

# 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

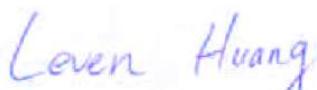
Issued Date: Feb. 05, 2015

Report No.: 1510122R-RFUSP15V00

**QuiTek**

Product Name	ASUS WT425 Wireless Optical Mouse
Applicant	Intech Electronics Corp.
Address	Haill 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 ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By :



(Senior Adm. Specialist / Leven Huang )

Tested By :



( Engineer / Benjamin Pan )

Approved By :



( 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
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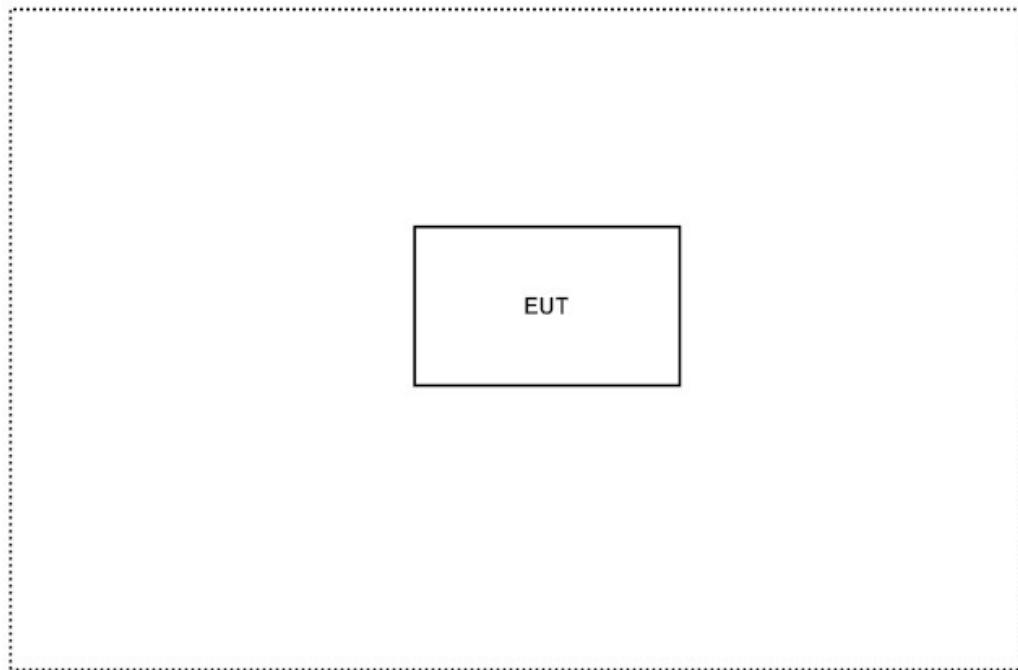
### 1.3. Tested System Details

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  
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FCC Accreditation Number: TW1014

## 2. Conducted Emission

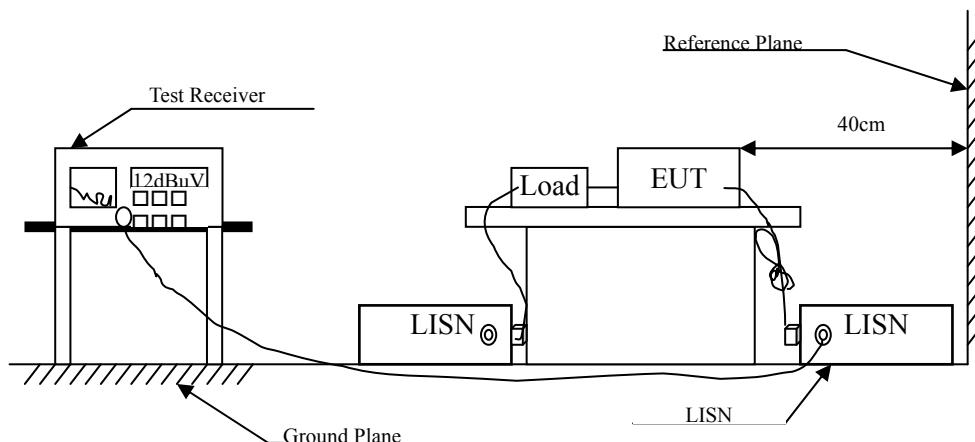
### 2.1. Test Equipment

	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

<b>FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit</b>		
Frequency 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

± 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:

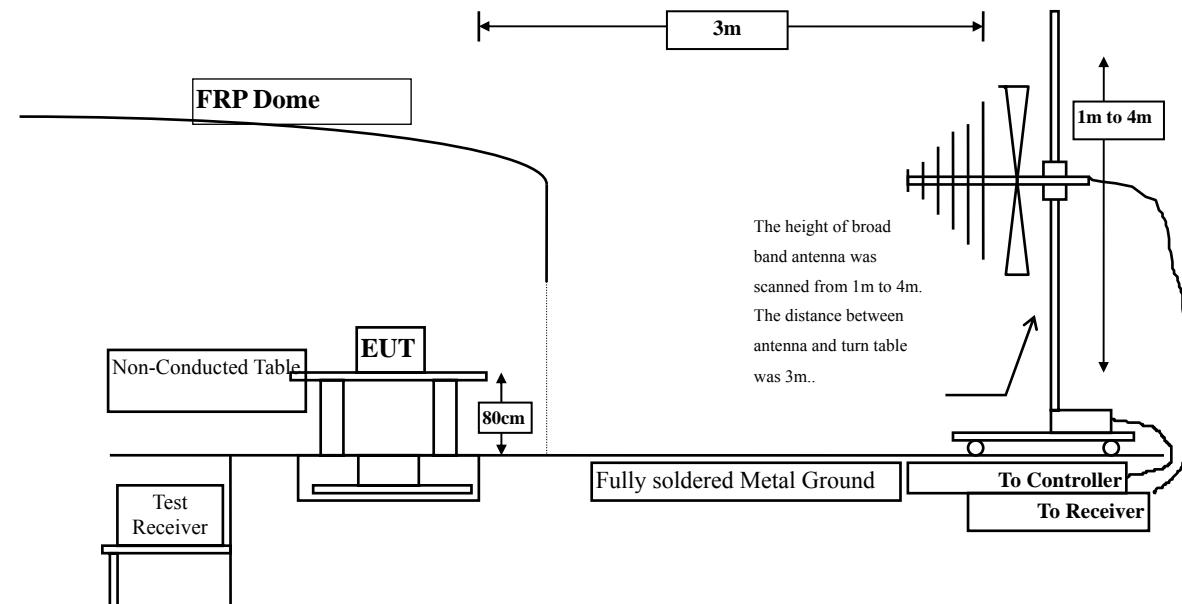
Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Magnetic Loop Antenna	Teseq	HLA6121/ 37133	Sep, 2014
	X	Bilog Antenna	Schaffner Chase	CBL6112B/ 2707	Jun, 2014
	X	EMI Test Receiver	R&S	ESCS 30/838251/ 001	Jun, 2014
	X	Coaxial Cable	QTK(Arnist)	RG 214/ LC003-RG	Jun, 2014
	X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

Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
☒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

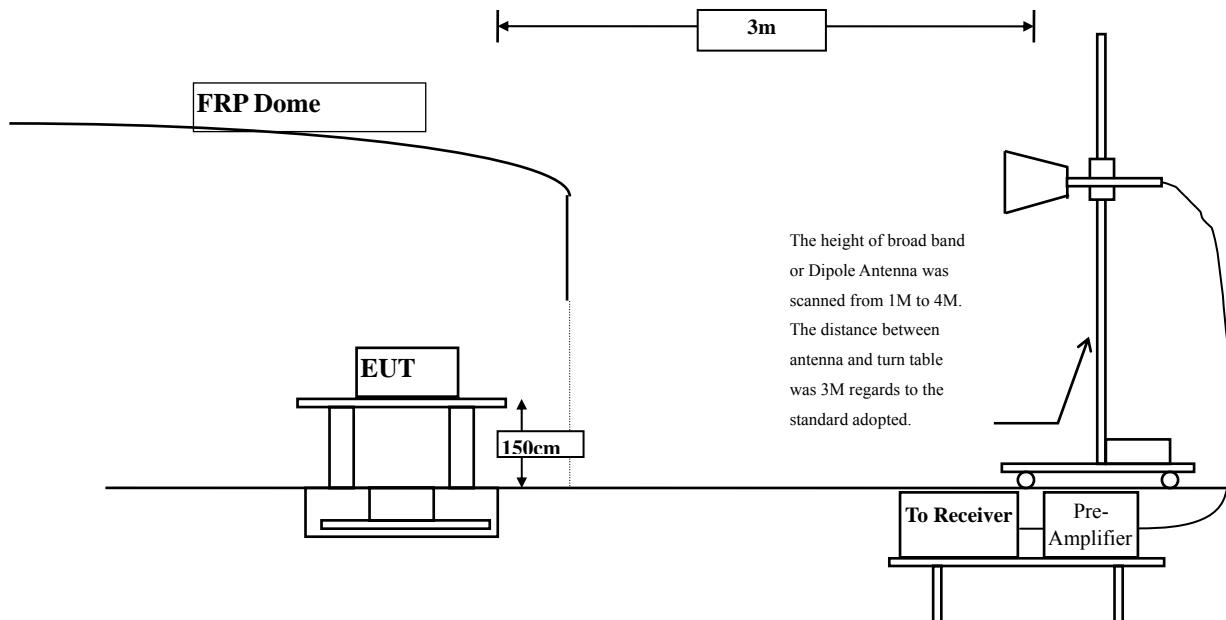
Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.  
2. The test instruments marked with "X" are used to measure the final test results.

## 3.2. Test Setup

### Radiated Emission Below 1GHz



### Radiated Emission Above 1GHz



### 3.3. Limits

#### ➤ Fundamental and Harmonics Emission Limits

<b>FCC Part 15 Subpart C Paragraph 15.249 Limits</b>				
Frequency 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.

