

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

FCC ID: ZSHS9

Product: Mobile phone

Trade Mark: KXD, Kenxinda, EL, E&L, Ken mobile

Model Number: S9

Family Model: S7

Report No.: STR190625003006E

Prepared for

SHENZHEN KENXINDA TECHNOLOGY CO.,LTD
18TH FLOOR,FUCHUN ORIENT BUILDING, SHENNAN AV 7006,
SHENZHEN, China

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name : SHENZHEN KENXINDA TECHNOLOGY CO.,LTD
Address..... : 18TH FLOOR,FUCHUN ORIENT BUILDING, SHENNAN AV 7006,
 SHENZHEN, China
Manufacturer's Name..... : SHENZHEN KENXINDA TECHNOLOGY CO.,LTD
Address..... : 18TH FLOOR,FUCHUN ORIENT BUILDING, SHENNAN AV 7006,
 SHENZHEN, China
Product name..... : Mobile phone
Model and/or type reference .. : S9
Family Model: S7
Standards..... : FCC CFR 47 Part 22H, Part 24E, Part 27
Test procedure : ANSI C63.26:2015
 ANSI/TIA-603-E-2016

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

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Date of Test

Date (s) of performance of tests..... 26 Jun. 2019 ~ 16 Jul, 2019

Date of Issue 22 Jul, 2019

Test Result **Pass**

Testing Engineer :



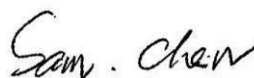
(Allen Liu)

Technical Manager :



(Jason Chen)

Authorized Signatory :



(Sam Chen)

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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Mobile phone
Trade Mark	KXD, Kenxinda, EL, E&L, Ken mobile
Model Name	S9
Family Model	S7
Model Difference	All models are the same circuit and RF module, except the model name.
FCC ID:	ZSHS9
Frequency Bands:	U.S. Bands: <input checked="" type="checkbox"/> LTE FDD Band 2, 4, 7, 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 7 Uplink: 2500MHz-2570MHz, Downlink: 2620MHz-2690MHz; LTE FDD Band 17 Uplink: 704MHz-716MHz, Downlink: 734MHz-746MHz;
Type of Modulation:	QPSK/16QAM
SIM Card	SIM 1 and SIM 2 is a chipset unit and tested as a single chipset. The SIM 1 is chosen for test.
Antenna:	PIFA Antenna
Antenna gain:	0.8dBi
Power Supply:	DC 3.8V/5000mAh from Battery or DC 5V from USB Port.
Adapter:	Model: K12S Input: 100-240V~50/60Hz 0.25A Output: 5V---1.5A
Extreme Vol. Limits:	DC 3.4V to DC 4.2V (Nominal DC 3.8V) (Note 1)
HW Version	S550-MB-V2.0
SW Version	NRD90M
** Note1: The High Voltage DC 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: ZSHS9** filing to comply with the FCC Part 22H&24E &27.

1.3 TEST METHODOLOGY

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

1.4 TEST FACILITY

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

ShenZhen NTEK Testing Technology Co., Ltd.

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

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

FCC Registration No.:463705

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.5dB

1.5 SPECIAL ACCESSORIES

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

1.6 WORST-CASE CONFIGURATION AND MODE

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

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

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

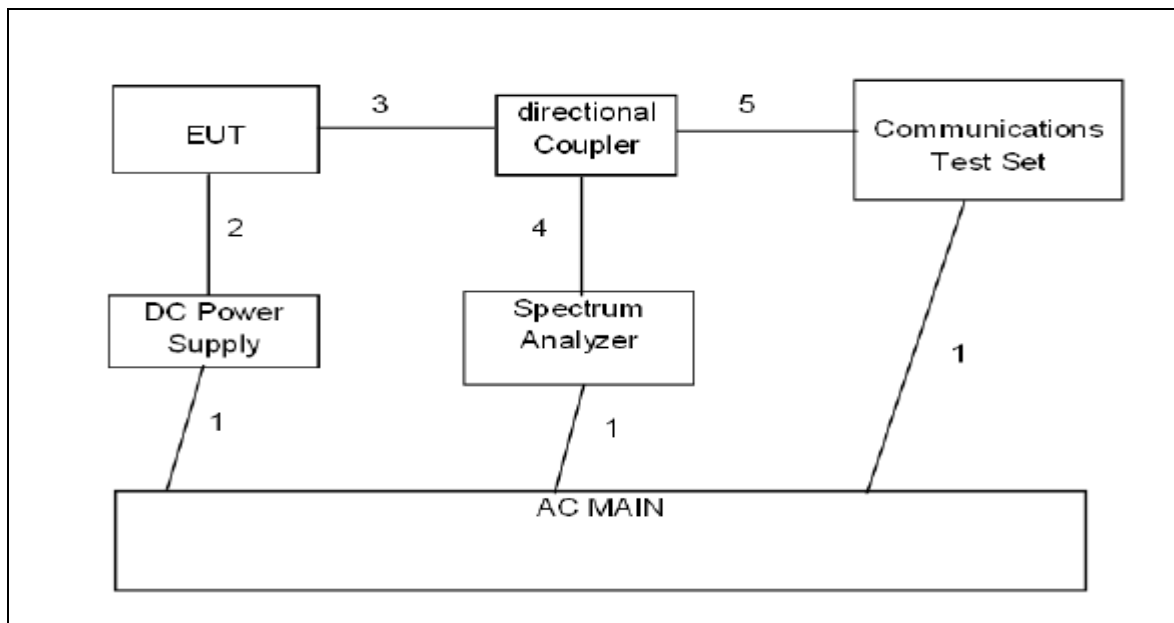
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Mobile phone	S9	FCC ID: ZSHS9	EUT

