
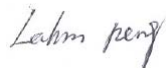



# FCC PART 15.249 MEASUREMENT AND TEST REPORT FOR

**Shenzhen Star Sources Electronic Technology Co., Ltd.**

**Room 2316, A Building Century Holiday Plaza, North Shennan RD, Nanshan  
District, Shenzhen, China**

**FCC ID: ZJEST-801**

|  |  |
|--|--|
| <b>Report Concerns:</b><br>Original Report | <b>Equipment Type:</b><br>2.4GHz Wireless Mouse  |
| <b>Model:</b>                              | <u>ST-801</u>  |
| <b>Report No.:</b>                         | <u>STR12048146I</u>  |
| <b>Test Date:</b>                          | <u>2012-04-17 to 2012-04-27</u>  |
| <b>Issue Date:</b>                         | <u>2012-05-04</u>  |
| <b>Tested By:</b>                          | <u>Jason Jiang / Engineer</u>   |
| <b>Reviewed By:</b>                        | <u>Lahm Peng / EMC Manager</u>    |
| <b>Approved &amp; Authorized By:</b>       | <u>Jandy so / PSQ Manager</u>   |
| <b>Prepared By:</b>                        | <p style="text-align: center;"><b>SEM.Test Compliance Service Co., Ltd</b><br/>                     3/F, Jinbao Commerce Building, Xin'an Fanshen Road,<br/>                     Bao'an District, Shenzhen, P.R.C. (518101)<br/>                     Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn</p> |

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

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## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: Shenzhen Star Sources Electronic Technology Co., Ltd.

Address of applicant: Room 2316, A Building Century Holiday Plaza, North Shennan RD, Nanshan District, Shenzhen, China

Manufacturer: Shenzhen Star Sources Electronic Technology Co., Ltd.

Address of manufacturer: Room 2316, A Building Century Holiday Plaza, North Shennan RD, Nanshan District, Shenzhen, China

#### General Description of E.U.T

| Items   | Description                   |
|---|-------------------------------|
| EUT Description:  | 2.4GHz Wireless Mouse         |
| Trade Name:   | /                             |
| Model No.:  | ST-801                        |
| Adding Models:  | ST-805, ST-806, ST-807,ST-809 |
| Rated Voltage:  | DC 3 V                        |
| Frequency Range:  | 2408-2474MHz                  |
| Antenna Type:   | Integral Antenna              |
| For more information refer to the circuit diagram form and the user's manual. |                               |

*The test data is gathered from a production sample, provided by the manufacturer. The others models listed in the report have different plastic case appearance and color of ST-801 without circuit and electronic construction changed, declared by the manufacturer.*

### 1.2 Test Standards

The following report is prepared on behalf of the Shenzhen Star Sources Electronic Technology Co., Ltd. in accordance with FCC Part 15, Subpart B, Subpart C, and section 15.107, 15.203, 15.205, 15.207, 15.209 and 15.249 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.107,15.203, 15.205, 15.207, 15.209 and 15.249 of the Federal Communication Commissions rules.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission, should be checked to ensure compliance has been maintained.

### 1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in

the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the Operating Instructions and let the EUT keep transmitting.

## 1.4 Test Facility

- **FCC – Registration No.: 994117**

SEM.Test Compliance Services Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 994117.

- **Industry Canada (IC) Registration No.: 7673A**

The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

- **CNAS Registration No.: L4062**

Shenzhen SEM.Test Electronics Service Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C (518101)

## 1.5 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components. The test software is started while the whole system is on.

## 1.6 Accessories Equipment List and Details

| Description | Manufacturer | Model | Serial Number |
|-------------|--------------|-------|---------------|
| /           | /            | /     | /             |

## 1.7 EUT Cable List and Details

| Cable Description | Length (M) | Shielded/Unshielded | With Core/Without Core |
|-------------------|------------|---------------------|------------------------|
| /                 | /          | /                   | /                      |

## 2. SUMMARY OF TEST RESULTS

| FCC RULES   | DESCRIPTION OF TEST          | RESULT    |
|-------------|------------------------------|-----------|
| §15.203     | Antenna Requirement          | Compliant |
| §15.207 (a) | Conducted Emission           | N/A       |
| §15.205     | Restricted Band of Operation | Compliant |
| §15.209     | Radiated Emission            | Compliant |
| §15.249 (a) | Field Strength               | Compliant |
| §15.249 (d) | Out of Band Emission         | Compliant |
| §15.215 (c) | Emission Bandwidth           | Compliant |

### **3. §15.203 - ANTENNA REQUIREMENT**

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#### **3.1 Standard Applicable**

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

#### **3.2 Test Result**

This product has an integral antenna, fulfill the requirement of this section.

## 4. §15.205, §15.209, §15.249 (a)- RADIATED EMISSION

### 4.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is  $\pm 5.10$  dB.

### 4.2 Standard Applicable

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 fundamental (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  |

(d) 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 in §15.209, whichever is the lesser attenuation.

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. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

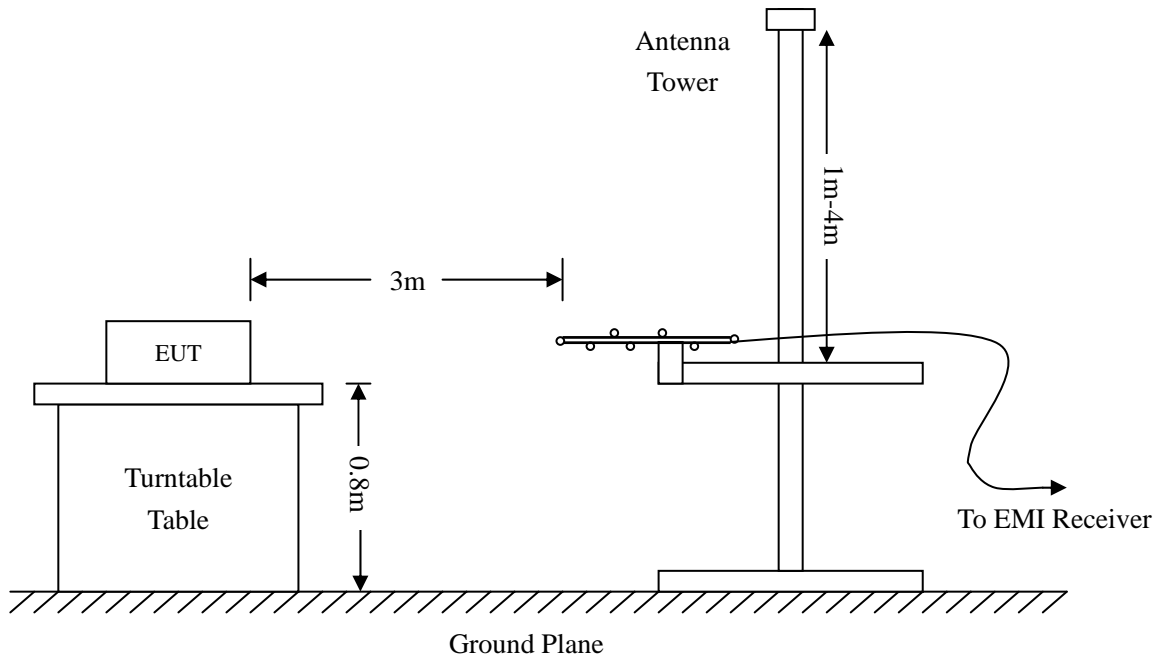
### 4.3 Test Equipment List and Details

| Description              | Manufacturer         | Model     | Serial Number | Cal. Date  | Due. Date  |
|--------------------------|----------------------|-----------|---------------|------------|------------|
| Spectrum Analyzer        | R&S                  | FSP       | 836079/035    | 2012-03-28 | 2013-03-27 |
| EMI Test Receiver        | R&S                  | ESVB      | 825471/005    | 2012-03-28 | 2013-03-27 |
| Pre-amplifier            | Agilent              | 8447F     | 3113A06717    | 2012-03-28 | 2013-03-27 |
| Pre-amplifier            | Compliance Direction | PAP-0118  | 24002         | 2012-03-28 | 2013-03-27 |
| Trilog Broadband Antenna | SCHWARZBECK          | VULB9163  | 9163-333      | 2012-02-25 | 2013-02-24 |
| Horn Antenna             | ETS                  | 3117      | 00086197      | 2012-02-25 | 2013-02-24 |
| Loop Antenna             | SCHWARZECK           | HFRA 5165 | 9365          | 2012-02-25 | 2013-02-24 |

### 4.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.249(a) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.



### 4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBµV means the emission is 6dBµV below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

### 4.6 Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 24 °C     |
| Relative Humidity: | 60 %      |
| ATM Pressure:      | 1012 mbar |



### 4.7 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.249 standards, and had the worst margin of:

**-6.20 dBμV at 180.6488 MHz in the Horizontal polarization, Low Channel, 9 kHz to 25 GHz, 3Meters**

*Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

#### Plot of Radiation Emissions Test

Radiated Disturbance

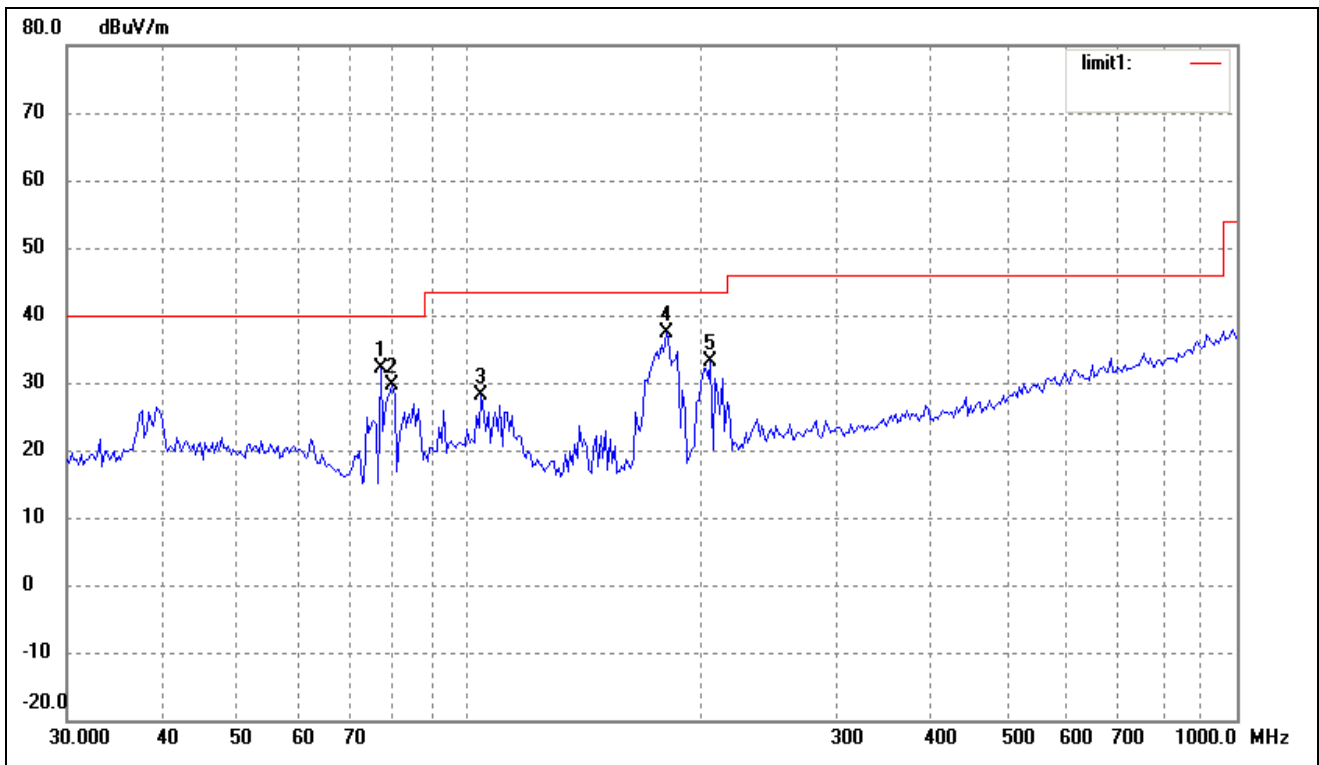
EUT: 2.4GHz Wireless Mouse

M/N: ST-801

Operating Condition: Transmitting below 1GHz(Low Channel 2408MHz)

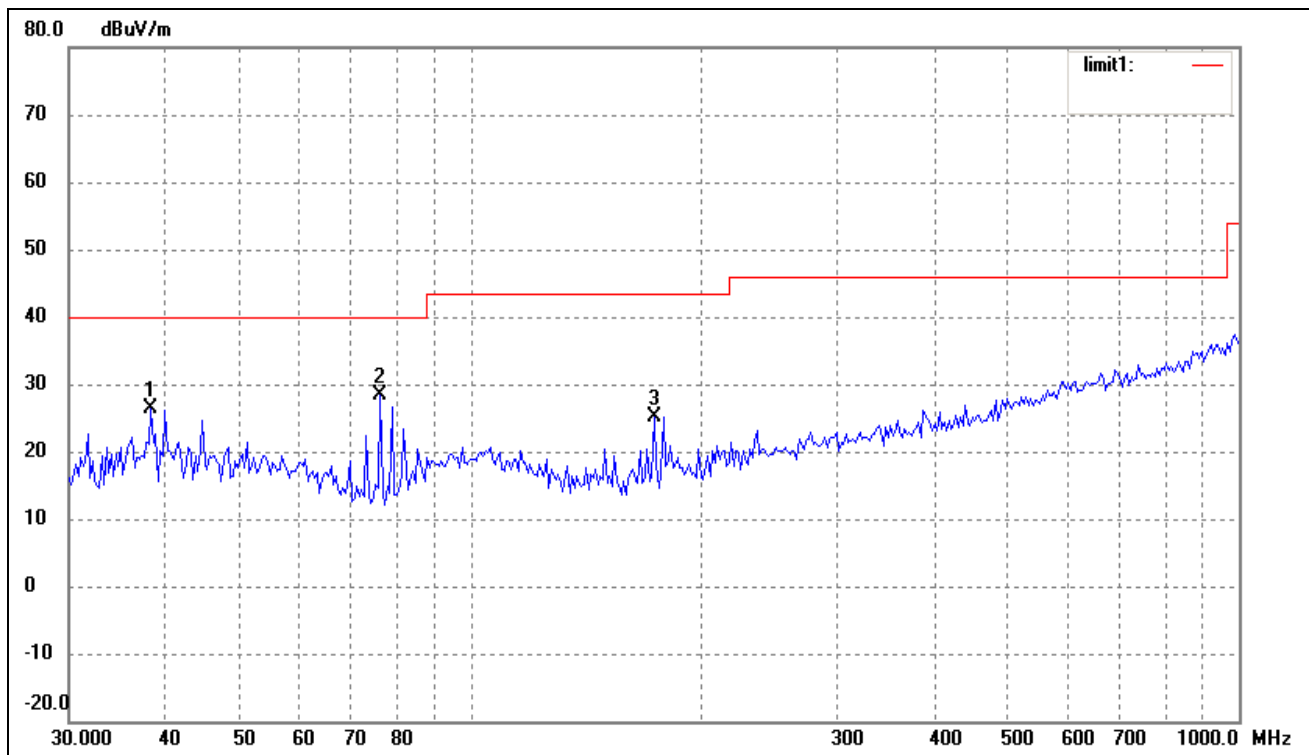
Test Specification: Horizontal & Vertical

