

Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band)

Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2462	32.019	59.99	92.009	Peak
Horizontal	2462	32.019	46.99	79.009	Average
Vertical	2462	31.29	76.61	107.9	Peak
Vertical	2462	31.29	63.22	94.51	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

Band Edge Test Data (Chain A)

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2483.7	92.009	41.73	50.279	74.000	Peak
Horizontal	2483.5	79.009	46.58	32.429	54.000	Average
Vertical	2483.7	107.9	41.73	66.17	74.000	Peak
Vertical	2483.5	94.51	46.58	47.93	54.000	Average

Band Edge Test Data (Chain B)

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	Δ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2484.4	92.009	35.69	56.319	74.000	Peak
Horizontal	2483.5	79.009	42.38	36.629	54.000	Average
Vertical	2484.4	107.9	35.69	72.21	74.000	Peak
Vertical	2483.5	94.51	42.38	52.13	54.000	Average

Note:

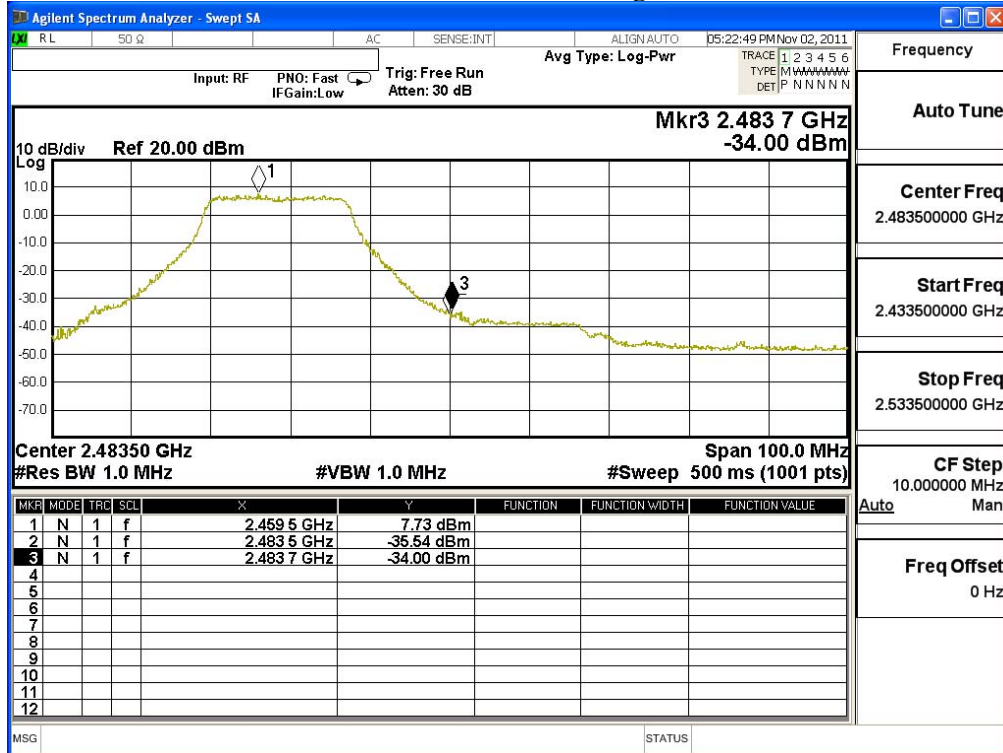
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F - Δ

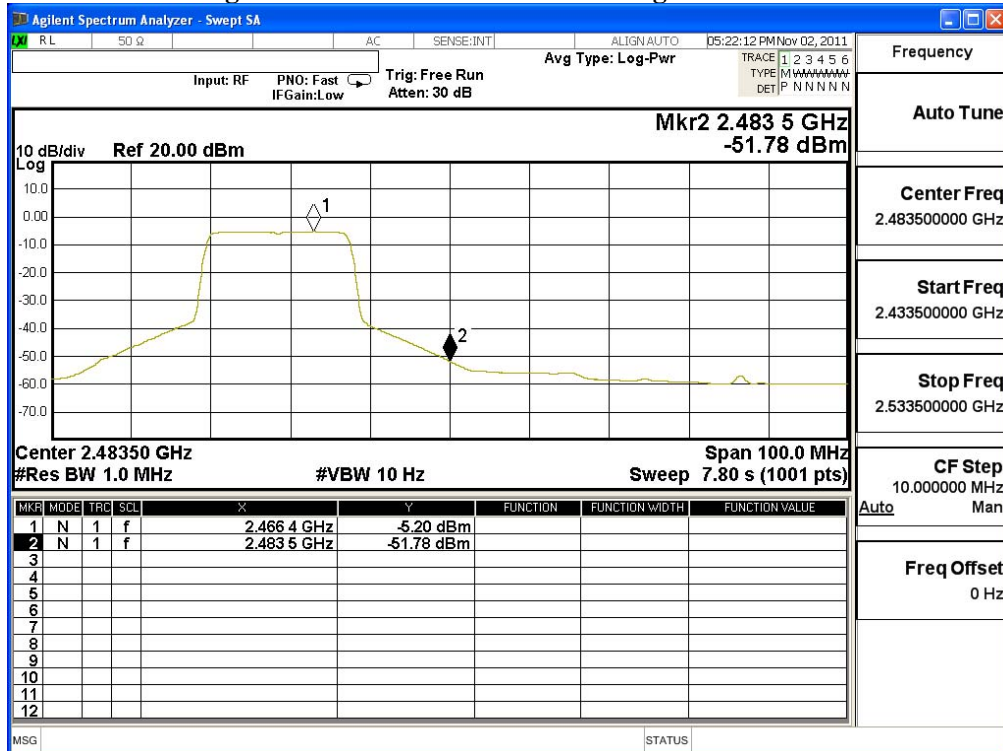
F = Fundamental field Strength (Peak or Average)

Δ = Conducted Band Edge Delta (Peak or Average)

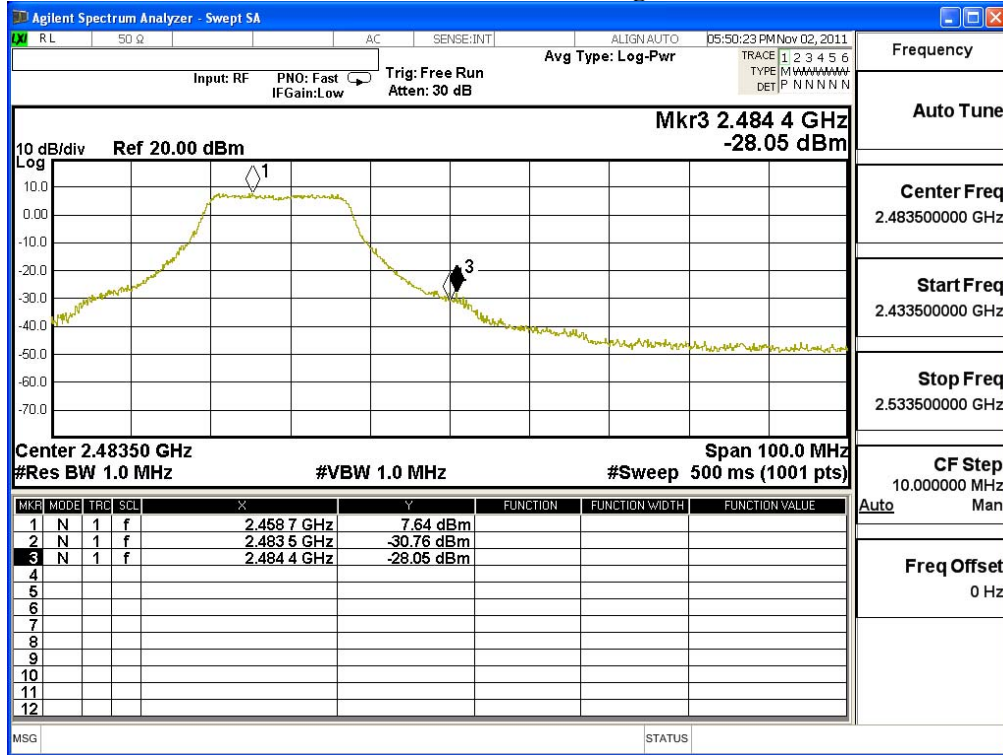
Peak Detector of conducted Band Edge Delta-Chain A



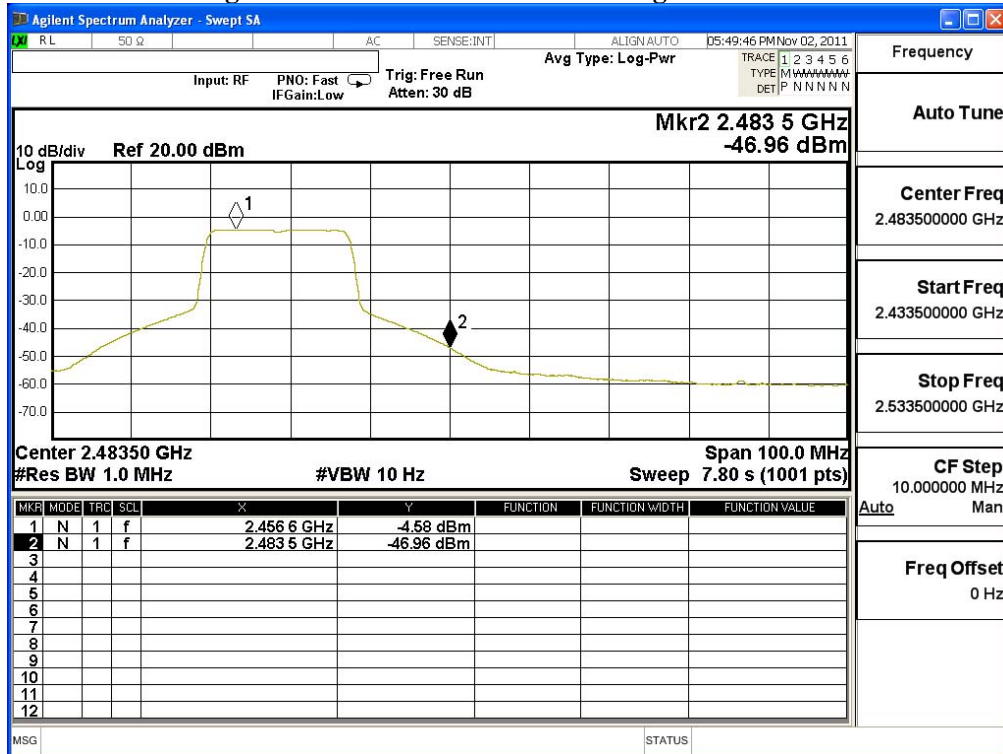
Average Detector of conducted Band Edge Delta-Chain A



Peak Detector of conducted Band Edge Delta-Chain B



Average Detector of conducted Band Edge Delta-Chain B



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
03 (Peak)	2390.000	31.509	27.036	58.545	74.00	54.00	Pass
03 (Peak)	2425.400	31.741	59.748	91.489	--	--	--
03 (Average)	2390.000	31.509	13.182	44.691	74.00	54.00	Pass
03 (Average)	2427.000	31.752	45.771	77.524	--	--	--

Figure Channel 03: Horizontal (Peak)

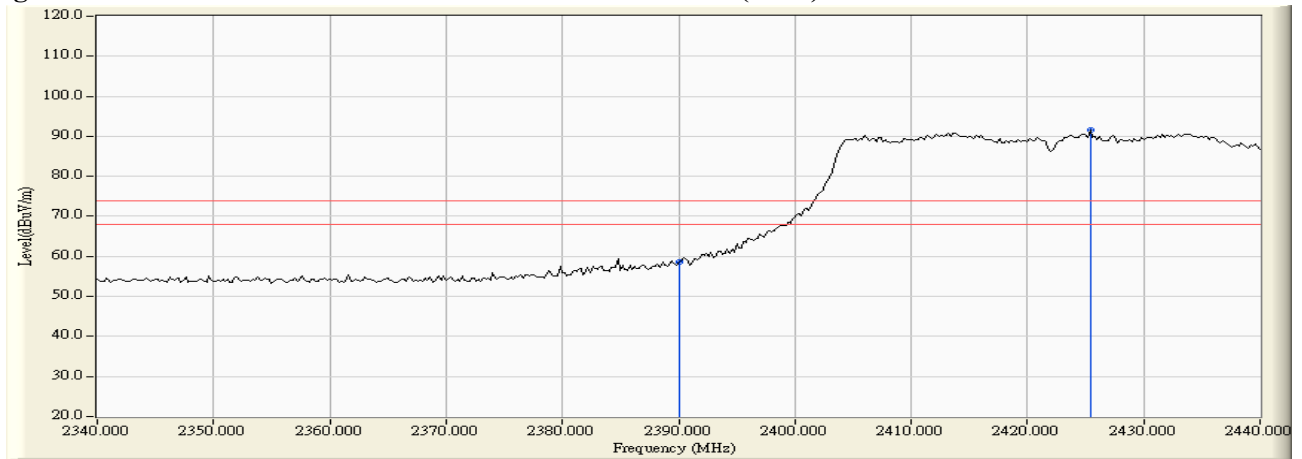
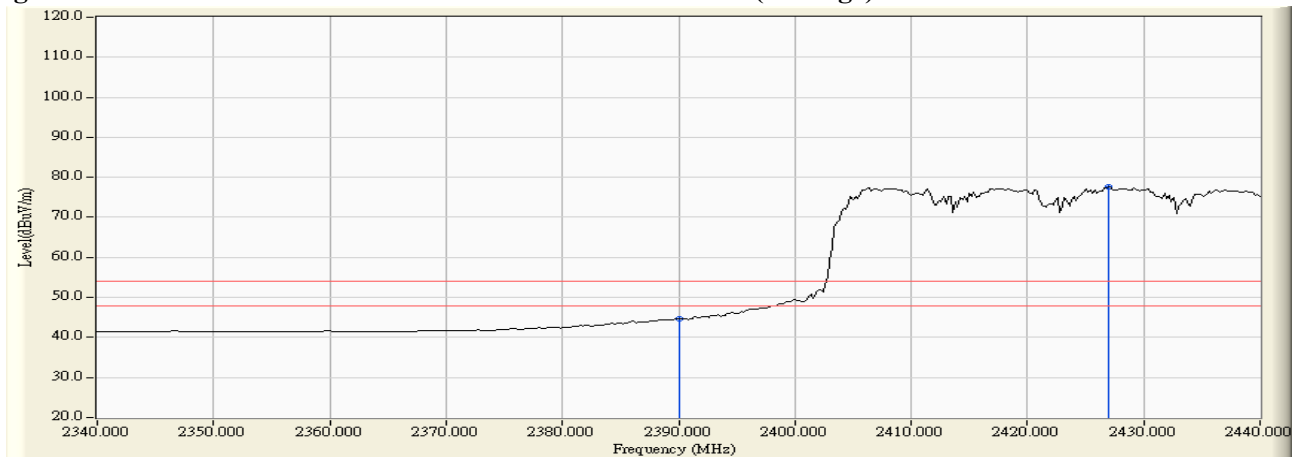


