# FCC Test Report
# (Part 90 – LTE Band 14)

| | |
|---|---|
| **Report No.:** | RFBBQZ-WTW-P21031117 |
| **FCC ID:** | PY320400515 |
| **Test Model:** | MR5200 |
| **Received Date:** | Mar. 31, 2021 |
| **Test Date:** | Apr. 27 ~ May 04, 2021 |
| **Issued Date:** | May 17, 2021 |

| | |
|---|---|
| **Applicant and Manufacturer:** | NETGEAR INC. |
| **Address:** | 350 East Plumeria Drive, San Jose, CA 95134, USA |

| | |
|---|---|
| **Issued By:** | Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch<br>Lin Kou Laboratories |
| **Lab Address:** | No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan |
| **Test Location:** | No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan |
| **FCC Registration / Designation Number:** | 788550 / TW0003 |

Testing Laboratory
2021

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## Release Control Record

| Issue No. | Description | Date Issued |
|---|---|---|
| RFBBQZ-WTW-P21031117 | Original release | May 17, 2021 |

## 1 Certificate of Conformity

| | |
|---|---|
| **Product:** | 5G MHS Travel Router |
| **Brand:** | NETGEAR |
| **Test Model:** | MR5200 |
| **Sample Status:** | Engineering sample |
| **Applicant:** | NETGEAR INC. |
| **Test Date:** | Apr. 27 ~ May 04, 2021 |
| **Standards:** | FCC Part 90, Subpart R |

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 RF characteristics under the conditions specified in this report.

**Prepared by :** Pettie Chen , **Date:** May 17, 2021

Pettie Chen / Senior Specialist

**Approved by :** Bruce Chen , **Date:** May 17, 2021

Bruce Chen / Senior Project Engineer

## 2 Summary of Test Results

| Applied Standard: FCC Part 90 & Part 2 | | | |
|---|---|---|---|
| FCC Clause | Test Item | Result | Remarks |
| 2.1046<br>90.542 (a)(7) | Effective Radiated Power | Pass | Meet the requirement of limit. |
| 2.1047 | Modulation Characteristics | Pass | Meet the requirement of limit. |
| 2.1055<br>90.539 (e) | Frequency Stability | Pass | Meet the requirement of limit. |
| 2.1049 | Occupied Bandwidth | Pass | Meet the requirement of limit. |
| - | Emission Masks | Pass | Meet the requirement of limit. |
| 2.1053<br>90.543 (e)(2)(3) | Band Edge Measurements | Pass | Meet the requirement of limit. |
| 2.1051<br>90.543 (e)(3) | Conducted Spurious Emissions | Pass | Meet the requirement of limit. |
| 2.1053<br>90.543 (e)(f) | Radiated Spurious Emissions | Pass | Meet the requirement of limit.<br>Minimum passing margin is -16.8dB at 1581.00MHz. |

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 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 | 9kHz ~ 30MHz | 3.04 dB |
| | 30MHz ~ 200MHz | 3.63 dB |
| | 200MHz ~1000MHz | 3.64 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>ROHDE & SCHWARZ | ESCI | 100424 | Dec. 31, 2020 | Dec. 30, 2021 |
| Spectrum Analyzer<br>ROHDE & SCHWARZ | FSP40 | 100040 | Sep. 16, 2020 | Sep. 15, 2021 |
| BILOG Antenna<br>SCHWARZBECK | VULB9168 | 9168-155 | Nov. 03, 2020 | Nov. 02, 2021 |
| HORN Antenna<br>SCHWARZBECK | BBHA 9120D | 9120D-1170 | Nov. 22, 2020 | Nov. 21, 2021 |
| HORN Antenna<br>SCHWARZBECK | BBHA 9170 | BBHA9170241 | Nov. 22, 2020 | Nov. 21, 2021 |
| Preamplifier<br>Agilent<br>(Below 1GHz) | 8447D | 2944A10631 | Jun. 08, 2020 | Jun. 07, 2021 |
| Preamplifier<br>KEYSIGHT<br>(Above 1GHz) | 83017A | MY53270295 | Jun. 08, 2020 | Jun. 07, 2021 |
| RF Coaxial Cable<br>WOKEN<br>With 5dB PAD | 8D-FB | Cable-CH4-01 | Aug. 16, 2020 | Aug. 15, 2021 |
| RF Coaxial Cable<br>EMCI | EMC102-KM-KM-3000 | 150929 | Aug. 16, 2020 | Aug. 15, 2021 |
| RF Coaxial Cable<br>EMCI | EMC102-KM-KM-600 | 150928 | Aug. 16, 2020 | Aug. 15, 2021 |
| RF signal cable<br>HUBER+SUHNER | SUCOFLEX 104 | MY 13380+295012/04 | Jun. 08, 2020 | Jun. 07, 2021 |
| RF signal cable<br>HUBER+SUHNER | SUCOFLEX 104 | Cable-CH4-03 (250724) | Jun. 08, 2020 | Jun. 07, 2021 |
| Software<br>BV ADT | ADT_Radiated_<br>V7.6.15.9.5 | NA | NA | NA |
| Antenna Tower<br>inn-co GmbH | MA 4000 | 010303 | NA | NA |
| Antenna Tower Controller<br>BV ADT | AT100 | AT93021703 | NA | NA |
| Turn Table<br>BV ADT | TT100 | TT93021703 | NA | NA |
| Turn Table Controller<br>BV ADT | SC100 | SC93021703 | NA | NA |
| Boresight Antenna Fixture | FBA-01 | FBA-SIP01 | 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 Temperature<br>And Humidity Chamber | TH-4S-C | W981030 | Jun. 01, 2020 | May 31, 2021 |
| JFW 20dB attenuation | 50HF-020-SMA | NA | NA | NA |
| True RMS Clamp Meter<br>Fluke | 325 | 31130711WS | Jun. 06, 2020 | Jun. 05, 2021 |

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 4.

## 3 General Information

### 3.1 General Description of EUT

| | | | | | |
|---|---|---|---|---|---|
| Product | 5G MHS Travel Router | | | | |
| Brand | NETGEAR | | | | |
| Test Model | MR5200 | | | | |
| Sample Status | Engineering Sample | | | | |
| Power Supply Rating | 5 or 9Vdc (adapter)<br>5Vdc (host equipment)<br>3.85Vdc (battery) | | | | |
| Modulation Type | QPSK, 16QAM, 64QAM, 256QAM | | | | |
| Operating Frequency | LTE Band 14 (Channel Bandwidth 5MHz) | 790.5MHz ~ 795.5MHz | | | |
| | LTE Band 14 (Channel Bandwidth 10MHz) | 793.0MHz | | | |
| Max. ERP Power (Internal Antenna) | | QPSK | 16QAM | 64QAM | 256QAM |
| | LTE Band 14 (Channel Bandwidth 5MHz) | 221.309mW (23.45dBm) | 175.792mW (22.45dBm) | 149.624mW (21.75dBm) | 118.850mW (20.75dBm) |
| | LTE Band 14 (Channel Bandwidth 10MHz) | 238.232mW (23.77dBm) | 189.234mW (22.77dBm) | 164.816mW (22.17dBm) | 130.918mW (21.17dBm) |
| Max. ERP Power (External Antenna) | | QPSK | 16QAM | 64QAM | 256QAM |
| | LTE Band 14 (Channel Bandwidth 5MHz) | 226.464mW (23.55dBm) | 179.887mW (22.55dBm) | 158.489mW (22.00dBm) | 125.893mW (21.00dBm) |
| | LTE Band 14 (Channel Bandwidth 10MHz) | 246.037mW (23.91dBm) | 195.434mW (22.91dBm) | 170.216mW (22.31dBm) | 135.207mW (21.31dBm) |
| Emission Designator | | QPSK | 16QAM | 64QAM | 256QAM |
| | LTE Band 14 (Channel Bandwidth 5MHz) | 4M49G7D | 4M49D7W | 4M49D7W | 4M49D7W |
| | LTE Band 14 (Channel Bandwidth 10MHz) | 8M97G7D | 8M97D7W | 8M97D7W | 8M97D7W |
| Antenna Type | Refer to Note | | | | |
| Antenna Connector | Refer to Note | | | | |
| Accessory Device | Adapter x1, battery x1 | | | | |
| Cable Supplied | 1m shielded USB cable without core (Brand: NIENYI, model: NYS2371-1) | | | | |

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report of BV CPS report no.: RFBBQZ-WTW-P20120749-5. Differences compared with the original report are changing model and adding LTE Band 14. Therefore, the EUT was tested and presented in the test report.

2. The EUT uses following adapter and battery.

| Adapter | |
|---|---|
| Brand | NETGEAR |
| Model | AD2122F20 |
| P/N | 332-11106-01 |
| Input Power | 100-240Vac, 50-60Hz, 0.5A |
| Output Power | 5Vdc, 2.0A<br>9Vdc, 1.8A |

| Battery | |
|---|---|
| Brand | NETGEAR |
| Model | W-20 |
| Rating | 3.85Vdc ,19.40Wh |

3. The following antennas were provided to the EUT.

Internal Antenna

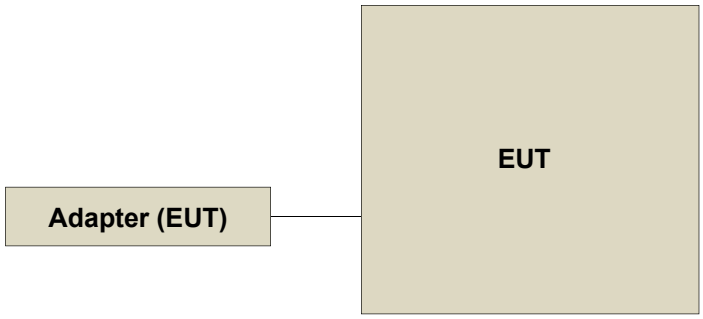
| No. | Type | Connector | Gain (dBi) |
|---|---|---|---|
| | | | B14 |
| 1 | Monopole | NA | 0.16 |
| 2 | Monopole | NA | 0.67 |

External Antenna

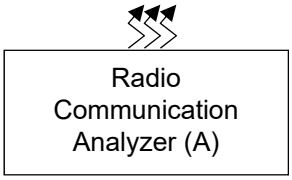
| No. | Type | Connector | Gain (dBi) |
|---|---|---|---|
| | | | B14 |
| 1 | Monopole | TS-9 plugs | 0.54 |
| 2 | Monopole | TS-9 plugs | 0.48 |

* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

### 3.2 Configuration of System under Test




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 Communication Analyzer | Anritsu | MT8821C | 6261806803 | 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 as the table below. Following channel(s) was (were) selected for the final test as listed below:

| Band | ERP | | Radiated Emission | |
|---|---|---|---|---|
| | Internal Antenna | External Antenna | Internal Antenna | External Antenna |
| LTE Band 14 | X-plane | Z-plane | X-plane | Z-plane |

LTE Band 14

| EUT Configure Mode | Test item | Available channel | Tested channel | Channel Bandwidth | Modulation | Mode |
|---|---|---|---|---|---|---|
| - | ERP | 23305 to 23355 | 23305 (790.5MHz), 23330 (793.0MHz), 23355 (795.5MHz) | 5MHz | QPSK / 16QAM / 64QAM / 256QAM | 1 RB / 0 RB Offset<br>1 RB / 12 RB Offset<br>1 RB / 24 RB Offset<br>12 RB / 0 RB Offset<br>12 RB / 6 RB Offset<br>12 RB / 13 RB Offset<br>25 RB / 0 RB Offset |
| | | 23330 | 23330 (793.0MHz) | 10MHz | QPSK / 16QAM / 64QAM / 256QAM | 1 RB / 0 RB Offset<br>1 RB / 24 RB Offset<br>1 RB / 49 RB Offset<br>25 RB / 0 RB Offset<br>25 RB / 12 RB Offset<br>25 RB / 25 RB Offset<br>50 RB / 0 RB Offset |
| - | Modulation Characteristics | 23330 | 23330 (793.0MHz) | 10MHz | QPSK / 16QAM / 64QAM / 256QAM | 50 RB / 0 RB Offset |
| - | Frequency Stability | 23305 to 23355 | 23305 (790.5MHz), 23355 (795.5MHz) | 5MHz | QPSK | 25RB / 0RB Offset |
| | | 23330 | 23330 (793.0MHz) | 10MHz | QPSK | 50RB / 0RB Offset |
| - | Occupied Bandwidth | 23305 to 23355 | 23305 (790.5MHz), 23330 (793.0MHz), 23355 (795.5MHz) | 5MHz | QPSK / 16QAM / 64QAM / 256QAM | 25RB / 0RB Offset |
| | | 23330 | 23330 (793.0MHz) | 10MHz | QPSK / 16QAM / 64QAM / 256QAM | 50RB / 0RB Offset |
| - | Emission Mask | 23305 to 23355 | 23305 (790.5MHz), 23330 (793.0MHz), 23355 (795.5MHz) | 5MHz | QPSK | 1 RB / 0 RB Offset<br>1 RB / 24 RB Offset<br>25RB / 0RB Offset |
| | | 23330 | 23330 (793.0MHz) | 10MHz | QPSK | 1 RB / 0 RB Offset<br>1 RB / 49 RB Offset<br>50RB / 0RB Offset |
| - | Conducted Emission | 23305 to 23355 | 23305 (790.5MHz), 23330 (793.0MHz), 23355 (795.5MHz) | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 23330 | 23330 (793.0MHz) | 10MHz | QPSK | 1 RB / 0 RB Offset |

| EUT Configure Mode | Test item | Available channel | Tested channel | Channel Bandwidth | Modulation | Mode |
|---|---|---|---|---|---|---|
| - | Radiated Emission below 1GHz | 23305 to 23355 | 23305 (790.5MHz) | 5MHz | QPSK | 1 RB / 0 RB Offset |
| - | Radiated Emission above 1GHz | 23305 to 23355 | 23305 (790.5MHz), 23330 (793.0MHz), 23355 (795.5MHz) | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 23330 | 23330 (793.0MHz) | 10MHz | QPSK | 1 RB / 0 RB Offset |

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM, 64QAM and 256QAM, measured value of QPSK is higher than 16QAM, 64QAM and 256QAM mode. Therefore, only Modulation characteristics, occupied bandwidth items had been tested under QPSK, 16QAM, 64QAM and 256QAM modes, the other test items were performed under QPSK mode only.

Test Condition:

| Test Item | Environmental Conditions | Input Power | Tested By |
|---|---|---|---|
| ERP | 22deg. C, 66%RH | 120Vac, 60Hz | Han Wu |
| Modulation characteristics | 22deg. C, 66%RH | 120Vac, 60Hz | Gavin Wu |
| Frequency Stability | 22deg. C, 66%RH | 3.85Vdc | Gavin Wu |
| Occupied Bandwidth | 22deg. C, 66%RH | 120Vac, 60Hz | Gavin Wu |
| Emission Mask | 22deg. C, 66%RH | 120Vac, 60Hz | Gavin Wu |
| Conducted Emission | 22deg. C, 66%RH | 120Vac, 60Hz | Gavin Wu |
| Radiated Emission | 22deg. C, 66%RH | 120Vac, 60Hz | Hans 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 and References

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

**Test Standard:**

**FCC 47 CFR Part 2**
**FCC 47 CFR Part 90**
**ANSI/TIA/EIA-603-E 2016**
ANSI 63.26-2015

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

**References Test Guidance:**

**KDB 971168 D01 Power Meas License Digital Systems v03r01**
**KDB 971168 D02 Misc Rev Approv License Devices v02r01**

All test items have been performed as a reference to the above KDB test guidance.

# 4 Test Types and Results

## 4.1 Output Power Measurement

### 4.1.1 Limits of Output Power Measurement

Control stations and mobile stations transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 30 watts ERP. Portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

### 4.1.2 Test Procedures

**EIRP / ERP Measurement:**

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) 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.

b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.

d. Following C63.26 section 5.2.7 and 5.2.2.4
   - EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.
   - ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

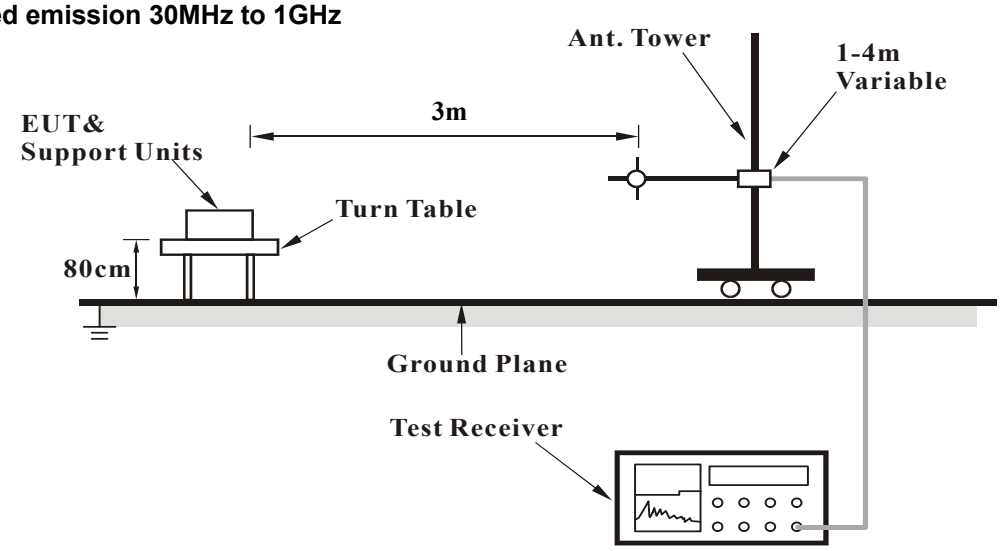
**Conducted Power Measurement:**

The EUT was set up for the maximum power with LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

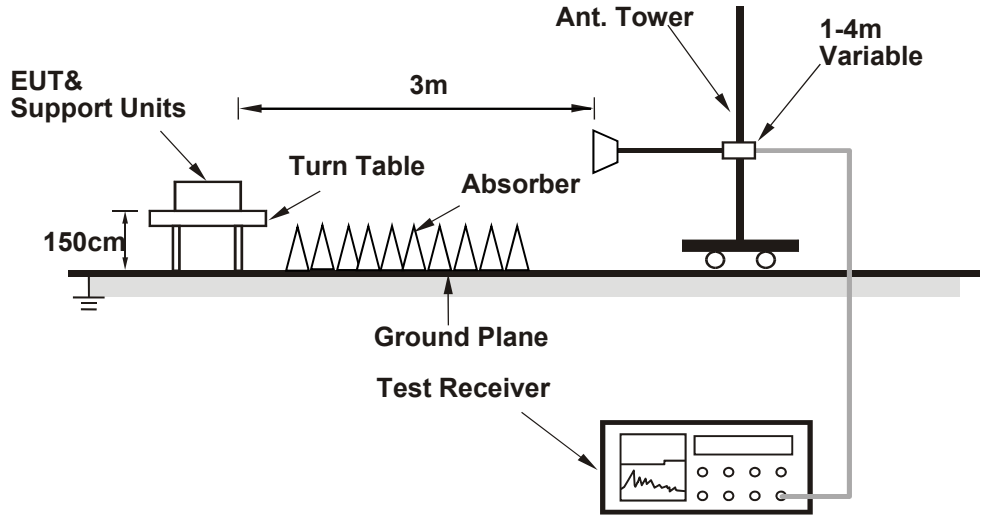
### 4.1.3 Test Setup

EIRP / ERP Measurement:

**For radiated emission 30MHz to 1GHz**

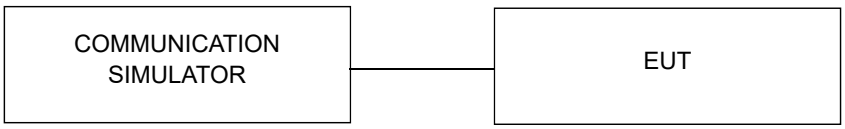



**For radiated emission above 1GHz**




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)**

| LTE Band 14 | | | | |
|---|---|---|---|---|
| BW | MCS Index | RB Size | RB Offset | Mid |
| | | Channel | | 23330 |
| | | Frequency (MHz) | | 793 |
| 10M | QPSK | 1 | 0 | 23.39 |
| | | 1 | 24 | 23.36 |
| | | 1 | 49 | 23.27 |
| | | 25 | 0 | 22.43 |
| | | 25 | 12 | 22.41 |
| | | 25 | 25 | 22.38 |
| | | 50 | 0 | 22.39 |
| 10M | 16QAM | 1 | 0 | 22.67 |
| | | 1 | 24 | 22.71 |
| | | 1 | 49 | 22.68 |
| | | 25 | 0 | 21.41 |
| | | 25 | 12 | 21.38 |
| | | 25 | 25 | 21.39 |
| | | 50 | 0 | 21.43 |
| 10M | 64QAM | 1 | 0 | 21.61 |
| | | 1 | 24 | 21.51 |
| | | 1 | 49 | 21.53 |
| | | 25 | 0 | 20.51 |
| | | 25 | 12 | 20.47 |
| | | 25 | 25 | 20.46 |
| | | 50 | 0 | 20.49 |
| 10M | 256QAM | 1 | 0 | 18.43 |
| | | 1 | 24 | 18.55 |
| | | 1 | 49 | 18.23 |
| | | 25 | 0 | 18.41 |
| | | 25 | 12 | 18.37 |
| | | 25 | 25 | 18.26 |
| | | 50 | 0 | 18.35 |

| LTE Band 14 | | | | | | |
|---|---|---|---|---|---|---|
| BW | MCS Index | RB Size | RB Offset | Low | Mid | High |
| | | Channel | | 23305 | 23330 | 23355 |
| | | Frequency (MHz) | | 790.5 | 793 | 795.5 |
| 5M | QPSK | 1 | 0 | 23.22 | 23.37 | 23.16 |
| | | 1 | 12 | 23.34 | 23.35 | 23.27 |
| | | 1 | 24 | 23.14 | 23.19 | 23.09 |
| | | 12 | 0 | 22.24 | 22.34 | 22.20 |
| | | 12 | 6 | 22.38 | 22.40 | 22.36 |
| | | 12 | 13 | 22.29 | 22.34 | 22.26 |
| | | 25 | 0 | 22.33 | 22.33 | 22.20 |
| 5M | 16QAM | 1 | 0 | 22.57 | 22.62 | 22.49 |
| | | 1 | 12 | 22.62 | 22.65 | 22.63 |
| | | 1 | 24 | 22.67 | 22.67 | 22.55 |
| | | 12 | 0 | 21.39 | 21.41 | 21.33 |
| | | 12 | 6 | 21.33 | 21.34 | 21.18 |
| | | 12 | 13 | 21.33 | 21.36 | 21.18 |
| | | 25 | 0 | 21.27 | 21.33 | 21.22 |
| 5M | 64QAM | 1 | 0 | 21.46 | 21.52 | 21.42 |
| | | 1 | 12 | 21.34 | 21.41 | 21.34 |
| | | 1 | 24 | 21.35 | 21.43 | 21.37 |
| | | 12 | 0 | 20.42 | 20.51 | 20.38 |
| | | 12 | 6 | 20.29 | 20.39 | 20.27 |
| | | 12 | 13 | 20.38 | 20.43 | 20.42 |
| | | 25 | 0 | 20.41 | 20.41 | 20.39 |
| 5M | 256QAM | 1 | 0 | 18.37 | 18.41 | 18.35 |
| | | 1 | 12 | 18.38 | 18.37 | 18.33 |
| | | 1 | 24 | 18.20 | 18.36 | 18.13 |
| | | 12 | 0 | 18.29 | 18.29 | 18.21 |
| | | 12 | 6 | 18.11 | 18.17 | 18.08 |
| | | 12 | 13 | 18.25 | 18.30 | 18.10 |
| | | 25 | 0 | 18.23 | 18.35 | 18.27 |

**ERP Power (dBm)**

Internal Antenna

**Modulation Type: QPSK**

LTE Band 14, Channel Bandwidth: 5MHz

| Mode | | TX channel 23305, 23330, 23355 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 20.05 | 34.77 | -14.72 | 1.54 H | 358 | 90.80 | -70.75 |
| 2 | 793.00 | 20.35 | 34.77 | -14.42 | 1.52 H | 3 | 91.12 | -70.77 |
| 3 | 795.50 | 20.65 | 34.77 | -14.12 | 1.49 H | 359 | 91.43 | -70.78 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 23.15 | 34.77 | -11.62 | 1.29 V | 133 | 93.90 | -70.75 |
| 2 | 793.00 | 23.36 | 34.77 | -11.41 | 1.32 V | 129 | 94.13 | -70.77 |
| 3 | 795.50 | 23.45 | 34.77 | -11.32 | 1.24 V | 132 | 94.23 | -70.78 |

LTE Band 14, Channel Bandwidth: 10MHz

| Mode | | TX channel 23330 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 20.30 | 34.77 | -14.47 | 1.50 H | 358 | 91.07 | -70.77 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 23.77 | 34.77 | -11.00 | 1.33 V | 135 | 94.54 | -70.77 |

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value

**Modulation Type: 16QAM**

LTE Band 14, Channel Bandwidth: 5MHz

| Mode | | TX channel 23305, 23330, 23355 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 19.05 | 34.77 | -15.72 | 1.54 H | 358 | 89.80 | -70.75 |
| 2 | 793.00 | 19.35 | 34.77 | -15.42 | 1.52 H | 3 | 90.12 | -70.77 |
| 3 | 795.50 | 19.65 | 34.77 | -15.12 | 1.49 H | 359 | 90.43 | -70.78 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 22.15 | 34.77 | -12.62 | 1.29 V | 133 | 92.90 | -70.75 |
| 2 | 793.00 | 22.36 | 34.77 | -12.41 | 1.32 V | 129 | 93.13 | -70.77 |
| 3 | 795.50 | 22.45 | 34.77 | -12.32 | 1.24 V | 132 | 93.23 | -70.78 |

LTE Band 14, Channel Bandwidth: 10MHz

| Mode | | TX channel 23330 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 19.30 | 34.77 | -15.47 | 1.50 H | 358 | 90.07 | -70.77 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 22.77 | 34.77 | -12.00 | 1.33 V | 135 | 93.54 | -70.77 |

