FCC PART 15.407
TEST AND MEASUREMENT REPORT

For

Ruckus Wireless, Inc.

350 West Java Drive,

Sunnyvale, CA 94089, USA

FCC ID: S9GT300

Report Type:	**Product Type:**
Class II Permissive Change	802.11a/b/g/n/ac Wireless Access Point

Prepared By:	Rui Zhou
Report Number:	R1410275-407 W52W58
Report Date:	2015-06-26
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1410275-407 W52W58	Initial	2015-06-26

1 General Description

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *Ruckus Wireless, Inc.*, and their product FCC ID: *S9GT300*, model T300e, or the "EUT" as referred to in this report. The EUT is an 802.11a/b/g/n/ac Wireless Access Point.

Note: Model: T301e has the same RF components with Model: T300.

1.2 Mechanical Description of EUT

The EUT measures approximately 183 mm (L) x 154 mm (W) x 77 mm (H) and weighs approximately 900 g.

The test data gathered are from typical production sample, serial number: 411494908407

1.3 Objective

This report is prepared on behalf of *Ruckus Wireless, Inc.* in accordance with FCC CFR47 §15.407.

This Class II permissive change is updating W58 band from Part 15.247 DTS to Part 15.407 NII new rules and increasing output power for W52 band under FCC Part 15.407 new rules.

The objective is to determine compliance with FCC Part 15.407 for Output Power, Antenna Requirements, AC Line Conducted Emissions, Bandwidth, and power spectral density, Band Edges Measurement, Spurious Emissions, Conducted and Radiated Spurious Emissions.

1.4 Related Submittal(s)/Grant(s)

FCC ID: S9GT300

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

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 CISPR16-4-2:2011, 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

Bay area compliance Laboratories Corp. (BACL) is:
1- An independent Commercial Test Laboratory accredited to **ISO 17025: 2005** by **A2LA**, in the fields of: Electromagnetic Compatibility & Telecommunications covering Emissions, Immunity, Radio, RF Exposure, Safety and Telecom. This includes NEBS (Network Equipment Building System), Wireless RF, Telecommunications Terminal Equipment (TTE); Network Equipment; Information Technology Equipment (ITE); Medical Electrical Equipment; Industrial, Commercial, and Medical Test Equipment; Professional Audio and Video Equipment; Electronic (Digital) Products; Industrial and Scientific Instruments; Cabled Distribution Systems and Energy Efficiency Lighting.

2- An ENERGY STAR Recognized Laboratory, for the LM80 Testing, a wide variety of Luminares and Computers.

3- A NIST Designated Phase-I and Phase-II CAB including: ACMA (Australian Communication and Media Authority), BSMI (Bureau of Standards, Metrology and Inspection of Taiwan), IDA (Infocomm Development Authority of Singapore), IC(Industry Canada), Korea (Ministry of Communications Radio Research Laboratory), NCC (Formerly DGT; Directorate General of Telecommunication of Chinese Taipei) OFTA (Office of the Telecommunications Authority of Hong Kong), Vietnam, VCCI - Voluntary Control Council for Interference of Japan and a designated EU CAB (Conformity Assessment Body) (Notified Body) for the EMC and R&TTE Directives.

4- A Product Certification Body accredited to **ISO Guide 65: 1996** by **A2LA** to certify:
.
2. Radio Standards Specifications (RSS) in the Category I Equipment Standards List and All Broadcasting Technical Standards (BETS) in Category I Equipment Standards List for Industry Canada.
3. Radio Communication Equipment for Singapore.
4. Radio Equipment Specifications, GMDSS Marine Radio Equipment Specifications, and Fixed Network Equipment Specifications for Hong Kong.
5. Japan MIC Telecommunication Business Law (A1, A2) and Radio Law (B1, B2 and B3).
6. Audio/Video, Battery Charging Systems, Computers, Displays, Enterprise Servers, Imaging Equipment, Set-Top Boxes, Telephony, Televisions, Ceiling Fans, CFLs (Including GU24s),Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Ventilating Fans.

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 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2009, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

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.: A-0027. 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 an American Association for Laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at

http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionid=8430d44f1f47cf2996124343c704b367816b

2 EUT Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.4-2009 and KDB-789033 D02 General UNII Test Procedures New Rules v01

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the average power, peak power and PPSD across all data rates bandwidths, and modulations.

2.2 EUT Exercise Software

The test utility used was *T301e ART* was provided by Ruckus Wireless Inc., and was verified by *Rui Zhou* to comply with the standard requirements being tested against.

2.3 Special Equipment

N/A

2.4 Equipment Modifications

No modifications were made to the EUT.

2.5 Local Support Equipment

Manufacturer	Description	Model	Serial Number
Dell	Laptop	Latitude E5420	CHZCMQ1

2.6 EUT Internal Configuration Details

Manufacturer	Description	Model	Serial Number
Ruckus	Main Board (SANTORINI)	ASM 120-11257 rev.4	411494908407
Ruckus	RJ45 Port Board	ASM 120-11264 rev. 2	1427
Ruckus	Ruckus Board	ASM 120-11229 rev. A	1439
Ruckus	IZAR Board	ASM 120-11261 rev. 3	1429
Ruckus	IZAR CROSS Board	ASM 120-11262 rev. 3	1433

2.7 Interface Ports and Cables

Cable Description	Length (m)	From	To
RJ45 Cable	1m	Laptop	POE
RJ45 Cable	1m	POE	EUT
RF Cable x2	<1m	EUT	PSA

2.8 Power Supply List and Details

Manufacturer	Description	Model	Part Number
Ruckus	POE AC Power Supply	740-64214-001	-

3 Summary of Test Results

FCC Rules	Description of Test	Result
§15.407(f), §2.1091	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.207	AC Power Line Conducted Emissions	Compliant
§15.209(a), 15.407(b)	Spurious Radiated Emissions	Compliant
§15.407(a)	Emission Bandwidth	Compliant
§407(a)	Peak Output Power Measurement	Compliant
§15.407(a)	Power Spectral Density	Compliant
§2.1051, §15.407(b)	Spurious Emissions at Antenna Terminals	Compliant
§15.407(h)	Dynamic Frequency Selection (DFS).	Compliant*

Note: * Please refer to DFS report: R1410275-DFS

4 FCC §2.1091 & §15.407(f) - RF Exposure

4.1 Applicable Standard

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

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

5.2 GHz band:

Maximum peak output power at antenna input terminal (dBm):	24.54
Maximum peak output power at antenna input terminal (mW):	284.4
Prediction distance (cm):	20
Prediction frequency (MHz):	5230
Maximum Antenna Gain, typical (dBi):	3.5
Maximum Antenna Gain (numeric):	2.238
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.1267
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

5.8 GHz band:

Maximum peak output power at antenna input terminal (dBm):	24.99
Maximum peak output power at antenna input terminal (mW):	315.5
Prediction distance (cm):	20
Prediction frequency (MHz):	5745
Maximum Antenna Gain, typical (dBi):	3.5
Maximum Antenna Gain (numeric):	2.238
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.1405
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

Note: There are two radios (2.4 GHz & 5 GHz) built into the system.

2.4 GHz band:

Maximum peak output power at antenna input terminal (dBm):	23.77
Maximum peak output power at antenna input terminal (mW):	238.2319
Prediction distance (cm):	20
Prediction frequency (MHz):	2437
Maximum Antenna Gain, typical (dBi):	2.5
Maximum Antenna Gain (numeric):	1.7782
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.0842
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

According to KDB 447498 D01 General RF Exposure Guidance v05r02, the sum of MPE ratio for two radios is: 0.0842 + 0.1405 = 0.2247, which is smaller than 1.0. So the colocation exposure exclusion applies.

5 FCC §15.203 – 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.

5.2 Antenna Description

The Antenna gain is 2.5 dBi at 2.4 GHz and 3.5 dBi at 5 GHz. Please refer to the internal photos.

6 FCC §15.207 - AC Power Line Conducted Emissions

6.1 Applicable Standards

As per FCC §15.207 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 C63.4-2009 measurement procedure. The specification used was FCC §15.207 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 EUT was connected with LISN-1 which provided 120 V / 60 Hz AC power.

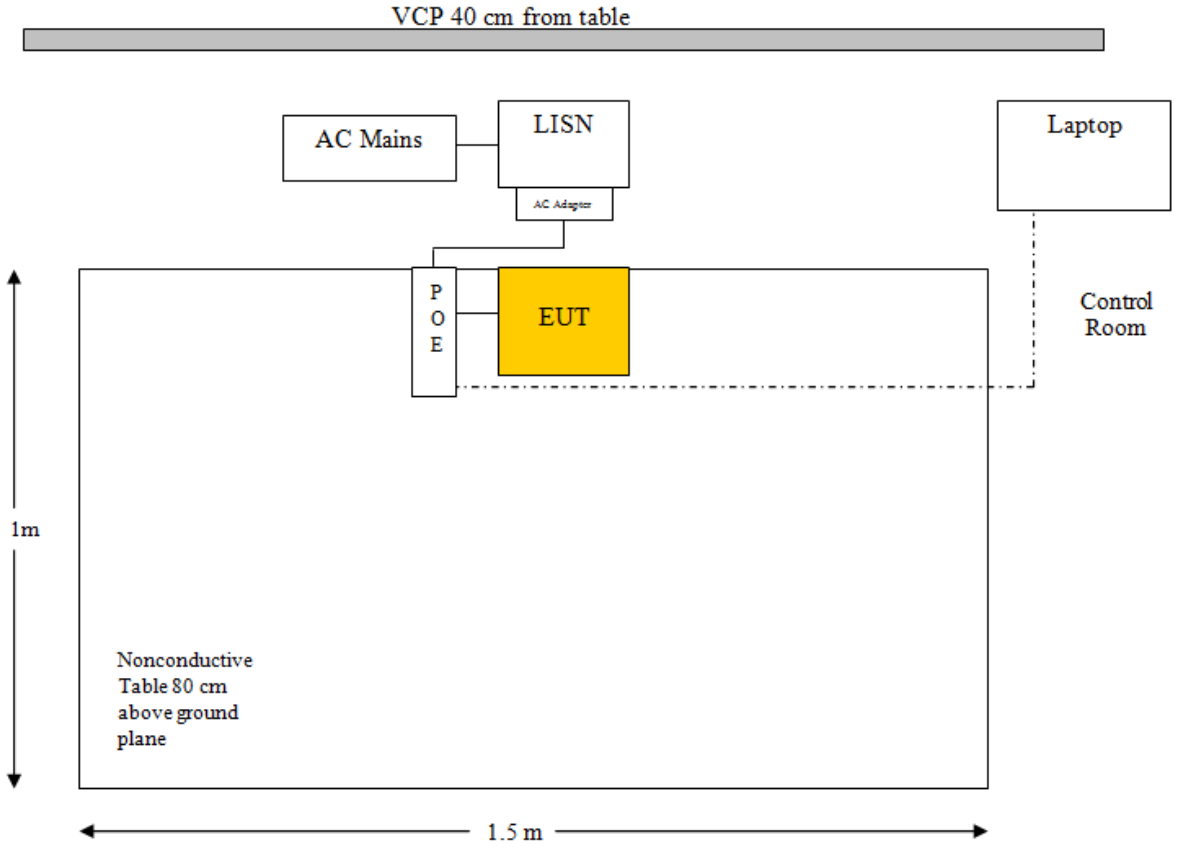
6.3 Test Procedure

During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-1 and the power cord of the support equipment was connected to 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	Calibration Interval
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2014-03-28	1 year
Solar Electronics	LISN	9252-50-R-24-N	511205	2013-06-25	1 year
TTE	Filter, High Pass	H9962-150K-50-21378	K7133	2013-05-30	1 year

Statement of Traceability: BACL Corp. *attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

6.7 Test Environmental Conditions

Temperature:	22-24º C
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 KPa

The testing was performed by Chen Ge on 2014-04-17 in 5 m chamber 3.

6.8 Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC Part 15 standard's conducted emissions limits, with the margin reading of:

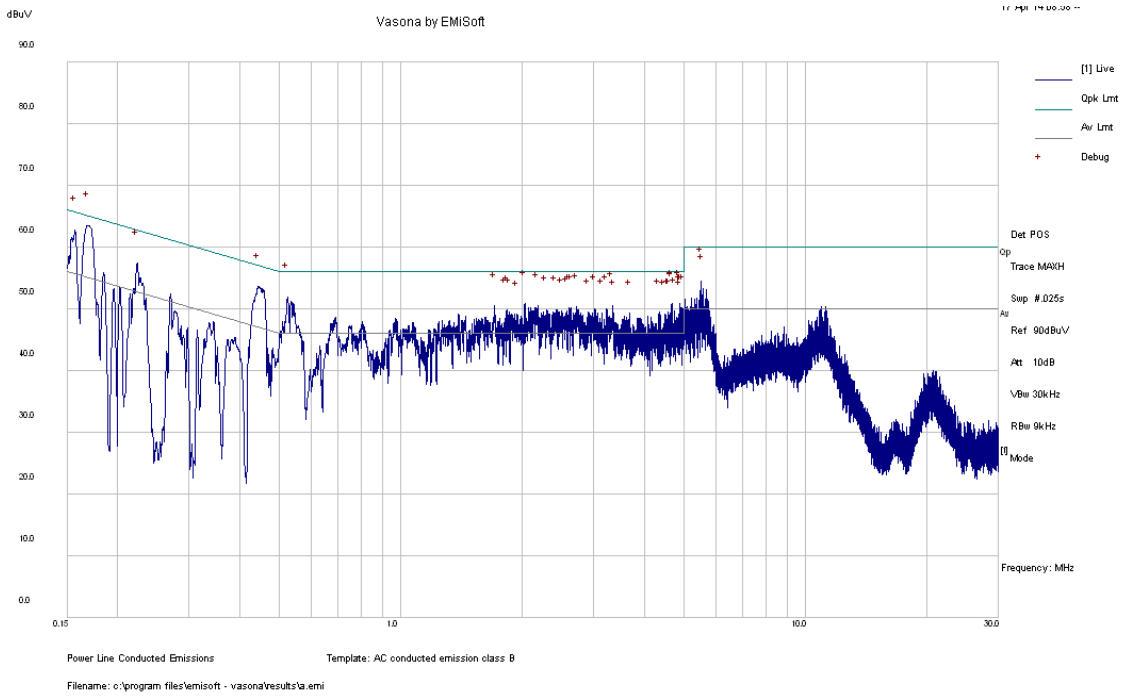
Connection: POE AC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Line/Neutral)**	**Range (MHz)**
-3.4	0.457407	Line	0.15-30

Note: AC Line Conducted Emission data please refer to R1403261-247 as the worst case: 2.4 GHz and 5 GHz transmitting simultaneously.

6.9 Conducted Emissions Test Plots and Data

Note: The EUT is transmitting at worst case: 2.4 GHz and 5 GHz colocation.

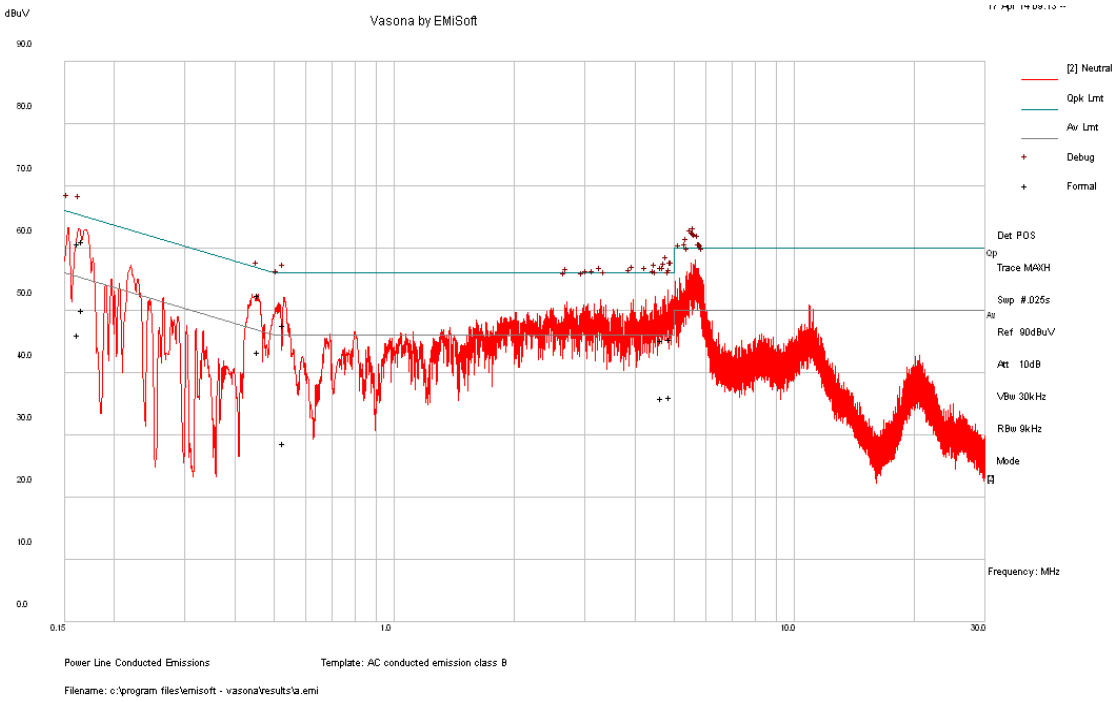
120 V, 60 Hz – Line



Frequency (MHz)	Cord. Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.162575	60.86	Line	65.33	-4.47	QP
0.166539	61.21	Line	65.13	-3.92	QP
0.457407	52.45	Line	56.74	-4.29	QP
0.531258	47.76	Line	56	-8.24	QP
4.896091	45.43	Line	56	-10.57	QP
4.680886	45.19	Line	56	-10.81	QP

Frequency (MHz)	Cord. Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.162575	46.2	Line	55.33	-9.13	Ave.
0.166539	50.08	Line	55.13	-5.05	Ave.
0.457407	43.34	Line	46.74	-3.40	Ave.
0.531258	28.67	Line	46	-17.33	Ave.
4.896091	36.16	Line	46	-9.84	Ave.
4.680886	35.88	Line	46	-10.12	Ave.

120 V, 60 Hz – Neutral



Frequency (MHz)	Cord. Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
5.623286	52.76	Neutral	60	-7.24	QP
0.162773	60.12	Neutral	65.32	-5.2	QP
5.525447	51.96	Neutral	60	-8.04	QP
0.1616	59.06	Neutral	65.38	-6.32	QP
5.579264	52.4	Neutral	60	-7.60	QP
4.823974	47.48	Neutral	56	-8.52	QP

Frequency (MHz)	Cord. Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
5.623286	45.63	Neutral	50	-4.37	Ave.
0.162773	45.5	Neutral	55.32	-9.82	Ave.
5.525447	44.37	Neutral	50	-5.63	Ave.
0.1616	43.64	Neutral	55.38	-11.74	Ave.
5.579264	45.18	Neutral	50	-4.82	Ave.
4.823974	38.63	Neutral	46	-7.37	Ave.

7 FCC §15.209 & §15.407(b) - Spurious Radiated Emissions

7.1 Applicable Standard

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.

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 1	3
88 - 216	150 Note 1	3
216 - 960	200 Note 1	3
Above 960	500	3

Note 1: 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	16.42 – 16.423	960 – 1240	4. 5 – 5. 15
0.495 – 0.505	16.69475 – 16.69525	1300 – 1427	5. 35 – 5. 46
2.1735 – 2.1905	25.5 – 25.67	1435 – 1626.5	7.25 – 7.75
4.125 – 4.128	37.5 – 38.25	1645.5 – 1646.5	8.025 – 8.5
4.17725 – 4.17775	73 – 74.6	1660 – 1710	9.0 – 9.2
4.20725 – 4.20775	74.8 – 75.2	1718.8 – 1722.2	9.3 – 9.5
6.215 – 6.218	108 – 121.94	2200 – 2300	10.6 – 12.7
6.26775 – 6.26825	123 – 138	2310 – 2390	13.25 – 13.4
6.31175 – 6.31225	149.9 – 150.05	2483.5 – 2500	14.47 – 14.5
8.291 – 8.294	156.52475 – 156.52525	2690 – 2900	15.35 – 16.2
8.362 – 8.366	156.7 – 156.9	3260 – 3267	17.7 – 21.4
8.37625 – 8.38675	162.0125 –167.17	3.332 – 3.339	22.01 – 23.12
8.41425 – 8.41475	167.72 – 173.2	3 3458 – 3 358	23.6 – 24.0
12.29 – 12.293	240 – 285	3.600 – 4.400	31.2 – 31.8
12.51975 – 12.52025	322 – 335.4		36.43 – 36.5
12.57675 – 12.57725	399.9 – 410		Above 38.6
13.36 – 13.41	608 – 614		

As per FCC Part 15.407 (b)

(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 e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

7.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.4-2009. The specification used was the FCC 15C/15E 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 were 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 for Class A. 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	Calibration Interval
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	N/R
Sunol Science Corp	Combination Antenna	JB3	A020106-3	2014-09-17	1 year
Hewlett Packard	Pre-amplifier	8447D	2944A06639	2014-04-26	1 year
Agilent	Pre-amplifier	8449B	3008A01978	2014-02-04	1 year
Agilent	Spectrum Analyzer	E4446A	US44300386	2014-09-03	1 year
EMCO	Horn Antenna	3315	9511-4627	2014-01-06	1 year
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2014-03-28	1 year

Statement of Traceability: BACL *attests that all calibrations have been performed per the A2LA requirements, traceable to NIST.*

7.6 Test Environmental Conditions

Temperature:	22-24º C
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 KPa

The testing was performed by Rui Zhou on 2014-12-15 in 5 m chamber 3.

7.7 Summary of Test Results

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

30 MHz-1 GHz

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, Channel**
-4.64	204.3035	Horizontal	802.11n-HT20 mode Middle Channel

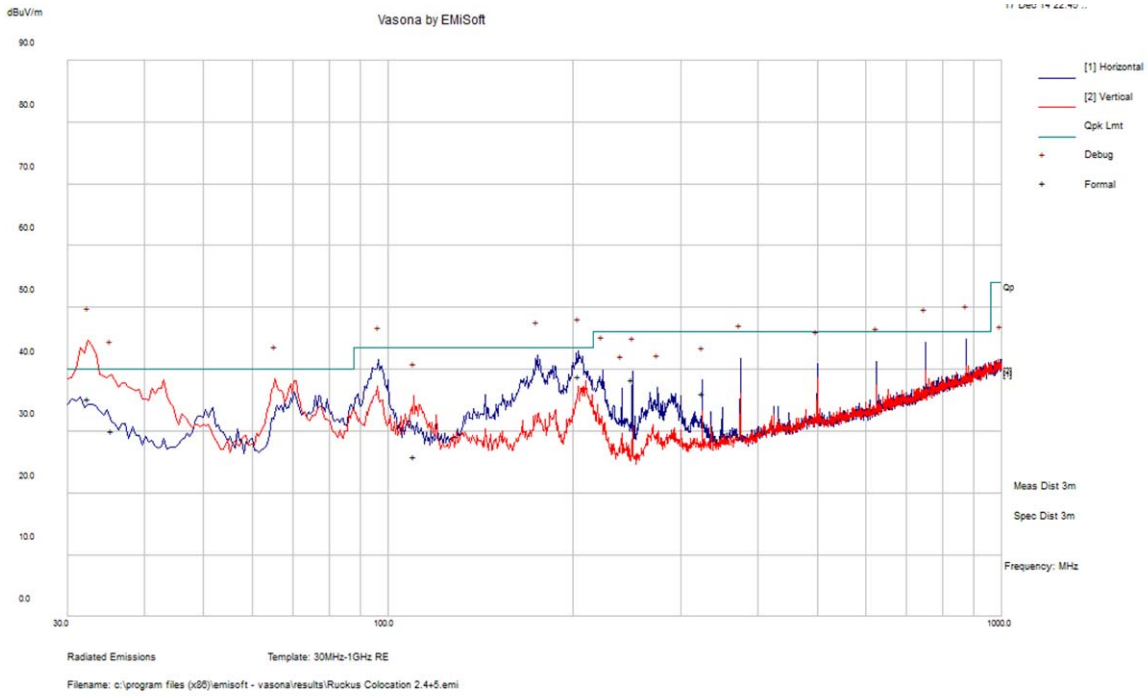
Above 1 GHz

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, Channel**
-4.91	5230	Horizontal	802.11n-HT40 mode High Channel

Please refer to the following table and plots for specific test result details

7.8 Radiated Emissions Test Result Data

1) 30 MHz – 1 GHz



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
32.437	35.3	154	V	91	40	-4.7
204.3035	38.86	158	H	296	43.5	-4.64
35.45025	30.11	196	V	21	40	-9.89
249.99075	38.34	114	H	38	46	-7.66
324.99	36.13	101	H	129	46	-9.87
110.12225	25.93	121	V	360	43.5	-17.57

Note: The EUT is transmitting in 2.4 GHz and 5.2 GHz Band simultaneously.

2) 1–40 GHz

5.2 GHz Band

802.11a mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz, measured at 3 meters											
10360	50.01	0	100	V	38.1	6.89	33.87	61.13	74	-12.87	Peak
10360	47.70	0	100	H	38.1	6.89	33.87	58.82	74	-15.18	Peak
10360	35.36	0	100	V	38.1	6.89	33.87	46.48	54	-7.52	Ave
10360	35.12	0	100	H	38.1	6.89	33.87	46.24	54	-7.76	Ave
15540	49.17	0	100	V	38.54	8.26	33.82	62.15	74	-11.85	Peak
15540	49.41	0	100	H	38.54	8.26	33.82	62.39	74	-11.61	Peak
15540	35.50	0	100	V	38.54	8.26	33.82	48.48	54	-5.52	Ave
15540	35.23	0	100	H	38.54	8.26	33.82	48.21	54	-5.79	Ave
20720	47.18	0	100	V	34.79	9.41	34.79	56.59	74	-17.41	Peak
20720	47.76	0	100	H	34.79	9.41	34.79	57.17	74	-16.83	Peak
20720	34.44	0	100	V	34.79	9.41	34.79	43.85	54	-10.15	Ave
20720	34.21	0	100	H	34.79	9.41	34.79	43.62	54	-10.38	Ave
Middle Channel 5200 MHz, measured at 3 meters											
10400	50.03	0	100	V	38.845	6.91	33.87	61.92	74	-12.08	Peak
10400	47.94	0	100	H	38.845	6.91	33.87	59.83	74	-14.17	Peak
10400	35.79	0	100	V	38.845	6.91	33.87	47.67	54	-6.33	Ave
10400	35.63	0	100	H	38.845	6.91	33.87	47.51	54	-6.49	Ave
15600	48.49	0	100	V	38.59	8.31	33.82	61.57	74	-12.43	Peak
15600	49.50	0	100	H	38.59	8.31	33.82	62.58	74	-11.42	Peak
15600	35.33	0	100	V	38.59	8.31	33.82	48.41	54	-5.59	Ave
15600	35.03	0	100	H	38.59	8.31	33.82	48.11	54	-5.89	Ave
20800	47.13	0	100	V	34.74	9.47	34.74	56.60	74	-17.40	Peak
20800	47.32	0	100	H	34.74	9.47	34.74	56.79	74	-17.21	Peak
20800	34.24	0	100	V	34.74	9.47	34.74	43.71	54	-10.29	Ave
20800	35.00	0	100	H	34.74	5.78	34.74	40.78	54	-13.22	Ave
High Channel 5240 MHz, measured at 3 meters											
10480	50.71	0	100	V	38.55	6.97	34.71	61.52	74	-12.48	Peak
10480	47.74	0	100	H	38.55	6.97	34.71	58.55	74	-15.45	Peak
10480	35.75	0	100	V	38.55	6.97	34.71	46.56	54	-7.44	Ave
10480	35.54	0	100	H	38.55	6.97	34.71	46.35	54	-7.65	Ave
15720	48.72	0	100	V	38.61	8.34	33.78	61.89	74	-12.11	Peak
15720	49.04	0	100	H	38.61	8.34	33.78	62.21	74	-11.79	Peak
15720	35.39	0	100	V	38.61	8.34	33.78	48.56	54	-5.44	Ave
15720	35.45	0	100	H	38.61	8.34	33.78	48.62	54	-5.38	Ave
20960	47.66	0	100	V	34.71	9.67	34.71	57.33	74	-16.67	Peak
20960	47.98	0	100	H	34.71	9.67	34.71	57.65	74	-16.35	Peak
20960	34.90	0	100	V	34.71	9.67	34.71	44.57	54	-9.43	Ave
20960	34.76	0	100	H	34.71	9.67	34.71	44.43	54	-9.57	Ave

802.11n-HT20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz, measured at 3 meters											
10360	50.63	0	100	V	38.1	6.89	33.87	61.75	74	-12.25	Peak
10360	47.36	0	100	H	38.1	6.89	33.87	58.48	74	-15.52	Peak
10360	35.91	0	100	V	38.1	6.89	33.87	47.03	54	-6.97	Ave
10360	35.55	0	100	H	38.1	6.89	33.87	46.67	54	-7.33	Ave
15540	48.62	0	100	V	38.54	8.26	33.82	61.60	74	-12.40	Peak
15540	49.46	0	100	H	38.54	8.26	33.82	62.44	74	-11.56	Peak
15540	35.13	0	100	V	38.54	8.26	33.82	48.11	54	-5.89	Ave
15540	35.65	0	100	H	38.54	8.26	33.82	48.63	54	-5.37	Ave
20720	47.70	0	100	V	34.79	9.41	34.79	57.11	74	-16.89	Peak
20720	47.70	0	100	H	34.79	9.41	34.79	57.11	74	-16.89	Peak
20720	34.93	0	100	V	34.79	9.41	34.79	44.34	54	-9.66	Ave
20720	34.97	0	100	H	34.79	9.41	34.79	44.38	54	-9.62	Ave
Middle Channel 5200 MHz, measured at 3 meters											
10400	50.29	0	100	V	38.845	6.91	33.87	62.18	74	-11.82	Peak
10400	47.96	0	100	H	38.845	6.91	33.87	59.85	74	-14.15	Peak
10400	35.76	0	100	V	38.845	6.91	33.87	47.65	54	-6.35	Ave
10400	35.55	0	100	H	38.845	6.91	33.87	47.44	54	-6.56	Ave
15600	48.43	0	100	V	38.59	8.31	33.82	61.51	74	-12.49	Peak
15600	49.56	0	100	H	38.59	8.31	33.82	62.64	74	-11.36	Peak
15600	35.27	0	100	V	38.59	8.31	33.82	48.35	54	-5.65	Ave
15600	35.82	0	100	H	38.59	8.31	33.82	48.90	54	-5.10	Ave
20800	47.38	0	100	V	34.74	9.47	34.74	56.85	74	-17.15	Peak
20800	47.73	0	100	H	34.74	9.47	34.74	57.20	74	-16.80	Peak
20800	34.46	0	100	V	34.74	9.47	34.74	43.93	54	-10.07	Ave
20800	34.94	0	100	H	34.74	9.47	34.74	44.41	54	-9.59	Ave
High Channel 5240 MHz, measured at 3 meters											
10480	50.14	0	100	V	38.55	6.97	34.71	60.95	74	-13.05	Peak
10480	47.34	0	100	H	38.55	6.97	34.71	58.15	74	-15.85	Peak
10480	35.65	0	100	V	38.55	6.97	34.71	46.46	54	-7.54	Ave
10480	35.86	0	100	H	38.55	6.97	34.71	46.67	54	-7.33	Ave
15720	49.27	0	100	V	38.61	8.34	33.78	62.44	74	-11.56	Peak
15720	49.24	0	100	H	38.61	8.34	33.78	62.41	74	-11.59	Peak
15720	35.80	0	100	V	38.61	8.34	33.78	48.97	54	-5.03	Ave
15720	35.92	0	100	H	38.61	8.34	33.78	49.09	54	-4.91	Ave
20960	47.33	0	100	V	34.71	9.67	34.71	57.00	74	-17.00	Peak
20960	47.41	0	100	H	34.71	9.67	34.71	57.08	74	-16.92	Peak
20960	34.48	0	100	V	34.71	9.67	34.71	44.15	54	-9.85	Ave
20960	35.06	0	100	H	34.71	9.67	34.71	44.73	54	-9.27	Ave

802.11n-HT40 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5190 MHz, measured at 3 meters											
10380	50.17	0	100	V	38.1	6.89	33.87	61.29	74	-12.71	Peak
10380	47.81	0	100	H	38.1	6.89	33.87	58.93	74	-15.07	Peak
10380	35.99	0	100	V	38.1	6.89	33.87	47.11	54	-6.89	Ave
10380	35.49	0	100	H	38.1	6.89	33.87	46.61	54	-7.39	Ave
15570	48.85	0	100	V	38.54	8.28	33.82	61.85	74	-12.15	Peak
15570	49.30	0	100	H	38.54	8.28	33.82	62.30	74	-11.70	Peak
15570	35.06	0	100	V	38.54	8.28	33.82	48.06	54	-5.94	Ave
15570	35.16	0	100	H	38.54	8.28	33.82	48.16	54	-5.84	Ave
20760	46.81	0	100	V	34.79	9.41	34.79	56.22	74	-17.78	Peak
20760	48.18	0	100	H	34.79	9.41	34.79	57.59	74	-16.41	Peak
20760	34.69	0	100	V	34.79	9.41	34.79	44.10	54	-9.90	Ave
20760	34.87	0	100	H	34.79	9.41	34.79	44.28	54	-9.72	Ave
High Channel 5230 MHz, measured at 3 meters											
10460	50.58	0	100	V	38.55	6.96	34.71	61.38	74	-12.62	Peak
10460	47.41	0	100	H	38.55	6.96	34.71	58.21	74	-15.79	Peak
10460	35.82	0	100	V	38.55	6.96	34.71	46.62	54	-7.38	Ave
10460	35.67	0	100	H	38.55	6.96	34.71	46.47	54	-7.53	Ave
15690	48.50	0	100	V	38.61	8.33	33.78	61.66	74	-12.34	Peak
15690	49.34	0	100	H	38.61	8.33	33.78	62.50	74	-11.50	Peak
15690	35.91	0	100	V	38.61	8.33	33.78	49.07	54	-4.93	Ave
15690	35.64	0	100	H	38.61	8.33	33.78	48.80	54	-5.20	Ave
20920	47.08	0	100	V	34.71	9.66	34.71	56.74	74	-17.26	Peak
20920	47.61	0	100	H	34.71	9.66	34.71	57.27	74	-16.73	Peak
20920	34.82	0	100	V	34.71	9.66	34.71	44.48	54	-9.52	Ave
20920	34.32	0	100	H	34.71	9.66	34.71	43.98	54	-10.02	Ave

802.11ac-VHT80 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
5210 MHz, measured at 3 meters											
10420	43.62	0	100	V	38.418	4.09	33.87	52.258	74	-21.742	Peak
10420	43.54	0	100	H	38.418	4.09	33.87	52.178	74	-21.822	Peak
10420	29.74	0	100	V	38.418	4.09	33.87	38.378	54	-15.622	Ave
10420	29.25	0	100	H	38.418	4.09	33.87	37.888	54	-16.112	Ave
15630	44.28	0	100	V	37.914	4.93	34.34	52.784	74	-21.216	Peak
15630	44.35	0	100	H	37.914	4.93	34.34	52.854	74	-21.146	Peak
15630	29.28	0	100	V	37.914	4.93	34.34	37.784	54	-16.216	Ave
15630	29.29	0	100	H	37.914	4.93	34.34	37.794	54	-16.206	Ave
20840	38.81	0	100	V	34.6	5.79	33.97	45.23	74	-28.77	Peak
20840	38.99	0	100	H	34.6	5.79	33.97	45.41	74	-28.59	Peak
20840	24.42	0	100	V	34.6	5.79	33.97	30.84	54	-23.16	Ave
20840	24.41	0	100	H	34.6	5.79	33.97	30.83	54	-23.17	Ave

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5.8 GHz Band

802.11a mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5745 MHz, measured at 3 meters											
5460	47.44	0	100	V	34.079	2.89	35.54	48.869	74	-25.131	Peak
5460	49.32	73	100	H	34.079	2.89	35.54	50.749	74	-23.251	Peak
5460	32.57	0	100	V	34.079	2.89	35.54	33.999	54	-20.001	Ave
5460	34.12	0	100	H	34.079	2.89	35.54	35.549	54	-18.451	Ave
11490	44.02	0	100	V	38.1	4.07	33.87	52.32	74	-21.68	Peak
11490	44.13	0	100	H	38.1	4.07	33.87	52.43	74	-21.57	Peak
11490	29.13	0	100	V	38.1	4.07	33.87	37.43	54	-16.57	Ave
11490	29.01	0	100	H	38.1	4.07	33.87	37.31	54	-16.69	Ave
17235	41.64	0	100	V	42.941	5.17	33.82	55.931	74	-18.069	Peak
17235	41.9	0	100	H	42.941	5.17	33.82	56.191	74	-17.809	Peak
17235	26.45	0	100	V	42.941	5.17	33.82	40.741	54	-13.259	Ave
17235	26.87	0	100	H	42.941	5.17	33.82	41.161	54	-12.839	Ave
22980	42.85	0	100	V	35.001	6.04	34.79	49.101	74	-24.899	Peak
22980	43.23	0	100	H	35.001	6.04	34.79	49.481	74	-24.519	Peak
22980	27.79	0	100	V	35.001	6.04	34.79	34.041	54	-19.959	Ave
22980	27.76	0	100	H	35.001	6.04	34.79	34.011	54	-19.989	Ave
Middle Channel 5785 MHz, measured at 3 meters											
11570	45.33	0	100	V	38.845	4.07	33.87	54.375	74	-19.625	Peak
11570	44.05	0	100	H	38.845	4.07	33.87	53.095	74	-20.905	Peak
11570	28.97	0	100	V	38.845	4.07	33.87	38.015	54	-15.985	Ave
11570	28.84	0	100	H	38.845	4.07	33.87	37.885	54	-16.115	Ave
17355	41.79	0	100	V	46.58	5.17	33.82	59.72	74	-14.28	Peak
17355	41.53	0	100	H	46.58	5.17	33.82	59.46	74	-14.54	Peak
17355	26.88	0	100	V	46.58	5.17	33.82	44.81	54	-9.19	Ave
17355	26.87	0	100	H	46.58	5.17	33.82	44.8	54	-9.2	Ave
23140	43.39	0	100	V	35.001	6.04	34.74	49.691	74	-24.309	Peak
23140	43.9	0	100	H	35.001	6.04	34.74	50.201	74	-23.799	Peak
23140	28.18	0	100	V	35.001	6.04	34.74	34.481	54	-19.519	Ave
23140	28.32	0	100	H	35.001	6.04	34.74	34.621	54	-19.379	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 5825 MHz, measured at 3 meters											
7250	43.49	0	100	V	35.703	3.25	34.43	48.013	74	-25.987	Peak
7250	44.57	0	100	H	35.703	3.25	34.43	49.093	74	-24.907	Peak
7250	29.67	0	100	V	35.703	3.25	34.43	34.193	54	-19.807	Ave
7250	30.11	0	100	H	35.703	3.25	34.43	34.633	54	-19.367	Ave
11650	43.86	0	100	V	39.015	4.07	34.27	52.675	74	-21.325	Peak
11650	44.32	0	100	H	39.015	4.07	34.27	53.135	74	-20.865	Peak
11650	28.54	0	100	V	39.015	4.07	34.27	37.355	54	-16.645	Ave
11650	28.7	0	100	H	39.015	4.07	34.27	37.515	54	-16.485	Ave
17475	41.72	0	100	V	45.021	5.17	33.78	58.131	74	-15.869	Peak
17475	41.61	0	100	H	45.021	5.17	33.78	58.021	74	-15.979	Peak
17475	26.3	0	100	V	45.021	5.17	33.78	42.711	54	-11.289	Ave
17475	26.72	0	100	H	45.021	5.17	33.78	43.131	54	-10.869	Ave
23300	44.02	0	100	V	34.854	6.04	34.71	50.204	74	-23.796	Peak
23300	43.35	0	100	H	34.854	6.04	34.71	49.534	74	-24.466	Peak
23300	29.31	0	100	V	34.854	6.04	34.71	35.494	54	-18.506	Ave
23300	28.1	0	100	H	34.854	6.04	34.71	34.284	54	-19.716	Ave

802.11n-HT20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5745 MHz, measured at 3 meters											
5460	48.23	325	100	V	34.079	2.89	34.54	50.659	74	-23.341	Peak
5460	48.75	282	100	H	34.079	2.89	34.54	51.179	74	-22.821	Peak
5460	34.22	325	100	V	34.079	2.89	34.54	36.649	54	-17.351	Ave
5460	24.83	282	100	H	34.079	2.89	34.54	27.259	54	-26.741	Ave
11490	45.16	0	100	V	38.1	4.07	33.87	53.46	74	-20.54	Peak
11490	43.77	0	100	H	38.1	4.07	33.87	52.07	74	-21.93	Peak
11490	31.2	0	100	V	38.1	4.07	33.87	39.5	54	-14.5	Ave
11490	29.09	0	100	H	38.1	4.07	33.87	37.39	54	-16.61	Ave
17235	41.62	0	100	V	42.941	5.17	33.82	55.911	74	-18.089	Peak
17235	41.51	0	100	H	42.941	5.17	33.82	55.801	74	-18.199	Peak
17235	27.21	0	100	V	42.941	5.17	33.82	41.501	54	-12.499	Ave
17235	26.24	0	100	H	42.941	5.17	33.82	40.531	54	-13.469	Ave
22980	43.18	0	100	V	35.001	6.04	34.79	49.431	74	-24.569	Peak
22980	43.38	0	100	H	35.001	6.04	34.79	49.631	74	-24.369	Peak
22980	27.58	0	100	V	35.001	6.04	34.79	33.831	54	-20.169	Ave
22980	27.84	0	100	H	35.001	6.04	34.79	34.091	54	-19.909	Ave
Middle Channel 5785 MHz, measured at 3 meters											
11570	44.06	0	100	V	38.845	4.07	33.87	53.105	74	-20.895	Peak
11570	43.74	0	100	H	38.845	4.07	33.87	52.785	74	-21.215	Peak
11570	28.9	0	100	V	38.845	4.07	33.87	37.945	54	-16.055	Ave
11570	29	0	100	H	38.845	4.07	33.87	38.045	54	-15.955	Ave
17355	41.99	0	100	V	46.58	5.17	33.82	59.92	74	-14.08	Peak
17355	41.49	0	100	H	46.58	5.17	33.82	59.42	74	-14.58	Peak
17355	26.93	0	100	V	46.58	5.17	33.82	44.86	54	-9.14	Ave
17355	26.89	0	100	H	46.58	5.17	33.82	44.82	54	-9.18	Ave
23140	44.14	0	100	V	35.001	6.04	34.74	50.441	74	-23.559	Peak
23140	43.21	0	100	H	35.001	6.04	34.74	49.511	74	-24.489	Peak
23140	28.38	0	100	V	35.001	6.04	34.74	34.681	54	-19.319	Ave
23140	28.27	0	100	H	35.001	6.04	34.74	34.571	54	-19.429	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 5825 MHz, measured at 3 meters											
7250	45.35	0	100	V	35.703	3.25	34.43	49.873	74	-24.127	Peak
7250	45.42	0	100	H	35.703	3.25	34.43	49.943	74	-24.057	Peak
7250	30.4	0	100	V	35.703	3.25	34.43	34.923	54	-19.077	Ave
7250	30.58	0	100	H	35.703	3.25	34.43	35.103	54	-18.897	Ave
11650	44.37	0	100	V	39.015	4.07	34.27	53.185	74	-20.815	Peak
11650	44.02	0	100	H	39.015	4.07	34.27	52.835	74	-21.165	Peak
11650	28.99	0	100	V	39.015	4.07	34.27	37.805	54	-16.195	Ave
11650	28.9	0	100	H	39.015	4.07	34.27	37.715	54	-16.285	Ave
17475	41.08	0	100	V	45.021	5.17	33.78	57.491	74	-16.509	Peak
17475	41.61	0	100	H	45.021	5.17	33.78	58.021	74	-15.979	Peak
17475	26.48	0	100	V	45.021	5.17	33.78	42.891	54	-11.109	Ave
17475	26.58	0	100	H	45.021	5.17	33.78	42.991	54	-11.009	Ave
23300	42.86	0	100	V	34.854	6.04	34.71	49.044	74	-24.956	Peak
23300	42.92	0	100	H	34.854	6.04	34.71	49.104	74	-24.896	Peak
23300	27.84	0	100	V	34.854	6.04	34.71	34.024	54	-19.976	Ave
23300	27.88	0	100	H	34.854	6.04	34.71	34.064	54	-19.936	Ave

802.11n-HT40 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5755 MHz, measured at 3 meters											
5460	47.96	325	105	V	34.079	2.89	34.54	50.389	74	-23.611	Peak
5460	49.09	82	100	H	34.079	2.89	34.54	51.519	74	-22.481	Peak
5460	34.11	325	105	V	34.079	2.89	34.54	36.539	54	-17.461	Ave
5460	37.54	82	100	H	34.079	2.89	34.54	39.969	54	-14.031	Ave
11510	44.65	0	100	V	38.1	4.07	33.87	52.95	74	-21.05	Peak
11510	44.09	0	100	H	38.1	4.07	33.87	52.39	74	-21.61	Peak
11510	28.65	0	100	V	38.1	4.07	33.87	36.95	54	-17.05	Ave
11510	28.97	0	100	H	38.1	4.07	33.87	37.27	54	-16.73	Ave
17265	41.99	0	100	V	42.941	5.17	33.82	56.281	74	-17.719	Peak
17265	42.05	0	100	H	42.941	5.17	33.82	56.341	74	-17.659	Peak
17265	26.93	0	100	V	42.941	5.17	33.82	41.221	54	-12.779	Ave
17265	27.02	0	100	H	42.941	5.17	33.82	41.311	54	-12.689	Ave
23020	43.27	0	100	V	35.001	6.04	34.79	49.521	74	-24.479	Peak
23020	43.16	0	100	H	35.001	6.04	34.79	49.411	74	-24.589	Peak
23020	27.92	0	100	V	35.001	6.04	34.79	34.171	54	-19.829	Ave
23020	27.82	0	100	H	35.001	6.04	34.79	34.071	54	-19.929	Ave
High Channel 5795 MHz, measured at 3 meters											
7250	45.42	0	100	V	35.703	3.25	34.43	49.943	74	-24.057	Peak
7250	45.65	0	100	H	35.703	3.25	34.43	50.173	74	-23.827	Peak
7250	30.36	0	100	V	35.703	3.25	34.43	34.883	54	-19.117	Ave
7250	30.32	0	100	H	35.703	3.25	34.43	34.843	54	-19.157	Ave
11590	44.25	0	100	V	38.845	4.07	33.87	53.295	74	-20.705	Peak
11590	44.84	0	100	H	38.845	4.07	33.87	53.885	74	-20.115	Peak
11590	29.05	0	100	V	38.845	4.07	33.87	38.095	54	-15.905	Ave
11590	29.05	0	100	H	38.845	4.07	33.87	38.095	54	-15.905	Ave
17385	42.3	0	100	V	46.58	5.17	33.82	60.23	74	-13.77	Peak
17385	43.51	0	100	H	46.58	5.17	33.82	61.44	74	-12.56	Peak
17385	26.53	0	100	V	46.58	5.17	33.82	44.46	54	-9.54	Ave
17385	27.11	0	100	H	46.58	5.17	33.82	45.04	54	-8.96	Ave
23180	43.05	0	100	V	35.001	6.04	34.74	49.351	74	-24.649	Peak
23180	43.21	0	100	H	35.001	6.04	34.74	49.511	74	-24.489	Peak
23180	27.62	0	100	V	35.001	6.04	34.74	33.921	54	-20.079	Ave
23180	27.71	0	100	H	35.001	6.04	34.74	34.011	54	-19.989	Ave

802.11ac-80 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Channel 5775 MHz, measured at 3 meters											
5460	45.35	0	100	V	34.079	2.89	34.54	47.779	74	-26.221	Peak
5460	51.27	340	100	H	34.079	2.89	34.54	53.699	74	-20.301	Peak
5460	31.3	0	100	V	34.079	2.89	34.54	33.729	54	-20.271	Ave
5460	34.74	340	100	H	34.079	2.89	34.54	37.169	54	-16.831	Ave
7250	45.63	0	100	V	35.703	3.25	34.43	50.153	74	-23.847	Peak
7250	45.5	0	100	H	35.703	3.25	34.43	50.023	74	-23.977	Peak
7250	29.92	0	100	V	35.703	3.25	34.43	34.443	54	-19.557	Ave
7250	29.85	0	100	H	35.703	3.25	34.43	34.373	54	-19.627	Ave
11550	44.86	0	100	V	38.845	4.07	33.87	53.905	74	-20.095	Peak
11550	44.41	0	100	H	38.845	4.07	33.87	53.455	74	-20.545	Peak
11550	29.24	0	100	V	38.845	4.07	33.87	38.285	54	-15.715	Ave
11550	29.26	0	100	H	38.845	4.07	33.87	38.305	54	-15.695	Ave
17325	42.07	0	100	V	46.58	5.17	33.82	60	74	-14	Peak
17325	42.44	0	100	H	46.58	5.17	33.82	60.37	74	-13.63	Peak
17325	27.02	0	100	V	46.58	5.17	33.82	44.95	54	-9.05	Ave
17325	27.13	0	100	H	46.58	5.17	33.82	45.06	54	-8.94	Ave
23100	43.62	0	100	V	35.001	6.04	34.74	49.921	74	-24.079	Peak
23100	43.34	0	100	H	35.001	6.04	34.74	49.641	74	-24.359	Peak
23100	28.37	0	100	V	35.001	6.04	34.74	34.671	54	-19.329	Ave
23100	28.45	0	100	H	35.001	6.04	34.74	34.751	54	-19.249	Ave

8 FCC §15.407(a) & §15.407(e) – Emission Bandwidth

8.1 Applicable Standards

FCC §15.407(a)

26 dB emission bandwidth is measured as reference for power and PSD measurement.

FCC §15.407(e)

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

8.2 Measurement Procedure

The measurements are base on FCC KDB 789033 D02 General UNII Test Procedures New Rules v01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section C: Emission bandwidth and section D: 99 Percent Occupied Bandwidth

8.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2014-10-24	1 year

Statement of Traceability: BACL Corp. *attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.*

8.4 Test Environmental Conditions

Temperature:	22-24 ºC
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 kPa

The testing was performed by Rui Zhou from 2014-12-15 at RF site.

8.5 Test Results

Please refer to the following tables and plots.

5.2 GHz Band

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz) J0	26 dB Emission Bandwidth (MHz) J1	99% Emission Bandwidth (MHz) J0	99% Emission Bandwidth (MHz) J1
802.11a mode					
Low	5180	21.997	21.807	16.7036	16.6602
Middle	5200	22.537	23.933	16.7101	16.7479
High	5240	21.026	21.269	16.6353	16.6198
802.11n-HT20 mode					
Low	5180	22.842	21.611	17.7639	17.7925
Middle	5200	22.636	24.383	17.8167	17.8362
High	5240	22.93	21.661	17.8347	17.7925
802.11n-HT40 mode					
Low	5190	43.203	43.602	36.3319	36.286
High	5230	46.278	46.43	36.3384	36.4563
802.11ac-VHT80 mode					
-	5210	87.581	83.184	75.7568	75.9033

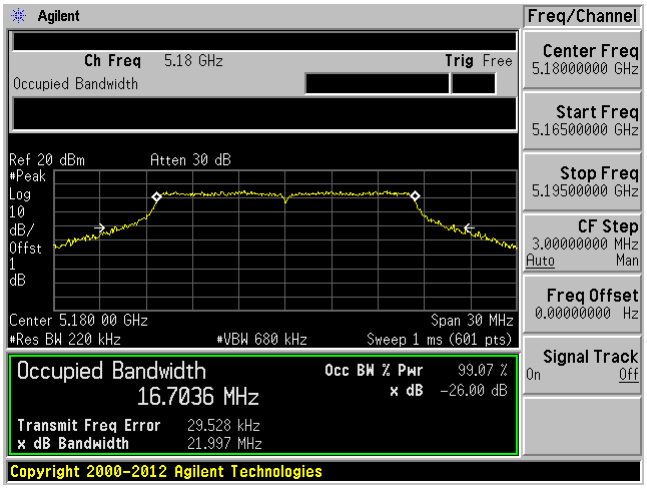
5.8 GHz Band

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz) J0	6 dB Emission Bandwidth (MHz) J1	99% Emission Bandwidth (MHz) J0	99% Emission Bandwidth (MHz) J1	Limit (MHz)	Results
802.11a mode							
Low	5745	16.576	16.51	16.5109	16.4537	> 0.5	Compliant
Middle	5785	16.581	16.442	16.5156	16.4537	> 0.5	Compliant
High	5825	16.565	16.424	16.447	16.4629	> 0.5	Compliant
802.11n-HT20 mode							
Low	5745	17.804	17.639	17.6764	17.6729	> 0.5	Compliant
Middle	5785	17.807	17.73	17.6829	17.6549	> 0.5	Compliant
High	5825	17.73	17.767	17.6775	17.6676	> 0.5	Compliant
802.11n-HT40 mode							
Low	5755	36.598	36.57	36.2339	36.1685	> 0.5	Compliant
High	5795	36.629	36.55	36.2391	36.2183	> 0.5	Compliant
802.11ac 80 mode							
-	5775	76.726	76.661	75.8932	75.7204	> 0.5	Compliant

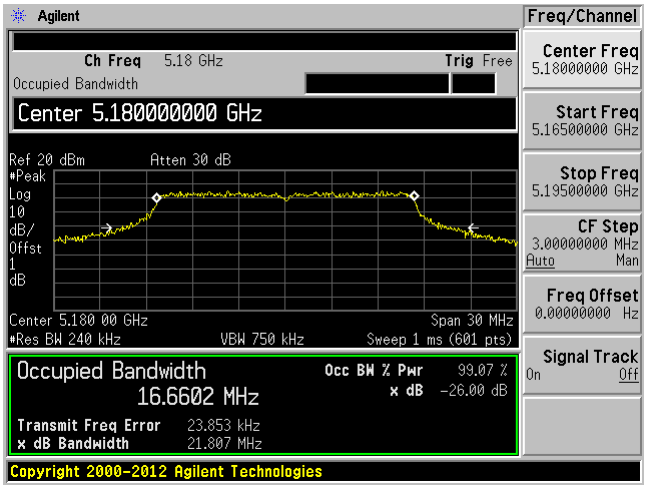
5.2 GHz Band

802.11a mode

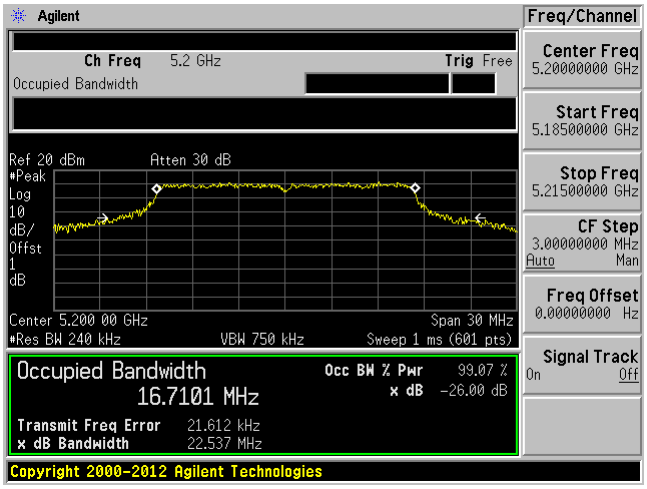
Low channel: 5180 MHz Chain 0



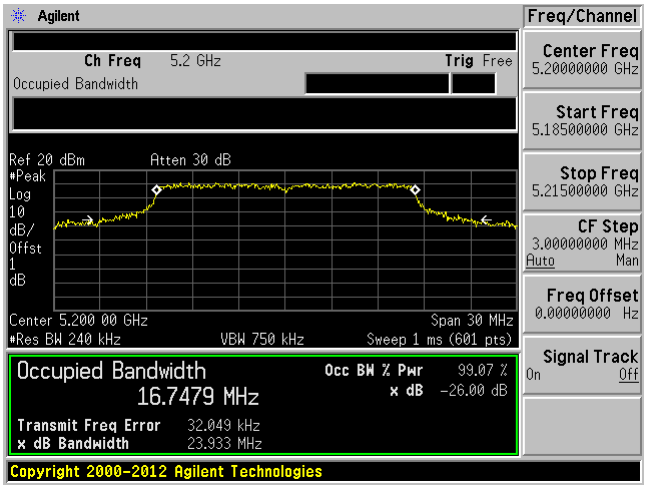
Low channel: 5180 MHz Chain 1



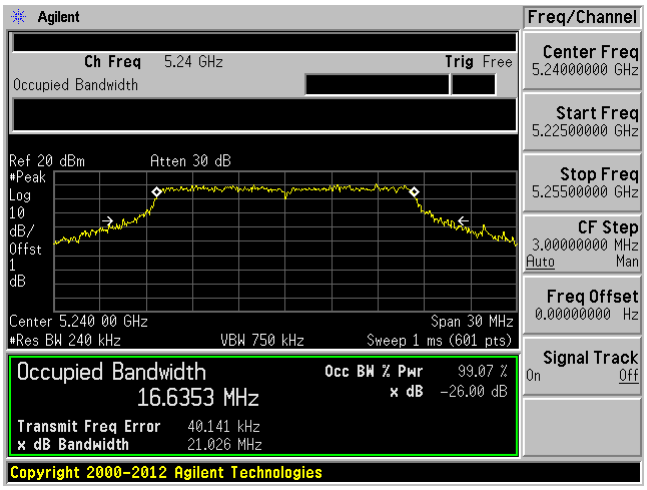
Middle channel: 5200 MHz Chain 0



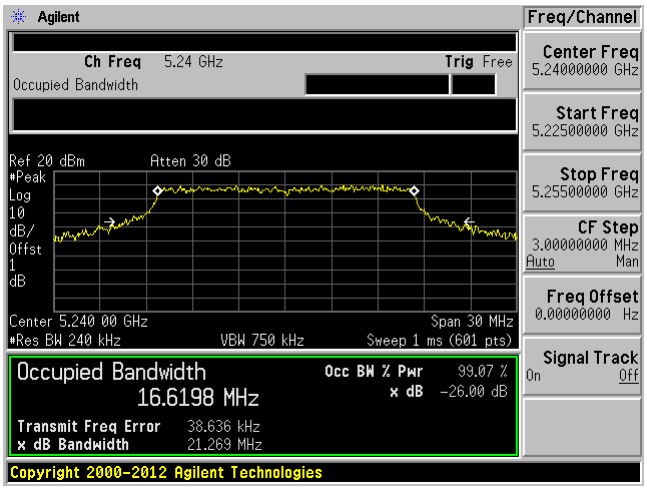
Middle channel: 5200 MHz Chain 1



High channel: 5240 MHz Chain 0

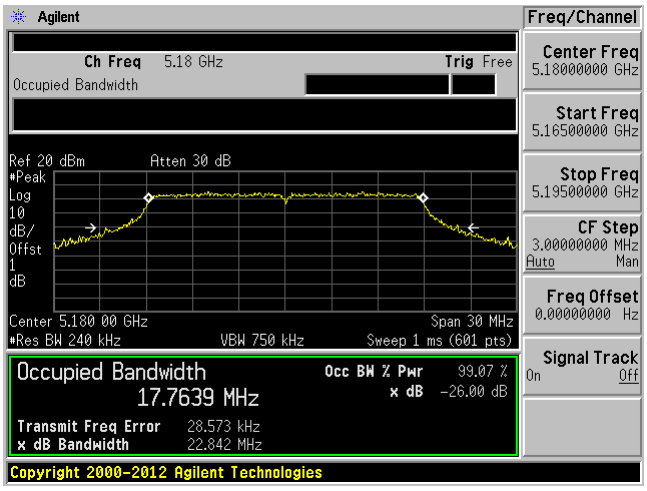


High channel: 5240 MHz Chain 1

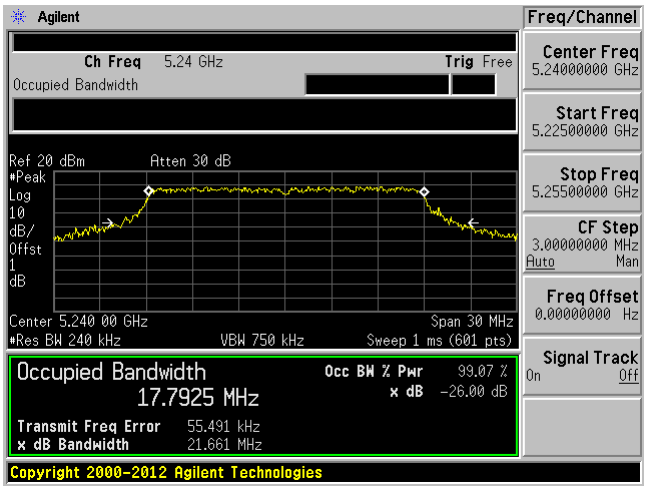


802.11n-HT20 mode

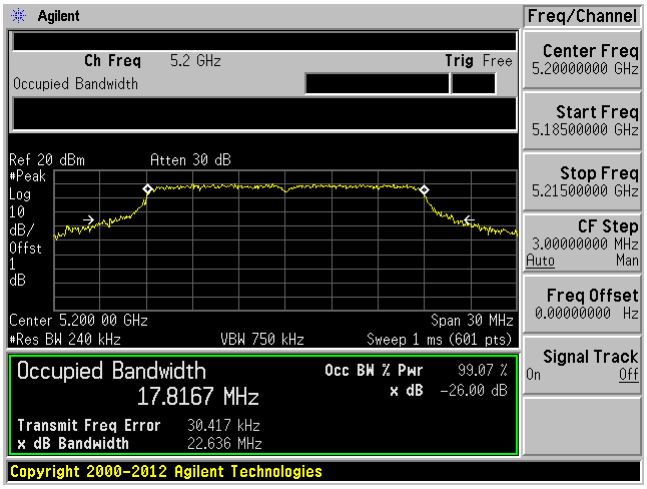
Low channel: 5180 MHz Chain 0



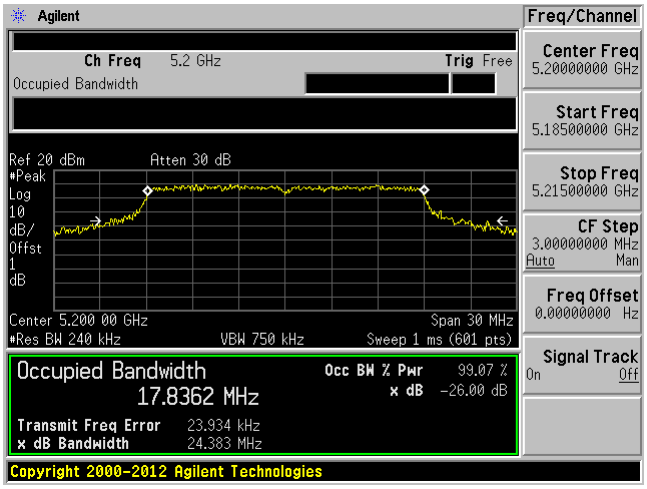
Low channel: 5180 MHz Chain 1



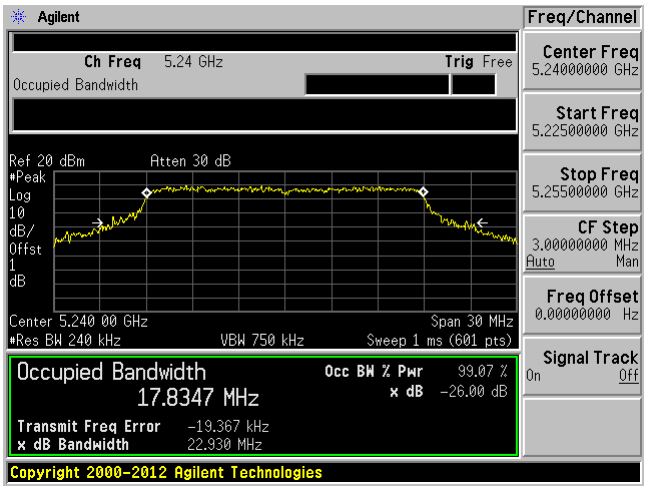
Middle channel: 5200 MHz Chain 0



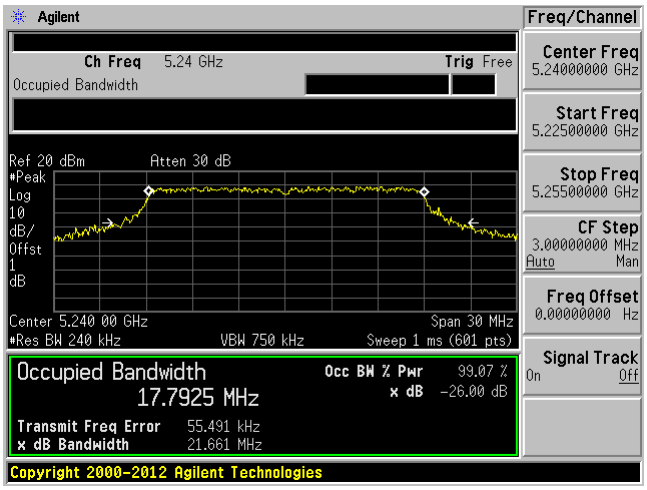
Middle channel: 5200 MHz Chain 1



High channel: 5240 MHz Chain 0

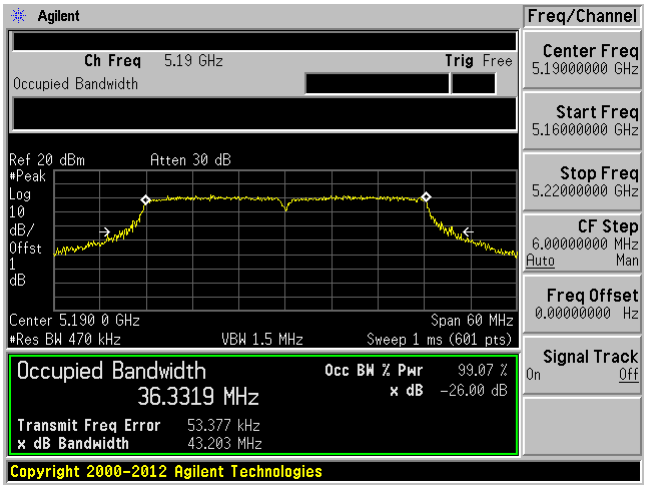


High channel: 5240 MHz Chain 1

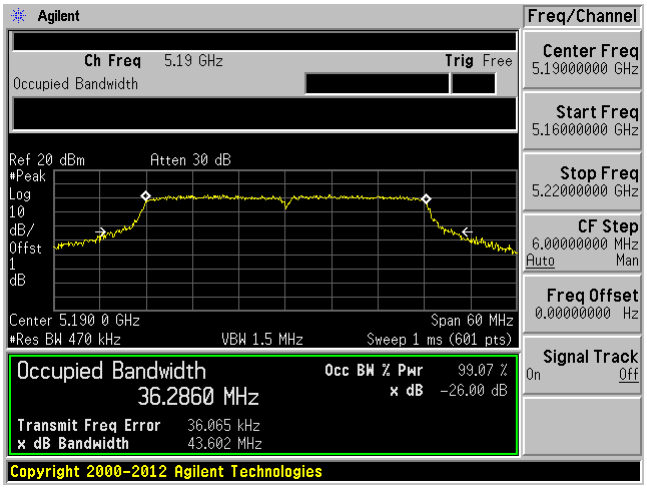


802.11n-HT40 mode

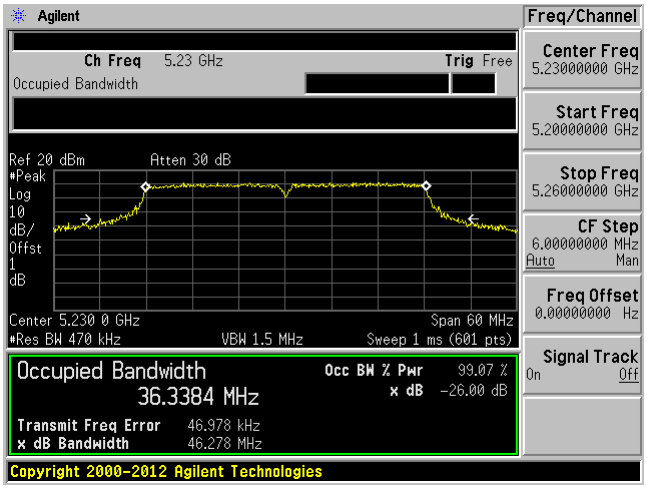
Low channel: 5190 MHz Chain 0



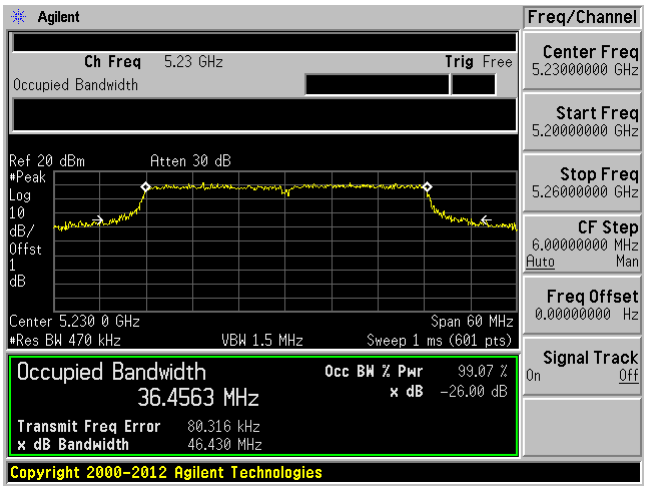
Low channel: 5190 MHz Chain 1



High channel: 5230 MHz Chain 0

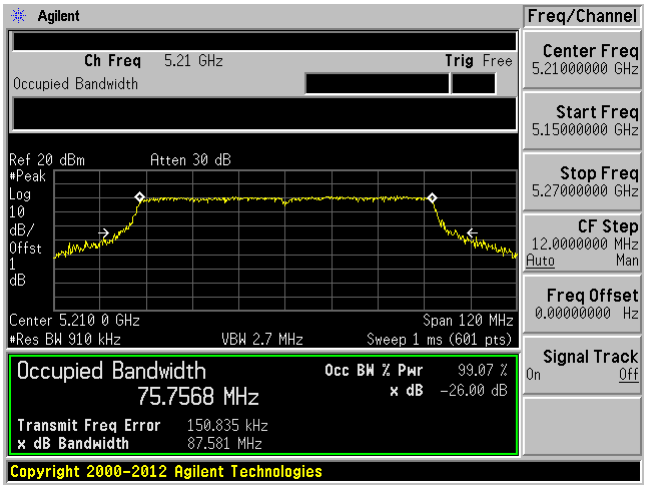


High channel: 5230 MHz Chain 1

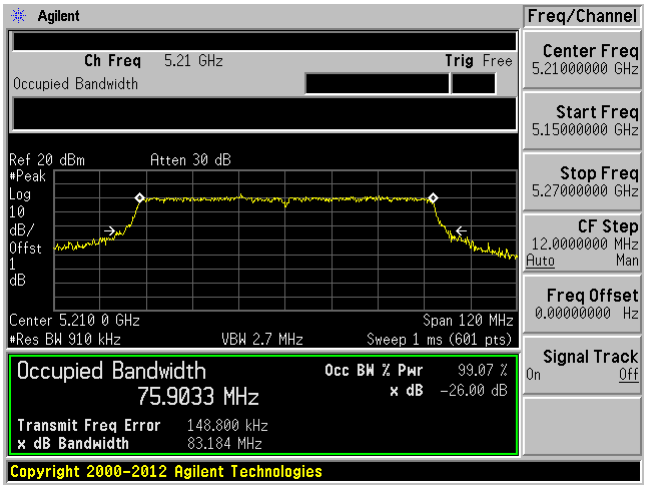


802.11ac-VHT80 mode

Chain 0



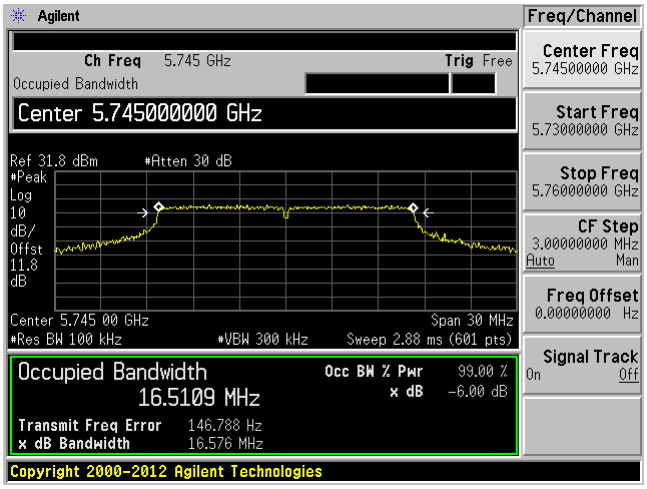
Chain 1



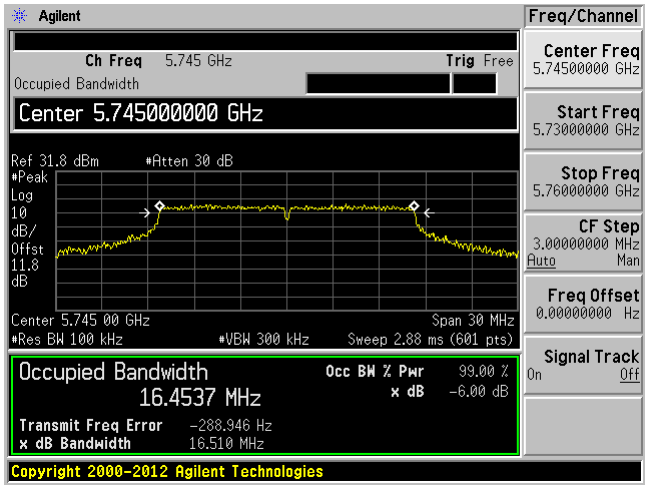
5.8 GHz Band

802.11a mode

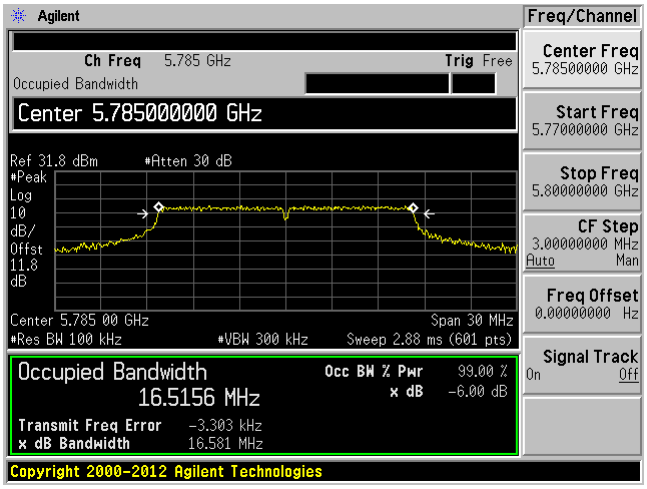
Low channel: 5745 MHz Chain J0



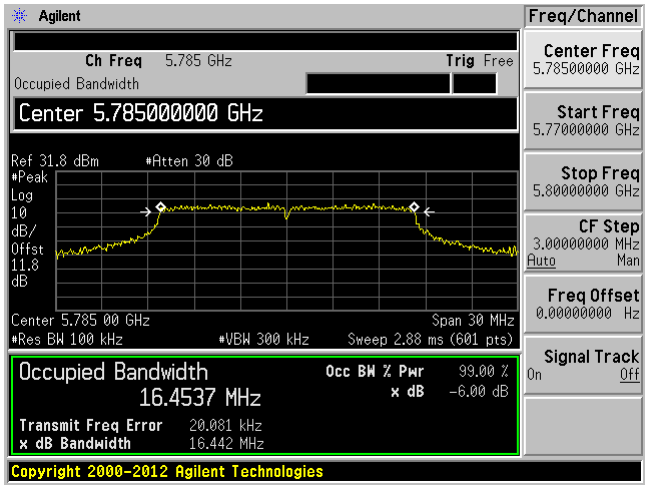
Low channel: 5745 MHz Chain J1



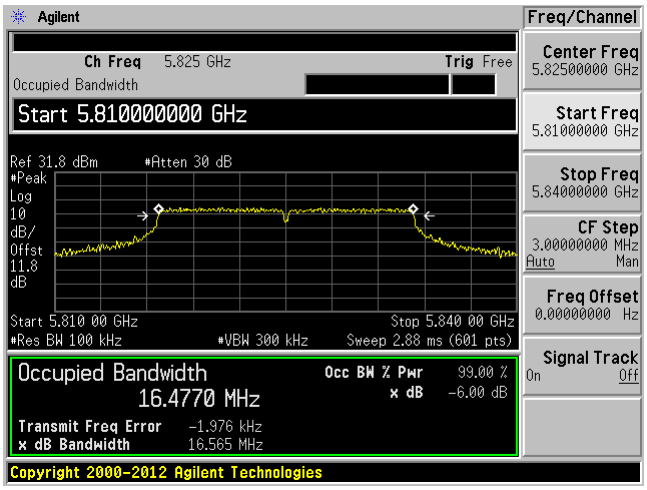
Middle channel: 5785 MHz Chain J0



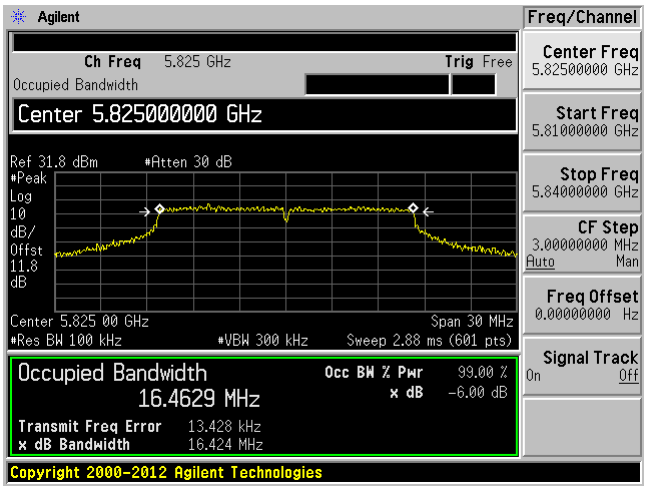
Middle channel: 5785 MHz Chain J1



High channel: 5825 MHz Chain J0

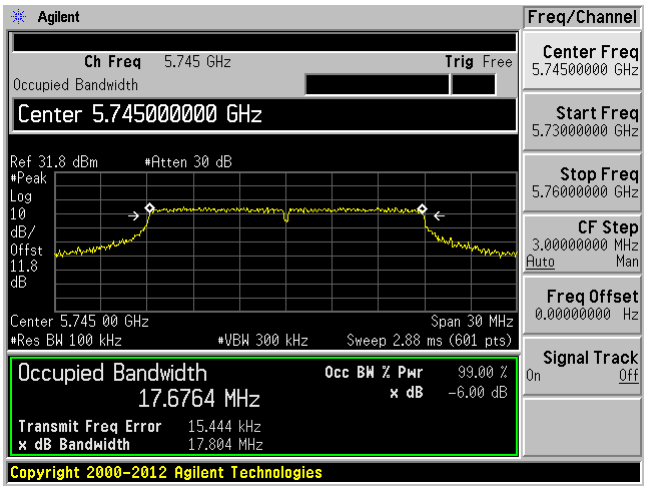


High channel: 5825 MHz Chain J1

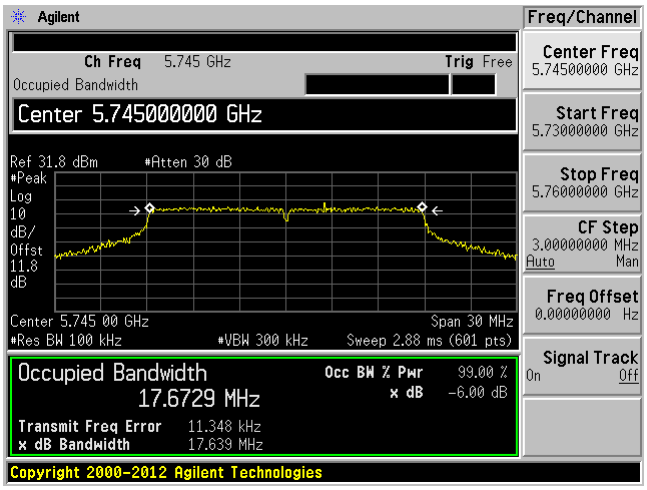


802.11n-HT20 mode

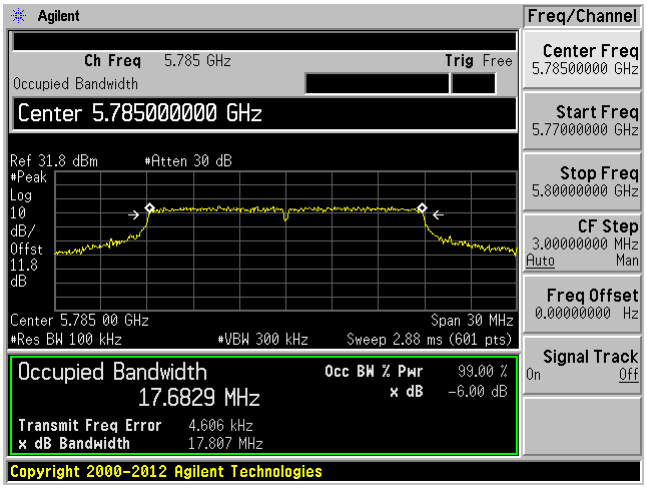
Low channel: 5745 MHz Chain J0



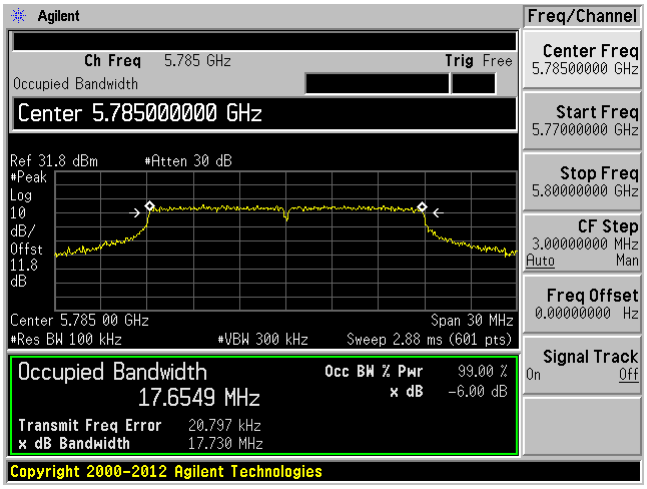
Low channel: 5745 MHz Chain J1



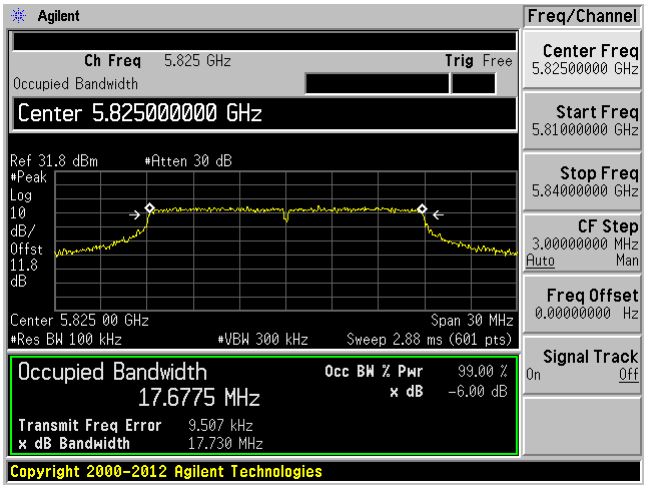
Middle channel: 5785 MHz Chain J0



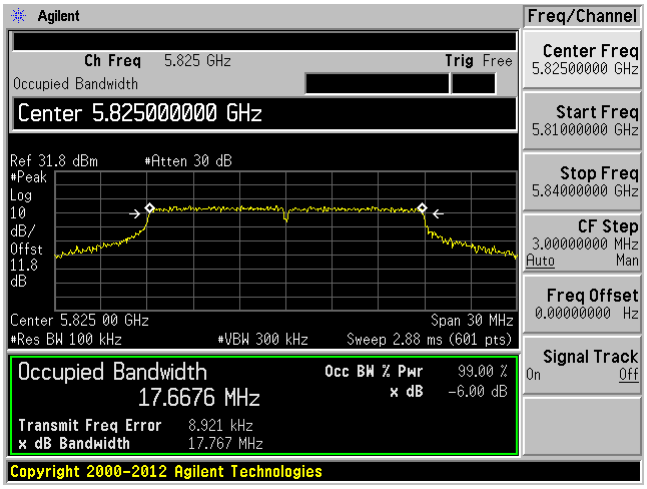
Middle channel: 5785 MHz Chain J1



High channel: 5825 MHz Chain J0

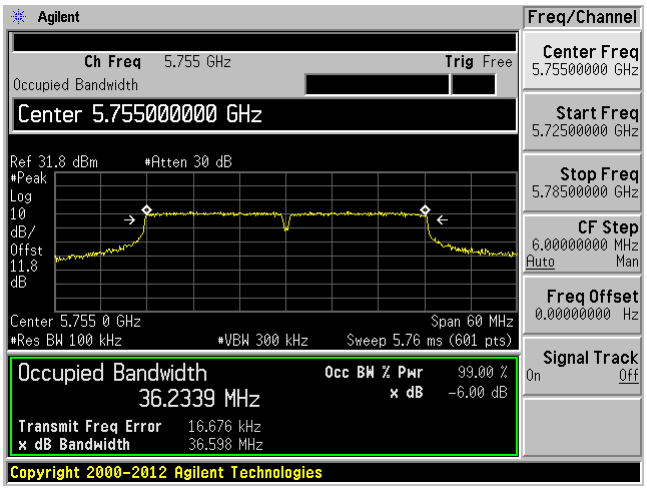


High channel: 5825 MHz Chain J1

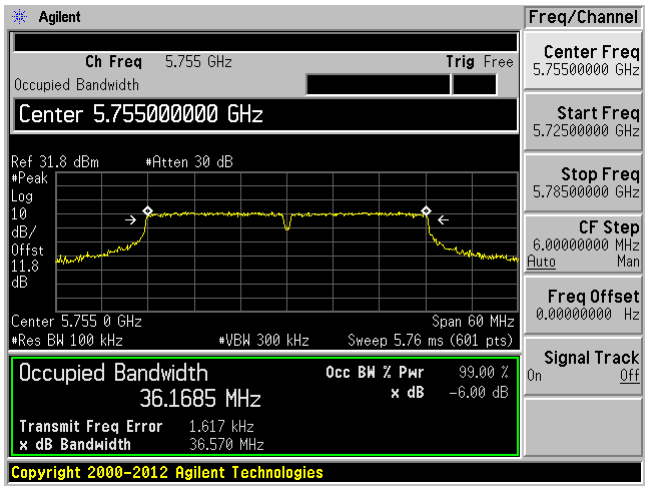


802.11n-HT40 mode

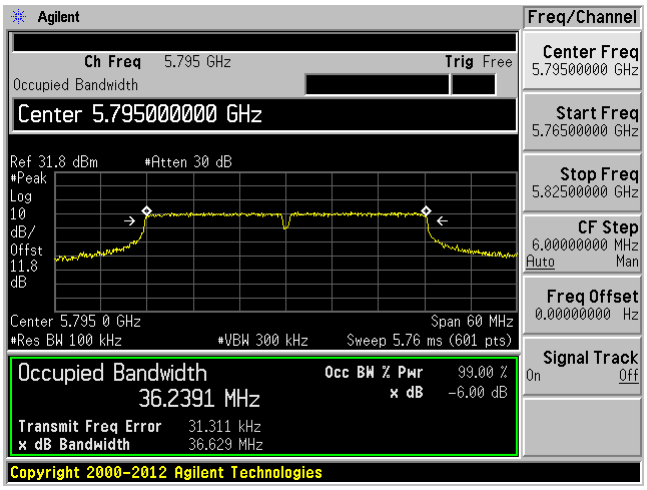
Low channel: 5755 MHz Chain J0



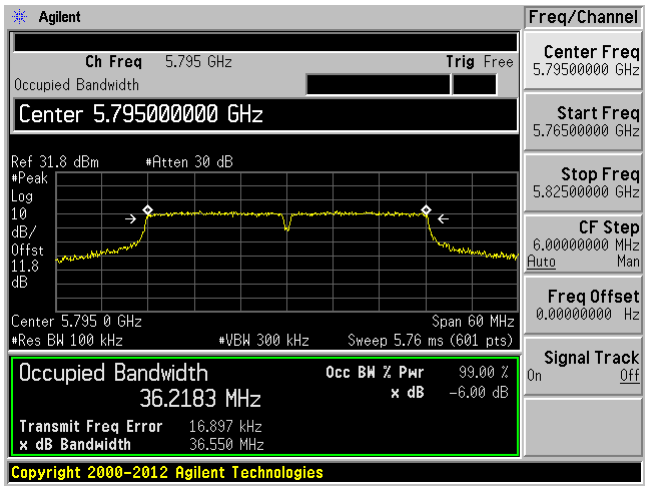
Low channel: 5755 MHz Chain J1



High channel: 5795 MHz Chain J0

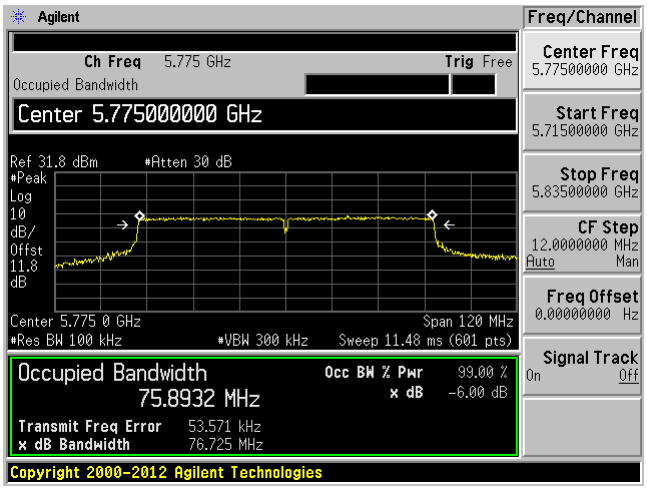


High channel: 5795 MHz Chain J1

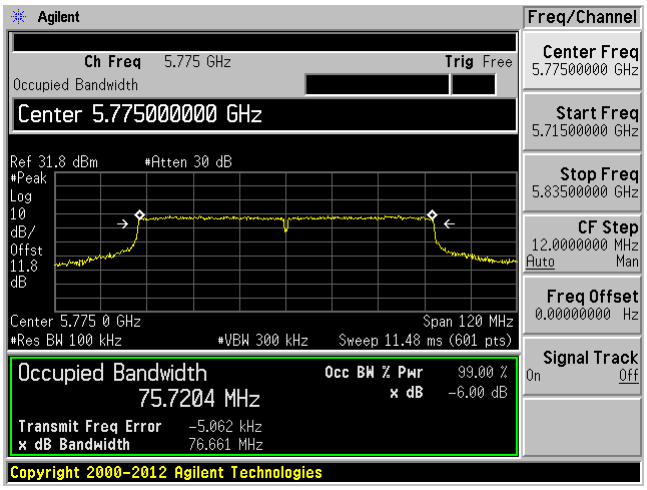


802.11ac-VHT80 mode

Chain J0



Chain J1



9 FCC §407(a) – Maximum Conducted Output Power

9.1 Applicable Standards

According to FCC §15.407(a)

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

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

9.2 Measurement Procedure

Test measurements are based on FCC KDB 789033 D02 General UNII Test Procedures New Rules v01, GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORAMTION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E

9.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2014-10-24	1 year

Statement of Traceability: BACL Corp. *attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.*

9.4 Test Environmental Conditions

Temperature:	22-24º C
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 KPa

The testing was performed by Rui Zhou from 2014-12-15 at RF site.

9.5 Test Results

5.2 GHz Band

Channel	Frequency (MHz)	Conducted Output Power (dBm)		Total Output Power (dBm)	Limit (dBm)	Result	Power Setting
		Chain J0	Chain J1				
802.11a mode							
Low	5180	15.44	14.78	15.44	30	Pass	15.5
Middle	5200	21.79	21.02	21.79	30	Pass	21.5
High	5240	20.58	20.28	20.58	30	Pass	20
802.11n-HT20 mode							
Low	5180	15.42	14.77	18.12	30	Pass	15.5
Middle	5200	21.33	19.77	23.63	30	Pass	21
High	5240	20.64	19.35	23.05	30	Pass	20
802.11n-HT40 mode							
Low	5190	12.59	12.34	15.48	30	Pass	13.5
High	5230	21.66	21.39	24.54	30	Pass	target
802.11ac-VHT80 mode							
-	5210	11.54	11.15	14.36	30	Pass	12.5

5.8 GHz Band

Channel	Frequency (MHz)	Conducted Output Power (dBm)		Total Output Power (dBm)	Limit (dBm)	Margin (dB)
		Chain J0	Chain J1			
802.11a mode						
Low	5745	21.89	22.07	24.99	30	-5.01
Middle	5785	21.79	22.14	24.98	30	-5.02
High	5825	21.09	21.84	24.49	30	-5.51
802.11n-HT20 mode						
Low	5745	20.96	21.26	24.12	30	-5.88
Middle	5785	20.84	21.11	23.99	30	-6.01
High	5825	20.18	20.69	23.45	30	-6.55
802.11n-HT40 mode						
Low	5755	20.67	20.81	23.75	30	-6.25
High	5795	20.42	20.66	23.55	30	-6.45
802.11ac-VHT80 mode						
-	5775	20.36	20.55	23.47	30	-6.53

10 FCC §15.407(b) - Spurious Emissions at Antenna Ports

10.1 Applicable Standards

According to FCC §15.407(b)

(b) (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 e.i.r.p. of −27 dBm/MHz.

(b) (4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz

10.2 Measurement Procedure

The measurements are base on FCC KDB 789033 D02 General UNII Test Procedures New Rules v01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section H: Unwanted emissions measurement

10.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2014-10-24	1 year

Statement of Traceability: BACL Corp. *attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.*

10.4 Test Environmental Conditions

Temperature:	22-24º C
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 KPa

The testing was performed by Rui Zhou from 2014-12-25 at RF site.

10.5 Test Results

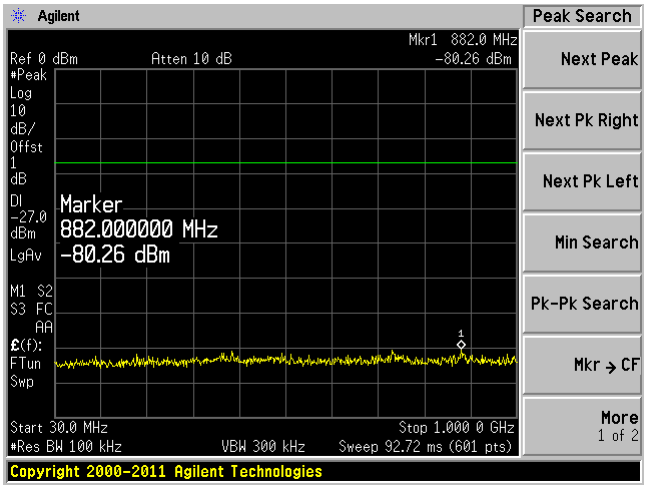
Please refer to following plots of spurious emissions.

Note: the offset include the attenuation, cable loss. And the magin between limit line and the emission covers other requirements in the KDB 789033.

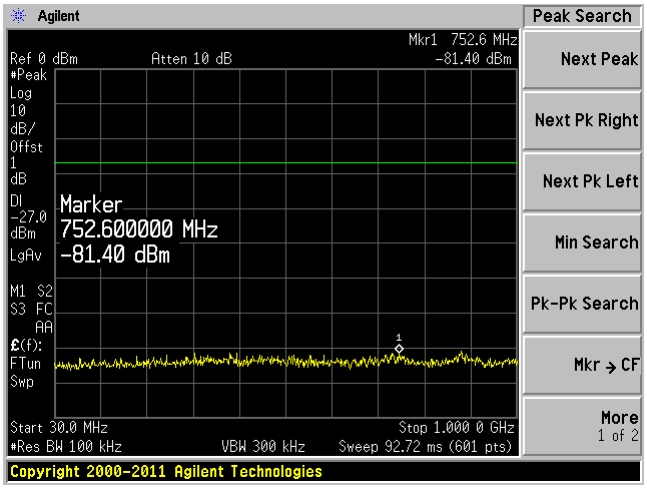
5.2 GHz Band

802.11a, Low Channel, 5180 MHz

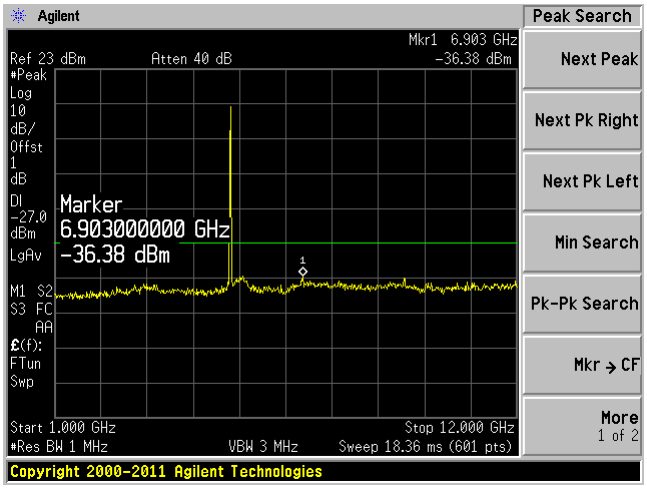
Chain 0, Plot: 30 MHz – 1 GHz



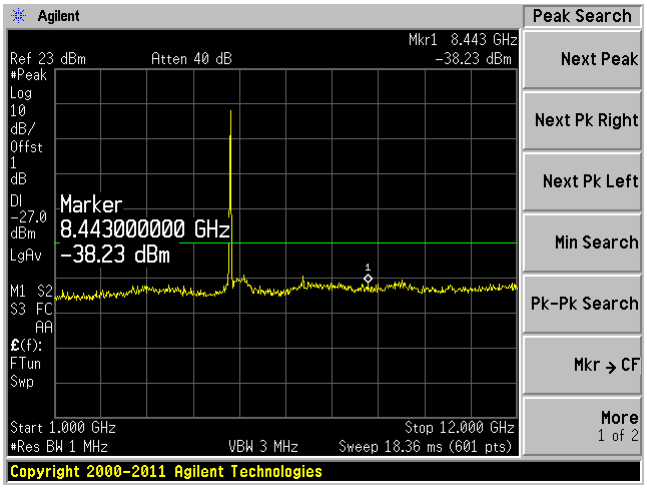
Chain 1, Plot: 30 MHz – 1 GHz



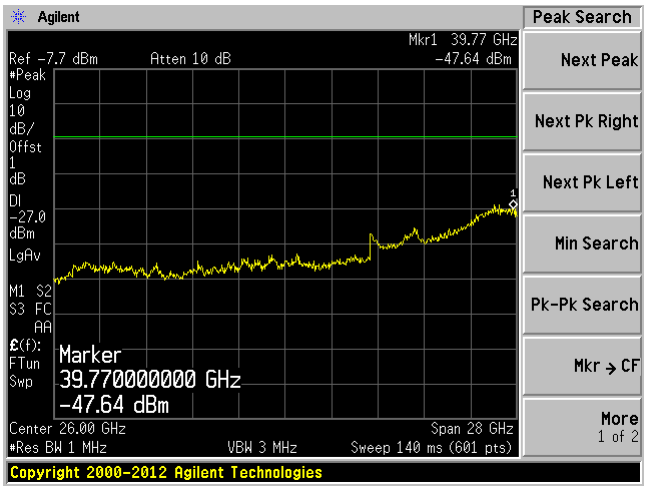
Chain 0, Plot: 1 GHz –12 GHz



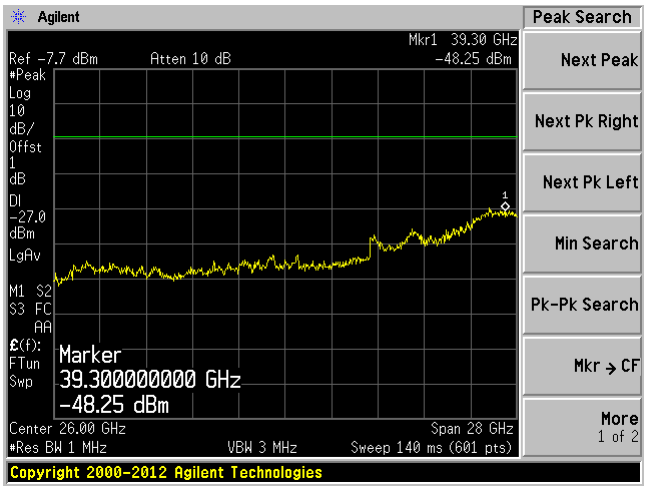
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

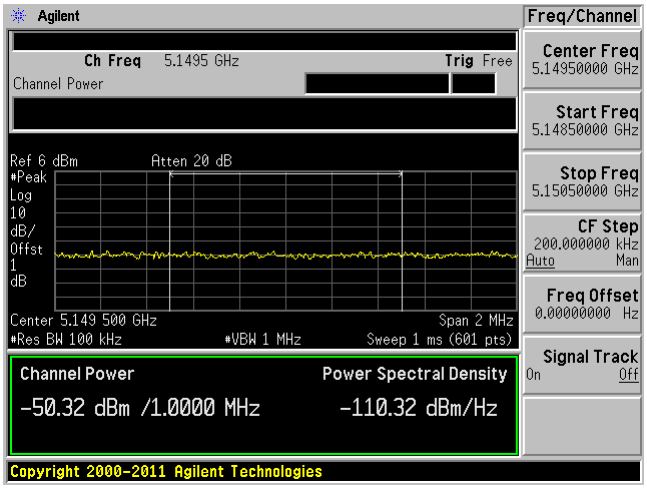


Chain 1, Plot: 12 GHz – 40 GHz

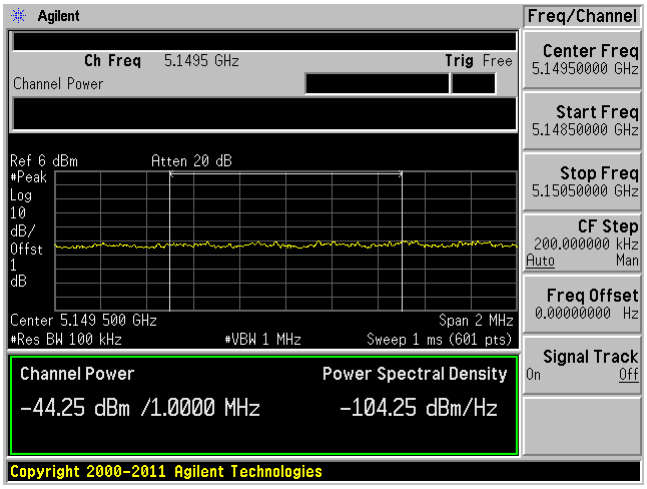


Band Edge Measurement:

Low channel: 5180 MHz Chain 0

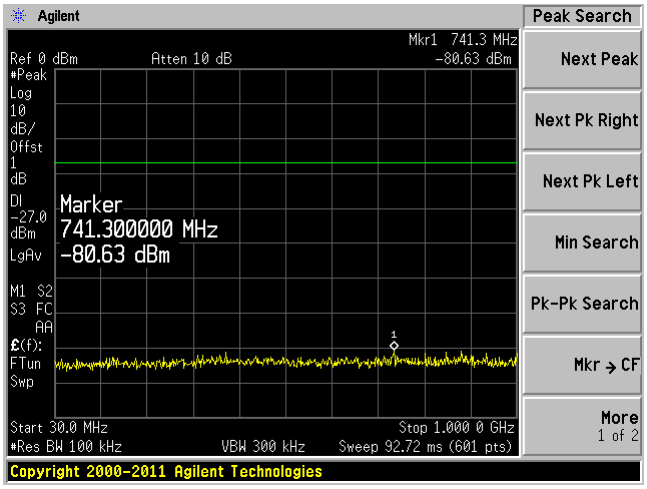


Low channel: 5180 MHz Chain 1

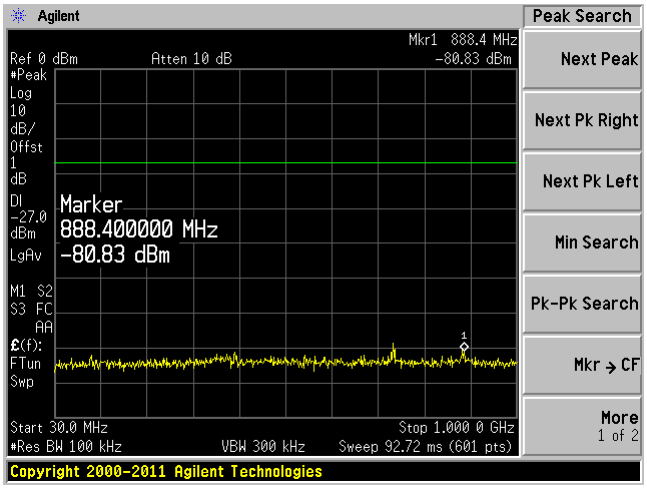


802.11a, Middle Channel, 5200 MHz

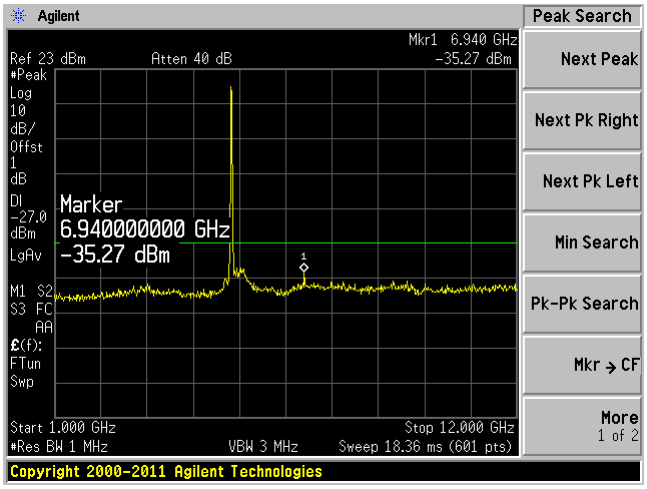
Chain 0, Plot: 30 MHz – 1 GHz



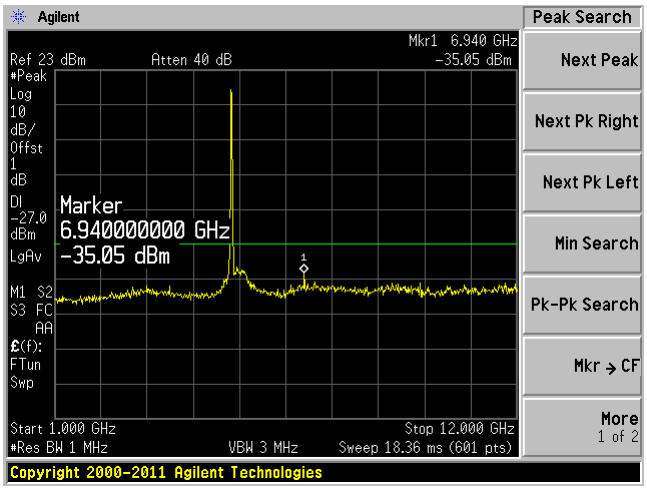
Chain 1, Plot: 30 MHz – 1 GHz



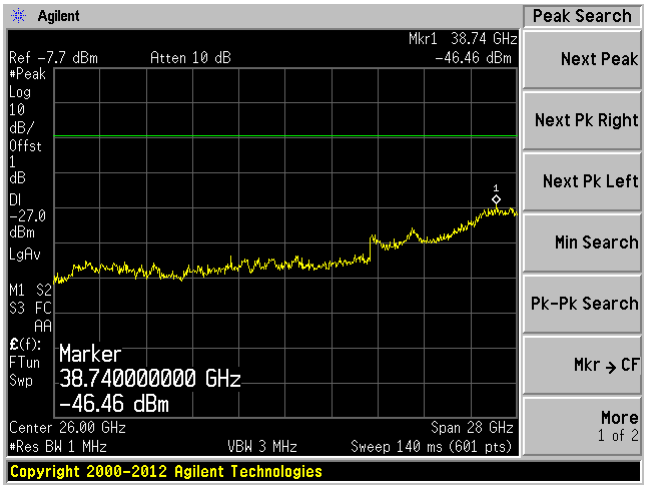
Chain 0, Plot: 1 GHz –12 GHz



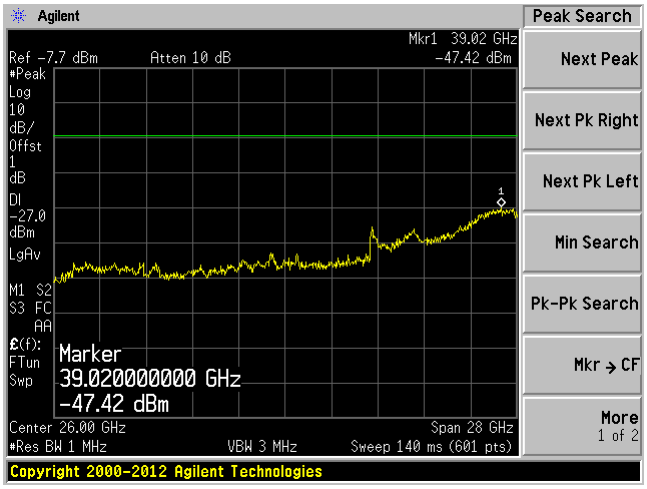
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

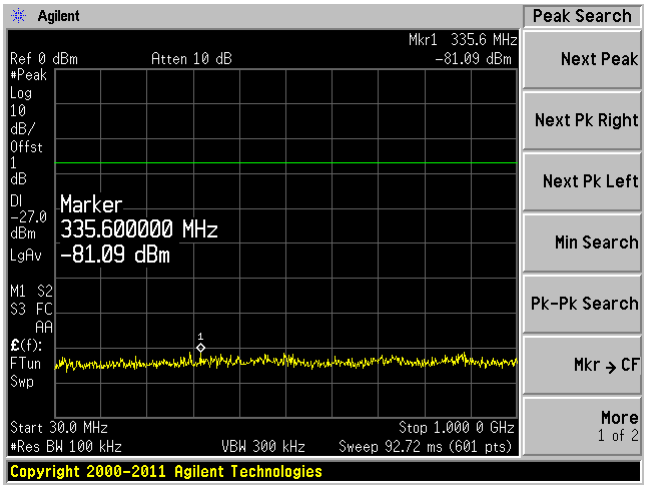


Chain 1, Plot: 12 GHz – 40 GHz

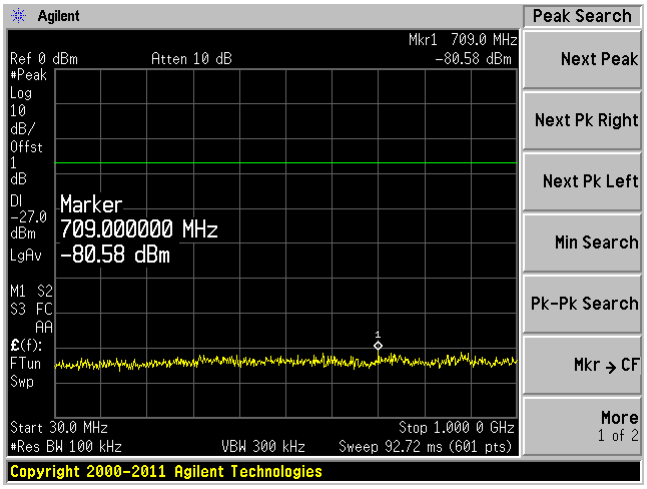


802.11a, High Channel, 5240 MHz

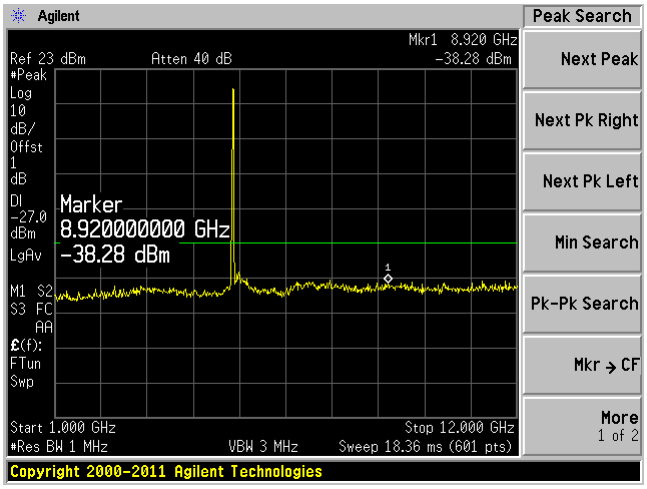
Chain 0, Plot: 30 MHz – 1 GHz



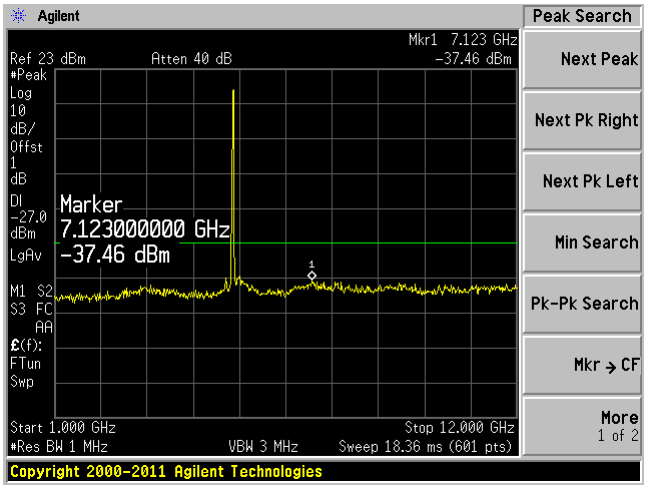
Chain 1, Plot: 30 MHz – 1 GHz



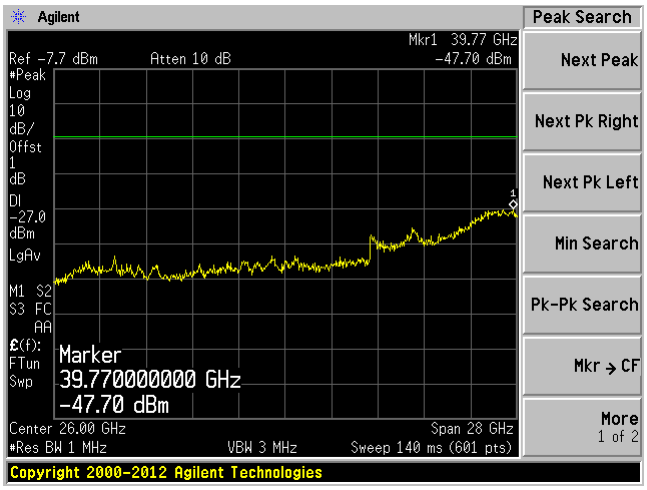
Chain 0, Plot: 1 GHz –12 GHz



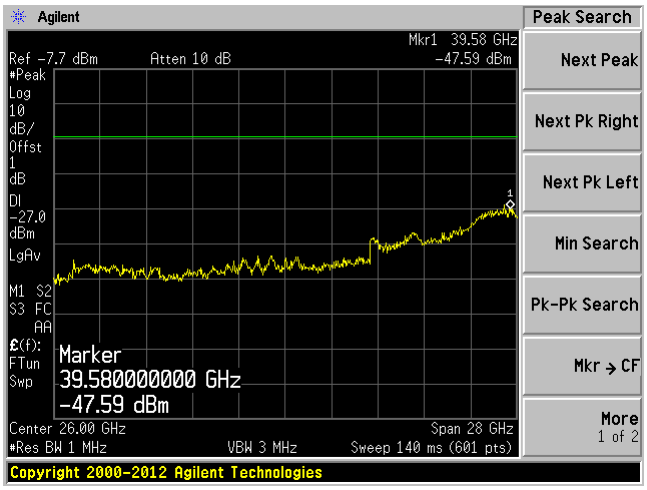
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

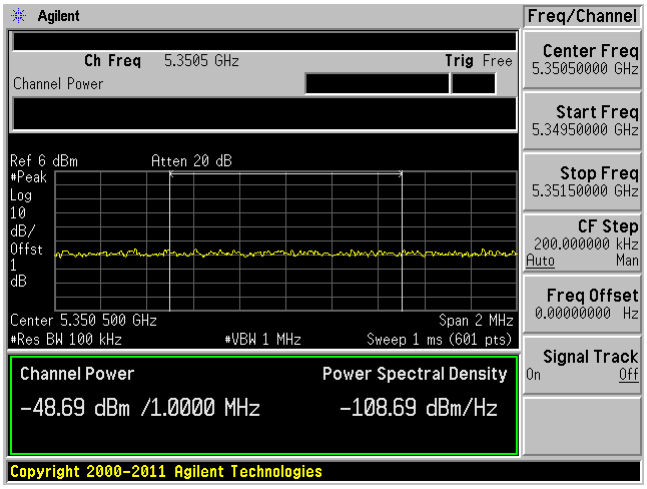


Chain 1, Plot: 12 GHz – 40 GHz

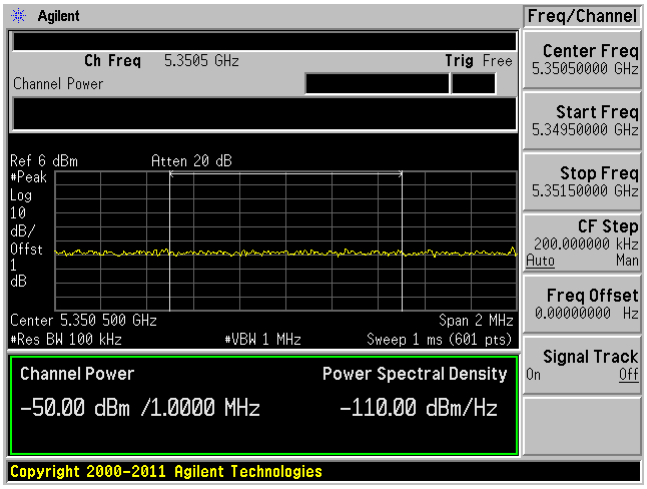


Band Edge Measurement:

High channel: 5240 MHz Chain 0

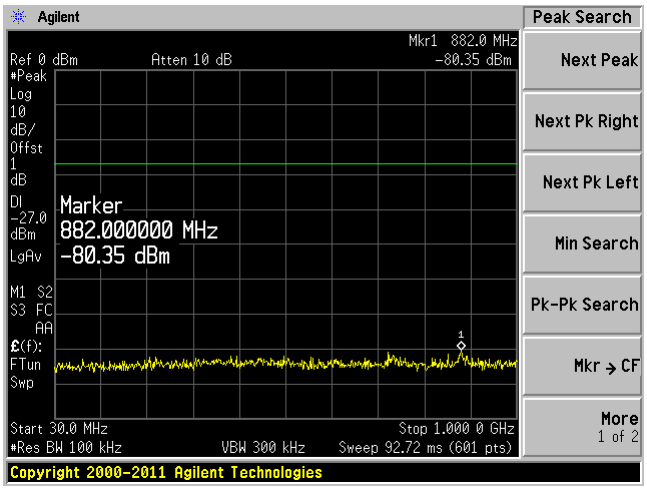


High channel: 5240 MHz Chain 1

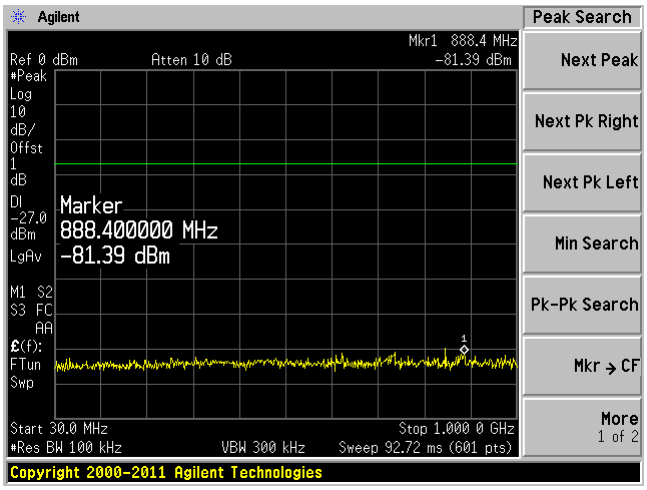


802.11n-HT 20, Low Channel 5180 MHz

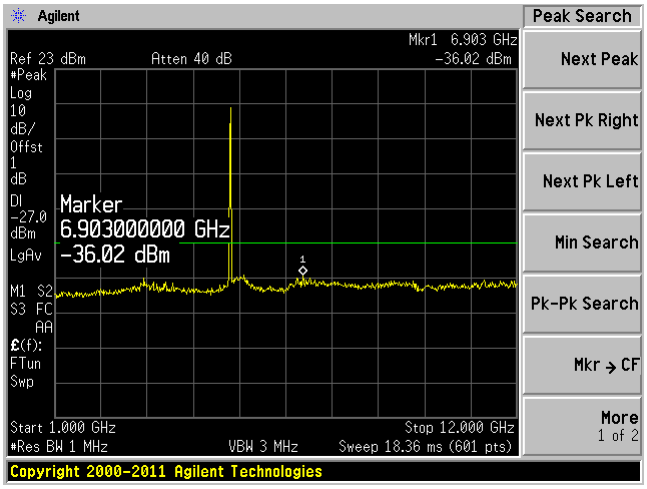
Chain 0, Plot: 30 MHz – 1 GHz



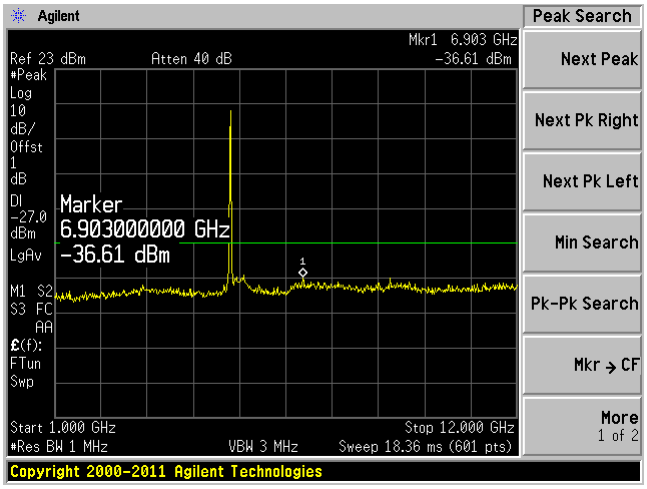
Chain 1, Plot: 30 MHz – 1 GHz



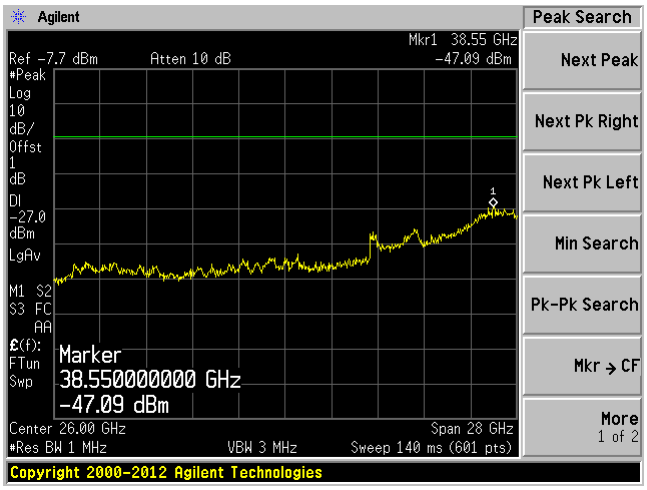
Chain 0, Plot: 1 GHz –12 GHz



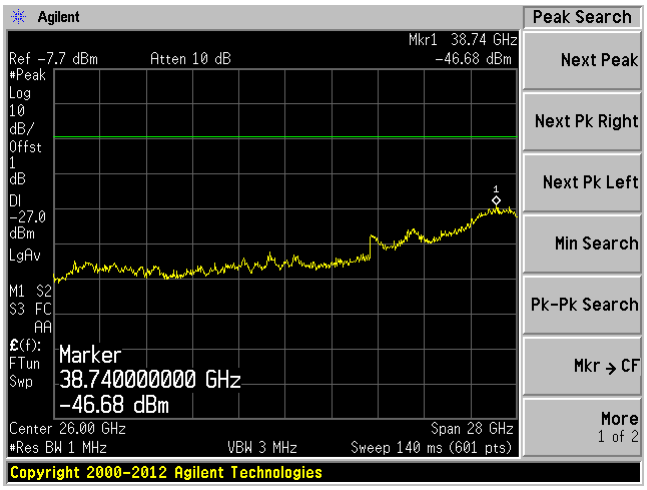
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

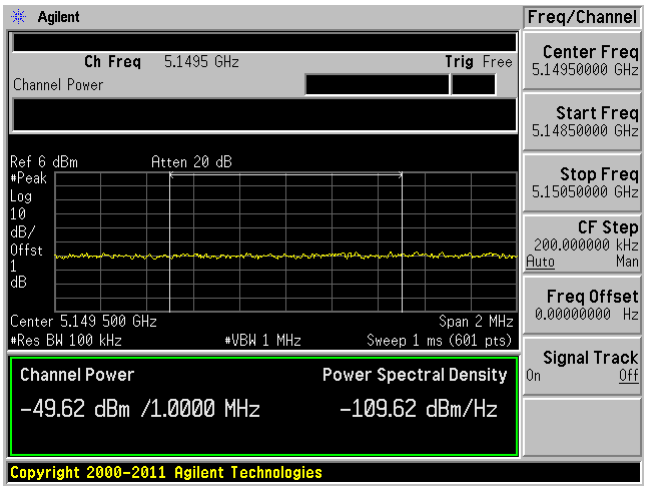


Chain 1, Plot: 12 GHz – 40 GHz

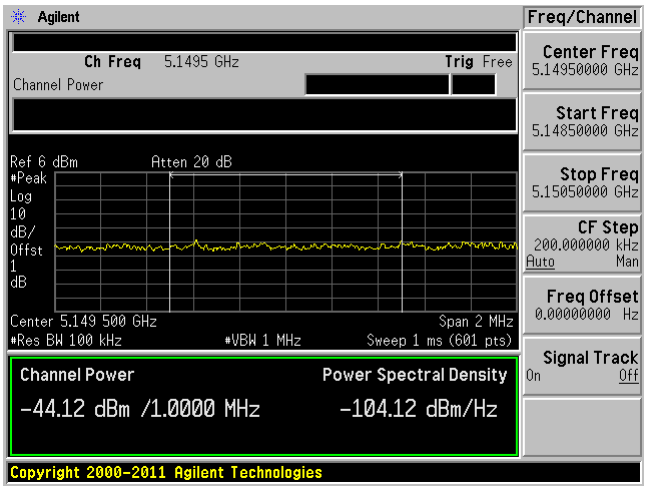


Band Edge Measurement:

Low channel: 5180 MHz Chain 0

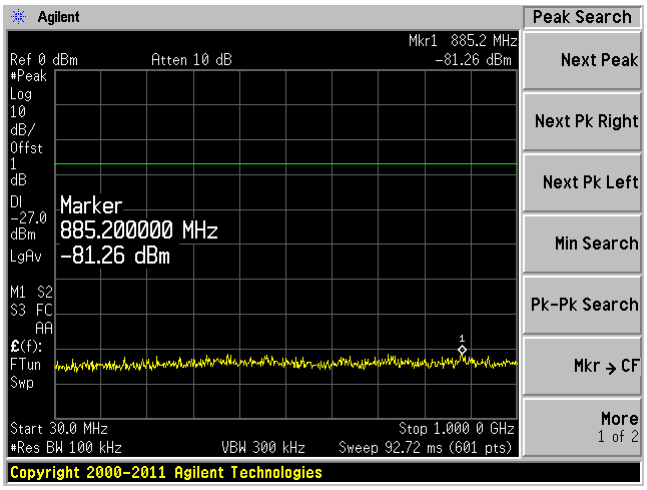


Low channel: 5180 MHz Chain 1

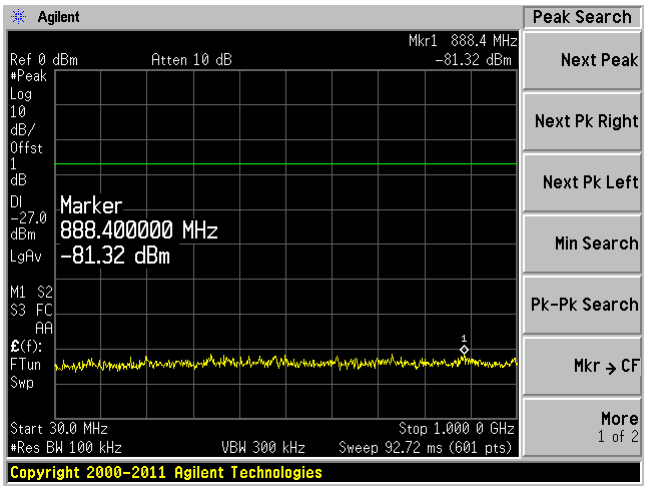


802.11n-HT20, Middle Channel 5200 MHz

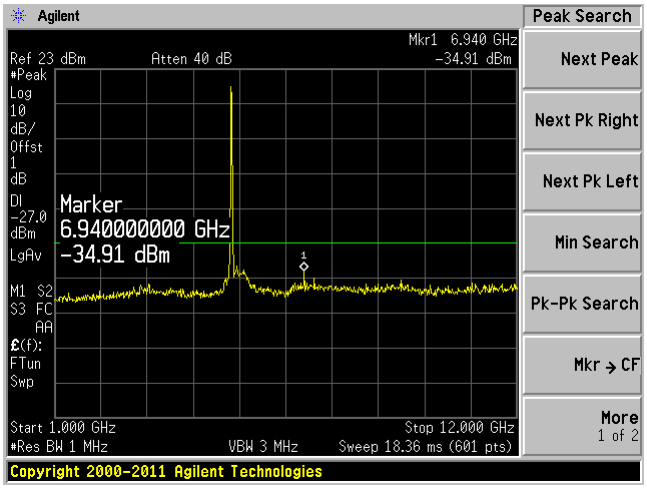
Chain 0, Plot: 30 MHz – 1 GHz



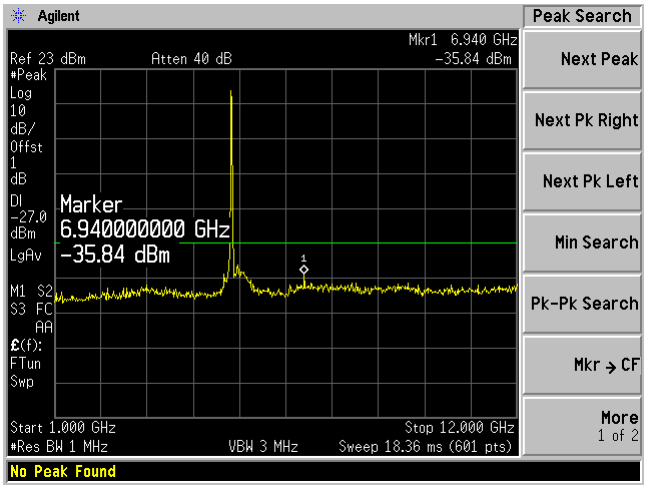
Chain 1, Plot: 30 MHz – 1 GHz



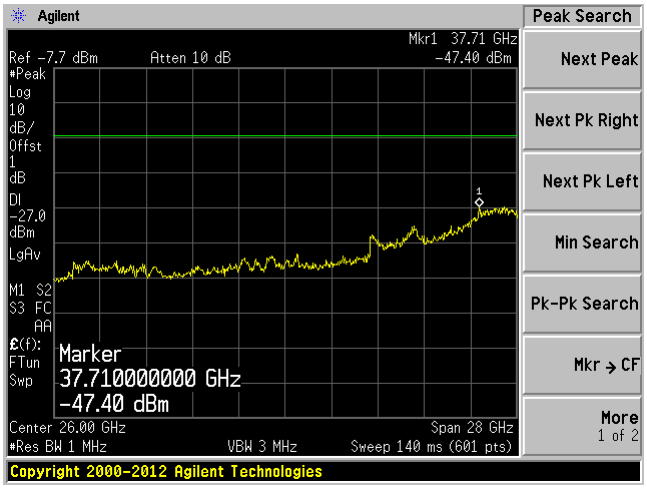
Chain 0, Plot: 1 GHz –12 GHz



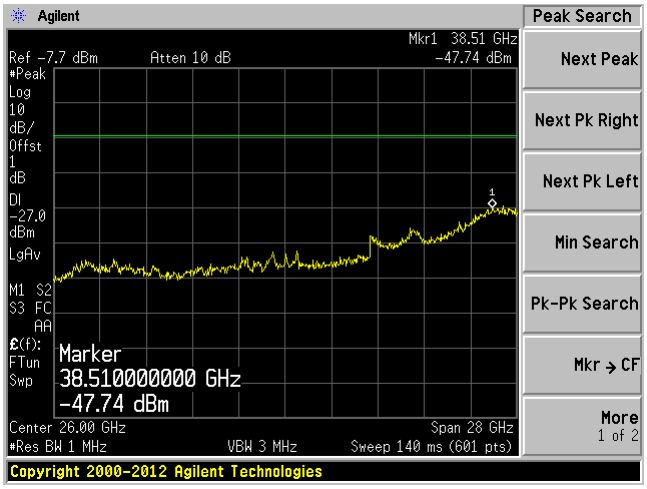
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

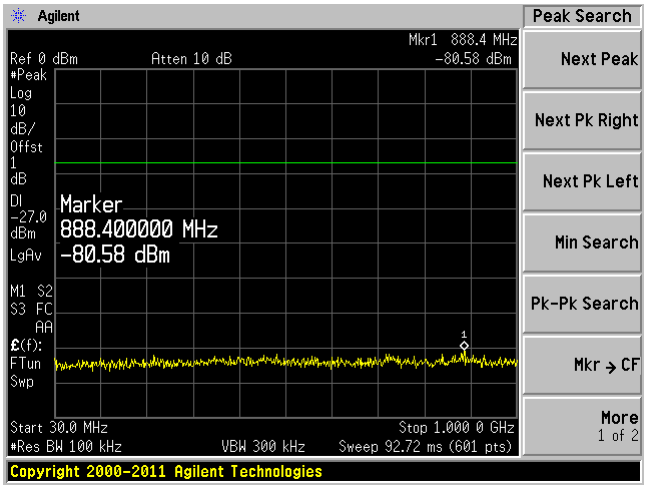


Chain 1, Plot: 12 GHz – 40 GHz

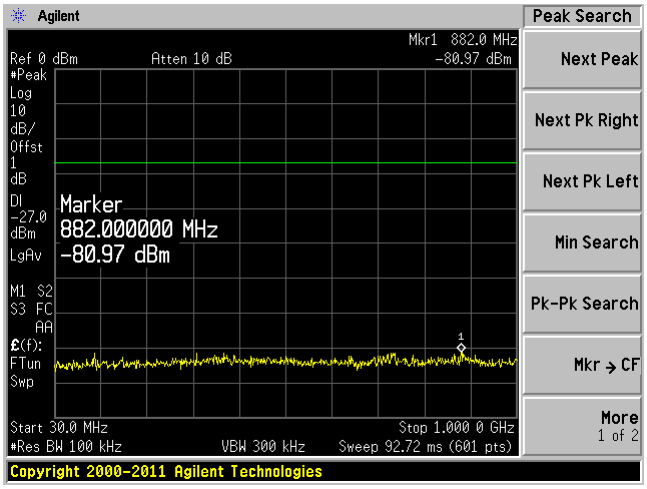


802.11n-HT 20, High Channel 5240 MHz

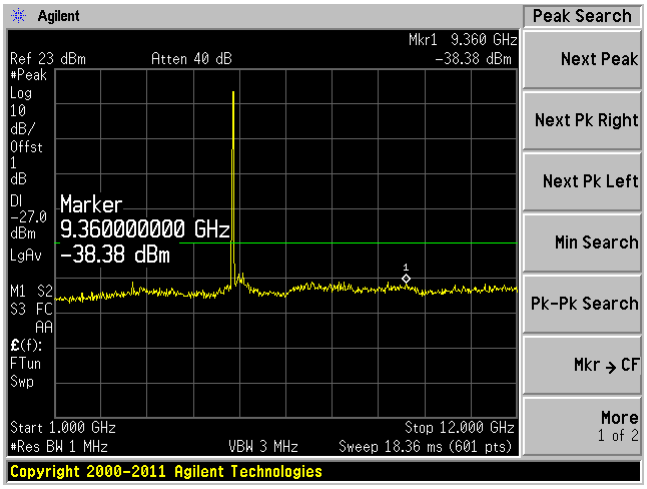
Chain 0, Plot: 30 MHz – 1 GHz



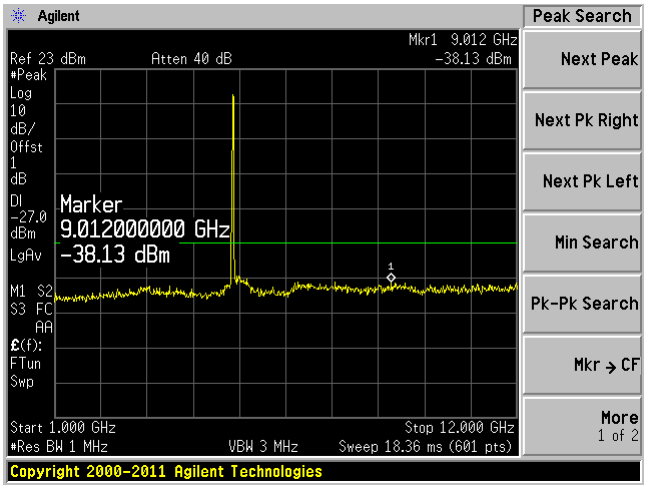
Chain 1, Plot: 30 MHz – 1 GHz



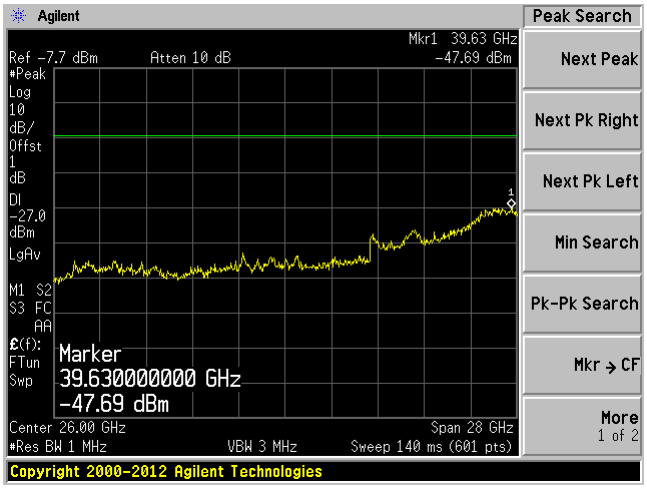
Chain 0, Plot: 1 GHz –12 GHz



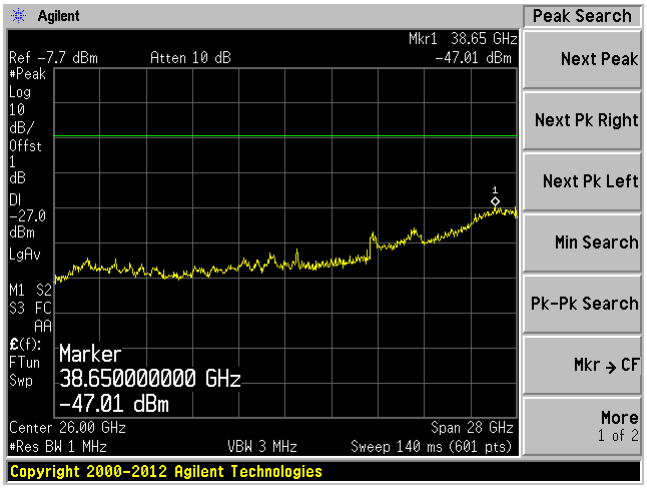
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

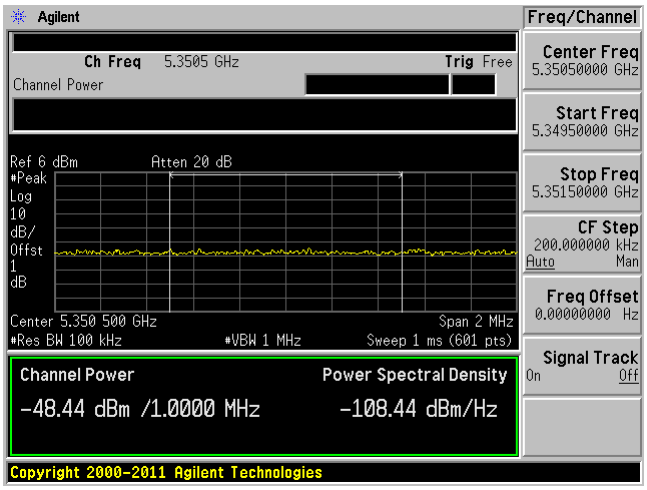


Chain 1, Plot: 12 GHz – 40 GHz

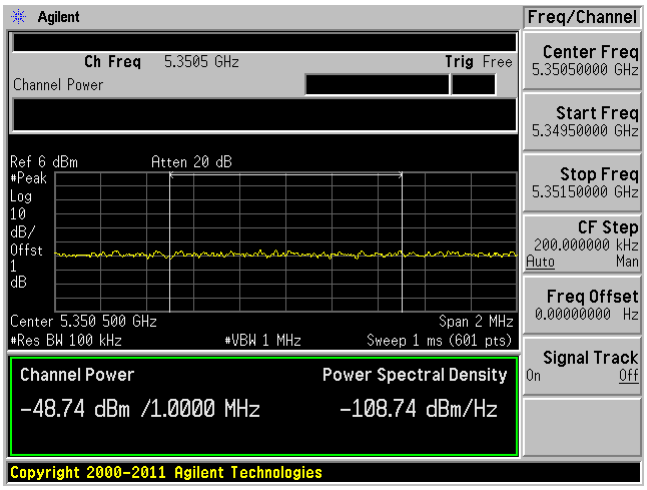


Band Edge Measurement:

High channel: 5240 MHz Chain 0

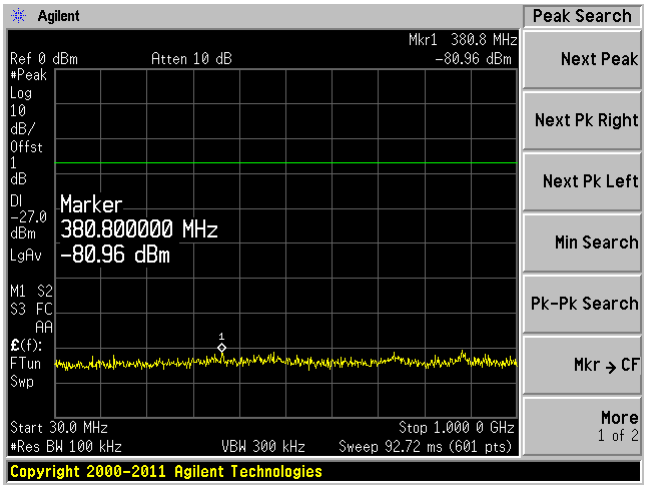


High channel: 5240 MHz Chain 1

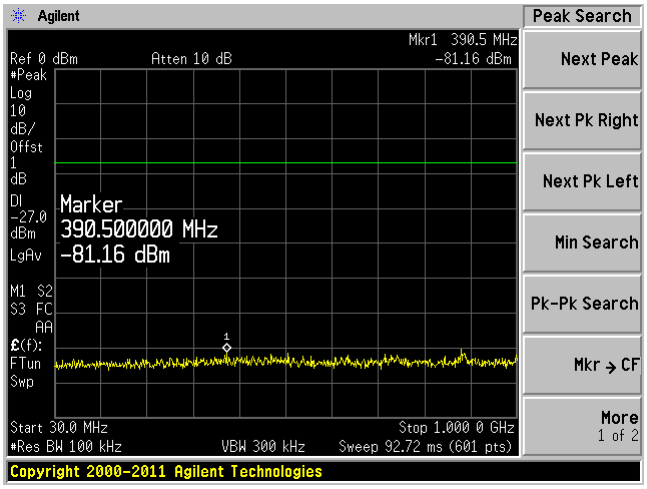


802.11n-HT40, Low Channel 5190 MHz

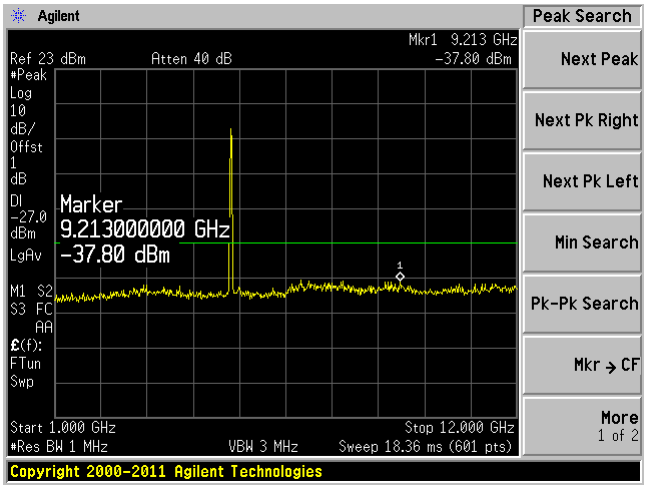
Chain 0, Plot: 30 MHz – 1 GHz



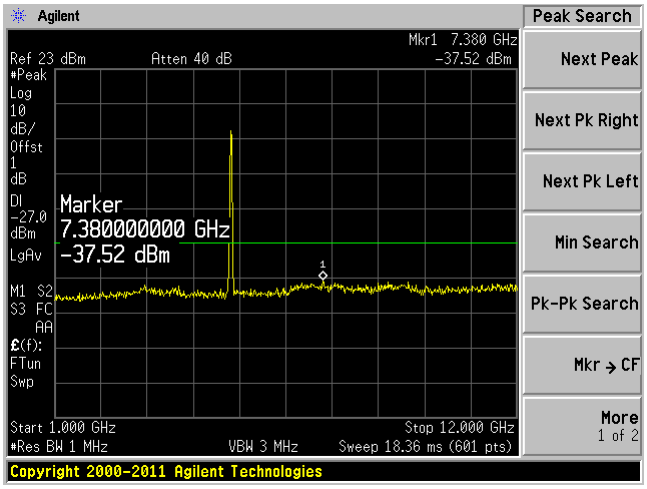
Chain 1, Plot: 30 MHz – 1 GHz



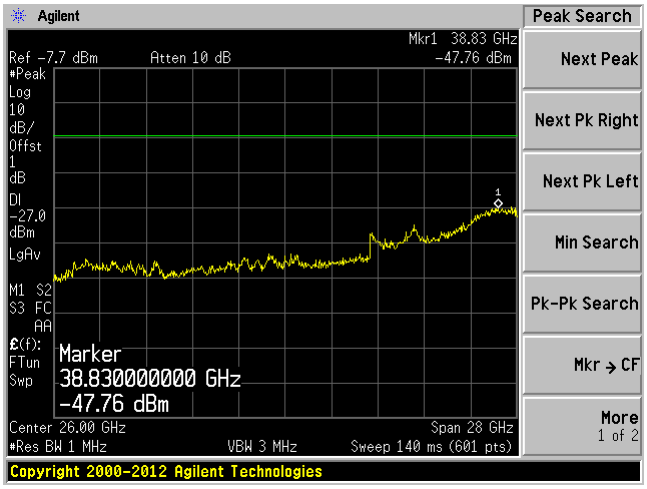
Chain 0, Plot: 1 GHz –12 GHz



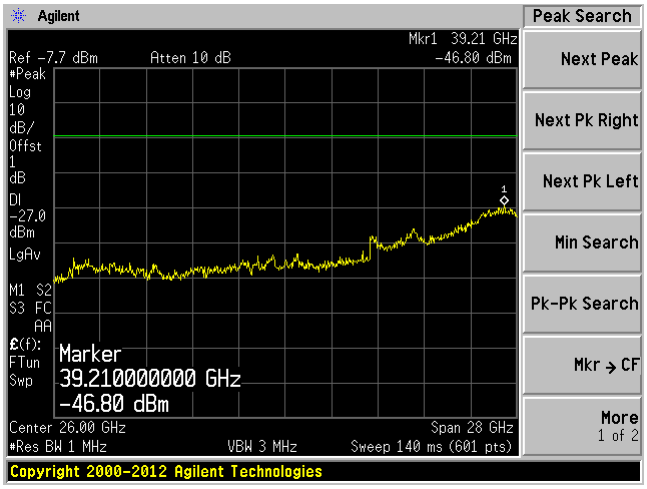
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

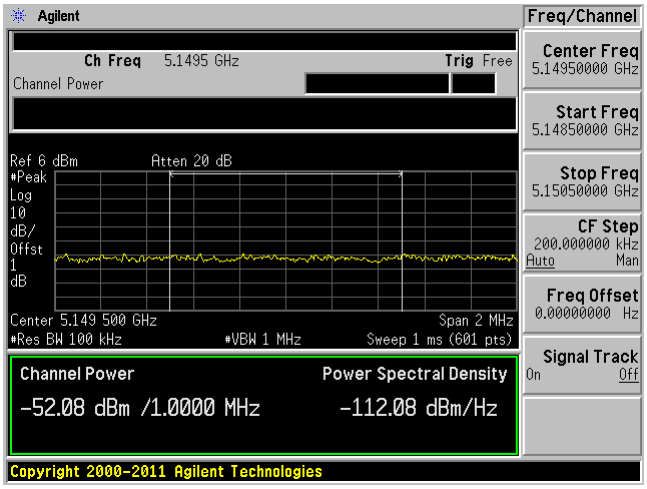


Chain 1, Plot: 12 GHz – 40 GHz

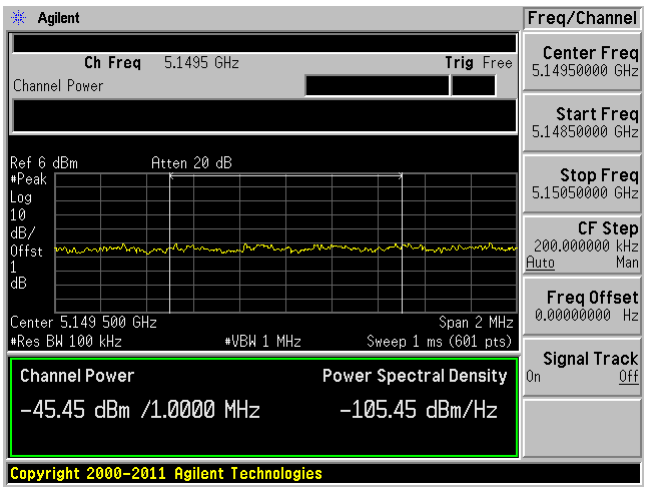


Band Edge Measurement:

Low channel: 5190 MHz Chain 0

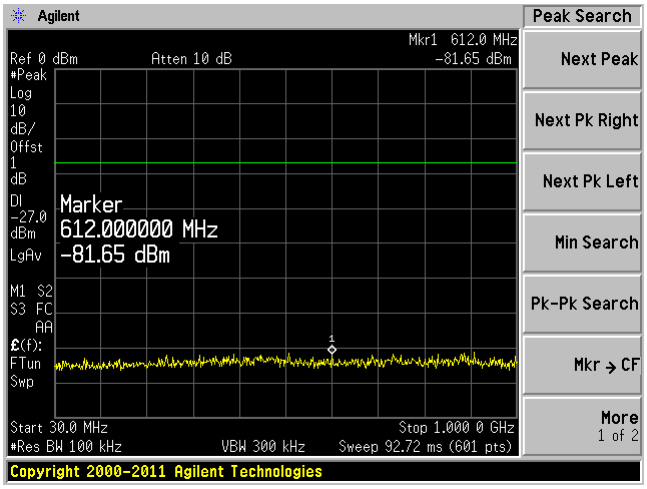


Low channel: 5190 MHz Chain 1

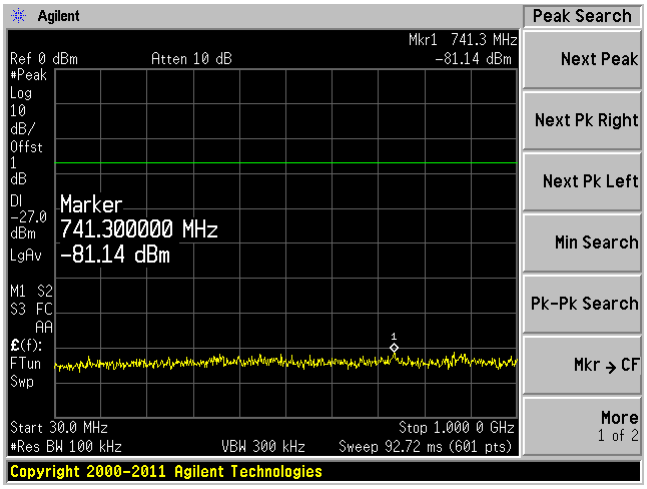


802.11n-HT40, High Channel 5230 MHz

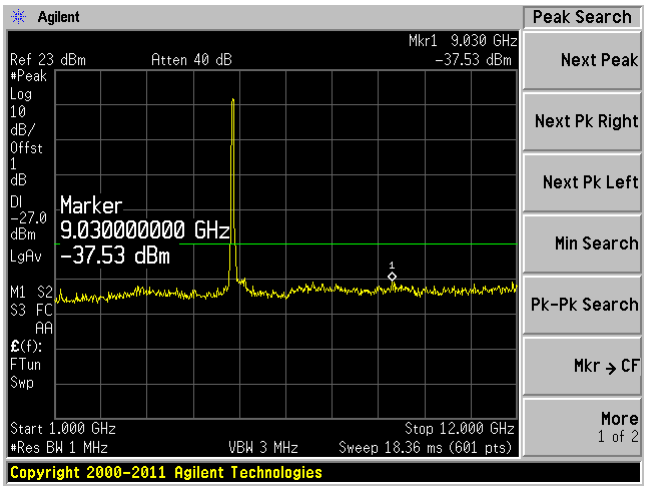
Chain 0, Plot: 30 MHz – 1 GHz



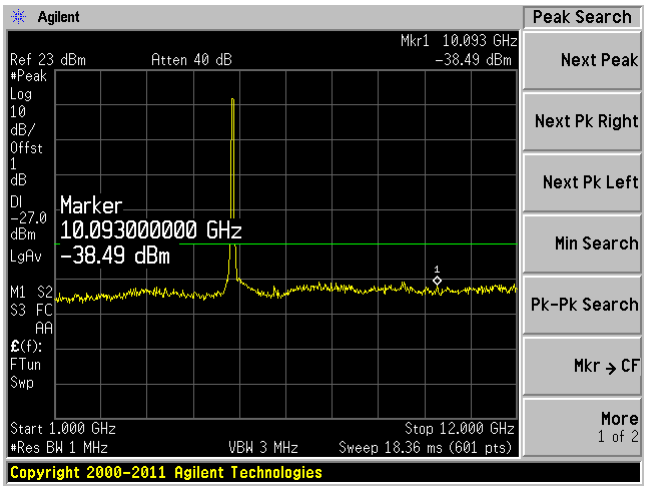
Chain 1, Plot: 30 MHz – 1 GHz



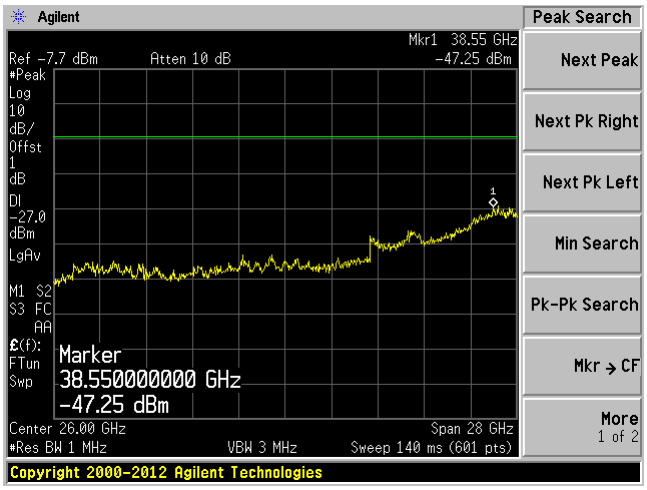
Chain 0, Plot: 1 GHz –12 GHz



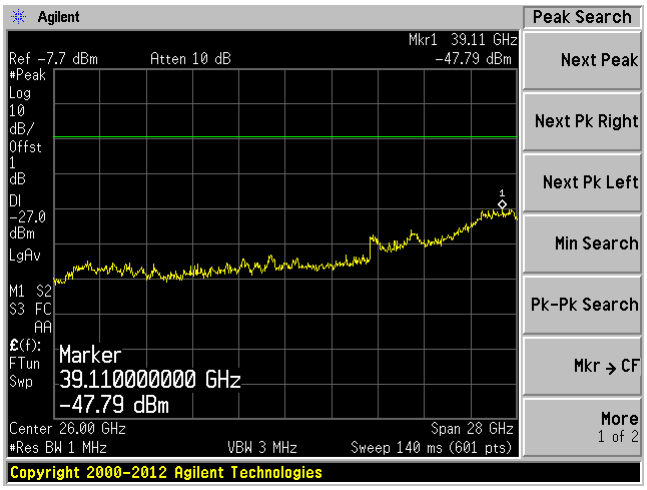
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

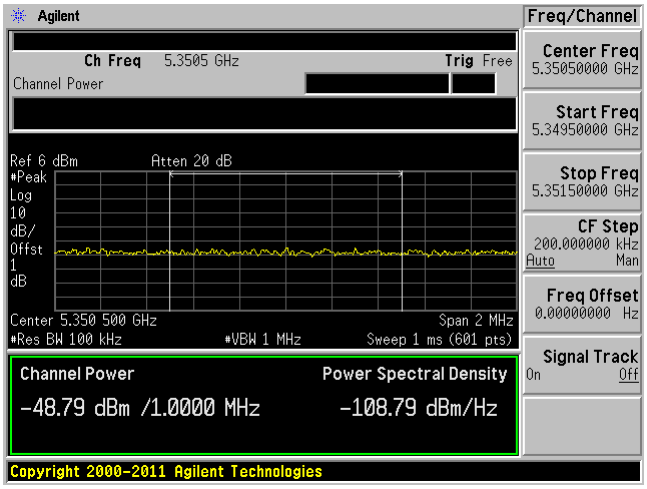


Chain 1, Plot: 12 GHz – 40 GHz

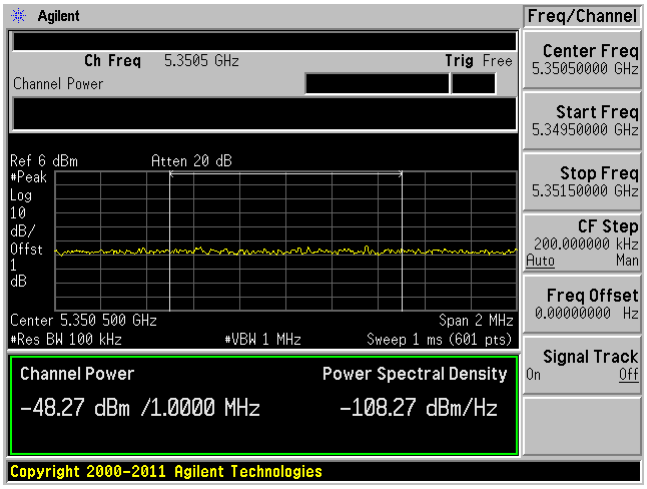


Band Edge Measurement:

High channel: 5230 MHz Chain 0

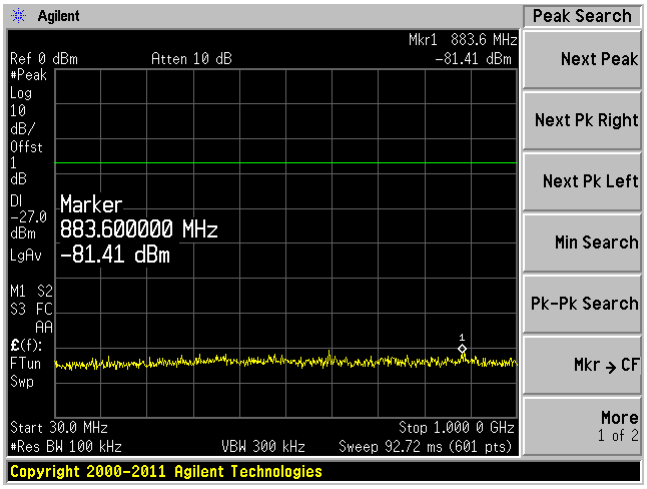


High channel: 5230 MHz Chain 1

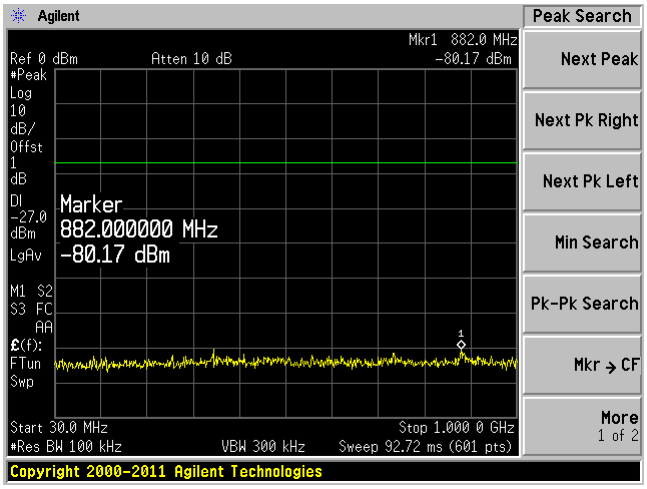


802.11ac-VHT80, 5210 MHz

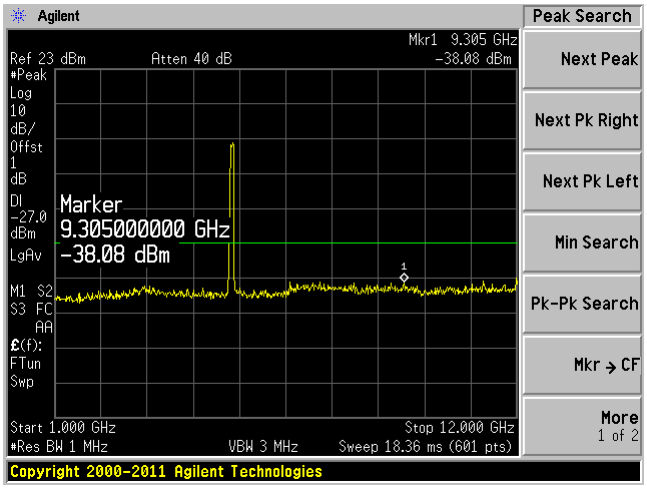
Chain 0, Plot: 30 MHz – 1 GHz



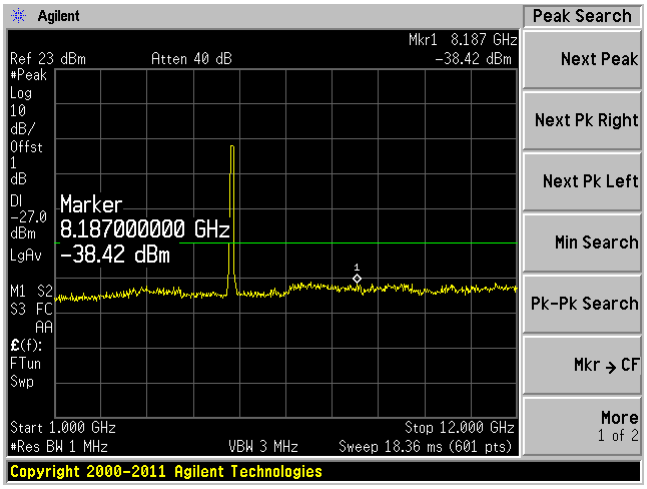
Chain 1, Plot: 30 MHz – 1 GHz



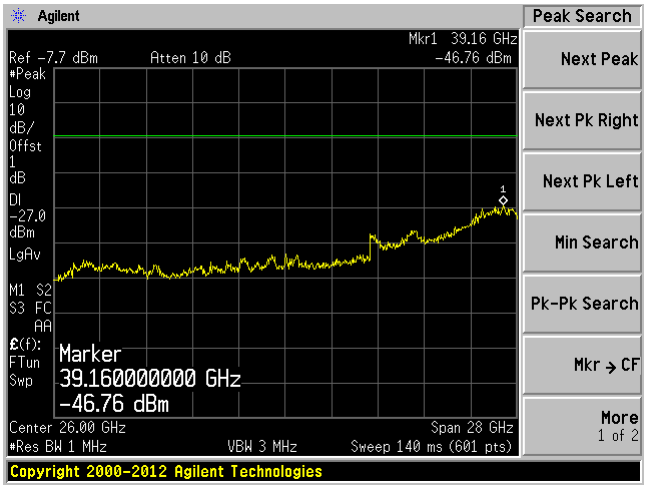
Chain 0, Plot: 1 GHz –12 GHz



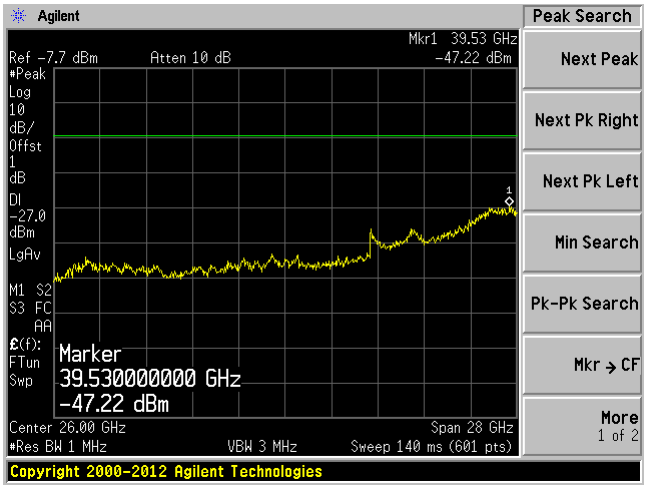
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

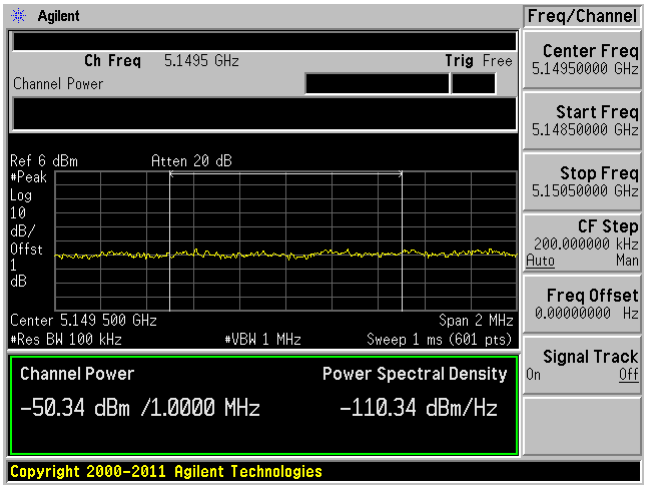


Chain 1, Plot: 12 GHz – 40 GHz

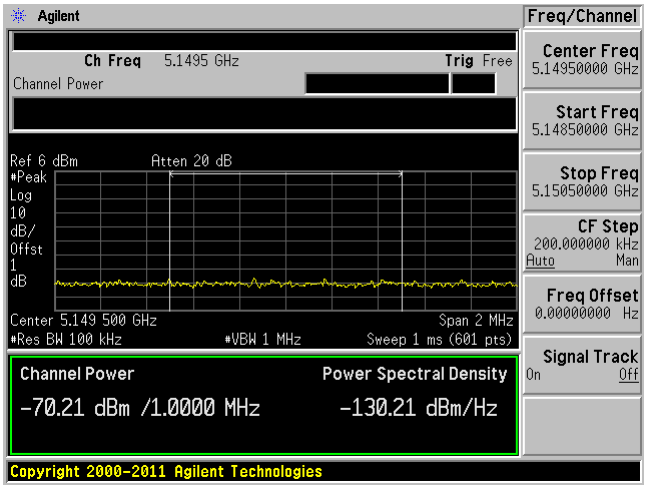


Band Edge Measurement:

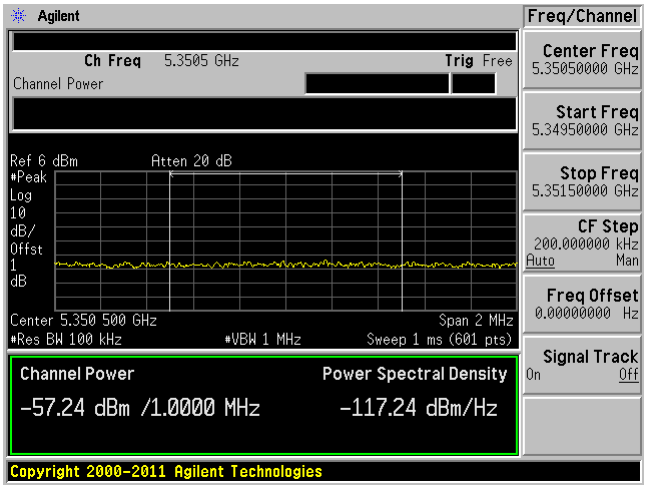
Low Edge Chain 0



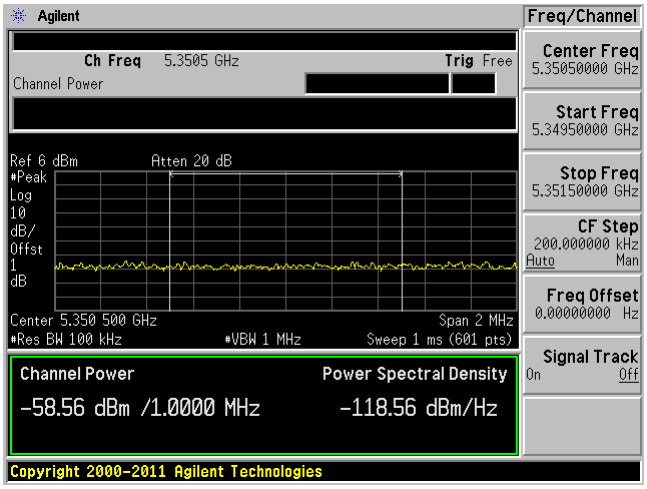
Low Edge Chain 1



High Edge Chain 0



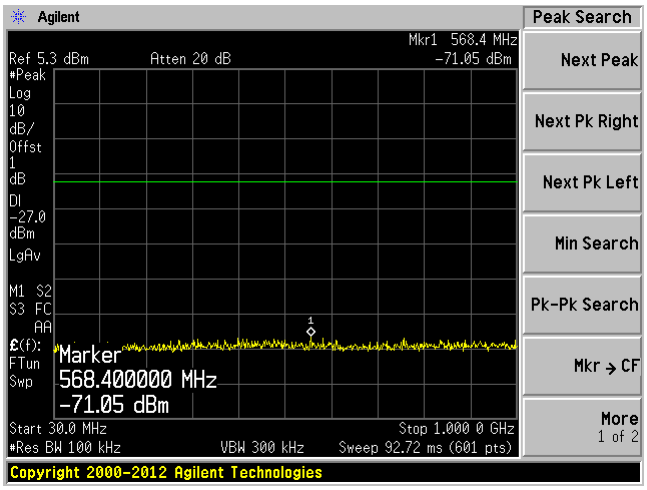
High Edge Chain 1



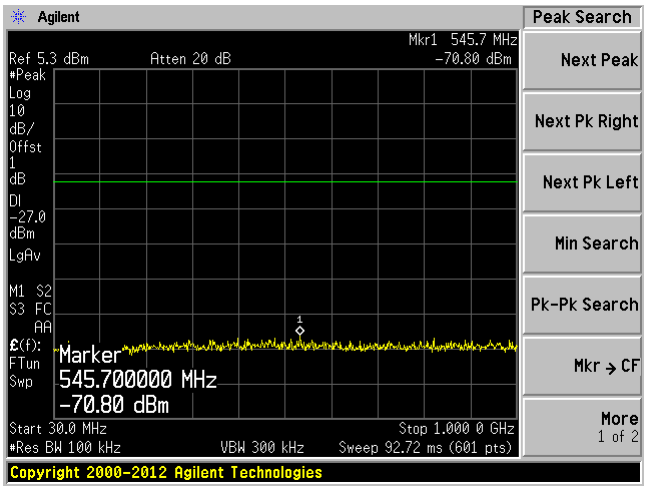
5.8 GHz Band

802.11a, Low Channel, 5745 MHz

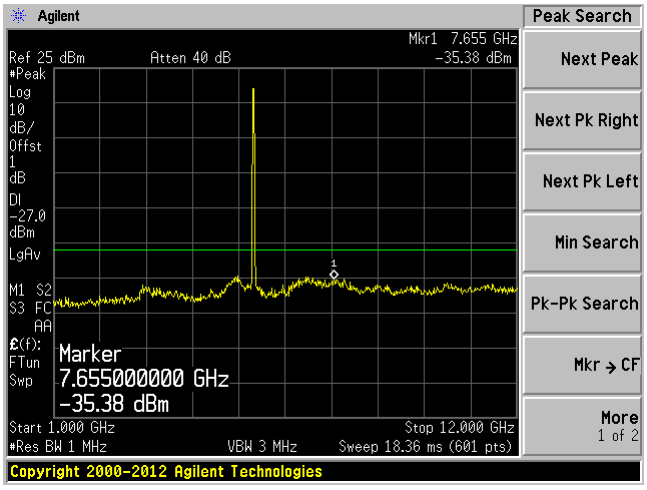
Chain 0, Plot: 30 MHz – 1 GHz



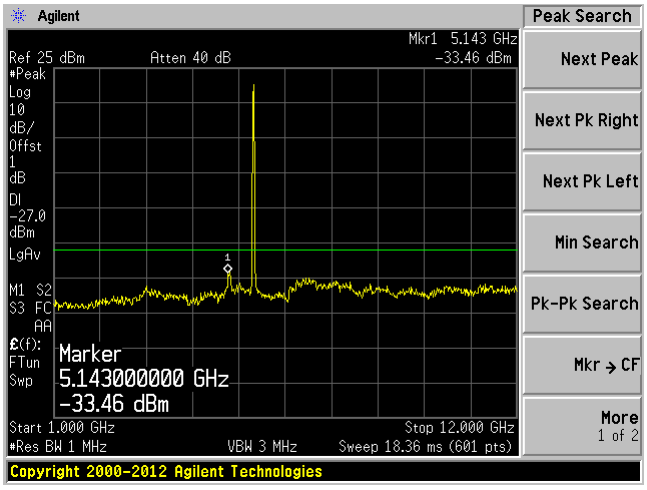
Chain 1, Plot: 30 MHz – 1 GHz



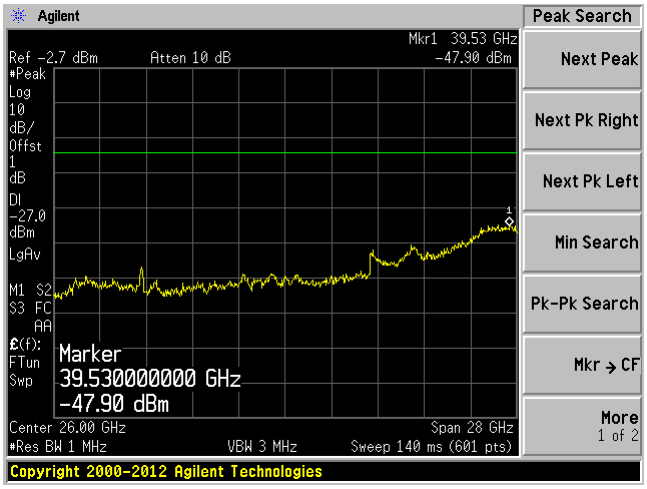
Chain 0, Plot: 1 GHz –12 GHz



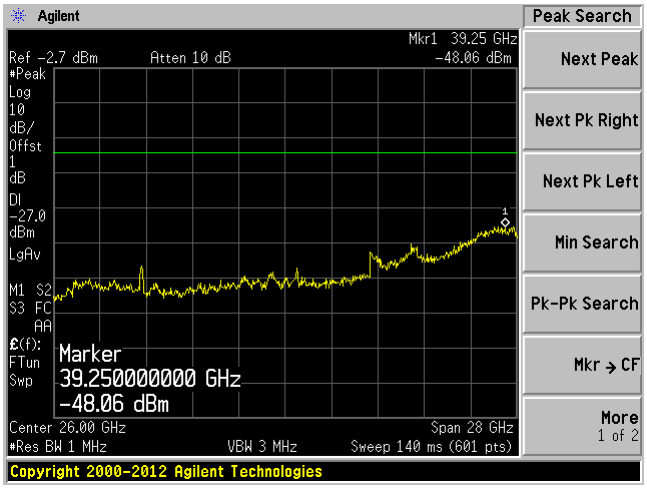
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

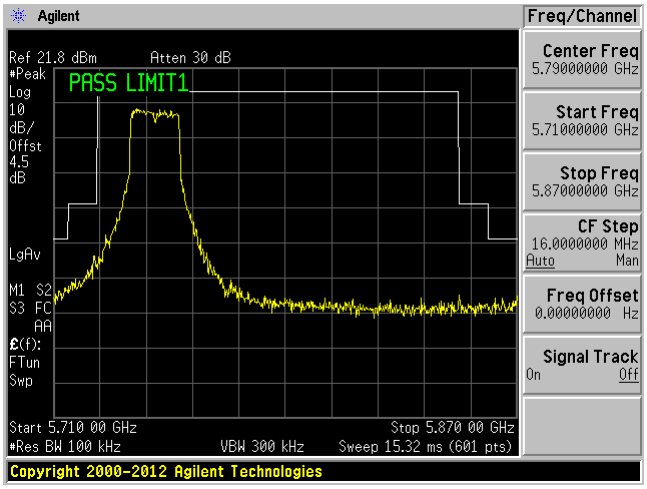


Chain 1, Plot: 12 GHz – 40 GHz

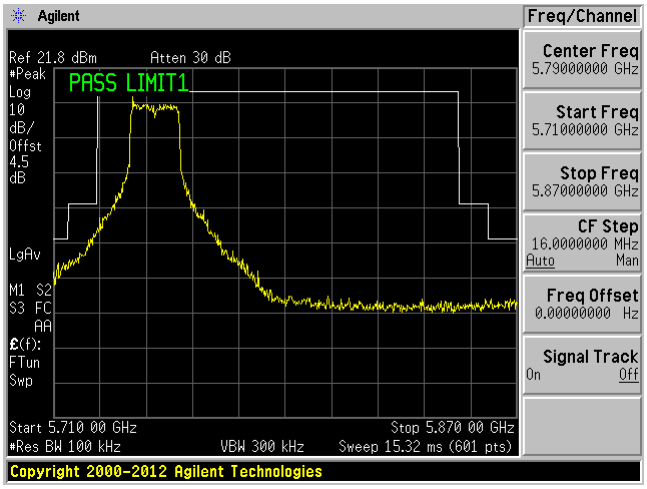


Band Edge Measurement:

Chain 0

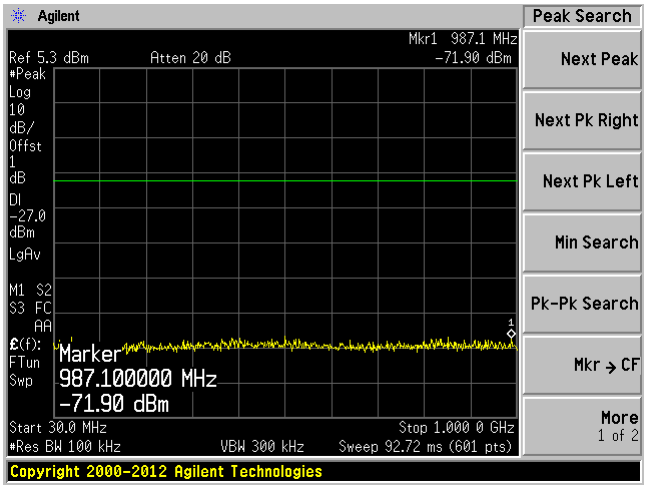


Chain 1

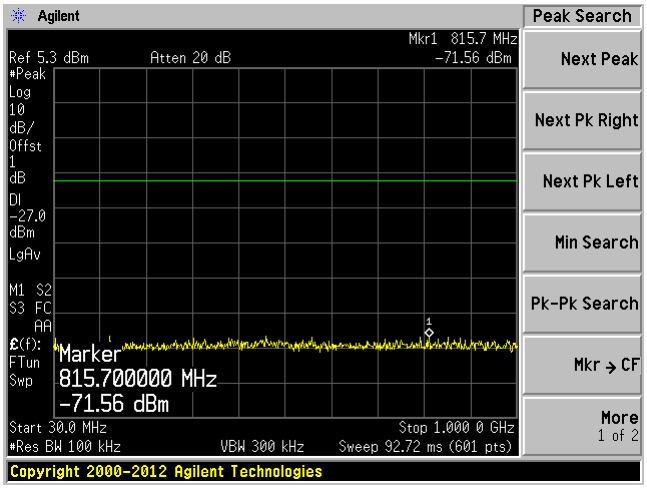


802.11a, Middle Channel, 5785 MHz

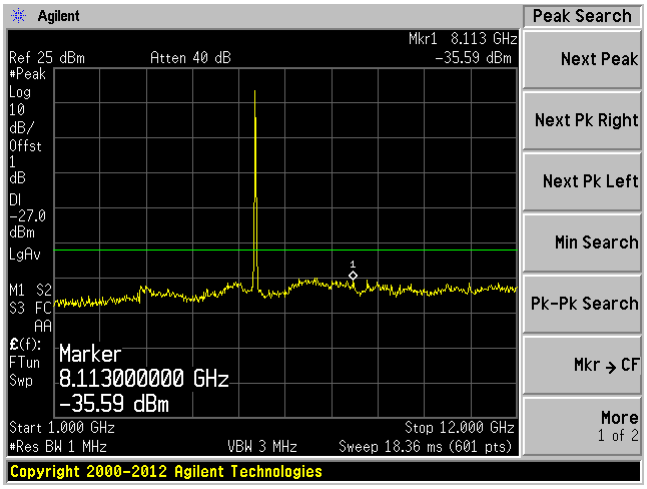
Chain 0, Plot: 30 MHz – 1 GHz



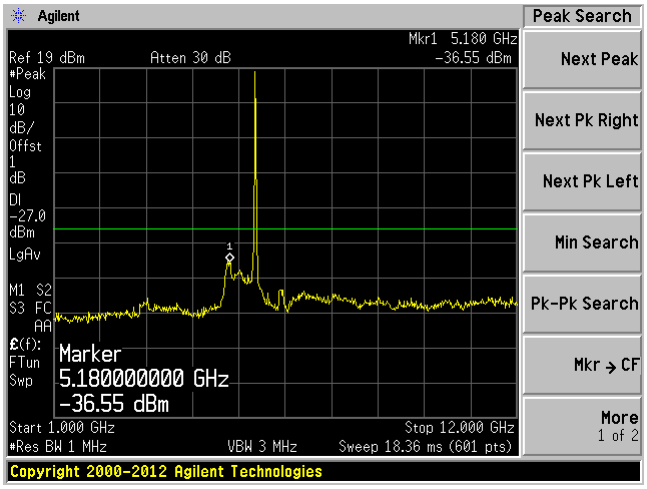
Chain 1, Plot: 30 MHz – 1 GHz



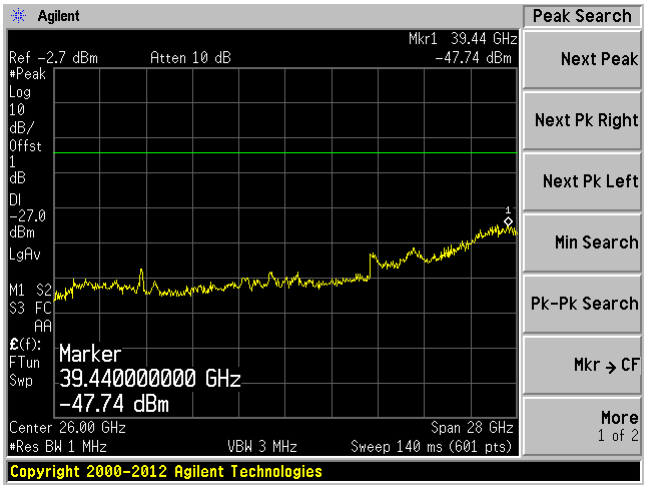
Chain 0, Plot: 1 GHz –12 GHz



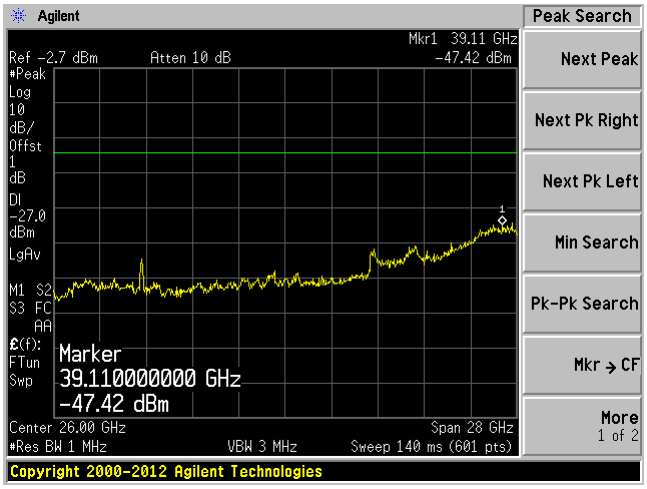
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz–40 GHz

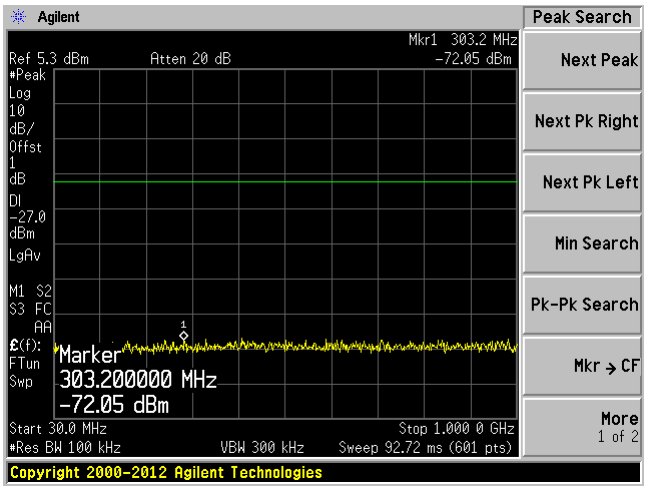


Chain 1, Plot: 12 GHz– 40 GHz

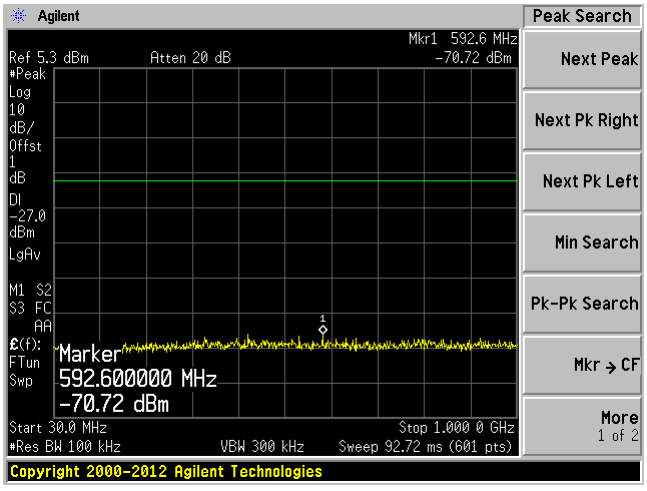


802.11a, High Channel, 5825 MHz

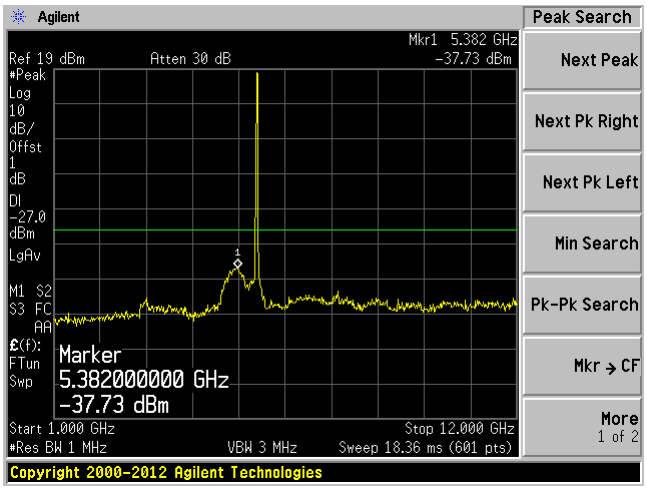
Chain 0, Plot: 30 MHz – 1 GHz



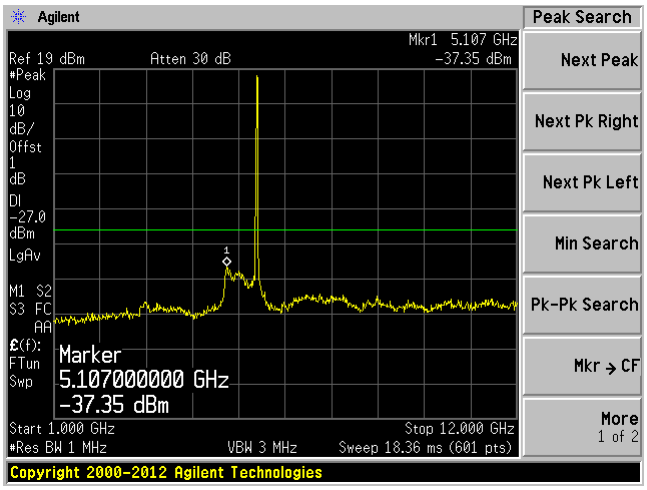
Chain 1, Plot: 30 MHz – 1 GHz



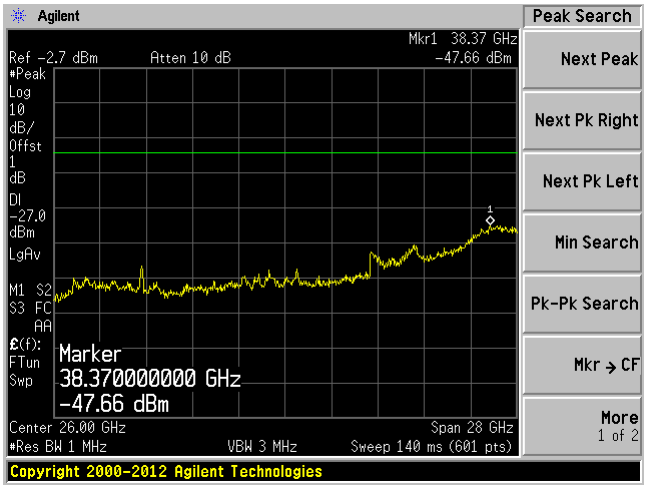
Chain 0, Plot: 1 GHz –12 GHz



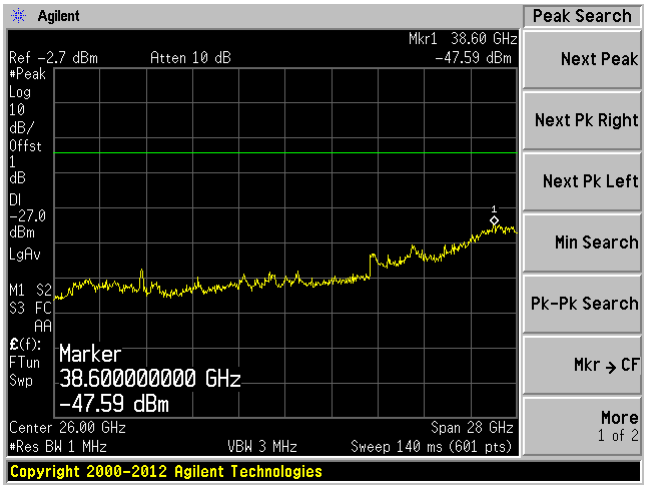
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

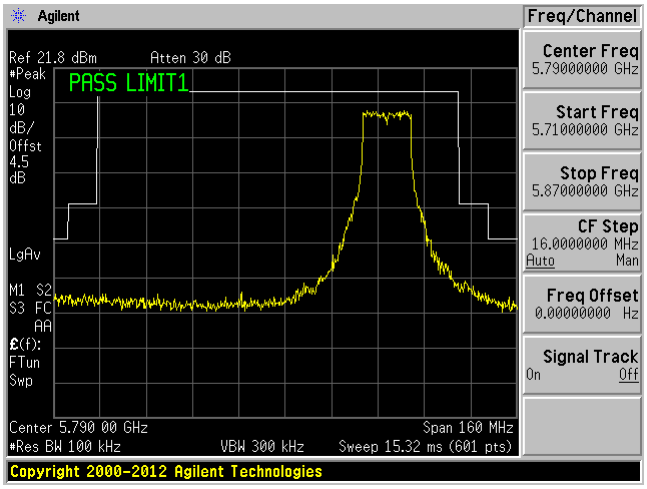


Chain 1, Plot: 12 GHz – 40 GHz

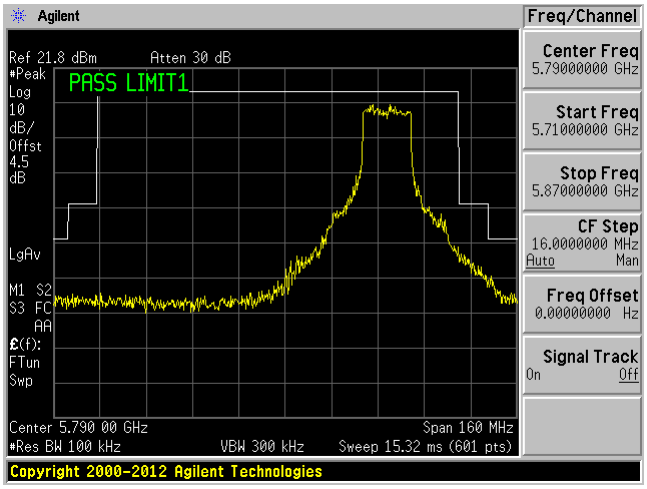


Band Edge Measurement

Chain 0

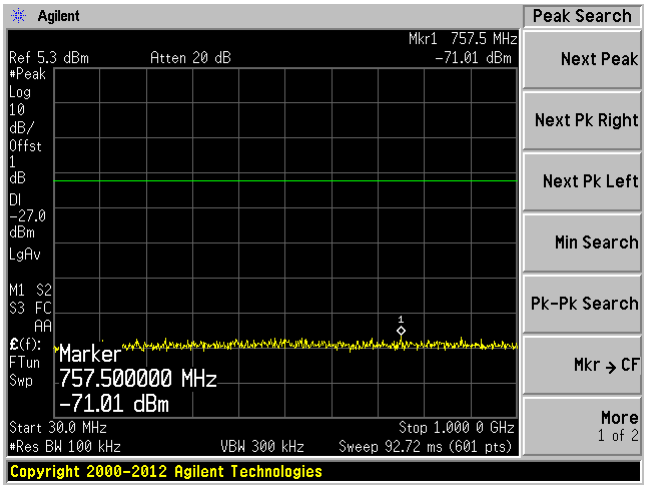


Chain 1

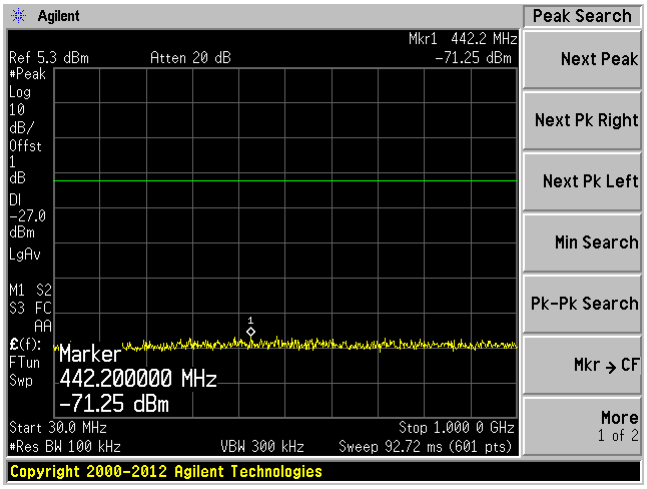


802.11n-HT 20, Low Channel 5745 MHz

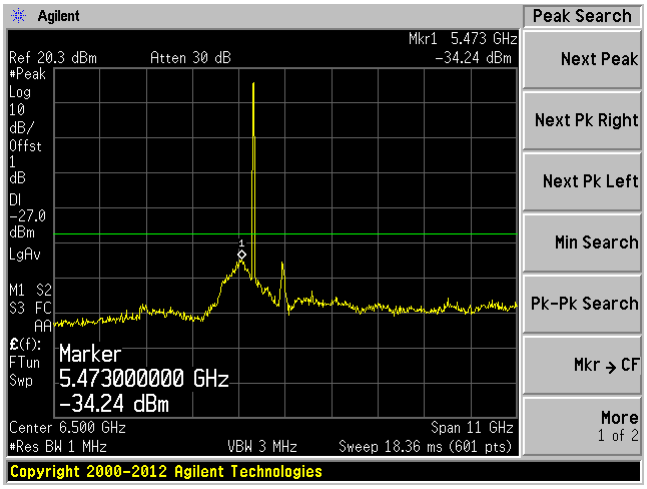
Chain 0, Plot: 30 MHz – 1 GHz



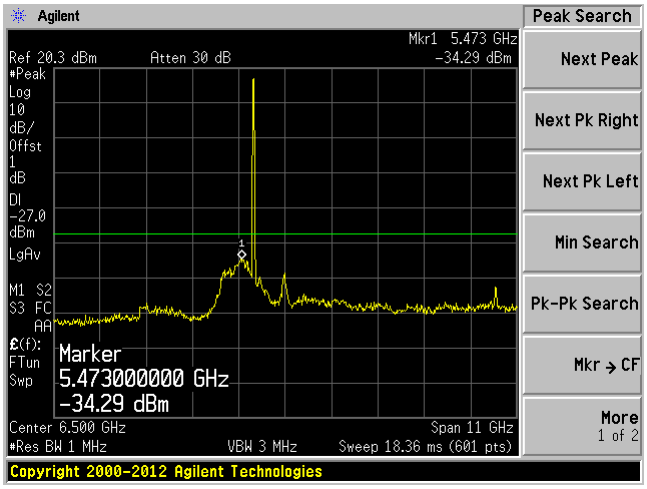
Chain 1, Plot: 30 MHz – 1 GHz



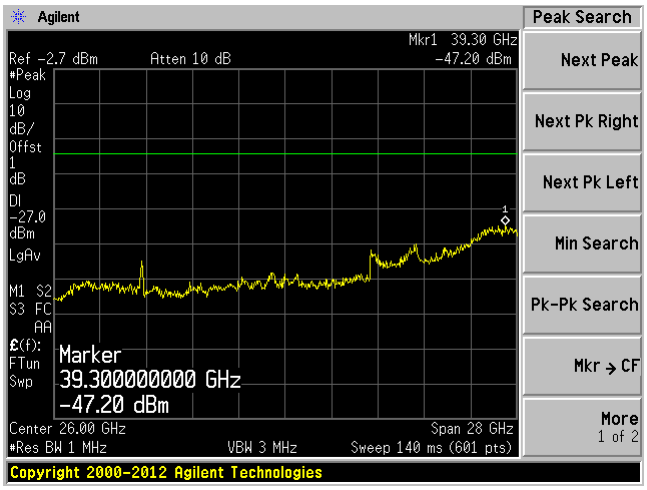
Chain 0, Plot: 1 GHz –12 GHz



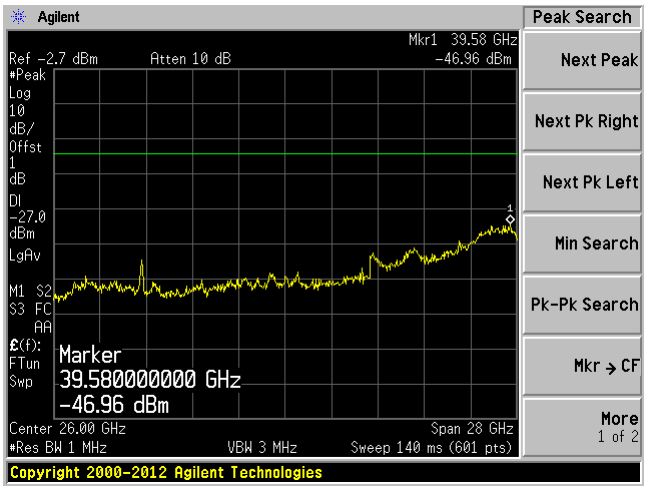
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

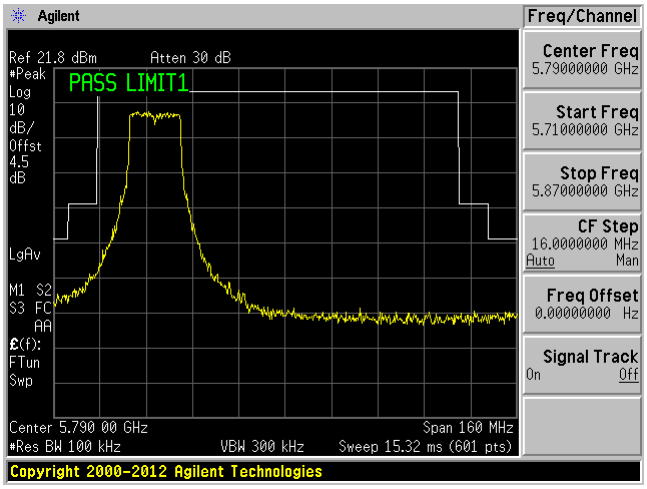


Chain 1, Plot: 12 GHz – 40 GHz

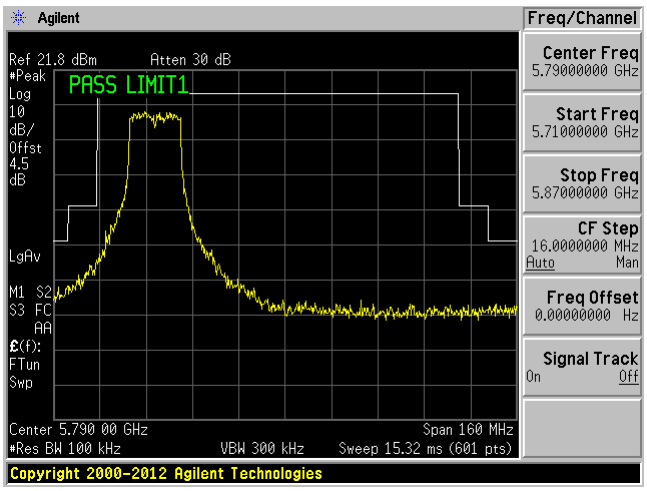


Band Edge Measurement

Chain 0

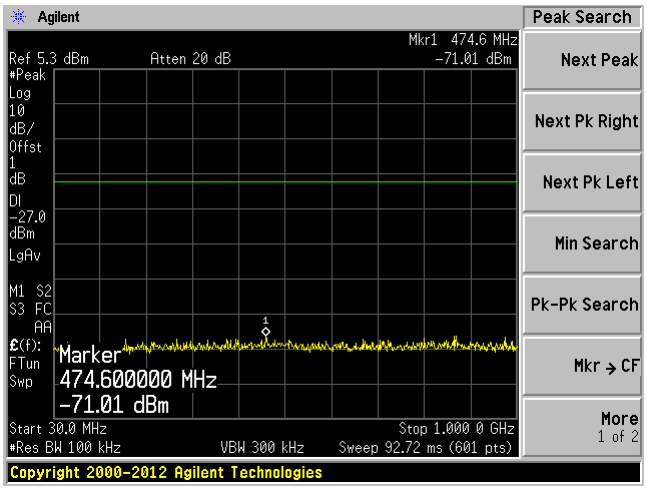


Chain 1

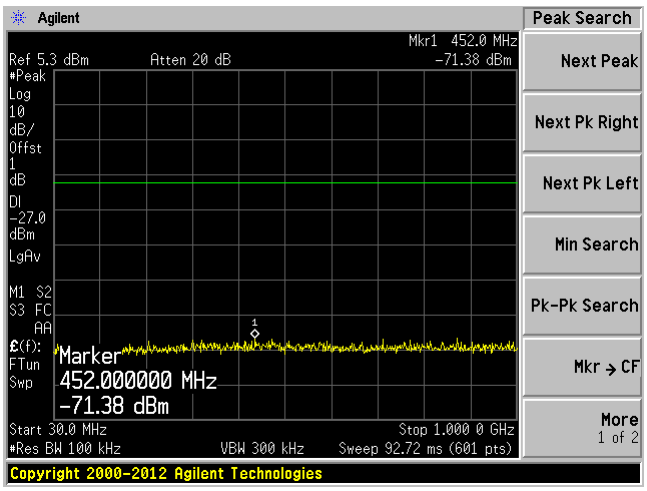


802.11n-HT20, Middle Channel 5785 MHz

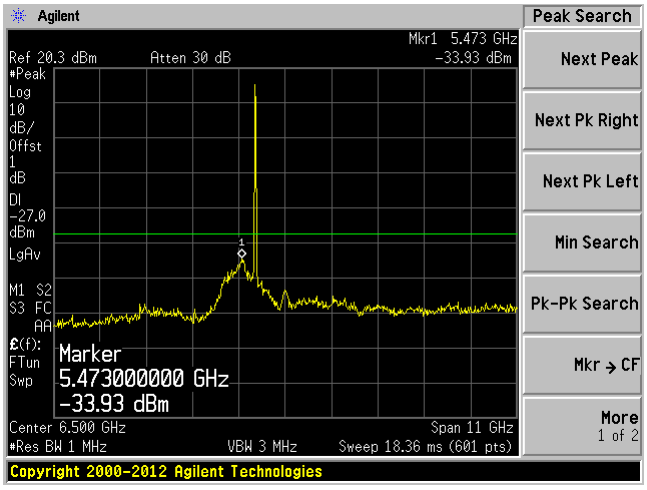
Chain 0, Plot: 30 MHz – 1 GHz



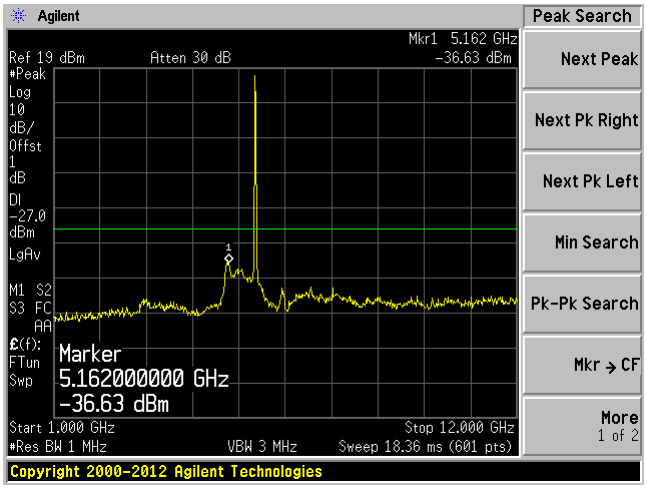
Chain 1, Plot: 30 MHz – 1 GHz



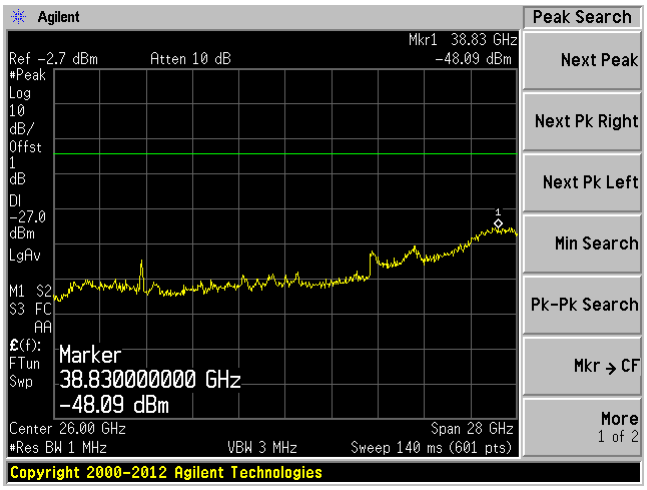
Chain 0, Plot: 1 GHz –12 GHz



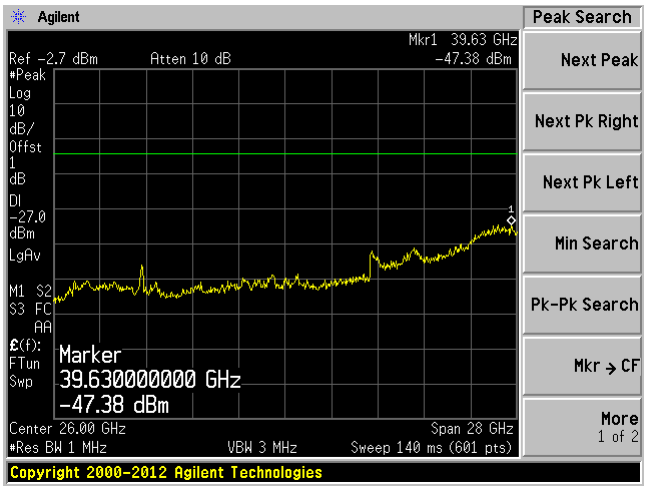
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

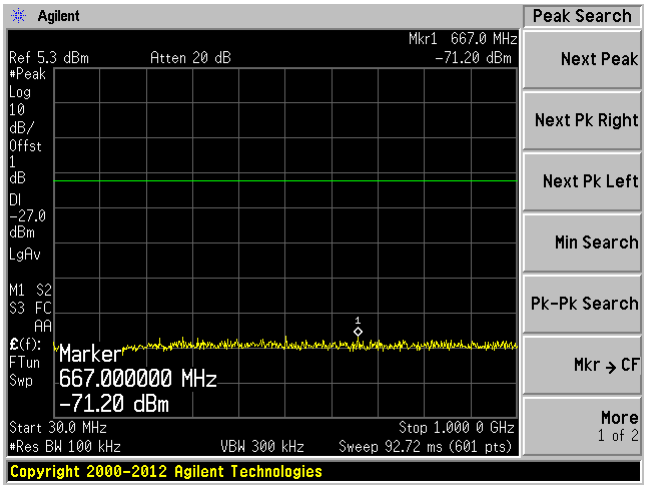


Chain 1, Plot: 12 GHz – 40 GHz

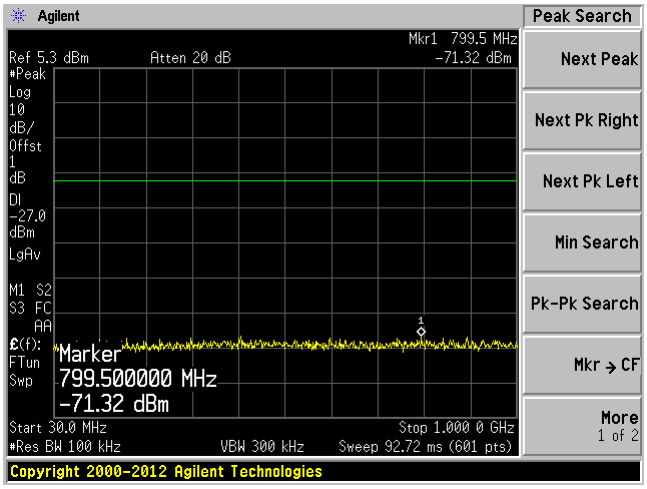


802.11n-HT 20, High Channel 5825 MHz

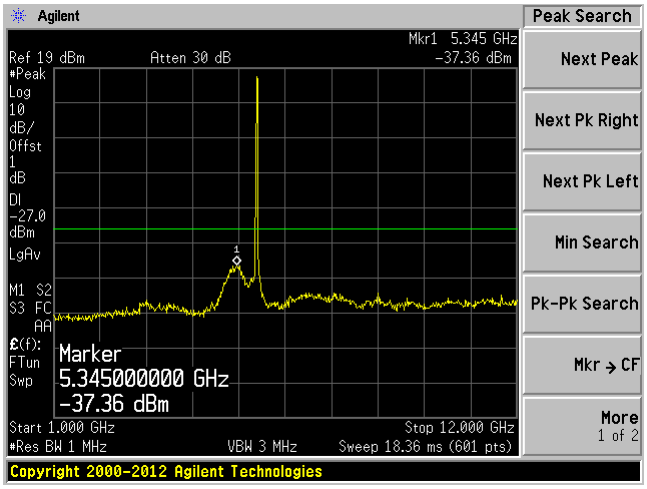
Chain 0, Plot: 30 MHz – 1 GHz



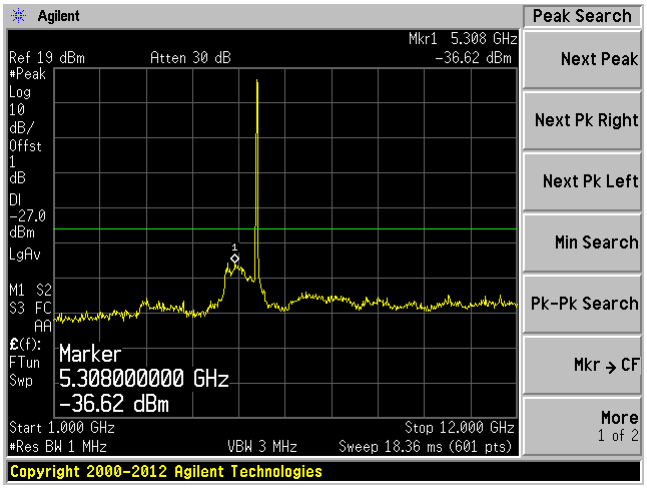
Chain 1, Plot: 30 MHz – 1 GHz



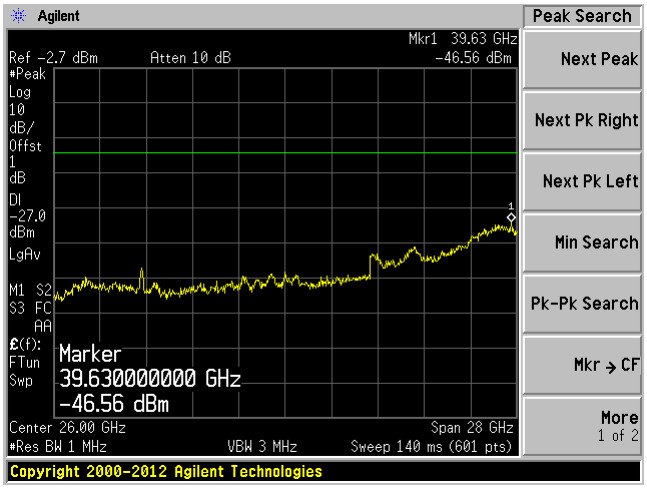
Chain 0, Plot: 1 GHz –12 GHz



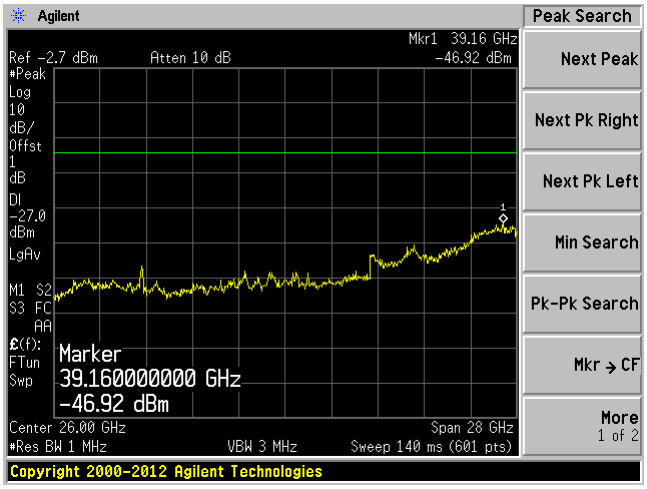
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

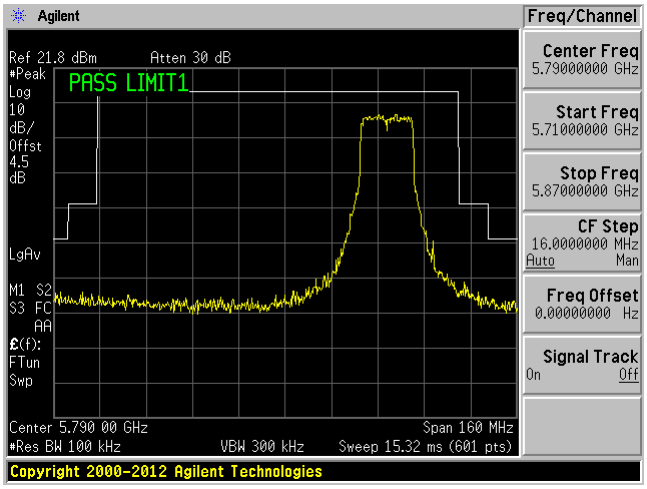


Chain 1, Plot: 12 GHz – 40 GHz

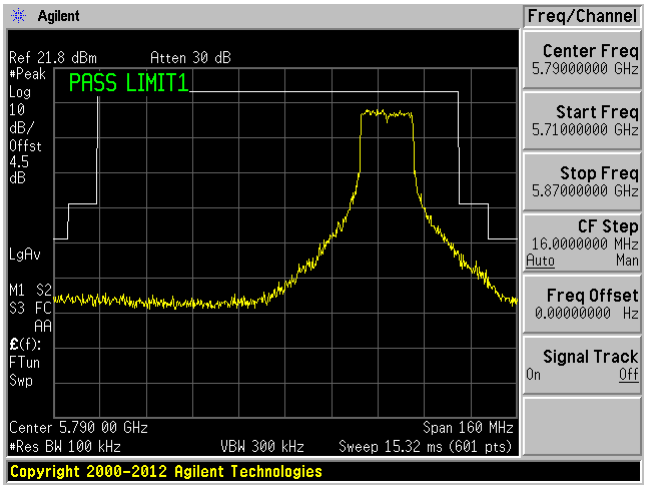


Band Edge Measurement

Chain 0

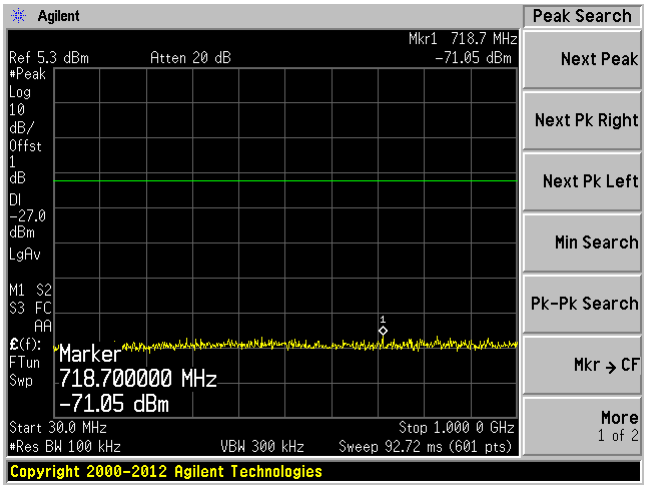


Chain 1

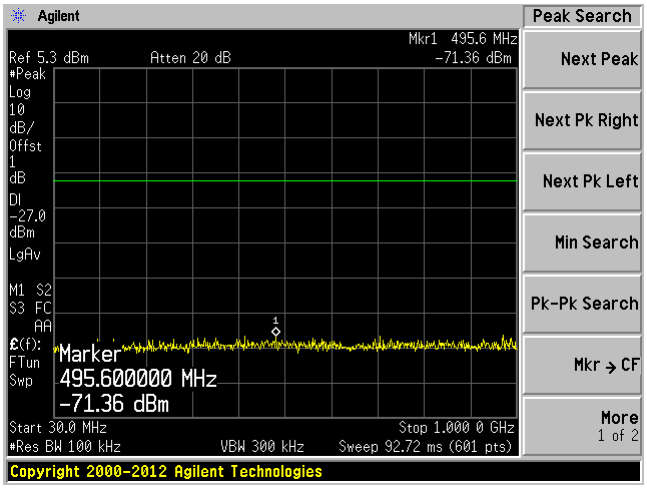


802.11n-HT40, Low Channel 5755 MHz

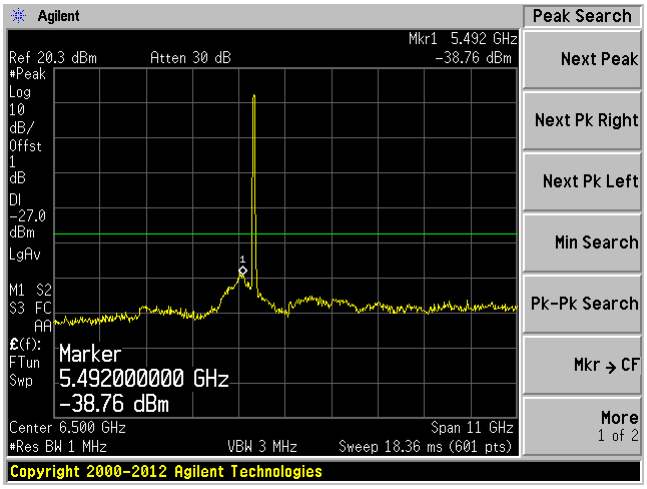
Chain 0, Plot: 30 MHz – 1 GHz



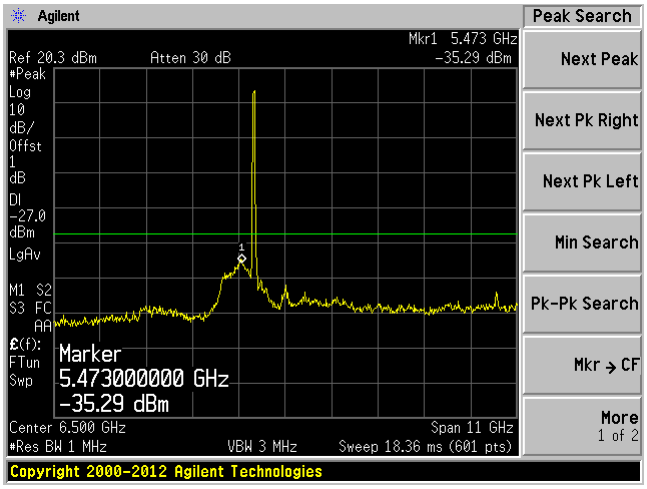
Chain 1, Plot: 30 MHz – 1 GHz



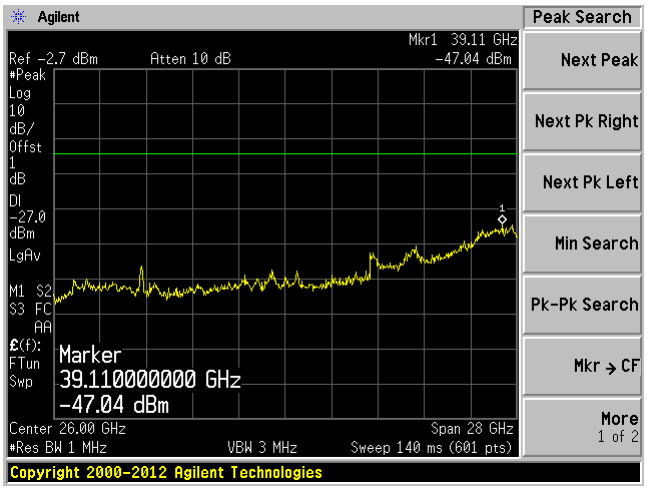
Chain 0, Plot: 1 GHz –12 GHz



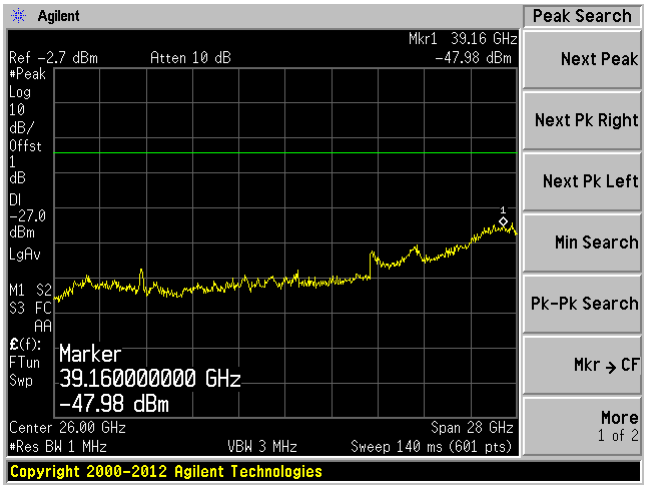
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

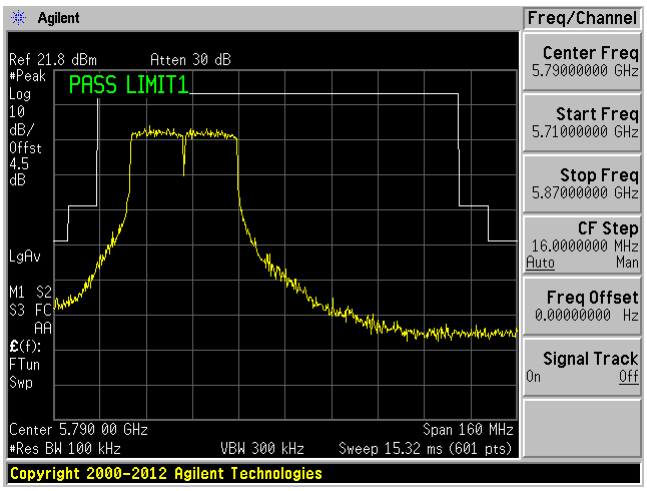


Chain 1, Plot: 12 GHz – 40 GHz

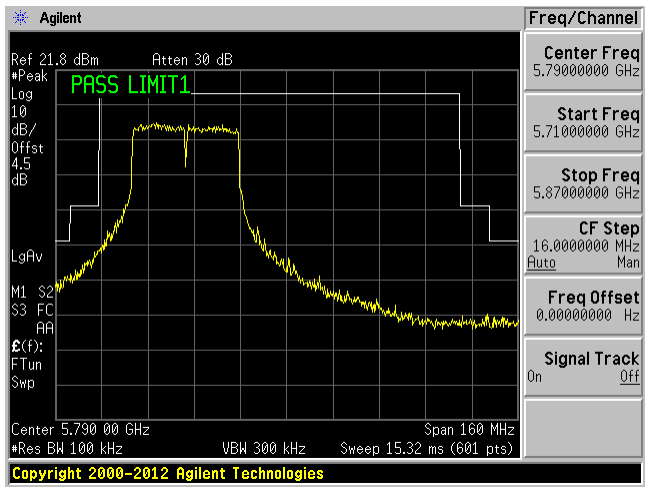


Band Edge Measurement

Chain 0

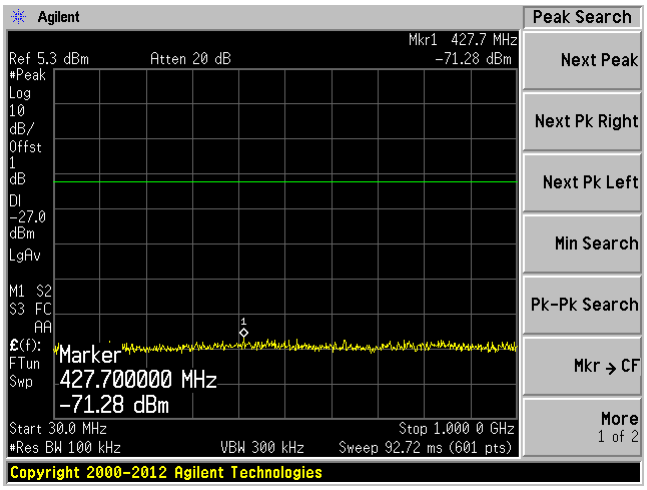


Chain 1

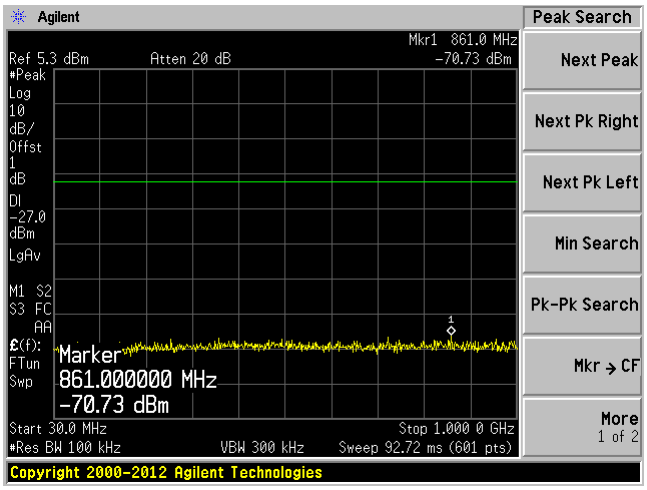


802.11n-HT40, High Channel 5795 MHz

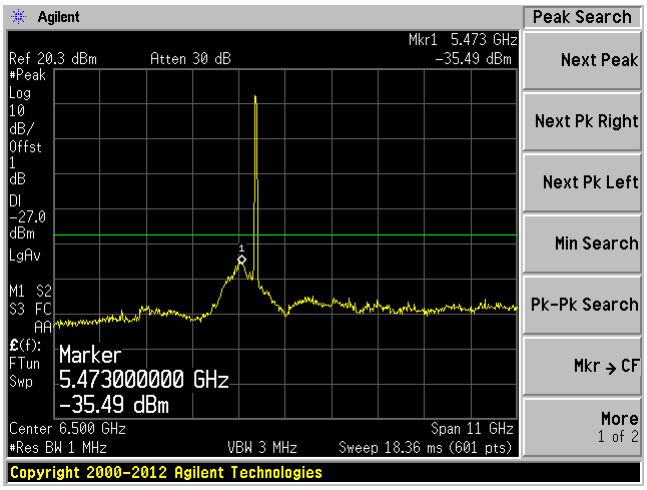
Chain 0, Plot: 30 MHz – 1 GHz



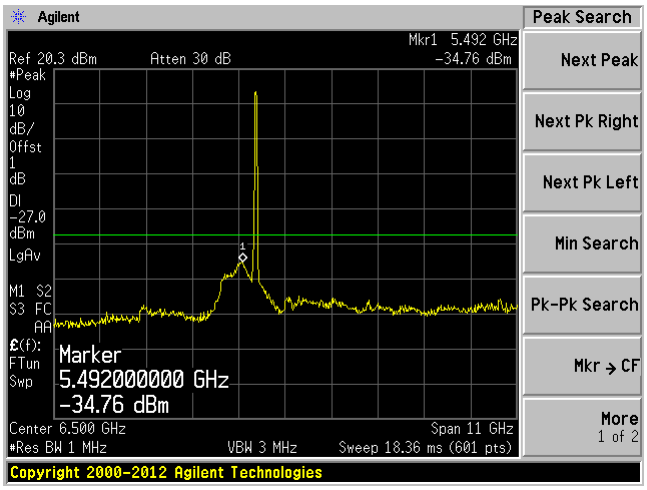
Chain 1, Plot: 30 MHz – 1 GHz



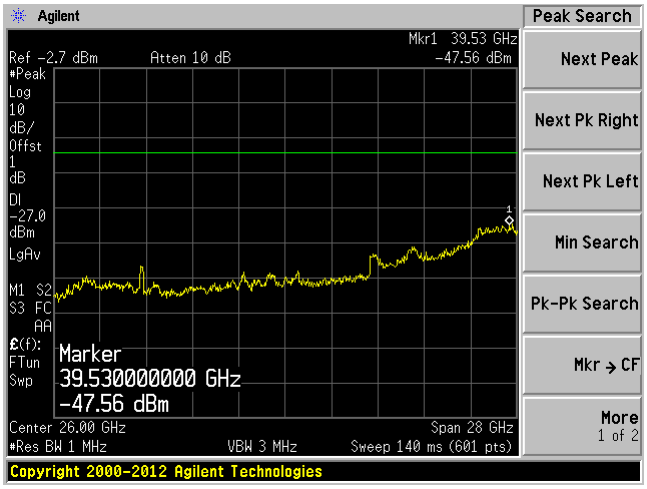
Chain 0, Plot: 1 GHz –12 GHz



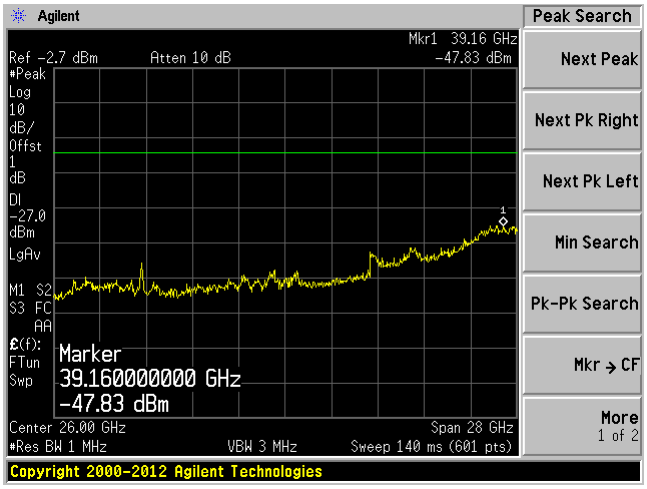
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

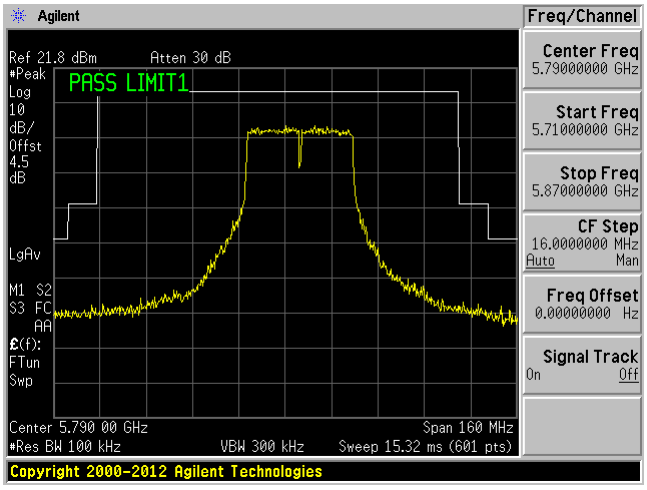


Chain 1, Plot: 12 GHz – 40 GHz

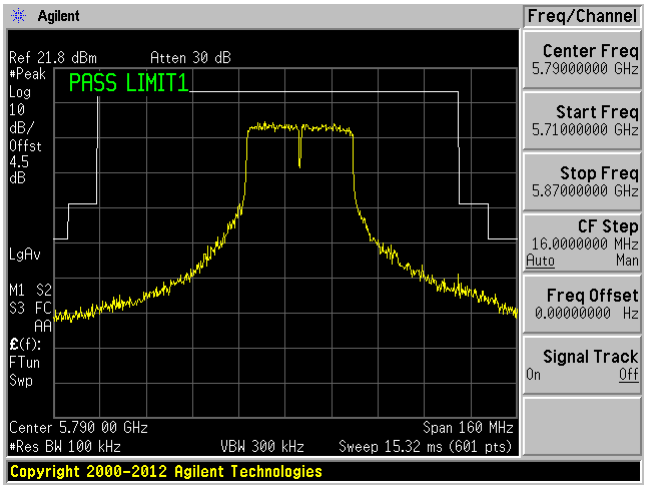


Band Edge Measurement

Chain 0

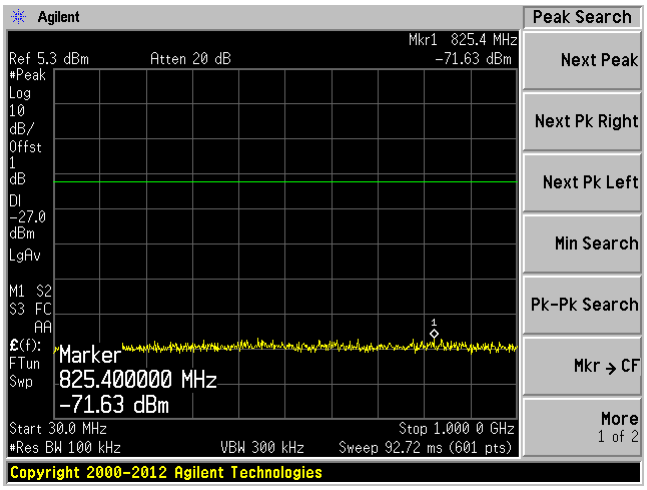


Chain 1

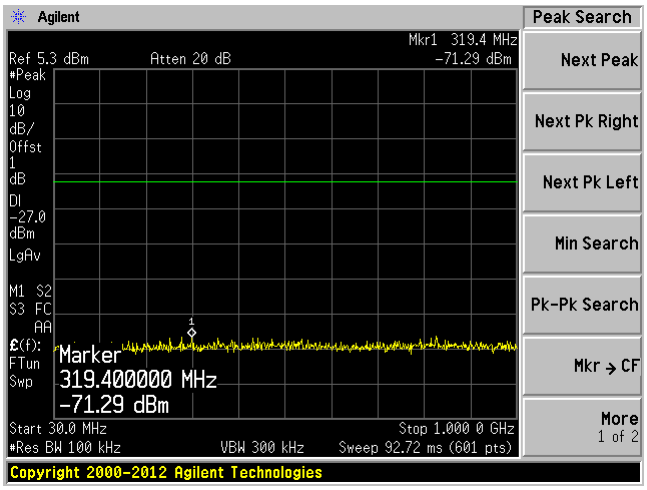


802.11 ac-VHT80, 5775 MHz

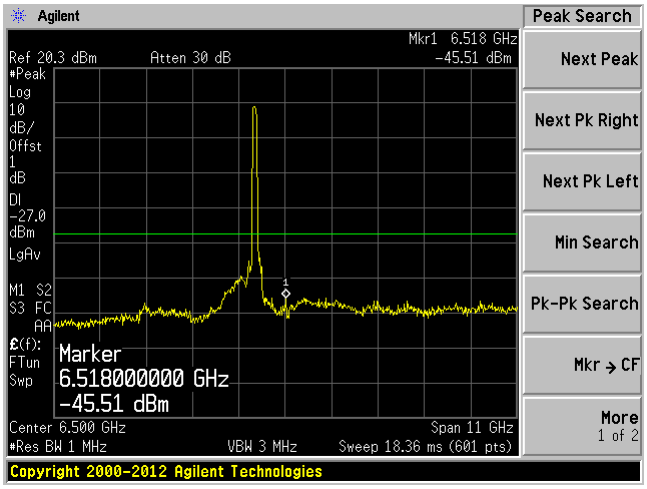
Chain 0, Plot: 30 MHz – 1 GHz



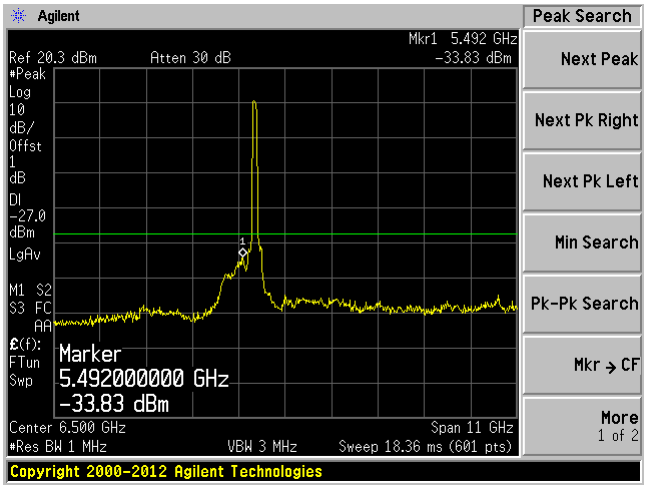
Chain 1, Plot: 30 MHz – 1 GHz



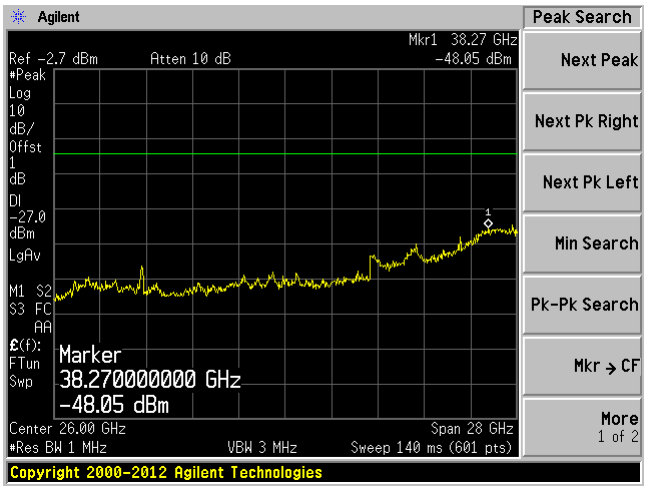
Chain 0, Plot: 1 GHz –12 GHz



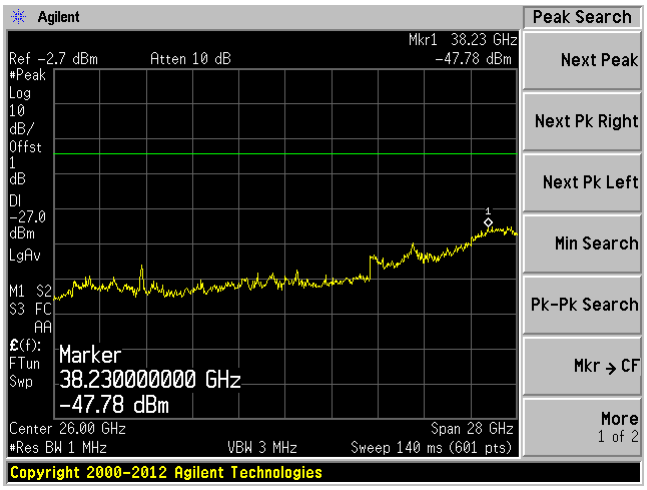
Chain 1, Plot: 1 GHz – 12 GHz



Chain 0, Plot: 12 GHz –40 GHz

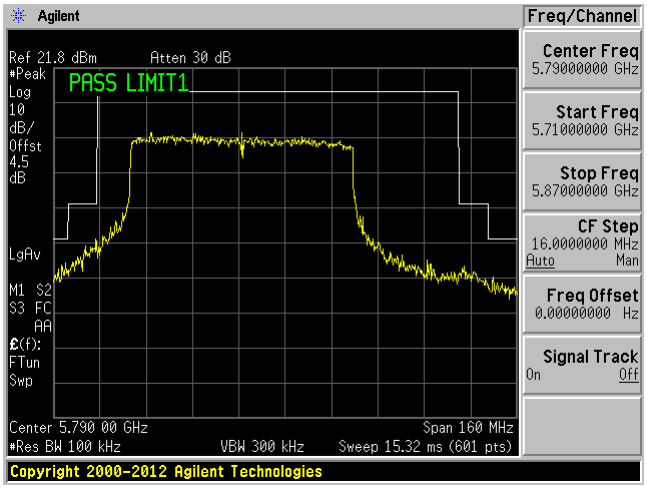


Chain 1, Plot: 12 GHz – 40 GHz

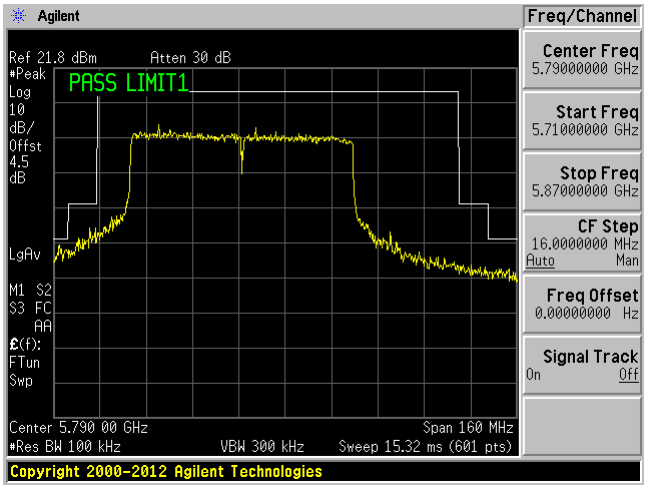


Band Edge Measurement:

Chain 0



Chain 1



11 FCC §15.407(a) - Power Spectral Density

11.1 Applicable Standards

According to FCC §15.407(a)

(1) For the band 5.15-5.25 GHz.

For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum 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

The measurements are base on FCC KDB 789033 D02 General UNII Test Procedures New Rules v01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section F: Peak power spectral density (PPSD)

11.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2014-10-24	1 year

Statement of Traceability: BACL Corp. *attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.*

11.4 Test Environmental Conditions

Temperature:	22-24º C
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 KPa

The testing was performed by Rui Zhou from 2014-12-25 at RF site.

11.5 Test Results

Please refer to the following tables and plots.

5.2 GHz Band

802.11a mode

Channel	Frequency (MHz)	TX Chain 0 PSD (dBm/MHz)	TX Chain 1 PSD (dBm/MHz)	Max PSD (dBm/MHz)	Limit (dBm/MHz)
Low	5180	4.57	3.478	4.57	17
Middle	5200	10.576	9.429	10.576	17
High	5240	9.832	8.949	9.832	17

802.11n-HT20 mode

Channel	Frequency (MHz)	TX Chain 0 Power (dBm/MHz)	TX Chain 1 Power (dBm/MHz)	Total PSD (dBm/MHz)	Limit (dBm/MHz)
Low	5180	3.738	3.249	6.51	17
Middle	5200	10.011	9.032	12.56	17
High	5240	8.963	8.836	11.91	17

802.11n-HT40 mode

Channel	Frequency (MHz)	TX Chain 0 Power (dBm/MHz)	TX Chain 1 Power (dBm/MHz)	Total PSD (dBm/MHz)	Limit (dBm/MHz)
Low	5190	-1.865	-2.348	0.91	17
High	5230	7.084	6.813	9.96	17

802.11ac-VHT80 mode

Channel	Frequency (MHz)	TX Chain 0 Power (dBm/MHz)	TX Chain 1 Power (dBm/MHz)	Total PSD (dBm/MHz)	Limit (dBm/MHz)
-	5210	-6.127	-6.526	-3.31	17

5.8 GHz Band

802.11a mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm/100 kHz)	Chain 1 PSD (dBm/100 kHz)	Factor (dB)	Max PSD (dBm/500 kHz)	Limit (dBm/500 kHz)
Low	5745	0.85	1.712	6.99	8.702	30
Middle	5785	0.349	1.713	6.99	8.703	30
High	5825	0.515	1.379	6.99	8.369	30

802.11n-HT20 mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm/100 kHz)	Chain 1 PSD (dBm/100 kHz)	Factor (dB)	Total PSD (dBm/500 kHz)	Limit (dBm/500 kHz)
Low	5745	0.099	1.031	6.99	9.281	30
Middle	5785	-0.707	0.484	6.99	8.957	30
High	5825	-1.131	0.469	6.99	8.874	30

802.11n-HT40 mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm/100 kHz)	Chain 1 PSD (dBm/100 kHz)	Factor (dB)	Total PSD (dBm/500 kHz)	Limit (dBm/500 kHz)
Low	5755	-4.584	-3.21	6.99	7.815	30
High	5795	-4.614	-3.339	6.99	7.799	30

802.11ac-VHT80 mode

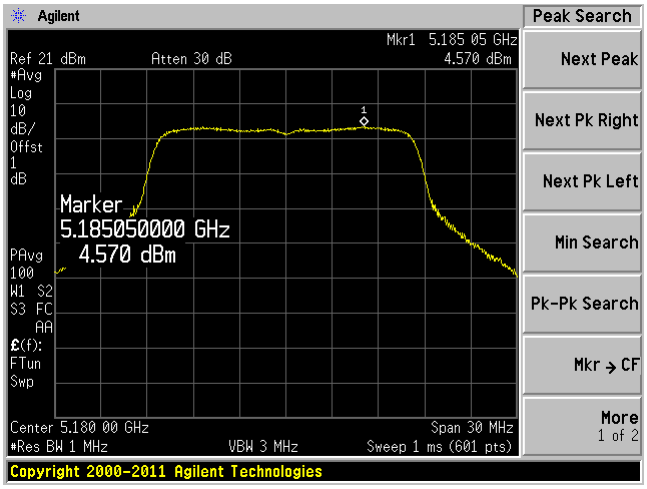
Channel	Frequency (MHz)	Chain 0 PSD (dBm/100 kHz)	Chain 1 PSD (dBm/100 kHz)	Factor (dB)	Total PSD (dBm/500 kHz)	Limit (dBm/500 kHz)
-	5775	-6.142	-7.617	6.99	7.406	30

Note: The PSA's RBW=100kHz and a 10*log(5) factor is added to compare the limit as 30 dBm/500 kHz for W58 Band.

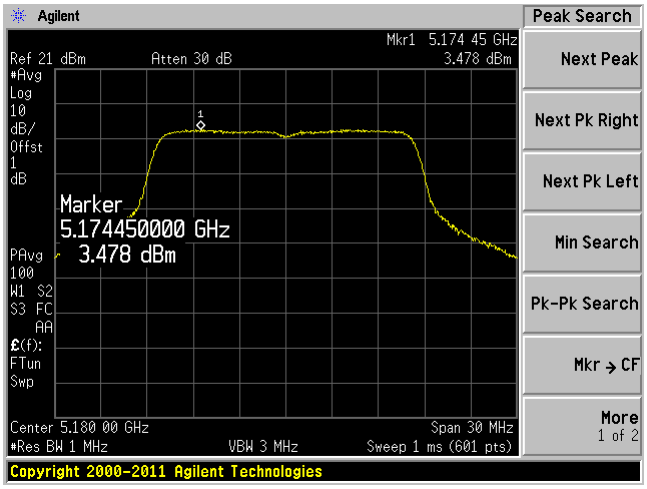
5.2 GHz Band

802.11a mode

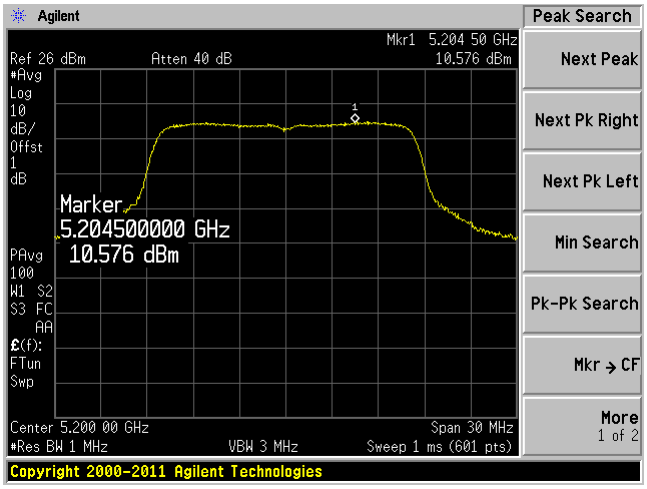
Low channel: 5180 MHz Chain 0



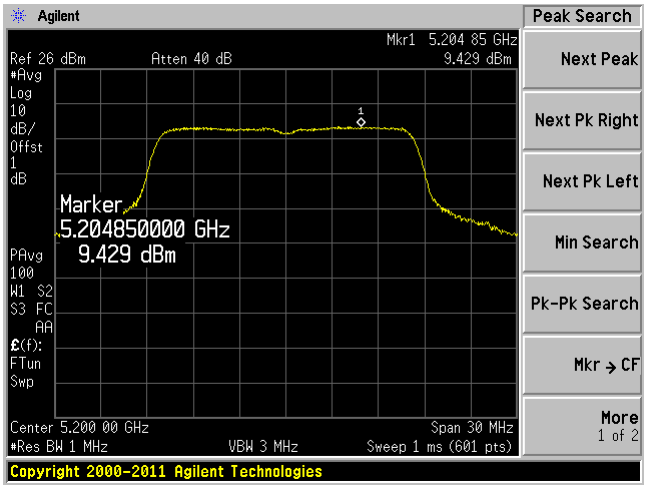
Low channel: 5180 MHz Chain 1



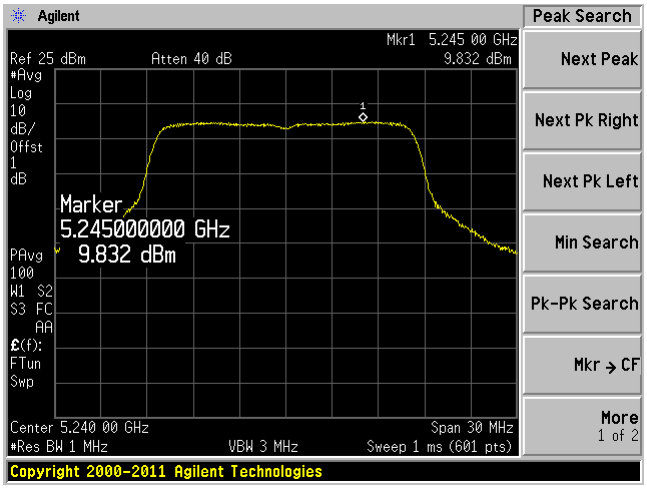
Middle channel: 5200 MHz Chain 0



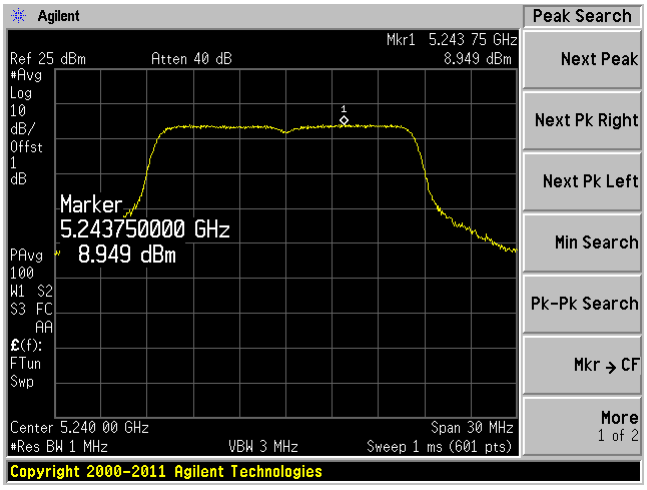
Middle channel: 5200 MHz Chain 1



High channel: 5240 MHz Chain 0

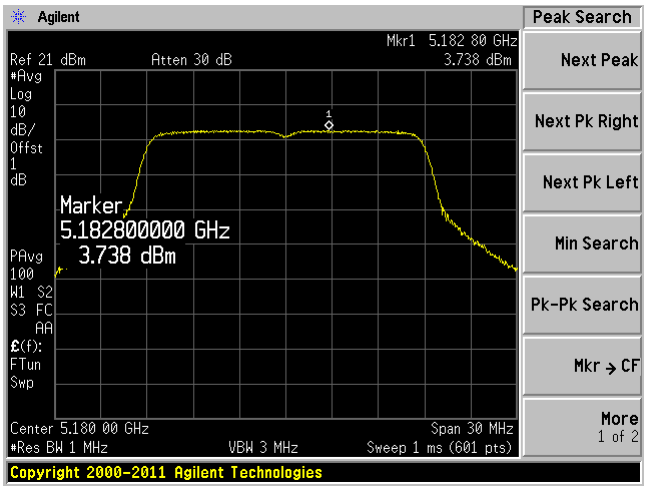


High channel: 5240 MHz Chain 1

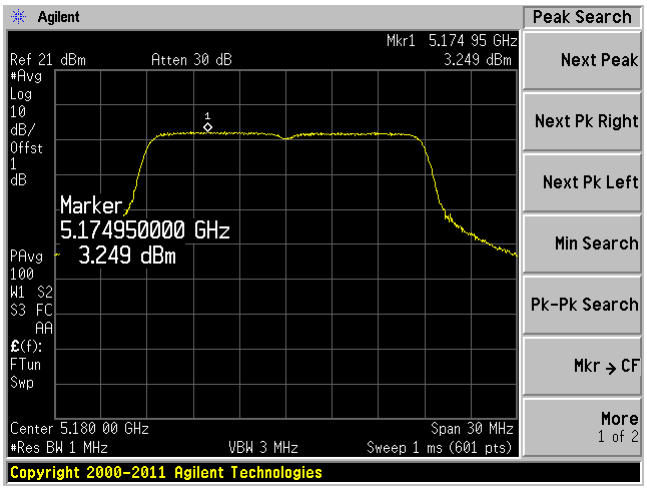


802.1n-HT20 mode

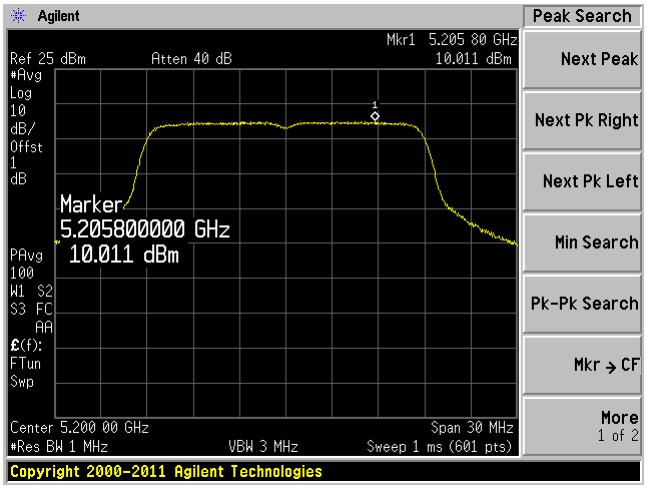
Low channel: 5180 MHz Chain 0



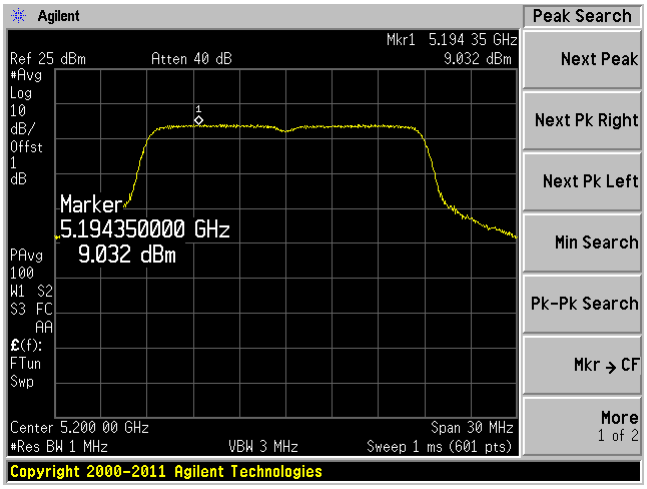
Low channel: 5180 MHz Chain 1



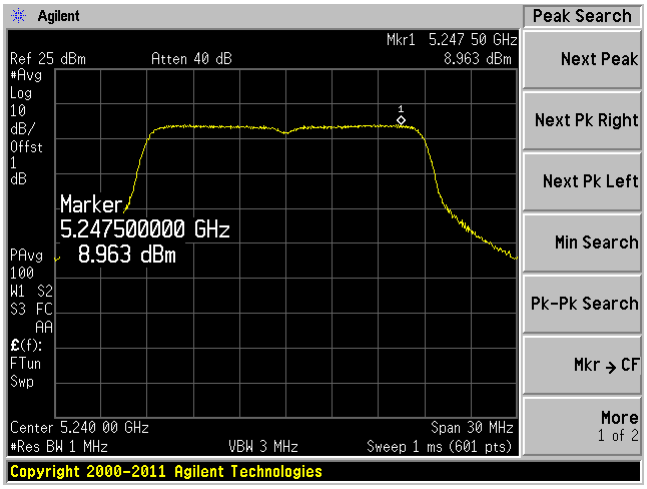
Middle channel: 5200 MHz Chain 0



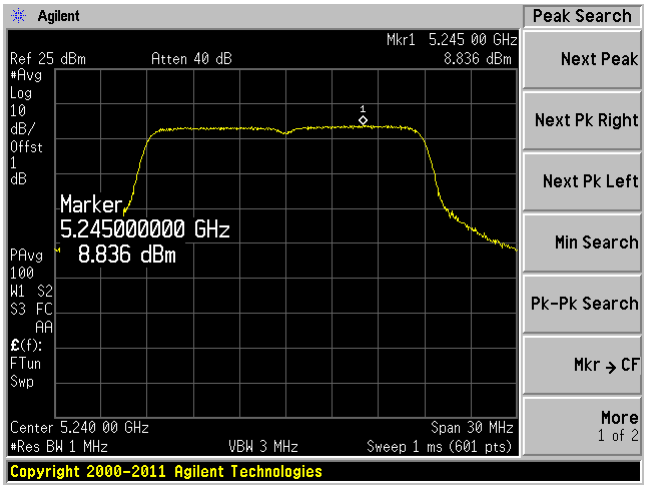
Middle channel: 5200 MHz Chain 1



High channel: 5240 MHz Chain 0

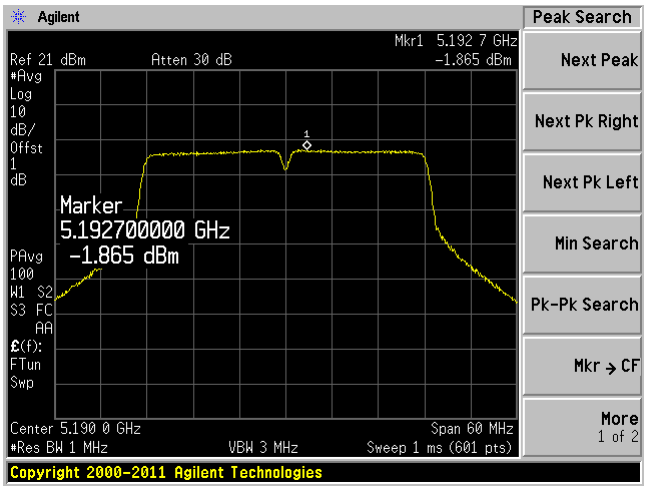


High channel: 5240 MHz Chain 1

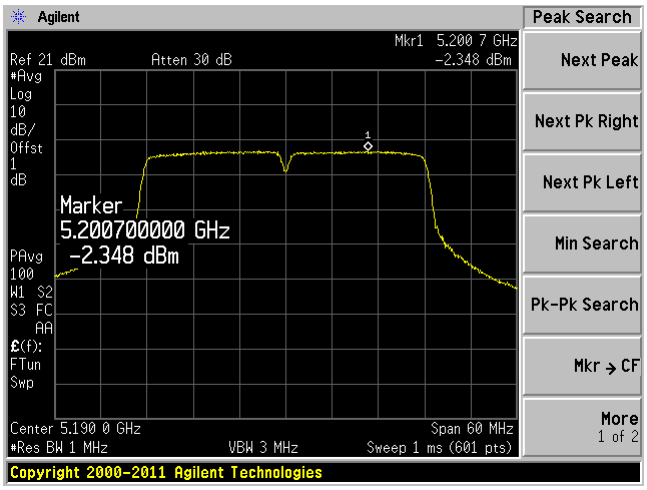


802.11n-HT40 mode

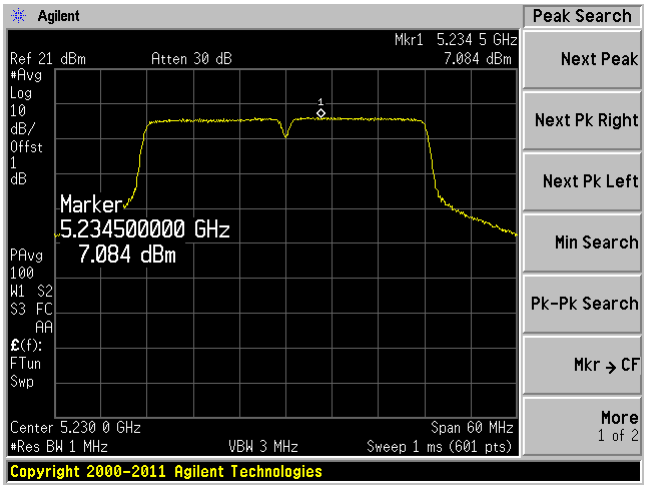
Low channel: 5190 MHz Chain 0



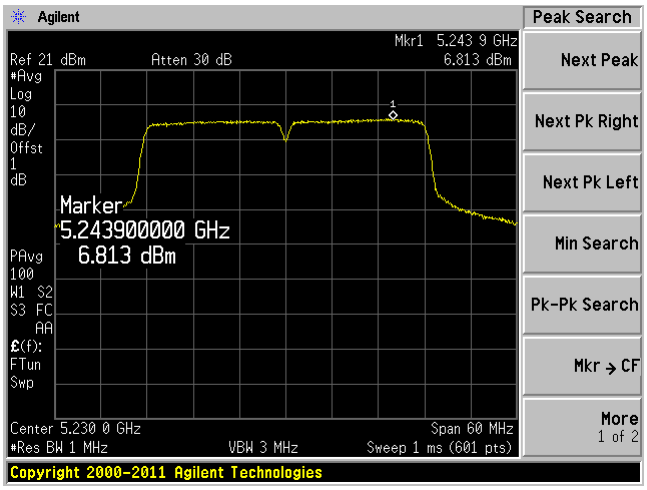
Low channel: 5190 MHz Chain 1



High channel: 5230 MHz Chain 0

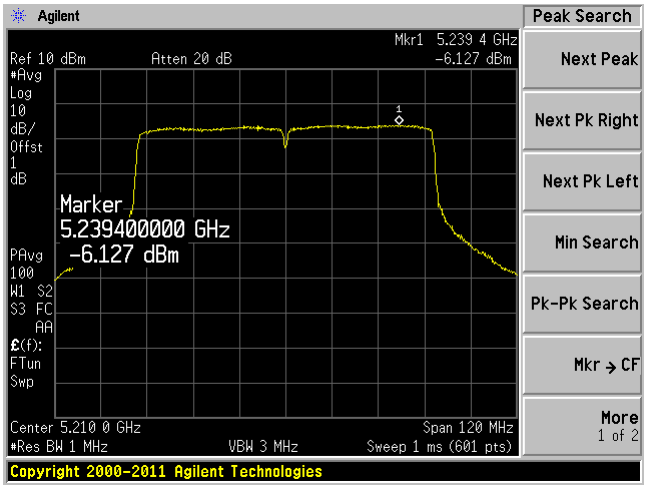


High channel: 5230 MHz Chain 1

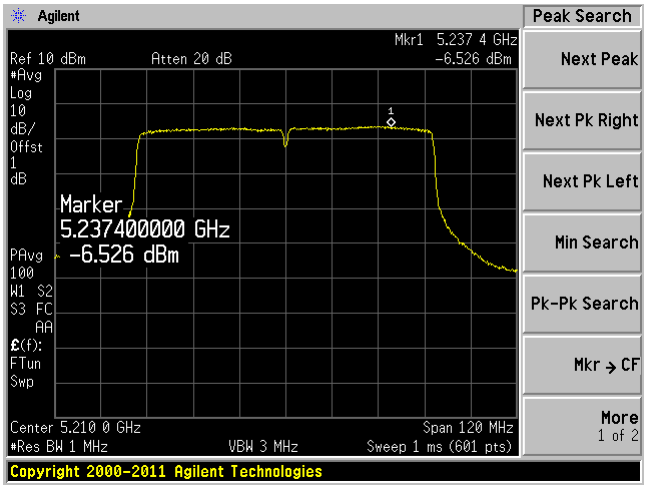


802.11ac-VHT80 mode

Chain 0



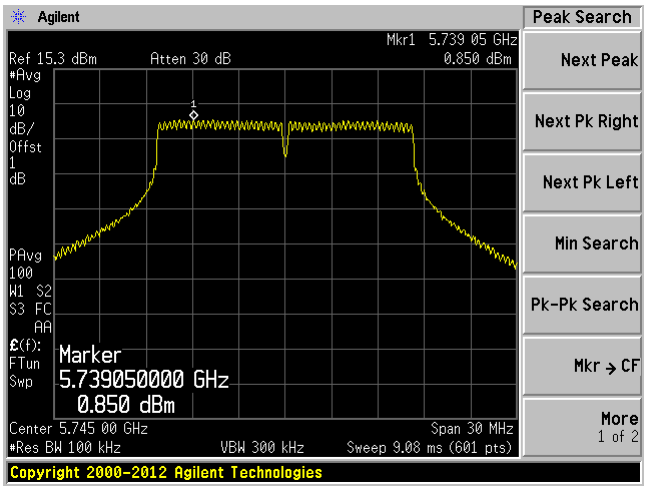
Chain 1



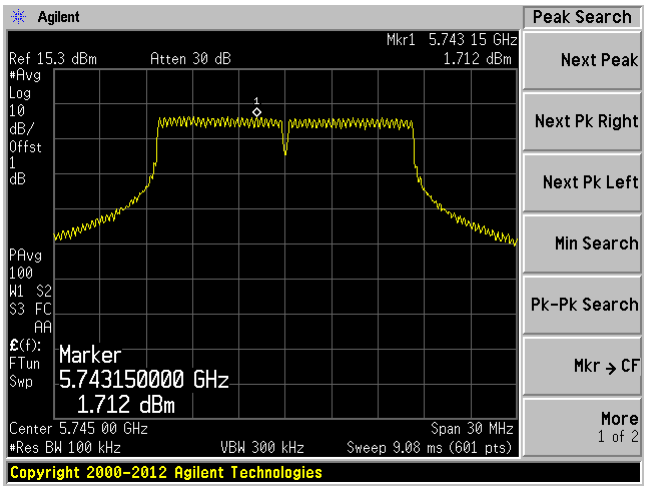
5.8 GHz Band

802.11a, Low Channel, 5745 MHz

Chain 0

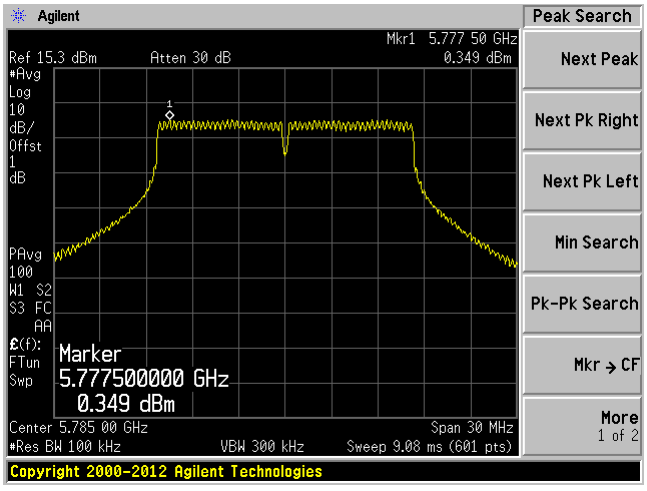


Chain 1

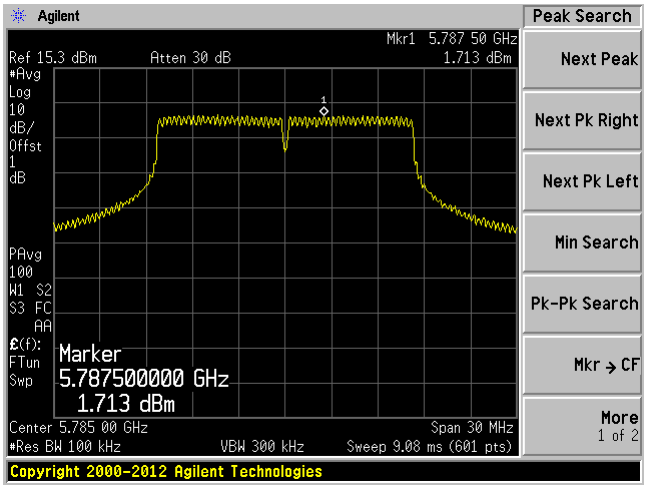


802.11a, Middle Channel, 5785 MHz

Chain 0

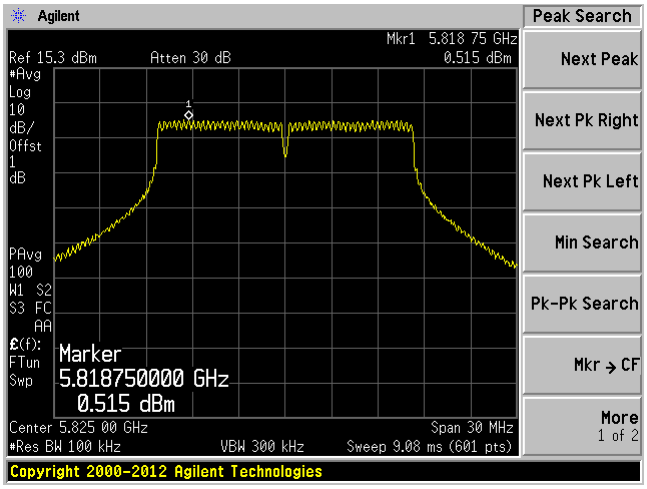


Chain 1

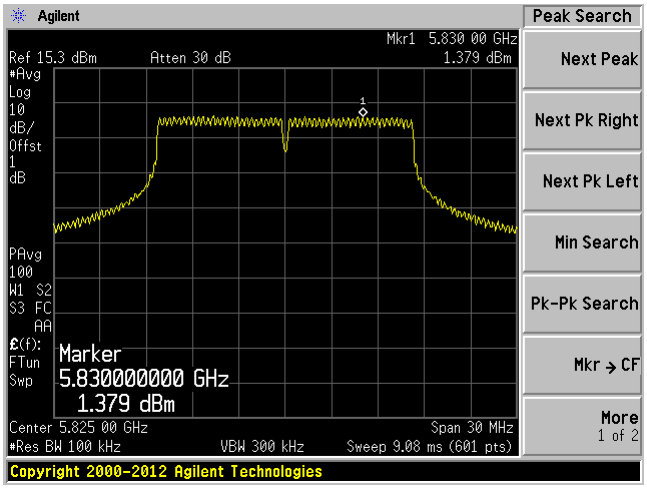


802.11a, High Channel, 5825 MHz

Chain 0

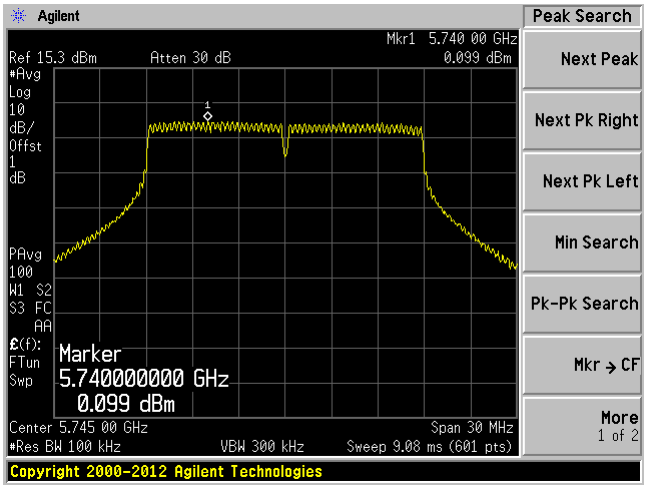


Chain 1

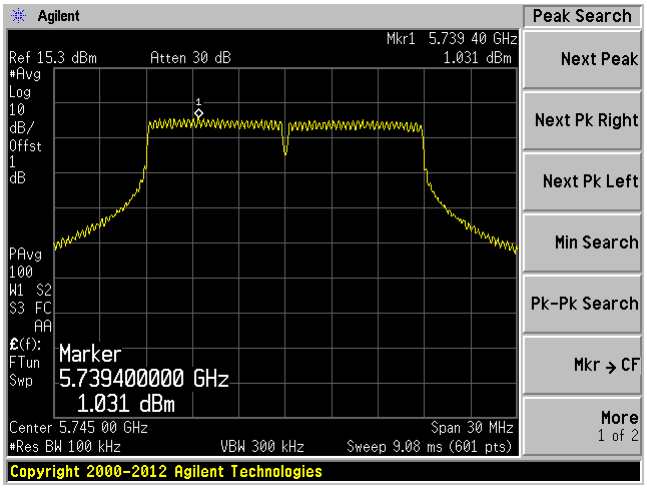


802.11n-HT20, Low Channel 5745 MHz

Chain 0

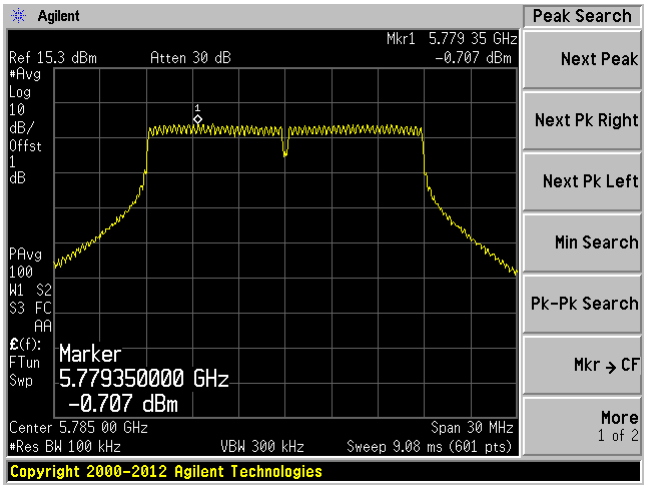


Chain 1

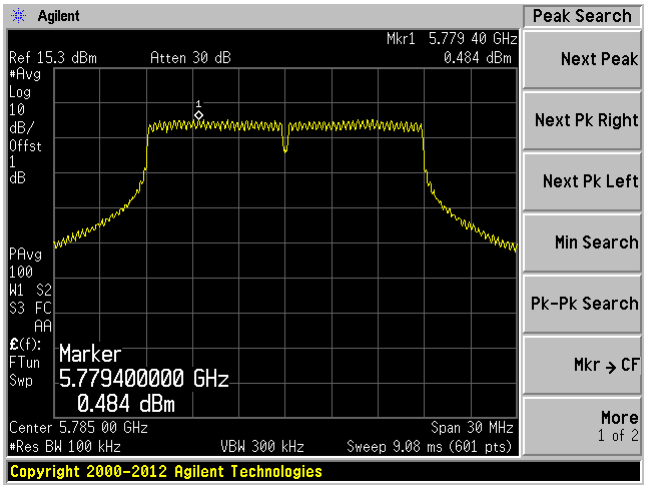


802.11n-HT20, Middle Channel 5785 MHz

Chain 0

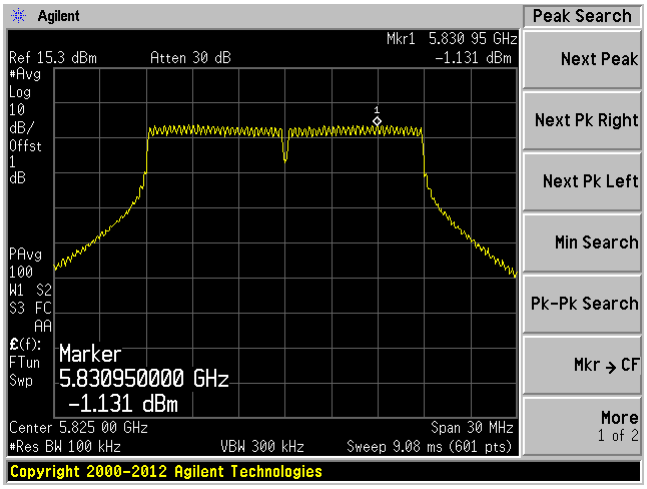


Chain 1

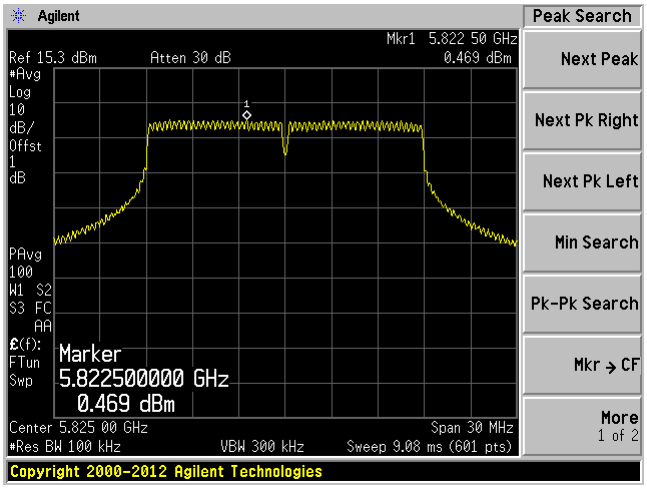


802.11n-HT20, High Channel, 5825 MHz

Chain 0

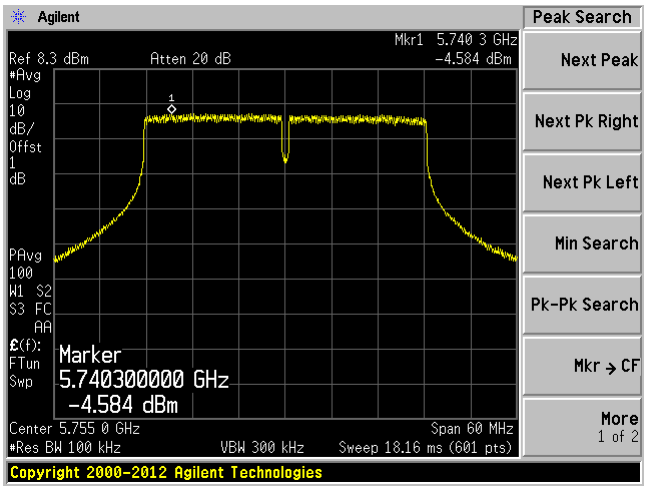


Chain 1

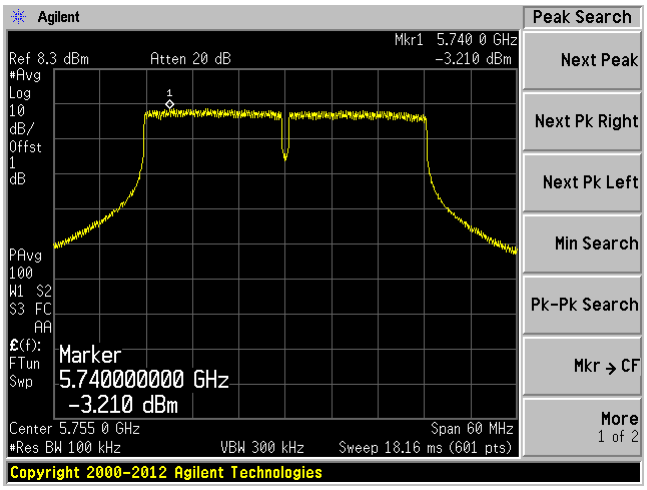


802.11n-HT40, Low Channel 5755 MHz

Chain 0

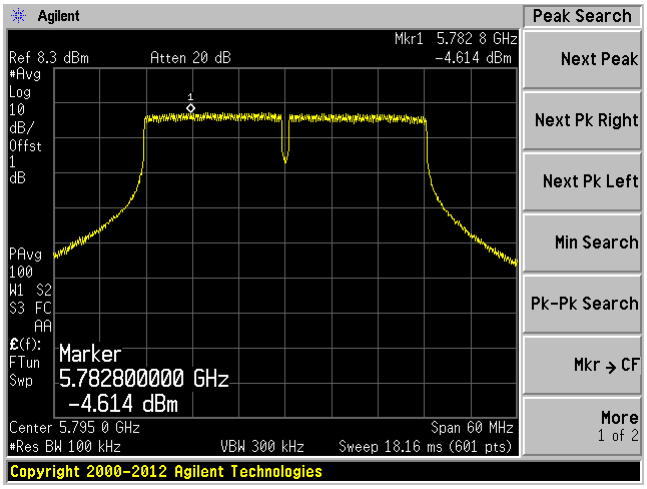


Chain 1

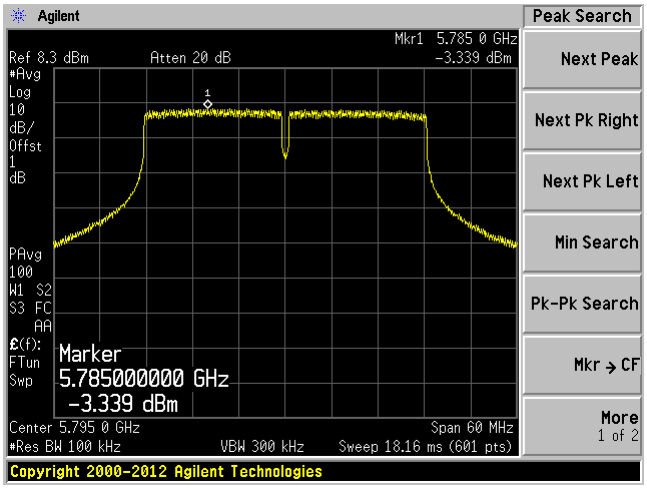


802.11n-HT40, High Channel 5795 MHz

Chain 0

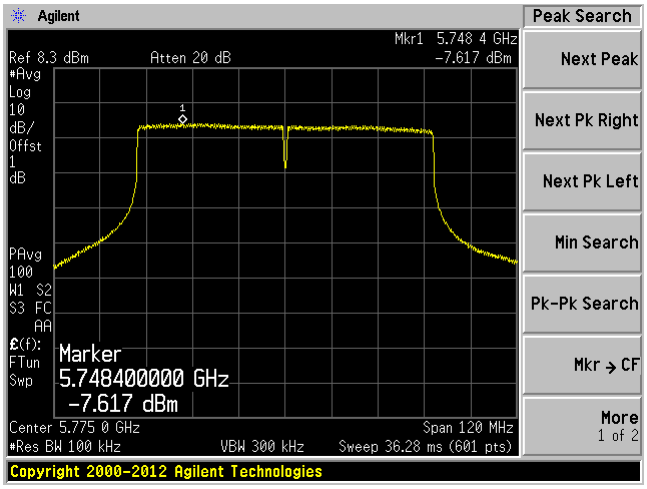


Chain 1



802.11ac-VHT80, 5775 MHz

Chain 0



Chain 1