

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

FCC ID: 2ANMU-WP28

Product: Smart Phone
Trade Mark: OUKITEL
Model Number: WP28
Family Model: WP28 S, WP28 Pro, WP28 Ultra
Report No.: S23090104402006
Issue Date: Sep 28, 2023

Prepared for

SHENZHEN YUNJI INTELLIGENT TECHNOLOGY CO.,LTD
A2 2F BUILDING ENET NEW INDUSTRIAL PARK,DAFU INDUSTRIAL
ZONE,GUANLAN, LONGHUA SHENZHEN, 518XXX China

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.
1&5/F, Building C, 1&2/F, Building E, Fenda Science Park,
Sanwei Community, Hangcheng Street, Baoan District, Shenzhen ,
Guangdong, China
Tel. 400-800-6106, 0755-2320 0050, 0755-2320 0090
Website:<http://www.ntek.org.cn>

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
Trade Mark	OUKITEL
Model and/or type reference	WP28
Family Model	WP28 S, WP28 Pro, WP28 Ultra
Test Sample number	S230901044003
Standards	FCC CFR 47 Part 22H, Part 24E, Part 27
Test procedure	ANSI C63.26:2015 ANSI/TIA-603-E-2016

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

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

Date of Test	
Date (s) of performance of tests	Sep 01, 2023 ~ Sep 28, 2023
Date of Issue	Sep 28, 2023
Test Result	Pass

Testing Engineer : *Mukzi Lee*
 (Mukzi Lee)

Authorized Signatory : *Alex*
 (Alex Li)

TABLE OF CONTENTS

1.1 PRODUCT DESCRIPTION	6
1.2 RELATED SUBMITTAL(S) / GRANT (S)	7
1.3 TEST METHODOLOGY	7
1.4 TEST FACILITY	7
MEASUREMENT UNCERTAINTY	7
1.5 SPECIAL ACCESSORIES	7
1.6 WORST-CASE CONFIGURATION AND MODE	8
1.6 SUMMARY OF TEST RESULTS	8
2. SYSTEM TEST CONFIGURATION	10
2.1 EUT CONFIGURATION	10
2.2 EUT EXERCISE	10
2.3 CONFIGURATION OF EUT SYSTEM	10
2.4 TEST SETUP	11
3. TEST AND MEASUREMENT EQUIPMENT	12
4. OUTPUT POWER	14
4.1 OUTPUT POWER MEASUREMENT	14
6. BANDEDGE AND EMISSION MASK	17
7. OUT OF BAND EMISSIONS	18
7.1 MEASUREMENT METHOD	19
8. RADIATED MEASUREMENT	20
8.1. RADIATED POWER (ERP & EIRP)	20
8.2 LTE BAND 2	21
8.3 LTE BAND 4	24
8.4 LTE BAND 5	27
8.5 LTE BAND 7	29
8.6 LTE BAND 12	31

8.7 LTE BAND 17 33

9. SPURIOUS RADIATION EMISSION35

9.1 LTE BAND 2..... 37

9.2 LTE BAND 4..... 39

9.3 LTE BAND 5..... 41

9.4 LTE BAND 7..... 43

9.5 LTE BAND 12 45

9.6 LTE BAND 17 47

10. FREQUENCY STABILITY49

10.1 LTE BAND 2 50

10.2 LTE BAND 4 52

10.3 LTE BAND 5 54

10.4 LTE BAND 7 56

10.5 LTE BAND 12 58

10.6 LTE BAND 17 60

11. PEAK-TO-AVERAGE RATIO.....62

11.1 Description of the PAR Measurement..... 62

11.2 Measuring Instruments 62

11.3 Test Procedures..... 62

11.4 Test Setup..... 62

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	WP28
Family Model	WP28 S, WP28 Pro, WP28 Ultra
Model Difference	All the model are the same circuit and RF module, except the colors.
FCC ID:	2ANMU-WP28
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
Power Class	Class 3
Antenna:	PIFA Antenna
Antenna gain:	Band 2: 0.15dBi, Band 4: 0.22dBi, Band 5: -0.23dBi, Band 7: 0.35 dBi, Band 12: -2.52 dBi, Band 17: -2.50 dBi
Adapter	Model: HJ-PD20W-US Input: 100-240V~50/60Hz 0.8A Output: 5.0V $\overline{\text{---}}$ 3.0A 15.0W OR 9.0V $\overline{\text{---}}$ 2.22A 19.98W OR 12.0V $\overline{\text{---}}$ 1.67A 20.0W MAX
Battery	DC 3.87V, 10600mAh, 41.022Wh
Power supply	DC 3.87V from battery or DC 5V from Adapter.
Extreme Vol. Limits:	DC 3.29V to DC 4.45V (Nominal DC 3.87V) (Note 1)
HW Version	J557_9230TMB_D4XU_V1.2
SW Version	OUKITEL_WP28_EEA_V03
** Note1: The High Voltage 4.45V and Low Voltage 3.29V 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-WP28** 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&5/F, Building C, 1&2/F, Building E, Fenda Science Park,

Sanwei Community, Hangcheng Street, Baoan District, Shenzhen ,Guangdong, 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% ($U = 2Uc(y)$)	2.5dB
2	Conducted Emission Test	± 1.38 dB
3	RF power, conducted	± 0.16 dB
4	Spurious emissions, conducted	± 0.21 dB
5	All emissions, radiated(<1G)	± 4.68 dB
6	All emissions, radiated(>1G)	± 4.89 dB
7	Temperature	± 0.5 °C
8	Humidity	± 2 %
9	Frequency error, conducted	± 0.19 ppm

1.5 SPECIAL ACCESSORIES

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

1.6 WORST-CASE CONFIGURATION AND MODE

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

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

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

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

1.6 SUMMARY OF TEST RESULTS

FCC Part22, Subpart H/ FCC Part24, Subpart E, FCC Part27, Subpart L, KDB 971168 D01 Power Meas License Digital Systems v03			
FCC Rule	Test Item	Verdict	Remark
2.1046	Conducted Output Power	PASS	
22.913(d) 24.232(d) 27.50(d)(5) KDB 971168 D01 Clause 5.7	Peak-to-Average Ratio	PASS	
2.1049 22.917(b) 24.238(b) KDB 971168 D01 Clause 4.2	Occupied Bandwidth	PASS	
2.1051 22.917(a) 24.238(a) 27.53(m), (g), (h) KDB 971168 D01 Clause 6	Band Edge	PASS	
22.913(a)(2) 27.50(c)(10) KDB 971168 D01 Clause 5.6	Effective Radiated Power	PASS	
24.232(c) 27.50(h)(2), (d)(4) KDB 971168 D01 Clause 5.6	Equivalent Isotropic Radiated Power	PASS	

2.1053 22.917(a) 24.238(a) 27.53(g)(h)(m) KDB 971168 D01 Clause 7	Field Strength of Spurious Radiation	PASS	
2.1055 22.355 24.235 27.54 KDB 971168 D01 Clause 9	Frequency Stability for Temperature & Voltage	PASS	
2.1051 22.917(a) 24.238(a) 27.53(g)(h)(m) KDB 971168 D01 Clause 6	Conducted Emission	PASS	

Remark:

1. "N/A" denotes test is not applicable in this Test Report.
2. All test items were verified and recorded according to the standards and without any deviation during the test.
3. No modifications are made to the EUT during all test items.

2. SYSTEM TEST CONFIGURATION

2.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

2.3 CONFIGURATION OF EUT SYSTEM

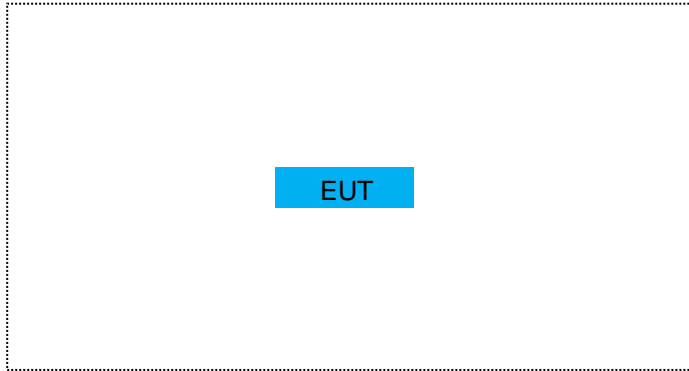
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Smart Phone	WP28	FCC ID: 2ANMU-WP28	EUT

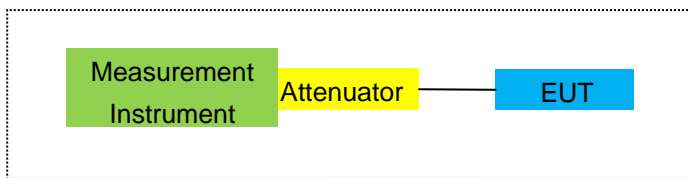
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

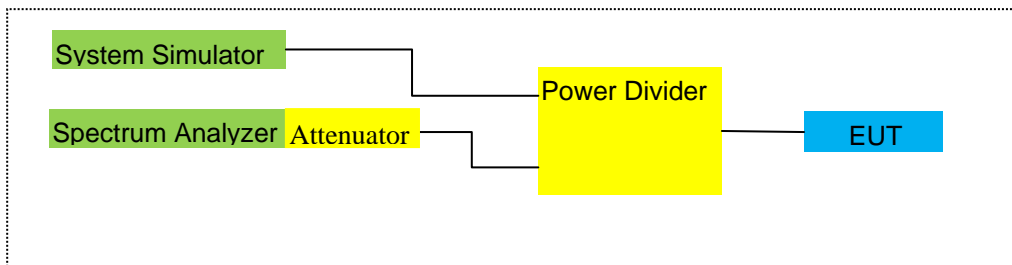
For Radiated Test Cases



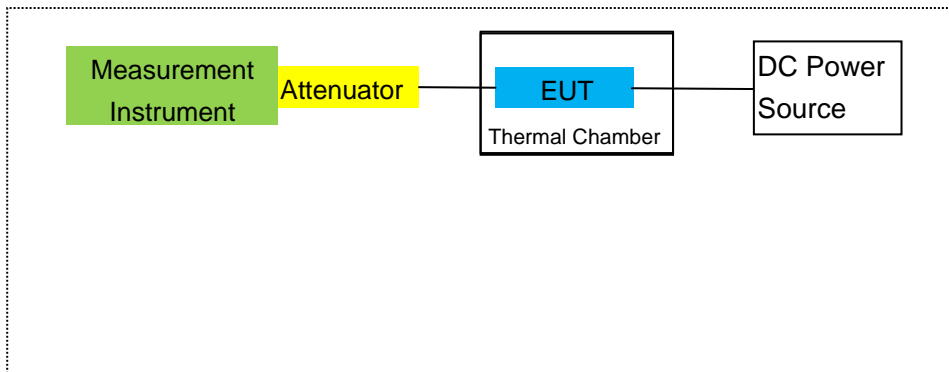
For Conducted Output Power



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	2023.03.16	2024.03.15	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2023.05.06	2026.05.05	3 year
5	Horn Antenna	EM	EM-AH-10180	2011071402	2022.03.31	2025.03.30	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2022.11.07	2023.11.06	1 year
7	Amplifier	EM	EM-30180	060538	2023.05.29	2024.05.28	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2022.11.04	2023.11.05	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	2023.05.29	2024.05.28	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

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

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 CMW500Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

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

Set display line

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

MODES TESTED

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

RESULTS

Test data reference attachment.

7. OUT OF BAND EMISSIONS

RULE PART(S)

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

LIMITS

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

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

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

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

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

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

TEST PROCEDURE

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

For each out of band emissions measurement:

Set display line

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

MODES TESTED

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

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

8. RADIATED MEASUREMENT

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

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

LIMITS:

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

TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17

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

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

MODES TESTED

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

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)	Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP		
							Average (mW)		
1.4MHz Band QPSK	1/#Mid	1850.7	-2.38	3.76	28.24	22.10	162.181	Horizontal	Pass
		1880	-2.10	3.91	28.22	22.21	166.341	Horizontal	Pass
		1909.3	-2.14	3.93	28.20	22.13	163.305	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-2.34	3.77	28.23	22.12	162.930	Horizontal	Pass
		1880	-2.22	3.91	28.24	22.11	162.555	Horizontal	Pass
		1908.5	-2.16	3.94	28.25	22.15	164.059	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-2.38	3.77	28.31	22.16	164.437	Horizontal	Pass
		1880	-2.16	3.91	28.22	22.15	164.059	Horizontal	Pass
		1907.5	-2.12	3.94	28.20	22.14	163.682	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1855	-2.40	3.79	28.33	22.14	163.682	Horizontal	Pass
		1880	-2.12	3.95	28.22	22.15	164.059	Horizontal	Pass
		1905	-2.06	3.97	28.19	22.16	164.437	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1857.5	-2.36	3.79	28.34	22.19	165.577	Horizontal	Pass
		1880	-2.15	3.95	28.22	22.12	162.930	Horizontal	Pass
		1902.5	-2.08	3.97	28.18	22.13	163.305	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1860	-2.40	3.81	28.35	22.14	163.682	Horizontal	Pass
		1880	-2.08	3.96	28.22	22.18	165.196	Horizontal	Pass
		1900	-2.00	4.00	28.16	22.16	164.437	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-2.27	3.76	28.24	22.21	166.341	Vertical	Pass
		1880	-2.14	3.91	28.22	22.17	164.816	Vertical	Pass
		1909.3	-2.12	3.93	28.20	22.15	164.059	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1851.5	-2.33	3.77	28.23	22.13	163.305	Vertical	Pass
		1880	-2.22	3.91	28.24	22.11	162.555	Vertical	Pass
		1908.5	-2.10	3.94	28.25	22.21	166.341	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1852.5	-2.32	3.77	28.31	22.22	166.725	Vertical	Pass
		1880	-2.17	3.91	28.22	22.14	163.682	Vertical	Pass
		1907.5	-2.11	3.94	28.20	22.15	164.059	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1855	-2.44	3.79	28.33	22.10	162.181	Vertical	Pass
		1880	-2.04	3.95	28.22	22.23	167.109	Vertical	Pass
		1905	-2.07	3.97	28.19	22.15	164.059	Vertical	Pass

15.0MHz		1857.5	-2.40	3.79	28.34	22.15	164.059	Vertical	Pass
Band	1/#Mid	1880	-2.04	3.95	28.22	22.23	167.109	Vertical	Pass
QPSK		1902.5	-2.09	3.97	28.18	22.12	162.930	Vertical	Pass
20.0MHz		1860	-2.25	3.81	28.35	22.29	169.434	Vertical	Pass
Band	1/#Mid	1880	-1.97	3.96	28.22	22.29	169.434	Vertical	Pass
QPSK		1900	-1.88	4.00	28.16	22.28	169.044	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 2										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP			
							Average			
							(mW)			
1.4MHz		1850.7	-3.15	3.76	28.24	21.33	135.831	Horizontal	Pass	
Band 16	1/#Mid	1880	-2.94	3.91	28.22	21.37	137.088	Horizontal	Pass	
QAM		1909.3	-2.86	3.93	28.20	21.41	138.357	Horizontal	Pass	
3.0MHz		1851.5	-3.05	3.77	28.23	21.41	138.357	Horizontal	Pass	
Band 16	1/#Mid	1880	-3.00	3.91	28.24	21.33	135.831	Horizontal	Pass	
QAM		1908.5	-2.99	3.94	28.25	21.32	135.519	Horizontal	Pass	
5.0MHz		1852.5	-3.17	3.77	28.31	21.37	137.088	Horizontal	Pass	
Band 16	1/#Mid	1880	-2.98	3.91	28.22	21.33	135.831	Horizontal	Pass	
QAM		1907.5	-2.98	3.94	28.20	21.28	134.276	Horizontal	Pass	
10.0MHz		1855	-3.12	3.79	28.33	21.42	138.676	Horizontal	Pass	
Band 16	1/#Mid	1880	-2.89	3.95	28.22	21.38	137.404	Horizontal	Pass	
QAM		1905	-2.87	3.97	28.19	21.35	136.458	Horizontal	Pass	
15.0MHz		1857.5	-3.17	3.79	28.34	21.38	137.404	Horizontal	Pass	
Band 16	1/#Mid	1880	-2.84	3.95	28.22	21.43	138.995	Horizontal	Pass	
QAM		1902.5	-2.87	3.97	28.18	21.34	136.144	Horizontal	Pass	
20.0MHz		1860	-3.24	3.81	28.35	21.30	134.896	Horizontal	Pass	
Band 16	1/#Mid	1880	-2.89	3.96	28.22	21.37	137.088	Horizontal	Pass	
QAM		1900	-2.79	4.00	28.16	21.37	137.088	Horizontal	Pass	
1.4MHz		1850.7	-3.11	3.76	28.24	21.37	137.088	Vertical	Pass	
Band 16	1/#Mid	1880	-2.95	3.91	28.22	21.36	136.773	Vertical	Pass	

