

## Partial FCC Test Report

### (PART 90S)

**Report No.:** RFBHDI-WTW-P21060617-4

**FCC ID:** 2ATM8EG25G

**Test Model:** EG25G MINPCIE

**Received Date:** Jun. 21, 2021

**Test Date:** Jun. 28 ~ Jul. 22, 2021

**Issued Date:** Jul. 30, 2021

**Applicant:** Hawkeye Tech Co., Ltd.

**Address:** 13F. No.736, Zhongzheng Rd., Zhonghe Dist., New Taipei City 235, Taiwan

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



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### Release Control Record

| Issue No.              | Description      | Date Issued   |
|------------------------|------------------|---------------|
| RFBHDI-WTW-P21060617-4 | Original Release | Jul. 30, 2021 |

## 1 Certificate of Conformity

**Product:** LTE Module

**Brand:** Quectel

**Test Model:** EG25G MINPCIE

**Sample Status:** Engineering Sample

**Applicant:** Hawkeye Tech Co., Ltd.

**Test Date:** Jun. 28 ~ Jul. 22, 2021

**Standards:** FCC Part 90, Subpart I, S  
FCC Part 2

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 : Lena Wang , Date: Jul. 30, 2021  
Lena Wang / Specialist

Approved by : Dylan Chiou , Date: Jul. 30, 2021  
Dylan Chiou / Senior Project Engineer

## 2 Summary of Test Results

| Applied Standard: FCC Part 90 & Part 2 (LTE 26) |                              |        |                                                                                    |
|-------------------------------------------------|------------------------------|--------|------------------------------------------------------------------------------------|
| FCC Clause                                      | Test Item                    | Result | Remarks                                                                            |
| 2.1046<br>90.635 (b)                            | Effective Radiated Power     | Pass   | Meet the requirement of limit.                                                     |
| 2.1047                                          | Modulation Characteristics   | N/A    | Refer to Note                                                                      |
| 2.1055<br>90.213                                | Frequency Stability          | N/A    | Refer to Note                                                                      |
| 2.1049<br>90.209                                | Occupied Bandwidth           | N/A    | Refer to Note                                                                      |
| 2.1051<br>90.691                                | Emission Masks               | N/A    | Refer to Note                                                                      |
| 2.1051<br>90.691                                | Conducted Spurious Emissions | N/A    | Refer to Note                                                                      |
| 2.1053<br>90.691                                | Radiated Spurious Emissions  | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -34.0 dB at 30.00 MHz. |

Note:

1. This report is a partial report. Therefore, only test item of Effective Radiated Power and Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to SGS report no.: HR/2019/1001601 for module (Brand: Quectel, Model: EG25G MINPCIE).
2. 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 | 9 kHz ~ 30 MHz     | 3.04 dB                        |
|                                | 30 MHz ~ 200 MHz   | 2.93 dB                        |
|                                | 200 MHz ~ 1000 MHz | 2.95 dB                        |
| Radiated Emissions above 1 GHz | 1 GHz ~ 18 GHz     | 2.26 dB                        |
|                                | 18 GHz ~ 40 GHz    | 1.94 dB                        |

## 2.2 Test Site and Instruments

| Description & Manufacturer                          | Model No.                              | Serial No.                      | Date of Calibration | Due Date of Calibration |
|-----------------------------------------------------|----------------------------------------|---------------------------------|---------------------|-------------------------|
| Test Receiver<br>KEYSIGHT                           | N9038A                                 | MY55420137                      | Apr. 09, 2021       | Apr. 08, 2022           |
| Spectrum Analyzer<br>ROHDE & SCHWARZ                | FSP40                                  | 100039                          | Jun. 10, 2021       | Jun. 09, 2022           |
| BILOG Antenna<br>SCHWARZBECK                        | VULB9168                               | 9168-160                        | Nov. 06, 2020       | Nov. 05, 2021           |
| HORN Antenna<br>SCHWARZBECK                         | BBHA 9120 D                            | 9120D-1169                      | 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                                  | 2944A10638                      | Jun. 05, 2021       | Jun. 04, 2022           |
| Preamplifier<br>Agilent<br>(Above 1GHz)             | 8449B                                  | 3008A02367                      | Feb. 17, 2021       | Feb. 16, 2022           |
| RF signal cable<br>HUBER+SUHNER&EMCI                | SUCOFLEX 104 &<br>EMC104-SM-<br>SM8000 | CABLE-CH9-02<br>(248780+171006) | Jan. 16, 2021       | Jan. 15, 2022           |
| RF signal cable<br>HUBER+SUHNER                     | SUCOFLEX 104                           | CABLE-CH9-<br>(250795/4)        | Jan. 16, 2021       | Jan. 15, 2022           |
| RF signal cable<br>Woken                            | 8D-FB                                  | Cable-CH9-01                    | Jun. 05, 2021       | Jun. 04, 2022           |
| Software<br>BV ADT                                  | ADT_Radiated_<br>V7.6.15.9.5           | NA                              | NA                  | NA                      |
| Antenna Tower & Turn<br>BV ADT                      | AT100                                  | AT93021705                      | NA                  | NA                      |
| Turn Table<br>BV ADT                                | TT100                                  | TT93021705                      | NA                  | NA                      |
| Turn Table Controller<br>BV ADT                     | SC100                                  | SC93021705                      | NA                  | NA                      |
| Boresight Antenna Fixture                           | FBA-01                                 | FBA-SIP01                       | NA                  | NA                      |
| WIT Standard<br>Temperature And<br>Humidity Chamber | TH-4S-C                                | W981030                         | Jun. 01, 2021       | May 31, 2022            |
| JFW 20dB attenuation                                | 50HF-020-SMA                           | NA                              | NA                  | NA                      |
| True RMS Clamp Meter<br>Fluke                       | 325                                    | 31130711WS                      | Jun. 02, 2021       | Jun. 01, 2022           |
| Radio Communication<br>Analyzer<br>Anritsu          | MT8820C                                | 6201010284                      | Dec. 28, 2020       | Dec. 27, 2021           |
| Temperature & Humidity<br>Chamber                   | GTH-120-40-CP-AR                       | MAA1306-019                     | Sep. 09, 2020       | Sep. 08, 2021           |
| DC Power Supply<br>Topward                          | 33010D                                 | 807748                          | NA                  | NA                      |

