

FCC TEST REPORT  
for  
Wintop Electronics Co., Limited  
  
2.4GHz Wireless Optical Mouse  
Model No.: WM-710, MP2175BLU,  
MP2275RED, MP2375BLK, MP2475PUR

Prepared for : Wintop Electronics Co., Limited  
Address : Unit 04 7/F, Bright Way Tower 33, Mong Kok RD KL,  
HONGKONG

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Report Number : R011406214E  
Date of Test : Jun. 11~30, 2014  
Date of Report : Jul. 01, 2014

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APPENDIX I (External Photos) (4 Pages)

APPENDIX II (Internal Photos) (3 Pages)

## TEST REPORT

Applicant : Wintop Electronics Co., Limited  
Manufacturer : Shenzhen Wintop Electronics Co., Limited  
EUT : 2.4GHz Wireless Optical Mouse  
Model No. : WM-710, MP2175BLU, MP2275RED, MP2375BLK, MP2475PUR  
Serial No. : N/A  
Trade Mark : N/A  
Rating : DC 3V, 8mA

Measurement Procedure Used:

FCC Part15 Subpart C, Paragraph 15.207, 15.249 & 15.209

The device described above is tested by Shenzhen Anbotech Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotech Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without

written approval of Shenzhen Anbotech Compliance Laboratory Limited.

Date of Test : Jun. 11~30, 2014

Prepared by :

*Rock zeng*

(Tested Engineer / Rock Zeng)

Reviewer :

*Amy Ding*

(Project Manager / Amy Ding)

Approved & Authorized Signer :

*Tom Chen*

(Manager / Tom Chen)

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

EUT : 2.4GHz Wireless Optical Mouse

Model Number : WM-710, MP2175BLU, MP2275RED, MP2375BLK, MP2475PUR  
(Note: All samples are the same except the model number and appearance, so we prepare “WM-710” for EMC test only.)

Test Power Supply : DC 3V

Frequency : 2402-2480MHz

Channel Space : 1MHz

No. of Channels : 79(Randomly selected 16 frequency point as working)

Antenna Specification : Printed Antenna:1.72 dBi

Applicant : Wintop Electronics Co., Limited  
Address : Unit 04 7/F, Bright Way Tower 33, Mong Kok RD KL, HONGKONG

Manufacturer : Shenzhen Wintop Electronics Co., Limited  
Address : Huaguan Industrial Park, Xinhe Road, Baolai Industrial District, Shangmugu, Pinghu Town, Longgang District, Shenzhen City, 518000, China

Factory : Shenzhen Wintop Electronics Co., Limited  
Address : Huaguan Industrial Park, Xinhe Road, Baolai Industrial District, Shangmugu, Pinghu Town, Longgang District, Shenzhen City, 518000, China

Date of receipt : Jun. 11, 2014

Date of Test : Jun. 11~30, 2014

## 1.2. Auxiliary Equipment Used during Test

PC	: Manufacturer: DELL M/N: OPTIPLEX 380 S/N: 1J63X2X CE , FCC: DOC
MONITOR	: Manufacturer: DELL M/N: E170Sc S/N: CN-00V539-64180-055-0UPS CE , FCC: DOC
KEYBOARD	: Manufacturer: DELL M/N: SK-8115 S/N: CN-0DJ313-71616-06C-02XN CE , FCC: DOC Cable: 1m, unshielded
Printer	: Manufacturer: Brother M/N: MFC-3360C S/N: N/A CE, FCC: DOC
Power Line	: Non-Shielded, 1.5m
VGA Cable	: Non-Shielded, 1.5m
Network Cable	: Non-Shielded, 1.5m

### 1.3. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

**CNAS - LAB Code: L3503**

Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

**FCC-Registration No.: 752021**

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 10, 2013.

**IC-Registration No.: 8058A-1**

Shenzhen Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A-1, February 22, 2013.

**Test Location**

All Emissions tests were performed at  
Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

### 1.4. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.3dB
Conduction Uncertainty	:	Uc = 3.4dB

## 2. Test Procedure

**GENERAL:** This report shall NOT be reproduced except in full without the written approval of Shenzhen Anbotek Compliance Laboratory Limited. The EUT was transmitting a test signal during the testing.

**RADIATION INTERFERENCE:** The test procedure used was ANSI STANDARD C63.4-2009 using a spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz up to 1.0GHz and 1.0MHz with a video BW of 3.0MHz above 1.0GHz. The ambient temperature of the EUT was 74.3oF with a humidity of 69%.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

**Example:**

Freq (MHz) METER READING + ACF = FS  
20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

**ANSI STANDARD C63.4-2009 10.1.7 MEASUREMENT PROCEDURES:** The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

### 3. Conducted Limits

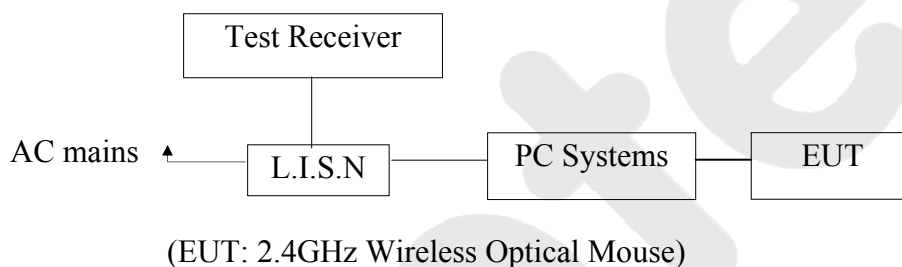
#### Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Two-Line V-network	Rohde & Schwarz	ENV216	100055	Apr. 23, 2014	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Apr. 23, 2014	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Apr. 23, 2014	1 Year

Conduction Uncertainty :  $U_c = 3.4\text{dB}$

#### 3.1. Block Diagram of Test Setup

##### 3.1.1. Block diagram of connection between the EUT and simulators



#### 3.2. Power Line Conducted Emission Measurement Limits (15.207)

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. \*Decreasing linearly with logarithm of frequency.  
2. The lower limit shall apply at the transition frequencies.

#### 3.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

EUT : 2.4GHz Wireless Optical Mouse  
Model Number : WM-710  
Applicant : Wintop Electronics Co., Limited



### 3.4. Operating Condition of EUT

- 3.4.1. Setup the EUT and simulator as shown as Section 3.1.
- 3.4.2. Turn on the power of all equipment.
- 3.4.3. Let the EUT work in test mode (ON) and measure it.

### 3.5. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.4-2009 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9KHz.

The frequency range from 150KHz to 30MHz is checked.

The test results are reported on Section 3.6.

### 3.6. Power Line Conducted Emission Measurement Results

**PASS.**

The frequency range from 150KHz to 30 MHz is investigated.

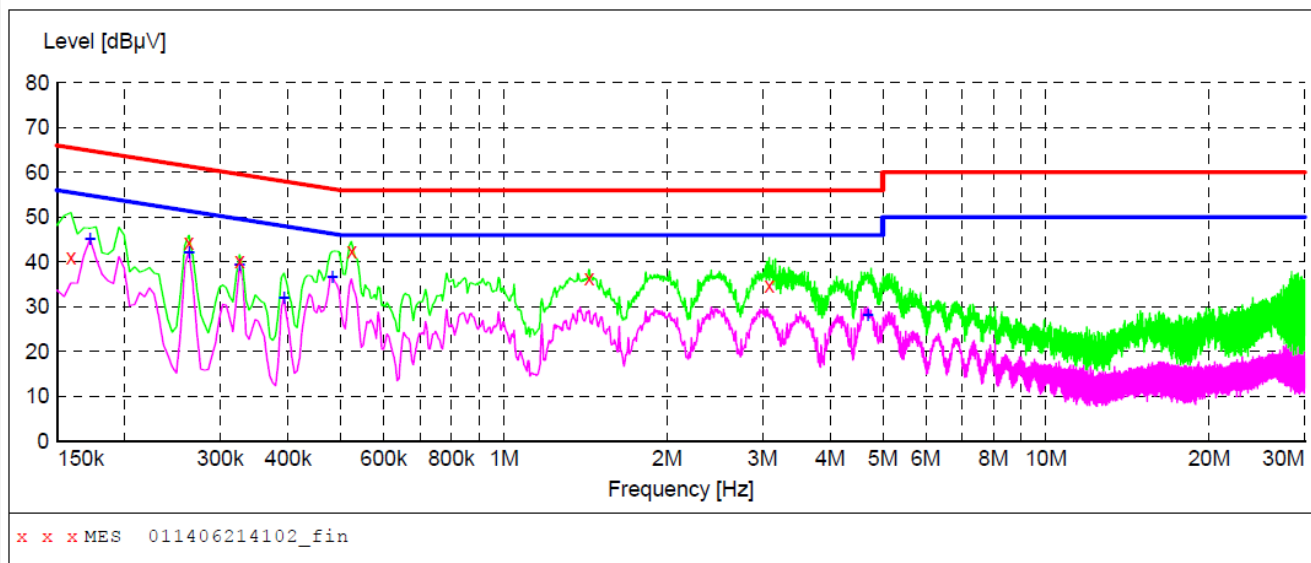
Please refer the following pages.