QAM		1909.3	-2.84	3.93	28.20	21.43	138.995	Vertical	Pass
3.0MHz	1/#Mid	1851.5	-3.08	3.77	28.23	21.38	137.404	Vertical	Pass
Band 16		1880	-3.02	3.91	28.24	21.31	135.207	Vertical	Pass
QAM		1908.5	-2.92	3.94	28.25	21.39	137.721	Vertical	Pass
5.0MHz	1/#Mid	1852.5	-3.10	3.77	28.31	21.44	139.316	Vertical	Pass
Band 16		1880	-2.93	3.91	28.22	21.38	137.404	Vertical	Pass
QAM		1907.5	-2.97	3.94	28.20	21.29	134.586	Vertical	Pass
10.0MHz	1/#Mid	1855	-3.10	3.79	28.33	21.44	139.316	Vertical	Pass
Band 16		1880	-2.83	3.95	28.22	21.44	139.316	Vertical	Pass
QAM		1905	-2.87	3.97	28.19	21.35	136.458	Vertical	Pass
15.0MHz	1/#Mid	1857.5	-3.13	3.79	28.34	21.42	138.676	Vertical	Pass
Band 16		1880	-2.97	3.95	28.22	21.30	134.896	Vertical	Pass
QAM		1902.5	-2.87	3.97	28.18	21.34	136.144	Vertical	Pass
20.0MHz	1/#Mid	1860	-3.07	3.81	28.35	21.47	140.281	Vertical	Pass
Band 16		1880	-2.78	3.96	28.22	21.48	140.605	Vertical	Pass
QAM		1900	-2.68	4.00	28.16	21.48	140.605	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result					Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Factor (dB)	Max. EIRP	Max. EIRP		
			(dBm)	(dBm)		Average	Average		
					(dBm)	(mW)			
1.4MHz Band QPSK	1/#Mid	1710.7	-2.92	3.12	27.58	21.54	142.561	Horizontal	Pass
		1732.5	-2.74	3.27	27.61	21.60	144.544	Horizontal	Pass
		1754.3	-2.76	3.29	27.63	21.58	143.880	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-2.93	3.13	27.61	21.55	142.889	Horizontal	Pass
		1732.5	-2.87	3.27	27.61	21.47	140.281	Horizontal	Pass
		1753.5	-2.78	3.30	27.62	21.54	142.561	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	-2.81	3.30	27.60	21.49	140.929	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	1715	-2.88	3.15	27.64	21.61	144.877	Horizontal	Pass
		1732.5	-2.82	3.31	27.61	21.48	140.605	Horizontal	Pass
		1750	-2.64	3.33	27.59	21.62	145.211	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	1717.5	-3.04	3.15	27.65	21.46	139.959	Horizontal	Pass
		1732.5	-2.79	3.31	27.61	21.51	141.579	Horizontal	Pass
		1747.5	-2.75	3.33	27.57	21.49	140.929	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	1720	-2.96	3.17	27.66	21.53	142.233	Horizontal	Pass
		1732.5	-2.82	3.32	27.61	21.47	140.281	Horizontal	Pass
		1745	-2.63	3.36	27.56	21.57	143.549	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-2.88	3.12	27.58	21.58	143.880	Vertical	Pass
		1732.5	-2.72	3.27	27.61	21.62	145.211	Vertical	Pass
		1754.3	-2.74	3.29	27.63	21.60	144.544	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	1711.5	-3.02	3.13	27.61	21.46	139.959	Vertical	Pass
		1732.5	-2.77	3.27	27.61	21.57	143.549	Vertical	Pass
		1753.5	-2.82	3.30	27.62	21.50	141.254	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	1712.5	-2.89	3.13	27.63	21.61	144.877	Vertical	Pass
		1732.5	-2.82	3.27	27.61	21.52	141.906	Vertical	Pass
		1752.5	-2.82	3.30	27.60	21.48	140.605	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	1715	-2.98	3.15	27.64	21.51	141.579	Vertical	Pass
		1732.5	-2.82	3.31	27.61	21.48	140.605	Vertical	Pass
		1750	-2.68	3.33	27.59	21.58	143.880	Vertical	Pass

15.0MHz		1717.5	-2.95	3.15	27.65	21.55	142.889	Vertical	Pass
Band	1/#Mid	1732.5	-2.74	3.31	27.61	21.56	143.219	Vertical	Pass
QPSK		1747.5	-2.76	3.33	27.57	21.48	140.605	Vertical	Pass
20.0MHz		1720	-2.85	3.17	27.66	21.64	145.881	Vertical	Pass
Band	1/#Mid	1732.5	-2.66	3.32	27.61	21.63	145.546	Vertical	Pass
QPSK		1745	-2.53	3.36	27.56	21.67	146.893	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 4										
Mode	RB/RB SIZE	Frequency	Result						Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Factor	Max. EIRP	Max. EIRP			
			(dBm)	(dBm)	(dB)	Average	Average			
						(dBm)	(mW)			
1.4MHz		1710.7	-3.61	3.12	27.58	20.85	121.619	Horizontal	Pass	
Band 16	1/#Mid	1732.5	-3.46	3.27	27.61	20.88	122.462	Horizontal	Pass	
QAM		1754.3	-3.53	3.29	27.63	20.81	120.504	Horizontal	Pass	
3.0MHz		1711.5	-3.66	3.13	27.61	20.82	120.781	Horizontal	Pass	
Band 16	1/#Mid	1732.5	-3.43	3.27	27.61	20.91	123.310	Horizontal	Pass	
QAM		1753.5	-3.41	3.30	27.62	20.91	123.310	Horizontal	Pass	
5.0MHz		1712.5	-3.66	3.13	27.63	20.84	121.339	Horizontal	Pass	
Band 16	1/#Mid	1732.5	-3.59	3.27	27.61	20.75	118.850	Horizontal	Pass	
QAM		1752.5	-3.39	3.30	27.60	20.91	123.310	Horizontal	Pass	
10.0MHz		1715	-3.64	3.15	27.64	20.85	121.619	Horizontal	Pass	
Band 16	1/#Mid	1732.5	-3.45	3.31	27.61	20.85	121.619	Horizontal	Pass	
QAM		1750	-3.48	3.33	27.59	20.78	119.674	Horizontal	Pass	
15.0MHz		1717.5	-3.63	3.15	27.65	20.87	122.180	Horizontal	Pass	
Band 16	1/#Mid	1732.5	-3.44	3.31	27.61	20.86	121.899	Horizontal	Pass	
QAM		1747.5	-3.48	3.33	27.57	20.76	119.124	Horizontal	Pass	
20.0MHz		1720	-3.60	3.17	27.66	20.89	122.744	Horizontal	Pass	
Band 16	1/#Mid	1732.5	-3.52	3.32	27.61	20.77	119.399	Horizontal	Pass	
QAM		1745	-3.36	3.36	27.56	20.84	121.339	Horizontal	Pass	
1.4MHz		1710.7	-3.63	3.12	27.58	20.83	121.060	Vertical	Pass	
Band 16	1/#Mid	1732.5	-3.52	3.27	27.61	20.82	120.781	Vertical	Pass	

QAM		1754.3	-3.56	3.29	27.63	20.78	119.674	Vertical	Pass
3.0MHz	1/#Mid	1711.5	-3.59	3.13	27.61	20.89	122.744	Vertical	Pass
Band 16		1732.5	-3.50	3.27	27.61	20.84	121.339	Vertical	Pass
QAM		1753.5	-3.52	3.30	27.62	20.80	120.226	Vertical	Pass
5.0MHz	1/#Mid	1712.5	-3.75	3.13	27.63	20.75	118.850	Vertical	Pass
Band 16		1732.5	-3.56	3.27	27.61	20.78	119.674	Vertical	Pass
QAM		1752.5	-3.43	3.30	27.60	20.87	122.180	Vertical	Pass
10.0MHz	1/#Mid	1715	-3.62	3.15	27.64	20.87	122.180	Vertical	Pass
Band 16		1732.5	-3.53	3.31	27.61	20.77	119.399	Vertical	Pass
QAM		1750	-3.41	3.33	27.59	20.85	121.619	Vertical	Pass
15.0MHz	1/#Mid	1717.5	-3.71	3.15	27.65	20.79	119.950	Vertical	Pass
Band 16		1732.5	-3.46	3.31	27.61	20.84	121.339	Vertical	Pass
QAM		1747.5	-3.45	3.33	27.57	20.79	119.950	Vertical	Pass
20.0MHz	1/#Mid	1720	-3.56	3.17	27.66	20.93	123.880	Vertical	Pass
Band 16		1732.5	-3.34	3.32	27.61	20.95	124.451	Vertical	Pass
QAM		1745	-3.26	3.36	27.56	20.94	124.165	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.4 LTE BAND 5

Radiated Power (ERP) for Band 5											
Mode	RB/RB SIZE	Frequency	Result							Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss (dBm)	Factor (dB)	Correction (dB)	Max. EIRP	Max. EIRP			
			(dBm)				Average	Average			
							(dBm)	(mW)			
1.4MHz Band QPSK	1/#Mid	824.7	3.77	2.01	19.68	2.15	19.29	84.918	Horizontal	Pass	
		836.5	3.59	2.01	19.77	2.15	19.20	83.176	Horizontal	Pass	
		848.3	3.58	2.02	19.82	2.15	19.23	83.753	Horizontal	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	3.66	2.01	19.70	2.15	19.20	83.176	Horizontal	Pass	
		836.5	3.66	2.01	19.77	2.15	19.27	84.528	Horizontal	Pass	
		847.5	3.65	2.02	19.81	2.15	19.29	84.918	Horizontal	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	3.60	2.01	19.71	2.15	19.15	82.224	Horizontal	Pass	
		836.5	3.52	2.01	19.77	2.15	19.13	81.846	Horizontal	Pass	
		846.5	3.66	2.02	19.79	2.15	19.28	84.723	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	829	3.59	2.01	19.73	2.15	19.16	82.414	Horizontal	Pass	
		836.5	3.52	2.01	19.77	2.15	19.13	81.846	Horizontal	Pass	
		844	3.61	2.02	19.78	2.15	19.22	83.560	Horizontal	Pass	
1.4MHz Band QPSK	1/#Mid	824.7	3.77	2.01	19.68	2.15	19.29	84.918	Vertical	Pass	
		836.5	3.66	2.01	19.77	2.15	19.27	84.528	Vertical	Pass	
		848.3	3.58	2.02	19.82	2.15	19.23	83.753	Vertical	Pass	
3.0MHz Band QPSK	1/#Mid	825.5	3.62	2.01	19.70	2.15	19.16	82.414	Vertical	Pass	
		836.5	3.55	2.01	19.77	2.15	19.16	82.414	Vertical	Pass	
		847.5	3.65	2.02	19.81	2.15	19.29	84.918	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	826.5	3.65	2.01	19.71	2.15	19.20	83.176	Vertical	Pass	
		836.5	3.59	2.01	19.77	2.15	19.20	83.176	Vertical	Pass	
		846.5	3.58	2.02	19.79	2.15	19.20	83.176	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	829	3.77	2.01	19.73	2.15	19.34	85.901	Vertical	Pass	
		836.5	3.71	2.01	19.77	2.15	19.32	85.507	Vertical	Pass	
		844	3.72	2.02	19.78	2.15	19.33	85.704	Vertical	Pass	

