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FCC TEST REPORT

REPORT NO.: RF130319D10
MODEL NO.: MORFGPO
FCC ID: EMJMMORFGPO
RECEIVED: Mar. 19, 2013
TESTED: Apr. 9, 2013
ISSUED: Apr. 11, 2013

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, 14th Ling, Chia Pau Vil., Lin Kou Dist.,
New Taipei City, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|-------------|-------------------|---------------|
| RF130319D10 | Original release | Apr. 11, 2013 |



1. CERTIFICATION

PRODUCT: HP Wireless Mouse Z4000

BRAND: HP

MODEL NO.: MORFGPO

APPLICANT: PRIMAX ELECTRONICS LTD.

TESTED: Apr. 9, 2013

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.

PREPARED BY : Annie Chang , **DATE:** Apr, 11, 2013
(Annie Chang / Supervisor)

APPROVED BY : Ken Liu , **DATE:** Apr, 11, 2013
(Ken Liu / Senior 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 PARAGRAPH | TEST TYPE | RESULT | REMARK |
| 15.207 | Conducted Emission Test | N/A | Power supply is 3.0Vdc from batteries |
| 15.209 15.249 15.249 (d) | Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209 | PASS | Meet the requirement of limit. Minimum passing margin is -9.2dB at 2390.00MHz. |

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 | HP Wireless Mouse Z4000 |
| MODEL NO. | MORFGPO |
| POWER SUPPLY | 3.0Vdc from batteries |
| MODULATION TYPE | GFSK |
| OPERATING FREQUENCY | 2402MHz ~ 2479MHz |
| NUMBER OF CHANNEL | 78 |
| ANTENNA TYPE | Printed antenna with -3.96dBi gain |
| DATA CABLE | N/A |
| I/O PORT | N/A |
| ACCESSORY DEVICES | N/A |

NOTE:

1. The EUT is a HP Wireless Mouse Z4000.
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. (MHz) | CHANNEL | FREQ. (MHz) | CHANNEL | FREQ. (MHz) | CHANNEL | FREQ. (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 CONFIGURE MODE | APPLICABLE TO | | | | DESCRIPTION |
|--------------------|---------------|-------|-------|----|-------------|
| | PLC | RE≥1G | RE<1G | BM | |
| - | Note | √ | √ | √ | - |

Where **PLC**: Power Line Conducted Emission **RE≥1G**: Radiated Emission above 1GHz
RE<1G: Radiated Emission below 1GHz **BM**: Bandedge Measurement

NOTE: 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 axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE |
|--------------------|-------------------|----------------|-----------------|
| - | 0 to 77 | 0, 39, 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 axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION 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 channel(s) was (were) selected for the final test as listed below.

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

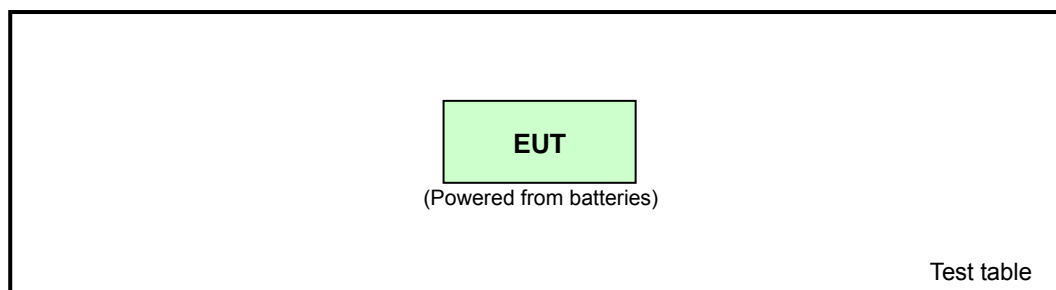
TEST CONDITION:

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER | TESTED BY |
|---------------|--------------------------|-------------|-----------|
| RE<1G | 22deg. C, 74% RH | 3.0Vdc | Saxon Lee |
| RE≥1G | 22deg. C, 74% RH | 3.0Vdc | Saxon Lee |
| BM | 22deg. C, 74% RH | 3.0Vdc | Saxon Lee |

