

FC

Test Report

Product Name	MOXA IEEE802.11 a/b/g mini PCI module
Model No	WAPA004
FCC ID.	SLE-WAPA004

Applicant	MOXA Inc.
Address	4TH FL 135 LANE 235 PAO CHIAO RD SHING TIEN DISTRICT NEW TAIPEI CITY

Date of Receipt	Nov. 22, 2012
Issue Date	Jan. 21, 2013
Report No.	12B363R-RFUSP42V01
Report Version	V1.0



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

Issue Date: Jan. 21, 2013

Report No.: 12B363R-RFUSP42V01



Product Name	MOXA IEEE802.11 a/b/g mini PCI module
Applicant	MOXA Inc.
Address	4TH FL 135 LANE 235 PAO CHIAO RD SHING TIEN DISTRICT NEW TAIPEI CITY
Manufacturer	MOXA Inc.
Model No.	WAPA004
EUT Rated Voltage	DC 3.3V (Power by PCI-E)
EUT Test Voltage	AC 120V/60Hz
Trade Name	MOXA
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2012 ANSI C63.4: 2003, ANSI C63.10: 2009
Test Result	Complied

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	MOXA IEEE802.11 a/b/g mini PCI module
Trade Name	MOXA
Model No.	WAPA004
FCC ID.	SLE-WAPA004
Frequency Range	802.11b/g: 2412-2462MHz , 802.11a: 5745-5825MHz
Number of Channels	802.11b/g: 11, 802.11a: 5
Data Speed	802.11b: 1-11Mbps, 802.11a/g: 6-54Mbps
Channel separation	802.11b/g: 5 MHz, 802.11a: 20MHz
Type of Modulation	802.11b:DSSS, DBPSK, DQPSK, CCK 802.11a/g: OFDM, BPSK, QPSK, 16QAM, 64QAM
Antenna Type	Dipole
Antenna Gain	Refer to the table "Antenna List"
Channel Control	Auto

Antenna List

No.	Manufacturer	Model No.	Peak Gain
1	KINSUN	ANT-WDB-O-2 BK (main)	2.9dBi in 2.4GHz
		ANT-WDB-O-2 BK (aux)	2.34dBi in 5GHz
2	KINSUN	ANT-WDB-ANM-0502 (main)	4.62 dBi in 2.4GHz
		ANT-WDB-ANM-0502 (aux)	1.41dBi in 5GHz

Note: 1. The antenna of EUT is conform to FCC 15.203

2. Only the higher gain antenna was tested and recorded in this report.

("ANT-WDB-ANM-0502" antenna is used for 2.4GHz band testing, "ANT-WDB-O-2 BK " antenna is used for 5GHz band testing.)

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		

802.11a Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 149:	5745 MHz	Channel 153:	5765 MHz	Channel 157:	5785 MHz	Channel 161:	5805 MHz
Channel 165:	5825 MHz						

Note:

1. This device is a MOXA IEEE802.11 a/b/g mini PCI module with a built-in 2.4GHz and 5GHz WLAN transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. The device is applied for modular approval.
4. At result of pretests, module supports dual-channel transmission, only the worst case is shown in the report. (802.11b is chain A 、802.11a/g is chain A)
5. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps 、802.11a/g is 6Mbps).
6. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11a/b/g/n transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.

Test Mode:	Mode 1: Transmit (802.11b 1Mbps)
	Mode 2: Transmit (802.11g 6Mbps)
	Mode 3: Transmit (802.11a 6Mbps)

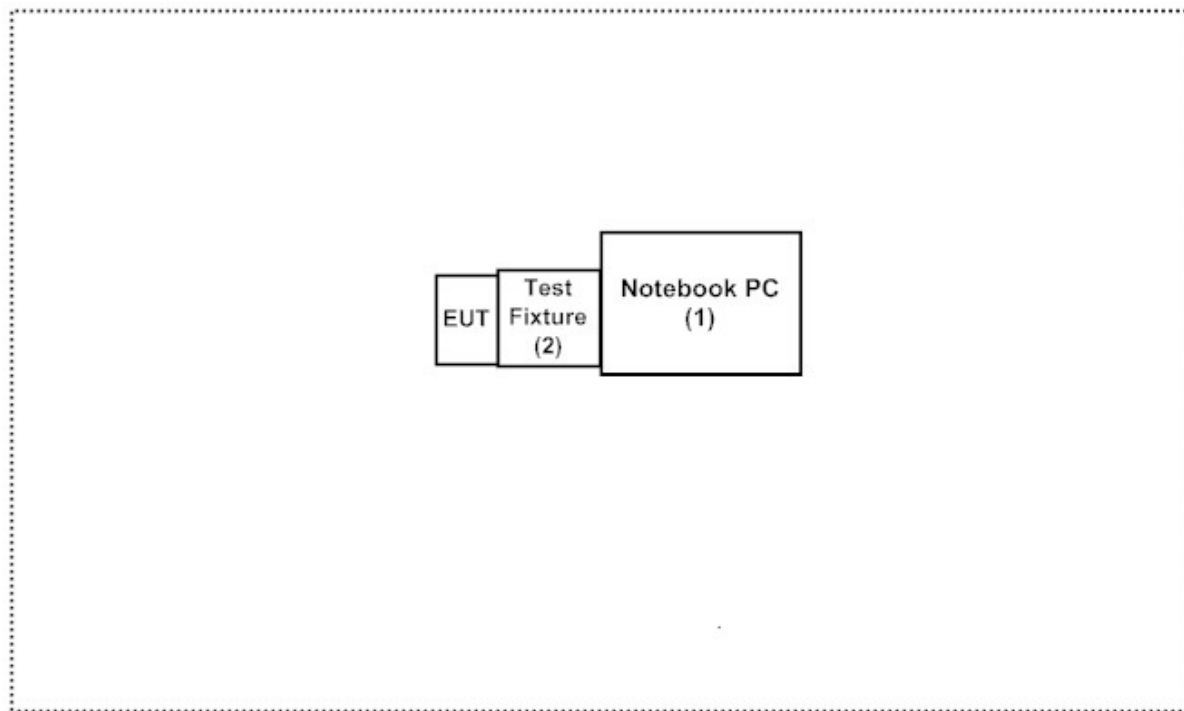
1.3. Tested System Details

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	PPT	N/A
2	Test Fixture	MOXA	N/A	N/A

Signal Cable Type	Signal cable Description
N/A	

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute program on the Notebook.
- (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/tw/ctg/cts/accreditations.htm>

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

Accreditation on NVLAP
NVLAP Lab Code: 200533-0

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

FCC Accreditation Number: TW1014

2. Conducted Emission

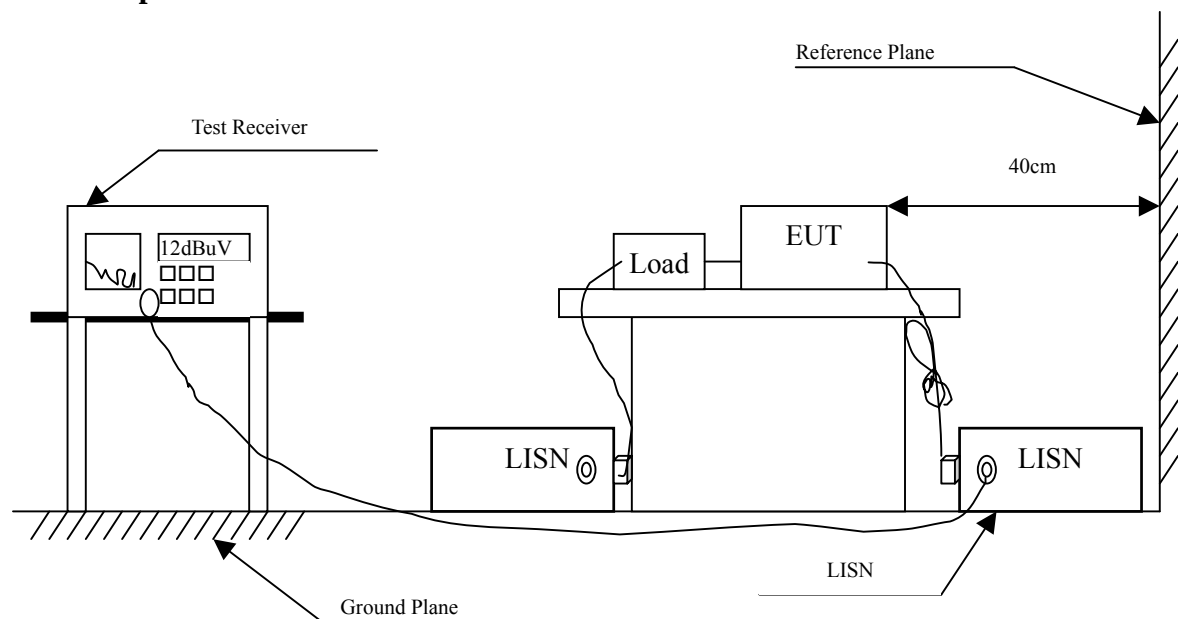
2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2012	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2012	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2012	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar, 2012	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2012	
	No.1 Shielded Room				

Note:

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

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AVG
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

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 C63.10: 2009 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
Line 1					
Quasi-Peak					
0.212	9.830	33.820	43.650	-20.579	64.229
0.283	9.830	29.570	39.400	-22.800	62.200
0.427	9.830	28.070	37.900	-20.186	58.086
1.638	9.840	13.900	23.740	-32.260	56.000
5.130	9.880	21.060	30.940	-29.060	60.000
13.181	10.059	32.720	42.779	-17.221	60.000
Average					
0.212	9.830	23.330	33.160	-21.069	54.229
0.283	9.830	26.010	35.840	-16.360	52.200
0.427	9.830	23.960	33.790	-14.296	48.086
1.638	9.840	13.890	23.730	-22.270	46.000
5.130	9.880	15.630	25.510	-24.490	50.000
13.181	10.059	32.170	42.229	-7.771	50.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.158	9.840	22.620	32.460	-33.311	65.771
0.173	9.836	15.630	25.466	-39.877	65.343
0.212	9.830	32.860	42.690	-21.539	64.229
0.283	9.831	26.440	36.271	-25.929	62.200
0.357	9.840	23.770	33.610	-26.476	60.086
0.427	9.840	25.060	34.900	-23.186	58.086
Average					
0.158	9.840	3.000	12.840	-42.931	55.771
0.173	9.836	9.030	18.866	-36.477	55.343
0.212	9.830	25.080	34.910	-19.319	54.229
0.283	9.831	26.430	36.261	-15.939	52.200
0.357	9.840	17.390	27.230	-22.856	50.086
0.427	9.840	23.240	33.080	-15.006	48.086

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 3: Transmit (802.11a 6Mbps)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
Line 1					
Quasi-Peak					
0.205	9.830	17.700	27.530	-36.899	64.429
0.287	9.830	26.640	36.470	-25.616	62.086
0.427	9.830	27.070	36.900	-21.186	58.086
0.638	9.830	24.830	34.660	-21.340	56.000
5.736	9.888	5.550	15.438	-44.562	60.000
12.970	10.056	29.910	39.966	-20.034	60.000
Average					
0.205	9.830	1.730	11.560	-42.869	54.429
0.287	9.830	23.130	32.960	-19.126	52.086
0.427	9.830	21.680	31.510	-16.576	48.086
0.638	9.830	17.190	27.020	-18.980	46.000
5.736	9.888	-3.630	6.258	-43.742	50.000
12.970	10.056	23.290	33.346	-16.654	50.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 3: Transmit (802.11a 6Mbps)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.150	9.840	29.100	38.940	-27.060	66.000
0.216	9.830	31.370	41.200	-22.914	64.114
0.283	9.831	26.520	36.351	-25.849	62.200
0.357	9.840	26.230	36.070	-24.016	60.086
0.427	9.840	27.050	36.890	-21.196	58.086
5.060	9.889	18.980	28.869	-31.131	60.000
Average					
0.150	9.840	17.970	27.810	-28.190	56.000
0.216	9.830	27.900	37.730	-16.384	54.114
0.283	9.831	26.490	36.321	-15.879	52.200
0.357	9.840	23.870	33.710	-16.376	50.086
0.427	9.840	23.420	33.260	-14.826	48.086
5.060	9.889	9.150	19.039	-30.961	50.000

Note:

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

3. Peak Power Output

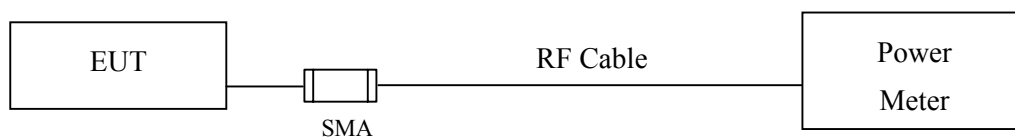
3.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2012
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2012
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2012
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2012
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2012

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



3.3. Limits

The maximum peak power shall be less 1 Watt.

3.4. Test Procedure

The EUT was tested according to DTS test procedure of ANSI C63.10: 2009 for compliance to FCC 47CFR 15.247 requirements.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Power Output

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

(Chain A)

(Channel 11)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)				Peak Power	Required Limit	Result
		1	2	5.5	11	1		
		Measurement Level (dBm)						
01	2412	15.98	--	--	--	18.18	<30dBm	Pass
06	2437	15.56	15.48	15.38	15.37	17.80	<30dBm	Pass
11	2462	15.76	--	--	--	17.98	<30dBm	Pass

(Chain B)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)				Peak Power	Required Limit	Result
		1	2	5.5	11	1		
		Measurement Level (dBm)						
01	2412	15.56	--	--	--	18.01	<30dBm	Pass
06	2437	15.38	15.28	15.25	15.22	17.59	<30dBm	Pass
11	2462	15.59	--	--	--	17.64	<30dBm	Pass

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

(Chain A)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54	6		
		Measurement Level (dBm)										
01	2412	13.92	--	--	--	--	--	--	--	23.05	<30dBm	Pass
06	2437	13.89	13.87	13.85	13.84	13.83	13.81	13.76	13.75	22.80	<30dBm	Pass
11	2462	13.99	--	--	--	--	--	--	--	22.87	<30dBm	Pass

(Chain B)

(Channel B)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54	6		
		Measurement Level (dBm)										
01	2412	13.62	--	--	--	--	--	--	--	22.87	<30dBm	Pass
06	2437	13.59	13.57	13.55	13.54	13.53	13.51	13.56	13.55	22.64	<30dBm	Pass
11	2462	13.59	--	--	--	--	--	--	--	22.64	<30dBm	Pass

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11a 6Mbps)

(Chain A)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54	6		
		Measurement Level (dBm)										
149	5745	13.01	--	--	--	--	--	--	--	19.43	<30dBm	Pass
157	5785	12.79	12.76	12.75	12.71	12.69	12.67	12.65	12.63	18.75	<30dBm	Pass
165	5825	12.57	--	--	--	--	--	--	--	18.24	<30dBm	Pass

(Chain B)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54	6		
		Measurement Level (dBm)										
149	5745	12.78	--	--	--	--	--	--	--	19.27	<30dBm	Pass
157	5785	12.49	12.46	12.45	12.41	12.49	12.47	12.45	12.43	18.51	<30dBm	Pass
165	5825	12.37	--	--	--	--	--	--	--	18.01	<30dBm	Pass

4. Radiated Emission

4.1. Test Equipment

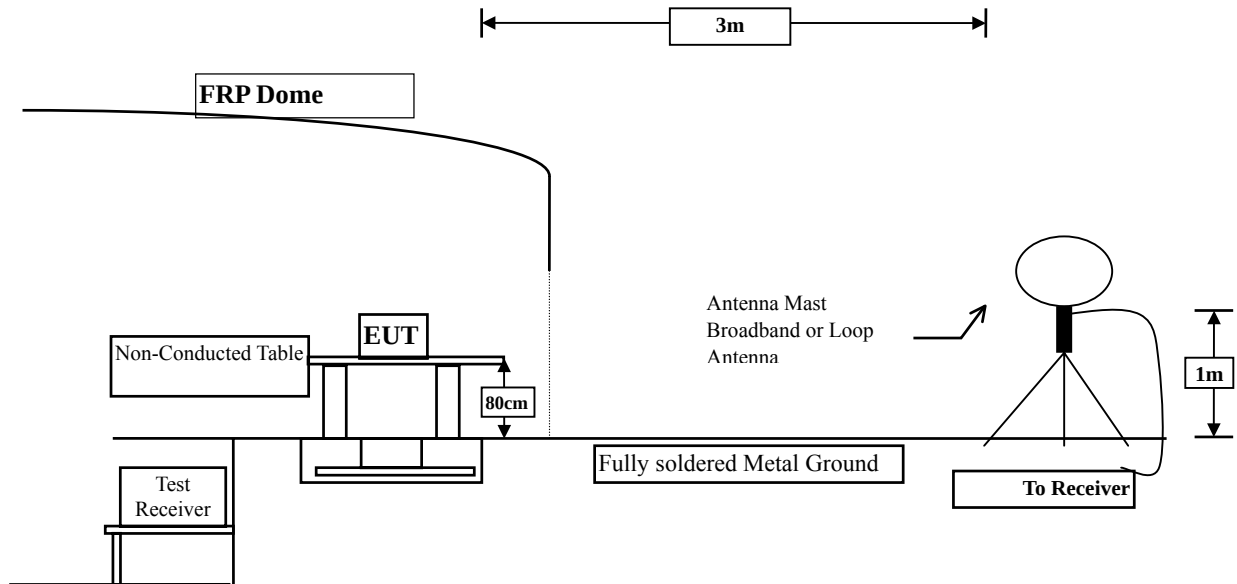
The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2012
	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2012
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2012
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2012
	X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2012
	X	Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2012
	X	Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar, 2012
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2012
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2012
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2012
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

