



Test Report

Product Name	MOXA IEEE802.11 a/b/g mini PCI module
Model No	WAPA003
FCC ID	SLE-WAPA003-1

Applicant	Moxa Inc.
Address	Fl.4, No. 135, Lane 235, Pao-Chiao Rd., Shing Tien City, Taipei, Taiwan, R.O.C.

Date of Receipt	Apr. 12, 2012
Issued Date	Jun. 05, 2012
Report No.	124286R-RFUSP45V01
Report Version	V1.0



The test results relate only to the samples tested.

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Test Report Certification

Issued Date: Jun. 05, 2012

Report No.: 124286R-RFUSP45V01



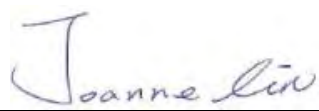
Product Name	MOXA IEEE802.11 a/b/g mini PCI module
Applicant	Moxa Inc.
Address	Fl.4, No. 135, Lane 235, Pao-Chiao Rd., Shing Tien City, Taipei, Taiwan, R.O.C.
Manufacturer	Moxa Inc.
Model No.	WAPA003
FCC ID.	SLE-WAPA003-1
EUT Rated Voltage	DC 3.3V(Power by PCI-E)
EUT Test Voltage	DC 3.3V(Power by PCI-E)
Trade Name	MOXA
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E: 2010 ANSI C63.4: 2003, FCC KDB-789033
Test Result	Complied

The Test Results relate only to the samples tested.

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Documented By :


(Adm. Specialist / Joanne Lin)

Tested By :


(Engineer / Jack Hsu)

Approved By :


(Manager / Vincent Lin)

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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
FCC ID.	SLE-WAPA003-1
Model No.	WAPA003
Frequency Range	802.11a: 5180-5320MHz, 5500-5700MHz, Turbo mode: 5210,5290MHz
Number of Channels	802.11a: 16; Turbo mode: 2
Data Rate	802.11a: 6 - 54Mbps, Turbo mode: up to 108Mbps
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	Part No.	Peak Gain
1	KINSUN	ANT-WDB-O-2 BK (main)(aux)	2.34dBi in 5GHz
2	KINSUN	ANT-WDB-ANM-0502 (main)(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

Turbo Mode Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency
Channel 42:	5210 MHz	Channel 58:	5290 MHz

Note:

1. This device is an MOXA IEEE802.11 a/b/g mini PCI module with a built-in 2.4GHz and 5GHz WLAN transceiver, this report for 5GHz.
2. The device is applied for modular approval.
3. 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 and turbo mode is 12Mbps)
4. 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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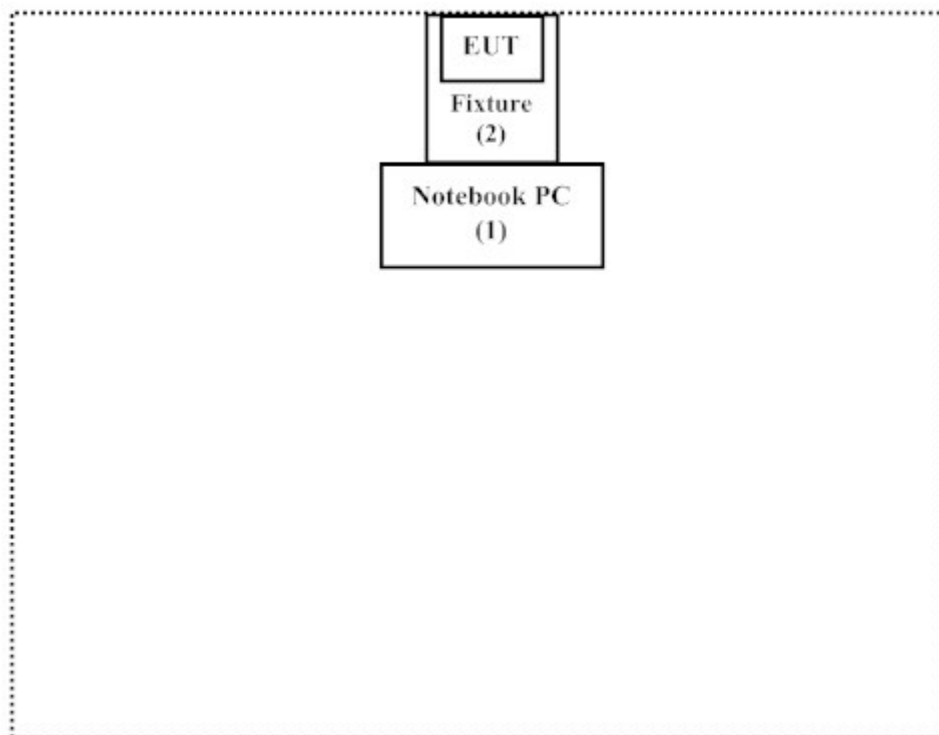
1.3. Tested System Details

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	PP18L	36119001664	Non-Shielded, 0.8m
2 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.
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E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

2. Conducted Emission

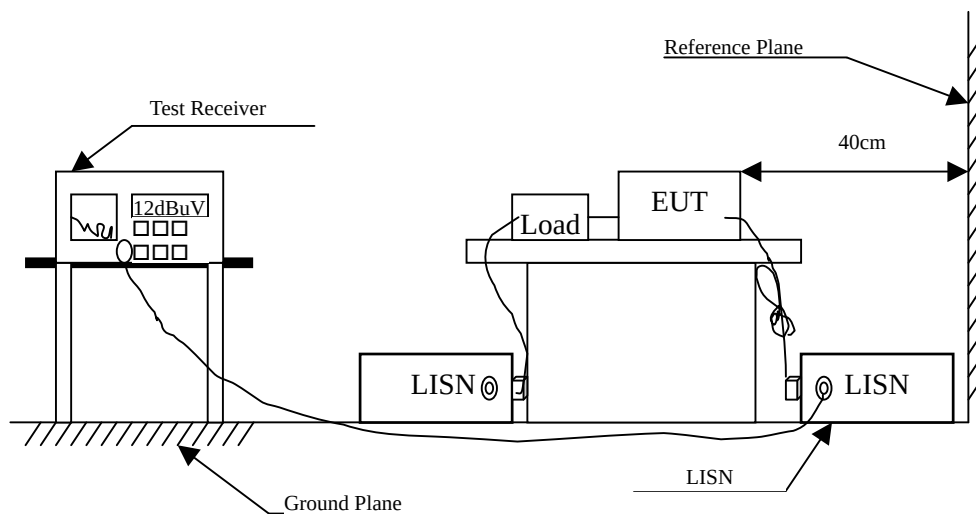
2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2011	
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 C63.4: 2003 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 C63.4, 2003; 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					
0.150	9.720	44.350	54.070	-11.930	66.000
0.177	9.702	37.800	47.502	-17.727	65.229
0.197	9.689	37.290	46.979	-17.678	64.657
0.271	9.649	30.300	39.949	-22.594	62.543
0.310	9.640	29.740	39.380	-22.049	61.429
0.384	9.640	26.510	36.150	-23.164	59.314
Average					
0.150	9.720	25.730	35.450	-20.550	56.000
0.177	9.702	22.750	32.452	-22.777	55.229
0.197	9.689	13.360	23.049	-31.608	54.657
0.271	9.649	28.530	38.179	-14.364	52.543
0.310	9.640	27.330	36.970	-14.459	51.429
0.384	9.640	15.500	25.140	-24.174	49.314

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	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
LINE 2					
Quasi-Peak					
0.170	9.714	34.300	44.014	-21.415	65.429
0.279	9.647	31.400	41.047	-21.267	62.314
0.306	9.649	31.140	40.789	-20.754	61.543
0.373	9.650	21.090	30.740	-28.889	59.629
0.459	9.650	28.730	38.380	-18.791	57.171
0.584	9.650	22.590	32.240	-23.760	56.000
Average					
0.170	9.714	21.410	31.124	-24.305	55.429
0.279	9.647	30.140	39.787	-12.527	52.314
0.306	9.649	30.310	39.959	-11.584	51.543
0.373	9.650	8.310	17.960	-31.669	49.629
0.459	9.650	19.150	28.800	-18.371	47.171
0.584	9.650	21.830	31.480	-14.520	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) (5300MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	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	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	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) (5600MHz)

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

Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 2: Transmitter Turbo Mode (5GHz Band) (5210MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
LINE 1					
Quasi-Peak					
0.166	9.710	24.720	34.430	-31.113	65.543
0.287	9.644	36.950	46.594	-15.492	62.086
0.474	9.640	22.030	31.670	-25.073	56.743
0.584	9.640	25.870	35.510	-20.490	56.000
0.877	9.670	22.370	32.040	-23.960	56.000
7.529	9.750	15.500	25.250	-34.750	60.000
Average					
0.166	9.710	22.170	31.880	-23.663	55.543
0.287	9.644	35.510	45.154	-6.932	52.086
0.474	9.640	14.270	23.910	-22.833	46.743
0.584	9.640	20.970	30.610	-15.390	46.000
0.877	9.670	15.180	24.850	-21.150	46.000
7.529	9.750	11.200	20.950	-29.050	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: Transmitter Turbo Mode (5GHz Band) (5210MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
LINE 2					
Quasi-Peak					
0.189	9.694	25.630	35.324	-29.562	64.886
0.291	9.647	39.730	49.376	-12.595	61.971
0.513	9.650	18.170	27.820	-28.180	56.000
0.607	9.650	15.550	25.200	-30.800	56.000
0.873	9.690	21.470	31.160	-24.840	56.000
6.931	9.770	15.840	25.610	-34.390	60.000
Average					
0.189	9.694	20.070	29.764	-25.122	54.886
0.291	9.647	37.980	47.626	-4.345	51.971
0.513	9.650	11.510	21.160	-24.840	46.000
0.607	9.650	10.860	20.510	-25.490	46.000
0.873	9.690	16.970	26.660	-19.340	46.000
6.931	9.770	11.800	21.570	-28.430	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 2: Transmitter Turbo Mode (5GHz Band) (5290MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
LINE 1					
Quasi-Peak					
0.291	9.643	37.290	46.933	-15.038	61.971
0.345	9.640	18.160	27.800	-32.629	60.429
0.490	9.640	23.490	33.130	-23.156	56.286
0.595	9.640	25.180	34.820	-21.180	56.000
1.170	9.670	23.740	33.410	-22.590	56.000
6.638	9.720	16.410	26.130	-33.870	60.000
Average					
0.291	9.643	36.610	46.253	-5.718	51.971
0.345	9.640	13.820	23.460	-26.969	50.429
0.490	9.640	16.280	25.920	-20.366	46.286
0.595	9.640	23.640	33.280	-12.720	46.000
1.170	9.670	18.740	28.410	-17.590	46.000
6.638	9.720	11.830	21.550	-28.450	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: Transmitter Turbo Mode (5GHz Band) (5290MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
LINE 2					
Quasi-Peak					
0.189	9.694	25.410	35.104	-29.782	64.886
0.291	9.647	39.710	49.356	-12.615	61.971
0.494	9.650	24.120	33.770	-22.401	56.171
0.580	9.650	26.200	35.850	-20.150	56.000
0.869	9.690	20.420	30.110	-25.890	56.000
7.201	9.770	16.420	26.190	-33.810	60.000
Average					
0.189	9.694	18.800	28.494	-26.392	54.886
0.291	9.647	36.150	45.796	-6.175	51.971
0.494	9.650	14.810	24.460	-21.711	46.171
0.580	9.650	24.800	34.450	-11.550	46.000
0.869	9.690	18.450	28.140	-17.860	46.000
7.201	9.770	12.060	21.830	-28.170	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 Transmit Power

3.1. Test Equipment

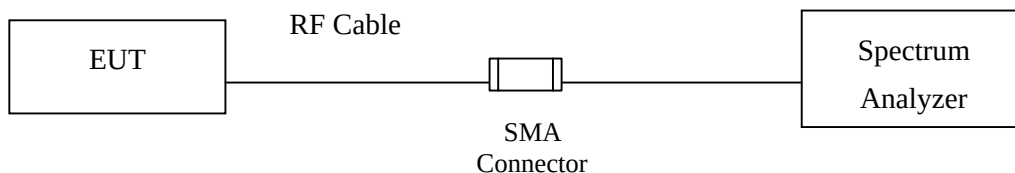
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2012
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2012
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2012

Note:

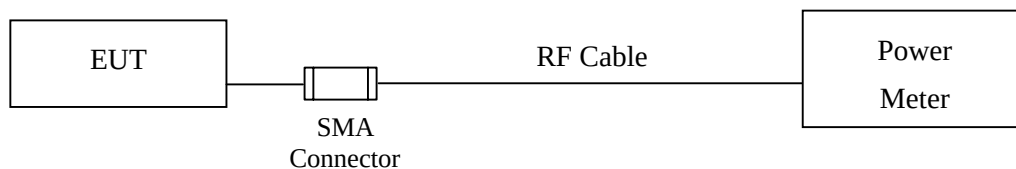
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

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)

Cable loss=1dB		Peak Power Output								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		6	9	12	18	24	36	48	54	
		Measurement Level (dBm)								
36	5180	9.92	--	--	--	--	--	--	--	<17dBm
44	5220	9.55	9.54	9.53	9.53	9.51	9.49	9.48	9.46	<17dBm
48	5240	9.68	--	--	--	--	--	--	--	<17dBm
52	5260	19.36	--	--	--	--	--	--	--	<24dBm
60	5300	19.39	19.38	19.37	19.36	19.36	19.34	19.32	19.31	<24dBm
64	5320	15.55	--	--	--	--	--	--	--	<24dBm
100	5500	13.78	--	--	--	--	--	--	--	<24dBm
116	5580	12.47	12.45	12.43	12.42	12.41	12.41	12.38	12.37	<24dBm
140	5700	12.51	--	--	--	--	--	--	--	<24dBm

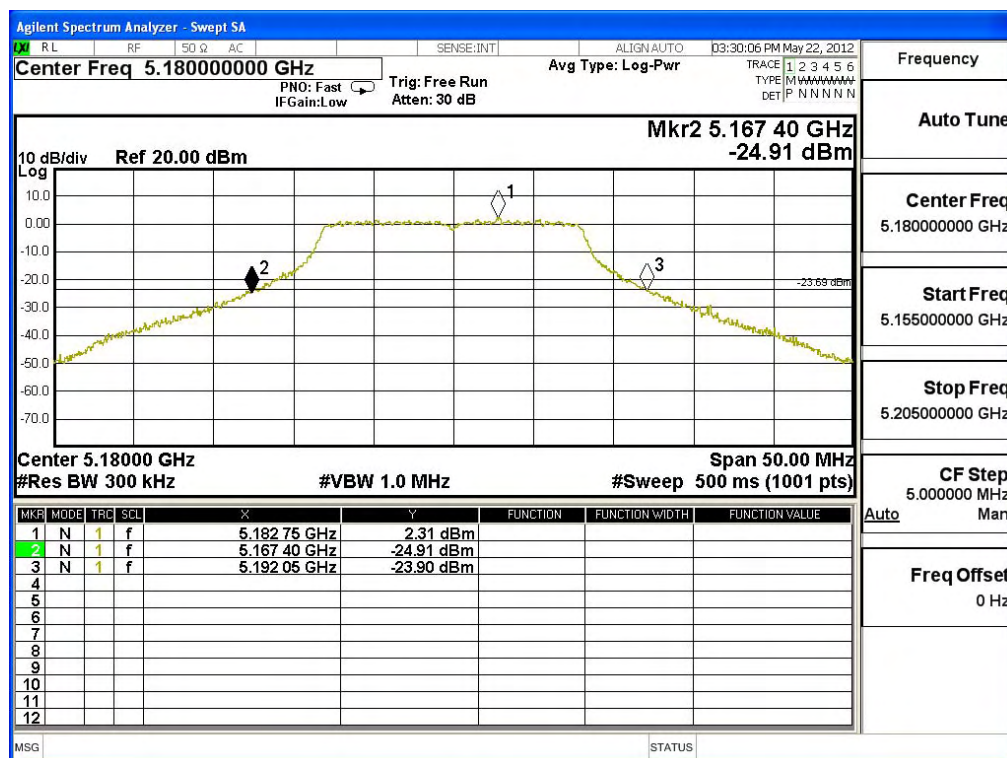
Note: Peak Power Output Value =Reading value on peak power meter + cable loss

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	24.65	9.92	17	17.92	Pass

26dBc Occupied Bandwidth:

Channel 36

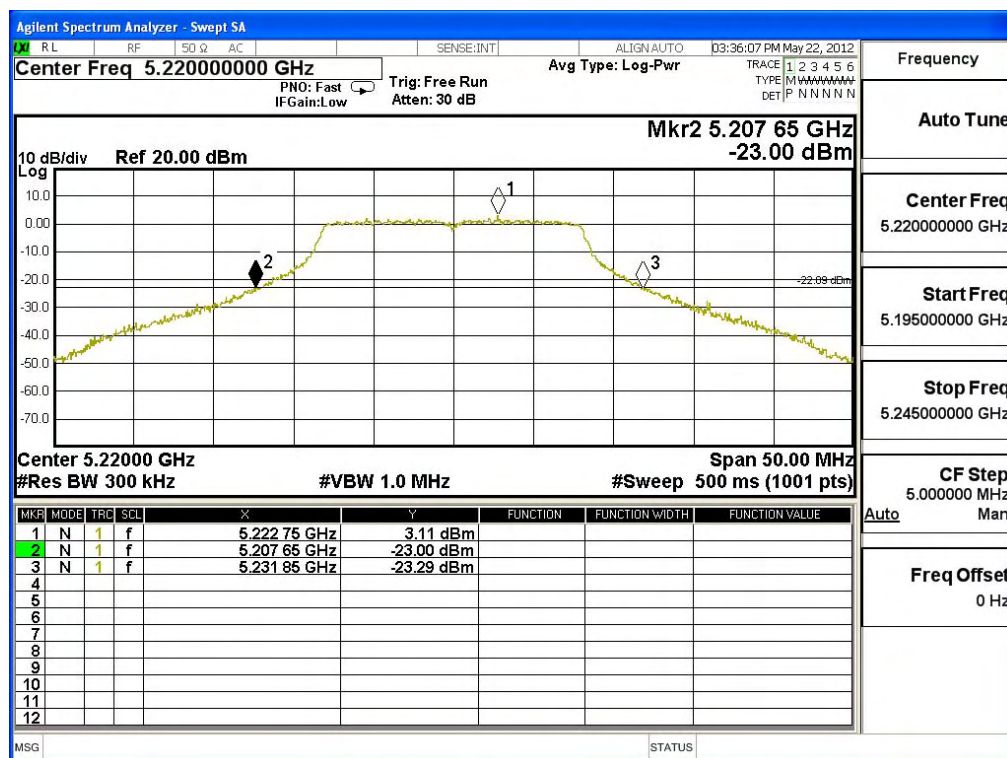


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
44	5220	24.2	9.55	17	17.84	Pass

26dBc Occupied Bandwidth:

Channel 44

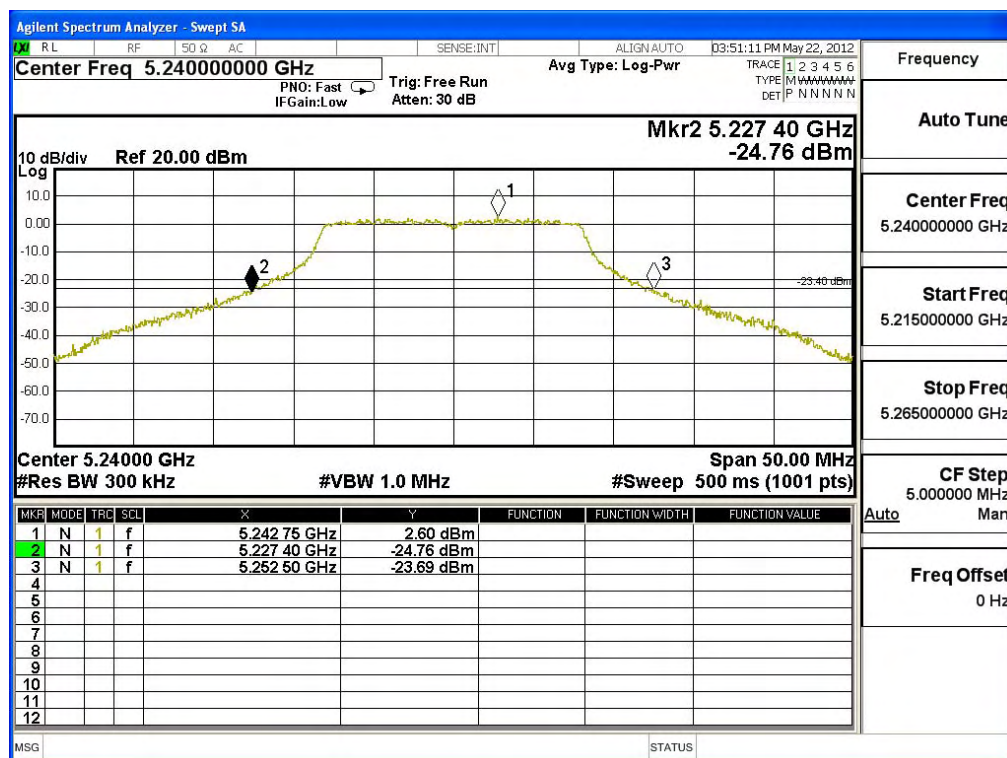


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
48	5240	25.1	9.68	17	18.00	Pass

26dBc Occupied Bandwidth:

Channel 48

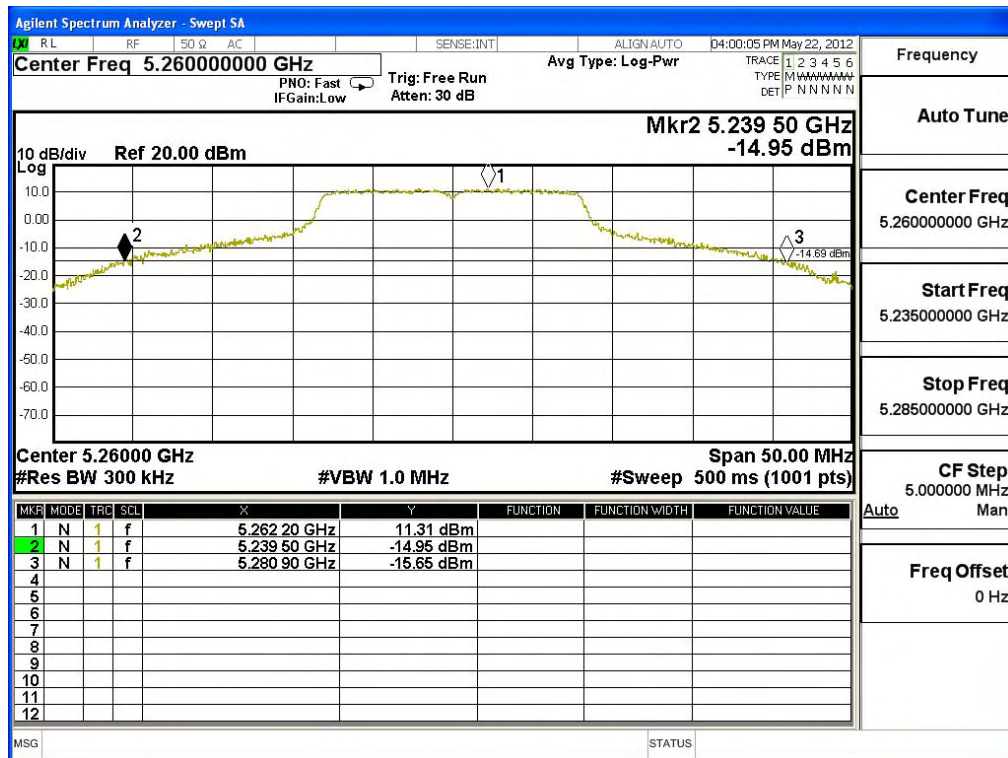


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
52	5260	41.4	19.36	24	27.17	Pass

26dBc Occupied Bandwidth:

Channel 52

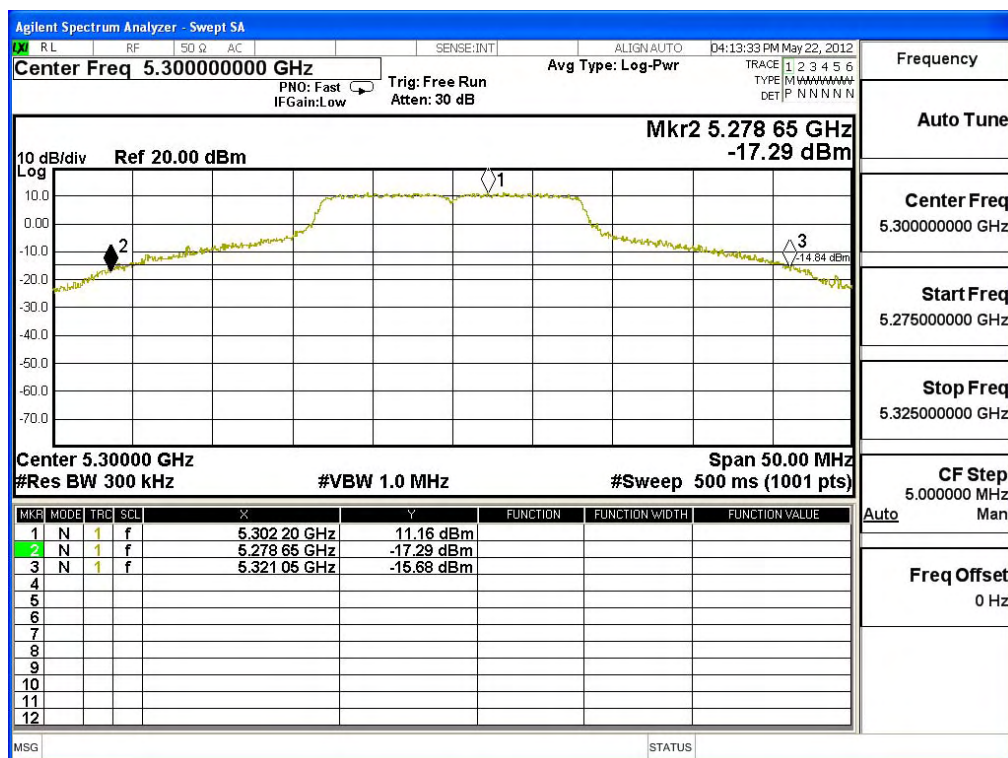


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
60	5300	42.4	19.39	24	27.27	Pass

26dBc Occupied Bandwidth:

Channel 60

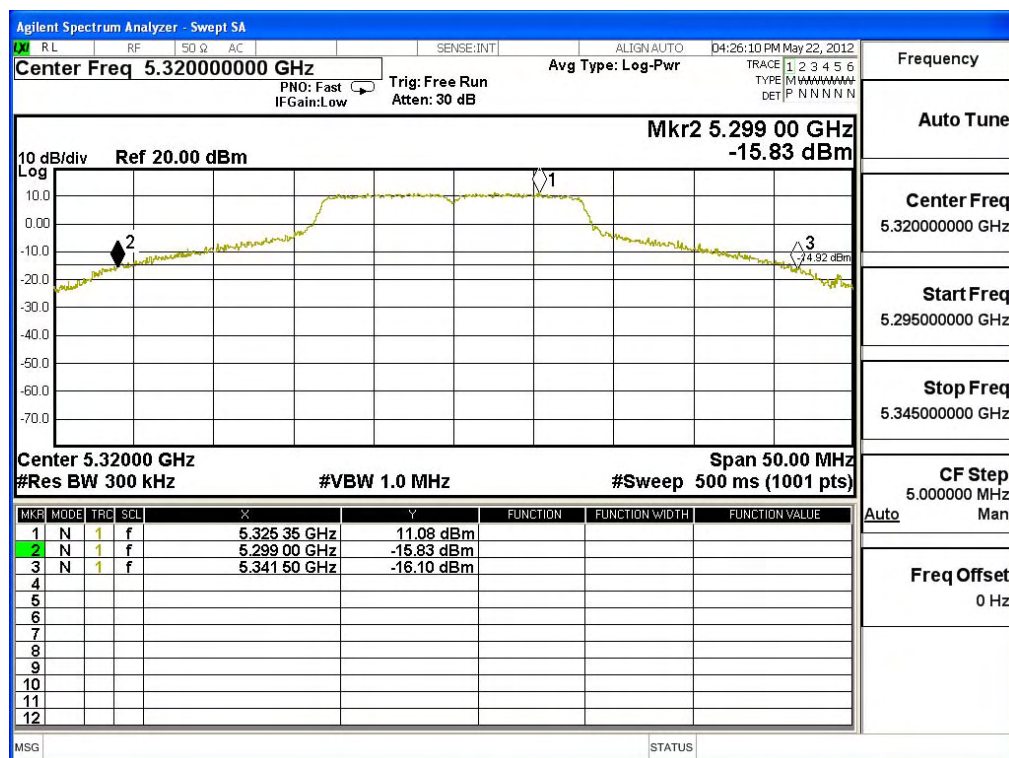


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
64	5320	42.5	15.55	24	27.28	Pass

26dBc Occupied Bandwidth:

Channel 64

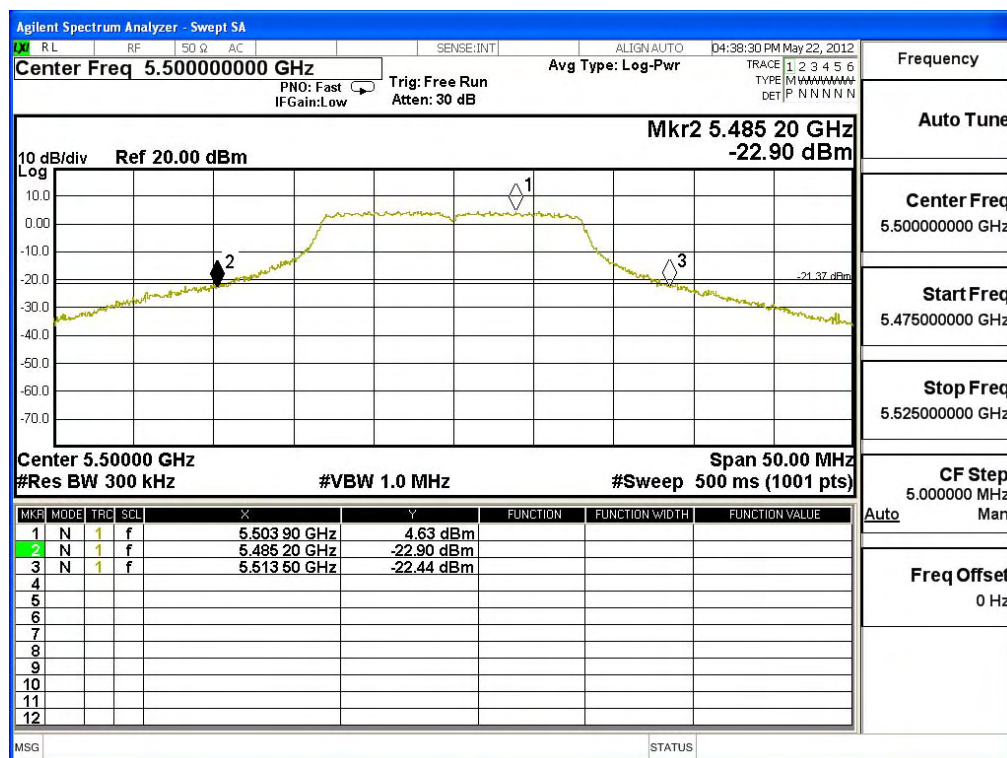


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
100	5500	28.3	13.78	24	25.52	Pass

26dBc Occupied Bandwidth:

Channel 100

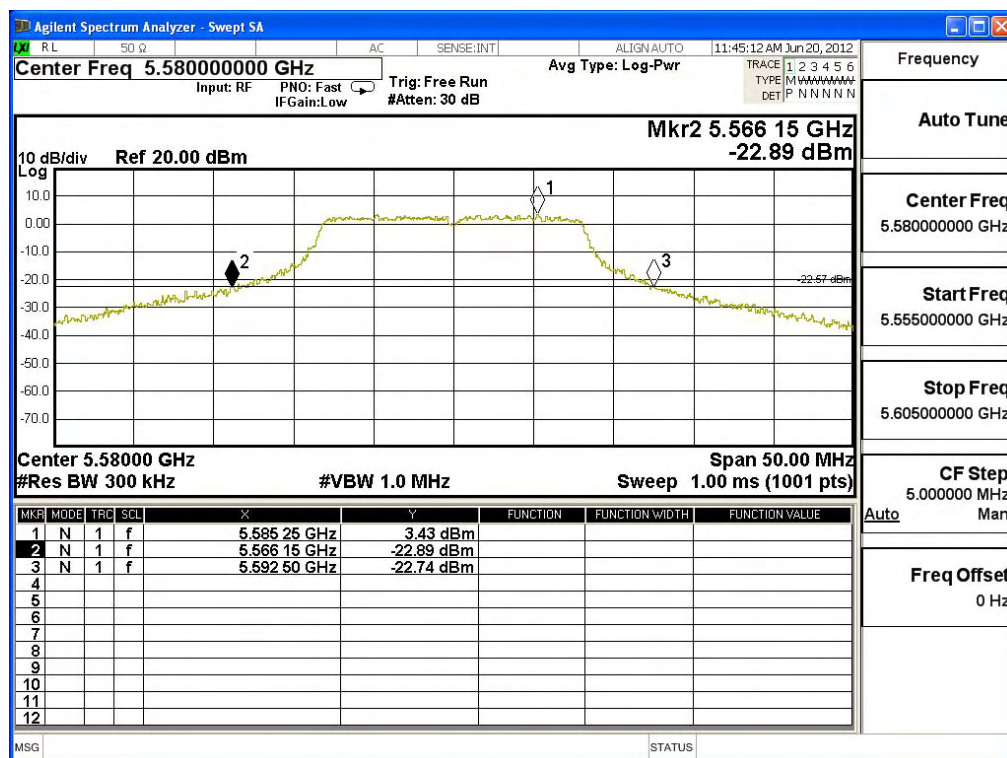


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
116	5580	26.35	12.47	24	25.21	Pass

26dBc Occupied Bandwidth:

Channel 116

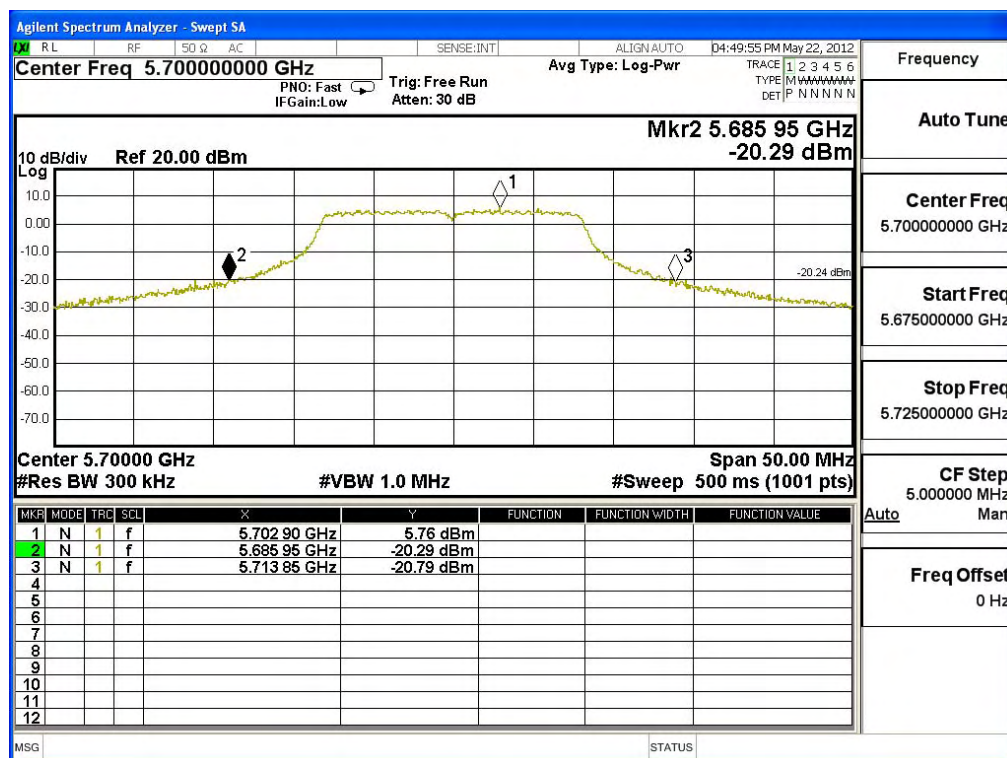


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
140	5700	27.9	12.51	24	25.46	Pass

26dBc Occupied Bandwidth:

Channel 140



Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter Turbo Mode (5GHz Band)

Cable loss=1dB		Peak Power Output								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		12	18	24	36	48	72	96	108	
		Measurement Level (dBm)								
42	5210	10.11	10.1	10.1	10.08	10.06	10.05	10.04	10.02	<17dBm
58	5290	18.98	--	--	--	--	--	--	--	<24dBm

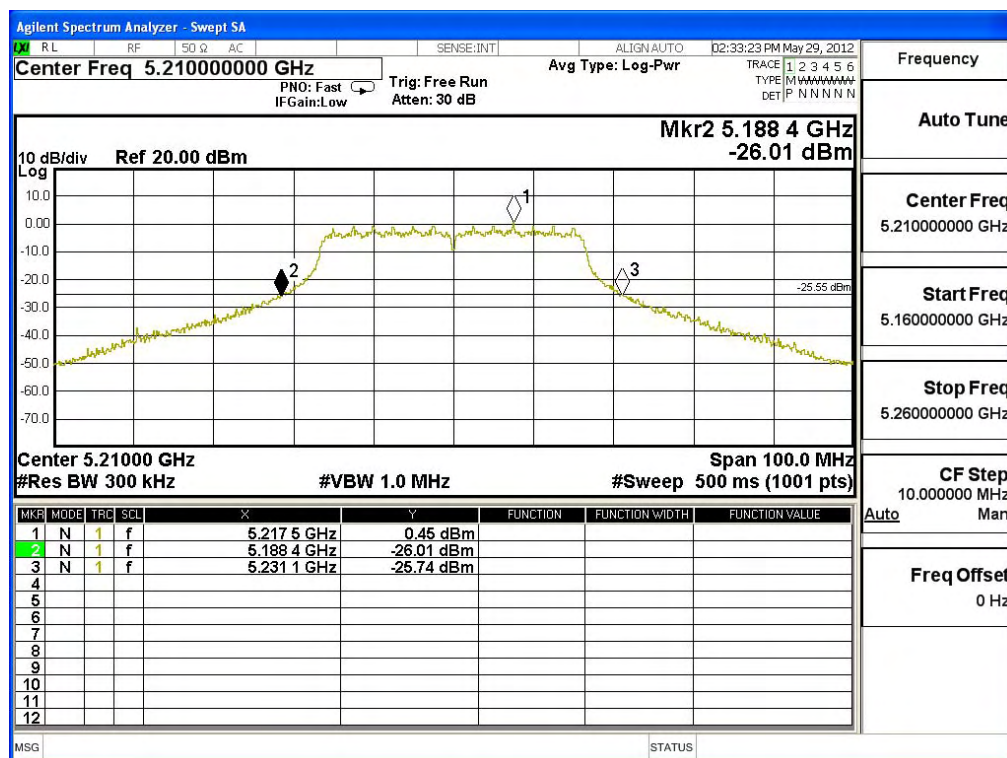
Note: Peak Power Output Value =Reading value on peak power meter + cable loss

Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
42	5210	42.7	10.11	17	20.30	Pass

26dBc Occupied Bandwidth:

Channel 42

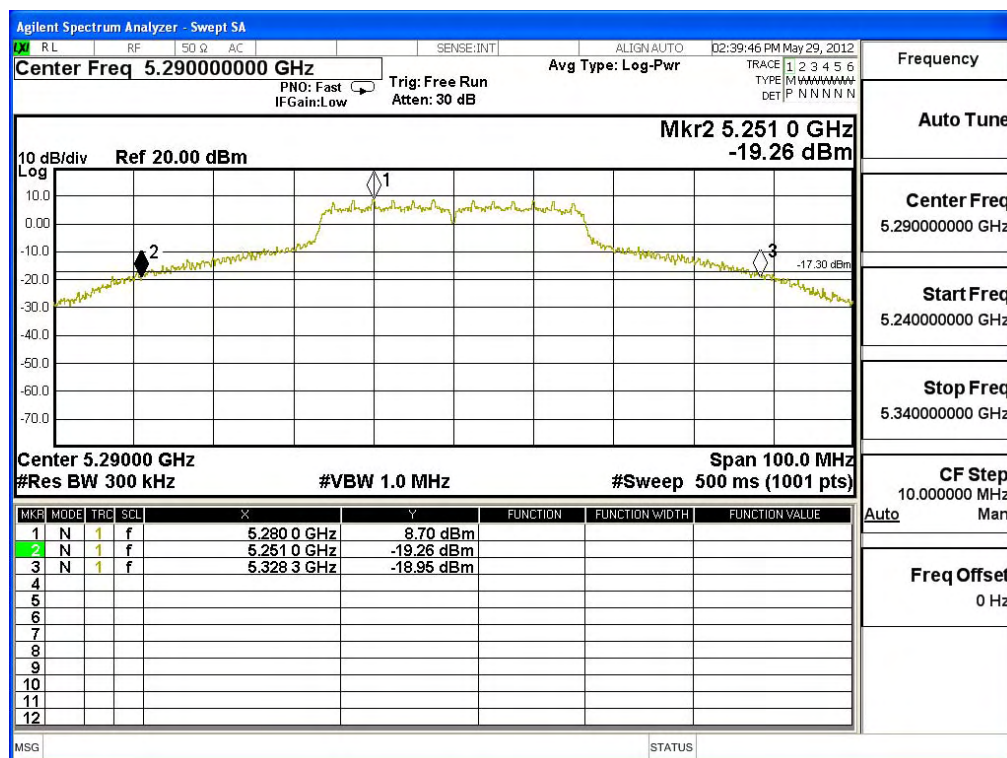


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
58	5290	77.3	18.98	24	29.88	Pass

26dBc Occupied Bandwidth:

Channel 58



4. Peak Power Spectral Density

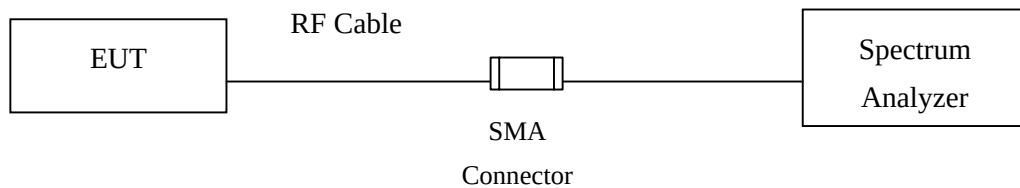
4.1. Test Equipment

	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 C63.4, 2003; tested to DTS test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

4.5. Uncertainty

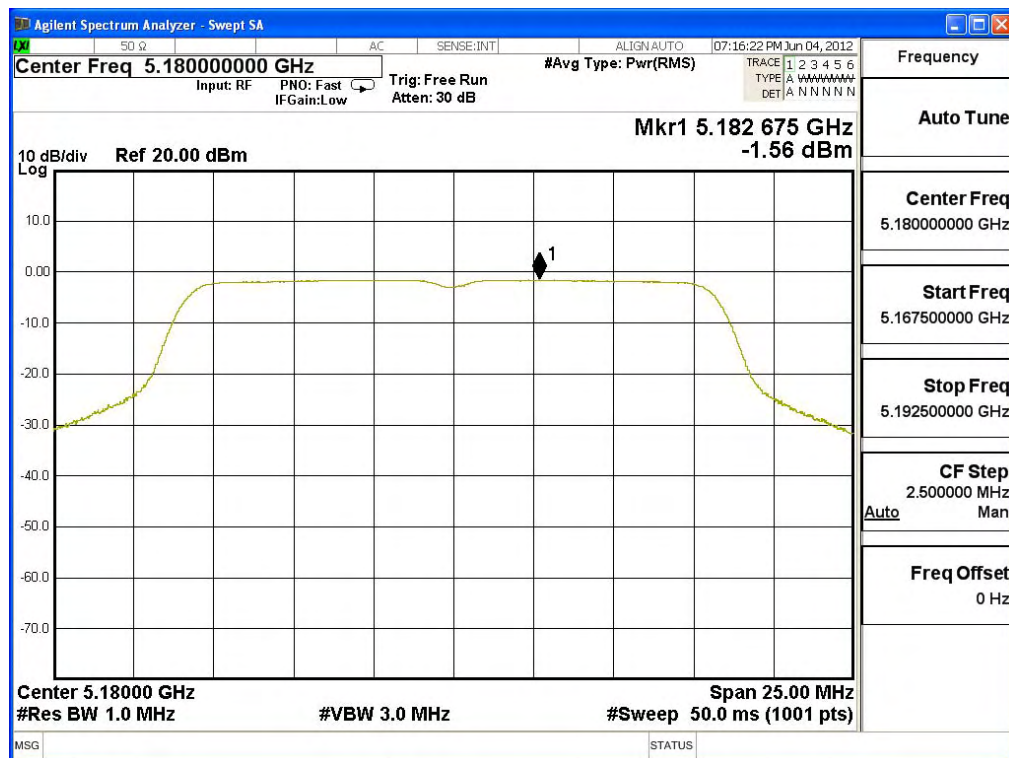
± 1.27 dB

4.6. Test Result of Peak Power Spectral Density

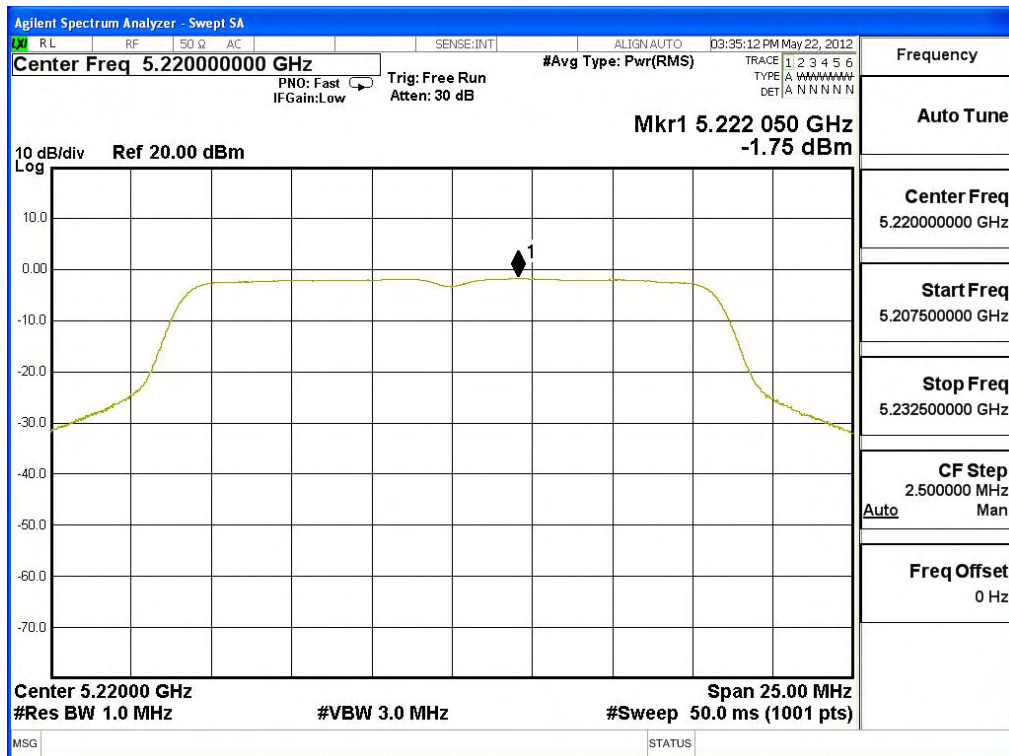
Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Peak Power Spectral Density
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
36	5180	-1.560	<4	Pass
44	5220	-1.750	<4	Pass
48	5240	-1.710	<4	Pass
52	5260	7.850	<11	Pass
60	5300	7.700	<11	Pass
64	5320	7.600	<11	Pass
100	5500	1.320	<11	Pass
116	5580	0.410	<11	Pass
140	5700	1.840	<11	Pass

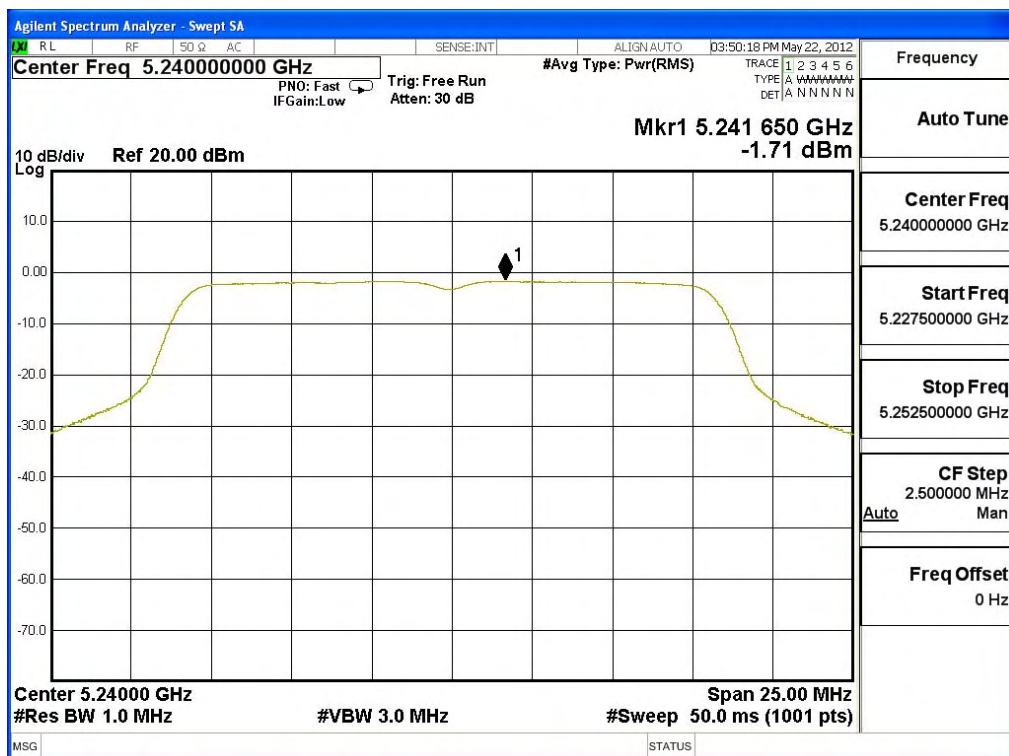
Channel 36:



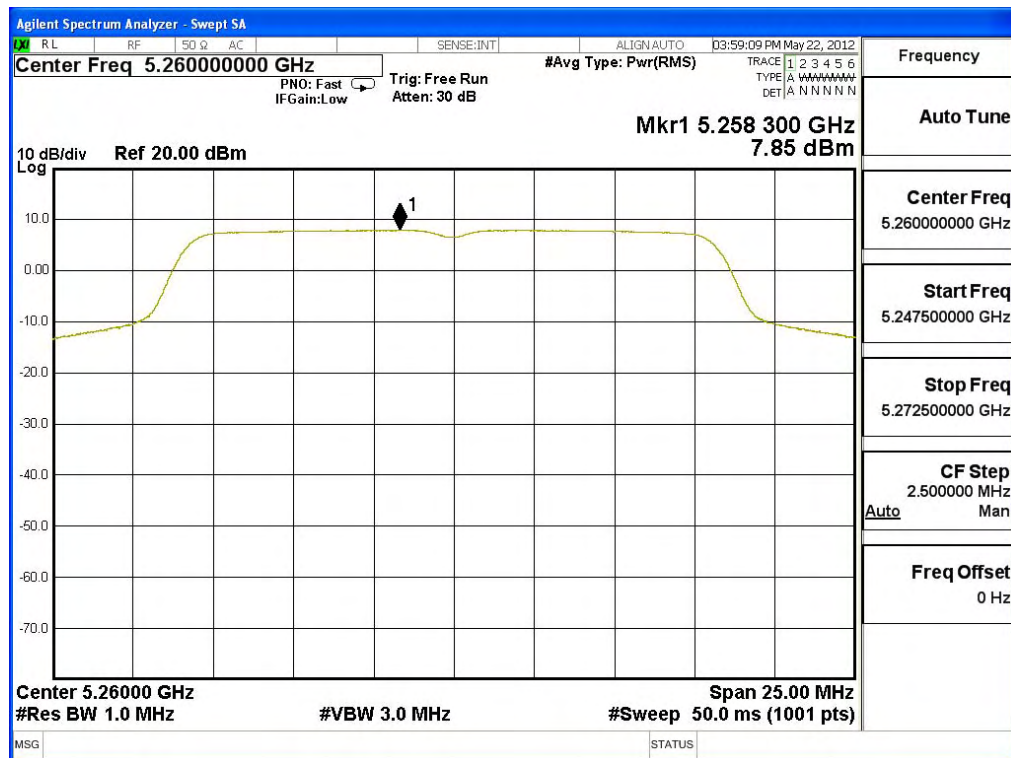
Channel 44:



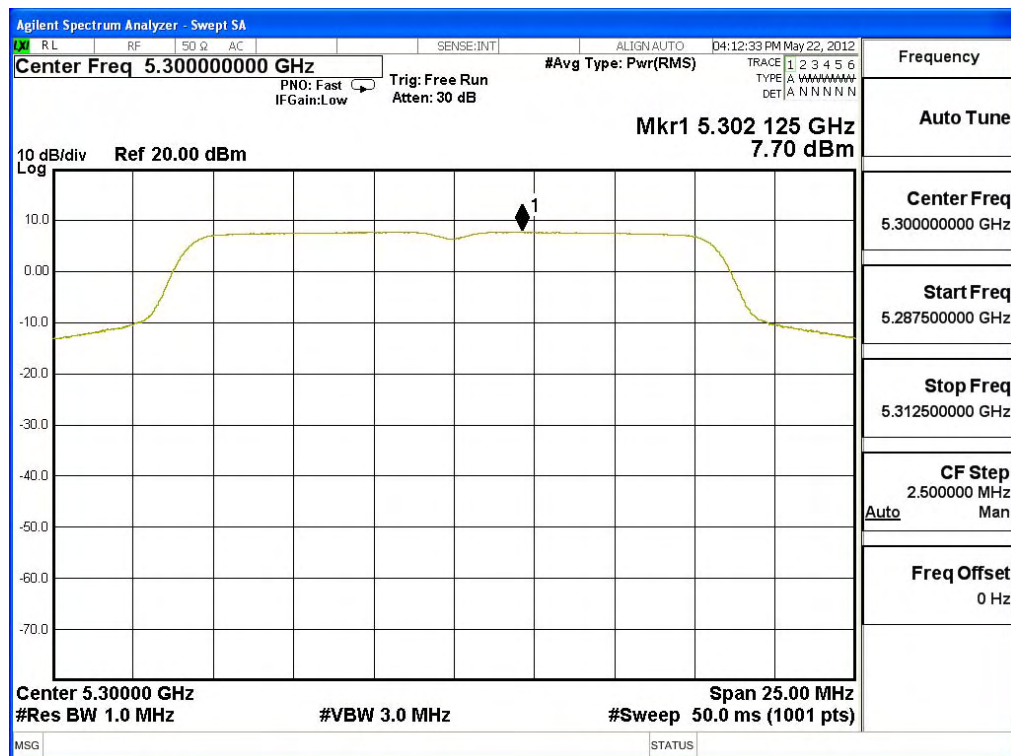
Channel 48:



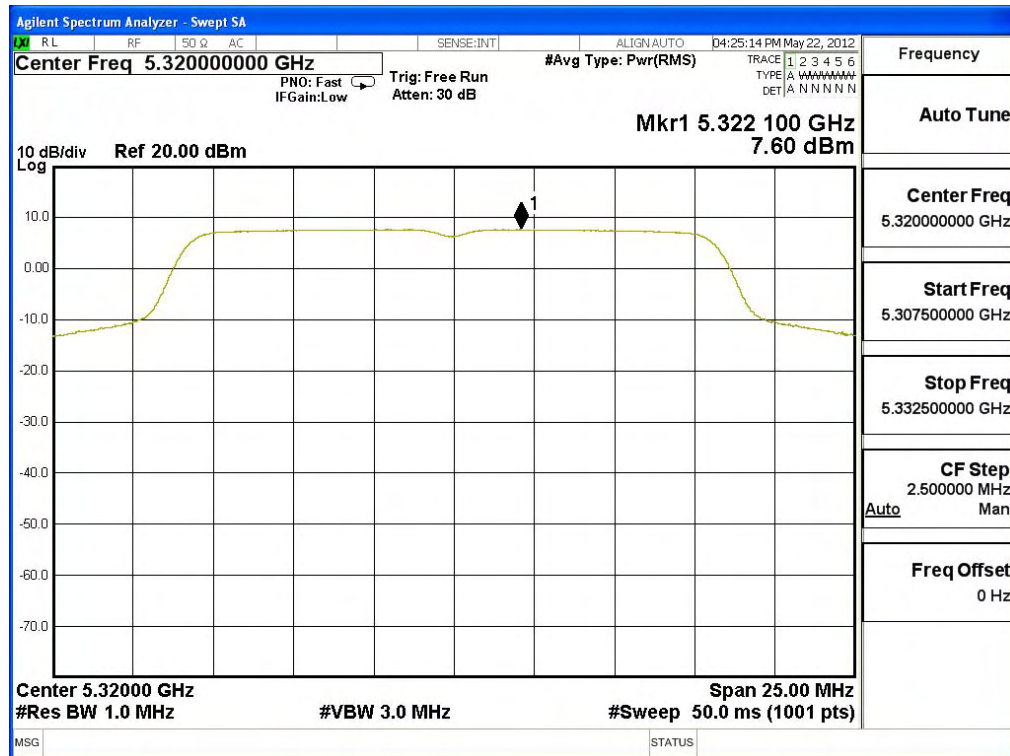
Channel 52:



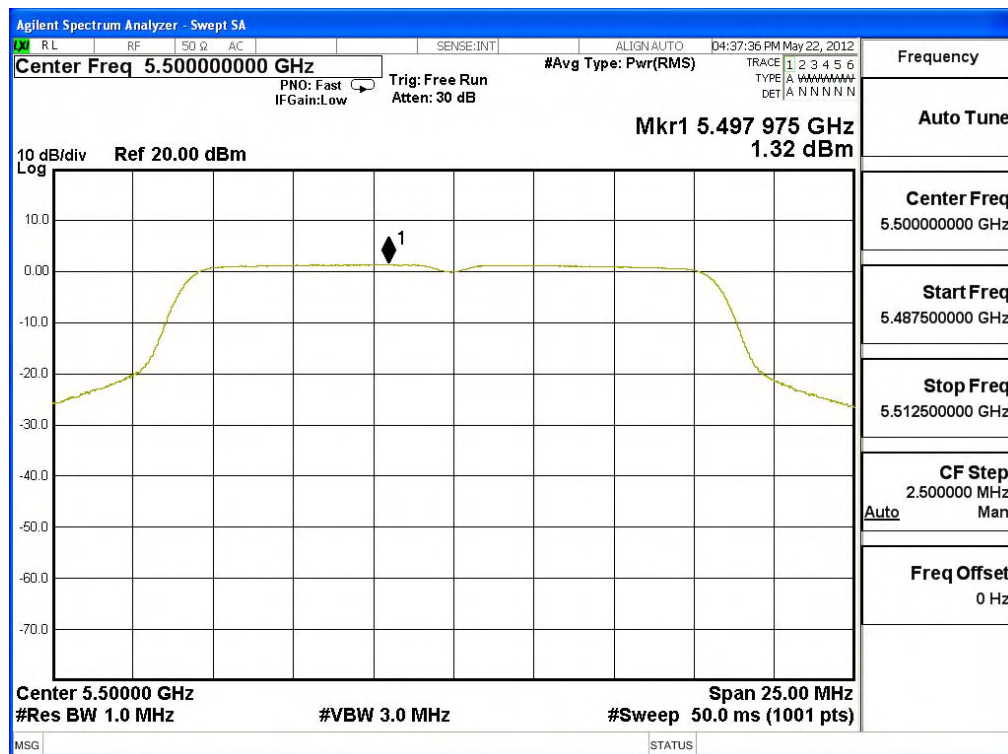
Channel 60:



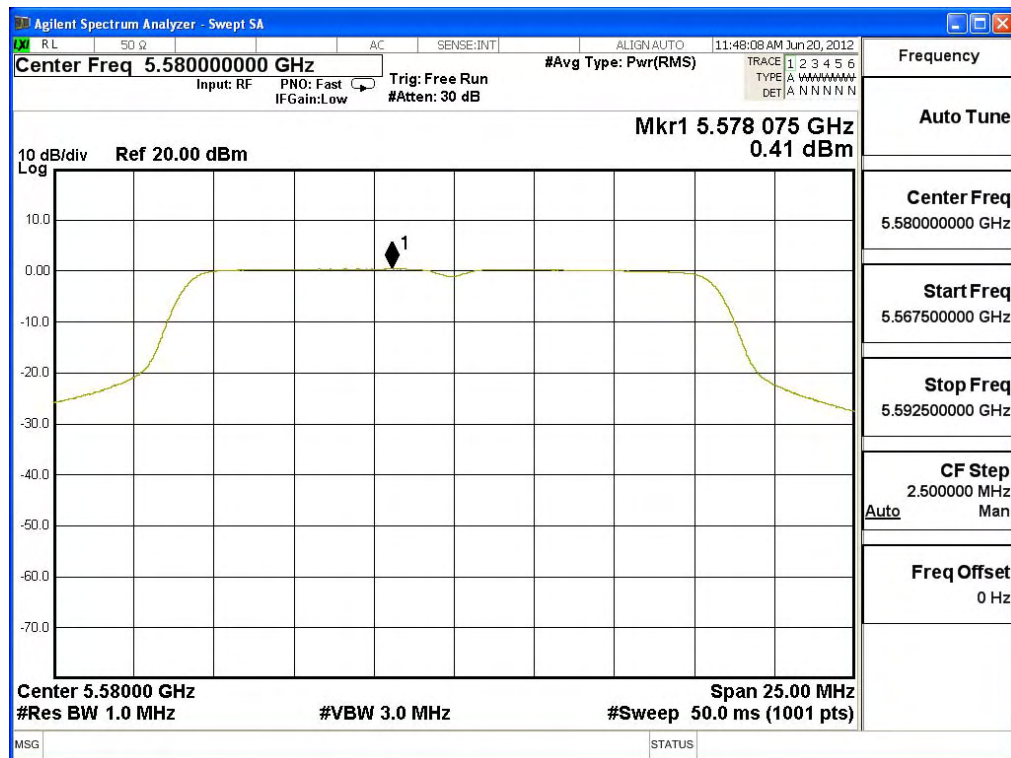
Channel 64:



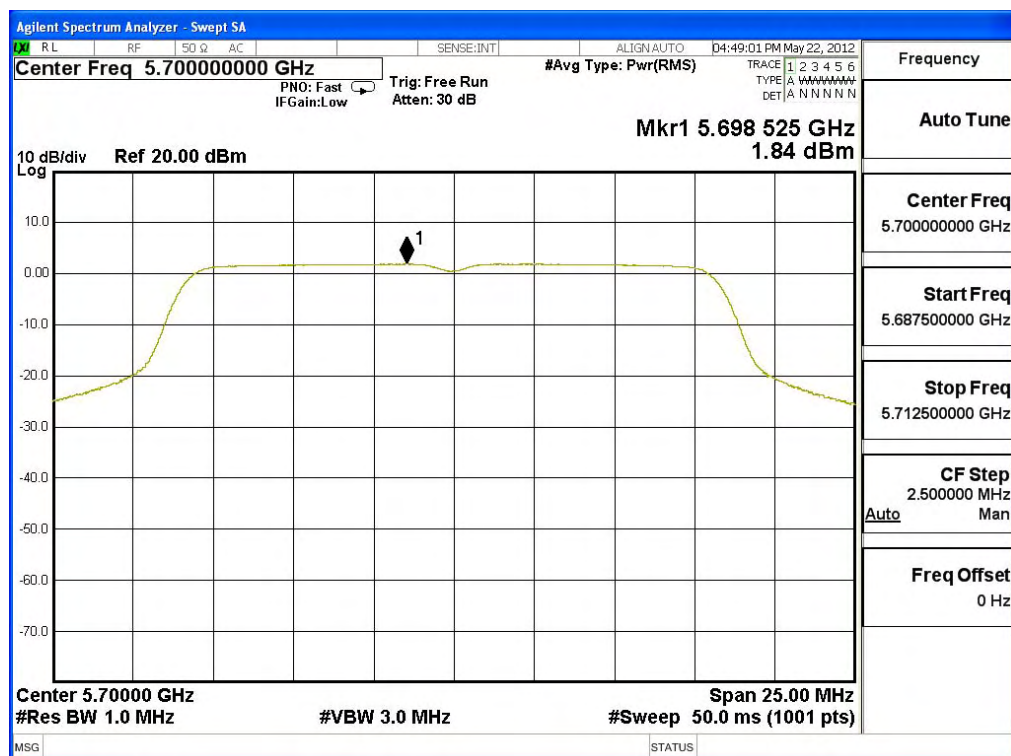
Channel 100:



Channel 116:



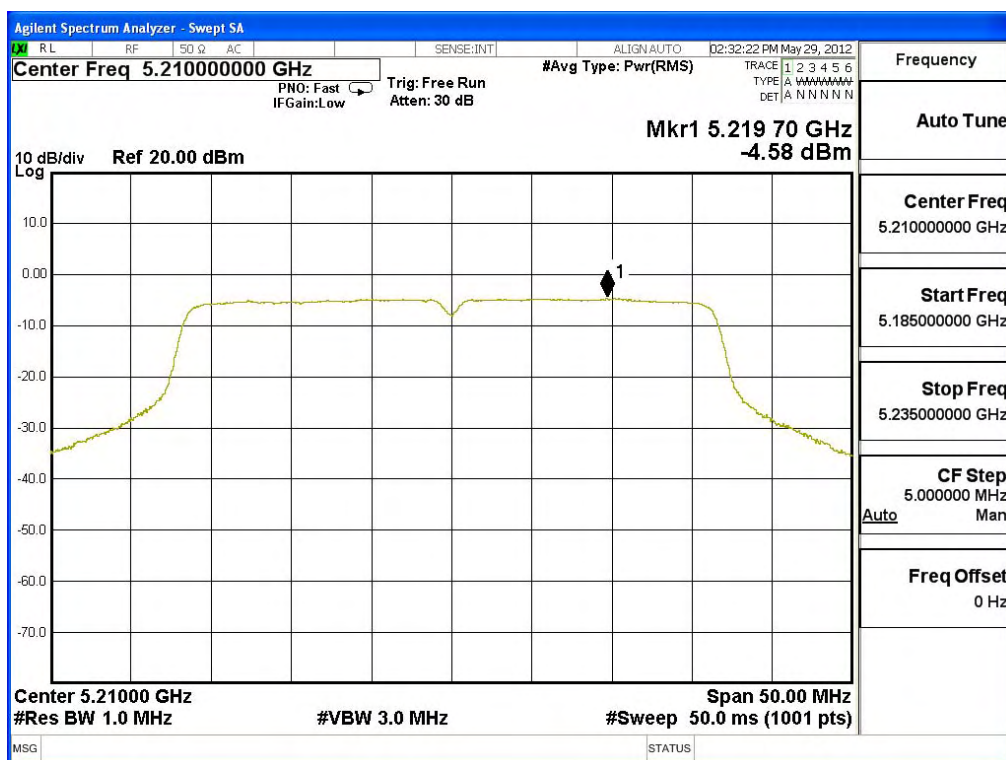
Channel 140:



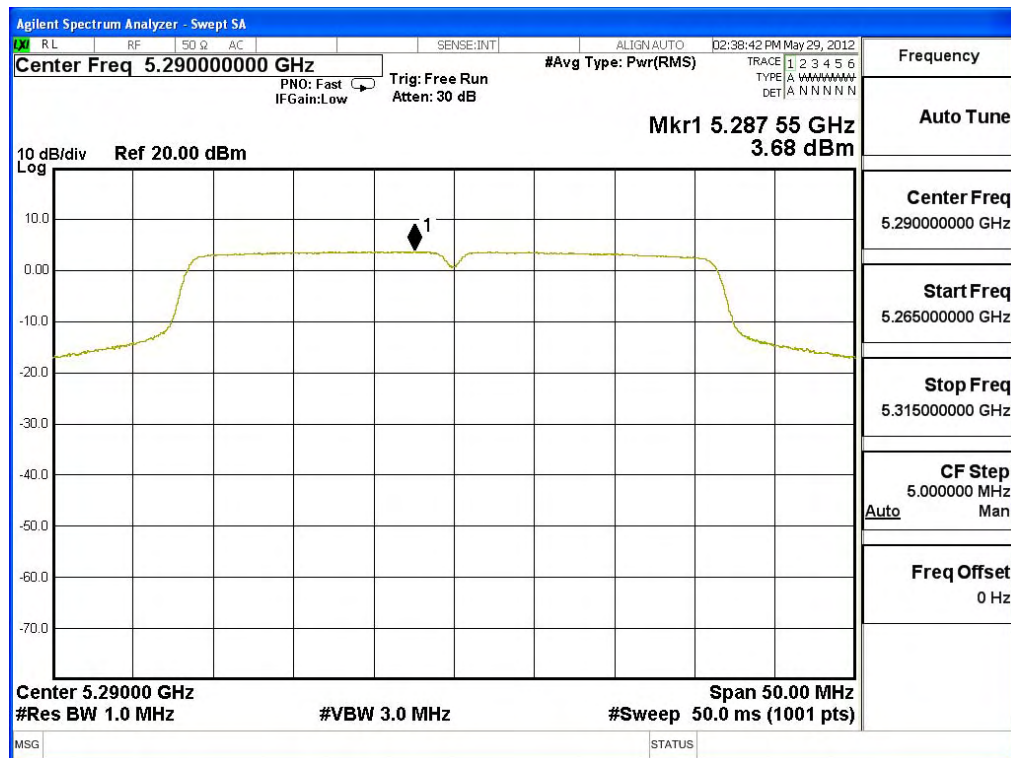
Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Peak Power Spectral Density
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter Turbo Mode (5GHz Band)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
42	5210	-4.580	<4	Pass
58	5290	3.680	<11	Pass

Channel 42:



Channel 58:



5. Peak Excursion

5.1. Test Equipment

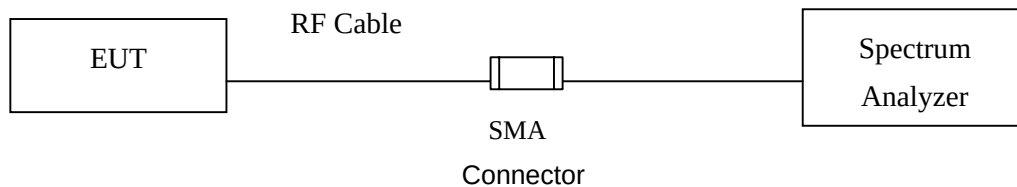
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2012
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2012
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2012

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 C63.4, 2003; tested to DTS test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

5.5. Uncertainty

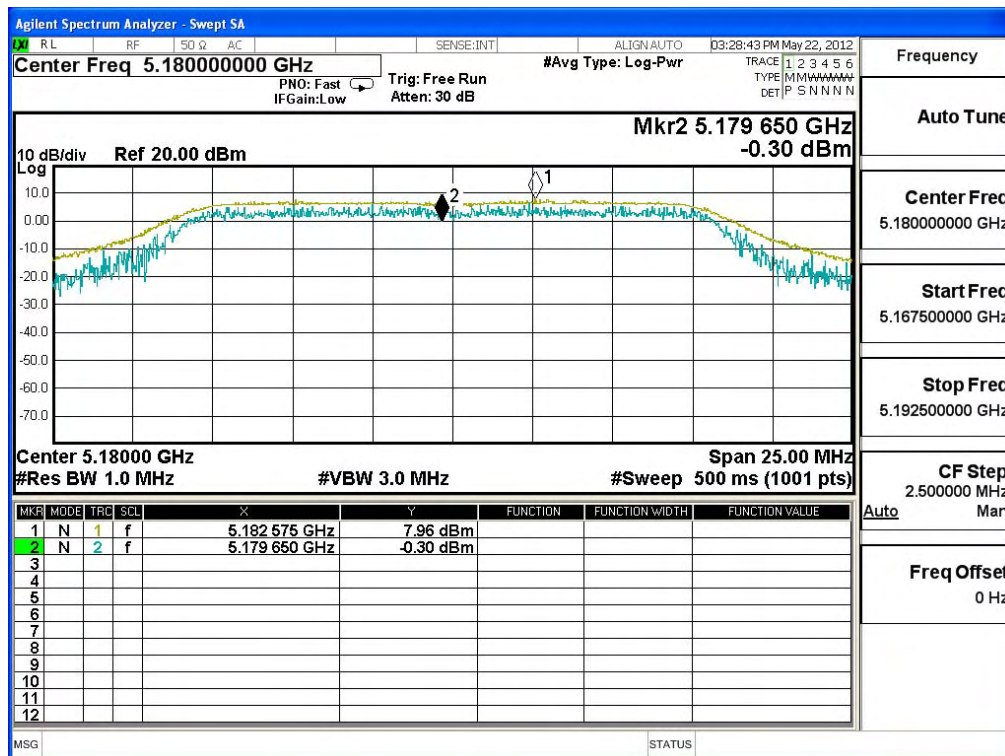
± 1.27 dB

5.6. Test Result of Peak Excursion

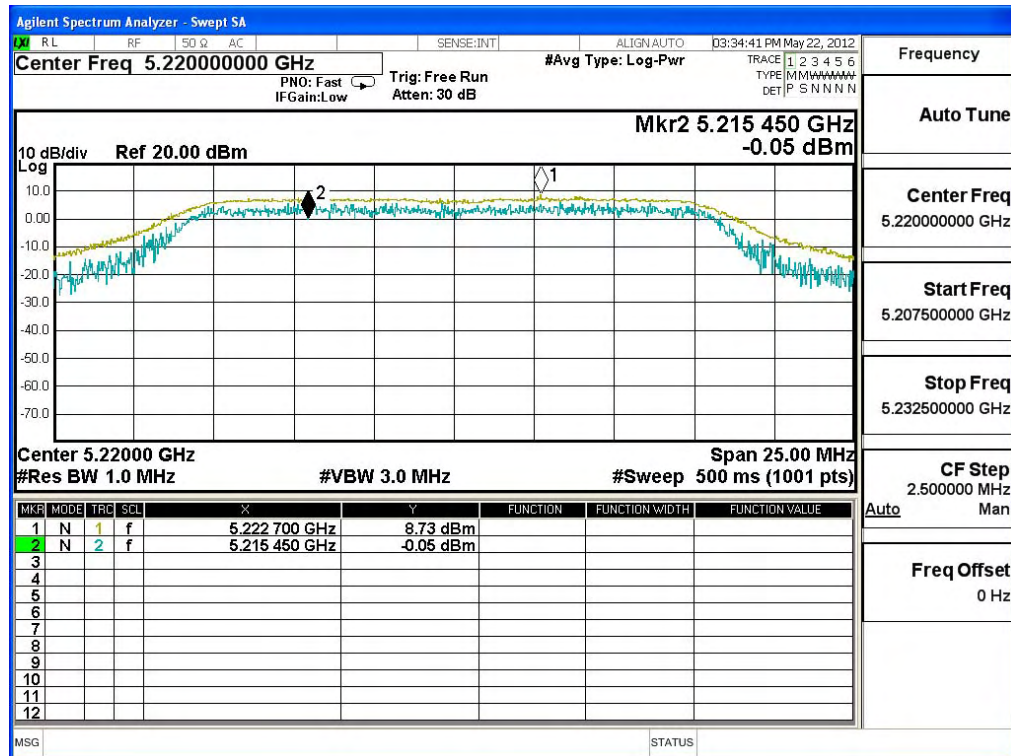
Product : MOXA IEEE802.11 a/b/g mini PCI module
 Test Item : Peak Excursion
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (802.11a-6Mbps)

Channel No.	Frequency (MHz)	Measurement Level (dB)	Required Limit (dB)	Result
36	5180	8.260	<13	Pass
44	5220	8.780	<13	Pass
48	5240	8.070	<13	Pass
52	5260	6.960	<13	Pass
60	5300	8.200	<13	Pass
64	5320	7.010	<13	Pass
100	5500	8.280	<13	Pass
116	5580	7.520	<13	Pass
140	5700	7.470	<13	Pass

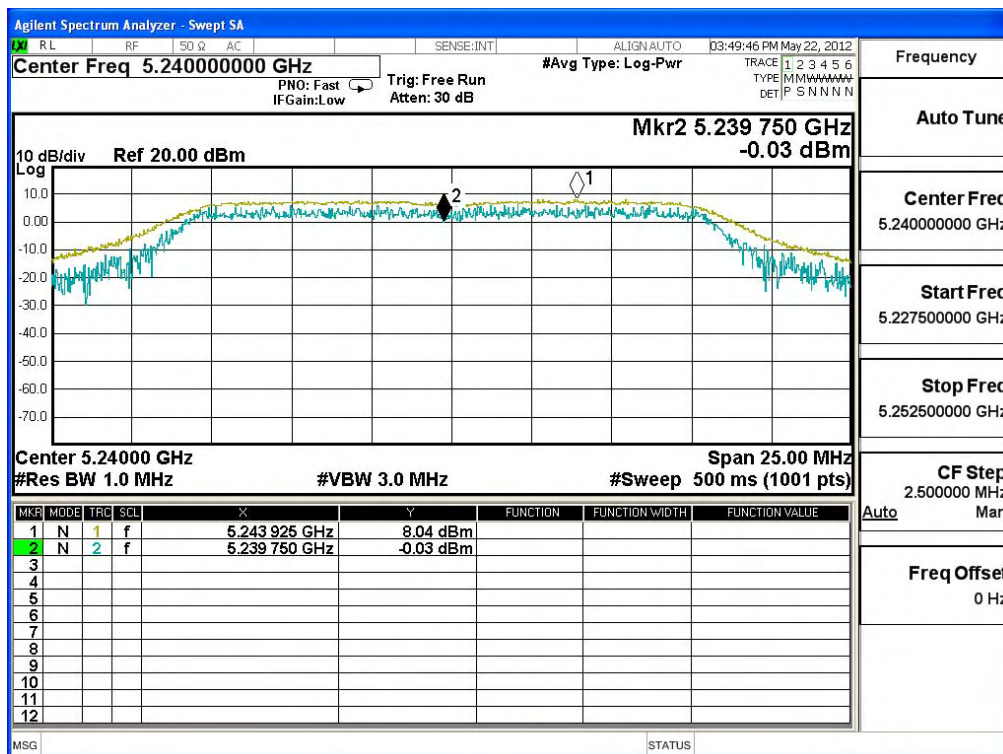
Channel 36:



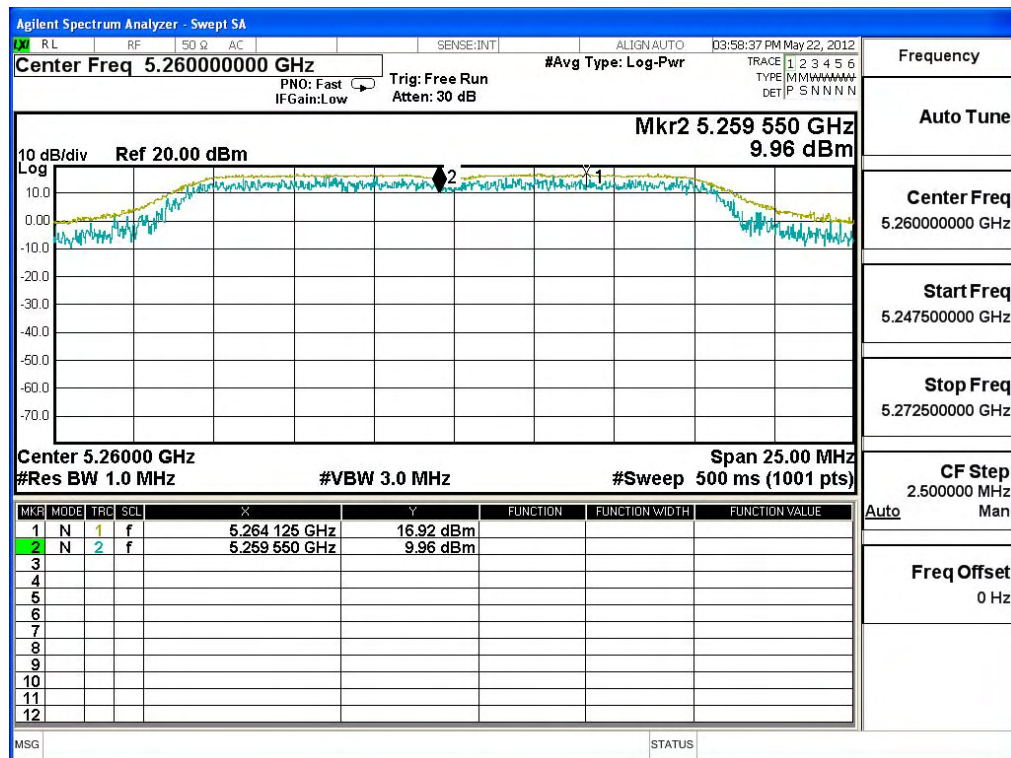
Channel 44:



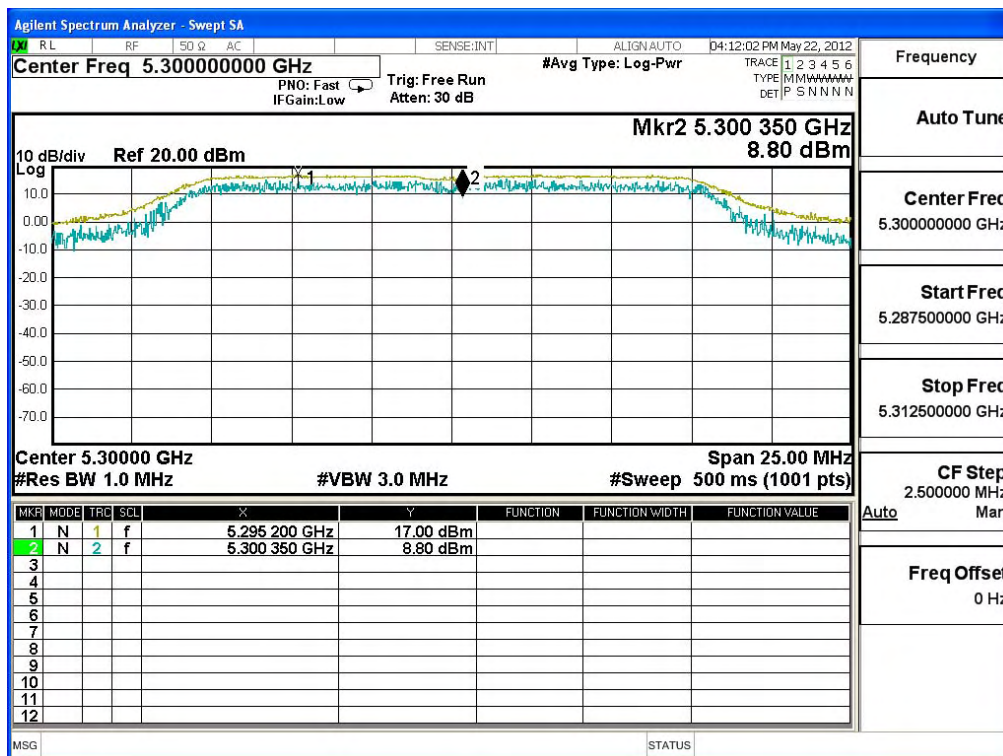
Channel 48:



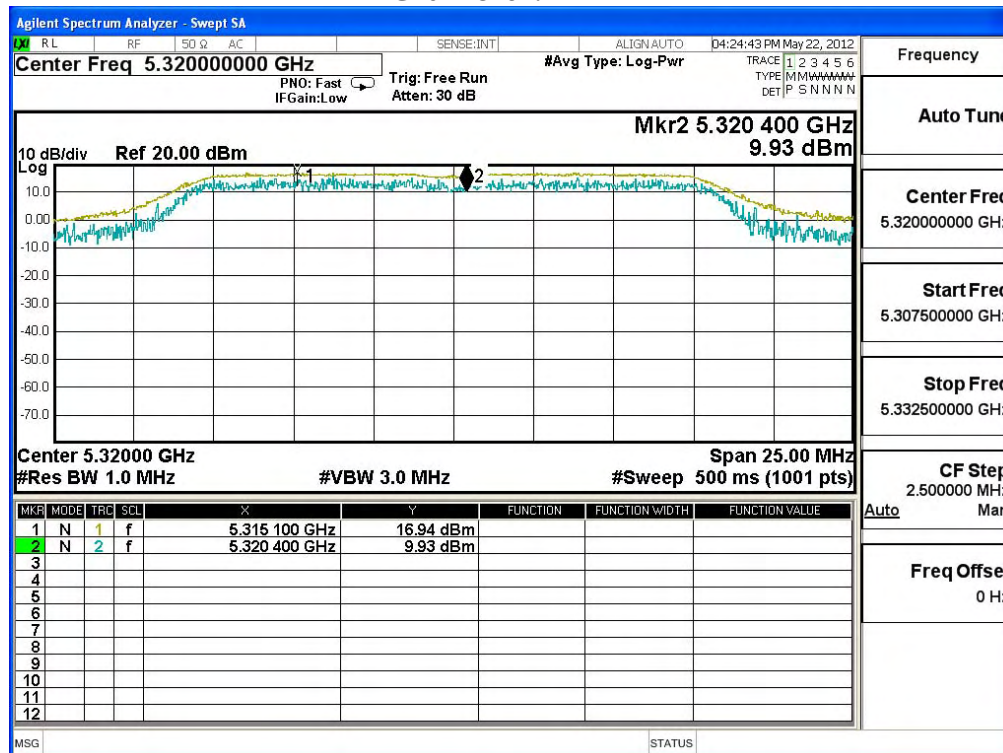
Channel 52:



Channel 60:



Channel 64:



Channel 100:

