

## Partial FCC Test Report (Part 22)

**Report No.:** RF200428C03H

**FCC ID:** PZWBHTM80QWG

**Test Model:** BHT-M80-QWG

**Received Date:** Feb. 04, 2021

**Test Date:** Mar. 19, 2021

**Issued Date:** Mar. 25, 2021

**Applicant:** DENSO WAVE INCORPORATED

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**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
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33383, Taiwan

**FCC Registration /** 788550 / TW0003

**Designation Number:**



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### Release Control Record

| Issue No.    | Description      | Date Issued   |
|--------------|------------------|---------------|
| RF200428C03H | Original release | Mar. 25, 2021 |

## 1 Certificate of Conformity

**Product:** 2D Code Handy Terminal

**Brand:** DENSO

**Test Model:** BHT-M80-QWG


**Sample Status:** Engineering sample

**Applicant:** DENSO WAVE INCORPORATED

**Test Date:** Mar. 19, 2021

**Standards:** FCC Part 22, Subpart H

This report is issued as a supplementary report of RF200428C03. This report shall be used combined together with its original report.

**Prepared by :**  , **Date:** Mar. 25, 2021  
Polly Chien / Specialist

**Approved by :**  , **Date:** Mar. 25, 2021  
Bruce Chen / Senior Project Engineer

Note: Radiated spurious emissions below 1G are performed for the addendum. Refer to original report for the other test data.

## 2 Summary of Test Results

| Applied Standard: FCC Part 22 & Part 2 |                              |        |  |
|--|------------------------------|--------|--|
| FCC Clause                             | Test Item                    | Result | Remarks  |
| 2.1046<br>22.913 (a)                   | Effective radiated power     | NA     | Refer to Note 1  |
| 2.1047                                 | Modulation Characteristics   | NA     | Refer to Note 1  |
| 22.913 (d)                             | Peak To Average Ratio        | NA     | Refer to Note 1  |
| 2.1055<br>22.355                       | Frequency Stability          | NA     | Refer to Note 1  |
| 2.1049                                 | Occupied Bandwidth           | NA     | Refer to Note 1  |
| 22.917                                 | Band Edge Measurements       | NA     | Refer to Note 1  |
| 2.1051<br>22.917                       | Conducted Spurious Emissions | NA     | Refer to Note 1  |
| 2.1053<br>22.917                       | Radiated Spurious Emissions  | Pass   | Meet the requirement of limit.<br>Minimum passing margin is<br>-37.2dB at 212.7536MHz. |

### Note:

1. Radiated spurious emissions below 1G are performed for the addendum. Refer to original report for the other test data.
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 | 9kHz ~ 30MHz    | 3.04 dB                        |
|                                | 30MHz ~ 200MHz  | 3.59 dB                        |
|                                | 200MHz ~1000MHz | 3.60 dB                        |

## 2.2 Test Site and Instruments

| Description & Manufacturer                          | Model No.                             | Serial No.                      | Cal. Date     | Cal. Due      |
|---|---------------------------------------|---------------------------------|---------------|---------------|
| Test Receiver<br>ROHDE & SCHWARZ                    | ESR3                                  | 102579                          | Jul. 07, 2020 | Jul. 06, 2021 |
| Spectrum Analyzer<br>ROHDE & SCHWARZ                | FSP40                                 | 100269                          | Jun. 09, 2020 | Jun. 08, 2021 |
| BILOG Antenna<br>SCHWARZBECK                        | VULB9168                              | 9168-171                        | Nov. 04, 2020 | Nov. 03, 2021 |
| HORN Antenna<br>SCHWARZBECK                         | 9120D                                 | 209                             | Nov. 22, 2020 | Nov. 21, 2021 |
| HORN Antenna<br>SCHWARZBECK                         | BBHA 9170                             | BBHA9170241                     | Nov. 22, 2020 | Nov. 21, 2021 |
| Loop Antenna<br>TESEQ                               | HLA 6121                              | 45745                           | Jul. 06, 2020 | Jul. 05, 2021 |
| Preamplifier<br>Agilent<br>(Below 1GHz)             | 8447D                                 | 2944A10738                      | Aug. 16, 2020 | Aug. 15, 2021 |
| RF Coaxial Cable<br>WOKEN<br>With 5dB PAD           | 8D-FB                                 | Cable-CH3-01                    | Aug. 16, 2020 | Aug. 15, 2021 |
| RF signal cable<br>HUBER+SUHNER                     | SUCOFLEX 104                          | Cable-CH3-03 (223653/4)         | Aug. 16, 2020 | Aug. 15, 2021 |
| RF signal cable<br>HUBER+SUHNER&<br>EMCI            | SUCOFLEX<br>104&EMC104-SM<br>-SM-8000 | Cable-CH3-03<br>(309224+170907) | Aug. 16, 2020 | Aug. 15, 2021 |
| Software<br>BV ADT                                  | ADT_Radiated_<br>V7.6.15.9.5          | NA                              | NA            | NA            |
| Antenna Tower<br>inn-co GmbH                        | MA 4000                               | 013303                          | NA            | NA            |
| Antenna Tower Controller<br>BV ADT                  | AT100                                 | AT93021702                      | NA            | NA            |
| Turn Table<br>BV ADT                                | TT100                                 | TT93021702                      | NA            | NA            |
| Turn Table Controller<br>BV ADT                     | SC100                                 | SC93021702                      | NA            | NA            |
| Boresight Antenna Fixture                           | FBA-01                                | FBA-SIP01                       | NA            | NA            |
| Standard Temperature And<br>Humidity Chamber TERCHY | HRM-120RF                             | 931022                          | Dec. 12, 2019 | Dec. 11, 2020 |
| JFW 20dB attenuation                                | 50HF-020-SMA                          | NA                              | NA            | NA            |
| True RMS Clamp Meter<br>Fluke                       | 325                                   | 31130711WS                      | Jun. 06, 2020 | Jun. 05, 2021 |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in HwaYa Chamber 3.

### 3 General Information

#### 3.1 General Description of EUT

|                     |  |                        |                        |
|---------------------|--|------------------------|------------------------|
| Product             | 2D Code Handy Terminal   |                        |                        |
| Brand               | DENSO  |                        |                        |
| Test Model          | BHT-M80-QWG  |                        |                        |
| Sample Status       | Engineering sample   |                        |                        |
| Power Supply Rating | 3.85Vdc (Battery)<br>5.0Vdc / 9.0Vdc / 12.0Vdc (from adapter)  |                        |                        |
| Modulation Type     | GSM, GPRS: GMSK<br>EDGE: 8PSK<br>WCDMA: BPSK, QPSK<br>HSDPA: BPSK<br>HSUPA: QPSK<br>LTE: QPSK, 16QAM |                        |                        |
| Operating Frequency | GSM/GPRS/EDGE  | 824.2~848.8MHz         |                        |
|                     | WCDMA Band 5   | 826.4~846.6MHz         |                        |
|                     | LTE Band 5 (Channel Bandwidth 1.4MHz)  | 824.7~848.3MHz         |                        |
|                     | LTE Band 5 (Channel Bandwidth 3MHz)  | 825.5~847.5MHz         |                        |
|                     | LTE Band 5 (Channel Bandwidth 5MHz)  | 826.5~846.5MHz         |                        |
|                     | LTE Band 5 (Channel Bandwidth 10MHz)   | 829.0~844.0MHz         |                        |
| Max. ERP Power      | GSM  | 954.993mW (29.8dBm)    |                        |
|                     | WCDMA Band 5   | 213.796mW (23.3dBm)    |                        |
|                     |  | QPSK                   | 16QAM                  |
|                     | LTE Band 5 (Channel Bandwidth 1.4MHz)  | 154.882mW<br>(21.9dBm) | 128.825mW<br>(21.1dBm) |
|                     | LTE Band 5 (Channel Bandwidth 3MHz)  | 154.882mW<br>(21.9dBm) | 125.893mW<br>(21.0dBm) |
|                     | LTE Band 5 (Channel Bandwidth 5MHz)  | 158.489mW<br>(22.0dBm) | 131.826mW<br>(21.2dBm) |
|                     | LTE Band 5 (Channel Bandwidth 10MHz)   | 154.882mW<br>(21.9dBm) | 117.490mW<br>(20.7dBm) |
| Emission Designator | GSM/GPRS   | 264KGXW                |                        |
|                     | EDGE   | 261KG7W                |                        |
|                     | WCDMA Band 5   | 4M15F9W                |                        |
|                     |  | QPSK                   | 16QAM                  |
|                     | LTE Band 5 (Channel Bandwidth 1.4MHz)  | 1M09G7D                | 1M09D7W                |
|                     | LTE Band 5 (Channel Bandwidth 3MHz)  | 2M70G7D                | 2M70D7W                |
|                     | LTE Band 5 (Channel Bandwidth 5MHz)  | 4M49G7D                | 4M49D7W                |
|                     | LTE Band 5 (Channel Bandwidth 10MHz)   | 8M98G7D                | 8M98D7W                |
| Antenna Type        | Refer to note  |                        |                        |
| Antenna Connector   | Refer to note  |                        |                        |
| Accessory Device    | Refer to note  |                        |                        |
| Cable Supplied      | Refer to note  |                        |                        |

**Note:**

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report of the original BV CPS report no.: RF200428C03. The differences compared with original report are adding large battery, WPC battery and updating S/W. Therefore, only Radiated spurious emissions below 1G are performed for the addendum. Refer to original report for the other test data.
2. The EUT contains following accessory devices. (Battery 3, 4 are new)

| Battery 1 |                           |
|-----------|---------------------------|
| Brand     | DENSO                     |
| Model     | BT1                       |
| Rating    | 3.85Vdc, 4020mAh, 15.47Wh |

| Battery 2 |                           |
|-----------|---------------------------|
| Brand     | DENSO                     |
| Model     | BT1S                      |
| Rating    | 3.85Vdc, 2900mAh, 11.16Wh |

| Battery 3 (New) |                           |
|-----------------|---------------------------|
| Brand           | DENSO                     |
| Model           | BT1L                      |
| Rating          | 3.85Vdc, 5800mAh, 22.33Wh |

| Battery 4 for WPC (New) |                           |
|-------------------------|---------------------------|
| Brand                   | DENSO                     |
| Model                   | BT1S-W                    |
| Rating                  | 3.85Vdc, 2900mAh, 11.16Wh |

| Adapter      |   |
|--------------|---|
| Brand        | CHANNEL WELL TECHNOLOGY   |
| Model        | 2ACP0183C   |
| Input Power  | 100-240Vac~0.5A , 50/60Hz   |
| Output Power | 5.0Vdc / 3.0A, 15.0W<br>9.0Vdc / 2.0A, 18.0W<br>12.0Vdc / 1.5A, 18.0W |
| Data Cable   | 1.45 m shielded USB cable without core                                |

