



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
Issued Date	Jan. 21, 2013
Report No.	12B363R-RFUSP45V01
Report Version	V1.0



The test results relate only to the samples tested.

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This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Issued Date: Jan. 21, 2013

Report No.: 12B363R-RFUSP45V01



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
FCC ID.	SLE-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 E: 2012 ANSI C63.4: 2003, ANSI C63.10: 2009, FCC KDB-789033
Test Result	Complied

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(Engineer / Alan Chen)

Approved By : Vincent Lin
(Manager / Vincent Lin)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	MOXA IEEE802.11 a/b/g mini PCI module
Trade Name	MOXA
FCC ID.	SLE-WAPA004
Model No.	WAPA004
Frequency Range	802.11a: 5180-5320MHz, 5500-5700MHz
Number of Channels	802.11a: 16
Data Rate	802.11a: 6 - 54Mbps
Channel Control	Auto
Type of Modulation	802.11a:OFDM, BPSK, QPSK, 16QAM, 64QAM
Antenna type	Dipole
Antenna Gain	Refer to the table "Antenna List"

Antenna List

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

802.11a Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 36:	5180 MHz	Channel 40:	5200 MHz	Channel 44:	5220 MHz	Channel 48:	5240 MHz
Channel 52:	5260 MHz	Channel 56:	5280 MHz	Channel 60:	5300 MHz	Channel 64:	5320 MHz
Channel 100:	5500 MHz	Channel 104:	5520 MHz	Channel 108:	5540 MHz	Channel 112:	5560 MHz
Channel 116:	5580 MHz	Channel 132:	5660 MHz	Channel 136:	5680 MHz	Channel 140:	5700 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, this report for 5GHz.
2. At result of pretests, module supports dual-channel transmission, only the worst case is shown in the report. (802.11a is chain A)
3. The device is applied for modular approval.
4. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11a is 6Mbps)
5. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.

Test Mode	Mode 1: Transmitter (802.11a-6Mbps) Mode 2: Transmitter Turbo Mode (5GHz Band)
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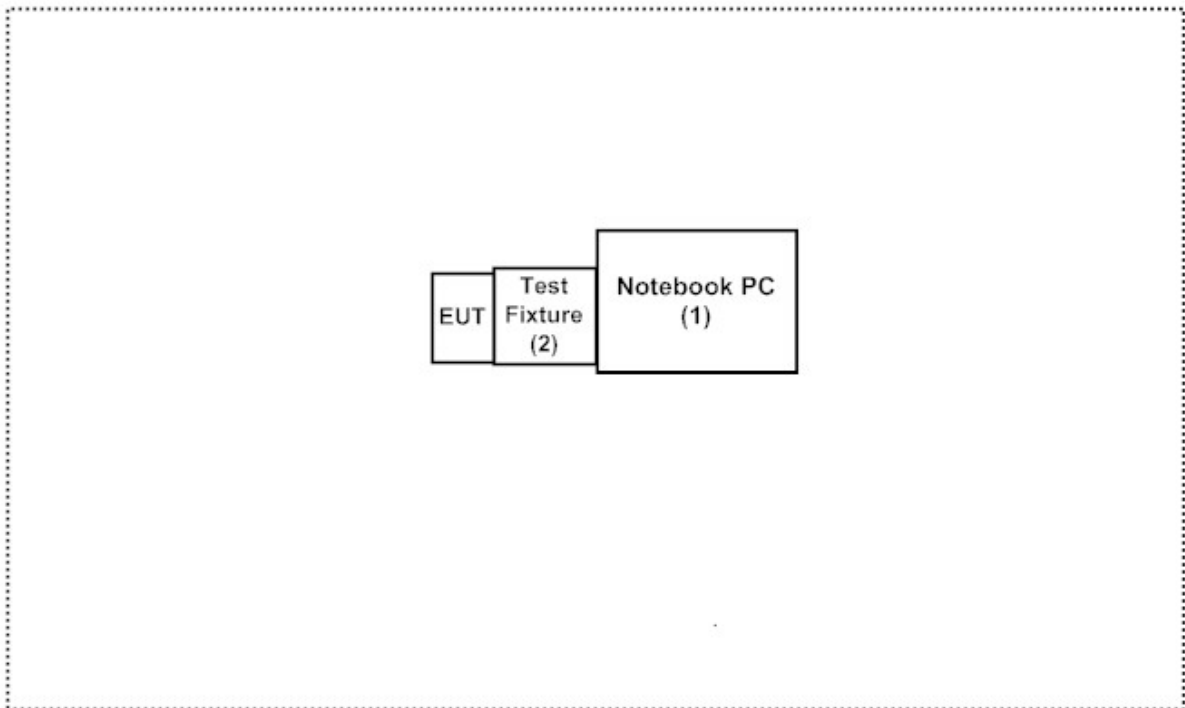
1.3. Tested System Details

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

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Notebook PC	DELL	PPT	N/A	Non-Shielded, 0.8m
2 Test Fixture	MOXA	N/A	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://tw.quietek.com/modules/myalbum/>

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

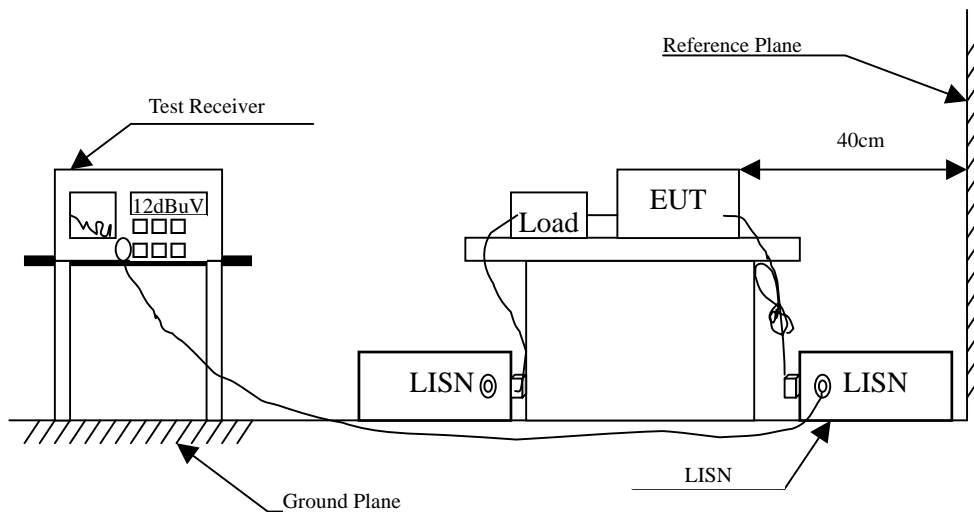
2.1. Test Equipment

	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	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks : In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10, 2009 on conducted measurement.

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

The EUT was setup to ANSI C63.10, 2009; tested to DTS test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

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 1: Transmitter (802.11a-6Mbps) (5220MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit 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 1: Transmitter (802.11a-6Mbps) (5220MHz)

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5300MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
0.154	9.717	41.830	51.547	-14.339	65.886
0.170	9.707	39.490	49.197	-16.232	65.429
0.177	9.702	38.550	48.252	-16.977	65.229
0.193	9.691	37.090	46.781	-17.990	64.771
0.212	9.678	34.400	44.078	-20.151	64.229
0.435	9.640	25.970	35.610	-22.247	57.857
Average					
0.154	9.717	36.200	45.917	-9.969	55.886
0.170	9.707	24.560	34.267	-21.162	55.429
0.177	9.702	22.910	32.612	-22.617	55.229
0.193	9.691	23.300	32.991	-21.780	54.771
0.212	9.678	18.620	28.298	-25.931	54.229
0.435	9.640	17.300	26.940	-20.917	47.857

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 1: Transmitter (802.11a-6Mbps) (5300MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 2					
Quasi-Peak					
0.154	9.727	38.170	47.897	-17.989	65.886
0.162	9.721	35.950	45.672	-19.985	65.657
0.279	9.647	31.340	40.987	-21.327	62.314
0.302	9.647	29.540	39.187	-22.470	61.657
0.400	9.650	22.560	32.210	-26.647	58.857
0.537	9.650	22.830	32.480	-23.520	56.000
Average					
0.154	9.727	23.600	33.327	-22.559	55.886
0.162	9.721	12.720	22.442	-33.215	55.657
0.279	9.647	29.750	39.397	-12.917	52.314
0.302	9.647	29.530	39.177	-12.480	51.657
0.400	9.650	10.480	20.130	-28.727	48.857
0.537	9.650	7.520	17.170	-28.830	46.000

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 1
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5580MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
0.158	9.715	39.940	49.655	-16.116	65.771
0.173	9.704	37.530	47.234	-18.109	65.343
0.220	9.673	34.680	44.353	-19.647	64.000
0.259	9.653	32.180	41.833	-21.053	62.886
0.275	9.648	31.080	40.728	-21.701	62.429
0.345	9.640	24.990	34.630	-25.799	60.429
Average					
0.158	9.715	15.980	25.695	-30.076	55.771
0.173	9.704	12.290	21.994	-33.349	55.343
0.220	9.673	21.710	31.383	-22.617	54.000
0.259	9.653	16.860	26.513	-26.373	52.886
0.275	9.648	28.430	38.078	-14.351	52.429
0.345	9.640	12.300	21.940	-28.489	50.429

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 1: Transmitter (802.11a-6Mbps) (5580MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 2					
Quasi-Peak					
0.166	9.718	35.630	45.348	-20.195	65.543
0.177	9.706	30.690	40.396	-24.833	65.229
0.252	9.656	25.480	35.136	-27.950	63.086
0.271	9.649	29.760	39.409	-23.134	62.543
0.302	9.647	29.460	39.107	-22.550	61.657
0.427	9.650	23.420	33.070	-25.016	58.086
Average					
0.166	9.718	19.140	28.858	-26.685	55.543
0.177	9.706	8.450	18.156	-37.073	55.229
0.252	9.656	10.800	20.456	-32.630	53.086
0.271	9.649	27.880	37.529	-15.014	52.543
0.302	9.647	28.570	38.217	-13.440	51.657
0.427	9.650	12.870	22.520	-25.566	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

3. Peak Transmit Power

3.1. Test Equipment

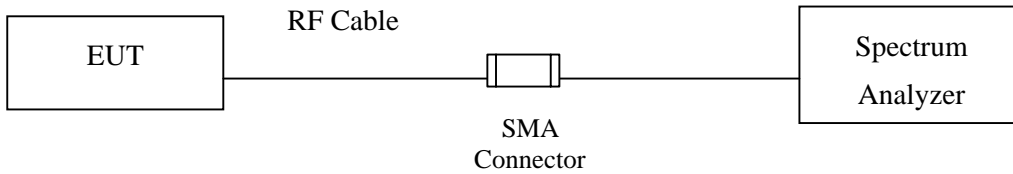
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2012
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2012
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2012

Note:

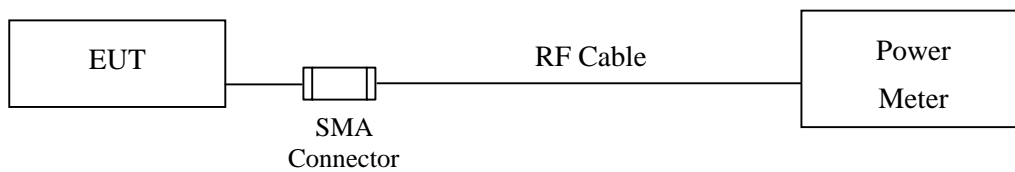
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

3.2. Test Setup

26dBc Occupied Bandwidth



Conduction Power Measurement



3.3. Limits

- (1) For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10\log B$, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
- (2) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10\log B$, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
- (3) For the band 5.725-5.825 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 1W or $17 \text{ dBm} + 10\log B$, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

3.4. Test Procedur

As an alternative to FCC KDB-789033, the EUT peak power was measured with a peak power meter employing a video bandwidth greater than 6dB BW of the emission under test. Peak output power was read directly from the meter across all data rates, and across three channels within each sub-band. Special care was used to make sure that the EUT was transmitting in continuous mode. This method exceeds the limitations of FCC KDB-789033, and provides more accurate measurements.

3.5. Uncertainty

$\pm 1.27 \text{ dB}$

3.6. Test Result of Peak Transmit Power

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps)

(Chain A)

Cable loss=1dB		Peak Power Output								Required Limit
Channel No.	Frequency (MHz)	Data Rate (Mbps)								
		6	9	12	18	24	36	48	54	
		Measurement Level (dBm)								
36	5180	11.35	--	--	--	--	--	--	--	<17dBm
44	5220	11.32	11.28	11.1	10.89	10.55	10.21	9.88	9.56	<17dBm
48	5240	11.21	--	--	--	--	--	--	--	<17dBm
52	5260	10.92	--	--	--	--	--	--	--	<24dBm
60	5300	10.64	10.41	10.32	10.14	10.08	9.99	9.54	9.13	<24dBm
64	5320	10.45	--	--	--	--	--	--	--	<24dBm
100	5500	13.25	--	--	--	--	--	--	--	<24dBm
116	5580	13.12	11.14	11.05	10.95	10.88	10.69	10.55	10.33	<24dBm
140	5700	13.12	--	--	--	--	--	--	--	<24dBm

Note: Peak Power Output Value =Reading value on peak power meter + cable loss

(Chain B)

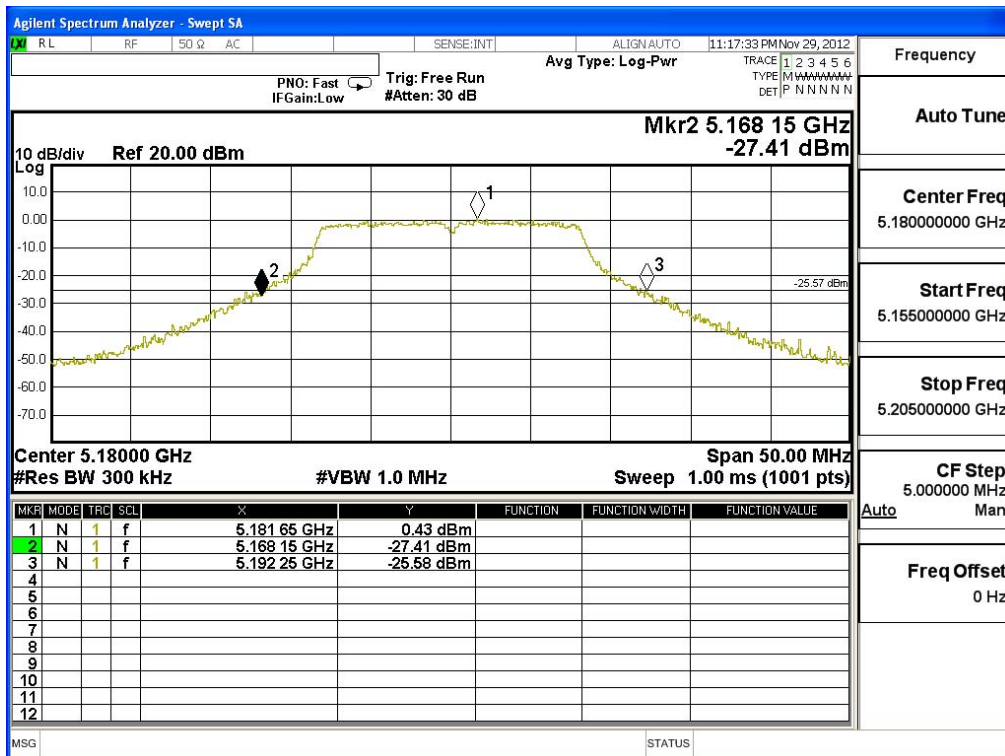
Cable loss=1dB		Peak Power Output								Required Limit
Channel No.	Frequency (MHz)	Data Rate (Mbps)								
		6	9	12	18	24	36	48	54	
		Measurement Level (dBm)								
36	5180	10.90	--	--	--	--	--	--	--	<17dBm
44	5220	10.84	10.58	10.43	10.14	10.02	9.88	9.64	9.32	<17dBm
48	5240	10.75	--	--	--	--	--	--	--	<17dBm
52	5260	10.69	--	--	--	--	--	--	--	<24dBm
60	5300	10.51	10.13	10.01	9.74	9.52	9.17	8.94	8.87	<24dBm
64	5320	10.36	--	--	--	--	--	--	--	<24dBm
100	5500	12.8	--	--	--	--	--	--	--	<24dBm
116	5580	12.42	10.98	10.64	10.55	10.47	10.31	10.2	10.17	<24dBm
140	5700	12.39	--	--	--	--	--	--	--	<24dBm

Note: Peak Power Output Value =Reading value on peak power meter + cable loss

Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
36	5180	19.800	11.35	17	16.97	Pass

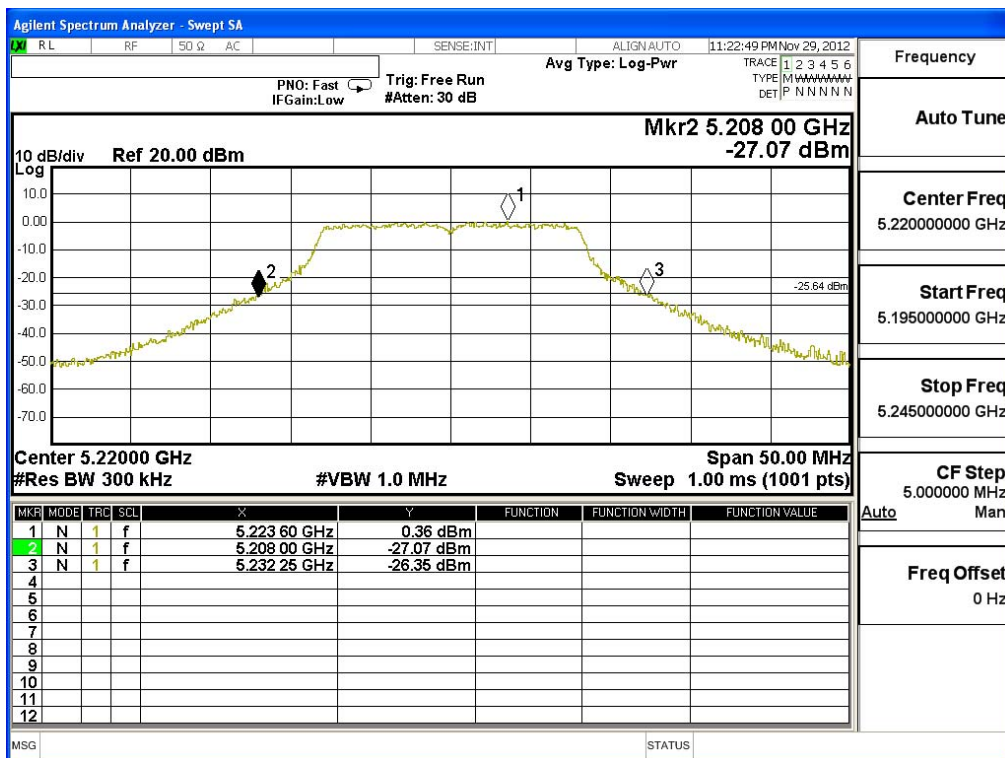
**26dBc Occupied Bandwidth:
Channel 36**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
44	5220	19.850	11.32	17	16.98	Pass

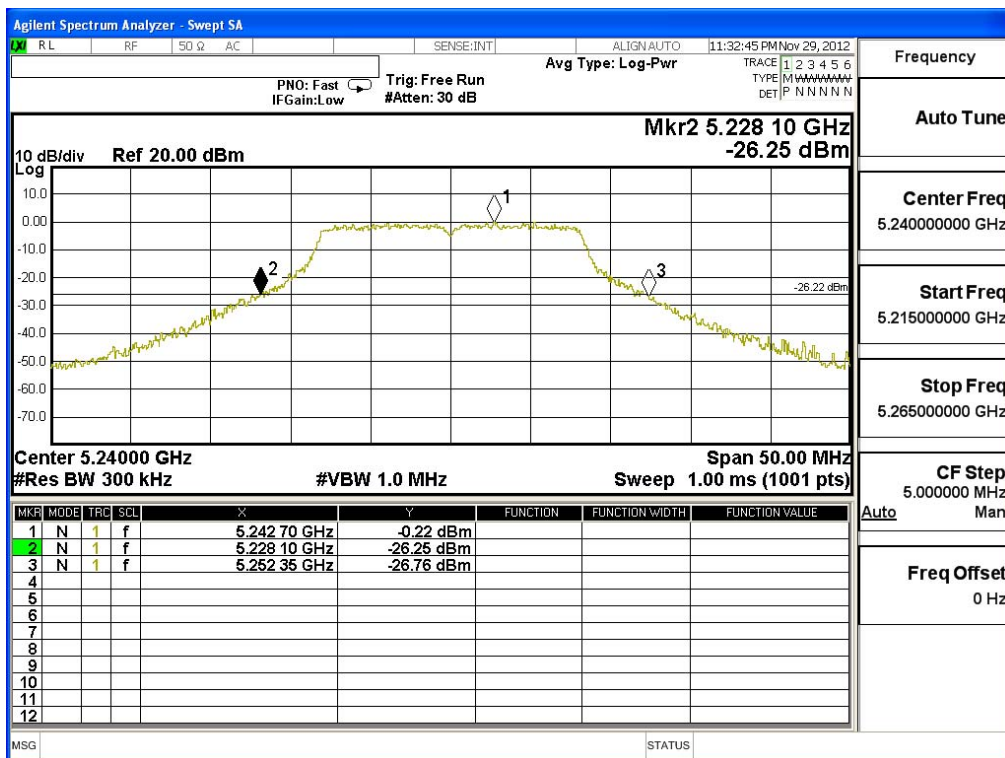
**26dBc Occupied Bandwidth:
Channel 44**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
48	5240	22.150	11.21	17	17.45	Pass

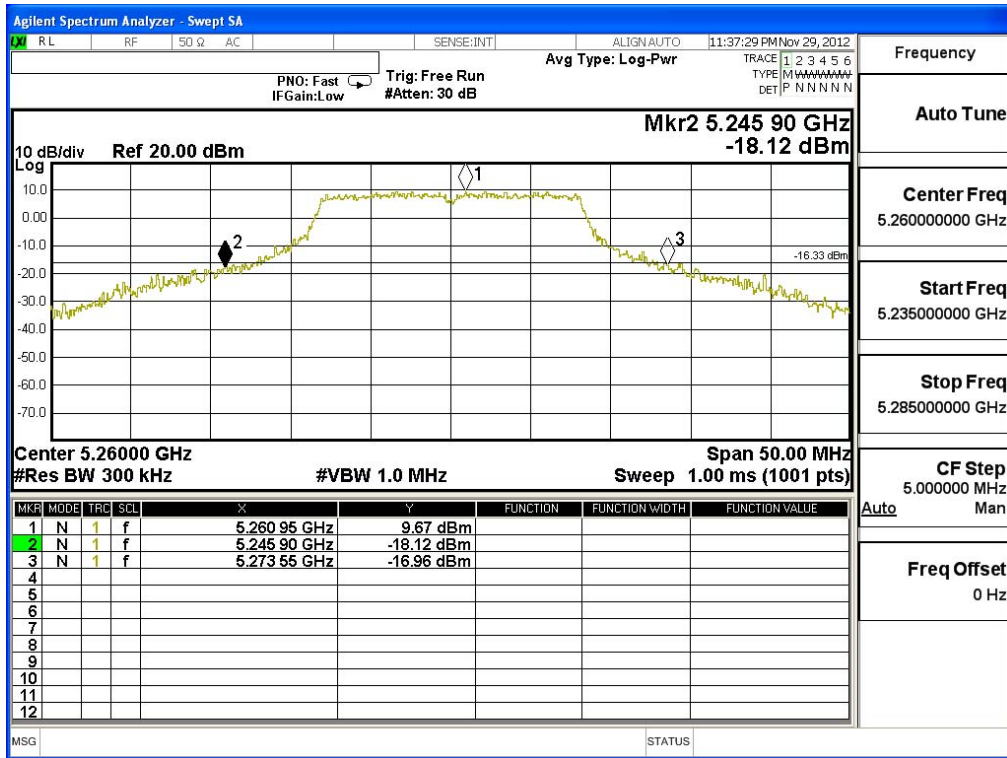
**26dBc Occupied Bandwidth:
Channel 48**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
52	5260	19.650	10.92	24	23.93	Pass

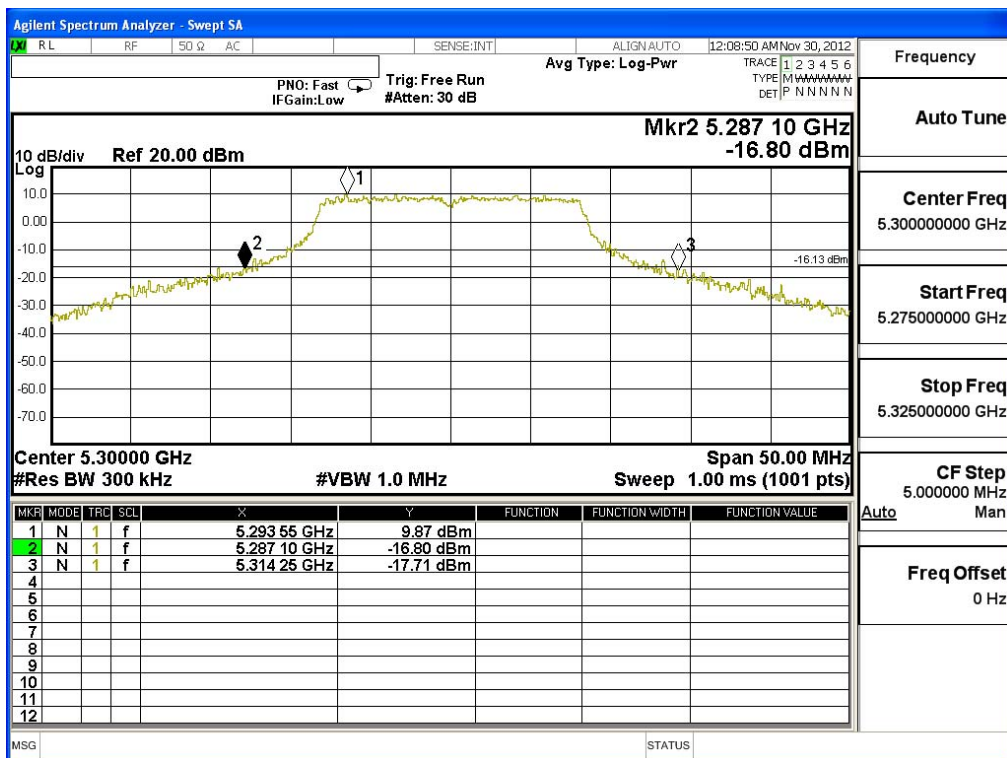
**26dBc Occupied Bandwidth:
Channel 52**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
60	5300	19.800	10.64	24	23.97	Pass

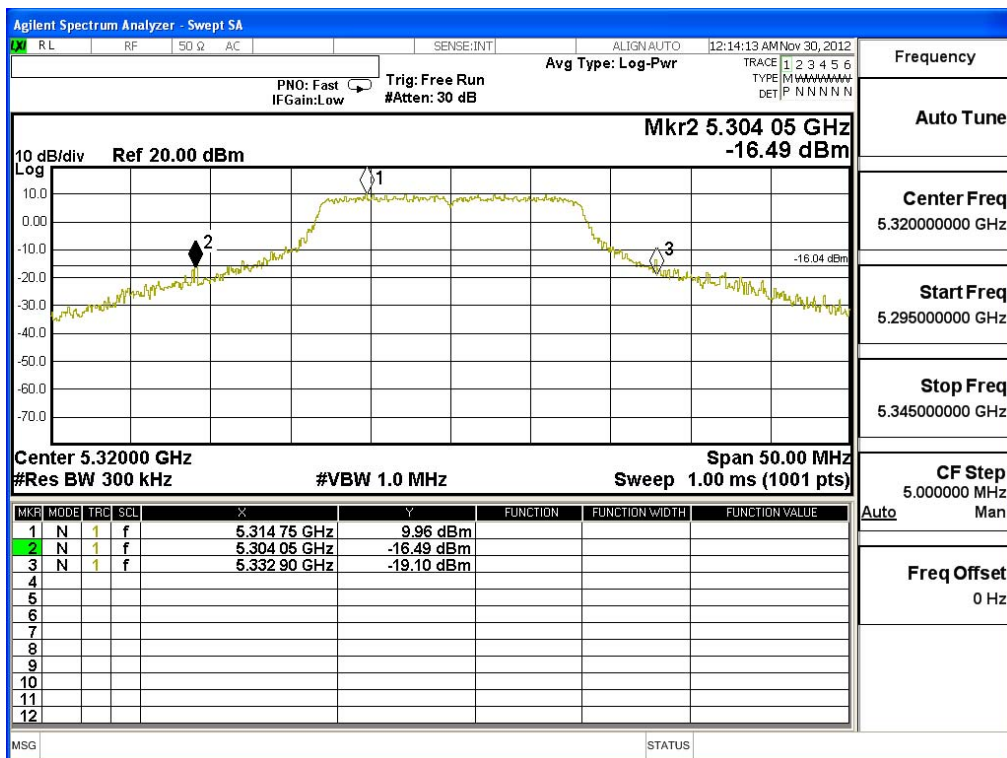
**26dBc Occupied Bandwidth:
Channel 60**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
64	5320	19.800	10.45	24	23.97	Pass

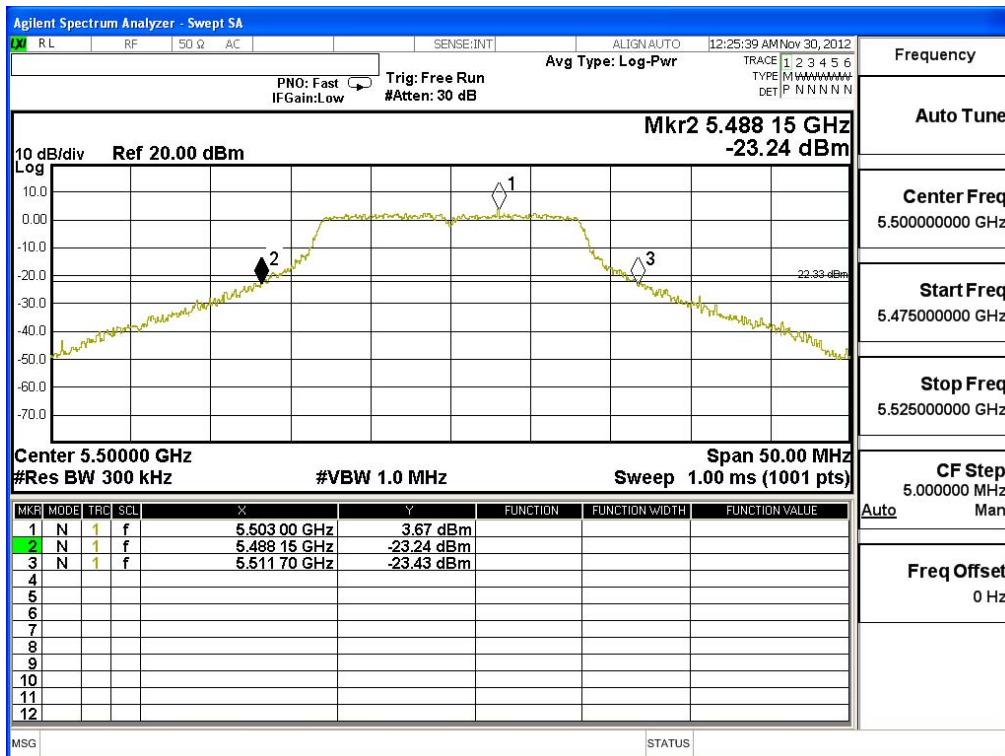
**26dBc Occupied Bandwidth:
Channel 64**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
100	5500	20.100	13.25	24	24.03	Pass

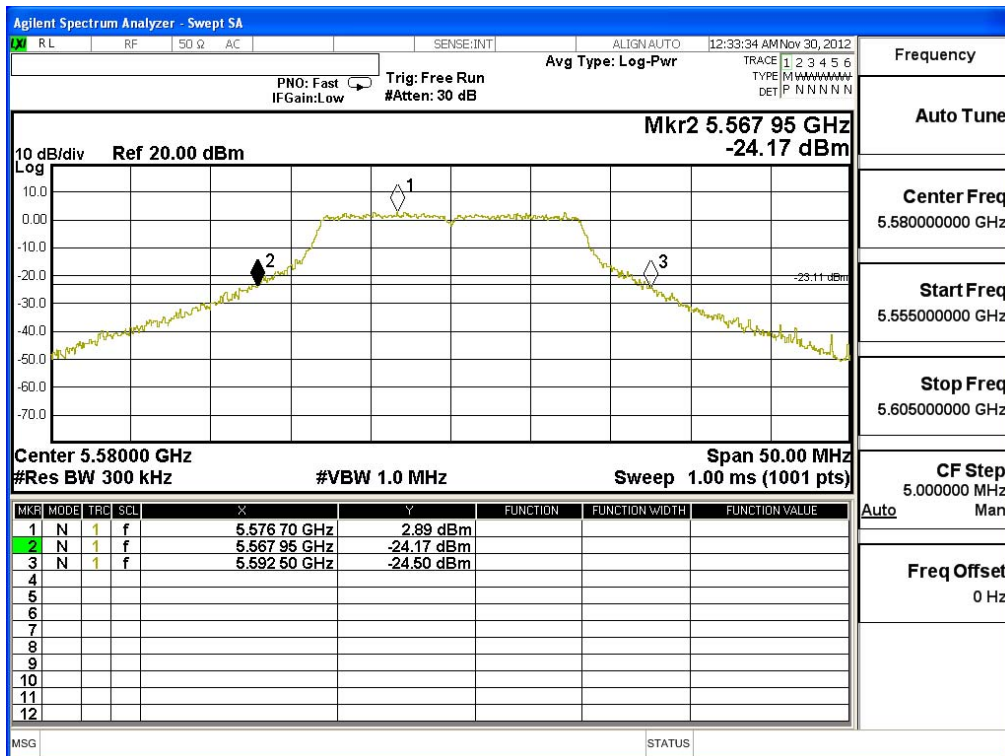
**26dBc Occupied Bandwidth:
Channel 100**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
116	5580	20.400	13.12	24	24.10	Pass

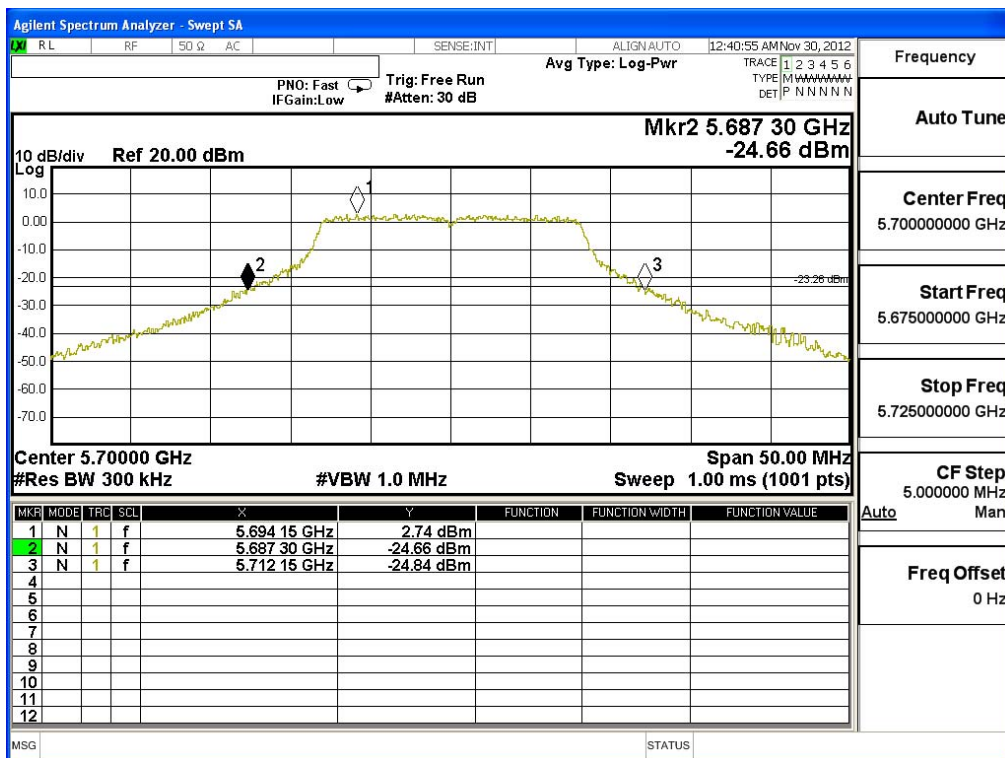
**26dBc Occupied Bandwidth:
Channel 116**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
140	5700	19.700	13.12	24	23.94	Pass

**26dBc Occupied Bandwidth:
Channel 140**



4. Peak Power Spectral Density

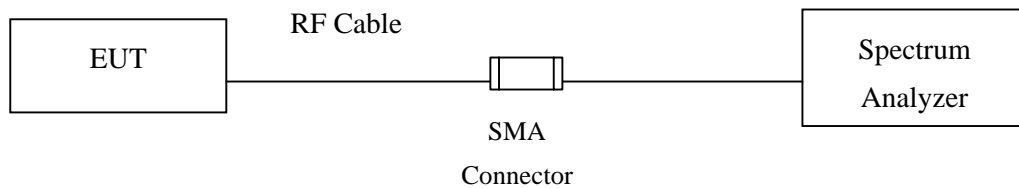
4.1. Test Equipment

	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.

4.2. Test Setup



4.3. Limits

- (4) For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
- (5) For the band 5.25-5.35 GHz, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
- (6) For the band 5.725-5.825 GHz, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

4.4. Test Procedure

The EUT was setup to ANSI C63.10, 2009; tested to DTS test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

4.5. Uncertainty

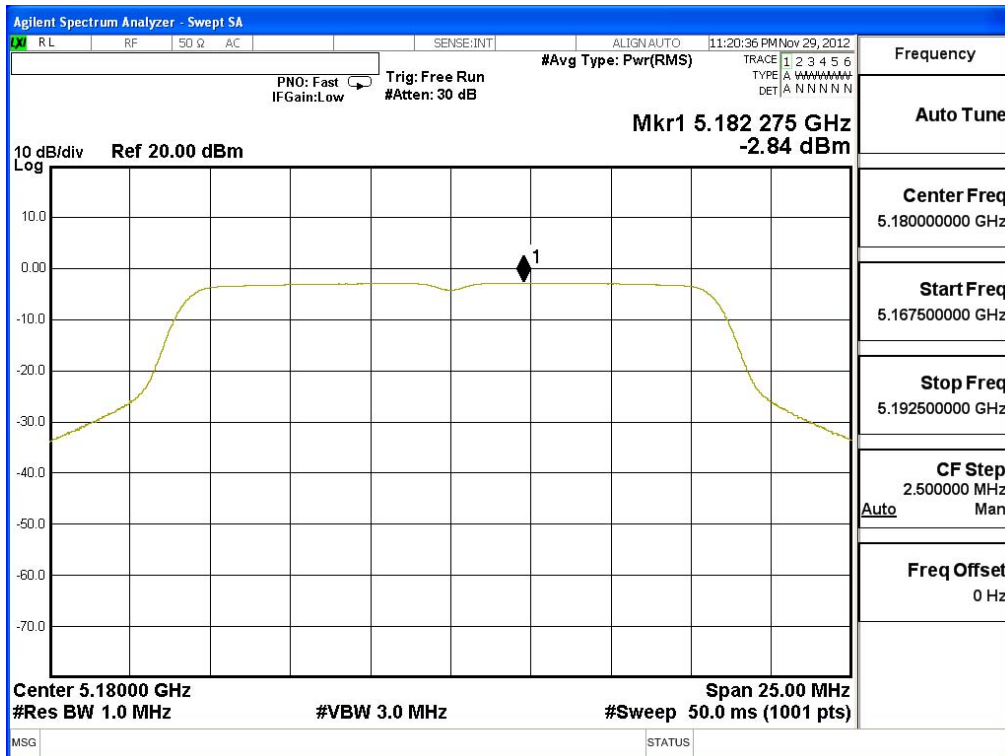
± 1.27 dB

4.6. Test Result of Peak Power Spectral Density

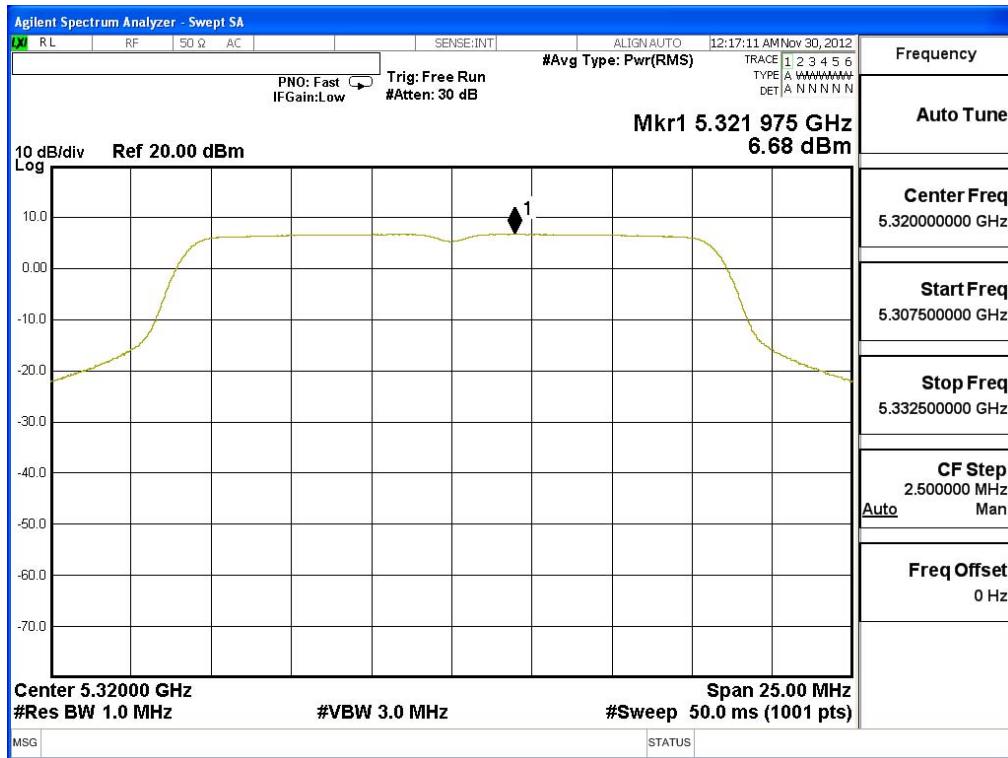
Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Peak Power Spectral Density
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
36	5180	-2.84	<4	Pass
44	5220	-2.66	<4	Pass
48	5240	-3.17	<4	Pass
52	5260	6.37	<11	Pass
60	5300	6.55	<11	Pass
64	5320	6.68	<11	Pass
100	5500	0.06	<11	Pass
116	5580	-0.16	<11	Pass
140	5700	-0.27	<11	Pass

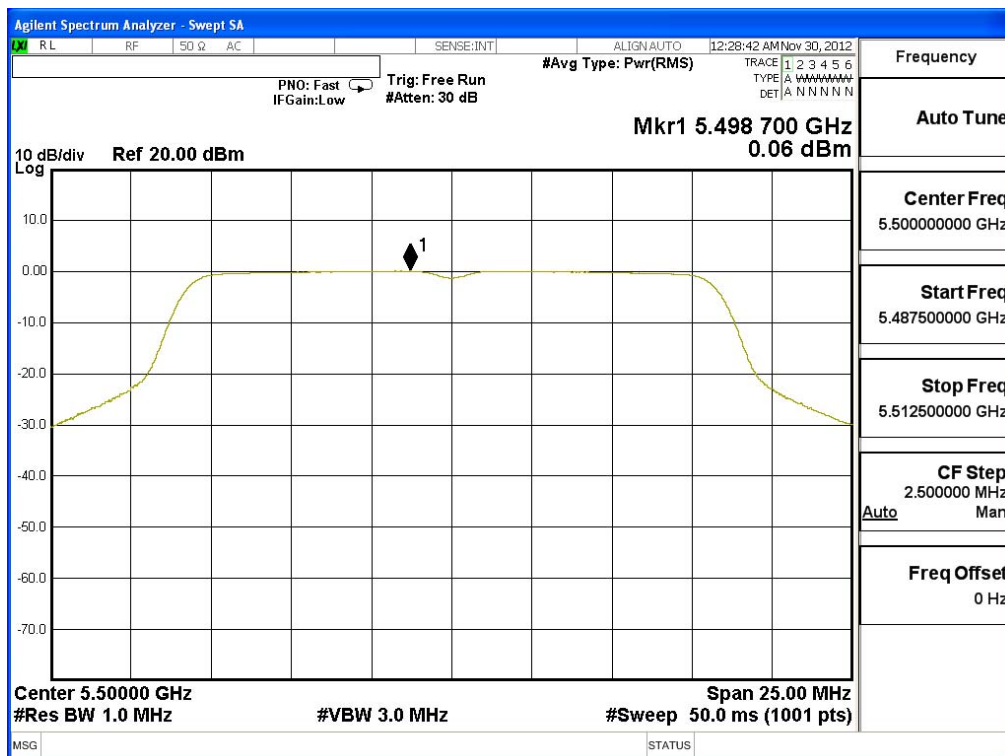
Channel 36:



Channel 64:



Channel 100:



5. Peak Excursion

5.1. Test Equipment

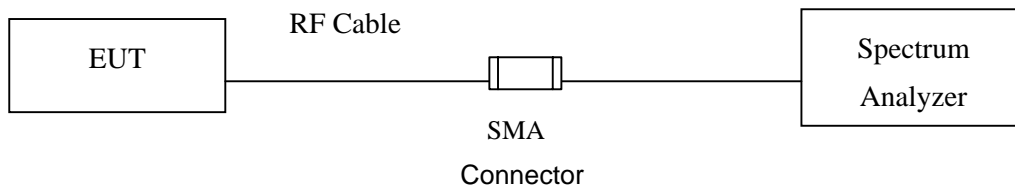
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2012
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2012
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2012

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

Conduction Power Measurement



5.3. Limits

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

5.4. Test Procedure

The EUT was setup to ANSI C63.10, 2009; tested to DTS test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

5.5. Uncertainty

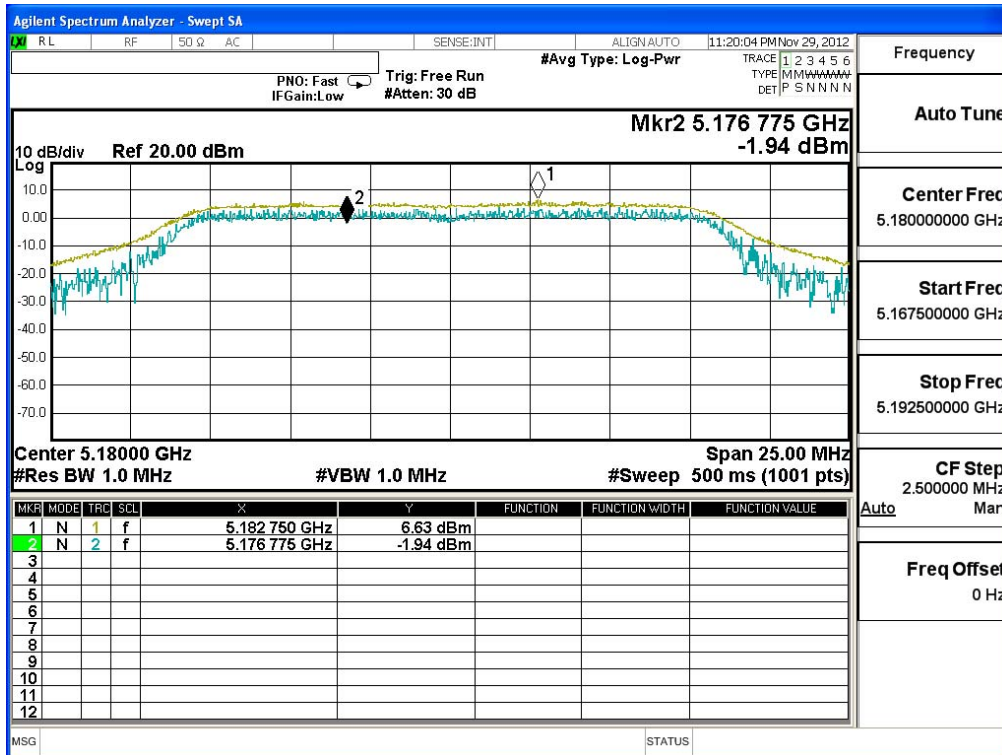
± 1.27 dB

5.6. Test Result of Peak Excursion

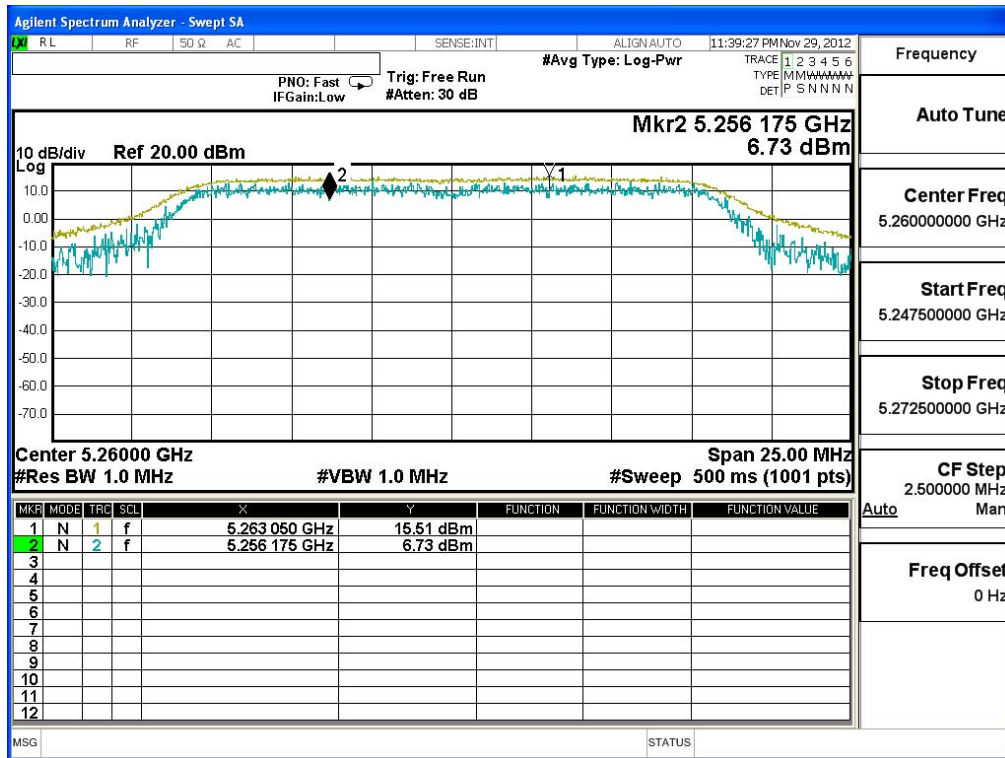
Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Peak Excursion
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps)

Channel No.	Frequency (MHz)	Measurement Level (dB)	Required Limit (dB)	Result
36	5180	8.57	<13	Pass
44	5220	10.77	<13	Pass
48	5240	7.74	<13	Pass
52	5260	8.78	<13	Pass
60	5300	8.43	<13	Pass
64	5320	8.11	<13	Pass
100	5500	9.62	<13	Pass
116	5580	8.44	<13	Pass
140	5700	8.05	<13	Pass

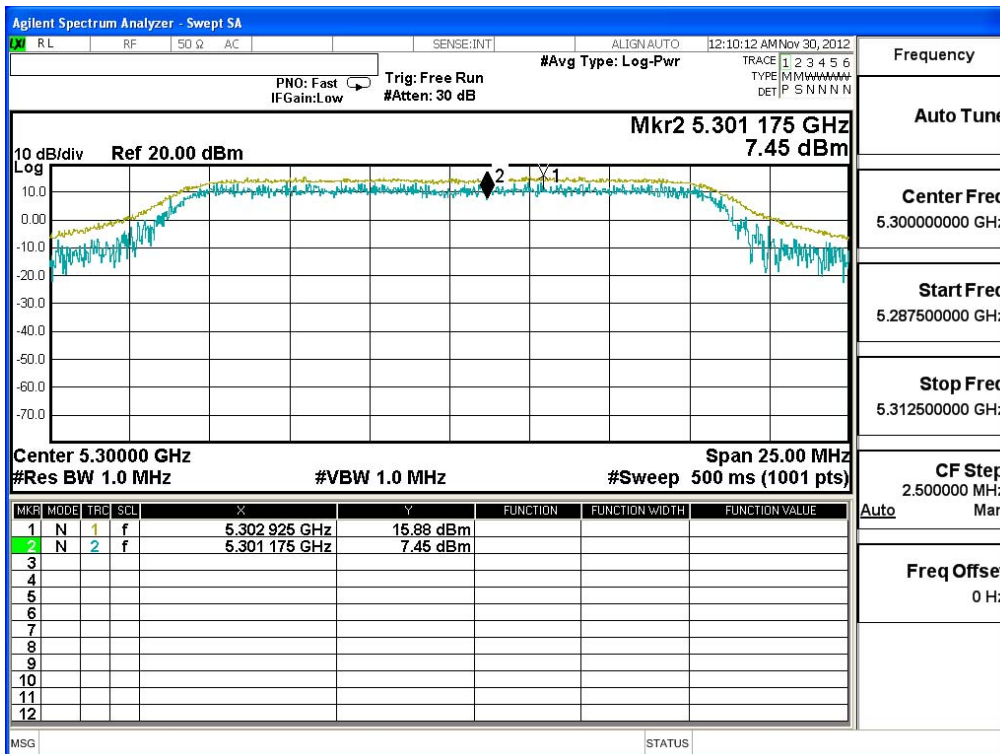
Channel 36:



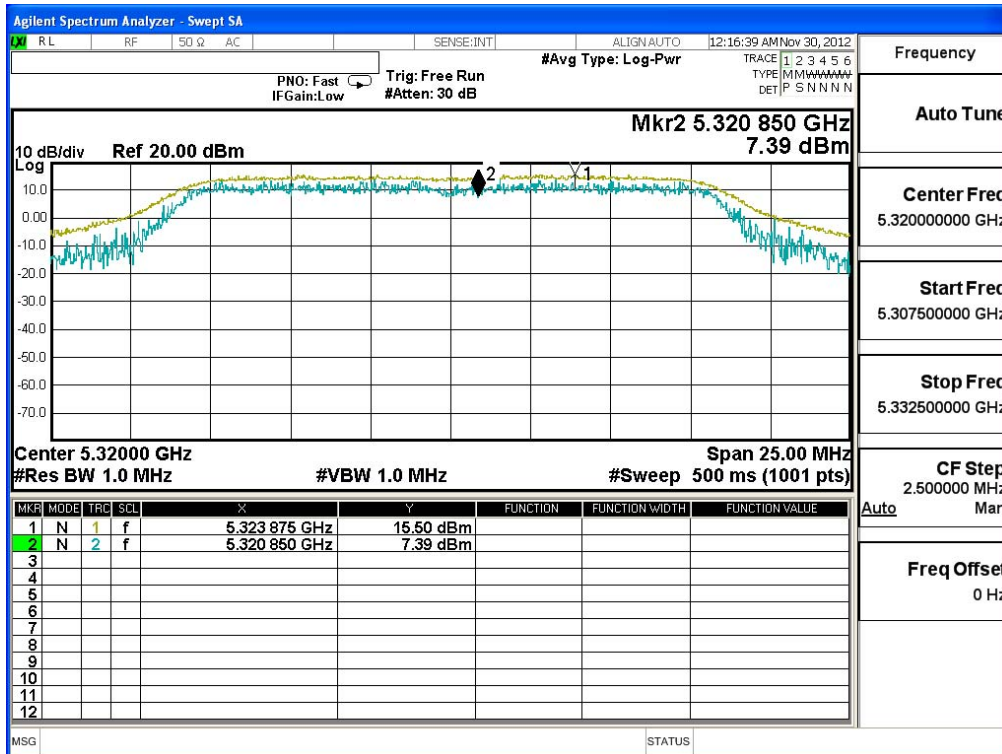
Channel 52:



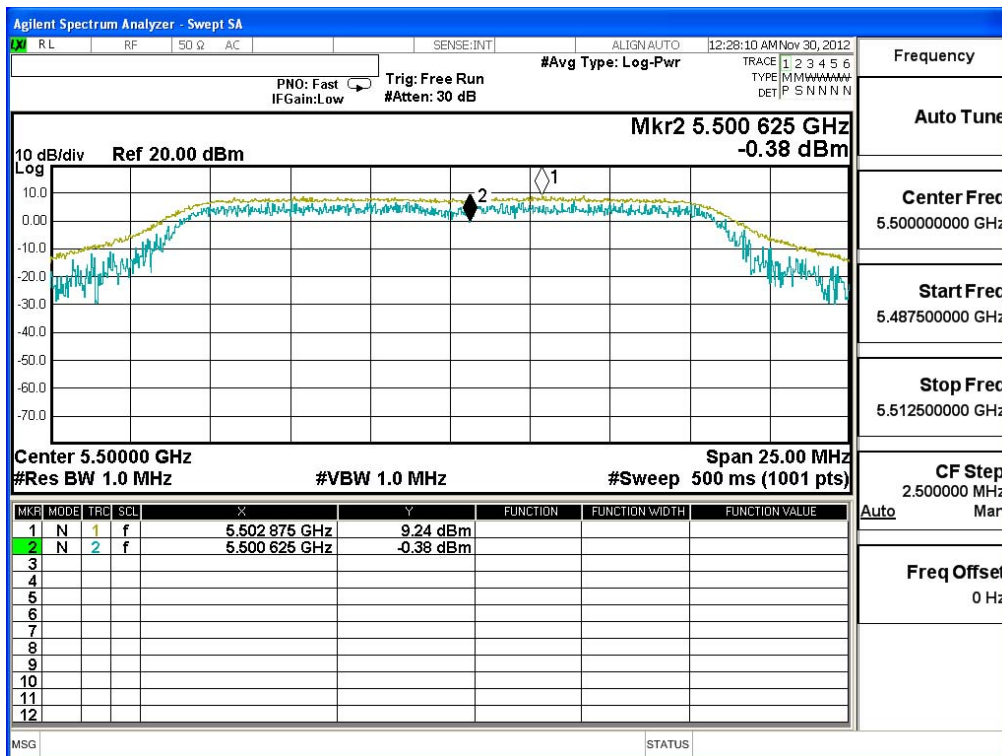
Channel 60:



Channel 64:



Channel 100:



6. Radiated Emission

6.1. Test Equipment

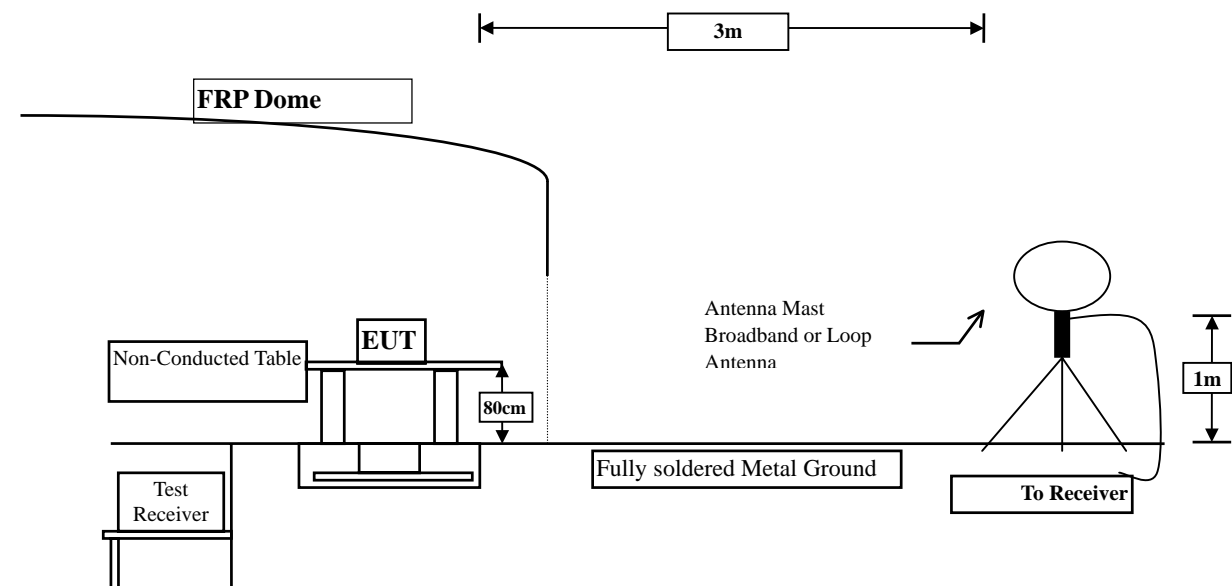
The following test equipments are used during the radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X 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

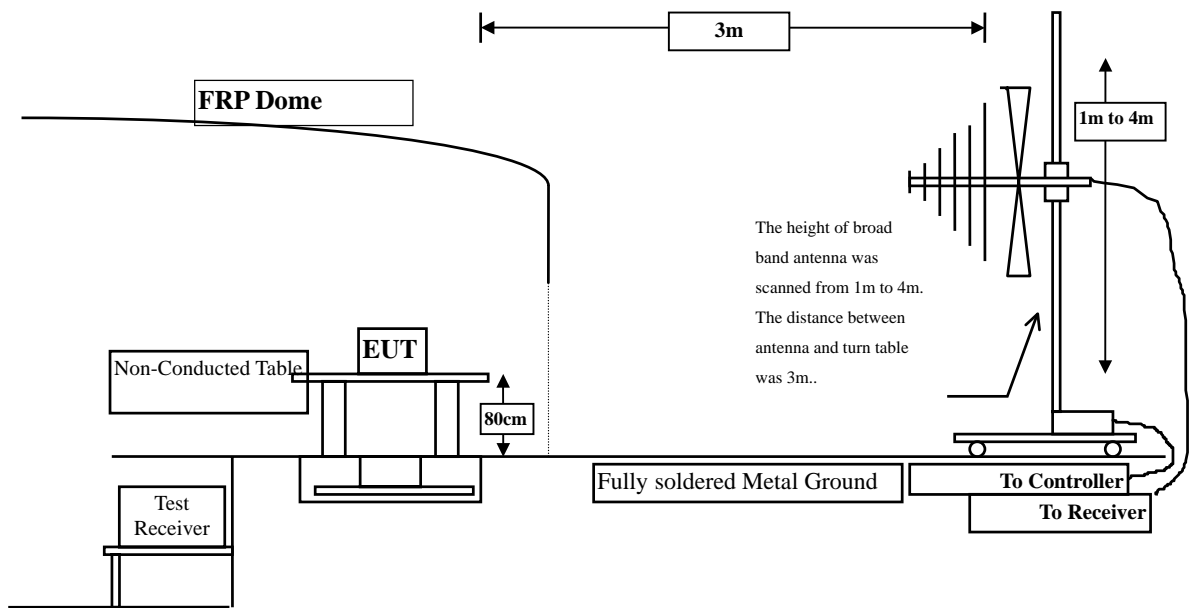
- Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with "X" are used to measure the final test results.

6.2. Test Setup

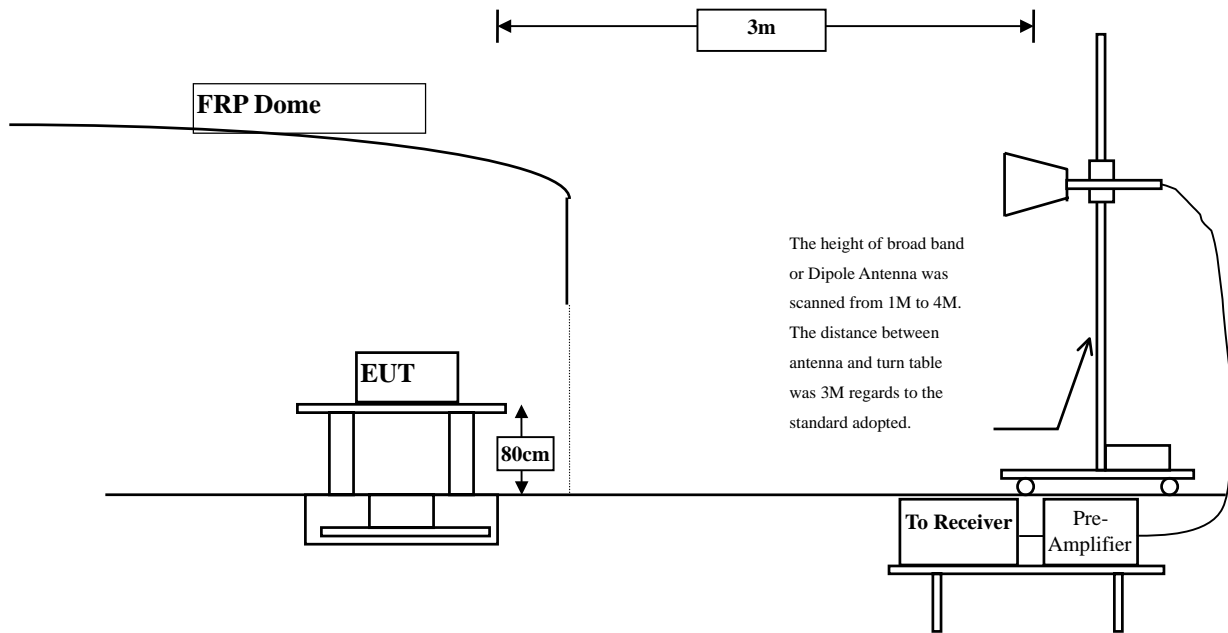
Radiated Emission Below 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



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.

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)

6.4. Test Procedure

The EUT was setup according to ANSI C63.10, 2009 and tested according to FCC KDB-789033 test procedure for compliance to FCC 47CFR 15. 407 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.

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 form 9kHz - 10th Harmonic of fundamental was investigated.

6.5. Uncertainty

± 3.8 dB below 1GHz

± 3.9 dB above 1GHz

6.6. 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: Transmitter (802.11a-6Mbps) (5180MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
10360.000	12.930	40.500	53.430	-20.570	74.000
15540.000	--	--	--	--	74.000
20720.000	--	--	--	--	74.000
25900.000	--	--	--	--	74.000
31080.000	--	--	--	--	74.000
36260.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5180MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical					
Peak Detector:					
10360.000	13.724	37.740	51.464	-22.536	74.000
15540.000	--	--	--	--	74.000
20720.000	--	--	--	--	74.000
25900.000	--	--	--	--	74.000
31080.000	--	--	--	--	74.000
36260.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5220MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
10440.000	13.322	37.150	50.472	-23.528	74.000
15600.000	--	--	--	--	74.000
20800.000	--	--	--	--	74.000
26000.000	--	--	--	--	74.000
31200.000	--	--	--	--	74.000
36400.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5220MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical					
Peak Detector:					
10440.000	14.245	37.890	52.135	-21.865	74.000
15600.000	--	--	--	--	74.000
20800.000	--	--	--	--	74.000
26000.000	--	--	--	--	74.000
31200.000	--	--	--	--	74.000
36400.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5240MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
10480.000	13.693	37.150	50.844	-23.156	74.000
15720.000	--	--	--	--	74.000
20960.000	--	--	--	--	74.000
26200.000	--	--	--	--	74.000
31440000	--	--	--	--	74.000
36680.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5240MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical					
Peak Detector:					
10480.000	14.620	37.080	51.701	-22.299	74.000
15720.000	--	--	--	--	74.000
20960.000	--	--	--	--	74.000
26200.000	--	--	--	--	74.000
31440000	--	--	--	--	74.000
36680.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5260MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
10520.000	14.015	37.560	51.575	-22.425	74.000
15780.000	--	--	--	--	74.000
21040.000	--	--	--	--	74.000
26300.000	--	--	--	--	74.000
31560.000	--	--	--	--	74.000
36820.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5260MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical					
Peak Detector:					
10520.000	14.818	37.150	51.968	-22.032	74.000
15780.000	--	--	--	--	74.000
21040.000	--	--	--	--	74.000
26300.000	--	--	--	--	74.000
31560.000	--	--	--	--	74.000
36820.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5300MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
10600.000	14.550	37.150	51.699	-22.301	74.000
15900.000	--	--	--	--	74.000
21200.000	--	--	--	--	74.000
26500.000	--	--	--	--	74.000
31800.000	--	--	--	--	74.000
37100.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5300MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical					
Peak Detector:					
10600.000	14.881	37.140	52.021	-21.979	74.000
15900.000	--	--	--	--	74.000
21200.000	--	--	--	--	74.000
26500.000	--	--	--	--	74.000
31800.000	--	--	--	--	74.000
37100.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5320MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
10640.000	14.690	37.090	51.780	-22.220	74.000
15960.000	--	--	--	--	74.000
21280.000	--	--	--	--	74.000
26600.000	--	--	--	--	74.000
31920.000	--	--	--	--	74.000
37240.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5320MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical					
Peak Detector:					
10640.000	15.083	35.150	50.233	-23.767	74.000
15960.000	--	--	--	--	74.000
21280.000	--	--	--	--	74.000
26600.000	--	--	--	--	74.000
31920.000	--	--	--	--	74.000
37240.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5500MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
11000.000	16.399	36.590	52.989	-21.011	74.000
16500.000	--	--	--	--	74.000
22000.000	--	--	--	--	74.000
27500.000	--	--	--	--	74.000
33000.000	--	--	--	--	74.000
38500.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5500MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical					
Peak Detector:					
11000.000	17.132	35.050	52.182	-21.818	74.000
16500.000	--	--	--	--	74.000
22000.000	--	--	--	--	74.000
27500.000	--	--	--	--	74.000
33000.000	--	--	--	--	74.000
38500.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5580MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
11600.000	16.639	35.020	51.659	-22.341	74.000
16740.000	--	--	--	--	74.000
22320.000	--	--	--	--	74.000
27900.000	--	--	--	--	74.000
33480.000	--	--	--	--	74.000
39060.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5580MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical					
Peak Detector:					
11600.000	17.521	36.080	53.601	-20.399	74.000
16740.000	--	--	--	--	74.000
22320.000	--	--	--	--	74.000
27900.000	--	--	--	--	74.000
33480.000	--	--	--	--	74.000
39060.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5700MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
11400.000	16.530	36.060	52.591	-21.409	74.000
17100.000	--	--	--	--	74.000
22800.000	--	--	--	--	74.000
28500.000	--	--	--	--	74.000
34200.000	--	--	--	--	74.000
39900.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5700MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical					
Peak Detector:					
11400.000	17.138	36.030	53.168	-20.832	74.000
17100.000	--	--	--	--	74.000
22800.000	--	--	--	--	74.000
28500.000	--	--	--	--	74.000
34200.000	--	--	--	--	74.000
39900.000	--	--	--	--	74.000

Note:

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5220MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector					
132.820	-10.230	47.445	37.215	-6.285	43.500
297.720	-3.633	40.533	36.901	-9.099	46.000
480.080	-0.329	34.860	34.531	-11.469	46.000
623.640	1.959	31.594	33.553	-12.447	46.000
782.720	4.325	34.888	39.213	-6.787	46.000
934.040	6.612	28.180	34.792	-11.208	46.000
Vertical					
Peak Detector					
90.140	-3.149	39.107	35.958	-7.542	43.500
245.340	-8.406	47.746	39.340	-6.660	46.000
462.620	-3.838	33.074	29.236	-16.764	46.000
660.500	-2.233	38.616	36.383	-9.617	46.000
800.180	2.801	33.808	36.609	-9.391	46.000
928.220	6.203	27.757	33.960	-12.040	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
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5300MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector					
144.460	-10.377	47.768	37.391	-6.109	43.500
297.720	-3.633	40.533	36.901	-9.099	46.000
480.080	-0.329	34.860	34.531	-11.469	46.000
660.500	2.097	38.616	40.713	-5.287	46.000
800.180	5.141	33.808	38.949	-7.051	46.000
934.040	6.612	28.180	34.792	-11.208	46.000
Vertical					
Peak Detector					
113.420	-1.849	39.144	37.295	-6.205	43.500
245.340	-8.406	47.746	39.340	-6.660	46.000
462.620	-3.838	33.074	29.236	-16.764	46.000
660.500	-2.233	38.616	36.383	-9.617	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
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5580MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector					
130.880	-10.159	46.729	36.570	-6.930	43.500
297.720	-3.633	40.533	36.901	-9.099	46.000
528.580	1.848	35.557	37.405	-8.595	46.000
666.320	2.031	38.493	40.525	-5.475	46.000
800.180	5.141	33.808	38.949	-7.051	46.000
934.040	6.612	28.180	34.792	-11.208	46.000
Vertical					
Peak Detector					
113.420	-1.849	39.144	37.295	-6.205	43.500
245.340	-8.406	47.746	39.340	-6.660	46.000
396.660	-4.356	34.084	29.728	-16.272	46.000
660.500	-2.233	38.616	36.383	-9.617	46.000
846.740	2.601	32.037	34.638	-11.362	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.

7. Band Edge

7.1. 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:

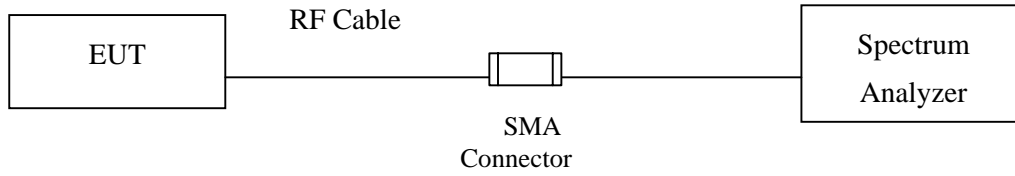
The following test equipments are used during the band edge tests:

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

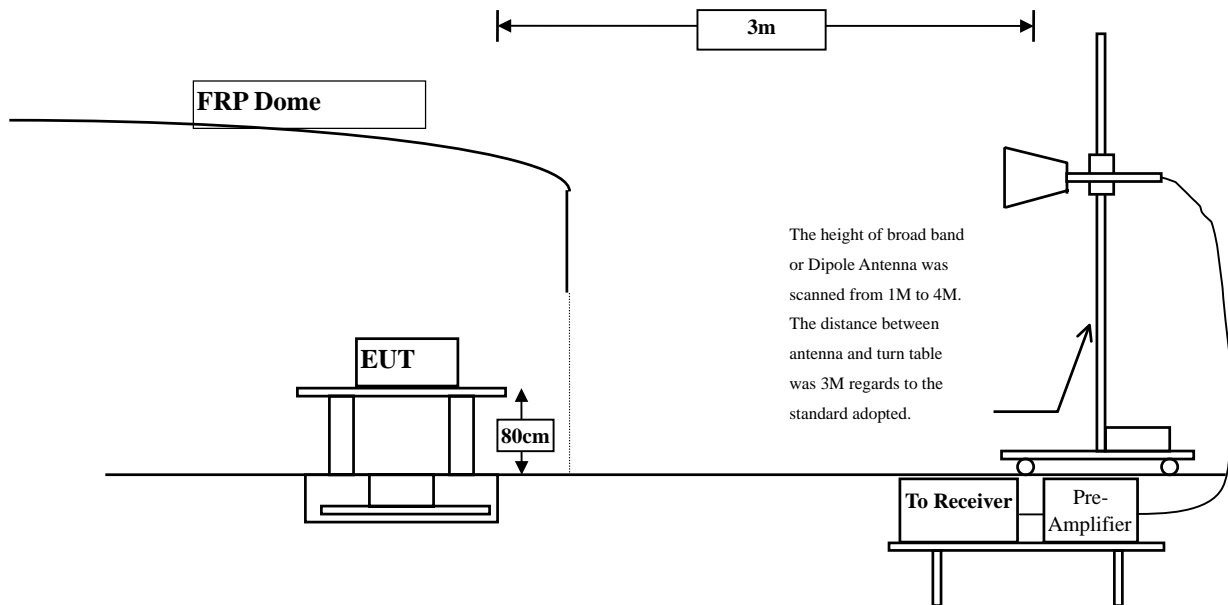
- Note:
1. All instruments are calibrated every one year.
 2. The test instruments marked by "X" are used to measure the final test results.

7.2. Test Setup

RF Conducted Measurement



RF Radiated Measurement:



7.3. Limits

The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

Radiated emissions which fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209:

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

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

7.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10, 2009 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz. The EUT was setup to ANSI C63.10, 2009; tested to DTS test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

7.5. Uncertainty

- ± 3.8 dB below 1GHz
- ± 3.9 dB above 1GHz

7.6. Test Result of Band Edge

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps)-Channel 36

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
36 (Peak)	5150.000	3.340	51.435	54.775	74.000	54.000	Pass
36 (Peak)	5183.000	3.224	87.017	90.240	--	--	--
36 (Average)	5150.000	3.340	38.896	42.236	74.000	54.000	Pass
36 (Average)	5177.800	3.242	75.885	79.127	--	--	--

Figure Channel 36: Horizontal (Peak)

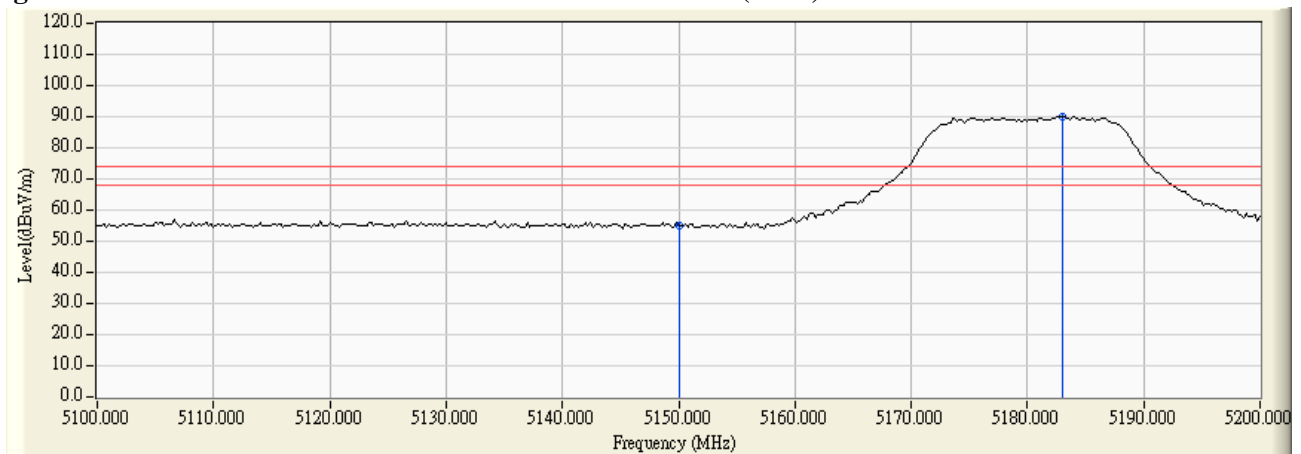
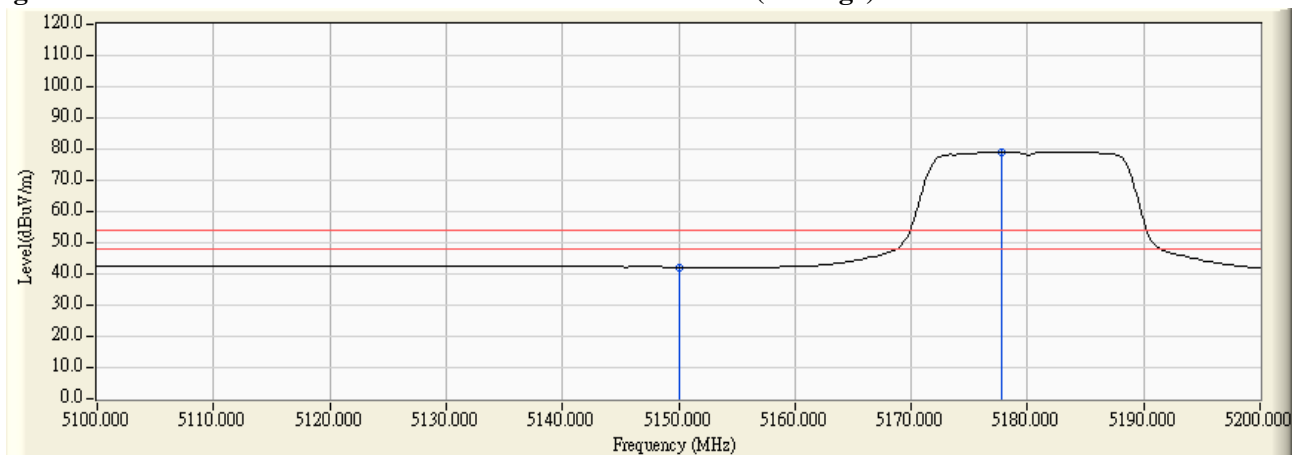


Figure Channel 36: Horizontal (Average)



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: Transmitter (802.11a-6Mbps)-Channel 36

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
36 (Peak)	5149.800	5.260	58.680	63.939	74.000	54.000	Pass
36 (Peak)	5150.000	5.260	55.477	60.737	74.000	54.000	Pass
36 (Peak)	5183.000	5.350	106.378	111.728	--	--	--
36 (Average)	5149.800	5.260	41.241	46.500	74.000	54.000	Pass
36 (Average)	5150.000	5.260	41.255	46.515	74.000	54.000	Pass
36 (Average)	5185.600	5.358	96.043	101.400	--	--	--

Figure Channel 36: Vertical (Peak)

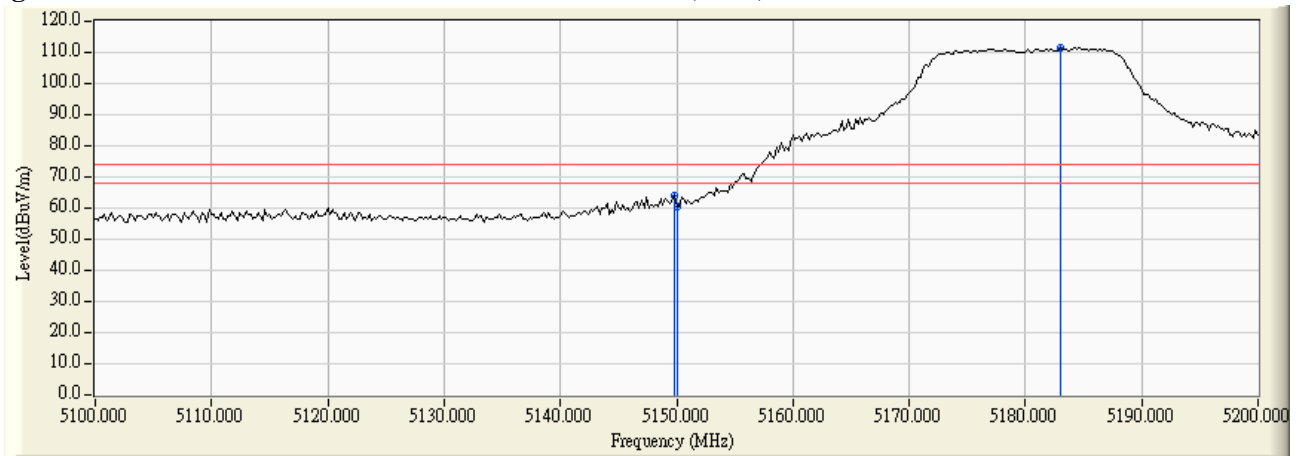
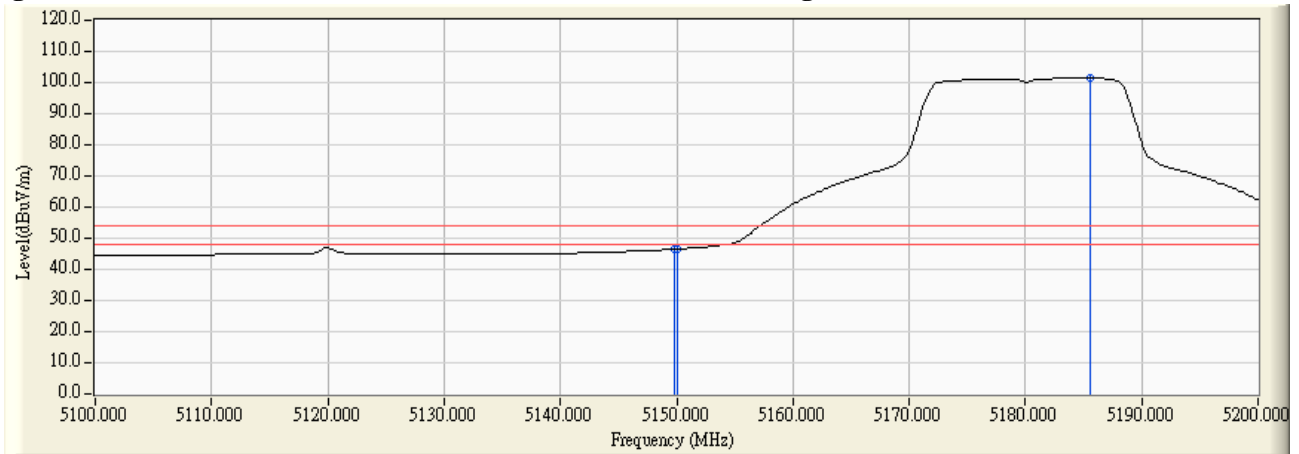


Figure Channel 36: Vertical (Average)



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: Transmitter (802.11a-6Mbps) -Channel 64

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
64 (Peak)	5324.000	3.799	90.153	93.953	--	--	--
64 (Peak)	5350.000	3.716	51.402	55.119	74.000	54.000	Pass
64 (Peak)	5351.000	3.713	53.417	57.130	74.000	54.000	Pass
64 (Average)	5325.600	3.795	79.717	83.512	--	--	--
64 (Average)	5350.000	3.716	39.524	43.241	74.000	54.000	Pass
64 (Average)	5351.000	3.713	39.443	43.156	74.000	54.000	Pass

Figure Channel 64: Horizontal (Peak)

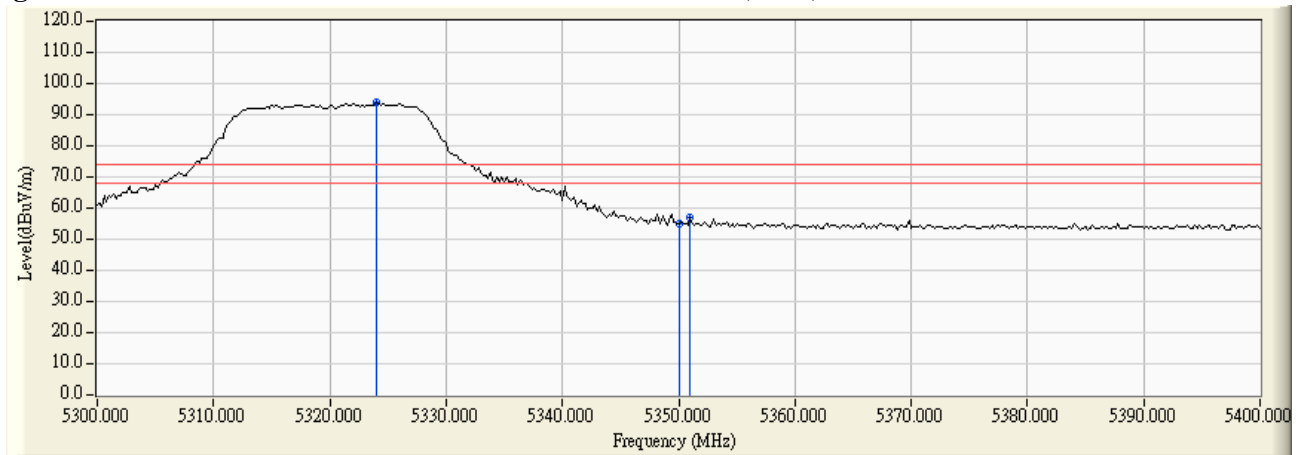
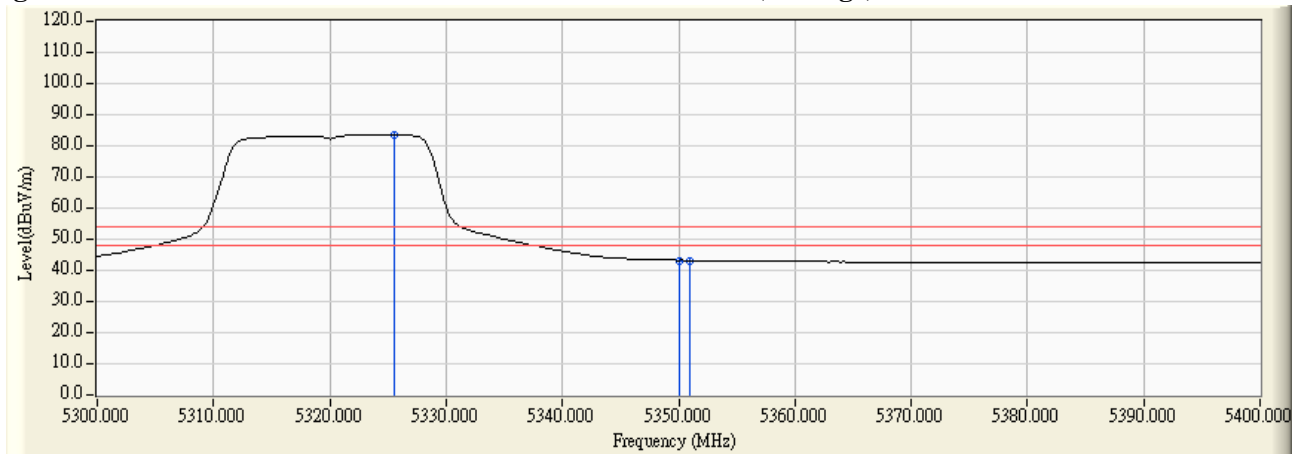


Figure Channel 64: Horizontal (Average)



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: Transmitter (802.11a-6Mbps) -Channel 64

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
64 (Peak)	5326.000	5.721	107.644	113.366	--	--	--
64 (Peak)	5350.000	5.691	65.099	70.791	74.000	54.000	Pass
64 (Average)	5318.000	5.732	96.972	102.704	--	--	--
64 (Average)	5350.000	5.691	44.524	50.216	74.000	54.000	Pass

Figure Channel 64: Vertical (Peak)

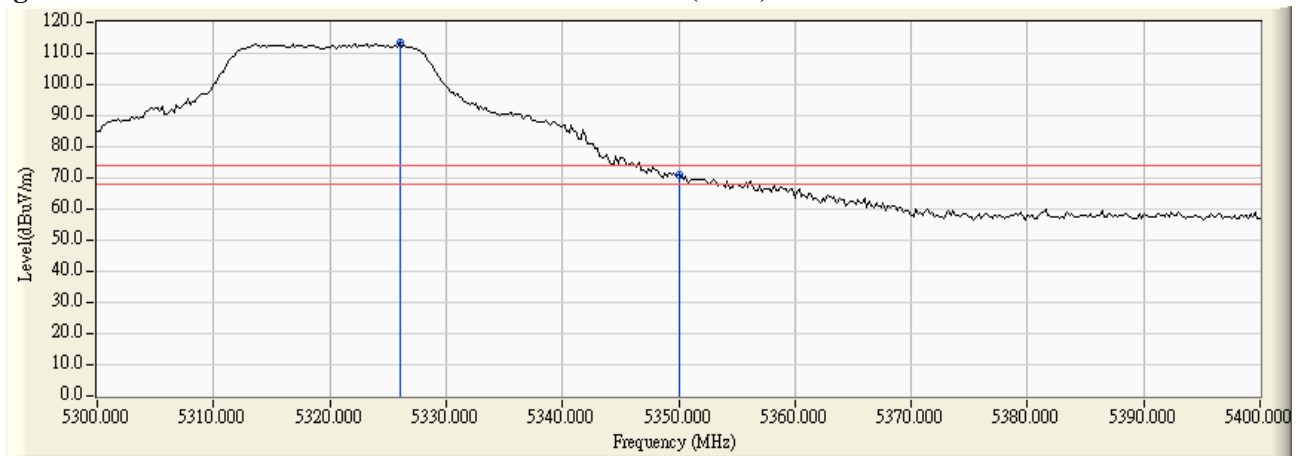
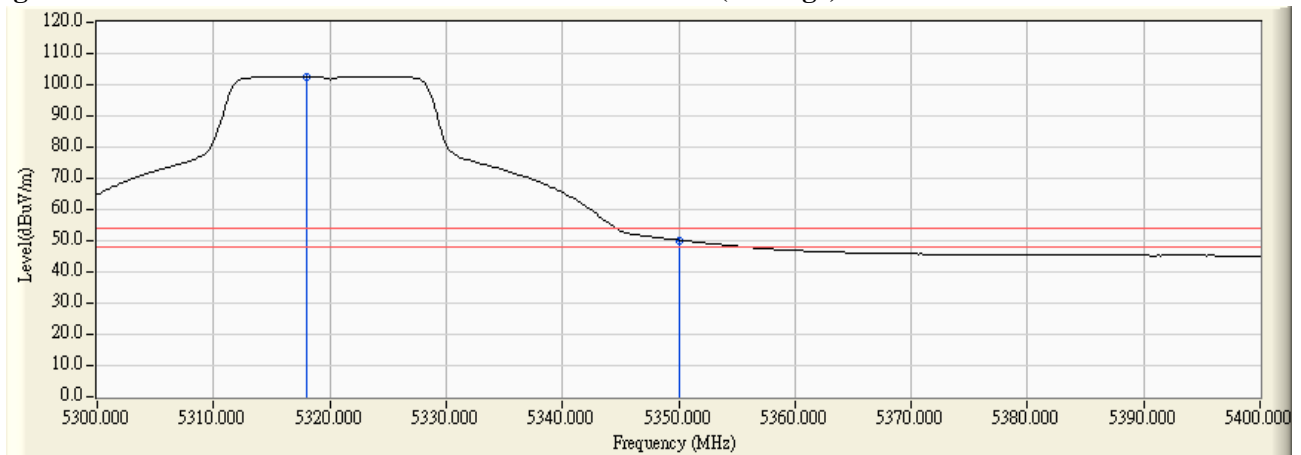


Figure Channel 64: Vertical (Average)



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: Transmitter (802.11a-6Mbps) -Channel 100

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
100(Peak)	5460.000	4.354	53.203	57.557	74.000	54.000	Pass
100 (Peak)	5497.800	4.799	97.195	101.994	--	--	--
100 (Average)	5460.000	4.354	40.065	44.419	74.000	54.000	Pass
100(Average)	5497.800	4.799	86.660	91.459	--	--	--

Figure Channel 100: Horizontal (Peak)

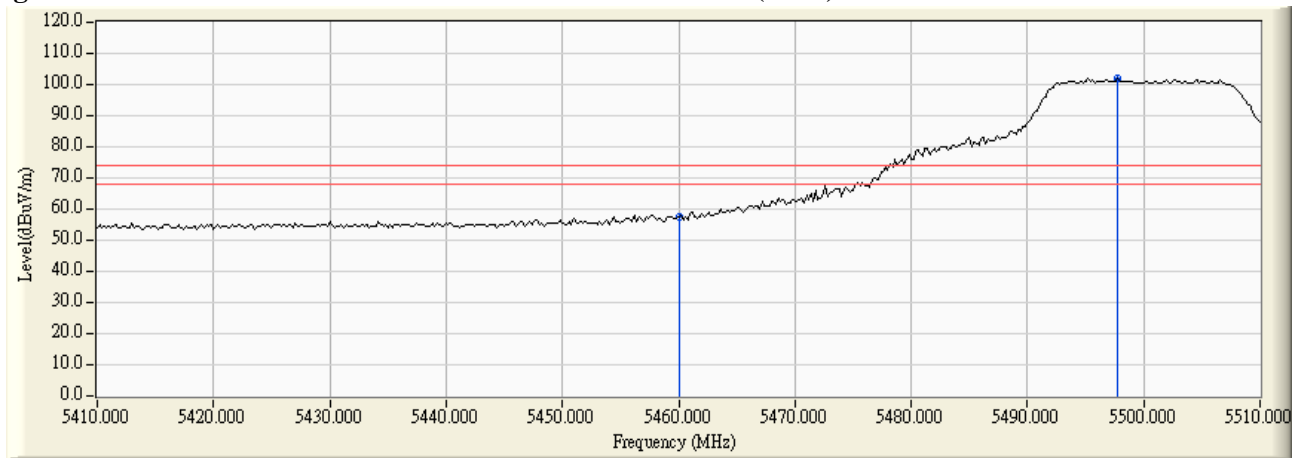
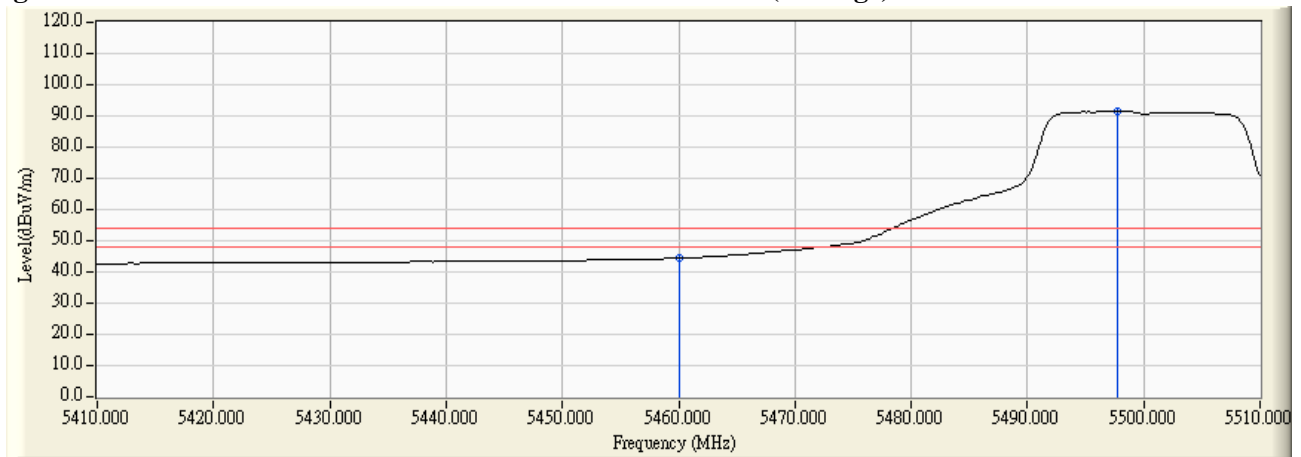


Figure Channel 100: Horizontal (Average)



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: Transmitter (802.11a-6Mbps) -Channel 100

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
100 (Peak)	5457.400	6.023	65.334	71.356	74.000	54.000	Pass
100 (Peak)	5460.000	6.041	64.625	70.666	74.000	54.000	Pass
100(Peak)	5502.800	6.283	107.342	113.625	--	--	--
100(Average)	5460.000	6.041	45.376	51.417	74.000	54.000	Pass
100 (Average)	5497.400	6.267	96.659	102.926	--	--	--

Figure Channel 100: Vertical (Peak)

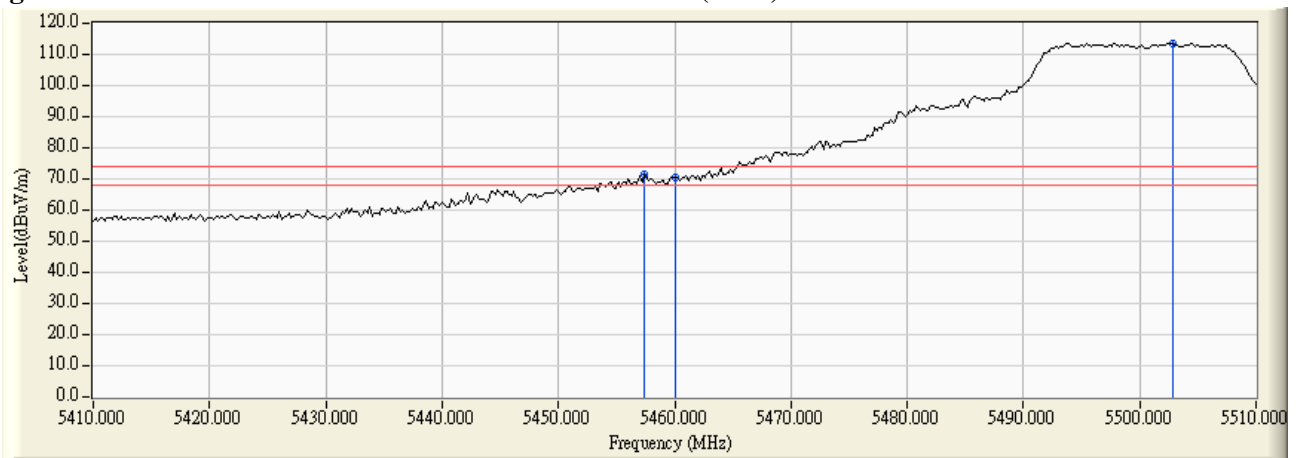
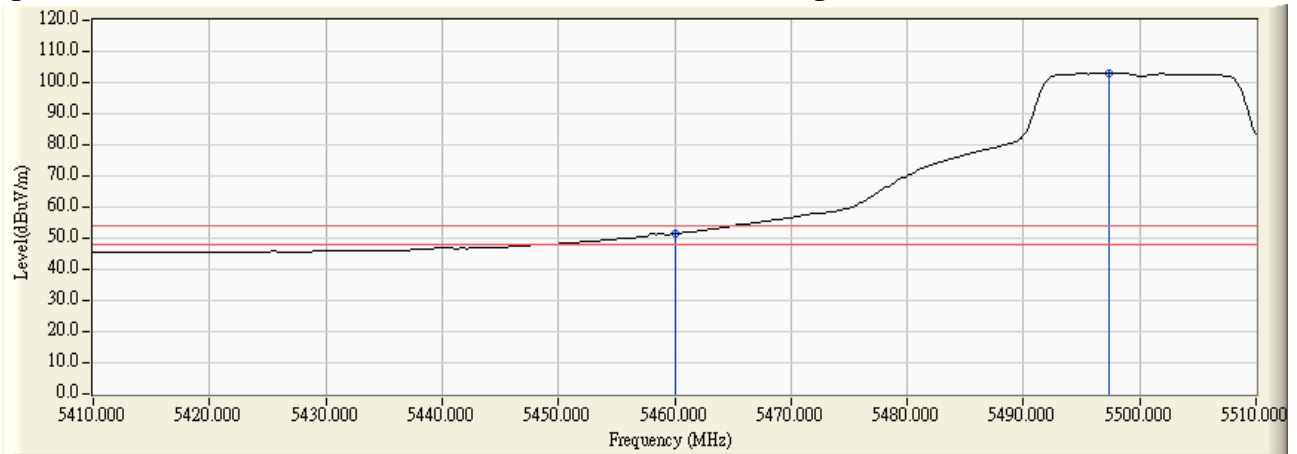


Figure Channel 100: Vertical (Average)



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: Transmitter (802.11a-6Mbps) -Channel 100

RF Radiated Measurement:

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5470.000	18.334	-77.730	-59.396	-32.396	-27.000	Pass

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5470.000	19.335	-75.660	-56.325	-29.325	-27.000	Pass

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps) -Channel 140

RF Radiated Measurement:

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5725.000	18.649	-76.270	-57.621	-30.621	-27.000	Pass

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5725.000	19.372	-75.210	-55.838	-28.838	-27.000	Pass

8. Frequency Stability

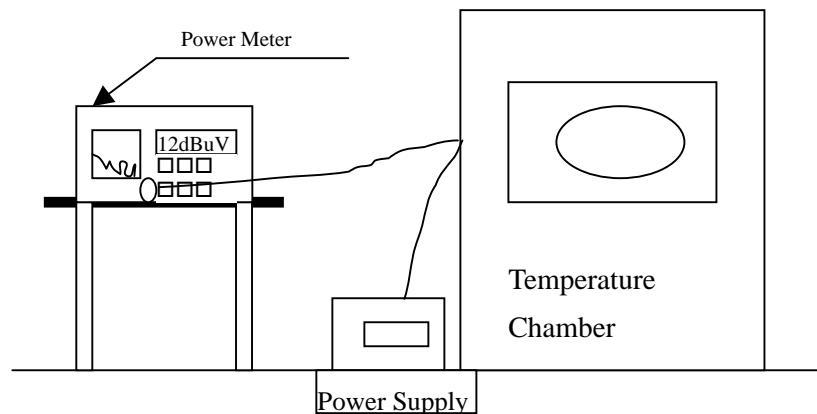
8.1. Test Equipment

	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.

8.2. Test Setup



8.3. Limits

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified

8.4. Test Procedure

The EUT was setup to ANSI C63.10, 2009; tested to DTS test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

8.5. Uncertainty

± 150 Hz

8.6. Test Result of Frequency Stability

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Frequency Stability
 Test Site : Temperature Chamber
 Test Mode : Carrier Wave

Test Conditions		Channel	Frequency (MHz)	Frequency (MHz)	ΔF (MHz)
Tnom (20) °C	Vnom (120)V	36	5180.0000	5180.0068	-0.0068
		38	5220.0000	5220.0082	-0.0082
		48	5240.0000	5240.0077	-0.0077
		52	5260.0000	5260.0088	-0.0088
		60	5300.0000	5300.0062	-0.0062
		64	5320.0000	5320.0032	-0.0032
		100	5500.0000	5500.0093	-0.0093
		116	5580.0000	5580.0097	-0.0097
		140	5700.0000	5700.0087	-0.0087
Tmax (50) °C	Vmax (138)V	36	5180.0000	5180.0068	-0.0068
		38	5220.0000	5220.0082	-0.0082
		48	5240.0000	5240.0077	-0.0077
		52	5260.0000	5260.0088	-0.0088
		60	5300.0000	5300.0062	-0.0062
		64	5320.0000	5320.0032	-0.0032
		100	5500.0000	5500.0093	-0.0093
		116	5580.0000	5580.0097	-0.0097
		140	5700.0000	5700.0087	-0.0087
Tmax (50) °C	Vmin (102)V	36	5180.0000	5180.0069	-0.0069
		38	5220.0000	5220.0088	-0.0088
		48	5240.0000	5240.0066	-0.0066
		52	5260.0000	5260.0079	-0.0079
		60	5300.0000	5300.0086	-0.0086
		64	5320.0000	5320.0074	-0.0074
		100	5500.0000	5500.0073	-0.0073
		116	5580.0000	5580.0101	-0.0101
		140	5700.0000	5700.0080	-0.0080

Test Conditions		Channel	Frequency (MHz)	Frequency (MHz)	ΔF (MHz)
Tmin (0) °C	Vmax (138)V	36	5180.0000	5180.0064	-0.0064
		38	5220.0000	5220.0094	-0.0094
		48	5240.0000	5240.0082	-0.0082
		52	5260.0000	5260.0076	-0.0076
		60	5300.0000	5300.0084	-0.0084
		64	5320.0000	5320.0100	-0.0100
		100	5500.0000	5500.0067	-0.0067
		116	5580.0000	5580.0094	-0.0094
		140	5700.0000	5580.0094	-0.0094
Tmin (0) °C	Vmin (102)V	36	5180.0000	5180.0064	-0.0064
		38	5220.0000	5220.0094	-0.0094
		48	5240.0000	5240.0082	-0.0082
		52	5260.0000	5260.0076	-0.0076
		60	5300.0000	5300.0084	-0.0084
		64	5320.0000	5320.0100	-0.0100
		100	5500.0000	5500.0067	-0.0067
		116	5580.0000	5580.0094	-0.0094
		140	5700.0000	5700.0086	-0.0086

9. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs