

# FCC TEST REPORT

| <b>REPORT NO.:</b> | RF141225D03   |  |
|--------------------|---------------|--|
| MODEL NO.:         | MORFJ3UO      |  |
| FCC ID:            | EMJMMORFJ3UO  |  |
| <b>RECEIVED</b> :  | Dec. 25, 2014 |  |
| TESTED:            | Dec. 30, 2014 |  |
| ISSUED:            | Jan. 6, 2015  |  |

**APPLICANT:** PRIMAX ELECTRONICS LTD.

ADDRESS: No. 669, Ruey Kuang Road, Neihu, Taipei, Taiwan, R.O.C.

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

LAB LOCATION: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan ( R.O.C. )

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## Table of Contents

| RELE  | ASE CONTROL RECORD                                      | 3  |
|-------|---|----|
| 1.    | CERTIFICATION   | 4  |
| 2.    | SUMMARY OF TEST RESULTS                                 | 5  |
| 2.1   | MEASUREMENT UNCERTAINTY                                 | 5  |
| 3.    | GENERAL INFORMATION                                     | 6  |
| 3.1   | GENERAL DESCRIPTION OF EUT                              | 6  |
| 3.2   | DESCRIPTION OF TEST MODES                               | 7  |
| 3.2.1 | TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL       | 8  |
| 3.3   | DESCRIPTION OF SUPPORT UNITS                            |    |
| 3.3.1 | CONFIGURATION OF SYSTEM UNDER TEST                      | 9  |
| 3.4   | GENERAL DESCRIPTION OF APPLIED STANDARDS 1              | 0  |
| 4.    | TEST TYPES AND RESULTS 1                                |    |
| 4.1   | CONDUCTED EMISSION MEASUREMENT 1                        |    |
| 4.2   | RADIATED EMISSION AND BAND EDGE MEASUREMENT 1           | 11 |
| 4.2.1 | LIMITS OF RADIATED EMISSION AND BAND EDGE MEASUREMENT 1 | 11 |
| 4.2.2 | TEST INSTRUMENTS1                                       |    |
| 4.2.3 | TEST PROCEDURES1  | 3  |
| 4.2.4 | DEVIATION FROM TEST STANDARD1                           |    |
| 4.2.5 | TEST SETUP1   |    |
| 4.2.6 | EUT OPERATING CONDITIONS1                               |    |
| 4.2.7 | TEST RESULTS1   | 5  |
| 5.    | PHOTOGRAPHS OF THE TEST CONFIGURATION1                  | 9  |
| 6.    | INFORMATION ON THE TESTING LABORATORIES                 | 20 |
| 7.    | APPENDIX A – MODIFICATION RECORDERS FOR ENGINEERING     |    |
|       | CHANGES TO THE EUT BY THE LAB2                          | 21 |



## RELEASE CONTROL RECORD

| ISSUE NO.   | REASON FOR CHANGE | DATE ISSUED  |
|-------------|-------------------|--------------|
| RF141225D03 | Original release  | Jan. 6, 2015 |
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## **1. CERTIFICATION**

PRODUCT: Wireless Blue LED Mouse BRAND NAME: Toshiba MODEL NO.: MORFJ3UO APPLICANT: PRIMAX ELECTRONICS LTD. TESTED: Dec. 30, 2014 TEST SAMPLE: ENGINEERING SAMPLE STANDARDS: FCC Part 15, Subpart C (Section 15.249) ANSI C63.10-2009

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

Asy

PREPARED BY

DATE: Jan. 6, 2015

Jessica Cheng / Senior Specialist )

**DATE:** Jan. 6, 2015

APPROVED BY

(Rex Lai / Assistant Manager)