Horizontal:



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (°) | Height (cm) | Remark |
|-----|-----------------|------------------|----------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1   | 76.7808         | 29.01            | 3.12           | 32.13           | 40.00          | -7.87       | 145        | 100         | peak   |
| 2   | 79.5209         | 26.11            | 3.55           | 29.66           | 40.00          | -10.34      | 96         | 100         | peak   |
| 3   | 103.8055        | 19.90            | 8.11           | 28.01           | 43.50          | -15.49      | 124        | 100         | peak   |
| 4   | 180.6488        | 31.60            | 5.70           | 37.30           | 43.50          | -6.20       | 254        | 100         | peak   |
| 5   | 206.3976        | 26.31            | 6.81           | 33.12           | 43.50          | -10.38      | 26         | 100         | peak   |

Vertical:



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (°) | Height (cm) | Remark |
|-----|-----------------|------------------|----------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1   | 38.3462         | 18.60            | 7.69           | 26.29           | 40.00          | -13.71      | 315        | 100         | peak   |
| 2   | 76.2442         | 25.37            | 3.04           | 28.41           | 40.00          | -11.59      | 76         | 100         | peak   |
| 3   | 173.2051        | 20.04            | 5.13           | 25.17           | 43.50          | -18.33      | 257        | 100         | peak   |

