

FCC CFR47 PART 15 SUBPART C(15.249)  
CERTIFICATION  
TEST REPORT

FOR

Lamax Group Co., Ltd.

2.4G Wireless Mice

Model No.: LMM-8068

Prepared for	: Lamax Group Co., Ltd.
Address	: Floor 18C, Block 3B, Jinhong Kaixuan City, Bao'an District, Shenzhen, China
Prepared by	: SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD.
Address	: Xingyuan Industrial Park, Tongda Road, Bao'an Blvd., Bao'an District, Shenzhen, Guangdong, China
Report Number	: LCS1109192400F
Date of Test	: September 19, 2011 - September 29, 2011
Date of Report	: September 29, 2011

# **TEST REPORT** **FCC CFR 47 PART 15 C(15.249)**

**Report Reference No. .... : LCS1109192400F**

**Date of issue..... : September 29, 2011**

**Testing Laboratory Name ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.**

**Address..... : Xingyuan Industrial Park, Tongda Road, Bao'an Blvd., Bao'an District, Shenzhen, Guangdong, China**

**Testing location/ procedure..... : Full application of Harmonised standards ☒**  
**Partial application of Harmonised standards ☐**  
**Other standard testing method ☐**

**Applicant's name..... : Lamax Group Co., Ltd.**

**Address..... : Floor 18C, Block 3B, Jinhong Kaixuan City, Bao'an District, Shenzhen, China**

## **Test specification**

**Standard..... : FCC CFR 47 PART 15 Subpart C: 2011, ANSI C63.4-2009**

**Test Report Form No. .... : LCSEMC-1.0**

**TRF Originator..... : Shenzhen LCS Compliance Testing Laboratory Ltd.**

**Master TRF ..... : Dated 2011-03**

## **SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD. All rights reserved.**

This publication may be reproduced in whole or in part for non-commercial purposes as long as the SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD. is acknowledged as copyright owner and source of the material. SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

**Test item description..... : 2.4G Wireless Mice**

**Trade Mark..... : N/A**

**Manufacturer ..... : Lamax Group Co., Ltd.**

**Model/Type reference ..... : LMM-8068(RX)**

**Ratings..... : DC 1.5V, Frequency Range: 2405.00-2475.00MHz**

**Result ..... : Positive**

**Compiled by:**

*Bobo Li*

**Supervised by:**

*Vito Cao*

**Approved by:**

*Gavin Liang*

Bobo Li/ File administrators

Vito Cao/ Technique principal

Gavin Liang/ Manager

**EMC -- TEST REPORT**

<b>Test Report No. : LCS1109192400F</b>	<u>September 29, 2011</u> Date of issue
---	--

Type / Model.....	: LMM-8068(RX)
EUT.....	: 2.4G Wireless Mice
<b>Applicant.....</b>	<b>: Lamax Group Co., Ltd.</b>
Address.....	: Floor 18C, Block 3B, Jinhong Kaixuan City, Bao'an District, Shenzhen, China
Telephone.....	: /
Fax.....	: /
Contact.....	: /
<b>Manufacturer.....</b>	<b>: Lamax Group Co., Ltd.</b>
Address.....	: Floor 18C, Block 3B, Jinhong Kaixuan City, Bao'an District, Shenzhen, China
Telephone.....	: /
Fax.....	: /
Contact.....	: /
<b>Factory.....</b>	<b>: /</b>
Address.....	: /
Telephone.....	: /
Fax.....	: /
Contact.....	: /

<b>Test Result</b> according to the standards on page 5: <b>Positive</b>
--

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

## TABLE OF CONTENTS

Test Report Description	Page
<b>1. GENERAL INFORMATION.....</b>	<b>5</b>
1.1. Description of Device (EUT).....	5
1.2. Description of Test Facility .....	5
1.3. Statement of the measurement uncertainty .....	5
1.4. Measurement Uncertainty .....	5
<b>2. TEST METHODOLOGY.....</b>	<b>6</b>
2.1. EUT Configuration .....	6
2.2. EUT Exercise.....	6
2.3. General Test Procedures .....	6
2.4. Description Of Test Modes.....	6
<b>3. CONNECTION DIAGRAM OF TEST SYSTEM .....</b>	<b>7</b>
<b>4. SUMMARY OF TEST RESULTS.....</b>	<b>7</b>
<b>5. §15.203 ANTENNA REQUIREMENT.....</b>	<b>8</b>
5.1. Standard Applicable.....	8
5.2. Antenna Connected Construction .....	8
<b>6. §15.207(A) CONDUCTED EMISSIONS.....</b>	<b>9</b>
6.1. Block Diagram of Test Setup.....	9
6.2. Conducted Emission Limit .....	9
6.3. Test Results.....	9
<b>7. §15.205 §15.209(A) §15.249(A) §15.249(C) - RADIATED EMISSIONS.....</b>	<b>11</b>
7.1. Limit.....	11
7.2. Measuring Instruments and Setting .....	11
7.3. Test Procedures.....	12
7.4. Test Equipment List and Details.....	12
7.5. Test Setup .....	13
7.6. Test Data .....	13
<b>8. §15.249(A) OUT OF BAND EMISSIONS.....</b>	<b>17</b>
8.1. Limit.....	17
8.2. Test Procedures.....	17
8.3. Test Equipment List and Details.....	17
8.4. Test Data .....	17
<b>9. §15.249 BAND EDGES MEASUREMENT .....</b>	<b>19</b>
9.1. Limit.....	19
9.2. Test Equipment .....	19
9.3. Block Diagram of Test Setup.....	19
9.4. Test Procedure .....	19
9.5. Test Results.....	20
<b>10. MANUFACTURER/ APPROVAL HOLDER DECLARATION.....</b>	<b>24</b>

# 1. GENERAL INFORMATION

## 1.1. Description of Device (EUT)

EUT : 2.4G Wireless Mice

Model Number : LMM-8068(RX)

Power Supply : DC 5V

## 1.2. Description of Test Facility

Site Description  
EMC Lab. : Accredited by CNAS, June 04, 2010  
The Certificate Registration Number. is L4595.  
Accredited by FCC, July 14, 2011  
The Certificate Registration Number. is 899208.  
Accredited by Industry Canada, May. 02, 2011  
The Certificate Registration Number. is 9642A-1

## 1.3. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

## 1.4. Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
Radiation Uncertainty	:	30MHz~200MHz	$\pm 2.96\text{dB}$	(1)
		200MHz~1000MHz	$\pm 3.10\text{dB}$	(1)
Conduction Uncertainty	:	150kHz~30MHz	$\pm 1.63\text{dB}$	(1)
Power disturbance	:	30MHz~300MHz	$\pm 1.60\text{dB}$	(1)

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

## 2. 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 radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen LCS Compliance Testing Laboratory Ltd..

