Lab Code: 200167-0

FCC PART 15.407
IC RSS-210, ISSUE 8, DEC 2010
TEST AND MEASUREMENT REPORT

For

Meru Networks, Inc.

894 Ross Drive,

Sunnyvale, CA 94089, USA

FCC ID: RE7-AP433
IC: 6749A-AP433

Report Type:	**Product Type:**
Original Report	802.11 a/b/g/n Wireless Module

Test Engineers:	Ning Ma
Report Number:	R1110122-407
Report Date:	2012-01-23
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1110122-407	Original Report	2012-01-23

1 General Description

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *Meru Networks Inc*., and their product model: *Peccock_XTAL_V2.1_20110825, FCC ID: RE7-AP433, IC: 6479A-AP433* or the "EUT" as referred to in this report. The EUT is a dual band Wireless 802.11a/b/g/n wireless module.

1.2 Mechanical Description of EUT

The "EUT" measures approximately *5.1cm (L) x 3.0cm (W) x 4.2cm (H)*, and weighs approximately *37.0*g.

The test data gathered are from typical production sample, serial number: 8500-601204-02, provided by the manufacturer.

1.3 Objective

This report is prepared on behalf of *Meru Networks, Inc.* in accordance with FCC §15.407 and RSS-210 Issue 8, Dec 2010.

The objective is to determine compliance with FCC Part 15C, 15E and IC RSS-210, RSS-Gen rules.

1.4 Related Submittal(s)/Grant(s)

FCC Part 15C, RSS-210 DTS submission with FCC ID: RE7-AP433, IC: 6749A-AP433.

1.5 Test Methodology

FCC Part 15.407 and RSS-210, Issue 8, Dec 2010, ANSI C63.4-2009 and ANSI C63.10-2009.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR16-4-2:2003, The Treatment of Uncertainty in EMC Measurements, the values ranging from $\pm$2.0 dB for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.7 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2005 + A1:2005 + A2:2006 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2003 & TIA/EIA-603.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: R-3729, C-4176, G-469, and T-1206. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is a National Institute of Standards and Technology (NIST) accredited laboratory under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/Standards/scopes/2001670.htm

2 EUT Test Configuration

2.1 Justification

The EUT was configured for testing according to FCC Part 15.407 and RSS-210 Standard.

The EUT has two Power settings: 1.High power setting; 2. Low power setting.

1. High Power setting compatible with the antenna:

Antenna model	5 GHz Antenna Gain (dBi)
ACC-ANT-ABGN230-W	3

2. Low Power setting compatible with the antenna:

Antenna model	5 GHz Antenna Gain (dBi)
ACC-ANT0O6ABGN-0607-PT	7
MERU-ANT-PI622	5

2.2 EUT Exercise Software

The software used, ART_1.8, was provided by customer and verified by Ning Ma to comply with the standard requirements being tested against.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Special Accessories

Manufacturer	Description	Model No.	Serial No.
Meru	Module Supporting Board	V101225 3	-

2.5 Local Support Equipment

Manufacturer	Description	Model No.	Serial No.
Lenovo	Laptop	6460	L3-M6828

2.6 EUT Internal Configuration

NA: Only the module card was tested

3 Summary of Test Results

FCC/IC Rules	Description of Test	Result
FCC §15.407(f), §2.1091 IC RSS-102	RF Exposure Information	Compliance
FCC §15.207 IC RSS-Gen §7.2.2	AC Line Conducted Emissions	Compliance
FCC §15.203 IC RSS-Gen §7.1.4	Antenna Requirement	Compliance
FCC §15.209(a), §15.407(b) IC RSS-210 §A9.2	Spurious Radiated Emissions	Compliance
FCC §15.407(a) IC RSS-210 §A9.2	26 dB and 99% Emission Bandwidth	Compliance
FCC §407(a)(1) IC RSS-210 §A9.2	Peak Output Power Measurement	Compliance
FCC §15.407 IC RSS-210 §A9.3	Out of Band Emissions	Compliance
FCC §15.407(a)(1) IC RSS-5210 §A9.2	Power Spectral Density	Compliance
IC RSS-210 §2.6 & RSS-Gen §6	Receiver Spurious Radiated Emissions	Compliance
FCC §15.407(b) IC RSS-210 §A9.2	Spurious Emissions at Antenna Terminals	Compliance

4 FCC §15.407(f), §2.1091 & IC RSS-102 - RF Exposure Information

4.1 Applicable Standards

According to FCC §15.407(f) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* (100)	30
1.34-30	824/f	2.19/f	* ($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

Before equipment certification is granted, the procedure of IC RSS-102 must be followed concerning the exposure of humans to RF fields.

According to IC RSS-102 Issue 2 section 4.1, RF limits used for general public will be applied to the EUT.

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Time Averaging (minutes)
0.003 - 1	280	2.19	-	6
1 - 10	280 / f	2.19 / f	-	6
10 - 30	28	2.19 / f	-	6
30 – 300	28	0.073	2*	6
300 – 1 500	$1.585\ f^{0.5}$	$0.0042\ f^{0.5}$	f / 150	6
1 500 – 15 000	61.4	0.163	10	6
15 000 – 150 000	61.4	0.163	10	$616000 / f^{1.2}$
150 000- 300 000	$0.158\ f^{0.5}$	$4.21 \times 10^{-4}\ f^{0.5}$	$6.67 \times 10^{-5}\ f$	$616000 / f^{1.2}$

Note: *f* is frequency in MHz
* = Power density limit is applicable at frequencies greater than 100 MHz

4.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

4.3 MPE Results

Maximum peak output power at antenna input terminal (dBm):	14.56
Maximum peak output power at antenna input terminal (mW):	28.57
Prediction distance (cm):	20
Prediction frequency (MHz):	5190
Maximum Antenna Gain, typical (dBi):	7.0
Maximum Antenna Gain (numeric):	5.01
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	0.03
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	0.3
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	10

The device is compliant with the requirement MPE limit for uncontrolled exposure at 20 cm distance.

5 FCC §15.203 & IC RSS-Gen §7.1.4 – Antenna Requirements

5.1 Applicable Standard

According to FCC §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to FCC §15.407 (a)(1), if transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

As per IC RSS-Gen §7.1.4: Transmitter Antenna

A transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

5.2 Antennas List

Antenna Type/Model	5 GHz Antenna Gain (dBi)	Power Limit
ACC-ANT-ABGN230-W Omni Directional Rubber Duct Dual-Band	3.0	17
ACC-ANT0O6ABGN-0607-PT Wall Mount Patch Dual-Band 3x3 MIMO	7.0	16
MERU-ANT-PI622 Internal PIFA Dual-Band MIMO	5.0	17

6 FCC §15.207 & IC RSS-Gen §7.2.2 – AC Line Conducted Emissions

6.1 Applicable Standards

As per FCC §15.207 and IC RSS-Gen §7.2.2 Conducted limits:

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 Note 1	56 to 46 Note 1
0.5-5	56	46
5-30	60	50

Note 1 Decreases with the logarithm of the frequency.

6.2 Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.4-2003 measurement procedure. The specification used was FCC §15.207 and IC RSS-Gen §7.2.2 limits.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The AC/DC power adapter of the Host was connected with LISN-1 which provided 120 V/60 Hz AC power.

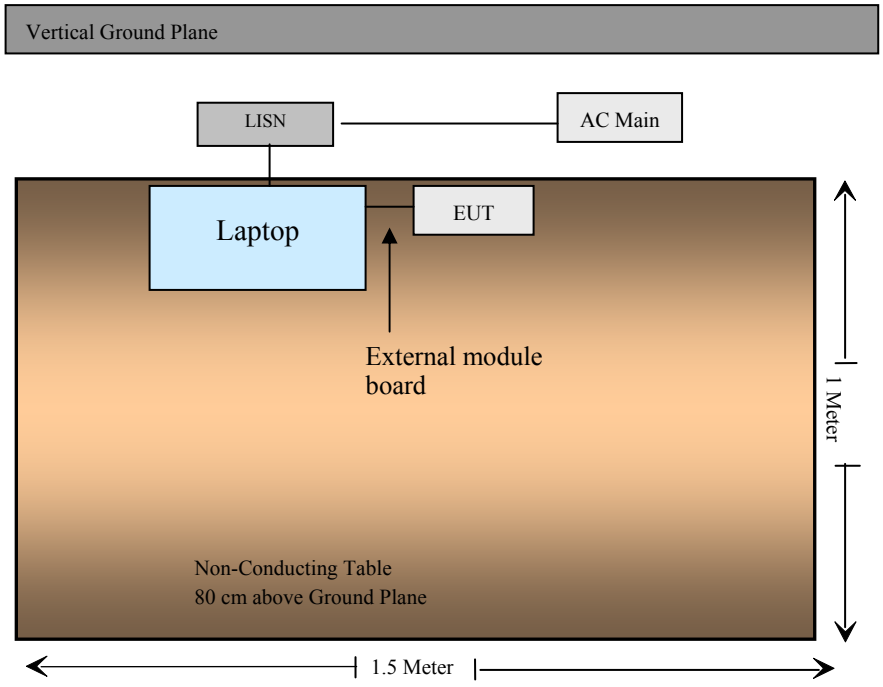
6.3 Test Procedure

During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-2.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the peak detection mode, quasi-peak and average. Quasi-Peak readings are distinguished with a “QP.” Average readings are distinguished with an “Ave”.

6.4 Test Setup Block Diagram



6.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Cable Loss (CL), the Attenuator Factor (Atten) to indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + CL + Atten

For example, a corrected amplitude of 46.2 dBuV = Indicated Reading (32.5 dBuV) + Cable Loss (3.7 dB) + Attenuator (10 dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

6.6 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100044	2011-04-14
Solar Electronics	LISN	9252-R-24-BNC	511205	2011-06-25
TTE	Filter, High Pass	H9962-150K-50-21378	K7133	2011-06-10

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

6.7 Test Environmental Conditions

Temperature:	21~24 °C
Relative Humidity:	38~45 %
ATM Pressure:	101.2-102 kPa

The testing was performed by Jerry Huang on 11-20-2011 to 11-21-2011 in 5 meter chamber 3.

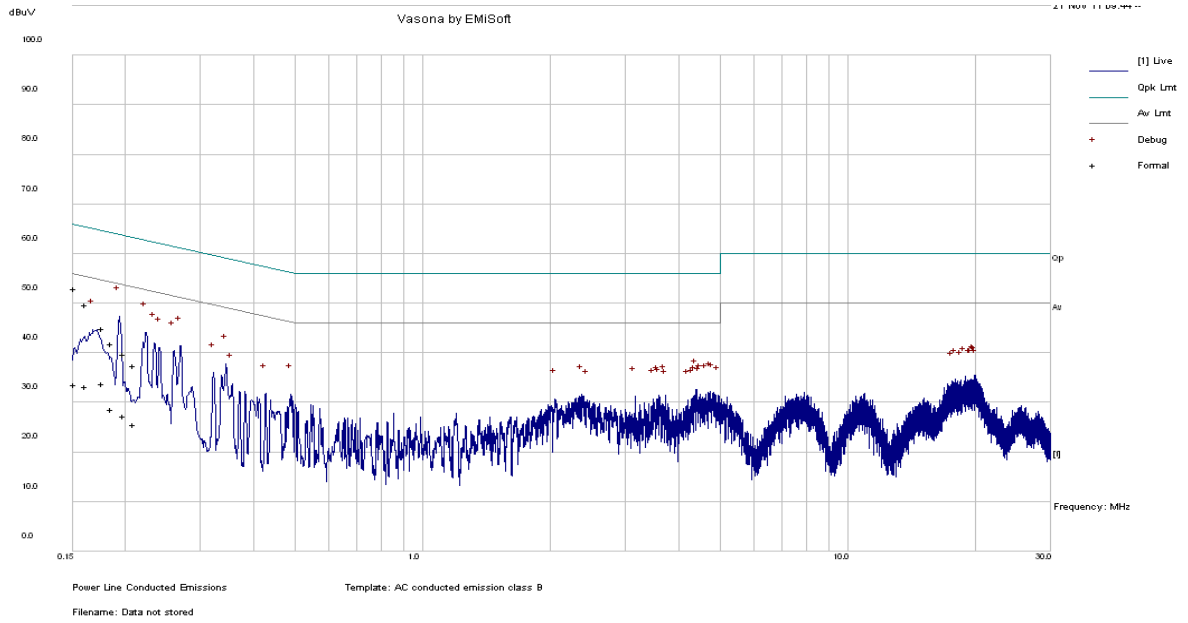
6.8 Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC/IC standard's conducted emissions limits, with the margin reading of:

Connection: 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor (Line/Neutral)**	**Range (MHz)**
-11.41	0.150732	Neutral	0.15 to 30

6.9 Conducted Emissions Test Plots and Data

5.2 GHz, 5 dBi Antenna 5230 MHz - 120 V, 60 Hz – Line



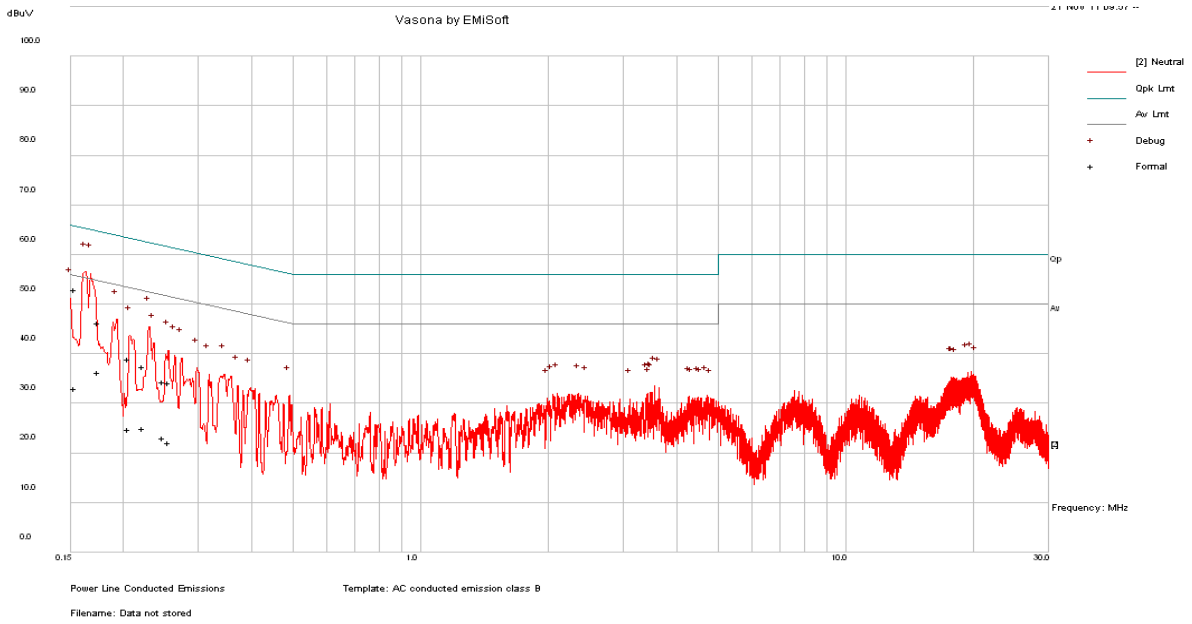
Quasi-Peak Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)
0.175242	46.29	Line	64.71	-18.42
0.20589	39.03	Line	63.37	-24.34
0.25686	34.16	Line	61.53	-27.37
0.22236	37.48	Line	62.73	-25.25
0.153813	53.01	Line	65.79	-12.78
0.248484	34.35	Line	61.81	-27.46

Average Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)
0.175242	36.31	Line	54.71	-18.40
0.20589	24.91	Line	53.37	-28.46
0.25686	22.21	Line	51.53	-29.33
0.22236	25.04	Line	52.73	-27.69
0.153813	33.12	Line	55.79	-22.67
0.248484	23.1	Line	51.81	-28.71

120 V, 60 Hz – Neutral



Quasi-Peak Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)
0.150732	54.54	Neutral	65.96	-11.41
0.150375	54.33	Neutral	65.98	-11.65
0.150287	54.35	Neutral	65.98	-11.64
0.213285	38.35	Neutral	63.08	-24.72
0.174918	46.53	Neutral	64.72	-18.20
0.190155	41.25	Neutral	64.03	-22.78

Average Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)
0.150732	34.53	Neutral	55.96	-21.43
0.150375	34.31	Neutral	55.98	-21.67
0.150287	34.35	Neutral	55.98	-21.63
0.213285	25.71	Neutral	53.08	-27.37
0.174918	33.57	Neutral	54.72	-21.15
0.190155	30.51	Neutral	54.03	-23.52

7 FCC §15.209 (a), §15.407(b) & IC RSS-210 §A9.2 - Spurious Radiated Emissions

7.1 Applicable Standards

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As per FCC §15.209(a) and RSS-210: Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100 Note 2	3
88 - 216	150 Note 2	3
216 - 960	200 Note 2	3
Above 960	500	3

Note 2: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110 0.495 – 0.505 2.1735 – 2.1905 4.125 – 4.128 4.17725 – 4.17775 4.20725 – 4.20775 6.215 – 6.218 6.26775 – 6.26825 6.31175 – 6.31225 8.291 – 8.294 8.362 – 8.366 8.37625 – 8.38675 8.41425 – 8.41475 12.29 – 12.293 12.51975 – 12.52025 12.57675 – 12.57725 13.36 – 13.41	16.42 – 16.423 16.69475 – 16.69525 25.5 – 25.67 37.5 – 38.25 73 – 74.6 74.8 – 75.2 108 – 121.94 123 – 138 149.9 – 150.05 156.52475 – 156.52525 156.7 – 156.9 162.0125 –167.17 167.72 – 173.2 240 – 285 322 – 335.4 399.9 – 410 608 – 614	960 – 1240 1300 – 1427 1435 – 1626.5 1645.5 – 1646.5 1660 – 1710 1718.8 – 1722.2 2200 – 2300 2310 – 2390 2483.5 – 2500 2690 – 2900 3260 – 3267 3.332 – 3.339 3 3458 – 3 358 3.600 – 4.400	4. 5 – 5. 15 5. 35 – 5. 46 7.25 – 7.75 8.025 – 8.5 9.0 – 9.2 9.3 – 9.5 10.6 – 12.7 13.25 – 13.4 14.47 – 14.5 15.35 – 16.2 17.7 – 21.4 22.01 – 23.12 23.6 – 24.0 31.2 – 31.8 36.43 – 36.5 Above 38.6

As per FCC Part 15.407 (b)(1) and IC RSS-210 §A9.2

(1) For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

7.2 EUT Setup

The radiated emissions tests were performed using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15E/IC RSS-210 limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

7.3 Test Procedure

For the radiated emissions test, the EUT host, and all support equipment power cords was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000 MHz:

(1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
(2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

7.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + AF + CL + Atten – Ga

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

7.5 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2011-03-21
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
Sunol Science Corp	Combination Antenna	JB3	A0020106-3	2011-06-29
A.R.A Inc	Horn antenna	DRG-1181A	1132	2010-11-29
Hewlett Packard	Pre-amplifier	8447D	2944A06639	2011-06-09
Mini-Circuits	Pre-amplifier	ZVA-183-S	570400946	2011-05-09

Statement of Traceability: BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

7.6 Test Environmental Conditions

Temperature:	18~21 °C
Relative Humidity:	30~35 %
ATM Pressure:	101.2-102.2kPa

The testing was performed by Jerry Huang from 2011-11-14 to 2011-11-18 in 5 meter chamber 2.

7.7 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Part 15.407, 15.205, 15.209 and IC RSS-210, RSS-Gen standard's radiated emissions limits, and had the worst margin of:

30-1000 MHz:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel, Range**
-15.81	134.6555	Horizontal	30 MHz - 1 GHz

Above 1 GHz:

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
-	-	-	-	-	-	-	-	-	-	-	-

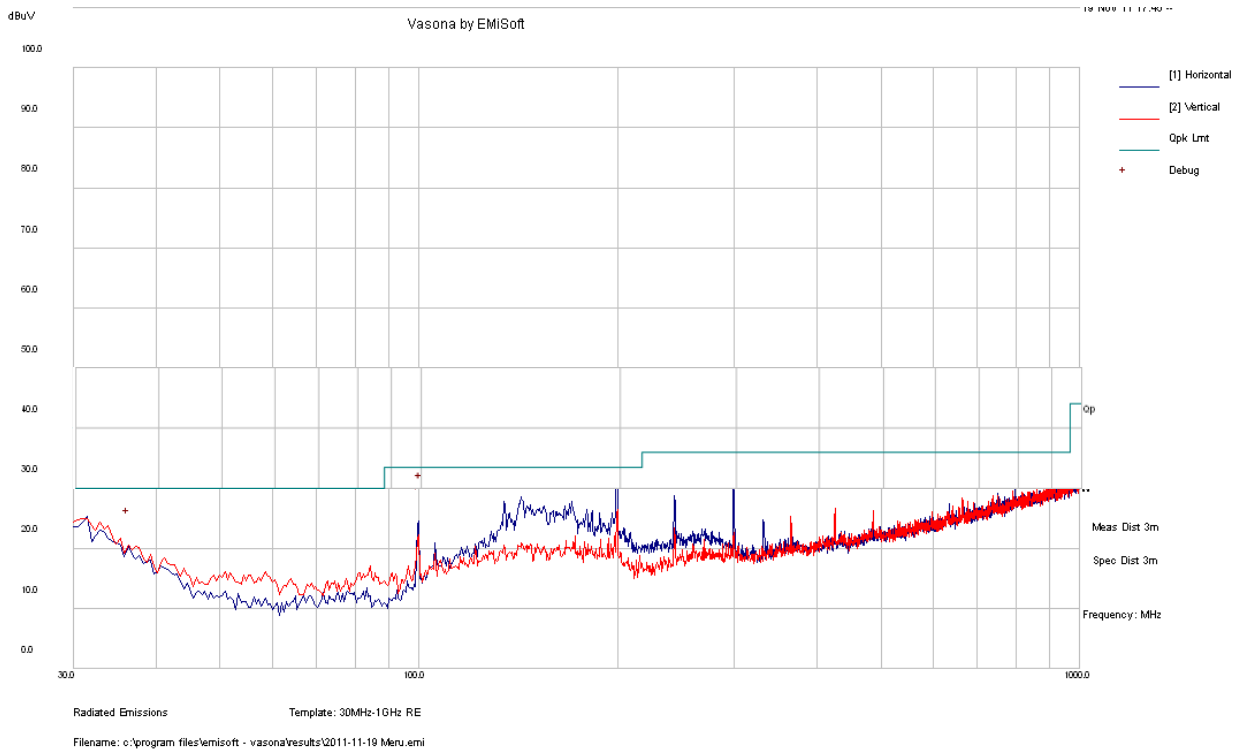
Note: All the Restricted Band Frequencies are more than 20 dB below the margin
Please refer to the following table and plots for specific test result details

7.8 Radiated Emissions Test Result Data

Radiated Emission at 3 meters, 30 MHz – 1 GHz

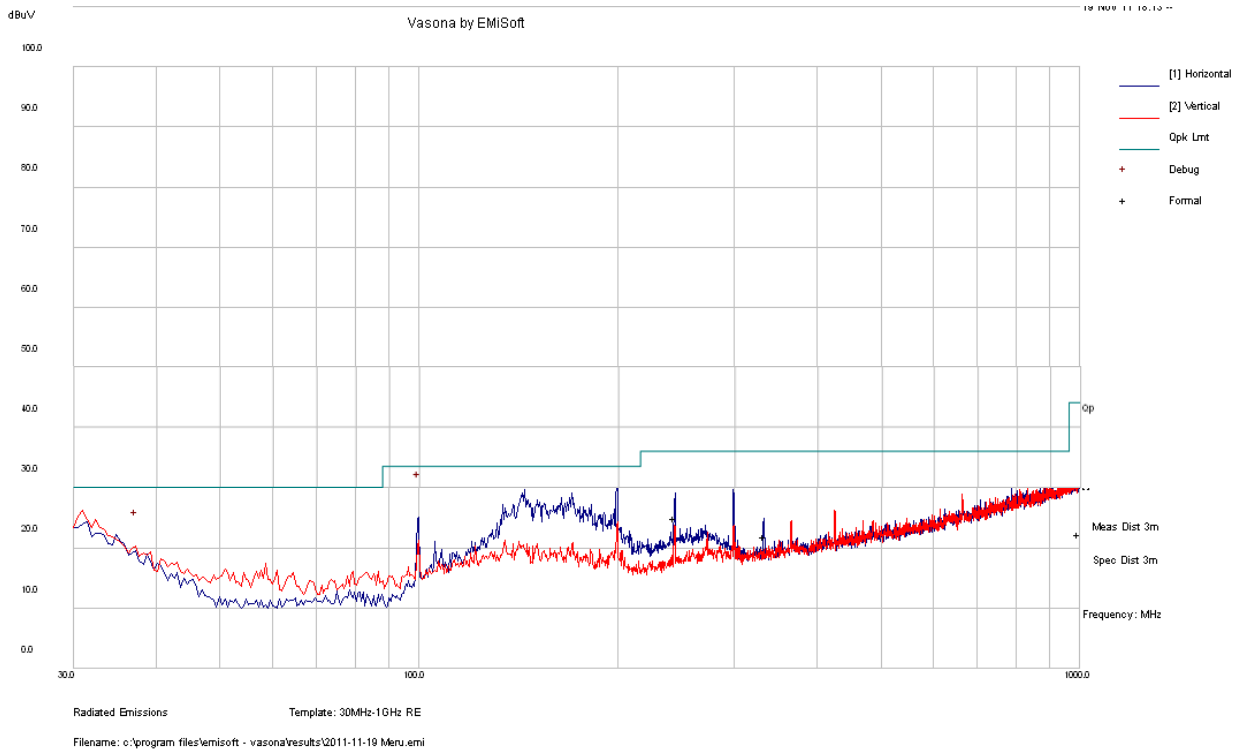
5.2 GHz Band, 3 dBi Antenna High Power

802.11a mode (5240 MHz)



Frequency (MHz)	Corrected Amplitude (dB)	Antenna Height (cm)	Antenna Polarity (H/V)	Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
331.8988	22.07	101	H	337	46	-23.93
999.051	22.5	99	H	114	54	-31.50

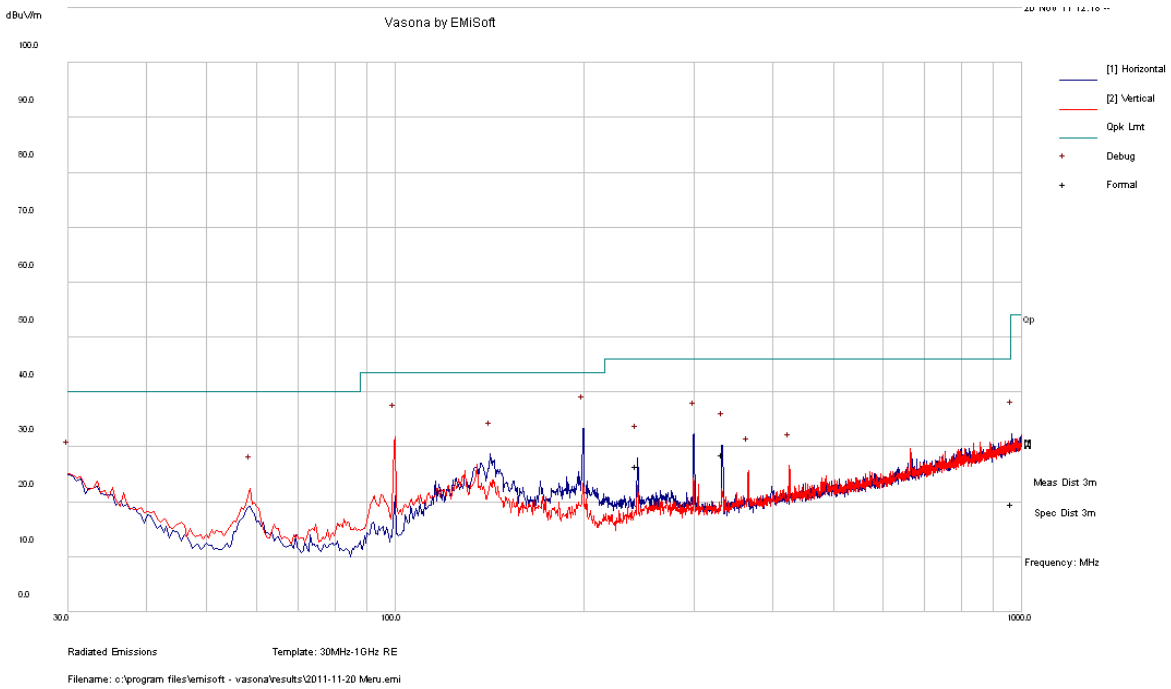
802.11 n 40 Mode 5230 MHz High Power



Frequency (MHz)	Corrected Amplitude (dB)	Antenna Height (cm)	Antenna Polarity (H/V)	Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
243.7778	24.93	148	H	316	46	-21.07
333.1333	22.03	108	H	350	46	-23.97
996.2135	22.41	117	V	161	54	-31.59