**Plot of Radiation Emissions Test**

*Radiated Disturbance*

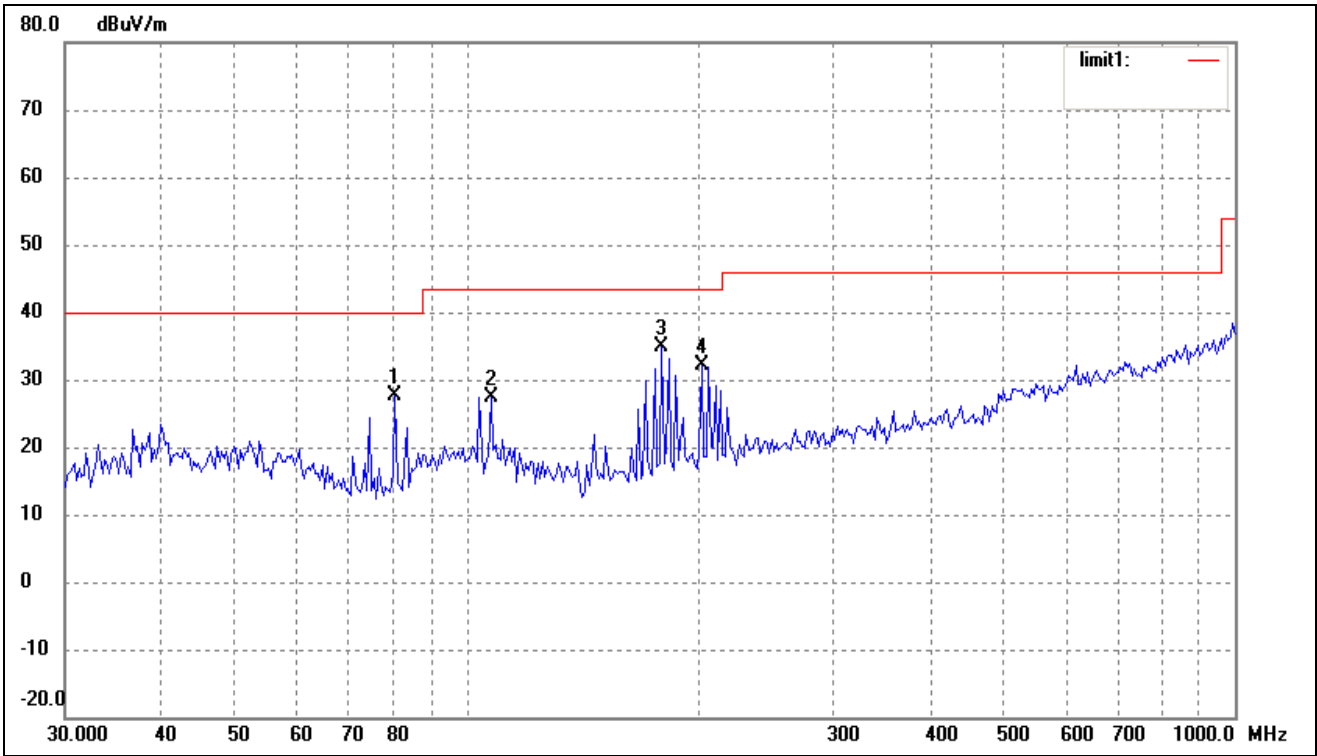
*EUT: 2.4GHz Wireless Mouse*

*M/N: ST-801*

*Operating Condition: Transmitting below 1GHz(Middle Channel 2440MHz)*

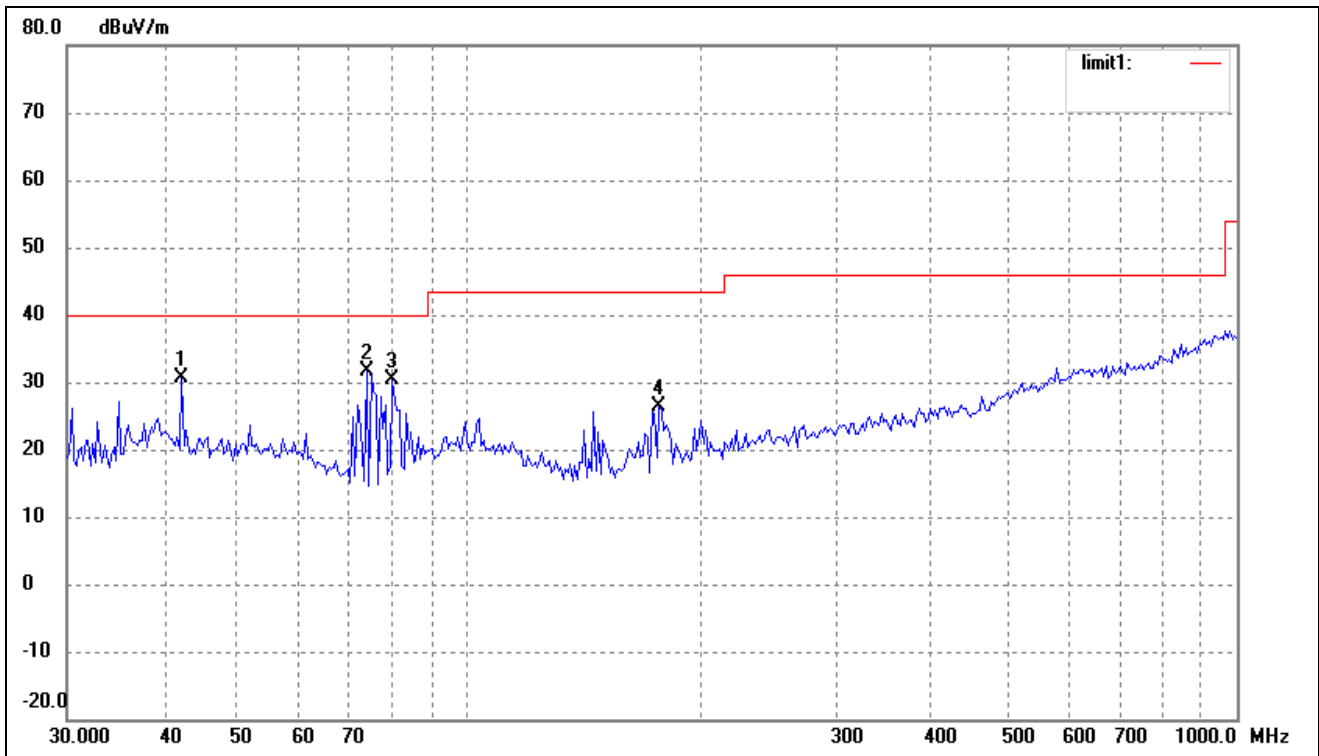
*Test Specification: Horizontal & Vertical*

*Horizontal:*



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (°) | Height (cm) | Remark |
|-----|-----------------|------------------|----------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1   | 80.6442         | 23.80            | 3.87           | 27.67           | 40.00          | -12.33      | 145        | 100         | peak   |
| 2   | 107.5101        | 19.70            | 7.80           | 27.50           | 43.50          | -16.00      | 96         | 100         | peak   |
| 3   | 179.3863        | 29.22            | 5.60           | 34.82           | 43.50          | -8.68       | 124        | 100         | peak   |
| 4   | 202.1005        | 25.35            | 6.66           | 32.01           | 43.50          | -11.49      | 254        | 100         | peak   |

Vertical:



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (°) | Height (cm) | Remark |
|-----|-----------------|------------------|----------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1   | 42.3022         | 22.52            | 8.18           | 30.70           | 40.00          | -9.30       | 315        | 100         | peak   |
| 2   | 73.6170         | 28.66            | 3.07           | 31.73           | 40.00          | -8.27       | 76         | 100         | peak   |
| 3   | 79.5209         | 26.86            | 3.55           | 30.41           | 40.00          | -9.59       | 257        | 100         | peak   |
| 4   | 176.8878        | 20.87            | 5.41           | 26.28           | 43.50          | -17.22      | 147        | 100         | peak   |

**Plot of Radiation Emissions Test**

Radiated Disturbance

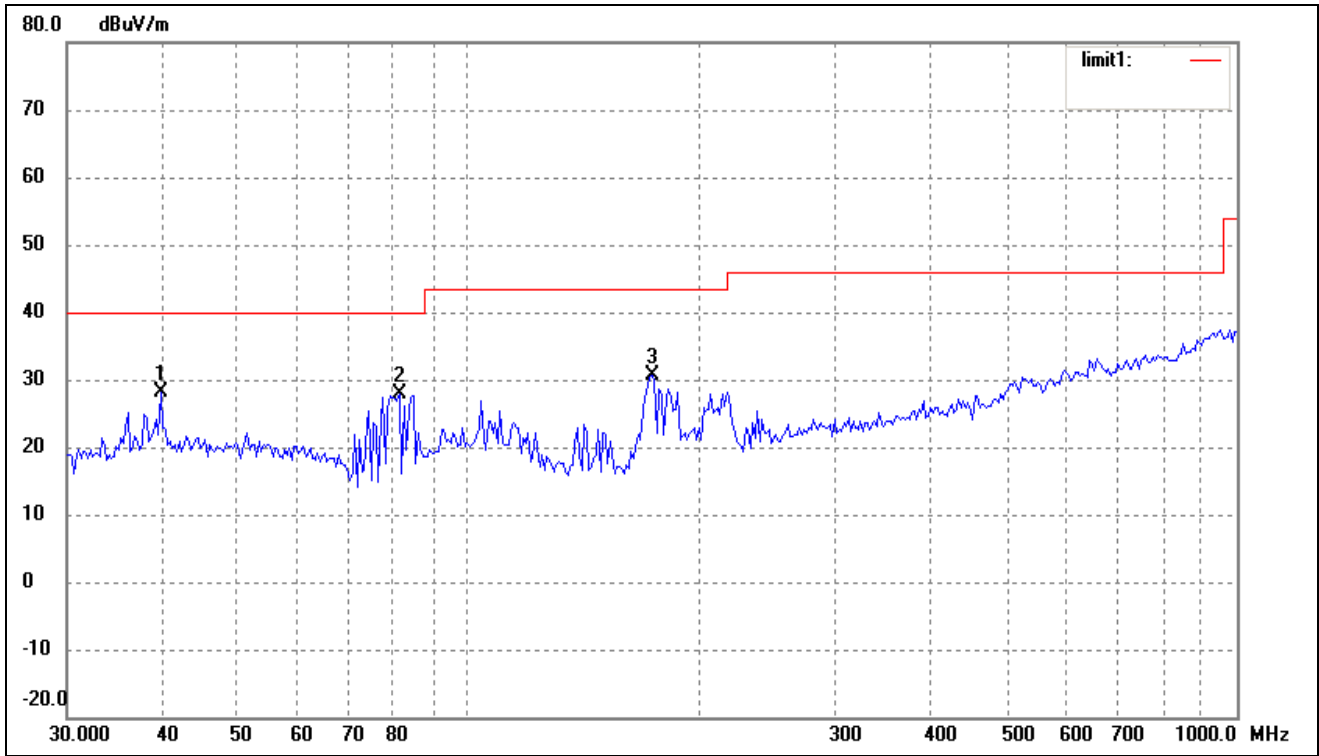
EUT: 2.4GHz Wireless Mouse

M/N: ST-801

Operating Condition: Transmitting below 1GHz(High Channel 2474MHz)

