

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

FCC ID: ZSW-30-134

Product: Mobile Phone

Trade Mark: Bmobile

Model Number: BL55 PLUS

Family Model: BL55

Report No.: S23111404701005

Prepared for

b mobile HK Limited

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TEST RESULT CERTIFICATION

Applicant's name..... : b mobile HK Limited

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Kwai Chung; New Territories; Hong Kong, China

Manufacturer's Name..... : b mobile HK Limited

Address : Flat 18; 14/F Block 1; Golden Industrial Building;16-26 Kwai Tak Street;
Kwai Chung; New Territories; Hong Kong, China

Product name : Mobile Phone

Model and/or type reference : BL55 PLUS

Family Model: BL55

Test sample number S231114047001

Standards..... : FCC CFR 47 Part 22H, Part 24E, Part 27

Test procedure : ANSI C63.26:2015
ANSI/TIA-603-E-2016

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date (s) of performance of tests Nov 15, 2023 ~ Dec 01, 2023

Date of Issue Dec 01, 2023

Test Result **Pass**

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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	Bmobile
Model Name	BL55 PLUS
Family Model	BL55
Model Difference	All the model are the same circuit and RF module, except the memory
FCC ID:	ZSW-30-134
Frequency Bands:	U.S. Bands: ☒ LTE FDD Band 2, 4, 5, 7, 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; 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:	Band2:-0.33dBi; Band4:-0.35dBi; Band5:-0.51dBi; Band7:-0.47dBi; Band38:-0.43dBi;Band66:-0.36dBi;
Power Supply:	DC 3.8V/2500mAh from battery or DC 5V from Adapter.
Adapter:	INPUT: AC 100-240V~50-60Hz 0.2A OUTPUT: DC 5.0V---1A
Extreme Vol. Limits:	DC 3.4V to DC 4.4V (Nominal DC 3.8V) (Note 1)
HW Version	BL55_HW_V1.0, Bmobile_BL55_HW_V2.0
SW Version	Bmobile_BL55_DG_SV_V001, Bmobile_BL55_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: ZSW-30-134** 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 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

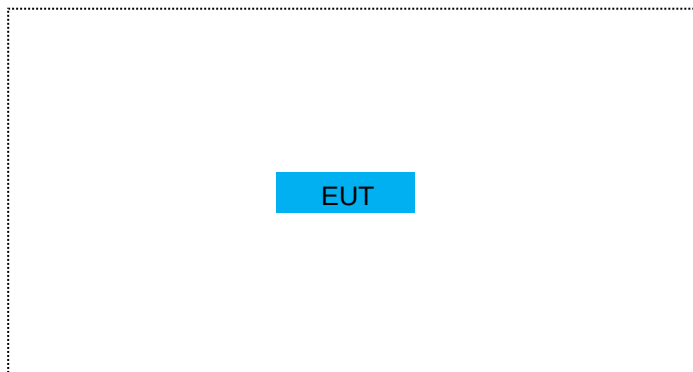
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Mobile Phone	BL55 PLUS	FCC ID: ZSW-30-134	EUT

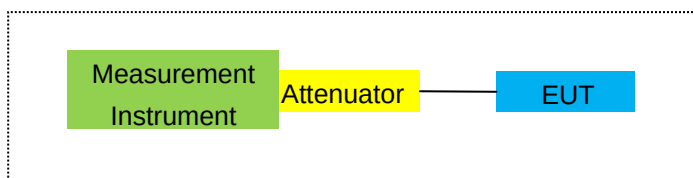
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

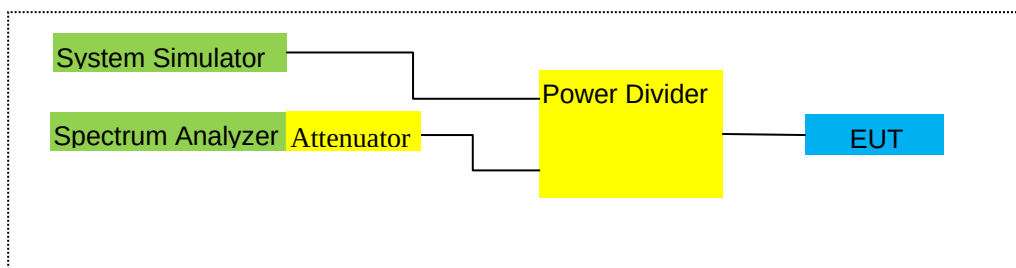
For Radiated Test Cases



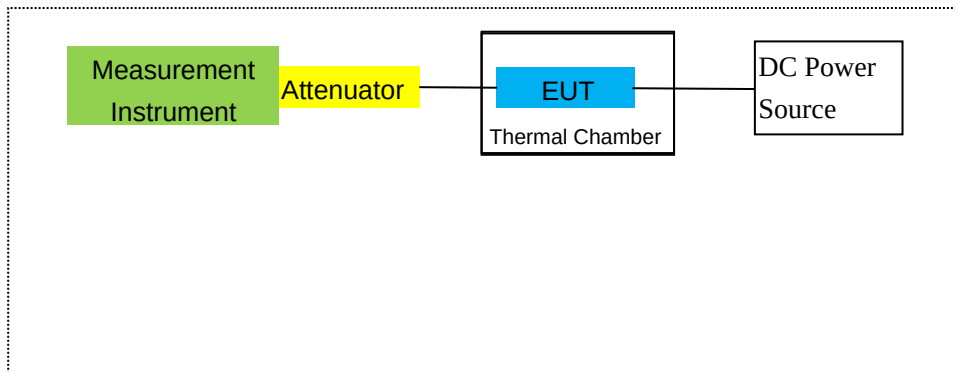
For Conducted Output Power



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

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

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

Set display line

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

MODES TESTED

- ☐ LTE Band 2/4/5/7/38/66

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 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 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	-3.05	3.76	28.24	21.43	138.995	Horizontal	Pass	
		1880	-2.86	3.91	28.22	21.45	139.637	Horizontal	Pass	
		1909.3	-2.77	3.93	28.20	21.50	141.254	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-3.11	3.77	28.23	21.35	136.458	Horizontal	Pass	
		1880	-2.96	3.91	28.24	21.37	137.088	Horizontal	Pass	
		1908.5	-2.83	3.94	28.25	21.48	140.605	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-3.00	3.77	28.31	21.54	142.561	Horizontal	Pass	
		1880	-2.62	3.91	28.22	21.69	147.571	Horizontal	Pass	
		1907.5	-2.55	3.94	28.20	21.71	148.252	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-2.86	3.79	28.33	21.68	147.231	Horizontal	Pass	
		1880	-2.56	3.95	28.22	21.71	148.252	Horizontal	Pass	
		1905	-2.45	3.97	28.19	21.77	150.314	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	1857.5	-2.82	3.79	28.34	21.73	148.936	Horizontal	Pass	
		1880	-2.61	3.95	28.22	21.66	146.555	Horizontal	Pass	
		1902.5	-2.47	3.97	28.18	21.74	149.279	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	1860	-2.81	3.81	28.35	21.73	148.936	Horizontal	Pass	
		1880	-2.48	3.96	28.22	21.78	150.661	Horizontal	Pass	
		1900	-2.42	4.00	28.16	21.74	149.279	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	1850.7	-3.98	3.76	28.24	20.50	112.202	Vertical	Pass	
		1880	-3.31	3.91	28.22	21.00	125.893	Vertical	Pass	
		1909.3	-3.80	3.93	28.20	20.47	111.429	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-3.54	3.77	28.23	20.92	123.595	Vertical	Pass	
		1880	-3.39	3.91	28.24	20.94	124.165	Vertical	Pass	
		1908.5	-3.64	3.94	28.25	20.67	116.681	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-3.75	3.77	28.31	20.79	119.950	Vertical	Pass	
		1880	-4.09	3.91	28.22	20.22	105.196	Vertical	Pass	
		1907.5	-3.16	3.94	28.20	21.10	128.825	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-3.91	3.79	28.33	20.63	115.611	Vertical	Pass	
		1880	-3.86	3.95	28.22	20.41	109.901	Vertical	Pass	
		1905	-3.33	3.97	28.19	20.89	122.744	Vertical	Pass	

15.0MHz	1/#Mid	1857.5	-4.01	3.79	28.34	20.54	113.240	Vertical	Pass
Band		1880	-3.51	3.95	28.22	20.76	119.124	Vertical	Pass
QPSK		1902.5	-4.02	3.97	28.18	20.19	104.472	Vertical	Pass
20.0MHz	1/#Mid	1860	-3.99	3.81	28.35	20.55	113.501	Vertical	Pass
Band		1880	-3.62	3.96	28.22	20.64	115.878	Vertical	Pass
QPSK		1900	-3.64	4.00	28.16	20.52	112.720	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)

J									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
						Average (dBm)	Average		
							(mW)		
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.17	3.76	28.24	20.31	107.399	Horizontal	Pass
		1880	-3.64	3.91	28.22	20.67	116.681	Horizontal	Pass
		1909.3	-3.57	3.93	28.20	20.70	117.490	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-3.67	3.77	28.23	20.79	119.950	Horizontal	Pass
		1880	-3.75	3.91	28.24	20.58	114.288	Horizontal	Pass
		1908.5	-3.96	3.94	28.25	20.35	108.393	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-3.61	3.77	28.31	20.93	123.880	Horizontal	Pass
		1880	-3.52	3.91	28.22	20.79	119.950	Horizontal	Pass
		1907.5	-3.20	3.94	28.20	21.06	127.644	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-3.66	3.79	28.33	20.88	122.462	Horizontal	Pass
		1880	-3.65	3.95	28.22	20.62	115.345	Horizontal	Pass
		1905	-3.12	3.97	28.19	21.10	128.825	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-3.64	3.79	28.34	20.91	123.310	Horizontal	Pass
		1880	-3.43	3.95	28.22	20.84	121.339	Horizontal	Pass
		1902.5	-3.39	3.97	28.18	20.82	120.781	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-3.53	3.81	28.35	21.01	126.183	Horizontal	Pass
		1880	-3.23	3.96	28.22	21.03	126.765	Horizontal	Pass
		1900	-3.05	4.00	28.16	21.11	129.122	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.41	3.76	28.24	20.07	101.625	Vertical	Pass
		1880	-4.47	3.91	28.22	19.84	96.383	Vertical	Pass
		1909.3	-4.28	3.93	28.20	19.99	99.770	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-4.32	3.77	28.23	20.14	103.276	Vertical	Pass
		1880	-5.11	3.91	28.24	19.22	83.560	Vertical	Pass
		1908.5	-4.78	3.94	28.25	19.53	89.743	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-4.79	3.77	28.31	19.75	94.406	Vertical	Pass
		1880	-4.69	3.91	28.22	19.62	91.622	Vertical	Pass
		1907.5	-4.95	3.94	28.20	19.31	85.310	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-4.54	3.79	28.33	20.00	100.000	Vertical	Pass
		1880	-5.12	3.95	28.22	19.15	82.224	Vertical	Pass
		1905	-4.29	3.97	28.19	19.93	98.401	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-4.77	3.79	28.34	19.78	95.060	Vertical	Pass
		1880	-4.54	3.95	28.22	19.73	93.972	Vertical	Pass
		1902.5	-4.14	3.97	28.18	20.07	101.625	Vertical	Pass

20.0MHz		1860	-4.42	3.81	28.35	20.12	102.802	Vertical	Pass
Band 16	1/#Mid	1880	-4.78	3.96	28.22	19.48	88.716	Vertical	Pass
QAM		1900	-4.32	4.00	28.16	19.84	96.383	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	Antenna Factor	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)	Average (dBm)	Average (mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-2.96	3.12	27.58	21.50	141.254	Horizontal	Pass
		1732.5	-2.95	3.27	27.61	21.39	137.721	Horizontal	Pass
		1754.3	-2.93	3.29	27.63	21.41	138.357	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.13	3.13	27.61	21.35	136.458	Horizontal	Pass
		1732.5	-3.05	3.27	27.61	21.29	134.586	Horizontal	Pass
		1753.5	-2.97	3.30	27.62	21.35	136.458	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.90	3.13	27.63	21.60	144.544	Horizontal	Pass
		1732.5	-2.80	3.27	27.61	21.54	142.561	Horizontal	Pass
		1752.5	-2.68	3.30	27.60	21.62	145.211	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-2.84	3.15	27.64	21.65	146.218	Horizontal	Pass
		1732.5	-2.61	3.31	27.61	21.69	147.571	Horizontal	Pass
		1750	-2.63	3.33	27.59	21.63	145.546	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-2.85	3.15	27.65	21.65	146.218	Horizontal	Pass
		1732.5	-2.69	3.31	27.61	21.61	144.877	Horizontal	Pass
		1747.5	-2.63	3.33	27.57	21.61	144.877	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-2.79	3.17	27.66	21.70	147.911	Horizontal	Pass
		1732.5	-2.62	3.32	27.61	21.67	146.893	Horizontal	Pass
		1745	-2.56	3.36	27.56	21.64	145.881	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-3.39	3.12	27.58	21.07	127.938	Vertical	Pass
		1732.5	-3.27	3.27	27.61	21.07	127.938	Vertical	Pass
		1754.3	-3.95	3.29	27.63	20.39	109.396	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.64	3.13	27.61	20.84	121.339	Vertical	Pass
		1732.5	-4.02	3.27	27.61	20.32	107.647	Vertical	Pass
		1753.5	-3.73	3.30	27.62	20.59	114.551	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-4.26	3.13	27.63	20.24	105.682	Vertical	Pass
		1732.5	-3.83	3.27	27.61	20.51	112.460	Vertical	Pass
		1752.5	-3.18	3.30	27.60	21.12	129.420	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-4.07	3.15	27.64	20.42	110.154	Vertical	Pass
		1732.5	-3.84	3.31	27.61	20.46	111.173	Vertical	Pass
		1750	-3.20	3.33	27.59	21.06	127.644	Vertical	Pass

15.0MHz	1/#Mid	1717.5	-3.38	3.15	27.65	21.12	129.420	Vertical	Pass
Band		1732.5	-3.24	3.31	27.61	21.06	127.644	Vertical	Pass
QPSK		1747.5	-3.87	3.33	27.57	20.37	108.893	Vertical	Pass
20.0MHz	1/#Mid	1720	-3.86	3.17	27.66	20.63	115.611	Vertical	Pass
Band		1732.5	-3.19	3.32	27.61	21.10	128.825	Vertical	Pass
QPSK		1745	-3.98	3.36	27.56	20.22	105.196	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 Loss	Antenna Factor	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	Average	Average	Of Max. ERP	
						(dBm)	(mW)		
1.4MHz	1/#Mid	1710.7	-3.77	3.12	27.58	20.69	117.220	Horizontal	Pass
Band 16		1732.5	-3.62	3.27	27.61	20.72	118.032	Horizontal	Pass
QAM		1754.3	-3.62	3.29	27.63	20.72	118.032	Horizontal	Pass
3.0MHz	1/#Mid	1711.5	-3.71	3.13	27.61	20.77	119.399	Horizontal	Pass
Band 16		1732.5	-3.84	3.27	27.61	20.50	112.202	Horizontal	Pass
QAM		1753.5	-4.06	3.30	27.62	20.26	106.170	Horizontal	Pass
5.0MHz	1/#Mid	1712.5	-3.54	3.13	27.63	20.96	124.738	Horizontal	Pass
Band 16		1732.5	-3.50	3.27	27.61	20.84	121.339	Horizontal	Pass
QAM		1752.5	-3.19	3.30	27.60	21.11	129.122	Horizontal	Pass
10.0MHz	1/#Mid	1715	-3.61	3.15	27.64	20.88	122.462	Horizontal	Pass
Band 16		1732.5	-3.80	3.31	27.61	20.50	112.202	Horizontal	Pass
QAM		1750	-3.18	3.33	27.59	21.08	128.233	Horizontal	Pass
15.0MHz	1/#Mid	1717.5	-3.41	3.15	27.65	21.09	128.529	Horizontal	Pass
Band 16		1732.5	-3.47	3.31	27.61	20.83	121.060	Horizontal	Pass
QAM		1747.5	-3.49	3.33	27.57	20.75	118.850	Horizontal	Pass
20.0MHz	1/#Mid	1720	-3.36	3.17	27.66	21.13	129.718	Horizontal	Pass
Band 16		1732.5	-3.37	3.32	27.61	20.92	123.595	Horizontal	Pass
QAM		1745	-3.18	3.36	27.56	21.02	126.474	Horizontal	Pass
1.4MHz	1/#Mid	1710.7	-5.17	3.12	27.58	19.29	84.918	Vertical	Pass
Band 16		1732.5	-4.20	3.27	27.61	20.14	103.276	Vertical	Pass
QAM		1754.3	-4.81	3.29	27.63	19.53	89.743	Vertical	Pass
3.0MHz	1/#Mid	1711.5	-5.04	3.13	27.61	19.44	87.902	Vertical	Pass
Band 16		1732.5	-5.08	3.27	27.61	19.26	84.333	Vertical	Pass
QAM		1753.5	-4.62	3.30	27.62	19.70	93.325	Vertical	Pass
5.0MHz	1/#Mid	1712.5	-4.37	3.13	27.63	20.13	103.039	Vertical	Pass
Band 16		1732.5	-4.70	3.27	27.61	19.64	92.045	Vertical	Pass
QAM		1752.5	-5.11	3.30	27.60	19.19	82.985	Vertical	Pass
10.0MHz	1/#Mid	1715	-4.49	3.15	27.64	20.00	100.000	Vertical	Pass
Band 16		1732.5	-4.35	3.31	27.61	19.95	98.855	Vertical	Pass
QAM		1750	-5.04	3.33	27.59	19.22	83.560	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-4.58	3.15	27.65	19.92	98.175	Vertical	Pass
Band 16		1732.5	-5.04	3.31	27.61	19.26	84.333	Vertical	Pass
QAM		1747.5	-4.53	3.33	27.57	19.71	93.541	Vertical	Pass

20.0MHz		1720	-4.95	3.17	27.66	19.54	89.950	Vertical	Pass
Band 16	1/#Mid	1732.5	-4.71	3.32	27.61	19.58	90.782	Vertical	Pass
QAM		1745	-4.98	3.36	27.56	19.22	83.560	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	
							(dBm)	(mW)		
1.4MHz	3/#Mid	824.7	6.34	2.01	19.68	2.15	21.86	153.462	Horizontal	Pass
Band		836.5	6.22	2.01	19.77	2.15	21.83	152.405	Horizontal	Pass
QPSK		848.3	6.02	2.02	19.82	2.15	21.67	146.893	Horizontal	Pass
3.0MHz	1/#Mid	825.5	6.11	2.01	19.70	2.15	21.65	146.218	Horizontal	Pass
Band		836.5	6.01	2.01	19.77	2.15	21.62	145.211	Horizontal	Pass
QPSK		847.5	5.88	2.02	19.81	2.15	21.52	141.906	Horizontal	Pass
5.0MHz	1/#Mid	826.5	6.39	2.01	19.71	2.15	21.94	156.315	Horizontal	Pass
Band		836.5	6.27	2.01	19.77	2.15	21.88	154.170	Horizontal	Pass
QPSK		846.5	6.11	2.02	19.79	2.15	21.73	148.936	Horizontal	Pass
10.0MHz	1/#Mid	829	6.41	2.01	19.73	2.15	21.98	157.761	Horizontal	Pass
Band		836.5	6.36	2.01	19.77	2.15	21.97	157.398	Horizontal	Pass
QPSK		844	6.26	2.02	19.78	2.15	21.87	153.815	Horizontal	Pass
1.4MHz	1/#Mid	824.7	5.30	2.01	19.68	2.15	20.82	120.781	Vertical	Pass
Band		836.5	4.71	2.01	19.77	2.15	20.32	107.647	Vertical	Pass
QPSK		848.3	5.13	2.02	19.82	2.15	20.78	119.674	Vertical	Pass
3.0MHz	1/#Mid	825.5	4.87	2.01	19.70	2.15	20.41	109.901	Vertical	Pass
Band		836.5	5.47	2.01	19.77	2.15	21.08	128.233	Vertical	Pass
QPSK		847.5	5.48	2.02	19.81	2.15	21.12	129.420	Vertical	Pass
5.0MHz	1/#Mid	826.5	5.57	2.01	19.71	2.15	21.12	129.420	Vertical	Pass
Band		836.5	4.74	2.01	19.77	2.15	20.35	108.393	Vertical	Pass
QPSK		846.5	4.72	2.02	19.79	2.15	20.34	108.143	Vertical	Pass
10.0MHz	1/#Mid	829	5.31	2.01	19.73	2.15	20.88	122.462	Vertical	Pass
Band		836.5	4.99	2.01	19.77	2.15	20.60	114.815	Vertical	Pass
QPSK		844	4.57	2.02	19.78	2.15	20.18	104.232	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.	Max.	Polarization	
			Level	Loss	Factor		EIRP	EIRP	Of Max.	
			(dBm)	(dBm)	(dB)		Average	Average	ERP	
						(dB)	(dBm)	(mW)		
1.4MHz	3/#Mid	824.7	5.49	2.01	19.68	2.15	21.01	126.183	Horizontal	Pass
Band 16		836.5	5.42	2.01	19.77	2.15	21.03	126.765	Horizontal	Pass
QAM		848.3	5.26	2.02	19.82	2.15	20.91	123.310	Horizontal	Pass
3.0MHz	1/#Mid	825.5	5.57	2.01	19.70	2.15	21.11	129.122	Horizontal	Pass
Band 16		836.5	5.28	2.01	19.77	2.15	20.89	122.744	Horizontal	Pass
QAM		847.5	4.76	2.02	19.81	2.15	20.40	109.648	Horizontal	Pass
5.0MHz	1/#Mid	826.5	5.89	2.01	19.71	2.15	21.44	139.316	Horizontal	Pass
Band 16		836.5	5.66	2.01	19.77	2.15	21.27	133.968	Horizontal	Pass
QAM		846.5	5.41	2.02	19.79	2.15	21.03	126.765	Horizontal	Pass
10.0MHz	1/#Mid	829	5.89	2.01	19.73	2.15	21.46	139.959	Horizontal	Pass
Band 16		836.5	5.61	2.01	19.77	2.15	21.22	132.434	Horizontal	Pass
QAM		844	5.15	2.02	19.78	2.15	20.76	119.124	Horizontal	Pass
1.4MHz	1/#Mid	824.7	3.64	2.01	19.68	2.15	19.16	82.414	Vertical	Pass
Band 16		836.5	5.30	2.01	19.77	2.15	20.91	123.310	Vertical	Pass
QAM		848.3	3.54	2.02	19.82	2.15	19.19	82.985	Vertical	Pass
3.0MHz	1/#Mid	825.5	3.86	2.01	19.70	2.15	19.40	87.096	Vertical	Pass
Band 16		836.5	4.75	2.01	19.77	2.15	20.36	108.643	Vertical	Pass
QAM		847.5	3.77	2.02	19.81	2.15	19.41	87.297	Vertical	Pass
5.0MHz	1/#Mid	826.5	5.16	2.01	19.71	2.15	20.71	117.761	Vertical	Pass
Band 16		836.5	4.85	2.01	19.77	2.15	20.46	111.173	Vertical	Pass
QAM		846.5	4.20	2.02	19.79	2.15	19.82	95.940	Vertical	Pass
10.0MHz	1/#Mid	829	3.73	2.01	19.73	2.15	19.30	85.114	Vertical	Pass
Band 16		836.5	5.34	2.01	19.77	2.15	20.95	124.451	Vertical	Pass
QAM		844	4.36	2.02	19.78	2.15	19.97	99.312	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	Cable Loss	Antenna Factor	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)	Average (dBm)	Average (mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	-1.24	4.54	27.75	21.97	157.398	Horizontal	Pass
		2535	-1.07	4.69	27.72	21.96	157.036	Horizontal	Pass
		2567.5	-1.00	4.71	27.71	22.00	158.489	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-1.17	4.55	27.76	22.04	159.956	Horizontal	Pass
		2535	-0.98	4.69	27.72	22.05	160.325	Horizontal	Pass
		2565	-0.90	4.72	27.70	22.08	161.436	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-1.18	4.55	27.77	22.04	159.956	Horizontal	Pass
		2535	-1.04	4.69	27.72	21.99	158.125	Horizontal	Pass
		2562.5	-0.94	4.72	27.69	22.03	159.588	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-1.12	4.57	27.78	22.09	161.808	Horizontal	Pass
		2535	-0.94	4.73	27.72	22.05	160.325	Horizontal	Pass
		2560	-0.90	4.75	27.68	22.03	159.588	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-2.29	4.54	27.75	20.92	123.595	Vertical	Pass
		2535	-2.82	4.69	27.72	20.21	104.954	Vertical	Pass
		2567.5	-2.79	4.71	27.71	20.21	104.954	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-2.51	4.55	27.76	20.70	117.490	Vertical	Pass
		2535	-2.47	4.69	27.72	20.56	113.763	Vertical	Pass
		2565	-2.76	4.72	27.70	20.22	105.196	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-2.22	4.55	27.77	21.00	125.893	Vertical	Pass
		2535	-2.16	4.69	27.72	20.87	122.180	Vertical	Pass
		2562.5	-2.56	4.72	27.69	20.41	109.901	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-2.49	4.57	27.78	20.72	118.032	Vertical	Pass
		2535	-2.81	4.73	27.72	20.18	104.232	Vertical	Pass
		2560	-2.11	4.75	27.68	20.82	120.781	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG	Cable	Antenna	Max.	Max.	Polarization	
			Level	Loss	Factor	EIRP	EIRP	Of Max.	
			(dBm)	(dBm)	(dB)	Average	Average	ERP	
5.0MHz	1/#Mid	2502.5	-1.93	4.54	27.75	21.28	134.276	Horizontal	Pass
Band 16		2535	-1.62	4.69	27.72	21.41	138.357	Horizontal	Pass
QAM		2567.5	-1.70	4.71	27.71	21.30	134.896	Horizontal	Pass
10.0MHz	1/#Mid	2505	-1.82	4.55	27.76	21.39	137.721	Horizontal	Pass
Band 16		2535	-1.83	4.69	27.72	21.20	131.826	Horizontal	Pass
QAM		2565	-2.10	4.72	27.70	20.88	122.462	Horizontal	Pass
15.0MHz	1/#Mid	2507.5	-2.00	4.55	27.77	21.22	132.434	Horizontal	Pass
Band 16		2535	-1.97	4.69	27.72	21.06	127.644	Horizontal	Pass
QAM		2562.5	-1.58	4.72	27.69	21.39	137.721	Horizontal	Pass
20.0MHz	1/#Mid	2510	-1.88	4.57	27.78	21.33	135.831	Horizontal	Pass
Band 16		2535	-1.55	4.73	27.72	21.44	139.316	Horizontal	Pass
QAM		2560	-1.65	4.75	27.68	21.28	134.276	Horizontal	Pass
5.0MHz	1/#Mid	2502.5	-3.95	4.54	27.75	19.26	84.333	Vertical	Pass
Band 16		2535	-2.12	4.69	27.72	20.91	123.310	Vertical	Pass
QAM		2567.5	-3.45	4.71	27.71	19.55	90.157	Vertical	Pass
10.0MHz	1/#Mid	2505	-2.19	4.55	27.76	21.02	126.474	Vertical	Pass
Band 16		2535	-2.76	4.69	27.72	20.27	106.414	Vertical	Pass
QAM		2565	-2.50	4.72	27.70	20.48	111.686	Vertical	Pass
15.0MHz	1/#Mid	2507.5	-2.26	4.55	27.77	20.96	124.738	Vertical	Pass
Band 16		2535	-3.73	4.69	27.72	19.30	85.114	Vertical	Pass
QAM		2562.5	-2.64	4.72	27.69	20.33	107.895	Vertical	Pass
20.0MHz	1/#Mid	2510	-4.00	4.57	27.78	19.21	83.368	Vertical	Pass
Band 16		2535	-2.93	4.73	27.72	20.06	101.391	Vertical	Pass
QAM		2560	-2.49	4.75	27.68	20.44	110.662	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)

8.7 LTE BAND 38

Radiated Power (EIRP) for Band 38									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG	Cable	Antenna	Max. EIRP	Max. EIRP	Polarization	
			Level	Loss	Gain			Of Max.	
			(dBm)	(dBm)	(dB)	Average	Average	ERP	
						(dBm)	(mW)		
5.0MHz	25/0	2572.5	-2.12	4.95	27.79	20.17	103.992	Vertical	Pass
Band		2595	-2.64	4.88	27.71	20.29	106.905	Vertical	Pass
QPSK		2617.5	-2.58	4.93	27.95	20.16	103.753	Vertical	Pass
5.0MHz	25/0	2572.5	-2.37	4.81	27.73	20.46	111.173	Vertical	Pass
Band 16		2595	-2.47	4.95	27.81	20.47	111.429	Vertical	Pass
QAM		2617.5	-2.59	5.03	27.69	20.90	123.027	Vertical	Pass
10.0MHz	50/0	2575	-2.98	5.01	27.86	20.82	120.781	Vertical	Pass
Band		2595	-2.6	5	27.65	21.10	128.825	Vertical	Pass
QPSK		2615	-2.67	4.87	27.89	20.72	118.032	Vertical	Pass
10.0MHz	50/0	2575	-2.71	4.77	27.78	20.47	111.429	Vertical	Pass
Band 16		2595	-2.38	4.87	27.87	20.45	110.917	Vertical	Pass
QAM		2615	-2.56	4.94	27.77	20.42	110.154	Vertical	Pass
15.0MHz	75/0	2577.5	-2.9	4.89	27.88	20.57	114.025	Vertical	Pass
Band		2595	-2.32	4.87	27.84	20.57	114.025	Vertical	Pass
QPSK		2612.5	-2.52	4.92	27.93	20.35	108.393	Vertical	Pass
15.0MHz	75/0	2577.5	-2.53	4.75	27.78	20.24	105.682	Vertical	Pass
Band 16		2595	-2.53	4.98	27.82	20.69	117.220	Vertical	Pass
QAM		2612.5	-2.6	4.95	27.83	20.74	118.577	Vertical	Pass
20.0MHz	100/0	2580	-2.53	4.86	27.8	20.23	105.439	Vertical	Pass
Band		2595	-2.37	4.79	27.83	21.75	149.624	Vertical	Pass
QPSK		2610	-2.68	4.89	27.87	20.95	124.451	Vertical	Pass
20.0MHz	100/0	2580	-2.87	4.95	27.73	20.94	124.165	Vertical	Pass
Band 16		2595	-2.88	4.91	27.71	20.64	115.878	Vertical	Pass
QAM		2610	-2.81	4.96	27.92	20.24	105.682	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 Of Max. ERP	
			(dBm)	(dBm)	(dB)	Average (dBm)	Average (mW)		
5.0MHz Band QPSK	25/0	2572.5	-2.12	4.95	27.79	20.72	118.032	Horizontal	Pass
		2595	-2.64	4.88	27.71	20.90	123.027	Horizontal	Pass
		2617.5	-2.58	4.93	27.95	20.87	122.180	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	2572.5	-2.37	4.81	27.73	21.21	132.130	Horizontal	Pass
		2595	-2.47	4.95	27.81	21.09	128.529	Horizontal	Pass
		2617.5	-2.59	5.03	27.69	20.94	124.165	Horizontal	Pass
10.0MHz Band QPSK	50/0	2575	-2.98	5.01	27.86	20.61	115.080	Horizontal	Pass
		2595	-2.6	5	27.65	20.49	111.944	Horizontal	Pass
		2615	-2.67	4.87	27.89	20.29	106.905	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	2575	-2.71	4.77	27.78	20.43	110.408	Horizontal	Pass
		2595	-2.38	4.87	27.87	21.01	126.183	Horizontal	Pass
		2615	-2.56	4.94	27.77	20.75	118.850	Horizontal	Pass
15.0MHz Band QPSK	75/0	2577.5	-2.9	4.89	27.88	20.73	118.304	Horizontal	Pass
		2595	-2.32	4.87	27.84	20.36	108.643	Horizontal	Pass
		2612.5	-2.52	4.92	27.93	20.55	113.501	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	2577.5	-2.53	4.75	27.78	20.65	116.145	Horizontal	Pass
		2595	-2.53	4.98	27.82	20.51	112.460	Horizontal	Pass
		2612.5	-2.6	4.95	27.83	20.87	122.180	Horizontal	Pass
20.0MHz Band QPSK	100/0	2580	-2.53	4.86	27.8	20.64	115.878	Horizontal	Pass
		2595	-2.37	4.79	27.83	21.22	132.434	Horizontal	Pass
		2610	-2.68	4.89	27.87	20.88	122.462	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	2580	-2.87	4.95	27.73	20.77	119.399	Horizontal	Pass
		2595	-2.88	4.91	27.71	20.98	125.314	Horizontal	Pass
		2610	-2.81	4.96	27.92	21.87	153.815	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)

8.8 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 Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1710.7	-2.81	3.76	28.24	21.67	146.893	Horizontal	Pass
		1745	-2.67	3.91	28.22	21.64	145.881	Horizontal	Pass
		1779.3	-2.54	3.93	28.2	21.73	148.936	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-2.87	3.77	28.23	21.59	144.212	Horizontal	Pass
		1745	-2.78	3.91	28.24	21.55	142.889	Horizontal	Pass
		1778.5	-2.80	3.94	28.25	21.51	141.579	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.77	3.77	28.31	21.77	150.314	Horizontal	Pass
		1745	-2.45	3.91	28.22	21.86	153.462	Horizontal	Pass
		1777.5	-2.51	3.94	28.2	21.75	149.624	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-2.66	3.79	28.33	21.88	154.170	Horizontal	Pass
		1745	-2.39	3.95	28.22	21.88	154.170	Horizontal	Pass
		1775	-2.40	3.97	28.19	21.82	152.055	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-2.68	3.79	28.34	21.87	153.815	Horizontal	Pass
		1745	-2.49	3.95	28.22	21.78	150.661	Horizontal	Pass
		1772.5	-2.44	3.97	28.18	21.77	150.314	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-2.65	3.81	28.35	21.89	154.525	Horizontal	Pass
		1745	-2.39	3.96	28.22	21.87	153.815	Horizontal	Pass
		1770	-2.41	4	28.16	21.75	149.624	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-4.07	3.76	28.24	20.41	109.901	Vertical	Pass
		1745	-3.85	3.91	28.22	20.46	111.173	Vertical	Pass
		1779.3	-3.97	3.93	28.2	20.30	107.152	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-4.28	3.77	28.23	20.18	104.232	Vertical	Pass
		1745	-3.38	3.91	28.24	20.95	124.451	Vertical	Pass
		1778.5	-3.88	3.94	28.25	20.43	110.408	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-4.39	3.77	28.31	20.15	103.514	Vertical	Pass
		1745	-3.45	3.91	28.22	20.86	121.899	Vertical	Pass
		1777.5	-3.60	3.94	28.2	20.66	116.413	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-4.27	3.79	28.34	20.28	106.660	Vertical	Pass
		1745	-3.76	3.95	28.22	20.51	112.460	Vertical	Pass
		1775	-3.06	3.97	28.18	21.15	130.317	Vertical	Pass

15.0MHz		1717.5	-3.82	3.81	28.35	20.72	118.032	Vertical	Pass
Band	1/#Mid	1745	-3.51	3.96	28.22	20.75	118.850	Vertical	Pass
QPSK		1772.5	-3.47	4	28.16	20.69	117.220	Vertical	Pass
20.0MHz		1720	-4.20	3.79	28.34	20.35	108.393	Vertical	Pass
Band	1/#Mid	1745	-3.21	3.95	28.22	21.06	127.644	Vertical	Pass
QPSK		1770	-3.51	3.97	28.18	20.70	117.490	Vertical	Pass

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	1/#Mid	1710.7	-3.64	3.76	28.24	20.84	121.339	Horizontal	Pass
Band 16		1745	-3.25	3.91	28.22	21.06	127.644	Horizontal	Pass
QAM		1779.3	-3.43	3.93	28.2	20.84	121.339	Horizontal	Pass
3.0MHz	1/#Mid	1711.5	-4.03	3.77	28.23	20.43	110.408	Horizontal	Pass
Band 16		1745	-3.28	3.91	28.24	21.05	127.350	Horizontal	Pass
QAM		1778.5	-3.57	3.94	28.25	20.74	118.577	Horizontal	Pass
5.0MHz	1/#Mid	1712.5	-3.45	3.77	28.31	21.09	128.529	Horizontal	Pass
Band 16		1745	-3.51	3.91	28.22	20.80	120.226	Horizontal	Pass
QAM		1777.5	-3.18	3.94	28.2	21.08	128.233	Horizontal	Pass
10.0MHz	1/#Mid	1715	-3.50	3.79	28.33	21.04	127.057	Horizontal	Pass
Band 16		1745	-3.16	3.95	28.22	21.11	129.122	Horizontal	Pass
QAM		1775	-3.48	3.97	28.19	20.74	118.577	Horizontal	Pass
15.0MHz	1/#Mid	1717.5	-3.49	3.79	28.34	21.06	127.644	Horizontal	Pass
Band 16		1745	-3.31	3.95	28.22	20.96	124.738	Horizontal	Pass
QAM		1772.5	-3.10	3.97	28.18	21.11	129.122	Horizontal	Pass
20.0MHz	1/#Mid	1720	-3.32	3.81	28.35	21.22	132.434	Horizontal	Pass
Band 16		1745	-3.10	3.96	28.22	21.16	130.617	Horizontal	Pass
QAM		1770	-3.04	4	28.16	21.12	129.420	Horizontal	Pass
1.4MHz	1/#Mid	1710.7	-4.43	3.76	28.24	20.05	101.158	Vertical	Pass
Band 16		1745	-4.54	3.91	28.22	19.77	94.842	Vertical	Pass
QAM		1779.3	-4.16	3.93	28.2	20.11	102.565	Vertical	Pass
3.0MHz	1/#Mid	1711.5	-4.47	3.77	28.23	19.99	99.770	Vertical	Pass
Band 16		1745	-3.29	3.91	28.24	21.04	127.057	Vertical	Pass
QAM		1778.5	-4.65	3.94	28.25	19.66	92.470	Vertical	Pass
5.0MHz	1/#Mid	1712.5	-5.14	3.77	28.31	19.40	87.096	Vertical	Pass
Band 16		1745	-3.80	3.91	28.22	20.51	112.460	Vertical	Pass
QAM		1777.5	-5.06	3.94	28.2	19.20	83.176	Vertical	Pass
10.0MHz	1/#Mid	1715	-4.40	3.79	28.34	20.15	103.514	Vertical	Pass
Band 16		1745	-3.85	3.95	28.22	20.42	110.154	Vertical	Pass
QAM		1775	-3.51	3.97	28.18	20.70	117.490	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-3.93	3.81	28.35	20.61	115.080	Vertical	Pass
Band 16		1745	-5.05	3.96	28.22	19.21	83.368	Vertical	Pass

QAM		1772.5	-5.00	4	28.16	19.16	82.414	Vertical	Pass
20.0MHz	1/#Mid	1720	-4.21	3.79	28.34	20.34	108.143	Vertical	Pass
Band 16		1745	-4.28	3.95	28.22	19.99	99.770	Vertical	Pass
QAM		1770	-3.89	3.97	28.18	20.32	107.647	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 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	-48.77	4.04	33.51	-19.30	-13	-6.30	Horizontal
3701.4	-50.22	4.04	33.51	-20.75	-13	-7.75	Vertical
5552.1	-49.06	5.24	35.84	-18.46	-13	-5.46	Vertical
5552.1	-50.35	5.24	35.84	-19.75	-13	-6.75	Horizontal
206.8	-44.90	1.43	16.02	-30.31	-13	-17.31	Vertical
423.4	-41.91	1.30	17.99	-25.22	-13	-12.22	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-45.65	4.04	33.56	-16.13	-13	-3.13	Horizontal
3760.0	-51.94	4.04	33.56	-22.42	-13	-9.42	Vertical
5640.0	-53.07	5.24	35.91	-22.40	-13	-9.40	Vertical
5640.0	-51.28	5.24	35.91	-20.61	-13	-7.61	Horizontal
175.5	-41.50	1.62	16.97	-26.15	-13	-13.15	Vertical
424.1	-37.27	1.74	15.98	-23.04	-13	-10.04	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-46.38	4.04	34.00	-16.42	-13	-3.42	Horizontal
3818.6	-53.73	4.04	34.00	-23.77	-13	-10.77	Vertical
5727.9	-49.69	5.24	36.04	-18.89	-13	-5.89	Vertical
5727.9	-51.29	5.24	36.04	-20.49	-13	-7.49	Horizontal
211.6	-43.04	1.42	17.29	-27.17	-13	-14.17	Vertical
258.1	-37.27	1.50	17.90	-20.86	-13	-7.86	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	-51.02	4.07	33.54	-21.55	-13	-8.55	Horizontal
3720.0	-48.41	4.07	33.54	-18.94	-13	-5.94	Vertical
5580.0	-52.36	5.28	35.86	-21.78	-13	-8.78	Vertical
5580.0	-50.71	5.28	35.86	-20.13	-13	-7.13	Horizontal
212.6	-40.97	1.58	16.89	-25.65	-13	-12.65	Vertical
446.9	-35.27	1.76	17.26	-19.77	-13	-6.77	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-50.16	4.04	33.56	-20.64	-13	-7.64	Horizontal
3760.0	-53.75	4.04	33.56	-24.23	-13	-11.23	Vertical
5640.0	-52.36	5.24	35.91	-21.69	-13	-8.69	Vertical
5640.0	-50.27	5.24	35.91	-19.60	-13	-6.60	Horizontal
204.5	-41.67	1.46	16.27	-26.86	-13	-13.86	Vertical
307.8	-39.31	1.59	15.15	-25.75	-13	-12.75	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-55.45	4.04	34.00	-25.49	-13	-12.49	Horizontal
3800.0	-48.95	4.04	34.00	-18.99	-13	-5.99	Vertical
5700.0	-48.46	5.24	36.04	-17.66	-13	-4.66	Vertical
5700.0	-50.58	5.24	36.04	-19.78	-13	-6.78	Horizontal
195.5	-41.01	1.36	17.39	-24.97	-13	-11.97	Vertical
457.8	-40.62	1.66	15.39	-26.89	-13	-13.89	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	-44.12	4.02	29.80	-18.34	-13	-5.34	Horizontal
3421.4	-47.52	4.02	29.80	-21.74	-13	-8.74	Vertical
5132.1	-47.93	5.24	35.84	-17.33	-13	-4.33	Vertical
5132.1	-49.79	5.24	35.84	-19.19	-13	-6.19	Horizontal
175.5	-44.38	1.68	16.04	-30.02	-13	-17.02	Vertical
280.1	-34.89	1.78	17.74	-18.93	-13	-5.93	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-47.42	4.03	30.00	-21.45	-13	-8.45	Horizontal
3465.0	-46.86	4.03	30.00	-20.89	-13	-7.89	Vertical
5197.5	-52.25	5.25	35.86	-21.64	-13	-8.64	Vertical
5197.5	-52.12	5.25	35.86	-21.51	-13	-8.51	Horizontal
207.2	-43.32	1.72	17.69	-27.35	-13	-14.35	Vertical
235.7	-36.67	1.62	16.02	-22.26	-13	-9.26	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-46.41	4.05	30.01	-20.45	-13	-7.45	Horizontal
3508.6	-44.18	4.05	30.01	-18.22	-13	-5.22	Vertical
5262.9	-48.09	5.26	35.86	-17.49	-13	-4.49	Vertical
5262.9	-49.18	5.26	35.86	-18.58	-13	-5.58	Horizontal
180.3	-36.78	1.80	16.69	-21.89	-13	-8.89	Vertical
287.1	-44.34	1.75	16.66	-29.44	-13	-16.44	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	-45.35	4.02	29.80	-19.57	-13	-6.57	Horizontal
3440.0	-52.34	4.02	29.80	-26.56	-13	-13.56	Vertical
5160.0	-48.08	5.24	35.84	-17.48	-13	-4.48	Vertical
5160.0	-51.67	5.24	35.84	-21.07	-13	-8.07	Horizontal
200.3	-43.88	1.57	17.26	-28.19	-13	-15.19	Vertical
390.2	-41.69	1.78	16.35	-27.12	-13	-14.12	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-52.13	4.03	30.00	-26.16	-13	-13.16	Horizontal
3465.0	-47.80	4.03	30.00	-21.83	-13	-8.83	Vertical
5197.5	-49.07	5.25	35.86	-18.46	-13	-5.46	Vertical
5197.5	-49.66	5.25	35.86	-19.05	-13	-6.05	Horizontal
210.0	-40.34	1.44	17.95	-23.83	-13	-10.83	Vertical
358.5	-40.05	1.65	16.09	-25.61	-13	-12.61	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-46.02	2.91	27.68	-21.25	-13	-8.25	Horizontal
3490.0	-52.43	2.91	27.68	-27.66	-13	-14.66	Vertical
5235.0	-51.74	5.26	35.86	-21.14	-13	-8.14	Vertical
5235.0	-49.75	5.26	35.86	-19.15	-13	-6.15	Horizontal
179.1	-44.88	1.61	16.85	-29.64	-13	-16.64	Vertical
411.4	-40.40	1.61	15.19	-26.82	-13	-13.82	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	-47.27	2.78	27.50	-22.55	-13	-9.55	Horizontal
1649.4	-46.69	2.78	27.50	-21.97	-13	-8.97	Vertical
2474.1	-45.19	2.90	27.80	-20.29	-13	-7.29	Vertical
2474.1	-50.97	2.90	27.80	-26.07	-13	-13.07	Horizontal
186.7	-38.66	1.76	17.59	-22.83	-13	-9.83	Vertical
410.6	-37.02	1.63	15.87	-22.78	-13	-9.78	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-47.48	2.80	27.48	-22.80	-13	-9.80	Horizontal
1673.0	-44.07	2.80	27.48	-19.39	-13	-6.39	Vertical
2509.5	-44.39	2.91	27.70	-19.60	-13	-6.60	Vertical
2509.5	-49.79	2.91	27.70	-25.00	-13	-12.00	Horizontal
191.0	-39.98	1.61	15.68	-25.91	-13	-12.91	Vertical
313.5	-43.03	1.59	17.52	-27.11	-13	-14.11	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-52.25	2.82	27.43	-27.64	-13	-14.64	Horizontal
1696.6	-44.23	2.82	27.43	-19.62	-13	-6.62	Vertical
2544.9	-53.62	2.92	27.74	-28.80	-13	-15.80	Vertical
2544.9	-52.42	2.92	27.74	-27.60	-13	-14.60	Horizontal
177.8	-41.68	1.69	16.67	-26.69	-13	-13.69	Vertical
261.8	-41.84	1.70	17.18	-26.36	-13	-13.36	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	-52.25	2.78	27.50	-27.53	-13	-14.53	Horizontal
1658.0	-50.17	2.78	27.50	-25.45	-13	-12.45	Vertical
2487.0	-45.82	2.90	27.80	-20.92	-13	-7.92	Vertical
2487.0	-51.37	2.90	27.80	-26.47	-13	-13.47	Horizontal
180.4	-38.04	1.71	15.57	-24.18	-13	-11.18	Vertical
375.3	-34.41	1.34	16.40	-19.35	-13	-6.35	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-47.27	2.80	27.48	-22.59	-13	-9.59	Horizontal
1673.0	-52.94	2.80	27.48	-28.26	-13	-15.26	Vertical
2509.5	-51.94	2.91	27.70	-27.15	-13	-14.15	Vertical
2509.5	-51.57	2.91	27.70	-26.78	-13	-13.78	Horizontal
201.1	-38.27	1.44	17.04	-22.67	-13	-9.67	Vertical
374.2	-43.47	1.76	17.62	-27.61	-13	-14.61	Horizontal
Test Results for High Channel 844MHz							
1688.0	-47.17	2.82	27.43	-22.56	-13	-9.56	Horizontal
1688.0	-53.98	2.82	27.43	-29.37	-13	-16.37	Vertical
2532.0	-46.58	2.92	27.74	-21.76	-13	-8.76	Vertical
2532.0	-52.09	2.92	27.74	-27.27	-13	-14.27	Horizontal
202.6	-44.93	1.74	17.70	-28.97	-13	-15.97	Vertical
378.4	-43.08	1.41	17.46	-27.02	-13	-14.02	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	-62.08	5.23	35.81	-31.50	-25	-6.50	Horizontal
5005.0	-62.71	5.23	35.81	-32.13	-25	-7.13	Vertical
7507.5	-62.45	5.67	36.85	-31.27	-25	-6.27	Vertical
7507.5	-61.35	5.67	36.85	-30.17	-25	-5.17	Horizontal
200.7	-47.03	1.73	17.97	-30.79	-25	-5.79	Vertical
361.0	-53.70	1.38	15.11	-39.97	-25	-14.97	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-63.64	5.23	35.82	-33.05	-25	-8.05	Horizontal
5070.0	-64.55	5.23	35.82	-33.96	-25	-8.96	Vertical
7605.0	-64.54	5.67	36.85	-33.36	-25	-8.36	Vertical
7605.0	-63.05	5.67	36.85	-31.87	-25	-6.87	Horizontal
212.1	-44.97	1.77	16.17	-30.56	-25	-5.56	Vertical
469.4	-50.83	1.63	15.21	-37.25	-25	-12.25	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-63.88	5.24	35.83	-33.29	-25	-8.29	Horizontal
5135.0	-64.08	5.24	35.83	-33.49	-25	-8.49	Vertical
7702.5	-59.43	5.68	36.87	-28.24	-25	-3.24	Vertical
7702.5	-64.03	5.68	36.87	-32.84	-25	-7.84	Horizontal
212.0	-51.69	1.58	17.56	-35.71	-25	-10.71	Vertical
379.3	-48.60	1.45	16.58	-33.47	-25	-8.47	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	-59.40	5.23	35.82	-28.81	-25	-3.81	Horizontal
5020.0	-61.94	5.23	35.82	-31.35	-25	-6.35	Vertical
7530.0	-64.37	5.67	36.86	-33.18	-25	-8.18	Vertical
7530.0	-61.02	5.67	36.86	-29.83	-25	-4.83	Horizontal
187.3	-46.72	1.63	15.76	-32.59	-25	-7.59	Vertical
272.3	-47.08	1.71	15.44	-33.35	-25	-8.35	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-60.62	5.23	35.82	-30.03	-25	-5.03	Horizontal
5070.0	-60.87	5.23	35.82	-30.28	-25	-5.28	Vertical
7605.0	-60.03	5.67	36.85	-28.85	-25	-3.85	Vertical
7605.0	-64.11	5.67	36.85	-32.93	-25	-7.93	Horizontal
208.8	-51.96	1.79	16.84	-36.90	-25	-11.90	Vertical
241.5	-52.47	1.71	17.64	-36.54	-25	-11.54	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-64.90	5.24	35.83	-34.31	-25	-9.31	Horizontal
5120.0	-59.59	5.24	35.83	-29.00	-25	-4.00	Vertical
7680.0	-60.34	5.70	36.88	-29.16	-25	-4.16	Vertical
7680.0	-59.55	5.70	36.88	-28.37	-25	-3.37	Horizontal
180.7	-46.12	1.79	16.84	-31.06	-25	-6.06	Vertical
261.8	-45.39	1.71	17.64	-29.46	-25	-4.46	Horizontal

9.6 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	-58.00	4.01	27.5	-34.51	-25	-9.51	Horizontal
5145	-58.65	4.01	27.5	-35.16	-25	-10.16	Vertical
7717.5	-58.03	5.09	27.8	-35.32	-25	-10.32	Vertical
7717.5	-61.81	5.09	27.8	-39.10	-25	-14.10	Horizontal
Test Results For Mid Channel 2595MHz							
5190	-59.20	4.1	27.48	-35.82	-25	-10.82	Horizontal
5190	-60.78	4.1	27.48	-37.40	-25	-12.40	Vertical
7785	-57.90	5.42	27.7	-35.62	-25	-10.62	Vertical
7785	-59.27	5.42	27.7	-36.99	-25	-11.99	Horizontal
Test Results for High Channel 2617.5MHz							
5234	-61.95	4.11	27.43	-38.63	-25	-13.63	Horizontal
5234	-63.14	4.11	27.43	-39.82	-25	-14.82	Vertical
7851	-59.96	5.31	27.74	-37.53	-25	-12.53	Vertical
7851	-59.89	5.31	27.74	-37.46	-25	-12.46	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	-57.91	3.89	27.5	-34.30	-25	-9.30	Horizontal
5160	-60.56	3.89	27.5	-36.95	-25	-11.95	Vertical
7740	-59.66	5.33	27.8	-37.19	-25	-12.19	Vertical
7740	-62.61	5.33	27.8	-40.14	-25	-15.14	Horizontal
Test Results for Mid Channel 2595MHz							
5190	-61.13	4.1	27.48	-37.75	-25	-12.75	Horizontal
5190	-60.86	4.1	27.48	-37.48	-25	-12.48	Vertical
7785	-61.71	5.42	27.7	-39.43	-25	-14.43	Vertical
7785	-59.87	5.42	27.7	-37.59	-25	-12.59	Horizontal
Test Results for High Channel 2610MHz							
5220	-61.82	4.01	27.43	-38.40	-25	-13.40	Horizontal
5220	-59.93	4.01	27.43	-36.51	-25	-11.51	Vertical
7830	-60.24	5.34	27.74	-37.84	-25	-12.84	Vertical
7830	-58.19	5.34	27.74	-35.79	-25	-10.79	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.

9.7 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	-54.66	4.02	29.80	-28.88	-13	-15.88	Horizontal
3421.4	-46.71	4.02	29.80	-20.93	-13	-7.93	Vertical
5132.1	-52.48	5.24	35.84	-21.88	-13	-8.88	Vertical
5132.1	-51.22	5.24	35.84	-20.62	-13	-7.62	Horizontal
112.6	-46.35	1.52	15.57	-32.30	-13	-19.30	Vertical
220.5	-47.19	1.33	17.14	-31.38	-13	-18.38	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-44.17	4.03	30.00	-18.20	-13	-5.20	Horizontal
3490.0	-47.82	4.03	30.00	-21.85	-13	-8.85	Vertical
5235.0	-51.29	5.25	35.86	-20.68	-13	-7.68	Vertical
5235.0	-54.09	5.25	35.86	-23.48	-13	-10.48	Horizontal
157.3	-45.10	1.53	17.13	-29.50	-13	-16.50	Vertical
213.1	-50.64	1.41	15.95	-36.10	-13	-23.10	Horizontal
Test Results for High Channel 1779.3MHz							
3558.6	-48.50	4.05	30.01	-22.54	-13	-9.54	Horizontal
3558.6	-53.00	4.05	30.01	-27.04	-13	-14.04	Vertical
5337.9	-54.55	5.26	35.86	-23.95	-13	-10.95	Vertical
5337.9	-52.93	5.26	35.86	-22.33	-13	-9.33	Horizontal
170.6	-44.73	1.44	15.51	-30.66	-13	-17.66	Vertical
169.0	-49.35	1.78	15.76	-35.37	-13	-22.37	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	-52.24	4.02	29.80	-26.46	-13	-13.46	Horizontal
3440.0	-44.68	4.02	29.80	-18.90	-13	-5.90	Vertical
5160.0	-53.99	5.24	35.84	-23.39	-13	-10.39	Vertical
5160.0	-47.95	5.24	35.84	-17.35	-13	-4.35	Horizontal
268.8	-49.23	1.62	17.02	-33.83	-13	-20.83	Vertical
161.4	-49.67	1.32	17.31	-33.68	-13	-20.68	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-52.27	4.03	30.00	-26.30	-13	-13.30	Horizontal
3490.0	-49.58	4.03	30.00	-23.61	-13	-10.61	Vertical
5235.0	-53.92	5.25	35.86	-23.31	-13	-10.31	Vertical
5235.0	-49.50	5.25	35.86	-18.89	-13	-5.89	Horizontal
159.9	-48.32	1.45	15.17	-34.60	-13	-21.60	Vertical
172.1	-50.16	1.48	17.82	-33.82	-13	-20.82	Horizontal
Test Results for High Channel 1770MHz							
3540.0	-54.83	2.91	27.68	-30.06	-13	-17.06	Horizontal
3540.0	-54.40	2.91	27.68	-29.63	-13	-16.63	Vertical
5310.0	-51.08	5.26	35.86	-20.48	-13	-7.48	Vertical
5310.0	-49.41	5.26	35.86	-18.81	-13	-5.81	Horizontal
197.3	-50.94	1.76	16.38	-36.32	-13	-23.32	Vertical
158.5	-48.85	1.43	17.13	-33.15	-13	-20.15	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 3.8V 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 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	0.006901	2.5
3.8	1880	14.1	0.007523	2.5
4.4	1880	13.4	0.007148	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	12.8	0.006827	2.5
Extreme (50C)	1880	11.6	0.006189	2.5
Extreme (40C)	1880	13.3	0.007059	2.5
Extreme (30C)	1880	13.3	0.007101	2.5
Extreme (10C)	1880	14.3	0.007610	2.5
Extreme (0C)	1880	11.7	0.006241	2.5
Extreme (-10C)	1880	13.4	0.007127	2.5
Extreme (-20C)	1880	14.4	0.007660	2.5
Extreme (-30C)	1880	14.4	0.007672	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1880	10.2	0.005434	2.5
3.8	1880	9.3	0.004925	2.5
4.4	1880	7.7	0.004106	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	9.6	0.005113	2.5
Extreme (50C)	1880	9.2	0.004867	2.5
Extreme (40C)	1880	8.1	0.004292	2.5
Extreme (30C)	1880	8.9	0.004714	2.5
Extreme (10C)	1880	9.1	0.004864	2.5
Extreme (0C)	1880	8.5	0.004544	2.5
Extreme (-10C)	1880	8.8	0.004695	2.5
Extreme (-20C)	1880	8.5	0.004513	2.5
Extreme (-30C)	1880	8.1	0.004326	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	8.8	0.005096	2.5
3.8	1732.5	9.2	0.005317	2.5
4.4	1732.5	8.5	0.004879	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	0.004974	2.5
Extreme (50C)	1732.5	8.6	0.004957	2.5
Extreme (40C)	1732.5	7.1	0.004121	2.5
Extreme (30C)	1732.5	5.8	0.003337	2.5
Extreme (10C)	1732.5	7.4	0.004265	2.5
Extreme (0C)	1732.5	9.6	0.005569	2.5
Extreme (-10C)	1732.5	8.1	0.004666	2.5
Extreme (-20C)	1732.5	7.0	0.004036	2.5
Extreme (-30C)	1732.5	7.9	0.004574	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	10.0	0.005751	2.5
3.8	1732.5	9.3	0.005363	2.5
4.4	1732.5	7.7	0.004438	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	10.1	0.005841	2.5
Extreme (50C)	1732.5	8.9	0.005149	2.5
Extreme (40C)	1732.5	8.5	0.004910	2.5
Extreme (30C)	1732.5	9.2	0.005315	2.5
Extreme (10C)	1732.5	9.3	0.005379	2.5
Extreme (0C)	1732.5	8.4	0.004859	2.5
Extreme (-10C)	1732.5	8.7	0.005043	2.5
Extreme (-20C)	1732.5	8.6	0.004962	2.5
Extreme (-30C)	1732.5	7.7	0.004433	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	6.1	0.007304	2.5
3.8	836.5	6.5	0.007782	2.5
4.4	836.5	4.4	0.005206	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	0.006994	2.5
Extreme (50C)	836.5	5.4	0.006496	2.5
Extreme (40C)	836.5	6.1	0.007294	2.5
Extreme (30C)	836.5	6.2	0.007447	2.5
Extreme (10C)	836.5	5.5	0.006517	2.5
Extreme (0C)	836.5	4.8	0.005794	2.5
Extreme (-10C)	836.5	5.1	0.006142	2.5
Extreme (-20C)	836.5	6.3	0.007481	2.5
Extreme (-30C)	836.5	6.1	0.007247	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	0.006603	2.5
3.8	836.5	6.2	0.007436	2.5
4.4	836.5	4.8	0.005744	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	6.1	0.007319	2.5
Extreme (50C)	836.5	6.3	0.007496	2.5
Extreme (40C)	836.5	5.8	0.006966	2.5
Extreme (30C)	836.5	6.8	0.008114	2.5
Extreme (10C)	836.5	5.6	0.006645	2.5
Extreme (0C)	836.5	5.4	0.006434	2.5
Extreme (-10C)	836.5	5.1	0.006139	2.5
Extreme (-20C)	836.5	5.9	0.007094	2.5
Extreme (-30C)	836.5	6.7	0.008065	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	10.4	0.004094	2.5
3.8	2535	9.0	0.003542	2.5
4.4	2535	8.7	0.003416	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	9.7	0.003833	2.5
Extreme (50C)	2535	9.1	0.003586	2.5
Extreme (40C)	2535	8.4	0.003298	2.5
Extreme (30C)	2535	9.4	0.003704	2.5
Extreme (10C)	2535	8.6	0.003373	2.5
Extreme (0C)	2535	8.4	0.003311	2.5
Extreme (-10C)	2535	8.9	0.003530	2.5
Extreme (-20C)	2535	8.8	0.003462	2.5
Extreme (-30C)	2535	8.6	0.003391	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	6.4	0.002522	2.5
3.8	2535	6.1	0.002413	2.5
4.4	2535	6.1	0.002397	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	6.9	0.002737	2.5
Extreme (50C)	2535	5.4	0.002130	2.5
Extreme (40C)	2535	5.1	0.002008	2.5
Extreme (30C)	2535	6.3	0.002486	2.5
Extreme (10C)	2535	5.8	0.002275	2.5
Extreme (0C)	2535	5.0	0.001981	2.5
Extreme (-10C)	2535	5.1	0.002029	2.5
Extreme (-20C)	2535	6.2	0.002439	2.5
Extreme (-30C)	2535	5.8	0.002271	2.5

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

10.6 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	8.1	0.003117	2.5
3.8	2595	6.5	0.002486	2.5
4.4	2595	7.3	0.002812	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	7.5	0.002902	2.5
Extreme (50C)	2595	4.8	0.001853	2.5
Extreme (40C)	2595	5.7	0.002185	2.5
Extreme (30C)	2595	4.3	0.001642	2.5
Extreme (10C)	2595	6.1	0.002351	2.5
Extreme (0C)	2595	5.2	0.001993	2.5
Extreme (-10C)	2595	10.0	0.003835	2.5
Extreme (-20C)	2595	11.2	0.004317	2.5
Extreme (-30C)	2595	6.3	0.002444	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	8.2	0.003177	2.5
3.8	2595	6.6	0.002548	2.5
4.4	2595	6.6	0.002537	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	7.9	0.003038	2.5
Extreme (50C)	2595	5.2	0.002002	2.5
Extreme (40C)	2595	5.1	0.001953	2.5
Extreme (30C)	2595	4.6	0.001762	2.5
Extreme (10C)	2595	6.9	0.002652	2.5
Extreme (0C)	2595	5.2	0.001987	2.5
Extreme (-10C)	2595	9.7	0.003728	2.5
Extreme (-20C)	2595	10.9	0.004208	2.5
Extreme (-30C)	2595	5.8	0.002249	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)				
3.4	1745	12.9	0.00739	2.5
3.8	1745	13.6	0.00778	2.5
4.4	1745	13.2	0.00757	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	7.7	0.004437	2.5
Extreme (50C)	1745	5.2	0.002983	2.5
Extreme (40C)	1745	5.0	0.002838	2.5
Extreme (30C)	1745	4.3	0.002489	2.5
Extreme (10C)	1745	6.9	0.003964	2.5
Extreme (0C)	1745	4.5	0.002587	2.5
Extreme (-10C)	1745	9.1	0.005193	2.5
Extreme (-20C)	1745	10.8	0.006165	2.5
Extreme (-30C)	1745	6.0	0.003437	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	13.1	0.007518	2.5
3.8	1745	14.2	0.008157	2.5
4.4	1745	13.1	0.007501	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	7.0	0.004039	2.5
Extreme (50C)	1745	5.0	0.002866	2.5
Extreme (40C)	1745	5.2	0.002984	2.5
Extreme (30C)	1745	4.4	0.002527	2.5
Extreme (10C)	1745	6.3	0.003585	2.5
Extreme (0C)	1745	4.7	0.002693	2.5
Extreme (-10C)	1745	9.6	0.005474	2.5
Extreme (-20C)	1745	10.6	0.006056	2.5
Extreme (-30C)	1745	6.5	0.003731	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.

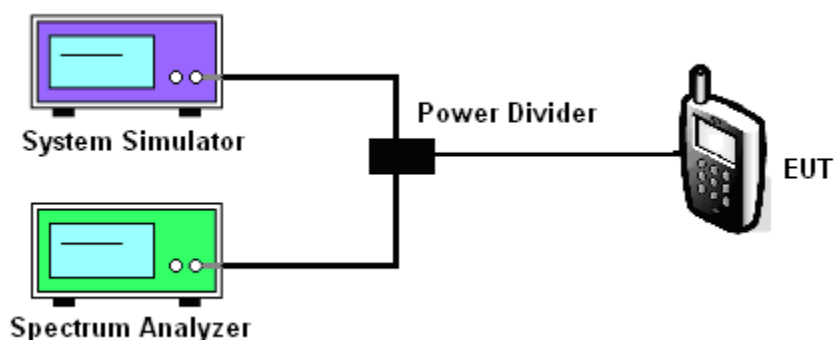
11.2 Measuring Instruments

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 2/4/5/7/38/66

☐

Test data reference attachment.

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