FCC PART 22 TEST REPORT

FCC Part 22

Report Reference No. ..... :	**LCS190220021AEF**
FCC ID. ..... :	**2APTIS62E81**
Date of Issue. ..... :	**April 10, 2019**
Testing Laboratory Name .....:	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address.....:	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
Applicant's name.....:	**Panasonic India Pvt Ltd**
Address.....:	12th Floor Ambience Tower, Ambience Island, NH-8, Gurgaon, Haryana-122002, India
Test specification ..... **:**	
Standard .....:	**FCC CFR Title 47 Part 2, Part 22** **TIA-603-E: 2016** **KDB 971168 D01**
Test Report Form No.....:	LCSEMC-1.0
TRF Originator.....:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF.....:	Dated 2011-03

Test item description ..... :	**Smart Phone**
Trade Mark .....:	Panasonic
Test Model.....:	Eluga Ray 810
Listed Models .....:	N/A
Modulation Type .....:	QPSK, 16QAM
Rating .....:	DC 3.85V by Rechargeable Li-polymer Battery(4000mAh) Recharged by DC 5V Adapter
Hardware version .....:	V1.2
Software version.....:	EB-90S62E81v1001
Result.....:	**PASS**

Compiled by:	**Supervised by:**	**Approved by:**
Leo Lee	Calvin Weng	Gavin Liang
Leo Lee/ Administrators	Calvin Weng/ Technique principal	Gavin Liang/ Manager

T E S T R E P O R T

Test Report No. : LCS190220021AEF	April 10, 2019 Date of issue

Equipment under Test	:	Smart Phone
Test Model	:	Eluga Ray 810
Listed Models	:	N/A
Model Declaration	:	N/A
Applicant	:	**Panasonic India Pvt Ltd**
Address	:	12th Floor Ambience Tower, Ambience Island, NH-8, Gurgaon, Haryana-122002, India
Telephone	:	+91-124-4751300
Fax	:	+91-124-4751333
Manufacturer	:	**Panasonic India Pvt Ltd**
Address	:	12th Floor Ambience Tower, Ambience Island, NH-8, Gurgaon, Haryana-122002, India
Telephone	:	+91-124-4751300
Fax	:	+91-124-4751333
Factory	:	**Shenzhen Konka Telecommunications Technology Limited Manufacturing Branch**
Address	:	2-3th floor, NO.3 Juyou Industrial Park, Liaokeng Village, Shiyan Street, Baoan District, Shenzhen, China
Telephone	:	0755-66619988
Fax	:	0755-66619988

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revison History

Revision	Issue Date	Revisions	Revised By
000	April 10, 2019	Initial Issue	Gavin Liang

Contents

1 TEST STANDARDS

The tests were performed according to following standards:
FCC Part 22 (10-1-16 Edition): Private Land Mobile Radio Services.
TIA-603-E March 2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
47 CFR FCC Part 15 Subpart B: Unintentional Radiators
FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS
ANSI C63.4:2014: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
FCCKDB971168 D01 Power Meas License Digital Systems v03r01

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	March 05, 2019
Testing commenced on	:	March 05, 2019
Testing concluded on	:	March 27, 2019

2.2 Product Description

The **Panasonic India Pvt Ltd**'s Model: Eluga Ray 810 or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	Smart Phone
Test Model	Eluga Ray 810
Modulation Type	GMSK for GSM/GPRS; 8-PSK for EDGE; QPSK for UMTS; QPSK, 16QAM for LTE
Antenna Gain	-0.81dBi (max.) For GSM 850; -0.75dBi (max.) For GSM 900; 0.76dBi (max.) For DCS 1800; 0.79dBi (max.) For PCS 1900; 0.81dBi for WCDMA Band I; -0.75dBi for WCDMA Band VIII; 0.81dBi for LTE Band 1; 0.76dBi for LTE Band 3; -0.81dBi for LTE Band 5; -0.75dBi for LTE Band 8; -0.29dBi (max.) For BT and WLAN
Hardware version	V1.2
Software version	EB-90S62E81v1001
GSM/EDGE/GPRS Operation Frequency Band	GSM850/PCS1900/GPRS850/GPRS1900/EDGE850/EDGE1900
UMTS Operation Frequency Band	UMTS FDD Band I/VIII
LTE Operation Frequency Band	LTE FDD band 1, 3, 5, 8
GSM/EDGE/GPRS	Supported GSM/GPRS/EDGE
GSM Release Version	R99
GSM/EDGE/GPRS Power Class	GSM850:Power Class 4/ PCS1900:Power Class 1
GPRS/EDGE Multislot Class	GPRS/EDGE: Multi-slot Class 12
GPRS operation mode	Class B
WCDMA Release Version	R8
HSDPA Release Version	Release 8
HSUPA Release Version	Release 6
DC-HSUPA Release Version	Not Supported
LTE Release Version	R9
LTE/UMTS Power Class	Class 3
WLAN FCC Modulation Type	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11a/g/n: OFDM(64QAM, 16QAM, QPSK, BPSK)
WLAN FCC Operation frequency	IEEE 802.11b/g/n20:2412-2462MHz IEEE 802.11n40:2422-2452MHz
Antenna Type	PIFA Antenna
BT Modulation Type	GFSK, π/4-DQPSK, 8-DPSK (BT V4.0)
Extreme temp. Tolerance	-20°C to +55°C
GPS function	Support and only RX
FM function	Support and only RX
NFC Function	Not Supported
Extreme vol. Limits	3.40VDC to 4.30VDC (nominal: 3.85VDC)

2.3 Equipment under Test

Power supply system utilised

Power supply voltage	:	○	120V/ 60 Hz	○	115V/60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 3.85V

2.4 Short description of the Equipment under Test (EUT)

2.4.1 GeneralDescription

Eluga Ray 810 is subscriber equipment in the WCDMA/GSM/LTE system. The GSM/GPRS/EDGE frequency band includes GSM850, GSM900, DCS1800 and PCS1900. The HSPA/UMTS frequency band is Band I/VIII. LTE frequency band is band 1, band 3, band 5 and band 8. The LTE band 1, band 3 and band 8 is not allowed in U.S. and will be disabled for U.S. models.The LTE frequency band 5 test data included in this report. The Smart Phone implements such functions as RF signal receiving/transmitting, HSPA/UMTS/LTE and GSM/GPRS/EDGE protocol processing, voice, video MMS service and etc. Externally it provides SIM card interface.

NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

2.5 Internal Identification of AE used during the test

AE ID*	Description
AE1	Rechargeable Li-polymer Battery
AE2	Adapter

AE2
Model: A8A-050200U-US1
INPUT: AC 100-240V, 50/60Hz 0.35A
OUTPUT: DC 5V/2A
*AE ID: is used to identify the test sample in the lab internally.

2.6 Normal Accessory setting

Fully charged battery was used during the test.

2.7 EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

2.8 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2APTIS62E81** filing to comply with FCC Part 22, Part 24 and Part 27 Rules

2.9 Modifications

No modifications were implemented to meet testing criteria.

2.10 General Test Conditions/Configurations

2.10.1 Test Environment

EnvironmentParameter	SelectedValuesDuringTests	
Relative Humidity	Ambient	
Temperature	TN	Ambient
Voltage	VL	3.40V
	VN	3.85V
	VH	4.30V

NOTE:VL=lower extreme testvoltage VN=nominal voltage
VH=upper extreme testvoltage TN=normal temperature

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen LCS Compliance Testing Laboratory Ltd

1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
The sites are constructed in conformance with the requirements of ANSI C63.4 (2014) and CISPR Publication 22.

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC Registration Number. is 254912.
Industry Canada Registration Number. is 9642A-1.
ESMD Registration Number. is ARCB0108.
UL Registration Number. is 100571-492.
TUV SUD Registration Number. is SCN1081.
TUV RH Registration Number. is UA 50296516-001
NVLAP Registration Code is 600167-0

3.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4 Test Description

Cellular Band (824-849MHz pairedwith 869-894MHz)(band 5)

Test Item	FCC Rule No.	Requirements	Verdict
Effective(Isotropic) Radiated Output Power	§2.1046, §22.913	FCC: ERP ≤ 7W.	Pass
Modulation Characteristics	§2.1047	Digital modulation	N/A
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §22.917	≤-≤ -13dBm/1%*EBW, In 1MHz bands immediately outside and adjacent to The frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §22.917	FCC: ≤ -13dBm/100kHz, from 9kHz to 10th harmonics but outside authorized operating frequency ranges.	Pass
Field Strength of Spurious Radiation	§2.1053, §22.917	FCC: ≤ -13dBm/100kHz.	Pass
Frequency Stability	§2.1055, §22.355	≤ ±2.5ppm.	Pass
NOTE 1:For the verdict, the“N/A”denotes“not applicable”,the“N/T”de notes “not tested”.			

3.5 Equipments Used during the Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Power Meter	R&S	NRVS	100444	2018-06-16	2019-06-15
2	Power Sensor	R&S	NRV-Z81	100458	2018-06-16	2019-06-15
3	Power Sensor	R&S	NRV-Z32	10057	2018-06-16	2019-06-15
4	LTE Test Software	Tonscend	JS1120-1	N/A	N/A	N/A
5	RF Control Unit	Tonscend	JS0806	158060009	2018-06-16	2019-06-15
6	MXA Signal Analyzer	Agilent	N9020A	MY51250905	2018-11-15	2019-11-14
7	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2018-06-16	2019-06-15
8	DC Power Supply	Agilent	E3642A	N/A	2018-11-15	2019-11-14
9	EMI Test Software	AUDIX	E3	N/A	2018-06-16	2019-06-15
10	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2018-06-16	2019-06-15
11	Positioning Controller	MF	MF-7082	N/A	2018-06-16	2019-06-15
12	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2018-07-26	2019-07-25
13	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2018-07-26	2019-07-25
14	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2018-07-02	2019-07-01
15	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2018-09-20	2019-09-19
16	Broadband Preamplifier	SCHWARZBECK	BBV 9719	9719-025	2018-09-20	2019-09-19
17	EMI Test Receiver	R&S	ESR 7	101181	2018-06-16	2019-06-15
18	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2018-11-15	2019-11-14
19	AMPLIFIER	QuieTek	QTK	CHM/0809065	2018-11-15	2019-11-14
20	RF Cable-R03m	Jye Bao	RG142	CB021	2018-06-16	2019-06-15
21	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2018-06-16	2019-06-15
22	6dB Attenuator	/	100W/6dB	1172040	2018-06-16	2019-06-15
23	3dB Attenuator	/	2N-3dB	/	2018-06-16	2019-06-15
24	Temperature & Humidity Chamber	GUANGZHOU GOGNWEN	GDS-100	70932	2018-10-10	2019-10-09
Note: All equipment is calibrated through GUANGZHOU LISAI CALIBRATION AND TEST CO.,LTD.						

