

FCC CFR47 PART 22H, 24E, 27 CERTIFICATION TEST REPORT FCC ID: 2ANMU-WP23SPUT

Product: Smart Phone

Trade Mark: OUKITEL

Model Number: WP23 Pro

Family Model: WP23, WP23 S, WP23 Ultra, WP23 TITAN

Report No.: S23091108202006

Prepared for

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TEST RESULT CERTIFICATION

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Address.....: A2 2F BUILDING ENET NEW INDUSTRIAL PARK, DAFU INDUSTRIAL ZONE, GUANLAN, LONGHUA SHENZHEN, 518XXX China
Manufacturer's Name.....: SHENZHEN YUNJI INTELLIGENT TECHNOLOGY CO.,LTD
Address.....: A2 2F BUILDING ENET NEW INDUSTRIAL PARK, DAFU INDUSTRIAL ZONE, GUANLAN, LONGHUA SHENZHEN, 518XXX China
Product name.....: Smart Phone
Model and/or type reference.....: WP23 Pro
Family Model: WP23, WP23 S, WP23 Ultra, WP23 TITAN
Test sample number S230911082004
Standards.....: FCC CFR 47 Part 22H, Part 24E, Part 27
Test procedure.....: ANSI C63.26:2015
ANSI/TIA-603-E-2016

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

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Date of Test
Date (s) of performance of tests 13 Sep. 2023 ~ 25 Sep. 2023
Date of Issue 25 Sep. 2023
Test Result..... Pass

Testing Engineer : [Signature]
(Allen Liu)

Authorized Signatory : [Signature]
(Alex Li)

TABLE OF CONTENTS

1. GENERAL INFORMATION.....	5
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.....	6
1.6 WORST-CASE CONFIGURATION AND MODE.....	6
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
8.5 LTE BAND 12.....	32
8.6 LTE BAND 17.....	34
9. SPURIOUS RADIATION EMISSION	36
9.1 LTE BAND 2.....	38
9.2 LTE BAND 4.....	40
9.3 LTE BAND 5.....	42
9.4 LTE BAND 7.....	44
9.5 LTE BAND 12.....	46
9.6 LTE BAND 17.....	48
10. FREQUENCY STABILITY	50
10.1 LTE BAND 2.....	51
10.2 LTE BAND 4.....	53
10.3 LTE BAND 5.....	55
10.4 LTE BAND 7.....	57
10.5 LTE BAND 12.....	59
10.6 LTE BAND 17.....	61
11. PEAK-TO-AVERAGE RATIO.....	63
11.1 Description of the PAR Measurement.....	63
11.2 Measuring Instruments.....	63
11.3 Test Procedures.....	63
11.4 Test Setup.....	63

1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Smart Phone
Trade Mark	OUKITEL
Model Name	WP23 Pro
Family Model	WP23, WP23 S, WP23 Ultra, WP23 TITAN
Model Difference	All models are the same circuit and RF module, except the model name and colour.
FCC ID:	2ANMU-WP23SPUT
Frequency Bands:	U.S. Bands: <input checked="" type="checkbox"/> LTE FDD Band 2, 4, 5, 7, 12, 17
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;
Type of Modulation:	QPSK/16QAM
Antenna:	FPC Antenna
Antenna gain:	Band 2: 0.15dBi, Band 4: 0.22dBi, Band 5: -2.3dBi, Band 7: 0.35dBi, Band 12: -2.52dBi, Band 17: -2.5dBi
Power Supply:	DC 3.87V/10600mAh from battery or DC 5V from Adapter.
Adapter:	Model: HJ-PD20W-US Input: 100-240V~50/60Hz 0.8A Output: 5.0V---3.0A 15.0W OR 9.0V---2.22A 19.98W OR 12.0V---1.67A 20.0W MAX
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.87V) (Note 1)
HW Version	J557_9230TMB_D4XU_V2.0
SW Version	OUKITEL_WP23_Pro_V06
** 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: 2ANMU-WP23SPUT** 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

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.

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

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

1.6 SUMMARY OF TEST RESULTS

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

2.1051 22.917(a) 24.238(a) 27.53(c)(g)(h)(m) KDB 971168 D01 Clause 6	Conducted Emission	PASS	
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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	WP23 Pro	FCC ID: 2ANMU-WP23SPUT	EUT

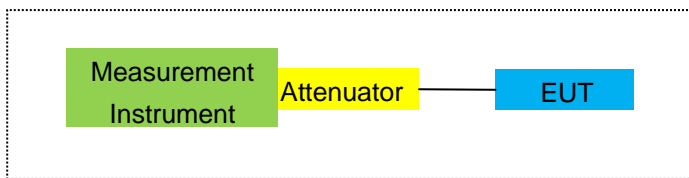
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

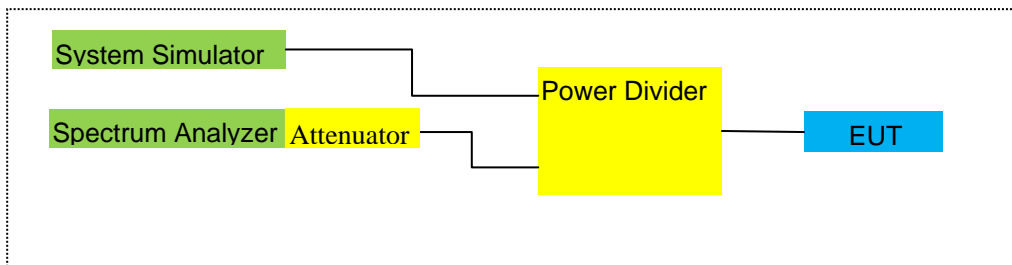
For Radiated Test Cases



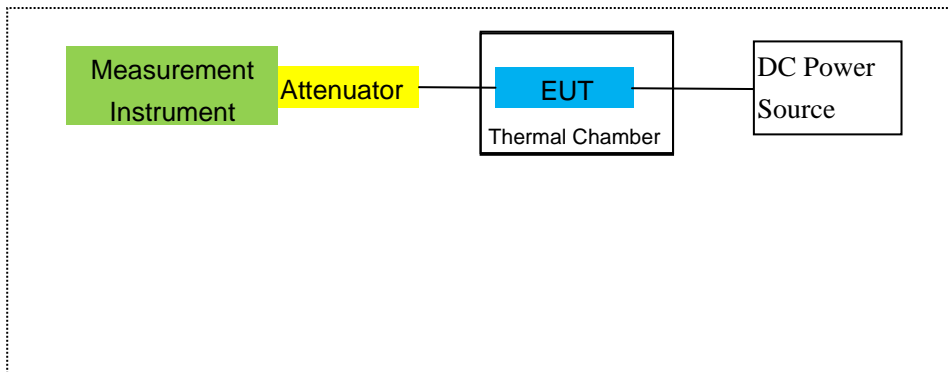
For Conducted Output Power



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



For Frequency Stability



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

3. TEST AND MEASUREMENT EQUIPMENT

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

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	MXA Signal Analyzer	Agilent	N9020A	MY49100060	2023.05.29	2024.05.28	1 year
2	Test Receiver	R&S	ESPI	101318	2023.03.27	2024.03.26	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2023.03.27	2024.03.26	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2023.05.06	2026.05.05	3 year
5	Broadband Horn Antenna	SCHWARZBECK	BBHA 9120 D	2816	2023/1/12	2024/1/11	1 year
6	Broadband Horn Antenna	SCHWARZBECK	BBHA 9120 D	2817	2023/1/12	2024/1/11	1 year
7	Amplifier	EM	EM-30180	060538	2023.05.29	2024.05.28	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2023.03.27	2024.03.26	1 year
9	Power Meter	R&S	NRVS	100696	2023.05.29	2024.05.28	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2023.03.27	2024.03.26	1 year
11	Test Cable	N/A	R-01	N/A	2022.06.17	2025.06.16	3 year
12	Test Cable	N/A	R-02	N/A	2022.06.17	2025.06.16	3 year
13	Test Cable	N/A	R-03	N/A	2022.06.17	2025.06.16	3 year
14	Test Receiver	R&S	ESCI	101160	2023.03.27	2024.03.26	1 year
15	LISN	R&S	ENV216	101313	2023.03.27	2024.03.26	1 year
16	LISN	EMCO	3816/2	00042990	2023.03.27	2024.03.26	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2023.03.27	2024.03.26	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2023.03.27	2024.03.26	1 year
19	Test Cable	N/A	C01	N/A	2023.05.06	2026.05.05	3 year
20	Test Cable	N/A	C02	N/A	2023.05.06	2026.05.05	3 year
21	Test Cable	N/A	C03	N/A	2023.05.06	2026.05.05	3 year
22	Attenuator	MCE	24-10-34	BN9258	2023.03.27	2024.03.26	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2023.03.27	2024.03.26	1 year
24	test receiver	R&S	ESCI	a0304218	2023.03.27	2024.03.26	1 year

25	Communication Tester	R&S	CMU200	A0304247	2023.05.29	2024.05.28	1 year
26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2023.03.27	2024.03.26	1 year
27	DC Power Source	N/A	PS-6005D	2017040292 3	2023.05.06	2026.05.05	3 year
28	MXG Vector Signal Generator	Agilent	N5182A	MY47070317	2023.05.29	2024.05.28	1 year
29	Communication Tester	R&S	CMW500	148500	2023.05.29	2024.05.28	1 year
30	MXG Vector Signal Generator	Agilent	N5183B	MY57280984	2022/11/8	2023/11/7	1 year
31	Log-Periodic Antenna	SCHWARZBECK	VULB 9162	584	2023/1/11	2024/1/10	1 year
32	Log-Periodic Antenna	SCHWARZBECK	VULB 9162	586	2023/1/11	2024/1/10	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	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
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

RESULTS

PASS

Test data reference attachment.

