

FCC Test Report

Product Name	Wired/Wireless Gaming Mouse
Model No.	L701(Mouse)
FCC ID	NIYL701TX

Applicant	Dexin Corp
Address	14F-8, No. 258, Lian Cheng Rd Chung Ho City, Taipei Hsien, Taiwan

Date of Receipt	Oct. 08, 2015
Issued Date	Dec. 01, 2015
Report No.	15A0132R-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: Dec. 01, 2015
Report No.: 15A0132R-RFUSP15V00



Product Name	Wired/Wireless Gaming Mouse
Applicant	Dexin Corp
Address	14F-8, No. 258, Lian Cheng Rd Chung Ho City,Taipei Hsien,Taiwan
Manufacturer	Dexin Corporation
Model No.	L701(Mouse)
EUT Rated Voltage	DC 3.7V (Power by battery)
EUT Test Voltage	DC 3.7V (Power by battery)
Trade Name	ASUS
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2014 ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By :

(Senior Adm. Specialist / Leven Huang)

Tested By :

(Engineer / Jack Hsu)

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	Wired/Wireless Gaming Mouse
Trade Name	ASUS
Model No.	L701(Mouse)
FCC ID	NIYL701TX
Frequency Range	2406-2478MHz
Channel Number	5CH
Type of Modulation	GFSK
Channel Control	Auto
Antenna Type	Printed on PCB
Antenna Gain	Refer to the table "Antenna List"
USB Cable	Shielded, 1.8m

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	ASUS	N/A	Printed on PCB	-0.76dBi 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:	2406 MHz	Channel 02:	2425 MHz	Channel 03:	2440 MHz	Channel 04:	2470 MHz
Channel 05:	2478 MHz						

Note:

1. The EUT is a Wired/Wireless Gaming 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 Mode 2: Charge Mode
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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:

Mode 1: Transmitter

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Notebook PC	DELL	M65	CG098	Non-Shielded, 0.8m

Signal Cable Type	Signal cable Description
A USB Cable	Shielded, 1.8m

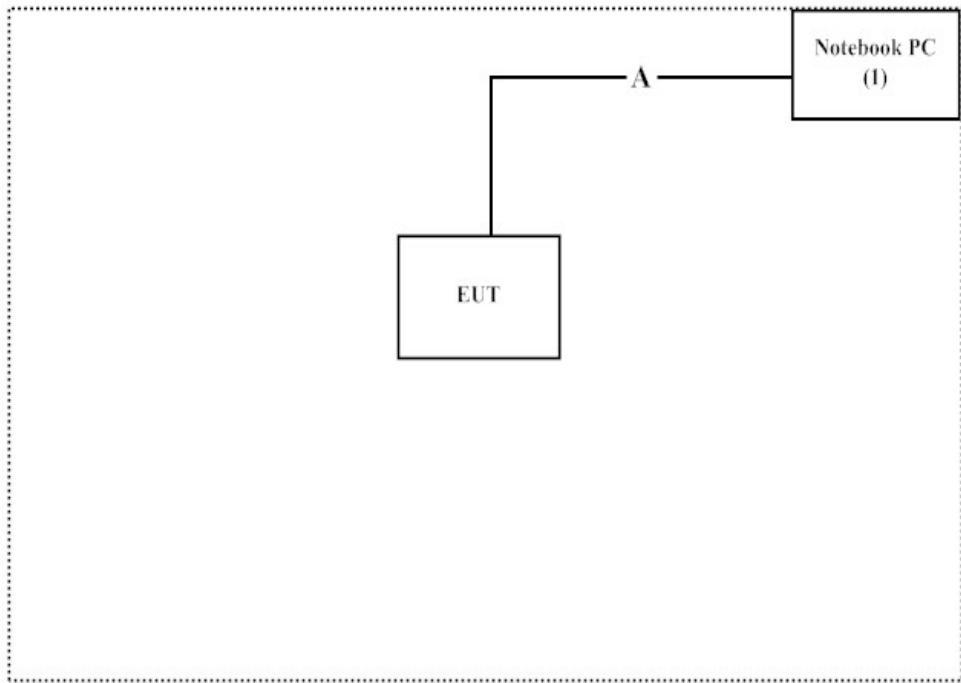
Mode 2: Charge

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Notebook PC	DELL	M65	CG098	Non-Shielded, 0.8m
2 Docking	ASUS	L701(Dock)	N/A	N/A

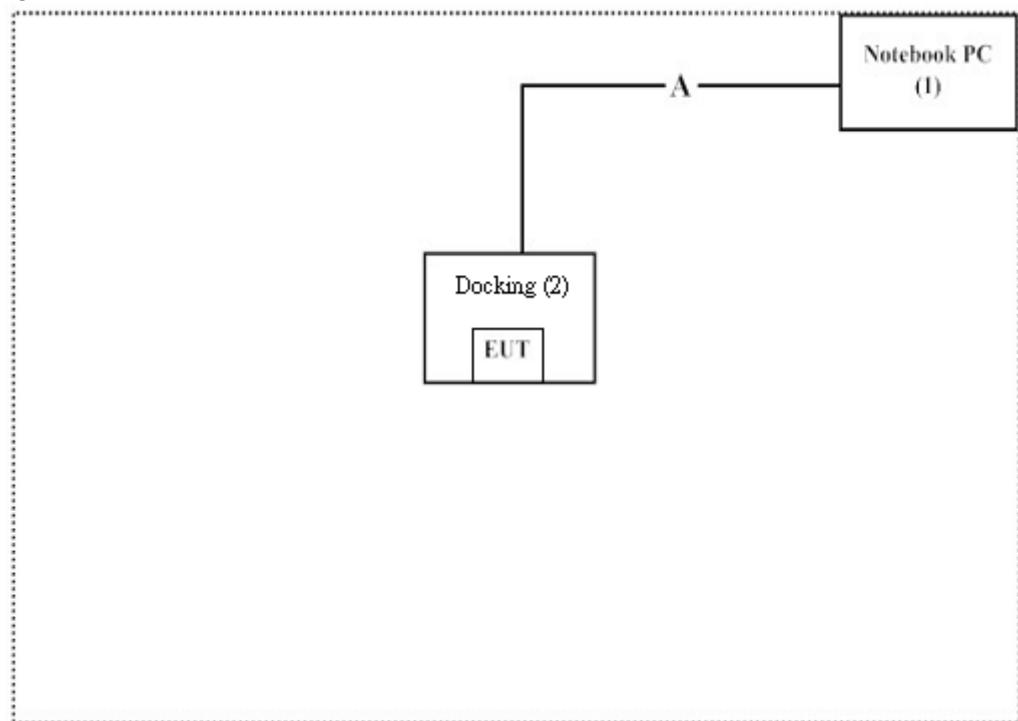
Signal Cable Type	Signal cable Description
A USB Cable	Shielded, 1.8m