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level	Cable Loss (dBm)	Factor (dB)	Correction (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)				Average	Average		
						(dBm)	(mW)			
1.4MHz Band 16 QAM	1/#Mid	824.7	3.45	2.01	19.68	2.15	18.97	78.886	Horizontal	Pass
		836.5	3.41	2.01	19.77	2.15	19.02	79.799	Horizontal	Pass
		848.3	3.40	2.02	19.82	2.15	19.05	80.353	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	3.42	2.01	19.70	2.15	18.96	78.705	Horizontal	Pass
		836.5	3.40	2.01	19.77	2.15	19.01	79.616	Horizontal	Pass
		847.5	3.45	2.02	19.81	2.15	19.09	81.096	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	3.49	2.01	19.71	2.15	19.04	80.168	Horizontal	Pass
		836.5	3.40	2.01	19.77	2.15	19.01	79.616	Horizontal	Pass
		846.5	3.42	2.02	19.79	2.15	19.04	80.168	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	829	3.42	2.01	19.73	2.15	18.99	79.250	Horizontal	Pass
		836.5	3.48	2.01	19.77	2.15	19.09	81.096	Horizontal	Pass
		844	3.44	2.02	19.78	2.15	19.05	80.353	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	824.7	3.49	2.01	19.68	2.15	19.01	79.616	Vertical	Pass
		836.5	3.47	2.01	19.77	2.15	19.08	80.910	Vertical	Pass
		848.3	3.36	2.02	19.82	2.15	19.01	79.616	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	825.5	3.42	2.01	19.70	2.15	18.96	78.705	Vertical	Pass
		836.5	3.47	2.01	19.77	2.15	19.08	80.910	Vertical	Pass
		847.5	3.44	2.02	19.81	2.15	19.08	80.910	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	826.5	3.38	2.01	19.71	2.15	18.93	78.163	Vertical	Pass
		836.5	3.33	2.01	19.77	2.15	18.94	78.343	Vertical	Pass
		846.5	3.41	2.02	19.79	2.15	19.03	79.983	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	829	3.59	2.01	19.73	2.15	19.16	82.414	Vertical	Pass
		836.5	3.52	2.01	19.77	2.15	19.13	81.846	Vertical	Pass
		844	3.51	2.02	19.78	2.15	19.12	81.658	Vertical	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result					Polarization Of Max. ERP	Conclusion
			SG Level	Cable Loss	Factor (dB)	Max. EIRP	Max. EIRP		
			(dBm)			Average	Average		
				(dBm)	(dBm)	(dBm)	(mW)		
5.0MHz Band QPSK	1/#Mid	2502.5	-0.69	4.54	27.75	22.52	178.649	Horizontal	Pass
		2535	-0.50	4.69	27.72	22.53	179.061	Horizontal	Pass
		2567.5	-0.37	4.71	27.71	22.63	183.231	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	2505	-0.56	4.55	27.76	22.65	184.077	Horizontal	Pass
		2535	-0.47	4.69	27.72	22.56	180.302	Horizontal	Pass
		2565	-0.44	4.72	27.70	22.54	179.473	Horizontal	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-0.71	4.55	27.77	22.51	178.238	Horizontal	Pass
		2535	-0.46	4.69	27.72	22.57	180.717	Horizontal	Pass
		2562.5	-0.39	4.72	27.69	22.58	181.134	Horizontal	Pass
20.0MHz Band QPSK	1/#Mid	2510	-0.64	4.57	27.78	22.57	180.717	Horizontal	Pass
		2535	-0.42	4.73	27.72	22.57	180.717	Horizontal	Pass
		2560	-0.35	4.75	27.68	22.58	181.134	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	2502.5	-0.61	4.54	27.75	22.60	181.970	Vertical	Pass
		2535	-0.42	4.69	27.72	22.61	182.390	Vertical	Pass
		2567.5	-0.40	4.71	27.71	22.60	181.970	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	2505	-0.70	4.55	27.76	22.51	178.238	Vertical	Pass
		2535	-0.44	4.69	27.72	22.59	181.552	Vertical	Pass
		2565	-0.46	4.72	27.70	22.52	178.649	Vertical	Pass
15.0MHz Band QPSK	1/#Mid	2507.5	-0.62	4.55	27.77	22.60	181.970	Vertical	Pass
		2535	-0.42	4.69	27.72	22.61	182.390	Vertical	Pass
		2562.5	-0.40	4.72	27.69	22.57	180.717	Vertical	Pass
20.0MHz Band QPSK	1/#Mid	2510	-0.53	4.57	27.78	22.68	185.353	Vertical	Pass
		2535	-0.31	4.73	27.72	22.68	185.353	Vertical	Pass
		2560	-0.24	4.75	27.68	22.69	185.780	Vertical	Pass

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
						Average (dBm)	Average (mW)		
5.0MHz Band 16 QAM	1/#Mid	2502.5	-1.81	4.54	27.75	21.40	138.038	Horizontal	Pass
		2535	-1.71	4.69	27.72	21.32	135.519	Horizontal	Pass
		2567.5	-1.62	4.71	27.71	21.38	137.404	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-1.89	4.55	27.76	21.32	135.519	Horizontal	Pass
		2535	-1.65	4.69	27.72	21.38	137.404	Horizontal	Pass
		2565	-1.53	4.72	27.70	21.45	139.637	Horizontal	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-1.85	4.55	27.77	21.37	137.088	Horizontal	Pass
		2535	-1.73	4.69	27.72	21.30	134.896	Horizontal	Pass
		2562.5	-1.69	4.72	27.69	21.28	134.276	Horizontal	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-1.86	4.57	27.78	21.35	136.458	Horizontal	Pass
		2535	-1.68	4.73	27.72	21.31	135.207	Horizontal	Pass
		2560	-1.50	4.75	27.68	21.43	138.995	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	2502.5	-1.77	4.54	27.75	21.44	139.316	Vertical	Pass
		2535	-1.63	4.69	27.72	21.40	138.038	Vertical	Pass
		2567.5	-1.60	4.71	27.71	21.40	138.038	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	2505	-1.90	4.55	27.76	21.31	135.207	Vertical	Pass
		2535	-1.69	4.69	27.72	21.34	136.144	Vertical	Pass
		2565	-1.61	4.72	27.70	21.37	137.088	Vertical	Pass
15.0MHz Band 16 QAM	1/#Mid	2507.5	-1.91	4.55	27.77	21.31	135.207	Vertical	Pass
		2535	-1.66	4.69	27.72	21.37	137.088	Vertical	Pass
		2562.5	-1.55	4.72	27.69	21.42	138.676	Vertical	Pass
20.0MHz Band 16 QAM	1/#Mid	2510	-1.75	4.57	27.78	21.46	139.959	Vertical	Pass
		2535	-1.50	4.73	27.72	21.49	140.929	Vertical	Pass
		2560	-1.45	4.75	27.68	21.48	140.605	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.6 LTE BAND 12

