

# FCC TEST REPORT

for

Acrox Technologies Co., Ltd.

2.4G WIRELESS MOUSE

Model Number: GMY/GMX/GMZ

FCC ID: PRDMU14

Prepared for : Acrox Technologies Co., Ltd.

Address : 4F., No.89, Minshan St., Neihu Dist., Taipei City 114, ,  
Taiwan, R.O.C

Prepared by : Keyway Testing Technology Co., Ltd.

Address : Baishun Industrial Zone, Zhangmutou Town,  
Dongguan, Guangdong, China

Tel: 86-769-8718 2258

Fax: 86-769-8718 1058

Report No. : 12KWE12258F

Date of Test : Dec.2~9, 2012

Date of Report : Dec.12,2012

## TABLE OF CONTENTS

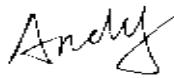
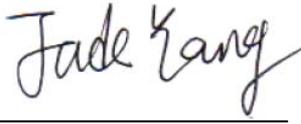
### Test Report Declaration

#### Page

<b>1. GENERAL PRODUCT INFORMATION .....</b>	<b>4</b>
1.1. Product Function.....	4
1.2. Description of Device (EUT) .....	4
1.3. Independent Operation Modes.....	4
<b>2. TEST SITES .....</b>	<b>5</b>
2.1. Test Facilities .....	5
2.2. List of Test and Measurement Instruments .....	6
<b>3. TEST SET-UP AND OPERATION MODES.....</b>	<b>7</b>
3.1. Principle of Configuration Selection.....	7
3.2. Block Diagram of Test Set-up.....	7
3.3. Test Operation Mode and Test Software.....	7
3.4. Special Accessories and Auxiliary Equipment.....	7
3.5. Countermeasures to Achieve EMC Compliance .....	7
<b>4. EMISSION TEST RESULTS .....</b>	<b>8</b>
4.1. Radiated Emission Test.....	8
<b>5. 20DB OCCUPY BANDWIDTH.....</b>	<b>18</b>
5.1. Limits .....	18
<b>6. BAND EDGE COMPLIANCE TEST.....</b>	<b>20</b>
6.1. Limits .....	20
6.2. Test set .....	20
<b>7. PHOTOGRAPHS OF TEST SET-UP .....</b>	<b>25</b>
7.1. Set-up for Radiated Emission Test.....	25
<b>8. PHOTOGRAPHS OF THE EUT .....</b>	<b>26</b>



# Keyway Testing Technology Co., Ltd.

<b>Applicant:</b>	Acrox Technologies Co., Ltd. 4F., No.89, Minshan St., Neihu Dist., Taipei City 114, Taiwan, R.O.C		
<b>Manufacturer:</b>	Acrox Technologies Co., Ltd. 4F., No.89, Minshan St., Neihu Dist., Taipei City 114, Taiwan, R.O.C		
<b>Factor:</b>	Acrox Technologies Co., Ltd. Hsinmin Industria, Changan Town, Dongguan City, Guangdong, China		
<b>E.U.T:</b>	2.4G Wireless Mouse		
<b>Model Number:</b>	GMY/GMX/GMZ		
<b>Trade Name:</b>	-----	<b>Serial No.:</b>	-----
<b>Date of Receipt:</b>	Dec.1, 2012	<b>Date of Test:</b>	Dec.2~9, 2012
<b>Test Specification:</b>	FCC Part 15, Subpart B: Oct. 1, 2010 ANSI C63.4:2009		
<b>Test Result:</b>	The equipment under test was found to be compliance with the requirements of the standards applied.		
<b>Issue Date: Dec.11, 2012</b>			
Tested by:	Reviewed by:	Approved by:	
			
Andy Gao / Engineer	Jade Yang/ Supervisor	Chris Du / Manager	
<b>Other Aspects:</b>	None.		
Abbreviations: OK/P=passed	fail/F=failed	n.a/N=not applicable	E.U.T=equipment under tested
This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Keyway Testing Technology Co., Ltd.			



# 1. GENERAL PRODUCT INFORMATION

## 1.1. Product Function

Refer to Technical Construction Form and User Manual.

## 1.2. Description of Device (EUT)

Description	:	2.4G Wireless Mouse
M/N	:	GMY/GMX/GMZ
Power Supply	:	DC 1.5V
Operation Frequency	:	2408~2474MHz
Modulation Technology	:	GFSK
Antenna Type	:	Integrated PCB antenna
Antenna Gain	:	0.5dBi

## 1.3. Independent Operation Modes

The basic operation modes are:

1.3.1. EUT work continues TX mode and frequency as below:

Channel	:	Frequency
Low	:	2408MHz
Middle	:	2440MHz
High	:	2474MHz

## 1.4. Difference between Model Numbers

Note: The products are all the same except the model number.

## 2. TEST SITES

### 2.1. Test Facilities

Lab Qualifications : 944 Shielded Room built by ETS-Lindgren, USA

Date of completion: March 28, 2011

966 Chamber built by ETS-Lindgren, USA

Date of completion: March 28, 2011

Certificated by TUV Rheinland, Germany.

Registration No.: UA 50207153

Date of registration: July 13, 2011

Certificated by UL, USA

Registration No.: 100567-237

Date of registration: September 1, 2011

Certificated by Intertek

Registration No.: 2011-RTL-L1-31

Date of registration: October 11, 2011

Certificated by Industry Canada

Registration No.: 9868A

Date of registration: December 8, 2011

Certificated by FCC, USA

Registration No.: 370994

Date of registration: February 21, 2012

Certificated by CNAS China

Registration No.: CNAS L5783

Date of registration: August 8, 2012

Name of Firm : Keyway Testing Technology Co., Ltd.

Site Location : Baishun Industrial Zone, Zhangmutou Town,  
Dongguan, Guangdong, China

## 2.2. List of Test and Measurement Instruments

### 2.2.1. For radiated emission test (Below 1GHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Jul. 7,12	Jul. 7,13
Bilog Antenna	ETS-LINDGREEN	3142D	135452	Jun. 28,12	Jun. 28,13
Spectrum Analyzer	Agilent	E4411B	MY4511304	Jul. 11,12	Jul. 11,13
3m Semi-anechoic Chamber	ETS-LINDGREEN	966	KW01	Aug.29,12	Aug.29,13
Signal Amplifier	SONOMA	310	187016	Jul. 7,12	Jul. 7,13
Signal Amplifier	Agilent	8449B	3008A00251	Jul. 7,12	Jul. 7,13
RF Cable	IMRO	IMRO-400	966 Cable 1#	Jul. 7,11	Jul. 7,12
MULTI-DEVICE Controller	ETS-LINDGREEN	2090	126913	N/A	N/A

### 2.2.2. For above 1GHz radiated emission, band edge, 20dB bandwidth test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	DAZE	ZN30701	11003	Jul. 11,12	Jul. 11,13
Horn Antenna	SCHWARZBECK	BBHA9170	9170-068	Jul. 11,12	Jul. 11,13
Spectrum Analyzer	Agilent	8593E	3911A04271	Jul. 7,12	Jul. 7,13
3m Semi-anechoic Chamber	ETS-LINDGREN	966	KW01	Jul. 7,12	Jul. 7,13
Signal Amplifier	DAZE	ZN3380C	11001	Jul. 7,12	Jul. 7,13
Signal Amplifier	Agilent	8449B	3008A00251	Jul. 7,12	Jul. 7,13
RF Cable	IMRO	IMRO-400	966 Cable 1#	Jul. 7,12	Jul. 7,13
MULTI-DEVICE Controller	ETS-LINDGREN	2090	126913	N/A	N/A
Antenna Holder	ETS-LINDGREN	2070B	00109601	N/A	N/A

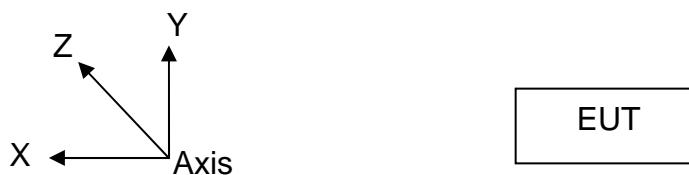
### 3. TEST SET-UP AND OPERATION MODES

#### 3.1. Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

#### 3.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



(EUT: 2.4G Wireless Mouse)

Note: By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "Y axis" position was the worst, then the final test was executed the worst condition and test data were recorded in this report. Test data as below.