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

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

FCC: §2.1046, §22.913, §24.232

LIMITS

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

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

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

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

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

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

TEST PROCEDURE

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

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

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

Set display line

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

MODES TESTED

- LTE Band 2/4/5/7/12/17

RESULTS

Test data reference attachment.

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

7. OUT OF BAND EMISSIONS

RULE PART(S)

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

LIMITS

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

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

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

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

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

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

TEST PROCEDURE

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

For each out of band emissions measurement:

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

MODES TESTED

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

7.1 MEASUREMENT METHOD

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

Test data reference attachment.

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

8. RADIATED MEASUREMENT

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

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

LIMITS:

22.913(a) (2)- The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
24.232 (c) Mobile and portable stations are limited to 2 watts EIRP.
27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.
27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.
27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.
27.50 (h)(2) Mobile and other user stations in the 2500–2570 MHz and 2620–2690 MHz bands. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17

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

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

MODES TESTED

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

RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP			
							Average			
							(mW)			
1.4MHz Band QPSK	1/#Mid	1850.7	-2.23	3.76	28.24	22.25	167.880	Horizontal	Pass	
		1880	-2.04	3.91	28.22	22.27	168.655	Horizontal	Pass	
		1909.3	-1.95	3.93	28.20	22.32	170.608	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-2.29	3.77	28.23	22.17	164.816	Horizontal	Pass	
		1880	-2.14	3.91	28.24	22.19	165.577	Horizontal	Pass	
		1908.5	-2.01	3.94	28.25	22.30	169.824	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-2.18	3.77	28.31	22.36	172.187	Horizontal	Pass	
		1880	-1.80	3.91	28.22	22.51	178.238	Horizontal	Pass	
		1907.5	-1.73	3.94	28.20	22.53	179.061	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-2.04	3.79	28.33	22.50	177.828	Horizontal	Pass	
		1880	-1.74	3.95	28.22	22.53	179.061	Horizontal	Pass	
		1905	-1.63	3.97	28.19	22.59	181.552	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	1857.5	-2.00	3.79	28.34	22.55	179.887	Horizontal	Pass	
		1880	-1.79	3.95	28.22	22.48	177.011	Horizontal	Pass	
		1902.5	-1.65	3.97	28.18	22.56	180.302	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	1860	-1.99	3.81	28.35	22.55	179.887	Horizontal	Pass	
		1880	-1.66	3.96	28.22	22.60	181.970	Horizontal	Pass	
		1900	-1.60	4.00	28.16	22.56	180.302	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	1850.7	-2.69	3.76	28.24	21.79	151.008	Vertical	Pass	
		1880	-2.84	3.91	28.22	21.47	140.281	Vertical	Pass	
		1909.3	-2.88	3.93	28.20	21.39	137.721	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-2.92	3.77	28.23	21.54	142.561	Vertical	Pass	
		1880	-2.45	3.91	28.24	21.88	154.170	Vertical	Pass	
		1908.5	-3.29	3.94	28.25	21.02	126.474	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-3.12	3.77	28.31	21.42	138.676	Vertical	Pass	
		1880	-3.03	3.91	28.22	21.28	134.276	Vertical	Pass	
		1907.5	-2.84	3.94	28.20	21.42	138.676	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-2.71	3.79	28.33	21.83	152.405	Vertical	Pass	
		1880	-3.08	3.95	28.22	21.19	131.522	Vertical	Pass	
		1905	-3.12	3.97	28.19	21.10	128.825	Vertical	Pass	
15.0MHz Band	1/#Mid	1857.5	-3.50	3.79	28.34	21.05	127.350	Vertical	Pass	
		1880	-2.90	3.95	28.22	21.37	137.088	Vertical	Pass	

QPSK		1902.5	-2.92	3.97	28.18	21.29	134.586	Vertical	Pass
20.0MHz	1/#Mid	1860	-3.31	3.81	28.35	21.23	132.739	Vertical	Pass
Band		1880	-3.26	3.96	28.22	21.00	125.893	Vertical	Pass
QPSK		1900	-2.42	4.00	28.16	21.74	149.279	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1850.7	-3.35	3.76	28.24	21.13	129.718	Horizontal	Pass
		1880	-2.82	3.91	28.22	21.49	140.929	Horizontal	Pass
		1909.3	-2.75	3.93	28.20	21.52	141.906	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-2.85	3.77	28.23	21.61	144.877	Horizontal	Pass
		1880	-2.93	3.91	28.24	21.40	138.038	Horizontal	Pass
		1908.5	-3.14	3.94	28.25	21.17	130.918	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-2.79	3.77	28.31	21.75	149.624	Horizontal	Pass
		1880	-2.70	3.91	28.22	21.61	144.877	Horizontal	Pass
		1907.5	-2.38	3.94	28.20	21.88	154.170	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-2.84	3.79	28.33	21.70	147.911	Horizontal	Pass
		1880	-2.83	3.95	28.22	21.44	139.316	Horizontal	Pass
		1905	-2.30	3.97	28.19	21.92	155.597	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-2.82	3.79	28.34	21.73	148.936	Horizontal	Pass
		1880	-2.61	3.95	28.22	21.66	146.555	Horizontal	Pass
		1902.5	-2.57	3.97	28.18	21.64	145.881	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1860	-2.71	3.81	28.35	21.83	152.405	Horizontal	Pass
		1880	-2.41	3.96	28.22	21.85	153.109	Horizontal	Pass
		1900	-2.23	4.00	28.16	21.93	155.955	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.09	3.76	28.24	20.39	109.396	Vertical	Pass
		1880	-3.95	3.91	28.22	20.36	108.643	Vertical	Pass
		1909.3	-3.32	3.93	28.20	20.95	124.451	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1851.5	-4.00	3.77	28.23	20.46	111.173	Vertical	Pass
		1880	-3.76	3.91	28.24	20.57	114.025	Vertical	Pass
		1908.5	-3.72	3.94	28.25	20.59	114.551	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1852.5	-4.32	3.77	28.31	20.22	105.196	Vertical	Pass
		1880	-3.58	3.91	28.22	20.73	118.304	Vertical	Pass
		1907.5	-3.99	3.94	28.20	20.27	106.414	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1855	-4.14	3.79	28.33	20.40	109.648	Vertical	Pass
		1880	-3.31	3.95	28.22	20.96	124.738	Vertical	Pass
		1905	-4.12	3.97	28.19	20.10	102.329	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1857.5	-4.51	3.79	28.34	20.04	100.925	Vertical	Pass
		1880	-3.56	3.95	28.22	20.71	117.761	Vertical	Pass
		1902.5	-3.64	3.97	28.18	20.57	114.025	Vertical	Pass

20.0MHz		1860	-4.42	3.81	28.35	20.12	102.802	Vertical	Pass
Band 16	1/#Mid	1880	-3.52	3.96	28.22	20.74	118.577	Vertical	Pass
QAM		1900	-4.00	4.00	28.16	20.16	103.753	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP	Max. EIRP			
			(dBm)			Average	Average			
						(dBm)	(mW)			
1.4MHz Band QPSK	1/#Mid	1710.7	-2.14	3.12	27.58	22.32	170.608	Horizontal	Pass	
		1732.5	-2.13	3.27	27.61	22.21	166.341	Horizontal	Pass	
		1754.3	-2.11	3.29	27.63	22.23	167.109	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	1711.5	-2.31	3.13	27.61	22.17	164.816	Horizontal	Pass	
		1732.5	-2.23	3.27	27.61	22.11	162.555	Horizontal	Pass	
		1753.5	-2.15	3.30	27.62	22.17	164.816	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	1712.5	-2.08	3.13	27.63	22.42	174.582	Horizontal	Pass	
		1732.5	-1.98	3.27	27.61	22.36	172.187	Horizontal	Pass	
		1752.5	-1.86	3.30	27.60	22.44	175.388	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	1715	-2.02	3.15	27.64	22.47	176.604	Horizontal	Pass	
		1732.5	-1.79	3.31	27.61	22.51	178.238	Horizontal	Pass	
		1750	-1.81	3.33	27.59	22.45	175.792	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	1717.5	-2.03	3.15	27.65	22.47	176.604	Horizontal	Pass	
		1732.5	-1.87	3.31	27.61	22.43	174.985	Horizontal	Pass	
		1747.5	-1.81	3.33	27.57	22.43	174.985	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	1720	-1.97	3.17	27.66	22.52	178.649	Horizontal	Pass	
		1732.5	-1.80	3.32	27.61	22.49	177.419	Horizontal	Pass	
		1745	-1.74	3.36	27.56	22.46	176.198	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	1710.7	-3.44	3.12	27.58	21.02	126.474	Vertical	Pass	
		1732.5	-3.04	3.27	27.61	21.30	134.896	Vertical	Pass	
		1754.3	-2.63	3.29	27.63	21.71	148.252	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	1711.5	-3.18	3.13	27.61	21.30	134.896	Vertical	Pass	
		1732.5	-3.02	3.27	27.61	21.32	135.519	Vertical	Pass	
		1753.5	-2.97	3.30	27.62	21.35	136.458	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	1712.5	-2.83	3.13	27.63	21.67	146.893	Vertical	Pass	
		1732.5	-2.38	3.27	27.61	21.96	157.036	Vertical	Pass	
		1752.5	-3.05	3.30	27.60	21.25	133.352	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	1715	-3.49	3.15	27.64	21.00	125.893	Vertical	Pass	
		1732.5	-3.03	3.31	27.61	21.27	133.968	Vertical	Pass	
		1750	-2.91	3.33	27.59	21.35	136.458	Vertical	Pass	
15.0MHz	1/#Mid	1717.5	-2.79	3.15	27.65	21.71	148.252	Vertical	Pass	

Band		1732.5	-2.33	3.31	27.61	21.97	157.398	Vertical	Pass
QPSK		1747.5	-2.70	3.33	27.57	21.54	142.561	Vertical	Pass
20.0MHz	1/#Mid	1720	-2.77	3.17	27.66	21.72	148.594	Vertical	Pass
Band		1732.5	-3.24	3.32	27.61	21.05	127.350	Vertical	Pass
QPSK		1745	-2.29	3.36	27.56	21.91	155.239	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			Average	Average		
						(dBm)	(mW)		
1.4MHz	1/#Mid	1710.7	-2.95	3.12	27.58	21.51	141.579	Horizontal	Pass
Band 16		1732.5	-2.80	3.27	27.61	21.54	142.561	Horizontal	Pass
QAM		1754.3	-2.80	3.29	27.63	21.54	142.561	Horizontal	Pass
3.0MHz	1/#Mid	1711.5	-2.89	3.13	27.61	21.59	144.212	Horizontal	Pass
Band 16		1732.5	-3.02	3.27	27.61	21.32	135.519	Horizontal	Pass
QAM		1753.5	-3.24	3.30	27.62	21.08	128.233	Horizontal	Pass
5.0MHz	1/#Mid	1712.5	-2.72	3.13	27.63	21.78	150.661	Horizontal	Pass
Band 16		1732.5	-2.68	3.27	27.61	21.66	146.555	Horizontal	Pass
QAM		1752.5	-2.37	3.30	27.60	21.93	155.955	Horizontal	Pass
10.0MHz	1/#Mid	1715	-2.79	3.15	27.64	21.70	147.911	Horizontal	Pass
Band 16		1732.5	-2.98	3.31	27.61	21.32	135.519	Horizontal	Pass
QAM		1750	-2.36	3.33	27.59	21.90	154.882	Horizontal	Pass
15.0MHz	1/#Mid	1717.5	-2.59	3.15	27.65	21.91	155.239	Horizontal	Pass
Band 16		1732.5	-2.65	3.31	27.61	21.65	146.218	Horizontal	Pass
QAM		1747.5	-2.67	3.33	27.57	21.57	143.549	Horizontal	Pass
20.0MHz	1/#Mid	1720	-2.54	3.17	27.66	21.95	156.675	Horizontal	Pass
Band 16		1732.5	-2.55	3.32	27.61	21.74	149.279	Horizontal	Pass
QAM		1745	-2.36	3.36	27.56	21.84	152.757	Horizontal	Pass
1.4MHz	1/#Mid	1710.7	-4.21	3.12	27.58	20.25	105.925	Vertical	Pass
Band 16		1732.5	-3.68	3.27	27.61	20.66	116.413	Vertical	Pass
QAM		1754.3	-3.91	3.29	27.63	20.43	110.408	Vertical	Pass
3.0MHz	1/#Mid	1711.5	-4.01	3.13	27.61	20.47	111.429	Vertical	Pass
Band 16		1732.5	-3.73	3.27	27.61	20.61	115.080	Vertical	Pass
QAM		1753.5	-3.53	3.30	27.62	20.79	119.950	Vertical	Pass
5.0MHz	1/#Mid	1712.5	-4.43	3.13	27.63	20.07	101.625	Vertical	Pass
Band 16		1732.5	-4.09	3.27	27.61	20.25	105.925	Vertical	Pass
QAM		1752.5	-3.87	3.30	27.60	20.43	110.408	Vertical	Pass
10.0MHz	1/#Mid	1715	-3.66	3.15	27.64	20.83	121.060	Vertical	Pass
Band 16		1732.5	-3.71	3.31	27.61	20.59	114.551	Vertical	Pass
QAM		1750	-3.85	3.33	27.59	20.41	109.901	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-4.05	3.15	27.65	20.45	110.917	Vertical	Pass
Band 16		1732.5	-3.87	3.31	27.61	20.43	110.408	Vertical	Pass
QAM		1747.5	-3.33	3.33	27.57	20.91	123.310	Vertical	Pass

20.0MHz		1720	-4.10	3.17	27.66	20.39	109.396	Vertical	Pass
Band 16	1/#Mid	1732.5	-3.86	3.32	27.61	20.43	110.408	Vertical	Pass
QAM		1745	-3.42	3.36	27.56	20.78	119.674	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

8.4 LTE BAND 5

Radiated Power (ERP) for Band 5											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)	(dB)	Average	Average			
							(dBm)	(mW)			
1.4MHz Band QPSK	3/#Mid	824.7	7.16	2.01	19.68	2.15	22.68	185.353	Horizontal	Pass	
		836.5	7.04	2.01	19.77	2.15	22.65	184.077	Horizontal	Pass	
		848.3	6.84	2.02	19.82	2.15	22.49	177.419	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	6.93	2.01	19.70	2.15	22.47	176.604	Horizontal	Pass	
		836.5	6.83	2.01	19.77	2.15	22.44	175.388	Horizontal	Pass	
		847.5	6.70	2.02	19.81	2.15	22.34	171.396	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	7.21	2.01	19.71	2.15	22.76	188.799	Horizontal	Pass	
		836.5	7.09	2.01	19.77	2.15	22.70	186.209	Horizontal	Pass	
		846.5	6.93	2.02	19.79	2.15	22.55	179.887	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	829	7.23	2.01	19.73	2.15	22.80	190.546	Horizontal	Pass	
		836.5	7.18	2.01	19.77	2.15	22.79	190.108	Horizontal	Pass	
		844	7.08	2.02	19.78	2.15	22.69	185.780	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	824.7	5.46	2.01	19.68	2.15	20.98	125.314	Vertical	Pass	
		836.5	5.74	2.01	19.77	2.15	21.35	136.458	Vertical	Pass	
		848.3	5.32	2.02	19.82	2.15	20.97	125.026	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	6.33	2.01	19.70	2.15	21.87	153.815	Vertical	Pass	
		836.5	5.58	2.01	19.77	2.15	21.19	131.522	Vertical	Pass	
		847.5	5.82	2.02	19.81	2.15	21.46	139.959	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	6.16	2.01	19.71	2.15	21.71	148.252	Vertical	Pass	
		836.5	6.27	2.01	19.77	2.15	21.88	154.170	Vertical	Pass	
		846.5	5.53	2.02	19.79	2.15	21.15	130.317	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	829	5.62	2.01	19.73	2.15	21.19	131.522	Vertical	Pass	
		836.5	5.80	2.01	19.77	2.15	21.41	138.357	Vertical	Pass	
		844	5.44	2.02	19.78	2.15	21.05	127.350	Vertical	Pass	