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	699.7	3.23	1.91	19.21	2.15	18.38	68.865	Vertical	Pass
		707.5	3.17	1.91	19.26	2.15	18.37	68.707	Vertical	Pass
		715.3	3.14	1.93	19.34	2.15	18.40	69.183	Vertical	Pass
3.0MHz Band QPSK	1/#Mid	700.5	3.25	1.91	19.21	2.15	18.40	69.183	Vertical	Pass
		707.5	3.19	1.91	19.26	2.15	18.39	69.024	Vertical	Pass
		714.5	3.07	1.93	19.34	2.15	18.33	68.077	Vertical	Pass
5.0MHz Band QPSK	1/#Mid	701.5	3.25	1.91	19.23	2.15	18.42	69.502	Vertical	Pass
		707.5	3.25	1.91	19.26	2.15	18.45	69.984	Vertical	Pass
		713.5	3.16	1.92	19.33	2.15	18.42	69.502	Vertical	Pass
10.0MHz Band QPSK	1/#Mid	704	3.24	1.91	19.25	2.15	18.43	69.663	Vertical	Pass
		707.5	3.19	1.91	19.26	2.15	18.39	69.024	Vertical	Pass
		711	3.13	1.92	19.32	2.15	18.38	68.865	Vertical	Pass
1.4MHz Band QPSK	1/#Mid	699.7	3.26	1.91	19.21	2.15	18.41	69.343	Horizontal	Pass
		707.5	3.17	1.91	19.26	2.15	18.37	68.707	Horizontal	Pass
		715.3	3.19	1.93	19.34	2.15	18.45	69.984	Horizontal	Pass
3.0MHz Band QPSK	1/#Mid	700.5	3.25	1.91	19.21	2.15	18.40	69.183	Horizontal	Pass
		707.5	3.26	1.91	19.26	2.15	18.46	70.146	Horizontal	Pass
		714.5	3.17	1.93	19.34	2.15	18.43	69.663	Horizontal	Pass
5.0MHz Band QPSK	1/#Mid	701.5	3.26	1.91	19.23	2.15	18.43	69.663	Horizontal	Pass
		707.5	3.11	1.91	19.26	2.15	18.31	67.764	Horizontal	Pass
		713.5	3.05	1.92	19.33	2.15	18.31	67.764	Horizontal	Pass
10.0MHz Band QPSK	1/#Mid	704	3.31	1.91	19.25	2.15	18.50	70.795	Horizontal	Pass
		707.5	3.31	1.91	19.26	2.15	18.51	70.958	Horizontal	Pass
		711	3.24	1.92	19.32	2.15	18.49	70.632	Horizontal	Pass

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Factor (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	699.7	2.24	1.91	19.21	2.15	17.39	54.828	Vertical	Pass
		707.5	2.18	1.91	19.26	2.15	17.38	54.702	Vertical	Pass
		715.3	2.12	1.93	19.34	2.15	17.38	54.702	Vertical	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	2.19	1.91	19.21	2.15	17.34	54.200	Vertical	Pass
		707.5	2.14	1.91	19.26	2.15	17.34	54.200	Vertical	Pass
		714.5	2.18	1.93	19.34	2.15	17.44	55.463	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	2.27	1.91	19.23	2.15	17.44	55.463	Vertical	Pass
		707.5	2.27	1.91	19.26	2.15	17.47	55.847	Vertical	Pass
		713.5	2.04	1.92	19.33	2.15	17.30	53.703	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	704	2.18	1.91	19.25	2.15	17.37	54.576	Vertical	Pass
		707.5	2.19	1.91	19.26	2.15	17.39	54.828	Vertical	Pass
		711	2.20	1.92	19.32	2.15	17.45	55.590	Vertical	Pass
1.4MHz Band 16 QAM	1/#Mid	699.7	2.30	1.91	19.21	2.15	17.45	55.590	Horizontal	Pass
		707.5	2.19	1.91	19.26	2.15	17.39	54.828	Horizontal	Pass
		715.3	2.09	1.93	19.34	2.15	17.35	54.325	Horizontal	Pass
3.0MHz Band 16 QAM	1/#Mid	700.5	2.18	1.91	19.21	2.15	17.33	54.075	Horizontal	Pass
		707.5	2.22	1.91	19.26	2.15	17.42	55.208	Horizontal	Pass
		714.5	2.15	1.93	19.34	2.15	17.41	55.081	Horizontal	Pass
5.0MHz Band 16 QAM	1/#Mid	701.5	2.19	1.91	19.23	2.15	17.36	54.450	Horizontal	Pass
		707.5	2.19	1.91	19.26	2.15	17.39	54.828	Horizontal	Pass
		713.5	2.17	1.92	19.33	2.15	17.43	55.335	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	704	2.33	1.91	19.25	2.15	17.52	56.494	Horizontal	Pass
		707.5	2.29	1.91	19.26	2.15	17.49	56.105	Horizontal	Pass
		711	2.28	1.92	19.32	2.15	17.53	56.624	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

8.7 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)	Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)			
5.0MHz Band QPSK	1/#Mid	706.5	3.28	1.91	19.23	2.15	18.45	69.984	Vertical	Pass	
		710	3.27	1.91	19.26	2.15	18.47	70.307	Vertical	Pass	
		713.5	3.19	1.92	19.33	2.15	18.45	69.984	Vertical	Pass	
10.0MHz Band QPSK	1/#Mid	709	3.17	1.91	19.25	2.15	18.36	68.549	Vertical	Pass	
		710	3.30	1.91	19.26	2.15	18.50	70.795	Vertical	Pass	
		711	3.23	1.92	19.32	2.15	18.48	70.469	Vertical	Pass	
5.0MHz Band QPSK	1/#Mid	706.5	3.26	1.91	19.23	2.15	18.43	69.663	Horizontal	Pass	
		710	3.19	1.91	19.26	2.15	18.39	69.024	Horizontal	Pass	
		713.5	3.23	1.92	19.33	2.15	18.49	70.632	Horizontal	Pass	
10.0MHz Band QPSK	1/#Mid	709	3.35	1.91	19.25	2.15	18.54	71.450	Horizontal	Pass	
		710	3.31	1.91	19.26	2.15	18.51	70.958	Horizontal	Pass	
		711	3.29	1.92	19.32	2.15	18.54	71.450	Horizontal	Pass	

Radiated Power (ERP) for Band 17										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	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	2.27	1.91	19.23	2.15	17.44	55.463	Vertical	Pass
		710	2.19	1.91	19.26	2.15	17.39	54.828	Vertical	Pass
		713.5	2.15	1.92	19.33	2.15	17.41	55.081	Vertical	Pass
10.0MHz Band 16 QAM	1/#Mid	709	2.27	1.91	19.25	2.15	17.46	55.719	Vertical	Pass
		710	2.26	1.91	19.26	2.15	17.46	55.719	Vertical	Pass
		711	2.09	1.92	19.32	2.15	17.34	54.200	Vertical	Pass
5.0MHz Band 16 QAM	1/#Mid	706.5	2.19	1.91	19.23	2.15	17.36	54.450	Horizontal	Pass
		710	2.25	1.91	19.26	2.15	17.45	55.590	Horizontal	Pass
		713.5	2.20	1.92	19.33	2.15	17.46	55.719	Horizontal	Pass
10.0MHz Band 16 QAM	1/#Mid	709	2.33	1.91	19.25	2.15	17.52	56.494	Horizontal	Pass
		710	2.31	1.91	19.26	2.15	17.51	56.364	Horizontal	Pass
		711	2.28	1.92	19.32	2.15	17.53	56.624	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

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

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

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

LIMIT

For Band 7, the minimum permissible attenuation level of any spurious emission is $55 + \log_{10}(P)$ [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 Band 2/4/5/7/12/17

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	-45.09	4.04	33.51	-15.62	-13	-2.62	Horizontal
3701.4	-46.72	4.04	33.51	-17.25	-13	-4.25	Vertical
5552.1	-44.37	5.24	35.84	-13.77	-13	-0.77	Vertical
5552.1	-51.96	5.24	35.84	-21.36	-13	-8.36	Horizontal
192.2	-38.89	1.43	16.02	-24.30	-13	-11.30	Vertical
397.3	-40.29	1.30	17.99	-23.60	-13	-10.60	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-50.41	4.04	33.56	-20.89	-13	-7.89	Horizontal
3760.0	-53.85	4.04	33.56	-24.33	-13	-11.33	Vertical
5640.0	-45.08	5.24	35.91	-14.41	-13	-1.41	Vertical
5640.0	-53.35	5.24	35.91	-22.68	-13	-9.68	Horizontal
207.2	-41.72	1.62	16.97	-26.37	-13	-13.37	Vertical
323.7	-43.64	1.74	15.98	-29.41	-13	-16.41	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-50.48	4.04	34.00	-20.52	-13	-7.52	Horizontal
3818.6	-46.84	4.04	34.00	-16.88	-13	-3.88	Vertical
5727.9	-47.07	5.24	36.04	-16.27	-13	-3.27	Vertical
5727.9	-50.38	5.24	36.04	-19.58	-13	-6.58	Horizontal
207.3	-37.23	1.42	17.29	-21.36	-13	-8.36	Vertical
397.3	-38.51	1.50	17.90	-22.10	-13	-9.10	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	-44.85	4.07	33.54	-15.38	-13	-2.38	Horizontal
3720.0	-47.70	4.07	33.54	-18.23	-13	-5.23	Vertical
5580.0	-51.97	5.28	35.86	-21.39	-13	-8.39	Vertical
5580.0	-51.85	5.28	35.86	-21.27	-13	-8.27	Horizontal
211.1	-36.50	1.58	16.89	-21.18	-13	-8.18	Vertical
399.7	-41.28	1.76	17.26	-25.78	-13	-12.78	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-47.95	4.04	33.56	-18.43	-13	-5.43	Horizontal
3760.0	-47.37	4.04	33.56	-17.85	-13	-4.85	Vertical
5640.0	-51.50	5.24	35.91	-20.83	-13	-7.83	Vertical
5640.0	-51.06	5.24	35.91	-20.39	-13	-7.39	Horizontal
208.3	-39.27	1.46	16.27	-24.46	-13	-11.46	Vertical
467.5	-37.22	1.59	15.15	-23.66	-13	-10.66	Horizontal
Test Results for High Channel 1900MHz							
3800.0	-48.93	4.04	34.00	-18.97	-13	-5.97	Horizontal
3800.0	-52.46	4.04	34.00	-22.50	-13	-9.50	Vertical
5700.0	-44.31	5.24	36.04	-13.51	-13	-0.51	Vertical
5700.0	-52.30	5.24	36.04	-21.50	-13	-8.50	Horizontal
208.0	-34.88	1.36	17.39	-18.84	-13	-5.84	Vertical
283.0	-34.48	1.66	15.39	-20.75	-13	-7.75	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

