

# FCC Test Report

## (Part 27: LTE Band 4, 13)

**Report No.:** RF180731E06-3

**FCC ID:** PKRNVWR1000

**Test Model:** R1000

**Received Date:** Jul. 31, 2018

**Test Date:** Aug. 02 ~ Aug. 05, 2018

**Issued Date:** Aug. 08, 2018

**Applicant:** Novatel Wireless, Inc.

**Address:** 9605 Scranton Road Suite 300, San Diego, CA 92121 United States

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

**FCC Registration /  
Designation Number:** 788550 / TW0003



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### Release Control Record

| Issue No.     | Description       | Date Issued   |
|---------------|-------------------|---------------|
| RF180731E06-3 | Original release. | Aug. 08, 2018 |

## 1 Certificate of Conformity

**Product:** 4G LTE Wireless Router

**Brand:** Inseego

**Test Model:** R1000

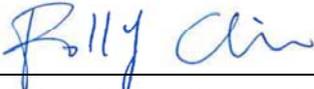
**Sample Status:** Engineering sample

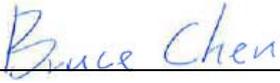
**Applicant:** Novatel Wireless, Inc.

**Test Date:** Aug. 02 ~ Aug. 05, 2018

**Standards:** FCC Part 27, Subpart C, L, F

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by :** , **Date:** Aug. 08, 2018  
Polly Chien / Specialist

**Approved by :** , **Date:** Aug. 08, 2018  
Bruce Chen / Project Engineer

## 2 Summary of Test Results

| Applied Standard: FCC Part 27 & Part 2 |                        |  |        |  |
|--|------------------------|--|--------|--|
| FCC Clause                             |                        | Test Item  | Result | Remarks  |
| LTE Band 4                             | LTE Band 13            |  |        |  |
| 2.1046<br>27.50(d)(4)                  | 2.1046<br>27.50(b)(10) | Equivalent Isotropically Radiated Power                            | Pass   | Meet the requirement of limit.   |
| ----                                   | ----                   | Peak To Average Ratio  | Pass   | Meet the requirement of limit.   |
| 2.1055<br>27.54                        | 2.1055<br>27.54        | Frequency Stability<br>Stay with the authorized bands of operation | Pass   | Meet the requirement of limit.   |
| 2.1049 27.53(m)(6)                     | 2.1049 27.53(m)(6)     | Emission Bandwidth   | Pass   | Meet the requirement of limit.   |
| 2.1051<br>27.53(h)                     | 2.1051<br>27.53(c)     | Band Edge Measurements   | Pass   | Meet the requirement of limit.   |
| 2.1051<br>27.53(h)                     | 2.1051<br>27.53(c)     | Conducted Spurious Emissions                                       | Pass   | Meet the requirement of limit.   |
| 2.1051<br>27.53(h)                     | 2.1051<br>27.53(c)     | Radiated Spurious Emissions  | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -26.6dB at 71.71MHz. |

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement                    | Frequency        | Expanded Uncertainty (k=2) (±) |
|--------------------------------|------------------|--------------------------------|
| Radiated Emissions up to 1 GHz | 30MHz ~ 200MHz   | 3.59 dB                        |
|                                | 200MHz ~ 1000MHz | 3.60 dB                        |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz     | 2.29 dB                        |
|                                | 18GHz ~ 40GHz    | 2.29 dB                        |

## 2.2 Test Site and Instruments

| Description & Manufacturer                          | Model No.                          | Serial No.                      | Cal. Date     | Cal. Due      |
|---|------------------------------------|---------------------------------|---------------|---------------|
| Test Receiver<br>KEYSIGHT                           | N9038A                             | MY55420137                      | Apr. 11, 2018 | Apr. 10, 2019 |
| Spectrum Analyzer<br>ROHDE & SCHWARZ                | FSP40                              | 100269                          | May 29, 2018  | May 28, 2019  |
| BILOG Antenna<br>SCHWARZBECK                        | VULB9168                           | 9168-148                        | Dec. 11, 2017 | Dec. 10, 2018 |
| HORN Antenna<br>SCHWARZBECK                         | BBHA 9120 D                        | 9120D-1169                      | Dec. 12, 2017 | Dec. 11, 2018 |
| HORN Antenna<br>SCHWARZBECK                         | BBHA 9170                          | BBHA9170241                     | Dec. 01, 2017 | Nov. 30, 2018 |
| Loop Antenna<br>EMCI                                | EM-6879                            | 269                             | Aug. 11, 2017 | Aug. 10, 2018 |
| Preamplifier<br>Agilent<br>(Below 1GHz)             | 8447D                              | 2944A10638                      | Aug. 08, 2017 | Aug. 07, 2018 |
| Preamplifier<br>Agilent<br>(Above 1GHz)             | 8449B                              | 3008A01638                      | Feb. 22, 2018 | Feb. 21, 2019 |
| RF signal cable<br>HUBER+SUHNER&EMCI                | SUCOFLEX 104 &<br>EMC104-SM-SM8000 | CABLE-CH9-02<br>(248780+171006) | Jan. 15, 2018 | Jan. 14, 2019 |
| RF signal cable<br>HUBER+SUHNER                     | SUCOFLEX 104                       | CABLE-CH9-(250795/4)            | Aug. 08, 2017 | Aug. 07, 2018 |
| RF signal cable<br>Woken                            | 8D-FB                              | Cable-CH9-01                    | Jul. 31, 2018 | Jul. 30, 2019 |
| Software<br>BV ADT                                  | ADT_Radiated_<br>V7.6.15.9.5       | NA                              | NA            | NA            |
| Antenna Tower<br>EMCO                               | 2070/2080                          | 512.835.4684                    | NA            | NA            |
| Turn Table<br>EMCO                                  | 2087-2.03                          | NA                              | NA            | NA            |
| Antenna Tower & Turn<br>BV ADT                      | AT100                              | AT93021705                      | NA            | NA            |
| Turn Table<br>BV ADT                                | TT100                              | TT93021705                      | NA            | NA            |
| Turn Table Controller<br>BV ADT                     | SC100                              | SC93021705                      | NA            | NA            |
| Boresight Antenna Fixture                           | FBA-01                             | FBA-SIP01                       | NA            | NA            |
| WIT Standard<br>Temperature And Humidity<br>Chamber | TH-4S-C                            | W981030                         | Jun. 04, 2018 | Jun. 03, 2019 |
| JFW 20dB attenuation                                | 50HF-020-SMA                       | NA                              | NA            | NA            |

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 9.
3. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
4. The IC Site Registration No. is IC 7450F-9.

### 3 General Information

#### 3.1 General Description of EUT

|                     |   |                         |                       |          |
|---------------------|---|-------------------------|-----------------------|----------|
| Product             | 4G LTE Wireless Router                        |                         |                       |          |
| Brand               | Inseego                                       |                         |                       |          |
| Test Model          | R1000   |                         |                       |          |
| Status of EUT       | Engineering sample                            |                         |                       |          |
| Power Supply Rating | 4.5 Vdc (Battery:1.5Vdc*3)<br>54Vdc (PoE)     |                         |                       |          |
| Modulation Type     | QPSK, 16QAM                                   |                         |                       |          |
| Operating Frequency | LTE Band 4                                    | Channel Bandwidth 5MHz  | 1712.5MHz ~ 1752.5MHz |          |
|                     |   | Channel Bandwidth 10MHz | 1715.0MHz ~ 1750.0MHz |          |
|                     |   | Channel Bandwidth 15MHz | 1717.5MHz ~ 1747.5MHz |          |
|                     |   | Channel Bandwidth 20MHz | 1720.0MHz ~ 1745.0MHz |          |
|                     | LTE Band 13                                   | Channel Bandwidth 5MHz  | 779.5MHz ~ 784.5MHz   |          |
|                     |   | Channel Bandwidth 10MHz | 782MHz                |          |
| Max. EIRP Power     | LTE Band 4                                    | Channel Bandwidth 5MHz  | 316.228mW (25.0dBm)   |          |
|                     |   | Channel Bandwidth 10MHz | 288.403mW (24.6dBm)   |          |
|                     |   | Channel Bandwidth 15MHz | 389.045mW (25.9dBm)   |          |
|                     |   | Channel Bandwidth 20MHz | 331.131mW (25.2dBm)   |          |
| Max. ERP Power      | LTE Band 13                                   | Channel Bandwidth 5MHz  | 309.030mW (24.9dBm)   |          |
|                     |   | Channel Bandwidth 10MHz | 269.153mW (24.3dBm)   |          |
| Emission Designator | LTE Band 4                                    |                         | QPSK                  | 16QAM    |
|                     |   | Channel Bandwidth 5MHz  | 4M48G7D               | 4M9W7D   |
|                     |   | Channel Bandwidth 10MHz | 8M97G7D               | 8M97W7D  |
|                     |   | Channel Bandwidth 15MHz | 13M49G7D              | 13M48W7D |
|                     | LTE Band 13                                   | Channel Bandwidth 5MHz  | 4M49G7D               | 4M49W7D  |
|                     |   | Channel Bandwidth 10MHz | 8M95G7D               | 8M95W7D  |
| Antenna Type        | Refer to Note for more details                |                         |                       |          |
| Antenna Connector   | Refer to Note for more details                |                         |                       |          |
| Accessory Device    | PoE   |                         |                       |          |
| Data Cable Supplied | 1.0m non-shielded Ethernet cable without core |                         |                       |          |

Note:

1. The EUT consumes power from the following PoE.

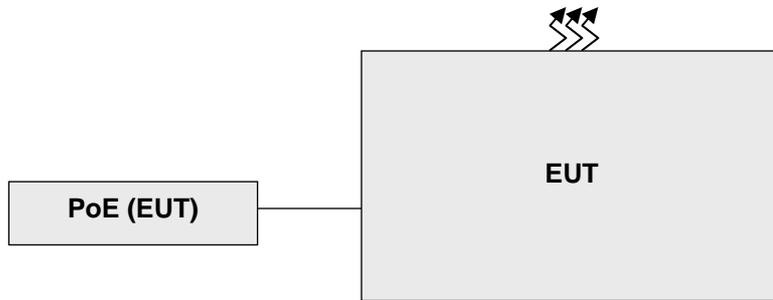
|              |   |
|--------------|---|
| Brand        | Leader  |
| Model        | UNA3-6540240-11   |
| Input Power  | 100-240Vac, 50/60Hz, 2.0A   |
| Output Power | 54Vdc, 2.4A   |
| Power Line   | 1.8m non shielded AC power cable without core<br>1.4m DC power cable without core |

2. The EUT uses following antennas.

| Frequency Range (MHz) | Antenna Type | Model       | Antenna Connector | *Cable Length | Antenna Gain (dBi) |
|-----------------------|--------------|-------------|-------------------|---------------|--------------------|
| LTE Band 4            | PCB          | C037-511495 | i-pex(MHF)        | 130mm         | 2.98               |
| LTE Band 13           |              |             |                   |               | 0.25               |

### 3.2 Configuration of System under Test

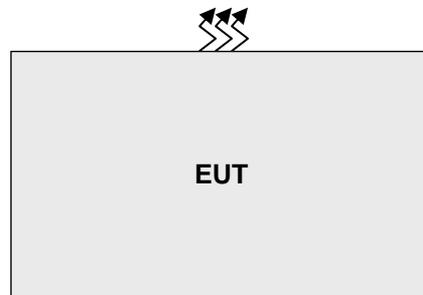
Mode A



Remote site



Mode B



Remote site



### 3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| ID | Product                          | Brand   | Model No. | Serial No. | FCC ID | Remarks |
|----|----------------------------------|---------|-----------|------------|--------|---------|
| A. | Radio<br>Communication<br>Tester | Anritsu | MT8820C   | 6201010284 | NA     | -       |

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

### 3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned on X-plane for LTE Band 4 and Z-plane for LTE Band 13. Following channel(s) was (were) selected for the final test as listed below:

Test results are presented in the report as below.

| Test Mode | Test Condition   |
|-----------|------------------|
| A         | EUT with battery |
| B         | EUT with adapter |

#### LTE Band 4

| EUT Configure Mode | Test Item                  | Available Channel | Tested Channel  | Channel Bandwidth | Modulation  | Mode  |
|--------------------|----------------------------|-------------------|---|-------------------|-------------|---|
| A                  | Output Power               | 19975 to 20375    | 19975(1712.50MHz),<br>20175(1732.50MHz),<br>20375(1752.50MHz) | 5MHz              | QPSK        | 1 RB / 24 RB Offset   |
|                    |                            | 20000 to 20350    | 20000(1715.00MHz),<br>20175(1732.50MHz),<br>20350(1750.00MHz) | 10MHz             | QPSK        | 1 RB / 49 RB Offset   |
|                    |                            | 20025 to 20325    | 20025(1717.50MHz),<br>20175(1732.50MHz),<br>20325(1747.50MHz) | 15MHz             | QPSK        | 1 RB / 74 RB Offset   |
|                    |                            | 20050 to 20300    | 20050(1720.00MHz),<br>20175(1732.50MHz),<br>20300(1745.00MHz) | 20MHz             | QPSK        | 1 RB / 99 RB Offset   |
| A                  | Modulation characteristics | 20050 to 20300    | 20175(1732.50MHz),  | 20MHz             | QPSK        | 1 RB / 99 RB Offset   |
| A                  | Frequency Stability        | 19975 to 20375    | 19975(1712.50MHz)   | 5MHz              | QPSK        | 1 RB / 0 RB Offset  |
|                    |                            | 20000 to 20350    | 20000(1715.00MHz)   | 10MHz             | QPSK        | 1 RB / 0 RB Offset  |
|                    |                            | 20025 to 20325    | 20025(1717.50MHz)   | 15MHz             | QPSK        | 1 RB / 0 RB Offset  |
|                    |                            | 20050 to 20300    | 20050(1720.00MHz)   | 20MHz             | QPSK        | 1 RB / 0 RB Offset  |
| A                  | Occupied Bandwidth         | 19975 to 20375    | 19975(1712.50MHz),<br>20175(1732.50MHz),<br>20375(1752.50MHz) | 5MHz              | QPSK, 16QAM | 25 RB / 0 RB Offset   |
|                    |                            | 20000 to 20350    | 20000(1715.00MHz),<br>20175(1732.50MHz),<br>20350(1750.00MHz) | 10MHz             | QPSK, 16QAM | 50 RB / 0 RB Offset   |
|                    |                            | 20025 to 20325    | 20025(1717.50MHz),<br>20175(1732.50MHz),<br>20325(1747.50MHz) | 15MHz             | QPSK, 16QAM | 75 RB / 0 RB Offset   |
|                    |                            | 20050 to 20300    | 20050(1720.00MHz),<br>20175(1732.50MHz),<br>20300(1745.00MHz) | 20MHz             | QPSK, 16QAM | 100 RB / 0 RB Offset  |
| A                  | Band Edge                  | 19975 to 20375    | 19975(1712.50MHz),<br>20375(1752.50MHz)                       | 5MHz              | QPSK        | 1 RB / 0 RB Offset<br>1 RB / 24 RB Offset<br>25 RB / 0 RB Offset  |
|                    |                            | 20000 to 20350    | 20000(1715.00MHz),<br>20350(1750.00MHz)                       | 10MHz             | QPSK        | 1 RB / 0 RB Offset<br>1 RB / 49 RB Offset<br>50 RB / 0 RB Offset  |
|                    |                            | 20025 to 20325    | 20025(1717.50MHz),<br>20325(1747.50MHz)                       | 15MHz             | QPSK        | 1 RB / 0 RB Offset<br>1 RB / 74 RB Offset<br>75 RB / 0 RB Offset  |
|                    |                            | 20050 to 20300    | 20050(1720.00MHz),<br>20300(1745.00MHz)                       | 20MHz             | QPSK        | 1 RB / 0 RB Offset<br>1 RB / 99 RB Offset<br>100 RB / 0 RB Offset |

| EUT Configure Mode | Test Item                    | Available Channel | Tested Channel  | Channel Bandwidth | Modulation | Mode               |
|--------------------|------------------------------|-------------------|---|-------------------|------------|--------------------|
| A                  | Conducted Emission           | 19975 to 20375    | 19975(1712.50MHz),<br>20175(1732.50MHz),<br>20375(1752.50MHz) | 5MHz              | QPSK       | 1 RB / 0 RB Offset |
|                    |                              | 20000 to 20350    | 20000(1715.00MHz),<br>20175(1732.50MHz),<br>20350(1750.00MHz) | 10MHz             | QPSK       | 1 RB / 0 RB Offset |
|                    |                              | 20025 to 20325    | 20025(1717.50MHz),<br>20175(1732.50MHz),<br>20325(1747.50MHz) | 15MHz             | QPSK       | 1 RB / 0 RB Offset |
|                    |                              | 20050 to 20300    | 20050(1720.00MHz),<br>20175(1732.50MHz),<br>20300(1745.00MHz) | 20MHz             | QPSK       | 1 RB / 0 RB Offset |
| A, B               | Radiated Emission Below 1GHz | 19975 to 20375    | 19975(1712.50MHz)   | 5MHz              | QPSK       | 1 RB / 0 RB Offset |
|                    |                              | 20000 to 20350    | 20000(1715.00MHz)   | 10MHz             | QPSK       | 1 RB / 0 RB Offset |
|                    |                              | 20025 to 20325    | 20025(1717.50MHz)   | 15MHz             | QPSK       | 1 RB / 0 RB Offset |
|                    |                              | 20050 to 20300    | 20050(1720.00MHz)   | 20MHz             | QPSK       | 1 RB / 0 RB Offset |
| A                  | Radiated Emission Above 1GHz | 19975 to 20375    | 19975(1712.50MHz),<br>20175(1732.50MHz),<br>20375(1752.50MHz) | 5MHz              | QPSK       | 1 RB / 0 RB Offset |
|                    |                              | 20000 to 20350    | 20000(1715.00MHz),<br>20175(1732.50MHz),<br>20350(1750.00MHz) | 10MHz             | QPSK       | 1 RB / 0 RB Offset |
|                    |                              | 20025 to 20325    | 20025(1717.50MHz),<br>20175(1732.50MHz),<br>20325(1747.50MHz) | 15MHz             | QPSK       | 1 RB / 0 RB Offset |
|                    |                              | 20050 to 20300    | 20050(1720.00MHz),<br>20175(1732.50MHz),<br>20300(1745.00MHz) | 20MHz             | QPSK       | 1 RB / 0 RB Offset |

**LTE Band 13**

| EUT Configure Mode | Test Item                    | Available Channel | Tested Channel   | Channel Bandwidth | Modulation  | Mode   |
|--------------------|------------------------------|-------------------|--|-------------------|-------------|--|
| A                  | Output Power                 | 23205 to 23255    | 23205(779.50MHz),<br>23230(782.00MHz),<br>23255(784.50MHz) | 5MHz              | QPSK        | 1 RB / 0 RB Offset   |
|                    |                              | 23230             | 23230(782.00MHz)   | 10MHz             | QPSK        | 1 RB / 0 RB Offset   |
| A                  | Modulation characteristics   | 23230             | 23230(782.0MHz),   | 10MHz             | QPSK        | 1 RB / 0 RB Offset   |
| A                  | Frequency Stability          | 23205 to 23255    | 23230(782.00MHz)   | 5MHz              | QPSK        | 1 RB / 0 RB Offset   |
| A                  | Emission Bandwidth           | 23205 to 23255    | 23205(779.50MHz),<br>23230(782.00MHz),<br>23255(784.50MHz) | 5MHz              | QPSK, 16QAM | 25 RB / 0 RB Offset  |
|                    |                              | 23230             | 23230(782.00MHz)   | 10MHz             | QPSK, 16QAM | 50 RB / 0 RB Offset  |
| A                  | Channel Edge                 | 23205 to 23255    | 23205(779.50MHz),<br>23255(784.50MHz)                      | 5MHz              | QPSK        | 1 RB / 0 RB Offset<br>1 RB / 24 RB Offset<br>25 RB / 0 RB Offset |
|                    |                              | 23230             | 23230(782.00MHz)   | 10MHz             | QPSK        | 1 RB / 0 RB Offset<br>1 RB / 49 RB Offset<br>50 RB / 0 RB Offset |
| A                  | Conducted Emission           | 23205 to 23255    | 23205(779.50MHz),<br>23230(782.00MHz),<br>23255(784.50MHz) | 5MHz              | QPSK        | 1 RB / 0 RB Offset   |
|                    |                              | 23230             | 23230(782.00MHz)   | 10MHz             | QPSK        | 1 RB / 0 RB Offset   |
| A, B               | Radiated Emission Below 1GHz | 23205 to 23255    | 23205(779.50MHz)   | 5MHz              | QPSK        | 1 RB / 0 RB Offset   |
|                    |                              | 23230             | 23230(782.00MHz)   | 10MHz             | QPSK        | 1 RB / 0 RB Offset   |
| A                  | Radiated Emission Above 1GHz | 23205 to 23255    | 23205(779.50MHz),<br>23230(782.00MHz),<br>23255(784.50MHz) | 5MHz              | QPSK        | 1 RB / 0 RB Offset   |
|                    |                              | 23230             | 23230(782.00MHz)   | 10MHz             | QPSK        | 1 RB / 0 RB Offset   |

**Note:**

1. For radiated emission below 1 GHz, the low, mid and high channels were pre-tested in chamber. The low channel was the worst case and chosen for final test.
2. The conducted output power for QPSK and 16QAM, measured value of QPSK is higher than 16QAM mode. Therefore, only Emission Bandwidth had been tested under QPSK and 16QAM modes, the others test items were performed under QPSK mode only.

**Test Condition:**

| Test Item                    | Environmental Conditions | Input Power            | Tested By  |
|------------------------------|--------------------------|------------------------|------------|
| Output Power                 | 24deg. C, 64%RH          | 120Vac, 60Hz           | Match Tsui |
| Modulation characteristics   | 24deg. C, 64%RH          | 120Vac, 60Hz           | Match Tsui |
| Frequency Stability          | 24deg. C, 64%RH          | 54Vdc                  | Match Tsui |
| Emission Bandwidth           | 24deg. C, 64%RH          | 120Vac, 60Hz           | Match Tsui |
| Channel Edge                 | 24deg. C, 64%RH          | 120Vac, 60Hz           | Match Tsui |
| Conducted Emission           | 24deg. C, 64%RH          | 120Vac, 60Hz           | Match Tsui |
| Radiated Emission Below 1GHz | 22deg. C, 66%RH          | 120Vac, 60Hz<br>4.5Vdc | Han Wu     |
| Radiated Emission Above 1GHz | 22deg. C, 66%RH          | 120Vac, 60Hz           | Han Wu     |

### **3.4 EUT Operating Conditions**

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

### **3.5 General Description of Applied Standards**

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 27**

**KDB 971168 D01 Power Meas License Digital Systems v03r01**

**ANSI/TIA/EIA-603-C 2004**

Note: All test items have been performed and recorded as per the above standards.

## 4 Test Types and Results

### 4.1 Output Power Measurement

#### 4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 1 watts e.i.r.p for LTE Band 4 and 3 watts e.r.p for LTE Band 13.

#### 4.1.2 Test Procedures

##### EIRP / ERP Measurement:

- a. All measurements were done at low, middle and high operational frequency range. RWB and VBW is 5MHz for LTE Mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G
- d.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ . E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15\text{dBi}$ .

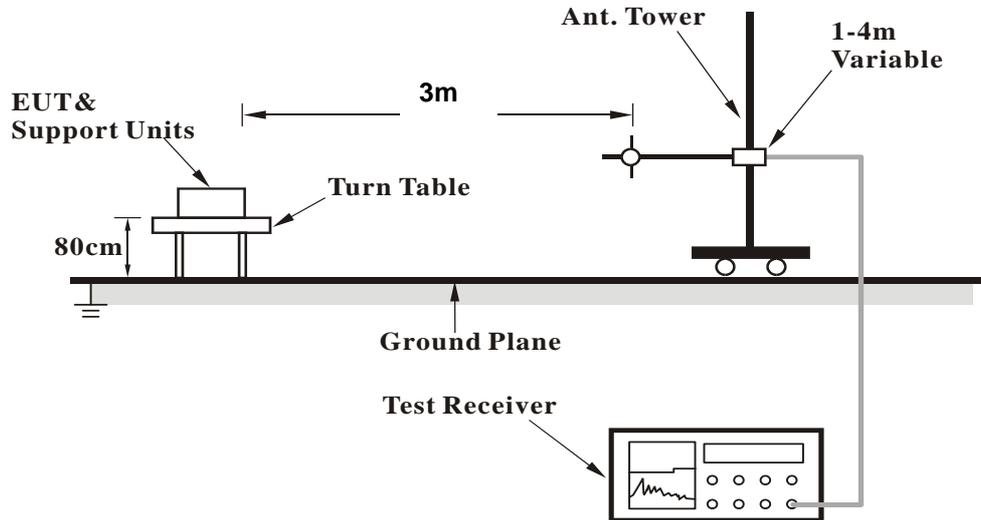
##### Conducted Power Measurement:

A power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

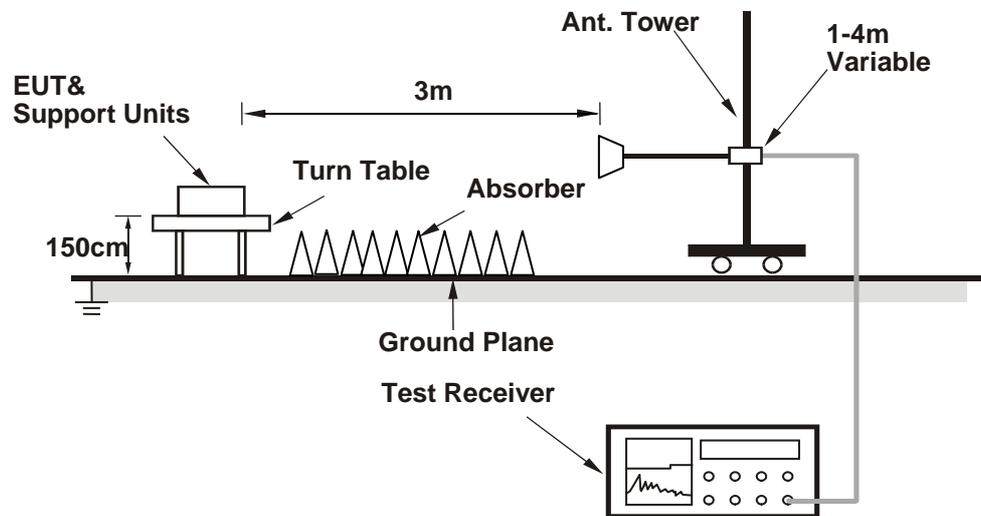
### 4.1.3 Test Setup

EIRP / ERP MEASUREMENT:

**For Radiated Emission below or equal 1GHz**



**For Radiated Emission above 1GHz**



For the actual test configuration, please refer to the attached file (Test Setup Photo).

CONDUCTED POWER MEASUREMENT:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.4 Test Results

##### Conducted Output Power (dBm)

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 16QAM        |              |               |
|-----------|---------|-----------|--------------|--------------|---------------|--------------|--------------|---------------|
|           |         |           | Low CH 19975 | Mid CH 20175 | High CH 20375 | Low CH 19975 | Mid CH 20175 | High CH 20375 |
|           |         |           | 1712.5 MHz   | 1732.5 MHz   | 1752.5 MHz    | 1712.5 MHz   | 1732.5 MHz   | 1752.5 MHz    |
| 4 / 5M    | 1       | 0         | 24.82        | 23.91        | 24.34         | 23.50        | 22.71        | 23.10         |
|           | 1       | 12        | 24.72        | 23.83        | 24.21         | 23.57        | 22.71        | 23.31         |
|           | 1       | 24        | 24.61        | 23.57        | 24.11         | 23.39        | 22.57        | 22.93         |
|           | 12      | 0         | 23.67        | 22.77        | 23.23         | 22.56        | 21.61        | 22.16         |
|           | 12      | 6         | 23.44        | 22.48        | 23.06         | 22.51        | 21.57        | 21.98         |
|           | 12      | 13        | 23.32        | 22.42        | 22.91         | 22.27        | 21.42        | 21.89         |
|           | 25      | 0         | 23.71        | 22.68        | 23.12         | 22.56        | 21.63        | 22.22         |
| Band / BW | RB Size | RB Offset | QPSK         |              |               | 16QAM        |              |               |
|           |         |           | Low CH 20000 | Mid CH 20175 | High CH 20350 | Low CH 20000 | Mid CH 20175 | High CH 20350 |
|           |         |           | 1715 MHz     | 1732.5 MHz   | 1750 MHz      | 1715 MHz     | 1732.5 MHz   | 1750 MHz      |
| 4 / 10M   | 1       | 0         | 24.84        | 23.98        | 24.40         | 23.67        | 22.74        | 23.21         |
|           | 1       | 24        | 24.75        | 23.79        | 24.28         | 23.64        | 22.72        | 23.23         |
|           | 1       | 49        | 24.55        | 23.57        | 24.07         | 23.54        | 22.54        | 22.96         |
|           | 25      | 0         | 23.75        | 22.78        | 23.31         | 22.67        | 21.60        | 22.17         |
|           | 25      | 12        | 23.54        | 22.64        | 23.09         | 22.47        | 21.48        | 22.07         |
|           | 25      | 25        | 23.44        | 22.48        | 23.02         | 22.41        | 21.44        | 21.93         |
|           | 50      | 0         | 23.67        | 22.76        | 23.26         | 22.66        | 21.73        | 22.27         |
| Band / BW | RB Size | RB Offset | QPSK         |              |               | 16QAM        |              |               |
|           |         |           | Low CH 20025 | Mid CH 20175 | High CH 20325 | Low CH 20025 | Mid CH 20175 | High CH 20325 |
|           |         |           | 1717.5 MHz   | 1732.5 MHz   | 1747.5 MHz    | 1717.5 MHz   | 1732.5 MHz   | 1747.5 MHz    |
| 4 / 15M   | 1       | 0         | 24.92        | 24.01        | 24.45         | 23.79        | 22.87        | 23.36         |
|           | 1       | 37        | 24.80        | 23.87        | 24.36         | 23.73        | 22.88        | 23.32         |
|           | 1       | 74        | 24.54        | 23.61        | 24.16         | 23.56        | 22.65        | 23.13         |
|           | 36      | 0         | 23.82        | 22.83        | 23.31         | 22.70        | 21.76        | 22.13         |
|           | 36      | 19        | 23.67        | 22.66        | 23.09         | 22.59        | 21.60        | 22.06         |
|           | 36      | 39        | 23.52        | 22.56        | 23.10         | 22.47        | 21.48        | 21.89         |
|           | 75      | 0         | 23.73        | 22.75        | 23.36         | 22.65        | 21.78        | 22.24         |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 16QAM        |              |               |
|-----------|---------|-----------|--------------|--------------|---------------|--------------|--------------|---------------|
|           |         |           | Low CH 20050 | Mid CH 20175 | High CH 20300 | Low CH 20050 | Mid CH 20175 | High CH 20300 |
|           |         |           | 1720 MHz     | 1732.5 MHz   | 1745 MHz      | 1720 MHz     | 1732.5 MHz   | 1745 MHz      |
| 4 / 20M   | 1       | 0         | 24.96        | 24.04        | 24.53         | 23.93        | 22.97        | 23.49         |
|           | 1       | 50        | 24.84        | 23.94        | 24.43         | 23.75        | 22.89        | 23.39         |
|           | 1       | 99        | 24.59        | 23.71        | 24.25         | 23.60        | 22.64        | 23.25         |
|           | 50      | 0         | 23.84        | 22.89        | 23.44         | 22.69        | 21.84        | 22.23         |
|           | 50      | 25        | 23.62        | 22.67        | 23.25         | 22.64        | 21.73        | 22.19         |
|           | 50      | 50        | 23.57        | 22.62        | 23.14         | 22.51        | 21.63        | 22.09         |
|           | 100     | 0         | 23.78        | 22.85        | 23.31         | 22.78        | 21.84        | 22.36         |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 16QAM        |              |               |
|-----------|---------|-----------|--------------|--------------|---------------|--------------|--------------|---------------|
|           |         |           | Low CH 23205 | Mid CH 23230 | High CH 23255 | Low CH 23205 | Mid CH 23230 | High CH 23255 |
|           |         |           | 779.5 MHz    | 782 MHz      | 784.5 MHz     | 779.5 MHz    | 782 MHz      | 784.5 MHz     |
| 13 / 5M   | 1       | 0         | 22.93        | 23.01        | 22.95         | 21.94        | 22.02        | 21.91         |
|           | 1       | 12        | 22.89        | 22.94        | 22.91         | 21.81        | 21.88        | 21.80         |
|           | 1       | 24        | 22.68        | 22.78        | 22.63         | 21.64        | 21.80        | 21.61         |
|           | 12      | 0         | 21.93        | 22.00        | 21.99         | 20.89        | 21.02        | 20.93         |
|           | 12      | 6         | 21.89        | 21.95        | 21.83         | 20.83        | 20.95        | 20.88         |
|           | 12      | 13        | 21.83        | 21.92        | 21.78         | 20.77        | 20.91        | 20.81         |
|           | 25      | 0         | 21.78        | 21.88        | 21.74         | 20.75        | 20.89        | 20.76         |

| Band / BW | RB Size | RB Offset | QPSK         |  |  | 16QAM        |  |  |
|-----------|---------|-----------|--------------|--|--|--------------|--|--|
|           |         |           | Mid CH 23230 |  |  | Mid CH 23230 |  |  |
|           |         |           | 782MHz       |  |  | 782MHz       |  |  |
| 13 / 10M  | 1       | 0         | 22.12        |  |  | 21.09        |  |  |
|           | 1       | 24        | 22.06        |  |  | 21.02        |  |  |
|           | 1       | 49        | 22.03        |  |  | 20.92        |  |  |
|           | 25      | 0         | 21.21        |  |  | 20.02        |  |  |
|           | 25      | 12        | 21.18        |  |  | 19.92        |  |  |
|           | 25      | 25        | 21.15        |  |  | 19.89        |  |  |
|           | 50      | 0         | 21.11        |  |  | 19.82        |  |  |

EIRP Power (dBm)

LTE Band 4

Channel Bandwidth: 5MHz

| MODE  |             | TX channel 19975 |                       |                        |            |             |             |
|---|-------------|------------------|-----------------------|------------------------|------------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1712.50     | -15.7            | 22.4                  | 0.7                    | 23.1       | 30.0        | -6.9        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1712.50     | -14.5            | 23.4                  | 0.7                    | 24.1       | 30.0        | -5.9        |

| MODE  |             | TX channel 20175 |                       |                        |             |             |             |
|---|-------------|------------------|-----------------------|------------------------|-------------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |             |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm)  | Limit (dBm) | Margin (dB) |
| 1   | 1732.50     | -15.3            | 23.1                  | 0.6                    | 23.7        | 30.0        | -6.3        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |             |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm)  | Limit (dBm) | Margin (dB) |
| 1   | 1732.50     | -13.9            | 24.4                  | 0.6                    | <b>25.0</b> | 30.0        | -5.0        |

| MODE  |             | TX channel 20375 |                       |                        |            |             |             |
|---|-------------|------------------|-----------------------|------------------------|------------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1752.50     | -15.7            | 23.1                  | 0.5                    | 23.6       | 30.0        | -6.4        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1752.50     | -14.5            | 24.3                  | 0.5                    | 24.8       | 30.0        | -5.2        |

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

Channel Bandwidth: 10MHz

| MODE  |             | TX channel 20000 |                       |                        |             |             |             |
|---|-------------|------------------|-----------------------|------------------------|-------------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |             |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm)  | Limit (dBm) | Margin (dB) |
| 1   | 1715.00     | -15.7            | 22.4                  | 0.7                    | 23.1        | 30.0        | -6.9        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |             |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm)  | Limit (dBm) | Margin (dB) |
| 1   | 1715.00     | -14.0            | 23.9                  | 0.7                    | <b>24.6</b> | 30.0        | -5.4        |

| MODE  |             | TX channel 20175 |                       |                        |            |             |             |
|---|-------------|------------------|-----------------------|------------------------|------------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1732.50     | -15.8            | 22.6                  | 0.6                    | 23.2       | 30.0        | -6.8        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1732.50     | -14.5            | 23.8                  | 0.6                    | 24.4       | 30.0        | -5.6        |

| MODE  |             | TX channel 20350 |                       |                        |            |             |             |
|---|-------------|------------------|-----------------------|------------------------|------------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1750.00     | -15.8            | 23.0                  | 0.5                    | 23.5       | 30.0        | -6.5        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1750.00     | -15.3            | 23.5                  | 0.5                    | 24.0       | 30.0        | -6.0        |

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

Channel Bandwidth: 15MHz

| MODE  |             | TX channel 20025 |                       |                        |             |             |             |
|---|-------------|------------------|-----------------------|------------------------|-------------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |             |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm)  | Limit (dBm) | Margin (dB) |
| 1   | 1717.50     | -14.5            | 23.6                  | 0.7                    | 24.3        | 30.0        | -5.7        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |             |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm)  | Limit (dBm) | Margin (dB) |
| 1   | 1717.50     | -12.8            | 25.2                  | 0.7                    | <b>25.9</b> | 30.0        | -4.1        |

| MODE  |             | TX channel 20175 |                       |                        |            |             |             |
|---|-------------|------------------|-----------------------|------------------------|------------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1732.50     | -15.0            | 23.4                  | 0.6                    | 24.0       | 30.0        | -6.0        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1732.50     | -14.0            | 24.3                  | 0.6                    | 24.9       | 30.0        | -5.1        |

| MODE  |             | TX channel 20325 |                       |                        |            |             |             |
|---|-------------|------------------|-----------------------|------------------------|------------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1747.50     | -14.8            | 23.9                  | 0.5                    | 24.4       | 30.0        | -5.6        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1747.50     | -14.0            | 24.7                  | 0.5                    | 25.2       | 30.0        | -4.8        |

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

Channel Bandwidth: 20MHz

| MODE  |             | TX channel 20050 |                       |                        |            |             |             |
|---|-------------|------------------|-----------------------|------------------------|------------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1720.00     | -14.7            | 23.5                  | 0.7                    | 24.2       | 30.0        | -5.8        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1720.00     | -14.1            | 23.9                  | 0.7                    | 24.6       | 30.0        | -5.4        |

| MODE  |             | TX channel 20175 |                       |                        |            |             |             |
|---|-------------|------------------|-----------------------|------------------------|------------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1732.50     | -15.0            | 23.4                  | 0.6                    | 24.0       | 30.0        | -6.0        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1732.50     | -14.4            | 23.9                  | 0.6                    | 24.5       | 30.0        | -5.5        |

| MODE  |             | TX channel 20300 |                       |                        |             |             |             |
|---|-------------|------------------|-----------------------|------------------------|-------------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |             |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm)  | Limit (dBm) | Margin (dB) |
| 1   | 1745.00     | -14.5            | 24.2                  | 0.5                    | 24.7        | 30.0        | -5.3        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |             |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm)  | Limit (dBm) | Margin (dB) |
| 1   | 1745.00     | -14.0            | 24.7                  | 0.5                    | <b>25.2</b> | 30.0        | -4.8        |

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 13

Channel Bandwidth: 5MHz

| MODE  |             | TX channel 23205 |                       |                        |             |             |             |
|---|-------------|------------------|-----------------------|------------------------|-------------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |             |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm)   | Limit (dBm) | Margin (dB) |
| 1   | 779.50      | -8.7             | 17.3                  | 4.0                    | 21.3        | 34.8        | -13.5       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |             |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm)   | Limit (dBm) | Margin (dB) |
| 1   | 779.50      | -7.2             | 20.9                  | 4.0                    | <b>24.9</b> | 34.8        | -9.9        |

| MODE  |             | TX channel 23230 |                       |                        |           |             |             |
|---|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 782.00      | -8.2             | 17.8                  | 4.0                    | 21.8      | 34.8        | -13.0       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 782.00      | -7.7             | 20.2                  | 4.0                    | 24.2      | 34.8        | -10.6       |

| MODE  |             | TX channel 23255 |                       |                        |           |             |             |
|---|-------------|------------------|-----------------------|------------------------|-----------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |           |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 784.50      | -8.2             | 17.9                  | 4.0                    | 21.9      | 34.8        | -12.9       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |           |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 784.50      | -7.2             | 20.7                  | 4.0                    | 24.7      | 34.8        | -10.1       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

Channel Bandwidth: 10MHz

| MODE  |             | TX channel 23230 |                       |                        |             |             |             |
|---|-------------|------------------|-----------------------|------------------------|-------------|-------------|-------------|
| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                  |                       |                        |             |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm)   | Limit (dBm) | Margin (dB) |
| 1   | 782.00      | -8.4             | 17.6                  | 4.0                    | 21.6        | 34.8        | -13.2       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                  |                       |                        |             |             |             |
| No.   | Freq. (MHz) | Reading (dBm)    | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm)   | Limit (dBm) | Margin (dB) |
| 1   | 782.00      | -7.6             | 20.3                  | 4.0                    | <b>24.3</b> | 34.8        | -10.5       |

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

## 4.2 Modulation Characteristics Measurement

### 4.2.1 Limits of Modulation Characteristics

N/A

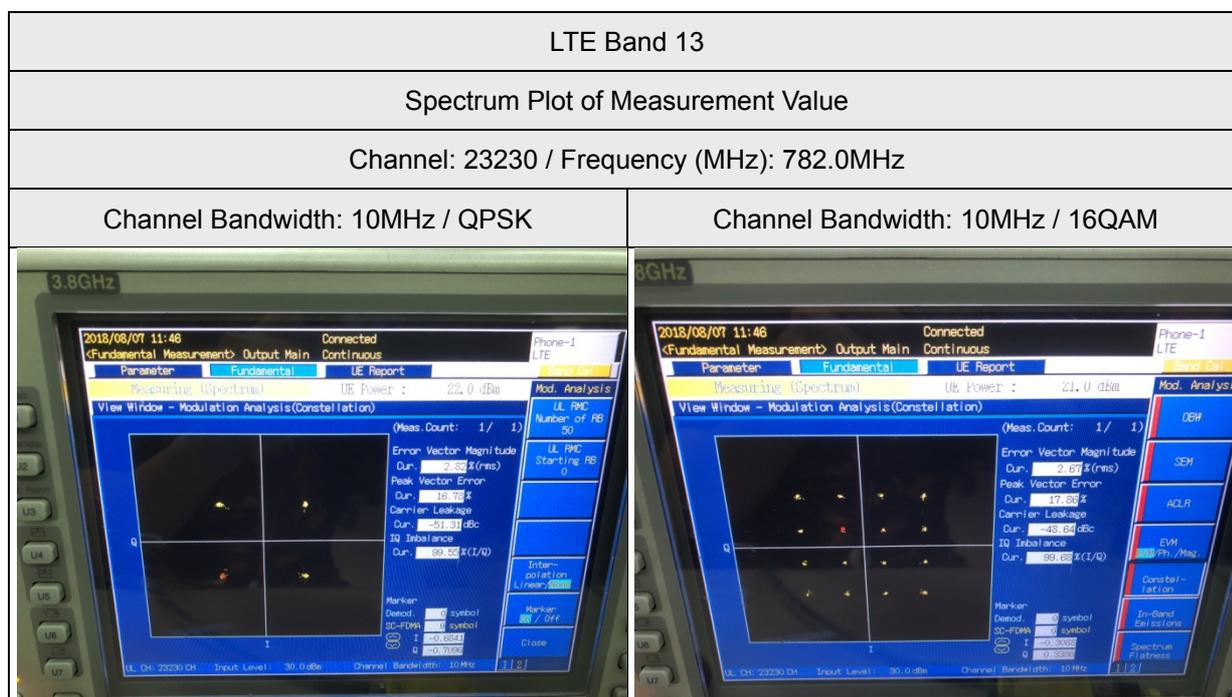
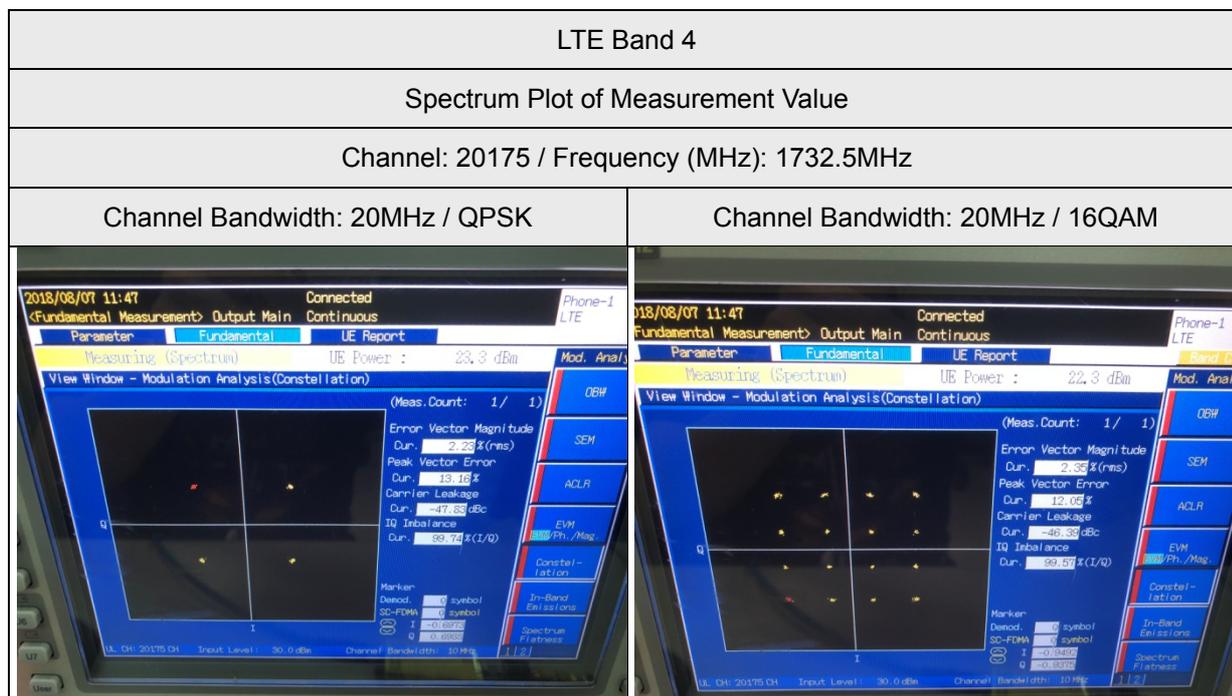
### 4.2.2 Test Procedure

