

# FCC Test Report

## (Class II Permissive Change)

Product Name	MOXA IEEE 802.11a/b/g/n Wireless
Model No	WAPN005
FCC ID	SLE-WAPN005

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

Date of Receipt	Feb. 25, 2015
Issued Date	Mar. 09, 2015
Report No.	1520478R-RFUSP07V00
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of QuiTek Corporation.

## Test Report

Issued Date: Mar. 09, 2015

Report No.: 1520478R-RFUSP07V00

**QuiTek**

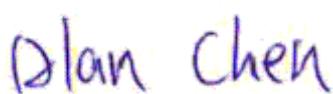
Product Name	MOXA IEEE 802.11a/b/g/n Wireless
Applicant	MOXA Inc.
Address	FL.4, NO. 135. LANE 235, BAOQIAO RD. XINDIAN DIST.,NEW TAIPEI CITY, TAIWAN
Manufacturer	MOXA Inc.
Model No.	WAPN005
FCC ID.	SLE-WAPN005
EUT Rated Voltage	DC 3.3V
EUT Test Voltage	AC 120V/60Hz
Trade Name	MOXA
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E: 2014 ANSI C63.4: 2014, ANSI C63.10: 2013 789033 D02 General UNII Test Procedures New Rules v01
Test Result	Complied

Documented By



( Senior Adm. Specialist / Joanne Lin )

Tested By



( Engineer / Alan Chen )

Approved By



( Director / 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 IEEE 802.11a/b/g/n Wireless
Trade Name	MOXA
FCC ID.	SLE-WAPN005
Model No.	WAPN005
Frequency Range	802.11a/n-20MHz: 5180-5240MHz, 5745-5825MHz 802.11n-40MHz: 5190-5230MHz, 5755-5795MHz
Number of Channels	802.11a/n-20MHz: 9; 802.11n-40MHz: 4
Data Rate	802.11a: 6 - 54Mbps 802.11n: up to 300Mbps
Type of Modulation	802.11a/n:OFDM, BPSK, QPSK, 16QAM, 64QAM
Channel Control	Auto
Antenna type	Dipole Antenna
Antenna Gain	Refer to the table “Antenna List”

#### Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	KINSUN	ANT-WDB-O-2 BK	Dipole	2.34dBi For 5.15~5.25GHz 2.34dBi For 5.725~5.825GHz
2	KINSUN	ANT-WDB-ANM-0502	Dipole	1.41dBi For 5.15~5.25GHz 1.41dBi For 5.725~5.825GHz

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/n-20MHz 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 149:	5745 MHz	Channel 153:	5765 MHz	Channel 157:	5785 MHz	Channel 161:	5805 MHz
Channel 165:	5825 MHz						

**802.11n-40MHz Center Working Frequency of Each Channel:**

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 38:	5190 MHz	Channel 46:	5230 MHz	Channel 151:	5755 MHz	Channel 159:	5795 MHz

**Note:**

1. This device is a MOXA IEEE 802.11a/b/g/n Wireless with a built-in 802.11a/b/g/n WLAN transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. At result of pretests, module supports dual-channel transmission, only the worst case is shown in the report. (802.11a is chain A)
4. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11a is 6Mbps 、 802.11n-20BW is 14.4Mbps 、 802.11n-40BW is 30Mbps)
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.
6. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.
7. This is requesting a Class II permissive change for FCC ID: SLE-WAPN005, originally granted on 04/28/2014.

The differences are listed as below:

- (1) Original grant compliance band 1 and band 3 are following old rule of UNII requirements, changed to meet the requirements of the new rules and all other hardware is identical with original granted.
- (2) Band 2a and Band 2c UNII requirements haven't changed, the test data is not presented in the test report.

Test Mode	Mode 1: Transmit (802.11a-6Mbps) Mode 2: Transmit (802.11n-20BW 14.4Mbps) Mode 3: Transmit (802.11n-40BW 30Mbps)
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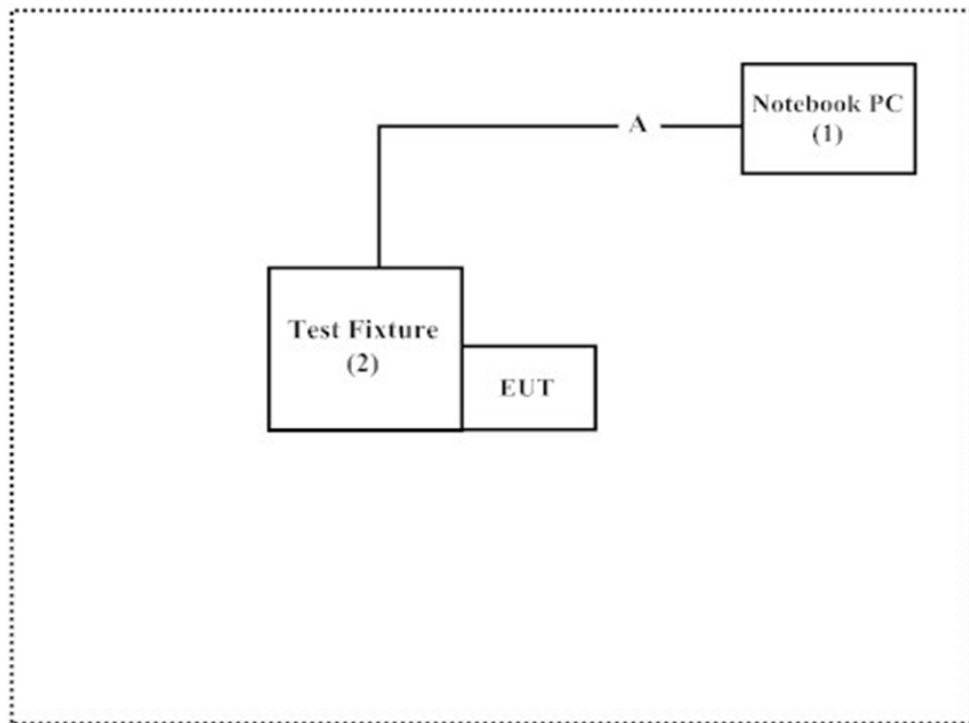
### 1.3. Tested System Details

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
2	Test Fixture	MOXA	N/A	N/A

Signal Cable Type	Signal cable Description
A LAN Cable	Shielded, 1.8m

### 1.4. Configuration of tested System



### 1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute “ART-2 v2.3” program on the Notebook PC.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Start the continuous transmission.
- (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  
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Registration Number: 92195

Site Name: Quietek Corporation  
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24451, Taiwan, R.O.C.  
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FCC Accreditation Number: TW1014

## 2. Conducted Emission

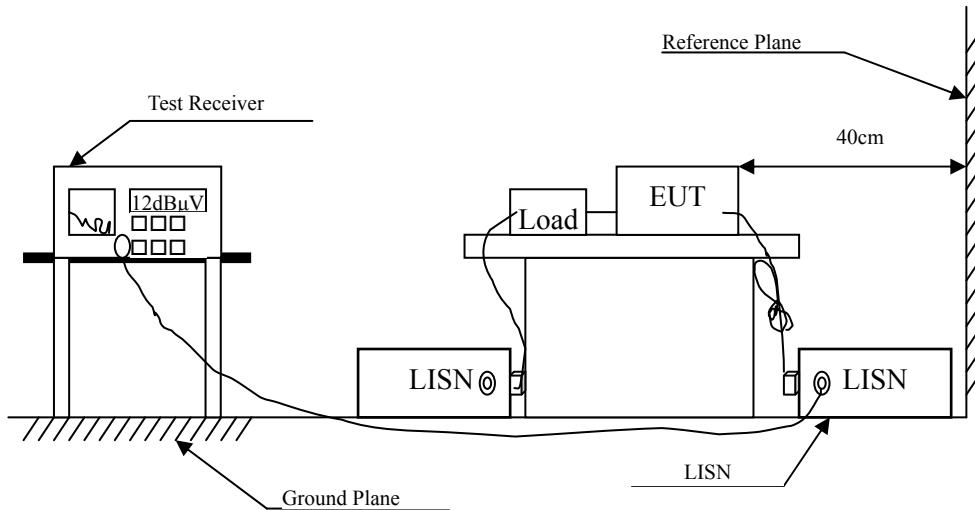
### 2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2014	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2015	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2015	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar., 2015	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2015	
	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

<b>FCC Part 15 Subpart C Paragraph 15.207 (dB<math>\mu</math>V) Limit</b>		
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 C63.10:2013 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, 2013; tested to UNII 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 IEEE 802.11a/b/g/n Wireless  
Test Item : Conducted Emission Test  
Power Line : Line 1  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5190MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V	Margin dB	Limit dB $\mu$ V
<b>LINE 1</b>					
<b>Quasi-Peak</b>					
0.158	9.747	34.680	44.427	-21.344	65.771
0.170	9.743	32.900	42.644	-22.785	65.429
0.212	9.739	28.440	38.179	-26.050	64.229
0.341	9.745	26.150	35.895	-24.648	60.543
0.505	9.753	33.100	42.853	-13.147	56.000
0.654	9.759	26.900	36.659	-19.341	56.000
<b>Average</b>					
0.158	9.747	26.160	35.907	-19.864	55.771
0.170	9.743	13.810	23.554	-31.875	55.429
0.212	9.739	20.420	30.159	-24.070	54.229
0.341	9.745	10.480	20.225	-30.318	50.543
0.505	9.753	21.420	31.173	-14.827	46.000
0.654	9.759	19.760	29.519	-16.481	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 IEEE 802.11a/b/g/n Wireless  
Test Item : Conducted Emission Test  
Power Line : Line 2  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5190MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V	Margin dB	Limit dB $\mu$ V
<b>LINE 2</b>					
<b>Quasi-Peak</b>					
0.166	9.747	33.830	43.577	-21.966	65.543
0.212	9.749	28.580	38.329	-25.900	64.229
0.373	9.747	28.450	38.197	-21.432	59.629
0.498	9.752	32.750	42.502	-13.555	56.057
7.912	9.920	27.580	37.500	-22.500	60.000
21.162	10.105	25.840	35.945	-24.055	60.000
<b>Average</b>					
0.166	9.747	28.500	38.247	-17.296	55.543
0.212	9.749	24.300	34.049	-20.180	54.229
0.373	9.747	15.410	25.157	-24.472	49.629
0.498	9.752	28.740	38.492	-7.565	46.057
7.912	9.920	22.630	32.550	-17.450	50.000
21.162	10.105	20.160	30.265	-19.735	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 IEEE 802.11a/b/g/n Wireless  
Test Item : Conducted Emission Test  
Power Line : Line 1  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5755MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V	Margin dB	Limit dB $\mu$ V
<b>LINE 1</b>					
<b>Quasi-Peak</b>					
0.158	9.747	34.680	44.427	-21.344	65.771
0.170	9.743	32.900	42.644	-22.785	65.429
0.212	9.739	28.440	38.179	-26.050	64.229
0.341	9.745	26.150	35.895	-24.648	60.543
0.505	9.753	33.100	42.853	-13.147	56.000
0.654	9.759	26.900	36.659	-19.341	56.000
<b>Average</b>					
0.158	9.747	26.160	35.907	-19.864	55.771
0.170	9.743	13.810	23.554	-31.875	55.429
0.212	9.739	20.420	30.159	-24.070	54.229
0.341	9.745	10.480	20.225	-30.318	50.543
0.505	9.753	21.420	31.173	-14.827	46.000
0.654	9.759	19.760	29.519	-16.481	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 IEEE 802.11a/b/g/n Wireless  
Test Item : Conducted Emission Test  
Power Line : Line 2  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5755MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V	Margin dB	Limit dB $\mu$ V
<b>LINE 2</b>					
<b>Quasi-Peak</b>					
0.166	9.747	33.830	43.577	-21.966	65.543
0.212	9.749	28.580	38.329	-25.900	64.229
0.373	9.747	28.450	38.197	-21.432	59.629
0.498	9.752	32.750	42.502	-13.555	56.057
7.912	9.920	27.580	37.500	-22.500	60.000
21.162	10.105	25.840	35.945	-24.055	60.000
<b>Average</b>					
0.166	9.747	28.500	38.247	-17.296	55.543
0.212	9.749	24.300	34.049	-20.180	54.229
0.373	9.747	15.410	25.157	-24.472	49.629
0.498	9.752	28.740	38.492	-7.565	46.057
7.912	9.920	22.630	32.550	-17.450	50.000
21.162	10.105	20.160	30.265	-19.735	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. Maximum conducted output power

#### 3.1. Test Equipment

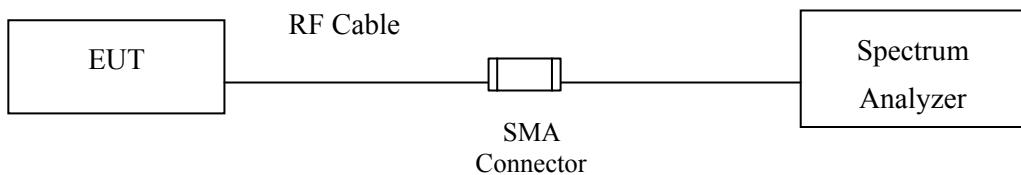
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2014
X	Power Sensor	Anritsu	MA2411B/0738448	Jun., 2014
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2014

Note:

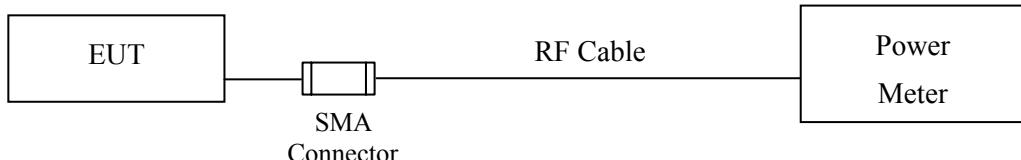
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

#### 3.2. Test Setup

##### 26dBc Occupied Bandwidth



##### Conduction Power Measurement (for 802.11an)



### 3.3. Limits

#### 3.3.1. For the band 5.15-5.25 GHz,

- (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
- (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-topoint U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
- (iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 3.3.2. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands 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 megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 3.3.3. For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in

this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

### **3.4. Test Procedure**

As an alternative to FCC KDB-789033, the EUT maximum conducted output power was measured with an average power meter employing a video bandwidth greater the 6dB BW of the emission under test. Maximum conducted 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.

802.11an (BW $\leq$ 40MHz) Maximum conducted output power using KDB 789033 section E3)b)  
Method PM-G (Measurement using a gated RF average power meter)

*Note: the power meter have a video bandwidth that is greater than or equal to the measurement bandwidth, (Anritsu/ MA2411B video bandwidth: 65MHz)*

802.11ac (BW=80MHz) Maximum conducted output power using KDB 789033 section E2)b)  
Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep).

When transmitted signals consist of two or more non-contiguous spectrum segments (e.g., 80+80 MHz mode) or when a single spectrum segment of a transmission crosses the boundary between two adjacent U-NII bands, KDB 644545 D01 section F) procedure is used for measurements.

### **3.5. Uncertainty**

$\pm 1.27$  dB

**3.6. Test Result of Maximum conducted output power**

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Maximum conducted output power  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmit (802.11a-6Mbps)

**Chain A**

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		6	9	12	18	24	36	48	54	
		Measurement Level (dBm)								
36	5180	10.55	--	--	--	--	--	--	--	<24dBm
44	5220	10.83	10.79	10.68	10.57	10.46	10.35	10.34	10.23	<24dBm
48	5240	11.47	--	--	--	--	--	--	--	<24dBm
149	5745	12.96	--	--	--	--	--	--	--	<30dBm
157	5785	12.51	12.35	12.29	12.21	12.17	12.11	12.07	11.92	<30dBm
165	5825	12.71	--	--	--	--	--	--	--	<30dBm

**Chain B**

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		6	9	12	18	24	36	48	54	
		Measurement Level (dBm)								
36	5180	10.48	--	--	--	--	--	--	--	<24dBm
44	5220	10.79	10.72	10.65	10.58	10.51	10.44	10.37	10.3	<24dBm
48	5240	11.41	--	--	--	--	--	--	--	<24dBm
149	5745	12.46	--	--	--	--	--	--	--	<30dBm
157	5785	12.41	12.38	12.36	12.33	12.35	12.32	12.27	12.28	<30dBm
165	5825	12.61	--	--	--	--	--	--	--	<30dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

**Maximum conducted output power Measurement:****Chain A**

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
36	5180	--	10.55	24	--
44	5220	--	10.83	24	--
48	5240	--	11.47	24	--
149	5745	--	12.96	30	--
157	5785	--	12.51	30	--
165	5825	--	12.71	30	--

## Note:

1. Power Output Value =Reading value on average power meter + cable loss
2. 26 dB Bandwidth is the bandwidth of chain A or chain B whichever is less bandwidth, output power limitation is more stringent.

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Maximum conducted output power  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps)

**Chain A**

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		14.4	28.9	43.3	57.8	86.7	115.6	130	144.4	
		Measurement Level (dBm)								
36	5180	10.43	--	--	--	--	--	--	--	<24dBm
44	5220	10.69	10.62	10.55	10.48	10.41	10.34	10.27	10.2	<24dBm
48	5240	11.29	--	--	--	--	--	--	--	<24dBm
149	5745	11.31	--	--	--	--	--	--	--	<30dBm
157	5785	11.26	11.19	11.08	10.92	10.81	10.71	10.68	10.53	<30dBm
165	5825	11.41	--	--	--	--	--	--	--	<30dBm

**Chain B**

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		14.4	28.9	43.3	57.8	86.7	115.6	130	144.4	
		Measurement Level (dBm)								
36	5180	10.35	--	--	--	--	--	--	--	<24dBm
44	5220	10.13	10.09	10.05	10.01	9.97	9.93	9.89	9.85	<24dBm
48	5240	10.33	--	--	--	--	--	--	--	<24dBm
149	5745	10.72	--	--	--	--	--	--	--	<30dBm
157	5785	11.21	11.14	11.08	10.86	10.71	10.53	10.38	10.21	<30dBm
165	5825	11.21	--	--	--	--	--	--	--	<30dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

**Maximum conducted output power Measurement:****(Chain A+ B)**

Channel Number	Frequency (MHz)	26dB Bandwidth (MHz)	Chain A	Chain B	Output Power	Output Power Limit	
			Power (dBm)	Power (dBm)	(dBm)	(dBm)	dBm+10log(BW)
36	5180	--	10.43	10.35	13.40	24	--
44	5220	--	10.69	10.13	13.43	24	--
48	5240	--	11.29	10.33	13.85	24	--
149	5745	--	11.31	10.72	14.04	30	--
157	5785	--	11.26	11.21	14.25	30	--
165	5825	--	11.41	11.21	14.32	30	--

Note:

1. Power Output Value =Reading value on average power meter + cable loss
2. Output Power (dBm) =  $10\log(\text{Chain A Power (mW}) + \text{Chain B Power (mW)})$
3. 26 dB Bandwidth is the bandwidth of chain A or chain B whichever is less bandwidth, output power limitation is more stringent.

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Maximum conducted output power  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps)

**Chain A**

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		30	60	90	120	180	240	270	300	
		Measurement Level (dBm)								
38	5190	10.68	--	--	--	--	--	--	--	<24dBm
46	5230	10.62	9.81	9.77	9.73	9.69	9.65	9.61	9.57	<24dBm
151	5755	11.54	--	--	--	--	--	--	--	<30dBm
159	5795	11.82	10.81	10.63	10.39	10.21	10.09	9.92	9.86	<30dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

**Chain B**

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		30	60	90	120	180	240	270	300	
		Measurement Level (dBm)								
38	5190	10.47	--	--	--	--	--	--	--	<24dBm
46	5230	10.6	10.59	10.56	10.53	10.5	10.47	10.44	10.41	<24dBm
151	5755	10.97	--	--	--	--	--	--	--	<30dBm
159	5795	10.86	10.67	10.43	10.24	10.08	9.98	9.89	9.71	<30dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

**Maximum conducted output power Measurement:****(Chain A+ B)**

Channel Number	Frequency (MHz)	26dB Bandwidth (MHz)	Chain A Power	Chain B Power	Output Power	Output Power Limit	
			(dBm)	(dBm)	(dBm)	(dBm)	(dBm+10log(BW))
38	5190	--	10.68	10.47	13.59	24	--
46	5230	--	10.62	10.60	13.62	24	--
151	5755	--	11.54	10.97	14.27	30	--
159	5795	--	11.82	10.86	14.38	30	--

Note:

1. Power Output Value =Reading value on average power meter + cable loss
2. Output Power (dBm) =  $10\log$  (Chain A Power (mW)+ Chain B Power (mW))
3. 26 dB Bandwidth is the bandwidth of chain A or chain B whichever is less bandwidth, output power limitation is more stringent.

## 4. Peak Power Spectral Density

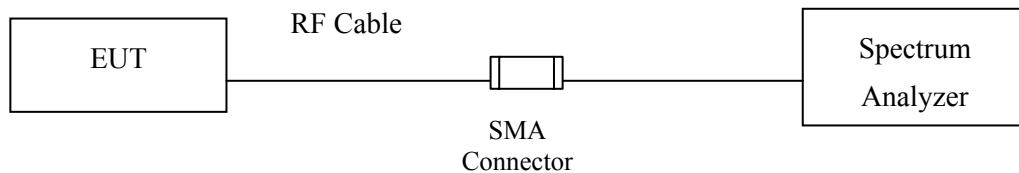
### 4.1. Test Equipment

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2014
Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2014
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr, 2014

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

- (1) For the band 5.15-5.25 GHz,
  - (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
  - (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
  - (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the

equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.+

- (2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (3) For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

#### **4.4. Test Procedure**

The EUT was setup to ANSI C63.10, 2013; tested to DTS test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

The Peak Power Spectral Density using KDB 789033 section F) procedure, Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E(2) for measuring maximum conducted output power using a spectrum analyzer.

SA-1 method is selected to run the test.

For the band 5.725-5.85 GHz, Scale the observed power level to an equivalent value in 500 kHz by adjusting (increase) the measured power by a bandwidth correction factor (BWCF) where BWCF =  $10\log(500\text{ kHz}/100\text{ kHz}) = 6.98\text{ dB}$ .