9.2 LTE BAND 4

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-50.52	4.02	29.80	-24.74	-13	-11.74	Horizontal
3421.4	-47.86	4.02	29.80	-22.08	-13	-9.08	Vertical
5132.1	-45.94	5.24	35.84	-15.34	-13	-2.34	Vertical
5132.1	-49.35	5.24	35.84	-18.75	-13	-5.75	Horizontal
184.7	-38.44	1.68	16.04	-24.08	-13	-11.08	Vertical
288.2	-39.43	1.78	17.74	-23.47	-13	-10.47	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-52.89	4.03	30.00	-26.92	-13	-13.92	Horizontal
3465.0	-52.16	4.03	30.00	-26.19	-13	-13.19	Vertical
5197.5	-47.15	5.25	35.86	-16.54	-13	-3.54	Vertical
5197.5	-52.81	5.25	35.86	-22.20	-13	-9.20	Horizontal
204.5	-37.23	1.72	17.69	-21.26	-13	-8.26	Vertical
415.0	-34.92	1.62	16.02	-20.51	-13	-7.51	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-49.47	4.05	30.01	-23.51	-13	-10.51	Horizontal
3508.6	-50.07	4.05	30.01	-24.11	-13	-11.11	Vertical
5262.9	-51.54	5.26	35.86	-20.94	-13	-7.94	Vertical
5262.9	-50.11	5.26	35.86	-19.51	-13	-6.51	Horizontal
193.1	-44.36	1.80	16.69	-29.47	-13	-16.47	Vertical
353.5	-41.02	1.75	16.66	-26.12	-13	-13.12	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	-47.69	4.02	29.80	-21.91	-13	-8.91	Horizontal
3440.0	-50.37	4.02	29.80	-24.59	-13	-11.59	Vertical
5160.0	-47.34	5.24	35.84	-16.74	-13	-3.74	Vertical
5160.0	-49.94	5.24	35.84	-19.34	-13	-6.34	Horizontal
204.6	-39.35	1.57	17.26	-23.66	-13	-10.66	Vertical
431.9	-35.25	1.78	16.35	-20.68	-13	-7.68	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-52.42	4.03	30.00	-26.45	-13	-13.45	Horizontal
3465.0	-51.88	4.03	30.00	-25.91	-13	-12.91	Vertical
5197.5	-45.27	5.25	35.86	-14.66	-13	-1.66	Vertical
5197.5	-51.29	5.25	35.86	-20.68	-13	-7.68	Horizontal
187.2	-43.64	1.44	17.95	-27.13	-13	-14.13	Vertical
235.6	-34.73	1.65	16.09	-20.29	-13	-7.29	Horizontal
Test Results for High Channel 1745MHz							
3490.0	-45.51	4.05	27.68	-21.88	-13	-8.88	Horizontal
3490.0	-51.88	4.05	27.68	-28.25	-13	-15.25	Vertical
5235.0	-45.36	5.26	35.86	-14.76	-13	-1.76	Vertical
5235.0	-49.06	5.26	35.86	-18.46	-13	-5.46	Horizontal
207.5	-42.08	1.61	16.85	-26.84	-13	-13.84	Vertical
443.3	-40.67	1.61	15.19	-27.09	-13	-14.09	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

9.3 LTE BAND 5

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

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-48.27	2.78	27.50	-23.55	-13	-10.55	Horizontal
1649.4	-52.84	2.78	27.50	-28.12	-13	-15.12	Vertical
2474.1	-51.61	2.90	27.80	-26.71	-13	-13.71	Vertical
2474.1	-50.02	2.90	27.80	-25.12	-13	-12.12	Horizontal
192.9	-40.79	1.76	17.59	-24.96	-13	-11.96	Vertical
403.5	-42.07	1.63	15.87	-27.83	-13	-14.83	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-52.52	2.80	27.48	-27.84	-13	-14.84	Horizontal
1673.0	-47.95	2.80	27.48	-23.27	-13	-10.27	Vertical
2509.5	-50.11	2.91	27.70	-25.32	-13	-12.32	Vertical
2509.5	-53.74	2.91	27.70	-28.95	-13	-15.95	Horizontal
201.7	-37.06	1.61	15.68	-22.99	-13	-9.99	Vertical
405.0	-42.43	1.59	17.52	-26.51	-13	-13.51	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-52.38	2.82	27.43	-27.77	-13	-14.77	Horizontal
1696.6	-44.74	2.82	27.43	-20.13	-13	-7.13	Vertical
2544.9	-47.29	2.92	27.74	-22.47	-13	-9.47	Vertical
2544.9	-53.38	2.92	27.74	-28.56	-13	-15.56	Horizontal
180.5	-43.19	1.69	16.67	-28.20	-13	-15.20	Vertical
404.5	-38.97	1.70	17.18	-23.49	-13	-10.49	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	-48.16	2.78	27.50	-23.44	-13	-10.44	Horizontal
1658.0	-51.00	2.78	27.50	-26.28	-13	-13.28	Vertical
2487.0	-53.22	2.90	27.80	-28.32	-13	-15.32	Vertical
2487.0	-53.82	2.90	27.80	-28.92	-13	-15.92	Horizontal
195.6	-44.90	1.71	15.57	-31.04	-13	-18.04	Vertical
294.8	-41.03	1.34	16.40	-25.97	-13	-12.97	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-48.42	2.80	27.48	-23.74	-13	-10.74	Horizontal
1673.0	-49.28	2.80	27.48	-24.60	-13	-11.60	Vertical
2509.5	-44.80	2.91	27.70	-20.01	-13	-7.01	Vertical
2509.5	-52.49	2.91	27.70	-27.70	-13	-14.70	Horizontal
191.0	-34.28	1.44	17.04	-18.68	-13	-5.68	Vertical
328.5	-34.74	1.76	17.62	-18.88	-13	-5.88	Horizontal
Test Results for High Channel 844MHz							
1688.0	-50.50	2.82	27.43	-25.89	-13	-12.89	Horizontal
1688.0	-45.12	2.82	27.43	-20.51	-13	-7.51	Vertical
2532.0	-49.23	2.92	27.74	-24.41	-13	-11.41	Vertical
2532.0	-51.73	2.92	27.74	-26.91	-13	-13.91	Horizontal
195.7	-42.52	1.74	17.70	-26.56	-13	-13.56	Vertical
317.3	-43.63	1.41	17.46	-27.57	-13	-14.57	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

9.4 LTE BAND 7

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

Test Results for Low Channel 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-59.16	5.23	35.81	-28.58	-25	-3.58	Horizontal
5005.0	-64.89	5.23	35.81	-34.31	-25	-9.31	Vertical
7507.5	-59.23	5.67	36.85	-28.05	-25	-3.05	Vertical
7507.5	-62.63	5.67	36.85	-31.45	-25	-6.45	Horizontal
183.1	-46.32	1.73	17.97	-30.08	-25	-5.08	Vertical
381.3	-47.60	1.38	15.11	-33.87	-25	-8.87	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-64.44	5.23	35.82	-33.85	-25	-8.85	Horizontal
5070.0	-60.03	5.23	35.82	-29.44	-25	-4.44	Vertical
7605.0	-62.22	5.67	36.85	-31.04	-25	-6.04	Vertical
7605.0	-64.98	5.67	36.85	-33.80	-25	-8.80	Horizontal
187.8	-49.13	1.77	16.17	-34.72	-25	-9.72	Vertical
334.0	-52.25	1.63	15.21	-38.67	-25	-13.67	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-63.14	5.24	35.83	-32.55	-25	-7.55	Horizontal
5135.0	-59.72	5.24	35.83	-29.13	-25	-4.13	Vertical
7702.5	-61.45	5.68	36.87	-30.26	-25	-5.26	Vertical
7702.5	-61.37	5.68	36.87	-30.18	-25	-5.18	Horizontal
209.4	-53.35	1.58	17.56	-37.37	-25	-12.37	Vertical
297.2	-52.96	1.45	16.58	-37.83	-25	-12.83	Horizontal

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

Test Results for Low Channel 2510MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020.0	-59.18	5.23	35.82	-28.59	-25	-3.59	Horizontal
5020.0	-62.71	5.23	35.82	-32.12	-25	-7.12	Vertical
7530.0	-63.83	5.67	36.86	-32.64	-25	-7.64	Vertical
7530.0	-59.58	5.67	36.86	-28.39	-25	-3.39	Horizontal
198.8	-45.14	1.63	15.76	-31.01	-25	-6.01	Vertical
387.8	-44.38	1.71	15.44	-30.65	-25	-5.65	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-61.61	5.23	35.82	-31.02	-25	-6.02	Horizontal
5070.0	-62.98	5.23	35.82	-32.39	-25	-7.39	Vertical
7605.0	-64.03	5.67	36.85	-32.85	-25	-7.85	Vertical
7605.0	-63.43	5.67	36.85	-32.25	-25	-7.25	Horizontal
185.8	-45.57	1.79	16.84	-30.51	-25	-5.51	Vertical
452.6	-50.13	1.71	17.64	-34.20	-25	-9.20	Horizontal
Test Results for High Channel 2560MHz							
5120.0	-61.39	5.24	35.83	-30.80	-25	-5.80	Horizontal
5120.0	-63.41	5.24	35.83	-32.82	-25	-7.82	Vertical
7680.0	-59.50	5.70	36.88	-28.32	-25	-3.32	Vertical
7680.0	-63.41	5.70	36.88	-32.23	-25	-7.23	Horizontal
208.9	-45.91	1.79	16.84	-30.85	-25	-5.85	Vertical
269.4	-47.26	1.71	17.64	-31.33	-25	-6.33	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

9.5 LTE BAND 12

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

Test Results for Low Channel 699.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-50.89	2.60	27.20	-26.29	-13	-13.29	Horizontal
1399.4	-45.64	2.60	27.20	-21.04	-13	-8.04	Vertical
2099.1	-46.25	2.85	27.54	-21.56	-13	-8.56	Vertical
2099.1	-52.38	2.85	27.54	-27.69	-13	-14.69	Horizontal
182.7	-37.75	1.49	17.78	-21.46	-13	-8.46	Vertical
400.4	-38.23	1.36	17.33	-22.26	-13	-9.26	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-49.26	2.61	27.28	-24.59	-13	-11.59	Horizontal
1415.0	-51.47	2.61	27.28	-26.80	-13	-13.80	Vertical
2122.5	-52.72	2.87	27.59	-28.00	-13	-15.00	Vertical
2122.5	-50.97	2.87	27.59	-26.25	-13	-13.25	Horizontal
212.0	-43.32	1.73	15.74	-29.31	-13	-16.31	Vertical
428.2	-34.89	1.62	15.79	-20.72	-13	-7.72	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-53.28	2.63	27.28	-28.63	-13	-15.63	Horizontal
1430.6	-48.70	2.63	27.28	-24.05	-13	-11.05	Vertical
2145.9	-50.22	2.88	27.60	-25.50	-13	-12.50	Vertical
2145.9	-53.39	2.88	27.60	-28.67	-13	-15.67	Horizontal
191.7	-39.02	1.61	18.00	-22.63	-13	-9.63	Vertical
428.1	-43.77	1.45	15.49	-29.74	-13	-16.74	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	-46.96	2.61	27.26	-22.31	-13	-9.31	Horizontal
1408.0	-53.37	2.61	27.26	-28.72	-13	-15.72	Vertical
2112.0	-53.26	2.87	27.58	-28.55	-13	-15.55	Vertical
2112.0	-50.05	2.87	27.58	-25.34	-13	-12.34	Horizontal
200.8	-36.64	1.31	16.97	-20.98	-13	-7.98	Vertical
277.8	-42.60	1.65	16.70	-27.55	-13	-14.55	Horizontal
Test Results for Mid Channel 707.5MHz							
1415.0	-48.54	2.61	27.28	-23.87	-13	-10.87	Horizontal
1415.0	-47.20	2.61	27.28	-22.53	-13	-9.53	Vertical
2122.5	-52.40	2.87	27.59	-27.68	-13	-14.68	Vertical
2122.5	-52.54	2.87	27.59	-27.82	-13	-14.82	Horizontal
192.9	-34.35	1.72	17.99	-18.08	-13	-5.08	Vertical
422.7	-43.73	1.73	17.94	-27.52	-13	-14.52	Horizontal
Test Results for High Channel 711MHz							
1422.0	-44.06	2.62	27.28	-19.40	-13	-6.40	Horizontal
1422.0	-48.24	2.62	27.28	-23.58	-13	-10.58	Vertical
2133.0	-50.03	2.87	27.60	-25.30	-13	-12.30	Vertical
2133.0	-52.78	2.87	27.60	-28.05	-13	-15.05	Horizontal
204.0	-39.30	1.58	15.93	-24.95	-13	-11.95	Vertical
391.7	-42.92	1.36	15.59	-28.69	-13	-15.69	Horizontal

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

. Margin = Spurious Emission Level - Limit

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

9.6 LTE BAND 17

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

Test Results for Low Channel 706.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1413.0	-51.32	2.61	27.28	-26.65	-13	-13.65	Horizontal
1413.0	-50.87	2.61	27.28	-26.20	-13	-13.20	Vertical
2119.5	-45.99	2.87	27.59	-21.27	-13	-8.27	Vertical
2119.5	-49.80	2.87	27.59	-25.08	-13	-12.08	Horizontal
204.8	-44.17	1.71	16.15	-29.73	-13	-16.73	Vertical
238.2	-34.68	1.41	17.32	-18.77	-13	-5.77	Horizontal
Test Results For Mid Channel 710MHz							
1420.0	-46.99	2.62	27.30	-22.31	-13	-9.31	Horizontal
1420.0	-53.19	2.62	27.30	-28.51	-13	-15.51	Vertical
2130.0	-46.96	2.87	27.62	-22.21	-13	-9.21	Vertical
2130.0	-52.45	2.87	27.62	-27.70	-13	-14.70	Horizontal
181.1	-35.27	1.42	15.25	-21.45	-13	-8.45	Vertical
370.6	-40.61	1.36	17.19	-24.78	-13	-11.78	Horizontal
Test Results for High Channel 713.5MHz							
1427.0	-44.10	2.66	27.28	-19.48	-13	-6.48	Horizontal
1427.0	-44.39	2.66	27.28	-19.77	-13	-6.77	Vertical
2140.5	-48.84	2.88	27.60	-24.12	-13	-11.12	Vertical
2140.5	-49.96	2.88	27.60	-25.24	-13	-12.24	Horizontal
193.8	-44.39	1.32	17.29	-28.42	-13	-15.42	Vertical
233.9	-42.57	1.72	16.89	-27.40	-13	-14.40	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	-46.30	2.62	27.30	-21.62	-13	-8.62	Horizontal
1418.0	-48.99	2.62	27.30	-24.31	-13	-11.31	Vertical
2127.0	-47.55	2.87	27.62	-22.80	-13	-9.80	Vertical
2127.0	-50.81	2.87	27.62	-26.06	-13	-13.06	Horizontal
187.1	-37.85	1.35	16.91	-22.29	-13	-9.29	Vertical
256.5	-40.87	1.62	16.31	-26.18	-13	-13.18	Horizontal
Test Results for Mid Channel 710MHz							
1420.0	-45.63	2.62	27.30	-20.95	-13	-7.95	Horizontal
1420.0	-47.97	2.62	27.30	-23.29	-13	-10.29	Vertical
2130.0	-47.25	2.87	27.62	-22.50	-13	-9.50	Vertical
2130.0	-49.88	2.87	27.62	-25.13	-13	-12.13	Horizontal
177.3	-34.27	1.51	17.14	-18.64	-13	-5.64	Vertical
444.9	-44.53	1.77	16.88	-29.42	-13	-16.42	Horizontal
Test Results for High Channel 711MHz							
1422.0	-52.77	2.62	27.30	-28.09	-13	-15.09	Horizontal
1422.0	-51.90	2.62	27.30	-27.22	-13	-14.22	Vertical
2133.0	-52.54	2.87	27.62	-27.79	-13	-14.79	Vertical
2133.0	-51.16	2.87	27.62	-26.41	-13	-13.41	Horizontal
209.5	-43.36	1.78	15.95	-29.19	-13	-16.19	Vertical
298.1	-44.24	1.34	17.95	-27.64	-13	-14.64	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value + Cable Loss+ Antenna Factor + 11.74
 . Margin = Spurious Emission Level - Limit
 . Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

10. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = -30° to $+50^{\circ}\text{C}$
- Voltage = low voltage, DC 3.29V, Normal, DC 3.87V and High voltage, DC 4.45V.

Frequency Stability vs Temperature:

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

Frequency Stability vs Voltage:

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

MODES TESTED

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

RESULTS

See the following pages.

10.1 LTE BAND 2

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.29	1880	12.6	0.006694	2.5
3.87	1880	14.2	0.007567	2.5
4.45	1880	13.7	0.007276	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	12.6	0.006727	2.5
Extreme (50C)	1880	11.2	0.005940	2.5
Extreme (40C)	1880	13.3	0.007076	2.5
Extreme (30C)	1880	13.6	0.007254	2.5
Extreme (10C)	1880	14.0	0.007463	2.5
Extreme (0C)	1880	11.6	0.006185	2.5
Extreme (-10C)	1880	13.2	0.006999	2.5
Extreme (-20C)	1880	14.0	0.007451	2.5
Extreme (-30C)	1880	14.5	0.007721	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.29	1880	9.9	0.005267	2.5
3.87	1880	8.8	0.004665	2.5
4.45	1880	7.9	0.004176	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.7	0.005152	2.5
Extreme (50C)	1880	8.8	0.004672	2.5
Extreme (40C)	1880	8.1	0.004305726	2.5
Extreme (30C)	1880	8.6	0.004600175	2.5
Extreme (10C)	1880	9.3	0.004951394	2.5
Extreme (0C)	1880	7.8	0.004156022	2.5
Extreme (-10C)	1880	8.6	0.004549974	2.5
Extreme (-20C)	1880	8.7	0.004627025	2.5
Extreme (-30C)	1880	8.6	0.004566568	2.5

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

10.2 LTE BAND 4

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.29	1732.5	9.0	0.005222	2.5
3.87	1732.5	8.7	0.005038	2.5
4.45	1732.5	8.6	0.004945	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.3	0.004773	2.5
Extreme (50C)	1732.5	9.1	0.005242	2.5
Extreme (40C)	1732.5	7.0	0.004025	2.5
Extreme (30C)	1732.5	5.8	0.003352	2.5
Extreme (10C)	1732.5	6.7	0.003888	2.5
Extreme (0C)	1732.5	9.8	0.005665	2.5
Extreme (-10C)	1732.5	8.4	0.004860	2.5
Extreme (-20C)	1732.5	7.3	0.004217	2.5
Extreme (-30C)	1732.5	8.8	0.005067	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.29	1732.5	10.0	0.005748	2.5
3.87	1732.5	9.3	0.005349	2.5
4.45	1732.5	8.3	0.004812	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	9.9	0.005724	2.5
Extreme (50C)	1732.5	8.6	0.004976	2.5
Extreme (40C)	1732.5	8.6	0.004943	2.5
Extreme (30C)	1732.5	8.7	0.005014	2.5
Extreme (10C)	1732.5	9.3	0.005368	2.5
Extreme (0C)	1732.5	7.6	0.004404	2.5
Extreme (-10C)	1732.5	8.8	0.005093	2.5
Extreme (-20C)	1732.5	8.6	0.004953	2.5
Extreme (-30C)	1732.5	8.4	0.004849	2.5

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

10.3 LTE BAND 5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.29	836.5	5.4	0.006414	2.5
3.87	836.5	7.1	0.008485	2.5
4.45	836.5	4.4	0.005240	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	5.6	0.006716	2.5
Extreme (50C)	836.5	6.0	0.007141	2.5
Extreme (40C)	836.5	6.3	0.007491	2.5
Extreme (30C)	836.5	6.3	0.007557	2.5
Extreme (10C)	836.5	5.7	0.006867	2.5
Extreme (0C)	836.5	5.0	0.005985	2.5
Extreme (-10C)	836.5	5.2	0.006273	2.5
Extreme (-20C)	836.5	6.0	0.007124	2.5
Extreme (-30C)	836.5	6.7	0.008052	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.29	836.5	6.1	0.007293	2.5
3.87	836.5	7.0	0.008420	2.5
4.45	836.5	4.8	0.005746	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.0	0.007117	2.5
Extreme (50C)	836.5	5.9	0.007107	2.5
Extreme (40C)	836.5	6.3	0.007508	2.5
Extreme (30C)	836.5	6.3	0.007555	2.5
Extreme (10C)	836.5	5.2	0.006263	2.5
Extreme (0C)	836.5	5.1	0.006131	2.5
Extreme (-10C)	836.5	5.3	0.006297	2.5
Extreme (-20C)	836.5	6.5	0.007756	2.5
Extreme (-30C)	836.5	6.7	0.008016	2.5

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

10.4 LTE BAND 7

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.29	2535	10.3	0.004043	2.5
3.87	2535	8.7	0.003433	2.5
4.45	2535	8.0	0.003162	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	9.2	0.003630	2.5
Extreme (50C)	2535	8.6	0.003381	2.5
Extreme (40C)	2535	8.8	0.003473	2.5
Extreme (30C)	2535	8.9	0.003510	2.5
Extreme (10C)	2535	8.4	0.003330	2.5
Extreme (0C)	2535	8.1	0.003188	2.5
Extreme (-10C)	2535	9.3	0.003682	2.5
Extreme (-20C)	2535	8.8	0.003489	2.5
Extreme (-30C)	2535	7.9	0.003133	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.29	2535	6.9	0.002722	2.5
3.87	2535	6.0	0.002362	2.5
4.45	2535	5.2	0.002070	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	2535	6.9	0.002722	2.5
Extreme (50C)	2535	5.6	0.002209	2.5
Extreme (40C)	2535	5.2	0.002052	2.5
Extreme (30C)	2535	6.2	0.002451	2.5
Extreme (10C)	2535	5.9	0.002333	2.5
Extreme (0C)	2535	4.7	0.001862	2.5
Extreme (-10C)	2535	5.4	0.002116	2.5
Extreme (-20C)	2535	6.2	0.002431	2.5
Extreme (-30C)	2535	6.0	0.002372	2.5

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

10.5 LTE BAND 12

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.29	707.5	8.6	0.012103	2.5
3.87	707.5	9.9	0.013971	2.5
4.45	707.5	8.1	0.011468	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.3	0.011780	2.5
Extreme (50C)	707.5	8.0	0.011278	2.5
Extreme (40C)	707.5	7.2	0.010210	2.5
Extreme (30C)	707.5	7.9	0.011162	2.5
Extreme (10C)	707.5	7.4	0.010506	2.5
Extreme (0C)	707.5	8.6	0.012176	2.5
Extreme (-10C)	707.5	8.6	0.012201	2.5
Extreme (-20C)	707.5	8.6	0.012138	2.5
Extreme (-30C)	707.5	8.3	0.011668	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.29	707.5	6.9	0.009819	2.5
3.87	707.5	8.2	0.011537	2.5
4.45	707.5	6.9	0.009814	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	9.4	0.013295	2.5
Extreme (50C)	707.5	8.6	0.012171	2.5
Extreme (40C)	707.5	8.9	0.012620	2.5
Extreme (30C)	707.5	7.8	0.010997	2.5
Extreme (10C)	707.5	8.4	0.011838	2.5
Extreme (0C)	707.5	7.2	0.010178	2.5
Extreme (-10C)	707.5	7.3	0.010362	2.5
Extreme (-20C)	707.5	9.2	0.013064	2.5
Extreme (-30C)	707.5	8.5	0.011946	2.5

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

10.6 LTE BAND 17

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.29	710.0	9.7	0.013652	2.5
3.87	710.0	8.7	0.012257	2.5
4.45	710.0	8.3	0.011624	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.6	0.013544	2.5
Extreme (50C)	710.0	8.5	0.011939	2.5
Extreme (40C)	710.0	8.4	0.011899	2.5
Extreme (30C)	710.0	8.6	0.012074	2.5
Extreme (10C)	710.0	8.6	0.012068	2.5
Extreme (0C)	710.0	7.9	0.011137	2.5
Extreme (-10C)	710.0	8.5	0.012021	2.5
Extreme (-20C)	710.0	9.2	0.012982	2.5
Extreme (-30C)	710.0	8.5	0.011948	2.5

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

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
3.29	710.0	9.8	0.013790	2.5
3.87	710.0	9.4	0.013184	2.5
4.45	710.0	8.1	0.011390	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	710.0	9.3	0.013070	2.5
Extreme (50C)	710.0	8.5	0.011949	2.5
Extreme (40C)	710.0	8.7	0.012313	2.5
Extreme (30C)	710.0	8.7	0.012190	2.5
Extreme (10C)	710.0	8.4	0.011822	2.5
Extreme (0C)	710.0	8.3	0.011664	2.5
Extreme (-10C)	710.0	9.2	0.012913	2.5
Extreme (-20C)	710.0	8.9	0.012585	2.5
Extreme (-30C)	710.0	8.1	0.011351	2.5

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

11. Peak-to-Average Ratio

11.1 Description of the PAR Measurement

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

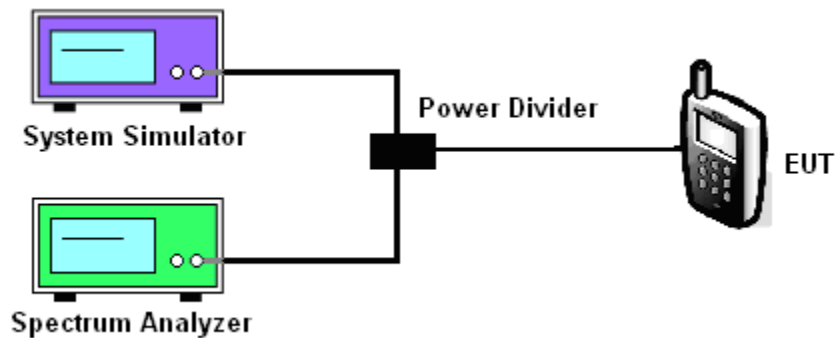
11.2 Measuring Instruments

See list of measuring instruments of this test report.

11.3 Test Procedures

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

11.4 Test Setup



MODES TESTED

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

Test data reference attachment.

----END OF REPORT----