Connect the EUT to Communication Simulator via the antenna connector, the frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

### 4.2.3 Test Setup



#### 4.2.4 Test Results



### 4.3 Frequency Stability Measurement

#### 4.3.1 Limits of Frequency Stability Measurement

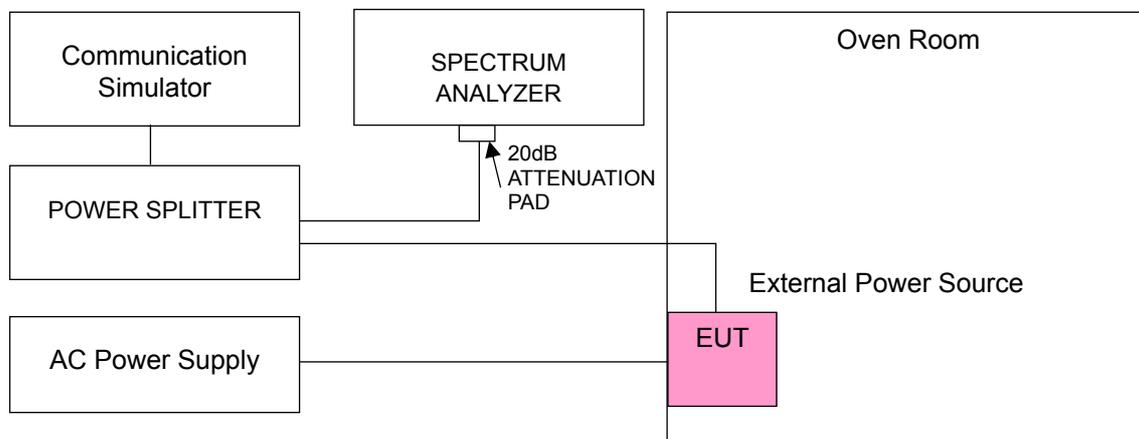
According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that "The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT  $-30^{\circ}\text{C} \sim 50^{\circ}\text{C}$ .

#### 4.3.2 Test Procedure

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the AC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

**Note:** The frequency error was recorded frequency error from the communication simulator.

#### 4.3.3 Test Setup



#### 4.3.4 Test Results

##### Frequency Error vs. Voltage

| Voltage (Volts) | Frequency Error (ppm) |       |       |       |             |       | Limit (ppm) |
|-----------------|-----------------------|-------|-------|-------|-------------|-------|-------------|
|                 | LTE Band 4            |       |       |       | LTE Band 13 |       |             |
|                 | 5MHz                  | 10MHz | 15MHz | 20MHz | 5MHz        | 10MHz |             |
| 54              | 0.001                 | 0.001 | 0.002 | 0.001 | 0.003       | 0.003 | 2.5         |
| 45.9            | 0.001                 | 0.002 | 0.001 | 0.001 | 0.001       | 0.002 | 2.5         |
| 62.1            | 0.001                 | 0.002 | 0.002 | 0.001 | 0.003       | 0.005 | 2.5         |

Note: The applicant defined the normal working voltage is from 45.9Vdc to 62.1Vdc.

##### Frequency Error vs. Temperature

| Voltage (Volts) | Frequency Error (ppm) |        |        |        |             |        | Limit (ppm) |
|-----------------|-----------------------|--------|--------|--------|-------------|--------|-------------|
|                 | LTE Band 4            |        |        |        | LTE Band 13 |        |             |
|                 | 5MHz                  | 10MHz  | 15MHz  | 20MHz  | 5MHz        | 10MHz  |             |
| -30             | 0.001                 | 0.002  | 0.002  | 0.002  | 0.002       | 0.004  | 2.5         |
| -20             | 0.002                 | 0.001  | 0.002  | 0.001  | 0.002       | 0.002  | 2.5         |
| -10             | 0.001                 | 0.002  | 0.002  | 0.002  | 0.004       | 0.002  | 2.5         |
| 0               | 0.001                 | 0.002  | 0.001  | 0.001  | 0.005       | 0.003  | 2.5         |
| 10              | 0.002                 | 0.002  | 0.002  | 0.002  | 0.002       | 0.005  | 2.5         |
| 20              | -0.001                | -0.002 | -0.002 | -0.001 | -0.003      | -0.005 | 2.5         |
| 30              | -0.001                | -0.001 | -0.002 | -0.002 | -0.004      | -0.002 | 2.5         |
| 40              | -0.001                | -0.002 | -0.002 | -0.002 | -0.005      | -0.003 | 2.5         |
| 50              | -0.001                | -0.002 | -0.002 | -0.002 | -0.002      | -0.003 | 2.5         |

## 4.4 Emission Bandwidth Measurement

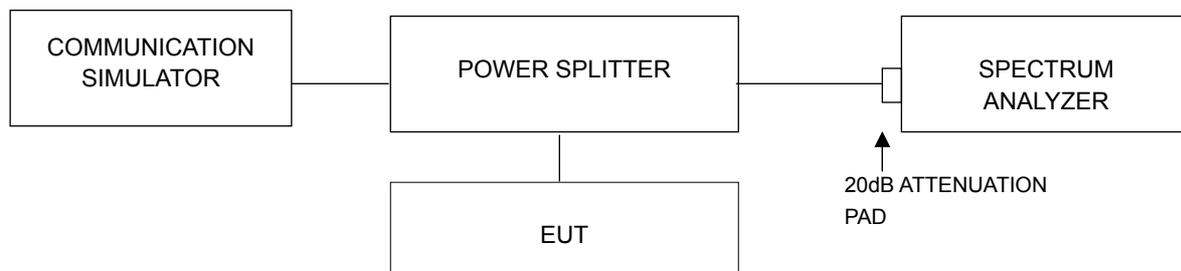
### 4.4.1 Limits of Emission Bandwidth Measurement

According to FCC 27.53(m)(6) specified that emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

### 4.4.2 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW = 30kHz and VBW = 100kHz (Channel Bandwidth: 1.4MHz), RBW = 51kHz and VBW = 150kHz (Channel Bandwidth: 3MHz and 5MHz), RBW = 100kHz and VBW = 300kHz (Channel Bandwidth: 10MHz), RBW = 200kHz and VBW = 620kHz (Channel Bandwidth: 15MHz) and RBW = 430kHz and VBW = 1.2MHz (Channel Bandwidth: 20MHz). The 26dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 26dB.

### 4.4.3 Test Setup



#### 4.4.4 Test Result

##### LTE Band 4

| Channel Bandwidth: 5MHz |                 |                       |       |                          |       |
|-------------------------|-----------------|-----------------------|-------|--------------------------|-------|
| Channel                 | Frequency (MHz) | 26dBc Bandwidth (MHz) |       | Occupied Bandwidth (MHz) |       |
|                         |                 | QPSK                  | 16QAM | QPSK                     | 16QAM |
| 19975                   | 1712.5          | 4.766                 | 4.782 | 4.489                    | 4.490 |
| 20175                   | 1732.5          | 4.767                 | 4.773 | 4.486                    | 4.489 |
| 20375                   | 1752.5          | 4.766                 | 4.780 | 4.487                    | 4.490 |

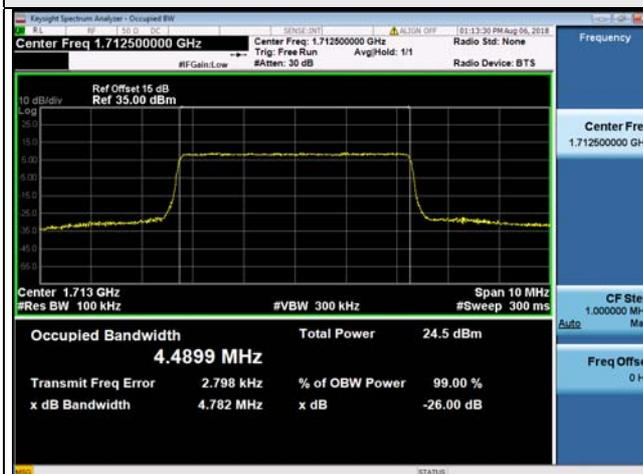
| Channel Bandwidth: 10MHz |                 |                       |       |                          |       |
|--------------------------|-----------------|-----------------------|-------|--------------------------|-------|
| Channel                  | Frequency (MHz) | 26dBc Bandwidth (MHz) |       | Occupied Bandwidth (MHz) |       |
|                          |                 | QPSK                  | 16QAM | QPSK                     | 16QAM |
| 20000                    | 1715.0          | 9.496                 | 9.500 | 8.973                    | 8.968 |
| 20175                    | 1732.5          | 9.499                 | 9.490 | 8.961                    | 8.965 |
| 20350                    | 1750.0          | 9.483                 | 9.486 | 8.969                    | 8.974 |

| Channel Bandwidth: 15MHz |                 |                       |        |                          |        |
|--------------------------|-----------------|-----------------------|--------|--------------------------|--------|
| Channel                  | Frequency (MHz) | 26dBc Bandwidth (MHz) |        | Occupied Bandwidth (MHz) |        |
|                          |                 | QPSK                  | 16QAM  | QPSK                     | 16QAM  |
| 20025                    | 1717.5          | 14.249                | 14.251 | 13.494                   | 13.478 |
| 20175                    | 1732.5          | 14.249                | 14.254 | 13.471                   | 13.469 |
| 20325                    | 1747.5          | 14.250                | 14.241 | 13.489                   | 13.483 |

| Channel Bandwidth: 20MHz |                 |                       |        |                          |        |
|--------------------------|-----------------|-----------------------|--------|--------------------------|--------|
| Channel                  | Frequency (MHz) | 26dBc Bandwidth (MHz) |        | Occupied Bandwidth (MHz) |        |
|                          |                 | QPSK                  | 16QAM  | QPSK                     | 16QAM  |
| 20050                    | 1720.0          | 19.006                | 19.035 | 17.949                   | 17.970 |
| 20175                    | 1732.5          | 19.017                | 19.014 | 17.917                   | 17.939 |
| 20300                    | 1745.0          | 19.018                | 19.022 | 17.952                   | 17.974 |

**26dBc Bandwidth**  
**Spectrum Plot of Worst Value**

**5MHz / 16QAM**



**10MHz / 16QAM**



**15MHz / 16QAM**

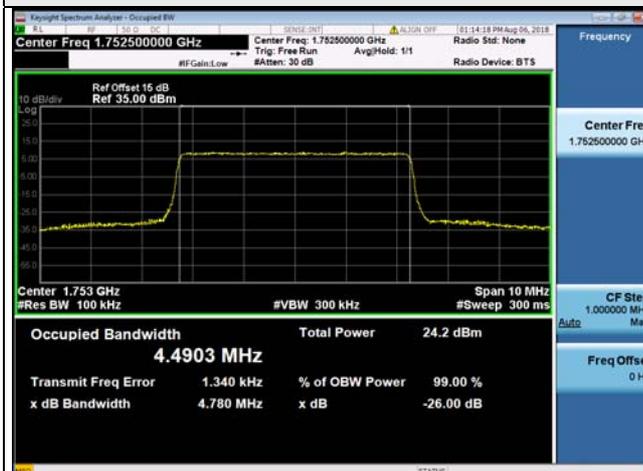


**20MHz / 16QAM**



**Occupied Bandwidth**  
**Spectrum Plot of Worst Value**

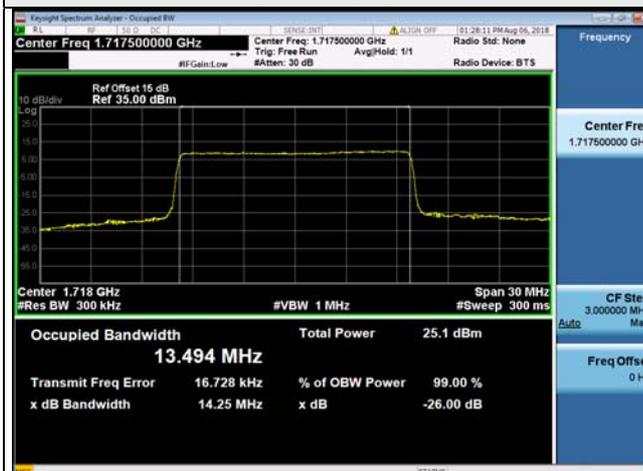
**5MHz / 16QAM**



**10MHz / 16QAM**



**15MHz / QPSK**



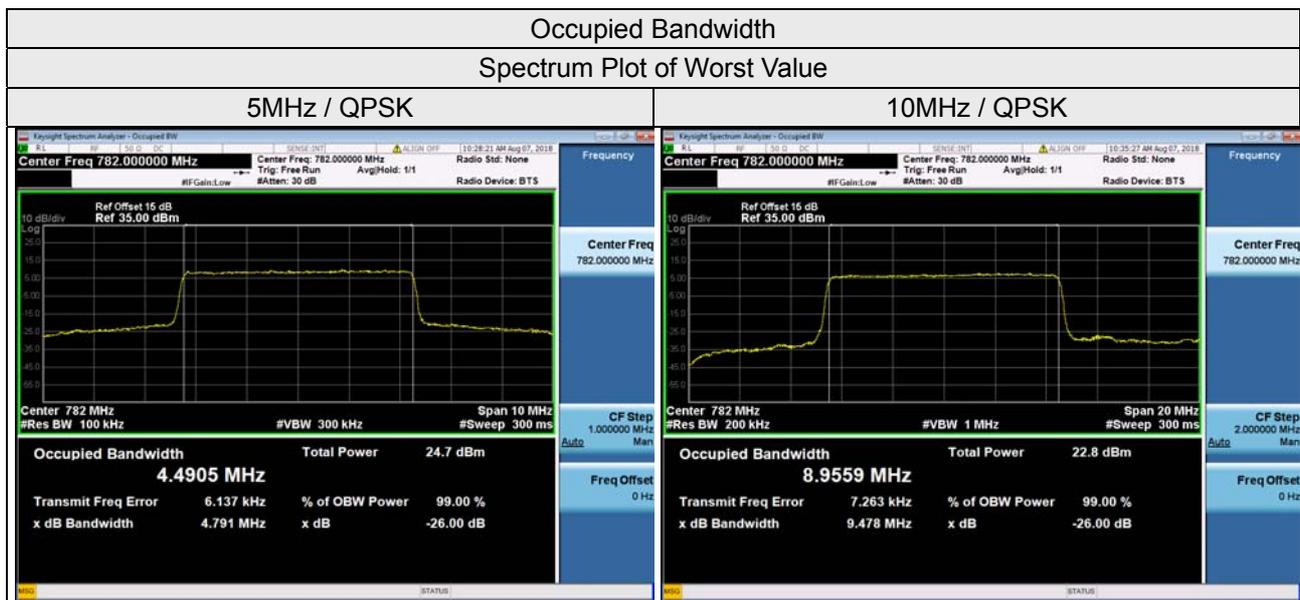
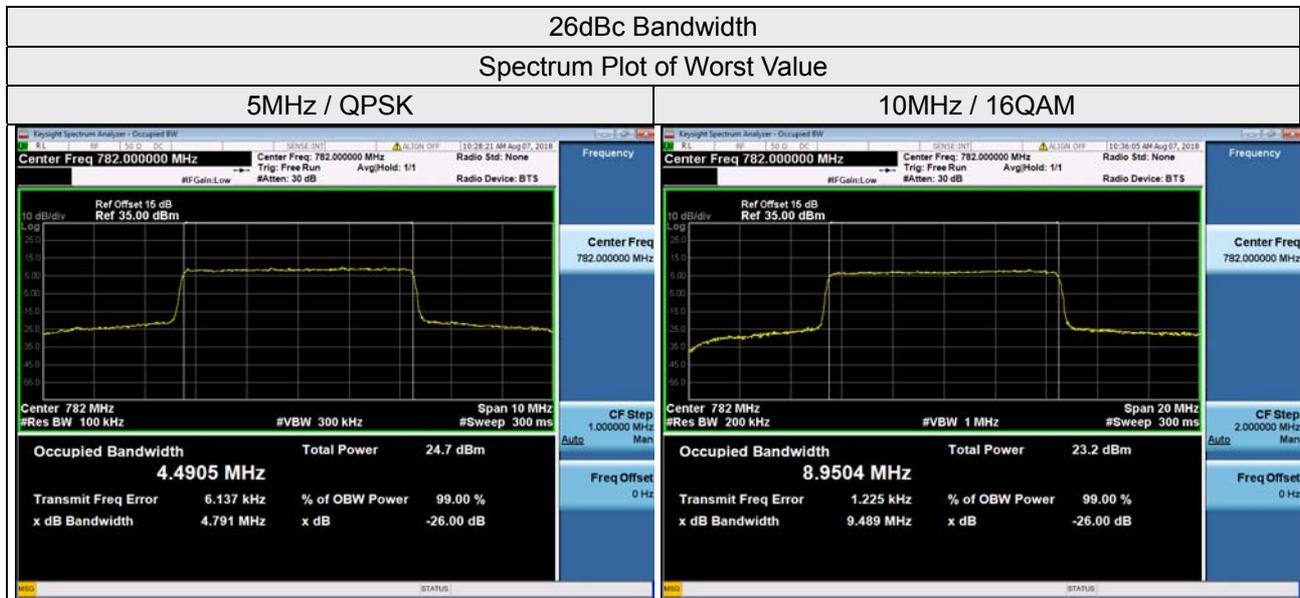
**20MHz / 16QAM**



LTE Band 13

| Channel Bandwidth: 5MHz |                 |                       |       |                          |       |
|-------------------------|-----------------|-----------------------|-------|--------------------------|-------|
| Channel                 | Frequency (MHz) | 26dBc Bandwidth (MHz) |       | Occupied Bandwidth (MHz) |       |
|                         |                 | QPSK                  | 16QAM | QPSK                     | 16QAM |
| 23205                   | 779.5           | 4.778                 | 4.766 | 4.487                    | 4.487 |
| 23230                   | 782.0           | 4.791                 | 4.775 | 4.491                    | 4.490 |
| 23255                   | 784.5           | 4.768                 | 4.763 | 4.481                    | 4.483 |

| Channel Bandwidth: 10MHz |                 |                       |       |                          |       |
|--------------------------|-----------------|-----------------------|-------|--------------------------|-------|
| Channel                  | Frequency (MHz) | 26dBc Bandwidth (MHz) |       | Occupied Bandwidth (MHz) |       |
|                          |                 | QPSK                  | 16QAM | QPSK                     | 16QAM |
| 23230                    | 782.0           | 9.478                 | 9.489 | 8.956                    | 8.950 |



## 4.5 Channel Edge Measurement

### 4.5.1 Limits of Band Edge Measurement

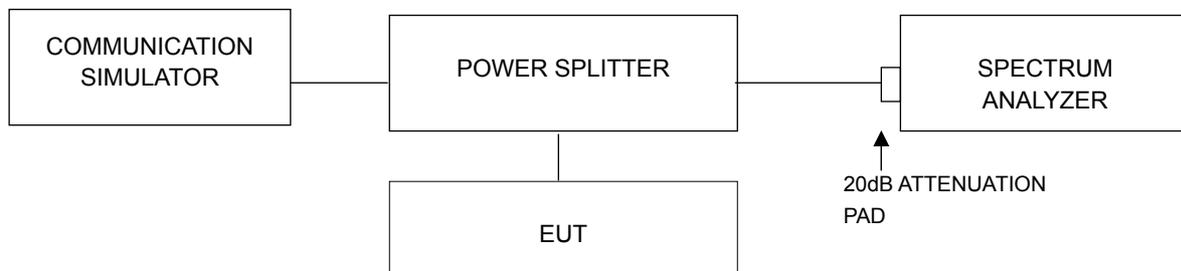
For LTE Band 4

According to FCC 27.53(h) for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 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.

For LTE Band 13

According to FCC 27.53(c) (2) for 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.

### 4.5.2 Test Setup



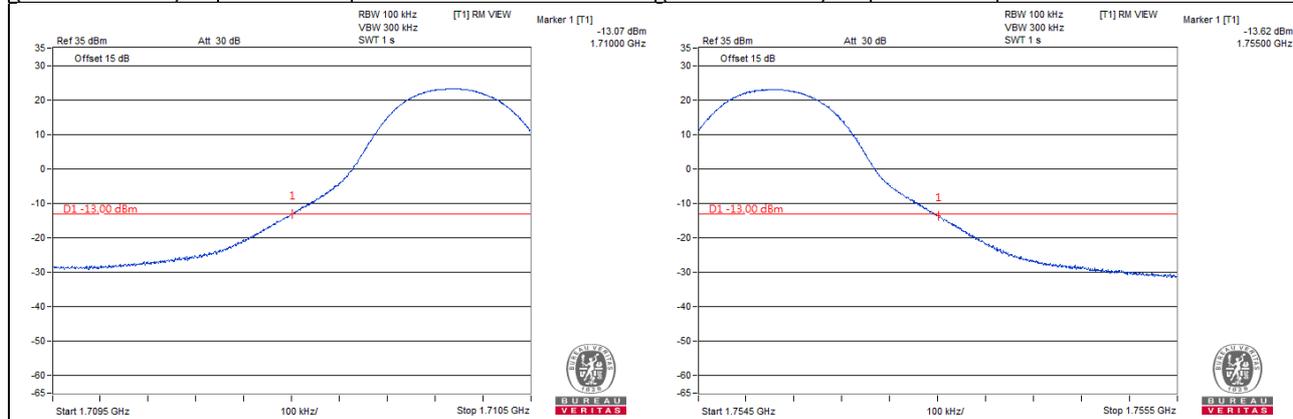
### 4.5.3 Test Procedures

- The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels: low, middle and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RBW = 51kHz and VBW = 150kHz (Channel Bandwidth: 5MHz), RBW = 100kHz and VBW = 300kHz (Channel Bandwidth: 10MHz), RBW = 200kHz and VBW = 620kHz (Channel Bandwidth: 15MHz) and RBW = 430kHz and VBW = 1.2MHz (Channel Bandwidth: 20MHz).
- Record the max trace plot into the test report.