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





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 Frequency | Field Strength of Fundamental (millivolts/meter) | Field Strength of Harmonics (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 (MHz) | Field strength (microvolts/meter) | Measurement distance (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 & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|-------------------------------|------------------------------|------------|-----------------|------------------|
| HP Preamplifier | 8447D | 2432A03504 | Feb. 26, 2013 | Feb. 25, 2014 |
| HP Preamplifier | 8449B | 3008A01201 | Feb. 26, 2013 | Feb. 25, 2014 |
| Agilent Spectrum Analyzer | E4446A | MY46180403 | Jun. 13, 2012 | Jun. 12, 2013 |
| ROHDE & SCHWARZ Test Receiver | ESCS 30 | 838251/021 | Oct. 11, 2012 | Oct. 10, 2013 |
| Schwarzbeck Antenna | VULB 9168 | 137 | Mar. 20, 2013 | Mar. 19, 2014 |
| Schwarzbeck Antenna | VHBA 9123 | 480 | May 22, 2012 | May 21, 2013 |
| ADT. Turn Table | TT100 | 0306 | NA | NA |
| ADT. Tower | AT100 | 0306 | NA | NA |
| Software | ADT_Radiated_V 7.6.15.9.2 | NA | NA | NA |
| SUHNER RF cable | SF102 | CABLE-CH6 | Aug. 19, 2012 | Aug. 18, 2013 |
| Schwarzbeck Horn Antenna | BBHA 9120-D1 | D130 | May 18, 2012 | May 17, 2013 |

- 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 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.
- 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.

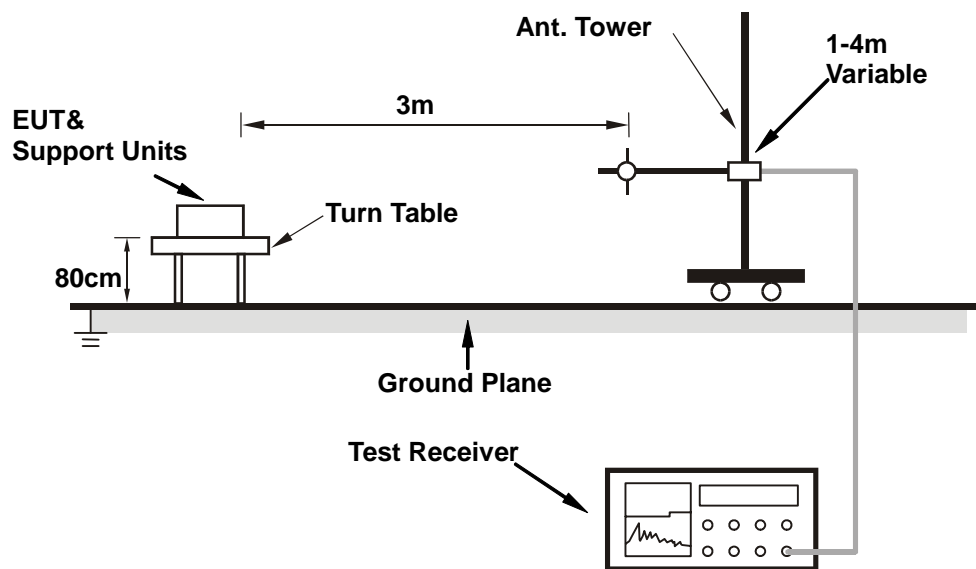
NOTE:

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 FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 25GHz | | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 2390.00 | 59.1 PK | 74.0 | -14.9 | 1.01 H | 22 | 26.83 | 32.25 |
| 2 | 2390.00 | 44.8 AV | 54.0 | -9.2 | 1.01 H | 22 | 12.56 | 32.25 |
| 3 | 2400.00 | 53.9 PK | 74.0 | -20.1 | 1.01 H | 22 | 21.62 | 32.29 |
| 4 | 2400.00 | 11.4 AV | 54.0 | -42.6 | 1.01 H | 22 | -20.88 | 32.29 |
| 5 | *2402.00 | 91.8 PK | 114.0 | -22.2 | 1.01 H | 22 | 59.51 | 32.30 |
| 6 | *2402.00 | 49.3 AV | 94.0 | -44.7 | 1.01 H | 22 | 17.01 | 32.30 |
| 7 | 4804.00 | 48.5 PK | 74.0 | -25.5 | 1.00 H | 176 | 9.12 | 39.38 |
| 8 | 4804.00 | 6.0 AV | 54.0 | -48.0 | 1.00 H | 176 | -33.38 | 39.38 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 2390.00 | 58.1 PK | 74.0 | -15.9 | 1.00 V | 301 | 25.89 | 32.25 |
| 2 | 2390.00 | 44.8 AV | 54.0 | -9.2 | 1.00 V | 301 | 12.58 | 32.25 |
| 3 | 2400.00 | 49.5 PK | 74.0 | -24.5 | 1.00 V | 301 | 17.24 | 32.29 |
| 4 | 2400.00 | 7.0 AV | 54.0 | -47.0 | 1.00 V | 301 | -25.26 | 32.29 |
| 5 | *2402.00 | 85.9 PK | 114.0 | -28.1 | 1.00 V | 301 | 53.63 | 32.30 |
| 6 | *2402.00 | 43.4 AV | 94.0 | -50.6 | 1.00 V | 301 | 11.13 | 32.30 |
| 7 | 4804.00 | 47.0 PK | 74.0 | -27.0 | 1.01 V | 241 | 7.63 | 39.38 |
| 8 | 4804.00 | 4.5 AV | 54.0 | -49.5 | 1.01 V | 241 | -34.87 | 39.38 |