Figure Channel 03: Horizontal (Average)



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 802.11 a/b/g/n PCI-e
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RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
03 (Peak)	2390.000	30.915	38.656	69.571	74.00	54.00	Pass
03 (Peak)	2428.000	31.058	72.586	103.644	--	--	--
03 (Average)	2390.000	30.915	21.359	52.274	74.00	54.00	Pass
03 (Average)	2435.400	31.108	58.628	89.736	--	--	--

Figure Channel 03: Vertical (Peak)

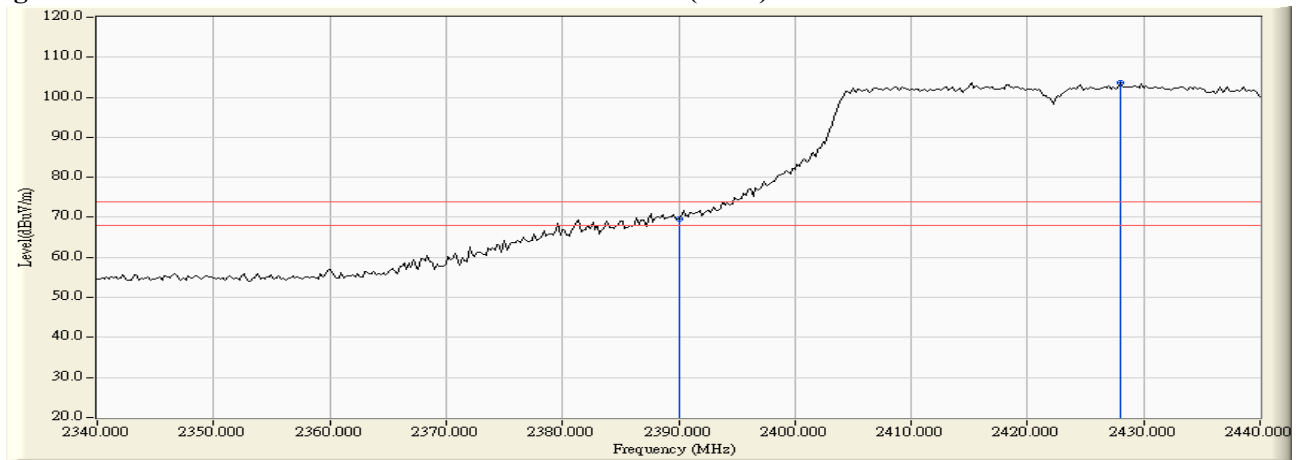
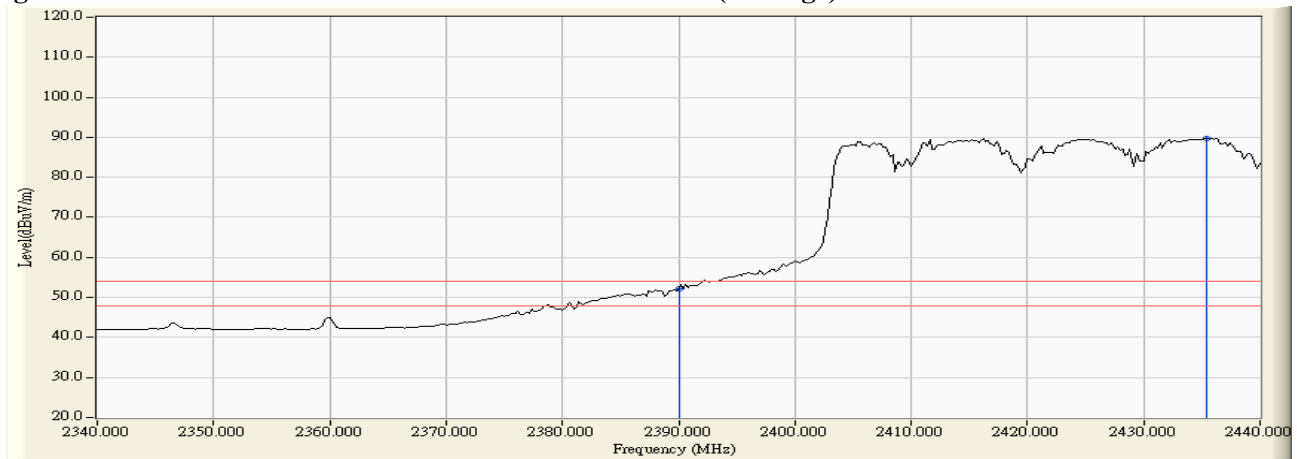


Figure Channel 03: Vertical (Average)



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 802.11 a/b/g/n PCI-e
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 Test Site : No.3 OATS
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
03 (Peak)	2449.300	31.923	57.785	89.708	--	--	--
03 (Peak)	2483.500	32.182	24.442	56.624	74.00	54.00	Pass
03 (Average)	2454.700	31.964	44.699	76.663	--	--	--
03 (Average)	2483.500	32.182	11.642	43.824	74.00	54.00	Pass

Figure Channel 03: Horizontal (Peak)

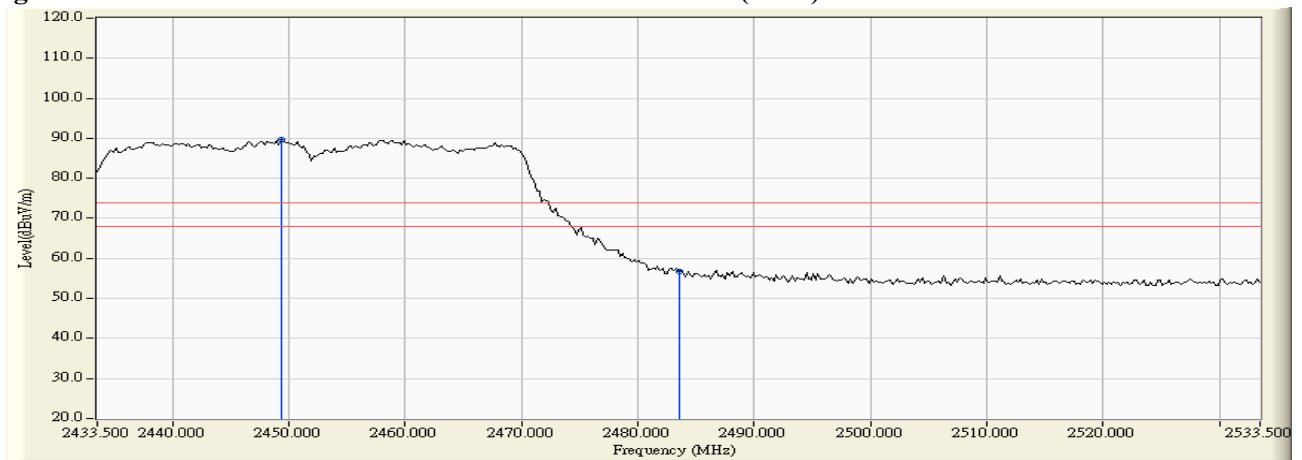
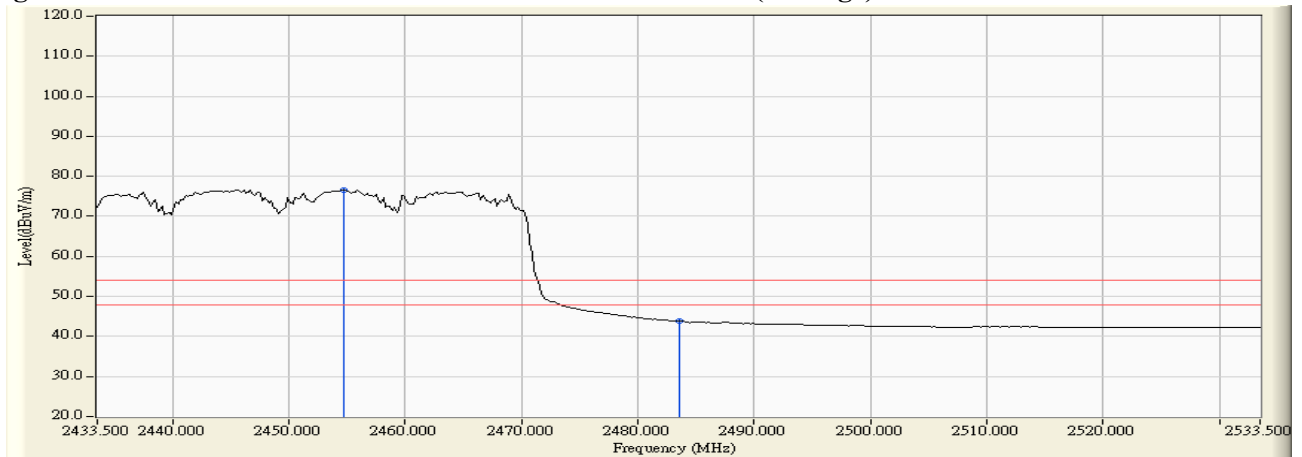


Figure Channel 03: Horizontal (Average)



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 802.11 a/b/g/n PCI-e
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 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
03 (Peak)	2446.500	31.184	72.217	103.401	--	--	--
03 (Peak)	2483.500	31.435	36.241	67.676	74.00	54.00	Pass
03 (Peak)	2485.100	31.446	37.736	69.182	74.00	54.00	Pass
03 (Average)	2435.100	31.106	58.902	90.008	--	--	--
03 (Average)	2483.500	31.435	21.375	52.810	74.00	54.00	Pass

Figure Channel 03: Vertical (Peak)

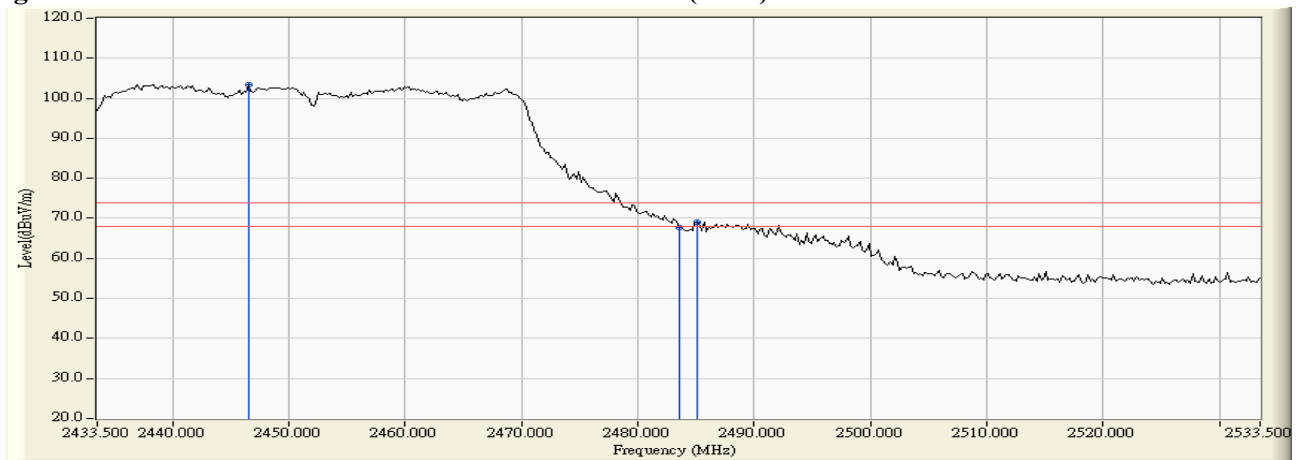
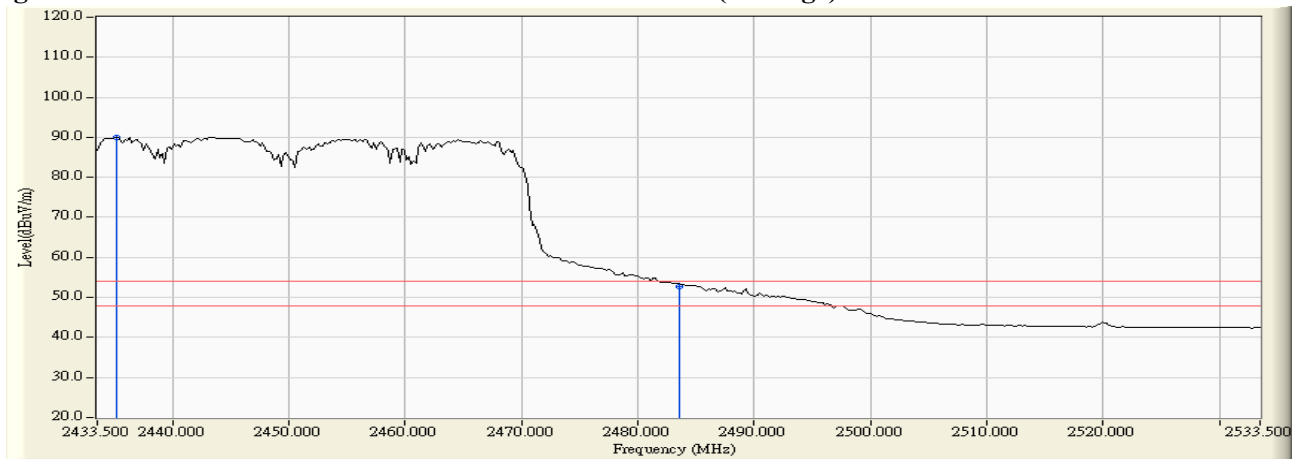