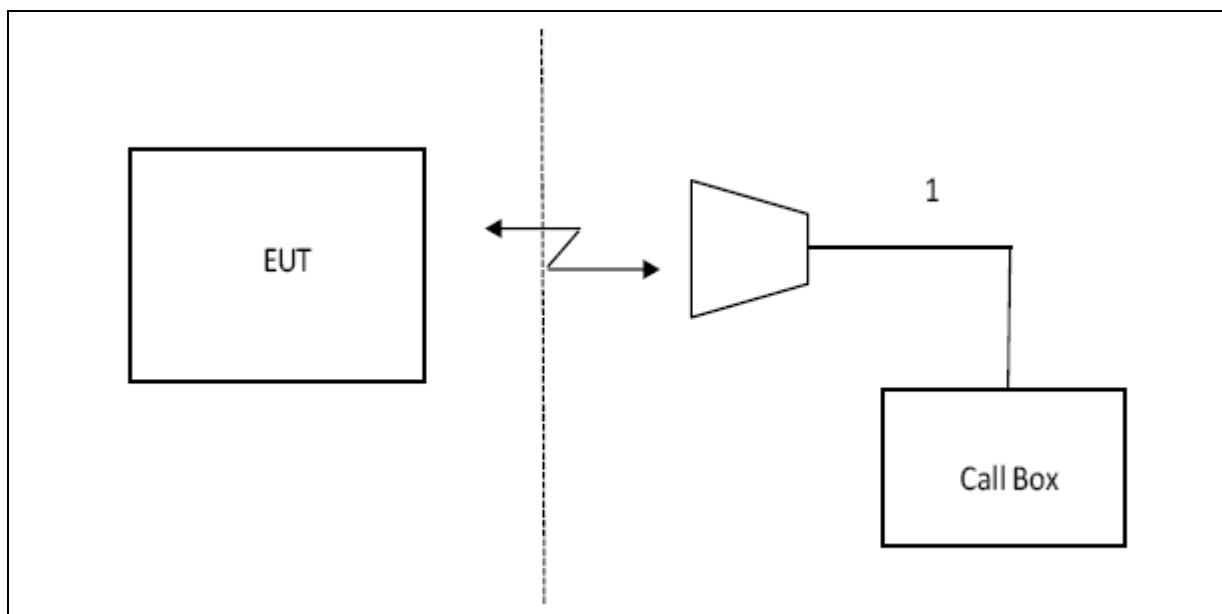
*Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

CONDUCTED SETUP DIAGRAM FOR TESTS



RADIATED SETUP DIAGRAM FOR TESTS



3. TEST AND MEASUREMENT EQUIPMENT

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

NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	NEXT CAL. DATE
SPECTRUM ANALYZER	AGILENT	N9020A	MY49100060	2019.10.07
TEST RECEIVER	R&S	ESCI	101318	2020.05.12
COMMUNICATION TESTER	R&S	CMU200	117858	2020.05.12
COMMUNICATION TESTER	R&S	CMW500	148500	2020.05.12
TEST RECEIVER	R&S	FCKL1528	A0304230	2020.05.12
LISN	SCHWARZBECK	NSLK8127	A0304233	2020.05.12
CLIMATE CHAMBER	ALBATROSS	--	--	2020.05.12
Loop Antenna	Daze	ZN30900N	SEL0097	2020.05.12
Biological Antenna	A.H. Systems Inc.	SAS-521-4	N/A	2020.05.12
Horn Antenna	EM	EM-AH-10180	2011071402	2020.05.12
DC Power Source	N/A	PS-6005D	20170402923	2020.05.12

4. OUTPUT POWER

4.1 OUTPUT POWER MEASUREMENT

LTE Measurement Procedure:

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

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

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

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

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

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

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

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

Test data reference attachment.

5. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

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

MODES TESTED

LTE Band 2
LTE Band 4
LTE Band 7
LTE Band 17

RESULTS

PASS

Test data reference attachment.

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53, and §90.691

FCC: §22.359

LIMITS

FCC: §22.359, §24.238,

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

(m)(4) For mobile digital stations, 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 as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Show citation box.

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 (704, 716, 824, 849, 1710 and 1755, 1850 and 1910 MHz)

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

Set display line at -13 dBm

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

MODES TESTED

LTE Band 2

LTE Band 4

LTE Band 7

LTE Band 17

RESULTS

Test data reference attachment.

7. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238 and §27.53

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

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 at -13 dBm

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

LTE Band 4

LTE Band 7

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.

8. RADIATED MEASUREMENT

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232 and §27.50

LIMITS:

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

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.

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

LTE Band 4

LTE Band 7

LTE Band 17

RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/ Mid	1850.7	-1.78	3.76	28.24	22.70	186.300	Horizontal	Pass
		1880	-1.52	3.91	28.22	22.79	190.081	Horizontal	Pass
		1909.3	-1.53	3.93	28.2	22.74	187.893	Horizontal	Pass
3.0MHz Band QPSK	1/ Mid	1851.5	-1.78	3.77	28.23	22.68	185.339	Horizontal	Pass
		1880	-1.65	3.91	28.24	22.68	185.555	Horizontal	Pass
		1908.5	-1.57	3.94	28.25	22.74	187.953	Horizontal	Pass
5.0MHz Band QPSK	1/ Mid	1852.5	-1.92	3.77	28.31	22.62	182.965	Horizontal	Pass
		1880	-1.63	3.91	28.22	22.68	185.553	Horizontal	Pass
		1907.5	-1.73	3.94	28.2	22.53	178.973	Horizontal	Pass
10.0MHz Band QPSK	1/ Mid	1855	-1.89	3.79	28.33	22.65	184.011	Horizontal	Pass
		1880	-1.52	3.95	28.22	22.75	188.188	Horizontal	Pass
		1905	-1.42	3.97	28.19	22.80	190.478	Horizontal	Pass
15.0MHz Band QPSK	1/ Mid	1857.5	-1.64	3.79	28.34	22.91	195.621	Horizontal	Pass
		1880	-1.36	3.95	28.22	22.91	195.384	Horizontal	Pass
		1902.5	-1.27	3.97	28.18	22.94	196.630	Horizontal	Pass
20.0MHz Band QPSK	1/ Mid	1860	-1.84	3.81	28.35	22.70	186.167	Horizontal	Pass
		1880	-1.61	3.96	28.22	22.65	183.867	Horizontal	Pass
		1900	-1.31	4	28.16	22.85	192.895	Horizontal	Pass
1.4MHz Band QPSK	1/ Mid	1850.7	-1.82	3.76	28.24	22.66	184.660	Vertical	Pass
		1880	-1.62	3.91	28.22	22.69	185.763	Vertical	Pass
		1909.3	-1.63	3.93	28.2	22.64	183.845	Vertical	Pass
3.0MHz Band QPSK	1/ Mid	1851.5	-1.64	3.77	28.23	22.82	191.445	Vertical	Pass
		1880	-1.49	3.91	28.24	22.84	192.210	Vertical	Pass
		1908.5	-1.42	3.94	28.25	22.89	194.693	Vertical	Pass
5.0MHz Band QPSK	1/ Mid	1852.5	-1.84	3.77	28.31	22.70	186.180	Vertical	Pass
		1880	-1.54	3.91	28.22	22.77	189.428	Vertical	Pass
		1907.5	-1.71	3.94	28.2	22.55	179.964	Vertical	Pass
10.0MHz Band	1/ Mid	1855	-1.78	3.79	28.33	22.76	188.987	Vertical	Pass
		1880	-1.57	3.95	28.22	22.70	186.236	Vertical	Pass