REMARKS:

- Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
- Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB) if use.
- The other emission levels were very low against the limit.
- Margin value = Emission level – Limit value.
- “ * “ : Fundamental frequency
- The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
 $20 \log (\text{Duty cycle}) = 20 \log (0.12 \text{ ms} / 16.04 \text{ ms}) = -42.5 \text{ dB}$
 Please see page 18 for plotted duty.



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| | | | |
|------------------------|---------------|--------------------------|--------------|
| CHANNEL | TX Channel 39 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 25GHz | | Average (AV) |

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *2441.00 | 91.8 PK | 114.0 | -22.2 | 1.00 H | 29 | 59.36 | 32.48 |
| 2 | *2441.00 | 49.3 AV | 94.0 | -44.7 | 1.00 H | 29 | 16.86 | 32.48 |
| 3 | 4882.00 | 48.8 PK | 74.0 | -25.2 | 1.00 H | 184 | 9.22 | 39.58 |
| 4 | 4882.00 | 6.3 AV | 54.0 | -47.7 | 1.00 H | 184 | -33.28 | 39.58 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *2441.00 | 86.1 PK | 114.0 | -27.9 | 1.00 V | 295 | 53.58 | 32.48 |
| 2 | *2441.00 | 43.6 AV | 94.0 | -50.4 | 1.00 V | 295 | 11.08 | 32.48 |
| 3 | 4882.00 | 47.2 PK | 74.0 | -26.8 | 1.01 V | 249 | 7.65 | 39.58 |
| 4 | 4882.00 | 4.7 AV | 54.0 | -49.3 | 1.01 V | 249 | -34.85 | 39.58 |

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) if use.
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. “ * “ : Fundamental frequency
6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
 $20 \log (\text{Duty cycle}) = 20 \log (0.12 \text{ ms} / 16.04 \text{ ms}) = -42.5 \text{ dB}$
Please see page 18 for plotted duty.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *2479.00 | 91.8 PK | 114.0 | -22.2 | 1.00 H | 30 | 59.12 | 32.65 |
| 2 | *2479.00 | 49.3 AV | 94.0 | -44.7 | 1.00 H | 30 | 16.62 | 32.65 |
| 3 | 2483.50 | 45.5 PK | 74.0 | -28.5 | 1.00 H | 30 | 12.80 | 32.67 |
| 4 | 2483.50 | 3.0 AV | 54.0 | -51.0 | 1.00 H | 30 | -29.70 | 32.67 |
| 5 | 4958.00 | 48.5 PK | 74.0 | -25.5 | 1.02 H | 178 | 8.85 | 39.65 |
| 6 | 4958.00 | 6.0 AV | 54.0 | -48.0 | 1.02 H | 178 | -33.65 | 39.65 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