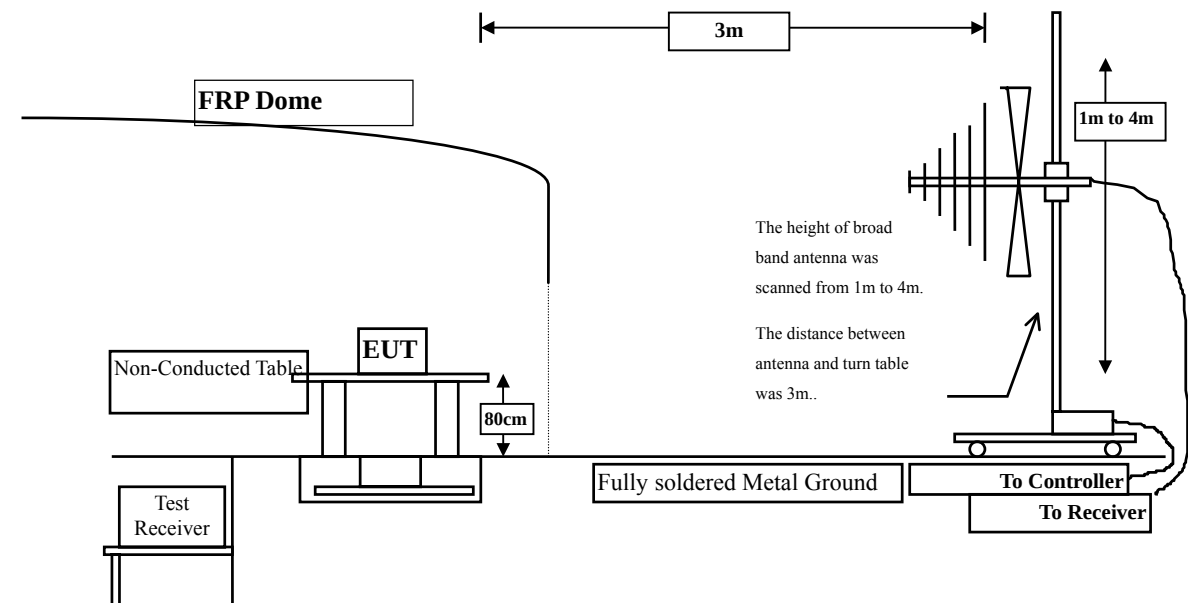
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with "X" are used to measure the final test results.

4.2. Test Setup

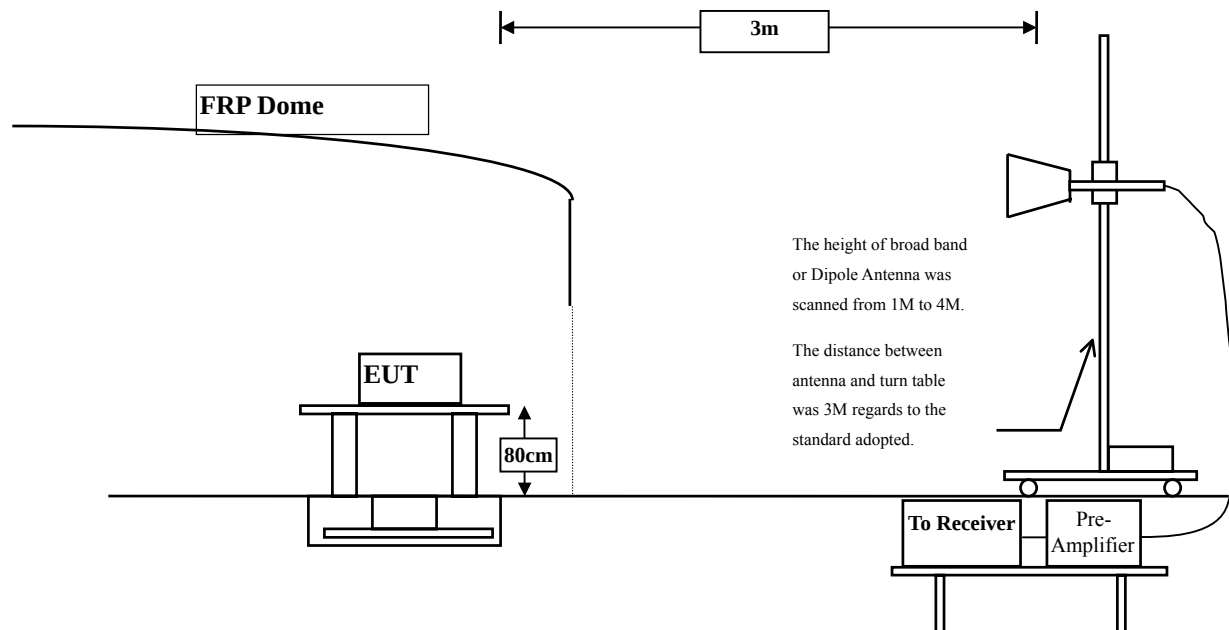
Radiated Emission Below 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



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.

FCC Part 15 Subpart C Paragraph 15.209(a) 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: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2009 and tested according to DTS test procedure of ANSI C63.10: 2009 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 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: 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 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.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product : MOXA IEEE802.11 a/b/g mini PCI 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 dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4824.000	3.261	38.260	41.521	-32.479	74.000
7236.000	10.650	36.150	46.800	-27.200	74.000
9648.000	13.337	35.290	48.626	-25.374	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4824.000	6.421	47.160	53.581	-20.419	74.000
7236.000	11.495	35.880	47.375	-26.625	74.000
9648.000	13.807	36.480	50.286	-23.714	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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4874.000	3.038	38.150	41.187	-32.813	74.000
7311.000	11.795	36.150	47.944	-26.056	74.000
9748.000	12.635	37.150	49.785	-24.215	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4874.000	5.812	45.050	50.861	-23.139	74.000
7311.000	12.630	36.150	48.779	-25.221	74.000
9748.000	13.126	38.120	51.246	-22.754	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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4924.000	2.858	38.150	41.007	-32.993	74.000
7386.000	12.127	36.120	48.248	-25.752	74.000
9848.000	12.852	36.180	49.033	-24.967	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4924.000	5.521	47.190	52.710	-21.290	74.000
7386.000	13.254	36.190	49.444	-24.556	74.000
9848.000	13.367	36.090	49.457	-24.543	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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4824.000	3.261	37.260	40.521	-33.479	74.000
7236.000	10.650	36.150	46.800	-27.200	74.000
9648.000	13.337	36.090	49.426	-24.574	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4824.000	6.421	46.760	53.181	-20.819	74.000
7236.000	11.495	36.150	47.645	-26.355	74.000
9648.000	13.807	36.060	49.866	-24.134	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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4874.000	3.038	38.260	41.297	-32.703	74.000
7311.000	11.795	34.800	46.594	-27.406	74.000
9748.000	12.635	36.150	48.785	-25.215	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4874.000	5.812	40.670	46.481	-27.519	74.000
7311.000	12.630	36.190	48.819	-25.181	74.000
9748.000	13.126	37.890	51.016	-22.984	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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4924.000	2.858	38.160	41.017	-32.983	74.000
7386.000	12.127	36.190	48.318	-25.682	74.000
9848.000	12.852	37.060	49.913	-24.087	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4924.000	5.521	39.260	44.780	-29.220	74.000
7386.000	13.254	36.150	49.404	-24.596	74.000
9848.000	13.367	36.890	50.257	-23.743	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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11a 6Mbps) (5745MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
11490.000	17.106	35.140	52.247	-21.753	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
11490.000	18.034	35.180	53.215	-20.785	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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11a 6Mbps) (5785MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
11570.000	16.809	35.590	52.399	-21.601	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
11570.000	17.698	35.750	53.448	-20.552	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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11a 6Mbps) (5825MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
11650.000	16.158	35.570	51.728	-22.272	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
11650.000	17.274	35.190	52.465	-21.535	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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
144.460	-10.377	47.768	37.391	-6.109	43.500
297.720	-3.633	40.533	36.901	-9.099	46.000
466.500	0.794	34.163	34.956	-11.044	46.000
658.560	2.115	33.251	35.366	-10.634	46.000
796.300	5.161	30.001	35.162	-10.838	46.000
934.040	6.612	28.180	34.792	-11.208	46.000
Vertical					
72.680	-5.622	41.414	35.791	-4.209	40.000
231.760	-8.848	50.161	41.313	-4.687	46.000
396.660	-4.356	34.084	29.728	-16.272	46.000
660.500	-2.233	41.795	39.562	-6.438	46.000
800.180	2.801	33.808	36.609	-9.391	46.000
959.260	6.964	27.118	34.082	-11.918	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of 9kHz~30MHz are very lower than the limit and not show in test report.

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
132.820	-10.230	48.563	38.333	-5.167	43.500
245.340	-6.346	47.746	41.400	-4.600	46.000
355.920	-2.528	38.810	36.282	-9.718	46.000
528.580	1.848	35.557	37.405	-8.595	46.000
705.120	2.635	34.747	37.382	-8.618	46.000
846.740	5.741	32.037	37.778	-8.222	46.000
Vertical					
113.420	-1.849	39.144	37.295	-6.205	43.500
245.340	-8.406	47.746	39.340	-6.660	46.000
355.920	-3.488	38.810	35.322	-10.678	46.000
528.580	-0.462	35.557	35.095	-10.905	46.000
705.120	0.115	34.747	34.862	-11.138	46.000
846.740	2.601	32.037	34.638	-11.362	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of 9kHz~30MHz are very lower than the limit and not show in test report.

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11a 6Mbps) (5745MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
144.460	-10.377	47.768	37.391	-6.109	43.500
297.720	-3.633	40.533	36.901	-9.099	46.000
466.500	0.794	34.163	34.956	-11.044	46.000
658.560	2.115	33.251	35.366	-10.634	46.000
796.300	5.161	30.001	35.162	-10.838	46.000
934.040	6.612	28.180	34.792	-11.208	46.000
Vertical					
72.680	-5.622	41.414	35.791	-4.209	40.000
231.760	-8.848	50.161	41.313	-4.687	46.000
396.660	-4.356	34.084	29.728	-16.272	46.000
660.500	-2.233	41.795	39.562	-6.438	46.000
800.180	2.801	33.808	36.609	-9.391	46.000
959.260	6.964	27.118	34.082	-11.918	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of 9kHz~30MHz are very lower than the limit and not show in test report.

5. RF antenna conducted test

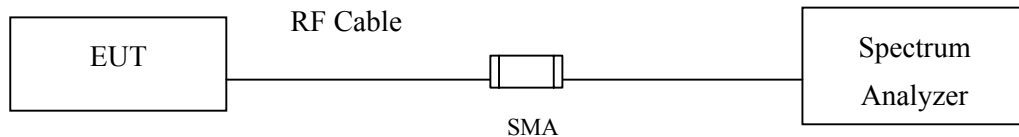
5.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2012
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2012
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2012

- 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.

5.2. Test Setup

RF antenna Conducted Measurement:



5.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 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)).

5.4. Test Procedure

The EUT was tested according to DTS test procedure of ANSI C63.10: 2009 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

5.5. Uncertainty

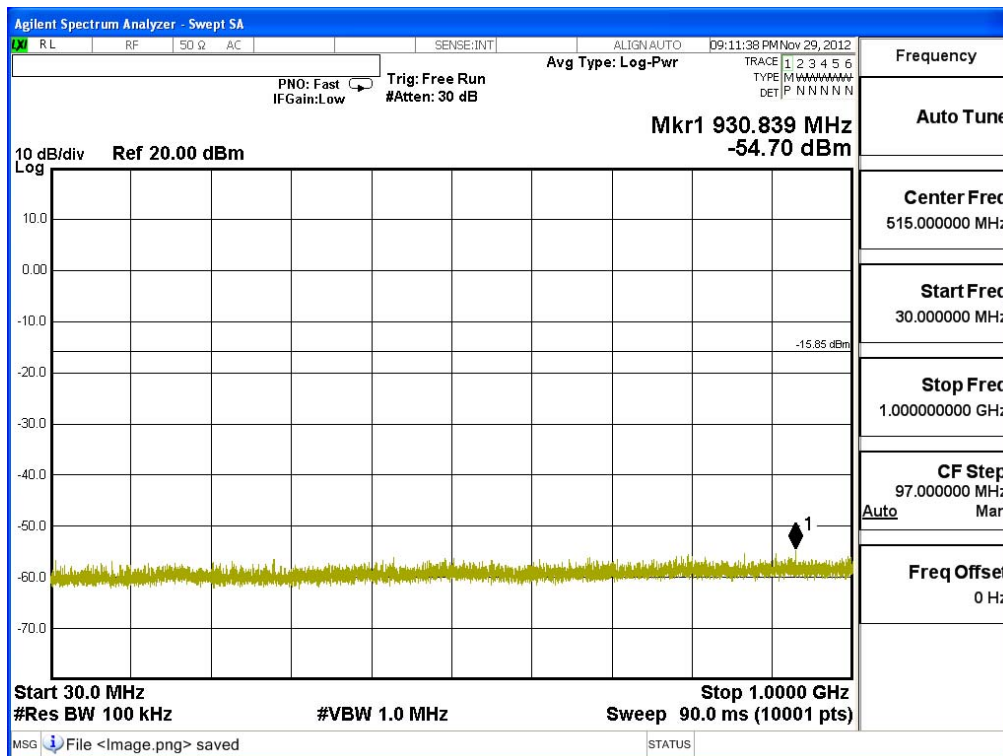
The measurement uncertainty

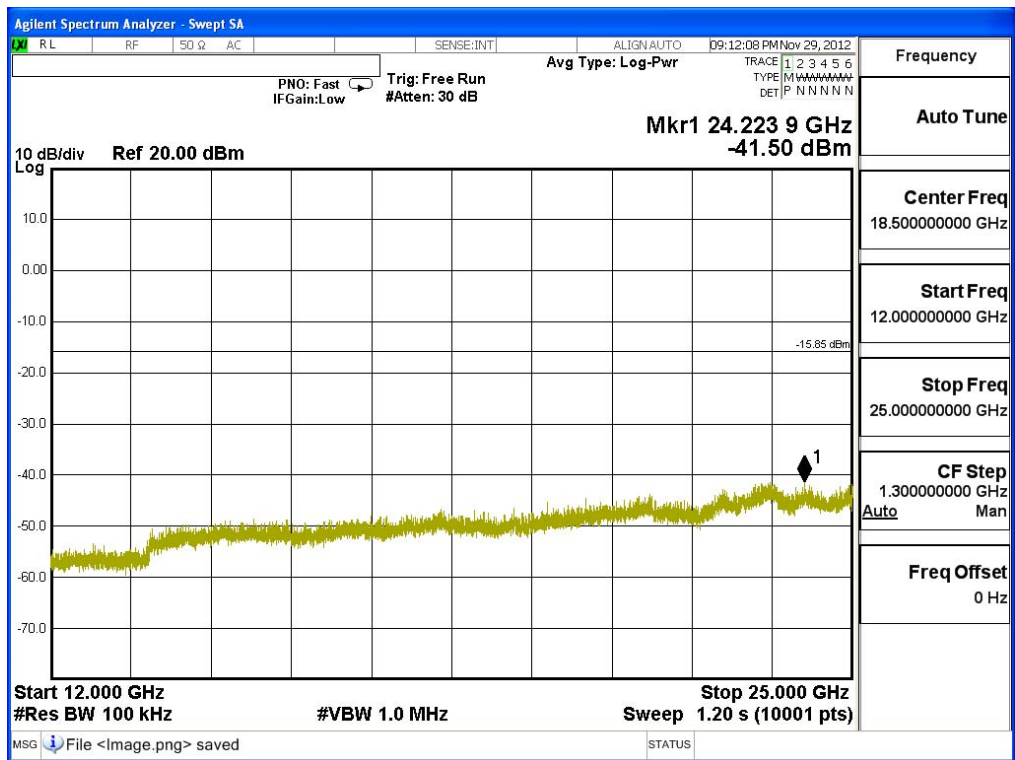
Conducted is defined as $\pm 1.27\text{dB}$