#### **4.5. Uncertainty**

$\pm 1.27\text{ dB}$

#### 4.6. Test Result of Peak Power Spectral Density

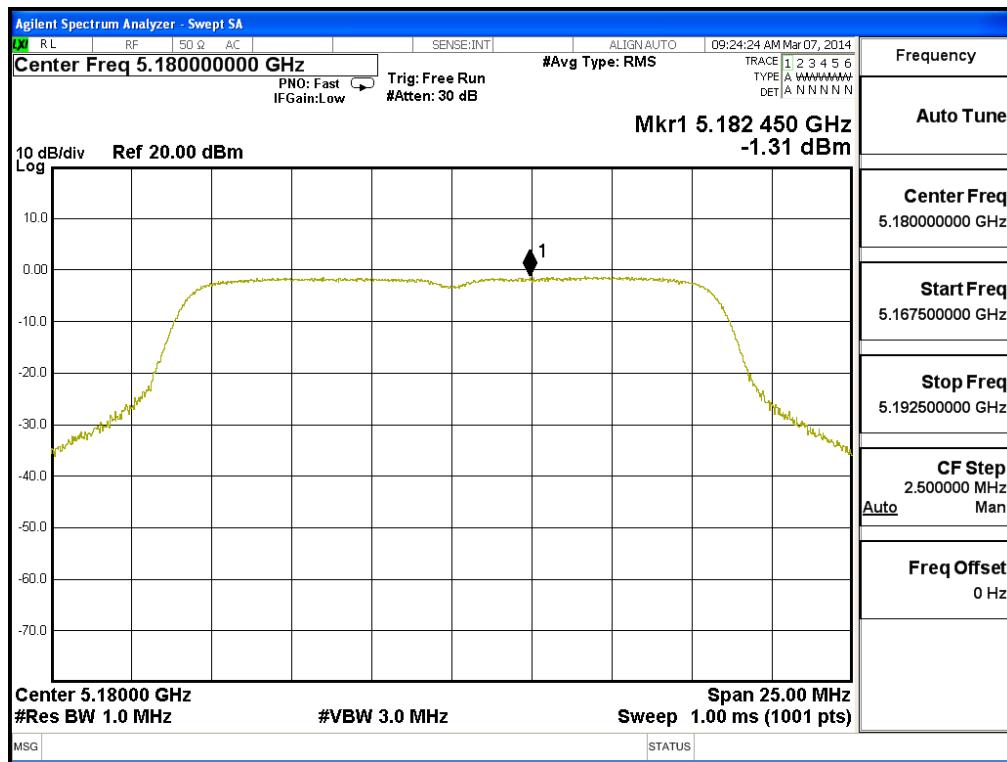
Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Peak Power Spectral Density  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmit (802.11a-6Mbps)

Channel Number	Frequency (MHz)	Data Rate (Mbps)	Measurement Level (dBm)	Required Limit (dBm)	Result
36	5180	6	-1.310	11	Pass
44	5220	6	-0.400	11	Pass
48	5240	6	0.260	11	Pass

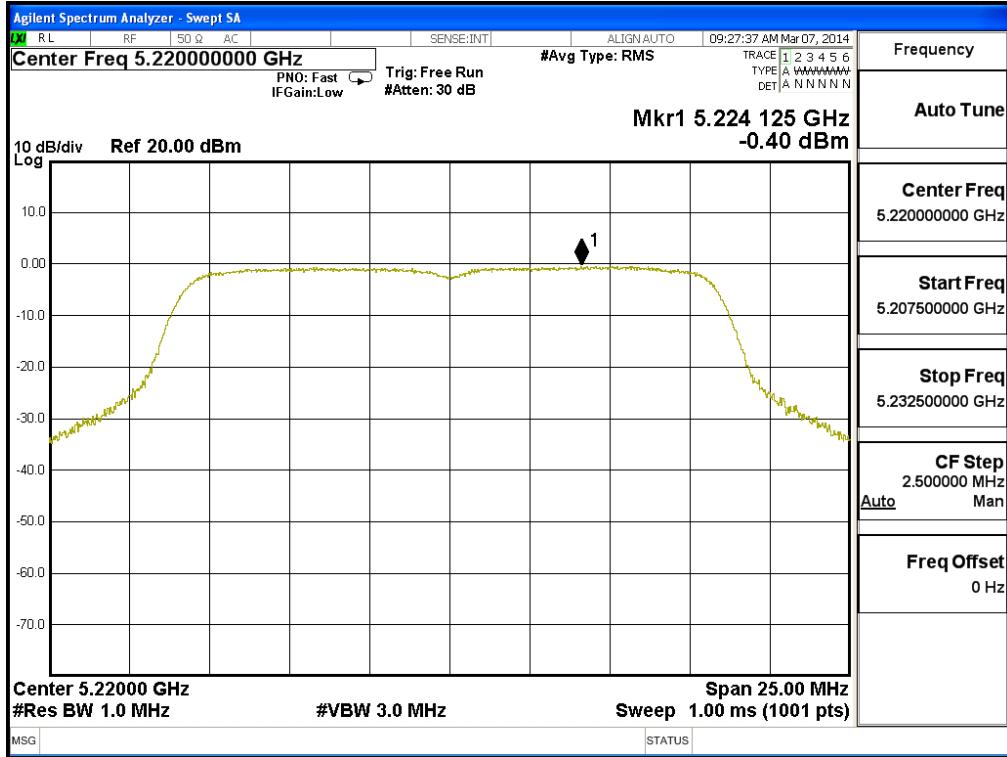
Channel Number	Frequency (MHz)	Data Rate (Mbps)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
149	5745	6	4.410	6.980	14.400	<30	Pass
157	5785	6	3.300	6.980	13.290	<30	Pass
165	5825	6	2.910	6.980	12.900	<30	Pass

Note 1: The quantity  $10 \log 2$  (two antennas) is added to the spectrum peak value according to document 662911 D01.

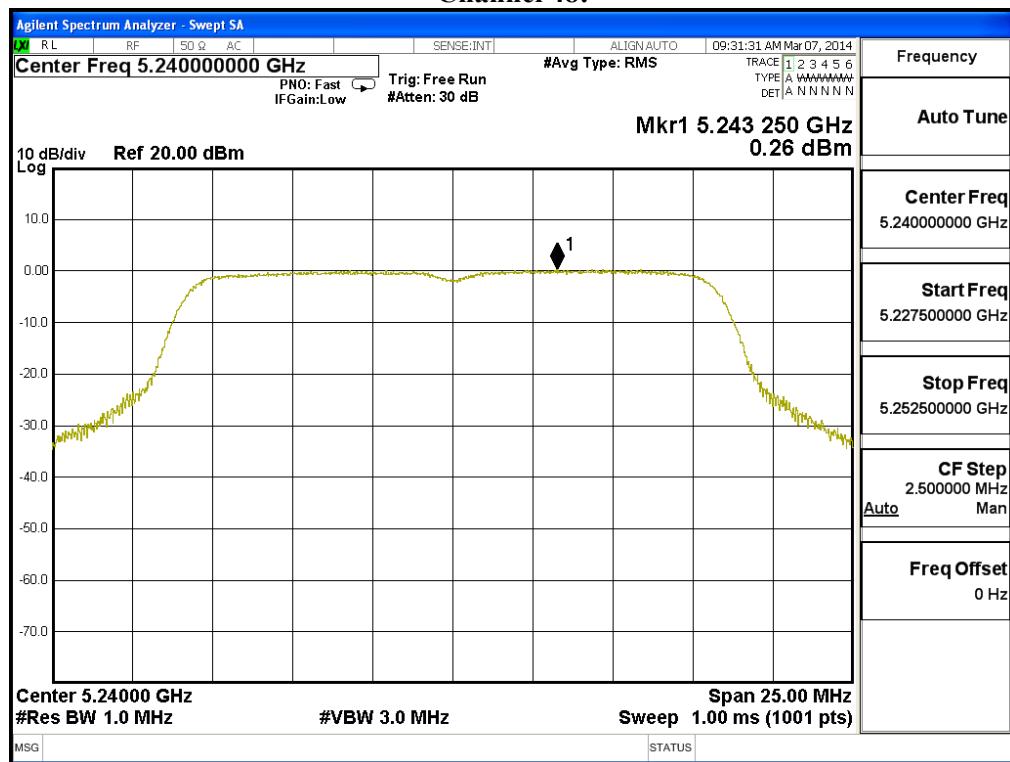
## Channel 36:



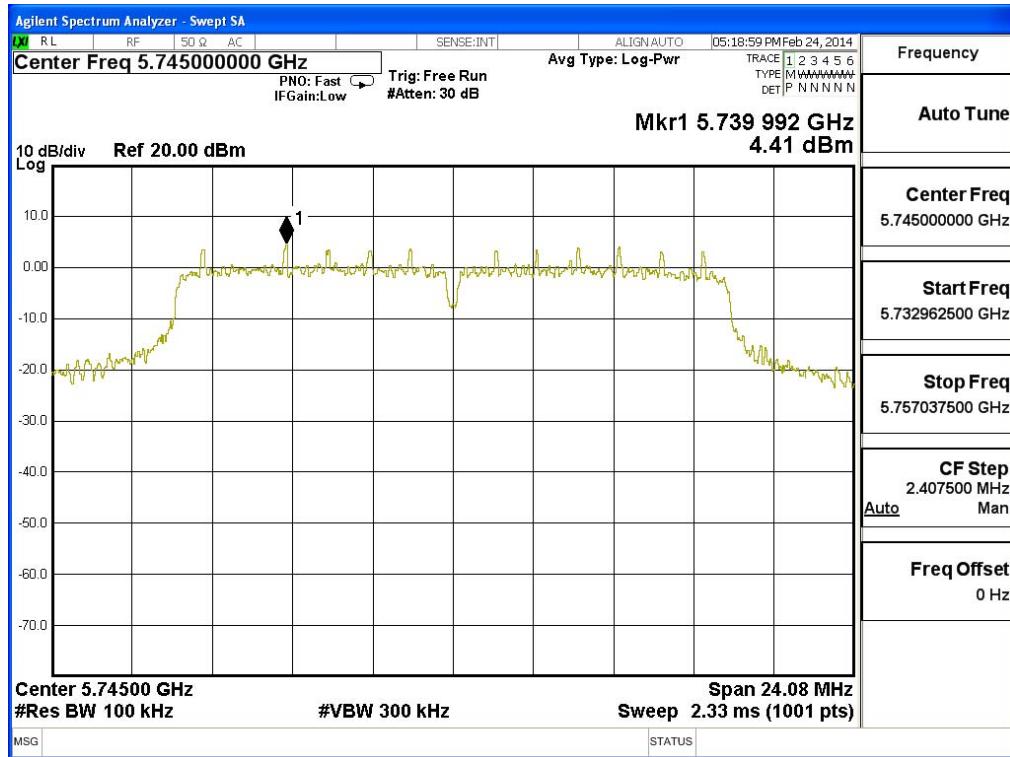
## Channel 44:



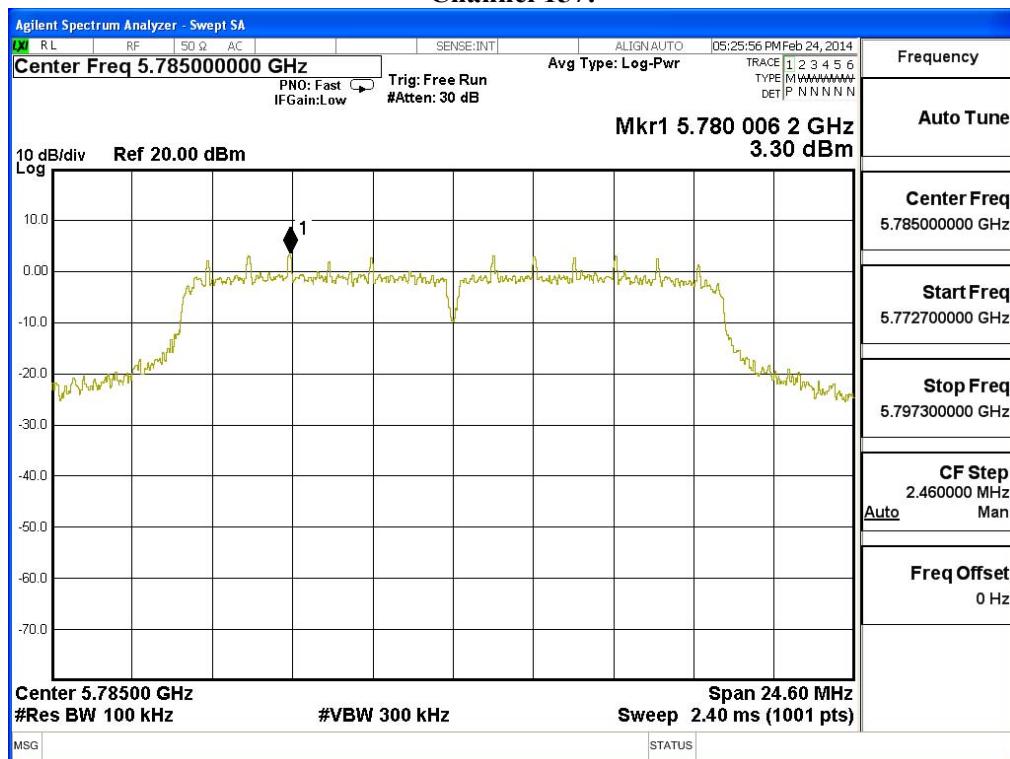
## Channel 48:



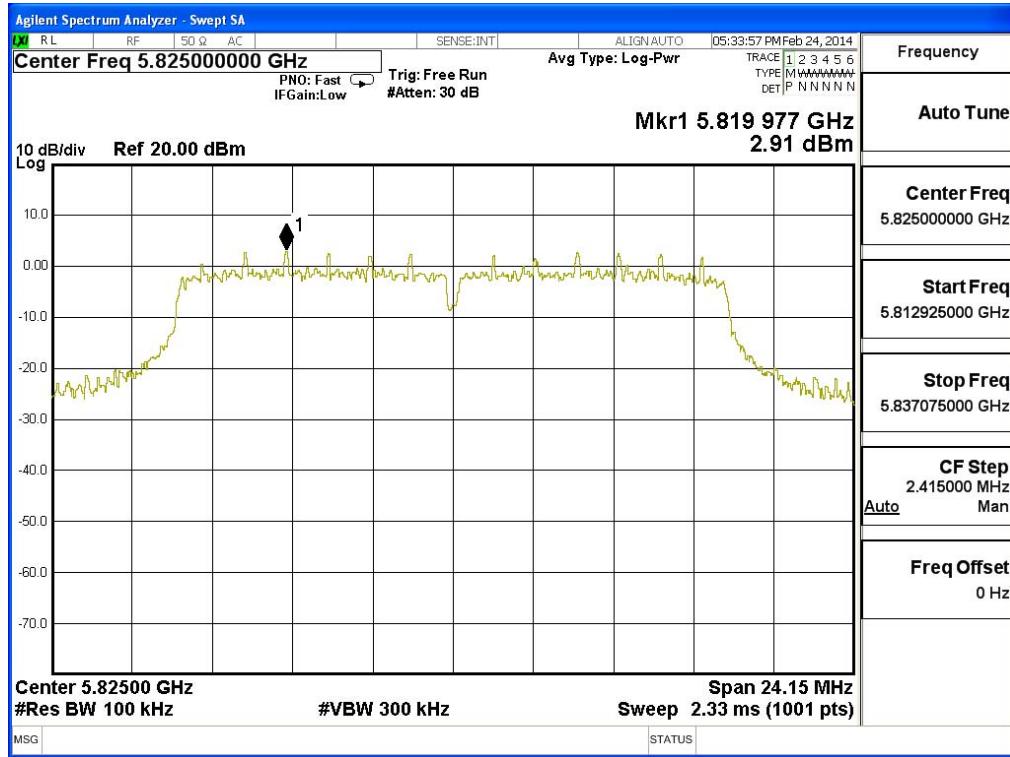
## Channel 149:



## Channel 157:



## Channel 165:



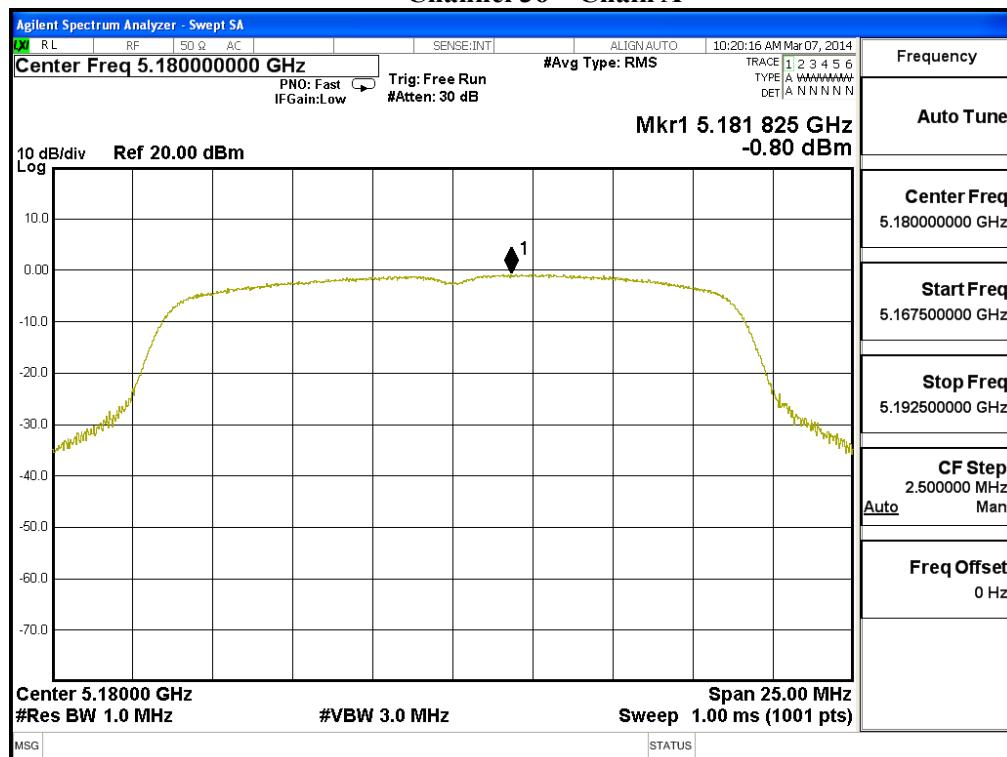
Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Peak Power Spectral Density  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps)

Channel Number	Frequency (MHz)	Chain	PPSD (dBm)	Total PPSD (dBm) <sup>1</sup>	Required Limit (dBm)	Result
36	5180	A	-0.800	2.210	11	Pass
		B	-1.120	1.890	11	Pass
44	5220	A	-0.570	2.440	11	Pass
		B	-1.290	1.720	11	Pass
48	5240	A	0.690	3.700	11	Pass
		B	-0.930	2.080	11	Pass

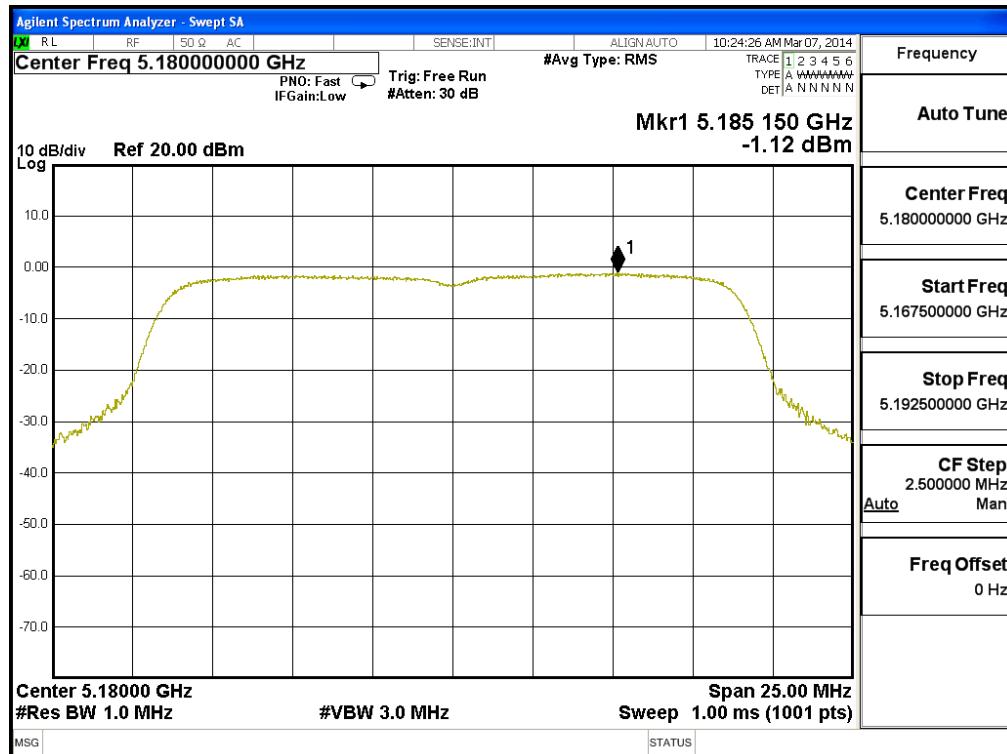
Channel Number	Frequency (MHz)	Chain	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm) <sup>1</sup>	Required Limit (dBm)	Result
149	5745	A	0.030	6.980	10.020	<30	Pass
		B	-1.390	6.980	8.600	<30	Pass
157	5785	A	-0.050	6.980	9.940	<30	Pass
		B	-0.210	6.980	9.780	<30	Pass
165	5825	A	-0.080	6.980	9.910	<30	Pass
		B	0.370	6.980	10.360	<30	Pass

Note 1: The quantity  $10 \log 2$  (two antennas) is added to the spectrum peak value according to document 662911 D01.

