



# FCC Test Report

## FCC ID: 2BO2L-CHTBG12

Applicant: Shenzhen Heli Xinde Technology Co., Ltd.

Address: Rm1204, Bldg 64, Pengxing Garden, No.3101, Luosha Rd., Lianhua Comm., Liantang St., Luohu Dist., Shenzhen

Manufacturer: Guangdong Intelligent Yunchuang Technology Co., Ltd

Address: Room 301, No. 2, Fanguayuan Road, Houjie Town, Dongguan City, Guangdong Province

EUT: 4G LTE Cellular Security Camera Wireless Outdoor

Trade Mark: /

Model Number: CHTBG12  
CHTBG05, CHTBG06, CHTBG07, CHTBG13, CHCW52

Date of Receipt: Mar. 31, 2025

Test Date: Mar. 31, 2025 - Apr. 14, 2025

Date of Report: Apr. 14, 2025

Prepared By: Shenzhen DL Testing Technology Co., Ltd.

Address: 101-201, Comprehensive Building, Tongzhou Electronics Longgang Factory Area, No.1 Baolong Fifth Road, Baolong Community, Baolong Street, Longgang District, Shenzhen, China

Applicable Standards: FCC Part 2 Subpart J,  
Part 22 Subpart H,  
Part 24 Subpart E,  
Part 27  
FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01  
ANSI C63.26:2015, ANSI/TIA-603-E-2016

Test Result: Pass

Report Number: DL-241115042ER

Prepared (Test Engineer): Randy Xie

Reviewer (Supervisor): Jack Bu

Approved (Manager): Jade Yang



This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.

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**1. TEST SUMMARY**

| Test Items                            | FCC Test Requirement                    | IC Test Requirement                                                                       | Result |
|---------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------|--------|
| Peak to Average Radio                 | §22.913<br>§24.232<br>§27.50            | RSS-132 Issue 4 5.4<br>RSS-133 Issue 7 5.5<br>RSS-139 Issue 4 5.5                         | PASS   |
| Conducted Output Power                | §2.1046                                 | RSS-Gen Issue 5 6.12                                                                      | PASS   |
| 99% & -26 dB Occupied Bandwidth       | §2.1049                                 | RSS-Gen Issue 5 6.7                                                                       | PASS   |
| Frequency Stability                   | §2.1055<br>§22.355<br>§24.235<br>§27.54 | RSS-Gen Issue 5 6.11<br>RSS-132 Issue 4 5.3<br>RSS-133 Issue 7 5.4<br>RSS-139 Issue 4 5.4 | PASS   |
| Conducted Out of Band Emissions       | §22.917<br>§24.238<br>§27.53            | RSS-132 Issue 4 5.5<br>RSS-133 Issue 7 5.6<br>RSS-139 Issue 4 5.6                         | PASS   |
| Band Edge                             | §22.917<br>§24.238<br>§27.53            | RSS-132 Issue 4 5.5<br>RSS-133 Issue 7 5.6<br>RSS-139 Issue 4 5.6                         | PASS   |
| Transmitter Radiated Power (EIPR/ERP) | §2.1046<br>§22.913<br>§24.232<br>§27.50 | RSS-132 Issue 4 5.4<br>RSS-133 Issue 7 5.5<br>RSS-139 Issue 4 5.5                         | PASS   |
| Radiated Out of Band Emissions        | §22.917<br>§24.238<br>§27.53            | RSS-132 Issue 4 5.5<br>RSS-133 Issue 7 5.6<br>RSS-139 Issue 4 5.6                         | PASS   |



## 2. GENERAL PRODUCT INFORMATION

### 2.1. Description of Device (EUT)

|                        |                                                                                                                                                                                                                                                                                                                              |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name:          | 4G LTE Cellular Security Camera Wireless Outdoor                                                                                                                                                                                                                                                                             |
| Trademark              | /                                                                                                                                                                                                                                                                                                                            |
| Model No.:             | CHTBG12<br>CHTBG05, CHTBG06, CHTBG07, CHTBG13, CHCW52                                                                                                                                                                                                                                                                        |
| Test Model:            | CHTBG12                                                                                                                                                                                                                                                                                                                      |
| S/N:                   | 0001                                                                                                                                                                                                                                                                                                                         |
| Model Difference       | All models are same as the samples except model name and appearance, they have the same structure and circuit.                                                                                                                                                                                                               |
| Operation Frequency:   | LTE Band 2: Tx: 1850.00 - 1910.00MHz; Rx: 1930.00 - 1990.00MHz<br>LTE Band 4: Tx: 1710.00 - 1755.00MHz; Rx: 2110.00 - 2155.00MHz<br>LTE Band 5: Tx: 824.00 - 849.00MHz; Rx: 869.00 - 894.00MHz<br>LTE Band 12: Tx: 699.00 - 716.00MHz; Rx: 728.00 - 746.00MHz<br>LTE Band 13: Tx: 777.00 - 787.00MHz; Rx: 746.00 - 757.00MHz |
| Modulation technology: | LTE Mode with QPSK, 16QAM                                                                                                                                                                                                                                                                                                    |
| Antenna Type:          | External Antenna                                                                                                                                                                                                                                                                                                             |
| Antenna gain:          | LTE Band 2: 3.67dBi, LTE Band 4: 1.89dBi, LTE Band 5: 1.35dBi,<br>LTE Band 12: 1.22dBi, LTE Band 13: 1.22dBi                                                                                                                                                                                                                 |
| Power supply:          | DC 3.7V from battery<br>DC 5V from Solar panels                                                                                                                                                                                                                                                                              |
| LTE Category           | 1                                                                                                                                                                                                                                                                                                                            |
| Hardware Version       | HV01                                                                                                                                                                                                                                                                                                                         |
| Software Version       | SV01                                                                                                                                                                                                                                                                                                                         |

#### Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. The EUT's all information provided by client.

### 2.2. Product Function

Refer to Technical Construction Form and User Manual.



### 2.3. Independent Operation Modes

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

| Test modes         |                                                                           |                                                                           |
|--------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Band               | Radiated                                                                  | Conducted                                                                 |
| <b>LTE Band 2</b>  | Bandwidth:(MHz)1.4/3/5/10/15/20MHz<br>Modulation: QPSK/16QAM<br>RB:1/100% | Bandwidth:(MHz)1.4/3/5/10/15/20MHz<br>Modulation: QPSK/16QAM<br>RB:1/100% |
| <b>LTE Band 4</b>  | Bandwidth:(MHz)1.4/3/5/10/15/20MHz<br>Modulation: QPSK/16QAM<br>RB:1/100% | Bandwidth:(MHz)1.4/3/5/10/15/20MHz<br>Modulation: QPSK/16QAM<br>RB:1/100% |
| <b>LTE Band 5</b>  | Bandwidth:(MHz)1.4/3/5/10MHz<br>Modulation: QPSK/16QAM<br>RB:1/100%       | Bandwidth:(MHz)1.4/3/5/10MHz<br>Modulation: QPSK/16QAM<br>RB:1/100%       |
| <b>LTE Band 12</b> | Bandwidth:(MHz)1.4/3/5/10MHz<br>Modulation: QPSK/16QAM<br>RB:1/100%       | Bandwidth:(MHz)1.4/3/5/10MHz<br>Modulation: QPSK/16QAM<br>RB:1/100%       |
| <b>LTE Band 13</b> | Bandwidth:(MHz) 5/10MHz<br>Modulation: QPSK/16QAM<br>RB:1/100%            | Bandwidth:(MHz) 5/10MHz<br>Modulation: QPSK/16QAM<br>RB:1/100%            |

Note1: for LTE mode, if the bandwidth is different, the test frequency is changed.



### 3. TEST SITES

#### 3.1. Test Facilities

##### Site Description

Name of Firm : Shenzhen DL Testing Technology Co., Ltd.

101-201, Comprehensive Building, Tongzhou Electronics

Site Location : Longgang Factory Area, No.1 Baolong Fifth Road, Baolong  
Community, Baolong Street, Longgang District, Shenzhen, China

FCC Test Firm Registration Number: 854456

Designation Number: CN1307

IC Registered No.: 27485

CAB ID.: CN0118

#### 3.2. Measurement Uncertainty

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

| No. | Item                         | Uncertainty               |
|-----|------------------------------|---------------------------|
| 1   | Conducted Emission Test      | $\pm 1.38\text{dB}$       |
| 2   | RF power,conducted           | $\pm 0.16\text{dB}$       |
| 3   | Spurious emissions,conducted | $\pm 0.21\text{dB}$       |
| 4   | All emissions,radiated(<1G)  | $\pm 4.68\text{dB}$       |
| 5   | All emissions,radiated(>1G)  | $\pm 4.89\text{dB}$       |
| 6   | Temperature                  | $\pm 0.5^{\circ}\text{C}$ |
| 7   | Humidity                     | $\pm 2\%$                 |
| 8   | Bandwidth                    | $\pm 0.2\text{MHz}$       |
| 9   | Frequency Stability          | $\pm 0.02\text{MHz}$      |



## 3.3. List of Test and Measurement Instruments

## 3.3.1. For conducted emission at the mains terminals test

| Equipment         | Manufacturer | Model No. | Serial No. | Last Cal.     | Next Cal.     |
|-------------------|--------------|-----------|------------|---------------|---------------|
| 843 Shielded Room | YIHENG       | 843 Room  | 843        | Nov. 05, 2023 | Nov. 04, 2026 |
| EMI Receiver      | R&S          | ESR       | 101421     | Nov. 01, 2024 | Oct. 31, 2025 |
| LISN              | R&S          | ENV216    | 102417     | Nov. 01, 2024 | Oct. 31, 2025 |
| 843 Cable 1#      | ChengYu      | CE Cable  | 001        | Nov. 01, 2024 | Oct. 31, 2025 |
| 843 Cable 1#      | FUJIKURA     | 843C1#    | 001        | Nov. 01, 2024 | Oct. 31, 2025 |

## 3.3.2. For radiated test

| Equipment                                | Manufacturer    | Model No.          | Serial No.  | Last Cal.     | Next Cal.     |
|------------------------------------------|-----------------|--------------------|-------------|---------------|---------------|
| Spectrum Analyzer<br>(9kHz-26.5GHz)      | Agilent         | E4408B             | MY50140780  | Nov. 01, 2024 | Oct. 31, 2025 |
| Test Receiver(9kHz-7GHz)                 | R&S             | ESRP7              | 101393      | Nov. 01, 2024 | Oct. 31, 2025 |
| Bilog Antenna (30MHz-1GHz)               | R&S             | VULB9162           | 00311       | Nov. 01, 2024 | Oct. 31, 2025 |
| Bilog Antenna (30MHz-1GHz)               | R&S             | VULB9162           | 00306       | Nov. 01, 2024 | Oct. 31, 2025 |
| Horn Antenna(1GHz-18GHz)                 | Schwarzbeck     | BBHA9120D          | 02139       | Nov. 01, 2024 | Oct. 31, 2025 |
| Horn Antenna(1GHz-18GHz)                 | Schwarzbeck     | BBHA9120D          | 02133       | Nov. 01, 2024 | Oct. 31, 2025 |
| Horn<br>Antenna(18GHz-40GHz)             | A.H. Systems    | SAS-574            | 588         | Nov. 01, 2024 | Oct. 31, 2025 |
| Horn<br>Antenna(18GHz-40GHz)             | A.H. Systems    | SAS-574            | 585         | Nov. 01, 2024 | Oct. 31, 2025 |
| Amplifier(9kHz-6GHz)                     | Schwarzbeck     | BBV9743B           | 00153       | Nov. 01, 2024 | Oct. 31, 2025 |
| Amplifier(1GHz-18GHz)                    | EMEC            | EM01G8GA           | 00270       | Nov. 01, 2024 | Oct. 31, 2025 |
| Amplifier(18GHz-40GHz)                   | Quanjuda        | DLE-161            | 97          | Nov. 01, 2024 | Oct. 31, 2025 |
| Loop Antenna(9kHz-30MHz)                 | Schwarzbeck     | FMZB1519B          | 00014       | Nov. 01, 2024 | Oct. 31, 2025 |
| RF cables1(9kHz-1GHz)                    | ChengYu         | 966                | 004         | Nov. 01, 2024 | Oct. 31, 2025 |
| RF cables2(1GHz-40GHz)                   | ChengYu         | 966                | 003         | Nov. 01, 2024 | Oct. 31, 2025 |
| Antenna connector                        | Florida RF Labs | N/A                | RF 01#      | Nov. 01, 2024 | Oct. 31, 2025 |
| Power probe                              | KEYSIGHT        | U2021XA            | MY55210018  | Nov. 01, 2024 | Oct. 31, 2025 |
| Signal Analyzer                          | Agilent         | N9020A             | MY55370280  | Nov. 01, 2024 | Oct. 31, 2025 |
| Test Receiver                            | R&S             | ESU 40             | 100376      | Nov. 01, 2024 | Oct. 31, 2025 |
| D.C. Power Supply                        | LongWei         | PS-305D            | 010964729   | Nov. 01, 2024 | Oct. 31, 2025 |
| Signal Amplifier                         | DAZE            | ZN3380B            | 11235       | Nov. 01, 2024 | Oct. 31, 2025 |
| High Pass filter                         | KANGMAI         | WHKX1.0/1.5G-10SS  | 40          | Nov. 01, 2024 | Oct. 31, 2025 |
| Filter                                   | COM-MW          | ZBSF-C836.5-25-X   | BCTC042     | Nov. 01, 2024 | Oct. 31, 2025 |
| Filter                                   | COM-MW          | ZBSF-C1747.5-75-X2 | BCTC045     | Nov. 01, 2024 | Oct. 31, 2025 |
| Filter                                   | COM-MW          | ZBSF-C1880-60-X2   | BCTC047     | Nov. 01, 2024 | Oct. 31, 2025 |
| Splitter                                 | Agilent         | 11435B             | 1125162     | Nov. 01, 2024 | Oct. 31, 2025 |
| RF CONDUCTED TEST                        |                 |                    |             |               |               |
| System Simulator                         | Agilent         | E5515C             | GB43130252  | Nov. 01, 2024 | Oct. 31, 2025 |
| Spectrum Analyzer                        | Agilent         | N9020A             | MY45108040  | Nov. 01, 2024 | Oct. 31, 2025 |
| DC Power Supply                          | LongWei         | PS-305D            | 010965682   | Nov. 01, 2024 | Oct. 31, 2025 |
| Constant temperature and<br>humidity box | GF              | GTH-800-40-2P      | MAA9906-012 | Nov. 01, 2024 | Oct. 31, 2025 |
| Universal radio<br>communication tester  | R&S             | CMW500             | 115295      | Nov. 01, 2024 | Oct. 31, 2025 |



#### 4. TEST SET-UP

##### 4.1. Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

##### 4.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators

EUT

##### 4.3. Test Environment:

Ambient conditions in the test laboratory:

| Items            | Actual |
|------------------|--------|
| Temperature (°C) | 21~23  |
| Humidity (%RH)   | 50~65  |



## 5. EMISSION TEST RESULTS

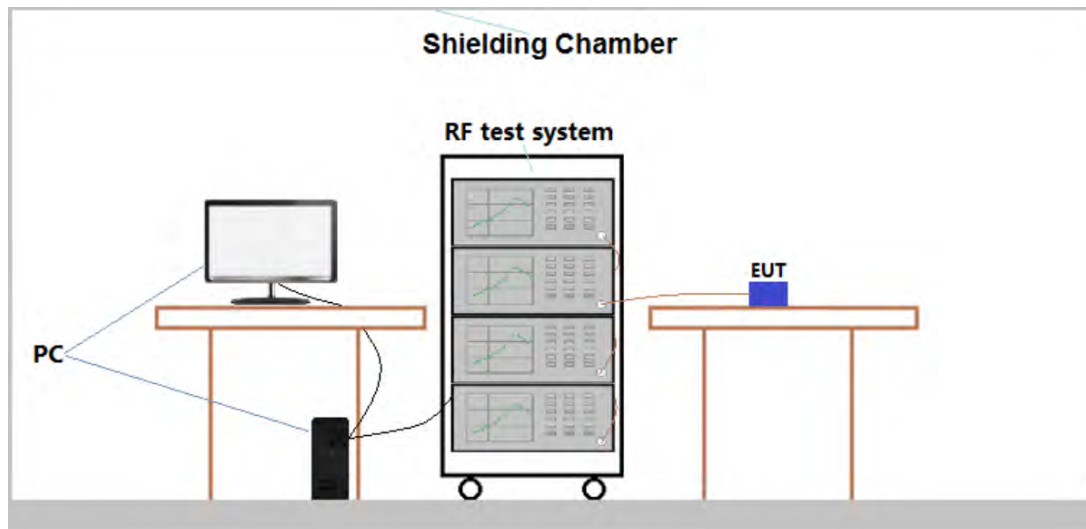
### 5.1. Conducted RF Output Power

#### 5.1.1. Limit

CFR 47, Section FCC §2.1046 and IC RSS-Gen Issue 5 6.12.

#### 5.1.2. Test Setup

The EUT, which is powered by the adapter, is coupled to the CMW500 and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power.



#### 5.1.3. Test Result

Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT.



The conducted power tables are as follows:

| Average Conducted Power |            |         |           |                         |            |              |
|-------------------------|------------|---------|-----------|-------------------------|------------|--------------|
| Band                    | LTE Band 2 |         |           | Channel/Frequency (MHz) |            |              |
| Bandwidth               | Modulation | RB size | RB offset | 18607/1850.7            | 18900/1880 | 19193/1909.3 |
| 1.4MHz                  | QPSK       | 1       | 0.00      | 22.82                   | 22.77      | 22.86        |
|                         |            | 1       | 3.00      | 22.05                   | 22.34      | 22.35        |
|                         |            | 1       | 5.00      | 22.09                   | 22.42      | 22.33        |
|                         |            | 3       | 0.00      | 22.03                   | 22.37      | 22.33        |
|                         |            | 3       | 2.00      | 22.04                   | 22.39      | 22.30        |
|                         |            | 3       | 3.00      | 22.04                   | 22.42      | 22.27        |
|                         |            | 6       | 0.00      | 21.05                   | 21.39      | 21.39        |
|                         | 16QAM      | 1       | 0.00      | 22.14                   | 22.12      | 22.92        |
|                         |            | 1       | 3.00      | 22.02                   | 22.49      | 22.25        |
|                         |            | 1       | 5.00      | 22.12                   | 22.47      | 22.71        |
|                         |            | 3       | 0.00      | 22.15                   | 22.43      | 22.61        |
|                         |            | 3       | 2.00      | 22.19                   | 22.45      | 22.58        |
|                         |            | 3       | 3.00      | 22.18                   | 22.44      | 22.53        |
|                         |            | 6       | 0.00      | 21.24                   | 21.24      | 21.45        |
| Bandwidth               | Modulation | RB size | RB offset | 18615/1851.5            | 18900/1880 | 19185/1908.5 |
| 3MHz                    | QPSK       | 1       | 0.00      | 22.22                   | 22.37      | 22.36        |
|                         |            | 1       | 7.00      | 22.25                   | 22.56      | 22.49        |
|                         |            | 1       | 14.00     | 22.17                   | 22.49      | 22.24        |
|                         |            | 8       | 0.00      | 22.30                   | 22.48      | 22.44        |
|                         |            | 8       | 4.00      | 22.27                   | 22.53      | 22.48        |
|                         |            | 8       | 7.00      | 22.26                   | 22.55      | 22.43        |
|                         |            | 15      | 0.00      | 21.22                   | 21.49      | 21.48        |
|                         | 16QAM      | 1       | 0.00      | 22.52                   | 22.40      | 22.59        |
|                         |            | 1       | 7.00      | 22.62                   | 22.58      | 22.05        |
|                         |            | 1       | 14.00     | 22.56                   | 22.53      | 22.53        |
|                         |            | 8       | 0.00      | 22.35                   | 22.58      | 22.45        |
|                         |            | 8       | 4.00      | 22.42                   | 22.64      | 22.51        |
|                         |            | 8       | 7.00      | 22.43                   | 22.58      | 22.46        |
|                         |            | 15      | 0.00      | 22.22                   | 22.37      | 22.36        |
| Bandwidth               | Modulation | RB size | RB offset | 18625/1852.5            | 18900/1880 | 19175/1907.5 |
| 5MHz                    | QPSK       | 1       | 0.00      | 22.34                   | 22.33      | 22.38        |
|                         |            | 1       | 12.00     | 22.39                   | 22.57      | 22.47        |
|                         |            | 1       | 24.00     | 22.19                   | 22.62      | 22.39        |
|                         |            | 12      | 0.00      | 22.24                   | 22.33      | 22.24        |
|                         |            | 12      | 6.00      | 22.30                   | 22.50      | 22.39        |
|                         |            | 12      | 13.00     | 22.19                   | 22.46      | 22.38        |
|                         |            | 25      | 0.00      | 21.17                   | 21.40      | 21.29        |
|                         | 16QAM      | 1       | 0.00      | 22.68                   | 22.56      | 22.43        |
|                         |            | 1       | 12.00     | 22.68                   | 22.69      | 22.61        |
|                         |            | 1       | 24.00     | 22.56                   | 22.07      | 22.55        |
|                         |            | 12      | 0.00      | 22.16                   | 22.54      | 22.44        |
|                         |            | 12      | 6.00      | 22.29                   | 22.12      | 22.51        |
|                         |            | 12      | 13.00     | 22.13                   | 22.66      | 22.50        |
|                         |            | 25      | 0.00      | 21.29                   | 21.47      | 21.30        |