### 2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

### 2.2. EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209 and 15.249 under the FCC Rules Part 15 Subpart C.

### 2.3. General Test Procedures

#### 2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

#### 2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4

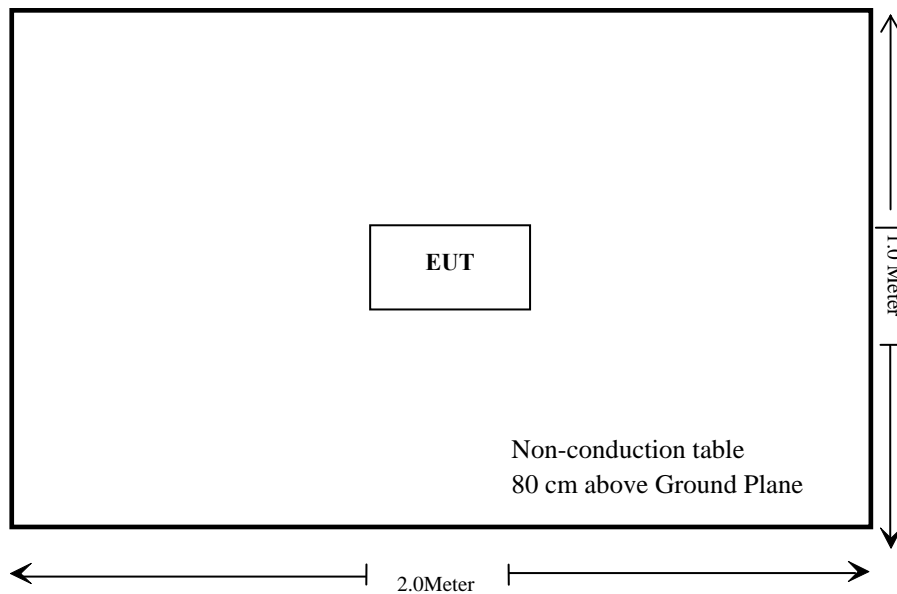
### 2.4. Description Of Test Modes

The EUT has been tested under operating condition.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

Then, the worst case is FSK, these were chosen for full testing.

### 3. CONNECTION DIAGRAM OF TEST SYSTEM



### 4. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conduction Emissions	Compliant
§15.205(a)§15.209(a), §15.249(a), §15.249(c)	Radiated Emissions	Compliant*
§15.249(d)	Out of band emissions	Compliant
§15.249	Band Edges emissions	Compliant

\* Within the measurement uncertainty.

## 5. §15.203 ANTENNA REQUIREMENT

### 5.1. Standard Applicable

According to §15.203, Antenna requirement.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the re-sponsible party shall be used with the device. The use of a permanently attached antenna or of an an-tenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be re-placed by the user, but the use of a standard antenna jack or electrical connector is prohibited. This re-quirement does not apply to carrier current devices or to devices operated under the provisions of Sec-tions 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field dis-turbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

### 5.2. Antenna Connected Construction

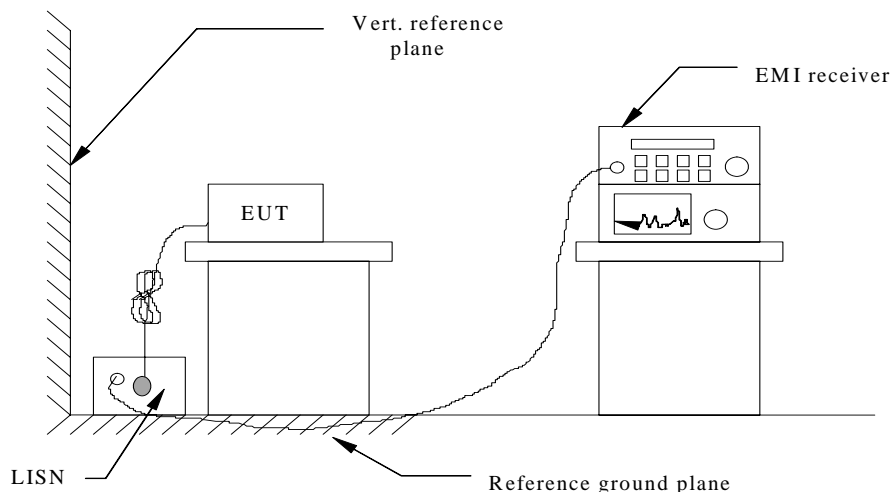
The directional gains of antenna used for transmitting is 1.5dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

Result: Compliance.



## 6. §15.207(a) CONDUCTED EMISSIONS

### 6.1. Block Diagram of Test Setup



### 6.2. Conducted Emission Limit

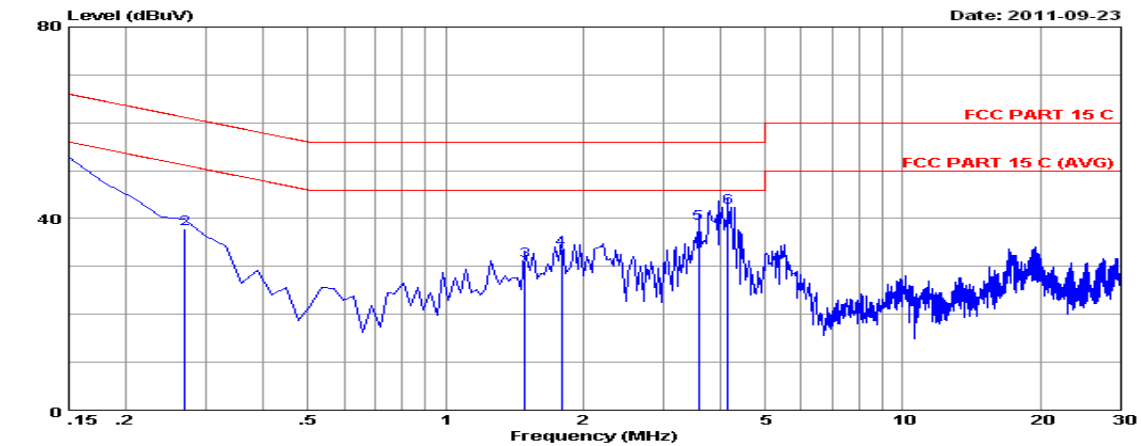
For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

### 6.3. Test Results

PASS.

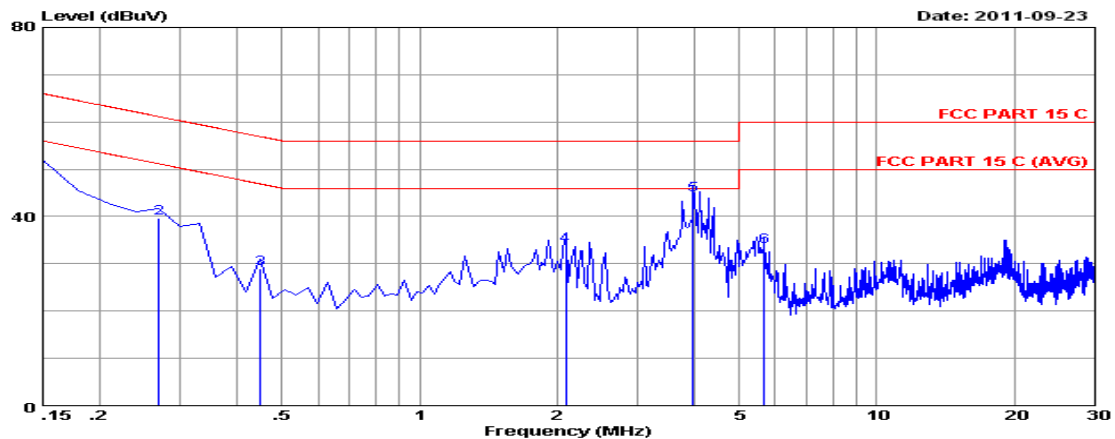
The test data please refer to following page.