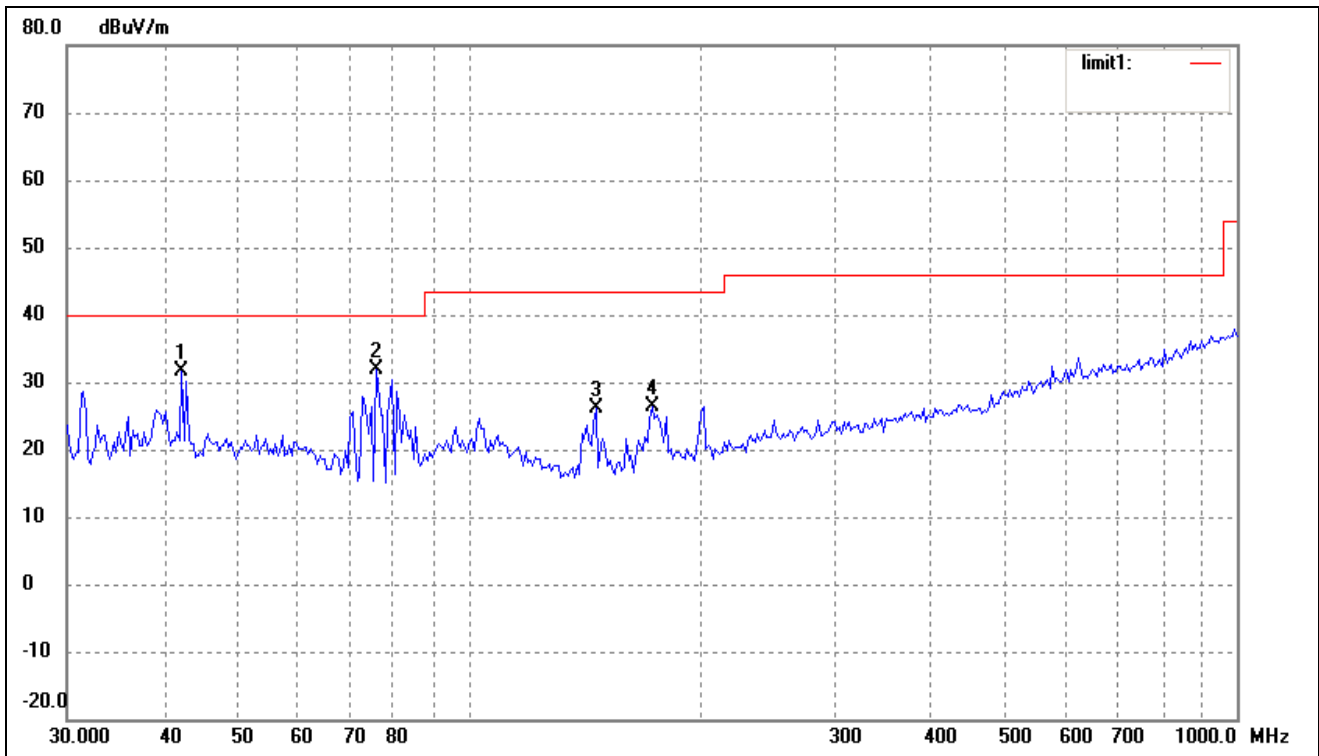
Test Specification: Horizontal & Vertical

Horizontal:



| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Correct<br>dB/m | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Degree<br>( ° ) | Height<br>(cm) | Remark |
|-----|--------------------|---------------------|-----------------|--------------------|-------------------|----------------|-----------------|----------------|--------|
| 1   | 39.7147            | 20.04               | 8.07            | 28.11              | 40.00             | -11.89         | 145             | 100            | peak   |
| 2   | 81.2117            | 23.85               | 4.07            | 27.92              | 40.00             | -12.08         | 96              | 100            | peak   |
| 3   | 173.2051           | 25.40               | 5.13            | 30.53              | 43.50             | -12.97         | 124             | 100            | peak   |

Vertical:



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (°) | Height (cm) | Remark |
|-----|-----------------|------------------|----------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1   | 42.3022         | 23.48            | 8.18           | 31.66           | 40.00          | -8.34       | 315        | 100         | peak   |
| 2   | 75.7114         | 28.84            | 2.96           | 31.80           | 40.00          | -8.20       | 76         | 100         | peak   |
| 3   | 146.3735        | 22.10            | 4.04           | 26.14           | 43.50          | -17.36      | 257        | 100         | peak   |
| 4   | 173.2051        | 21.21            | 5.13           | 26.34           | 43.50          | -17.16      | 147        | 100         | peak   |

Spurious Emission Above 1GHz

| Frequency MHz            | Detector | Meter Reading dBuV | Direction Degree | Polar H / V | Antenna Loss dB | Cable loss dB | Amplifier dB | Correction Amplitude dBuV/m | Limit dBuV/m | Margin dB |
|--------------------------|----------|--------------------|------------------|-------------|-----------------|---------------|--------------|-----------------------------|--------------|-----------|
| Low Channel (2408MHz)    |          |                    |                  |             |                 |               |              |                             |              |           |
| 2408.0                   | AV       | 61.85              | 45               | H           | 29.1            | 3.7           | 34.0         | 60.65                       | 94           | -33.35    |
| 2408.0                   | PK       | 78.34              | 78               | H           | 29.1            | 3.7           | 34.0         | 77.14                       | 114          | -36.86    |
| 4816.0                   | AV       | 24.37              | 57               | H           | 34.1            | 5.2           | 33.0         | 30.67                       | 54           | -23.33    |
| 4816.0                   | PK       | 43.54              | 65               | H           | 34.1            | 5.2           | 33.0         | 49.84                       | 74           | -24.16    |
| 7224.0                   | AV       | 22.83              | 60               | H           | 37.4            | 6.1           | 33.5         | 32.83                       | 54           | -21.17    |
| 7224.0                   | PK       | 34.34              | 256              | H           | 37.4            | 6.1           | 33.5         | 44.34                       | 74           | -29.66    |
| 2408.0                   | AV       | 59.19              | 359              | V           | 29.1            | 3.7           | 34.0         | 57.99                       | 94           | -36.01    |
| 2408.0                   | PK       | 75.38              | 44               | V           | 29.1            | 3.7           | 34.0         | 74.18                       | 114          | -39.82    |
| 4816.0                   | AV       | 22.45              | 35               | V           | 34.1            | 5.2           | 33.0         | 28.75                       | 54           | -25.25    |
| 4816.0                   | PK       | 39.75              | 98               | V           | 34.1            | 5.2           | 33.0         | 46.05                       | 74           | -27.95    |
| 7224.0                   | AV       | 21.56              | 79               | V           | 37.4            | 6.1           | 33.5         | 31.56                       | 54           | -22.44    |
| 7224.0                   | PK       | 32.88              | 185              | V           | 37.4            | 6.1           | 33.5         | 42.88                       | 74           | -31.12    |
| Middle Channel (2440MHz) |          |                    |                  |             |                 |               |              |                             |              |           |
| 2440.0                   | AV       | 61.09              | 34               | H           | 29.1            | 3.7           | 34           | 59.89                       | 94           | -34.11    |
| 2440.0                   | PK       | 77.96              | 159              | H           | 29.1            | 3.7           | 34           | 76.76                       | 114          | -37.24    |
| 4880.0                   | AV       | 27.30              | 341              | H           | 34.1            | 5.2           | 33           | 33.60                       | 54           | -20.40    |
| 4880.0                   | PK       | 45.95              | 28               | H           | 34.1            | 5.2           | 33           | 52.25                       | 74           | -21.75    |
| 7320.0                   | AV       | 22.63              | 91               | H           | 37.4            | 6.1           | 33.5         | 32.63                       | 54           | -21.37    |
| 7320.0                   | PK       | 34.38              | 267              | H           | 37.4            | 6.1           | 33.5         | 44.38                       | 74           | -29.62    |
| 2440.0                   | AV       | 54.29              | 33               | V           | 29.1            | 3.7           | 34           | 53.09                       | 94           | -40.91    |
| 2440.0                   | PK       | 72.80              | 164              | V           | 29.1            | 3.7           | 34           | 71.60                       | 114          | -42.40    |
| 4880.0                   | AV       | 23.22              | 24               | V           | 34.1            | 5.2           | 33           | 29.52                       | 54           | -24.48    |
| 4880.0                   | PK       | 37.83              | 177              | V           | 34.1            | 5.2           | 33           | 44.13                       | 74           | -29.87    |
| 7320.0                   | AV       | 21.33              | 325              | V           | 37.4            | 6.1           | 33.5         | 31.33                       | 54           | -22.67    |
| 7320.0                   | PK       | 33.31              | 77               | V           | 37.4            | 6.1           | 33.5         | 43.31                       | 74           | -30.69    |

