# TEST REPORT

| | |
|---|---|
| To: | **Camino International Limited** |
| Address: | Flat A, 3rd Floor, Industrial Building, 501-503 Castle Peak Road, Cheung Sha Wan, Kowloon, Hong Kong |

| | |
|---|---|
| Manufacturer or Supplier | **Hoi Ming Plastic Products Factory** |
| Address | No. 10 Kai Ming Road, Niu Shi Po, Liu Yue, Heng Gang, Long Gang District, Shenzhen, China |
| Product: | Wireless Optical Mouse(USB) |
| Brand Name: | Camino |
| Model: | 760761(USB) |
| Additional Model & Model Difference: | 760762<br>Different appearance only |
| Tested Sample: | 760761 |
| Date of tests: | Oct. 12 ~ 17, 2011 |

The submitted sample of the above equipment has been tested for according with ANSI C63.4-2009 and the tests have been carried out according to the requirements of the following standards:

☒ **FCC Part 15, Subpart C (Section 15.249)**

**CONCLUSION: The submitted sample was found to <u>COMPLY</u> with the test requirement**

| Prepared by Glyn He<br>Project Engineer / EMC Department | Approved by Sam Tung<br>Manager / EMC Department |
|---|---|
| Glyn | Date: Oct.21, 2011 |

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# RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|---|---|---|
| Original release | N/A | Oct. 16, 2011 |

# 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247) | | | |
|---|---|---|---|
| **STANDARD SECTION** | **TEST TYPE AND LIMIT** | **RESULT** | **REMARK** |
| §15.203 | Antenna Requirement | PASS | Compliant |
| §15.207 (a) | Conducted Emission | PASS | Compliant |
| §15.205 | Restricted Band of Operation | PASS | Compliant |
| §15.209<br>§15.249(a) | Radiated Emission | PASS | Compliant |
| §15.215(c) | 20dB Bandwidth Test | PASS | Compliant |
| §15.249(d) | Out of Band Emission | PASS | Compliant |

# 2. 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 | UNCERTAINTY |
|---|---|---|
| Conducted emissions | 9kHz~30MHz | 2.44dB |
| Radiated emissions | 30MHz ~ 200MHz | 3.19dB |
| | 200MHz ~1000MHz | 3.21dB |
| | 1GHz ~ 18GHz | 2.26dB |
| | 18GHz ~ 40GHz | 1.94dB |

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

# 3. GENERAL INFORMATION

## 3.1 GENERAL DESCRIPTION OF EUT

| | |
|---|---|
| **PRODUCT** | Wireless Optical Mouse(USB) |
| **MODEL NO.** | 760761/760762(USB) |
| **FCC ID** | ZZX671D |
| **NOMINAL VOLTAGE** | 5V DC (By PC) |
| **MODULATION TYPE** | GFSK |
| **OPERATING FREQUENCY** | **2.4GHz:** 2402.0 ~ 2480.0MHz |
| **ANTENNA TYPE** | Integral Antenna |
| **ANTENNA CONNECTER** | N/A |
| **DATA CABLE** | N/A |
| **I/O PORTS** | N/A |
| **ACCESSORY DEVICES** | N/A |

## 3.2 DESCRIPTION OF TEST MODES

| CHANNEL | FREQUENCY |
|---|---|
| Low | 2402MHz |
| Middle | 2441MHz |
| High | 2480MHz |

## 3.3 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 (15.249)**
**ANSI C63.4-2009**

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

**NOTE:** The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

## 3.4 DESCRIPTION OF SUPPORT UNITS

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

| NO. | PRODUCT | BRAND | MODEL NO. | SERIAL NO. | FCC ID |
|---|---|---|---|---|---|
| 1 | NOTEBOOK | DELL | D531 | CN-0XM006-48643 -81U-2610 | QDS-BRCM1020 |
| | | | | | |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|---|---|
| 1 | N/A |
| | |

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

# 4. TEST TYPES AND RESULTS

## 4.1 RADIATED EMISSION MEASUREMENT

### 4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

| 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 |

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental Frequency | Field strength of fundamental (milli-volts/meter) | Field strength of harmonics (micro-volts/meter) |
|---|---|---|
| 902-928 MHz | 50 | 500 |
| 2400-2483.5 MHz | 50 | 500 |
| 5725-5875 MHz | 50 | 500 |
| 24.0-24.25 GHz | 250 | 2500 |

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

**NOTE**:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), 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.

## 4.1.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|---|---|---|---|
| Test Receiver ROHDE & SCHWARZ | ESVS10 | 841431/004 | May 25,11 | May 25,12 |
| Bilog Antenna TESEQ | CBL 6111D | 25758 | Nov.22,10 | Nov.22,11 |
| 10m Semi-anechoic Chamber ETS-LINDGREN | 21.4m*12.1m*8.8m | NSEMC006 | May 2,11 | May 2,12 |
| RF Cable IMRO | IMRO-400 | 10m Cable 1#10m | May 2,11 | May 2,12 |
| RF Cable IMRO | IMRO-400 | 10m Cable 2#3m | May 2,11 | May 2,12 |
| Signal Amplifier Agilent | 8447D | 2944A11174 | May 2,11 | May 2,12 |
| Horn Antenna EMCO | 3117 | 00062558 | Nov.01,10 | Nov.01,11 |
| Horn Antenna (AUX) EMCO | 3117 | 00085519 | Nov.01,10 | Nov.01,11 |
| Spectrum Analyzer HP | 8593E | 3448U00806 | May 25,11 | May 25,12 |
| Spectrum Analyzer Agilent | E4446A | MY46180622 | Apr. 25,11 | Apr. 25,12 |
| RF Cable DRAKA | M06/25-RG102 | 10m Cable 2# | May 2,11 | May 2,12 |

**NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA.
2. The test was performed in Dongguan Chamber 10m.
3. The horn antenna are used only for the measurement of emission frequency above 1GHz if tested.

### 4.1.3 TEST PROCEDURES

The EUT was placed on a turn table which was 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on a antenna tower. At the frequency band of 30MHz to 1GHz, The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 to 4 m for horizontal and vertical polarizations. The broadband antenna (calibrated by dipole antenna) was used as a receiving antenna. At the frequency band of 1GHz to 10GHz, The measuring antenna moved from 1 to 4 m for horizontal and vertical polarization. The horn antenna was use das a receiving antenna.

The resolution bandwidth and video bandwidth of the test receiver was 120 kHz and
300kHz for Quasi-peak detection at frequency below 1GHz.

The resolution bandwidth and video bandwidth of the test receiver was1MHz and 1MHz for Peak detection at frequency above 1GHz.

For Average measurement at frequency above 1GHz.The resolution bandwidth of the test receiver was 1MHz ; due to the shortest pulse width T is 116us, according the video bandwidth should not smaller than 1/T,so the video bandwidth is 10Hz.

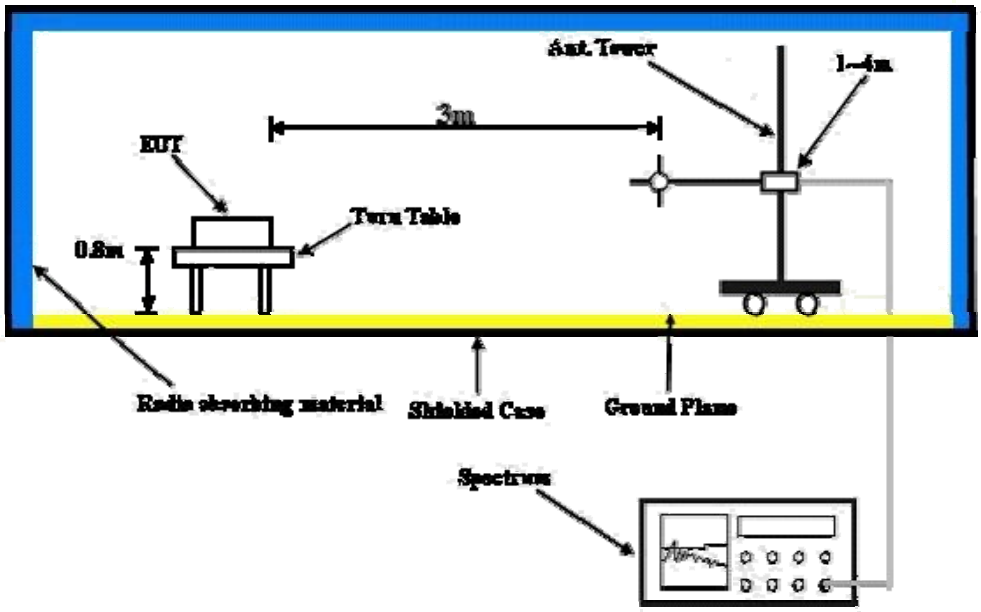
In 18GHz to 25GHz, The EUT was checked by Horn ANT . But the test result is background.

The EUT position(X. Y. Z) were checked and worse case was happened in Y position. So Y position was chose for find measurement. The EUT was tested in Chamber Site.

### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.1.5 TEST SETUP




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

### 4.1.6 EUT OPERATING CONDITIONS

a. Placed the EUT on the testing table.
b. The EUT connected with PC and run a test program
c. Enable EUT under transmission condition continuously at specific channel frequency.

## 4.1.7 TEST RESULTS

**ABOVE 1GHz WORST-CASE DATA: Low channel**

| Frequency MHz | Detector | Raw Value dBuV | Direction Degree | Polar H / V | Correction factor dB/m | Emission level dBuV/m | Limit dBuV/m | Margin dB |
|---|---|---|---|---|---|---|---|---|
| 4804.85 | AV | -21 | 24 | V | 41.9 | 39.8 | 54 | -14.2 |
| 4804.85 | AV | -1.8 | 341 | H | 41.9 | 40.1 | 54 | -13.9 |
| 4804.85 | PK | 15.5 | 177 | V | 41.9 | 57.4 | 74 | -16.6 |
| 4804.85 | PK | 16.1 | 28 | H | 41.9 | 58.0 | 74 | -16.0 |
| 7207.47 | AV | -5.5 | 325 | V | 47.4 | 41.9 | 54 | -12.1 |
| 7207.47 | AV | -5.1 | 91 | H | 47.4 | 42.3 | 54 | -11.7 |
| 7207.47 | PK | 18.5 | 77 | V | 47.4 | 65.9 | 74 | -8.1 |
| 7207.47 | PK | 18.2 | 267 | H | 47.4 | 65.6 | 74 | -8.4 |
| 2402.425 | AV | 31.9 | 33 | V | 34.1 | 66.0 | 94 | -28.0 |
| 2402.425 | AV | 32.7 | 34 | H | 34.1 | 66.8 | 94 | -27.2 |
| 2402.425 | PK | 47.4 | 164 | V | 34.1 | 81.5 | 114 | -32.5 |
| 2402.425 | PK | 47.5 | 159 | H | 34.1 | 81.6 | 114 | -32.4 |
| 2390.00 | AV | 7.3 | 228 | V | 33.9 | 41.2 | 54 | -12.8 |
| 2390.00 | AV | 8.5 | 56 | H | 33.9 | 42.4 | 54 | -11.6 |
| 2390.00 | PK | 21.9 | 229 | V | 33.9 | 55.8 | 74 | -18.2 |
| 2390.00 | PK | 22.8 | 56 | H | 33.9 | 56.7 | 74 | -17.3 |
| 2400.00 | AV | 9.5 | 210 | V | 34.0 | 43.5 | 54 | -10.5 |
| 2400.00 | AV | 10.2 | 45 | H | 34.0 | 44.2 | 54 | -9.8 |
| 2400.00 | PK | 23.5 | 212 | V | 34.0 | 57.5 | 74 | -16.5 |
| 2400.00 | PK | 22.8 | 46 | H | 34.0 | 56.8 | 74 | -17.2 |

## ABOVE 1GHz WORST-CASE DATA: Middle channel

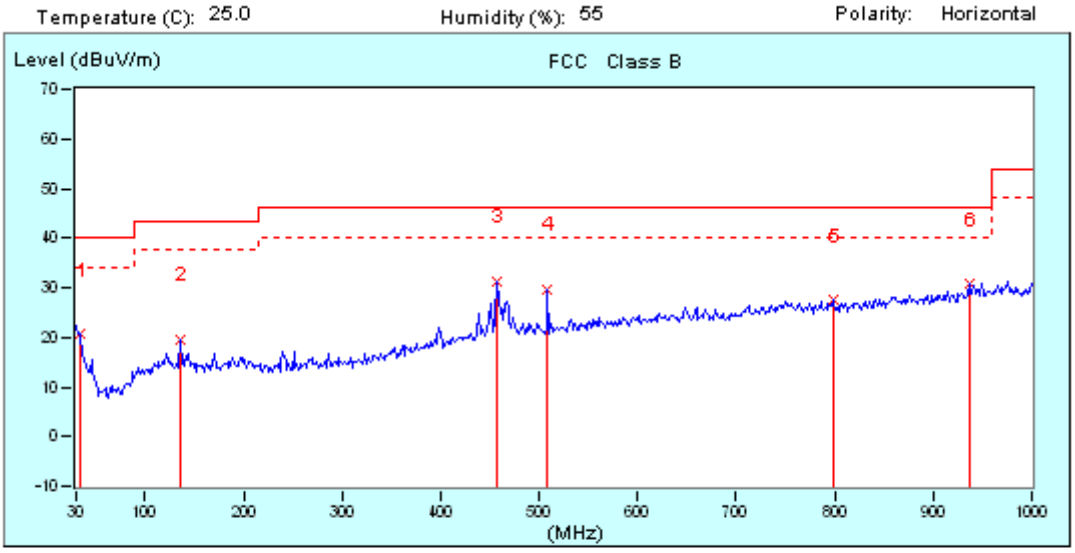
| Frequency MHz | Detector | Raw Value dBuV | Direction Degree | Polar H / V | Correction factor dB/m | Emission level dBuV/m | Limit dBuV/m | Margin dB |
|---|---|---|---|---|---|---|---|---|
| 4882.65 | AV | -4.2 | 24 | V | 41.8 | 37.6 | 54 | -16.4 |
| 4882.65 | AV | -3.3 | 341 | H | 41.8 | 38.5 | 54 | -15.5 |
| 4882.65 | PK | 21.4 | 177 | V | 41.8 | 63.2 | 74 | -10.8 |
| 4882.65 | PK | 17.1 | 28 | H | 41.8 | 58.9 | 74 | -15.1 |
| 7323.85 | AV | -3.9 | 325 | V | 47.9 | 44.0 | 54 | -10.0 |
| 7323.85 | AV | -3.6 | 91 | H | 47.9 | 44.3 | 54 | -9.7 |
| 7323.85 | PK | 7.9 | 77 | V | 47.9 | 55.8 | 74 | -18.2 |
| 7323.85 | PK | 8.8 | 267 | H | 47.9 | 56.7 | 74 | -17.3 |
| 2441.32 | AV | 43.5 | 33 | V | 34.3 | 77.8 | 94 | -16.2 |
| 2441.32 | AV | 44.2 | 34 | H | 34.3 | 78.5 | 94 | -15.5 |
| 2441.32 | PK | 47.7 | 164 | V | 34.3 | 82.0 | 114 | -32.0 |
| 2441.32 | PK | 50.3 | 159 | H | 34.3 | 84.6 | 114 | -29.4 |

## ABOVE 1GHz WORST-CASE DATA: High channel

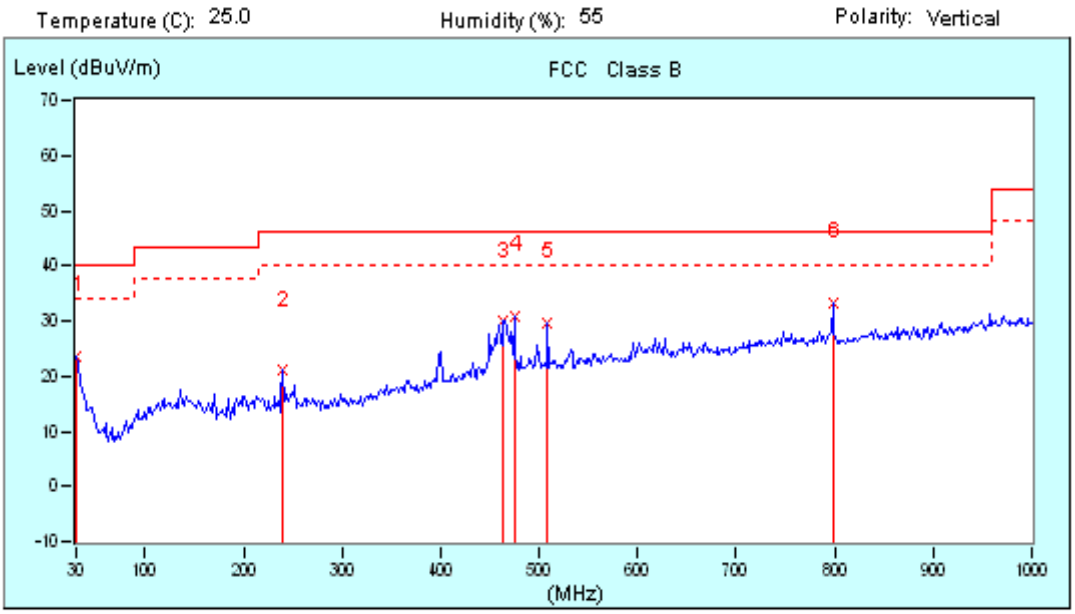
| Frequency MHz | Detector | Raw Value dBuV | Direction Degree | Polar H / V | Correction factor dB/m | Emission level dBuV/m | Limit dBuV/m | Margin dB |
|---|---|---|---|---|---|---|---|---|
| 4960.850 | AV | -7.0 | 24 | V | 42.0 | 35.0 | 54 | -19.0 |
| 4960.850 | AV | -6.5 | 341 | H | 42.0 | 35.5 | 54 | -18.5 |
| 4960.850 | PK | 13.8 | 177 | V | 42.0 | 55.8 | 74 | -18.2 |
| 4960.850 | PK | 14.9 | 28 | H | 42.0 | 56.9 | 74 | -17.1 |
| 7441.250 | AV | -8.2 | 325 | V | 48.1 | 39.9 | 54 | -14.1 |
| 7441.250 | AV | -8.7 | 91 | H | 48.1 | 39.4 | 54 | -14.6 |
| 7441.250 | PK | 16.6 | 77 | V | 48.1 | 64.7 | 74 | -9.3 |
| 7441.250 | PK | 16.4 | 267 | H | 48.1 | 64.5 | 74 | -9.5 |
| 2480.420 | AV | 40.5 | 33 | V | 34.5 | 75.0 | 94 | -19.0 |
| 2480.420 | AV | 39.4 | 34 | H | 34.5 | 73.9 | 94 | -20.1 |
| 2480.420 | PK | 48.1 | 164 | V | 34.5 | 82.6 | 114 | -31.4 |
| 2480.420 | PK | 48.8 | 159 | H | 34.5 | 83.3 | 114 | -30.7 |
| 2483.500 | AV | 7.9 | 57 | V | 34.6 | 42.5 | 54 | -11.5 |
| 2483.500 | AV | 6.5 | 59 | H | 34.6 | 41.1 | 54 | -12.9 |
| 2483.500 | PK | 20.1 | 146 | V | 34.6 | 54.7 | 74 | -19.3 |
| 2483.500 | PK | 21.3 | 145 | H | 34.6 | 55.9 | 74 | -18.1 |

**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).
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: Low channel

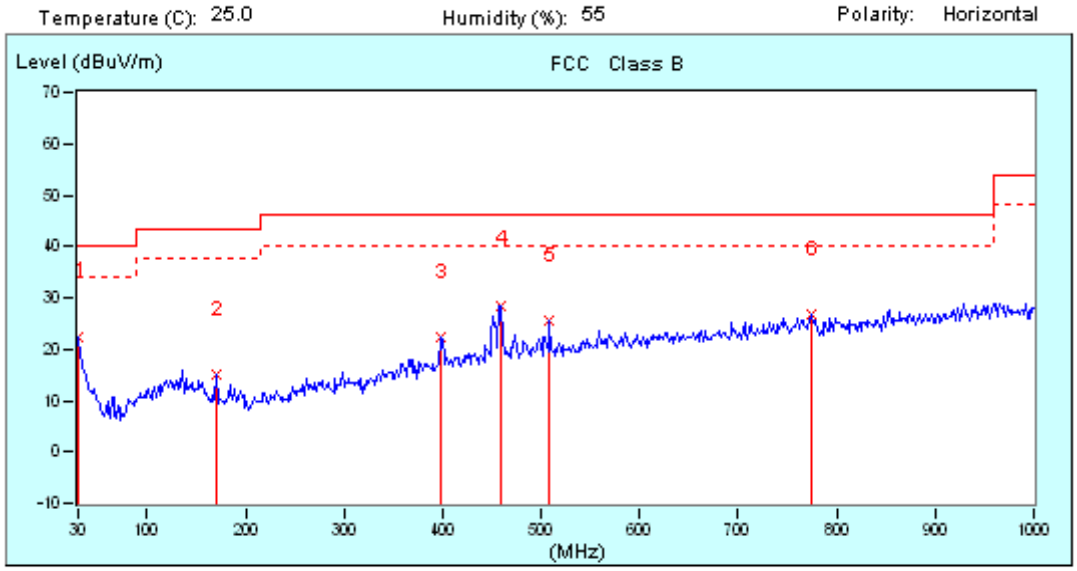



| | No. | Frequency | Factor | Reading | Emission | Limit | Margin | Tower / Table | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | cm | deg |
| | 1 | 33.11 | 18.35 | 2.23 | 20.58 | 40.00 | -19.42 | 100 | 0 |
| | 2 | 135.71 | 13.21 | 6.35 | 19.56 | 43.50 | -23.94 | 100 | 0 |
| * | 3 | 457.48 | 20.18 | 11.23 | 31.41 | 46.00 | -14.59 | 100 | 2 |
| | 4 | 508.78 | 21.11 | 8.66 | 29.77 | 46.00 | -16.23 | 100 | 15 |
| | 5 | 797.92 | 25.88 | 1.66 | 27.54 | 46.00 | -18.46 | 100 | 0 |
| | 6 | 936.27 | 28.18 | 2.51 | 30.69 | 46.00 | -15.31 | 100 | 0 |