Frequency (MHz)	Axis	Field Strength (dBuV/m)	Antenna Polarization
2404	X	97.06	Vertical
2404	Y	98.97	Vertical
2404	Z	96.14	Vertical

#### 3.3. Test Operation Mode and Test Software

None.

#### 3.4. Special Accessories and Auxiliary Equipment

None.

#### 3.5. Countermeasures to Achieve EMC Compliance

None.

## 4. EMISSION TEST RESULTS

### 4.1. Radiated Emission Test

#### 4.1.1. Limit 15.209 limits

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

#### 4.1.2. Fundamental and harmonics emission limits

Fundamental Frequency	Field Strength of Fundamental		Field Strength of Harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902~928 MHz	50	94	500	54
2400~2483.5 MHz	50	94	500	54
5725~5875MHz	50	94	500	54
24.0~24.25GHz	250	108	2500	68

#### 4.1.3. Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

#### 4.1.4. Test setup

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

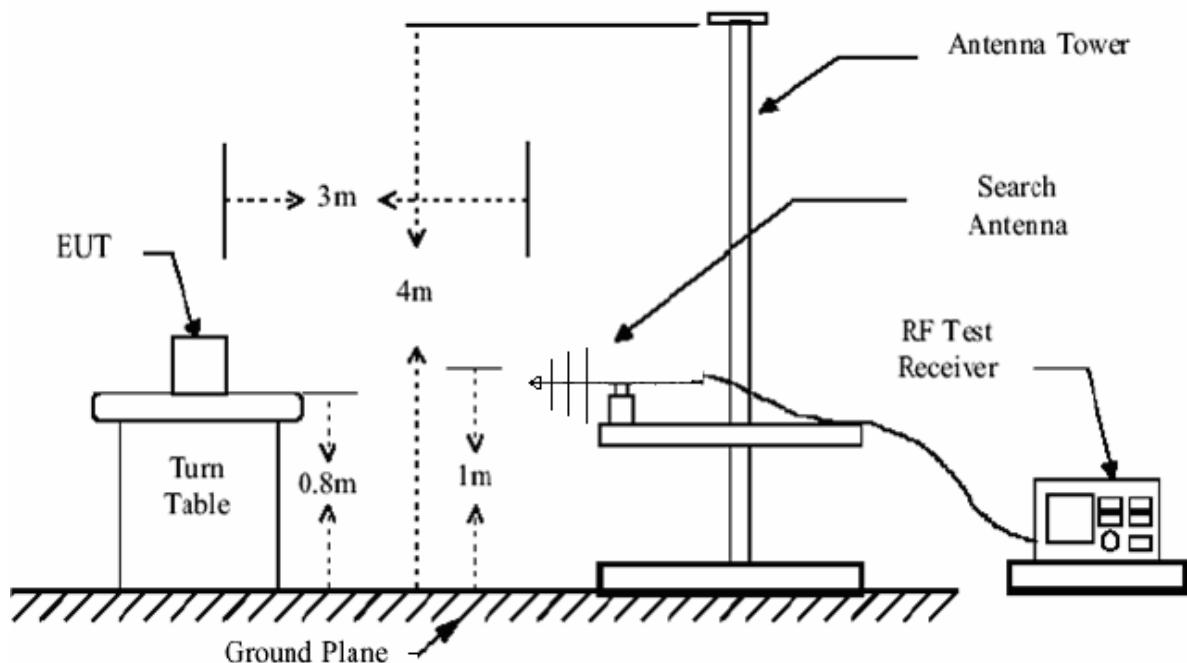
The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

The bandwidth of the EMI test receiver is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz.

The frequency range from 30MHz to 10<sup>th</sup> harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

The test data of the worst case condition(s) was reported on the following pages.

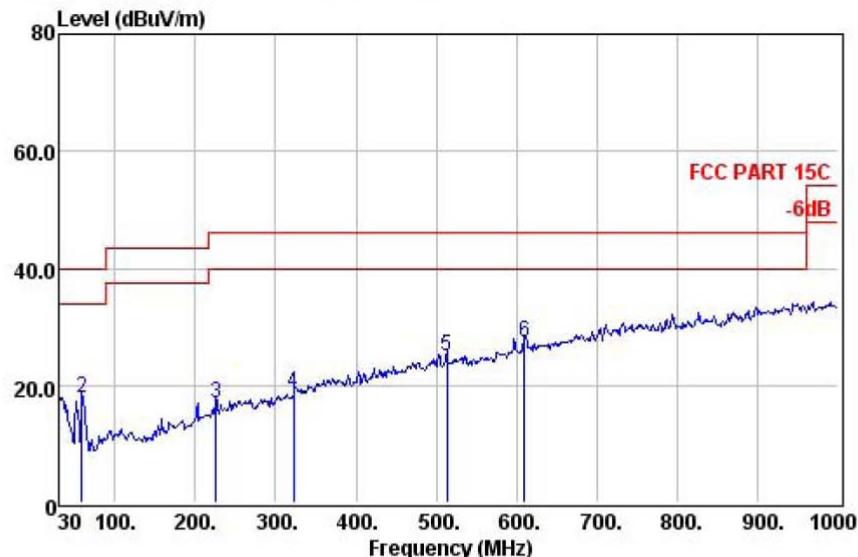


## Test Data



Keyway Testing Technology Co.,Ltd.  
Baishun Industrial Zone,Zhangmutou  
Town,Dongguan,Guangdong,China  
Tel: 0769-87182258  
Fax: 0769-87181058  
Mail: kwtest@keywaytest.com

Data: 24 File: D:\966 data\report\RF.EM6 (24)



Site : 966 Chamber  
Condition: FCC PART 15C 3m 3142D VERTICAL  
EUT : 2.4G Wireless Mouse  
M/N : GMY/GMX/GMZ  
Power : DC 1.5V  
Test By : Andy  
Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
Test Mode: TX Mode

	Preamp Freq	Read Level	CableAntenna		Limit Level	Line	Over Limit	Remark
			Factor	Loss Factor				
	MHz	dB	dBuV	dB	dBuV/m	dBuV/m	dB	
1	30.00	31.41	31.16	0.56	18.80	19.11	40.00	-20.89 QP
2	59.10	31.35	40.90	0.75	7.44	17.74	40.00	-22.26 QP
3	225.94	30.94	34.18	1.53	12.23	17.00	46.00	-29.00 QP
4	322.94	30.83	33.20	2.02	14.44	18.83	46.00	-27.17 QP
5	513.06	30.62	33.68	2.85	18.96	24.87	46.00	-21.13 QP
6	610.06	30.61	33.59	3.38	20.88	27.24	46.00	-18.76 QP

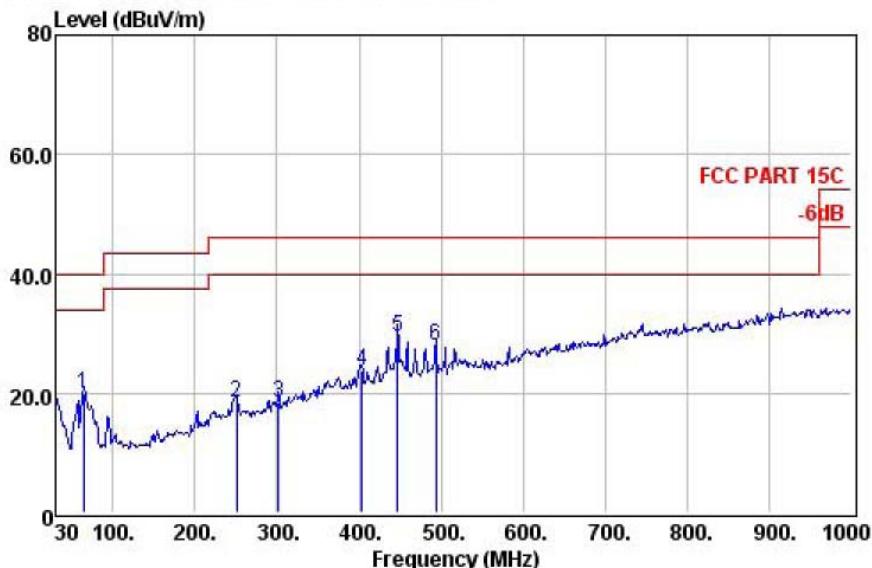
Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.  
2. Measurement Uncertainty:  $\pm 3.2$  dB at a level of confidence of 95%.