# **CONDUCTED EMISSION TEST DATA**

Test Site: 1# Shielded Room  
Operating Condition: ON  
Test Specification: DC 3V  
Comment: Live Line  
Tem:25℃ Hum:50%

## **SCAN TABLE: "Voltage (150K~30M) FIN"**

Short Description: 150K-30M Disturbance Voltages



## **MEASUREMENT RESULT: "011406214102\_fin"**

6/12/2014 2:41PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.159000	41.00	20.1	66	24.5	QP	L1	GND
0.262500	44.40	20.1	61	17.0	QP	L1	GND
0.325500	40.10	20.1	60	19.5	QP	L1	GND
0.523500	42.40	20.1	56	13.6	QP	L1	GND
1.436500	36.30	20.3	56	19.7	QP	L1	GND
3.088000	34.60	20.4	56	21.4	QP	L1	GND

## **MEASUREMENT RESULT: "011406214102\_fin2"**

6/12/2014 2:41PM

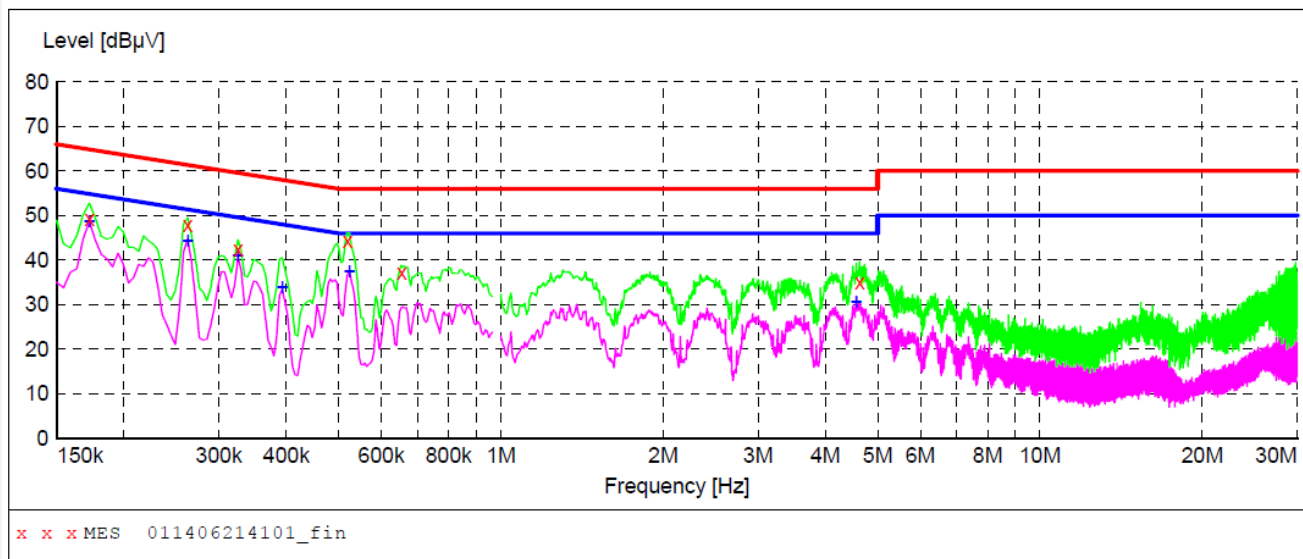
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.172500	45.10	20.1	55	9.7	AV	L1	GND
0.262500	42.10	20.1	51	9.3	AV	L1	GND
0.325500	39.40	20.1	50	10.2	AV	L1	GND
0.393000	32.00	20.1	48	16.0	AV	L1	GND
0.483000	36.70	20.1	46	9.6	AV	L1	GND
4.694500	28.30	20.5	46	17.7	AV	L1	GND

## CONDUCTED EMISSION TEST DATA

Test Site: 1# Shielded Room  
Operating Condition: ON  
Test Specification: DC 3V  
Comment: Neutral Line  
Tem:25°C Hum:50%

### SCAN TABLE: "Voltage (150K~30M) FIN"

Short Description: 150K-30M Disturbance Voltages



### MEASUREMENT RESULT: "011406214101\_fin"

6/12/2014 2:38PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.172500	49.30	20.1	65	15.5	QP	N	GND
0.262500	48.00	20.1	61	13.4	QP	N	GND
0.325500	42.40	20.1	60	17.2	QP	N	GND
0.519000	44.30	20.1	56	11.7	QP	N	GND
0.654000	37.10	20.1	56	18.9	QP	N	GND
4.627000	35.10	20.5	56	20.9	QP	N	GND

### MEASUREMENT RESULT: "011406214101\_fin2"

6/12/2014 2:38PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.172500	48.60	20.1	55	6.2	AV	N	GND
0.262500	44.30	20.1	51	7.1	AV	N	GND
0.325500	40.90	20.1	50	8.7	AV	N	GND
0.393000	34.00	20.1	48	14.0	AV	N	GND
0.523500	37.40	20.1	46	8.6	AV	N	GND
4.568500	30.60	20.5	46	15.4	AV	N	GND

## 4. Radiation Interference

### 4.1. Requirements (15.249, 15.209):

FIELD STRENGTH of Fundamental: @3M 902-928 MHz 2.4-2.4835 GHz 94 dBμV/m @3m	FIELD STRENGTH of Harmonics    54 dBμV/m @3m	S15.209 30 - 88 MHz  88 - 216 MHz 216 - 960 MHz ABOVE 960 MHz	40 dBuV/m  43.5 46 54dBuV/m
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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.

### 4.2 Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz. The EUT is tested in 9\*6\*6 Chamber.

The test results are listed in Section 4.3.

#### Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2014	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2014	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

Radiation Uncertainty : Ur = 4.3dB

### 4.3 Test Results

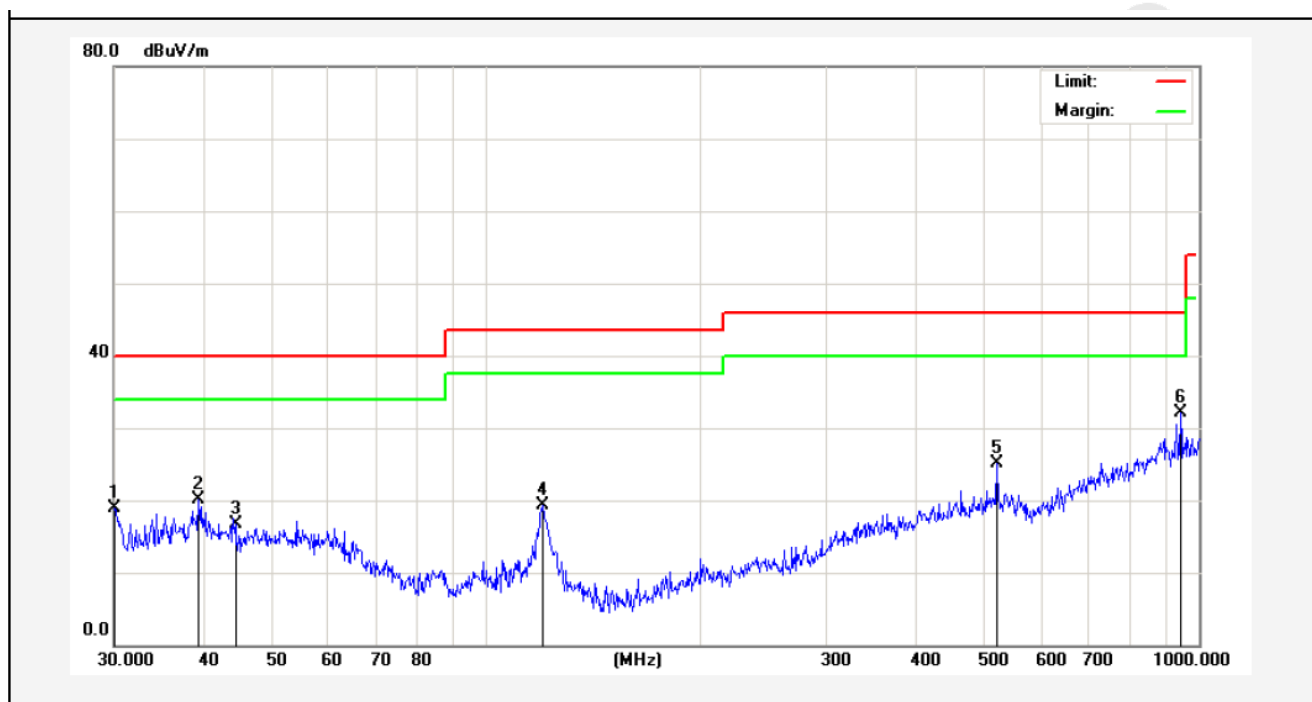
PASS.