Figure Channel 03: Vertical (Average)

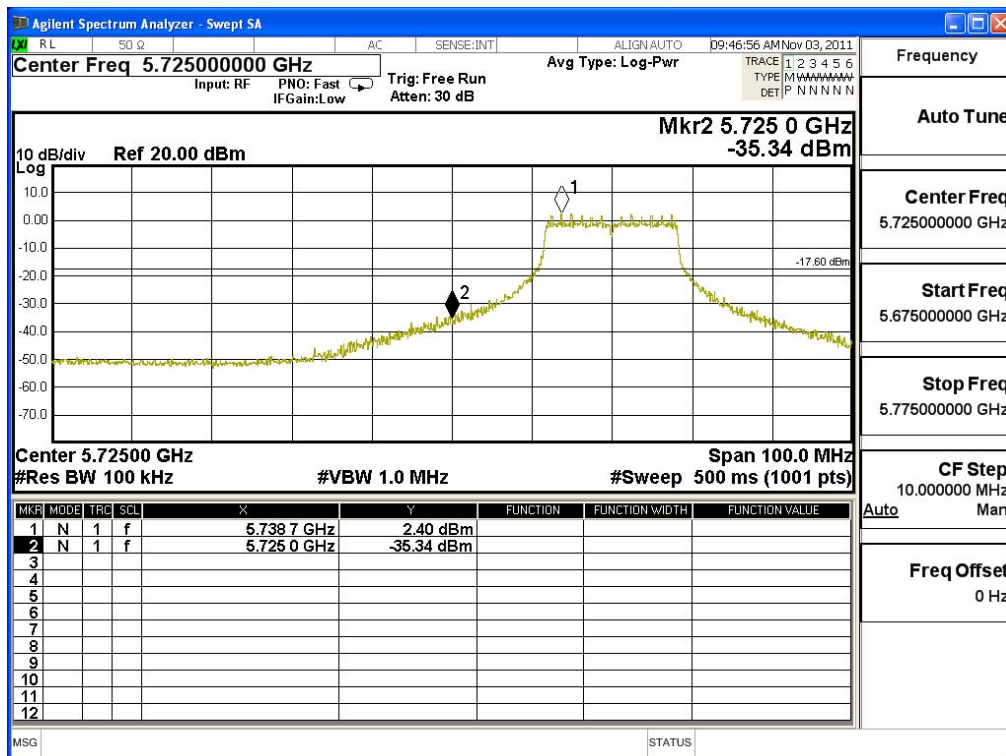


Note:

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.

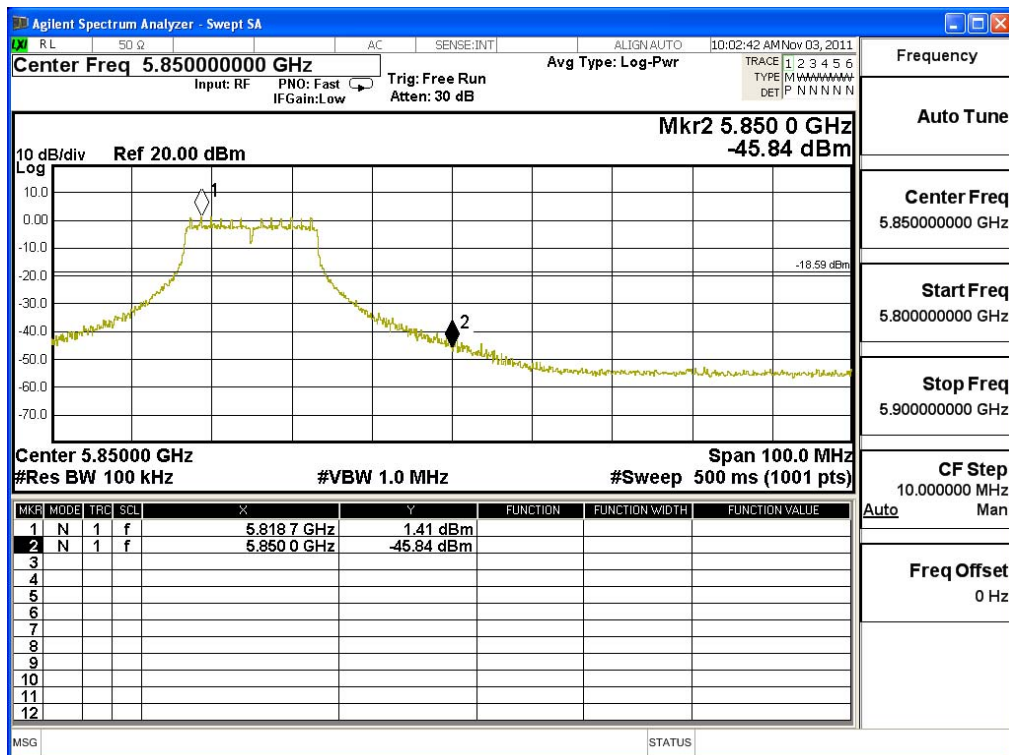
Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps

Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5745	37.74	>20	PASS



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps

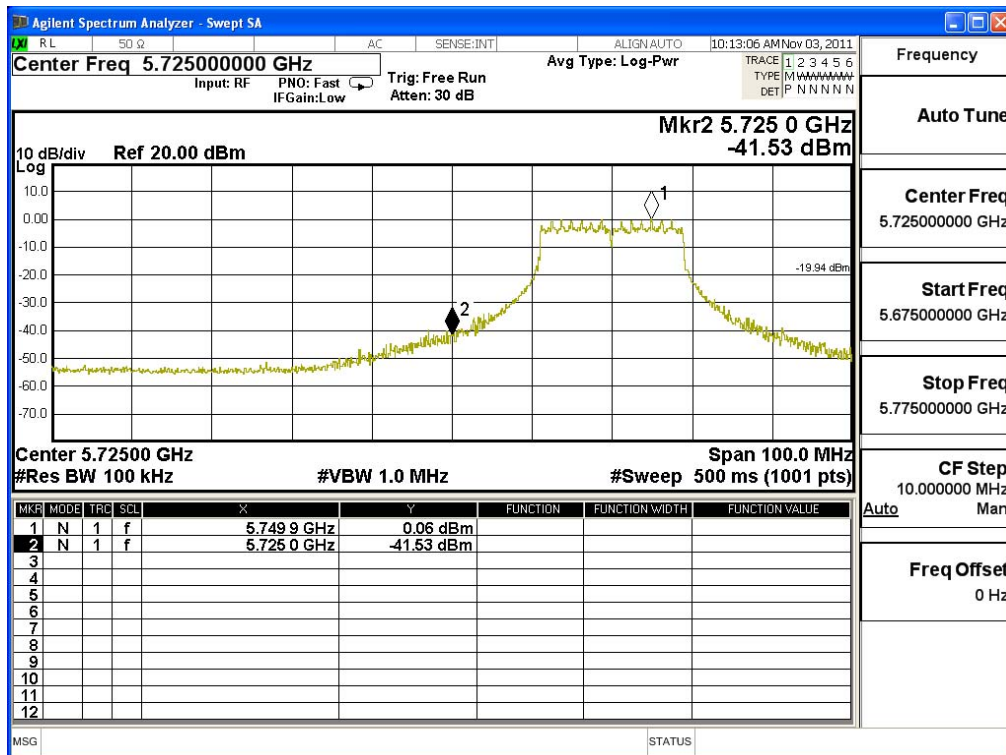
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5825	47.25	>20	PASS



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band)

Chain A

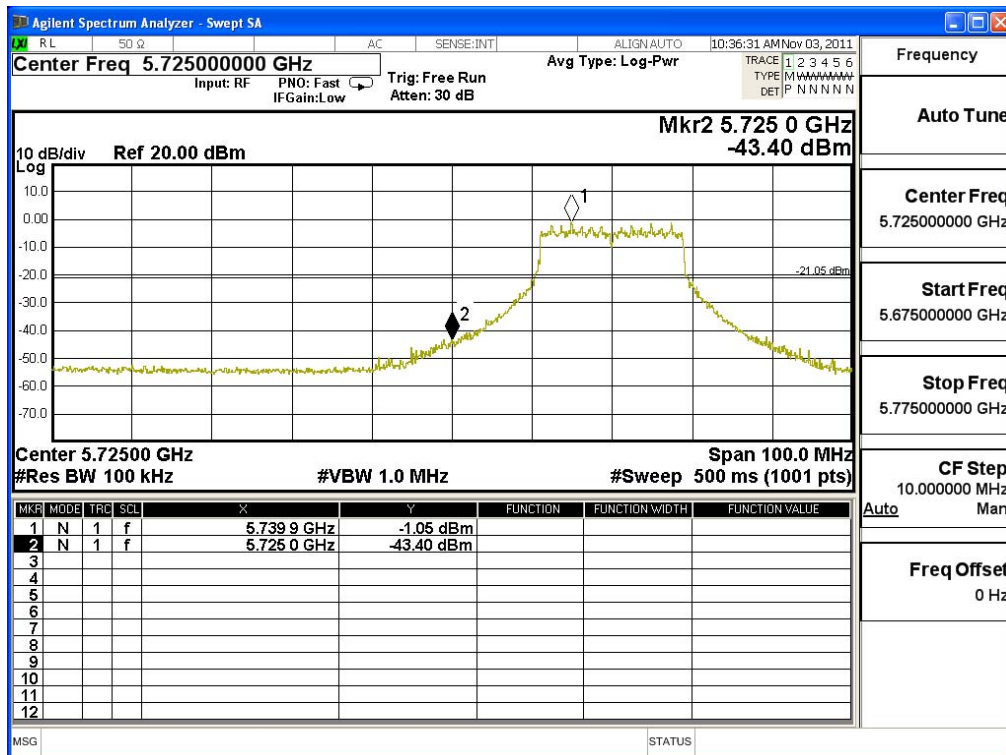
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5745	41.59	>20	PASS



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band)

Chain B

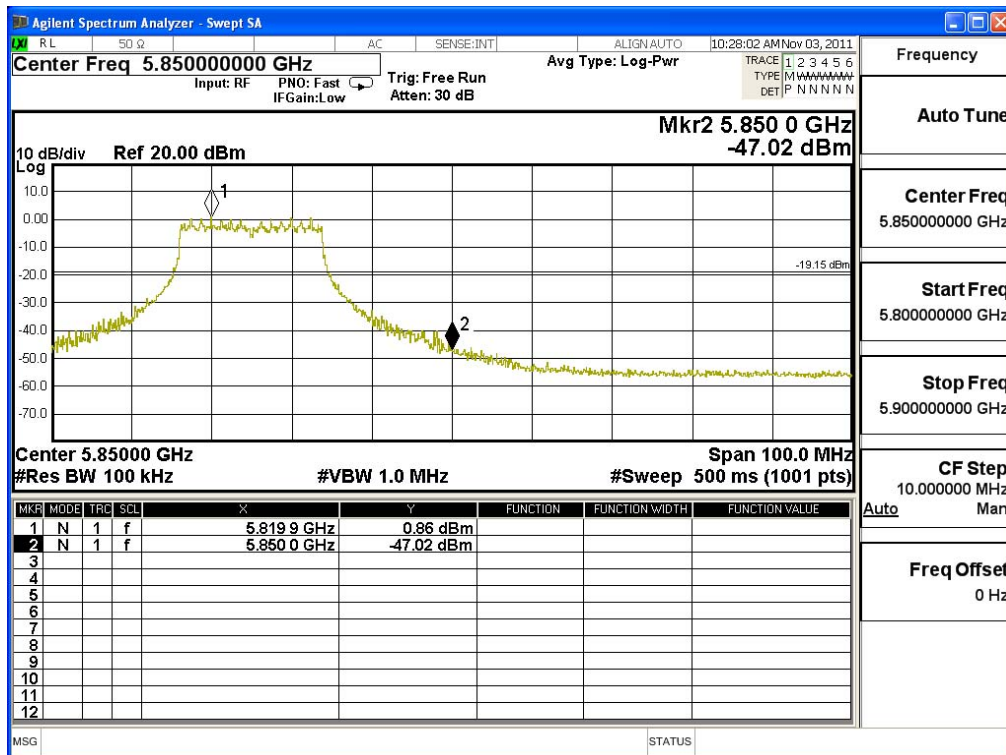
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5745	42.35	>20	PASS



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band)

Chain A

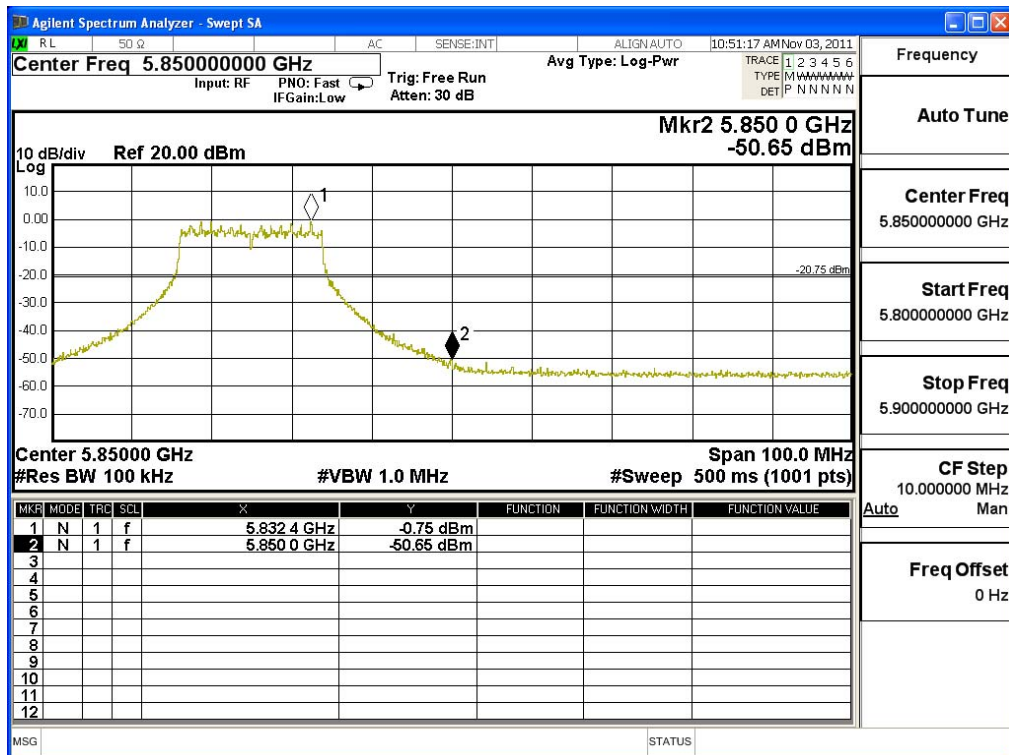
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5825	47.88	>20	PASS



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band)

Chain B

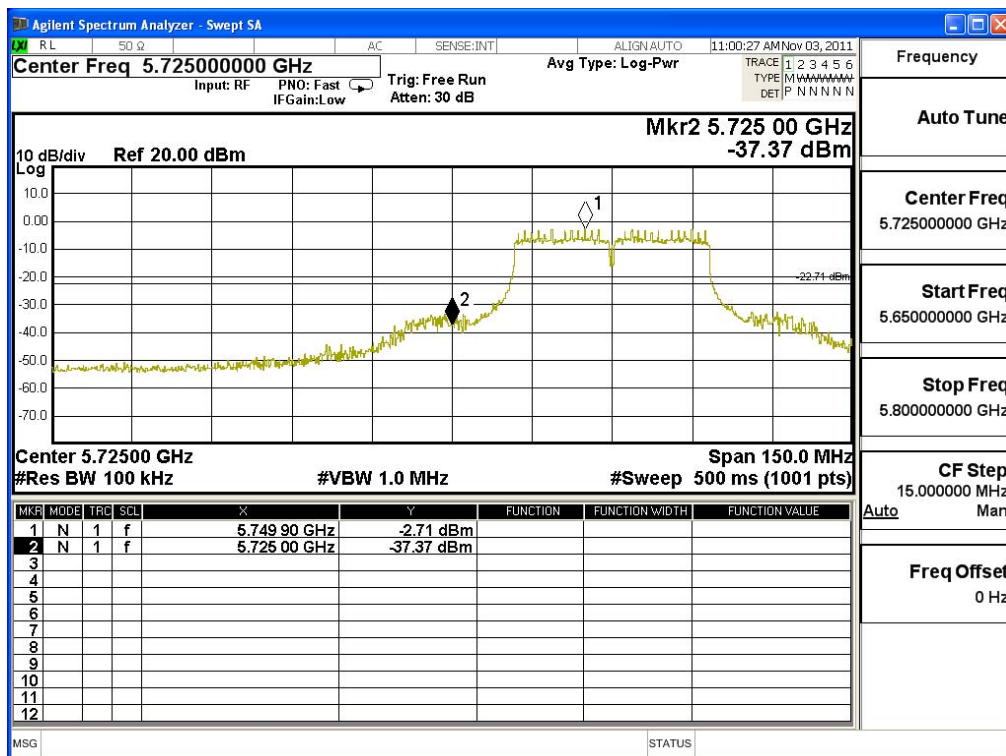
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5825	49.9	>20	PASS



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band)

Chain A

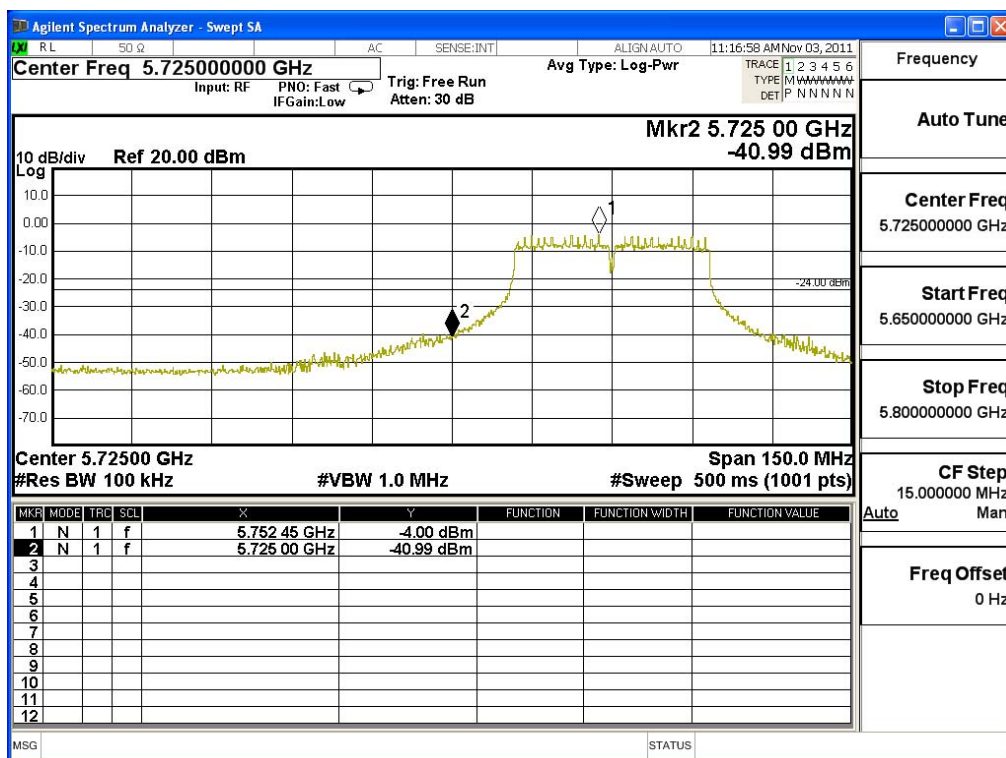
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5755	34.66	>20	PASS



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band)

Chain B

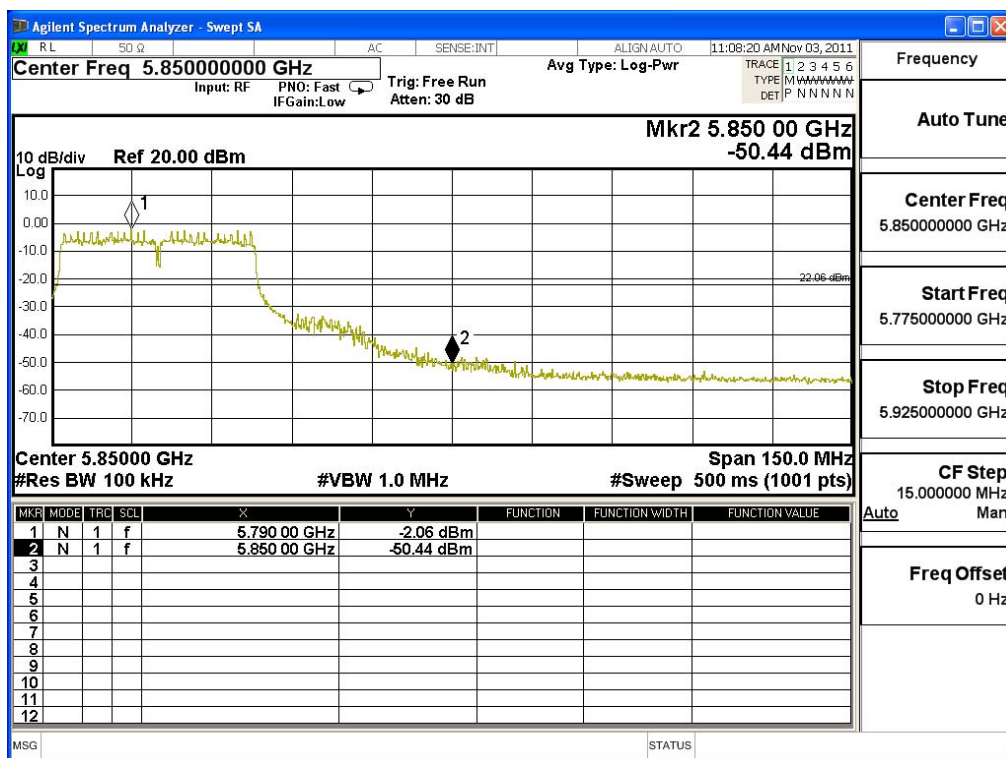
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5755	36.99	>20	PASS



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band)

Chain A

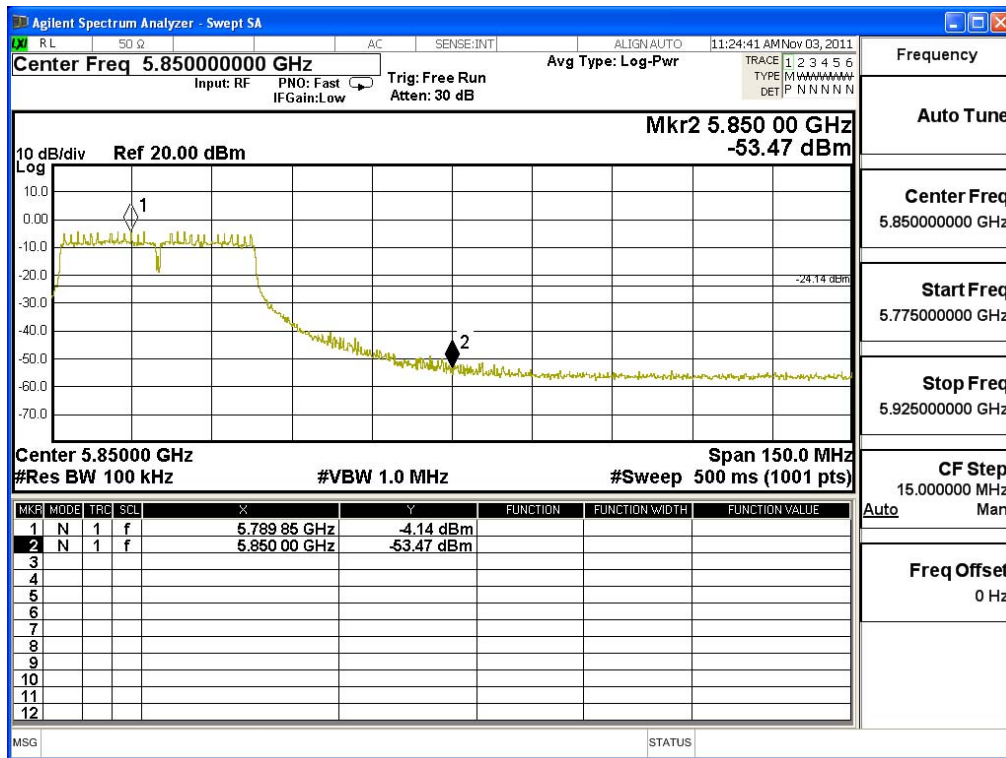
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5795	48.38	>20	PASS



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 7: Transmit - 802.11n-40BW_30Mbps(5G Band)

Chain B

Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
5795	49.33	>20	PASS



7. Occupied Bandwidth

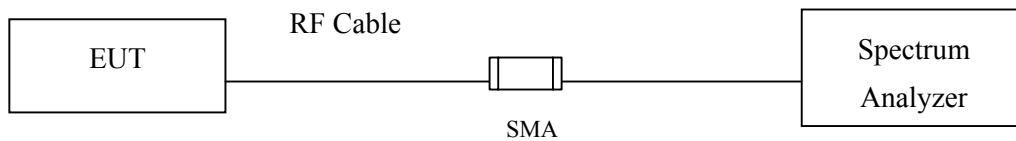
7.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2011
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2011
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2011

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

The minimum bandwidth shall be at least 500 kHz.

7.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009; tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Span greater than RBW.

7.5. Uncertainty

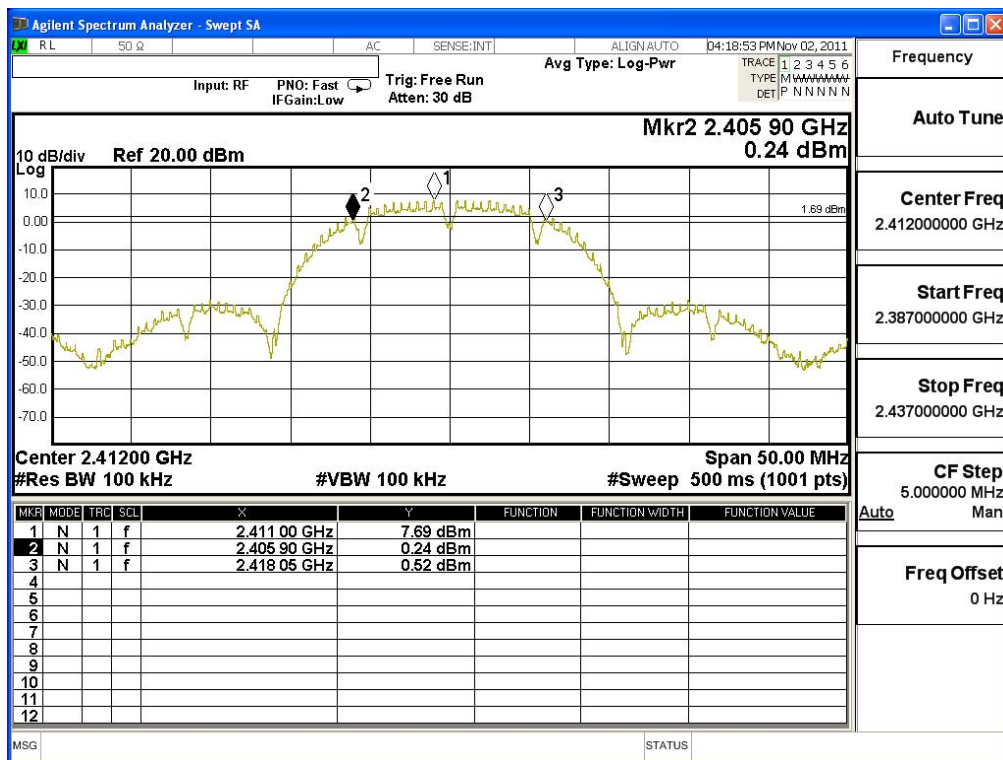
± 150Hz

7.6. Test Result of Occupied Bandwidth

Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 802.11b 1Mbps (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2412.00	12150	>500	Pass

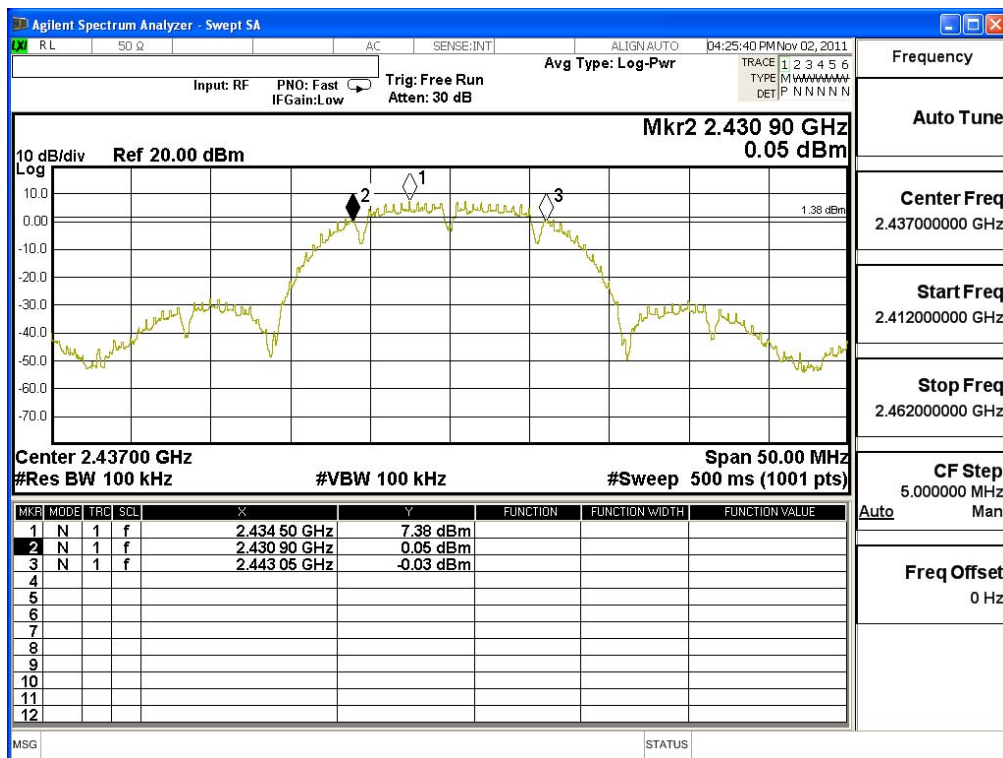
Figure Channel 1:



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 802.11b 1Mbps (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437.00	12150	>500	Pass

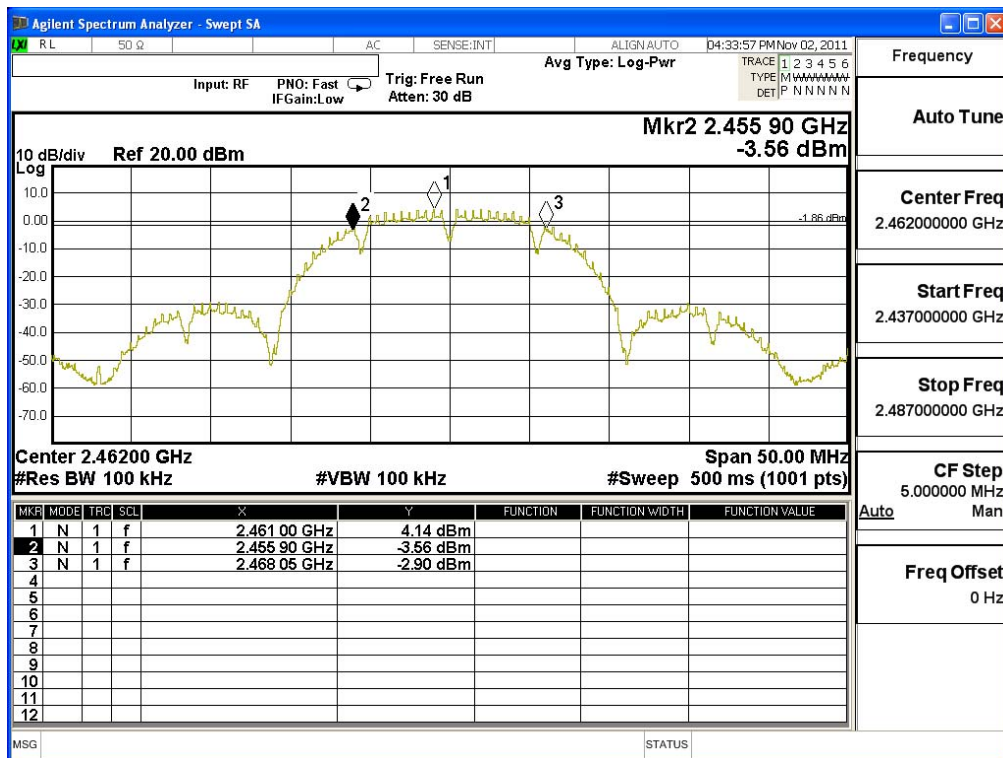
Figure Channel 6:



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - 802.11b 1Mbps (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462.00	12150	>500	Pass

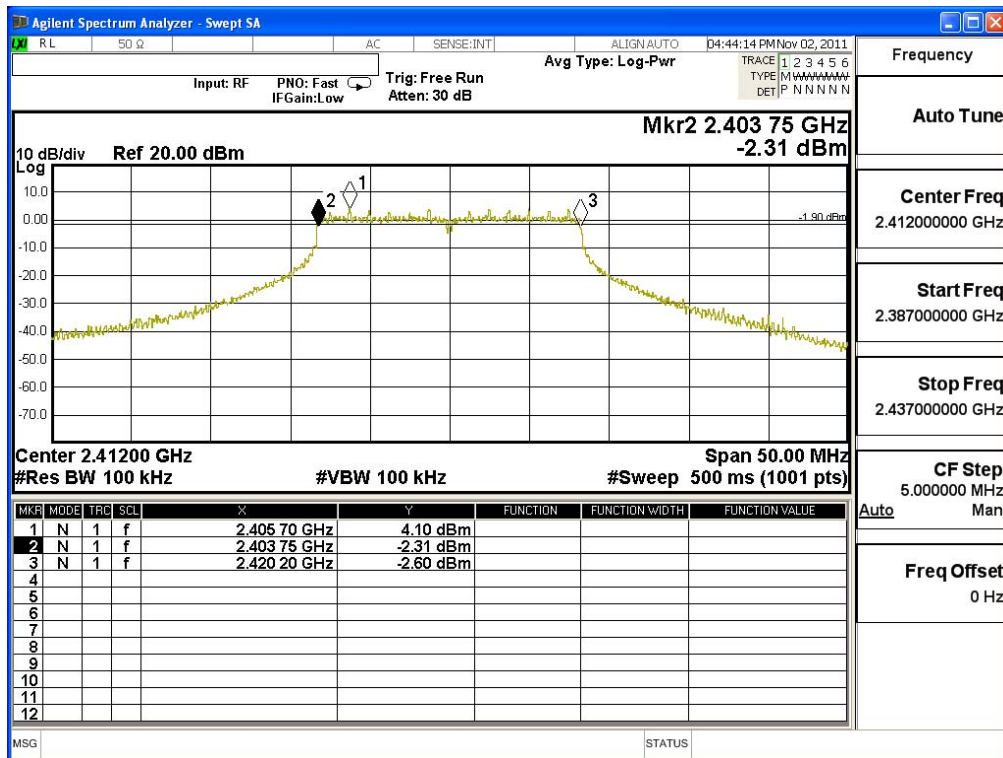
Figure Channel 11:



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 802.11g 6Mbps (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2412.00	16450	>500	Pass

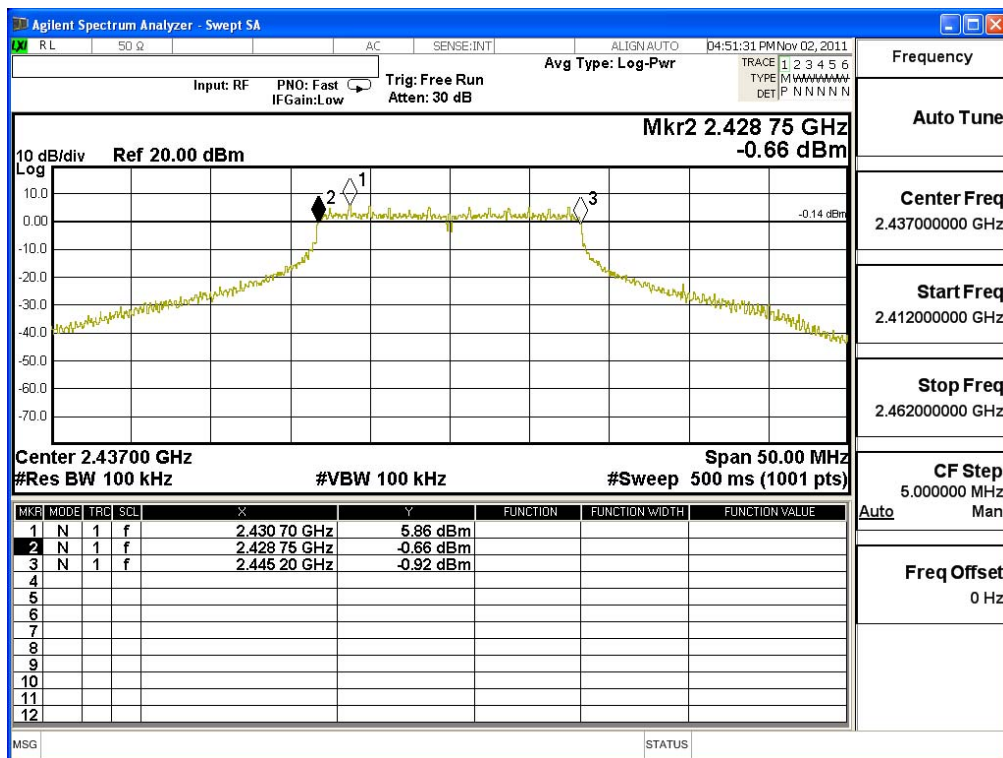
Figure Channel 1:



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 802.11g 6Mbps (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437.00	16450	>500	Pass

