

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

FCC ID: 2AX4YV20

Product: Smart Phone
Trade Mark: DOOGEE
Model Number: V20
Family Model: S86Pro, S86, S97Pro, V10
Report No.: STR220222001006E

Prepared for

Shenzhen DOOGEE Hengtong Technology CO.,LTD
B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No. 22,
Dafu Industrial Zone, Guanlan Aobei Community, Guanlan Street,
Longhua New District, Shenzhen, Guangdong China

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.
1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street
Bao'an District, Shenzhen 518126 P.R. China
Tel. 400-800-6106, 0755-2320 0050, 0755-2320 0090
Website: <http://www.ntek.org.cn>

TEST RESULT CERTIFICATION

Applicant's name	Shenzhen DOOGEE Hengtong Technology CO.,LTD
Address	B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No. 22, Dafu Industrial Zone, Guanlan Aobei Community, Guanlan Street, Longhua New District, Shenzhen, Guangdong China
Manufacturer's Name	Shenzhen DOOGEE Hengtong Technology CO.,LTD
Address	B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No. 22, Dafu Industrial Zone, Guanlan Aobei Community, Guanlan Street, Longhua New District, Shenzhen, Guangdong China
Product name	Smart Phone
Model and/or type reference ..	V20
Family Model:	S86Pro, S86, S97Pro, V10
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.

This report shall not be reproduced except in full, without the written approval of NTEK, this document may be altered or revised by NTEK, personal only, and shall be noted in the revision of the document.

Date of Test	
Date (s) of performance of tests	Feb 22, 2022 ~Mar 28, 2022
Date of Issue	Mar 28, 2022
Test Result	Pass

Testing Engineer : Mukzi Lee
(Mukzi Lee)

Authorized Signatory : Alex
(Alex Li)

TABLE OF CONTENTS

1.1 PRODUCT DESCRIPTION	5
1.2 RELATED SUBMITTAL(S) / GRANT (S)	6
1.3 TEST METHODOLOGY	6
1.4 TEST FACILITY	6
MEASUREMENT UNCERTAINTY	6
1.5 SPECIAL ACCESSORIES	7
1.6 WORST-CASE CONFIGURATION AND MODE	7
1.6 SUMMARY OF TEST RESULTS	7
2. SYSTEM TEST CONFIGURATION	9
2.1 EUT CONFIGURATION	9
2.2 EUT EXERCISE	9
2.3 CONFIGURATION OF EUT SYSTEM	9
2.4 TEST SETUP	10
3. TEST AND MEASUREMENT EQUIPMENT	11
4. OUTPUT POWER	13
4.1 OUTPUT POWER MEASUREMENT	13
6. BANDEDGE AND EMISSION MASK	16
7. OUT OF BAND EMISSIONS	17
7.1 MEASUREMENT METHOD	18
8. RADIATED MEASUREMENT	19
8.1. RADIATED POWER (ERP & EIRP)	19
8.2 LTE BAND 2	20
8.3 LTE BAND 4	24
8.4 LTE BAND 5	28
8.5 LTE BAND 7	30
8.6 LTE BAND 12	32

8.7 LTE BAND 17	34
8.8 LTE BAND66	36
9. SPURIOUS RADIATION EMISSION	38
9.1 LTE BAND 2.....	40
9.2 LTE BAND 4.....	42
9.3 LTE BAND 5.....	44
9.4 LTE BAND 7.....	46
9.5 LTE BAND 12	48
9.6 LTE BAND 17	50
9.7 LTE BAND 66	52
10. FREQUENCY STABILITY	54
10.1 LTE BAND 2	55
10.2 LTE BAND 4	57
10.3 LTE BAND 5	59
10.4 LTE BAND 7	61
10.5 LTE BAND 12	63
10.6 LTE BAND 17	65
10.7 LTE BAND 66	67
11. PEAK-TO-AVERAGE RATIO.....	69
11.1 Description of the PAR Measurement.....	69
11.2 Measuring Instruments	69
11.3 Test Procedures.....	69
11.4 Test Setup.....	69

1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Smart Phone
Trade Mark	DOOGEE
Model Name	V20
Family Model	S86Pro, S86, S97Pro, V10
Model Difference	All the model are the same circuit and RF module,except the model names.
FCC ID:	2AX4YV20
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
Power Class	Class 3
Antenna:	PIFA Antenna
Antenna gain:	0.8dBi;
Adapter	Model: HJ-PD33W-US Input: AC 100-240V~50/60Hz, 0.8A Output: DC 5.0V---3.0A, DC 9.0V---3.0A, DC 11.0V---3.0A, 33.0W
Battery	DC 3.85V, 6000mAh, 23.1Wh
Power supply	DC 3.85V from battery or DC 11V from Adapter.
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.85V) (Note 1)
HW Version	A201_V01
SW Version	DOOGEE-V20-Android11.0-20211119

** Note1: The High Voltage 4.2V and Low Voltage 3.4V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AX4YV20** filing to comply with the FCC Part 22H&24E &27.

1.3 TEST METHODOLOGY

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

1.4 TEST FACILITY

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

ShenZhen NTEK Testing Technology Co., Ltd.

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

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

FCC Registration No.:463705

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.5dB
2	Conducted Emission Test	$\pm 1.38\text{dB}$
3	RF power, conducted	$\pm 0.16\text{dB}$
4	Spurious emissions, conducted	$\pm 0.21\text{dB}$
5	All emissions, radiated(<1G)	$\pm 4.68\text{dB}$
6	All emissions, radiated(>1G)	$\pm 4.89\text{dB}$
7	Temperature	$\pm 0.5^\circ\text{C}$
8	Humidity	$\pm 2\%$
9	Frequency error, conducted	$\pm 0.19\text{ ppm}$

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.

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(m), (g), (h) KDB 971168 D01 Clause 6	Band Edge	PASS	
22.913(a)(2) 27.50(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(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(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	Smart Phone	V20	FCC ID: 2AX4YV20	EUT

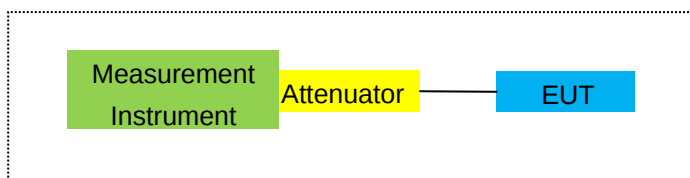
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

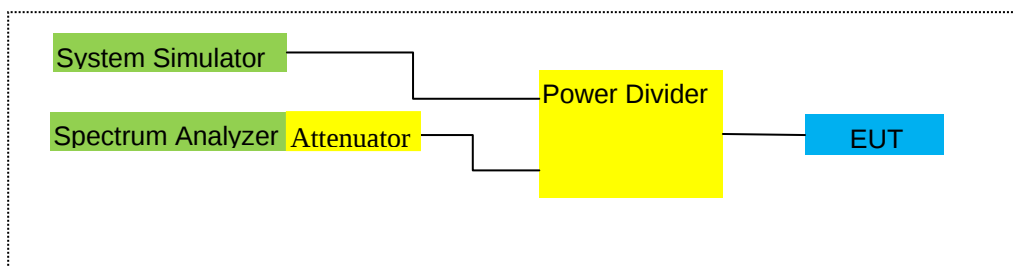
For Radiated Test Cases



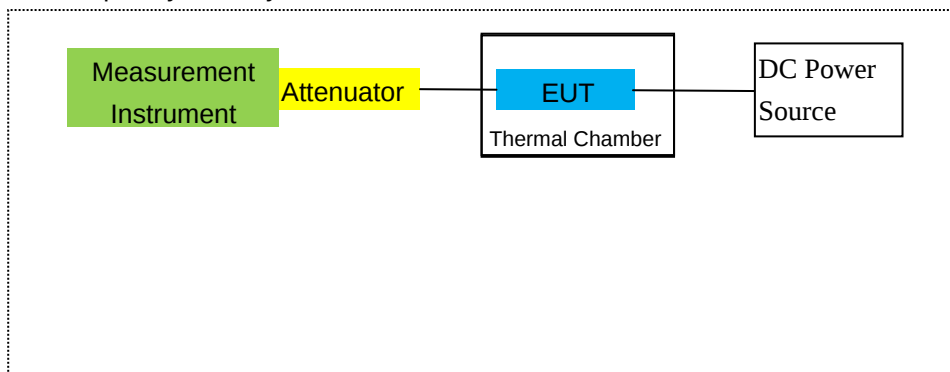
For Conducted Output Power



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



For Frequency Stability



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

3.TEST AND MEASUREMENT EQUIPMENT

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

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	MXA Signal Analyzer	Agilent	N9020A	MY49100060	2021.07.01	2022.06.30	1 year
2	Test Receiver	R&S	ESPI	101318	2021.04.27	2022.04.26	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2021.03.29	2022.03.28	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2020.05.11	2023.05.10	3 year
5	Horn Antenna	EM	EM-AH-10180	2011071402	2021.03.29	2022.03.28	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2021.11.07	2022.11.06	1 year
7	Amplifier	EM	EM-30180	060538	2021.07.01	2022.06.30	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2021.04.27	2022.04.26	1 year
9	Power Meter	R&S	NRVS	100696	2021.07.01	2022.06.30	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2021.04.27	2022.04.26	1 year
11	Test Cable	N/A	R-01	N/A	2019.08.06	2022.08.05	3 year
12	Test Cable	N/A	R-02	N/A	2019.08.06	2022.08.05	3 year
13	Test Cable	N/A	R-03	N/A	2019.06.28	2022.06.27	3 year
14	Test Receiver	R&S	ESCI	101160	2021.04.27	2022.04.26	1 year
15	LISN	R&S	ENV216	101313	2021.04.27	2022.04.26	1 year
16	LISN	EMCO	3816/2	00042990	2021.04.27	2022.04.26	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2021.04.27	2022.04.26	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2021.04.27	2022.04.26	1 year
19	Test Cable	N/A	C01	N/A	2020.05.11	2023.05.10	3 year
20	Test Cable	N/A	C02	N/A	2020.05.11	2023.05.10	3 year
21	Test Cable	N/A	C03	N/A	2020.05.11	2023.05.10	3 year
22	Attenuator	MCE	24-10-34	BN9258	2020.04.07	2023.04.06	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2021.04.27	2022.04.26	1 year
24	test receiver	R&S	ESCI	a0304218	2021.04.27	2022.04.26	1 year
25	Communication Tester	R&S	CMU200	A0304247	2021.07.01	2022.06.30	1 year
26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2021.04.27	2022.04.26	1 year

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

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

4. OUTPUT POWER

4.1 OUTPUT POWER MEASUREMENT

LTE Measurement Procedure:

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

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

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

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

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

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

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

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

Test data reference attachment.

5. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

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

MODES TESTED

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

RESULTS

Test data reference attachment.

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 Band2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 17
- 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: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported (LTE Band 2/4/7: above 10GHz).

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 Band2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 17
- LTE Band 66

RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB Size/RB Position	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Max. EIRP Average (dBm)	Max. EIRP	Polarization Of Max. ERP	
							Average (mW)		
1.4MHz Band QPSK	1/#Mid	1850.7	-1.76	3.76	28.24	22.72	187.068	Horizontal	Pass
		1880	-1.65	3.91	28.22	22.66	184.502	Horizontal	Pass
		1909.3	-1.54	3.93	28.20	22.73	187.499	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-1.79	3.77	28.23	22.67	184.927	Horizontal	Pass
		1880	-1.59	3.91	28.24	22.74	187.932	Horizontal	Pass
		1908.5	-1.51	3.94	28.25	22.80	190.546	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-1.75	3.77	28.31	22.79	190.108	Horizontal	Pass
		1880	-1.57	3.91	28.22	22.74	187.932	Horizontal	Pass
		1907.5	-1.49	3.94	28.20	22.77	189.234	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-1.83	3.79	28.33	22.71	186.638	Horizontal	Pass
		1880	-1.47	3.95	28.22	22.80	190.546	Horizontal	Pass
		1905	-1.54	3.97	28.19	22.68	185.353	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-1.78	3.79	28.34	22.77	189.234	Horizontal	Pass
		1880	-1.60	3.95	28.22	22.67	184.927	Horizontal	Pass
		1902.5	-1.46	3.97	28.18	22.75	188.365	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-1.79	3.81	28.35	22.75	188.365	Horizontal	Pass
		1880	-1.60	3.96	28.22	22.66	184.502	Horizontal	Pass
		1900	-1.42	4.00	28.16	22.74	187.932	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-1.82	3.76	28.24	22.66	184.502	Vertical	Pass
		1880	-1.58	3.91	28.22	22.73	187.499	Vertical	Pass
		1909.3	-1.59	3.93	28.20	22.68	185.353	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-1.69	3.77	28.23	22.77	189.234	Vertical	Pass
		1880	-1.64	3.91	28.24	22.69	185.780	Vertical	Pass
		1908.5	-1.54	3.94	28.25	22.77	189.234	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-1.80	3.77	28.31	22.74	187.932	Vertical	Pass
		1880	-1.53	3.91	28.22	22.78	189.671	Vertical	Pass
		1907.5	-1.56	3.94	28.20	22.70	186.209	Vertical	Pass
10.0MHz Band	1/#Mid	1855	-1.81	3.79	28.33	22.73	187.499	Vertical	Pass
		1880	-1.53	3.95	28.22	22.74	187.932	Vertical	Pass

QPSK		1905	-1.49	3.97	28.19	22.73	187.499	Vertical	Pass
15.0MHz	1/#Mid	1857.5	-1.86	3.79	28.34	22.69	185.780	Vertical	Pass
z Band		1880	-1.56	3.95	28.22	22.71	186.638	Vertical	Pass
QPSK		1902.5	-1.46	3.97	28.18	22.75	188.365	Vertical	Pass
20.0MHz	1/#Mid	1860	-1.74	3.81	28.35	22.80	190.546	Vertical	Pass
z Band		1880	-1.42	3.96	28.22	22.84	192.309	Vertical	Pass
QPSK		1900	-1.33	4.00	28.16	22.83	191.867	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 2									
Mode	RB Size/RB Position	Frequency	Result					Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Max. EIRP Average (dBm)	Max. EIRP		
							Average (mW)		
1.4MHz Band 16 QAM	1/#Mid	1850.7	-2.69	3.76	28.24	21.79	151.008	Horizontal	Pass
		1880	-2.63	3.91	28.22	21.68	147.231	Horizontal	Pass
		1909.3	-2.58	3.93	28.20	21.69	147.571	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-2.74	3.77	28.23	21.72	148.594	Horizontal	Pass
		1880	-2.58	3.91	28.24	21.75	149.624	Horizontal	Pass
		1908.5	-2.60	3.94	28.25	21.71	148.252	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-2.81	3.77	28.31	21.73	148.936	Horizontal	Pass
		1880	-2.64	3.91	28.22	21.67	146.893	Horizontal	Pass
		1907.5	-2.61	3.94	28.20	21.65	146.218	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-2.76	3.79	28.33	21.78	150.661	Horizontal	Pass
		1880	-2.49	3.95	28.22	21.78	150.661	Horizontal	Pass
		1905	-2.43	3.97	28.19	21.79	151.008	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-2.78	3.79	28.34	21.77	150.314	Horizontal	Pass
		1880	-2.58	3.95	28.22	21.69	147.571	Horizontal	Pass
		1902.5	-2.48	3.97	28.18	21.73	148.936	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-2.76	3.81	28.35	21.78	150.661	Horizontal	Pass
		1880	-2.48	3.96	28.22	21.78	150.661	Horizontal	Pass
		1900	-2.39	4.00	28.16	21.77	150.314	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-2.82	3.76	28.24	21.66	146.555	Vertical	Pass
		1880	-2.64	3.91	28.22	21.67	146.893	Vertical	Pass
		1909.3	-2.58	3.93	28.20	21.69	147.571	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-2.79	3.77	28.23	21.67	146.893	Vertical	Pass
		1880	-2.66	3.91	28.24	21.67	146.893	Vertical	Pass
		1908.5	-2.67	3.94	28.25	21.64	145.881	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-2.87	3.77	28.31	21.67	146.893	Vertical	Pass
		1880	-2.56	3.91	28.22	21.75	149.624	Vertical	Pass
		1907.5	-2.47	3.94	28.20	21.79	151.008	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-2.87	3.79	28.33	21.67	146.893	Vertical	Pass
		1880	-2.61	3.95	28.22	21.66	146.555	Vertical	Pass
		1905	-2.42	3.97	28.19	21.80	151.356	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-2.76	3.79	28.34	21.79	151.008	Vertical	Pass
		1880	-2.58	3.95	28.22	21.69	147.571	Vertical	Pass
		1902.5	-2.43	3.97	28.18	21.78	150.661	Vertical	Pass

20.0MHz Band 16 QAM	1/#Mid	1860	-2.73	3.81	28.35	21.81	151.705	Vertical	Pass
		1880	-2.45	3.96	28.22	21.81	151.705	Vertical	Pass
		1900	-2.32	4.00	28.16	21.84	152.757	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/R B SIZE	Frequenc y	Result						Conclusio n
			SG Level (dBm)	Cabl e Loss (dB)	Antenn a Gain (dBi)	Max. EIRP Averag e (dBm)	Max. EIRP	Polarizatio n Of Max. ERP	
							Averag e		
							(mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-1.78	3.12	27.58	22.68	185.353	Horizontal	Pass
		1732.5	-1.60	3.27	27.61	22.74	187.932	Horizontal	Pass
		1754.3	-1.66	3.29	27.63	22.68	185.353	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-1.73	3.13	27.61	22.75	188.365	Horizontal	Pass
		1732.5	-1.57	3.27	27.61	22.77	189.234	Horizontal	Pass
		1753.5	-1.56	3.30	27.62	22.76	188.799	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-1.83	3.13	27.63	22.67	184.927	Horizontal	Pass
		1732.5	-1.65	3.27	27.61	22.69	185.780	Horizontal	Pass
		1752.5	-1.66	3.30	27.60	22.64	183.654	Horizontal	Pass
10.0MH z Band QPSK	1/#Mid	1715	-1.82	3.15	27.64	22.67	184.927	Horizontal	Pass
		1732.5	-1.53	3.31	27.61	22.77	189.234	Horizontal	Pass
		1750	-1.59	3.33	27.59	22.67	184.927	Horizontal	Pass
15.0MH z Band QPSK	1/#Mid	1717.5	-1.70	3.15	27.65	22.80	190.546	Horizontal	Pass
		1732.5	-1.54	3.31	27.61	22.76	188.799	Horizontal	Pass
		1747.5	-1.58	3.33	27.57	22.66	184.502	Horizontal	Pass
20.0MH z Band QPSK	1/#Mid	1720	-1.78	3.17	27.66	22.71	186.638	Horizontal	Pass
		1732.5	-1.59	3.32	27.61	22.70	186.209	Horizontal	Pass
		1745	-1.43	3.36	27.56	22.77	189.234	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-1.68	3.12	27.58	22.78	189.671	Vertical	Pass
		1732.5	-1.57	3.27	27.61	22.77	189.234	Vertical	Pass
		1754.3	-1.63	3.29	27.63	22.71	186.638	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-1.75	3.13	27.61	22.73	187.499	Vertical	Pass
		1732.5	-1.62	3.27	27.61	22.72	187.068	Vertical	Pass
		1753.5	-1.61	3.30	27.62	22.71	186.638	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-1.80	3.13	27.63	22.70	186.209	Vertical	Pass
		1732.5	-1.60	3.27	27.61	22.74	187.932	Vertical	Pass
		1752.5	-1.63	3.30	27.60	22.67	184.927	Vertical	Pass
10.0MH z Band	1/#Mid	1715	-1.76	3.15	27.64	22.73	187.499	Vertical	Pass
		1732.5	-1.50	3.31	27.61	22.80	190.546	Vertical	Pass