<b>FCC Part 15 Subpart C Paragraph 15.209(a) Limits</b>		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (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 MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit 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.

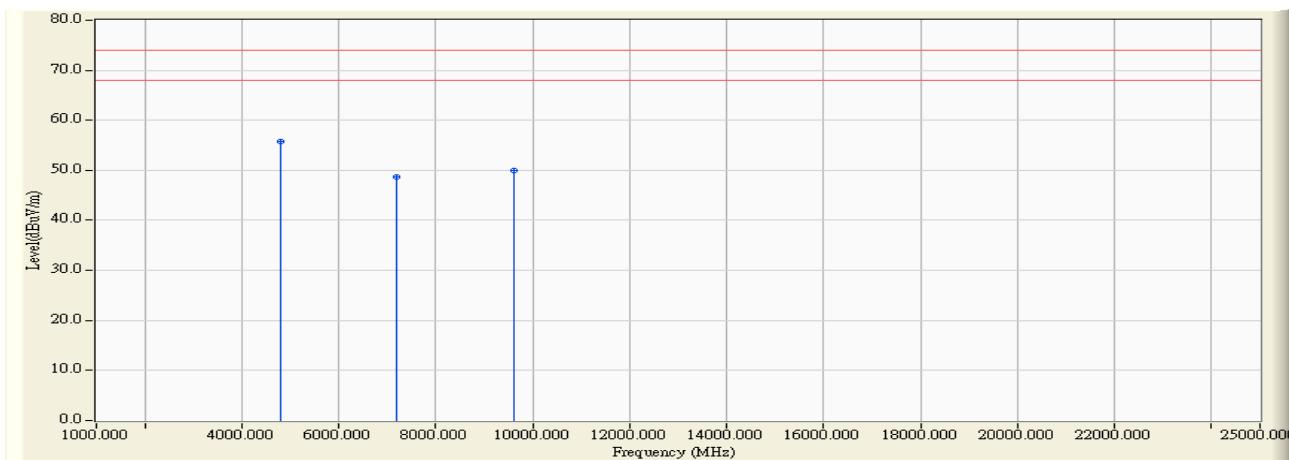
**Average Detector:**

Frequency MHz	Peak Measurement dBuV/m	Duty Cycle Correct Factor dB	Measurement Level dBuV/m	Margin dB	Limit 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 MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit 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.

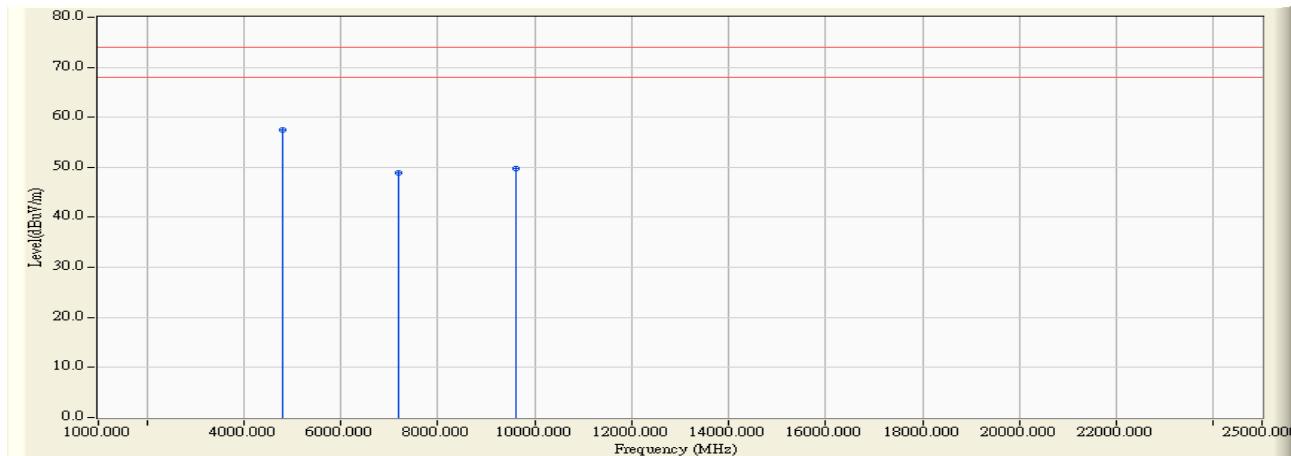
**Average Detector:**

Frequency MHz	Peak Measurement dBuV/m	Duty Cycle Correct Factor dB	Measurement Level dBuV/m	Margin dB	Limit 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 MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit 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.

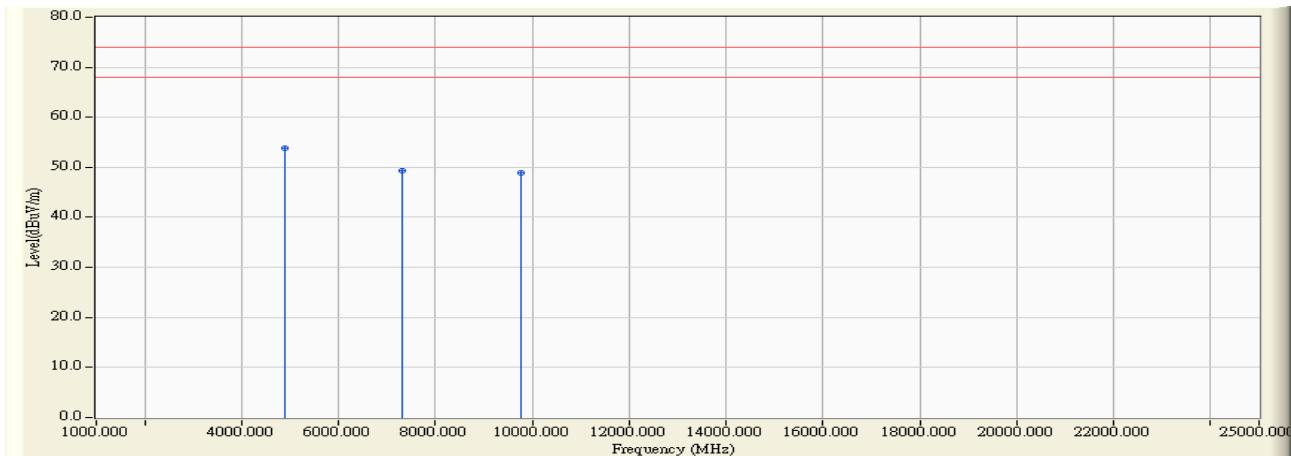
**Average Detector:**

Frequency MHz	Peak Measurement dBuV/m	Duty Cycle Correct Factor dB	Measurement Level dBuV/m	Margin dB	Limit 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 MHz	Correct Factor Db	Reading Level dBuV	Measurement Level dBuV/m	Margin Db	Limit dBuV/m
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### Horizontal

#### Peak Detector:

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.

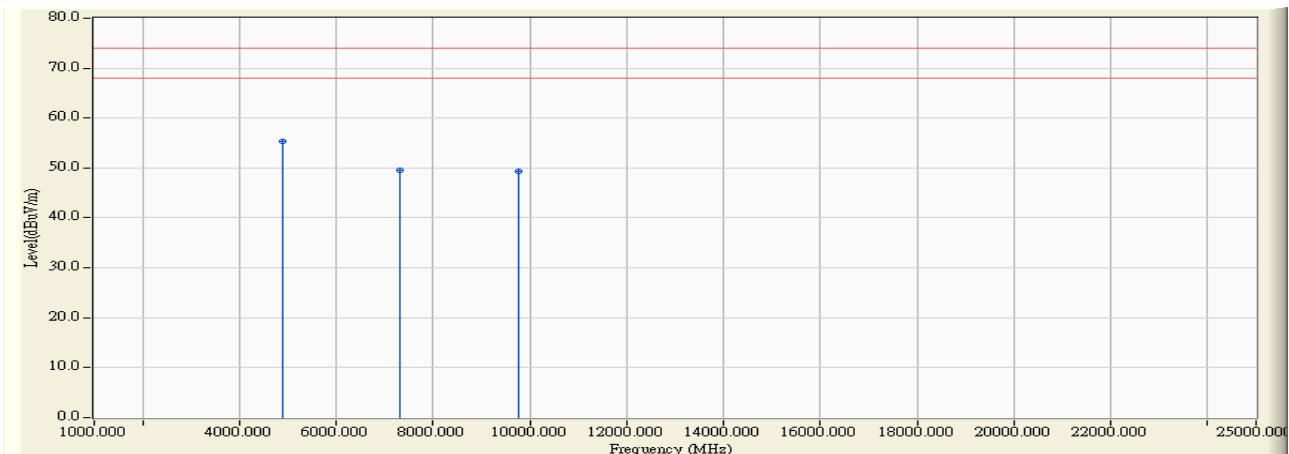
**Average Detector:**

Frequency MHz	Peak Measurement dBuV/m	Duty Cycle Correct Factor dB	Measurement Level dBuV/m	Margin dB	Limit 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 MHz	Correct Factor Db	Reading Level dBuV	Measurement Level dBuV/m	Margin Db	Limit 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.

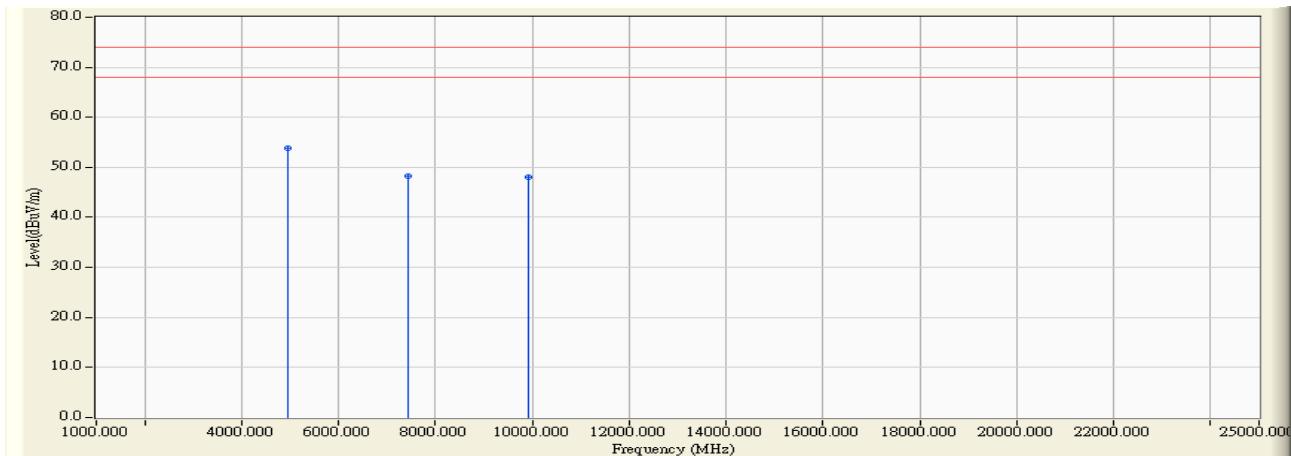
**Average Detector:**

Frequency MHz	Peak Measurement dBuV/m	Duty Cycle Correct Factor dB	Measurement Level dBuV/m	Margin dB	Limit 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 MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit 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.

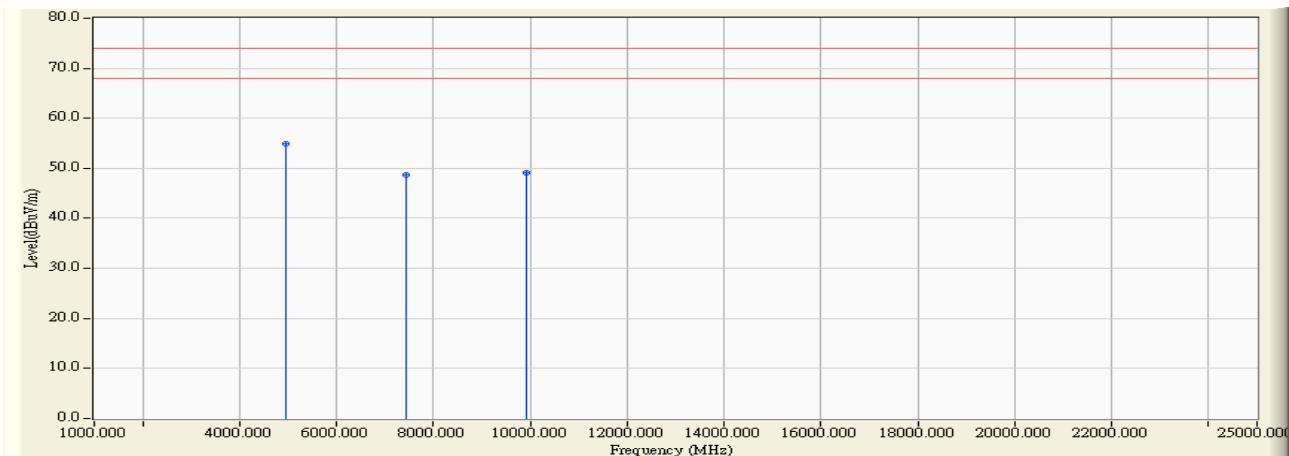
**Average Detector:**

Frequency MHz	Peak Measurement dBuV/m	Duty Cycle Correct Factor dB	Measurement Level dBuV/m	Margin dB	Limit 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 MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit 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 MHz	Peak Measurement dBuV/m	Duty Cycle Correct Factor dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Vertical</b>					
<b>Average Detector:</b>					
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 Factor	Reading Level	Measurement Level	Margin	Limit
MHz	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:

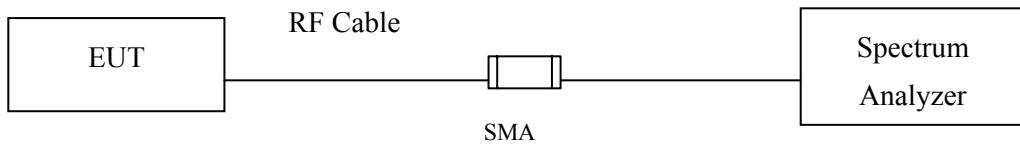
Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
XCB # 8	X Spectrum Analyzer	R&S	FSP40/ 100339	Oct, 2014
	X Horn Antenna	ETS-Lindgren	3117/ 35205	Mar, 2014
	X Horn Antenna	Schwarzbeck	BBHA9170/209	Jan, 2015
	X Horn Antenna	TRC	AH-0801/95051	Aug, 2014
	X Pre-Amplifier	EMCI	EMC012630SE/980210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

Note:

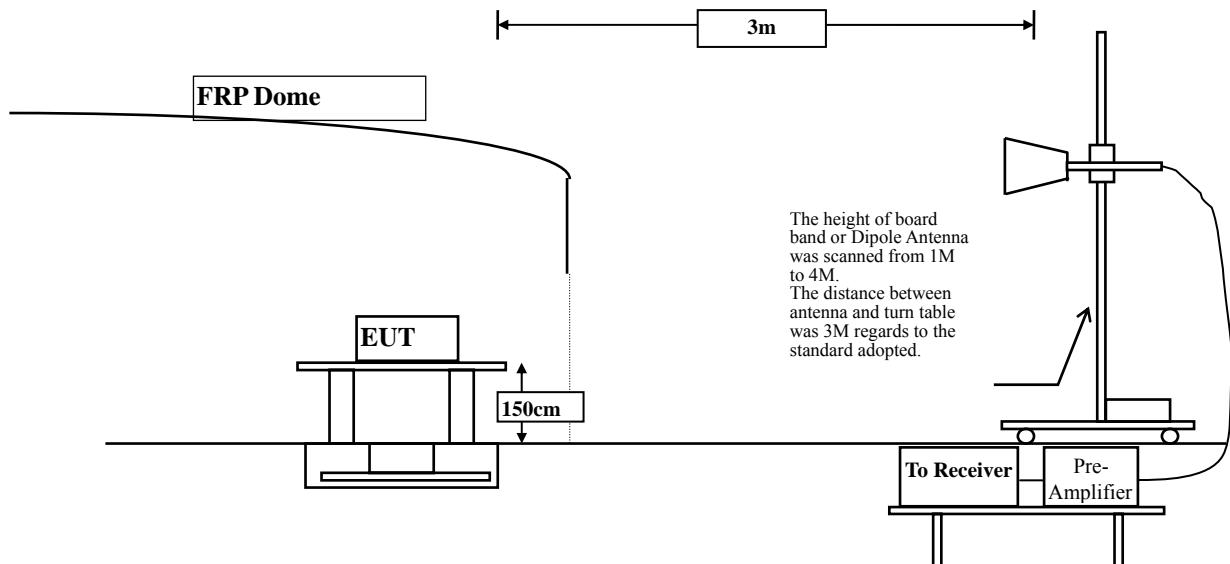
1. All equipments are calibrated every one year.
2. The test equipments marked by “X” are used to measure the final test results.

## 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

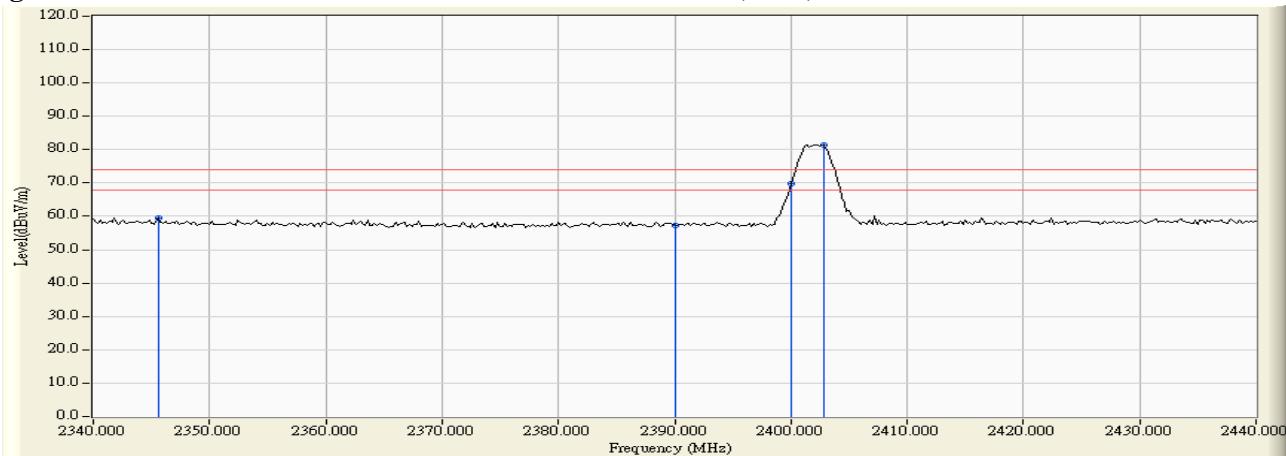
Product : ASUS WT425 Wireless Optical Mouse  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (2402 MHz)

#### RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/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.

**Average Detector:**

Frequency MHz	Peak Measurement dB $\mu$ V/m	Duty Cycle Factor dB	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m	Result Pass
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**Horizontal****Average Detector:**

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

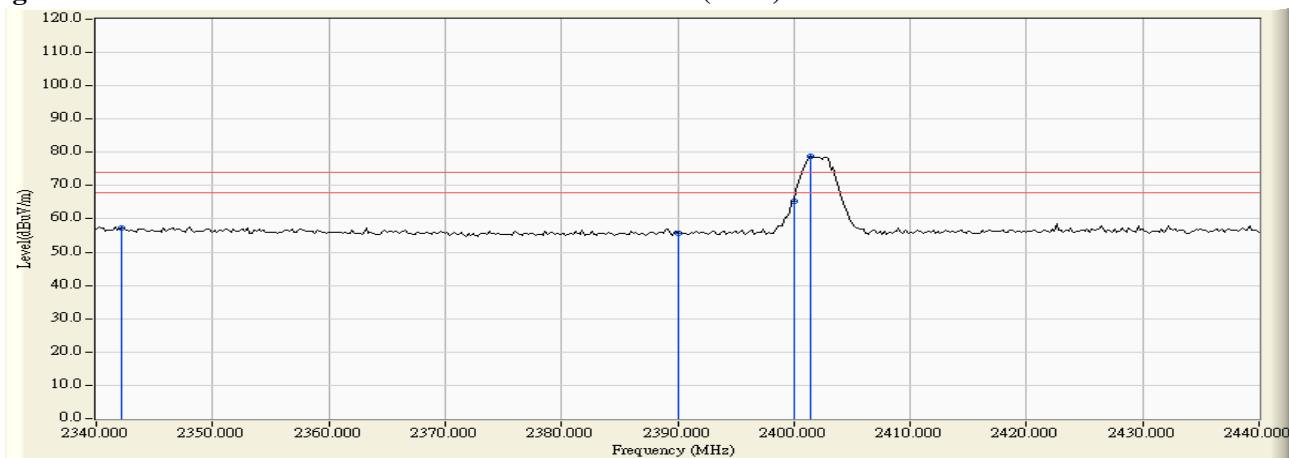
Note:

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 (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/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 Measurement	Duty Cycle Factor	Measurement Level	Margin	Limit	Result Pass
MHz	dB $\mu$ V/m	dB	dB $\mu$ V/m	dB	dB $\mu$ V/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

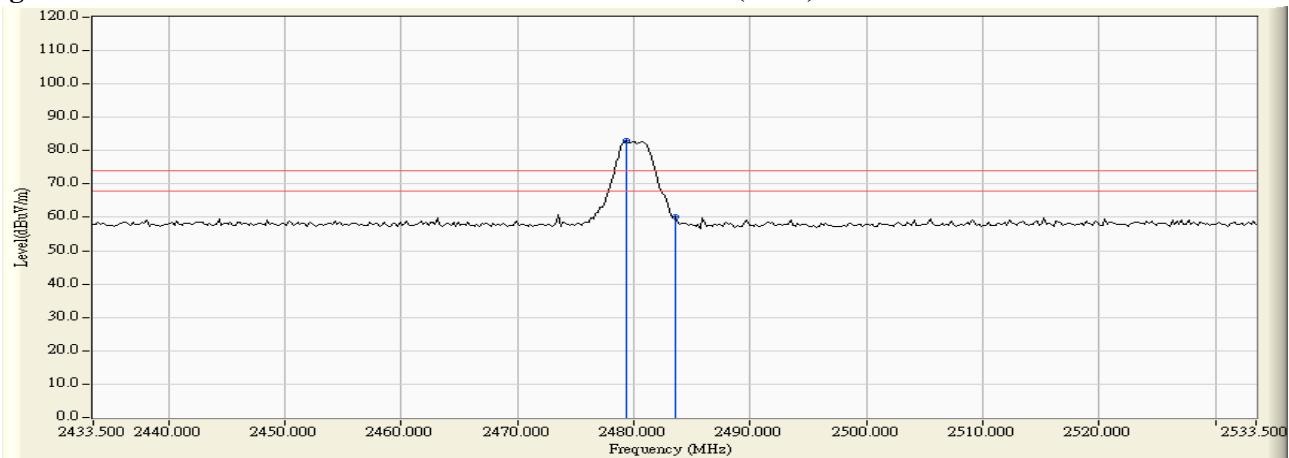
Note:

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 (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/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 MHz	Peak Measurement dB $\mu$ V/m	Duty Cycle Factor dB	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m	Result Pass
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**Horizontal****Average Detector:**

2483.500	60.156	-30.458	29.698	-24.302	54.000	Pass
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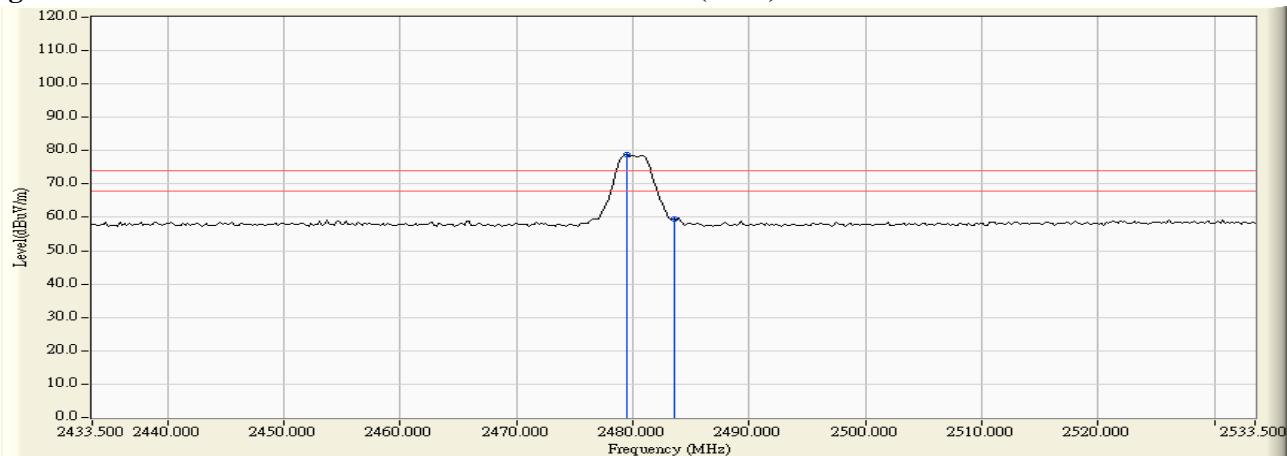
Note:

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 (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/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.

**Average Detector:**

Frequency MHz	Peak Measurement dB $\mu$ V/m	Duty Cycle Factor dB	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m	Result Pass
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**Vertical****Average Detector:**

2483.500	59.648	-30.458	29.190	-24.810	54.000	Pass
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Note:

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

## 5. Duty Cycle

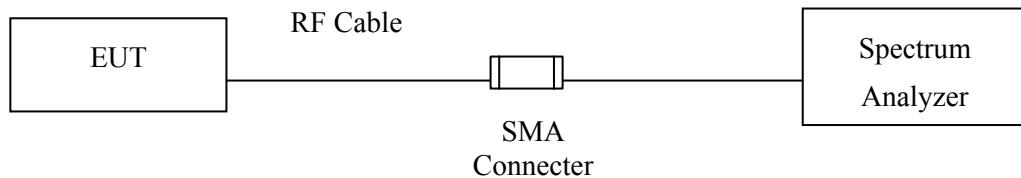
### 5.1. Test Equipment

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

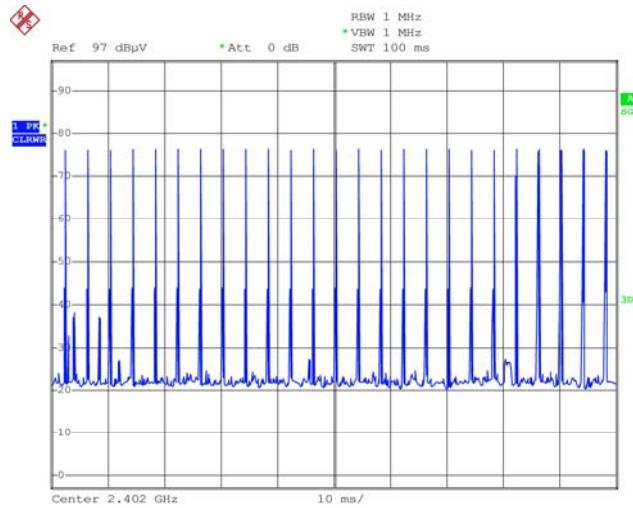


### 5.3. Uncertainty

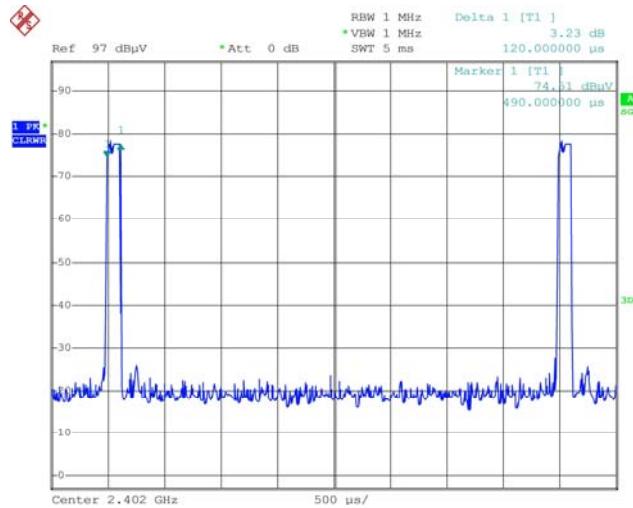
± 150Hz

## 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=  $0.12\text{ms} \times 25 = 3.000\text{ms}$

Duty Cycle=  $3.000\text{ms} / 100\text{ms} = 0.03$

Duty Cycle correction factor=  $20 \text{ LOG } 0.03 = -30.458 \text{ dB}$

<b>Duty Cycle correction factor</b>	<b>-30.458</b>	<b>dB</b>
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**6. EMI Reduction Method During Compliance Testing**

No modification was made during testing.