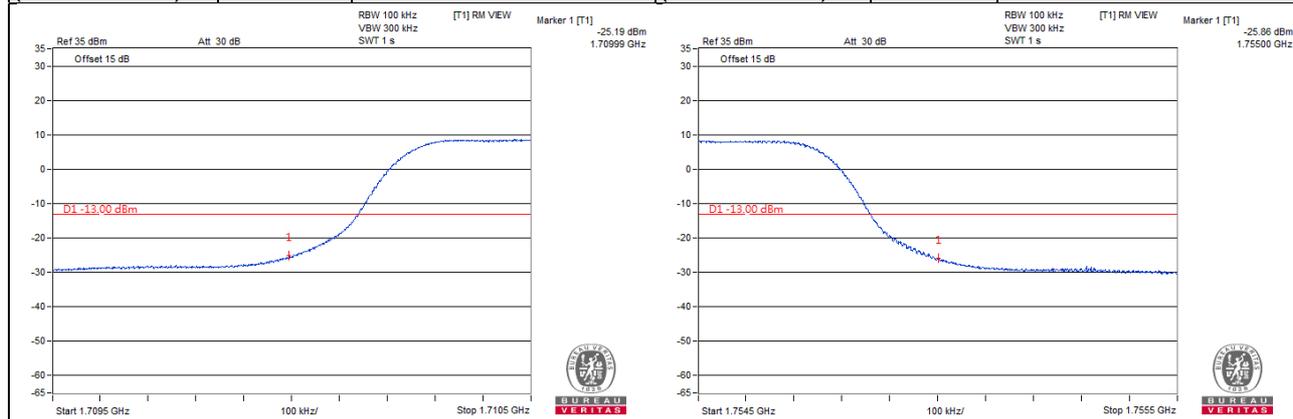
### 4.5.4 Test Results

#### LTE Band 4

|                               |      |                    |                               |      |                     |
|-------------------------------|------|--------------------|-------------------------------|------|---------------------|
| Channel Bandwidth: 5MHz       |      |                    |                               |      |                     |
| Channel 19975<br>(1712.50MHz) | QPSK | 1 RB / 0 RB Offset | Channel 20375<br>(1752.50MHz) | QPSK | 1 RB / 24 RB Offset |



|                               |      |                     |                               |      |                     |
|-------------------------------|------|---------------------|-------------------------------|------|---------------------|
| Channel 19975<br>(1712.50MHz) | QPSK | 25 RB / 0 RB Offset | Channel 20375<br>(1752.50MHz) | QPSK | 25 RB / 0 RB Offset |
|-------------------------------|------|---------------------|-------------------------------|------|---------------------|



**Channel Bandwidth: 10MHz**

**Channel 20000  
(1715.00MHz)**

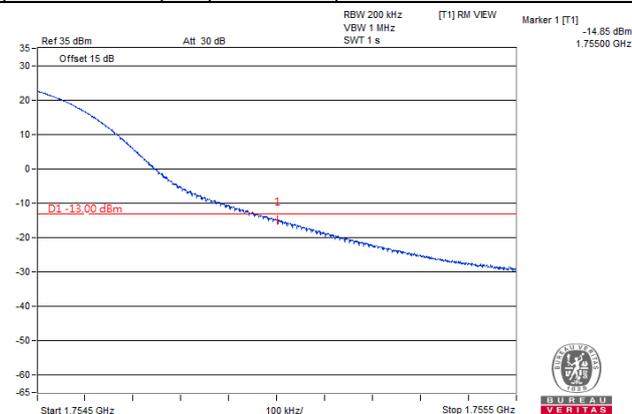
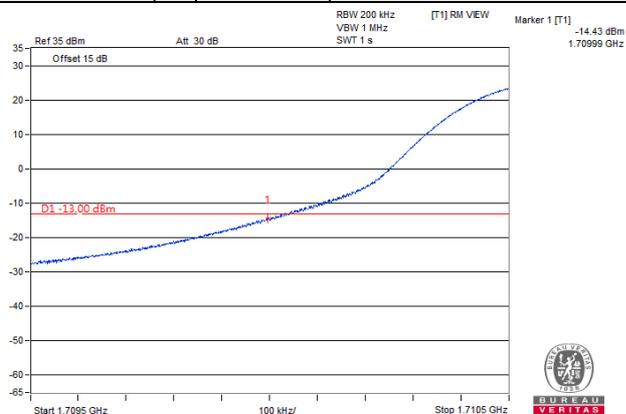
**QPSK**

**1 RB / 0 RB Offset**

**Channel 20350  
(1750.00MHz)**

**QPSK**

**1 RB / 49 RB Offset**



**Channel 20000  
(1715.00MHz)**

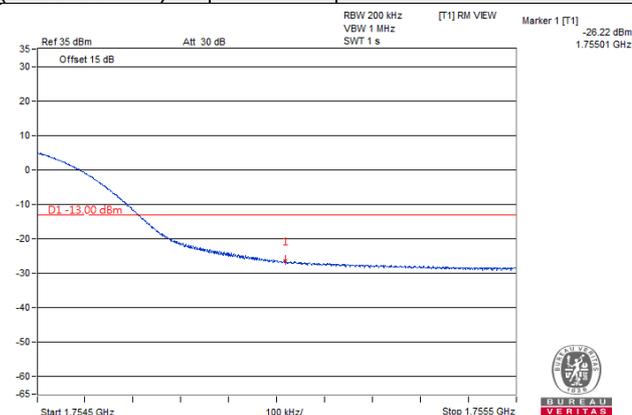
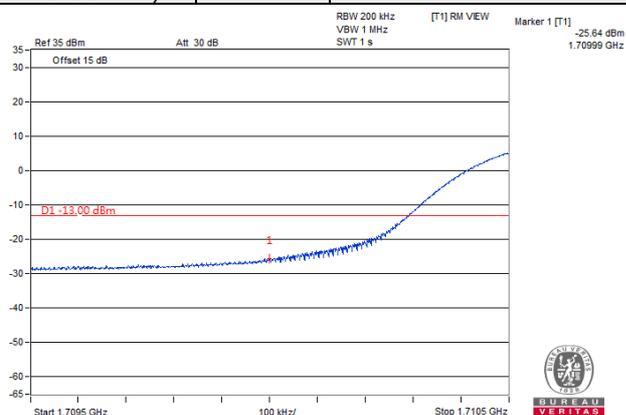
**QPSK**

**50 RB / 0 RB Offset**

**Channel 20350  
(1750.00MHz)**

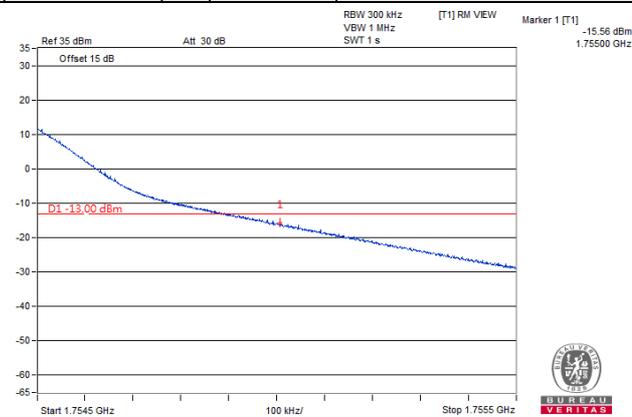
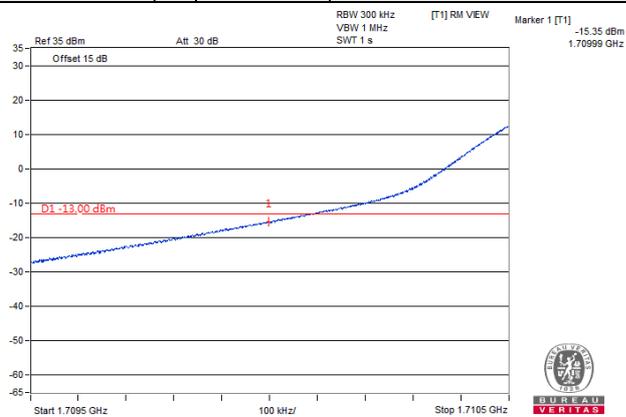
**QPSK**

**50 RB / 0 RB Offset**

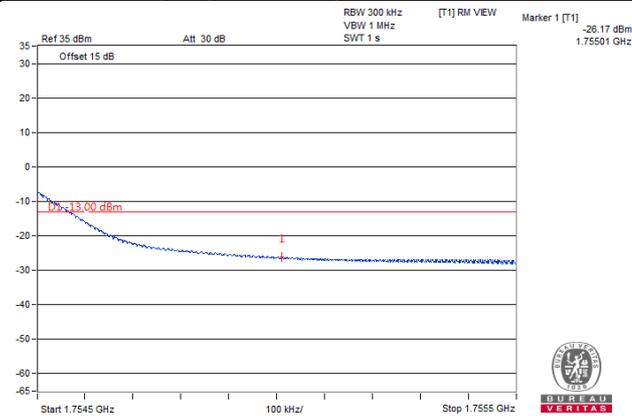
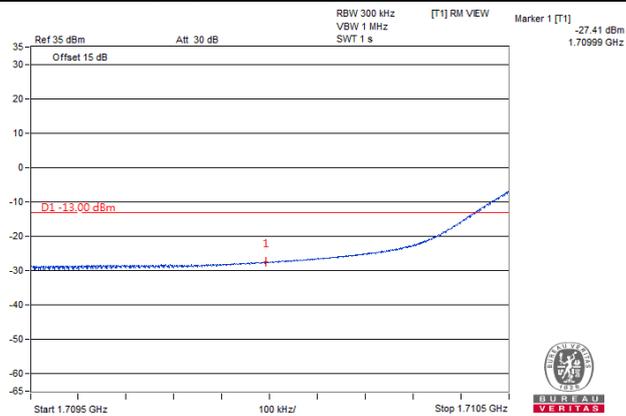


**Channel Bandwidth: 15MHz**

|                                       |             |                           |                                       |             |                            |
|---------------------------------------|-------------|---------------------------|---------------------------------------|-------------|----------------------------|
| <b>Channel 20025<br/>(1717.50MHz)</b> | <b>QPSK</b> | <b>1 RB / 0 RB Offset</b> | <b>Channel 20325<br/>(1747.50MHz)</b> | <b>QPSK</b> | <b>1 RB / 74 RB Offset</b> |
|---------------------------------------|-------------|---------------------------|---------------------------------------|-------------|----------------------------|



|                                       |             |                            |                                       |             |                            |
|---------------------------------------|-------------|----------------------------|---------------------------------------|-------------|----------------------------|
| <b>Channel 20025<br/>(1717.50MHz)</b> | <b>QPSK</b> | <b>75 RB / 0 RB Offset</b> | <b>Channel 20325<br/>(1747.50MHz)</b> | <b>QPSK</b> | <b>75 RB / 0 RB Offset</b> |
|---------------------------------------|-------------|----------------------------|---------------------------------------|-------------|----------------------------|



Channel Bandwidth: 20MHz

Channel 20050  
(1720.00MHz)

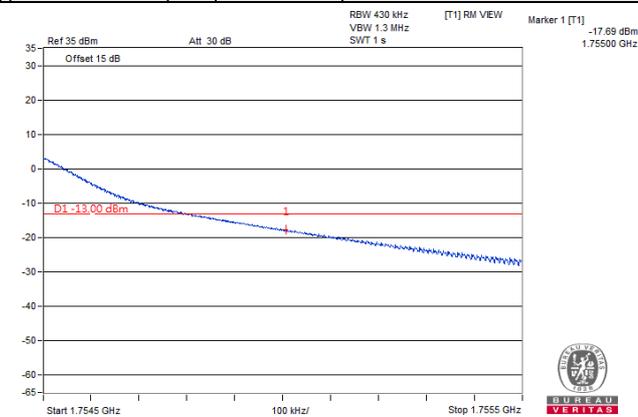
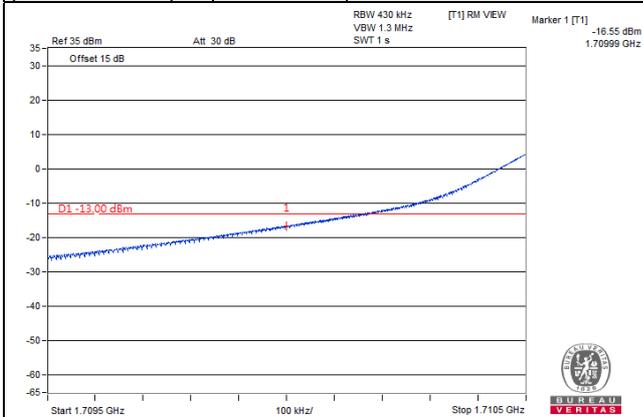
QPSK

1 RB / 0 RB Offset

Channel 20300  
(1745.00MHz)

QPSK

1 RB / 99 RB Offset



Channel 20050  
(1720.00MHz)

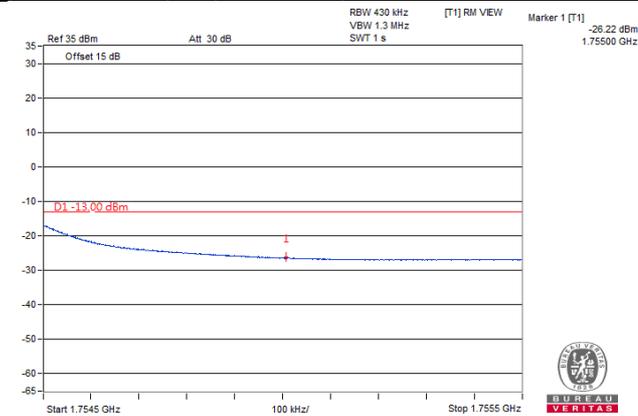
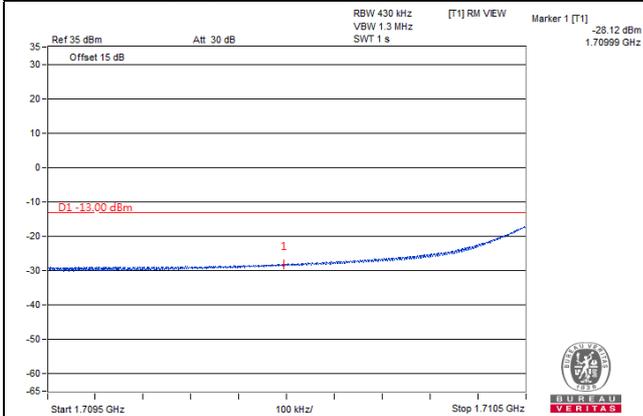
QPSK

100 RB / 0 RB Offset

Channel 20300  
(1745.00MHz)

QPSK

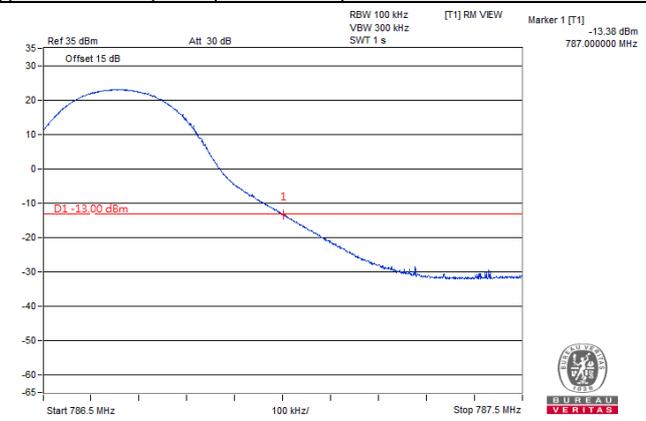
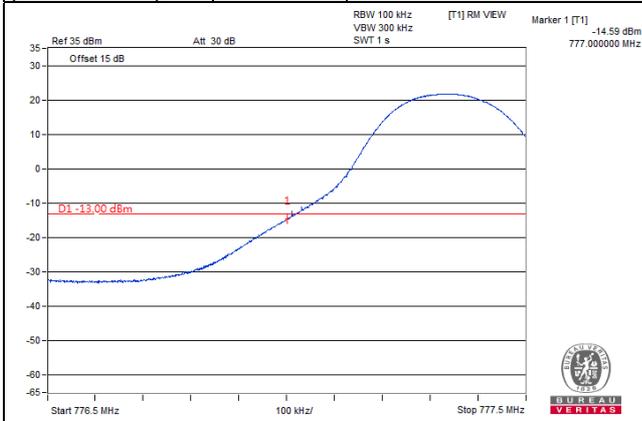
100 RB / 0 RB Offset



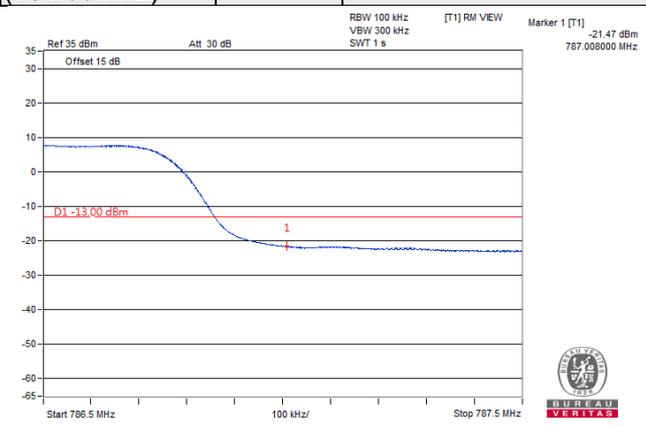
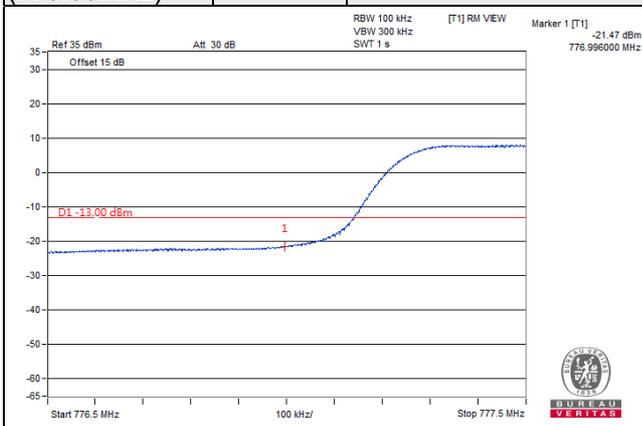
LTE Band 13

Channel Bandwidth: 5MHz

|                              |      |                    |                              |      |                     |
|------------------------------|------|--------------------|------------------------------|------|---------------------|
| Channel 23205<br>(779.50MHz) | QPSK | 1 RB / 0 RB Offset | Channel 23255<br>(784.50MHz) | QPSK | 1 RB / 24 RB Offset |
|------------------------------|------|--------------------|------------------------------|------|---------------------|



|                              |      |                     |                              |      |                     |
|------------------------------|------|---------------------|------------------------------|------|---------------------|
| Channel 23205<br>(779.50MHz) | QPSK | 25 RB / 0 RB Offset | Channel 23255<br>(784.50MHz) | QPSK | 25 RB / 0 RB Offset |
|------------------------------|------|---------------------|------------------------------|------|---------------------|



Channel Bandwidth: 10MHz

Channel 23230  
(782.00MHz)

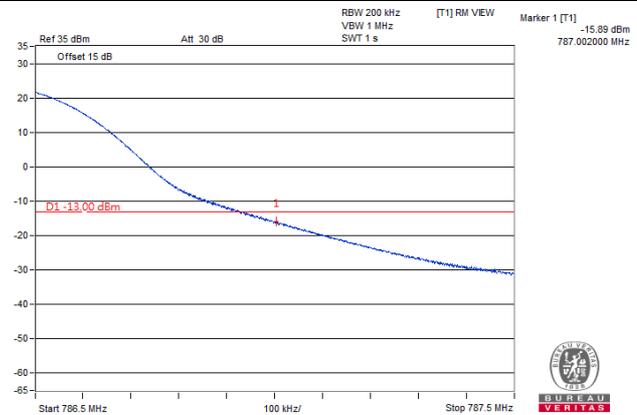
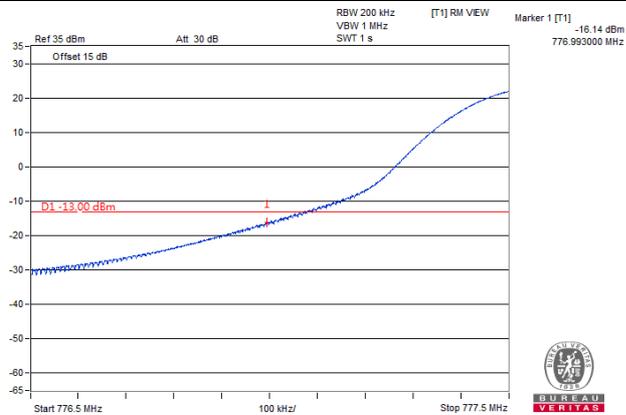
QPSK

1 RB / 0 RB Offset

Channel 23230  
(782.00MHz)

QPSK

1 RB / 49 RB Offset



Channel 23230  
(782.00MHz)

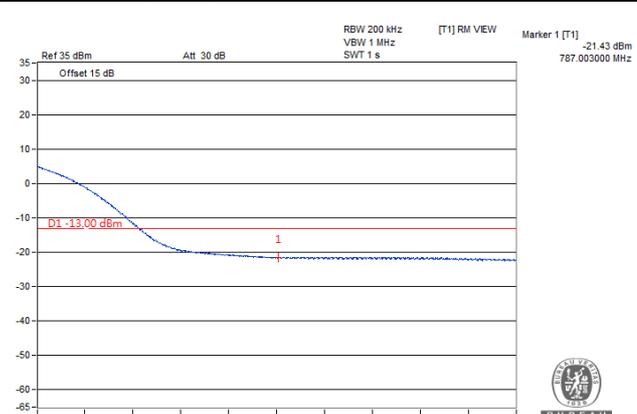
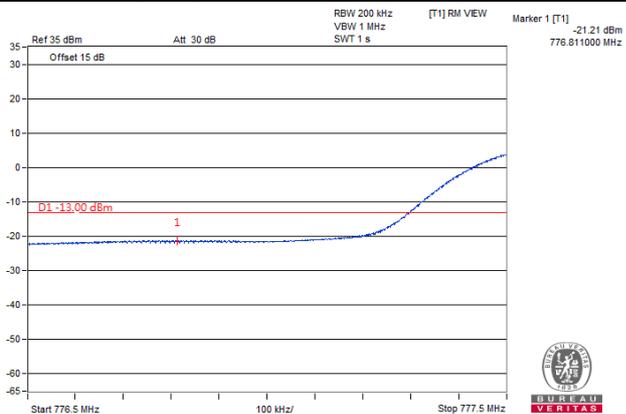
QPSK

50 RB / 0 RB Offset

Channel 23230  
(782.00MHz)

QPSK

50 RB / 0 RB Offset

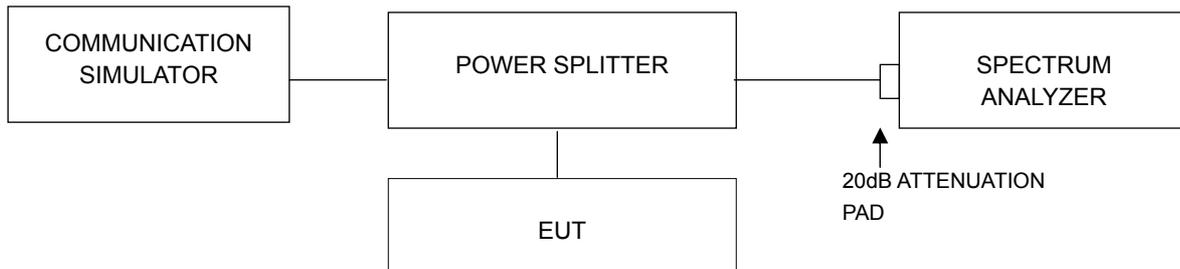


## 4.6 Peak to Average Ratio

### 4.6.1 Limits of Peak to Average Ratio Measurement

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

### 4.6.2 Test Setup



### 4.6.3 Test Procedures

- Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
- Set the number of counts to a value that stabilizes the measured CCDF curve;
- Record the maximum PAPR level associated with a probability of 0.1%.

