

# FCC Test Report

|              |                                   |
|--------------|-----------------------------------|
| Product Name | ASUS WT425 Wireless Optical Mouse |
| Model No.    | WT425M                            |
| FCC ID       | UC3WT425M                         |

|           |                                                               |
|-----------|---------------------------------------------------------------|
| Applicant | Intech Electronics Corp.                                      |
| Address   | Haill B3, Yuan-Hu Industry Park, Golf Blvd.,Taiwan City China |

|                 |                     |
|-----------------|---------------------|
| Date of Receipt | Jan. 05, 2015       |
| Issued Date     | Feb. 05, 2015       |
| Report No.      | 1510122R-RFUSP15V00 |
| Report Version  | V1.0                |



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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# Test Report

Issued Date: Feb. 05, 2015

Report No.: 1510122R-RFUSP15V00



|                     |                                                                                 |
|---------------------|---------------------------------------------------------------------------------|
| Product Name        | ASUS WT425 Wireless Optical Mouse                                               |
| Applicant           | Intech Electronics Corp.                                                        |
| Address             | Hail B3, Yuan-Hu Industry Park, Golf Blvd., Taiwan City China                   |
| Manufacturer        | Intech Electronics Corp.                                                        |
| Model No.           | WT425M                                                                          |
| EUT Rated Voltage   | DC 1.5V (Power by battery)                                                      |
| EUT Test Voltage    | DC 1.5V (Power by battery)                                                      |
| Trade Name          | ASUS                                                                            |
| Applicable Standard | FCC CFR Title 47 Part 15 Subpart C: 2013<br>ANSI C63.4: 2014, ANSI C63.10: 2013 |
| Test Result         | Complied                                                                        |

Documented By :

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( Engineer / Benjamin Pan )

Approved By :

*Vincent Lin*

( Director / Vincent Lin )

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

## 1. GENERAL INFORMATION

### 1.1. EUT Description

|                    |                                   |
|--------------------|-----------------------------------|
| Product Name       | ASUS WT425 Wireless Optical Mouse |
| Trade Name         | ASUS                              |
| Model No.          | WT425M                            |
| FCC ID             | UC3WT425M                         |
| Frequency Range    | 2402~2480MHz                      |
| Channel Number     | 16                                |
| Type of Modulation | GFSK                              |
| Channel Control    | Auto                              |
| Antenna Type       | PCB Antenna                       |
| Antenna Gain       | Refer to the table "Antenna List" |

#### Antenna List

| No. | Manufacturer | Part No. | Peak Gain          |
|-----|--------------|----------|--------------------|
| 1   | ASUS         | N/A      | 1.8dBi for 2.4 GHz |

Note: The antenna of EUT is conform to FCC 15.203

### Frequency of Each Channel

| Channel     | Frequency | Channel     | Frequency | Channel     | Frequency | Channel     | Frequency |
|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|
| Channel 01: | 2402 MHz  | Channel 02: | 2426 MHz  | Channel 03: | 2441 MHz  | Channel 04: | 2463 MHz  |
| Channel 05: | 2407 MHz  | Channel 06: | 2422 MHz  | Channel 07: | 2445MHz   | Channel 08: | 2466 MHz  |
| Channel 09: | 2414 MHz  | Channel 10: | 2436 MHz  | Channel 11: | 2459MHz   | Channel 12: | 2473 MHz  |
| Channel 13: | 2419 MHz  | Channel 14: | 2439 MHz  | Channel 15: | 2453 MHz  | Channel 16: | 2480 MHz  |

Note:

1. The EUT is a ASUS WT425 Wireless Optical Mouse with a built-in 2.4GHz transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. These tests are conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.249 for spread spectrum devices.

|           |                  |
|-----------|------------------|
| Test Mode | Mode 1: Transmit |
|-----------|------------------|

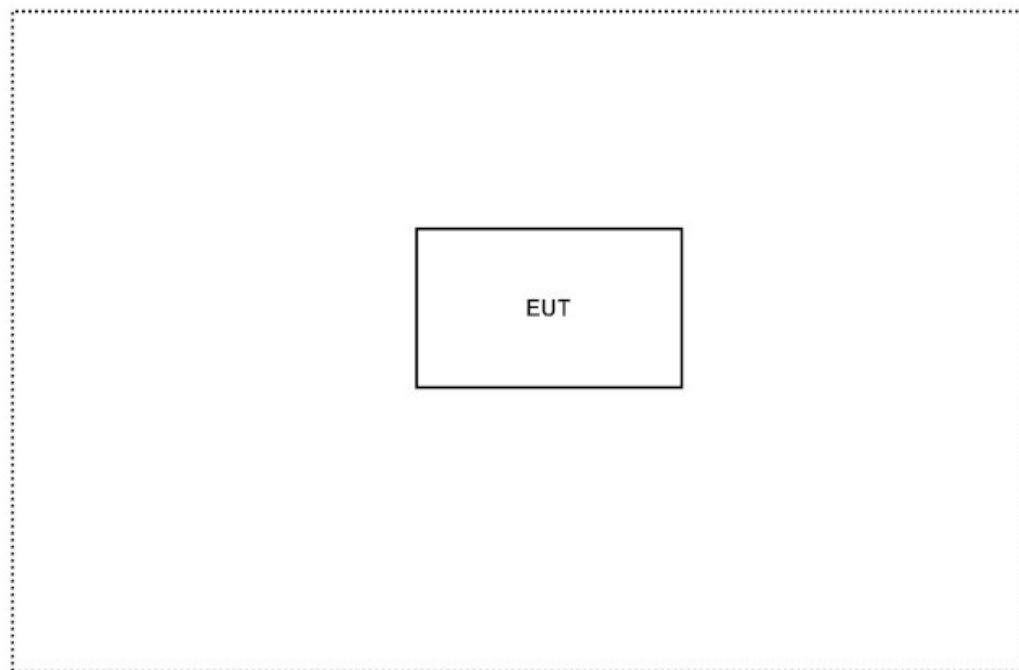
### 1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

| Product | Manufacturer | Model No. | Serial No. | Power Cord |
|---------|--------------|-----------|------------|------------|
| N/A     |              |           |            |            |

| Signal Cable Type | Signal cable Description |
|-------------------|--------------------------|
| N/A               |                          |

### 1.4. Configuration of Test System



### 1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4.
- (2) Press the EUT button.
- (3) Configure the test mode and the test channel.
- (4) Start the continuous Transmit.
- (5) Verify that the EUT works properly.

## 1.6. Test Facility

Ambient conditions in the laboratory:

| Items                      | Required (IEC 68-1) | Actual   |
|----------------------------|---------------------|----------|
| Temperature (°C)           | 15-35               | 20-35    |
| Humidity (%RH)             | 25-75               | 50-65    |
| Barometric pressure (mbar) | 860-1060            | 950-1000 |

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site : <http://www.quietek.com/tw/ctg/cts/accreditations.htm>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>

Site Description: File on  
Federal Communications Commission  
FCC Engineering Laboratory  
7435 Oakland Mills Road  
Columbia, MD 21046  
Registration Number: 92195

Site Name: Quietek Corporation  
Site Address: No.5-22, Ruishukeng, Linkou Dist.,  
New Taipei City 24451,  
Taiwan, R.O.C  
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E-Mail : [service@quietek.com](mailto:service@quietek.com)

FCC Accreditation Number: TW1014

## 2. Conducted Emission

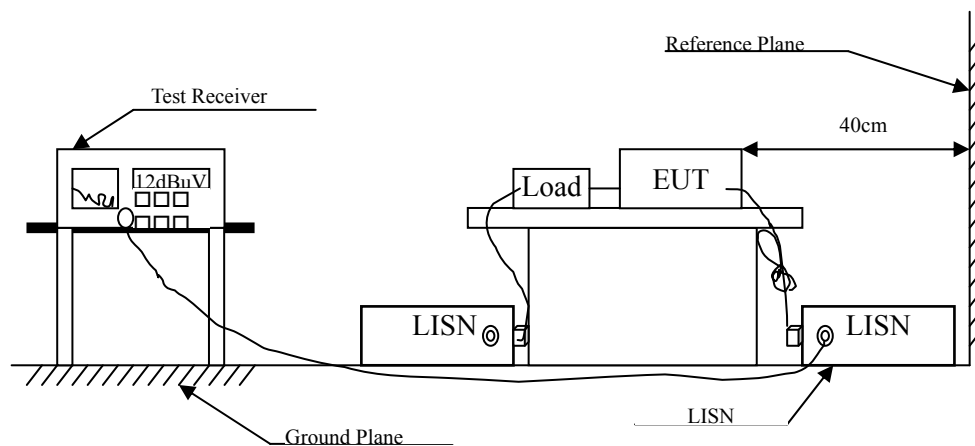
### 2.1. Test Equipment

|   | Equipment                | Manufacturer | Model No. / Serial No. | Last Cal.  | Remark      |
|---|--------------------------|--------------|------------------------|------------|-------------|
| X | Test Receiver            | R & S        | ESCS 30 / 825442/018   | Sep., 2014 |             |
| X | Artificial Mains Network | R & S        | ENV4200 / 848411/10    | Feb., 2015 | Peripherals |
| X | LISN                     | R & S        | ESH3-Z5 / 825562/002   | Feb., 2015 | EUT         |
|   | DC LISN                  | Schwarzbeck  | 8226 / 176             | Mar, 2014  | EUT         |
| X | Pulse Limiter            | R & S        | ESH3-Z2 / 357.8810.52  | Feb., 2015 |             |
|   | No.1 Shielded Room       |              |                        |            |             |

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

### 2.2. Test Setup



### 2.3. Limits

| FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit |        |       |
|-----------------------------------------------------|--------|-------|
| Frequency<br>MHz                                    | Limits |       |
|                                                     | QP     | AV    |
| 0.15 - 0.50                                         | 66-56  | 56-46 |
| 0.50-5.0                                            | 56     | 46    |
| 5.0 - 30                                            | 60     | 50    |

Remarks: In the above table, the tighter limit applies at the band edges.

### 2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

### 2.5. Uncertainty

$\pm 2.26$  dB

**2.6. Test Result of Conducted Emission**

Owing to the EUT use vehicle battery supply voltage, this test item is not performed.

### 3. Radiated Emission

#### 3.1. Test Equipment

The following test equipments are used during the radiated emission test:

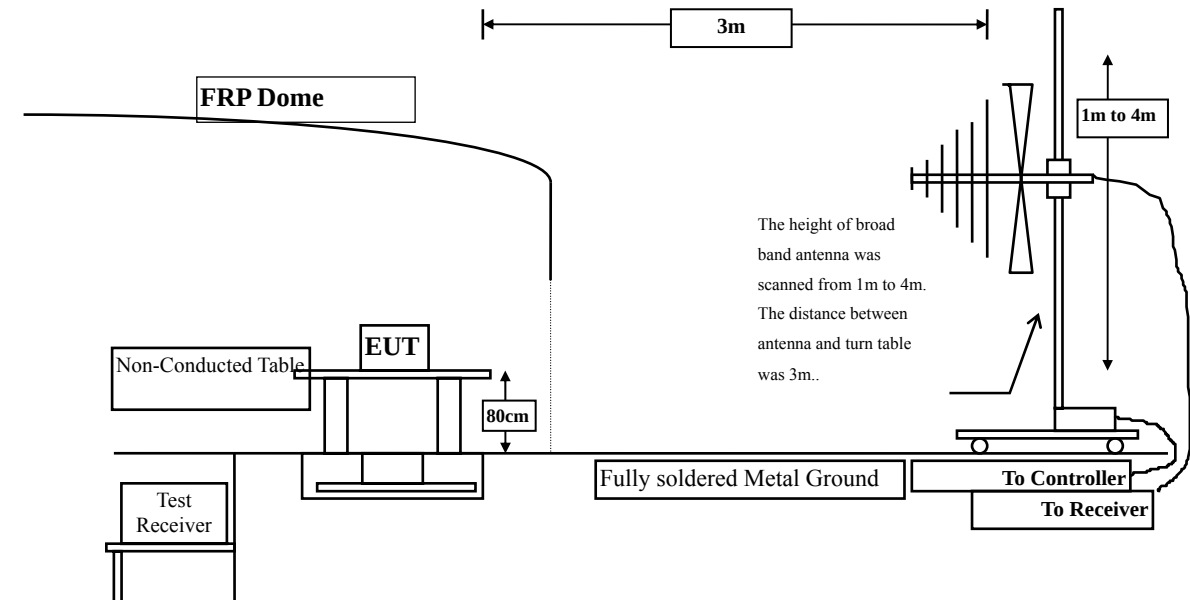
| Test Site                                    |   | Equipment             | Manufacturer    | Model No./Serial No. | Last Cal. |
|----------------------------------------------|---|-----------------------|-----------------|----------------------|-----------|
| <input checked="" type="checkbox"/> Site # 3 | X | Magnetic Loop Antenna | Teseq           | HLA6121/ 37133       | Sep, 2014 |
|                                              | X | Bilog Antenna         | Schaffner Chase | CBL6112B/ 2707       | Jun, 2014 |
|                                              | X | EMI Test Receiver     | R&S             | ESCS 30/838251/ 001  | Jun, 2014 |
|                                              | X | Coaxial Cable         | QTK(Arnist)     | RG 214/ LC003-RG     | Jun, 2014 |
|                                              | X | Coaxial signal switch | Arnist          | MP59B/ 6200798682    | Jun, 2014 |

| Test Site                                  |   | Equipment         | Manufacturer | Model No./Serial No.        | Last Cal. |
|--------------------------------------------|---|-------------------|--------------|-----------------------------|-----------|
| <input checked="" type="checkbox"/> CB # 8 | X | Spectrum Analyzer | R&S          | FSP40/ 100339               | Oct, 2014 |
|                                            | X | Horn Antenna      | ETS-Lindgren | 3117/ 35205                 | Mar, 2014 |
|                                            | X | Horn Antenna      | Schwarzbeck  | BBHA9170/209                | Jan, 2015 |
|                                            | X | Horn Antenna      | TRC          | AH-0801/95051               | Aug, 2014 |
|                                            | X | Pre-Amplifier     | EMCI         | EMC012630SE/980210          | Jan, 2015 |
|                                            | X | Pre-Amplifier     | MITEQ        | JS41-001040000-58-5P/153945 | Jul, 2014 |
|                                            | X | Pre-Amplifier     | NARDA        | DBL-1840N506/013            | Jul, 2014 |

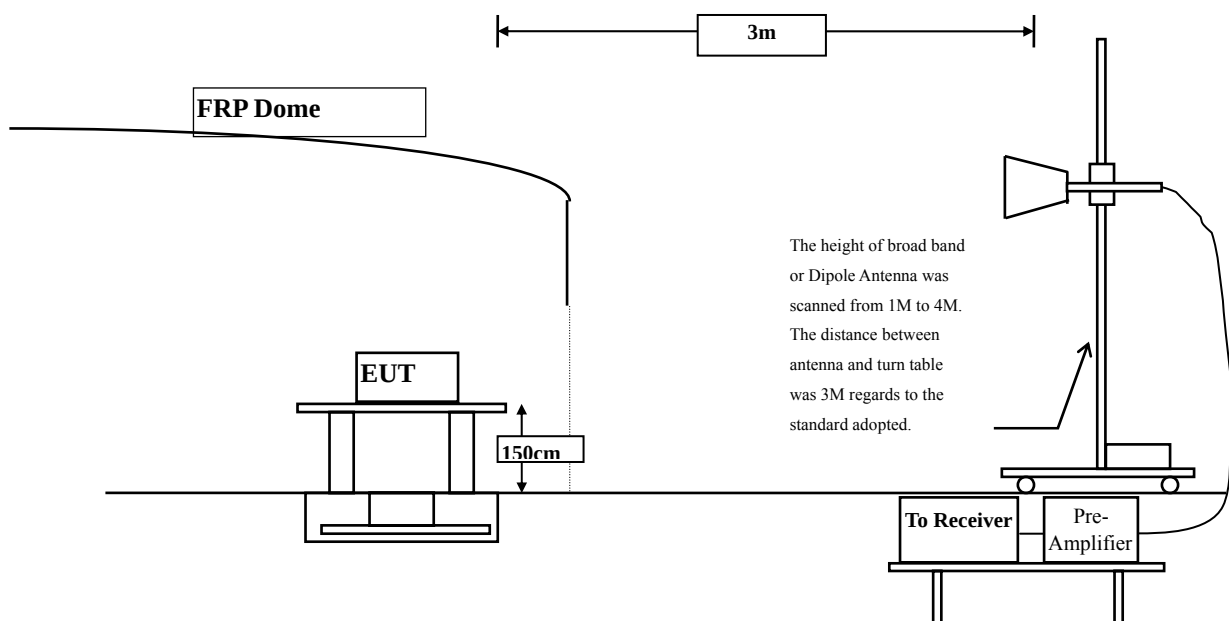
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
  2. The test instruments marked with "X" are used to measure the final test results.