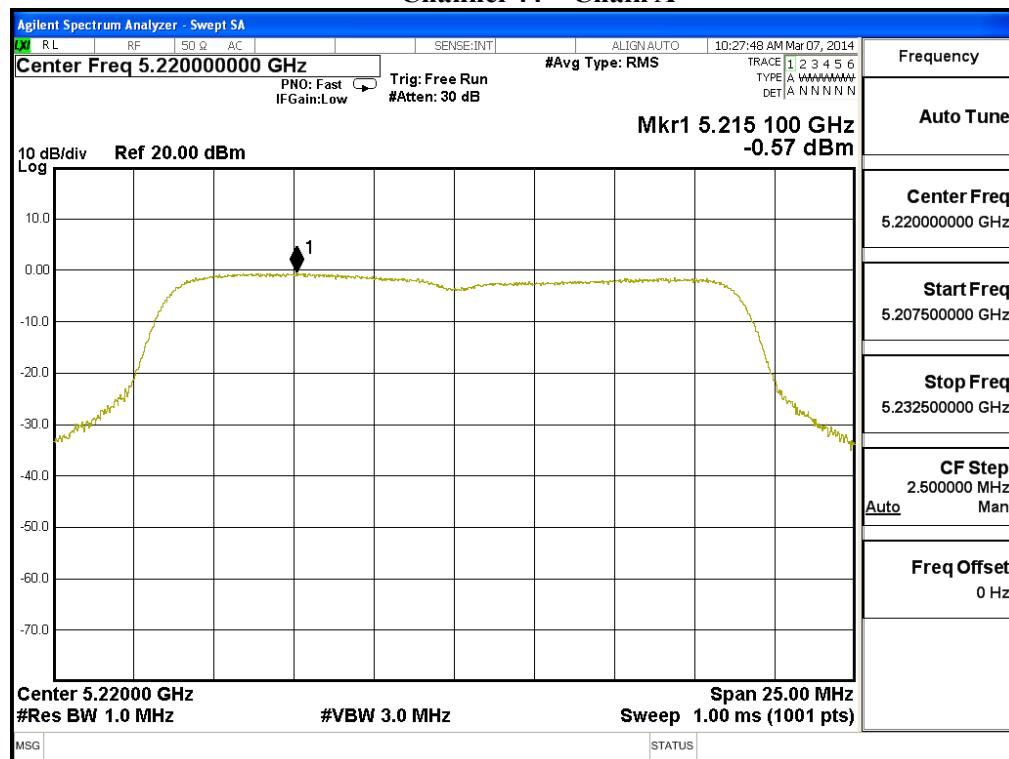
## Channel 36 – Chain A



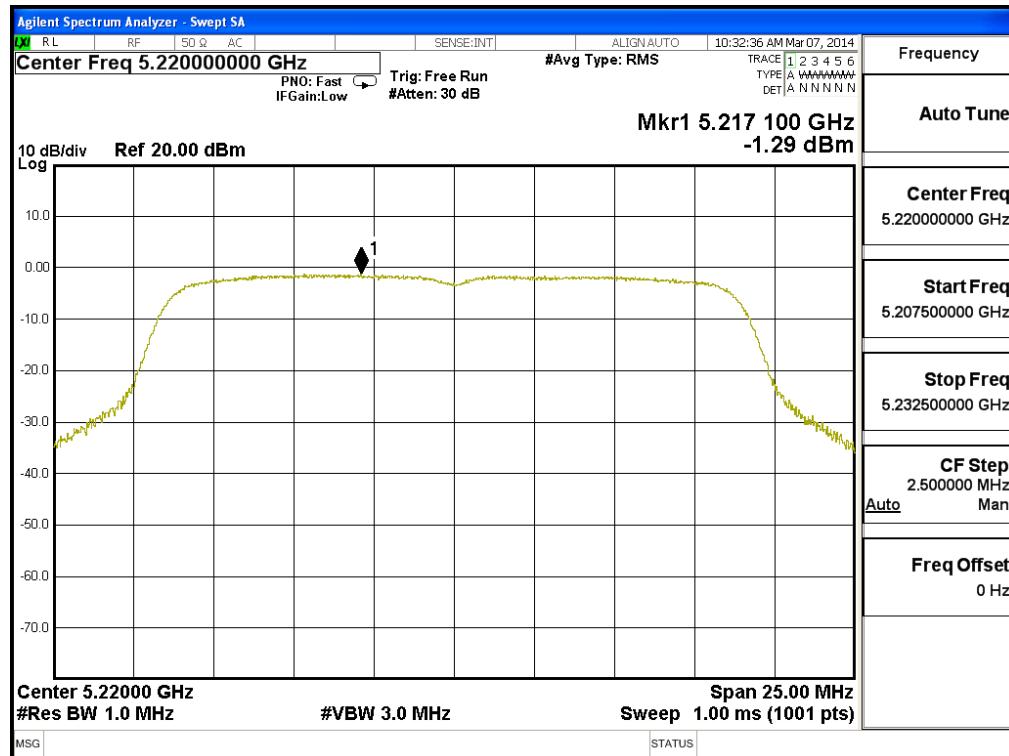
## Channel 36 – Chain B



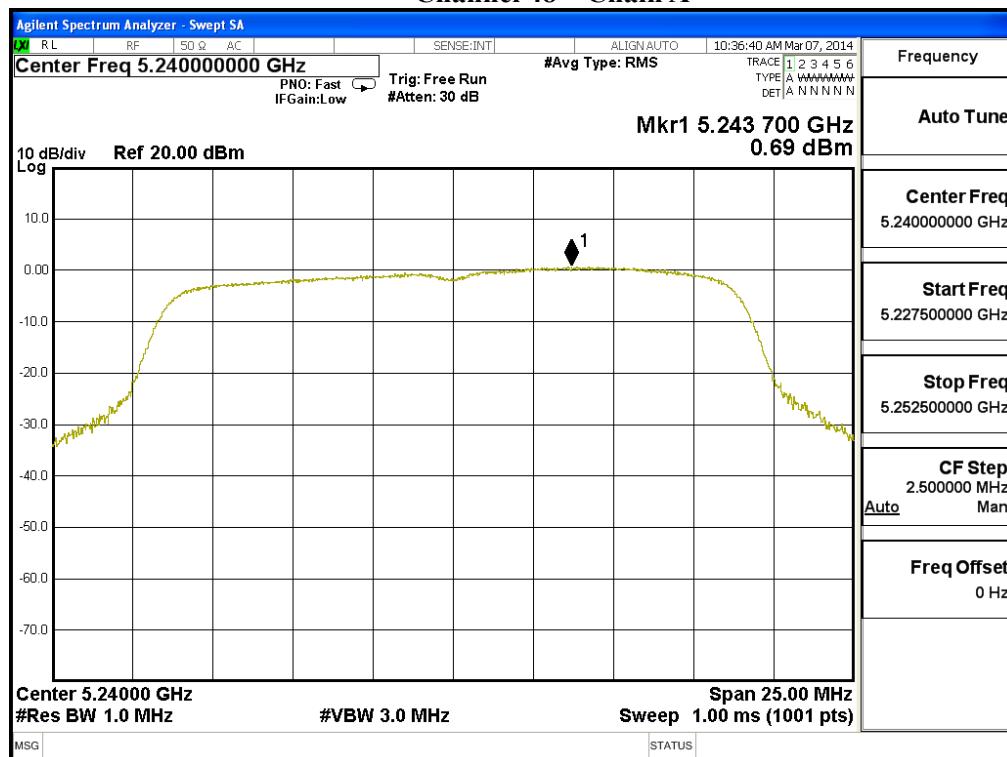
## Channel 44 – Chain A



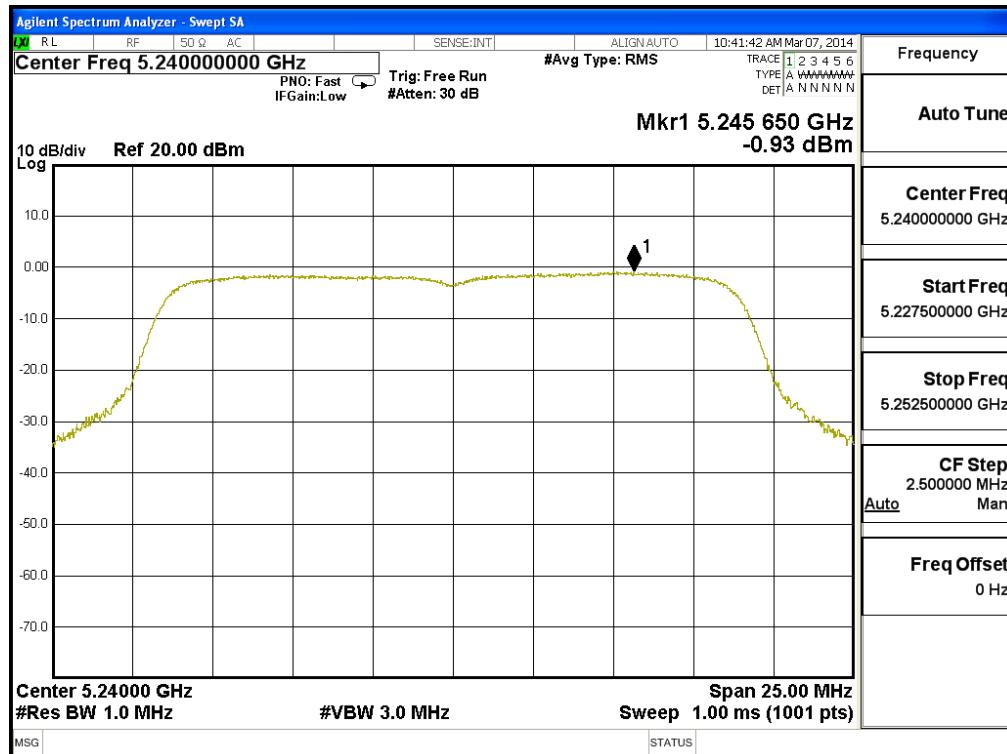
## Channel 44 – Chain B



## Channel 48 – Chain A



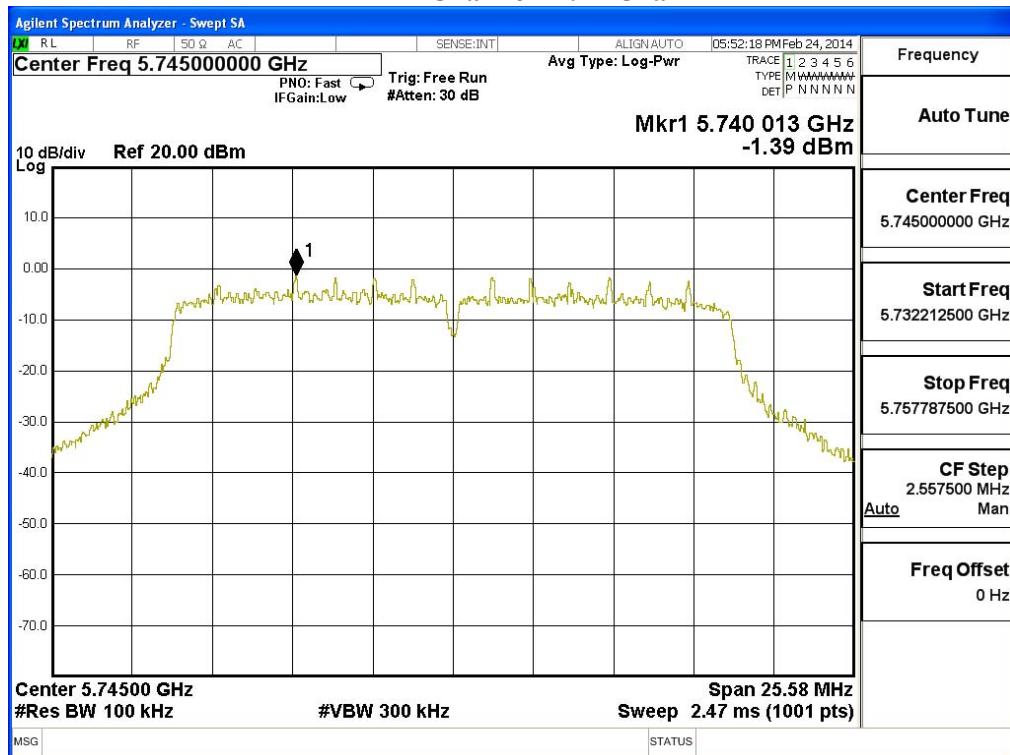
## Channel 48 – Chain B



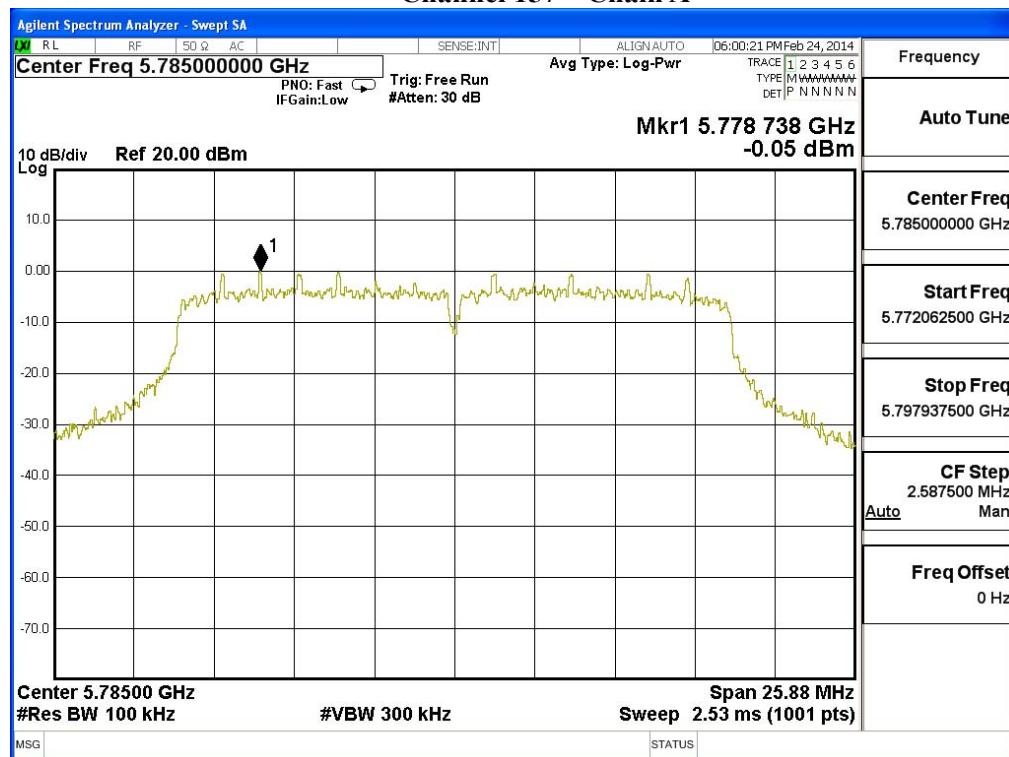
## Channel 149 – Chain A



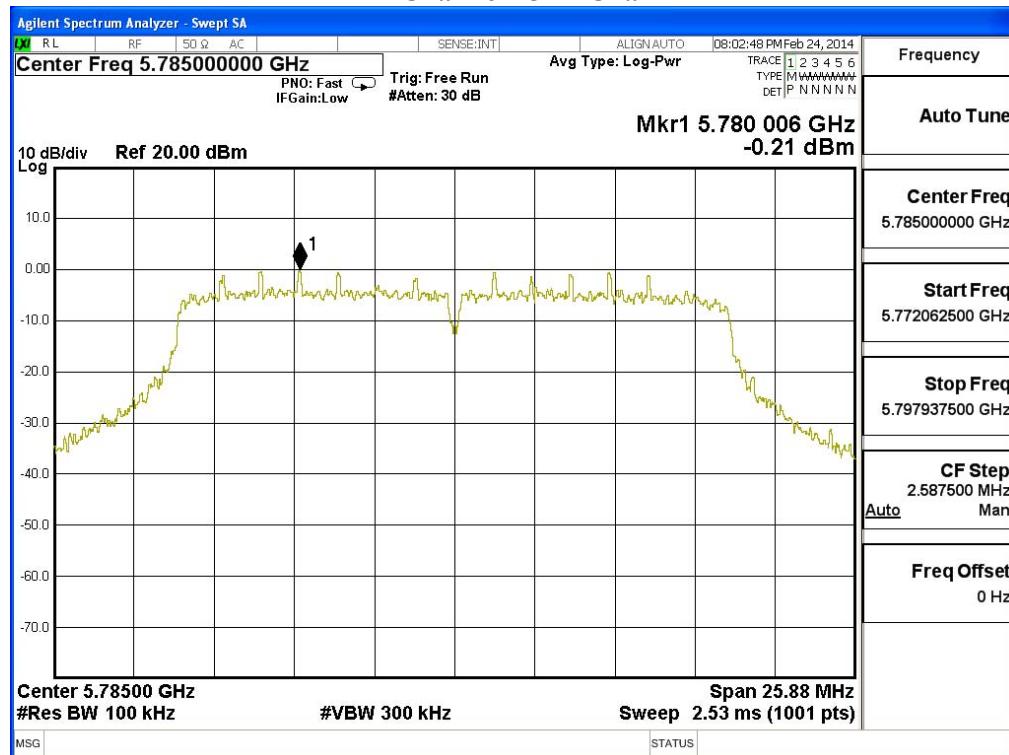
## Channel 149 – Chain B



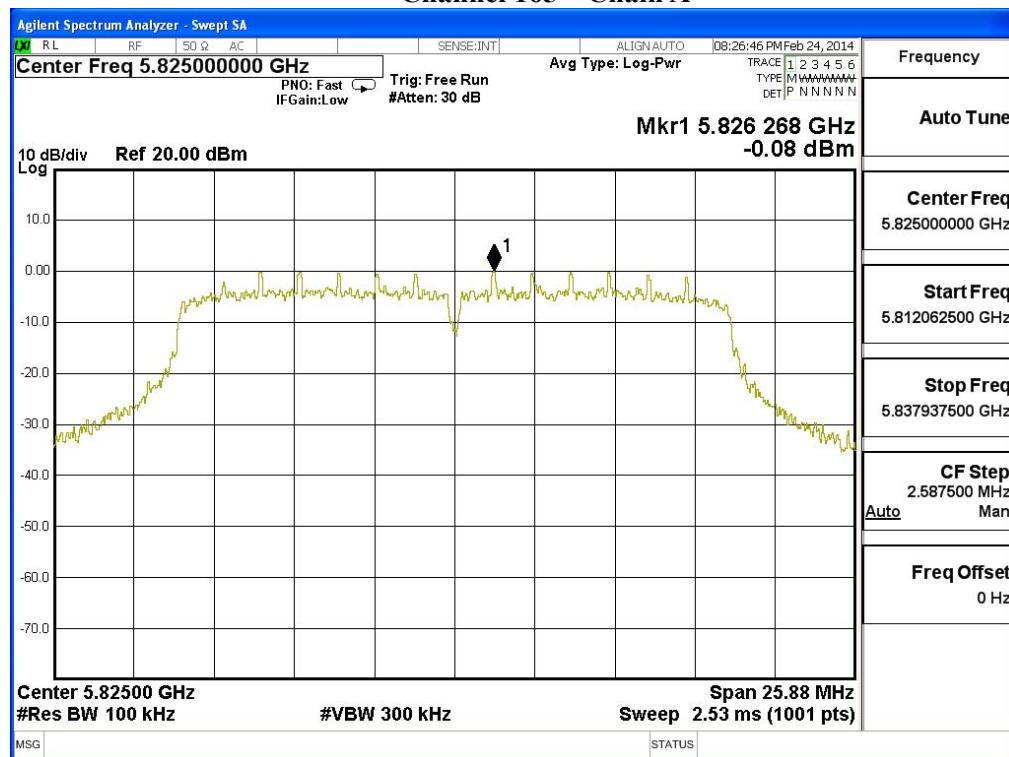
## Channel 157 – Chain A



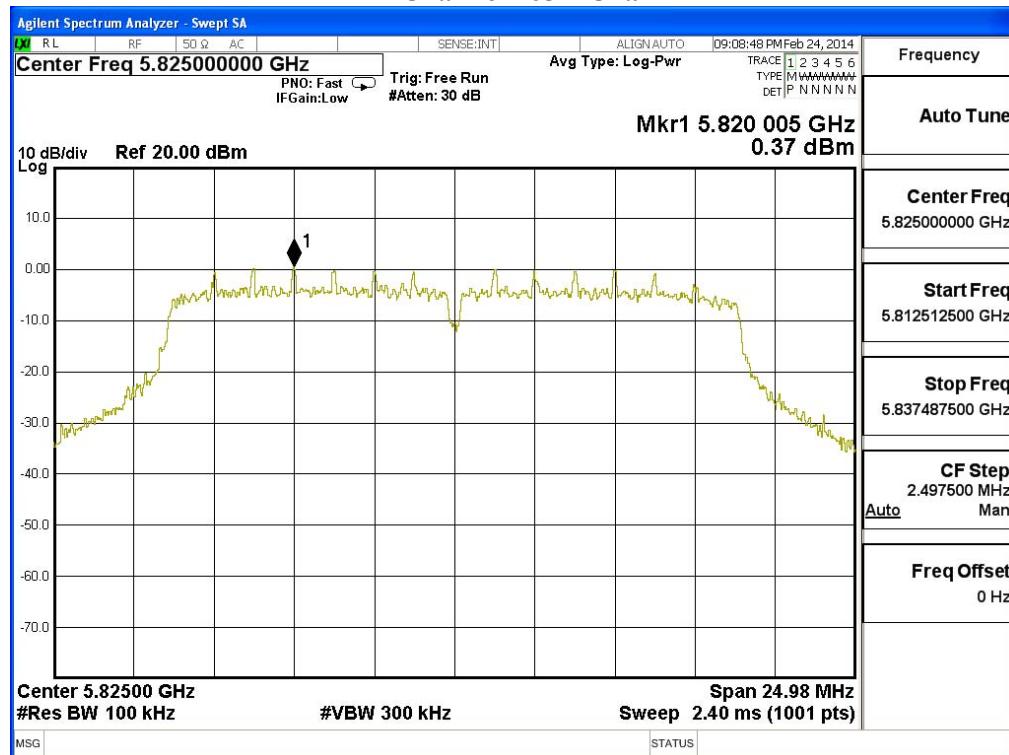
## Channel 157 – Chain B



## Channel 165 – Chain A



## Channel 165 – Chain B



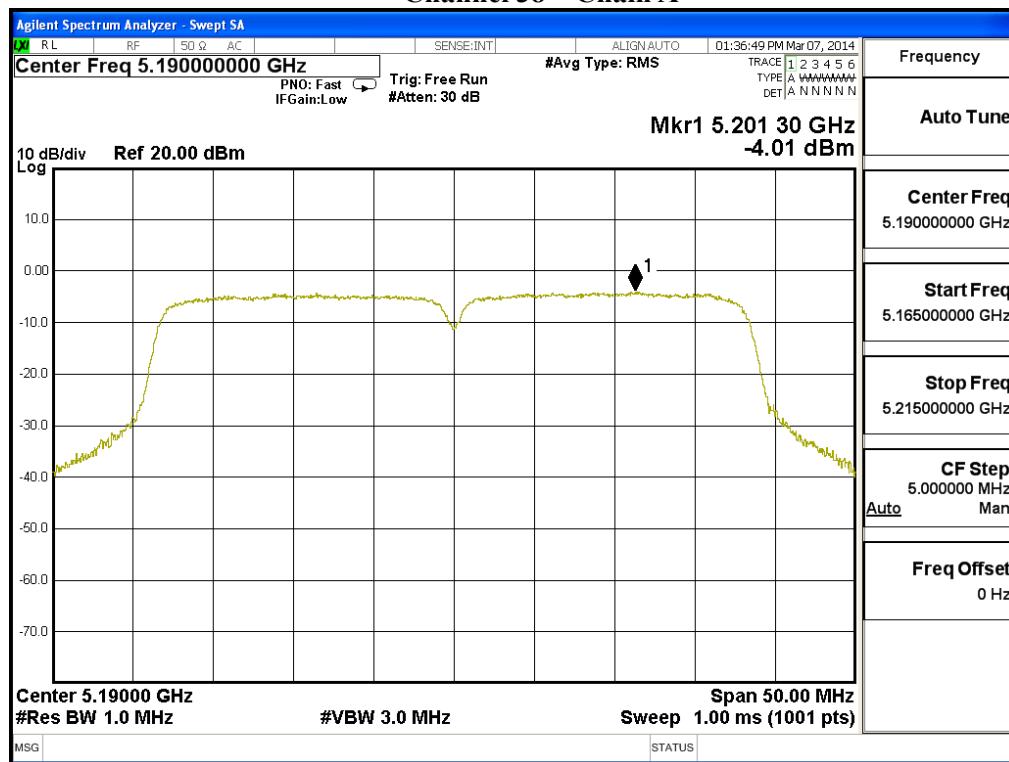
Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Peak Power Spectral Density  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps)

Channel Number	Frequency (MHz)	Chain	PPSD (dBm)	Total PPSD (dBm)1	Required Limit (dBm)	Result
38	5190	A	-4.010	-1.000	11	Pass
		B	-4.230	-1.220	11	Pass
46	5230	A	-3.810	-0.800	11	Pass
		B	-4.630	-1.620	11	Pass

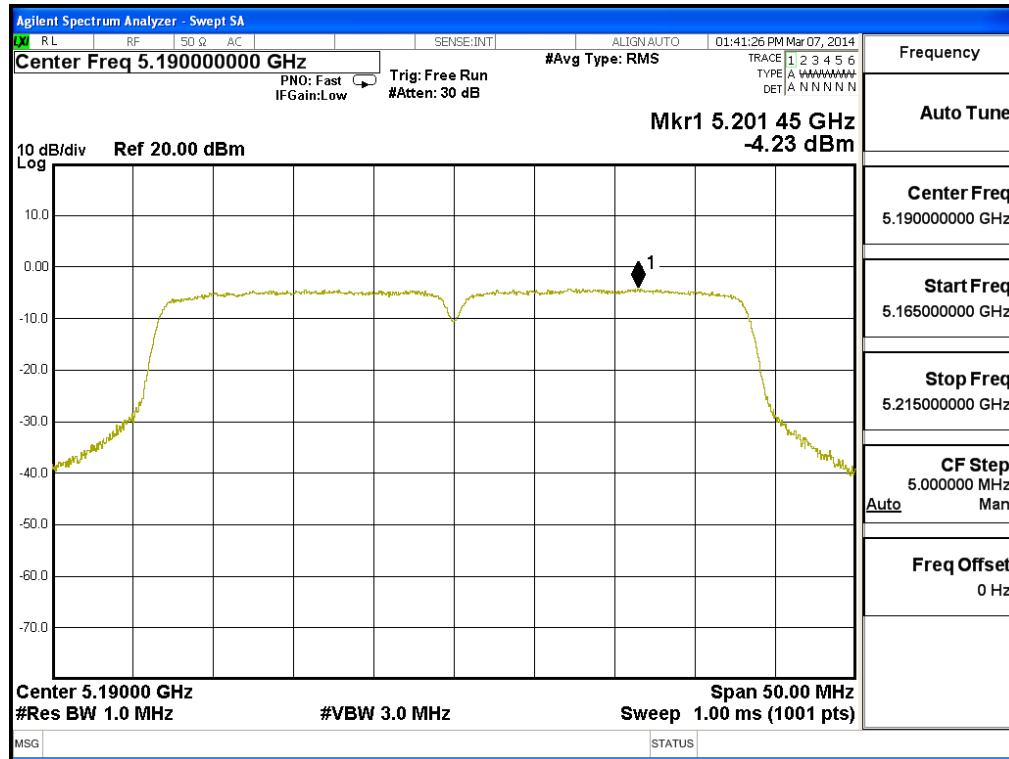
Channel Number	Frequency (MHz)	Chain	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)1	Required Limit (dBm)	Result
151	5755	A	-1.910	6.980	8.080	<30	Pass
		B	-2.640	6.980	7.350	<30	Pass
159	5795	A	-2.700	6.980	7.290	<30	Pass
		B	-2.000	6.980	7.990	<30	Pass

Note 1: The quantity  $10 \log 2$  (two antennas) is added to the spectrum peak value according to document 662911 D01.