## **2. SUMMARY OF TEST RESULTS**

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.249)   |                             |        |   |  |  |
|---|-----------------------------|--------|---|--|--|
| STANDARD<br>PARAGRAPH   | TEST TYPE                   | RESULT | REMARK  |  |  |
| 15.207  | Conducted Emission Test N/A |        | Power supply is 1.5Vdc from battery   |  |  |
| Radiated Emission Test<br>15.209 Band Edge Measurement<br>15.249 Limit: 50dB less than the peak value of<br>15.249 (d) fundamental frequency or meet radiated<br>emission limit in section 15.209 |                             | PASS   | Meet the requirement of limit.<br>Minimum passing margin is<br>-16.5dB at 4958.00MHz. |  |  |

## 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:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| Measurement        | Frequency    | Uncertainty |
|--------------------|--------------|-------------|
| Radiated emissions | 30MHz ~ 1GHz | 4.00 dB     |
|                    | Above 1GHz   | 3.36 dB     |



## 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

| EUT                 | Wireless Blue LED Mouse           |
|---------------------|-----------------------------------|
| MODEL NO.           | MORFJ3UO                          |
| POWER SUPPLY        | 1.5Vdc from battery               |
| MODULATION TYPE     | GFSK                              |
| OPERATING FREQUENCY | 2402MHz ~ 2479MHz                 |
| NUMBER OF CHANNEL   | 78                                |
| ANTENNA TYPE        | Printed antenna with 3.85dBi gain |
| DATA CABLE          | N/A                               |
| I/O PORT            | N/A                               |
| ACCESSORY DEVICES   | N/A                               |

#### NOTE:

- 1. The EUT is a Wireless Blue LED Mouse.
- 2. The above EUT information is declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.



## 3.2 DESCRIPTION OF TEST MODES

78 channels are provided to this EUT:

| CHANNEL | FREQ.<br>(MHz) | CHANNEL | FREQ.<br>(MHz) | CHANNEL | FREQ.<br>(MHz) | CHANNEL | FREQ.<br>(MHz) |
|---------|----------------|---------|----------------|---------|----------------|---------|----------------|
| 0       | 2402           | 20      | 2422           | 40      | 2442           | 60      | 2462           |
| 1       | 2403           | 21      | 2423           | 41      | 2443           | 61      | 2463           |
| 2       | 2404           | 22      | 2424           | 42      | 2444           | 62      | 2464           |
| 3       | 2405           | 23      | 2425           | 43      | 2445           | 63      | 2465           |
| 4       | 2406           | 24      | 2426           | 44      | 2446           | 64      | 2466           |
| 5       | 2407           | 25      | 2427           | 45      | 2447           | 65      | 2467           |
| 6       | 2408           | 26      | 2428           | 46      | 2448           | 66      | 2468           |
| 7       | 2409           | 27      | 2429           | 47      | 2449           | 67      | 2469           |
| 8       | 2410           | 28      | 2430           | 48      | 2450           | 68      | 2470           |
| 9       | 2411           | 29      | 2431           | 49      | 2451           | 69      | 2471           |
| 10      | 2412           | 30      | 2432           | 50      | 2452           | 70      | 2472           |
| 11      | 2413           | 31      | 2433           | 51      | 2453           | 71      | 2473           |
| 12      | 2414           | 32      | 2434           | 52      | 2454           | 72      | 2474           |
| 13      | 2415           | 33      | 2435           | 53      | 2455           | 73      | 2475           |
| 14      | 2416           | 34      | 2436           | 54      | 2456           | 74      | 2476           |
| 15      | 2417           | 35      | 2437           | 55      | 2457           | 75      | 2477           |
| 16      | 2418           | 36      | 2438           | 56      | 2458           | 76      | 2478           |
| 17      | 2419           | 37      | 2439           | 57      | 2459           | 77      | 2479           |
| 18      | 2420           | 38      | 2440           | 58      | 2460           |         |                |
| 19      | 2421           | 39      | 2441           | 59      | 2461           |         |                |