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 9.

### 3 General Information

#### 3.1 General Description of EUT

|                            |                                          |                          |                          |
|----------------------------|------------------------------------------|--------------------------|--------------------------|
| <b>Product</b>             | LTE Module                               |                          |                          |
| <b>Brand</b>               | Quectel                                  |                          |                          |
| <b>Test Model</b>          | EG25G MINPCIE                            |                          |                          |
| <b>Status of EUT</b>       | Engineering Sample                       |                          |                          |
| <b>Power Supply Rating</b> | 48 Vdc (POE)                             |                          |                          |
| <b>Modulation Type</b>     | LTE                                      | QPSK, 16QAM              |                          |
| <b>Frequency Range</b>     | LTE Band 26 (Channel Bandwidth: 1.4 MHz) | 814.7 ~ 823.3 MHz        |                          |
|                            | LTE Band 26 (Channel Bandwidth: 3 MHz)   | 815.5 ~ 822.5 MHz        |                          |
|                            | LTE Band 26 (Channel Bandwidth: 5 MHz)   | 816.5 ~ 821.5 MHz        |                          |
|                            | LTE Band 26 (Channel Bandwidth: 10 MHz)  | 819 MHz                  |                          |
| <b>Max. ERP Power</b>      |                                          | QPSK                     | 16QAM                    |
|                            | LTE Band 26 (Channel Bandwidth: 1.4 MHz) | 213.304 mW<br>(23.29dBm) | 151.356 mW<br>(21.80dBm) |
|                            | LTE Band 26 (Channel Bandwidth: 3 MHz)   | 207.970 mW<br>(23.18dBm) | 153.109 mW<br>(21.85dBm) |
|                            | LTE Band 26 (Channel Bandwidth: 5 MHz)   | 204.644 mW<br>(23.11dBm) | 149.624 mW<br>(21.75dBm) |
|                            | LTE Band 26 (Channel Bandwidth: 10 MHz)  | 206.063 mW<br>(23.14dBm) | 136.144 mW<br>(21.34dBm) |
| <b>Antenna Type</b>        | Dipole Antenna with 1.6 dBi gain         |                          |                          |
| <b>Accessory Device</b>    | Refer to Note as below                   |                          |                          |
| <b>Data Cable Supplied</b> | Refer to Note as below                   |                          |                          |

Note:

1. The EUT was installed in a specific End-product.

| Product | Brand   | Model                                 | FCC ID     |
|---------|---------|---------------------------------------|------------|
| veeaHub | veeaHub | VHE10XXXXX (X=A-Z, 0-9, blank or "-") | 2ARXKVHE10 |

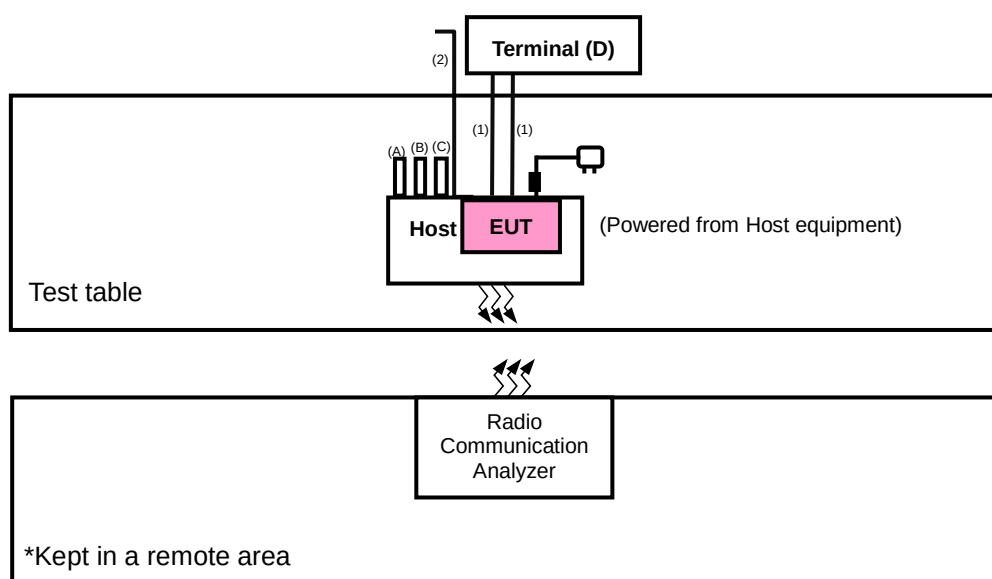
2. The End-product contains following accessory devices.