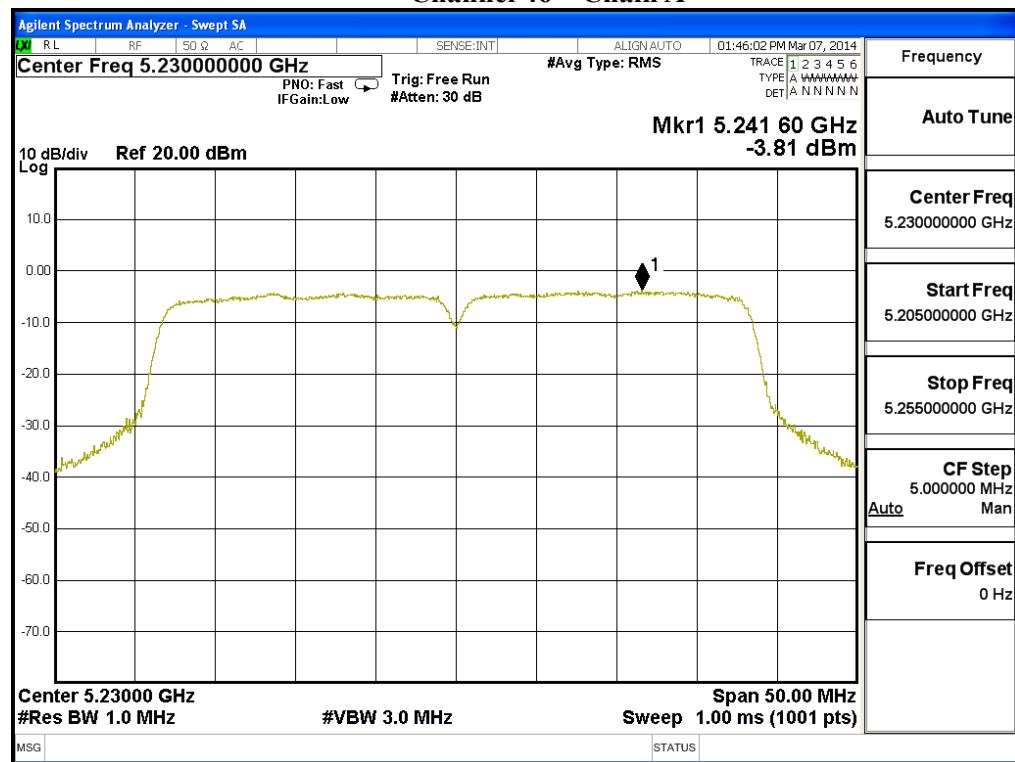
## Channel 38 – Chain A



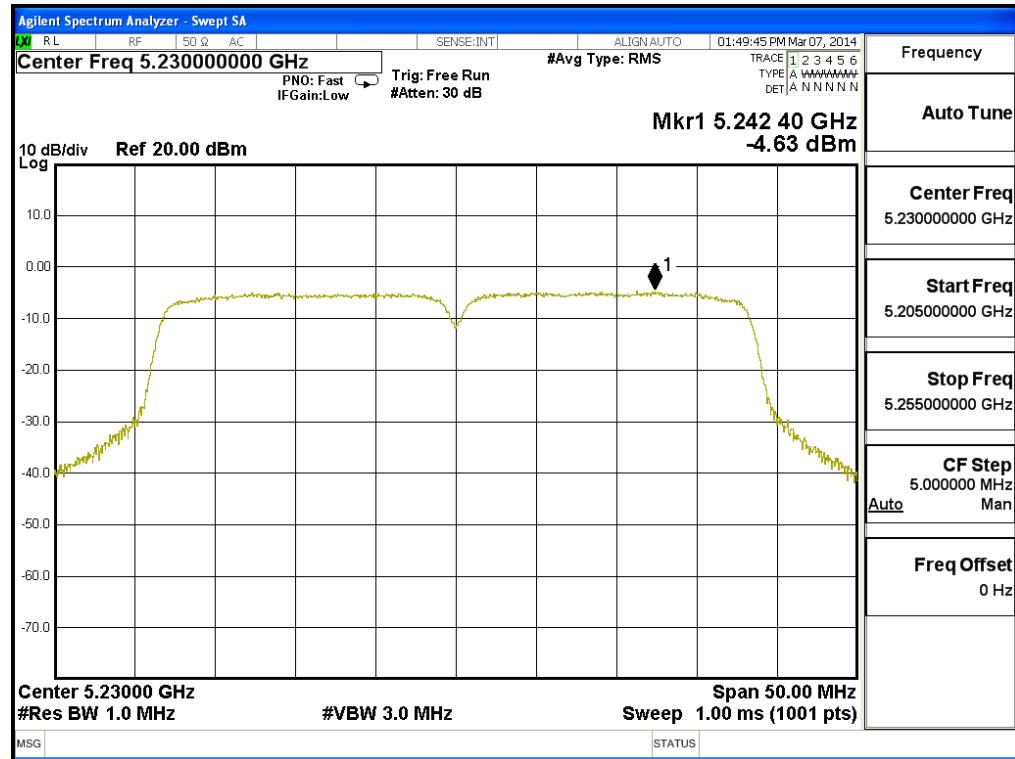
## Channel 38 – Chain B



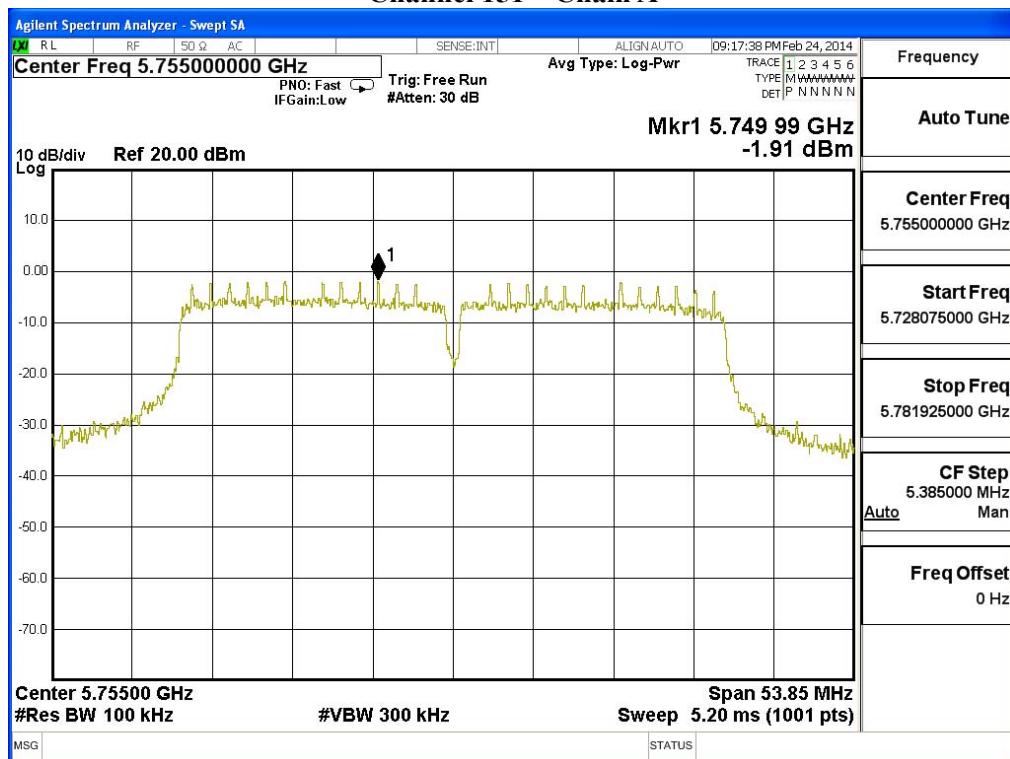
## Channel 46 – Chain A



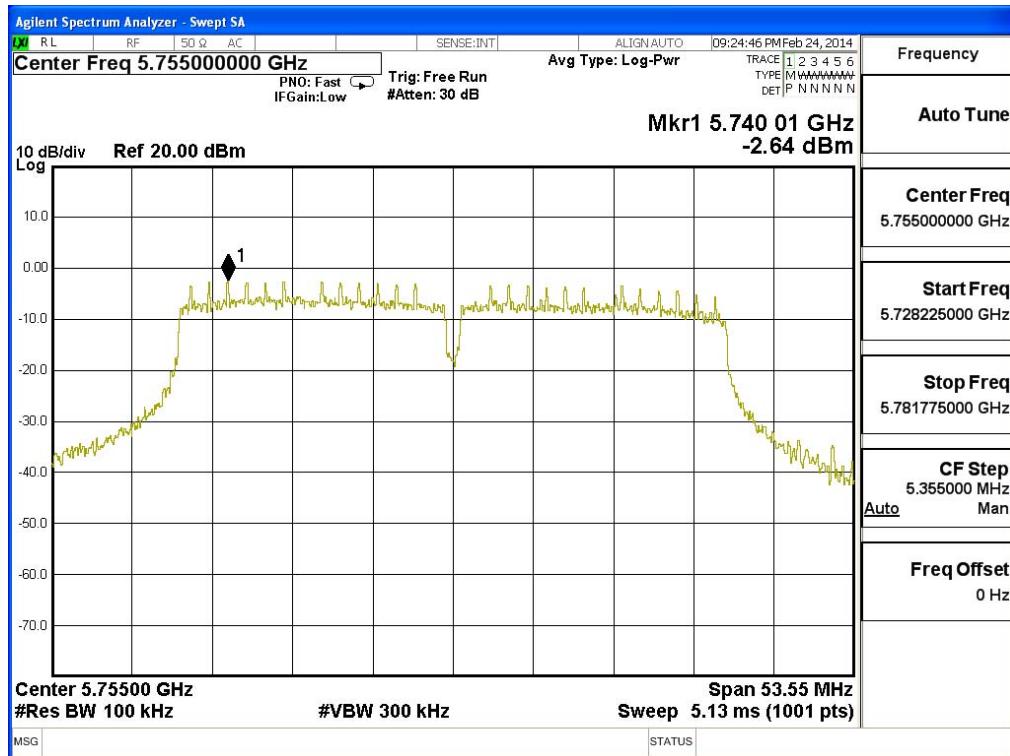
## Channel 46 – Chain B



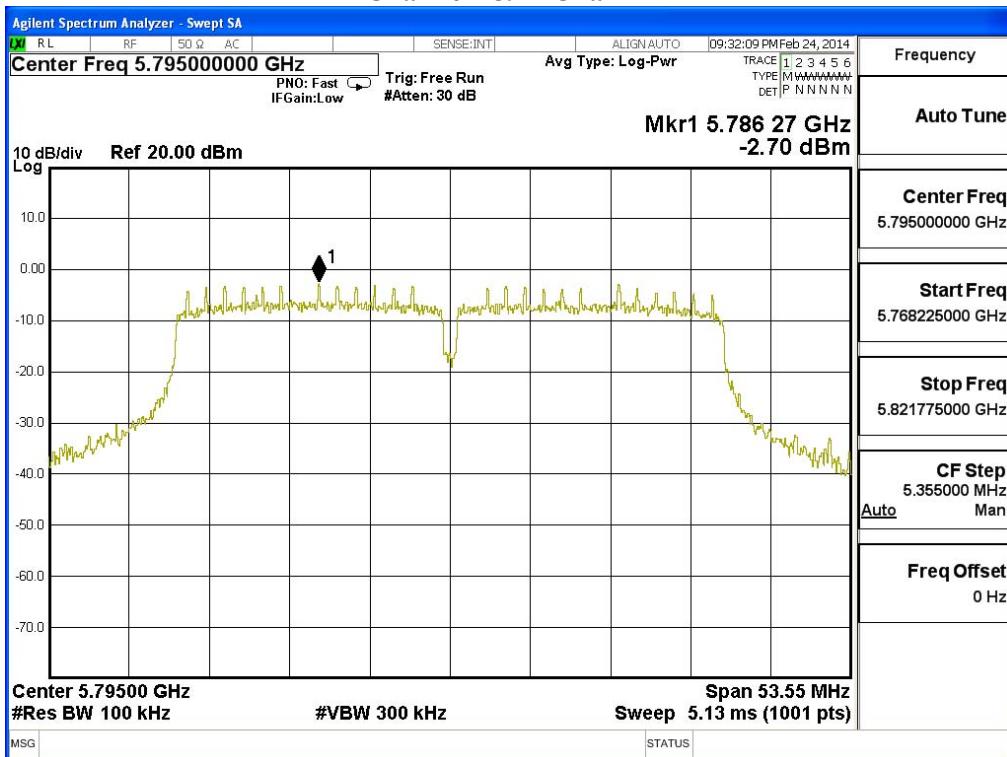
## Channel 151 – Chain A



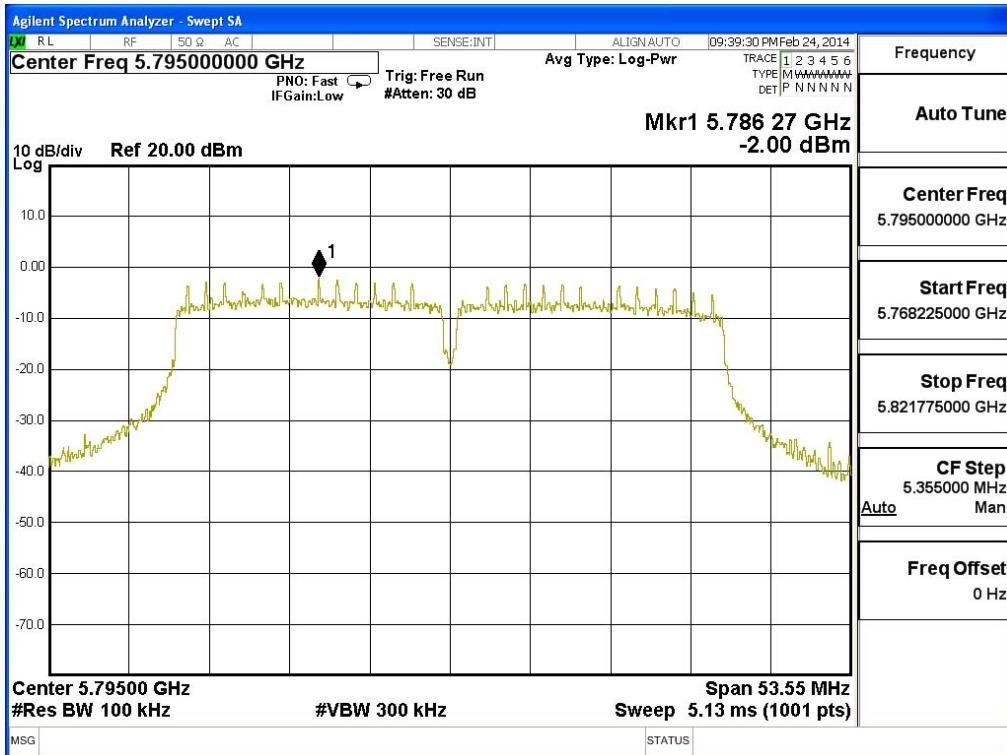
## Channel 151 – Chain B



## Channel 159 – Chain A



## Channel 159 – Chain B



## 5. Radiated Emission

### 5.1. Test Equipment

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

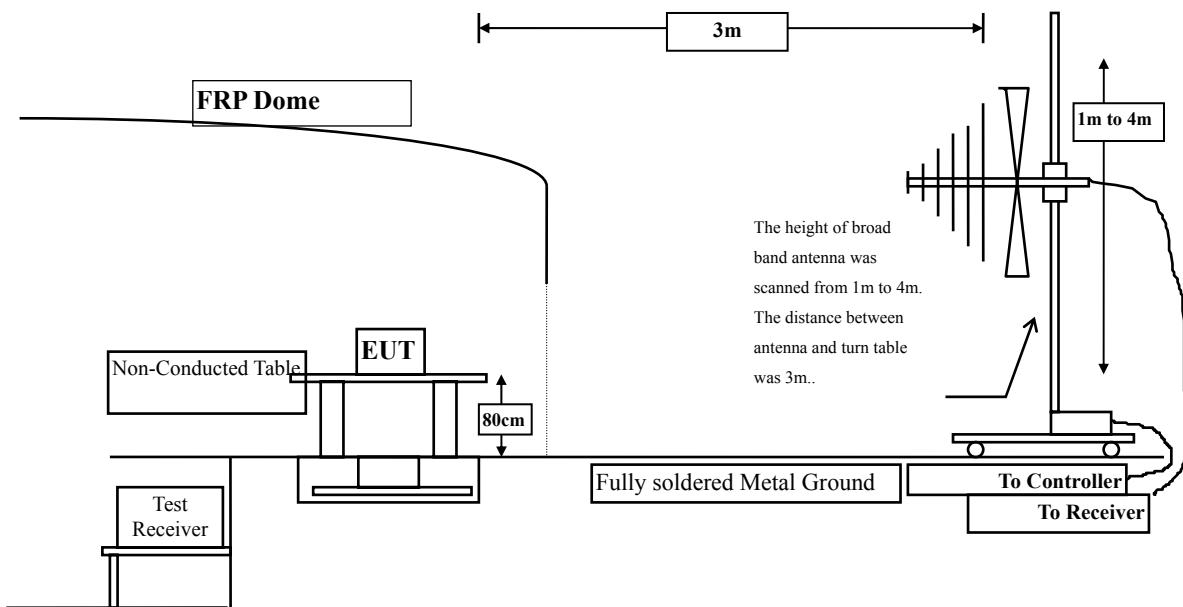
Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Magnetic Loop Antenna	Teseq	HLA6121/ 37133	Sep., 2014
	X	Bilog Antenna	Schaffner Chase	CBL6112B/ 2707	Jun., 2014
	X	EMI Test Receiver	R&S	ESCS 30/838251/ 001	Jun., 2014
	X	Coaxial Cable	QTK(Arnist)	RG 214/ LC003-RG	Jun., 2014
	X	Coaxial signal switch	Arnist	MP59B/ 6200798682	Jun., 2014

Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
☒CB # 8	X	Spectrum Analyzer	R&S	FSP40/ 100339	Oct, 2014
	X	Horn Antenna	ETS-Lindgren	3117/ 35205	Mar, 2015
	X	Horn Antenna	Schwarzbeck	BBHA9170/209	Jan, 2015
	X	Horn Antenna	TRC	AH-0801/95051	Aug, 2014
	X	Pre-Amplifier	EMCI	EMC012630SE/980210	Jan, 2015
	X	Pre-Amplifier	MITEQ	JS41-001040000-58-5P/153945	Jul, 2014
	X	Pre-Amplifier	NARDA	DBL-1840N506/013	Jul, 2014

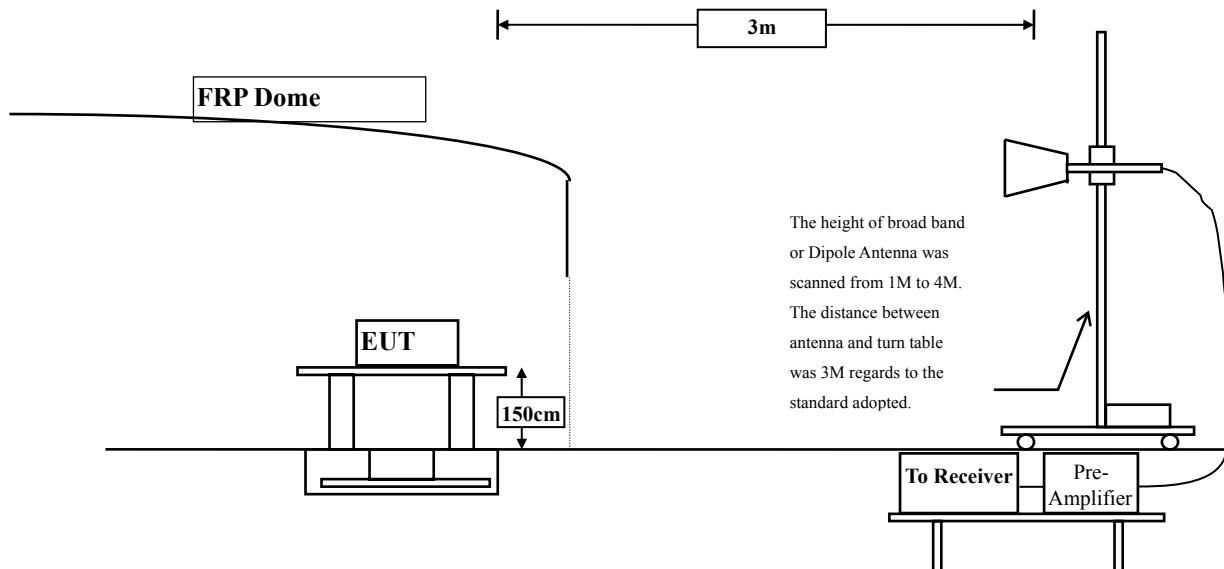
Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.  
2. The test instruments marked with "X" are used to measure the final test results.

## 5.2. Test Setup

### Radiated Emission Below 1GHz



### Radiated Emission Above 1GHz



### 5.3. 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.

<b>FCC Part 15 Subpart C Paragraph 15.209(a) Limits</b>		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks: E field strength (dB $\mu$ V/m) = 20 log E field strength (uV/m)

#### **5.4. Test Procedure**

The EUT was setup according to ANSI C63.10, 2013 and tested according to FCC KDB-789033 test procedure for compliance to FCC 47CFR 15. 407 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10, 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range from 9KHz - 10th Harmonic of fundamental was investigated.

#### **5.5. Uncertainty**

± 3.8 dB below 1GHz

± 3.9 dB above 1GHz

## 5.6. Test Result of Radiated Emission

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5180MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
10360.000	12.930	36.480	49.410	-24.590	74.000
15540.000	*	*	*	*	74.000
20720.000	*	*	*	*	74.000
25900.000	*	*	*	*	74.000
31080.000	*	*	*	*	74.000
36260.000	*	*	*	*	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
10360.000	13.724	36.320	50.044	-23.956	74.000
15540.000	*	*	*	*	74.000
20720.000	*	*	*	*	74.000
25900.000	*	*	*	*	74.000
31080.000	*	*	*	*	74.000
36260.000	*	*	*	*	74.000
<b>Average Detector:</b>					
--					

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 IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5220MHz)

Frequency MHz	Correct Factor	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
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**Horizontal****Peak Detector:**

10440.000	13.322	36.770	50.092	-23.908	74.000
15660.000	*	*	*	*	74.000
20880.000	*	*	*	*	74.000
26100.000	*	*	*	*	74.000

**Average****Detector:**

--

**Vertical****Peak Detector:**

10440.000	14.245	36.890	51.135	-22.865	74.000
15660.000	*	*	*	*	74.000
20880.000	*	*	*	*	74.000
26100.000	*	*	*	*	74.000

**Average****Detector:**

--

Note:

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

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5240MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
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**Horizontal****Peak Detector:**

10480.000	13.693	37.560	51.254	-22.746	74.000
15720.000	*	*	*	*	74.000
20960.000	*	*	*	*	74.000
26200.000	*	*	*	*	74.000

**Average****Detector:**

--

**Vertical****Peak Detector:**

10480.000	14.620	37.860	52.481	-21.519	74.000
15720.000	*	*	*	*	74.000
20960.000	*	*	*	*	74.000
26200.000	*	*	*	*	74.000

**Average****Detector:**

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Note:

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

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5745MHz)

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

**Horizontal****Peak Detector:**

11490.000	17.106	35.190	52.297	-21.703	74.000
17235.000	*	*	*	*	74.000
20720.000	*	*	*	*	74.000
25900.000	*	*	*	*	74.000
31080.000	*	*	*	*	74.000
36260.000	*	*	*	*	74.000

**Average****Detector:**

--

**Vertical****Peak Detector:**

11490.000	18.034	35.330	53.365	-20.635	74.000
17235.000	*	*	*	*	74.000
20720.000	*	*	*	*	74.000
25900.000	*	*	*	*	74.000
31080.000	*	*	*	*	74.000
36260.000	*	*	*	*	74.000

**Average****Detector:**

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Note:

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

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5785MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11570.000	16.809	36.260	53.069	-20.931	74.000
17355.000	*	*	*	*	74.000
20800.000	*	*	*	*	74.000
26000.000	*	*	*	*	74.000
31200.000	*	*	*	*	74.000
36400.000	*	*	*	*	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11570.000	17.698	36.060	53.758	-20.242	74.000
17355.000	*	*	*	*	74.000
20800.000	*	*	*	*	74.000
26000.000	*	*	*	*	74.000
31200.000	*	*	*	*	74.000
36400.000	*	*	*	*	74.000
<b>Average Detector:</b>					
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**Note:**

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

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5825MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11650.000	16.158	35.260	51.418	-22.582	74.000
17475.000	*	*	*	*	74.000
20960.000	*	*	*	*	74.000
26200.000	*	*	*	*	74.000
31440000	*	*	*	*	74.000
36680.000	*	*	*	*	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11650.000	17.274	35.540	52.815	-21.185	74.000
17475.000	*	*	*	*	74.000
20960.000	*	*	*	*	74.000
26200.000	*	*	*	*	74.000
31440000	*	*	*	*	74.000
36680.000	*	*	*	*	74.000
<b>Average Detector:</b>					
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Note:

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

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5180MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m

**Horizontal****Peak Detector:**

10360.000	12.930	35.760	48.690	-25.310	74.000
15540.000	*	*	*	*	74.000
20720.000	*	*	*	*	74.000
25900.000	*	*	*	*	74.000

**Average****Detector:**

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**Vertical****Peak Detector:**

10360.000	13.724	36.220	49.944	-24.056	74.000
15540.000	*	*	*	*	74.000
20720.000	*	*	*	*	74.000
25900.000	*	*	*	*	74.000

**Average****Detector:**

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Note:

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

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5220MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
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**Horizontal****Peak Detector:**

10440.000	13.322	36.330	49.652	-24.348	74.000
15660.000	*	*	*	*	74.000
20880.000	*	*	*	*	74.000
26100.000	*	*	*	*	74.000

**Average  
Detector:**

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**Vertical****Peak Detector:**

10440.000	14.245	36.760	51.005	-22.995	74.000
15660.000	*	*	*	*	74.000
20880.000	*	*	*	*	74.000
26100.000	*	*	*	*	74.000

**Average  
Detector:**

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Note:

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

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5240MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
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**Horizontal****Peak Detector:**

10480.000	13.693	36.190	49.884	-24.116	74.000
15720.000	*	*	*	*	74.000
20960.000	*	*	*	*	74.000
26200.000	*	*	*	*	74.000

**Average****Detector:**

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**Vertical****Peak Detector:**

10480.000	14.620	36.560	51.181	-22.819	74.000
15720.000	*	*	*	*	74.000
20960.000	*	*	*	*	74.000
26200.000	*	*	*	*	74.000

**Average****Detector:**

--

Note:

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

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5745MHz)

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

**Horizontal****Peak Detector:**

11490.000	17.106	36.512	53.619	-20.381	74.000
17235.000	*	*	*	*	74.000
20720.000	*	*	*	*	74.000
25900.000	*	*	*	*	74.000
31080.000	*	*	*	*	74.000
36260.000	*	*	*	*	74.000

**Average****Detector:**

--

**Vertical****Peak Detector:**

11490.000	18.034	35.480	53.515	-20.485	74.000
17235.000	*	*	*	*	74.000
20720.000	*	*	*	*	74.000
25900.000	*	*	*	*	74.000
31080.000	*	*	*	*	74.000
36260.000	*	*	*	*	74.000

**Average****Detector:**

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Note:

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

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5785MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11570.000	16.809	36.590	53.399	-20.601	74.000
17355.000	*	*	*	*	74.000
20880.000	*	*	*	*	74.000
26100.000	*	*	*	*	74.000
31320.000	*	*	*	*	74.000
36540.000	*	*	*	*	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11570.000	17.698	35.590	53.288	-20.712	74.000
17355.000	*	*	*	*	74.000
20880.000	*	*	*	*	74.000
26100.000	*	*	*	*	74.000
31320.000	*	*	*	*	74.000
36540.000	*	*	*	*	74.000
<b>Average Detector:</b>					
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**Note:**

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

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5825MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11650.000	16.158	36.590	52.748	-21.252	74.000
17475.000	*	*	*	*	74.000
20960.000	*	*	*	*	74.000
26200.000	*	*	*	*	74.000
31440.000	*	*	*	*	74.000
36680.000	*	*	*	*	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11650.000	17.274	36.150	53.425	-20.575	74.000
17475.000	*	*	*	*	74.000
20960.000	*	*	*	*	74.000
26200.000	*	*	*	*	74.000
31440.000	*	*	*	*	74.000
36680.000	*	*	*	*	74.000
<b>Average Detector:</b>					
--					

**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 IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5190MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
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**Horizontal****Peak Detector:**

10380.000	12.939	35.870	48.809	-25.191	74.000
15570.000	*	*	*	*	74.000
20760.000	*	*	*	*	74.000
25950.000	*	*	*	*	74.000

**Average  
Detector:**

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**Vertical****Peak Detector:**

10380.000	13.796	36.730	50.526	-23.474	74.000
15570.000	*	*	*	*	74.000
20760.000	*	*	*	*	74.000
25950.000	*	*	*	*	74.000

**Average  
Detector:**

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Note:

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

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5230MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
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**Horizontal****Peak Detector:**

10460.000	14.690	36.290	50.980	-23.020	74.000
15690.000	*	*	*	*	74.000
20920.000	*	*	*	*	74.000
26150.000	*	*	*	*	74.000

**Average****Detector:**

--

**Vertical****Peak Detector:**

10460.000	14.433	36.760	51.193	-22.807	74.000
15690.000	*	*	*	*	74.000
20920.000	*	*	*	*	74.000
26150.000	*	*	*	*	74.000

**Average****Detector:**

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Note:

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

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5755MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
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**Horizontal****Peak Detector:**

11510.000	17.124	35.150	52.274	-21.726	74.000
17265.000	*	*	*	*	74.000
20760.000	*	*	*	*	74.000
25950.000	*	*	*	*	74.000
31140.000	*	*	*	*	74.000
36330.000	*	*	*	*	74.000

**Average****Detector:**

--

**Vertical****Peak Detector:**

11510.000	18.081	35.590	53.671	-20.329	74.000
17265.000	*	*	*	*	74.000
20760.000	*	*	*	*	74.000
25950.000	*	*	*	*	74.000
31140.000	*	*	*	*	74.000
36330.000	*	*	*	*	74.000

**Average****Detector:**

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**Note:**

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

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Harmonic Radiated Emission Data  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5795MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
11590.000	16.701	35.150	51.850	-22.150	74.000
17385.000	*	*	*	*	74.000
20920.000	*	*	*	*	74.000
26150.000	*	*	*	*	74.000
31380.000	*	*	*	*	74.000
36610.000	*	*	*	*	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
11590.000	17.567	36.290	53.856	-20.144	74.000
17385.000	*	*	*	*	74.000
20920.000	*	*	*	*	74.000
26150.000	*	*	*	*	74.000
31380.000	*	*	*	*	74.000
36610.000	*	*	*	*	74.000
<b>Average Detector:</b>					
--					

**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 IEEE 802.11a/b/g/n Wireless  
Test Item : General Radiated Emission  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5220MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m
<b>Horizontal</b>					
<b>Peak Detector</b>					
161.920	-11.626	47.213	35.588	-7.912	43.500
392.780	-2.096	36.327	34.231	-11.769	46.000
483.960	-0.688	36.919	36.232	-9.768	46.000
600.360	3.977	33.950	37.927	-8.073	46.000
712.880	3.569	27.806	31.375	-14.625	46.000
961.200	6.450	43.499	49.949	-4.051	54.000

**Vertical****Peak Detector**

111.480	-0.954	35.740	34.786	-8.714	43.500
181.320	-9.512	44.271	34.759	-8.741	43.500
222.060	-8.789	43.212	34.423	-11.577	46.000
286.080	-8.097	45.106	37.009	-8.991	46.000
365.620	-2.179	34.574	32.395	-13.605	46.000
747.800	2.166	30.672	32.838	-13.162	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 other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : General Radiated Emission  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5785MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
<b>Horizontal</b>					
<b>Peak Detector</b>					
117.300	-9.196	47.333	38.137	-5.363	43.500
282.200	-5.211	43.485	38.274	-7.726	46.000
449.040	-2.238	39.290	37.052	-8.948	46.000
650.800	2.175	31.921	34.096	-11.904	46.000
811.820	5.081	32.485	37.565	-8.435	46.000
955.380	6.247	28.702	34.949	-11.051	46.000
<b>Vertical</b>					
<b>Peak Detector</b>					
107.600	-0.318	39.374	39.056	-4.444	43.500
227.880	-8.519	47.062	38.544	-7.456	46.000
406.360	-6.660	39.695	33.035	-12.965	46.000
540.220	0.121	29.639	29.760	-16.240	46.000
668.260	-1.694	40.358	38.664	-7.336	46.000
901.060	3.331	32.854	36.185	-9.815	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 other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : General Radiated Emission  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5220MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m
<b>Horizontal</b>					
<b>Peak Detector</b>					
171.620	-10.242	44.542	34.300	-9.200	43.500
406.360	-2.500	35.772	33.272	-12.728	46.000
559.620	1.664	33.160	34.824	-11.176	46.000
608.120	4.384	29.852	34.236	-11.764	46.000
720.640	3.511	31.804	35.315	-10.685	46.000
961.200	6.450	43.648	50.098	-3.902	54.000

### Vertical

#### Peak Detector

159.980	-6.185	38.478	32.293	-11.207	43.500
288.020	-8.189	44.244	36.055	-9.945	46.000
390.840	-3.099	37.207	34.108	-11.892	46.000
509.180	-0.158	31.207	31.049	-14.951	46.000
687.660	2.444	27.477	29.921	-16.079	46.000
961.200	7.260	36.351	43.611	-10.389	54.000

#### Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + 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.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : General Radiated Emission  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5785MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m
<b>Horizontal</b>					
<b>Peak Detector</b>					
117.300	-9.196	47.333	38.137	-5.363	43.500
268.620	-4.942	44.057	39.115	-6.885	46.000
449.040	-2.238	39.290	37.052	-8.948	46.000
666.320	2.031	38.300	40.332	-5.668	46.000
811.820	5.081	32.485	37.565	-8.435	46.000
943.740	6.492	28.263	34.756	-11.244	46.000
<b>Vertical</b>					
<b>Peak Detector</b>					
107.600	-0.318	39.374	39.056	-4.444	43.500
227.880	-8.519	47.062	38.544	-7.456	46.000
338.460	-4.265	41.347	37.082	-8.918	46.000
507.240	-0.471	38.506	38.035	-7.965	46.000
681.840	1.484	37.538	39.022	-6.978	46.000
901.060	3.331	32.854	36.185	-9.815	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 other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : General Radiated Emission  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5190MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m
<b>Horizontal</b>					
<b>Peak Detector</b>					
101.780	-7.141	42.502	35.361	-8.139	43.500
152.220	-10.135	40.694	30.559	-12.941	43.500
369.500	-1.098	35.487	34.389	-11.611	46.000
468.440	1.195	33.790	34.985	-11.015	46.000
600.360	3.977	36.226	40.203	-5.797	46.000
961.200	6.450	42.479	48.929	-5.071	54.000

**Vertical****Peak Detector**

119.240	-3.541	34.451	30.910	-12.590	43.500
237.580	-8.970	49.206	40.236	-5.764	46.000
357.860	-3.734	40.629	36.895	-9.105	46.000
480.080	-4.359	35.967	31.608	-14.392	46.000
687.660	2.444	28.304	30.748	-15.252	46.000
831.220	2.561	33.565	36.126	-9.874	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 other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : General Radiated Emission  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5755MHz)

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
<b>Horizontal</b>					
<b>Peak Detector</b>					
117.300	-9.196	47.333	38.137	-5.363	43.500
233.700	-8.619	46.008	37.389	-8.611	46.000
330.700	-4.492	42.056	37.564	-8.436	46.000
507.240	0.759	38.506	39.265	-6.735	46.000
728.400	3.452	32.159	35.611	-10.389	46.000
920.460	6.467	29.637	36.104	-9.896	46.000
<b>Vertical</b>					
<b>Peak Detector</b>					
111.480	-0.954	37.955	37.001	-6.499	43.500
256.980	-7.573	46.941	39.368	-6.632	46.000
338.460	-4.265	41.347	37.082	-8.918	46.000
449.040	-7.498	39.290	31.792	-14.208	46.000
681.840	1.484	37.538	39.022	-6.978	46.000
901.060	3.331	32.854	36.185	-9.815	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 other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

## 6. Band Edge

### 6.1. Test Equipment

#### RF Conducted Measurement

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

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2014
Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2014
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2014

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:

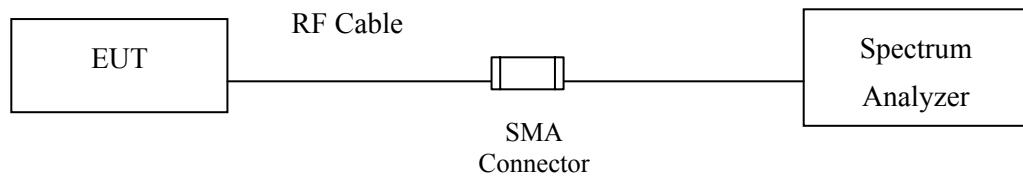
Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒CB # 8	X Spectrum Analyzer	R&S	FSP40/ 100339	Oct., 2014
	X Horn Antenna	ETS-Lindgren	3117/ 35205	Mar., 2015
	X Horn Antenna	Schwarzbeck	BBHA9170/209	Jan., 2015
	X Horn Antenna	TRC	AH-0801/95051	Aug., 2014
	X Pre-Amplifier	EMCI	EMC012630SE/980210	Jan., 2015
	X Pre-Amplifier	MITEQ	JS41-001040000-58-5P/153945	Jul., 2014
	X Pre-Amplifier	NARDA	DBL-1840N506/013	Jul., 2014

Note:

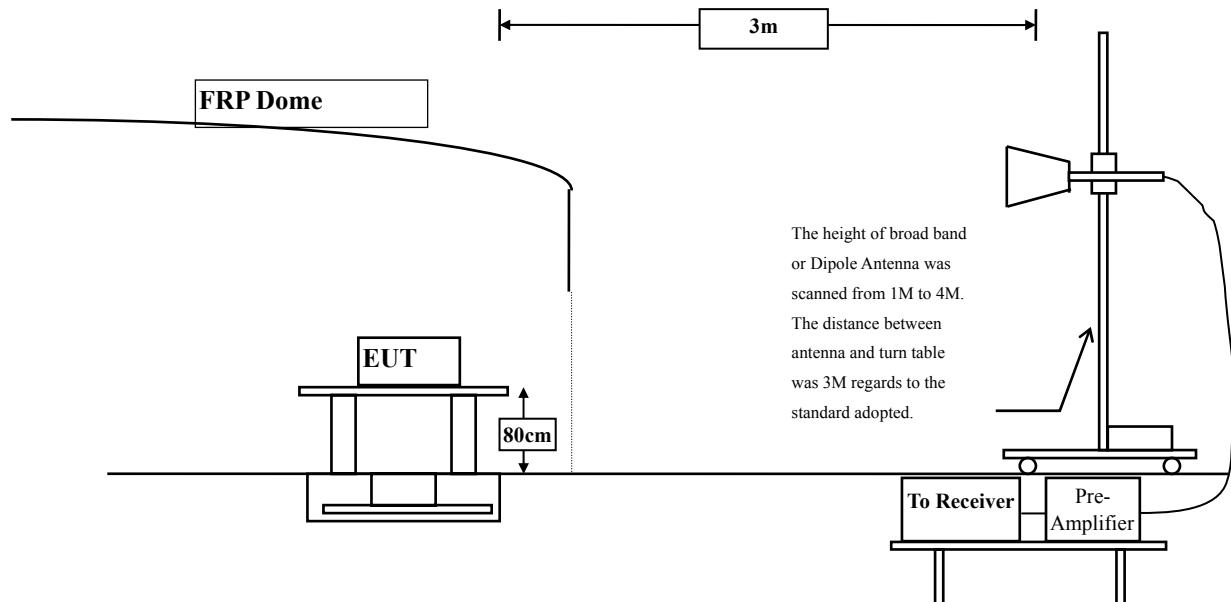
1. All instruments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

## 6.2. Test Setup

### RF Conducted Measurement:



### RF Radiated Measurement:



### 6.3. Limits

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:

<b>FCC Part 15 Subpart C Paragraph 15.209 Limits</b>		
Frequency MHz	uV/m @3m	dB $\mu$ V/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks : 1. RF Voltage (dB $\mu$ V) = 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.