### 4.6.4 Test Results

LTE Band 4

| Channel Bandwidth: 5MHz |                 |                            |       |
|-------------------------|-----------------|----------------------------|-------|
| Channel                 | Frequency (MHz) | Peak To Average Ratio (dB) |       |
|                         |                 | QPSK                       | 16QAM |
| 19975                   | 1712.5          | 3.71                       | 4.80  |
| 20175                   | 1732.5          | 4.15                       | 5.23  |
| 20375                   | 1752.5          | 4.09                       | 5.12  |



| Channel Bandwidth: 10MHz |                 |                            |       |
|--------------------------|-----------------|----------------------------|-------|
| Channel                  | Frequency (MHz) | Peak To Average Ratio (dB) |       |
|                          |                 | QPSK                       | 16QAM |
| 20000                    | 1715.0          | 3.63                       | 4.88  |
| 20175                    | 1732.5          | 4.05                       | 5.33  |
| 20350                    | 1750.0          | 3.84                       | 5.00  |

**SPECTRUM PLOT OF WORST VALUE**



Channel Bandwidth: 15MHz

| Channel | Frequency (MHz) | Peak To Average Ratio (dB) |       |
|---------|-----------------|----------------------------|-------|
|         |                 | QPSK                       | 16QAM |
| 20025   | 1717.5          | 3.38                       | 4.58  |
| 20175   | 1732.5          | 4.07                       | 4.88  |
| 20325   | 1747.5          | 3.56                       | 4.56  |

SPECTRUM PLOT OF WORST VALUE



Channel Bandwidth: 20MHz

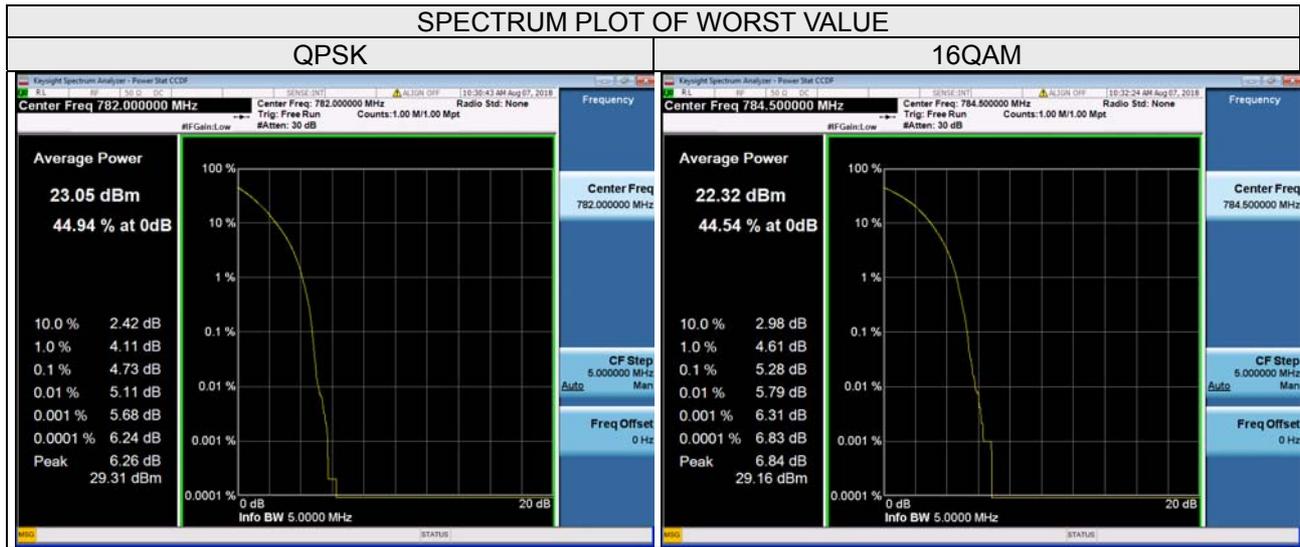
| Channel | Frequency (MHz) | Peak To Average Ratio (dB) |       |
|---------|-----------------|----------------------------|-------|
|         |                 | QPSK                       | 16QAM |
| 20050   | 1720.0          | 3.59                       | 4.96  |
| 20175   | 1732.5          | 4.21                       | 5.41  |
| 20300   | 1745.0          | 3.73                       | 5.07  |

SPECTRUM PLOT OF WORST VALUE

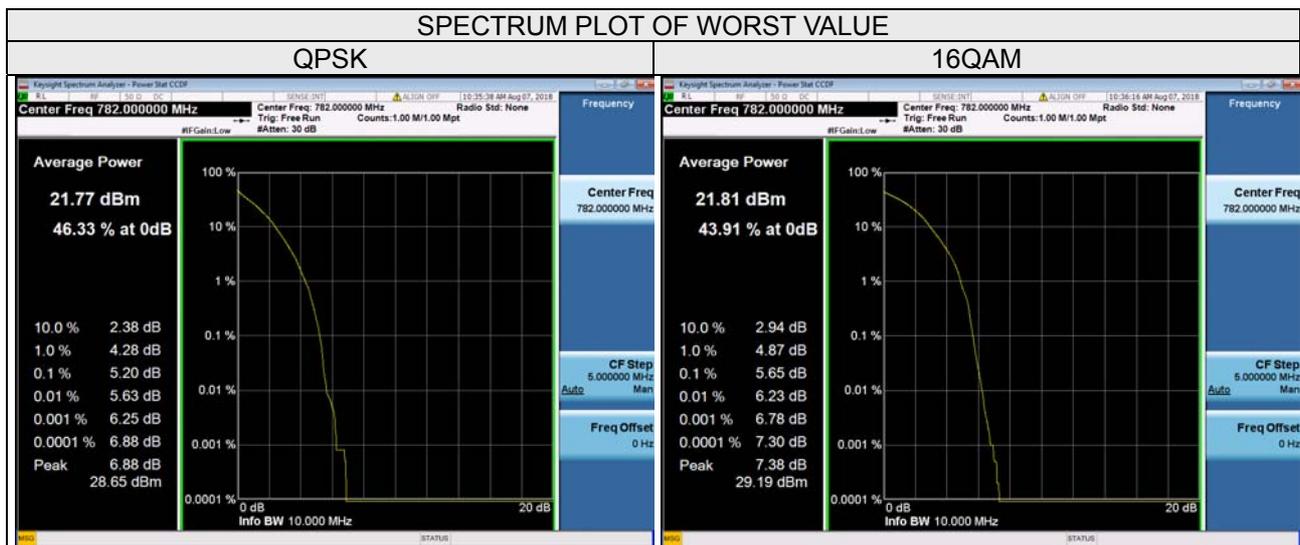


LTE Band 13

| Channel Bandwidth: 5MHz |                 |                            |       |
|-------------------------|-----------------|----------------------------|-------|
| Channel                 | Frequency (MHz) | Peak To Average Ratio (dB) |       |
|                         |                 | QPSK                       | 16QAM |
| 23205                   | 779.5           | 4.22                       | 5.02  |
| 23230                   | 782.0           | 4.73                       | 5.23  |
| 23255                   | 784.5           | 4.53                       | 5.28  |



| Channel Bandwidth: 10MHz |                 |                            |       |
|--------------------------|-----------------|----------------------------|-------|
| Channel                  | Frequency (MHz) | Peak To Average Ratio (dB) |       |
|                          |                 | QPSK                       | 16QAM |
| 23230                    | 782.0           | 5.20                       | 5.65  |



## 4.7 Conducted Spurious Emissions

### 4.7.1 Limits of Conducted Spurious Emissions Measurement

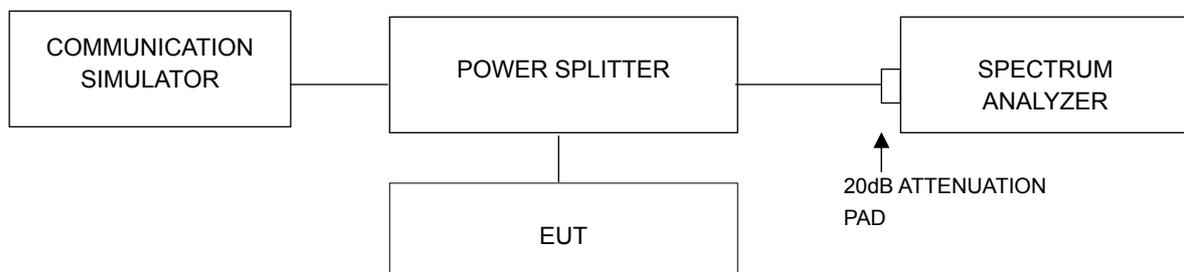
For LTE Band 4

According to FCC 27.53(h) for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 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.

For LTE Band 13

According to FCC 27.53(c) (2) for 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.

### 4.7.2 Test Setup



### 4.7.3 Test Procedure

- All measurements were done at 3 channels: low, middle and high operational frequency range.
- When the spectrum scanned from 9kHz to 27GHz, it shall be connected to the 20dB pad attenuated the carried frequency. The spectrum set RB = 1MHz, VB = 3MHz.

### 4.7.4 Test Results

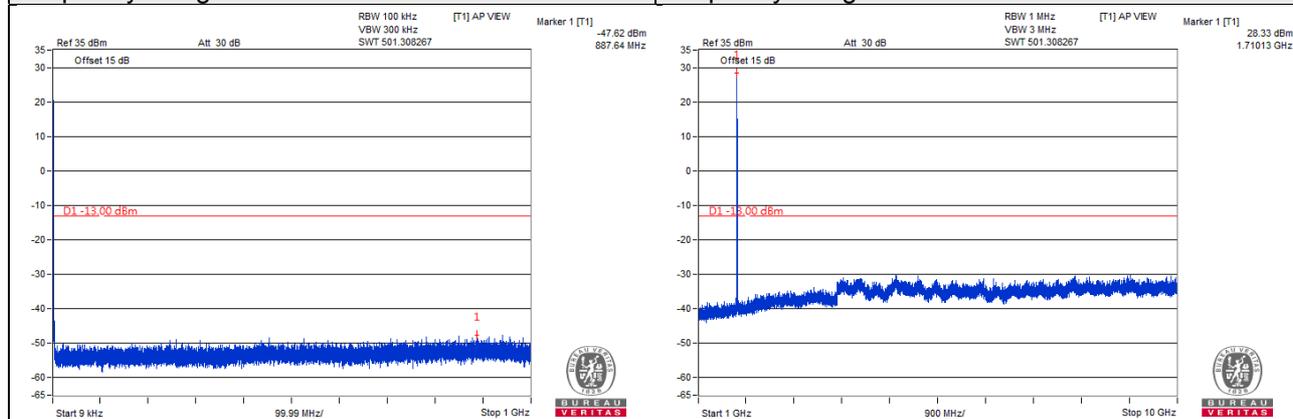
#### LTE Band 4

Channel Bandwidth: 5MHz

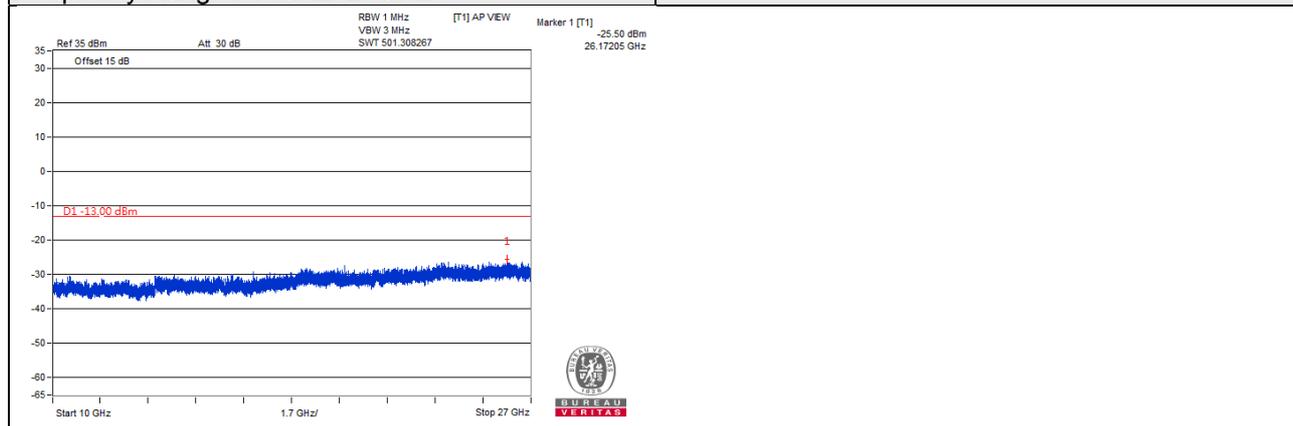
Channel 19975 (1712.50MHz)

Frequency Range : 9kHz~1GHz

Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~27GHz

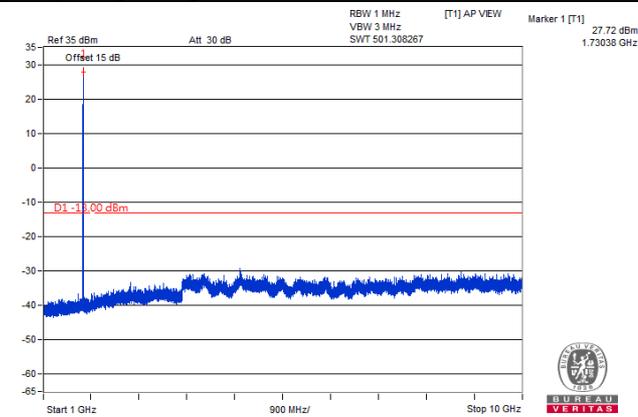
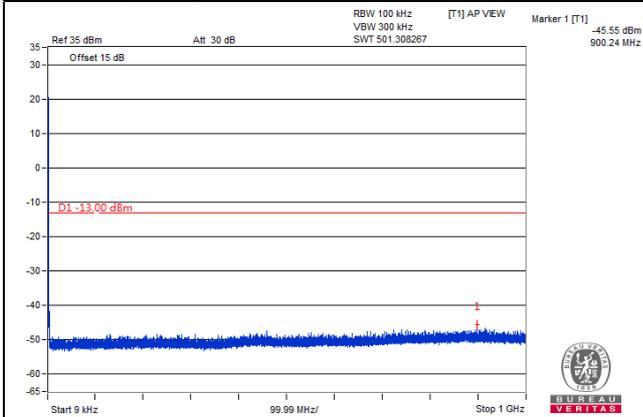


Channel Bandwidth: 5MHz

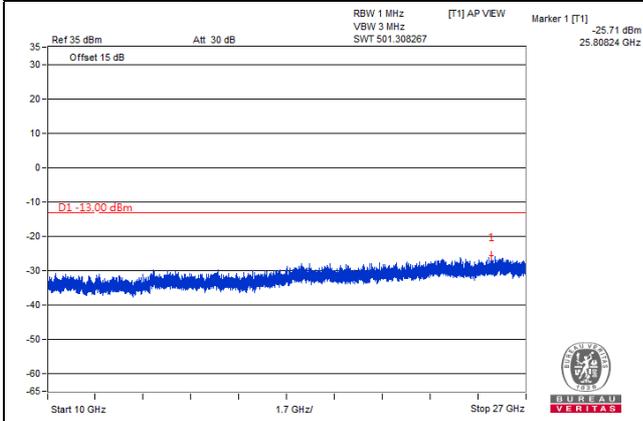
Channel 20175 (1732.50MHz)

Frequency Range : 9kHz~1GHz

Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~27GHz

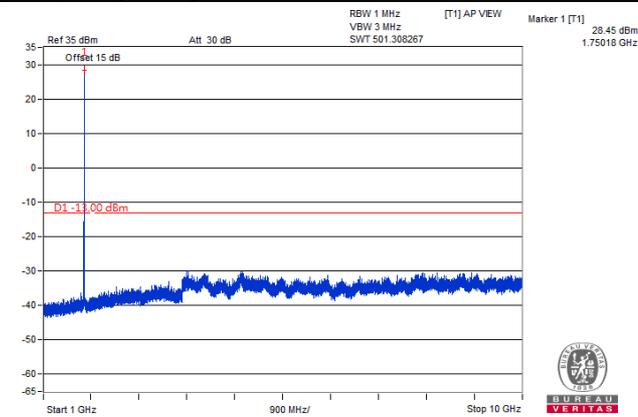
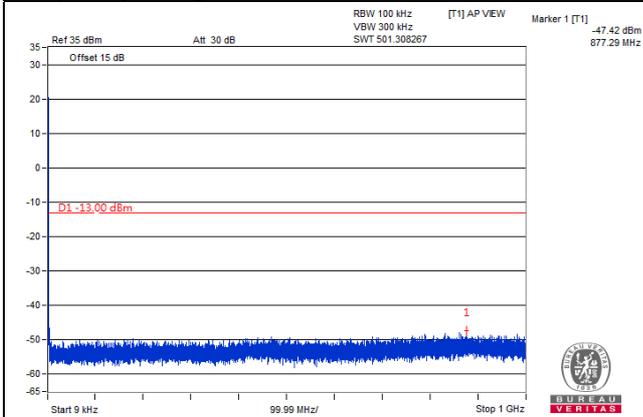


Channel Bandwidth: 5MHz

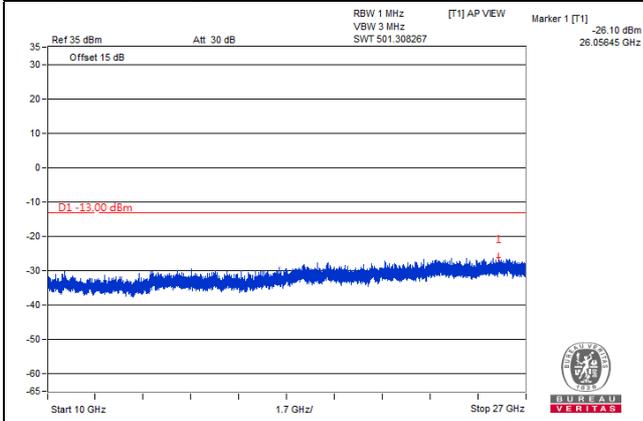
Channel 20375 (1752.50MHz)