3.6 Measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to ETSI TR 100 028"Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics" and is documented in the Shenzhen LCS Compliance Testing Laboratory Ltd.quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen LCS Compliance Testing Laboratory Ltd. is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	3.10 dB	(1)
Radiated Emission	1~18GHz	3.80 dB	(1)
Radiated Emission	18-40GHz	3.90 dB	(1)
Conducted Disturbance	0.15~30MHz	1.63 dB	(1)
Conducted Power	9KHz~18GHz	0.61 dB	(1)
Spurious RF Conducted Emission	9KHz~40GHz	1.22 dB	(1)
Band Edge Compliance of RF Emission	9KHz~40GHz	1.22 dB	(1)
Occuiped Bandwidth	9KHz~40GHz	-	(1)

(1)This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

4 TEST CONDITIONS AND RESULTS

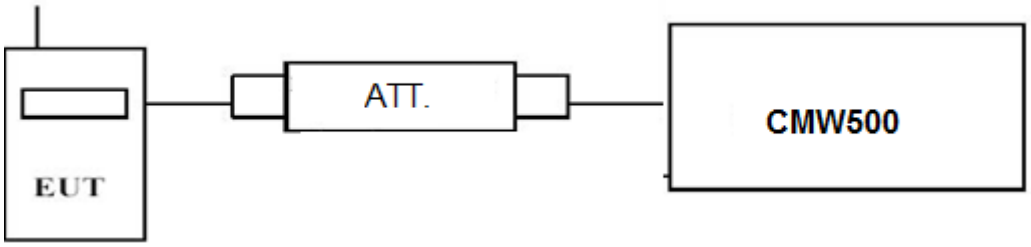
4.1 Output Power

TEST APPLICABLE

During the process of testing, the EUT was controlled via R&S Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation. This result contains output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

4.1.1. Conducted Output Power

TEST CONFIGURATION



TEST PROCEDURE

Conducted Power Measurement:

a) Place the EUT on a bench and set it in transmitting mode.
b) Connect a low loss RF cable from the antenna port to a CMW500 by an Att.
c) EUT Communicate with CMW500 then selects a channel for testing.
d) Add a correction factor to the display CMW500, and then test.

TEST RESULTS

Remark:

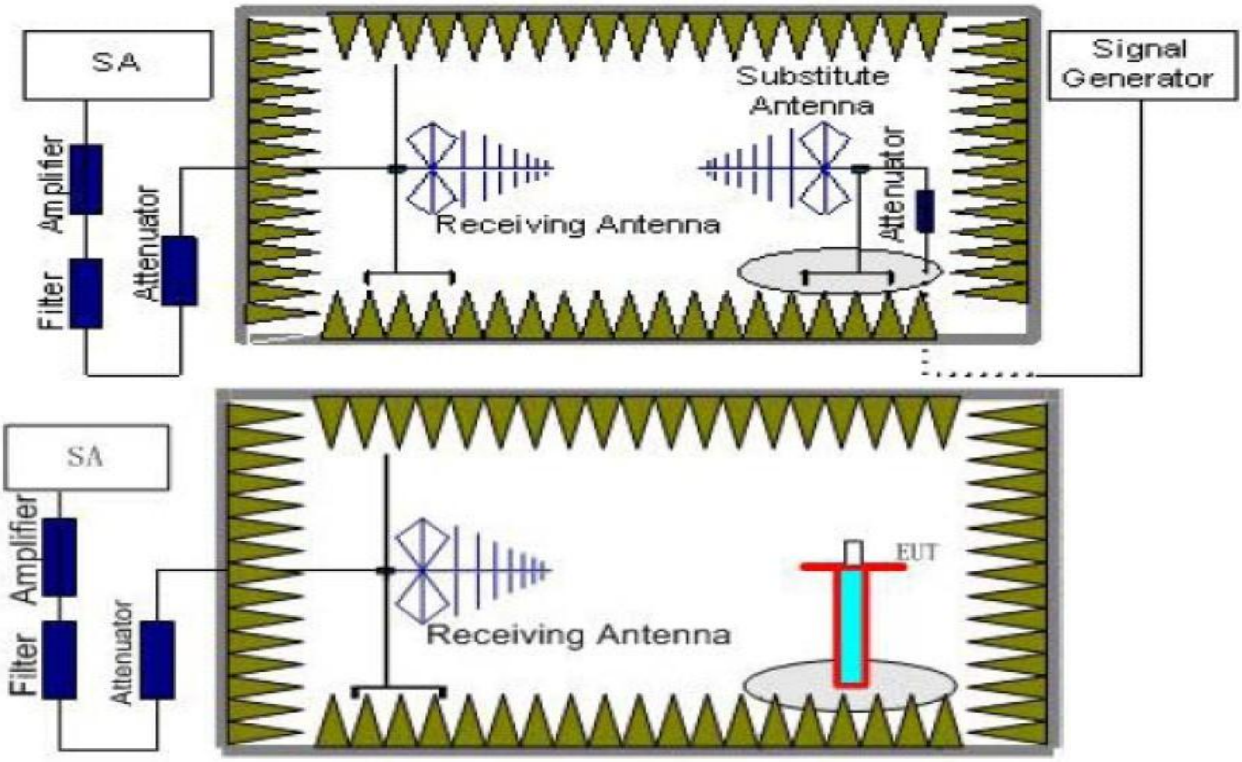
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case for each Channel Bandwidth of LTE FDD Band 5.*
2. *For E-UTRA Band 5, please refer to Appendix D: Section D.1*

4.1.2. Radiated Output Power

LIMIT

This is the test for the maximum radiated power from the EUT.
Per §22.913(2) Extend coverage on a secondary basis into cellular unserved areas, as those areas are defined in §22.949, the ERP of base transmitters and cellular repeaters of such systems must not exceed 1000 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

TEST CONFIGURATION



TEST PROCEDURE

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna.In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}+ P_{Ag} - P_{cl} + G_a
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST RESULTS

Radiated Measurement:

Remark:

1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case for each Channel Bandwidth of LTE FDD Band 5.*
2. *EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_a(dBi)*
3. *ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.*
4. *Margin = Emission Level - Limit*
5. *We test the H direction and V direction recorded worst case*

LTE FDD Band 5_Channel Bandwidth 1.4MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.70	-16.33	3.45	8.45	2.15	33.79	20.31	38.45	-18.14	V
836.50	-15.86	3.49	8.45	2.15	33.85	20.80	38.45	-17.65	V
848.30	-15.66	3.55	8.36	2.15	33.88	20.88	38.45	-17.57	V