| Average Conducted Power |            |         |           |                         |            |              |
|-------------------------|------------|---------|-----------|-------------------------|------------|--------------|
| Band                    | LTE Band 2 |         |           | Channel/Frequency (MHz) |            |              |
| Bandwidth               | Modulation | RB size | RB offset | 18650/1855              | 18900/1880 | 19150/1905   |
| 10MHz                   | QPSK       | 1       | 0.00      | 22.20                   | 22.02      | 22.70        |
|                         |            | 1       | 24.00     | 22.02                   | 22.37      | 22.16        |
|                         |            | 1       | 49.00     | 22.63                   | 22.42      | 22.25        |
|                         |            | 25      | 0.00      | 21.93                   | 21.99      | 22.62        |
|                         |            | 25      | 12.00     | 22.22                   | 22.28      | 22.07        |
|                         |            | 25      | 25.00     | 22.67                   | 22.23      | 22.04        |
|                         |            | 50      | 0.00      | 21.25                   | 21.05      | 21.86        |
|                         | 16QAM      | 1       | 0.00      | 22.38                   | 22.13      | 22.01        |
|                         |            | 1       | 24.00     | 22.27                   | 22.43      | 22.48        |
|                         |            | 1       | 49.00     | 21.93                   | 22.51      | 22.52        |
| Bandwidth               | Modulation | RB size | RB offset | 18675/1857.5            | 18900/1880 | 19125/1902.5 |
| 15MHz                   | QPSK       | 1       | 0.00      | 22.14                   | 22.00      | 22.08        |
|                         |            | 1       | 37.00     | 22.53                   | 22.18      | 22.11        |
|                         |            | 1       | 74.00     | 22.48                   | 22.59      | 22.37        |
|                         |            | 36      | 0.00      | 22.05                   | 22.19      | 22.16        |
|                         |            | 36      | 18.00     | 21.88                   | 22.48      | 22.49        |
|                         |            | 36      | 38.00     | 22.61                   | 22.54      | 22.17        |
|                         |            | 75      | 0.00      | 21.68                   | 21.27      | 21.11        |
|                         | 16QAM      | 1       | 0.00      | 22.40                   | 22.17      | 22.20        |
|                         |            | 1       | 38.00     | 22.10                   | 22.04      | 22.22        |
|                         |            | 1       | 74.00     | 22.05                   | 22.09      | 22.58        |
| Bandwidth               | Modulation | RB size | RB offset | 18700/1860              | 18900/1880 | 19100/1900   |
| 20MHz                   | QPSK       | 1       | 0.00      | 22.19                   | 22.65      | 22.53        |
|                         |            | 1       | 49.00     | 22.59                   | 22.50      | 21.97        |
|                         |            | 1       | 99.00     | 22.49                   | 22.24      | 22.24        |
|                         |            | 50      | 0.00      | 22.58                   | 22.50      | 22.57        |
|                         |            | 50      | 25.00     | 21.76                   | 22.30      | 22.56        |
|                         |            | 50      | 50.00     | 22.35                   | 22.34      | 21.99        |
|                         |            | 100     | 0.00      | 21.69                   | 21.90      | 21.66        |
|                         | 16QAM      | 1       | 0.00      | 22.20                   | 21.80      | 22.34        |
|                         |            | 1       | 49.00     | 22.62                   | 22.61      | 22.63        |
|                         |            | 1       | 99.00     | 22.58                   | 22.54      | 22.28        |

Note: Measurement Uncertainty:  $\pm 2.6$  dB.



| Average Conducted Power |            |         |           |                         |              |              |
|-------------------------|------------|---------|-----------|-------------------------|--------------|--------------|
| Band                    | LTE Band 4 |         |           | Channel/Frequency (MHz) |              |              |
| Bandwidth               | Modulation | RB size | RB offset | 19957/1710.7            | 20175/1732.5 | 20393/1754.3 |
| 1.4MHz                  | QPSK       | 1       | 0.00      | 22.89                   | 22.90        | 22.84        |
|                         |            | 1       | 3.00      | 22.55                   | 22.40        | 22.25        |
|                         |            | 1       | 5.00      | 22.39                   | 22.30        | 22.18        |
|                         |            | 3       | 0.00      | 22.48                   | 22.11        | 22.19        |
|                         |            | 3       | 2.00      | 22.52                   | 22.05        | 22.22        |
|                         |            | 3       | 3.00      | 22.58                   | 22.08        | 22.17        |
|                         | 16QAM      | 6       | 0.00      | 21.75                   | 21.04        | 21.40        |
|                         |            | 1       | 0.00      | 22.48                   | 22.14        | 22.54        |
|                         |            | 1       | 2.00      | 22.67                   | 22.19        | 21.97        |
|                         |            | 1       | 5.00      | 22.58                   | 22.95        | 22.65        |
|                         |            | 3       | 0.00      | 22.60                   | 22.25        | 22.12        |
|                         |            | 3       | 1.00      | 22.55                   | 22.28        | 22.26        |
|                         |            | 3       | 3.00      | 22.47                   | 22.13        | 22.20        |
|                         |            | 6       | 0.00      | 21.74                   | 21.16        | 21.41        |
| Bandwidth               | Modulation | RB size | RB offset | 19965/1711.5            | 20175/1732.5 | 20385/1753.5 |
| 3MHz                    | QPSK       | 1       | 0.00      | 22.72                   | 22.69        | 22.03        |
|                         |            | 1       | 7.00      | 22.59                   | 22.63        | 22.43        |
|                         |            | 1       | 14.00     | 22.56                   | 22.46        | 22.47        |
|                         |            | 8       | 0.00      | 22.53                   | 21.98        | 22.11        |
|                         |            | 8       | 4.00      | 22.57                   | 21.99        | 22.14        |
|                         |            | 8       | 7.00      | 22.47                   | 22.07        | 22.22        |
|                         |            | 15      | 0.00      | 21.47                   | 21.95        | 21.22        |
|                         | 16QAM      | 1       | 0.00      | 22.38                   | 22.59        | 22.00        |
|                         |            | 1       | 7.00      | 22.30                   | 22.16        | 22.30        |
|                         |            | 1       | 14.00     | 22.28                   | 22.70        | 22.13        |
|                         |            | 8       | 0.00      | 22.46                   | 22.70        | 22.51        |
|                         |            | 8       | 4.00      | 22.43                   | 22.71        | 22.35        |
|                         |            | 8       | 7.00      | 22.32                   | 22.06        | 22.03        |
|                         |            | 15      | 0.00      | 21.40                   | 21.78        | 21.20        |
| Bandwidth               | Modulation | RB size | RB offset | 19975/1712.5            | 20175/1732.5 | 20375/1752.5 |
| 5MHz                    | QPSK       | 1       | 0.00      | 22.46                   | 22.49        | 22.02        |
|                         |            | 1       | 12.00     | 22.67                   | 22.64        | 21.99        |
|                         |            | 1       | 24.00     | 22.49                   | 22.56        | 22.04        |
|                         |            | 12      | 0.00      | 22.45                   | 22.57        | 22.08        |
|                         |            | 12      | 6.00      | 22.45                   | 22.55        | 22.14        |
|                         |            | 12      | 13.00     | 22.46                   | 22.64        | 22.20        |
|                         |            | 25      | 0.00      | 21.42                   | 21.52        | 21.10        |
|                         | 16QAM      | 1       | 0.00      | 22.35                   | 22.54        | 22.50        |
|                         |            | 1       | 12.00     | 22.49                   | 22.12        | 22.07        |
|                         |            | 1       | 24.00     | 22.31                   | 22.63        | 22.06        |
|                         |            | 12      | 0.00      | 22.32                   | 22.11        | 22.92        |
|                         |            | 12      | 6.00      | 22.26                   | 22.05        | 22.00        |
|                         |            | 12      | 13.00     | 22.24                   | 22.64        | 22.05        |
|                         |            | 25      | 0.00      | 22.46                   | 22.49        | 22.12        |



| Average Conducted Power |            |         |           |                         |              |              |
|-------------------------|------------|---------|-----------|-------------------------|--------------|--------------|
| Band                    | LTE Band 4 |         |           | Channel/Frequency (MHz) |              |              |
| Bandwidth               | Modulation | RB size | RB offset | 20000/1715              | 20175/1732.5 | 20350/1750   |
| 10MHz                   | QPSK       | 1       | 0.00      | 22.57                   | 22.56        | 22.08        |
|                         |            | 1       | 24.00     | 22.55                   | 22.13        | 22.24        |
|                         |            | 1       | 49.00     | 22.49                   | 22.61        | 22.21        |
|                         |            | 25      | 0.00      | 22.31                   | 22.48        | 22.51        |
|                         |            | 25      | 12.00     | 22.47                   | 22.07        | 22.42        |
|                         |            | 25      | 25.00     | 22.51                   | 22.11        | 22.45        |
|                         |            | 50      | 0.00      | 22.33                   | 21.92        | 22.49        |
|                         | 16QAM      | 1       | 0.00      | 22.35                   | 22.43        | 22.21        |
|                         |            | 1       | 24.00     | 22.28                   | 22.67        | 22.18        |
|                         |            | 1       | 49.00     | 22.33                   | 22.61        | 22.07        |
| Bandwidth               | Modulation | RB size | RB offset | 20025/1717.5            | 20175/1732.5 | 20325/1747.5 |
| 15MHz                   | QPSK       | 1       | 0.00      | 22.46                   | 22.51        | 22.39        |
|                         |            | 1       | 37.00     | 22.70                   | 22.14        | 22.39        |
|                         |            | 1       | 74.00     | 21.96                   | 22.10        | 22.38        |
|                         |            | 36      | 0.00      | 22.31                   | 22.46        | 22.36        |
|                         |            | 36      | 18.00     | 22.38                   | 22.52        | 22.31        |
|                         |            | 36      | 38.00     | 22.58                   | 22.56        | 22.23        |
|                         |            | 75      | 0.00      | 22.32                   | 22.40        | 22.33        |
|                         | 16QAM      | 1       | 0.00      | 22.23                   | 22.48        | 22.19        |
|                         |            | 1       | 37.00     | 22.05                   | 22.70        | 21.99        |
|                         |            | 1       | 74.00     | 22.35                   | 22.50        | 22.40        |
| Bandwidth               | Modulation | RB size | RB offset | 20050/1720              | 20175/1732.5 | 20300/1745   |
| 20MHz                   | QPSK       | 1       | 0.00      | 22.08                   | 22.63        | 22.70        |
|                         |            | 1       | 49.00     | 22.17                   | 22.08        | 22.71        |
|                         |            | 1       | 99.00     | 22.61                   | 22.70        | 22.13        |
|                         |            | 50      | 0.00      | 22.08                   | 22.08        | 22.10        |
|                         |            | 50      | 25.00     | 22.04                   | 22.03        | 22.07        |
|                         |            | 50      | 50.00     | 22.47                   | 22.50        | 21.96        |
|                         |            | 100     | 0.00      | 22.42                   | 22.42        | 21.97        |
|                         | 16QAM      | 1       | 0.00      | 22.46                   | 22.53        | 22.44        |
|                         |            | 1       | 49.00     | 22.04                   | 22.07        | 22.08        |
|                         |            | 1       | 99.00     | 22.12                   | 22.12        | 22.14        |

Note: Measurement Uncertainty:  $\pm 2.6$  dB.