### 3.2. Test Setup

#### Radiated Emission Below 1GHz



#### Radiated Emission Above 1GHz



### 3.3. Limits

#### ➤ Fundamental and Harmonics Emission Limits

| FCC Part 15 Subpart C Paragraph 15.249 Limits |                               |              |                             |              |
|-----------------------------------------------|-------------------------------|--------------|-----------------------------|--------------|
| Frequency<br>MHz                              | Field Strength of Fundamental |              | Field Strength of Harmonics |              |
|                                               | (mV/m @3m)                    | (dBuV/m @3m) | (uV/m @3m)                  | (dBuV/m @3m) |
| 902-928                                       | 50                            | 94           | 500                         | 54           |
| 2400-2483.5                                   | 50                            | 94           | 500                         | 54           |
| 5725-5875                                     | 50                            | 94           | 500                         | 54           |

Remarks : 1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)  
 2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

#### ➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

| FCC Part 15 Subpart C Paragraph 15.209(a) Limits |                                      |                                 |
|--------------------------------------------------|--------------------------------------|---------------------------------|
| Frequency<br>MHz                                 | Field strength<br>(microvolts/meter) | Measurement distance<br>(meter) |
| 0.009-0.490                                      | 2400/F(kHz)                          | 300                             |
| 0.490-1.705                                      | 24000/F(kHz)                         | 30                              |
| 1.705-30                                         | 30                                   | 30                              |
| 30-88                                            | 100                                  | 3                               |
| 88-216                                           | 150                                  | 3                               |
| 216-960                                          | 200                                  | 3                               |
| Above 960                                        | 500                                  | 3                               |

Remarks: E field strength (dBuV/m) = 20 log E field strength (uV/m)

### **3.4. Test Procedure**

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.249 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

### **3.5. Uncertainty**

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

### 3.6. Test Result of Radiated Emission

Product : ASUS WT425 Wireless Optical Mouse  
 Test Item : Fundamental Radiated Emission  
 Test Site : No.3OATS  
 Test Mode : Mode 1: Transmit (X-Axis)

| Frequency<br>MHz      | Correct<br>Factor<br>dB | Reading<br>Level<br>dBuV | Measurement<br>Level<br>dBuV/m | Margin<br>dB | Limit<br>dBuV/m |
|-----------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| <b>Horizontal</b>     |                         |                          |                                |              |                 |
| <b>Peak Detector:</b> |                         |                          |                                |              |                 |
| 2402.000              | 33.755                  | 47.850                   | 81.604                         | -32.396      | 114.000         |
| 2441.000              | 33.840                  | 48.600                   | 82.440                         | -31.560      | 114.000         |
| 2480.000              | 33.941                  | 48.960                   | 82.901                         | -31.099      | 114.000         |
| <b>Vertical</b>       |                         |                          |                                |              |                 |
| <b>Peak Detector:</b> |                         |                          |                                |              |                 |
| 2402.000              | 32.241                  | 46.680                   | 78.921                         | -35.079      | 114.000         |
| 2441.000              | 32.380                  | 46.630                   | 79.010                         | -34.990      | 114.000         |
| 2480.000              | 32.568                  | 46.010                   | 78.578                         | -35.422      | 114.000         |

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

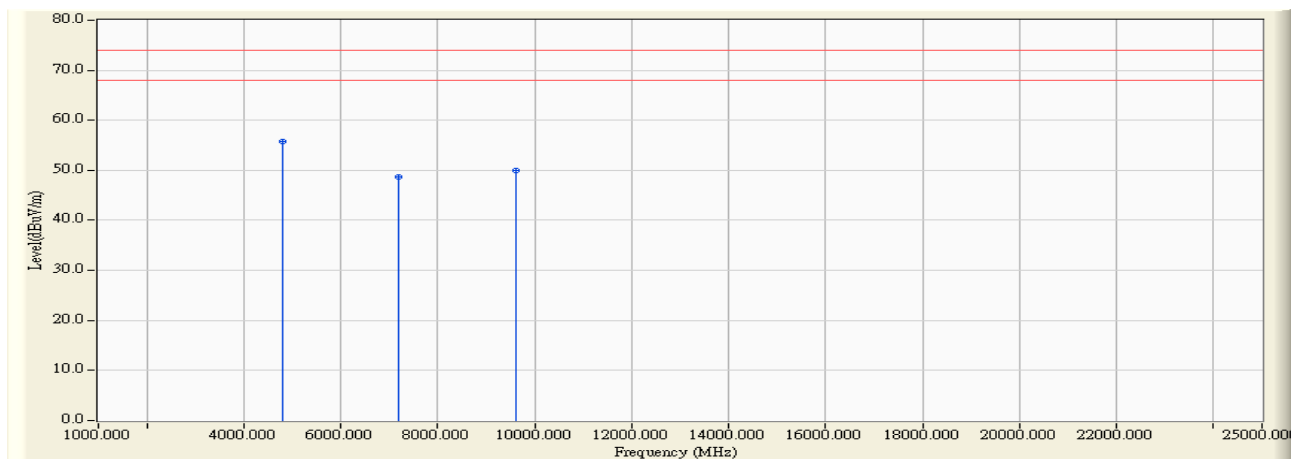
## Average Detector:

| Frequency                | Peak        | Duty Cycle     | Measurement | Margin  | Limit  |
|--------------------------|-------------|----------------|-------------|---------|--------|
| MHz                      | Measurement | Correct Factor | Level       |         |        |
|                          | dBuV/m      | dB             | dBuV/m      | dB      | dBuV/m |
| <b>Horizontal</b>        |             |                |             |         |        |
| <b>Average Detector:</b> |             |                |             |         |        |
| 2402.000                 | 81.604      | -30.458        | 51.146      | -42.854 | 94.000 |
| 2441.000                 | 82.440      | -30.458        | 51.982      | -42.018 | 94.000 |
| 2480.000                 | 82.901      | -30.458        | 52.443      | -41.557 | 94.000 |
| <b>Vertical</b>          |             |                |             |         |        |
| <b>Average Detector:</b> |             |                |             |         |        |
| 2402.000                 | 78.921      | -30.458        | 48.463      | -45.537 | 94.000 |
| 2441.000                 | 79.010      | -30.458        | 48.552      | -45.448 | 94.000 |
| 2480.000                 | 78.578      | -30.458        | 48.120      | -45.880 | 94.000 |

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ASUS WT425 Wireless Optical Mouse  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (2402MHz)



| Frequency             | Correct | Reading | Measurement | Margin  | Limit  |
|-----------------------|---------|---------|-------------|---------|--------|
| MHz                   | Factor  | Level   | Level       |         |        |
|                       | dB      | dBuV    | dBuV/m      | dB      | dBuV/m |
| <b>Horizontal</b>     |         |         |             |         |        |
| <b>Peak Detector:</b> |         |         |             |         |        |
| 4804.000              | 2.511   | 53.340  | 55.850      | -18.150 | 74.000 |
| 7206.000              | 9.511   | 39.220  | 48.731      | -25.269 | 74.000 |
| 9608.000              | 10.394  | 39.540  | 49.934      | -24.066 | 74.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

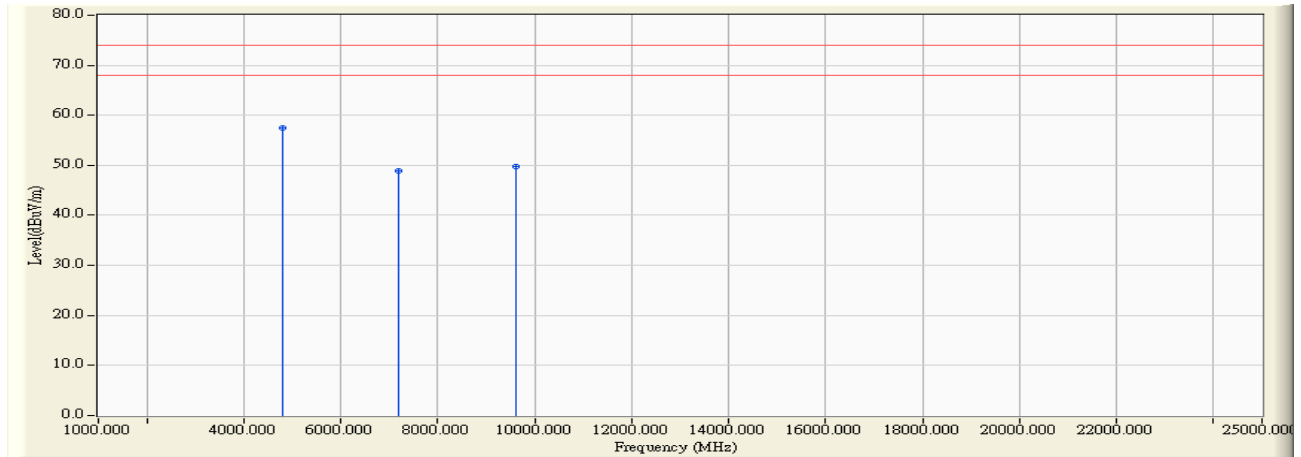
**Average Detector:**

| Frequency                | Peak        | Duty Cycle     | Measurement | Margin  | Limit  |
|--------------------------|-------------|----------------|-------------|---------|--------|
| MHz                      | Measurement | Correct Factor | Level       |         |        |
|                          | dBuV/m      | dB             | dBuV/m      | dB      | dBuV/m |
| <b>Horizontal</b>        |             |                |             |         |        |
| <b>Average Detector:</b> |             |                |             |         |        |
| 4804.000                 | 55.850      | -30.458        | 25.392      | -28.608 | 54.000 |
| 7206.000                 | 48.731      | -30.458        | 18.273      | -35.727 | 54.000 |
| 9608.000                 | 49.934      | -30.458        | 19.476      | -34.524 | 54.000 |

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ASUS WT425 Wireless Optical Mouse  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (2402MHz)



| Frequency             | Correct | Reading | Measurement | Margin  | Limit  |
|-----------------------|---------|---------|-------------|---------|--------|
| MHz                   | Factor  | Level   | Level       |         |        |
|                       | dB      | dBuV    | dBuV/m      | dB      | dBuV/m |
| <b>Vertical</b>       |         |         |             |         |        |
| <b>Peak Detector:</b> |         |         |             |         |        |
| 4804.000              | 2.923   | 54.530  | 57.452      | -16.548 | 74.000 |
| 7206.000              | 9.988   | 38.910  | 48.899      | -25.101 | 74.000 |
| 9608.000              | 10.847  | 38.850  | 49.697      | -24.303 | 74.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

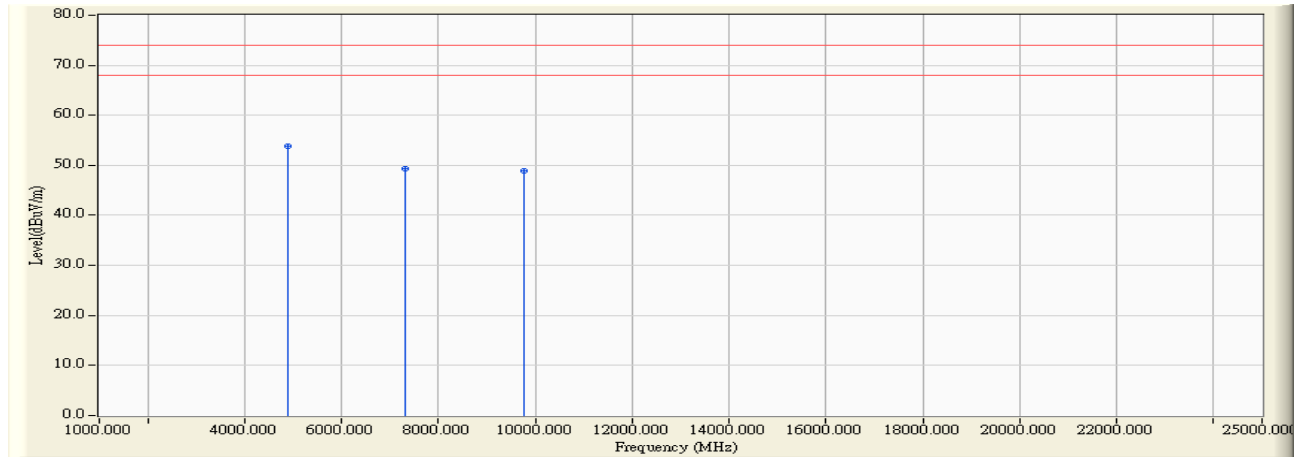
**Average Detector:**

| Frequency                | Peak        | Duty Cycle     | Measurement | Margin  | Limit  |
|--------------------------|-------------|----------------|-------------|---------|--------|
| MHz                      | Measurement | Correct Factor | Level       |         |        |
|                          | dBuV/m      | dB             | dBuV/m      | dB      | dBuV/m |
| <b>Vertical</b>          |             |                |             |         |        |
| <b>Average Detector:</b> |             |                |             |         |        |
| 4804.000                 | 57.452      | -30.458        | 26.994      | -27.006 | 54.000 |
| 7206.000                 | 48.899      | -30.458        | 18.441      | -35.559 | 54.000 |
| 9608.000                 | 49.697      | -30.458        | 19.239      | -34.761 | 54.000 |

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ASUS WT425 Wireless Optical Mouse  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (2441 MHz)



| Frequency             | Correct | Reading | Measurement | Margin  | Limit  |
|-----------------------|---------|---------|-------------|---------|--------|
| MHz                   | Factor  | Level   | Level       | Db      | dBuV/m |
|                       | Db      | dBuV    | dBuV/m      |         |        |
| <b>Horizontal</b>     |         |         |             |         |        |
| <b>Peak Detector:</b> |         |         |             |         |        |
| 4882.000              | 2.025   | 51.760  | 53.785      | -20.215 | 74.000 |
| 7323.000              | 9.762   | 39.580  | 49.341      | -24.659 | 74.000 |
| 9764.000              | 9.682   | 39.260  | 48.941      | -25.059 | 74.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

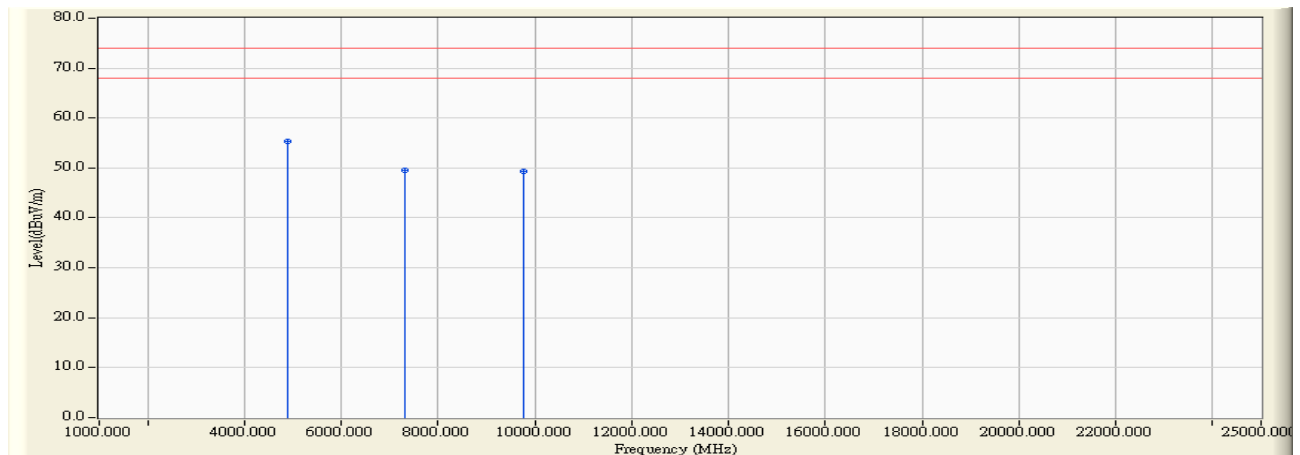
**Average Detector:**

| Frequency                | Peak        | Duty Cycle     | Measurement | Margin  | Limit  |
|--------------------------|-------------|----------------|-------------|---------|--------|
| MHz                      | Measurement | Correct Factor | Level       |         |        |
|                          | dBuV/m      | dB             | dBuV/m      | dB      | dBuV/m |
| <b>Horizontal</b>        |             |                |             |         |        |
| <b>Average Detector:</b> |             |                |             |         |        |
| 4882.000                 | 53.785      | -30.458        | 23.327      | -30.673 | 54.000 |
| 7323.000                 | 49.341      | -30.458        | 18.883      | -35.117 | 54.000 |
| 9764.000                 | 48.941      | -30.458        | 18.483      | -35.517 | 54.000 |

