4/5/7/12/13/17/38/66

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Test data reference attachment.

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