## 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

| EUT<br>CONFIGURE |  | APPLICABLE TO   |                    |       |    | DESCRIPTION |  |
|------------------|--|---|--------------------|-------|----|-------------|--|
| MO               |  | PLC   | RE <sup>3</sup> 1G | RE<1G | ВМ |             |  |
| -                | - Note 1 √ √ √   |   | -                  |       |    |             |  |
| Where            | PLC: Power Line Conducted Emission      RE <sup>3</sup> 1G: Radiated Emission above 1GHz |   |                    |       |    |             |  |
|                  | RE   | RE<1G: Radiated Emission below 1GHz BM: Bandedge Measurement                  |                    |       |    |             |  |
| NOTE:            | No nee   | No need to concern of Conducted Emission due to the EUT is powered by battery |                    |       |    |             |  |

#### RADIATED EMISSION TEST (ABOVE 1 GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE<br>MODE | AVAILABLE<br>CHANNEL |           |      |
|-----------------------|----------------------|-----------|------|
| -                     | 0 to 77              | 0, 37, 77 | GFSK |

#### RADIATED EMISSION TEST (BELOW 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
   Fallewing channel(a) was (was) ask at all fan the final test or listed helew.
- Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE | AVAILABLE | TESTED  | MODULATION |
|---------------|-----------|---------|------------|
| MODE          | CHANNEL   | CHANNEL | TYPE       |
| -             | 0 to 77   | 0       | GFSK       |

#### **BANDEDGE MEASUREMENT:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
  Following chappel(s) was (were) selected for the final test as listed below.
- Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE | AVAILABLE | TESTED  | MODULATION |
|---------------|-----------|---------|------------|
| MODE          | CHANNEL   | CHANNEL | TYPE       |
| -             | 0 to 77   | 0 , 77  | GFSK       |

#### **TEST CONDITION:**

| APPLICABLE<br>TO   | ENVIRONMENTAL<br>CONDITIONS | INPUT POWER | TESTED BY |
|--------------------|-----------------------------|-------------|-----------|
| RE <sup>3</sup> 1G | 24deg. C, 69% RH            | 1.5Vdc      | Aaron You |
| RE<1G              | 24deg. C, 69% RH            | 1.5Vdc      | Aaron You |
| BM                 | 24deg. C, 69% RH            | 1.5Vdc      | Aaron You |



## 3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together without any necessary accessory or support unit.

## 3.3.1 CONFIGURATION OF SYSTEM UNDER TEST

| Test Table | EUT<br>(Powered from battery) |  |
|------------|-------------------------------|--|
|            |                               |  |
|            |                               |  |
|            |                               |  |
|            |                               |  |
|            |                               |  |
|            |                               |  |
|            |                               |  |
|            |                               |  |



## 3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

#### FCC Part 15, Subpart C (Section 15.249)

ANSI C63.10-2009

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



## 4. TEST TYPES AND RESULTS

#### 4.1 CONDUCTED EMISSION MEASUREMENT

N/A

#### 4.2 RADIATED EMISSION AND BAND EDGE MEASUREMENT

# 4.2.1 LIMITS OF RADIATED EMISSION AND BAND EDGE MEASUREMENT

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following

| Fundamental<br>Frequency | Field Strength of<br>Fundamental<br>(millivolts/meter) | Field Strength of<br>Harmonics<br>(microvolts/meter) |
|--------------------------|--|--|
| 902 ~ 928 MHz            | 50   | 500  |
| 2400 ~ 2483.5 MHz        | 50   | 500  |
| 5725 ~ 5875 MHz          | 50   | 500  |
| 24 ~ 24.25 GHz           | 250  | 2500   |

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits as below table, whichever is the lesser attenuation

| Frequencies<br>(MHz) | Field strength<br>(microvolts/meter) | Measurement distance<br>(meters) |
|----------------------|--------------------------------------|----------------------------------|
| 0.009 ~ 0.490        | 2400/F(kHz)                          | 300                              |
| 0.490 ~ 1.705        | 24000/F(kHz)                         | 30                               |
| 1.705 ~ 30.0         | 30                                   | 30                               |
| 30 ~ 88              | 100                                  | 3                                |
| 88 ~ 216             | 150                                  | 3                                |
| 216 ~ 960            | 200                                  | 3                                |
| Above 960            | 500                                  | 3                                |