Frequency Range : 9kHz~1GHz

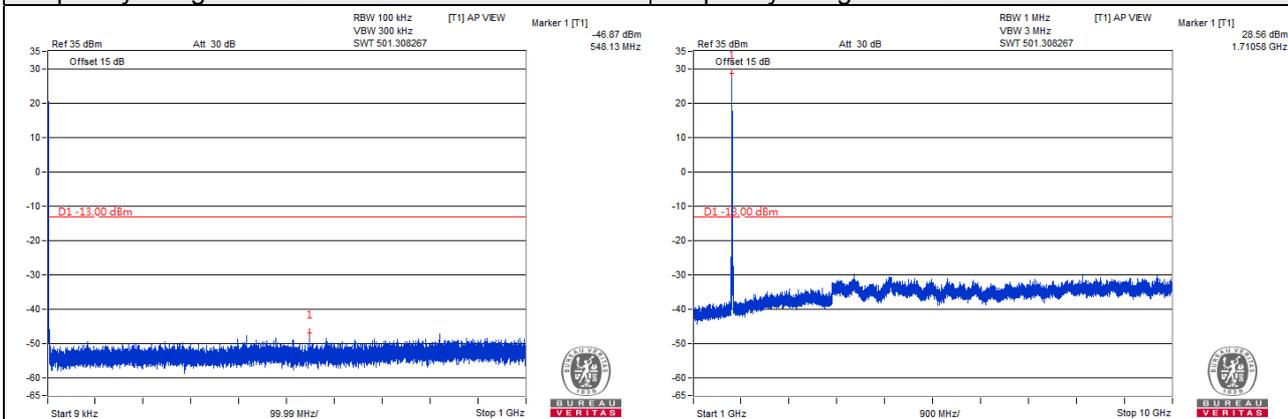
Frequency Range : 1GHz~10GHz



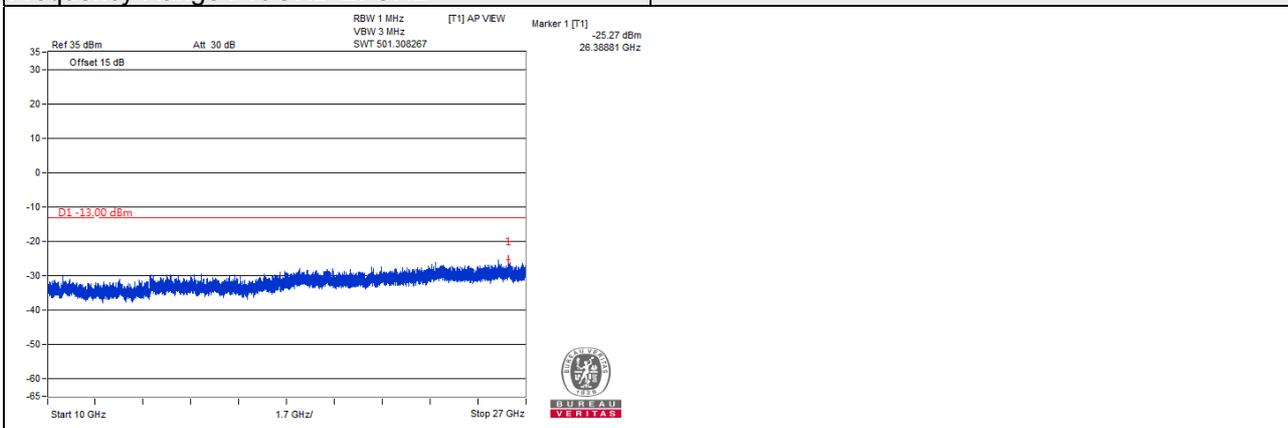
Frequency Range : 10GHz~27GHz



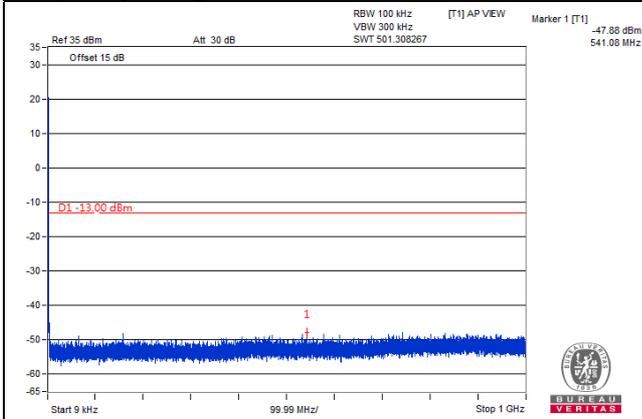
Channel Bandwidth: 10MHz  
 Channel 20000 (1715.00MHz)  
 Frequency Range : 9kHz~1GHz      Frequency Range : 1GHz~10GHz



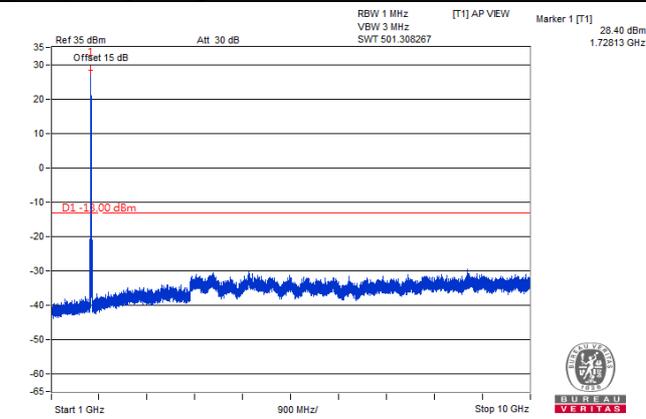
Frequency Range : 10GHz~27GHz



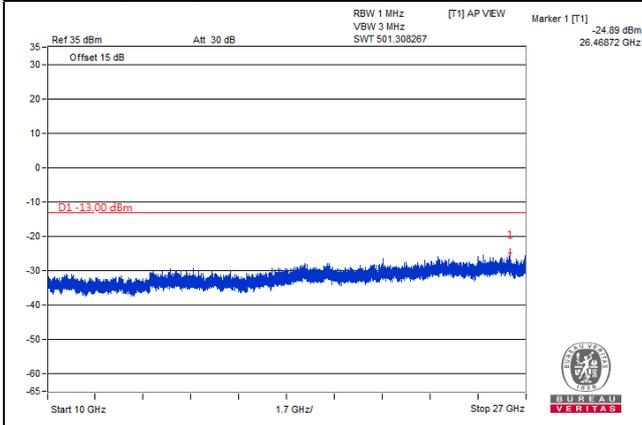
Channel Bandwidth: 10MHz  
 Channel 20175 (1732.50MHz)  
 Frequency Range : 9kHz~1GHz



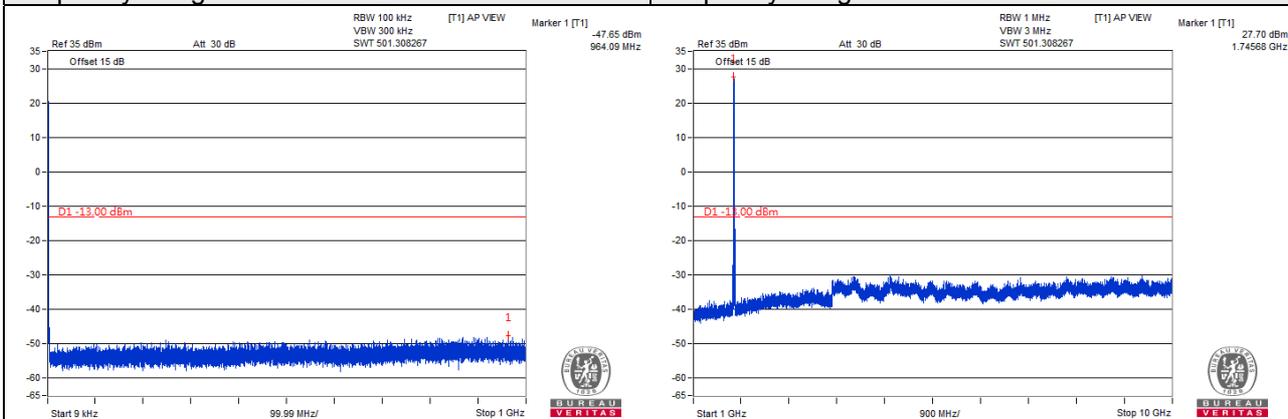
Frequency Range : 1GHz~10GHz



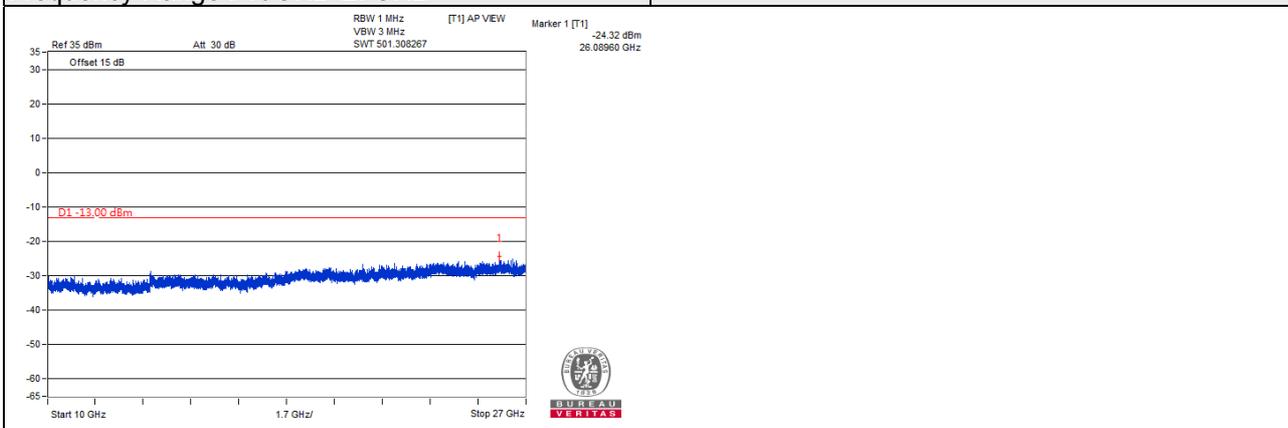
Frequency Range : 10GHz~27GHz



Channel Bandwidth: 10MHz  
 Channel 20350 (1750.00MHz)  
 Frequency Range : 9kHz~1GHz      Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~27GHz

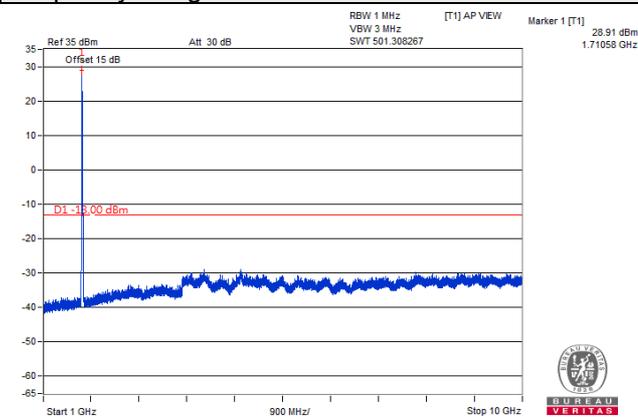
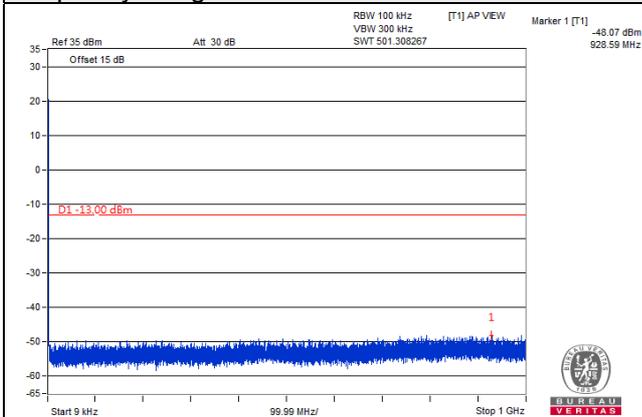


Channel Bandwidth: 15MHz

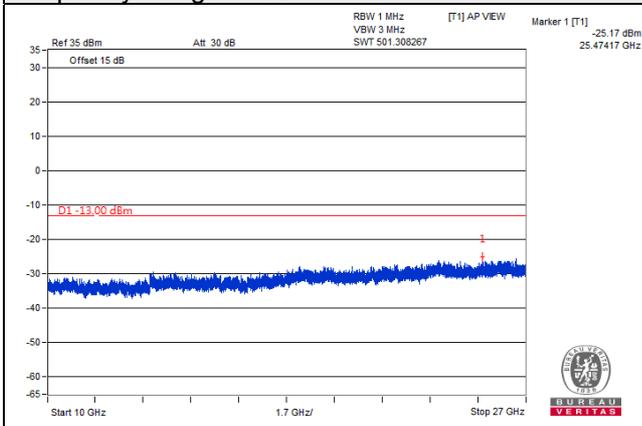
Channel 20025 (1717.50MHz)

Frequency Range : 9kHz~1GHz

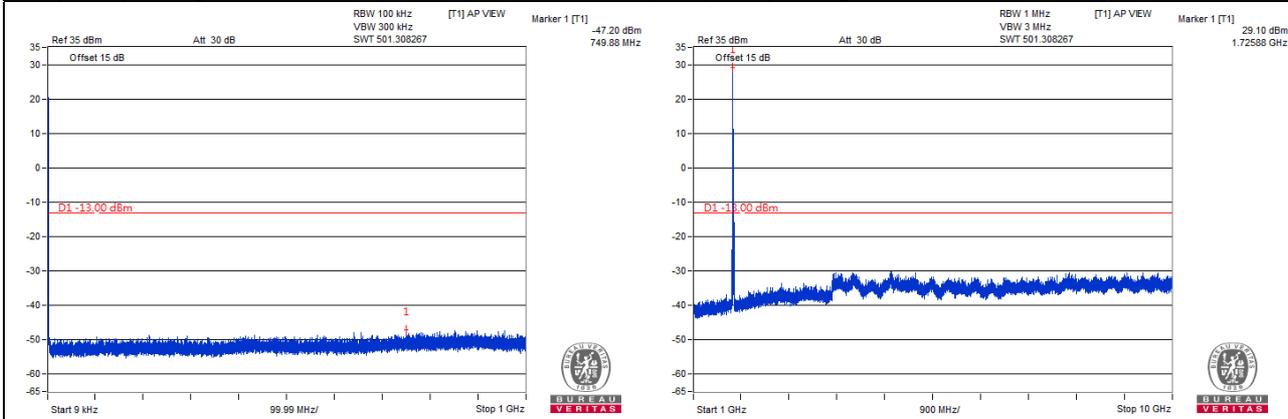
Frequency Range : 1GHz~10GHz



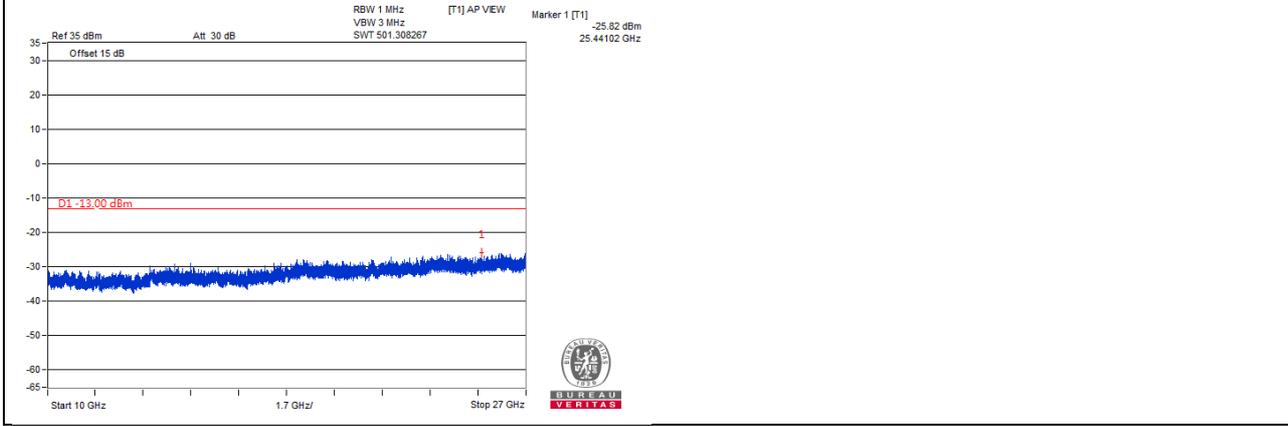
Frequency Range : 10GHz~27GHz



Channel Bandwidth: 15MHz  
 Channel 20175 (1732.50MHz)  
 Frequency Range : 9kHz~1GHz      Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~27GHz

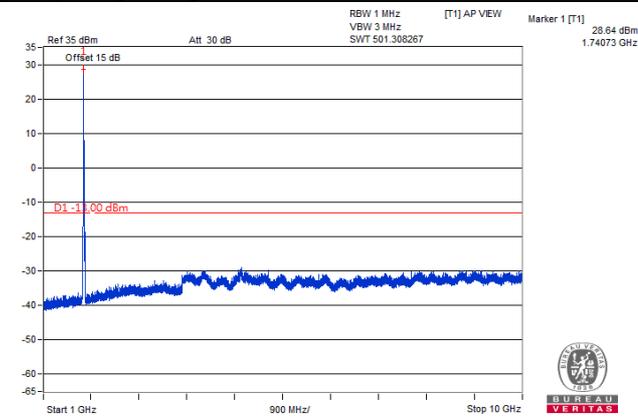
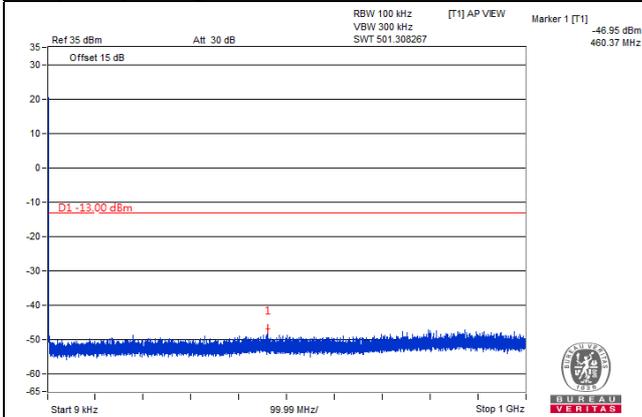


Channel Bandwidth: 15MHz

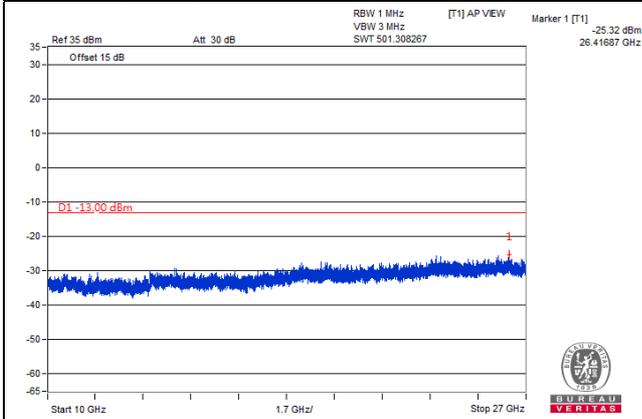
Channel 20325 (1747.50MHz)

Frequency Range : 9kHz~1GHz

Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~27GHz

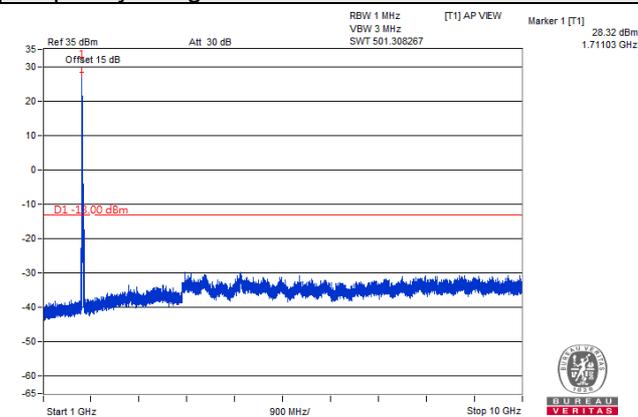
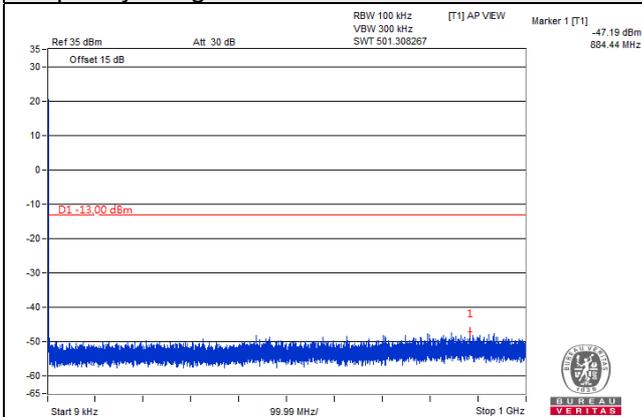


Channel Bandwidth: 20MHz

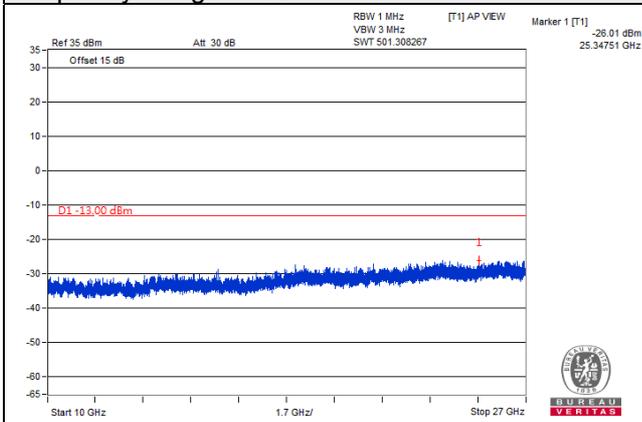
Channel 20050 (1720.00MHz)

Frequency Range : 9kHz~1GHz

Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~27GHz

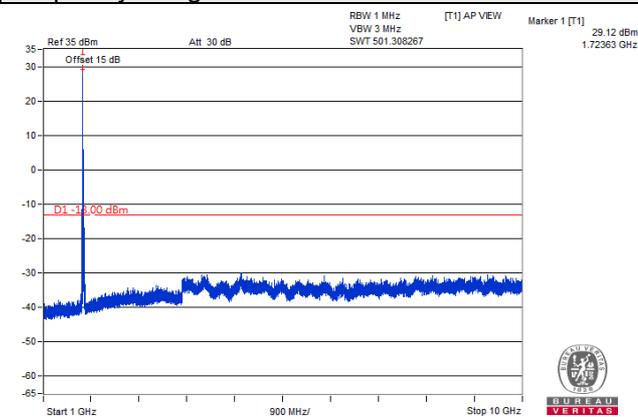
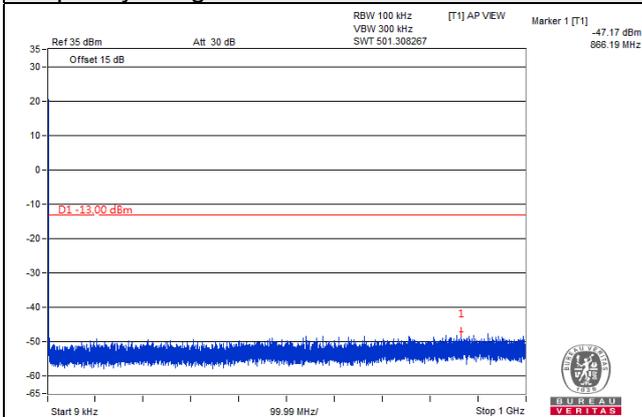