Keyway Testing Technology Co.,Ltd.  
Baishun Industrial Zone, Zhangmutou  
Town, Dongguan, Guangdong, China  
Tel: 0769-87182258  
Fax: 0769-87181058  
Mail: kwtest@keywaytest.com

Data: 23 File: D:\966 data\report\RF.EM6 (28)



Site : 966 Chamber  
Condition: FCC PART 15C 3m 3142D HORIZONTAL  
EUT : 2.4G Wireless Mouse  
M/N : GMY/GMX/GMZ  
Power : DC 1.5V  
Test By : Andy  
Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
Test Mode: TX Mode

Freq	Preamp Factor	Read Level	Cable Antenna		Limit Level	Over Line	Over Limit	Remark	
			MHz	dB	dBuV	dB	dBuV/m	dBuV/m	dB
1	63.95	31.32	43.18	0.75	7.38	19.99	40.00	-20.01	QP
2	251.16	30.97	34.83	1.70	12.90	18.46	46.00	-27.54	QP
3	301.60	30.92	33.45	1.94	13.84	18.31	46.00	-27.69	QP
4	403.45	30.63	35.57	2.37	16.41	23.72	46.00	-22.28	QP
5	447.10	30.61	40.03	2.62	17.54	29.58	46.00	-16.42	QP
6	493.66	30.59	37.07	2.77	18.60	27.85	46.00	-18.15	QP

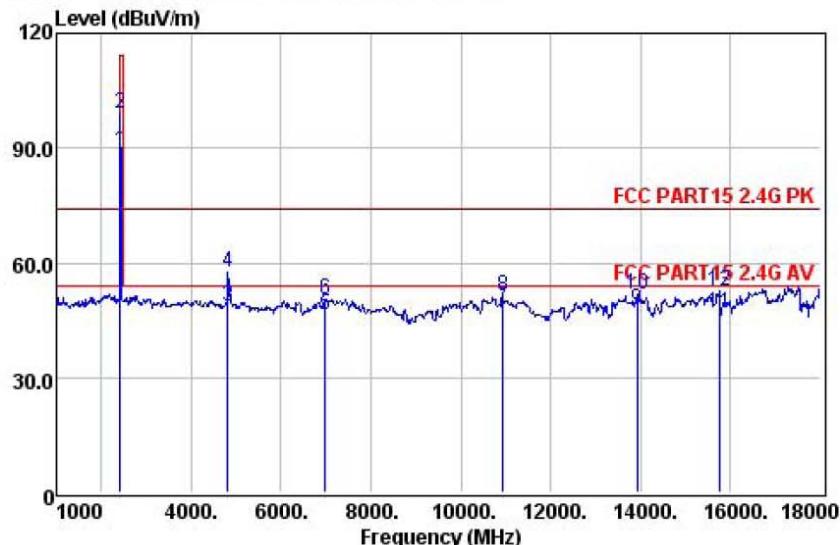
Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.  
2. Measurement Uncertainty:  $\pm 3.2$  dB at a level of confidence of 95%.





Keyway Testing Technology Co.,Ltd.  
Baishun Industrial Zone,Zhangmutou  
Town,Dongguan,Guangdong,China  
Tel: 0769-87182258  
Fax: 0769-87181058  
Mail: kwtest@keywaytest.com

Data: 13 File: D:\966 data\report\RF.EM6 (34)



Site : 966 Chamber  
Condition: FCC PART15 2.4G PK 3m ZN30701 VERTICAL  
EUT : 2.4G Wireless Mouse  
M/N : GMY/GMX/GMZ  
Power : DC 1.5V  
Test By : Andy  
Comment : Temp:24.8°C Humi:56% Press:101.52kPa  
Test Mode: TX 2408MHz

Freq	Preamp Factor	Read Level		Cable Antenna Loss Factor		Limit Level	Line Limit	Over Remark
		MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m
1	2408.00	26.32	79.32	7.39	28.73	89.12	94.00	-4.88 Average
2	2408.00	26.32	89.17	7.39	28.73	98.97	114.00	-15.03 Peak
3	4816.00	27.49	31.26	12.01	32.94	48.72	54.00	-5.28 Average
4	4816.00	27.49	40.03	12.01	32.94	57.49	74.00	-16.51 Peak
5	6984.00	27.90	20.34	16.60	37.16	46.20	54.00	-7.80 Average
6	6984.00	27.90	24.45	16.60	37.16	50.31	74.00	-23.69 Peak
7	10928.00	28.89	20.26	17.15	39.46	47.98	54.00	-6.02 Average
8	10928.00	28.89	23.44	17.15	39.46	51.16	74.00	-22.84 Peak
9	13920.00	29.38	14.25	19.27	43.42	47.56	54.00	-6.44 Average
10	13920.00	29.38	18.23	19.27	43.42	51.54	74.00	-22.46 Peak
11	15739.00	29.66	16.67	20.47	39.32	46.80	54.00	-7.20 Average
12	15739.00	29.66	22.32	20.47	39.32	52.45	74.00	-21.55 Peak

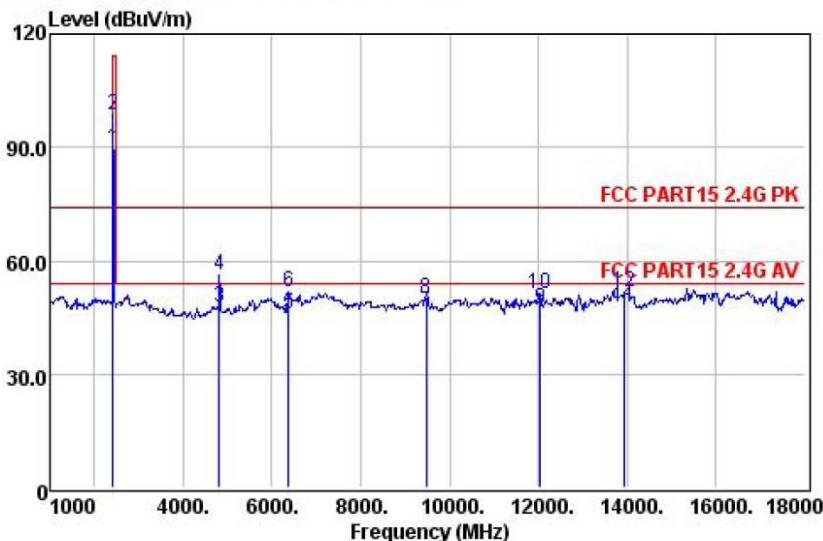
Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.  
2. Measurement Uncertainty:  $\pm 3.2$  dB at a level of confidence of 95%.





Keyway Testing Technology Co.,Ltd.  
Baishun Industrial Zone,Zhangmutou  
Town,Dongguan,Guangdong,China  
Tel: 0769-87182258  
Fax: 0769-87181058  
Mail: kwtest@keywaytest.com

Data: 14 File: D:\966 data\report\RF.EM6 (34)



Site : 966 Chamber  
Condition: FCC PART15 2.4G PK 3m ZN30701 HORIZONTAL  
EUT : 2.4G Wireless Mouse  
M/N : GMY/GMX/GMZ  
Power : DC 1.5V  
Test By : Andy  
Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
Test Mode: TX 2408MHz

Freq	Preamp Factor	Read Level		Cable Loss Factor		Antenna Level	Limit Line	Over Limit	Over Remark
		MHz	dB	dBuV	dB				
1	2408.00	26.32	80.06	7.39	28.73	89.86	94.00	-4.14	Average
2	2408.00	26.32	88.96	7.39	28.73	98.76	114.00	-15.24	Peak
3	4816.00	27.49	30.29	12.01	32.94	47.75	54.00	-6.25	Average
4	4816.00	27.49	38.60	12.01	32.94	56.06	74.00	-17.94	Peak
5	6372.00	27.77	21.61	16.60	35.71	46.15	54.00	-7.85	Average
6	6372.00	27.77	27.21	16.60	35.71	51.75	74.00	-22.25	Peak
7	9466.00	28.59	20.28	16.92	37.96	46.57	54.00	-7.43	Average
8	9466.00	28.59	23.45	16.92	37.96	49.74	74.00	-24.26	Peak
9	12033.00	29.01	19.37	17.40	39.41	47.17	54.00	-6.83	Average
10	12033.00	29.01	23.71	17.40	39.41	51.51	74.00	-22.49	Peak
11	13920.00	29.38	14.26	19.27	43.42	47.57	54.00	-6.43	Average
12	13920.00	29.38	18.48	19.27	43.42	51.79	74.00	-22.21	Peak

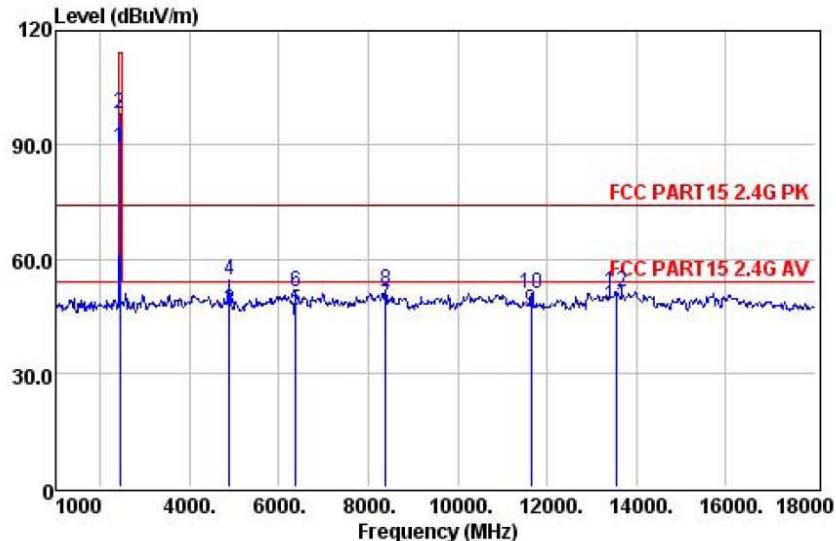
Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.  
2. Measurement Uncertainty:  $\pm 3.2$  dB at a level of confidence of 95%.





Keyway Testing Technology Co.,Ltd.  
Baishun Industrial Zone, Zhangmutou  
Town, Dongguan, Guangdong, China  
Tel: 0769-87182258  
Fax: 0769-87181058  
Mail: kwtest@keywaytest.com

Data: 15 File: D:\966 data\report\RF.EM6 (34)



Site : 966 Chamber  
Condition: FCC PART15 2.4G PK 3m ZN30701 VERTICAL  
EUT : 2.4G Wireless Mouse  
M/N : GMY/GMX/GMZ  
Power : DC 1.5V  
Test By : Andy  
Comment : Temp:24.8°C Humi:56% Press:101.52kPa  
Test Mode: TX 2440MHz

Freq	Preamp Factor	Read		Cable Antenna		Limit Level	Line Limit	Over dB	Remark
		MHz	dB	dBuV	dB				
1	2440.00	26.33	79.25	7.48	28.76	89.16	94.00	-4.84	Average
2	2440.00	26.33	88.30	7.48	28.76	98.21	114.00	-15.79	Peak
3	4880.00	27.53	28.62	12.14	33.11	46.34	54.00	-7.66	Average
4	4880.00	27.53	36.91	12.14	33.11	54.63	74.00	-19.37	Peak
5	6372.00	27.77	21.70	16.60	35.71	46.24	54.00	-7.76	Average
6	6372.00	27.77	26.69	16.60	35.71	51.23	74.00	-22.77	Peak
7	8395.00	28.22	22.29	16.75	36.72	47.54	54.00	-6.46	Average
8	8395.00	28.22	26.54	16.75	36.72	51.79	74.00	-22.21	Peak
9	11642.00	28.96	18.27	17.29	39.76	46.36	54.00	-7.64	Average
10	11642.00	28.96	22.59	17.29	39.76	50.68	74.00	-23.32	Peak
11	13563.00	29.31	15.22	18.85	43.07	47.83	54.00	-6.17	Average
12	13563.00	29.31	18.56	18.85	43.07	51.17	74.00	-22.83	Peak

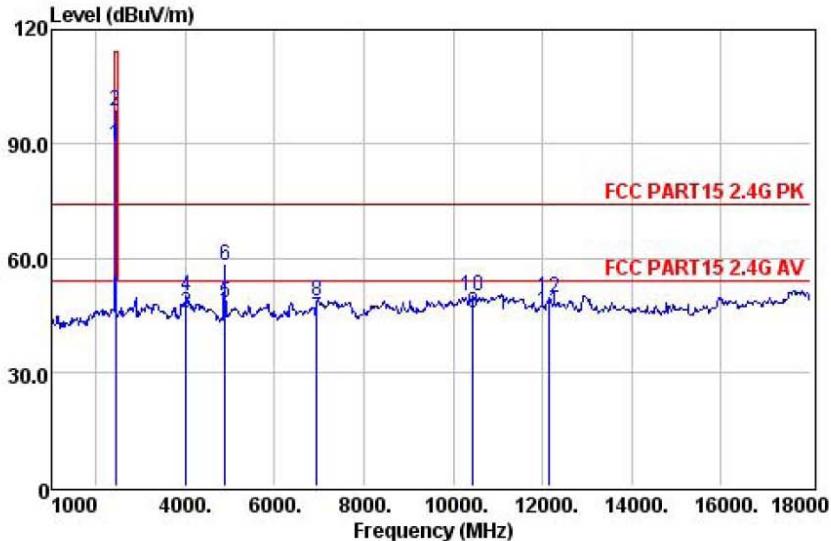
Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.  
2. Measurement Uncertainty:  $\pm 3.2$  dB at a level of confidence of 95%.





Keyway Testing Technology Co.,Ltd.  
Baishun Industrial Zone,Zhangmutou  
Town,Dongguan,Guangdong,China  
Tel: 0769-87182258  
Fax: 0769-87181058  
Mail: kwtest@keywaytest.com

Data: 16 File: D:\966 data\report\RF.EM6 (34)



Site : 966 Chamber  
Condition: FCC PART15 2.4G PK 3m ZN30701 VERTICAL  
EUT : 2.4G Wireless Mouse  
M/N : GMY/GMX/GMZ  
Power : DC 1.5V  
Test By : Andy  
Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
Test Mode: TX 2440MHz

Freq	Preamp Factor	Read		CableAntenna		Limit Line	Over Limit	Remark
		Level	dB	Loss	Factor			
MHz		dB	dBuV	dB	dBuV/m	dBuV/m	dB	
1	2440.00	26.33	79.67	7.48	28.76	89.58	94.00	-4.42 Average
2	2440.00	26.33	88.49	7.48	28.76	98.40	114.00	-15.60 Peak
3	4009.00	27.01	30.69	10.50	31.52	45.70	54.00	-8.30 Average
4	4009.00	27.01	34.76	10.50	31.52	49.77	74.00	-24.23 Peak
5	4880.00	27.53	30.27	12.14	33.11	47.99	54.00	-6.01 Average
6	4880.00	27.53	40.31	12.14	33.11	58.03	74.00	-15.97 Peak
7	6933.00	27.89	18.62	16.60	37.02	44.35	54.00	-9.65 Average
8	6933.00	27.89	23.05	16.60	37.02	48.78	74.00	-25.22 Peak
9	10435.00	28.84	18.27	17.05	39.09	45.57	54.00	-8.43 Average
10	10435.00	28.84	22.50	17.05	39.09	49.80	74.00	-24.20 Peak
11	12152.00	29.03	17.93	17.50	39.43	45.83	54.00	-8.17 Average
12	12152.00	29.03	21.57	17.50	39.43	49.47	74.00	-24.53 Peak

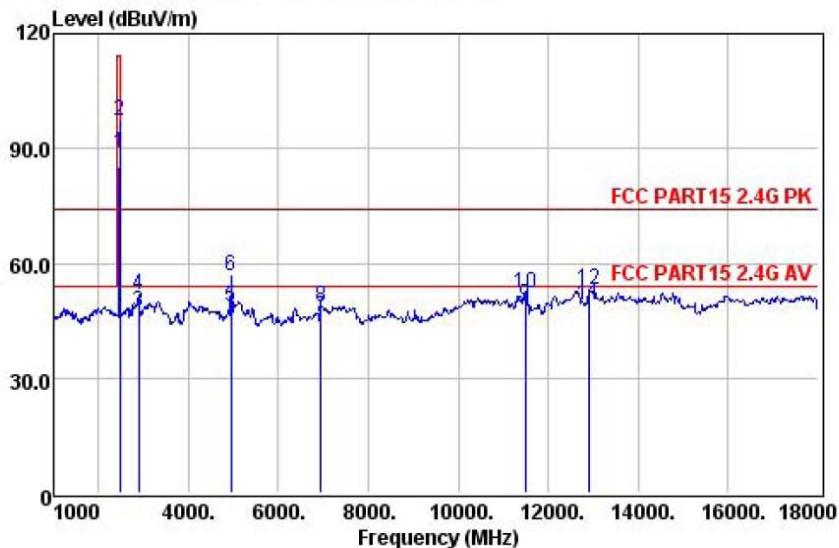
Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.  
2. Measurement Uncertainty:  $\pm 3.2$  dB at a level of confidence of 95%.





Keyway Testing Technology Co., Ltd.  
 Baishun Industrial Zone, Zhangmutou  
 Town, Dongguan, Guangdong, China  
 Tel: 0769-87182258  
 Fax: 0769-87181058  
 Mail: [kwtest@keywaytest.com](mailto:kwtest@keywaytest.com)

Data: 17 File: D:\966 data\report\RF.EM6 (34)



Site : 966 Chamber  
 Condition: FCC PART15 2.4G PK 3m ZN30701 VERTICAL  
 EUT : 2.4G Wireless Mouse  
 M/N : GMY/GMX/GMZ  
 Power : DC 1.5V  
 Test By : Andy  
 Comment : Temp:24.8°C Humi:56% Press:101.52kPa  
 Test Mode: TX 2474MHz

	Preamp Freq	Read Factor	Cable Level	Antenna Loss Factor	Limit Level	Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB
1	2474.00	26.34	78.68	7.52	28.79	88.65	94.00	-5.35 Average
2	2474.00	26.34	87.10	7.52	28.79	97.07	114.00	-16.93 Peak
3	2887.00	26.46	34.63	9.38	29.72	47.27	54.00	-6.73 Average
4	2887.00	26.46	39.17	9.38	29.72	51.81	74.00	-22.19 Peak
5	4948.00	27.57	30.39	12.32	33.28	48.42	54.00	-5.58 Average
6	4948.00	27.57	38.73	12.32	33.28	56.76	74.00	-17.24 Peak
7	6933.00	27.89	20.22	16.60	37.02	45.95	54.00	-8.05 Average
8	6933.00	27.89	23.05	16.60	37.02	48.78	74.00	-25.22 Peak
9	11489.00	28.95	20.67	17.26	39.89	48.87	54.00	-5.13 Average
10	11489.00	28.95	23.78	17.26	39.89	51.98	74.00	-22.02 Peak
11	12917.00	29.18	19.68	18.14	40.50	49.14	54.00	-4.86 Average
12	12917.00	29.18	23.56	18.14	40.50	53.02	74.00	-20.98 Peak

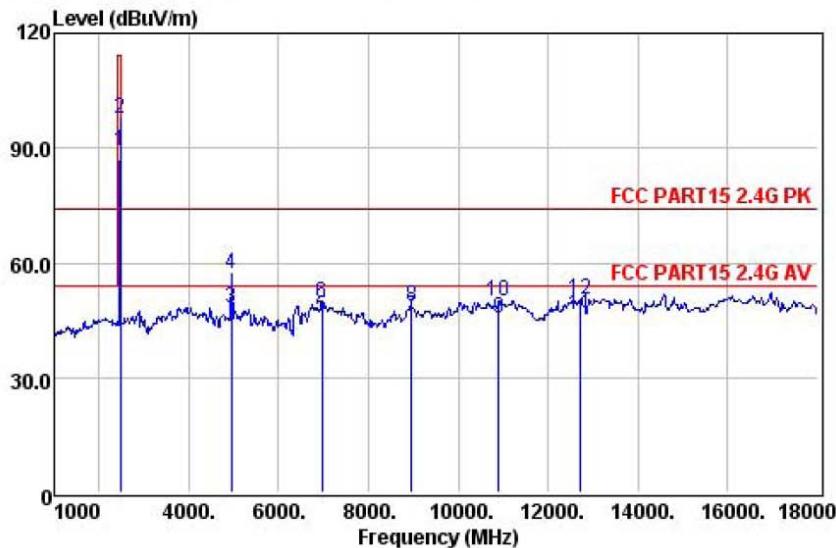
Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.  
 2. Measurement Uncertainty:  $\pm 3.2\text{dB}$  at a level of confidence of 95%.





Keyway Testing Technology Co., Ltd.  
 Baishun Industrial Zone, Zhangmutou  
 Town, Dongguan, Guangdong, China  
 Tel: 0769-87182258  
 Fax: 0769-87181058  
 Mail: kwtest@keywaytest.com

Data: 18 File: D:\966 data\report\RF.EM6 (34)



Site : 966 Chamber  
 Condition: FCC PART15 2.4G PK 3m ZN30701 HORIZONTAL  
 EUT : 2.4G Wireless Mouse  
 M/N : GMY/GMX/GMZ  
 Power : DC 1.5V  
 Test By : Andy  
 Comment : Temp:24.8°C Humi:56% Press:101.52kPa  
 Test Mode: TX 2474MHz

Freq	Preamp Factor	Read Level		Cable Antenna Loss Factor		Limit Level	Over Line	Over Limit	Remark
		MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	
1	2474.00	26.34	79.36	7.52	28.79	89.33	94.00	-4.67	Average
2	2474.00	26.34	87.89	7.52	28.79	97.86	114.00	-16.14	Peak
3	4948.00	27.57	30.28	12.32	33.28	48.31	54.00	-5.69	Average
4	4948.00	27.57	38.89	12.32	33.28	56.92	74.00	-17.08	Peak
5	6967.00	27.89	20.20	16.60	37.11	46.02	54.00	-7.98	Average
6	6967.00	27.89	23.77	16.60	37.11	49.59	74.00	-24.41	Peak
7	8956.00	28.38	19.96	16.87	37.34	45.79	54.00	-8.21	Average
8	8956.00	28.38	22.97	16.87	37.34	48.80	74.00	-25.20	Peak
9	10894.00	28.89	17.65	17.15	39.44	45.35	54.00	-8.65	Average
10	10894.00	28.89	22.35	17.15	39.44	50.05	74.00	-23.95	Peak
11	12730.00	29.15	17.43	17.99	40.06	46.33	54.00	-7.67	Average
12	12730.00	29.15	21.60	17.99	40.06	50.50	74.00	-23.50	Peak

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.  
 2. Measurement Uncertainty:  $\pm 3.24$  dB at a level of confidence of 95%.



## 5. 20DB OCCUPY BANDWIDTH

### 5.1. Limits

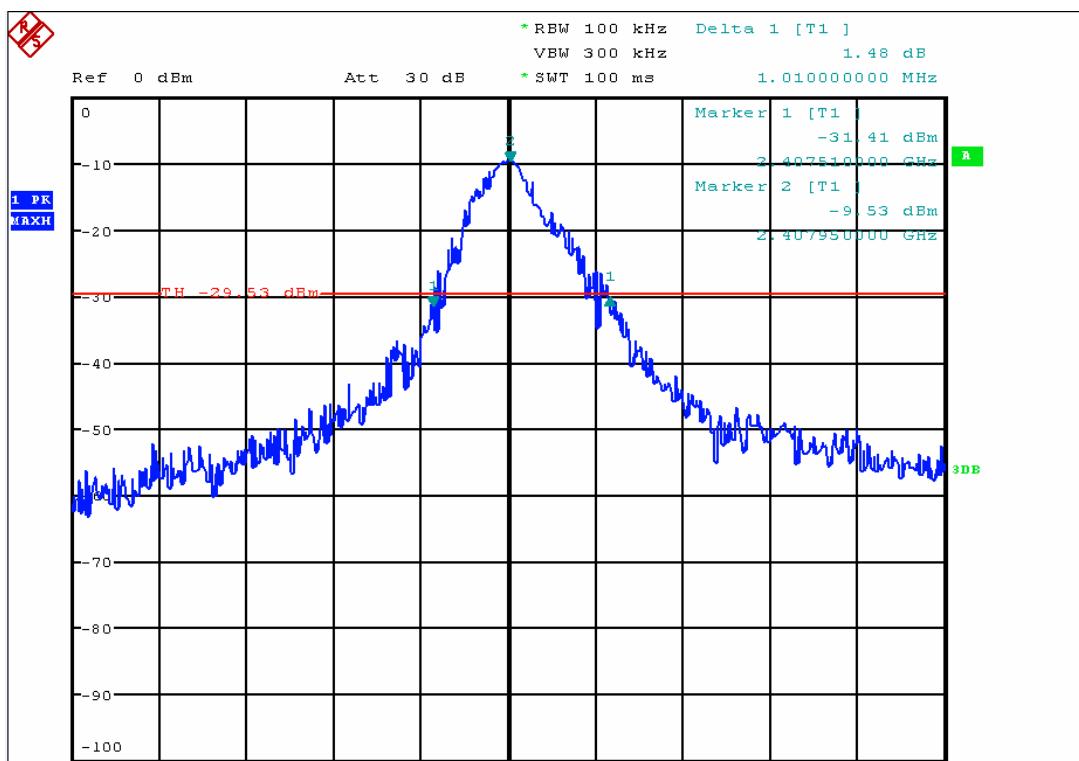
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Test data:

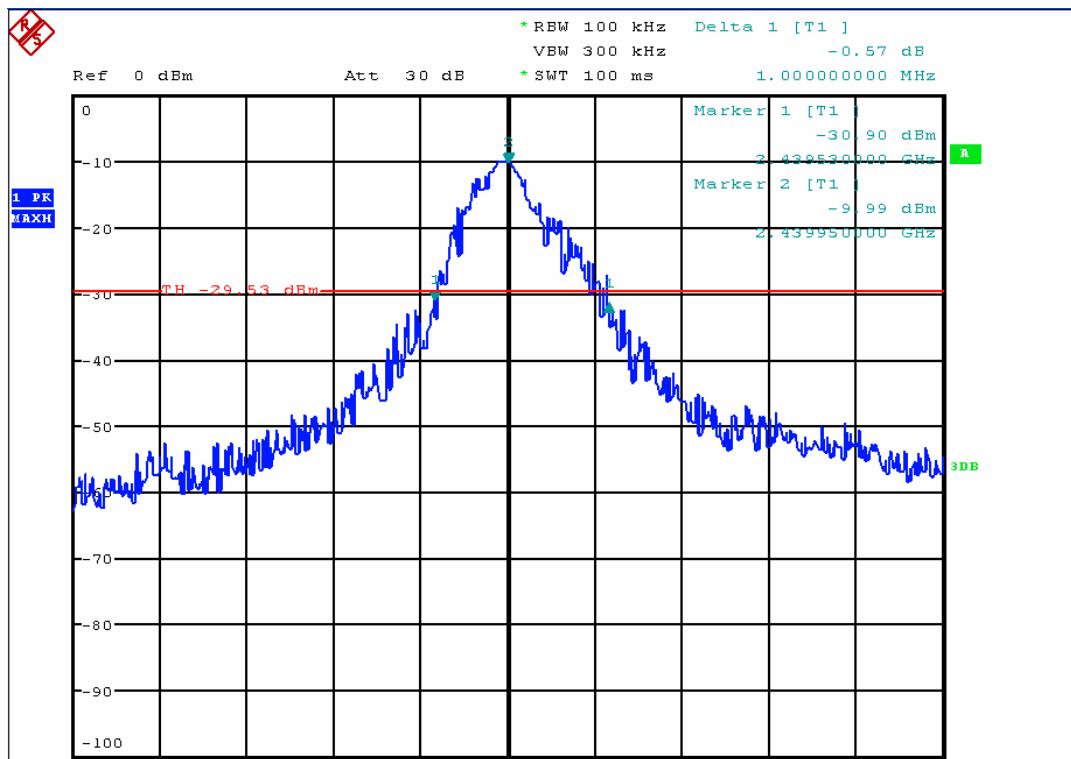
Channel Frequency (MHz)	20dB Bandwidth (MHz)	Limit (kHz)
2408	1.01	N/A
2440	1.00	N/A
2474	1.00	N/A

Test plot as follows:

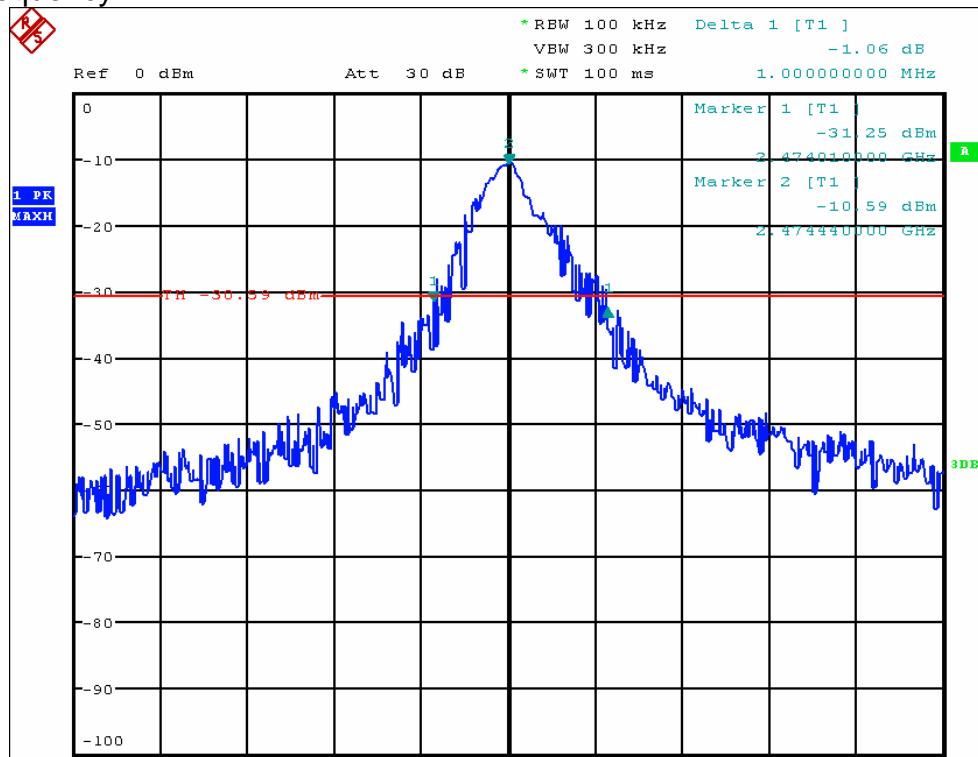
Test Frequency: 2408MHz



Test Frequency: 2440MHz



Test Frequency: 2474MHz



## 6. BAND EDGE COMPLIANCE TEST

### 6.1. Limits

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

### 6.2. Test setup

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure.

Note: If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

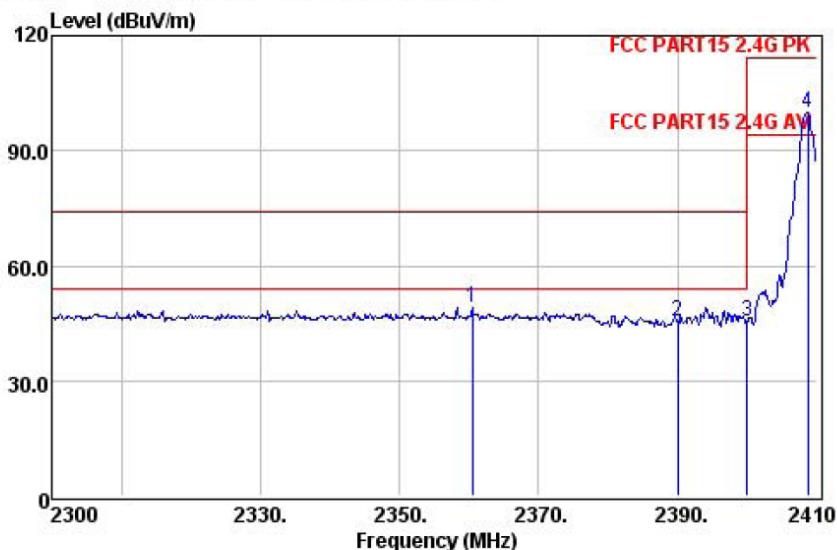
Test plot as follows:





Keyway Testing Technology Co.,Ltd.  
Baishun Industrial Zone,Zhangmutou  
Town,Dongguan,Guangdong,China  
Tel: 0769-87182258  
Fax: 0769-87181058  
Mail: kwtest@keywaytest.com

Data: 19 File: D:\966 data\report\RF.EM6 (24)



Site : 966 Chamber  
Condition: FCC PART15 2.4G PK 3m ZN30701 HORIZONTAL  
EUT : 2.4G Wireless Mouse  
M/N : GMY/GMX/GMZ  
Power : DC 1.5V  
Test By : Andy  
Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
Test Mode: TX 2408MHz

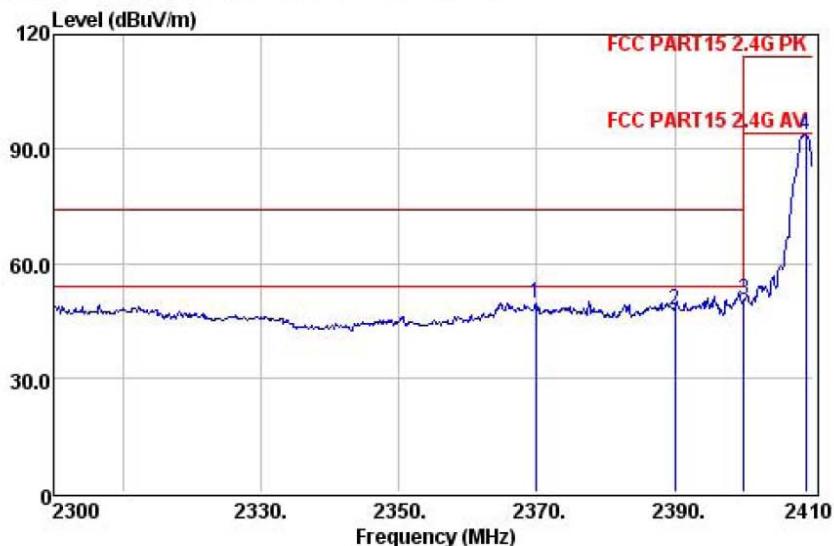
	Preamp Freq	Read Factor	Cable Level	Antenna Loss Factor	Limit Level	Line Limit	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB
1	2360.50	26.31	39.41	7.25	28.69	49.04	74.00	-24.96 Peak
2	2390.00	26.32	35.95	7.34	28.72	45.69	74.00	-28.31 Peak
3	2400.00	26.32	35.92	7.34	28.72	45.66	74.00	-28.34 Peak
4	2408.68	26.32	90.07	7.39	28.73	99.87	114.00	-14.13 Peak





Keyway Testing Technology Co., Ltd.  
 Baishun Industrial Zone, Zhangmutou  
 Town, Dongguan, Guangdong, China  
 Tel: 0769-87182258  
 Fax: 0769-87181058  
 Mail: kwtest@keywaytest.com

Data: 20 File: D:\966 data\report\RF.EM6 (24)



Site : 966 Chamber  
 Condition: FCC PART15 2.4G PK 3m ZN30701 VERTICAL  
 EUT : 2.4G Wireless Mouse  
 M/N : GMY/GMX/GMZ  
 Power : DC 1.5V  
 Test By : Andy  
 Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
 Test Mode: TX 2408MHz

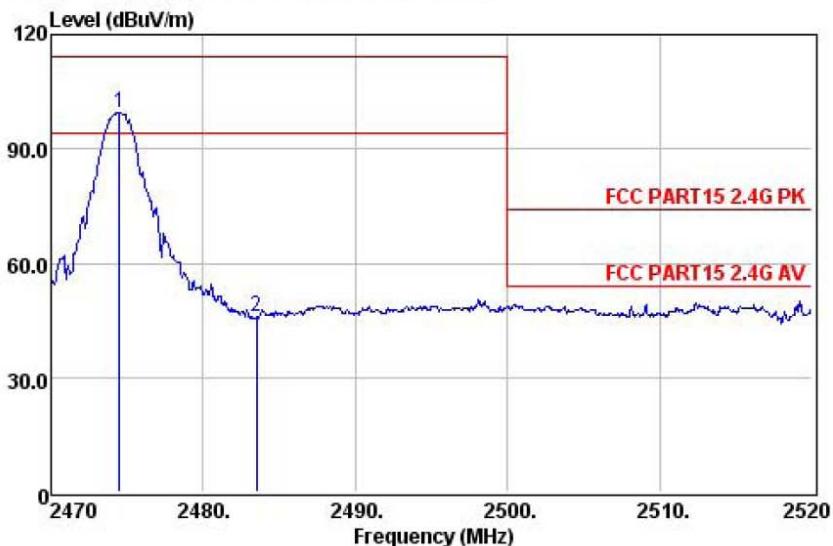
Freq	Preamp Factor	Read Level	Cable Antenna		Limit Level	Line Limit	Over dB	Remark
			MHz	dB	dBuV	dB	dBuV/m	dBuV/m
1	2369.85	26.31	40.05	7.30	28.70	49.74	74.00	-24.26 Peak
2	2390.00	26.32	37.99	7.34	28.72	47.73	74.00	-26.27 Peak
3	2400.00	26.32	40.80	7.34	28.72	50.54	74.00	-23.46 Peak
4	2408.90	26.32	83.97	7.39	28.73	93.77	114.00	-20.23 Peak





Keyway Testing Technology Co.,Ltd.  
Baishun Industrial Zone,Zhangmutou  
Town,Dongguan,Guangdong,China  
Tel: 0769-87182258  
Fax: 0769-87181058  
Mail: kwtest@keywaytest.com

Data: 21 File: D:\966 data\report\RF.EM6 (24)



Site : 966 Chamber

Condition: FCC PART15 2.4G PK 3m ZN30701 VERTICAL

EUT : 2.4G Wireless Mouse

M/N : GMY/GMX/GMZ

Power : DC 1.5V

Test By : Andy

Comment : Temp:24.8'C Humi:56% Press:101.52kPa

Test Mode: TX 2474MHz

Freq	Preamp Factor	Read Level	Cable Loss Factor	Antenna Factor	Limit Level	Line Limit	Over Remark	
		MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m
1		2474.50	26.34	89.47	7.57	28.79	99.49	114.00 -14.51 Peak
2		2483.50	26.34	35.80	7.57	28.79	45.82	114.00 -68.18 Peak

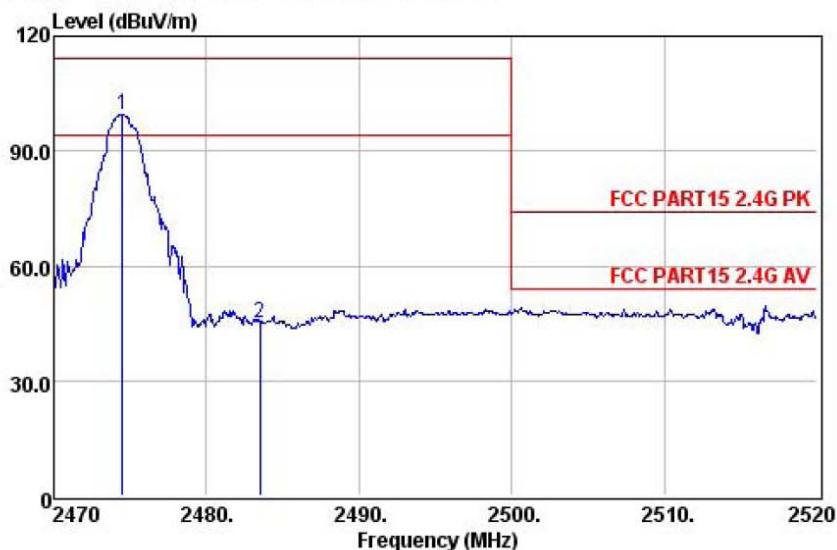




Keyway  
Testing

Keyway Testing Technology Co.,Ltd.  
Baishun Industrial Zone, Zhangmutou  
Town, Dongguan, Guangdong, China  
Tel: 0769-87182258  
Fax: 0769-87181058  
Mail: kwtest@keywaytest.com

Data: 22 File: D:\966 data\report\RF.EM6 (24)



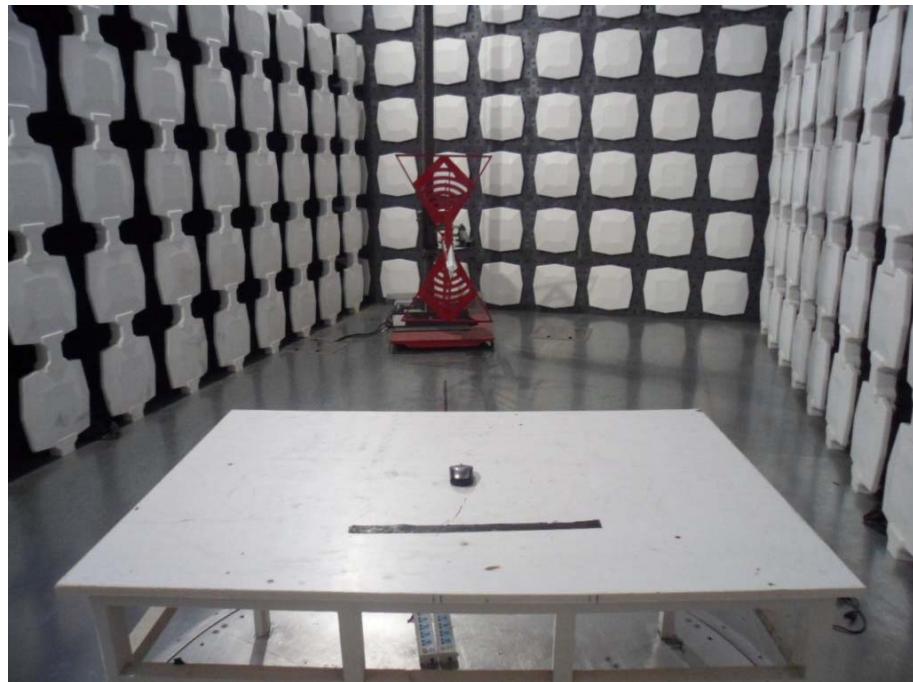
Site : 966 Chamber  
Condition: FCC PART15 2.4G PK 3m ZN30701 HORIZONTAL  
EUT : 2.4G Wireless Mouse  
M/N : GMY/GMX/GMZ  
Power : DC 1.5V  
Test By : Andy  
Comment : Temp:24.8'C Humi:56% Press:101.52kPa  
Test Mode: TX 2474MHz

	Preamp Freq	Read Level	Cable Loss	Antenna Factor	Limit Level	Line Level	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB
1	2474.50	26.34	89.34	7.57	28.79	99.36	114.00	-14.64 Peak
2	2483.50	26.34	35.15	7.57	28.79	45.17	114.00	-68.83 Peak



## 7. PHOTOGRAPHS OF TEST SET-UP

### 7.1. Set-up for Radiated Emission Test



## 8. PHOTOGRAPHS OF THE EUT

Figure 1  
General Appearance of the EUT



Figure 2  
General Appearance of the EUT



Figure 3  
General Appearance of the PCB

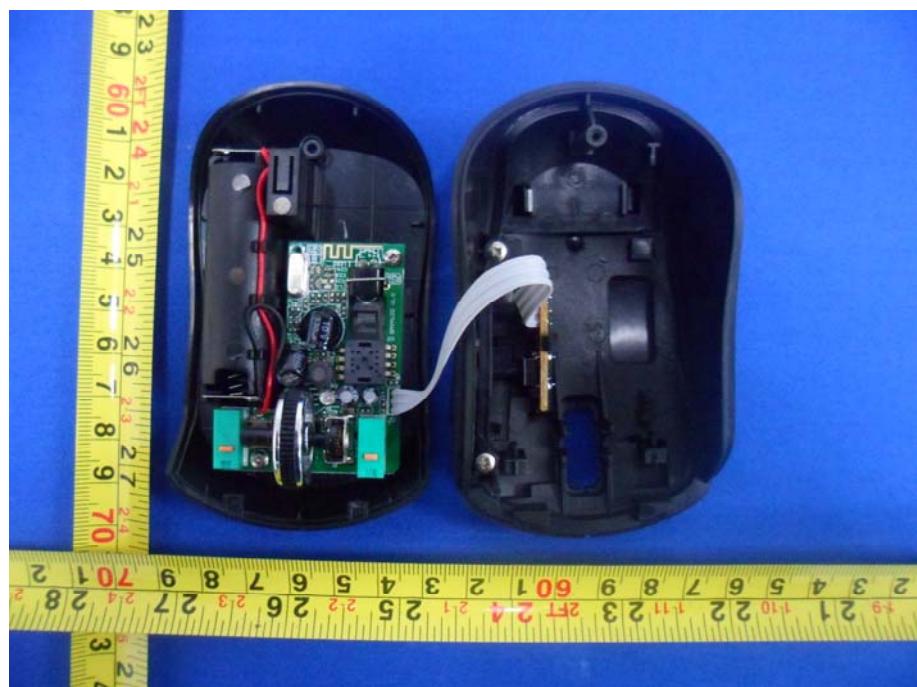


Figure 4  
General Appearance of the PCB

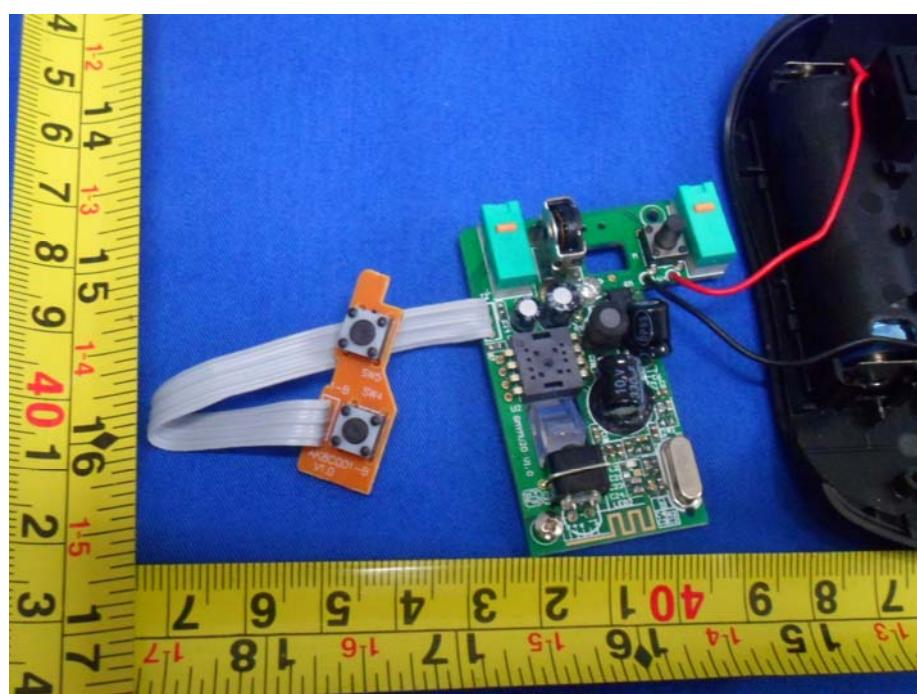
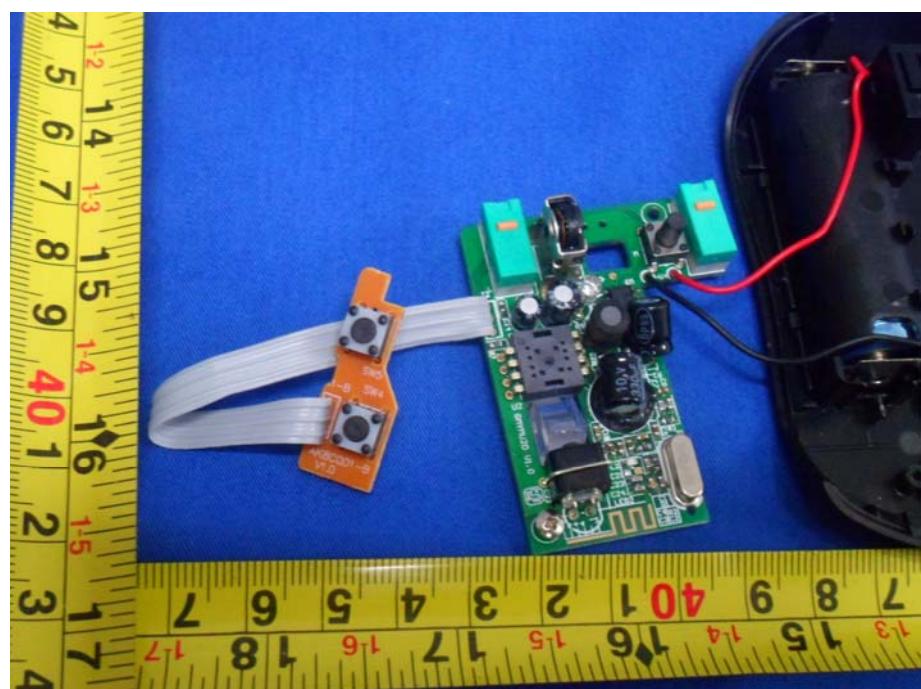


Figure 5  
General Appearance of the PCB



END.