Please refer the following pages.

**Data:**

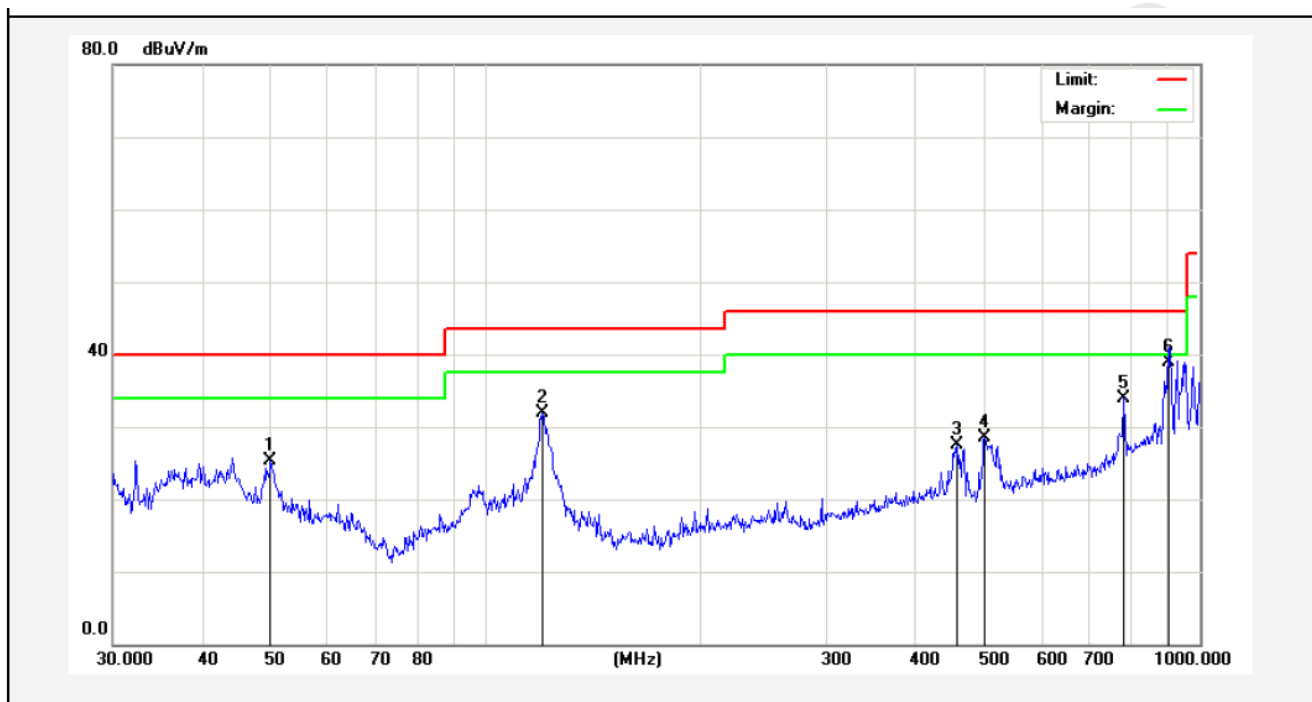
**Below 1GHz:**

<b>Job No.:</b>	<b>011406214E</b>	<b>Polarziation:</b>	<b>Horizontal</b>
<b>Standard:</b>	<b>(RE)FCC PART15 C _3m</b>	<b>Power Source:</b>	<b>DC 3V</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Temp.(C)/Hum.(%RH):</b>	<b>24.3( C)/55%RH</b>
<b>Mode:</b>	<b>ON</b>	<b>Distance:</b>	<b>3m</b>
<b>Note:</b>	<b>30-1000MHz</b>		



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.0000	35.87	-16.95	18.92	40.00	-21.08	peak			
2	39.4371	34.61	-14.58	20.03	40.00	-19.97	peak			
3	44.4308	31.04	-14.34	16.70	40.00	-23.30	peak			
4	119.8556	40.56	-21.32	19.24	43.50	-24.26	peak			
5	520.8882	36.06	-11.01	25.05	46.00	-20.95	peak			
6	942.1305	36.18	-4.10	32.08	46.00	-13.92	peak			

Job No.: 011406214E Polarization: Vertical  
Standard: (RE)FCC PART15 C \_3m Power Source: DC 3V  
Test item: Radiation Test Temp.(C)/Hum.(%RH): 24.3( C)/55%RH  
Mode: ON Distance: 3m  
Note: 30-1000MHz



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	49.8814	39.77	-14.56	25.21	40.00	-14.79	peak			
2	119.8556	48.31	-16.32	31.99	43.50	-11.51	peak			
3	457.5073	39.50	-11.99	27.51	46.00	-18.49	peak			
4	499.4247	39.37	-10.96	28.41	46.00	-17.59	peak			
5	782.3453	40.03	-6.03	34.00	46.00	-12.00	peak			
6	903.3094	42.64	-3.71	38.93	46.00	-7.07	QP	100	0	

**Above 1 GHz:**

Horizontal CH Low (2402MHz)								
Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2402.000	2.17	31.21	35.30	87.45	85.53	114.0	-28.47	Peak
2402.000	2.17	31.21	35.30	84.18	82.26	94.0	-11.74	AV
4804.250	2.56	34.01	34.71	49.57	51.43	74.0	-22.57	Peak
4804.250	2.56	34.01	34.71	34.19	36.05	54.0	-17.95	AV
7206.560	2.98	36.16	35.15	35.98	39.97	74.0	-34.03	Peak
7206.560	2.98	36.16	35.15	23.07	27.06	54.0	-26.94	AV
9608.000	---	---	---	---	---	---	---	---
12010.00	---	---	---	---	---	---	---	---
14412.00	---	---	---	---	---	---	---	---
16814.00	---	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---

Vertical CH Low (2402MHz)								
Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2402.000	2.17	31.21	35.30	91.06	89.14	114.0	-24.86	Peak
2402.000	2.17	31.21	35.30	82.62	80.70	94.0	-13.30	AV
4804.250	2.56	34.01	34.71	42.33	44.19	74.0	-29.81	Peak
4804.250	2.56	34.01	34.71	34.20	36.06	54.0	-17.94	AV
7206.560	2.98	36.16	35.15	35.12	39.11	74.0	-34.89	Peak
7206.560	2.98	36.16	35.15	36.08	40.07	54.0	-13.93	AV
9608.000	---	---	---	---	---	---	---	---
12010.00	---	---	---	---	---	---	---	---
14412.00	---	---	---	---	---	---	---	---
16814.00	---	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---

Horizontal CH Middle (2442MHz)								
Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2442.000	2.19	31.22	34.60	92.33	91.14	114.0	-22.86	Peak
2442.000	2.19	31.22	34.60	87.56	86.37	94.0	-7.63	AV
4884.190	2.57	35.00	34.58	35.29	38.28	74.0	-35.72	Peak
4884.190	2.57	35.00	34.58	31.08	34.07	54.0	-19.93	AV
7326.070	3.00	36.17	35.14	37.80	41.83	74.0	-32.17	Peak
7326.070	3.00	36.17	35.14	36.25	40.28	54.0	-13.72	AV
9768.000	---	---	---	---	---	---	---	---
12210.00	---	---	---	---	---	---	---	---
14652.00	---	---	---	---	---	---	---	---
17094.00	---	---	---	---	---	---	---	---
---								

Vertical CH Middle (2442MHz)								
Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2442.000	2.19	31.22	34.60	92.15	90.96	114.0	-23.04	Peak
2442.000	2.19	31.22	34.60	84.33	83.14	94.0	-10.86	AV
4884.190	2.57	35.00	34.58	42.50	45.49	74.0	-28.51	Peak
4884.190	2.57	35.00	34.58	43.02	46.01	54.0	-7.99	AV
7326.070	3.00	36.17	35.14	37.28	41.31	74.0	-32.69	Peak
7326.070	3.00	36.17	35.14	39.65	43.68	54.0	-10.32	AV
9768.000	---	---	---	---	---	---	---	---
12210.00	---	---	---	---	---	---	---	---
14652.00	---	---	---	---	---	---	---	---
17094.00	---	---	---	---	---	---	---	---
---								



Horizontal CH High (2480MHz)								
Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2480.000	2.20	31.65	36.00	91.32	89.17	114.0	-24.83	Peak
2480.000	2.20	31.65	36.00	85.17	83.02	94.0	-10.98	AV
4960.220	2.58	35.06	34.79	45.09	47.94	74.0	-26.06	Peak
4960.220	2.58	35.06	34.79	40.16	43.01	54.0	-10.99	AV
7440.990	3.02	36.19	34.90	46.33	50.64	74.0	-23.36	Peak
7440.990	3.02	36.20	35.20	32.58	36.60	54.0	-17.40	AV
9920.000	---	---	---	---	---	---	---	---
12400.00	---	---	---	---	---	---	---	---
14880.00	---	---	---	---	---	---	---	---
17360.00	---	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---

Vertical CH High (2480MHz)								
Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2480.000	2.20	31.65	36.00	87.24	85.09	114.0	-28.91	Peak
2480.000	2.20	31.65	36.00	85.34	83.19	94.0	-10.81	AV
4960.220	2.58	35.06	34.79	46.39	49.24	74.0	-24.76	Peak
4960.220	2.58	35.06	34.79	36.55	39.40	54.0	-14.60	AV
7440.990	3.02	36.19	34.90	37.51	41.82	74.0	-32.18	Peak
7440.990	3.02	36.20	35.20	37.16	41.18	54.0	-12.82	AV
9920.000	---	---	---	---	---	---	---	---
12400.00	---	---	---	---	---	---	---	---
14880.00	---	---	---	---	---	---	---	---
17360.00	---	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---

**NOTE: “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured. The results of different modulations are the same.**

## 5. Bandedge

### 5.1. Requirements (15.249):

The field strength of any emissions appearing outside the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.249.

### 5.2. Test Procedure

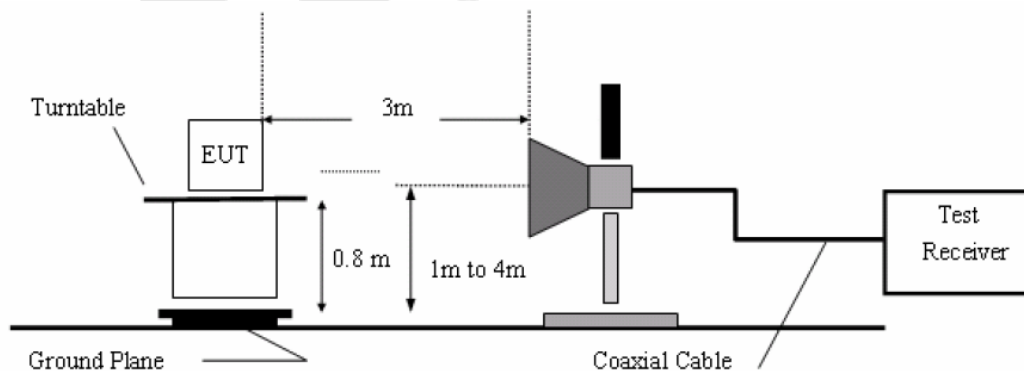
The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

#### Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2014	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2014	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

Radiation Uncertainty : Ur = 4.3dB

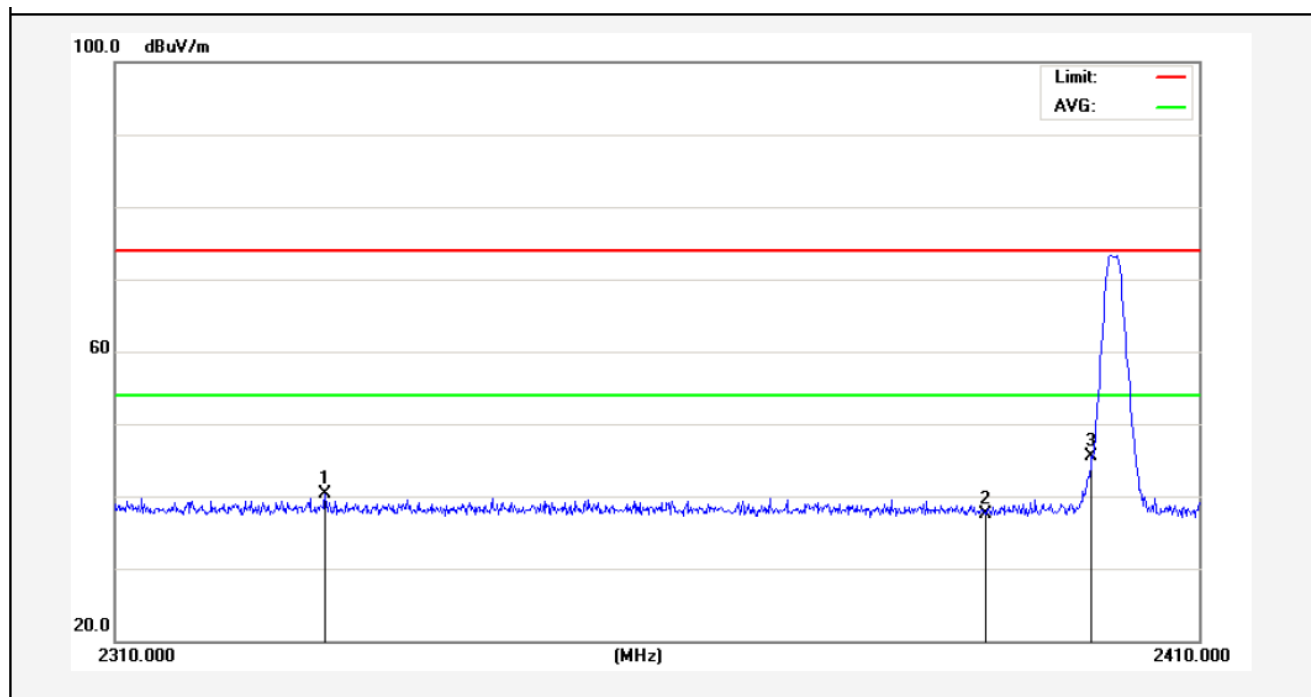
### 5.3. Test Configuration:



### 5.4. Test Results

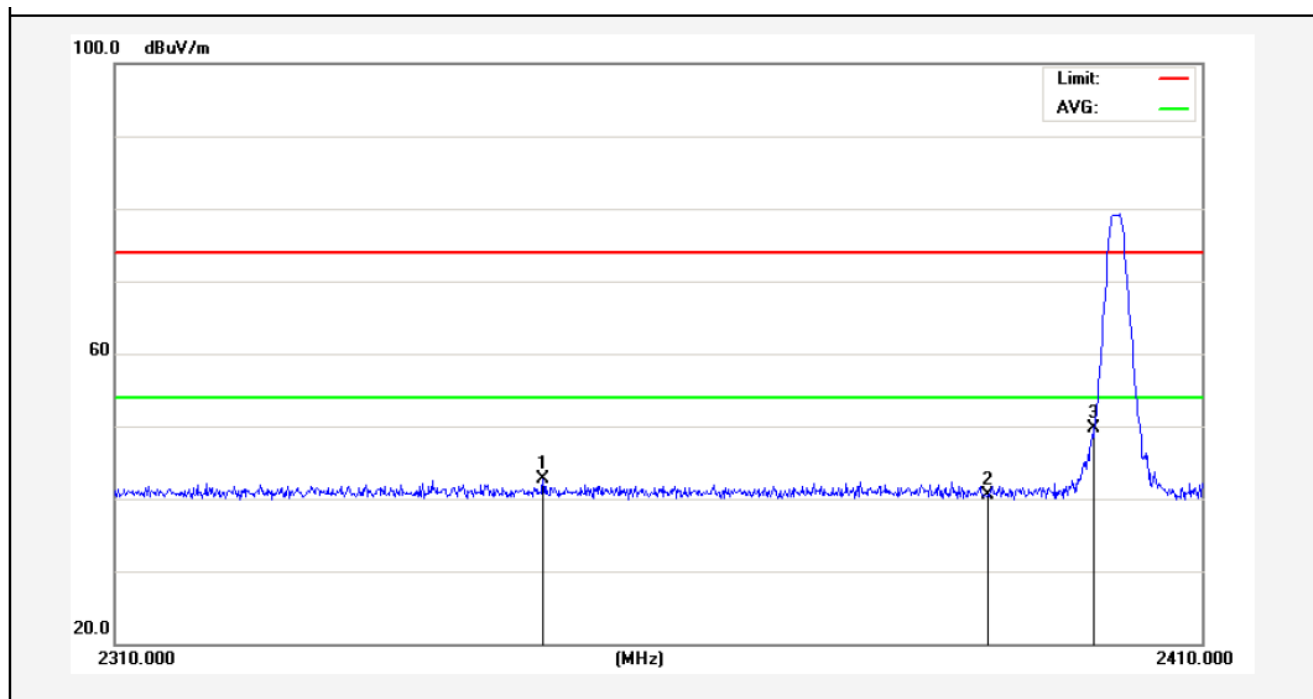
Pass.  
Please refer the following plot.

