

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

FCC ID: 2BF7A-H3

Product: Rugged feature phone

Trade Mark: HAMTOD

Model Number: H3

Family Model: H2,H5

Report No.: S24042306705003

Prepared for

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TEST RESULT CERTIFICATION

Applicant's name..... Shenzhen Hao Mai Tongda Technology Co., LTD
Address Room703,Building F, Qihang R&D Industrial Park, No.1008,Songbai Road,
 Sunshine Community, Xili Street, Nanshan District, Shenzhen, China
Manufacturer's Name..... Shenzhen Hao Mai Tongda Technology Co., LTD
Address Room703,Building F, Qihang R&D Industrial Park, No.1008,Songbai Road,
 Sunshine Community, Xili Street, Nanshan District, Shenzhen, China
Product name Rugged feature phone
Model and/or type reference H3
Family Model: H2,H5
Test sample number S240423067005
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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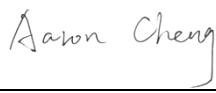
Date of Test

Date (s) of performance of tests May 23, 2024 ~ Jul. 25, 2024

Date of Issue Jul. 25, 2024

Test Result **Pass**

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TABLE OF CONTENTS

1. GENERAL INFORMATION.....	5
1.1 PRODUCT DESCRIPTION	5
1.2 RELATED SUBMITTAL(S) / GRANT (S)	7
1.3 TEST METHODOLOGY	7
1.4 TEST FACILITY	7
MEASUREMENT UNCERTAINTY	7
1.5 SPECIAL ACCESSORIES.....	7
1.6 WORST-CASE CONFIGURATION AND MODE.....	7
2. SYSTEM TEST CONFIGURATION	8
2.1 EUT CONFIGURATION.....	8
2.2 EUT EXERCISE	8
2.3 CONFIGURATION OF EUT SYSTEM.....	8
2.4 TEST SETUP	9
3.TEST AND MEASUREMENT EQUIPMENT	10
4. OUTPUT POWER.....	12
4.1 OUTPUT POWER MEASUREMENT	12
6. BANDEDGE AND EMISSION MASK	15
7. OUT OF BAND EMISSIONS	16
7.1 MEASUREMENT METHOD	17
8. RADIATED MEASUREMENT	18
8.1. RADIATED POWER (ERP & EIRP).....	18
8.2 LTE BAND 2.....	19
8.3 LTE BAND 4.....	23
8.4 LTE BAND 5.....	27
8.5 LTE BAND 7.....	29

8.6 LTE BAND 12	31
8.7 LTE BAND 17	33
8.8 LTE BAND 66	35
9. SPURIOUS RADIATION EMISSION	39
9.1 LTE BAND 2.....	41
9.2 LTE BAND 4.....	43
9.3 LTE BAND 5.....	45
9.4 LTE BAND 7.....	47
9.5 LTE BAND 12	49
9.6 LTE BAND 17	51
9.7 LTE BAND 66	53
10. FREQUENCY STABILITY	55
10.1 LTE BAND 2	56
10.2 LTE BAND 4	58
10.3 LTE BAND 5	60
10.4 LTE BAND 7	62
10.5 LTE BAND 12	64
10.6 LTE BAND 17	66
10.7 LTE BAND 66	68
11. PEAK-TO-AVERAGE RATIO.....	70
11.1 Description of the PAR Measurement.....	70
11.2 Measuring Instruments	70
11.3 Test Procedures.....	70
11.4 Test Setup.....	70

1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Rugged feature phone
Trade Mark	HAMTOD
Model Name	H3
Family Model	H2,H5
Model Difference	All models have the same circuit and RF module, except for appearances.
FCC ID:	2BF7A-H3
Frequency Bands:	U.S. Bands: ☒ LTE FDD Band 2, 4, 5, 7, 12, 17, 66
Frequency Range:	LTE FDD Band 2 Uplink: 1850MHz-1910MHz, Downlink: 1930MHz-1990MHz; LTE FDD Band 4 Uplink: 1710MHz-1755MHz, Downlink: 2110MHz-2155MHz; LTE FDD Band 5 Uplink: 824MHz-849MHz, Downlink: 869MHz-894MHz; LTE-FDD Band 7 Uplink: 2500MHz-2570MHz, Downlink: 2620MHz-2690MHz; LTE FDD Band 12 Uplink: 699MHz-716MHz, Downlink: 729MHz-746MHz; LTE FDD Band 17 Uplink: 704MHz-716MHz, Downlink: 734MHz-746MHz; LTE FDD Band 66 Uplink: 1710MHz-1780MHz, Downlink: 2110MHz-2200MHz;
Type of Modulation:	QPSK/16QAM
Antenna:	LDS Antenna
Antenna gain:	Band 2:1.83dBi, Band 4:1.58 dBi, Band 5:-1.4 dBi, Band 7:0.94dBi, Band 12:-1.58 dBi, Band 17:-1.58 dBi, Band 66:1.58 dBi
Battery	DC 3.7V, 2000mAh, 7.4Wh
Adapter	Input: 100-240V~50/60Hz 0.3A Output: 5.0V---1.0A 5.0W
Power supply	DC 3.7V from battery or DC 5Vfrom adapter
Extreme Vol. Limits:	DC 3.15V to DC 4.26V (Nominal DC 3.7V) (Note 1)
HW Version	L7610C-MB-V0.1
SW Version	L7610C_HY_H3_US

** Note1: The High Voltage 4.26V and Low Voltage 3.15V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2BF7A-H3** filing to comply with the FCC Part 22H&24E &27

1.3 TEST METHODOLOGY

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

1.4 TEST FACILITY

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

ShenZhen NTEK Testing Technology Co., Ltd.

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

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

FCC Registration No.:463705

IC Registration No.:9270A,

CNAS Registration No.:L5516

MEASUREMENT UNCERTAINTY

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

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

1.5 SPECIAL ACCESSORIES

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

1.6 WORST-CASE CONFIGURATION AND MODE

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

The device has LTE Bands of: Band 2, Band 4, Band 5, Band 7, Band 12, Band 17, Band 66.

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

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

2. SYSTEM TEST CONFIGURATION

2.1 EUT CONFIGURATION

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

2.2 EUT EXERCISE

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

2.3 CONFIGURATION OF EUT SYSTEM

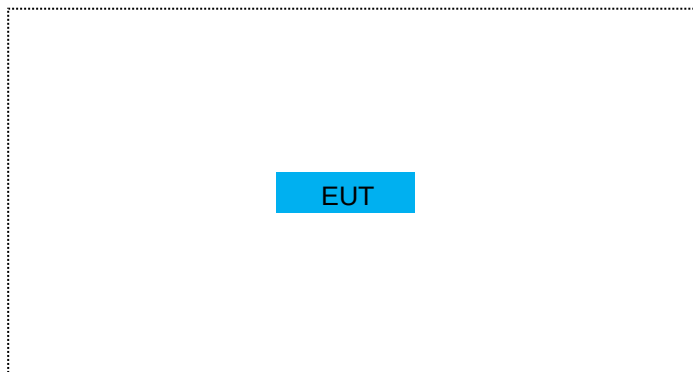
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Rugged feature phone	H3	FCC ID: 2BF7A-H3	EUT

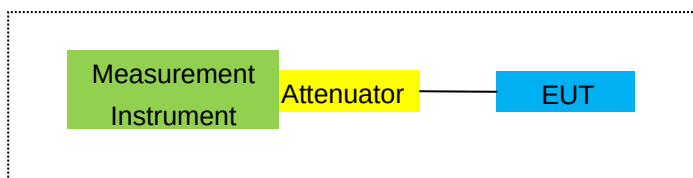
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

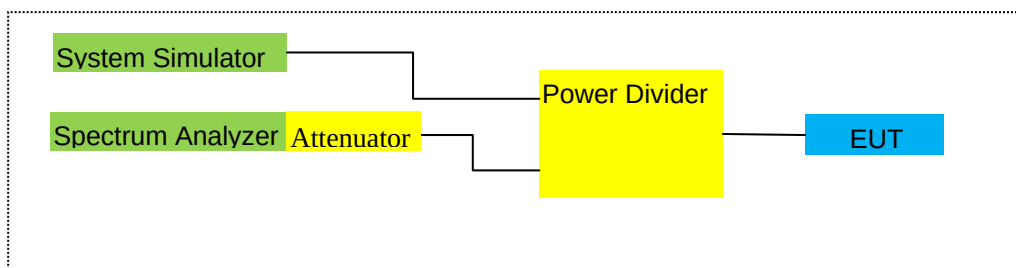
For Radiated Test Cases



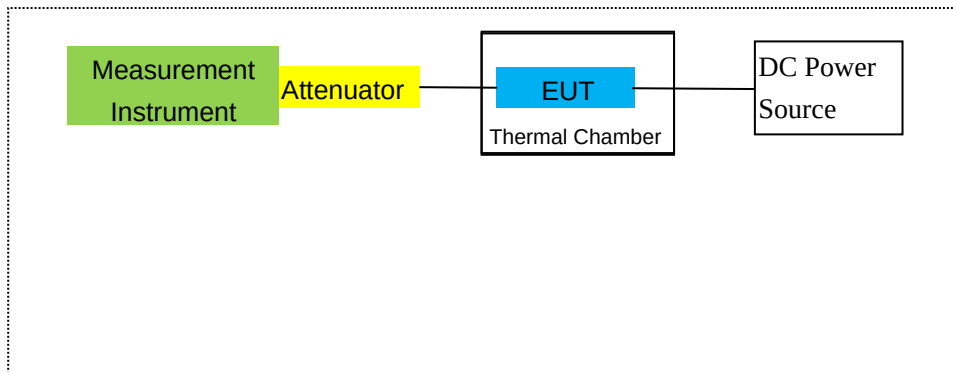
For Conducted Output Power



For Peak-to Average Ratio, Occupied Bandwidth, Conducted Band edge and Conducted Spurious Emission



For Frequency Stability



Note: EUT built-in battery-powered, the battery is fully-charged.

3.TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	MXA Signal Analyzer	Agilent	N9020A	MY49100060	2024.04.26	2025.04.25	1 year
2	Test Receiver	R&S	ESPI	101318	2024.03.12	2025.03.11	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2024.03.11	2025.03.10	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2023.05.06	2026.05.05	3 year
5	Horn Antenna	EM	EM-AH-10180	2011071402	2024.05.12	2027.05.11	3 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2024.05.12	2027.05.11	3 year
7	Amplifier	EM	EM-30180	060538	2024.04.26	2025.04.25	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2024.03.12	2025.03.11	1 year
9	Power Meter	R&S	NRVS	100696	2024.04.26	2025.04.25	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2024.03.12	2025.03.11	1 year
11	Test Cable	N/A	R-01	N/A	2022.06.17	2025.06.16	3 year
12	Test Cable	N/A	R-02	N/A	2022.06.17	2025.06.16	3 year
13	Test Cable	N/A	R-03	N/A	2022.06.17	2025.06.16	3 year
14	Test Receiver	R&S	ESCI	101160	2024.03.12	2025.03.11	1 year
15	LISN	R&S	ENV216	101313	2024.03.12	2025.03.11	1 year
16	LISN	EMCO	3816/2	00042990	2024.03.12	2025.03.11	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2024.03.12	2025.03.11	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2024.03.12	2025.03.11	1 year
19	Test Cable	N/A	C01	N/A	2023.05.06	2026.05.05	3 year
20	Test Cable	N/A	C02	N/A	2023.05.06	2026.05.05	3 year
21	Test Cable	N/A	C03	N/A	2023.05.06	2026.05.05	3 year
22	Attenuator	MCE	24-10-34	BN9258	2024.03.12	2025.03.11	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2024.03.12	2025.03.11	1 year
24	test receiver	R&S	ESCI	a0304218	2024.03.12	2025.03.11	1 year
25	Communication Tester	R&S	CMU200	A0304247	2024.03.12	2025.03.11	1 year

26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2024.03.12	2025.03.11	1 year
27	DC Power Source	N/A	PS-6005D	20170402923	2023.05.06	2026.05.05	3 year
28	MXG Vector Signal Generator	Agilent	N5182A	MY47070317	2024.04.25	2025.04.24	1 year
29	Communication Tester	R&S	CMW500	148500	2024.05.30	2025.05.29	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
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

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

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

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

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

Test data reference attachment.

5. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

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

MODES TESTED

- ☐ LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 17
- LTE Band 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 Band2/4/5/7/12/17/66

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 2/4/5/7/12/17/66

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 2/4/5/7/12/17/66

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	-2.97	3.76	28.24	21.51	141.579	Horizontal	Pass
		1880	-2.78	3.91	28.22	21.53	142.233	Horizontal	Pass
		1909.3	-2.69	3.93	28.20	21.58	143.880	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-3.03	3.77	28.23	21.43	138.995	Horizontal	Pass
		1880	-2.88	3.91	28.24	21.45	139.637	Horizontal	Pass
		1908.5	-2.75	3.94	28.25	21.56	143.219	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-2.92	3.77	28.31	21.62	145.211	Horizontal	Pass
		1880	-2.54	3.91	28.22	21.77	150.314	Horizontal	Pass
		1907.5	-2.47	3.94	28.20	21.79	151.008	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-2.78	3.79	28.33	21.76	149.968	Horizontal	Pass
		1880	-2.48	3.95	28.22	21.79	151.008	Horizontal	Pass
		1905	-2.37	3.97	28.19	21.85	153.109	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-2.74	3.79	28.34	21.81	151.705	Horizontal	Pass
		1880	-2.53	3.95	28.22	21.74	149.279	Horizontal	Pass
		1902.5	-2.39	3.97	28.18	21.82	152.055	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-2.73	3.81	28.35	21.81	151.705	Horizontal	Pass
		1880	-2.40	3.96	28.22	21.86	153.462	Horizontal	Pass
		1900	-2.34	4.00	28.16	21.82	152.055	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-4.00	3.76	28.24	20.48	111.686	Vertical	Pass
		1880	-3.36	3.91	28.22	20.95	124.451	Vertical	Pass
		1909.3	-3.39	3.93	28.20	20.88	122.462	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-3.74	3.77	28.23	20.72	118.032	Vertical	Pass
		1880	-3.51	3.91	28.24	20.82	120.781	Vertical	Pass
		1908.5	-3.50	3.94	28.25	20.81	120.504	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-3.42	3.77	28.31	21.12	129.420	Vertical	Pass
		1880	-3.59	3.91	28.22	20.72	118.032	Vertical	Pass
		1907.5	-3.16	3.94	28.20	21.10	128.825	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	-3.77	3.79	28.33	20.77	119.399	Vertical	Pass
		1880	-3.69	3.95	28.22	20.58	114.288	Vertical	Pass
		1905	-3.00	3.97	28.19	21.22	132.434	Vertical	Pass

15.0MHz Band QPSK	1/#Mid	1857.5	-4.25	3.79	28.34	20.30	107.152	Vertical	Pass
		1880	-3.69	3.95	28.22	20.58	114.288	Vertical	Pass
		1902.5	-3.51	3.97	28.18	20.70	117.490	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	1860	-3.54	3.81	28.35	21.00	125.893	Vertical	Pass
		1880	-3.14	3.96	28.22	21.12	129.420	Vertical	Pass
		1900	-3.65	4.00	28.16	20.51	112.460	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	-4.09	3.76	28.24	20.39	109.396	Horizontal	Pass
		1880	-3.56	3.91	28.22	20.75	118.850	Horizontal	Pass
		1909.3	-3.49	3.93	28.20	20.78	119.674	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-3.59	3.77	28.23	20.87	122.180	Horizontal	Pass
		1880	-3.67	3.91	28.24	20.66	116.413	Horizontal	Pass
		1908.5	-3.88	3.94	28.25	20.43	110.408	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-3.53	3.77	28.31	21.01	126.183	Horizontal	Pass
		1880	-3.44	3.91	28.22	20.87	122.180	Horizontal	Pass
		1907.5	-3.12	3.94	28.20	21.14	130.017	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-3.58	3.79	28.33	20.96	124.738	Horizontal	Pass
		1880	-3.57	3.95	28.22	20.70	117.490	Horizontal	Pass
		1905	-3.04	3.97	28.19	21.18	131.220	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-3.56	3.79	28.34	20.99	125.603	Horizontal	Pass
		1880	-3.35	3.95	28.22	20.92	123.595	Horizontal	Pass
		1902.5	-3.31	3.97	28.18	20.90	123.027	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-3.45	3.81	28.35	21.09	128.529	Horizontal	Pass
		1880	-3.15	3.96	28.22	21.11	129.122	Horizontal	Pass
		1900	-2.97	4.00	28.16	21.19	131.522	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-5.21	3.76	28.24	19.27	84.528	Vertical	Pass
		1880	-4.30	3.91	28.22	20.01	100.231	Vertical	Pass
		1909.3	-4.24	3.93	28.20	20.03	100.693	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-4.47	3.77	28.23	19.99	99.770	Vertical	Pass
		1880	-4.45	3.91	28.24	19.88	97.275	Vertical	Pass
		1908.5	-5.05	3.94	28.25	19.26	84.333	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-5.14	3.77	28.31	19.40	87.096	Vertical	Pass
		1880	-4.86	3.91	28.22	19.45	88.105	Vertical	Pass
		1907.5	-4.98	3.94	28.20	19.28	84.723	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-4.67	3.79	28.33	19.87	97.051	Vertical	Pass
		1880	-4.28	3.95	28.22	19.99	99.770	Vertical	Pass
		1905	-4.37	3.97	28.19	19.85	96.605	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-4.80	3.79	28.34	19.75	94.406	Vertical	Pass
		1880	-4.54	3.95	28.22	19.73	93.972	Vertical	Pass
		1902.5	-4.49	3.97	28.18	19.72	93.756	Vertical	Pass
20.0MHz	1/#Mid	1860	-4.73	3.81	28.35	19.81	95.719	Vertical	Pass

Band 16 QAM	1880	-4.09	3.96	28.22	20.17	103.992	Vertical	Pass
	1900	-4.86	4.00	28.16	19.30	85.114	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 (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1710.7	-3.69	3.12	27.58	20.77	119.399	Horizontal	Pass
		1732.5	-3.68	3.27	27.61	20.66	116.413	Horizontal	Pass
		1754.3	-3.66	3.29	27.63	20.68	116.950	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.86	3.13	27.61	20.62	115.345	Horizontal	Pass
		1732.5	-3.78	3.27	27.61	20.56	113.763	Horizontal	Pass
		1753.5	-3.70	3.30	27.62	20.62	115.345	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-3.63	3.13	27.63	20.87	122.180	Horizontal	Pass
		1732.5	-3.53	3.27	27.61	20.81	120.504	Horizontal	Pass
		1752.5	-3.41	3.30	27.60	20.89	122.744	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-3.57	3.15	27.64	20.92	123.595	Horizontal	Pass
		1732.5	-3.34	3.31	27.61	20.96	124.738	Horizontal	Pass
		1750	-3.36	3.33	27.59	20.90	123.027	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-3.58	3.15	27.65	20.92	123.595	Horizontal	Pass
		1732.5	-3.42	3.31	27.61	20.88	122.462	Horizontal	Pass
		1747.5	-3.36	3.33	27.57	20.88	122.462	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-3.52	3.17	27.66	20.97	125.026	Horizontal	Pass
		1732.5	-3.35	3.32	27.61	20.94	124.165	Horizontal	Pass
		1745	-3.29	3.36	27.56	20.91	123.310	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-4.60	3.12	27.58	19.86	96.828	Vertical	Pass
		1732.5	-4.51	3.27	27.61	19.83	96.161	Vertical	Pass
		1754.3	-4.70	3.29	27.63	19.64	92.045	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-4.63	3.13	27.61	19.85	96.605	Vertical	Pass
		1732.5	-4.03	3.27	27.61	20.31	107.399	Vertical	Pass
		1753.5	-4.67	3.30	27.62	19.65	92.257	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-4.10	3.13	27.63	20.40	109.648	Vertical	Pass
		1732.5	-4.49	3.27	27.61	19.85	96.605	Vertical	Pass
		1752.5	-3.91	3.30	27.60	20.39	109.396	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-4.95	3.15	27.64	19.54	89.950	Vertical	Pass
		1732.5	-4.59	3.31	27.61	19.71	93.541	Vertical	Pass
		1750	-4.58	3.33	27.59	19.68	92.897	Vertical	Pass

15.0MHz Band QPSK	1/#Mid	1717.5	-5.01	3.15	27.65	19.49	88.920	Vertical	Pass
		1732.5	-4.04	3.31	27.61	20.26	106.170	Vertical	Pass
		1747.5	-4.78	3.33	27.57	19.46	88.308	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	1720	-4.68	3.17	27.66	19.81	95.719	Vertical	Pass
		1732.5	-4.61	3.32	27.61	19.68	92.897	Vertical	Pass
		1745	-4.07	3.36	27.56	20.13	103.039	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 (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1710.7	-4.50	3.12	27.58	19.96	99.083	Horizontal	Pass
		1732.5	-4.35	3.27	27.61	19.99	99.770	Horizontal	Pass
		1754.3	-4.35	3.29	27.63	19.99	99.770	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-4.44	3.13	27.61	20.04	100.925	Horizontal	Pass
		1732.5	-4.57	3.27	27.61	19.77	94.842	Horizontal	Pass
		1753.5	-4.79	3.30	27.62	19.53	89.743	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-4.27	3.13	27.63	20.23	105.439	Horizontal	Pass
		1732.5	-4.23	3.27	27.61	20.11	102.565	Horizontal	Pass
		1752.5	-3.92	3.30	27.60	20.38	109.144	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-4.34	3.15	27.64	20.15	103.514	Horizontal	Pass
		1732.5	-4.53	3.31	27.61	19.77	94.842	Horizontal	Pass
		1750	-3.91	3.33	27.59	20.35	108.393	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-4.14	3.15	27.65	20.36	108.643	Horizontal	Pass
		1732.5	-4.20	3.31	27.61	20.10	102.329	Horizontal	Pass
		1747.5	-4.22	3.33	27.57	20.02	100.462	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-4.09	3.17	27.66	20.40	109.648	Horizontal	Pass
		1732.5	-4.10	3.32	27.61	20.19	104.472	Horizontal	Pass
		1745	-3.91	3.36	27.56	20.29	106.905	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-5.97	3.12	27.58	18.49	70.632	Vertical	Pass
		1732.5	-5.77	3.27	27.61	18.57	71.945	Vertical	Pass
		1754.3	-5.78	3.29	27.63	18.56	71.779	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-5.26	3.13	27.61	19.22	83.560	Vertical	Pass
		1732.5	-5.55	3.27	27.61	18.79	75.683	Vertical	Pass
		1753.5	-5.74	3.30	27.62	18.58	72.111	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-5.43	3.13	27.63	19.07	80.724	Vertical	Pass
		1732.5	-5.80	3.27	27.61	18.54	71.450	Vertical	Pass
		1752.5	-5.26	3.30	27.60	19.04	80.168	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-5.77	3.15	27.64	18.72	74.473	Vertical	Pass
		1732.5	-5.19	3.31	27.61	19.11	81.470	Vertical	Pass
		1750	-5.31	3.33	27.59	18.95	78.524	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-6.00	3.15	27.65	18.50	70.795	Vertical	Pass
		1732.5	-4.97	3.31	27.61	19.33	85.704	Vertical	Pass
		1747.5	-4.94	3.33	27.57	19.30	85.114	Vertical	Pass
20.0MHz	1/#Mid	1720	-5.89	3.17	27.66	18.60	72.444	Vertical	Pass

Band 16 QAM		1732.5	-5.12	3.32	27.61	19.17	82.604	Vertical	Pass
		1745	-5.73	3.36	27.56	18.47	70.307	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 Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	3/#Mid	824.7	5.61	2.01	19.68	2.15	21.13	129.718	Horizontal	Pass
		836.5	5.49	2.01	19.77	2.15	21.10	128.825	Horizontal	Pass
		848.3	5.29	2.02	19.82	2.15	20.94	124.165	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	825.5	5.38	2.01	19.70	2.15	20.92	123.595	Horizontal	Pass
		836.5	5.28	2.01	19.77	2.15	20.89	122.744	Horizontal	Pass
		847.5	5.15	2.02	19.81	2.15	20.79	119.950	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	826.5	5.66	2.01	19.71	2.15	21.21	132.130	Horizontal	Pass
		836.5	5.54	2.01	19.77	2.15	21.15	130.317	Horizontal	Pass
		846.5	5.38	2.02	19.79	2.15	21.00	125.893	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	829	5.68	2.01	19.73	2.15	21.25	133.352	Horizontal	Pass
		836.5	5.63	2.01	19.77	2.15	21.24	133.045	Horizontal	Pass
		844	5.53	2.02	19.78	2.15	21.14	130.017	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	824.7	4.30	2.01	19.68	2.15	19.82	95.940	Vertical	Pass
		836.5	4.18	2.01	19.77	2.15	19.79	95.280	Vertical	Pass
		848.3	4.67	2.02	19.82	2.15	20.32	107.647	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	825.5	3.92	2.01	19.70	2.15	19.46	88.308	Vertical	Pass
		836.5	3.97	2.01	19.77	2.15	19.58	90.782	Vertical	Pass
		847.5	4.26	2.02	19.81	2.15	19.90	97.724	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	826.5	4.17	2.01	19.71	2.15	19.72	93.756	Vertical	Pass
		836.5	4.02	2.01	19.77	2.15	19.63	91.833	Vertical	Pass
		846.5	4.73	2.02	19.79	2.15	20.35	108.393	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	829	3.98	2.01	19.73	2.15	19.55	90.157	Vertical	Pass
		836.5	4.35	2.01	19.77	2.15	19.96	99.083	Vertical	Pass
		844	4.02	2.02	19.78	2.15	19.63	91.833	Vertical	Pass

Radiated Power (ERP) for Band 5

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	3/##Mid	824.7	4.76	2.01	19.68	2.15	20.28	106.660	Horizontal	Pass
		836.5	4.69	2.01	19.77	2.15	20.30	107.152	Horizontal	Pass
		848.3	4.53	2.02	19.82	2.15	20.18	104.232	Horizontal	Pass
3.0MHz Band 16 QAM	1/##Mid	825.5	4.84	2.01	19.70	2.15	20.38	109.144	Horizontal	Pass
		836.5	4.55	2.01	19.77	2.15	20.16	103.753	Horizontal	Pass
		847.5	4.03	2.02	19.81	2.15	19.67	92.683	Horizontal	Pass
5.0MHz Band 16 QAM	1/##Mid	826.5	5.16	2.01	19.71	2.15	20.71	117.761	Horizontal	Pass
		836.5	4.93	2.01	19.77	2.15	20.54	113.240	Horizontal	Pass
		846.5	4.68	2.02	19.79	2.15	20.30	107.152	Horizontal	Pass
10.0MHz Band 16 QAM	1/##Mid	829	5.16	2.01	19.73	2.15	20.73	118.304	Horizontal	Pass
		836.5	4.88	2.01	19.77	2.15	20.49	111.944	Horizontal	Pass
		844	4.42	2.02	19.78	2.15	20.03	100.693	Horizontal	Pass
1.4MHz Band 16 QAM	1/##Mid	824.7	3.39	2.01	19.68	2.15	18.91	77.804	Vertical	Pass
		836.5	4.05	2.01	19.77	2.15	19.66	92.470	Vertical	Pass
		848.3	3.19	2.02	19.82	2.15	18.84	76.560	Vertical	Pass
3.0MHz Band 16 QAM	1/##Mid	825.5	2.99	2.01	19.70	2.15	18.53	71.285	Vertical	Pass
		836.5	3.32	2.01	19.77	2.15	18.93	78.163	Vertical	Pass
		847.5	3.64	2.02	19.81	2.15	19.28	84.723	Vertical	Pass
5.0MHz Band 16 QAM	1/##Mid	826.5	3.84	2.01	19.71	2.15	19.39	86.896	Vertical	Pass
		836.5	4.75	2.01	19.77	2.15	20.36	108.643	Vertical	Pass
		846.5	4.28	2.02	19.79	2.15	19.90	97.724	Vertical	Pass
10.0MHz Band 16 QAM	1/##Mid	829	3.77	2.01	19.73	2.15	19.34	85.901	Vertical	Pass
		836.5	4.38	2.01	19.77	2.15	19.99	99.770	Vertical	Pass
		844	3.13	2.02	19.78	2.15	18.74	74.817	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 Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	1/#Mid	2502.5	-1.97	4.54	27.75	21.24	133.045	Horizontal	Pass
		2535	-1.80	4.69	27.72	21.23	132.739	Horizontal	Pass
		2567.5	-1.73	4.71	27.71	21.27	133.968	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-1.90	4.55	27.76	21.31	135.207	Horizontal	Pass
		2535	-1.71	4.69	27.72	21.32	135.519	Horizontal	Pass
		2565	-1.63	4.72	27.70	21.35	136.458	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-1.91	4.55	27.77	21.31	135.207	Horizontal	Pass
		2535	-1.77	4.69	27.72	21.26	133.660	Horizontal	Pass
		2562.5	-1.67	4.72	27.69	21.30	134.896	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-1.85	4.57	27.78	21.36	136.773	Horizontal	Pass
		2535	-1.67	4.73	27.72	21.32	135.519	Horizontal	Pass
		2560	-1.63	4.75	27.68	21.30	134.896	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-3.39	4.54	27.75	19.82	95.940	Vertical	Pass
		2535	-2.76	4.69	27.72	20.27	106.414	Vertical	Pass
		2567.5	-2.78	4.71	27.71	20.22	105.196	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-2.94	4.55	27.76	20.27	106.414	Vertical	Pass
		2535	-3.31	4.69	27.72	19.72	93.756	Vertical	Pass
		2565	-3.26	4.72	27.70	19.72	93.756	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-2.87	4.55	27.77	20.35	108.393	Vertical	Pass
		2535	-3.46	4.69	27.72	19.57	90.573	Vertical	Pass
		2562.5	-3.25	4.72	27.69	19.72	93.756	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-2.95	4.57	27.78	20.26	106.170	Vertical	Pass
		2535	-3.41	4.73	27.72	19.58	90.782	Vertical	Pass
		2560	-3.39	4.75	27.68	19.54	89.950	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band 16 QAM	1/#Mid	2502.5	-2.66	4.54	27.75	20.55	113.501	Horizontal	Pass
		2535	-2.35	4.69	27.72	20.68	116.950	Horizontal	Pass
		2567.5	-2.43	4.71	27.71	20.57	114.025	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-2.55	4.55	27.76	20.66	116.413	Horizontal	Pass
		2535	-2.56	4.69	27.72	20.47	111.429	Horizontal	Pass
		2565	-2.83	4.72	27.70	20.15	103.514	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-2.73	4.55	27.77	20.49	111.944	Horizontal	Pass
		2535	-2.70	4.69	27.72	20.33	107.895	Horizontal	Pass
		2562.5	-2.31	4.72	27.69	20.66	116.413	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-2.61	4.57	27.78	20.60	114.815	Horizontal	Pass
		2535	-2.28	4.73	27.72	20.71	117.761	Horizontal	Pass
		2560	-2.38	4.75	27.68	20.55	113.501	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-3.94	4.54	27.75	19.27	84.528	Vertical	Pass
		2535	-3.79	4.69	27.72	19.24	83.946	Vertical	Pass
		2567.5	-4.54	4.71	27.71	18.46	70.146	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-4.44	4.55	27.76	18.77	75.336	Vertical	Pass
		2535	-3.08	4.69	27.72	19.95	98.855	Vertical	Pass
		2565	-2.77	4.72	27.70	20.21	104.954	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-3.16	4.55	27.77	20.06	101.391	Vertical	Pass
		2535	-4.59	4.69	27.72	18.44	69.823	Vertical	Pass
		2562.5	-4.38	4.72	27.69	18.59	72.277	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-2.86	4.57	27.78	20.35	108.393	Vertical	Pass
		2535	-4.27	4.73	27.72	18.72	74.473	Vertical	Pass
		2560	-2.57	4.75	27.68	20.36	108.643	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 Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	699.7	5.98	1.91	19.21	2.15	21.13	129.718	Vertical	Pass
		707.5	5.90	1.91	19.26	2.15	21.10	128.825	Vertical	Pass
		715.3	5.68	1.93	19.34	2.15	20.94	124.165	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	700.5	5.77	1.91	19.21	2.15	20.92	123.595	Vertical	Pass
		707.5	5.69	1.91	19.26	2.15	20.89	122.744	Vertical	Pass
		714.5	5.53	1.93	19.34	2.15	20.79	119.950	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	701.5	6.04	1.91	19.23	2.15	21.21	132.130	Vertical	Pass
		707.5	5.95	1.91	19.26	2.15	21.15	130.317	Vertical	Pass
		713.5	5.74	1.92	19.33	2.15	21.00	125.893	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	704	6.06	1.91	19.25	2.15	21.25	133.352	Vertical	Pass
		707.5	6.04	1.91	19.26	2.15	21.24	133.045	Vertical	Pass
		711	5.89	1.92	19.32	2.15	21.14	130.017	Vertical	Pass
1.4MHz Band QPSK	1/#Mid	699.7	4.56	1.91	19.21	2.15	19.71	93.541	Horizontal	Pass
		707.5	4.37	1.91	19.26	2.15	19.57	90.573	Horizontal	Pass
		715.3	4.57	1.93	19.34	2.15	19.83	96.161	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	700.5	4.48	1.91	19.21	2.15	19.63	91.833	Horizontal	Pass
		707.5	4.96	1.91	19.26	2.15	20.16	103.753	Horizontal	Pass
		714.5	4.51	1.93	19.34	2.15	19.77	94.842	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	701.5	4.47	1.91	19.23	2.15	19.64	92.045	Horizontal	Pass
		707.5	4.78	1.91	19.26	2.15	19.98	99.541	Horizontal	Pass
		713.5	4.98	1.92	19.33	2.15	20.24	105.682	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	704	5.13	1.91	19.25	2.15	20.32	107.647	Horizontal	Pass
		707.5	4.95	1.91	19.26	2.15	20.15	103.514	Horizontal	Pass
		711	4.81	1.92	19.32	2.15	20.06	101.391	Horizontal	Pass

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss (dBm)	Antenna Factor (dB)	Correction	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			(dB)	Average	Average		
							(dBm)	(mW)		
1.4MHz Band 16 QAM	1/#Mid	699.7	5.67	1.91	19.21	2.15	20.82	120.781	Vertical	Pass
		707.5	5.59	1.91	19.26	2.15	20.79	119.950	Vertical	Pass
		715.3	5.37	1.93	19.34	2.15	20.63	115.611	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	5.46	1.91	19.21	2.15	20.61	115.080	Vertical	Pass
		707.5	5.38	1.91	19.26	2.15	20.58	114.288	Vertical	Pass
		714.5	5.22	1.93	19.34	2.15	20.48	111.686	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	5.73	1.91	19.23	2.15	20.90	123.027	Vertical	Pass
		707.5	5.64	1.91	19.26	2.15	20.84	121.339	Vertical	Pass
		713.5	5.43	1.92	19.33	2.15	20.69	117.220	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	704	5.75	1.91	19.25	2.15	20.94	124.165	Vertical	Pass
		707.5	5.73	1.91	19.26	2.15	20.93	123.880	Vertical	Pass
		711	5.58	1.92	19.32	2.15	20.83	121.060	Vertical	Pass
1.4MHz Band 16 QAM	1/#Mid	699.7	4.67	1.91	19.21	2.15	19.82	95.940	Horizontal	Pass
		707.5	4.74	1.91	19.26	2.15	19.94	98.628	Horizontal	Pass
		715.3	4.24	1.93	19.34	2.15	19.50	89.125	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	4.20	1.91	19.21	2.15	19.35	86.099	Horizontal	Pass
		707.5	4.52	1.91	19.26	2.15	19.72	93.756	Horizontal	Pass
		714.5	4.46	1.93	19.34	2.15	19.72	93.756	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	4.43	1.91	19.23	2.15	19.60	91.201	Horizontal	Pass
		707.5	4.10	1.91	19.26	2.15	19.30	85.114	Horizontal	Pass
		713.5	3.97	1.92	19.33	2.15	19.23	83.753	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	704	4.84	1.91	19.25	2.15	20.03	100.693	Horizontal	Pass
		707.5	4.89	1.91	19.26	2.15	20.09	102.094	Horizontal	Pass
		711	4.68	1.92	19.32	2.15	19.93	98.401	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 17

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	1/#Mid	706.5	6.44	1.91	19.23	2.15	21.61	144.877	Vertical	Pass
		710	6.30	1.91	19.26	2.15	21.50	141.254	Vertical	Pass
		713.5	6.20	1.92	19.33	2.15	21.46	139.959	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	709	6.45	1.91	19.25	2.15	21.64	145.881	Vertical	Pass
		710	6.40	1.91	19.26	2.15	21.60	144.544	Vertical	Pass
		711	6.36	1.92	19.32	2.15	21.61	144.877	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	706.5	4.35	1.91	19.23	2.15	19.52	89.536	Horizontal	Pass
		710	4.79	1.91	19.26	2.15	19.99	99.770	Horizontal	Pass
		713.5	5.74	1.92	19.33	2.15	21.00	125.893	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	709	4.79	1.91	19.25	2.15	19.98	99.541	Horizontal	Pass
		710	6.09	1.91	19.26	2.15	21.29	134.586	Horizontal	Pass
		711	4.33	1.92	19.32	2.15	19.58	90.782	Horizontal	Pass

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band 16 QAM	1/#Mid	706.5	5.79	1.91	19.23	2.15	20.96	124.738	Vertical	Pass
		710	5.70	1.91	19.26	2.15	20.90	123.027	Vertical	Pass
		713.5	5.50	1.92	19.33	2.15	20.76	119.124	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	709	5.33	1.91	19.25	2.15	20.52	112.720	Vertical	Pass
		710	5.86	1.91	19.26	2.15	21.06	127.644	Vertical	Pass
		711	5.59	1.92	19.32	2.15	20.84	121.339	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	706.5	5.11	1.91	19.23	2.15	20.28	106.660	Horizontal	Pass
		710	4.86	1.91	19.26	2.15	20.06	101.391	Horizontal	Pass
		713.5	4.27	1.92	19.33	2.15	19.53	89.743	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	709	4.64	1.91	19.25	2.15	19.83	96.161	Horizontal	Pass
		710	4.53	1.91	19.26	2.15	19.73	93.972	Horizontal	Pass
		711	4.34	1.92	19.32	2.15	19.59	90.991	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)

8.8 LTE BAND 66

Radiated Power (EIRP) for Band 66									
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	1710.7	-3.85	3.76	28.24	20.63	115.611	Horizontal	Pass
		1745	-3.71	3.91	28.22	20.60	114.815	Horizontal	Pass
		1779.3	-3.58	3.93	28.2	20.69	117.220	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.91	3.77	28.23	20.55	113.501	Horizontal	Pass
		1745	-3.82	3.91	28.24	20.51	112.460	Horizontal	Pass
		1778.5	-3.84	3.94	28.25	20.47	111.429	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-3.81	3.77	28.31	20.73	118.304	Horizontal	Pass
		1745	-3.49	3.91	28.22	20.82	120.781	Horizontal	Pass
		1777.5	-3.55	3.94	28.2	20.71	117.761	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-3.70	3.79	28.33	20.84	121.339	Horizontal	Pass
		1745	-3.43	3.95	28.22	20.84	121.339	Horizontal	Pass
		1775	-3.44	3.97	28.19	20.78	119.674	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-3.72	3.79	28.34	20.83	121.060	Horizontal	Pass
		1745	-3.53	3.95	28.22	20.74	118.577	Horizontal	Pass
		1772.5	-3.48	3.97	28.18	20.73	118.304	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-3.69	3.81	28.35	20.85	121.619	Horizontal	Pass
		1745	-3.43	3.96	28.22	20.83	121.060	Horizontal	Pass
		1770	-3.45	4	28.16	20.71	117.761	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-4.53	3.76	28.24	19.95	98.855	Vertical	Pass
		1745	-5.09	3.91	28.22	19.22	83.560	Vertical	Pass
		1779.3	-4.80	3.93	28.2	19.47	88.512	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-4.41	3.77	28.23	20.05	101.158	Vertical	Pass
		1745	-4.90	3.91	28.24	19.43	87.700	Vertical	Pass
		1778.5	-4.99	3.94	28.25	19.32	85.507	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-4.87	3.77	28.31	19.67	92.683	Vertical	Pass
		1745	-4.38	3.91	28.22	19.93	98.401	Vertical	Pass
		1777.5	-4.32	3.94	28.2	19.94	98.628	Vertical	Pass
10.0MHz Band	1/#Mid	1715	-5.39	3.79	28.34	19.16	82.414	Vertical	Pass
		1745	-4.74	3.95	28.22	19.53	89.743	Vertical	Pass

QPSK		1775	-5.06	3.97	28.18	19.15	82.224	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-4.74	3.81	28.35	19.80	95.499	Vertical	Pass
Band		1745	-5.06	3.96	28.22	19.20	83.176	Vertical	Pass
QPSK		1772.5	-4.76	4	28.16	19.40	87.096	Vertical	Pass
20.0MHz	1/#Mid	1720	-5.27	3.79	28.34	19.28	84.723	Vertical	Pass
Band		1745	-4.67	3.95	28.22	19.60	91.201	Vertical	Pass
QPSK		1770	-4.73	3.97	28.18	19.48	88.716	Vertical	Pass

Radiated Power (EIRP) for Band 66									
Mode	RB/RB SIZE	Frequency	Result					Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP		
							Average (mW)		
1.4MHz Band 16 QAM	1/#Mid	1710.7	-4.81	3.76	28.24	19.67	92.683	Horizontal	Pass
		1745	-4.42	3.91	28.22	19.89	97.499	Horizontal	Pass
		1779.3	-4.60	3.93	28.2	19.67	92.683	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-5.20	3.77	28.23	19.26	84.333	Horizontal	Pass
		1745	-4.45	3.91	28.24	19.88	97.275	Horizontal	Pass
		1778.5	-4.74	3.94	28.25	19.57	90.573	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-4.62	3.77	28.31	19.92	98.175	Horizontal	Pass
		1745	-4.68	3.91	28.22	19.63	91.833	Horizontal	Pass
		1777.5	-4.35	3.94	28.2	19.91	97.949	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-4.67	3.79	28.33	19.87	97.051	Horizontal	Pass
		1745	-4.33	3.95	28.22	19.94	98.628	Horizontal	Pass
		1775	-4.65	3.97	28.19	19.57	90.573	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-4.66	3.79	28.34	19.89	97.499	Horizontal	Pass
		1745	-4.48	3.95	28.22	19.79	95.280	Horizontal	Pass
		1772.5	-4.27	3.97	28.18	19.94	98.628	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-4.49	3.81	28.35	20.05	101.158	Horizontal	Pass
		1745	-4.27	3.96	28.22	19.99	99.770	Horizontal	Pass
		1770	-4.21	4	28.16	19.95	98.855	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-6.22	3.76	28.24	18.26	66.988	Vertical	Pass
		1745	-4.64	3.91	28.22	19.67	92.683	Vertical	Pass
		1779.3	-4.35	3.93	28.2	19.92	98.175	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-5.58	3.77	28.23	18.88	77.268	Vertical	Pass
		1745	-4.95	3.91	28.24	19.38	86.696	Vertical	Pass
		1778.5	-4.53	3.94	28.25	19.78	95.060	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-5.36	3.77	28.31	19.18	82.794	Vertical	Pass
		1745	-5.70	3.91	28.22	18.61	72.611	Vertical	Pass
		1777.5	-5.02	3.94	28.2	19.24	83.946	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-5.21	3.79	28.34	19.34	85.901	Vertical	Pass
		1745	-5.11	3.95	28.22	19.16	82.414	Vertical	Pass
		1775	-5.81	3.97	28.18	18.40	69.183	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-6.44	3.81	28.35	18.10	64.565	Vertical	Pass

Band 16 QAM		1745	-5.71	3.96	28.22	18.55	71.614	Vertical	Pass
		1772.5	-4.65	4	28.16	19.51	89.331	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-4.63	3.79	28.34	19.92	98.175	Vertical	Pass
		1745	-5.07	3.95	28.22	19.20	83.176	Vertical	Pass
		1770	-5.64	3.97	28.18	18.57	71.945	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 $55 + \log_{10}(P)$ [Watts].

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

TEST PROCEDURE

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

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

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

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

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

MODES TESTED

- ☐ LTE Band 2/4/5/7/12/17/66

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	-51.92	4.04	33.51	-22.45	-13	-9.45	Horizontal
3701.4	-53.70	4.04	33.51	-24.23	-13	-11.23	Vertical
5552.1	-46.41	5.24	35.84	-15.81	-13	-2.81	Vertical
5552.1	-49.19	5.24	35.84	-18.59	-13	-5.59	Horizontal
201.9	-38.87	1.43	16.02	-24.28	-13	-11.28	Vertical
383.3	-41.28	1.30	17.99	-24.59	-13	-11.59	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-48.10	4.04	33.56	-18.58	-13	-5.58	Horizontal
3760.0	-45.50	4.04	33.56	-15.98	-13	-2.98	Vertical
5640.0	-44.78	5.24	35.91	-14.11	-13	-1.11	Vertical
5640.0	-52.80	5.24	35.91	-22.13	-13	-9.13	Horizontal
205.0	-40.44	1.62	16.97	-25.09	-13	-12.09	Vertical
468.2	-36.15	1.74	15.98	-21.92	-13	-8.92	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-53.86	4.04	34.00	-23.90	-13	-10.90	Horizontal
3818.6	-44.68	4.04	34.00	-14.72	-13	-1.72	Vertical
5727.9	-45.52	5.24	36.04	-14.72	-13	-1.72	Vertical
5727.9	-50.71	5.24	36.04	-19.91	-13	-6.91	Horizontal
193.9	-34.34	1.42	17.29	-18.47	-13	-5.47	Vertical
359.9	-34.36	1.50	17.90	-17.95	-13	-4.95	Horizontal

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

Test Results for Low Channel 1860MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720.0	-50.84	4.07	33.54	-21.37	-13	-8.37	Horizontal
3720.0	-49.62	4.07	33.54	-20.15	-13	-7.15	Vertical
5580.0	-44.64	5.28	35.86	-14.06	-13	-1.06	Vertical
5580.0	-49.34	5.28	35.86	-18.76	-13	-5.76	Horizontal
202.8	-37.96	1.58	16.89	-22.64	-13	-9.64	Vertical
245.1	-40.25	1.76	17.26	-24.75	-13	-11.75	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-52.64	4.04	33.56	-23.12	-13	-10.12	Horizontal
3760.0	-45.89	4.04	33.56	-16.37	-13	-3.37	Vertical
5640.0	-47.76	5.24	35.91	-17.09	-13	-4.09	Vertical
5640.0	-50.78	5.24	35.91	-20.11	-13	-7.11	Horizontal
202.3	-35.57	1.46	16.27	-20.76	-13	-7.76	Vertical
291.7	-41.32	1.59	15.15	-27.76	-13	-14.76	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-52.96	4.04	34.00	-23.00	-13	-10.00	Horizontal
3800.0	-50.47	4.04	34.00	-20.51	-13	-7.51	Vertical
5700.0	-48.10	5.24	36.04	-17.30	-13	-4.30	Vertical
5700.0	-50.64	5.24	36.04	-19.84	-13	-6.84	Horizontal
208.8	-35.56	1.36	17.39	-19.52	-13	-6.52	Vertical
293.4	-34.76	1.66	15.39	-21.03	-13	-8.03	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	-51.35	4.02	29.80	-25.57	-13	-12.57	Horizontal
3421.4	-49.49	4.02	29.80	-23.71	-13	-10.71	Vertical
5132.1	-48.01	5.24	35.84	-17.41	-13	-4.41	Vertical
5132.1	-53.87	5.24	35.84	-23.27	-13	-10.27	Horizontal
203.8	-35.72	1.68	16.04	-21.36	-13	-8.36	Vertical
245.6	-34.68	1.78	17.74	-18.72	-13	-5.72	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-51.64	4.03	30.00	-25.67	-13	-12.67	Horizontal
3465.0	-50.92	4.03	30.00	-24.95	-13	-11.95	Vertical
5197.5	-45.79	5.25	35.86	-15.18	-13	-2.18	Vertical
5197.5	-50.15	5.25	35.86	-19.54	-13	-6.54	Horizontal
186.7	-35.40	1.72	17.69	-19.43	-13	-6.43	Vertical
410.4	-39.02	1.62	16.02	-24.61	-13	-11.61	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-49.98	4.05	30.01	-24.02	-13	-11.02	Horizontal
3508.6	-51.22	4.05	30.01	-25.26	-13	-12.26	Vertical
5262.9	-48.17	5.26	35.86	-17.57	-13	-4.57	Vertical
5262.9	-51.55	5.26	35.86	-20.95	-13	-7.95	Horizontal
175.4	-34.68	1.80	16.69	-19.79	-13	-6.79	Vertical
293.1	-36.09	1.75	16.66	-21.19	-13	-8.19	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	-50.26	4.02	29.80	-24.48	-13	-11.48	Horizontal
3440.0	-46.75	4.02	29.80	-20.97	-13	-7.97	Vertical
5160.0	-44.95	5.24	35.84	-14.35	-13	-1.35	Vertical
5160.0	-51.66	5.24	35.84	-21.06	-13	-8.06	Horizontal
189.1	-39.08	1.57	17.26	-23.39	-13	-10.39	Vertical
432.7	-38.11	1.78	16.35	-23.54	-13	-10.54	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-53.85	4.03	30.00	-27.88	-13	-14.88	Horizontal
3465.0	-52.51	4.03	30.00	-26.54	-13	-13.54	Vertical
5197.5	-45.62	5.25	35.86	-15.01	-13	-2.01	Vertical
5197.5	-51.72	5.25	35.86	-21.11	-13	-8.11	Horizontal
197.0	-45.00	1.44	17.95	-28.49	-13	-15.49	Vertical
418.2	-39.77	1.65	16.09	-25.33	-13	-12.33	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-50.42	2.91	27.68	-25.65	-13	-12.65	Horizontal
3490.0	-46.29	2.91	27.68	-21.52	-13	-8.52	Vertical
5235.0	-50.81	5.26	35.86	-20.21	-13	-7.21	Vertical
5235.0	-50.85	5.26	35.86	-20.25	-13	-7.25	Horizontal
195.2	-39.38	1.61	16.85	-24.14	-13	-11.14	Vertical
435.2	-40.82	1.61	15.19	-27.24	-13	-14.24	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	-47.30	2.78	27.50	-22.58	-13	-9.58	Horizontal
1649.4	-49.56	2.78	27.50	-24.84	-13	-11.84	Vertical
2474.1	-50.81	2.90	27.80	-25.91	-13	-12.91	Vertical
2474.1	-52.26	2.90	27.80	-27.36	-13	-14.36	Horizontal
191.1	-42.76	1.76	17.59	-26.93	-13	-13.93	Vertical
394.5	-41.53	1.63	15.87	-27.29	-13	-14.29	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-51.68	2.80	27.48	-27.00	-13	-14.00	Horizontal
1673.0	-50.81	2.80	27.48	-26.13	-13	-13.13	Vertical
2509.5	-48.76	2.91	27.70	-23.97	-13	-10.97	Vertical
2509.5	-49.66	2.91	27.70	-24.87	-13	-11.87	Horizontal
209.4	-35.12	1.61	15.68	-21.05	-13	-8.05	Vertical
276.4	-39.77	1.59	17.52	-23.85	-13	-10.85	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-45.86	2.82	27.43	-21.25	-13	-8.25	Horizontal
1696.6	-44.82	2.82	27.43	-20.21	-13	-7.21	Vertical
2544.9	-47.00	2.92	27.74	-22.18	-13	-9.18	Vertical
2544.9	-53.74	2.92	27.74	-28.92	-13	-15.92	Horizontal
210.6	-39.25	1.69	16.67	-24.26	-13	-11.26	Vertical
290.0	-36.97	1.70	17.18	-21.49	-13	-8.49	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	-52.32	2.78	27.50	-27.60	-13	-14.60	Horizontal
1658.0	-47.08	2.78	27.50	-22.36	-13	-9.36	Vertical
2487.0	-50.58	2.90	27.80	-25.68	-13	-12.68	Vertical
2487.0	-50.34	2.90	27.80	-25.44	-13	-12.44	Horizontal
207.1	-44.40	1.71	15.57	-30.54	-13	-17.54	Vertical
273.2	-44.53	1.34	16.40	-29.47	-13	-16.47	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-47.32	2.80	27.48	-22.64	-13	-9.64	Horizontal
1673.0	-51.82	2.80	27.48	-27.14	-13	-14.14	Vertical
2509.5	-50.36	2.91	27.70	-25.57	-13	-12.57	Vertical
2509.5	-49.03	2.91	27.70	-24.24	-13	-11.24	Horizontal
204.4	-44.44	1.44	17.04	-28.84	-13	-15.84	Vertical
379.8	-36.01	1.76	17.62	-20.15	-13	-7.15	Horizontal
Test Results for High Channel 844MHz							
1688.0	-44.25	2.82	27.43	-19.64	-13	-6.64	Horizontal
1688.0	-52.85	2.82	27.43	-28.24	-13	-15.24	Vertical
2532.0	-48.32	2.92	27.74	-23.50	-13	-10.50	Vertical
2532.0	-51.26	2.92	27.74	-26.44	-13	-13.44	Horizontal
193.7	-39.90	1.74	17.70	-23.94	-13	-10.94	Vertical
314.0	-43.56	1.41	17.46	-27.50	-13	-14.50	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	-64.02	5.23	35.81	-33.44	-25	-8.44	Horizontal
5005.0	-63.63	5.23	35.81	-33.05	-25	-8.05	Vertical
7507.5	-64.59	5.67	36.85	-33.41	-25	-8.41	Vertical
7507.5	-59.06	5.67	36.85	-27.88	-25	-2.88	Horizontal
211.1	-50.29	1.73	17.97	-34.05	-25	-9.05	Vertical
277.7	-49.75	1.38	15.11	-36.02	-25	-11.02	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.11	5.23	35.82	-30.52	-25	-5.52	Horizontal
5070.0	-60.11	5.23	35.82	-29.52	-25	-4.52	Vertical
7605.0	-62.20	5.67	36.85	-31.02	-25	-6.02	Vertical
7605.0	-64.50	5.67	36.85	-33.32	-25	-8.32	Horizontal
200.4	-47.53	1.77	16.17	-33.12	-25	-8.12	Vertical
380.0	-47.68	1.63	15.21	-34.10	-25	-9.10	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-59.39	5.24	35.83	-28.80	-25	-3.80	Horizontal
5135.0	-62.19	5.24	35.83	-31.60	-25	-6.60	Vertical
7702.5	-63.53	5.68	36.87	-32.34	-25	-7.34	Vertical
7702.5	-62.91	5.68	36.87	-31.72	-25	-6.72	Horizontal
194.1	-51.20	1.58	17.56	-35.22	-25	-10.22	Vertical
438.7	-48.27	1.45	16.58	-33.14	-25	-8.14	Horizontal

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

Test Results for Low Channel 2510MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020.0	-60.22	5.23	35.82	-29.63	-25	-4.63	Horizontal
5020.0	-59.24	5.23	35.82	-28.65	-25	-3.65	Vertical
7530.0	-63.45	5.67	36.86	-32.26	-25	-7.26	Vertical
7530.0	-62.39	5.67	36.86	-31.20	-25	-6.20	Horizontal
211.1	-51.39	1.63	15.76	-37.26	-25	-12.26	Vertical
452.0	-53.69	1.71	15.44	-39.96	-25	-14.96	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.86	5.23	35.82	-31.27	-25	-6.27	Horizontal
5070.0	-60.79	5.23	35.82	-30.20	-25	-5.20	Vertical
7605.0	-59.07	5.67	36.85	-27.89	-25	-2.89	Vertical
7605.0	-59.64	5.67	36.85	-28.46	-25	-3.46	Horizontal
179.3	-45.52	1.79	16.84	-30.46	-25	-5.46	Vertical
257.3	-54.46	1.71	17.64	-38.53	-25	-13.53	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-62.27	5.24	35.83	-31.68	-25	-6.68	Horizontal
5120.0	-60.22	5.24	35.83	-29.63	-25	-4.63	Vertical
7680.0	-64.67	5.70	36.88	-33.49	-25	-8.49	Vertical
7680.0	-63.10	5.70	36.88	-31.92	-25	-6.92	Horizontal
175.3	-46.64	1.79	16.84	-31.58	-25	-6.58	Vertical
404.1	-48.46	1.71	17.64	-32.53	-25	-7.53	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	-51.51	2.60	27.20	-26.91	-13	-13.91	Horizontal
1399.4	-50.68	2.60	27.20	-26.08	-13	-13.08	Vertical
2099.1	-45.33	2.85	27.54	-20.64	-13	-7.64	Vertical
2099.1	-52.84	2.85	27.54	-28.15	-13	-15.15	Horizontal
203.7	-42.76	1.49	17.78	-26.47	-13	-13.47	Vertical
348.4	-38.16	1.36	17.33	-22.19	-13	-9.19	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-52.65	2.61	27.28	-27.98	-13	-14.98	Horizontal
1415.0	-51.76	2.61	27.28	-27.09	-13	-14.09	Vertical
2122.5	-50.14	2.87	27.59	-25.42	-13	-12.42	Vertical
2122.5	-50.57	2.87	27.59	-25.85	-13	-12.85	Horizontal
187.9	-42.37	1.73	15.74	-28.36	-13	-15.36	Vertical
263.7	-34.46	1.62	15.79	-20.29	-13	-7.29	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-49.51	2.63	27.28	-24.86	-13	-11.86	Horizontal
1430.6	-44.37	2.63	27.28	-19.72	-13	-6.72	Vertical
2145.9	-45.76	2.88	27.60	-21.04	-13	-8.04	Vertical
2145.9	-50.00	2.88	27.60	-25.28	-13	-12.28	Horizontal
188.7	-38.23	1.61	18.00	-21.84	-13	-8.84	Vertical
275.8	-39.88	1.45	15.49	-25.85	-13	-12.85	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	-47.09	2.61	27.26	-22.44	-13	-9.44	Horizontal
1408.0	-50.46	2.61	27.26	-25.81	-13	-12.81	Vertical
2112.0	-50.43	2.87	27.58	-25.72	-13	-12.72	Vertical
2112.0	-50.01	2.87	27.58	-25.30	-13	-12.30	Horizontal
212.4	-39.40	1.31	16.97	-23.74	-13	-10.74	Vertical
369.2	-34.21	1.65	16.70	-19.16	-13	-6.16	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-44.73	2.61	27.28	-20.06	-13	-7.06	Horizontal
1415.0	-49.42	2.61	27.28	-24.75	-13	-11.75	Vertical
2122.5	-49.52	2.87	27.59	-24.80	-13	-11.80	Vertical
2122.5	-50.65	2.87	27.59	-25.93	-13	-12.93	Horizontal
204.6	-36.50	1.72	17.99	-20.23	-13	-7.23	Vertical
366.0	-34.08	1.73	17.94	-17.87	-13	-4.87	Horizontal
Test Results for High Channel 711MHz							
1422.0	-46.95	2.62	27.28	-22.29	-13	-9.29	Horizontal
1422.0	-49.92	2.62	27.28	-25.26	-13	-12.26	Vertical
2133.0	-46.50	2.87	27.60	-21.77	-13	-8.77	Vertical
2133.0	-49.77	2.87	27.60	-25.04	-13	-12.04	Horizontal
175.1	-37.27	1.58	15.93	-22.92	-13	-9.92	Vertical
458.3	-39.36	1.36	15.59	-25.13	-13	-12.13	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 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	-53.27	2.61	27.28	-28.60	-13	-15.60	Horizontal
1413.0	-47.93	2.61	27.28	-23.26	-13	-10.26	Vertical
2119.5	-53.52	2.87	27.59	-28.80	-13	-15.80	Vertical
2119.5	-50.75	2.87	27.59	-26.03	-13	-13.03	Horizontal
196.5	-37.96	1.71	16.15	-23.52	-13	-10.52	Vertical
359.1	-42.97	1.41	17.32	-27.06	-13	-14.06	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-46.94	2.62	27.30	-22.26	-13	-9.26	Horizontal
1420.0	-44.18	2.62	27.30	-19.50	-13	-6.50	Vertical
2130.0	-44.99	2.87	27.62	-20.24	-13	-7.24	Vertical
2130.0	-52.09	2.87	27.62	-27.34	-13	-14.34	Horizontal
180.3	-40.19	1.42	15.25	-26.37	-13	-13.37	Vertical
418.0	-39.56	1.36	17.19	-23.73	-13	-10.73	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-49.91	2.66	27.28	-25.29	-13	-12.29	Horizontal
1427.0	-50.78	2.66	27.28	-26.16	-13	-13.16	Vertical
2140.5	-53.33	2.88	27.60	-28.61	-13	-15.61	Vertical
2140.5	-50.51	2.88	27.60	-25.79	-13	-12.79	Horizontal
202.5	-37.17	1.32	17.29	-21.20	-13	-8.20	Vertical
270.5	-40.22	1.72	16.89	-25.05	-13	-12.05	Horizontal

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

Test Results for Low Channel 709MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1418.0	-47.73	2.62	27.30	-23.05	-13	-10.05	Horizontal
1418.0	-45.88	2.62	27.30	-21.20	-13	-8.20	Vertical
2127.0	-47.80	2.87	27.62	-23.05	-13	-10.05	Vertical
2127.0	-52.22	2.87	27.62	-27.47	-13	-14.47	Horizontal
180.9	-37.32	1.35	16.91	-21.76	-13	-8.76	Vertical
337.8	-43.17	1.62	16.31	-28.48	-13	-15.48	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-47.88	2.62	27.30	-23.20	-13	-10.20	Horizontal
1420.0	-49.26	2.62	27.30	-24.58	-13	-11.58	Vertical
2130.0	-47.59	2.87	27.62	-22.84	-13	-9.84	Vertical
2130.0	-53.48	2.87	27.62	-28.73	-13	-15.73	Horizontal
182.6	-34.24	1.51	17.14	-18.61	-13	-5.61	Vertical
240.2	-40.03	1.77	16.88	-24.92	-13	-11.92	Horizontal
Test Results for High Channel 711MHz							
1422.0	-46.73	2.62	27.30	-22.05	-13	-9.05	Horizontal
1422.0	-47.57	2.62	27.30	-22.89	-13	-9.89	Vertical
2133.0	-44.32	2.87	27.62	-19.57	-13	-6.57	Vertical
2133.0	-51.52	2.87	27.62	-26.77	-13	-13.77	Horizontal
183.9	-35.50	1.78	15.95	-21.33	-13	-8.33	Vertical
437.2	-34.62	1.34	17.95	-18.02	-13	-5.02	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 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	-54.11	4.02	29.80	-28.33	-13	-15.33	Horizontal
3421.4	-52.64	4.02	29.80	-26.86	-13	-13.86	Vertical
5132.1	-51.31	5.24	35.84	-20.71	-13	-7.71	Vertical
5132.1	-53.46	5.24	35.84	-22.86	-13	-9.86	Horizontal
112.6	-47.49	1.52	15.57	-33.44	-13	-20.44	Vertical
220.5	-51.23	1.33	17.14	-35.42	-13	-22.42	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-51.41	4.03	30.00	-25.44	-13	-12.44	Horizontal
3490.0	-49.68	4.03	30.00	-23.71	-13	-10.71	Vertical
5235.0	-49.20	5.25	35.86	-18.59	-13	-5.59	Vertical
5235.0	-52.92	5.25	35.86	-22.31	-13	-9.31	Horizontal
157.3	-47.04	1.53	17.13	-31.44	-13	-18.44	Vertical
213.1	-52.51	1.41	15.95	-37.97	-13	-24.97	Horizontal
Test Results for High Channel 1779.3MHz							
3558.6	-44.75	4.05	30.01	-18.79	-13	-5.79	Horizontal
3558.6	-47.25	4.05	30.01	-21.29	-13	-8.29	Vertical
5337.9	-54.21	5.26	35.86	-23.61	-13	-10.61	Vertical
5337.9	-52.20	5.26	35.86	-21.60	-13	-8.60	Horizontal
170.6	-47.56	1.44	15.51	-33.49	-13	-20.49	Vertical
169.0	-54.42	1.78	15.76	-40.44	-13	-27.44	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	-51.85	4.02	29.80	-26.07	-13	-13.07	Horizontal
3440.0	-44.59	4.02	29.80	-18.81	-13	-5.81	Vertical
5160.0	-54.93	5.24	35.84	-24.33	-13	-11.33	Vertical
5160.0	-53.46	5.24	35.84	-22.86	-13	-9.86	Horizontal
268.8	-47.71	1.62	17.02	-32.31	-13	-19.31	Vertical
161.4	-48.29	1.32	17.31	-32.30	-13	-19.30	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-52.19	4.03	30.00	-26.22	-13	-13.22	Horizontal
3490.0	-44.79	4.03	30.00	-18.82	-13	-5.82	Vertical
5235.0	-53.91	5.25	35.86	-23.30	-13	-10.30	Vertical
5235.0	-47.86	5.25	35.86	-17.25	-13	-4.25	Horizontal
159.9	-45.93	1.45	15.17	-32.21	-13	-19.21	Vertical
172.1	-50.15	1.48	17.82	-33.81	-13	-20.81	Horizontal
Test Results for High Channel 1770MHz							
3540.0	-48.33	2.91	27.68	-23.56	-13	-10.56	Horizontal
3540.0	-45.74	2.91	27.68	-20.97	-13	-7.97	Vertical
5310.0	-50.37	5.26	35.86	-19.77	-13	-6.77	Vertical
5310.0	-51.99	5.26	35.86	-21.39	-13	-8.39	Horizontal
197.3	-51.10	1.76	16.38	-36.48	-13	-23.48	Vertical
158.5	-46.09	1.43	17.13	-30.39	-13	-17.39	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ A_{Rpl} (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 6.62V, Normal, DC 3.7V and High voltage, DC 8.96V.

Frequency Stability vs Temperature:

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

Frequency Stability vs Voltage:

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

MODES TESTED

- ☐ LTE Band 2/4/5/7/12/17/66

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)				
3.15	1880	12.9	0.006847	2.5
3.7	1880	13.7	0.007303	2.5
4.26	1880	13.3	0.007077	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	12.5	0.006662	2.5
Extreme (50C)	1880	11.2	0.005947	2.5
Extreme (40C)	1880	13.9	0.007402	2.5
Extreme (30C)	1880	13.8	0.007328	2.5
Extreme (10C)	1880	13.8	0.007346	2.5
Extreme (0C)	1880	11.8	0.006280	2.5
Extreme (-10C)	1880	12.9	0.006842	2.5
Extreme (-20C)	1880	14.3	0.007608	2.5
Extreme (-30C)	1880	14.5	0.007737	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)				
3.15	1880	9.9	0.005276	2.5
3.7	1880	9.1	0.004860	2.5
4.26	1880	8.2	0.004356	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	9.7	0.005145	2.5
Extreme (50C)	1880	9.2	0.004912	2.5
Extreme (40C)	1880	8.1	0.004290	2.5
Extreme (30C)	1880	8.6	0.004551	2.5
Extreme (10C)	1880	8.8	0.004665	2.5
Extreme (0C)	1880	8.6	0.004561	2.5
Extreme (-10C)	1880	8.9	0.004759	2.5
Extreme (-20C)	1880	8.9	0.004733	2.5
Extreme (-30C)	1880	8.4	0.004467	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)				
3.15	1732.5	8.5	0.004903	2.5
3.7	1732.5	8.6	0.004952	2.5
4.26	1732.5	8.8	0.005073	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	8.6	0.004964	2.5
Extreme (50C)	1732.5	9.4	0.005401	2.5
Extreme (40C)	1732.5	7.6	0.004400	2.5
Extreme (30C)	1732.5	6.1	0.003538	2.5
Extreme (10C)	1732.5	7.5	0.004332	2.5
Extreme (0C)	1732.5	9.6	0.005569	2.5
Extreme (-10C)	1732.5	8.4	0.004856	2.5
Extreme (-20C)	1732.5	7.2	0.004169	2.5
Extreme (-30C)	1732.5	8.9	0.005125	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)				
3.15	1732.5	9.7	0.005606	2.5
3.7	1732.5	8.6	0.004951	2.5
4.26	1732.5	7.9	0.004548	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	9.7	0.005600	2.5
Extreme (50C)	1732.5	8.5	0.004888	2.5
Extreme (40C)	1732.5	8.5	0.004916	2.5
Extreme (30C)	1732.5	8.5	0.004928	2.5
Extreme (10C)	1732.5	8.9	0.005162	2.5
Extreme (0C)	1732.5	7.9	0.004554	2.5
Extreme (-10C)	1732.5	9.3	0.005344	2.5
Extreme (-20C)	1732.5	9.0	0.005213	2.5
Extreme (-30C)	1732.5	8.6	0.004960	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)				
3.15	836.5	6.0	0.007222	2.5
3.7	836.5	6.5	0.007807	2.5
4.26	836.5	4.8	0.005708	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	6.3	0.007569	2.5
Extreme (50C)	836.5	5.7	0.006819	2.5
Extreme (40C)	836.5	6.4	0.007635	2.5
Extreme (30C)	836.5	6.7	0.007973	2.5
Extreme (10C)	836.5	5.5	0.006565	2.5
Extreme (0C)	836.5	5.0	0.006005	2.5
Extreme (-10C)	836.5	5.6	0.006691	2.5
Extreme (-20C)	836.5	6.0	0.007231	2.5
Extreme (-30C)	836.5	6.1	0.007280	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)				
3.15	836.5	5.3	0.006338	2.5
3.7	836.5	6.8	0.008171	2.5
4.26	836.5	4.4	0.005227	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	5.7	0.006835	2.5
Extreme (50C)	836.5	5.9	0.007042	2.5
Extreme (40C)	836.5	5.9	0.007011	2.5
Extreme (30C)	836.5	6.3	0.007586	2.5
Extreme (10C)	836.5	4.9	0.005893	2.5
Extreme (0C)	836.5	5.4	0.006449	2.5
Extreme (-10C)	836.5	5.4	0.006466	2.5
Extreme (-20C)	836.5	6.5	0.007750	2.5
Extreme (-30C)	836.5	6.1	0.007307	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)				
3.15	2535	9.9	0.003888	2.5
3.7	2535	8.9	0.003509	2.5
4.26	2535	8.4	0.003308	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	0.003565	2.5
Extreme (50C)	2535	9.4	0.003708	2.5
Extreme (40C)	2535	8.8	0.003473	2.5
Extreme (30C)	2535	8.8	0.003466	2.5
Extreme (10C)	2535	7.6	0.003006	2.5
Extreme (0C)	2535	7.9	0.003127	2.5
Extreme (-10C)	2535	9.3	0.003655	2.5
Extreme (-20C)	2535	8.8	0.003479	2.5
Extreme (-30C)	2535	8.3	0.003276	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)				
3.15	2535	6.9	0.002718	2.5
3.7	2535	6.3	0.002480	2.5
4.26	2535	6.0	0.002382	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	6.7	0.002653	2.5
Extreme (50C)	2535	5.4	0.002129	2.5
Extreme (40C)	2535	5.5	0.002166	2.5
Extreme (30C)	2535	6.6	0.002606	2.5
Extreme (10C)	2535	5.6	0.002218	2.5
Extreme (0C)	2535	5.5	0.002151	2.5
Extreme (-10C)	2535	5.4	0.002111	2.5
Extreme (-20C)	2535	6.0	0.002355	2.5
Extreme (-30C)	2535	5.3	0.002071	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]
3.15	707.5	9.0	0.012753	2.5
3.7	707.5	9.6	0.013556	2.5
4.26	707.5	8.7	0.012267	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.7	0.012250	2.5
Extreme (50C)	707.5	7.9	0.011097	2.5
Extreme (40C)	707.5	6.9	0.009809	2.5
Extreme (30C)	707.5	8.1	0.011478	2.5
Extreme (10C)	707.5	7.0	0.009959	2.5
Extreme (0C)	707.5	9.5	0.013402	2.5
Extreme (-10C)	707.5	8.3	0.011692	2.5
Extreme (-20C)	707.5	8.6	0.012142	2.5
Extreme (-30C)	707.5	8.2	0.011550	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]
3.15	707.5	7.8	0.010991	2.5
3.7	707.5	8.6	0.012107	2.5
4.26	707.5	7.8	0.011036	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 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]
3.15	710.0	9.4	0.013201	2.5
3.7	710.0	8.9	0.012499	2.5
4.26	710.0	8.3	0.011677	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.9	0.013938	2.5
Extreme (50C)	710.0	8.9	0.012556	2.5
Extreme (40C)	710.0	8.6	0.012097	2.5
Extreme (30C)	710.0	8.7	0.012219	2.5
Extreme (10C)	710.0	9.2	0.013019	2.5
Extreme (0C)	710.0	8.3	0.011759	2.5
Extreme (-10C)	710.0	8.9	0.012558	2.5
Extreme (-20C)	710.0	9.3	0.013047	2.5
Extreme (-30C)	710.0	8.2	0.011573	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]
3.15	710.0	10.5	0.014733	2.5
3.7	710.0	8.9	0.012478	2.5
4.26	710.0	8.0	0.011258	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.7	0.013671	2.5
Extreme (50C)	710.0	8.5	0.011915	2.5
Extreme (40C)	710.0	8.8	0.012342	2.5
Extreme (30C)	710.0	8.5	0.011908	2.5
Extreme (10C)	710.0	7.7	0.010793	2.5
Extreme (0C)	710.0	8.4	0.011837	2.5
Extreme (-10C)	710.0	9.6	0.013582	2.5
Extreme (-20C)	710.0	8.6	0.012148	2.5
Extreme (-30C)	710.0	8.3	0.011700	2.5

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

10.7 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)				
3.15	1745	12.4	0.00708	2.5
3.7	1745	14.0	0.00803	2.5
4.26	1745	12.8	0.00734	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	7.1	0.004048	2.5
Extreme (50C)	1745	4.5	0.002550	2.5
Extreme (40C)	1745	5.5	0.003179	2.5
Extreme (30C)	1745	4.7	0.002700	2.5
Extreme (10C)	1745	6.5	0.003700	2.5
Extreme (0C)	1745	4.7	0.002701	2.5
Extreme (-10C)	1745	9.4	0.005365	2.5
Extreme (-20C)	1745	10.5	0.006032	2.5
Extreme (-30C)	1745	6.6	0.003786	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)				
3.15	1745	12.4	0.007114	2.5
3.7	1745	13.7	0.007840	2.5
4.26	1745	13.0	0.007457	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	7.5	0.004287	2.5
Extreme (50C)	1745	4.5	0.002586	2.5
Extreme (40C)	1745	5.5	0.003166	2.5
Extreme (30C)	1745	4.4	0.002515	2.5
Extreme (10C)	1745	6.8	0.003904	2.5
Extreme (0C)	1745	5.0	0.002886	2.5
Extreme (-10C)	1745	9.5	0.005427	2.5
Extreme (-20C)	1745	11.0	0.006299	2.5
Extreme (-30C)	1745	6.6	0.003787	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.

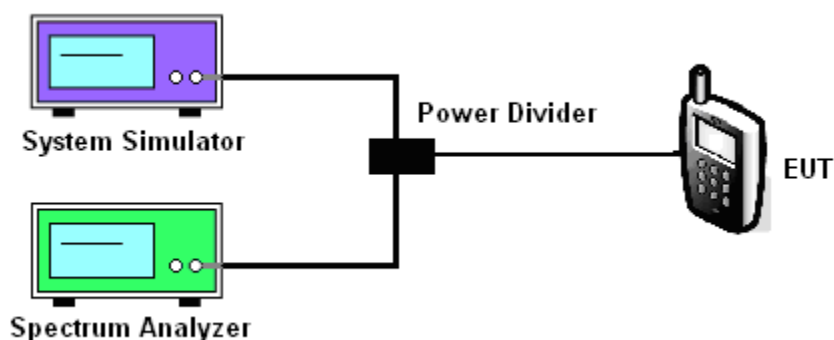
11.2 Measuring Instruments

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 2/4/5/7/12/17/66
- ☐

Test data reference attachment.

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