| Cradle 1: QC3.0 charge single Cradle (Option) |   |
|---|---|
| Brand   | DENSO   |
| Model   | CU-M80UQ  |
| Adapter                                       |   |
| Brand   | CHANNEL WELL TECHNOLOGY   |
| Model   | 2ACP0183C   |
| Input Power                                   | 100-240Vac, 50/60Hz, 0.5A   |
| Output Power                                  | 5.0Vdc / 3.0A, 15.0W<br>9.0Vdc / 2.0A, 18.0W<br>12.0Vdc / 1.5A, 18.0W |
| Data Cable                                    | 1.45 m shielded USB cable without core                                |



|   |  |
|---|--|
| Cradle 2: USB Cradle with spare battery charge (Option) |  |
| Brand   | DENSO  |
| Model   | CU-M80U  |
| Adapter   |  |
| Brand   | Sunny  |
| Model   | SYS1548-5012-T3  |
| Input Power   | 100-240Vac, 1.5A MAX, 50-60Hz  |
| Output Power  | +12.0Vdc, 4.16A  |
| Power cable   | DC: 1.16m cable with one core<br>AC: 1.71m non-shielded cable without core |
| Data Cable  | 1.45 m shielded USB cable without core                                     |

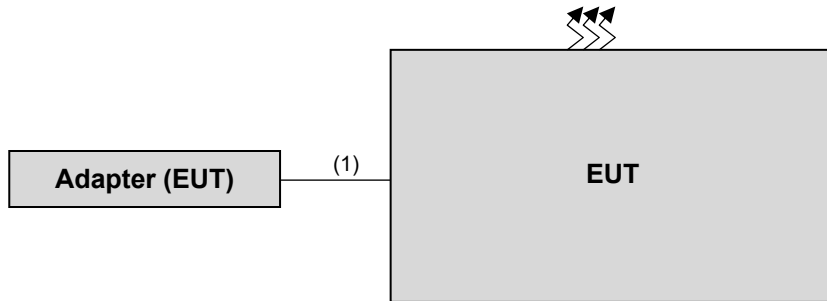
3. The EUT uses the following antennas.

|                                |        |      |             |
|--------------------------------|--------|------|-------------|
| Ant. Type                      | PIFA   |      |             |
| Ant. Connector                 | Spring |      |             |
| GSM850/WCDMA Band 5/LTE Band 5 |        |      |             |
| Frequency (MHz)                | 824    | 836  | 849         |
| Peak Gain (dBi)                | 0.18   | 0.35 | <b>0.69</b> |

\* The max. gain was chosen for final tests.

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

### 3.2 Configuration of System under Test



Remote site



#### 3.2.1 Description of Support Units

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

| ID | Product                      | Brand   | Model No. | Serial No. | FCC ID | Remarks |
|----|------------------------------|---------|-----------|------------|--------|---------|
| A. | Radio Communication Analyzer | Anritsu | MT8821C   | 6201462755 | NA     | -       |

Note:

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

| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks          |
|----|--------------|------|------------|--------------------|--------------|------------------|
| 1. | USB cable    | 1    | 1.45       | Y                  | 0            | Accessory of EUT |

### 3.3 Test Mode Applicability and Tested Channel Detail

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

Test results are presented in the report as below.

| Test Mode | Test Condition            |
|-----------|---------------------------|
| A         | EUT + Battery 3 + Adapter |
| B         | EUT + Battery 4 + Adapter |

#### GSM Mode

| EUT Configure Mode | Test Item                    | Available Channel | Tested Channel | Mode |
|--------------------|------------------------------|-------------------|----------------|------|
| A, B               | Radiated Emission Below 1GHz | 128 to 251        | 189(836.4MHz)  | GSM  |

Note: For radiated emissions below 1 GHz, select the worst radiated emission (above 1GHz) channel for final testing.

#### WCDMA Band 5

| EUT Configure Mode | Test Item                    | Available Channel | Tested Channel  | Mode  |
|--------------------|------------------------------|-------------------|-----------------|-------|
| A, B               | Radiated Emission Below 1GHz | 4132 to 4233      | 4132 (826.4MHz) | WCDMA |

Note: For radiated emissions below 1 GHz, select the worst radiated emission (above 1GHz) channel for final testing.

#### LTE Band 5

| EUT Configure Mode | Test item                    | Available channel | Tested channel  | Channel Bandwidth | Modulation | Mode               |
|--------------------|------------------------------|-------------------|-----------------|-------------------|------------|--------------------|
| A, B               | Radiated Emission Below 1GHz | 20425 to 20625    | 20625(846.5MHz) | 5MHz              | QPSK       | 1 RB / 0 RB Offset |

Note: For radiated emissions below 1 GHz, select the worst radiated emission (above 1GHz) channel for final testing.

#### Test Condition:

| Test Item         | Environmental Conditions | Input Power (system) | Tested By  |
|-------------------|--------------------------|----------------------|------------|
| Radiated Emission | 23deg. C, 66%RH          | 120Vac, 60Hz         | Edison Lee |

### **3.4 EUT Operating Conditions**

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

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

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

#### **Test Standard:**

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 22**

**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**

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

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

## 4 Test Types and Results

### 4.1 Radiated Emission Measurement

#### 4.1.1 Limits of Radiated Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to  $-13$ dBm.

#### 4.1.2 Test Procedure

- a. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
- d. Following C63.26 section 5.5 and 5.2.7.
  - $EIRP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8$ ; where D is the measurement distance (in the far field region) in m.
  - $ERP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8 - 2.15$ ; where D is the measurement distance (in the far field region) in m.

Note:

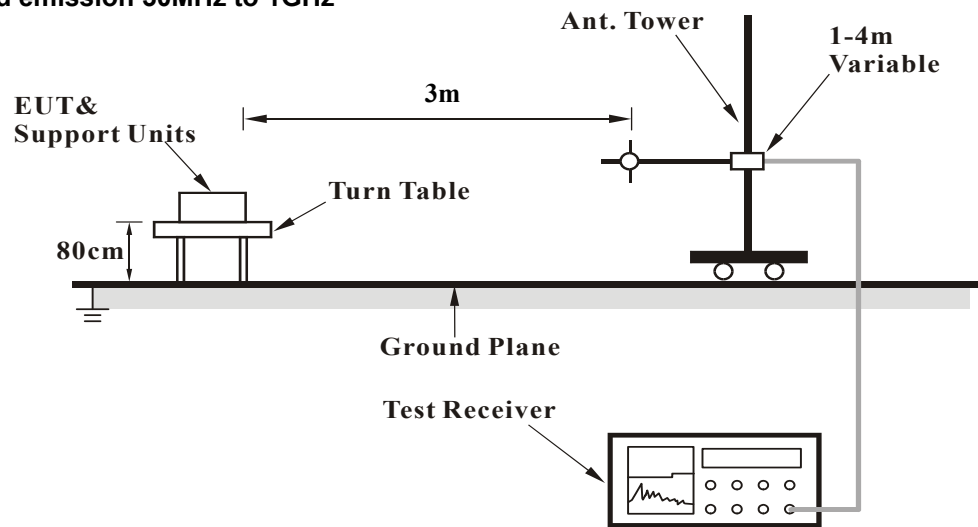
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:  
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

#### 4.1.3 Deviation from Test Standard

No deviation.

#### 4.1.4 Test Setup

For radiated emission 30MHz to 1GHz



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

#### 4.1.5 Test Results

##### 9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Below 1GHz

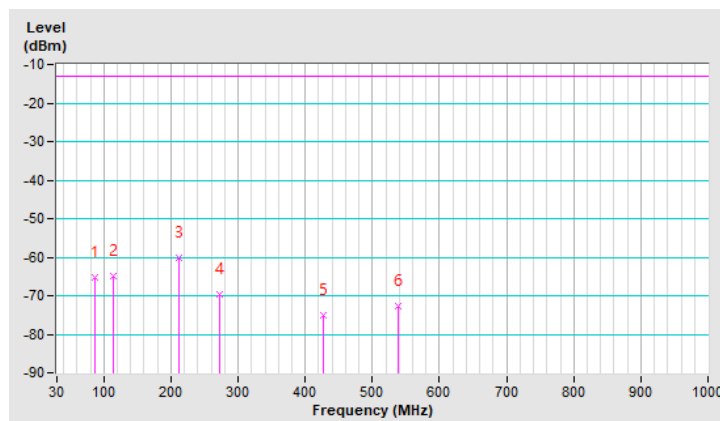
GSM Mode

|                          |                              |                 |                |
|--------------------------|------------------------------|-----------------|----------------|
| Mode                     | TX channel 189<br>(836.4MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 23deg. C, 66%RH              | Input Power     | 120Vac, 60Hz   |
| Tested By                | Edison Lee                   | Test Mode       | A              |

| 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  | 87.6377         | -65.3     | -13.0       | -52.3       | 2.00 H             | 14                   | 46.5             | -111.8                   |
| 2  | 114.3478        | -65.0     | -13.0       | -52.0       | 1.50 H             | 171                  | 44.1             | -109.1                   |
| 3  | 212.7536        | -60.0     | -13.0       | -47.0       | 1.00 H             | 274                  | 48.2             | -108.2                   |
| 4  | 273.2029        | -69.5     | -13.0       | -56.5       | 1.50 H             | 311                  | 35.2             | -104.7                   |
| 5  | 427.8406        | -75.1     | -13.0       | -62.1       | 2.00 H             | 1                    | 26.1             | -101.2                   |
| 6  | 538.8986        | -72.7     | -13.0       | -59.7       | 1.50 H             | 173                  | 26.1             | -98.8                    |

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.

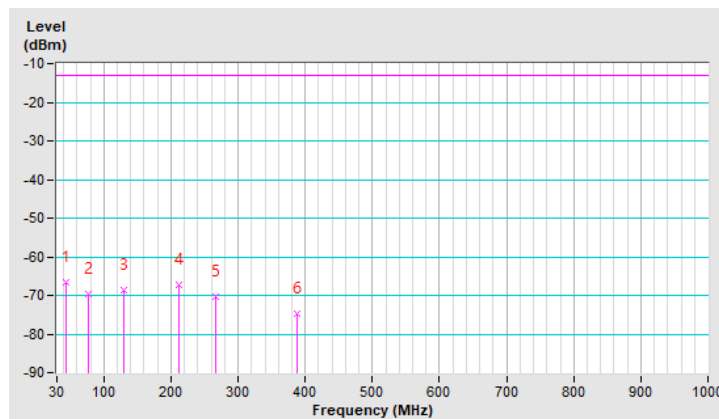


|                          |                              |                 |                |
|--------------------------|------------------------------|-----------------|----------------|
| Mode                     | TX channel 189<br>(836.4MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 23deg. C, 66%RH              | Input Power     | 120Vac, 60Hz   |
| Tested By                | Edison Lee                   | Test Mode       | A              |

| 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   | 44.0580         | -66.5     | -13.0       | -53.5       | 1.00 V             | 13                   | 40.2             | -106.7                   |
| 2   | 77.7971         | -69.8     | -13.0       | -56.8       | 1.50 V             | 293                  | 40.5             | -110.2                   |
| 3   | 129.8116        | -68.5     | -13.0       | -55.5       | 1.50 V             | 232                  | 39.0             | -107.5                   |
| 4   | 211.3478        | -67.3     | -13.0       | -54.3       | 2.00 V             | 215                  | 41.0             | -108.3                   |
| 5   | 267.5797        | -70.2     | -13.0       | -57.2       | 1.50 V             | 194                  | 34.9             | -105.1                   |
| 6   | 388.4783        | -74.8     | -13.0       | -61.8       | 1.50 V             | 331                  | 27.6             | -102.4                   |

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.