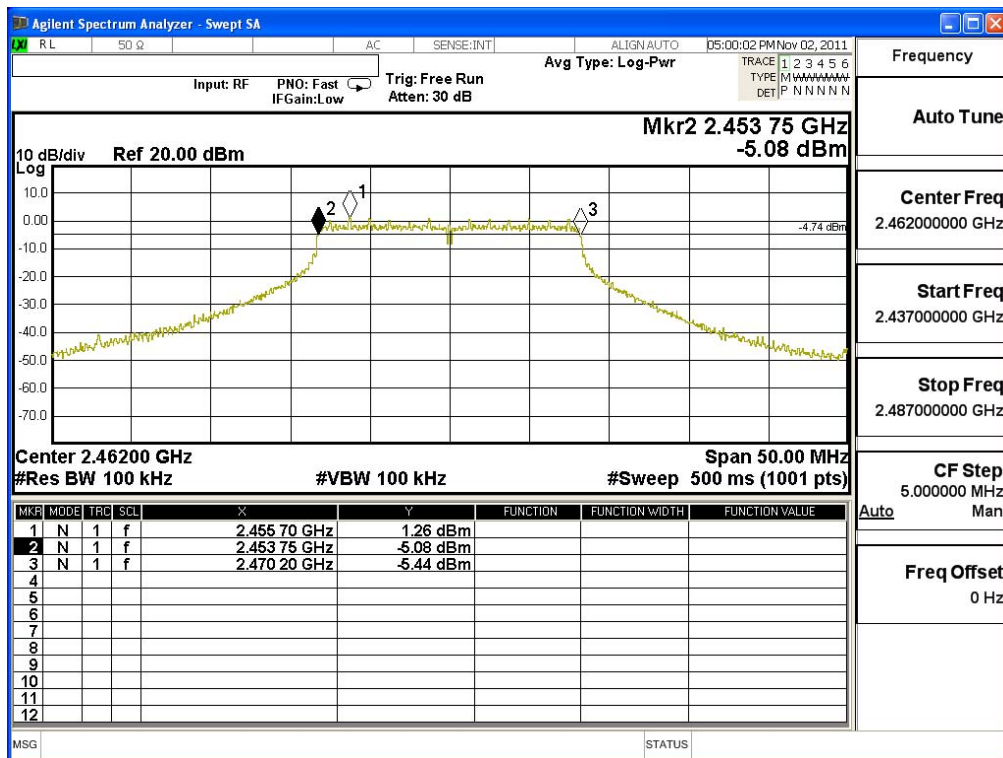
Figure Channel 6:



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit - 802.11g 6Mbps (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462.00	16450	>500	Pass

Figure Channel 11:



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5745MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745.00	16450	>500	Pass

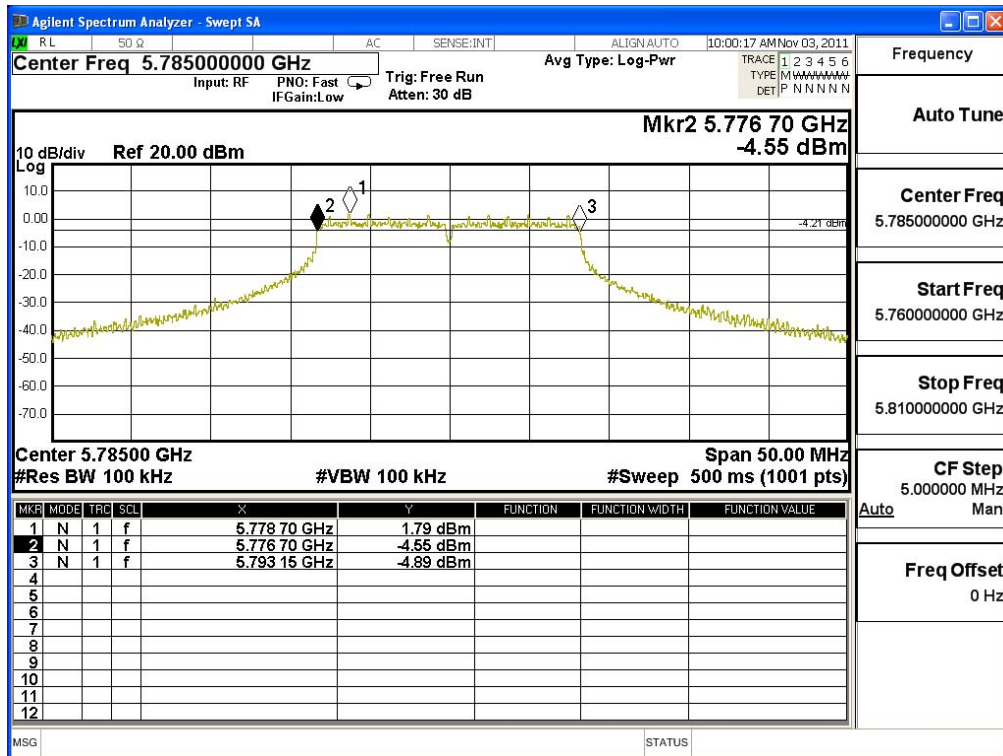
Figure Channel 149:



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5785MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
157	5785.00	16450	>500	Pass

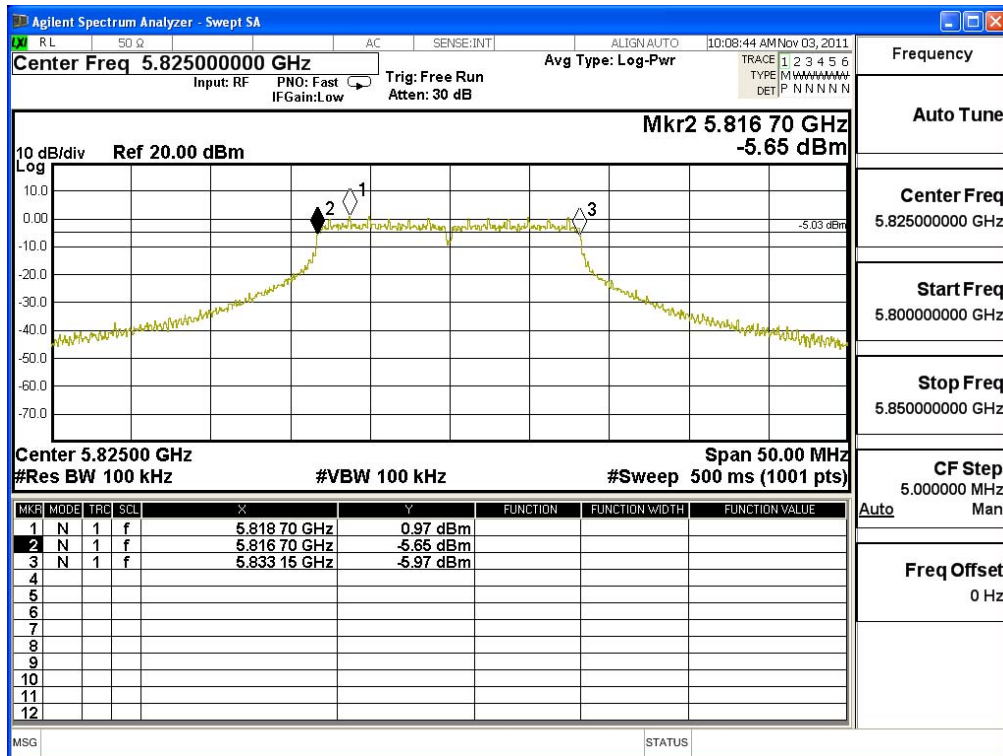
Figure Channel 157:



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11a 6Mbps (5825MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
165	5825.00	16450	>500	Pass

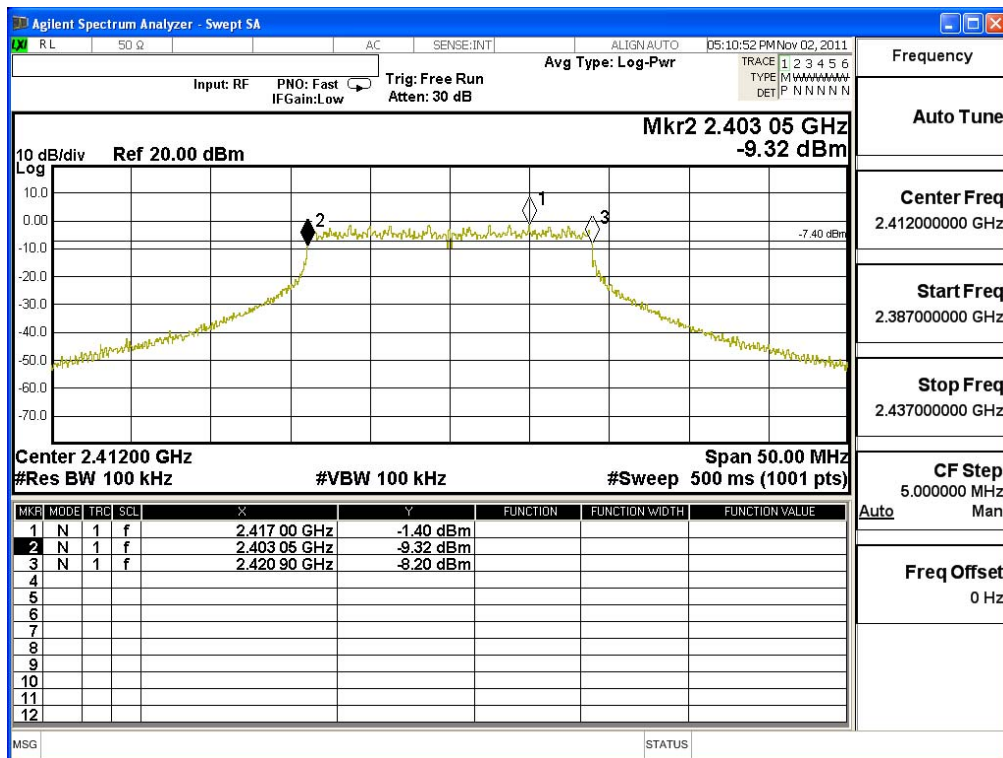
Figure Channel 165:



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band) (2412MHz)

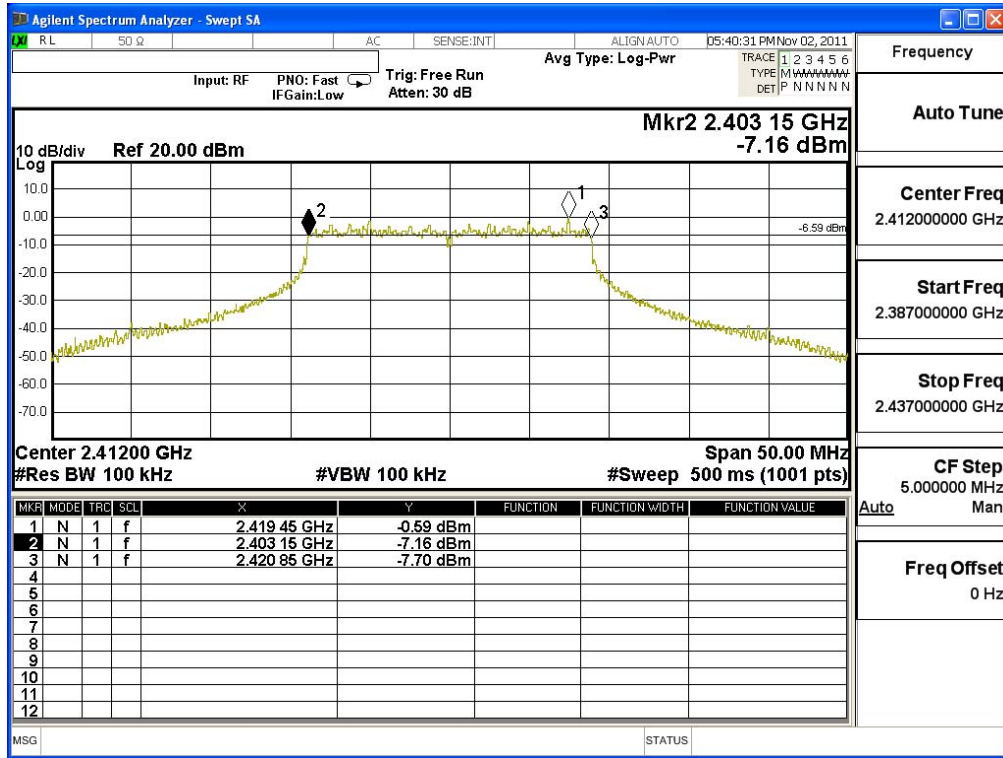
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2412.00	17850	>500	Pass

Figure Channel 1: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2412.00	17700	>500	Pass

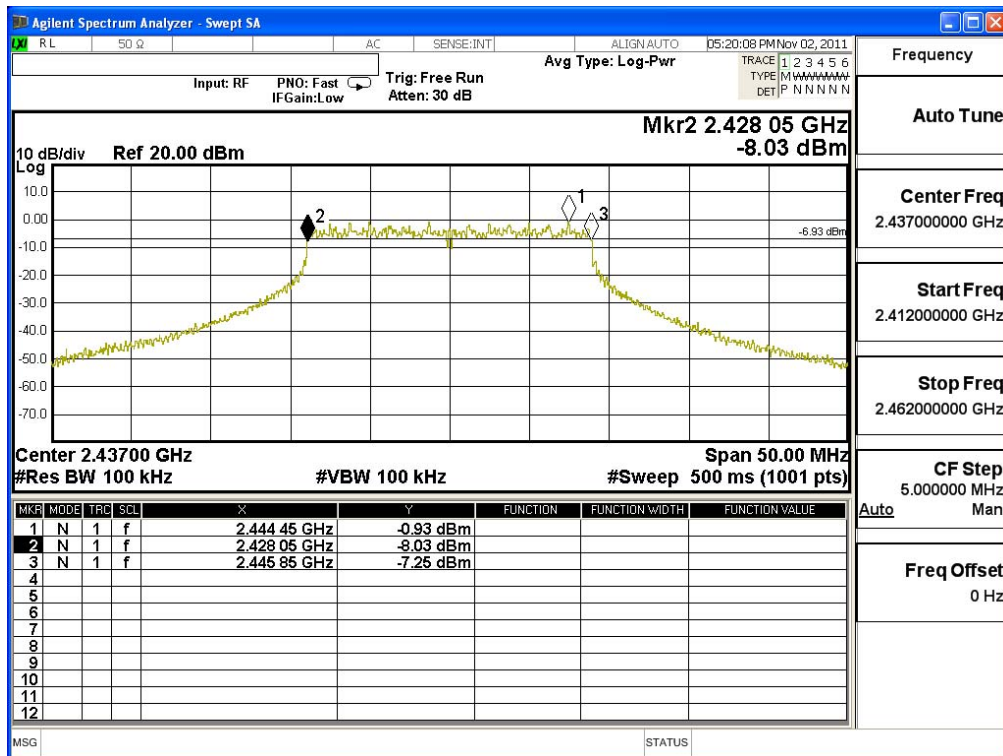
Figure Channel 1: (Chain B)



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band) (2437MHz)

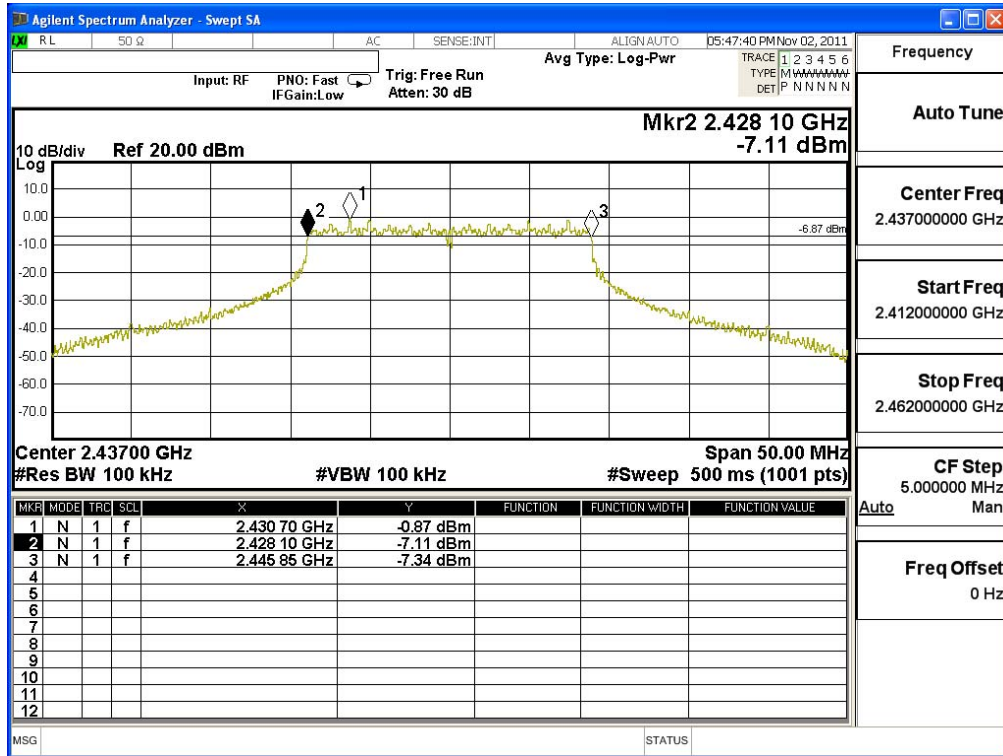
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437.00	17800	>500	Pass

Figure Channel 6: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437.00	17750	>500	Pass

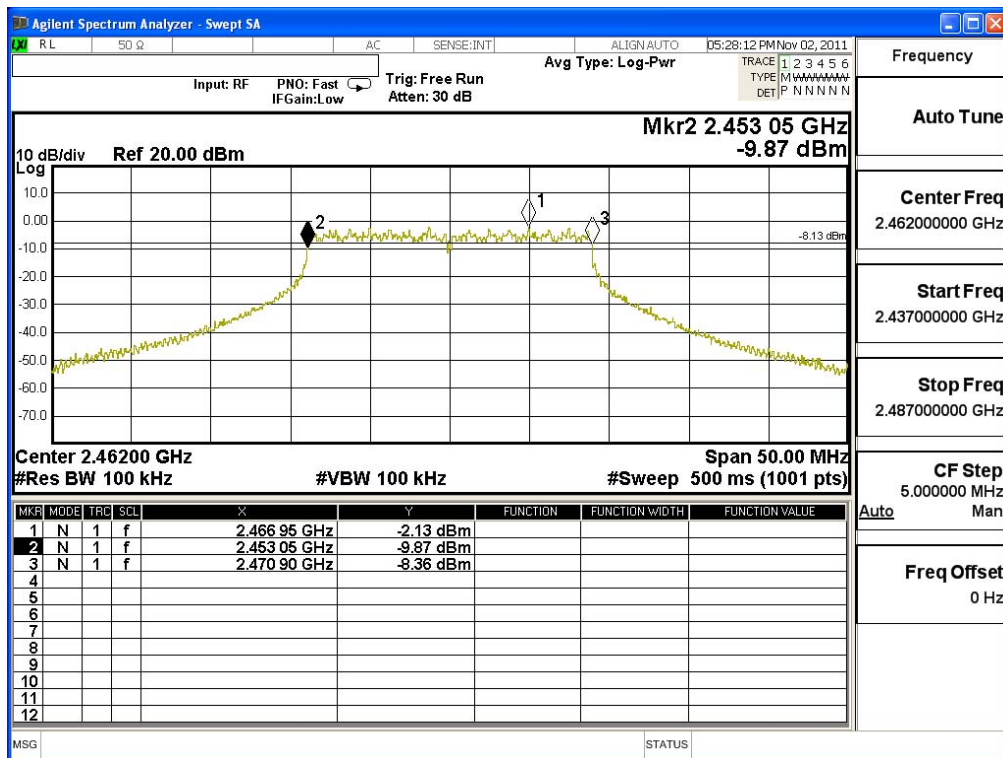
Figure Channel 6: (Chain B)



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-20BW_14.4Mbps(2.4G Band) (2462MHz)

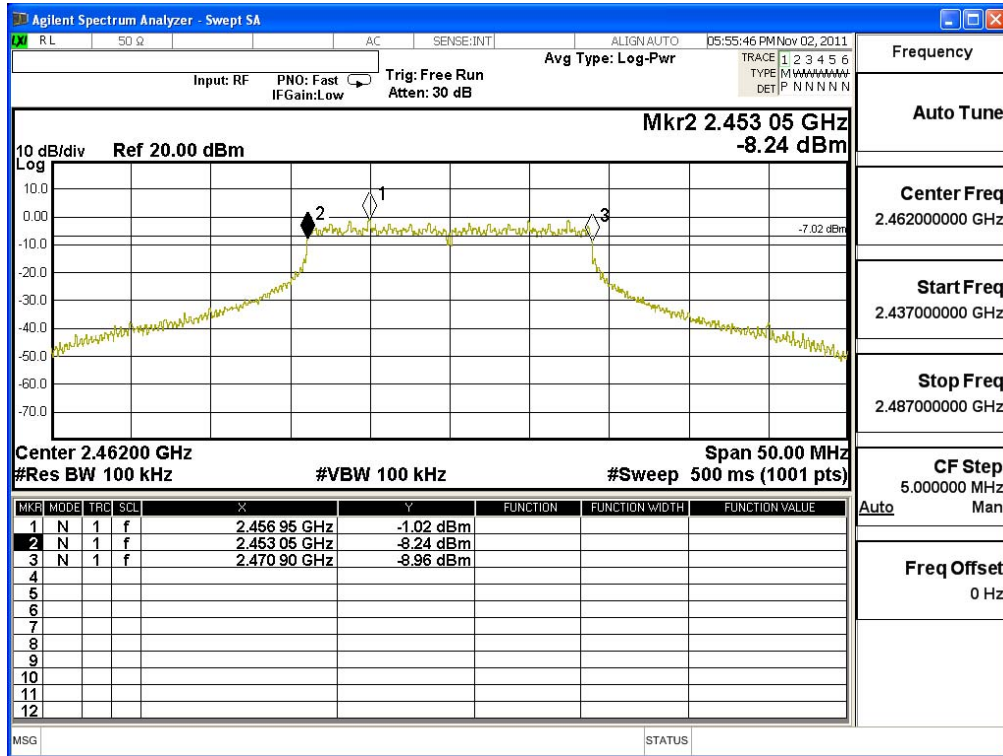
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462.00	17850	>500	Pass

Figure Channel 11: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462.00	17850	>500	Pass

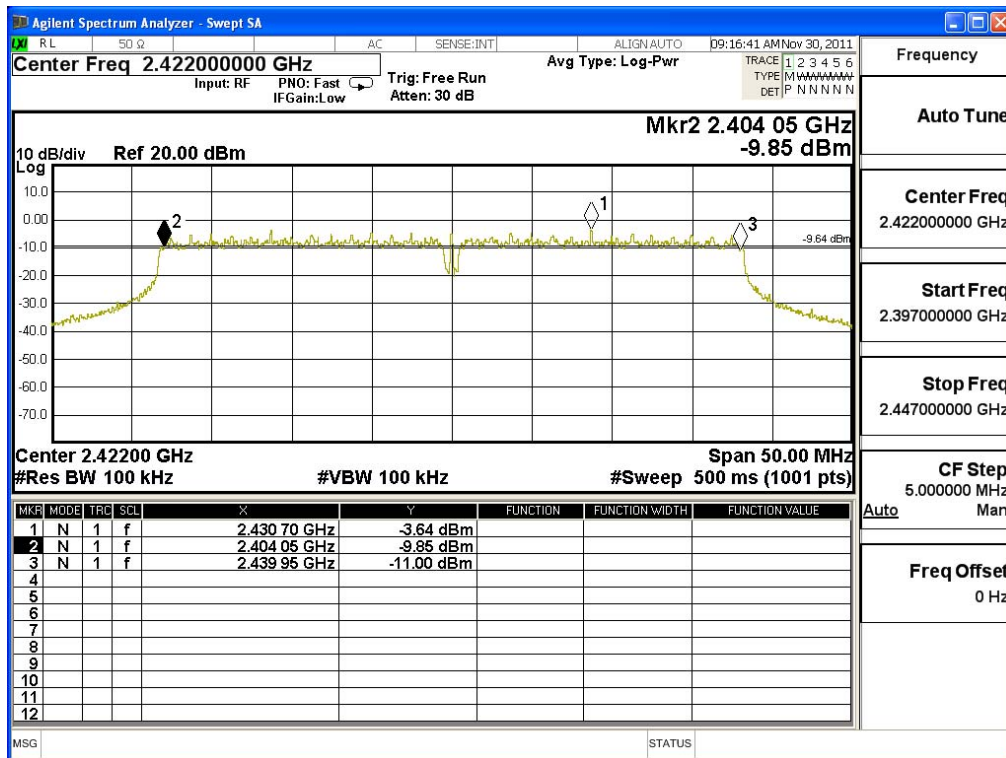
Figure Channel 11: (Chain B)



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band) (2422MHz)

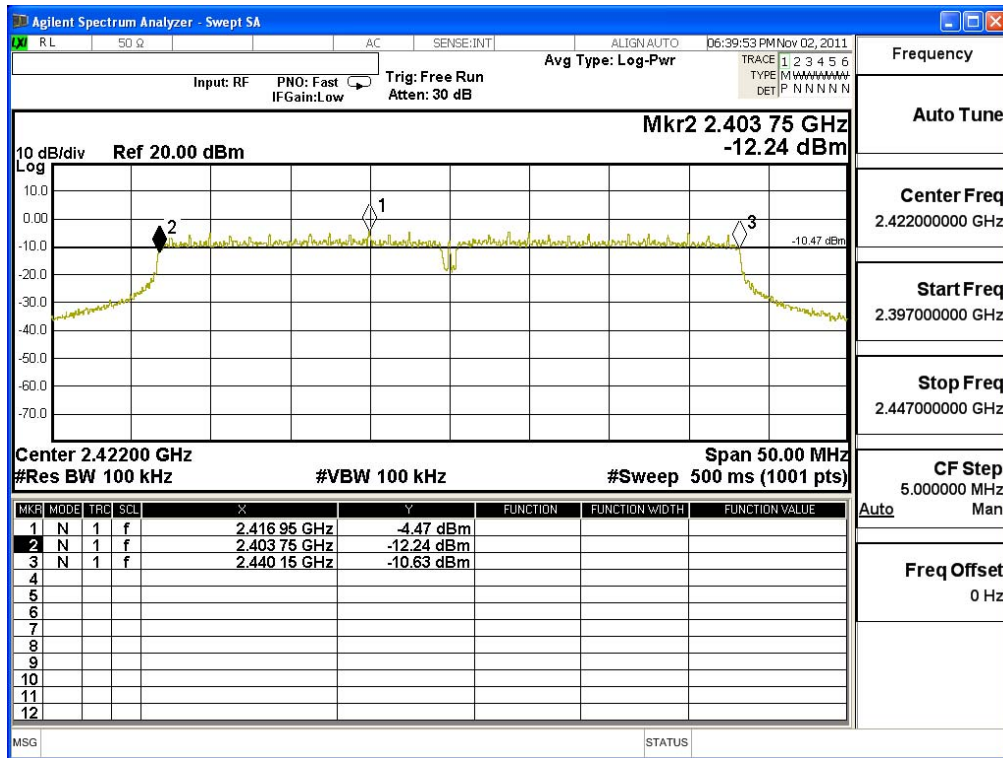
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
3	2422.00	35900	>500	Pass

Figure Channel 3: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
3	2422.00	36400	>500	Pass

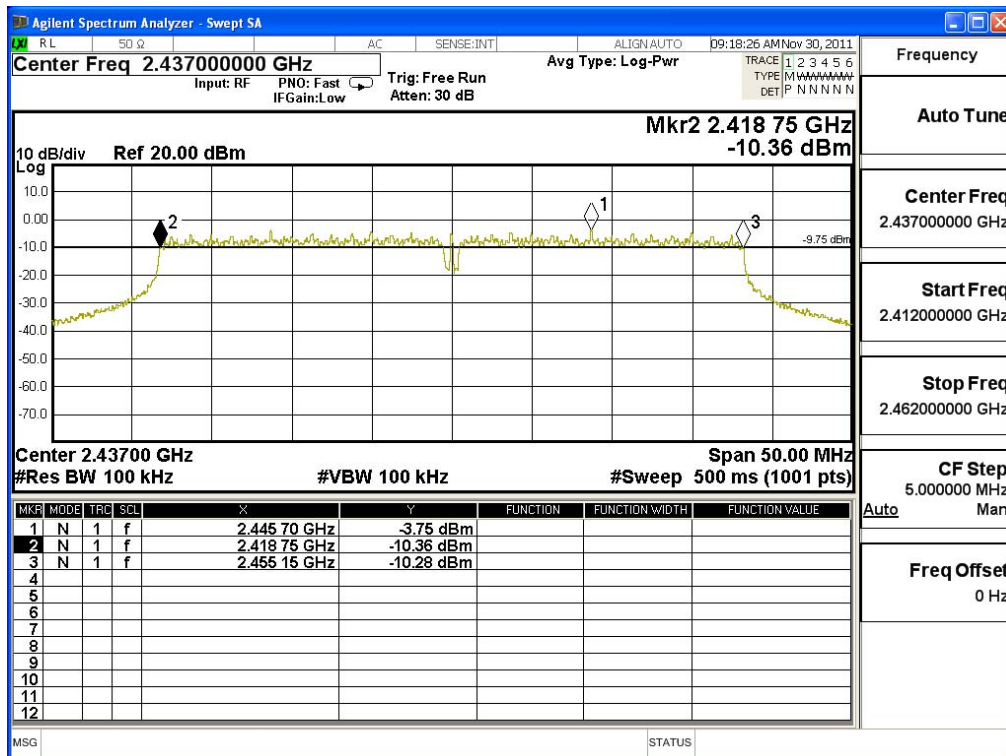
Figure Channel 3: (Chain B)



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band) (2437MHz)

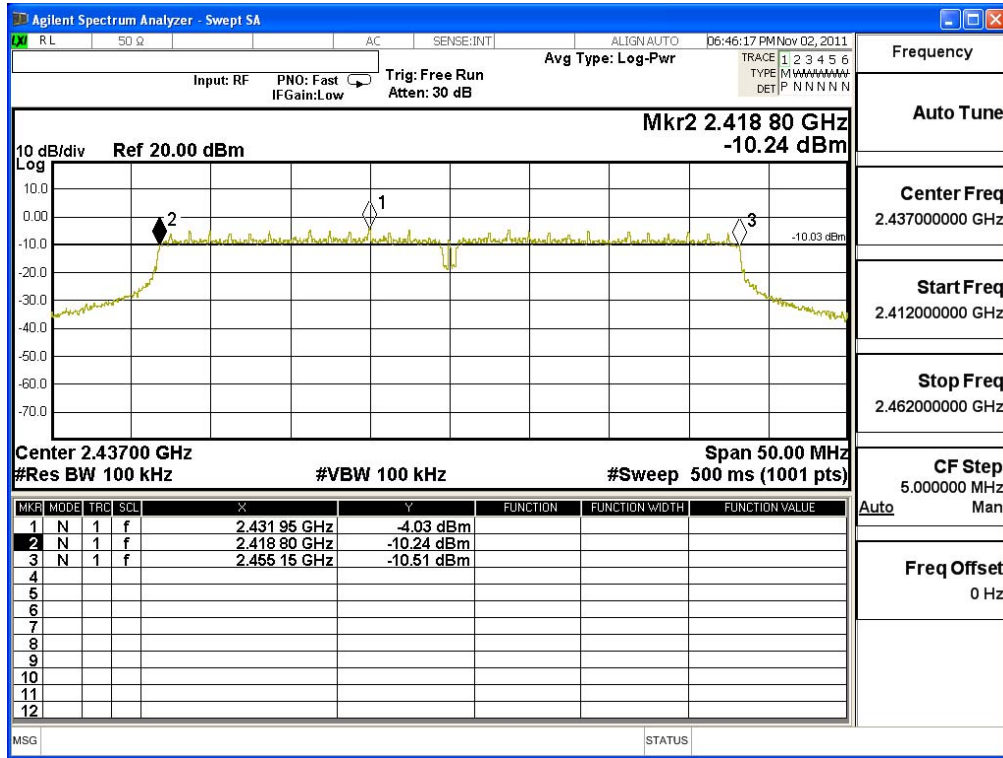
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437.00	36400	>500	Pass

Figure Channel 6: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437.00	36350	>500	Pass

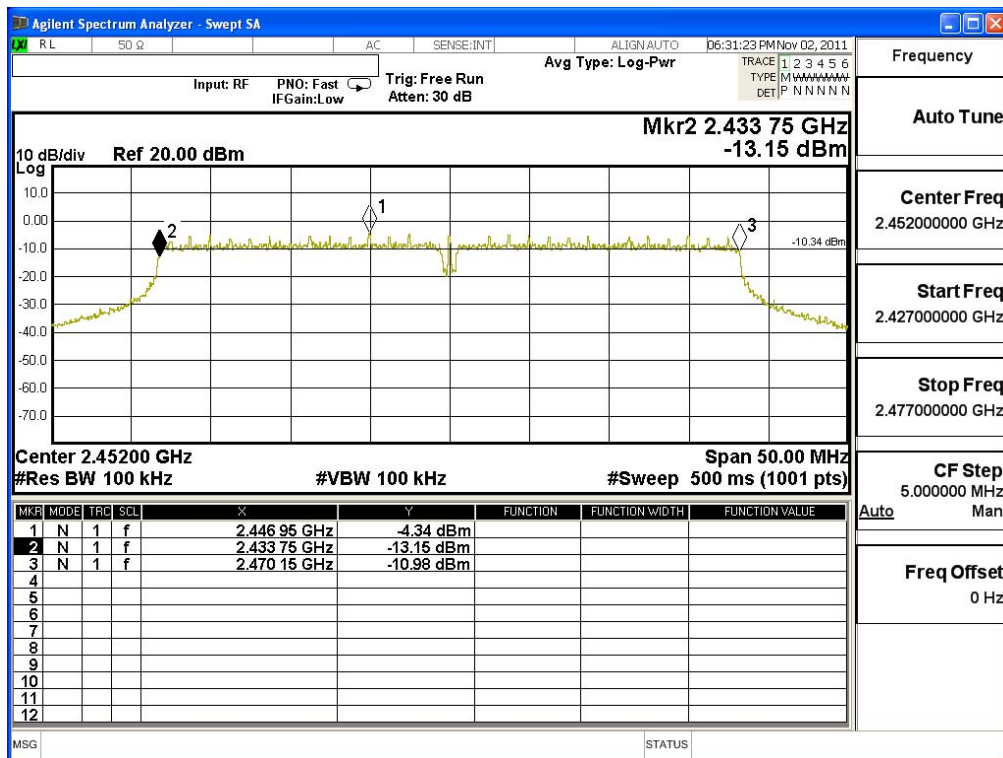
Figure Channel 6: (Chain B)



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 5: Transmit - 802.11n-40BW_30Mbps(2.4G Band) (2452MHz)

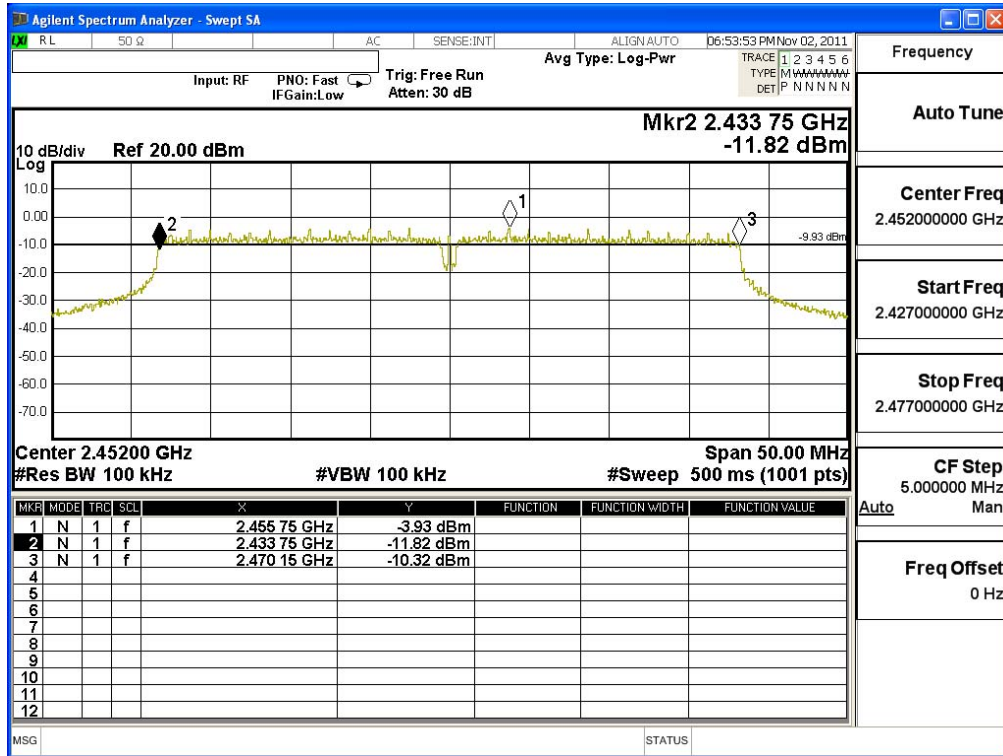
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
9	2452.00	36400	>500	Pass

Figure Channel 9: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
9	2452.00	36400	>500	Pass

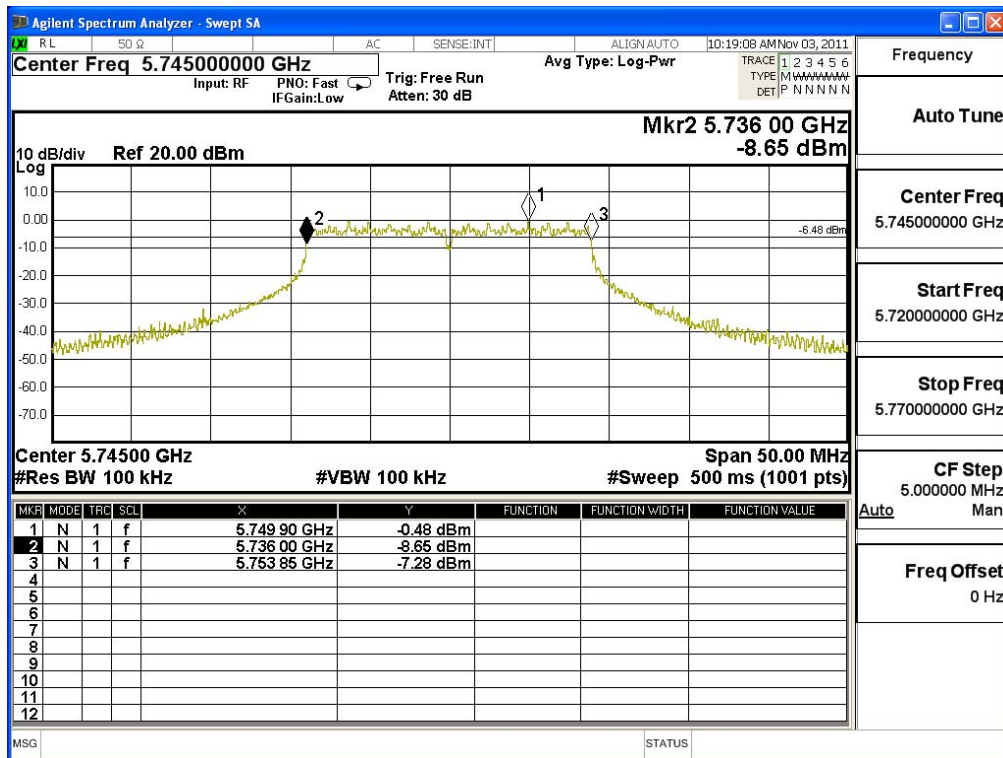
Figure Channel 9: (Chain B)



Product : MOXA IEEE 802.11 a/b/g/n PCI-e
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 6: Transmit - 802.11n-20BW_14.4Mbps(5G Band) (5745MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745.00	17850	>500	Pass

Figure Channel 149: (Chain A)



Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745.00	17700	>500	Pass

Figure Channel 149: (Chain B)