Channel Bandwidth: 20MHz

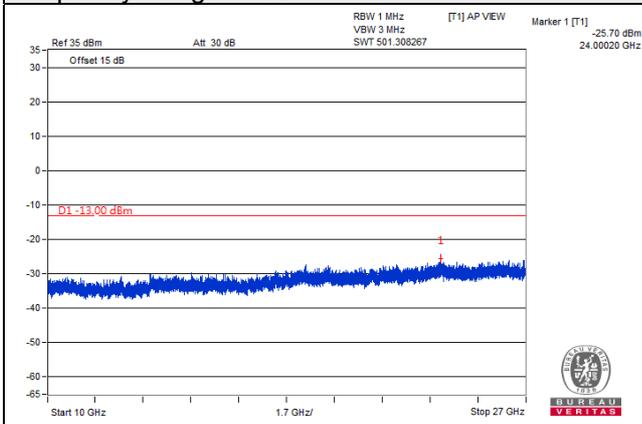
Channel 20175 (1732.50MHz)

Frequency Range : 9kHz~1GHz

Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~27GHz

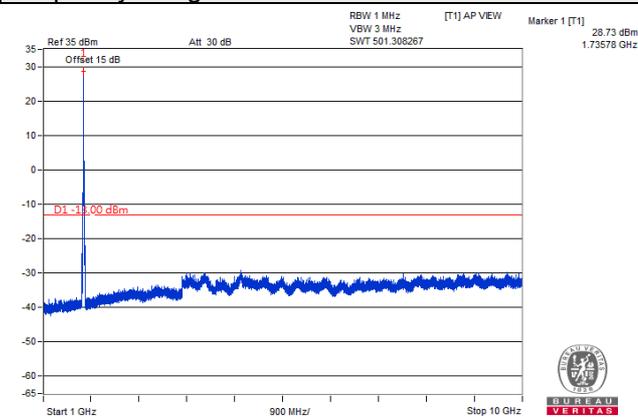
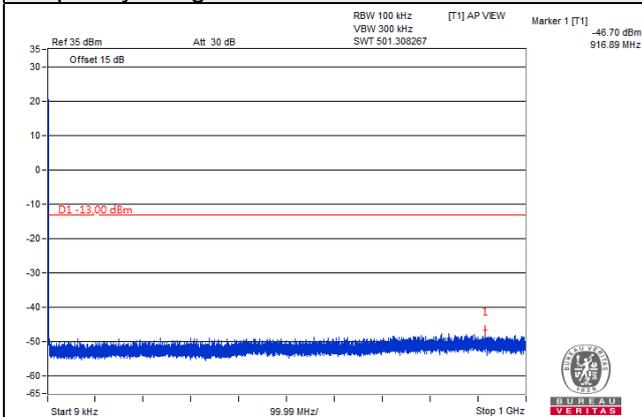


Channel Bandwidth: 20MHz

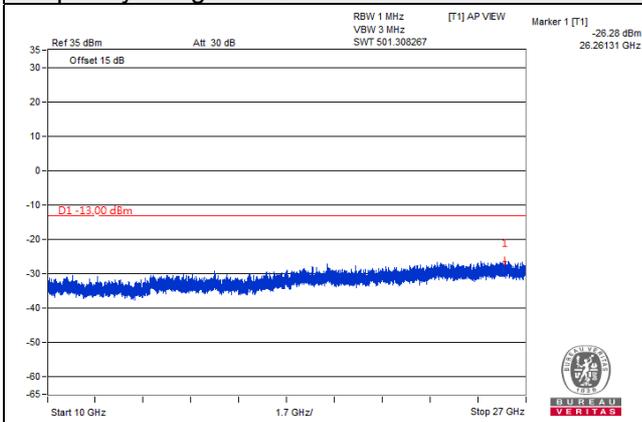
Channel 20300 (1745.00MHz)

Frequency Range : 9kHz~1GHz

Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~27GHz



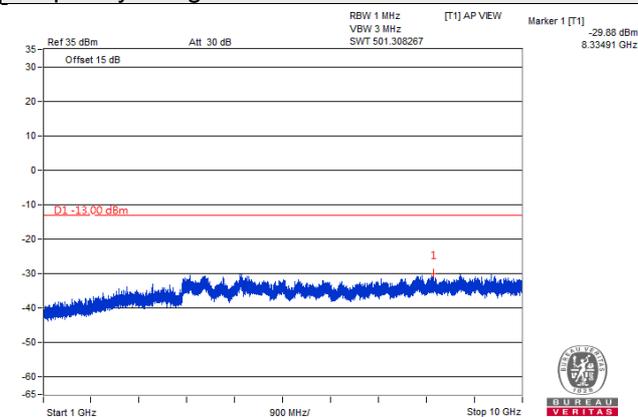
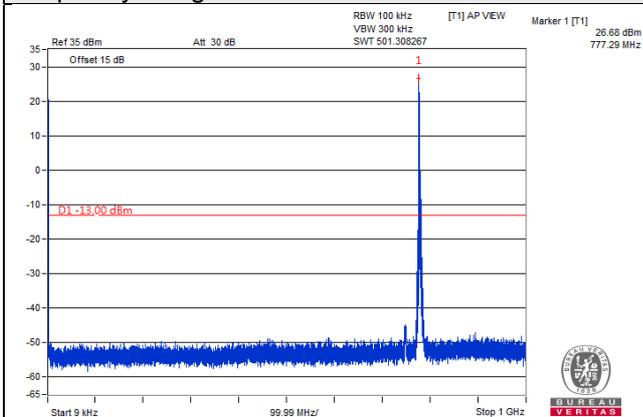
### LTE Band 13

Channel Bandwidth: 5MHz

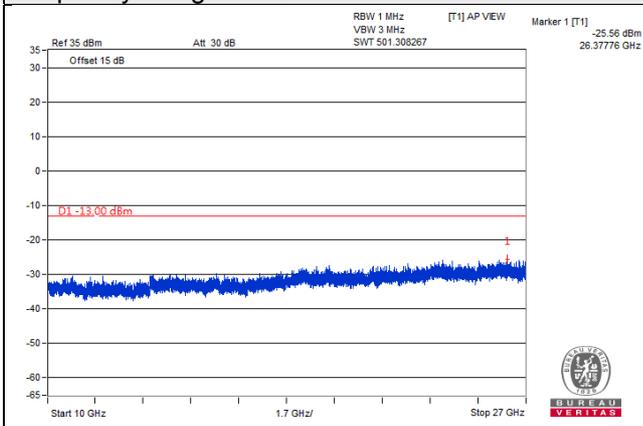
Channel 23205 (779.50MHz)

Frequency Range : 9kHz~1GHz

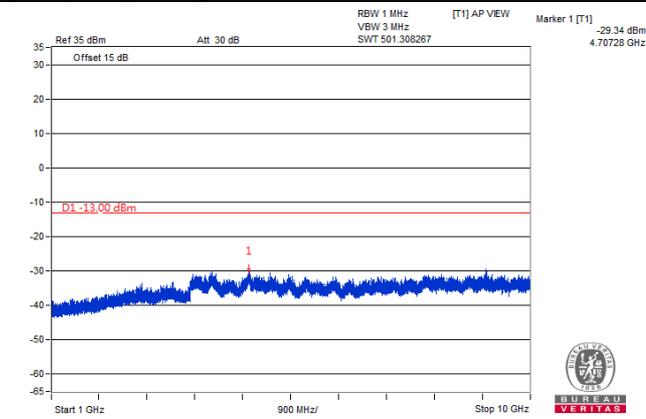
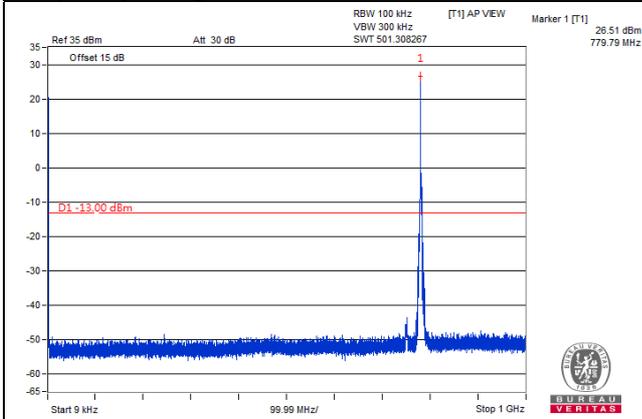
Frequency Range : 1GHz~10GHz



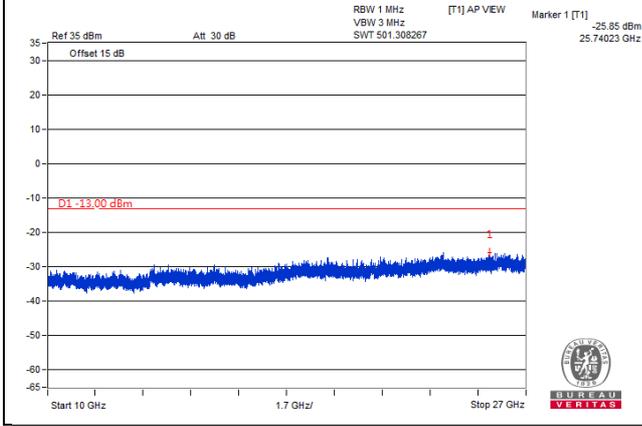
Frequency Range : 10GHz~27GHz



Channel Bandwidth: 5MHz  
 Channel 23230 (782.00MHz)  
 Frequency Range : 9kHz~1GHz



Frequency Range : 10GHz~27GHz



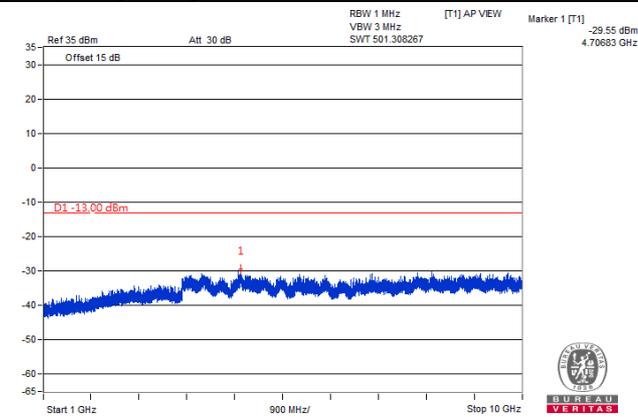
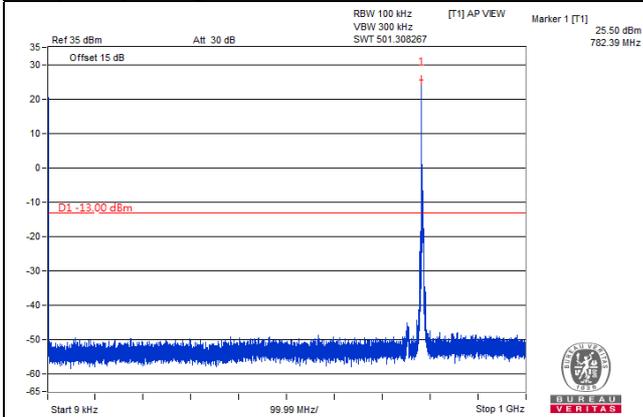
Report No.: RF180731E06-3

Channel Bandwidth: 5MHz

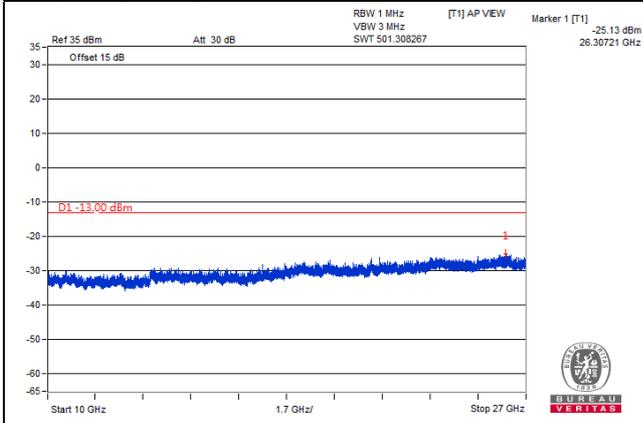
Channel 23255 (784.50MHz)

Frequency Range : 9kHz~1GHz

Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~27GHz

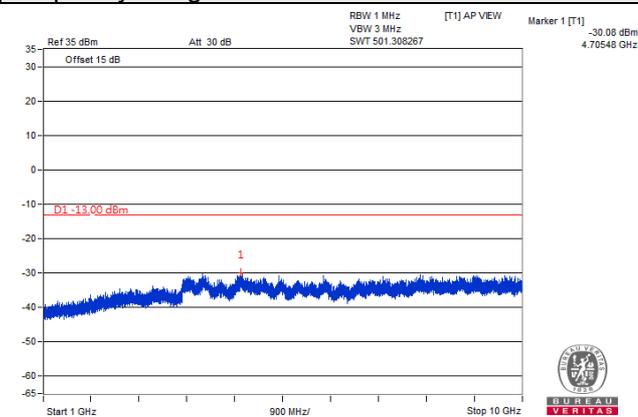
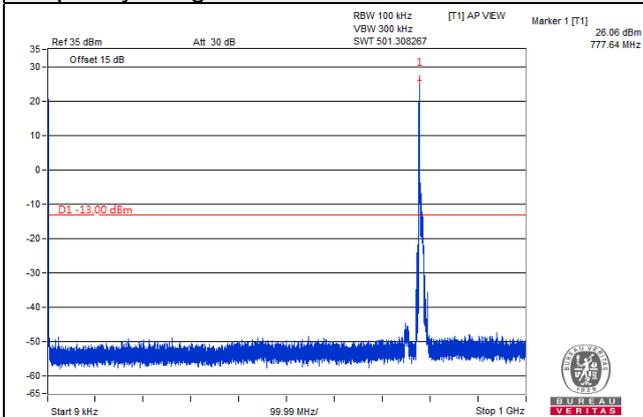


Channel Bandwidth: 10MHz

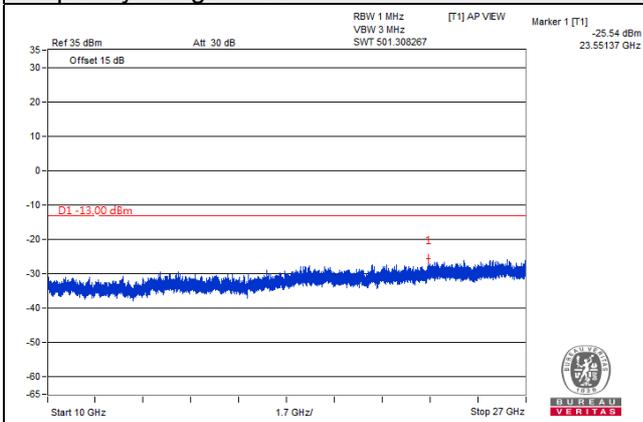
Channel 23230 (782.00MHz)

Frequency Range : 9kHz~1GHz

Frequency Range : 1GHz~10GHz



Frequency Range : 10GHz~27GHz



## 4.8 Radiated Emission Measurement

### 4.8.1 Limits of Radiated Emission Measurement

For LTE Band 4

According to FCC 27.53(h) for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 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.

For LTE Band 13

According to FCC 27.53(c) (2) for 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.

### 4.8.2 Test Procedure

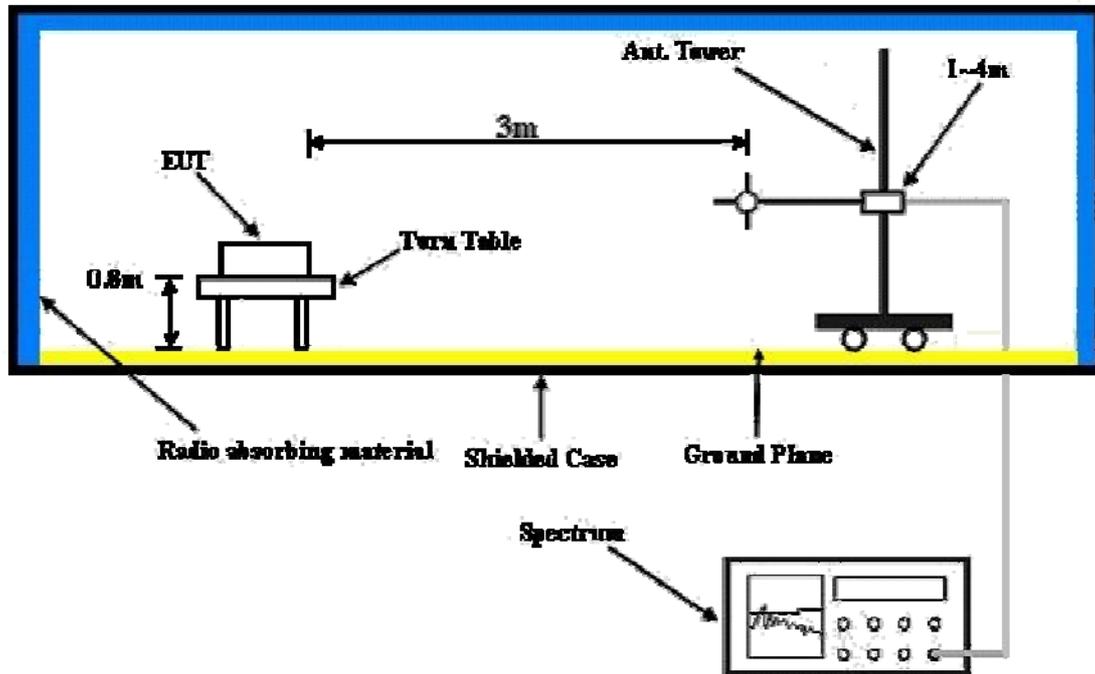
- a. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high channel of operational frequency range.)
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. The substitution antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G
- d.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution antenna}$ .

**Note:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

### 4.8.3 Deviation from Test Standard

No deviation.

#### 4.8.4 Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.8.5 Test Results

Below 1GHz

LTE Band 4

Channel Bandwidth: 5MHz

|                          |                                  |                 |                |
|--------------------------|----------------------------------|-----------------|----------------|
| Mode                     | TX channel 19975<br>(1712.50MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                           | Test Mode       | A              |

##### Antenna Polarity & Test Distance: Horizontal at 3 M

| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| 1   | 42.61       | -46.9         | -33.2                 | -11.8                  | -45.0      | -13.0       | -32.0       |
| 2   | 51.34       | -50.4         | -44.3                 | -7.3                   | -51.6      | -13.0       | -38.6       |
| 3   | 98.87       | -56.7         | -63.9                 | -1.4                   | -65.3      | -13.0       | -52.3       |
| 4   | 173.56      | -53.0         | -57.6                 | -2.8                   | -60.4      | -13.0       | -47.4       |
| 5   | 220.12      | -49.3         | -55.5                 | -1.9                   | -57.4      | -13.0       | -44.4       |
| 6   | 580.96      | -66.1         | -68.8                 | 3.8                    | -65.0      | -13.0       | -52.0       |

##### Antenna Polarity & Test Distance: Vertical at 3 M

| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| 1   | 51.34       | -43.2         | -43.1                 | -7.3                   | -50.4      | -13.0       | -37.4       |
| 2   | 67.83       | -41.6         | -47.5                 | -1.0                   | -48.5      | -13.0       | -35.5       |
| 3   | 90.14       | -51.4         | -57.5                 | -0.2                   | -57.7      | -13.0       | -44.7       |
| 4   | 192.96      | -53.7         | -52.6                 | -2.6                   | -55.2      | -13.0       | -42.2       |
| 5   | 224.00      | -51.6         | -53.9                 | -2.1                   | -56.0      | -13.0       | -43.0       |
| 6   | 429.64      | -60.3         | -64.2                 | 3.5                    | -60.7      | -13.0       | -47.7       |

#### Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                  |                 |                |
|--------------------------|----------------------------------|-----------------|----------------|
| Mode                     | TX channel 19975<br>(1712.50MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                           | Test Mode       | B              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 59.10       | -50.1         | -50.8                 | -3.8                   | -54.6      | -13.0       | -41.6       |
| 2   | 101.78      | -54.5         | -61.2                 | -1.6                   | -62.8      | -13.0       | -49.8       |
| 3   | 159.01      | -61.2         | -63.5                 | -2.8                   | -66.3      | -13.0       | -53.3       |
| 4   | 202.66      | -54.1         | -60.0                 | -2.1                   | -62.1      | -13.0       | -49.1       |
| 5   | 235.64      | -59.4         | -65.1                 | -1.5                   | -66.6      | -13.0       | -53.6       |
| 6   | 580.96      | -63.1         | -65.8                 | 3.8                    | -62.0      | -13.0       | -49.0       |

| Antenna Polarity & Test Distance: Vertical at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 44.55       | -54.2         | -51.7                 | -10.9                  | -62.6      | -13.0       | -49.6       |
| 2   | 79.47       | -60.4         | -65.9                 | 0.6                    | -65.3      | -13.0       | -52.3       |
| 3   | 117.30      | -63.9         | -67.9                 | -2.9                   | -70.8      | -13.0       | -57.8       |
| 4   | 181.32      | -59.2         | -59.6                 | -3.0                   | -62.6      | -13.0       | -49.6       |
| 5   | 194.90      | -54.4         | -52.9                 | -2.6                   | -55.5      | -13.0       | -42.5       |
| 6   | 248.25      | -62.7         | -61.7                 | -1.5                   | -63.2      | -13.0       | -50.2       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 10MHz

|                          |                                  |                 |                |
|--------------------------|----------------------------------|-----------------|----------------|
| Mode                     | TX channel 20000<br>(1715.00MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                           | Test Mode       | A              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 47.46       | -47.5         | -38.1                 | -9.2                   | -47.3      | -13.0       | -34.3       |
| 2   | 114.39      | -54.1         | -59.2                 | -2.8                   | -62.0      | -13.0       | -49.0       |
| 3   | 170.65      | -53.9         | -58.1                 | -2.8                   | -60.9      | -13.0       | -47.9       |
| 4   | 224.97      | -49.8         | -55.9                 | -1.9                   | -57.8      | -13.0       | -44.8       |
| 5   | 307.42      | -66.9         | -75.1                 | 3.9                    | -71.2      | -13.0       | -58.2       |
| 6   | 580.96      | -65.6         | -68.3                 | 3.8                    | -64.5      | -13.0       | -51.5       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 47.46       | -36.9         | -35.6                 | -9.2                   | -44.8      | -13.0       | -31.8       |
| 2   | 90.14       | -55.1         | -61.2                 | -0.2                   | -61.4      | -13.0       | -48.4       |
| 3   | 132.82      | -50.2         | -51.1                 | -3.3                   | -54.4      | -13.0       | -41.4       |
| 4   | 219.15      | -48.6         | -50.5                 | -2.0                   | -52.5      | -13.0       | -39.5       |
| 5   | 360.77      | -62.3         | -66.7                 | 4.0                    | -62.7      | -13.0       | -49.7       |
| 6   | 430.61      | -51.2         | -55.1                 | 3.5                    | -51.6      | -13.0       | -38.6       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                  |                 |                |
|--------------------------|----------------------------------|-----------------|----------------|
| Mode                     | TX channel 20000<br>(1715.00MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                           | Test Mode       | B              |