Job No.:	011406214E	Polarization:	Horizontal
Standard:	(RE)FCC PART15 C _3m	Power Source:	DC 3V
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3( C)/55%RH
Note:	PEAK	Distance:	3m



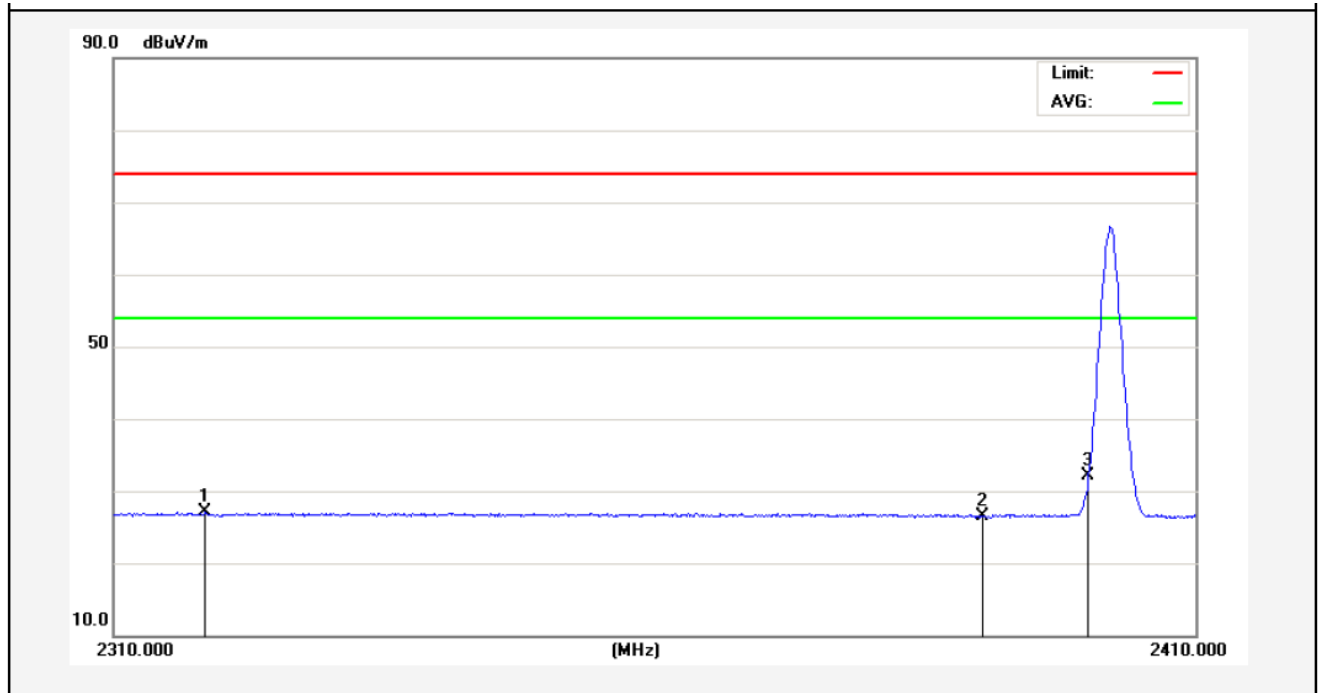
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2329.100	40.60	-0.33	40.27	74.00	-33.73	peak			
2	2390.000	37.92	-0.46	37.46	74.00	-36.54	peak			
3	2400.000	45.95	-0.49	45.46	74.00	-28.54	peak			

Job No.:	011406214E	Polarization:	Vertical
Standard:	(RE)FCC PART15 C _3m	Power Source:	DC 3V
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3( C)/55%RH
Note:	PEAK	Distance:	3m



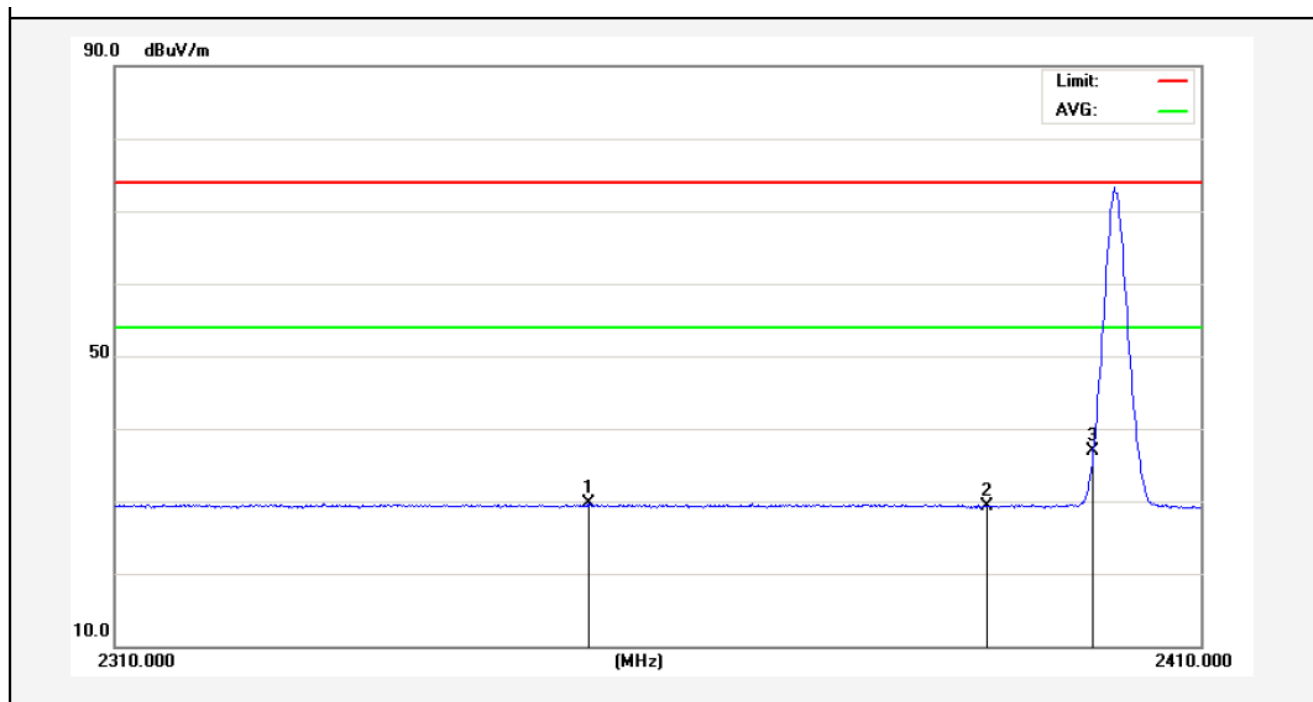
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2348.900	40.41	2.22	42.63	74.00	-31.37	peak			
2	2390.000	38.36	2.22	40.58	74.00	-33.42	peak			
3	2400.000	47.44	2.21	49.65	74.00	-24.35	peak			

<b>Job No.:</b>	<b>011406214E</b>	<b>Polarization:</b>	<b>Horizontal</b>
<b>Standard:</b>	<b>(RE)FCC PART15 C _3m</b>	<b>Power Source:</b>	<b>DC 3V</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Temp.(C)/Hum.(%RH):</b>	<b>24.3( C)/55%RH</b>
<b>Note:</b>	<b>AV</b>	<b>Distance:</b>	<b>3m</b>



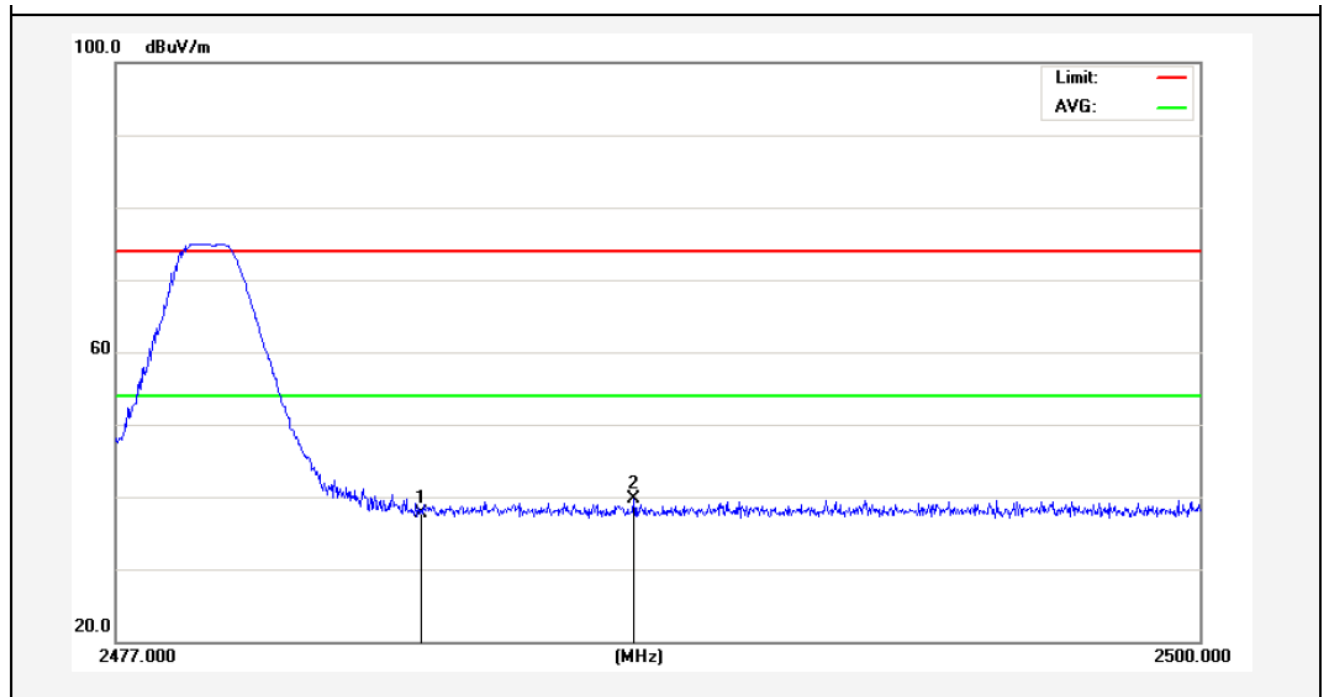
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2318.400	27.34	-0.30	27.04	54.00	-26.96	AVG			
2	2390.000	26.96	-0.46	26.50	54.00	-27.50	AVG			
3	2400.000	32.61	-0.49	32.12	54.00	-21.88	AVG			

Job No.:	011406214E	Polarization:	Vertical
Standard:	(RE)FCC PART15 C _3m	Power Source:	DC 3V
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3( C)/55%RH
Note:	AV	Distance:	3m



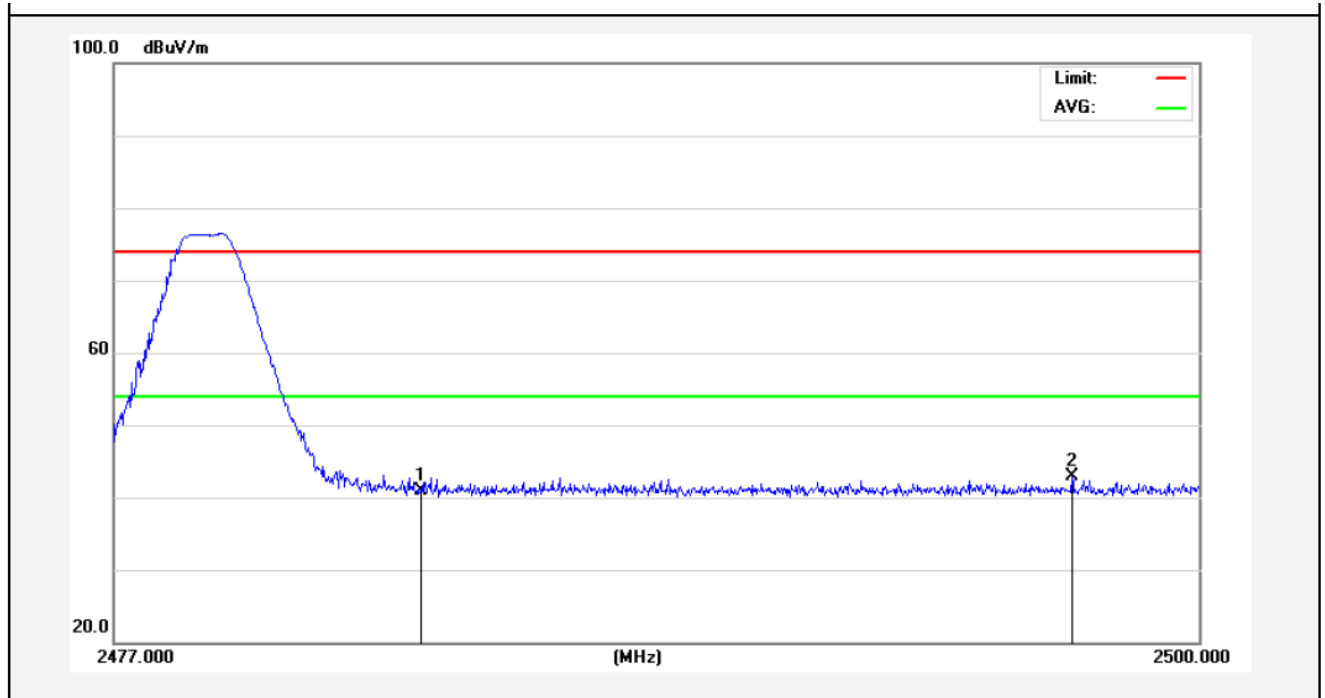
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2353.100	27.45	2.22	29.67	54.00	-24.33	AVG			
2	2390.000	27.00	2.22	29.22	54.00	-24.78	AVG			
3	2400.000	34.71	2.21	36.92	54.00	-17.08	AVG			

Job No.:	011406214E	Polarization:	Horizontal
Standard:	(RE)FCC PART15 C _3m	Power Source:	DC 3V
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3( C)/55%RH
Note:	PEAK	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	38.42	-0.67	37.75	74.00	-36.25	peak			
2	2487.971	40.34	-0.68	39.66	74.00	-34.34	peak			

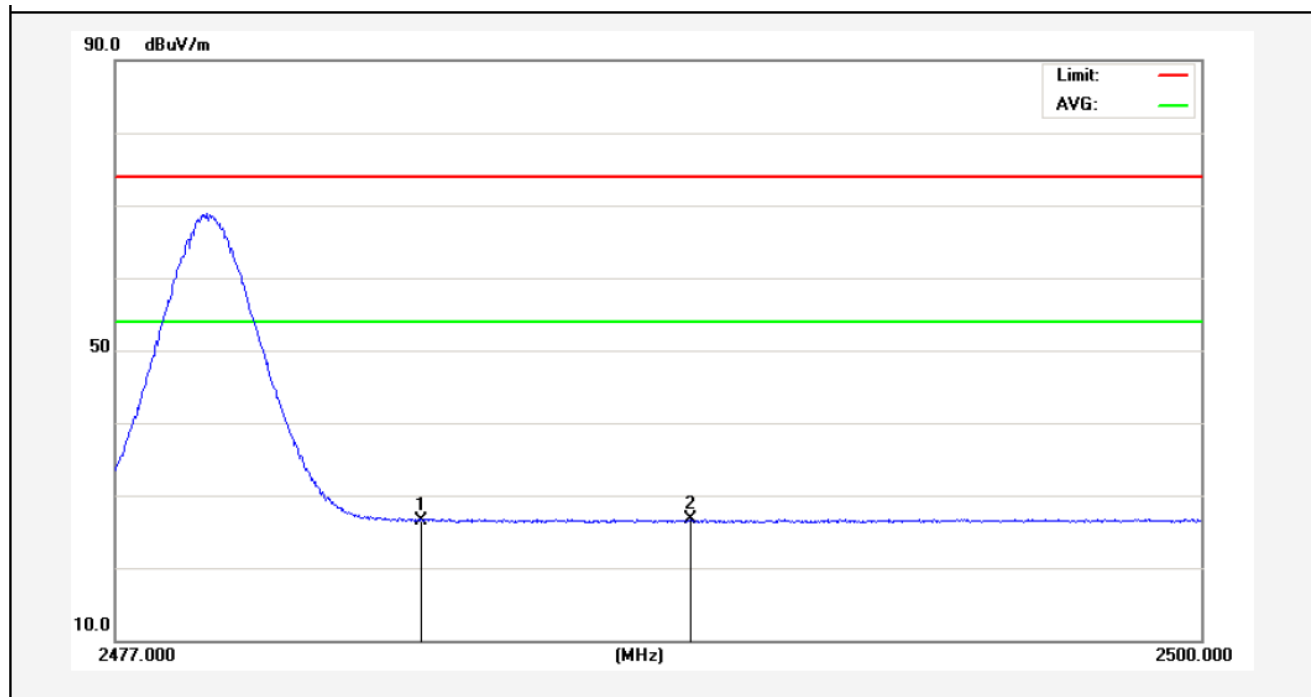
Job No.:	011406214E	Polarization:	Vertical
Standard:	(RE)FCC PART15 C _3m	Power Source:	DC 3V
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3( C)/55%RH
Note:	PEAK	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	38.75	2.20	40.95	74.00	-33.05	peak			
2	2497.309	40.65	2.20	42.85	74.00	-31.15	peak			