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ASUS WT425 Wireless Optical Mouse  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (2441MHz)



| Frequency             | Correct | Reading | Measurement | Margin  | Limit  |
|-----------------------|---------|---------|-------------|---------|--------|
| MHz                   | Factor  | Level   | Level       |         |        |
|                       | Db      | dBuV    | dBuV/m      | Db      | dBuV/m |
| <b>Vertical</b>       |         |         |             |         |        |
| <b>Peak Detector:</b> |         |         |             |         |        |
| 4882.000              | 2.488   | 52.840  | 55.328      | -18.672 | 74.000 |
| 7323.000              | 10.375  | 39.140  | 49.514      | -24.486 | 74.000 |
| 9764.000              | 10.315  | 39.020  | 49.335      | -24.665 | 74.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

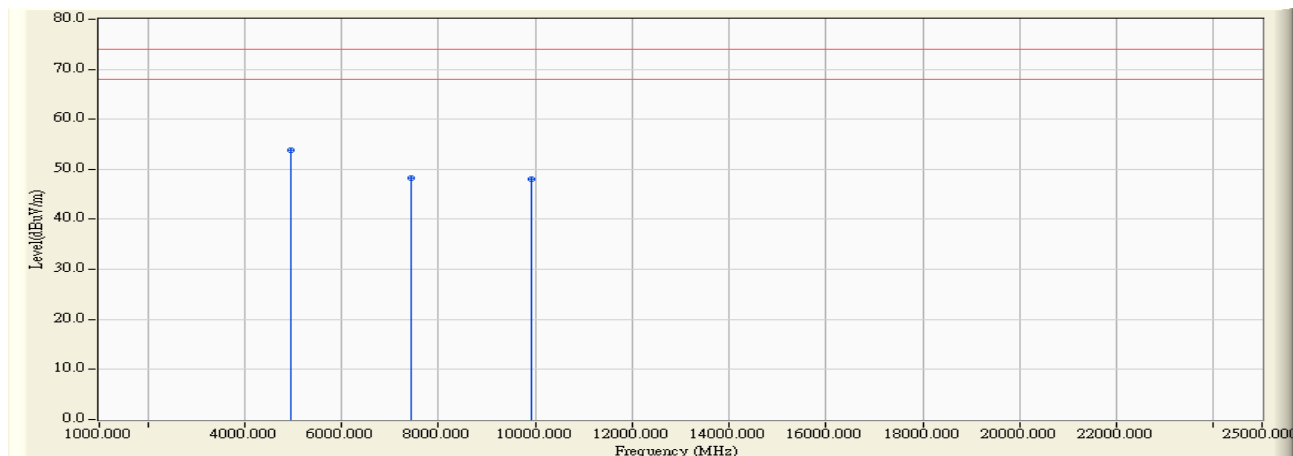
**Average Detector:**

| Frequency                | Peak        | Duty Cycle     | Measurement | Margin  | Limit  |
|--------------------------|-------------|----------------|-------------|---------|--------|
| MHz                      | Measurement | Correct Factor | Level       |         |        |
|                          | dBuV/m      | dB             | dBuV/m      | dB      | dBuV/m |
| <b>Vertical</b>          |             |                |             |         |        |
| <b>Average Detector:</b> |             |                |             |         |        |
| 4882.000                 | 55.328      | -30.458        | 24.870      | -29.130 | 54.000 |
| 7323.000                 | 49.514      | -30.458        | 19.056      | -34.944 | 54.000 |
| 9764.000                 | 49.335      | -30.458        | 18.877      | -35.123 | 54.000 |

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ASUS WT425 Wireless Optical Mouse  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (2480 MHz)



| Frequency             | Correct | Reading | Measurement | Margin  | Limit  |
|-----------------------|---------|---------|-------------|---------|--------|
| MHz                   | Factor  | Level   | Level       |         |        |
|                       | dB      | dBuV    | dBuV/m      | dB      | dBuV/m |
| <b>Horizontal</b>     |         |         |             |         |        |
| <b>Peak Detector:</b> |         |         |             |         |        |
| 4960.000              | 2.582   | 51.320  | 53.902      | -20.098 | 74.000 |
| 7440.000              | 10.555  | 37.610  | 48.165      | -25.835 | 74.000 |
| 9920.000              | 10.206  | 37.810  | 48.016      | -25.984 | 74.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

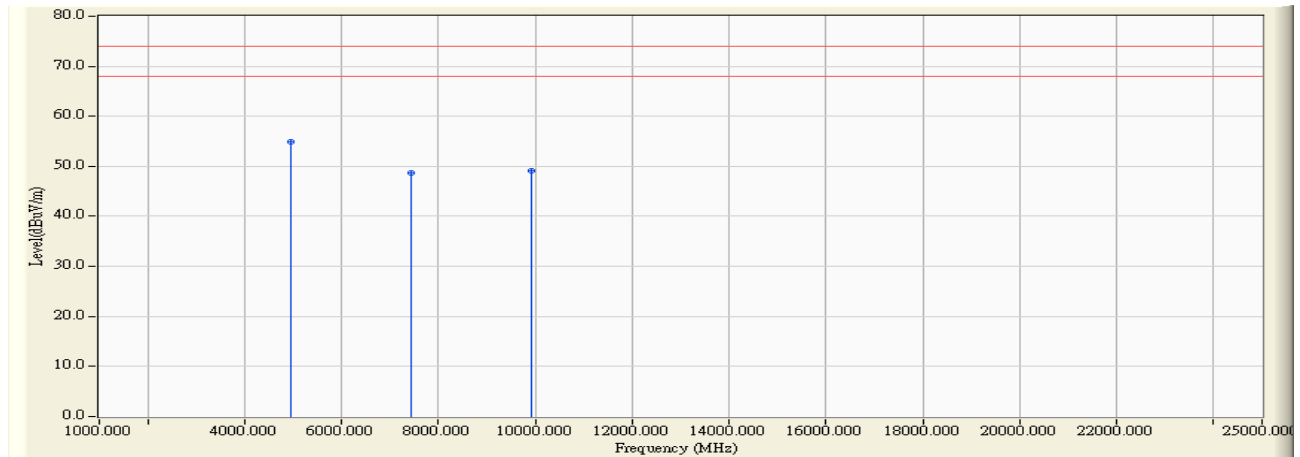
**Average Detector:**

| Frequency                | Peak        | Duty Cycle     | Measurement | Margin  | Limit  |
|--------------------------|-------------|----------------|-------------|---------|--------|
| MHz                      | Measurement | Correct Factor | Level       |         |        |
|                          | dBuV/m      | dB             | dBuV/m      | dB      | dBuV/m |
| <b>Horizontal</b>        |             |                |             |         |        |
| <b>Average Detector:</b> |             |                |             |         |        |
| 4960.000                 | 53.902      | -30.458        | 23.444      | -30.556 | 54.000 |
| 7440.000                 | 48.165      | -30.458        | 17.707      | -36.293 | 54.000 |
| 9920.000                 | 48.016      | -30.458        | 17.558      | -36.442 | 54.000 |

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ASUS WT425 Wireless Optical Mouse  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (2480MHz)



| Frequency             | Correct | Reading | Measurement | Margin  | Limit  |
|-----------------------|---------|---------|-------------|---------|--------|
| MHz                   | Factor  | Level   | Level       |         |        |
|                       | dB      | dBuV    | dBuV/m      | dB      | dBuV/m |
| <b>Vertical</b>       |         |         |             |         |        |
| <b>Peak Detector:</b> |         |         |             |         |        |
| 4960.000              | 3.398   | 51.520  | 54.919      | -19.081 | 74.000 |
| 7440.000              | 11.214  | 37.450  | 48.664      | -25.336 | 74.000 |
| 9920.000              | 11.245  | 37.890  | 49.135      | -24.865 | 74.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

**Average Detector:**

| Frequency | Peak        | Duty Cycle     | Measurement | Margin | Limit  |
|-----------|-------------|----------------|-------------|--------|--------|
| MHz       | Measurement | Correct Factor | Level       |        |        |
|           | dBuV/m      | dB             | dBuV/m      | dB     | dBuV/m |