| High Channel (2474MHz) |    |       |     |   |      |     |      |       |     |        |
|------------------------|----|-------|-----|---|------|-----|------|-------|-----|--------|
| 2474.0                 | AV | 63.63 | 63  | H | 29.1 | 3.7 | 34.0 | 62.43 | 94  | -31.57 |
| 2474.0                 | PK | 78.13 | 85  | H | 29.1 | 3.7 | 34.0 | 76.93 | 114 | -37.07 |
| 4948.0                 | AV | 27.22 | 17  | H | 34.1 | 5.2 | 33.0 | 33.52 | 54  | -20.48 |
| 4948.0                 | PK | 45.32 | 50  | H | 34.1 | 5.2 | 33.0 | 51.62 | 74  | -22.38 |
| 7422.0                 | AV | 22.19 | 355 | H | 37.4 | 6.1 | 33.5 | 32.19 | 54  | -21.81 |
| 7422.0                 | PK | 34.41 | 269 | H | 37.4 | 6.1 | 33.5 | 44.41 | 74  | -29.59 |
| 2474.0                 | AV | 59.70 | 85  | V | 29.1 | 3.7 | 34.0 | 58.50 | 94  | -35.50 |
| 2474.0                 | PK | 76.93 | 55  | V | 29.1 | 3.7 | 34.0 | 75.73 | 114 | -38.27 |
| 4948.0                 | AV | 23.45 | 13  | V | 34.1 | 5.2 | 33.0 | 29.75 | 54  | -24.25 |
| 4948.0                 | PK | 36.92 | 59  | V | 34.1 | 5.2 | 33.0 | 43.22 | 74  | -30.78 |
| 7422.0                 | AV | 22.19 | 66  | V | 37.4 | 6.1 | 33.5 | 32.19 | 54  | -21.81 |
| 7422.0                 | PK | 34.17 | 64  | V | 37.4 | 6.1 | 33.5 | 44.17 | 74  | -29.83 |

*Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 5<sup>th</sup> Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured. The measurements greater than 20dB below the limit from 9kHz to 30MHz..*



## 5. §15.249(b) OUT OF BAND EMISSIONS

### 5.1 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 or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

### 5.2 Test Equipment List and Details

| Description              | Manufacturer         | Model    | Serial Number | Cal. Date  | Due. Date  |
|--------------------------|----------------------|----------|---------------|------------|------------|
| Spectrum Analyzer        | R&S                  | FSP      | 836079/035    | 2012-03-28 | 2013-03-27 |
| EMI Test Receiver        | R&S                  | ESVB     | 825471/005    | 2012-03-28 | 2013-03-27 |
| Pre-amplifier            | Agilent              | 8447F    | 3113A06717    | 2012-03-28 | 2013-03-27 |
| Pre-amplifier            | Compliance Direction | PAP-0118 | 24002         | 2012-03-28 | 2013-03-27 |
| Trilog Broadband Antenna | SCHWARZBECK          | VULB9163 | 9163-333      | 2012-02-25 | 2013-02-24 |
| Horn Antenna             | ETS                  | 3117     | 00086197      | 2012-02-25 | 2013-02-24 |

### 5.3 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2483.5MHz, than mark the higher-level emission for comparing with the FCC rules.

### 5.4 Environmental Conditions

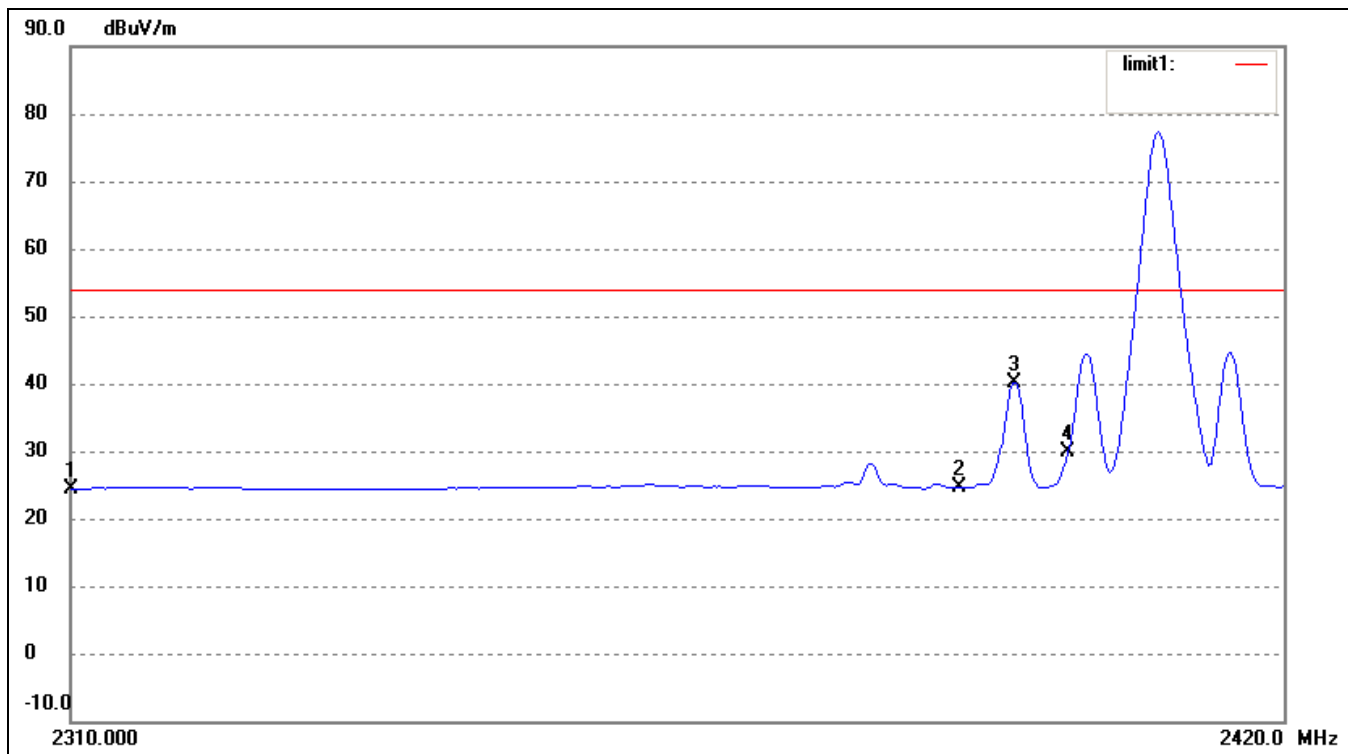
|                    |           |
|--------------------|-----------|
| Temperature:       | 24 °C     |
| Relative Humidity: | 60 %      |
| ATM Pressure:      | 1012 mbar |

### 5.5 Summary of Test Results/Plots

| Frequency MHz | Limit dBuV | Result |
|---------------|------------|--------|
| 2310.000      | <54dBuV    | Pass   |
| 2390.000      | <54dBuV    | Pass   |
| 2395.136      | <54dBuV    | Pass   |
| 2400.000      | <54dBuV    | Pass   |
| 2483.500      | <54dBuV    | Pass   |
| 2500.000      | <54dBuV    | Pass   |

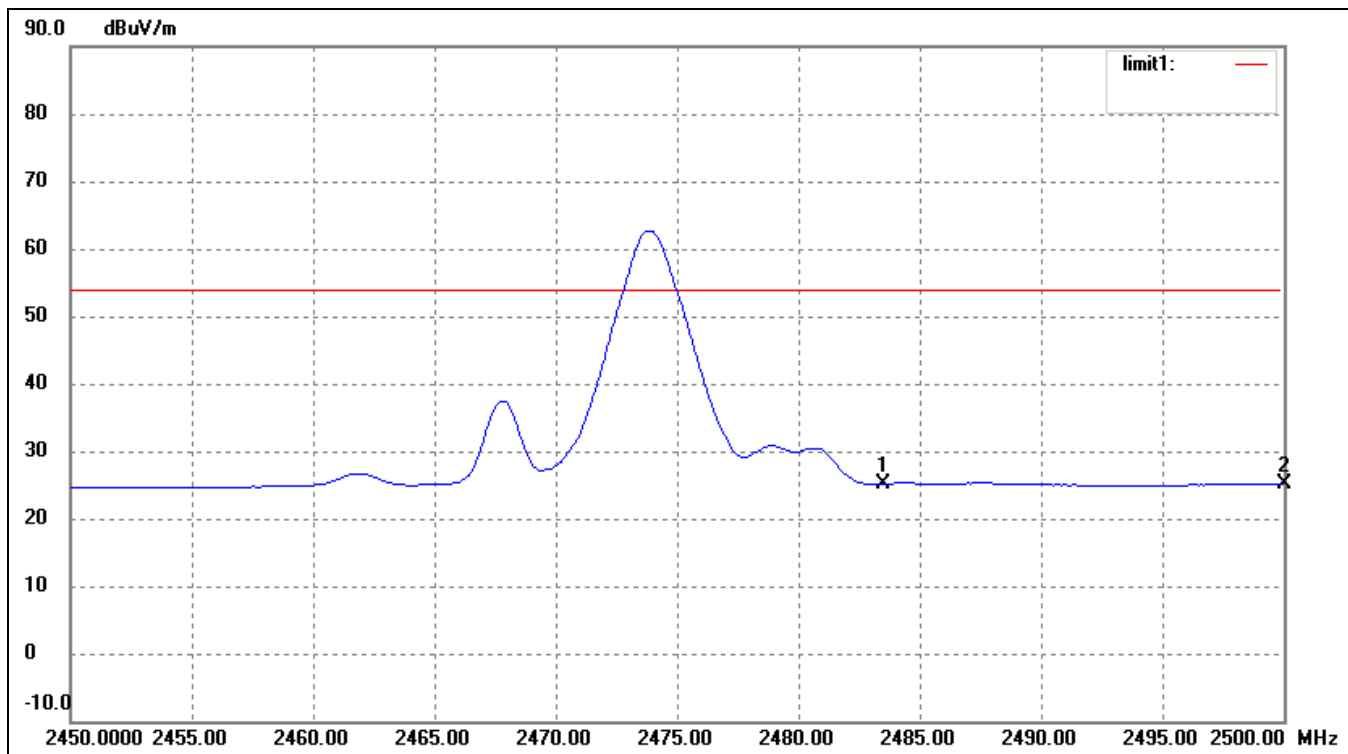
The edge emissions are below the FCC 15.209 Limits. Please refer to the test plots below.

Lowest Bandedge



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark        |
|-----|-----------------|------------------|----------------|-----------------|----------------|-------------|---------------|
| 1   | 2310.000        | 32.01            | -7.51          | 24.50           | 54.00          | -29.50      | Ave Detector  |
|     | 2310.000        | 41.91            | -7.51          | 34.40           | 74.00          | -39.60      | Peak Detector |
| 2   | 2390.000        | 32.02            | -7.34          | 24.68           | 54.00          | -29.32      | Ave Detector  |
|     | 2390.000        | 41.98            | -7.34          | 34.64           | 74.00          | -39.36      | Peak Detector |
| 3   | 2395.136        | 47.42            | -7.32          | 40.10           | 54.00          | -13.90      | Ave Detector  |
|     | 2395.136        | 51.51            | -7.32          | 44.19           | 74.00          | -29.81      | Peak Detector |
| 4   | 2400.000        | 37.12            | -7.31          | 29.81           | 54.00          | -24.19      | Ave Detector  |
|     | 2400.000        | 45.66            | -7.31          | 38.35           | 74.00          | -35.65      | Peak Detector |

Highest Bandedge



| No. | Frequency (MHz) | Reading (dBuV/m) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark        |
|-----|-----------------|------------------|----------------|-----------------|----------------|-------------|---------------|
| 1   | 2483.500        | 32.25            | -7.13          | 25.12           | 54.00          | -28.88      | Ave Detector  |
|     | 2483.500        | 46.37            | -7.13          | 39.24           | 74.00          | -34.76      | Peak Detector |
| 2   | 2500.000        | 32.14            | -7.08          | 25.06           | 54.00          | -28.94      | Ave Detector  |
|     | 2500.000        | 45.62            | -7.08          | 38.54           | 74.00          | -35.46      | Peak Detector |

## 6. Emission Bandwidth

### 6.1 Standard Applicable

According to 15.215 (c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, 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. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

### 6.2 Test Equipment List and Details

| Description       | Manufacturer | Model       | Serial Number | Cal. Date  | Due. Date  |
|-------------------|--------------|-------------|---------------|------------|------------|
| Spectrum Analyzer | Agilent      | E4402B      | US41192821    | 2012-03-28 | 2013-03-27 |
| Attenuator        | ATTEN        | ATS100-4-20 | /             | 2012-03-28 | 2013-03-27 |

### 6.3 Test Procedure

According to the ANSI 63.4-2003, the emission bandwidth test method as follows.

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Set span = 1MHz, centered on a transmitting channel

RBW  $\geq$ 1% 20dB Bandwidth, VBW  $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down and 99% bandwidth of the emission.

### 6.4 Environmental Conditions

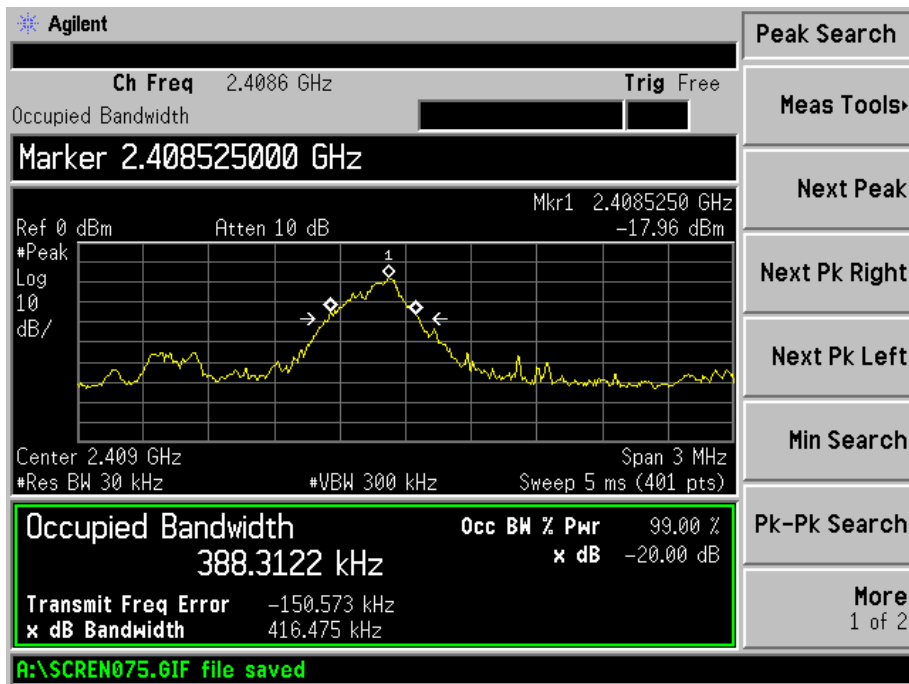
|                    |           |
|--------------------|-----------|
| Temperature:       | 25 °C     |
| Relative Humidity: | 53%       |
| ATM Pressure:      | 1018 mbar |

### 6.5 Summary of Test Results/Plots

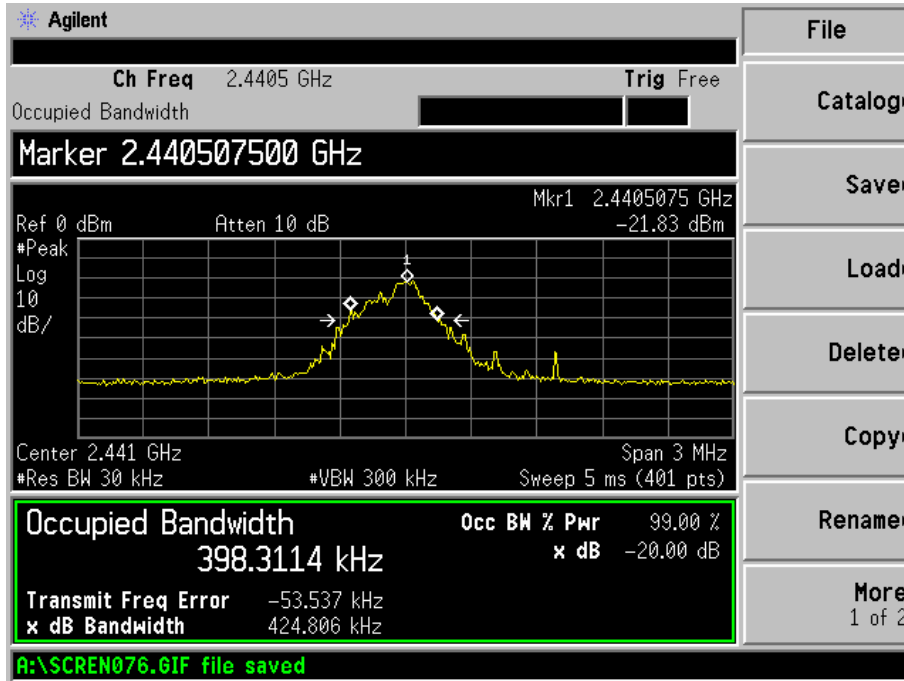
| Channel        | Frequency MHz | 20dB Bandwidth kHz | 99% Bandwidth kHz |
|----------------|---------------|--------------------|-------------------|
| Low Channel    | 2402          | 416.475            | 388.3122          |
| Middle Channel | 2442          | 424.806            | 398.3114          |
| High Channel   | 2477          | 394.732            | 376.4410          |

Please refer to the following test plots

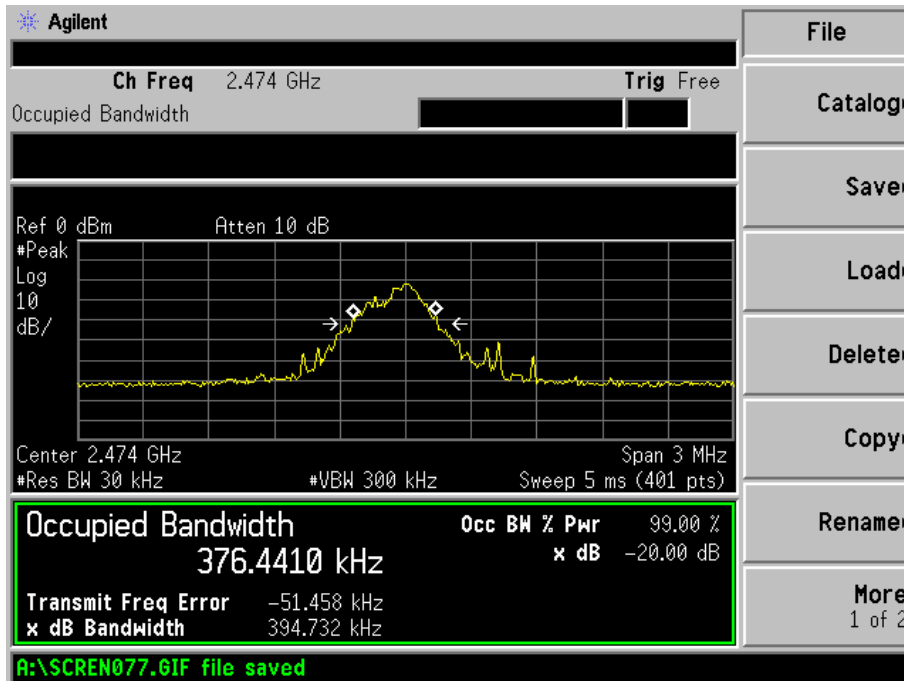
Low Channel:



Middle Channel:



High Channel:



\*\*\*\*\* END OF REPORT \*\*\*\*\*