

## FCC Test Report (Part 90R)

**Report No.:** RFBEOP-WTW-P20100005-3

**FCC ID:** NKRM18QAG

**Test Model:** M18QAG

**Received Date:** Oct. 04, 2020

**Test Date:** Oct. 13 to 14, 2020

**Issued Date:** Nov. 12, 2020

**Applicant:** Wistron NeWeb Corporation

**Address:** 20 Park Ave. II, Hsinchu Science Park, Hsinchu 308, Taiwan

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

**Lab Address:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan

**Test Location:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan

**FCC Registration /  
Designation Number:** 723255 / TW2022



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### Release Control Record

| Issue No.              | Description      | Date Issued   |
|------------------------|------------------|---------------|
| RFBEOP-WTW-P20100005-3 | Original release | Nov. 12, 2020 |

## 1 Certificate of Conformity

**Product:** M2M DATA MODULE

**Brand:** Wistron NeWeb Corporation

**Test Model:** M18QAG

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** Wistron NeWeb Corporation

**Test Date:** Oct. 13 to 14, 2020

**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 EMC characteristics under the conditions specified in this report.

**Prepared by :**  , **Date:** Nov. 12, 2020  
Claire Kuan / Specialist

**Approved by :**  , **Date:** Nov. 12, 2020  
Clark Lin / Technical Manager

## 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)                 | Radiated Power               | PASS   | Meet the requirement of limit.                                                   |
| 2.1047                                 | Modulation characteristics   | PASS   | Meet the requirement                                                             |
| 2.1055<br>90.213<br>90.539             | Frequency Stability          | PASS   | Meet the requirement of limit.                                                   |
| 2.1049<br>90.209                       | Occupied Bandwidth           | PASS   | Meet the requirement of limit.                                                   |
| 2.1051<br>90.543                       | Emission Mask                | PASS   | Meet the requirement of limit.                                                   |
| ---                                    | Peak To Average Ratio        | PASS   | Meet the requirement of limit.                                                   |
| 2.1051<br>90.543                       | Conducted Spurious Emissions | PASS   | Meet the requirement of limit.                                                   |
| 2.1053<br>90.543                       | Radiated Spurious Emissions  | PASS   | Meet the requirement of limit.<br>Minimum passing margin is -22.28dB at 1581MHz. |

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   | 3.1 dB                         |
|                                | 30MHz ~ 1GHz   | 5.4 dB                         |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz   | 5.0 dB                         |
|                                | 1GHz ~ 40GHz   | 5.3 dB                         |
|                                | 40GHz ~ 200GHz | 5.4 dB                         |

## 2.2 Test Site and Instruments

For radiated spurious emissions test:

| DESCRIPTION & MANUFACTURER                 | MODEL NO.            | SERIAL NO.  | CALIBRATED DATE | CALIBRATED UNTIL |
|--------------------------------------------|----------------------|-------------|-----------------|------------------|
| Test Receiver<br>Keysight                  | N9038A               | MY54450088  | July 06, 2020   | July 05, 2021    |
| Pre-Amplifier<br>EMCI                      | EMC001340            | 980142      | May 25, 2020    | May 24, 2021     |
| Loop Antenna<br>Electro-Metrics            | EM-6879              | 264         | Feb. 18, 2020   | Feb. 17, 2021    |
| RF Cable                                   | NA                   | LOOPCAB-001 | Jan. 08, 2020   | Jan. 07, 2021    |
| RF Cable                                   | NA                   | LOOPCAB-002 | Jan. 08, 2020   | Jan. 07, 2021    |
| Pre-Amplifier<br>Mini-Circuits             | ZFL-1000VH2B         | AMP-ZFL-05  | Apr. 28, 2020   | Apr. 27, 2021    |
| Trilog Broadband<br>Antenna<br>SCHWARZBECK | VULB 9168            | 9168-361    | Nov. 11, 2019   | Nov. 10, 2020    |
| RF Cable                                   | 8D                   | 966-3-1     | Mar. 17, 2020   | Mar. 16, 2021    |
| RF Cable                                   | 8D                   | 966-3-2     | Mar. 17, 2020   | Mar. 16, 2021    |
| RF Cable                                   | 8D                   | 966-3-3     | Mar. 17, 2020   | Mar. 16, 2021    |
| Fixed attenuator<br>Mini-Circuits          | UNAT-5+              | PAD-3m-3-01 | Sep. 24, 2020   | Sep. 23, 2021    |
| Horn_Antenna<br>SCHWARZBECK                | BBHA9120-D           | 9120D-406   | Nov. 24, 2019   | Nov. 23, 2020    |
| Pre-Amplifier<br>EMCI                      | EMC12630SE           | 980384      | Jan. 15, 2020   | Jan. 14, 2021    |
| RF Cable                                   | EMC104-SM-SM-1500    | 180504      | Apr. 29, 2020   | Apr. 28, 2021    |
| RF Cable                                   | EMC104-SM-SM-2000    | 180601      | June 09, 2020   | June 08, 2021    |
| RF Cable                                   | EMC104-SM-SM-6000    | 180602      | June 09, 2020   | June 08, 2021    |
| Spectrum Analyzer<br>Keysight              | N9030A               | MY54490679  | July 13, 2020   | July 12, 2021    |
| Pre-Amplifier<br>EMCI                      | EMC184045SE          | 980387      | Jan. 15, 2020   | Jan. 14, 2021    |
| Horn_Antenna<br>SCHWARZBECK                | BBHA 9170            | BBHA9170519 | Nov. 24, 2019   | Nov. 23, 2020    |
| RF Cable                                   | EMC102-KM-KM-1200    | 160924      | Jan. 15, 2020   | Jan. 14, 2021    |
| RF Cable                                   | EMC-KM-KM-4000       | 200214      | Mar. 11, 2020   | Mar. 10, 2021    |
| Software                                   | ADT_Radiated_V8.7.08 | NA          | NA              | NA               |
| Antenna Tower & Turn<br>Table<br>Max-Full  | MF-7802              | MF780208406 | NA              | NA               |
| Boresight Antenna<br>Fixture               | FBA-01               | FBA-SIP01   | 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 966 Chamber No. 3.
3. Tested Date: Oct. 14, 2020

**For other test items:**

| DESCRIPTION & MANUFACTURER                 | MODEL NO.                     | SERIAL NO.    | CALIBRATED DATE | CALIBRATED UNTIL |
|--------------------------------------------|-------------------------------|---------------|-----------------|------------------|
| Spectrum Analyzer R&S                      | FSV40                         | 100964        | May 29, 2020    | May 28, 2021     |
| Spectrum Analyzer Keysight                 | N9030A                        | MY54490679    | July 13, 2020   | July 12, 2021    |
| Power meter Anritsu                        | ML2495A                       | 1529002       | July 22, 2020   | July 21, 2021    |
| Power sensor Anritsu                       | MA2411B                       | 1339443       | July 22, 2020   | July 21, 2021    |
| Fixed Attenuator Mini-Circuits             | MDCS18N-10                    | MDCS18N-10-01 | Apr. 14, 2020   | Apr. 13, 2021    |
| DC Power Supply Topward                    | 6603D                         | 795558        | NA              | NA               |
| Temperature & Humidity Chamber Giant Force | GTH-150-40-SP-AR              | MAA0812-008   | Jan. 16, 2020   | Jan. 15, 2021    |
| True RMS Clamp Meter FLUKE                 | 325                           | 31130711WS    | June 06, 2020   | June 05, 2021    |
| Mech Switch Absorptive Mini-Circuits       | MSP4TA-18+                    | 0140          | Feb. 10, 2020   | Feb. 09, 2021    |
| FXD ATTEN Mini-Circuits                    | BW-S3W2+                      | MN71981       | Feb. 10, 2020   | Feb. 09, 2021    |
| Software                                   | ADT_RF Test Software V6.6.5.4 | NA            | NA              | NA               |

- Note:**
1. The test was performed in Oven room 2.
  2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  3. Tested Date: Oct. 13, 2020

### 3 General Information

#### 3.1 General Description of EUT

|                     |                                          |                         |                     |
|---------------------|------------------------------------------|-------------------------|---------------------|
| Product             | M2M DATA MODULE                          |                         |                     |
| Brand               | Wistron NeWeb Corporation                |                         |                     |
| Test Model          | M18QAG                                   |                         |                     |
| Status of EUT       | ENGINEERING SAMPLE                       |                         |                     |
| Power Supply Rating | DC 3.8V from host equipment              |                         |                     |
| Modulation Type     | QPSK, 16QAM                              |                         |                     |
| Operating Frequency | LTE Band 14                              |                         | 790.5MHz ~ 795.5MHz |
| Max. ERP Power      | LTE Band 14<br>(Channel Bandwidth 5MHz)  |                         | 23.32 dBm           |
|                     | LTE Band 14<br>(Channel Bandwidth 10MHz) |                         | 23.23 dBm           |
| Emission Designator | LTE Band 14                              | Channel Bandwidth 5MHz  | QPSK: 4M48G7D       |
|                     |                                          |                         | 16QAM: 4M48D7W      |
|                     |                                          | Channel Bandwidth 10MHz | QPSK: 8M92G7D       |
|                     |                                          |                         | 16QAM: 8M94D7W      |
| Antenna Type        | Refer to Note                            |                         |                     |
| Antenna Connector   | Refer to Note                            |                         |                     |
| Accessory Device    | NA                                       |                         |                     |
| Data Cable Supplied | NA                                       |                         |                     |

Note:

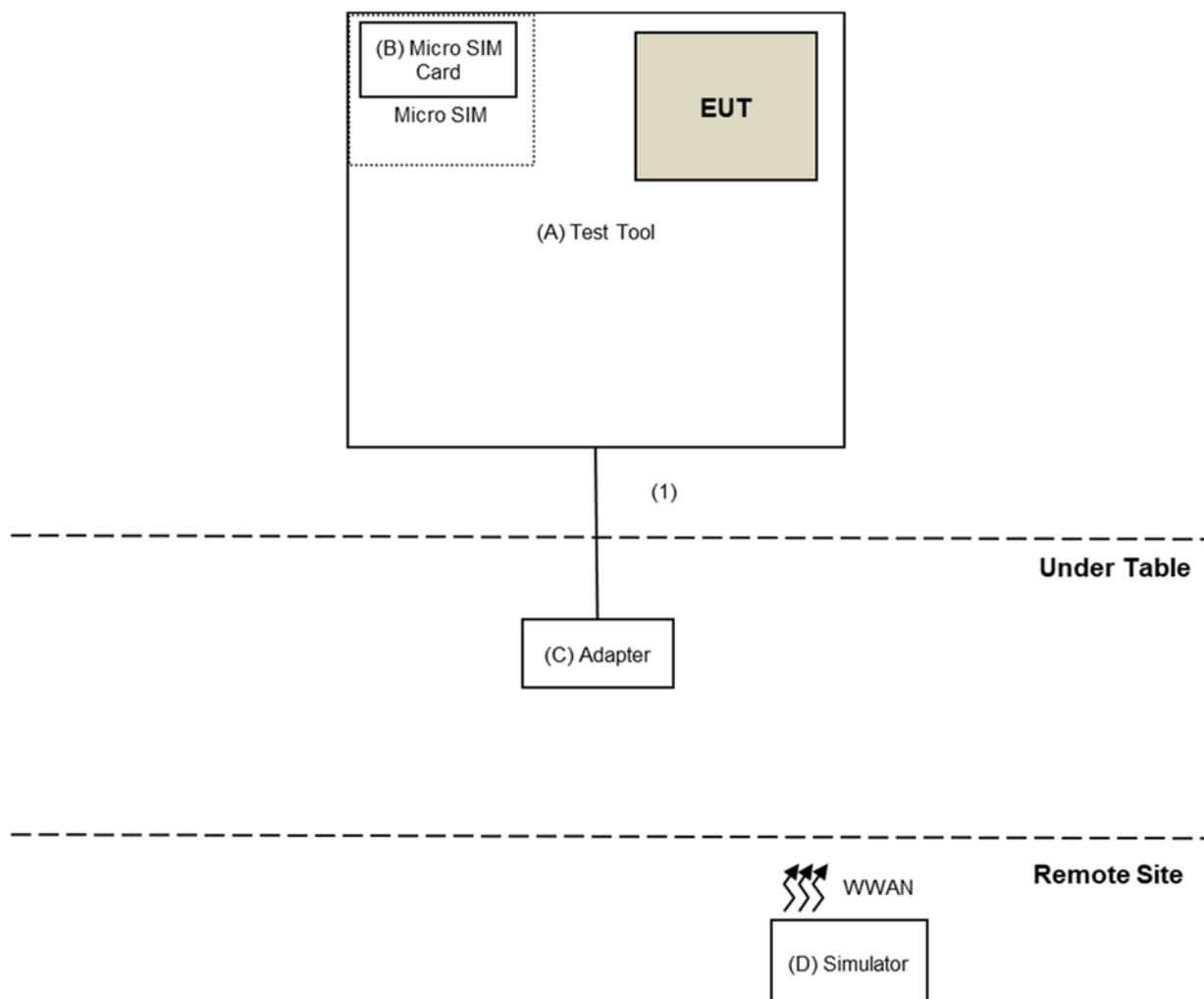
1. The antennas provided to the EUT, please refer to the following table:

| For GPS     |                  |                   |                        |              |                |
|-------------|------------------|-------------------|------------------------|--------------|----------------|
| Antenna No. | Band             | Freq. Range (MHz) | Antenna Net Gain (dBi) | Antenna Type | Connector Type |
| 1           | GPS              | 1602              | 2.24                   | Dipole       | SMA            |
| For WWAN    |                  |                   |                        |              |                |
| Antenna No. | Band             | Freq. Range (MHz) | Antenna Net Gain (dBi) | Antenna Type | Connector Type |
| 2           | LTE / WCDMA (2)  | 1850~1910         | 1.56                   | Dipole       | SMA            |
|             | LTE / WCDMA (4)  | 1710~1755         | 1.62                   | Dipole       | SMA            |
|             | LTE / WCDMA (5)  | 824~849           | 3.2                    | Dipole       | SMA            |
|             | LTE / WCDMA (12) | 699~716           | 1.49                   | Dipole       | SMA            |
|             | LTE / WCDMA (14) | 788~798           | 1.66                   | Dipole       | SMA            |

2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3. 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



### 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. | Test Tool | WNC     | NA              | NA         | NA     | Supplied by client |
| B. | SIM Card  | R&S     | CRT-Z3          | NA         | NA     | Provided by Lab    |
| C. | Adapter   | I.T.E   | MU24-Y120200-A1 | NA         | NA     | Supplied by client |
| D. | Simulator | Anritsu | MT8820C         | 6201127458 | NA     | Provided by Lab    |

| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks            |
|----|--------------|------|------------|--------------------|--------------|--------------------|
| 1. | DC Cable     | 1    | 1.8        | No                 | 0            | Supplied by client |

### 3.3 Test Mode Applicability and Tested Channel Detail

#### LTE Band 14

| TEST ITEM             | AVAILABLE CHANNEL | TESTED CHANNEL      | CHANNEL BANDWIDTH | MODULATION | MODE                |
|-----------------------|-------------------|---------------------|-------------------|------------|---------------------|
| ERP                   | 23305 to 23355    | 23305, 23330, 23355 | 5MHz              | QPSK/16QAM | 1RB / 0 RB offset   |
|                       | 23330             | 23330               | 10MHz             | QPSK/16QAM | 1RB / 0 RB offset   |
| Frequency Stability   | 23305 to 23355    | 23305, 23330, 23355 | 5MHz              | QPSK       | -                   |
|                       | 23330             | 23330               | 10MHz             | QPSK       | -                   |
| Occupied Bandwidth    | 23305 to 23355    | 23305, 23330, 23355 | 5MHz              | QPSK/16QAM | Full RB             |
|                       | 23330             | 23330               | 10MHz             | QPSK/16QAM | Full RB             |
| Emission Mask         | 23305 to 23355    | 23305               | 5MHz              | QPSK       | 1 RB / 0 RB Offset  |
|                       |                   | 23355               |                   |            | 1 RB / 24 RB Offset |
|                       |                   | 23305, 23355        |                   |            | 25 RB / 0 RB Offset |
|                       | 23330             | 23330               | 10MHz             | QPSK       | 1 RB / 0 RB Offset  |
|                       |                   |                     |                   |            | 1 RB / 49 RB Offset |
|                       |                   |                     |                   |            | 50 RB / 0 RB Offset |
| Peak to Average Ratio | 23305 to 23355    | 23305, 23330, 23355 | 5MHz              | QPSK/16QAM | Full RB             |
|                       | 23330             | 23330               | 10MHz             | QPSK/16QAM | Full RB             |
| Conducted Emission    | 23305 to 23355    | 23305, 23330, 23355 | 5MHz              | QPSK       | 1RB / 0 RB offset   |
|                       | 23330             | 23330               | 10MHz             | QPSK       | 1RB / 0 RB offset   |
| Radiated Emission     | 23305 to 23355    | 23305, 23330, 23355 | 5MHz              | QPSK       | 1RB / 0 RB offset   |
|                       | 23330             | 23330               | 10MHz             | QPSK       | 1RB / 0 RB offset   |

#### NOTE:

All supported modulation types were evaluated. The Worst case of QPSK was selected. Therefore, the Frequency Stability, Conducted Emission and Radiated Emission were presented under QPSK mode only.

#### Test Condition:

| Test Item                    | Environmental Conditions | Input Power (System) | Tested By    |
|------------------------------|--------------------------|----------------------|--------------|
| Output Power                 | 25deg. C, 62%RH          | 120Vac, 60Hz         | Charlie Yang |
| Frequency Stability          | 25deg. C, 62%RH          | 120Vac, 60Hz         | Charlie Yang |
| Occupied Bandwidth           | 25deg. C, 62%RH          | 120Vac, 60Hz         | Charlie Yang |
| Emission Mask                | 25deg. C, 62%RH          | 120Vac, 60Hz         | Charlie Yang |
| Peak to Average Ratio        | 25deg. C, 62%RH          | 120Vac, 60Hz         | Charlie Yang |
| Conducted Emission           | 25deg. C, 62%RH          | 120Vac, 60Hz         | Charlie Yang |
| Radiated Emission Below 1GHz | 24deg. C, 75%RH          | 120Vac, 60Hz         | Tom Yang     |
| Radiated Emission Above 1GHz | 24deg. C, 75%RH          | 120Vac, 60Hz         | Tom Yang     |

### **3.4 EUT Operating Conditions**

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 and references:

**Test standard:**

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 90, Subpart R**

**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**

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 and Antenna Height

According to 90.542(a)(7), 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

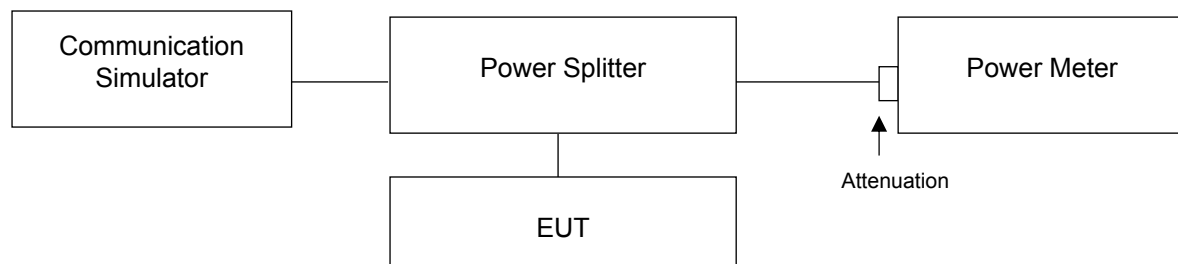
##### Conducted Power Measurement:

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 difference RB size/ RB offset for difference bandwidth record the power level shown on power meter.

##### EIRP / ERP Measurement:

- EIRP = Conducted Output power level + Antenna gain.
- ERP power can be calculated form EIRP power by subtracting the gain of dipole, ERP power = EIRP power - 2.15dBi.
- ERP = Conducted Output power level + Antenna gain (dBi) - Isotropically Factor (2.15dB).

#### 4.1.3 Test Setup



#### 4.1.4 Test Results

##### CONDUCTED OUTPUT POWER

##### LTE Band 14

| Band / BW | RB Size | RB Offset | QPSK   |        |         | 3GPP MPR (dB) | 16QAM  |        |         | 3GPP MPR (dB) |
|-----------|---------|-----------|--------|--------|---------|---------------|--------|--------|---------|---------------|
|           |         |           | Low CH | Mid CH | High CH |               | Low CH | Mid CH | High CH |               |
|           |         |           | 23305  | 23330  | 23335   |               | 23305  | 23330  | 23335   |               |
|           |         |           | 790.5  | 793    | 795.5   |               | 790.5  | 793    | 795.5   |               |
|           |         |           | MHz    | MHz    | MHz     |               | MHz    | MHz    | MHz     |               |
| 14 / 5M   | 1       | 0         | 23.81  | 23.35  | 23.40   | 0             | 22.75  | 22.76  | 22.28   | 1             |
|           | 1       | 12        | 23.64  | 23.71  | 23.54   | 0             | 22.33  | 22.67  | 22.58   | 1             |
|           | 1       | 24        | 23.26  | 23.51  | 22.64   | 0             | 22.23  | 22.49  | 22.55   | 1             |
|           | 12      | 0         | 22.39  | 22.57  | 22.66   | 1             | 21.35  | 21.72  | 21.66   | 2             |
|           | 12      | 6         | 22.50  | 22.55  | 22.68   | 1             | 21.37  | 21.55  | 21.49   | 2             |
|           | 12      | 13        | 22.54  | 22.59  | 22.63   | 1             | 21.50  | 21.51  | 21.60   | 2             |
|           | 25      | 0         | 22.52  | 22.60  | 22.67   | 1             | 21.52  | 21.57  | 21.76   | 2             |

| Band / BW | RB Size | RB Offset | QPSK   | 3GPP MPR (dB) | 16QAM  | 3GPP MPR (dB) |
|-----------|---------|-----------|--------|---------------|--------|---------------|
|           |         |           | Mid CH |               | Mid CH |               |
|           |         |           | 23330  |               | 23330  |               |
|           |         |           | 793    |               | 793    |               |
|           |         |           | MHz    |               | MHz    |               |
| 14 / 10M  | 1       | 0         | 23.72  | 0             | 23.65  | 1             |
|           | 1       | 24        | 23.43  | 0             | 23.61  | 1             |
|           | 1       | 49        | 23.41  | 0             | 22.73  | 1             |
|           | 25      | 0         | 22.61  | 1             | 21.49  | 2             |
|           | 25      | 12        | 22.64  | 1             | 21.62  | 2             |
|           | 25      | 25        | 22.62  | 1             | 21.60  | 2             |
|           | 50      | 0         | 22.64  | 1             | 21.55  | 2             |

## ERP POWER

### LTE Band 14

Band 14 / 5M 1RB#0

| Test Mode                 | QPSK   |        |         | 16QAM  |        |         |
|---------------------------|--------|--------|---------|--------|--------|---------|
|                           | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
|                           | 23305  | 23330  | 23355   | 23305  | 23330  | 23355   |
|                           | 790.5  | 793    | 795.5   | 790.5  | 793    | 795.5   |
|                           | MHz    | MHz    | MHz     | MHz    | MHz    | MHz     |
| Max Cond. Power (dBm)     | 23.81  | 23.35  | 23.40   | 22.75  | 22.76  | 22.28   |
| Gain (dBi)                | 1.66   | 1.66   | 1.66    | 1.66   | 1.66   | 1.66    |
| Isotropically Factor (dB) | 2.15   | 2.15   | 2.15    | 2.15   | 2.15   | 2.15    |
| Max ERP Power (dBm)       | 23.32  | 22.86  | 22.91   | 22.26  | 22.27  | 21.79   |

Band 14 / 10M 1RB#0

| Test Mode                 | QPSK   | 16QAM  |
|---------------------------|--------|--------|
|                           | Mid CH | Mid CH |
|                           | 23330  | 23330  |
|                           | 793    | 793    |
|                           | MHz    | MHz    |
| Max Cond. Power (dBm)     | 23.72  | 23.65  |
| Gain (dBi)                | 1.66   | 1.66   |
| Isotropically Factor (dB) | 2.15   | 2.15   |
| Max ERP Power (dBm)       | 23.23  | 23.16  |

## 4.2 Modulation Characteristics Measurement

### 4.2.1 Limits of Modulation Characteristics

N/A

### 4.2.2 Test Procedure

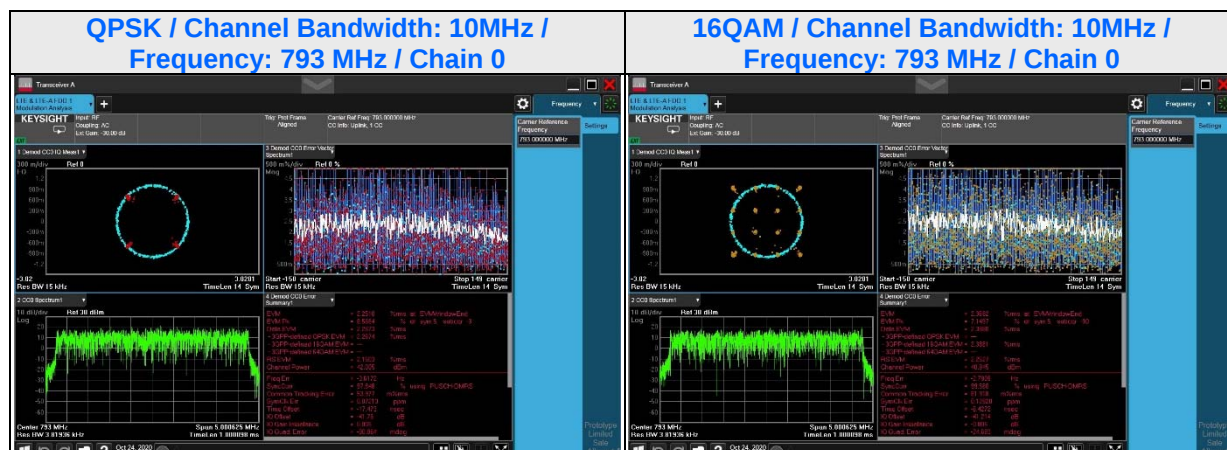
Connect the EUT to Communication Simulator via the antenna connector, the frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

### 4.2.3 Test Setup



## 4.2.4 Test Results

### LTE Band 14



### 4.3 Frequency Stability Measurement

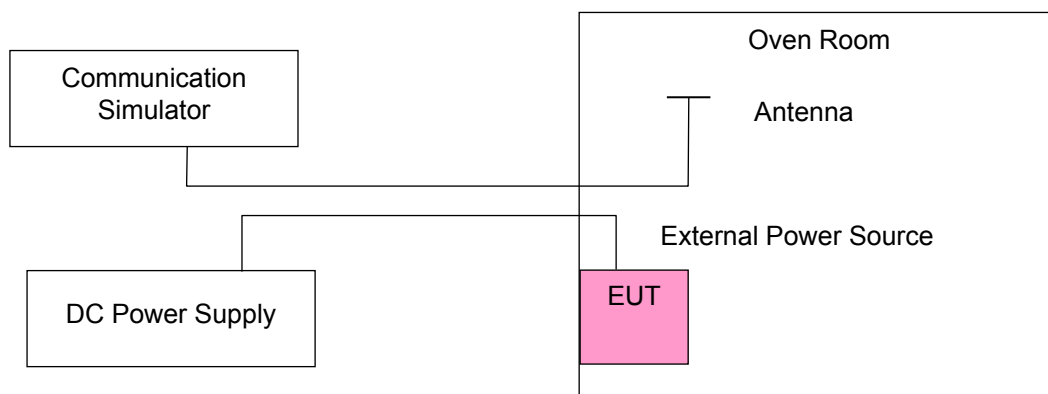
#### 4.3.1 Limits of Frequency Stability Measurement

Follow the 90.213 1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.  
Follow the 90.539 frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 parts per million.

#### 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 DC 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  $\pm 0.5$  °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.

#### 4.3.3 Test Setup



#### 4.3.4 Test Results

##### LTE Band 14

| Frequency Error vs. Voltage |                   |       | Limit ( ppm ) | Pass/Fail |
|-----------------------------|-------------------|-------|---------------|-----------|
| Voltage<br>(Volts)          | Test result (ppm) |       |               |           |
|                             | 5M                | 10M   |               |           |
| 3.3                         | 0.040             | 0.055 | ±2.5          | Pass      |
| 4.2                         | 0.044             | 0.033 | ±2.5          | Pass      |

| Frequency Error vs. Temperature |                   |       | Limit ( ppm ) | Pass/Fail |
|---------------------------------|-------------------|-------|---------------|-----------|
| Temp.<br>(°C)                   | Test result (ppm) |       |               |           |
|                                 | 5M                | 10M   |               |           |
| 60                              | 0.049             | 0.048 | ±2.5          | Pass      |
| 50                              | 0.037             | 0.043 | ±2.5          | Pass      |
| 40                              | 0.037             | 0.044 | ±2.5          | Pass      |
| 30                              | 0.059             | 0.039 | ±2.5          | Pass      |
| 20                              | 0.035             | 0.053 | ±2.5          | Pass      |
| 10                              | 0.037             | 0.062 | ±2.5          | Pass      |
| 0                               | 0.038             | 0.053 | ±2.5          | Pass      |
| -10                             | 0.048             | 0.035 | ±2.5          | Pass      |
| -20                             | 0.053             | 0.029 | ±2.5          | Pass      |
| -30                             | 0.052             | 0.047 | ±2.5          | Pass      |

#### 4.4 Emission Bandwidth Measurement

##### 4.4.1 Limits of Emission 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 transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with  $RBW \geq 1\% \times OBW$  and  $VBW \geq 3 \times RBW$ .

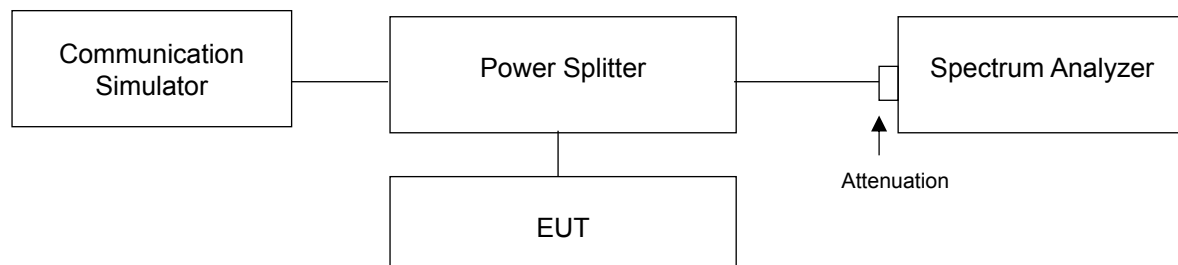
##### Occupied Bandwidth Measurement:

Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

##### 26 dB Bandwidth Measurement:

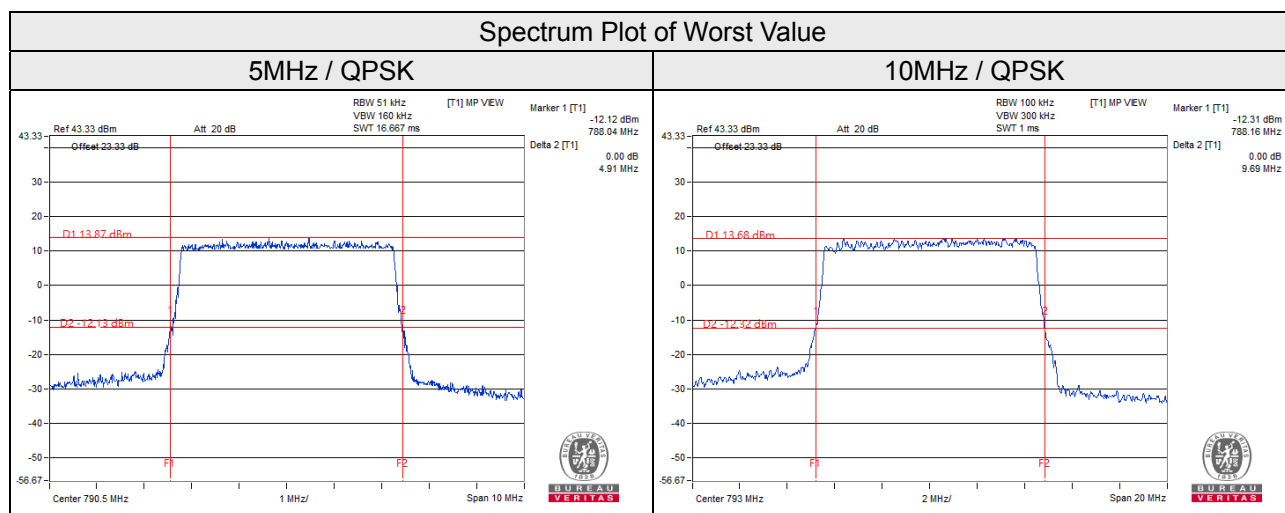
The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26dB below the transmitter power.

##### 4.4.3 Test Setup



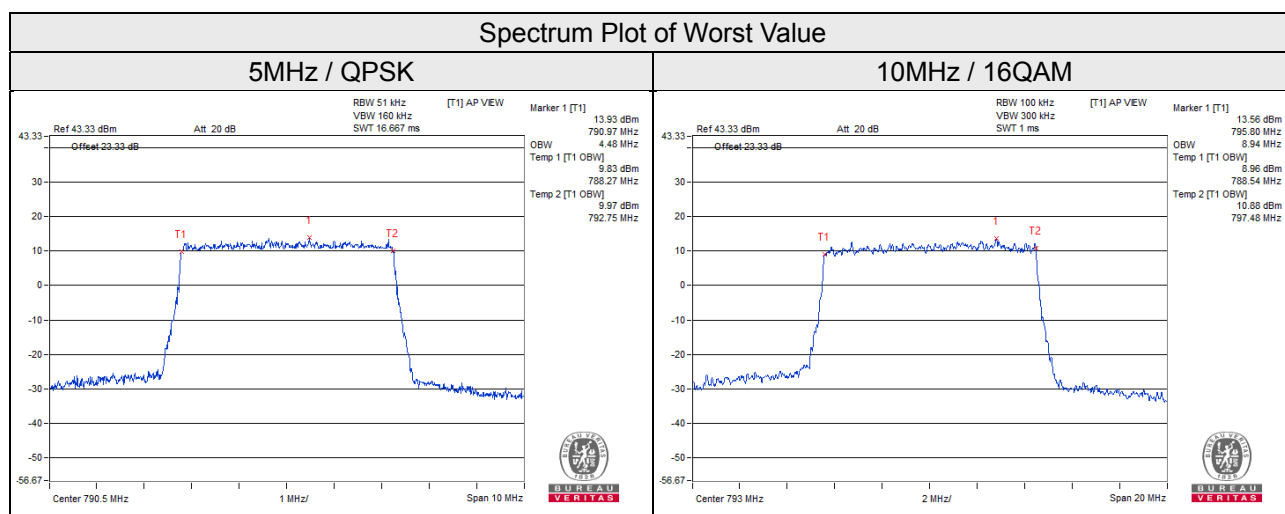
#### 4.4.4 Test Result (-26dB Bandwidth)

| LTE Band 14            |                 |                       |       |                         |                 |                       |       |
|------------------------|-----------------|-----------------------|-------|-------------------------|-----------------|-----------------------|-------|
| Channel Bandwidth 5MHz |                 |                       |       | Channel Bandwidth 10MHz |                 |                       |       |
| Channel                | Frequency (MHz) | -26dB Bandwidth (MHz) |       | Channel                 | Frequency (MHz) | -26dB Bandwidth (MHz) |       |
|                        |                 | QPSK                  | 16QAM |                         |                 | QPSK                  | 16QAM |
| 23305                  | 790.5           | 4.91                  | 4.88  | 23330                   | 793             | 9.69                  | 9.69  |
| 23330                  | 793             | 4.90                  | 4.87  |                         |                 |                       |       |
| 23355                  | 795.5           | 4.85                  | 4.88  |                         |                 |                       |       |



#### 4.4.5 Test Result (Occupied Bandwidth)

| LTE Band 14            |                 |                              |       |                         |                 |                              |       |
|------------------------|-----------------|------------------------------|-------|-------------------------|-----------------|------------------------------|-------|
| Channel Bandwidth 5MHz |                 |                              |       | Channel Bandwidth 10MHz |                 |                              |       |
| Channel                | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       | Channel                 | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                        |                 | QPSK                         | 16QAM |                         |                 | QPSK                         | 16QAM |
| 23305                  | 790.5           | 4.48                         | 4.48  | 23330                   | 793             | 8.92                         | 8.94  |
| 23330                  | 793             | 4.48                         | 4.48  |                         |                 |                              |       |
| 23355                  | 795.5           | 4.48                         | 4.47  |                         |                 |                              |       |



## 4.5 Emission Mask Measurement

### 4.5.1 Limits of Emission Mask Measurement

Per 90.543(e), Emission mask requirements

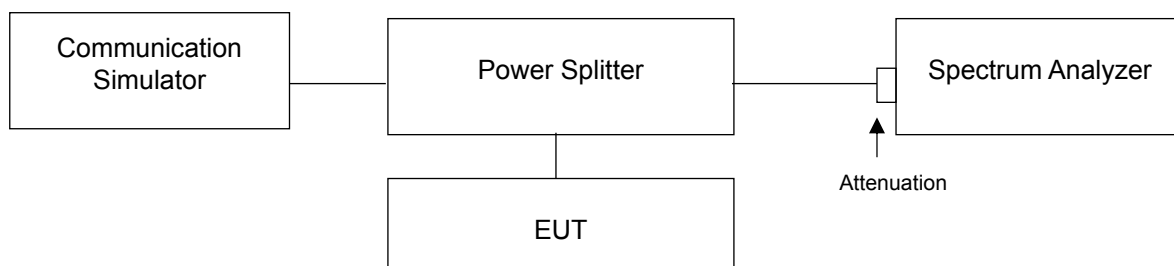
For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than  $76 + 10 \log (P)$  dB in a 6.25 kHz band segment, for base and fixed stations. (2) 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. (3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least  $43 + 10 \log (P)$  dB. (4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

### 4.5.2 Test Procedures

1. The power was measured with Spectrum Analyzer. All measurements were done at low and high operational frequency range.
2. The measurement used the power splitter via EUT RF power connector between signal generator and spectrum analyzer.
3. Record the test plot.

### 4.5.3 Test Setup

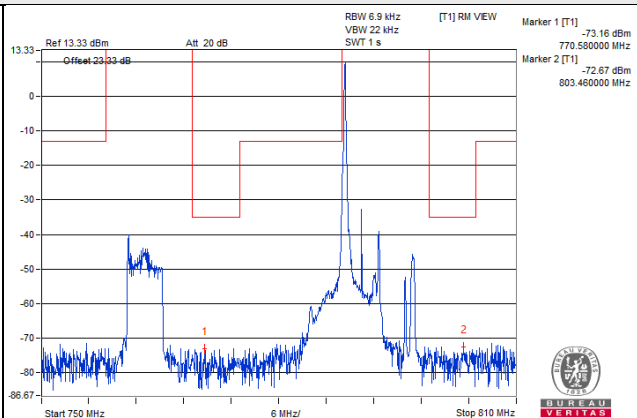
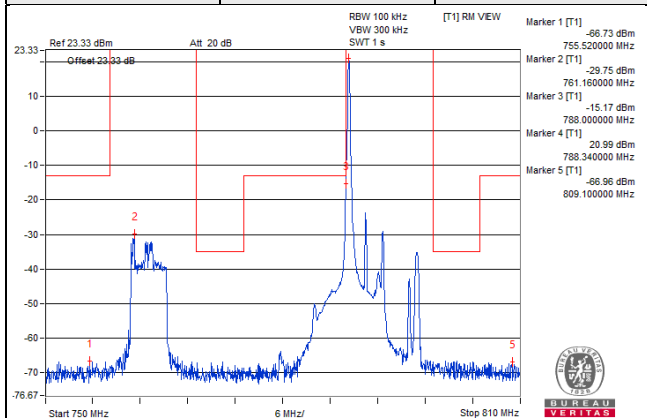


## 4.5.4 Test Results

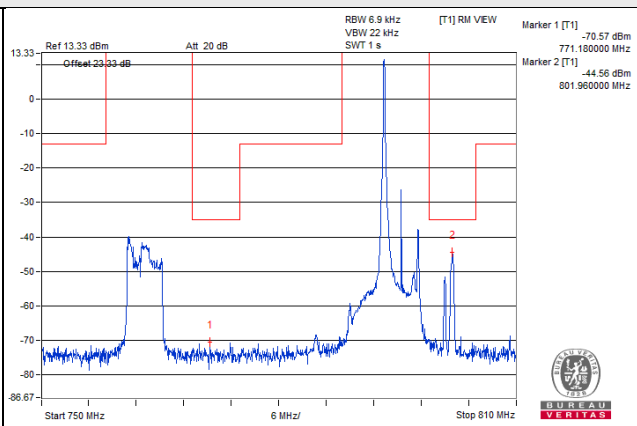
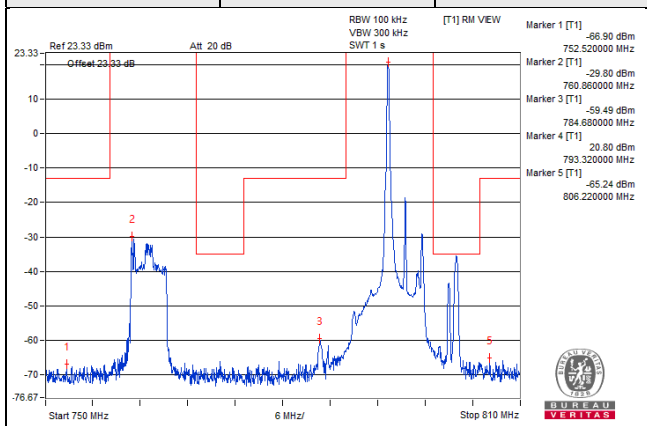
### LTE Band 14

### Channel Bandwidth 5MHz QPSK

Channel 23305 1 RB



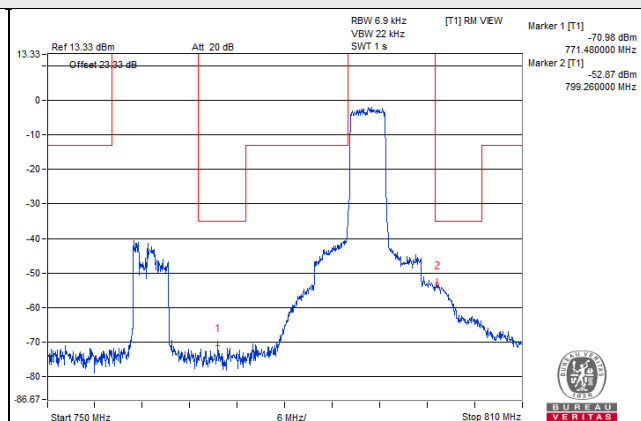
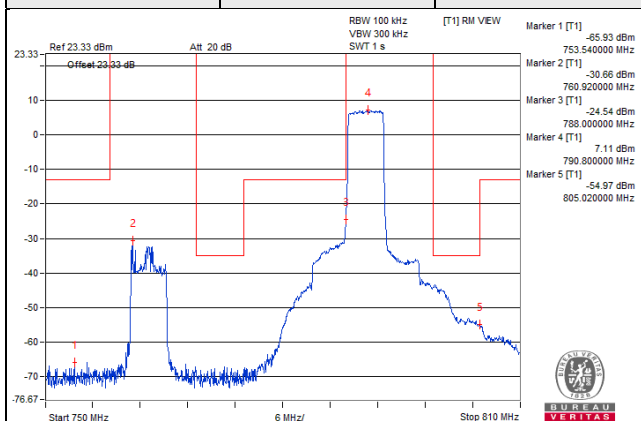
Channel 23355 1 RB



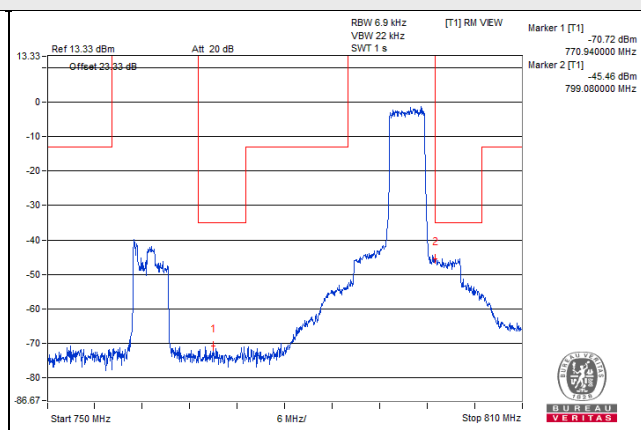
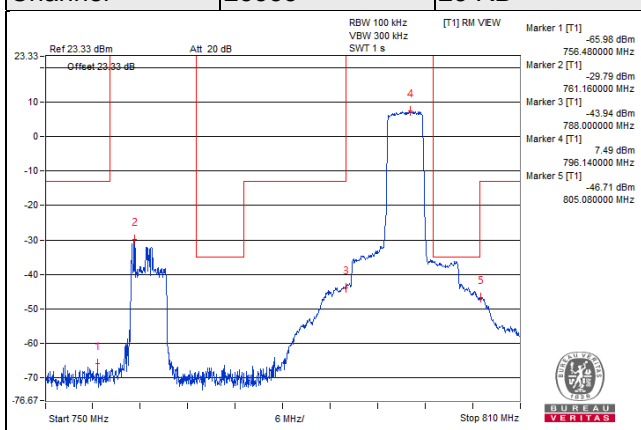
## LTE Band 14

### Channel Bandwidth 5MHz QPSK

Channel 23305 25 RB



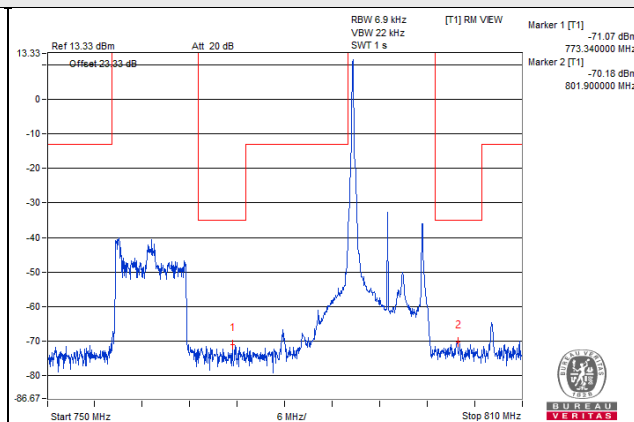
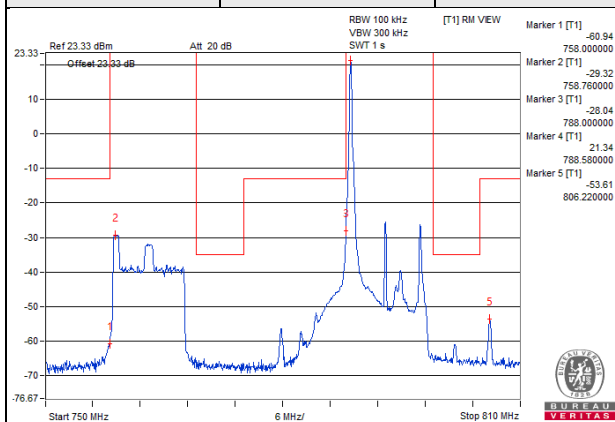
Channel 23355 25 RB



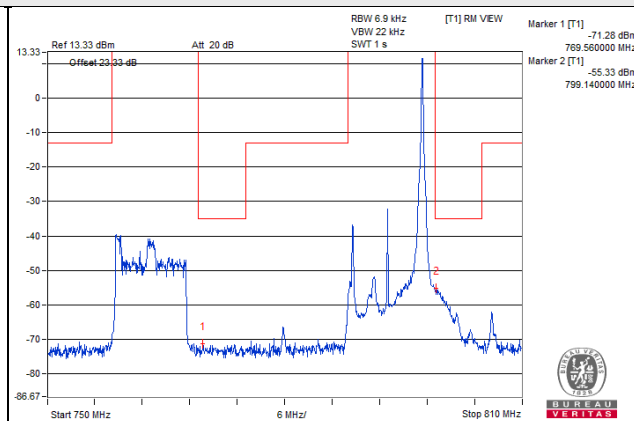
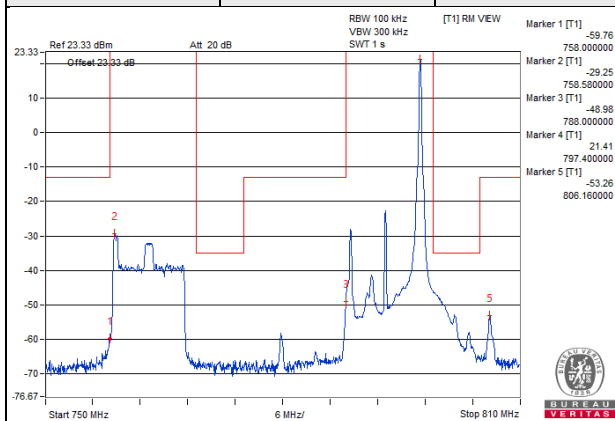
## LTE Band 14

### Channel Bandwidth 10MHz QPSK

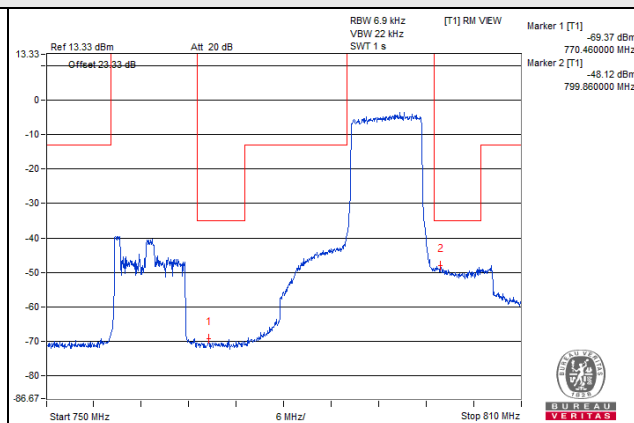
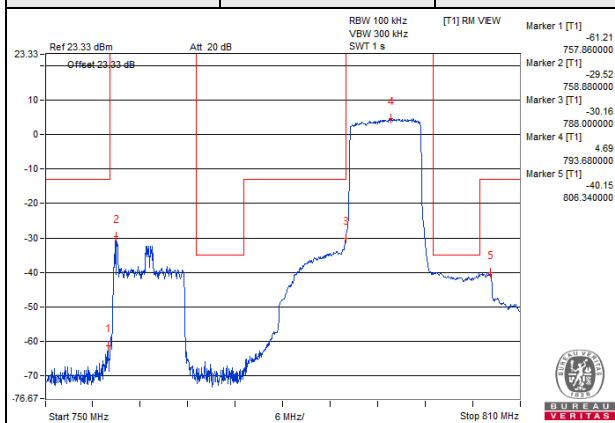
Channel 23330 1 RB#0



Channel 23330 1 RB#Max



Channel 23330 50 RB

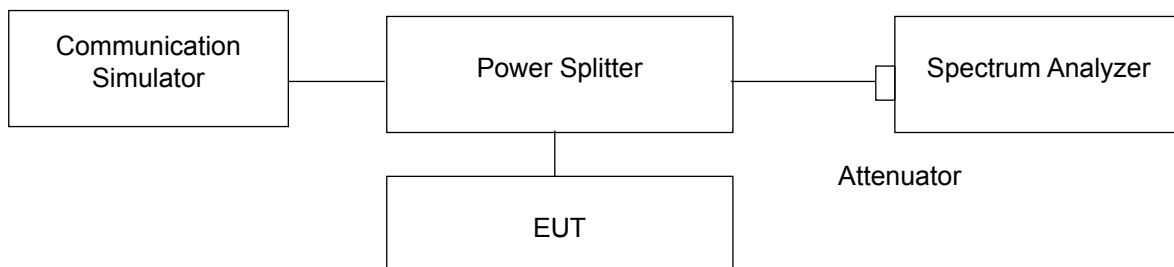


## 4.6 Peak To Average Power Ratio

### 4.4.1 Limits of Peak To Average Power Ratio Measurement

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

### 4.4.2 Test Setup

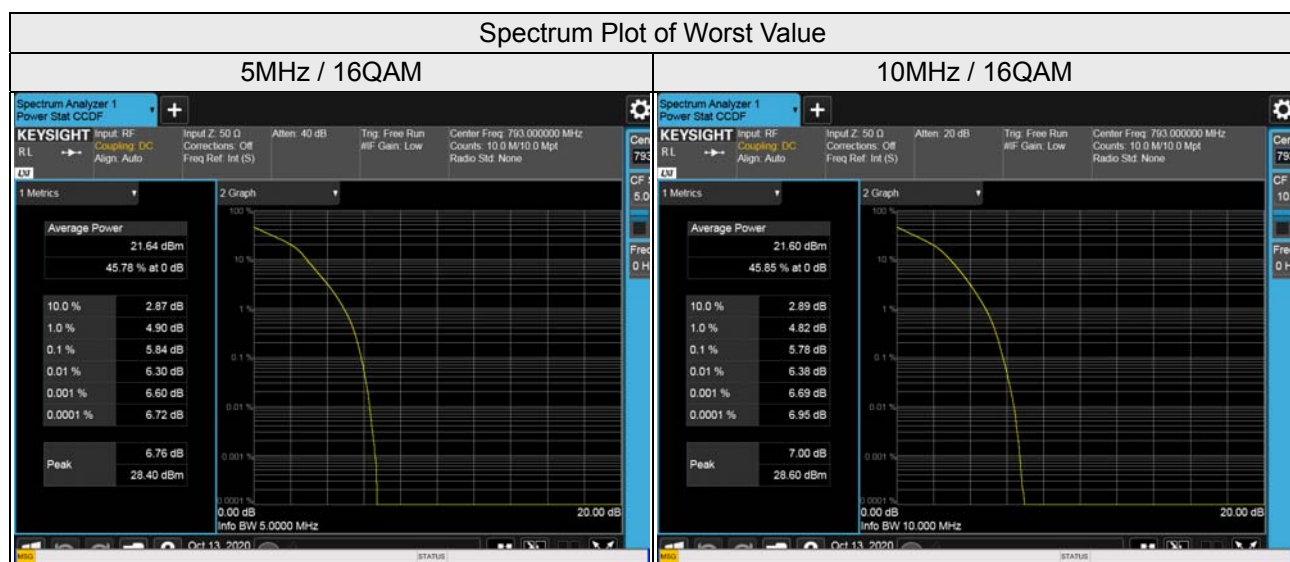


### 4.4.3 Test Procedures

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

#### 4.4.4 Test Results

| LTE Band 14            |                 |                            |       |                         |                 |                            |       |
|------------------------|-----------------|----------------------------|-------|-------------------------|-----------------|----------------------------|-------|
| Channel Bandwidth 5MHz |                 |                            |       | Channel Bandwidth 10MHz |                 |                            |       |
| Channel                | Frequency (MHz) | Peak To Average Ratio (dB) |       | Channel                 | Frequency (MHz) | Peak To Average Ratio (dB) |       |
|                        |                 | QPSK                       | 16QAM |                         |                 | QPSK                       | 16QAM |
| 23305                  | 790.5           | 4.97                       | 5.81  | 23330                   | 793             | 4.92                       | 5.78  |
| 23330                  | 793             | 4.98                       | 5.84  |                         |                 |                            |       |
| 23355                  | 795.5           | 4.91                       | 4.92  |                         |                 |                            |       |

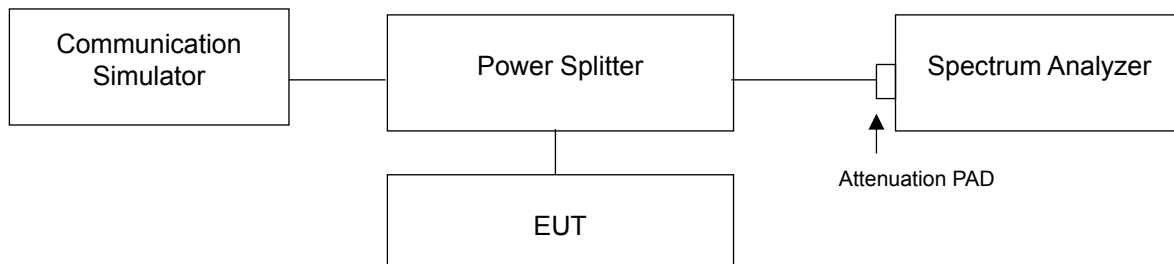


## 4.7 Conducted Spurious Emissions

### 4.7.1 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  $-13\text{dBm}$ .

### 4.7.2 Test Setup



### 4.7.3 Test Procedure

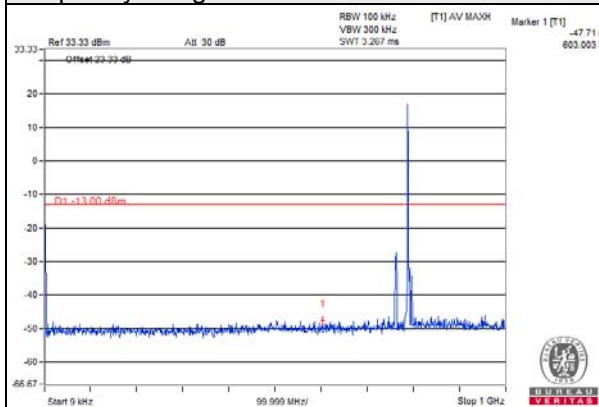
- The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with Spectrum Analyzer.
- The conducted spurious emission used the power splitter via EUT RF power connector between signal generator and spectrum analyzer.
- When the spectrum scanned from 9kHz to the tenth harmonic of the highest fundamental frequency, it shall be connected to the band reject filter attenuated the carried frequency. The spectrum set RBW: 1 MHz and VBW=3\*RBW is used for measurement.

#### 4.7.4 Test Results

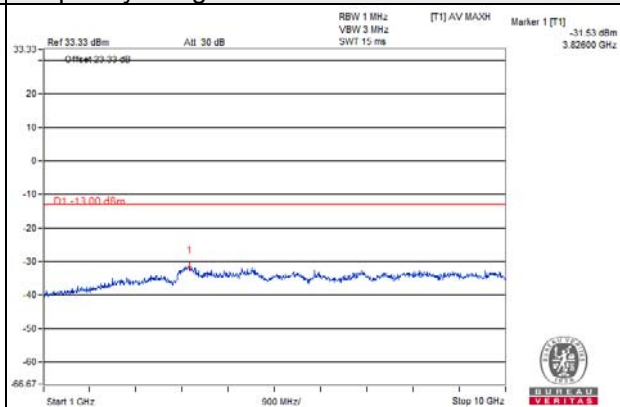
LTE Band 14 Channel Bandwidth: 5MHz

Channel 23305

Frequency Range : 9kHz~1GHz

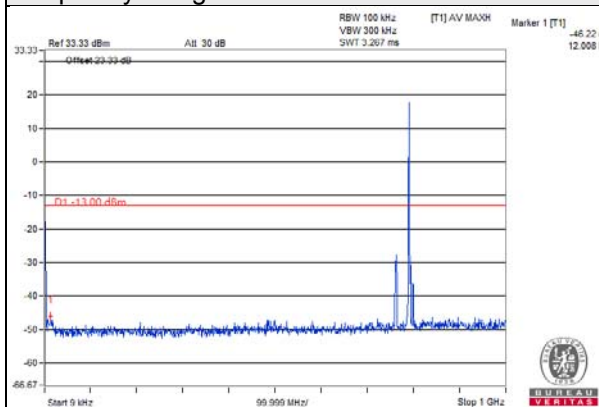


Frequency Range : 1GHz~10GHz

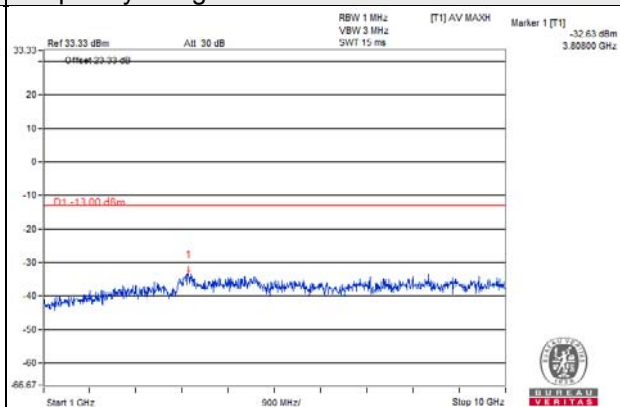


Channel 23330

Frequency Range : 9kHz~1GHz

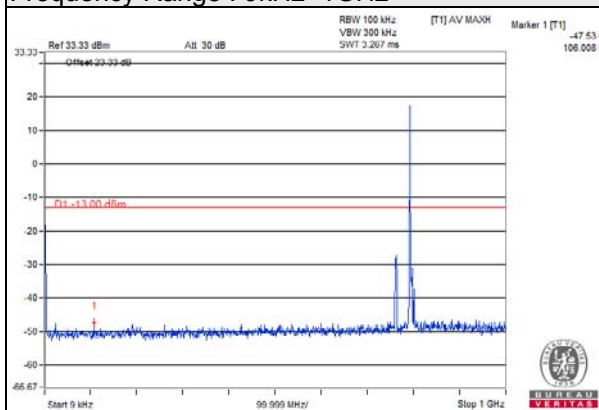


Frequency Range : 1GHz~10GHz

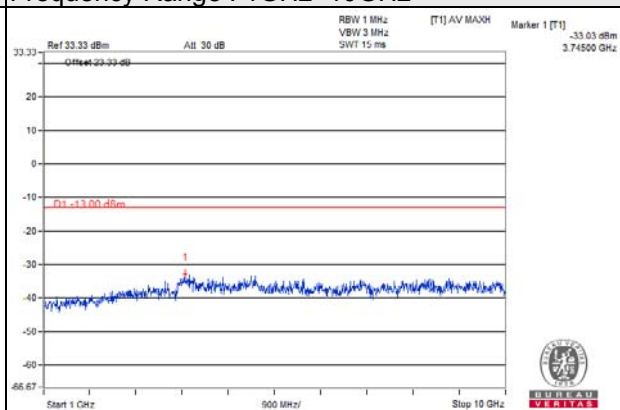


Channel 23355

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~10GHz



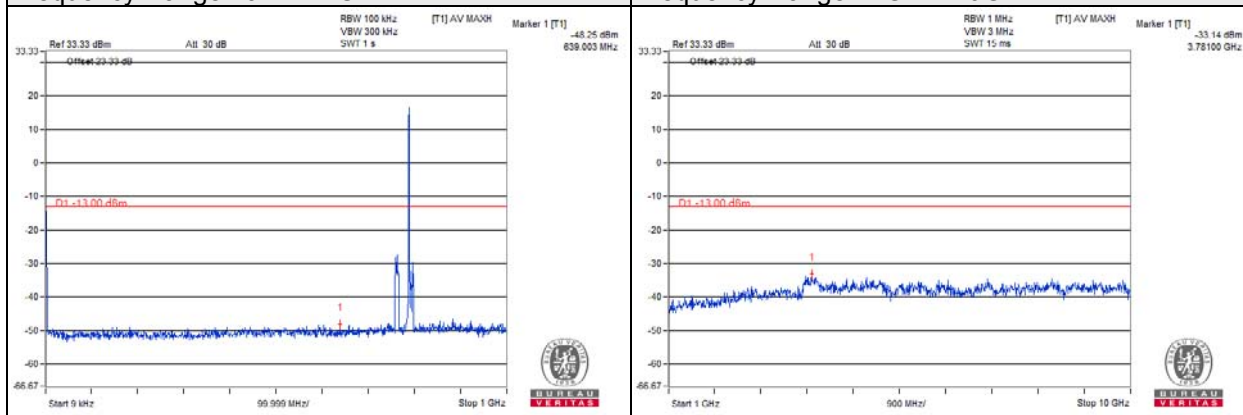
Note: The signal of 9kHz is IF signal from test instrument.

LTE Band 14 Channel Bandwidth: 10MHz

Channel 23330

Frequency Range : 9kHz~1GHz

Frequency Range : 1GHz~10GHz



Note: The signal of 9kHz is IF signal from test instrument.

## 4.8 Radiated Emission Measurement

### 4.8.1 Limits of Radiated Emission Measuremen

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  $-13\text{dBm}$

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  $-70\text{ dBW/MHz}$  equivalent isotropically radiated power (EIRP) for wideband signals, and  $-80\text{ dBW}$  EIRP for discrete emissions of less than 700 Hz bandwidth.

### 4.8.2 Test Procedure

- a. The field strength was measured with Spectrum Analyzer.
- b. Measurement in the semi-anechoic chamber, EUT placed on the 0.8m/1.5m 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 field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor.
- c. Perform a field strength measurement and then mathematically convert the measured field strength level to EIRP level.
- d. Follow ANSI 63.26 section 5.2.7 d), Emission Value (dBm) = Read Value (dB $\mu$ V/m) - Correction Factor @ 3m
- e. Correction Factor (dB) @ 3m =  $20\log(D) - 104.8$ ; where D is the measurement distance @3m =  $-95.26\text{dB}$

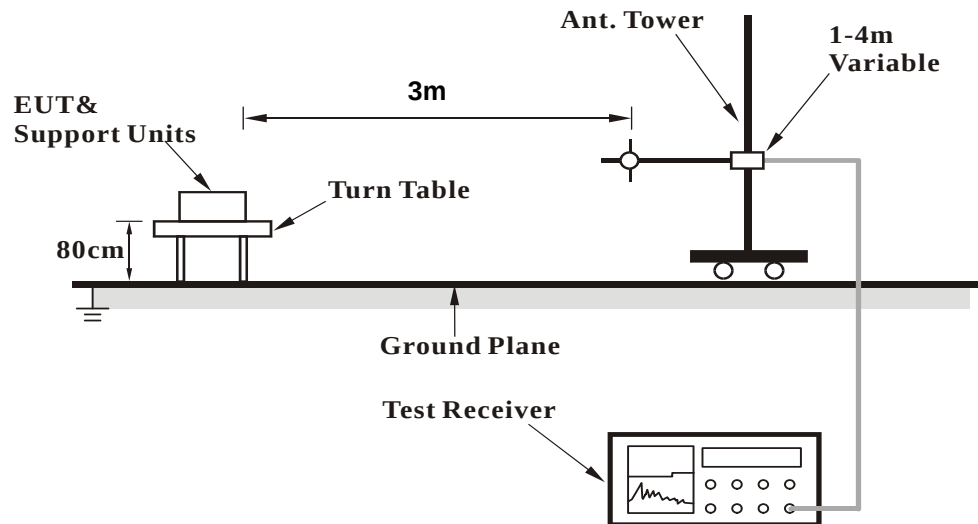
**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

### 4.8.3 Deviation from Test Standard

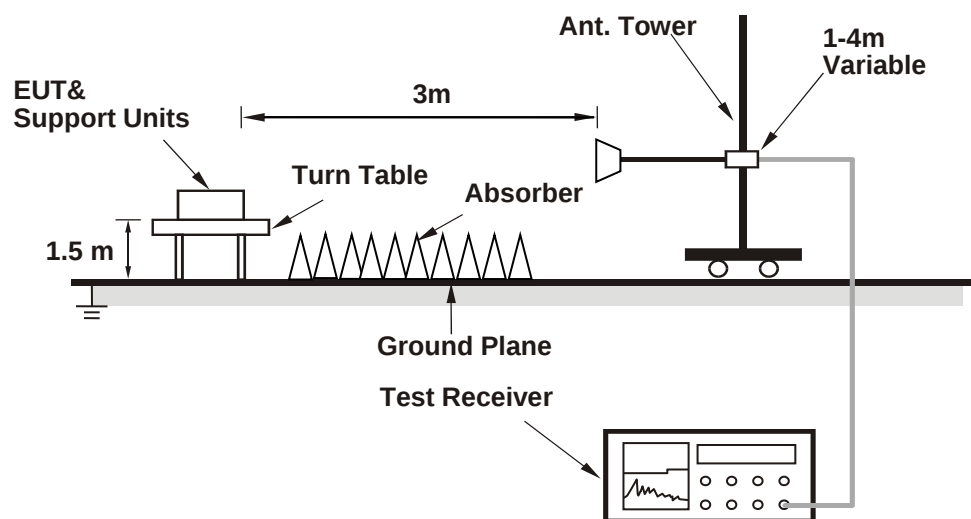
No deviation.

#### 4.8.4 Test Setup

For Radiated emission below 1GHz



For Radiated emission above 1GHz



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

#### 4.8.5 Test Results

Below 1GHz

LTE Band 14: 5MHz

|      |                  |                 |                |
|------|------------------|-----------------|----------------|
| Mode | TX channel 23305 | Frequency Range | Below 1000 MHz |
|------|------------------|-----------------|----------------|

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                        |                        |                |             |             |
|-----------------------------------------------------|-------------|------------------------|------------------------|----------------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dB $\mu$ V/m) | Correction Factor (dB) | Emission (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 30.59       | 29.89                  | -95.26                 | -65.37         | -13         | -52.37      |
| 2                                                   | 109.17      | 24.78                  | -95.26                 | -70.48         | -13         | -57.48      |
| 3                                                   | 149.2       | 24.73                  | -95.26                 | -70.53         | -13         | -57.53      |
| 4                                                   | 196.93      | 26.77                  | -95.26                 | -68.49         | -13         | -55.49      |
| 5                                                   | 309.93      | 24.9                   | -95.26                 | -70.36         | -13         | -57.36      |
| 6                                                   | 486.1       | 29.11                  | -95.26                 | -66.15         | -13         | -53.15      |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                        |                        |                |             |             |
| No.                                                 | Freq. (MHz) | Reading (dB $\mu$ V/m) | Correction Factor (dB) | Emission (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 30.59       | 31.79                  | -95.26                 | -63.47         | -13         | -50.47      |
| 2                                                   | 48.14       | 29.65                  | -95.26                 | -65.61         | -13         | -52.61      |
| 3                                                   | 106.6       | 24.79                  | -95.26                 | -70.47         | -13         | -57.47      |
| 4                                                   | 159.63      | 26.43                  | -95.26                 | -68.83         | -13         | -55.83      |
| 5                                                   | 197.74      | 22.77                  | -95.26                 | -72.49         | -13         | -59.49      |
| 6                                                   | 380.61      | 26.62                  | -95.26                 | -68.64         | -13         | -55.64      |

Remarks:

1. Follow ANSI 63.26 section 5.2.7 d), Emission Value (dBm) = E (dB $\mu$ V/m) - Correction Factor @ 3m.
2. Correction Factor (dB) = 20log(D) - 104.8; where D is the measurement distance @3m.

|      |                  |                 |                |
|------|------------------|-----------------|----------------|
| Mode | TX channel 23330 | Frequency Range | Below 1000 MHz |
|------|------------------|-----------------|----------------|

Antenna Polarity & Test Distance: Horizontal at 3 M

| No. | Freq.<br>(MHz) | Reading<br>(dB $\mu$ V/m) | Correction Factor<br>(dB) | Emission<br>(dBm) | Limit<br>(dBm) | Margin (dB) |
|-----|----------------|---------------------------|---------------------------|-------------------|----------------|-------------|
| 1   | 30.56          | 29.76                     | -95.26                    | -65.50            | -13            | -52.50      |
| 2   | 109.08         | 24.82                     | -95.26                    | -70.44            | -13            | -57.44      |
| 3   | 149.11         | 24.75                     | -95.26                    | -70.51            | -13            | -57.51      |
| 4   | 196.81         | 26.94                     | -95.26                    | -68.32            | -13            | -55.32      |
| 5   | 309.82         | 24.79                     | -95.26                    | -70.47            | -13            | -57.47      |
| 6   | 485.97         | 29.12                     | -95.26                    | -66.14            | -13            | -53.14      |

Antenna Polarity & Test Distance: Vertical at 3 M

| No. | Freq.<br>(MHz) | Reading<br>(dB $\mu$ V/m) | Correction Factor<br>(dB) | Emission<br>(dBm) | Limit<br>(dBm) | Margin (dB) |
|-----|----------------|---------------------------|---------------------------|-------------------|----------------|-------------|
| 1   | 30.67          | 31.78                     | -95.26                    | -63.48            | -13            | -50.48      |
| 2   | 47.98          | 29.59                     | -95.26                    | -65.67            | -13            | -52.67      |
| 3   | 106.67         | 24.72                     | -95.26                    | -70.54            | -13            | -57.54      |
| 4   | 159.58         | 26.35                     | -95.26                    | -68.91            | -13            | -55.91      |
| 5   | 197.8          | 22.62                     | -95.26                    | -72.64            | -13            | -59.64      |
| 6   | 380.66         | 26.49                     | -95.26                    | -68.77            | -13            | -55.77      |

Remarks:

1. Follow ANSI 63.26 section 5.2.7 d), Emission Value (dBm) = E (dB $\mu$ V/m) - Correction Factor @ 3m.
2. Correction Factor (dB) = 20log(D) - 104.8; where D is the measurement distance @3m.

|      |                  |                 |                |
|------|------------------|-----------------|----------------|
| Mode | TX channel 23355 | Frequency Range | Below 1000 MHz |
|------|------------------|-----------------|----------------|

Antenna Polarity & Test Distance: Horizontal at 3 M

| No. | Freq.<br>(MHz) | Reading<br>(dB $\mu$ V/m) | Correction Factor<br>(dB) | Emission<br>(dBm) | Limit<br>(dBm) | Margin (dB) |
|-----|----------------|---------------------------|---------------------------|-------------------|----------------|-------------|
| 1   | 30.75          | 29.74                     | -95.26                    | -65.52            | -13            | -52.52      |
| 2   | 109.24         | 24.68                     | -95.26                    | -70.58            | -13            | -57.58      |
| 3   | 149.02         | 24.7                      | -95.26                    | -70.56            | -13            | -57.56      |
| 4   | 196.92         | 26.97                     | -95.26                    | -68.29            | -13            | -55.29      |
| 5   | 309.85         | 24.85                     | -95.26                    | -70.41            | -13            | -57.41      |
| 6   | 485.97         | 29.17                     | -95.26                    | -66.09            | -13            | -53.09      |

Antenna Polarity & Test Distance: Vertical at 3 M

| No. | Freq.<br>(MHz) | Reading<br>(dB $\mu$ V/m) | Correction Factor<br>(dB) | Emission<br>(dBm) | Limit<br>(dBm) | Margin (dB) |
|-----|----------------|---------------------------|---------------------------|-------------------|----------------|-------------|
| 1   | 30.67          | 31.73                     | -95.26                    | -63.53            | -13            | -50.53      |
| 2   | 48.11          | 29.68                     | -95.26                    | -65.58            | -13            | -52.58      |
| 3   | 106.68         | 24.7                      | -95.26                    | -70.56            | -13            | -57.56      |
| 4   | 159.65         | 26.31                     | -95.26                    | -68.95            | -13            | -55.95      |
| 5   | 197.79         | 22.76                     | -95.26                    | -72.50            | -13            | -59.50      |
| 6   | 380.47         | 26.59                     | -95.26                    | -68.67            | -13            | -55.67      |

Remarks:

1. Follow ANSI 63.26 section 5.2.7 d), Emission Value (dBm) = E (dB $\mu$ V/m) - Correction Factor @ 3m.
2. Correction Factor (dB) = 20log(D) - 104.8; where D is the measurement distance @3m.

### LTE Band 14: 10MHz

|      |                  |                 |                |
|------|------------------|-----------------|----------------|
| Mode | TX channel 23330 | Frequency Range | Below 1000 MHz |
|------|------------------|-----------------|----------------|

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

| No. | Freq. (MHz) | Reading (dB $\mu$ V/m) | Correction Factor (dB) | Emission (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|------------------------|------------------------|----------------|-------------|-------------|
| 1   | 30.81       | 29.76                  | -95.26                 | -65.50         | -13         | -52.50      |
| 2   | 109.19      | 24.77                  | -95.26                 | -70.49         | -13         | -57.49      |
| 3   | 149.14      | 24.86                  | -95.26                 | -70.40         | -13         | -57.40      |
| 4   | 196.88      | 26.96                  | -95.26                 | -68.30         | -13         | -55.30      |
| 5   | 309.91      | 24.79                  | -95.26                 | -70.47         | -13         | -57.47      |
| 6   | 486         | 29                     | -95.26                 | -66.26         | -13         | -53.26      |

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

| No. | Freq. (MHz) | Reading (dB $\mu$ V/m) | Correction Factor (dB) | Emission (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|------------------------|------------------------|----------------|-------------|-------------|
| 1   | 30.69       | 31.63                  | -95.26                 | -63.63         | -13         | -50.63      |
| 2   | 48.26       | 29.55                  | -95.26                 | -65.71         | -13         | -52.71      |
| 3   | 106.64      | 24.8                   | -95.26                 | -70.46         | -13         | -57.46      |
| 4   | 159.77      | 26.35                  | -95.26                 | -68.91         | -13         | -55.91      |
| 5   | 197.95      | 22.71                  | -95.26                 | -72.55         | -13         | -59.55      |
| 6   | 380.7       | 26.49                  | -95.26                 | -68.77         | -13         | -55.77      |

#### Remarks:

1. Follow ANSI 63.26 section 5.2.7 d), Emission Value (dBm) = E (dB $\mu$ V/m) - Correction Factor @ 3m.
2. Correction Factor (dB) = 20log(D) - 104.8; where D is the measurement distance @3m.

Above 1GHz

LTE Band 14: 5MHz

|      |                  |                 |                |
|------|------------------|-----------------|----------------|
| Mode | TX channel 23305 | Frequency Range | Above 1000 MHz |
|------|------------------|-----------------|----------------|

| Antenna Polarity & Test Distance: Horizontal at 3 M |                |                           |                           |                   |                |               |
|-----------------------------------------------------|----------------|---------------------------|---------------------------|-------------------|----------------|---------------|
| No.                                                 | Freq.<br>(MHz) | Reading<br>(dB $\mu$ V/m) | Correction Factor<br>(dB) | Emission<br>(dBm) | Limit<br>(dBm) | Margin (dB)   |
| 1                                                   | 1581           | 32.43                     | -95.26                    | -62.83            | -40            | -22.83        |
| 2                                                   | 2371.5         | 32.81                     | -95.26                    | -62.45            | -13            | -49.45        |
| 3                                                   | 3162           | 33.29                     | -95.26                    | -61.97            | -13            | -48.97        |
| 4                                                   | 3952.5         | 33.72                     | -95.26                    | -61.54            | -13            | -48.54        |
| Antenna Polarity & Test Distance: Vertical at 3 M   |                |                           |                           |                   |                |               |
| No.                                                 | Freq.<br>(MHz) | Reading<br>(dB $\mu$ V/m) | Correction Factor<br>(dB) | Emission<br>(dBm) | Limit<br>(dBm) | Margin (dB)   |
| <b>1</b>                                            | <b>1581</b>    | <b>32.98</b>              | <b>-95.26</b>             | <b>-62.28</b>     | <b>-40</b>     | <b>-22.28</b> |
| 2                                                   | 2371.5         | 32.93                     | -95.26                    | -62.33            | -13            | -49.33        |
| 3                                                   | 3162           | 33.72                     | -95.26                    | -61.54            | -13            | -48.54        |
| 4                                                   | 3952.5         | 34.14                     | -95.26                    | -61.12            | -13            | -48.12        |

Remarks:

1. Follow ANSI 63.26 section 5.2.7 d), Emission Value (dBm) = E (dB $\mu$ V/m) - Correction Factor @ 3m.
2. Correction Factor (dB) = 20log(D) - 104.8; where D is the measurement distance @3m.

|      |                  |                 |                |
|------|------------------|-----------------|----------------|
| Mode | TX channel 23330 | Frequency Range | Above 1000 MHz |
|------|------------------|-----------------|----------------|

Antenna Polarity & Test Distance: Horizontal at 3 M

| No. | Freq.<br>(MHz) | Reading<br>(dB $\mu$ V/m) | Correction Factor<br>(dB) | Emission<br>(dBm) | Limit<br>(dBm) | Margin (dB) |
|-----|----------------|---------------------------|---------------------------|-------------------|----------------|-------------|
| 1   | 1586           | 32.5                      | -95.26                    | -62.76            | -40            | -22.76      |
| 2   | 2379           | 32.9                      | -95.26                    | -62.36            | -13            | -49.36      |
| 3   | 3172           | 33.4                      | -95.26                    | -61.86            | -13            | -48.86      |
| 4   | 3965           | 33.59                     | -95.26                    | -61.67            | -13            | -48.67      |

Antenna Polarity & Test Distance: Vertical at 3 M

| No. | Freq.<br>(MHz) | Reading<br>(dB $\mu$ V/m) | Correction Factor<br>(dB) | Emission<br>(dBm) | Limit<br>(dBm) | Margin (dB) |
|-----|----------------|---------------------------|---------------------------|-------------------|----------------|-------------|
| 1   | 1586           | 32.83                     | -95.26                    | -62.43            | -40            | -22.43      |
| 2   | 2379           | 32.92                     | -95.26                    | -62.34            | -13            | -49.34      |
| 3   | 3172           | 33.76                     | -95.26                    | -61.50            | -13            | -48.50      |
| 4   | 3965           | 34.32                     | -95.26                    | -60.94            | -13            | -47.94      |

Remarks:

1. Follow ANSI 63.26 section 5.2.7 d), Emission Value (dBm) = E (dB $\mu$ V/m) - Correction Factor @ 3m.
2. Correction Factor (dB) = 20log(D) - 104.8; where D is the measurement distance @3m.

|      |                  |                 |                |
|------|------------------|-----------------|----------------|
| Mode | TX channel 23355 | Frequency Range | Above 1000 MHz |
|------|------------------|-----------------|----------------|

Antenna Polarity & Test Distance: Horizontal at 3 M

| No. | Freq.<br>(MHz) | Reading<br>(dB $\mu$ V/m) | Correction Factor<br>(dB) | Emission<br>(dBm) | Limit<br>(dBm) | Margin (dB) |
|-----|----------------|---------------------------|---------------------------|-------------------|----------------|-------------|
| 1   | 1591           | 32.43                     | -95.26                    | -62.83            | -40            | -22.83      |
| 2   | 2386.5         | 32.88                     | -95.26                    | -62.38            | -13            | -49.38      |
| 3   | 3182           | 33.39                     | -95.26                    | -61.87            | -13            | -48.87      |
| 4   | 3977.5         | 33.82                     | -95.26                    | -61.44            | -13            | -48.44      |

Antenna Polarity & Test Distance: Vertical at 3 M

| No. | Freq.<br>(MHz) | Reading<br>(dB $\mu$ V/m) | Correction Factor<br>(dB) | Emission<br>(dBm) | Limit<br>(dBm) | Margin (dB) |
|-----|----------------|---------------------------|---------------------------|-------------------|----------------|-------------|
| 1   | 1591           | 32.84                     | -95.26                    | -62.42            | -40            | -22.42      |
| 2   | 2386.5         | 32.92                     | -95.26                    | -62.34            | -13            | -49.34      |
| 3   | 3182           | 33.6                      | -95.26                    | -61.66            | -13            | -48.66      |
| 4   | 3977.5         | 34.32                     | -95.26                    | -60.94            | -13            | -47.94      |

Remarks:

1. Follow ANSI 63.26 section 5.2.7 d), Emission Value (dBm) = E (dB $\mu$ V/m) - Correction Factor @ 3m.
2. Correction Factor (dB) = 20log(D) - 104.8; where D is the measurement distance @3m.

# LTE Band 14: 10MHz

|      |                  |                 |                |
|------|------------------|-----------------|----------------|
| Mode | TX channel 23330 | Frequency Range | Above 1000 MHz |
|------|------------------|-----------------|----------------|

| Antenna Polarity & Test Distance: Horizontal at 3 M |             |                        |                        |                |             |             |
|-----------------------------------------------------|-------------|------------------------|------------------------|----------------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dB $\mu$ V/m) | Correction Factor (dB) | Emission (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1586        | 32.59                  | -95.26                 | -62.67         | -40         | -22.67      |
| 2                                                   | 2379        | 32.77                  | -95.26                 | -62.49         | -13         | -49.49      |
| 3                                                   | 3172        | 33.31                  | -95.26                 | -61.95         | -13         | -48.95      |
| 4                                                   | 3965        | 33.8                   | -95.26                 | -61.46         | -13         | -48.46      |
| Antenna Polarity & Test Distance: Vertical at 3 M   |             |                        |                        |                |             |             |
| No.                                                 | Freq. (MHz) | Reading (dB $\mu$ V/m) | Correction Factor (dB) | Emission (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1586        | 32.75                  | -95.26                 | -62.51         | -40         | -22.51      |
| 2                                                   | 2379        | 32.94                  | -95.26                 | -62.32         | -13         | -49.32      |
| 3                                                   | 3172        | 33.75                  | -95.26                 | -61.51         | -13         | -48.51      |
| 4                                                   | 3965        | 34.2                   | -95.26                 | -61.06         | -13         | -48.06      |

## Remarks:

1. Follow ANSI 63.26 section 5.2.7 d), Emission Value (dBm) = E (dB $\mu$ V/m) - Correction Factor @ 3m.
2. Correction Factor (dB) = 20log(D) - 104.8; where D is the measurement distance @3m.

## 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 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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