FCC CFR47 PART 22H and 27
CERTIFICATION TEST REPORT
FCC ID: 2ARTX-LN99102GB

Product： Mobile Phone

Trade Mark： LAVA XOLO

Model Number： LN9910_2GB

Family Model： N/A

Report No.： STR190606003004E

Prepared for

LAVA International Limited

A-56, Sector 64, Noida 201301, U.P., India

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name ..... :	LAVA International Limited
Address..... :	A-56, Sector 64, Noida 201301, U.P., India
Manufacturer's Name..... :	LAVA International Limited
Address..... :	A-56, Sector 64, Noida 201301, U.P., India
Product name..... :	Mobile Phone
Model and/or type reference .. :	LN9910_2GB
Family Model:	N/A
Standards..... :	FCC CFR 47 Part 22H and 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..... Jun. 10, 2019 ~ Jul. 09, 2019

Date of Issue..... Jul. 09, 2019

Test Result..... **Pass**

Testing Engineer : Cheng Jiawen

(Cheng Jiawen)

Technical Manager : Jason chen

(Jason Chen)

Authorized Signatory : Sam . Chen

(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	LAVA XOLO
Model Name	LN9910_2GB
Family Model	N/A
Model Difference	N/A
FCC ID:	2ARTX-LN99102GB
Frequency Bands:	U.S. Bands: ☒ LTE FDD Band 5; LTE TDD Band 41
Frequency Range:	LTE FDD Band 5 Uplink: 824MHz-849MHz, Downlink: 869MHz-894MHz; LTE TDD Band 41 Note2
Type of Modulation:	QPSK/16QAM
Antenna:	PIFA Antenna
Antenna gain:	-2.1dBi
Power Supply:	DC 3.85V/3000mAh from Battery or DC 5V from USB Port.
Adapter:	Model:CLV-15 Input: 100-240V~50/60Hz 0.2A Output: 5.0V⎓1.0A
Extreme Vol. Limits:	DC 3.4V to 4.2V (Nominal DC 3.85V) Note1
Extreme Temp.	-10℃ to +40℃
HW Version	OP29_MB_V1.0
SW Version	TEST_LAVA_LN9910_1_16_V1.0_S101_20190510_ENG_INT

** Note: 1. The High Voltage 4.2V and Low Voltage 3.4V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.

2. Frequency Range:

Test Frequency ID	Bandwidth(MHz)	EARFCN	Frequency (UL and DL) (MHz)
Low Range	5	40265	2557.5
	10	40290	2560
	15	40315	2562.5
	20	40340	2565
Mid Range	5/10/15/20	40740	2605
High Range	5	41215	2652.5
	10	41190	2650
	15	41165	2648.5
	20	41140	2645

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2ARTX-LN99102GB** filing to comply with the FCC Part 22H and 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 22H and 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

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: LTE FDD Band 5, LTE TDD Band 41