#### NOTE:

- 1. The lower limit shall apply at the transition frequencies.
- 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



## 4.2.2 TEST INSTRUMENTS

| DESCRIPTION &<br>MANUFACTURER             | MODEL NO.                    | SERIAL NO.     | CALIBRATED<br>DATE | CALIBRATED<br>UNTIL |
|---|------------------------------|----------------|--------------------|---------------------|
| HP Preamplifier                           | 8447D                        | 2432A03504     | Feb. 26, 2014      | Feb. 25, 2015       |
| HP Preamplifier                           | 8449B                        | 3008A01201     | Feb. 26, 2014      | Feb. 25, 2015       |
| MITEQ Preamplifier                        | AMF-6F-260400-<br>33-8P      | 892164         | Mar. 01, 2014      | Feb. 28, 2015       |
| Agilent Spectrum                          | E4446A                       | MY51100050     | Oct. 24, 2014      | Oct. 23, 2015       |
| Agilent<br>TEST RECEIVER                  | N9038A                       | MY51210129     | Jan. 18, 2014      | Jan. 17, 2015       |
| Schwarzbeck Antenna                       | VULB 9168                    | 139            | Feb. 24, 2014      | Feb. 23, 2015       |
| Schwarzbeck Antenna                       | VHBA 9123                    | 480            | May 29, 2013       | May 28, 2015        |
| Schwarzbeck Horn<br>Antenna               | BBHA-9170                    | 212            | Aug. 26, 2014      | Aug. 25, 2015       |
| Schwarzbeck Horn<br>Antenna               | BBHA 9120-D1                 | D130           | Aug. 26, 2014      | Aug. 25, 2015       |
| ADT. Turn Table                           | TT100                        | 0306           | NA                 | NA                  |
| ADT. Tower                                | AT100                        | 0306           | NA                 | NA                  |
| Software                                  | ADT_Radiated_V<br>7.6.15.9.4 | NA             | NA                 | NA                  |
| SUHNER RF cable                           | SF104                        | CABLE-CH6      | Aug. 15, 2014      | Aug. 14, 2015       |
| SUHNER RF cable                           | SF102                        | Cable-CH8-3.6m | Aug. 15, 2014      | Aug. 14, 2015       |
| EMCO Horn Antenna                         | 3115                         | 00028257       | Aug. 28, 2014      | Aug. 27, 2015       |
| Highpass filter<br>Wainwright Instruments | WHK<br>3.1/18G-10SS          | SN 8           | NA                 | NA                  |
| ROHDE & SCHWARZ<br>Spectrum Analyzer      | FSV40                        | 101042         | Sep. 29, 2014      | Sep. 28, 2015       |

**NOTE:** 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.

2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

3. The test was performed in Chamber No. 6.

4. The Industry Canada Reference No. IC 7450E-6.

5. The FCC Site Registration No. is 447212.



## 4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height 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.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

#### NOTE:

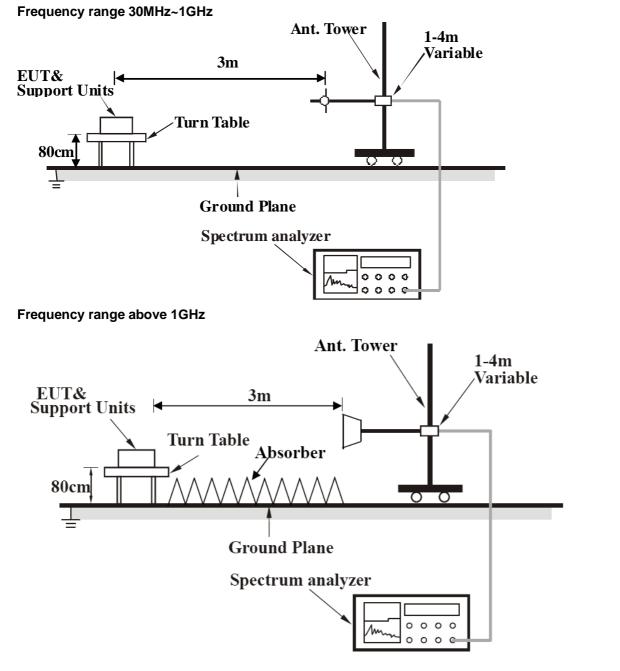
- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
- 3. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.



#### 4.2.5 TEST SETUP



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

## 4.2.6 EUT OPERATING CONDITIONS

Set the EUT under transmission condition continuously at specific channel frequency.



## 4.2.7 TEST RESULTS

#### ABOVE 1GHz DATA

| CHANNEL         | TX Channel 0 | DETECTOR | Peak (PK)    |
|-----------------|--------------|----------|--------------|
| FREQUENCY RANGE | 1GHz ~ 25GHz | FUNCTION | Average (AV) |

|     | ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                               |                   |                |                          |                            |                        |                                |  |
|-----|---|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|--|
| NO. | FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |  |
| 1   | 2390.00   | 45.8 PK                       | 74.0              | -28.2          | 1.17 H                   | 351                        | 50.02                  | -4.20                          |  |
| 2   | 2390.00   | 29.7 AV                       | 54.0              | -24.3          | 1.17 H                   | 351                        | 33.91                  | -4.20                          |  |
| 3   | 2400.00   | 51.7 PK                       | 74.0              | -22.3          | 1.17 H                   | 351                        | 55.87                  | -4.14                          |  |
| 4   | 2400.00   | 31.8 AV                       | 54.0              | -22.2          | 1.17 H                   | 351                        | 35.93                  | -4.14                          |  |
| 5   | *2402.00  | 91.1 PK                       | 114.0             | -22.9          | 1.17 H                   | 351                        | 95.26                  | -4.13                          |  |
| 6   | *2402.00  | 71.2 AV                       | 94.0              | -22.8          | 1.17 H                   | 351                        | 75.32                  | -4.13                          |  |
| 7   | 4804.00   | 49.3 PK                       | 74.0              | -24.7          | 1.00 H                   | 257                        | 46.92                  | 2.35                           |  |
| 8   | 4804.00   | 37.2 AV                       | 54.0              | -16.8          | 1.00 H                   | 257                        | 34.81                  | 2.35                           |  |
|     |   | ANTENNA                       |                   | A TEST DI      | STANCE: V                | ERTICAL A                  | Т 3 М                  |                                |  |
| NO. | FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |  |
| 1   | 2390.00   | 44.7 PK                       | 74.0              | -29.3          | 1.18 V                   | 35                         | 48.92                  | -4.20                          |  |
| 2   | 2390.00   | 28.3 AV                       | 54.0              | -25.7          | 1.18 V                   | 35                         | 32.48                  | -4.20                          |  |
| 3   | 2400.00   | 42.3 PK                       | 74.0              | -31.7          | 1.18 V                   | 35                         | 46.48                  | -4.14                          |  |
| 4   | 2400.00   | 23.4 AV                       | 54.0              | -30.6          | 1.18 V                   | 35                         | 27.50                  | -4.14                          |  |
| 5   | *2402.00  | 81.7 PK                       | 114.0             | -32.3          | 1.18 V                   | 35                         | 85.87                  | -4.13                          |  |
| 6   | *2402.00  | 62.8 AV                       | 94.0              | -31.2          | 1.18 V                   | 35                         | 66.89                  | -4.13                          |  |
| 7   | 4804.00   | 45.7 PK                       | 74.0              | -28.3          | 1.06 V                   | 191                        | 43.31                  | 2.35                           |  |
| 8   | 4804.00   | 34.6 AV                       | 54.0              | -19.4          | 1.06 V                   | 191                        | 32.28                  | 2.35                           |  |

#### **REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. The other emission levels were very low against the limit.

4. Margin value = Emission Level – Limit value

5. " \* ": Fundamental frequency.



| CHANNEL         | TX Channel 37 | DETECTOR | Peak (PK)    |
|-----------------|---------------|----------|--------------|
| FREQUENCY RANGE | 1GHz ~ 25GHz  | FUNCTION | Average (AV) |

|     | ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                               |                   |                |                          |                            |                        |                                |  |
|-----|---|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|--|
| NO. | FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |  |
| 1   | *2439.00  | 91.0 PK                       | 114.0             | -23.0          | 1.12 H                   | 353                        | 94.93                  | -3.96                          |  |
| 2   | *2439.00  | 71.1 AV                       | 94.0              | -22.9          | 1.12 H                   | 353                        | 75.06                  | -3.96                          |  |
| 3   | 4878.00   | 48.8 PK                       | 74.0              | -25.2          | 1.00 H                   | 233                        | 46.35                  | 2.46                           |  |
| 4   | 4878.00   | 36.0 AV                       | 54.0              | -18.0          | 1.00 H                   | 233                        | 33.51                  | 2.46                           |  |
|     |   | ANTENNA                       |                   | / & TEST DI    | STANCE: V                | ERTICAL A                  | Т 3 М                  |                                |  |
| NO. | FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |  |
| 1   | *2439.00  | 82.2 PK                       | 114.0             | -31.8          | 1.08 V                   | 41                         | 86.18                  | -3.96                          |  |
| 2   | *2439.00  | 63.4 AV                       | 94.0              | -30.6          | 1.08 V                   | 41                         | 67.39                  | -3.96                          |  |
| 3   | 4878.00   | 46.1 PK                       | 74.0              | -27.9          | 1.04 V                   | 207                        | 43.66                  | 2.46                           |  |
| 4   | 4878.00   | 35.0 AV                       | 54.0              | -19.1          | 1.04 V                   | 207                        | 32.49                  | 2.46                           |  |

#### **REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. The other emission levels were very low against the limit.

4. Margin value = Emission Level – Limit value

5. " \* ": Fundamental frequency.



| CHANNEL         | TX Channel 77 | DETECTOR | Peak (PK)    |
|-----------------|---------------|----------|--------------|
| FREQUENCY RANGE | 1GHz ~ 25GHz  | FUNCTION | Average (AV) |

|     | ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                               |                   |                |                          |                            |                        |                                |  |
|-----|---|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|--|
| NO. | FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |  |
| 1   | *2479.00  | 91.0 PK                       | 114.0             | -23.0          | 1.12 H                   | 352                        | 94.82                  | -3.79                          |  |
| 2   | *2479.00  | 71.1 AV                       | 94.0              | -22.9          | 1.12 H                   | 352                        | 74.91                  | -3.79                          |  |
| 3   | 2483.50   | 49.7 PK                       | 74.0              | -24.3          | 1.12 H                   | 352                        | 53.44                  | -3.77                          |  |
| 4   | 2483.50   | 31.4 AV                       | 54.0              | -22.6          | 1.12 H                   | 352                        | 35.17                  | -3.77                          |  |
| 5   | 4958.00   | 49.7 PK                       | 74.0              | -24.3          | 1.00 H                   | 261                        | 47.15                  | 2.59                           |  |
| 6   | 4958.00   | 37.5 AV                       | 54.0              | -16.5          | 1.00 H                   | 261                        | 34.88                  | 2.59                           |  |
|     |   | ANTENNA                       |                   | / & TEST DI    | STANCE: V                | ERTICAL A                  | Т 3 М                  |                                |  |
| NO. | FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |  |
| 1   | *2479.00  | 82.3 PK                       | 114.0             | -31.7          | 1.00 V                   | 64                         | 86.13                  | -3.79                          |  |
| 2   | *2479.00  | 63.8 AV                       | 94.0              | -30.3          | 1.00 V                   | 64                         | 67.54                  | -3.79                          |  |
| 3   | 2483.50   | 45.0 PK                       | 74.0              | -29.0          | 1.00 V                   | 64                         | 48.73                  | -3.77                          |  |
| 4   | 2483.50   | 28.5 AV                       | 54.0              | -25.5          | 1.00 V                   | 64                         | 32.27                  | -3.77                          |  |
| 5   | 4958.00   | 48.7 PK                       | 74.0              | -25.3          | 1.08 V                   | 174                        | 46.08                  | 2.59                           |  |
| 6   | 4958.00   | 36.8 AV                       | 54.0              | -17.2          | 1.08 V                   | 174                        | 34.19                  | 2.59                           |  |

#### **REMARKS**:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. The other emission levels were very low against the limit.

4. Margin value = Emission Level – Limit value

5. " \* ": Fundamental frequency.



#### **BELOW 1GHz WORST-CASE DATA**

| CHANNEL         | TX Channel 0 | DETECTOR<br>FUNCTION | Quasi Bask (QB) |
|-----------------|--------------|----------------------|-----------------|
| FREQUENCY RANGE | 30MHz ~ 1GHz |                      | Quasi-Peak (QP) |

|     | ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                               |                   |                |                          |                            |                        |                                |  |
|-----|---|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|--|
| NO. | FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |  |
| 1   | 42.46   | 18.9 QP                       | 40.0              | -21.1          | 1.38 H                   | 187                        | 33.02                  | -14.14                         |  |
| 2   | 123.61  | 21.8 QP                       | 43.5              | -21.7          | 1.07 H                   | 77                         | 37.46                  | -15.67                         |  |
| 3   | 594.15  | 22.1 QP                       | 46.0              | -23.9          | 1.15 H                   | 360                        | 28.43                  | -6.34                          |  |
| 4   | 746.49  | 25.4 QP                       | 46.0              | -20.7          | 1.71 H                   | 10                         | 29.13                  | -3.78                          |  |
| 5   | 839.08  | 26.6 QP                       | 46.0              | -19.4          | 1.00 H                   | 328                        | 28.96                  | -2.38                          |  |
| 6   | 944.42  | 28.1 QP                       | 46.0              | -17.9          | 1.03 H                   | 290                        | 28.72                  | -0.66                          |  |
|     |   | ANTENNA                       |                   | ( & TEST DI    | STANCE: V                | ERTICAL A                  | Т 3 М                  |                                |  |
| NO. | FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |  |
| 1   | 38.39   | 20.9 QP                       | 40.0              | -19.2          | 1.55 V                   | 258                        | 35.45                  | -14.60                         |  |
| 2   | 107.94  | 19.2 QP                       | 43.5              | -24.3          | 1.37 V                   | 246                        | 36.27                  | -17.08                         |  |
| 3   | 537.79  | 21.6 QP                       | 46.0              | -24.4          | 1.08 V                   | 122                        | 29.29                  | -7.67                          |  |
| 4   | 651.77  | 23.2 QP                       | 46.0              | -22.8          | 2.03 V                   | 287                        | 28.76                  | -5.53                          |  |
| 5   | 772.58  | 26.0 QP                       | 46.0              | -20.0          | 1.00 V                   | 171                        | 29.18                  | -3.21                          |  |
| 6   | 925.65  | 28.4 QP                       | 46.0              | -17.6          | 1.66 V                   | 109                        | 29.39                  | -0.96                          |  |

#### **REMARKS**:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. The other emission levels were very low against the limit.

4. Margin value = Emission Level – Limit value



## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



## 6. INFORMATION ON THE TESTING LABORATORIES

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

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

Linko EMC/RF Lab Tel: 886-2-26052180 Fax: 886-2-26051924 Hsin Chu EMC/RF/Telecom Lab Tel: 886-3-5935343 Fax: 886-3-5935342

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

Email: <u>service.adt@tw.bureauveritas.com</u> Web Site: <u>www.bureauveritas-adt.com</u>

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



#### 7. APPENDIX A – MODIFICATION RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

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