

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

FCC ID: 2ANMU-WP21

Product: Smart Phone

Trade Mark: OUKITEL

Model Number: WP21

Family Model: WP21 Pro, WP21 S

Report No.: S22092204105006

Prepared for

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TEST RESULT CERTIFICATION

Applicant's name..... : SHENZHEN YUNJI INTELLIGENT TECHNOLOGY CO.,LTD
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 : WP21
Family Model: WP21 Pro, WP21 S
Test sample number : S220922041012
Standards..... : FCC CFR 47 Part 22H, Part 24E, Part 27
Test procedure : ANSI C63.46:2015
 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 Oct. 2022 ~ 04 Nov, 2022
 Date of Issue 08 Nov, 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:	Smart Phone
Trade Mark	OUKITEL
Model Name	WP21
Family Model	WP21 Pro, WP21 S
Model Difference	All models are the same circuit and RF module, except the model name.
FCC ID:	2ANMU-WP21
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: 0.7dBi, Band 4: 0.4dBi, Band 5: -0.8dBi, Band 7: 1.3dBi, Band 12: -1.3dBi, Band 17: -1.3dBi
Power Supply:	DC 3.87V/9800mAh from battery or DC 5V from Adapter.
Adapter:	Model: HJ-PD66W-US Input: 100-240V~50/60Hz 1.5A Output: 5.0V---3.0A 15.0W OR 9.0V---3.0A 27.0W OR 12.0V---3.0A 36.0W OR 15.0V---3.0A 45.0W OR 20.0V---3.25A 65.0W OR 11.0V---6.0A 66.0W MAX
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.87V) (Note 1)
HW Version	M129-MUB-V2
SW Version	OUKITEL_WP21_EEA_V03
** 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-WP21** 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 C63.46:2015.

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 C63.46:2015& 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% ($U = 2Uc(y)$)	2.5dB

1.5 SPECIAL ACCESSORIES

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

1.6 WORST-CASE CONFIGURATION AND MODE

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

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

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

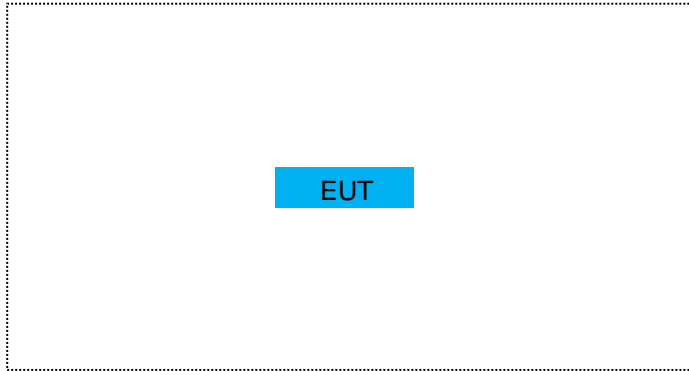
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Smart Phone	WP21	FCC ID: 2ANMU-WP21	EUT

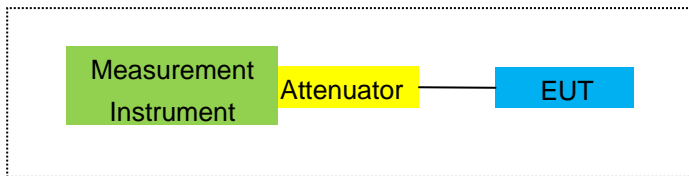
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

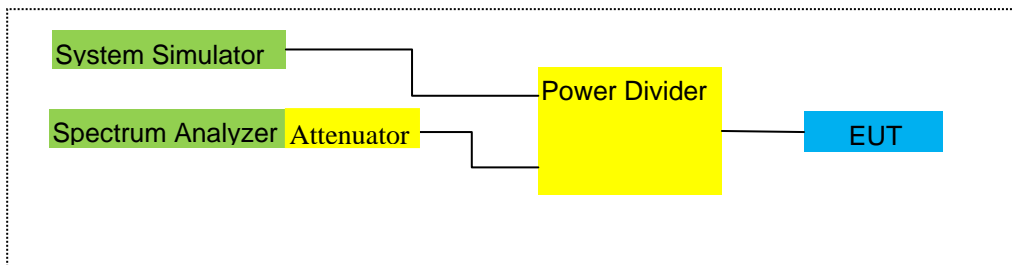
For Radiated Test Cases



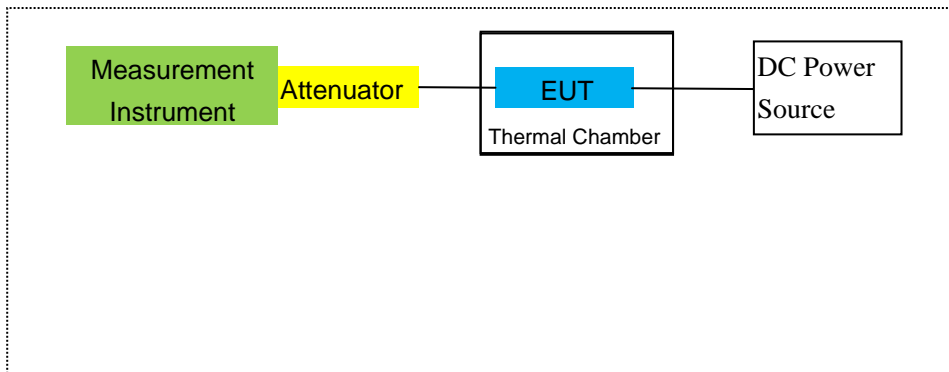
For Conducted Output Power



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	2017040292 3	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	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	-3.08	3.76	28.24	21.40	138.038	Horizontal	Pass	
		1880	-2.89	3.91	28.22	21.42	138.676	Horizontal	Pass	
		1909.3	-2.80	3.93	28.20	21.47	140.281	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-3.14	3.77	28.23	21.32	135.519	Horizontal	Pass	
		1880	-2.99	3.91	28.24	21.34	136.144	Horizontal	Pass	
		1908.5	-2.86	3.94	28.25	21.45	139.637	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-3.03	3.77	28.31	21.51	141.579	Horizontal	Pass	
		1880	-2.65	3.91	28.22	21.66	146.555	Horizontal	Pass	
		1907.5	-2.58	3.94	28.20	21.68	147.231	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-2.89	3.79	28.33	21.65	146.218	Horizontal	Pass	
		1880	-2.59	3.95	28.22	21.68	147.231	Horizontal	Pass	
		1905	-2.48	3.97	28.19	21.74	149.279	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	1857.5	-2.85	3.79	28.34	21.70	147.911	Horizontal	Pass	
		1880	-2.64	3.95	28.22	21.63	145.546	Horizontal	Pass	
		1902.5	-2.50	3.97	28.18	21.71	148.252	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	1860	-2.84	3.81	28.35	21.70	147.911	Horizontal	Pass	
		1880	-2.51	3.96	28.22	21.75	149.624	Horizontal	Pass	
		1900	-2.45	4.00	28.16	21.71	148.252	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	1850.7	-3.95	3.76	28.24	20.53	112.980	Vertical	Pass	
		1880	-3.36	3.91	28.22	20.95	124.451	Vertical	Pass	
		1909.3	-3.32	3.93	28.20	20.95	124.451	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	1851.5	-4.26	3.77	28.23	20.20	104.713	Vertical	Pass	
		1880	-3.97	3.91	28.24	20.36	108.643	Vertical	Pass	
		1908.5	-3.62	3.94	28.25	20.69	117.220	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	1852.5	-4.29	3.77	28.31	20.25	105.925	Vertical	Pass	
		1880	-3.44	3.91	28.22	20.87	122.180	Vertical	Pass	
		1907.5	-3.61	3.94	28.20	20.65	116.145	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	1855	-3.87	3.79	28.33	20.67	116.681	Vertical	Pass	
		1880	-4.01	3.95	28.22	20.26	106.170	Vertical	Pass	
		1905	-3.49	3.97	28.19	20.73	118.304	Vertical	Pass	
15.0MHz	1/#Mid	1857.5	-3.97	3.79	28.34	20.58	114.288	Vertical	Pass	