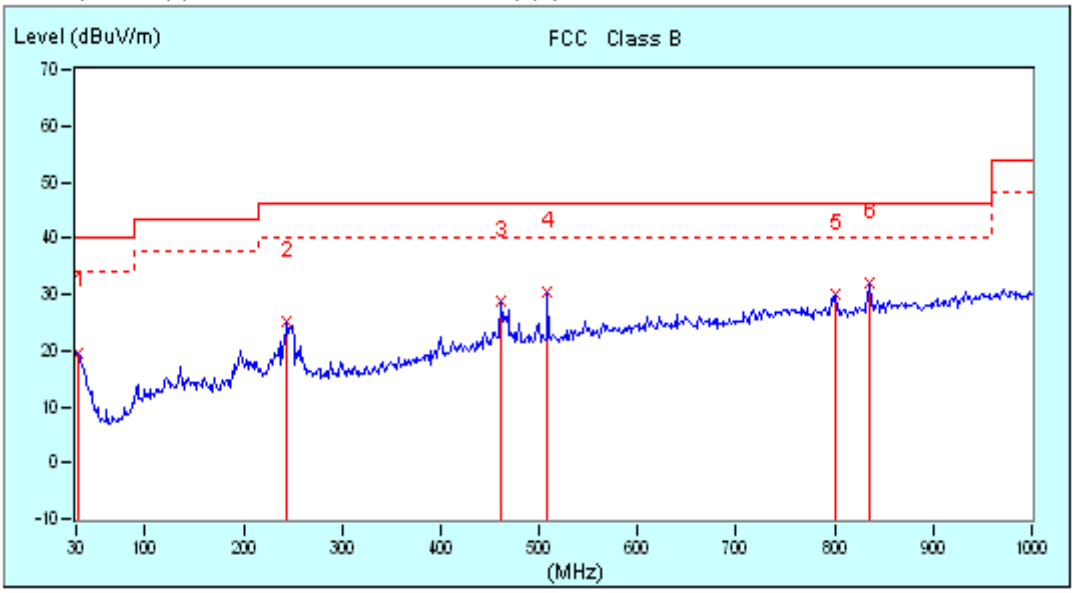

| No. | | Frequency | Factor | Reading | Emission | Limit | Margin | Tower / Table | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | cm | deg |
| | 1 | 30.00 | 19.44 | 4.18 | 23.62 | 40.00 | -16.38 | 100 | 0 |
| | 2 | 239.86 | 12.45 | 8.70 | 21.15 | 46.00 | -24.85 | 100 | 0 |
| | 3 | 463.70 | 20.37 | 9.64 | 30.01 | 46.00 | -15.99 | 100 | 0 |
| | 4 | 474.58 | 20.62 | 10.35 | 30.97 | 46.00 | -15.03 | 100 | 0 |
| | 5 | 508.78 | 21.11 | 8.60 | 29.71 | 46.00 | -16.29 | 100 | 0 |
| * | 6 | 797.92 | 25.88 | 7.44 | 33.32 | 46.00 | -12.68 | 100 | 0 |

## BELOW 1GHz WORST-CASE DATA: Middle channel




| | No. | Frequency MHz | Factor dB/m | Reading dBuV | Emission dBuV/m | Limit dBuV/m | Margin dB | Tower / Table cm | deg |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 30.00 | 19.44 | 2.99 | 22.43 | 40.00 | -17.57 | 100 | 0 |
| | 2 | 169.90 | 11.01 | 4.03 | 15.04 | 43.50 | -28.46 | 100 | 0 |
| | 3 | 398.41 | 18.35 | 3.86 | 22.21 | 46.00 | -23.79 | 100 | 0 |
| * | 4 | 459.04 | 20.25 | 8.24 | 28.49 | 46.00 | -17.51 | 100 | 0 |
| | 5 | 508.78 | 21.11 | 4.42 | 25.53 | 46.00 | -20.47 | 100 | 0 |
| | 6 | 774.60 | 25.61 | 1.16 | 26.77 | 46.00 | -19.23 | 100 | 0 |

Temperature (C): 25.0 Humidity (%): 55 Polarity: Vertical




| No. | | Frequency | Factor | Reading | Emission | Limit | Margin | Tower / Table | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | cm | deg |
| | 1 | 31.55 | 18.89 | 0.76 | 19.65 | 40.00 | -20.35 | 400 | 4 |
| | 2 | 244.52 | 12.84 | 12.25 | 25.09 | 46.00 | -20.91 | 400 | 52 |
| | 3 | 460.59 | 20.30 | 8.41 | 28.71 | 46.00 | -17.29 | 400 | 151 |
| | 4 | 508.78 | 21.11 | 9.13 | 30.24 | 46.00 | -15.76 | 400 | 137 |
| | 5 | 801.03 | 25.88 | 4.14 | 30.02 | 46.00 | -15.98 | 400 | 104 |
| * | 6 | 835.22 | 26.46 | 5.37 | 31.83 | 46.00 | -14.17 | 400 | 118 |
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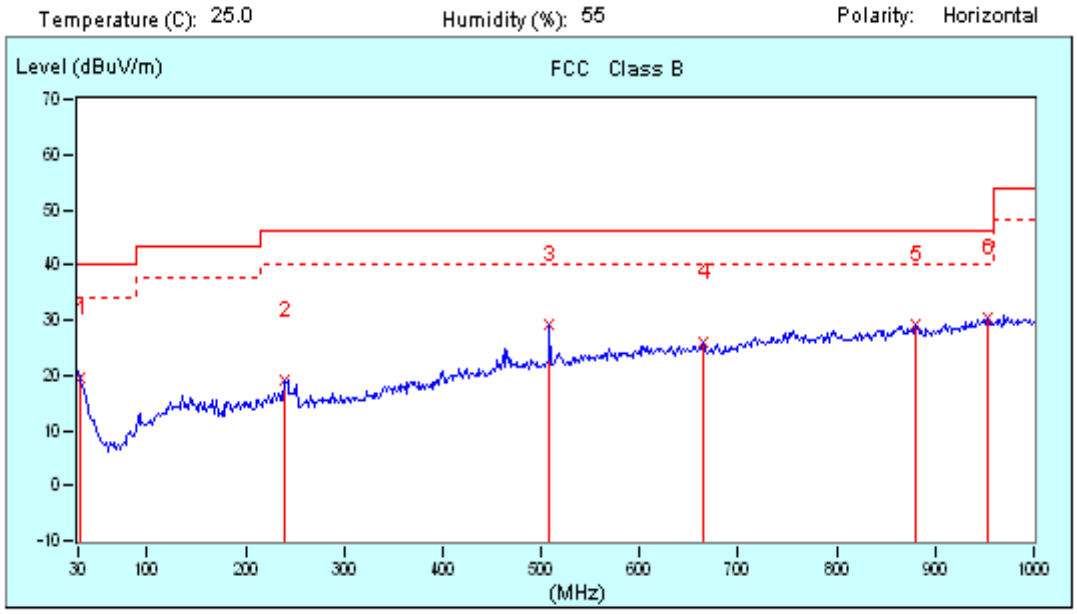
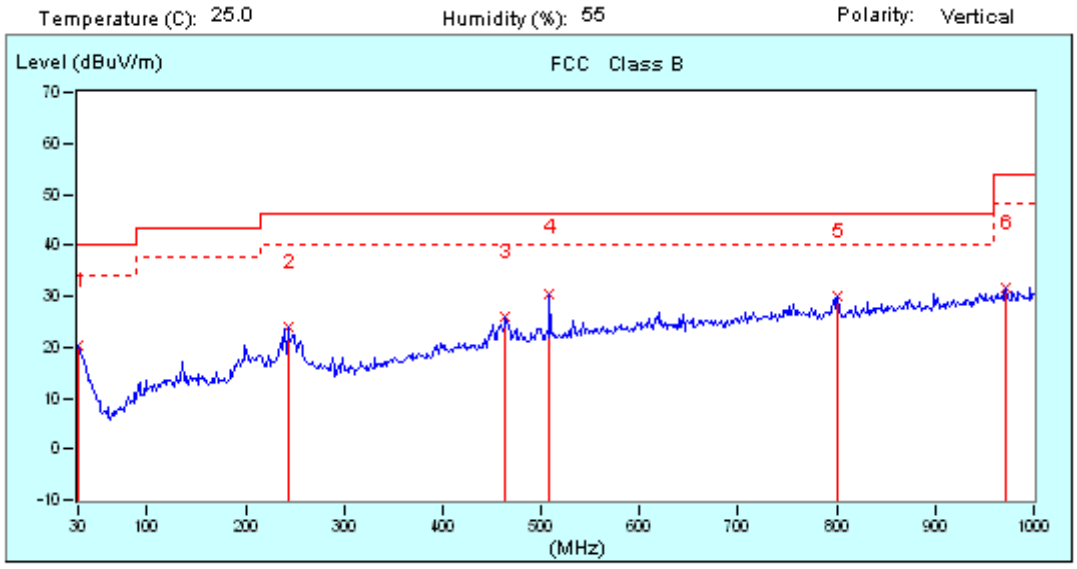
## BELOW 1GHz WORST-CASE DATA : High channel