LTE FDD Band 5_Channel Bandwidth 3MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
825.50	-16.09	3.45	8.45	2.15	33.79	20.55	38.45	-17.90	V
836.50	-16.41	3.49	8.45	2.15	33.85	20.25	38.45	-18.20	V
847.50	-16.27	3.55	8.36	2.15	33.88	20.27	38.45	-18.18	V

LTE FDD Band 5_Channel Bandwidth 5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.50	-15.92	3.45	8.45	2.15	33.79	20.72	38.45	-17.73	V
836.50	-15.98	3.49	8.45	2.15	33.85	20.68	38.45	-17.77	V
846.50	-15.71	3.55	8.36	2.15	33.88	20.83	38.45	-17.62	V

LTE FDD Band 5_Channel Bandwidth 10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
829.00	-15.99	3.45	8.45	2.15	33.79	20.65	38.45	-17.80	V
836.50	-16.02	3.49	8.45	2.15	33.85	20.64	38.45	-17.81	V
844.00	-16.10	3.55	8.36	2.15	33.88	20.44	38.45	-18.01	V

LTE FDD Band 5_Channel Bandwidth 1.4MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.70	-17.25	3.45	8.45	2.15	33.79	19.39	38.45	-19.06	V
836.50	-16.64	3.49	8.45	2.15	33.85	20.02	38.45	-18.43	V
848.30	-17.39	3.55	8.36	2.15	33.88	19.15	38.45	-19.30	V

LTE FDD Band 5_Channel Bandwidth 3MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
825.50	-16.55	3.45	8.45	2.15	33.79	20.09	38.45	-18.36	V
836.50	-16.82	3.49	8.45	2.15	33.85	19.84	38.45	-18.61	V
847.50	-17.06	3.55	8.36	2.15	33.88	19.48	38.45	-18.97	V

LTE FDD Band 5_Channel Bandwidth 5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.50	-17.19	3.45	8.45	2.15	33.79	19.45	38.45	-19.00	V
836.50	-17.38	3.49	8.45	2.15	33.85	19.28	38.45	-19.17	V
846.50	-17.37	3.55	8.36	2.15	33.88	19.17	38.45	-19.28	V

LTE FDD Band 5_Channel Bandwidth 10MHz_16QAM

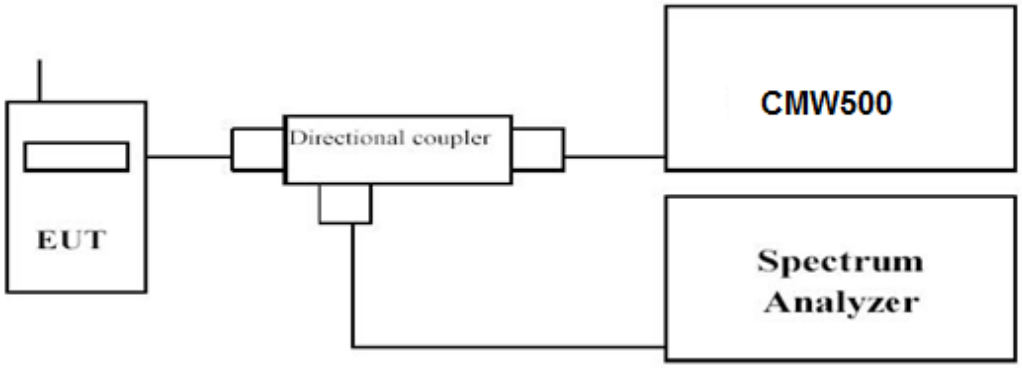
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
829.00	-16.80	3.45	8.45	2.15	33.79	19.84	38.45	-18.61	V
836.50	-16.57	3.49	8.45	2.15	33.85	20.09	38.45	-18.36	V
844.00	-17.24	3.55	8.36	2.15	33.88	19.30	38.45	-19.15	V

4.2 Peak-to-Average Ratio (PAR)

LIMIT

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

TEST CONFIGURATION



TEST PROCEDURE

1. Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
2. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
3. Set the number of counts to a value that stabilizes the measured CCDF curve;
4. Set the measurement interval as follows:
   1). for continuous transmissions, set to 1 ms,
   2). for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
5. Record the maximum PAPR level associated with a probability of 0.1%.

TEST RESULTS

Remark:

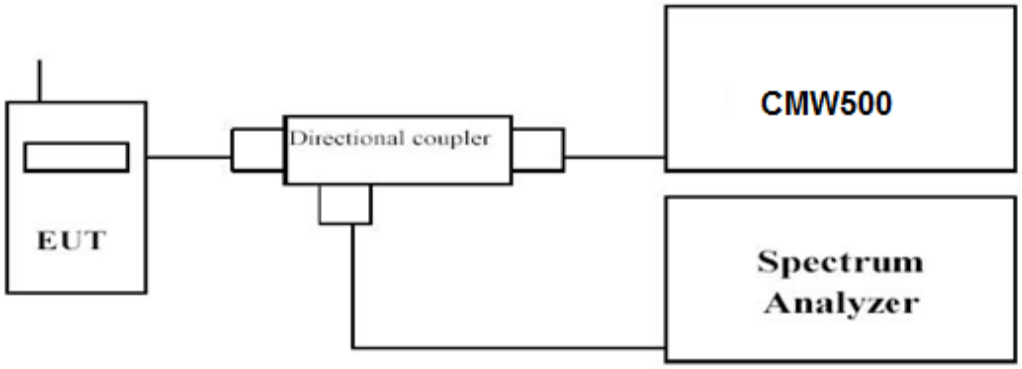
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case for each Channel Bandwidth of LTE FDD Band 5.*
2. *For E-UTRA Band 5, please refer to Appendix D: Section D.2*

4.3 Occupied Bandwidth and Emission Bandwidth

LIMIT

N/A

TEST CONFIGURATION



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 low, middle and high channel in each band. The -26dBc Emission bandwidth was also measured and recorded.
Set RBW was set to about 1% of emission BW, VBW≥3 times RBW.
-26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

TEST RESULTS

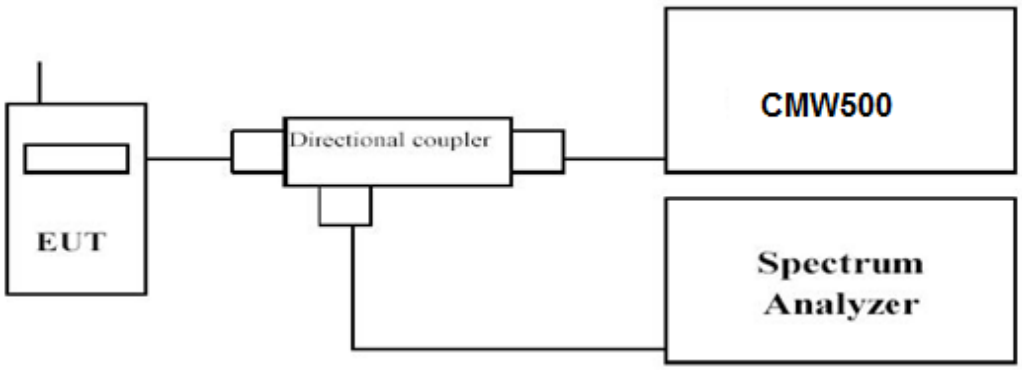
Remark:
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case for each Channel Bandwidth of LTE FDD Band 5.*
2. *For E-UTRA Band 5, please refer to Appendix D: Section D.3*

4.4 Band Edge compliance

LIMIT

For LTE FDD Band 5:Per FCC §22.917 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 + 10log(P) dB.

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowestand highest channels for each band and different modulation.
5. Measure Band edge using RMS (Average) detector by spectrum

TEST RESULTS

Remark:

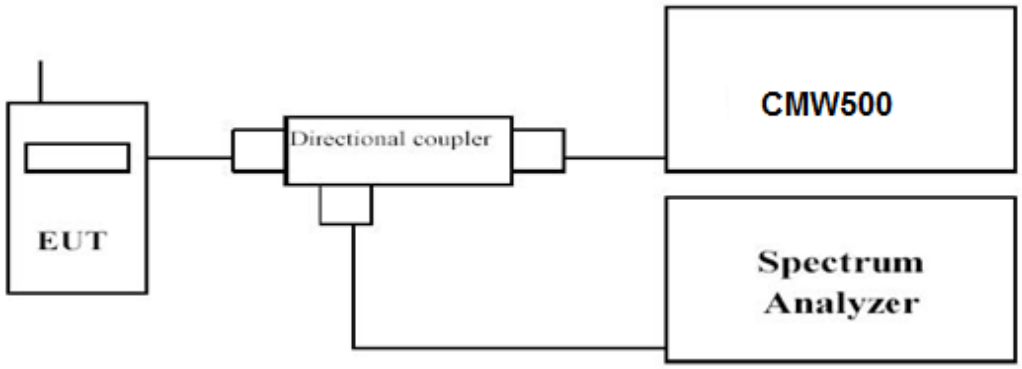
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case for each Channel Bandwidth of LTE FDD Band 5.*
2. *For E-UTRA Band 5, please refer to Appendix D: Section D.45*

4.5 Spurious Emssion on Antenna Port

LIMIT

For LTE FDD Band 5:Per FCC §22.917 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 + 10log(P) dB.

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to TIA-603-E

a. Place the EUT on a bench and set it in transmitting mode.
b. Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
c. EUT Communicate with CMW500, then select a channel for testing.
d. Add a correction factor to the display of spectrum, and then test.
e. The resolution bandwidth of the spectrum analyzer was setsufficient scans were taken to show the out of band Emission if any up to10^{th} harmonic.
f. Please refer to following tables for test antenna conducted emissions.

Working Frequency	Sub range (GHz)	RBW	VBW	Sweep time (s)
LTE FDD Band 5	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~26	1 MHz	3 MHz	Auto

TEST RESULTS

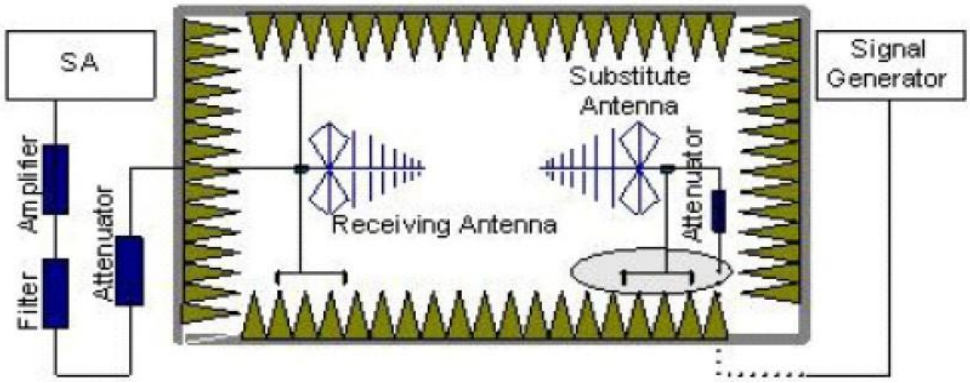
Remark:
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case for each Channel Bandwidth of LTE FDD Band 5.*
2. *For E-UTRA Band 5, please refer to Appendix D: Section D.5*

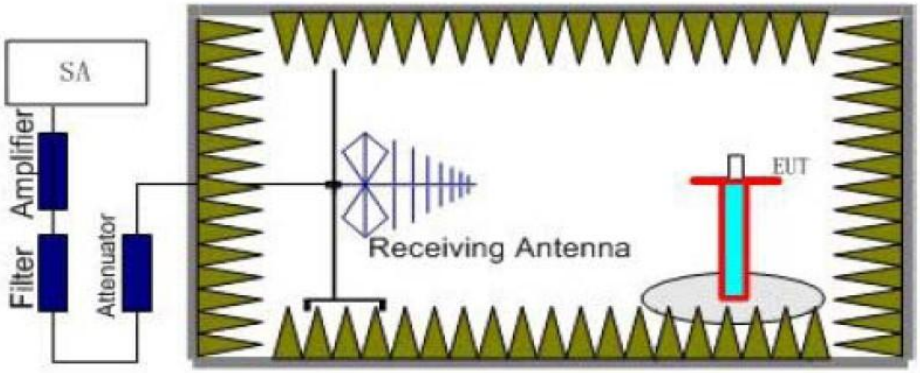
4.6 Radiated Spurious Emssion

LIMIT

For LTE FDD Band 5:Per FCC §22.917 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 + 10log(P) dB.

TEST CONFIGURATION





TEST PROCEDURE

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna.In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}+ P_{Ag} - P_{cl} + G_a
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.
8. In order to make sure test results more clearly,we set frequency range and sweep time for difference frequency range as follows table:

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
LTE FDD Band 5	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~9	1 MHz	3 MHz	3

TEST LIMITS

According to FCC §22.917 specify that 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.
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Frequency	Channel	Frequency Range	Verdict
LTE FDD Band 5	Low	9KHz -9GHz	PASS
	Middle	9KHz -9GHz	PASS
	High	9KHz -9GHz	PASS

TEST RESULTS

Remark:
1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case for each Channel Bandwidth of LTE FDD Band 5.
2. EIRP=P_{Mea}(dBm)-P_{cl}(dB) +G_a(dBi)
3. We were not recorded other points as values lower than limits.
4. Margin = EIRP - Limit

LTE FDD Band 5_Channel Bandwidth 1.4MHz_QPSK_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1649.40	-38.54	3.86	3.00	8.56	-33.84	-13.00	-20.84	H
2474.10	-46.99	4.29	3.00	6.98	-44.30	-13.00	-31.30	H
1649.40	-35.41	3.86	3.00	8.56	-30.71	-13.00	-17.71	V
2474.10	-36.05	4.29	3.00	6.98	-33.36	-13.00	-20.36	V

LTE FDD Band 5_Channel Bandwidth 1.4MHz_QPSK_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.00	-41.23	3.90	3.00	8.58	-36.55	-13.00	-23.55	H
2509.50	-46.38	4.32	3.00	6.80	-43.90	-13.00	-30.90	H
1673.00	-33.70	3.90	3.00	8.58	-29.02	-13.00	-16.02	V
2509.50	-39.07	4.32	3.00	6.80	-36.59	-13.00	-23.59	V

LTE FDD Band 5_Channel Bandwidth 1.4MHz_QPSK_ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1696.60	-40.00	3.91	3.00	9.06	-34.85	-13.00	-21.85	H
2544.90	-44.41	4.32	3.00	6.65	-42.08	-13.00	-29.08	H
1696.60	-36.75	3.91	3.00	9.06	-31.60	-13.00	-18.60	V
2544.90	-38.47	4.32	3.00	6.65	-36.14	-13.00	-23.14	V

LTE FDD Band 5_Channel Bandwidth 3MHz_QPSK_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1651.00	-41.47	3.86	3.00	8.56	-36.77	-13.00	-23.77	H
2476.50	-45.99	4.29	3.00	6.98	-43.30	-13.00	-30.30	H
1651.00	-33.44	3.86	3.00	8.56	-28.74	-13.00	-15.74	V
2476.50	-38.65	4.29	3.00	6.98	-35.96	-13.00	-22.96	V

LTE FDD Band 5_Channel Bandwidth 3MHz_QPSK_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.00	-38.66	3.90	3.00	8.58	-33.98	-13.00	-20.98	H
2509.50	-47.96	4.32	3.00	6.80	-45.48	-13.00	-32.48	H
1673.00	-33.99	3.90	3.00	8.58	-29.31	-13.00	-16.31	V
2509.50	-36.96	4.32	3.00	6.80	-34.48	-13.00	-21.48	V

LTE FDD Band 5_Channel Bandwidth 3MHz_QPSK_ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1695.00	-40.73	3.91	3.00	9.06	-35.58	-13.00	-22.58	H
2542.50	-44.19	4.32	3.00	6.65	-41.86	-13.00	-28.86	H
1695.00	-36.06	3.91	3.00	9.06	-30.91	-13.00	-17.91	V
2542.50	-38.55	4.32	3.00	6.65	-36.22	-13.00	-23.22	V

LTE FDD Band 5_Channel Bandwidth 5MHz_QPSK_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1653.00	-40.09	3.86	3.00	8.56	-35.39	-13.00	-22.39	H
2479.50	-47.45	4.29	3.00	6.98	-44.76	-13.00	-31.76	H
1653.00	-34.13	3.86	3.00	8.56	-29.43	-13.00	-16.43	V
2479.50	-38.94	4.29	3.00	6.98	-36.25	-13.00	-23.25	V

LTE FDD Band 5_Channel Bandwidth 5MHz_QPSK_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.00	-40.93	3.90	3.00	8.58	-36.25	-13.00	-23.25	H
2509.50	-39.18	4.32	3.00	6.80	-36.70	-13.00	-23.70	H
1673.00	-33.08	3.90	3.00	8.58	-28.40	-13.00	-15.40	V
2509.50	-39.56	4.32	3.00	6.80	-37.08	-13.00	-24.08	V

LTE FDD Band 5_Channel Bandwidth 5MHz_QPSK_ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1693.00	-39.95	3.91	3.00	9.06	-34.80	-13.00	-21.80	H
2539.50	-46.25	4.32	3.00	6.65	-43.92	-13.00	-30.92	H
1693.00	-34.64	3.91	3.00	9.06	-29.49	-13.00	-16.49	V
2539.50	-39.20	4.32	3.00	6.65	-36.87	-13.00	-23.87	V

LTE FDD Band 5_Channel Bandwidth 10MHz_QPSK_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1658.00	-40.53	3.86	3.00	8.56	-35.83	-13.00	-22.83	H
2487.00	-44.09	4.29	3.00	6.98	-41.40	-13.00	-28.40	H
1658.00	-35.07	3.86	3.00	8.56	-30.37	-13.00	-17.37	V
2487.00	-38.20	4.29	3.00	6.98	-35.51	-13.00	-22.51	V

LTE FDD Band 5_Channel Bandwidth 10MHz_QPSK_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.00	-38.46	3.90	3.00	8.58	-33.78	-13.00	-20.78	H
2509.50	-46.97	4.32	3.00	6.80	-44.49	-13.00	-31.49	H
1673.00	-33.69	3.90	3.00	8.58	-29.01	-13.00	-16.01	V
2509.50	-38.45	4.32	3.00	6.80	-35.97	-13.00	-22.97	V

LTE FDD Band 5_Channel Bandwidth 10MHz_QPSK_ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1688.00	-40.59	3.91	3.00	9.06	-35.44	-13.00	-22.44	H
2532.00	-44.55	4.32	3.00	6.65	-42.22	-13.00	-29.22	H
1688.00	-36.93	3.91	3.00	9.06	-31.78	-13.00	-18.78	V
2532.00	-39.44	4.32	3.00	6.65	-37.11	-13.00	-24.11	V

LTE FDD Band 5_Channel Bandwidth 1.4MHz_16QAM _ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1649.40	-43.51	3.86	3.00	8.56	-38.81	-13.00	-25.81	H
2474.10	-48.23	4.29	3.00	6.98	-45.54	-13.00	-32.54	H
1649.40	-38.27	3.86	3.00	8.56	-33.57	-13.00	-20.57	V
2474.10	-41.40	4.29	3.00	6.98	-38.71	-13.00	-25.71	V

LTE FDD Band 5_Channel Bandwidth 1.4MHz_16QAM _ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.00	-41.55	3.90	3.00	8.58	-36.87	-13.00	-23.87	H
2509.50	-48.65	4.32	3.00	6.80	-46.17	-13.00	-33.17	H
1673.00	-38.33	3.90	3.00	8.58	-33.65	-13.00	-20.65	V
2509.50	-41.37	4.32	3.00	6.80	-38.89	-13.00	-25.89	V

LTE FDD Band 5_Channel Bandwidth 1.4MHz_16QAM _ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1696.60	-42.86	3.91	3.00	9.06	-37.71	-13.00	-24.71	H
2544.90	-47.96	4.32	3.00	6.65	-45.63	-13.00	-32.63	H
1696.60	-37.62	3.91	3.00	9.06	-32.47	-13.00	-19.47	V
2544.90	-41.15	4.32	3.00	6.65	-38.82	-13.00	-25.82	V

LTE FDD Band 5_Channel Bandwidth 3MHz_16QAM _ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1651.00	-41.33	3.86	3.00	8.56	-36.63	-13.00	-23.63	H
2476.50	-46.17	4.29	3.00	6.98	-43.48	-13.00	-30.48	H
1651.00	-39.82	3.86	3.00	8.56	-35.12	-13.00	-22.12	V
2476.50	-39.55	4.29	3.00	6.98	-36.86	-13.00	-23.86	V

LTE FDD Band 5_Channel Bandwidth 3MHz_16QAM _ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.00	-42.41	3.90	3.00	8.58	-37.73	-13.00	-24.73	H
2509.50	-48.43	4.32	3.00	6.80	-45.95	-13.00	-32.95	H
1673.00	-36.89	3.90	3.00	8.58	-32.21	-13.00	-19.21	V
2509.50	-40.68	4.32	3.00	6.80	-38.20	-13.00	-25.20	V

LTE FDD Band 5_Channel Bandwidth 3MHz_16QAM _ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1695.00	-43.95	3.91	3.00	9.06	-38.80	-13.00	-25.80	H
2542.50	-48.91	4.32	3.00	6.65	-46.58	-13.00	-33.58	H
1695.00	-38.98	3.91	3.00	9.06	-33.83	-13.00	-20.83	V
2542.50	-42.63	4.32	3.00	6.65	-40.30	-13.00	-27.30	V

LTE FDD Band 5_Channel Bandwidth 5MHz_16QAM _ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1653.00	-43.88	3.86	3.00	8.56	-39.18	-13.00	-26.18	H
2479.50	-49.27	4.29	3.00	6.98	-46.58	-13.00	-33.58	H
1653.00	-36.43	3.86	3.00	8.56	-31.73	-13.00	-18.73	V
2479.50	-39.87	4.29	3.00	6.98	-37.18	-13.00	-24.18	V

LTE FDD Band 5_Channel Bandwidth 5MHz_16QAM _ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.00	-41.91	3.90	3.00	8.58	-37.23	-13.00	-24.23	H
2509.50	-46.27	4.32	3.00	6.80	-43.79	-13.00	-30.79	H
1673.00	-36.02	3.90	3.00	8.58	-31.34	-13.00	-18.34	V
2509.50	-41.47	4.32	3.00	6.80	-38.99	-13.00	-25.99	V

LTE FDD Band 5_Channel Bandwidth 5MHz_16QAM _ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1693.00	-41.49	3.91	3.00	9.06	-36.34	-13.00	-23.34	H
2539.50	-49.72	4.32	3.00	6.65	-47.39	-13.00	-34.39	H
1693.00	-36.41	3.91	3.00	9.06	-31.26	-13.00	-18.26	V
2539.50	-39.48	4.32	3.00	6.65	-37.15	-13.00	-24.15	V

LTE FDD Band 5_Channel Bandwidth 10MHz_16QAM _ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1658.00	-41.46	3.86	3.00	8.56	-36.76	-13.00	-23.76	H
2487.00	-48.84	4.29	3.00	6.98	-46.15	-13.00	-33.15	H
1658.00	-36.83	3.86	3.00	8.56	-32.13	-13.00	-19.13	V
2487.00	-40.78	4.29	3.00	6.98	-38.09	-13.00	-25.09	V

LTE FDD Band 5_Channel Bandwidth 10MHz_16QAM _ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.00	-41.14	3.90	3.00	8.58	-36.46	-13.00	-23.46	H
2509.50	-49.82	4.32	3.00	6.80	-47.34	-13.00	-34.34	H
1673.00	-38.29	3.90	3.00	8.58	-33.61	-13.00	-20.61	V
2509.50	-42.50	4.32	3.00	6.80	-40.02	-13.00	-27.02	V

LTE FDD Band 5_Channel Bandwidth 10MHz_16QAM _ High Channel

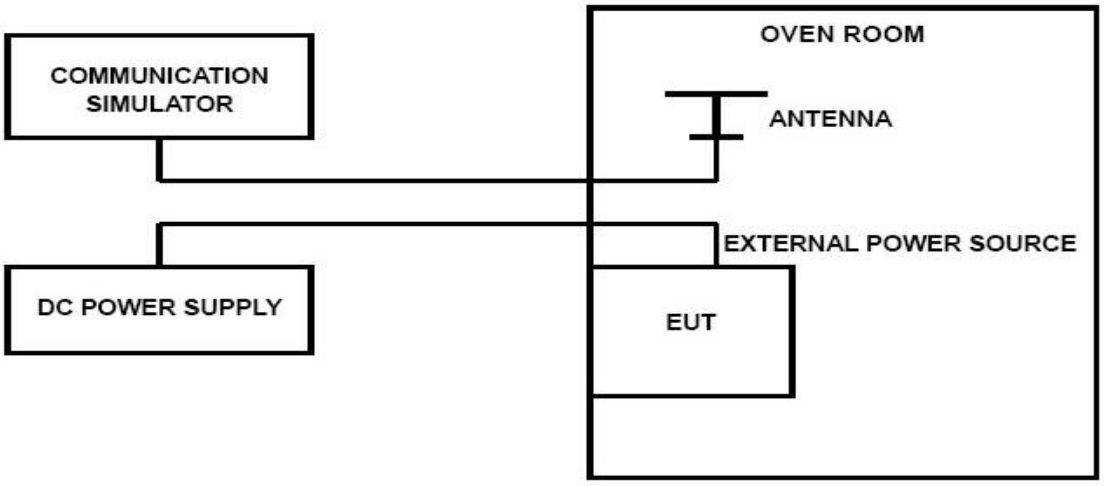
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1688.00	-43.70	3.91	3.00	9.06	-38.55	-13.00	-25.55	H
2532.00	-48.41	4.32	3.00	6.65	-46.08	-13.00	-33.08	H
1688.00	-37.46	3.91	3.00	9.06	-32.31	-13.00	-19.31	V
2532.00	-40.85	4.32	3.00	6.65	-38.52	-13.00	-25.52	V

4.7 Frequency Stability under Temperature & Voltage Variations

LIMIT

According to FCC §2.1055,§22.355 requirement, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation and should not exceed 2.5ppm.

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to TIA-603-E

Frequency Stability Under Temperature Variations:
In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.
1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30℃.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel for LTE band 5; measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10℃ increments from -30℃ to +50℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 ℃ increments from +50℃ to -30℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.
Frequency Stability Under Voltage Variations:
Set chamber temperature to 20℃. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.

TEST RESULTS

Remark:
We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5; recorded worst case for each Channel Bandwidth of LTE FDD Band 5.

LTE Band 5, QPSK, 1.4MHz bandwidth(worst case of all bandwidths)

LTE FDD Band 5					
DC Power	Temperature (℃)	Frequency error(Hz)	Frequency error(ppm)	Limit (ppm)	Verdict
3.40	20	-26	-0.031	±2.50	PASS
3.85	20	-8	-0.010	±2.50	PASS
4.30	20	8	0.009	±2.50	PASS
3.85	-30	-7	-0.008	±2.50	PASS
3.85	-20	-28	-0.033	±2.50	PASS
3.85	-10	-34	-0.040	±2.50	PASS
3.85	0	26	0.031	±2.50	PASS
3.85	10	28	0.034	±2.50	PASS
3.85	20	-67	-0.080	±2.50	PASS
3.85	30	10	0.012	±2.50	PASS
3.85	40	12	0.014	±2.50	PASS
3.85	50	-36	-0.044	±2.50	PASS

LTE Band 5, 16QAM, 1.4MHz bandwidth(worst case of all bandwidths)

LTE FDD Band 5					
DC Power	Temperature (℃)	Frequency error(Hz)	Frequency error(ppm)	Limit (ppm)	Verdict
3.40	20	-34	-0.041	±2.50	PASS
3.85	20	-50	-0.060	±2.50	PASS
4.30	20	37	0.044	±2.50	PASS
3.85	-30	-22	-0.026	±2.50	PASS
3.85	-20	57	0.068	±2.50	PASS
3.85	-10	34	0.041	±2.50	PASS
3.85	0	39	0.047	±2.50	PASS
3.85	10	-69	-0.083	±2.50	PASS
3.85	20	26	0.031	±2.50	PASS
3.85	30	19	0.023	±2.50	PASS
3.85	40	28	0.034	±2.50	PASS
3.85	50	-45	-0.054	±2.50	PASS

5 Test Setup Photos of the EUT

Pleaserefer to separated files for Test Setup Photos of the EUT.

6 External Photos of the EUT

Pleaserefer to separated files for External Photos of the EUT.

7 Internal Photos of the EUT

Pleaserefer to separated files for Internal Photos of the EUT.

************************End of Report*************************