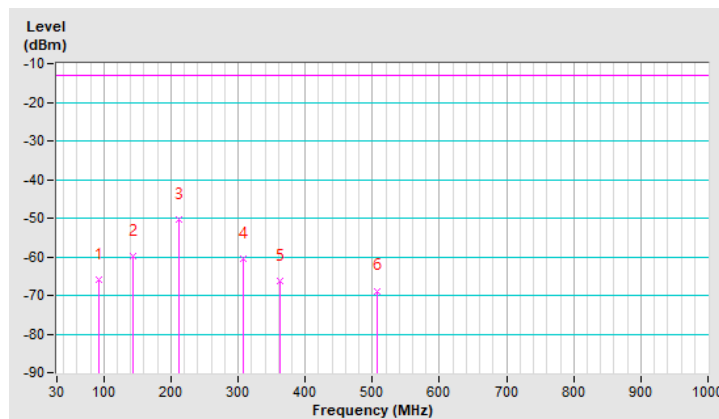


|                          |                              |                 |                |
|--------------------------|------------------------------|-----------------|----------------|
| Mode                     | TX channel 189<br>(836.4MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 23deg. C, 66%RH              | Input Power     | 120Vac, 60Hz   |
| Tested By                | Edison Lee                   | Test Mode       | B              |

| 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  | 91.8551         | -65.9        | -13.0        | -52.9        | 1.50 H             | 4                    | 45.8             | -111.7                   |
| 2  | 143.8696        | -59.9        | -13.0        | -46.9        | 1.00 H             | 113                  | 46.4             | -106.3                   |
| <b>3</b>   | <b>212.7536</b> | <b>-50.2</b> | <b>-13.0</b> | <b>-37.2</b> | <b>1.50 H</b>      | <b>260</b>           | <b>58.0</b>      | <b>-108.2</b>            |
| 4  | 308.3478        | -60.4        | -13.0        | -47.4        | 1.00 H             | 70                   | 43.5             | -103.9                   |
| 5  | 363.1739        | -66.4        | -13.0        | -53.4        | 1.00 H             | 60                   | 36.3             | -102.8                   |
| 6  | 507.9710        | -68.8        | -13.0        | -55.8        | 1.00 H             | 282                  | 31.0             | -99.8                    |

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.

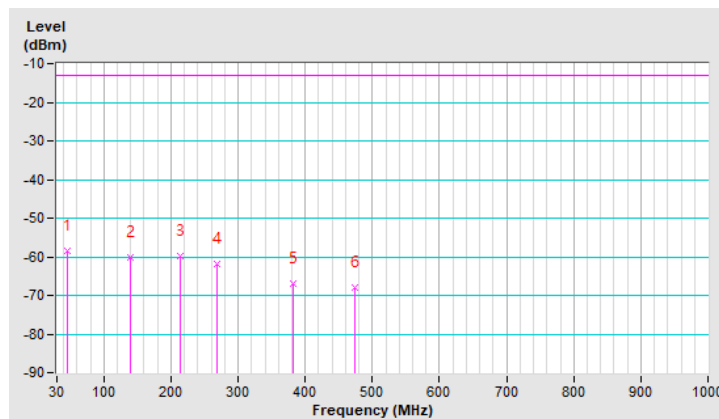


|                          |                              |                 |                |
|--------------------------|------------------------------|-----------------|----------------|
| Mode                     | TX channel 189<br>(836.4MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 23deg. C, 66%RH              | Input Power     | 120Vac, 60Hz   |
| Tested By                | Edison Lee                   | Test Mode       | B              |

| 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   | 45.4638         | -58.6     | -13.0       | -45.6       | 1.50 V             | 304                  | 48.0             | -106.6                   |
| 2   | 139.6522        | -60.3     | -13.0       | -47.3       | 1.00 V             | 291                  | 46.2             | -106.5                   |
| 3   | 214.1594        | -59.9     | -13.0       | -46.9       | 1.00 V             | 214                  | 48.4             | -108.2                   |
| 4   | 268.9855        | -61.9     | -13.0       | -48.9       | 1.00 V             | 186                  | 43.1             | -105.0                   |
| 5   | 381.4493        | -66.9     | -13.0       | -53.9       | 2.00 V             | 189                  | 35.5             | -102.5                   |
| 6   | 474.2319        | -68.0     | -13.0       | -55.0       | 1.50 V             | 332                  | 32.2             | -100.2                   |

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.



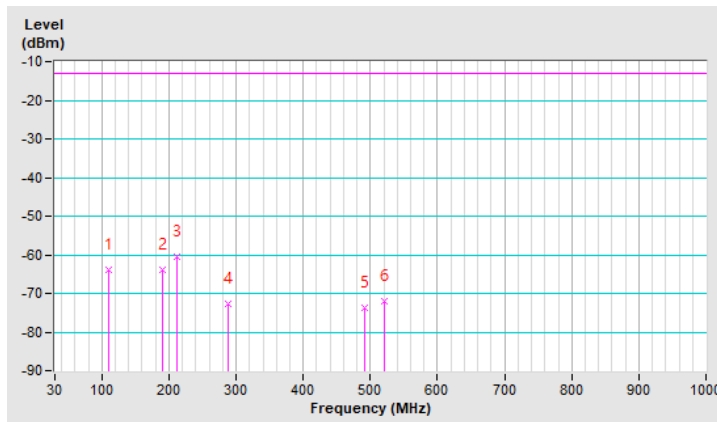
WCDMA Band 5

|                          |                               |                 |                |
|--------------------------|-------------------------------|-----------------|----------------|
| Mode                     | TX channel 4132<br>(826.4MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 23deg. C, 66%RH               | Input Power     | 120Vac, 60Hz   |
| Tested By                | Edison Lee                    | Test Mode       | A              |

| 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  | 110.1304        | -63.9     | -13.0       | -50.9       | 2.00 H             | 197                  | 45.5             | -109.4                   |
| 2  | 190.2609        | -63.9     | -13.0       | -50.9       | 1.50 H             | 283                  | 44.4             | -108.3                   |
| 3  | 212.7536        | -60.5     | -13.0       | -47.5       | 1.00 H             | 266                  | 47.8             | -108.2                   |
| 4  | 288.6667        | -72.6     | -13.0       | -59.6       | 1.50 H             | 311                  | 31.6             | -104.2                   |
| 5  | 491.1014        | -73.7     | -13.0       | -60.7       | 1.00 H             | 12                   | 26.2             | -99.9                    |
| 6  | 520.6232        | -72.1     | -13.0       | -59.1       | 1.50 H             | 168                  | 27.2             | -99.3                    |

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.

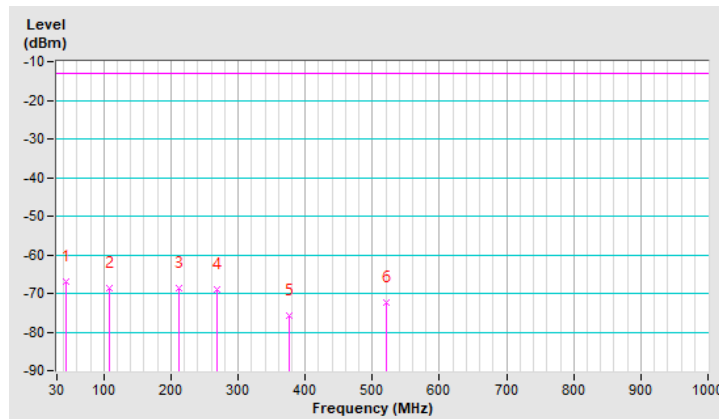


|                          |                               |                 |                |
|--------------------------|-------------------------------|-----------------|----------------|
| Mode                     | TX channel 4132<br>(826.4MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 23deg. C, 66%RH               | Input Power     | 120Vac, 60Hz   |
| Tested By                | Edison Lee                    | Test Mode       | A              |

| 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   | 44.0580         | -67.0     | -13.0       | -54.0       | 2.00 V             | 114                  | 39.7             | -106.7                   |
| 2   | 108.7246        | -68.6     | -13.0       | -55.6       | 1.50 V             | 338                  | 40.8             | -109.4                   |
| 3   | 211.3478        | -68.7     | -13.0       | -55.7       | 1.50 V             | 237                  | 39.6             | -108.3                   |
| 4   | 268.9855        | -68.9     | -13.0       | -55.9       | 1.00 V             | 181                  | 36.1             | -105.0                   |
| 5   | 375.8261        | -75.7     | -13.0       | -62.7       | 1.50 V             | 186                  | 26.8             | -102.5                   |
| 6   | 520.6232        | -72.4     | -13.0       | -59.4       | 1.00 V             | 284                  | 26.9             | -99.3                    |

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.

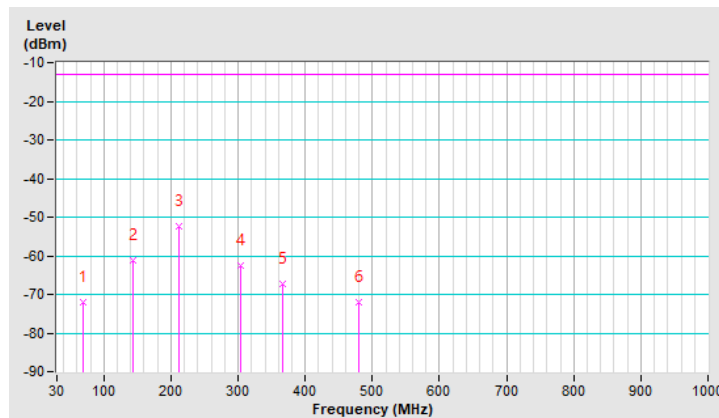


|                          |                               |                 |                |
|--------------------------|-------------------------------|-----------------|----------------|
| Mode                     | TX channel 4132<br>(826.4MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 23deg. C, 66%RH               | Input Power     | 120Vac, 60Hz   |
| Tested By                | Edison Lee                    | Test Mode       | B              |

| 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  | 69.3623         | -72.1     | -13.0       | -59.1       | 1.50 H             | 170                  | 36.4             | -108.5                   |
| 2  | 142.4638        | -61.3     | -13.0       | -48.3       | 1.00 H             | 101                  | 45.1             | -106.4                   |
| 3  | 211.3478        | -52.4     | -13.0       | -39.4       | 1.50 H             | 261                  | 55.9             | -108.3                   |
| 4  | 304.1304        | -62.5     | -13.0       | -49.5       | 1.00 H             | 70                   | 41.5             | -104.0                   |
| 5  | 365.9855        | -67.2     | -13.0       | -54.2       | 2.00 H             | 59                   | 35.4             | -102.6                   |
| 6  | 479.8551        | -71.9     | -13.0       | -58.9       | 1.00 H             | 231                  | 28.2             | -100.1                   |

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.

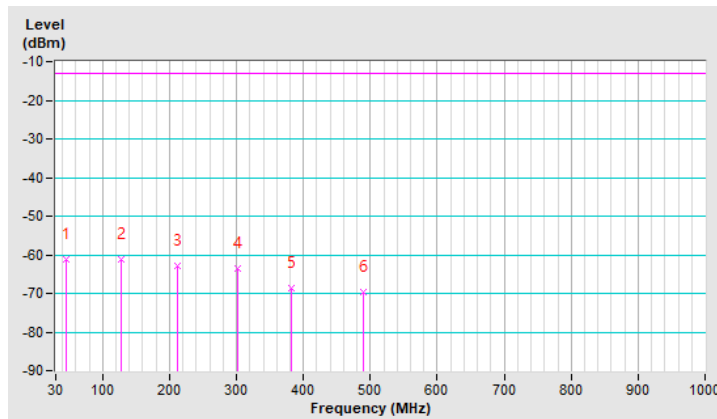


|                          |                               |                 |                |
|--------------------------|-------------------------------|-----------------|----------------|
| Mode                     | TX channel 4132<br>(826.4MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 23deg. C, 66%RH               | Input Power     | 120Vac, 60Hz   |
| Tested By                | Edison Lee                    | Test Mode       | B              |

| 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   | 45.4638         | -61.2     | -13.0       | -48.2       | 1.50 V             | 311                  | 45.4             | -106.6                   |
| 2   | 128.4058        | -61.1     | -13.0       | -48.1       | 1.00 V             | 250                  | 46.5             | -107.6                   |
| 3   | 211.3478        | -62.9     | -13.0       | -49.9       | 1.50 V             | 206                  | 45.4             | -108.3                   |
| 4   | 302.7246        | -63.6     | -13.0       | -50.6       | 1.00 V             | 167                  | 40.4             | -104.0                   |
| 5   | 382.8551        | -68.5     | -13.0       | -55.5       | 2.00 V             | 193                  | 34.0             | -102.5                   |
| 6   | 489.6957        | -69.8     | -13.0       | -56.8       | 1.00 V             | 164                  | 30.1             | -99.9                    |

Remarks:

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



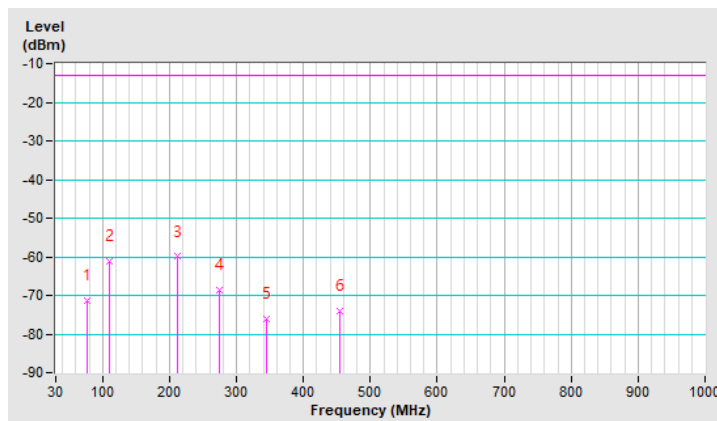
LTE Band 5, Channel Bandwidth: 5MHz

|                          |                                |                 |                |
|--------------------------|--------------------------------|-----------------|----------------|
| Mode                     | TX channel 20625<br>(846.5MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 23deg. C, 66%RH                | Input Power     | 120Vac, 60Hz   |
| Tested By                | Edison Lee                     | Test Mode       | A              |

| 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  | 77.7971         | -71.2     | -13.0       | -58.2       | 1.00 H             | 345                  | 39.0             | -110.2                   |
| 2  | 110.1304        | -61.2     | -13.0       | -48.2       | 1.50 H             | 166                  | 48.2             | -109.4                   |
| 3  | 211.3478        | -60.0     | -13.0       | -47.0       | 1.50 H             | 84                   | 48.3             | -108.3                   |
| 4  | 274.6087        | -68.6     | -13.0       | -55.6       | 2.00 H             | 312                  | 36.1             | -104.7                   |
| 5  | 344.8986        | -76.0     | -13.0       | -63.0       | 1.50 H             | 215                  | 27.2             | -103.2                   |
| 6  | 454.5507        | -74.2     | -13.0       | -61.2       | 1.00 H             | 267                  | 26.4             | -100.6                   |

Remarks:

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

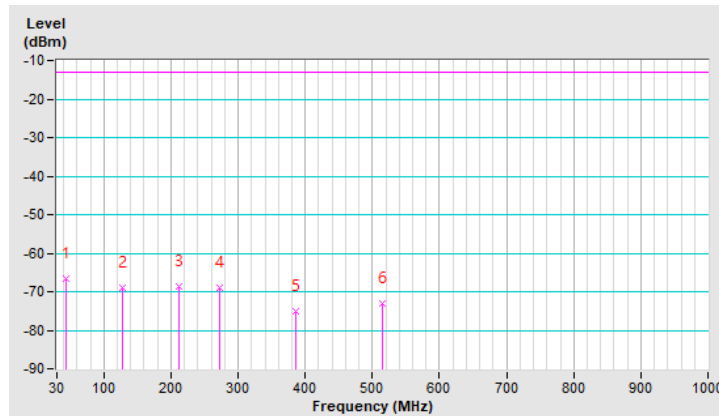


|                          |                                |                 |                |
|--------------------------|--------------------------------|-----------------|----------------|
| Mode                     | TX channel 20625<br>(846.5MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 23deg. C, 66%RH                | Input Power     | 120Vac, 60Hz   |
| Tested By                | Edison Lee                     | Test Mode       | A              |