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

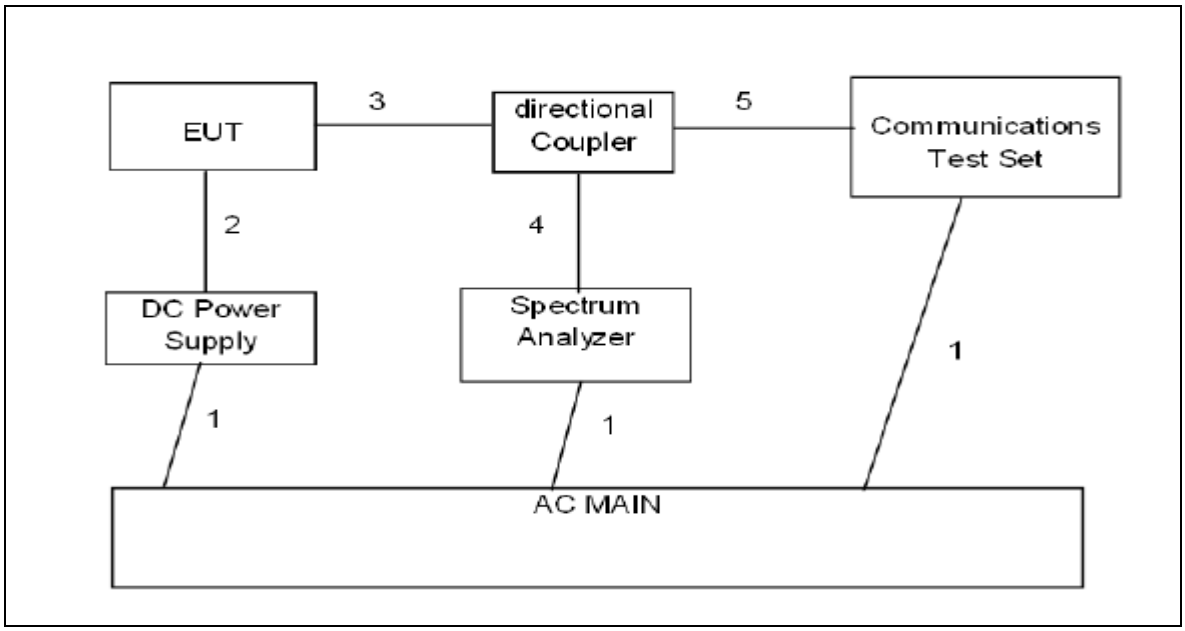
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	Series No.	Note
1	Mobile Phone	LN9910_2GB	N/A	EUT

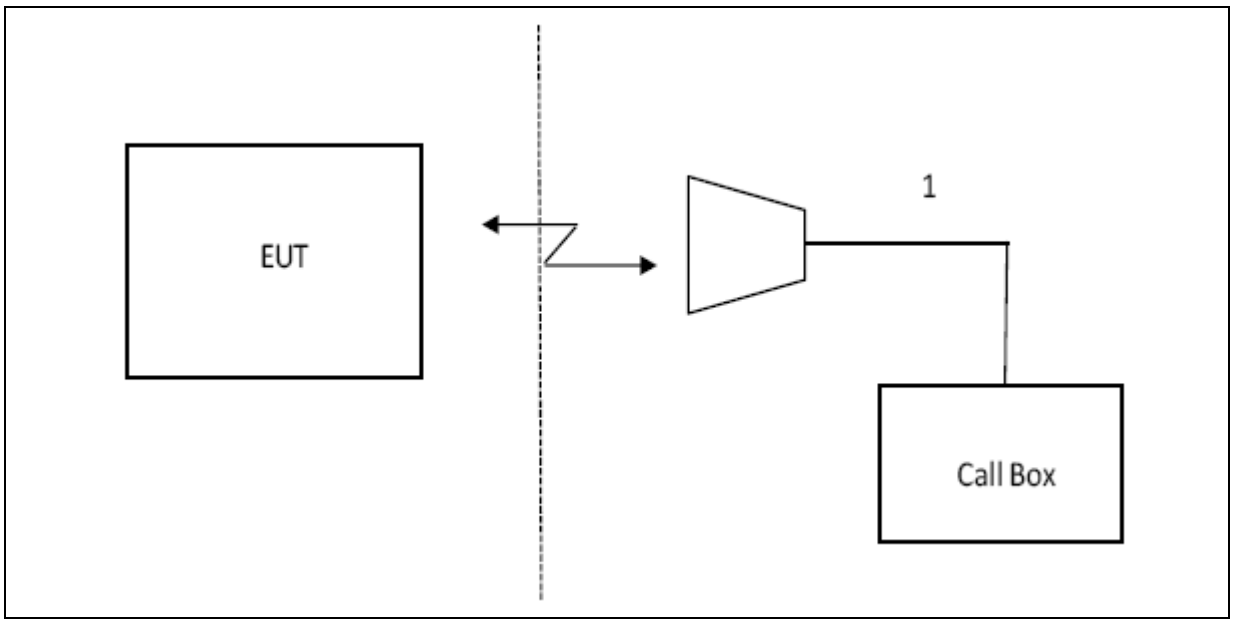
Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.

