



## FCC TEST REPORT FOR

Wishtel Pvt Ltd

Tablet PC

Test Model: IRA T1015

Prepared for : Wishtel Pvt Ltd  
Address : 4, Champaklal Industrail Estate, Sion East, Mumbai, MH - 400022, Mumbai, India

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.  
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Date of receipt of test sample : December 10, 2024  
Number of tested samples : 2  
Sample No. : A12024283-1, A12024283-2  
Serial number : Prototype  
Date of Test : December 10, 2024 ~ December 16, 2024  
Date of Report : December 17, 2024



**FCC PART 22/27 TEST REPORT****FCC Part 22H/Part 27****Report Reference No. .... : LCSA12024283EK****FCC ID. .... : 2BHIY-IRAT1015****Date of Issue..... : December 17, 2024****Testing Laboratory Name ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.****Address..... : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park  
Yabianxueziwei, Shajing Street, Baoan District, Shenzhen,  
518000, China****Applicant's name ..... : Wishtel Pvt Ltd****Address..... : 4, Champaklal Industrail Estate, Sion East, Mumbai, MH - 400022,  
Mumbai, India****Test specification..... :****FCC CFR Title 47 Part 2, Part 22H, Part 27****Standard ..... : TIA-603-E: 2016****KDB971168 D01 Power Meas License Digital Systems v03r01****Test Report Form No ..... : TRF-4-E-153 A/0****TRF Originator ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.****Master TRF ..... : Dated 2011-03****Shenzhen LCS Compliance Testing Laboratory Ltd. All rights reserved.**

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**Test item description..... : Tablet PC****Trade Mark..... : Wishtel****Test Model ..... : IRA T1015****Modulation Type ..... : QPSK,16QAM****Rating..... : Input: 5V $\Rightarrow$ 2000mA  
For AC Adapter Input: 100-240V~, 50/60Hz, 0.35A MAX  
Adapter Output: 5V $\Rightarrow$ 2000mA  
DC 3.8V by Rechargeable Li-ion Battery, 7000mAh****Result..... : PASS****Compiled by:**

Kevin Huang/ Administrator

**Supervised by:**

Cary Luo/ Technique principal

**Approved by:**

Gavin Liang/ Manager



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**TEST REPORT****Test Report No. : LCSA12024283EK**

December 17, 2024

Date of issue

|                          |                                                                                  |
|--------------------------|----------------------------------------------------------------------------------|
| EUT.....                 | : Tablet PC                                                                      |
| Test Model.....          | : IRA T1015                                                                      |
| <b>Applicant.....</b>    | <b>: Wishtel Pvt Ltd</b>                                                         |
| Address.....             | : 4, Champaklal Industrail Estate, Sion East, Mumbai, MH - 400022, Mumbai, India |
| Telephone.....           | : /                                                                              |
| Fax.....                 | : /                                                                              |
| <b>Manufacturer.....</b> | <b>: Wishtel Pvt Ltd</b>                                                         |
| Address.....             | : 4, Champaklal Industrail Estate, Sion East, Mumbai, MH - 400022, Mumbai, India |
| Telephone.....           | : /                                                                              |
| Fax.....                 | : /                                                                              |
| <b>Factory.....</b>      | <b>: /</b>                                                                       |
| Address.....             | : /                                                                              |
| Telephone.....           | : /                                                                              |
| Fax.....                 | : /                                                                              |

**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.



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Revision History

| Report Version | Issue Date        | Revision Content | Revised By |
|----------------|-------------------|------------------|------------|
| 000            | December 17, 2024 | Initial Issue    | ---        |
|                |                   |                  |            |
|                |                   |                  |            |



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## 1 TEST STANDARDS

The tests were performed according to following standards:

[FCC Part 22H](#): Cellular Radiotelephone Service

[FCC Part 27](#): MISCELLANEOUS WIRELESS COMMUNICATIONS 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 ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

[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

[FCC KDB971168 D01](#) Power Meas License Digital Systems v03r01



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## 2 SUMMARY

### 2.1 Product Description

The **Wishtel Pvt Ltd's** Model: Tablet PC 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.

EUT : Tablet PC

Test Model : IRA T1015

Ratings : Input: 5V $\pm$ 2000mA  
For AC Adapter Input: 100-240V~, 50/60Hz, 0.35A MAX  
Adapter Output: 5V $\pm$ 2000mA  
DC 3.8V by Rechargeable Li-ion Battery, 7000mAh

Hardware Version : S866T-T310-V1.0

Software Version : IRA T1015\_V1.1\_20241108

Bluetooth :

Frequency Range : 2402MHz~2480MHz

Channel Number : 79 channels for Bluetooth V5.0 (DSS)  
40 channels for Bluetooth V5.0 (DTS)

Channel Spacing : 1MHz for Bluetooth V5.0 (DSS)  
2MHz for Bluetooth V5.0 (DTS)

Modulation Type : GFSK,  $\pi/4$ -DQPSK, 8-DPSK for Bluetooth V5.0 (DSS)  
GFSK for Bluetooth V5.0 (DTS)

Bluetooth Version : V5.0

Antenna Description : FPC Antenna, 2.0dBi(Max.)

WIFI(2.4G Band) :

Frequency Range : 2412MHz~2462MHz

Channel Spacing : 5MHz

Channel Number : 11 Channels for 20MHz bandwidth (2412~2462MHz)  
7 Channels for 40MHz bandwidth (2422~2452MHz)

Modulation Type : IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)  
IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)  
IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)

Antenna Description : FPC Antenna, 2.0dBi(Max.)

WIFI(5.2G Band) :

Frequency Range : 5180MHz~5240MHz

Channel Number : 4 Channels for 20MHz bandwidth(5180MHz~5240MHz)  
2 channels for 40MHz bandwidth(5190MHz~5230MHz)  
1 channels for 80MHz bandwidth(5210MHz)

Modulation Type : IEEE 802.11a/n: OFDM (64QAM, 16QAM, QPSK, BPSK)  
IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)

Antenna Description : FPC Antenna, 3.28dBi(Max.)

WIFI(5.3G Band) :

Frequency Range : 5260MHz~5320MHz

Channel Number : 4 Channels for 20MHz bandwidth(5260MHz~5320MHz)  
2 channels for 40MHz bandwidth(5270MHz~5310MHz)  
1 channels for 80MHz bandwidth(5290MHz)

Modulation Type : IEEE 802.11a/n: OFDM (64QAM, 16QAM, QPSK, BPSK)  
IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)

Antenna Description : FPC Antenna, 3.28dBi(Max.)



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WIFI(5.5G Band) :  
Frequency Range : 5500MHz~5700MHz  
Channel Number : 11 Channels for 20MHz bandwidth(5500MHz~5700MHz)  
5 Channels for 40MHz bandwidth(5510MHz~5670MHz)  
2 Channels for 80MHz bandwidth(5530MHz, 5610MHz)  
Modulation Type : IEEE 802.11a/n: OFDM (64QAM, 16QAM, QPSK, BPSK)  
IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)  
Antenna Description : FPC Antenna, 3.28dBi(Max.)

WIFI(5.8G Band) :  
Frequency Range : 5745MHz~5825MHz  
Channel Number : 5 channels for 20MHz bandwidth(5745MHz~5825MHz)  
2 channels for 40MHz bandwidth(5755MHz~5795MHz)  
1 channels for 80MHz bandwidth(5775MHz)  
Modulation Type : IEEE 802.11a/n: OFDM (64QAM, 16QAM, QPSK, BPSK)  
IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)  
Antenna Description : FPC Antenna, 3.28dBi(Max.)

2G :  
Support Band : ☒ GSM 900 (EU-Band) ☒ DCS 1800 (EU-Band)  
☒ GSM 850 (U.S.-Band) ☒ PCS 1900 (U.S.-Band)  
Release Version : R99  
GPRS Class : Class 12  
EGPRS Class : Class 12  
Type Of Modulation : GMSK for GSM/GPRS; GMSK/8PSK for EGPRS  
Antenna Description : FPC Antenna  
-2.88dBi (max.) For GSM 850  
-4.12dBi (max.) For PCS 1900

3G :  
Support Band : ☒ WCDMA Band I (EU-Band)  
☒ WCDMA Band II (U.S.-Band)  
☒ WCDMA Band V (U.S.-Band)  
☒ WCDMA Band VIII (EU-Band)  
Release Version : R10  
Type Of Modulation : QPSK,16QAM  
Antenna Description : FPC Antenna  
-4.12dBi (max.) For WCDMA Band II  
-2.88dBi (max.) For WCDMA Band V

LTE :  
Support Band : ☒ E-UTRA Band 5(U.S.-Band)  
☒ E-UTRA Band 7(U.S.-Band)  
☒ E-UTRA Band 38(U.S.-Band)  
☒ E-UTRA Band 41(U.S.-Band)  
LTE Release Version : R10  
Type Of Modulation : QPSK/16QAM  
Antenna Description : FPC Antenna  
-2.88dBi (max.) For E-UTRA Band 5  
-3.41dBi (max.) For E-UTRA Band 7  
-3.43dBi (max.) For E-UTRA Band 38  
-3.41dBi (max.) For E-UTRA Band 41  
Power Class : Class 3





|                     |                                         |
|---------------------|-----------------------------------------|
| GPS Function        | : Support and only RX                   |
| Extreme temp.       | : -30°C to +50°C                        |
| Tolerance           |                                         |
| Extreme vol. Limits | : 3.40VDC to 4.35VDC (nominal: 3.80VDC) |

## 2.2 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"/> 12 V DC   |
|                      |   | <input type="radio"/> Other (specified in blank below): |                                 |

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

### 2.3.1 General Description

Tablet PC is subscriber equipment in the BT/BLE/2.4GWIFI/5.2GWIFI/5.3GWIFI/5.5GWIFI/5.8GWIFI/GSM/WCDMA/LTE system. GSM/GPRS/EGPRS frequency band is Band II/V. The HSPA/UMTS frequency band is Band II/V. LTE frequency band is band 5/7/38/41. The HSPA/UMTS frequency band II and Band V test data included in this report. The Tablet PC implements such functions as RF signal receiving/transmitting, GSM/GPRS/EGPRS HSPA/UMTS/LTE protocol processing, video MMS service and etc. Externally it provides SIM card interface.

## 2.4 Support equipment List

| Manufacturer                           | Description   | Model              | Serial Number | Certificate |
|----------------------------------------|---------------|--------------------|---------------|-------------|
| SHENZHEN FUSHIGANG TECHNOLOGY CO.,LTD. | POWER ADAPTER | AS1201A-0502000USU | ---           | FCC         |

## 2.5 External I/O Cable

| I/O Port Description | Quantity | Cable                       |
|----------------------|----------|-----------------------------|
| Type-C USB Port      | 1        | USB Cable: 0.8m, unshielded |

## 2.6 Normal Accessory setting

Fully charged battery was used during the test.

## 2.7 Test Sample

The application provides 2 samples to meet requirement;

| Sample Number         | Description                           |
|-----------------------|---------------------------------------|
| Sample 1(A12024283-1) | Engineer sample – continuous transmit |
| Sample 2(A12024283-2) | Normal sample – Intermittent transmit |





## 2.8 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. :    | / |

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

This submittal(s) (test report) is intended for FCC ID: 2BHIY-IRAT1015 filing to comply with FCC Part 22, Part 24, Part 27 Rules

## 2.10 Modifications

No modifications were implemented to meet testing criteria.

## 2.11 General Test Conditions/Configurations

### 2.10.1 Test Environment

| EnvironmentParameter | SelectedValuesDuringTests |          |
|----------------------|---------------------------|----------|
| Relative Humidity    | Ambient                   |          |
| Temperature          | TN                        | Ambient  |
| Voltage              | VL                        | DC 3.40V |
|                      | VN                        | DC 3.80V |
|                      | VH                        | DC 4.35V |

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**

101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

The sites are constructed in conformance with the requirements of ANSI C63.4 (2014) and CISPR Publication 32.

#### 3.2 Test Facility

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

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

#### 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

**Band 5 (824-849MHz pairedwith 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,<br>In 1MHz bands immediately outside and adjacent to<br>The frequency block.               | Pass    |
| Spurious Emission at Antenna Terminals     | §2.1051,<br>§22.917 | FCC: ≤ -13dBm/100kHz,<br>from 9kHz to 10th harmonics but outside<br>authorized operating frequency ranges. | Pass    |
| Field Strength of Spurious Radiation       | §2.1053,<br>§22.917 | FCC: ≤ -13dBm/100kHz.                                                                                      | Pass    |
| Frequency Stability                        | §2.1055,<br>§22.355 | ≤ ±2.5ppm.                                                                                                 | Pass    |

NOTE 1:For the verdict, the"N/A"denotes"not applicable",the"N/T"de notes "not tested".



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**Band 7 (2500-2570MHz pairedwith 2620-2690MHz)**

| Test Item                                  | FCC Rule No.       | Requirements                           | Verdict |
|--------------------------------------------|--------------------|----------------------------------------|---------|
| Effective(Isotropic) Radiated Output Power | §2.1046, §27.50(h) | FCC: EIRP $\leq$ 2W.                   | Pass    |
| Peak-AverageRatio                          | §2.1046, §27.50(a) | Limit $\leq$ 13dB                      | 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, §27.53(m) | More details specified in §27.53(m)(4) | Pass    |
| Spurious Emission at Antenna Terminals     | §2.1051, §27.53(m) | More details specified in §27.53(m)(4) | Pass    |
| Field Strength of Spurious Radiation       | §2.1053, §27.53(m) | More details specified in §27.53(m)(4) | Pass    |
| Frequency Stability                        | §2.1055, §27.54    | $\leq \pm 2.5$ ppm.                    | Pass    |

NOTE 1:For the verdict, the“N/A”denotes“not applicable”,the“N/T”de notes “not tested”.

**Band 38 (2570-2620MHz)**

| Test Item                                       | FCC Rule No.       | Requirements                                                                                       | Verdict |
|-------------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------|---------|
| Effective(Isotropic) Radiated Power Output Data | §2.1046, §27.50(h) | ERP $\leq$ 2W;                                                                                     | PASS    |
| Peak-Average Ratio                              | §2.1046, §27.50    | Limit $\leq$ 13dB                                                                                  | PASS    |
| Modulation Characteristics                      | §2.1047            | Digitalmodulation                                                                                  | N/A     |
| Bandwidth                                       | §2.1049            | OBW: Nolimit.<br>EBW: Nolimit.                                                                     | PASS    |
| BandEdges Compliance                            | §2.1051, §27.53(m) | $\leq -13$ dBm/1%*EBW,in1 MHz bands immediately outside and adjacent to The frequency block.       | PASS    |
| Spurious Emission at Antenna Terminals          | §2.1051, §27.53(m) | $\leq -13$ dBm/1MHz, from 9kHz to10th harmonics but outside authorized Operating frequency ranges. | PASS    |
| Frequency Stability                             | §2.1055, §27.54    | Within authorized bands of operation/frequency block.                                              | PASS    |
| Radiated spurious emission                      | §2.1053, §27.53(m) | $\leq -25$ dBm/1MHz.                                                                               | PASS    |

NOTE 1:For the verdict, the“N/A”denotes“not applicable”,the“N/T”de notes “not tested”.



**TDD Band 41(2496-2690MHz)**

| Test Item                                                                              | FCC Rule No.       | Requirements                                                                                 | Verdict |
|----------------------------------------------------------------------------------------|--------------------|----------------------------------------------------------------------------------------------|---------|
| Effective(Isotropic) Radiated Power Output Data                                        | §2.1046, §27.50(h) | ERP ≤ 2W;                                                                                    | PASS    |
| Peak-Average Ratio                                                                     | §2.1046, §27.50    | Limit≤13dB                                                                                   | PASS    |
| Modulation Characteristics                                                             | §2.1047            | Digitalmodulation                                                                            | N/A     |
| Bandwidth                                                                              | §2.1049            | OBW: Nolimit.<br>EBW: Nolimit.                                                               | PASS    |
| BandEdges Compliance                                                                   | §2.1051, §27.53(m) | ≤ -13dBm/1%*EBW,in1 MHz bands immediately outside and adjacent to The frequency block.       | PASS    |
| Spurious Emission at Antenna Terminals                                                 | §2.1051, §27.53(m) | ≤ -13dBm/1MHz, from 9kHz to10th harmonics but outside authorized Operating frequency ranges. | PASS    |
| Frequency Stability                                                                    | §2.1055, §27.54    | Within authorized bands of operation/frequency block.                                        | PASS    |
| Radiated spurious emission                                                             | §2.1053, §27.53(m) | ≤ -25dBm/1MHz.                                                                               | 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      | 2024-06-06 | 2025-06-05 |
| 2    | Power Sensor                        | R&S            | NRV-Z81    | 100458      | 2024-06-06 | 2025-06-05 |
| 3    | Power Sensor                        | R&S            | NRV-Z32    | 10057       | 2024-06-06 | 2025-06-05 |
| 4    | LTE Test Software                   | Tonscend       | JS1120-1   | N/A         | N/A        | N/A        |
| 5    | RF Control Unit                     | Tonscend       | JS0806-1   | 158060009   | 2024-11-08 | 2025-11-07 |
| 6    | MXA Signal Analyzer                 | Agilent        | N9020A     | MY51250905  | 2024-10-08 | 2025-10-07 |
| 7    | WIDEBAND RADIO COMMUNICATION TESTER | R&S            | CMW 500    | 103818      | 2024-06-06 | 2025-06-05 |
| 8    | DC Power Supply                     | Agilent        | E3642A     | N/A         | 2024-10-08 | 2025-10-07 |
| 9    | EMI Test Software                   | AUDIX          | E3         | /           | N/A        | N/A        |
| 10   | 3m Semi Anechoic Chamber            | SIDT FRANKONIA | SAC-3M     | 03CH03-HY   | 2024-06-06 | 2025-06-05 |
| 11   | Positioning Controller              | Max-Full       | MF7802BS   | MF780208586 | N/A        | N/A        |
| 12   | Active Loop Antenna                 | SCHWARZBECK    | FMZB 1519B | 00005       | 2024-07-13 | 2027-07-12 |
| 13   | By-log Antenna                      | SCHWARZBECK    | VULB9163   | 9163-470    | 2024-08-03 | 2027-08-02 |
| 14   | By-log Antenna                      | SCHWARZBECK    | VULB9163   | 9163-471    | 2024-08-03 | 2027-08-02 |
| 15   | Horn Antenna                        | SCHWARZBECK    | BBHA 9120D | 9120D-1925  | 2024-07-13 | 2027-07-12 |
| 16   | Horn Antenna                        | SCHWARZBECK    | BBHA 9120D | 9120D-1926  | 2024-07-13 | 2027-07-12 |
| 17   | Broadband Horn Antenna              | SCHWARZBECK    | BBHA 9170  | 791         | 2024-07-13 | 2027-07-12 |
| 18   | Broadband Horn Antenna              | SCHWARZBECK    | BBHA 9170  | 792         | 2024-07-13 | 2027-07-12 |
| 19   | Broadband Preamplifier              | SCHWARZBECK    | BBV9719    | 9719-025    | 2024-07-30 | 2025-07-29 |
| 20   | EMI Test Receiver                   | R&S            | ESR 7      | 101181      | 2024-06-06 | 2025-06-05 |
| 21   | RS SPECTRUM ANALYZER                | R&S            | FSP40      | 100503      | 2024-06-06 | 2025-06-05 |
| 22   | Low-frequency amplifier             | SchwarzZBECK   | BBV9745    | 00253       | 2024-10-08 | 2025-10-07 |
| 23   | High-frequency amplifier            | JS Denki Pte   | PA0118-43  | JSPA21009   | 2024-10-08 | 2025-10-07 |
| 24   | 6dB Attenuator                      | /              | 100W/6dB   | 1172040     | 2024-06-06 | 2025-06-05 |
| 26   | 3dB Attenuator                      | /              | 2N-3dB     | /           | 2024-10-08 | 2025-10-07 |
| 27   | Temperature & Humidity Chamber      | Baro           | /          | /           | 2024-06-12 | 2025-06-11 |
| 28   | EMI Test Software                   | Farad          | EZ         | /           | N/A        | N/A        |
| 29   | RADIO COMMUNICATION TESTER          | R&S            | CMU 200    | 105988      | 2024-06-06 | 2025-06-05 |
| 30   | Antenna Mast                        | Max-Full       | MFA-515BSN | 1308572     | N/A        | N/A        |





### 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

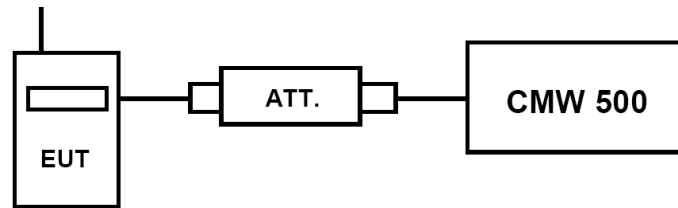
### 4.1 Output Power

#### TEST APPLICABLE

During the process of testing, the EUT was controlled via R&S Digital Radio Communication tester (CMW 500) 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 CMW 500 by an Att.
- EUT Communicate with CMW 500 then selects a channel for testing.
- Add a correction factor to the display CMW 500, and then test.

#### TEST RESULTS

##### Remark:

- We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41; recorded worst case for each Channel Bandwidth of LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41.
- For E-UTRA Band 5, please refer to Appendix H: Section H.1
- For E-UTRA Band 7, please refer to Appendix I: Section I.1
- For E-UTRA Band 38, please refer to Appendix J: Section J.1
- For E-UTRA Band 41, please refer to Appendix K: Section K.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.

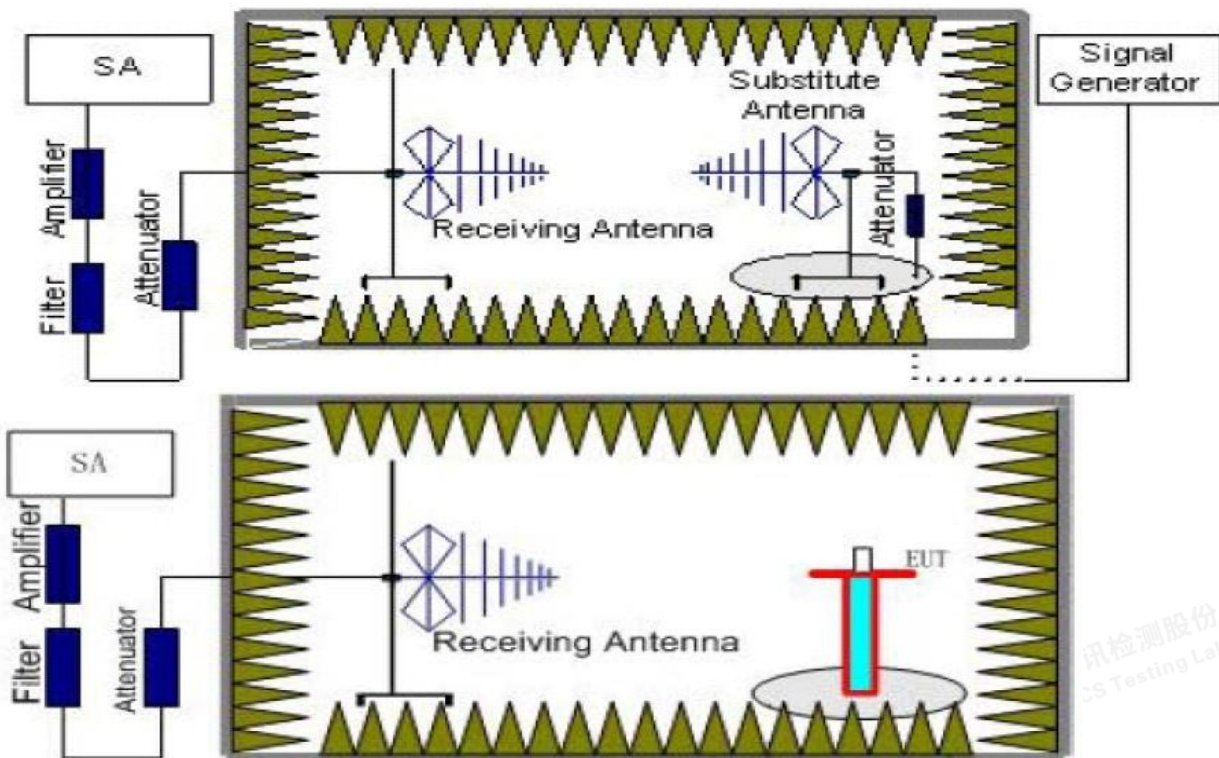
Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(e) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Per Part 27.50(d) (4) specifies, Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755MHz band are limited to 1W EIRP. Fixed stations operating in this band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in this band must employ a means for limiting power to the minimum necessary for successful communications.

Per Part 27.50(c) (10) specifies, Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

Per Part 27.50(h) (2) specifies Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

#### 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.

- 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 ( $P_r$ ).
- 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.
- 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:  
$$\text{Power(EIRP)} = P_{Mea} + P_{Ag} - P_{cl} + G_a$$
- This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
- ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15\text{dBi}$ .

## TEST RESULTS

### Radiated Measurement:

Remark:

- We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41; recorded worst case for each Channel Bandwidth of LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41.
- $EIRP = P_{Mea}(\text{dBm}) - P_{cl}(\text{dB}) + P_{Ag}(\text{dB}) + G_a(\text{dBi})$
- $ERP = EIRP - 2.15\text{dBi}$  as EIRP by subtracting the gain of the dipole.
- Margin = Emission Level - Limit
- We tested the worst-case records for H and V directions, and only the worst-case records for V direction were recorded in the report.

#### 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          | -15.67          | 3.45          | 8.45                   | 2.15            | 33.79         | 20.97          | 38.45       | -17.48      | V            |
| 836.50          | -16.31          | 3.49          | 8.45                   | 2.15            | 33.85         | 20.35          | 38.45       | -18.10      | V            |
| 848.30          | -15.77          | 3.55          | 8.36                   | 2.15            | 33.88         | 20.77          | 38.45       | -17.68      | 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          | -16.10          | 3.45          | 8.45                   | 2.15            | 33.79         | 20.54          | 38.45       | -17.91      | V            |
| 836.50          | -16.39          | 3.49          | 8.45                   | 2.15            | 33.85         | 20.27          | 38.45       | -18.18      | V            |
| 847.50          | -16.02          | 3.55          | 8.36                   | 2.15            | 33.88         | 20.52          | 38.45       | -17.93      | 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          | -16.41          | 3.45          | 8.45                   | 2.15            | 33.79         | 20.23          | 38.45       | -18.22      | V            |
| 836.50          | -15.94          | 3.49          | 8.45                   | 2.15            | 33.85         | 20.72          | 38.45       | -17.73      | V            |
| 846.50          | -16.01          | 3.55          | 8.36                   | 2.15            | 33.88         | 20.53          | 38.45       | -17.92      | 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) | Peak ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|-----------------|----------------------|----------------|-------------|-------------|--------------|
| 829.00          | -16.45                 | 3.45                 | 8.45                            | 2.15            | 33.79                | 20.19          | 38.45       | -18.26      | V            |
| 836.50          | -15.89                 | 3.49                 | 8.45                            | 2.15            | 33.85                | 20.77          | 38.45       | -17.68      | V            |
| 844.00          | -15.51                 | 3.55                 | 8.36                            | 2.15            | 33.88                | 21.03          | 38.45       | -17.42      | 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) | Peak ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|-----------------|----------------------|----------------|-------------|-------------|--------------|
| 824.70          | -17.07                 | 3.45                 | 8.45                            | 2.15            | 33.79                | 19.57          | 38.45       | -18.88      | V            |
| 836.50          | -16.80                 | 3.49                 | 8.45                            | 2.15            | 33.85                | 19.86          | 38.45       | -18.59      | V            |
| 848.30          | -16.86                 | 3.55                 | 8.36                            | 2.15            | 33.88                | 19.68          | 38.45       | -18.77      | 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) | Peak ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|-----------------|----------------------|----------------|-------------|-------------|--------------|
| 825.50          | -16.95                 | 3.45                 | 8.45                            | 2.15            | 33.79                | 19.69          | 38.45       | -18.76      | V            |
| 836.50          | -16.78                 | 3.49                 | 8.45                            | 2.15            | 33.85                | 19.88          | 38.45       | -18.57      | V            |
| 847.50          | -17.13                 | 3.55                 | 8.36                            | 2.15            | 33.88                | 19.41          | 38.45       | -19.04      | 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) | Peak ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|-----------------|----------------------|----------------|-------------|-------------|--------------|
| 826.50          | -17.21                 | 3.45                 | 8.45                            | 2.15            | 33.79                | 19.43          | 38.45       | -19.02      | V            |
| 836.50          | -17.07                 | 3.49                 | 8.45                            | 2.15            | 33.85                | 19.59          | 38.45       | -18.86      | V            |
| 846.50          | -17.44                 | 3.55                 | 8.36                            | 2.15            | 33.88                | 19.10          | 38.45       | -19.35      | 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) | Peak ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|-----------------|----------------------|----------------|-------------|-------------|--------------|
| 829.00          | -17.29                 | 3.45                 | 8.45                            | 2.15            | 33.79                | 19.35          | 38.45       | -19.10      | V            |
| 836.50          | -16.53                 | 3.49                 | 8.45                            | 2.15            | 33.85                | 20.13          | 38.45       | -18.32      | V            |
| 844.00          | -17.40                 | 3.55                 | 8.36                            | 2.15            | 33.88                | 19.14          | 38.45       | -19.31      | V            |

*LTE FDD Band 7\_Channel Bandwidth 5MHz\_QPSK*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|-----------------|-------------|-------------|--------------|
| 2502.5          | -18.81                 | 4.32                 | 6.80                            | 36.14                | 19.81           | 33.01       | -13.20      | V            |
| 2535.0          | -18.45                 | 4.32                 | 6.61                            | 36.17                | 20.01           | 33.01       | -13.00      | V            |
| 2567.5          | -18.91                 | 4.33                 | 6.57                            | 36.22                | 19.55           | 33.01       | -13.46      | V            |

*LTE FDD Band 7\_Channel Bandwidth 10MHz\_QPSK*

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|-----------------|-------------|-------------|--------------|
| 2505.0          | -18.23                 | 4.32                 | 6.80                            | 36.14                | 20.39           | 33.01       | -12.62      | V            |
| 2535.0          | -18.69                 | 4.32                 | 6.61                            | 36.17                | 19.77           | 33.01       | -13.24      | V            |
| 2565.0          | -18.26                 | 4.33                 | 6.57                            | 36.22                | 20.20           | 33.01       | -12.81      | V            |



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**LTE FDD Band 7\_Channel Bandwidth 15MHz\_QPSK**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|-----------------|-------------|-------------|--------------|
| 2507.5          | -18.21                 | 4.32                 | 6.80                            | 36.14                | 20.41           | 33.01       | -12.60      | V            |
| 2535.0          | -18.54                 | 4.32                 | 6.61                            | 36.17                | 19.92           | 33.01       | -13.09      | V            |
| 2562.5          | -18.28                 | 4.33                 | 6.57                            | 36.22                | 20.18           | 33.01       | -12.83      | V            |

**LTE FDD Band 7\_Channel Bandwidth 20MHz\_QPSK**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|-----------------|-------------|-------------|--------------|
| 2510.0          | -18.25                 | 4.32                 | 6.80                            | 36.14                | 20.37           | 33.01       | -12.64      | V            |
| 2535.0          | -18.86                 | 4.32                 | 6.61                            | 36.17                | 19.60           | 33.01       | -13.41      | V            |
| 2560.0          | -18.64                 | 4.33                 | 6.57                            | 36.22                | 19.82           | 33.01       | -13.19      | V            |

**LTE FDD Band 7\_Channel Bandwidth 5MHz\_16QAM**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|-----------------|-------------|-------------|--------------|
| 2502.5          | -19.76                 | 4.32                 | 6.80                            | 36.14                | 18.86           | 33.01       | -14.15      | V            |
| 2535.0          | -19.11                 | 4.32                 | 6.61                            | 36.17                | 19.35           | 33.01       | -13.66      | V            |
| 2567.5          | -19.55                 | 4.33                 | 6.57                            | 36.22                | 18.91           | 33.01       | -14.10      | V            |

**LTE FDD Band 7\_Channel Bandwidth 10MHz\_16QAM**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|-----------------|-------------|-------------|--------------|
| 2505.0          | -18.94                 | 4.32                 | 6.80                            | 36.14                | 19.68           | 33.01       | -13.33      | V            |
| 2535.0          | -19.63                 | 4.32                 | 6.61                            | 36.17                | 18.83           | 33.01       | -14.18      | V            |
| 2565.0          | -19.11                 | 4.33                 | 6.57                            | 36.22                | 19.35           | 33.01       | -13.66      | V            |

**LTE FDD Band 7\_Channel Bandwidth 15MHz\_16QAM**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|-----------------|-------------|-------------|--------------|
| 2507.5          | -19.50                 | 4.32                 | 6.80                            | 36.14                | 19.12           | 33.01       | -13.89      | V            |
| 2535.0          | -19.68                 | 4.32                 | 6.61                            | 36.17                | 18.78           | 33.01       | -14.23      | V            |
| 2562.5          | -19.50                 | 4.33                 | 6.57                            | 36.22                | 18.96           | 33.01       | -14.05      | V            |

**LTE FDD Band 7\_Channel Bandwidth 20MHz\_16QAM**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|-----------------|-------------|-------------|--------------|
| 2510.0          | -19.54                 | 4.32                 | 6.80                            | 36.14                | 19.08           | 33.01       | -13.93      | V            |
| 2535.0          | -19.83                 | 4.32                 | 6.61                            | 36.17                | 18.63           | 33.01       | -14.38      | V            |
| 2560.0          | -19.78                 | 4.33                 | 6.57                            | 36.22                | 18.68           | 33.01       | -14.33      | V            |

**LTE TDD Band 38\_Channel Bandwidth 5MHz\_QPSK**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2572.5          | -18.47                 | 4.34                 | 6.88                            | 36.20                | 20.27                    | 33.01       | -12.74      | V            |
| 2595.0          | -18.02                 | 4.36                 | 6.55                            | 36.26                | 20.43                    | 33.01       | -12.58      | V            |
| 2617.5          | -18.75                 | 4.47                 | 6.35                            | 36.50                | 19.63                    | 33.01       | -13.38      | V            |



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Scan code to check authenticity



## LTE TDD Band 38\_Channel Bandwidth 10MHz\_QPSK

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2575.0          | -18.18                 | 4.34                 | 6.88                            | 36.20                | 20.56                    | 33.01       | -12.45      | V            |
| 2595.0          | -18.71                 | 4.36                 | 6.55                            | 36.26                | 19.74                    | 33.01       | -13.27      | V            |
| 2615.0          | -18.31                 | 4.47                 | 6.35                            | 36.50                | 20.07                    | 33.01       | -12.94      | V            |

## LTE TDD Band 38\_Channel Bandwidth 15MHz\_QPSK

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2577.5          | -18.64                 | 4.34                 | 6.88                            | 36.20                | 20.10                    | 33.01       | -12.91      | V            |
| 2595.0          | -18.64                 | 4.36                 | 6.55                            | 36.26                | 19.81                    | 33.01       | -13.20      | V            |
| 2612.5          | -18.42                 | 4.47                 | 6.35                            | 36.50                | 19.96                    | 33.01       | -13.05      | V            |

## LTE TDD Band 38\_Channel Bandwidth 20MHz\_QPSK

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2580.0          | -18.54                 | 4.34                 | 6.88                            | 36.20                | 20.20                    | 33.01       | -12.81      | V            |
| 2595.0          | -18.02                 | 4.36                 | 6.55                            | 36.26                | 20.43                    | 33.01       | -12.58      | V            |
| 2610.0          | -18.66                 | 4.47                 | 6.35                            | 36.50                | 19.72                    | 33.01       | -13.29      | V            |

## LTE TDD Band 38\_Channel Bandwidth 5MHz\_16QAM

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2572.5          | -19.78                 | 4.34                 | 6.88                            | 36.20                | 18.96                    | 33.01       | -14.05      | V            |
| 2595.0          | -19.32                 | 4.36                 | 6.55                            | 36.26                | 19.13                    | 33.01       | -13.88      | V            |
| 2617.5          | -19.30                 | 4.47                 | 6.35                            | 36.50                | 19.08                    | 33.01       | -13.93      | V            |

## LTE TDD Band 38\_Channel Bandwidth 10MHz\_16QAM

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2575.0          | -19.47                 | 4.34                 | 6.88                            | 36.20                | 19.27                    | 33.01       | -13.74      | V            |
| 2595.0          | -19.55                 | 4.36                 | 6.55                            | 36.26                | 18.90                    | 33.01       | -14.11      | V            |
| 2615.0          | -19.03                 | 4.47                 | 6.35                            | 36.50                | 19.35                    | 33.01       | -13.66      | V            |

## LTE TDD Band 38\_Channel Bandwidth 15MHz\_16QAM

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2577.5          | -19.16                 | 4.34                 | 6.88                            | 36.20                | 19.58                    | 33.01       | -13.43      | V            |
| 2595.0          | -19.12                 | 4.36                 | 6.55                            | 36.26                | 19.33                    | 33.01       | -13.68      | V            |
| 2612.5          | -19.37                 | 4.47                 | 6.35                            | 36.50                | 19.01                    | 33.01       | -14.00      | V            |



**LTE TDD Band 38\_Channel Bandwidth 20MHz\_16QAM**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2580.0          | -19.50                 | 4.34                 | 6.88                            | 36.20                | 19.24                    | 33.01       | -13.77      | V            |
| 2595.0          | -19.26                 | 4.36                 | 6.55                            | 36.26                | 19.19                    | 33.01       | -13.82      | V            |
| 2610.0          | -19.77                 | 4.47                 | 6.35                            | 36.50                | 18.61                    | 33.01       | -14.40      | V            |

**LTE TDD Band 41\_Channel Bandwidth 5MHz\_QPSK**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2498.5          | -18.95                 | 4.32                 | 6.8                             | 36.13                | 19.66                    | 33.01       | -13.35      | V            |
| 2593.0          | -18.88                 | 4.36                 | 6.55                            | 36.26                | 19.57                    | 33.01       | -13.44      | V            |
| 2687.5          | -18.56                 | 4.51                 | 6.37                            | 36.54                | 19.84                    | 33.01       | -13.17      | V            |

**LTE TDD Band 41\_Channel Bandwidth 10MHz\_QPSK**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2501.0          | -18.75                 | 4.32                 | 6.8                             | 36.13                | 19.86                    | 33.01       | -13.15      | V            |
| 2593.0          | -18.27                 | 4.36                 | 6.55                            | 36.26                | 20.18                    | 33.01       | -12.83      | V            |
| 2685.0          | -18.45                 | 4.51                 | 6.37                            | 36.54                | 19.95                    | 33.01       | -13.06      | V            |

**LTE TDD Band 41\_Channel Bandwidth 15MHz\_QPSK**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2503.5          | -18.36                 | 4.32                 | 6.8                             | 36.13                | 20.25                    | 33.01       | -12.76      | V            |
| 2593.0          | -18.76                 | 4.36                 | 6.55                            | 36.26                | 19.69                    | 33.01       | -13.32      | V            |
| 2682.5          | -18.30                 | 4.51                 | 6.37                            | 36.54                | 20.10                    | 33.01       | -12.91      | V            |

**LTE TDD Band 41\_Channel Bandwidth 20MHz\_QPSK**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2506.0          | -18.47                 | 4.32                 | 6.8                             | 36.13                | 20.14                    | 33.01       | -12.87      | V            |
| 2593.0          | -18.98                 | 4.36                 | 6.55                            | 36.26                | 19.47                    | 33.01       | -13.54      | V            |
| 2680.0          | -18.71                 | 4.51                 | 6.37                            | 36.54                | 19.69                    | 33.01       | -13.32      | V            |

**LTE TDD Band 41\_Channel Bandwidth 5MHz\_16QAM**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2498.5          | -19.72                 | 4.32                 | 6.8                             | 36.13                | 18.89                    | 33.01       | -14.12      | V            |
| 2593.0          | -19.55                 | 4.36                 | 6.55                            | 36.26                | 18.90                    | 33.01       | -14.11      | V            |
| 2687.5          | -19.90                 | 4.51                 | 6.37                            | 36.54                | 18.50                    | 33.01       | -14.51      | V            |





## LTE TDD Band 41\_Channel Bandwidth 10MHz\_16QAM

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2501.0          | -19.13                 | 4.32                 | 6.8                             | 36.13                | 19.48                    | 33.01       | -13.53      | V            |
| 2593.0          | -18.97                 | 4.36                 | 6.55                            | 36.26                | 19.48                    | 33.01       | -13.53      | V            |
| 2685.0          | -19.86                 | 4.51                 | 6.37                            | 36.54                | 18.54                    | 33.01       | -14.47      | V            |

## LTE TDD Band 41\_Channel Bandwidth 15MHz\_16QAM

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2503.5          | -19.50                 | 4.32                 | 6.8                             | 36.13                | 19.11                    | 33.01       | -13.90      | V            |
| 2593.0          | -19.33                 | 4.36                 | 6.55                            | 36.26                | 19.12                    | 33.01       | -13.89      | V            |
| 2682.5          | -19.53                 | 4.51                 | 6.37                            | 36.54                | 18.87                    | 33.01       | -14.14      | V            |

## LTE TDD Band 41\_Channel Bandwidth 20MHz\_16QAM

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | Burst Average EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|---------------------------------|----------------------|--------------------------|-------------|-------------|--------------|
| 2506.0          | -18.98                 | 4.32                 | 6.8                             | 36.13                | 19.63                    | 33.01       | -13.38      | V            |
| 2593.0          | -19.08                 | 4.36                 | 6.55                            | 36.26                | 19.37                    | 33.01       | -13.64      | V            |
| 2680.0          | -19.88                 | 4.51                 | 6.37                            | 36.54                | 18.52                    | 33.01       | -14.49      | V            |



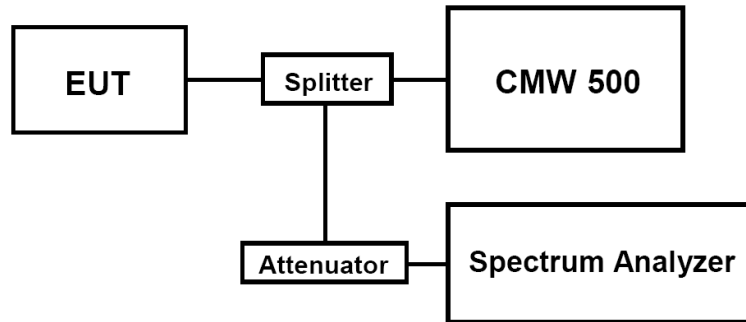


## 4.2 Peak-to-Average Ratio (PAR)

### 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, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41; recorded worst case for each Channel Bandwidth of LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41.
2. For E-UTRA Band 5, please refer to Appendix H: Section H.2
3. For E-UTRA Band 7, please refer to Appendix I: Section I.2
4. For E-UTRA Band 38, please refer to Appendix J: Section J.2
5. For E-UTRA Band 41, please refer to Appendix K: Section K.2



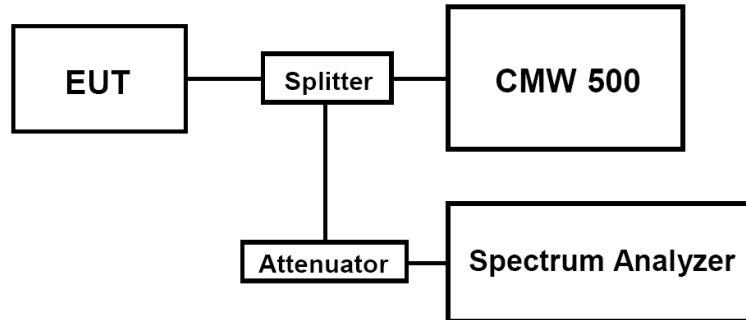


### 4.3 Occupied Bandwidth and Emission Bandwidth

#### 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, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41; recorded worst case for each Channel Bandwidth of LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41.
2. For E-UTRA Band 5, please refer to Appendix H: Section H.3
3. For E-UTRA Band 7, please refer to Appendix I: Section I.3
4. For E-UTRA Band 38, please refer to Appendix J: Section J.3
5. For E-UTRA Band 41, please refer to Appendix K: Section K.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  $43 + 10\log(P)$  dB.

For LTE FDD Band 7: Per FCC §27.53 (m)(4): For mobile digital stations, the attenuation factor shall be not less than:

- $40 + 10\log P$  dB (−10 dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge,
- $43 + 10\log P$  dB (−13 dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge, and
- $55 + 10\log P$  dB (−25 dBm, 3 nW) on all frequencies more than X MHz from the channel edge, where X is the greater of 6 MHz or the actual emission bandwidth (26 dB). [§ 27.53(m)(4)]

In addition, the attenuation factor (fixed limit) shall not be less than:

- $43 + 10\log P$  dB on all frequencies between 2490.5 MHz and 2496 MHz, and
- $55 + 10\log P$  dB at or below 2490.5 MHz. [§ 27.53(m)(4)]

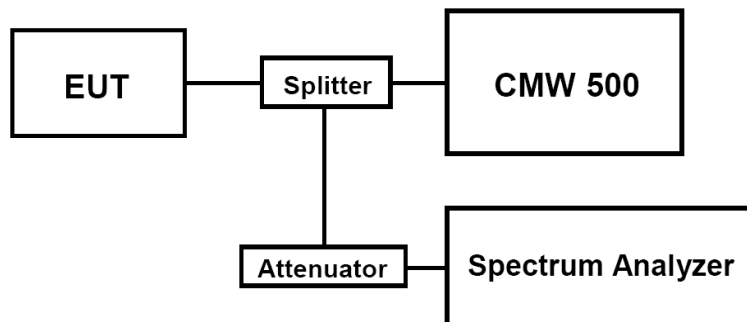
For LTE TDD Band 38/41: Per §27.53 (m)(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

(m)(4) For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Show citation box.





## TEST 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, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41; recorded worst case for each Channel Bandwidth of LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41.
2. For E-UTRA Band 5, please refer to Appendix H: Section H.4
3. For E-UTRA Band 7, please refer to Appendix I: Section I.4
4. For E-UTRA Band 38, please refer to Appendix J: Section J.4
5. For E-UTRA Band 41, please refer to Appendix K: Section K.4





## 4.5 Spurious Emission 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  $43 + 10\log(P)$  dB.

For LTE FDD Band 7: Per FCC §27.53 (m)(4): For mobile digital stations, the attenuation factor shall be not less than:

- $40 + 10\log P$  dB ( $-10$  dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge,
- $43 + 10\log P$  dB ( $-13$  dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge, and
- $55 + 10\log P$  dB ( $-25$  dBm, 3 nW) on all frequencies more than X MHz from the channel edge, where X is the greater of 6 MHz or the actual emission bandwidth (26 dB). [§ 27.53(m)(4)]

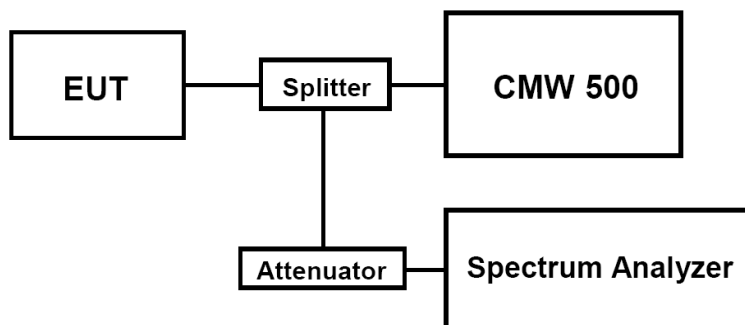
In addition, the attenuation factor (fixed limit) shall not be less than:

- $43 + 10\log P$  dB on all frequencies between 2490.5 MHz and 2496 MHz, and
- $55 + 10\log P$  dB at or below 2490.5 MHz. [§ 27.53(m)(4)]

For LTE TDD Band 38/41: Per §27.53 (m)(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

(m)(4) For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Show citation box.



**TEST CONFIGURATION****TEST PROCEDURE**

The EUT was setup according to TIA-603-E

- 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 CMW 500 by a Directional Couple.
- EUT Communicate with CMW 500, 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 setsufficient scans were taken to show the out of band Emission if any up to10<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 | 1KHz  | 3KHz  | Auto           |
|                   | 0.000015~0.03     | 10KHz | 30KHz | Auto           |
|                   | 0.03~26           | 1 MHz | 3 MHz | Auto           |
| LTE FDD Band 7    | 0.000009~0.000015 | 1KHz  | 3KHz  | Auto           |
|                   | 0.000015~0.03     | 10KHz | 30KHz | Auto           |
|                   | 0.03~26.5         | 1 MHz | 3 MHz | Auto           |
| LTE FDD Band 38   | 0.000009~0.000015 | 1KHz  | 3KHz  | Auto           |
|                   | 0.000015~0.03     | 10KHz | 30KHz | Auto           |
|                   | 0.03~26.5         | 1 MHz | 3 MHz | Auto           |
| LTE FDD Band 41   | 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:

- We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41; recorded worst case for each Channel Bandwidth of LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41.
- For E-UTRA Band 5, please refer to Appendix H: Section H.5
- For E-UTRA Band 7, please refer to Appendix I: Section I.5
- For E-UTRA Band 38, please refer to Appendix J: Section J.5
- For E-UTRA Band 41, please refer to Appendix K: Section K.5





## 4.6 Radiated Spurious Emission

### 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  $43 + 10\log(P)$  dB.

*For LTE FDD Band 7:* Per FCC §27.53 (m)(4): For mobile digital stations, the attenuation factor shall be not less than:

- $40 + 10\log P$  dB (−10 dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge,
- $43 + 10\log P$  dB (−13 dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge, and
- $55 + 10\log P$  dB (−25 dBm, 3 nW) on all frequencies more than X MHz from the channel edge, where X is the greater of 6 MHz or the actual emission bandwidth (26 dB). [§ 27.53(m)(4)]

In addition, the attenuation factor (fixed limit) shall not be less than:

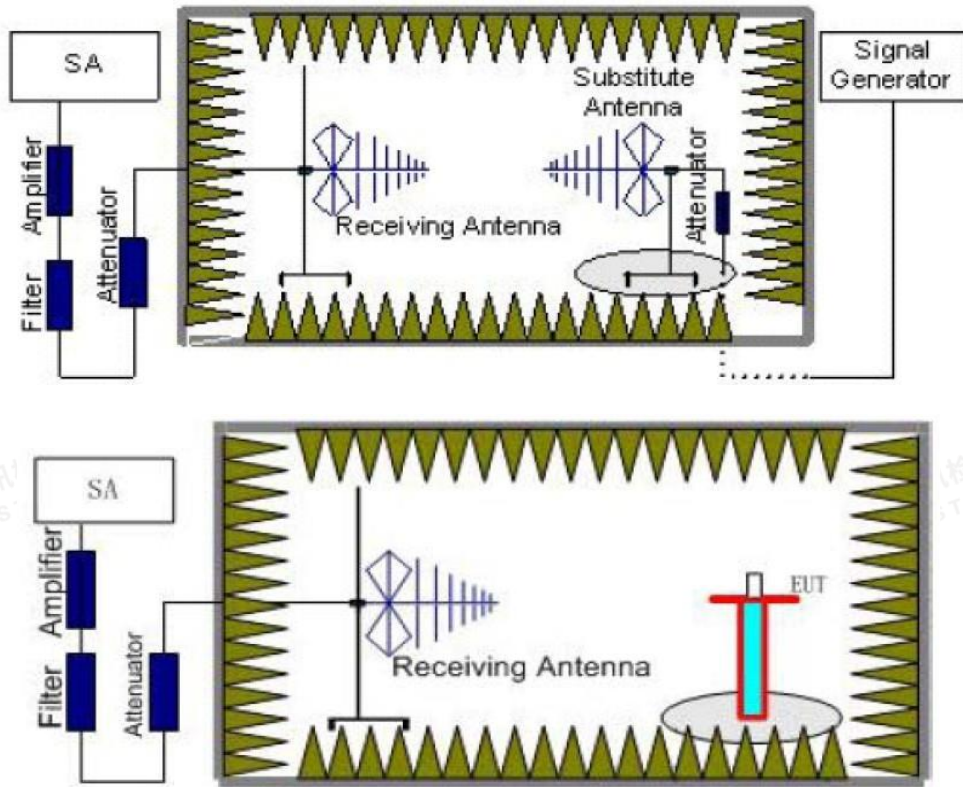
- $43 + 10\log P$  dB on all frequencies between 2490.5 MHz and 2496 MHz, and
- $55 + 10\log P$  dB at or below 2490.5 MHz. [§ 27.53(m)(4)]

*For LTE TDD Band 38/41:* Per §27.53 (m)(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

(m)(4) For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Show citation box.



## TEST 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:  
$$\text{Power(EIRP)} = P_{Mea} + P_{Ag} - P_{cl} + G_a$$
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,  $ERP = EIRP - 2.15\text{dBi}$ .
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              |
|                   | 5~8            | 1 MHz  | 3 MHz  | 3              |
|                   | 8~9            | 1 MHz  | 3 MHz  | 3              |
| LTE FDD Band 7    | 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              |
|                   | 8~11           | 1 MHz  | 3 MHz  | 3              |
|                   | 11~14          | 1 MHz  | 3 MHz  | 3              |
|                   | 14~18          | 1 MHz  | 3 MHz  | 3              |
|                   | 18~20          | 1 MHz  | 3 MHz  | 2              |
| LTE FDD Band 38   | 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              |
|                   | 8~11           | 1 MHz  | 3 MHz  | 3              |
|                   | 11~14          | 1 MHz  | 3 MHz  | 3              |
|                   | 14~18          | 1 MHz  | 3 MHz  | 3              |
|                   | 18~20          | 1 MHz  | 3 MHz  | 2              |
| LTE TDD Band 41   | 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              |
|                   | 8~11           | 1 MHz  | 3 MHz  | 3              |
|                   | 11~14          | 1 MHz  | 3 MHz  | 3              |
|                   | 14~18          | 1 MHz  | 3 MHz  | 3              |
|                   | 18~20          | 1 MHz  | 3 MHz  | 2              |

| Frequency       | Channel | Frequency Range | Verdict |
|-----------------|---------|-----------------|---------|
| LTE FDD Band 5  | Low     | 9KHz -9GHz      | PASS    |
|                 | Middle  | 9KHz -9GHz      | PASS    |
|                 | High    | 9KHz -9GHz      | PASS    |
| LTE FDD Band 7  | Low     | 9KHz -26GHz     | PASS    |
|                 | Middle  | 9KHz -26GHz     | PASS    |
|                 | High    | 9KHz -26GHz     | PASS    |
| LTE FDD Band 38 | Low     | 9KHz -26GHz     | PASS    |
|                 | Middle  | 9KHz -26GHz     | PASS    |
|                 | High    | 9KHz -26GHz     | PASS    |
| LTE TDD Band 41 | Low     | 9KHz -26GHz     | PASS    |
|                 | Middle  | 9KHz -26GHz     | PASS    |
|                 | High    | 9KHz -26GHz     | PASS    |



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**TEST RESULTS**

Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41; recorded worst case for each Channel Bandwidth of LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41.

3. We were not recorded other points as values lower than limits.

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

5.  $\text{Margin} = \text{EIRP} - \text{Limit}$

**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         | -39.06                 | 3.86                 | 3.00     | 8.56                            | -34.36          | -13.00      | -21.36      | H            |
| 2487.00         | -46.59                 | 4.29                 | 3.00     | 6.98                            | -43.90          | -13.00      | -30.90      | H            |
| 1658.00         | -36.23                 | 3.86                 | 3.00     | 8.56                            | -31.53          | -13.00      | -18.53      | V            |
| 2487.00         | -37.40                 | 4.29                 | 3.00     | 6.98                            | -34.71          | -13.00      | -21.71      | 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         | -41.81                 | 3.90                 | 3.00     | 8.58                            | -37.13          | -13.00      | -24.13      | H            |
| 2509.50         | -44.69                 | 4.32                 | 3.00     | 6.80                            | -42.21          | -13.00      | -29.21      | H            |
| 1673.00         | -33.51                 | 3.90                 | 3.00     | 8.58                            | -28.83          | -13.00      | -15.83      | V            |
| 2509.50         | -37.61                 | 4.32                 | 3.00     | 6.80                            | -35.13          | -13.00      | -22.13      | 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         | -40.33                 | 3.91                 | 3.00     | 9.06                            | -35.18          | -13.00      | -22.18      | H            |
| 2532.00         | -44.86                 | 4.32                 | 3.00     | 6.65                            | -42.53          | -13.00      | -29.53      | H            |
| 1688.00         | -33.20                 | 3.91                 | 3.00     | 9.06                            | -28.05          | -13.00      | -15.05      | V            |
| 2532.00         | -38.62                 | 4.32                 | 3.00     | 6.65                            | -36.29          | -13.00      | -23.29      | 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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 1658.00         | -44.75                 | 3.86                 | 3.00     | 8.56                            | -40.05          | -13.00      | -27.05      | H            |
| 2487.00         | -46.47                 | 4.29                 | 3.00     | 6.98                            | -43.78          | -13.00      | -30.78      | H            |
| 1658.00         | -37.47                 | 3.86                 | 3.00     | 8.56                            | -32.77          | -13.00      | -19.77      | V            |
| 2487.00         | -42.27                 | 4.29                 | 3.00     | 6.98                            | -39.58          | -13.00      | -26.58      | 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         | -43.49                 | 3.90                 | 3.00     | 8.58                            | -38.81          | -13.00      | -25.81      | H            |
| 2509.50         | -49.46                 | 4.32                 | 3.00     | 6.80                            | -46.98          | -13.00      | -33.98      | H            |
| 1673.00         | -39.52                 | 3.90                 | 3.00     | 8.58                            | -34.84          | -13.00      | -21.84      | V            |
| 2509.50         | -40.30                 | 4.32                 | 3.00     | 6.80                            | -37.82          | -13.00      | -24.82      | V            |



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*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         | -41.65                 | 3.91                 | 3.00     | 9.06                            | -36.50          | -13.00      | -23.50      | H            |
| 2532.00         | -48.27                 | 4.32                 | 3.00     | 6.65                            | -45.94          | -13.00      | -32.94      | H            |
| 1688.00         | -39.36                 | 3.91                 | 3.00     | 9.06                            | -34.21          | -13.00      | -21.21      | V            |
| 2532.00         | -42.04                 | 4.32                 | 3.00     | 6.65                            | -39.71          | -13.00      | -26.71      | V            |

*LTE FDD Band 7\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5020.0          | -38.91                 | 5.88                 | 3.00     | 10.77                           | -34.02          | -25.00      | -9.02       | H            |
| 7530.0          | -44.15                 | 7.12                 | 3.00     | 12.26                           | -39.01          | -25.00      | -14.01      | H            |
| 5020.0          | -36.42                 | 5.88                 | 3.00     | 10.77                           | -31.53          | -25.00      | -6.53       | V            |
| 7530.0          | -36.98                 | 7.12                 | 3.00     | 12.26                           | -31.84          | -25.00      | -6.84       | V            |

*LTE FDD Band 7\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5070.0          | -38.13                 | 5.90                 | 3.00     | 10.81                           | -33.22          | -25.00      | -8.22       | H            |
| 7605.0          | -47.08                 | 7.19                 | 3.00     | 12.32                           | -41.95          | -25.00      | -16.95      | H            |
| 5070.0          | -35.83                 | 5.90                 | 3.00     | 10.81                           | -30.92          | -25.00      | -5.92       | V            |
| 7605.0          | -39.91                 | 7.19                 | 3.00     | 12.32                           | -34.78          | -25.00      | -9.78       | V            |

*LTE FDD Band 7\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5120.0          | -38.03                 | 5.94                 | 3.00     | 10.86                           | -33.11          | -25.00      | -8.11       | H            |
| 7680.0          | -45.22                 | 7.25                 | 3.00     | 12.98                           | -39.49          | -25.00      | -14.49      | H            |
| 5120.0          | -35.60                 | 5.94                 | 3.00     | 10.86                           | -30.68          | -25.00      | -5.68       | V            |
| 7680.0          | -36.88                 | 7.25                 | 3.00     | 12.98                           | -31.15          | -25.00      | -6.15       | V            |

*LTE FDD Band 7\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5020.0          | -41.28                 | 5.88                 | 3.00     | 10.77                           | -36.39          | -25.00      | -11.39      | H            |
| 7530.0          | -47.72                 | 7.12                 | 3.00     | 12.26                           | -42.58          | -25.00      | -17.58      | H            |
| 5020.0          | -36.41                 | 5.88                 | 3.00     | 10.77                           | -31.52          | -25.00      | -6.52       | V            |
| 7530.0          | -39.49                 | 7.12                 | 3.00     | 12.26                           | -34.35          | -25.00      | -9.35       | V            |

*LTE FDD Band 7\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5070.0          | -44.96                 | 5.90                 | 3.00     | 10.81                           | -40.05          | -25.00      | -15.05      | H            |
| 7605.0          | -46.81                 | 7.19                 | 3.00     | 12.32                           | -41.68          | -25.00      | -16.68      | H            |
| 5070.0          | -38.83                 | 5.90                 | 3.00     | 10.81                           | -33.92          | -25.00      | -8.92       | V            |
| 7605.0          | -39.50                 | 7.19                 | 3.00     | 12.32                           | -34.37          | -25.00      | -9.37       | V            |



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*LTE FDD Band 7\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5120.0          | -42.34                 | 5.94                 | 3.00     | 10.86                           | -37.42          | -25.00      | -12.42      | H            |
| 7680.0          | -47.33                 | 7.25                 | 3.00     | 12.98                           | -41.60          | -25.00      | -16.60      | H            |
| 5120.0          | -38.02                 | 5.94                 | 3.00     | 10.86                           | -33.10          | -25.00      | -8.10       | V            |
| 7680.0          | -40.64                 | 7.25                 | 3.00     | 12.98                           | -34.91          | -25.00      | -9.91       | V            |

*LTE TDD Band 38\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5160.0          | -40.70                 | 7.10                 | 3.00     | 9.78                            | -38.02          | -25.00      | -13.02      | H            |
| 7740.0          | -47.69                 | 8.32                 | 3.00     | 10.86                           | -45.15          | -25.00      | -20.15      | H            |
| 5160.0          | -44.47                 | 7.10                 | 3.00     | 9.78                            | -41.79          | -25.00      | -16.79      | V            |
| 7740.0          | -43.02                 | 8.32                 | 3.00     | 10.86                           | -40.48          | -25.00      | -15.48      | V            |

*LTE TDD Band 38\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5190.0          | -40.92                 | 7.18                 | 3.00     | 9.88                            | -38.22          | -25.00      | -13.22      | H            |
| 7785.0          | -47.71                 | 8.44                 | 3.00     | 11.38                           | -44.77          | -25.00      | -19.77      | H            |
| 5190.0          | -45.51                 | 7.18                 | 3.00     | 9.88                            | -42.81          | -25.00      | -17.81      | V            |
| 7785.0          | -41.05                 | 8.44                 | 3.00     | 11.38                           | -38.11          | -25.00      | -13.11      | V            |

*LTE TDD Band 38\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5220.0          | -41.65                 | 7.15                 | 3.00     | 9.25                            | -39.55          | -25.00      | -14.55      | H            |
| 7830.0          | -47.16                 | 8.36                 | 3.00     | 11.43                           | -44.09          | -25.00      | -19.09      | H            |
| 5220.0          | -44.71                 | 7.15                 | 3.00     | 9.25                            | -42.61          | -25.00      | -17.61      | V            |
| 7830.0          | -42.36                 | 8.36                 | 3.00     | 11.43                           | -39.29          | -25.00      | -14.29      | V            |

*LTE TDD Band 38\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5160.0          | -43.02                 | 7.10                 | 3.00     | 9.78                            | -40.34          | -25.00      | -15.34      | H            |
| 7740.0          | -47.93                 | 8.32                 | 3.00     | 10.86                           | -45.39          | -25.00      | -20.39      | H            |
| 5160.0          | -44.46                 | 7.10                 | 3.00     | 9.78                            | -41.78          | -25.00      | -16.78      | V            |
| 7740.0          | -41.01                 | 8.32                 | 3.00     | 10.86                           | -38.47          | -25.00      | -13.47      | V            |

*LTE TDD Band 38\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5190.0          | -41.40                 | 7.18                 | 3.00     | 9.88                            | -38.70          | -25.00      | -13.70      | H            |
| 7785.0          | -46.25                 | 8.44                 | 3.00     | 11.38                           | -43.31          | -25.00      | -18.31      | H            |
| 5190.0          | -45.87                 | 7.18                 | 3.00     | 9.88                            | -43.17          | -25.00      | -18.17      | V            |
| 7785.0          | -41.71                 | 8.44                 | 3.00     | 11.38                           | -38.77          | -25.00      | -13.77      | V            |



*LTE TDD Band 38\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5220.0          | -44.59                 | 7.15                 | 3.00     | 9.25                            | -42.49          | -25.00      | -17.49      | H            |
| 7830.0          | -47.76                 | 8.36                 | 3.00     | 11.43                           | -44.69          | -25.00      | -19.69      | H            |
| 5220.0          | -47.56                 | 7.15                 | 3.00     | 9.25                            | -45.46          | -25.00      | -20.46      | V            |
| 7830.0          | -42.67                 | 8.36                 | 3.00     | 11.43                           | -39.60          | -25.00      | -14.60      | V            |

*LTE TDD Band 41\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5012.0          | -39.87                 | 7.15                 | 3.00     | 9.88                            | -37.14          | -25.00      | -12.14      | H            |
| 7518.0          | -45.78                 | 8.36                 | 3.00     | 11.36                           | -42.78          | -25.00      | -17.78      | H            |
| 5012.0          | -45.37                 | 7.15                 | 3.00     | 9.88                            | -42.64          | -25.00      | -17.64      | V            |
| 7518.0          | -43.57                 | 8.36                 | 3.00     | 11.36                           | -40.57          | -25.00      | -15.57      | V            |

*LTE TDD Band 41\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5186.0          | -39.35                 | 7.26                 | 3.00     | 10.03                           | -36.58          | -25.00      | -11.58      | H            |
| 7779.0          | -45.51                 | 8.48                 | 3.00     | 11.41                           | -42.58          | -25.00      | -17.58      | H            |
| 5186.0          | -47.16                 | 7.26                 | 3.00     | 10.03                           | -44.39          | -25.00      | -19.39      | V            |
| 7779.0          | -43.60                 | 8.48                 | 3.00     | 11.41                           | -40.67          | -25.00      | -15.67      | V            |

*LTE TDD Band 41\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5360.0          | -39.51                 | 7.17                 | 3.00     | 9.62                            | -37.06          | -25.00      | -12.06      | H            |
| 8040.0          | -47.99                 | 8.39                 | 3.00     | 11.46                           | -44.92          | -25.00      | -19.92      | H            |
| 5360.0          | -45.39                 | 7.17                 | 3.00     | 9.62                            | -42.94          | -25.00      | -17.94      | V            |
| 8040.0          | -43.24                 | 8.39                 | 3.00     | 11.46                           | -40.17          | -25.00      | -15.17      | V            |

*LTE TDD Band 41\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5012.0          | -41.80                 | 7.15                 | 3.00     | 9.88                            | -39.07          | -25.00      | -14.07      | H            |
| 7518.0          | -46.46                 | 8.36                 | 3.00     | 11.36                           | -43.46          | -25.00      | -18.46      | H            |
| 5012.0          | -45.19                 | 7.15                 | 3.00     | 9.88                            | -42.46          | -25.00      | -17.46      | V            |
| 7518.0          | -42.41                 | 8.36                 | 3.00     | 11.36                           | -39.41          | -25.00      | -14.41      | V            |

*LTE TDD Band 41\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5186.0          | -41.93                 | 7.26                 | 3.00     | 10.03                           | -39.16          | -25.00      | -14.16      | H            |
| 7779.0          | -47.38                 | 8.48                 | 3.00     | 11.41                           | -44.45          | -25.00      | -19.45      | H            |
| 5186.0          | -47.88                 | 7.26                 | 3.00     | 10.03                           | -45.11          | -25.00      | -20.11      | V            |
| 7779.0          | -40.20                 | 8.48                 | 3.00     | 11.41                           | -37.27          | -25.00      | -12.27      | V            |





LTE TDD Band 41\_Channel Bandwidth 20MHz\_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 |
|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 5360.0          | -44.23                 | 7.17                 | 3.00     | 9.62                            | -41.78          | -25.00      | -16.78      | H            |
| 8040.0          | -48.91                 | 8.39                 | 3.00     | 11.46                           | -45.84          | -25.00      | -20.84      | H            |
| 5360.0          | -45.16                 | 7.17                 | 3.00     | 9.62                            | -42.71          | -25.00      | -17.71      | V            |
| 8040.0          | -42.17                 | 8.39                 | 3.00     | 11.46                           | -39.10          | -25.00      | -14.10      | V            |

Notes: All channel bandwidth were tested,the report recorded the worst data.



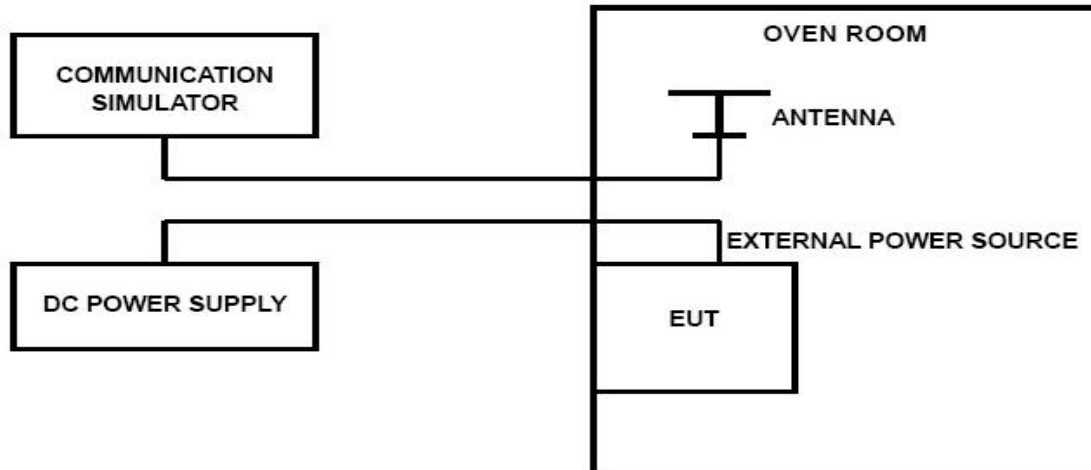


## 4.7 Frequency Stability under Temperature & Voltage Variations

### LIMIT

According to FCC §2.1055, §22.355, §24.235, §27.54 and §90.213 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 CMW 500 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 CMW 500 and in a simulated call on middle channel for LTE Band 5, LTE Band 7, TE Band 38, LTE Band 41; 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 CMW 500 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 ( $\pm 15\%$ ) and endpoint, record the maximum frequency change.



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**TEST RESULTS****Remark:**

We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41; recorded worst case for each Channel Bandwidth of LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 38, LTE FDD Band 41.

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

| LTE FDD Band 5 |                  |                     |                      |             |         |
|----------------|------------------|---------------------|----------------------|-------------|---------|
| DC Power       | Temperature (°C) | Frequency error(Hz) | Frequency error(ppm) | Limit (ppm) | Verdict |
| VL             | 20               | 43                  | 0.052                | ±2.50       | PASS    |
| VN             | 20               | -5                  | -0.006               | ±2.50       | PASS    |
| VH             | 20               | -42                 | -0.051               | ±2.50       | PASS    |
| VN             | -30              | 12                  | 0.015                | ±2.50       | PASS    |
| VN             | -20              | 5                   | 0.006                | ±2.50       | PASS    |
| VN             | -10              | 3                   | 0.004                | ±2.50       | PASS    |
| VN             | 0                | 25                  | 0.030                | ±2.50       | PASS    |
| VN             | 10               | 36                  | 0.044                | ±2.50       | PASS    |
| VN             | 20               | 13                  | 0.016                | ±2.50       | PASS    |
| VN             | 30               | -22                 | -0.027               | ±2.50       | PASS    |
| VN             | 40               | 7                   | 0.008                | ±2.50       | PASS    |
| VN             | 50               | -15                 | -0.018               | ±2.50       | PASS    |

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

| LTE FDD Band 5 |                  |                     |                      |             |         |
|----------------|------------------|---------------------|----------------------|-------------|---------|
| DC Power       | Temperature (°C) | Frequency error(Hz) | Frequency error(ppm) | Limit (ppm) | Verdict |
| VL             | 20               | 2                   | 0.002                | ±2.50       | PASS    |
| VN             | 20               | 39                  | 0.047                | ±2.50       | PASS    |
| VH             | 20               | 20                  | 0.024                | ±2.50       | PASS    |
| VN             | -30              | -37                 | -0.045               | ±2.50       | PASS    |
| VN             | -20              | 37                  | 0.045                | ±2.50       | PASS    |
| VN             | -10              | 26                  | 0.032                | ±2.50       | PASS    |
| VN             | 0                | 23                  | 0.028                | ±2.50       | PASS    |
| VN             | 10               | 7                   | 0.008                | ±2.50       | PASS    |
| VN             | 20               | -39                 | -0.047               | ±2.50       | PASS    |
| VN             | 30               | 43                  | 0.052                | ±2.50       | PASS    |
| VN             | 40               | 12                  | 0.015                | ±2.50       | PASS    |
| VN             | 50               | -18                 | -0.022               | ±2.50       | PASS    |



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**LTE Band 7, QPSK, 5MHz bandwidth (worst case of all bandwidths and modulation type)****LTE FDD Band 7**

| DC Power | Temperature (°C) | Frequency error(Hz) | Frequency error(ppm) | Limit (ppm) | Verdict |
|----------|------------------|---------------------|----------------------|-------------|---------|
| VL       | 20               | -5                  | -0.002               | ±2.50       | PASS    |
| VN       | 20               | 4                   | 0.002                | ±2.50       | PASS    |
| VH       | 20               | -12                 | -0.005               | ±2.50       | PASS    |
| VN       | -30              | 1                   | 0.000                | ±2.50       | PASS    |
| VN       | -20              | -9                  | -0.004               | ±2.50       | PASS    |
| VN       | -10              | 1                   | 0.000                | ±2.50       | PASS    |
| VN       | 0                | -15                 | -0.006               | ±2.50       | PASS    |
| VN       | 10               | -2                  | -0.001               | ±2.50       | PASS    |
| VN       | 20               | 4                   | 0.002                | ±2.50       | PASS    |
| VN       | 30               | -6                  | -0.002               | ±2.50       | PASS    |
| VN       | 40               | -17                 | -0.007               | ±2.50       | PASS    |
| VN       | 50               | -8                  | -0.003               | ±2.50       | PASS    |

**LTE Band 7, 16QAM, 5MHz bandwidth (worst case of all bandwidths and modulation type)****LTE FDD Band 7**

| DC Power | Temperature (°C) | Frequency error(Hz) | Frequency error(ppm) | Limit (ppm) | Verdict |
|----------|------------------|---------------------|----------------------|-------------|---------|
| VL       | 20               | -1                  | 0.000                | ±2.50       | PASS    |
| VN       | 20               | -9                  | -0.004               | ±2.50       | PASS    |
| VH       | 20               | -10                 | -0.004               | ±2.50       | PASS    |
| VN       | -30              | 20                  | 0.008                | ±2.50       | PASS    |
| VN       | -20              | -10                 | -0.004               | ±2.50       | PASS    |
| VN       | -10              | 20                  | 0.008                | ±2.50       | PASS    |
| VN       | 0                | -18                 | -0.007               | ±2.50       | PASS    |
| VN       | 10               | -17                 | -0.007               | ±2.50       | PASS    |
| VN       | 20               | -4                  | -0.002               | ±2.50       | PASS    |
| VN       | 30               | -5                  | -0.002               | ±2.50       | PASS    |
| VN       | 40               | -1                  | 0.000                | ±2.50       | PASS    |
| VN       | 50               | 5                   | 0.002                | ±2.50       | PASS    |

**LTE Band 38, 5MHz bandwidth, QPSK (worst case of all bandwidths)****LTE TDD Band 38**

| DC Power | Temperature (°C) | Frequency error(Hz) | Frequency error(ppm) | Limit (ppm) | Verdict |
|----------|------------------|---------------------|----------------------|-------------|---------|
| VL       | 20               | 5                   | 0.002                | 2.50        | PASS    |
| VN       | 20               | 38                  | 0.015                | 2.50        | PASS    |
| VH       | 20               | 77                  | 0.030                | 2.50        | PASS    |
| VN       | -30              | 40                  | 0.015                | 2.50        | PASS    |
| VN       | -20              | 35                  | 0.013                | 2.50        | PASS    |
| VN       | -10              | 37                  | 0.014                | 2.50        | PASS    |
| VN       | 0                | 38                  | 0.015                | 2.50        | PASS    |
| VN       | 10               | 18                  | 0.007                | 2.50        | PASS    |
| VN       | 20               | 69                  | 0.027                | 2.50        | PASS    |
| VN       | 30               | 79                  | 0.030                | 2.50        | PASS    |
| VN       | 40               | 88                  | 0.034                | 2.50        | PASS    |
| VN       | 50               | 84                  | 0.032                | 2.50        | PASS    |



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LTE Band 38, 5MHz bandwidth, 16QAM (worst case of all bandwidths)

| LTE TDD Band 38 |                  |                     |                      |             |         |
|-----------------|------------------|---------------------|----------------------|-------------|---------|
| DC Power        | Temperature (°C) | Frequency error(Hz) | Frequency error(ppm) | Limit (ppm) | Verdict |
| VL              | 20               | 76                  | 0.029                | 2.50        | PASS    |
| VN              | 20               | 94                  | 0.036                | 2.50        | PASS    |
| VH              | 20               | 73                  | 0.028                | 2.50        | PASS    |
| VN              | -30              | 71                  | 0.027                | 2.50        | PASS    |
| VN              | -20              | 11                  | 0.004                | 2.50        | PASS    |
| VN              | -10              | 7                   | 0.003                | 2.50        | PASS    |
| VN              | 0                | 12                  | 0.005                | 2.50        | PASS    |
| VN              | 10               | 2                   | 0.001                | 2.50        | PASS    |
| VN              | 20               | 97                  | 0.037                | 2.50        | PASS    |
| VN              | 30               | 60                  | 0.023                | 2.50        | PASS    |
| VN              | 40               | 84                  | 0.032                | 2.50        | PASS    |
| VN              | 50               | 24                  | 0.009                | 2.50        | PASS    |

LTE Band 41, 5MHz bandwidth, QPSK (worst case of all bandwidths)

| LTE TDD Band 41 |                  |                     |                      |             |         |
|-----------------|------------------|---------------------|----------------------|-------------|---------|
| DC Power        | Temperature (°C) | Frequency error(Hz) | Frequency error(ppm) | Limit (ppm) | Verdict |
| VL              | 20               | 6                   | 0.003                | 2.50        | PASS    |
| VN              | 20               | 52                  | 0.025                | 2.50        | PASS    |
| VH              | 20               | 11                  | 0.005                | 2.50        | PASS    |
| VN              | -30              | 92                  | 0.044                | 2.50        | PASS    |
| VN              | -20              | 96                  | 0.046                | 2.50        | PASS    |
| VN              | -10              | 5                   | 0.002                | 2.50        | PASS    |
| VN              | 0                | 56                  | 0.027                | 2.50        | PASS    |
| VN              | 10               | 87                  | 0.042                | 2.50        | PASS    |
| VN              | 20               | 98                  | 0.047                | 2.50        | PASS    |
| VN              | 30               | 75                  | 0.036                | 2.50        | PASS    |
| VN              | 40               | 33                  | 0.016                | 2.50        | PASS    |
| VN              | 50               | 68                  | 0.032                | 2.50        | PASS    |

LTE Band 41, 5MHz bandwidth, 16QAM (worst case of all bandwidths)

| LTE TDD Band 41 |                  |                     |                      |             |         |
|-----------------|------------------|---------------------|----------------------|-------------|---------|
| DC Power        | Temperature (°C) | Frequency error(Hz) | Frequency error(ppm) | Limit (ppm) | Verdict |
| VL              | 20               | 77                  | 0.037                | 2.50        | PASS    |
| VN              | 20               | 1                   | 0.000                | 2.50        | PASS    |
| VH              | 20               | 68                  | 0.032                | 2.50        | PASS    |
| VN              | -30              | 16                  | 0.008                | 2.50        | PASS    |
| VN              | -20              | 50                  | 0.024                | 2.50        | PASS    |
| VN              | -10              | 61                  | 0.029                | 2.50        | PASS    |
| VN              | 0                | 99                  | 0.047                | 2.50        | PASS    |
| VN              | 10               | 14                  | 0.007                | 2.50        | PASS    |
| VN              | 20               | 43                  | 0.021                | 2.50        | PASS    |
| VN              | 30               | 58                  | 0.028                | 2.50        | PASS    |
| VN              | 40               | 21                  | 0.010                | 2.50        | PASS    |
| VN              | 50               | 66                  | 0.032                | 2.50        | PASS    |



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## **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.

-----THE END OF REPORT-----