### 6.4. 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 C63.10:2013 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, 2013; tested to DTS test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

### 6.5. Uncertainty

± 3.8 dB below 1GHz

± 3.9 dB above 1GHz

## 6.6. Test Result of Band Edge

Product : MOXA IEEE 802.11a/b/g/n Wireless  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11a-6Mbps)-Channel 36

### RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Result
36 (Peak)	5149.600	3.342	41.296	44.638	74.00	54.00	Pass
36 (Peak)	5150.000	3.340	40.457	43.797	74.00	54.00	Pass
36 (Peak)	5183.200	3.223	89.953	93.176	--	--	--
36 (Average)	5104.800	3.479	28.773	32.252	74.00	54.00	Pass
36 (Average)	5150.000	3.340	25.469	28.809	74.00	54.00	Pass
36 (Average)	5185.000	3.217	77.968	81.184	--	--	--

Figure Channel 36:

Horizontal (Peak)

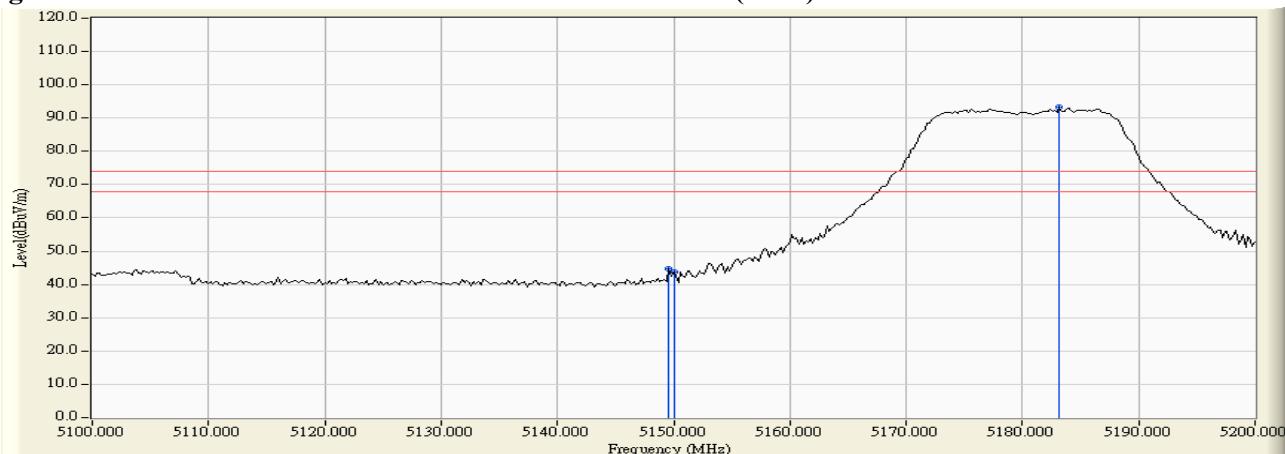
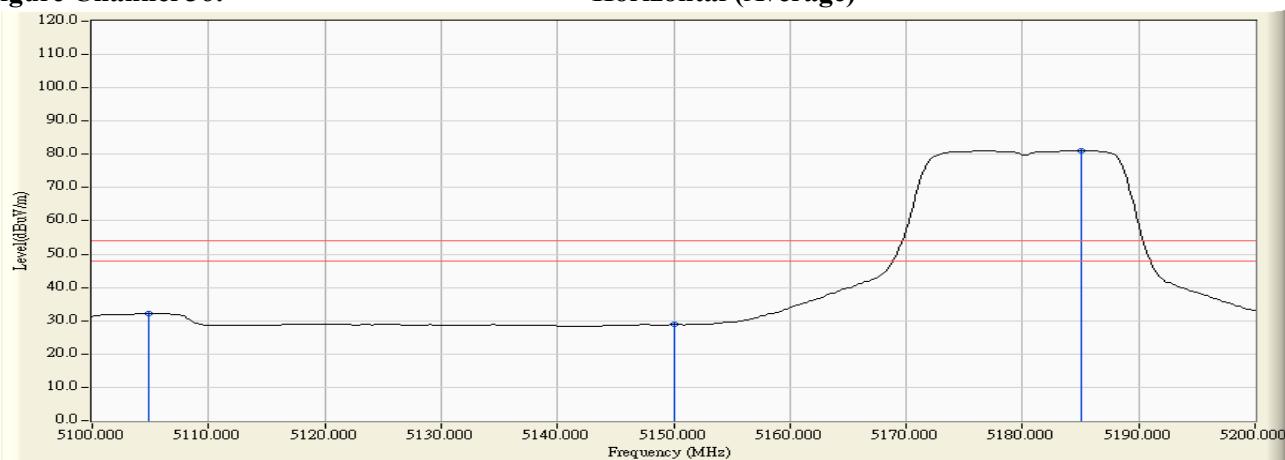


Figure Channel 36:

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 IEEE 802.11a/b/g/n Wireless  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11a-6Mbps)-Channel 36

#### RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Result
36 (Peak)	5150.000	5.260	50.796	56.056	74.00	54.00	Pass
36 (Peak)	5185.000	5.356	98.879	104.234	--	--	--
36 (Average)	5105.800	5.148	35.614	40.762	74.00	54.00	Pass
36 (Average)	5150.000	5.260	32.037	37.297	74.00	54.00	Pass
36 (Average)	5186.000	5.359	86.239	91.597	--	--	--

Figure Channel 36:

Vertical (Peak)

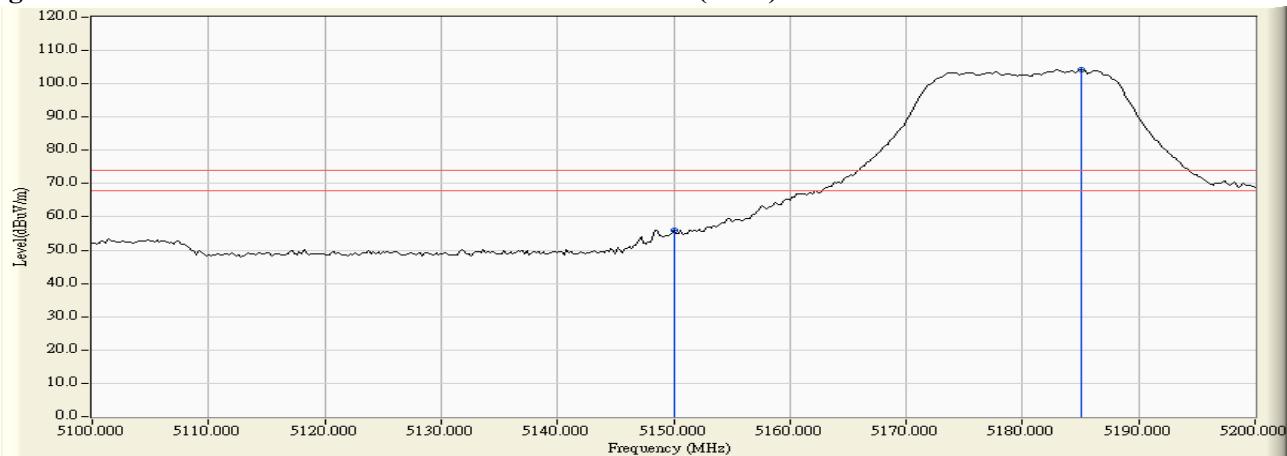
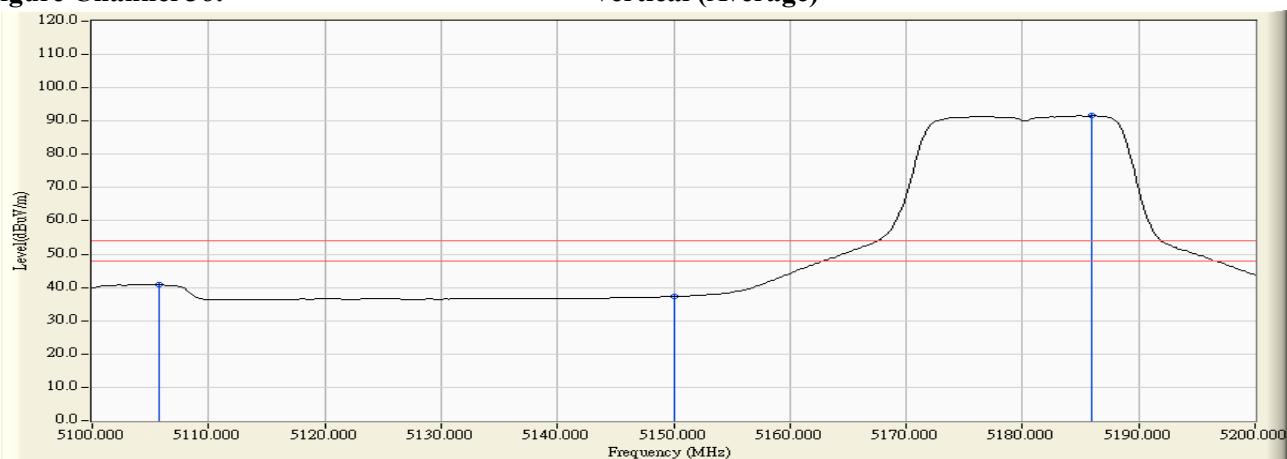


Figure Channel 36:

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 IEEE 802.11a/b/g/n Wireless  
Test Item : Band Edge Data  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmit (802.11a-6Mbps) -Channel 149

**RF Radiated Measurement:**

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5715.000	18.644	-68.120	-49.476	-22.476	-27.000	Pass
Horizontal	5725.000	18.649	-70.360	-51.711	-34.711	-17.000	Pass

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5715.000	19.296	-68.230	-48.934	-21.934	-27.000	Pass
Vertical	5725.000	19.372	-68.110	-48.738	-31.738	-17.000	Pass

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Band Edge Data  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmit (802.11a-6Mbps) -Channel 165

**RF Radiated Measurement:**

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5850.000	19.292	-70.230	-50.938	-33.938	-17.000	Pass
Horizontal	5860.000	19.415	-70.140	-50.725	-23.725	-27.000	Pass

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5850.000	20.512	-71.140	-50.628	-33.628	-17.000	Pass
Vertical	5860.000	20.635	-70.930	-50.295	-23.295	-27.000	Pass

Product : MOXA IEEE 802.11a/b/g/n Wireless  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) -Channel 36

#### RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Result
36 (Peak)	5146.800	3.351	43.139	46.491	74.00	54.00	Pass
36 (Peak)	5150.000	3.340	40.376	43.716	74.00	54.00	Pass
36 (Peak)	5176.400	3.248	90.519	93.766	--	--	--
36 (Average)	5104.800	3.479	28.768	32.247	74.00	54.00	Pass
36 (Average)	5150.000	3.340	25.757	29.097	74.00	54.00	Pass
36 (Average)	5176.400	3.248	76.516	79.763	--	--	--

Figure Channel 36:

Horizontal (Peak)

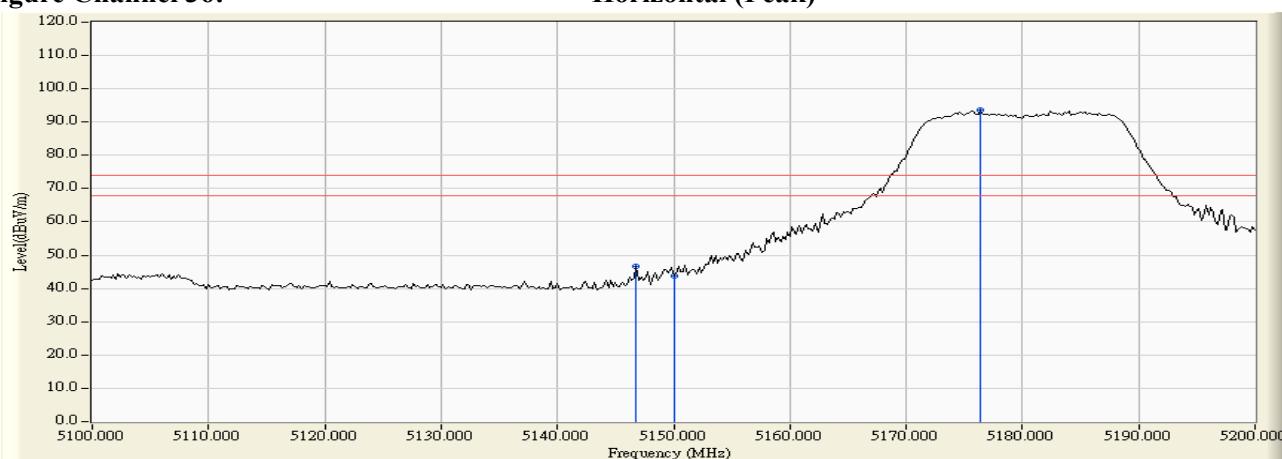
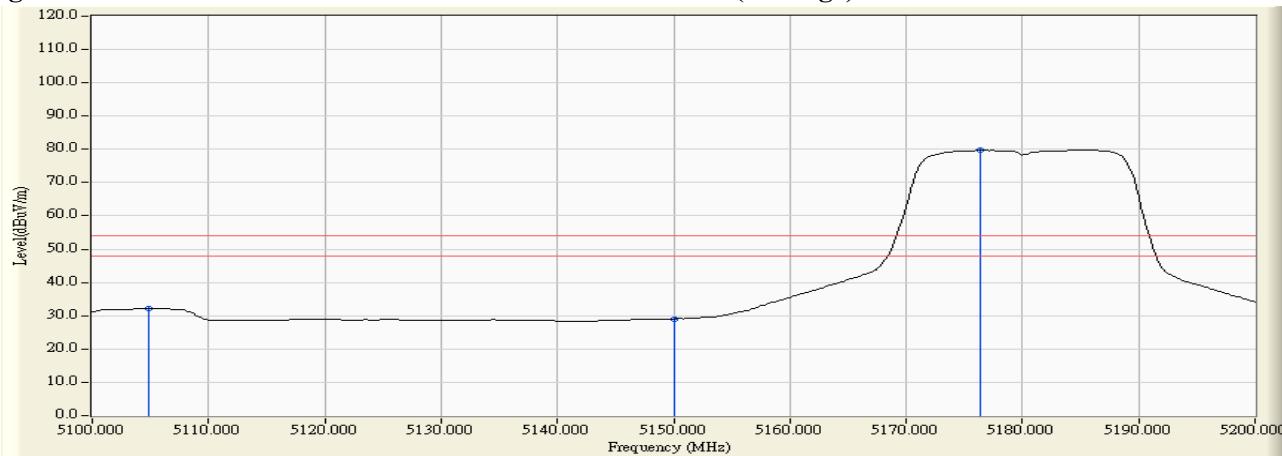


Figure Channel 36:

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 IEEE 802.11a/b/g/n Wireless  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) -Channel 36

#### RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Result
36 (Peak)	5148.800	5.257	52.637	57.894	74.00	54.00	Pass
36 (Peak)	5150.000	5.260	51.181	56.441	74.00	54.00	Pass
36 (Peak)	5174.200	5.327	100.274	105.600	--	--	--
36 (Average)	5120.200	5.178	35.675	40.853	74.00	54.00	Pass
36 (Average)	5150.000	5.260	32.722	37.982	74.00	54.00	Pass
36 (Average)	5186.000	5.359	85.224	90.582	--	--	--

Figure Channel 36:

Vertical (Peak)

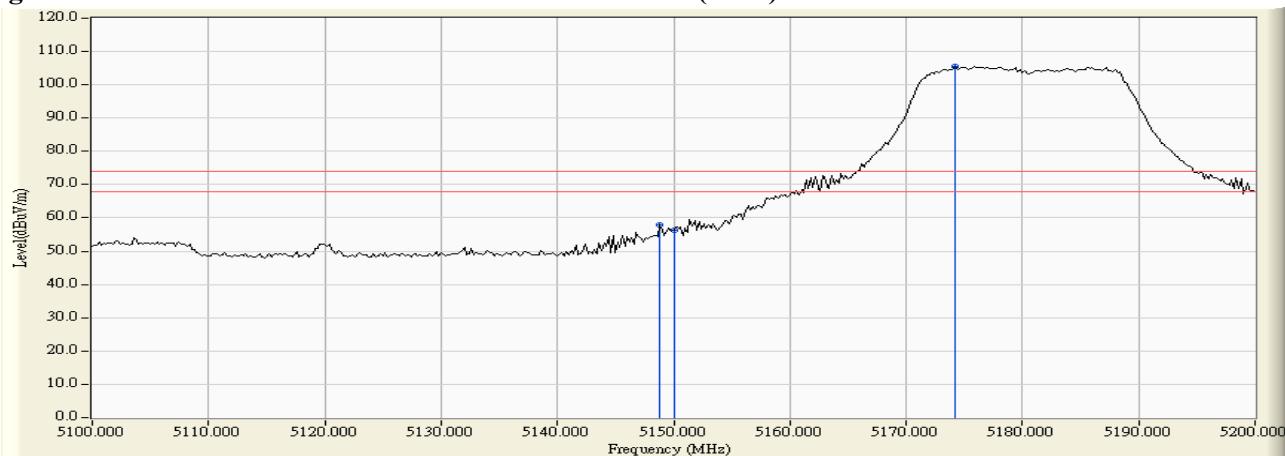
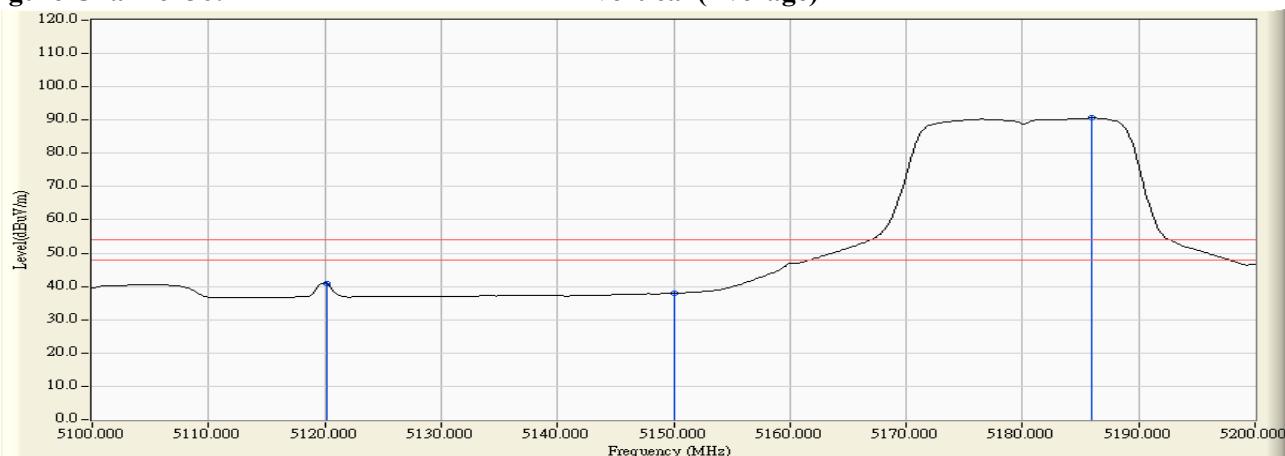


Figure Channel 36:

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 IEEE 802.11a/b/g/n Wireless  
Test Item : Band Edge Data  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) -Channel 149

**RF Radiated Measurement:**

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5715.000	18.644	-70.140	-51.496	-24.496	-27.000	Pass
Horizontal	5725.000	18.649	-70.580	-51.931	-34.931	-17.000	Pass

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5715.000	19.296	-70.140	-50.844	-23.844	-27.000	Pass
Vertical	5725.000	19.372	-70.630	-51.258	-34.258	-17.000	Pass

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Band Edge Data  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) -Channel 165

**RF Radiated Measurement:**

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5850.000	19.292	-70.260	-50.968	-33.968	-17.000	Pass
Horizontal	5860.000	19.415	-69.230	-49.815	-22.815	-27.000	Pass

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5850.000	20.512	-71.150	-50.638	-33.638	-17.000	Pass
Vertical	5860.000	20.635	-70.660	-50.025	-23.025	-27.000	Pass

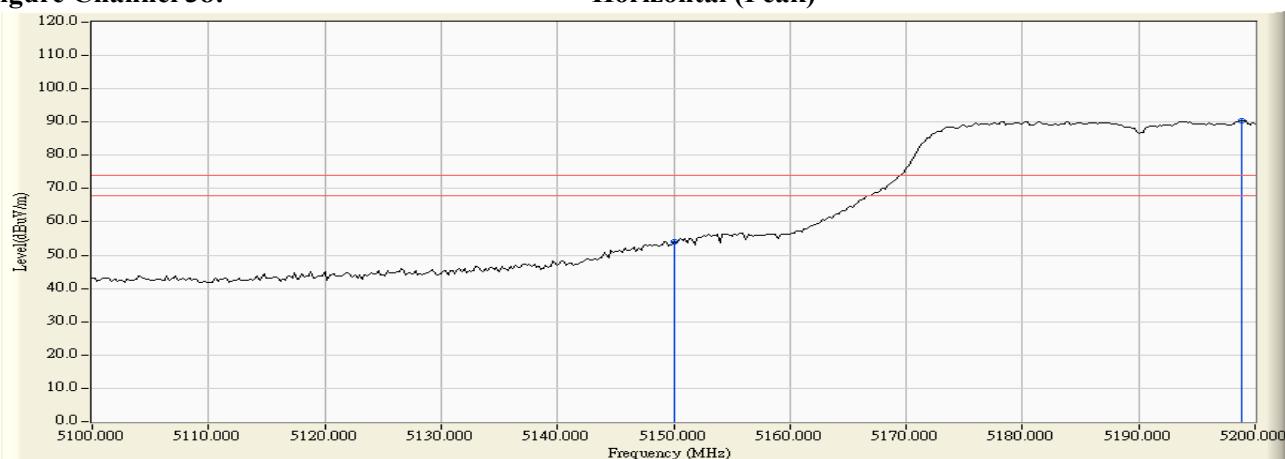
Product : MOXA IEEE 802.11a/b/g/n Wireless  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) -Channel 38

**RF Radiated Measurement (Horizontal):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Result
38 (Peak)	5150.000	3.340	50.773	54.113	74.00	54.00	Pass
38 (Peak)	5198.800	3.157	87.297	90.454	--	--	--
38 (Average)	5150.000	3.340	30.222	33.562	74.00	54.00	Pass
38 (Average)	5197.800	3.161	72.379	75.540	--	--	--

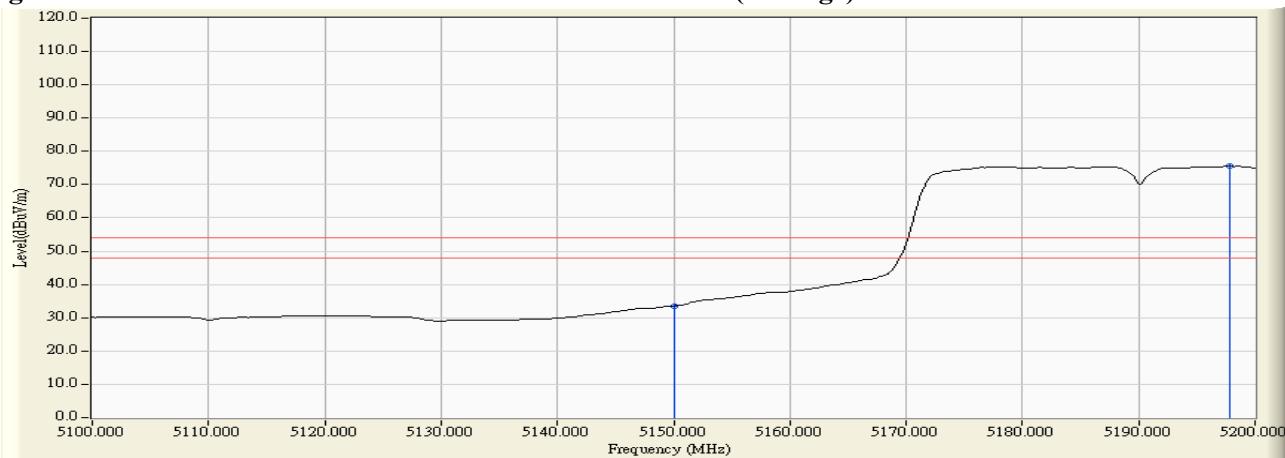
**Figure Channel 38:**

**Horizontal (Peak)**



**Figure Channel 38:**

**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 IEEE 802.11a/b/g/n Wireless  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) -Channel 38

#### RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Result
38 (Peak)	5149.600	5.259	60.769	66.028	74.00	54.00	Pass
38 (Peak)	5150.000	5.260	58.278	63.538	74.00	54.00	Pass
38 (Peak)	5197.600	5.380	98.266	103.646	--	--	--
38 (Average)	5150.000	5.260	39.773	45.033	74.00	54.00	Pass
38 (Average)	5199.000	5.383	82.113	87.496	--	--	--

Figure Channel 38:

Vertical (Peak)

