



Test Report

Product Name : RF 2.4G Presenter Mouse
Model No. : Libra-P5
FCC ID. : F2QLIBRAP5U

Applicant : Itron Technology Inc.
Address : 9F, #75, Sec 1, Hsin Tai Wu Rd., Hsichih, Taiwan, R.O.C

Date of Receipt : Aug. 18, 2006
Issued Date : Sep. 11, 2006
Report No. : 068L148-RF-US-P07V01

The Test Results relate only to the samples tested.
The test report shall not be reproduced except in full without the written approval of Quietek Corporation.
This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Issued Date: Sep. 11, 2006

Report No. : 068L148-RF-US-P07V01



Accredited by NIST (NVLAP)

NVLAP Lab Code: 200533-0

Product Name : RF 2.4G Presenter Mouse

Applicant : Itron Technology Inc.

Address : 9F, #75, Sec 1, Hsin Tai Wu Rd., Hsichih, Taiwan, R.O.C

Manufacturer : Itron Technology Inc.

Model No. : Libra-P5

Rated Voltage : AC 120V/60Hz

Working Voltage : Battery 1.5V*2

Trade Name : iOne

Applicable Standard : FCC Part 15 Subpart C Paragraph 15.249: 2005
ANSI C63.4: 2003

Test Result : Complied



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TABLE OF CONTENTS

Description	Page
1. GENERAL INFORMATION	4
1.1. EUT Description	4
1.2. Operation Description	5
1.3. Tested System Details	6
1.4. Configuration of Test System	6
1.5. EUT Exercise Software	6
1.6. Test Facility	7
2. Conducted Emission	8
2.1. Test Equipment	8
2.2. Test Setup	8
2.3. Limits	8
2.4. Test Procedure	9
2.5. Uncertainty	9
2.6. Test Result of Conducted Emission	10
3. Radiated Emission	11
3.1. Test Equipment	11
3.2. Test Setup	11
3.3. Limits	12
3.4. Test Procedure	13
3.5. Uncertainty	13
3.6. Test Result of Radiated Emission	14
4. Band Edge	17
4.1. Test Equipment	17
4.2. Test Setup	17
4.3. Limit	18
4.4. Test Procedure	19
4.5. Uncertainty	19
4.6. Test Result of Band Edge	20
5. EMI Reduction Method During Compliance Testing	22
Attachment 1: EUT Test Photographs	
Attachment 2: EUT Detailed Photographs	

1. GENERAL INFORMATION

1.1. EUT Description

Product Name : RF 2.4G Presenter Mouse
 Trade Name : iOne
 FCC ID. : F2QLIBRAP5U
 Model No. : Libra-P5
 Frequency Range : 2438MHz
 Type of Modulation : GFSK
 Number of Channels : 1
 Channel Separation : N/A
 Channel Control : N/A
 Antenna Type : Printed on the PCB
 Antenna Gain : -16.30dBi

Frequency of Each Channel:

Channel	Frequency
Channel 1:	2438 MHz

Note:

1. The EUT is a RF 2.4G Presenter Mouse with a built-in 2.4GHz transmitter.
2. These tests are conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.249.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

EMI Test Mode	Mode 1: Transmitter
---------------	---------------------

1.2. Operation Description

The EUT is RF 2.4G Presenter Mouse. The operation frequency is 2.438GHz. One channel is built in the EUT. The signals modulated by GFSK are transmitted from the printed antenna on the PCB of the EUT. Two 1.5 Batteries shall be provided for EUT operation.

1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
(1)	N/A	N/A	N/A	N/A	N/A	N/A

	Signal Cable Type	Signal Cable Description
(A)	N/A	N/A

1.4. Configuration of Test System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4.
- (2) Install the batteries of the EUT.
- (3) Press and hold a button on the EUT
- (4) 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

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2



Accreditation on NVLAP
NVLAP Lab Code: 200533-0



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2. Conducted Emission

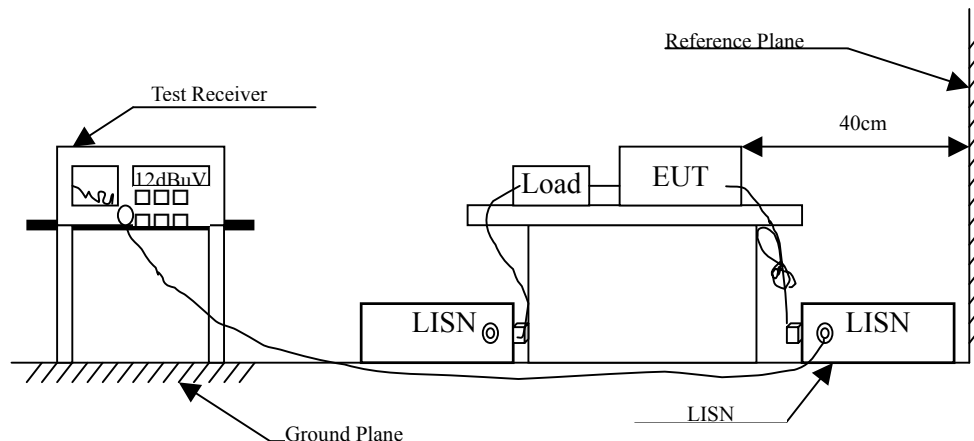
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2006	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2006	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2006	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2006	
5	No.1 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

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: 2003 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

The EUT is powered by batteries. This test item is not performed.

3. Radiated Emission

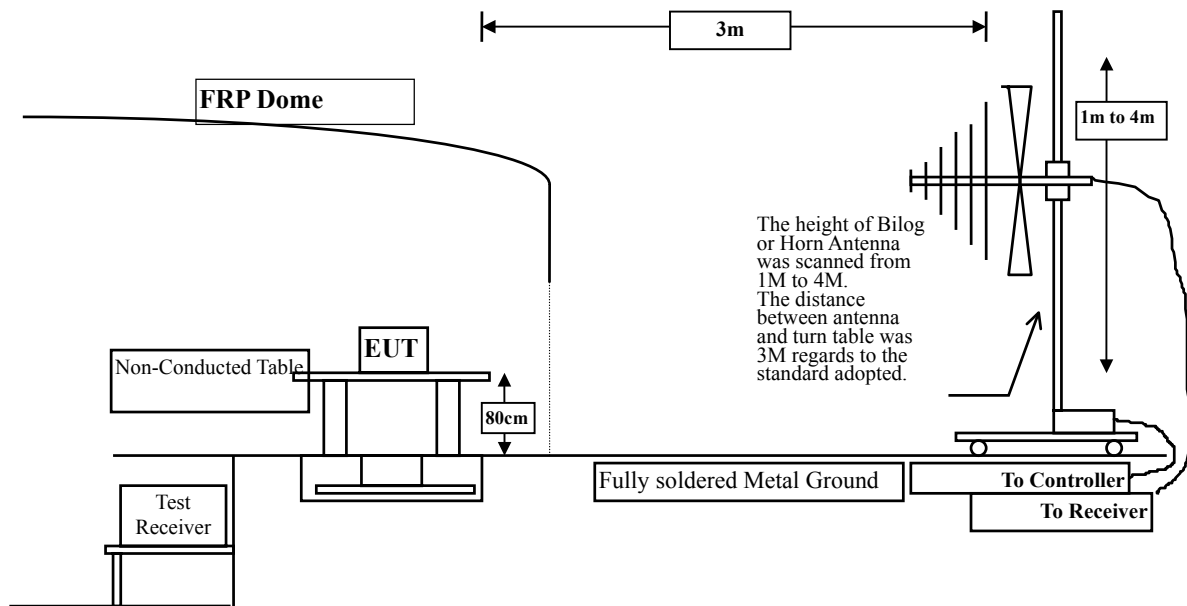
3.1. Test Equipment

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

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☐ Site # 1		Test Receiver	R & S	ESVS 10 / 834468/003	May, 2006
		Spectrum Analyzer	Advantest	R3162/ 00803480	May, 2006
		Pre-Amplifier	Advantest	BB525C/ 3307A01812	May, 2006
		Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Sep., 2006
☐ Site # 2		Test Receiver	R & S	ESCS 30 / 836858 / 022	May, 2006
		Spectrum Analyzer	Advantest	R3162 / 100803466	May, 2006
		Pre-Amplifier	Advantest	BB525C/3307A01814	May, 2006
		Bilog Antenna	SCHAFFNER	CBL6112B / 2705	May, 2006
		Horn Antenna	ETS	3115 / 0005-6160	Sep., 2006
		Pre-Amplifier	QTK	QTK-AMP-01/ 0001	May, 2006
☒ Site # 3	X	Test Receiver	R & S	ESI 26 / 838786/004	May, 2006
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2006
	X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2006
	X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2006
	X	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2006
	X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2006
	X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2006
	X	Pre-Amplifier	HP	8449B / 3008A01123	July, 2006

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

3.2. Test Setup



3.3. Limits

➤ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart B 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 B Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks :

1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.

Radiated emissions were investigated over the frequency range from 30MHz to 1GHz using a receiver bandwidth of 120kHz. Radiated was performed at an antenna to EUT distance of 3 meters.

The frequency range from 30MHz to 10th harmonics is checked.

3.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

3.6. Test Result of Radiated Emission

Product : RF 2.4G Presenter Mouse
 Test Item : Fundamental Radiated Emission
 Test Site : No.3OATS
 Test Mode : Mode 1: Transmitter

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

Horizontal

Peak Detector:

Channel 01

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
2438.350	-2.191	82.577	80.386	-33.614	114.000

Average Detector

Vertical

Peak Detector:

Channel 01

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
2438.400	-2.192	86.302	84.111	-29.889	114.000

Average Detector

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.

Product : RF 2.4G Presenter Mouse
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2438MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Average Limit dBuV/m
Horizontal					
Peak Detector:					
4876.375	3.274	58.670	61.943	-12.057	74.000
7315.000	8.801	54.390	63.192	-10.808	74.000
9752.750	10.960	33.782	44.742	-29.258	74.000
12191.000	14.089	36.578	50.667	-23.333	74.000
Average Detector					
4876.375	3.274	32.527	35.800	-18.200	54.000
7315.000	8.801	31.231	40.033	-13.967	54.000
Vertical					
Peak Detector:					
4876.625	3.274	60.451	63.725	-10.275	74.000
7314.625	8.801	56.847	65.648	-8.352	74.000
9753.375	10.960	38.892	49.852	-24.148	74.000
12191.000	14.089	38.120	52.209	-21.791	74.000
Average Detector					
4876.625	3.274	31.902	35.176	-18.824	54.000
7314.625	8.801	29.898	38.699	-15.301	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz ◦
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz ◦
4. Emission Level = Reading Level + Correct Factor.
5. 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.

Product : RF 2.4G Presenter Mouse
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (2438MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
473.775	18.633	7.165	25.798	-20.202	46.000
544.100	19.945	7.656	27.601	-18.399	46.000
607.150	20.225	6.887	27.112	-18.888	46.000
772.050	21.743	6.530	28.273	-17.727	46.000
929.675	22.977	8.097	31.074	-14.926	46.000
968.475	23.449	9.611	33.060	-20.940	54.000
Vertical					
102.750	11.071	13.196	24.267	-19.233	43.500
376.775	16.582	5.655	22.237	-23.763	46.000
544.100	20.532	4.306	24.838	-21.162	46.000
614.425	21.662	1.367	23.028	-22.972	46.000
692.025	20.525	5.900	26.425	-19.575	46.000
966.050	22.938	9.036	31.974	-22.026	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “■” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

4. Band Edge

4.1. Test Equipment

The following test equipments are used during the band edge tests:

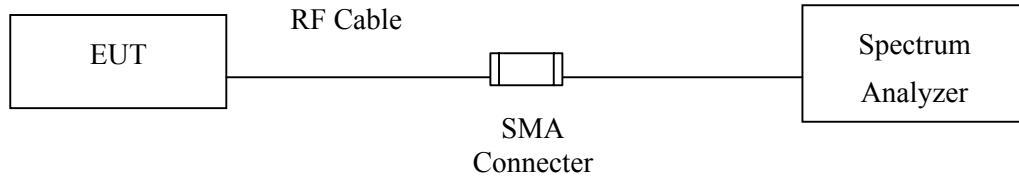
Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Test Receiver	R & S	ESI 26 / 838786/004	May, 2006
X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2006
X Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2006
X Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2006
X Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2006
X Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2006
X Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2006
X Pre-Amplifier	HP	8449B / 3008A01123	July, 2006

OATS No.3

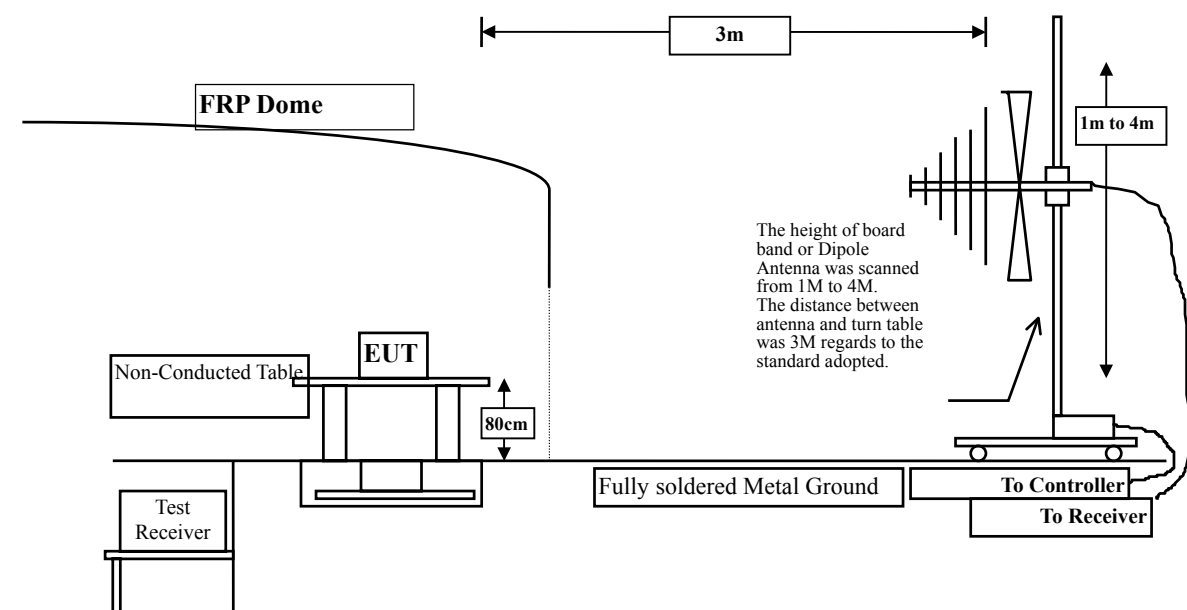
- Note:
1. All equipments are calibrated every one year.
 2. The test equipments marked by “X” are used to measure the final test results.

4.2. Test Setup

RF Conducted Measurement:



RF Radiated Measurement:



4.3. Limit

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 and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2003 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESCS 30)is 120 kHz, above 1GHz are 1 MHz.

4.5. Uncertainty

Conducted is ± 1.27 dB

Radiated is ± 3.9 dB.

4.6. Test Result of Band Edge

Product : RF 2.4G Presenter Mouse
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2438MHz)

RF Conducted Measurement

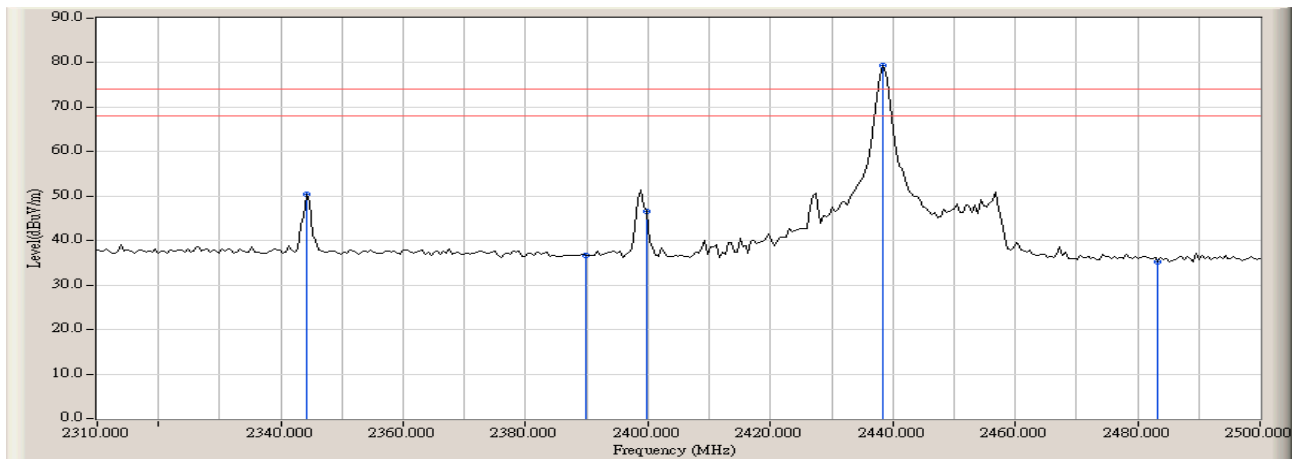
Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
01	<2400	>20	Pass
	>2483.5	>20	Pass

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)	2344.200	-1.132	51.507	50.375	74.00	54.00	Pass
	2483.375	-2.662	37.835	35.173	74.00	54.00	Pass
01(Avg)	--	--	--	--	74.00	54.00	

Figure Channel 01:

Horizontal



Note:

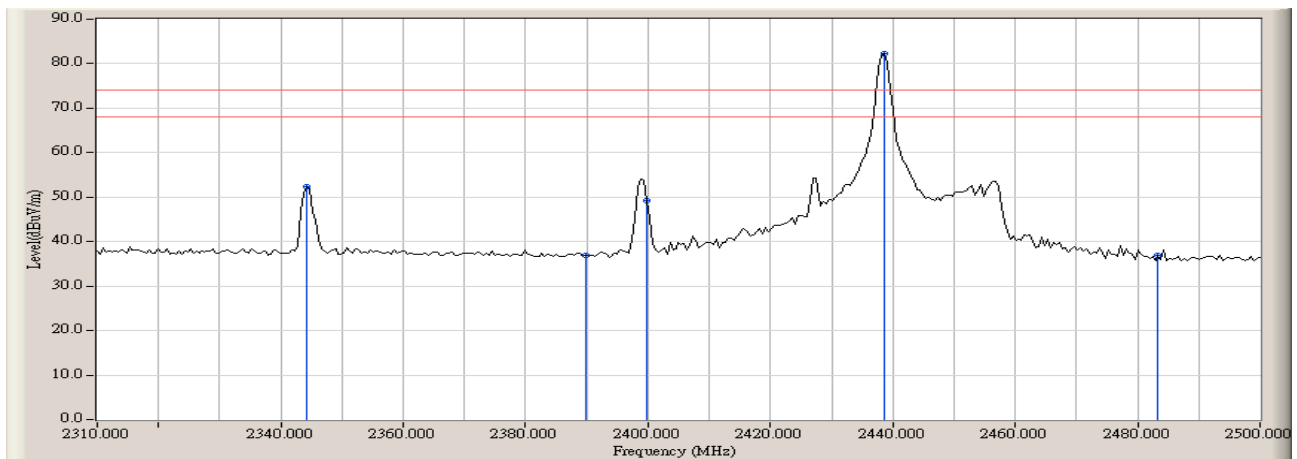
RBW=1MHz, VBW=1MHz, Sweep Time=500ms

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)	2344.200	-1.132	53.390	52.258	74.00	54.00	Pass
	2483.375	-2.662	39.640	36.978	74.00	54.00	Pass
01(Avg)	--	--	--	--	74.00	54.00	Pass

Figure Channel 01:

Vertical



Note:

RBW=1MHz, VBW=1MHz, Sweep Time=500ms

Note: 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.

5. EMI Reduction Method During Compliance Testing

No modification was made during testing.