

FCC Test Report (Class II Permissive Change)

Product Name	IEEE 802.11a/b/g miniPCI module
Model No	WAPA003
FCC ID.	SLE-WAPA003

Applicant	MOXA Inc.
Address	FL.4, NO. 135. LANE 235, BAOQIAO RD. XINDIAN DIST.,NEW TAIPEI CITY, TAIWAN

Date of Receipt	Sep. 22, 2015
Issue Date	Jan. 06, 2016
Report No.	1590608R-RFUSP25V00
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

Issue Date: Jan. 06, 2016

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Product Name	IEEE 802.11a/b/g miniPCI module
Applicant	MOXA Inc.
Address	FL.4, NO. 135. LANE 235, BAOQIAO RD. XINDIAN DIST.,NEW TAIPEI CITY, TAIWAN
Manufacturer	MOXA Inc.
Model No.	WAPA003
FCC ID.	SLE-WAPA003
EUT Rated Voltage	120V/60Hz
EUT Test Voltage	120V/60Hz
Trade Name	MOXA
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2014 ANSI C63.4: 2014, ANSI C63.10: 2013 KDB 558074 D01 DTS Meas Guidance v03r03
Test Result	Complied

Documented By :

Leven Huang

(Senior Adm. Specialist / Leven Huang)

Tested By :

Eason chen

(Engineer / Eason Chen)

Approved By :

Vincent Lin

(Director / Vincent Lin)

TABLE OF CONTENTS

Description	Page
1. GENERAL INFORMATION	4
1.1. EUT Description	4
1.2. Operational Description	6
1.3. Tested System Details	7
1.4. Configuration of Tested System	7
1.5. EUT Exercise Software	7
1.6. Test Facility	8
2. Peak Power Output	9
2.1. Test Equipment	9
2.2. Test Setup	9
2.3. Limits	9
2.4. Test Procedure	9
2.5. Uncertainty	9
2.6. Test Result of Peak Power Output	10
3. Radiated Emission	12
3.1. Test Equipment	12
3.2. Test Setup	12
3.3. Limits	13
3.4. Test Procedure	14
3.5. Uncertainty	14
3.6. Test Result of Radiated Emission	15
4. Band Edge	23
4.1. Test Equipment	23
4.2. Test Setup	23
4.3. Limits	24
4.4. Test Procedure	24
4.5. Uncertainty	24
4.6. Test Result of Band Edge	25
5. EMI Reduction Method During Compliance Testing	49
Attachment 1: EUT Test Photographs	
Attachment 2: EUT Detailed Photographs	

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	IEEE 802.11a/b/g miniPCI module
Trade Name	MOXA
Model No.	WAPA003
FCC ID.	SLE-WAPA003
Frequency Range	2412-2462MHz for 802.11b/g
Number of Channels	802.11b/g: 11
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps
Type of Modulation	802.11b:DSSS (DBPSK, DQPSK, CCK) 802.11g:OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type	Panel Antenna
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	KINSUN	SMA-Male-RP (main)(aux)	Dipole	2dBi for 2.4GHz
2	KINSUN	ANT-WSB-ANM-05 (main)(aux)	Dipole	5dBi for 2.4GHz
3	KINSUN	ANT-WDB-ANM-0609 (main)(aux)	Dipole	6dBi for 2.4GHz
4	Antenna Technology	AT1515	Panel	11dBi for 2.4GHz
5	Antenna Technology	AT1524	Panel	8dBi for 2.4GHz
6	Antenna Technology	AT1539	Panel	14dBi for 2.4GHz
7	DIAMOND	TK2632	Panel	14dBi for 2.4GHz

Note:

1. The antenna of EUT conforms to FCC 15.203.
2. Only the higher gain antenna was tested and recorded in this report
3. Addition four new antenna (AT1515, AT1524, AT1539, TK2632), antenna gain is higher with the original application.
4. No.6 (Antenna Technology / AT1539) and No.7(DIAMOND/ TK2632) are same antennas with different marketing name.

802.11b/g Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2412 MHz	Channel 02:	2417 MHz	Channel 03:	2422 MHz	Channel 04:	2427 MHz
Channel 05:	2432 MHz	Channel 06:	2437 MHz	Channel 07:	2442 MHz	Channel 08:	2447 MHz
Channel 09:	2452 MHz	Channel 10:	2457 MHz	Channel 11:	2462 MHz		

Note:

1. The EUT is a IEEE 802.11a/b/g miniPCI module with a built-in 2.4GHz and 5GHz WLAN transceiver, this report for 2.4GHz Band.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. At result of pretests, module supports dual-channel transmission, only the worst case is shown in the report.
4. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps 、 802.11g is 6Mbps.)
5. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g/n transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.
6. This is to request a Class II permissive change for FCC ID: SLE-WAPA003, originally granted on 07/08/2009.

The major change filed under this application are:

Change #1: Add four Panel type antennas and groups cable, the antenna type is different than the original application, as follows:

No.	Manufacturer	Part No.	Antenna Type
1	Antenna Technology	AT1524	Panel
2	Antenna Technology	AT1515	Panel
3	Antenna Technology	AT1539	Panel
4	DIAMOND	TK2632	Panel

#2: Reduce the Output Power through firmware.

#3: Through the firmware changes, disable 5GHz function.

#4: All other hardware is identical with original granted.

#5: No.3 and No.4 are same antennas with different marketing name.

Test Mode:	Mode 1: Transmit (802.11b 1Mbps)
	Mode 2: Transmit (802.11g 6Mbps)

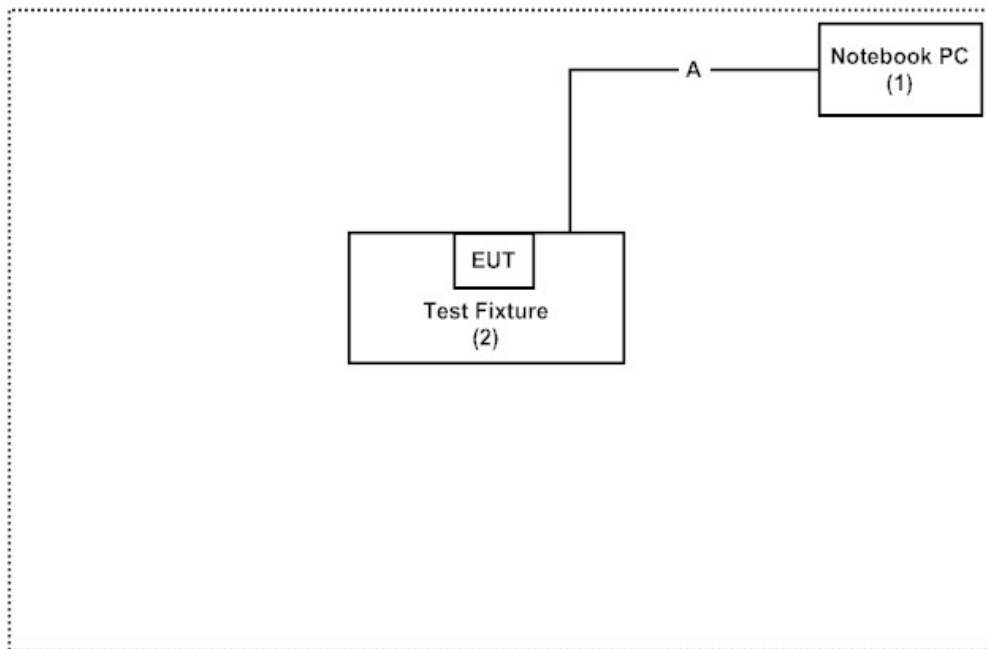
1.3. Tested System Details

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.	Power Cord	
1	Notebook PC	DELL	M65	CG098	Non-Shielded, 0.8m
2	Test Fixture	MOXA	N/A	N/A	N/A

Signal Cable Type	Signal cable Description
A	LAN Cable
	Non-Shielded, 1m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software “ Tera Term V4.67” on the EUT.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. 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. Peak Power Output

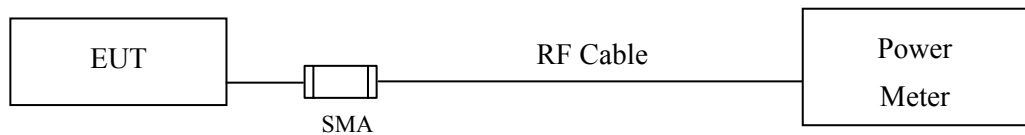
2.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2015
X	Power Sensor	Anritsu	MA2411B/0738448	Jun., 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.

2.2. Test Setup



2.3. Limits

The maximum peak power shall be less 1 Watt.

2.4. Test Procedure

The EUT was tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using KDB 558074 D01 DTS Meas Guidance v03r02 section 9.1.2 PKPM1 Peak power meter method.

2.5. Uncertainty

± 1.27 dB

2.6. Test Result of Peak Power Output

Product : IEEE 802.11a/b/g miniPCI module
Test Item : Peak Power Output Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel No.	Data Rate	Frequency (MHz)	Measurement (dBm)	Required Limit (dBm)	Result
01	1Mbps	2412	13.52	<28	Pass
02	1Mbps	2417	15.98	<28	Pass
03	1Mbps	2422	17.88	<28	Pass
04	1Mbps	2427	18.89	<28	Pass
06	1Mbps	2437	19.66	<28	Pass
08	1Mbps	2447	19.08	<28	Pass
09	1Mbps	2452	18.92	<28	Pass
10	1Mbps	2457	14.62	<28	Pass
11	1Mbps	2462	14.08	<28	Pass

Note:

1. Peak Power Output Value =Reading value on power meter + cable loss
2. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps)
3. Required Limit= $30\text{dBm} - [(14\text{dBi} - 6\text{dBi}) / 3] = 28 \text{ dBm}$ for compliance to FCC 47CFR 15.247(c) requirements.(fixed point to point operation)

Product : IEEE 802.11a/b/g miniPCI module
Test Item : Peak Power Output Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Channel No.	Data Rate	Frequency (MHz)	Measurement (dBm)	Required Limit (dBm)	Result
01	6Mbps	2412	16.38	<28	Pass
02	6Mbps	2417	22.87	<28	Pass
06	6Mbps	2437	22.92	<28	Pass
10	6Mbps	2457	22.09	<28	Pass
11	6Mbps	2462	16.74	<28	Pass

Note:

1. Peak Power Output Value =Reading value on power meter + cable loss
2. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11g is 6Mbps)
3. Required Limit= $30\text{dBm} - [(14\text{dBi} - 6\text{dBi}) / 3] = 28 \text{ dBm}$ for compliance to FCC 47CFR 15.247(c) requirements.(fixed point to point operation)

3. Radiated Emission

3.1. Test Equipment

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

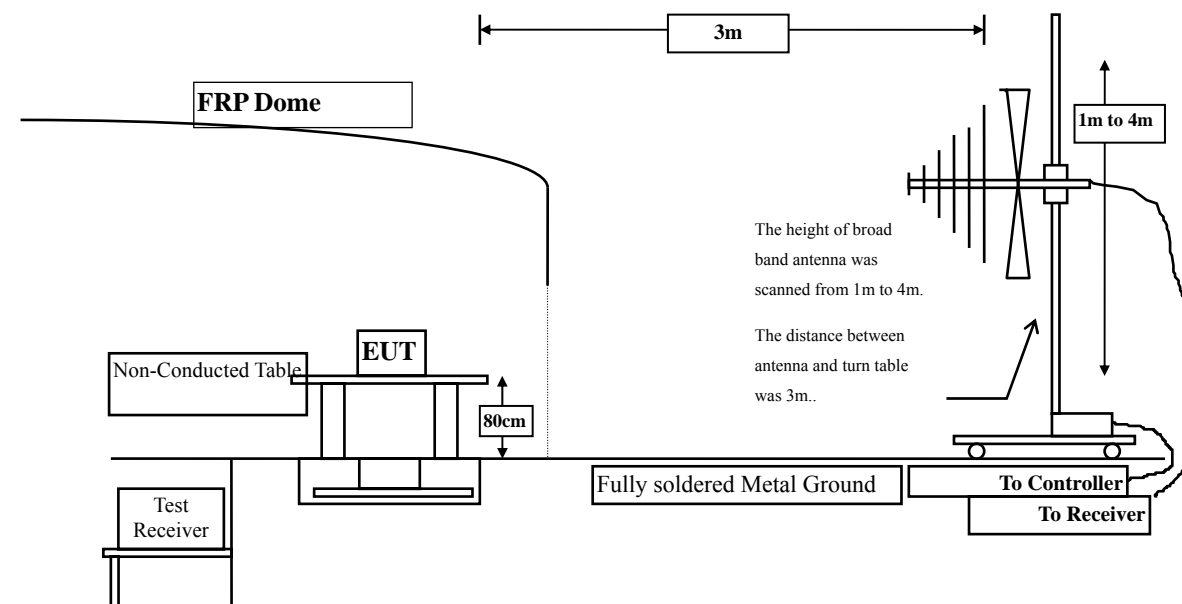
Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X Magnetic Loop Antenna	Teseq	HLA6121/ 37133	Sep., 2015
	X Bilog Antenna	Schaffner Chase	CBL6112B/ 2707	Jun., 2015
	X EMI Test Receiver	R&S	ESCS 30/838251/ 001	Jun., 2015
	X Coaxial Cable	QTK(Arnist)	RG 214/ LC003-RG	Jun., 2015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

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ 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., 2016
	X Horn Antenna	TRC	AH-0801/95051	Aug., 2015
	X Pre-Amplifier	EMCI	EMC012630SE/980210	Jan., 2016
	X Pre-Amplifier	MITEQ	JS41-001040000-58-5P/153945	Jul., 2015
	X Pre-Amplifier	NARDA	DBL-1840N506/013	Jul., 2015

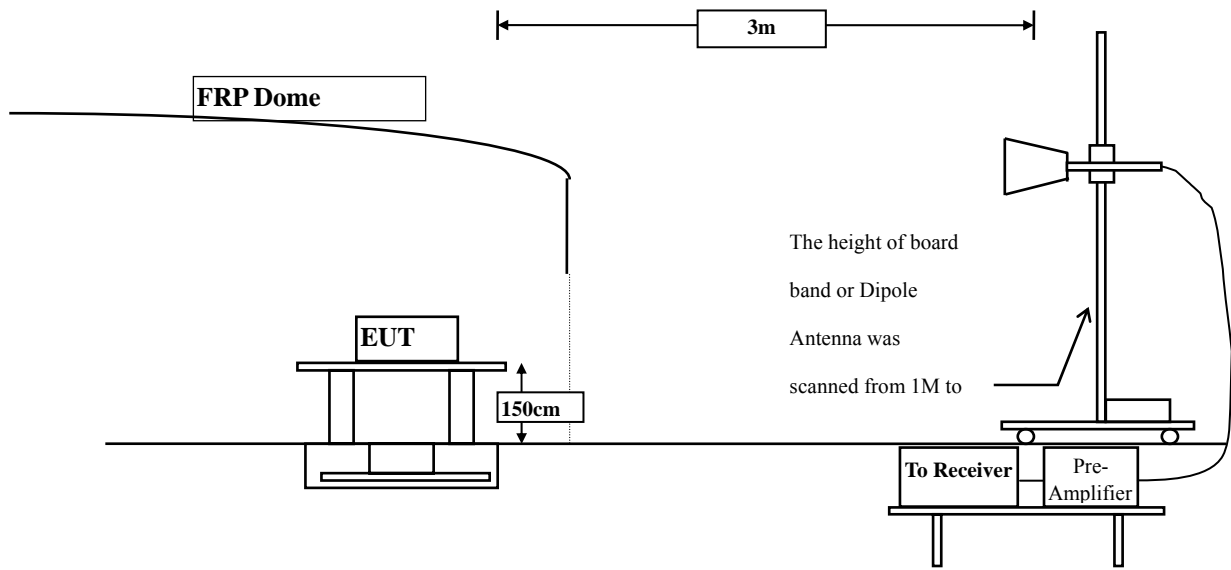
- Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

3.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB 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 (dBμV/m) = 20 log E field strength (uV/m)

3.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
4824.000	3.261	41.530	44.791	-29.209	74.000
7236.000	10.650	33.490	44.140	-29.860	74.000
9648.000	13.337	33.970	47.306	-26.694	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4824.000	6.421	40.170	46.591	-27.409	74.000
7236.000	11.495	33.260	44.755	-29.245	74.000
9648.000	13.807	33.510	47.316	-26.684	74.000
Average Detector:					
--					

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 : IEEE 802.11a/b/g miniPCI module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
4874.000	3.038	47.960	50.997	-23.003	74.000
7311.000	11.795	37.650	49.444	-24.556	74.000
9748.000	12.635	31.710	44.345	-29.655	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	5.812	47.450	53.261	-20.739	74.000
7311.000	12.630	36.260	48.889	-25.111	74.000
9748.000	13.126	31.770	44.896	-29.104	74.000
Average Detector:					
--					

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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)

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

Peak Detector:

4924.000	2.858	41.530	44.387	-29.613	74.000
7386.000	12.127	33.610	45.738	-28.262	74.000
9848.000	12.852	34.270	47.123	-26.877	74.000

Average Detector:

--

Vertical

Peak Detector:

4924.000	5.521	40.530	46.050	-27.950	74.000
7386.000	13.254	33.710	46.964	-27.036	74.000
9848.000	13.367	33.980	47.347	-26.653	74.000

Average Detector:

--

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 : IEEE 802.11a/b/g miniPCI module
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

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

Peak Detector:

4824.000	3.261	37.630	40.891	-33.109	74.000
7236.000	10.650	32.730	43.380	-30.620	74.000
9648.000	13.337	33.190	46.526	-27.474	74.000

Average Detector:

--

Vertical

Peak Detector:

4824.000	6.421	36.810	43.231	-30.769	74.000
7236.000	11.495	33.680	45.175	-28.825	74.000
9648.000	13.807	33.930	47.736	-26.264	74.000

Average Detector:

--

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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

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

Horizontal

Peak Detector:

4874.000	3.038	43.480	46.517	-27.483	74.000
7311.000	11.795	37.800	49.594	-24.406	74.000
9748.000	12.635	31.710	44.345	-29.655	74.000

Average Detector:

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Vertical

Peak Detector:

4874.000	5.812	41.980	47.791	-26.209	74.000
7311.000	12.630	35.500	48.129	-25.871	74.000
9748.000	13.126	32.050	45.176	-28.824	74.000

Average Detector:

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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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
------------------	-------------------------	--------------------------------	--------------------------------------	--------------	-----------------------

Horizontal

Peak Detector:

4924.000	2.858	37.830	40.687	-33.313	74.000
7386.000	12.127	33.690	45.818	-28.182	74.000
9848.000	12.852	33.540	46.393	-27.607	74.000

Average Detector:

--

Vertical

Peak Detector:

4924.000	5.521	36.970	42.490	-31.510	74.000
7386.000	13.254	33.630	46.884	-27.116	74.000
9848.000	13.367	34.250	47.617	-26.383	74.000

Average Detector:

--

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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437MHz)

Frequency MHz	Correction Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector					
105.660	-6.673	33.990	27.317	-16.183	43.500
264.740	-4.991	32.035	27.044	-18.956	46.000
460.680	1.589	29.645	31.234	-14.766	46.000
631.400	1.605	32.516	34.121	-11.879	46.000
899.120	5.433	29.280	34.713	-11.287	46.000
1000.000	9.119	30.272	39.391	-14.609	54.000
Vertical					
Peak Detector					
158.040	-6.191	40.457	34.266	-9.234	43.500
398.600	-4.678	33.536	28.858	-17.142	46.000
532.460	-0.563	30.506	29.943	-16.057	46.000
685.720	2.319	30.835	33.153	-12.847	46.000
817.640	3.272	29.140	32.412	-13.588	46.000
965.080	7.932	29.811	37.743	-16.257	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 + Correction Factor.
5. Correction Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.
7. The emission levels of other frequencies are greater then 10db under the limit and not shown in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : IEEE 802.11a/b/g miniPCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437MHz)

Frequency	Correction	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	dB	dB μ V/m
	dB	dB μ V	dB μ V/m		

Horizontal

Peak Detector

148.340	-10.254	46.684	36.430	-7.070	43.500
247.280	-6.192	36.700	30.507	-15.493	46.000
344.280	-2.591	33.872	31.282	-14.718	46.000
509.180	1.252	32.788	34.040	-11.960	46.000
656.620	2.128	30.664	32.792	-13.208	46.000
780.780	4.230	27.180	31.410	-14.590	46.000

Vertical

Peak Detector

198.780	-8.221	36.548	28.327	-15.173	43.500
278.320	-8.739	29.663	20.924	-25.076	46.000
487.840	-3.132	25.703	22.571	-23.429	46.000
606.180	-1.594	23.055	21.461	-24.539	46.000
691.540	2.421	22.977	25.398	-20.602	46.000
934.040	5.792	23.383	29.175	-16.825	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 + Correction Factor.
5. Correction Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.
7. The emission levels of other frequencies are greater than 10db under the limit and not shown in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

4. Band Edge

4.1. Test Equipment

RF Radiated Measurement:

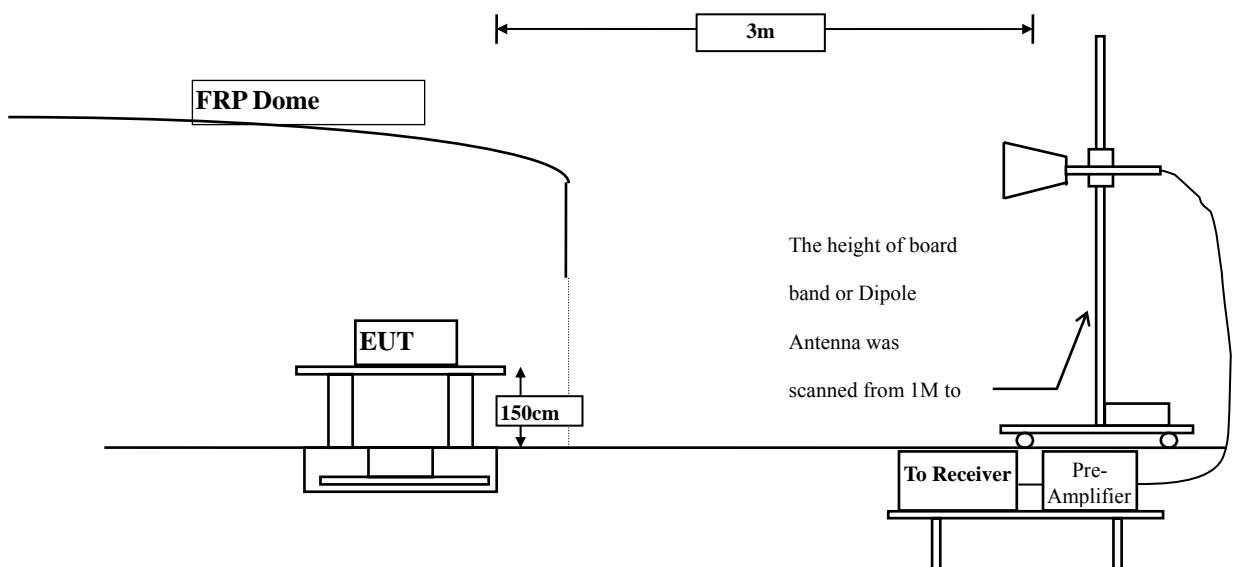
The following test equipments are used during the band edge tests:

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., 2016
	X	Horn Antenna	TRC	AH-0801/95051	Aug., 2015
	X	Pre-Amplifier	EMCI	EMC012630SE/980210	Jan., 2016
	X	Pre-Amplifier	MITEQ	JS41-001040000-58-5P/153945	Jul., 2015
	X	Pre-Amplifier	NARDA	DBL-1840N506/013	Jul., 2015

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

4.2. Test Setup

RF Radiated Measurement:



4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

4.4. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

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 from 1 meter to 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.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Band Edge

Product : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2386.232	31.494	31.855	63.349	74.00	54.00	Pass
01 (Peak)	2390.000	31.509	27.875	59.384	74.00	54.00	Pass
01 (Peak)	2396.812	31.542	44.629	76.171	--	--	--
01 (Peak)	2400.000	31.561	40.528	72.089	--	--	--
01 (Peak)	2413.043	31.646	79.549	111.195	--	--	--
01 (Average)	2386.232	31.494	21.945	53.439	74.00	54.00	Pass
01 (Average)	2390.000	31.509	15.754	47.263	74.00	54.00	Pass
01 (Average)	2397.246	31.545	39.322	70.867	--	--	--
01 (Average)	2400.000	31.561	35.508	67.069	--	--	--
01 (Average)	2412.754	31.644	76.145	107.789	--	--	--

Figure Channel 01: Horizontal (Peak)

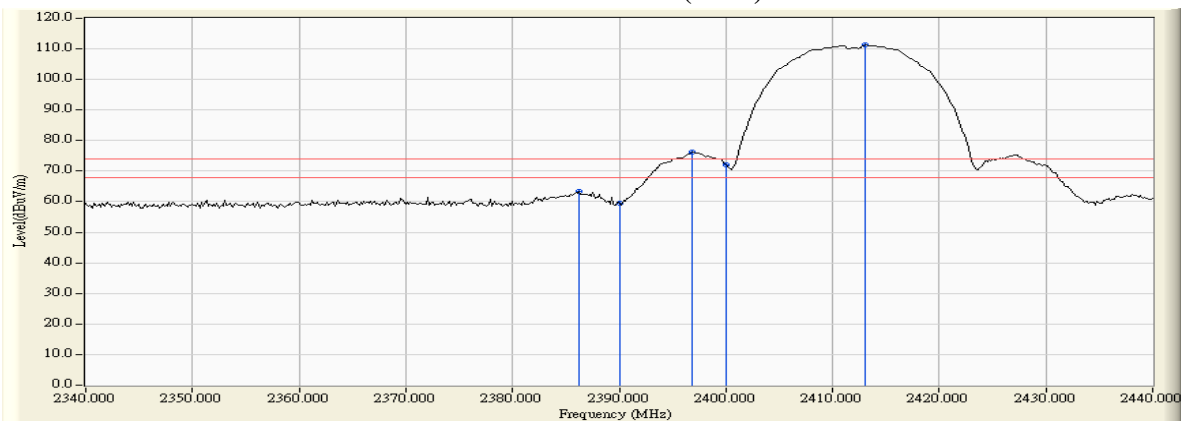
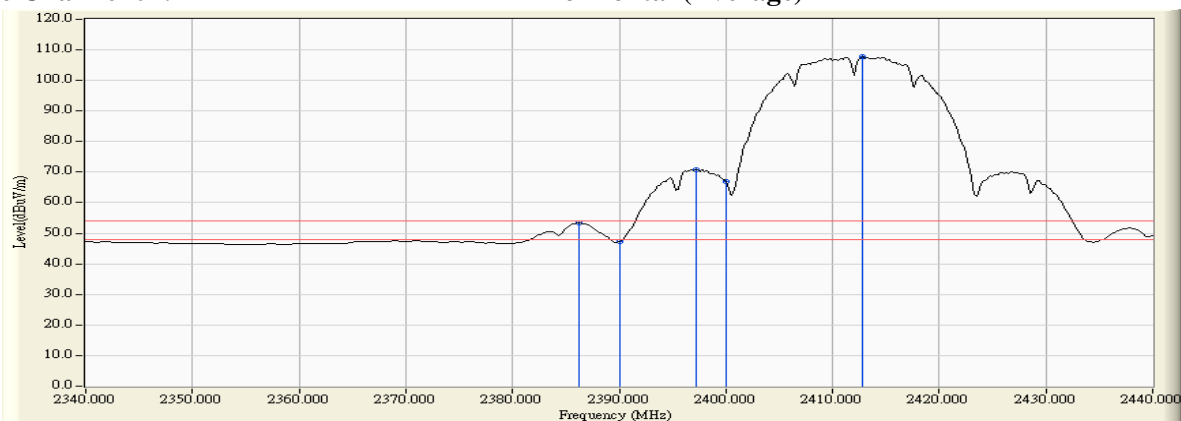


Figure Channel 01: Horizontal (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2361.594	31.046	28.241	59.288	74.00	54.00	Pass
01 (Peak)	2390.000	30.915	27.215	58.130	74.00	54.00	Pass
01 (Peak)	2396.812	30.904	34.369	65.273	--	--	--
01 (Peak)	2400.000	30.912	30.970	61.882	--	--	--
01 (Peak)	2413.043	30.957	66.572	97.528	--	--	--
01 (Average)	2390.000	30.915	13.732	44.647	74.00	54.00	Pass
01 (Average)	2396.667	30.903	26.877	57.781	--	--	--
01 (Average)	2400.000	30.912	23.146	54.058	--	--	--
01 (Average)	2412.754	30.955	63.180	94.134	--	--	--

Figure Channel 01: VERTICAL (Peak)

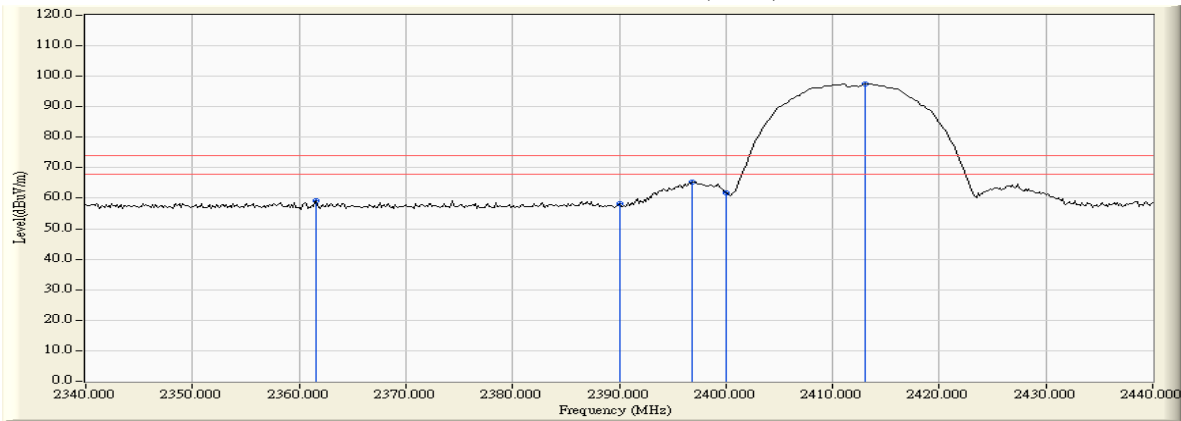
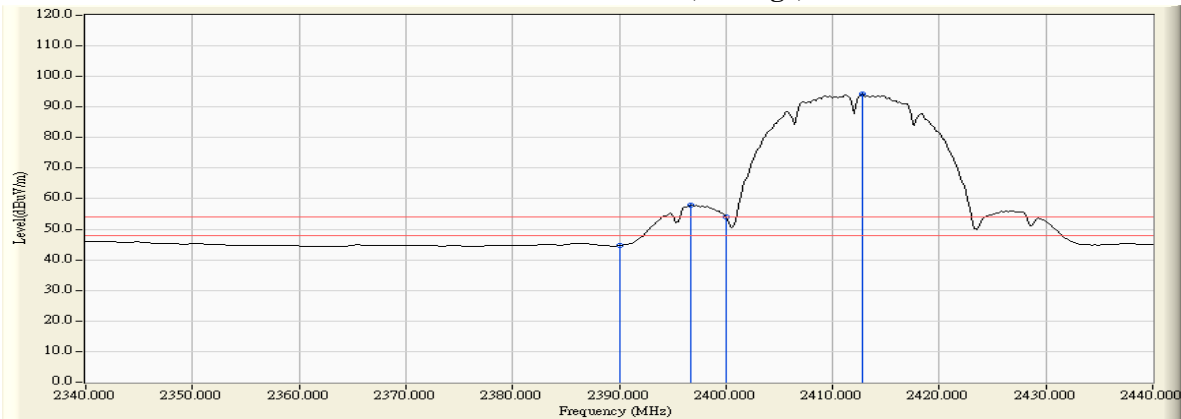


Figure Channel 01: VERTICAL (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2417MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
02 (Peak)	2390.000	-1.131	60.995	59.864	74.00	54.00	Pass
02 (Peak)	2400.000	-1.084	76.053	74.970	--	--	--
02 (Peak)	2415.652	-0.993	110.021	109.028	--	--	--
02 (Average)	2390.000	-1.131	54.130	52.999	74.00	54.00	Pass
02 (Average)	2400.000	-1.084	72.525	71.442	--	--	--
02 (Average)	2416.232	-0.989	106.757	105.768	--	--	--

Figure Channel 01: Horizontal (Peak)

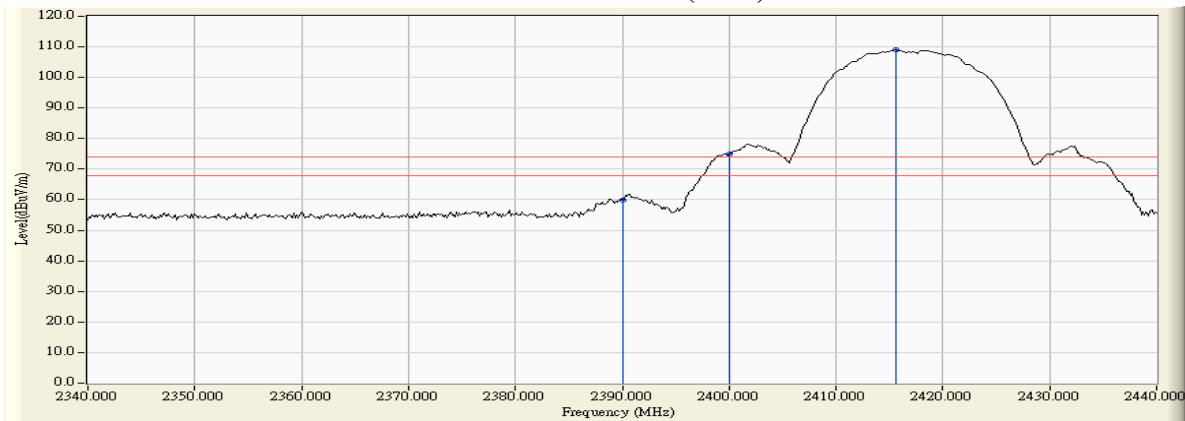
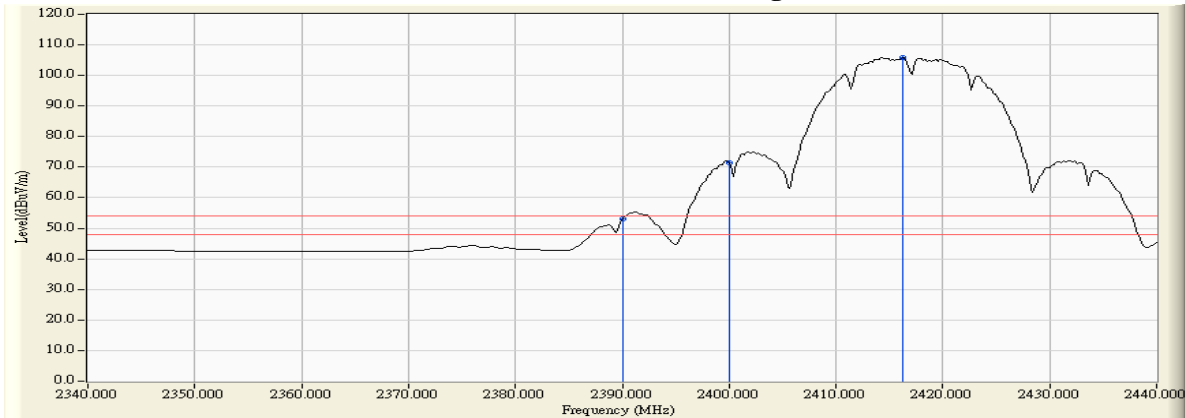


Figure Channel 01: Horizontal (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2417MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
02 (Peak)	2390.000	-1.725	47.633	45.908	74.00	54.00	Pass
02 (Peak)	2400.000	-1.733	54.368	52.636	--	--	--
02 (Peak)	2415.652	-1.685	91.554	89.869	--	--	--
02 (Average)	2390.000	-1.725	36.288	34.563	74.00	54.00	Pass
02 (Average)	2400.000	-1.733	47.546	45.814	--	--	--
02 (Average)	2414.348	-1.691	87.406	85.714	--	--	--

Figure Channel 01: VERTICAL (Peak)

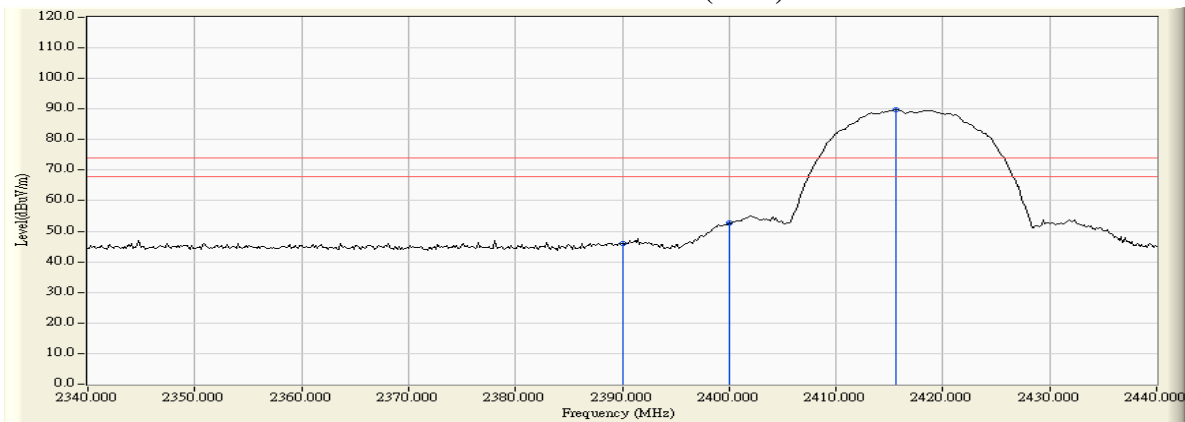
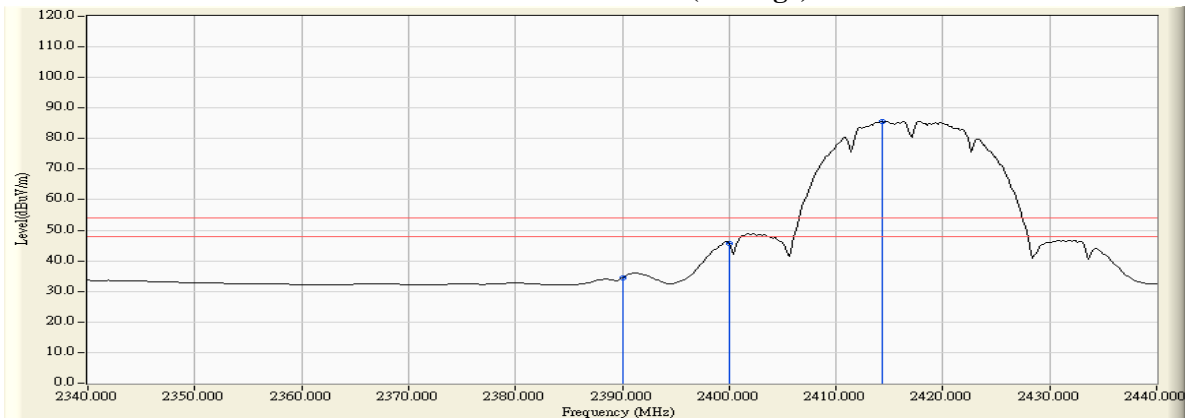


Figure Channel 01: VERTICAL (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2422MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
03 (Peak)	2384.783	-1.151	64.220	63.069	74.00	54.00	Pass
03 (Peak)	2390.000	-1.131	60.333	59.202	74.00	54.00	Pass
03 (Peak)	2396.087	-1.103	72.180	71.076	--	--	--
03 (Peak)	2400.000	-1.084	63.962	62.879	--	--	--
03 (Peak)	2420.725	-0.961	113.383	112.423	--	--	--
03 (Average)	2385.072	-1.150	53.341	52.191	74.00	54.00	Pass
03 (Average)	2390.000	-1.131	48.872	47.741	74.00	54.00	Pass
03 (Average)	2395.797	-1.105	64.875	63.769	--	--	--
03 (Average)	2400.000	-1.084	50.102	49.019	--	--	--
03 (Average)	2421.304	-0.956	109.386	108.430	--	--	--

Figure Channel 01: Horizontal (Peak)

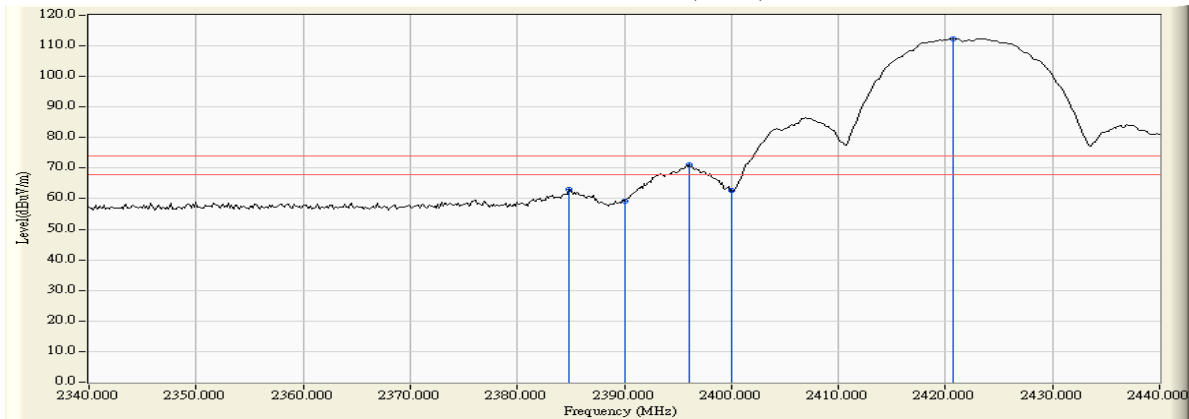
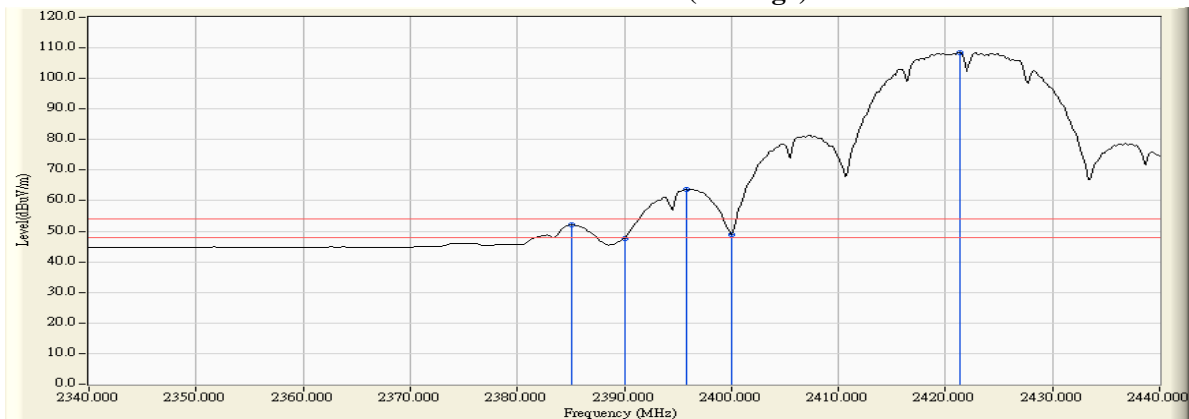


Figure Channel 01: Horizontal (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2422MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
03 (Peak)	2380.145	-1.678	48.383	46.704	74.00	54.00	Pass
03 (Peak)	2390.000	-1.725	46.318	44.593	74.00	54.00	Pass
03 (Peak)	2396.377	-1.738	51.104	49.365	--	--	--
03 (Peak)	2400.000	-1.733	47.137	45.405	--	--	--
03 (Peak)	2420.580	-1.658	93.812	92.155	--	--	--
03 (Average)	2390.000	-1.725	34.321	32.596	74.00	54.00	Pass
03 (Average)	2396.232	-1.739	39.801	38.062	--	--	--
03 (Average)	2400.000	-1.733	34.892	33.160	--	--	--
03 (Average)	2421.304	-1.653	90.026	88.373	--	--	--

Figure Channel 01: VERTICAL (Peak)

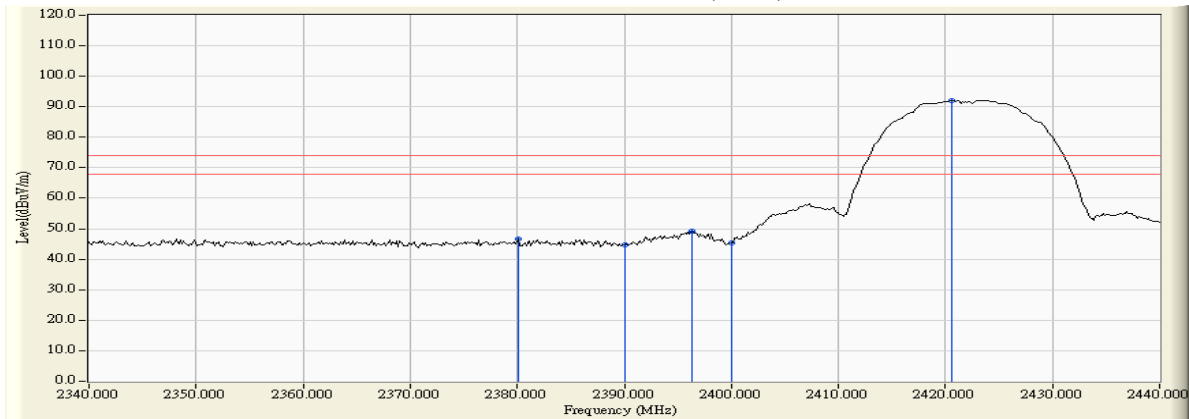
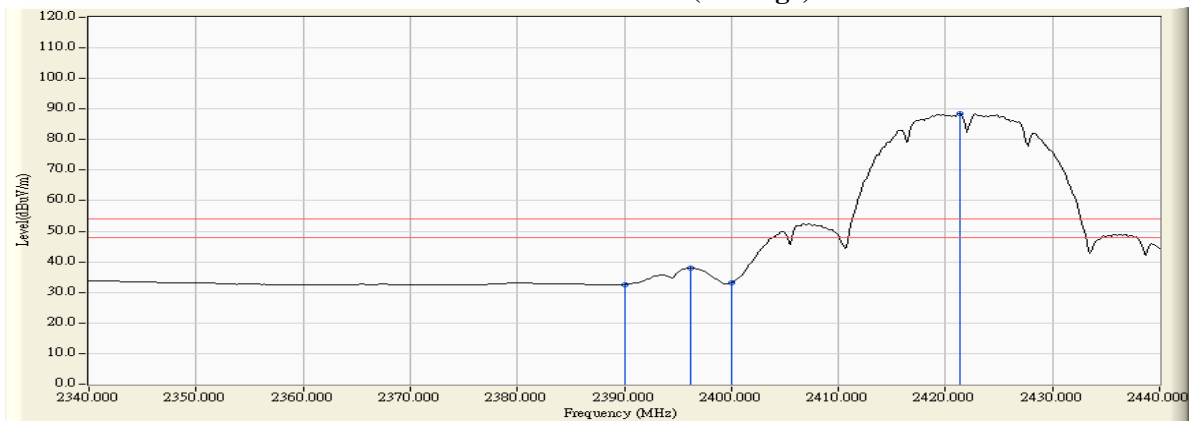


Figure Channel 01: VERTICAL (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2427MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
04 (Peak)	2390.000	-1.131	63.304	62.173	74.00	54.00	Pass
04 (Peak)	2400.000	-1.084	69.916	68.833	--	--	--
04 (Peak)	2426.087	-0.925	113.413	112.488	--	--	--
04 (Average)	2390.000	-1.131	54.238	53.107	74.00	54.00	Pass
04 (Average)	2400.000	-1.084	64.899	63.816	--	--	--
04 (Average)	2426.232	-0.925	110.112	109.188	--	--	--

Figure Channel 01: Horizontal (Peak)

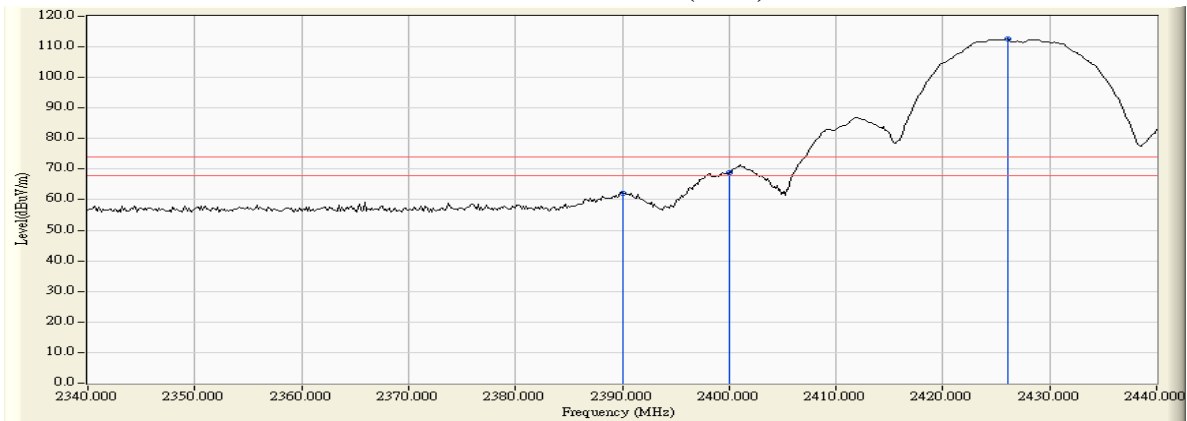
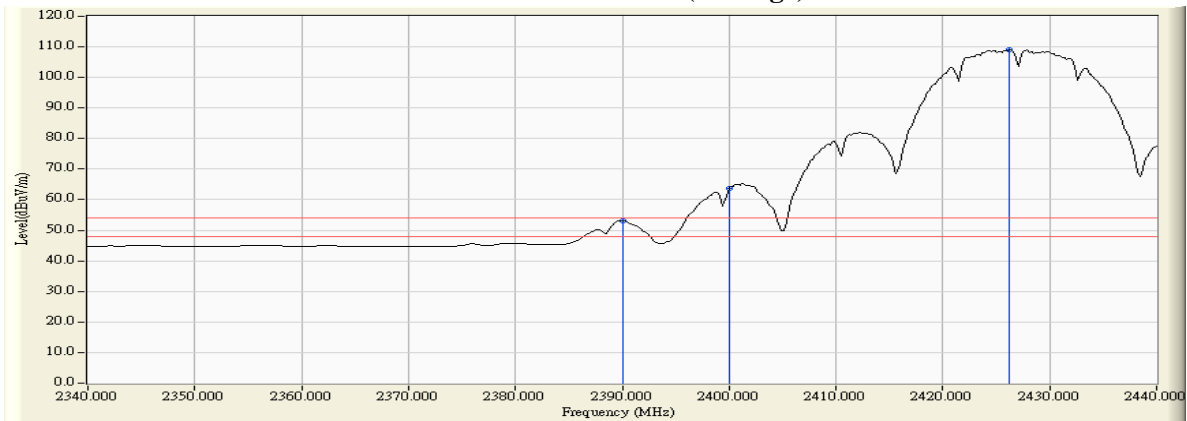


Figure Channel 01: Horizontal (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2427MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
04 (Peak)	2360.870	-1.590	49.001	47.411	74.00	54.00	Pass
04 (Peak)	2390.000	-1.725	48.490	46.765	74.00	54.00	Pass
04 (Peak)	2400.000	-1.733	52.433	50.701	--	--	--
04 (Peak)	2425.507	-1.630	96.910	95.280	--	--	--
04 (Average)	2390.000	-1.725	37.355	35.630	74.00	54.00	Pass
04 (Average)	2400.000	-1.733	45.034	43.302	--	--	--
04 (Average)	2426.377	-1.625	92.570	90.945	--	--	--

Figure Channel 01: VERTICAL (Peak)

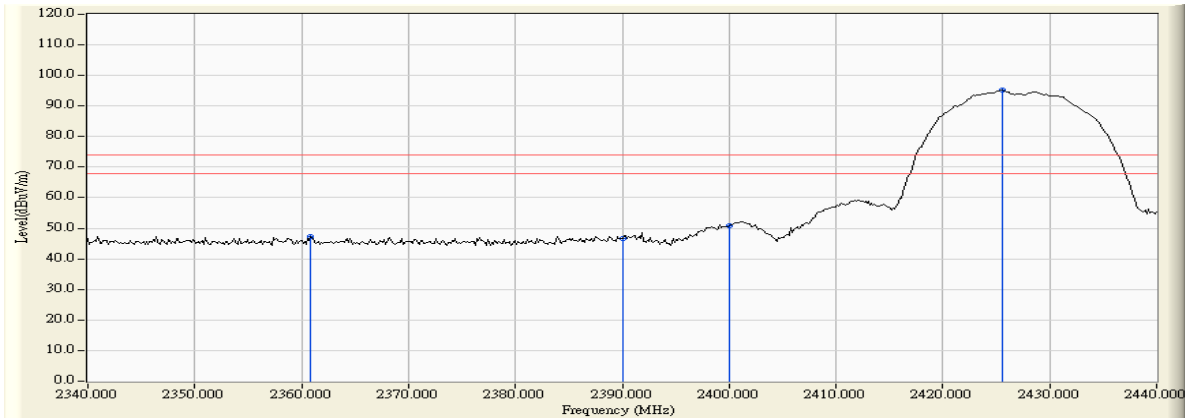
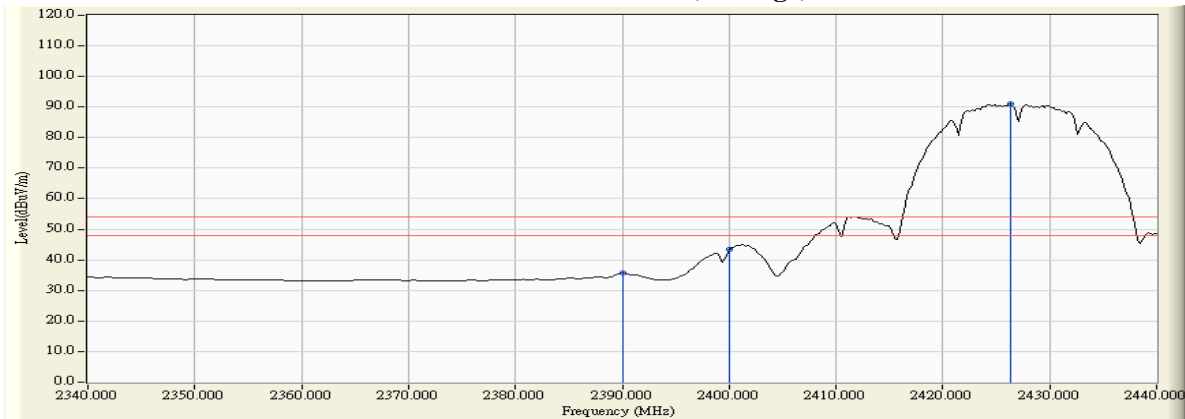


Figure Channel 01: VERTICAL (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2447MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
08 (Peak)	2445.529	-0.800	114.819	114.019	--	--	--
08 (Peak)	2483.500	-0.558	64.342	63.784	74.00	54.00	Pass
08 (Average)	2446.254	-0.796	110.375	109.579	--	--	--
08 (Average)	2483.500	-0.558	53.432	52.874	74.00	54.00	Pass
08 (Average)	2483.790	-0.556	53.923	53.367	74.00	54.00	Pass

Figure Channel 01: Horizontal (Peak)

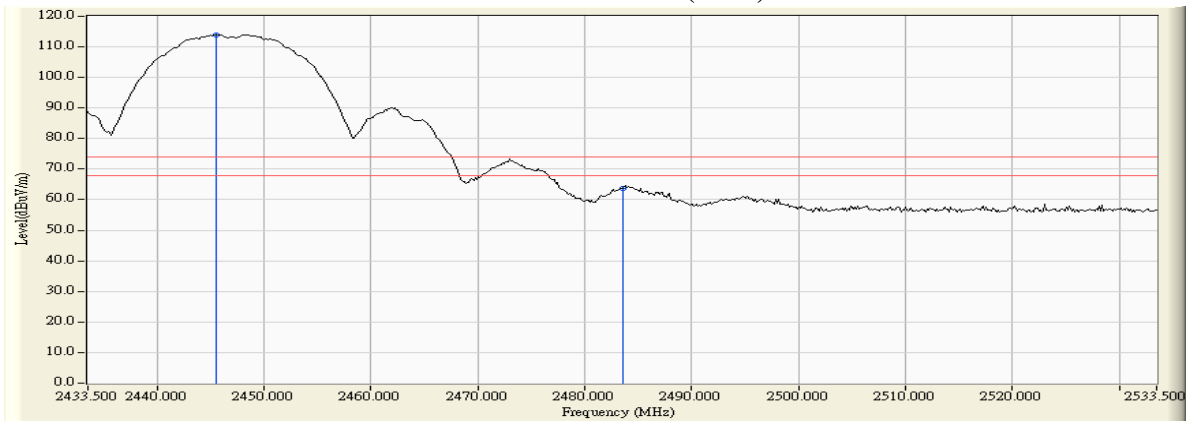
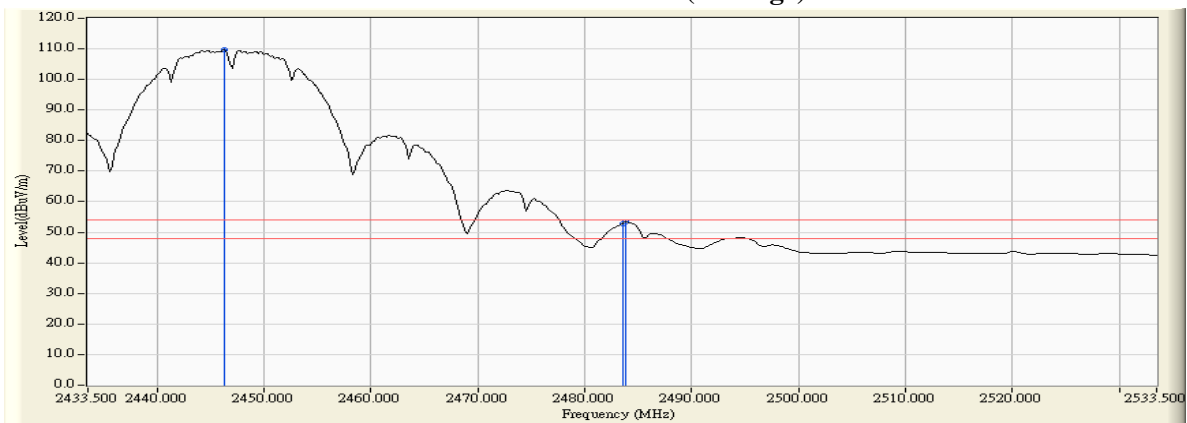


Figure Channel 01: Horizontal (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2447MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
08 (Peak)	2445.529	-1.517	96.408	94.890	--	--	--
08 (Peak)	2483.500	-1.305	47.459	46.154	74.00	54.00	Pass
08 (Peak)	2497.993	-1.233	48.735	47.501	74.00	54.00	Pass
08 (Average)	2446.254	-1.514	92.580	91.066	--	--	--
08 (Average)	2483.500	-1.305	35.411	34.106	74.00	54.00	Pass

Figure Channel 01: VERTICAL (Peak)

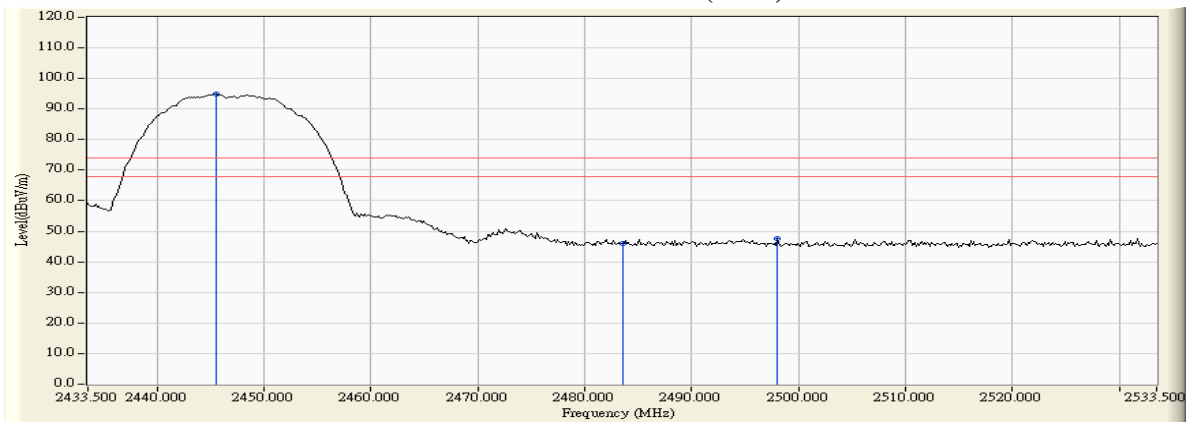
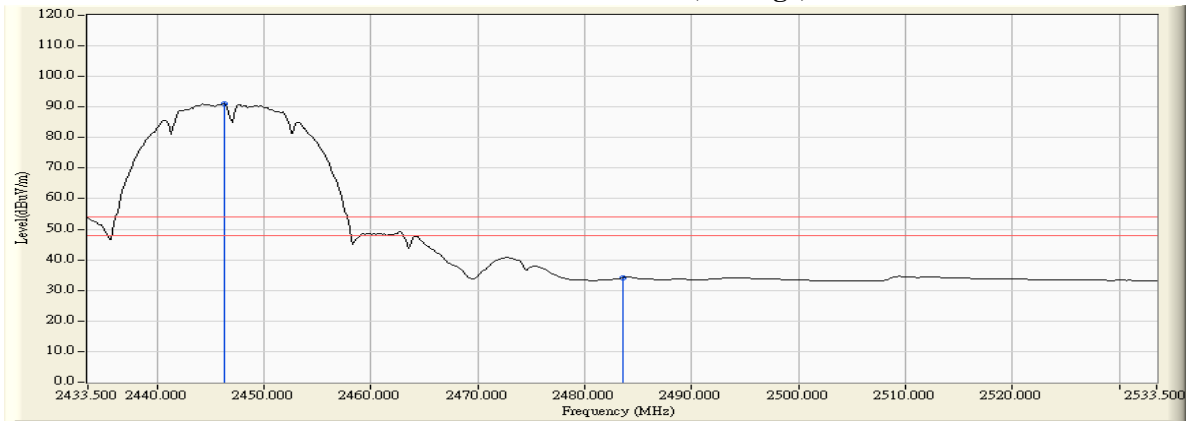


Figure Channel 01: VERTICAL (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2452MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
09 (Peak)	2450.312	-0.769	114.072	113.302	--	--	--
09 (Peak)	2483.350	-0.559	60.723	60.164	74.00	54.00	Pass
09 (Peak)	2489.007	-0.523	63.107	62.584	74.00	54.00	Pass
09 (Average)	2451.181	-0.764	110.420	109.656	--	--	--
09 (Average)	2483.500	-0.558	50.052	49.494	74.00	54.00	Pass
09 (Average)	2488.717	-0.525	53.711	53.186	74.00	54.00	Pass

Figure Channel 01: Horizontal (Peak)

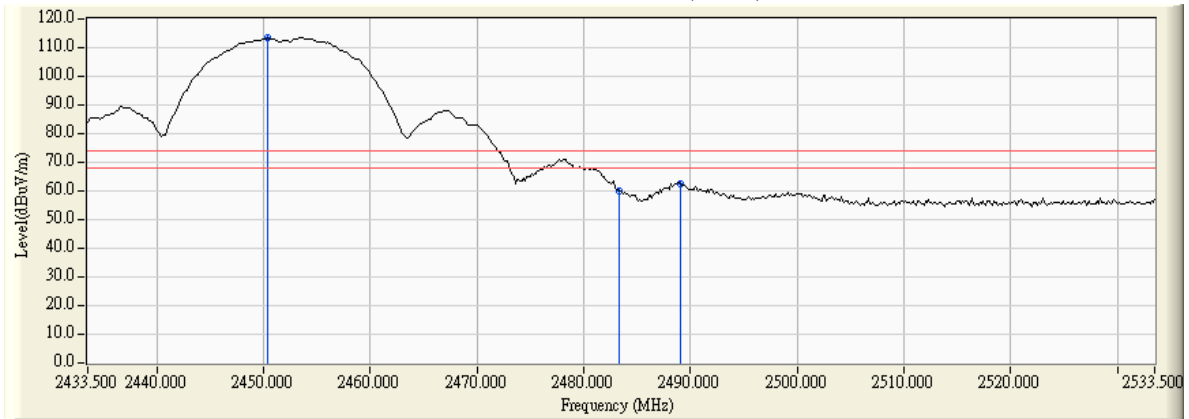
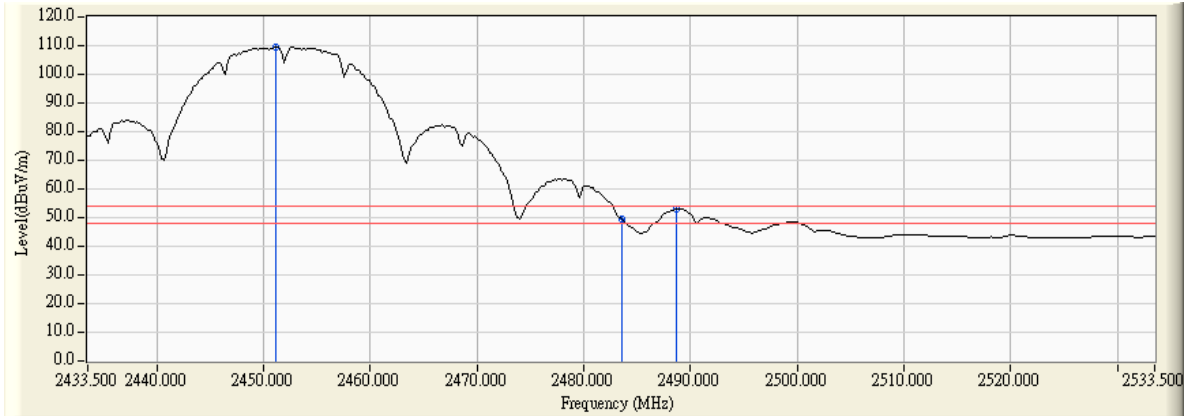


Figure Channel 01: Horizontal (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2452MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
09 (Peak)	2450.457	-1.489	96.343	94.854	--	--	--
09 (Peak)	2483.500	-1.305	48.709	47.404	74.00	54.00	Pass
09 (Peak)	2503.065	-1.230	49.222	47.992	74.00	54.00	Pass
09 (Average)	2451.181	-1.485	92.270	90.785	--	--	--
09 (Average)	2483.500	-1.305	34.977	33.672	74.00	54.00	Pass
09 (Average)	2508.862	-1.226	35.556	34.331	74.00	54.00	Pass

Figure Channel 01: VERTICAL (Peak)

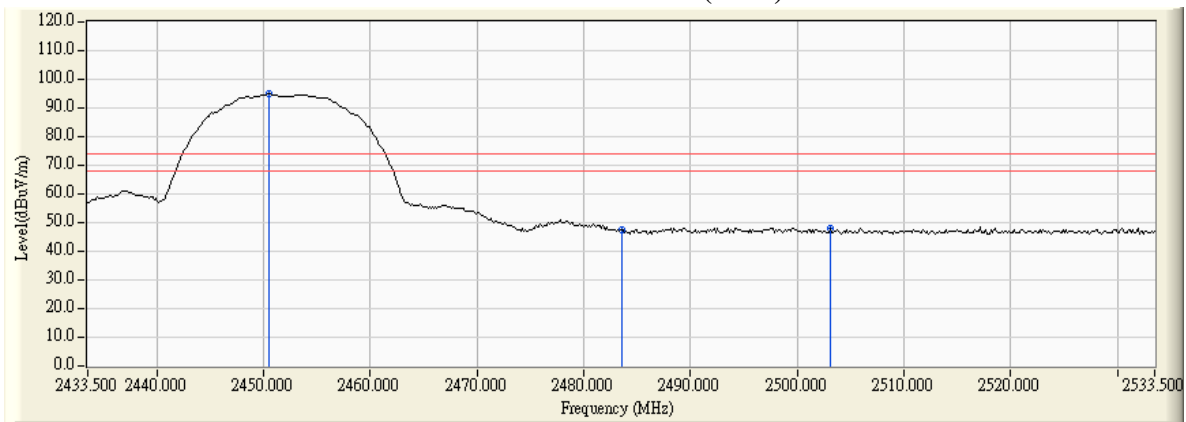


Figure Channel 01: VERTICAL (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2457MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
10 (Peak)	2455.529	-0.735	110.913	110.177	--	--	--
10 (Peak)	2483.500	-0.558	61.261	60.703	74.00	54.00	Pass
10 (Average)	2456.254	-0.732	106.847	106.116	--	--	--
10 (Average)	2483.500	-0.558	51.921	51.363	74.00	54.00	Pass

Figure Channel 01: Horizontal (Peak)

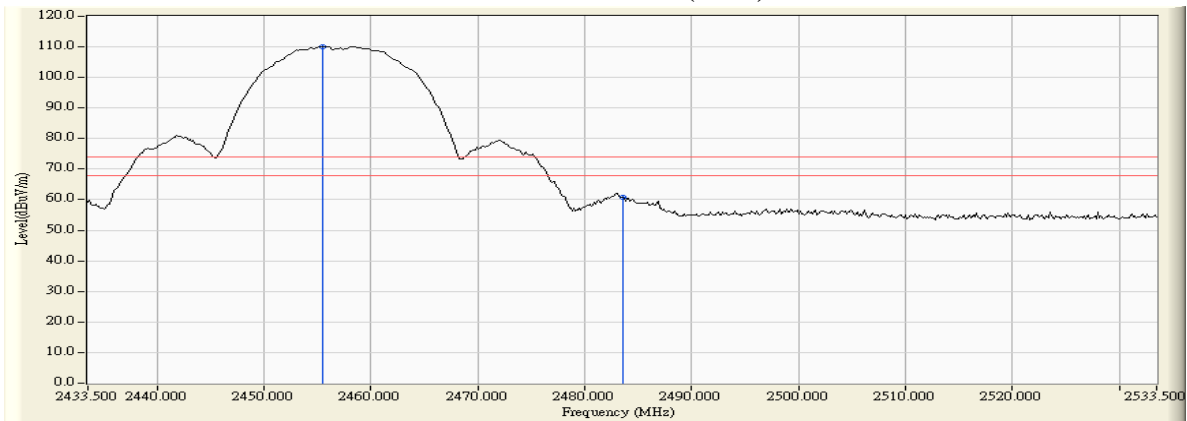


Figure Channel 01: Horizontal (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2457MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
10 (Peak)	2455.384	-1.461	92.280	90.819	--	--	--
10 (Peak)	2483.500	-1.305	48.344	47.039	74.00	54.00	Pass
10 (Average)	2456.254	-1.456	87.697	86.241	--	--	--
10 (Average)	2483.500	-1.305	35.081	33.776	74.00	54.00	Pass
10 (Average)	2509.007	-1.226	35.576	34.351	74.00	54.00	Pass

Figure Channel 01: VERTICAL (Peak)

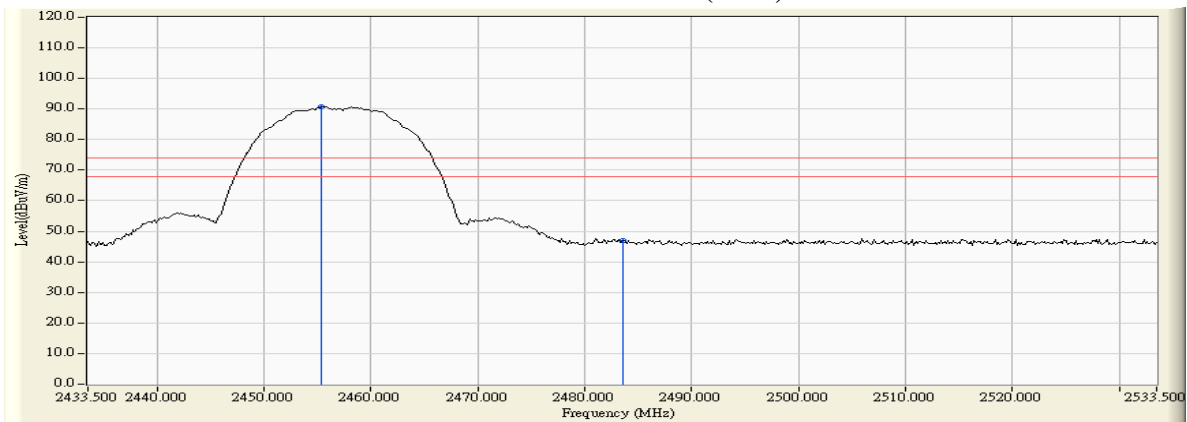
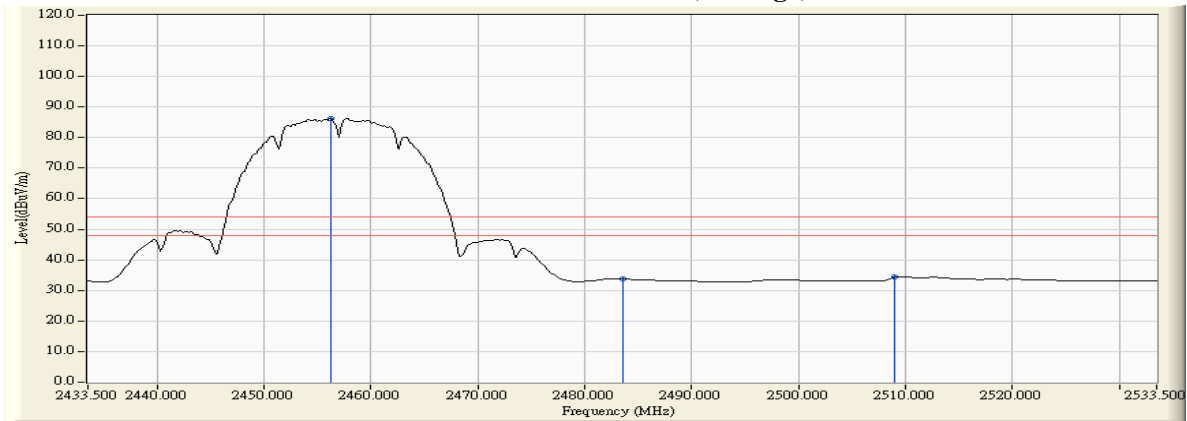


Figure Channel 01: VERTICAL (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2460.891	32.011	79.689	111.700	--	--	--
11 (Peak)	2483.500	32.182	28.468	60.650	74.00	54.00	Pass
11 (Peak)	2487.413	32.211	30.826	63.038	74.00	54.00	Pass
11 (Average)	2461.181	32.014	76.589	108.602	--	--	--
11 (Average)	2483.500	32.182	16.011	48.193	74.00	54.00	Pass
11 (Average)	2487.848	32.215	20.731	52.946	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

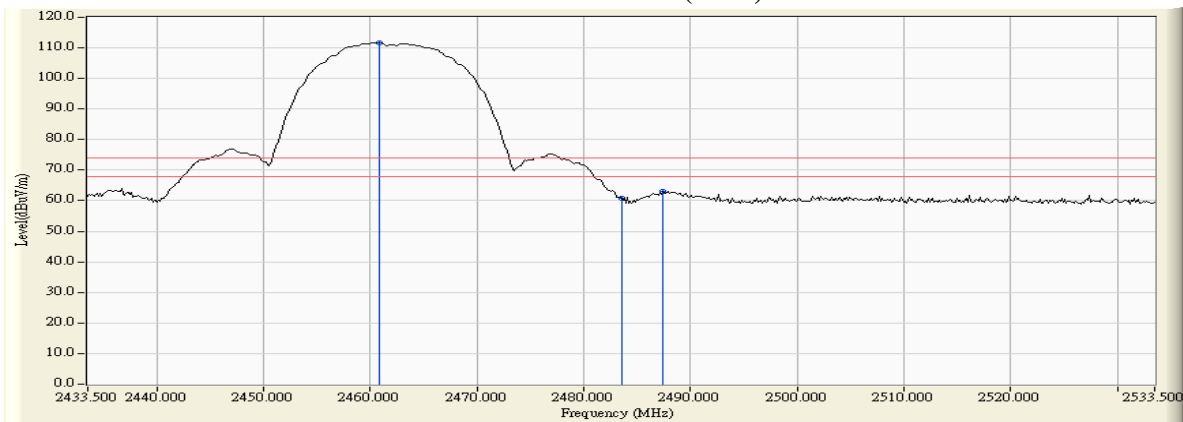
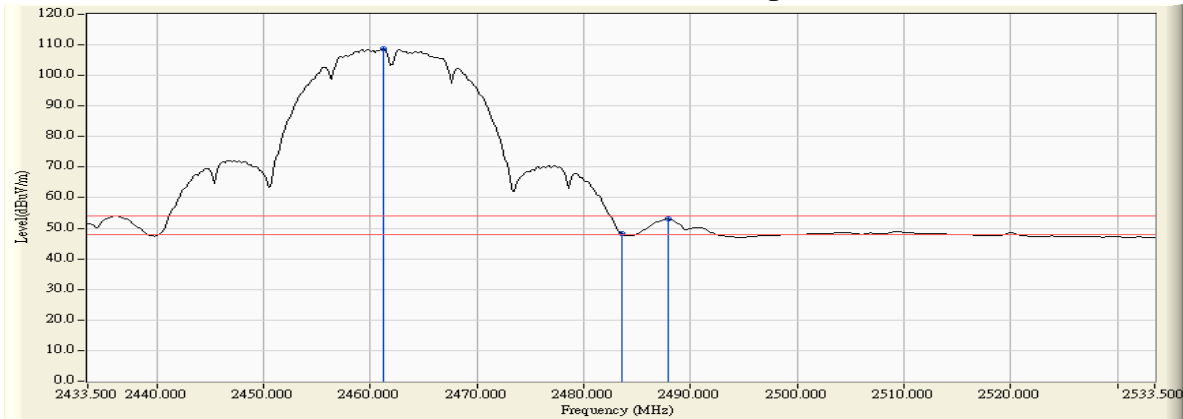


Figure Channel 11: Horizontal (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2460.891	31.283	66.238	97.521	--	--	--
11 (Peak)	2483.500	31.435	27.986	59.421	74.00	54.00	Pass
11 (Average)	2461.181	31.285	63.056	94.341	--	--	--
11 (Average)	2483.500	31.435	14.170	45.605	74.00	54.00	Pass

Figure Channel 11: VERTICAL (Peak)

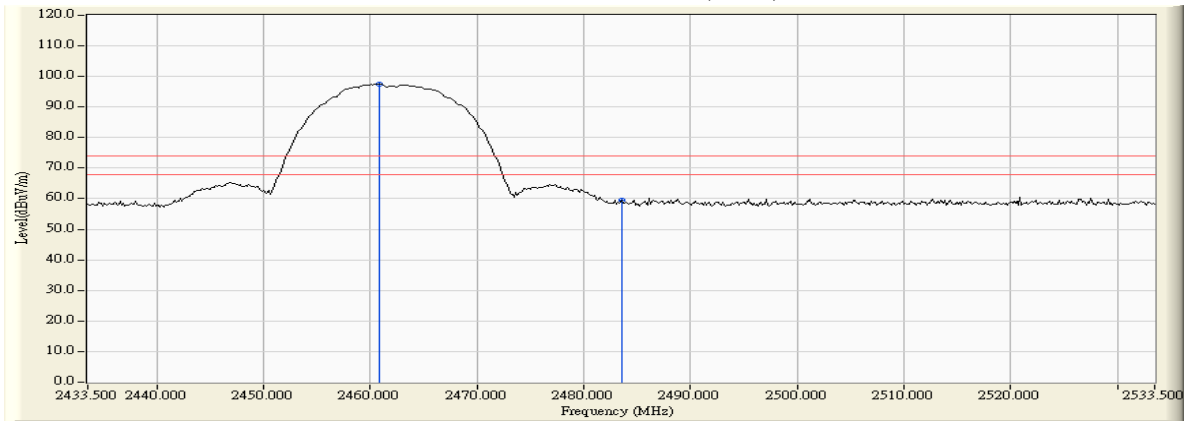
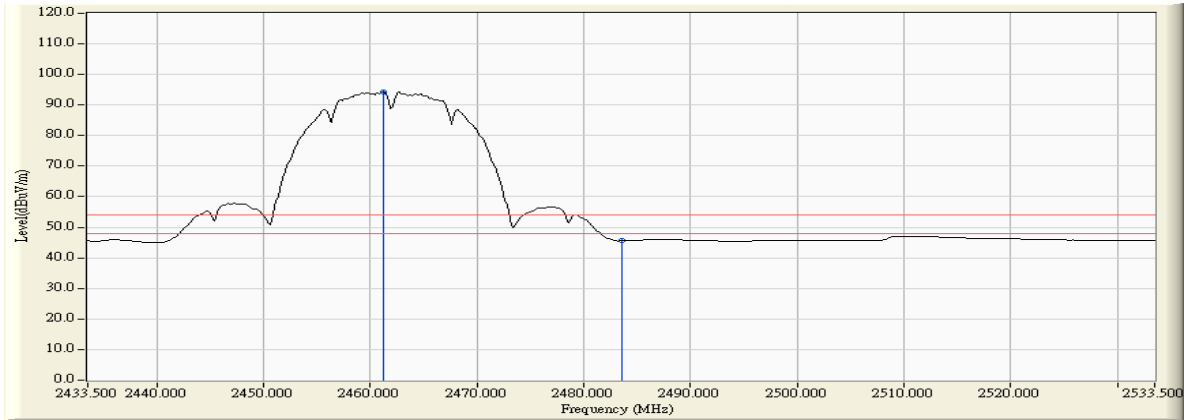


Figure Channel 11: VERTICAL (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2390.000	31.509	39.576	71.085	74.00	54.00	Pass
01 (Peak)	2400.000	31.561	60.079	91.640	--	--	--
01 (Peak)	2414.783	31.660	80.895	112.555	--	--	--
01 (Average)	2390.000	31.509	21.325	52.834	74.00	54.00	Pass
01 (Average)	2400.000	31.561	34.220	65.781	--	--	--
01 (Average)	2413.623	31.650	68.811	100.462	--	--	--

Figure Channel 01: Horizontal (Peak)

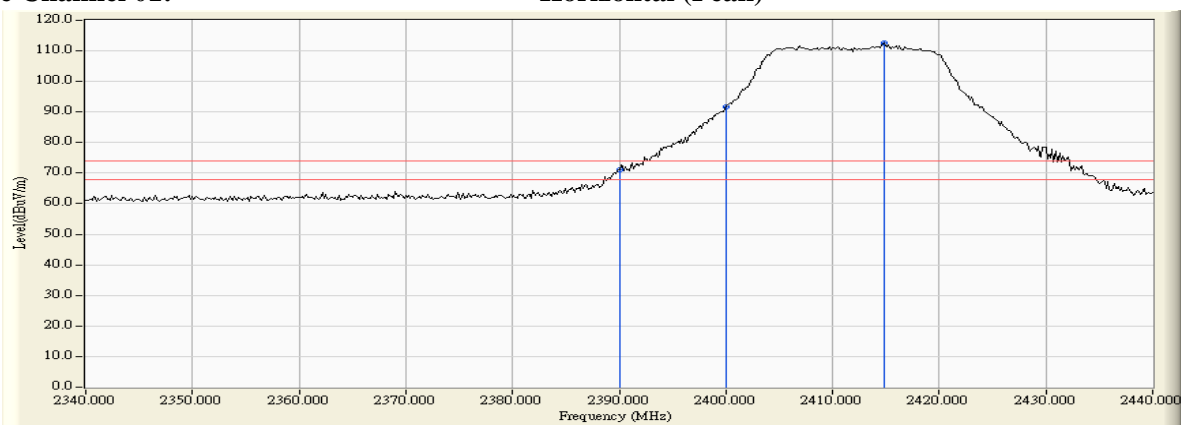
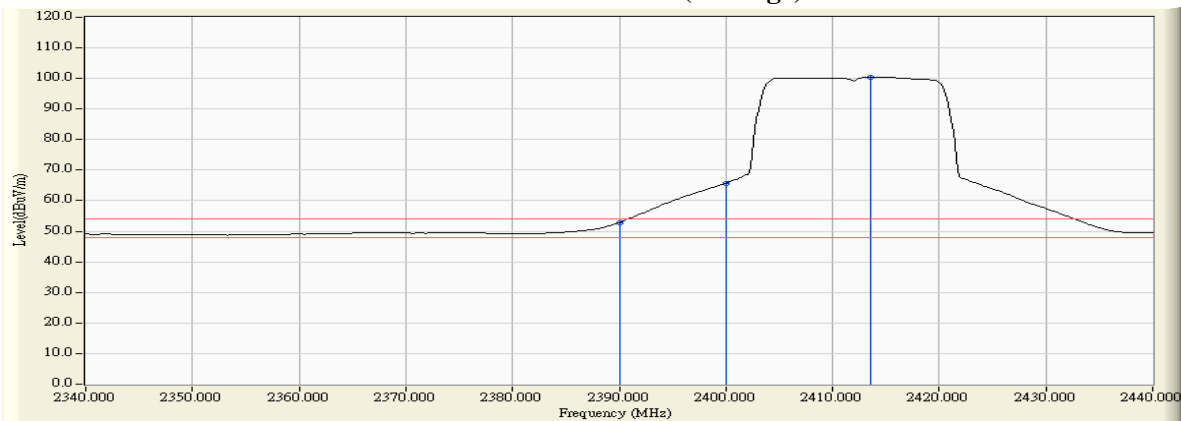


Figure Channel 01: Horizontal (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2348.116	31.110	28.521	59.630	74.00	54.00	Pass
01 (Peak)	2390.000	30.915	27.320	58.235	74.00	54.00	Pass
01 (Peak)	2400.000	30.912	46.612	77.524	--	--	--
01 (Peak)	2407.536	30.932	66.745	97.678	--	--	--
01 (Average)	2390.000	30.915	14.569	45.484	74.00	54.00	Pass
01 (Average)	2400.000	30.912	21.993	52.905	--	--	--
01 (Average)	2413.478	30.959	55.307	86.266	--	--	--

Figure Channel 01: VERTICAL (Peak)

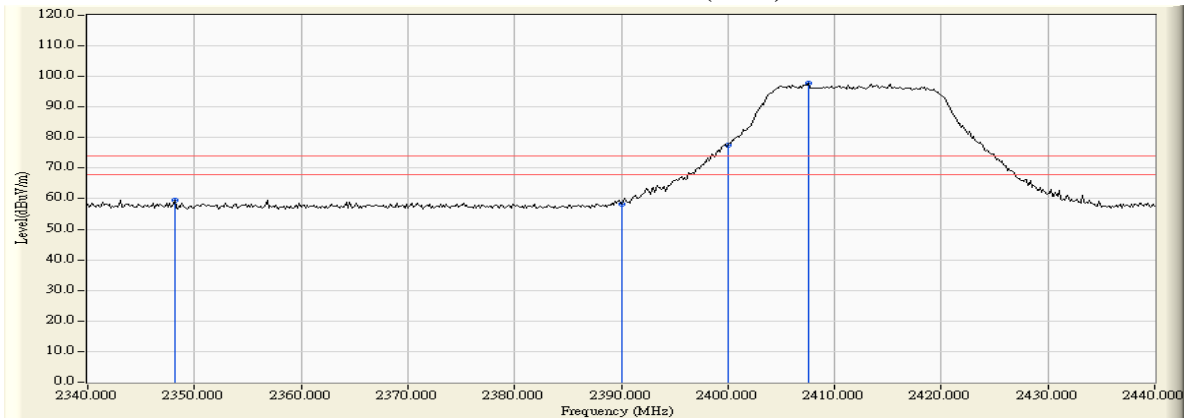
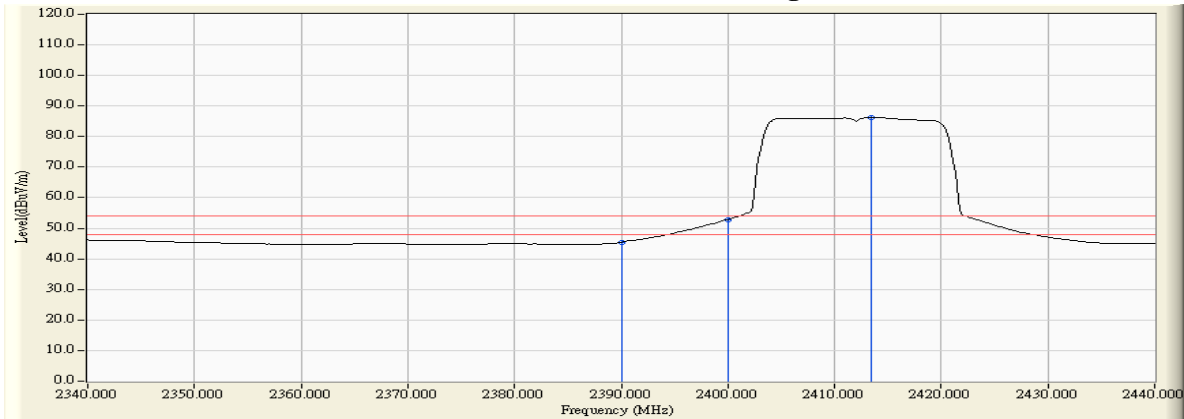


Figure Channel 01: VERTICAL (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2417MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
02 (Peak)	2390.000	-1.131	72.937	71.806	74.00	54.00	Pass
02 (Peak)	2400.000	-1.084	87.868	86.785	--	--	--
02 (Peak)	2412.464	-1.013	113.902	112.889	--	--	--
02 (Average)	2390.000	-1.131	54.663	53.532	74.00	54.00	Pass
02 (Average)	2400.000	-1.084	71.225	70.142	--	--	--
02 (Average)	2413.333	-1.008	102.794	101.786	--	--	--

Figure Channel 01: Horizontal (Peak)

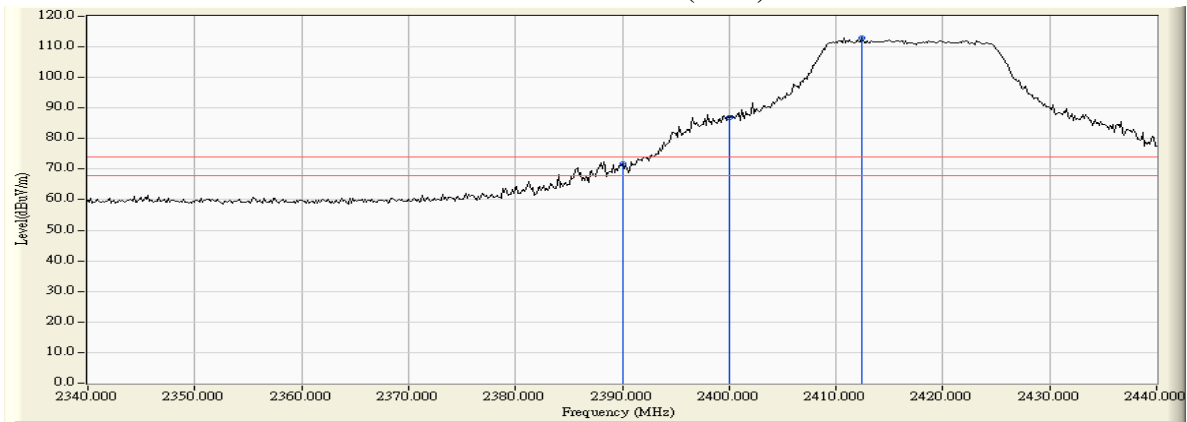
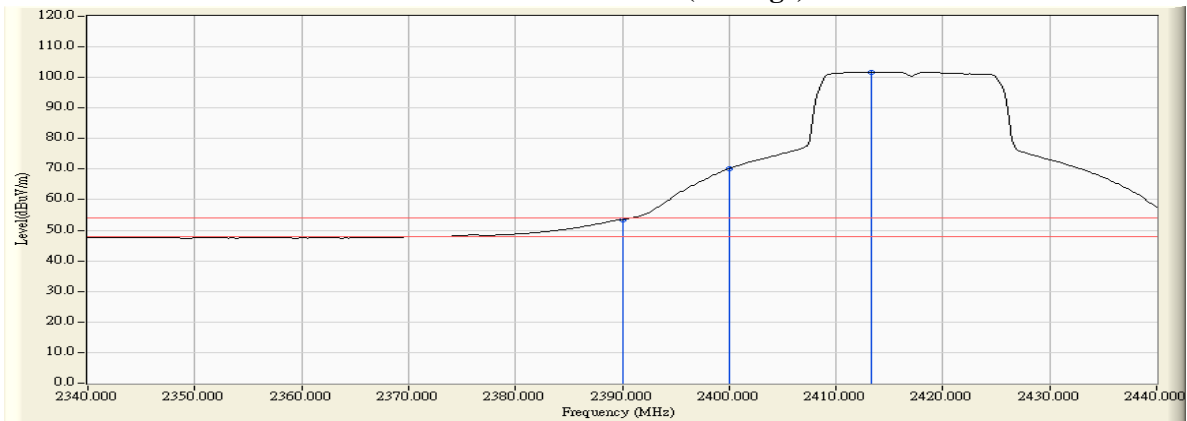


Figure Channel 01: Horizontal (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2417MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
02 (Peak)	2389.710	-1.723	53.670	51.947	74.00	54.00	Pass
02 (Peak)	2390.000	-1.725	52.435	50.710	74.00	54.00	Pass
02 (Peak)	2400.000	-1.733	65.070	63.338	--	--	--
02 (Peak)	2414.493	-1.690	96.534	94.843	--	--	--
02 (Average)	2390.000	-1.725	38.233	36.508	74.00	54.00	Pass
02 (Average)	2400.000	-1.733	46.243	44.511	--	--	--
02 (Average)	2414.348	-1.691	85.644	83.952	--	--	--

Figure Channel 01: VERTICAL (Peak)

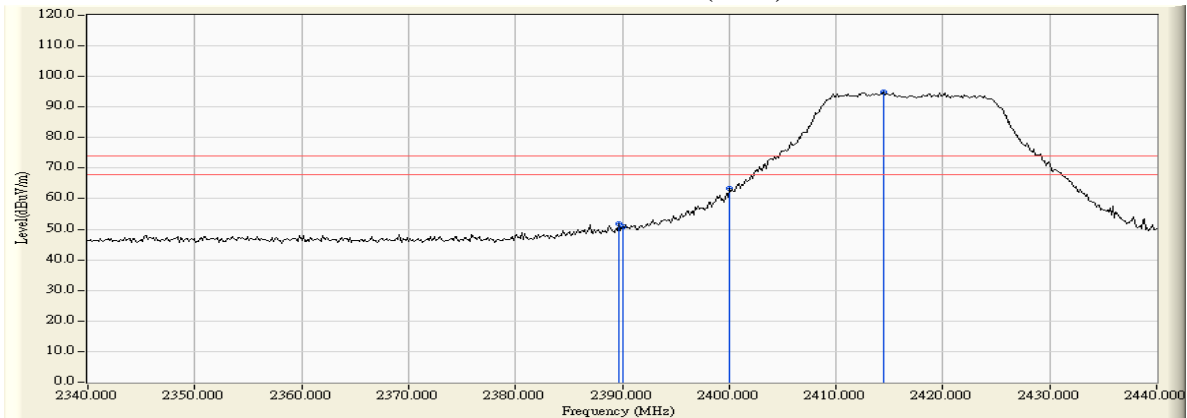
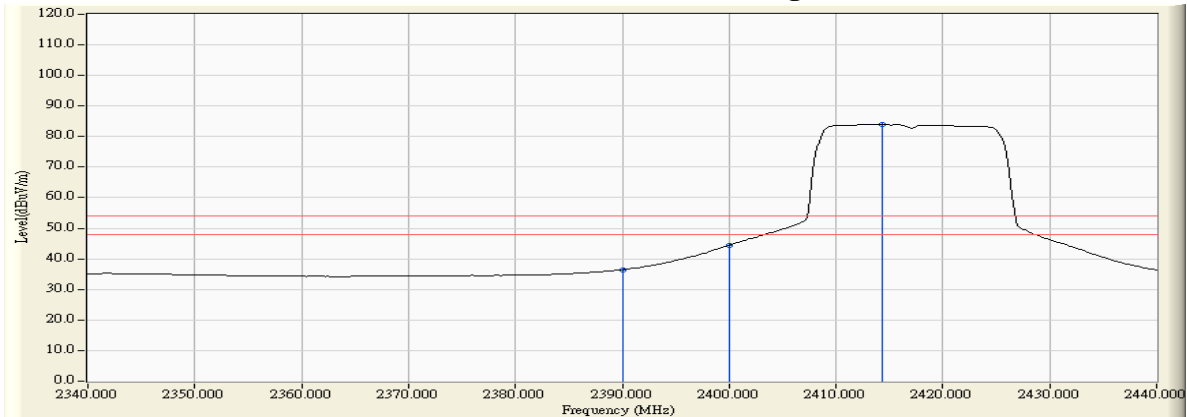


Figure Channel 01: VERTICAL (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2457MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
10 (Peak)	2459.877	-0.709	114.230	113.522	--	--	--
10 (Peak)	2483.500	-0.558	71.804	71.246	74.00	54.00	Pass
10 (Peak)	2484.370	-0.553	73.526	72.973	74.00	54.00	Pass
10 (Average)	2458.572	-0.717	102.749	102.032	--	--	--
10 (Average)	2483.500	-0.558	52.522	51.964	74.00	54.00	Pass

Figure Channel 01: Horizontal (Peak)

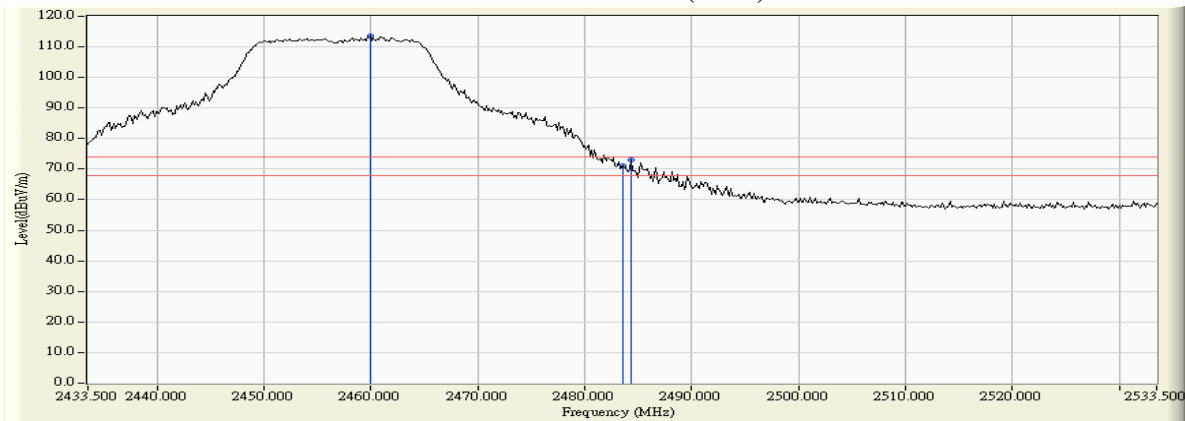
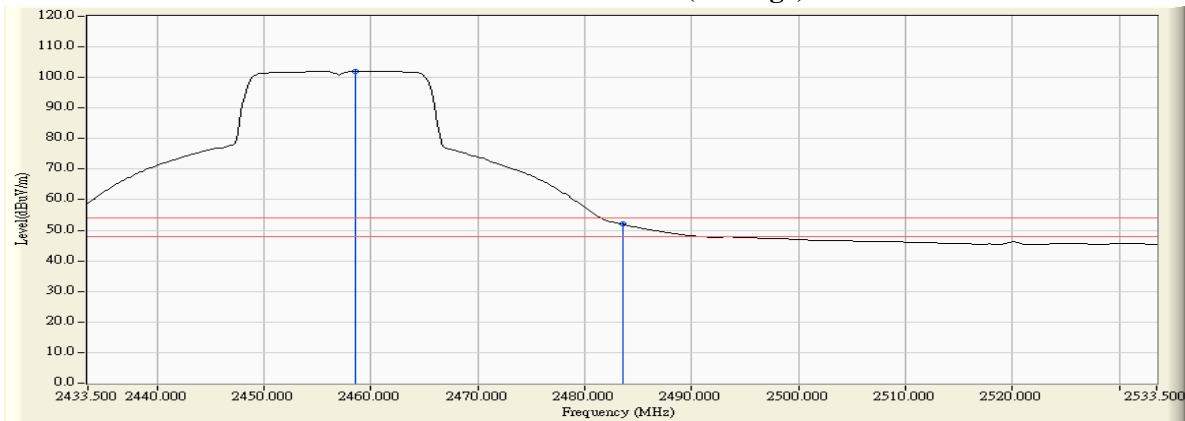


Figure Channel 01: Horizontal (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2457MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
10 (Peak)	2452.341	-1.478	94.679	93.200	--	--	--
10 (Peak)	2483.500	-1.305	48.351	47.046	74.00	54.00	Pass
10 (Peak)	2493.210	-1.251	48.555	47.304	74.00	54.00	Pass
10 (Average)	2458.572	-1.444	83.356	81.913	--	--	--
10 (Average)	2483.500	-1.305	35.669	34.364	74.00	54.00	Pass
10 (Average)	2509.152	-1.224	35.987	34.762	74.00	54.00	Pass

Figure Channel 01: VERTICAL (Peak)

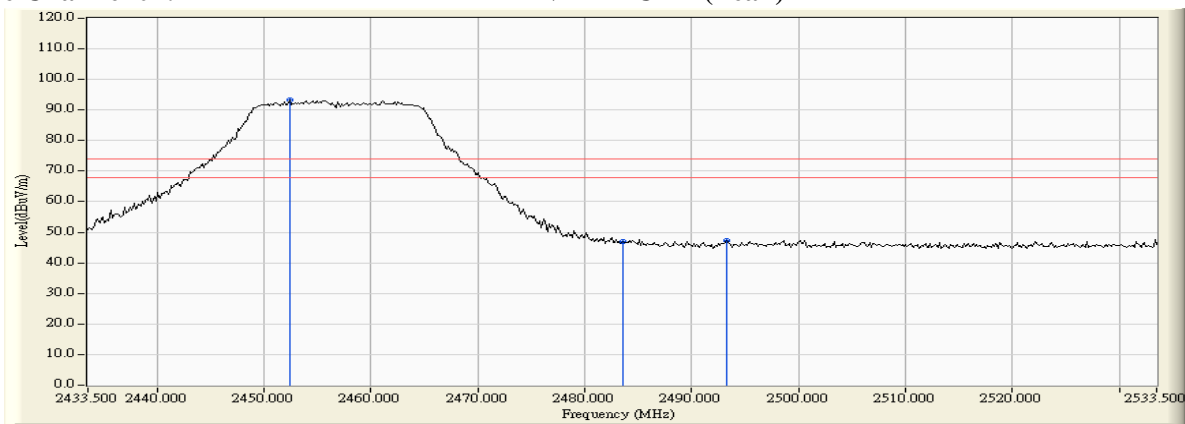
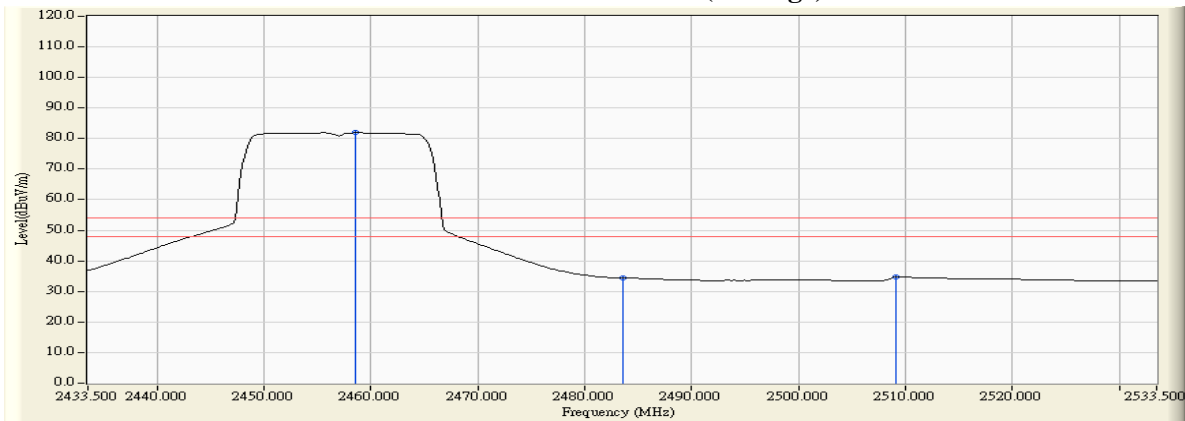


Figure Channel 01: VERTICAL (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2457.413	31.985	80.671	112.656	--	--	--
11 (Peak)	2483.500	32.182	38.754	70.936	74.00	54.00	Pass
11 (Average)	2460.457	32.008	69.140	101.148	--	--	--
11 (Average)	2483.500	32.182	16.577	48.759	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

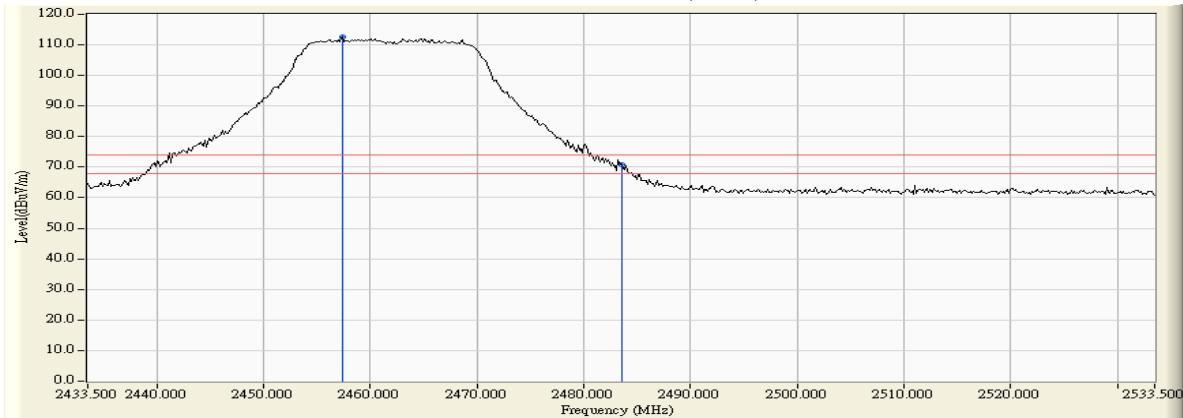
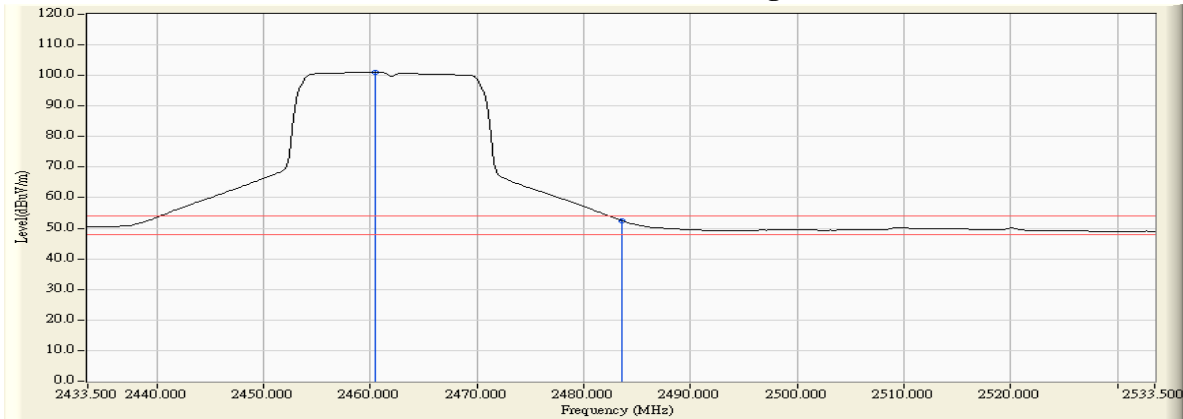


Figure Channel 11: Horizontal (Average)



- 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 : IEEE 802.11a/b/g miniPCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2459.732	31.275	66.346	97.621	--	--	--
11 (Peak)	2483.500	31.435	26.934	58.369	74.00	54.00	Pass
11 (Peak)	2484.370	31.441	28.824	60.265	74.00	54.00	Pass
11 (Average)	2460.312	31.278	55.142	86.421	--	--	--
11 (Average)	2483.500	31.435	14.600	46.035	74.00	54.00	Pass

Figure Channel 11: VERTICAL (Peak)

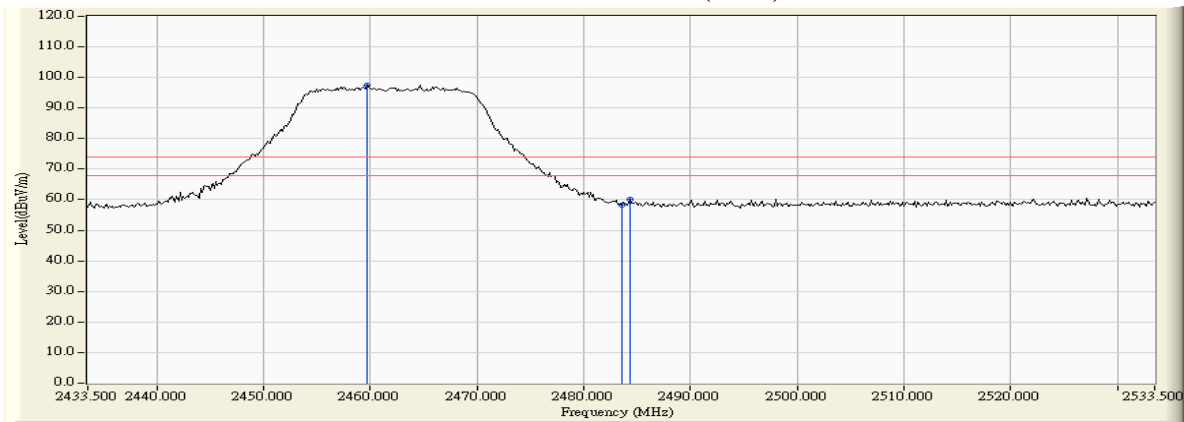
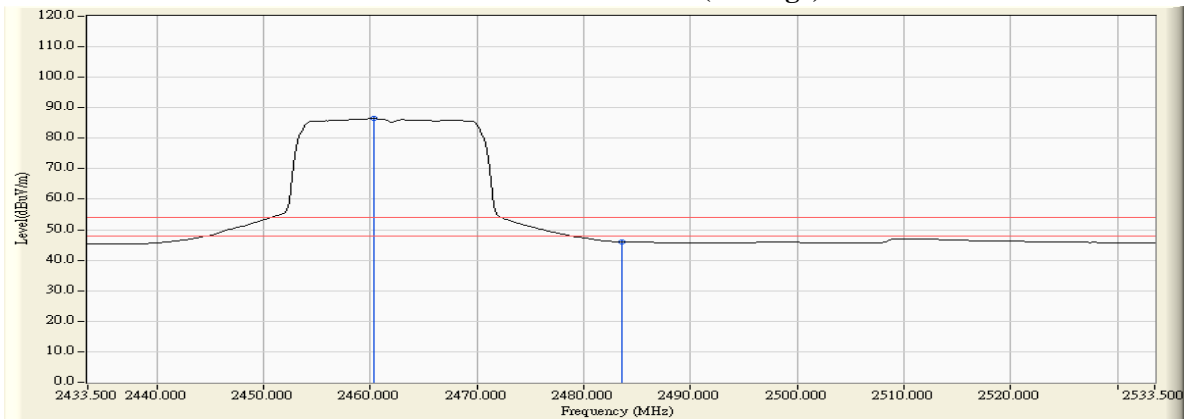


Figure Channel 11: VERTICAL (Average)



- 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.

5. EMI Reduction Method During Compliance Testing

No modification was made during testing.