Radiated Power (ERP) for Band 5

Radiated Power (ERP) for Band 5											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization		
			(dBm)				(dBm)	(dB)			
						(dB)	(dBm)	(mW)			
1.4MHz Band 16 QAM	3/#Mid	824.7	6.31	2.01	19.68	2.15	21.83	152.405	Horizontal	Pass	
		836.5	6.24	2.01	19.77	2.15	21.85	153.109	Horizontal	Pass	
		848.3	6.08	2.02	19.82	2.15	21.73	148.936	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	6.39	2.01	19.70	2.15	21.93	155.955	Horizontal	Pass	
		836.5	6.10	2.01	19.77	2.15	21.71	148.252	Horizontal	Pass	
		847.5	5.58	2.02	19.81	2.15	21.22	132.434	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	6.71	2.01	19.71	2.15	22.26	168.267	Horizontal	Pass	
		836.5	6.48	2.01	19.77	2.15	22.09	161.808	Horizontal	Pass	
		846.5	6.23	2.02	19.79	2.15	21.85	153.109	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	829	6.71	2.01	19.73	2.15	22.28	169.044	Horizontal	Pass	
		836.5	6.43	2.01	19.77	2.15	22.04	159.956	Horizontal	Pass	
		844	5.97	2.02	19.78	2.15	21.58	143.880	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	824.7	5.92	2.01	19.68	2.15	21.44	139.316	Vertical	Pass	
		836.5	4.71	2.01	19.77	2.15	20.32	107.647	Vertical	Pass	
		848.3	4.52	2.02	19.82	2.15	20.17	103.992	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	5.19	2.01	19.70	2.15	20.73	118.304	Vertical	Pass	
		836.5	6.14	2.01	19.77	2.15	21.75	149.624	Vertical	Pass	
		847.5	4.59	2.02	19.81	2.15	20.23	105.439	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	4.93	2.01	19.71	2.15	20.48	111.686	Vertical	Pass	
		836.5	5.44	2.01	19.77	2.15	21.05	127.350	Vertical	Pass	
		846.5	5.15	2.02	19.79	2.15	20.77	119.399	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	829	5.16	2.01	19.73	2.15	20.73	118.304	Vertical	Pass	
		836.5	4.46	2.01	19.77	2.15	20.07	101.625	Vertical	Pass	
		844	6.02	2.02	19.78	2.15	21.63	145.546	Vertical	Pass	

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

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

8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			Average	Average		
						(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	-0.42	4.54	27.75	22.79	190.108	Horizontal	Pass
		2535	-0.25	4.69	27.72	22.78	189.671	Horizontal	Pass
		2567.5	-0.18	4.71	27.71	22.82	191.426	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-0.35	4.55	27.76	22.86	193.197	Horizontal	Pass
		2535	-0.16	4.69	27.72	22.87	193.642	Horizontal	Pass
		2565	-0.08	4.72	27.70	22.90	194.984	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-0.36	4.55	27.77	22.86	193.197	Horizontal	Pass
		2535	-0.22	4.69	27.72	22.81	190.985	Horizontal	Pass
		2562.5	-0.12	4.72	27.69	22.85	192.752	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-0.30	4.57	27.78	22.91	195.434	Horizontal	Pass
		2535	-0.12	4.73	27.72	22.87	193.642	Horizontal	Pass
		2560	-0.08	4.75	27.68	22.85	192.752	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-1.80	4.54	27.75	21.41	138.357	Vertical	Pass
		2535	-1.55	4.69	27.72	21.48	140.605	Vertical	Pass
		2567.5	-1.65	4.71	27.71	21.35	136.458	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-1.69	4.55	27.76	21.52	141.906	Vertical	Pass
		2535	-1.28	4.69	27.72	21.75	149.624	Vertical	Pass
		2565	-1.65	4.72	27.70	21.33	135.831	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-1.37	4.55	27.77	21.85	153.109	Vertical	Pass
		2535	-1.20	4.69	27.72	21.83	152.405	Vertical	Pass
		2562.5	-1.75	4.72	27.69	21.22	132.434	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-1.67	4.57	27.78	21.54	142.561	Vertical	Pass
		2535	-1.71	4.73	27.72	21.28	134.276	Vertical	Pass
		2560	-1.14	4.75	27.68	21.79	151.008	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)			Average	Average		
						(dBm)	(mW)		
5.0MHz Band 16 QAM	1/#Mid	2502.5	-1.11	4.54	27.75	22.10	162.181	Horizontal	Pass
		2535	-0.80	4.69	27.72	22.23	167.109	Horizontal	Pass
		2567.5	-0.88	4.71	27.71	22.12	162.930	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-1.00	4.55	27.76	22.21	166.341	Horizontal	Pass
		2535	-1.01	4.69	27.72	22.02	159.221	Horizontal	Pass
		2565	-1.28	4.72	27.70	21.70	147.911	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-1.18	4.55	27.77	22.04	159.956	Horizontal	Pass
		2535	-1.15	4.69	27.72	21.88	154.170	Horizontal	Pass
		2562.5	-0.76	4.72	27.69	22.21	166.341	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-1.06	4.57	27.78	22.15	164.059	Horizontal	Pass
		2535	-0.73	4.73	27.72	22.26	168.267	Horizontal	Pass
		2560	-0.83	4.75	27.68	22.10	162.181	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-2.21	4.54	27.75	21.00	125.893	Vertical	Pass
		2535	-1.84	4.69	27.72	21.19	131.522	Vertical	Pass
		2567.5	-2.12	4.71	27.71	20.88	122.462	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-1.62	4.55	27.76	21.59	144.212	Vertical	Pass
		2535	-2.96	4.69	27.72	20.07	101.625	Vertical	Pass
		2565	-1.39	4.72	27.70	21.59	144.212	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-1.39	4.55	27.77	21.83	152.405	Vertical	Pass
		2535	-1.40	4.69	27.72	21.63	145.546	Vertical	Pass
		2562.5	-1.14	4.72	27.69	21.83	152.405	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-2.55	4.57	27.78	20.66	116.413	Vertical	Pass
		2535	-1.69	4.73	27.72	21.30	134.896	Vertical	Pass
		2560	-1.75	4.75	27.68	21.18	131.220	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

8.5 LTE BAND 12

Radiated Power (ERP) for Band 12											
Mode	RB/RB SIZE	Frequency	Result							Polarization	Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Of Max. ERP		
			(dBm)	(dBm)	(dB)	(dB)	Average	Average			
							(dBm)	(mW)			
1.4MHz Band QPSK	1/#Mid	699.7	7.13	1.91	19.21	2.15	22.28	169.044	Vertical	Pass	
		707.5	7.05	1.91	19.26	2.15	22.25	167.880	Vertical	Pass	
		715.3	6.83	1.93	19.34	2.15	22.09	161.808	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	6.92	1.91	19.21	2.15	22.07	161.065	Vertical	Pass	
		707.5	6.84	1.91	19.26	2.15	22.04	159.956	Vertical	Pass	
		714.5	6.68	1.93	19.34	2.15	21.94	156.315	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	7.19	1.91	19.23	2.15	22.36	172.187	Vertical	Pass	
		707.5	7.10	1.91	19.26	2.15	22.30	169.824	Vertical	Pass	
		713.5	6.89	1.92	19.33	2.15	22.15	164.059	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	704	7.21	1.91	19.25	2.15	22.40	173.780	Vertical	Pass	
		707.5	7.19	1.91	19.26	2.15	22.39	173.380	Vertical	Pass	
		711	7.04	1.92	19.32	2.15	22.29	169.434	Vertical	Pass	
1.4MHz Band QPSK	1/#Mid	699.7	6.15	1.91	19.21	2.15	21.30	134.896	Horizontal	Pass	
		707.5	6.25	1.91	19.26	2.15	21.45	139.637	Horizontal	Pass	
		715.3	5.43	1.93	19.34	2.15	20.69	117.220	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	5.79	1.91	19.21	2.15	20.94	124.165	Horizontal	Pass	
		707.5	6.21	1.91	19.26	2.15	21.41	138.357	Horizontal	Pass	
		714.5	5.66	1.93	19.34	2.15	20.92	123.595	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	5.46	1.91	19.23	2.15	20.63	115.611	Horizontal	Pass	
		707.5	5.98	1.91	19.26	2.15	21.18	131.220	Horizontal	Pass	
		713.5	5.95	1.92	19.33	2.15	21.21	132.130	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	704	5.49	1.91	19.25	2.15	20.68	116.950	Horizontal	Pass	
		707.5	5.93	1.91	19.26	2.15	21.13	129.718	Horizontal	Pass	
		711	5.51	1.92	19.32	2.15	20.76	119.124	Horizontal	Pass	

Radiated Power (ERP) for Band 12											
Mode	RB/RB SIZE	Frequency	Result							Polarization	Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Of Max. ERP		
			(dBm)	(dBm)	(dB)	(dB)	Average	Average	ERP		
							(dBm)	(mW)			
1.4MHz Band 16 QAM	1/#Mid	699.7	7.05	1.91	19.21	2.15	22.20	165.959	Vertical	Pass	
		707.5	6.97	1.91	19.26	2.15	22.17	164.816	Vertical	Pass	
		715.3	6.75	1.93	19.34	2.15	22.01	158.855	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	700.5	6.84	1.91	19.21	2.15	21.99	158.125	Vertical	Pass	
		707.5	6.76	1.91	19.26	2.15	21.96	157.036	Vertical	Pass	
		714.5	6.60	1.93	19.34	2.15	21.86	153.462	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	701.5	7.11	1.91	19.23	2.15	22.28	169.044	Vertical	Pass	
		707.5	7.02	1.91	19.26	2.15	22.22	166.725	Vertical	Pass	
		713.5	6.81	1.92	19.33	2.15	22.07	161.065	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	704	7.13	1.91	19.25	2.15	22.32	170.608	Vertical	Pass	
		707.5	7.11	1.91	19.26	2.15	22.31	170.216	Vertical	Pass	
		711	6.96	1.92	19.32	2.15	22.21	166.341	Vertical	Pass	
1.4MHz Band 16 QAM	1/#Mid	699.7	6.15	1.91	19.21	2.15	21.30	134.896	Horizontal	Pass	
		707.5	5.88	1.91	19.26	2.15	21.08	128.233	Horizontal	Pass	
		715.3	5.68	1.93	19.34	2.15	20.94	124.165	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	700.5	5.58	1.91	19.21	2.15	20.73	118.304	Horizontal	Pass	
		707.5	5.31	1.91	19.26	2.15	20.51	112.460	Horizontal	Pass	
		714.5	5.77	1.93	19.34	2.15	21.03	126.765	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	701.5	5.84	1.91	19.23	2.15	21.01	126.183	Horizontal	Pass	
		707.5	5.51	1.91	19.26	2.15	20.71	117.761	Horizontal	Pass	
		713.5	6.10	1.92	19.33	2.15	21.36	136.773	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	704	5.66	1.91	19.25	2.15	20.85	121.619	Horizontal	Pass	
		707.5	5.72	1.91	19.26	2.15	20.92	123.595	Horizontal	Pass	
		711	6.05	1.92	19.32	2.15	21.30	134.896	Horizontal	Pass	

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

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

8.6 LTE BAND 17

Radiated Power (ERP) for Band 17											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG	Cable	Antenna	Correction	Max. EIRP	Max.			
			Level	Loss	Factor		EIRP	EIRP			
			(dBm)	(dBm)	(dB)		Average	Average			
			(dB)	(dBm)	(mW)						
5.0MHz Band QPSK	1/#Mid	706.5	7.51	1.91	19.23	2.15	22.68	185.353	Vertical	Pass	
		710	7.37	1.91	19.26	2.15	22.57	180.717	Vertical	Pass	
		713.5	7.27	1.92	19.33	2.15	22.53	179.061	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	709	7.52	1.91	19.25	2.15	22.71	186.638	Vertical	Pass	
		710	7.47	1.91	19.26	2.15	22.67	184.927	Vertical	Pass	
		711	7.43	1.92	19.32	2.15	22.68	185.353	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	706.5	6.31	1.91	19.23	2.15	21.48	140.605	Horizontal	Pass	
		710	5.33	1.91	19.26	2.15	20.53	112.980	Horizontal	Pass	
		713.5	6.89	1.92	19.33	2.15	22.15	164.059	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	709	6.50	1.91	19.25	2.15	21.69	147.571	Horizontal	Pass	
		710	6.35	1.91	19.26	2.15	21.55	142.889	Horizontal	Pass	
		711	6.75	1.92	19.32	2.15	22.00	158.489	Horizontal	Pass	

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss	Antenna Factor	Correction	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	(dBm)	(dB)		Average	Average	Of Max. ERP	
							(dB)	(dBm)	(mW)	
5.0MHz	1/#Mid	706.5	6.68	1.91	19.23	2.15	21.85	153.109	Vertical	Pass
Band 16		710	6.59	1.91	19.26	2.15	21.79	151.008	Vertical	Pass
QAM		713.5	6.39	1.92	19.33	2.15	21.65	146.218	Vertical	Pass
10.0MHz	1/#Mid	709	6.22	1.91	19.25	2.15	21.41	138.357	Vertical	Pass
Band 16		710	6.75	1.91	19.26	2.15	21.95	156.675	Vertical	Pass
QAM		711	6.48	1.92	19.32	2.15	21.73	148.936	Vertical	Pass
5.0MHz	1/#Mid	706.5	6.05	1.91	19.23	2.15	21.22	132.434	Horizontal	Pass
Band 16		710	5.12	1.91	19.26	2.15	20.32	107.647	Horizontal	Pass
QAM		713.5	5.17	1.92	19.33	2.15	20.43	110.408	Horizontal	Pass
10.0MHz	1/#Mid	709	5.71	1.91	19.25	2.15	20.90	123.027	Horizontal	Pass
Band 16		710	5.34	1.91	19.26	2.15	20.54	113.240	Horizontal	Pass
QAM		711	5.82	1.92	19.32	2.15	21.07	127.938	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

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

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 $43 + 10 \text{ Log}_{10}(p)$, dB; and
- b. for mobile subscriber equipment, the attenuation shall not be less than $43 + 10 \text{ Log}_{10}(p)$, dB at the channel edges and $55 + 10 \text{ Log}_{10}(p)$ 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

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	-50.86	4.04	33.51	-21.39	-13	-8.39	Horizontal
3701.4	-53.57	4.04	33.51	-24.10	-13	-11.10	Vertical
5552.1	-50.76	5.24	35.84	-20.16	-13	-7.16	Vertical
5552.1	-49.62	5.24	35.84	-19.02	-13	-6.02	Horizontal
189.7	-35.25	1.43	16.02	-20.66	-13	-7.66	Vertical
457.6	-35.93	1.30	17.99	-19.24	-13	-6.24	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-48.33	4.04	33.56	-18.81	-13	-5.81	Horizontal
3760.0	-45.62	4.04	33.56	-16.10	-13	-3.10	Vertical
5640.0	-48.16	5.24	35.91	-17.49	-13	-4.49	Vertical
5640.0	-50.30	5.24	35.91	-19.63	-13	-6.63	Horizontal
212.8	-39.21	1.62	16.97	-23.86	-13	-10.86	Vertical
339.2	-35.33	1.74	15.98	-21.10	-13	-8.10	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-46.27	4.04	34.00	-16.31	-13	-3.31	Horizontal
3818.6	-46.13	4.04	34.00	-16.17	-13	-3.17	Vertical
5727.9	-52.72	5.24	36.04	-21.92	-13	-8.92	Vertical
5727.9	-51.80	5.24	36.04	-21.00	-13	-8.00	Horizontal
202.8	-41.99	1.42	17.29	-26.12	-13	-13.12	Vertical
309.4	-36.56	1.50	17.90	-20.15	-13	-7.15	Horizontal

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

Test Results for Low Channel 1860MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720.0	-50.23	4.07	33.54	-20.76	-13	-7.76	Horizontal
3720.0	-48.74	4.07	33.54	-19.27	-13	-6.27	Vertical
5580.0	-52.22	5.28	35.86	-21.64	-13	-8.64	Vertical
5580.0	-52.48	5.28	35.86	-21.90	-13	-8.90	Horizontal
209.0	-36.63	1.58	16.89	-21.31	-13	-8.31	Vertical
461.1	-41.90	1.76	17.26	-26.40	-13	-13.40	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-47.82	4.04	33.56	-18.30	-13	-5.30	Horizontal
3760.0	-47.48	4.04	33.56	-17.96	-13	-4.96	Vertical
5640.0	-50.69	5.24	35.91	-20.02	-13	-7.02	Vertical
5640.0	-51.75	5.24	35.91	-21.08	-13	-8.08	Horizontal
203.1	-37.91	1.46	16.27	-23.10	-13	-10.10	Vertical
433.5	-37.30	1.59	15.15	-23.74	-13	-10.74	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-48.74	4.04	34.00	-18.78	-13	-5.78	Horizontal
3800.0	-53.86	4.04	34.00	-23.90	-13	-10.90	Vertical
5700.0	-49.75	5.24	36.04	-18.95	-13	-5.95	Vertical
5700.0	-53.57	5.24	36.04	-22.77	-13	-9.77	Horizontal
178.8	-40.64	1.36	17.39	-24.60	-13	-11.60	Vertical
333.9	-43.76	1.66	15.39	-30.03	-13	-17.03	Horizontal