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
Bilogical 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 5

□ LTE Band 41

RESULTS

PASS

Test data reference attachment

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §22.359, §27.53

LIMITS

FCC: §27.53, §22.359

(m)(6) *Measurement procedure.* Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz 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; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent 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 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). 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. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

(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 that 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 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 at -13 dBm
Set resolution bandwidth to at least 1% of emission bandwidth.

MODES TESTED

- LTE Band 5
  LTE Band 41

RESULTS

Test data reference attachment

7. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §22.359, §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 5

  LTE Band 41

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, §22.901, §22.917, §22.359, §27.50

LIMITS:

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 5
- LTE Band 41

RESULTS

PASS

8.2 LTE BAND 5

Radiated Power (ERP) for Band 5										
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	
1.4MHz Band QPSK	6/0	824.7	4.13	2.01	19.68	2.15	19.65	92.308	Horizontal	Pass
		836.5	4.17	2.01	19.77	2.15	19.78	95.165	Horizontal	Pass
		848.3	4.05	2.02	19.82	2.15	19.70	93.282	Horizontal	Pass
3.0MHz Band QPSK	15/0	825.5	4.14	2.01	19.7	2.15	19.68	92.874	Horizontal	Pass
		836.5	4.18	2.01	19.77	2.15	19.79	95.170	Horizontal	Pass
		847.5	3.98	2.02	19.81	2.15	19.62	91.589	Horizontal	Pass
5.0MHz Band QPSK	25/0	826.5	3.98	2.01	19.71	2.15	19.53	89.696	Horizontal	Pass
		836.5	3.91	2.01	19.77	2.15	19.52	89.569	Horizontal	Pass
		846.5	3.94	2.02	19.79	2.15	19.56	90.350	Horizontal	Pass
10.0MHz Band QPSK	50/0	829	3.94	2.01	19.73	2.15	19.51	89.238	Horizontal	Pass
		836.5	3.95	2.01	19.77	2.15	19.56	90.374	Horizontal	Pass
		844	3.89	2.02	19.78	2.15	19.50	89.157	Horizontal	Pass
1.4MHz Band QPSK	6/0	824.7	4.14	2.01	19.68	2.15	19.66	92.395	Vertical	Pass
		836.5	4.13	2.01	19.77	2.15	19.74	94.162	Vertical	Pass
		848.3	4.02	2.02	19.82	2.15	19.67	92.662	Vertical	Pass
3.0MHz Band QPSK	15/0	825.5	4.12	2.01	19.7	2.15	19.66	92.399	Vertical	Pass
		836.5	4.04	2.01	19.77	2.15	19.65	92.272	Vertical	Pass
		847.5	4.00	2.02	19.81	2.15	19.64	92.017	Vertical	Pass
5.0MHz Band QPSK	25/0	826.5	3.89	2.01	19.71	2.15	19.44	87.918	Vertical	Pass
		836.5	3.84	2.01	19.77	2.15	19.45	88.148	Vertical	Pass
		846.5	4.07	2.02	19.79	2.15	19.69	93.005	Vertical	Pass
10.0MHz Band QPSK	50/0	829	4.06	2.01	19.73	2.15	19.63	91.747	Vertical	Pass
		836.5	3.92	2.01	19.77	2.15	19.53	89.829	Vertical	Pass
		844	4.23	2.02	19.78	2.15	19.84	96.447	Vertical	Pass

Note:
SG Level= Signal generator output
Max. ERP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)-2.15