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value

**Modulation Type: 64QAM**

LTE Band 14, Channel Bandwidth: 5MHz

| Mode | | TX channel 23305, 23330, 23355 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 18.25 | 34.77 | -16.52 | 1.54 H | 358 | 89.00 | -70.75 |
| 2 | 793.00 | 18.55 | 34.77 | -16.22 | 1.52 H | 3 | 89.32 | -70.77 |
| 3 | 795.50 | 18.85 | 34.77 | -15.92 | 1.49 H | 359 | 89.63 | -70.78 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 21.35 | 34.77 | -13.42 | 1.29 V | 133 | 92.10 | -70.75 |
| 2 | 793.00 | 21.66 | 34.77 | -13.11 | 1.32 V | 129 | 92.43 | -70.77 |
| 3 | 795.50 | 21.75 | 34.77 | -13.02 | 1.24 V | 132 | 92.53 | -70.78 |

LTE Band 14, Channel Bandwidth: 10MHz

| Mode | | TX channel 23330 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 18.50 | 34.77 | -16.27 | 1.50 H | 358 | 89.27 | -70.77 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 22.17 | 34.77 | -12.60 | 1.33 V | 135 | 92.94 | -70.77 |

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value

**Modulation Type: 256QAM**

LTE Band 14, Channel Bandwidth: 5MHz

| Mode | TX channel 23305, 23330, 23355 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 17.25 | 34.77 | -17.52 | 1.54 H | 358 | 88.00 | -70.75 |
| 2 | 793.00 | 17.55 | 34.77 | -17.22 | 1.52 H | 3 | 88.32 | -70.77 |
| 3 | 795.50 | 17.85 | 34.77 | -16.92 | 1.49 H | 359 | 88.63 | -70.78 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 20.35 | 34.77 | -14.42 | 1.29 V | 133 | 91.10 | -70.75 |
| 2 | 793.00 | 20.66 | 34.77 | -14.11 | 1.32 V | 129 | 91.43 | -70.77 |
| 3 | 795.50 | 20.75 | 34.77 | -14.02 | 1.24 V | 132 | 91.53 | -70.78 |

LTE Band 14, Channel Bandwidth: 10MHz

| Mode | TX channel 23330 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 17.50 | 34.77 | -17.27 | 1.50 H | 358 | 88.27 | -70.77 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 21.17 | 34.77 | -13.60 | 1.33 V | 135 | 91.94 | -70.77 |

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value

External Antenna

**Modulation Type: QPSK**

LTE Band 14, Channel Bandwidth: 5MHz

| Mode | TX channel 23305, 23330, 23355 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 23.50 | 34.77 | -11.27 | 1.00 H | 189 | 94.25 | -70.75 |
| 2 | 793.00 | 23.55 | 34.77 | -11.22 | 1.00 H | 188 | 94.32 | -70.77 |
| 3 | 795.50 | 23.05 | 34.77 | -11.72 | 1.00 H | 191 | 93.83 | -70.78 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 17.65 | 34.77 | -17.12 | 1.78 V | 199 | 88.40 | -70.75 |
| 2 | 793.00 | 17.45 | 34.77 | -17.32 | 1.81 V | 197 | 88.22 | -70.77 |
| 3 | 795.50 | 17.65 | 34.77 | -17.12 | 1.87 V | 202 | 88.43 | -70.78 |

LTE Band 14, Channel Bandwidth: 10MHz

| Mode | TX channel 23330 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 23.91 | 34.77 | -10.86 | 1.01 H | 192 | 94.68 | -70.77 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 17.51 | 34.77 | -17.26 | 1.76 V | 200 | 88.28 | -70.77 |

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value

**Modulation Type: 16QAM**

LTE Band 14, Channel Bandwidth: 5MHz

| Mode | | TX channel 23305, 23330, 23355 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 22.50 | 34.77 | -12.27 | 1.00 H | 189 | 93.25 | -70.75 |
| 2 | 793.00 | 22.55 | 34.77 | -12.22 | 1.00 H | 188 | 93.32 | -70.77 |
| 3 | 795.50 | 22.05 | 34.77 | -12.72 | 1.00 H | 191 | 92.83 | -70.78 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 16.65 | 34.77 | -18.12 | 1.78 V | 199 | 87.40 | -70.75 |
| 2 | 793.00 | 16.45 | 34.77 | -18.32 | 1.81 V | 197 | 87.22 | -70.77 |
| 3 | 795.50 | 16.65 | 34.77 | -18.12 | 1.87 V | 202 | 87.43 | -70.78 |

LTE Band 14, Channel Bandwidth: 10MHz

| Mode | | TX channel 23330 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 22.91 | 34.77 | -11.86 | 1.01 H | 192 | 93.68 | -70.77 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 16.51 | 34.77 | -18.26 | 1.76 V | 200 | 87.28 | -70.77 |

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value

**Modulation Type: 64QAM**

LTE Band 14, Channel Bandwidth: 5MHz

| Mode | TX channel 23305, 23330, 23355 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 22.00 | 34.77 | -12.77 | 1.00 H | 189 | 92.75 | -70.75 |
| 2 | 793.00 | 21.85 | 34.77 | -12.92 | 1.00 H | 188 | 92.62 | -70.77 |
| 3 | 795.50 | 21.45 | 34.77 | -13.32 | 1.00 H | 191 | 92.23 | -70.78 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 16.05 | 34.77 | -18.72 | 1.78 V | 199 | 86.80 | -70.75 |
| 2 | 793.00 | 15.75 | 34.77 | -19.02 | 1.81 V | 197 | 86.52 | -70.77 |
| 3 | 795.50 | 15.00 | 34.77 | -19.77 | 1.87 V | 202 | 85.78 | -70.78 |

LTE Band 14, Channel Bandwidth: 10MHz

| Mode | TX channel 23330 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 22.31 | 34.77 | -12.46 | 1.01 H | 192 | 93.08 | -70.77 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 15.85 | 34.77 | -18.92 | 1.76 V | 200 | 86.62 | -70.77 |

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value

**Modulation Type: 256QAM**

LTE Band 14, Channel Bandwidth: 5MHz

| Mode | TX channel 23305, 23330, 23355 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 21.00 | 34.77 | -13.77 | 1.00 H | 189 | 91.75 | -70.75 |
| 2 | 793.00 | 20.85 | 34.77 | -13.92 | 1.00 H | 188 | 91.62 | -70.77 |
| 3 | 795.50 | 20.45 | 34.77 | -14.32 | 1.00 H | 191 | 91.23 | -70.78 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 790.50 | 15.05 | 34.77 | -19.72 | 1.78 V | 199 | 85.80 | -70.75 |
| 2 | 793.00 | 14.75 | 34.77 | -20.02 | 1.81 V | 197 | 85.52 | -70.77 |
| 3 | 795.50 | 14.00 | 34.77 | -20.77 | 1.87 V | 202 | 84.78 | -70.78 |

LTE Band 14, Channel Bandwidth: 10MHz

| Mode | TX channel 23330 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 21.31 | 34.77 | -13.46 | 1.01 H | 192 | 92.08 | -70.77 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | | |
| No. | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 793.00 | 14.85 | 34.77 | -19.92 | 1.76 V | 200 | 85.62 | -70.77 |

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value

## 4.2 Modulation Characteristics Measurement

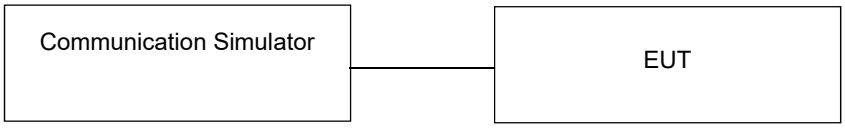
### 4.2.1 Limits of Modulation Characteristics

N/A

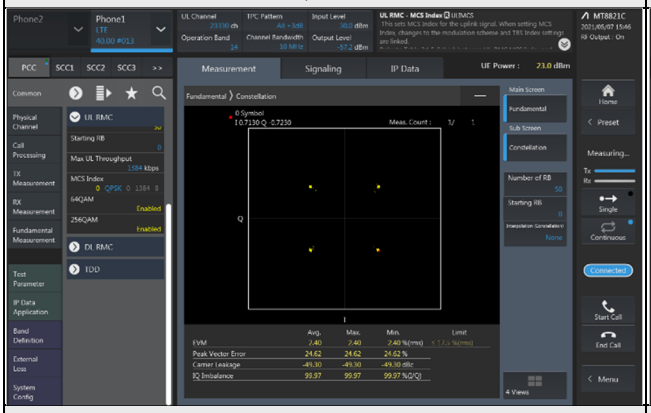
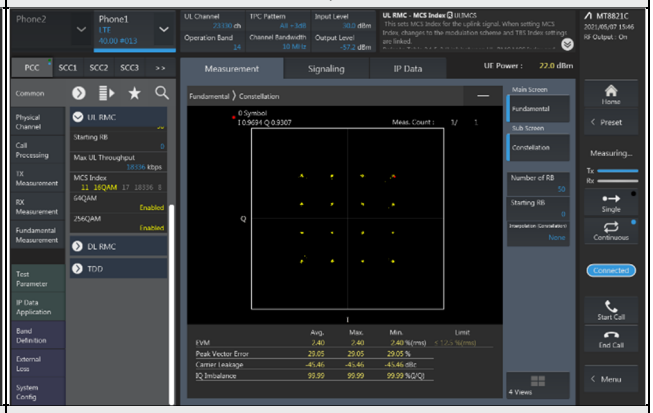
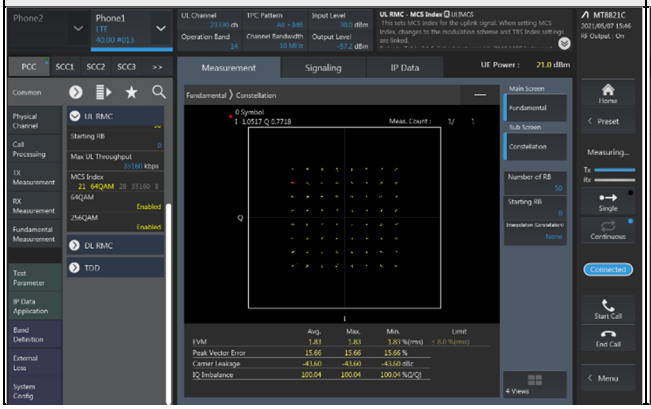
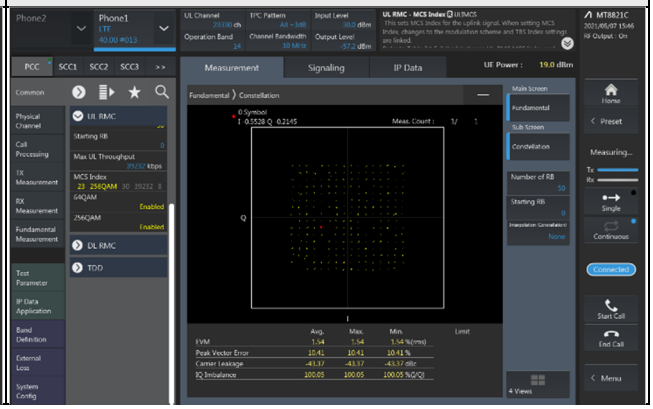
### 4.2.2 Test Procedure

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

| LTE Band 14 | |
|---|---|
| Spectrum Plot of Measurement Value | |
| Channel: 23330 / Frequency (MHz): 793.0MHz | |
| QPSK | 16QAM |
|  |  |
| 64QAM | 256QAM |
|  |  |

### 4.3 Frequency Stability Measurement

#### 4.3.1 Limits of Frequency Stability Measurement

The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a base station, and 5 parts per million or better when AFC is not locked.

#### 4.3.2 Test Procedure

a. 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.
b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5 ℃ 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.

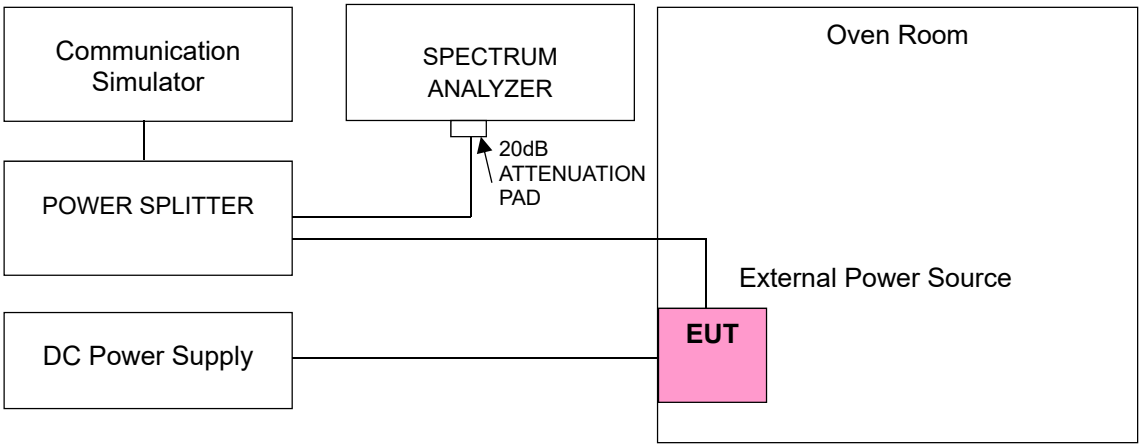
Note: The frequency error was recorded frequency error from the communication simulator.