9.2 LTE BAND 4

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-46.81	4.02	29.80	-21.03	-13	-8.03	Horizontal
3421.4	-44.13	4.02	29.80	-18.35	-13	-5.35	Vertical
5132.1	-53.34	5.24	35.84	-22.74	-13	-9.74	Vertical
5132.1	-51.05	5.24	35.84	-20.45	-13	-7.45	Horizontal
182.2	-44.94	1.68	16.04	-30.58	-13	-17.58	Vertical
428.4	-35.06	1.78	17.74	-19.10	-13	-6.10	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-44.30	4.03	30.00	-18.33	-13	-5.33	Horizontal
3465.0	-51.89	4.03	30.00	-25.92	-13	-12.92	Vertical
5197.5	-51.63	5.25	35.86	-21.02	-13	-8.02	Vertical
5197.5	-49.22	5.25	35.86	-18.61	-13	-5.61	Horizontal
192.1	-42.42	1.72	17.69	-26.45	-13	-13.45	Vertical
300.4	-34.35	1.62	16.02	-19.94	-13	-6.94	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-51.14	4.05	30.01	-25.18	-13	-12.18	Horizontal
3508.6	-53.22	4.05	30.01	-27.26	-13	-14.26	Vertical
5262.9	-52.88	5.26	35.86	-22.28	-13	-9.28	Vertical
5262.9	-52.07	5.26	35.86	-21.47	-13	-8.47	Horizontal
182.7	-44.67	1.80	16.69	-29.78	-13	-16.78	Vertical
399.6	-37.34	1.75	16.66	-22.44	-13	-9.44	Horizontal

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

Test Results for Low Channel 1720MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440.0	-44.76	4.02	29.80	-18.98	-13	-5.98	Horizontal
3440.0	-46.80	4.02	29.80	-21.02	-13	-8.02	Vertical
5160.0	-52.80	5.24	35.84	-22.20	-13	-9.20	Vertical
5160.0	-52.16	5.24	35.84	-21.56	-13	-8.56	Horizontal
190.4	-35.14	1.57	17.26	-19.45	-13	-6.45	Vertical
451.0	-36.79	1.78	16.35	-22.22	-13	-9.22	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-48.00	4.03	30.00	-22.03	-13	-9.03	Horizontal
3465.0	-46.22	4.03	30.00	-20.25	-13	-7.25	Vertical
5197.5	-49.34	5.25	35.86	-18.73	-13	-5.73	Vertical
5197.5	-53.75	5.25	35.86	-23.14	-13	-10.14	Horizontal
211.1	-35.10	1.44	17.95	-18.59	-13	-5.59	Vertical
289.9	-42.79	1.65	16.09	-28.35	-13	-15.35	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-44.85	2.91	27.68	-20.08	-13	-7.08	Horizontal
3490.0	-47.18	2.91	27.68	-22.41	-13	-9.41	Vertical
5235.0	-51.57	5.26	35.86	-20.97	-13	-7.97	Vertical
5235.0	-52.49	5.26	35.86	-21.89	-13	-8.89	Horizontal
202.3	-41.28	1.61	16.85	-26.04	-13	-13.04	Vertical
422.6	-39.06	1.61	15.19	-25.48	-13	-12.48	Horizontal

9.3 LTE BAND 5

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

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-47.09	2.78	27.50	-22.37	-13	-9.37	Horizontal
1649.4	-48.87	2.78	27.50	-24.15	-13	-11.15	Vertical
2474.1	-46.43	2.90	27.80	-21.53	-13	-8.53	Vertical
2474.1	-50.39	2.90	27.80	-25.49	-13	-12.49	Horizontal
192.1	-37.03	1.76	17.59	-21.20	-13	-8.20	Vertical
393.4	-34.10	1.63	15.87	-19.86	-13	-6.86	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-46.39	2.80	27.48	-21.71	-13	-8.71	Horizontal
1673.0	-45.48	2.80	27.48	-20.80	-13	-7.80	Vertical
2509.5	-45.63	2.91	27.70	-20.84	-13	-7.84	Vertical
2509.5	-52.03	2.91	27.70	-27.24	-13	-14.24	Horizontal
176.5	-38.37	1.61	15.68	-24.30	-13	-11.30	Vertical
465.9	-36.47	1.59	17.52	-20.55	-13	-7.55	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-52.13	2.82	27.43	-27.52	-13	-14.52	Horizontal
1696.6	-45.93	2.82	27.43	-21.32	-13	-8.32	Vertical
2544.9	-49.46	2.92	27.74	-24.64	-13	-11.64	Vertical
2544.9	-50.84	2.92	27.74	-26.02	-13	-13.02	Horizontal
206.9	-40.36	1.69	16.67	-25.37	-13	-12.37	Vertical
344.4	-36.25	1.70	17.18	-20.77	-13	-7.77	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	-48.45	2.78	27.50	-23.73	-13	-10.73	Horizontal
1658.0	-46.00	2.78	27.50	-21.28	-13	-8.28	Vertical
2487.0	-53.19	2.90	27.80	-28.29	-13	-15.29	Vertical
2487.0	-50.78	2.90	27.80	-25.88	-13	-12.88	Horizontal
186.6	-36.30	1.71	15.57	-22.44	-13	-9.44	Vertical
294.9	-42.45	1.34	16.40	-27.39	-13	-14.39	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-53.29	2.80	27.48	-28.61	-13	-15.61	Horizontal
1673.0	-51.69	2.80	27.48	-27.01	-13	-14.01	Vertical
2509.5	-48.70	2.91	27.70	-23.91	-13	-10.91	Vertical
2509.5	-53.76	2.91	27.70	-28.97	-13	-15.97	Horizontal
211.6	-35.54	1.44	17.04	-19.94	-13	-6.94	Vertical
355.9	-40.47	1.76	17.62	-24.61	-13	-11.61	Horizontal
Test Results for High Channel 844MHz							
1688.0	-45.59	2.82	27.43	-20.98	-13	-7.98	Horizontal
1688.0	-44.64	2.82	27.43	-20.03	-13	-7.03	Vertical
2532.0	-46.77	2.92	27.74	-21.95	-13	-8.95	Vertical
2532.0	-51.97	2.92	27.74	-27.15	-13	-14.15	Horizontal
208.0	-43.33	1.74	17.70	-27.37	-13	-14.37	Vertical
416.1	-38.96	1.41	17.46	-22.90	-13	-9.90	Horizontal

9.4 LTE BAND 7

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

Test Results for Low Channel 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-60.87	5.23	35.81	-30.29	-25	-5.29	Horizontal
5005.0	-62.32	5.23	35.81	-31.74	-25	-6.74	Vertical
7507.5	-62.90	5.67	36.85	-31.72	-25	-6.72	Vertical
7507.5	-62.08	5.67	36.85	-30.90	-25	-5.90	Horizontal
184.9	-46.22	1.73	17.97	-29.98	-25	-4.98	Vertical
340.7	-54.60	1.38	15.11	-40.87	-25	-15.87	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.51	5.23	35.82	-30.92	-25	-5.92	Horizontal
5070.0	-63.37	5.23	35.82	-32.78	-25	-7.78	Vertical
7605.0	-62.66	5.67	36.85	-31.48	-25	-6.48	Vertical
7605.0	-59.23	5.67	36.85	-28.05	-25	-3.05	Horizontal
209.7	-44.88	1.77	16.17	-30.47	-25	-5.47	Vertical
374.8	-51.89	1.63	15.21	-38.31	-25	-13.31	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-64.10	5.24	35.83	-33.51	-25	-8.51	Horizontal
5135.0	-64.43	5.24	35.83	-33.84	-25	-8.84	Vertical
7702.5	-62.57	5.68	36.87	-31.38	-25	-6.38	Vertical
7702.5	-63.82	5.68	36.87	-32.63	-25	-7.63	Horizontal
195.2	-51.12	1.58	17.56	-35.14	-25	-10.14	Vertical
264.2	-44.02	1.45	16.58	-28.89	-25	-3.89	Horizontal

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

Test Results for Low Channel 2510MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020.0	-60.50	5.23	35.82	-29.91	-25	-4.91	Horizontal
5020.0	-62.14	5.23	35.82	-31.55	-25	-6.55	Vertical
7530.0	-60.07	5.67	36.86	-28.88	-25	-3.88	Vertical
7530.0	-62.70	5.67	36.86	-31.51	-25	-6.51	Horizontal
186.7	-49.27	1.63	15.76	-35.14	-25	-10.14	Vertical
320.0	-49.44	1.71	15.44	-35.71	-25	-10.71	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.18	5.23	35.82	-30.59	-25	-5.59	Horizontal
5070.0	-59.76	5.23	35.82	-29.17	-25	-4.17	Vertical
7605.0	-61.71	5.67	36.85	-30.53	-25	-5.53	Vertical
7605.0	-63.30	5.67	36.85	-32.12	-25	-7.12	Horizontal
196.2	-45.12	1.79	16.84	-30.06	-25	-5.06	Vertical
278.6	-49.75	1.71	17.64	-33.82	-25	-8.82	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-59.83	5.24	35.83	-29.24	-25	-4.24	Horizontal
5120.0	-63.83	5.24	35.83	-33.24	-25	-8.24	Vertical
7680.0	-59.65	5.70	36.88	-28.47	-25	-3.47	Vertical
7680.0	-64.63	5.70	36.88	-33.45	-25	-8.45	Horizontal
199.6	-45.60	1.79	16.84	-30.54	-25	-5.54	Vertical
415.7	-45.36	1.71	17.64	-29.43	-25	-4.43	Horizontal

9.5 LTE BAND 12

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

Test Results for Low Channel 699.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-50.29	2.60	27.20	-25.69	-13	-12.69	Horizontal
1399.4	-45.77	2.60	27.20	-21.17	-13	-8.17	Vertical
2099.1	-51.36	2.85	27.54	-26.67	-13	-13.67	Vertical
2099.1	-50.26	2.85	27.54	-25.57	-13	-12.57	Horizontal
202.0	-40.02	1.49	17.78	-23.73	-13	-10.73	Vertical
314.8	-43.37	1.36	17.33	-27.40	-13	-14.40	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-50.27	2.61	27.28	-25.60	-13	-12.60	Horizontal
1415.0	-46.42	2.61	27.28	-21.75	-13	-8.75	Vertical
2122.5	-49.21	2.87	27.59	-24.49	-13	-11.49	Vertical
2122.5	-52.11	2.87	27.59	-27.39	-13	-14.39	Horizontal
202.0	-36.87	1.73	15.74	-22.86	-13	-9.86	Vertical
430.7	-38.23	1.62	15.79	-24.06	-13	-11.06	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-52.15	2.63	27.28	-27.50	-13	-14.50	Horizontal
1430.6	-50.70	2.63	27.28	-26.05	-13	-13.05	Vertical
2145.9	-45.53	2.88	27.60	-20.81	-13	-7.81	Vertical
2145.9	-51.14	2.88	27.60	-26.42	-13	-13.42	Horizontal
179.9	-41.69	1.61	18.00	-25.30	-13	-12.30	Vertical
353.1	-42.01	1.45	15.49	-27.98	-13	-14.98	Horizontal

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

Test Results for Low Channel 704MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1408.0	-47.40	2.61	27.26	-22.75	-13	-9.75	Horizontal
1408.0	-52.70	2.61	27.26	-28.05	-13	-15.05	Vertical
2112.0	-45.65	2.87	27.58	-20.94	-13	-7.94	Vertical
2112.0	-50.30	2.87	27.58	-25.59	-13	-12.59	Horizontal
197.6	-39.10	1.31	16.97	-23.44	-13	-10.44	Vertical
278.6	-34.38	1.65	16.70	-19.33	-13	-6.33	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-46.14	2.61	27.28	-21.47	-13	-8.47	Horizontal
1415.0	-52.61	2.61	27.28	-27.94	-13	-14.94	Vertical
2122.5	-49.87	2.87	27.59	-25.15	-13	-12.15	Vertical
2122.5	-49.80	2.87	27.59	-25.08	-13	-12.08	Horizontal
178.5	-43.60	1.72	17.99	-27.33	-13	-14.33	Vertical
358.8	-35.06	1.73	17.94	-18.85	-13	-5.85	Horizontal
Test Results for High Channel 711MHz							
1422.0	-49.77	2.62	27.28	-25.11	-13	-12.11	Horizontal
1422.0	-46.34	2.62	27.28	-21.68	-13	-8.68	Vertical
2133.0	-44.17	2.87	27.60	-19.44	-13	-6.44	Vertical
2133.0	-50.32	2.87	27.60	-25.59	-13	-12.59	Horizontal
183.5	-40.04	1.58	15.93	-25.69	-13	-12.69	Vertical
308.2	-44.45	1.36	15.59	-30.22	-13	-17.22	Horizontal

9.6 LTE BAND 17

QPSK EIRP POWER FOR LTE BAND 17 (5MHZ BANDWIDTH)

Test Results for Low Channel 706.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1413.0	-50.43	2.61	27.28	-25.76	-13	-12.76	Horizontal
1413.0	-44.63	2.61	27.28	-19.96	-13	-6.96	Vertical
2119.5	-44.39	2.87	27.59	-19.67	-13	-6.67	Vertical
2119.5	-51.80	2.87	27.59	-27.08	-13	-14.08	Horizontal
190.2	-34.51	1.71	16.15	-20.07	-13	-7.07	Vertical
248.1	-37.20	1.41	17.32	-21.29	-13	-8.29	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-45.53	2.62	27.30	-20.85	-13	-7.85	Horizontal
1420.0	-45.30	2.62	27.30	-20.62	-13	-7.62	Vertical
2130.0	-50.96	2.87	27.62	-26.21	-13	-13.21	Vertical
2130.0	-49.22	2.87	27.62	-24.47	-13	-11.47	Horizontal
182.6	-38.31	1.42	15.25	-24.49	-13	-11.49	Vertical
325.2	-44.73	1.36	17.19	-28.90	-13	-15.90	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-46.55	2.66	27.28	-21.93	-13	-8.93	Horizontal
1427.0	-48.59	2.66	27.28	-23.97	-13	-10.97	Vertical
2140.5	-50.35	2.88	27.60	-25.63	-13	-12.63	Vertical
2140.5	-53.90	2.88	27.60	-29.18	-13	-16.18	Horizontal
187.1	-42.68	1.32	17.29	-26.71	-13	-13.71	Vertical
424.0	-43.06	1.72	16.89	-27.89	-13	-14.89	Horizontal

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

Test Results for Low Channel 709MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1418.0	-48.42	2.62	27.30	-23.74	-13	-10.74	Horizontal
1418.0	-44.11	2.62	27.30	-19.43	-13	-6.43	Vertical
2127.0	-51.35	2.87	27.62	-26.60	-13	-13.60	Vertical
2127.0	-51.10	2.87	27.62	-26.35	-13	-13.35	Horizontal
194.0	-36.60	1.35	16.91	-21.04	-13	-8.04	Vertical
281.1	-35.29	1.62	16.31	-20.60	-13	-7.60	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-52.75	2.62	27.30	-28.07	-13	-15.07	Horizontal
1420.0	-50.68	2.62	27.30	-26.00	-13	-13.00	Vertical
2130.0	-50.95	2.87	27.62	-26.20	-13	-13.20	Vertical
2130.0	-50.88	2.87	27.62	-26.13	-13	-13.13	Horizontal
212.0	-42.15	1.51	17.14	-26.52	-13	-13.52	Vertical
322.7	-35.00	1.77	16.88	-19.89	-13	-6.89	Horizontal
Test Results for High Channel 711MHz							
1422.0	-47.15	2.62	27.30	-22.47	-13	-9.47	Horizontal
1422.0	-44.11	2.62	27.30	-19.43	-13	-6.43	Vertical
2133.0	-50.23	2.87	27.62	-25.48	-13	-12.48	Vertical
2133.0	-51.66	2.87	27.62	-26.91	-13	-13.91	Horizontal
200.9	-37.22	1.78	15.95	-23.05	-13	-10.05	Vertical
394.3	-39.07	1.34	17.95	-22.47	-13	-9.47	Horizontal

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, DC3.87V 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 7
LTE Band 12
LTE Band 17

RESULTS

See the following pages.

10.1 LTE BAND 2

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1880	13.2	0.007003	2.5
3.87	1880	14.0	0.007456	2.5
4.2	1880	13.6	0.007233	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	13.0	0.006905	2.5
Extreme (50C)	1880	12.1	0.006429	2.5
Extreme (40C)	1880	13.2	0.007043	2.5
Extreme (30C)	1880	13.6	0.007221	2.5
Extreme (10C)	1880	14.3	0.007617	2.5
Extreme (0C)	1880	11.8	0.006292	2.5
Extreme (-10C)	1880	12.9	0.006878	2.5
Extreme (-20C)	1880	14.5	0.007726	2.5
Extreme (-30C)	1880	15.1	0.008020	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1880	9.4	0.005004	2.5
3.87	1880	8.8	0.004706	2.5
4.2	1880	7.8	0.004132	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	9.2	0.004892	2.5
Extreme (50C)	1880	8.6	0.004597	2.5
Extreme (40C)	1880	7.9	0.004180	2.5
Extreme (30C)	1880	8.6	0.004559	2.5
Extreme (10C)	1880	8.7	0.004622	2.5
Extreme (0C)	1880	7.7	0.004098	2.5
Extreme (-10C)	1880	8.9	0.004742	2.5
Extreme (-20C)	1880	9.3	0.004930	2.5
Extreme (-30C)	1880	8.2	0.004368	2.5

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

10.2 LTE BAND 4

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1732.5	8.5	0.004916	2.5
3.87	1732.5	9.2	0.005312	2.5
4.2	1732.5	8.5	0.004913	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	8.8	0.005064	2.5
Extreme (50C)	1732.5	9.4	0.005407	2.5
Extreme (40C)	1732.5	7.2	0.004162	2.5
Extreme (30C)	1732.5	5.8	0.003334	2.5
Extreme (10C)	1732.5	6.6	0.003815	2.5
Extreme (0C)	1732.5	8.9	0.005159	2.5
Extreme (-10C)	1732.5	7.9	0.004589	2.5
Extreme (-20C)	1732.5	7.1	0.004073	2.5
Extreme (-30C)	1732.5	8.2	0.004728	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1732.5	9.3	0.005385	2.5
3.87	1732.5	9.3	0.005340	2.5
4.2	1732.5	8.1	0.004694	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	9.7	0.005601	2.5
Extreme (50C)	1732.5	8.7	0.005031	2.5
Extreme (40C)	1732.5	8.2	0.004757	2.5
Extreme (30C)	1732.5	9.4	0.005450	2.5
Extreme (10C)	1732.5	8.8	0.005066	2.5
Extreme (0C)	1732.5	8.4	0.004839	2.5
Extreme (-10C)	1732.5	9.2	0.005322	2.5
Extreme (-20C)	1732.5	8.6	0.004990	2.5
Extreme (-30C)	1732.5	8.1	0.004670	2.5

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

10.3 LTE BAND 5

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	836.5	5.7	0.006812	2.5
3.87	836.5	6.5	0.007779	2.5
4.2	836.5	5.2	0.006265	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	6.0	0.007160	2.5
Extreme (50C)	836.5	5.8	0.006932	2.5
Extreme (40C)	836.5	6.0	0.007133	2.5
Extreme (30C)	836.5	6.2	0.007421	2.5
Extreme (10C)	836.5	5.8	0.006890	2.5
Extreme (0C)	836.5	5.3	0.006364	2.5
Extreme (-10C)	836.5	5.2	0.006263	2.5
Extreme (-20C)	836.5	6.5	0.007810	2.5
Extreme (-30C)	836.5	5.9	0.007104	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	836.5	6.2	0.007415	2.5
3.87	836.5	7.2	0.008603	2.5
4.2	836.5	5.0	0.005940	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	5.7	0.006771	2.5
Extreme (50C)	836.5	5.5	0.006597	2.5
Extreme (40C)	836.5	5.7	0.006818	2.5
Extreme (30C)	836.5	6.7	0.007964	2.5
Extreme (10C)	836.5	5.2	0.006236	2.5
Extreme (0C)	836.5	5.4	0.006456	2.5
Extreme (-10C)	836.5	5.2	0.006269	2.5
Extreme (-20C)	836.5	6.2	0.007405	2.5
Extreme (-30C)	836.5	6.2	0.007363	2.5

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

10.4 LTE BAND 7

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2535	9.9	0.003903	2.5
3.87	2535	9.2	0.003625	2.5
4.2	2535	8.1	0.003215	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	9.8	0.003848	2.5
Extreme (50C)	2535	9.1	0.003584	2.5
Extreme (40C)	2535	8.8	0.003485	2.5
Extreme (30C)	2535	8.9	0.003505	2.5
Extreme (10C)	2535	8.5	0.003356	2.5
Extreme (0C)	2535	8.6	0.003400	2.5
Extreme (-10C)	2535	9.4	0.003695	2.5
Extreme (-20C)	2535	9.2	0.003628	2.5
Extreme (-30C)	2535	8.4	0.003309	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2535	7.2	0.002830	2.5
3.87	2535	6.1	0.002412	2.5
4.2	2535	5.2	0.002058	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	6.7	0.002624	2.5
Extreme (50C)	2535	6.1	0.002392	2.5
Extreme (40C)	2535	5.7	0.002256	2.5
Extreme (30C)	2535	6.8	0.002687	2.5
Extreme (10C)	2535	5.9	0.002341	2.5
Extreme (0C)	2535	5.1	0.002024	2.5
Extreme (-10C)	2535	5.6	0.002195	2.5
Extreme (-20C)	2535	5.5	0.002176	2.5
Extreme (-30C)	2535	6.1	0.002422	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

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	707.5	9.1	0.012923	2.5
3.87	707.5	10.4	0.014731	2.5
4.2	707.5	9.0	0.012722	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	707.5	8.8	0.012375	2.5
Extreme (50C)	707.5	7.2	0.010141	2.5
Extreme (40C)	707.5	7.5	0.010574	2.5
Extreme (30C)	707.5	8.7	0.012271	2.5
Extreme (10C)	707.5	7.6	0.010694	2.5
Extreme (0C)	707.5	9.1	0.012912	2.5
Extreme (-10C)	707.5	8.3	0.011708	2.5
Extreme (-20C)	707.5	9.4	0.013285	2.5
Extreme (-30C)	707.5	8.0	0.011273	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 16QAM, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	707.5	7.1	0.010091	2.5
3.87	707.5	8.1	0.011435	2.5
4.2	707.5	7.2	0.010118	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	707.5	6.5	0.009175	2.5
Extreme (50C)	707.5	5.5	0.007765	2.5
Extreme (40C)	707.5	6.4	0.009110	2.5
Extreme (30C)	707.5	-7.7	-0.010912	2.5
Extreme (10C)	707.5	-8.2	-0.011590	2.5
Extreme (0C)	707.5	2.9	0.004100	2.5
Extreme (-10C)	707.5	-5.2	-0.007292	2.5
Extreme (-20C)	707.5	-8.7	-0.012302	2.5
Extreme (-30C)	707.5	-10.2	-0.014350	2.5

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

10.6 LTE BAND 17

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	710.0	9.4	0.013266	2.5
3.87	710.0	9.2	0.012988	2.5
4.2	710.0	7.9	0.011160	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710.0	10.0	0.014102	2.5
Extreme (50C)	710.0	8.6	0.012141	2.5
Extreme (40C)	710.0	7.7	0.010814	2.5
Extreme (30C)	710.0	9.0	0.012737	2.5
Extreme (10C)	710.0	8.6	0.012076	2.5
Extreme (0C)	710.0	8.2	0.011613	2.5
Extreme (-10C)	710.0	8.7	0.012217	2.5
Extreme (-20C)	710.0	8.9	0.012539	2.5
Extreme (-30C)	710.0	8.6	0.012103	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 16QAM, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	710.0	9.6	0.013568	2.5
3.87	710.0	8.6	0.012124	2.5
4.2	710.0	8.3	0.011722	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710.0	9.2	0.012903	2.5
Extreme (50C)	710.0	8.7	0.012274	2.5
Extreme (40C)	710.0	8.9	0.012534	2.5
Extreme (30C)	710.0	9.2	0.013024	2.5
Extreme (10C)	710.0	8.1	0.011376	2.5
Extreme (0C)	710.0	8.6	0.012054	2.5
Extreme (-10C)	710.0	9.2	0.012910	2.5
Extreme (-20C)	710.0	8.5	0.011914	2.5
Extreme (-30C)	710.0	8.5	0.011905	2.5

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

11. Peak-to-Average Ratio

11.1 Description of the PAR Measurement

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

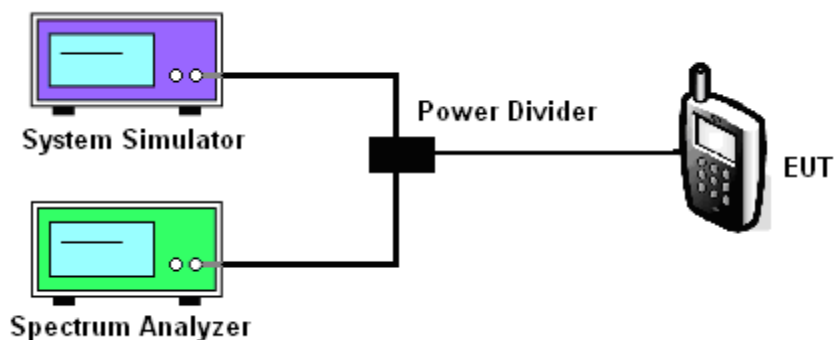
11.2 Measuring Instruments

See list of measuring instruments of this test report.

11.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. For GSM/EGPRS operating modes:
 - a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
 - b. Set EUT in maximum power output, and triggered the burst signal.
 - c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.
4. For UMTS operating modes:
 - a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
 - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

11.4 Test Setup



MODES TESTED

- LTE Band 2/4/5/7/12/17
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Test data reference attachment.

----END OF REPORT----