| 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   | 44.0580         | -66.6     | -13.0       | -53.6       | 1.00 V             | 16                   | 40.1             | -106.7                   |
| 2   | 128.4058        | -68.9     | -13.0       | -55.9       | 1.50 V             | 250                  | 38.7             | -107.6                   |
| 3   | 212.7536        | -68.8     | -13.0       | -55.8       | 1.50 V             | 228                  | 39.5             | -108.2                   |
| 4   | 273.2029        | -69.1     | -13.0       | -56.1       | 2.00 V             | 189                  | 35.6             | -104.7                   |
| 5   | 385.6667        | -75.1     | -13.0       | -62.1       | 1.50 V             | 145                  | 27.3             | -102.4                   |
| 6   | 515.0000        | -73.1     | -13.0       | -60.1       | 2.00 V             | 16                   | 26.4             | -99.5                    |

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.



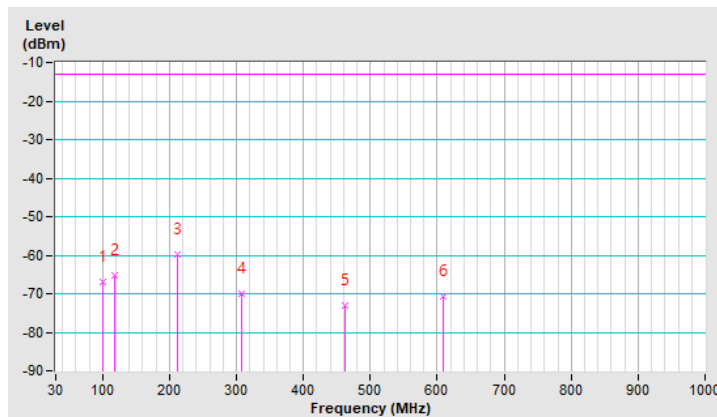


|                          |                                |                 |                |
|--------------------------|--------------------------------|-----------------|----------------|
| Mode                     | TX channel 20625<br>(846.5MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 23deg. C, 66%RH                | Input Power     | 120Vac, 60Hz   |
| Tested By                | Edison Lee                     | Test Mode       | B              |

| 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  | 100.2899        | -66.8     | -13.0       | -53.8       | 1.00 H             | 219                  | 43.9             | -110.7                   |
| 2  | 118.5652        | -65.3     | -13.0       | -52.3       | 1.50 H             | 7                    | 43.2             | -108.5                   |
| 3  | 211.3478        | -59.9     | -13.0       | -46.9       | 1.50 H             | 260                  | 48.4             | -108.3                   |
| 4  | 306.9420        | -70.1     | -13.0       | -57.1       | 1.00 H             | 70                   | 33.8             | -103.9                   |
| 5  | 461.5797        | -73.2     | -13.0       | -60.2       | 1.50 H             | 303                  | 27.3             | -100.5                   |
| 6  | 609.1884        | -70.6     | -13.0       | -57.6       | 2.00 H             | 69                   | 26.3             | -96.9                    |

Remarks:

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

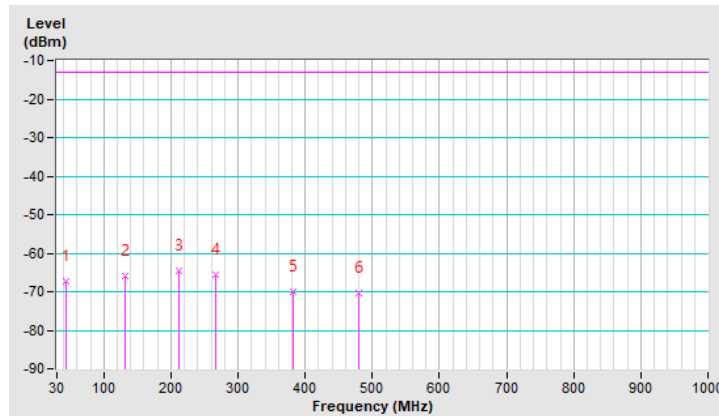


|                          |                                |                 |                |
|--------------------------|--------------------------------|-----------------|----------------|
| Mode                     | TX channel 20625<br>(846.5MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 23deg. C, 66%RH                | Input Power     | 120Vac, 60Hz   |
| Tested By                | Edison Lee                     | Test Mode       | B              |

| 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   | 44.0580         | -67.2     | -13.0       | -54.2       | 1.00 V             | 84                   | 39.5             | -106.7                   |
| 2   | 131.2174        | -66.0     | -13.0       | -53.0       | 1.50 V             | 256                  | 41.4             | -107.4                   |
| 3   | 211.3478        | -64.6     | -13.0       | -51.6       | 1.50 V             | 231                  | 43.8             | -108.3                   |
| 4   | 267.5797        | -65.6     | -13.0       | -52.6       | 1.50 V             | 174                  | 39.5             | -105.1                   |
| 5   | 381.4493        | -70.1     | -13.0       | -57.1       | 1.00 V             | 3                    | 32.4             | -102.5                   |
| 6   | 479.8551        | -70.2     | -13.0       | -57.2       | 1.50 V             | 342                  | 29.9             | -100.1                   |

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 and approved according to ISO/IEC 17025.

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**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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

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