#### 4.3.3 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Due |
|---|---|---|---|---|
| Radio Communication Analyzer Anritsu | MT8820C | 6201010284 | Dec. 28, 2020 | Dec. 27, 2021 |
| Temperature & Humidity Chamber TERCHY | HRM-120RF | 931022 | Dec. 24, 2020 | Dec. 23, 2021 |
| Digital Multimeter Fluke | 87-III | 70360742 | Jun. 23, 2020 | Jun. 22, 2021 |
| DC Power Supply Topward | 6306A | 727263 | 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.

### 4.3.4 Test Setup



### 4.3.5 Test Results

Frequency Error vs. Voltage

| Voltage (Vdc) | LTE Band 14 | | | |
|---|---|---|---|---|
| | Channel Bandwidth: 5MHz | | | |
| | Low Channel | | High Channel | |
| | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 3.85 | 790.500002 | 0.003 | 795.500003 | 0.004 |
| 3.40 | 790.500004 | 0.005 | 795.500001 | 0.002 |
| 4.40 | 790.500001 | 0.002 | 795.500001 | 0.001 |

Note: The applicant defined the normal working voltage is from 3.40Vdc to 4.40Vdc.

Frequency Error vs. Temperature

| Temp. (℃) | LTE Band 14 | | | |
|---|---|---|---|---|
| | Channel Bandwidth: 5 MHz | | | |
| | Low Channel | | High Channel | |
| | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -30 | 790.500004 | 0.005 | 795.500003 | 0.004 |
| -20 | 790.500002 | 0.002 | 795.500002 | 0.002 |
| -10 | 790.500004 | 0.005 | 795.500002 | 0.002 |
| 0 | 790.500004 | 0.005 | 795.500002 | 0.002 |
| 10 | 790.500003 | 0.004 | 795.500001 | 0.002 |
| 20 | 790.499997 | -0.004 | 795.499999 | -0.002 |
| 30 | 790.499998 | -0.003 | 795.499999 | -0.002 |
| 40 | 790.499997 | -0.004 | 795.499998 | -0.002 |
| 50 | 790.499998 | -0.002 | 795.499997 | -0.004 |

Frequency Error vs. Voltage

| Voltage (Vdc) | LTE Band 14 | |
|---|---|---|
| | Channel Bandwidth: 10 MHz | |
| | Frequency (MHz) | Frequency Error (ppm) |
| 3.85 | 793.000003 | 0.003 |
| 3.40 | 793.000001 | 0.001 |
| 4.40 | 793.000002 | 0.003 |

Note: The applicant defined the normal working voltage is from 3.40Vdc to 4.40Vdc.

Frequency Error vs. Temperature

| Temp. (℃) | LTE Band 14 | |
|---|---|---|
| | Channel Bandwidth: 10 MHz | |
| | Frequency (MHz) | Frequency Error (ppm) |
| -30 | 793.000004 | 0.005 |
| -20 | 793.000001 | 0.001 |
| -10 | 793.000002 | 0.002 |
| 0 | 793.000002 | 0.002 |
| 10 | 793.000001 | 0.002 |
| 20 | 792.999999 | -0.002 |
| 30 | 792.999999 | -0.001 |
| 40 | 792.999999 | -0.002 |
| 50 | 792.999997 | -0.004 |

## 4.4 Occupied Bandwidth Measurement

### 4.4.1 Limits of Occupied Bandwidth Measurement

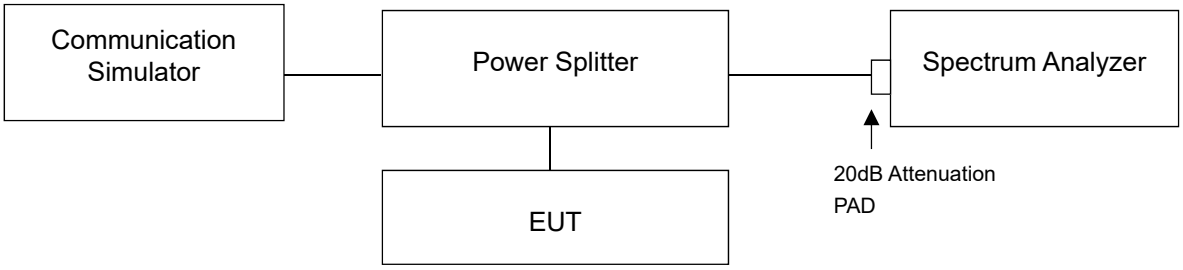
The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

### 4.4.2 Test Procedure

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Measurement method, please refer to section 5.4.4 of ANSI C63.26. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

For the 26dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

### 4.4.3 Test Setup

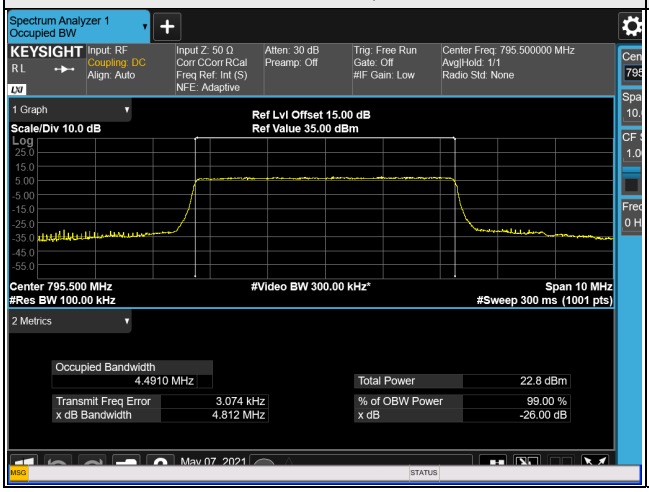


### 4.4.4 Test Result

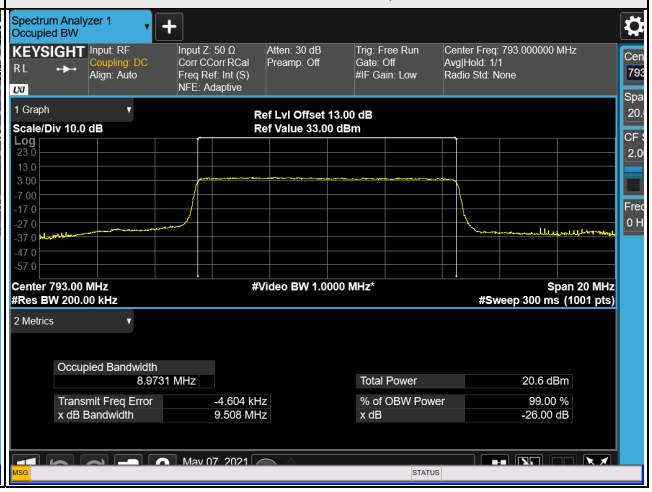
| LTE Band 14, Channel Bandwidth 5MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | | | |
| | | QPSK | 16QAM | 64QAM | 256QAM |
| 23305 | 790.5 | 4.48 | 4.48 | 4.49 | 4.49 |
| 23330 | 793.0 | 4.49 | 4.49 | 4.49 | 4.49 |
| 23355 | 795.5 | 4.49 | 4.49 | 4.49 | 4.49 |
| LTE Band 14, Channel Bandwidth 10MHz | | | | | |
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | | | |
| | | QPSK | 16QAM | 64QAM | 256QAM |
| 23330 | 793.0 | 8.97 | 8.97 | 8.97 | 8.97 |

Spectrum Plot of Worst Value

5MHz / 16QAM

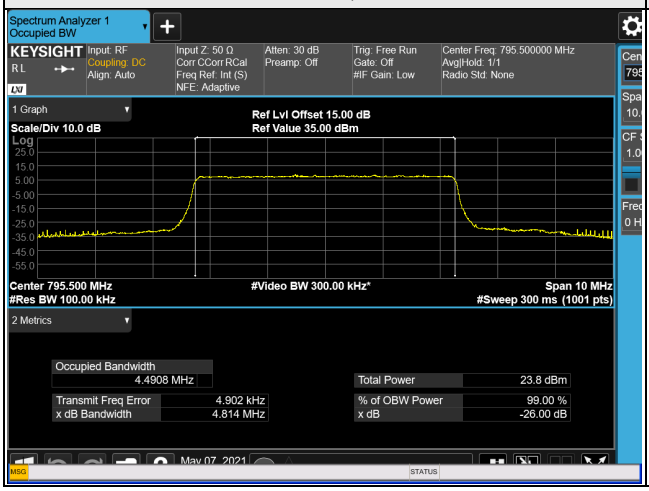
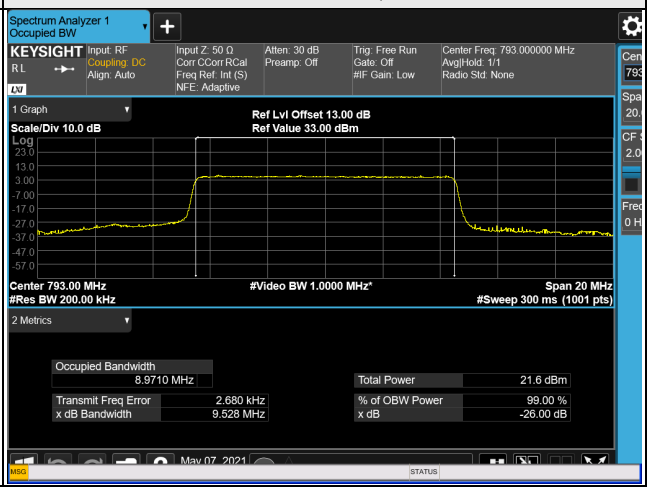



10MHz / 256QAM



## 26dB Bandwidth

| LTE Band 14, Channel Bandwidth 5MHz | | | | | |
|---|---|---|---|---|---|
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | | | |
| | | QPSK | 16QAM | 64QAM | 256QAM |
| 23305 | 790.5 | 4.80 | 4.81 | 4.79 | 4.79 |
| 23330 | 793.0 | 4.80 | 4.81 | 4.81 | 4.81 |
| 23355 | 795.5 | 4.81 | 4.81 | 4.81 | 4.81 |
| LTE Band 14, Channel Bandwidth 10MHz | | | | | |
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | | | |
| | | QPSK | 16QAM | 64QAM | 256QAM |
| 23330 | 793.0 | 9.52 | 9.52 | 9.53 | 9.51 |

| Spectrum Plot of Worst Value | |
|---|---|
| 5MHz / QPSK | 10MHz / 64QAM |
|  |  |

## 4.5 Emission Mask Measurement

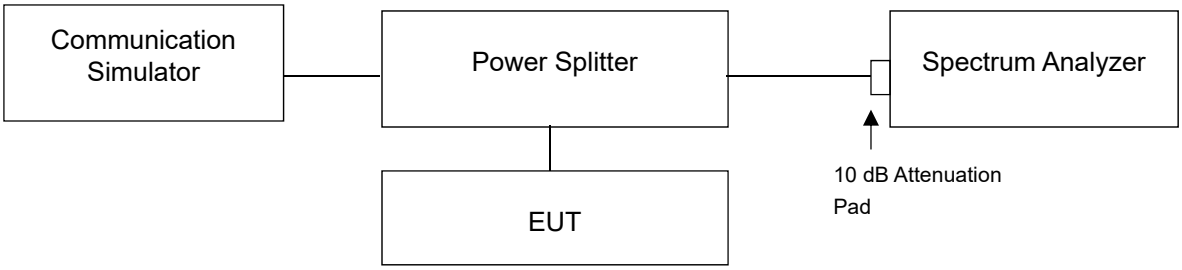
### 4.5.1 Limits of Emission Mask Measurement

According to FCC part 90.543 (e), For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