Radiated Power (ERP) for Band 5										
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	
1.4MHz Band 16 QAM	6/0	824.7	2.89	2.01	19.68	2.15	18.41	69.384	Horizontal	Pass
		836.5	2.99	2.01	19.77	2.15	18.60	72.485	Horizontal	Pass
		848.3	2.99	2.02	19.82	2.15	18.64	73.082	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	825.5	3.29	2.01	19.7	2.15	18.83	76.352	Horizontal	Pass
		836.5	3.15	2.01	19.77	2.15	18.76	75.096	Horizontal	Pass
		847.5	2.94	2.02	19.81	2.15	18.58	72.108	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	826.5	3.04	2.01	19.71	2.15	18.59	72.201	Horizontal	Pass
		836.5	3.13	2.01	19.77	2.15	18.74	74.783	Horizontal	Pass
		846.5	2.99	2.02	19.79	2.15	18.61	72.599	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	829	3.28	2.01	19.73	2.15	18.85	76.666	Horizontal	Pass
		836.5	3.17	2.01	19.77	2.15	18.78	75.484	Horizontal	Pass
		844	3.13	2.02	19.78	2.15	18.74	74.861	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	824.7	3.11	2.01	19.68	2.15	18.63	72.862	Vertical	Pass
		836.5	3.02	2.01	19.77	2.15	18.63	72.956	Vertical	Pass
		848.3	2.98	2.02	19.82	2.15	18.63	72.964	Vertical	Pass
3.0MHz Band 16 QAM	15/0	825.5	3.06	2.01	19.7	2.15	18.60	72.378	Vertical	Pass
		836.5	3.16	2.01	19.77	2.15	18.77	75.251	Vertical	Pass
		847.5	2.97	2.02	19.81	2.15	18.61	72.598	Vertical	Pass
5.0MHz Band 16 QAM	25/0	826.5	3.10	2.01	19.71	2.15	18.65	73.317	Vertical	Pass
		836.5	3.11	2.01	19.77	2.15	18.72	74.431	Vertical	Pass
		846.5	2.99	2.02	19.79	2.15	18.61	72.668	Vertical	Pass
10.0MHz Band 16 QAM	50/0	829	3.23	2.01	19.73	2.15	18.80	75.806	Vertical	Pass
		836.5	3.26	2.01	19.77	2.15	18.87	77.145	Vertical	Pass
		844	3.18	2.02	19.78	2.15	18.79	75.669	Vertical	Pass

Note:
SG Level= Signal generator output
Max. ERP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)-2.15

8.3 LTE BAND 41

Radiated Power (EIRP) for Band 41									
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	
5.0MHz Band QPSK	25/0	2537.5	-3.83	3.661	28.31	20.81	120.640	Vertical	Pass
		2595	-3.73	3.758	28.22	20.74	118.462	Vertical	Pass
		2652.5	-3.86	3.912	28.2	20.43	110.451	Vertical	Pass
10.0MHz Band QPSK	50/0	2540	-4.21	3.901	28.33	20.22	105.114	Vertical	Pass
		2595	-4.14	3.776	28.22	20.31	107.308	Vertical	Pass
		2650	-3.97	3.871	28.19	20.35	108.393	Vertical	Pass
15.0MHz Band QPSK	75/0	2542.5	-3.79	3.894	28.34	20.65	116.266	Vertical	Pass
		2595	-3.40	3.997	28.22	20.82	120.781	Vertical	Pass
		2647.5	-3.83	3.94	28.18	20.41	109.908	Vertical	Pass
20.0MHz Band QPSK	100/0	2545	-3.84	3.939	28.35	20.58	114.159	Vertical	Pass
		2595	-4.33	3.836	28.22	20.06	101.310	Vertical	Pass
		2645	-3.17	4.174	28.16	20.82	120.695	Vertical	Pass
5.0MHz Band QPSK	25/0	2537.5	-4.50	3.71	28.31	20.11	102.484	Horizontal	Pass
		2595	-3.77	3.93	28.22	20.52	112.613	Horizontal	Pass
		2652.5	-4.05	4.03	28.2	20.12	102.731	Horizontal	Pass
10.0MHz Band QPSK	50/0	2540	-4.01	3.96	28.33	20.35	108.467	Horizontal	Pass
		2595	-3.41	4.15	28.22	20.66	116.491	Horizontal	Pass
		2650	-3.79	3.92	28.19	20.48	111.665	Horizontal	Pass
15.0MHz Band QPSK	75/0	2542.5	-3.58	3.98	28.34	20.78	119.555	Horizontal	Pass
		2595	-4.26	3.81	28.22	20.14	103.343	Horizontal	Pass
		2647.5	-3.48	4.15	28.18	20.54	113.322	Horizontal	Pass
20.0MHz Band QPSK	100/0	2545	-4.21	3.70	28.35	20.44	110.748	Horizontal	Pass
		2595	-3.81	4.05	28.22	20.37	108.873	Horizontal	Pass
		2645	-3.04	4.18	28.16	20.94	124.268	Horizontal	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 41									
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	
5.0MHz Band 16 QAM	25/0	2537.5	-5.20	3.80	28.31	19.31	85.354	Vertical	Pass
		2595	-4.67	3.85	28.22	19.69	93.158	Vertical	Pass
		2652.5	-5.22	3.83	28.2	19.15	82.215	Vertical	Pass
10.0MHz Band 16 QAM	50/0	2540	-4.82	3.93	28.33	19.58	90.731	Vertical	Pass
		2595	-4.23	4.07	28.22	19.92	98.088	Vertical	Pass
		2650	-4.36	3.99	28.19	19.84	96.327	Vertical	Pass
15.0MHz Band 16 QAM	75/0	2542.5	-4.96	3.84	28.34	19.55	90.062	Vertical	Pass
		2595	-5.15	4.10	28.22	18.97	78.823	Vertical	Pass
		2647.5	-5.16	3.94	28.18	19.07	80.767	Vertical	Pass
20.0MHz Band 16 QAM	100/0	2545	-4.80	3.90	28.35	19.65	92.269	Vertical	Pass
		2595	-4.98	3.80	28.22	19.43	87.784	Vertical	Pass
		2645	-4.42	3.86	28.16	19.88	97.370	Vertical	Pass
5.0MHz Band 16 QAM	25/0	2537.5	-5.50	3.69	28.31	19.12	81.641	Horizontal	Pass
		2595	-4.47	3.79	28.22	19.96	99.183	Horizontal	Pass
		2652.5	-5.18	4.09	28.2	18.93	78.145	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	2540	-5.45	3.86	28.33	19.02	79.776	Horizontal	Pass
		2595	-4.62	3.82	28.22	19.78	95.039	Horizontal	Pass
		2650	-4.64	3.96	28.19	19.58	90.838	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	2542.5	-5.44	3.83	28.34	19.07	80.778	Horizontal	Pass
		2595	-4.47	4.02	28.22	19.73	93.999	Horizontal	Pass
		2647.5	-4.29	4.06	28.18	19.82	96.033	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	2545	-4.43	3.88	28.35	20.04	100.902	Horizontal	Pass
		2595	-4.53	3.86	28.22	19.82	96.023	Horizontal	Pass
		2645	-4.86	3.95	28.16	19.36	86.260	Horizontal	Pass

Note:
SG Level= Signal generator output
Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

FCC: §2.1053, §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 log10(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 Log10 (p), dB; and
b. for mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB at the channel edges and 55 + 10 Log10 (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 5
  LTE Band 41

RESULTS

PASS

9.1 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 Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1649.4	-53.53	2.78	27.50	-28.81	-13	-15.81	Horizontal
1649.4	-47.43	2.78	27.50	-22.71	-13	-9.71	Vertical
2474.1	-50.50	2.90	27.80	-25.60	-13	-12.60	Vertical
2474.1	-51.57	2.90	27.80	-26.67	-13	-13.67	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-53.81	2.80	27.48	-29.13	-13	-16.13	Horizontal
1673.0	-51.71	2.80	27.48	-27.03	-13	-14.03	Vertical
2509.5	-55.22	2.91	27.70	-30.43	-13	-17.43	Vertical
2509.5	-51.22	2.91	27.70	-26.43	-13	-13.43	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-52.45	2.82	27.43	-27.84	-13	-14.84	Horizontal
1696.6	-52.58	2.82	27.43	-27.97	-13	-14.97	Vertical
2544.9	-48.60	2.92	27.74	-23.78	-13	-10.78	Vertical
2544.9	-53.61	2.92	27.74	-28.79	-13	-15.79	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 Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1658.0	-51.83	2.78	27.50	-27.11	-13	-14.11	Horizontal
1658.0	-55.11	2.78	27.50	-30.39	-13	-17.39	Vertical
2487.0	-54.34	2.90	27.80	-29.44	-13	-16.44	Vertical
2487.0	-46.86	2.90	27.80	-21.96	-13	-8.96	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-51.44	2.80	27.48	-26.76	-13	-13.76	Horizontal
1673.0	-53.53	2.80	27.48	-28.85	-13	-15.85	Vertical
2509.5	-54.54	2.91	27.70	-29.75	-13	-16.75	Vertical
2509.5	-54.29	2.91	27.70	-29.50	-13	-16.50	Horizontal
Test Results for High Channel 844MHz							
1688.0	-52.54	2.82	27.43	-27.93	-13	-14.93	Horizontal
1688.0	-54.27	2.82	27.43	-29.66	-13	-16.66	Vertical
2532.0	-52.47	2.92	27.74	-27.65	-13	-14.65	Vertical
2532.0	-54.88	2.92	27.74	-30.06	-13	-17.06	Horizontal

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)

. Over Limit= : PMea(dBm)-Limit(dBm)

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

9.2 LTE BAND 41

QPSK EIRP POWER FOR LTE BAND 41 (5MHZ BANDWIDTH)

Test Results for Low Channel 2557.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
5075.0	-48.81	4.04	33.51	-19.34	-13	-6.34	Horizontal
5075.0	-50.95	4.04	33.51	-21.48	-13	-8.48	Vertical
7612.5	-54.72	5.24	35.84	-24.12	-13	-11.12	Vertical
7612.5	-65.20	5.24	35.84	-34.60	-13	-21.60	Horizontal
Test Results for Mid Channel 2605MHz							
5190.0	-49.79	4.04	33.56	-20.27	-13	-7.27	Horizontal
5190.0	-50.19	4.04	33.56	-20.67	-13	-7.67	Vertical
7785.0	-51.39	5.24	35.91	-20.72	-13	-7.72	Vertical
7785.0	-53.38	5.24	35.91	-22.71	-13	-9.71	Horizontal
Test Results for High Channel 2652.5MHz							
5305.0	-50.66	4.04	34.00	-20.70	-13	-7.70	Horizontal
5305.0	-52.68	4.04	34.00	-22.72	-13	-9.72	Vertical
7957.5	-53.86	5.24	36.04	-23.06	-13	-10.06	Vertical
7957.5	-54.24	5.24	36.04	-23.44	-13	-10.44	Horizontal

QPSK EIRP POWER FOR LTE BAND 41 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 2565MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
5090.0	-54.11	4.07	33.54	-24.64	-13	-11.64	Horizontal
5090.0	-49.37	4.07	33.54	-19.90	-13	-6.90	Vertical
7635.0	-55.87	5.28	35.86	-25.29	-13	-12.29	Vertical
7635.0	-56.65	5.28	35.86	-26.07	-13	-13.07	Horizontal
Test Results for Mid Channel 2605MHz							
5190.0	-53.26	4.04	33.56	-23.74	-13	-10.74	Horizontal
5190.0	-50.49	4.04	33.56	-20.97	-13	-7.97	Vertical
7785.0	-55.28	5.24	35.91	-24.61	-13	-11.61	Vertical
7785.0	-55.92	5.24	35.91	-25.25	-13	-12.25	Horizontal
Test Results for High Channel 2645MHz							
5290.0	-52.88	4.04	34.00	-22.92	-13	-9.92	Horizontal
5290.0	-53.56	4.04	34.00	-23.60	-13	-10.60	Vertical
7935.0	-55.59	5.24	36.04	-24.79	-13	-11.79	Vertical
7935.0	-52.31	5.24	36.04	-21.51	-13	-8.51	Horizontal

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)

. Over Limit= : PMea(dBm)-Limit(dBm)

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

10. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §27.54

LIMITS

§27.54 - 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°C
- Voltage =low voltage,DC 3.2V, Normal, DC 3.85V and High voltage, DC 4.4V.

Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to -30ºC 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 +50ºC is reached.

Frequency Stability vs Voltage:

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

MODES TESTED

- LTE Band 5

LTE Band 41

RESULTS

See the following pages.

10.1 LTE BAND 5

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	836.5	1.15	0.001375	2.5
3.85	836.5	1.12	0.001339	2.5
4.2	836.5	1.11	0.001327	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	1.06	0.001267	2.5
Extreme (50C)	836.5	1.16	0.001387	2.5
Extreme (40C)	836.5	1.11	0.001327	2.5
Extreme (30C)	836.5	1.09	0.001303	2.5
Extreme (10C)	836.5	1.08	0.001291	2.5
Extreme (0C)	836.5	1.07	0.001279	2.5
Extreme (-10C)	836.5	1.13	0.001351	2.5
Extreme (-20C)	836.5	1.21	0.001447	2.5
Extreme (-30C)	836.5	1.13	0.001351	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	836.5	0.47	0.000562	2.5
3.85	836.5	0.35	0.000418	2.5
4.2	836.5	0.39	0.000466	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	0.38	0.000454	2.5
Extreme (50C)	836.5	0.29	0.000347	2.5
Extreme (40C)	836.5	0.29	0.000347	2.5
Extreme (30C)	836.5	0.31	0.000371	2.5
Extreme (10C)	836.5	0.33	0.000395	2.5
Extreme (0C)	836.5	0.33	0.000395	2.5
Extreme (-10C)	836.5	0.31	0.000371	2.5
Extreme (-20C)	836.5	0.39	0.000466	2.5
Extreme (-30C)	836.5	0.38	0.000454	2.5

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

10.2 LTE BAND 41

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
QPSK, (CH 40740 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2595	-29.62	-0.011414	2.5
3.85	2595	-26.83	-0.010339	2.5
4.2	2595	-26.47	-0.010200	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
QPSK, (CH 40740 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2595	-26.37	-0.010162	2.5
Extreme (50C)	2595	-26.11	-0.010062	2.5
Extreme (40C)	2595	-26.24	-0.010112	2.5
Extreme (30C)	2595	-26.27	-0.010123	2.5
Extreme (10C)	2595	-25.83	-0.009954	2.5
Extreme (0C)	2595	-26.91	-0.010370	2.5
Extreme (-10C)	2595	-27.17	-0.010470	2.5
Extreme (-20C)	2595	-26.63	-0.010262	2.5
Extreme (-30C)	2595	-26.77	-0.010316	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
16QAM, (CH 40740 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2595	-36.29	-0.013985	2.5
3.85	2595	-34.83	-0.013422	2.5
4.2	2595	-34.97	-0.013476	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
16QAM, (CH 40740 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2595	-34.27	-0.013206	2.5
Extreme (50C)	2595	-34.76	-0.013395	2.5
Extreme (40C)	2595	-34.21	-0.013183	2.5
Extreme (30C)	2595	-35.38	-0.013634	2.5
Extreme (10C)	2595	-34.47	-0.013283	2.5
Extreme (0C)	2595	-35.19	-0.013561	2.5
Extreme (-10C)	2595	-33.93	-0.013075	2.5
Extreme (-20C)	2595	-33.56	-0.012933	2.5
Extreme (-30C)	2595	-34.27	-0.013206	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.

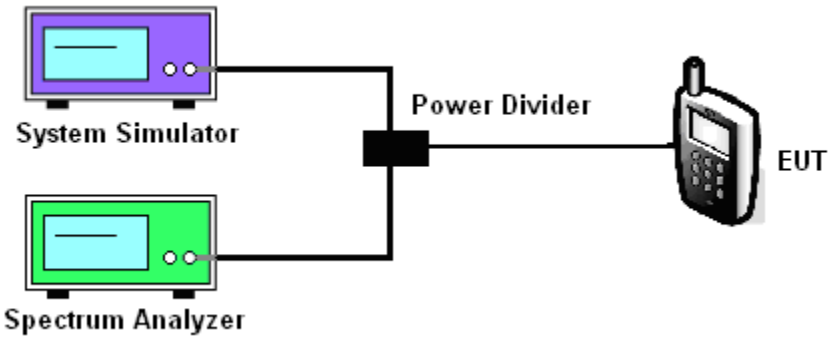
11.2 Measuring Instruments

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 Band5
- LTE Band 41

Test data reference attachment

----END OF REPORT----