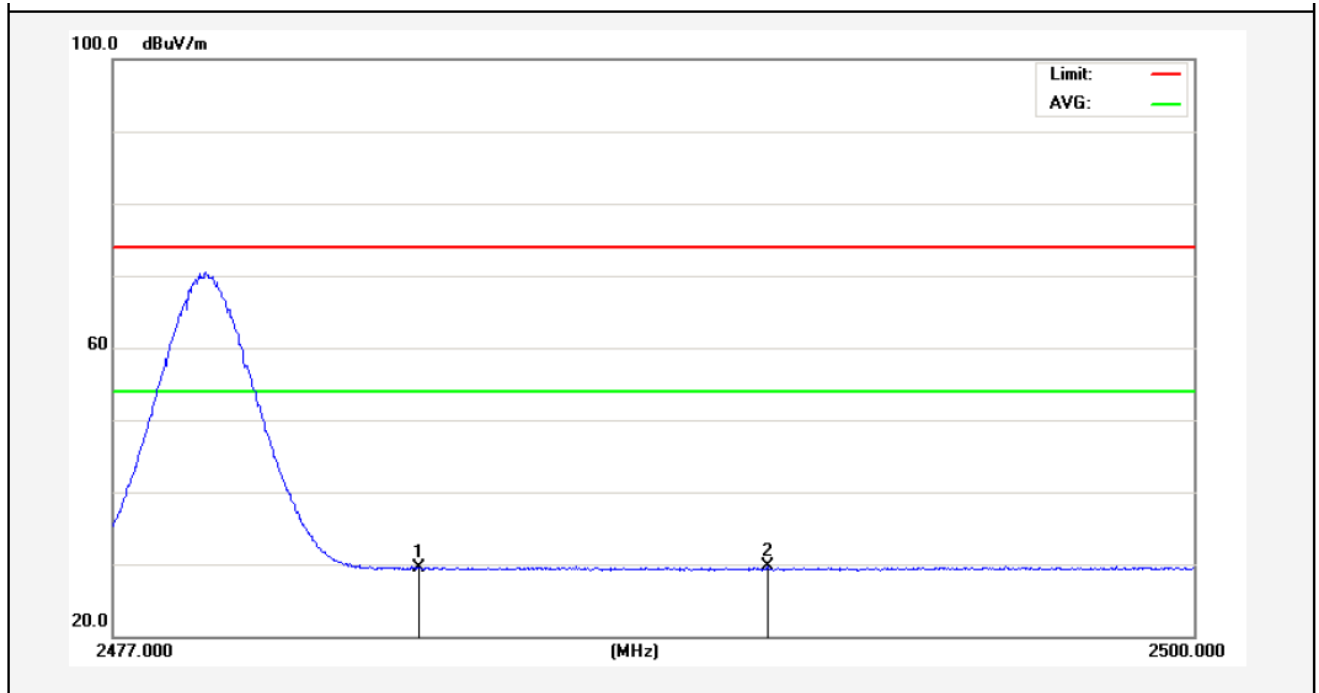


Job No.:	011406214E	Polarization:	Horizontal
Standard:	(RE)FCC PART15 C _3m	Power Source:	DC 3V
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3( C)/55%RH
Note:	AV	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	27.20	-0.67	26.53	54.00	-27.47	AVG			
2	2489.167	27.42	-0.68	26.74	54.00	-27.26	AVG			

<b>Job No.:</b>	<b>011406214E</b>	<b>Polarization:</b>	<b>Vertical</b>
<b>Standard:</b>	<b>(RE)FCC PART15 C _3m</b>	<b>Power Source:</b>	<b>DC 3V</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Temp.(C)/Hum.(%RH):</b>	<b>24.3( C)/55%RH</b>
<b>Note:</b>	<b>AV</b>	<b>Distance:</b>	<b>3m</b>



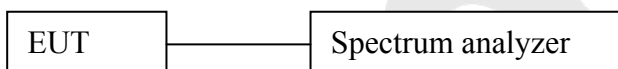
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	27.35	2.20	29.55	54.00	-24.45	AVG			
2	2490.915	27.46	2.20	29.66	54.00	-24.34	AVG			

## 6. Occupied Bandwidth

### 6.1. Requirements :

According to 15.215 (c), 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. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

### 6.2. Test SET-UP



### 6.3 Test Equipment

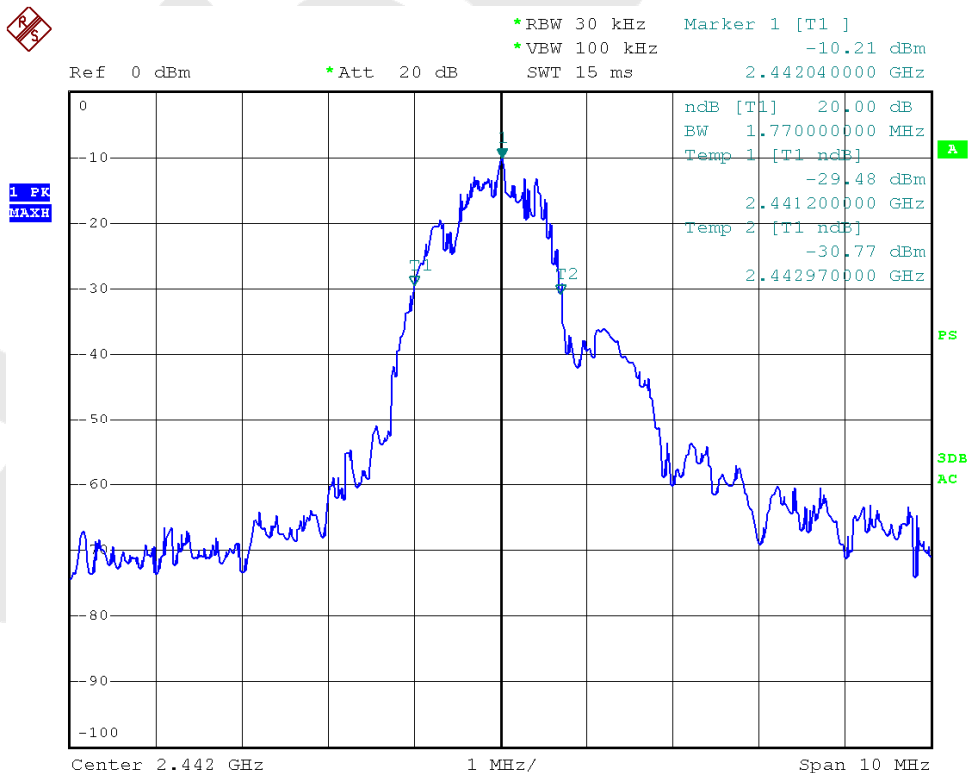
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2014	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2014	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

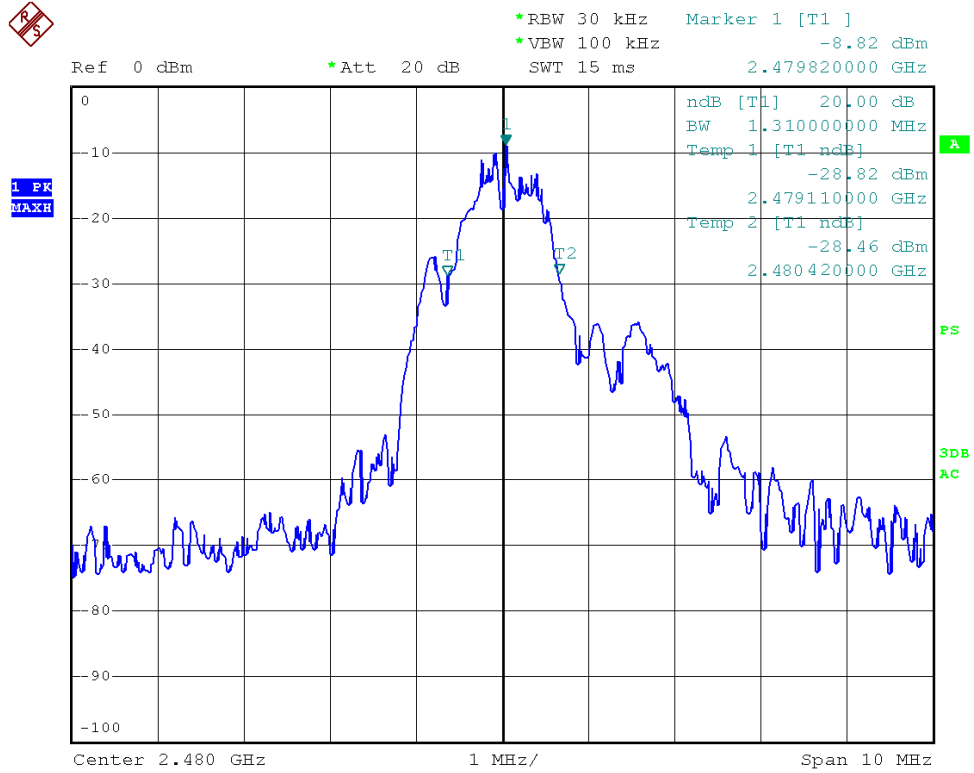
### 6.4. Test Results

Pass.

Please refer the following plot.

20dB Down:





## 7. PHOTOGRAPH

### 7.1. Photo of Power Line Conducted Emission Measurement





## 7.2. Photo of Radiation Emission Test



## APPENDIX I (External Photos)

Figure 1  
The EUT-Series View



Figure 2  
The EUT-Overall View





Figure 3  
The EUT-Front View



Figure 4  
The EUT-Back View



Figure 5  
The EUT-Left View



Figure 6  
The EUT-Right View





Figure 7  
The EUT-Top View

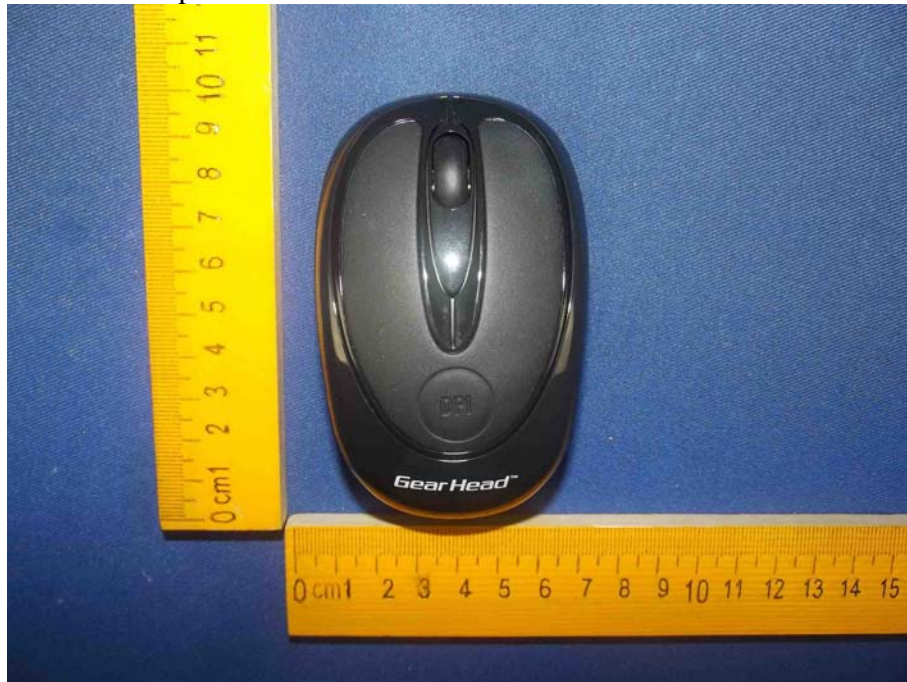


Figure 8  
The EUT-Bottom View



## APPENDIX II (Internal Photos)

Figure 9  
The EUT-Inside View



Figure 10  
PCB of the EUT-Front View

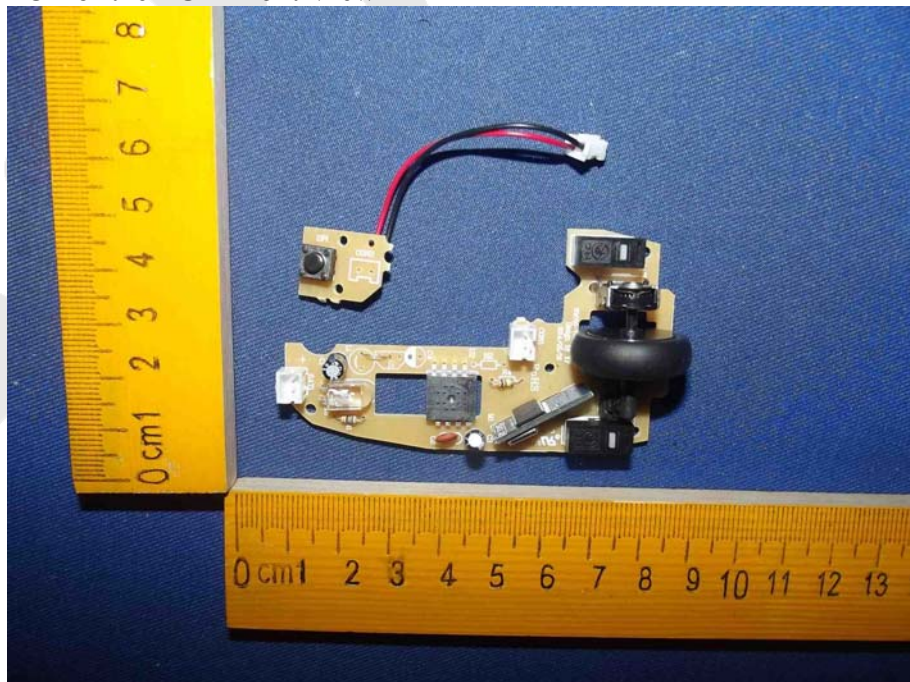




Figure 11  
PCB of the EUT-Back View

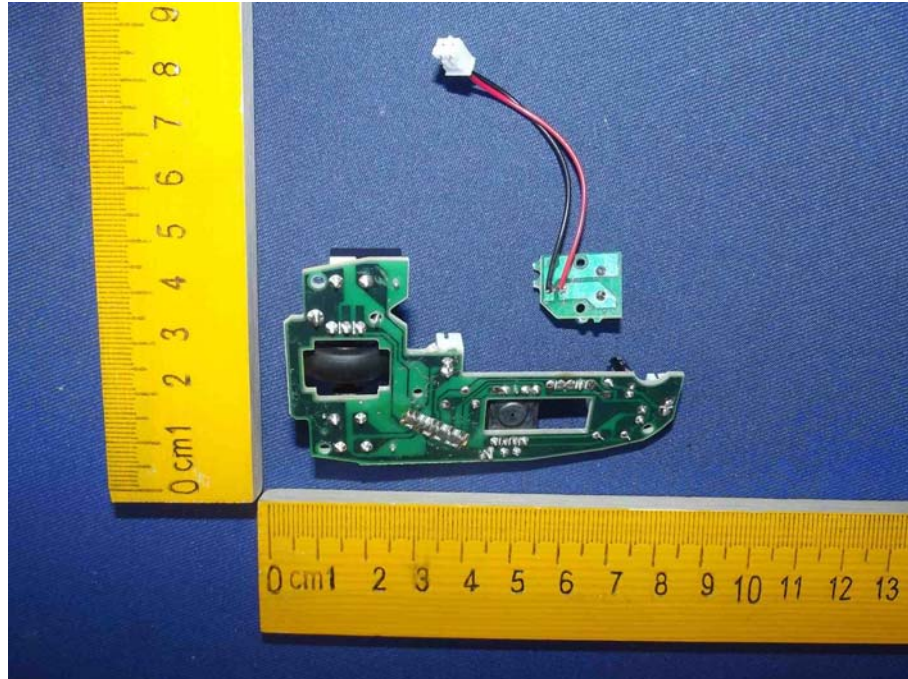


Figure 12  
PCB of the EUT-Front View

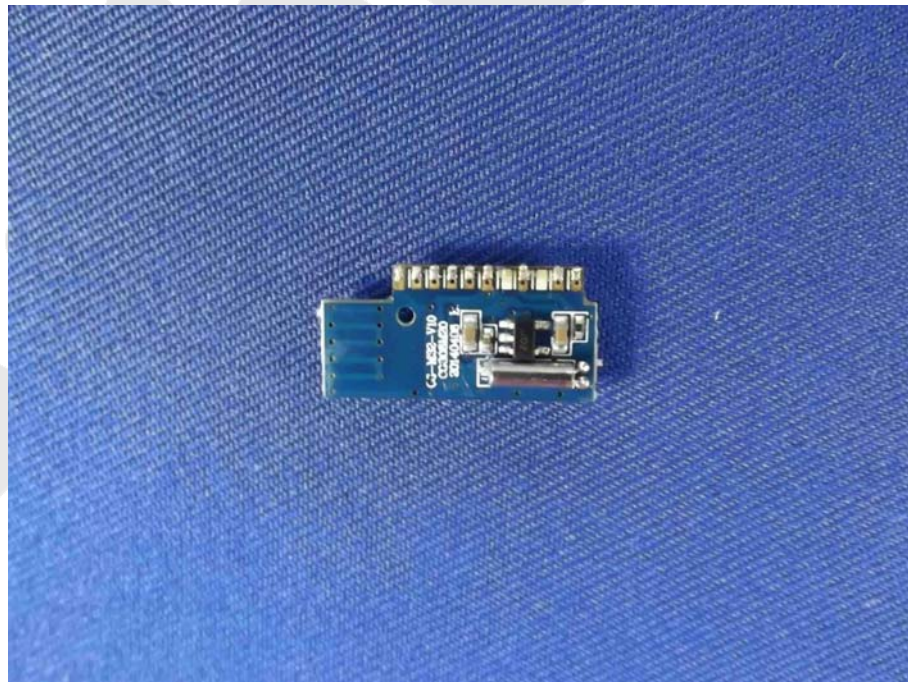


Figure 13  
PCB of the EUT-Back View