(2) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

### 4.5.2 Test Setup



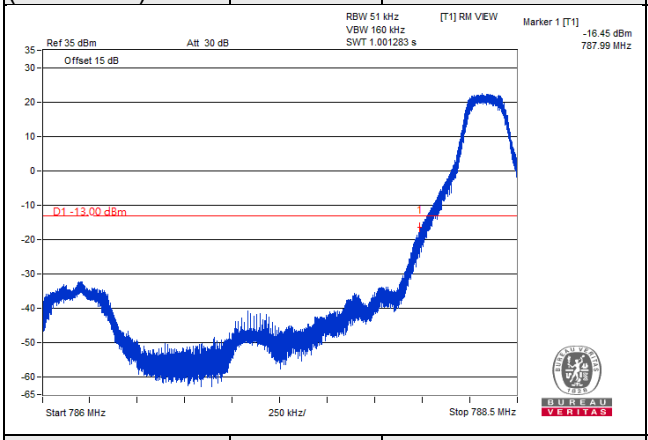
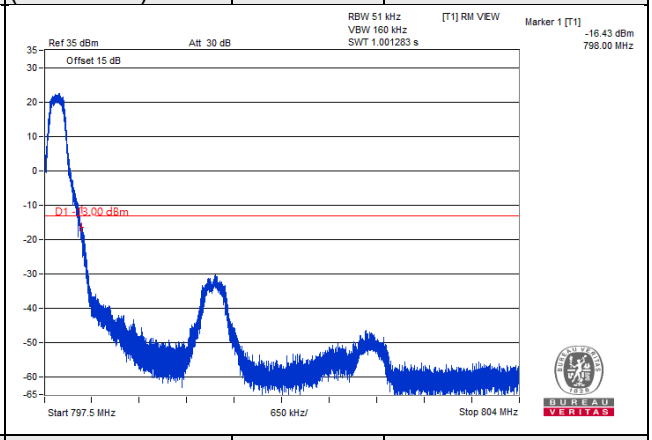
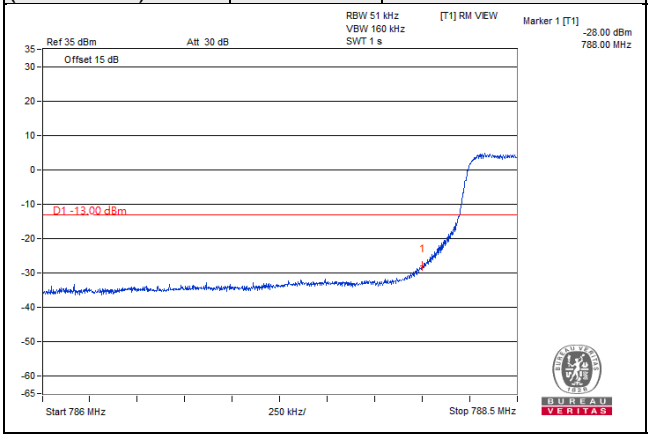
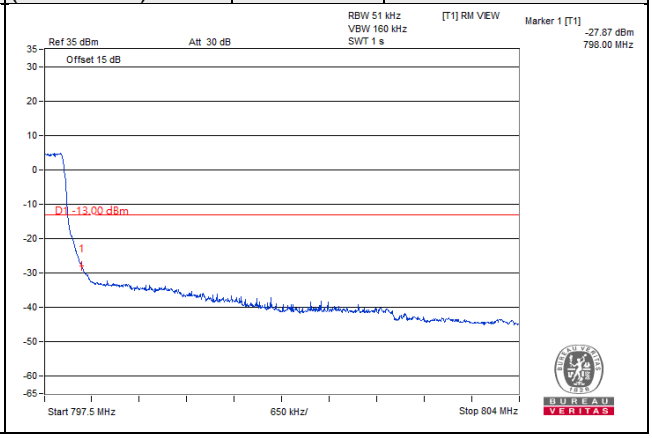

### 4.5.3 Test Procedures

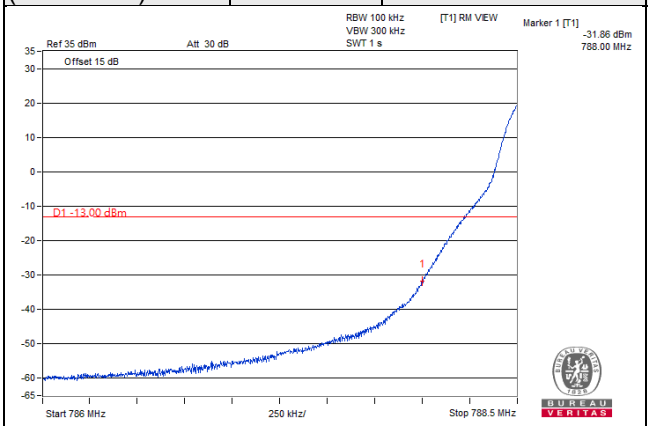
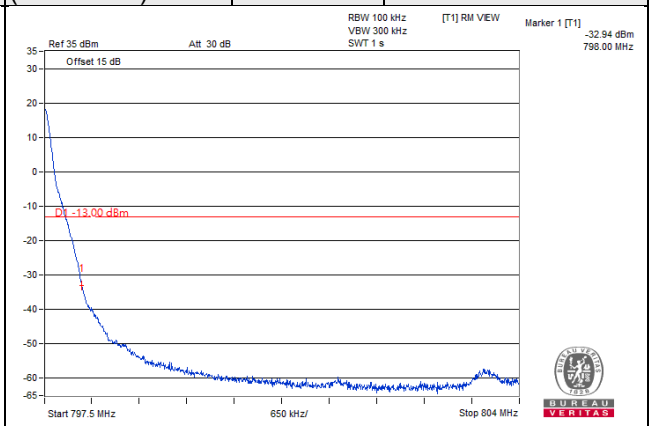
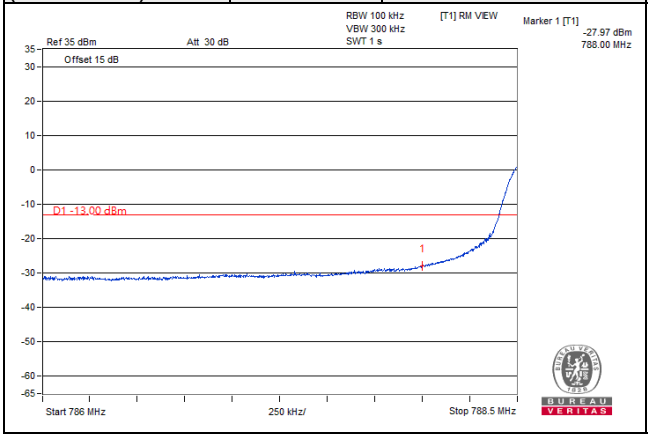
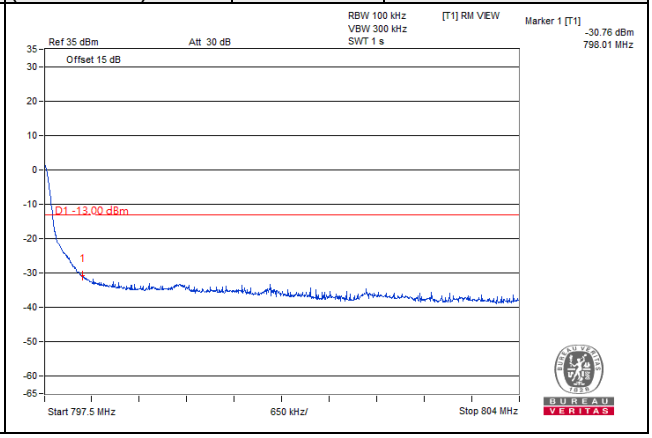
a. The measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

b. Record the test plot.

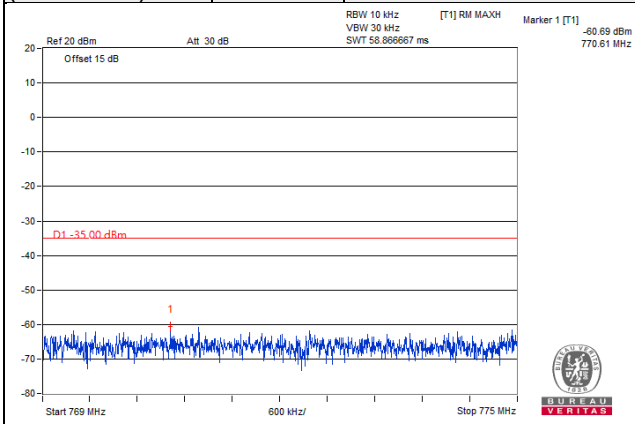
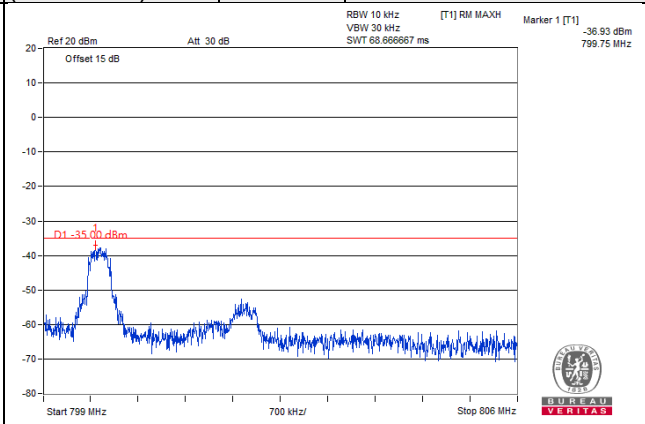
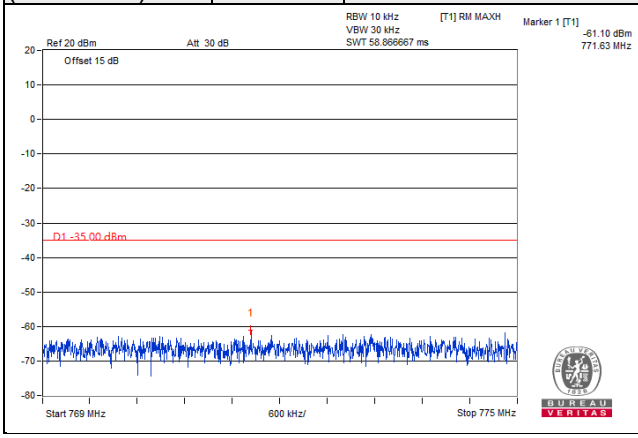
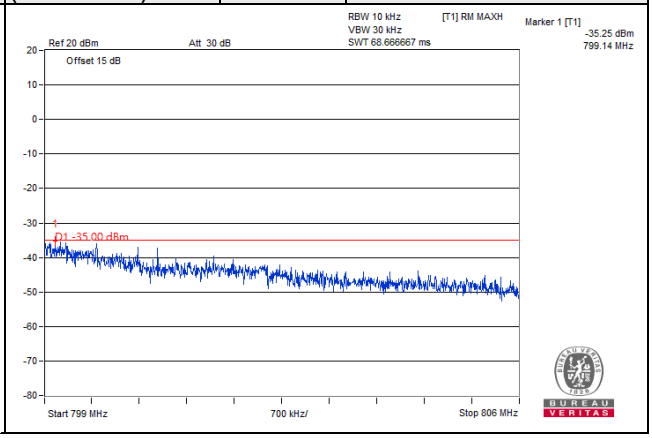
### 4.5.4 Test Results

**Band Edge**

| LTE Band 14, Channel Bandwidth 5MHz | | | | | |
|---|---|---|---|---|---|
| Channel 23305 (790.5MHz) | QPSK | 1 RB / 0 RB Offset | Channel 23355 (795.5MHz) | QPSK | 1 RB / 24 RB Offset |
|  | | |  | | |
| Channel 23305 (790.5MHz) | QPSK | 25 RB / 0 RB Offset | Channel 23355 (795.5MHz) | QPSK | 25 RB / 0 RB Offset |
|  | | |  | | |

| LTE Band 14, Channel Bandwidth 10MHz | | | | | |
|---|---|---|---|---|---|
| Channel 23330 (793.0MHz) | QPSK | 1 RB / 0 RB Offset | Channel 23330 (793.0MHz) | QPSK | 1 RB / 49 RB Offset |
|  | | |  | | |
| Channel 23330 (793.0MHz) | QPSK | 50 RB / 0 RB Offset | Channel 23330 (793.0MHz) | QPSK | 50 RB / 0 RB Offset |
|  | | |  | | |

**Out Of Band Emission**

| LTE Band 14, Channel Bandwidth 5MHz | | | | | |
|---|---|---|---|---|---|
| Channel 23305 (790.5MHz) | QPSK | 1 RB / 0 RB Offset | Channel 23355 (795.5MHz) | QPSK | 1 RB / 24 RB Offset |
|  | | |  | | |
| Channel 23305 (790.5MHz) | QPSK | 25 RB / 0 RB Offset | Channel 23355 (795.5MHz) | QPSK | 25 RB / 0 RB Offset |
|  | | |  | | |

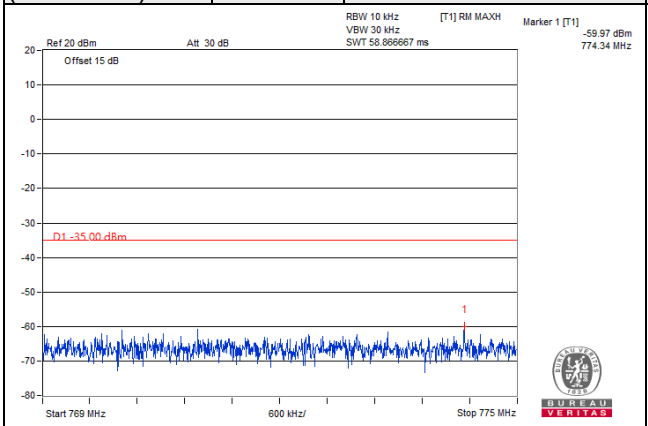
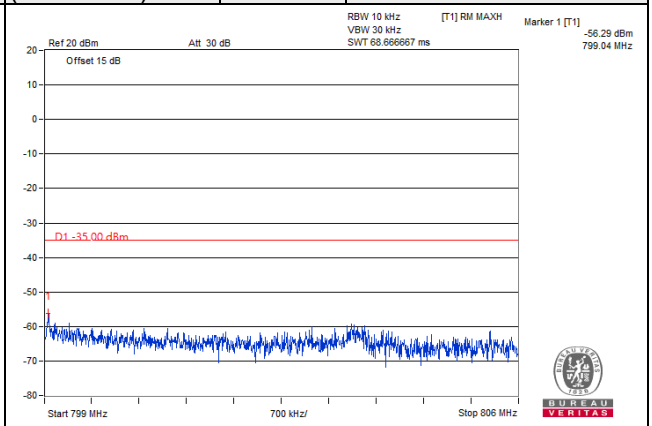
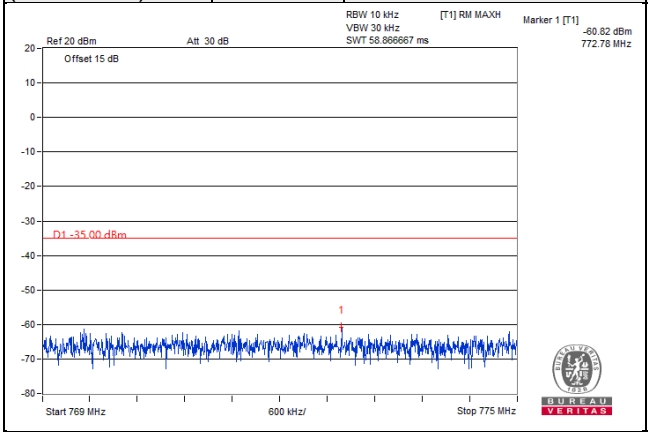
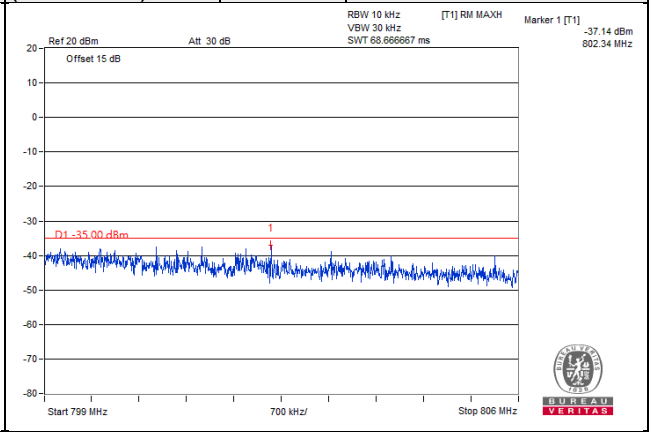








For the 769-775MHz and 799-805MHz band, the FCC limit is 65+10log(P[watt]) in a 6.25 kHz bandwidth. Since it was not possible to set the resolution bandwidth to 6.25 kHz with the available equipment, a bandwidth of 10 kHz was used instead to show compliance, and the correction factor is compensated at the spectrum. By using a 10 kHz bandwidth on the spectrum analyzer.

| LTE Band 14, Channel Bandwidth 10MHz | | | | | |
|---|---|---|---|---|---|
| Channel 23330 (793.0MHz) | QPSK | 1 RB / 0 RB Offset | Channel 23330 (793.0MHz) | QPSK | 1 RB / 49 RB Offset |
|  | | |  | | |
| Channel 23330 (793.0MHz) | QPSK | 50 RB / 0 RB Offset | Channel 23330 (793.0MHz) | QPSK | 50 RB / 0 RB Offset |
|  | | |  | | |

For the 769-775MHz and 799-805MHz band, the FCC limit is 65+10log(P[watt]) in a 6.25 kHz bandwidth. Since it was not possible to set the resolution bandwidth to 6.25 kHz with the available equipment, a bandwidth of 10 kHz was used instead to show compliance, and the correction factor is compensated at the spectrum. By using a 10 kHz bandwidth on the spectrum analyzer.

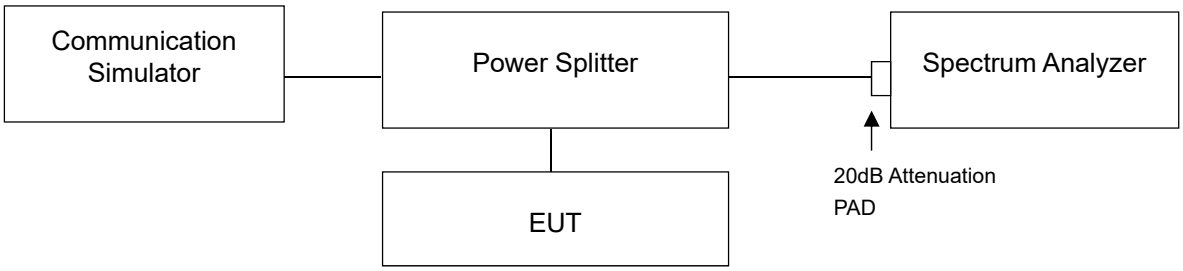
## 4.6 Conducted Spurious Emissions

### 4.6.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 $\log_{10}$(P) dB. The limit of emission equal to –13dBm.

For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz. The limit of emissions is equal to -40 dBm.

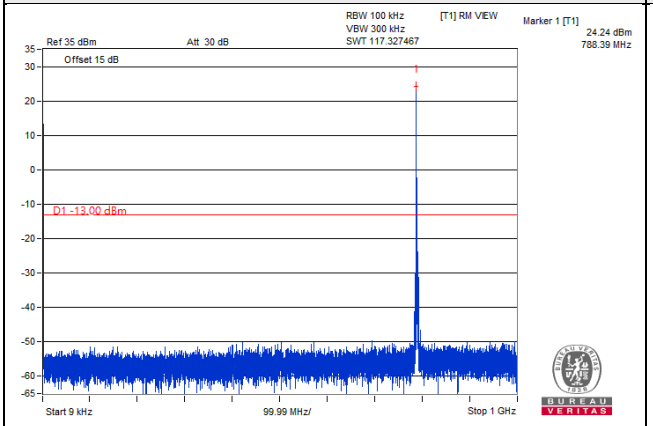
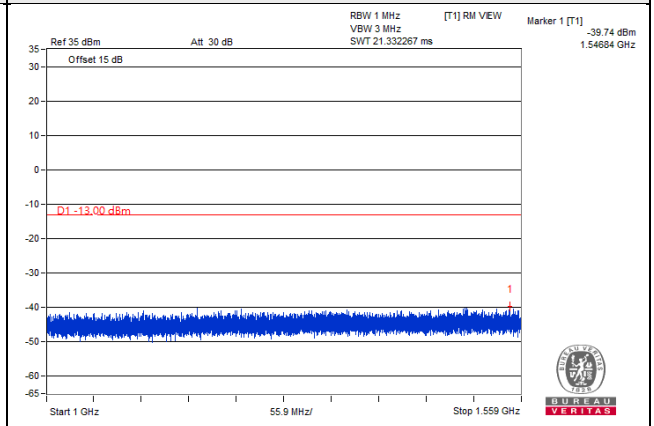
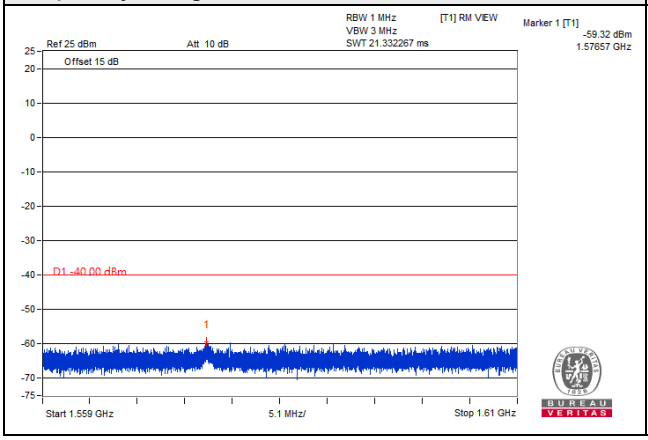
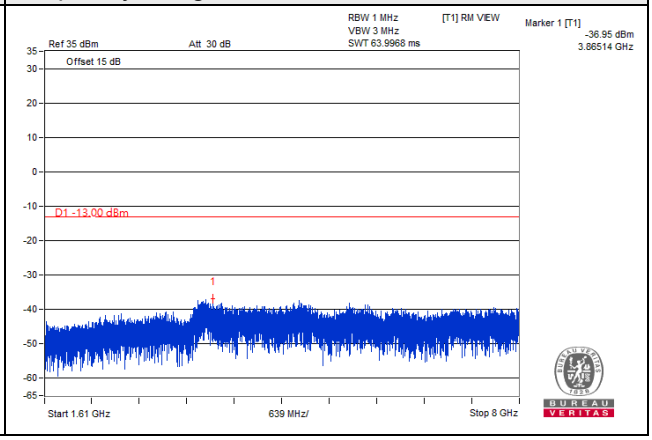
### 4.6.2 Test Setup



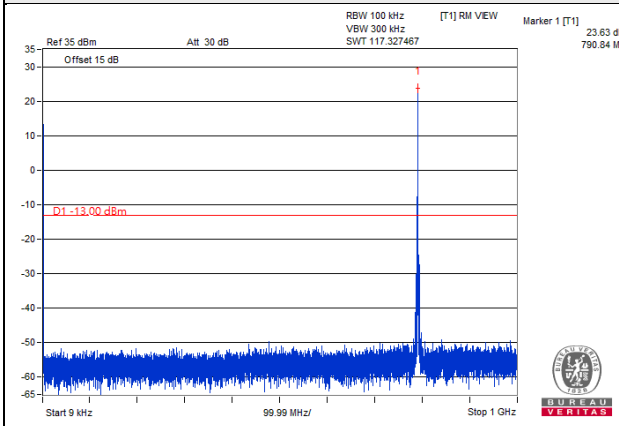
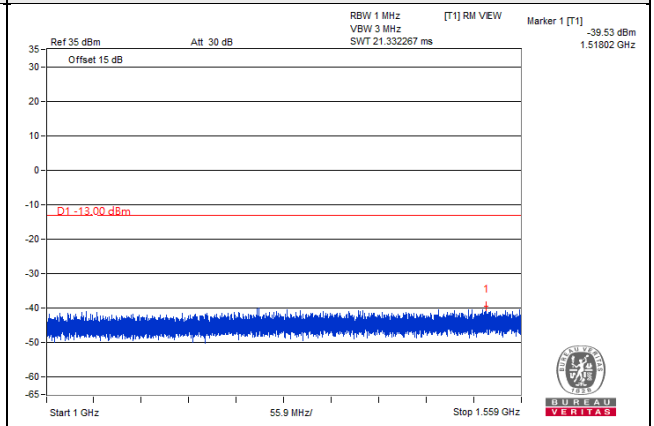
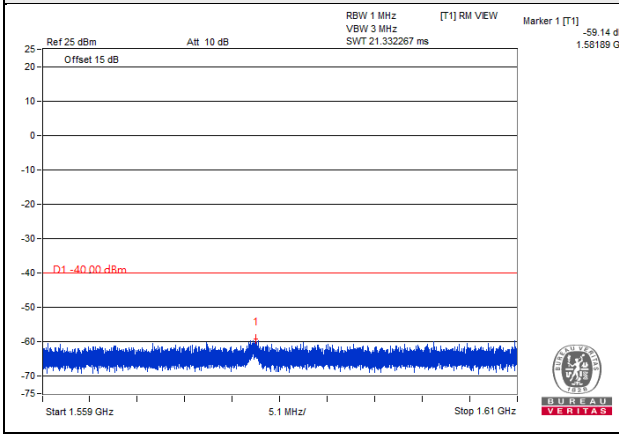
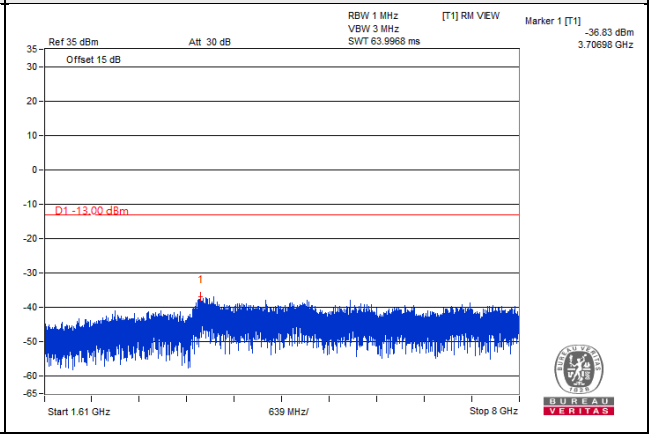

### 4.6.3 Test Procedure

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
b. Measuring frequency range is from 9kHz to 8GHz. 20dB attenuation pad is connected with spectrum. RBW=100kHz and VBW=300kHz for 9kHz to 1GHz and RBW=1MHz and VBW=3MHz for 1 GHz to 9GHz are used for LTE band conducted emission measurement.

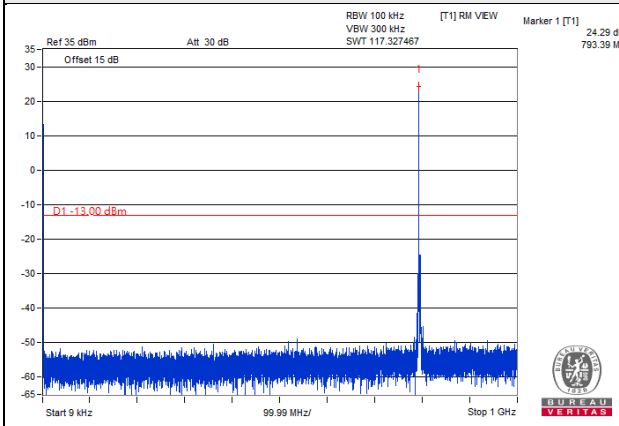
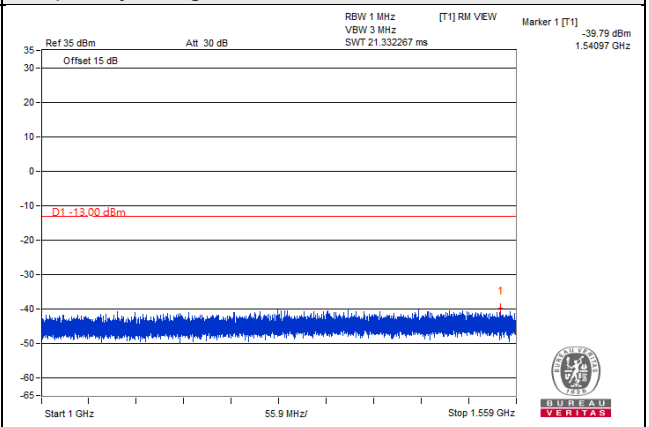
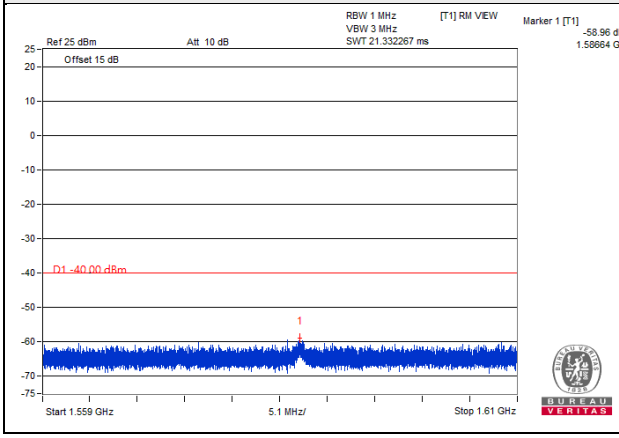
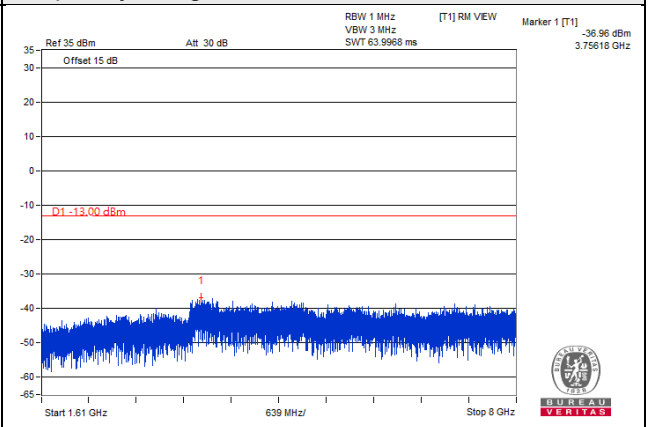
### 4.6.4 Test Results

| LTE Band 14, Channel Band width: 5MHz | |
|---|---|
| Channel 23305 (790.5MHz) | |
| Frequency Range : 9kHz ~ 1GHz | Frequency Range : 1GHz ~ 1.559GHz |
|  |  |
| Frequency Range : 1.559GHz ~ 1.61GHz | Frequency Range : 1.61GHz ~ 8GHz |
|  |  |

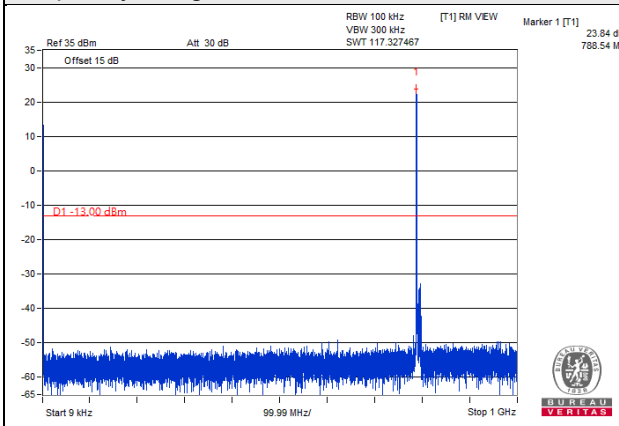
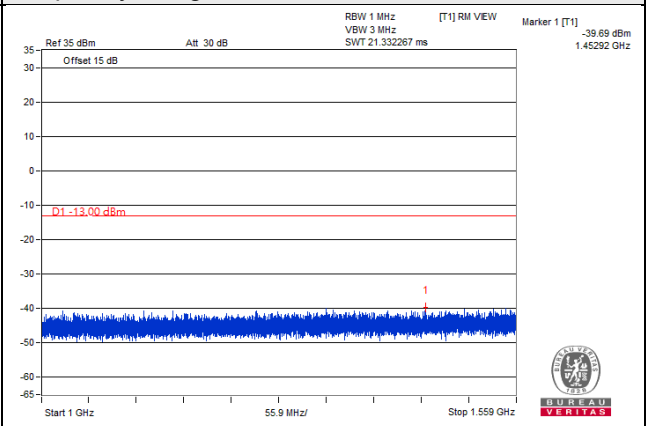
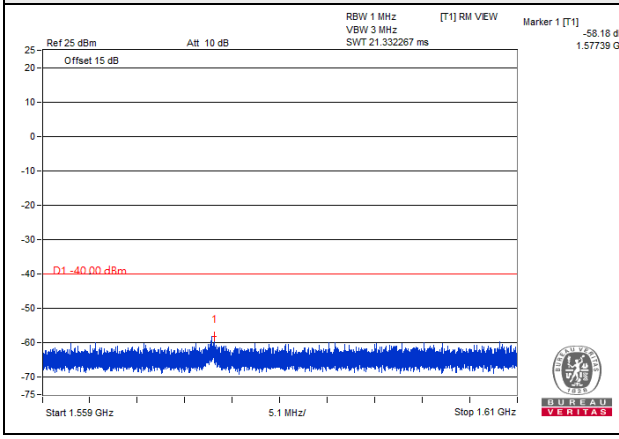
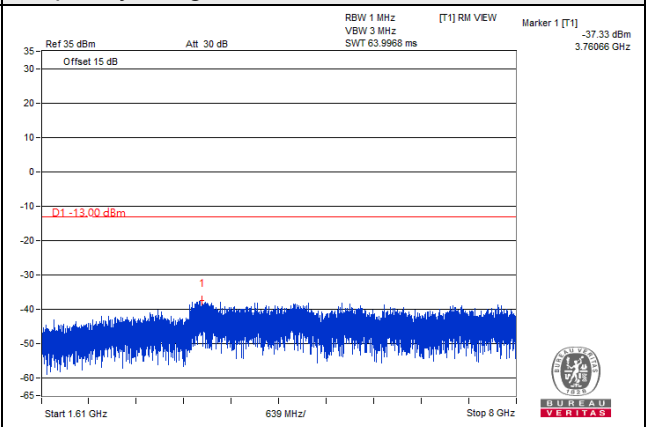
*The 9kHz signal over the limit is from Spectrum.

| LTE Band 14, Channel Band width: 5MHz | |
|---|---|
| Channel 23330 (793.0MHz) | |
| Frequency Range : 9kHz ~ 1GHz | Frequency Range : 1GHz ~ 1.559GHz |
|  |  |
| Frequency Range : 1.559GHz ~ 1.61GHz | Frequency Range : 1.61GHz ~ 8GHz |
|  |  |

*The 9kHz signal over the limit is from Spectrum.

| LTE Band 14, Channel Band width: 5MHz | |
|---|---|
| Channel 23355 (795.5MHz) | |
| Frequency Range : 9kHz ~ 1GHz | Frequency Range : 1GHz ~ 1.559GHz |
|  |  |
| Frequency Range : 1.559GHz ~ 1.61GHz | Frequency Range : 1.61GHz ~ 8GHz |
|  |  |

*The 9kHz signal over the limit is from Spectrum.

| LTE Band 14, Channel Band width: 10MHz | |
|---|---|
| Channel 23330 (793.0MHz) | |
| Frequency Range : 9kHz ~ 1GHz | Frequency Range : 1GHz ~ 1.559GHz |
|  |  |
| Frequency Range : 1.559GHz ~ 1.61GHz | Frequency Range : 1.61GHz ~ 8GHz |
|  |  |

*The 9kHz signal over the limit is from Spectrum.

## 4.7 Radiated Emission Measurement

### 4.7.1 Limits of Radiated Emission Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm.

For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz. The limit of emissions is equal to -40 dBm.

### 4.7.2 Test Procedure

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) 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.

b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.

d. Following C63.26 section 5.5 and 5.2.7
   - EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.
   - ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

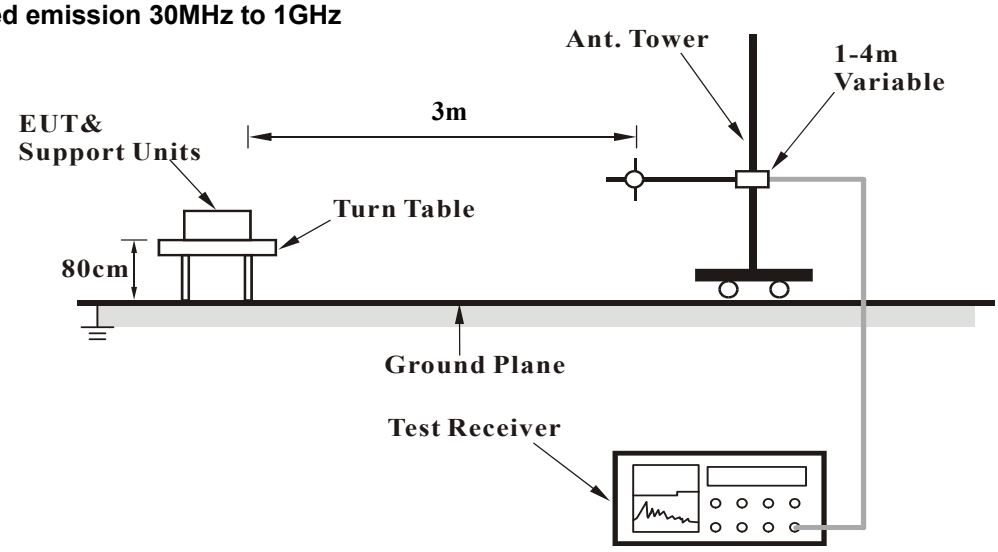
Note:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
   The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

### 4.7.3 Deviation from Test Standard

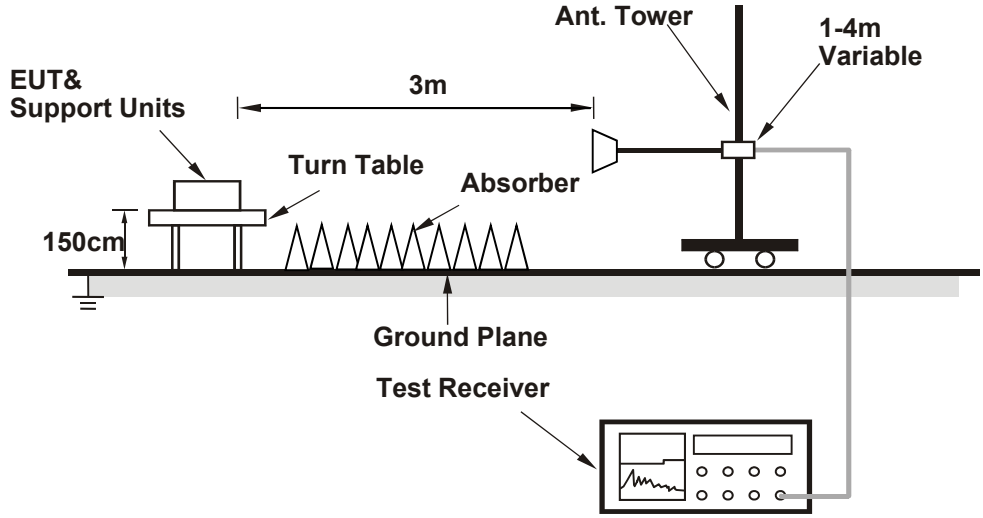
No deviation.

### 4.7.4 Test Setup

**For radiated emission 30MHz to 1GHz**




**For radiated emission above 1GHz**




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

### 4.7.5 Test Results

Internal Antenna

Below 1GHz

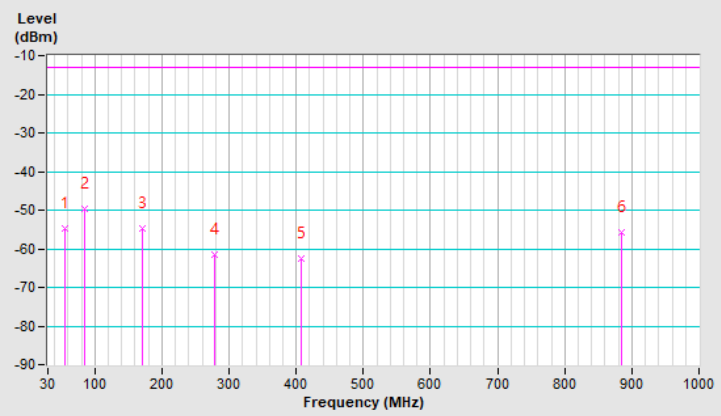
LTE Band 14, Channel Bandwidth 10MHz

| | | | |
|---|---|---|---|
| Mode | TX channel 23305 (790.5MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 25deg. C, 70%RH | Input Power | 120Vac, 60Hz |
| Tested By | Hans Wu | | |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 55.30 | -54.8 | -13.0 | -41.8 | 1.50 H | 146 | 51.7 | -106.5 |
| 2 | 84.83 | -49.7 | -13.0 | -36.7 | 1.50 H | 173 | 62.0 | -111.7 |
| 3 | 170.58 | -54.7 | -13.0 | -41.7 | 2.00 H | 137 | 52.0 | -106.7 |
| 4 | 277.42 | -61.5 | -13.0 | -48.5 | 1.00 H | 296 | 44.3 | -105.8 |
| 5 | 406.75 | -62.4 | -13.0 | -49.4 | 2.00 H | 98 | 40.8 | -103.2 |
| 6 | 884.72 | -55.6 | -13.0 | -42.6 | 1.00 H | 58 | 36.3 | -91.9 |

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value.
4. The other ERP levels were very low against the limit.

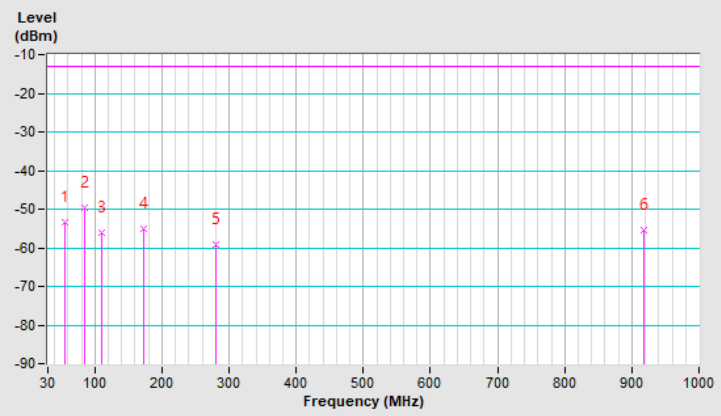


| | | | |
|---|---|---|---|
| Mode | TX channel 23305 (790.5MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 25deg. C, 70%RH | Input Power | 120Vac, 60Hz |
| Tested By | Hans Wu | | |

| Antenna Polarity & Test Distance : Vertical at 3m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 55.30 | -53.5 | -13.0 | -40.5 | 1.50 V | 119 | 53.0 | -106.5 |
| 2 | 84.83 | -49.8 | -13.0 | -36.8 | 1.00 V | 196 | 61.9 | -111.7 |
| 3 | 110.13 | -56.2 | -13.0 | -43.2 | 2.00 V | 308 | 53.2 | -109.4 |
| 4 | 171.99 | -55.1 | -13.0 | -42.1 | 2.00 V | 120 | 51.7 | -106.8 |
| 5 | 280.23 | -59.3 | -13.0 | -46.3 | 2.00 V | 105 | 46.4 | -105.7 |
| 6 | 917.06 | -55.4 | -13.0 | -42.4 | 1.00 V | 277 | 35.4 | -90.8 |

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value.
4. The other ERP levels were very low against the limit.



Above 1GHz

LTE Band 14, Channel Bandwidth: 5MHz

| Mode | TX channel 23305 (790.5MHz) | Frequency Range | 1GHz ~ 8GHz |
|---|---|---|---|
| Environmental Conditions | 25deg. C, 70%RH | Input Power | 120Vac, 60Hz |
| Tested By | Hans Wu | | |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1581.00 | -60.3 | -40.0 | -20.3 | 1.13 H | 178 | 36.5 | -96.8 |
| Antenna Polarity & Test Distance : Vertical at 3m | | | | | | | | |
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1581.00 | -58.1 | -40.0 | -18.1 | 1.06 V | 173 | 38.7 | -96.8 |

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

| Mode | TX channel 23330 (793.0MHz) | Frequency Range | 1GHz ~ 8GHz |
|---|---|---|---|
| Environmental Conditions | 25deg. C, 70%RH | Input Power | 120Vac, 60Hz |
| Tested By | Hans Wu | | |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1586.00 | -60.1 | -40.0 | -20.1 | 1.04 H | 187 | 36.7 | -96.8 |
| Antenna Polarity & Test Distance : Vertical at 3m | | | | | | | | |
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1586.00 | -59.1 | -40.0 | -19.1 | 1.00 V | 146 | 37.7 | -96.8 |

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

| | | | |
|---|---|---|---|
| Mode | TX channel 23355 (795.5MHz) | Frequency Range | 1GHz ~ 8GHz |
| Environmental Conditions | 25deg. C, 70%RH | Input Power | 120Vac, 60Hz |
| Tested By | Hans Wu | | |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1591.00 | -60.2 | -40.0 | -20.2 | 1.08 H | 175 | 36.6 | -96.8 |
| Antenna Polarity & Test Distance : Vertical at 3m | | | | | | | | |
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1591.00 | -59.2 | -40.0 | -19.2 | 1.29 V | 98 | 37.6 | -96.8 |

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 14, Channel Bandwidth: 10MHz

| | | | |
|---|---|---|---|
| Mode | TX channel 23330 (793.0MHz) | Frequency Range | 1GHz ~ 8GHz |
| Environmental Conditions | 25deg. C, 70%RH | Input Power | 120Vac, 60Hz |
| Tested By | Hans Wu | | |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1586.00 | -59.5 | -40.0 | -19.5 | 1.13 H | 190 | 37.3 | -96.8 |
| Antenna Polarity & Test Distance : Vertical at 3m | | | | | | | | |
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1586.00 | -58.8 | -40.0 | -18.8 | 1.06 V | 153 | 38.0 | -96.8 |

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

External Antenna

Below 1GHz

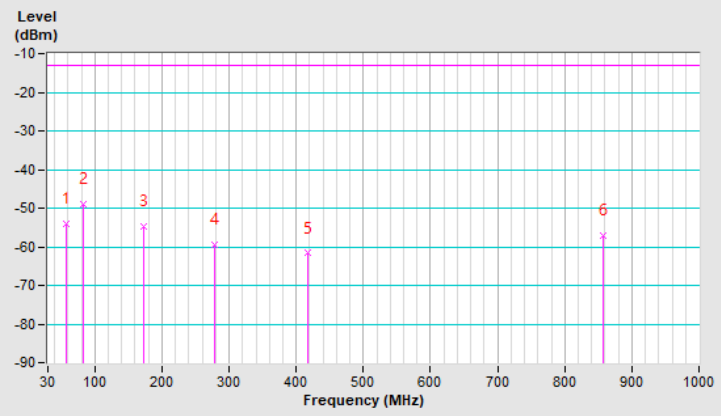
LTE Band 14, Channel Bandwidth 10MHz

| | | | |
|---|---|---|---|
| Mode | TX channel 23305 (790.5MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 25deg. C, 70%RH | Input Power | 120Vac, 60Hz |
| Tested By | Hans Wu | | |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 56.71 | -54.1 | -13.0 | -41.1 | 1.00 H | 141 | 52.7 | -106.8 |
| 2 | 83.42 | -49.0 | -13.0 | -36.0 | 1.00 H | 195 | 62.5 | -111.5 |
| 3 | 171.99 | -54.7 | -13.0 | -41.7 | 2.00 H | 107 | 52.1 | -106.8 |
| 4 | 277.42 | -59.6 | -13.0 | -46.6 | 2.00 H | 273 | 46.2 | -105.8 |
| 5 | 416.59 | -61.7 | -13.0 | -48.7 | 1.00 H | 115 | 41.3 | -103.0 |
| 6 | 858.01 | -57.1 | -13.0 | -44.1 | 1.50 H | 63 | 35.3 | -92.4 |

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value.
4. The other ERP levels were very low against the limit.

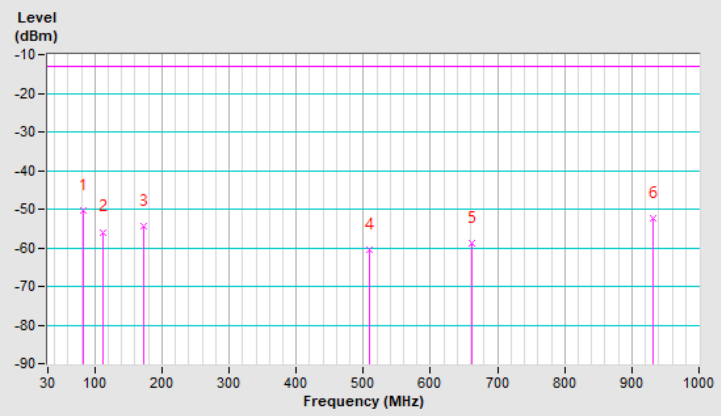


| | | | |
|---|---|---|---|
| Mode | TX channel 23305 (790.5MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 25deg. C, 70%RH | Input Power | 120Vac, 60Hz |
| Tested By | Hans Wu | | |

| Antenna Polarity & Test Distance : Vertical at 3m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 83.42 | -50.4 | -13.0 | -37.4 | 2.00 V | 166 | 61.1 | -111.5 |
| 2 | 112.94 | -55.9 | -13.0 | -42.9 | 1.00 V | 316 | 53.3 | -109.2 |
| 3 | 171.99 | -54.3 | -13.0 | -41.3 | 1.00 V | 137 | 52.5 | -106.8 |
| 4 | 509.38 | -60.4 | -13.0 | -47.4 | 1.50 V | 272 | 40.6 | -101.0 |
| 5 | 661.20 | -58.9 | -13.0 | -45.9 | 2.00 V | 295 | 38.5 | -97.4 |
| 6 | 932.52 | -52.4 | -13.0 | -39.4 | 1.50 V | 237 | 38.2 | -90.6 |

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value.
4. The other ERP levels were very low against the limit.



Above 1GHz

LTE Band 14, Channel Bandwidth: 5MHz

| Mode | TX channel 23305 (790.5MHz) | Frequency Range | 1GHz ~ 8GHz |
|---|---|---|---|
| Environmental Conditions | 25deg. C, 70%RH | Input Power | 120Vac, 60Hz |
| Tested By | Hans Wu | | |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| **1** | **1581.00** | **-56.8** | **-40.0** | **-16.8** | **1.68 H** | **165** | **40.0** | **-96.8** |
| Antenna Polarity & Test Distance : Vertical at 3m | | | | | | | | |
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1581.00 | -57.0 | -40.0 | -17.0 | 1.71 V | 158 | 39.8 | -96.8 |

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

| Mode | TX channel 23330 (793.0MHz) | Frequency Range | 1GHz ~ 8GHz |
|---|---|---|---|
| Environmental Conditions | 25deg. C, 70%RH | Input Power | 120Vac, 60Hz |
| Tested By | Hans Wu | | |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1586.00 | -57.0 | -40.0 | -17.0 | 1.73 H | 162 | 39.8 | -96.8 |
| Antenna Polarity & Test Distance : Vertical at 3m | | | | | | | | |
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1586.00 | -56.9 | -40.0 | -16.9 | 1.66 V | 164 | 39.9 | -96.8 |

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

| | | | |
|---|---|---|---|
| Mode | TX channel 23355 (795.5MHz) | Frequency Range | 1GHz ~ 8GHz |
| Environmental Conditions | 25deg. C, 70%RH | Input Power | 120Vac, 60Hz |
| Tested By | Hans Wu | | |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1591.00 | -57.2 | -40.0 | -17.2 | 1.73 H | 162 | 39.6 | -96.8 |
| Antenna Polarity & Test Distance : Vertical at 3m | | | | | | | | |
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1591.00 | -58.2 | -40.0 | -18.2 | 1.70 V | 161 | 38.6 | -96.8 |

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 14, Channel Bandwidth: 10MHz

| | | | |
|---|---|---|---|
| Mode | TX channel 23330 (793.0MHz) | Frequency Range | 1GHz ~ 8GHz |
| Environmental Conditions | 25deg. C, 70%RH | Input Power | 120Vac, 60Hz |
| Tested By | Hans Wu | | |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1586.00 | -58.1 | -40.0 | -18.1 | 1.63 H | 155 | 38.7 | -96.8 |
| Antenna Polarity & Test Distance : Vertical at 3m | | | | | | | | |
| No | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 1586.00 | -57.2 | -40.0 | -17.2 | 1.72 V | 174 | 39.6 | -96.8 |

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

## 5 Pictures of Test Arrangements

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

**Appendix – Information of 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.

If you have any comments, please feel free to contact us at the following:


**Linko EMC/RF Lab**
Tel: 886-2-26052180
Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab**
Tel: 886-3-6668565
Fax: 886-3-6668323

**Hwa Ya EMC/RF/Safety Lab**
Tel: 886-3-3183232
Fax: 886-3-3270892

**Email:** service.adt@tw.bureauveritas.com
**Web Site:** www.bureauveritas-adt.com


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

**--- END ---**