5.2 GHz Band, 5 dBi Antenna Low Power

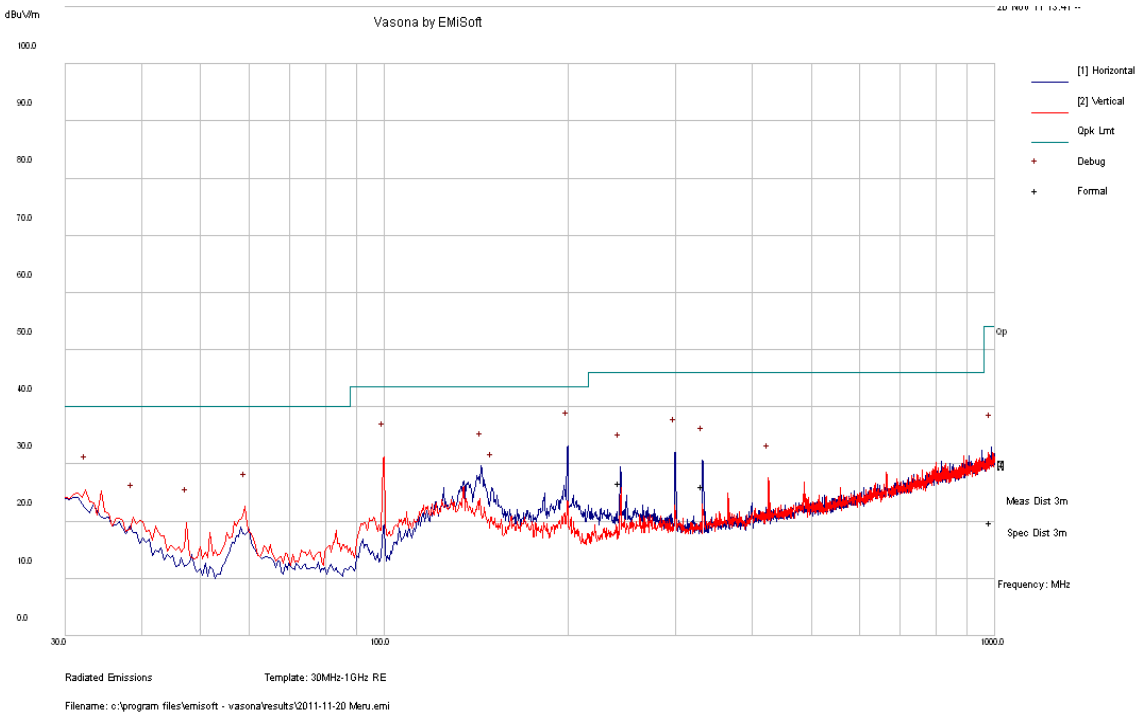
802.11a mode (5240 MHz)



Frequency (MHz)	Corrected Amplitude (dB)	Antenna Height (cm)	Antenna Polarity (H/V)	Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
333.1408	28.71	99	H	176	46	-17.29
243.096	26.45	126	H	314	46	-19.55
963.218	19.62	170	H	147	54	-34.38

5.2 GHz Band, 5 dBi Antenna Low Power

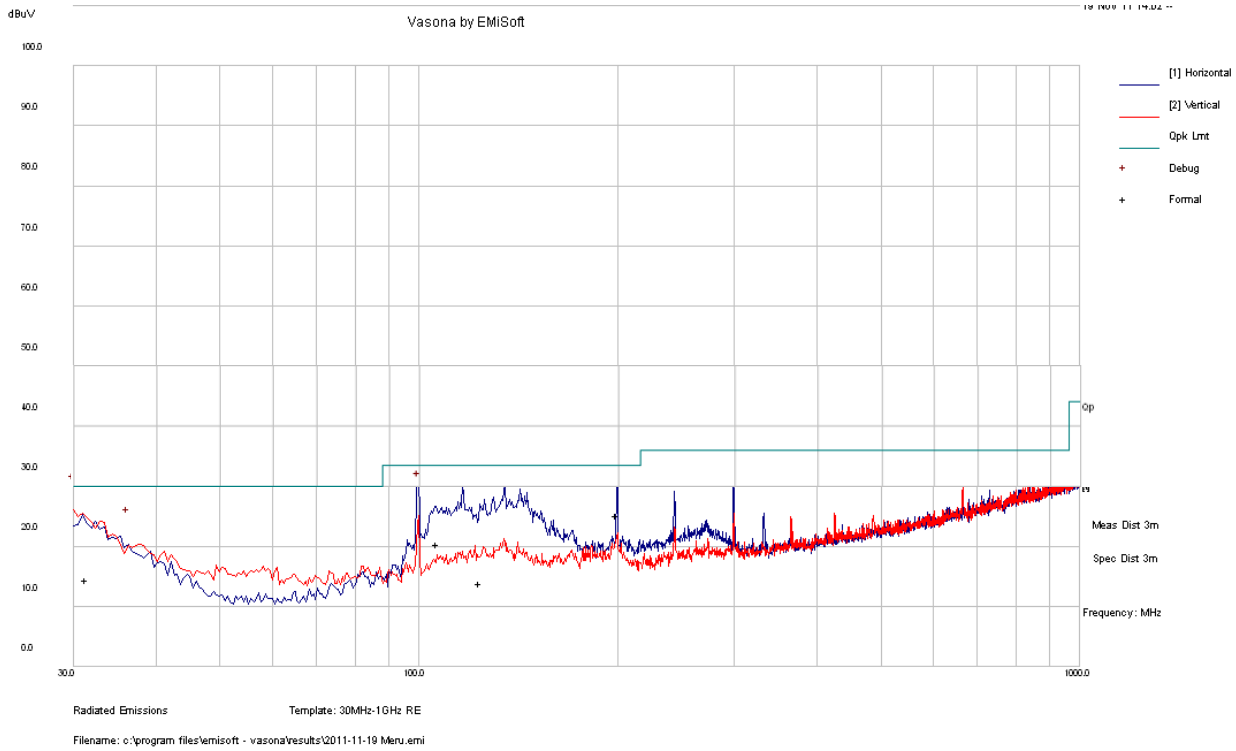
802.11n 40 mode (5230 MHz)



Frequency (MHz)	Corrected Amplitude (dB)	Antenna Height (cm)	Antenna Polarity (H/V)	Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
331.8298	26.19	125	H	188	46	-19.81
243.0645	26.63	132	H	308	46	-19.37
984.3748	19.87	115	H	79	54	-34.13

5.2 GHz Band, 7 dBi Antenna Low Power

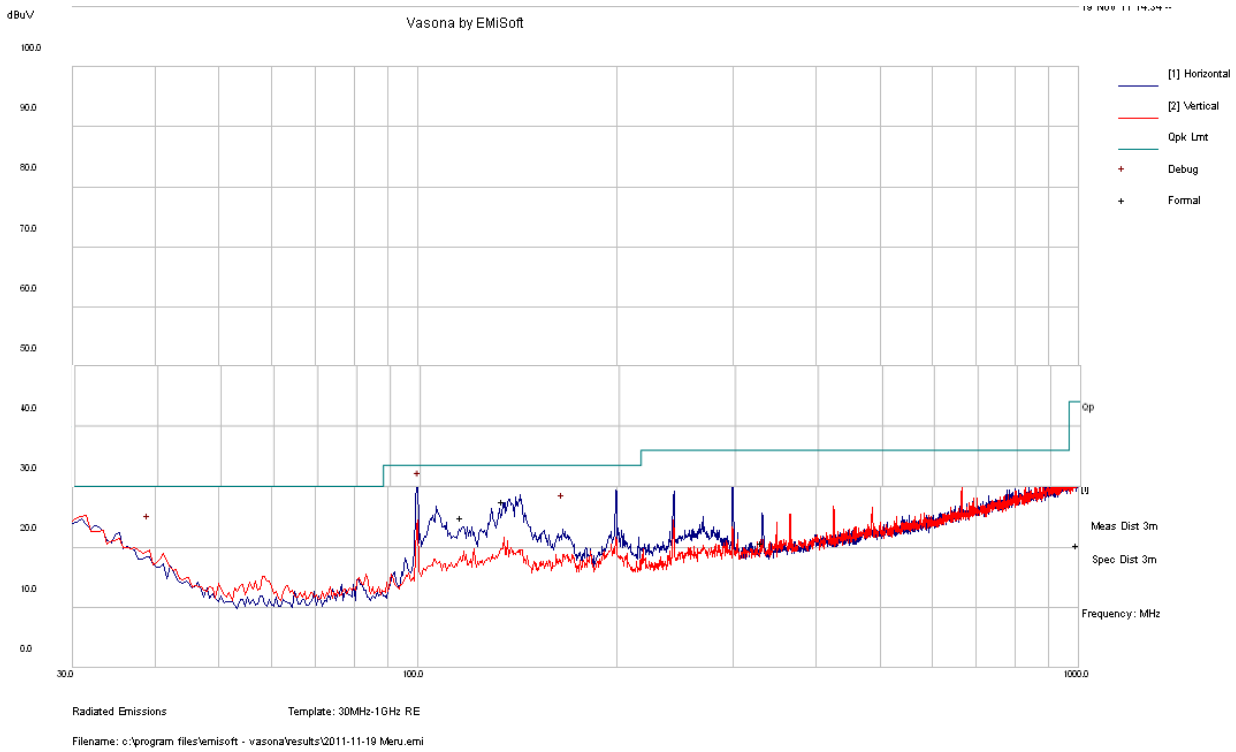
802.11 a mode (5240 MHz)



Frequency (MHz)	Corrected Amplitude (dB)	Antenna Height (cm)	Antenna Polarity (H/V)	Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
116.3263	24.95	127	H	14	43.5	-18.55
134.6555	27.69	175	H	211	43.5	-15.81
331.9065	20.78	99	H	146	46	-25.22
995.8798	20.34	142	V	215	46	-25.66

5.2 GHz Band, 7 dBi Antenna High Power

802.11 n 40 mode (5230 MHz)



Frequency (MHz)	Corrected Amplitude (dB)	Antenna Height (cm)	Antenna Polarity (H/V)	Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
166.021	19.1	124	H	0	43.5	-24.40
243.7665	25.28	113	H	294	46	-20.72
331.8428	20.21	105	H	13	54	-33.79

Radiated Emission at 3 meters, above 1GHz

5.2 GHz Band, 3 dBi Antenna High Power

802.11a Mode High Power

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz, measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-
Middle Channel 5200 MHz measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-
High Channel 5240 MHz measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-

Note: All the Restricted Band Frequencies are more than 20 dB below the margin

802.11 n 20 Mode High Power

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz, measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-
Middle Channel 5200 MHz measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-
High Channel 5240 MHz measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-

Note: All the Restricted Band Frequencies are more than 20 dB below the margin

802.11 n 40 Mode High Power

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5190 MHz, measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-
High Channel 5230 MHz measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-

Note: All the Restricted Band Frequencies are more than 20 dB below the margin

5.2 GHz Band, 5 dBi Antenna

802.11a Mode Low Power

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz, measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-
Middle Channel 5200 MHz measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-
High Channel 5240 MHz measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-

Note: All the Restricted Band Frequencies are more than 20 dB below the margin

802.11 n 20 Mode Lower Power

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz, measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-
Middle Channel 5200 MHz measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-
High Channel 5240 MHz measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-

Note: All the Restricted Band Frequencies are more than 20 dB below the margin

802.11 n 40 Mode Lower Power

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5190 MHz, measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-
High Channel 5230 MHz measured at 3 meters											
-	-	-	-	-	-	-	-	-	-	-	-

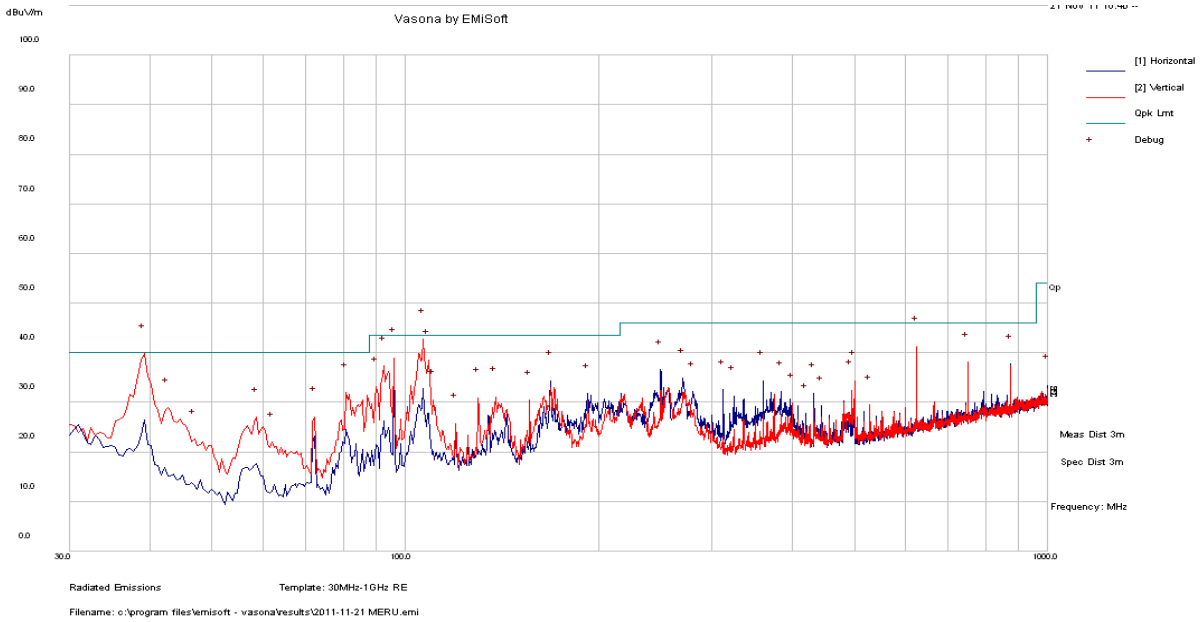
Note: All the Restricted Band Frequencies are more than 20 dB below the margin

Co-location Radiated Emission at 3 meters, 30 MHz - 1GHz

3 dBi and 7 dBi antenna

Co-location:

2.4 GHz: 2437 MHz
5.8 GHz: 5785 MHz
5.2 GHz: 5200 MHz

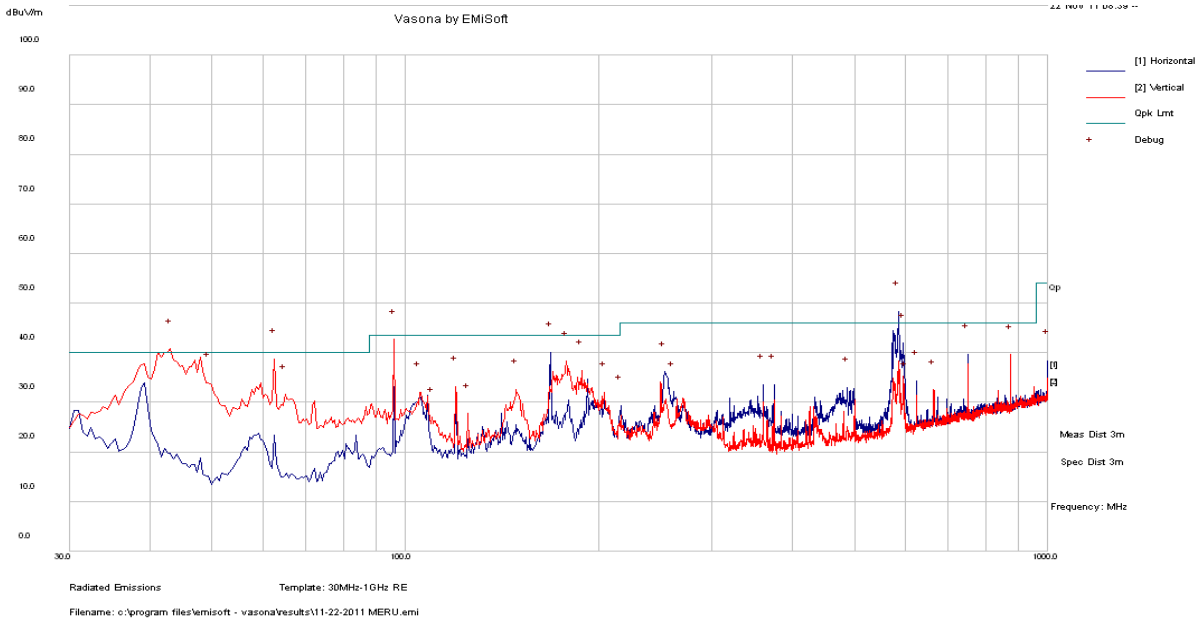


Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
106.6993	40.57	105	V	237	43.5	-2.93
625.014	40.5	101	V	153	46	-5.50
96.0935	37.36	103	V	184	43.5	-6.14
108.806	34.92	120	V	255	43.5	-8.58
39.319	28.98	99	V	68	40	-11.02

3 dBi antenna:

Co-location: 2.4 GHz:

2.4 GHz: 2437 MHz
5.8 GHz: 5785 MHz
5.2 GHz: 5200 MHz

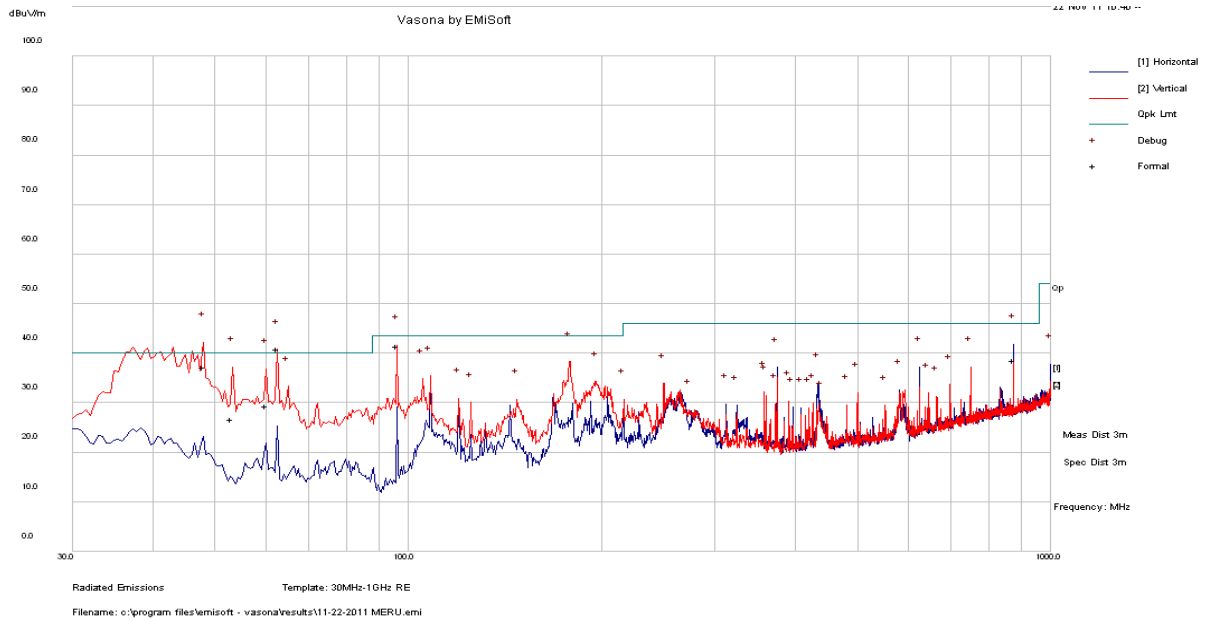


Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
96.09	42.71	99	V	20	43.5	-0.79
62.4955	38.8	120	V	20	40	-1.20
42.8795	33.72	225	V	190	40	-6.28
168.1608	34.43	125	H	103	43.5	-9.07
585.2715	14.68	238	H	161	46	-31.32

3 dBi and 8 dBi Antenna

Co-location:

2.4 GHz: 2437 MHz
5.8 GHz: 5785 MHz
5.2 GHz: 5200 MHz

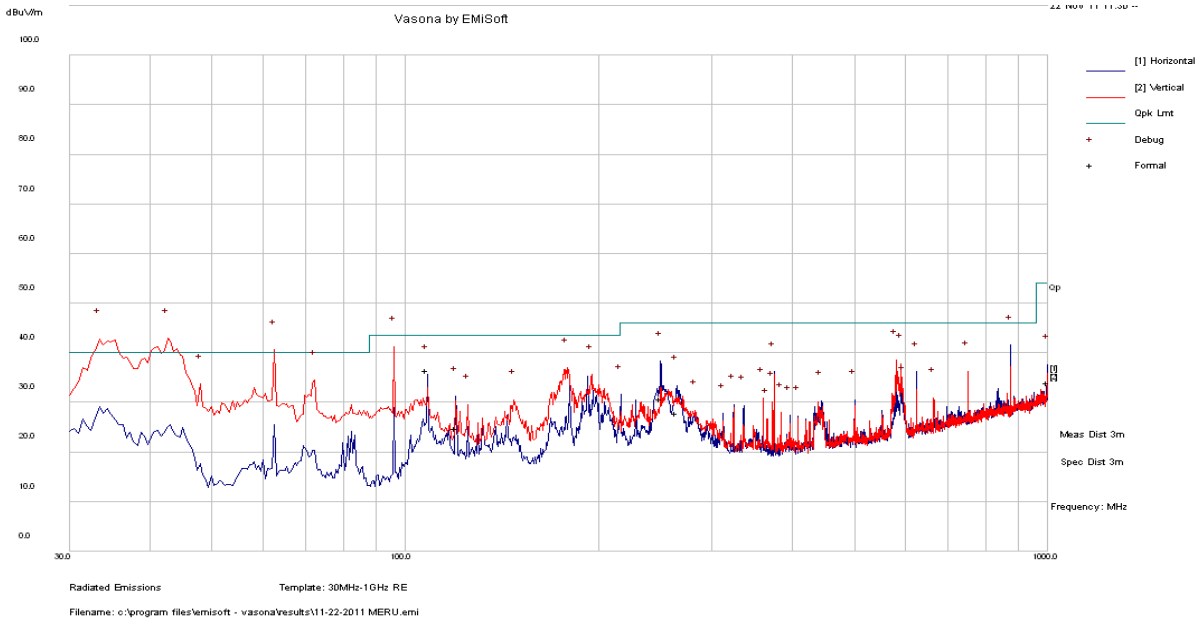


Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
62.4895	39.84	127	V	6	40	-0.16
96.08075	41.42	103	V	265	43.5	-2.08
875.1055	38.62	100	H	126	46	-7.38
60.056	29.47	138	V	14	40	-10.53
53.02875	26.71	99	V	326	40	-13.29

7 dBi and 5 dBi Antenna

Co-location:

2.4 GHz: 2437 MHz
5.8 GHz: 5785 MHz
5.2 GHz: 5200 MHz



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
108.105	36.49	152	H	128	43.5	-7.01
249.9503	30.81	103	H	86	46	-15.19
264.2245	27.92	220	H	135	46	-18.08
119.9678	24.9	245	H	135	43.5	-18.60

Co-location, Radiated Emission at 3 meters, Above 1GHz

3 dBi Antenna

Co-location:

2.4 GHz: 2437 MHz
5.8 GHz: 5785 MHz
5.2 GHz: 5200 MHz

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
-	-	-	-	-	-	-	-	-	-	-	-

Note: All the Restricted Band Frequencies are more than 20 dB below the margin

3 dBi and 7 dBi Antenna

Co-location:

2.4 GHz: 2437 MHz
5.8 GHz: 5785 MHz
5.2 GHz: 5200 MHz

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
-	-	-	-	-	-	-	-	-	-	-	-

Note: All the Restricted Band Frequencies are more than 20 dB below the margin

3 dBi and 5 dBi Antenna

Co-location:

2.4 GHz: 2437 MHz
5.8 GHz: 5785 MHz
5.2 GHz: 5200 MHz

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
-	-	-	-	-	-	-	-	-	-	-	-

Note: All the Restricted Band Frequencies are more than 20 dB below the margin

8 FCC §15.407(a) & IC RSS-210 §A9.2 – 26 dB and 99% Emission Bandwidth

8.1 Applicable Standard

FCC §15.407(a) and RSS-210 A9.2.

8.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 26 dB from the reference level. Record the frequency difference as the emissions bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

8.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

8.4 Test Environmental Conditions

Temperature:	23-25 °C
Relative Humidity:	35-50 %
ATM Pressure:	101-103kPa

The testing was performed by Ning Ma on 2011-11-07~ 2011-11-11 at RF Site.

8.5 Test Results

802.11a mode High power

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Results
Chain 0				
Low	5180	20.998	16.5395	Compliant
Middle	5200	21.163	16.5694	Compliant
High	5240	21.445	16.5828	Compliant
Chain 1				
Low	5180	20.683	16.523	Compliant
Middle	5200	20.69	16.4854	Compliant
High	5240	20.789	16.5144	Compliant
Chain 2				
Low	5180	20.473	16.5889	Compliant
Middle	5200	20.603	16.5855	Compliant
High	5240	20.718	16.6068	Compliant

802.11a mode Low power

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Results
Chain 0				
Low	5180	21.953	16.5483	Compliant
Middle	5200	21.032	16.5556	Compliant
High	5240	21.356	16.5679	Compliant
Chain 1				
Low	5180	20.693	16.5657	Compliant
Middle	5200	21.847	16.5647	Compliant
High	5240	20.715	16.518	Compliant
Chain 2				
Low	5180	20.799	16.4789	Compliant
Middle	5200	20.768	16.5987	Compliant
High	5240	20.518	16.5843	Compliant

802.11n HT20 mode High power

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Results
Chain 0				
Low	5180	22.201	17.7455	Compliant
Middle	5200	22.213	17.7667	Compliant
High	5240	22.635	17.6973	Compliant
Chain 1				
Low	5180	21.644	17.6691	Compliant
Middle	5200	21.466	17.6112	Compliant
High	5240	22.257	17.809	Compliant
Chain 2				
Low	5180	21.794	17.8419	Compliant
Middle	5200	21.936	17.8388	Compliant
High	5240	21.103	17.6331	Compliant

802.11n HT20 mode Low power

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Results
Chain 0				
Low	5180	22.099	17.7276	Compliant
Middle	5200	22.105	17.7626	Compliant
High	5240	21.781	17.845	Compliant
Chain 1				
Low	5180	21.874	17.6757	Compliant
Middle	5200	21.496	17.6142	Compliant
High	5240	21.967	17.838	Compliant
Chain 2				
Low	5180	20.799	16.4789	Compliant
Middle	5200	20.768	16.5987	Compliant
High	5240	20.855	17.6268	Compliant

5150-5250 MHz

802.11n HT40 mode High power

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Results
Chain 0				
Low	5190	42.586	36.3156	Compliant
High	5230	42.537	36.3458	Compliant
Chain 1				
Low	5190	42.635	36.4532	Compliant
High	5230	42.047	36.4298	Compliant
Chain 2				
Low	5190	40.819	36.1317	Compliant
High	5230	41.083	36.0755	Compliant

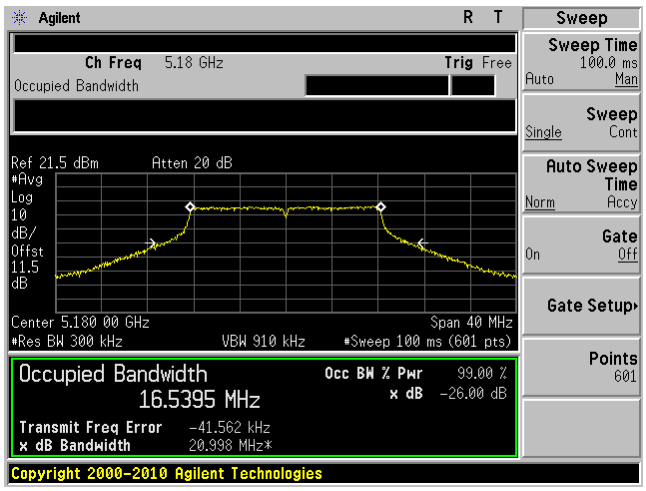
802.11n HT40 mode Low power

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Results
Chain 0				
Low	5190	43.11	36.2891	Compliant
High	5230	42.636	36.3079	Compliant
Chain 1				
Low	5190	42.795	36.3245	Compliant
High	5230	42.795	36.3245	Compliant
Chain 2				
Low	5190	41.694	36.4513	Compliant
High	5230	41.263	36.1597	Compliant

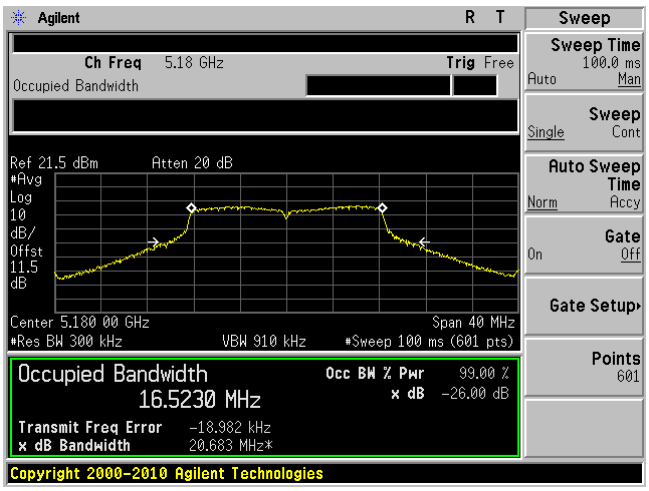
Please refer to the follow plots.

5150-5250 MHz

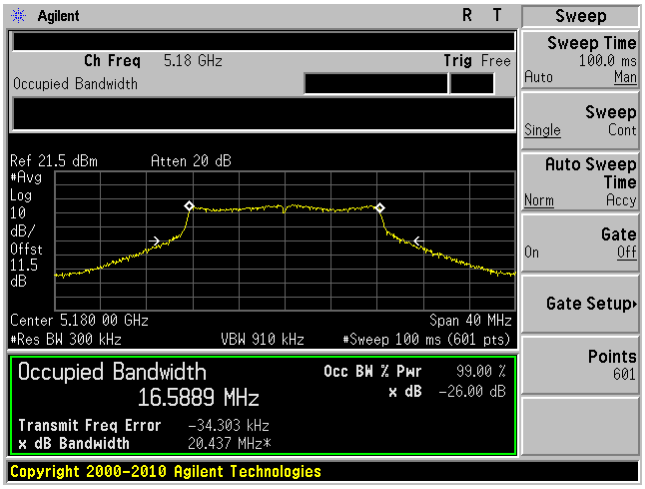
5180 MHz, a mode, High power, Chain 0



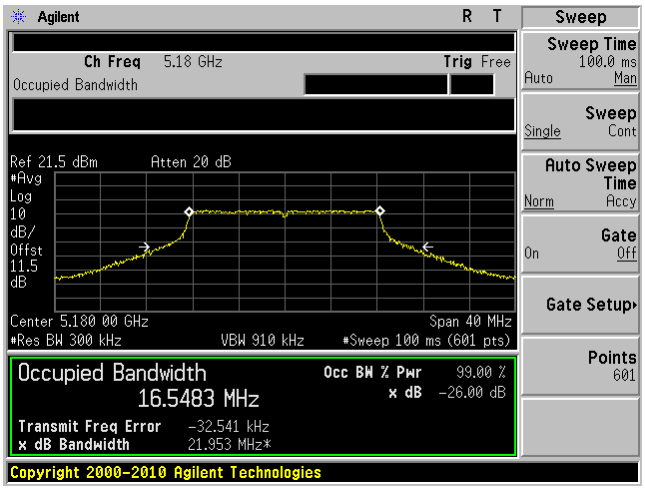
5180 MHz, a mode, High power, Chain 1



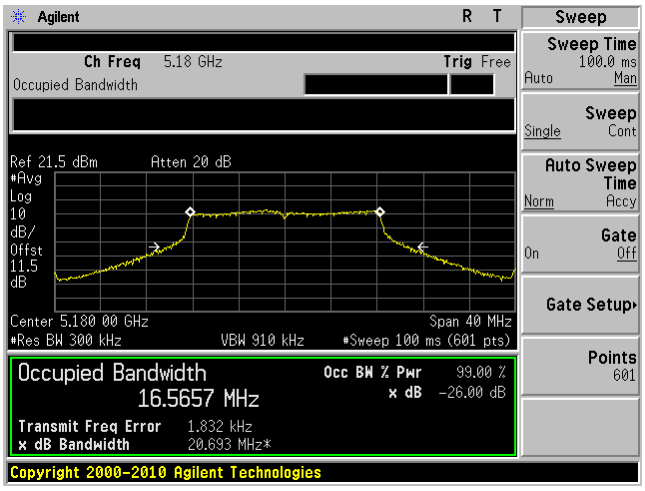
5180 MHz, a mode, High power, Chain 2



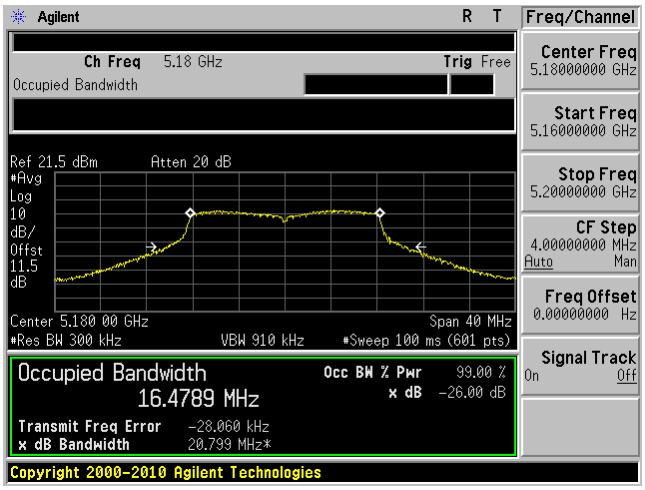
5180 MHz, a mode, Low power, Chain 0



5180 MHz, a mode, Low power, Chain 1

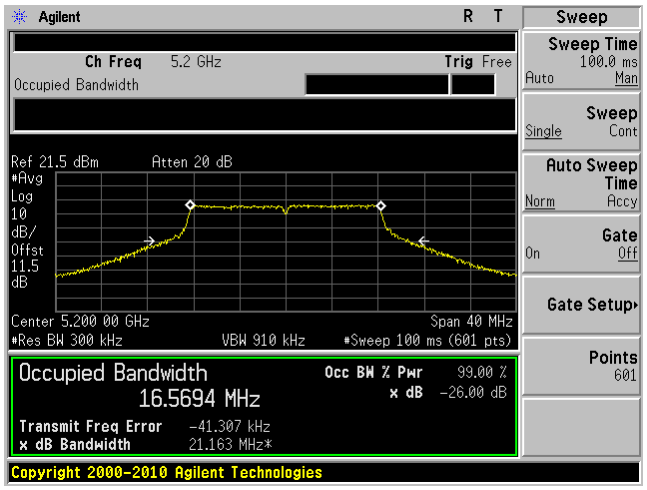


5180 MHz, a mode, Low power, Chain 2

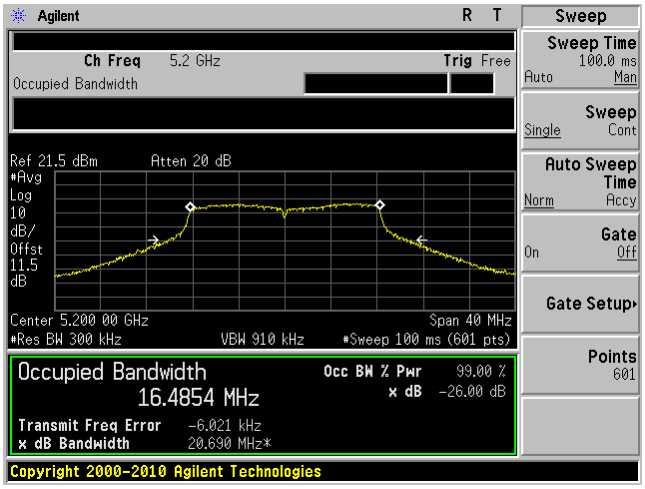


5150-5250 MHz

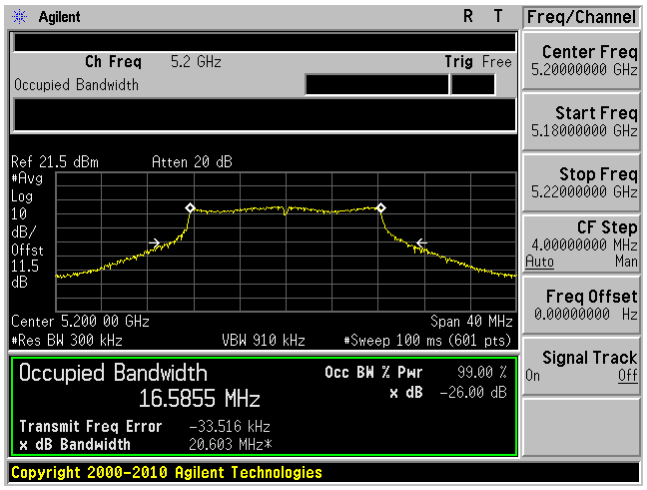
5200 MHz, a mode, High power, Chain 0



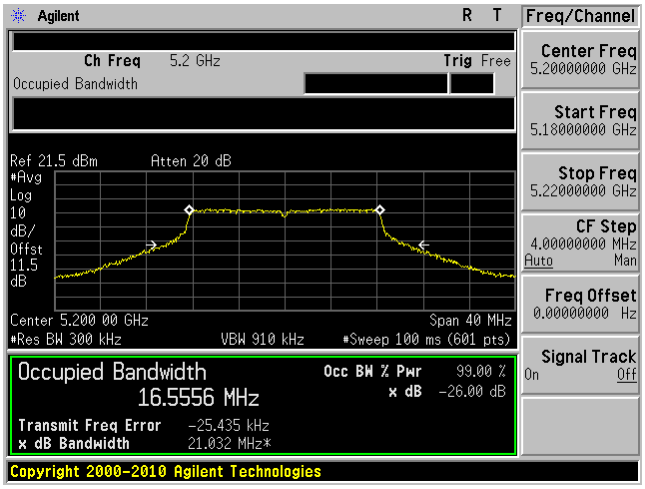
5200 MHz, a mode, High power, Chain 1



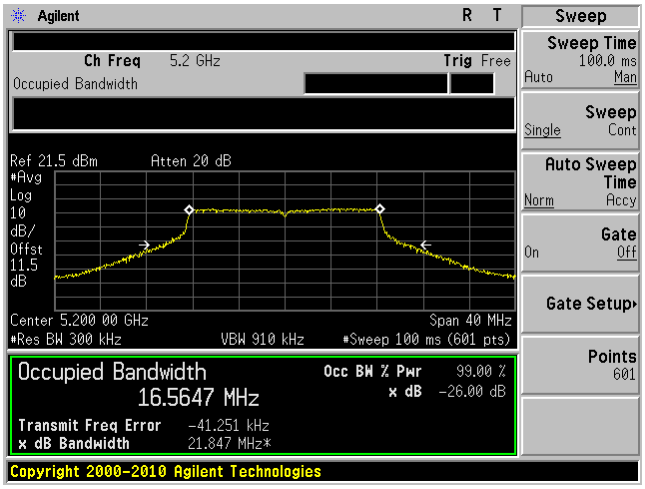
5200 MHz, a mode, High power, Chain 2



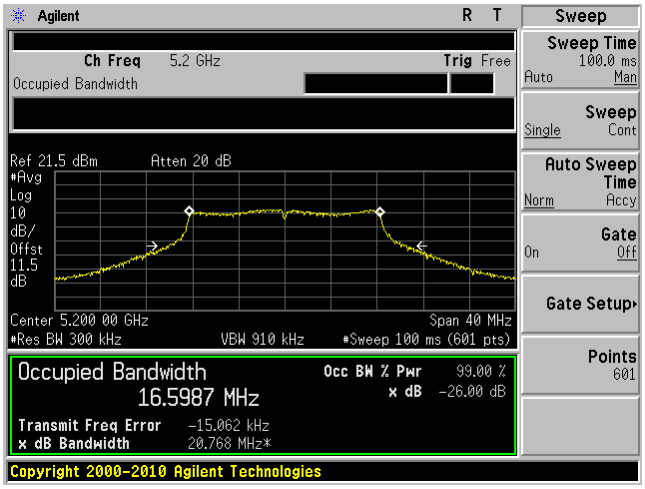
5200 MHz, a mode, Low power, Chain 0



5200 MHz, a mode, Low power, Chain 1

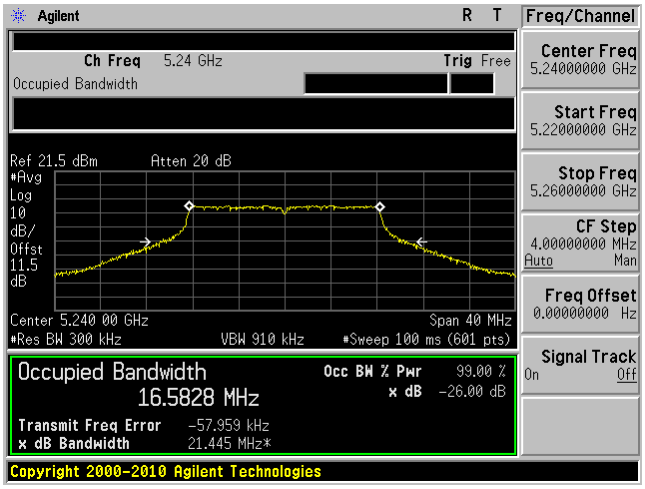


5200 MHz, a mode, Low power, Chain 2

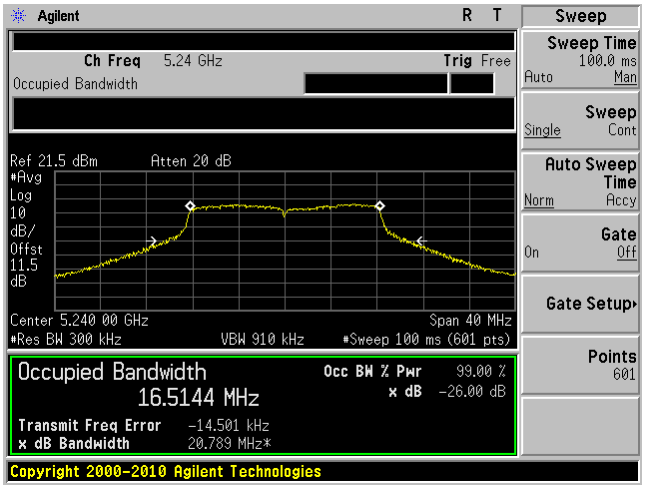


5150-5250 MHz

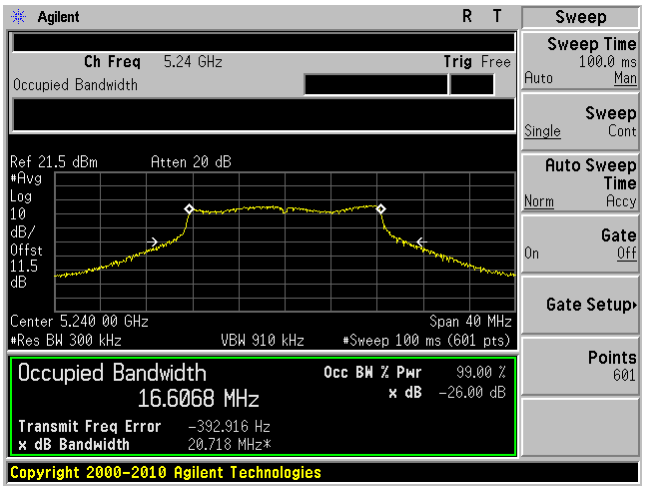
5240 MHz, a mode, High power, Chain 0



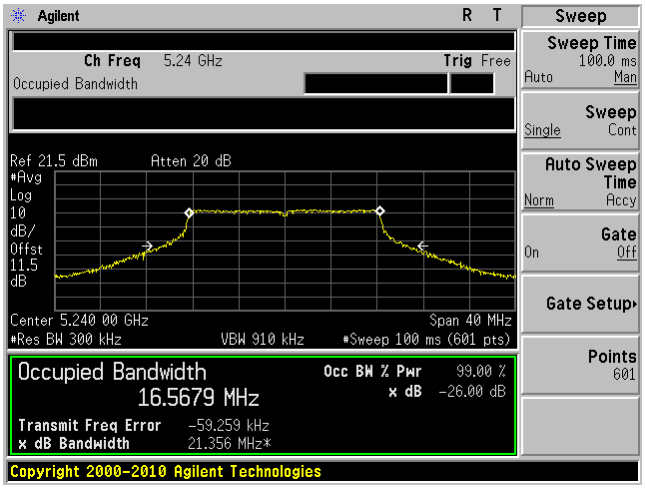
5240 MHz, a mode, High power, Chain 1



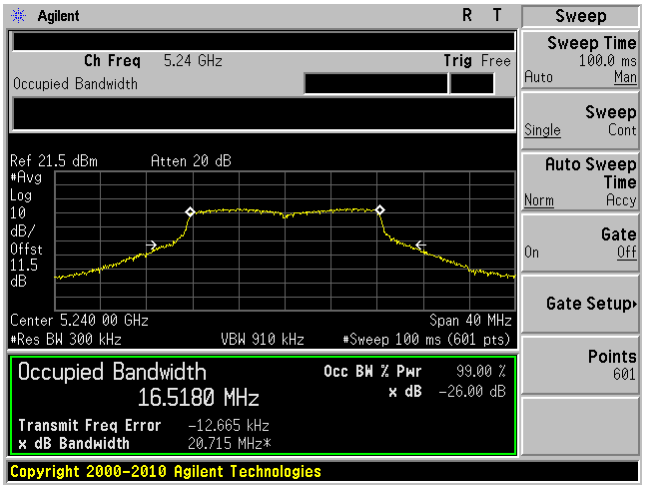
5240 MHz, a mode, High power, Chain 2



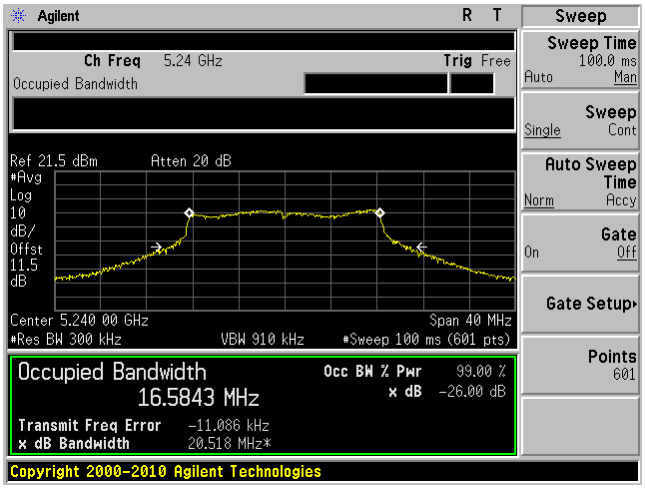
5240 MHz, a mode, Low power, Chain 0



5240 MHz, a mode, Low power, Chain 1

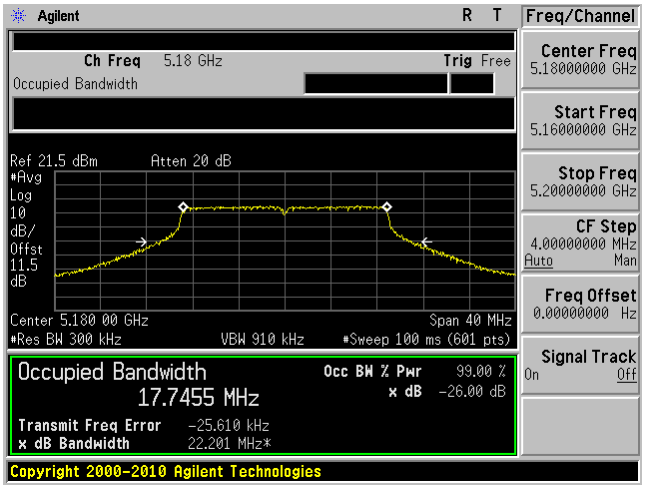


5240 MHz, a mode, Low power, Chain 2

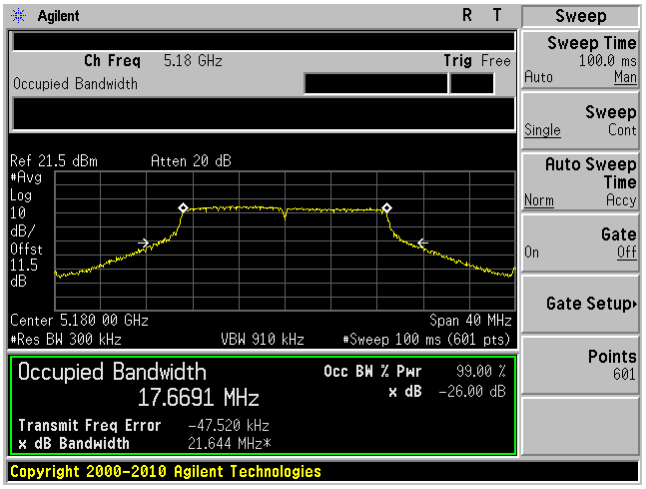


5150-5250 MHz

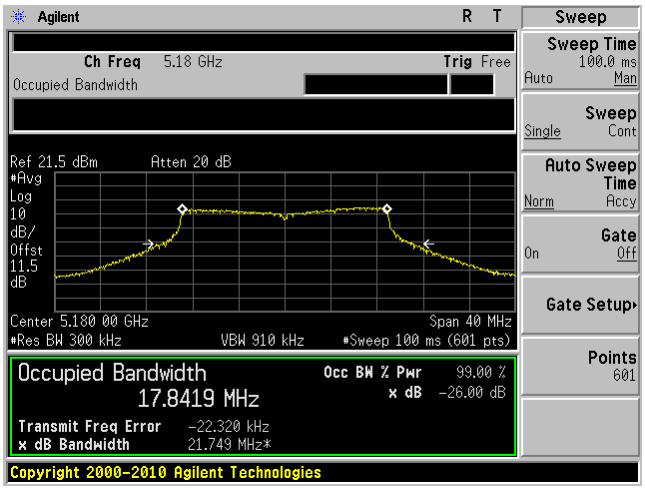
5180 MHz, n 20 mode, High power, Chain 0



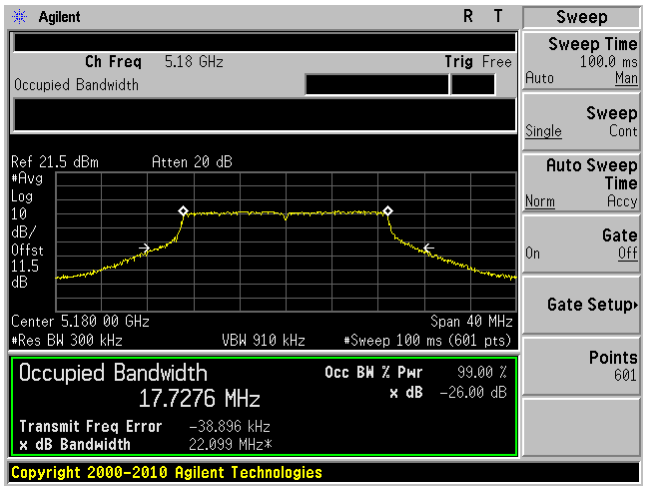
5180 MHz, n 20 mode, High power, Chain 1



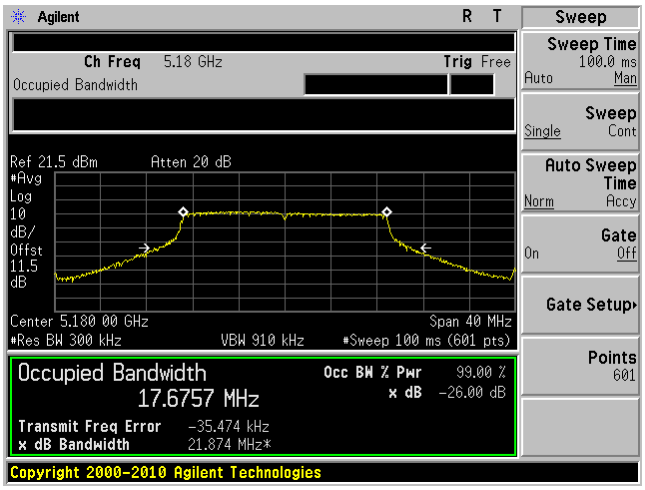
5180 MHz, n 20 mode, High power, Chain 2



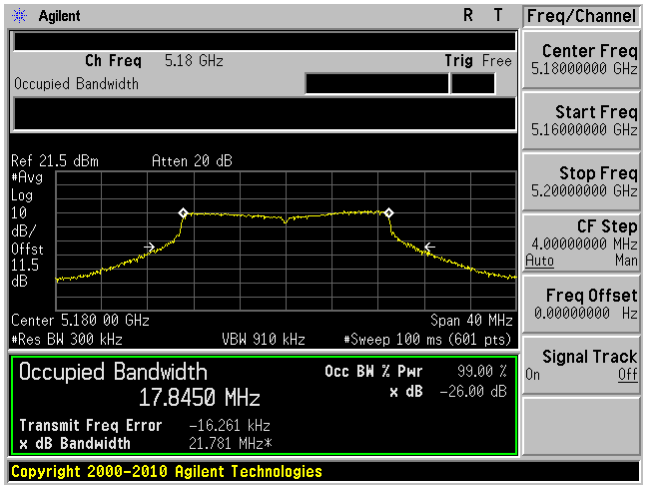
5180 MHz, n 20 mode, Low power, Chain 0



5180 MHz, n 20 mode, Low power, Chain 1

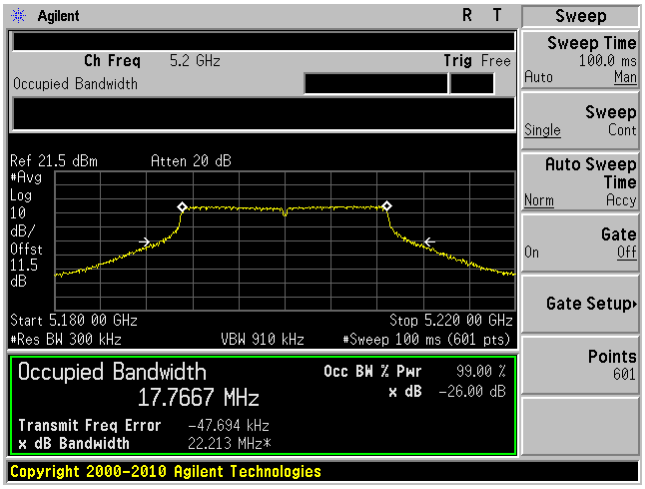


5180 MHz, n 20 mode, Low power, Chain 2

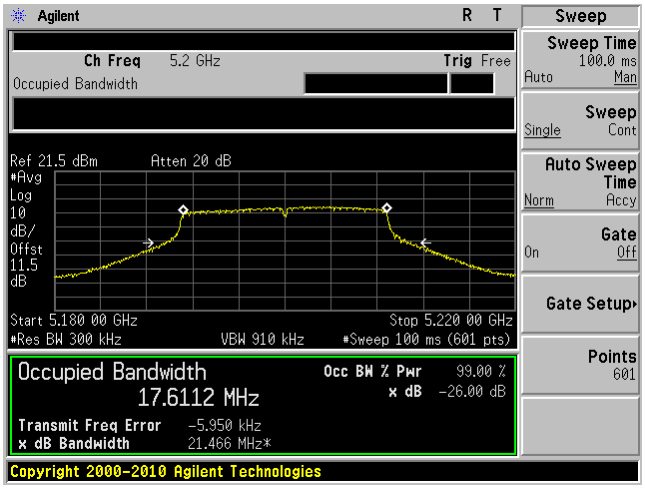


5150-5250 MHz

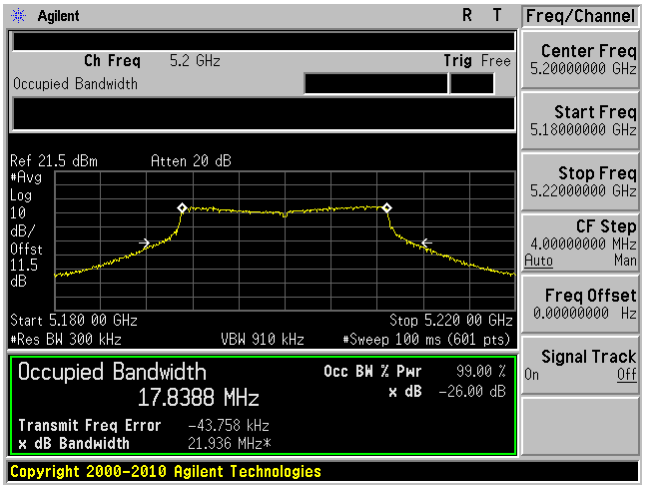
5200 MHz, n 20 mode, High power, Chain 0



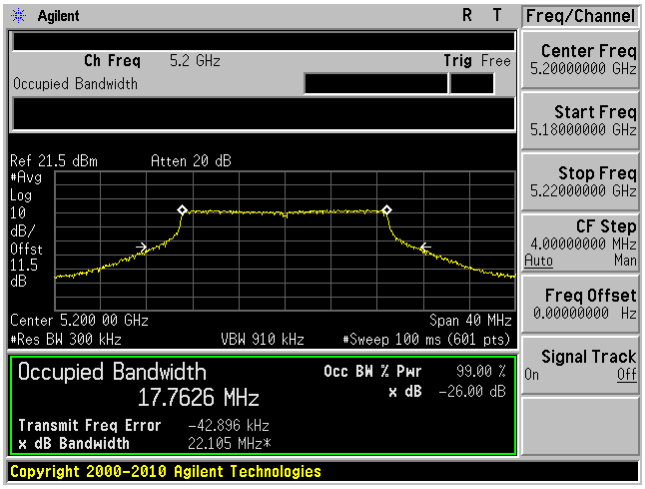
5200 MHz, n 20 mode, High power, Chain 1



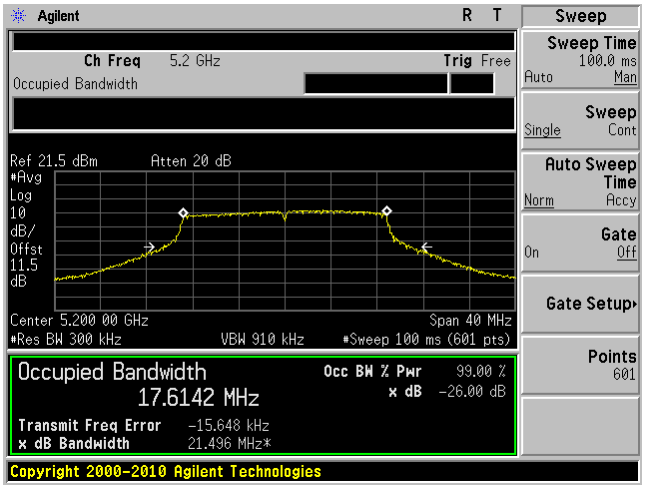
5200 MHz, n 20 mode, High power, Chain 2



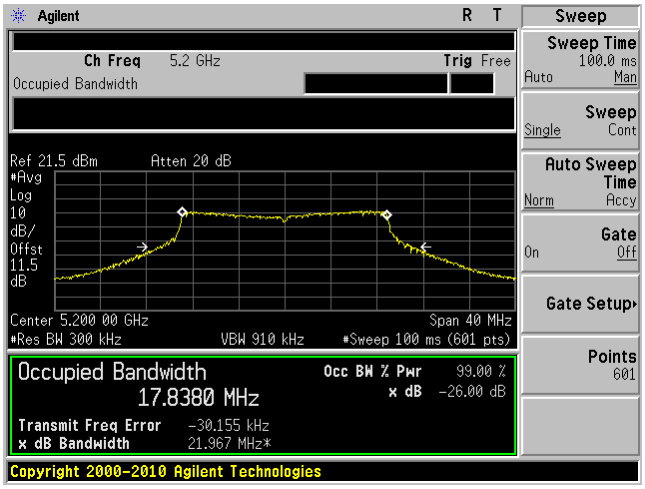
5200 MHz, n 20 mode, Low power, Chain 0



5200 MHz, n 20 mode, Low power, Chain 1

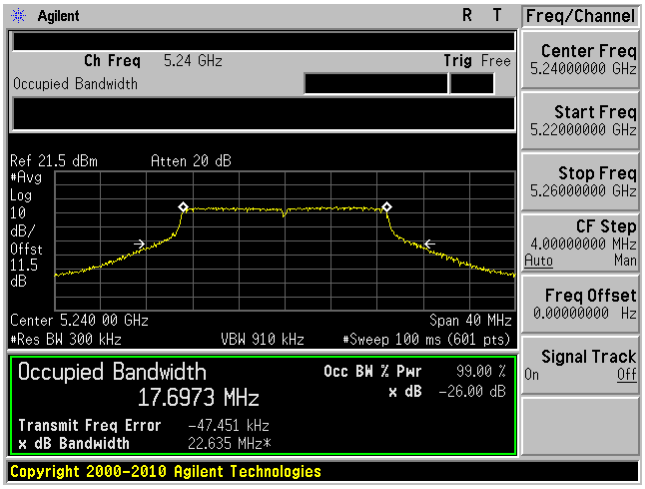


5200 MHz, n 20 mode, Low power, Chain 2

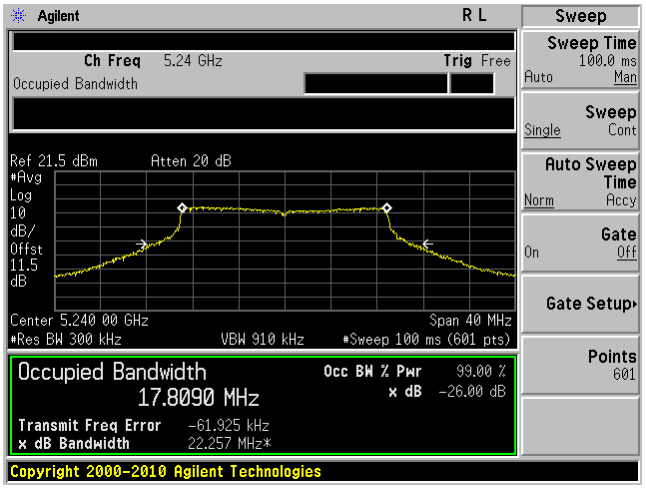


5150-5250 MHz

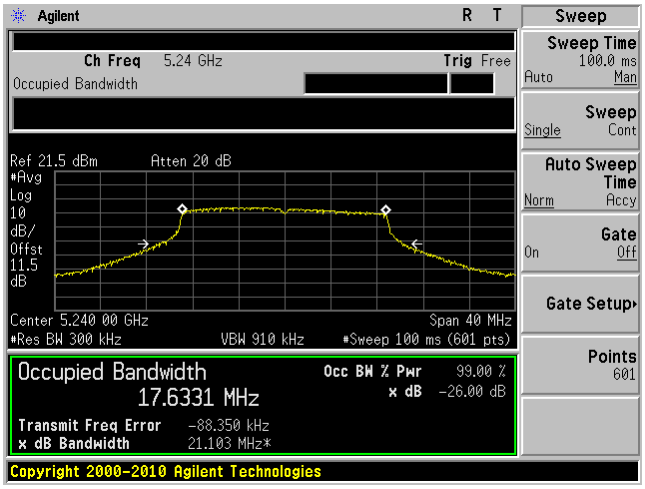
5240 MHz, n 20 mode, High power, Chain 0



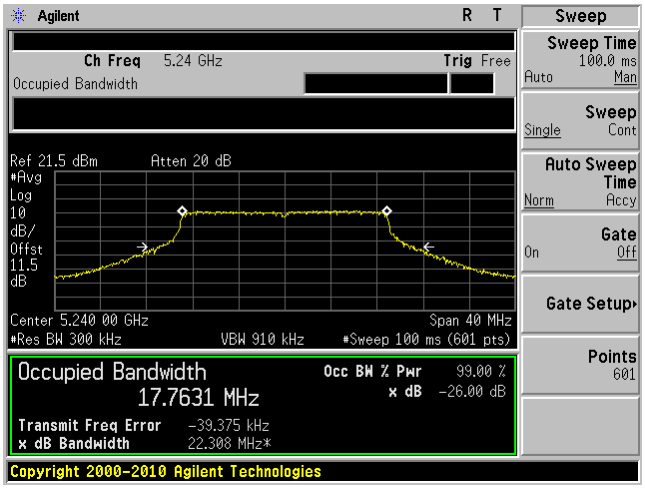
5240 MHz, n 20 mode, High power, Chain 1



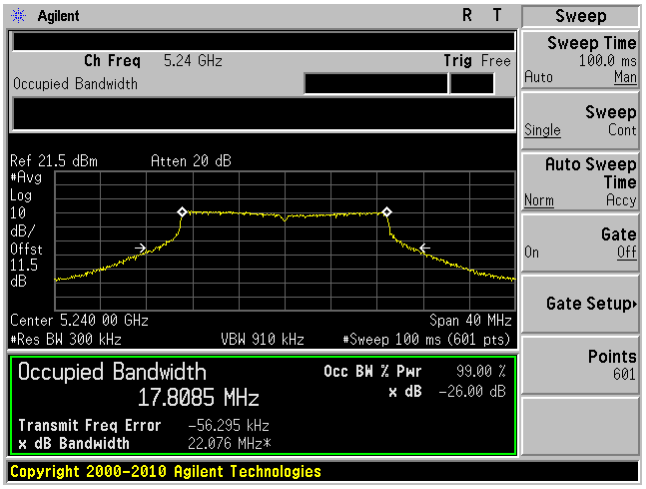
5240 MHz, n 20 mode, High power, Chain 2



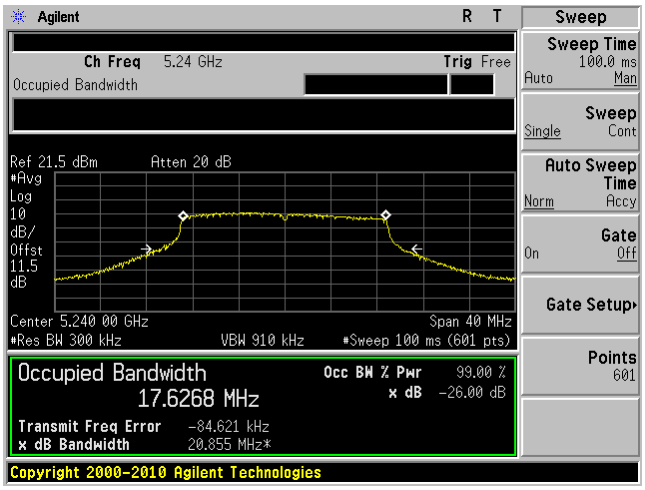
5240 MHz, n 20 mode, Low power, Chain 0



5240 MHz, n 20 mode, Low power, Chain 1

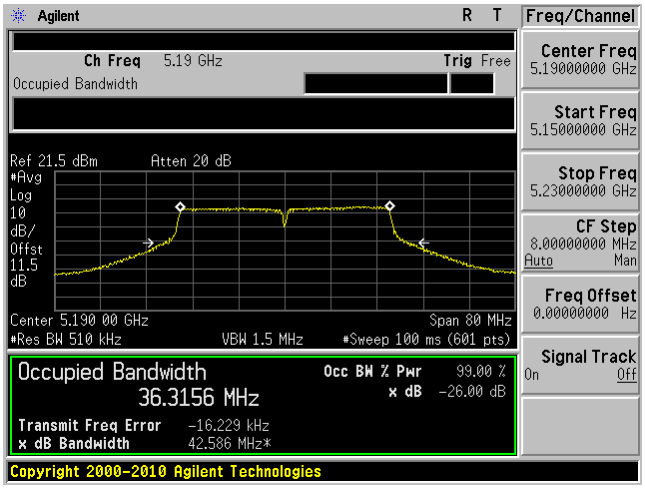


5240 MHz, n 20 mode, Low power, Chain 2

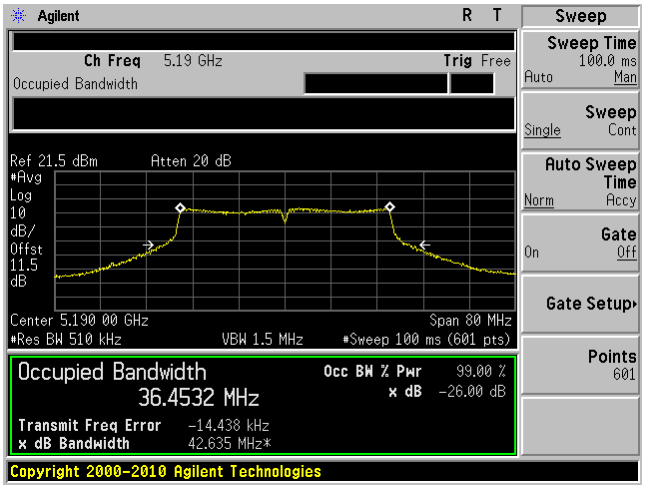


5150-5250 MHz

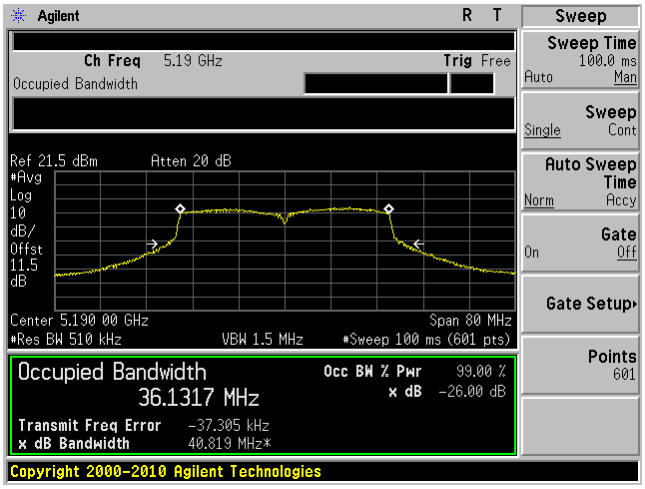
5190 MHz, n 40 mode, High power, Chain 0



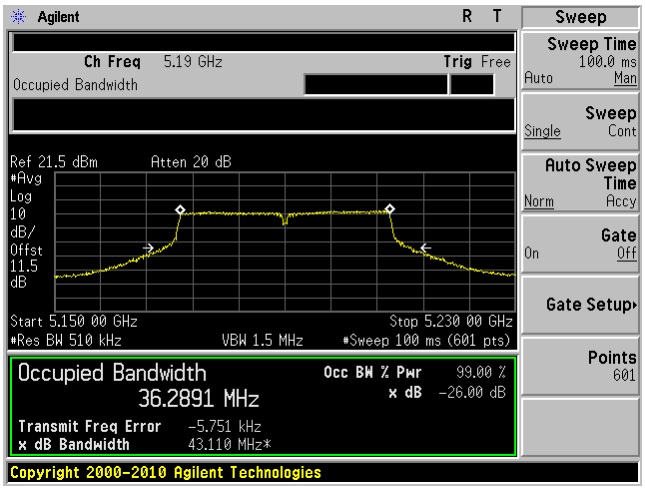
5190 MHz, n 40 mode, High power, Chain 1



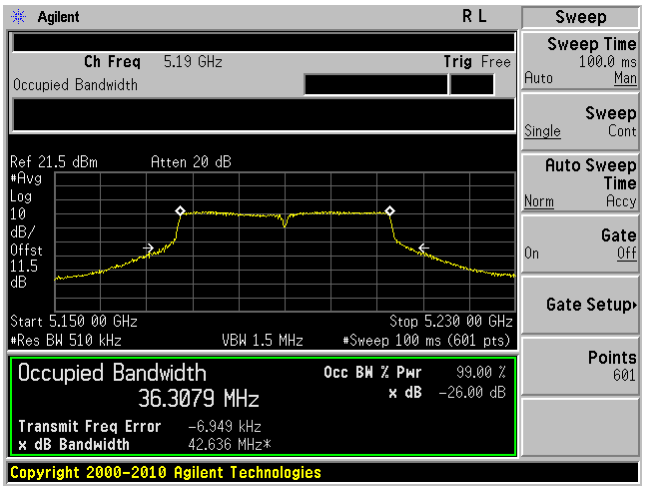
5190 MHz, n 40 mode, High power, Chain 2



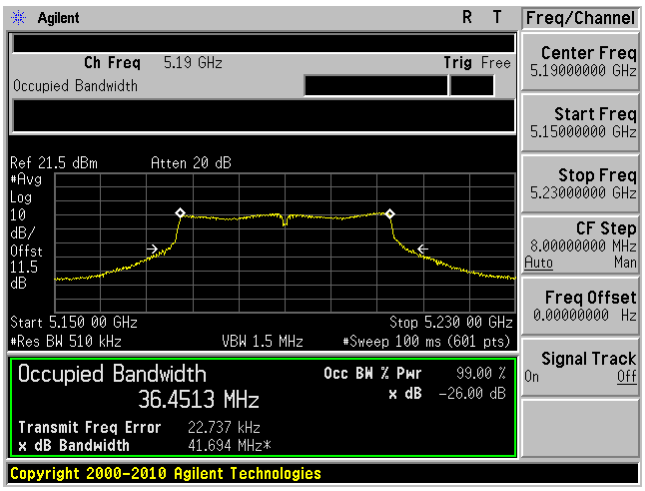
5190 MHz, n 40 mode, Low power, Chain 0



5190 MHz, n 40 mode, Low power, Chain 1

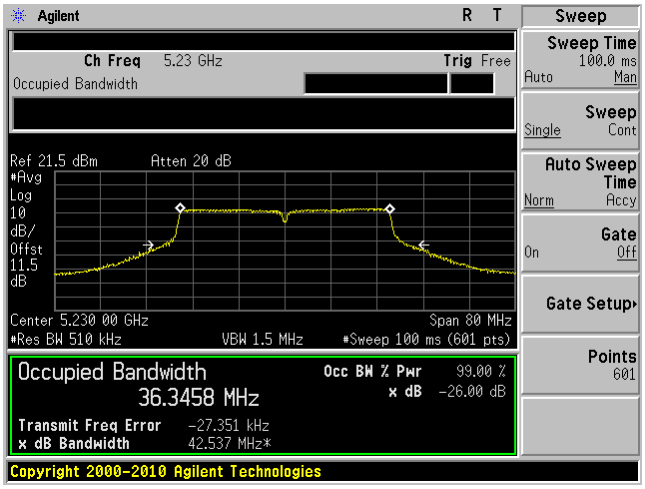


5190 MHz, n 40 mode, Low power, Chain 2

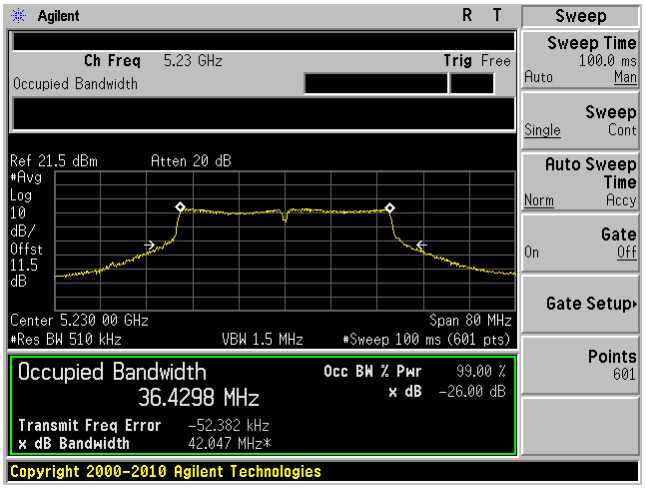


5150-5250 MHz

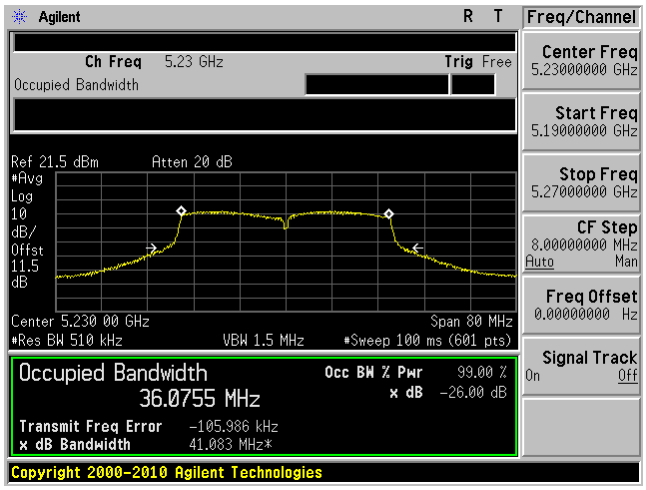
5230 MHz, n 40 mode, High power, Chain 0



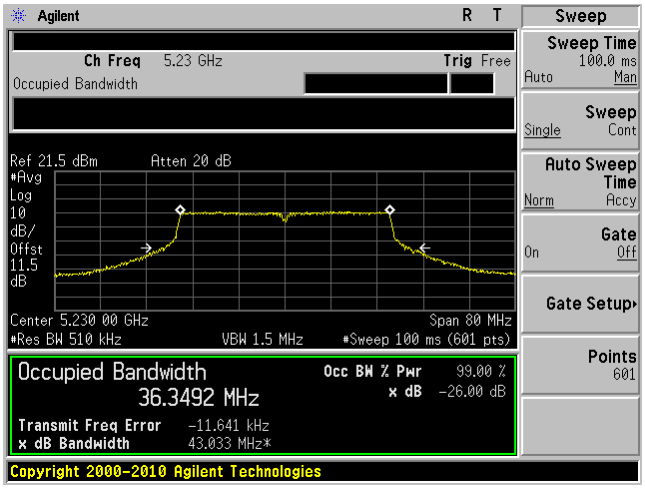
5230 MHz, n 40 mode, High power, Chain 1



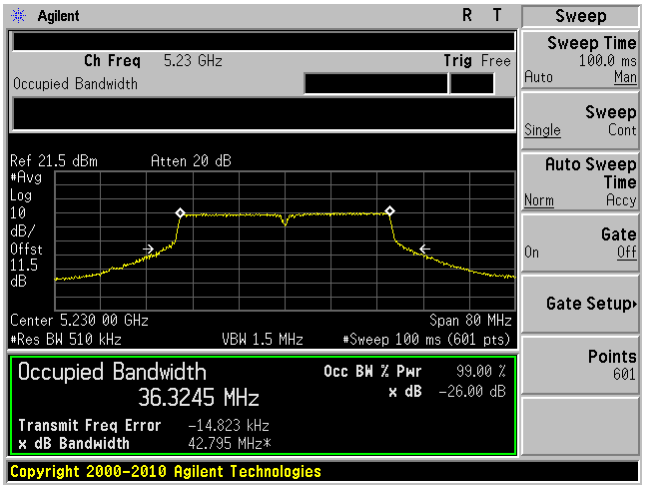
5230 MHz, n 40 mode, High power, Chain 2



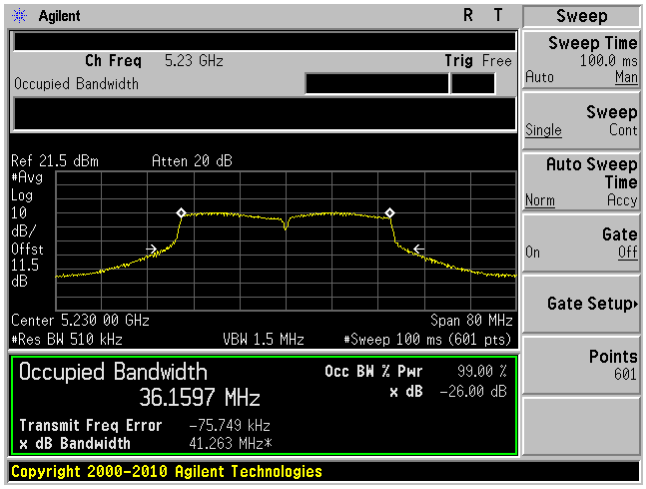
5230 MHz, n 40 mode, Low power, Chain 0



5230 MHz, n 40 mode, Low power, Chain 1



5230 MHz, n 40 mode, Low power, Chain 2



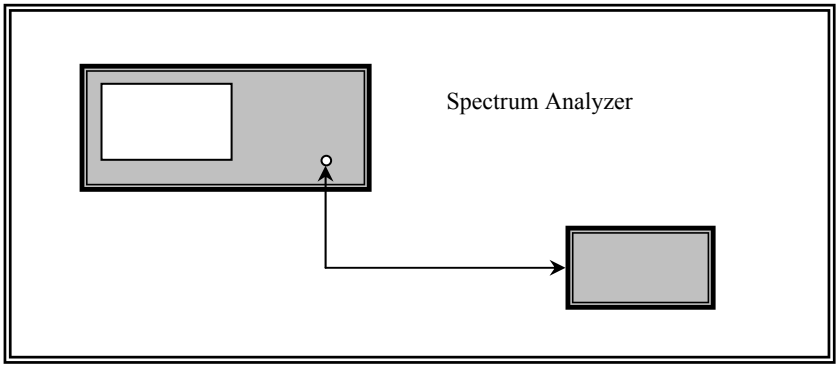
9 FCC §407(a) & IC RSS-210 §A9.2 - Peak Output Power

9.1 Applicable Standard

FCC §15.407(a) and IC RESS-210 §A9.2

9.2 Measurement Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a spectrum analyzer.
3. Add a correction factor to the display.



9.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

9.4 Test Environmental Conditions

Temperature:	23-25 °C
Relative Humidity:	35-50 %
ATM Pressure:	101-103kPa

The testing was performed by Ning Ma on 2011-11-07~ 2011-11-11 at RF Site.

9.5 Test Results

High power:

5.2 GHz Band, a mode

Antenna Gain 3 dBi

Channel	Frequency (MHz)	TX Chain 0 Power (dBm)	TX Chain 1 Power (dBm)	TX Chain 2 Power (dBm)	Worst Power (dBm))	Limit (dBm)	Margin (dB)
Low	5180	12.8	11.77	11.79	12.8	17	-4.2
Middle	5200	13	11.27	11.99	13.0	17	-4.0
High	5240	12.17	11.7	11.24	12.17	17	-4.83

5.2 GHz Band, n 20 mode

Antenna Gain 3 dBi

Channel	Frequency (MHz)	TX Chain 0 Power (dBm)	TX Chain 1 Power (dBm)	TX Chain 2 Power (dBm)	Total Power (dBm))	Limit (dBm)	Margin (dB)
Low	5180	11.64	11.02	10.86	15.96	17	-1.04
Middle	5200	12.01	10.57	10.53	15.86	17	-1.14
High	5240	12.03	10.67	10.25	15.81	17	-1.19

5.2 GHz Band, n 40mode

Antenna Gain 3 dBi

Channel	Frequency (MHz)	TX Chain 0 Power (dBm)	TX Chain 1 Power (dBm)	TX Chain 2 Power (dBm)	Total Power (dBm))	Limit (dBm)	Margin (dB)
Low	5190	11.97	10.89	10.56	15.95	17	-1.05
High	5230	11.62	11.18	10.24	15.82	17	-1.18

Low power:

5.2 GHz Band, a mode

Antenna Gain 7 dBi

Channel	Frequency (MHz)	TX Chain 0 Power (dBm)	TX Chain 1 Power (dBm)	TX Chain 2 Power (dBm)	Worst Power (dBm))	Limit (dBm)	Margin (dB)
Low	5180	12.21	9.83	9.57	12.21	16	-3.79
Middle	5200	10.54	9.77	8.93	10.54	16	-5.46
High	5240	10.17	9.2	8.91	10.17	16	-5.83

5.2 GHz Band, n 20 mode

Antenna Gain 7 dBi,

Channel	Frequency (MHz)	TX Chain 0 Power (dBm)	TX Chain 1 Power (dBm)	TX Chain 2 Power (dBm)	Total Power (dBm))	Limit (dBm)	Margin (dB)
Low	5180	10.06	9.18	8.5	14.06	16	-1.94
Middle	5200	10.37	9.34	8.73	14.3	16	-1.7
High	5240	9.58	9.04	8.4	13.8	16	-2.2

5.2 GHz Band, n 40mode

Antenna Gain 7 dBi

Channel	Frequency (MHz)	TX Chain 0 Power (dBm)	TX Chain 1 Power (dBm)	TX Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5190	10.44	9.63	9.21	14.56	16	-1.44
High	5230	9.65	8.62	8.23	13.64	16	-2.36

10 FCC §15.407(b) & IC RSS-210 §A9.2 – Out of Band Emissions

10.1 Applicable Standard

According to FCC §15.407(b) For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of –27 dBm/MHz in the 5.15–5.25 GHz band. For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.

According to Rss-210 §A9.2, Emissions outside the band 5150-5250 MHz shall not exceed -27 dBm/MHz e.i.r.p. Emissions outside the band 5250-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. Emissions outside the band 5470-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p.

10.2 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

10.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

10.4 Test Environmental Conditions

Temperature:	23-25 °C
Relative Humidity:	35-50 %
ATM Pressure:	101-103kPa

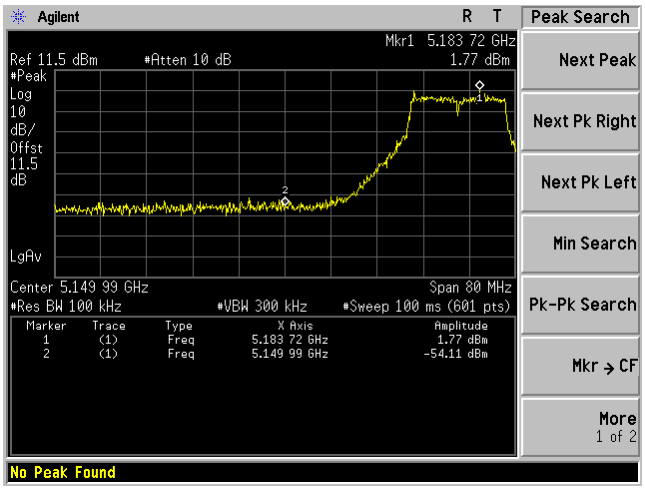
The testing was performed by Ning Ma on 2011-11-07~ 2011-11-11 at RF Site.

10.5 Test Results

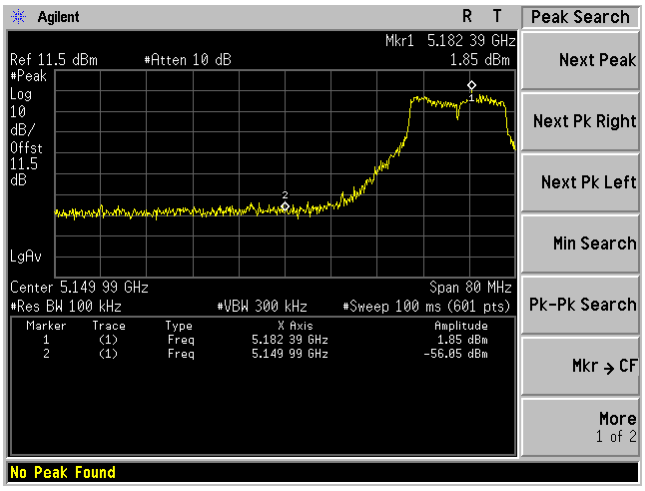
Please refer to following pages for plots of band edge.

5150-5250 MHz High Power Only

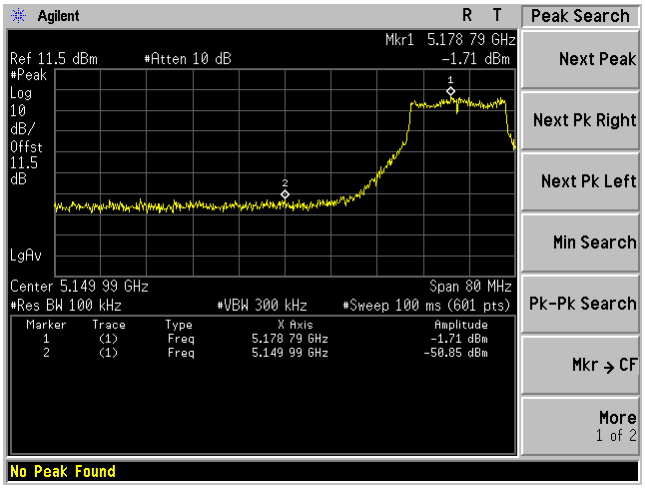
802.11 a mode, High power, Chain 0



802.11 a mode, High power, Chain 1

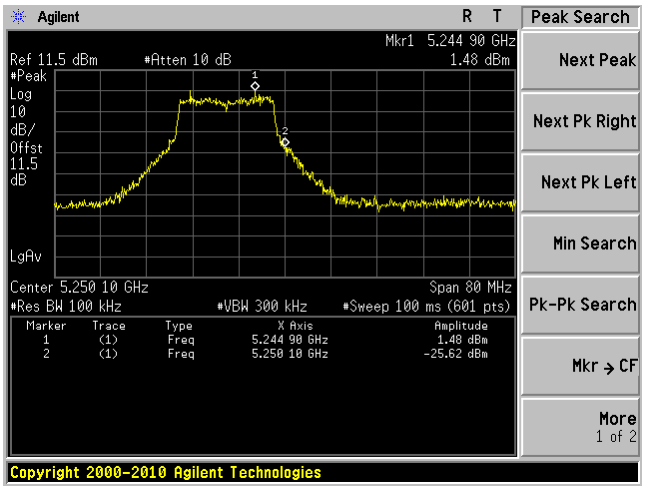


802.11 a mode, High power, Chain 2

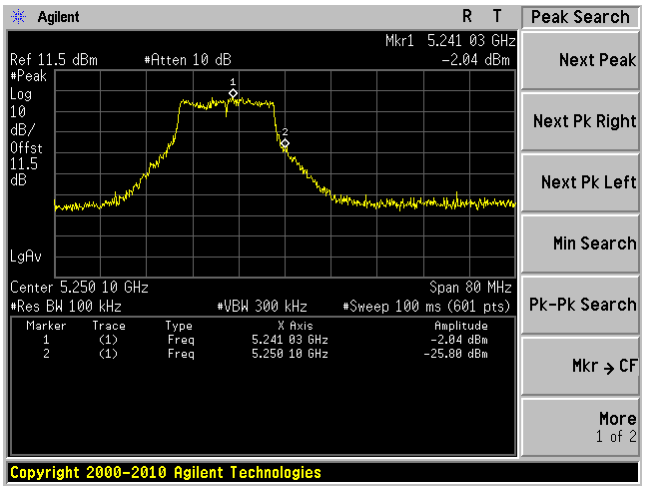


5150-5250 MHz

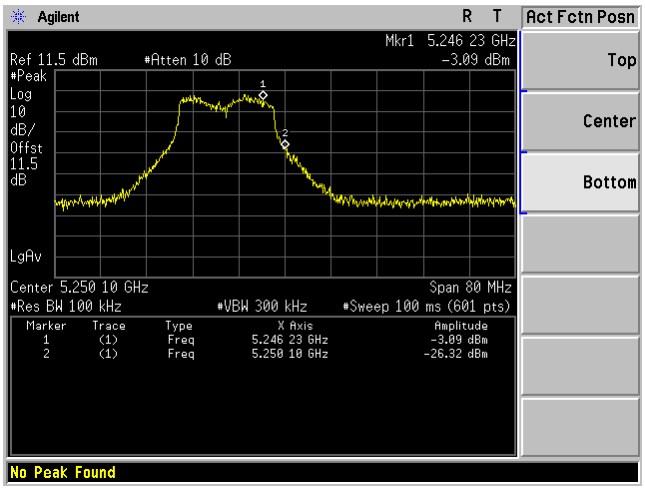
802.11 a mode, High power, Chain 0



802.11 a mode, High power, Chain 1

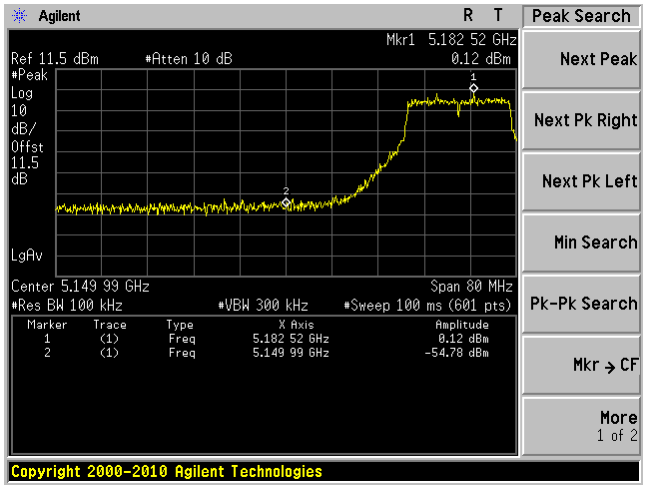


802.11 a mode, High power, Chain 2

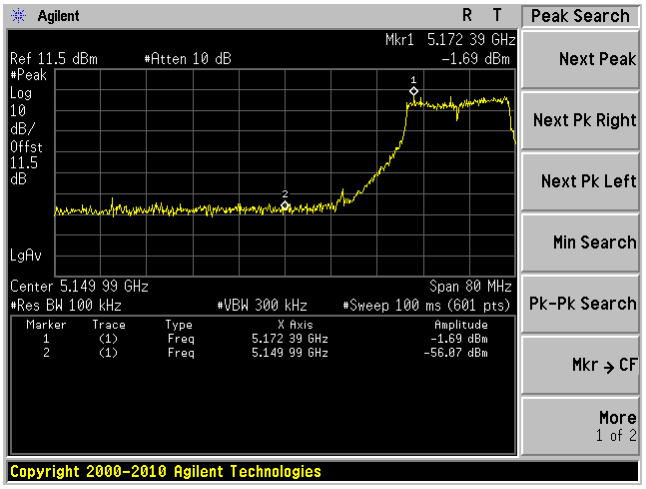


5150-5250 MHz

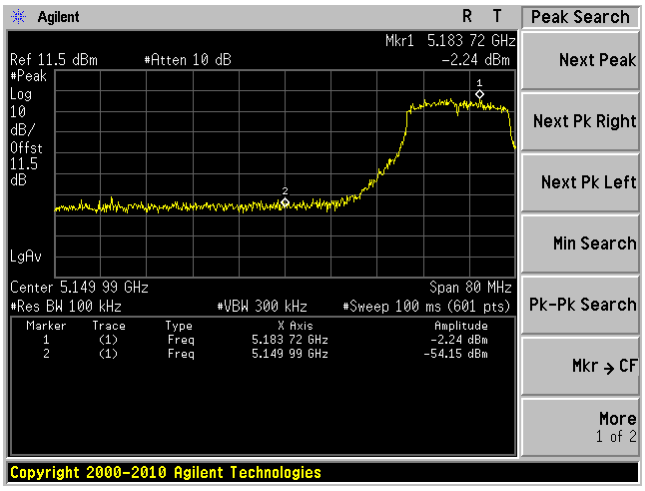
802.11 n 20 mode, High power, Chain 0



802.11 n 20 mode, High power, Chain 1

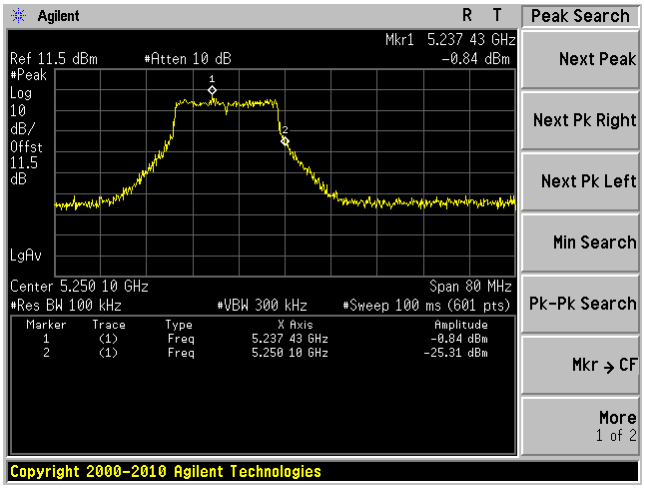


802.11 n 20 mode, High power, Chain 2

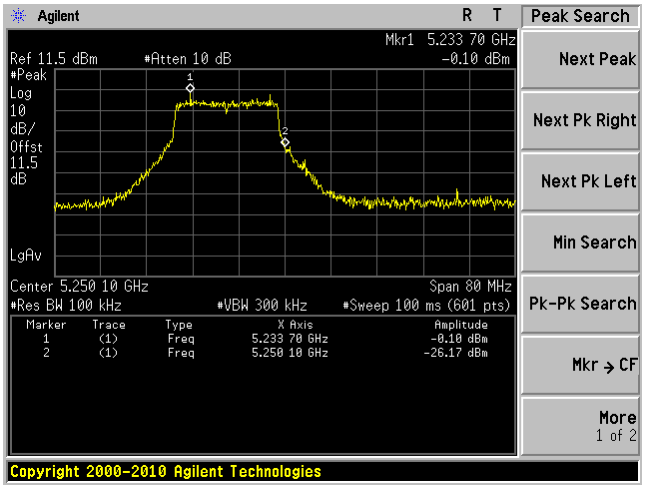


5150-5250 MHz

802.11 n 20 mode, High power, Chain 0



802.11 n 20 mode, High power, Chain 1



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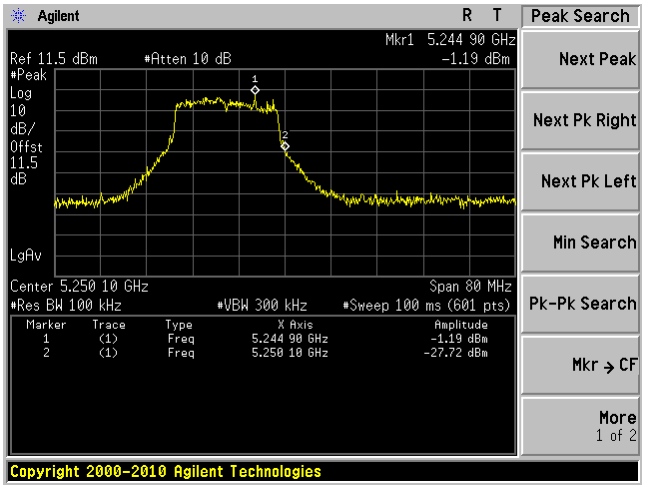
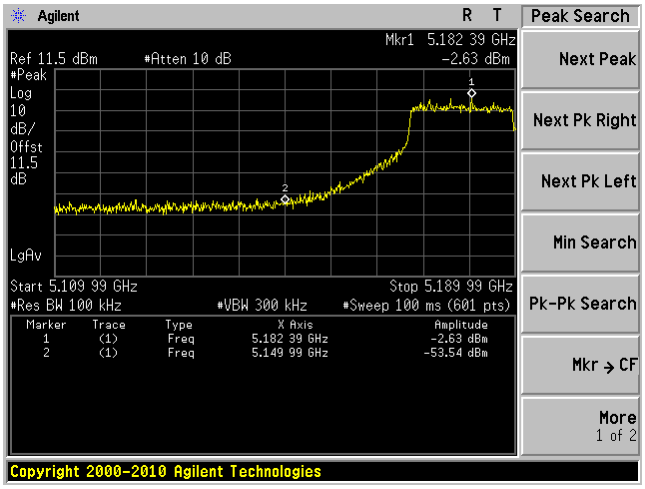
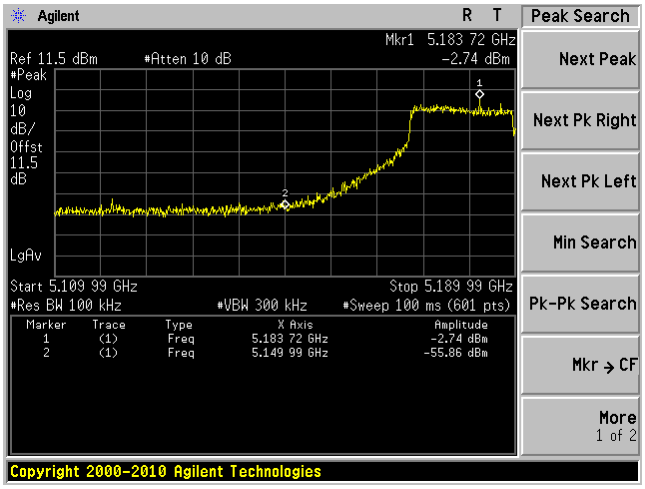


5150-5250 MHz

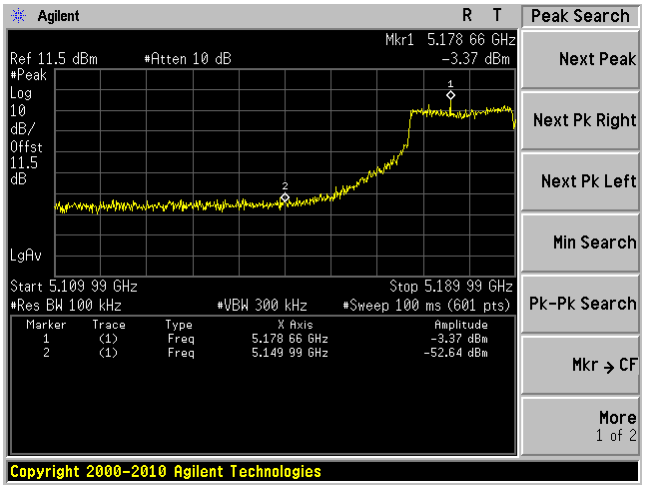
802.11 n 40 mode, High power, Chain 0



802.11 n 40 mode, High power, Chain 1

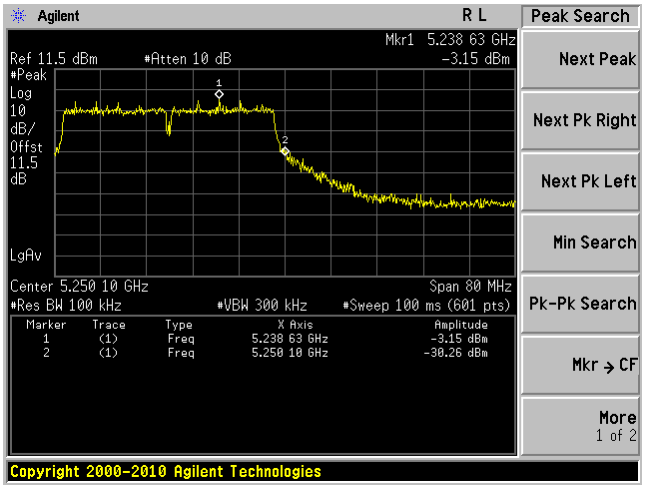


802.11 n 40 mode, High power, Chain 2

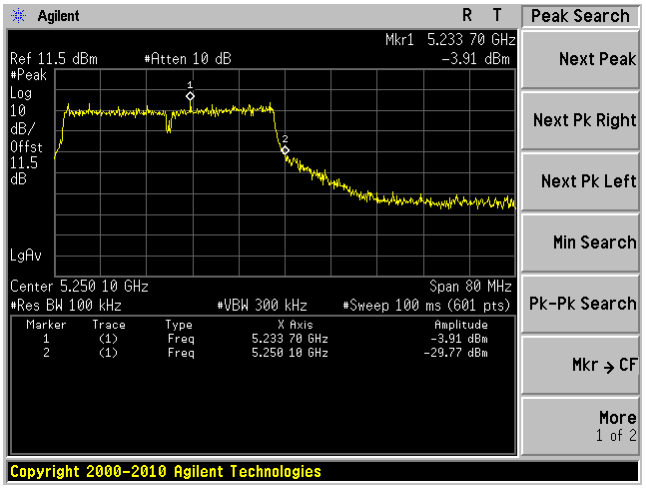


5150-5250 MHz

802.11 n 40 mode, High power, Chain 0



802.11 n 40 mode, High power, Chain 1



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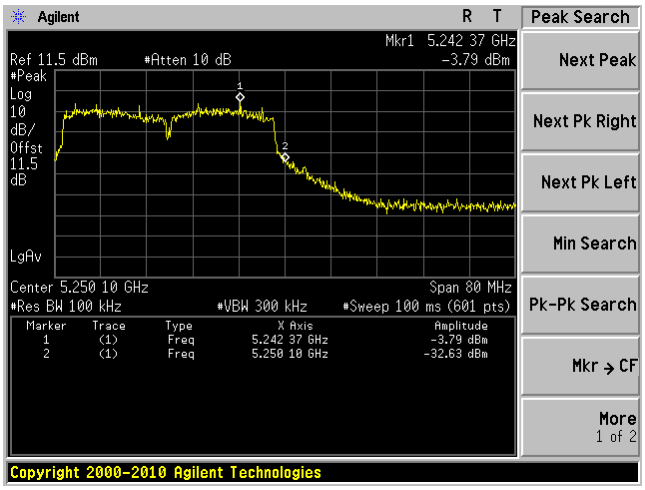


11 FCC §15.407(a) & IC RSS-210 §A9.2 - Power Spectral Density

11.1 Applicable Standard

According to FCC §15.407(a) and UC RSS-210 §A9.2

(1) For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak 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 conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak 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, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

11.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to 1.5MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Repeat above procedures until all frequencies measured were complete.

11.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

11.4 Test Environmental Conditions

Temperature:	23-25 °C
Relative Humidity:	35-50 %
ATM Pressure:	101-103kPa

The testing was performed by Ning Ma on 2011-11-14~ 2011-11-19 at RF Site.

11.5 Test Results

5150-5250 MHz High Power:

802.11 a mode

Channel	Frequency (MHz)	Chain 1 PSD (dBm)	Chain 2 PDS (dBm))	Chain 3 PSD (dBm)	Worst PSD (dBm))	Limit (dBm/MHz)	Margin (dB)
Low	5180	0.043	-0.794	-0.292	0.04	4.0	-3.96
Middle	5200	-1.596	-0.555	-0.703	-0.56	4.0	-3.54
High	5240	-0.608	-1.324	-0.847	-0.61	4.0	-3.61

802.11n HT20 mode

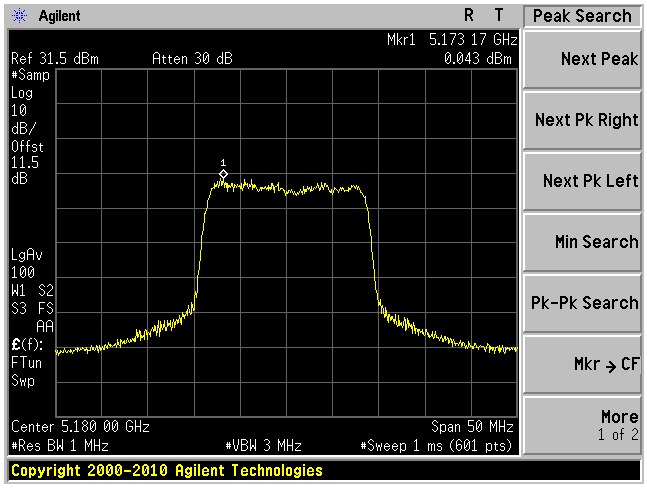
Channel	Frequency (MHz)	Chain 1 PSD (dBm)	Chain 2 PDS (dBm))	Chain 3 PSD (dBm)	Total PSD (dBm))	Limit (dBm/MHz)	Margin (dB)
Low	5180	-1.757	-0.87	-2.925	3.00	4.0	-1.00
Middle	5200	-1.452	-2.119	0.074	3.71	4.0	-0.29
High	5240	-1.928	-2.943	-2.737	2.25	4.0	-1.75

802.11n HT40 mode

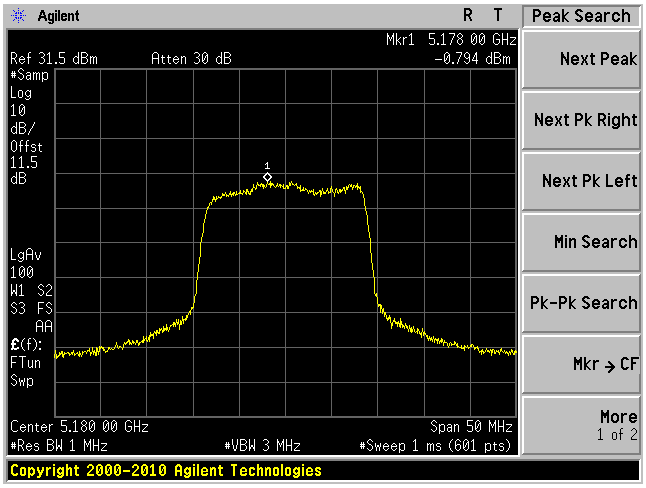
Channel	Frequency (MHz)	Chain 1 PSD (dBm)	Chain 2 PDS (dBm))	Chain 3 PSD (dBm)	Total PSD (dBm))	Limit (dBm/MHz)	Margin (dB)
Low	5190	-4.661	-5.385	-5.458	-0.38	4.0	-4.38
High	5230	-6.685	-6.685	-5.998	-1.67	4.0	-5.67

5150MHz-5250MHz, High Power Only

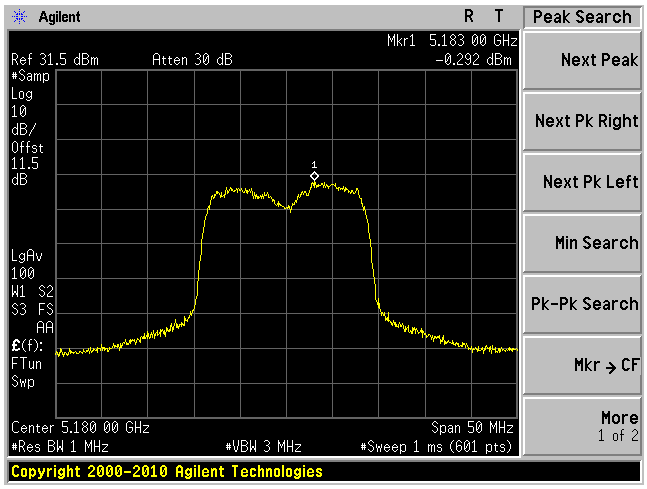
802.11 a mode, Low channel, Chain 0



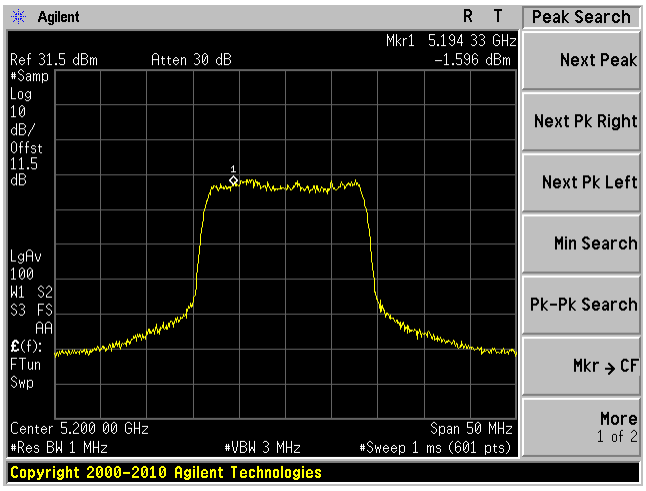
802.11 a mode, Low channel, Chain 1



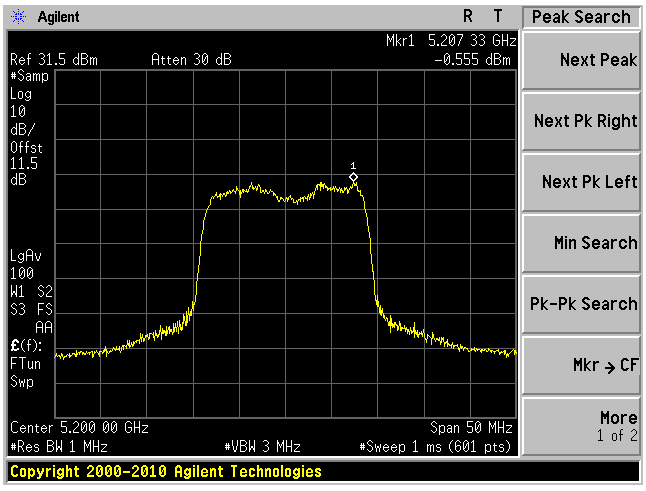
802.11 a mode, Low channel, Chain 2



802.11 a mode, Middle channel, Chain 0



802.11 a mode, Middle channel, Chain 1



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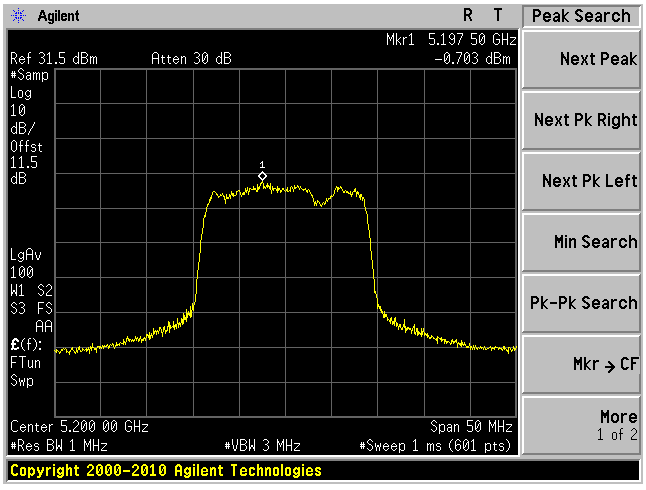
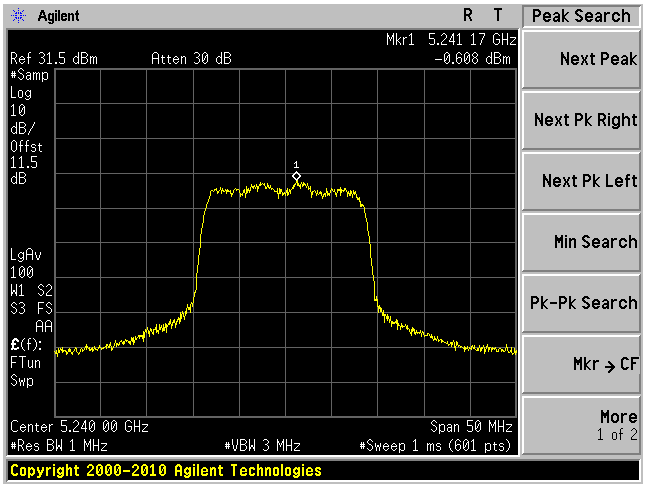
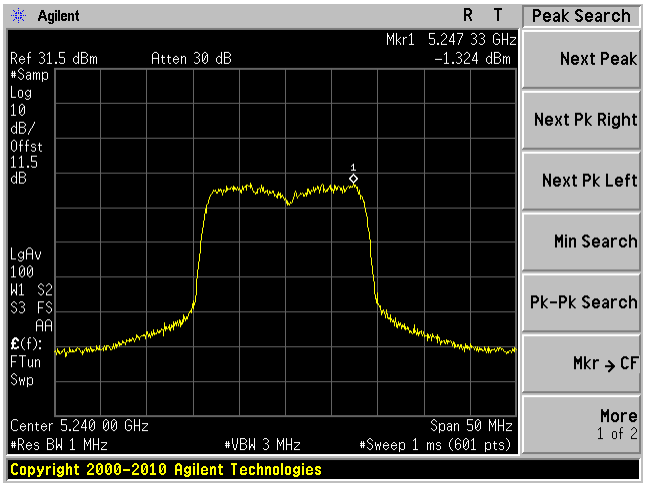


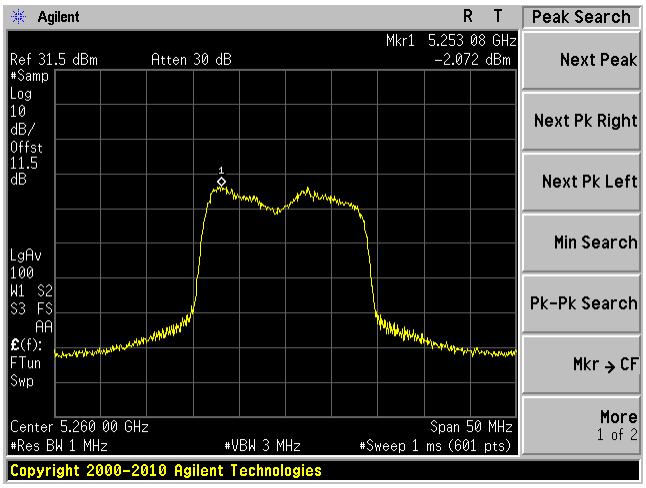
802.11 a mode, High channel, Chain 0



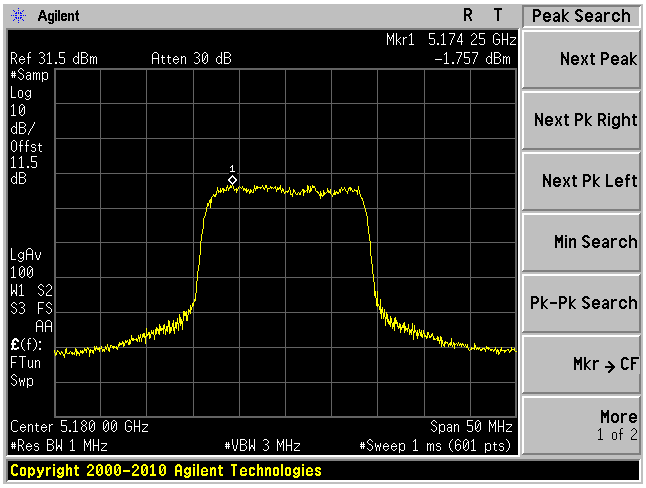
802.11 a mode, High channel, Chain 1



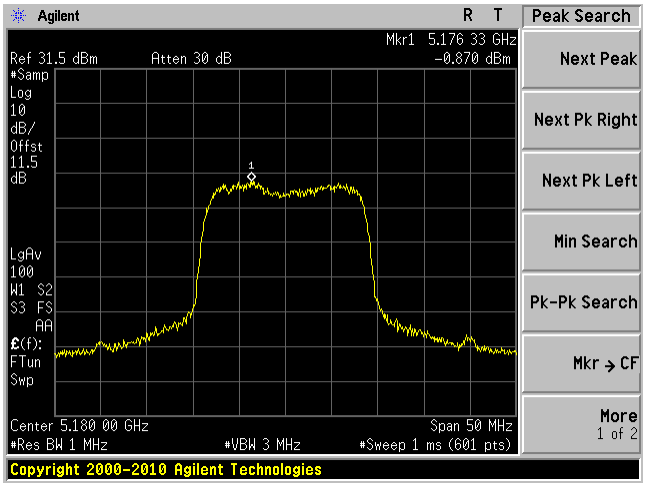
802.11 a mode, High channel, Chain 2



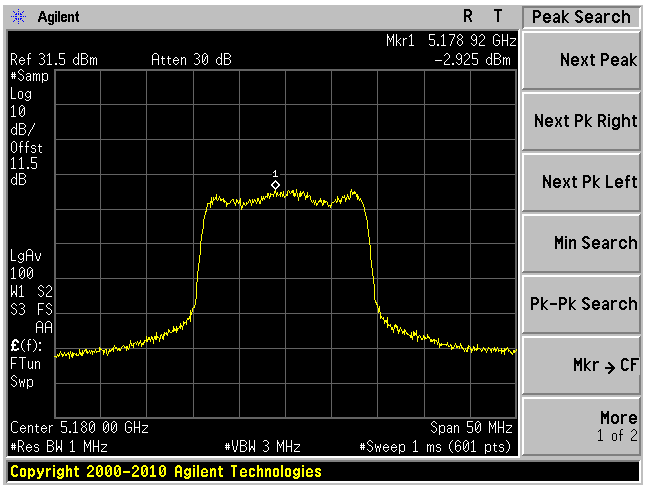
802.11 n20 mode, Low channel, Chain 0



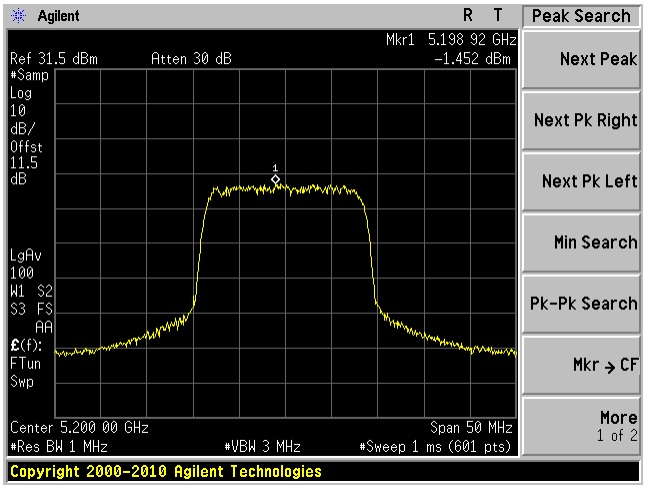
802.11 n20 mode, Low channel, Chain 1



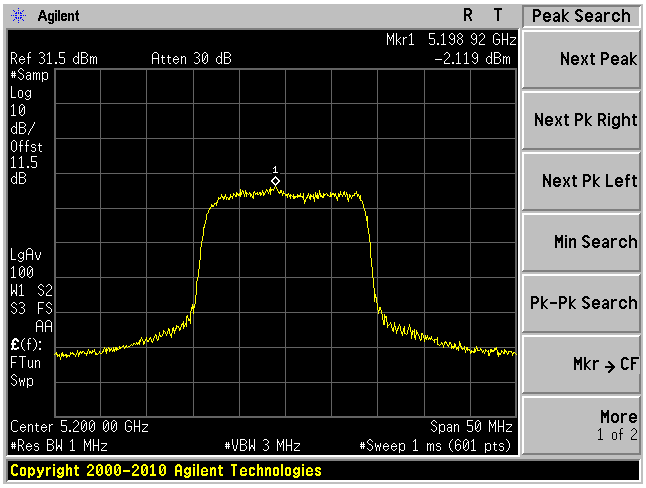
802.11 n20 mode, Low channel, Chain 2



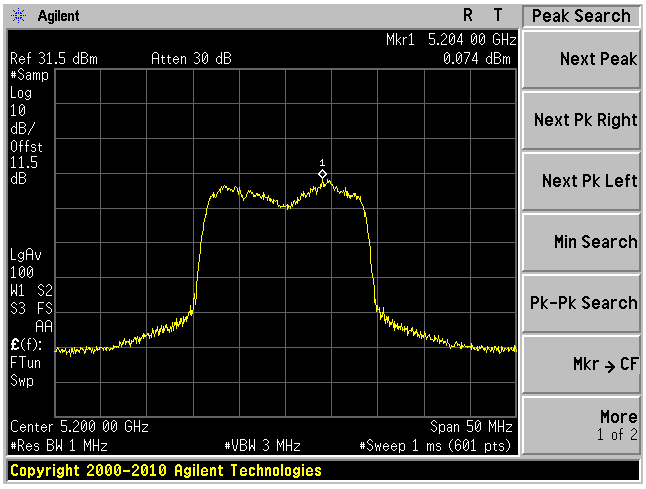
802.11 n20 mode, Middle Channel, Chain 0



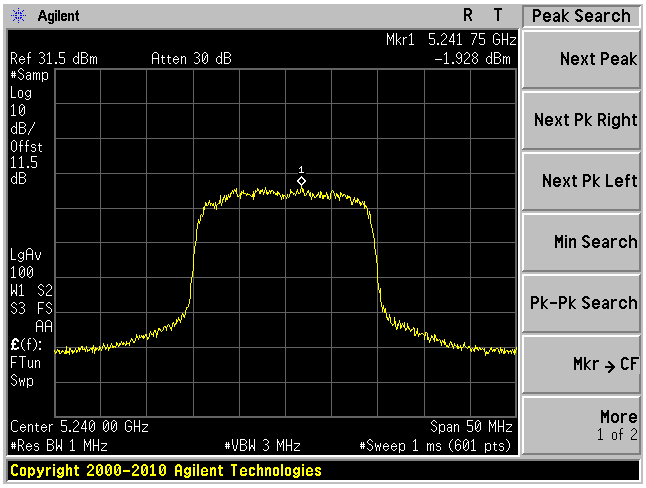
802.11 n20 mode, Middle Channel, Chain 1



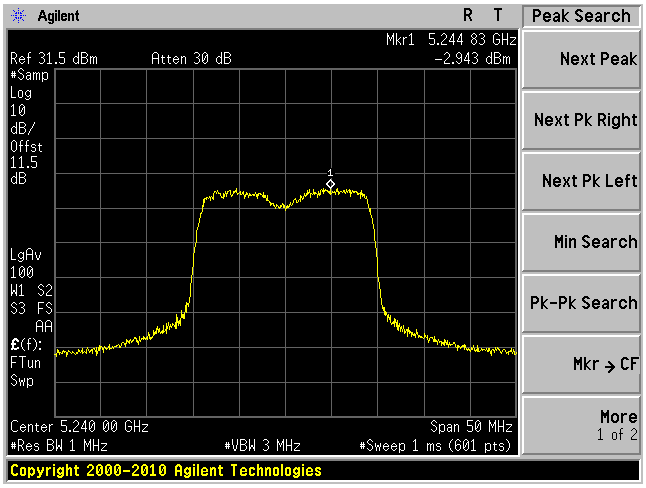
802.11 n20 mode, Middle Channel, Chain 2



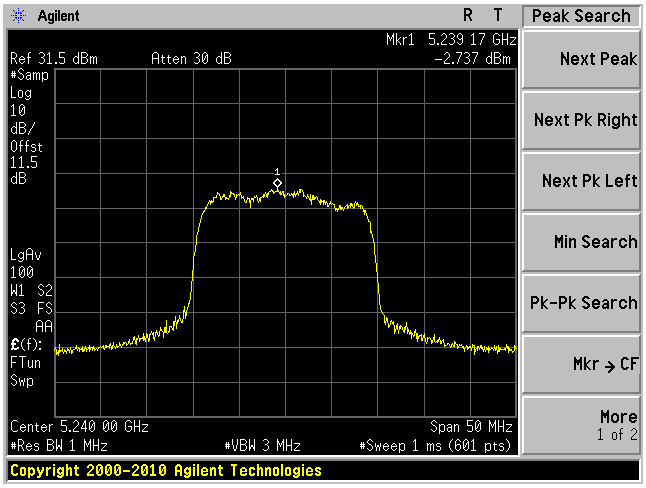
802.11 n20 mode, High Channel, Chain 0



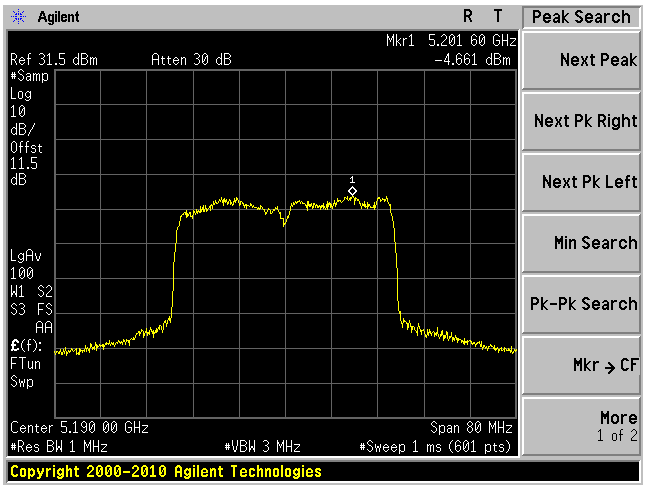
802.11 n20 mode, High Channel, Chain 1



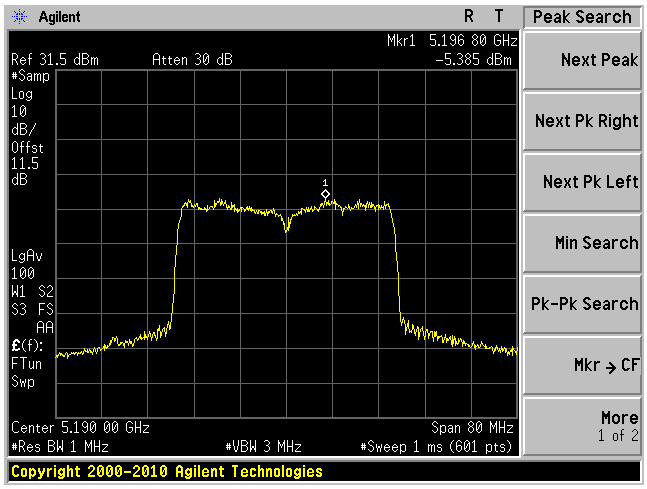
802.11 n20 mode, High Channel, Chain 2



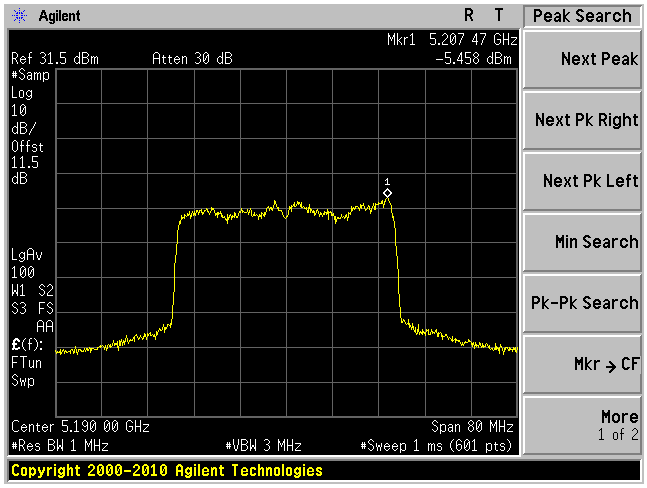
802.11 n40 mode, Low Channel, Chain 0



802.11 n40 mode, Low Channel, Chain 1



802.11 n40 mode, Low Channel, Chain 2



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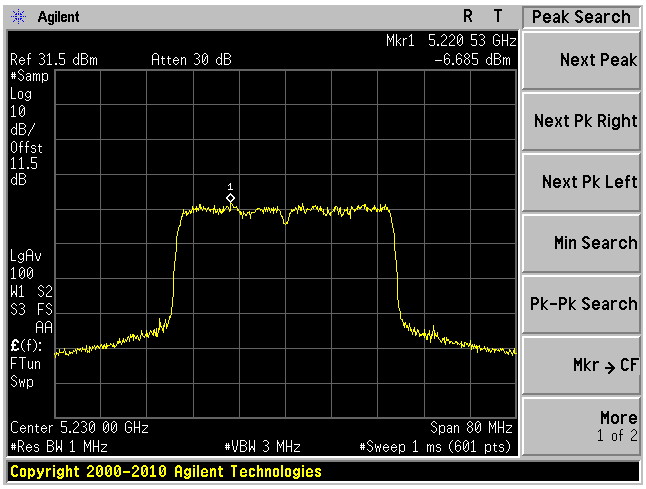
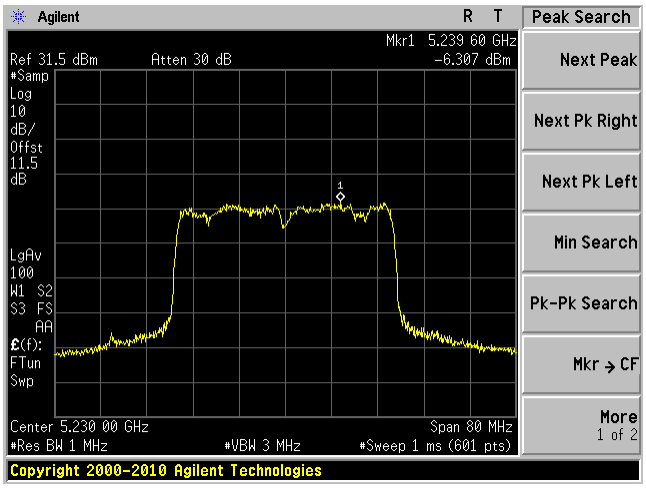
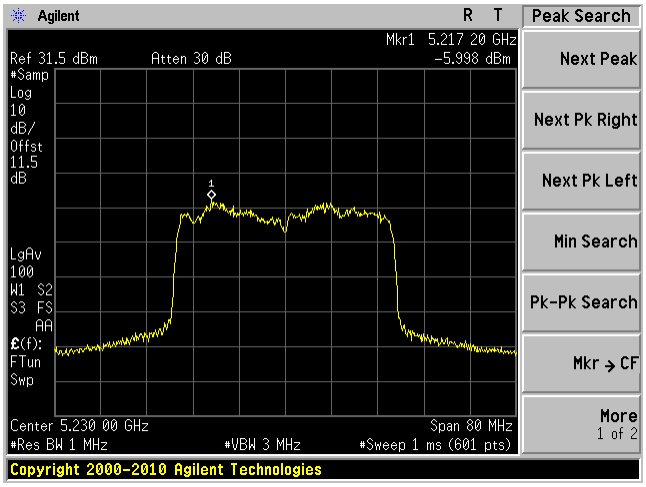


802.11 n40 mode, High Channel, Chain 1



802.11 n40 mode, High Channel, Chain 2



12 IC RSS-210 §2.6 & RSS-Gen §6 - Receiver Spurious Radiated Emissions

12.1 Applicable Standard

According to RSS-Gen §4.10, The receiver shall be operated in the normal receive mode near the mid-point of the band over which the receiver is designed to operate.

Unless otherwise specified in the applicable RSS, the radiated emission measurement is the standard measurement method (with the device's antenna in place) to measure receiver spurious emissions.

Radiated emission measurements are to be performed using a calibrated open-area test site.

For either method, the search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is the higher, to at least 3 times the highest tuneable or local oscillator frequency, whichever is the higher, without exceeding 40 GHz.

For emissions below 1 GHz, measurements shall be performed using a CISPR quasi-peak detector and the related measurement bandwidth. As an alternative to CISPR quasi-peak measurement, compliance with the emission limit can be demonstrated using measuring equipment employing a peak detector with the same measurement bandwidth as that for CISPR quasi-peak measurements. Above 1 GHz, measurements shall be performed using an average detector and a resolution bandwidth of 300 kHz to 1 MHz.

According to RSS-210 §2.6, Tables 2 and 3 show the general field strength limits of unwanted emissions, where applicable, for transmitters and receivers operating in accordance with the provisions specified in this RSS. Transmitters whose wanted emissions are also within the limits shown in Tables 2 and 3 may operate in any of the frequency bands of Tables 2 and 3, other than the restricted bands of Table 1 and the TV bands, and shall be certified under RSS-210.

Table 2: General Field Strength Limits for Transmitters and Receivers at Frequencies above 30 MHz **(Note)**

Frequency (MHz)	Field Strength Microvolts/m at 3 meters (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Note: Transmitting devices are not permitted in Table 1 bands or in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz, and 614-806 MHz). Prohibition of operation in TV bands does not apply to momentary devices, or to medical telemetry devices in the band 174-216 MHz, and to perimeter protection systems in the bands 54-72 and 76-88 MHz. The perimeter protection devices are to meet Table 3 field strengths limits.

Table 3: General Field Strength Limits for Transmitters at Frequencies below 30 MHz (Transmit)

Frequency (fundamental or spurious)	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/377F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Note: The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing an average detector.

12.2 EUT Setup

The radiated emissions tests were performed in the 3 meter chamber, using the setup in accordance with ANSI C63.4-2009.

12.3 Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations.

All data were recorded in the peak detection mode. Quasi-peak readings was performed only when an emissions was found to be marginal (within -4 dB of specification limits), and are distinguished with a "**QP**" in the data table.

12.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = Ai + AF + CL + Atten – Ga$$

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

$$Margin = Corrected\ Amplitude - Limit$$

12.5 Test Equipment Lists and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2011-03-21
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
Sunol Science Corp	Combination Antenna	JB3	A0020106-3	2011-06-29
A.R.A Inc	Horn antenna	DRG-1181A	1132	2010-11-29
Hewlett Packard	Pre amplifier	8447D	2944A06639	2011-06-09
Mini-Circuits	Pre Amplifier	ZVA-183-S	570400946	2011-05-09

Statement of Traceability: BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

12.6 Test Environmental Conditions

Temperature:	18~21 °C
Relative Humidity:	30~35 %
ATM Pressure:	101.2-102.2kPa

The testing was performed by Ning Ma from 2011-11-18 to 2011-11-22.

12.7 Summary of Test Results

According to the test data,, the EUT complied with the with the RSS-210/RSS-Gen, with the closest margins from the limit listed below:

30-1000 MHz:

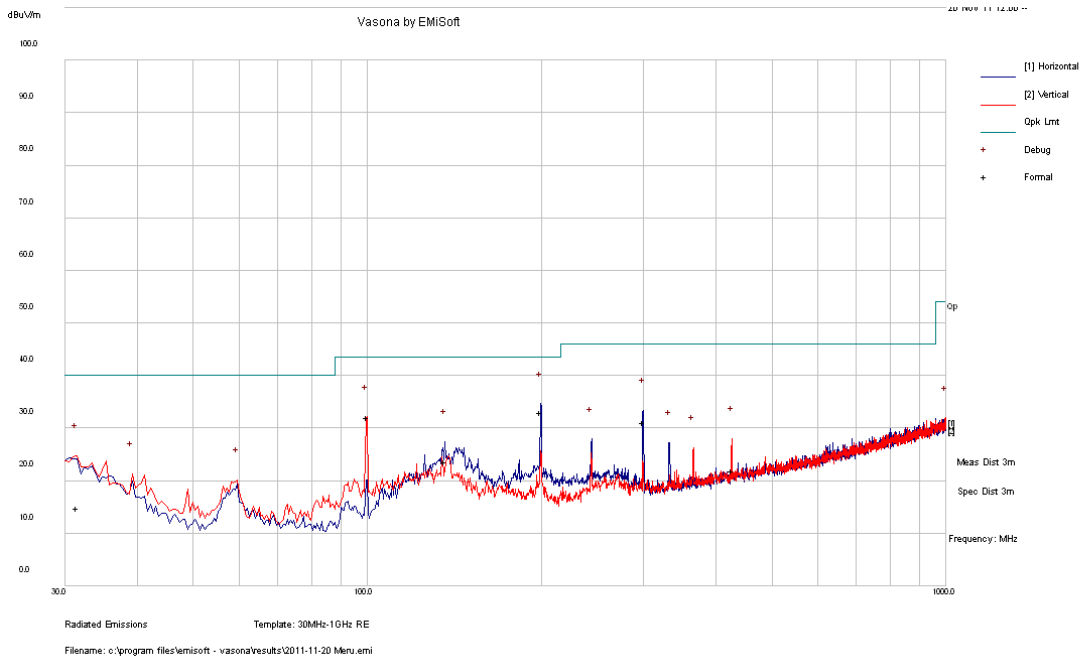
Mode: Receiving			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Range (MHz)**
-5.31	499.991	Vertical	30 to 1000

Above 1GHz:

Mode: Receiving			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Range (MHz)**
-12.087	1395	vertical	1-13GHz

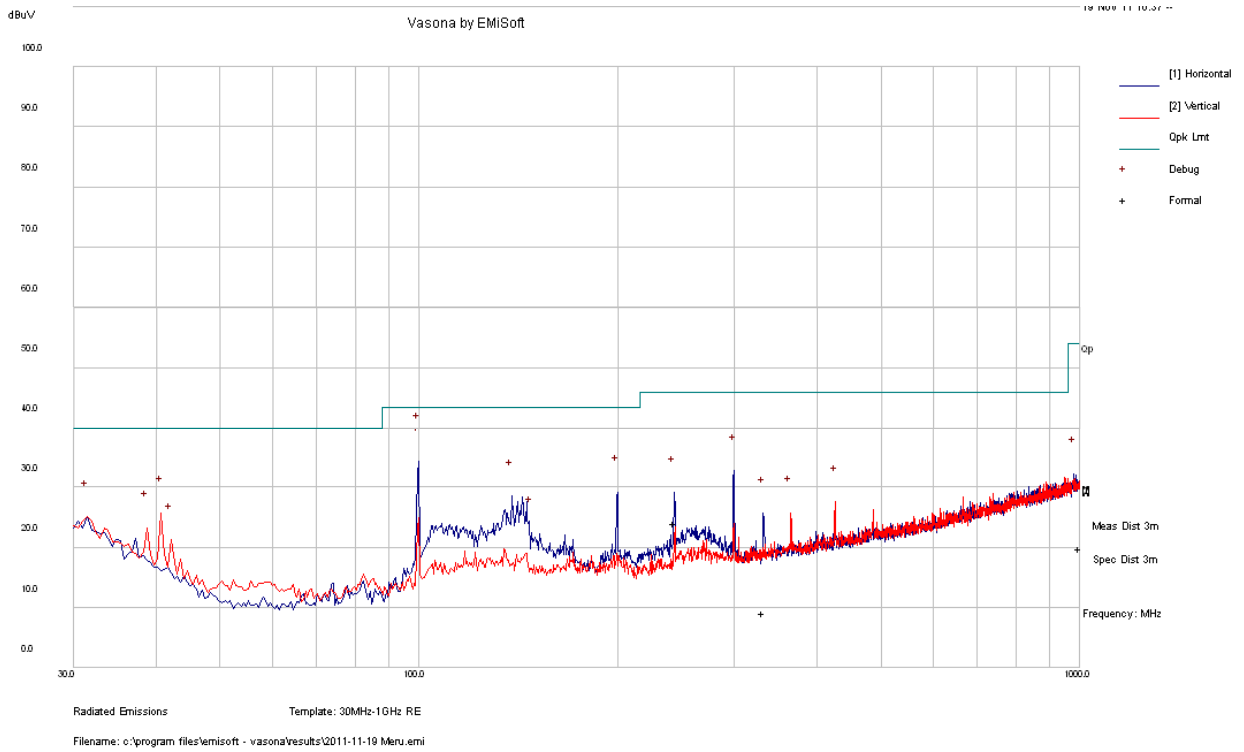
Radiated Emission at 3 meters, 30 MHz -1GHz

5.2 GHz Band, 7 dBi Antenna



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
199.8518	35.79	159	H	185	43.5	-7.71
134.496	26.11	162	H	223	43.5	-17.39
99.715	23.42	142	V	259	43.5	-20.08
243.7588	24.29	109	H	241	46	-21.71
31.59725	14.73	115	V	215	40	-25.27
201.6878	18.08	177	H	360	43.5	-25.42

5.2 GHz Band, 5 dBi Antenna



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
99.93025	36.06	166	H	216	43.5	-7.44
199.8448	27.17	173	H	188	43.5	-16.33
299.797	29.01	99	H	128	46	-16.99
138.2793	22.41	154	H	211	43.5	-21.09
40.458	8.42	131	V	313	40	-31.58
978.0895	19.72	185	H	34	54	-34.28

13 FCC §15.407(b) & IC RSS-210 §A9.2 - Spurious Emissions at Antenna Terminals

13.1 Applicable Standard

For FCC §15.407(b) and IC RSS-210 §A9.2, For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of –27 dBm/MHz in the 5.15–5.25 GHz band. For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.

13.2 Test Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

13.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

13.4 Test Environmental Conditions

Temperature:	23-25 °C
Relative Humidity:	35-50 %
ATM Pressure:	101-103kPa

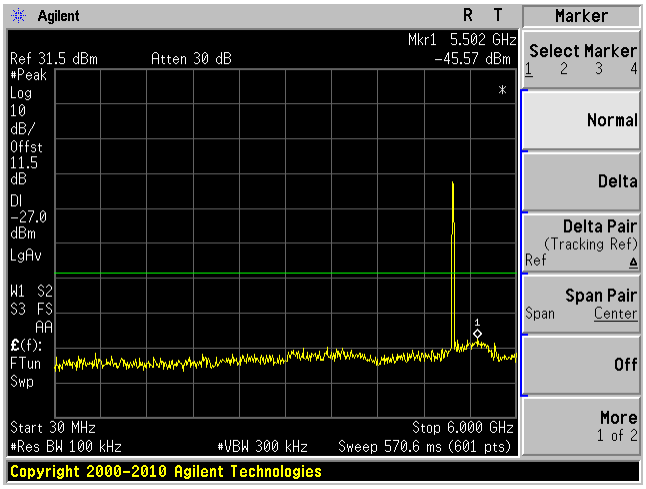
The testing was performed by Ning Ma on 2011-11-11~ 2011-11-12 at RF Site.

13.5 Test Results

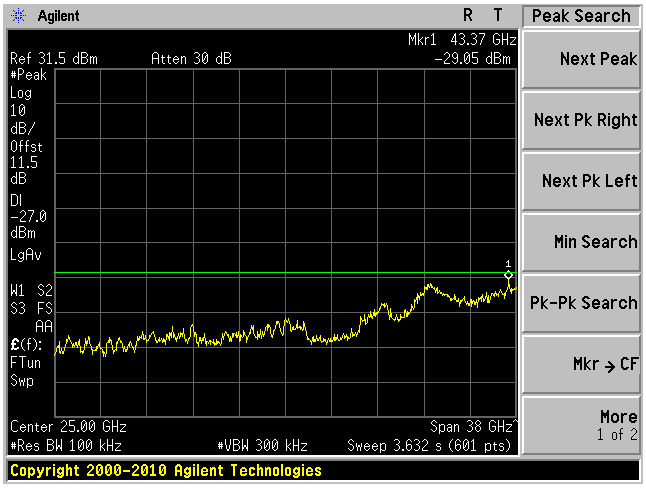
Please refer to following plots of spurious emissions.

5250z-5350 MHz, High Power Only

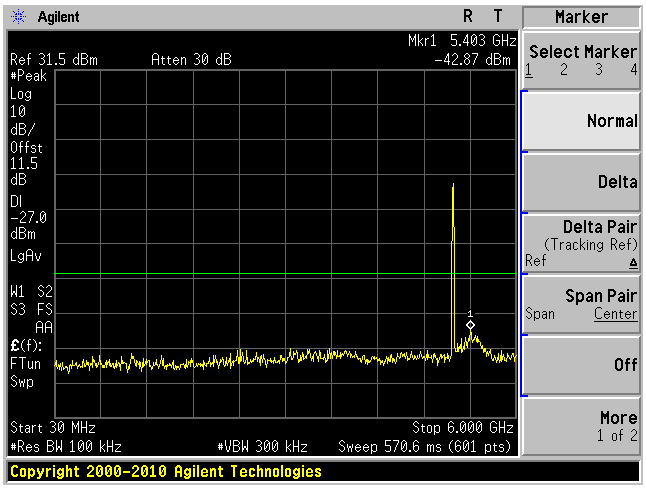
802.11 a mode, Low channel, Chain 0
30MHz – 6GHz



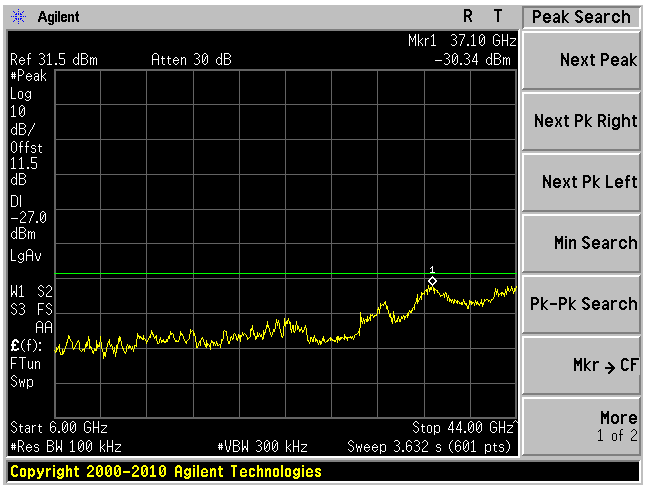
802.11 a mode, Low channel, Chain 0
6G – 38 GHz



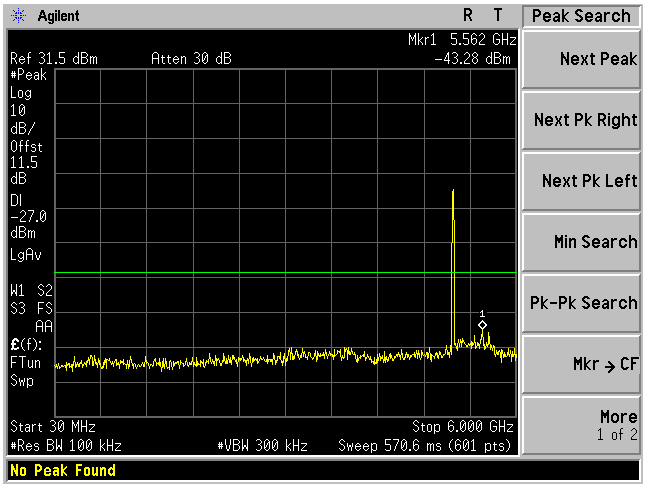
802.11 a mode, Low channel, Chain 1
30MHz – 6 GHz



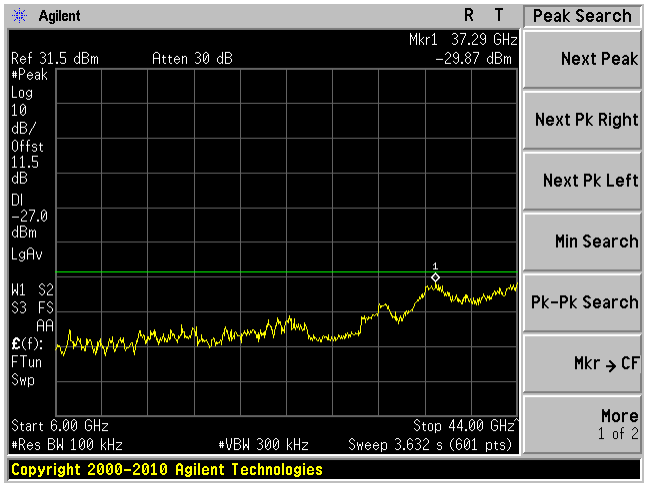
802.11 a mode, Low channel, Chain 1
6G – 44 GHz



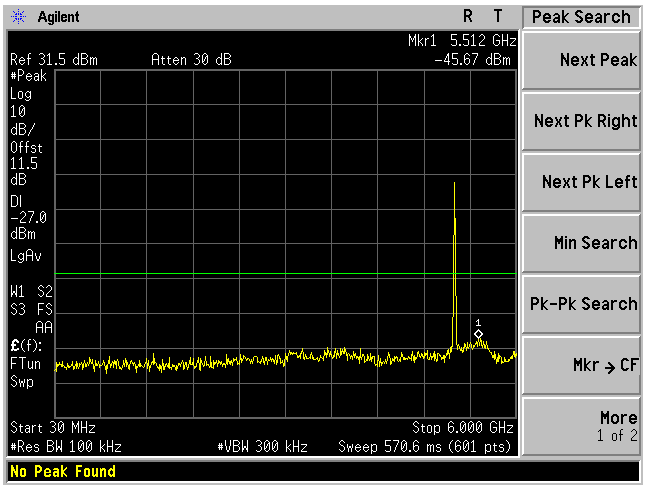
802.11 a mode, Low channel, Chain 2
30MHz – 6GHz



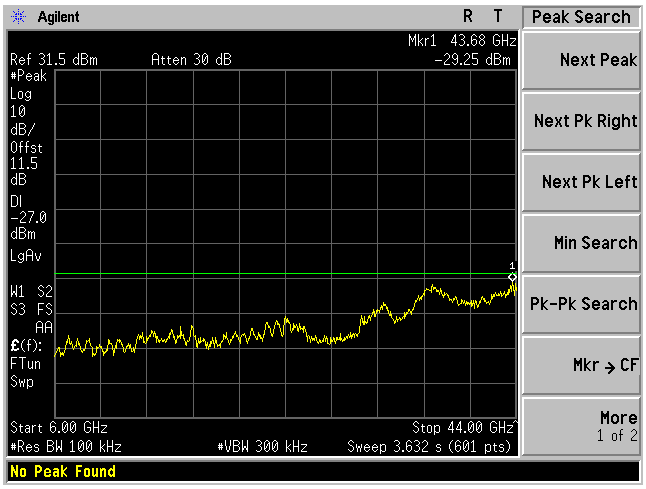
802.11 a mode, Low channel, Chain 2
6G – 44 GHz



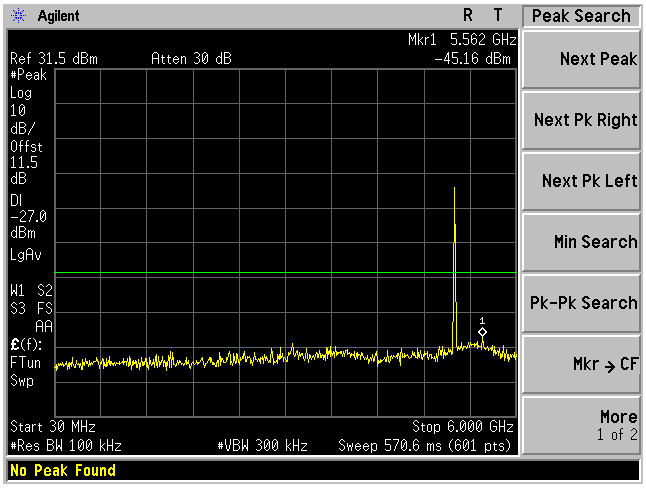
802.11 a mode, Middle channel, Chain 0
30MHz – 6GHz



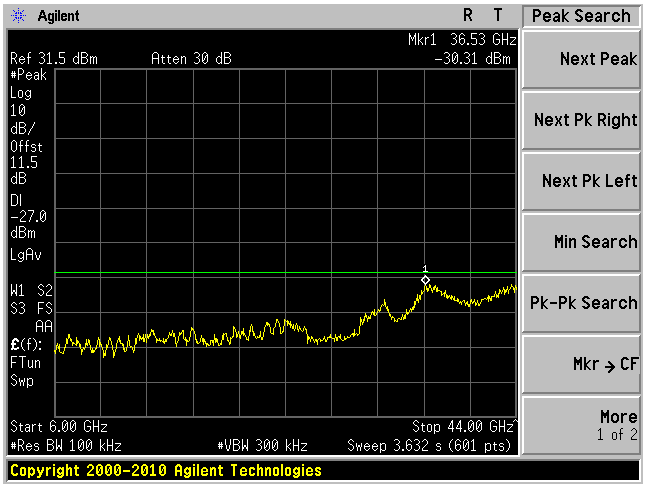
802.11 a mode, Middle channel, Chain 0
6G – 44 GHz



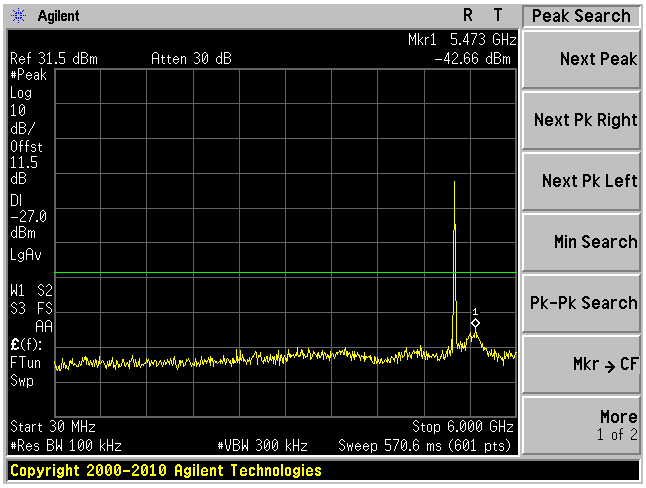
802.11 a mode, Middle channel, Chain 1
30MHz – 6GHz



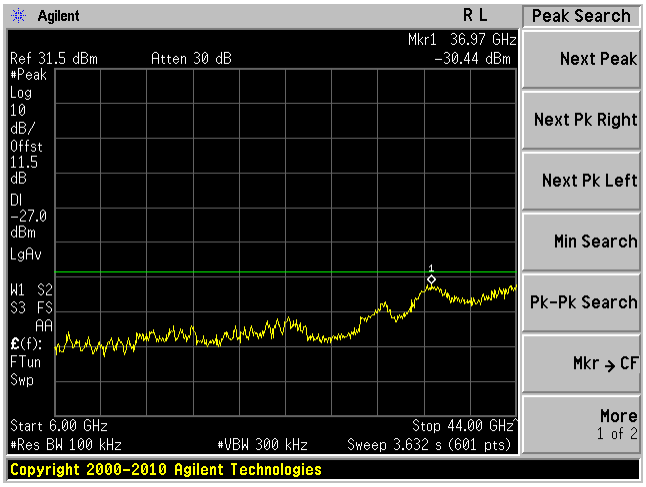
802.11 a mode, Middle channel, Chain 1
6G – 44 GHz



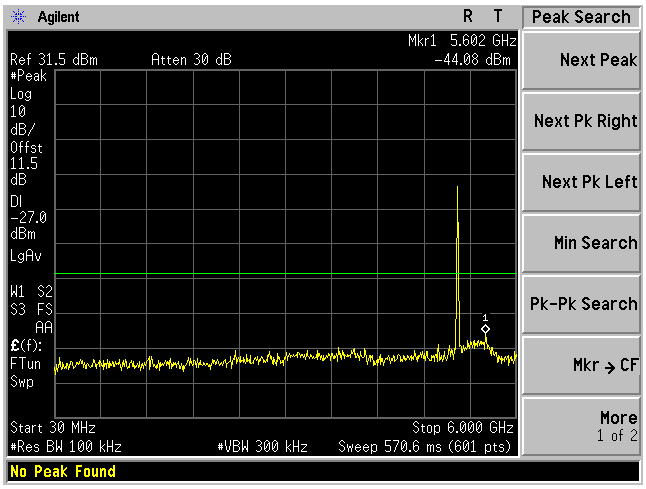
802.11 a mode, Middle channel, Chain 2
30MHz – 6GHz



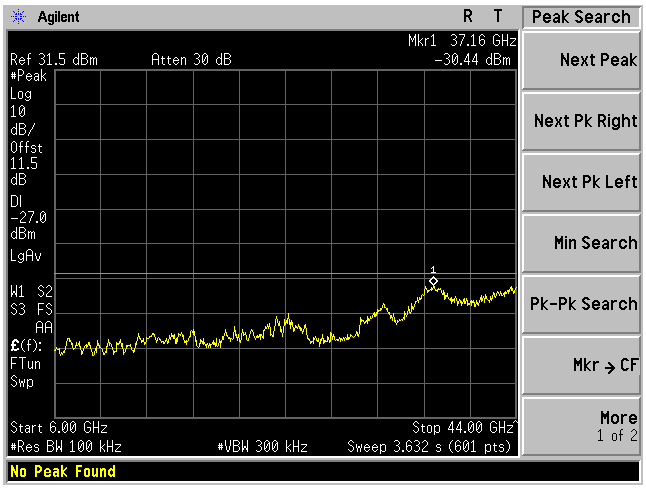
802.11 a mode, Middle channel, Chain 2
6G – 44 GHz



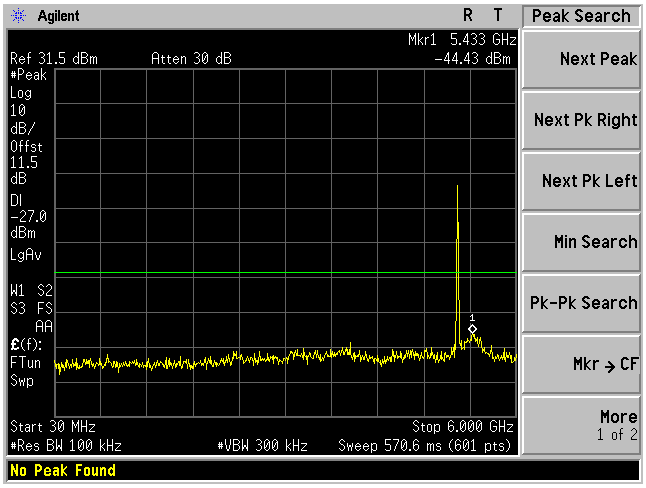
802.11 a mode, High channel, Chain 0
30MHz – 6GHz



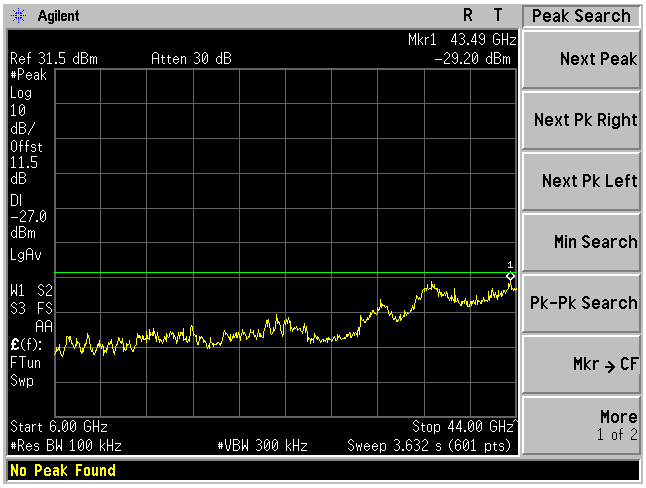
802.11 a mode, High channel, Chain 0
6G – 44 GHz



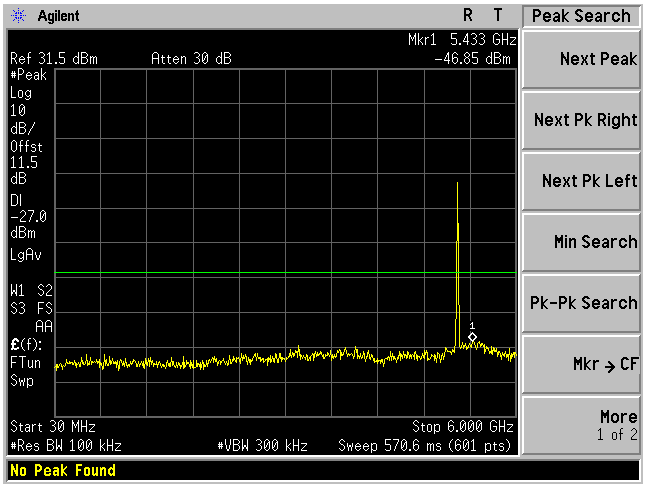
802.11 a mode, High channel, Chain 1
30MHz – 6GHz



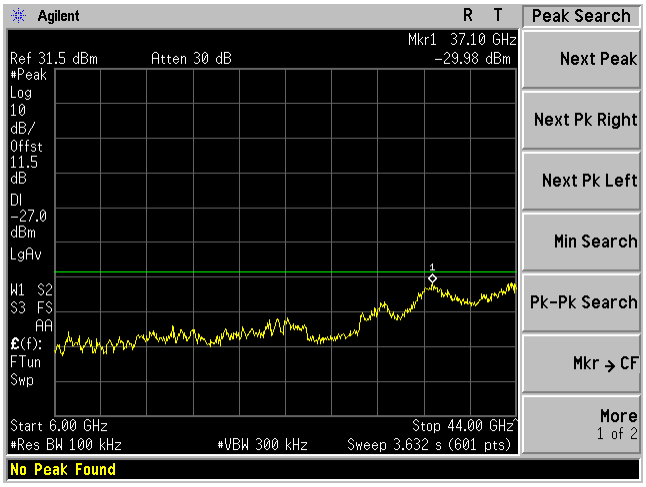
802.11 a mode, High channel, Chain 1
6G – 44 GHz



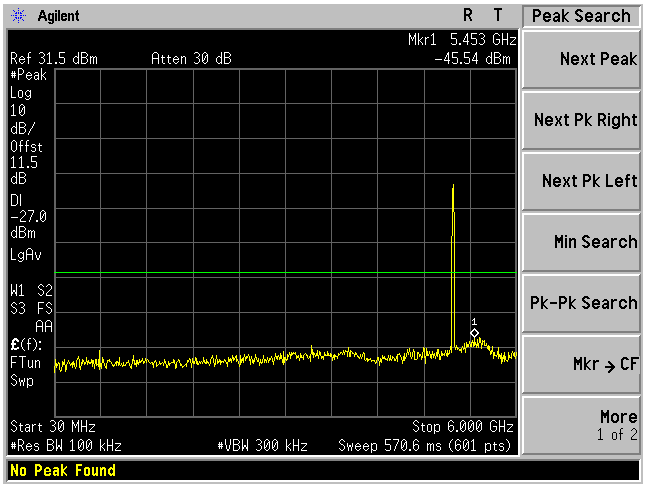
802.11 a mode, High channel, Chain 2
30MHz – 6GHz



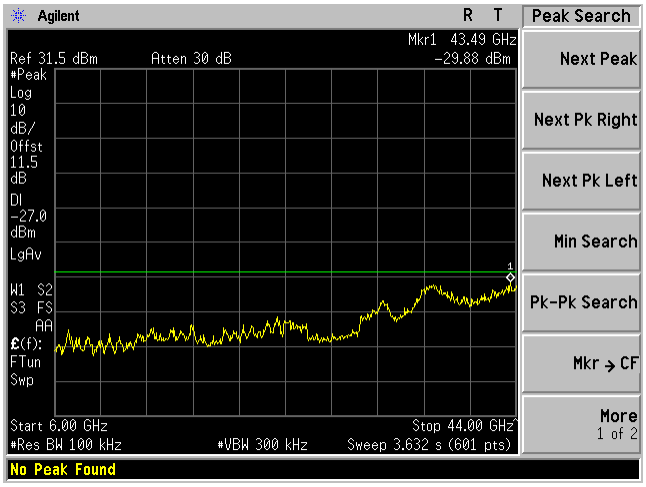
802.11 a mode, High channel, Chain 2
6G – 44 GHz



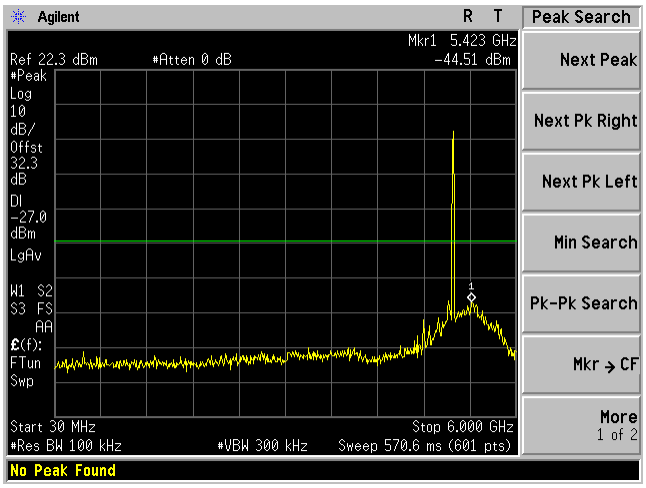
802.11 n20 mode, Low channel, Chain 0
30MHz – 6GHz



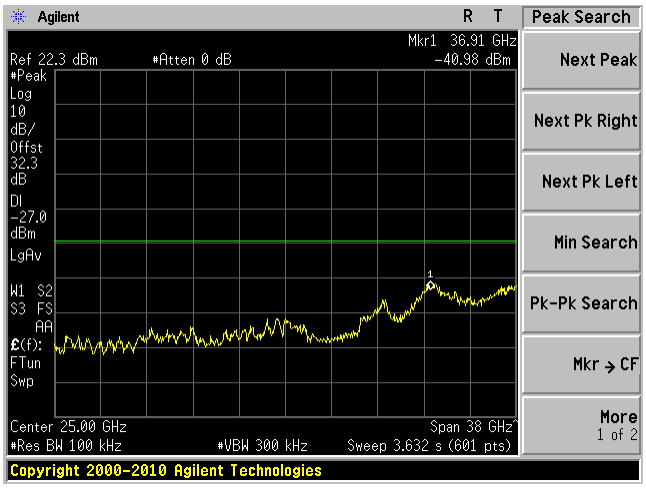
802.11 n20 mode, Low channel, Chain 0
6G – 44 GHz



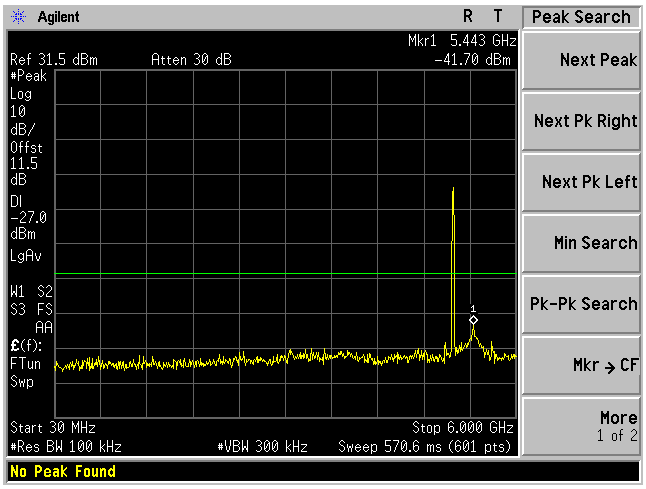
802.11 n20 mode, Low channel, Chain 012
30MHz – 6GHz



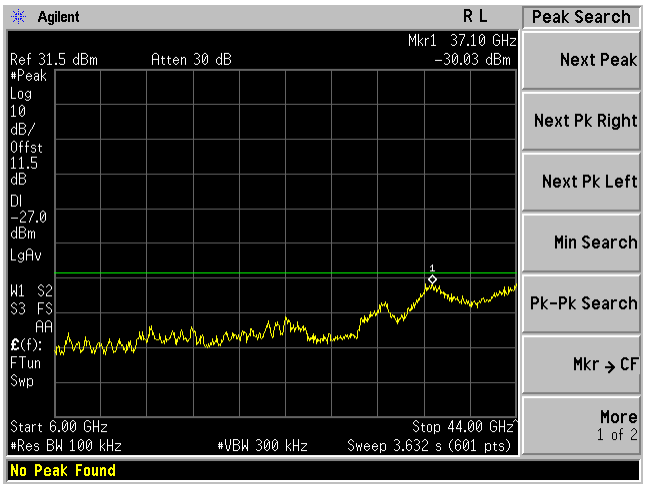
802.11 n20 mode, Low channel, Chain 012
6G – 44 GHz



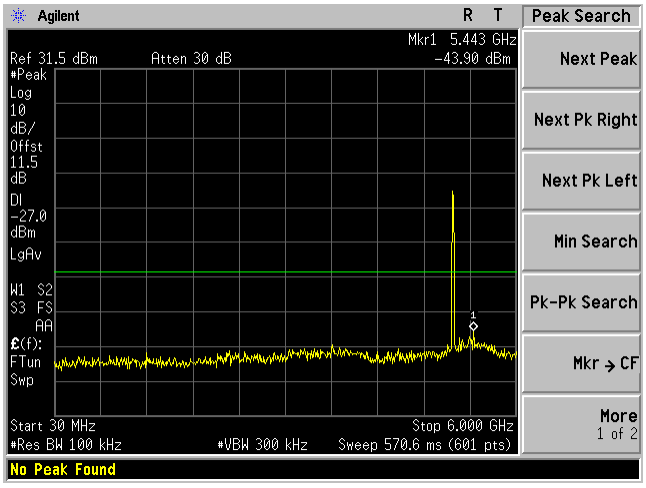
802.11 n20 mode, Low channel, Chain 1
30MHz – 6GHz



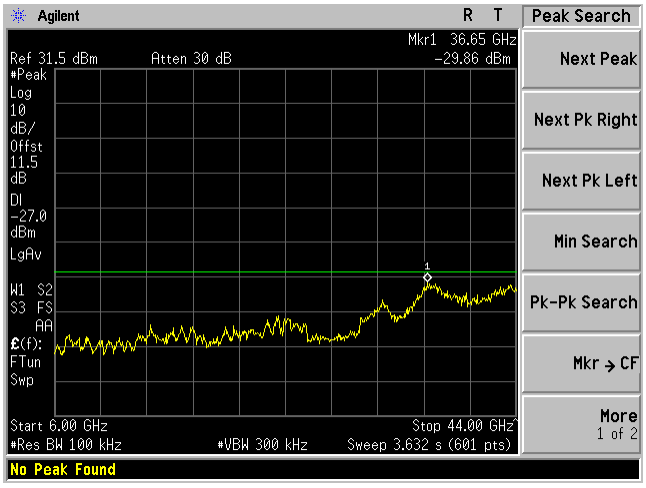
802.11 n20 mode, Low channel, Chain 1
6G – 44 GHz



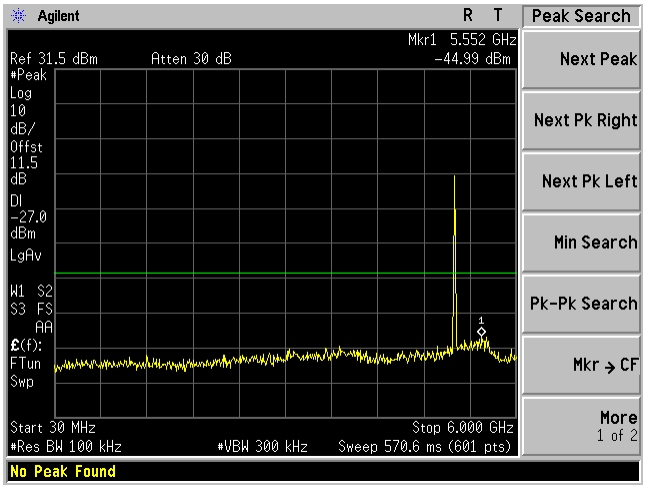
802.11 n20 mode, Low channel, Chain 2
30MHz – 6GHz



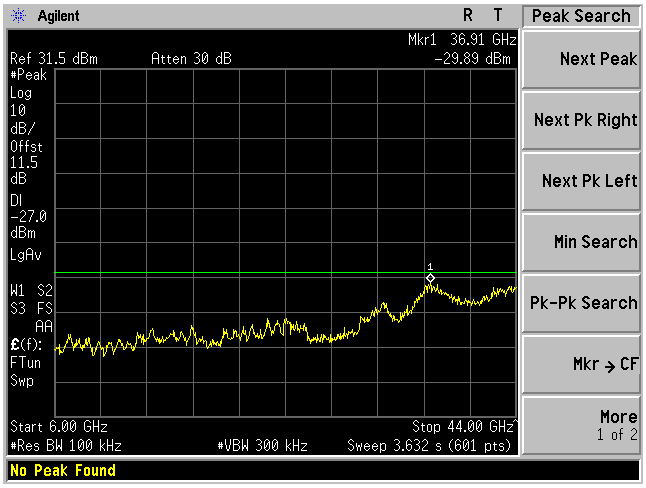
802.11 n20 mode, Low channel, Chain 2
6G – 44 GHz



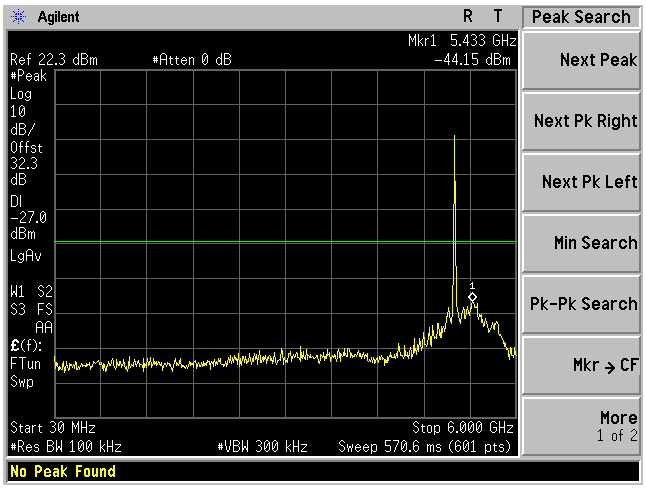
802.11 n20 mode, Middle channel, Chain 0
30MHz – 6GHz



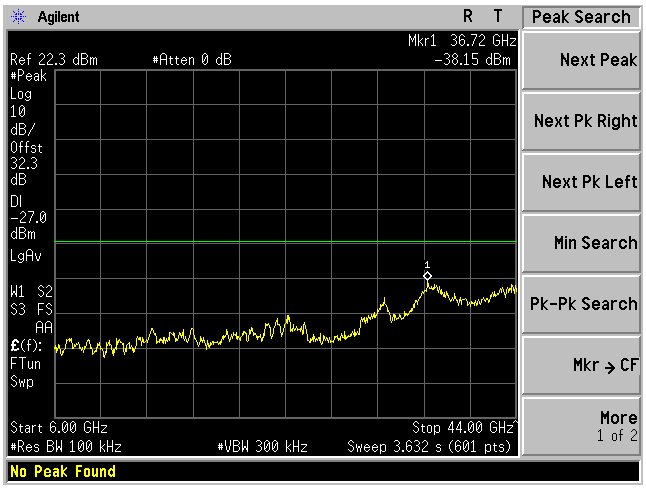
802.11 n20 mode, Middle channel, Chain 0
6G – 44 GHz



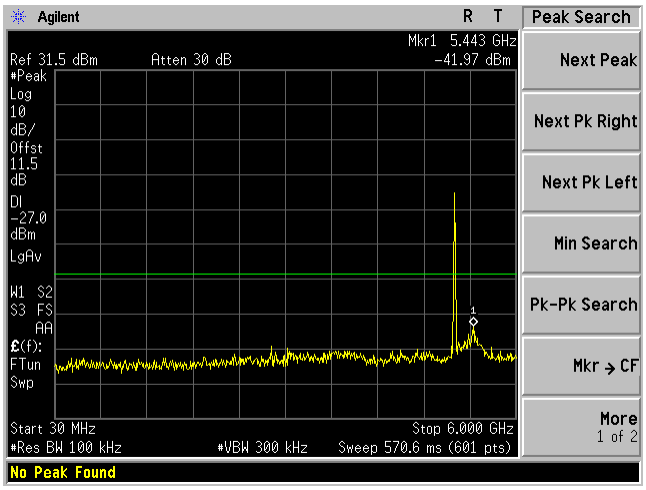
802.11 n20 mode, Middle channel, Chain 012
30MHz – 6GHz



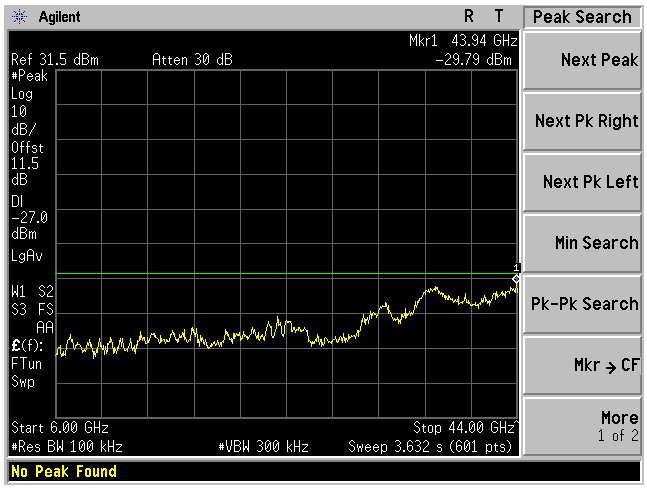
802.11 n20 mode, Middle channel, Chain 012
6G – 44 GHz



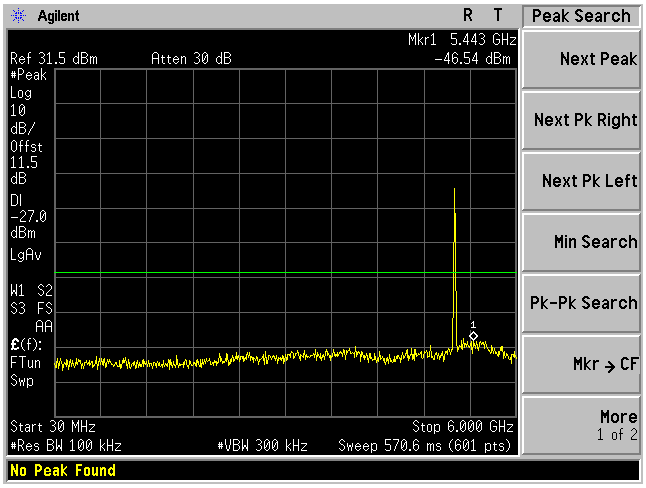
802.11 n20 mode, Middle channel, Chain 1
30MHz – 6GHz



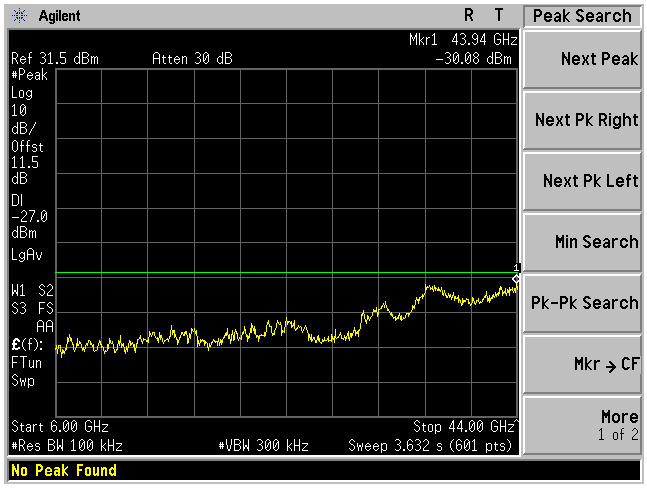
802.11 n20 mode, Middle channel, Chain 1
6G – 44 GHz



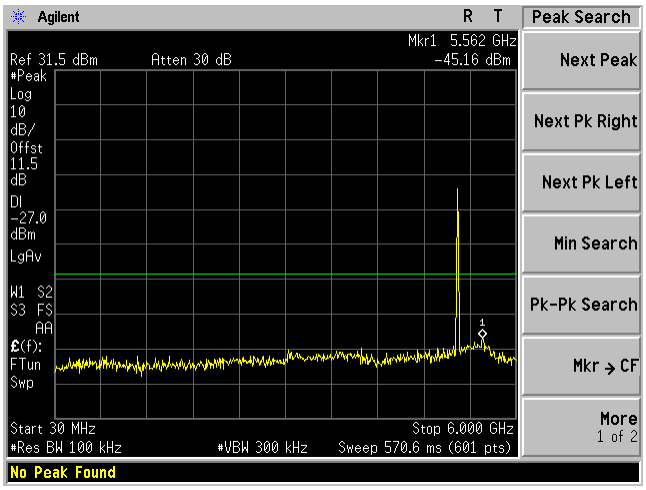
802.11 n20 mode, Middle channel, Chain 2
30MHz – 6GHz



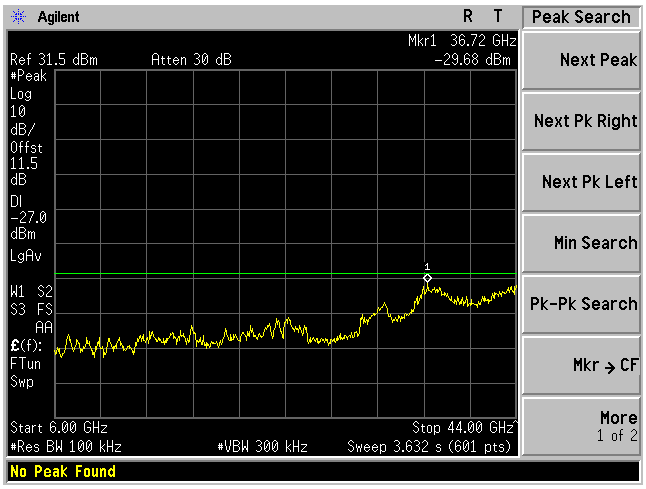
802.11 n20 mode, Middle channel, Chain 2
6G – 44 GHz



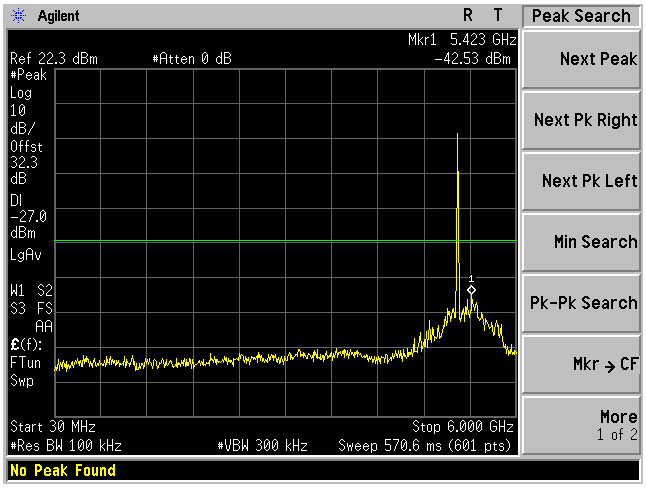
802.11 n20 mode, High channel, Chain 0
30MHz – 6GHz



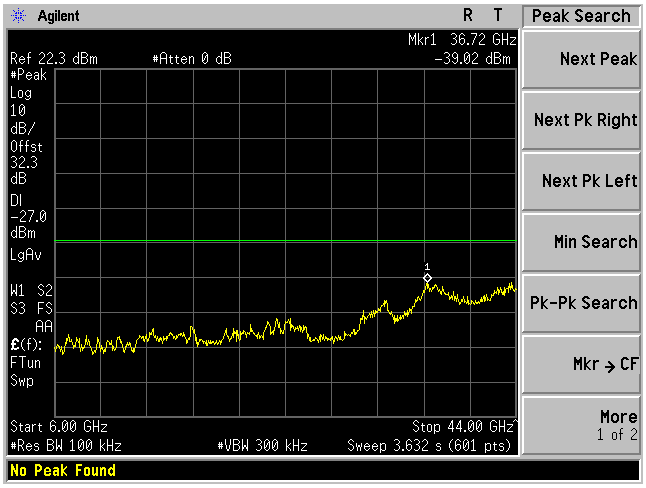
802.11 n20 mode, High channel, Chain 0
6G – 44 GHz



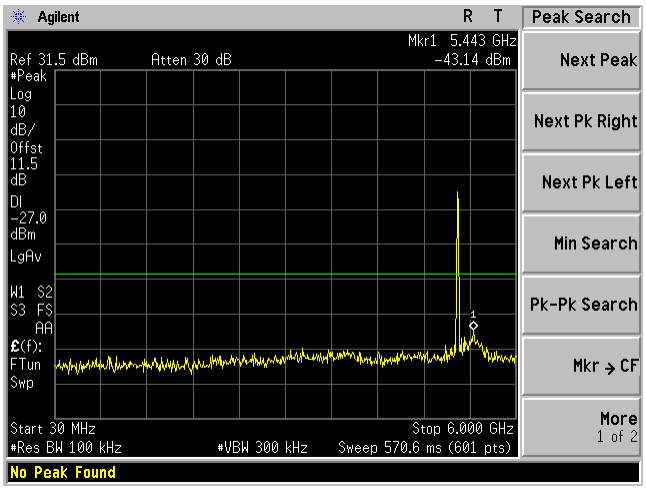
802.11 n20 mode, High channel, Chain 012
30MHz – 6GHz



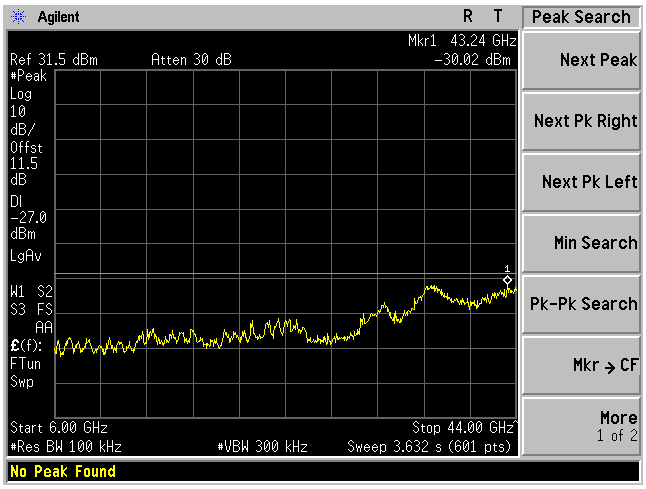
802.11 n20 mode, High channel, Chain 012
6G – 44 GHz



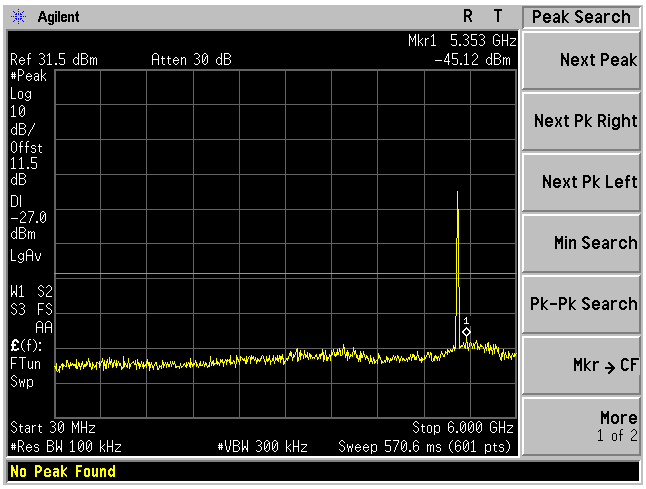
802.11 n20 mode, High channel, Chain 1
30MHz – 6GHz



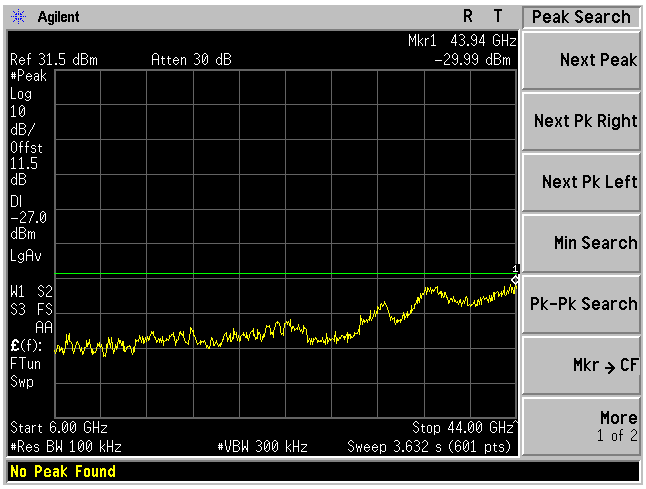
802.11 n20 mode, High channel, Chain 1
6G – 44 GHz



802.11 n20 mode, High channel, Chain 2
30MHz – 6GHz

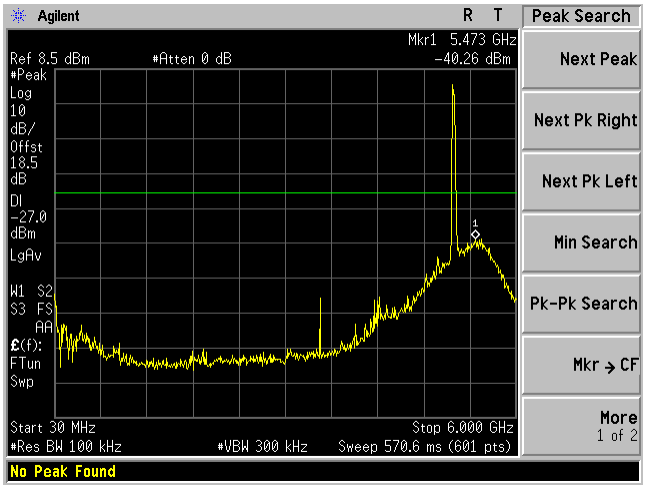


802.11 n20 mode, High channel, Chain 2
6G – 44 GHz

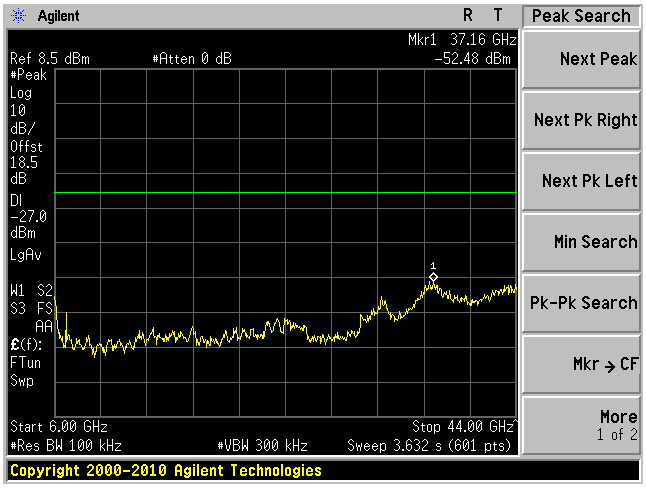


5150 – 5250 MHz, High Power

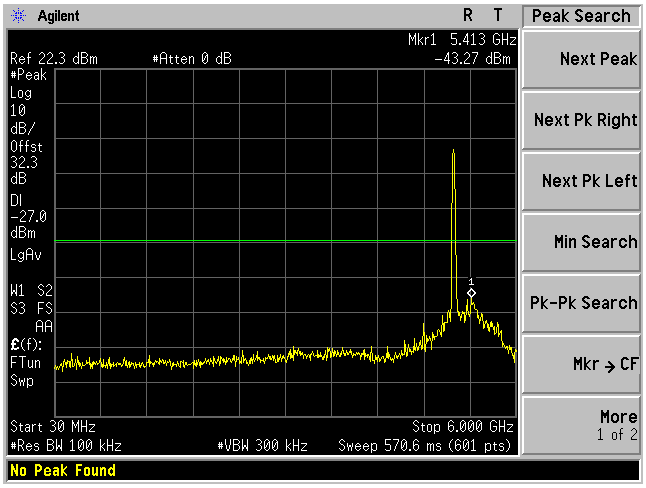
802.11 n40 mode, Low channel, Chain 0
30MHz – 6GHz



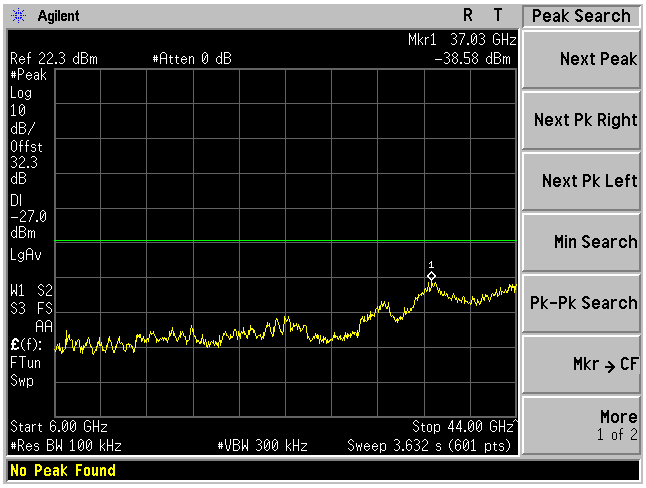
802.11 n40 mode, Low channel, Chain 0
6G – 44 GHz



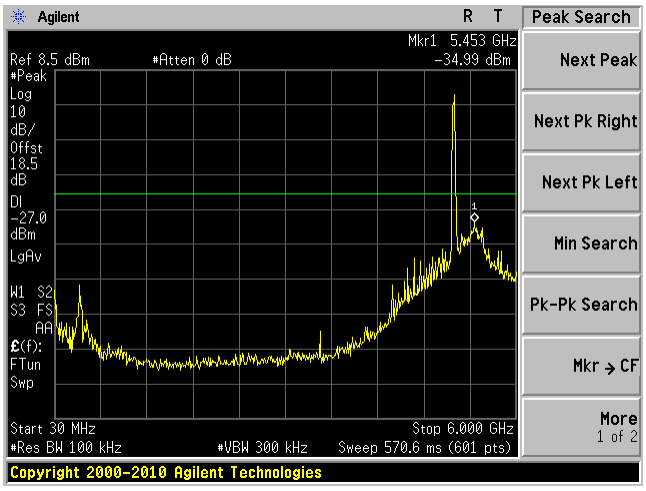
802.11 n40 mode, Low channel, Chain 012
30MHz – 6GHz



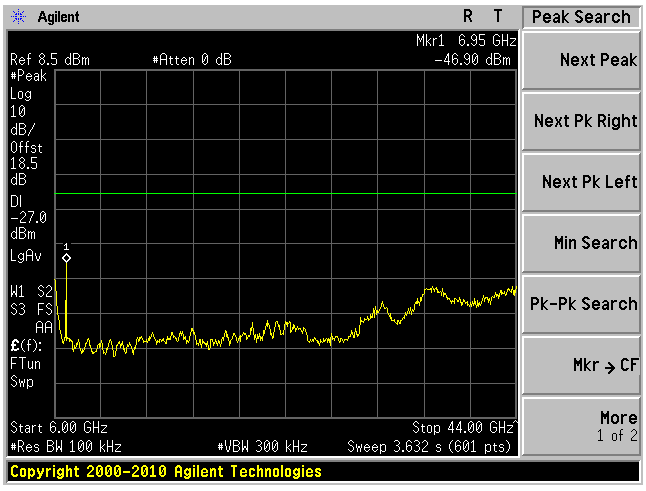
802.11 n40 mode, Low channel, Chain 012
6G – 44 GHz



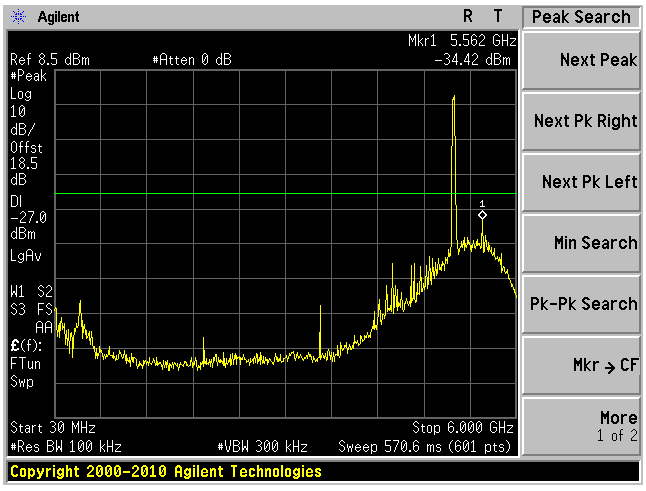
802.11 n40 mode, Low channel, Chain 1
30MHz – 6GHz



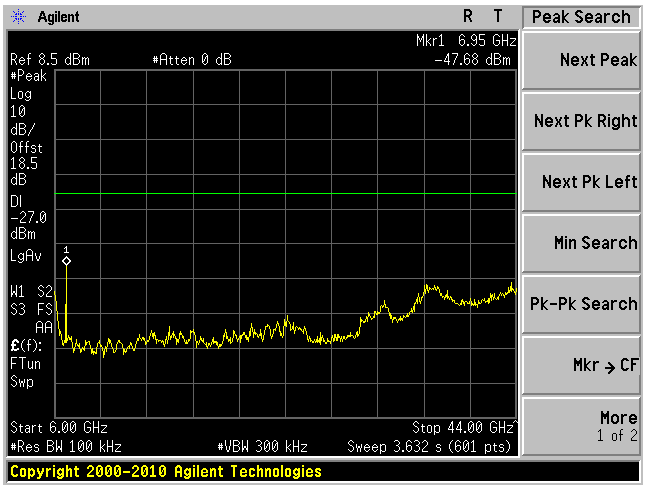
802.11 n40 mode, Low channel, Chain 1
6G – 44 GHz



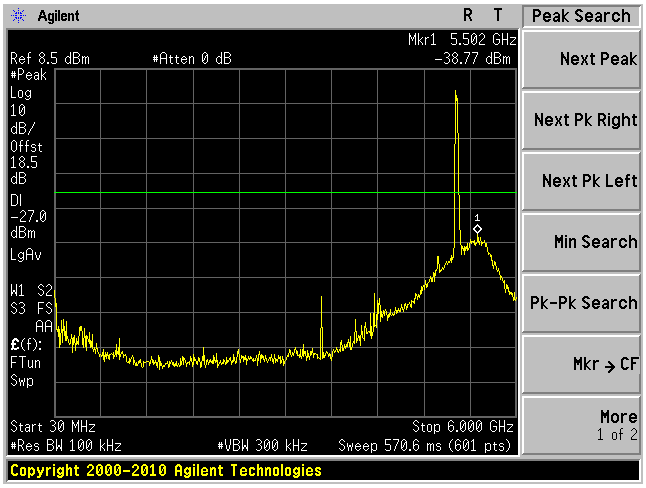
802.11 n40 mode, Low channel, Chain 2
30MHz – 6GHz



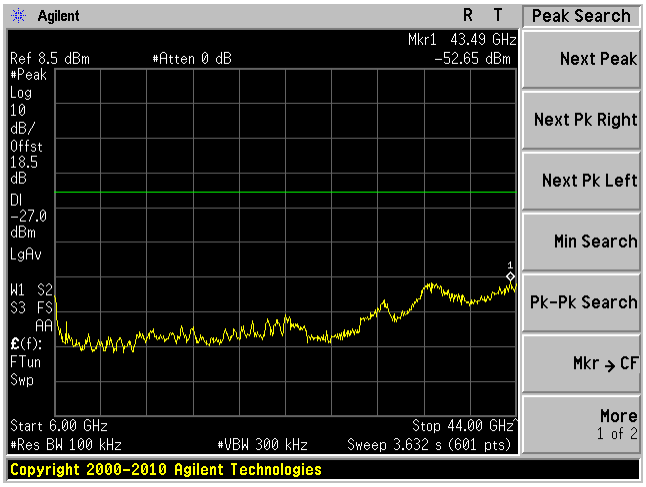
802.11 n40 mode, Low channel, Chain 2
6G – 44 GHz



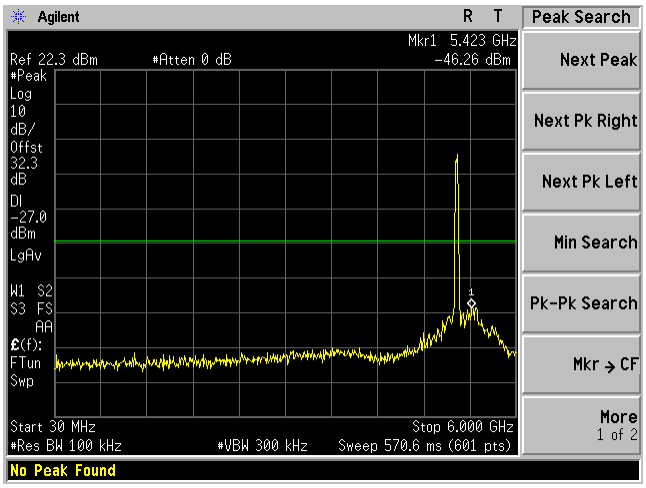
802.11 n40 mode, High channel, Chain 0
30MHz – 6GHz



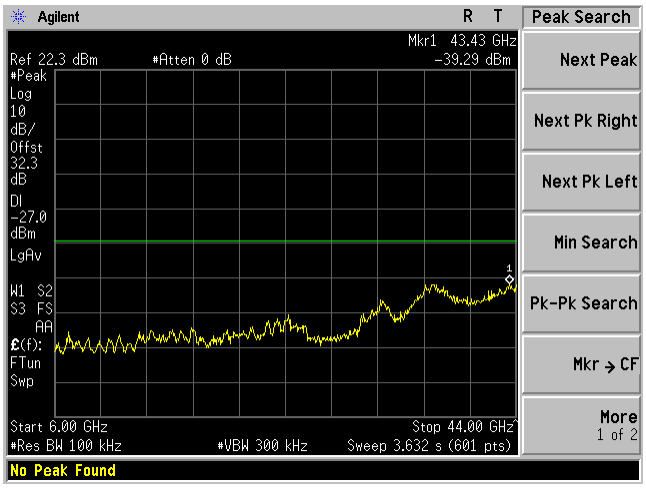
802.11 n40 mode, High channel, Chain 0
6G – 44 GHz



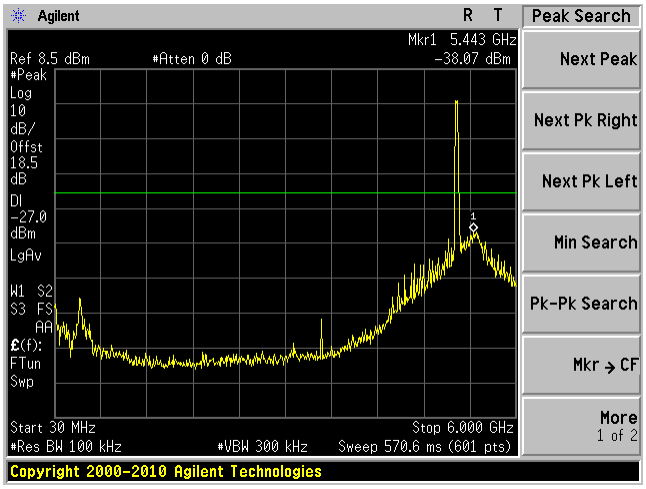
802.11 n40 mode, High channel, Chain 012
30MHz – 6GHz



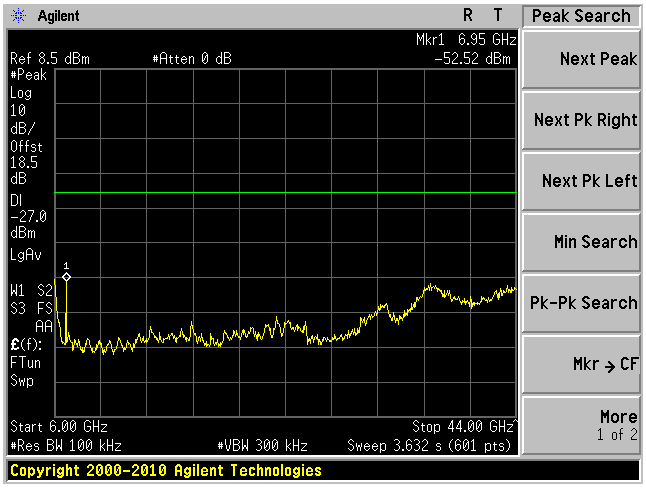
802.11 n40 mode, High channel, Chain 012
6G – 44 GHz



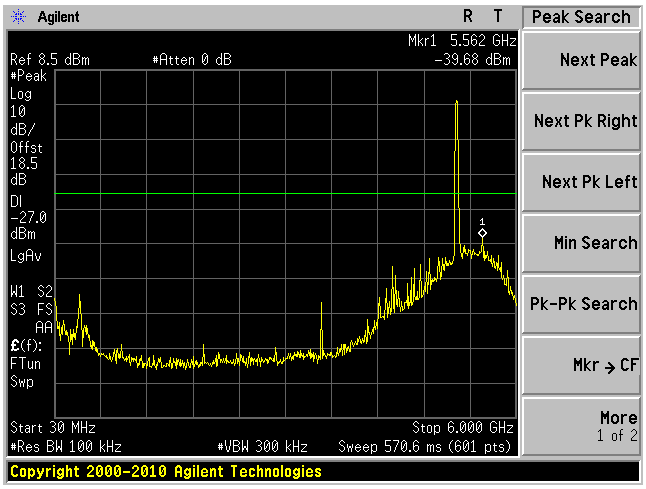
802.11 n40 mode, High channel, Chain 1
30MHz – 6GHz



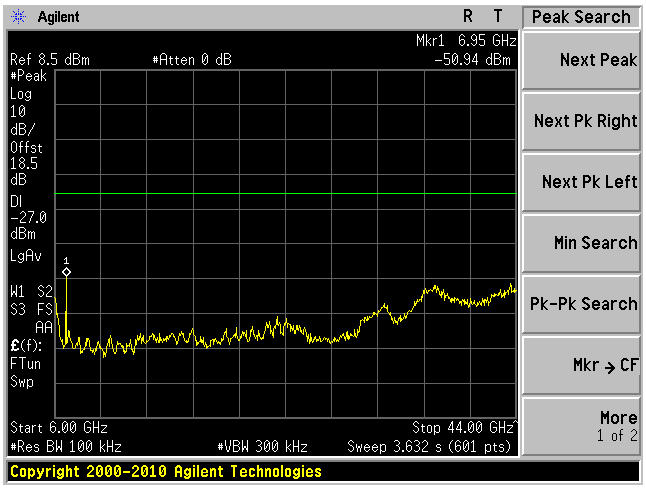
802.11 n40 mode, High channel, Chain 1
6G – 44 GHz



802.11 n40 mode, High channel, Chain 2
30MHz – 6GHz



802.11 n40 mode, High channel, Chain 2
6G – 44 GHz



14 FCC §15.407(a)(6) – Peak Excursion Ratio

14.1 Applicable Standard

According to FCC §15.407(a) (6), the ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

14.2 Test Procedure

Set the spectrum analyzer span to view the entire emission bandwidth.
The largest difference between the following two traces must be ≤ 13 dB for all frequencies across the emission bandwidth. Submit a plot.

1st Trace:
• Set RBW = 1 MHz, VBW ≥ 3 MHz with peak detector and maxhold settings.

2nd Trace:
• create the 2nd trace using the settings described in the setion "FCC §15.407(a)(1)(2) – CONDUCTED TRANSMITTER OUTPUT POWER".

14.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

14.4 Test Environmental Conditions

Temperature:	23-25 °C
Relative Humidity:	35-50 %
ATM Pressure:	101-103kPa

The testing was performed by Ning Ma on 2011-11-14~ 2011-11-19 at RF Site.

14.5 Test Results

5150-5250 MHz Band:

Channel	Frequency (MHz)	TX Chain 0 PER (dB)	TX Chain 1 PER (dB)	TX Chain 2 PER (dB)	Limit (dB)
802.11a mode					
Low	5180	8.41	7.82	8.29	13
Middle	5200	8.35	8.01	8.39	
High	5240	8.27	8.01	8.59	
802.11n20 mode					
Low	5180	8.45	7.85	8.25	13
Middle	5200	8.37	8.25	8.37	
High	5240	8.29	8.25	8.55	
802.11n40 mode					
Low	5190	10.29	11.01	10.94	13
High	5230	10.39	10.99	11.01	