**Antenna Polarity & Test Distance: Horizontal at 3 M**

| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| 1   | 101.78      | -53.8         | -60.5                 | -1.6                   | -62.1      | -13.0       | -49.1       |
| 2   | 159.98      | -60.2         | -62.5                 | -3.0                   | -65.5      | -13.0       | -52.5       |
| 3   | 202.66      | -53.8         | -59.7                 | -2.1                   | -61.8      | -13.0       | -48.8       |
| 4   | 221.09      | -53.3         | -59.5                 | -1.9                   | -61.4      | -13.0       | -48.4       |
| 5   | 294.81      | -66.4         | -67.7                 | -1.8                   | -69.5      | -13.0       | -56.5       |
| 6   | 580.96      | -61.3         | -64.0                 | 3.8                    | -60.2      | -13.0       | -47.2       |

**Antenna Polarity & Test Distance: Vertical at 3 M**

| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| 1   | 41.64       | -53.4         | -50.1                 | -12.3                  | -62.4      | -13.0       | -49.4       |
| 2   | 67.83       | -54.3         | -60.2                 | -1.0                   | -61.2      | -13.0       | -48.2       |
| 3   | 90.14       | -54.8         | -60.9                 | -0.2                   | -61.1      | -13.0       | -48.1       |
| 4   | 138.64      | -61.4         | -61.2                 | -3.2                   | -64.4      | -13.0       | -51.4       |
| 5   | 193.93      | -54.0         | -52.7                 | -2.6                   | -55.3      | -13.0       | -42.3       |
| 6   | 245.34      | -60.3         | -59.9                 | -1.6                   | -61.5      | -13.0       | -48.5       |

**Remarks:**

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 15MHz

|                          |                                  |                 |                |
|--------------------------|----------------------------------|-----------------|----------------|
| Mode                     | TX channel 20025<br>(1717.50MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                           | Test Mode       | A              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |              |               |                       |                        |              |              |              |
|---|--------------|---------------|-----------------------|------------------------|--------------|--------------|--------------|
| No.   | Freq. (MHz)  | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm)   | Limit (dBm)  | Margin (dB)  |
| 1   | 48.43        | -48.6         | -39.9                 | -8.7                   | -48.6        | -13.0        | -35.6        |
| 2   | <b>71.71</b> | <b>-33.5</b>  | <b>-39.3</b>          | <b>-0.3</b>            | <b>-39.6</b> | <b>-13.0</b> | <b>-26.6</b> |
| 3   | 119.24       | -55.8         | -60.5                 | -3.1                   | -63.6        | -13.0        | -50.6        |
| 4   | 181.32       | -53.1         | -58.3                 | -3.0                   | -61.3        | -13.0        | -48.3        |
| 5   | 221.09       | -48.8         | -55.0                 | -1.9                   | -56.9        | -13.0        | -43.9        |
| 6   | 580.96       | -67.0         | -69.7                 | 3.8                    | -65.9        | -13.0        | -52.9        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |              |               |                       |                        |              |              |              |
| No.   | Freq. (MHz)  | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm)   | Limit (dBm)  | Margin (dB)  |
| 1   | 44.55        | -32.6         | -30.1                 | -10.9                  | -41.0        | -13.0        | -28.0        |
| 2   | 92.08        | -50.3         | -56.6                 | -0.6                   | -57.2        | -13.0        | -44.2        |
| 3   | 141.55       | -63.0         | -62.4                 | -3.0                   | -65.4        | -13.0        | -52.4        |
| 4   | 194.90       | -54.4         | -52.9                 | -2.6                   | -55.5        | -13.0        | -42.5        |
| 5   | 221.09       | -50.0         | -52.1                 | -1.9                   | -54.0        | -13.0        | -41.0        |
| 6   | 429.64       | -55.0         | -58.9                 | 3.5                    | -55.4        | -13.0        | -42.4        |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                  |                 |                |
|--------------------------|----------------------------------|-----------------|----------------|
| Mode                     | TX channel 20025<br>(1717.50MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                           | Test Mode       | B              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 66.86       | -48.7         | -54.1                 | -1.5                   | -55.6      | -13.0       | -42.6       |
| 2   | 101.78      | -53.3         | -60.0                 | -1.6                   | -61.6      | -13.0       | -48.6       |
| 3   | 123.12      | -52.8         | -57.2                 | -3.1                   | -60.3      | -13.0       | -47.3       |
| 4   | 261.83      | -53.6         | -56.7                 | -1.6                   | -58.3      | -13.0       | -45.3       |
| 5   | 359.80      | -60.0         | -66.7                 | 4.0                    | -62.7      | -13.0       | -49.7       |
| 6   | 580.96      | -61.3         | -64.0                 | 3.8                    | -60.2      | -13.0       | -47.2       |

| Antenna Polarity & Test Distance: Vertical at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 67.83       | -52.7         | -58.6                 | -1.0                   | -59.6      | -13.0       | -46.6       |
| 2   | 90.14       | -57.0         | -63.1                 | -0.2                   | -63.3      | -13.0       | -50.3       |
| 3   | 191.02      | -54.4         | -53.6                 | -2.7                   | -56.3      | -13.0       | -43.3       |
| 4   | 204.60      | -56.7         | -56.6                 | -2.0                   | -58.6      | -13.0       | -45.6       |
| 5   | 247.28      | -61.1         | -60.4                 | -1.5                   | -61.9      | -13.0       | -48.9       |
| 6   | 580.96      | -65.8         | -67.5                 | 3.8                    | -63.7      | -13.0       | -50.7       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 20MHz

|                          |                                  |                 |                |
|--------------------------|----------------------------------|-----------------|----------------|
| Mode                     | TX channel 20050<br>(1720.00MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                           | Test Mode       | A              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 74.62       | -50.9         | -56.8                 | 0.1                    | -56.7      | -13.0       | -43.7       |
| 2   | 113.42      | -54.7         | -59.7                 | -2.7                   | -62.4      | -13.0       | -49.4       |
| 3   | 205.57      | -52.1         | -58.2                 | -2.0                   | -60.2      | -13.0       | -47.2       |
| 4   | 233.70      | -54.0         | -59.8                 | -1.7                   | -61.5      | -13.0       | -48.5       |
| 5   | 388.90      | -67.1         | -71.2                 | 3.4                    | -67.8      | -13.0       | -54.8       |
| 6   | 580.96      | -65.7         | -68.4                 | 3.8                    | -64.6      | -13.0       | -51.6       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 48.43       | -42.9         | -41.9                 | -8.7                   | -50.6      | -13.0       | -37.6       |
| 2   | 89.17       | -44.5         | -50.7                 | -0.1                   | -50.8      | -13.0       | -37.8       |
| 3   | 139.61      | -64.3         | -64.0                 | -3.1                   | -67.1      | -13.0       | -54.1       |
| 4   | 202.66      | -54.2         | -53.6                 | -2.1                   | -55.7      | -13.0       | -42.7       |
| 5   | 232.73      | -53.6         | -54.5                 | -1.6                   | -56.1      | -13.0       | -43.1       |
| 6   | 580.96      | -66.0         | -67.7                 | 3.8                    | -63.9      | -13.0       | -50.9       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                  |                 |                |
|--------------------------|----------------------------------|-----------------|----------------|
| Mode                     | TX channel 20050<br>(1720.00MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                           | Test Mode       | B              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 101.78      | -53.0         | -59.7                 | -1.6                   | -61.3      | -13.0       | -48.3       |
| 2   | 127.00      | -52.3         | -55.5                 | -3.3                   | -58.8      | -13.0       | -45.8       |
| 3   | 224.00      | -51.2         | -57.3                 | -2.1                   | -59.4      | -13.0       | -46.4       |
| 4   | 279.29      | -59.8         | -62.6                 | -1.6                   | -64.2      | -13.0       | -51.2       |
| 5   | 388.90      | -52.3         | -56.4                 | 3.4                    | -53.0      | -13.0       | -40.0       |
| 6   | 580.96      | -62.6         | -65.3                 | 3.8                    | -61.5      | -13.0       | -48.5       |

| Antenna Polarity & Test Distance: Vertical at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 52.310      | -52.4         | -52.6                 | -6.8                   | -59.4      | -13.0       | -46.4       |
| 2   | 82.380      | -53.3         | -58.2                 | 0.4                    | -57.8      | -13.0       | -44.8       |
| 3   | 137.670     | -63.3         | -63.3                 | -3.2                   | -66.5      | -13.0       | -53.5       |
| 4   | 174.530     | -58.9         | -59.7                 | -2.8                   | -62.5      | -13.0       | -49.5       |
| 5   | 194.900     | -55.0         | -53.5                 | -2.6                   | -56.1      | -13.0       | -43.1       |
| 6   | 276.380     | -69.7         | -64.8                 | -1.6                   | -66.4      | -13.0       | -53.4       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 13

Channel Bandwidth: 5MHz

|                          |                                 |                 |                |
|--------------------------|---------------------------------|-----------------|----------------|
| Mode                     | TX channel 23205<br>(779.50MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                 | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                          | Test Mode       | A              |

Antenna Polarity & Test Distance: Horizontal at 3 M

| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| 1   | 65.89       | -53.0         | -60.4                 | -1.9                   | -62.3     | -13.0       | -49.3       |
| 2   | 101.78      | -56.8         | -65.7                 | -1.6                   | -67.3     | -13.0       | -54.3       |
| 3   | 164.83      | -60.0         | -65.6                 | -2.9                   | -68.5     | -13.0       | -55.5       |
| 4   | 188.11      | -55.6         | -63.3                 | -2.7                   | -66.0     | -13.0       | -53.0       |
| 5   | 204.60      | -53.5         | -61.6                 | -2.0                   | -63.6     | -13.0       | -50.6       |
| 6   | 231.76      | -55.0         | -63.2                 | -1.6                   | -64.8     | -13.0       | -51.8       |

Antenna Polarity & Test Distance: Vertical at 3 M

| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| 1   | 67.83       | -52.8         | -60.8                 | -1.0                   | -61.8     | -13.0       | -48.8       |
| 2   | 101.78      | -56.2         | -65.1                 | -1.6                   | -66.7     | -13.0       | -53.7       |
| 3   | 194.90      | -54.8         | -55.4                 | -2.6                   | -58.0     | -13.0       | -45.0       |
| 4   | 244.37      | -62.0         | -64.1                 | -1.4                   | -65.5     | -13.0       | -52.5       |
| 5   | 276.38      | -70.0         | -67.2                 | -1.6                   | -68.8     | -13.0       | -55.8       |
| 6   | 580.96      | -62.1         | -65.9                 | 3.8                    | -62.1     | -13.0       | -49.1       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                 |                 |                |
|--------------------------|---------------------------------|-----------------|----------------|
| Mode                     | TX channel 23205<br>(779.50MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                 | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                          | Test Mode       | B              |

**Antenna Polarity & Test Distance: Horizontal at 3 M**

| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| 1   | 41.64       | -45.4         | -33.1                 | -12.3                  | -45.4     | -13.0       | -32.4       |
| 2   | 101.78      | -51.9         | -60.8                 | -1.6                   | -62.4     | -13.0       | -49.4       |
| 3   | 159.01      | -58.2         | -62.7                 | -2.8                   | -65.5     | -13.0       | -52.5       |
| 4   | 223.03      | -52.0         | -60.2                 | -2.0                   | -62.2     | -13.0       | -49.2       |
| 5   | 499.48      | -62.2         | -68.3                 | 3.8                    | -64.5     | -13.0       | -51.5       |
| 6   | 579.99      | -61.4         | -66.3                 | 3.8                    | -62.5     | -13.0       | -49.5       |

**Antenna Polarity & Test Distance: Vertical at 3 M**

| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| 1   | 52.31       | -50.8         | -53.1                 | -6.8                   | -59.9     | -13.0       | -46.9       |
| 2   | 140.58      | -61.7         | -63.4                 | -3.0                   | -66.4     | -13.0       | -53.4       |
| 3   | 193.93      | -54.3         | -55.2                 | -2.6                   | -57.8     | -13.0       | -44.8       |
| 4   | 244.37      | -60.5         | -62.6                 | -1.4                   | -64.0     | -13.0       | -51.0       |
| 5   | 568.35      | -54.0         | -58.2                 | 3.7                    | -54.5     | -13.0       | -41.5       |
| 6   | 591.63      | -52.4         | -55.4                 | 3.8                    | -51.6     | -13.0       | -38.6       |

**Remarks:**

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 10MHz

|                          |                                 |                 |                |
|--------------------------|---------------------------------|-----------------|----------------|
| Mode                     | TX channel 23230<br>(782.00MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                 | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                          | Test Mode       | A              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|---|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 33.88       | -42.0         | -24.1                 | -17.1                  | -41.2     | -13.0       | -28.2       |
| 2   | 65.89       | -51.5         | -58.9                 | -1.9                   | -60.8     | -13.0       | -47.8       |
| 3   | 101.78      | -55.2         | -64.1                 | -1.6                   | -65.7     | -13.0       | -52.7       |
| 4   | 226.91      | -53.8         | -62.1                 | -1.7                   | -63.8     | -13.0       | -50.8       |
| 5   | 490.75      | -66.1         | -72.3                 | 3.7                    | -68.6     | -13.0       | -55.6       |
| 6   | 580.96      | -65.2         | -70.0                 | 3.8                    | -66.2     | -13.0       | -53.2       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 68.80       | -51.9         | -59.8                 | -0.8                   | -60.6     | -13.0       | -47.6       |
| 2   | 88.20       | -55.2         | -63.5                 | -0.2                   | -63.7     | -13.0       | -50.7       |
| 3   | 141.55      | -63.2         | -64.7                 | -3.0                   | -67.7     | -13.0       | -54.7       |
| 4   | 193.93      | -54.0         | -54.9                 | -2.6                   | -57.5     | -13.0       | -44.5       |
| 5   | 247.28      | -60.1         | -61.6                 | -1.5                   | -63.1     | -13.0       | -50.1       |
| 6   | 580.96      | -66.0         | -69.8                 | 3.8                    | -66.0     | -13.0       | -53.0       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                 |                 |                |
|--------------------------|---------------------------------|-----------------|----------------|
| Mode                     | TX channel 23230<br>(782.00MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH                 | Input Power     | 120Vac, 60Hz   |
| Tested By                | Han Wu                          | Test Mode       | B              |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|---|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 40.67       | -49.1         | -36.0                 | -13.1                  | -49.1     | -13.0       | -36.1       |
| 2   | 101.78      | -54.8         | -63.6                 | -1.6                   | -65.2     | -13.0       | -52.2       |
| 3   | 159.01      | -60.8         | -65.2                 | -2.8                   | -68.0     | -13.0       | -55.0       |
| 4   | 226.91      | -53.3         | -61.7                 | -1.7                   | -63.4     | -13.0       | -50.4       |
| 5   | 399.57      | -69.0         | -75.3                 | 3.3                    | -72.0     | -13.0       | -59.0       |
| 6   | 580.96      | -62.5         | -67.3                 | 3.8                    | -63.5     | -13.0       | -50.5       |

| Antenna Polarity & Test Distance: Vertical at 3 M |             |               |                       |                        |           |             |             |
|---|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 71.71       | -43.6         | -51.4                 | -0.3                   | -51.7     | -13.0       | -38.7       |
| 2   | 101.78      | -54.5         | -63.4                 | -1.6                   | -65.0     | -13.0       | -52.0       |
| 3   | 192.96      | -54.2         | -55.3                 | -2.6                   | -57.9     | -13.0       | -44.9       |
| 4   | 260.86      | -61.4         | -61.0                 | -1.5                   | -62.5     | -13.0       | -49.5       |
| 5   | 490.75      | -63.3         | -69.3                 | 3.7                    | -65.6     | -13.0       | -52.6       |
| 6   | 580.96      | -61.7         | -65.5                 | 3.8                    | -61.7     | -13.0       | -48.7       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Above 1GHz

Channel Bandwidth: 5MHz

|                          |                                  |                 |               |
|--------------------------|----------------------------------|-----------------|---------------|
| Mode                     | TX channel 19975<br>(1712.50MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                           |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3425.00     | -62.8         | -54.2                 | 1.3                    | -52.9      | -13.0       | -39.9       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3425.00     | -60.7         | -52.6                 | 1.3                    | -51.3      | -13.0       | -38.3       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                  |                 |               |
|--------------------------|----------------------------------|-----------------|---------------|
| Mode                     | TX channel 20175<br>(1732.50MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                           |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3465.00     | -63.9         | -55.5                 | 1.4                    | -54.1      | -13.0       | -41.1       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3465.00     | -61.0         | -53.2                 | 1.4                    | -51.8      | -13.0       | -38.8       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                  |                 |               |
|--------------------------|----------------------------------|-----------------|---------------|
| Mode                     | TX channel 20375<br>(1752.50MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                           |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3505.00     | -63.3         | -55.1                 | 1.5                    | -53.6      | -13.0       | -40.6       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3505.00     | -60.0         | -52.4                 | 1.5                    | -50.9      | -13.0       | -37.9       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 10MHz

|                          |                                  |                 |               |
|--------------------------|----------------------------------|-----------------|---------------|
| Mode                     | TX channel 20000<br>(1715.00MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                           |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3430.00     | -61.9         | -53.4                 | 1.4                    | -52.0      | -13.0       | -39.0       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3430.00     | -59.4         | -51.4                 | 1.4                    | -50.0      | -13.0       | -37.0       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                  |                 |               |
|--------------------------|----------------------------------|-----------------|---------------|
| Mode                     | TX channel 20175<br>(1732.50MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                           |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3465.00     | -62.4         | -54.0                 | 1.4                    | -52.6      | -13.0       | -39.6       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3465.00     | -61.0         | -53.2                 | 1.4                    | -51.8      | -13.0       | -38.8       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                  |                 |               |
|--------------------------|----------------------------------|-----------------|---------------|
| Mode                     | TX channel 20350<br>(1750.00MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                           |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3500.00     | -63.8         | -55.6                 | 1.5                    | -54.1      | -13.0       | -41.1       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3500.00     | -60.9         | -53.3                 | 1.5                    | -51.8      | -13.0       | -38.8       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 15MHz

|                          |                                  |                 |               |
|--------------------------|----------------------------------|-----------------|---------------|
| Mode                     | TX channel 20025<br>(1717.50MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                           |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3435.00     | -64.1         | -55.5                 | 1.3                    | -54.2      | -13.0       | -41.2       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3435.00     | -61.1         | -53.0                 | 1.3                    | -51.7      | -13.0       | -38.7       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                  |                 |               |
|--------------------------|----------------------------------|-----------------|---------------|
| Mode                     | TX channel 20175<br>(1732.50MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                           |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3465.00     | -62.6         | -54.2                 | 1.4                    | -52.8      | -13.0       | -39.8       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3465.00     | -60.5         | -52.7                 | 1.4                    | -51.3      | -13.0       | -38.3       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                  |                 |               |
|--------------------------|----------------------------------|-----------------|---------------|
| Mode                     | TX channel 20325<br>(1747.50MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                           |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3495.00     | -62.5         | -54.3                 | 1.5                    | -52.8      | -13.0       | -39.8       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3495.00     | -58.7         | -51.1                 | 1.5                    | -49.6      | -13.0       | -36.6       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 20MHz

|                          |                                  |                 |               |
|--------------------------|----------------------------------|-----------------|---------------|
| Mode                     | TX channel 20050<br>(1720.00MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                           |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3440.00     | -61.9         | -53.4                 | 1.3                    | -52.1      | -13.0       | -39.1       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3440.00     | -59.3         | -51.3                 | 1.3                    | -50.0      | -13.0       | -37.0       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                  |                 |               |
|--------------------------|----------------------------------|-----------------|---------------|
| Mode                     | TX channel 20175<br>(1732.50MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                           |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3465.00     | -63.0         | -54.6                 | 1.4                    | -53.2      | -13.0       | -40.2       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3465.00     | -61.1         | -53.3                 | 1.4                    | -51.9      | -13.0       | -38.9       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                  |                 |               |
|--------------------------|----------------------------------|-----------------|---------------|
| Mode                     | TX channel 20300<br>(1745.00MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                  | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                           |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |            |             |             |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3490.00     | -62.2         | -54.0                 | 1.5                    | -52.5      | -13.0       | -39.5       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |            |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 3490.00     | -59.0         | -51.4                 | 1.5                    | -49.9      | -13.0       | -36.9       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 13

Channel Bandwidth: 5MHz

|                          |                                 |                 |               |
|--------------------------|---------------------------------|-----------------|---------------|
| Mode                     | TX channel 23205<br>(779.50MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                 | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                          |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|---|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1559.00     | -53.4         | -45.7                 | 1.3                    | -44.4     | -13.0       | -31.4       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1559.00     | -55.0         | -48.2                 | 1.3                    | -46.9     | -13.0       | -33.9       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                 |                 |               |
|--------------------------|---------------------------------|-----------------|---------------|
| Mode                     | TX channel 23230<br>(782.00MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                 | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                          |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|---|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1564.00     | -54.0         | -46.2                 | 1.2                    | -45.0     | -13.0       | -32.0       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1564.00     | -53.1         | -46.2                 | 1.2                    | -45.0     | -13.0       | -32.0       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

|                          |                                 |                 |               |
|--------------------------|---------------------------------|-----------------|---------------|
| Mode                     | TX channel 23255<br>(784.50MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                 | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                          |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|---|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1569.00     | -54.8         | -46.9                 | 1.2                    | -45.7     | -13.0       | -32.7       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1569.00     | -55.2         | -48.3                 | 1.2                    | -47.1     | -13.0       | -34.1       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Channel Bandwidth: 10MHz

|                          |                                 |                 |               |
|--------------------------|---------------------------------|-----------------|---------------|
| Mode                     | TX channel 23230<br>(782.00MHz) | Frequency Range | Above 1000MHz |
| Environmental Conditions | 22deg. C, 66%RH                 | Input Power     | 120Vac, 60Hz  |
| Tested By                | Han Wu                          |                 |               |

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |               |                       |                        |           |             |             |
|---|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1564.00     | -53.8         | -46.0                 | 1.2                    | -44.8     | -13.0       | -31.8       |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |               |                       |                        |           |             |             |
| No.   | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1   | 1564.00     | -55.9         | -48.9                 | 1.2                    | -47.7     | -13.0       | -34.7       |

Remarks:

1. Output Power (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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The address and road map of all our labs can be found in our web site also.

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