**Vertical**

**Average Detector:**

|          |        |         |        |         |        |
|----------|--------|---------|--------|---------|--------|
| 4960.000 | 54.919 | -30.458 | 24.461 | -29.539 | 54.000 |
| 7440.000 | 48.664 | -30.458 | 18.206 | -35.794 | 54.000 |
| 9920.000 | 49.135 | -30.458 | 18.677 | -35.323 | 54.000 |

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ASUS WT425 Wireless Optical Mouse  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (2441 MHz)

| Frequency         | Correct | Reading | Measurement | Margin  | Limit  |
|-------------------|---------|---------|-------------|---------|--------|
| MHz               | Factor  | Level   | Level       |         |        |
|                   | dB      | dBuV    | dBuV/m      | dB      | dBuV/m |
| <b>Horizontal</b> |         |         |             |         |        |
| 255.040           | -5.409  | 27.203  | 21.794      | -24.206 | 46.000 |
| 359.800           | -0.226  | 27.584  | 27.358      | -18.642 | 46.000 |
| 462.620           | 3.589   | 26.313  | 29.902      | -16.098 | 46.000 |
| 606.180           | 4.196   | 26.337  | 30.533      | -15.467 | 46.000 |
| 854.500           | 7.380   | 27.298  | 34.678      | -11.322 | 46.000 |
| 965.080           | 7.222   | 24.243  | 31.465      | -22.535 | 54.000 |
| <b>Vertical</b>   |         |         |             |         |        |
| 111.480           | -3.439  | 28.681  | 25.243      | -18.257 | 43.500 |
| 286.080           | -5.409  | 28.535  | 23.126      | -22.874 | 46.000 |
| 462.620           | -2.571  | 25.804  | 23.233      | -22.767 | 46.000 |
| 596.480           | 0.907   | 26.377  | 27.284      | -18.716 | 46.000 |
| 821.520           | 3.036   | 24.860  | 27.896      | -18.104 | 46.000 |
| 961.200           | 3.310   | 24.234  | 27.544      | -26.456 | 54.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

## 4. Band Edge

### 4.1. Test Equipment

#### RF Conducted Measurement

The following test equipments are used during the band edge tests:

|   | Equipment         | Manufacturer | Model No./Serial No. | Last Cal.  |
|---|-------------------|--------------|----------------------|------------|
|   | Spectrum Analyzer | R&S          | FSP40 / 100170       | Jun, 2014  |
|   | Spectrum Analyzer | Agilent      | E4407B / US39440758  | Jun, 2014  |
| X | Spectrum Analyzer | Agilent      | N9010A / MY48030495  | Apr., 2014 |

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

The following test equipments are used during the band edge tests:

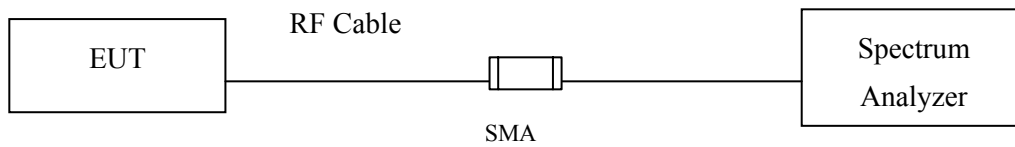
| Test Site |   | Equipment         | Manufacturer | Model No./Serial No.        | Last Cal. |
|-----------|---|-------------------|--------------|-----------------------------|-----------|
| ☒ CB # 8  | X | Spectrum Analyzer | R&S          | FSP40/ 100339               | Oct, 2014 |
|           | X | Horn Antenna      | ETS-Lindgren | 3117/ 35205                 | Mar, 2014 |
|           | X | Horn Antenna      | Schwarzbeck  | BBHA9170/209                | Jan, 2015 |
|           | X | Horn Antenna      | TRC          | AH-0801/95051               | Aug, 2014 |
|           | X | Pre-Amplifier     | EMCI         | EMC012630SE/980210          | Jan, 2015 |
|           | X | Pre-Amplifier     | MITEQ        | JS41-001040000-58-5P/153945 | Jul, 2014 |
|           | X | Pre-Amplifier     | NARDA        | DBL-1840N506/013            | Jul, 2014 |

Note:

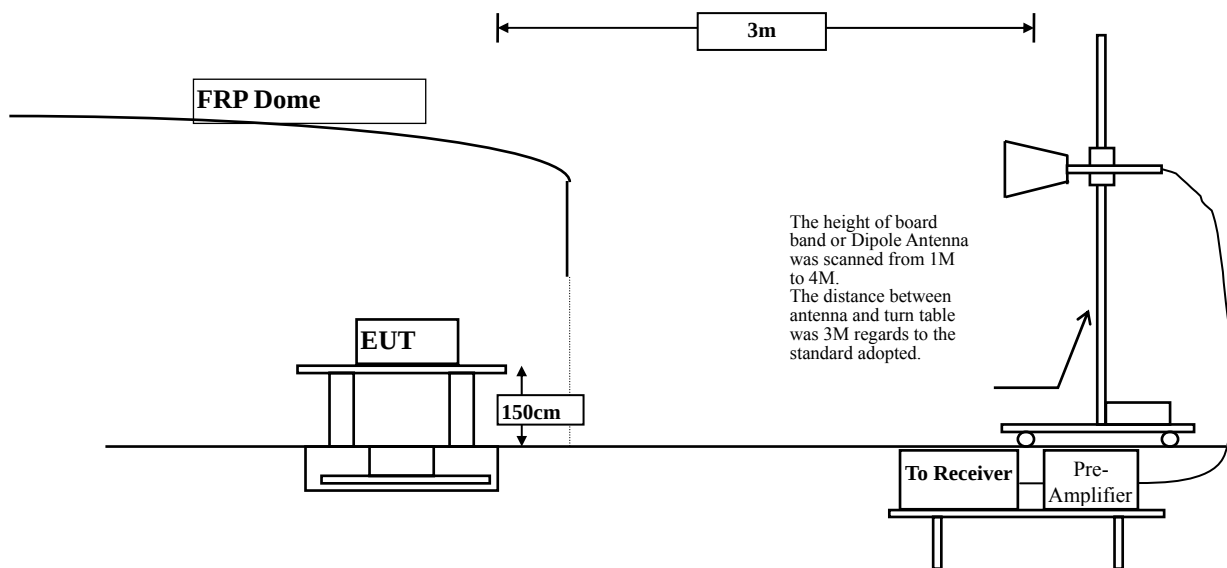
1. All equipments are calibrated every one year.
2. The test equipments marked by “X” are used to measure the final test results.

## 4.2. Test Setup

### RF Conducted Measurement



### RF Radiated Measurement:



#### **4.3. Limits**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

#### **4.4. Test Procedure**

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table can rotate 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

#### **4.5. Uncertainty**

Conducted is  $\pm 1.27$  dB

Radiated is  $\pm 3.9$  dB

#### 4.6. Test Result of Band Edge

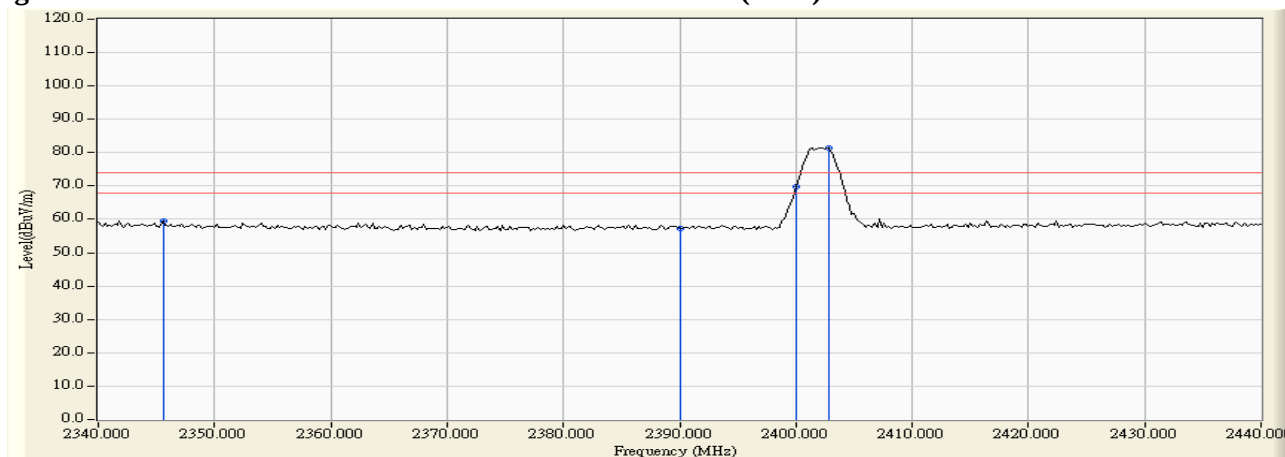
Product : ASUS WT425 Wireless Optical Mouse  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (2402 MHz)