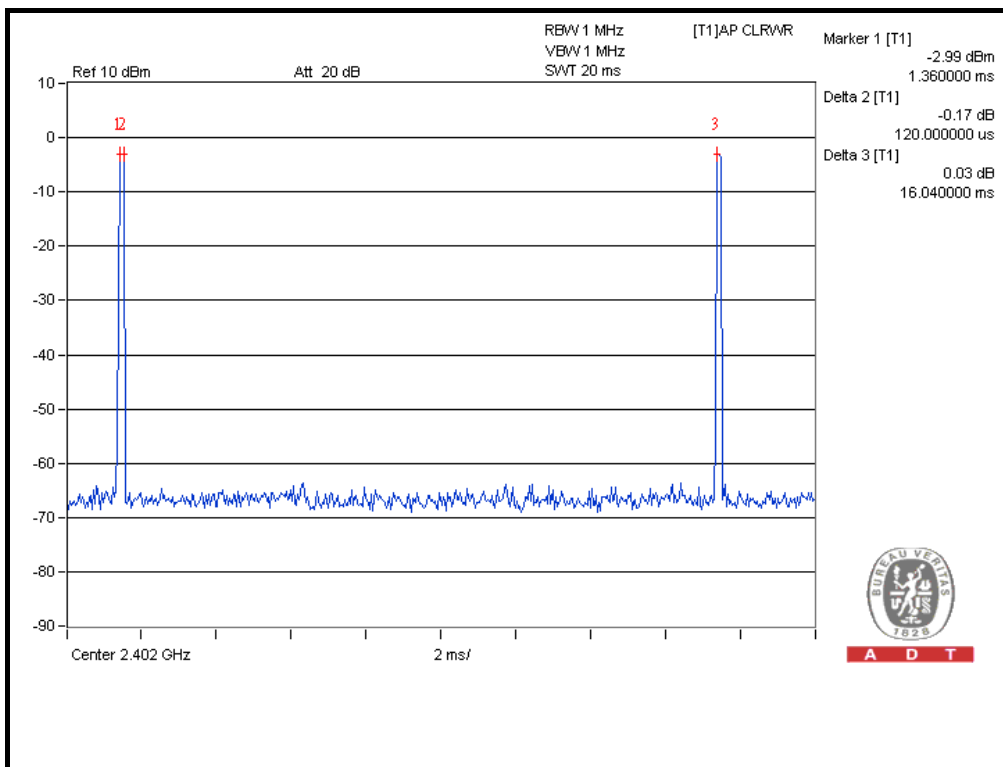
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *2479.00 | 86.3 PK | 114.0 | -27.7 | 1.01 V | 298 | 53.63 | 32.65 |
| 2 | *2479.00 | 43.8 AV | 94.0 | -50.2 | 1.01 V | 298 | 11.13 | 32.65 |
| 3 | 2483.50 | 42.9 PK | 74.0 | -31.1 | 1.01 V | 298 | 10.21 | 32.67 |
| 4 | 2483.50 | 0.4 AV | 54.0 | -53.6 | 1.01 V | 298 | -32.29 | 32.67 |
| 5 | 4958.00 | 47.2 PK | 74.0 | -26.8 | 1.00 V | 236 | 7.55 | 39.65 |
| 6 | 4958.00 | 4.7 AV | 54.0 | -49.3 | 1.00 V | 236 | -34.95 | 39.65 |

REMARKS:

- Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
- Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB) if use.
- The other emission levels were very low against the limit.
- Margin value = Emission level – Limit value.
- “ * ” : Fundamental frequency
- The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
 $20 \log (\text{Duty cycle}) = 20 \log (0.12 \text{ ms} / 16.04 \text{ ms}) = -42.5 \text{ dB}$
Please see page 18 for plotted duty.



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$$20 \log (\text{Duty cycle}) = 20 \log (0.12 \text{ ms} / 16.04 \text{ ms}) = -42.5 \text{ dB}$$



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BELOW 1GHZ WORST-CASE DATA

| | | | |
|------------------------|---------------|------------------------------|------------|
| CHANNEL | TX Channel 0 | DETECTOR FUNCTION | Quasi-Peak |
| FREQUENCY RANGE | Below 1000MHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 48.43 | 18.9 QP | 40.0 | -21.1 | 1.47 H | 175 | 4.94 | 14.00 |
| 2 | 145.43 | 14.9 QP | 43.5 | -28.6 | 1.02 H | 9 | 0.57 | 14.35 |
| 3 | 278.32 | 25.5 QP | 46.0 | -20.5 | 1.10 H | 239 | 10.12 | 15.41 |
| 4 | 333.61 | 26.5 QP | 46.0 | -19.5 | 1.03 H | 235 | 9.54 | 16.96 |
| 5 | 606.18 | 23.9 QP | 46.0 | -22.1 | 1.48 H | 8 | 0.23 | 23.68 |
| 6 | 854.50 | 27.7 QP | 46.0 | -18.3 | 1.06 H | 221 | -0.03 | 27.73 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 48.43 | 19.5 QP | 40.0 | -20.5 | 1.48 V | 72 | 5.50 | 14.00 |
| 2 | 279.29 | 18.7 QP | 46.0 | -27.3 | 1.44 V | 348 | 3.23 | 15.49 |
| 3 | 332.64 | 18.1 QP | 46.0 | -27.9 | 1.47 V | 162 | 1.09 | 16.98 |
| 4 | 453.89 | 19.8 QP | 46.0 | -26.2 | 1.03 V | 187 | -0.62 | 20.39 |
| 5 | 574.17 | 23.3 QP | 46.0 | -22.7 | 1.52 V | 187 | 0.47 | 22.83 |
| 6 | 811.82 | 27.5 QP | 46.0 | -18.5 | 1.03 V | 273 | 0.37 | 27.16 |

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) if use.
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:

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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.

---END---