Band		1880	-3.74	3.95	28.22	20.53	112.980	Vertical	Pass
QPSK		1902.5	-3.09	3.97	28.18	21.12	129.420	Vertical	Pass
20.0MHz		1860	-4.37	3.81	28.35	20.17	103.992	Vertical	Pass
Band	1/#Mid	1880	-3.36	3.96	28.22	20.90	123.027	Vertical	Pass
QPSK		1900	-3.52	4.00	28.16	20.64	115.878	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						Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP	Of Max. ERP		
							Average (mW)			
1.4MHz Band 16 QAM	1/#Mid	1850.7	-4.20	3.76	28.24	20.28	106.660	Horizontal	Pass	
		1880	-3.67	3.91	28.22	20.64	115.878	Horizontal	Pass	
		1909.3	-3.60	3.93	28.20	20.67	116.681	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	1851.5	-3.70	3.77	28.23	20.76	119.124	Horizontal	Pass	
		1880	-3.78	3.91	28.24	20.55	113.501	Horizontal	Pass	
		1908.5	-3.99	3.94	28.25	20.32	107.647	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	1852.5	-3.64	3.77	28.31	20.90	123.027	Horizontal	Pass	
		1880	-3.55	3.91	28.22	20.76	119.124	Horizontal	Pass	
		1907.5	-3.23	3.94	28.20	21.03	126.765	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	1855	-3.69	3.79	28.33	20.85	121.619	Horizontal	Pass	
		1880	-3.68	3.95	28.22	20.59	114.551	Horizontal	Pass	
		1905	-3.15	3.97	28.19	21.07	127.938	Horizontal	Pass	
15.0MHz Band 16 QAM	1/#Mid	1857.5	-3.67	3.79	28.34	20.88	122.462	Horizontal	Pass	
		1880	-3.46	3.95	28.22	20.81	120.504	Horizontal	Pass	
		1902.5	-3.42	3.97	28.18	20.79	119.950	Horizontal	Pass	
20.0MHz Band 16 QAM	1/#Mid	1860	-3.56	3.81	28.35	20.98	125.314	Horizontal	Pass	
		1880	-3.26	3.96	28.22	21.00	125.893	Horizontal	Pass	
		1900	-3.08	4.00	28.16	21.08	128.233	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	1850.7	-5.12	3.76	28.24	19.36	86.298	Vertical	Pass	
		1880	-4.94	3.91	28.22	19.37	86.497	Vertical	Pass	
		1909.3	-4.57	3.93	28.20	19.70	93.325	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	1851.5	-5.03	3.77	28.23	19.43	87.700	Vertical	Pass	
		1880	-4.80	3.91	28.24	19.53	89.743	Vertical	Pass	
		1908.5	-4.34	3.94	28.25	19.97	99.312	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	1852.5	-5.15	3.77	28.31	19.39	86.896	Vertical	Pass	
		1880	-5.05	3.91	28.22	19.26	84.333	Vertical	Pass	
		1907.5	-4.87	3.94	28.20	19.39	86.896	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	1855	-4.95	3.79	28.33	19.59	90.991	Vertical	Pass	
		1880	-4.97	3.95	28.22	19.30	85.114	Vertical	Pass	
		1905	-4.41	3.97	28.19	19.81	95.719	Vertical	Pass	
15.0MHz Band 16 QAM	1/#Mid	1857.5	-5.03	3.79	28.34	19.52	89.536	Vertical	Pass	
		1880	-4.36	3.95	28.22	19.91	97.949	Vertical	Pass	
		1902.5	-4.53	3.97	28.18	19.68	92.897	Vertical	Pass	

20.0MHz		1860	-5.02	3.81	28.35	19.52	89.536	Vertical	Pass
Band 16	1/#Mid	1880	-4.50	3.96	28.22	19.76	94.624	Vertical	Pass
QAM		1900	-4.79	4.00	28.16	19.37	86.497	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	Antenna Factor	Max. EIRP	Max. EIRP		
			(dBm)	(dBm)	(dB)	Average	Average		
						(dBm)	(mW)		
1.4MHz Band QPSK	1/#Mid	1710.7	-2.99	3.12	27.58	21.47	140.281	Horizontal	Pass
		1732.5	-2.98	3.27	27.61	21.36	136.773	Horizontal	Pass
		1754.3	-2.96	3.29	27.63	21.38	137.404	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.16	3.13	27.61	21.32	135.519	Horizontal	Pass
		1732.5	-3.08	3.27	27.61	21.26	133.660	Horizontal	Pass
		1753.5	-3.00	3.30	27.62	21.32	135.519	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.93	3.13	27.63	21.57	143.549	Horizontal	Pass
		1732.5	-2.83	3.27	27.61	21.51	141.579	Horizontal	Pass
		1752.5	-2.71	3.30	27.60	21.59	144.212	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-2.87	3.15	27.64	21.62	145.211	Horizontal	Pass
		1732.5	-2.64	3.31	27.61	21.66	146.555	Horizontal	Pass
		1750	-2.66	3.33	27.59	21.60	144.544	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-2.88	3.15	27.65	21.62	145.211	Horizontal	Pass
		1732.5	-2.72	3.31	27.61	21.58	143.880	Horizontal	Pass
		1747.5	-2.66	3.33	27.57	21.58	143.880	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-2.82	3.17	27.66	21.67	146.893	Horizontal	Pass
		1732.5	-2.65	3.32	27.61	21.64	145.881	Horizontal	Pass
		1745	-2.59	3.36	27.56	21.61	144.877	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-3.53	3.12	27.58	20.93	123.880	Vertical	Pass
		1732.5	-4.05	3.27	27.61	20.29	106.905	Vertical	Pass
		1754.3	-3.41	3.29	27.63	20.93	123.880	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-4.21	3.13	27.61	20.27	106.414	Vertical	Pass
		1732.5	-4.06	3.27	27.61	20.28	106.660	Vertical	Pass
		1753.5	-3.87	3.30	27.62	20.45	110.917	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-3.90	3.13	27.63	20.60	114.815	Vertical	Pass
		1732.5	-3.27	3.27	27.61	21.07	127.938	Vertical	Pass
		1752.5	-3.61	3.30	27.60	20.69	117.220	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-3.53	3.15	27.64	20.96	124.738	Vertical	Pass
		1732.5	-3.33	3.31	27.61	20.97	125.026	Vertical	Pass
		1750	-3.51	3.33	27.59	20.75	118.850	Vertical	Pass

15.0MHz		1717.5	-4.24	3.15	27.65	20.26	106.170	Vertical	Pass
Band	1/#Mid	1732.5	-3.95	3.31	27.61	20.35	108.393	Vertical	Pass
QPSK		1747.5	-3.83	3.33	27.57	20.41	109.901	Vertical	Pass
20.0MHz		1720	-3.44	3.17	27.66	21.05	127.350	Vertical	Pass
Band	1/#Mid	1732.5	-3.47	3.32	27.61	20.82	120.781	Vertical	Pass
QPSK		1745	-3.84	3.36	27.56	20.36	108.643	Vertical	Pass

Note:

SG Level= Signal generator output

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

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

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable	Antenna	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	Loss	Factor	Average	Average	Of Max. ERP	
			(dBm)	(dB)	(dBm)	(mW)			
1.4MHz Band 16 QAM	1/#Mid	1710.7	-3.80	3.12	27.58	20.66	116.413	Horizontal	Pass
		1732.5	-3.65	3.27	27.61	20.69	117.220	Horizontal	Pass
		1754.3	-3.65	3.29	27.63	20.69	117.220	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-3.74	3.13	27.61	20.74	118.577	Horizontal	Pass
		1732.5	-3.87	3.27	27.61	20.47	111.429	Horizontal	Pass
		1753.5	-4.09	3.30	27.62	20.23	105.439	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-3.57	3.13	27.63	20.93	123.880	Horizontal	Pass
		1732.5	-3.53	3.27	27.61	20.81	120.504	Horizontal	Pass
		1752.5	-3.22	3.30	27.60	21.08	128.233	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-3.64	3.15	27.64	20.85	121.619	Horizontal	Pass
		1732.5	-3.83	3.31	27.61	20.47	111.429	Horizontal	Pass
		1750	-3.21	3.33	27.59	21.05	127.350	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-3.44	3.15	27.65	21.06	127.644	Horizontal	Pass
		1732.5	-3.50	3.31	27.61	20.80	120.226	Horizontal	Pass
		1747.5	-3.52	3.33	27.57	20.72	118.032	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	1720	-3.39	3.17	27.66	21.10	128.825	Horizontal	Pass
		1732.5	-3.40	3.32	27.61	20.89	122.744	Horizontal	Pass
		1745	-3.21	3.36	27.56	20.99	125.603	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-4.71	3.12	27.58	19.75	94.406	Vertical	Pass
		1732.5	-5.06	3.27	27.61	19.28	84.723	Vertical	Pass
		1754.3	-5.14	3.29	27.63	19.20	83.176	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	1711.5	-5.23	3.13	27.61	19.25	84.140	Vertical	Pass
		1732.5	-5.15	3.27	27.61	19.19	82.985	Vertical	Pass
		1753.5	-4.30	3.30	27.62	20.02	100.462	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	1712.5	-5.15	3.13	27.63	19.35	86.099	Vertical	Pass
		1732.5	-4.49	3.27	27.61	19.85	96.605	Vertical	Pass
		1752.5	-5.06	3.30	27.60	19.24	83.946	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	1715	-5.07	3.15	27.64	19.42	87.498	Vertical	Pass
		1732.5	-4.50	3.31	27.61	19.80	95.499	Vertical	Pass
		1750	-4.73	3.33	27.59	19.53	89.743	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	1717.5	-4.71	3.15	27.65	19.79	95.280	Vertical	Pass
		1732.5	-4.24	3.31	27.61	20.06	101.391	Vertical	Pass
		1747.5	-4.17	3.33	27.57	20.07	101.625	Vertical	Pass

20.0MHz		1720	-5.19	3.17	27.66	19.30	85.114	Vertical	Pass
Band 16	1/#Mid	1732.5	-4.43	3.32	27.61	19.86	96.828	Vertical	Pass
QAM		1745	-4.30	3.36	27.56	19.90	97.724	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	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	3/#Mid	824.7	6.93	2.01	19.68	2.15	22.45	175.792	Horizontal	Pass	
		836.5	6.81	2.01	19.77	2.15	22.42	174.582	Horizontal	Pass	
		848.3	6.61	2.02	19.82	2.15	22.26	168.267	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	6.70	2.01	19.70	2.15	22.24	167.494	Horizontal	Pass	
		836.5	6.60	2.01	19.77	2.15	22.21	166.341	Horizontal	Pass	
		847.5	6.47	2.02	19.81	2.15	22.11	162.555	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	6.98	2.01	19.71	2.15	22.53	179.061	Horizontal	Pass	
		836.5	6.86	2.01	19.77	2.15	22.47	176.604	Horizontal	Pass	
		846.5	6.70	2.02	19.79	2.15	22.32	170.608	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	829	7.00	2.01	19.73	2.15	22.57	180.717	Horizontal	Pass	
		836.5	6.95	2.01	19.77	2.15	22.56	180.302	Horizontal	Pass	
		844	6.85	2.02	19.78	2.15	22.46	176.198	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	824.7	5.69	2.01	19.68	2.15	21.21	132.130	Vertical	Pass	
		836.5	5.93	2.01	19.77	2.15	21.54	142.561	Vertical	Pass	
		848.3	5.14	2.02	19.82	2.15	20.79	119.950	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	5.97	2.01	19.70	2.15	21.51	141.579	Vertical	Pass	
		836.5	5.62	2.01	19.77	2.15	21.23	132.739	Vertical	Pass	
		847.5	5.50	2.02	19.81	2.15	21.14	130.017	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	5.54	2.01	19.71	2.15	21.09	128.529	Vertical	Pass	
		836.5	5.56	2.01	19.77	2.15	21.17	130.918	Vertical	Pass	
		846.5	5.85	2.02	19.79	2.15	21.47	140.281	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	829	5.38	2.01	19.73	2.15	20.95	124.451	Vertical	Pass	
		836.5	5.49	2.01	19.77	2.15	21.10	128.825	Vertical	Pass	
		844	5.80	2.02	19.78	2.15	21.41	138.357	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 (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP	Max. EIRP			
			(dBm)				Average	Average			
							(dBm)	(mW)			
1.4MHz Band 16 QAM	3/#Mid	824.7	6.08	2.01	19.68	2.15	21.60	144.544	Horizontal	Pass	
		836.5	6.01	2.01	19.77	2.15	21.62	145.211	Horizontal	Pass	
		848.3	5.85	2.02	19.82	2.15	21.50	141.254	Horizontal	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	6.16	2.01	19.70	2.15	21.70	147.911	Horizontal	Pass	
		836.5	5.87	2.01	19.77	2.15	21.48	140.605	Horizontal	Pass	
		847.5	5.35	2.02	19.81	2.15	20.99	125.603	Horizontal	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	6.48	2.01	19.71	2.15	22.03	159.588	Horizontal	Pass	
		836.5	6.25	2.01	19.77	2.15	21.86	153.462	Horizontal	Pass	
		846.5	6.00	2.02	19.79	2.15	21.62	145.211	Horizontal	Pass	
10.0MHz Band 16 QAM	1/#Mid	829	6.48	2.01	19.73	2.15	22.05	160.325	Horizontal	Pass	
		836.5	6.20	2.01	19.77	2.15	21.81	151.705	Horizontal	Pass	
		844	5.74	2.02	19.78	2.15	21.35	136.458	Horizontal	Pass	
1.4MHz Band 16 QAM	1/#Mid	824.7	6.21	2.01	19.68	2.15	21.73	148.936	Vertical	Pass	
		836.5	4.37	2.01	19.77	2.15	19.98	99.541	Vertical	Pass	
		848.3	4.12	2.02	19.82	2.15	19.77	94.842	Vertical	Pass	
3.0MHz Band 16 QAM	1/#Mid	825.5	5.09	2.01	19.70	2.15	20.63	115.611	Vertical	Pass	
		836.5	5.99	2.01	19.77	2.15	21.60	144.544	Vertical	Pass	
		847.5	5.99	2.02	19.81	2.15	21.63	145.546	Vertical	Pass	
5.0MHz Band 16 QAM	1/#Mid	826.5	5.02	2.01	19.71	2.15	20.57	114.025	Vertical	Pass	
		836.5	4.48	2.01	19.77	2.15	20.09	102.094	Vertical	Pass	
		846.5	4.38	2.02	19.79	2.15	20.00	100.000	Vertical	Pass	
10.0MHz Band 16 QAM	1/#Mid	829	4.38	2.01	19.73	2.15	19.95	98.855	Vertical	Pass	
		836.5	5.84	2.01	19.77	2.15	21.45	139.637	Vertical	Pass	
		844	5.07	2.02	19.78	2.15	20.68	116.950	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					Polarization Of	Max. ERP	Conclusion
			SG Level	Cable Loss	Antenna Factor	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)	Average	Average			
						(dBm)	(mW)			
5.0MHz Band QPSK	1/#Mid	2502.5	-1.27	4.54	27.75	21.94	156.315	Horizontal	Pass	
		2535	-1.10	4.69	27.72	21.93	155.955	Horizontal	Pass	
		2567.5	-1.03	4.71	27.71	21.97	157.398	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	2505	-1.20	4.55	27.76	22.01	158.855	Horizontal	Pass	
		2535	-1.01	4.69	27.72	22.02	159.221	Horizontal	Pass	
		2565	-0.93	4.72	27.70	22.05	160.325	Horizontal	Pass	
15.0MHz Band QPSK	1/#Mid	2507.5	-1.21	4.55	27.77	22.01	158.855	Horizontal	Pass	
		2535	-1.07	4.69	27.72	21.96	157.036	Horizontal	Pass	
		2562.5	-0.97	4.72	27.69	22.00	158.489	Horizontal	Pass	
20.0MHz Band QPSK	1/#Mid	2510	-1.15	4.57	27.78	22.06	160.694	Horizontal	Pass	
		2535	-0.97	4.73	27.72	22.02	159.221	Horizontal	Pass	
		2560	-0.93	4.75	27.68	22.00	158.489	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	2502.5	-2.09	4.54	27.75	21.12	129.420	Vertical	Pass	
		2535	-2.04	4.69	27.72	20.99	125.603	Vertical	Pass	
		2567.5	-2.21	4.71	27.71	20.79	119.950	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	2505	-2.82	4.55	27.76	20.39	109.396	Vertical	Pass	
		2535	-1.96	4.69	27.72	21.07	127.938	Vertical	Pass	
		2565	-2.77	4.72	27.70	20.21	104.954	Vertical	Pass	
15.0MHz Band QPSK	1/#Mid	2507.5	-2.95	4.55	27.77	20.27	106.414	Vertical	Pass	
		2535	-2.64	4.69	27.72	20.39	109.396	Vertical	Pass	
		2562.5	-2.31	4.72	27.69	20.66	116.413	Vertical	Pass	
20.0MHz Band QPSK	1/#Mid	2510	-2.79	4.57	27.78	20.42	110.154	Vertical	Pass	
		2535	-2.12	4.73	27.72	20.87	122.180	Vertical	Pass	
		2560	-2.76	4.75	27.68	20.17	103.992	Vertical	Pass	

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable	Antenna	Max. EIRP	Max. EIRP	Polarization	
			(dBm)	Loss	Factor	Average	Average	Of Max. ERP	
			(dBm)	(dB)	(dBm)	(mW)			
5.0MHz Band 16 QAM	1/#Mid	2502.5	-1.96	4.54	27.75	21.25	133.352	Horizontal	Pass
		2535	-1.65	4.69	27.72	21.38	137.404	Horizontal	Pass
		2567.5	-1.73	4.71	27.71	21.27	133.968	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-1.85	4.55	27.76	21.36	136.773	Horizontal	Pass
		2535	-1.86	4.69	27.72	21.17	130.918	Horizontal	Pass
		2565	-2.13	4.72	27.70	20.85	121.619	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-2.03	4.55	27.77	21.19	131.522	Horizontal	Pass
		2535	-2.00	4.69	27.72	21.03	126.765	Horizontal	Pass
		2562.5	-1.61	4.72	27.69	21.36	136.773	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-1.91	4.57	27.78	21.30	134.896	Horizontal	Pass
		2535	-1.58	4.73	27.72	21.41	138.357	Horizontal	Pass
		2560	-1.68	4.75	27.68	21.25	133.352	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-2.25	4.54	27.75	20.96	124.738	Vertical	Pass
		2535	-3.53	4.69	27.72	19.50	89.125	Vertical	Pass
		2567.5	-3.58	4.71	27.71	19.42	87.498	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-3.50	4.55	27.76	19.71	93.541	Vertical	Pass
		2535	-2.91	4.69	27.72	20.12	102.802	Vertical	Pass
		2565	-3.39	4.72	27.70	19.59	90.991	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-3.80	4.55	27.77	19.42	87.498	Vertical	Pass
		2535	-2.76	4.69	27.72	20.27	106.414	Vertical	Pass
		2562.5	-2.40	4.72	27.69	20.57	114.025	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-3.39	4.57	27.78	19.82	95.940	Vertical	Pass
		2535	-3.54	4.73	27.72	19.45	88.105	Vertical	Pass
		2560	-3.35	4.75	27.68	19.58	90.782	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 Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
1.4MHz Band QPSK	1/#Mid	699.7	7.30	1.91	19.21	2.15	22.45	175.792	Vertical	Pass	
		707.5	7.22	1.91	19.26	2.15	22.42	174.582	Vertical	Pass	
		715.3	7.00	1.93	19.34	2.15	22.26	168.267	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	7.09	1.91	19.21	2.15	22.24	167.494	Vertical	Pass	
		707.5	7.01	1.91	19.26	2.15	22.21	166.341	Vertical	Pass	
		714.5	6.85	1.93	19.34	2.15	22.11	162.555	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	7.36	1.91	19.23	2.15	22.53	179.061	Vertical	Pass	
		707.5	7.27	1.91	19.26	2.15	22.47	176.604	Vertical	Pass	
		713.5	7.06	1.92	19.33	2.15	22.32	170.608	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	704	7.38	1.91	19.25	2.15	22.57	180.717	Vertical	Pass	
		707.5	7.36	1.91	19.26	2.15	22.56	180.302	Vertical	Pass	
		711	7.21	1.92	19.32	2.15	22.46	176.198	Vertical	Pass	
1.4MHz Band QPSK	1/#Mid	699.7	5.93	1.91	19.21	2.15	21.08	128.233	Horizontal	Pass	
		707.5	5.96	1.91	19.26	2.15	21.16	130.617	Horizontal	Pass	
		715.3	6.05	1.93	19.34	2.15	21.31	135.207	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	700.5	6.21	1.91	19.21	2.15	21.36	136.773	Horizontal	Pass	
		707.5	5.60	1.91	19.26	2.15	20.80	120.226	Horizontal	Pass	
		714.5	5.97	1.93	19.34	2.15	21.23	132.739	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	701.5	5.73	1.91	19.23	2.15	20.90	123.027	Horizontal	Pass	
		707.5	5.84	1.91	19.26	2.15	21.04	127.057	Horizontal	Pass	
		713.5	6.04	1.92	19.33	2.15	21.30	134.896	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	704	6.26	1.91	19.25	2.15	21.45	139.637	Horizontal	Pass	
		707.5	5.79	1.91	19.26	2.15	20.99	125.603	Horizontal	Pass	
		711	6.22	1.92	19.32	2.15	21.47	140.281	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 Of Max. ERP	
			(dBm)	(dBm)	(dB)		Average	Average		
						(dB)	(dBm)	(mW)		
1.4MHz Band 16 QAM	1/#Mid	699.7	7.22	1.91	19.21	2.15	22.37	172.584	Vertical	Pass
		707.5	7.14	1.91	19.26	2.15	22.34	171.396	Vertical	Pass
		715.3	6.92	1.93	19.34	2.15	22.18	165.196	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	7.01	1.91	19.21	2.15	22.16	164.437	Vertical	Pass
		707.5	6.93	1.91	19.26	2.15	22.13	163.305	Vertical	Pass
		714.5	6.77	1.93	19.34	2.15	22.03	159.588	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	7.28	1.91	19.23	2.15	22.45	175.792	Vertical	Pass
		707.5	7.19	1.91	19.26	2.15	22.39	173.380	Vertical	Pass
		713.5	6.98	1.92	19.33	2.15	22.24	167.494	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	704	7.30	1.91	19.25	2.15	22.49	177.419	Vertical	Pass
		707.5	7.28	1.91	19.26	2.15	22.48	177.011	Vertical	Pass
		711	7.13	1.92	19.32	2.15	22.38	172.982	Vertical	Pass
1.4MHz Band 16 QAM	1/#Mid	699.7	6.06	1.91	19.21	2.15	21.21	132.130	Horizontal	Pass
		707.5	5.71	1.91	19.26	2.15	20.91	123.310	Horizontal	Pass
		715.3	6.15	1.93	19.34	2.15	21.41	138.357	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	6.19	1.91	19.21	2.15	21.34	136.144	Horizontal	Pass
		707.5	5.81	1.91	19.26	2.15	21.01	126.183	Horizontal	Pass
		714.5	6.13	1.93	19.34	2.15	21.39	137.721	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	5.82	1.91	19.23	2.15	20.99	125.603	Horizontal	Pass
		707.5	5.47	1.91	19.26	2.15	20.67	116.681	Horizontal	Pass
		713.5	6.31	1.92	19.33	2.15	21.57	143.549	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	704	6.18	1.91	19.25	2.15	21.37	137.088	Horizontal	Pass
		707.5	6.29	1.91	19.26	2.15	21.49	140.929	Horizontal	Pass
		711	5.88	1.92	19.32	2.15	21.13	129.718	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 Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
5.0MHz Band QPSK	1/#Mid	706.5	7.68	1.91	19.23	2.15	22.85	192.752	Vertical	Pass	
		710	7.54	1.91	19.26	2.15	22.74	187.932	Vertical	Pass	
		713.5	7.44	1.92	19.33	2.15	22.70	186.209	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	709	7.69	1.91	19.25	2.15	22.88	194.089	Vertical	Pass	
		710	7.64	1.91	19.26	2.15	22.84	192.309	Vertical	Pass	
		711	7.60	1.92	19.32	2.15	22.85	192.752	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	706.5	7.29	1.91	19.23	2.15	22.46	176.198	Horizontal	Pass	
		710	6.87	1.91	19.26	2.15	22.07	161.065	Horizontal	Pass	
		713.5	6.07	1.92	19.33	2.15	21.33	135.831	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	709	6.07	1.91	19.25	2.15	21.26	133.660	Horizontal	Pass	
		710	5.57	1.91	19.26	2.15	20.77	119.399	Horizontal	Pass	
		711	5.80	1.92	19.32	2.15	21.05	127.350	Horizontal	Pass	

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
							Average	Average		
							(dBm)	(mW)		
5.0MHz Band 16 QAM	1/#Mid	706.5	7.03	1.91	19.23	2.15	22.20	165.959	Vertical	Pass
		710	6.94	1.91	19.26	2.15	22.14	163.682	Vertical	Pass
		713.5	6.74	1.92	19.33	2.15	22.00	158.489	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	709	6.57	1.91	19.25	2.15	21.76	149.968	Vertical	Pass
		710	7.10	1.91	19.26	2.15	22.30	169.824	Vertical	Pass
		711	6.83	1.92	19.32	2.15	22.08	161.436	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	706.5	5.80	1.91	19.23	2.15	20.97	125.026	Horizontal	Pass
		710	5.86	1.91	19.26	2.15	21.06	127.644	Horizontal	Pass
		713.5	6.01	1.92	19.33	2.15	21.27	133.968	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	709	5.91	1.91	19.25	2.15	21.10	128.825	Horizontal	Pass
		710	5.86	1.91	19.26	2.15	21.06	127.644	Horizontal	Pass
		711	5.49	1.92	19.32	2.15	20.74	118.577	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	-52.42	4.04	33.51	-22.95	-13	-9.95	Horizontal
3701.4	-51.01	4.04	33.51	-21.54	-13	-8.54	Vertical
5552.1	-51.77	5.24	35.84	-21.17	-13	-8.17	Vertical
5552.1	-51.77	5.24	35.84	-21.17	-13	-8.17	Horizontal
185.0	-43.69	1.43	16.02	-29.10	-13	-16.10	Vertical
304.2	-42.04	1.30	17.99	-25.35	-13	-12.35	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-49.03	4.04	33.56	-19.51	-13	-6.51	Horizontal
3760.0	-44.03	4.04	33.56	-14.51	-13	-1.51	Vertical
5640.0	-53.71	5.24	35.91	-23.04	-13	-10.04	Vertical
5640.0	-49.70	5.24	35.91	-19.03	-13	-6.03	Horizontal
190.6	-39.48	1.62	16.97	-24.13	-13	-11.13	Vertical
306.1	-34.41	1.74	15.98	-20.18	-13	-7.18	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-45.09	4.04	34.00	-15.13	-13	-2.13	Horizontal
3818.6	-50.91	4.04	34.00	-20.95	-13	-7.95	Vertical
5727.9	-51.03	5.24	36.04	-20.23	-13	-7.23	Vertical
5727.9	-50.52	5.24	36.04	-19.72	-13	-6.72	Horizontal
191.9	-39.67	1.42	17.29	-23.80	-13	-10.80	Vertical
352.0	-44.74	1.50	17.90	-28.33	-13	-15.33	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	-52.81	4.07	33.54	-23.34	-13	-10.34	Horizontal
3720.0	-44.31	4.07	33.54	-14.84	-13	-1.84	Vertical
5580.0	-47.71	5.28	35.86	-17.13	-13	-4.13	Vertical
5580.0	-49.58	5.28	35.86	-19.00	-13	-6.00	Horizontal
177.9	-36.57	1.58	16.89	-21.25	-13	-8.25	Vertical
252.5	-34.79	1.76	17.26	-19.29	-13	-6.29	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-49.33	4.04	33.56	-19.81	-13	-6.81	Horizontal
3760.0	-53.44	4.04	33.56	-23.92	-13	-10.92	Vertical
5640.0	-44.76	5.24	35.91	-14.09	-13	-1.09	Vertical
5640.0	-49.64	5.24	35.91	-18.97	-13	-5.97	Horizontal
197.4	-44.42	1.46	16.27	-29.61	-13	-16.61	Vertical
454.4	-35.38	1.59	15.15	-21.82	-13	-8.82	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-48.69	4.04	34.00	-18.73	-13	-5.73	Horizontal
3800.0	-50.81	4.04	34.00	-20.85	-13	-7.85	Vertical
5700.0	-51.03	5.24	36.04	-20.23	-13	-7.23	Vertical
5700.0	-53.35	5.24	36.04	-22.55	-13	-9.55	Horizontal
202.5	-41.67	1.36	17.39	-25.63	-13	-12.63	Vertical
455.8	-34.31	1.66	15.39	-20.58	-13	-7.58	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	-48.98	4.02	29.80	-23.20	-13	-10.20	Horizontal
3421.4	-45.66	4.02	29.80	-19.88	-13	-6.88	Vertical
5132.1	-45.24	5.24	35.84	-14.64	-13	-1.64	Vertical
5132.1	-50.25	5.24	35.84	-19.65	-13	-6.65	Horizontal
210.5	-36.25	1.68	16.04	-21.89	-13	-8.89	Vertical
384.6	-39.76	1.78	17.74	-23.80	-13	-10.80	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-45.46	4.03	30.00	-19.49	-13	-6.49	Horizontal
3465.0	-44.51	4.03	30.00	-18.54	-13	-5.54	Vertical
5197.5	-49.81	5.25	35.86	-19.20	-13	-6.20	Vertical
5197.5	-51.20	5.25	35.86	-20.59	-13	-7.59	Horizontal
207.1	-34.62	1.72	17.69	-18.65	-13	-5.65	Vertical
402.0	-42.38	1.62	16.02	-27.97	-13	-14.97	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-51.43	4.05	30.01	-25.47	-13	-12.47	Horizontal
3508.6	-53.55	4.05	30.01	-27.59	-13	-14.59	Vertical
5262.9	-48.91	5.26	35.86	-18.31	-13	-5.31	Vertical
5262.9	-51.23	5.26	35.86	-20.63	-13	-7.63	Horizontal
200.9	-39.59	1.80	16.69	-24.70	-13	-11.70	Vertical
437.9	-39.54	1.75	16.66	-24.64	-13	-11.64	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	-47.23	4.02	29.80	-21.45	-13	-8.45	Horizontal
3440.0	-52.75	4.02	29.80	-26.97	-13	-13.97	Vertical
5160.0	-51.10	5.24	35.84	-20.50	-13	-7.50	Vertical
5160.0	-50.63	5.24	35.84	-20.03	-13	-7.03	Horizontal
184.1	-43.97	1.57	17.26	-28.28	-13	-15.28	Vertical
279.7	-35.22	1.78	16.35	-20.65	-13	-7.65	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-45.40	4.03	30.00	-19.43	-13	-6.43	Horizontal
3465.0	-51.54	4.03	30.00	-25.57	-13	-12.57	Vertical
5197.5	-50.24	5.25	35.86	-19.63	-13	-6.63	Vertical
5197.5	-51.02	5.25	35.86	-20.41	-13	-7.41	Horizontal
211.6	-36.87	1.44	17.95	-20.36	-13	-7.36	Vertical
365.0	-44.07	1.65	16.09	-29.63	-13	-16.63	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-49.67	2.91	27.68	-24.90	-13	-11.90	Horizontal
3490.0	-46.26	2.91	27.68	-21.49	-13	-8.49	Vertical
5235.0	-52.69	5.26	35.86	-22.09	-13	-9.09	Vertical
5235.0	-49.30	5.26	35.86	-18.70	-13	-5.70	Horizontal
190.2	-42.75	1.61	16.85	-27.51	-13	-14.51	Vertical
265.3	-36.71	1.61	15.19	-23.13	-13	-10.13	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	-45.06	2.78	27.50	-20.34	-13	-7.34	Horizontal
1649.4	-49.44	2.78	27.50	-24.72	-13	-11.72	Vertical
2474.1	-49.41	2.90	27.80	-24.51	-13	-11.51	Vertical
2474.1	-53.89	2.90	27.80	-28.99	-13	-15.99	Horizontal
197.5	-44.54	1.76	17.59	-28.71	-13	-15.71	Vertical
315.5	-36.69	1.63	15.87	-22.45	-13	-9.45	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-53.14	2.80	27.48	-28.46	-13	-15.46	Horizontal
1673.0	-46.14	2.80	27.48	-21.46	-13	-8.46	Vertical
2509.5	-47.81	2.91	27.70	-23.02	-13	-10.02	Vertical
2509.5	-49.11	2.91	27.70	-24.32	-13	-11.32	Horizontal
178.6	-36.75	1.61	15.68	-22.68	-13	-9.68	Vertical
240.7	-40.81	1.59	17.52	-24.89	-13	-11.89	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-46.29	2.82	27.43	-21.68	-13	-8.68	Horizontal
1696.6	-53.86	2.82	27.43	-29.25	-13	-16.25	Vertical
2544.9	-45.34	2.92	27.74	-20.52	-13	-7.52	Vertical
2544.9	-49.55	2.92	27.74	-24.73	-13	-11.73	Horizontal
177.9	-44.86	1.69	16.67	-29.87	-13	-16.87	Vertical
310.9	-43.36	1.70	17.18	-27.88	-13	-14.88	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	-49.82	2.78	27.50	-25.10	-13	-12.10	Horizontal
1658.0	-52.56	2.78	27.50	-27.84	-13	-14.84	Vertical
2487.0	-48.97	2.90	27.80	-24.07	-13	-11.07	Vertical
2487.0	-53.54	2.90	27.80	-28.64	-13	-15.64	Horizontal
202.6	-38.74	1.71	15.57	-24.88	-13	-11.88	Vertical
373.3	-43.83	1.34	16.40	-28.77	-13	-15.77	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-52.03	2.80	27.48	-27.35	-13	-14.35	Horizontal
1673.0	-48.84	2.80	27.48	-24.16	-13	-11.16	Vertical
2509.5	-50.15	2.91	27.70	-25.36	-13	-12.36	Vertical
2509.5	-52.89	2.91	27.70	-28.10	-13	-15.10	Horizontal
197.1	-37.70	1.44	17.04	-22.10	-13	-9.10	Vertical
381.1	-38.68	1.76	17.62	-22.82	-13	-9.82	Horizontal
Test Results for High Channel 844MHz							
1688.0	-47.32	2.82	27.43	-22.71	-13	-9.71	Horizontal
1688.0	-47.31	2.82	27.43	-22.70	-13	-9.70	Vertical
2532.0	-45.91	2.92	27.74	-21.09	-13	-8.09	Vertical
2532.0	-50.24	2.92	27.74	-25.42	-13	-12.42	Horizontal
207.1	-34.56	1.74	17.70	-18.60	-13	-5.60	Vertical
393.4	-40.77	1.41	17.46	-24.71	-13	-11.71	Horizontal

9.4 LTE BAND 7

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

Test Results for Low Channel 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-62.17	5.23	35.81	-31.59	-25	-6.59	Horizontal
5005.0	-62.33	5.23	35.81	-31.75	-25	-6.75	Vertical
7507.5	-60.03	5.67	36.85	-28.85	-25	-3.85	Vertical
7507.5	-60.53	5.67	36.85	-29.35	-25	-4.35	Horizontal
184.8	-44.73	1.73	17.97	-28.49	-25	-3.49	Vertical
463.8	-53.54	1.38	15.11	-39.81	-25	-14.81	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.28	5.23	35.82	-30.69	-25	-5.69	Horizontal
5070.0	-62.11	5.23	35.82	-31.52	-25	-6.52	Vertical
7605.0	-59.58	5.67	36.85	-28.40	-25	-3.40	Vertical
7605.0	-60.99	5.67	36.85	-29.81	-25	-4.81	Horizontal
186.4	-52.19	1.77	16.17	-37.78	-25	-12.78	Vertical
456.9	-48.06	1.63	15.21	-34.48	-25	-9.48	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-59.88	5.24	35.83	-29.29	-25	-4.29	Horizontal
5135.0	-64.43	5.24	35.83	-33.84	-25	-8.84	Vertical
7702.5	-63.99	5.68	36.87	-32.80	-25	-7.80	Vertical
7702.5	-64.88	5.68	36.87	-33.69	-25	-8.69	Horizontal
182.3	-49.44	1.58	17.56	-33.46	-25	-8.46	Vertical
304.1	-44.17	1.45	16.58	-29.04	-25	-4.04	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	-60.54	5.23	35.82	-29.95	-25	-4.95	Horizontal
5020.0	-64.47	5.23	35.82	-33.88	-25	-8.88	Vertical
7530.0	-60.31	5.67	36.86	-29.12	-25	-4.12	Vertical
7530.0	-59.45	5.67	36.86	-28.26	-25	-3.26	Horizontal
207.9	-48.80	1.63	15.76	-34.67	-25	-9.67	Vertical
424.7	-54.37	1.71	15.44	-40.64	-25	-15.64	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-64.38	5.23	35.82	-33.79	-25	-8.79	Horizontal
5070.0	-59.85	5.23	35.82	-29.26	-25	-4.26	Vertical
7605.0	-61.65	5.67	36.85	-30.47	-25	-5.47	Vertical
7605.0	-59.84	5.67	36.85	-28.66	-25	-3.66	Horizontal
206.9	-45.05	1.79	16.84	-29.99	-25	-4.99	Vertical
314.8	-46.53	1.71	17.64	-30.60	-25	-5.60	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-62.95	5.24	35.83	-32.36	-25	-7.36	Horizontal
5120.0	-59.31	5.24	35.83	-28.72	-25	-3.72	Vertical
7680.0	-60.34	5.70	36.88	-29.16	-25	-4.16	Vertical
7680.0	-64.38	5.70	36.88	-33.20	-25	-8.20	Horizontal
211.9	-45.86	1.79	16.84	-30.80	-25	-5.80	Vertical
306.9	-46.18	1.71	17.64	-30.25	-25	-5.25	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	-46.92	2.60	27.20	-22.32	-13	-9.32	Horizontal
1399.4	-52.09	2.60	27.20	-27.49	-13	-14.49	Vertical
2099.1	-52.79	2.85	27.54	-28.10	-13	-15.10	Vertical
2099.1	-53.95	2.85	27.54	-29.26	-13	-16.26	Horizontal
190.6	-40.75	1.49	17.78	-24.46	-13	-11.46	Vertical
392.6	-44.70	1.36	17.33	-28.73	-13	-15.73	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-50.40	2.61	27.28	-25.73	-13	-12.73	Horizontal
1415.0	-51.64	2.61	27.28	-26.97	-13	-13.97	Vertical
2122.5	-44.36	2.87	27.59	-19.64	-13	-6.64	Vertical
2122.5	-52.76	2.87	27.59	-28.04	-13	-15.04	Horizontal
182.2	-39.33	1.73	15.74	-25.32	-13	-12.32	Vertical
295.3	-40.21	1.62	15.79	-26.04	-13	-13.04	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-45.27	2.63	27.28	-20.62	-13	-7.62	Horizontal
1430.6	-45.96	2.63	27.28	-21.31	-13	-8.31	Vertical
2145.9	-54.00	2.88	27.60	-29.28	-13	-16.28	Vertical
2145.9	-52.80	2.88	27.60	-28.08	-13	-15.08	Horizontal
175.8	-42.00	1.61	18.00	-25.61	-13	-12.61	Vertical
267.5	-40.09	1.45	15.49	-26.06	-13	-13.06	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	-46.68	2.61	27.26	-22.03	-13	-9.03	Horizontal
1408.0	-45.24	2.61	27.26	-20.59	-13	-7.59	Vertical
2112.0	-49.11	2.87	27.58	-24.40	-13	-11.40	Vertical
2112.0	-51.35	2.87	27.58	-26.64	-13	-13.64	Horizontal
188.3	-34.45	1.31	16.97	-18.79	-13	-5.79	Vertical
285.8	-37.75	1.65	16.70	-22.70	-13	-9.70	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-49.76	2.61	27.28	-25.09	-13	-12.09	Horizontal
1415.0	-50.07	2.61	27.28	-25.40	-13	-12.40	Vertical
2122.5	-47.76	2.87	27.59	-23.04	-13	-10.04	Vertical
2122.5	-49.89	2.87	27.59	-25.17	-13	-12.17	Horizontal
206.4	-37.82	1.72	17.99	-21.55	-13	-8.55	Vertical
326.3	-34.74	1.73	17.94	-18.53	-13	-5.53	Horizontal
Test Results for High Channel 711MHz							
1422.0	-44.79	2.62	27.28	-20.13	-13	-7.13	Horizontal
1422.0	-48.40	2.62	27.28	-23.74	-13	-10.74	Vertical
2133.0	-47.76	2.87	27.60	-23.03	-13	-10.03	Vertical
2133.0	-53.28	2.87	27.60	-28.55	-13	-15.55	Horizontal
207.9	-41.26	1.58	15.93	-26.91	-13	-13.91	Vertical
301.2	-36.67	1.36	15.59	-22.44	-13	-9.44	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	-49.94	2.61	27.28	-25.27	-13	-12.27	Horizontal
1413.0	-45.70	2.61	27.28	-21.03	-13	-8.03	Vertical
2119.5	-45.04	2.87	27.59	-20.32	-13	-7.32	Vertical
2119.5	-53.56	2.87	27.59	-28.84	-13	-15.84	Horizontal
200.4	-35.80	1.71	16.15	-21.36	-13	-8.36	Vertical
337.7	-34.58	1.41	17.32	-18.67	-13	-5.67	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-48.30	2.62	27.30	-23.62	-13	-10.62	Horizontal
1420.0	-46.37	2.62	27.30	-21.69	-13	-8.69	Vertical
2130.0	-52.42	2.87	27.62	-27.67	-13	-14.67	Vertical
2130.0	-52.40	2.87	27.62	-27.65	-13	-14.65	Horizontal
194.5	-39.87	1.42	15.25	-26.05	-13	-13.05	Vertical
428.9	-39.17	1.36	17.19	-23.34	-13	-10.34	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-46.42	2.66	27.28	-21.80	-13	-8.80	Horizontal
1427.0	-44.17	2.66	27.28	-19.55	-13	-6.55	Vertical
2140.5	-45.72	2.88	27.60	-21.00	-13	-8.00	Vertical
2140.5	-49.35	2.88	27.60	-24.63	-13	-11.63	Horizontal
206.2	-43.32	1.32	17.29	-27.35	-13	-14.35	Vertical
359.4	-34.72	1.72	16.89	-19.55	-13	-6.55	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	-48.13	2.62	27.30	-23.45	-13	-10.45	Horizontal
1418.0	-47.17	2.62	27.30	-22.49	-13	-9.49	Vertical
2127.0	-45.43	2.87	27.62	-20.68	-13	-7.68	Vertical
2127.0	-52.86	2.87	27.62	-28.11	-13	-15.11	Horizontal
176.2	-42.77	1.35	16.91	-27.21	-13	-14.21	Vertical
233.5	-37.88	1.62	16.31	-23.19	-13	-10.19	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-51.40	2.62	27.30	-26.72	-13	-13.72	Horizontal
1420.0	-44.48	2.62	27.30	-19.80	-13	-6.80	Vertical
2130.0	-53.90	2.87	27.62	-29.15	-13	-16.15	Vertical
2130.0	-52.02	2.87	27.62	-27.27	-13	-14.27	Horizontal
196.9	-45.00	1.51	17.14	-29.37	-13	-16.37	Vertical
348.9	-38.36	1.77	16.88	-23.25	-13	-10.25	Horizontal
Test Results for High Channel 711MHz							
1422.0	-51.47	2.62	27.30	-26.79	-13	-13.79	Horizontal
1422.0	-45.72	2.62	27.30	-21.04	-13	-8.04	Vertical
2133.0	-45.56	2.87	27.62	-20.81	-13	-7.81	Vertical
2133.0	-53.12	2.87	27.62	-28.37	-13	-15.37	Horizontal
210.7	-38.89	1.78	15.95	-24.72	-13	-11.72	Vertical
458.7	-41.71	1.34	17.95	-25.11	-13	-12.11	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	12.4	0.006603	2.5
3.87	1880	13.6	0.007225	2.5
4.2	1880	13.0	0.006931	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	12.7	0.006772	2.5
Extreme (50C)	1880	11.8	0.006277	2.5
Extreme (40C)	1880	13.4	0.007116	2.5
Extreme (30C)	1880	13.5	0.007203	2.5
Extreme (10C)	1880	14.0	0.007426	2.5
Extreme (0C)	1880	11.7	0.006245	2.5
Extreme (-10C)	1880	12.9	0.006858	2.5
Extreme (-20C)	1880	14.3	0.007616	2.5
Extreme (-30C)	1880	15.0	0.007991	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	9.5	0.005040	2.5
3.87	1880	8.5	0.004515	2.5
4.2	1880	8.1	0.004300	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	9.8	0.005192	2.5
Extreme (50C)	1880	9.1	0.004838	2.5
Extreme (40C)	1880	8.4	0.004490	2.5
Extreme (30C)	1880	8.5	0.004545	2.5
Extreme (10C)	1880	8.4	0.004484	2.5
Extreme (0C)	1880	7.7	0.004079	2.5
Extreme (-10C)	1880	9.3	0.004971	2.5
Extreme (-20C)	1880	8.5	0.004497	2.5
Extreme (-30C)	1880	8.4	0.004492	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	8.7	0.005018	2.5
3.87	1732.5	9.4	0.005415	2.5
4.2	1732.5	8.9	0.005128	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	8.5	0.004899	2.5
Extreme (50C)	1732.5	9.0	0.005185	2.5
Extreme (40C)	1732.5	7.5	0.004348	2.5
Extreme (30C)	1732.5	5.7	0.003270	2.5
Extreme (10C)	1732.5	7.4	0.004274	2.5
Extreme (0C)	1732.5	9.5	0.005492	2.5
Extreme (-10C)	1732.5	8.2	0.004723	2.5
Extreme (-20C)	1732.5	7.1	0.004099	2.5
Extreme (-30C)	1732.5	8.2	0.004717	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	9.6	0.005525	2.5
3.87	1732.5	9.4	0.005409	2.5
4.2	1732.5	8.5	0.004930	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	9.2	0.005326	2.5
Extreme (50C)	1732.5	8.4	0.004870	2.5
Extreme (40C)	1732.5	8.4	0.004867	2.5
Extreme (30C)	1732.5	8.6	0.004988	2.5
Extreme (10C)	1732.5	8.4	0.004875	2.5
Extreme (0C)	1732.5	7.9	0.004540	2.5
Extreme (-10C)	1732.5	8.9	0.005130	2.5
Extreme (-20C)	1732.5	8.5	0.004885	2.5
Extreme (-30C)	1732.5	8.2	0.004753	2.5

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

10.3 LTE BAND 5

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	836.5	6.0	0.007212	2.5
3.87	836.5	6.3	0.007493	2.5
4.2	836.5	4.8	0.005770	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	5.8	0.006984	2.5
Extreme (50C)	836.5	5.9	0.007038	2.5
Extreme (40C)	836.5	5.7	0.006793	2.5
Extreme (30C)	836.5	6.4	0.007634	2.5
Extreme (10C)	836.5	5.4	0.006488	2.5
Extreme (0C)	836.5	5.4	0.006478	2.5
Extreme (-10C)	836.5	5.7	0.006853	2.5
Extreme (-20C)	836.5	6.0	0.007145	2.5
Extreme (-30C)	836.5	6.1	0.007330	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	836.5	5.5	0.006601	2.5
3.87	836.5	6.8	0.008156	2.5
4.2	836.5	4.4	0.005238	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	6.4	0.007638	2.5
Extreme (50C)	836.5	5.8	0.006925	2.5
Extreme (40C)	836.5	5.7	0.006859	2.5
Extreme (30C)	836.5	6.0	0.007167	2.5
Extreme (10C)	836.5	5.7	0.006792	2.5
Extreme (0C)	836.5	5.0	0.006024	2.5
Extreme (-10C)	836.5	6.0	0.007155	2.5
Extreme (-20C)	836.5	6.5	0.007824	2.5
Extreme (-30C)	836.5	6.5	0.007806	2.5

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

10.4 LTE BAND 7

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2535	10.3	0.004074	2.5
3.87	2535	8.6	0.003383	2.5
4.2	2535	7.9	0.003136	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	9.1	0.003599	2.5
Extreme (50C)	2535	8.9	0.003500	2.5
Extreme (40C)	2535	8.1	0.003176	2.5
Extreme (30C)	2535	9.1	0.003582	2.5
Extreme (10C)	2535	8.2	0.003250	2.5
Extreme (0C)	2535	8.7	0.003418	2.5
Extreme (-10C)	2535	9.2	0.003615	2.5
Extreme (-20C)	2535	8.9	0.003525	2.5
Extreme (-30C)	2535	8.3	0.003262	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2535	6.9	0.002722	2.5
3.87	2535	6.1	0.002398	2.5
4.2	2535	5.7	0.002268	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	6.9	0.002722	2.5
Extreme (50C)	2535	5.9	0.002332	2.5
Extreme (40C)	2535	5.6	0.002189	2.5
Extreme (30C)	2535	6.5	0.002546	2.5
Extreme (10C)	2535	5.4	0.002142	2.5
Extreme (0C)	2535	4.7	0.001861	2.5
Extreme (-10C)	2535	5.6	0.002217	2.5
Extreme (-20C)	2535	6.2	0.002464	2.5
Extreme (-30C)	2535	5.6	0.002206	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	8.8	0.012368	2.5
3.87	707.5	10.2	0.014432	2.5
4.2	707.5	9.0	0.012769	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	8.7	0.012237	2.5
Extreme (50C)	707.5	7.2	0.010177	2.5
Extreme (40C)	707.5	7.3	0.010268	2.5
Extreme (30C)	707.5	8.4	0.011823	2.5
Extreme (10C)	707.5	7.7	0.010909	2.5
Extreme (0C)	707.5	9.4	0.013310	2.5
Extreme (-10C)	707.5	8.2	0.011543	2.5
Extreme (-20C)	707.5	9.1	0.012925	2.5
Extreme (-30C)	707.5	7.8	0.010984	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	0.009992	2.5
3.87	707.5	8.5	0.011950	2.5
4.2	707.5	7.0	0.009851	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	9.7	0.013649	2.5
3.87	710.0	8.6	0.012171	2.5
4.2	710.0	7.7	0.010873	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	9.3	0.013147	2.5
Extreme (50C)	710.0	8.9	0.012585	2.5
Extreme (40C)	710.0	8.3	0.011659	2.5
Extreme (30C)	710.0	9.4	0.013263	2.5
Extreme (10C)	710.0	8.5	0.011956	2.5
Extreme (0C)	710.0	8.2	0.011519	2.5
Extreme (-10C)	710.0	8.9	0.012562	2.5
Extreme (-20C)	710.0	9.4	0.013177	2.5
Extreme (-30C)	710.0	8.6	0.012049	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	10.0	0.014028	2.5
3.87	710.0	8.6	0.012101	2.5
4.2	710.0	8.7	0.012323	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	0.012996	2.5
Extreme (50C)	710.0	9.0	0.012725	2.5
Extreme (40C)	710.0	8.7	0.012220	2.5
Extreme (30C)	710.0	9.2	0.012928	2.5
Extreme (10C)	710.0	8.4	0.011869	2.5
Extreme (0C)	710.0	8.6	0.012056	2.5
Extreme (-10C)	710.0	9.7	0.013648	2.5
Extreme (-20C)	710.0	9.2	0.013020	2.5
Extreme (-30C)	710.0	8.4	0.011801	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.

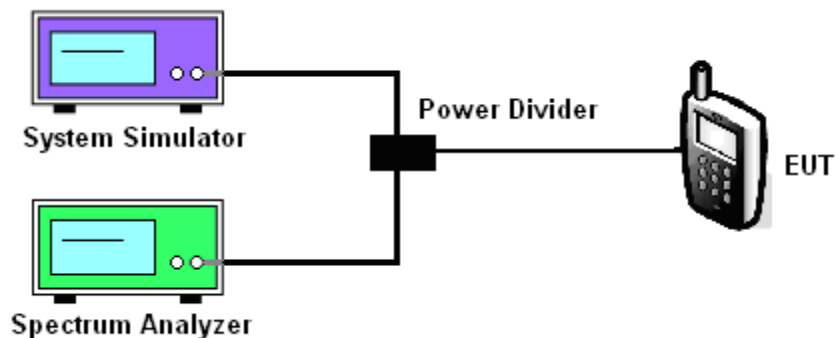
11.2 Measuring Instruments

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----