1.4. Configuration of Test System

Mode 1: Transmitter



Mode 2: Charge



1.5. EUT Exercise Software

Mode 1: Transmitter

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

Mode 2: Charge

- (1) Setup the EUT as shown in Section 1.4.
- (2) Using Charge mode on EUT.
- (3) 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/chinese/about/certificates.aspx?bval=5>

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

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

Site Name: Quietek Corporation
Site Address: No.5-22, Ruishukeng, Linkou Dist.,
New Taipei City 24451,
Taiwan, R.O.C
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

2. Conducted Emission

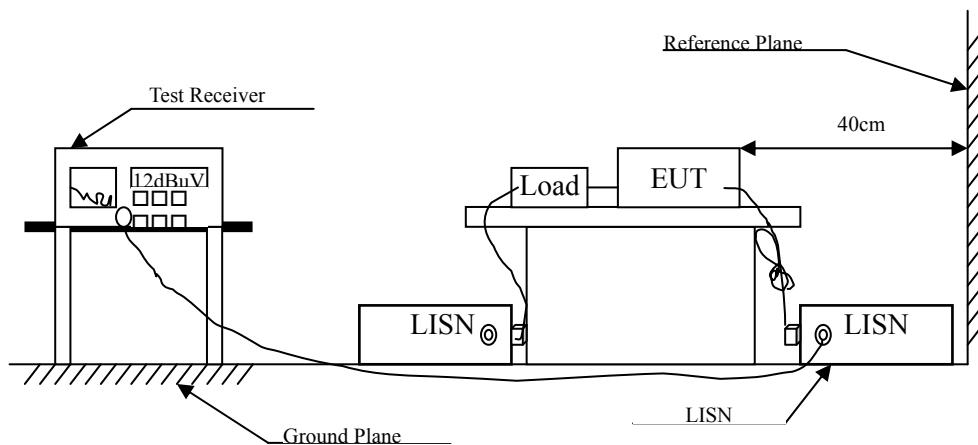
2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2015	
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, 2015	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2015	
	No.1 Shielded Room				

Note:

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

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency 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

Product : Wired/Wireless Gaming Mouse
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: Transmit (2440MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Line 1					
Quasi-Peak					
0.162	9.761	27.970	37.731	-27.926	65.657
0.177	9.757	24.670	34.427	-30.802	65.229
0.193	9.754	22.680	32.434	-32.337	64.771
0.498	9.778	18.940	28.718	-27.339	56.057
2.615	9.927	28.080	38.007	-17.993	56.000
9.400	10.066	22.650	32.717	-27.283	60.000
Average					
0.162	9.761	14.920	24.681	-30.976	55.657
0.177	9.757	12.060	21.817	-33.412	55.229
0.193	9.754	11.740	21.494	-33.277	54.771
0.498	9.778	12.620	22.398	-23.659	46.057
2.615	9.927	22.660	32.587	-13.413	46.000
9.400	10.066	16.330	26.397	-23.603	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Wired/Wireless Gaming Mouse
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 1: Transmit (2440MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.150	9.764	28.930	38.694	-27.306	66.000
0.189	9.754	22.970	32.724	-32.162	64.886
0.216	9.756	20.030	29.786	-34.328	64.114
0.248	9.758	18.200	27.958	-35.242	63.200
2.615	9.927	25.710	35.637	-20.363	56.000
9.466	10.096	17.570	27.666	-32.334	60.000
Average					
0.150	9.764	14.440	24.204	-31.796	56.000
0.189	9.754	10.690	20.444	-34.442	54.886
0.216	9.756	10.090	19.846	-34.268	54.114
0.248	9.758	10.320	20.078	-33.122	53.200
2.615	9.927	20.510	30.437	-15.563	46.000
9.466	10.096	10.380	20.476	-29.524	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Wired/Wireless Gaming Mouse
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 2: Charge Mode

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
Line 1					
Quasi-Peak					
0.216	9.756	24.970	34.726	-29.388	64.114
0.505	9.778	24.850	34.628	-21.372	56.000
3.048	9.945	28.990	38.935	-17.065	56.000
5.584	9.996	23.110	33.106	-26.894	60.000
9.248	10.064	28.110	38.174	-21.826	60.000
11.966	10.103	23.050	33.153	-26.847	60.000
Average					
0.216	9.756	21.660	31.416	-22.698	54.114
0.505	9.778	19.340	29.118	-16.882	46.000
3.048	9.945	24.530	34.475	-11.525	46.000
5.584	9.996	18.410	28.406	-21.594	50.000
9.248	10.064	22.470	32.534	-17.466	50.000
11.966	10.103	18.630	28.733	-21.267	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “  “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Wired/Wireless Gaming Mouse
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 2: Charge Mode

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.216	9.756	23.280	33.036	-31.078	64.114
0.748	9.797	17.120	26.917	-29.083	56.000
1.775	9.886	20.070	29.956	-26.044	56.000
2.681	9.929	26.800	36.729	-19.271	56.000
5.584	10.006	17.450	27.456	-32.544	60.000
19.451	10.318	21.130	31.448	-28.552	60.000
Average					
0.216	9.756	17.040	26.796	-27.318	54.114
0.748	9.797	12.600	22.397	-23.603	46.000
1.775	9.886	16.210	26.096	-19.904	46.000
2.681	9.929	23.630	33.559	-12.441	46.000
5.584	10.006	12.400	22.406	-27.594	50.000
19.451	10.318	16.460	26.778	-23.222	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “  “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Radiated Emission

3.1. Test Equipment

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

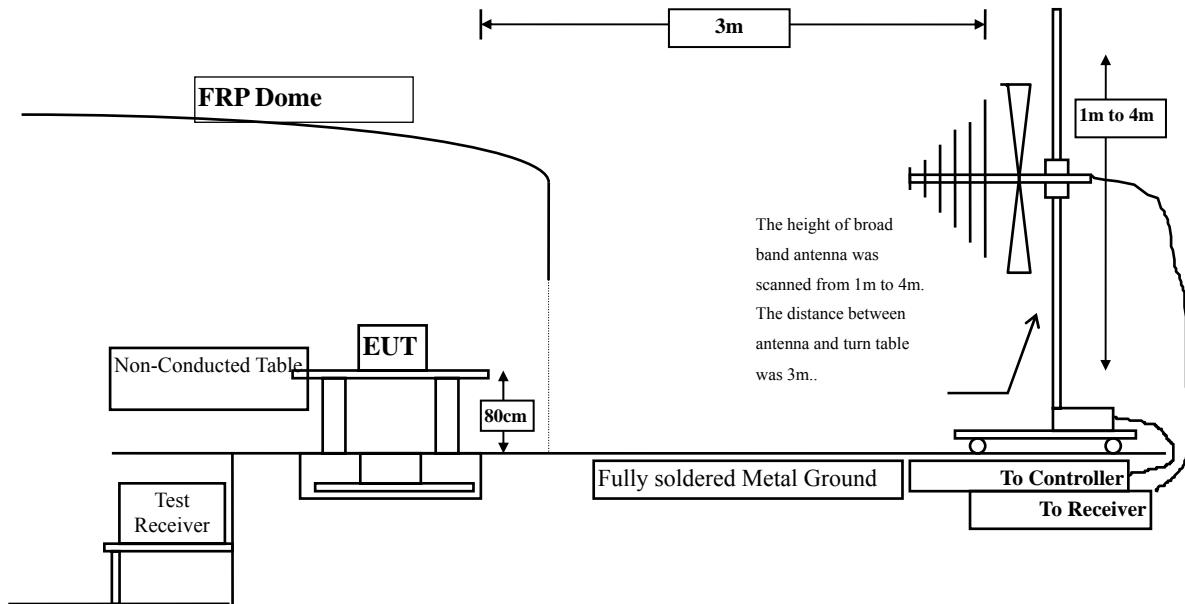
Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
<input checked="" type="checkbox"/> Site # 3	X	Magnetic Loop Antenna	Teseq	HLA6121/ 37133	Sep, 2015
	X	Bilog Antenna	Schaffner Chase	CBL6112B/ 2707	Jun, 2015
	X	EMI Test Receiver	R&S	ESCS 30/838251/ 001	Jun, 2015
	X	Coaxial Cable	QTK(Arnist)	RG 214/ LC003-RG	Jun, 2015
	X	Coaxial signal switch	Arnist	MP59B/ 6200798682	Jun, 2015

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

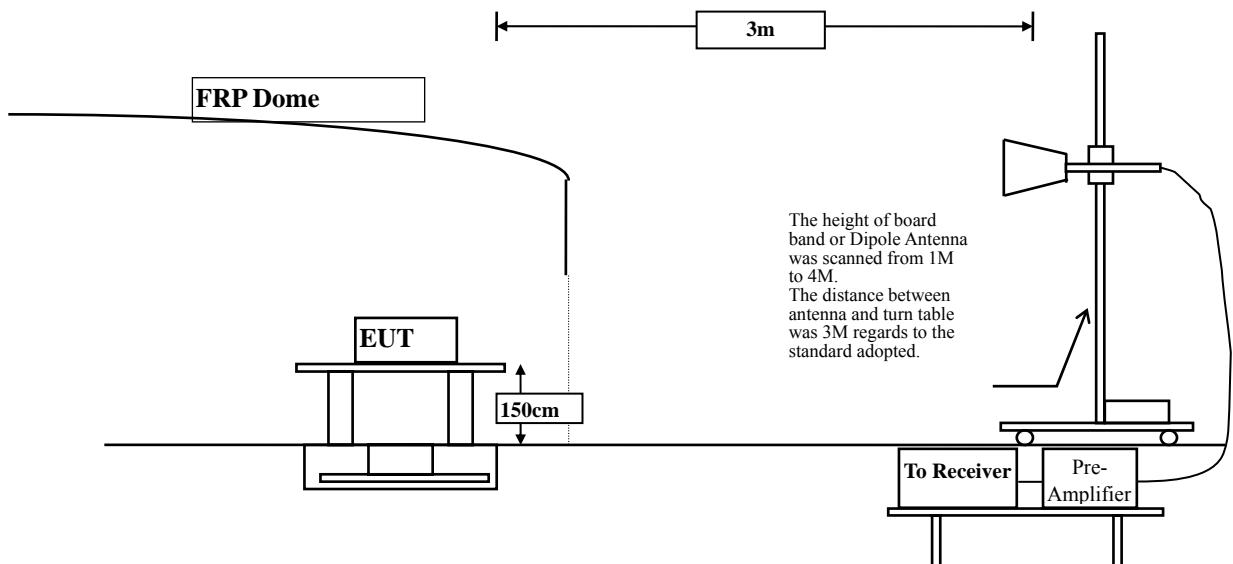
Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with "X" are used to measure the final test results.

3.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.3. Limits

➤ Fundamental and Harmonics Emission Limits

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

Remarks : 1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➤ General Radiated Emission Limits

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

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency 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 : Wired/Wireless Gaming Mouse
 Test Item : Fundamental Radiated Emission
 Test Site : No.3OATS
 Test Mode : Mode 1: Transmit

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
2406.000	-1.051	94.689	93.639	-20.361	114.000
2440.000	-0.836	95.787	94.951	-19.049	114.000
2478.000	-0.593	95.074	94.481	-19.519	114.000
Vertical					
Peak Detector:					
2406.000	-1.721	90.332	88.611	-25.389	114.000
2440.000	-1.549	91.413	89.864	-24.136	114.000
2478.000	-1.336	90.553	89.218	-24.782	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
------------------	-------------------------------	------------------------------------	--------------------------------	--------------	-----------------

Horizontal

Average Detector:

2406.000	93.639	-16.548	77.091	-16.909	94.000
2440.000	94.951	-16.548	78.403	-15.597	94.000
2478.000	94.481	-16.548	77.933	-16.067	94.000

Vertical

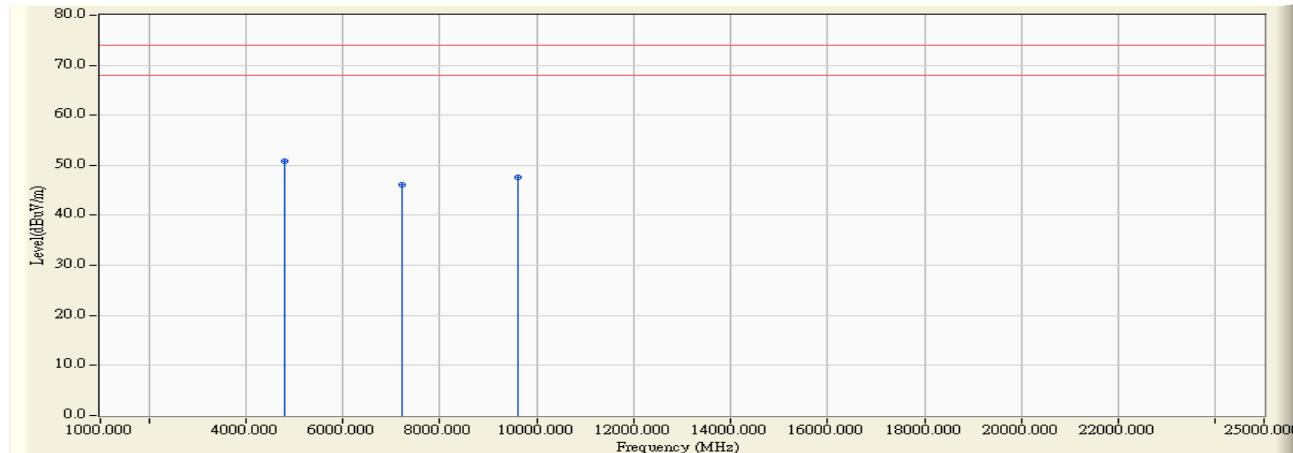
Average Detector:

2406.000	88.611	-16.548	72.063	-21.937	94.000
2440.000	89.864	-16.548	73.316	-20.684	94.000
2478.000	89.218	-16.548	72.670	-21.330	94.000

Note:

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

Product : Wired/Wireless Gaming Mouse
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2406MHz)



Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
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Horizontal

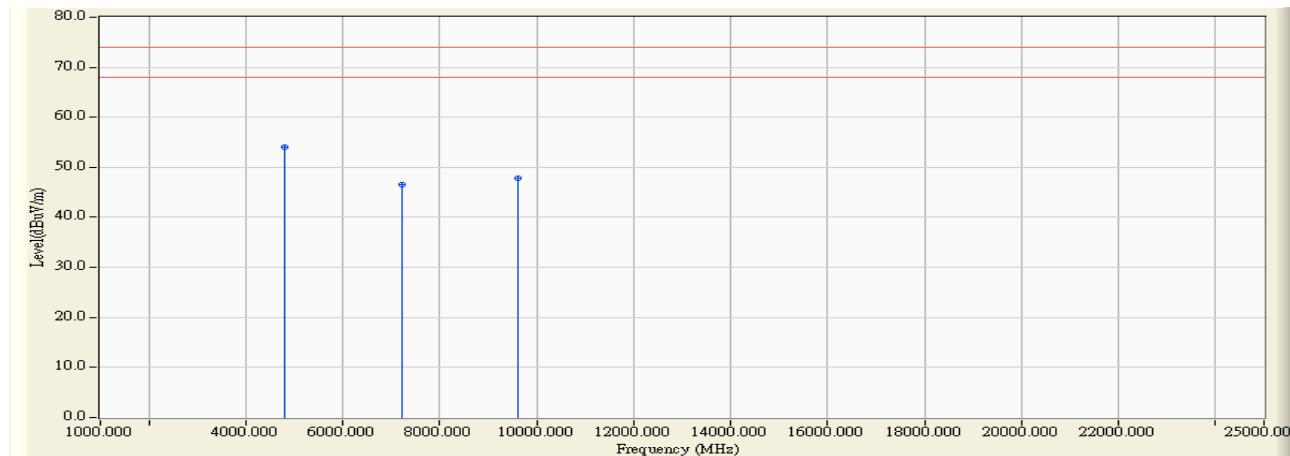
Peak Detector:

4812.000	3.313	47.590	50.904	-23.096	74.000
7218.000	10.341	35.840	46.182	-27.818	74.000
9624.000	13.559	34.160	47.719	-26.281	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.

Product : Wired/Wireless Gaming Mouse
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2406MHz)



Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m

Vertical

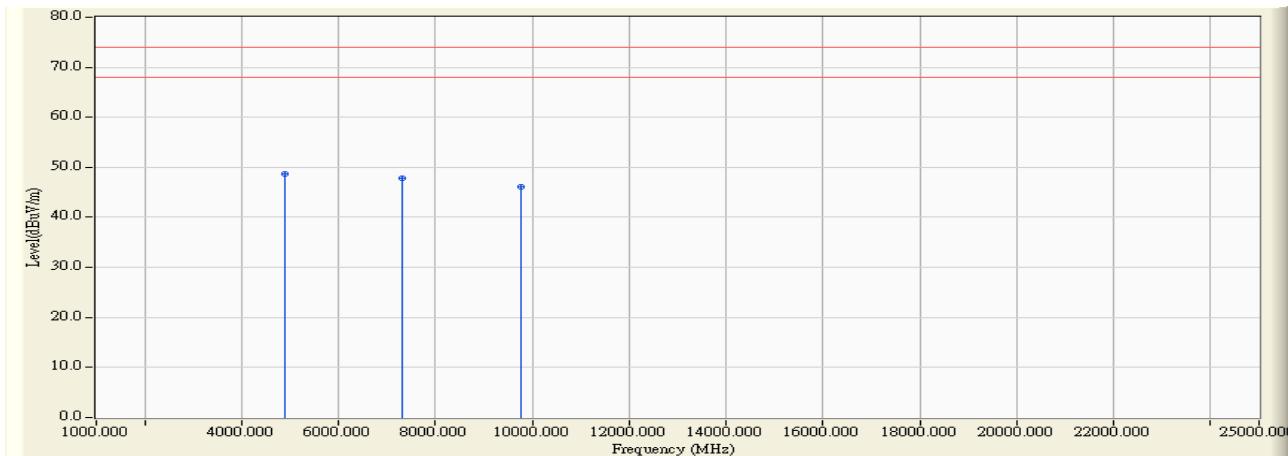
Peak Detector:

4812.000	6.566	47.380	53.947	-20.053	74.000
7218.000	11.201	35.240	46.441	-27.559	74.000
9624.000	13.985	33.870	47.855	-26.145	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.

Product : Wired/Wireless Gaming Mouse
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2440 MHz)



Frequency MHz	Correct Factor Db	Reading Level dBuV	Measurement Level dBuV/m	Margin Db	Limit dBuV/m
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Horizontal

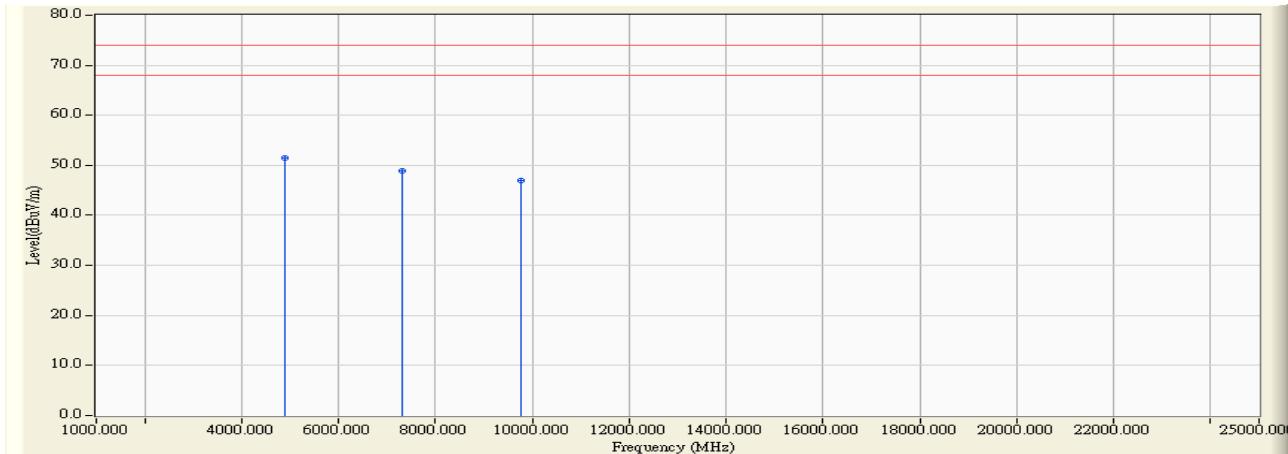
Peak Detector:

4880.000	3.010	45.610	48.620	-25.380	74.000
7320.000	11.833	35.930	47.764	-26.236	74.000
9760.000	12.580	33.540	46.121	-27.879	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.

Product : Wired/Wireless Gaming Mouse
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2440MHz)



Frequency MHz	Correct Factor Db	Reading Level dBuV	Measurement Level dBuV/m	Margin Db	Limit dBuV/m
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Vertical

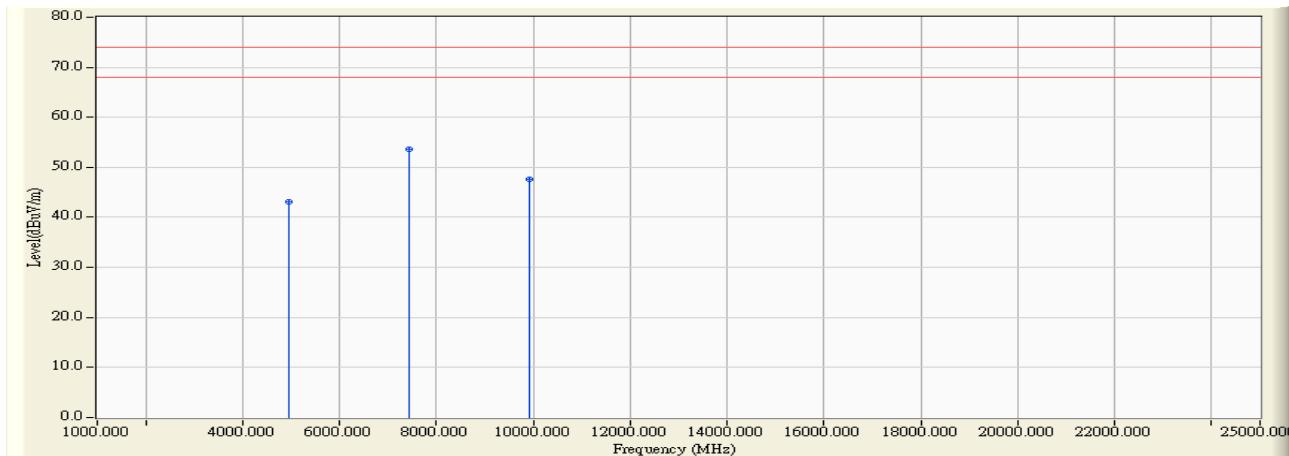
Peak Detector:

4880.000	5.738	45.630	51.368	-22.632	74.000
7320.000	12.703	36.240	48.943	-25.057	74.000
9760.000	13.052	33.890	46.942	-27.058	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.

Product : Wired/Wireless Gaming Mouse
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2478 MHz)

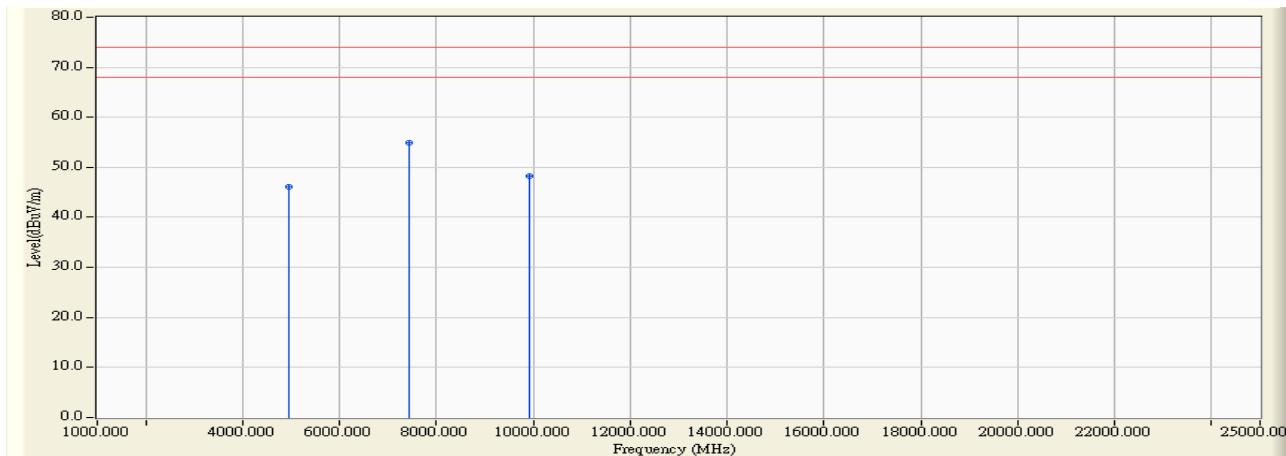


Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4956.000	2.771	40.370	43.141	-30.859	74.000
7434.000	12.509	41.190	53.700	-20.300	74.000
9912.000	13.411	34.260	47.671	-26.329	74.000

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.

Product : Wired/Wireless Gaming Mouse
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2478MHz)



Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Vertical					
Peak Detector:					
4956.000	5.553	40.570	46.124	-27.876	74.000
7434.000	13.416	40.480	53.897	-20.103	74.000
9912.000	13.964	34.340	48.305	-25.695	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.

Product : Wired/Wireless Gaming Mouse
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2440 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
30.000	2.120	23.380	25.500	-14.500	40.000
266.174	-4.970	25.055	20.084	-25.916	46.000
461.580	1.526	23.567	25.093	-20.907	46.000
606.377	4.638	23.713	28.350	-17.650	46.000
856.609	6.345	24.590	30.935	-15.065	46.000
1000.000	9.119	22.680	31.799	-22.201	54.000
Vertical					
30.000	1.020	24.072	25.092	-14.908	40.000
101.696	-0.016	24.894	24.878	-18.622	43.500
371.609	-2.706	26.895	24.190	-21.810	46.000
509.377	-0.143	24.314	24.171	-21.829	46.000
803.188	3.392	24.197	27.589	-18.411	46.000
967.667	8.104	23.574	31.678	-22.322	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.

Product : Wired/Wireless Gaming Mouse
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Charge Mode

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
108.725	-7.307	27.230	19.923	-23.577	43.500
301.319	-3.412	30.936	27.524	-18.476	46.000
367.391	-1.215	32.150	30.934	-15.066	46.000
471.420	0.933	26.778	27.711	-18.289	46.000
613.406	3.619	24.069	27.688	-18.312	46.000
824.275	6.185	19.818	26.003	-19.997	46.000
Vertical					
259.145	-7.480	31.151	23.671	-22.329	46.000
378.638	-1.584	28.696	27.112	-18.888	46.000
499.536	-0.848	23.808	22.960	-23.040	46.000
595.130	-3.505	30.095	26.590	-19.410	46.000
724.464	-0.135	25.932	25.797	-20.203	46.000
846.768	2.579	21.667	24.246	-21.754	46.000

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

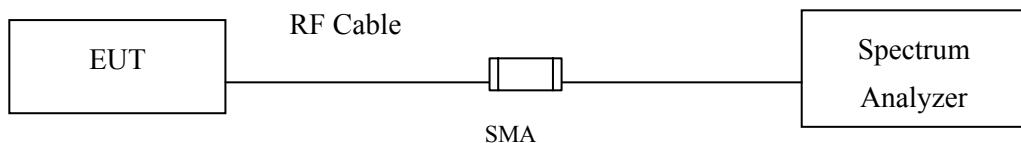
4.1. Test Equipment

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

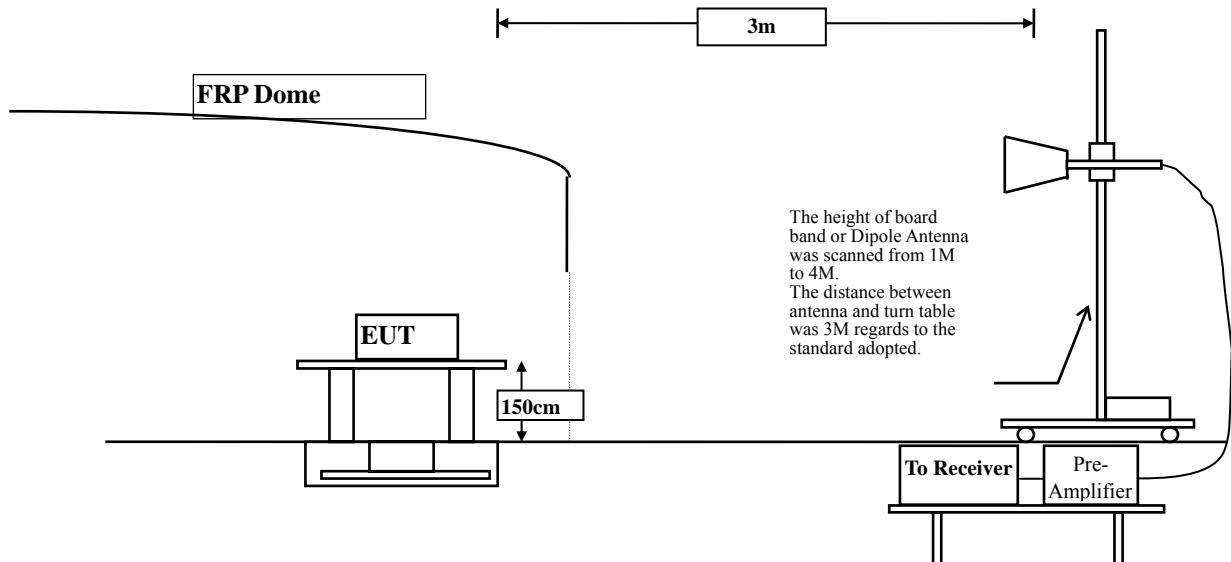
Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with "X" are used to measure the final test results.

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

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 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

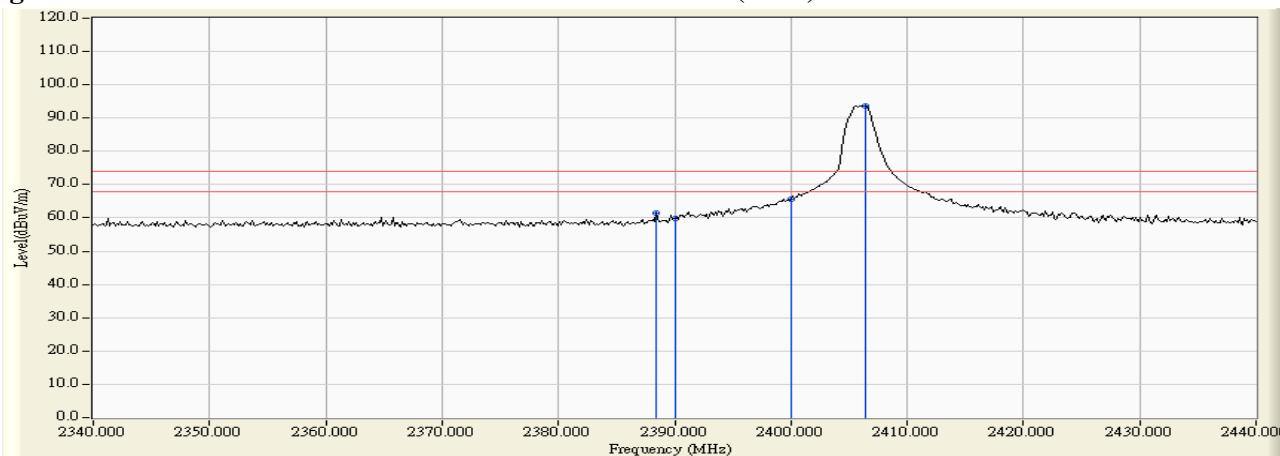
Product : Wired/Wireless Gaming Mouse
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2406 MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2388.406	31.503	29.801	61.304	74.00	54.00	Pass
01 (Peak)	2390.000	31.509	28.366	59.875	74.00	54.00	Pass
01 (Peak)	2400.000	31.561	33.991	65.552	74.00	54.00	Pass
01 (Peak)	2406.377	31.601	62.038	93.639	--	--	--

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.

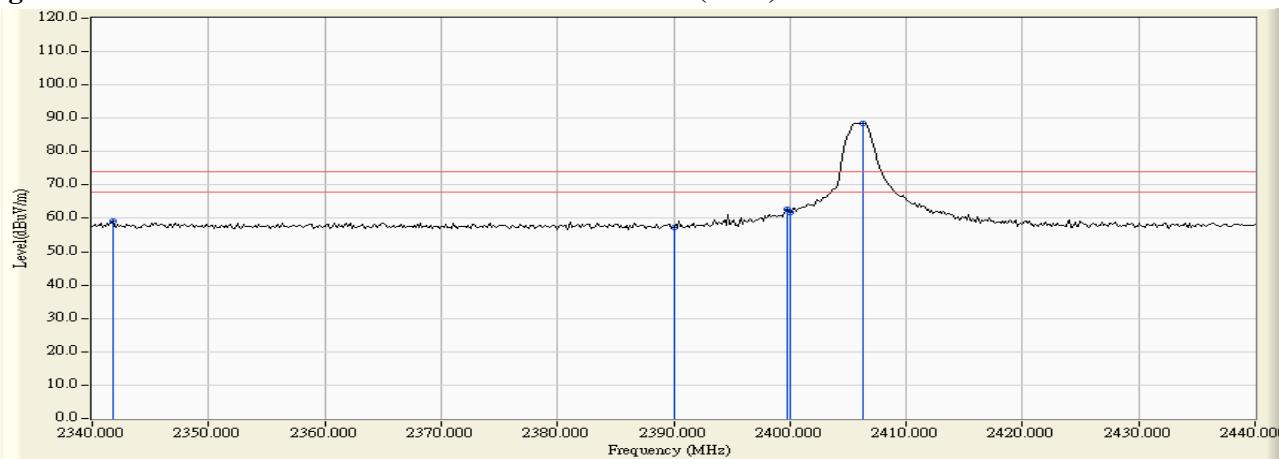
Product : Wired/Wireless Gaming Mouse
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2406 MHz)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2341.739	31.140	28.149	59.288	74.00	54.00	Pass
01 (Peak)	2390.000	30.915	26.491	57.406	74.00	54.00	Pass
01 (Peak)	2399.710	30.911	31.911	62.823	74.00	54.00	Pass
01 (Peak)	2400.000	30.912	30.837	61.749	74.00	54.00	Pass
01 (Peak)	2406.232	30.929	57.682	88.611	--	--	--

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 MHz	Peak Measurement dB μ V/m	Duty Cycle Factor dB	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m	Result Pass
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Horizontal

Average Detector:

2388.406	61.304	-16.548	44.756	-9.244	54.000	Pass
2390.000	59.875	-16.548	43.327	-10.673	54.000	Pass
2400.000	65.552	-16.548	49.004	-4.996	54.000	Pass

Vertical

Average Detector:

2341.739	59.288	-16.548	42.740	-11.260	54.000	Pass
2390.000	57.406	-16.548	40.858	-13.142	54.000	Pass
2399.710	62.823	-16.548	46.275	-7.725	54.000	Pass
2400.000	61.749	-16.548	45.201	-8.799	54.000	Pass

Note:

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

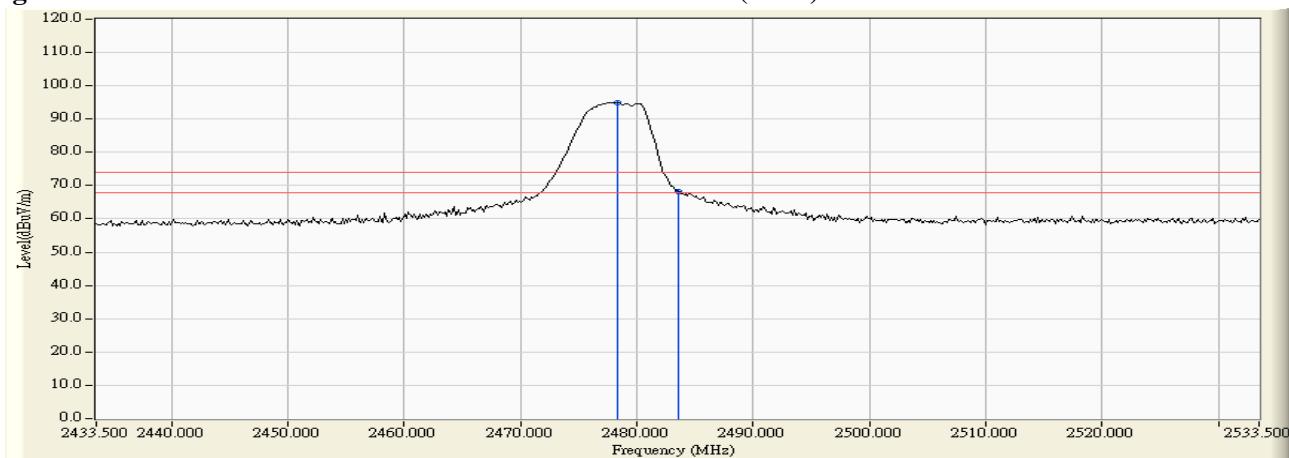
Product : Wired/Wireless Gaming Mouse
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2478 MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
05 (Peak)	2478.283	32.143	62.919	95.062	--	--	--
05 (Peak)	2483.500	32.182	36.139	68.321	74.00	54.00	Pass

Figure Channel 05:

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.

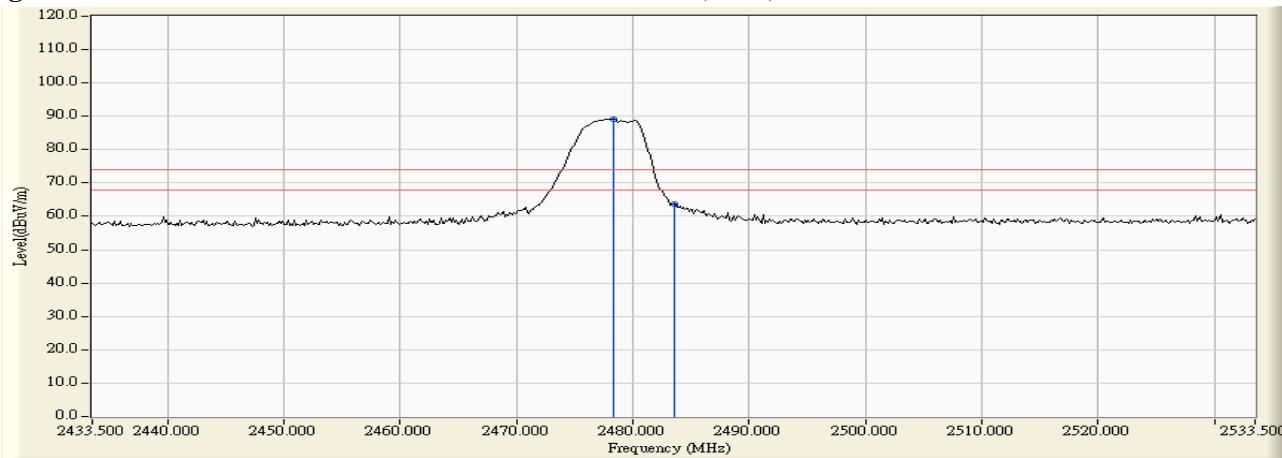
Product : Wired/Wireless Gaming Mouse
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2478 MHz)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
05 (Peak)	2478.283	31.401	57.818	89.218	--	--	--
05 (Peak)	2483.500	31.435	32.403	63.838	74.00	54.00	Pass

Figure Channel 05:

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 μ V/m	Duty Cycle Factor dB	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m	Result Pass
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Horizontal

Average Detector:

2483.500	68.321	-16.548	51.773	-2.227	54.000	Pass
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Vertical

Average Detector:

2483.500	63.838	-16.548	47.290	-6.710	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

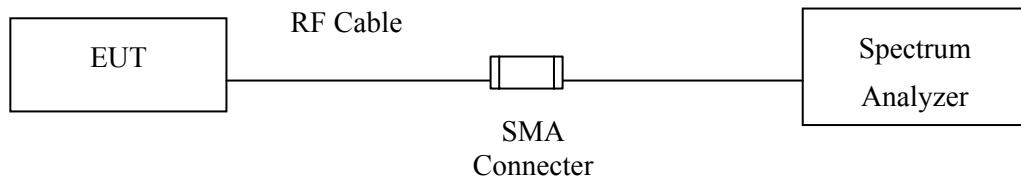
5.1. Test Equipment

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, 2015
Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2015
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

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

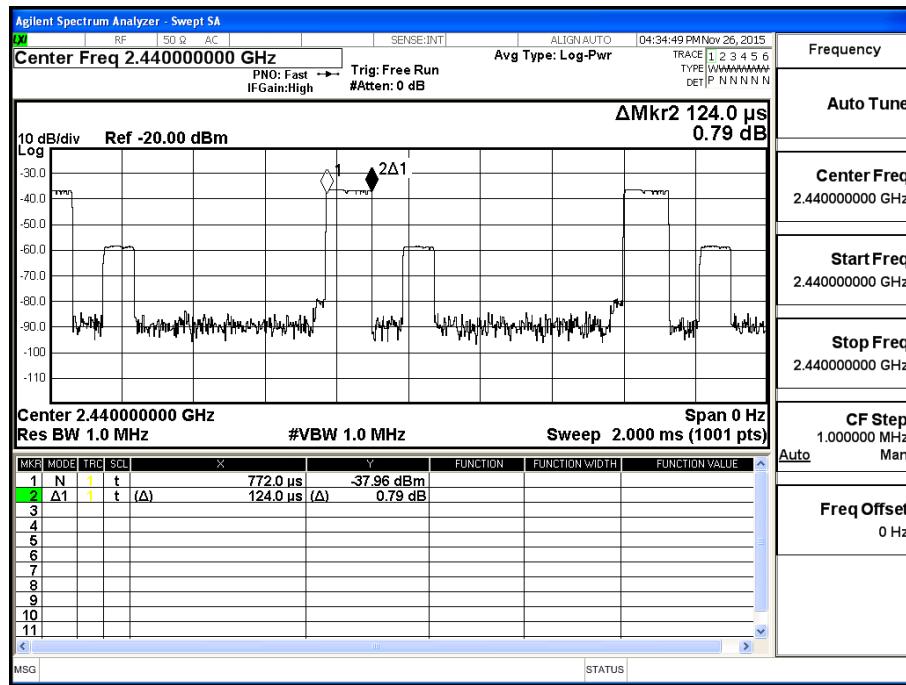
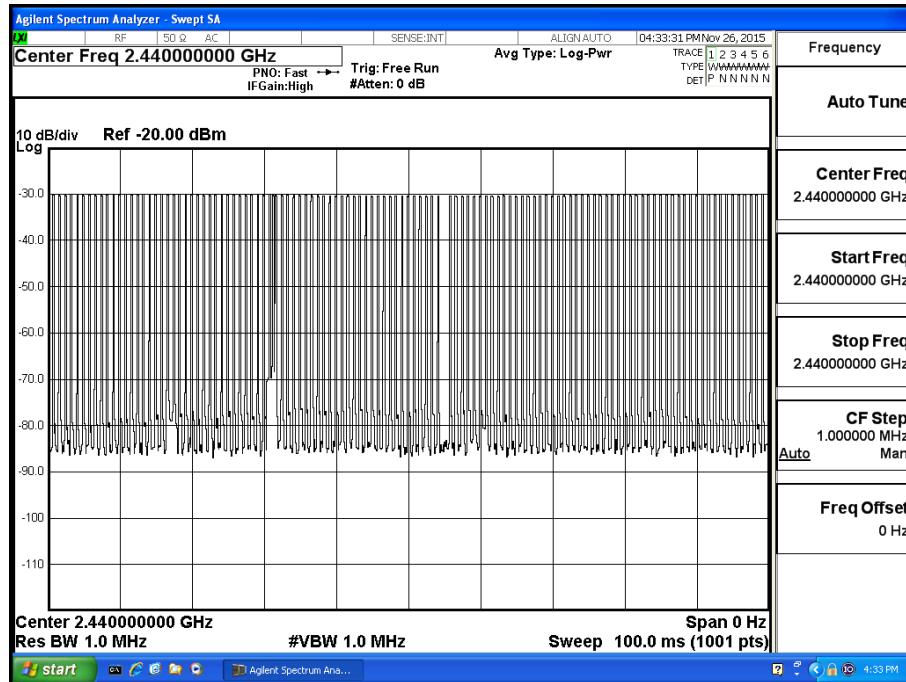


5.3. Uncertainty

± 150Hz

5.4. Test Result of Duty Cycle

Product : Wired/Wireless Gaming Mouse
 Test Item : Duty Cycle Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit



Time on of 100ms= 124.00us*120= 14.880 ms

Duty Cycle=14.88ms / 100ms= 0.1488

Duty Cycle correction factor= 20 LOG 0.1488= -16.548 dB

Duty Cycle correction factor	-16.548	dB
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6. EMI Reduction Method During Compliance Testing

No modification was made during testing.