#### RF Radiated Measurement (Horizontal):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBμV) | Emission Level (dBμV/m) | Peak Limit (dBμV/m) | Average Limit (dBμV/m) | Result |
|-------------|-----------------|---------------------|----------------------|-------------------------|---------------------|------------------------|--------|
| 01 (Peak)   | 2345.600        | 33.730              | 25.796               | 59.525                  | 74.00               | 54.00                  | Pass   |
| 01 (Peak)   | 2390.000        | 33.739              | 23.497               | 57.236                  | 74.00               | 54.00                  | Pass   |
| 01 (Peak)   | 2400.000        | 33.752              | 36.132               | 69.883                  | --                  | --                     | --     |
| 01 (Peak)   | 2402.800        | 33.755              | 47.760               | 81.516                  | --                  | --                     | --     |

Figure Channel 01:

Horizontal (Peak)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

| <b>Average Detector:</b> |             |            |             |         |        |        |
|--------------------------|-------------|------------|-------------|---------|--------|--------|
| Frequency                | Peak        | Duty Cycle | Measurement | Margin  | Limit  | Result |
| MHz                      | Measurement | Factor     | Level       |         |        | Pass   |
|                          | dBμV/m      | dB         | dBμV/m      | dB      | dBμV/m |        |
| <b>Horizontal</b>        |             |            |             |         |        |        |
| <b>Average Detector:</b> |             |            |             |         |        |        |
| 2345.600                 | 59.525      | -30.458    | 29.067      | -24.933 | 54.000 | Pass   |
| 2390.000                 | 57.236      | -30.458    | 26.778      | -27.222 | 54.000 | Pass   |
| 2400.000                 | 69.883      | -30.458    | 39.425      | -14.575 | 54.000 | Pass   |

Note:

1.  $AVG\ Measurement = Peak\ Measurement + Duty\ Cycle\ Correct\ Factor$
2. The Duty Cycle is refer to section 5.

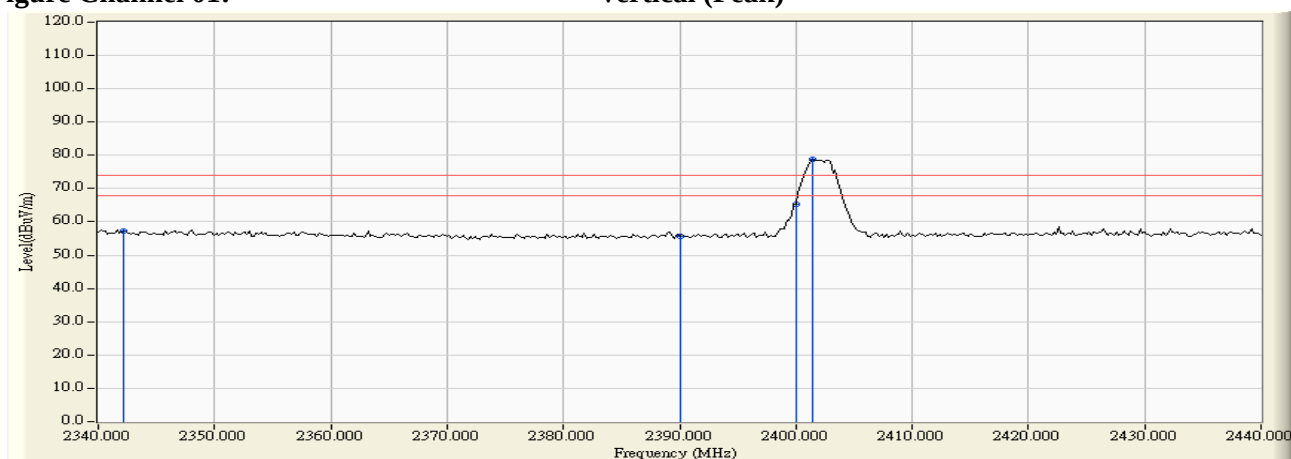
Product : ASUS WT425 Wireless Optical Mouse  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (2402 MHz)

**RF Radiated Measurement (Vertical):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBμV) | Emission Level (dBμV/m) | Peak Limit (dBμV/m) | Average Limit (dBμV/m) | Result |
|-------------|-----------------|---------------------|----------------------|-------------------------|---------------------|------------------------|--------|
| 01 (Peak)   | 2342.200        | 32.636              | 24.789               | 57.424                  | 74.00               | 54.00                  | Pass   |
| 01 (Peak)   | 2390.000        | 32.267              | 23.514               | 55.781                  | 74.00               | 54.00                  | Pass   |
| 01 (Peak)   | 2400.000        | 32.241              | 32.981               | 65.222                  | --                  | --                     | --     |
| 01 (Peak)   | 2401.400        | 32.241              | 46.528               | 78.769                  | --                  | --                     | --     |

**Figure Channel 01:**

**Vertical (Peak)**



**Note:**

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

**Average Detector:**

| Frequency | Peak        | Duty Cycle | Measurement | Margin | Limit  | Result |
|-----------|-------------|------------|-------------|--------|--------|--------|
| MHz       | Measurement | Factor     | Level       |        |        | Pass   |
|           | dBμV/m      | dB         | dBμV/m      | dB     | dBμV/m |        |

**Vertical**

**Average Detector:**

|          |        |         |        |         |        |      |
|----------|--------|---------|--------|---------|--------|------|
| 2342.200 | 57.424 | -30.458 | 26.966 | -27.034 | 54.000 | Pass |
| 2390.000 | 55.781 | -30.458 | 25.323 | -28.677 | 54.000 | Pass |
| 2400.000 | 65.222 | -30.458 | 34.764 | -19.236 | 54.000 | Pass |

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

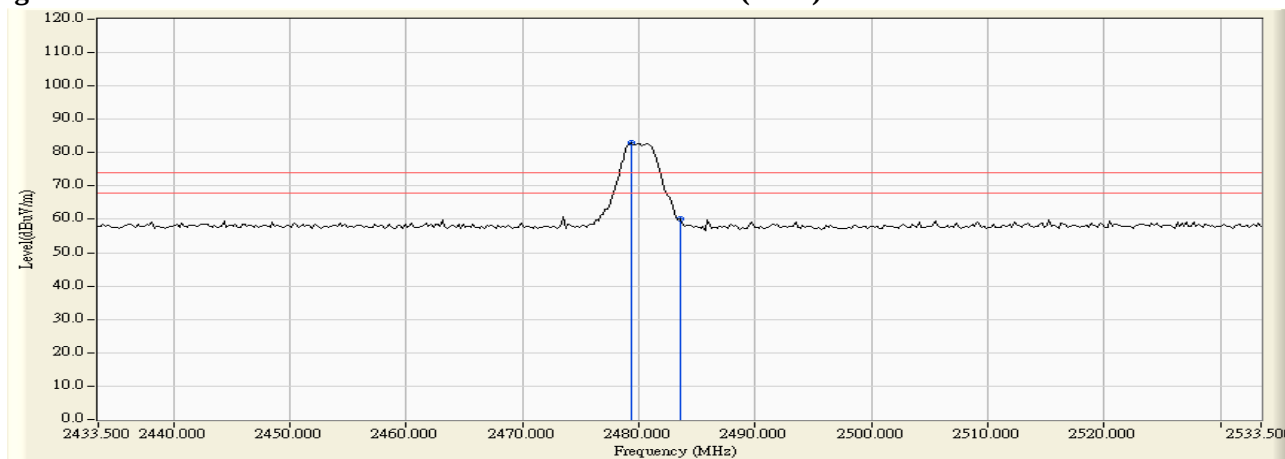
Product : ASUS WT425 Wireless Optical Mouse  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (2480 MHz)

**RF Radiated Measurement (Horizontal):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBμV) | Emission Level (dBμV/m) | Peak Limit (dBμV/m) | Average Limit (dBμV/m) | Result |
|-------------|-----------------|---------------------|----------------------|-------------------------|---------------------|------------------------|--------|
| 16 (Peak)   | 2479.300        | 33.938              | 48.964               | 82.903                  | --                  | --                     | --     |
| 16 (Peak)   | 2483.500        | 33.951              | 26.206               | 60.156                  | 74.00               | 54.00                  | Pass   |

**Figure Channel 16:**

**Horizontal (Peak)**



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

| Average Detector: |             |            |             |         |        |        |
|-------------------|-------------|------------|-------------|---------|--------|--------|
| Frequency         | Peak        | Duty Cycle | Measurement | Margin  | Limit  | Result |
| MHz               | Measurement | Factor     | Level       |         |        | Pass   |
|                   | dBμV/m      | dB         | dBμV/m      | dB      | dBμV/m |        |
| <b>Horizontal</b> |             |            |             |         |        |        |
| Average Detector: |             |            |             |         |        |        |
| 2483.500          | 60.156      | -30.458    | 29.698      | -24.302 | 54.000 | Pass   |

Note:

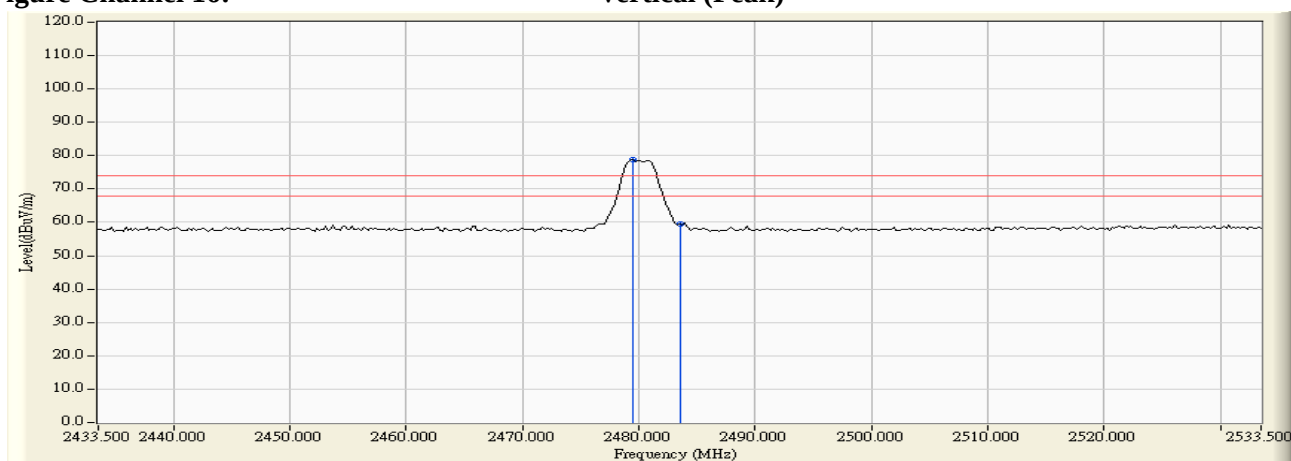
1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ASUS WT425 Wireless Optical Mouse  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (2480 MHz)

**RF Radiated Measurement (Vertical):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBμV) | Emission Level (dBμV/m) | Peak Limit (dBμV/m) | Average Limit (dBμV/m) | Result |
|-------------|-----------------|---------------------|----------------------|-------------------------|---------------------|------------------------|--------|
| 16 (Peak)   | 2479.500        | 32.566              | 46.108               | 78.674                  | --                  | --                     | --     |
| 16 (Peak)   | 2483.500        | 32.586              | 27.063               | 59.648                  | 74.00               | 54.00                  | Pass   |

**Figure Channel 16: Vertical (Peak)**



**Note:**

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

| <b>Average Detector:</b> |             |            |             |         |        |        |
|--------------------------|-------------|------------|-------------|---------|--------|--------|
| Frequency                | Peak        | Duty Cycle | Measurement | Margin  | Limit  | Result |
| MHz                      | Measurement | Factor     | Level       |         |        | Pass   |
|                          | dBμV/m      | dB         | dBμV/m      | dB      | dBμV/m |        |
| <b>Vertical</b>          |             |            |             |         |        |        |
| <b>Average Detector:</b> |             |            |             |         |        |        |
| 2483.500                 | 59.648      | -30.458    | 29.190      | -24.810 | 54.000 | Pass   |

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

## 5. Duty Cycle

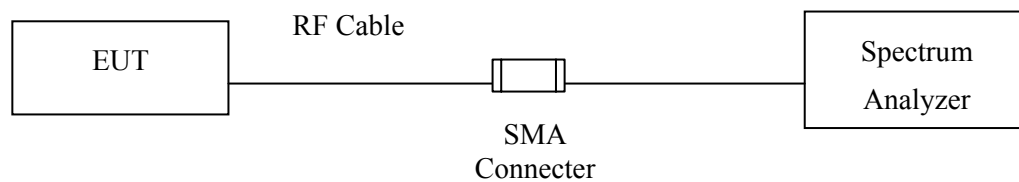
### 5.1. Test Equipment

The following test equipments are used during the band edge tests:

|   | Equipment         | Manufacturer | Model No./Serial No. | Last Cal.  |
|---|-------------------|--------------|----------------------|------------|
|   | Spectrum Analyzer | R&S          | FSP40 / 100170       | Jun, 2014  |
|   | Spectrum Analyzer | Agilent      | E4407B / US39440758  | Jun, 2014  |
| X | Spectrum Analyzer | Agilent      | N9010A / MY48030495  | Apr., 2014 |

Note: 1. All equipments are calibrated every one year.  
2. The test equipments marked by "X" are used to measure the final test results.

### 5.2. Test Setup

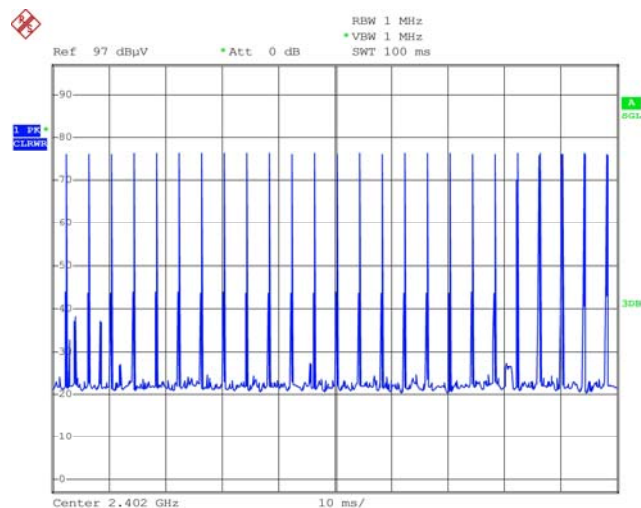


### 5.3. Uncertainty

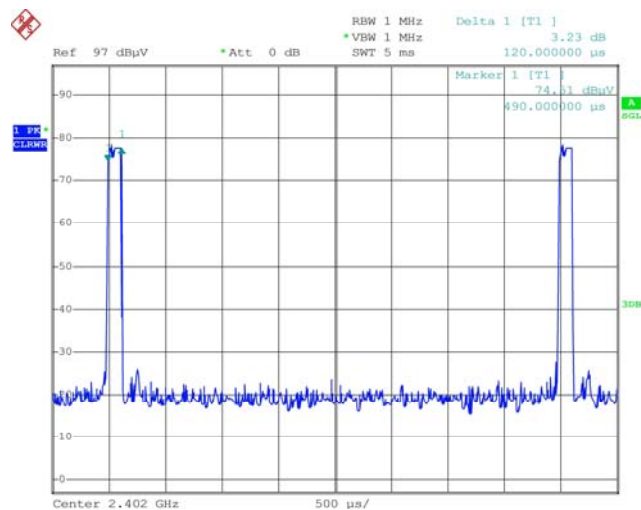
$\pm 150\text{Hz}$

#### 5.4. Test Result of Duty Cycle

Product : ASUS WT425 Wireless Optical Mouse  
 Test Item : Duty Cycle Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit



Date: 14.JAN.2015 08:26:24



Date: 14.JAN.2015 08:30:57

Time on of 100ms= 0.12ms\*25=3.000ms

Duty Cycle= 3.000ms / 100ms= 0.03

Duty Cycle correction factor= 20 LOG 0.03= -30.458 dB

|                              |         |    |
|------------------------------|---------|----|
| Duty Cycle correction factor | -30.458 | dB |
|------------------------------|---------|----|

**6. EMI Reduction Method During Compliance Testing**

No modification was made during testing.