| Average Conducted Power |            |         |           |                         |             |             |
|-------------------------|------------|---------|-----------|-------------------------|-------------|-------------|
| Band                    | LTE Band 5 |         |           | Channel/Frequency (MHz) |             |             |
| Bandwidth               | Modulation | RB size | RB offset | 20407/824.7             | 20525/836.5 | 20643/848.3 |
| 1.4MHz                  | QPSK       | 1       | 0.00      | 22.84                   | 22.82       | 22.85       |
|                         |            | 1       | 3.00      | 22.68                   | 22.00       | 22.71       |
|                         |            | 1       | 5.00      | 22.46                   | 22.53       | 22.58       |
|                         |            | 3       | 0.00      | 22.50                   | 22.71       | 22.50       |
|                         |            | 3       | 2.00      | 22.60                   | 22.26       | 22.55       |
|                         |            | 3       | 3.00      | 22.69                   | 22.67       | 22.62       |
|                         |            | 6       | 0.00      | 22.17                   | 22.16       | 22.46       |
|                         | 16QAM      | 1       | 0.00      | 22.26                   | 22.46       | 22.03       |
|                         |            | 1       | 2.00      | 22.66                   | 22.50       | 22.38       |
|                         |            | 1       | 5.00      | 22.52                   | 22.32       | 22.66       |
|                         |            | 3       | 0.00      | 22.71                   | 22.54       | 22.35       |
|                         |            | 3       | 1.00      | 22.63                   | 22.69       | 22.62       |
|                         |            | 3       | 3.00      | 22.64                   | 22.59       | 22.71       |
|                         |            | 6       | 0.00      | 21.97                   | 22.53       | 22.54       |
| Bandwidth               | Modulation | RB size | RB offset | 20415/825.5             | 20525/836.5 | 20635/847.5 |
| 3MHz                    | QPSK       | 1       | 0.00      | 22.06                   | 22.04       | 22.20       |
|                         |            | 1       | 7.00      | 22.46                   | 22.38       | 22.20       |
|                         |            | 1       | 14.00     | 22.09                   | 22.51       | 22.44       |
|                         |            | 8       | 0.00      | 22.08                   | 22.34       | 21.96       |
|                         |            | 8       | 4.00      | 22.46                   | 22.29       | 22.47       |
|                         |            | 8       | 7.00      | 22.15                   | 22.45       | 22.42       |
|                         |            | 15      | 0.00      | 22.49                   | 22.46       | 22.79       |
|                         | 16QAM      | 1       | 0.00      | 22.67                   | 22.68       | 22.22       |
|                         |            | 1       | 8.00      | 22.14                   | 22.05       | 22.30       |
|                         |            | 1       | 14.00     | 22.03                   | 22.67       | 22.77       |
|                         |            | 8       | 0.00      | 22.67                   | 22.18       | 22.66       |
|                         |            | 8       | 4.00      | 22.35                   | 22.71       | 22.46       |
|                         |            | 8       | 7.00      | 22.18                   | 22.62       | 22.63       |
|                         |            | 15      | 0.00      | 22.53                   | 22.53       | 22.39       |
| Bandwidth               | Modulation | RB size | RB offset | 20425/826.5             | 20525/836.5 | 20625/846.5 |
| 5MHz                    | QPSK       | 1       | 0.00      | 21.96                   | 22.40       | 22.45       |
|                         |            | 1       | 12.00     | 22.25                   | 22.35       | 22.08       |
|                         |            | 1       | 24.00     | 22.63                   | 22.57       | 22.71       |
|                         |            | 12      | 0.00      | 22.51                   | 21.96       | 22.31       |
|                         |            | 12      | 6.00      | 22.08                   | 21.98       | 22.18       |
|                         |            | 12      | 13.00     | 22.42                   | 22.72       | 22.44       |
|                         |            | 25      | 0.00      | 22.22                   | 22.72       | 22.05       |
|                         | 16QAM      | 1       | 0.00      | 22.57                   | 22.63       | 22.13       |
|                         |            | 1       | 12.00     | 22.00                   | 22.32       | 22.35       |
|                         |            | 1       | 24.00     | 22.58                   | 22.51       | 22.09       |
|                         |            | 12      | 0.00      | 22.51                   | 22.65       | 22.14       |
|                         |            | 12      | 6.00      | 22.34                   | 22.77       | 22.28       |
|                         |            | 12      | 13.00     | 22.57                   | 22.54       | 22.04       |
|                         |            | 25      | 0.00      | 22.31                   | 22.66       | 22.18       |



| Average Conducted Power |            |         |           |                         |             |           |
|-------------------------|------------|---------|-----------|-------------------------|-------------|-----------|
| Band                    | LTE Band 5 |         |           | Channel/Frequency (MHz) |             |           |
| Bandwidth               | Modulation | RB size | RB offset | 20450/829               | 20525/836.5 | 20600/844 |
| 10MHz                   | QPSK       | 1       | 0.00      | 22.15                   | 22.25       | 22.22     |
|                         |            | 1       | 24.00     | 22.26                   | 22.38       | 22.46     |
|                         |            | 1       | 49.00     | 22.06                   | 22.33       | 22.56     |
|                         |            | 25      | 0.00      | 22.25                   | 22.18       | 22.14     |
|                         |            | 25      | 12.00     | 22.42                   | 21.96       | 22.60     |
|                         |            | 25      | 25.00     | 22.55                   | 22.57       | 22.14     |
|                         |            | 50      | 0.00      | 22.09                   | 22.17       | 22.34     |
|                         | 16QAM      | 1       | 0.00      | 21.98                   | 22.13       | 22.64     |
|                         |            | 1       | 24.00     | 22.66                   | 22.59       | 22.63     |
|                         |            | 1       | 49.00     | 22.08                   | 22.34       | 22.43     |

Note: Measurement Uncertainty:  $\pm 2.6$  dB.



| Average Conducted Power |             |         |           |                         |             |             |
|-------------------------|-------------|---------|-----------|-------------------------|-------------|-------------|
| Band                    | LTE Band 12 |         |           | Channel/Frequency (MHz) |             |             |
| Bandwidth               | Modulation  | RB size | RB offset | 23017/699.7             | 23095/707.5 | 23173/715.3 |
| 1.4MHz                  | QPSK        | 1       | 0.00      | 22.87                   | 22.89       | 22.83       |
|                         |             | 1       | 3.00      | 22.03                   | 22.21       | 22.69       |
|                         |             | 1       | 5.00      | 22.13                   | 21.99       | 22.56       |
|                         |             | 3       | 0.00      | 22.61                   | 22.27       | 22.44       |
|                         |             | 3       | 2.00      | 22.62                   | 22.28       | 22.28       |
|                         |             | 3       | 3.00      | 22.46                   | 22.24       | 22.63       |
|                         |             | 6       | 0.00      | 22.66                   | 22.21       | 22.35       |
|                         | 16QAM       | 1       | 0.00      | 22.27                   | 21.99       | 22.18       |
|                         |             | 1       | 2.00      | 22.31                   | 22.45       | 21.97       |
|                         |             | 1       | 5.00      | 22.18                   | 22.23       | 22.49       |
|                         |             | 3       | 0.00      | 22.44                   | 22.36       | 21.98       |
|                         |             | 3       | 2.00      | 22.48                   | 22.30       | 22.02       |
|                         |             | 3       | 3.00      | 22.41                   | 22.30       | 22.65       |
|                         |             | 6       | 0.00      | 22.70                   | 22.22       | 22.00       |
| Bandwidth               | Modulation  | RB size | RB offset | 23025/700.5             | 23095/707.5 | 23165/714.5 |
| 3MHz                    | QPSK        | 1       | 0.00      | 22.58                   | 22.01       | 22.11       |
|                         |             | 1       | 7.00      | 22.47                   | 22.10       | 22.39       |
|                         |             | 1       | 14.00     | 22.50                   | 22.29       | 22.65       |
|                         |             | 8       | 0.00      | 22.42                   | 22.09       | 22.31       |
|                         |             | 8       | 4.00      | 22.46                   | 22.08       | 22.35       |
|                         |             | 8       | 7.00      | 22.49                   | 22.18       | 22.25       |
|                         |             | 15      | 0.00      | 22.43                   | 22.02       | 22.29       |
|                         | 16QAM       | 1       | 0.00      | 22.37                   | 22.22       | 22.26       |
|                         |             | 1       | 7.00      | 22.40                   | 22.15       | 22.18       |
|                         |             | 1       | 14.00     | 22.46                   | 22.65       | 22.52       |
|                         |             | 8       | 0.00      | 22.44                   | 22.02       | 22.04       |
|                         |             | 8       | 4.00      | 22.40                   | 22.00       | 22.26       |
|                         |             | 8       | 7.00      | 22.32                   | 22.34       | 22.50       |
|                         |             | 15      | 0.00      | 22.23                   | 22.33       | 22.44       |
| Bandwidth               | Modulation  | RB size | RB offset | 26035/701.5             | 23095/707.5 | 23155/713.5 |
| 5MHz                    | QPSK        | 1       | 0.00      | 22.32                   | 22.35       | 21.99       |
|                         |             | 1       | 12.00     | 22.64                   | 22.31       | 22.15       |
|                         |             | 1       | 24.00     | 22.22                   | 22.44       | 22.45       |
|                         |             | 12      | 0.00      | 22.39                   | 22.05       | 22.15       |
|                         |             | 12      | 6.00      | 22.47                   | 22.18       | 21.98       |
|                         |             | 12      | 13.00     | 22.44                   | 21.97       | 22.42       |
|                         |             | 25      | 0.00      | 22.34                   | 21.98       | 22.00       |
|                         | 16QAM       | 1       | 0.00      | 22.30                   | 22.26       | 22.61       |
|                         |             | 1       | 12.00     | 22.36                   | 22.34       | 22.08       |
|                         |             | 1       | 24.00     | 22.15                   | 22.36       | 22.17       |
|                         |             | 12      | 0.00      | 21.98                   | 22.02       | 22.07       |
|                         |             | 12      | 6.00      | 22.41                   | 22.08       | 22.01       |
|                         |             | 12      | 13.00     | 22.34                   | 22.24       | 22.71       |
|                         |             | 25      | 0.00      | 22.32                   | 22.03       | 21.96       |



| Average Conducted Power |             |         |           |                         |             |           |
|-------------------------|-------------|---------|-----------|-------------------------|-------------|-----------|
| Band                    | LTE Band 12 |         |           | Channel/Frequency (MHz) |             |           |
| Bandwidth               | Modulation  | RB size | RB offset | 23060/714               | 23095/707.5 | 23130/711 |
| 10MHz                   | QPSK        | 1       | 0.00      | 22.56                   | 22.18       | 22.10     |
|                         |             | 1       | 24.00     | 22.11                   | 22.08       | 22.62     |
|                         |             | 1       | 49.00     | 22.33                   | 21.97       | 22.23     |
|                         |             | 25      | 0.00      | 22.47                   | 22.18       | 22.03     |
|                         |             | 25      | 12.00     | 22.38                   | 22.24       | 22.08     |
|                         |             | 25      | 25.00     | 22.28                   | 22.06       | 21.98     |
|                         |             | 50      | 0.00      | 22.20                   | 22.08       | 22.08     |
|                         | 16QAM       | 1       | 0.00      | 22.17                   | 22.20       | 22.36     |
|                         |             | 1       | 24.00     | 22.56                   | 22.50       | 22.48     |
|                         |             | 1       | 49.00     | 22.07                   | 22.57       | 22.04     |

| Average Conducted Power |             |         |           |                         |           |             |
|-------------------------|-------------|---------|-----------|-------------------------|-----------|-------------|
| Band                    | LTE Band 13 |         |           | Channel/Frequency (MHz) |           |             |
| Bandwidth               | Modulation  | RB size | RB offset | 23205/779.5             | 23230/782 | 23255/784.5 |
| 5MHz                    | QPSK        | 1       | 0.00      | 22.86                   | 22.85     | 22.88       |
|                         |             | 1       | 37.00     | 22.58                   | 22.27     | 22.30       |
|                         |             | 1       | 74.00     | 22.21                   | 22.24     | 22.10       |
|                         |             | 36      | 0.00      | 22.34                   | 22.30     | 21.97       |
|                         |             | 36      | 18.00     | 22.23                   | 22.18     | 22.16       |
|                         |             | 36      | 38.00     | 21.97                   | 22.07     | 22.24       |
|                         |             | 75      | 0.00      | 21.97                   | 22.04     | 22.02       |
|                         | 16QAM       | 1       | 0.00      | 22.58                   | 22.35     | 22.35       |
|                         |             | 1       | 37.00     | 21.98                   | 22.33     | 22.22       |
|                         |             | 1       | 74.00     | 22.01                   | 22.11     | 22.28       |
|                         |             | 36      | 0.00      | 22.01                   | 22.08     | 22.06       |
|                         |             | 36      | 18.00     | 22.62                   | 22.39     | 22.39       |
|                         |             | 36      | 38.00     | 22.02                   | 22.37     | 22.26       |
|                         |             | 75      | 0.00      | 22.23                   | 22.18     | 22.16       |
| Bandwidth               | Modulation  | RB size | RB offset | 23230/782               |           |             |
| 10MHz                   | QPSK        | 1       | 0.00      |                         | 22.54     |             |
|                         |             | 1       | 49.00     |                         | 22.43     |             |
|                         |             | 1       | 99.00     |                         | 22.38     |             |
|                         |             | 50      | 0.00      |                         | 22.36     |             |
|                         |             | 50      | 25.00     |                         | 22.18     |             |
|                         |             | 50      | 50.00     |                         | 22.01     |             |
|                         |             | 100     | 0.00      |                         | 22.18     |             |
|                         | 16QAM       | 1       | 0.00      |                         | 22.17     |             |
|                         |             | 1       | 49.00     |                         | 22.71     |             |
|                         |             | 1       | 99.00     |                         | 22.32     |             |

Note: Measurement Uncertainty:  $\pm 2.6\text{dB}$ .



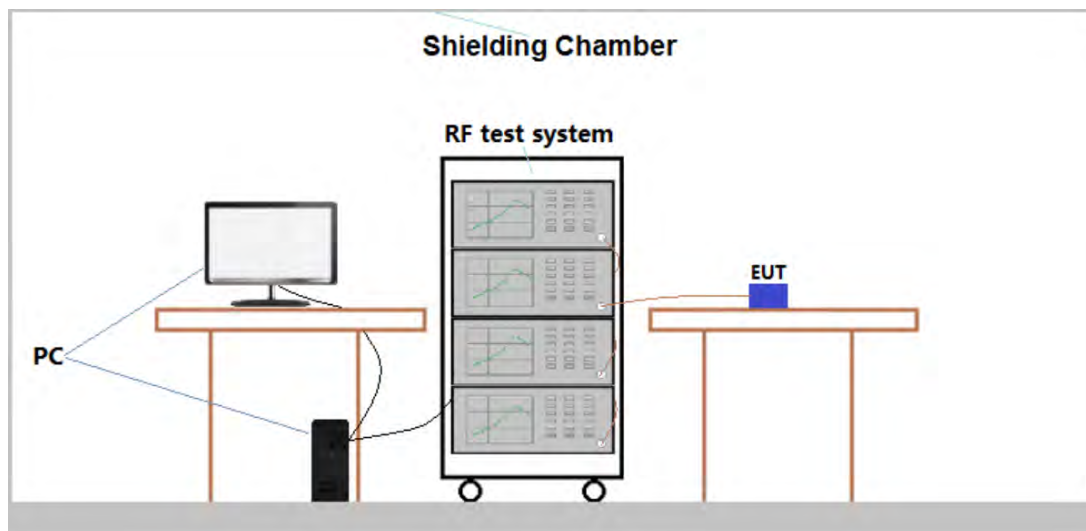
## 5.2. -26dB and 99% Occupied Bandwidth

### 5.2.1. Limit

CFR 47, Section FCC §2.1049 and IC RSS-Gen Issue 5 6.7.

### 5.2.2. Test Setup

The EUT, which is powered by the adapter, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power.



### 5.2.3. Test Result

Pass, the table and plot please see annex.



### 5.3. Peak to Average Ratio

#### 5.3.1. Limit

##### FCC

-§22.913(d) Measurement of the ERP of Cellular base transmitters and repeaters must be made using an average power measurement technique. The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

-§24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph

(e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

- §27.50(d)(5), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

##### IC

##### - RSS-130 Issue 2

4.6.1, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1 % of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

##### -RSS-132 Issue 4

5.4, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1 % of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

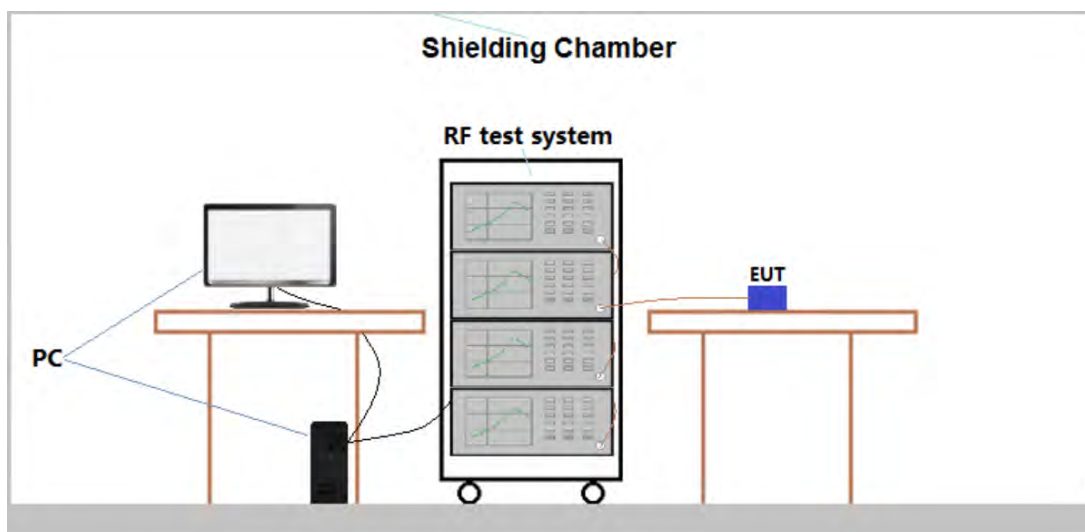
##### -RSS-133 Issue 7

6.4, the transmitter's peak-to-average power ratio (PAPR) shall not exceed 13 dB for more than 0.1 % of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

##### -RSS-139 Issue 4

5.5, the peak to average power ratio (PAPR) of the equipment shall not exceed 13 dB for more than 0.1 % of the time, using a signal that corresponds to the highest PAPR during periods of continuous transmission.

#### 5.3.2. Test Setup





#### 5.3.3. Test Procedure

The test follows section 5.2.3.4 of ANSI C63.26-2015.

See instrumentation-specific application literature for further guidance regarding use of the CCDF capability.

The following guidelines are offered for performing a CCDF measurement.

- a. Set resolution/measurement bandwidth  $\geq$  OBW or specified reference bandwidth.
- b. Set the number of counts to a value that stabilizes the measured CCDF curve.
- c. Set the measurement interval as follows:
  - 1) For continuous transmissions, set to greater of  $[10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})]$  or 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. Set the measurement interval to a time that is less than or equal to the burst duration.
  - 3) If there are several carriers in a single antenna port, the peak power shall be determined for each individual carrier (by disabling the other carriers while measuring the required carrier) and the total peak power calculated from the sum of the individual carrier peak powers.
- d. Record the maximum PAPR level associated with a probability of 0.1 %.
- e. The peak power level is calculated from the sum of the PAPR value from step d) to the measured average power.

#### 5.3.4. Test Result

Pass, the table and plot please see annex.



#### 5.4. Frequency Stability

##### 5.4.1. Limit

###### FCC

-§ 2.1055 (a), § 2.1055 (d) & following:

-§22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table of this section.

For Mobile devices operating in the 824 to 849 MHz band at a power level less than or equal to 3 Watts, the limit specified in Table C-1 is +/- 2.5 ppm.

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

-§27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

For Mobile devices operating in the 809 to 824 MHz band at a power level 2 Watts or less, the limit specified in Table is +/- 2.5 ppm.

###### IC

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6.11, for licensed devices, the following measurement conditions apply:

a. at the temperatures of -30°C (-22°F), +20°C (+68°F) and +50°C (+122°F), and at the manufacturer's rated supply voltage

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4.5, the transmitter frequency stability limit shall be determined as follows:

For equipment that is capable of transmitting numerous channels simultaneously for different applications (e.g. LTE and narrowband – internet of things (IoT)), the occupied bandwidth shall be the bandwidth representing the sum of the occupied bandwidths of these channels.

The frequency stability shall be sufficient to ensure that the occupied bandwidth remains within each frequency block range when tested at the temperature and supply voltage variations specified in RSS-Gen.

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5.3, the frequency stability shall be sufficient to ensure that the occupied bandwidth stays within each of the sub-bands when tested at the temperature and supply voltage variations specified in RSS-Gen.

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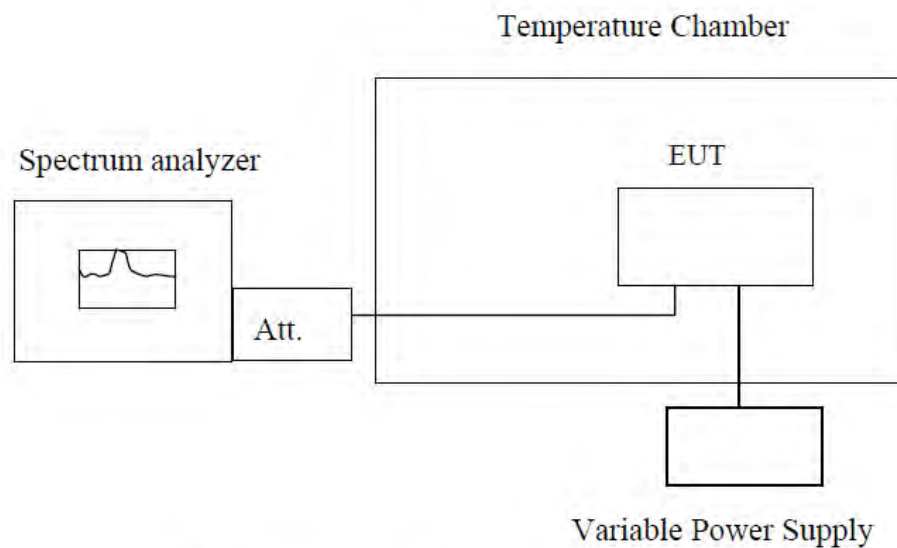
6.3, the carrier frequency shall not depart from the reference frequency, in excess of  $\pm 2.5$  ppm for mobile stations and  $\pm 1.0$  ppm for base stations.

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5.4, the frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block or frequency block group when tested to the temperature and supply voltage variations specified in RSS-Gen.



#### 5.4.2. Test Setup



**Note :** Measurement setup for testing on Antenna connector

The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber.

The EUT is commanded by the System Simulator (SS) to operate at the maximum output power

#### 5.4.3. Test Result

Tested the result of  $\pm 10\%$  of normal voltage

which are specified by the applicant; the normal temperature here used is 25°C. The frequency

deviation limit of 850MHz band is  $\pm 2.5\text{ppm}$ .

For LTE mode, only test the max bandwidth.

The table and plot please see next page.



| Test Conditions                                                           |            |                 | Frequency Deviation |        |            | Result |
|---------------------------------------------------------------------------|------------|-----------------|---------------------|--------|------------|--------|
| Band                                                                      | Power(Vdc) | Temperature(°C) | Frequency Error(Hz) | ppm    | Limit ppm  |        |
| LTE Band 2<br>Bandwidth<br>20MHz<br>QPSK<br>Middle<br>channel<br>1880MHz  | 3.7        | -40             | 75                  | 0.0399 | whole band | PASS   |
|                                                                           | 3.7        | -30             | 53                  | 0.0282 |            |        |
|                                                                           | 3.7        | -20             | 64                  | 0.0340 |            |        |
|                                                                           | 3.7        | -10             | 65                  | 0.0346 |            |        |
|                                                                           | 3.7        | 0               | 55                  | 0.0293 |            |        |
|                                                                           | 3.7        | 10              | 72                  | 0.0383 |            |        |
|                                                                           | 3.7        | 20              | 56                  | 0.0298 |            |        |
|                                                                           | 3.7        | 30              | 62                  | 0.0330 |            |        |
|                                                                           | 3.7        | 40              | 65                  | 0.0346 |            |        |
|                                                                           | 3.7        | 50              | 57                  | 0.0303 |            |        |
|                                                                           | 3.7        | 60              | 73                  | 0.0388 |            |        |
|                                                                           | 3.7        | 70              | 52                  | 0.0277 |            |        |
|                                                                           | 3.7        | 80              | 78                  | 0.0415 |            |        |
|                                                                           | 4.10       | 25              | 69                  | 0.0367 |            |        |
|                                                                           | 3.7        | 25              | 81                  | 0.0431 |            |        |
|                                                                           | 3.33       | 25              | 102                 | 0.0548 |            |        |
| LTE Band 2<br>Bandwidth<br>20MHz<br>16QAM<br>Middle<br>channel<br>1880MHz | 3.7        | -40             | 62                  | 0.0330 | whole band | PASS   |
|                                                                           | 3.7        | -30             | 54                  | 0.0287 |            |        |
|                                                                           | 3.7        | -20             | 71                  | 0.0378 |            |        |
|                                                                           | 3.7        | -10             | 57                  | 0.0303 |            |        |
|                                                                           | 3.7        | 0               | 73                  | 0.0388 |            |        |
|                                                                           | 3.7        | 10              | 59                  | 0.0314 |            |        |
|                                                                           | 3.7        | 20              | 72                  | 0.0383 |            |        |
|                                                                           | 3.7        | 30              | 83                  | 0.0441 |            |        |
|                                                                           | 3.7        | 40              | 41                  | 0.0218 |            |        |
|                                                                           | 3.7        | 50              | 64                  | 0.0340 |            |        |
|                                                                           | 3.7        | 60              | 66                  | 0.0351 |            |        |
|                                                                           | 3.7        | 70              | 73                  | 0.0388 |            |        |
|                                                                           | 3.7        | 80              | 82                  | 0.0436 |            |        |
|                                                                           | 4.10       | 25              | 97                  | 0.0516 |            |        |
|                                                                           | 3.7        | 25              | 71                  | 0.0378 |            |        |
|                                                                           | 3.33       | 25              | 101                 | 0.0537 |            |        |



| Test Conditions                                                             |            |                 | Frequency Deviation |        |            | Result |
|-----------------------------------------------------------------------------|------------|-----------------|---------------------|--------|------------|--------|
| Band                                                                        | Power(Vdc) | Temperature(°C) | Frequency Error(Hz) | ppm    | Limit ppm  |        |
| LTE Band 4<br>Bandwidth<br>20MHz<br>QPSK<br>Middle<br>channel<br>1732.5MHz  | 3.7        | -40             | 72                  | 0.0416 | whole band | PASS   |
|                                                                             | 3.7        | -30             | 28                  | 0.0162 |            |        |
|                                                                             | 3.7        | -20             | 81                  | 0.0468 |            |        |
|                                                                             | 3.7        | -10             | 68                  | 0.0392 |            |        |
|                                                                             | 3.7        | 0               | 31                  | 0.0179 |            |        |
|                                                                             | 3.7        | 10              | 52                  | 0.0300 |            |        |
|                                                                             | 3.7        | 20              | 64                  | 0.0369 |            |        |
|                                                                             | 3.7        | 30              | 54                  | 0.0312 |            |        |
|                                                                             | 3.7        | 40              | 65                  | 0.0375 |            |        |
|                                                                             | 3.7        | 50              | 42                  | 0.0242 |            |        |
|                                                                             | 3.7        | 60              | 76                  | 0.0439 |            |        |
|                                                                             | 3.7        | 70              | 92                  | 0.0531 |            |        |
|                                                                             | 3.7        | 80              | 81                  | 0.0468 |            |        |
|                                                                             | 4.10       | 25              | 72                  | 0.0416 |            |        |
|                                                                             | 3.7        | 25              | 83                  | 0.0479 |            |        |
|                                                                             | 3.33       | 25              | 98                  | 0.0571 |            |        |
| LTE Band 4<br>Bandwidth<br>20MHz<br>16QAM<br>Middle<br>channel<br>1732.5MHz | 3.7        | -40             | 81                  | 0.0468 | whole band | PASS   |
|                                                                             | 3.7        | -30             | 72                  | 0.0416 |            |        |
|                                                                             | 3.7        | -20             | 83                  | 0.0479 |            |        |
|                                                                             | 3.7        | -10             | 64                  | 0.0369 |            |        |
|                                                                             | 3.7        | 0               | 56                  | 0.0323 |            |        |
|                                                                             | 3.7        | 10              | 63                  | 0.0364 |            |        |
|                                                                             | 3.7        | 20              | 77                  | 0.0444 |            |        |
|                                                                             | 3.7        | 30              | 62                  | 0.0358 |            |        |
|                                                                             | 3.7        | 40              | 78                  | 0.0450 |            |        |
|                                                                             | 3.7        | 50              | 62                  | 0.0358 |            |        |
|                                                                             | 3.7        | 60              | 51                  | 0.0294 |            |        |
|                                                                             | 3.7        | 70              | 79                  | 0.0456 |            |        |
|                                                                             | 3.7        | 80              | 62                  | 0.0358 |            |        |
|                                                                             | 4.10       | 25              | 79                  | 0.0456 |            |        |
|                                                                             | 3.7        | 25              | 82                  | 0.0468 |            |        |
|                                                                             | 3.33       | 25              | 91                  | 0.0566 |            |        |

Note: Measurement Uncertainty:  $\pm 20\text{Hz}$ .



| Test Conditions                                                            |            |                 | Frequency Deviation |        |           | Result |
|----------------------------------------------------------------------------|------------|-----------------|---------------------|--------|-----------|--------|
| Band                                                                       | Power(Vdc) | Temperature(°C) | Frequency Error(Hz) | ppm    | Limit ppm |        |
| LTE Band 5<br>Bandwidth<br>10MHz<br>QPSK<br>Middle<br>channel<br>836.5MHz  | 3.7        | -40             | 72                  | 0.0861 | ±2.5      | PASS   |
|                                                                            | 3.7        | -30             | 83                  | 0.0992 |           |        |
|                                                                            | 3.7        | -20             | 44                  | 0.0526 |           |        |
|                                                                            | 3.7        | -10             | 77                  | 0.0921 |           |        |
|                                                                            | 3.7        | 0               | 22                  | 0.0263 |           |        |
|                                                                            | 3.7        | 10              | 48                  | 0.0574 |           |        |
|                                                                            | 3.7        | 20              | 72                  | 0.0861 |           |        |
|                                                                            | 3.7        | 30              | 64                  | 0.0765 |           |        |
|                                                                            | 3.7        | 40              | 79                  | 0.0944 |           |        |
|                                                                            | 3.7        | 50              | 52                  | 0.0622 |           |        |
|                                                                            | 3.7        | 60              | 78                  | 0.0932 |           |        |
|                                                                            | 3.7        | 70              | 52                  | 0.0622 |           |        |
|                                                                            | 3.7        | 80              | 63                  | 0.0753 |           |        |
|                                                                            | 4.10       | 25              | 78                  | 0.0932 |           |        |
|                                                                            | 3.7        | 25              | 52                  | 0.0622 |           |        |
|                                                                            | 3.33       | 25              | 99                  | 0.1172 |           |        |
| LTE Band 5<br>Bandwidth<br>10MHz<br>16QAM<br>Middle<br>channel<br>836.5MHz | 3.7        | -40             | 77                  | 0.0921 | ±2.5      | PASS   |
|                                                                            | 3.7        | -30             | 67                  | 0.0801 |           |        |
|                                                                            | 3.7        | -20             | 59                  | 0.0705 |           |        |
|                                                                            | 3.7        | -10             | 62                  | 0.0741 |           |        |
|                                                                            | 3.7        | 0               | 54                  | 0.0646 |           |        |
|                                                                            | 3.7        | 10              | 67                  | 0.0801 |           |        |
|                                                                            | 3.7        | 20              | 63                  | 0.0753 |           |        |
|                                                                            | 3.7        | 30              | 58                  | 0.0693 |           |        |
|                                                                            | 3.7        | 40              | 63                  | 0.0753 |           |        |
|                                                                            | 3.7        | 50              | 78                  | 0.0932 |           |        |
|                                                                            | 3.7        | 60              | 52                  | 0.0622 |           |        |
|                                                                            | 3.7        | 70              | 73                  | 0.0873 |           |        |
|                                                                            | 3.7        | 80              | 66                  | 0.0789 |           |        |
|                                                                            | 4.10       | 25              | 56                  | 0.0669 |           |        |
|                                                                            | 3.7        | 25              | 82                  | 0.0980 |           |        |
|                                                                            | 3.33       | 25              | 98                  | 0.1184 |           |        |

Note: Measurement Uncertainty: ±20Hz.



| Test Conditions                                                             |            |                 | Frequency Deviation |        |            | Result |
|-----------------------------------------------------------------------------|------------|-----------------|---------------------|--------|------------|--------|
| Band                                                                        | Power(Vdc) | Temperature(°C) | Frequency Error(Hz) | ppm    | Limit ppm  |        |
| LTE Band 12<br>Bandwidth<br>10MHz<br>QPSK<br>Middle<br>channel<br>707.5MHz  | 3.7        | -40             | 82                  | 0.1159 | whole band | PASS   |
|                                                                             | 3.7        | -30             | 55                  | 0.0777 |            |        |
|                                                                             | 3.7        | -20             | 67                  | 0.0947 |            |        |
|                                                                             | 3.7        | -10             | 49                  | 0.0693 |            |        |
|                                                                             | 3.7        | 0               | 26                  | 0.0367 |            |        |
|                                                                             | 3.7        | 10              | 34                  | 0.0481 |            |        |
|                                                                             | 3.7        | 20              | 68                  | 0.0961 |            |        |
|                                                                             | 3.7        | 30              | 72                  | 0.1018 |            |        |
|                                                                             | 3.7        | 40              | 65                  | 0.0919 |            |        |
|                                                                             | 3.7        | 50              | 52                  | 0.0735 |            |        |
|                                                                             | 3.7        | 60              | 73                  | 0.1032 |            |        |
|                                                                             | 3.7        | 70              | 68                  | 0.0961 |            |        |
|                                                                             | 3.7        | 80              | 26                  | 0.0367 |            |        |
|                                                                             | 4.10       | 25              | 62                  | 0.0876 |            |        |
|                                                                             | 3.7        | 25              | 73                  | 0.1032 |            |        |
|                                                                             | 3.33       | 25              | 99                  | 0.1399 |            |        |
| LTE Band 12<br>Bandwidth<br>10MHz<br>16QAM<br>Middle<br>channel<br>707.5MHz | 3.7        | -40             | 55                  | 0.0777 | whole band | PASS   |
|                                                                             | 3.7        | -30             | 63                  | 0.0890 |            |        |
|                                                                             | 3.7        | -20             | 56                  | 0.0792 |            |        |
|                                                                             | 3.7        | -10             | 63                  | 0.0890 |            |        |
|                                                                             | 3.7        | 0               | 65                  | 0.0919 |            |        |
|                                                                             | 3.7        | 10              | 52                  | 0.0735 |            |        |
|                                                                             | 3.7        | 20              | 48                  | 0.0678 |            |        |
|                                                                             | 3.7        | 30              | 52                  | 0.0735 |            |        |
|                                                                             | 3.7        | 40              | 79                  | 0.1117 |            |        |
|                                                                             | 3.7        | 50              | 52                  | 0.0735 |            |        |
|                                                                             | 3.7        | 60              | 78                  | 0.1102 |            |        |
|                                                                             | 3.7        | 70              | 92                  | 0.1300 |            |        |
|                                                                             | 3.7        | 80              | 56                  | 0.0792 |            |        |
|                                                                             | 4.10       | 25              | 53                  | 0.0749 |            |        |
|                                                                             | 3.7        | 25              | 98                  | 0.1385 |            |        |
|                                                                             | 3.33       | 25              | 105                 | 0.1385 |            |        |

Note: Measurement Uncertainty:  $\pm 20\text{Hz}$ .



| Test Conditions                                                           |            |                 | Frequency Deviation |        |            | Result |
|---------------------------------------------------------------------------|------------|-----------------|---------------------|--------|------------|--------|
| Band                                                                      | Power(Vdc) | Temperature(°C) | Frequency Error(Hz) | ppm    | Limit ppm  |        |
| LTE Band 13<br>Bandwidth<br>10MHz<br>QPSK<br>Middle<br>channel<br>782MHz  | 3.7        | -40             | 84                  | 0.1074 | whole band | PASS   |
|                                                                           | 3.7        | -30             | 54                  | 0.0691 |            |        |
|                                                                           | 3.7        | -20             | 65                  | 0.0831 |            |        |
|                                                                           | 3.7        | -10             | 56                  | 0.0716 |            |        |
|                                                                           | 3.7        | 0               | 77                  | 0.0985 |            |        |
|                                                                           | 3.7        | 10              | 48                  | 0.0614 |            |        |
|                                                                           | 3.7        | 20              | 65                  | 0.0831 |            |        |
|                                                                           | 3.7        | 30              | 53                  | 0.0678 |            |        |
|                                                                           | 3.7        | 40              | 88                  | 0.1125 |            |        |
|                                                                           | 3.7        | 50              | 53                  | 0.0678 |            |        |
|                                                                           | 3.7        | 60              | 78                  | 0.0997 |            |        |
|                                                                           | 3.7        | 70              | 53                  | 0.0678 |            |        |
|                                                                           | 3.7        | 80              | 24                  | 0.0307 |            |        |
|                                                                           | 4.10       | 25              | 65                  | 0.0831 |            |        |
|                                                                           | 3.7        | 25              | 87                  | 0.1113 |            |        |
|                                                                           | 3.33       | 25              | 93                  | 0.1189 |            |        |
| LTE Band 13<br>Bandwidth<br>10MHz<br>16QAM<br>Middle<br>channel<br>782MHz | 3.7        | -40             | 52                  | 0.0665 | whole band | PASS   |
|                                                                           | 3.7        | -30             | 74                  | 0.0946 |            |        |
|                                                                           | 3.7        | -20             | 55                  | 0.0703 |            |        |
|                                                                           | 3.7        | -10             | 57                  | 0.0729 |            |        |
|                                                                           | 3.7        | 0               | 62                  | 0.0793 |            |        |
|                                                                           | 3.7        | 10              | 54                  | 0.0691 |            |        |
|                                                                           | 3.7        | 20              | 22                  | 0.0281 |            |        |
|                                                                           | 3.7        | 30              | 54                  | 0.0691 |            |        |
|                                                                           | 3.7        | 40              | 61                  | 0.0780 |            |        |
|                                                                           | 3.7        | 50              | 54                  | 0.0691 |            |        |
|                                                                           | 3.7        | 60              | 61                  | 0.0780 |            |        |
|                                                                           | 3.7        | 70              | 78                  | 0.0997 |            |        |
|                                                                           | 3.7        | 80              | 52                  | 0.0665 |            |        |
|                                                                           | 4.10       | 25              | 63                  | 0.0806 |            |        |
|                                                                           | 3.7        | 25              | 96                  | 0.1228 |            |        |
|                                                                           | 3.33       | 25              | 98                  | 0.1253 |            |        |

Note: Measurement Uncertainty:  $\pm 20\text{Hz}$ .



## 5.5. Conducted Spurious Emissions

### 5.5.1. Limit

#### FCC

- §22.917(a), 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.
- §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10\log(P)$  dB.
- §27.53(c)(2), on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10\log(P)$  dB.
- §27.53(g), the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10\log(P)$  dB.
- §27.53(h)(1), for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10\log_{10}(P)$  dB.
- §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than  $40 + 10\log_{10}(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10\log_{10}(P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10\log_{10}(P)$  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  $43 + 10\log_{10}(P)$  dB on all frequencies between 2 490.5 MHz and 2 496 MHz and  $55 + 10\log_{10}(P)$  dB at or below 2 490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2 495 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.

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- 4.7.1, the unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dB W), by at least  $43 + 10\log_{10} p$  (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.
- 4.7.2, In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:
  - a) The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dB W), by at least:
    - (i)  $76 + 10\log_{10} p$  (watts), dB, for base and fixed equipment, and
    - (ii)  $65 + 10\log_{10} p$  (watts), dB, for mobile and portable equipment.
  - b) The e.i.r.p. in the band 1 559-1 610 MHz shall not exceed -70 dB W/MHz for wideband signal and -80 dB W for discrete emission with bandwidth less than 700 Hz.

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5.5, Equipment shall meet the unwanted emission limits specified below.

- (i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1 % of the occupied bandwidth shall be attenuated below the transmitter output power P (dB W) by at least  $43 + 10\log(p)$  dB.
- (ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated below the transmitter output power P (dB W) by at least  $43 + 10\log(p)$  dB. If the measurement is performed using 1 % of the occupied bandwidth, power integration over 100 kHz is required.

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6.5, Equipment shall comply with the limits in (i) and (ii) below.

- (i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1 % of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dB W) by at least  $43 + 10\log_{10} p$  (watts).
- (ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dB W) by at least  $43 + 10\log_{10} p$  (watts). If the measurement is performed using 1 % of the emission bandwidth, power integration over 1.0 MHz is required.

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5.6, Unwanted emissions shall be measured in terms of average values.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors) of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in table 6.

**Table 6: Unwanted emission limits**

| Offset from the edge of the frequency block or frequency block group | Unwanted emission limit |
|----------------------------------------------------------------------|-------------------------|
| $\leq 1$ MHz                                                         | -13 dB m/(1% of OB)*    |
| $> 1$ MHz                                                            | -13 dB m                |

\* OB is the occupied bandwidth

**Table 4: Unwanted emission limits for fixed station, base station and fixed subscriber equipment**

| Offset from the edge of the frequency block or frequency block group (MHz) | Unwanted emission limit |
|----------------------------------------------------------------------------|-------------------------|
| $\leq 1$                                                                   | -13 dB m/(1% of OB*)    |
| $> 1$                                                                      | -13 dB m/MHz            |

\* OB is the occupied bandwidth

**Table 5: Unwanted emission limits for subscriber equipment other than fixed subscriber equipment**

| Offset from the edge of the frequency block or frequency block group (MHz) | Unwanted emission limit |
|----------------------------------------------------------------------------|-------------------------|
| 0-1                                                                        | -10 dB m/(2% of OB*)    |
| 1-5                                                                        | -10 dB m/MHz            |
| 5-X**                                                                      | -13 dB m/MHz            |
| $\geq X$                                                                   | -25 dB m/MHz            |

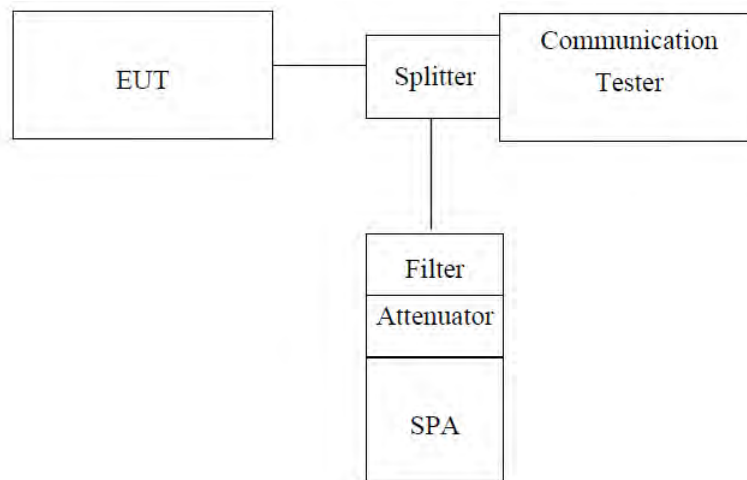
\* OB is the occupied bandwidth

\*\* X is 6 MHz or the equipment occupied bandwidth, whichever is greater

In addition to complying with the limits in table 5, subscriber equipment other than fixed subscriber equipment shall not exceed -13 dBm/MHz on all frequencies between 2 490.5 MHz and 2 496 MHz, and -25 dBm/MHz at or below 2 490.5 MHz.



### 5.5.2. Test Setup



*Note: Measurement setup for testing on Antenna connector*

### 5.5.3. Measurement Procedure

The test follows section 5.7 of ANSI C63.26-2015.

1. Start frequency was set to 9 kHz and stop frequency was set to at least 10\* the fundamental frequency.
2. Detector = RMS.
3. Trace mode = Max hold.
4. Sweep time = Auto couple.
5. The trace was allowed to stabilize.
6. Please see notes below for RBW and VBW settings.
7. For plots showing conducted spurious emissions from 9 kHz to 26 GHz, all path loss of wide frequency range was investigated and compensated to spectrum analyzer as TDF function.

### 5.5.4. Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

For LTE mode, the plot only show the min and max bandwidth's data.

Pass, the table and plot please see annex.



## 5.6. Conducted Out of Band Emissions

### 5.6.1. Limit

#### FCC

- §22.917(a), 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.
- §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.
- §27.53(c)(2), on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB.
- §27.53(c)(4), on all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log(P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;
- §27.53 (f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.
- §27.53(g), the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB.
- §27.53(h)(1), for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB.
- §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log_{10} (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log_{10} (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log_{10} (P)$  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  $43 + 10 \log_{10} (P)$  dB on all frequencies between 2 490.5 MHz and 2 496 MHz and  $55 + 10 \log_{10} (P)$  dB at or below 2 490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2 495 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.

#### IC

##### - RSS-130 Issue 2

4.7.1, the unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dB W), by at least  $43 + 10 \log_{10} p$  (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

4.7.2, In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:

a) The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dB W), by at least:

- (i)  $76 + 10 \log_{10} p$  (watts), dB, for base and fixed equipment, and
- (ii)  $65 + 10 \log_{10} p$  (watts), dB, for mobile and portable equipment.

) The e.i.r.p. in the band 1 559-1 610 MHz shall not exceed -70 dB W/MHz for wideband signal and -80 dB W for discrete emission with bandwidth less than 700 Hz.

##### - RSS-132 Issue 4

5.5, Equipment shall meet the unwanted emission limits specified below.

(i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1 % of the occupied bandwidth shall be attenuated below the transmitter output power P (dB W) by at least  $43 + 10 \log(p)$  dB.

(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated below the transmitter output power P (dB W) by at least

$43 + 10 \log(p)$  dB. If the measurement is performed using 1 % of the occupied bandwidth, power integration over 100 kHz is required.

##### - RSS-133 Issue 7

6.5, Equipment shall comply with the limits in (i) and (ii) below.



(i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1 % of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dB W) by at least  $43 + 10 \log_{10} p(\text{watts})$ .

(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dB W) by at least  $43 + 10 \log_{10} p(\text{watts})$ . If the measurement is performed using 1 % of the emission bandwidth, power integration over 1.0 MHz is required.

- RSS-139 Issue 4

5.6, Unwanted emissions shall be measured in terms of average values.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors) of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in table 6.

| Offset from the edge of the frequency block or frequency block group | Unwanted emission limits |
|----------------------------------------------------------------------|--------------------------|
| $\leq 1$ MHz                                                         | -13 dBm/(1% of OB*)      |
| $> 1$ MHz                                                            | -13 dBm/MHz              |

\*OB is the occupied bandwidth.

Table 4: Unwanted emission limits for fixed station, base station and fixed subscriber equipment

| Offset from the edge of the frequency block or frequency block group (MHz) | Unwanted emission limit |
|----------------------------------------------------------------------------|-------------------------|
| $\leq 1$                                                                   | -13 dB m/(1% of OB')    |
| $> 1$                                                                      | -13 dB m/MHz            |

\* OB is the occupied bandwidth

Table 5: Unwanted emission limits for subscriber equipment other than fixed subscriber equipment

| Offset from the edge of the frequency block or frequency block group (MHz) | Unwanted emission limit |
|----------------------------------------------------------------------------|-------------------------|
| 0-1                                                                        | -10 dB m/(2% of OB')    |
| 1-5                                                                        | -10 dB m/MHz            |
| 5-X**                                                                      | -13 dB m/MHz            |
| $\geq X$                                                                   | -25 dB m/MHz            |

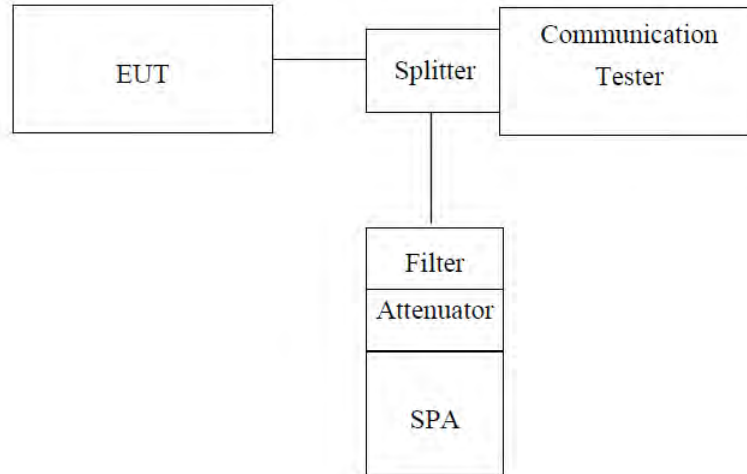
\* OB is the occupied bandwidth

\*\* X is 6 MHz or the equipment occupied bandwidth, whichever is greater

In addition to complying with the limits in table 5, subscriber equipment other than fixed subscriber equipment shall not exceed -13 dBm/MHz on all frequencies between 2 490.5 MHz and 2 496 MHz, and -25 dBm/MHz at or below 2 490.5 MHz.



### 5.6.2. Test Setup



*Note: Measurement setup for testing on Antenna connector*

### 5.6.3. Measurement Procedure

The test follows section 5.7 of ANSI C63.26-2015.

- Span was set large enough so as to capture all out of band emissions near the band edge.
- $RBW \geq 1\%$  of OBW
- $VBW \geq 3 \times RBW$ .
- Detector = RMS.
- Trace mode = Average.
- Sweep time = Auto.
- The trace was allowed to stabilize.
- All path loss of frequency range was investigated and compensated to spectrum analyzer as TDF function.

### 5.6.4. Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

Pass, the table and plot please see annex.



### 5.7. Transmitter Power (EIRP/ERP)

#### 5.7.1. Limit

##### FCC

-§22.913(a)(5), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

-§24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

-§27.50(b)(9), control stations and mobile stations transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands and fixed stations transmitting in the 787-788 MHz and 805-806 MHz bands are limited to 30 watts ERP.

-§27.50(c)(9), control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP.

-§27.50(c)(10), 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.

-§27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1 710-1 755 MHz band and mobile and portable stations operating in the 1 695-1 710 MHz and 1 755-1 780 MHz bands are limited to 1 watt EIRP.

-§27.50(h)(2), 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.

##### IC

##### -RSS-130 Issue 2

4.6.3, the e.r.p. shall not exceed 30 watts for mobile equipment and outdoor fixed subscriber equipment. The e.r.p. shall not exceed 3 watts for portable equipment and indoor fixed subscriber equipment.

For base and fixed equipment other than fixed subscriber equipment, refer to SRSP-518 for the e.i.r.p. limits.

##### -RSS-132 Issue 4

5.4, the transmitter output power shall be measured in terms of average power. The equivalent radiated power (e.r.p.) shall not exceed 7 watts for mobile equipment and 3 watts for portable equipment.

The effective isotropic radiated power (e.i.r.p.) shall not exceed the limits specified in SRSP-503 for base station equipment.

##### -RSS-133 Issue 7

6.4, the equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510. Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p. The equipment shall employ means to limit the power to the minimum necessary for successful communication.

##### -RSS-139 Issue 4

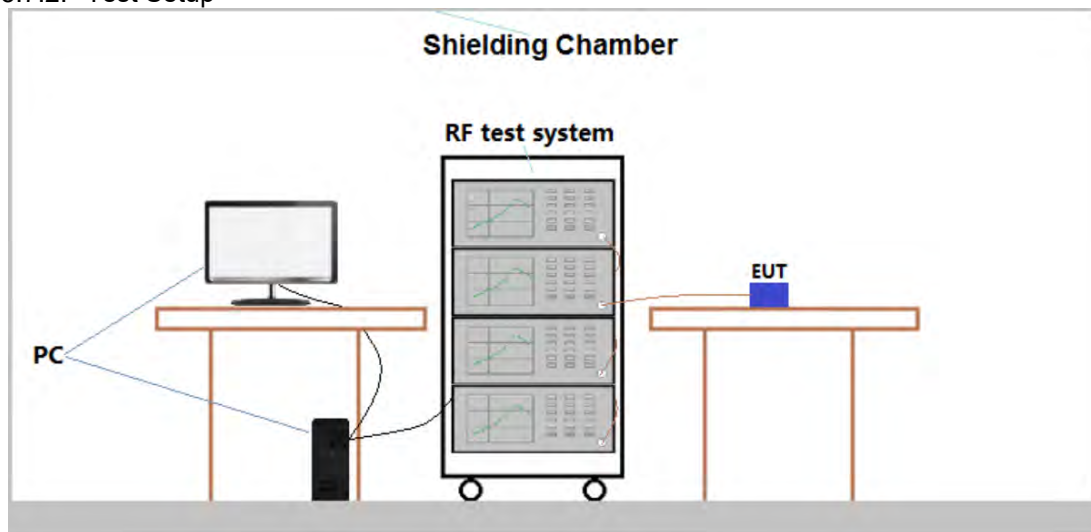
5.5, The maximum output power of the equipment shall comply with the limits specified below. In the tables, maximum power refers to the equivalent isotropically radiated power (e.i.r.p.) or total radiated power (TRP), measured in terms of average values.

**Table 3: Maximum power of equipment in the band 1 710-1 780 MHz**

| Equipment type                 | Maximum power                      |
|--------------------------------|------------------------------------|
| Fixed station and base station | 30 dBm e.i.r.p./ channel bandwidth |
| Subscriber equipment           | 30 dBm e.i.r.p./ channel bandwidth |



#### 5.7.2. Test Setup



#### 5.7.3. Measurement Procedure

ERP in frequency below 1GHz, the ERP was calculated as follows:

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - 2.15$$

EIRP in frequency above 1GHz the EIRP was calculated as follows:

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)}$$

#### 5.7.4. Test Result

Pass,