5.6. Test Result of RF antenna conducted test

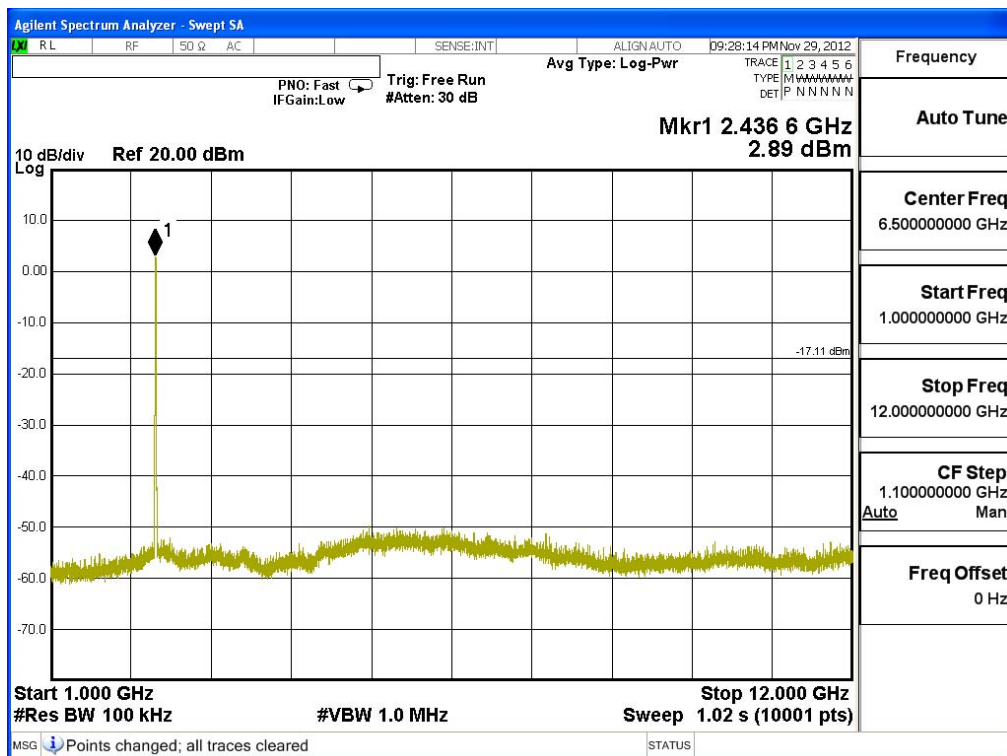
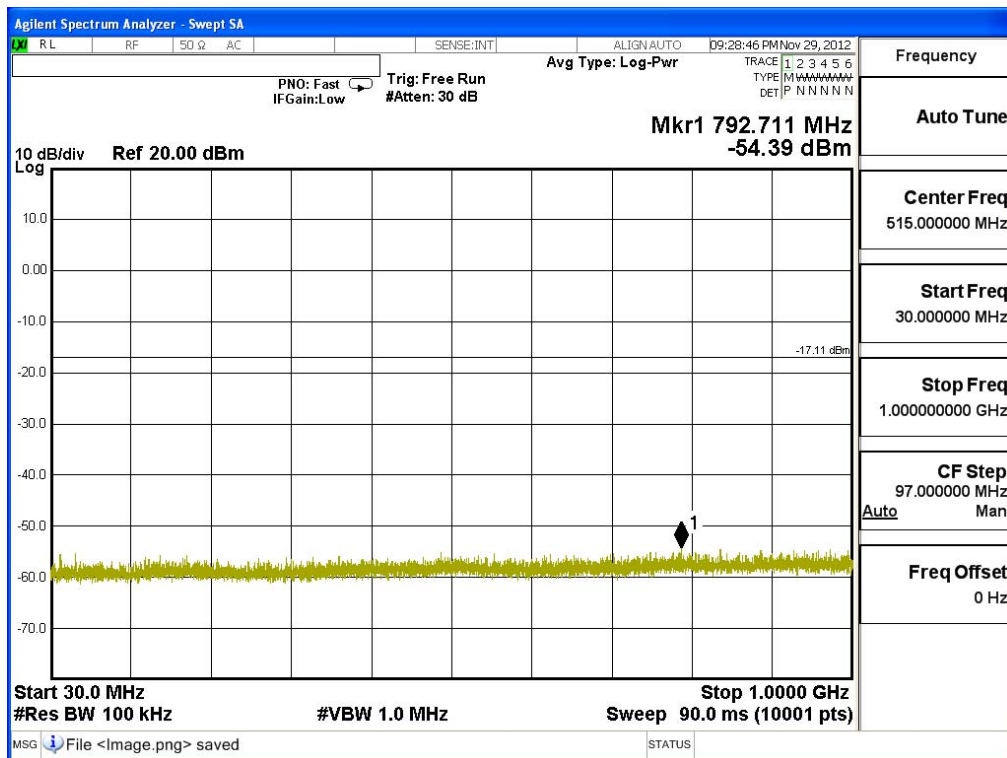
Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : RF antenna conducted test
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

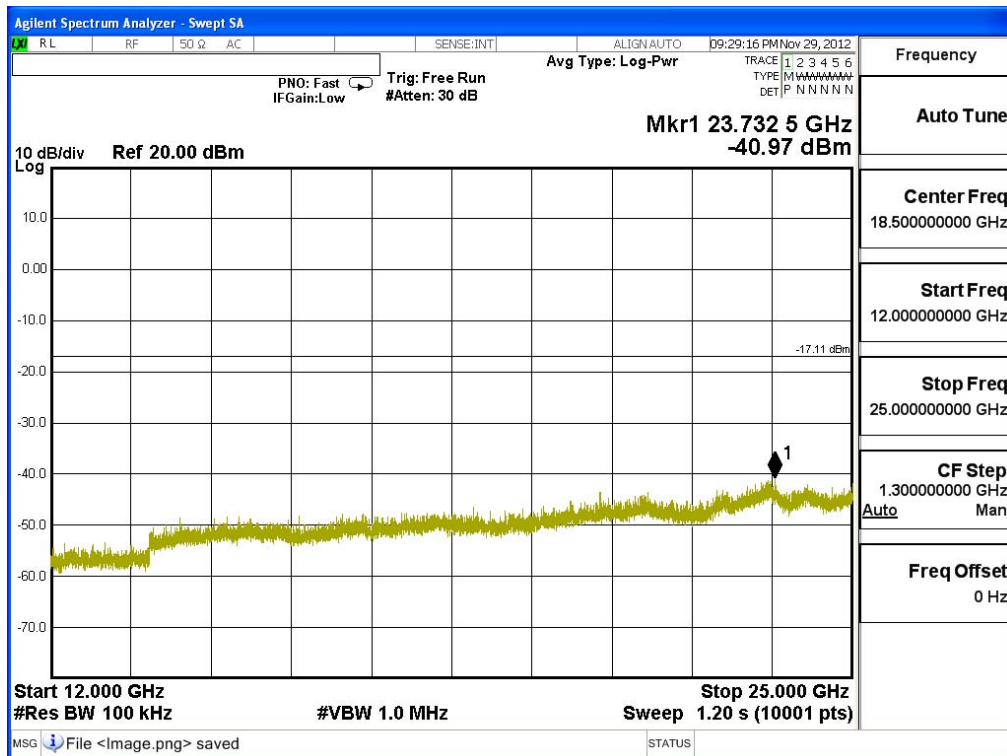
Channel 01 (2412MHz) 30MHz-25GHz



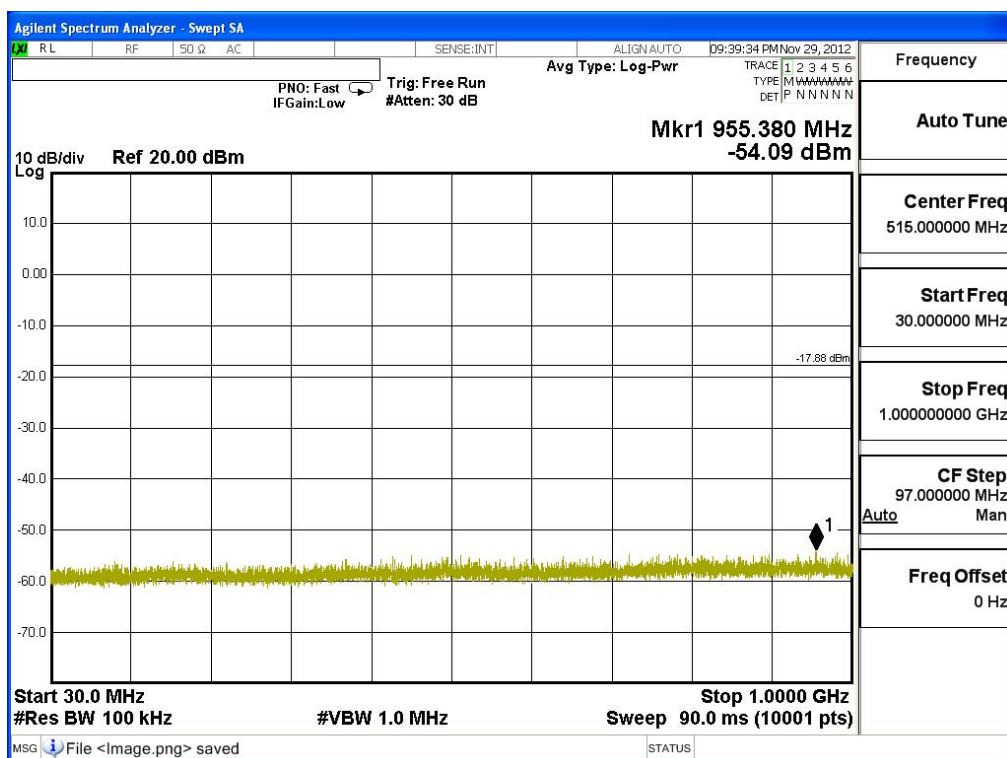


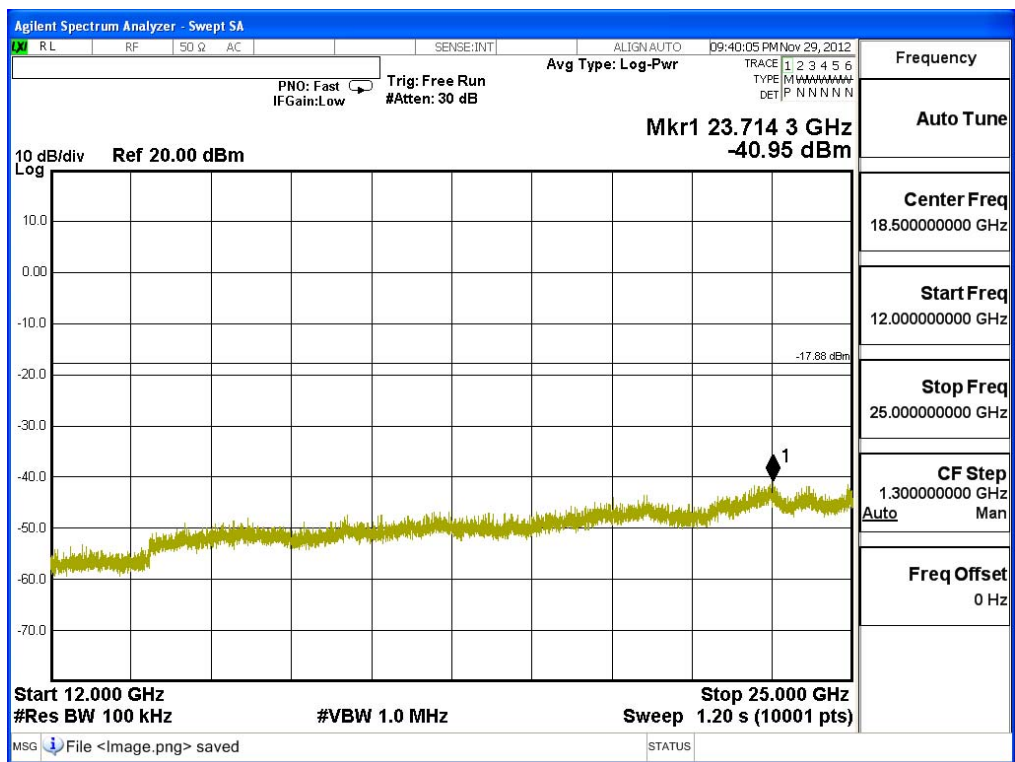
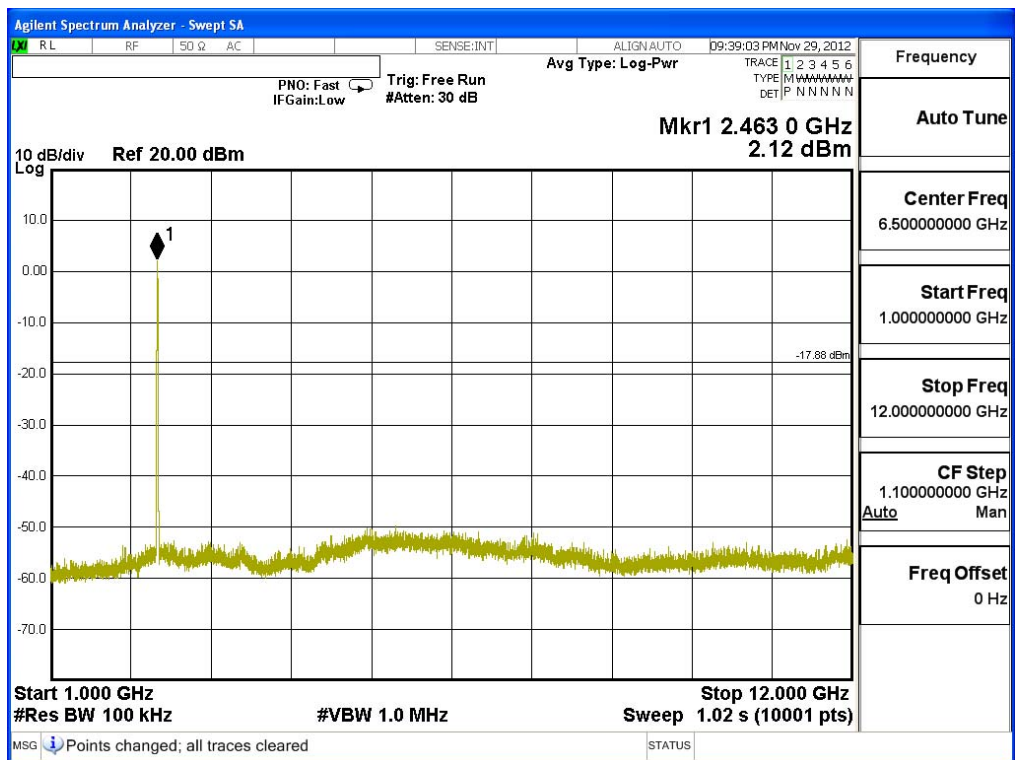
Channel 06 (2437MHz) 30MHz -25GHz





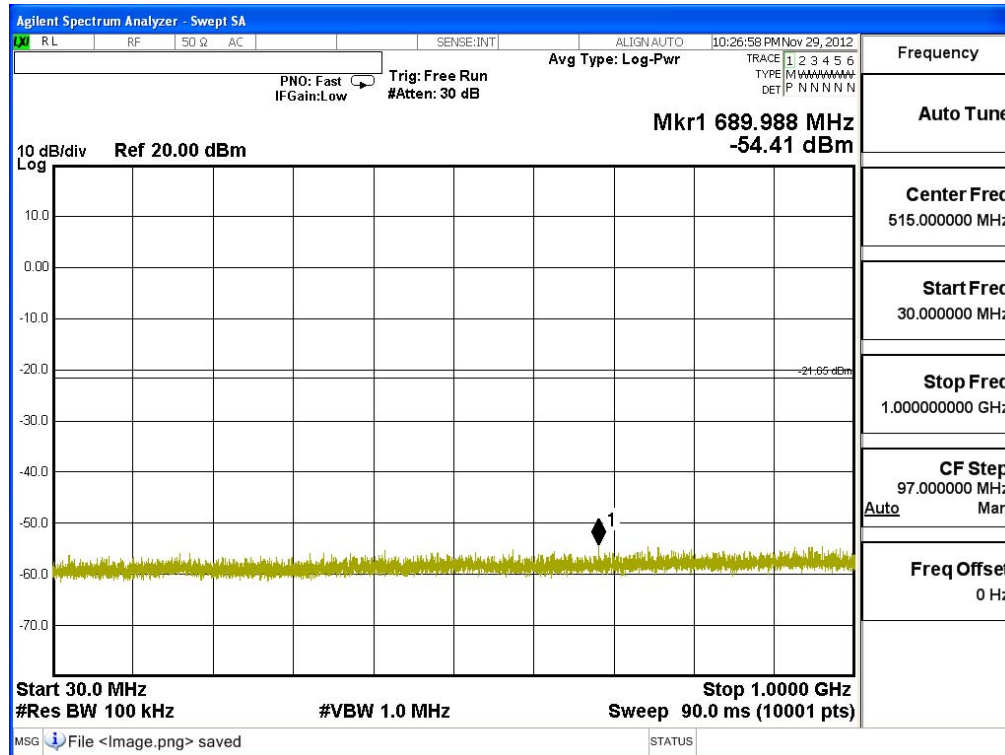
Channel 11 (2462MHz) 30MHz -25GHz

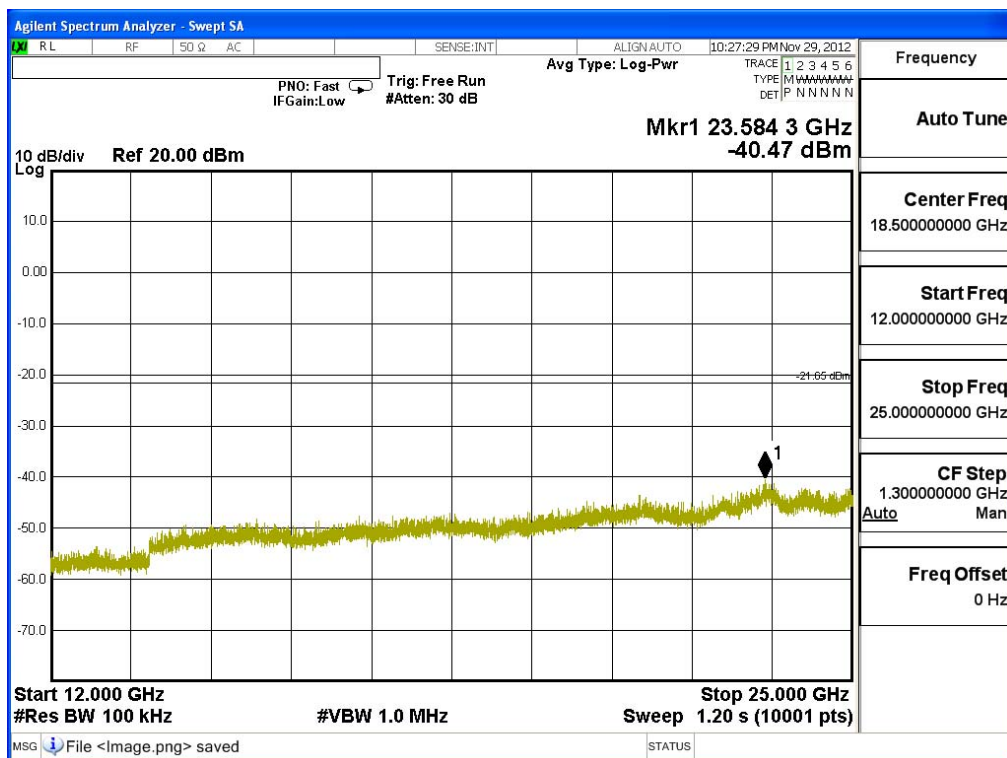
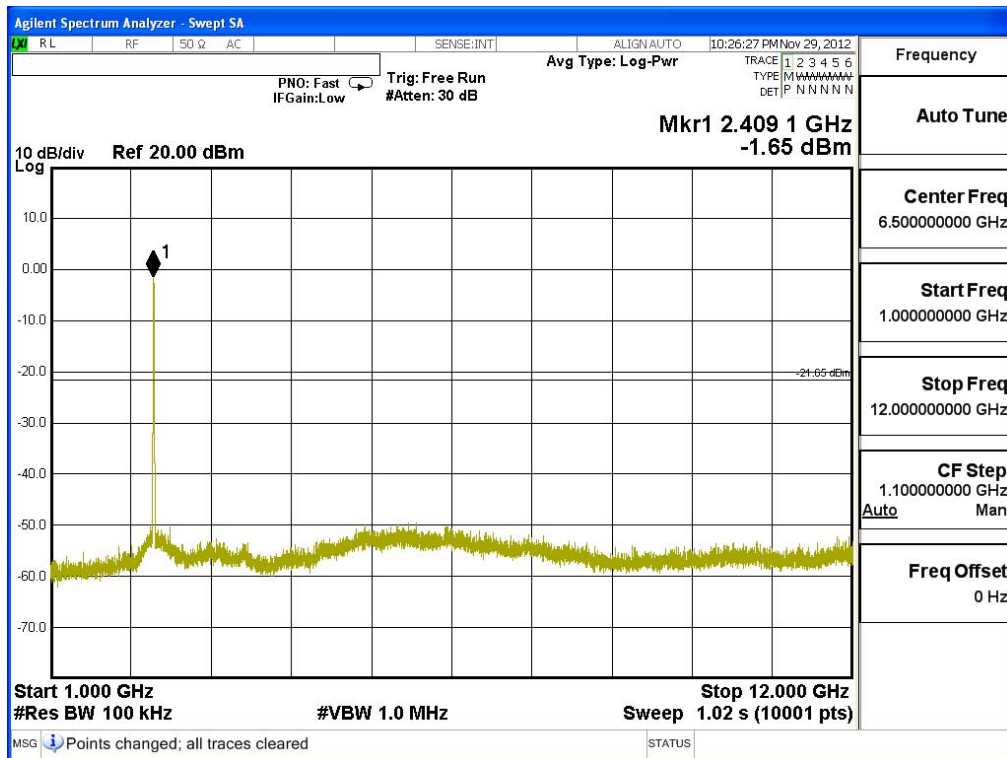




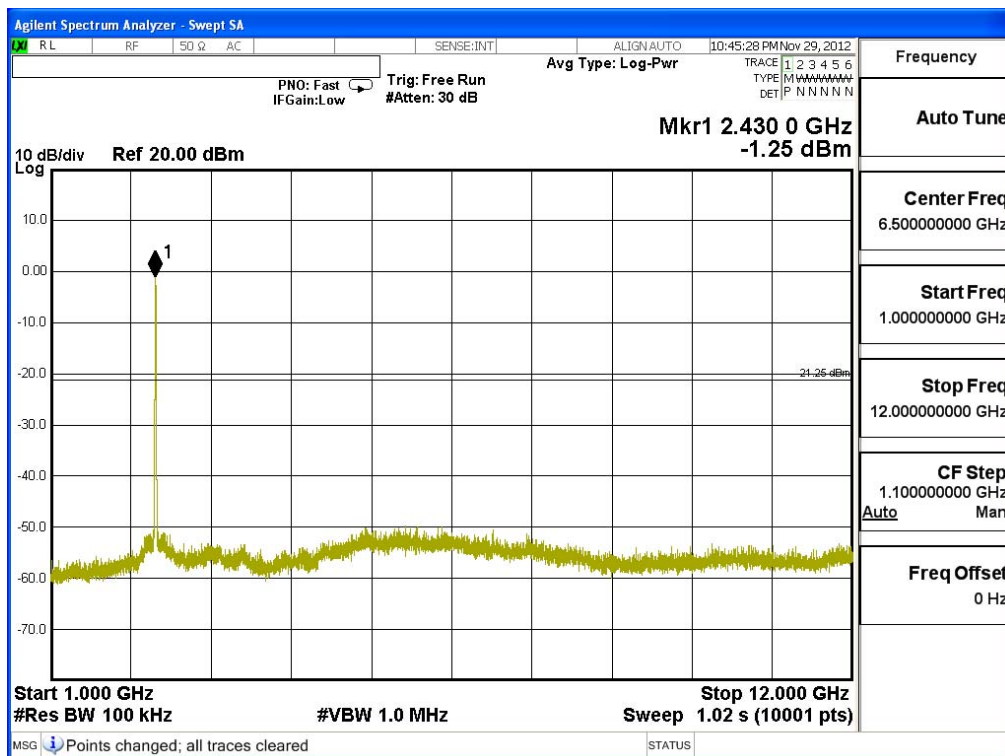
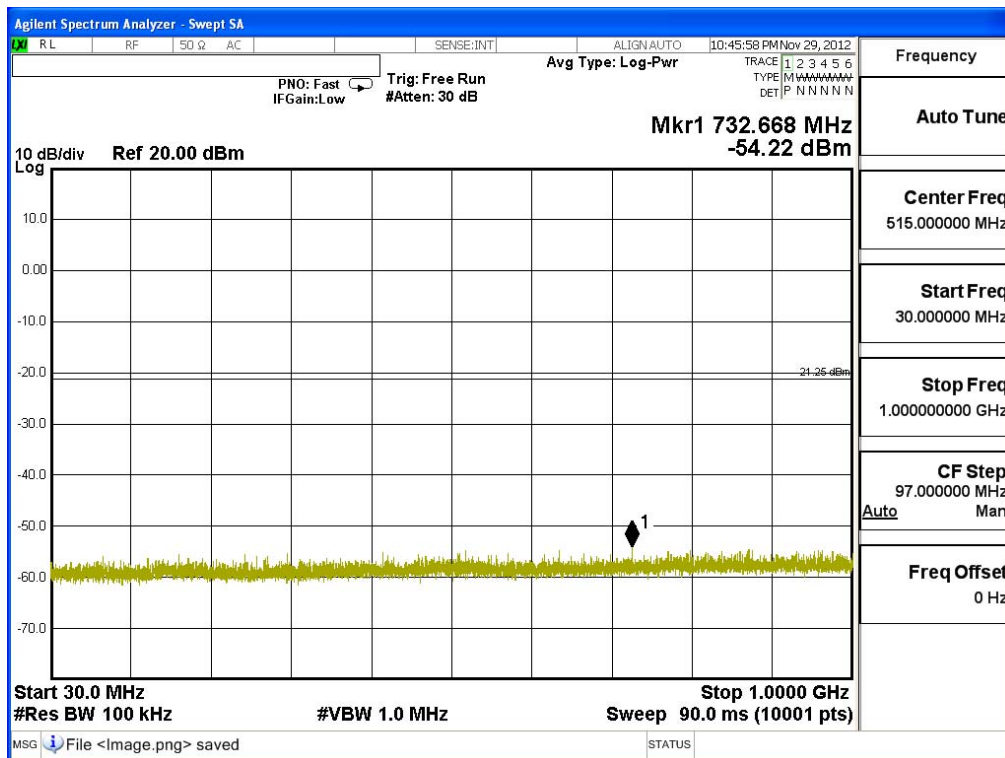
Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

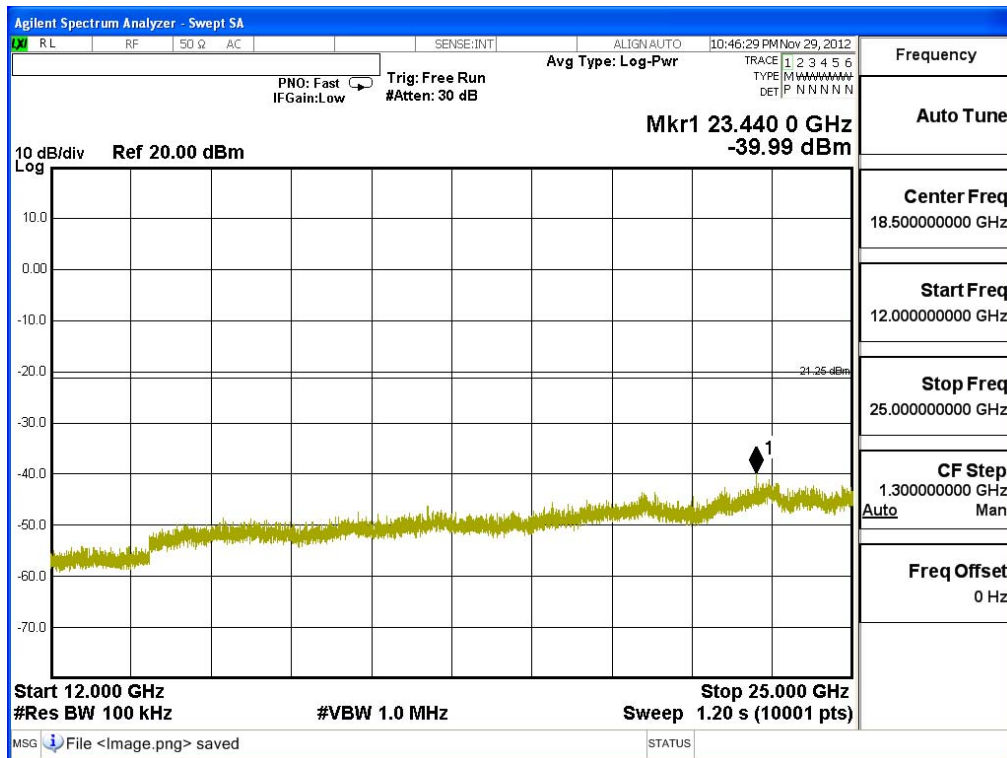
Channel 01 (2412MHz) 30MHz -25GHz



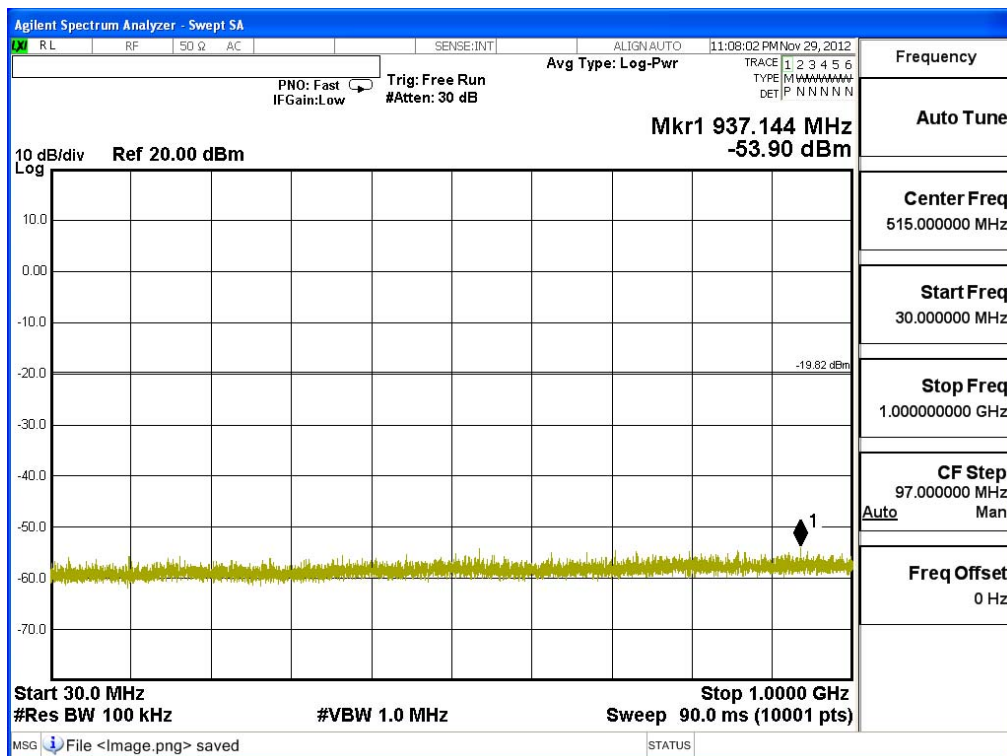


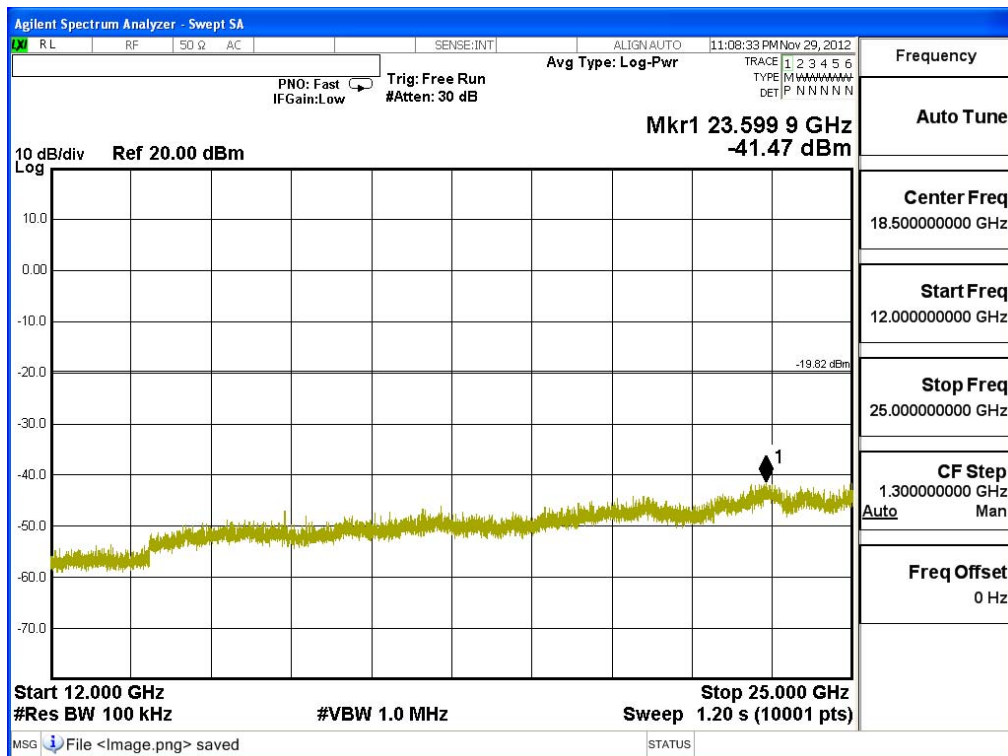
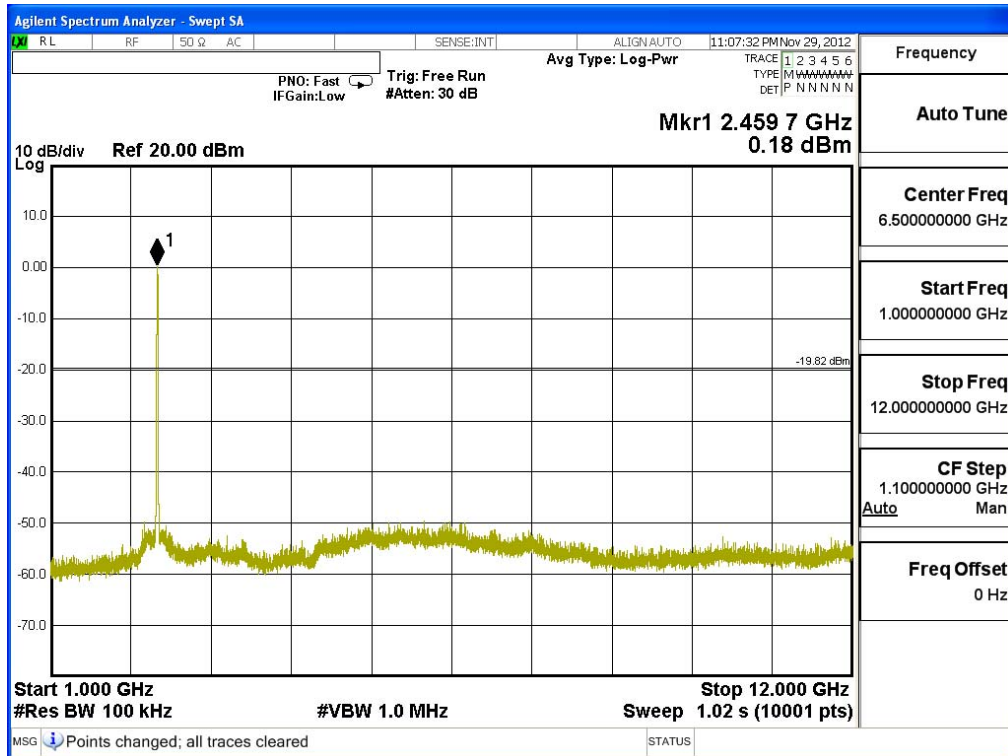
Channel 06 (2437MHz) 30MHz -25GHz





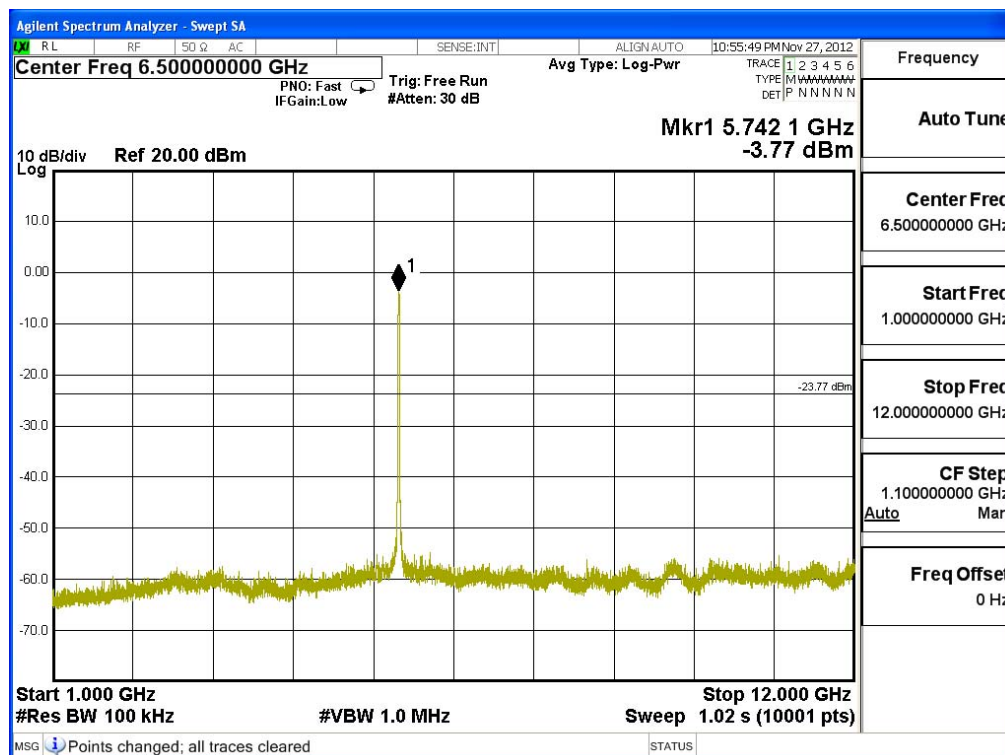
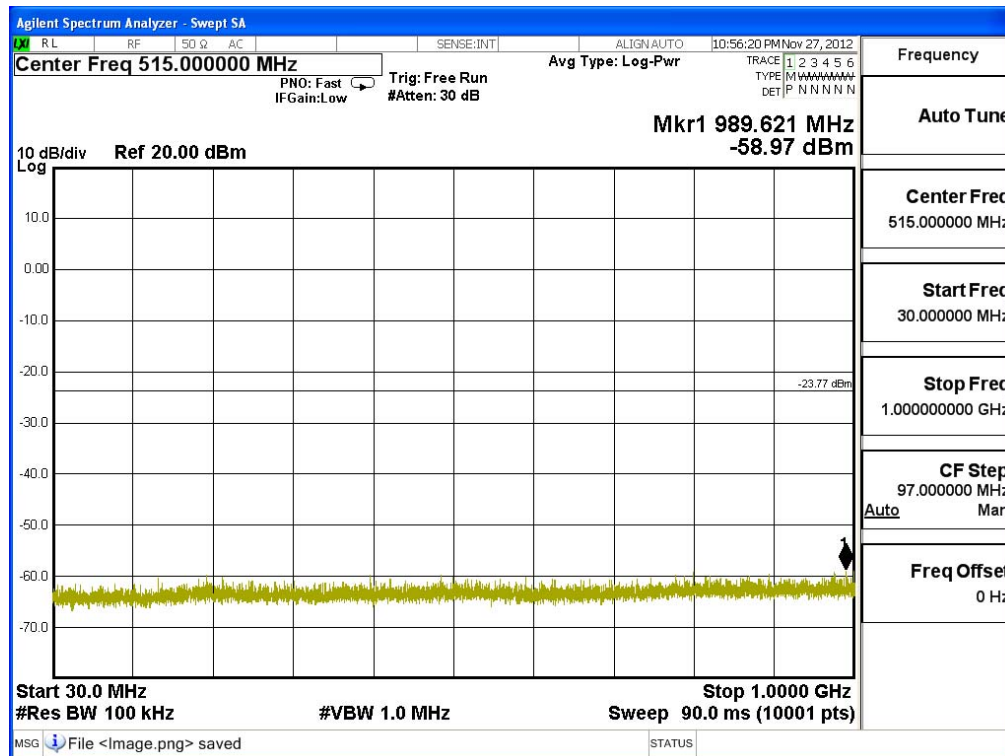
Channel 11 (2462MHz) 30MHz -25GHz

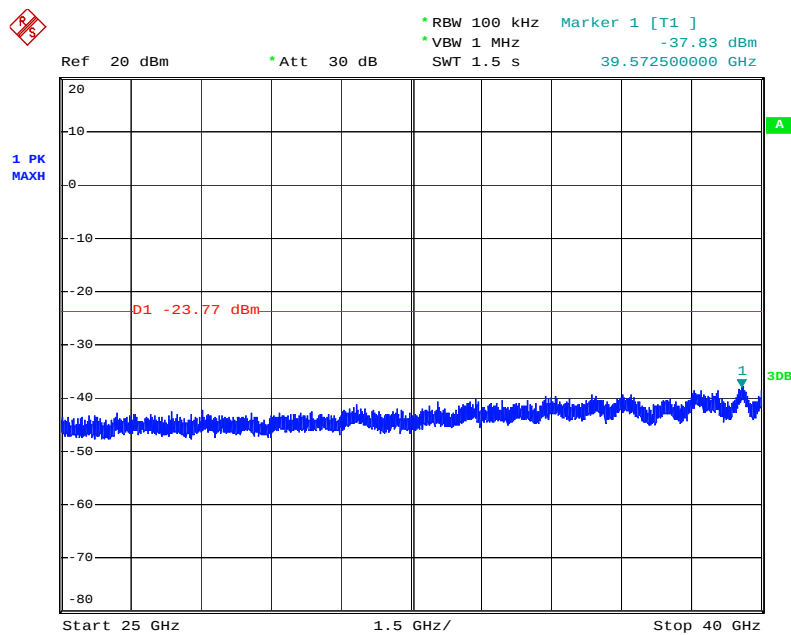
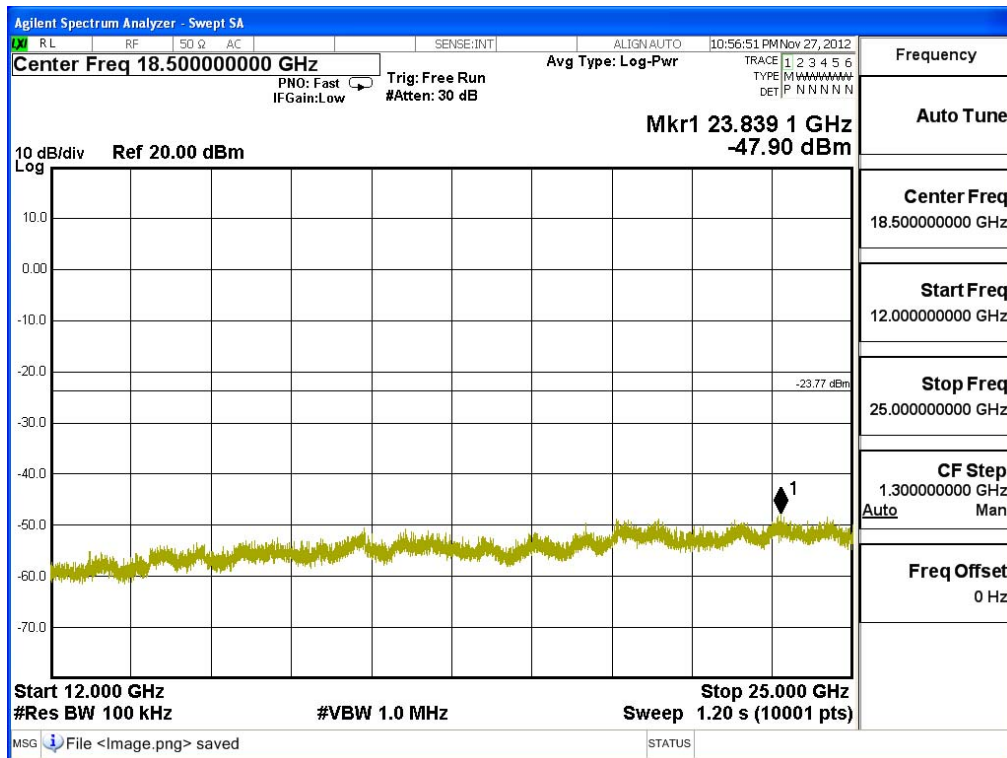




Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11a 6Mbps)

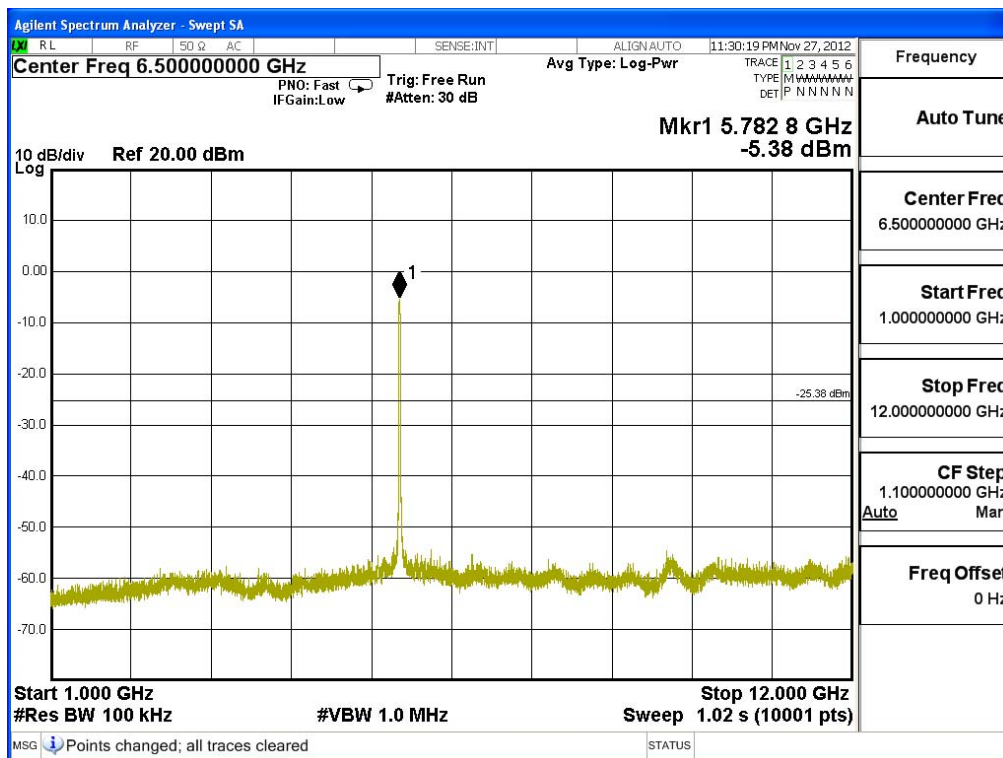
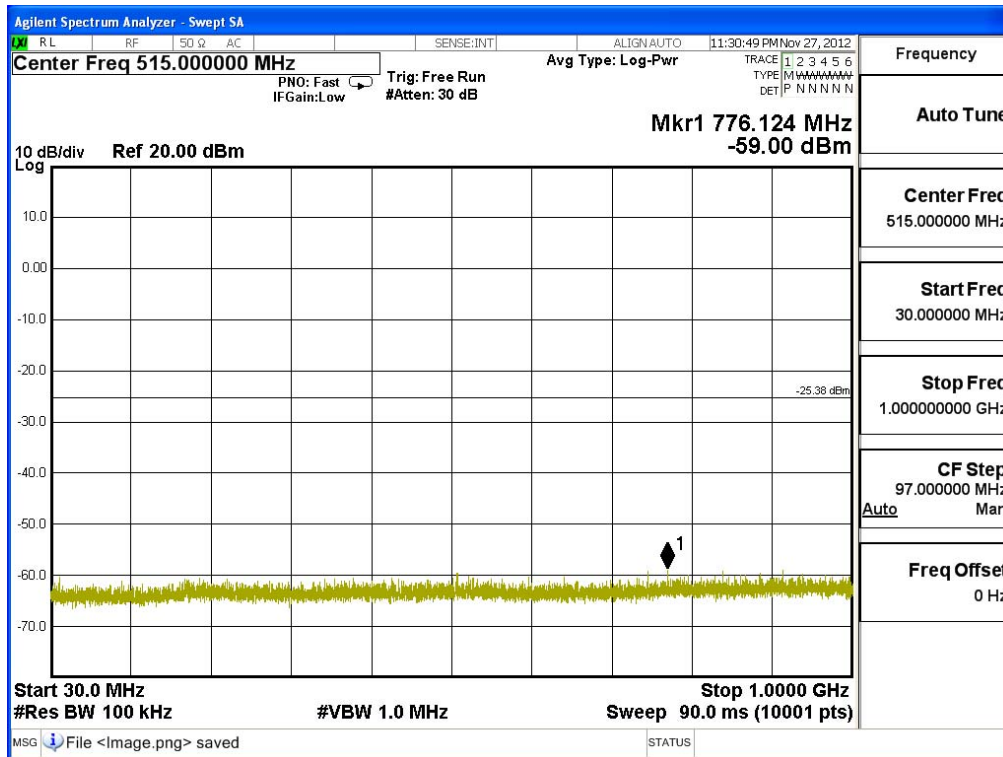
Channel 149 (5745MHz) 30MHz -40GHz

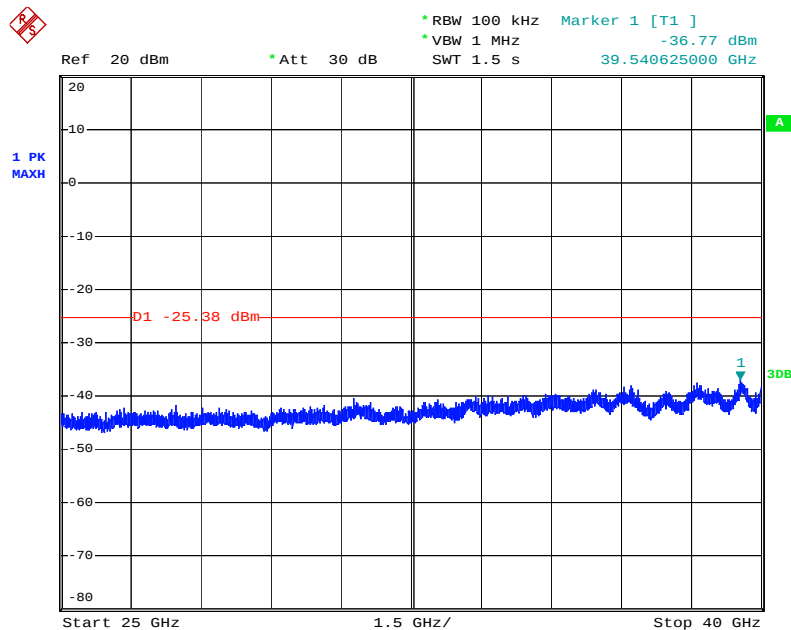
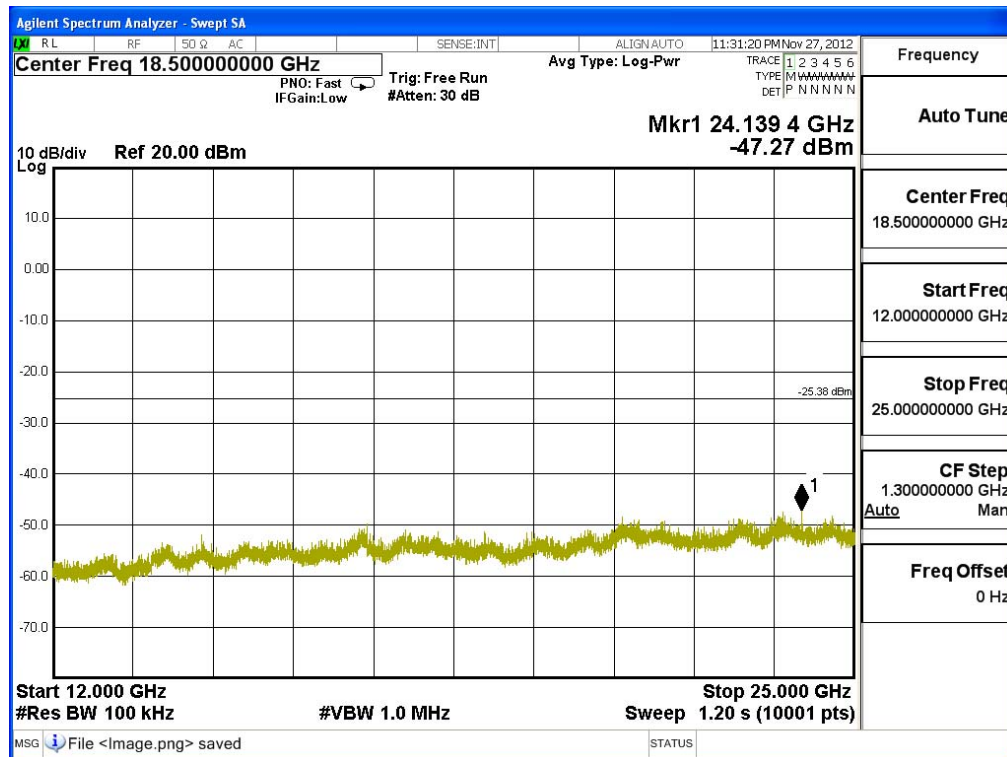




Date: 30.NOV.2012 16:26:47

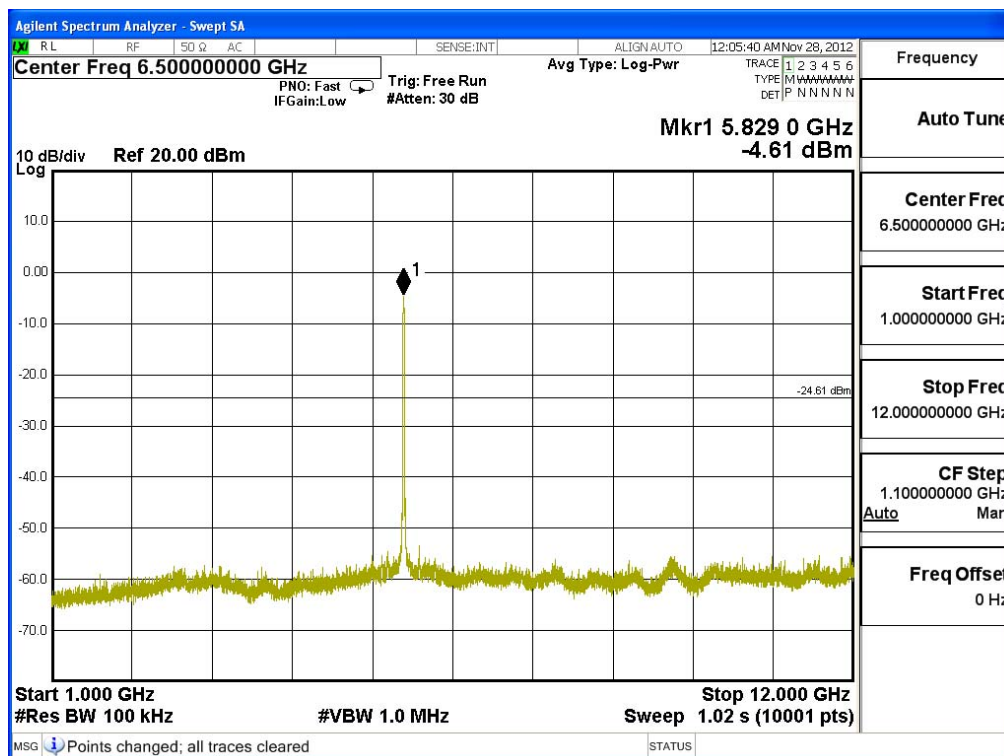
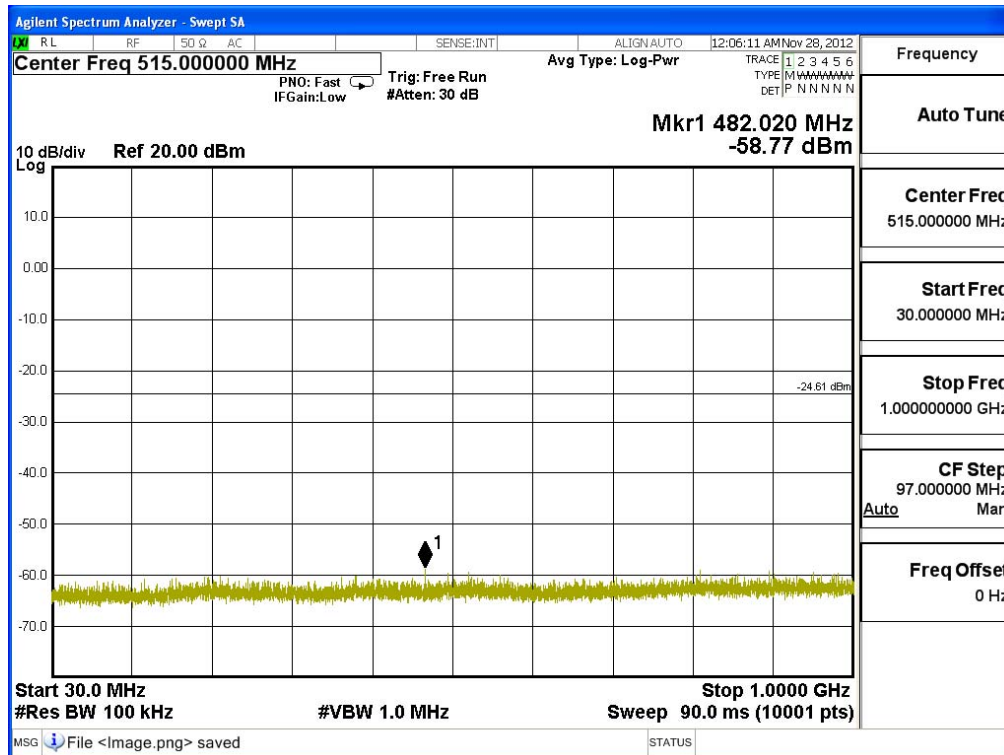
Channel 157 (5785MHz) 30MHz -40GHz

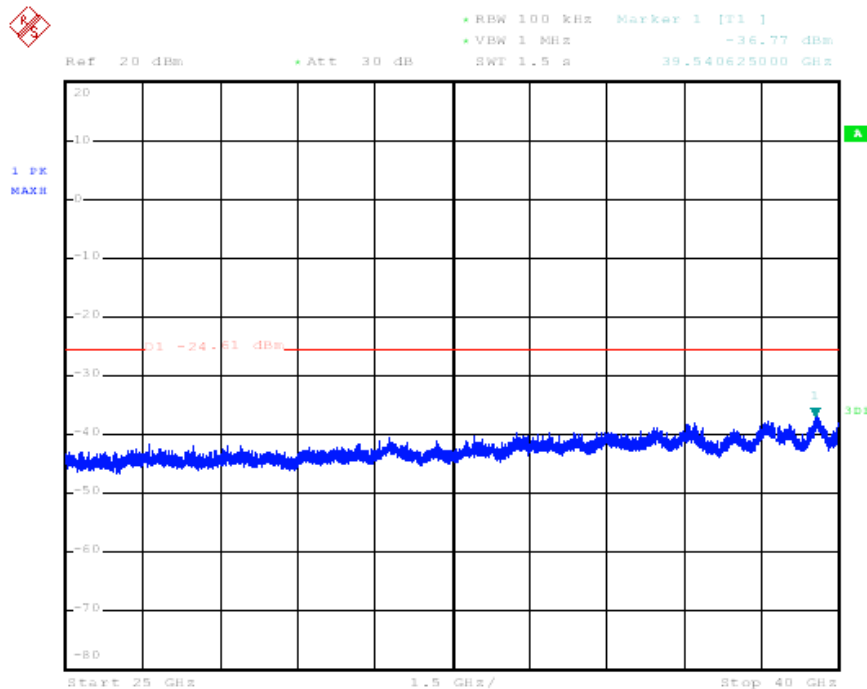
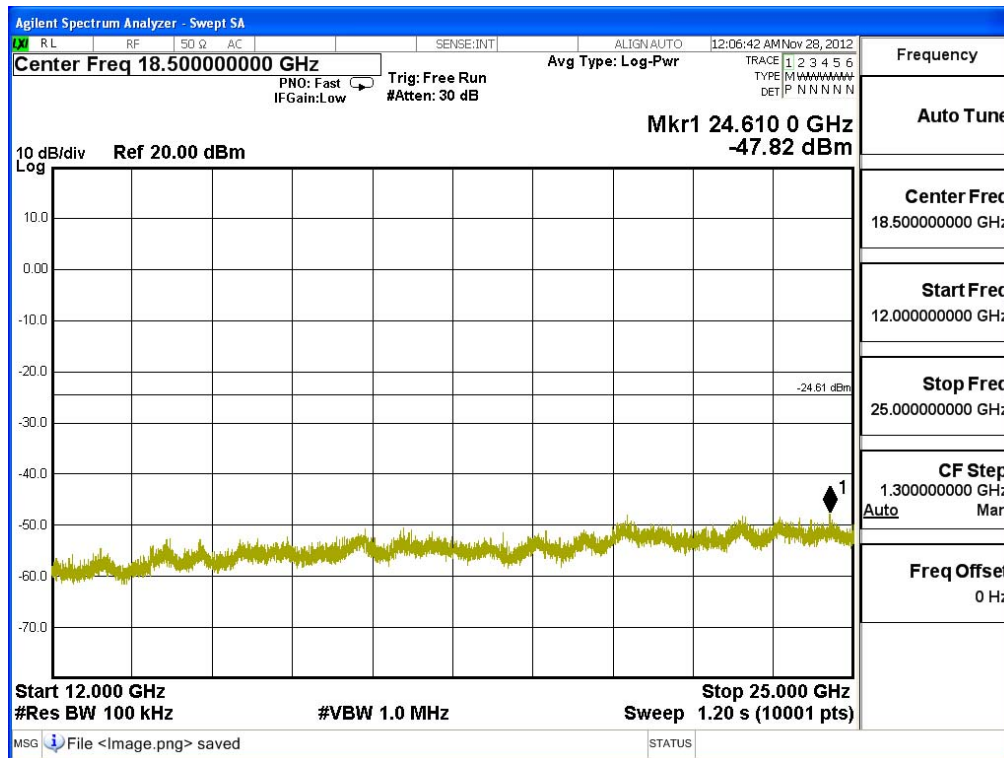




Date: 30.NOV.2012 16:28:55

Channel 165 (5825MHz) 30MHz -40GHz





Date: 30.NOV.2012 16:30:48

6. Band Edge

6.1. Test Equipment

RF Conducted Measurement

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

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2012
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2012
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2012

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.

RF Radiated Measurement:

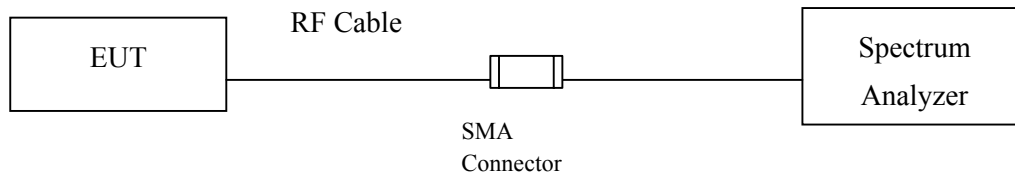
The following test equipments are used during the band edge tests:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 3		Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2012
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2012
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2012
		Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2012
	X	Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2012
		Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar, 2012
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2012
		Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2012
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2012
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

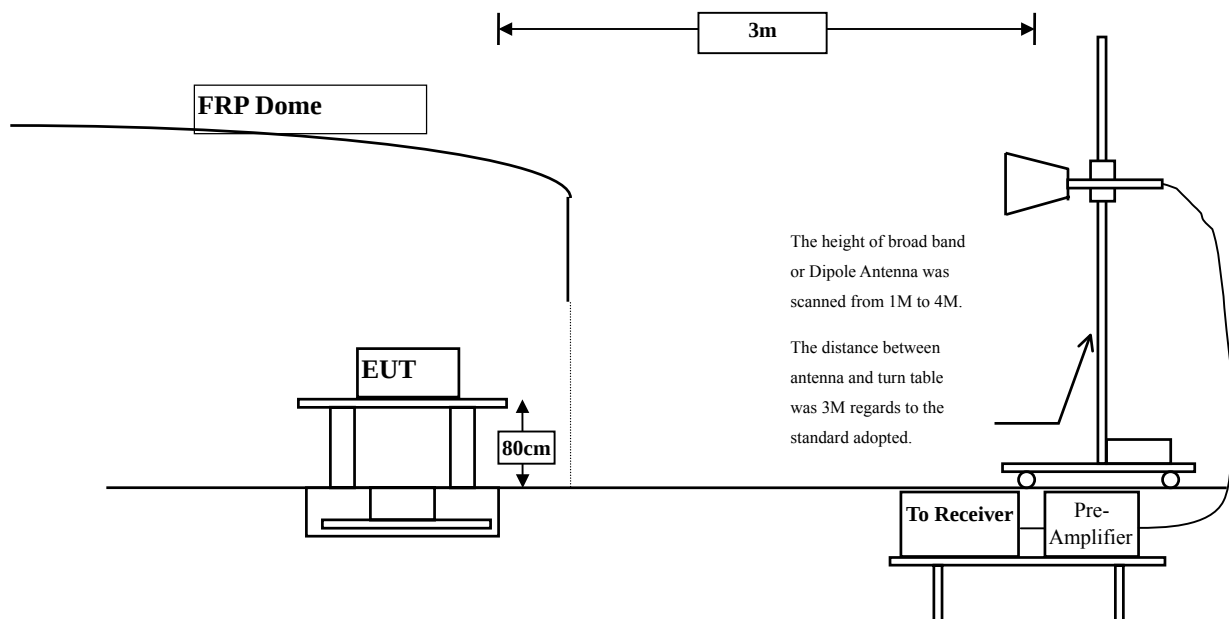
- Note:
1. All instruments are calibrated every one year.
 2. The test instruments marked by “X” are used to measure the final test results.

6.2. Test Setup

RF Conducted Measurement



RF Radiated Measurement:



6.3. 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.

6.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2009 and tested according to DTS test procedure of ANSI C63.10: 2009 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 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: 2009 on radiated measurement.

6.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

6.6. Test Result of Band Edge

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

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)	2390.000	31.509	22.971	54.480	74.000	54.000	Pass
01 (Peak)	2413.000	31.646	61.777	93.423	--	--	--
01 (Average)	2390.000	31.509	11.850	43.359	74.000	54.000	Pass
01 (Average)	2409.200	31.619	57.868	89.487	--	--	--

Figure Channel 01: Horizontal (Peak)

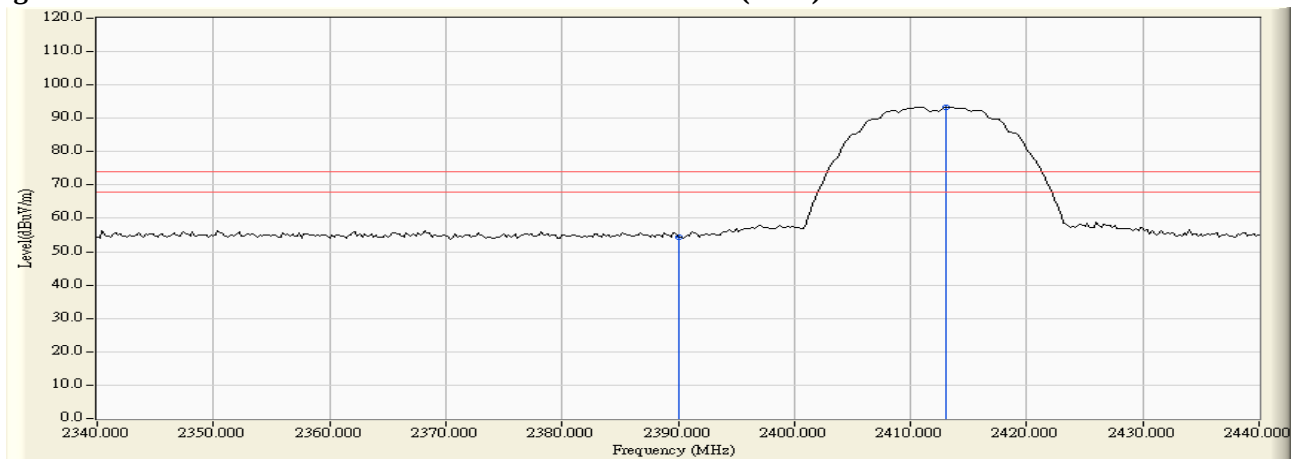
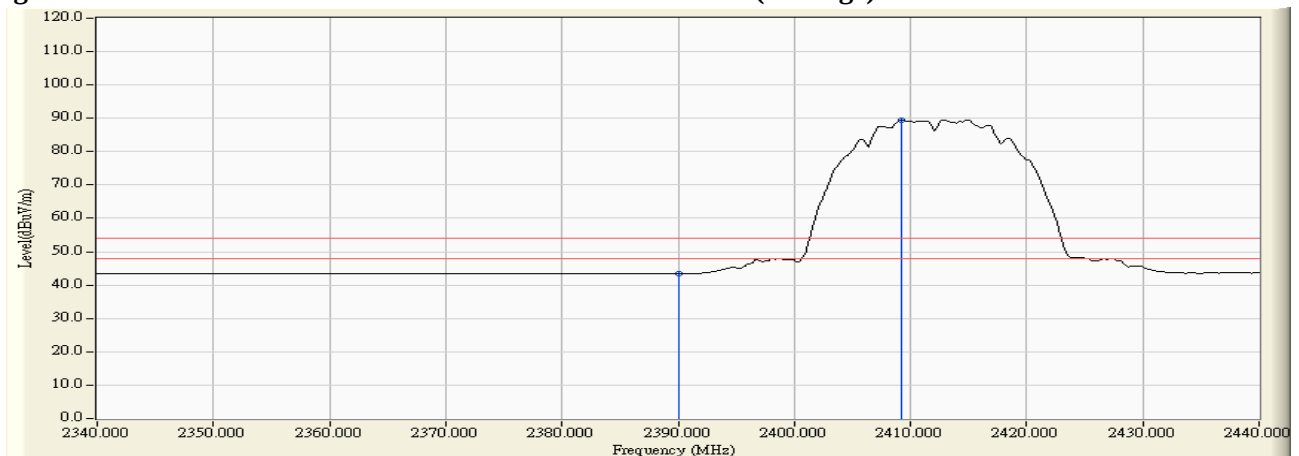


Figure Channel 01: Horizontal (Average)



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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

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)	2388.200	30.924	26.343	57.267	74.000	54.000	Pass
01 (Peak)	2390.000	30.915	24.667	55.582	74.000	54.000	Pass
01 (Peak)	2413.000	30.956	75.362	106.318	--	--	--
01 (Average)	2386.000	30.934	13.418	44.352	74.000	54.000	Pass
01 (Average)	2390.000	30.915	12.976	43.891	74.000	54.000	Pass
01 (Average)	2409.200	30.937	71.332	102.269	--	--	--

Figure Channel 01: Vertical (Peak)

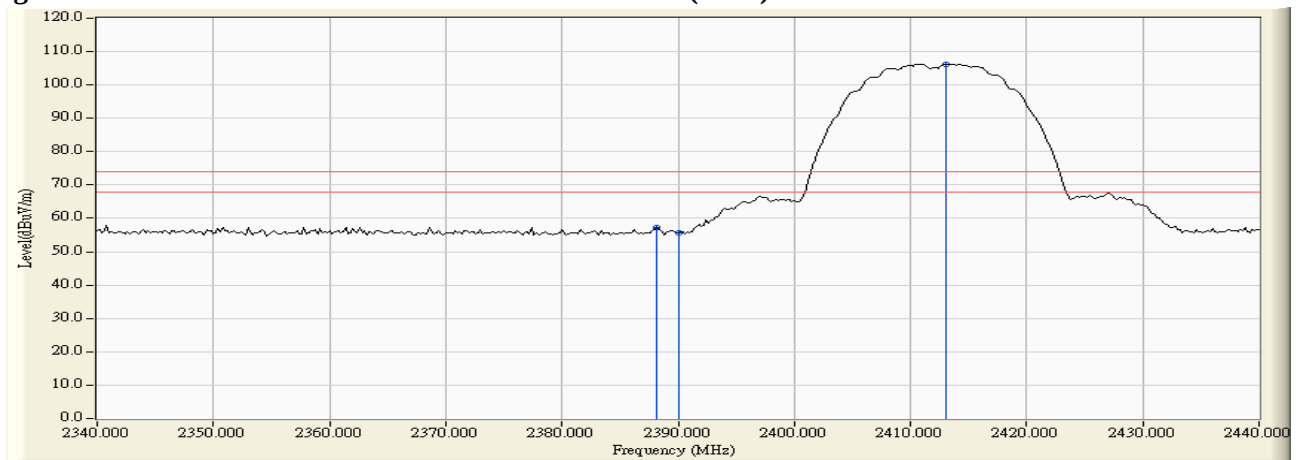
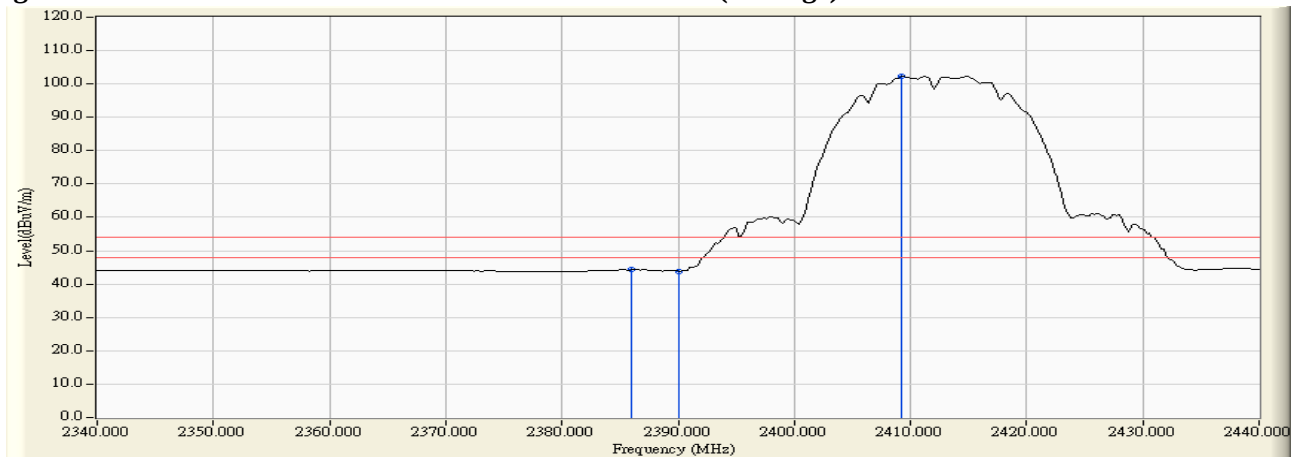


Figure Channel 01: Vertical (Average)



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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

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
11 (Peak)	2460.900	32.011	62.807	94.818	--	--	--
11 (Peak)	2483.500	32.182	23.597	55.779	74.000	54.000	Pass
11 (Average)	2461.100	32.013	58.996	91.009	--	--	--
11 (Average)	2483.500	32.182	11.849	44.031	74.000	54.000	Pass

Figure Channel 11:

Horizontal (Peak)

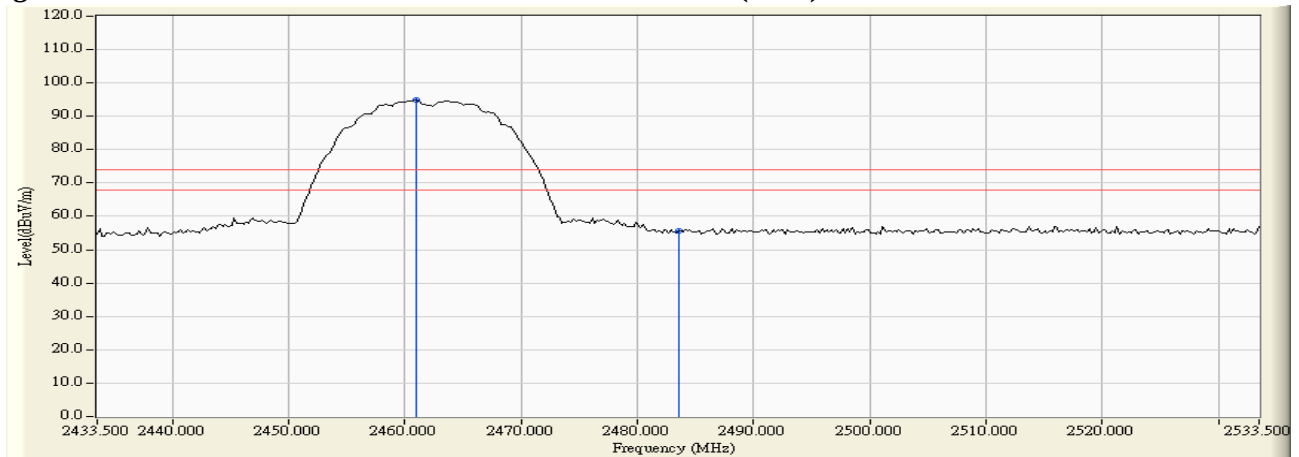
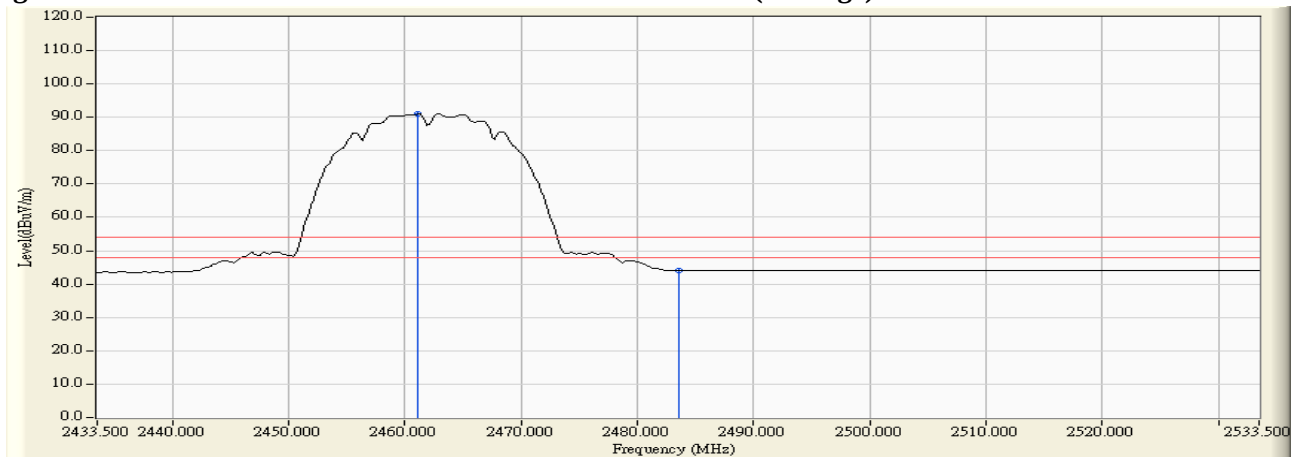


Figure Channel 11:

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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

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
11 (Peak)	2462.900	31.296	75.818	107.114	--	--	--
11 (Peak)	2483.500	31.435	25.330	56.765	74.000	54.000	Pass
11 (Peak)	2486.900	31.459	27.040	58.498	74.000	54.000	Pass
11 (Average)	2461.100	31.285	72.022	103.306	--	--	--
11 (Average)	2483.500	31.435	13.506	44.941	74.000	54.000	Pass

Figure Channel 11: Vertical (Peak)

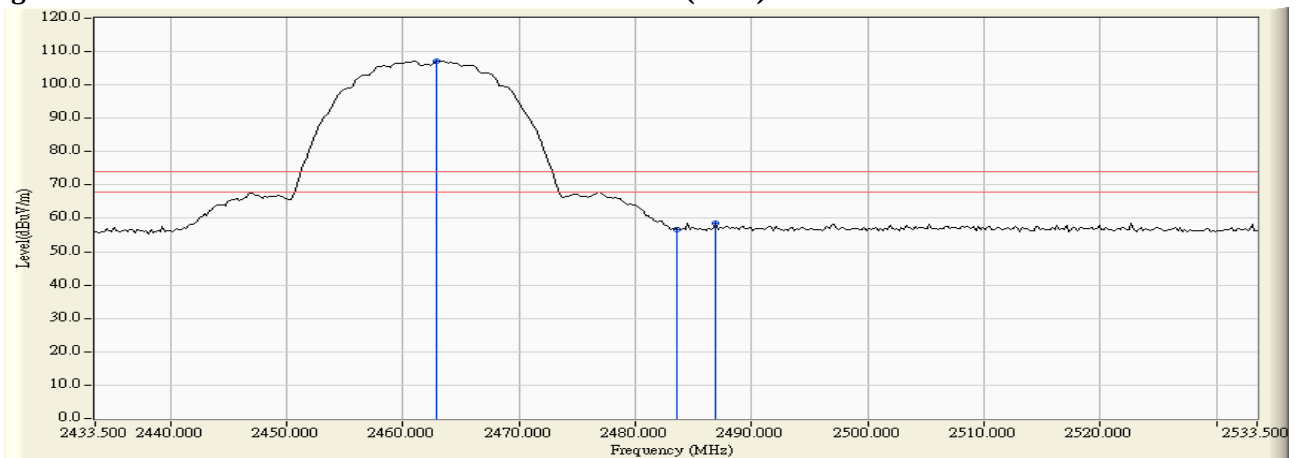
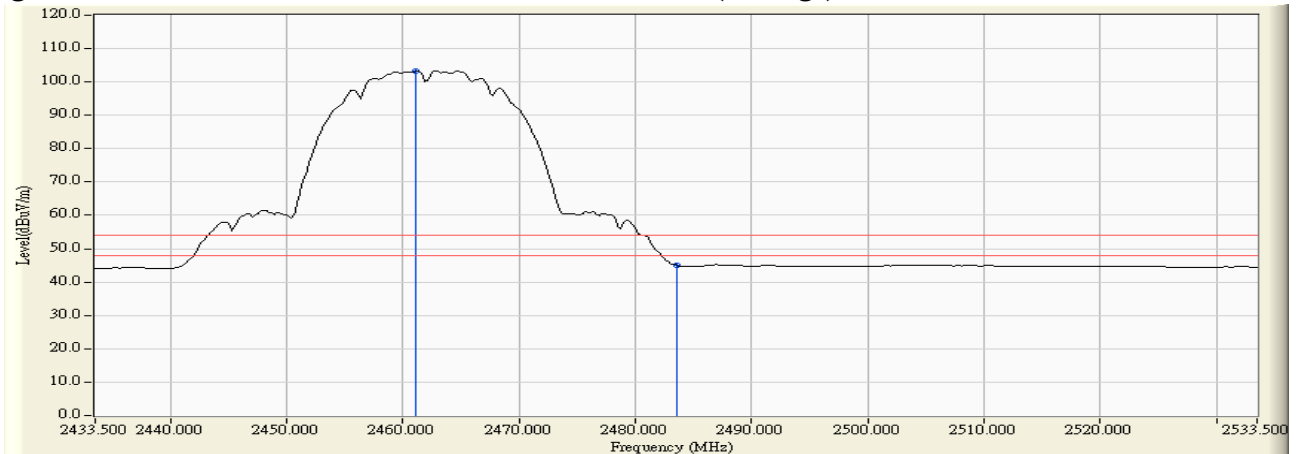


Figure Channel 11: Vertical (Average)



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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

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)	2371.800	31.438	25.781	57.219	74.000	54.000	Pass
01 (Peak)	2390.000	31.509	24.264	55.773	74.000	54.000	Pass
01 (Peak)	2415.000	31.661	64.154	95.815	--	--	--
01 (Average)	2390.000	31.509	12.070	43.579	74.000	54.000	Pass
01 (Average)	2416.200	31.671	52.668	84.338	--	--	--

Figure Channel 01: Horizontal (Peak)

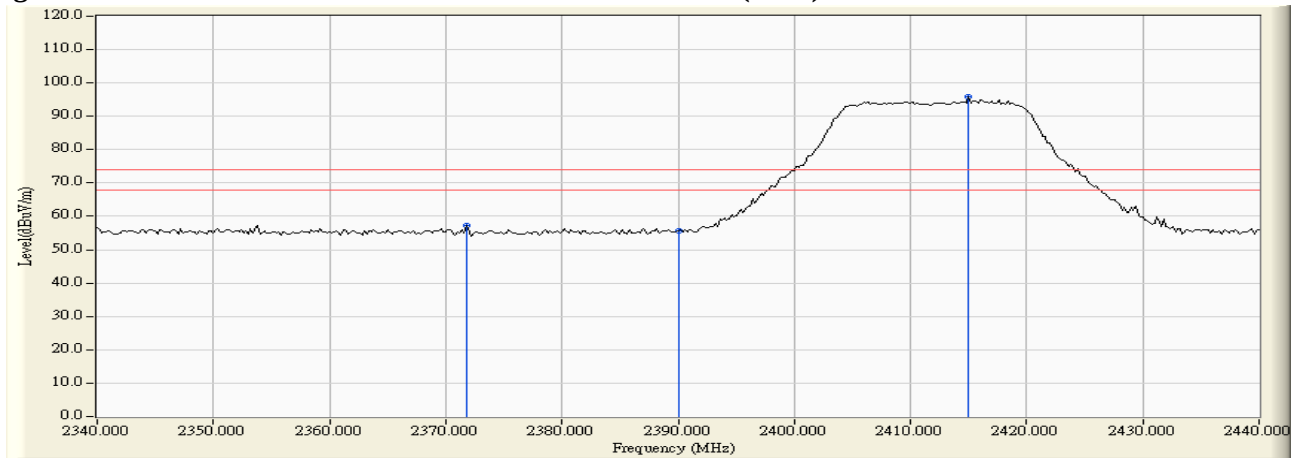
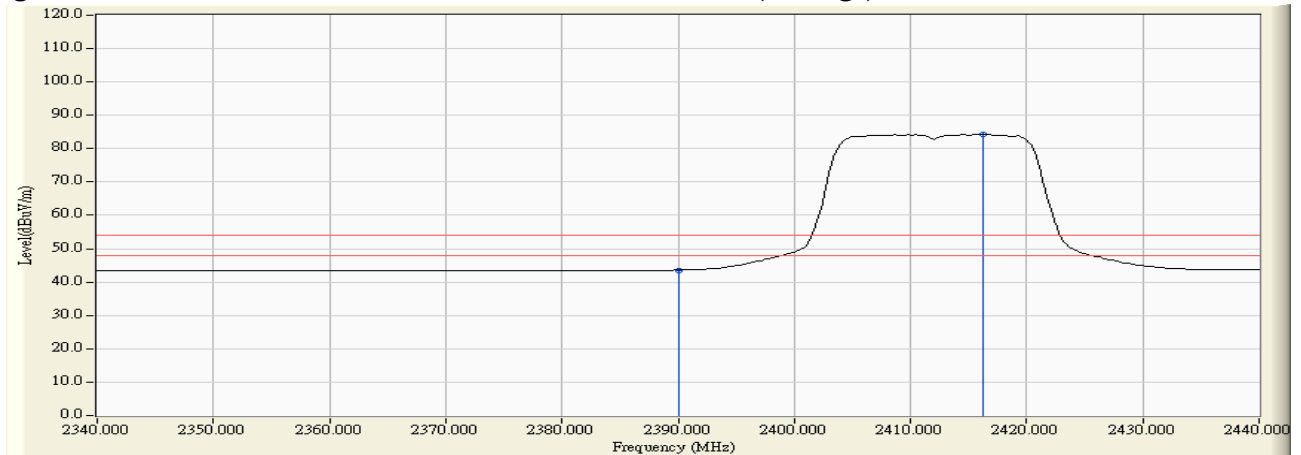


Figure Channel 01: Horizontal (Average)



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 etection.

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

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)	2390.000	30.915	33.248	64.163	74.000	54.000	Pass
01 (Peak)	2414.800	30.968	75.659	106.627	--	--	--
01 (Average)	2390.000	30.915	15.552	46.467	74.000	54.000	Pass
01 (Average)	2407.400	30.932	64.283	95.215	--	--	--

Figure Channel 01:

Vertical (Peak)

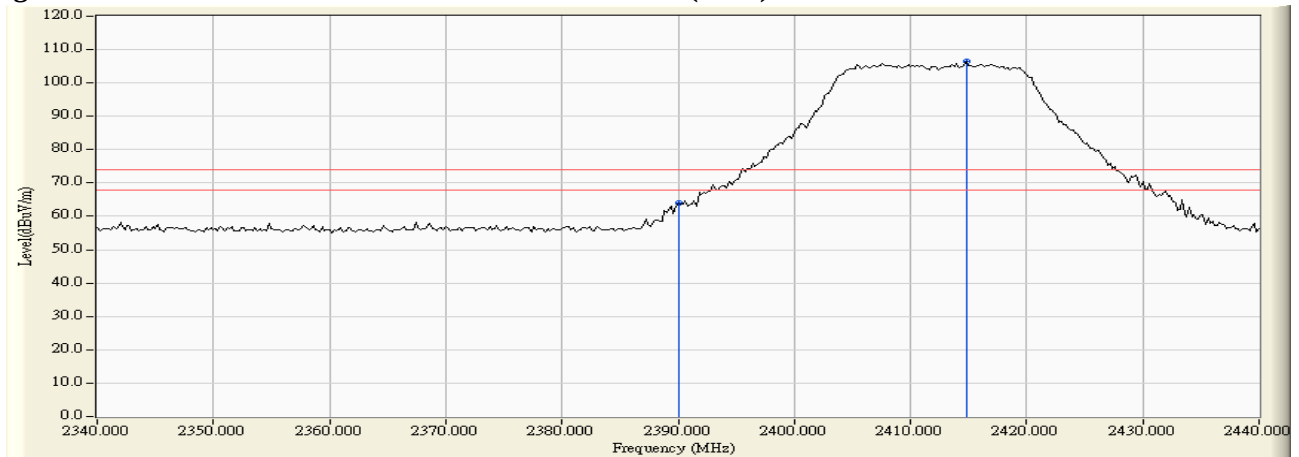
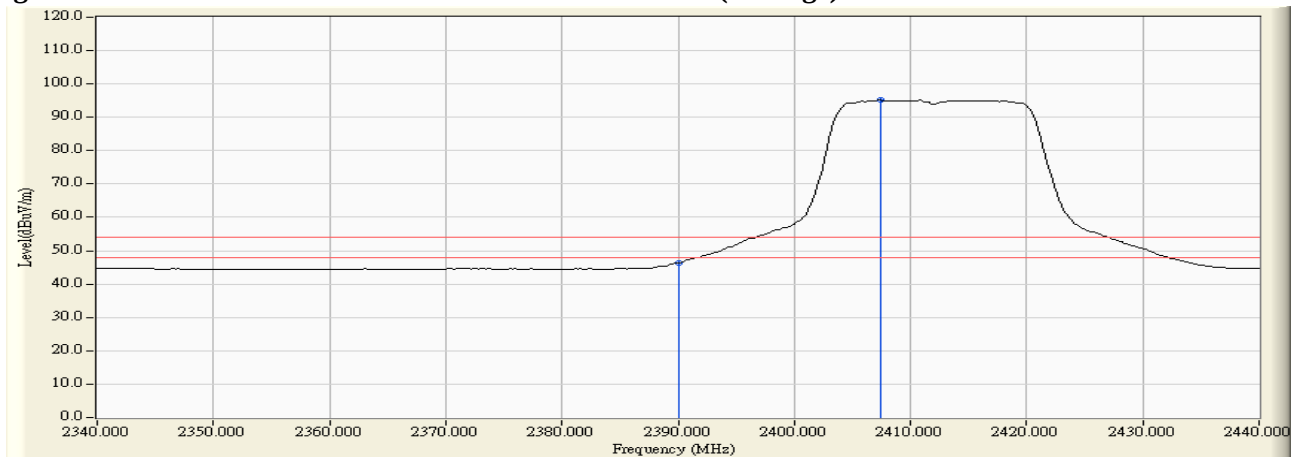


Figure Channel 01:

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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

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
11 (Peak)	2464.900	32.042	65.408	97.449	--	--	--
11 (Peak)	2483.500	32.182	25.361	57.543	74.000	54.000	Pass
11 (Average)	2468.300	32.067	54.282	86.349	--	--	--
11 (Average)	2483.500	32.182	12.570	44.752	74.000	54.000	Pass

Figure Channel 11: Horizontal (Peak)

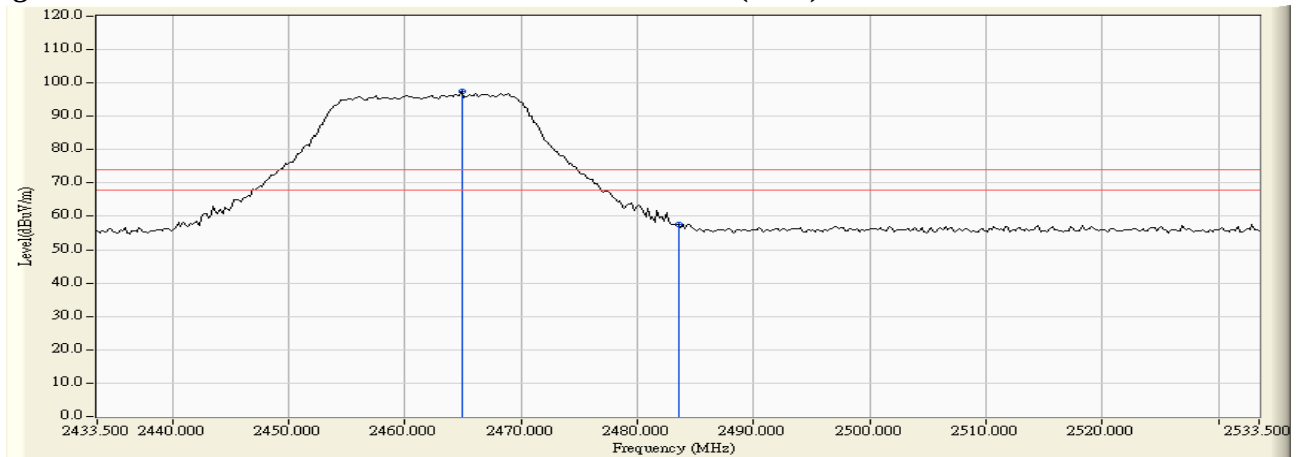
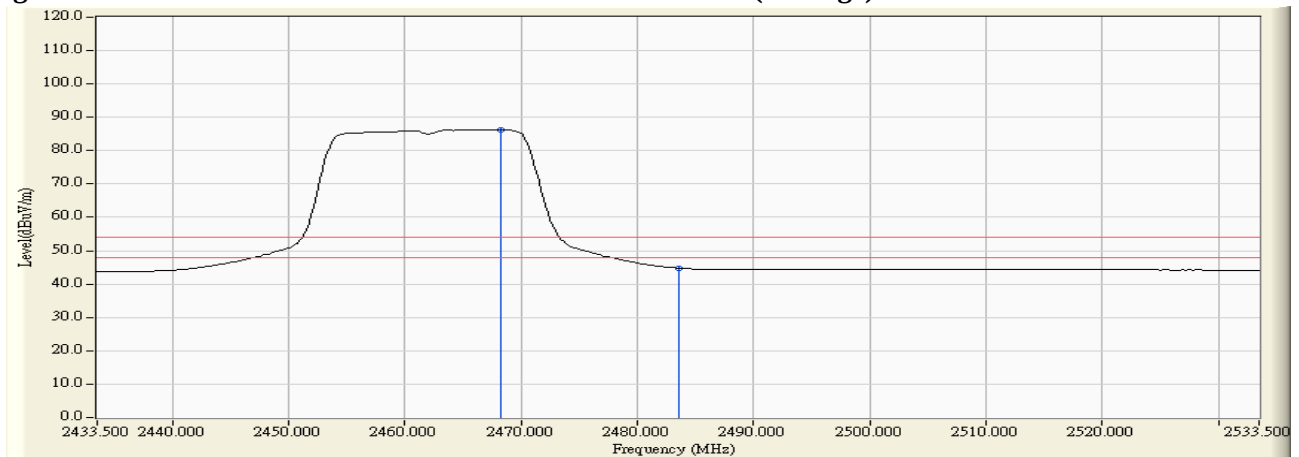


Figure Channel 11: Horizontal (Average)



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 etection.

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

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
11 (Peak)	2464.900	31.310	77.194	108.504	--	--	--
11 (Peak)	2483.500	31.435	34.353	65.788	74.000	54.000	Pass
11 (Average)	2463.900	31.303	65.956	97.259	--	--	--
11 (Average)	2483.500	31.435	17.252	48.687	74.000	54.000	Pass

Figure Channel 11: Vertical (Peak)

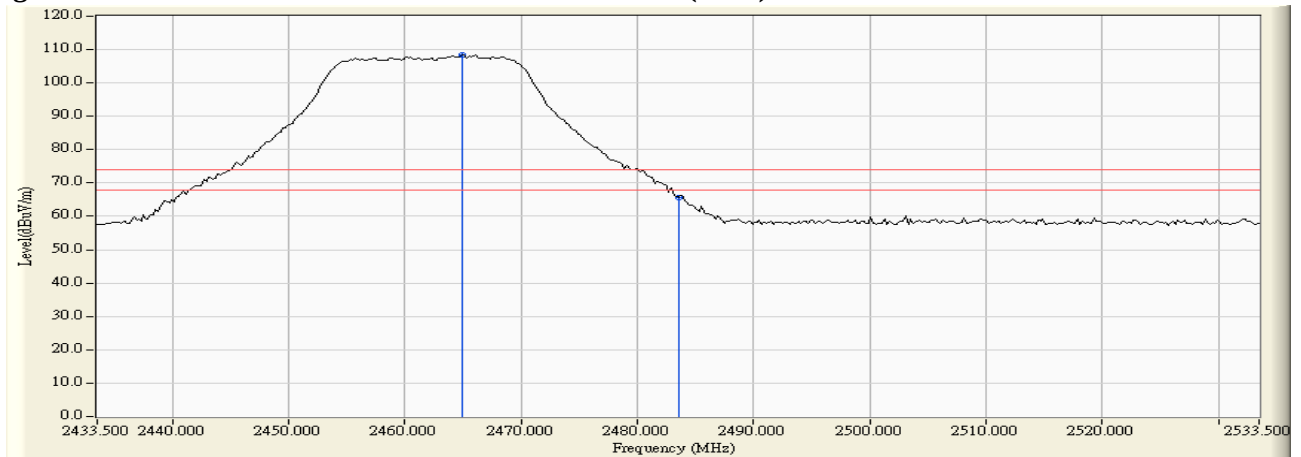
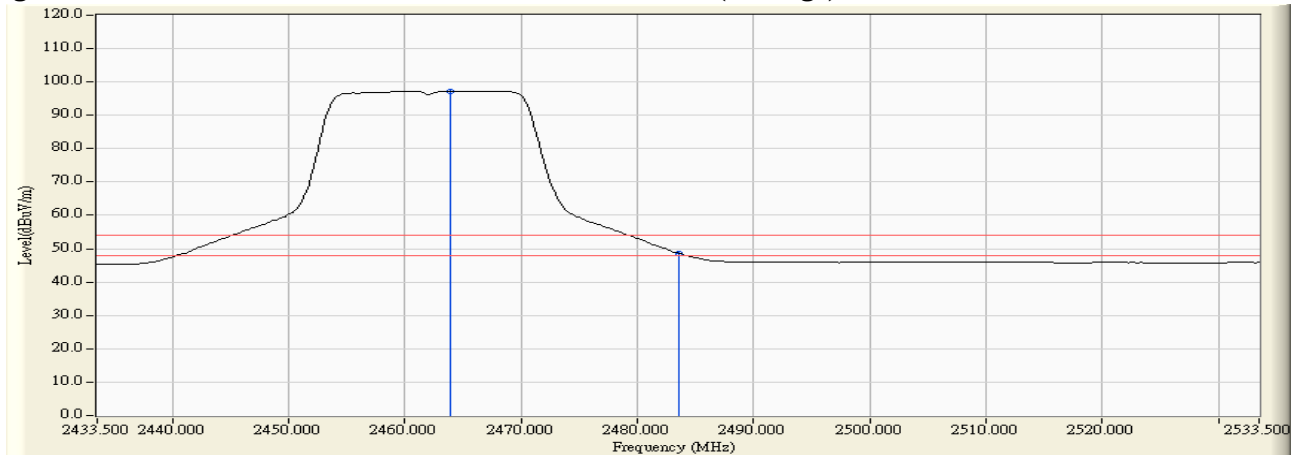


Figure Channel 11: Vertical (Average)

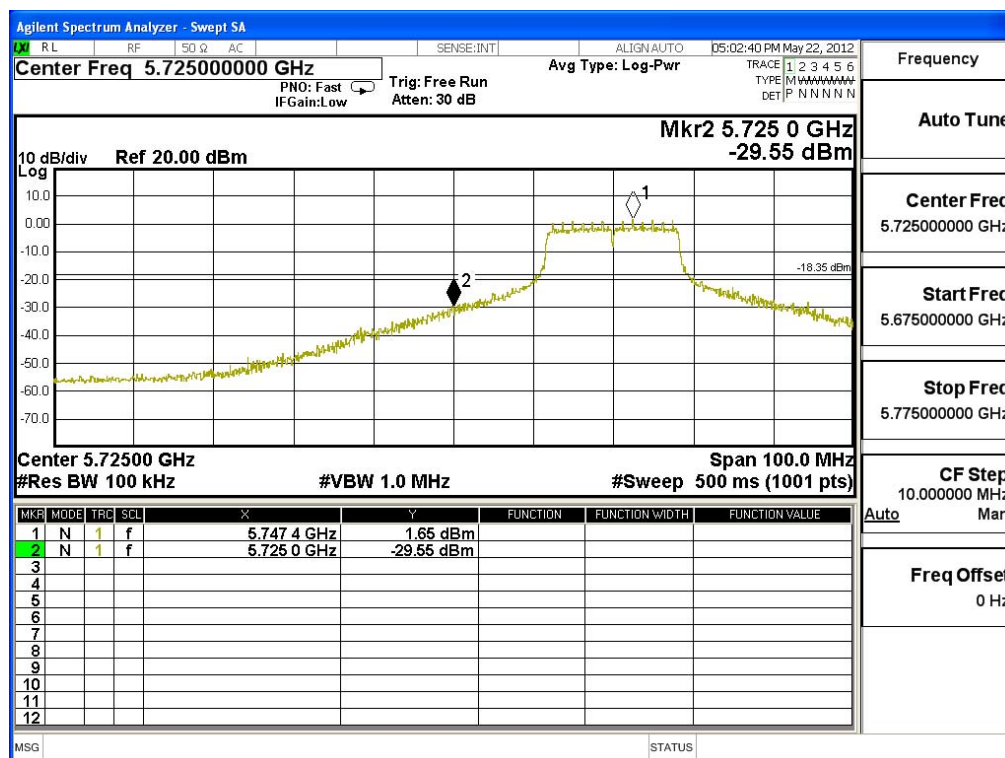


Note:

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 : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11a 6Mbps)

Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5745	31.20	>20	PASS



Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11a 6Mbps)

Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5825	33.23	>20	PASS