| | No. | Frequency MHz | Factor dB/m | Reading dBuV | Emission dBuV/m | Limit dBuV/m | Margin dB | Tower / Table cm | deg |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 31.55 | 18.89 | 0.48 | 19.37 | 40.00 | -20.63 | 153 | 176 |
| | 2 | 239.86 | 12.45 | 6.68 | 19.13 | 46.00 | -26.87 | 189 | 212 |
| | 3 | 508.78 | 21.11 | 8.09 | 29.20 | 46.00 | -16.80 | 225 | 248 |
| | 4 | 664.23 | 23.66 | 2.35 | 26.01 | 46.00 | -19.99 | 100 | 0 |
| | 5 | 880.30 | 27.13 | 1.91 | 29.04 | 46.00 | -16.96 | 120 | 144 |
| * | 6 | 953.37 | 28.73 | 1.56 | 30.29 | 46.00 | -15.71 | 100 | 4 |




| No. | | Frequency | Factor | Reading | Emission | Limit | Margin | Tower / Table | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | cm | deg |
| | 1 | 30.00 | 19.44 | 0.89 | 20.33 | 40.00 | -19.67 | 367 | 352 |
| | 2 | 242.96 | 12.71 | 11.26 | 23.97 | 46.00 | -22.03 | 310 | 0 |
| | 3 | 463.70 | 20.37 | 5.47 | 25.84 | 46.00 | -20.16 | 100 | 102 |
| * | 4 | 508.78 | 21.11 | 9.35 | 30.46 | 46.00 | -15.54 | 288 | 346 |
| | 5 | 801.03 | 25.88 | 4.12 | 30.00 | 46.00 | -16.00 | 400 | 308 |
| | 6 | 972.02 | 29.00 | 2.57 | 31.57 | 54.00 | -22.43 | 400 | 286 |
| | | | | | | | | | |
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**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

## 4.2 CONDUCTED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 ~ 0.5 | 66 to 56 | 56 to 46 |
| 0.5 ~ 5 | 56 | 46 |
| 5 ~ 30 | 60 | 50 |

**NOTE**: 1.The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### 4.2.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|---|---|---|---|
| Test Receiver<br>ROHDE & SCHWARZ | ESCS30 | 100199 | May 25,11 | May 25,12 |
| Artificial Mains Network<br>ROHDE & SCHWARZ | ENV216 | 101173 | May 25,11 | May 25,12 |
| RF Cable<br>FUJIKURA | 3D-2W | 844 Cable | May 2,11 | May 2,12 |
| ISN<br>TESEQ | ISN T800 | 27957 | Oct 16,11 | Oct 16,12 |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA

2. The test was performed in Dongguan Shielded Room 1.

### 4.2.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

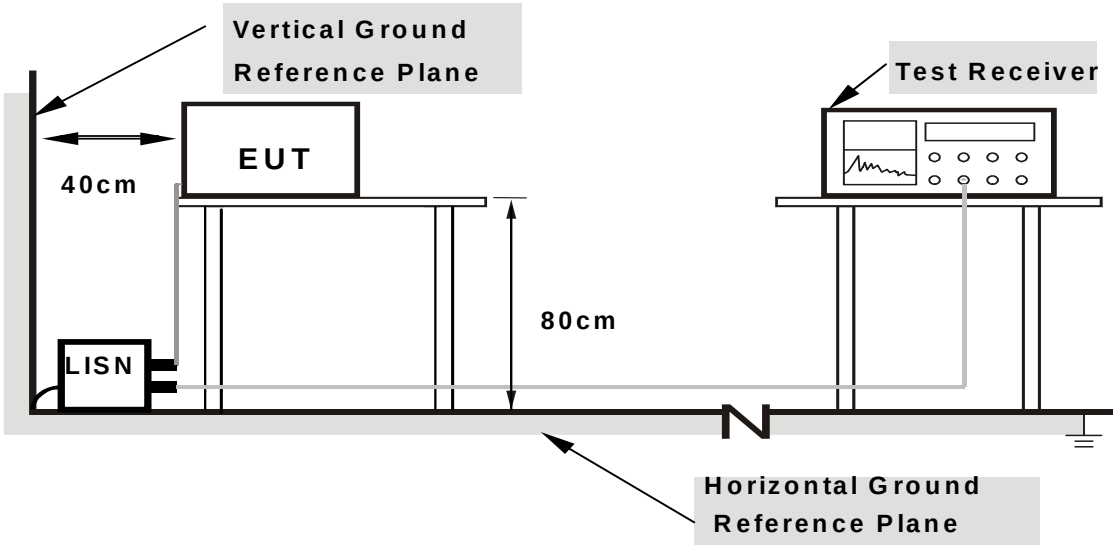
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

**NOTE:** 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




**Note: 1.Support units were connected to second LISN.**
**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

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

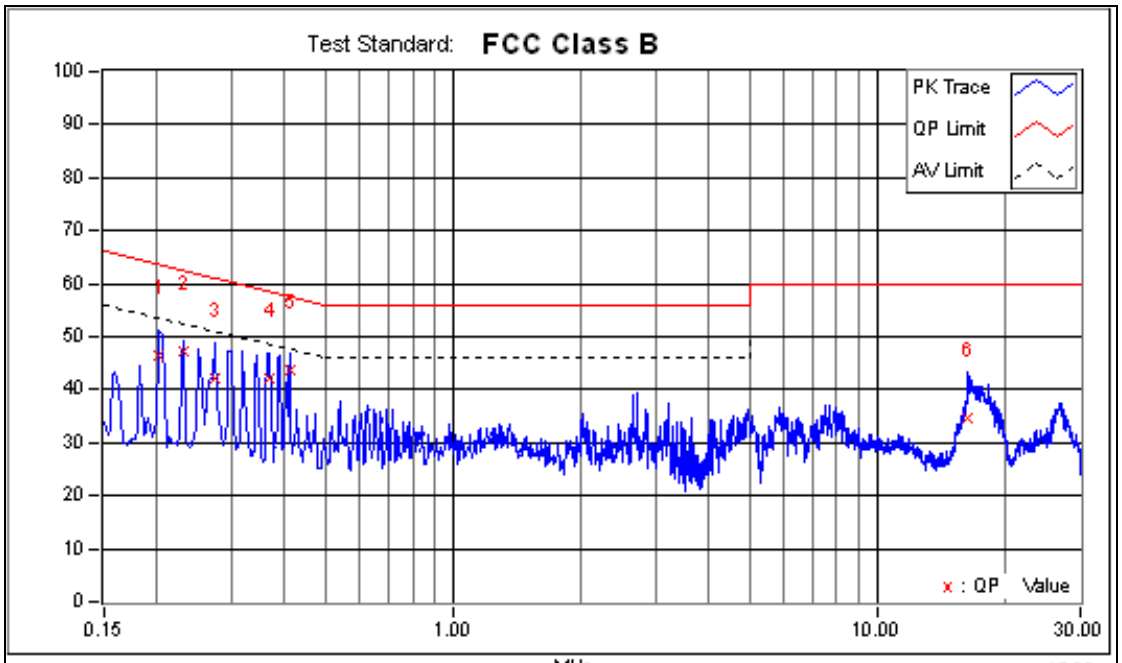
### 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

## 4.2.7 TEST RESULTS

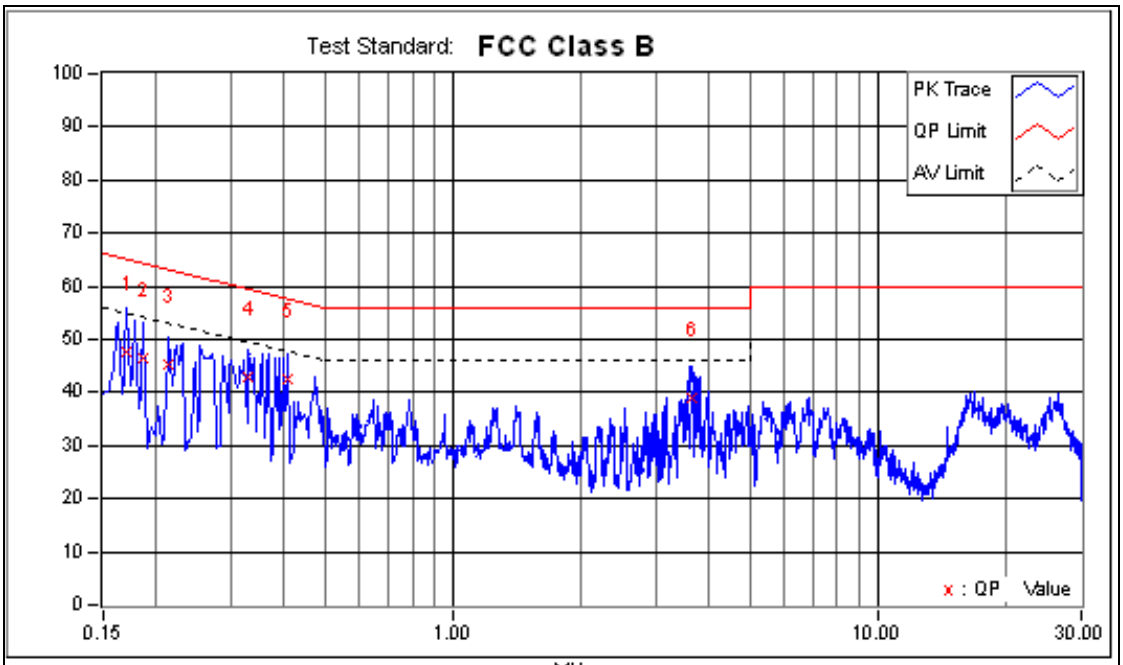
### CONDUCTED WORST-CASE DATA

| PHASE | Line 1 | 6dB BANDWIDTH | 9kHz |
|---|---|---|---|
| TEST MODE | Transmitting | | |




| | Frequency | Corr. Factor | Reading dBuV | | Emission dBuV | | Limit dBuV | | Margins dB | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | MHz | dB | QP | AV | QP | AV | QP | AV | QP | AV | Notes |
| 1 | 0.20201 | 9.64 | 36.99 | 15.71 | 46.63 | 25.35 | 63.53 | 53.53 | -16.90 | -28.18 | |
| 2 | 0.23000 | 9.62 | 37.60 | 17.63 | 47.22 | 27.25 | 62.45 | 52.45 | -15.23 | -25.20 | |
| 3 | 0.27400 | 9.58 | 32.42 | 16.06 | 42.00 | 25.64 | 61.00 | 51.00 | -18.99 | -25.35 | |
| 4 | 0.36600 | 9.51 | 32.81 | 13.18 | 42.32 | 22.69 | 58.59 | 48.59 | -16.27 | -25.90 | |
| +5 | 0.41035 | 9.48 | 34.32 | 15.76 | 43.80 | 25.24 | 57.64 | 47.64 | -13.84 | -22.40 | |
| 6 | 16.25000 | 10.75 | 23.72 | 14.94 | 34.47 | 25.69 | 60.00 | 50.00 | -25.53 | -24.31 | |

| PHASE | Line 2 | 6dB BANDWIDTH | 9kHz |
|---|---|---|---|
| TEST MODE | Transmitting | | |




| | Frequency | Corr. Factor | Reading dBuV | | Emission dBuV | | Limit dBuV | | Margins dB | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | MHz | dB | QP | AV | QP | AV | QP | AV | QP | AV | Notes |
| 1 | 0.17000 | 9.63 | 37.95 | 17.55 | 47.58 | 27.18 | 64.96 | 54.96 | -17.38 | -27.78 | |
| 2 | 0.18600 | 9.63 | 36.95 | 16.00 | 46.58 | 25.63 | 64.21 | 54.21 | -17.63 | -28.58 | |
| 3 | 0.21406 | 9.62 | 35.55 | 16.01 | 45.17 | 25.63 | 63.05 | 53.05 | -17.88 | -27.42 | |
| 4 | 0.33000 | 9.53 | 33.42 | 15.24 | 42.95 | 24.77 | 59.45 | 49.45 | -16.50 | -24.68 | |
| +5 | 0.40600 | 9.48 | 32.99 | 13.35 | 42.47 | 22.83 | 57.73 | 47.73 | -15.26 | -24.90 | |
| 6 | 3.65000 | 10.17 | 28.67 | 9.50 | 38.84 | 19.67 | 56.00 | 46.00 | -17.16 | -26.33 | |

**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

## 4.3 20dB BANDWIDTH MEASUREMENT

### 4.3.1 LIMITS OF 20dB BANDWIDTH MEASUREMENT

According to FCC 15.215(c), must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

### 4.3.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|---|---|---|---|
| Spectrum Analyzer Agilent | E4446A | MY46180622 | Apr. 25,11 | Apr. 25,12 |

**NOTE:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA

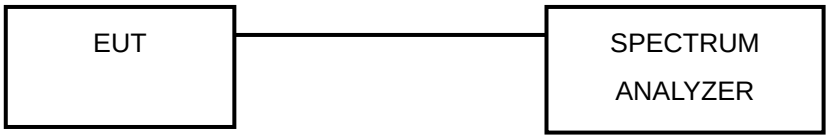
### 4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

### 4.3.5 TEST SETUP



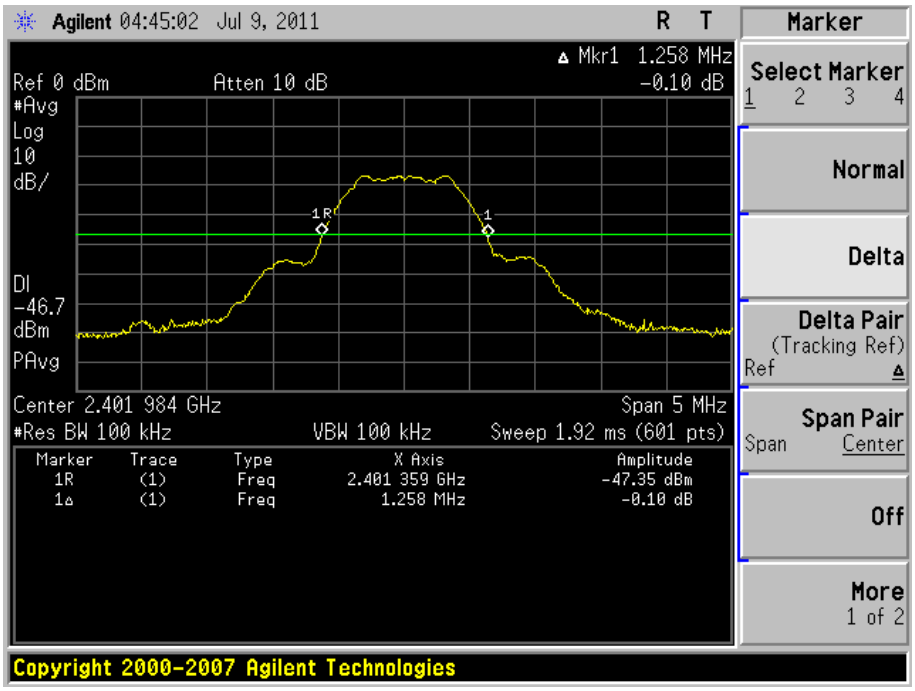

### 4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

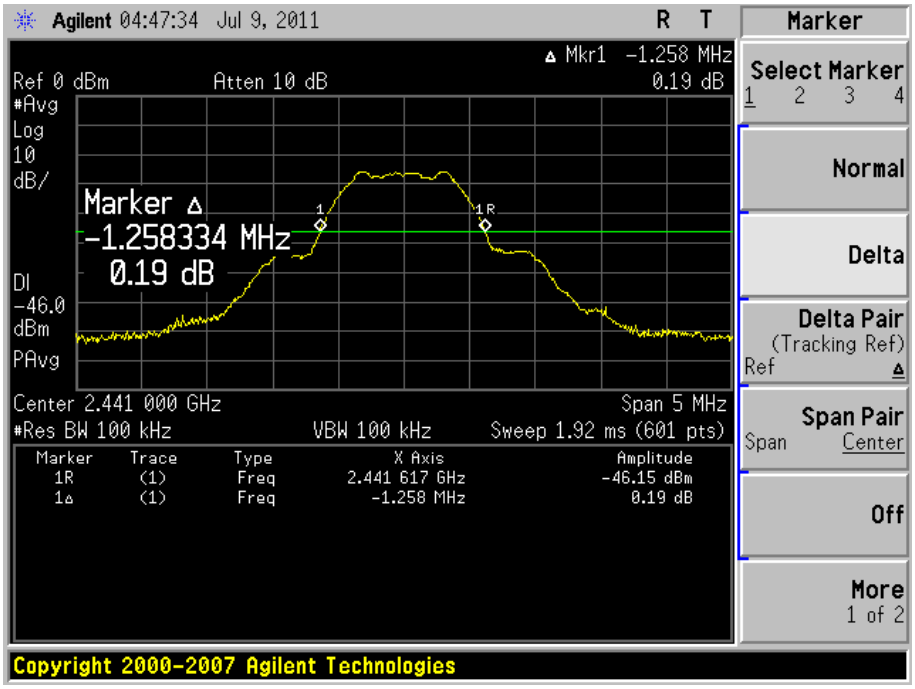
## 4.3.7 TEST RESULTS

| CHANNEL | CHANNEL FREQUENCY (MHz) | 20dB BANDWIDTH (MHz) |
|---|---|---|
| Low | 2402 | 1.258 |
| Middle | 2441 | 1.258 |
| Hight | 2480 | 1.275 |

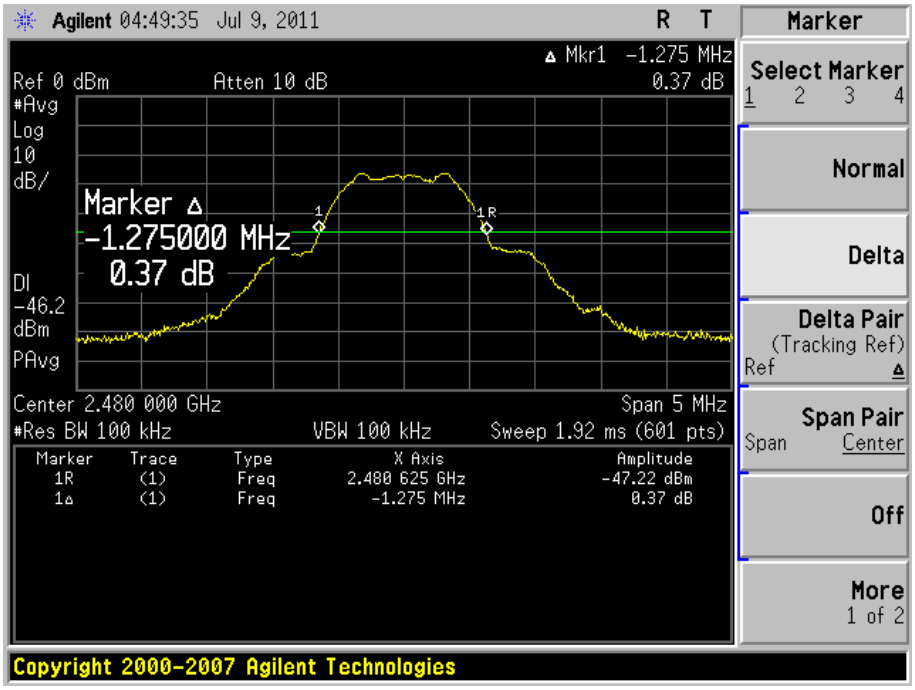
**Test Data:** Low channel



**Test Data:** Middle channel




**Test Data:** High channel



## 4.4 OUT OF BAND EMISSIONS

### 4.4.1 STANDARD APPLICABLE

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, whichever is the lesser attenuation.

### 4.4.2 TEST EQUIPMENT LIST AND DETAILS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|---|---|---|---|
| Spectrum Analyzer Agilent | E4446A | MY46180622 | Apr. 25,11 | Apr. 25,12 |

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

### 4.4.3 TEST PROCEDURE

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2438.5MHz, than mark the higher-level emission for comparing with the FCC rules.

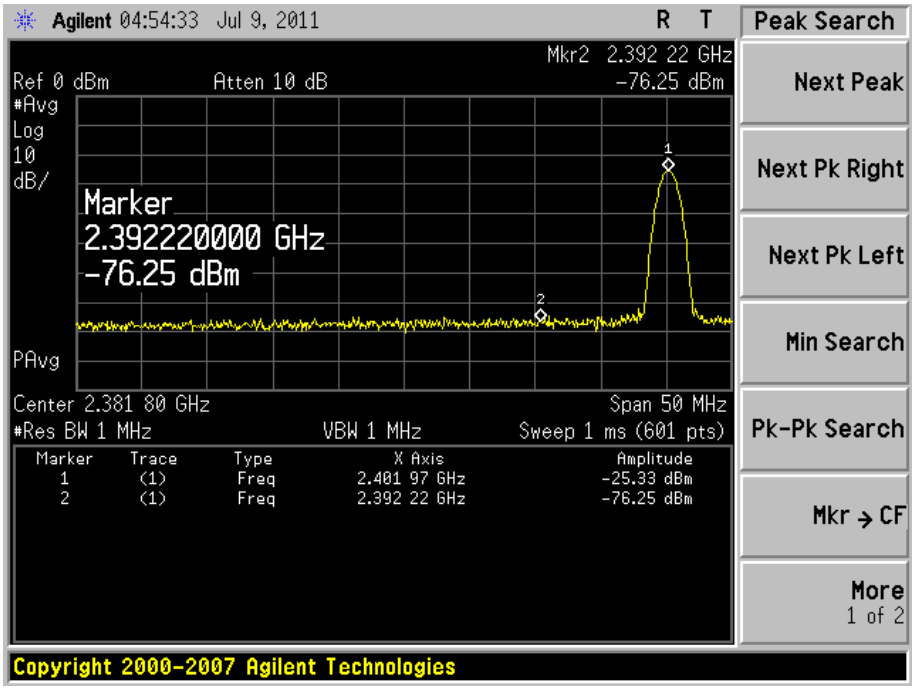
### 4.4.4 SUMMARY OF TEST RESULTS/PLOTS

| Frequency MHz | Limit dBuv | Result |
|---|---|---|
| Low Edge | <54 | Pass |
| High Edge | <54 | Pass |

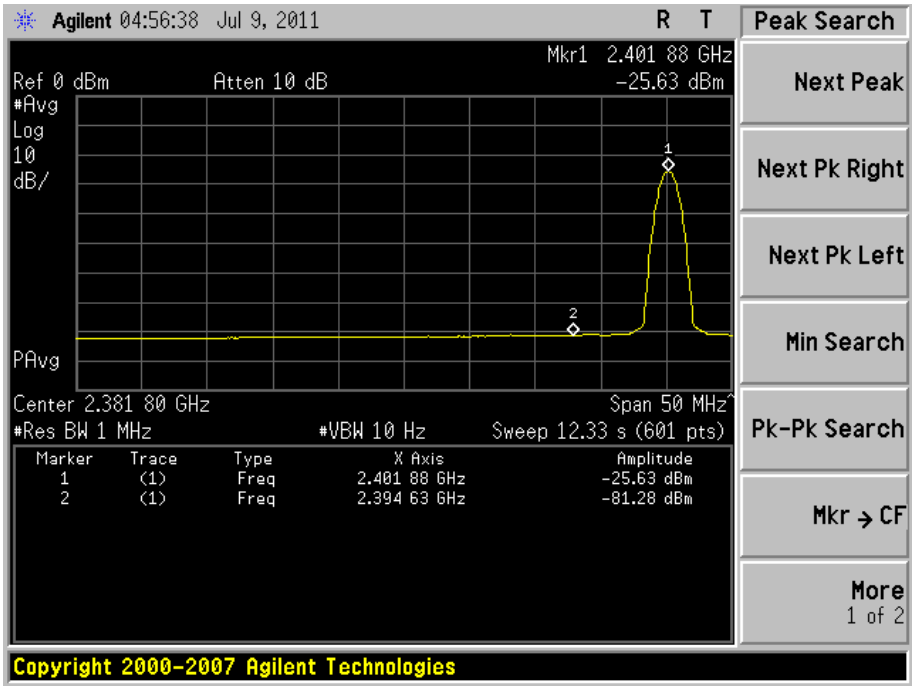
The edge emissions are shall be attenuated by at least 50 dB below the level of the fundamental.

Please refer to the test plots below.

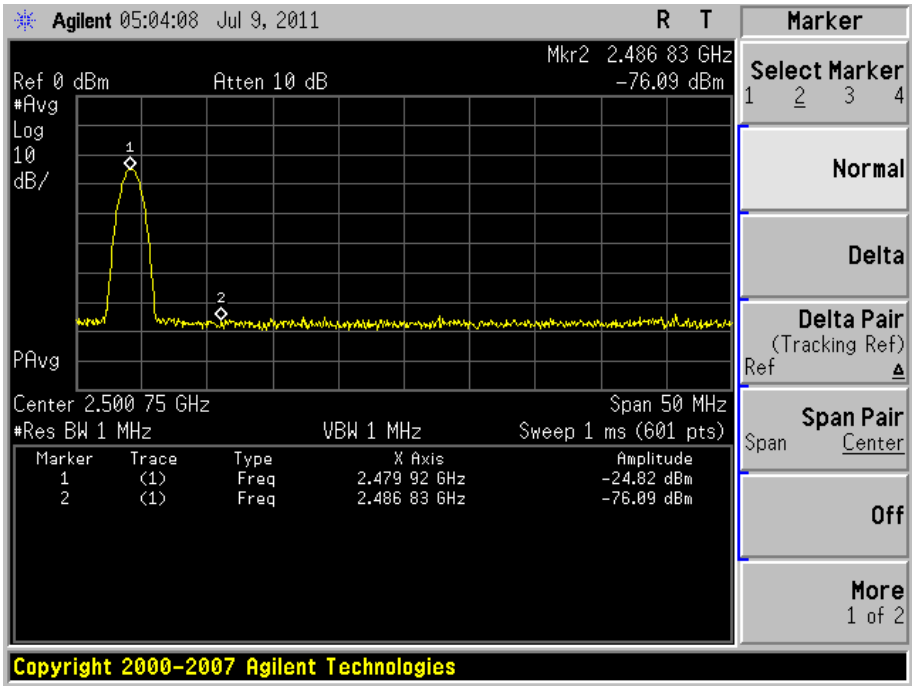
Lowest Bandedge：PK



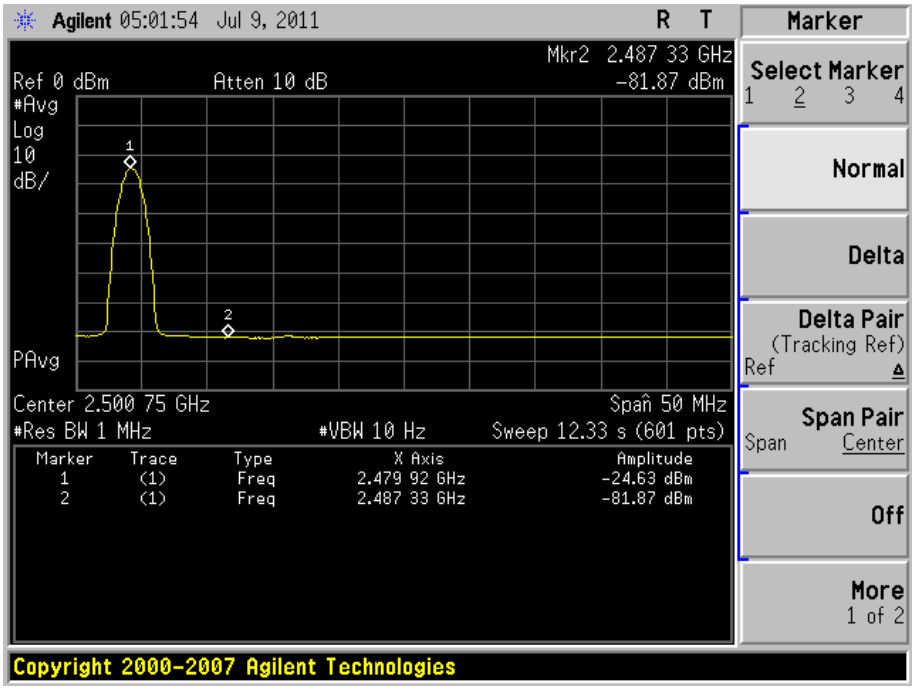

Lowest Bandedge：AV



Highest Bandedge：PK




Highest Bandedge：AV



# 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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

# 6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

**---END---**