QPSK		1905	-1.60	3.97	28.19	22.62	182.725	Vertical	Pass
15.0MHz Band QPSK	1/ Mid	1857.5	-1.75	3.79	28.34	22.80	190.763	Vertical	Pass
		1880	-1.50	3.95	28.22	22.77	189.037	Vertical	Pass
		1902.5	-1.22	3.97	28.18	22.99	198.992	Vertical	Pass
20.0MHz Band QPSK	1/ Mid	1860	-1.76	3.81	28.35	22.78	189.767	Vertical	Pass
		1880	-1.66	3.96	28.22	22.60	181.787	Vertical	Pass
		1900	-1.14	4	28.16	23.02	200.667	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/ Mid	1850.7	-2.70	3.76	28.24	21.78	150.492	Horizontal	Pass
		1880	-2.47	3.91	28.22	21.84	152.841	Horizontal	Pass
		1909.3	-2.41	3.93	28.2	21.86	153.519	Horizontal	Pass
3.0MHz Band 16 QAM	1/ Mid	1851.5	-2.70	3.77	28.23	21.76	150.063	Horizontal	Pass
		1880	-2.66	3.91	28.24	21.67	147.054	Horizontal	Pass
		1908.5	-2.51	3.94	28.25	21.80	151.285	Horizontal	Pass
5.0MHz Band 16 QAM	1/ Mid	1852.5	-2.79	3.77	28.31	21.75	149.462	Horizontal	Pass
		1880	-2.39	3.91	28.22	21.92	155.433	Horizontal	Pass
		1907.5	-2.51	3.94	28.2	21.75	149.764	Horizontal	Pass
10.0MHz Band 16 QAM	1/ Mid	1855	-2.73	3.79	28.33	21.81	151.658	Horizontal	Pass
		1880	-2.41	3.95	28.22	21.86	153.610	Horizontal	Pass
		1905	-2.46	3.97	28.19	21.76	149.858	Horizontal	Pass
15.0MHz Band 16 QAM	1/ Mid	1857.5	-2.79	3.79	28.34	21.76	150.091	Horizontal	Pass
		1880	-2.52	3.95	28.22	21.75	149.668	Horizontal	Pass
		1902.5	-2.43	3.97	28.18	21.78	150.773	Horizontal	Pass
20.0MHz Band 16 QAM	1/ Mid	1860	-2.75	3.81	28.35	21.79	151.108	Horizontal	Pass
		1880	-2.38	3.96	28.22	21.88	154.140	Horizontal	Pass
		1900	-2.49	4	28.16	21.67	146.910	Horizontal	Pass
1.4MHz Band 16 QAM	1/ Mid	1850.7	-2.64	3.76	28.24	21.84	152.609	Vertical	Pass
		1880	-2.57	3.91	28.22	21.74	149.331	Vertical	Pass
		1909.3	-2.36	3.93	28.2	21.91	155.168	Vertical	Pass
3.0MHz Band 16 QAM	1/ Mid	1851.5	-2.72	3.77	28.23	21.74	149.394	Vertical	Pass
		1880	-2.65	3.91	28.24	21.68	147.391	Vertical	Pass
		1908.5	-2.49	3.94	28.25	21.82	152.183	Vertical	Pass
5.0MHz Band 16 QAM	1/ Mid	1852.5	-2.74	3.77	28.31	21.80	151.475	Vertical	Pass
		1880	-2.59	3.91	28.22	21.72	148.707	Vertical	Pass
		1907.5	-2.38	3.94	28.2	21.88	154.321	Vertical	Pass
10.0MHz Band 16 QAM	1/ Mid	1855	-2.90	3.79	28.33	21.64	145.779	Vertical	Pass
		1880	-2.59	3.95	28.22	21.68	147.266	Vertical	Pass
		1905	-2.68	3.97	28.19	21.54	142.409	Vertical	Pass
15.0MHz Band	1/ Mid	1857.5	-2.91	3.79	28.34	21.64	145.794	Vertical	Pass
		1880	-2.56	3.95	28.22	21.71	148.370	Vertical	Pass

16 QAM		1902.5	-2.51	3.97	28.18	21.70	148.046	Vertical	Pass
20.0MH	1/ Mid	1860	-2.70	3.81	28.35	21.84	152.672	Vertical	Pass
z Band		1880	-2.33	3.96	28.22	21.93	156.105	Vertical	Pass
16 QAM		1900	-2.37	4	28.16	21.79	151.165	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/ Mid	1710.7	-2.46	3.12	27.58	22.00	158.560	Horizontal	Pass
		1732.5	-2.55	3.27	27.61	21.79	151.123	Horizontal	Pass
		1754.3	-2.19	3.29	27.63	22.15	164.240	Horizontal	Pass
3.0MHz Band QPSK	1/ Mid	1711.5	-2.58	3.13	27.61	21.90	154.919	Horizontal	Pass
		1732.5	-2.35	3.27	27.61	21.99	158.267	Horizontal	Pass
		1753.5	-2.27	3.3	27.62	22.05	160.229	Horizontal	Pass
5.0MHz Band QPSK	1/ Mid	1712.5	-2.25	3.13	27.63	22.25	167.895	Horizontal	Pass
		1732.5	-1.95	3.27	27.61	22.39	173.211	Horizontal	Pass
		1752.5	-2.01	3.3	27.6	22.29	169.272	Horizontal	Pass
10.0MHz Band QPSK	1/ Mid	1715	-2.29	3.15	27.64	22.20	166.001	Horizontal	Pass
		1732.5	-2.28	3.31	27.61	22.02	159.176	Horizontal	Pass
		1750	-2.18	3.33	27.59	22.08	161.615	Horizontal	Pass
15.0MHz Band QPSK	1/ Mid	1717.5	-2.60	3.15	27.65	21.90	154.851	Horizontal	Pass
		1732.5	-2.18	3.31	27.61	22.12	162.930	Horizontal	Pass
		1747.5	-2.20	3.33	27.57	22.04	159.951	Horizontal	Pass
20.0MHz Band QPSK	1/ Mid	1720	-2.42	3.17	27.66	22.07	160.900	Horizontal	Pass
		1732.5	-2.19	3.32	27.61	22.10	162.116	Horizontal	Pass
		1745	-2.30	3.36	27.56	21.90	154.749	Horizontal	Pass
1.4MHz Band QPSK	1/ Mid	1710.7	-2.41	3.12	27.58	22.05	160.261	Vertical	Pass
		1732.5	-2.35	3.27	27.61	21.99	158.026	Vertical	Pass
		1754.3	-2.33	3.29	27.63	22.01	158.818	Vertical	Pass
3.0MHz Band QPSK	1/ Mid	1711.5	-2.39	3.13	27.61	22.09	161.764	Vertical	Pass
		1732.5	-2.21	3.27	27.61	22.13	163.333	Vertical	Pass
		1753.5	-2.37	3.3	27.62	21.95	156.797	Vertical	Pass
5.0MHz Band QPSK	1/ Mid	1712.5	-2.13	3.13	27.63	22.37	172.649	Vertical	Pass
		1732.5	-2.04	3.27	27.61	22.30	169.664	Vertical	Pass
		1752.5	-1.96	3.3	27.6	22.34	171.250	Vertical	Pass
10.0MHz Band QPSK	1/ Mid	1715	-2.40	3.15	27.64	22.09	161.656	Vertical	Pass
		1732.5	-2.25	3.31	27.61	22.05	160.418	Vertical	Pass
		1750	-2.18	3.33	27.59	22.08	161.519	Vertical	Pass

