

**FCC PART 22 TEST REPORT****FCC Part 22****Report Reference No.....: LCS180323004AEH****FCC ID.....: 2AMY3-ACERONE74G****Date of Issue. ....: May 07, 2018****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.....: Acer India Pvt Ltd.**Address .....: Embassy Heights 6th Floor, No.13, Magrath Road, (Next to  
Hosmat Hospital) Bangalore, 560025, India**Test specification .....****FCC CFR Title 47 Part 2, Part 22**Standard .....: **EIA/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

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**Test item description .....** Tablet PC

Trade Mark .....: Acer

Model/Type reference.....: Acer One 7 4G

Listed Models .....: /

Modulation Type .....: QPSK, 16QAM

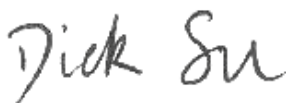
Rating .....: DC 3.8V by Li-ion battery(3500mAh)  
Recharged by DC 5V/2A by adapter

Hardware version .....: L706BA\_V1\_20170902

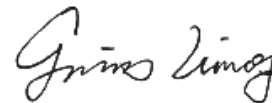
Software version.....: full\_elink8735b\_f3h-user.2018031215

Result.....: **PASS****Compiled by:**

Peter Xiao / Administrators

**Supervised by:**

Dick Su / Technique principal

**Approved by:**

Gavin Liang/ Manager

## TEST REPORT

|                                                 |                                     |
|-------------------------------------------------|-------------------------------------|
| <b>Test Report No. :</b> <b>LCS180323004AEH</b> | May 07, 2018<br><hr/> Date of issue |
|-------------------------------------------------|-------------------------------------|

Equipment under Test                      :              Tablet PC

Model /Type                                        :              Acer One 7 4G

Listed Models                                        :              /

**Applicant**                                                :              **Acer India Pvt Ltd.**

Address                                                :              Embassy Heights 6th Floor, No.13, Magrath Road, (Next to Hosmat Hospital) Bangalore, 560025, India

**Manufacturer**                                                :              **Yuko Technology Co., Ltd**

Address                                                :              6th Floor, A9 building, TianRui Industrial Park, FuYuan 1st Road, FuYong Town, Bao'an District, ShenZhen, China

**Factory**                                                :              **Yuko Technology Co., Ltd**

Address                                                :              6th Floor, A9 building, TianRui Industrial Park, FuYuan 1st Road, FuYong Town, Bao'an District, ShenZhen, China

|                     |             |
|---------------------|-------------|
| <b>Test Result:</b> | <b>PASS</b> |
|---------------------|-------------|

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.

## Revision History

| Revision | Issue Date   | Revisions     | Revised By  |
|----------|--------------|---------------|-------------|
| 00       | May 07, 2018 | Initial Issue | Gavin Liang |
|          |              |               |             |
|          |              |               |             |

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# **1 TEST STANDARDS**

The tests were performed according to following standards:

[FCC Part 22\(10-1-16 Edition\)](#):PRIVATE LAND MOBILE RADIO SERVICES.

[FCC Part 2](#): FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS

[ANSI C63.26:2015](#): American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

[KDB 971168 D01 Power Meas License Digital Systems v03](#) : Measurement Guidance For Certification of Licensed Digital Transmitters

## 2 SUMMARY

### 2.1 General Remarks

|                                |   |                |
|--------------------------------|---|----------------|
| Date of receipt of test sample | : | March 23, 2018 |
| Testing commenced on           | : | March 27, 2018 |
| Testing concluded on           | : | May 07, 2018   |

### 2.2 Product Description

The **Acer India Pvt Ltd.**'s Model: Acer One 7 4G 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                            | Tablet PC                                                                                                                                                                                                                                   |
| Model Number                           | Acer One 7 4G                                                                                                                                                                                                                               |
| Modulation Type                        | GMSK for GSM/GPRS, 8-PSK for EDGE, QPSK for UMTS, QPSK/16QAM for LTE                                                                                                                                                                        |
| Hardware version                       | L706BA_V1_20170902                                                                                                                                                                                                                          |
| Software version                       | full_elink8735b_f3h-user.2018031215                                                                                                                                                                                                         |
| GSM/EDGE/GPRS Operation Frequency Band | GSM850/PCS1900/GPRS850/GPRS1900/EDGE850/EDGE1900                                                                                                                                                                                            |
| UMTS Operation Frequency Band          | UMTS FDD Band II/V                                                                                                                                                                                                                          |
| LTE Operation Frequency Band           | LTE Band 5                                                                                                                                                                                                                                  |
| 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 7                                                                                                                                                                                                                                   |
| 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)<br>IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK)<br>IEEE 802.11n HT20:OFDM (64QAM, 16QAM, QPSK,BPSK)<br>IEEE 802.11n HT40:OFDM (64QAM, 16QAM, QPSK,BPSK)<br>IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) |
| WLAN FCC Operation frequency           | IEEE 802.11b:2412-2462MHz<br>IEEE 802.11g:2412-2462MHz<br>IEEE 802.11n HT20:2412-2462MHz,5180-5240MHz,5745-5825MHz<br>IEEE 802.11n HT40:2422-2452MHz,5190-5230MHz,5755-5795MHz<br>IEEE 802.11a:5180-5240MHz, 5745-5825MHz                   |
| Antenna Type                           | PIFA Antenna, 0.5dBi(Max.) for BT/WIFI/2G/3G/4G                                                                                                                                                                                             |
| BT Modulation Type                     | GFSK,8-DPSK, $\pi/4$ -DQPSK(BT V4.0)                                                                                                                                                                                                        |
| Extreme temp. Tolerance                | -20°C to +45°C                                                                                                                                                                                                                              |
| GPS function                           | Support and only RX                                                                                                                                                                                                                         |
| FM function                            | Support and only RX                                                                                                                                                                                                                         |
| Extreme vol. Limits                    | 3.30VDC to 4.35VDC (nominal: 3.80VDC)                                                                                                                                                                                                       |

## 2.3 Equipment under Test

### Power supply system utilised

|                      |   |                                                                   |                                 |
|----------------------|---|-------------------------------------------------------------------|---------------------------------|
| Power supply voltage | : | <input type="radio"/> 120V/ 60 Hz                                 | <input type="radio"/> 115V/60Hz |
|                      |   | <input type="radio"/> 12 V DC                                     | <input type="radio"/> 24 V DC   |
|                      |   | <input checked="" type="radio"/> Other (specified in blank below) |                                 |

DC 3.80V

## 2.4 Short description of the Equipment under Test (EUT)

### 2.4.1 General Description

Acer One 7 4G is subscriber equipment in the WCDMA/GSM/LTE system. The HSPA/UMTS frequency band is Band II/V, LTE frequency band is band 5. The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900, but only Band II and Band V and GSM850 and PCS1900 bands test data included in this report. The Terminal implements such functions as RF signal receiving/transmitting, HSPA/UMTS and GPRS/EDGE protocol processing, video MMS service and etc. Externally it provides micro SD card interface and 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    | Battery     |
| AE2    | Charger     |

AE2

Model: ASSA65w-050200

INPUT: AC100-240V 50/60Hz 0.45A

OUTPUT: DC 5.0V 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

|                                   |                |   |
|-----------------------------------|----------------|---|
| <input type="radio"/> Power Cable | Length (m) :   | / |
|                                   | Shield :       | / |
|                                   | Detachable :   | / |
| <input type="radio"/> Multimeter  | Manufacturer : | / |
|                                   | Model No. :    | / |

## 2.8 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2AMY3-ACERONE74G** filing to comply with FCC Part 22, FCC Part 24 Rules and FCC 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**

| <b>EnvironmentParameter</b> | <b>SelectedValuesDuringTests</b> |         |
|-----------------------------|----------------------------------|---------|
| Relative Humidity           | Ambient                          |         |
| Temperature                 | TN                               | Ambient |
| Voltage                     | VL                               | 3.30V   |
|                             | VN                               | 3.80V   |
|                             | VH                               | 4.35V   |

NOTE:VL=lower extreme testvoltageVN=nominalvoltage  
VH=upperextreme testvoltageTN=normaltemperature

### 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 C63.26 (2015) 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

##### 3.4.1 Cellular Band (824-849MHz paired with 869-894MHz)

| Test Item                                  | FCC Rule No.        | Requirements                                                                                                 | Verdict |
|--------------------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------|---------|
| Effective(Isotropic) Radiated Output Power | §2.1046,<br>§22.913 | FCC: ERP ≤ 7W.                                                                                               | PASS    |
| Modulation Characteristics                 | §2.1047             | Digital modulation                                                                                           | N/A     |
| Bandwidth                                  | §2.1049             | OBW: No limit.<br>EBW: No limit.                                                                             | PASS    |
| Band Edges Compliance                      | §2.1051,<br>§22.917 | ≤-13dBm/1%*EBW, in 1MHz bands immediately outside and adjacent to The frequency block.                       | PASS    |
| Spurious Emission at Antenna Terminals     | §2.1051,<br>§22.917 | ≤ -13dBm/100kHz, from 9 KHz to 10 <sup>th</sup> harmonics but outside authorized operating frequency ranges. | PASS    |
| Field Strength of Spurious Radiation       | §2.1053,<br>§22.917 | ≤ -13dBm/100kHz.                                                                                             | PASS    |
| Frequency Stability                        | §2.1055,<br>§22.355 | ≤ ±2.5ppm.                                                                                                   | PASS    |
| Peak-Average Ratio                         | N/A                 | Limit≤13dB                                                                                                   | PASS    |
| Receiver Spurious Emissions                | N/A                 | --                                                                                                           | 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      | 2017-06-17 | 2018-06-16 |
| 2                                                                                       | Power Sensor                                       | R&S               | NRV-Z81      | 100458      | 2017-06-17 | 2018-06-16 |
| 3                                                                                       | Power Sensor                                       | R&S               | NRV-Z32      | 10057       | 2017-06-17 | 2018-06-16 |
| 4                                                                                       | X-series USB Peak and Average Power Sensor Aglient | Agilent           | U2021XA      | MY54080022  | 2017-10-26 | 2018-10-25 |
| 5                                                                                       | 4 CH. Simultaneous Sampling 14 Bits 2MS/s          | Agilent           | U2531A       | MY54080016  | 2017-10-26 | 2018-10-25 |
| 6                                                                                       | Test Software                                      | Ascentest         | AT890-SW     | 20160630    | N/A        | N/A        |
| 7                                                                                       | RF Control Unit                                    | Ascentest         | AT890-RFB    | N/A         | 2017-06-17 | 2018-06-16 |
| 8                                                                                       | ESA-E SERIES SPECTRUM ANALYZER                     | Agilent           | E4407B       | MY41440754  | 2017-11-17 | 2018-11-16 |
| 9                                                                                       | MXA Signal Analyzer                                | Agilent           | N9020A       | MY49100040  | 2017-06-17 | 2018-06-16 |
| 10                                                                                      | SPECTRUM ANALYZER                                  | R&S               | FSP          | 100503      | 2017-06-17 | 2018-06-16 |
| 11                                                                                      | MXG Vector Signal Generator                        | Agilent           | N5182A       | MY47071151  | 2017-11-17 | 2018-11-16 |
| 12                                                                                      | ESG VECTOR SIGNAL GENERATOR                        | Agilent           | E4438C       | MY42081396  | 2017-11-17 | 2018-11-16 |
| 13                                                                                      | PSG Analog Signal Generator                        | Agilent           | E8257D       | MY4520521   | 2017-11-17 | 2018-11-16 |
| 14                                                                                      | Universal Radio Communication Tester               | R&S               | CMU 200      | 105788      | 2017-06-17 | 2018-06-16 |
| 15                                                                                      | WIDEBAND RADIO COMMUNICATION TESTER                | R&S               | CMW 500      | 103818      | 2017-06-17 | 2018-06-16 |
| 16                                                                                      | RF Control Unit                                    | Tonscend          | JS0806-1     | N/A         | 2017-06-17 | 2018-06-16 |
| 17                                                                                      | DC Power Supply                                    | Agilent           | E3642A       | N/A         | 2017-11-17 | 2018-11-16 |
| 18                                                                                      | LTE Test Software                                  | Tonscend          | JS1120-1     | N/A         | N/A        | N/A        |
| 19                                                                                      | Temperature & Humidity Chamber                     | GUANGZHOU GOGNWEI | GDS-100      | 70932       | 2017-10-11 | 2018-10-10 |
| 20                                                                                      | DC Source                                          | CHROMA            | 62012P-80-60 | 34782951    | 2017-10-11 | 2018-10-10 |
| 21                                                                                      | RF Filter                                          | Micro-Tronics     | BRC50718     | S/N-017     | 2017-06-17 | 2018-06-16 |
| 22                                                                                      | RF Filter                                          | Micro-Tronics     | BRC50719     | S/N-011     | 2017-06-17 | 2018-06-16 |
| 23                                                                                      | RF Filter                                          | Micro-Tronics     | BRC50720     | S/N-011     | 2017-06-17 | 2018-06-16 |
| 24                                                                                      | RF Filter                                          | Micro-Tronics     | BRC50721     | S/N-013     | 2017-06-17 | 2018-06-16 |
| 25                                                                                      | RF Filter                                          | Micro-Tronics     | BRM50702     | S/N-195     | 2017-06-17 | 2018-06-16 |
| 26                                                                                      | Splitter/Combiner                                  | Micro-Tronics     | PS2-15       | CB11-20     | 2017-06-17 | 2018-06-16 |
| 27                                                                                      | Splitter/Combiner                                  | Micro-Tronics     | CB11-20      | N/A         | 2017-06-17 | 2018-06-16 |
| 28                                                                                      | Attenuator                                         | Micro-Tronics     | PAS-8-10     | S/N23466    | 2017-06-17 | 2018-06-16 |
| 29                                                                                      | Exposure Level Tester                              | Narda             | ELT-400      | N-0713      | 2018-04-03 | 2019-04-02 |
| 30                                                                                      | B-Field Probe                                      | Narda             | ELT-400      | M-1154      | 2018-04-11 | 2019-04-10 |
| 31                                                                                      | 3m Semi Anechoic Chamber                           | SIDT FRANKONIA    | SAC-3M       | 03CH03-HY   | 2017-06-17 | 2018-06-16 |
| 32                                                                                      | Positioning Controller                             | MF                | MF-7082      | /           | 2017-06-17 | 2018-06-16 |
| 33                                                                                      | EMI Test Software                                  | AUDIX             | E3           | N/A         | N/A        | N/A        |
| 34                                                                                      | EMI Test Receiver                                  | R&S               | ESR 7        | 101181      | 2017-06-17 | 2018-06-16 |
| 35                                                                                      | AMPLIFIER                                          | QuieTek           | QTK-A2525G   | CHM10809065 | 2017-11-17 | 2018-11-16 |
| 36                                                                                      | Active Loop Antenna                                | SCHWARZBECK       | FMZB 1519B   | 00005       | 2017-06-23 | 2018-06-22 |
| 37                                                                                      | By-log Antenna                                     | SCHWARZBECK       | VULB9163     | 9163-470    | 2018-05-01 | 2019-04-30 |
| 38                                                                                      | Horn Antenna                                       | EMCO              | 3115         | 6741        | 2017-06-23 | 2018-06-22 |
| 39                                                                                      | Broadband Horn Antenna                             | SCHWARZBECK       | BBHA 9170    | 791         | 2017-09-21 | 2018-09-20 |
| 40                                                                                      | Broadband Preamplifier                             | SCHWARZBECK       | BBV 9719     | 9719-025    | 2017-09-21 | 2018-09-20 |
| 41                                                                                      | RF Cable-R03m                                      | Jye Bao           | RG142        | CB021       | 2017-06-17 | 2018-06-16 |
| 42                                                                                      | RF Cable-HIGH                                      | SUHNER            | SUCOFLEX 106 | 03CH03-HY   | 2017-06-17 | 2018-06-16 |
| 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 compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of 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)   |
| Occupied 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**

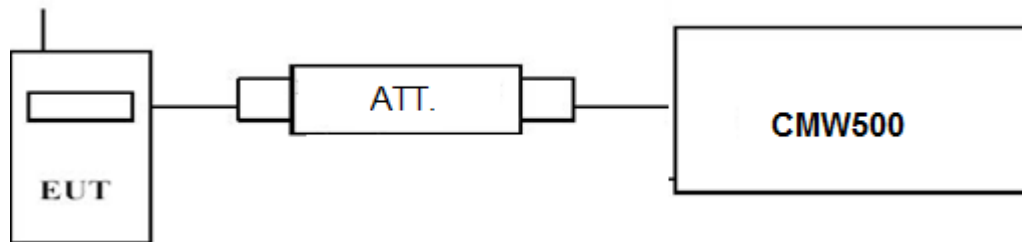
### **4.1 Output Power**

#### **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:**

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

##### **TEST RESULTS**

###### *Remark:*

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

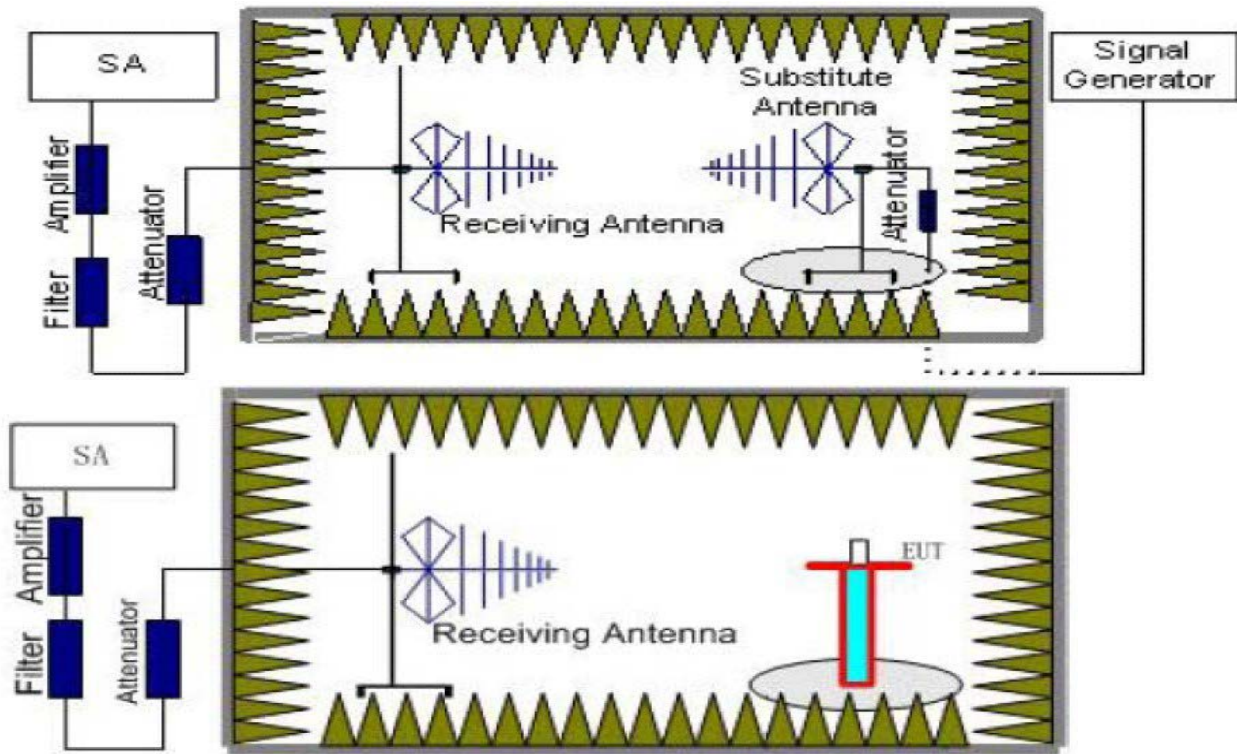
### 4.1.2. Radiated Output Power

#### 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:

$$\text{Power(EIRP)} = P_{\text{Mea}} + P_{\text{Ag}} - P_{\text{cl}} + G_{\text{a}}$$

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,  $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$ .

## TEST RESULTS

### Radiated Measurement:

Remark:

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

#### LTE FDD Band 5\_Channel Bandwidth 1.4MHz\_QPSK

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain (dB) | Correction (dB) | P <sub>Ag</sub> (dB) | Burst Average ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------------------------------|-----------------|----------------------|-------------------------|-------------|-------------|--------------|
| 824.70          | -13.52                 | 3.45                 | 8.45                             | 2.15            | 33.79                | <b>23.12</b>            | 38.45       | -15.33      | V            |
| 836.50          | -13.89                 | 3.49                 | 8.45                             | 2.15            | 33.85                | 22.77                   | 38.45       | -15.68      | V            |
| 848.30          | -14.34                 | 3.55                 | 8.36                             | 2.15            | 33.88                | 22.20                   | 38.45       | -16.25      | V            |

#### LTE FDD Band 5\_Channel Bandwidth 3MHz\_QPSK

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain (dB) | Correction (dB) | P <sub>Ag</sub> (dB) | Burst Average ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------------------------------|-----------------|----------------------|-------------------------|-------------|-------------|--------------|
| 825.50          | -14.55                 | 3.45                 | 8.45                             | 2.15            | 33.79                | 22.09                   | 38.45       | -16.36      | V            |
| 836.50          | -14.49                 | 3.49                 | 8.45                             | 2.15            | 33.85                | 22.17                   | 38.45       | -16.28      | V            |
| 847.50          | -14.47                 | 3.55                 | 8.36                             | 2.15            | 33.88                | 22.07                   | 38.45       | -16.38      | V            |

#### LTE FDD Band 5\_Channel Bandwidth 5MHz\_QPSK

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain (dB) | Correction (dB) | P <sub>Ag</sub> (dB) | Burst Average ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------------------------------|-----------------|----------------------|-------------------------|-------------|-------------|--------------|
| 826.50          | -15.03                 | 3.45                 | 8.45                             | 2.15            | 33.79                | 21.61                   | 38.45       | -16.84      | V            |
| 836.50          | -15.35                 | 3.49                 | 8.45                             | 2.15            | 33.85                | 21.31                   | 38.45       | -17.14      | V            |
| 846.50          | -15.15                 | 3.55                 | 8.36                             | 2.15            | 33.88                | 21.39                   | 38.45       | -17.06      | V            |

#### LTE FDD Band 5\_Channel Bandwidth 10MHz\_QPSK

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain (dB) | Correction (dB) | P <sub>Ag</sub> (dB) | Burst Average ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------------------------------|-----------------|----------------------|-------------------------|-------------|-------------|--------------|
| 829.00          | -15.03                 | 3.45                 | 8.45                             | 2.15            | 33.79                | <b>21.61</b>            | 38.45       | -16.84      | V            |
| 836.50          | -15.32                 | 3.49                 | 8.45                             | 2.15            | 33.85                | 21.34                   | 38.45       | -17.11      | V            |
| 844.00          | -15.84                 | 3.55                 | 8.36                             | 2.15            | 33.88                | 20.70                   | 38.45       | -17.75      | V            |

#### LTE FDD Band 5\_Channel Bandwidth 1.4MHz\_16QAM

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain (dB) | Correction (dB) | P <sub>Ag</sub> (dB) | Burst Average ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------------------------------|-----------------|----------------------|-------------------------|-------------|-------------|--------------|
| 824.70          | -14.99                 | 3.45                 | 8.45                             | 2.15            | 33.79                | 21.65                   | 38.45       | -16.80      | V            |
| 836.50          | -14.40                 | 3.49                 | 8.45                             | 2.15            | 33.85                | <b>22.26</b>            | 38.45       | -16.19      | V            |
| 848.30          | -14.29                 | 3.55                 | 8.36                             | 2.15            | 33.88                | 22.25                   | 38.45       | -16.20      | V            |

*LTE FDD Band 5\_Channel Bandwidth 3MHz\_16QAM*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain (dB) | Correction (dB) | P <sub>Ag</sub> (dB) | Burst Average ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------------------------------|-----------------|----------------------|-------------------------|-------------|-------------|--------------|
| 825.50          | -15.44                 | 3.45                 | 8.45                             | 2.15            | 33.79                | 21.20                   | 38.45       | -17.25      | V            |
| 836.50          | -15.38                 | 3.49                 | 8.45                             | 2.15            | 33.85                | 21.28                   | 38.45       | -17.17      | V            |
| 847.50          | -14.95                 | 3.55                 | 8.36                             | 2.15            | 33.88                | 21.59                   | 38.45       | -16.86      | V            |

*LTE FDD Band 5\_Channel Bandwidth 5MHz\_16QAM*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain (dB) | Correction (dB) | P <sub>Ag</sub> (dB) | Burst Average ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------------------------------|-----------------|----------------------|-------------------------|-------------|-------------|--------------|
| 826.50          | -15.25                 | 3.45                 | 8.45                             | 2.15            | 33.79                | 21.39                   | 38.45       | -17.06      | V            |
| 836.50          | -15.36                 | 3.49                 | 8.45                             | 2.15            | 33.85                | 21.30                   | 38.45       | -17.15      | V            |
| 846.50          | -15.55                 | 3.55                 | 8.36                             | 2.15            | 33.88                | 20.99                   | 38.45       | -17.46      | V            |

*LTE FDD Band 5\_Channel Bandwidth 10MHz\_16QAM*

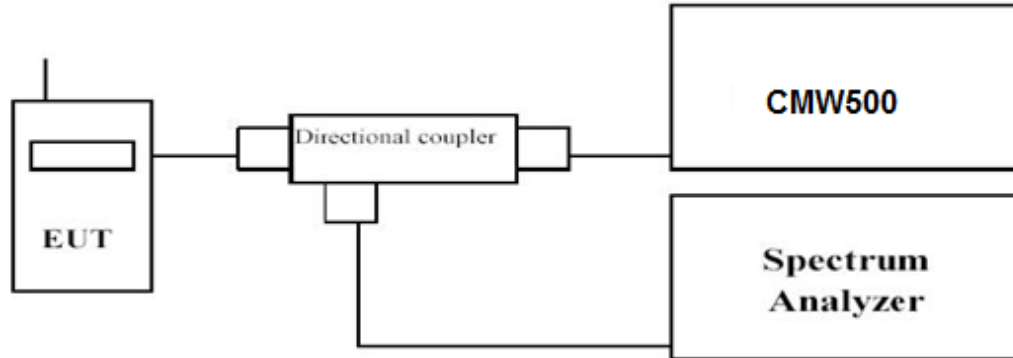
| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain (dB) | Correction (dB) | P <sub>Ag</sub> (dB) | Burst Average ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------------------------------|-----------------|----------------------|-------------------------|-------------|-------------|--------------|
| 829.00          | -15.78                 | 3.45                 | 8.45                             | 2.15            | 33.79                | <b>20.86</b>            | 38.45       | -17.59      | V            |
| 836.50          | -15.83                 | 3.49                 | 8.45                             | 2.15            | 33.85                | 20.83                   | 38.45       | -17.62      | V            |
| 844.00          | -16.19                 | 3.55                 | 8.36                             | 2.15            | 33.88                | 20.35                   | 38.45       | -18.10      | 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  $\geq$  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:*

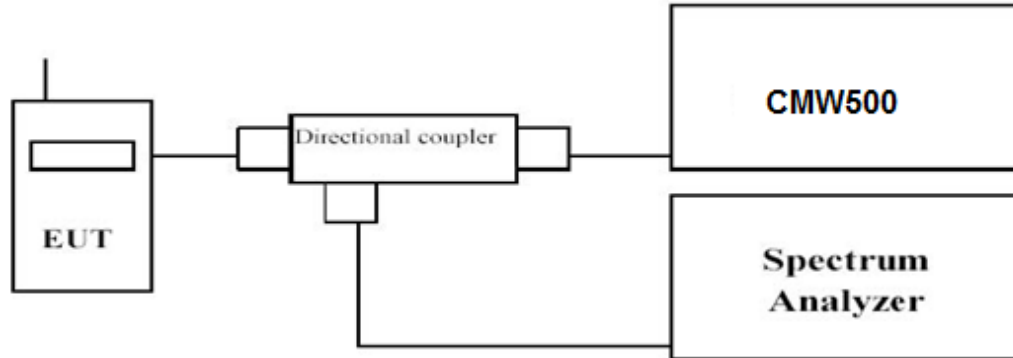
1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5;
2. For E-UTRA Band 5, please refer to Appendix D: Section D.2

### **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 $\geq$ 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:*

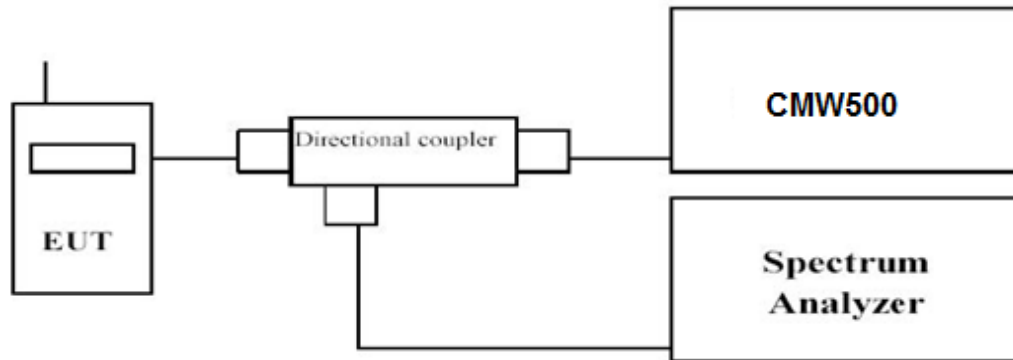
- 1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5;*
- 2. For E-UTRA Band 5, please refer to Appendix D: Section D.3*

## **4.4 Band Edge compliance**

### **LIMIT**

*For LTE FDD Band 5: Per §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  $43 + 10 \log(P)$  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 lowest and highest channels for each band and different modulation.
5. Measure Band edge using RMS (Average) detector by spectrum

### **TEST RESULTS**

*Remark:*

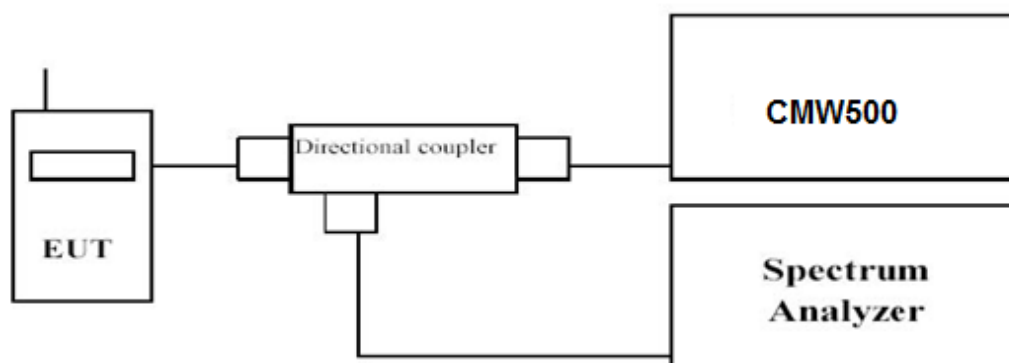
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5;*
2. *For E-UTRA Band 5, please refer to Appendix D: Section D.4*

## 4.5 Spurious Emission on Antenna Port

### LIMIT

For LTE FDD Band 5: Per §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  $43 + 10 \log(P)$  dB.

### TEST CONFIGURATION



### TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Coupler.
- EUT Communicate with CMW500, then select a channel for testing.
- Add a correction factor to the display of spectrum, and then test.
- The resolution bandwidth of the spectrum analyzer was set sufficient scans were taken to show the out of band Emission if any up to 10<sup>th</sup> harmonic.
- 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 | 1 KHz  | 3 KHz  | Auto           |
|                   | 0.000015~0.03     | 10 KHz | 30 KHz | Auto           |
|                   | 0.03~26           | 1 MHz  | 3 MHz  | Auto           |

### TEST RESULTS

Remark:

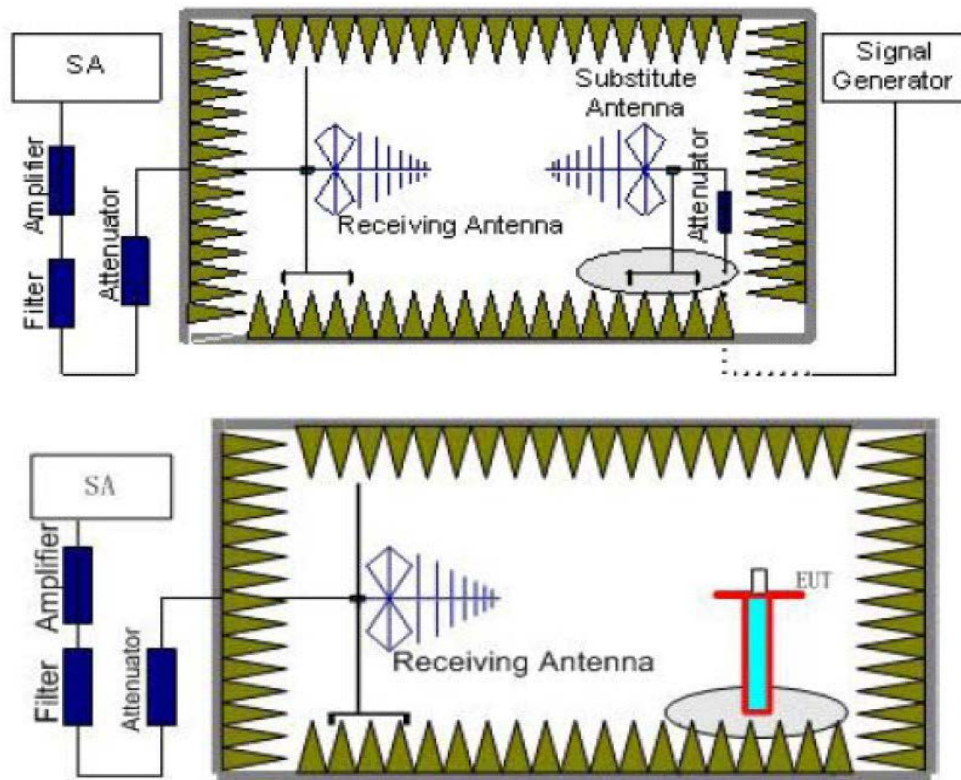
- We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5;
- For E-UTRA Band 5, please refer to Appendix D: Section D.5

## 4.6 Radiated Spurious Emission

### LIMIT

For LTE FDD Band 5: Per §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  $43 + 10 \log(P)$  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:

$$\text{Power(EIRP)} = P_{\text{Mea}} + P_{\text{Ag}} - P_{\text{cl}} + G_{\text{a}}$$

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,  $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$ .
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              |
|                   | 5~9            | 1 MHz  | 3 MHz  | 3              |

### TEST LIMITS

According to §24.238, §22.917, §27.53(h), § 27.53(m) (4), §27.53(g) 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     | 9 KHz – 9 GHz   | PASS    |
|                | Middle  | 9 KHz – 9 GHz   | PASS    |
|                | High    | 9 KHz – 9 GHz   | PASS    |

### TEST RESULTS

Remark:

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

#### LTE FDD Band 5\_Channel Bandwidth 1.4MHz\_QPSK\_Low Channel

| Frequency (MHz) | $P_{\text{Mea}}$ (dBm) | $P_{\text{cl}}$ (dB) | Diatance | $G_{\text{a}}$ Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1649.40         | -41.01                 | 3.86                 | 3.00     | 8.56                            | -36.31          | -13.00      | -23.31      | H            |
| 2474.10         | -45.65                 | 4.29                 | 3.00     | 6.98                            | -42.96          | -13.00      | -29.96      | H            |
| 1649.40         | -34.95                 | 3.86                 | 3.00     | 8.56                            | -30.25          | -13.00      | -17.25      | V            |
| 2474.10         | -39.28                 | 4.29                 | 3.00     | 6.98                            | -36.59          | -13.00      | -23.59      | V            |

#### LTE FDD Band 5\_Channel Bandwidth 1.4MHz\_QPSK\_Middle Channel

| Frequency (MHz) | $P_{\text{Mea}}$ (dBm) | $P_{\text{cl}}$ (dB) | Diatance | $G_{\text{a}}$ Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1673.00         | -39.31                 | 3.90                 | 3.00     | 8.58                            | -34.63          | -13.00      | -21.63      | H            |
| 2509.50         | -44.01                 | 4.32                 | 3.00     | 6.8                             | -41.53          | -13.00      | -28.53      | H            |
| 1673.00         | -36.19                 | 3.90                 | 3.00     | 8.58                            | -31.51          | -13.00      | -18.51      | V            |
| 2509.50         | -39.39                 | 4.32                 | 3.00     | 6.8                             | -36.91          | -13.00      | -23.91      | V            |

*LTE FDD Band 5\_Channel Bandwidth 1.4MHz\_QPSK\_High Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1696.60         | -41.30                 | 3.91                 | 3.00     | 9.06                            | -36.15          | -13.00      | -23.15      | H            |
| 2544.90         | -44.91                 | 4.32                 | 3.00     | 6.65                            | -42.58          | -13.00      | -29.58      | H            |
| 1696.60         | -33.46                 | 3.91                 | 3.00     | 9.06                            | -28.31          | -13.00      | -15.31      | V            |
| 2544.90         | -37.19                 | 4.32                 | 3.00     | 6.65                            | -34.86          | -13.00      | -21.86      | V            |

*LTE FDD Band 5\_Channel Bandwidth 3MHz\_QPSK\_Low Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1651.00         | -39.42                 | 3.86                 | 3.00     | 8.56                            | -34.72          | -13.00      | -21.72      | H            |
| 2476.50         | -47.02                 | 4.29                 | 3.00     | 6.98                            | -44.33          | -13.00      | -31.33      | H            |
| 1651.00         | -33.67                 | 3.86                 | 3.00     | 8.56                            | -28.97          | -13.00      | -15.97      | V            |
| 2476.50         | -37.14                 | 4.29                 | 3.00     | 6.98                            | -34.45          | -13.00      | -21.45      | V            |

*LTE FDD Band 5\_Channel Bandwidth 3MHz\_QPSK\_Middle Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1673.00         | -38.59                 | 3.9                  | 3.00     | 8.58                            | -33.91          | -13.00      | -20.91      | H            |
| 2509.50         | -45.47                 | 4.32                 | 3.00     | 6.8                             | -42.99          | -13.00      | -29.99      | H            |
| 1673.00         | -33.35                 | 3.9                  | 3.00     | 8.58                            | -28.67          | -13.00      | -15.67      | V            |
| 2509.50         | -37.62                 | 4.32                 | 3.00     | 6.8                             | -35.14          | -13.00      | -22.14      | V            |

*LTE FDD Band 5\_Channel Bandwidth 3MHz\_QPSK\_High Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1695.00         | -41.89                 | 3.91                 | 3.00     | 9.06                            | -36.74          | -13.00      | -23.74      | H            |
| 2542.50         | -46.22                 | 4.32                 | 3.00     | 6.65                            | -43.89          | -13.00      | -30.89      | H            |
| 1695.00         | -35.05                 | 3.91                 | 3.00     | 9.06                            | -29.90          | -13.00      | -16.90      | V            |
| 2542.50         | -36.30                 | 4.32                 | 3.00     | 6.65                            | -33.97          | -13.00      | -20.97      | V            |

*LTE FDD Band 5\_Channel Bandwidth 5MHz\_QPSK\_Low Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1653.00         | -38.59                 | 3.86                 | 3.00     | 8.56                            | -33.89          | -13.00      | -20.89      | H            |
| 2479.50         | -45.27                 | 4.29                 | 3.00     | 6.98                            | -42.58          | -13.00      | -29.58      | H            |
| 1653.00         | -34.75                 | 3.86                 | 3.00     | 8.56                            | -30.05          | -13.00      | -17.05      | V            |
| 2479.50         | -39.99                 | 4.29                 | 3.00     | 6.98                            | -37.30          | -13.00      | -24.30      | V            |

*LTE FDD Band 5\_Channel Bandwidth 5MHz\_QPSK\_Middle Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1673.00         | -39.69                 | 3.9                  | 3.00     | 8.58                            | -35.01          | -13.00      | -22.01      | H            |
| 2509.50         | -45.21                 | 4.32                 | 3.00     | 6.8                             | -42.73          | -13.00      | -29.73      | H            |
| 1673.00         | -34.43                 | 3.9                  | 3.00     | 8.58                            | -29.75          | -13.00      | -16.75      | V            |
| 2509.50         | -39.07                 | 4.32                 | 3.00     | 6.8                             | -36.59          | -13.00      | -23.59      | V            |

*LTE FDD Band 5\_Channel Bandwidth 5MHz\_QPSK\_High Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1693.00         | -40.86                 | 3.91                 | 3.00     | 9.06                            | -35.71          | -13.00      | -22.71      | H            |
| 2539.50         | -47.54                 | 4.32                 | 3.00     | 6.65                            | -45.21          | -13.00      | -32.21      | H            |
| 1693.00         | -33.05                 | 3.91                 | 3.00     | 9.06                            | -27.90          | -13.00      | -14.90      | V            |
| 2539.50         | -39.14                 | 4.32                 | 3.00     | 6.65                            | -36.81          | -13.00      | -23.81      | V            |

*LTE FDD Band 5\_Channel Bandwidth 10MHz\_QPSK\_Low Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1658.00         | -40.40                 | 3.86                 | 3.00     | 8.56                            | -35.70          | -13.00      | -22.70      | H            |
| 2487.00         | -44.86                 | 4.29                 | 3.00     | 6.98                            | -42.17          | -13.00      | -29.17      | H            |
| 1658.00         | -35.32                 | 3.86                 | 3.00     | 8.56                            | -30.62          | -13.00      | -17.62      | V            |
| 2487.00         | -37.96                 | 4.29                 | 3.00     | 6.98                            | -35.27          | -13.00      | -22.27      | V            |

*LTE FDD Band 5\_Channel Bandwidth 10MHz\_QPSK\_Middle Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1673.00         | -40.95                 | 3.90                 | 3.00     | 8.58                            | -36.27          | -13.00      | -23.27      | H            |
| 2509.50         | -45.60                 | 4.32                 | 3.00     | 6.8                             | -43.12          | -13.00      | -30.12      | H            |
| 1673.00         | -36.98                 | 3.90                 | 3.00     | 8.58                            | -32.30          | -13.00      | -19.30      | V            |
| 2509.50         | -36.21                 | 4.32                 | 3.00     | 6.8                             | -33.73          | -13.00      | -20.73      | V            |

*LTE FDD Band 5\_Channel Bandwidth 10MHz\_QPSK\_High Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1688.00         | -41.43                 | 3.91                 | 3.00     | 9.06                            | -36.28          | -13.00      | -23.28      | H            |
| 2532.00         | -45.06                 | 4.32                 | 3.00     | 6.65                            | -42.73          | -13.00      | -29.73      | H            |
| 1688.00         | -36.20                 | 3.91                 | 3.00     | 9.06                            | -31.05          | -13.00      | -18.05      | V            |
| 2532.00         | -36.76                 | 4.32                 | 3.00     | 6.65                            | -34.43          | -13.00      | -21.43      | V            |

*LTE FDD Band 5\_Channel Bandwidth 1.4MHz\_16QAM\_Low Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1649.40         | -44.25                 | 3.86                 | 3.00     | 8.56                            | -39.55          | -13.00      | -26.55      | H            |
| 2474.10         | -46.80                 | 4.29                 | 3.00     | 6.98                            | -44.11          | -13.00      | -31.11      | H            |
| 1649.40         | -39.47                 | 3.86                 | 3.00     | 8.56                            | -34.77          | -13.00      | -21.77      | V            |
| 2474.10         | -41.88                 | 4.29                 | 3.00     | 6.98                            | -39.19          | -13.00      | -26.19      | V            |

*LTE FDD Band 5\_Channel Bandwidth 1.4MHz\_16QAM\_Middle Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1673.00         | -41.37                 | 3.9                  | 3.00     | 8.58                            | -36.69          | -13.00      | -23.69      | H            |
| 2509.50         | -49.60                 | 4.32                 | 3.00     | 6.8                             | -47.12          | -13.00      | -34.12      | H            |
| 1673.00         | -36.47                 | 3.9                  | 3.00     | 8.58                            | -31.79          | -13.00      | -18.79      | V            |
| 2509.50         | -42.18                 | 4.32                 | 3.00     | 6.8                             | -39.70          | -13.00      | -26.70      | V            |

*LTE FDD Band 5\_Channel Bandwidth 1.4MHz\_16QAM\_High Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1696.60         | -42.87                 | 3.91                 | 3.00     | 9.06                            | -37.72          | -13.00      | -24.72      | H            |
| 2544.90         | -46.63                 | 4.32                 | 3.00     | 6.65                            | -44.30          | -13.00      | -31.30      | H            |
| 1696.60         | -36.48                 | 3.91                 | 3.00     | 9.06                            | -31.33          | -13.00      | -18.33      | V            |
| 2544.90         | -42.17                 | 4.32                 | 3.00     | 6.65                            | -39.84          | -13.00      | -26.84      | V            |

*LTE FDD Band 5\_Channel Bandwidth 3MHz\_16QAM\_Low Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1651.00         | -43.00                 | 3.86                 | 3.00     | 8.56                            | -38.30          | -13.00      | -25.30      | H            |
| 2476.50         | -47.86                 | 4.29                 | 3.00     | 6.98                            | -45.17          | -13.00      | -32.17      | H            |
| 1651.00         | -36.27                 | 3.86                 | 3.00     | 8.56                            | -31.57          | -13.00      | -18.57      | V            |
| 2476.50         | -40.69                 | 4.29                 | 3.00     | 6.98                            | -38.00          | -13.00      | -25.00      | V            |

*LTE FDD Band 5\_Channel Bandwidth 3MHz\_16QAM\_Middle Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1673.00         | -41.73                 | 3.90                 | 3.00     | 8.58                            | -37.05          | -13.00      | -24.05      | H            |
| 2509.50         | -49.91                 | 4.32                 | 3.00     | 6.8                             | -47.43          | -13.00      | -34.43      | H            |
| 1673.00         | -39.36                 | 3.90                 | 3.00     | 8.58                            | -34.68          | -13.00      | -21.68      | V            |
| 2509.50         | -40.78                 | 4.32                 | 3.00     | 6.8                             | -38.30          | -13.00      | -25.30      | V            |

*LTE FDD Band 5\_Channel Bandwidth 3MHz\_16QAM\_High Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1695.00         | -43.25                 | 3.91                 | 3.00     | 9.06                            | -38.10          | -13.00      | -25.10      | H            |
| 2542.50         | -49.77                 | 4.32                 | 3.00     | 6.65                            | -47.44          | -13.00      | -34.44      | H            |
| 1695.00         | -38.11                 | 3.91                 | 3.00     | 9.06                            | -32.96          | -13.00      | -19.96      | V            |
| 2542.50         | -41.50                 | 4.32                 | 3.00     | 6.65                            | -39.17          | -13.00      | -26.17      | V            |

*LTE FDD Band 5\_Channel Bandwidth 5MHz\_16QAM\_Low Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1653.00         | -44.44                 | 3.86                 | 3.00     | 8.56                            | -39.74          | -13.00      | -26.74      | H            |
| 2479.50         | -49.55                 | 4.29                 | 3.00     | 6.98                            | -46.86          | -13.00      | -33.86      | H            |
| 1653.00         | -37.52                 | 3.86                 | 3.00     | 8.56                            | -32.82          | -13.00      | -19.82      | V            |
| 2479.50         | -41.53                 | 4.29                 | 3.00     | 6.98                            | -38.84          | -13.00      | -25.84      | V            |

*LTE FDD Band 5\_Channel Bandwidth 3MHz\_16QAM\_Middle Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1673.00         | -43.58                 | 3.90                 | 3.00     | 8.58                            | -38.90          | -13.00      | -25.90      | H            |
| 2509.50         | -47.90                 | 4.32                 | 3.00     | 6.8                             | -45.42          | -13.00      | -32.42      | H            |
| 1673.00         | -36.47                 | 3.90                 | 3.00     | 8.58                            | -31.79          | -13.00      | -18.79      | V            |
| 2509.50         | -41.65                 | 4.32                 | 3.00     | 6.8                             | -39.17          | -13.00      | -26.17      | V            |

*LTE FDD Band 5\_Channel Bandwidth 5MHz\_16QAM\_High Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1693.00         | -44.14                 | 3.91                 | 3.00     | 9.06                            | -38.99          | -13.00      | -25.99      | H            |
| 2539.50         | -47.81                 | 4.32                 | 3.00     | 6.65                            | -45.48          | -13.00      | -32.48      | H            |
| 1693.00         | -37.40                 | 3.91                 | 3.00     | 9.06                            | -32.25          | -13.00      | -19.25      | V            |
| 2539.50         | -41.89                 | 4.32                 | 3.00     | 6.65                            | -39.56          | -13.00      | -26.56      | V            |

*LTE FDD Band 5\_Channel Bandwidth 10MHz\_16QAM\_Low Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1658            | -42.23                 | 3.86                 | 3.00     | 8.56                            | -37.53          | -13.00      | -24.53      | H            |
| 2487            | -48.66                 | 4.29                 | 3.00     | 6.98                            | -45.97          | -13.00      | -32.97      | H            |
| 1658            | -38.90                 | 3.86                 | 3.00     | 8.56                            | -34.20          | -13.00      | -21.20      | V            |
| 2487            | -40.43                 | 4.29                 | 3.00     | 6.98                            | -37.74          | -13.00      | -24.74      | V            |

*LTE FDD Band 5\_Channel Bandwidth 10MHz\_16QAM\_Middle Channel*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1673.00         | -42.28                 | 3.90                 | 3.00     | 8.58                            | -37.60          | -13.00      | -24.60      | H            |
| 2509.50         | -47.62                 | 4.32                 | 3.00     | 6.8                             | -45.14          | -13.00      | -32.14      | H            |
| 1673.00         | -37.08                 | 3.90                 | 3.00     | 8.58                            | -32.40          | -13.00      | -19.40      | V            |
| 2509.50         | -40.10                 | 4.32                 | 3.00     | 6.8                             | -37.62          | -13.00      | -24.62      | V            |

*LTE FDD Band 5\_Channel Bandwidth 10MHz\_16QAM\_High Channel*

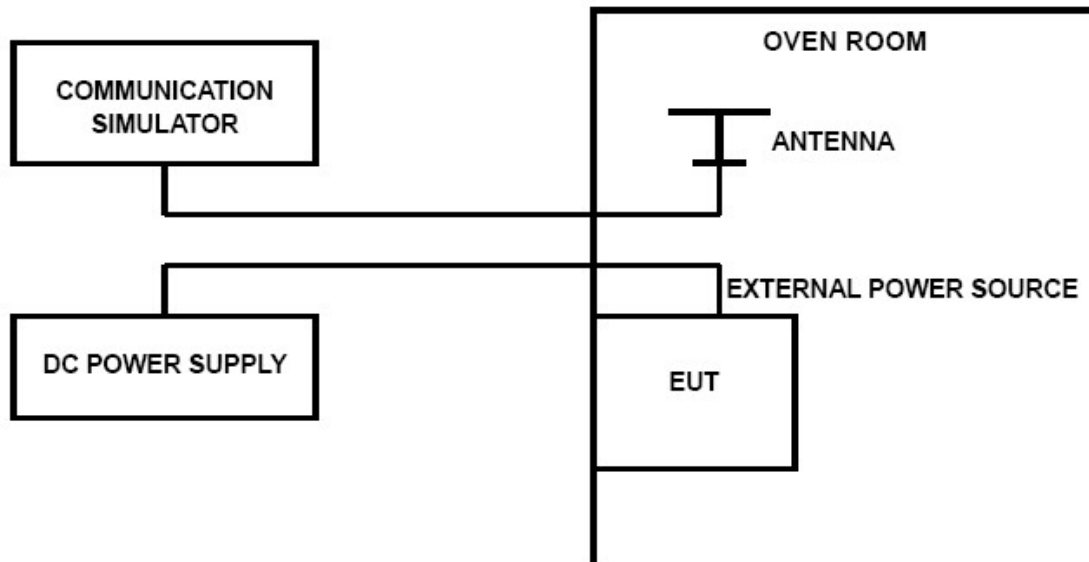
| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Diatance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1688.00         | -41.64                 | 3.91                 | 3.00     | 9.06                            | -36.49          | -13.00      | -23.49      | H            |
| 2532.00         | -47.88                 | 4.32                 | 3.00     | 6.65                            | -45.55          | -13.00      | -32.55      | H            |
| 1688.00         | -36.19                 | 3.91                 | 3.00     | 9.06                            | -31.04          | -13.00      | -18.04      | V            |
| 2532.00         | -40.30                 | 4.32                 | 3.00     | 6.65                            | -37.97          | -13.00      | -24.97      | V            |

## **4.7 Frequency Stability under Temperature & Voltage Variations**

### **LIMIT**

According to FCC §2.1055, §22.355, §24.235 and §27.54 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 EIA/TIA 603D

#### **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°C.
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°C increments from -30°C to +50°C. 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°C.
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 °C increments from +50°C to -30°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

#### **Frequency Stability Under Voltage Variations:**

Set chamber temperature to 20°C. 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:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5;

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

| LTE FDD Band 5 |                  |                     |                      |             |         |
|----------------|------------------|---------------------|----------------------|-------------|---------|
| DC Power       | Temperature (°C) | Frequency error(Hz) | Frequency error(ppm) | Limit (ppm) | Verdict |
| 3.30           | 25               | 2.20                | 0.003                | 2.50        | PASS    |
| 3.80           | 25               | 2.13                | 0.003                | 2.50        | PASS    |
| 4.35           | 25               | 1.42                | 0.002                | 2.50        | PASS    |
| 3.80           | -30              | -1.94               | 0.002                | 2.50        | PASS    |
| 3.80           | -20              | 0.71                | 0.001                | 2.50        | PASS    |
| 3.80           | -10              | -1.03               | 0.001                | 2.50        | PASS    |
| 3.80           | 0                | 2.45                | 0.003                | 2.50        | PASS    |
| 3.80           | 10               | 2.58                | 0.003                | 2.50        | PASS    |
| 3.80           | 20               | -0.71               | 0.001                | 2.50        | PASS    |
| 3.80           | 30               | 1.74                | 0.002                | 2.50        | PASS    |
| 3.80           | 40               | 1.61                | 0.002                | 2.50        | PASS    |
| 3.80           | 45               | 1.10                | 0.001                | 2.50        | PASS    |

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

| LTE FDD Band 5 |                  |                     |                      |             |         |
|----------------|------------------|---------------------|----------------------|-------------|---------|
| DC Power       | Temperature (°C) | Frequency error(Hz) | Frequency error(ppm) | Limit (ppm) | Verdict |
| 3.30           | 25               | 3.20                | 0.004                | 2.50        | PASS    |
| 3.80           | 25               | 6.78                | 0.008                | 2.50        | PASS    |
| 4.35           | 25               | 4.84                | 0.006                | 2.50        | PASS    |
| 3.80           | -30              | 5.62                | 0.007                | 2.50        | PASS    |
| 3.80           | -20              | 3.65                | 0.004                | 2.50        | PASS    |
| 3.80           | -10              | 6.33                | 0.008                | 2.50        | PASS    |
| 3.80           | 0                | 0.42                | 0.001                | 2.50        | PASS    |
| 3.80           | 10               | 2.91                | 0.003                | 2.50        | PASS    |
| 3.80           | 20               | 5.49                | 0.007                | 2.50        | PASS    |
| 3.80           | 30               | 3.52                | 0.004                | 2.50        | PASS    |
| 3.80           | 40               | 5.81                | 0.007                | 2.50        | PASS    |
| 3.80           | 45               | 3.07                | 0.004                | 2.50        | PASS    |

## **5 Test Setup Photos of the EUT**

Please refer to separated files for Test Setup Photos of the EUT.

## **6 External Photos of the EUT**

Please refer to separated files for External Photos of the EUT.

## **7 Internal Photos of the EUT**

Please refer to separated files for Internal Photos of the EUT.

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