| Product    | Brand           | Model         | Description                                                                           |
|------------|-----------------|---------------|---------------------------------------------------------------------------------------|
| AC Adapter | EDACPOWER ELEC. | EA1062SGR-480 | I/P: 100-240 Vac, 50/60 Hz, 2.5 A<br>O/P: 48 Vdc, 1.35 A<br>1.2m DC cable with 1 core |

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.
4. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

#### 3.2 Configuration of System under Test

<Radiated Emission Test> & <E.R.P. 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.

| No. | Product  | Brand | Model No. | Serial No. | FCC ID |
|-----|----------|-------|-----------|------------|--------|
| A   | FLASH    | HP    | v250W     | 09         | N/A    |
| B   | FLASH    | HP    | v250W     | 05         | N/A    |
| C   | FLASH    | HP    | v250W     | 03         | N/A    |
| D   | Terminal | N/A   | N/A       | N/A        | N/A    |

| No. | Signal Cable Description Of The Above Support Units |
|-----|-----------------------------------------------------|
| 1.  | LAN Cable: 1.5m                                     |
| 2.  | RS232 to A Cable: 1.6m                              |

Note:

1. All power cords of the above support units are non-shielded (1.8m).

### 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        | Radiated Emission |
|-------------|-------------------|
| LTE Band 26 | X-axis            |

#### LTE Band 26

| EUT Configure Mode | Test Item         | Available Channel | Tested Channel      | Channel Bandwidth | Modulation  | Mode               |
|--------------------|-------------------|-------------------|---------------------|-------------------|-------------|--------------------|
| -                  | ERP               | 26697 to 26783    | 26697, 26740, 26783 | 1.4 MHz           | QPSK, 16QAM | 1 RB / 0 RB Offset |
|                    |                   | 26705 to 26775    | 26705, 26740, 26775 | 3 MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset |
|                    |                   | 26715 to 26765    | 26715, 26740, 26765 | 5 MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset |
|                    |                   | 26740             | 26740               | 10 MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset |
| -                  | Radiated Emission | 26697 to 26783    | 26697, 26740, 26783 | 1.4 MHz           | QPSK        | 1 RB / 0 RB Offset |
|                    |                   | 26715 to 26765    | 26715, 26740, 26765 | 5 MHz             | QPSK        | 1 RB / 0 RB Offset |
|                    |                   | 26740             | 26740               | 10 MHz            | QPSK        | 1 RB / 0 RB Offset |

#### Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. For radiated emission above 1 GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5 MHz & highest channel bandwidth for final test.
3. For radiated emissions below 1 GHz, select the worst radiated emission channel for final testing

#### Test Condition:

| Test Item         | Environmental Conditions | Input Power    | Tested By |
|-------------------|--------------------------|----------------|-----------|
| ERP               | 25 deg. C, 65 % RH       | 120 Vac, 60 Hz | Rex Wang  |
| Radiated Emission | 25 deg. C, 65 % RH       | 120 Vac, 60 Hz | Rex Wang  |

### **3.4 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**

**ANSI 63.26-2015**

**Note:** 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**

**ANSI/TIA/EIA-603-E 2016**

**Note:** 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

The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw) ERP.

#### 4.1.2 Test Procedures

##### **EIRP / ERP Measurement:**

- a. All measurements were done at low, middle and high operational frequency range. RBW is 5 MHz for 1.4 MHz, 5 MHz, 10 MHz for LTE mode, and VBW  $\geq 3 \times$  RBW.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) 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 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn. E.R.P power can be calculated from E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15 dB.

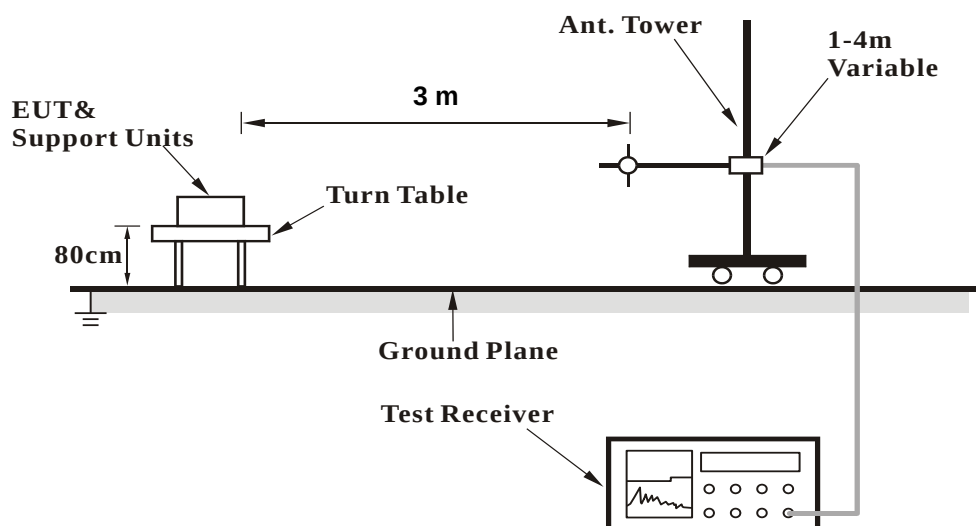
##### **Conducted Power Measurement:**

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

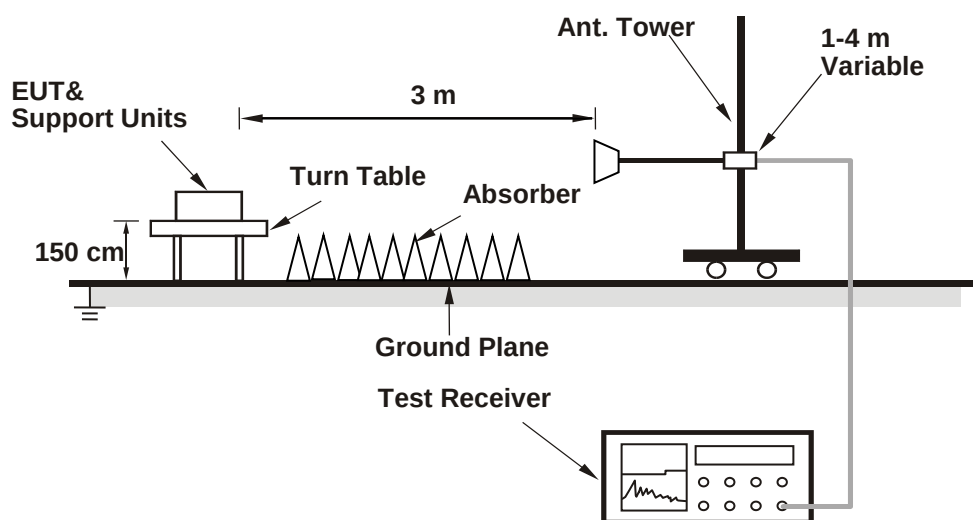
#### 4.1.3 Test Setup

##### EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>

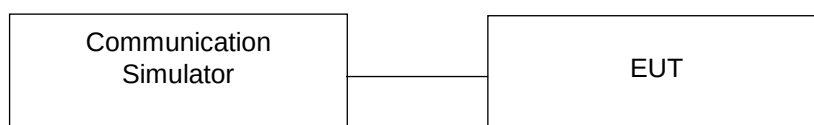


<Radiated Emission above 1 GHz>



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

##### Conducted Power Measurement:



#### 4.1.4 Test Results

##### Conducted Output Power (dBm)

| LTE Band 26 |           |                 |           |       |       |       |
|-------------|-----------|-----------------|-----------|-------|-------|-------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|             |           | Channel         |           | 26697 | 26740 | 26783 |
|             |           | Frequency (MHz) |           | 814.7 | 819   | 823.3 |
| 1.4M        | QPSK      | 1               | 0         | 23.59 | 23.00 | 23.84 |
|             |           | 1               | 2         | 23.80 | 23.48 | 23.83 |
|             |           | 1               | 5         | 23.41 | 23.46 | 23.62 |
|             |           | 3               | 0         | 22.81 | 22.21 | 22.35 |
|             |           | 3               | 1         | 22.60 | 22.52 | 22.58 |
|             |           | 3               | 3         | 22.80 | 22.60 | 22.31 |
|             |           | 6               | 0         | 22.45 | 22.41 | 22.57 |
|             | 16QAM     | 1               | 0         | 22.35 | 21.94 | 21.84 |
|             |           | 1               | 2         | 22.02 | 21.94 | 22.07 |
|             |           | 1               | 5         | 22.19 | 21.86 | 22.16 |
|             |           | 3               | 0         | 21.51 | 21.22 | 21.43 |
|             |           | 3               | 1         | 21.39 | 21.28 | 21.46 |
|             |           | 3               | 3         | 21.63 | 21.38 | 21.41 |
|             |           | 6               | 0         | 21.43 | 21.20 | 21.66 |
| BW          | MCS Index | Channel         |           | 26705 | 26740 | 26775 |
|             |           | Frequency (MHz) |           | 815.5 | 819   | 822.5 |
| 3M          | QPSK      | 1               | 0         | 23.73 | 23.12 | 23.67 |
|             |           | 1               | 7         | 23.71 | 23.59 | 23.70 |
|             |           | 1               | 14        | 23.67 | 23.64 | 23.49 |
|             |           | 8               | 0         | 22.78 | 22.35 | 22.38 |
|             |           | 8               | 3         | 22.82 | 22.17 | 22.50 |
|             |           | 8               | 7         | 22.59 | 22.60 | 22.38 |
|             |           | 15              | 0         | 22.48 | 22.45 | 22.43 |
|             | 16QAM     | 1               | 0         | 22.31 | 22.18 | 22.22 |
|             |           | 1               | 7         | 22.40 | 21.91 | 22.24 |
|             |           | 1               | 14        | 22.25 | 22.17 | 22.09 |
|             |           | 8               | 0         | 21.81 | 21.17 | 21.46 |
|             |           | 8               | 3         | 21.49 | 21.22 | 21.48 |
|             |           | 8               | 7         | 21.59 | 21.34 | 21.22 |
|             |           | 15              | 0         | 21.49 | 21.10 | 21.34 |

| LTE Band 26 |           |                 |    |       |       |       |
|-------------|-----------|-----------------|----|-------|-------|-------|
| BW          | MCS Index | Channel         |    | 26715 | 26740 | 26765 |
|             |           | Frequency (MHz) |    | 816.5 | 819   | 821.5 |
| 5M          | QPSK      | 1               | 0  | 23.63 | 23.03 | 23.58 |
|             |           | 1               | 12 | 23.66 | 23.52 | 23.60 |
|             |           | 1               | 24 | 23.37 | 23.55 | 23.50 |
|             |           | 12              | 0  | 22.62 | 22.10 | 22.44 |
|             |           | 12              | 6  | 22.76 | 22.52 | 22.58 |
|             |           | 12              | 13 | 22.55 | 22.60 | 22.57 |
|             |           | 25              | 0  | 22.47 | 22.36 | 22.59 |
|             | 16QAM     | 1               | 0  | 22.30 | 22.03 | 22.13 |
|             |           | 1               | 12 | 22.11 | 21.70 | 21.98 |
|             |           | 1               | 24 | 22.24 | 22.12 | 22.28 |
|             |           | 12              | 0  | 21.67 | 21.14 | 21.21 |
|             |           | 12              | 6  | 21.61 | 20.97 | 21.53 |
|             |           | 12              | 13 | 21.51 | 21.28 | 21.12 |
|             |           | 25              | 0  | 21.58 | 21.35 | 21.48 |
| BW          | MCS Index | Channel         |    | 26740 |       |       |
|             |           | Frequency (MHz) |    | 819   |       |       |
| 10M         | QPSK      | 1               | 0  | 23.15 |       |       |
|             |           | 1               | 24 | 23.62 |       |       |
|             |           | 1               | 49 | 23.69 |       |       |
|             |           | 25              | 0  | 22.16 |       |       |
|             |           | 25              | 12 | 22.30 |       |       |
|             |           | 25              | 25 | 22.47 |       |       |
|             |           | 50              | 0  | 22.14 |       |       |
|             | 16QAM     | 1               | 0  | 21.89 |       |       |
|             |           | 1               | 24 | 21.88 |       |       |
|             |           | 1               | 49 | 21.84 |       |       |
|             |           | 25              | 0  | 21.07 |       |       |
|             |           | 25              | 12 | 20.98 |       |       |
|             |           | 25              | 25 | 21.35 |       |       |
|             |           | 50              | 0  | 21.07 |       |       |

# ERP Power (dBm)

| LTE Band 26 |           |                 |           |       |       |       |
|-------------|-----------|-----------------|-----------|-------|-------|-------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|             |           | Channel         |           | 26697 | 26740 | 26783 |
|             |           | Frequency (MHz) |           | 814.7 | 819   | 823.3 |
| 1.4M        | QPSK      | 1               | 0         | 23.04 | 22.45 | 23.29 |
|             |           | 1               | 2         | 23.25 | 22.93 | 23.28 |
|             |           | 1               | 5         | 22.86 | 22.91 | 23.07 |
|             |           | 3               | 0         | 22.26 | 21.66 | 21.80 |
|             |           | 3               | 1         | 22.05 | 21.97 | 22.03 |
|             |           | 3               | 3         | 22.25 | 22.05 | 21.76 |
|             |           | 6               | 0         | 21.90 | 21.86 | 22.02 |
|             | 16QAM     | 1               | 0         | 21.80 | 21.39 | 21.29 |
|             |           | 1               | 2         | 21.47 | 21.39 | 21.52 |
|             |           | 1               | 5         | 21.64 | 21.31 | 21.61 |
|             |           | 3               | 0         | 20.96 | 20.67 | 20.88 |
|             |           | 3               | 1         | 20.84 | 20.73 | 20.91 |
|             |           | 3               | 3         | 21.08 | 20.83 | 20.86 |
|             |           | 6               | 0         | 20.88 | 20.65 | 21.11 |
| BW          | MCS Index | Channel         |           | 26705 | 26740 | 26775 |
|             |           | Frequency (MHz) |           | 815.5 | 819   | 822.5 |
| 3M          | QPSK      | 1               | 0         | 23.18 | 22.57 | 23.12 |
|             |           | 1               | 7         | 23.16 | 23.04 | 23.15 |
|             |           | 1               | 14        | 23.12 | 23.09 | 22.94 |
|             |           | 8               | 0         | 22.23 | 21.80 | 21.83 |
|             |           | 8               | 3         | 22.27 | 21.62 | 21.95 |
|             |           | 8               | 7         | 22.04 | 22.05 | 21.83 |
|             |           | 15              | 0         | 21.93 | 21.90 | 21.88 |
|             | 16QAM     | 1               | 0         | 21.76 | 21.63 | 21.67 |
|             |           | 1               | 7         | 21.85 | 21.36 | 21.69 |
|             |           | 1               | 14        | 21.70 | 21.62 | 21.54 |
|             |           | 8               | 0         | 21.26 | 20.62 | 20.91 |
|             |           | 8               | 3         | 20.94 | 20.67 | 20.93 |
|             |           | 8               | 7         | 21.04 | 20.79 | 20.67 |
|             |           | 15              | 0         | 20.94 | 20.55 | 20.79 |

\*ERP = Conducted + antenna gain (1.6dBi)-2.15

| LTE Band 26 |           |                 |    |       |       |       |
|-------------|-----------|-----------------|----|-------|-------|-------|
| BW          | MCS Index | Channel         |    | 26715 | 26740 | 26765 |
|             |           | Frequency (MHz) |    | 816.5 | 819   | 821.5 |
| 5M          | QPSK      | 1               | 0  | 23.08 | 22.48 | 23.03 |
|             |           | 1               | 12 | 23.11 | 22.97 | 23.05 |
|             |           | 1               | 24 | 22.82 | 23.00 | 22.95 |
|             |           | 12              | 0  | 22.07 | 21.55 | 21.89 |
|             |           | 12              | 6  | 22.21 | 21.97 | 22.03 |
|             |           | 12              | 13 | 22.00 | 22.05 | 22.02 |
|             |           | 25              | 0  | 21.92 | 21.81 | 22.04 |
|             | 16QAM     | 1               | 0  | 21.75 | 21.48 | 21.58 |
|             |           | 1               | 12 | 21.56 | 21.15 | 21.43 |
|             |           | 1               | 24 | 21.69 | 21.57 | 21.73 |
|             |           | 12              | 0  | 21.12 | 20.59 | 20.66 |
|             |           | 12              | 6  | 21.06 | 20.42 | 20.98 |
|             |           | 12              | 13 | 20.96 | 20.73 | 20.57 |
|             |           | 25              | 0  | 21.03 | 20.80 | 20.93 |
| BW          | MCS Index | Channel         |    | 26740 |       |       |
|             |           | Frequency (MHz) |    | 819   |       |       |
| 10M         | QPSK      | 1               | 0  | 22.60 |       |       |
|             |           | 1               | 24 | 23.07 |       |       |
|             |           | 1               | 49 | 23.14 |       |       |
|             |           | 25              | 0  | 21.61 |       |       |
|             |           | 25              | 12 | 21.75 |       |       |
|             |           | 25              | 25 | 21.92 |       |       |
|             |           | 50              | 0  | 21.59 |       |       |
|             | 16QAM     | 1               | 0  | 21.34 |       |       |
|             |           | 1               | 24 | 21.33 |       |       |
|             |           | 1               | 49 | 21.29 |       |       |
|             |           | 25              | 0  | 20.52 |       |       |
|             |           | 25              | 12 | 20.43 |       |       |
|             |           | 25              | 25 | 20.80 |       |       |
|             |           | 50              | 0  | 20.52 |       |       |

\*ERP = Conducted + antenna gain (1.6dBi)-2.15

## 4.2 Radiated Emission Measurement

### 4.2.1 Limits of Radiated Emission Measurement

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

### 4.2.2 Test Procedure

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) 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 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
- c. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15 dB.

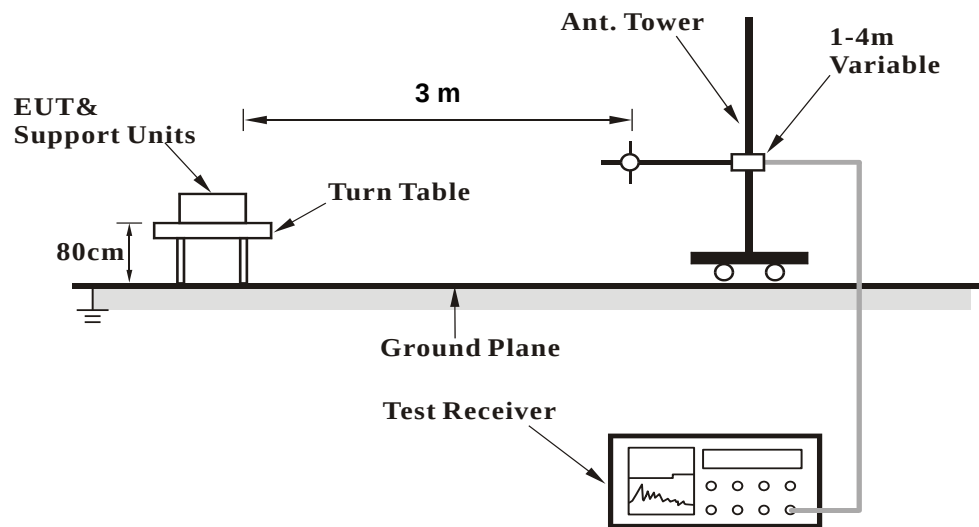
**Note:** The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

### 4.2.3 Deviation from Test Standard

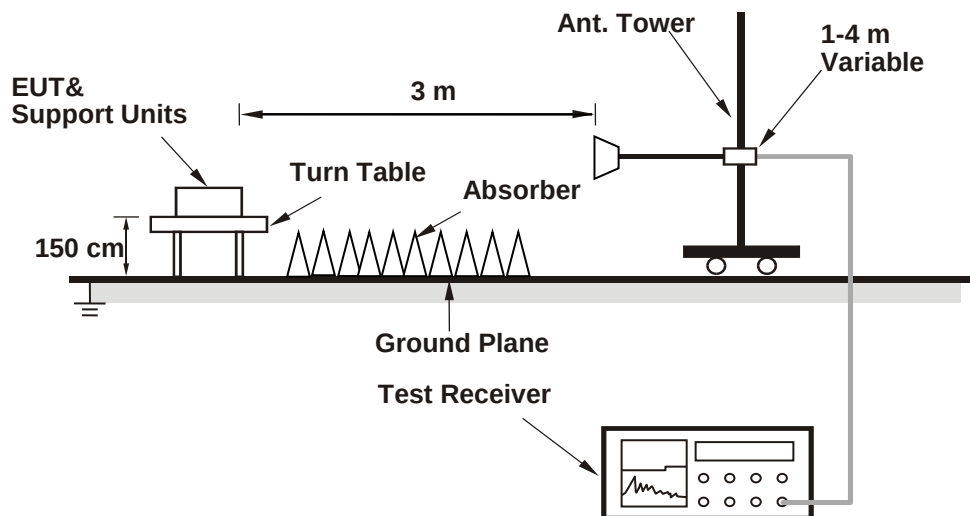
No deviation.

#### 4.2.4 Test Setup

##### <Radiated Emission below or equal 1 GHz>



##### <Radiated Emission above 1 GHz>



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

#### 4.2.5 Test Results

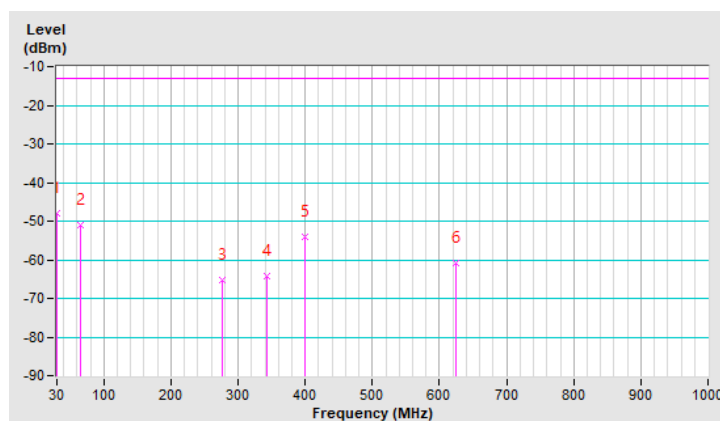
##### Below 1GHz

|                        |                       |                |                    |
|------------------------|-----------------------|----------------|--------------------|
| <b>RF Mode</b>         | TX LTE Band XXVI-5MHz | <b>Channel</b> | CH 26740 : 819 MHz |
| <b>Frequency Range</b> | 30MHz ~ 1GHz          |                |                    |

| 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                                                    | 30.00           | -48.1     | -13.0       | -35.1       | 1.25 H             | 93                   | 69.3             | -117.4                   |
| 2                                                    | 65.89           | -50.9     | -13.0       | -37.9       | 2.00 H             | 175                  | 66.8             | -117.7                   |
| 3                                                    | 276.38          | -65.3     | -13.0       | -52.3       | 1.50 H             | 189                  | 50.6             | -115.9                   |
| 4                                                    | 342.34          | -64.4     | -13.0       | -51.4       | 1.00 H             | 329                  | 49.8             | -114.1                   |
| 5                                                    | 399.57          | -54.0     | -13.0       | -41.0       | 1.25 H             | 0                    | 58.8             | -112.8                   |
| 6                                                    | 624.61          | -60.9     | -13.0       | -47.9       | 1.00 H             | 252                  | 46.8             | -107.8                   |

##### Remarks:

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

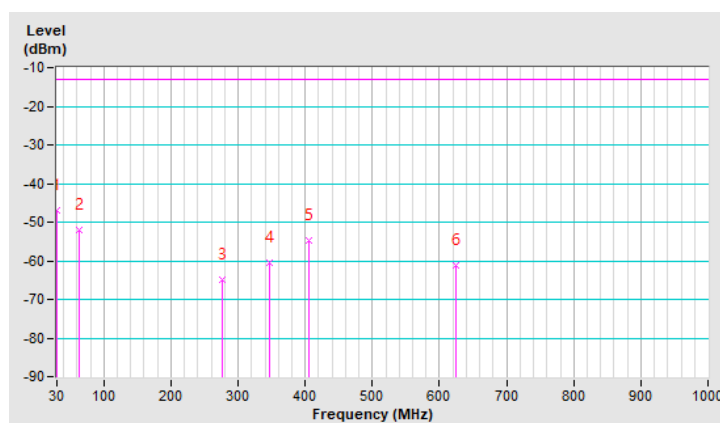


|                        |                       |                |                    |
|------------------------|-----------------------|----------------|--------------------|
| <b>RF Mode</b>         | TX LTE Band XXVI-5MHz | <b>Channel</b> | CH 26740 : 819 MHz |
| <b>Frequency Range</b> | 30MHz ~ 1GHz          |                |                    |

| 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                                                 | 30.00           | -47.0     | -13.0       | -34.0       | 1.00 V             | 96                   | 70.4             | -117.4                   |
| 2                                                 | 62.98           | -52.1     | -13.0       | -39.1       | 1.00 V             | 185                  | 65.0             | -117.0                   |
| 3                                                 | 277.35          | -64.9     | -13.0       | -51.9       | 1.50 V             | 203                  | 50.9             | -115.9                   |
| 4                                                 | 347.19          | -60.7     | -13.0       | -47.7       | 1.00 V             | 320                  | 53.5             | -114.1                   |
| 5                                                 | 406.36          | -54.7     | -13.0       | -41.7       | 1.00 V             | 353                  | 58.0             | -112.7                   |
| 6                                                 | 624.61          | -61.3     | -13.0       | -48.3       | 1.50 V             | 142                  | 46.5             | -107.8                   |

**Remarks:**

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



# Above 1GHz

|                        |                         |                |                      |
|------------------------|-------------------------|----------------|----------------------|
| <b>RF Mode</b>         | TX LTE Band XXVI-1.4MHz | <b>Channel</b> | CH 26697 : 814.7 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 20GHz           |                |                      |

| 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                                                    | 1629.40         | -52.6     | -13.0       | -39.6       | 3.29 H             | 92                   | 50.8             | -103.4                   |
| 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                                                    | 1629.40         | -49.5     | -13.0       | -36.5       | 2.02 V             | 197                  | 53.9             | -103.4                   |

## Remarks:

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

|                        |                         |                |                    |
|------------------------|-------------------------|----------------|--------------------|
| <b>RF Mode</b>         | TX LTE Band XXVI-1.4MHz | <b>Channel</b> | CH 26740 : 819 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 20GHz           |                |                    |

| 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                                                    | 1638.00         | -52.9     | -13.0       | -39.9       | 3.32 H             | 88                   | 50.5             | -103.4                   |
| 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                                                    | 1638.00         | -49.3     | -13.0       | -36.3       | 2.10 V             | 193                  | 54.1             | -103.4                   |

**Remarks:**

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

|                        |                         |                |                      |
|------------------------|-------------------------|----------------|----------------------|
| <b>RF Mode</b>         | TX LTE Band XXVI-1.4MHz | <b>Channel</b> | CH 26783 : 823.3 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 20GHz           |                |                      |

| 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                                                    | 1646.60         | -52.2     | -13.0       | -39.2       | 3.26 H             | 90                   | 51.3             | -103.5                   |
| 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                                                    | 1646.60         | -49.3     | -13.0       | -36.3       | 2.06 V             | 194                  | 54.2             | -103.5                   |

**Remarks:**

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

|                        |                       |                |                      |
|------------------------|-----------------------|----------------|----------------------|
| <b>RF Mode</b>         | TX LTE Band XXVI-5MHz | <b>Channel</b> | CH 26715 : 816.5 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 20GHz         |                |                      |

| 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                                                    | 1633.00         | -52.2     | -13.0       | -39.2       | 3.32 H             | 92                   | 51.2             | -103.4                   |
| 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                                                    | 1633.00         | -49.7     | -13.0       | -36.7       | 2.00 V             | 193                  | 53.7             | -103.4                   |

**Remarks:**

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

|                        |                       |                |                    |
|------------------------|-----------------------|----------------|--------------------|
| <b>RF Mode</b>         | TX LTE Band XXVI-5MHz | <b>Channel</b> | CH 26740 : 819 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 20GHz         |                |                    |

| 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                                                    | 1638.00         | -51.2     | -13.0       | -38.2       | 3.30 H             | 91                   | 52.2             | -103.4                   |
| 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                                                    | 1638.00         | -49.2     | -13.0       | -36.2       | 2.05 V             | 193                  | 54.3             | -103.4                   |

**Remarks:**

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

|                        |                       |                |                      |
|------------------------|-----------------------|----------------|----------------------|
| <b>RF Mode</b>         | TX LTE Band XXVI-5MHz | <b>Channel</b> | CH 26765 : 821.5 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 20GHz         |                |                      |

| 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                                                    | 1643.00         | -52.1     | -13.0       | -39.1       | 3.35 H             | 88                   | 51.4             | -103.5                   |
| 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                                                    | 1643.00         | -50.1     | -13.0       | -37.1       | 2.05 V             | 196                  | 53.4             | -103.5                   |

**Remarks:**

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

|                        |                        |                |                    |
|------------------------|------------------------|----------------|--------------------|
| <b>RF Mode</b>         | TX LTE Band XXVI-10MHz | <b>Channel</b> | CH 26740 : 819 MHz |
| <b>Frequency Range</b> | 1GMHz ~ 20GHz          |                |                    |

| 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                                                    | 1638.00         | -52.0     | -13.0       | -39.0       | 3.33 H             | 91                   | 51.5             | -103.4                   |
| 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                                                    | 1638.00         | -50.1     | -13.0       | -37.1       | 2.05 V             | 196                  | 53.4             | -103.4                   |

**Remarks:**

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