Site no :1#conduction Data No :3  
 Dis./Ant. : \*\* 2011 ESH2-25 LINE  
 Limit : FCC PART 15 C  
 Env./Ins. : Temp:23' Humi:54% Engineer : Willis  
 EUT : 2.4G Wireless Mice  
 Power Rating : DC 5V From PC Input AC 120V/60Hz  
 Test Mode : TX Mode  
 M/N : LMM-8068

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15000	0.17	9.88	40.68	50.73	66.00	15.27	QP
2	0.26940	0.18	9.88	27.78	37.84	61.14	23.30	QP
3	1.493	0.27	9.90	21.07	31.24	56.00	24.76	QP
4	1.792	0.29	9.90	23.54	33.73	56.00	22.27	QP
5	3.583	0.34	9.94	28.66	38.94	56.00	17.06	QP
6	4.150	0.35	9.94	31.95	42.24	56.00	13.76	QP

Remarks: 1. Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit)+Reading.  
 2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



Site no :1#conduction Data No :4  
 Dis./Ant. : \*\* 2011 ESH2-25 NEUTRAL  
 Limit : FCC PART 15 C  
 Env./Ins. : Temp:23' Humi:54% Engineer : Willis  
 EUT : 2.4G Wireless Mice  
 Power Rating : DC 5V From PC Input AC 120V/60Hz  
 Test Mode : TX Mode  
 M/N : LMM-8068

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15000	0.21	9.88	39.77	49.86	66.00	16.14	QP
2	0.26940	0.21	9.88	29.49	39.58	61.14	21.56	QP
3	0.44850	0.22	9.88	18.83	28.93	56.90	27.97	QP
4	2.090	0.27	9.91	23.80	33.98	56.00	22.02	QP
5	3.971	0.31	9.94	34.43	44.68	56.00	11.32	QP
6	5.672	0.35	9.95	23.33	33.63	60.00	26.37	QP

Remarks: 1. Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit)+Reading.  
 2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

## 7. §15.205 §15.209(a) §15.249(a) §15.249(c) - RADIATED EMISSIONS

### 7.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

### 7.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1000KHz / 1000KHz for peak

Spectrum Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

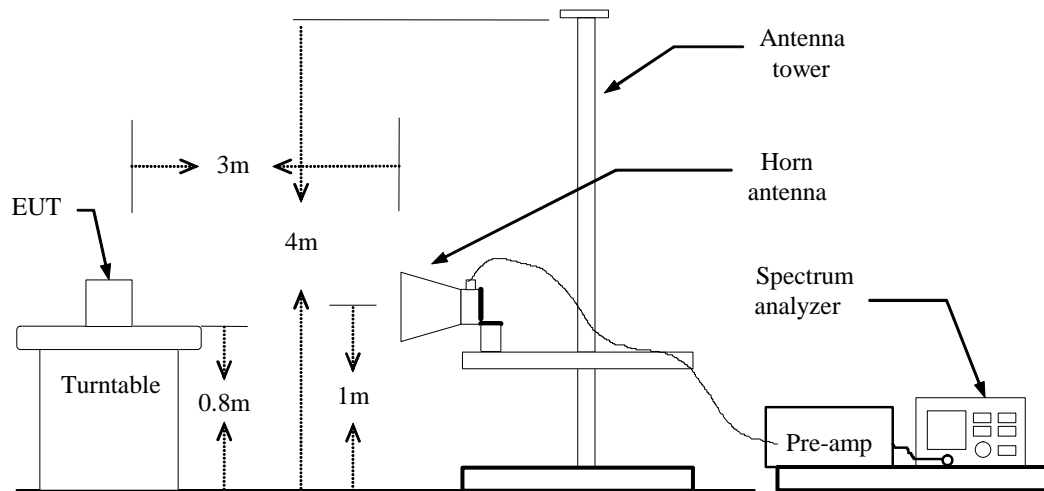
### 7.3. Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 m to 4 m) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

### 7.4. Test Equipment List and Details

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2011/06
2	EMI Test Receiver	ROHDE & SCHWARZ	ESPI	1164.6407.03	2011/06
3	Log per Antenna	ROHDE & SCHWARZ	VULB9163	9163-470	2011/06
4	Amplifier	SCHWARZBECK	PAP-0001	21002	2011/06
5	Horn Antenna	Sunol Sciences	DRH-118	A052604	2011/06
6	Spectrum	Agilent	E4407B	MY41440292	2011/06
7	Amp	HP	8449B	3008A00863	2011/06

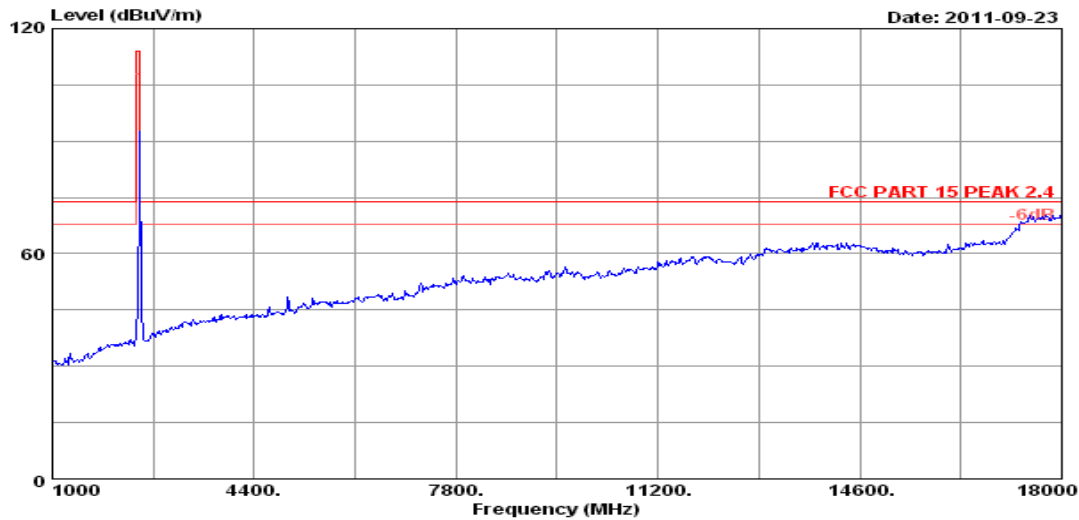
## 7.5. Test Setup



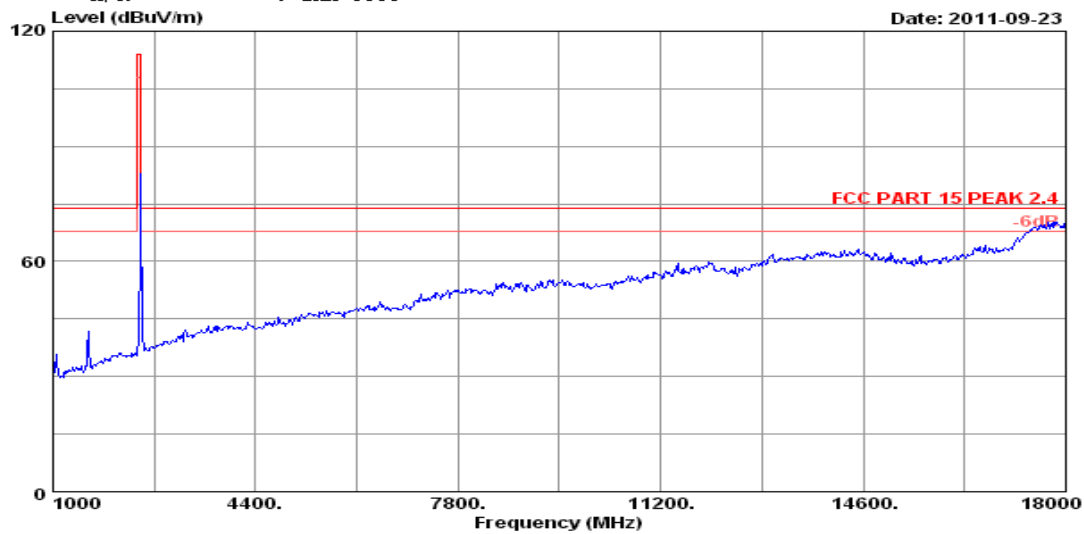
## 7.6. Test Data

**PASS.**

Please refer to the following page.

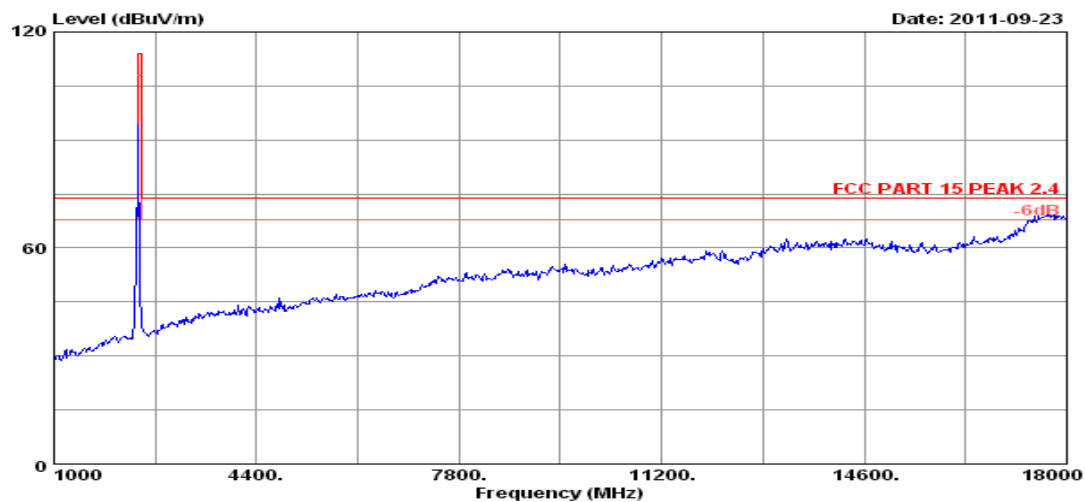


Site no. : RF Chamber Data no. : 1  
 Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54% Engineer : Willis  
 EUT : 2.4G Wireless Mice  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : 2405MHz Tx  
 M/N : LMM-8068

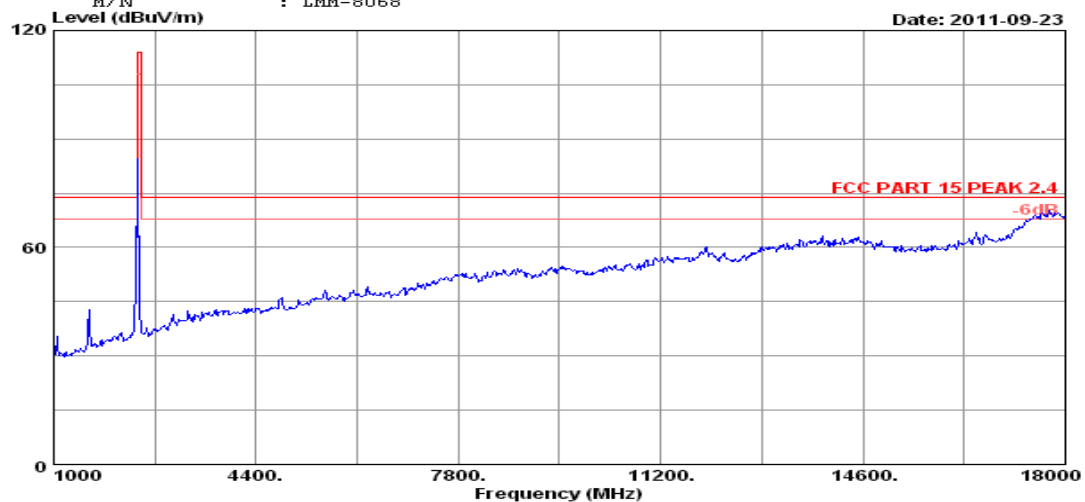


Site no. : RF Chamber Data no. : 3  
 Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54% Engineer : Willis  
 EUT : 2.4G Wireless Mice  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : 2405MHz Tx  
 M/N : LMM-8068

Freq.	Level	Read Level	Ant. Fac	Pre. Fac	Cab.Los	Over limit	Limits	Remark	Pol/Phase
(MHz)	(dBuV/m)	(dBuV)	(dB/m)	(dB)	(dB)	(dB)	(dBuV/m)		
2405.00	92.99	92.56	29.49	36.60	7.54	-21.01	114.00	Peak	Horizontal
2405.00	90.75	88.32	29.49	36.60	7.54	-5.68	94.00	Average	Horizontal
2405.00	89.60	89.17	29.49	36.60	7.54	-24.40	114.00	Peak	Vertical
2405.00	87.34	86.91	29.49	36.60	7.54	-6.66	94.00	Average	Vertical
4810.00	56.75	46.40	34.52	34.95	10.78	-17.25	74.00	Peak	Vertical
4810.00	38.15	27.80	34.52	34.95	10.78	-15.85	54.00	Average	Vertical

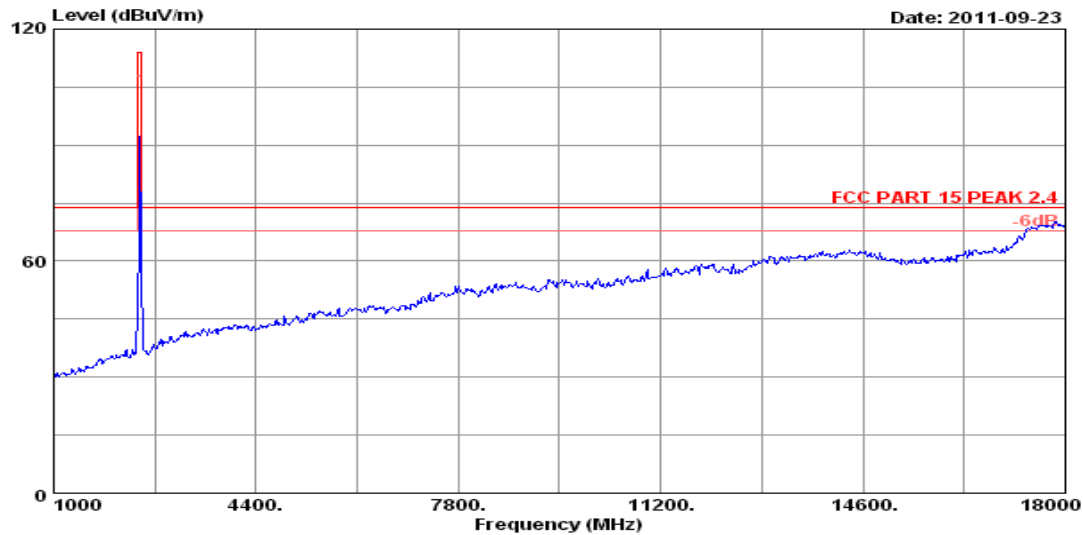


Site no. : RF Chamber Data no. : 7  
 Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54% Engineer : Willis  
 EUT : 2.4G Wireless Mice  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : 2450MHz Tx  
 M/N : LMM-8068

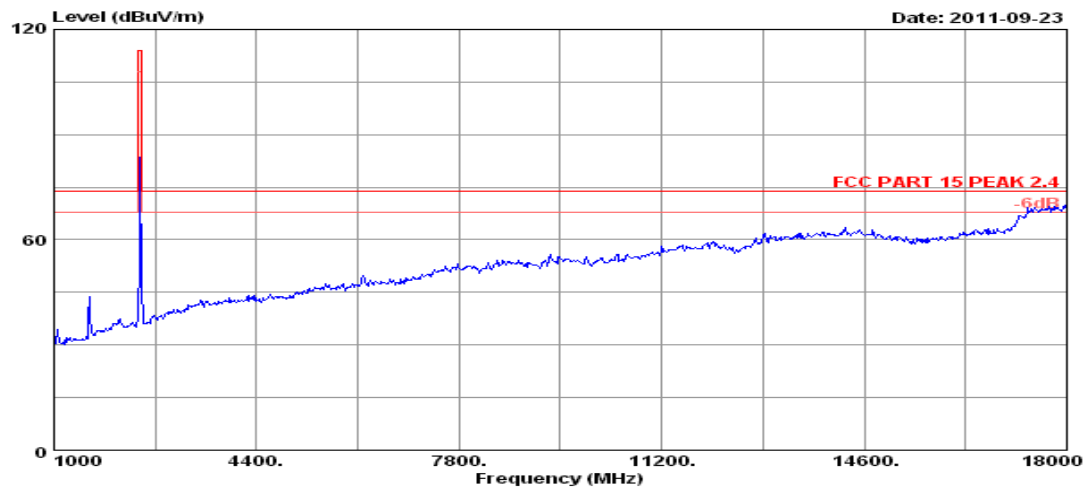


Site no. : RF Chamber Data no. : 5  
 Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54% Engineer : Willis  
 EUT : 2.4G Wireless Mice  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : 2450MHz Tx  
 M/N : LMM-8068

Freq. (MHz)	Level (dBuV/m)	Read Level (dBuV)	Ant. Fac (dB/m)	Pre. Fac (dB)	Cab.Los (dB)	Over limit (dB)	Limits (dBuV/m)	Remark	Pol/Phase
2450.00	91.74	91.31	29.49	36.60	7.54	-22.26	114.00	Peak	Horizontal
2450.00	90.70	90.27	29.49	36.60	7.54	-3.30	94.00	Average	Horizontal
2450.00	87.70	87.28	29.49	36.60	7.54	-23.29	114.00	Peak	Vertical
2450.00	85.62	85.19	29.49	36.60	7.54	-8.38	94.00	Average	Vertical
4900.00	55.45	45.10	34.52	34.95	10.78	-18.55	74.00	Peak	Vertical
4900.00	36.65	26.30	34.52	34.95	10.78	-17.35	54.00	Average	Vertical



Site no. : RF Chamber Data no. : 9  
 Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54% Engineer : Willis  
 EUT : 2.4G Wireless Mice  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : 2475MHz Tx  
 M/N : LMM-8068



Site no. : RF Chamber Data no. : 11  
 Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54% Engineer : Willis  
 EUT : 2.4G Wireless Mice  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : 2475MHz Tx  
 M/N : LMM-8068

Freq. (MHz)	Level (dBuV/m)	Read Level (dBuV)	Ant. Fac (dB/m)	Pre. Fac (dB)	Cab.Los (dB)	Over limit (dB)	Limits (dBuV/m)	Remark	Pol/Phase
2475.00	90.86	86.94	25.10	36.70	7.68	-23.14	114.00	Peak	Horizontal
2475.00	88.05	84.13	25.10	36.70	7.68	-5.95	94.00	Average	Horizontal
2475.00	84.75	88.67	25.10	36.70	7.68	-29.25	114.00	Peak	Vertical
2475.00	82.57	78.65	25.10	36.70	7.68	-11.43	94.00	Average	Vertical
4950.00	55.25	44.83	34.63	35.02	10.81	-18.75	74.00	Peak	Vertical
4950.00	36.13	25.71	34.63	35.02	10.81	-17.87	54.00	Average	Vertical



## 8. §15.249(A) OUT OF BAND EMISSIONS

### 8.1. Limit

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.

### 8.2. Test Procedures

- 8.2.1 Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 8.2.2 Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- 8.2.3 Set the RBW to 1 MHz and VBW of spectrum analyzer to 3 MHz for PK Detector, Set the RBW to 1 MHz and VBW of spectrum analyzer to 10 Hz for AV Detector with a convenient frequency span including the specified frequencies of band edges.
- 8.2.4 Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- 8.2.5 Repeat above procedures until all measured frequencies were complete.

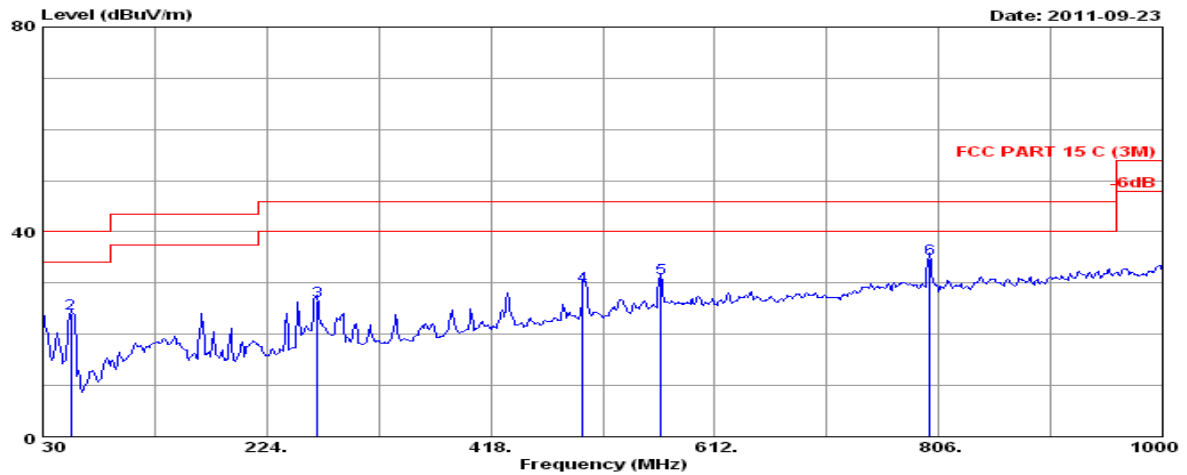
### 8.3. Test Equipment List and Details

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2011/06
2	EMI Test Receiver	ROHDE & SCHWARZ	ESPI	1164.6407.03	2011/06
3	Log per Antenna	ROHDE & SCHWARZ	VULB9163	9163-470	2011/06
4	Amplifier	SCHWARZBECK	PAP-0001	21002	2011/06
5	EMI Test Software	AUDIX	E3	N/A	2011/06
6	Amplifier	HP	8449B	3008A00277	2011/06
7	Horn Antenna	Sunol Sciences	DRH-118	A052604	2011/06

### 8.4. Test Data

**PASS.**

Please refer to the following page.

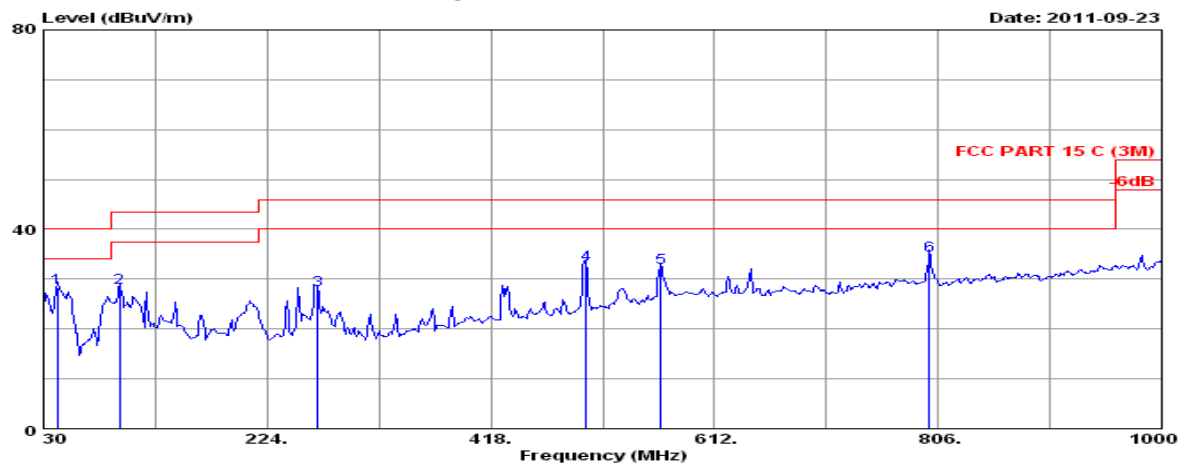


Site no. : 3m Chamber  
 Dis. / Ant. : 3m 2010 CBL6111C  
 Limit : FCC PART 15 C (3M)  
 Env. / Ins. : 24°C/56%  
 EUT : 2.4G Wireless Mice  
 Power rating : DC 5V From PC Input AC 120V/60Hz  
 Test Mode : TX Mode  
 M/N : LMM-8068

Data no. : 1  
 Ant. pol. : HORIZONTAL  
 Engineer : Willis

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	30.000	20.00	0.61	2.79	23.40	40.00	16.60	QP
2	54.250	7.54	0.81	15.63	23.98	40.00	16.02	QP
3	267.650	13.50	2.28	10.84	26.62	46.00	19.38	QP
4	497.540	18.27	3.53	7.70	29.50	46.00	16.50	QP
5	565.440	19.61	3.92	7.39	30.92	46.00	15.08	QP
6	798.240	22.02	4.89	7.95	34.86	46.00	11.14	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber  
 Dis. / Ant. : 3m 2010 CBL6111C  
 Limit : FCC PART 15 C (3M)  
 Env. / Ins. : 24°C/56%  
 EUT : 2.4G Wireless Mice  
 Power rating : DC 5V From PC Input AC 120V/60Hz  
 Test Mode : TX Mode  
 M/N : LMM-8068

Data no. : 2  
 Ant. pol. : VERTICAL  
 Engineer : Willis

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	41.640	13.42	0.71	14.23	28.36	40.00	11.64	QP
2	95.960	9.84	1.09	17.34	28.27	43.50	15.23	QP
3	267.650	13.50	2.28	12.01	27.79	46.00	18.21	QP
4	500.450	18.30	3.55	11.09	32.94	46.00	13.06	QP
5	565.440	19.61	3.92	8.77	32.30	46.00	13.70	QP
6	798.240	22.02	4.89	7.89	34.80	46.00	11.20	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

## 9. §15.249 BAND EDGES MEASUREMENT

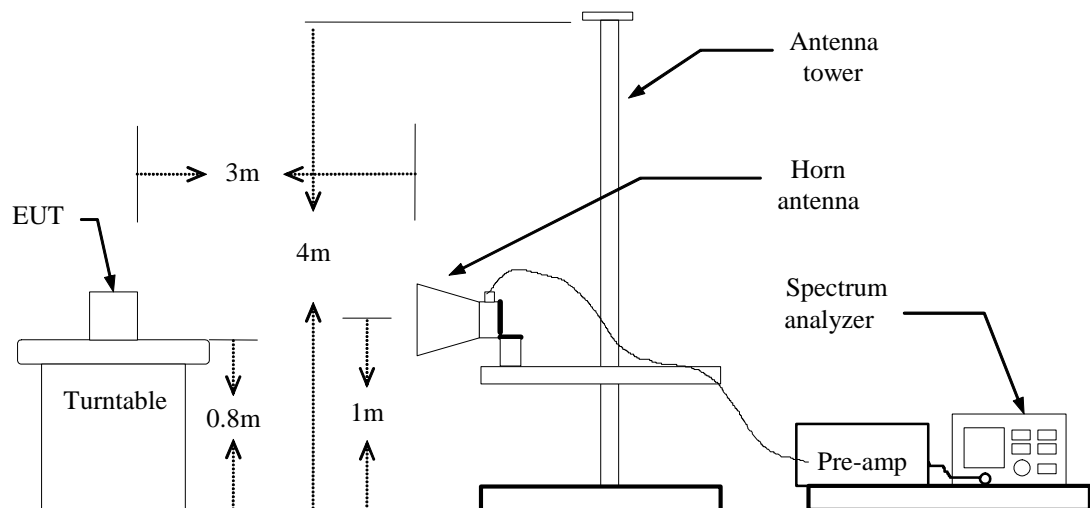
### 9.1. Limit

According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

### 9.2. Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Spectrum Analyzer	Anritsu	MS2661C	6200140915	2011-06	1 Year
Test Receiver	Rohde&Schwarz	ESCS30	828985/018	2011-06	1 Year
Antenna	Schwarzbeck	VULB9163	142	2011-06	1 Year
Horn-antenna	Schwarzbeck	BBHA9120D	D:266	2011-06	1 Year
DC Filter	MPE	23872C	N/A	2011-06	1 Year

### 9.3. Block Diagram of Test Setup



### 9.4. Test Procedure

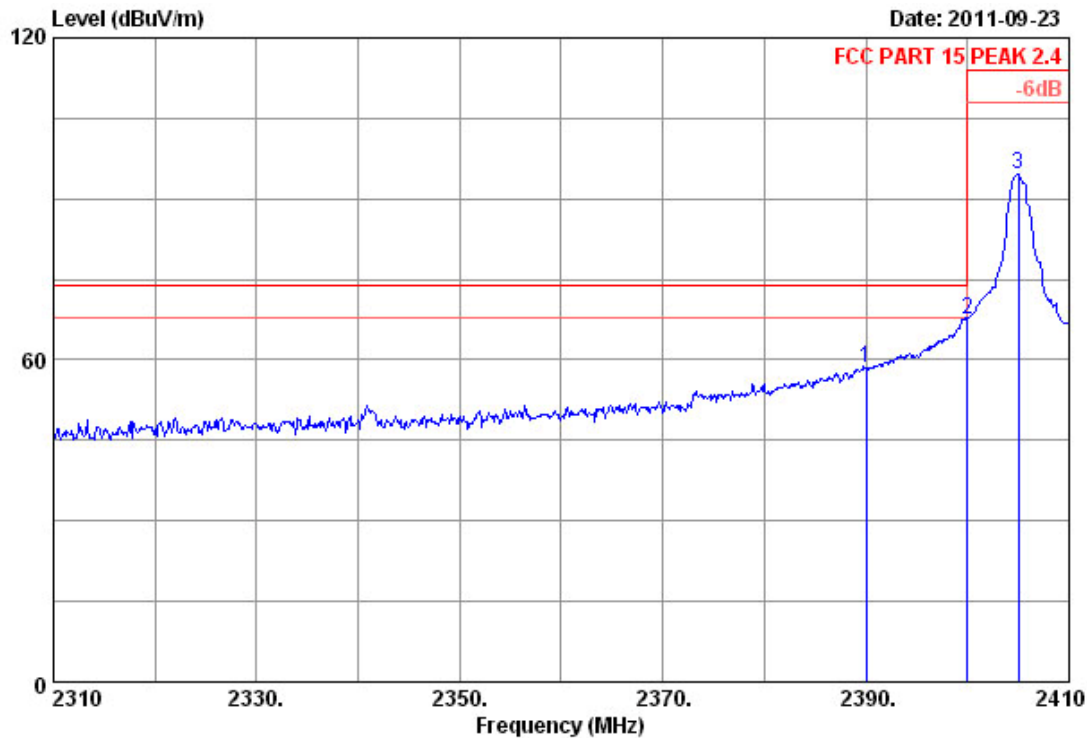
The EUT is placed on a turntable, which is 0.8m above the ground plane. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

Peak: RBW=VBW=1MHz / Sweep=AUTO

Repeat the procedures until the peak versus polarization are measured.

## 9.5. Test Results

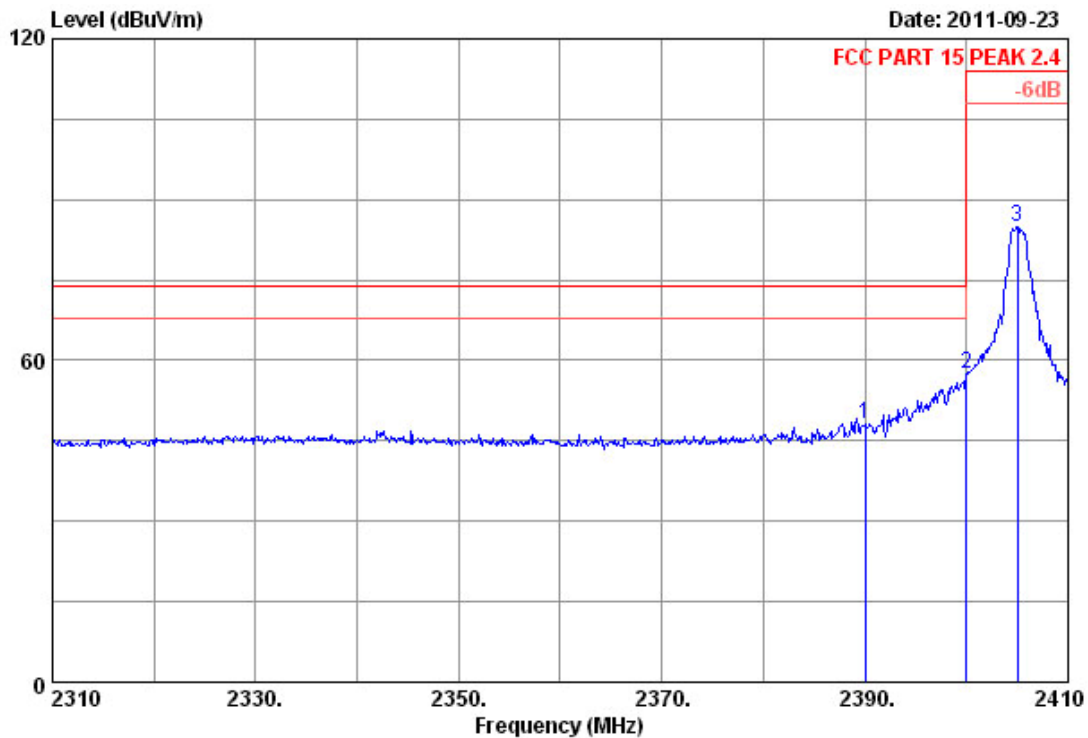


Site no. : RF Chamber Data no. : 13  
 Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4

	Ant.	Cable	Amp.		Emission				
Freq.	Factor	loss	Factor	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1 2390.000	29.44	7.39	36.62	58.26	58.47	74.00	15.53	Peak	
2 2400.000	29.44	7.43	36.62	67.41	67.66	74.00	6.34	Peak	
3 2405.000	29.45	7.43	36.62	94.24	94.50	114.00	19.50	Peak	

### Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

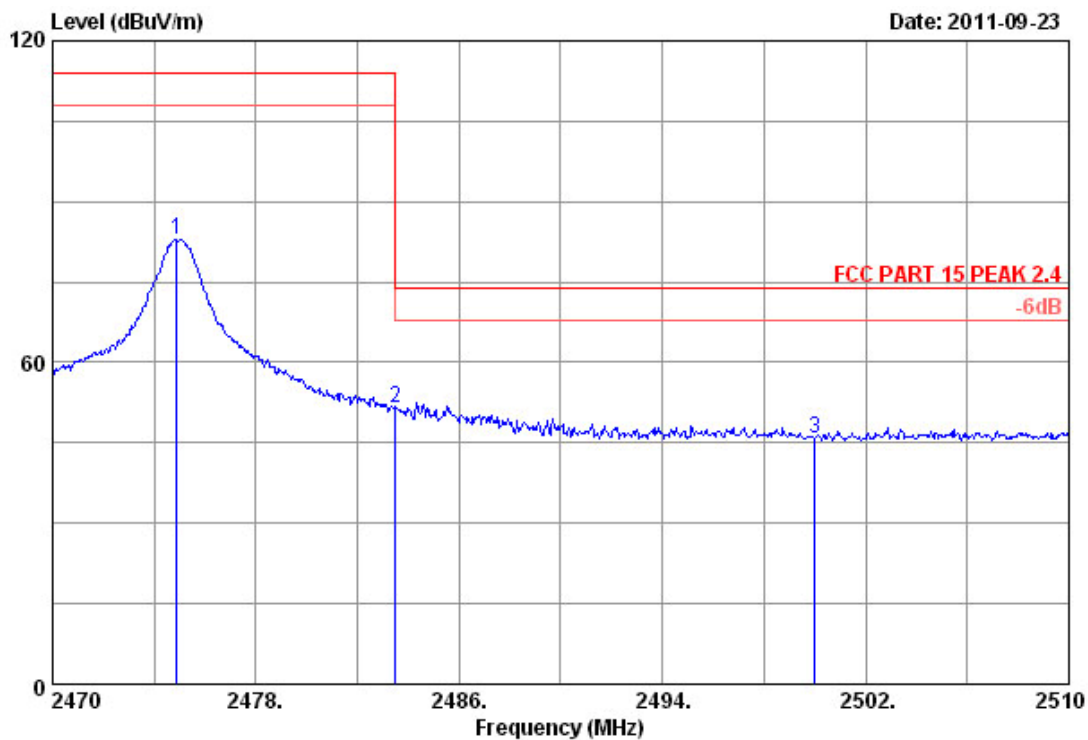


Site no. : RF Chamber Data no. : 14  
 Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4

	Ant. Freq. (MHz)	Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	29.44	7.39	36.62	47.99	48.20	74.00	25.80	Peak
2	2400.000	29.44	7.43	36.62	57.09	57.34	74.00	16.66	Peak
3	2405.000	29.45	7.43	36.62	84.50	84.76	114.00	29.24	Peak

## Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

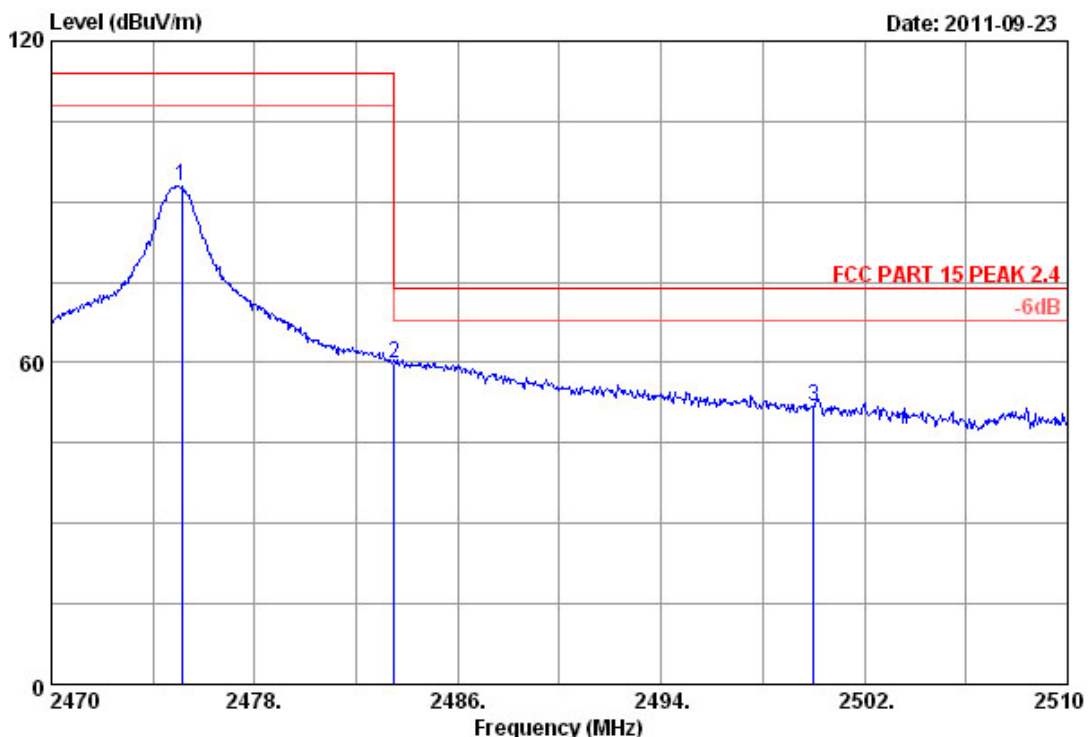


Site no. : RF Chamber                      Data no. : 15  
 Dis. / Ant. : 3m 3115 (0911)              Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4

	Ant. Freq. (MHz)	Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2474.880	29.49	7.54	36.60	82.37	82.80	114.00	31.20	Peak
2	2483.500	29.49	7.58	36.60	51.05	51.52	74.00	22.48	Peak
3	2500.000	29.50	7.62	36.60	45.35	45.87	74.00	28.13	Peak

## Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : RF Chamber Data no. : 16  
 Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4

	Ant.	Cable	Amp.		Emission				
Freq.	Factor	loss	Factor	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1 2475.120	29.49	7.54	36.60	92.40	92.83	114.00	21.17	Peak	
2 2483.500	29.49	7.58	36.60	59.37	59.84	74.00	14.16	Peak	
3 2500.000	29.50	7.62	36.60	51.40	51.92	74.00	22.08	Peak	

## Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

10. MANUFACTURER/ APPROVAL HOLDER DECLARATION

The following identical model(s):

--	--	--
----	----	----

Belong to the tested device:

Product description : 2.4G Wireless Mice  
Model name : LMM-8068

No additional models were tested.

-----THE END OF THE REPORT-----