QPSK		1750	-1.55	3.33	27.59	22.71	186.638	Vertical	Pass
15.0MH	1/#Mid	1717.5	-1.77	3.15	27.65	22.73	187.499	Vertical	Pass
z Band		1732.5	-1.52	3.31	27.61	22.78	189.671	Vertical	Pass
QPSK		1747.5	-1.57	3.33	27.57	22.67	184.927	Vertical	Pass
20.0MH	1/#Mid	1720	-1.65	3.17	27.66	22.84	192.309	Vertical	Pass
z Band		1732.5	-1.46	3.32	27.61	22.83	191.867	Vertical	Pass
QPSK		1745	-1.39	3.36	27.56	22.81	190.985	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Max. EIRP Average (dBm)	Max. EIRP	Polarization Of Max. ERP	
							Average (mW)		
1.4MHz Band 16 QAM	1/#Mid	1710.7	-2.75	3.12	27.58	21.71	148.252	Horizontal	Pass
		1732.5	-2.56	3.27	27.61	21.78	150.661	Horizontal	Pass
		1754.3	-2.62	3.29	27.63	21.72	148.594	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.76	3.13	27.61	21.72	148.594	Horizontal	Pass
		1732.5	-2.57	3.27	27.61	21.77	150.314	Horizontal	Pass
		1753.5	-2.58	3.30	27.62	21.74	149.279	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.72	3.13	27.63	21.78	150.661	Horizontal	Pass
		1732.5	-2.64	3.27	27.61	21.70	147.911	Horizontal	Pass
		1752.5	-2.64	3.30	27.60	21.66	146.555	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-2.80	3.15	27.64	21.69	147.571	Horizontal	Pass
		1732.5	-2.50	3.31	27.61	21.80	151.356	Horizontal	Pass
		1750	-2.46	3.33	27.59	21.80	151.356	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-2.85	3.15	27.65	21.65	146.218	Horizontal	Pass
		1732.5	-2.56	3.31	27.61	21.74	149.279	Horizontal	Pass
		1747.5	-2.45	3.33	27.57	21.79	151.008	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-2.71	3.17	27.66	21.78	150.661	Horizontal	Pass
		1732.5	-2.64	3.32	27.61	21.65	146.218	Horizontal	Pass
		1745	-2.42	3.36	27.56	21.78	150.661	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-2.79	3.12	27.58	21.67	146.893	Vertical	Pass
		1732.5	-2.55	3.27	27.61	21.79	151.008	Vertical	Pass
		1754.3	-2.56	3.29	27.63	21.78	150.661	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-2.78	3.13	27.61	21.70	147.911	Vertical	Pass
		1732.5	-2.64	3.27	27.61	21.70	147.911	Vertical	Pass
		1753.5	-2.65	3.30	27.62	21.67	146.893	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-2.80	3.13	27.63	21.70	147.911	Vertical	Pass
		1732.5	-2.66	3.27	27.61	21.68	147.231	Vertical	Pass
		1752.5	-2.59	3.30	27.60	21.71	148.252	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-2.77	3.15	27.64	21.72	148.594	Vertical	Pass
		1732.5	-2.61	3.31	27.61	21.69	147.571	Vertical	Pass
		1750	-2.55	3.33	27.59	21.71	148.252	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-2.78	3.15	27.65	21.72	148.594	Vertical	Pass
		1732.5	-2.53	3.31	27.61	21.77	150.314	Vertical	Pass
		1747.5	-2.57	3.33	27.57	21.67	146.893	Vertical	Pass

20.0MHz Band 16 QAM	1/#Mid	1720	-2.69	3.17	27.66	21.80	151.356	Vertical	Pass
		1732.5	-2.44	3.32	27.61	21.85	153.109	Vertical	Pass
		1745	-2.38	3.36	27.56	21.82	152.055	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.4 LTE BAND 5

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP	Polarization Of Max. ERP	
								Average		
								(mW)		
1.4MHz Band QPSK	1/##Mid	824.7	6.55	2.01	19.68	2.15	22.07	161.065	Horizontal	Pass
		836.5	6.44	2.01	19.77	2.15	22.05	160.325	Horizontal	Pass
		848.3	6.34	2.02	19.82	2.15	21.99	158.125	Horizontal	Pass
3.0MHz Band QPSK	1/##Mid	825.5	6.49	2.01	19.70	2.15	22.03	159.588	Horizontal	Pass
		836.5	6.41	2.01	19.77	2.15	22.02	159.221	Horizontal	Pass
		847.5	6.43	2.02	19.81	2.15	22.07	161.065	Horizontal	Pass
5.0MHz Band QPSK	1/##Mid	826.5	6.53	2.01	19.71	2.15	22.08	161.436	Horizontal	Pass
		836.5	6.41	2.01	19.77	2.15	22.02	159.221	Horizontal	Pass
		846.5	6.32	2.02	19.79	2.15	21.94	156.315	Horizontal	Pass
10.0MHz Band QPSK	1/##Mid	829	6.50	2.01	19.73	2.15	22.07	161.065	Horizontal	Pass
		836.5	6.40	2.01	19.77	2.15	22.01	158.855	Horizontal	Pass
		844	6.49	2.02	19.78	2.15	22.10	162.181	Horizontal	Pass
1.4MHz Band QPSK	1/##Mid	824.7	6.47	2.01	19.68	2.15	21.99	158.125	Vertical	Pass
		836.5	6.41	2.01	19.77	2.15	22.02	159.221	Vertical	Pass
		848.3	6.38	2.02	19.82	2.15	22.03	159.588	Vertical	Pass
3.0MHz Band QPSK	1/##Mid	825.5	6.45	2.01	19.70	2.15	21.99	158.125	Vertical	Pass
		836.5	6.35	2.01	19.77	2.15	21.96	157.036	Vertical	Pass
		847.5	6.45	2.02	19.81	2.15	22.09	161.808	Vertical	Pass
5.0MHz Band QPSK	1/##Mid	826.5	6.46	2.01	19.71	2.15	22.01	158.855	Vertical	Pass
		836.5	6.47	2.01	19.77	2.15	22.08	161.436	Vertical	Pass
		846.5	6.45	2.02	19.79	2.15	22.07	161.065	Vertical	Pass
10.0MHz Band QPSK	1/##Mid	829	6.57	2.01	19.73	2.15	22.14	163.682	Vertical	Pass
		836.5	6.50	2.01	19.77	2.15	22.11	162.555	Vertical	Pass
		844	6.49	2.02	19.78	2.15	22.10	162.181	Vertical	Pass

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP		
								Average (mW)		
1.4MHz Band 16 QAM	1/#Mid	824.7	5.64	2.01	19.68	2.15	21.16	130.617	Horizontal	Pass
		836.5	5.45	2.01	19.77	2.15	21.06	127.644	Horizontal	Pass
		848.3	5.51	2.02	19.82	2.15	21.16	130.617	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	5.56	2.01	19.70	2.15	21.10	128.825	Horizontal	Pass
		836.5	5.54	2.01	19.77	2.15	21.15	130.317	Horizontal	Pass
		847.5	5.51	2.02	19.81	2.15	21.15	130.317	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	5.65	2.01	19.71	2.15	21.20	131.826	Horizontal	Pass
		836.5	5.52	2.01	19.77	2.15	21.13	129.718	Horizontal	Pass
		846.5	5.46	2.02	19.79	2.15	21.08	128.233	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	829	5.54	2.01	19.73	2.15	21.11	129.122	Horizontal	Pass
		836.5	5.58	2.01	19.77	2.15	21.19	131.522	Horizontal	Pass
		844	5.44	2.02	19.78	2.15	21.05	127.350	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	824.7	5.62	2.01	19.68	2.15	21.14	130.017	Vertical	Pass
		836.5	5.47	2.01	19.77	2.15	21.08	128.233	Vertical	Pass
		848.3	5.44	2.02	19.82	2.15	21.09	128.529	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	5.53	2.01	19.70	2.15	21.07	127.938	Vertical	Pass
		836.5	5.46	2.01	19.77	2.15	21.07	127.938	Vertical	Pass
		847.5	5.44	2.02	19.81	2.15	21.08	128.233	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	5.65	2.01	19.71	2.15	21.20	131.826	Vertical	Pass
		836.5	5.42	2.01	19.77	2.15	21.03	126.765	Vertical	Pass
		846.5	5.41	2.02	19.79	2.15	21.03	126.765	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	829	5.66	2.01	19.73	2.15	21.23	132.739	Vertical	Pass
		836.5	5.62	2.01	19.77	2.15	21.23	132.739	Vertical	Pass
		844	5.60	2.02	19.78	2.15	21.21	132.130	Vertical	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/R B SIZE	Frequenc y	Result						Conclusio n
			SG Level (dBm)	Cabl e Loss (dB)	Antenn a Gain (dBi)	Max. EIRP Averag e (dBm)	Max. EIRP	Polarizatio n Of Max. ERP	
							Averag e		
							(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	-0.87	4.54	27.75	22.34	171.396	Horizontal	Pass
		2535	-0.67	4.69	27.72	22.36	172.187	Horizontal	Pass
		2567.5	-0.74	4.71	27.71	22.26	168.267	Horizontal	Pass
10.0MH z Band QPSK	1/#Mid	2505	-0.93	4.55	27.76	22.28	169.044	Horizontal	Pass
		2535	-0.68	4.69	27.72	22.35	171.791	Horizontal	Pass
		2565	-0.73	4.72	27.70	22.25	167.880	Horizontal	Pass
15.0MH z Band QPSK	1/#Mid	2507.5	-0.90	4.55	27.77	22.32	170.608	Horizontal	Pass
		2535	-0.73	4.69	27.72	22.30	169.824	Horizontal	Pass
		2562.5	-0.69	4.72	27.69	22.28	169.044	Horizontal	Pass
20.0MH z Band QPSK	1/#Mid	2510	-0.87	4.57	27.78	22.34	171.396	Horizontal	Pass
		2535	-0.73	4.73	27.72	22.26	168.267	Horizontal	Pass
		2560	-0.59	4.75	27.68	22.34	171.396	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-0.96	4.54	27.75	22.25	167.880	Vertical	Pass
		2535	-0.64	4.69	27.72	22.39	173.380	Vertical	Pass
		2567.5	-0.74	4.71	27.71	22.26	168.267	Vertical	Pass
10.0MH z Band QPSK	1/#Mid	2505	-0.97	4.55	27.76	22.24	167.494	Vertical	Pass
		2535	-0.74	4.69	27.72	22.29	169.434	Vertical	Pass
		2565	-0.68	4.72	27.70	22.30	169.824	Vertical	Pass
15.0MH z Band QPSK	1/#Mid	2507.5	-0.97	4.55	27.77	22.25	167.880	Vertical	Pass
		2535	-0.67	4.69	27.72	22.36	172.187	Vertical	Pass
		2562.5	-0.62	4.72	27.69	22.35	171.791	Vertical	Pass
20.0MH z Band QPSK	1/#Mid	2510	-0.81	4.57	27.78	22.40	173.780	Vertical	Pass
		2535	-0.55	4.73	27.72	22.44	175.388	Vertical	Pass
		2560	-0.49	4.75	27.68	22.44	175.388	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result					Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Max. EIRP Average (dBm)	Max. EIRP		
							Average (mW)		
5.0MHz Band 16 QAM	1/#Mid	2502.5	-1.64	4.54	27.75	21.57	143.549	Horizontal	Pass
		2535	-1.45	4.69	27.72	21.58	143.880	Horizontal	Pass
		2567.5	-1.44	4.71	27.71	21.56	143.219	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-1.56	4.55	27.76	21.65	146.218	Horizontal	Pass
		2535	-1.47	4.69	27.72	21.56	143.219	Horizontal	Pass
		2565	-1.28	4.72	27.70	21.70	147.911	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-1.59	4.55	27.77	21.63	145.546	Horizontal	Pass
		2535	-1.35	4.69	27.72	21.68	147.231	Horizontal	Pass
		2562.5	-1.33	4.72	27.69	21.64	145.881	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-1.54	4.57	27.78	21.67	146.893	Horizontal	Pass
		2535	-1.41	4.73	27.72	21.58	143.880	Horizontal	Pass
		2560	-1.31	4.75	27.68	21.62	145.211	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-1.56	4.54	27.75	21.65	146.218	Vertical	Pass
		2535	-1.46	4.69	27.72	21.57	143.549	Vertical	Pass
		2567.5	-1.39	4.71	27.71	21.61	144.877	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-1.63	4.55	27.76	21.58	143.880	Vertical	Pass
		2535	-1.34	4.69	27.72	21.69	147.571	Vertical	Pass
		2565	-1.28	4.72	27.70	21.70	147.911	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-1.68	4.55	27.77	21.54	142.561	Vertical	Pass
		2535	-1.47	4.69	27.72	21.56	143.219	Vertical	Pass
		2562.5	-1.37	4.72	27.69	21.60	144.544	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-1.47	4.57	27.78	21.74	149.279	Vertical	Pass
		2535	-1.27	4.73	27.72	21.72	148.594	Vertical	Pass
		2560	-1.20	4.75	27.68	21.73	148.936	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.6 LTE BAND 12

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP	Polarization Of Max. ERP	
								Average		
								(mW)		
1.4MHz Band QPSK	1/#Mid	699.7	7.60	1.91	19.21	2.15	22.75	188.365	Vertical	Pass
		707.5	7.54	1.91	19.26	2.15	22.74	187.932	Vertical	Pass
		715.3	7.49	1.93	19.34	2.15	22.75	188.365	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	700.5	7.63	1.91	19.21	2.15	22.78	189.671	Vertical	Pass
		707.5	7.59	1.91	19.26	2.15	22.79	190.108	Vertical	Pass
		714.5	7.52	1.93	19.34	2.15	22.78	189.671	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	701.5	7.61	1.91	19.23	2.15	22.78	189.671	Vertical	Pass
		707.5	7.57	1.91	19.26	2.15	22.77	189.234	Vertical	Pass
		713.5	7.41	1.92	19.33	2.15	22.67	184.927	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	704	7.54	1.91	19.25	2.15	22.73	187.499	Vertical	Pass
		707.5	7.54	1.91	19.26	2.15	22.74	187.932	Vertical	Pass
		711	7.35	1.92	19.32	2.15	22.60	181.970	Vertical	Pass
1.4MHz Band QPSK	1/#Mid	699.7	7.54	1.91	19.21	2.15	22.69	185.780	Horizontal	Pass
		707.5	7.60	1.91	19.26	2.15	22.80	190.546	Horizontal	Pass
		715.3	7.45	1.93	19.34	2.15	22.71	186.638	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	700.5	7.62	1.91	19.21	2.15	22.77	189.234	Horizontal	Pass
		707.5	7.60	1.91	19.26	2.15	22.80	190.546	Horizontal	Pass
		714.5	7.43	1.93	19.34	2.15	22.69	185.780	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	701.5	7.55	1.91	19.23	2.15	22.72	187.068	Horizontal	Pass
		707.5	7.51	1.91	19.26	2.15	22.71	186.638	Horizontal	Pass
		713.5	7.43	1.92	19.33	2.15	22.69	185.780	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	704	7.63	1.91	19.25	2.15	22.82	191.426	Horizontal	Pass
		707.5	7.64	1.91	19.26	2.15	22.84	192.309	Horizontal	Pass
		711	7.58	1.92	19.32	2.15	22.83	191.867	Horizontal	Pass

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP	Polarization Of Max. ERP	
								Average		
								(mW)		
1.4MHz Band 16 QAM	1/#Mid	699.7	6.52	1.91	19.21	2.15	21.67	146.893	Vertical	Pass
		707.5	6.58	1.91	19.26	2.15	21.78	150.661	Vertical	Pass
		715.3	6.52	1.93	19.34	2.15	21.78	150.661	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	6.59	1.91	19.21	2.15	21.74	149.279	Vertical	Pass
		707.5	6.51	1.91	19.26	2.15	21.71	148.252	Vertical	Pass
		714.5	6.53	1.93	19.34	2.15	21.79	151.008	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	6.57	1.91	19.23	2.15	21.74	149.279	Vertical	Pass
		707.5	6.58	1.91	19.26	2.15	21.78	150.661	Vertical	Pass
		713.5	6.52	1.92	19.33	2.15	21.78	150.661	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	704	6.58	1.91	19.25	2.15	21.77	150.314	Vertical	Pass
		707.5	6.40	1.91	19.26	2.15	21.60	144.544	Vertical	Pass
		711	6.48	1.92	19.32	2.15	21.73	148.936	Vertical	Pass
1.4MHz Band 16 QAM	1/#Mid	699.7	6.51	1.91	19.21	2.15	21.66	146.555	Horizontal	Pass
		707.5	6.50	1.91	19.26	2.15	21.70	147.911	Horizontal	Pass
		715.3	6.48	1.93	19.34	2.15	21.74	149.279	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	6.59	1.91	19.21	2.15	21.74	149.279	Horizontal	Pass
		707.5	6.55	1.91	19.26	2.15	21.75	149.624	Horizontal	Pass
		714.5	6.39	1.93	19.34	2.15	21.65	146.218	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	6.55	1.91	19.23	2.15	21.72	148.594	Horizontal	Pass
		707.5	6.55	1.91	19.26	2.15	21.75	149.624	Horizontal	Pass
		713.5	6.37	1.92	19.33	2.15	21.63	145.546	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	704	6.63	1.91	19.25	2.15	21.82	152.055	Horizontal	Pass
		707.5	6.63	1.91	19.26	2.15	21.83	152.405	Horizontal	Pass
		711	6.56	1.92	19.32	2.15	21.81	151.705	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)

8.7 LTE BAND 17

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP	Polarization Of Max. ERP	
								Average		
								(mW)		
5.0MHz Band QPSK	1/#Mid	706.5	7.51	1.91	19.23	2.15	22.68	185.353	Vertical	Pass
		710	7.48	1.91	19.26	2.15	22.68	185.353	Vertical	Pass
		713.5	7.43	1.92	19.33	2.15	22.69	185.780	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	709	7.51	1.91	19.25	2.15	22.70	186.209	Vertical	Pass
		710	7.52	1.91	19.26	2.15	22.72	187.068	Vertical	Pass
		711	7.45	1.92	19.32	2.15	22.70	186.209	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	706.5	7.61	1.91	19.23	2.15	22.78	189.671	Horizontal	Pass
		710	7.49	1.91	19.26	2.15	22.69	185.780	Horizontal	Pass
		713.5	7.45	1.92	19.33	2.15	22.71	186.638	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	709	7.65	1.91	19.25	2.15	22.84	192.309	Horizontal	Pass
		710	7.62	1.91	19.26	2.15	22.82	191.426	Horizontal	Pass
		711	7.57	1.92	19.32	2.15	22.82	191.426	Horizontal	Pass

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP	Polarization Of Max. ERP	
								Average		
								(mW)		
5.0MHz Band 16 QAM	1/#Mid	706.5	6.29	1.91	19.23	2.15	21.46	139.959	Vertical	Pass
		710	6.39	1.91	19.26	2.15	21.59	144.212	Vertical	Pass
		713.5	6.27	1.92	19.33	2.15	21.53	142.233	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	709	6.26	1.91	19.25	2.15	21.45	139.637	Vertical	Pass
		710	6.29	1.91	19.26	2.15	21.49	140.929	Vertical	Pass
		711	6.32	1.92	19.32	2.15	21.57	143.549	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	706.5	6.43	1.91	19.23	2.15	21.60	144.544	Horizontal	Pass
		710	6.40	1.91	19.26	2.15	21.60	144.544	Horizontal	Pass
		713.5	6.32	1.92	19.33	2.15	21.58	143.880	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	709	6.45	1.91	19.25	2.15	21.64	145.881	Horizontal	Pass
		710	6.45	1.91	19.26	2.15	21.65	146.218	Horizontal	Pass
		711	6.40	1.92	19.32	2.15	21.65	146.218	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 BAND66

Radiated Power (EIRP) for Band66									
Mode	RB/R B SIZE	Frequenc y	Result						Conclusio n
			SG Level (dBm)	Cabl e Loss (dB)	Antenn a Gain (dBi)	Max. EIRP Averag e (dBm)	Max. EIRP	Polarizatio n Of Max. ERP	
							Averag e		
1.4MHz Band QPSK	1/#Mid	1710.7	-1.55	3.76	28.24	22.93	196.336	Horizontal	Pass
		1745	-1.42	3.91	28.22	22.89	194.536	Horizontal	Pass
		1779.3	-1.33	3.93	28.2	22.94	196.789	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-1.49	3.77	28.23	22.97	198.153	Horizontal	Pass
		1745	-1.43	3.91	28.24	22.90	194.984	Horizontal	Pass
		1778.5	-1.39	3.94	28.25	22.92	195.884	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-1.61	3.77	28.31	22.93	196.336	Horizontal	Pass
		1745	-1.48	3.91	28.22	22.83	191.867	Horizontal	Pass
		1777.5	-1.42	3.94	28.2	22.84	192.309	Horizontal	Pass
10.0MH z Band QPSK	1/#Mid	1715	-1.64	3.79	28.33	22.90	194.984	Horizontal	Pass
		1745	-1.32	3.95	28.22	22.95	197.242	Horizontal	Pass
		1775	-1.25	3.97	28.19	22.97	198.153	Horizontal	Pass
15.0MH z Band QPSK	1/#Mid	1717.5	-1.68	3.79	28.34	22.87	193.642	Horizontal	Pass
		1745	-1.27	3.95	28.22	23.00	199.526	Horizontal	Pass
		1772.5	-1.29	3.97	28.18	22.92	195.884	Horizontal	Pass
20.0MH z Band QPSK	1/#Mid	1720	-1.58	3.81	28.35	22.96	197.697	Horizontal	Pass
		1745	-1.34	3.96	28.22	22.92	195.884	Horizontal	Pass
		1770	-1.22	4	28.16	22.94	196.789	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-1.53	3.76	28.24	22.95	197.242	Vertical	Pass
		1745	-1.43	3.91	28.22	22.88	194.089	Vertical	Pass
		1779.3	-1.41	3.93	28.2	22.86	193.197	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-1.60	3.77	28.23	22.86	193.197	Vertical	Pass
		1745	-1.41	3.91	28.24	22.92	195.884	Vertical	Pass
		1778.5	-1.35	3.94	28.25	22.96	197.697	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-1.59	3.77	28.31	22.95	197.242	Vertical	Pass
		1745	-1.46	3.91	28.22	22.85	192.752	Vertical	Pass
		1777.5	-1.36	3.94	28.2	22.90	194.984	Vertical	Pass
10.0MH	1/#Mid	1715	-1.70	3.79	28.34	22.85	192.752	Vertical	Pass

z Band QPSK		1745	-1.41	3.95	28.22	22.86	193.197	Vertical	Pass
		1775	-1.23	3.97	28.18	22.98	198.609	Vertical	Pass
15.0MH	1/#Mid	1717.5	-1.56	3.81	28.35	22.98	198.609	Vertical	Pass
z Band QPSK		1745	-1.30	3.96	28.22	22.96	197.697	Vertical	Pass
		1772.5	-1.25	4	28.16	22.91	195.434	Vertical	Pass
20.0MH	1/#Mid	1720	-1.54	3.79	28.34	23.01	199.986	Vertical	Pass
z Band QPSK		1745	-1.27	3.95	28.22	23.00	199.526	Vertical	Pass
		1770	-1.20	3.97	28.18	23.01	199.986	Vertical	Pass

Note:

SG Level= Signal generator output

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

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 Band2
LTE Band 4
- ☐ LTE Band 5
LTE Band 7
LTE Band 12
LTE Band 17
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)	Spectrum Analyzer (dBm)	Cable Loss (dB)	Antenna Factor (dB/m)	Spurious Emission Level (dBm)	Limit (dBm)	Margin (dB)	Polarity
3701.4	-50.28	4.04	33.51	-20.81	-13	-7.81	Horizontal
3701.4	-46.50	4.04	33.51	-17.03	-13	-4.03	Vertical
5552.1	-49.72	5.24	35.84	-19.12	-13	-6.12	Vertical
5552.1	-53.25	5.24	35.84	-22.65	-13	-9.65	Horizontal
194.3	-43.75	1.43	16.02	-29.16	-13	-16.16	Vertical
388.2	-41.39	1.30	17.99	-24.70	-13	-11.70	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-49.97	4.04	33.56	-20.45	-13	-7.45	Horizontal
3760.0	-46.16	4.04	33.56	-16.64	-13	-3.64	Vertical
5640.0	-48.19	5.24	35.91	-17.52	-13	-4.52	Vertical
5640.0	-50.45	5.24	35.91	-19.78	-13	-6.78	Horizontal
212.3	-40.79	1.62	16.97	-25.44	-13	-12.44	Vertical
361.7	-37.12	1.74	15.98	-22.89	-13	-9.89	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-46.95	4.04	34.00	-16.99	-13	-3.99	Horizontal
3818.6	-48.45	4.04	34.00	-18.49	-13	-5.49	Vertical
5727.9	-49.10	5.24	36.04	-18.30	-13	-5.30	Vertical
5727.9	-53.89	5.24	36.04	-23.09	-13	-10.09	Horizontal
211.2	-44.60	1.42	17.29	-28.73	-13	-15.73	Vertical
233.8	-35.39	1.50	17.90	-18.98	-13	-5.98	Horizontal

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

Test Results for Low Channel 1860MHz							
Frequency (MHz)	Spectrum Analyzer (dBm)	Cable Loss (dB)	Antenna Factor (dB/m)	Spurious Emission Level (dBm)	Limit (dBm)	Margin (dB)	Polarity
3720.0	-45.27	4.07	33.54	-15.80	-13	-2.80	Horizontal
3720.0	-51.02	4.07	33.54	-21.55	-13	-8.55	Vertical
5580.0	-51.54	5.28	35.86	-20.96	-13	-7.96	Vertical
5580.0	-53.11	5.28	35.86	-22.53	-13	-9.53	Horizontal
187.7	-43.97	1.58	16.89	-28.65	-13	-15.65	Vertical
429.8	-35.56	1.76	17.26	-20.06	-13	-7.06	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-44.68	4.04	33.56	-15.16	-13	-2.16	Horizontal
3760.0	-50.75	4.04	33.56	-21.23	-13	-8.23	Vertical
5640.0	-49.79	5.24	35.91	-19.12	-13	-6.12	Vertical
5640.0	-52.53	5.24	35.91	-21.86	-13	-8.86	Horizontal
200.2	-40.25	1.46	16.27	-25.44	-13	-12.44	Vertical
400.3	-35.22	1.59	15.15	-21.66	-13	-8.66	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-50.96	4.04	34.00	-21.00	-13	-8.00	Horizontal
3800.0	-47.02	4.04	34.00	-17.06	-13	-4.06	Vertical
5700.0	-51.19	5.24	36.04	-20.39	-13	-7.39	Vertical
5700.0	-49.44	5.24	36.04	-18.64	-13	-5.64	Horizontal
180.3	-40.04	1.36	17.39	-24.00	-13	-11.00	Vertical
306.7	-34.35	1.66	15.39	-20.62	-13	-7.62	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.

9.2 LTE BAND 4

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

Test Results for Low Channel 1710.7MHz							
Frequency (MHz)	Spectrum Analyzer (dBm)	Cable Loss (dB)	Antenna Factor (dB/m)	Spurious Emission Level (dBm)	Limit (dBm)	Margin (dB)	Polarity
3421.4	-50.31	4.02	29.80	-24.53	-13	-11.53	Horizontal
3421.4	-48.40	4.02	29.80	-22.62	-13	-9.62	Vertical
5132.1	-50.45	5.24	35.84	-19.85	-13	-6.85	Vertical
5132.1	-52.60	5.24	35.84	-22.00	-13	-9.00	Horizontal
198.2	-35.83	1.68	16.04	-21.47	-13	-8.47	Vertical
277.2	-41.22	1.78	17.74	-25.26	-13	-12.26	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-53.05	4.03	30.00	-27.08	-13	-14.08	Horizontal
3465.0	-47.53	4.03	30.00	-21.56	-13	-8.56	Vertical
5197.5	-46.70	5.25	35.86	-16.09	-13	-3.09	Vertical
5197.5	-50.24	5.25	35.86	-19.63	-13	-6.63	Horizontal
192.8	-40.76	1.72	17.69	-24.79	-13	-11.79	Vertical
410.1	-42.12	1.62	16.02	-27.71	-13	-14.71	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-50.03	4.05	30.01	-24.07	-13	-11.07	Horizontal
3508.6	-48.05	4.05	30.01	-22.09	-13	-9.09	Vertical
5262.9	-45.00	5.26	35.86	-14.40	-13	-1.40	Vertical
5262.9	-51.81	5.26	35.86	-21.21	-13	-8.21	Horizontal
212.7	-35.08	1.80	16.69	-20.19	-13	-7.19	Vertical
366.1	-44.62	1.75	16.66	-29.72	-13	-16.72	Horizontal

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

Test Results for Low Channel 1720MHz							
Frequency (MHz)	Spectrum Analyzer (dBm)	Cable Loss (dB)	Antenna Factor (dB/m)	Spurious Emission Level (dBm)	Limit (dBm)	Margin (dB)	Polarity
3440.0	-51.78	4.02	29.80	-26.00	-13	-13.00	Horizontal
3440.0	-46.90	4.02	29.80	-21.12	-13	-8.12	Vertical
5160.0	-52.31	5.24	35.84	-21.71	-13	-8.71	Vertical
5160.0	-52.16	5.24	35.84	-21.56	-13	-8.56	Horizontal
188.4	-40.11	1.57	17.26	-24.42	-13	-11.42	Vertical
408.4	-43.33	1.78	16.35	-28.76	-13	-15.76	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-53.55	4.03	30.00	-27.58	-13	-14.58	Horizontal
3465.0	-50.45	4.03	30.00	-24.48	-13	-11.48	Vertical
5197.5	-49.88	5.25	35.86	-19.27	-13	-6.27	Vertical
5197.5	-50.00	5.25	35.86	-19.39	-13	-6.39	Horizontal
198.0	-38.95	1.44	17.95	-22.44	-13	-9.44	Vertical
287.1	-44.38	1.65	16.09	-29.94	-13	-16.94	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-51.06	4.05	27.68	-27.43	-13	-14.43	Horizontal
3490.0	-48.55	4.05	27.68	-24.92	-13	-11.92	Vertical
5235.0	-47.82	5.26	35.86	-17.22	-13	-4.22	Vertical
5235.0	-52.93	5.26	35.86	-22.33	-13	-9.33	Horizontal
202.8	-41.28	1.61	16.85	-26.04	-13	-13.04	Vertical
437.9	-38.54	1.61	15.19	-24.96	-13	-11.96	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.

9.3 LTE BAND 5

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

Test Results for Low Channel 824.7MHz							
Frequency (MHz)	Spectrum Analyzer (dBm)	Cable Loss (dB)	Antenna Factor (dB/m)	Spurious Emission Level (dBm)	Limit (dBm)	Margin (dB)	Polarity
1649.4	-51.93	2.78	27.50	-27.21	-13	-14.21	Horizontal
1649.4	-50.17	2.78	27.50	-25.45	-13	-12.45	Vertical
2474.1	-51.47	2.90	27.80	-26.57	-13	-13.57	Vertical
2474.1	-51.97	2.90	27.80	-27.07	-13	-14.07	Horizontal
193.2	-41.29	1.76	17.59	-25.46	-13	-12.46	Vertical
337.3	-34.05	1.63	15.87	-19.81	-13	-6.81	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-46.06	2.80	27.48	-21.38	-13	-8.38	Horizontal
1673.0	-49.20	2.80	27.48	-24.52	-13	-11.52	Vertical
2509.5	-52.61	2.91	27.70	-27.82	-13	-14.82	Vertical
2509.5	-53.28	2.91	27.70	-28.49	-13	-15.49	Horizontal
177.1	-40.26	1.61	15.68	-26.19	-13	-13.19	Vertical
428.7	-43.32	1.59	17.52	-27.40	-13	-14.40	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-48.92	2.82	27.43	-24.31	-13	-11.31	Horizontal
1696.6	-45.02	2.82	27.43	-20.41	-13	-7.41	Vertical
2544.9	-46.40	2.92	27.74	-21.58	-13	-8.58	Vertical
2544.9	-51.21	2.92	27.74	-26.39	-13	-13.39	Horizontal
203.8	-38.08	1.69	16.67	-23.09	-13	-10.09	Vertical
253.8	-38.60	1.70	17.18	-23.12	-13	-10.12	Horizontal

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

Test Results for Low Channel 829MHz							
Frequency (MHz)	Spectrum Analyzer (dBm)	Cable Loss (dB)	Antenna Factor (dB/m)	Spurious Emission Level (dBm)	Limit (dBm)	Margin (dB)	Polarity
1658.0	-53.11	2.78	27.50	-28.39	-13	-15.39	Horizontal
1658.0	-53.69	2.78	27.50	-28.97	-13	-15.97	Vertical
2487.0	-45.87	2.90	27.80	-20.97	-13	-7.97	Vertical
2487.0	-51.82	2.90	27.80	-26.92	-13	-13.92	Horizontal
176.5	-43.22	1.71	15.57	-29.36	-13	-16.36	Vertical
380.7	-38.37	1.34	16.40	-23.31	-13	-10.31	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-44.07	2.80	27.48	-19.39	-13	-6.39	Horizontal
1673.0	-48.89	2.80	27.48	-24.21	-13	-11.21	Vertical
2509.5	-45.72	2.91	27.70	-20.93	-13	-7.93	Vertical
2509.5	-50.37	2.91	27.70	-25.58	-13	-12.58	Horizontal
192.8	-41.97	1.44	17.04	-26.37	-13	-13.37	Vertical
287.2	-44.25	1.76	17.62	-28.39	-13	-15.39	Horizontal
Test Results for High Channel 844MHz							
1688.0	-51.84	2.82	27.43	-27.23	-13	-14.23	Horizontal
1688.0	-47.96	2.82	27.43	-23.35	-13	-10.35	Vertical
2532.0	-52.39	2.92	27.74	-27.57	-13	-14.57	Vertical
2532.0	-51.12	2.92	27.74	-26.30	-13	-13.30	Horizontal
205.9	-35.12	1.74	17.70	-19.16	-13	-6.16	Vertical
446.6	-42.50	1.41	17.46	-26.44	-13	-13.44	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.

9.4 LTE BAND 7

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

Test Results for Low Channel 2502.5MHz							
Frequency (MHz)	Spectrum Analyzer (dBm)	Cable Loss (dB)	Antenna Factor (dB/m)	Spurious Emission Level (dBm)	Limit (dBm)	Margin (dB)	Polarity
5005.0	-59.49	5.23	35.81	-28.91	-25	-3.91	Horizontal
5005.0	-62.15	5.23	35.81	-31.57	-25	-6.57	Vertical
7507.5	-63.07	5.67	36.85	-31.89	-25	-6.89	Vertical
7507.5	-62.44	5.67	36.85	-31.26	-25	-6.26	Horizontal
182.6	-46.55	1.73	17.97	-30.31	-25	-5.31	Vertical
307.8	-50.41	1.38	15.11	-36.68	-25	-11.68	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-59.46	5.23	35.82	-28.87	-25	-3.87	Horizontal
5070.0	-59.97	5.23	35.82	-29.38	-25	-4.38	Vertical
7605.0	-63.79	5.67	36.85	-32.61	-25	-7.61	Vertical
7605.0	-59.61	5.67	36.85	-28.43	-25	-3.43	Horizontal
190.0	-47.68	1.77	16.17	-33.27	-25	-8.27	Vertical
379.1	-45.81	1.63	15.21	-32.23	-25	-7.23	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-59.45	5.24	35.83	-28.86	-25	-3.86	Horizontal
5135.0	-64.58	5.24	35.83	-33.99	-25	-8.99	Vertical
7702.5	-59.40	5.68	36.87	-28.21	-25	-3.21	Vertical
7702.5	-64.39	5.68	36.87	-33.20	-25	-8.20	Horizontal
188.7	-48.05	1.58	17.56	-32.07	-25	-7.07	Vertical
460.3	-54.94	1.45	16.58	-39.81	-25	-14.81	Horizontal

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

Test Results for Low Channel 2510MHz							
Frequency (MHz)	Spectrum Analyzer (dBm)	Cable Loss (dB)	Antenna Factor (dB/m)	Spurious Emission Level (dBm)	Limit (dBm)	Margin (dB)	Polarity
5020.0	-60.03	5.23	35.82	-29.44	-25	-4.44	Horizontal
5020.0	-59.41	5.23	35.82	-28.82	-25	-3.82	Vertical
7530.0	-62.91	5.67	36.86	-31.72	-25	-6.72	Vertical
7530.0	-64.05	5.67	36.86	-32.86	-25	-7.86	Horizontal
185.9	-52.16	1.63	15.76	-38.03	-25	-13.03	Vertical
340.4	-53.33	1.71	15.44	-39.60	-25	-14.60	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.39	5.23	35.82	-30.80	-25	-5.80	Horizontal
5070.0	-62.02	5.23	35.82	-31.43	-25	-6.43	Vertical
7605.0	-61.07	5.67	36.85	-29.89	-25	-4.89	Vertical
7605.0	-62.55	5.67	36.85	-31.37	-25	-6.37	Horizontal
197.2	-52.86	1.79	16.84	-37.80	-25	-12.80	Vertical
376.9	-52.67	1.71	17.64	-36.74	-25	-11.74	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-64.79	5.24	35.83	-34.20	-25	-9.20	Horizontal
5120.0	-60.54	5.24	35.83	-29.95	-25	-4.95	Vertical
7680.0	-61.63	5.70	36.88	-30.45	-25	-5.45	Vertical
7680.0	-64.19	5.70	36.88	-33.01	-25	-8.01	Horizontal
212.5	-45.41	1.79	16.84	-30.35	-25	-5.35	Vertical
241.0	-46.38	1.71	17.64	-30.45	-25	-5.45	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

9.5 LTE BAND 12

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

Test Results for Low Channel 699.7MHz							
Frequency (MHz)	Spectrum Analyzer (dBm)	Cable Loss (dB)	Antenna Factor (dB/m)	Spurious Emission Level (dBm)	Limit (dBm)	Margin (dB)	Polarity
1399.4	-45.53	2.60	27.20	-20.93	-13	-7.93	Horizontal
1399.4	-44.96	2.60	27.20	-20.36	-13	-7.36	Vertical
2099.1	-53.85	2.85	27.54	-29.16	-13	-16.16	Vertical
2099.1	-52.99	2.85	27.54	-28.30	-13	-15.30	Horizontal
192.7	-36.75	1.49	17.78	-20.46	-13	-7.46	Vertical
422.7	-40.21	1.36	17.33	-24.24	-13	-11.24	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-51.25	2.61	27.28	-26.58	-13	-13.58	Horizontal
1415.0	-50.33	2.61	27.28	-25.66	-13	-12.66	Vertical
2122.5	-51.46	2.87	27.59	-26.74	-13	-13.74	Vertical
2122.5	-52.74	2.87	27.59	-28.02	-13	-15.02	Horizontal
206.9	-42.80	1.73	15.74	-28.79	-13	-15.79	Vertical
281.1	-34.39	1.62	15.79	-20.22	-13	-7.22	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-45.06	2.63	27.28	-20.41	-13	-7.41	Horizontal
1430.6	-51.62	2.63	27.28	-26.97	-13	-13.97	Vertical
2145.9	-46.79	2.88	27.60	-22.07	-13	-9.07	Vertical
2145.9	-49.89	2.88	27.60	-25.17	-13	-12.17	Horizontal
212.9	-35.39	1.61	18.00	-19.00	-13	-6.00	Vertical
398.7	-37.57	1.45	15.49	-23.54	-13	-10.54	Horizontal

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

Test Results for Low Channel 704MHz							
Frequency (MHz)	Spectrum Analyzer (dBm)	Cable Loss (dB)	Antenna Factor (dB/m)	Spurious Emission Level (dBm)	Limit (dBm)	Margin (dB)	Polarity
1408.0	-53.72	2.61	27.26	-29.07	-13	-16.07	Horizontal
1408.0	-44.34	2.61	27.26	-19.69	-13	-6.69	Vertical
2112.0	-53.91	2.87	27.58	-29.20	-13	-16.20	Vertical
2112.0	-49.79	2.87	27.58	-25.08	-13	-12.08	Horizontal
197.4	-36.63	1.31	16.97	-20.97	-13	-7.97	Vertical
420.2	-40.53	1.65	16.70	-25.48	-13	-12.48	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-44.08	2.61	27.28	-19.41	-13	-6.41	Horizontal
1415.0	-51.39	2.61	27.28	-26.72	-13	-13.72	Vertical
2122.5	-48.80	2.87	27.59	-24.08	-13	-11.08	Vertical
2122.5	-51.55	2.87	27.59	-26.83	-13	-13.83	Horizontal
183.9	-41.73	1.72	17.99	-25.46	-13	-12.46	Vertical
468.8	-35.06	1.73	17.94	-18.85	-13	-5.85	Horizontal
Test Results for High Channel 711MHz							
1422.0	-50.05	2.62	27.28	-25.39	-13	-12.39	Horizontal
1422.0	-47.27	2.62	27.28	-22.61	-13	-9.61	Vertical
2133.0	-51.62	2.87	27.60	-26.89	-13	-13.89	Vertical
2133.0	-52.43	2.87	27.60	-27.70	-13	-14.70	Horizontal
198.8	-40.45	1.58	15.93	-26.10	-13	-13.10	Vertical
310.9	-44.97	1.36	15.59	-30.74	-13	-17.74	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)	Spectrum Analyzer (dBm)	Cable Loss (dB)	Antenna Factor (dB/m)	Spurious Emission Level (dBm)	Limit (dBm)	Margin (dB)	Polarity
1413.0	-52.88	2.61	27.28	-28.21	-13	-15.21	Horizontal
1413.0	-46.94	2.61	27.28	-22.27	-13	-9.27	Vertical
2119.5	-47.97	2.87	27.59	-23.25	-13	-10.25	Vertical
2119.5	-52.69	2.87	27.59	-27.97	-13	-14.97	Horizontal
203.6	-42.34	1.71	16.15	-27.90	-13	-14.90	Vertical
338.7	-42.13	1.41	17.32	-26.22	-13	-13.22	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-49.54	2.62	27.30	-24.86	-13	-11.86	Horizontal
1420.0	-51.16	2.62	27.30	-26.48	-13	-13.48	Vertical
2130.0	-47.20	2.87	27.62	-22.45	-13	-9.45	Vertical
2130.0	-50.74	2.87	27.62	-25.99	-13	-12.99	Horizontal
182.1	-35.29	1.42	15.25	-21.47	-13	-8.47	Vertical
376.1	-41.98	1.36	17.19	-26.15	-13	-13.15	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-48.80	2.66	27.28	-24.18	-13	-11.18	Horizontal
1427.0	-47.92	2.66	27.28	-23.30	-13	-10.30	Vertical
2140.5	-44.12	2.88	27.60	-19.40	-13	-6.40	Vertical
2140.5	-53.97	2.88	27.60	-29.25	-13	-16.25	Horizontal
179.4	-43.34	1.32	17.29	-27.37	-13	-14.37	Vertical
280.8	-40.83	1.72	16.89	-25.66	-13	-12.66	Horizontal

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

Test Results for Low Channel 709MHz							
Frequency (MHz)	Spectrum Analyzer (dBm)	Cable Loss (dB)	Antenna Factor (dB/m)	Spurious Emission Level (dBm)	Limit (dBm)	Margin (dB)	Polarity
1418.0	-48.27	2.62	27.30	-23.59	-13	-10.59	Horizontal
1418.0	-49.18	2.62	27.30	-24.50	-13	-11.50	Vertical
2127.0	-53.50	2.87	27.62	-28.75	-13	-15.75	Vertical
2127.0	-52.64	2.87	27.62	-27.89	-13	-14.89	Horizontal
175.9	-37.10	1.35	16.91	-21.54	-13	-8.54	Vertical
381.2	-42.54	1.62	16.31	-27.85	-13	-14.85	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-51.36	2.62	27.30	-26.68	-13	-13.68	Horizontal
1420.0	-46.75	2.62	27.30	-22.07	-13	-9.07	Vertical
2130.0	-52.25	2.87	27.62	-27.50	-13	-14.50	Vertical
2130.0	-54.00	2.87	27.62	-29.25	-13	-16.25	Horizontal
192.5	-36.26	1.51	17.14	-20.63	-13	-7.63	Vertical
278.4	-43.43	1.77	16.88	-28.32	-13	-15.32	Horizontal
Test Results for High Channel 711MHz							
1422.0	-46.77	2.62	27.30	-22.09	-13	-9.09	Horizontal
1422.0	-44.64	2.62	27.30	-19.96	-13	-6.96	Vertical
2133.0	-52.17	2.87	27.62	-27.42	-13	-14.42	Vertical
2133.0	-50.60	2.87	27.62	-25.85	-13	-12.85	Horizontal
202.4	-38.40	1.78	15.95	-24.23	-13	-11.23	Vertical
349.9	-41.82	1.34	17.95	-25.22	-13	-12.22	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.

9.7 LTE BAND 66

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

Test Results for Low Channel 1710.7MHz							
Frequency (MHz)	Spectrum Analyzer (dBm)	Cable Loss (dB)	Antenna Factor (dB/m)	Spurious Emission Level (dBm)	Limit (dBm)	Margin (dB)	Polarity
3421.4	-63.17	3.84	35.81	-31.20	-13	-18.20	Horizontal
3421.4	-61.89	3.84	35.81	-29.92	-13	-16.92	Vertical
5132.1	-59.59	5.18	36.85	-27.92	-13	-14.92	Vertical
5132.1	-59.22	5.18	36.85	-27.55	-13	-14.55	Horizontal
179.4	-54.95	1.56	17.97	-38.54	-13	-25.54	Vertical
461.5	-45.83	1.33	15.11	-32.05	-13	-19.05	Horizontal
Test Results For Mid Channel 1745MHz							
3490.0	-62.20	3.85	35.82	-30.23	-13	-17.23	Horizontal
3490.0	-62.84	3.85	35.82	-30.87	-13	-17.87	Vertical
5235.0	-62.22	5.21	36.85	-30.58	-13	-17.58	Vertical
5235.0	-61.24	5.21	36.85	-29.60	-13	-16.60	Horizontal
183.8	-44.84	1.77	16.17	-30.43	-13	-17.43	Vertical
313.3	-54.44	1.63	15.21	-40.86	-13	-27.86	Horizontal
Test Results for High Channel 1779.3MHz							
3558.6	-63.67	3.86	35.83	-31.70	-13	-18.70	Horizontal
3558.6	-61.30	3.86	35.83	-29.33	-13	-16.33	Vertical
5337.9	-61.89	5.24	36.87	-30.26	-13	-17.26	Vertical
5337.9	-60.98	5.24	36.87	-29.35	-13	-16.35	Horizontal
180.2	-51.47	1.58	17.56	-35.49	-13	-22.49	Vertical
412.3	-45.71	1.45	16.58	-30.58	-13	-17.58	Horizontal

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

Test Results for Low Channel 1720MHz							
Frequency (MHz)	Spectrum Analyzer (dBm)	Cable Loss (dB)	Antenna Factor (dB/m)	Spurious Emission Level (dBm)	Limit (dBm)	Margin (dB)	Polarity
3440.0	-61.29	3.84	35.82	-29.31	-13	-16.31	Horizontal
3440.0	-60.72	3.84	35.82	-28.74	-13	-15.74	Vertical
5160.0	-61.88	5.18	36.86	-30.20	-13	-17.20	Vertical
5160.0	-59.38	5.18	36.86	-27.70	-13	-14.70	Horizontal
177.9	-48.46	1.56	15.76	-34.26	-13	-21.26	Vertical
321.4	-52.09	1.33	15.44	-37.98	-13	-24.98	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-61.63	3.85	35.82	-29.66	-13	-16.66	Horizontal
3490.0	-61.98	3.85	35.82	-30.01	-13	-17.01	Vertical
5235.0	-59.63	5.21	36.85	-27.99	-13	-14.99	Vertical
5235.0	-64.93	5.21	36.85	-33.29	-13	-20.29	Horizontal
175.5	-50.96	1.77	16.84	-35.88	-13	-22.88	Vertical
461.3	-44.22	1.63	17.64	-28.21	-13	-15.21	Horizontal
Test Results for High Channel 1770MHz							
3540.0	-64.22	3.86	35.83	-32.25	-13	-19.25	Horizontal
3540.0	-63.09	3.86	35.83	-31.12	-13	-18.12	Vertical
5310.0	-63.06	5.24	36.88	-31.42	-13	-18.42	Vertical
5310.0	-62.39	5.24	36.88	-30.75	-13	-17.75	Horizontal
181.8	-46.33	1.58	16.84	-31.06	-13	-18.06	Vertical
424.0	-44.08	1.45	17.64	-27.89	-13	-14.89	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

10. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- ☐ Temp. = -30° to $+50^{\circ}\text{C}$
- ☐ Voltage = low voltage, DC 34V, Normal, DC 3.85V and High voltage, DC 4.3V.

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 Band2
LTE Band 4
- ☐ LTE Band5
LTE Band 7
LTE Band 12
LTE Band 17
LTE Band 66

RESULTS

See the following pages.

10.1 LTE BAND 2

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1880	13.1	0.006983	2.5
3.85	1880	14.1	0.007507	2.5
4.2	1880	13.4	0.007129	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	12.6	0.006699	2.5
Extreme (50C)	1880	11.5	0.006111	2.5
Extreme (40C)	1880	14.1	0.007486	2.5
Extreme (30C)	1880	13.8	0.007364	2.5
Extreme (10C)	1880	13.8	0.007363	2.5
Extreme (0C)	1880	12.5	0.006675	2.5
Extreme (-10C)	1880	13.2	0.007041	2.5
Extreme (-20C)	1880	14.6	0.007754	2.5
Extreme (-30C)	1880	14.4	0.007655	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1880	9.7	0.005184	2.5
3.85	1880	9.1	0.004825	2.5
4.2	1880	7.6	0.004067	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.2	0.004870	2.5
Extreme (50C)	1880	9.1	0.004864	2.5
Extreme (40C)	1880	8.5	0.004518138	2.5
Extreme (30C)	1880	8.9	0.004714746	2.5
Extreme (10C)	1880	9.1	0.004817201	2.5
Extreme (0C)	1880	7.9	0.004189694	2.5
Extreme (-10C)	1880	9.1	0.004850164	2.5
Extreme (-20C)	1880	9.0	0.004812971	2.5
Extreme (-30C)	1880	8.0	0.004278538	2.5

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

10.2 LTE BAND 4

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1732.5	8.4	0.004857	2.5
3.85	1732.5	8.7	0.005040	2.5
4.2	1732.5	8.3	0.004777	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.2	0.004755	2.5
Extreme (50C)	1732.5	9.2	0.005326	2.5
Extreme (40C)	1732.5	7.9	0.004533	2.5
Extreme (30C)	1732.5	5.5	0.003185	2.5
Extreme (10C)	1732.5	7.4	0.004299	2.5
Extreme (0C)	1732.5	9.4	0.005448	2.5
Extreme (-10C)	1732.5	8.5	0.004898	2.5
Extreme (-20C)	1732.5	6.8	0.003934	2.5
Extreme (-30C)	1732.5	7.9	0.004564	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1732.5	10.1	0.005839	2.5
3.85	1732.5	9.1	0.005266	2.5
4.2	1732.5	8.4	0.004821	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	10.0	0.005783	2.5
Extreme (50C)	1732.5	8.5	0.004916	2.5
Extreme (40C)	1732.5	8.1	0.004673	2.5
Extreme (30C)	1732.5	8.9	0.005132	2.5
Extreme (10C)	1732.5	9.2	0.005316	2.5
Extreme (0C)	1732.5	8.5	0.004927	2.5
Extreme (-10C)	1732.5	9.0	0.005186	2.5
Extreme (-20C)	1732.5	8.9	0.005165	2.5
Extreme (-30C)	1732.5	7.8	0.004525	2.5

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

10.3 LTE BAND 5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	836.5	6.2	0.007472	2.5
3.85	836.5	7.1	0.008499	2.5
4.2	836.5	4.9	0.005846	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.3	0.007478	2.5
Extreme (50C)	836.5	5.6	0.006727	2.5
Extreme (40C)	836.5	6.3	0.007543	2.5
Extreme (30C)	836.5	6.4	0.007641	2.5
Extreme (10C)	836.5	5.6	0.006699	2.5
Extreme (0C)	836.5	5.4	0.006459	2.5
Extreme (-10C)	836.5	5.1	0.006128	2.5
Extreme (-20C)	836.5	6.1	0.007255	2.5
Extreme (-30C)	836.5	6.8	0.008091	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	836.5	5.5	0.006528	2.5
3.85	836.5	6.7	0.007967	2.5
4.2	836.5	5.1	0.006079	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	5.8	0.006898	2.5
Extreme (50C)	836.5	6.2	0.007432	2.5
Extreme (40C)	836.5	6.5	0.007751	2.5
Extreme (30C)	836.5	6.1	0.007327	2.5
Extreme (10C)	836.5	5.0	0.006019	2.5
Extreme (0C)	836.5	5.6	0.006680	2.5
Extreme (-10C)	836.5	6.1	0.007284	2.5
Extreme (-20C)	836.5	6.4	0.007609	2.5
Extreme (-30C)	836.5	6.4	0.007626	2.5

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

10.4 LTE BAND 7

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	2535	9.5	0.003761	2.5
3.85	2535	9.0	0.003533	2.5
4.2	2535	8.4	0.003295	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	8.9	0.003515	2.5
Extreme (50C)	2535	8.5	0.003367	2.5
Extreme (40C)	2535	8.7	0.003435	2.5
Extreme (30C)	2535	8.7	0.003433	2.5
Extreme (10C)	2535	7.7	0.003041	2.5
Extreme (0C)	2535	8.0	0.003139	2.5
Extreme (-10C)	2535	9.4	0.003699	2.5
Extreme (-20C)	2535	8.6	0.003391	2.5
Extreme (-30C)	2535	7.9	0.003122	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	2535	6.9	0.002722	2.5
3.85	2535	6.8	0.002685	2.5
4.2	2535	5.6	0.002201	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	6.9	0.002722	2.5
Extreme (50C)	2535	5.3	0.002079	2.5
Extreme (40C)	2535	5.4	0.002149	2.5
Extreme (30C)	2535	6.4	0.002517	2.5
Extreme (10C)	2535	5.6	0.002195	2.5
Extreme (0C)	2535	5.3	0.002088	2.5
Extreme (-10C)	2535	5.4	0.002127	2.5
Extreme (-20C)	2535	6.4	0.002522	2.5
Extreme (-30C)	2535	5.4	0.002129	2.5

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

10.5 LTE BAND 12

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	707.5	8.7	0.012231	2.5
3.85	707.5	10.1	0.014294	2.5
4.2	707.5	8.8	0.012421	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	9.0	0.012738	2.5
Extreme (50C)	707.5	7.4	0.010512	2.5
Extreme (40C)	707.5	7.7	0.010942	2.5
Extreme (30C)	707.5	8.6	0.012200	2.5
Extreme (10C)	707.5	7.6	0.010751	2.5
Extreme (0C)	707.5	9.2	0.012956	2.5
Extreme (-10C)	707.5	8.0	0.011342	2.5
Extreme (-20C)	707.5	9.0	0.012760	2.5
Extreme (-30C)	707.5	8.3	0.011683	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	707.5	6.9	0.009807	2.5
3.85	707.5	8.6	0.012192	2.5
4.2	707.5	7.5	0.010533	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.9	0.012575	2.5
Extreme (50C)	707.5	8.8	0.012509	2.5
Extreme (40C)	707.5	8.9	0.012627	2.5
Extreme (30C)	707.5	8.0	0.011348	2.5
Extreme (10C)	707.5	8.4	0.011886	2.5
Extreme (0C)	707.5	7.8	0.011084	2.5
Extreme (-10C)	707.5	7.1	0.010031	2.5
Extreme (-20C)	707.5	9.0	0.012671	2.5
Extreme (-30C)	707.5	8.4	0.011831	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]
3.4	710.0	9.3	0.013167	2.5
3.85	710.0	8.6	0.012094	2.5
4.2	710.0	7.8	0.010979	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	10.2	0.014330	2.5
Extreme (50C)	710.0	8.9	0.012532	2.5
Extreme (40C)	710.0	7.9	0.011095	2.5
Extreme (30C)	710.0	9.0	0.012708	2.5
Extreme (10C)	710.0	9.0	0.012732	2.5
Extreme (0C)	710.0	8.5	0.011904	2.5
Extreme (-10C)	710.0	9.5	0.013343	2.5
Extreme (-20C)	710.0	9.1	0.012851	2.5
Extreme (-30C)	710.0	8.4	0.011879	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	710.0	9.7	0.013670	2.5
3.85	710.0	9.3	0.013073	2.5
4.2	710.0	8.6	0.012159	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.0	0.012664	2.5
Extreme (50C)	710.0	8.6	0.012119	2.5
Extreme (40C)	710.0	8.8	0.012333	2.5
Extreme (30C)	710.0	8.6	0.012061	2.5
Extreme (10C)	710.0	8.2	0.011559	2.5
Extreme (0C)	710.0	8.3	0.011731	2.5
Extreme (-10C)	710.0	9.0	0.012733	2.5
Extreme (-20C)	710.0	8.6	0.012115	2.5
Extreme (-30C)	710.0	8.8	0.012325	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

Band 66 QPSK, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1745	6.2	0.003537	2.5
3.85	1745	6.6	0.003788	2.5
4.2	1745	7.7	0.004434	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1745	5.7	0.003270	2.5
Extreme (50C)	1745	7.8	0.004446	2.5
Extreme (40C)	1745	6.4	0.003660	2.5
Extreme (30C)	1745	7.4	0.004226	2.5
Extreme (10C)	1745	7.4	0.004254	2.5
Extreme (0C)	1745	6.4	0.003687	2.5
Extreme (-10C)	1745	6.0	0.003432	2.5
Extreme (-20C)	1745	6.6	0.003758	2.5
Extreme (-30C)	1745	6.0	0.003420	2.5

Band 66 16QAM, (20MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	1745	8.3	0.004744	2.5
3.85	1745	7.3	0.004157	2.5
4.2	1745	9.3	0.005321	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1745	8.3	0.004779	2.5
Extreme (50C)	1745	7.9	0.004542	2.5
Extreme (40C)	1745	8.3	0.004732	2.5
Extreme (30C)	1745	8.3	0.004771	2.5
Extreme (10C)	1745	8.1	0.004624	2.5
Extreme (0C)	1745	6.3	0.003612	2.5
Extreme (-10C)	1745	8.3	0.004738	2.5
Extreme (-20C)	1745	8.8	0.005056	2.5
Extreme (-30C)	1745	6.0	0.003436	2.5

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

11. Peak-to-Average Ratio

11.1 Description of the PAR Measurement

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

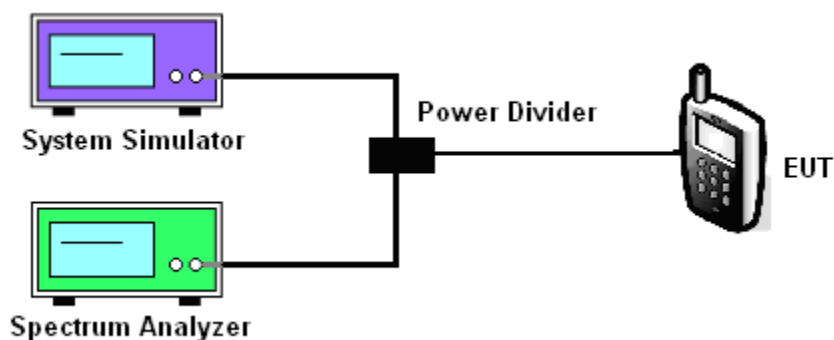
11.2 Measuring Instruments

See list of measuring instruments of this test report.

11.3 Test Procedures

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

11.4 Test Setup



MODES TESTED

- ☒ LTE Band 2/4/5/7/12/17/66
- ☐

Test data reference attachment.

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