

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

FCC ID: O55183722

Product: 1.8 inch 4G Bar Phone

Trade Mark: LOGIC, iSWAG, UNONU

Model Number: A5L

Family Model: FORCE, Q5L

Report No.: STR220930005004E

Prepared for

SWAGTEK

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Prepared by

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TEST RESULT CERTIFICATION

Applicant's name	SWAGTEK
Address.....	10205 NW 19th Street STE101Miami, FL 33172
Manufacturer's Name	SWAGTEK
Address.....	10205 NW 19th Street STE101Miami, FL 33172
Product name.....	1.8 inch 4G Bar Phone
Model and/or type reference ..	A5L
Family Model:	FORCE, Q5L
Standards	FCC CFR 47 Part 22H, Part 24E, Part 27
Test procedure	ANSI C63.26:2015 ANSI/TIA-603-E-2016
Test sample number	T220930003R002

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.....	Oct 08, 2022 ~ Oct 29, 2022
Date of Issue	Oct 31, 2022
Test Result	Pass

Testing Engineer :



(Allen Liu)

Authorized Signatory :



(Alex Li)

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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	1.8 inch 4G Bar Phone
Trade Mark	LOGIC, iSWAG, UNONU
Model Name	A5L
Family Model	FORCE, Q5L
Model Difference	All models are the same circuit and RF module, except the model name.
FCC ID:	O55183722
Frequency Bands:	U.S. Bands: ☒ LTE FDD Band 2, 4, 5, 12
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 12 Uplink: 699MHz-716MHz, Downlink: 729MHz-746MHz;
Type of Modulation:	QPSK/16QAM
Power Class	Class 3
Antenna:	PIFA Antenna
Antenna gain:	0.03dBi;
Adapter	Model: YLT-Y02A-2 Input: AC 100-240V, 50-60Hz 0.2A Output: DC 5.0V---500mA
Battery	DC 3.7V, 800mAh
Power supply	DC 3.7V from battery or DC 5V from Adapter.
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.7V) (Note 1)
Hardware version:	FD16_MB_V1.0
Firmware version:	MOCOR_20A_MP_W20.46.4
Software version:	LOGIC_A5L_GENERIC_V1.0_24092022
** 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: O55183722** 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 12

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	1.8 inch 4G Bar Phone	A5L	FCC ID: O55183722	EUT

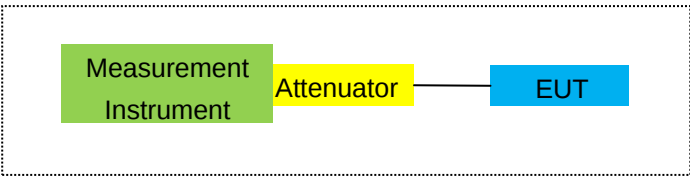
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

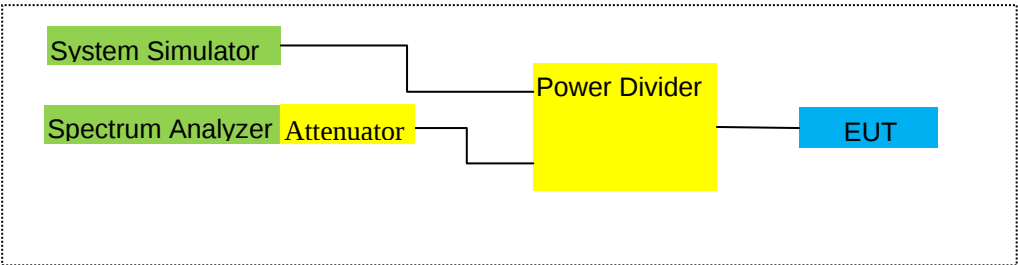
For Radiated Test Cases



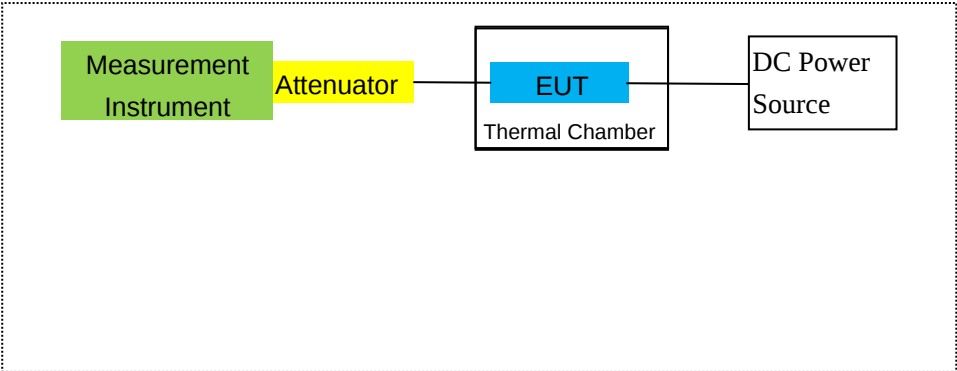
For Conducted Output Power



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	2022.04.06	2023.04.05	1 year
2	Test Receiver	R&S	ESPI	101318	2022.04.06	2023.04.05	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2022.03.30	2023.03.29	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	2022.03.31	2023.03.30	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2021.11.07	2022.11.06	1 year
7	Amplifier	EM	EM-30180	060538	2022.06.17	2023.06.16	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2022.04.06	2023.04.05	1 year
9	Power Meter	R&S	NRVS	100696	2022.06.17	2023.06.16	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2022.04.06	2023.04.05	1 year
11	Test Cable	N/A	R-01	N/A	2020.05.11	2023.05.10	3 year
12	Test Cable	N/A	R-02	N/A	2020.05.11	2023.05.10	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	2022.04.06	2023.04.05	1 year
15	LISN	R&S	ENV216	101313	2022.04.06	2023.04.05	1 year
16	LISN	EMCO	3816/2	00042990	2022.04.06	2023.04.05	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2022.04.06	2023.04.05	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2022.04.06	2023.04.05	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	2022.06.17	2023.06.16	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2022.04.06	2023.04.05	1 year
24	test receiver	R&S	ESCI	a0304218	2022.04.06	2023.04.05	1 year
25	Communication Tester	R&S	CMU200	A0304247	2022.06.17	2023.06.16	1 year

26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2022.04.06	2023.04.05	1 year
27	DC Power Source	N/A	PS-6005D	20170402923	2020.05.11	2023.05.10	3 year
28	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2022.06.16	2023.06.15	1 year
29	Communication Tester	R&S	CMW500	148500	2022.06.16	2023.06.15	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 12

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 2/4/5/12

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 12

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: 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 12

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.	Max.	Polarization Of Max. ERP	
						EIRP	EIRP		
						Average (dBm)	Average (mW)		
1.4MHz	1/#Mid	1850.7	-2.25	3.76	28.24	22.23	167.109	Horizontal	Pass
Band		1880	-2.06	3.91	28.22	22.25	167.880	Horizontal	Pass
QPSK		1909.3	-1.97	3.93	28.20	22.30	169.824	Horizontal	Pass
3.0MHz	1/#Mid	1851.5	-2.31	3.77	28.23	22.15	164.059	Horizontal	Pass
Band		1880	-2.16	3.91	28.24	22.17	164.816	Horizontal	Pass
QPSK		1908.5	-2.03	3.94	28.25	22.28	169.044	Horizontal	Pass
5.0MHz	1/#Mid	1852.5	-2.20	3.77	28.31	22.34	171.396	Horizontal	Pass
Band		1880	-1.82	3.91	28.22	22.49	177.419	Horizontal	Pass
QPSK		1907.5	-1.75	3.94	28.20	22.51	178.238	Horizontal	Pass
10.0MHz	1/#Mid	1855	-2.06	3.79	28.33	22.48	177.011	Horizontal	Pass
Band		1880	-1.76	3.95	28.22	22.51	178.238	Horizontal	Pass
QPSK		1905	-1.65	3.97	28.19	22.57	180.717	Horizontal	Pass
15.0MHz	1/#Mid	1857.5	-2.02	3.79	28.34	22.53	179.061	Horizontal	Pass
Band		1880	-1.81	3.95	28.22	22.46	176.198	Horizontal	Pass
QPSK		1902.5	-1.67	3.97	28.18	22.54	179.473	Horizontal	Pass
20.0MHz	1/#Mid	1860	-2.01	3.81	28.35	22.53	179.061	Horizontal	Pass
Band		1880	-1.68	3.96	28.22	22.58	181.134	Horizontal	Pass
QPSK		1900	-1.62	4.00	28.16	22.54	179.473	Horizontal	Pass
1.4MHz	1/#Mid	1850.7	-2.81	3.76	28.24	21.67	146.893	Vertical	Pass
Band		1880	-2.98	3.91	28.22	21.33	135.831	Vertical	Pass
QPSK		1909.3	-3.17	3.93	28.20	21.10	128.825	Vertical	Pass
3.0MHz	1/#Mid	1851.5	-3.38	3.77	28.23	21.08	128.233	Vertical	Pass
Band		1880	-3.17	3.91	28.24	21.16	130.617	Vertical	Pass
QPSK		1908.5	-2.82	3.94	28.25	21.49	140.929	Vertical	Pass
5.0MHz	1/#Mid	1852.5	-3.32	3.77	28.31	21.22	132.434	Vertical	Pass
Band		1880	-3.28	3.91	28.22	21.03	126.765	Vertical	Pass
QPSK		1907.5	-2.50	3.94	28.20	21.76	149.968	Vertical	Pass
10.0MHz	1/#Mid	1855	-3.41	3.79	28.33	21.13	129.718	Vertical	Pass
Band		1880	-3.22	3.95	28.22	21.05	127.350	Vertical	Pass
QPSK		1905	-3.05	3.97	28.19	21.17	130.918	Vertical	Pass

15.0MHz		1857.5	-2.73	3.79	28.34	21.82	152.055	Vertical	Pass
Band	1/#Mid	1880	-2.57	3.95	28.22	21.70	147.911	Vertical	Pass
QPSK		1902.5	-2.82	3.97	28.18	21.39	137.721	Vertical	Pass
20.0MHz		1860	-2.96	3.81	28.35	21.58	143.880	Vertical	Pass
Band	1/#Mid	1880	-2.78	3.96	28.22	21.48	140.605	Vertical	Pass
QPSK		1900	-3.03	4.00	28.16	21.13	129.718	Vertical	Pass

Note:

SG Level= Signal generator output

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

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.	Polarization Of Max. ERP	
							EIRP		
							Average (mW)		
1.4MHz	1/#Mid	1850.7	-3.37	3.76	28.24	21.11	129.122	Horizontal	Pass
Band 16		1880	-2.84	3.91	28.22	21.47	140.281	Horizontal	Pass
QAM		1909.3	-2.77	3.93	28.20	21.50	141.254	Horizontal	Pass
3.0MHz	1/#Mid	1851.5	-2.87	3.77	28.23	21.59	144.212	Horizontal	Pass
Band 16		1880	-2.95	3.91	28.24	21.38	137.404	Horizontal	Pass
QAM		1908.5	-3.16	3.94	28.25	21.15	130.317	Horizontal	Pass
5.0MHz	1/#Mid	1852.5	-2.81	3.77	28.31	21.73	148.936	Horizontal	Pass
Band 16		1880	-2.72	3.91	28.22	21.59	144.212	Horizontal	Pass
QAM		1907.5	-2.40	3.94	28.20	21.86	153.462	Horizontal	Pass
10.0MHz	1/#Mid	1855	-2.86	3.79	28.33	21.68	147.231	Horizontal	Pass
Band 16		1880	-2.85	3.95	28.22	21.42	138.676	Horizontal	Pass
QAM		1905	-2.32	3.97	28.19	21.90	154.882	Horizontal	Pass
15.0MHz	1/#Mid	1857.5	-2.84	3.79	28.34	21.71	148.252	Horizontal	Pass
Band 16		1880	-2.63	3.95	28.22	21.64	145.881	Horizontal	Pass
QAM		1902.5	-2.59	3.97	28.18	21.62	145.211	Horizontal	Pass
20.0MHz	1/#Mid	1860	-2.73	3.81	28.35	21.81	151.705	Horizontal	Pass
Band 16		1880	-2.43	3.96	28.22	21.83	152.405	Horizontal	Pass
QAM		1900	-2.25	4.00	28.16	21.91	155.239	Horizontal	Pass
1.4MHz	1/#Mid	1850.7	-3.74	3.76	28.24	20.74	118.577	Vertical	Pass
Band 16		1880	-3.37	3.91	28.22	20.94	124.165	Vertical	Pass
QAM		1909.3	-3.81	3.93	28.20	20.46	111.173	Vertical	Pass
3.0MHz	1/#Mid	1851.5	-3.52	3.77	28.23	20.94	124.165	Vertical	Pass
Band 16		1880	-3.55	3.91	28.24	20.78	119.674	Vertical	Pass
QAM		1908.5	-4.34	3.94	28.25	19.97	99.312	Vertical	Pass
5.0MHz	1/#Mid	1852.5	-3.90	3.77	28.31	20.64	115.878	Vertical	Pass
Band 16		1880	-3.57	3.91	28.22	20.74	118.577	Vertical	Pass
QAM		1907.5	-3.52	3.94	28.20	20.74	118.577	Vertical	Pass
10.0MHz	1/#Mid	1855	-3.93	3.79	28.33	20.61	115.080	Vertical	Pass
Band 16		1880	-3.52	3.95	28.22	20.75	118.850	Vertical	Pass
QAM		1905	-3.92	3.97	28.19	20.30	107.152	Vertical	Pass
15.0MHz	1/#Mid	1857.5	-4.59	3.79	28.34	19.96	99.083	Vertical	Pass
Band 16		1880	-3.96	3.95	28.22	20.31	107.399	Vertical	Pass

QAM		1902.5	-3.34	3.97	28.18	20.87	122.180	Vertical	Pass
20.0MHz	1/#Mid	1860	-4.33	3.81	28.35	20.21	104.954	Vertical	Pass
Band 16		1880	-3.38	3.96	28.22	20.88	122.462	Vertical	Pass
QAM		1900	-3.33	4.00	28.16	20.83	121.060	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG	Cable	Antenna	Max.	Max.	Polarization Of	
			Level	Loss	Factor	EIRP	EIRP	Max. ERP	
			(dBm)	(dBm)	(dB)	Average	Average		
						(dBm)	(mW)		
1.4MHz	1/#Mid	1710.7	-2.16	3.12	27.58	22.30	169.824	Horizontal	Pass
Band		1732.5	-2.15	3.27	27.61	22.19	165.577	Horizontal	Pass
QPSK		1754.3	-2.13	3.29	27.63	22.21	166.341	Horizontal	Pass
3.0MHz	1/#Mid	1711.5	-2.33	3.13	27.61	22.15	164.059	Horizontal	Pass
Band		1732.5	-2.25	3.27	27.61	22.09	161.808	Horizontal	Pass
QPSK		1753.5	-2.17	3.30	27.62	22.15	164.059	Horizontal	Pass
5.0MHz	1/#Mid	1712.5	-2.10	3.13	27.63	22.40	173.780	Horizontal	Pass
Band		1732.5	-2.00	3.27	27.61	22.34	171.396	Horizontal	Pass
QPSK		1752.5	-1.88	3.30	27.60	22.42	174.582	Horizontal	Pass
10.0MHz	1/#Mid	1715	-2.04	3.15	27.64	22.45	175.792	Horizontal	Pass
Band		1732.5	-1.81	3.31	27.61	22.49	177.419	Horizontal	Pass
QPSK		1750	-1.83	3.33	27.59	22.43	174.985	Horizontal	Pass
15.0MHz	1/#Mid	1717.5	-2.05	3.15	27.65	22.45	175.792	Horizontal	Pass
Band		1732.5	-1.89	3.31	27.61	22.41	174.181	Horizontal	Pass
QPSK		1747.5	-1.83	3.33	27.57	22.41	174.181	Horizontal	Pass
20.0MHz	1/#Mid	1720	-1.99	3.17	27.66	22.50	177.828	Horizontal	Pass
Band		1732.5	-1.82	3.32	27.61	22.47	176.604	Horizontal	Pass
QPSK		1745	-1.76	3.36	27.56	22.44	175.388	Horizontal	Pass
1.4MHz	1/#Mid	1710.7	-3.06	3.12	27.58	21.40	138.038	Vertical	Pass
Band		1732.5	-2.62	3.27	27.61	21.72	148.594	Vertical	Pass
QPSK		1754.3	-3.24	3.29	27.63	21.10	128.825	Vertical	Pass
3.0MHz	1/#Mid	1711.5	-3.34	3.13	27.61	21.14	130.017	Vertical	Pass
Band		1732.5	-3.36	3.27	27.61	20.98	125.314	Vertical	Pass
QPSK		1753.5	-3.04	3.30	27.62	21.28	134.276	Vertical	Pass
5.0MHz	1/#Mid	1712.5	-3.50	3.13	27.63	21.00	125.893	Vertical	Pass
Band		1732.5	-2.74	3.27	27.61	21.60	144.544	Vertical	Pass
QPSK		1752.5	-3.05	3.30	27.60	21.25	133.352	Vertical	Pass
10.0MHz	1/#Mid	1715	-3.07	3.15	27.64	21.42	138.676	Vertical	Pass
Band		1732.5	-2.37	3.31	27.61	21.93	155.955	Vertical	Pass
QPSK		1750	-2.37	3.33	27.59	21.89	154.525	Vertical	Pass

15.0MHz		1717.5	-3.24	3.15	27.65	21.26	133.660	Vertical	Pass
Band	1/#Mid	1732.5	-3.11	3.31	27.61	21.19	131.522	Vertical	Pass
QPSK		1747.5	-2.73	3.33	27.57	21.51	141.579	Vertical	Pass
20.0MHz		1720	-3.52	3.17	27.66	20.97	125.026	Vertical	Pass
Band	1/#Mid	1732.5	-3.18	3.32	27.61	21.11	129.122	Vertical	Pass
QPSK		1745	-2.26	3.36	27.56	21.94	156.315	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG	Cable	Antenna	Max. EIRP	Max. EIRP	Polarization	
			Level	Loss	Factor			Of Max.	
			(dBm)	(dBm)	(dB)	Average	Average	ERP	
						(dBm)	(mW)		
1.4MHz	1/#Mid	1710.7	-2.97	3.12	27.58	21.49	140.929	Horizontal	Pass
Band 16		1732.5	-2.82	3.27	27.61	21.52	141.906	Horizontal	Pass
QAM		1754.3	-2.82	3.29	27.63	21.52	141.906	Horizontal	Pass
3.0MHz	1/#Mid	1711.5	-2.91	3.13	27.61	21.57	143.549	Horizontal	Pass
Band 16		1732.5	-3.04	3.27	27.61	21.30	134.896	Horizontal	Pass
QAM		1753.5	-3.26	3.30	27.62	21.06	127.644	Horizontal	Pass
5.0MHz	1/#Mid	1712.5	-2.74	3.13	27.63	21.76	149.968	Horizontal	Pass
Band 16		1732.5	-2.70	3.27	27.61	21.64	145.881	Horizontal	Pass
QAM		1752.5	-2.39	3.30	27.60	21.91	155.239	Horizontal	Pass
10.0MHz	1/#Mid	1715	-2.81	3.15	27.64	21.68	147.231	Horizontal	Pass
Band 16		1732.5	-3.00	3.31	27.61	21.30	134.896	Horizontal	Pass
QAM		1750	-2.38	3.33	27.59	21.88	154.170	Horizontal	Pass
15.0MHz	1/#Mid	1717.5	-2.61	3.15	27.65	21.89	154.525	Horizontal	Pass
Band 16		1732.5	-2.67	3.31	27.61	21.63	145.546	Horizontal	Pass
QAM		1747.5	-2.69	3.33	27.57	21.55	142.889	Horizontal	Pass
20.0MHz	1/#Mid	1720	-2.56	3.17	27.66	21.93	155.955	Horizontal	Pass
Band 16		1732.5	-2.57	3.32	27.61	21.72	148.594	Horizontal	Pass
QAM		1745	-2.38	3.36	27.56	21.82	152.055	Horizontal	Pass
1.4MHz	1/#Mid	1710.7	-4.36	3.12	27.58	20.10	102.329	Vertical	Pass
Band 16		1732.5	-3.77	3.27	27.61	20.57	114.025	Vertical	Pass
QAM		1754.3	-4.14	3.29	27.63	20.20	104.713	Vertical	Pass
3.0MHz	1/#Mid	1711.5	-4.38	3.13	27.61	20.10	102.329	Vertical	Pass
Band 16		1732.5	-3.45	3.27	27.61	20.89	122.744	Vertical	Pass
QAM		1753.5	-4.11	3.30	27.62	20.21	104.954	Vertical	Pass
5.0MHz	1/#Mid	1712.5	-4.22	3.13	27.63	20.28	106.660	Vertical	Pass
Band 16		1732.5	-4.11	3.27	27.61	20.23	105.439	Vertical	Pass
QAM		1752.5	-3.99	3.30	27.60	20.31	107.399	Vertical	Pass
10.0MHz	1/#Mid	1715	-3.82	3.15	27.64	20.67	116.681	Vertical	Pass
Band 16		1732.5	-4.30	3.31	27.61	20.00	100.000	Vertical	Pass
QAM		1750	-3.41	3.33	27.59	20.85	121.619	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-3.77	3.15	27.65	20.73	118.304	Vertical	Pass
Band 16		1732.5	-4.29	3.31	27.61	20.01	100.231	Vertical	Pass

QAM		1747.5	-3.99	3.33	27.57	20.25	105.925	Vertical	Pass
20.0MHz	1/#Mid	1720	-4.22	3.17	27.66	20.27	106.414	Vertical	Pass
Band 16		1732.5	-3.58	3.32	27.61	20.71	117.761	Vertical	Pass
QAM		1745	-3.81	3.36	27.56	20.39	109.396	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Factor(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	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	7.14	2.01	19.68	2.15	22.66	184.502	Horizontal	Pass
Band		836.5	7.02	2.01	19.77	2.15	22.63	183.231	Horizontal	Pass
QPSK		848.3	6.82	2.02	19.82	2.15	22.47	176.604	Horizontal	Pass
3.0MHz	1/#Mid	825.5	6.91	2.01	19.70	2.15	22.45	175.792	Horizontal	Pass
Band		836.5	6.81	2.01	19.77	2.15	22.42	174.582	Horizontal	Pass
QPSK		847.5	6.68	2.02	19.81	2.15	22.32	170.608	Horizontal	Pass
5.0MHz	1/#Mid	826.5	7.19	2.01	19.71	2.15	22.74	187.932	Horizontal	Pass
Band		836.5	7.07	2.01	19.77	2.15	22.68	185.353	Horizontal	Pass
QPSK		846.5	6.91	2.02	19.79	2.15	22.53	179.061	Horizontal	Pass
10.0MHz	1/#Mid	829	7.21	2.01	19.73	2.15	22.78	189.671	Horizontal	Pass
Band		836.5	7.16	2.01	19.77	2.15	22.77	189.234	Horizontal	Pass
QPSK		844	7.06	2.02	19.78	2.15	22.67	184.927	Horizontal	Pass
1.4MHz	1/#Mid	824.7	6.16	2.01	19.68	2.15	21.68	147.231	Vertical	Pass
Band		836.5	5.74	2.01	19.77	2.15	21.35	136.458	Vertical	Pass
QPSK		848.3	5.32	2.02	19.82	2.15	20.97	125.026	Vertical	Pass
3.0MHz	1/#Mid	825.5	5.64	2.01	19.70	2.15	21.18	131.220	Vertical	Pass
Band		836.5	6.26	2.01	19.77	2.15	21.87	153.815	Vertical	Pass
QPSK		847.5	6.08	2.02	19.81	2.15	21.72	148.594	Vertical	Pass
5.0MHz	1/#Mid	826.5	5.92	2.01	19.71	2.15	21.47	140.281	Vertical	Pass
Band		836.5	6.13	2.01	19.77	2.15	21.74	149.279	Vertical	Pass
QPSK		846.5	5.45	2.02	19.79	2.15	21.07	127.938	Vertical	Pass
10.0MHz	1/#Mid	829	5.73	2.01	19.73	2.15	21.30	134.896	Vertical	Pass
Band		836.5	5.69	2.01	19.77	2.15	21.30	134.896	Vertical	Pass
QPSK		844	5.63	2.02	19.78	2.15	21.24	133.045	Vertical	Pass

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	Of Max. ERP	
							(dBm)	(mW)		
1.4MHz	3/#Mid	824.7	6.29	2.01	19.68	2.15	21.81	151.705	Horizontal	Pass
Band 16		836.5	6.22	2.01	19.77	2.15	21.83	152.405	Horizontal	Pass
QAM		848.3	6.06	2.02	19.82	2.15	21.71	148.252	Horizontal	Pass
3.0MHz	1/#Mid	825.5	6.37	2.01	19.70	2.15	21.91	155.239	Horizontal	Pass
Band 16		836.5	6.08	2.01	19.77	2.15	21.69	147.571	Horizontal	Pass
QAM		847.5	5.56	2.02	19.81	2.15	21.20	131.826	Horizontal	Pass
5.0MHz	1/#Mid	826.5	6.69	2.01	19.71	2.15	22.24	167.494	Horizontal	Pass
Band 16		836.5	6.46	2.01	19.77	2.15	22.07	161.065	Horizontal	Pass
QAM		846.5	6.21	2.02	19.79	2.15	21.83	152.405	Horizontal	Pass
10.0MHz	1/#Mid	829	6.69	2.01	19.73	2.15	22.26	168.267	Horizontal	Pass
Band 16		836.5	6.41	2.01	19.77	2.15	22.02	159.221	Horizontal	Pass
QAM		844	5.95	2.02	19.78	2.15	21.56	143.219	Horizontal	Pass
1.4MHz	1/#Mid	824.7	4.91	2.01	19.68	2.15	20.43	110.408	Vertical	Pass
Band 16		836.5	5.07	2.01	19.77	2.15	20.68	116.950	Vertical	Pass
QAM		848.3	6.21	2.02	19.82	2.15	21.86	153.462	Vertical	Pass
3.0MHz	1/#Mid	825.5	5.29	2.01	19.70	2.15	20.83	121.060	Vertical	Pass
Band 16		836.5	4.70	2.01	19.77	2.15	20.31	107.399	Vertical	Pass
QAM		847.5	5.93	2.02	19.81	2.15	21.57	143.549	Vertical	Pass
5.0MHz	1/#Mid	826.5	4.64	2.01	19.71	2.15	20.19	104.472	Vertical	Pass
Band 16		836.5	4.88	2.01	19.77	2.15	20.49	111.944	Vertical	Pass
QAM		846.5	4.83	2.02	19.79	2.15	20.45	110.917	Vertical	Pass
10.0MHz	1/#Mid	829	4.80	2.01	19.73	2.15	20.37	108.893	Vertical	Pass
Band 16		836.5	5.26	2.01	19.77	2.15	20.87	122.180	Vertical	Pass
QAM		844	4.45	2.02	19.78	2.15	20.06	101.391	Vertical	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

8.5 LTE BAND 12

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor		Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)	Correction	Average	Average	Of Max. ERP	
						(dB)	(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	699.7	7.41	1.91	19.21	2.15	22.56	180.302	Vertical	Pass
		707.5	7.33	1.91	19.26	2.15	22.53	179.061	Vertical	Pass
		715.3	7.11	1.93	19.34	2.15	22.37	172.584	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	700.5	7.20	1.91	19.21	2.15	22.35	171.791	Vertical	Pass
		707.5	7.12	1.91	19.26	2.15	22.32	170.608	Vertical	Pass
		714.5	6.96	1.93	19.34	2.15	22.22	166.725	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	701.5	7.47	1.91	19.23	2.15	22.64	183.654	Vertical	Pass
		707.5	7.38	1.91	19.26	2.15	22.58	181.134	Vertical	Pass
		713.5	7.17	1.92	19.33	2.15	22.43	174.985	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	704	7.49	1.91	19.25	2.15	22.68	185.353	Vertical	Pass
		707.5	7.47	1.91	19.26	2.15	22.67	184.927	Vertical	Pass
		711	7.32	1.92	19.32	2.15	22.57	180.717	Vertical	Pass
1.4MHz Band QPSK	1/#Mid	699.7	6.09	1.91	19.21	2.15	21.24	133.045	Horizontal	Pass
		707.5	5.77	1.91	19.26	2.15	20.97	125.026	Horizontal	Pass
		715.3	5.72	1.93	19.34	2.15	20.98	125.314	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	700.5	6.05	1.91	19.21	2.15	21.20	131.826	Horizontal	Pass
		707.5	6.14	1.91	19.26	2.15	21.34	136.144	Horizontal	Pass
		714.5	6.53	1.93	19.34	2.15	21.79	151.008	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	701.5	6.44	1.91	19.23	2.15	21.61	144.877	Horizontal	Pass
		707.5	6.10	1.91	19.26	2.15	21.30	134.896	Horizontal	Pass
		713.5	5.72	1.92	19.33	2.15	20.98	125.314	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	704	5.94	1.91	19.25	2.15	21.13	129.718	Horizontal	Pass
		707.5	6.24	1.91	19.26	2.15	21.44	139.316	Horizontal	Pass
		711	6.15	1.92	19.32	2.15	21.40	138.038	Horizontal	Pass

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)		Average	Average	Of Max. ERP	
							(dBm)	(mW)		
1.4MHz	1/#Mid	699.7	7.32	1.91	19.21	2.15	22.47	176.604	Vertical	Pass
Band 16		707.5	7.24	1.91	19.26	2.15	22.44	175.388	Vertical	Pass
QAM		715.3	7.02	1.93	19.34	2.15	22.28	169.044	Vertical	Pass
3.0MHz	1/#Mid	700.5	7.11	1.91	19.21	2.15	22.26	168.267	Vertical	Pass
Band 16		707.5	7.03	1.91	19.26	2.15	22.23	167.109	Vertical	Pass
QAM		714.5	6.87	1.93	19.34	2.15	22.13	163.305	Vertical	Pass
5.0MHz	1/#Mid	701.5	7.38	1.91	19.23	2.15	22.55	179.887	Vertical	Pass
Band 16		707.5	7.29	1.91	19.26	2.15	22.49	177.419	Vertical	Pass
QAM		713.5	7.08	1.92	19.33	2.15	22.34	171.396	Vertical	Pass
10.0MHz	1/#Mid	704	7.40	1.91	19.25	2.15	22.59	181.552	Vertical	Pass
Band 16		707.5	7.38	1.91	19.26	2.15	22.58	181.134	Vertical	Pass
QAM		711	7.23	1.92	19.32	2.15	22.48	177.011	Vertical	Pass
1.4MHz	1/#Mid	699.7	6.15	1.91	19.21	2.15	21.30	134.896	Horizontal	Pass
Band 16		707.5	5.85	1.91	19.26	2.15	21.05	127.350	Horizontal	Pass
QAM		715.3	5.77	1.93	19.34	2.15	21.03	126.765	Horizontal	Pass
3.0MHz	1/#Mid	700.5	6.53	1.91	19.21	2.15	21.68	147.231	Horizontal	Pass
Band 16		707.5	5.84	1.91	19.26	2.15	21.04	127.057	Horizontal	Pass
QAM		714.5	6.41	1.93	19.34	2.15	21.67	146.893	Horizontal	Pass
5.0MHz	1/#Mid	701.5	5.75	1.91	19.23	2.15	20.92	123.595	Horizontal	Pass
Band 16		707.5	6.09	1.91	19.26	2.15	21.29	134.586	Horizontal	Pass
QAM		713.5	6.45	1.92	19.33	2.15	21.71	148.252	Horizontal	Pass
10.0MHz	1/#Mid	704	6.35	1.91	19.25	2.15	21.54	142.561	Horizontal	Pass
Band 16		707.5	6.51	1.91	19.26	2.15	21.71	148.252	Horizontal	Pass
QAM		711	6.24	1.92	19.32	2.15	21.49	140.929	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

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 Band2
LTE Band 4
- ☐ LTE Band 5
LTE Band 12

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	-48.31	4.04	33.51	-18.84	-13	-5.84	Horizontal
3701.4	-53.71	4.04	33.51	-24.24	-13	-11.24	Vertical
5552.1	-50.64	5.24	35.84	-20.04	-13	-7.04	Vertical
5552.1	-50.02	5.24	35.84	-19.42	-13	-6.42	Horizontal
212.5	-39.71	1.43	16.02	-25.12	-13	-12.12	Vertical
373.4	-41.44	1.30	17.99	-24.75	-13	-11.75	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-51.96	4.04	33.56	-22.44	-13	-9.44	Horizontal
3760.0	-52.61	4.04	33.56	-23.09	-13	-10.09	Vertical
5640.0	-49.55	5.24	35.91	-18.88	-13	-5.88	Vertical
5640.0	-53.95	5.24	35.91	-23.28	-13	-10.28	Horizontal
175.8	-41.21	1.62	16.97	-25.86	-13	-12.86	Vertical
254.8	-40.11	1.74	15.98	-25.88	-13	-12.88	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-49.43	4.04	34.00	-19.47	-13	-6.47	Horizontal
3818.6	-53.65	4.04	34.00	-23.69	-13	-10.69	Vertical
5727.9	-49.14	5.24	36.04	-18.34	-13	-5.34	Vertical
5727.9	-51.87	5.24	36.04	-21.07	-13	-8.07	Horizontal
181.7	-34.57	1.42	17.29	-18.70	-13	-5.70	Vertical
369.1	-34.16	1.50	17.90	-17.75	-13	-4.75	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	-46.06	4.07	33.54	-16.59	-13	-3.59	Horizontal
3720.0	-51.00	4.07	33.54	-21.53	-13	-8.53	Vertical
5580.0	-46.05	5.28	35.86	-15.47	-13	-2.47	Vertical
5580.0	-50.89	5.28	35.86	-20.31	-13	-7.31	Horizontal
176.9	-37.64	1.58	16.89	-22.32	-13	-9.32	Vertical
388.4	-35.25	1.76	17.26	-19.75	-13	-6.75	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-44.86	4.04	33.56	-15.34	-13	-2.34	Horizontal
3760.0	-53.02	4.04	33.56	-23.50	-13	-10.50	Vertical
5640.0	-51.87	5.24	35.91	-21.20	-13	-8.20	Vertical
5640.0	-52.26	5.24	35.91	-21.59	-13	-8.59	Horizontal
178.9	-38.94	1.46	16.27	-24.13	-13	-11.13	Vertical
408.5	-35.34	1.59	15.15	-21.78	-13	-8.78	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-51.88	4.04	34.00	-21.92	-13	-8.92	Horizontal
3800.0	-46.71	4.04	34.00	-16.75	-13	-3.75	Vertical
5700.0	-47.41	5.24	36.04	-16.61	-13	-3.61	Vertical
5700.0	-51.53	5.24	36.04	-20.73	-13	-7.73	Horizontal
210.2	-43.82	1.36	17.39	-27.78	-13	-14.78	Vertical
444.9	-42.72	1.66	15.39	-28.99	-13	-15.99	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)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-47.78	4.02	29.80	-22.00	-13	-9.00	Horizontal
3421.4	-48.04	4.02	29.80	-22.26	-13	-9.26	Vertical
5132.1	-50.17	5.24	35.84	-19.57	-13	-6.57	Vertical
5132.1	-49.96	5.24	35.84	-19.36	-13	-6.36	Horizontal
188.2	-41.17	1.68	16.04	-26.81	-13	-13.81	Vertical
371.5	-39.54	1.78	17.74	-23.58	-13	-10.58	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-48.81	4.03	30.00	-22.84	-13	-9.84	Horizontal
3465.0	-44.11	4.03	30.00	-18.14	-13	-5.14	Vertical
5197.5	-53.46	5.25	35.86	-22.85	-13	-9.85	Vertical
5197.5	-51.68	5.25	35.86	-21.07	-13	-8.07	Horizontal
212.3	-37.86	1.72	17.69	-21.89	-13	-8.89	Vertical
271.3	-43.08	1.62	16.02	-28.67	-13	-15.67	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-49.95	4.05	30.01	-23.99	-13	-10.99	Horizontal
3508.6	-44.09	4.05	30.01	-18.13	-13	-5.13	Vertical
5262.9	-46.35	5.26	35.86	-15.75	-13	-2.75	Vertical
5262.9	-49.62	5.26	35.86	-19.02	-13	-6.02	Horizontal
184.2	-42.60	1.80	16.69	-27.71	-13	-14.71	Vertical
244.9	-42.29	1.75	16.66	-27.39	-13	-14.39	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	-45.83	4.02	29.80	-20.05	-13	-7.05	Horizontal
3440.0	-46.80	4.02	29.80	-21.02	-13	-8.02	Vertical
5160.0	-47.50	5.24	35.84	-16.90	-13	-3.90	Vertical
5160.0	-52.31	5.24	35.84	-21.71	-13	-8.71	Horizontal
184.7	-41.57	1.57	17.26	-25.88	-13	-12.88	Vertical
326.1	-39.36	1.78	16.35	-24.79	-13	-11.79	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-47.23	4.03	30.00	-21.26	-13	-8.26	Horizontal
3465.0	-48.76	4.03	30.00	-22.79	-13	-9.79	Vertical
5197.5	-47.94	5.25	35.86	-17.33	-13	-4.33	Vertical
5197.5	-53.90	5.25	35.86	-23.29	-13	-10.29	Horizontal
176.2	-44.61	1.44	17.95	-28.10	-13	-15.10	Vertical
433.0	-40.99	1.65	16.09	-26.55	-13	-13.55	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-50.82	2.91	27.68	-26.05	-13	-13.05	Horizontal
3490.0	-51.96	2.91	27.68	-27.19	-13	-14.19	Vertical
5235.0	-47.81	5.26	35.86	-17.21	-13	-4.21	Vertical
5235.0	-50.26	5.26	35.86	-19.66	-13	-6.66	Horizontal
207.2	-34.75	1.61	16.85	-19.51	-13	-6.51	Vertical
289.9	-44.08	1.61	15.19	-30.50	-13	-17.50	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)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-44.49	2.78	27.50	-19.77	-13	-6.77	Horizontal
1649.4	-48.11	2.78	27.50	-23.39	-13	-10.39	Vertical
2474.1	-52.91	2.90	27.80	-28.01	-13	-15.01	Vertical
2474.1	-51.27	2.90	27.80	-26.37	-13	-13.37	Horizontal
194.5	-44.14	1.76	17.59	-28.31	-13	-15.31	Vertical
266.6	-40.01	1.63	15.87	-25.77	-13	-12.77	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-52.92	2.80	27.48	-28.24	-13	-15.24	Horizontal
1673.0	-52.86	2.80	27.48	-28.18	-13	-15.18	Vertical
2509.5	-46.20	2.91	27.70	-21.41	-13	-8.41	Vertical
2509.5	-49.01	2.91	27.70	-24.22	-13	-11.22	Horizontal
186.0	-44.62	1.61	15.68	-30.55	-13	-17.55	Vertical
253.8	-35.93	1.59	17.52	-20.01	-13	-7.01	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-44.33	2.82	27.43	-19.72	-13	-6.72	Horizontal
1696.6	-50.70	2.82	27.43	-26.09	-13	-13.09	Vertical
2544.9	-51.90	2.92	27.74	-27.08	-13	-14.08	Vertical
2544.9	-52.53	2.92	27.74	-27.71	-13	-14.71	Horizontal
210.0	-44.89	1.69	16.67	-29.90	-13	-16.90	Vertical
258.2	-38.12	1.70	17.18	-22.64	-13	-9.64	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	-46.66	2.78	27.50	-21.94	-13	-8.94	Horizontal
1658.0	-52.10	2.78	27.50	-27.38	-13	-14.38	Vertical
2487.0	-52.81	2.90	27.80	-27.91	-13	-14.91	Vertical
2487.0	-52.33	2.90	27.80	-27.43	-13	-14.43	Horizontal
210.1	-34.23	1.71	15.57	-20.37	-13	-7.37	Vertical
392.4	-39.71	1.34	16.40	-24.65	-13	-11.65	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-44.26	2.80	27.48	-19.58	-13	-6.58	Horizontal
1673.0	-53.59	2.80	27.48	-28.91	-13	-15.91	Vertical
2509.5	-45.87	2.91	27.70	-21.08	-13	-8.08	Vertical
2509.5	-49.53	2.91	27.70	-24.74	-13	-11.74	Horizontal
196.7	-36.12	1.44	17.04	-20.52	-13	-7.52	Vertical
298.7	-38.80	1.76	17.62	-22.94	-13	-9.94	Horizontal
Test Results for High Channel 844MHz							
1688.0	-52.30	2.82	27.43	-27.69	-13	-14.69	Horizontal
1688.0	-45.28	2.82	27.43	-20.67	-13	-7.67	Vertical
2532.0	-50.04	2.92	27.74	-25.22	-13	-12.22	Vertical
2532.0	-53.38	2.92	27.74	-28.56	-13	-15.56	Horizontal
188.0	-34.73	1.74	17.70	-18.77	-13	-5.77	Vertical
406.5	-35.03	1.41	17.46	-18.97	-13	-5.97	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 12

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

Test Results for Low Channel 699.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-53.16	2.60	27.20	-28.56	-13	-15.56	Horizontal
1399.4	-44.82	2.60	27.20	-20.22	-13	-7.22	Vertical
2099.1	-49.23	2.85	27.54	-24.54	-13	-11.54	Vertical
2099.1	-49.06	2.85	27.54	-24.37	-13	-11.37	Horizontal
198.9	-34.07	1.49	17.78	-17.78	-13	-4.78	Vertical
468.5	-38.12	1.36	17.33	-22.15	-13	-9.15	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-52.63	2.61	27.28	-27.96	-13	-14.96	Horizontal
1415.0	-53.81	2.61	27.28	-29.14	-13	-16.14	Vertical
2122.5	-45.07	2.87	27.59	-20.35	-13	-7.35	Vertical
2122.5	-51.35	2.87	27.59	-26.63	-13	-13.63	Horizontal
208.8	-35.09	1.73	15.74	-21.08	-13	-8.08	Vertical
285.0	-39.33	1.62	15.79	-25.16	-13	-12.16	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-47.68	2.63	27.28	-23.03	-13	-10.03	Horizontal
1430.6	-45.87	2.63	27.28	-21.22	-13	-8.22	Vertical
2145.9	-51.84	2.88	27.60	-27.12	-13	-14.12	Vertical
2145.9	-53.90	2.88	27.60	-29.18	-13	-16.18	Horizontal
205.5	-42.00	1.61	18.00	-25.61	-13	-12.61	Vertical
267.5	-42.31	1.45	15.49	-28.28	-13	-15.28	Horizontal

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

Test Results for Low Channel 704MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1408.0	-50.19	2.61	27.26	-25.54	-13	-12.54	Horizontal
1408.0	-48.78	2.61	27.26	-24.13	-13	-11.13	Vertical
2112.0	-50.19	2.87	27.58	-25.48	-13	-12.48	Vertical
2112.0	-52.55	2.87	27.58	-27.84	-13	-14.84	Horizontal
212.6	-40.64	1.31	16.97	-24.98	-13	-11.98	Vertical
355.6	-34.62	1.65	16.70	-19.57	-13	-6.57	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-51.12	2.61	27.28	-26.45	-13	-13.45	Horizontal
1415.0	-44.60	2.61	27.28	-19.93	-13	-6.93	Vertical
2122.5	-49.60	2.87	27.59	-24.88	-13	-11.88	Vertical
2122.5	-51.65	2.87	27.59	-26.93	-13	-13.93	Horizontal
208.1	-38.30	1.72	17.99	-22.03	-13	-9.03	Vertical
294.9	-41.11	1.73	17.94	-24.90	-13	-11.90	Horizontal
Test Results for High Channel 711MHz							
1422.0	-44.99	2.62	27.28	-20.33	-13	-7.33	Horizontal
1422.0	-47.92	2.62	27.28	-23.26	-13	-10.26	Vertical
2133.0	-46.99	2.87	27.60	-22.26	-13	-9.26	Vertical
2133.0	-50.31	2.87	27.60	-25.58	-13	-12.58	Horizontal
204.1	-41.62	1.58	15.93	-27.27	-13	-14.27	Vertical
365.1	-34.54	1.36	15.59	-20.31	-13	-7.31	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 3.4V, Normal, DC 3.7V and High voltage, DC 4.2V.

Frequency Stability vs Temperature:

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

Frequency Stability vs Voltage:

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

MODES TESTED

- ☐ LTE Band2
- LTE Band 4
- ☐ LTE Band5
- LTE Band 12

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	12.8	0.006795	2.5
3.7	1880	14.2	0.007556	2.5
4.2	1880	13.2	0.007042	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	13.0	0.006895	2.5
Extreme (50C)	1880	11.5	0.006092	2.5
Extreme (40C)	1880	13.5	0.007157	2.5
Extreme (30C)	1880	13.9	0.007418	2.5
Extreme (10C)	1880	13.6	0.007218	2.5
Extreme (0C)	1880	11.9	0.006317	2.5
Extreme (-10C)	1880	13.5	0.007171	2.5
Extreme (-20C)	1880	13.7	0.007307	2.5
Extreme (-30C)	1880	14.5	0.007688	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	9.6	0.005086	2.5
3.7	1880	8.5	0.004530	2.5
4.2	1880	8.3	0.004397	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.2	0.004890	2.5
Extreme (50C)	1880	8.8	0.004657	2.5
Extreme (40C)	1880	8.3	0.004439	2.5
Extreme (30C)	1880	9.2	0.004909	2.5
Extreme (10C)	1880	9.1	0.004842	2.5
Extreme (0C)	1880	8.0	0.004262	2.5
Extreme (-10C)	1880	9.0	0.004796	2.5
Extreme (-20C)	1880	9.1	0.004859	2.5
Extreme (-30C)	1880	7.6	0.004053	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	0.004872	2.5
3.7	1732.5	8.4	0.004868	2.5
4.2	1732.5	8.2	0.004760	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.6	0.004982	2.5
Extreme (50C)	1732.5	9.2	0.005326	2.5
Extreme (40C)	1732.5	7.8	0.004514	2.5
Extreme (30C)	1732.5	5.6	0.003240	2.5
Extreme (10C)	1732.5	7.3	0.004202	2.5
Extreme (0C)	1732.5	9.6	0.005567	2.5
Extreme (-10C)	1732.5	8.2	0.004729	2.5
Extreme (-20C)	1732.5	7.4	0.004265	2.5
Extreme (-30C)	1732.5	8.8	0.005067	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	9.6	0.005564	2.5
3.7	1732.5	8.8	0.005086	2.5
4.2	1732.5	8.2	0.004742	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	9.6	0.005520	2.5
Extreme (50C)	1732.5	8.5	0.004895	2.5
Extreme (40C)	1732.5	8.2	0.004719	2.5
Extreme (30C)	1732.5	9.1	0.005240	2.5
Extreme (10C)	1732.5	8.5	0.004922	2.5
Extreme (0C)	1732.5	8.1	0.004657	2.5
Extreme (-10C)	1732.5	9.5	0.005472	2.5
Extreme (-20C)	1732.5	8.8	0.005094	2.5
Extreme (-30C)	1732.5	8.2	0.004729	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	0.007405	2.5
3.7	836.5	7.0	0.008369	2.5
4.2	836.5	4.5	0.005394	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.0	0.007206	2.5
Extreme (50C)	836.5	6.2	0.007438	2.5
Extreme (40C)	836.5	6.1	0.007345	2.5
Extreme (30C)	836.5	6.6	0.007917	2.5
Extreme (10C)	836.5	4.9	0.005889	2.5
Extreme (0C)	836.5	5.6	0.006705	2.5
Extreme (-10C)	836.5	5.7	0.006772	2.5
Extreme (-20C)	836.5	5.7	0.006814	2.5
Extreme (-30C)	836.5	5.8	0.006953	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	0.006533	2.5
3.7	836.5	6.5	0.007816	2.5
4.2	836.5	5.2	0.006195	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.4	0.007690	2.5
Extreme (50C)	836.5	5.9	0.007067	2.5
Extreme (40C)	836.5	5.7	0.006817	2.5
Extreme (30C)	836.5	6.3	0.007588	2.5
Extreme (10C)	836.5	5.2	0.006269	2.5
Extreme (0C)	836.5	5.5	0.006606	2.5
Extreme (-10C)	836.5	6.0	0.007126	2.5
Extreme (-20C)	836.5	6.0	0.007207	2.5
Extreme (-30C)	836.5	6.0	0.007143	2.5

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

10.4 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	8.8	0.012384	2.5
3.7	707.5	9.9	0.014051	2.5
4.2	707.5	8.3	0.011801	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	9.2	0.013034	2.5
Extreme (50C)	707.5	7.8	0.011073	2.5
Extreme (40C)	707.5	7.2	0.010141	2.5
Extreme (30C)	707.5	8.2	0.011622	2.5
Extreme (10C)	707.5	7.1	0.010106	2.5
Extreme (0C)	707.5	9.1	0.012825	2.5
Extreme (-10C)	707.5	8.4	0.011889	2.5
Extreme (-20C)	707.5	8.5	0.011999	2.5
Extreme (-30C)	707.5	8.2	0.011556	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.4	707.5	7.3	0.010252	2.5
3.7	707.5	8.0	0.011370	2.5
4.2	707.5	7.3	0.010263	2.5

Frequency error vs. Temperature

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

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

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.

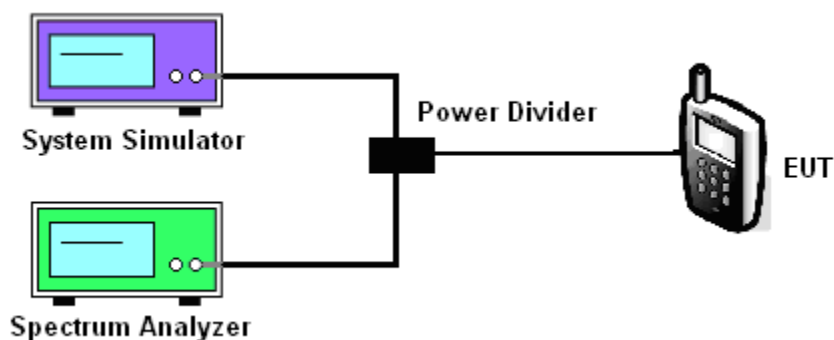
11.2 Measuring Instruments

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 2/4/5/12
- ☐

Test data reference attachment.

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