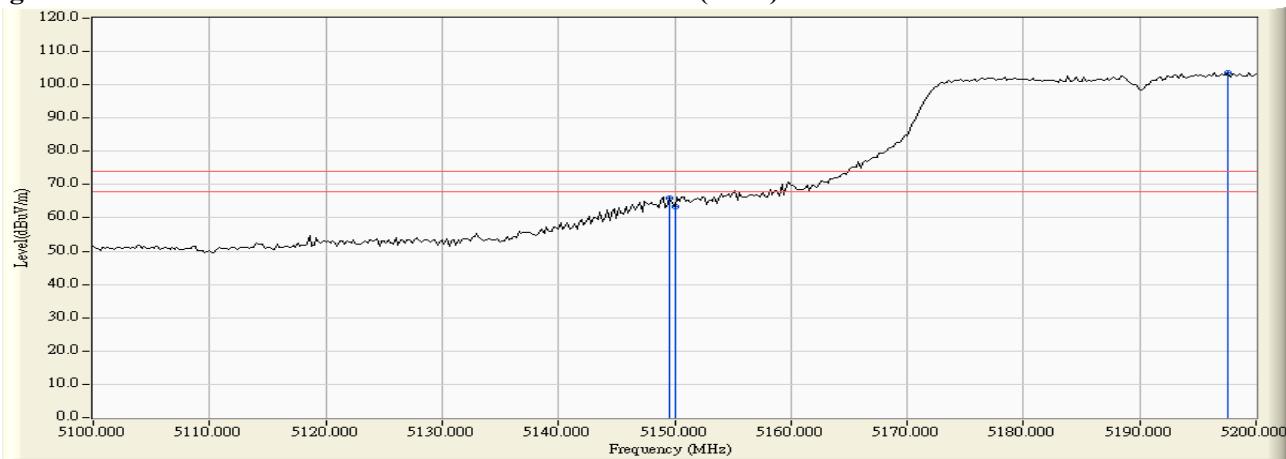
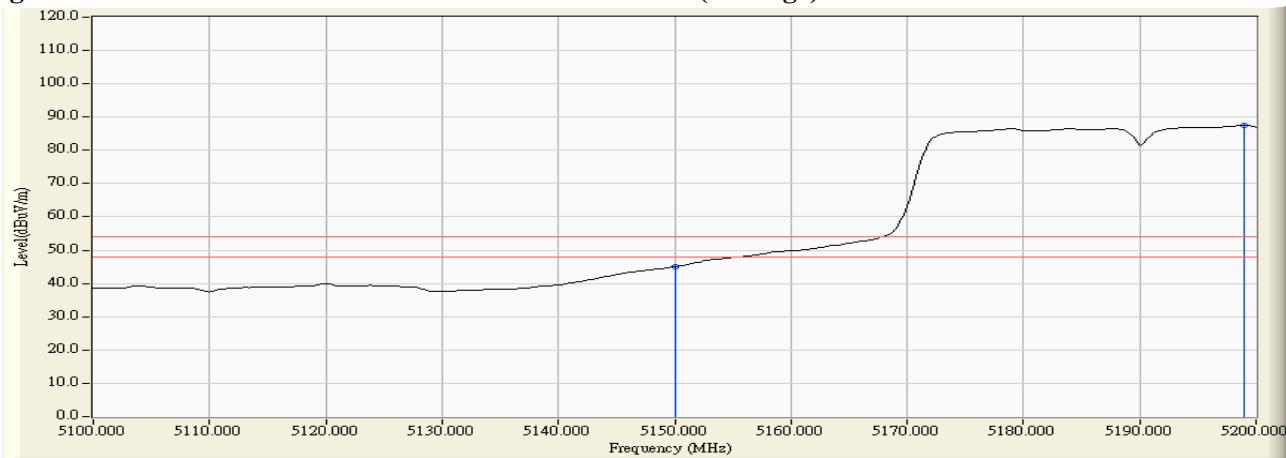


Figure Channel 38:

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 IEEE 802.11a/b/g/n Wireless  
Test Item : Band Edge Data  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) -Channel 151

**RF Radiated Measurement:**

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5715.000	18.644	-69.230	-50.586	-23.586	-27.000	Pass
Horizontal	5725.000	18.649	-71.120	-52.471	-35.471	-17.000	Pass

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5715.000	19.296	-70.150	-50.854	-23.854	-27.000	Pass
Vertical	5725.000	19.372	-71.030	-51.658	-34.658	-17.000	Pass

Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Band Edge Data  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) -Channel 159

**RF Radiated Measurement:**

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5850.000	19.292	-71.150	-51.858	-34.858	-17.000	Pass
Horizontal	5860.000	19.415	-70.230	-50.815	-23.815	-27.000	Pass

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5850.000	20.512	-71.230	-50.718	-33.718	-17.000	Pass
Vertical	5860.000	20.635	-71.360	-50.725	-23.725	-27.000	Pass

## 7. Occupied Bandwidth

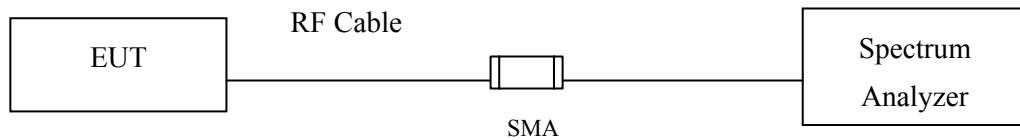
### 7.1. Test Equipment

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2014
Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2014
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2014

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.

### 7.2. Test Setup



### 7.3. Limits

For the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz

### 7.4. Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

### 7.5. Uncertainty

± 150Hz

## 7.6. Test Result of Occupied Bandwidth

Product : MOXA IEEE 802.11a/b/g/n Wireless  
 Test Item : Occupied Bandwidth Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit (802.11a-6Mbps)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745	16050	>500	Pass
157	5785	16400	>500	Pass
165	5825	16100	>500	Pass

Figure Channel 149:

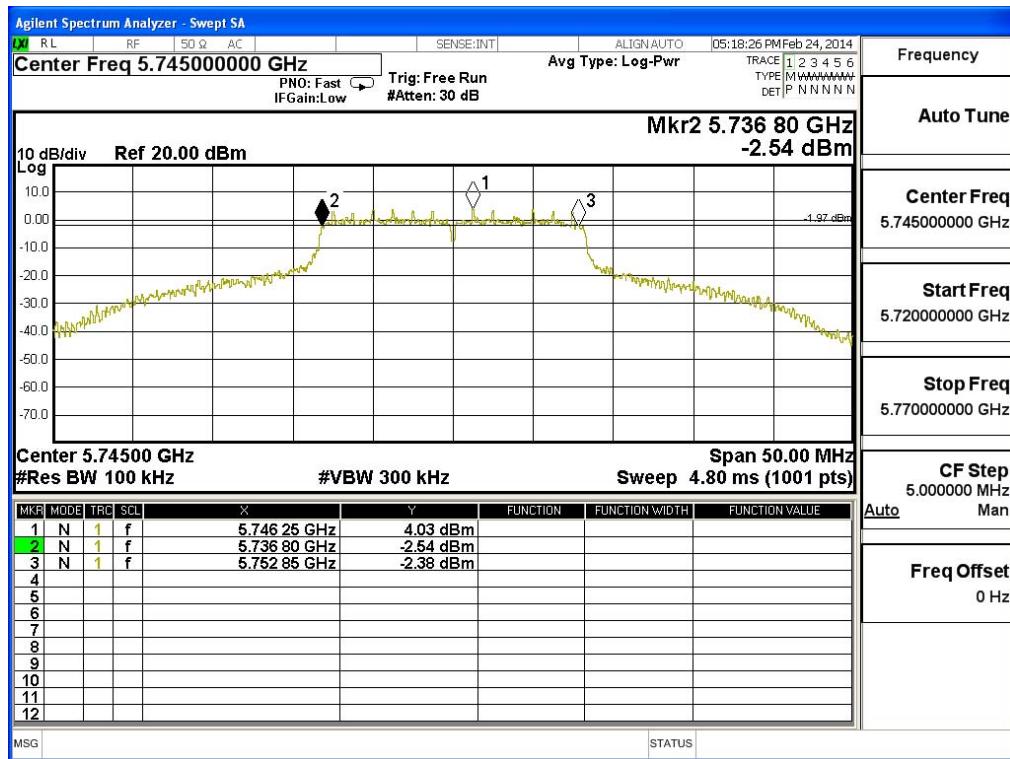


Figure Channel 157:

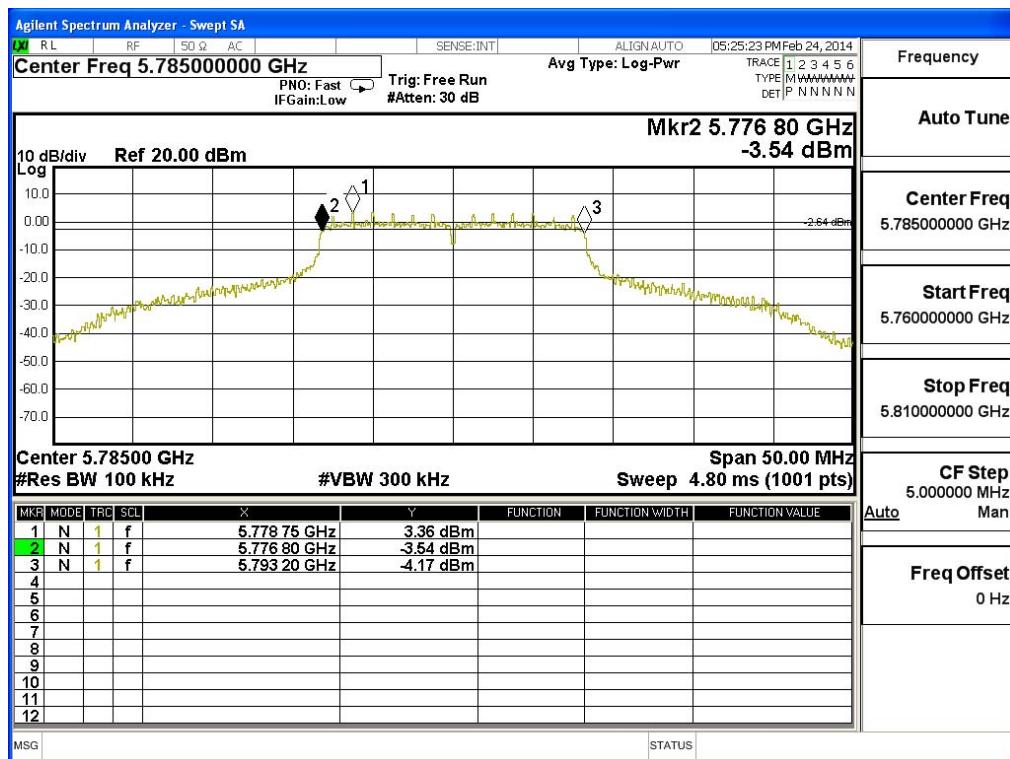
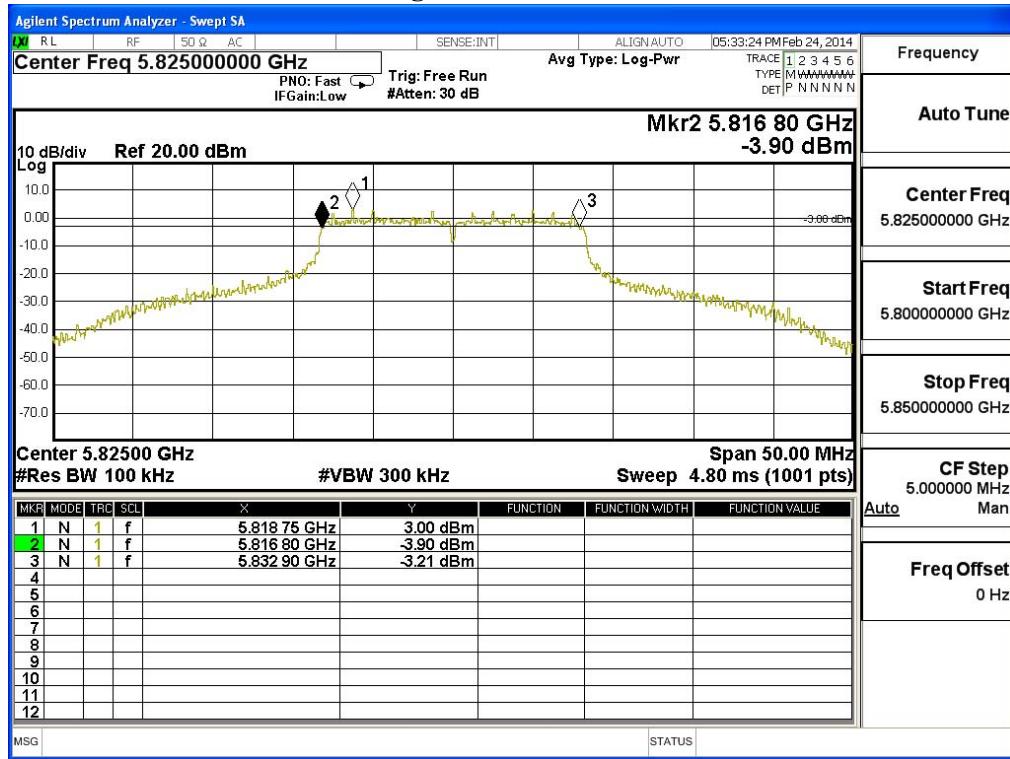


Figure Channel 165:



Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Occupied Bandwidth Data  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps)

Chain A

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745	17600	>500	Pass
157	5785	17250	>500	Pass
165	5825	17250	>500	Pass

Chain B

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745	17050	>500	Pass
157	5785	17250	>500	Pass
165	5825	16650	>500	Pass

Figure Channel 149: (Chain A)

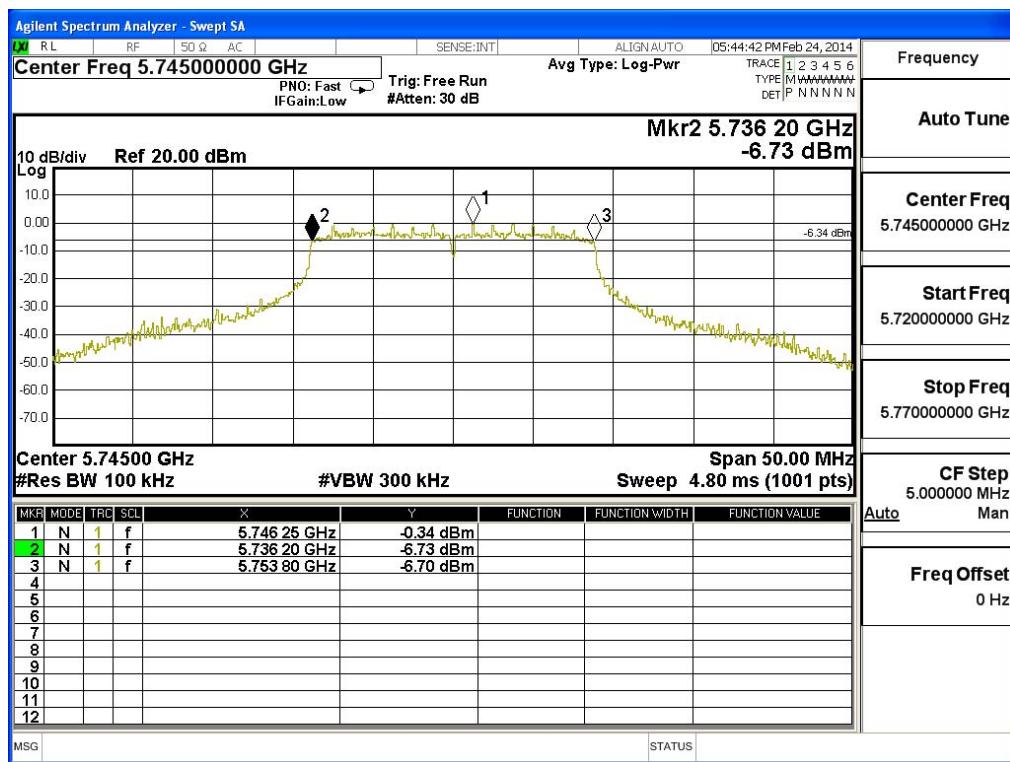


Figure Channel 149: (Chain B)

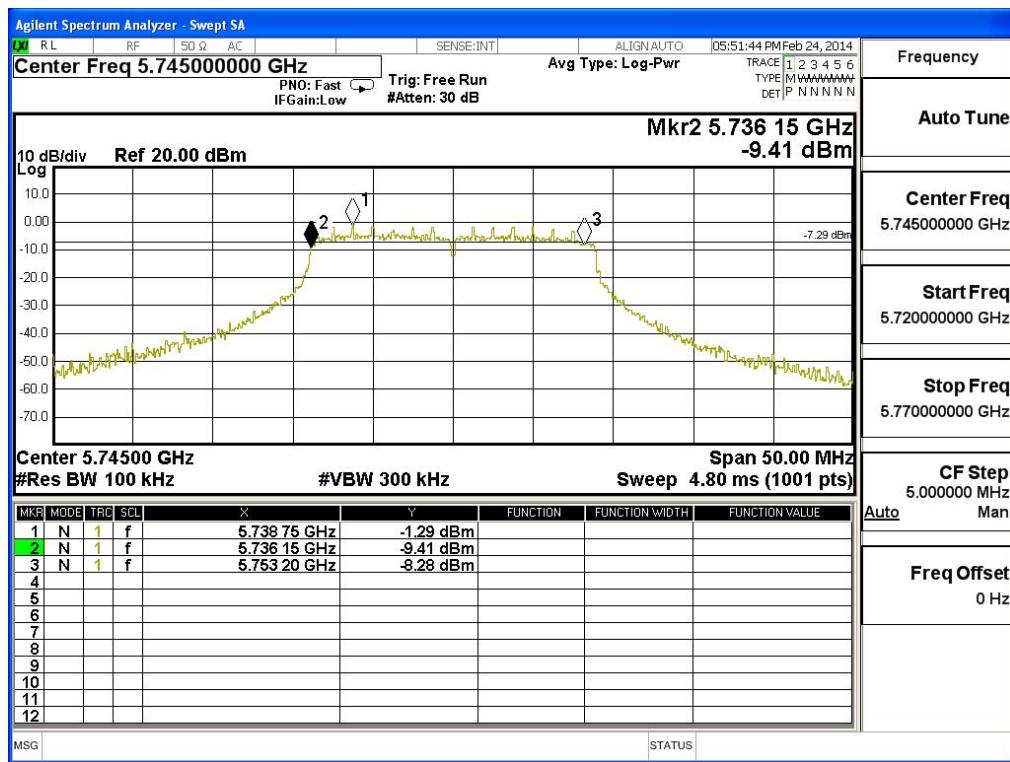


Figure Channel 157: (Chain A)

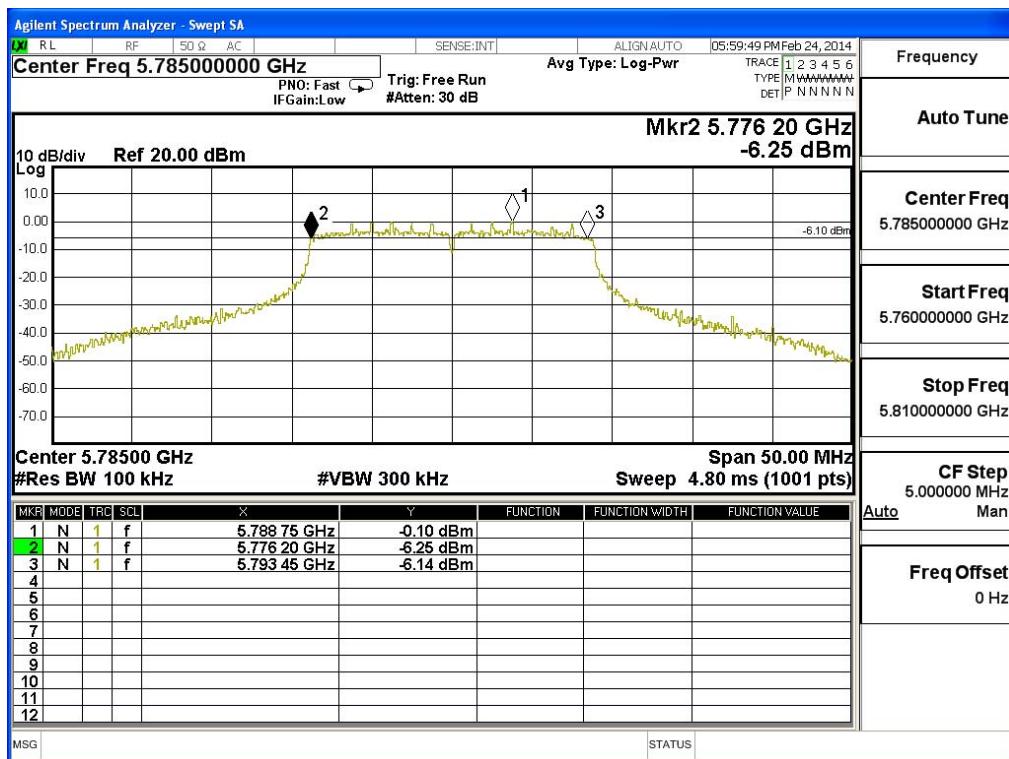


Figure Channel 157: (Chain B)

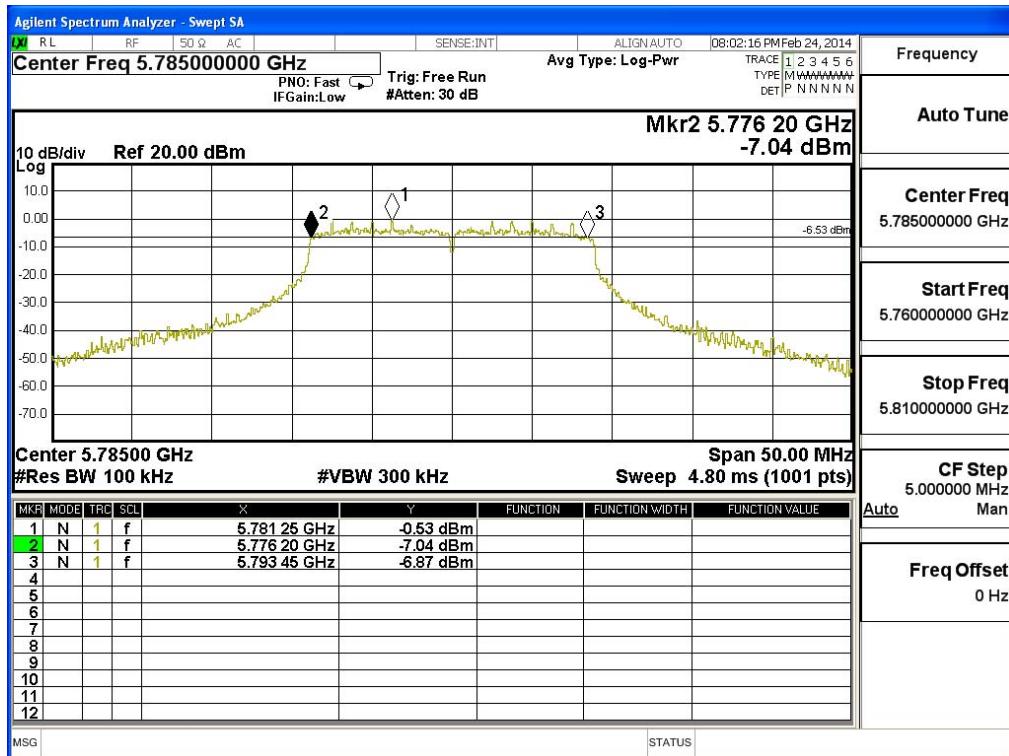


Figure Channel 165: (Chain A)