15.0MH z Band QPSK	1/ Mid	1717.5	-2.53	3.15	27.65	21.97	157.332	Vertical	Pass
		1732.5	-2.13	3.31	27.61	22.17	164.930	Vertical	Pass
		1747.5	-2.07	3.33	27.57	22.17	164.669	Vertical	Pass
20.0MH z Band QPSK	1/ Mid	1720	-2.04	3.17	27.66	22.45	175.651	Vertical	Pass
		1732.5	-2.22	3.32	27.61	22.07	160.955	Vertical	Pass
		1745	-2.19	3.36	27.56	22.01	159.003	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/ Mid	1710.7	-3.31	3.12	27.58	21.15	130.310	Horizontal	Pass
		1732.5	-3.18	3.27	27.61	21.16	130.509	Horizontal	Pass
		1754.3	-3.30	3.29	27.63	21.04	127.190	Horizontal	Pass
3.0MHz Band 16 QAM	1/ Mid	1711.5	-4.10	3.13	27.61	20.38	109.246	Horizontal	Pass
		1732.5	-3.96	3.27	27.61	20.38	109.202	Horizontal	Pass
		1753.5	-3.87	3.3	27.62	20.45	110.798	Horizontal	Pass
5.0MHz Band 16 QAM	1/ Mid	1712.5	-4.24	3.13	27.63	20.26	106.222	Horizontal	Pass
		1732.5	-4.11	3.27	27.61	20.23	105.359	Horizontal	Pass
		1752.5	-3.12	3.3	27.6	21.18	131.178	Horizontal	Pass
10.0MHz Band 16 QAM	1/ Mid	1715	-3.47	3.15	27.64	21.02	126.491	Horizontal	Pass
		1732.5	-3.17	3.31	27.61	21.13	129.650	Horizontal	Pass
		1750	-3.38	3.33	27.59	20.88	122.403	Horizontal	Pass
15.0MHz Band 16 QAM	1/ Mid	1717.5	-3.31	3.15	27.65	21.19	131.397	Horizontal	Pass
		1732.5	-3.14	3.31	27.61	21.16	130.571	Horizontal	Pass
		1747.5	-3.04	3.33	27.57	21.20	131.696	Horizontal	Pass
20.0MHz Band 16 QAM	1/ Mid	1720	-3.56	3.17	27.66	20.93	124.005	Horizontal	Pass
		1732.5	-3.34	3.32	27.61	20.95	124.413	Horizontal	Pass
		1745	-3.17	3.36	27.56	21.03	126.846	Horizontal	Pass
1.4MHz Band 16 QAM	1/ Mid	1710.7	-3.36	3.12	27.58	21.10	128.964	Vertical	Pass
		1732.5	-3.23	3.27	27.61	21.11	129.018	Vertical	Pass
		1754.3	-3.24	3.29	27.63	21.10	128.784	Vertical	Pass
3.0MHz Band 16 QAM	1/ Mid	1711.5	-3.95	3.13	27.61	20.53	112.877	Vertical	Pass
		1732.5	-3.90	3.27	27.61	20.44	110.706	Vertical	Pass
		1753.5	-3.83	3.3	27.62	20.49	111.991	Vertical	Pass
5.0MHz Band 16 QAM	1/ Mid	1712.5	-4.16	3.13	27.63	20.34	108.175	Vertical	Pass
		1732.5	-3.94	3.27	27.61	20.40	109.747	Vertical	Pass
		1752.5	-4.06	3.3	27.6	20.24	105.781	Vertical	Pass
10.0MHz Band 16 QAM	1/ Mid	1715	-3.35	3.15	27.64	21.14	129.951	Vertical	Pass
		1732.5	-3.14	3.31	27.61	21.16	130.546	Vertical	Pass
		1750	-3.33	3.33	27.59	20.93	123.800	Vertical	Pass
15.0MHz Band	1/ Mid	1717.5	-3.50	3.15	27.65	21.00	125.889	Vertical	Pass
		1732.5	-3.35	3.31	27.61	20.95	124.501	Vertical	Pass

16 QAM		1747.5	-3.36	3.33	27.57	20.88	122.500	Vertical	Pass
20.0MH	1/ Mid	1720	-3.42	3.17	27.66	21.07	128.076	Vertical	Pass
z Band		1732.5	-3.26	3.32	27.61	21.03	126.815	Vertical	Pass
16 QAM		1745	-2.96	3.36	27.56	21.24	133.145	Vertical	Pass

Note:

SG Level= Signal generator output

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

8.4 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/ RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cabl e Loss (dBm)	Antenn a Gain (dB)	Max. EIRP Averag e (dBm)	Max. EIRP Averag e (mW)	Polarizati on Of Max. ERP	
5.0MHz Band QPSK	1/ Mid	2502.5	-2.02	4.54	27.75	21.19	131.55	Vertical	Pass
		2535	-1.69	4.69	27.72	21.34	136.26	Vertical	Pass
		2567.5	-1.67	4.71	27.71	21.33	135.82	Vertical	Pass
5.0MHz Band 16 QAM	1/ Mid	2502.5	-2.90	4.54	27.75	20.31	107.30	Vertical	Pass
		2535	-2.05	4.69	27.72	20.98	125.31	Vertical	Pass
		2567.5	-2.71	4.71	27.71	20.29	106.94	Vertical	Pass
10.0MH z Band QPSK	1/ Mid	2505	-1.85	4.55	27.76	21.36	136.75	Vertical	Pass
		2535	-1.75	4.69	27.72	21.28	134.21	Vertical	Pass
		2565	-1.84	4.72	27.70	21.14	129.98	Vertical	Pass
10.0MH z Band 16 QAM	1/ Mid	2505	-3.08	4.55	27.76	20.13	102.96	Vertical	Pass
		2535	-2.62	4.69	27.72	20.41	109.96	Vertical	Pass
		2565	-2.84	4.72	27.70	20.14	103.28	Vertical	Pass
15.0MH z Band QPSK	1/ Mid	2507.5	-2.20	4.55	27.77	21.02	126.36	Vertical	Pass
		2535	-1.66	4.69	27.72	21.37	137.10	Vertical	Pass
		2562.5	-2.21	4.72	27.69	20.76	119.11	Vertical	Pass
15.0MH z Band 16 QAM	1/ Mid	2507.5	-2.77	4.55	27.77	20.45	110.86	Vertical	Pass
		2535	-3.24	4.69	27.72	19.79	95.36	Vertical	Pass
		2562.5	-2.44	4.72	27.69	20.53	113.01	Vertical	Pass
20.0MH z Band QPSK	1/ Mid	2510	-2.15	4.57	27.78	21.06	127.78	Vertical	Pass
		2535	-1.82	4.73	27.72	21.17	131.06	Vertical	Pass
		2560	-1.61	4.75	27.68	21.32	135.52	Vertical	Pass
20.0MH z Band 16 QAM	1/ Mid	2510	-2.33	4.57	27.78	20.88	122.46	Vertical	Pass
		2535	-1.44	4.73	27.72	21.55	142.89	Vertical	Pass
		2560	-1.77	4.75	27.68	21.16	130.62	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 7									
Mode	RB/ RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cabl e Loss (dBm)	Antenn a Gain (dB)	Max. EIRP Averag e (dBm)	Max. EIRP Averag e (mW)	Polarizati on Of Max. ERP	
5.0MHz Band QPSK	1/ Mid	2502.5	-1.58	4.54	27.75	21.63	145.546	Horizontal	Pass
		2535	-1.46	4.69	27.72	21.57	143.549	Horizontal	Pass
		2567.5	-1.55	4.71	27.71	21.45	139.637	Horizontal	Pass
5.0MHz Band 16 QAM	1/ Mid	2502.5	-2.72	4.54	27.75	20.49	111.944	Horizontal	Pass
		2535	-2.53	4.69	27.72	20.5	112.202	Horizontal	Pass
		2567.5	-2.49	4.71	27.71	20.51	112.460	Horizontal	Pass
10.0MH z Band QPSK	1/ Mid	2505	-1.57	4.55	27.76	21.64	145.881	Horizontal	Pass
		2535	-1.26	4.69	27.72	21.77	150.314	Horizontal	Pass
		2565	-1.39	4.72	27.7	21.59	144.212	Horizontal	Pass
10.0MH z Band 16 QAM	1/ Mid	2505	-2.50	4.55	27.76	20.71	117.761	Horizontal	Pass
		2535	-2.28	4.69	27.72	20.75	118.850	Horizontal	Pass
		2565	-2.37	4.72	27.7	20.61	115.080	Horizontal	Pass
15.0MH z Band QPSK	1/ Mid	2507.5	-1.40	4.55	27.77	21.82	152.055	Horizontal	Pass
		2535	-1.29	4.69	27.72	21.74	149.279	Horizontal	Pass
		2562.5	-1.47	4.72	27.69	21.5	141.254	Horizontal	Pass
15.0MH z Band 16 QAM	1/ Mid	2507.5	-2.61	4.55	27.77	20.61	115.080	Horizontal	Pass
		2535	-2.48	4.69	27.72	20.55	113.501	Horizontal	Pass
		2562.5	-2.51	4.72	27.69	20.46	111.173	Horizontal	Pass
20.0MH z Band QPSK	1/ Mid	2510	-1.84	4.57	27.78	21.37	137.088	Horizontal	Pass
		2535	-1.73	4.73	27.72	21.26	133.660	Horizontal	Pass
		2560	-1.51	4.75	27.68	21.42	138.676	Horizontal	Pass
20.0MH z Band 16 QAM	1/ Mid	2510	-1.34	4.57	27.78	21.87	153.815	Horizontal	Pass
		2535	-2.55	4.73	27.72	20.44	110.662	Horizontal	Pass
		2560	-2.67	4.75	27.68	20.26	106.170	Horizontal	Pass

Note:

SG Level= Signal generator output

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

8.5 LTE BAND 17

Radiated Power (ERP) for Band 17										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	1/ Mid	706.5	6.28	1.91	19.23	2.15	21.45	139.504	Vertical	Pass
		710	6.17	1.91	19.26	2.15	21.37	137.167	Vertical	Pass
		713.5	6.19	1.92	19.33	2.15	21.45	139.540	Vertical	Pass
10.0MHz Band QPSK	1/ Mid	709	6.41	1.91	19.25	2.15	21.60	144.516	Vertical	Pass
		710	6.45	1.91	19.26	2.15	21.65	146.090	Vertical	Pass
		711	6.17	1.92	19.32	2.15	21.42	138.749	Vertical	Pass
5.0MHz Band QPSK	1/ Mid	706.5	6.39	1.91	19.23	2.15	21.56	143.199	Horizontal	Pass
		710	6.23	1.91	19.26	2.15	21.43	138.911	Horizontal	Pass
		713.5	6.24	1.92	19.33	2.15	21.50	141.101	Horizontal	Pass
10.0MHz Band QPSK	1/ Mid	709	6.37	1.91	19.25	2.15	21.56	143.198	Horizontal	Pass
		710	6.48	1.91	19.26	2.15	21.68	147.136	Horizontal	Pass
		711	6.12	1.92	19.32	2.15	21.37	136.995	Horizontal	Pass

Radiated Power (ERP) for Band 17										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band 16 QAM	1/ Mid	706.5	6.18	1.91	19.23	2.15	21.35	136.378	Vertical	Pass
		710	6.15	1.91	19.26	2.15	21.35	136.541	Vertical	Pass
		713.5	6.09	1.92	19.33	2.15	21.35	136.314	Vertical	Pass
10.0MHz z Band 16 QAM	1/ Mid	709	6.07	1.91	19.25	2.15	21.26	133.771	Vertical	Pass
		710	5.97	1.91	19.26	2.15	21.17	130.882	Vertical	Pass
		711	6.00	1.92	19.32	2.15	21.25	133.335	Vertical	Pass
5.0MHz Band 16 QAM	1/ Mid	706.5	6.08	1.91	19.23	2.15	21.25	133.269	Horizontal	Pass
		710	6.15	1.91	19.26	2.15	21.35	136.513	Horizontal	Pass
		713.5	6.10	1.92	19.33	2.15	21.36	136.717	Horizontal	Pass
10.0MHz z Band 16 QAM	1/ Mid	709	6.05	1.91	19.25	2.15	21.24	133.093	Horizontal	Pass
		710	6.26	1.91	19.26	2.15	21.46	140.046	Horizontal	Pass
		711	5.93	1.92	19.32	2.15	21.18	131.281	Horizontal	Pass

Note:

SG Level= Signal generator output

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

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238 and §27.53

LIMIT

§22.917 (e) and §24.238 (a): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

§27.53 (g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

§27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth in the 1 MHz band immediately outside and adjacent to the channel edge of the equipment. Beyond the 1 MHz band immediately outside the channel edge of the equipment, a resolution bandwidth of 1 MHz shall be employed. A narrower resolution bandwidth is allowed to be used provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1% of the occupied bandwidth as applicable.

The power of any unwanted emissions measured from the channel edge of the equipment shall be attenuated below the transmitter power, P (dBW), as follows:

- a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than $43 + 10 \log_{10}(p)$, dB; and
- b. for mobile subscriber equipment, the attenuation shall not be less than $43 + 10 \log_{10}(p)$, dB at the channel edges and $55 + 10 \log_{10}(p)$ at 5.5 MHz away and beyond the channel edges where p in (a) and (b) is the transmitter power measured in watts.

MODES TESTED

LTE Band 2
LTE Band 4
LTE Band 7
LTE Band 17

RESULTS

PASS

Below 1G:

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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
177.47	-60.68	1.81	19.2	-43.29	-13	-30.29	Horizontal
296.45	-61.61	1.82	19.31	-44.12	-13	-31.12	Vertical
193	-61.29	1.82	19.22	-43.89	-13	-30.89	Vertical
297.25	-60.64	1.81	19.24	-43.21	-13	-30.21	Horizontal
Test Results for Mid Channel 1880MHz							
120.53	-62.92	1.81	18.11	-46.62	-13	-33.62	Horizontal
177.47	-60.93	1.91	19.2	-43.64	-13	-30.64	Vertical
496.7	-61.54	1.91	19.34	-44.11	-13	-31.11	Vertical
617.42	-61.75	1.91	19.21	-44.45	-13	-31.45	Horizontal
Test Results for High Channel 1909.3MHz							
174.77	-59.29	1.91	19.2	-42	-13	-29	Horizontal
300.68	-58.64	1.92	19.33	-41.23	-13	-28.23	Vertical
461.78	-58.84	1.91	19.22	-41.53	-13	-28.53	Vertical
659.06	-58.85	1.91	19.21	-41.55	-13	-28.55	Horizontal

Note:

1. Pre-test tests all modes, only the worst mode data is recorded in the report
2. All other emissions more than 20dB below the limit

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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3701.4	-59.44	4.04	33.51	-29.97	-13	-16.97	Horizontal
3701.4	-60.17	4.04	33.51	-30.70	-13	-17.70	Vertical
5552.1	-57.81	5.24	35.84	-27.21	-13	-14.21	Vertical
5552.1	-58.14	5.24	35.84	-27.54	-13	-14.54	Horizontal
Test Results for Mid Channel 1880MHz							
3760	-59.14	4.04	33.56	-29.62	-13	-16.62	Horizontal
3760	-57.44	4.04	33.56	-27.92	-13	-14.92	Vertical
5640	-58.57	5.24	35.91	-27.90	-13	-14.90	Vertical
5640	-57.81	5.24	35.91	-27.14	-13	-14.14	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-59.27	4.04	34.00	-29.31	-13	-16.31	Horizontal
3818.6	-58.45	4.04	34.00	-28.49	-13	-15.49	Vertical
5727.9	-57.97	5.24	36.04	-27.17	-13	-14.17	Vertical
5727.9	-58.53	5.24	36.04	-27.73	-13	-14.73	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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720	-56.89	4.07	33.54	-27.42	-13	-14.42	Horizontal
3720	-56.78	4.07	33.54	-27.31	-13	-14.31	Vertical
5580	-58.48	5.28	35.86	-27.90	-13	-14.90	Vertical
5580	-59.53	5.28	35.86	-28.95	-13	-15.95	Horizontal
Test Results for Mid Channel 1880MHz							
3760	-57.81	4.04	33.56	-28.29	-13	-15.29	Horizontal
3760	-58.24	4.04	33.56	-28.72	-13	-15.72	Vertical
5640	-59.44	5.24	35.91	-28.77	-13	-15.77	Vertical
5640	-58.14	5.24	35.91	-27.47	-13	-14.47	Horizontal
Test Results for High Channel 1900MHz							
3800	-58.24	4.04	34.00	-28.28	-13	-15.28	Horizontal
3800	-57.81	4.04	34.00	-27.85	-13	-14.85	Vertical
5700	-58.24	5.24	36.04	-27.44	-13	-14.44	Vertical
5700	-59.45	5.24	36.04	-28.65	-13	-15.65	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

. Over Limit= : P_{Mea}(dBm)-Limit(dBm)

. We test both H direction and V direction, recorded worst case direction.

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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-54.47	4.02	29.80	-28.69	-13	-15.69	Horizontal
3421.4	-55.14	4.02	29.80	-29.36	-13	-16.36	Vertical
5132.1	-58.24	5.24	35.84	-27.64	-13	-14.64	Vertical
5132.1	-59.56	5.24	35.84	-28.96	-13	-15.96	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465	-52.18	4.03	30.00	-26.21	-13	-13.21	Horizontal
3465	-52.90	4.03	30.00	-26.93	-13	-13.93	Vertical
5197.5	-57.24	5.25	35.86	-26.63	-13	-13.63	Vertical
5197.5	-57.53	5.25	35.86	-26.92	-13	-13.92	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-55.24	4.05	30.01	-29.28	-13	-16.28	Horizontal
3508.6	-57.00	4.05	30.01	-31.04	-13	-18.04	Vertical
5262.9	-57.35	5.26	35.86	-26.75	-13	-13.75	Vertical
5262.9	-56.76	5.26	35.86	-26.16	-13	-13.16	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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440	-57.14	4.02	29.80	-31.36	-13	-18.36	Horizontal
3440	-55.48	4.02	29.80	-29.70	-13	-16.70	Vertical
5160	-58.23	5.24	35.84	-27.63	-13	-14.63	Vertical
5160	-59.44	5.24	35.84	-28.84	-13	-15.84	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465	-54.45	4.03	30.00	-28.48	-13	-15.48	Horizontal
3465	-55.67	4.03	30.00	-29.70	-13	-16.70	Vertical
5197.5	-57.78	5.25	35.86	-27.17	-13	-14.17	Vertical
5197.5	-58.27	5.25	35.86	-27.66	-13	-14.66	Horizontal
Test Results for High Channel 1745MHz							
3490	-54.45	2.91	27.68	-29.68	-13	-16.68	Horizontal
3490	-57.81	2.91	27.68	-33.04	-13	-20.04	Vertical
5235	-58.45	5.26	35.86	-27.85	-13	-14.85	Vertical
5235	-59.14	5.26	35.86	-28.54	-13	-15.54	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

Over Limit= : P_{Mea}(dBm)-Limit(dBm)

We test both H direction and V direction, recorded worst case direction.

9.3 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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005	-84.24	5.23	35.81	-53.66	-25.00	-28.66	Horizontal
5005	-83.53	5.23	35.81	-52.95	-25.00	-27.95	Vertical
7507.5	-82.54	5.67	36.85	-51.36	-25.00	-26.36	Vertical
7507.5	-82.13	5.67	36.85	-50.95	-25.00	-25.95	Horizontal
Test Results for Mid Channel 2535MHz							
5070	-80.93	5.23	35.82	-50.34	-25.00	-25.34	Horizontal
5070	-82.02	5.23	35.82	-51.43	-25.00	-26.43	Vertical
7605	-82.57	5.67	36.85	-51.39	-25.00	-26.39	Vertical
7605	-83.05	5.67	36.85	-51.87	-25.00	-26.87	Horizontal
Test Results for High Channel 2567.5MHz							
5135	-85.14	5.24	35.83	-54.55	-25.00	-29.55	Horizontal
5135	-82.70	5.24	35.83	-52.11	-25.00	-27.11	Vertical
7702.5	-83.53	5.68	36.87	-52.34	-25.00	-27.34	Vertical
7702.5	-83.87	5.68	36.87	-52.68	-25.00	-27.68	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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020	-81.90	5.23	35.82	-51.31	-25.00	-26.31	Horizontal
5020	-81.33	5.23	35.82	-50.74	-25.00	-25.74	Vertical
7530	-82.29	5.67	36.86	-51.10	-25.00	-26.10	Vertical
7530	-82.32	5.67	36.86	-51.13	-25.00	-26.13	Horizontal
Test Results for Mid Channel 2535MHz							
5070	-83.77	5.23	35.82	-53.18	-25.00	-28.18	Horizontal
5070	-83.10	5.23	35.82	-52.51	-25.00	-27.51	Vertical
7605	-82.90	5.67	36.85	-51.72	-25.00	-26.72	Vertical
7605	-84.44	5.67	36.85	-53.26	-25.00	-28.26	Horizontal
Test Results for High Channel 2560MHz							
5120	-81.62	5.24	35.83	-51.03	-25.00	-26.03	Horizontal
5120	-81.57	5.24	35.83	-50.98	-25.00	-25.98	Vertical
7680	-81.89	5.70	36.88	-50.71	-25.00	-25.71	Vertical
7680	-81.29	5.70	36.88	-50.11	-25.00	-25.11	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

Over Limit= : P_{Mea}(dBm)-Limit(dBm)

We test both H direction and V direction, recorded worst case direction.

9.4 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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1413	-53.23	2.61	27.28	-28.56	-13	-15.56	Horizontal
1413	-54.14	2.61	27.28	-29.47	-13	-16.47	Vertical
2119.5	-53.59	2.87	27.59	-28.87	-13	-15.87	Vertical
2119.5	-53.25	2.87	27.59	-28.53	-13	-15.53	Horizontal
Test Results For Mid Channel 710MHz							
1420	-52.70	2.62	27.30	-28.02	-13	-15.02	Horizontal
1420	-54.56	2.62	27.30	-29.88	-13	-16.88	Vertical
2130	-55.28	2.87	27.62	-30.53	-13	-17.53	Vertical
2130	-57.93	2.87	27.62	-33.18	-13	-20.18	Horizontal
Test Results for High Channel 713.5MHz							
1427	-54.86	2.66	27.28	-30.24	-13	-17.24	Horizontal
1427	-56.31	2.66	27.28	-31.69	-13	-18.69	Vertical
2140.5	-53.43	2.88	27.60	-28.71	-13	-15.71	Vertical
2140.5	-52.13	2.88	27.60	-27.41	-13	-14.41	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 Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1418	-55.76	2.62	27.30	-31.08	-13	-18.08	Horizontal
1418	-53.62	2.62	27.30	-28.94	-13	-15.94	Vertical
2127	-54.79	2.87	27.62	-30.04	-13	-17.04	Vertical
2127	-57.88	2.87	27.62	-33.13	-13	-20.13	Horizontal
Test Results for Mid Channel 710MHz							
1420	-55.32	2.62	27.30	-30.64	-13	-17.64	Horizontal
1420	-52.83	2.62	27.30	-28.15	-13	-15.15	Vertical
2130	-57.19	2.87	27.62	-32.44	-13	-19.44	Vertical
2130	-52.77	2.87	27.62	-28.02	-13	-15.02	Horizontal
Test Results for High Channel 711MHz							
1422	-53.81	2.62	27.30	-29.13	-13	-16.13	Horizontal
1422	-54.42	2.62	27.30	-29.74	-13	-16.74	Vertical
2133	-53.37	2.87	27.62	-28.62	-13	-15.62	Vertical
2133	-56.32	2.87	27.62	-31.57	-13	-18.57	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

Over Limit= : P_{Mea}(dBm)-Limit(dBm)

We test both H direction and V direction, recorded worst case direction.

10. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

Temp. = -30° to $+50^{\circ}\text{C}$

Voltage = low voltage, DC 3.4V, Normal, DC 3.8V 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 Band 2
LTE Band 4
LTE Band 7
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	-16.6	-0.008830	2.5
3.8	1880	-16.7	-0.008883	2.5
4.2	1880	-16.2	-0.008617	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	-16.6	-0.008830	2.5
Extreme (50C)	1880	-14.5	-0.007713	2.5
Extreme (40C)	1880	-14.6	-0.007766	2.5
Extreme (30C)	1880	-16.7	-0.008883	2.5
Extreme (10C)	1880	-17.2	-0.009149	2.5
Extreme (0C)	1880	-17.1	-0.009096	2.5
Extreme (-10C)	1880	-18.8	-0.010000	2.5
Extreme (-20C)	1880	-18	-0.009574	2.5
Extreme (-30C)	1880	-18.7	-0.009947	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	-22.5	-0.011968	2.5
3.8	1880	-18.9	-0.010053	2.5
4.2	1880	-22.1	-0.011755	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	-22.8	-0.012128	2.5
Extreme (50C)	1880	-24	-0.012766	2.5
Extreme (40C)	1880	-23.6	-0.012553	2.5
Extreme (30C)	1880	-22.1	-0.011755	2.5
Extreme (10C)	1880	-22.7	-0.012074	2.5
Extreme (0C)	1880	-21.6	-0.011489	2.5
Extreme (-10C)	1880	-21	-0.011170	2.5
Extreme (-20C)	1880	-20.8	-0.011064	2.5
Extreme (-30C)	1880	-20.1	-0.010691	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	-18.4	-0.010620	2.5
3.8	1732.5	-18.4	-0.010620	2.5
4.2	1732.5	-18.5	-0.010678	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	-15.3	-0.008831	2.5
Extreme (50C)	1732.5	-17	-0.009812	2.5
Extreme (40C)	1732.5	-16.7	-0.009639	2.5
Extreme (30C)	1732.5	-16.7	-0.009639	2.5
Extreme (10C)	1732.5	-15	-0.008658	2.5
Extreme (0C)	1732.5	-14.2	-0.008196	2.5
Extreme (-10C)	1732.5	-14.5	-0.008369	2.5
Extreme (-20C)	1732.5	-18.7	-0.010794	2.5
Extreme (-30C)	1732.5	-17.1	-0.009870	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	-16.1	-0.009293	2.5
3.8	1732.5	-16.8	-0.009697	2.5
4.2	1732.5	-16.6	-0.009582	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	-16.7	-0.009639	2.5
Extreme (50C)	1732.5	-13.7	-0.007908	2.5
Extreme (40C)	1732.5	-14.2	-0.008196	2.5
Extreme (30C)	1732.5	-15.5	-0.008947	2.5
Extreme (10C)	1732.5	-16.1	-0.009293	2.5
Extreme (0C)	1732.5	-15.8	-0.009120	2.5
Extreme (-10C)	1732.5	-14	-0.008081	2.5
Extreme (-20C)	1732.5	-15.6	-0.009004	2.5
Extreme (-30C)	1732.5	-15.5	-0.008947	2.5

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

10.3 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	-25.5	-0.010059	2.5
3.8	2535	-25.9	-0.010217	2.5
4.2	2535	-26.3	-0.010375	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	-26.2	-0.010335	2.5
Extreme (50C)	2535	-29	-0.011440	2.5
Extreme (40C)	2535	-31.1	-0.012268	2.5
Extreme (30C)	2535	-26.1	-0.010296	2.5
Extreme (10C)	2535	-25.7	-0.010138	2.5
Extreme (0C)	2535	-24.8	-0.009783	2.5
Extreme (-10C)	2535	-28	-0.011045	2.5
Extreme (-20C)	2535	-26.5	-0.010454	2.5
Extreme (-30C)	2535	-29.6	-0.011677	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	-27.4	-0.010809	2.5
3.8	2535	-27.8	-0.010966	2.5
4.2	2535	-27.8	-0.010966	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	-27.1	-0.010690	2.5
Extreme (50C)	2535	-28.6	-0.011282	2.5
Extreme (40C)	2535	-30.1	-0.011874	2.5
Extreme (30C)	2535	-27.2	-0.010730	2.5
Extreme (10C)	2535	-27.3	-0.010769	2.5
Extreme (0C)	2535	-28	-0.011045	2.5
Extreme (-10C)	2535	-28.8	-0.011361	2.5
Extreme (-20C)	2535	-28.4	-0.011203	2.5
Extreme (-30C)	2535	-29.1	-0.011479	2.5

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

10.4 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	-11	-0.015493	2.5
3.8	710.0	-10.4	-0.014648	2.5
4.2	710.0	-10.2	-0.014366	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710.0	-10.5	-0.014789	2.5
Extreme (50C)	710.0	-11	-0.015493	2.5
Extreme (40C)	710.0	-10.5	-0.014789	2.5
Extreme (30C)	710.0	-11.3	-0.015915	2.5
Extreme (10C)	710.0	-11.2	-0.015775	2.5
Extreme (0C)	710.0	-11.3	-0.015915	2.5
Extreme (-10C)	710.0	-10.4	-0.014648	2.5
Extreme (-20C)	710.0	-10.9	-0.015352	2.5
Extreme (-30C)	710.0	-10.8	-0.015211	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	-12.3	-0.017324	2.5
3.8	710.0	-12.6	-0.017746	2.5
4.2	710.0	-12.1	-0.017042	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	-12.1	-0.017042	2.5
Extreme (50C)	710.0	-13.2	-0.018592	2.5
Extreme (40C)	710.0	-12.7	-0.017887	2.5
Extreme (30C)	710.0	-12.2	-0.017183	2.5
Extreme (10C)	710.0	-12.3	-0.017324	2.5
Extreme (0C)	710.0	-12.7	-0.017887	2.5
Extreme (-10C)	710.0	-13	-0.018310	2.5
Extreme (-20C)	710.0	-12.5	-0.017606	2.5
Extreme (-30C)	710.0	-12.9	-0.018169	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.

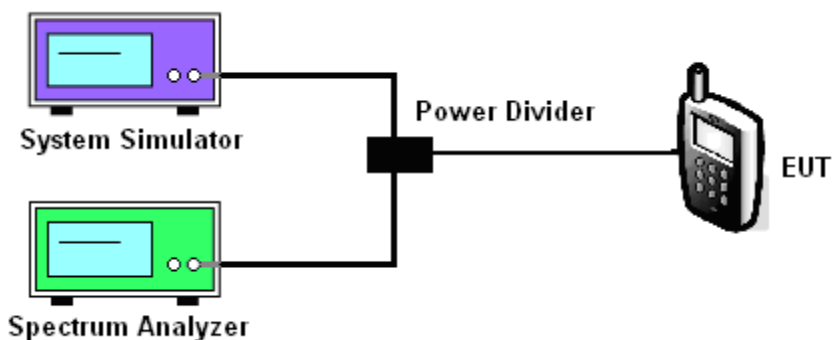
11.2 Measuring Instruments

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
- LTE Band 4
- LTE Band 7
- LTE Band 17

Test data reference attachment.

----END OF REPORT----