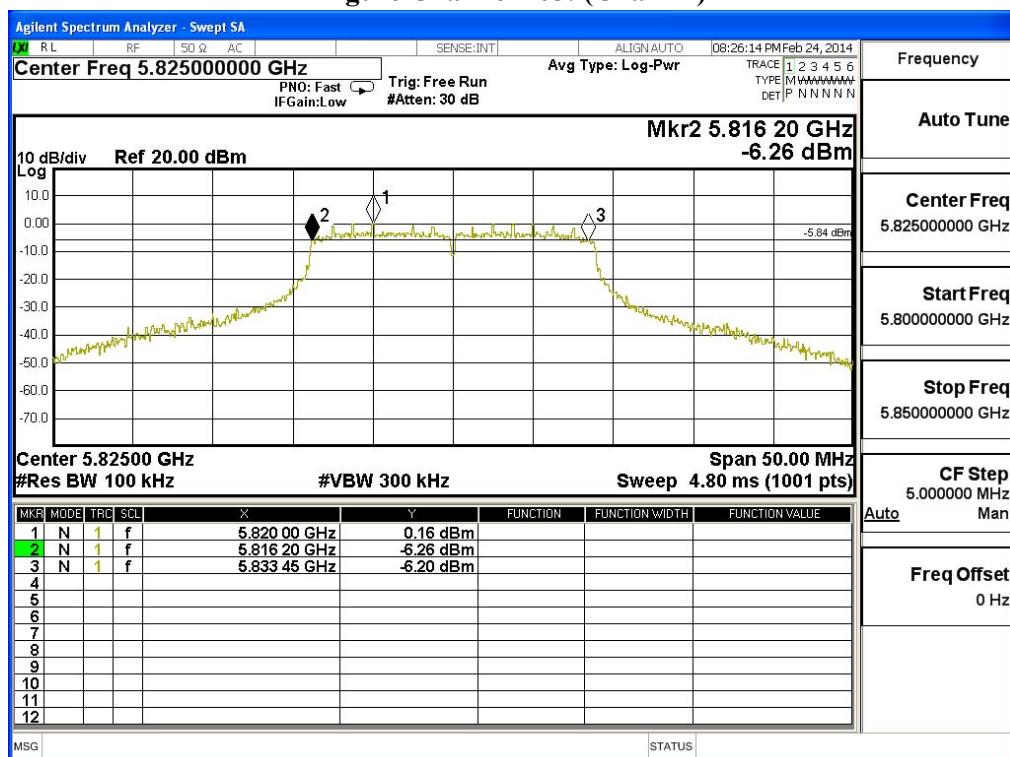
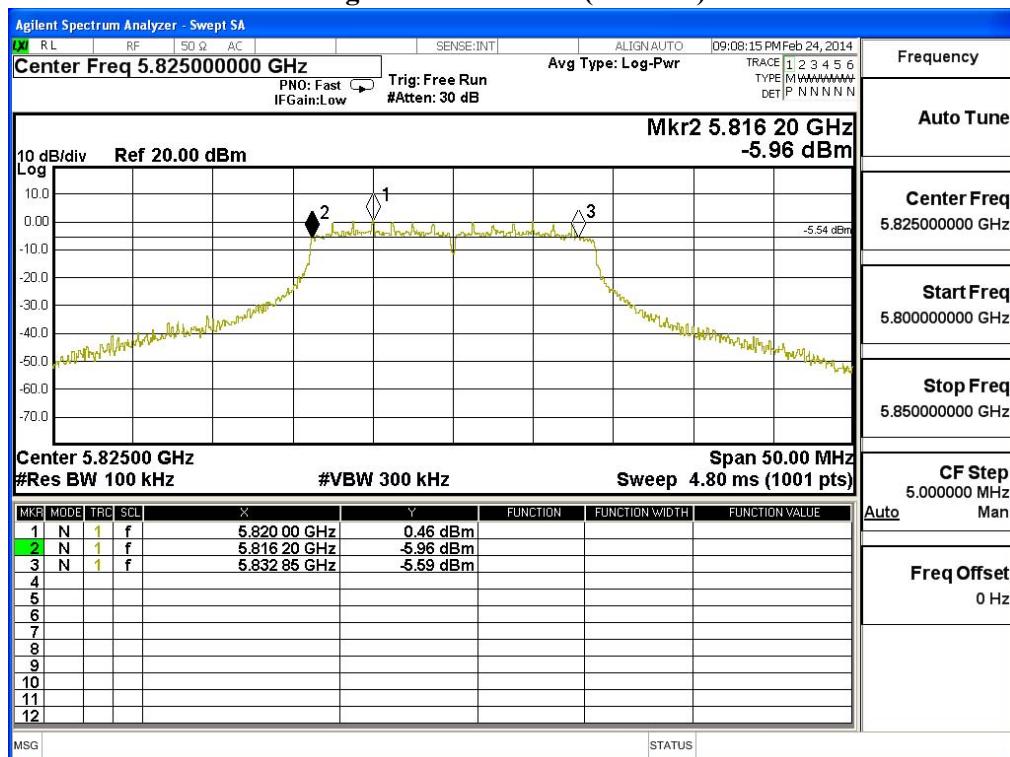


Figure Channel 165: (Chain B)



Product : MOXA IEEE 802.11a/b/g/n Wireless  
Test Item : Occupied Bandwidth Data  
Test Site : No.3 OATS  
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps)

Chain A

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
151	5755	35900	>500	Pass
159	5795	35700	>500	Pass

Chain B

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
151	5755	35700	>500	Pass
159	5795	35700	>500	Pass

Figure Channel 151: (Chain A)

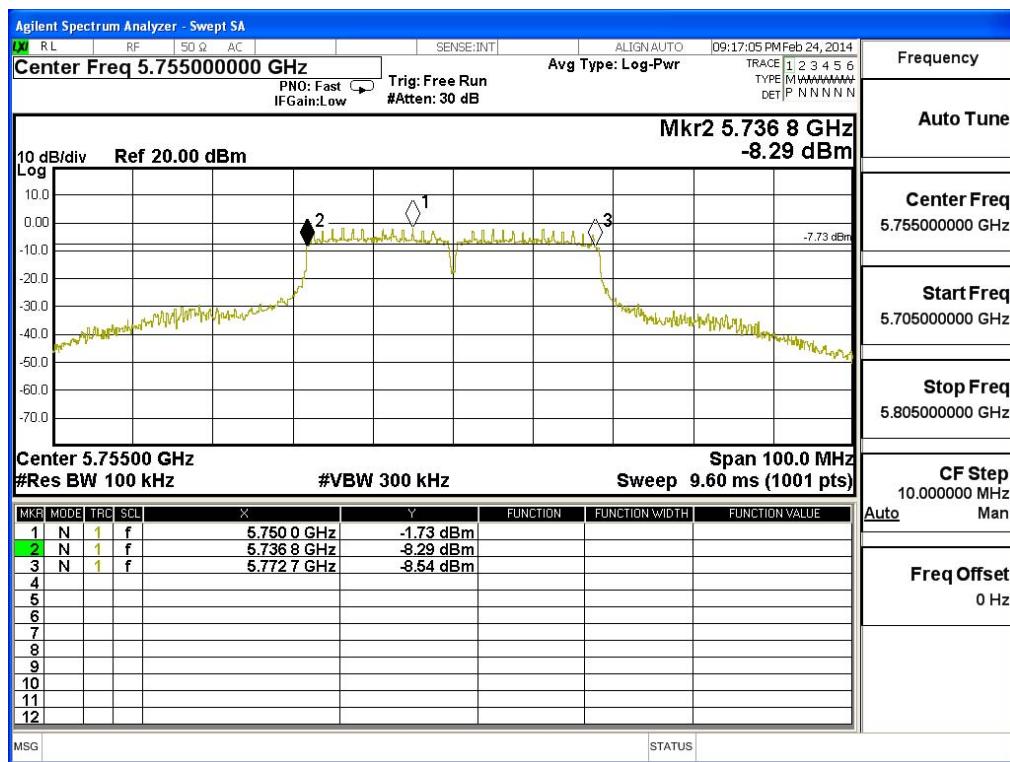


Figure Channel 151: (Chain B)

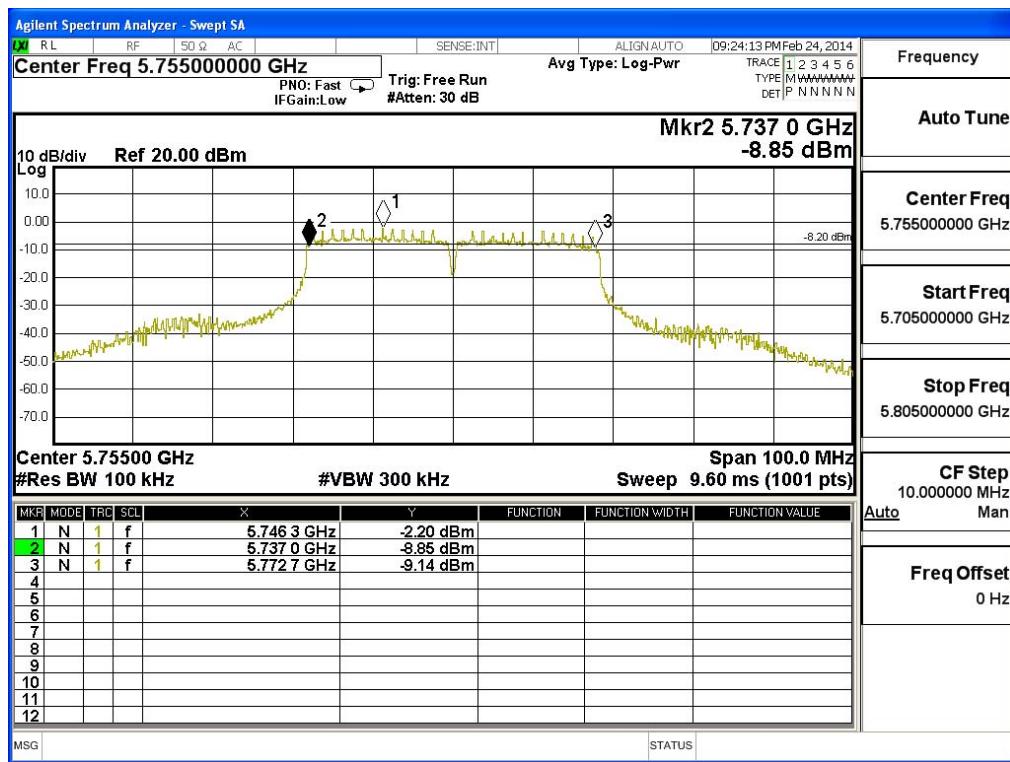


Figure Channel 159: (Chain A)

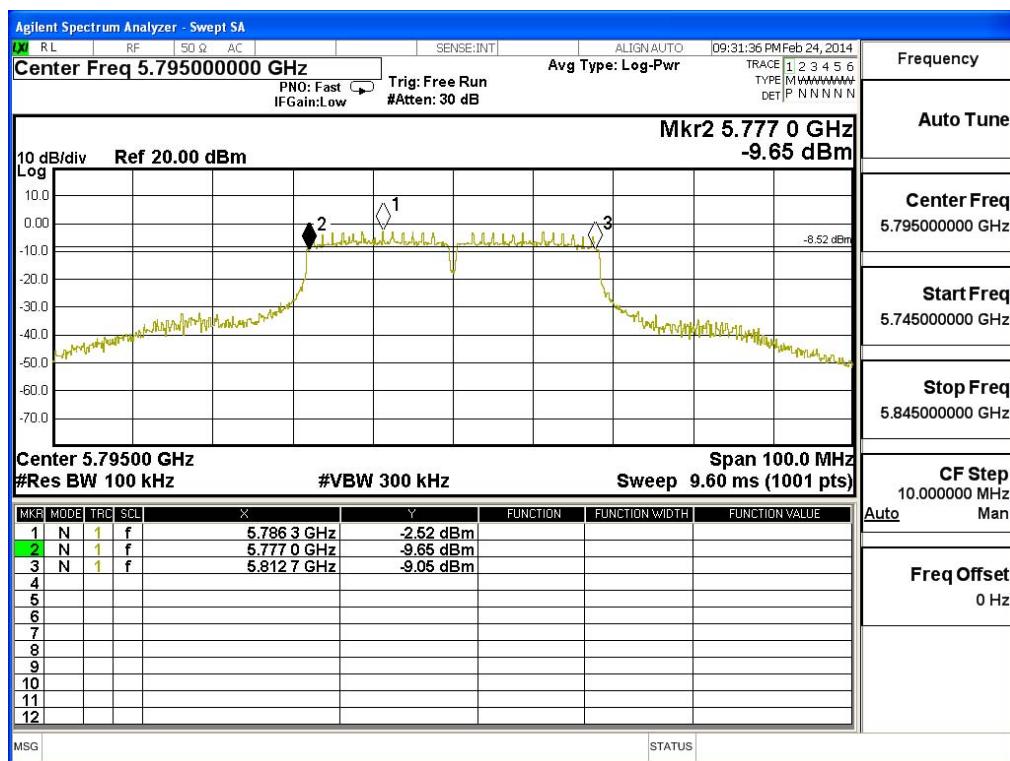
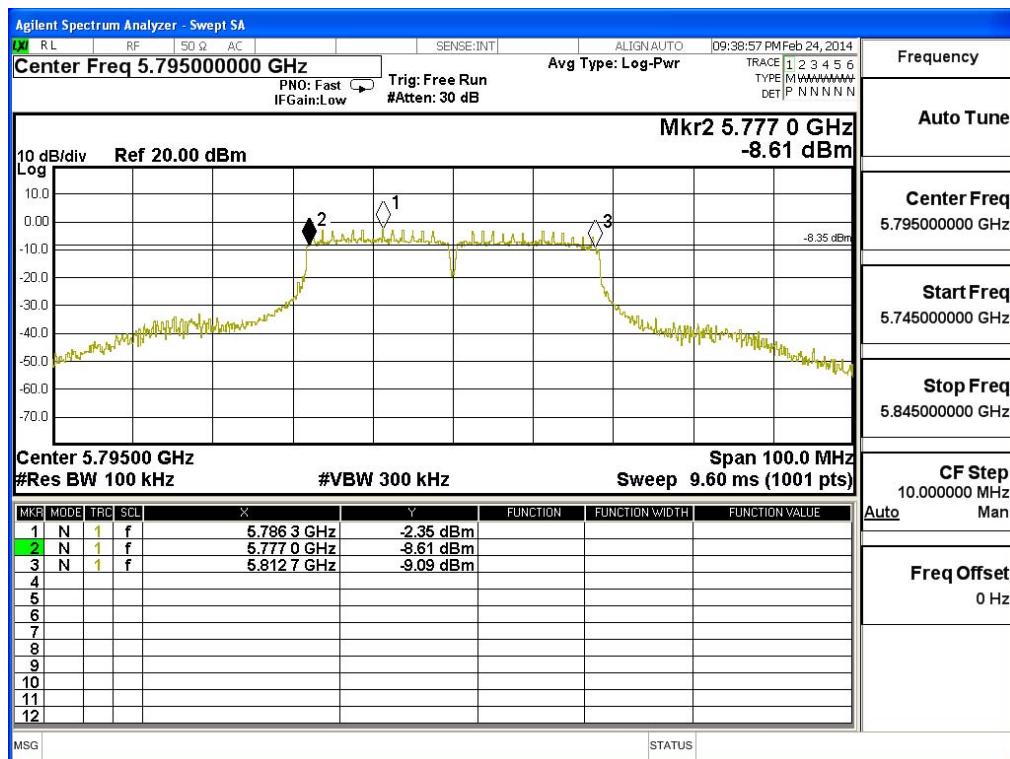


Figure Channel 159: (Chain B)



## 8. Frequency Stability

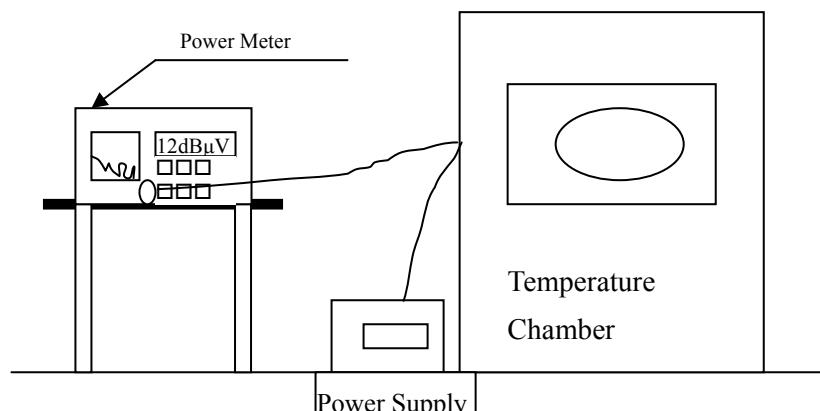
### 8.1. Test Equipment

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2014
Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2014
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2014

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

Manufacturers 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, 2013; 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 IEEE 802.11a/b/g/n Wireless  
Test Item : Frequency Stability  
Test Site : Temperature Chamber  
Test Mode : Carrier Wave

### Chain A

Test Conditions		Channel	Frequency (MHz)	Frequency (MHz)	$\Delta F$ (MHz)
T <sub>nom</sub> (20) °C	V <sub>nom</sub> (120)V	36	5180.0000	5180.0068	-0.0068
		38	5190.0000	5190.0043	-0.0043
		44	5220.0000	5220.0082	-0.0082
		46	5230.0000	5230.0069	-0.0069
		48	5240.0000	5240.0077	-0.0077
		149	5745.0000	5745.6500	-0.6500
		151	5755.0000	5755.0077	-0.0077
		157	5785.0000	5785.0088	-0.0088
		159	5795.0000	5795.0084	-0.0084
		165	5825.0000	5825.0088	-0.0088
T <sub>max</sub> (50) °C	V <sub>max</sub> (138)V	36	5180.0000	5180.0069	-0.0069
		38	5190.0000	5190.0077	-0.0077
		44	5220.0000	5220.0088	-0.0088
		46	5230.0000	5230.0074	-0.0074
		48	5240.0000	5240.0066	-0.0066
		149	5745.0000	5745.6500	-0.6500
		151	5755.0000	5755.0077	-0.0077
		157	5785.0000	5785.0088	-0.0088
		159	5795.0000	5795.0084	-0.0084
		165	5825.0000	5825.0088	-0.0088

Test Conditions		Channel	Frequency (MHz)	Frequency (MHz)	$\Delta F$ (MHz)
Tmax (50) °C	Vmin (102)V	36	5180.0000	5180.0064	-0.0064
		38	5190.0000	5190.0078	-0.0078
		44	5220.0000	5220.0094	-0.0094
		46	5230.0000	5230.0077	-0.0077
		48	5240.0000	5240.0082	-0.0082
		149	5745.0000	5745.6500	-0.6500
		151	5755.0000	5755.0077	-0.0077
		157	5785.0000	5785.0088	-0.0088
		159	5795.0000	5795.0084	-0.0084
		165	5825.0000	5825.0088	-0.0088
Tnom (-10) °C	Vnom (138)V	36	5180.0000	5180.6500	-0.6500
		38	5190.0000	5190.0077	-0.0077
		44	5220.0000	5220.0088	-0.0088
		46	5230.0000	5230.0084	-0.0084
		48	5240.0000	5240.0088	-0.0088
		149	5745.0000	5745.6500	-0.6500
		151	5755.0000	5755.0077	-0.0077
		157	5785.0000	5785.0088	-0.0088
		159	5795.0000	5795.0084	-0.0084
		165	5825.0000	5825.0088	-0.0088
Tmax (-10) °C	Vmax (102)V	36	5180.0000	5180.6500	-0.6500
		38	5190.0000	5190.0077	-0.0077
		44	5220.0000	5220.0088	-0.0088
		46	5230.0000	5230.0084	-0.0084
		48	5240.0000	5240.0088	-0.0088
		149	5745.0000	5745.6500	-0.6500
		151	5755.0000	5755.0077	-0.0077
		157	5785.0000	5785.0088	-0.0088
		159	5795.0000	5795.0084	-0.0084
		165	5825.0000	5825.0088	-0.0088

**Chain B**

Test Conditions		Channel	Frequency (MHz)	Frequency (MHz)	$\Delta F$ (MHz)
T <sub>nom</sub> (20) °C	V <sub>nom</sub> (120)V	36	5180.0000	5180.0065	-0.0065
		38	5190.0000	5190.0040	-0.0040
		44	5220.0000	5220.0077	-0.0077
		46	5230.0000	5230.0067	-0.0067
		48	5240.0000	5240.0074	-0.0074
		149	5745.0000	5745.6300	-0.6300
		151	5755.0000	5755.0075	-0.0075
		157	5785.0000	5785.0084	-0.0084
		159	5795.0000	5795.0080	-0.0080
		165	5825.0000	5825.0087	-0.0087
T <sub>max</sub> (50) °C	V <sub>max</sub> (138)V	36	5180.0000	5180.0063	-0.0063
		38	5190.0000	5190.0074	-0.0074
		44	5220.0000	5220.0087	-0.0087
		46	5230.0000	5230.0070	-0.0070
		48	5240.0000	5240.0063	-0.0063
		149	5745.0000	5745.6300	-0.6300
		151	5755.0000	5755.0075	-0.0075
		157	5785.0000	5785.0084	-0.0084
		159	5795.0000	5795.0080	-0.0080
		165	5825.0000	5825.0087	-0.0087

Test Conditions		Channel	Frequency (MHz)	Frequency (MHz)	$\Delta F$ (MHz)
Tmax (50) °C	Vmin (102)V	36	5180.0000	5180.0061	-0.0061
		38	5190.0000	5190.0077	-0.0077
		44	5220.0000	5220.0091	-0.0091
		46	5230.0000	5230.0077	-0.0077
		48	5240.0000	5240.0080	-0.0080
		149	5745.0000	5745.6300	-0.6300
		151	5755.0000	5755.0075	-0.0075
		157	5785.0000	5785.0084	-0.0084
		159	5795.0000	5795.0080	-0.0080
		165	5825.0000	5825.0087	-0.0087
Tnom (-10) °C	Vnom (138)V	36	5180.0000	5180.6300	-0.6300
		38	5190.0000	5190.0075	-0.0075
		44	5220.0000	5220.0084	-0.0084
		46	5230.0000	5230.0080	-0.0080
		48	5240.0000	5240.0087	-0.0087
		149	5745.0000	5745.6300	-0.6300
		151	5755.0000	5755.0075	-0.0075
		157	5785.0000	5785.0084	-0.0084
		159	5795.0000	5795.0080	-0.0080
		165	5825.0000	5825.0087	-0.0087
Tmax (-10) °C	Vmax (102)V	36	5180.0000	5180.6300	-0.6300
		38	5190.0000	5190.0075	-0.0075
		44	5220.0000	5220.0084	-0.0084
		46	5230.0000	5230.0080	-0.0080
		48	5240.0000	5240.0087	-0.0087
		149	5745.0000	5745.6300	-0.6300
		151	5755.0000	5755.0075	-0.0075
		157	5785.0000	5785.0084	-0.0084
		159	5795.0000	5795.0080	-0.0080
		165	5825.0000	5825.0087	-0.0087

**9. EMI Reduction Method During Compliance Testing**

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs