FCC PART 15.407
TEST AND MEASUREMENT REPORT

For

Senao Networks, Inc.

3F, No. 529, Chung Cheng Road,

Hsintien, Taipei, Taiwan, R.O.C

FCC ID: U2M-PCE4551AH

Report Type: Class II Permissive Change	**Product Type:** 802.11ac PCIe Module

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Report Number	R1406301-407
Report Date	2014-07-31
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1406301-407	Original Report	2014-07-31

1 General Description

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report has been compiled on behalf of Senao Networks, Inc., and their product, *FCC ID: U2M-PCE4551AH,* model number: PCE4551AH, which henceforth is referred to as the EUT (Equipment Under Test.) The EUT is a modular which operates in 5 GHz bands.

1.2 Mechanical Description of EUT

Module:

The Module measures approximately: 52mm (L) x 31mm (W) x 2 mm (H) and weighs approximately 8 g.

Host:

The Host measures approximately 22.cm (L) x 20 cm (W) x 35 cm (H) and weighs approximately 780 g.

The data gathered are from a production sample provided by the manufacturer, module serial number: 138305003, host serial number FP320CX13000125 assigned by manufacturer.

1.3 Objective

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

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

This is the Class II permissive change application of the device. The difference from the original device is that the frequency band: 5250-5350 MHz, 5470-5725 MHz were added. The co-location with other 2.4 GHz certified module (FCC ID: U2M-PCE3300AN) in the same enclosure was also addressed in this CIIPC filing.

For the changes made to the device, all items were performed for adding frequency band.

1.4 Related Submittal(s)/Grant(s)

None.

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 ±2.0 dB for Conducted Emissions tests and ±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 Luminaires 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:
1- Unlicensed, Licensed radio frequency devices and Telephone Terminal Equipment for the FCC. Scope A1, A2, A3, A4, B1, B2, B3, B4 & C.
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.

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 software "PCE4551AH_art2_ver_4_9_51_Pre_RC_Bin_for ICC" is provided by customer. The EUT exercise program used during testing was designed to exercise the system components.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Local Support Equipment

Manufacturer	Description	Model No.	Serial No.
Lenovo	Laptop	ThinkPad R60	LV-BB670
Lenovo	AC Adapter	42T4434	42T4435

2.5 Host Internal Configuration Details

Manufacturer	Description	Model	Serial Number
Fortinet	Main PCB Board	7016A0747004 Ver: 1.00	-
Senao	802.11 n PCIe module	PCE3300AN	13C220914
Senao	802.11 ac PCIe Module	PCE4551AH	-

3 Summary of Test Results

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

Compliant*: Please refer to BACL DFS report No.: R1406301-DFS
Note: the test result for original frequency band please refer to report number: FR370334AN, which Issued by Sporton Lab and granted on 2013-11-15.

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

5250-5350 MHz

Maximum peak output power at antenna input terminal (dBm):	20.80
Maximum peak output power at antenna input terminal (mW):	120.23
Prediction distance (cm):	20
Prediction frequency (MHz):	5260
Maximum Antenna Gain, typical (dBi):	6
Maximum Antenna Gain (numeric):	3.98
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.095
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

5470-5725 MHz

Maximum peak output power at antenna input terminal (dBm):	21.12
Maximum peak output power at antenna input terminal (mW):	129.419
Prediction distance (cm):	20
Prediction frequency (MHz):	5580
Maximum Antenna Gain, typical (dBi):	6
Maximum Antenna Gain (numeric):	3.98
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.10256
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

MPE calculation under simultaneous transmission condition:

Both of the WLAN 2.4 GHz & 5 GHz built in the final device FAP-320C can transmit Simultaneously. The maximum standalone MPE of WLAN 2.4 GHz (FCC ID: U2M-PCE3300AN) is 0.459 mW/cm^2@20cm. The maximum W53 & W56 is 0.10256 mW/cm^2@20cm.

Simultaneous transmission MPE= 0.459 + 0.10256 = 0.56156 < 1.0 mW/cm^2@20cm

The device meets FCC MPE requirement for uncontrolled exposure environment at 20 cm distance.

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 uses a unique coupling to the EUT, which complies with the antenna requirement.And the antenna gain is 6dBi. 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

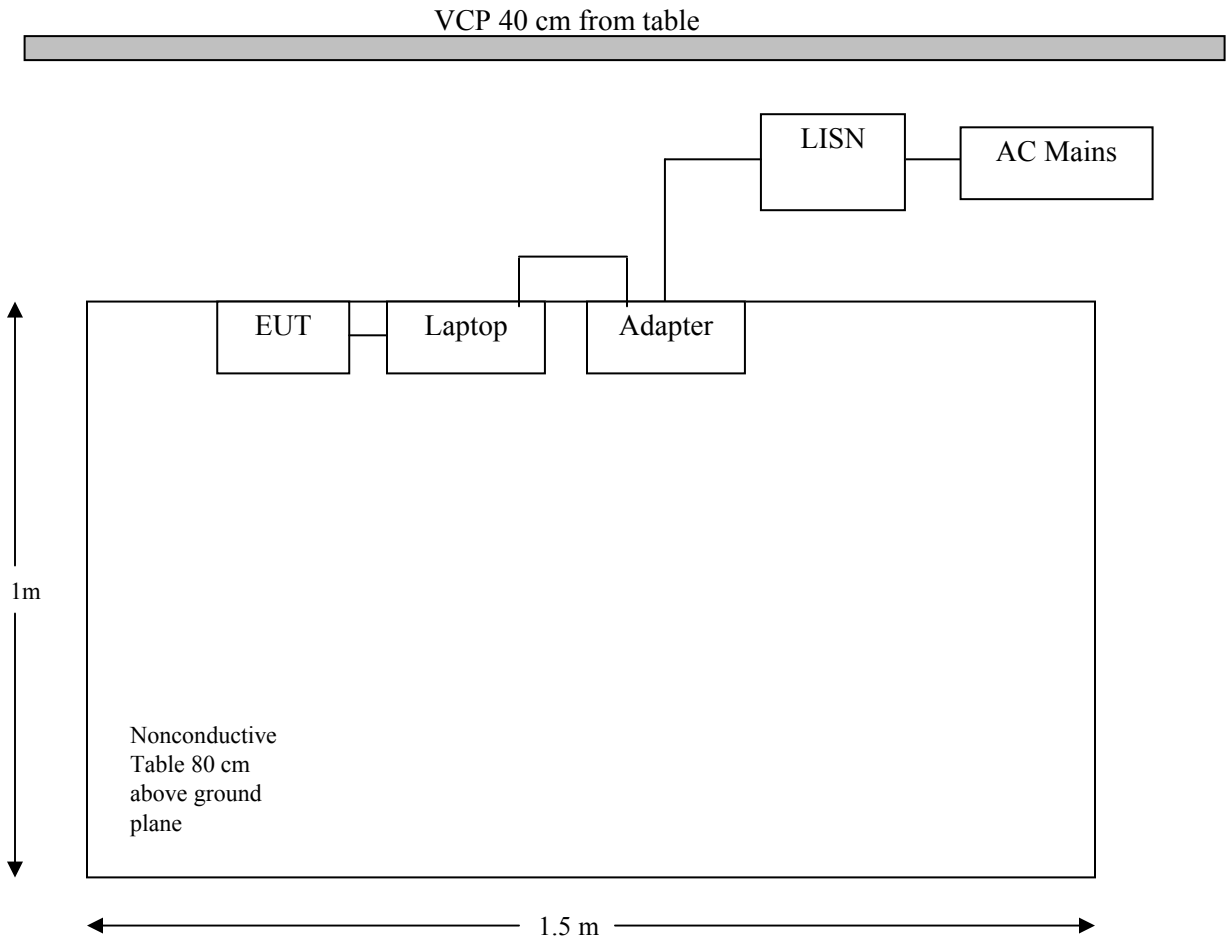
During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-1 and the power cord of the support equipment was connected to LISN-2.

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

AC/DC Adaptor:



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	2013-09-28	1 year
Solar Electronics	LISN	9252-50-R-24-N	511213	2013-7-14	1 year
TTE	Filter, High Pass	H962-150K-50-21378	K7133	2013-07-30	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:	22-24 ºC
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 KPa

The testing was performed by Rui Zhou on 2014-07-08 in 5m chamber3.

6.8 Summary of Test Results

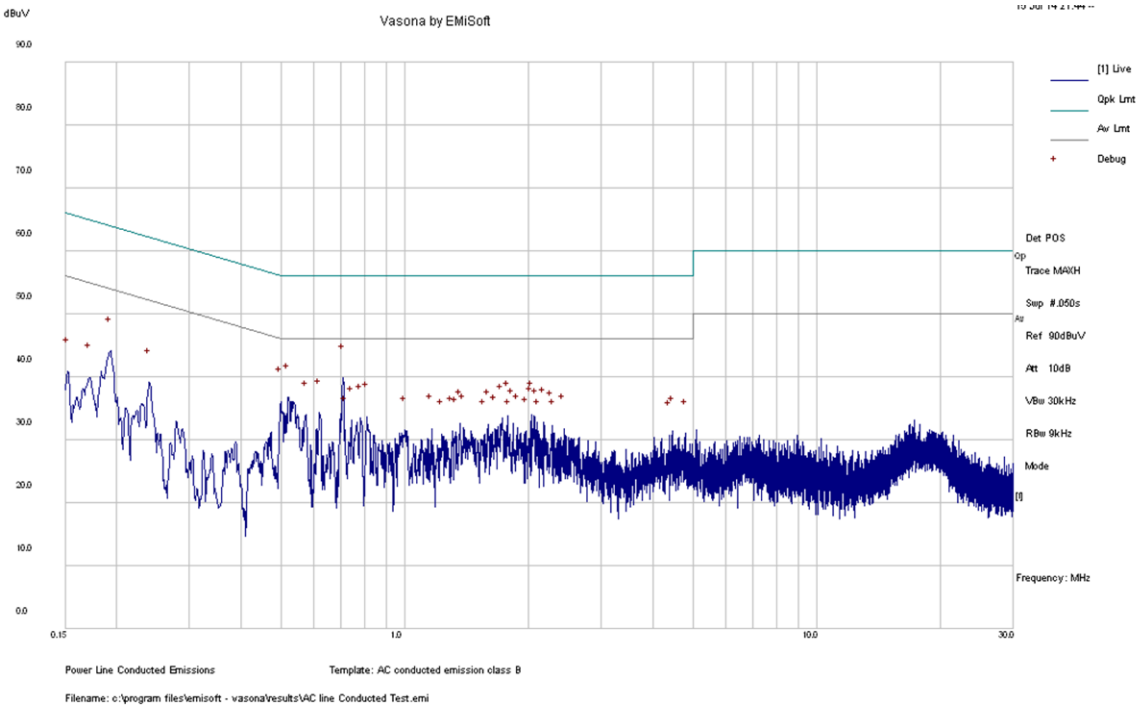
According to the recorded data in following table, the EUT complied with the FCC Part 15 standard's conducted emissions limits, with the margin reading of:

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Line/Neutral)**	**Range (MHz)**
-18.06	0.15307	Neutral	0.15-30

6.9 Conducted Emissions Test Plots and Data

Transmitting with 5 GHz Band:

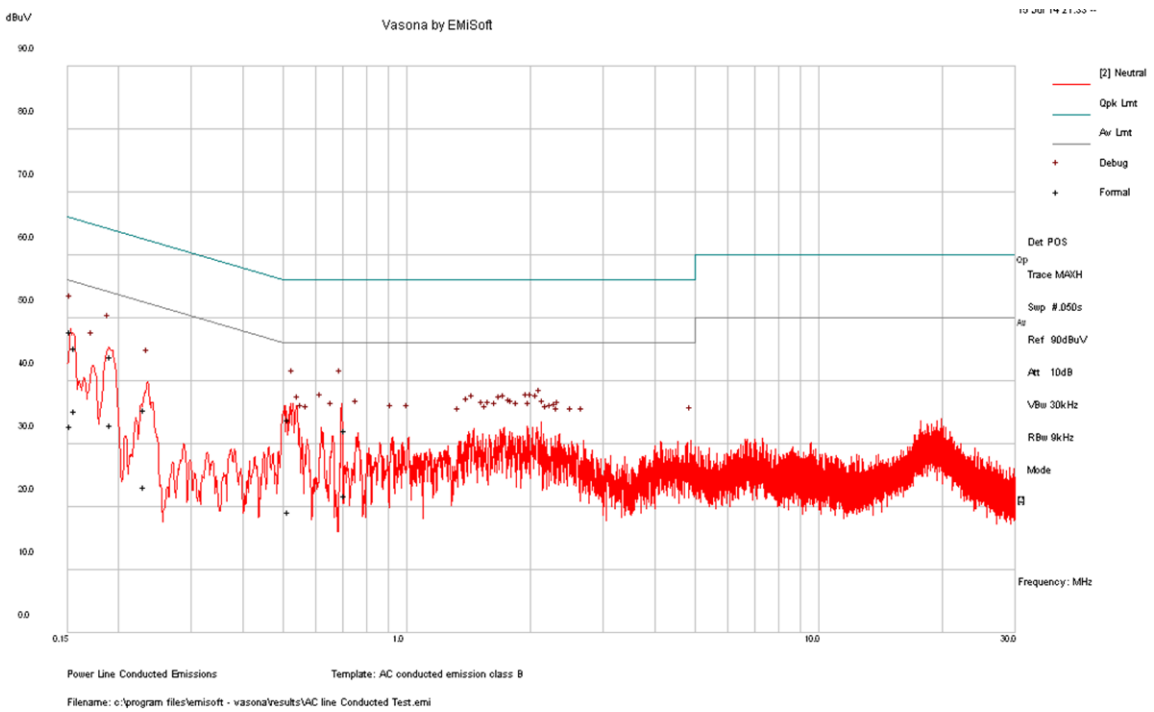
120 V, 60 Hz – Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.69964	36.08	Line	56	-19.92	QP
0.51722	34.96	Line	56	-21.04	QP
0.18986	41.87	Line	64.04	-22.18	QP
0.51433	34.41	Line	56	-21.59	QP
0.62237	32.97	Line	56	-23.03	QP
0.58209	29.41	Line	56	-26.59	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.69964	18.27	Line	46	-27.73	Ave.
0.51722	21.48	Line	46	-24.52	Ave.
0.18986	31.67	Line	54.04	-22.37	Ave.
0.51433	21.07	Line	46	-24.93	Ave.
0.62237	20.07	Line	46	-25.93	Ave.
0.58209	18.18	Line	46	-27.82	Ave.

120 V, 60 Hz – Neutral



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.15307	47.78	Neutral	65.83	-18.06	QP
0.19100	43.83	Neutral	63.99	-20.17	QP
0.70794	32.21	Neutral	56	-23.79	QP
0.51843	33.81	Neutral	56	-22.19	QP
0.15702	45.27	Neutral	65.62	-20.35	QP
0.23125	35.38	Neutral	62.4	-27.02	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.15307	32.83	Neutral	55.83	-23	Ave.
0.19100	32.97	Neutral	53.99	-21.02	Ave.
0.70794	21.74	Neutral	46	-24.26	Ave.
0.51843	19.3	Neutral	46	-26.7	Ave.
0.15702	35.27	Neutral	55.62	-20.35	Ave.
0.23125	23.26	Neutral	52.4	-29.14	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.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an 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	2013-07-18	1 year
Hewlett Packard	Pre-amplifier 1z-26.5 GHz	8447D	2944A06639	2013-08-09	1 year
Agilent	Spectrum Analyzer	E4446A	MY48250238	2013-08-29	1 year
EMCO	Horn Antenna	3315	9511-4627	2013-10-17	1 year
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2013-09-28	1 year
Wisewave	Pre-amplifier 26.5-40GHz	ALN-33144030-01	11424-01	2013-03-20	2 years
Wisewave	Horn Antenna 26.5-40GHz	ARH-4223-02	10555-02	2013-9-20	3 years

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 2014-07-7 to 2014-07-14 at 5 meter 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

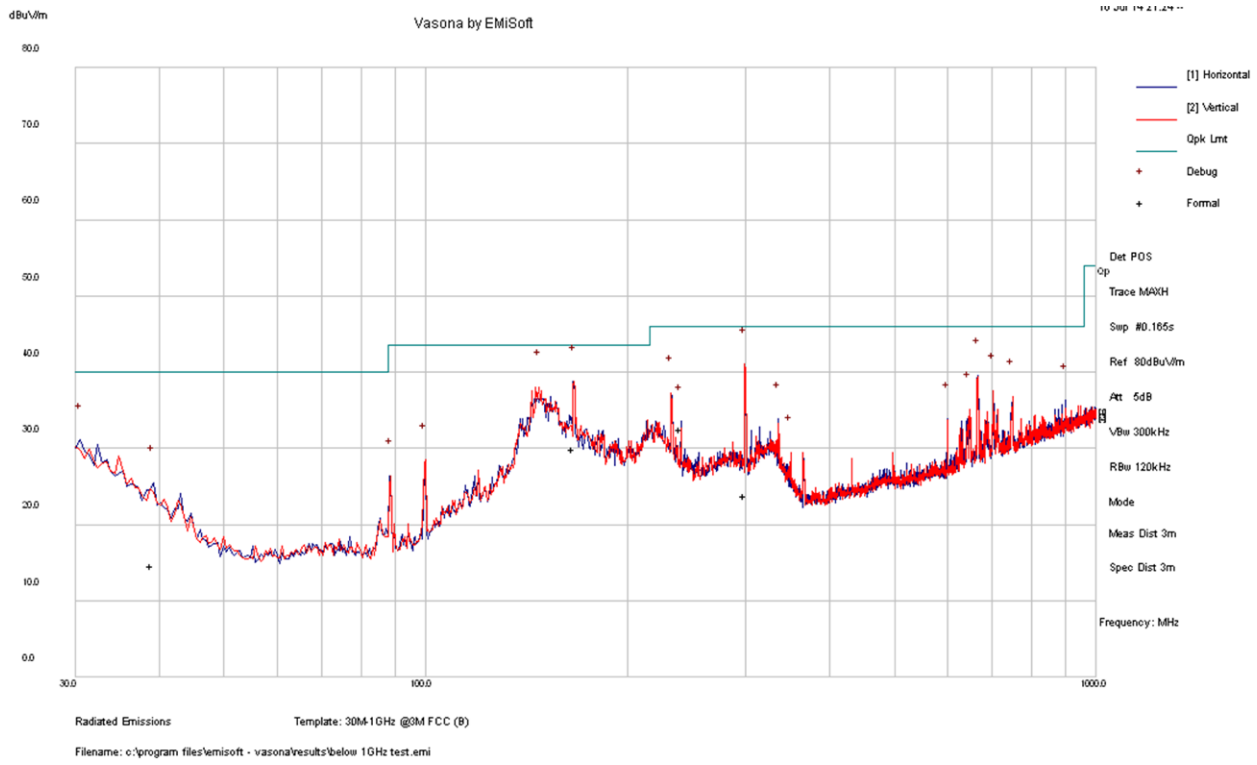
Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel, Range**
13.46	126.932	V	30 MHz - 1 GHz

1 -40 GHz

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel, Range**
0.69	5459.27	V	1 - 40 GHz

7.8 Radiated Emissions Test Result Data

1) 30 MHz – 1 GHz



Frequency MHz	Cord. Reading (dBµV/m)	Measurement Type	Antenna Polarity (H/V)	Antenna Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
126.932	30.04	QP	V	203	165	43.5	-13.46
31.2095	23.86	QP	V	100	238	40.0	-16.14
128.189	32.56	QP	H	100	353	43.5	-10.94

2) 1–40 GHz

5.3 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 5260 MHz, measured at 3 meters											
5260	77.76	15	100	V	33.63	4.6	0	115.99	-	-	Peak
5260	70.49	216	100	H	33.69	4.6	0	108.78	-	-	Peak
5260	65.65	15	100	V	33.63	4.6	0	103.88	-	-	Ave
5260	59.4	216	100	H	33.69	4.6	0	97.69	-	-	Ave
10520	43.32	0	100	V	38.34	7	34.49	54.17	74	-19.83	Peak
10520	43.31	0	100	H	38.34	7	34.49	54.16	74	-19.84	Peak
10520	31.63	0	100	V	38.34	7	34.49	42.48	54	-11.52	Ave
10520	31.16	0	100	H	38.34	7	34.49	42.01	54	-11.99	Ave
15780	46.18	0	100	V	37.93	8.35	34.61	57.85	74	-16.15	Peak
15780	45.81	0	100	H	37.93	8.35	34.61	57.48	74	-16.52	Peak
15780	33.66	0	100	V	37.93	8.35	34.61	45.33	54	-8.67	Ave
15780	33.86	0	100	H	37.93	8.35	34.61	45.53	54	-8.47	Ave
21040	45.61	0	100	V	34.60	9.79	34	56.00	74	-18.00	Peak
21040	46.25	0	100	H	34.60	9.79	34	56.64	74	-17.36	Peak
21040	33.27	0	100	V	34.60	9.79	34	43.66	54	-10.34	Ave
21040	33.11	0	100	H	34.60	9.79	34	43.50	54	-10.50	Ave
Middle Channel 5280 MHz, measured at 3 meters											
5280	78.53	129	100	V	33.628	4.6	0	116.758	-	-	Peak
5280	72.7	333	100	H	33.688	4.6	0	110.988	-	-	Peak
5280	65.81	129	100	V	33.628	4.6	0	104.038	-	-	Ave
5280	57.96	333	100	H	33.688	4.6	0	96.248	-	-	Ave
10560	43.84	0	100	V	38.418	7.07	34.49	54.84	74	-19.16	Peak
10560	43.94	0	100	H	38.418	7.07	34.49	54.94	74	-19.06	Peak
10560	31.86	0	100	V	38.418	7.07	34.49	42.86	54	-11.14	Ave
10560	31.64	0	100	H	38.418	7.07	34.49	42.64	54	-11.36	Ave
15840	46.45	0	100	V	37.914	8.38	34.61	58.13	74	-15.87	Peak
15840	46.12	0	100	H	37.914	8.38	34.61	57.80	74	-16.20	Peak
15840	33.75	0	100	V	37.914	8.38	34.61	45.43	54	-8.57	Ave
15840	33.93	0	100	H	37.914	8.38	34.61	45.61	54	-8.39	Ave
21120	46.07	0	100	V	34.6	9.8	34	56.47	74	-17.53	Peak
21120	47.04	0	100	H	34.6	9.8	34	57.44	74	-16.56	Peak
21120	34.01	0	100	V	34.6	9.8	34	44.41	54	-9.59	Ave
21120	33.62	0	100	H	34.6	9.8	34	44.02	54	-9.98	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 5320 MHz, measured at 3 meters											
5320	74.05	355	100	V	34.85	4.71	0	113.61	-	-	Peak
5320	67.48	215	100	H	34.85	4.71	0	107.04	-	-	Peak
5320	61.22	355	100	V	34.85	4.71	0	100.78	-	-	Ave
5320	53.57	215	100	H	34.85	4.71	0	93.13	-	-	Ave
5350	27.3	355	100	V	33.63	4.71	0	65.64	74	-8.362	Peak
5350	26.88	215	100	H	33.69	4.71	0	65.28	74	-8.722	Peak
5350	13.35	355	100	V	33.63	4.71	0	51.69	54	-2.312	Ave
5350	13.13	215	100	H	33.69	4.71	0	51.53	54	-2.472	Ave
10640	43.03	0	100	V	38.42	7.07	34.49	54.03	74	-19.97	Peak
10640	42.86	0	100	H	38.42	7.07	34.49	53.86	74	-20.14	Peak
10640	31.05	0	100	V	38.42	7.07	34.49	42.05	54	-11.95	Ave
10640	30.56	0	100	H	38.42	7.07	34.49	41.56	54	-12.44	Ave
15960	45.93	0	100	V	37.90	8.39	34.61	57.61	74	-16.39	Peak
15960	44.87	0	100	H	37.90	8.39	34.61	56.55	74	-17.45	Peak
15960	33.31	0	100	V	37.90	8.39	34.61	44.99	54	-9.01	Ave
15960	33.47	0	100	H	37.90	8.39	34.61	45.15	54	-8.85	Ave
21280	44.65	0	100	V	34.60	9.79	34	55.04	74	-18.96	Peak
21280	45.33	0	100	H	34.60	9.79	34	55.72	74	-18.28	Peak
21280	33.18	0	100	V	34.60	9.79	34	43.57	54	-10.43	Ave
21280	32.51	0	100	H	34.60	9.79	34	42.90	54	-11.10	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 5260 MHz, measured at 3 meters											
5260	77.78	274	100	V	33.628	4.6	0	116.008	-	-	Peak
5260	70.8	222	100	H	33.688	4.6	0	109.088	-	-	Peak
5260	64.96	274	100	V	33.628	4.6	0	103.188	-	-	Ave
5260	58.63	222	100	H	33.688	4.6	0	96.918	-	-	Ave
10520	43.53	0	100	V	38.343	7	34.49	54.39	74	-19.61	Peak
10520	43.63	0	100	H	38.343	7	34.49	54.48	74	-19.52	Peak
10520	32.25	0	100	V	38.343	7	34.49	43.10	54	-10.90	Ave
10520	32.02	0	100	H	38.343	7	34.49	42.88	54	-11.12	Ave
15780	46.50	0	100	V	37.928	8.35	34.61	58.17	74	-15.83	Peak
15780	46.07	0	100	H	37.928	8.35	34.61	57.74	74	-16.26	Peak
15780	33.44	0	100	V	37.928	8.35	34.61	45.10	54	-8.90	Ave
15780	33.52	0	100	H	37.928	8.35	34.61	45.18	54	-8.82	Ave
21040	45.12	0	100	V	34.6	9.79	34	55.51	74	-18.49	Peak
21040	45.52	0	100	H	34.6	9.79	34	55.91	74	-18.09	Peak
21040	32.87	0	100	V	34.6	9.79	34	43.26	54	-10.74	Ave
21040	32.18	0	100	H	34.6	9.79	34	42.57	54	-11.43	Ave
Middle Channel 5280 MHz, measured at 3 meters											
5280	77.58	52	100	V	33.63	4.6	0	115.81	-	-	Peak
5280	70.93	334	100	H	33.69	4.6	0	109.22	-	-	Peak
5280	65.02	52	100	V	33.63	4.6	0	103.25	-	-	Ave
5280	58.36	334	100	H	33.69	4.6	0	96.65	-	-	Ave
10560	43.51	0	100	V	38.42	7.07	34.49	54.51	74	-19.49	Peak
10560	44.20	0	100	H	38.42	7.07	34.49	55.20	74	-18.80	Peak
10560	31.87	0	100	V	38.42	7.07	34.49	42.87	54	-11.13	Ave
10560	31.86	0	100	H	38.42	7.07	34.49	42.86	54	-11.14	Ave
15840	46.77	0	100	V	37.91	8.38	34.61	58.45	74	-15.55	Peak
15840	46.67	0	100	H	37.91	8.38	34.61	58.35	74	-15.65	Peak
15840	33.87	0	100	V	37.91	8.38	34.61	45.55	54	-8.45	Ave
15840	34.60	0	100	H	37.91	8.38	34.61	46.28	54	-7.72	Ave
21120	45.62	0	100	V	34.60	9.8	34	56.02	74	-17.98	Peak
21120	46.42	0	100	H	34.60	9.8	34	56.82	74	-17.18	Peak
21120	33.55	0	100	V	34.60	9.8	34	43.95	54	-10.05	Ave
21120	33.70	0	100	H	34.60	9.8	34	44.10	54	-9.90	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 5320 MHz, measured at 3 meters											
5320	74.16	330	100	V	34.39	4.71	0	113.26	-	-	Peak
5320	69.18	324	100	H	34.39	4.71	0	108.28	-	-	Peak
5320	61.68	330	100	V	34.39	4.71	0	100.78	-	-	Ave
5320	56.6	324	100	H	34.39	4.71	0	95.70	-	-	Ave
5355.87	26.2	330	100	V	35.00	4.71	0	65.91	74	-8.09	Peak
5351.1	25.29	324	100	H	35.00	4.71	0	65.00	74	-9	Peak
5355.87	13.16	330	100	V	35.00	4.71	0	52.87	54	-1.13	Ave
5351.1	12.99	324	100	H	35.00	4.71	0	52.70	54	-1.3	Ave
10640	42.82	0	100	V	38.42	7.07	34.49	53.82	74	-20.18	Peak
10640	42.81	0	100	H	38.42	7.07	34.49	53.81	74	-20.19	Peak
10640	31.05	0	100	V	38.42	7.07	34.49	42.05	54	-11.95	Ave
10640	30.27	0	100	H	38.42	7.07	34.49	41.27	54	-12.73	Ave
15960	45.67	0	100	V	37.90	8.39	34.61	57.35	74	-16.65	Peak
15960	45.68	0	100	H	37.90	8.39	34.61	57.36	74	-16.64	Peak
15960	33.26	0	100	V	37.90	8.39	34.61	44.94	54	-9.06	Ave
15960	33.57	0	100	H	37.90	8.39	34.61	45.25	54	-8.75	Ave
21280	44.63	0	100	V	34.60	9.79	34	55.02	74	-18.98	Peak
21280	45.32	0	100	H	34.60	9.79	34	55.71	74	-18.29	Peak
21280	32.36	0	100	V	34.60	9.79	34	42.75	54	-11.25	Ave
21280	32.33	0	100	H	34.60	9.79	34	42.72	54	-11.28	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 5270 MHz, measured at 3 meters											
5270	74.88	125	100	V	34.82	4.6	0	114.301	-	-	Peak
5270	66.87	228	100	H	34.82	4.6	0	106.291	-	-	Peak
5270	60.88	125	100	V	34.82	4.6	0	100.301	-	-	Ave
5270	53.93	228	100	H	34.82	4.6	0	93.351	-	-	Ave
10540	42.71	0	100	V	38.34	7.05	34.49	53.61	74	-20.39	Peak
10540	42.55	0	100	H	38.34	7.05	34.49	53.45	74	-20.55	Peak
10540	30.80	0	100	V	38.34	7.05	34.49	41.70	54	-12.30	Ave
10540	31.05	0	100	H	38.34	7.05	34.49	41.95	54	-12.05	Ave
15810	45.59	0	100	V	37.93	8.35	34.61	57.26	74	-16.74	Peak
15810	45.68	0	100	H	37.93	8.35	34.61	57.35	74	-16.65	Peak
15810	33.72	0	100	V	37.93	8.35	34.61	45.39	54	-8.61	Ave
15810	34.08	0	100	H	37.93	8.35	34.61	45.75	54	-8.25	Ave
21080	46.26	0	100	V	34.60	9.84	34	56.70	74	-17.30	Peak
21080	46.94	0	100	H	34.60	9.84	34	57.38	74	-16.62	Peak
21080	33.32	0	100	V	34.60	9.84	34	43.76	54	-10.24	Ave
21080	33.49	0	100	H	34.60	9.84	34	43.93	54	-10.07	Ave
High Channel 5310 MHz, measured at 3 meters											
5310	68.92	105	100	V	34.39	4.71	0	108.02	-	-	Peak
5310	64.54	334	100	H	34.39	4.71	0	103.64	-	-	Peak
5310	55.19	105	100	V	34.39	4.71	0	94.29	-	-	Ave
5310	50.76	334	100	H	34.39	4.71	0	89.86	-	-	Ave
5350	25.47	105	100	V	34.82	4.71	0	65.00	74	-9.00	Peak
5357.52	26.37	334	100	H	35.00	4.71	0	66.08	74	-7.92	Peak
5350	13.53	105	100	V	34.82	4.71	0	53.06	54	-0.94	Ave
5357.52	13.11	334	100	H	35.00	4.71	0	52.82	54	-1.18	Ave
10620	43.93	0	100	V	38.42	7.07	34.49	54.93	74	-19.07	Peak
10620	44.07	0	100	H	38.42	7.07	34.49	55.07	74	-18.93	Peak
10620	32.46	0	100	V	38.42	7.07	34.49	43.46	54	-10.54	Ave
10620	31.27	0	100	H	38.42	7.07	34.49	42.27	54	-11.73	Ave
15930	46.77	0	100	V	37.91	8.38	34.61	58.45	74	-15.55	Peak
15930	45.94	0	100	H	37.91	8.38	34.61	57.62	74	-16.38	Peak
15930	33.60	0	100	V	37.91	8.38	34.61	45.28	54	-8.72	Ave
15930	33.64	0	100	H	37.91	8.38	34.61	45.32	54	-8.68	Ave
21240	44.96	0	100	V	34.60	9.79	34	55.35	74	-18.65	Peak
21240	45.56	0	100	H	34.60	9.79	34	55.95	74	-18.05	Peak
21240	33.22	0	100	V	34.60	9.79	34	43.61	54	-10.39	Ave
21240	32.73	0	100	H	34.60	9.79	34	43.12	54	-10.88	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)	
5290 MHz, measured at 3 meters											
5290	57.08	337	100	V	34.33	4.6	0	96.01	-	-	Peak
5290	56.29	227	100	H	34.33	4.6	0	95.22	-	-	Peak
5290	40.96	337	100	V	34.33	4.6	0	79.89	-	-	Ave
5290	41.58	227	100	H	34.33	4.6	0	80.51	-	-	Ave
5350.37	26.5	337	100	V	34.3	4.56	0	65.36	74	-8.64	Peak
5355.68	26.39	227	100	H	34.3	4.56	0	65.25	74	-8.75	Peak
5350.37	13.3	337	100	V	34.3	4.56	0	52.16	54	-1.84	Ave
5355.68	13.05	227	100	H	34.3	4.56	0	51.91	54	-2.09	Ave
10580	43.93	0	100	V	38.5	7.05	34.49	54.99	74	-19.01	Peak
10580	44.07	0	100	H	38.5	7.05	34.49	55.13	74	-18.87	Peak
10580	32.46	0	100	V	38.5	7.05	34.49	43.52	54	-10.48	Ave
10580	31.27	0	100	H	38.5	7.05	34.49	42.33	54	-11.67	Ave
15870	46.77	0	100	V	38.6	8.35	34.61	59.11	74	-14.89	Peak
15870	45.68	0	100	H	38.6	8.35	34.61	58.02	74	-15.98	Peak
15870	33.60	0	100	V	38.6	8.35	34.61	45.94	54	-8.06	Ave
15870	33.64	0	100	H	38.6	8.35	34.61	45.98	54	-8.02	Ave
21160	44.96	0	100	V	34.6	9.84	34	55.40	74	-18.60	Peak
21160	45.56	0	100	H	34.6	9.84	34	56.00	74	-18.00	Peak
21160	33.22	0	100	V	34.6	9.84	34	43.66	54	-10.34	Ave
21160	32.73	0	100	H	34.6	9.84	34	43.17	54	-10.83	Ave

5.6 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 5500 MHz, measured at 3 meters											
5500	77.75	58	100	V	34.82	4.76	0	117.33	-	-	Peak
5500	67.32	32	100	H	34.82	4.76	0	106.90	-	-	Peak
5500	66.36	58	100	V	34.82	4.76	0	105.94	-	-	Ave
5500	55.58	32	100	H	34.82	4.76	0	95.16	-	-	Ave
5450.83	26.89	58	100	V	34.82	4.76	0	66.47	74	-7.53	Peak
5454.95	25.95	32	100	H	35.00	4.76	0	65.71	74	-8.29	Peak
5450.83	13.64	58	100	V	34.82	4.76	0	53.22	54	-0.78	Ave
5454.95	13.2	32	100	H	35.00	4.76	0	52.96	54	-1.04	Ave
11000	45.42	0	100	V	38.38	7.36	34.05	57.11	74	-16.89	Peak
11000	45.65	0	100	H	38.38	7.36	34.05	57.34	74	-16.66	Peak
11000	33.09	0	100	V	38.38	7.36	34.05	44.78	54	-9.22	Ave
11000	32.88	0	100	H	38.38	7.36	34.05	44.57	54	-9.43	Ave
16500	46.79	0	100	V	38.77	8.5	34.64	59.42	74	-14.58	Peak
16500	46.85	0	100	H	38.77	8.5	34.64	59.48	74	-14.52	Peak
16500	33.13	0	100	V	38.77	8.5	34.64	45.76	54	-8.24	Ave
16500	33.12	0	100	H	38.77	8.5	34.64	45.75	54	-8.25	Ave
22000	46.92	0	100	V	34.90	9.94	34.69	57.07	74	-16.93	Peak
22000	45.34	0	100	H	34.90	9.94	34.69	55.49	74	-18.51	Peak
22000	33.43	0	100	V	34.90	9.94	34.69	43.58	54	-10.42	Ave
22000	33.10	0	100	H	34.90	9.94	34.69	43.25	54	-10.75	Ave
Middle Channel 5580 MHz, measured at 3 meters											
5580	79.53	188	100	V	34.52	4.84	0	118.89	-	-	Peak
5580	68.34	227	100	H	34.52	4.84	0	107.70	-	-	Peak
5580	66.09	188	100	V	34.52	4.84	0	105.45	-	-	Ave
5580	56.92	227	100	H	34.52	4.84	0	96.28	-	-	Ave
11160	45.22	0	100	V	38.51	7.52	34.05	57.20	74	-16.80	Peak
11160	44.97	0	100	H	38.51	7.52	34.05	56.95	74	-17.05	Peak
11160	32.17	0	100	V	38.51	7.52	34.05	44.15	54	-9.85	Ave
11160	31.44	0	100	H	38.51	7.52	34.05	43.42	54	-10.58	Ave
16740	45.57	0	100	V	39.94	8.63	34.64	59.50	74	-14.50	Peak
16740	47.57	0	100	H	39.94	8.63	34.64	61.50	74	-12.50	Peak
16740	34.19	0	100	V	39.94	8.63	34.64	48.12	54	-5.88	Ave
16740	34.60	0	100	H	39.94	8.63	34.64	48.53	54	-5.47	Ave
22320	48.30	0	100	V	34.90	9.92	34.69	58.43	74	-15.57	Peak
22320	47.16	0	100	H	34.90	9.92	34.69	57.29	74	-16.71	Peak
22320	35.11	0	100	V	34.90	9.92	34.69	45.24	54	-8.76	Ave
22320	33.12	0	100	H	34.90	9.92	34.69	43.25	54	-10.75	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 5700 MHz, measured at 3 meters											
5700	77.13	95	100	V	34.39	4.85	0	116.37	-	-	Peak
5700	68.54	233	100	H	34.39	4.85	0	107.78	-	-	Peak
5700	65.72	95	100	V	34.39	4.85	0	104.96	-	-	Ave
5700	57.46	233	100	H	34.39	4.85	0	96.70	-	-	Ave
11400	45.42	0	100	V	38.88	7.57	34.05	57.82	74	-16.18	Peak
11400	45.65	0	100	H	38.88	7.57	34.05	58.05	74	-15.95	Peak
11400	33.09	0	100	V	38.88	7.57	34.05	45.49	54	-8.51	Ave
11400	32.88	0	100	H	38.88	7.57	34.05	45.28	54	-8.72	Ave
17100	46.79	0	100	V	42.64	8.66	34.64	63.45	74	-10.55	Peak
17100	47.57	0	100	H	42.64	8.66	34.64	64.23	74	-9.77	Peak
17100	34.19	0	100	V	42.64	8.66	34.64	50.85	54	-3.15	Ave
17100	33.12	0	100	H	42.64	8.66	34.64	49.78	54	-4.22	Ave
22800	46.92	0	100	V	34.90	10.17	34.69	57.30	74	-16.70	Peak
22800	45.34	0	100	H	34.90	10.17	34.69	55.72	74	-18.28	Peak
22800	33.43	0	100	V	34.90	10.17	34.69	43.81	54	-10.19	Ave
22800	33.10	0	100	H	34.90	10.17	34.69	43.48	54	-10.52	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 5500 MHz, measured at 3 meters											
5500	76.36	98	100	V	34.82	4.76	0	115.94	-	-	Peak
5500	67.11	222	100	H	34.82	4.76	0	106.69	-	-	Peak
5500	64.4	98	100	V	34.82	4.76	0	103.98	-	-	Ave
5500	55.65	222	100	H	34.82	4.76	0	95.23	-	-	Ave
5459.27	26.01	98	100	V	35.00	4.76	0	65.77	74	-8.23	Peak
5459.27	26.02	222	100	H	35.00	4.76	0	65.78	74	-8.22	Peak
5459.27	13.55	98	100	V	35.00	4.76	0	53.31	54	-0.69	Ave
5459.27	13.19	222	100	H	35.00	4.76	0	52.95	54	-1.05	Ave
11000	45.74	0	100	V	38.38	7.36	34.05	57.43	74	-16.57	Peak
11000	45.85	0	100	H	38.38	7.36	34.05	57.54	74	-16.46	Peak
11000	32.65	0	100	V	38.38	7.36	34.05	44.34	54	-9.66	Ave
11000	32.34	0	100	H	38.38	7.36	34.05	44.03	54	-9.97	Ave
16500	46.21	0	100	V	38.77	8.5	34.64	58.84	74	-15.16	Peak
16500	47.23	0	100	H	38.77	8.5	34.64	59.86	74	-14.14	Peak
16500	34.33	0	100	V	38.77	8.5	34.64	46.96	54	-7.04	Ave
16500	33.65	0	100	H	38.77	8.5	34.64	46.28	54	-7.72	Ave
22000	47.10	0	100	V	34.90	9.94	34.69	57.25	74	-16.75	Peak
22000	45.58	0	100	H	34.90	9.94	34.69	55.73	74	-18.27	Peak
22000	33.32	0	100	V	34.90	9.94	34.69	43.47	54	-10.53	Ave
22000	32.18	0	100	H	34.9	9.94	34.69	42.33	54	-11.67	Ave
Middle Channel 5580 MHz, measured at 3 meters											
5580	75.85	187	100	V	34.52	4.84	0	115.214	-	-	Peak
5580	68.3	55	100	H	34.52	4.84	0	107.664	-	-	Peak
5580	64.02	187	100	V	34.52	4.84	0	103.384	-	-	Ave
5580	56.29	55	100	H	34.52	4.84	0	95.654	-	-	Ave
11160	45.74	0	100	V	38.51	7.52	34.05	57.72	74	-16.28	Peak
11160	45.85	0	100	H	38.51	7.52	34.05	57.83	74	-16.17	Peak
11160	32.65	0	100	V	38.51	7.52	34.05	44.63	54	-9.37	Ave
11160	32.34	0	100	H	38.51	7.52	34.05	44.32	54	-9.68	Ave
16740	46.15	0	100	V	39.94	8.63	34.64	60.08	74	-13.92	Peak
16740	47.19	0	100	H	39.94	8.63	34.64	61.12	74	-12.88	Peak
16740	32.99	0	100	V	39.94	8.63	34.64	46.92	54	-7.08	Ave
16740	33.65	0	100	H	39.94	8.63	34.64	47.58	54	-6.42	Ave
22320	47.10	0	100	V	34.90	9.92	34.69	57.23	74	-16.77	Peak
22320	45.58	0	100	H	34.90	9.92	34.69	55.71	74	-18.29	Peak
22320	33.32	0	100	V	34.90	9.92	34.69	43.45	54	-10.55	Ave
22320	32.18	0	100	H	34.90	9.92	34.69	42.31	54	-11.69	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 5700 MHz, measured at 3 meters											
5700	75.43	34	100	V	34.39	4.85	0	114.67	-	-	Peak
5700	67.43	138	100	H	34.39	4.85	0	106.67	-	-	Peak
5700	63.02	34	100	V	34.39	4.85	0	102.26	-	-	Ave
5700	53.81	138	100	H	34.39	4.85	0	93.05	-	-	Ave
11400	45.74	0	100	V	38.88	7.57	34.05	58.14	74	-15.86	Peak
11400	45.85	0	100	H	38.88	7.57	34.05	58.25	74	-15.75	Peak
11400	32.65	0	100	V	38.88	7.57	34.05	45.05	54	-8.95	Ave
11400	31.98	0	100	H	38.88	7.57	34.05	44.38	54	-9.62	Ave
17100	46.15	0	100	V	42.64	8.66	34.64	62.81	74	-11.19	Peak
17100	47.19	0	100	H	42.64	8.66	34.64	63.85	74	-10.15	Peak
17100	32.99	0	100	V	42.64	8.66	34.64	49.65	54	-4.35	Ave
17100	34.07	0	100	H	42.64	8.66	34.64	50.73	54	-3.27	Ave
22800	48.12	0	100	V	34.90	10.17	34.69	58.50	74	-15.50	Peak
22800	46.92	0	100	H	34.90	10.17	34.69	57.30	74	-16.70	Peak
22800	35.22	0	100	V	34.90	10.17	34.69	45.60	54	-8.40	Ave
22800	34.04	0	100	H	34.90	10.17	34.69	44.42	54	-9.58	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 5510 MHz, measured at 3 meters											
5510	72.01	93	100	V	34.82	4.76	0	111.59	-	-	Peak
5510	63.35	33	100	H	34.82	4.76	0	102.93	-	-	Peak
5510	59.01	93		V	34.82	4.76	0	98.59	-	-	Ave
5510	50.21	33	100	H	34.82	4.76	0	89.79	-	-	Ave
5456.7	26.81	93	100	V	34.82	4.76	0	66.39	74	-7.61	Peak
5448.7	25.09	33	100	H	35.00	4.76	0	64.85	74	-9.15	Peak
5456.7	13.7	93	100	V	34.82	4.76	0	53.28	54	-0.72	Ave
5448.7	13.2	33	100	H	35.00	4.76	0	52.96	54	-1.04	Ave
11020	46.18	0	100	V	38.38	7.36	34.05	57.87	74	-16.13	Peak
11020	45.81	0	100	H	38.38	7.36	34.05	57.50	74	-16.50	Peak
11020	32.75	0	100	V	38.38	7.36	34.05	44.44	54	-9.56	Ave
11020	32.54	0	100	H	38.38	7.36	34.05	44.23	54	-9.77	Ave
16530	47.09	0	100	V	38.77	8.5	34.64	59.72	74	-14.28	Peak
16530	47.08	0	100	H	38.77	8.5	34.64	59.71	74	-14.29	Peak
16530	32.77	0	100	V	38.77	8.5	34.64	45.40	54	-8.60	Ave
16530	33.13	0	100	H	38.77	8.5	34.64	45.76	54	-8.24	Ave
22040	47.36	0	100	V	34.90	9.76	34.69	57.33	74	-16.67	Peak
22040	45.45	0	100	H	34.90	9.76	34.69	55.42	74	-18.58	Peak
22040	34.16	0	100	V	34.90	9.76	34.69	44.13	54	-9.87	Ave
22040	32.74	0	100	H	34.90	9.76	34.69	42.71	54	-11.29	Ave
Middle Channel 5550 MHz, measured at 3 meters											
5550	71.69	194	100	V	34.82	4.76	0	111.27	-	-	Peak
5550	63.33	58	100	H	34.82	4.76	0	102.91	-	-	Peak
5550	58.39	194	100	V	34.82	4.76	0	97.97	-	-	Ave
5550	49.57	58	100	H	34.82	4.76	0	89.15	-	-	Ave
11100	44.78	0	100	V	38.51	7.39	34.05	56.63	74	-17.37	Peak
11100	44.76	0	100	H	38.51	7.39	34.05	56.61	74	-17.39	Peak
11100	31.79	0	100	V	38.51	7.39	34.05	43.64	54	-10.36	Ave
11100	31.42	0	100	H	38.51	7.39	34.05	43.27	54	-10.73	Ave
16650	46.14	0	100	V	39.26	8.55	34.64	59.31	74	-14.69	Peak
16650	47.50	0	100	H	39.26	8.55	34.64	60.67	74	-13.33	Peak
16650	34.05	0	100	V	39.26	8.55	34.64	47.22	54	-6.78	Ave
16650	34.18	0	100	H	39.26	8.55	34.64	47.35	54	-6.65	Ave
22200	47.64	0	100	V	35.00	9.91	34.69	57.86	74	-16.14	Peak
22200	46.81	0	100	H	35.00	9.91	34.69	57.03	74	-16.97	Peak
22200	34.77	0	100	V	35.00	9.91	34.69	44.99	54	-9.01	Ave
22200	33.82	0	100	H	35.00	9.91	34.69	44.04	54	-9.96	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 5670 MHz, measured at 3 meters											
5670	72.76	35	100	V	34.39	4.93	0	112.08	-	-	Peak
5670	63.82	348	100	H	34.39	4.93	0	103.14	-	-	Peak
5670	59.91	35	100	V	34.39	4.93	0	99.23	-	-	Ave
5670	51.05	348	100	H	34.39	4.93	0	90.37	-	-	Ave
11340	46.18	0	100	V	38.84	7.52	34.05	58.49	74	-15.51	Peak
11340	45.81	0	100	H	38.84	7.52	34.05	58.12	74	-15.88	Peak
11340	32.75	0	100	V	38.84	7.52	34.05	45.06	54	-8.94	Ave
11340	32.54	0	100	H	38.84	7.52	34.05	44.85	54	-9.15	Ave
17010	47.09	0	100	V	41.89	8.61	34.64	62.95	74	-11.05	Peak
17010	47.34	0	100	H	41.89	8.61	34.64	63.20	74	-10.80	Peak
17010	34.55	0	100	V	41.89	8.61	34.64	50.41	54	-3.59	Ave
17010	33.13	0	100	H	41.89	8.61	34.64	48.99	54	-5.04	Ave
22680	47.36	0	100	V	34.90	10.07	34.69	57.64	74	-16.36	Peak
22680	45.45	0	100	H	34.90	10.07	34.69	55.73	74	-18.27	Peak
22680	34.16	0	100	V	34.90	10.07	34.69	44.44	54	-9.56	Ave
22680	32.74	0	100	H	34.90	10.07	34.69	43.02	54	-10.98	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)	
5530 MHz, measured at 3 meters											
5530	64.42	195	100	V	34.82	4.76	0	104.00	-	-	Peak
5530	54.64	229	100	H	34.82	4.76	0	94.22	-	-	Peak
5530	49.85	195	100	V	34.82	4.76	0	89.43	-	-	Ave
5530	41.1	229	100	H	34.82	4.76	0	80.68	-	-	Ave
5446.42	26.16	195	100	V	35.00	4.76	0	65.92	74	-8.08	Peak
5440.42	25.43	229	100	H	34.82	4.76	0	65.01	74	-8.99	Peak
5446.42	13.41	195	100	V	34.60	4.76	0	52.77	54	-1.23	Ave
5440.42	13.19	229	100	H	34.82	4.76	0	52.77	54	-1.23	Ave
11060	45.95	0	100	V	38.38	7.36	34.05	57.64	74	-16.36	Peak
11060	45.41	0	100	H	38.38	7.36	34.05	57.10	74	-16.90	Peak
11060	33.55	0	100	V	38.38	7.36	34.05	45.24	54	-8.76	Ave
11060	33.10	0	100	H	38.38	7.36	34.05	44.79	54	-9.21	Ave
16590	46.62	0	100	V	38.77	8.5	34.64	59.25	74	-14.75	Peak
16590	47.19	0	100	H	38.77	8.5	34.64	59.82	74	-14.18	Peak
16590	33.13	0	100	V	38.77	8.5	34.64	45.76	54	-8.24	Ave
16590	32.98	0	100	H	38.77	8.5	34.64	45.61	54	-8.39	Ave
22120	47.12	0	100	V	34.90	9.76	34.69	57.09	74	-16.91	Peak
22120	45.54	0	100	H	34.90	9.76	34.69	55.51	74	-18.49	Peak
22120	33.36	0	100	V	34.90	9.76	34.69	43.33	54	-10.67	Ave
22120	32.14	0	100	H	34.90	9.76	34.69	42.11	54	-11.89	Ave

8 FCC §15.407(a) – Emission Bandwidth

8.1 Applicable Standards

FCC §15.407(a)

8.2 Measurement Procedure

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

8.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2013-09-29	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:	22-24º C
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 KPa

The testing was performed by Rui Zhou on 2014-07-07 to 2014-07-14 at RF site.

8.5 Test Results

5.3 GHz Band:

802.11a mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
Chain 0			
Low	5260	22.383	16.777
Middle	5280	21.687	16.787
High	5320	22.622	16.751
Chain 1			
Low	5260	21.873	16.748
Middle	5280	21.54	16.695
High	5320	21.934	16.789
Chain 2			
Low	5260	23.168	16.907
Middle	5280	22.79	16.796
High	5320	22.378	16.897

802.11n-HT20 mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
Chain 0			
Low	5260	22.666	17.883
Middle	5280	22.979	17.958
High	5320	23.781	17.845
Chain 1			
Low	5260	24.761	17.97
Middle	5280	22.758	17.896
High	5320	23.998	17.915
Chain 2			
Low	5260	22.484	17.889
Middle	5280	23.900	17.993
High	5320	22.560	17.880

802.11n-HT40 mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
Chain 0			
Low	5270	45.777	36.667
High	5310	45.154	36.736
Chain 1			
Low	5270	46.028	36.676
High	5310	44.360	36.321
Chain 2			
Low	5260	44.371	36.353
High	5320	44.458	36.595

802.11ac-VHT80 mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
Chain 0			
-	5290	88.298	75.919
Chain 1			
-	5290	93.399	76.106
Chain 2			
-	5290	88.616	75.519

5.6 GHz Band:

802.11a mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
Chain 0			
Low	5500	22.044	16.79
Middle	5580	22.915	16.722
High	5700	22.062	16.717
Chain 1			
Low	5500	21.177	16.794
Middle	5580	22.452	16.686
High	5700	21.822	16.774
Chain 2			
Low	5500	20.93	16.713
Middle	5580	21.937	16.840
High	5700	22.133	16.703

802.11n-HT20 mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
Chain 0			
Low	5500	23.266	17.911
Middle	5580	23.797	17.956
High	5700	22.656	17.88
Chain 1			
Low	5500	22.535	17.873
Middle	5580	22.623	17.977
High	5700	22.663	17.899
Chain 2			
Low	5500	23.938	17.95
Middle	5580	22.755	17.972
High	5700	24.524	17.945

802.11n-HT40 mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
Chain 0			
Low	5510	46.411	36.604
Middle	5550	52.625	36.665
High	5670	45.068	36.469
Chain 1			
Low	5510	45.233	36.572
Middle	5550	49.141	36.515
High	5670	43.963	36.524
Chain 2			
Low	5500	51.253	36.494
Middle	5580	50.34	36.646
High	5700	44.347	36.545

802.1ac-VHT80 mode

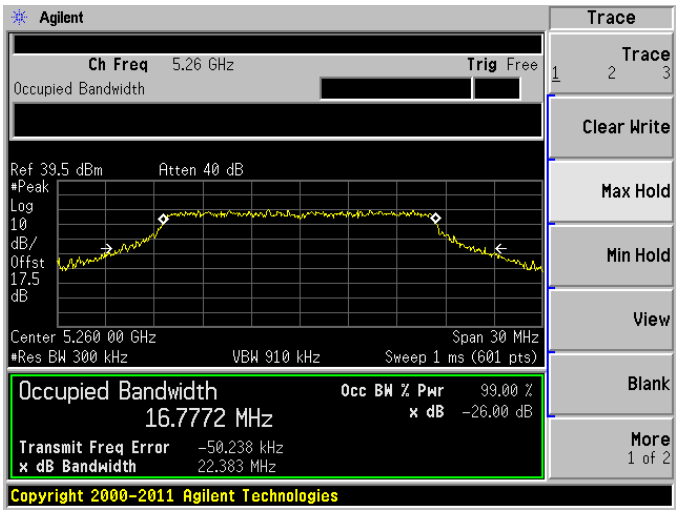
Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
Chain 0			
-	5530	93.7	76.33
Chain 1			
-	5530	94.062	76..34
Chain 2			
-	5530	92.612	76.143

Please refer to the following plots.

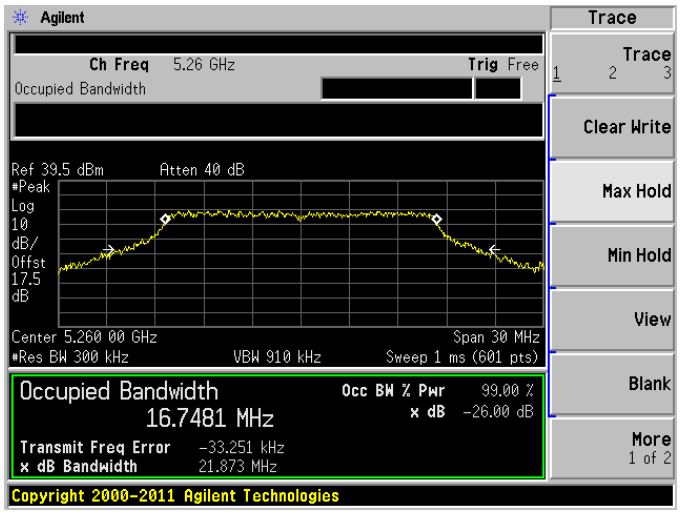
5.3 GHz Band

802.11a, Low Channel, 5260 MHz

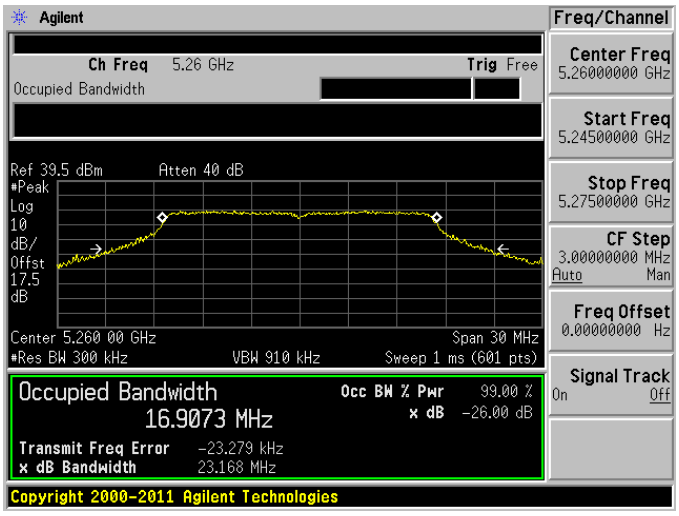
Chain 0



Chain 1

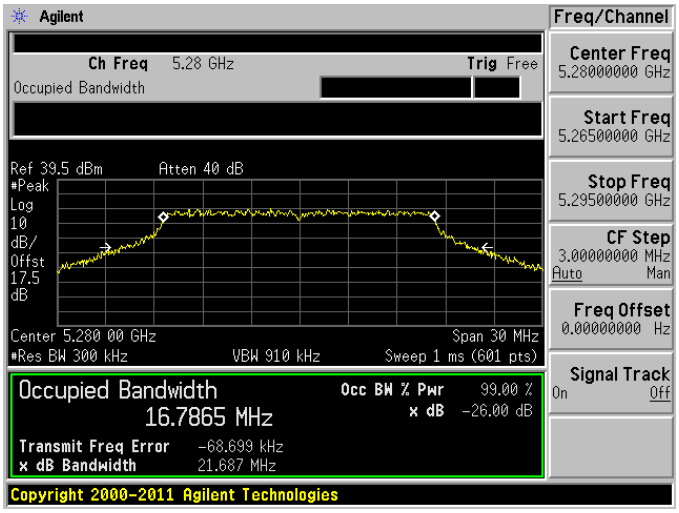


Chain 2

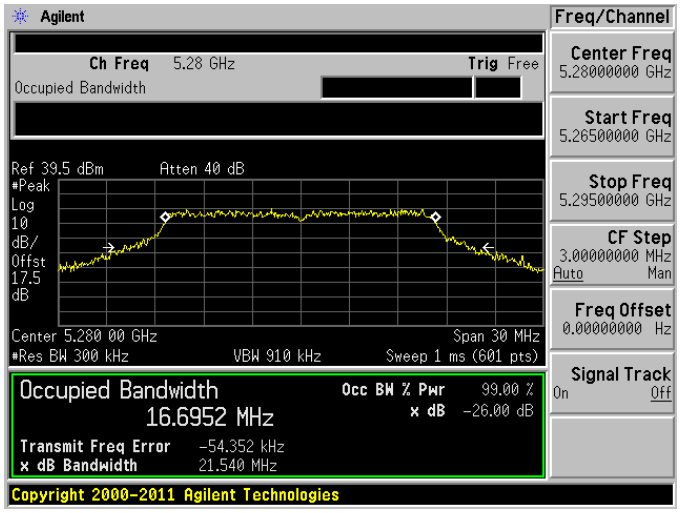


802.11a, Middle Channel, 5280 MHz

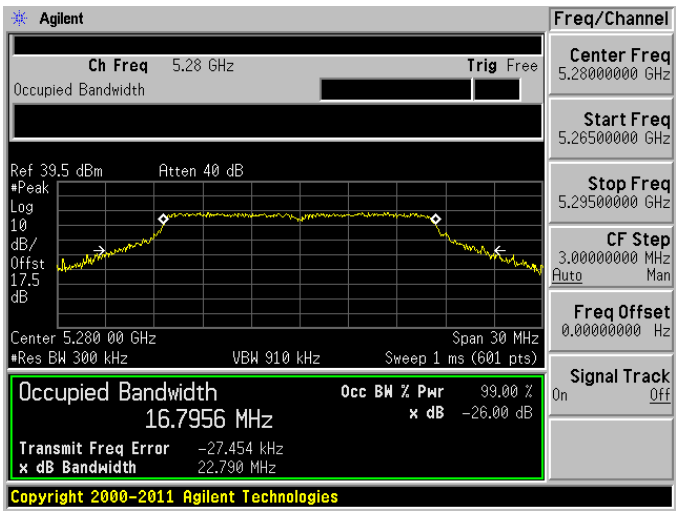
Chain 0



Chain 1

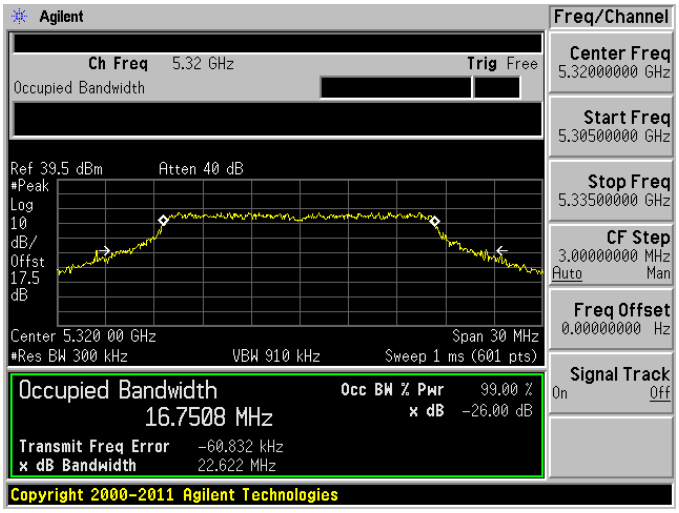


Chain 2

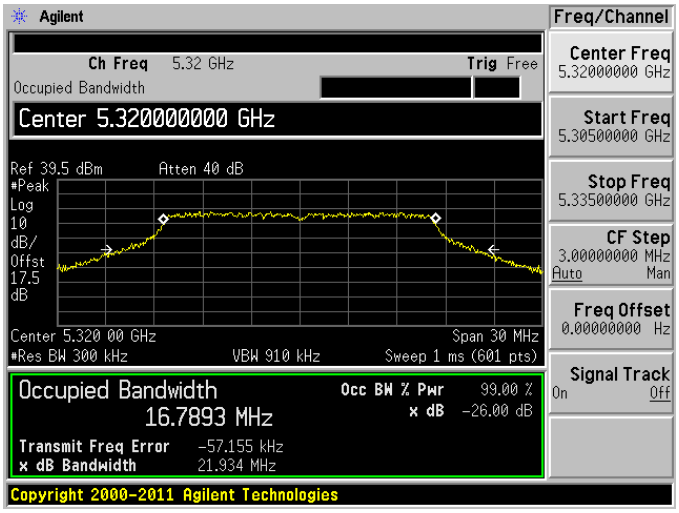


802.11a, High Channel, 5320 MHz

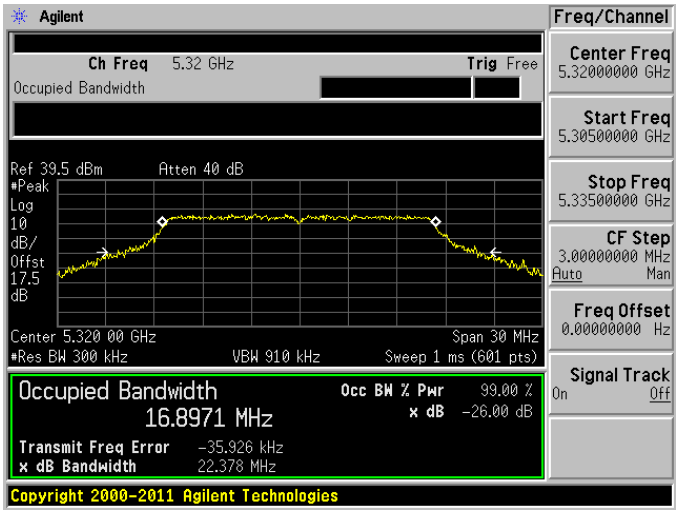
Chain 0



Chain 1

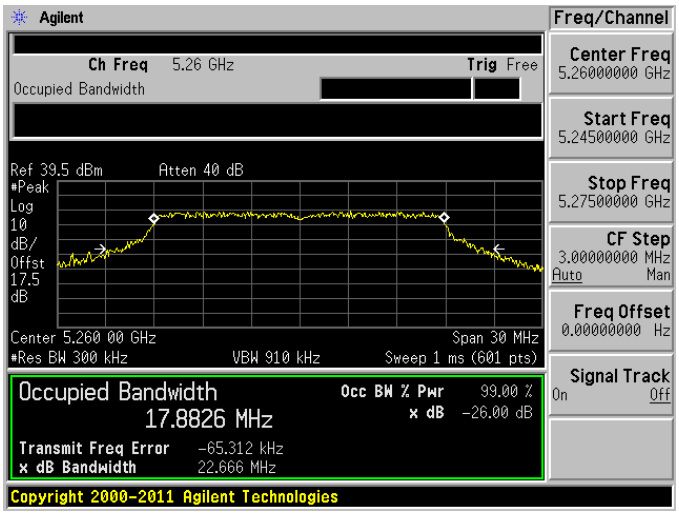


Chain 2

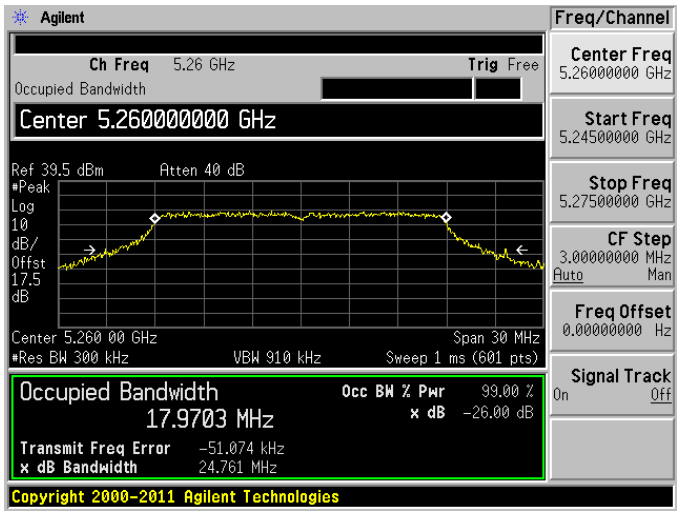


802.11n-HT 20, Low Channel 5260 MHz

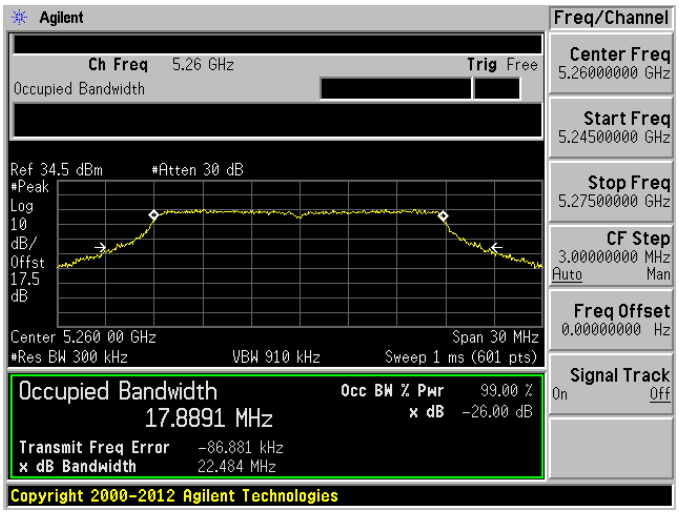
Chain 0



Chain 1

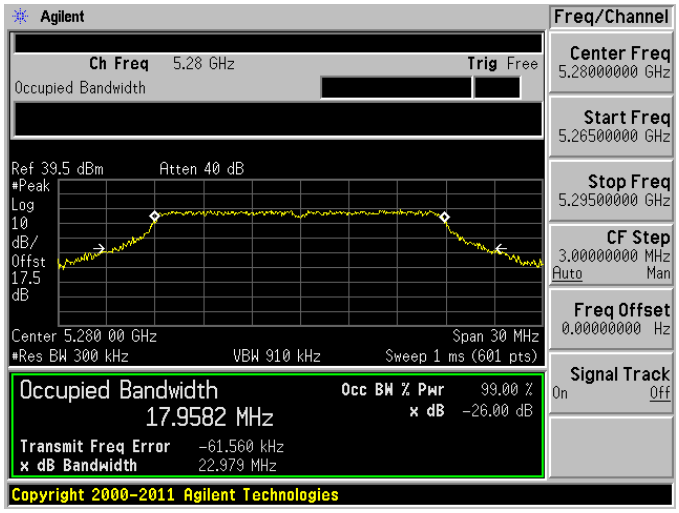


Chain 2

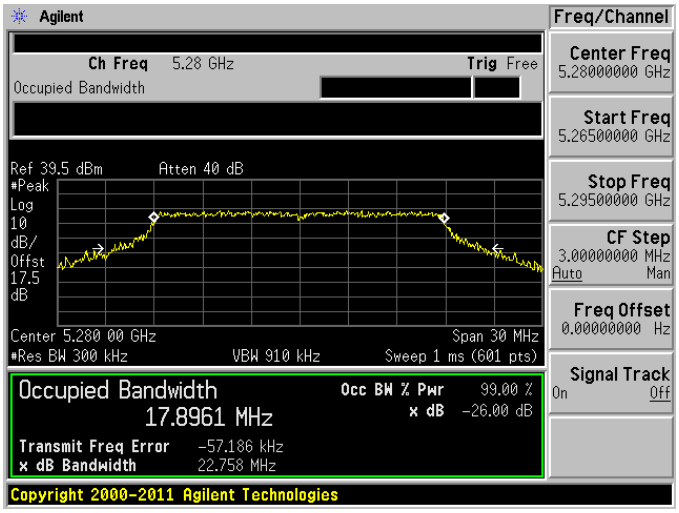


802.11n-HT20, Middle Channel 5280 MHz

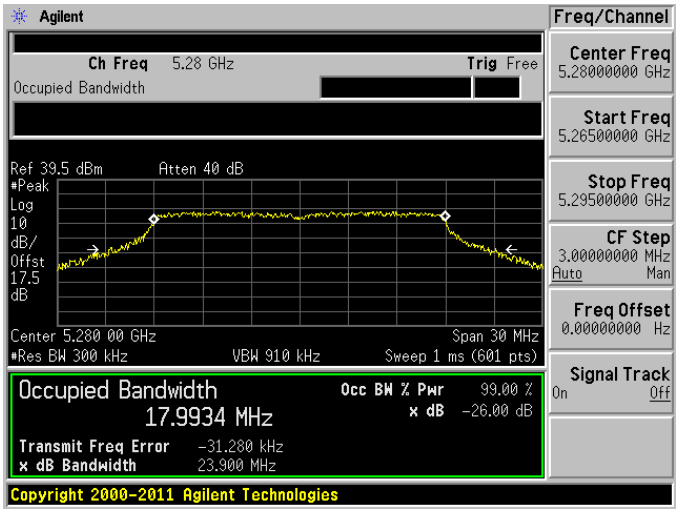
Chain 0



Chain 1

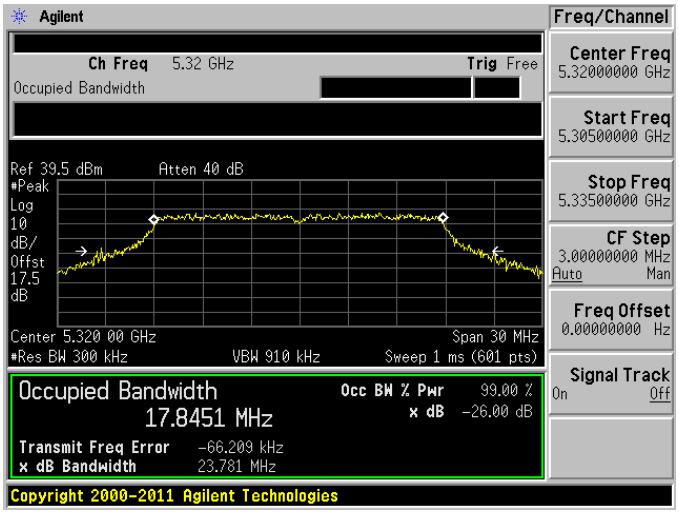


Chain 2

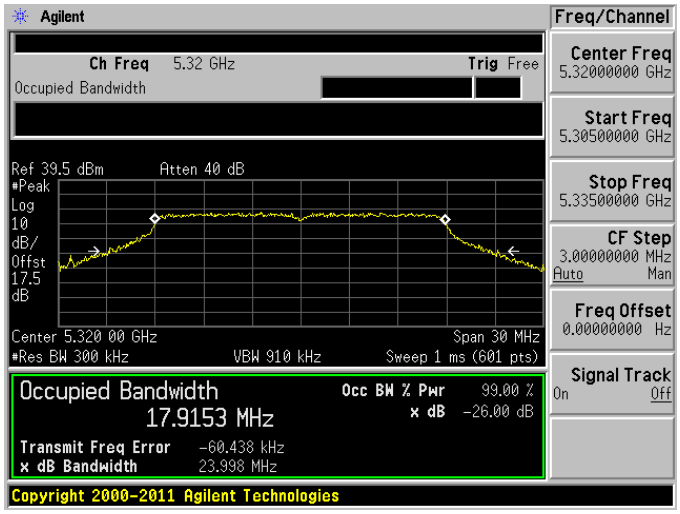


802.11n-HT20, High Channel, 5320 MHz

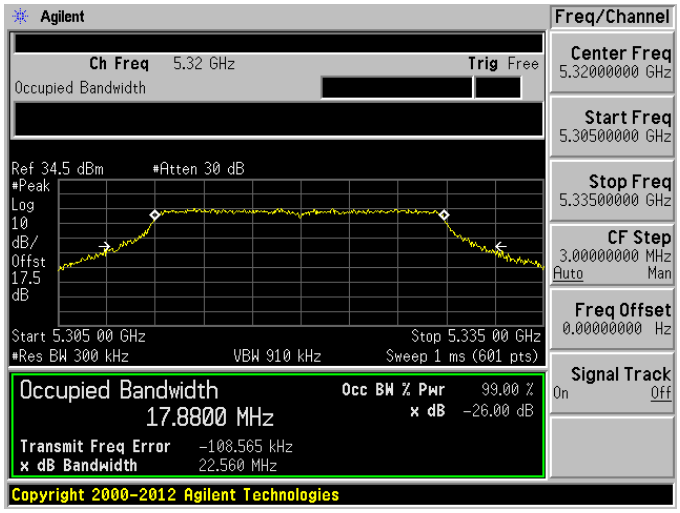
Chain 0



Chain 1

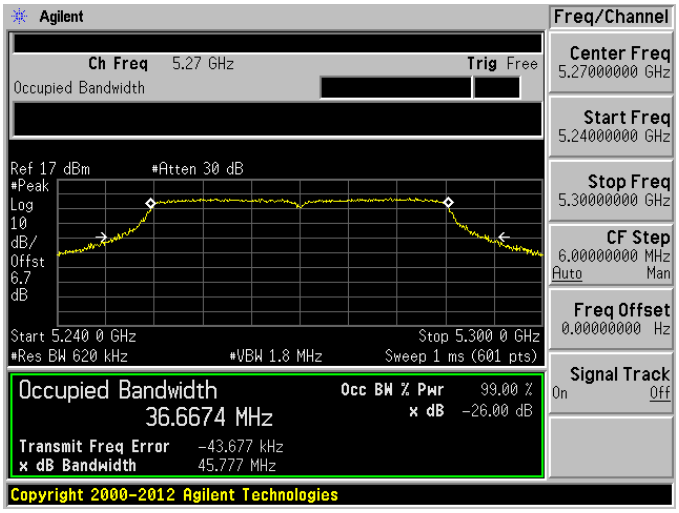


Chain 2

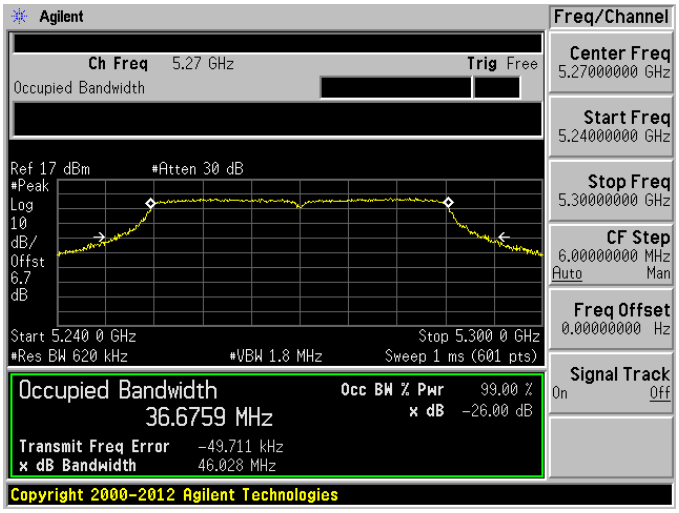


802.11n-HT40, Low Channel 5270 MHz

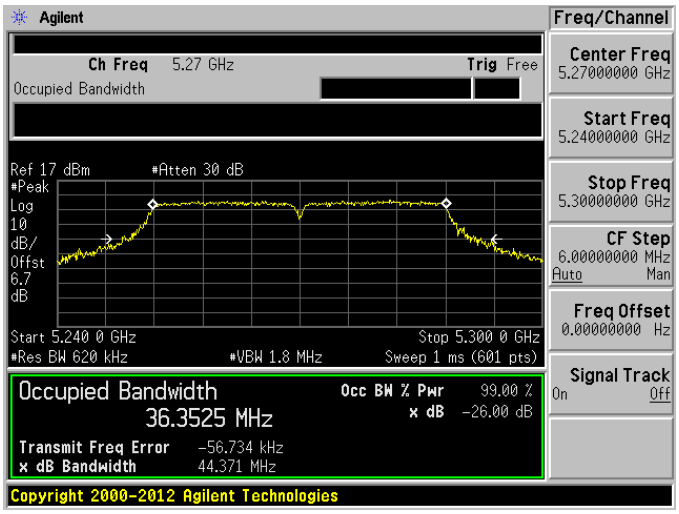
Chain 0



Chain 1

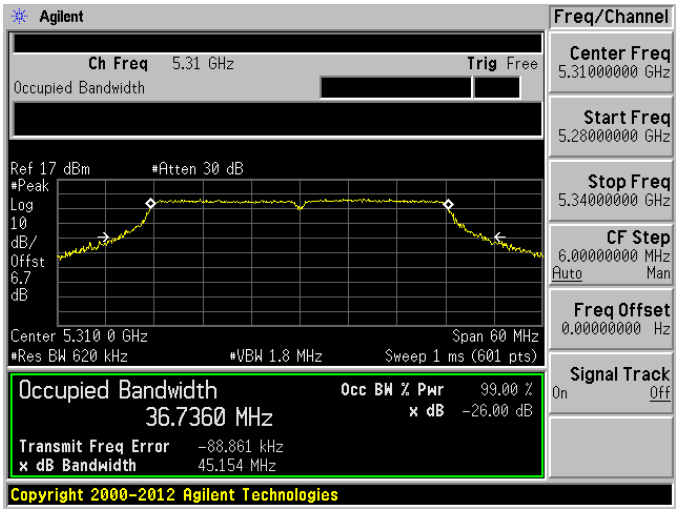


Chain 2

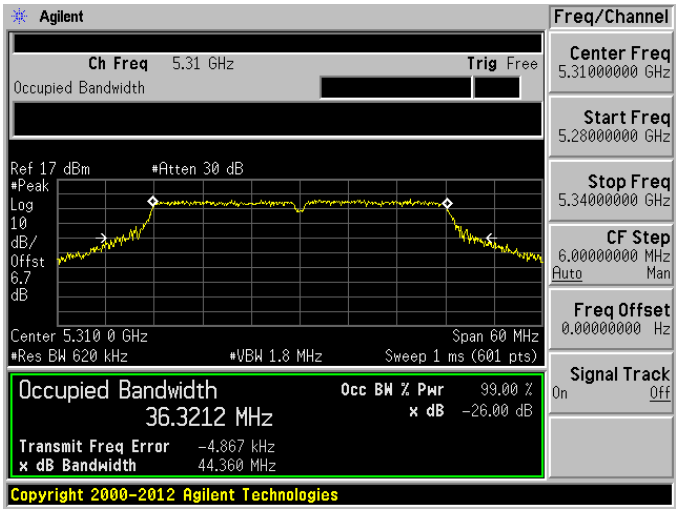


802.11n-HT40, High Channel 5310 MHz

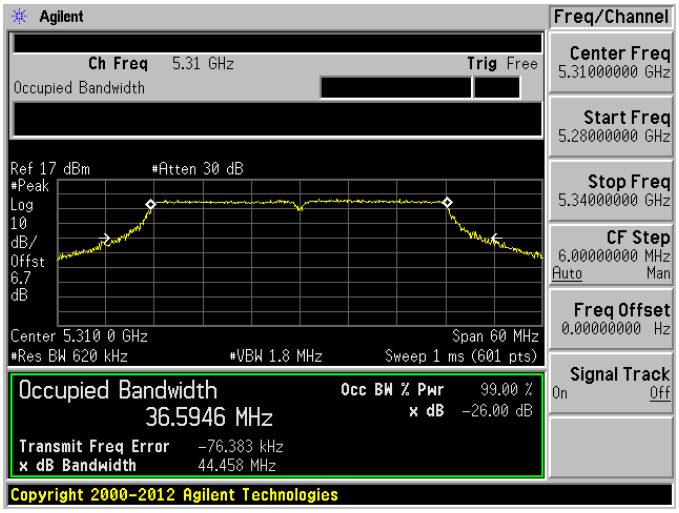
Chain 0



Chain 1

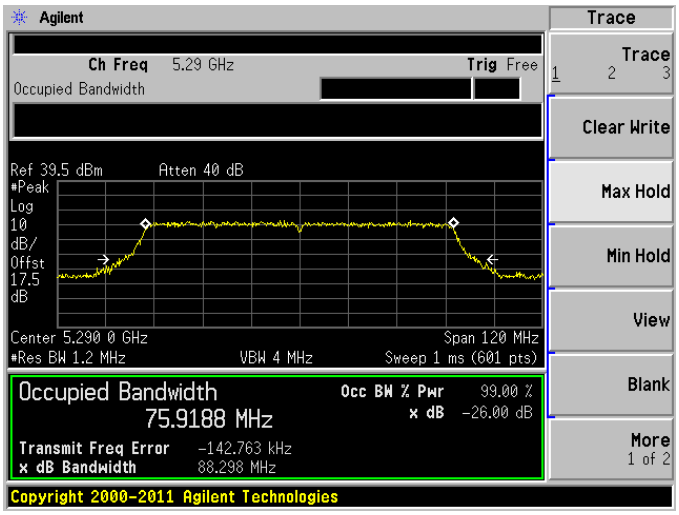


Chain 2

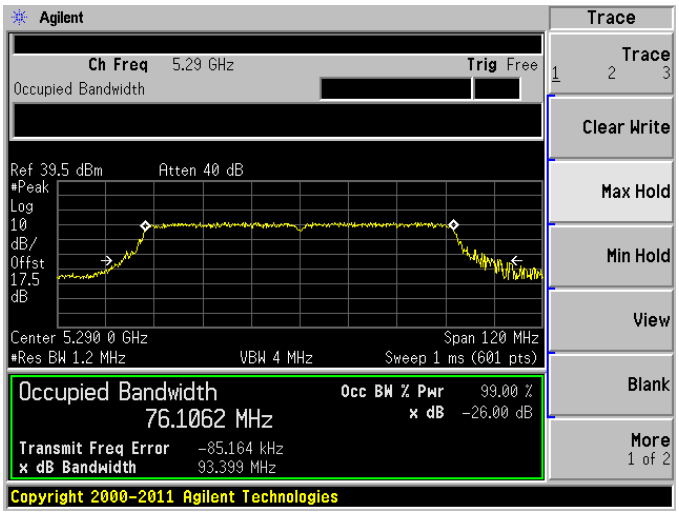


802.11ac-VHT80, High Channel 5290 MHz

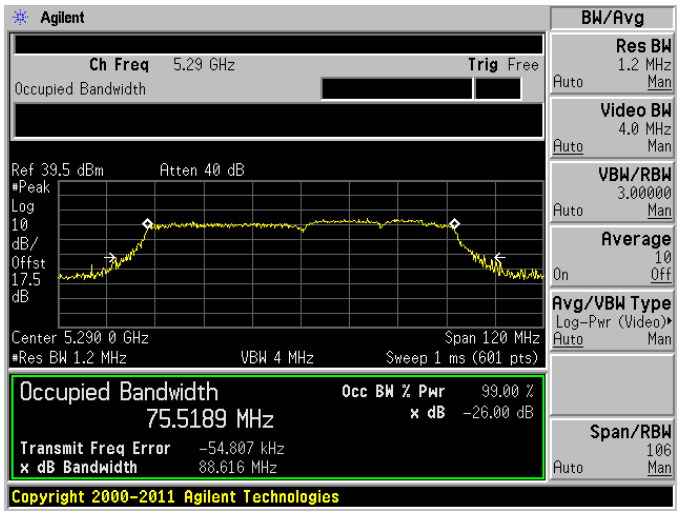
Chain 0



Chain 1



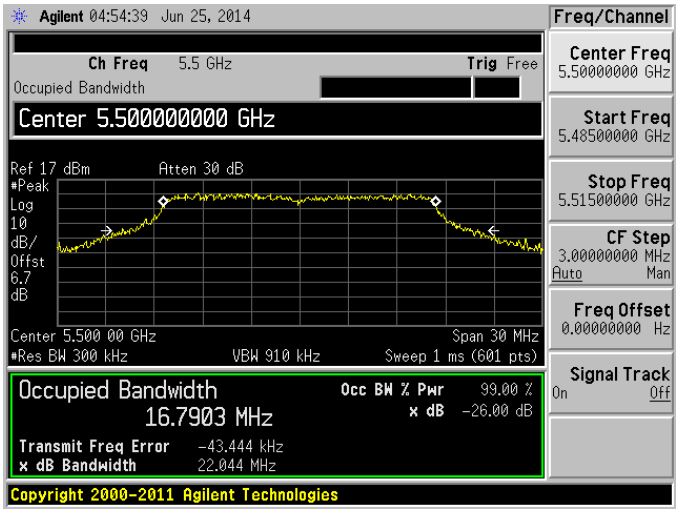
Chain 2



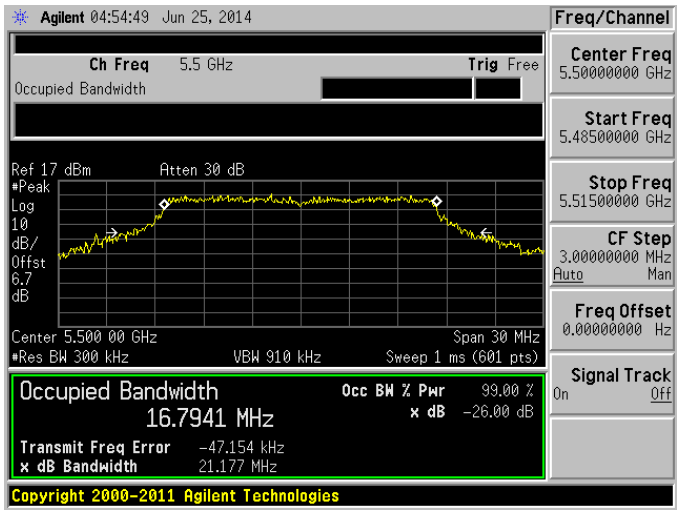
5.6 GHz Band

802.11a, Low Channel, 5500 MHz

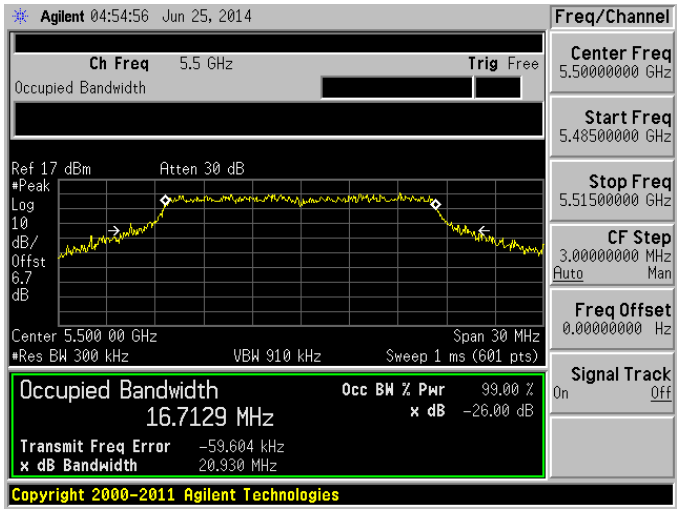
Chain 0



Chain 1

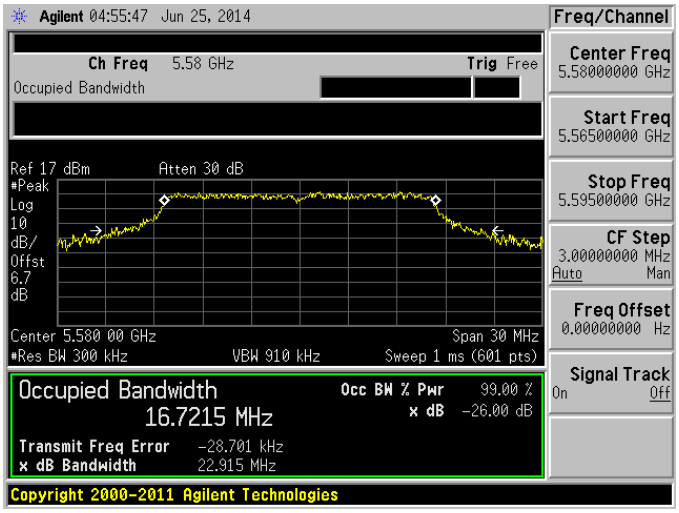


Chain 2

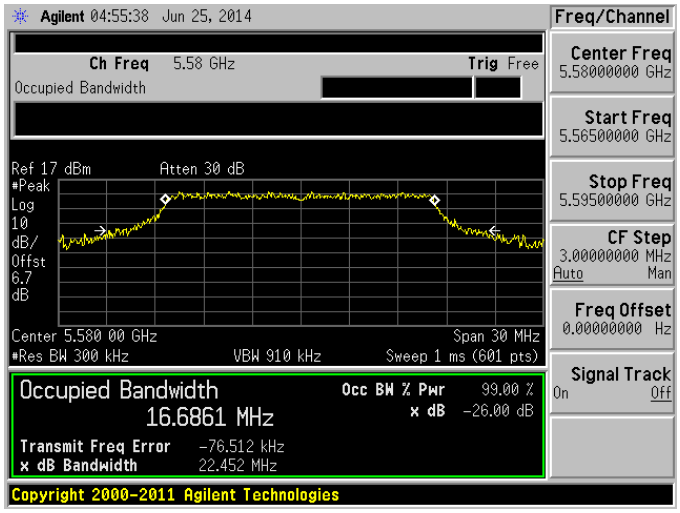


802.11a, Middle Channel, 5580 MHz

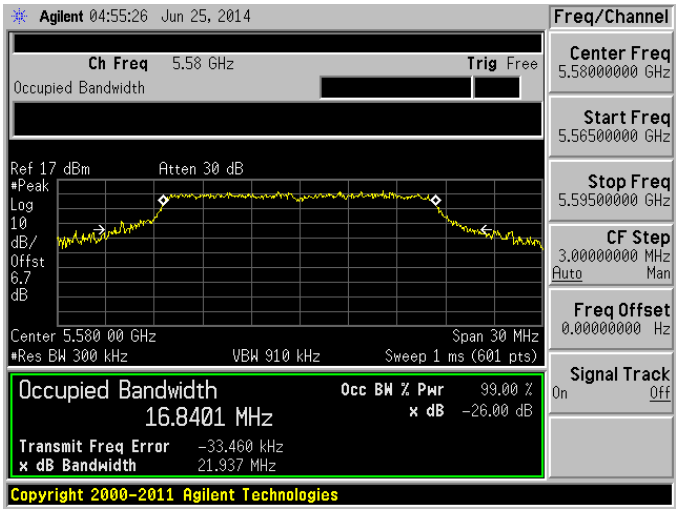
Chain 0



Chain 1

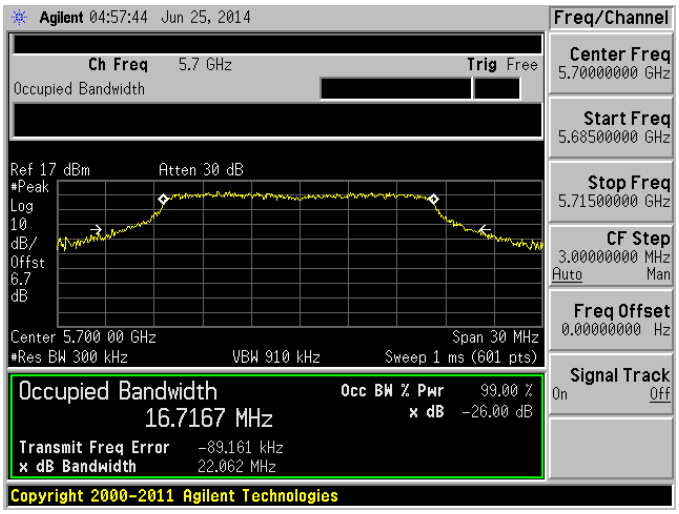


Chain 2

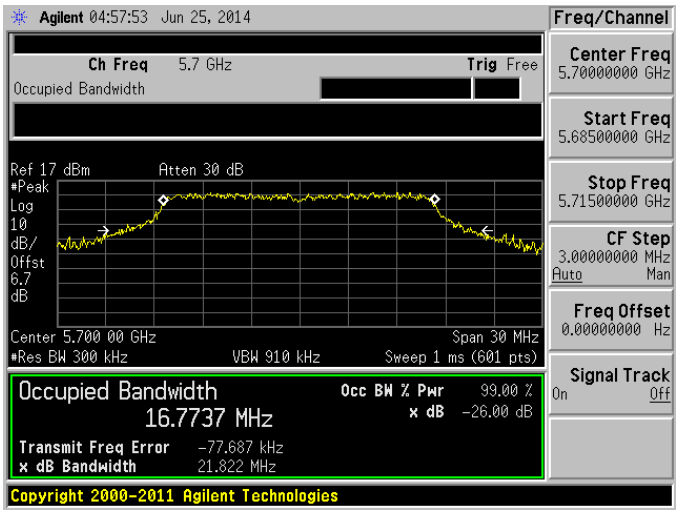


802.11a, High Channel, 5700 MHz

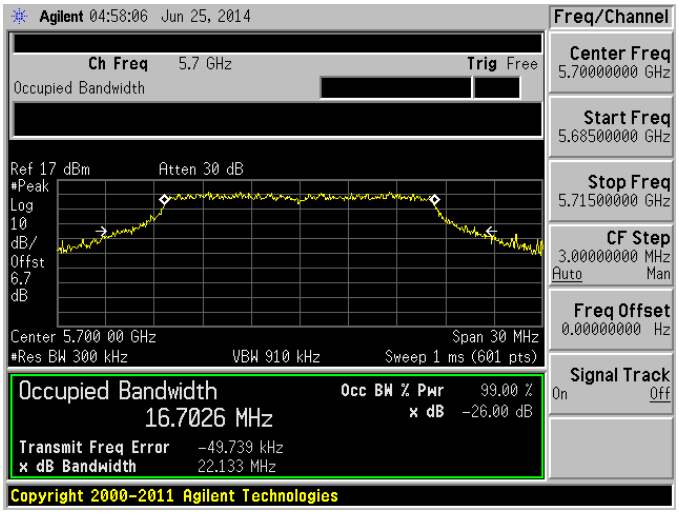
Chain 0



Chain 1

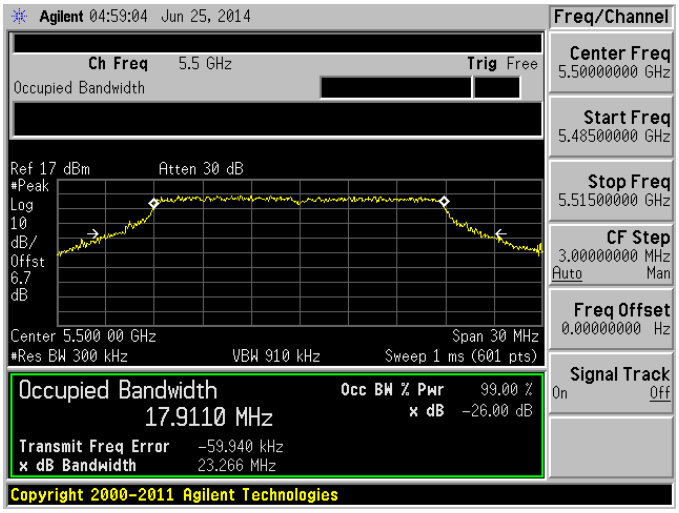


Chain 2

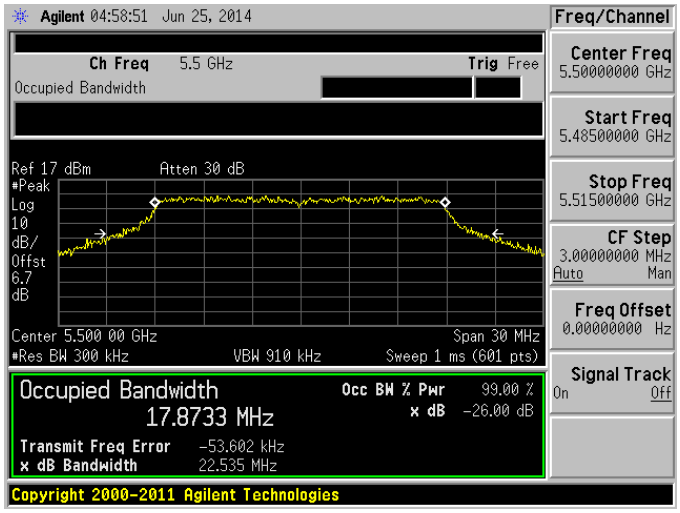


802.11n-HT 20, Low Channel 5500 MHz

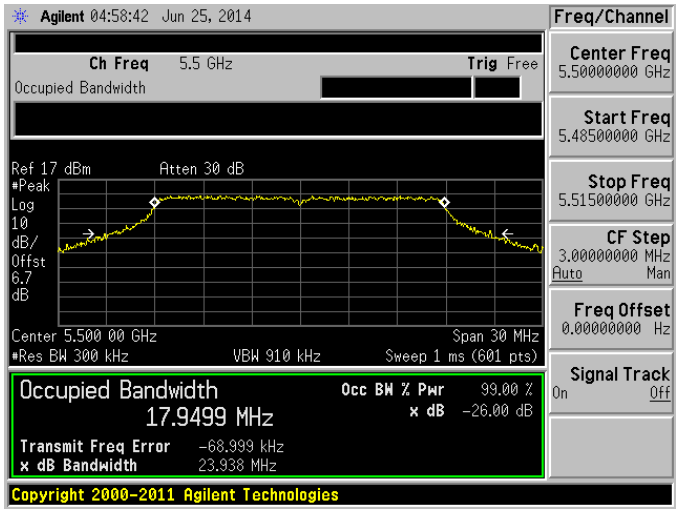
Chain 0



Chain 1

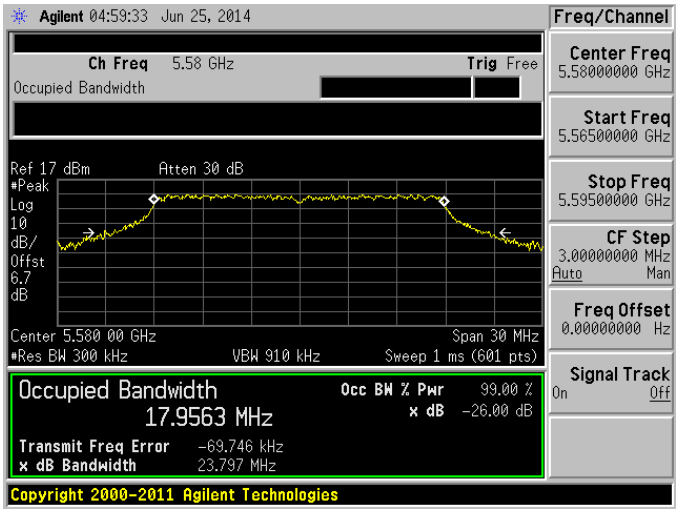


Chain 2

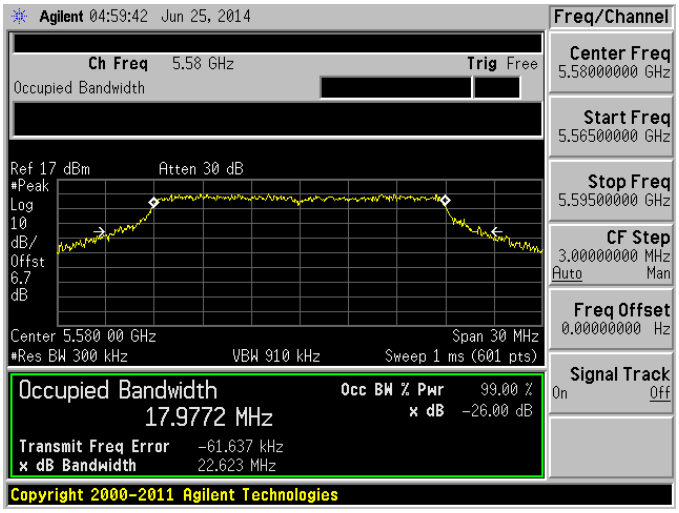


802.11n-HT20, Middle Channel 5580 MHz

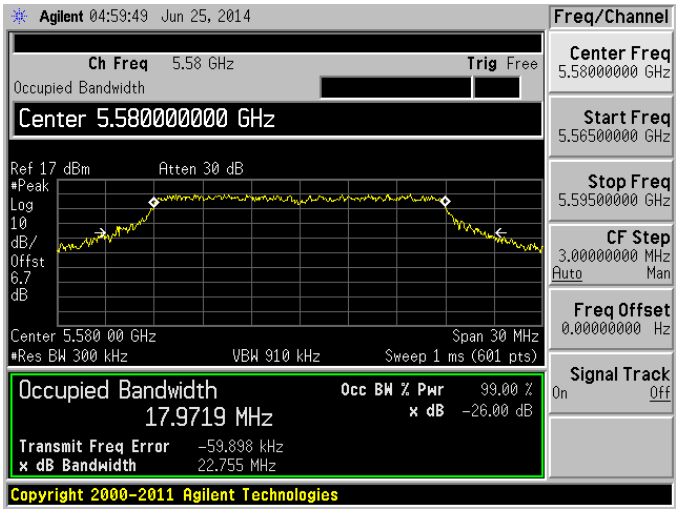
Chain 0



Chain 1

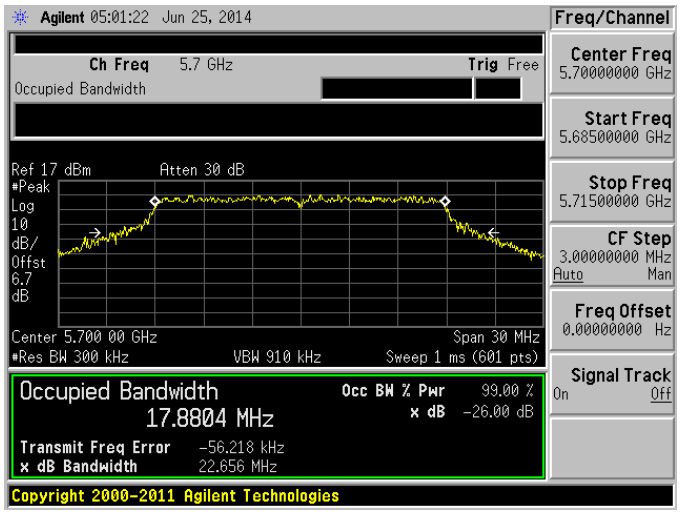


Chain 2

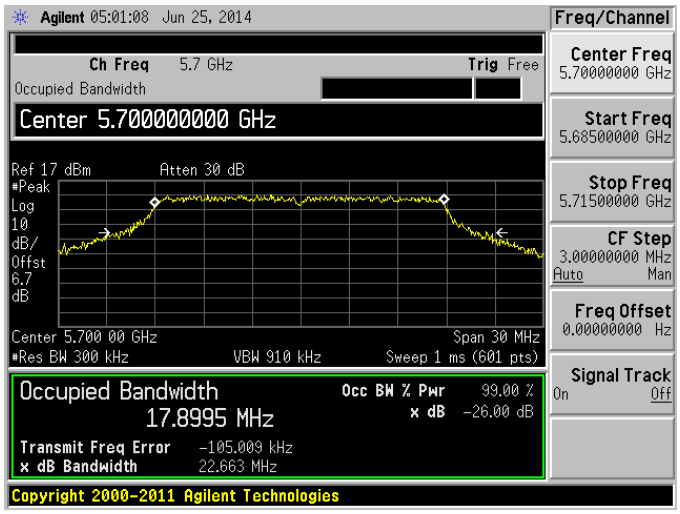


802.11n-HT20, High Channel 5700 MHz

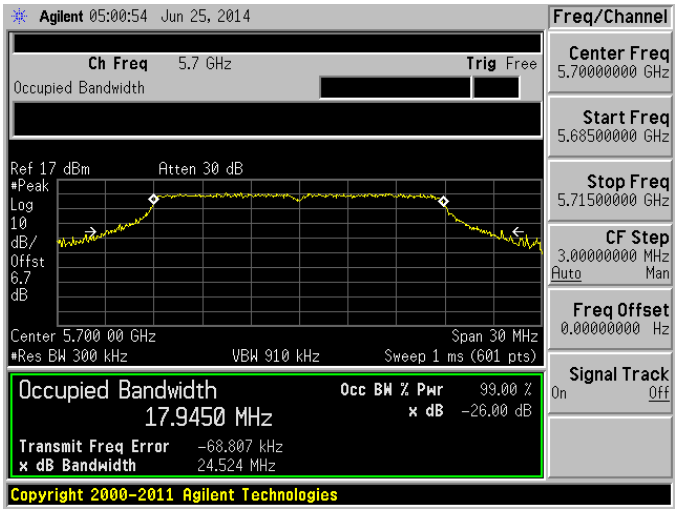
Chain 0



Chain 1

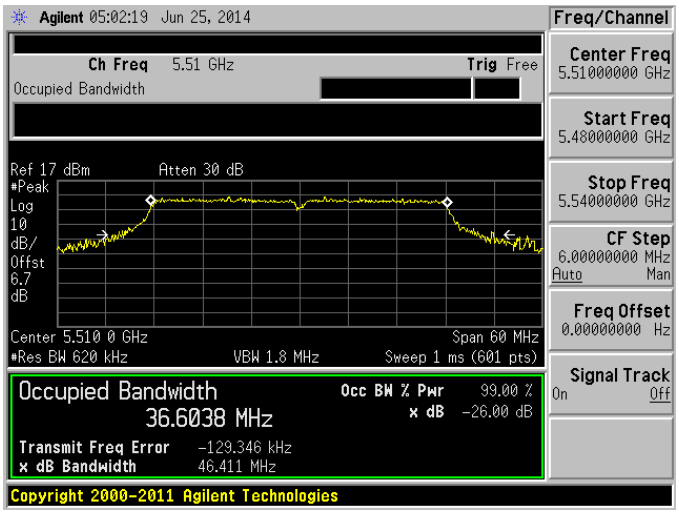


Chain 2

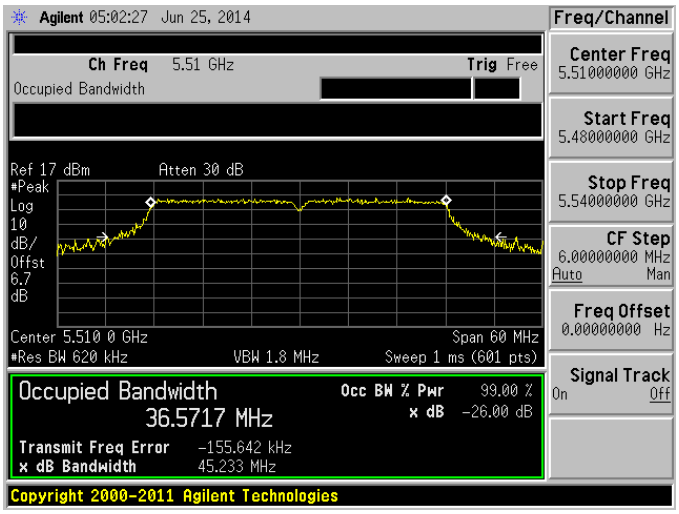


802.11n-HT40, Low Channel 5510 MHz

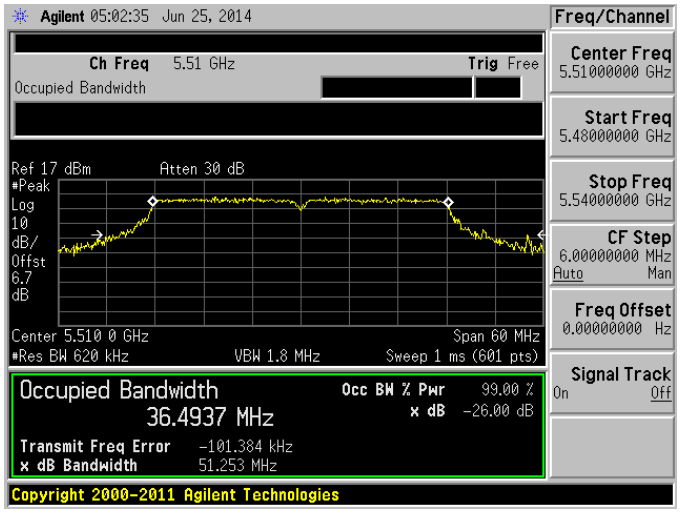
Chain 0



Chain 1

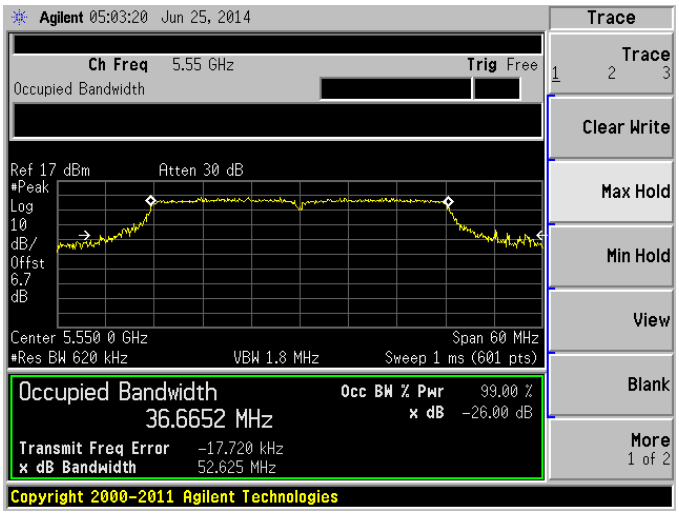


Chain 2

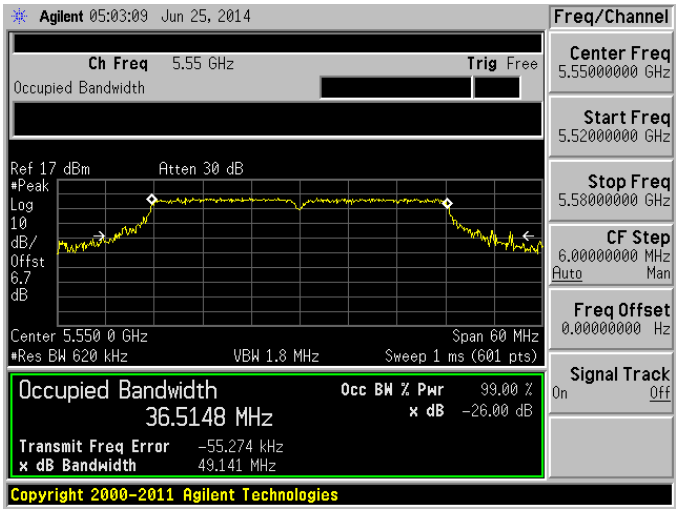


802.11n-HT40, Middle Channel 5550 MHz

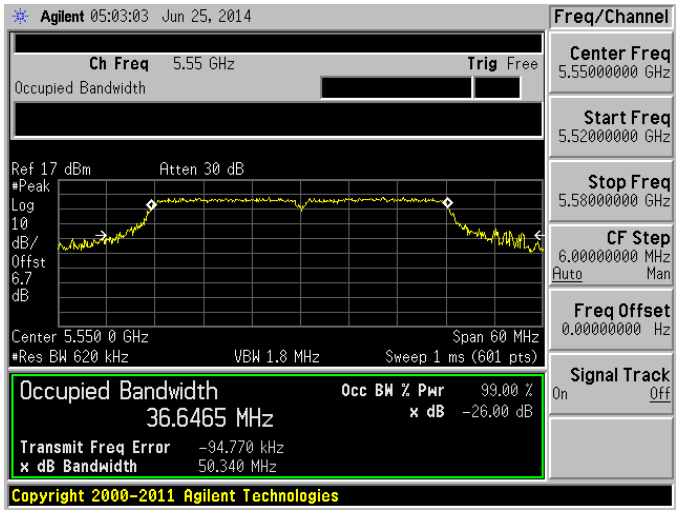
Chain 0



Chain 1

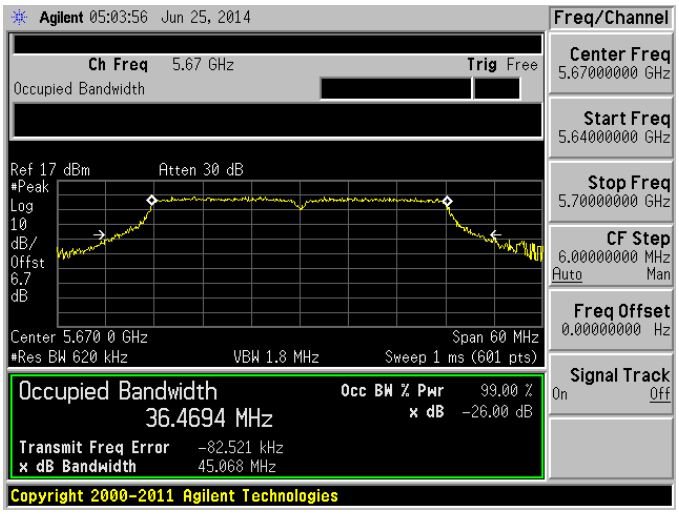


Chain 2

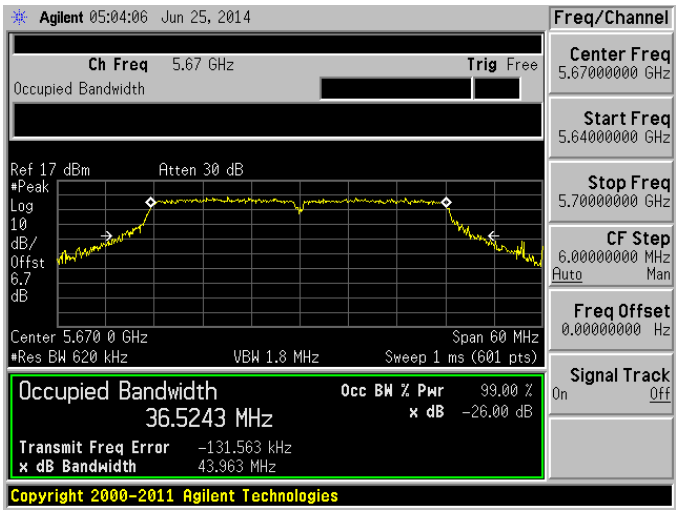


802.11n-HT40, High Channel 5670 MHz

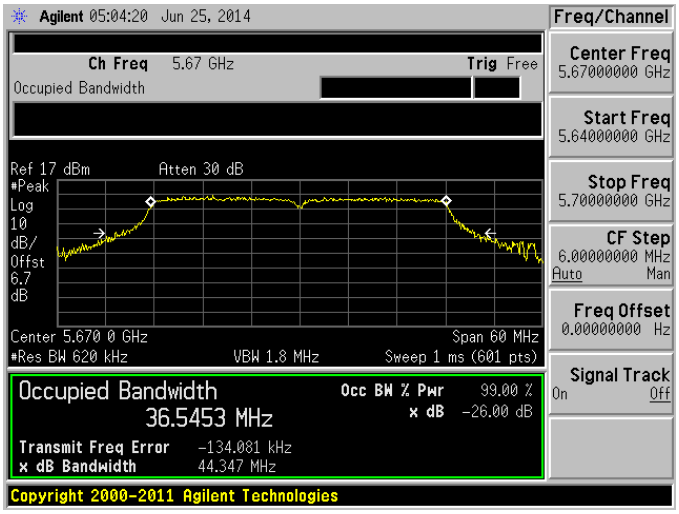
Chain 0



Chain 1

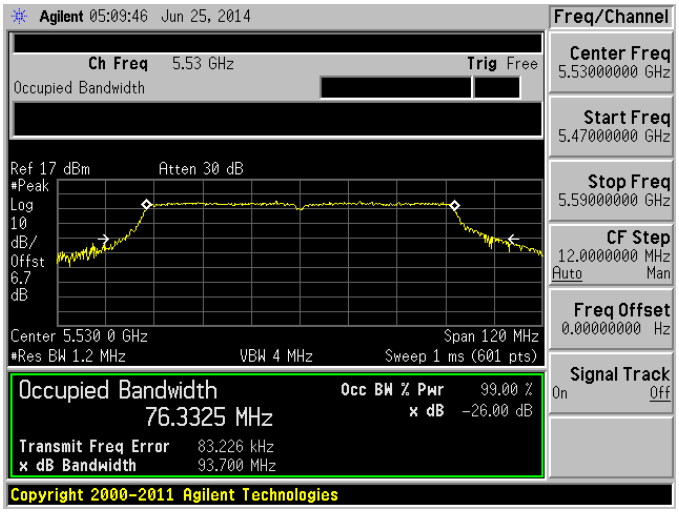


Chain 2

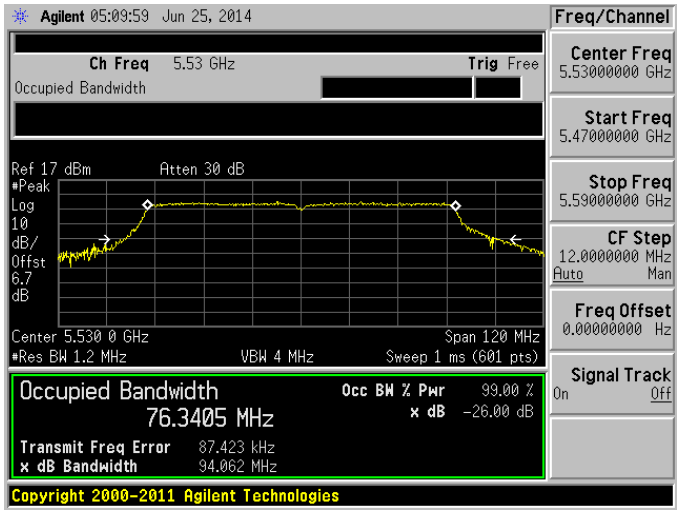


802.11ac-VHT80, 5530 MHz

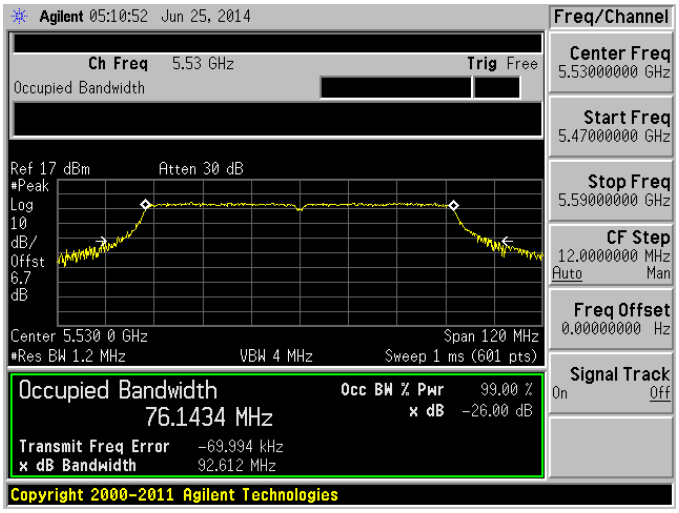
Chain 0



Chain 1



Chain 2



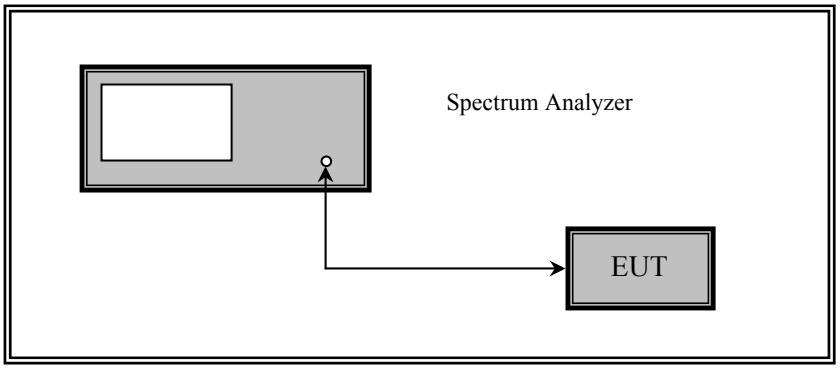
9 FCC §407(a) – Maximum Conducted Output Power

9.1 Applicable Standards

FCC §15.407(a)

9.2 Measurement Procedure

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



Test measurements are base on 789033 D01 General UNII Test Procedures Old Rules v01r04

9.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2013-09-29	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 on 2014-07-07 to 2014-07-14 at RF site.

9.5 Test Results

Maximum Conducted Output Power

Note: Duty Cycle is 99%; no duty factor should be added

5.3 GHz Band:

802.11a mode

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Power setting
Low	5260	16.00	15.71	15.68	20.57	24	17
Middle	5280	16.02	15.67	15.79	20.6	24	17
High	5320	14.32	13.56	13.65	18.63	24	15

802.11n-HT20 mode

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Power setting
Low	5260	16.3	15.91	15.89	20.8	24	17
Middle	5280	16.2	15.79	15.76	20.7	24	17
High	5320	14.23	13.56	13.64	18.6	24	15

802.11n-HT40 mode

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Power setting
Low	5270	15.83	15.29	15.54	20.33	24	17
High	5310	10.99	10.71	10.73	15.58	24	12

802.11ac-VHT80 mode

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Power setting
Middle	5290	9.4	9.22	9.19	14.04	24	11

5.6 GHz Band :

802.11a mode

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Power setting
Low	5500	16.62	16.21	15.86	21.01	24	17
Middle	5580	16.69	16.27	16.07	21.12	24	17
High	5700	16	15.3	14.84	20.18	24	17

802.11n-HT20 mode

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Power setting
Low	5500	15.09	15.05	14.86	19.77	24	16
Middle	5580	15.22	15.13	15	19.89	24	16
High	5700	14.94	14.27	13.84	19.14	24	16

802.11n-HT40 mode

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Power setting
Low	5510	13.58	13.82	13.69	18.47	24	15
Middle	5550	13.63	13.84	13.67	18.49	24	15
High	5670	13.29	13.34	13.27	18.07	24	15

802.11ac-VHT80 mode

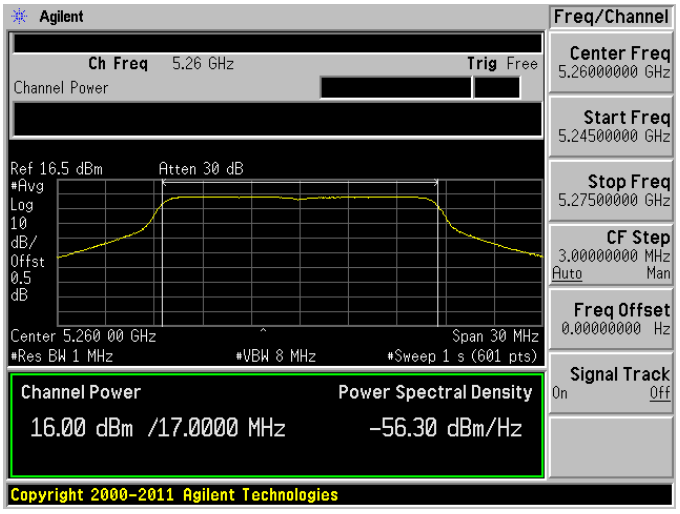
Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Power setting
Middle	5530	10.41	10.71	10.39	15.28	24	12

Please refer to the plots as following:

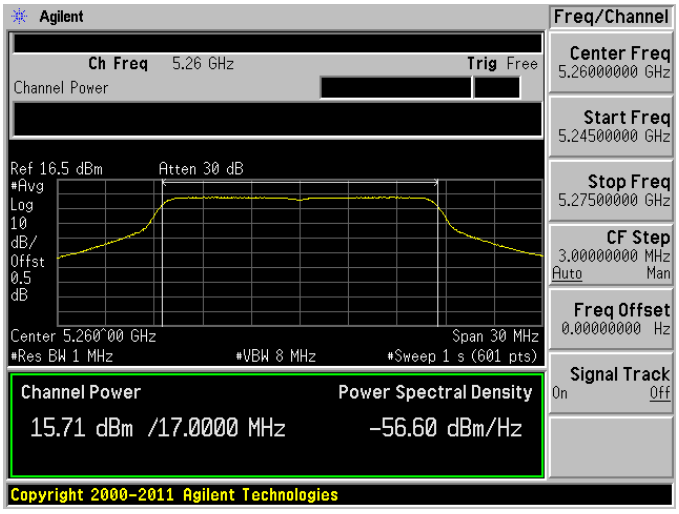
5.3 GHz Band

802.11a, Low Channel, 5260 MHz

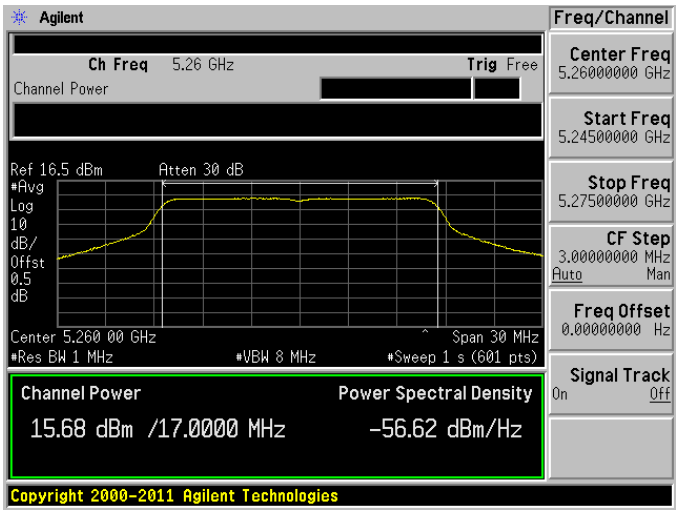
Chain 0



Chain 1

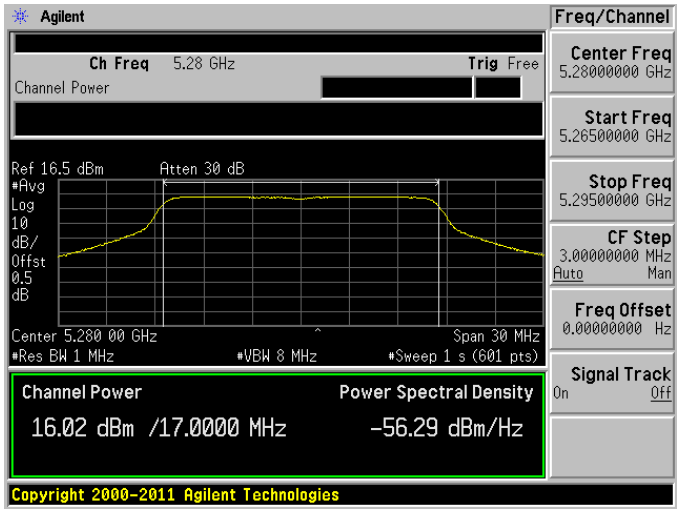


Chain 2

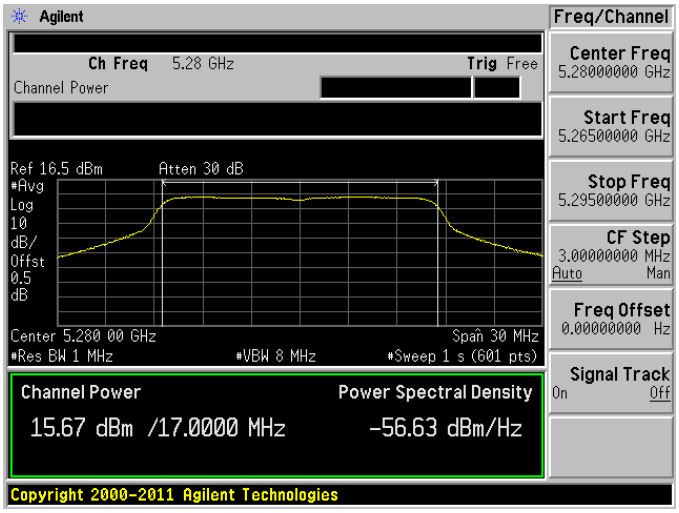


802.11a, Middle Channel, 5280 MHz

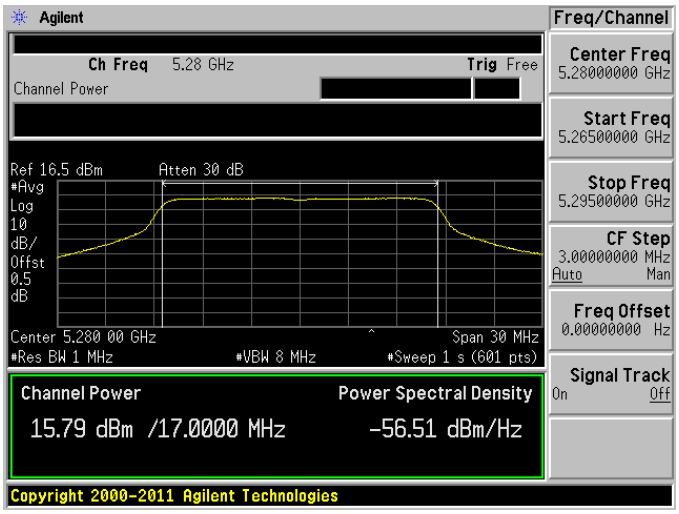
Chain 0



Chain 1

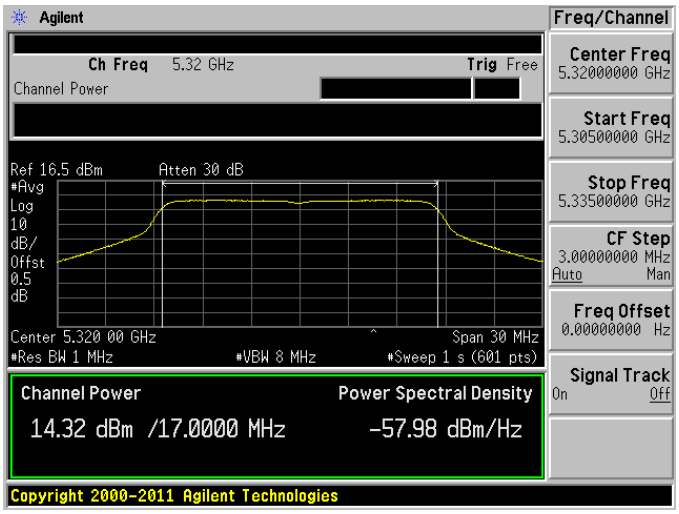


Chain 2

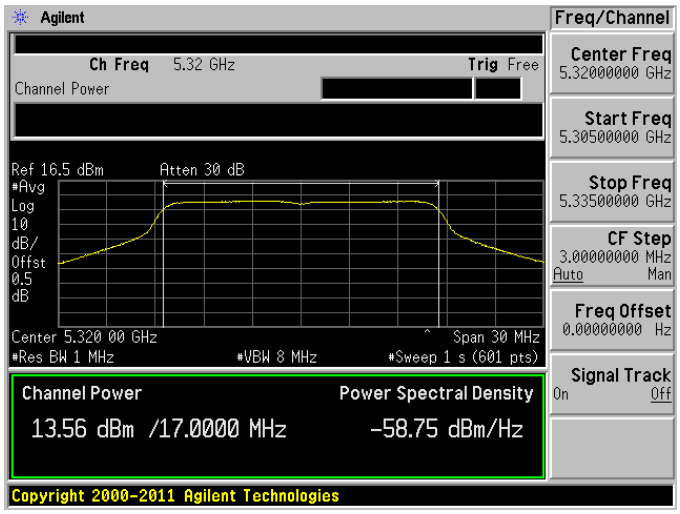


802.11a, High Channel, 5320 MHz

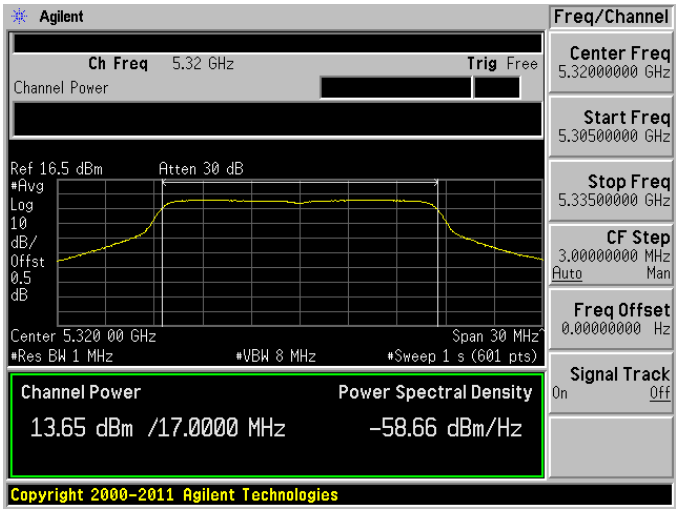
Chain 0



Chain 1

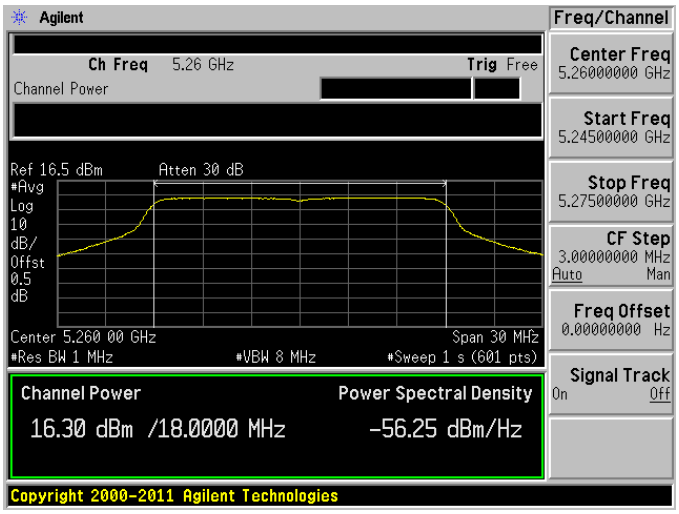


Chain 2

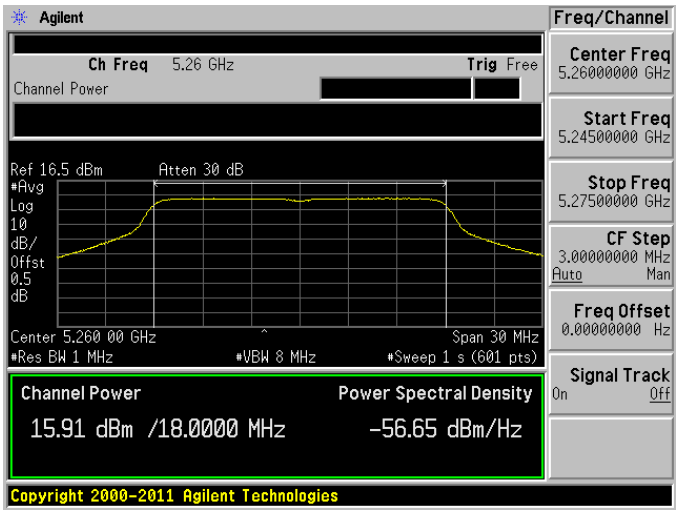


802.11n-HT 20, Low Channel 5260 MHz

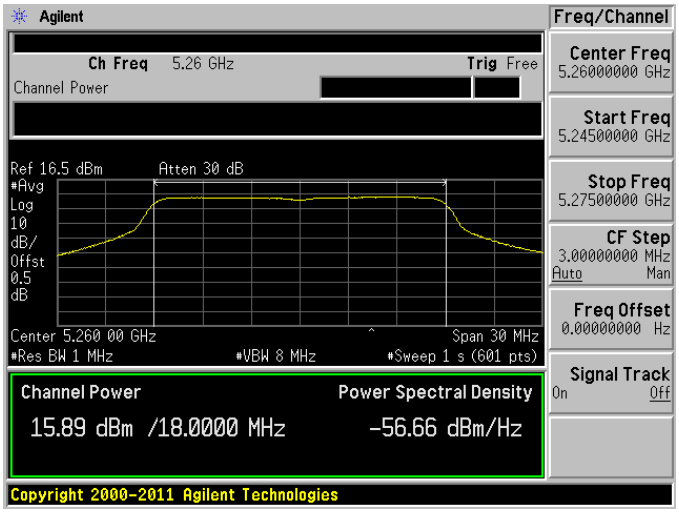
Chain 0



Chain 1

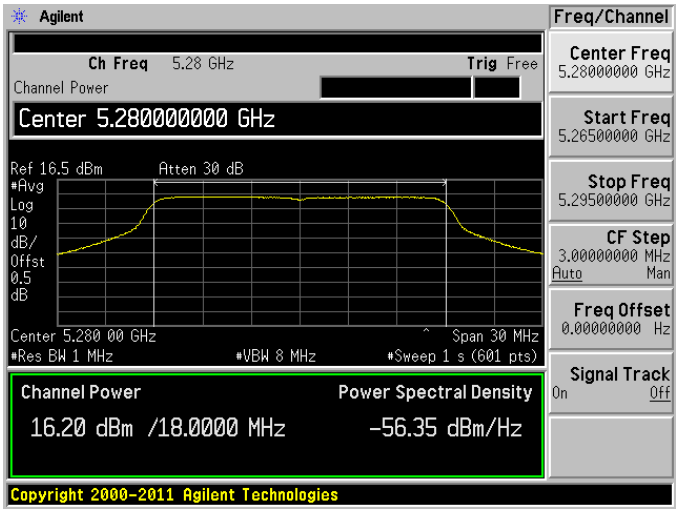


Chain 2

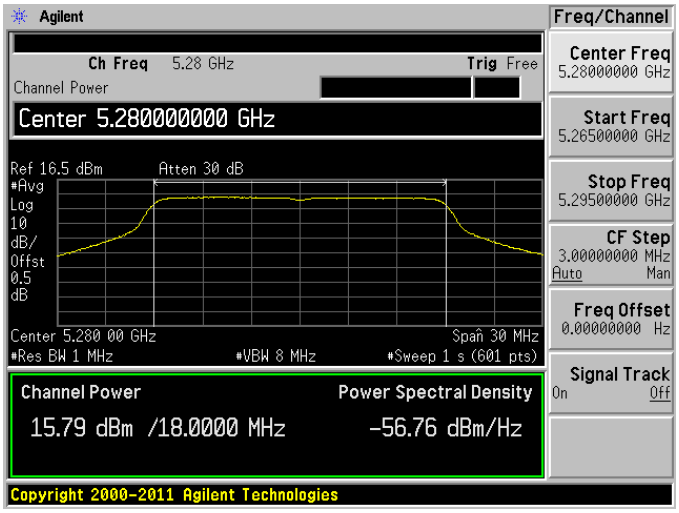


802.11n-HT20, Middle Channel 5280 MHz

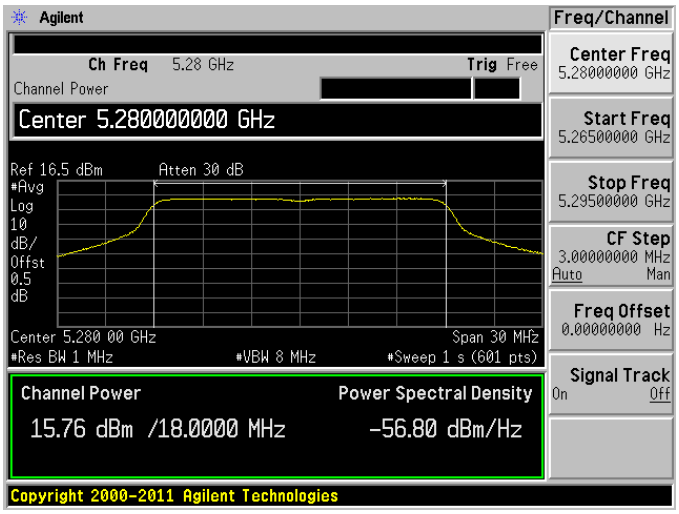
Chain 0



Chain 1

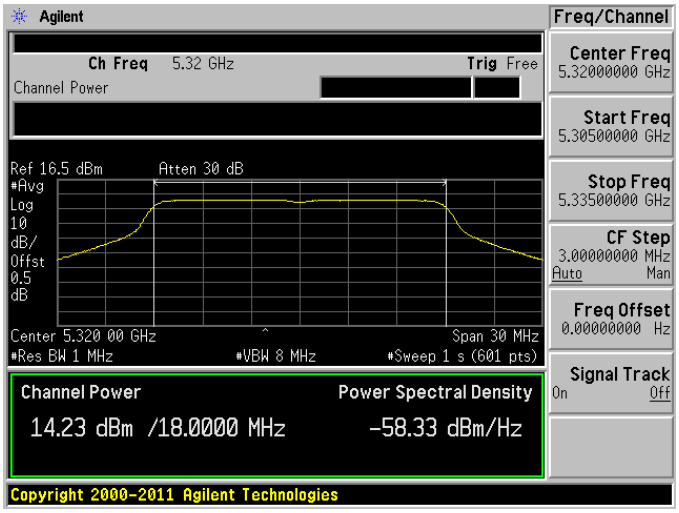


Chain 2

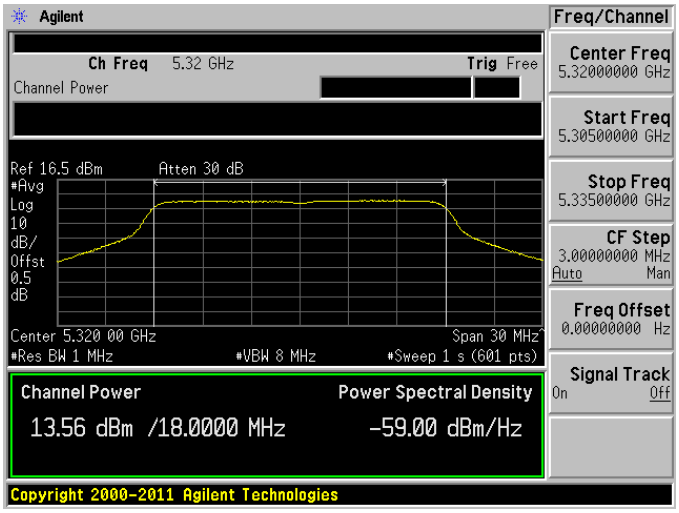


802.11n-HT20, High Channel, 5320 MHz

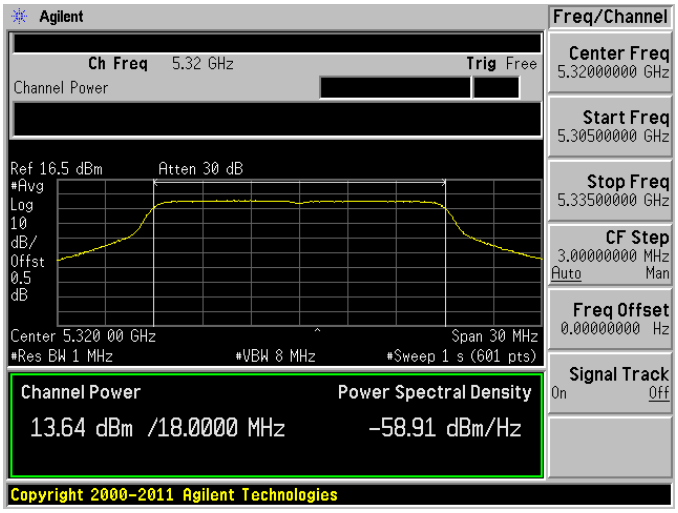
Chain 0



Chain 1

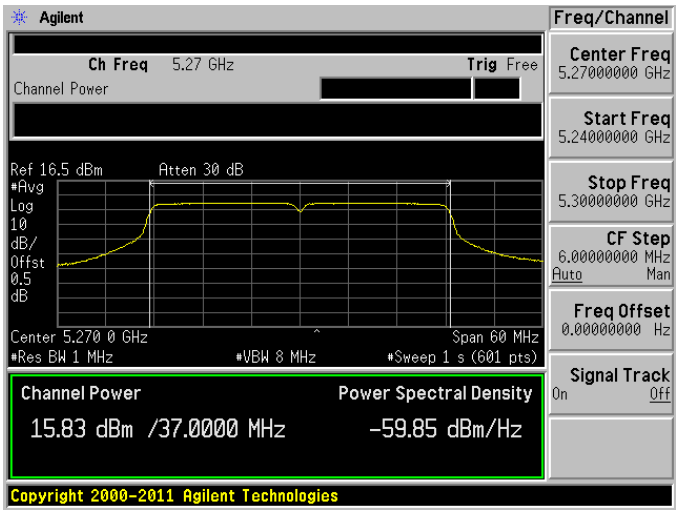


Chain 2

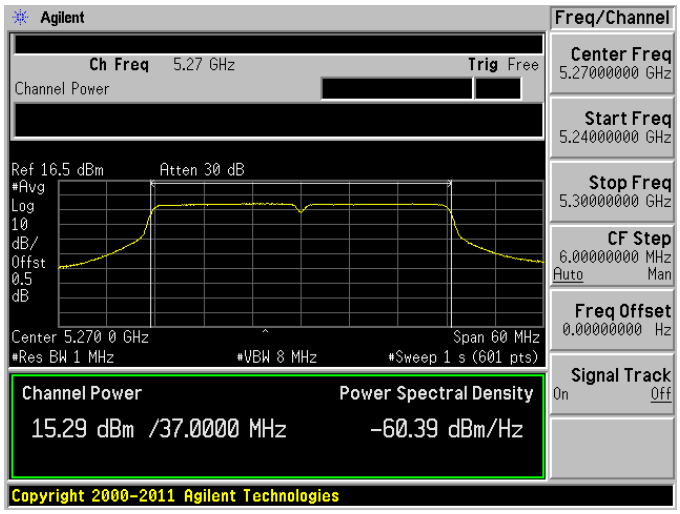


802.11n-HT40, Low Channel 5270 MHz

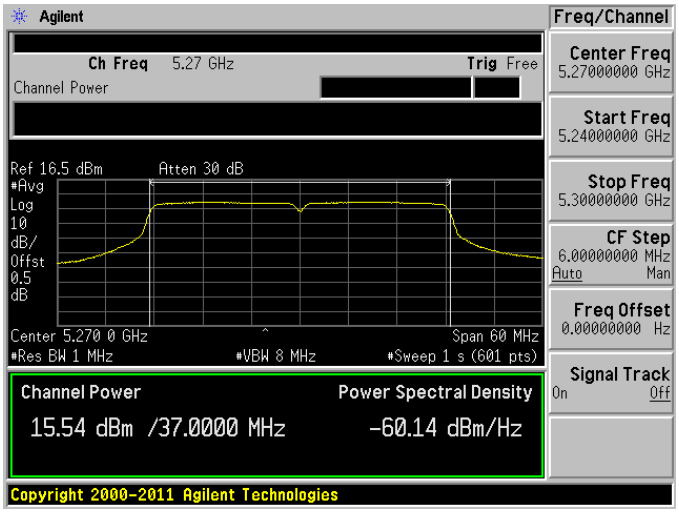
Chain 0



Chain 1

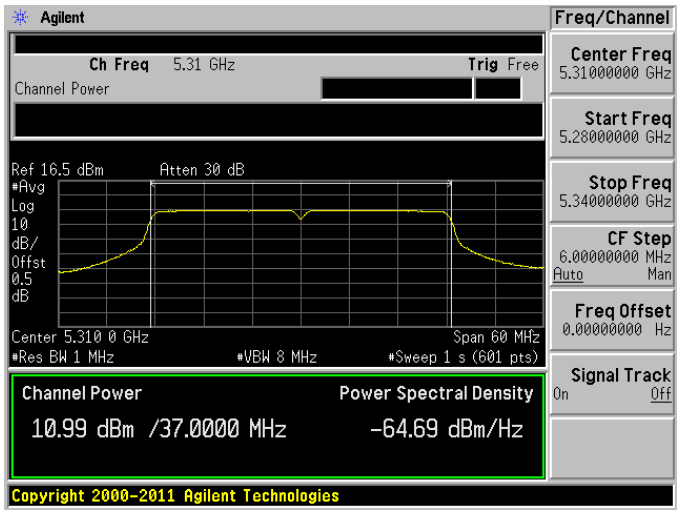


Chain 2

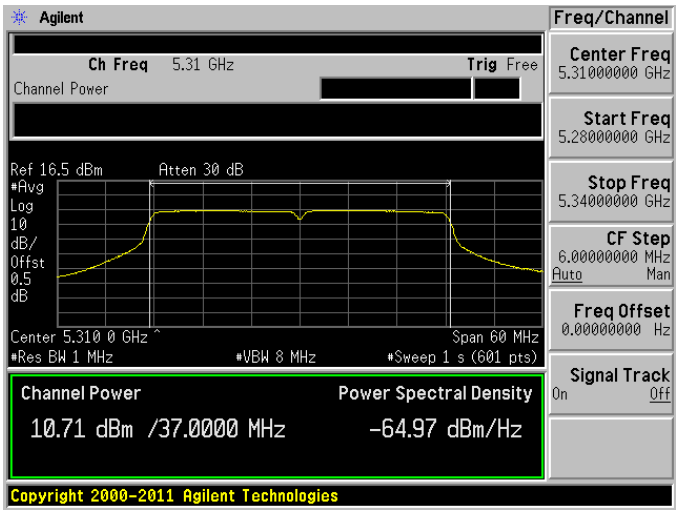


802.11n-HT40, High Channel 5310 MHz

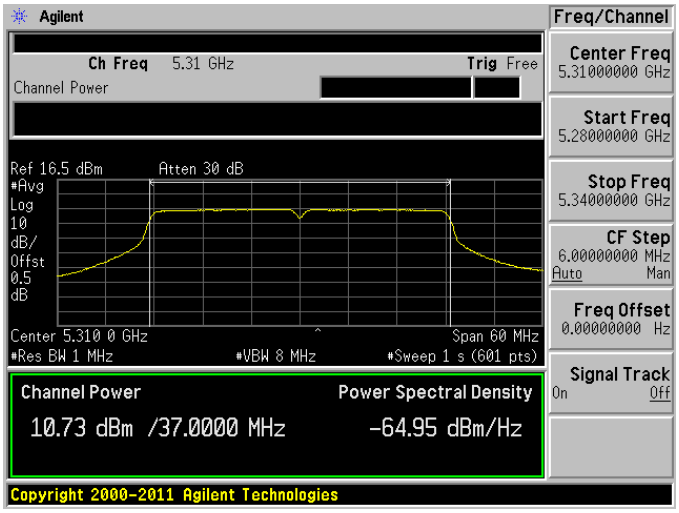
Chain 0



Chain 1

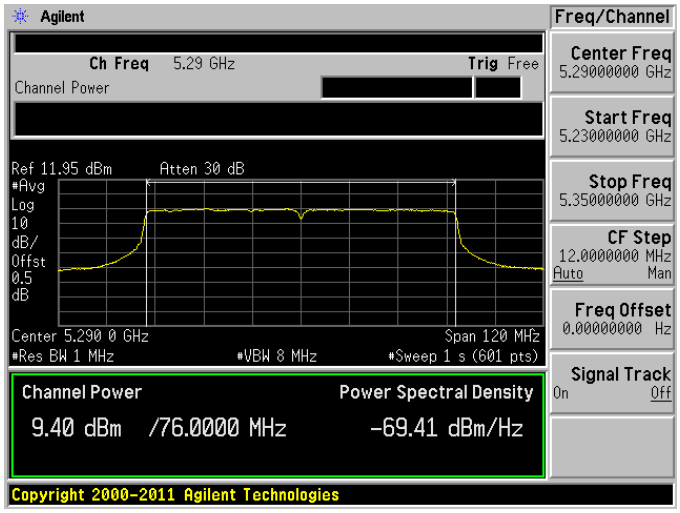


Chain 2

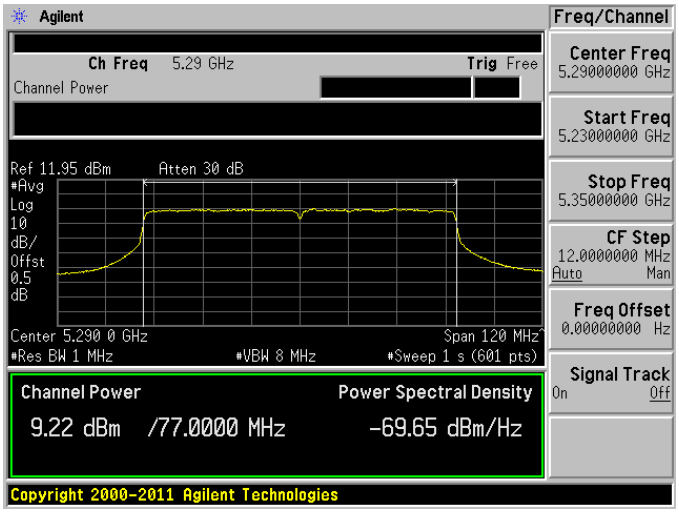


802.11ac-VHT80, High Channel 5290 MHz

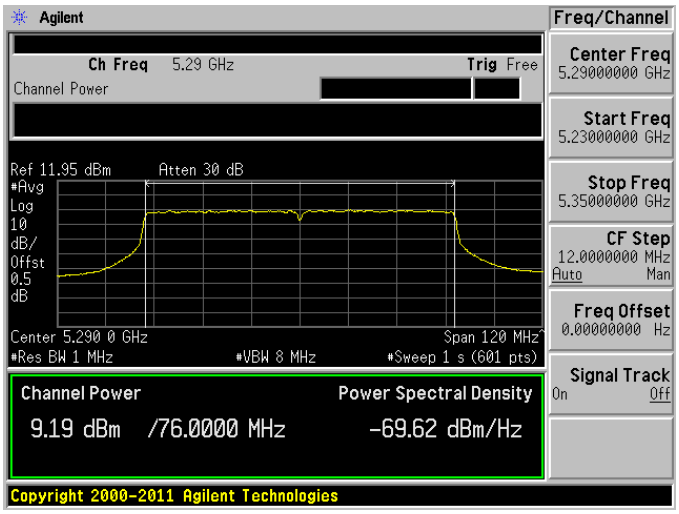
Chain 0



Chain 1



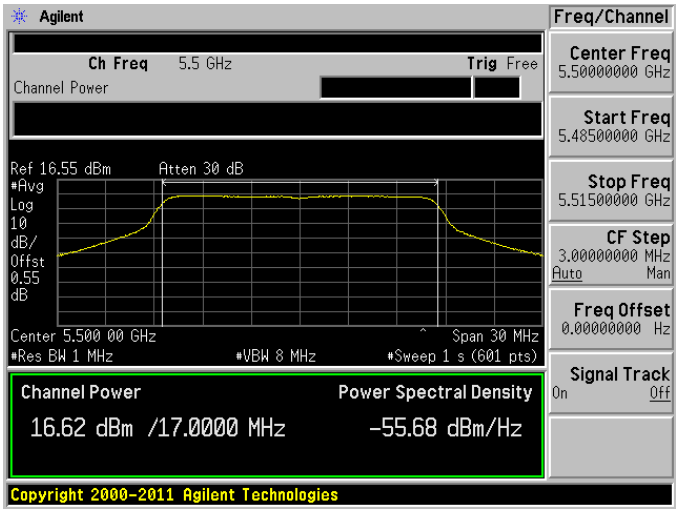
Chain 2



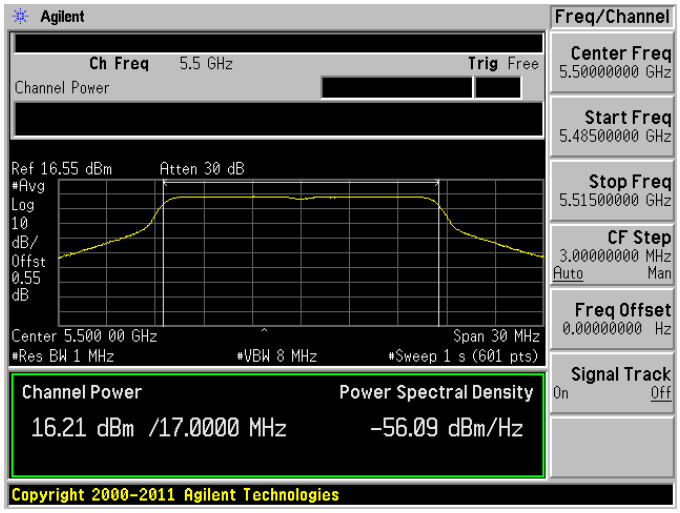
5.6 GHz Band

802.11a, Low Channel, 5500 MHz

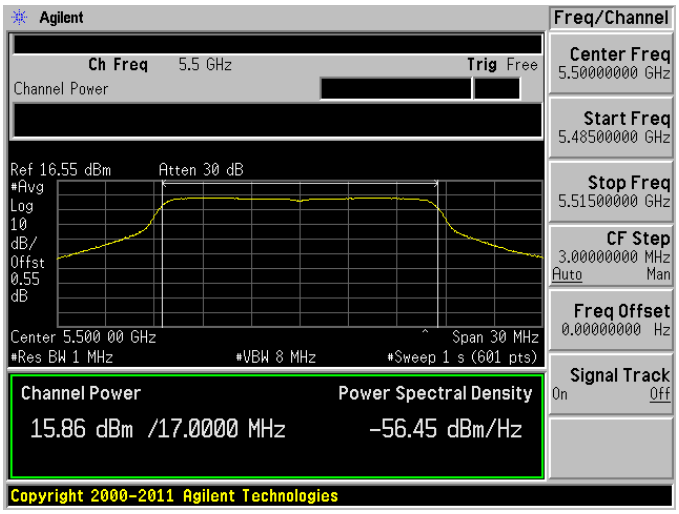
Chain 0



Chain 1

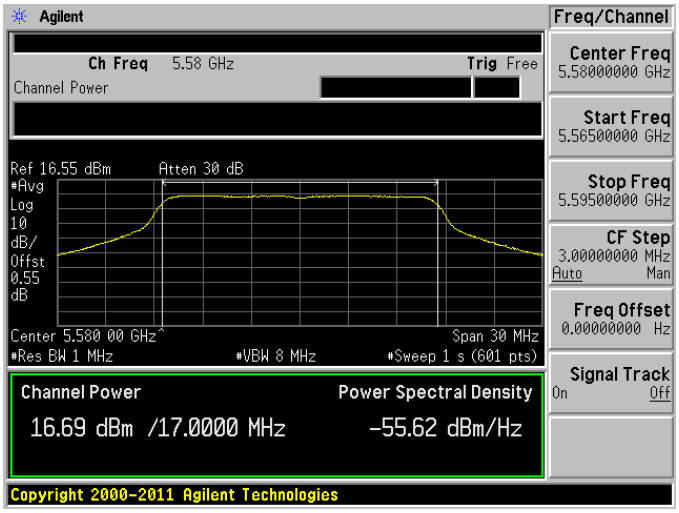


Chain 2

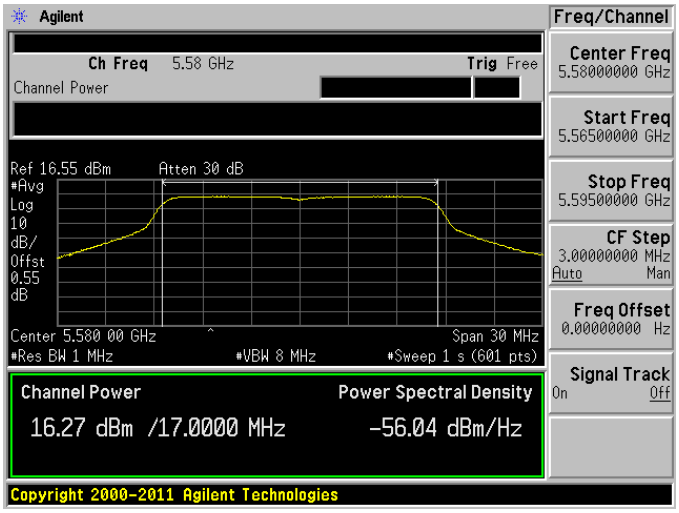


802.11a, Middle Channel, 5580 MHz

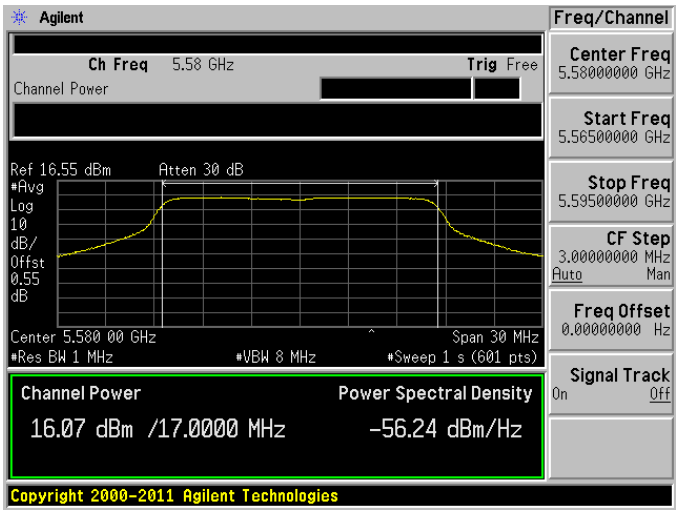
Chain 0



Chain 1

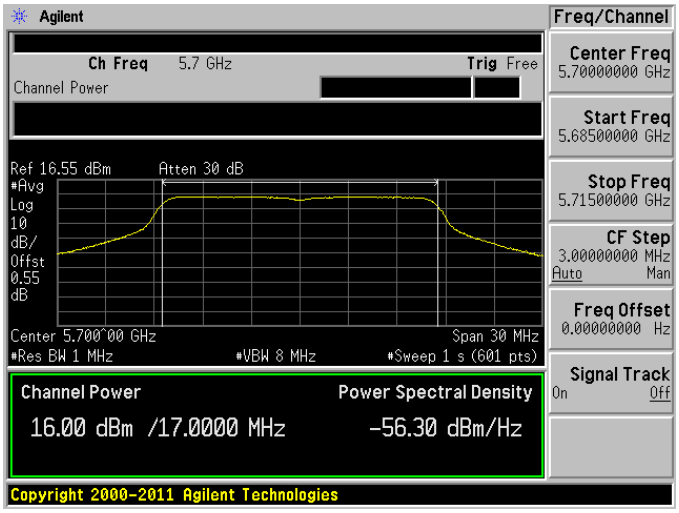


Chain 2

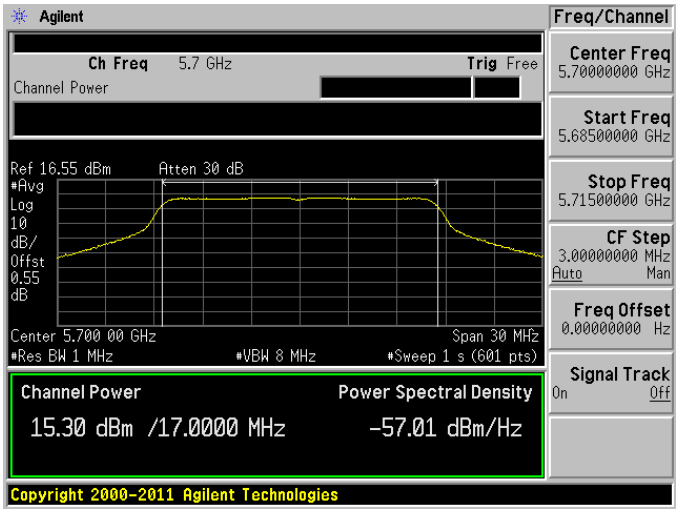


802.11a, High Channel, 5700 MHz

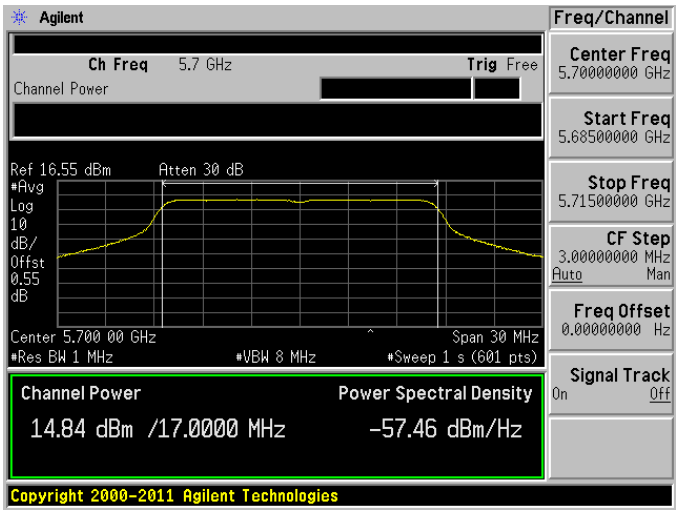
Chain 0



Chain 1

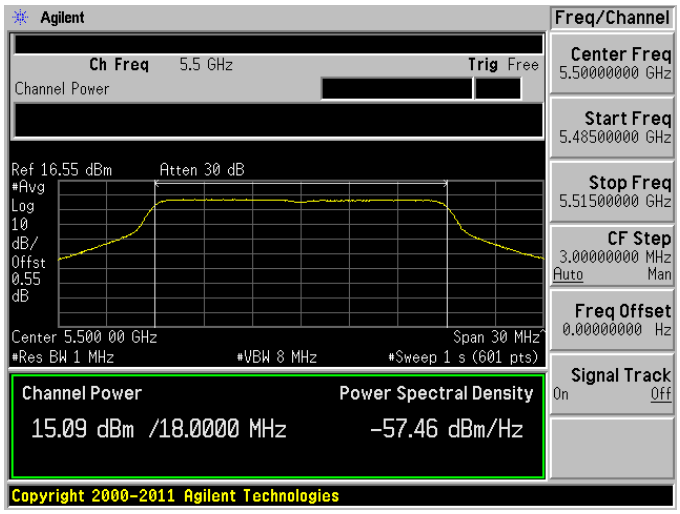


Chain 2

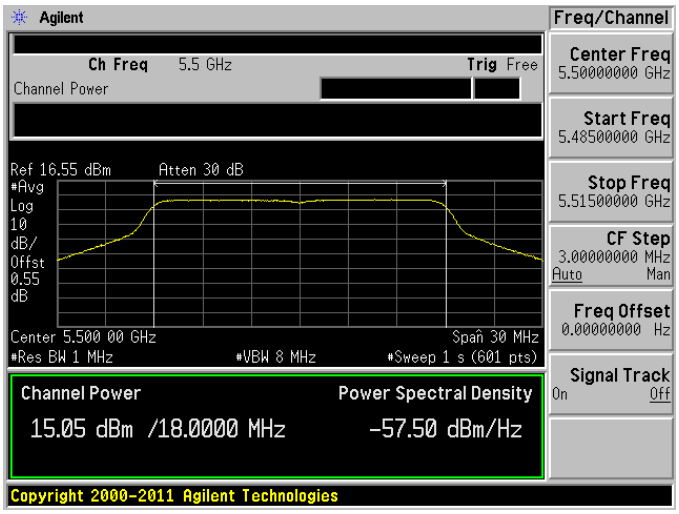


802.11n-HT 20, Low Channel 5500 MHz

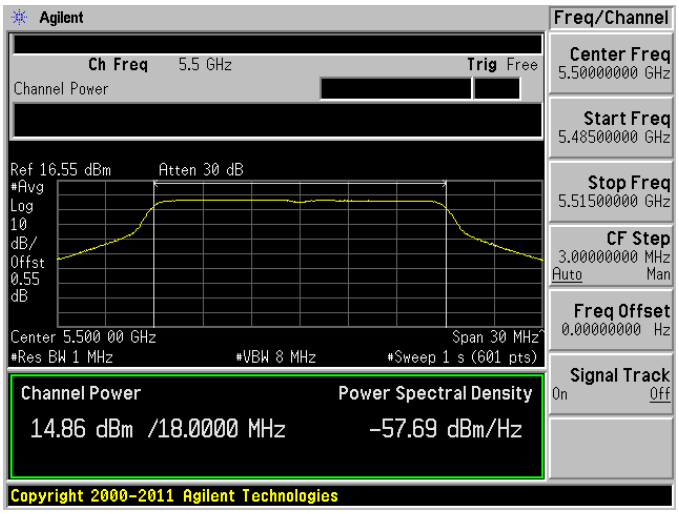
Chain 0



Chain 1

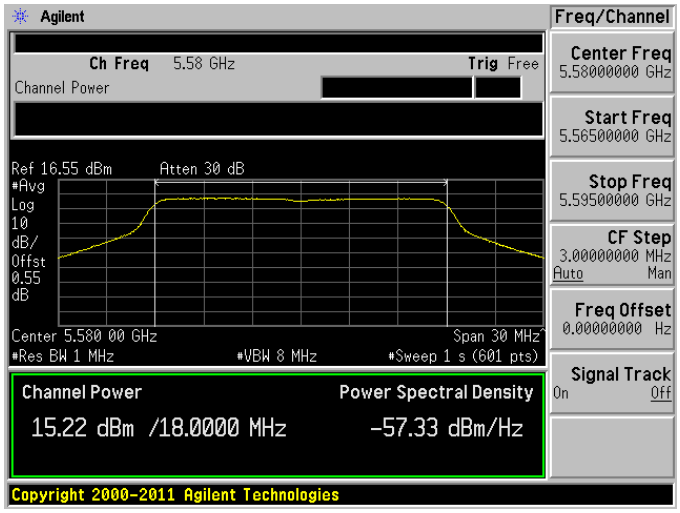


Chain 2

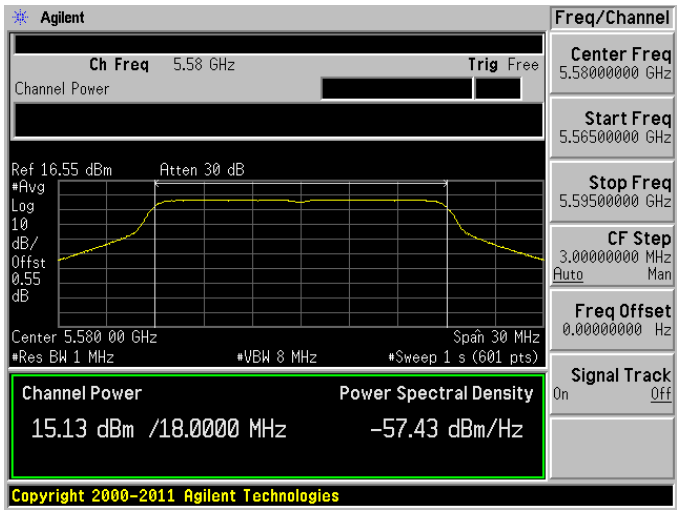


802.11n-HT20, Middle Channel 5580 MHz

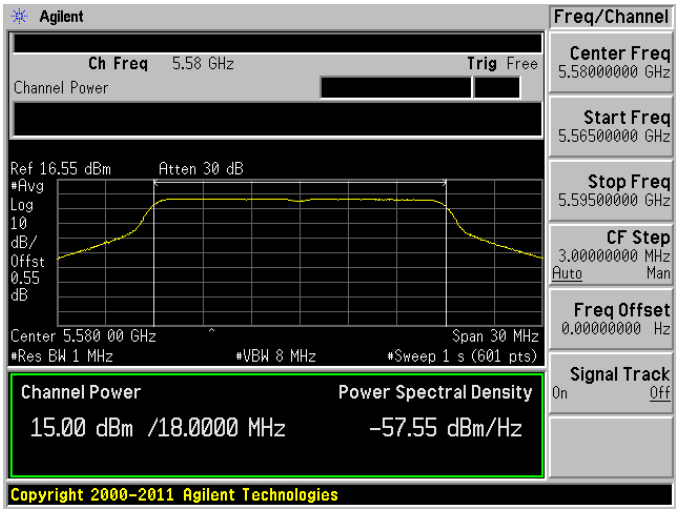
Chain 0



Chain 1

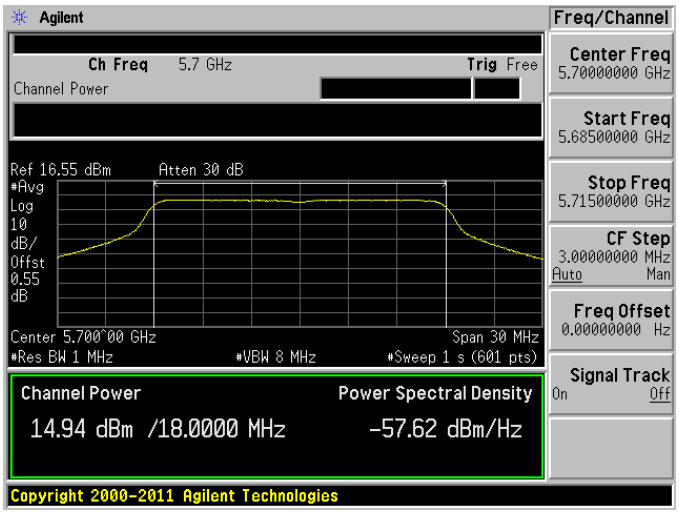


Chain 2

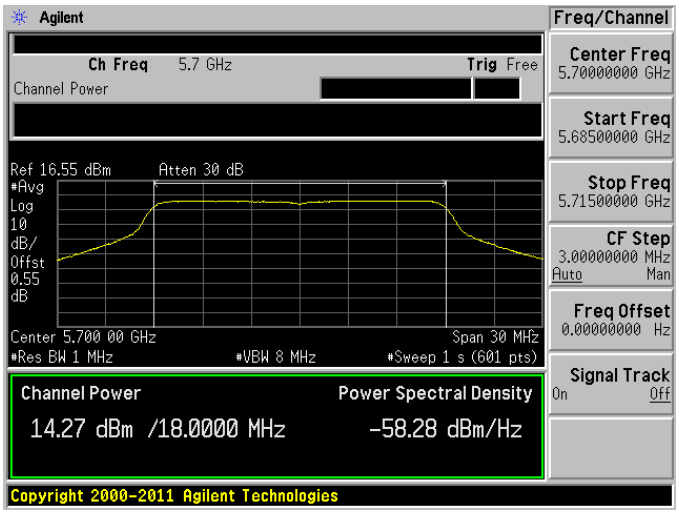


802.11n-HT20, High Channel 5700 MHz

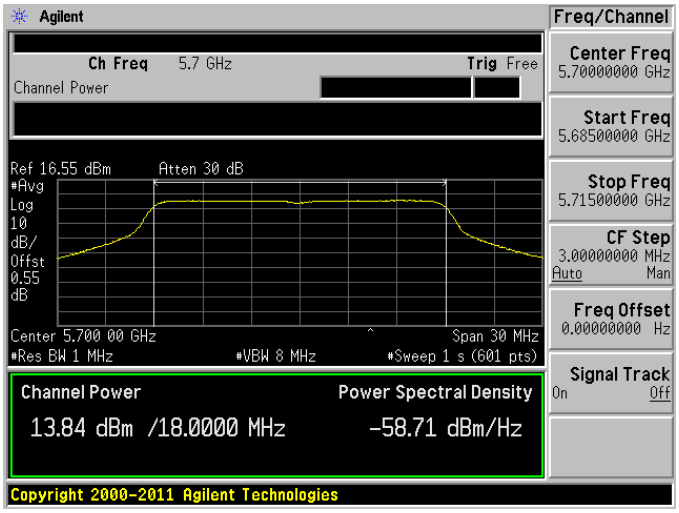
Chain 0



Chain 1

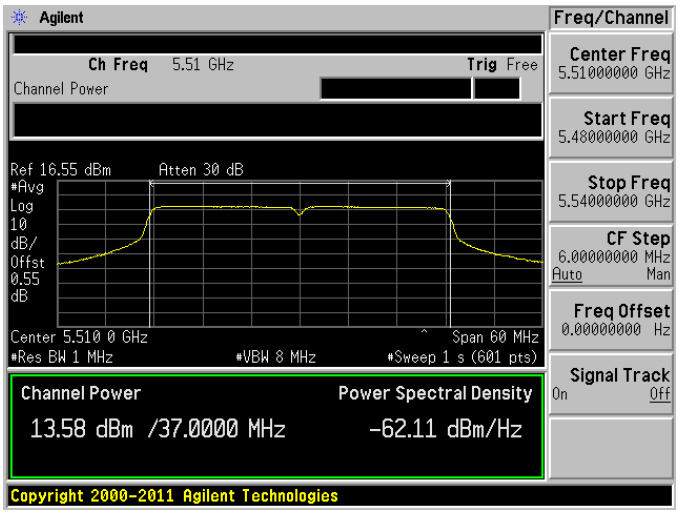


Chain 2

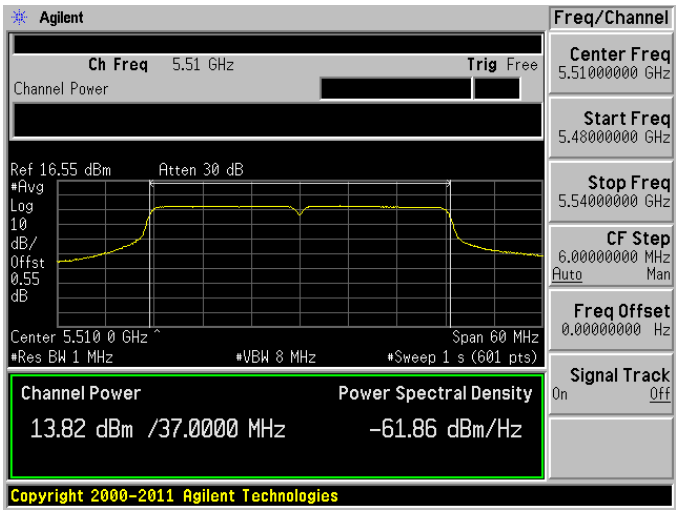


802.11n-HT40, Low Channel 5510 MHz

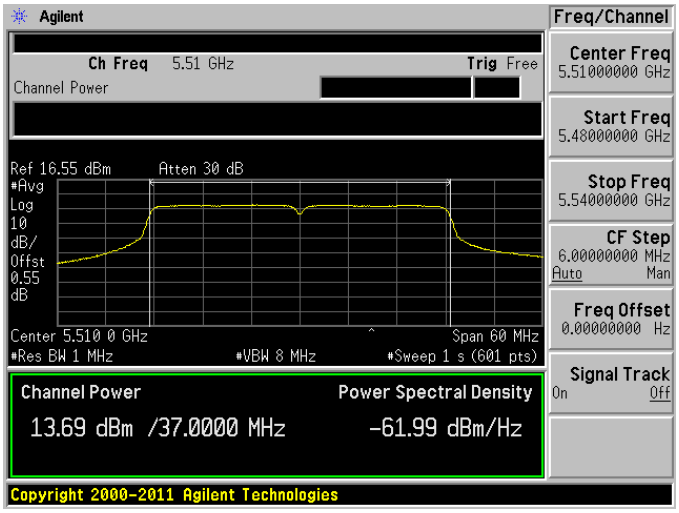
Chain 0



Chain 1

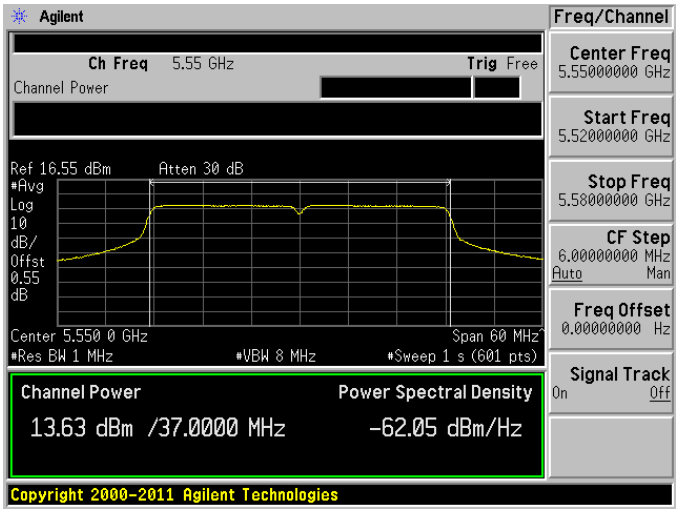


Chain 2

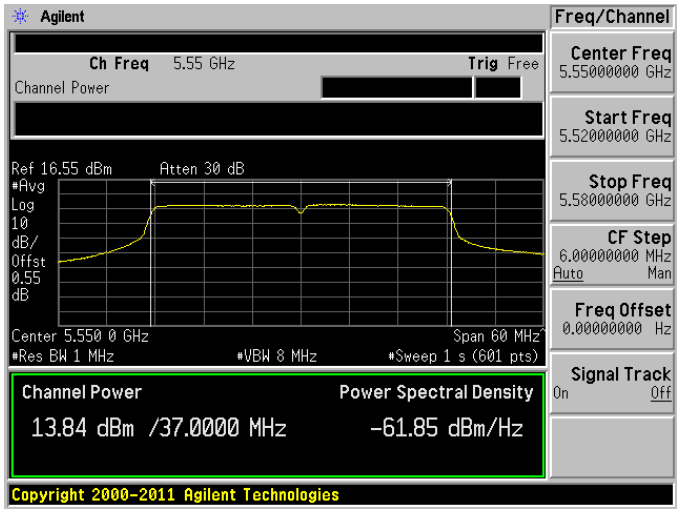


802.11n-HT40, Middle Channel 5550 MHz

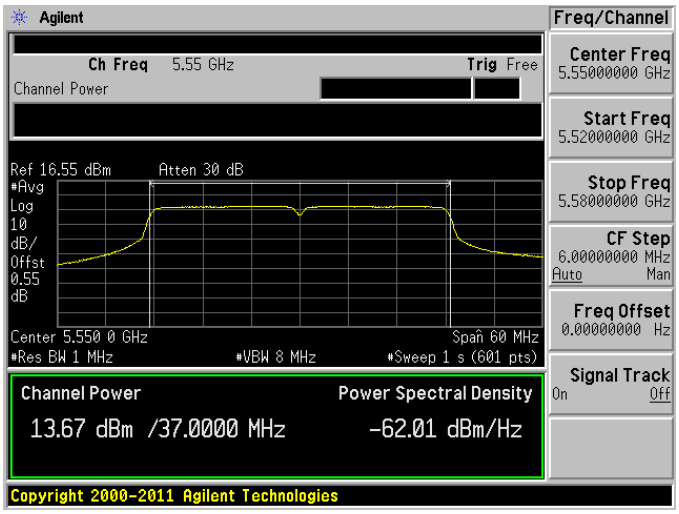
Chain 0



Chain 1

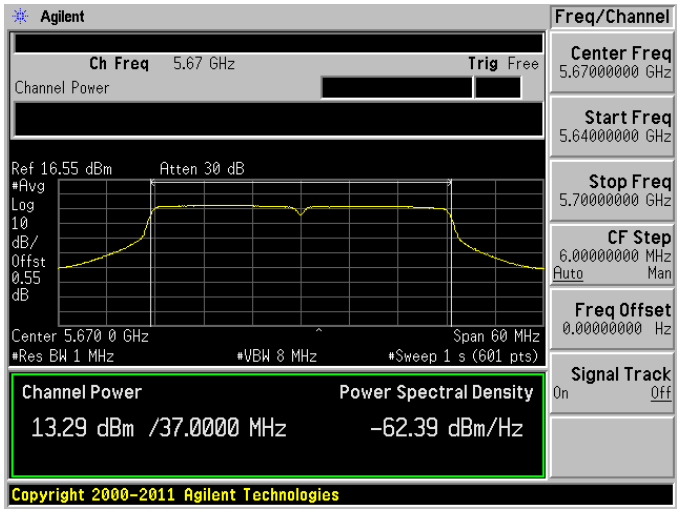


Chain 2

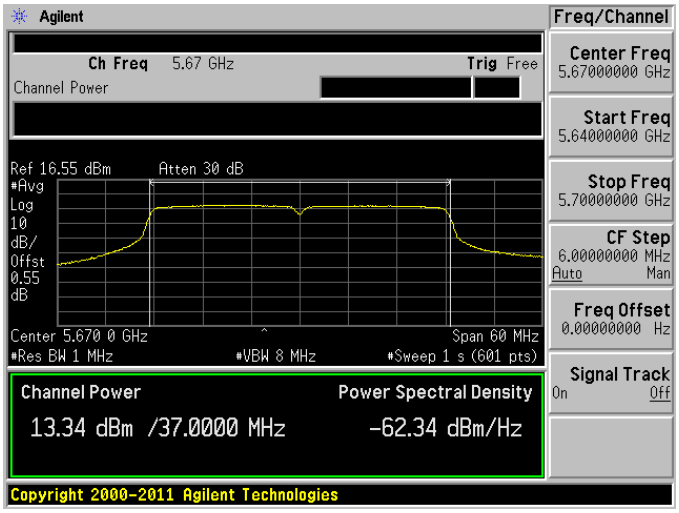


802.11n-HT40, High Channel 5670 MHz

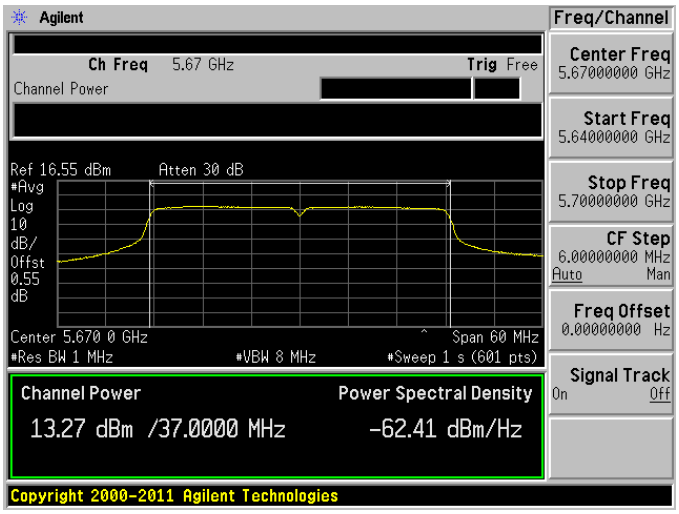
Chain 0



Chain 1

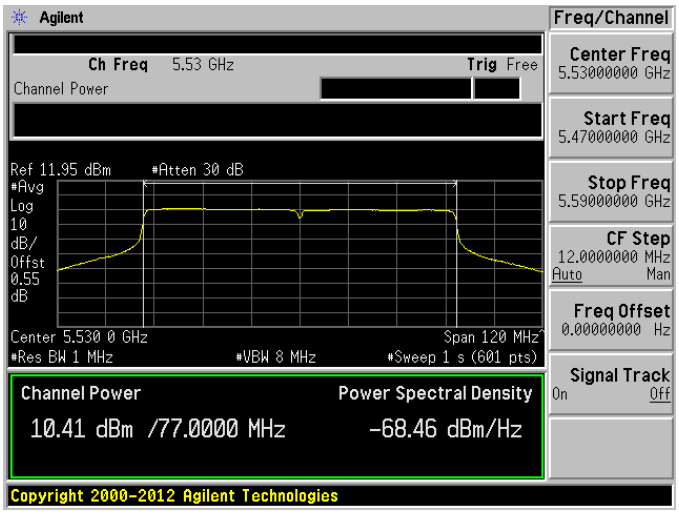


Chain 2

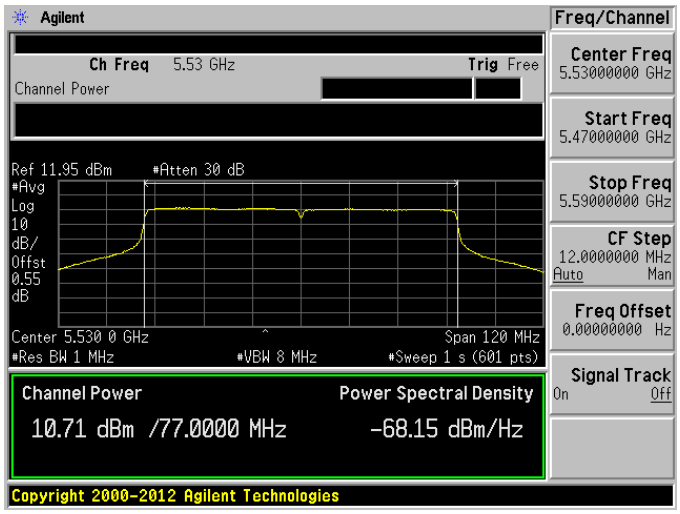


802.11ac-VHT80, 5530 MHz

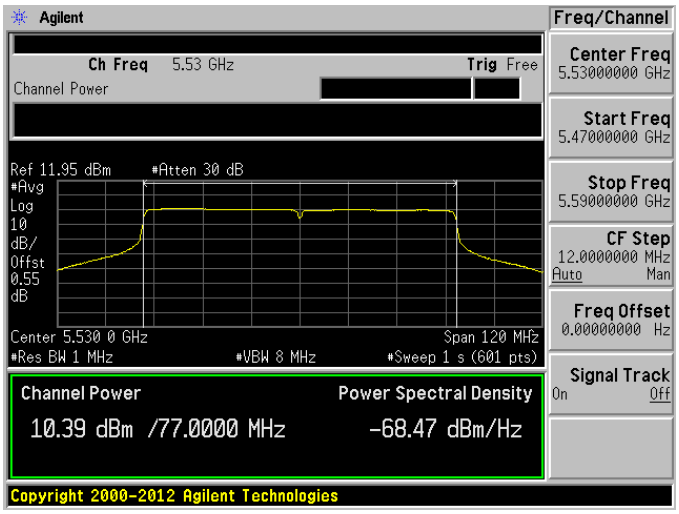
Chain 0



Chain 1



Chain 2



10 FCC §15.407(b) - Out of Band Emissions

10.1 Applicable Standard

According to FCC §15.407(b)

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(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.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an 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.

10.2 Measurement Procedure

The measurements are base on FCC KDB 789033 D01 General UNII Test Procedures v01r04

10.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2013-09-29	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:	21° C
Relative Humidity:	43 %
ATM Pressure:	101-102 kPa

The testing was performed by Rui Zhou from 2014-07-07 to 2014-07-14 at RF site.

10.5 Test Results

5.3 GHz Band

802.11a mode

Channel	Band Edge (MHz)	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Total (dBm)	Limit (dBm)
Low	5150	5260	-47.57	-51.4	-51.11	-44.88	-27
High	5350	5320	-49.9	-47.77	-48.8	-43.97	-27

802.11n-HT20 mode

Channel	Band Edge (MHz)	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Total (dBm)	Limit (dBm)
Low	5150	5260	-48.4	-50.34	-51.46	-45.11	-27
High	5350	5320	-46.37	-49.13	-47.98	-42.91	-27

802.11n-HT40 mode

Channel	Band Edge (MHz)	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Total (dBm)	Limit (dBm)
Low	5150	5270	-48.87	-50.52	-50.98	-45.25	-27
High	5350	5310	-40.84	-44.66	-44.1	-38.08	-27

802.11ac-VHT80 mode

Channel	Band Edge (MHz)	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Total (dBm)	Limit (dBm)
-	5150	5290	-57.4	-56.76	-58.52	-52.73	-27
	5350	5290	-36.76	-37.46	-36.74	-32.20	-27

5.6 GHz Band

802.11a mode

Channel	Band Edge (MHz)	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Total (dBm)	Limit (dBm)
Low	5470	5550	-42.46	-43.91	-44.21	-38.69	-27
High	5725	5700	-48.61	-37.56	-40.06	-35.41	-27

802.11n-HT20 mode

Channel	Band Edge (MHz)	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Total (dBm)	Limit (dBm)
Low	5470	5500	-44.48	-45.98	-45.07	-40.36	-27
High	5725	5700	-40.37	-39.21	-41.96	-35.60	-27

802.11n-HT40 mode

Channel	Band Edge (MHz)	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Total (dBm)	Limit (dBm)
Low	5470	5510	-42	-39.23	-38.94	-35.08	-27
High	5725	5670	-45.96	-45.82	-45.92	-41.13	-27

802.11ac-VHT80 mode

Channel	Band Edge (MHz)	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Total (dBm)	Limit (dBm)
-	5470	5530	-45.69	-46.55	-45.79	-41.22	-27
	5725	5530	-45.07	-46.82	-47.41	-41.22	-27

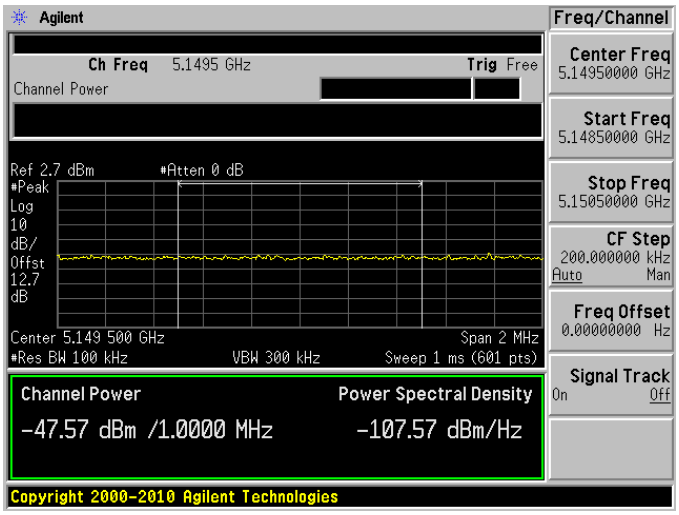
Note: the offset include the attenuation, cable loss and antenna gain. And the magin between limit line and the emission covers other requirements in the KDB 789033.

Please refer to the following plots.

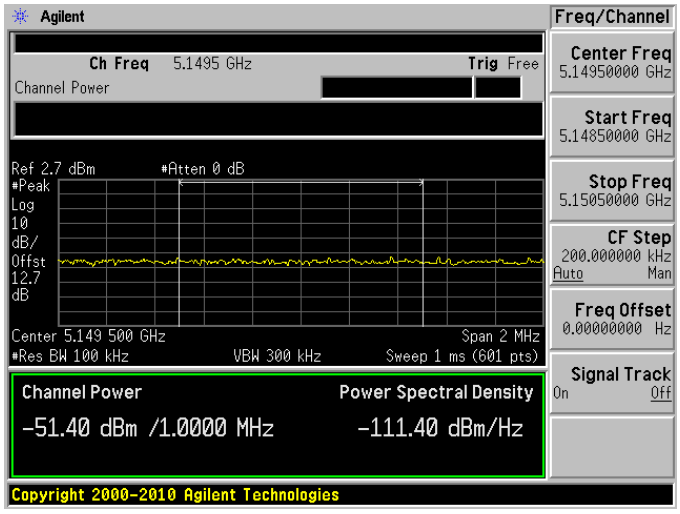
5.3 GHz Band

802.11a, Low Channel, 5260 MHz

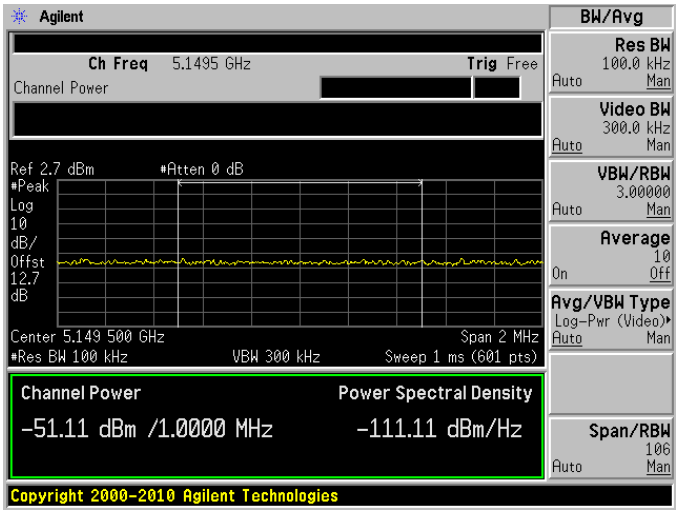
Chain 0



Chain 1

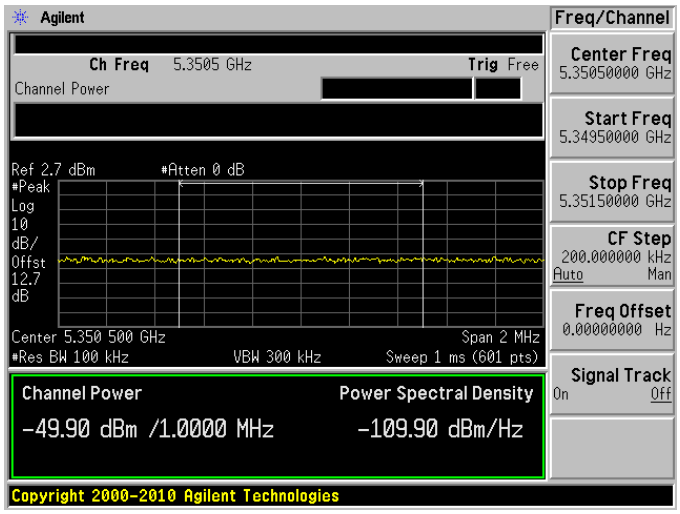


Chain 2

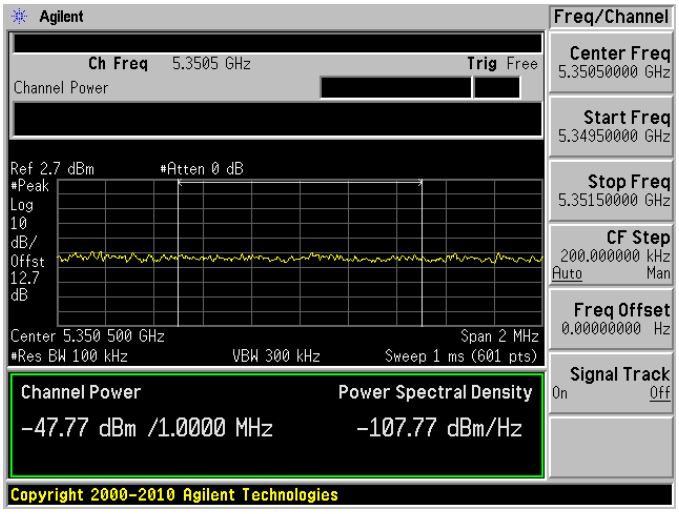


802.11a, High Channel, 5320 MHz

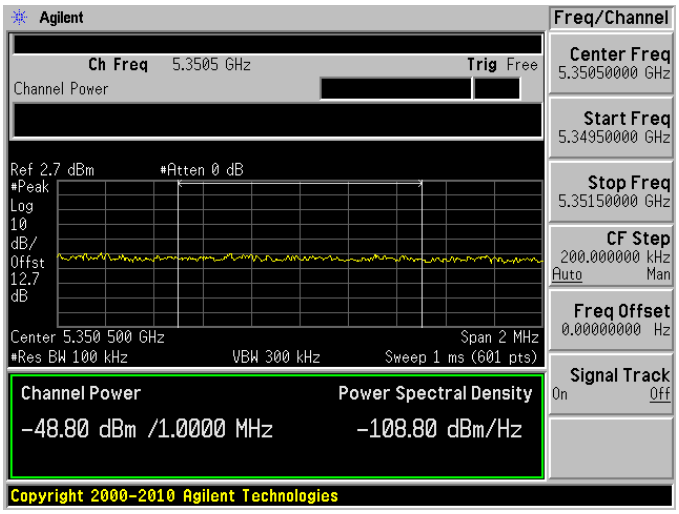
Chain 0



Chain 1

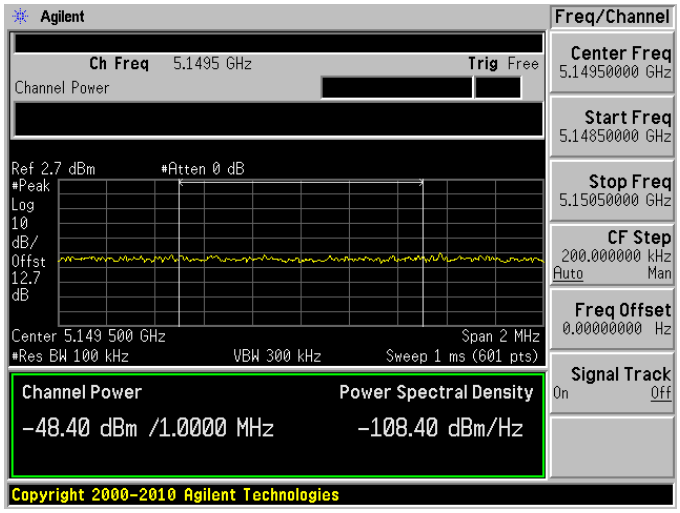


Chain 2

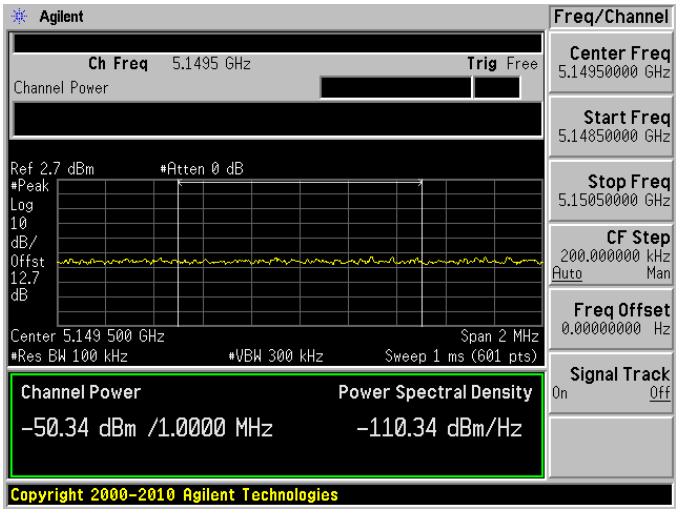


802.11n-HT 20, Low Channel 5260 MHz

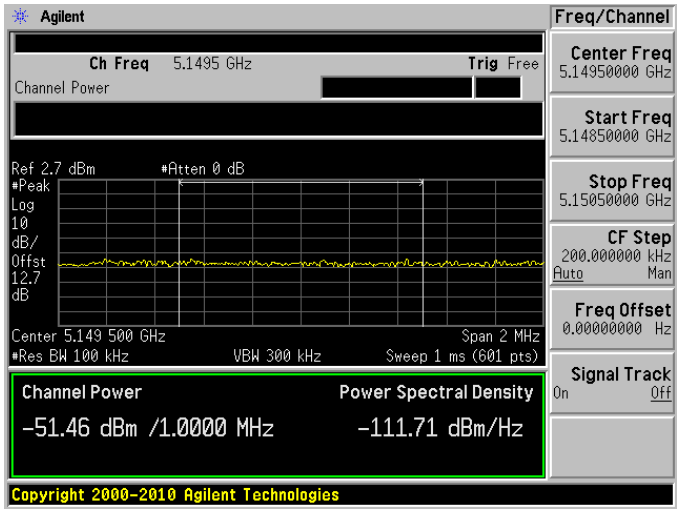
Chain 0



Chain 1

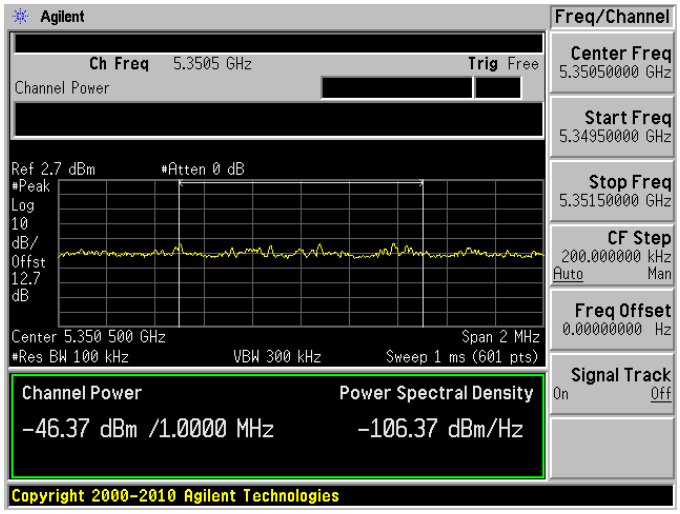


Chain 2

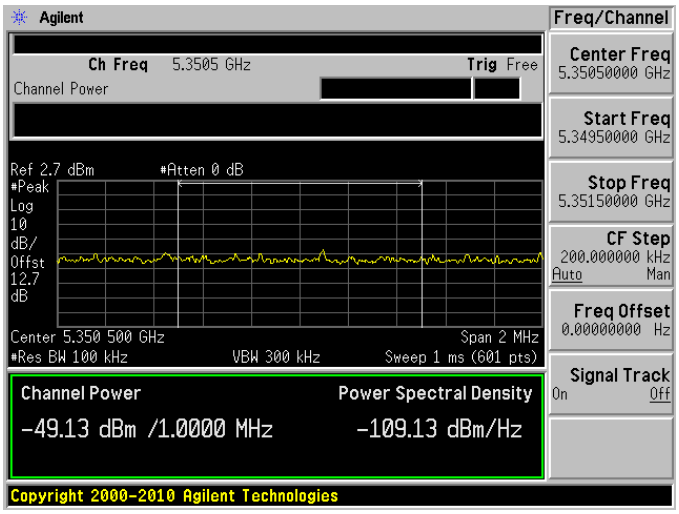


802.11n-HT20, High Channel, 5320 MHz

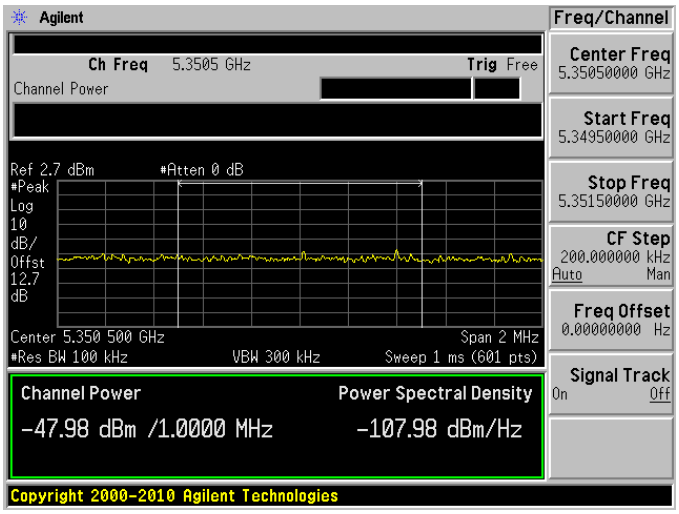
Chain 0



Chain 1

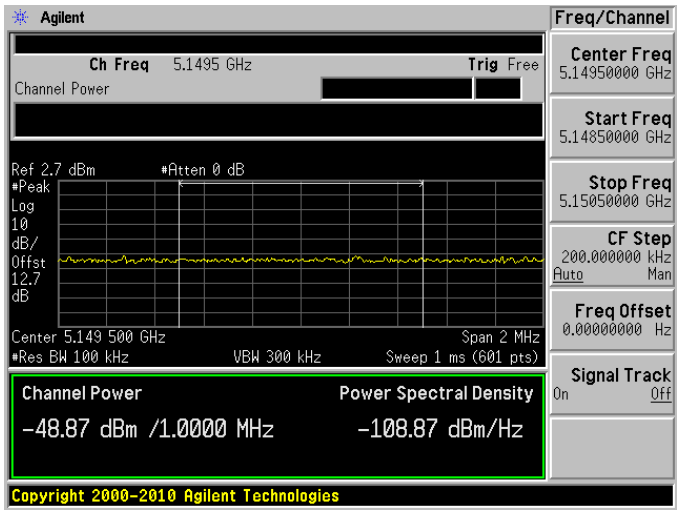


Chain 2

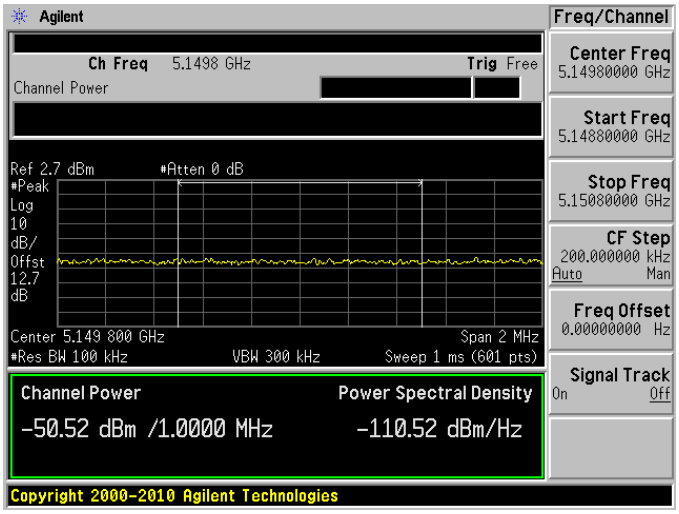


802.11n-HT40, Low Channel 5270 MHz

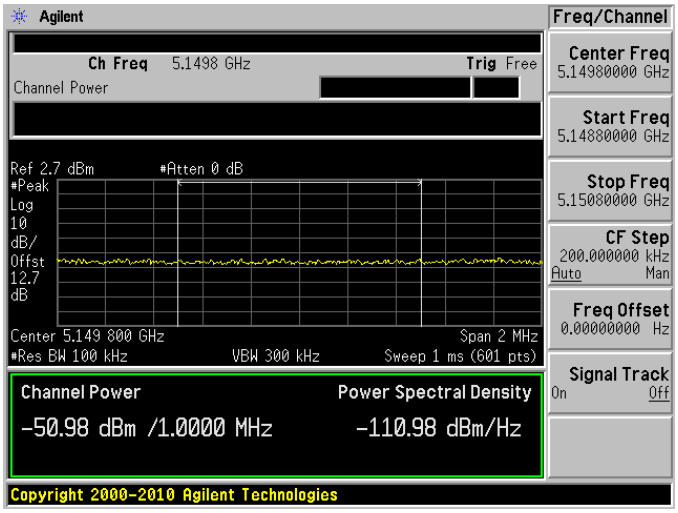
Chain 0



Chain 1

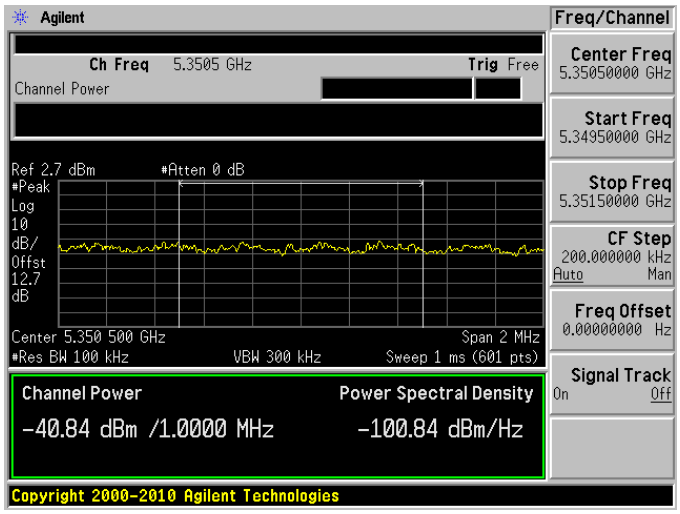


Chain 2

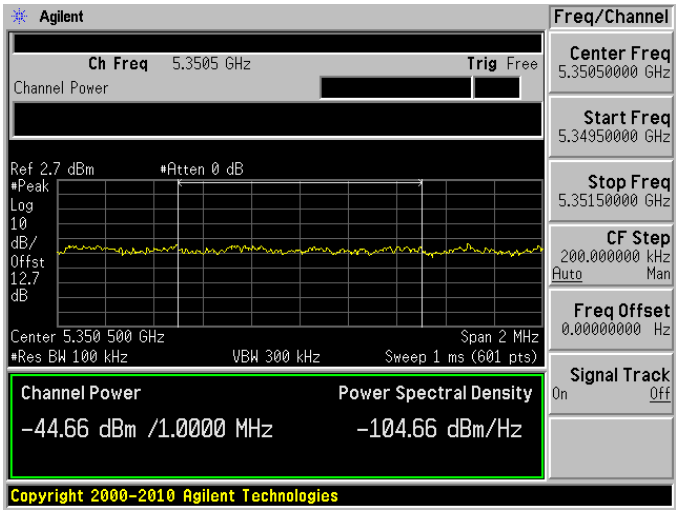


802.11n-HT40, High Channel 5310 MHz

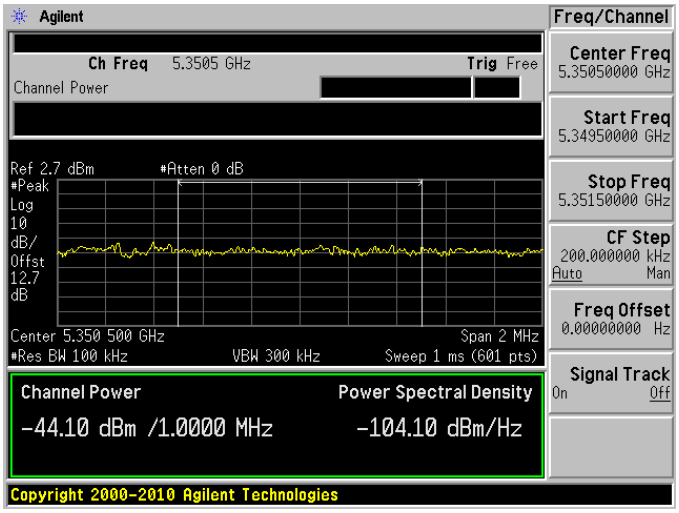
Chain 0



Chain 1

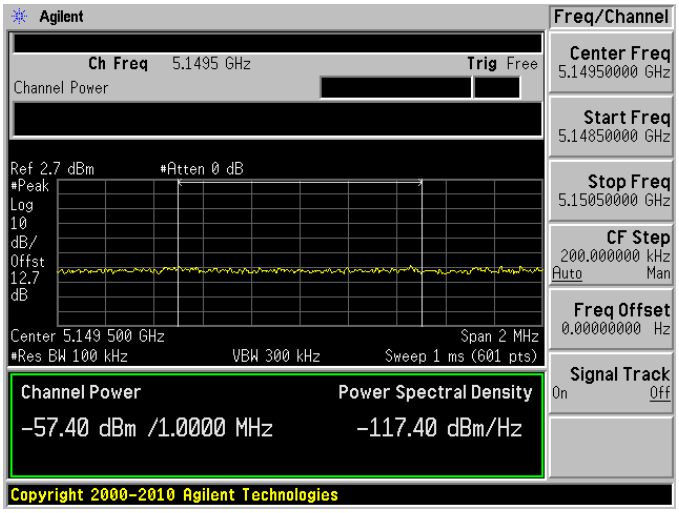


Chain 2

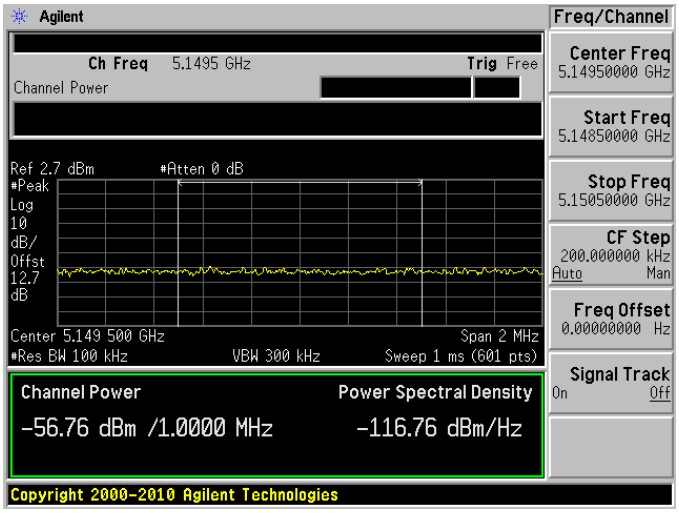


802.11ac-VHT80, Channel 5290 MHz Lower Band Edge at 5150MHz

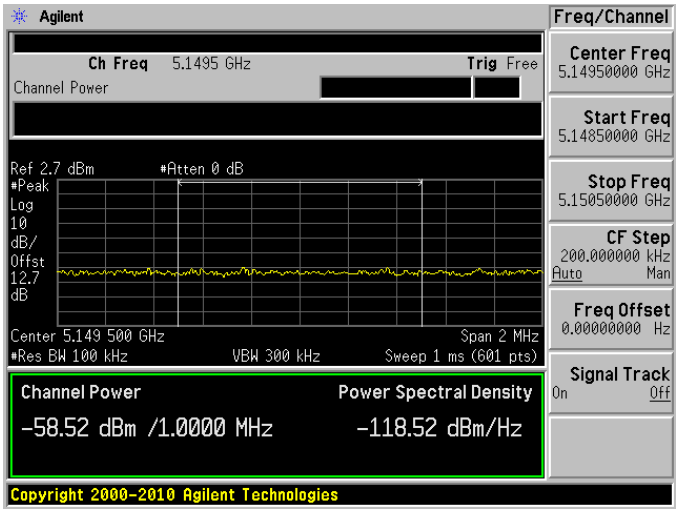
Chain 0



Chain 1

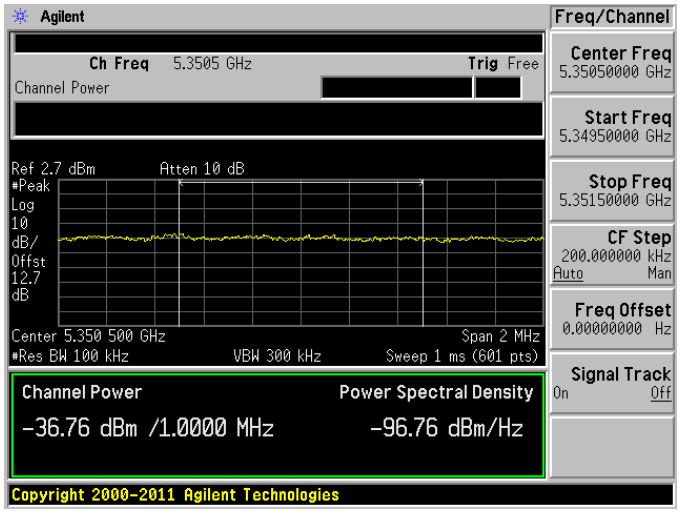


Chain 2

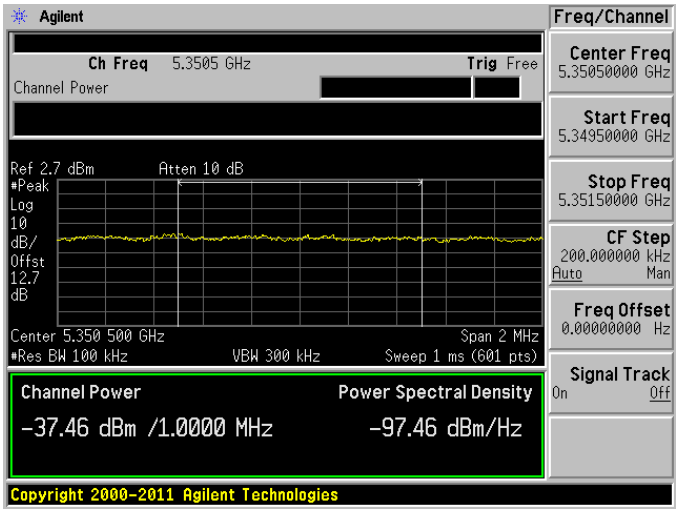


802.11ac-VHT80, Channel 5290 MHz Higher Band Edge at 5350MHz

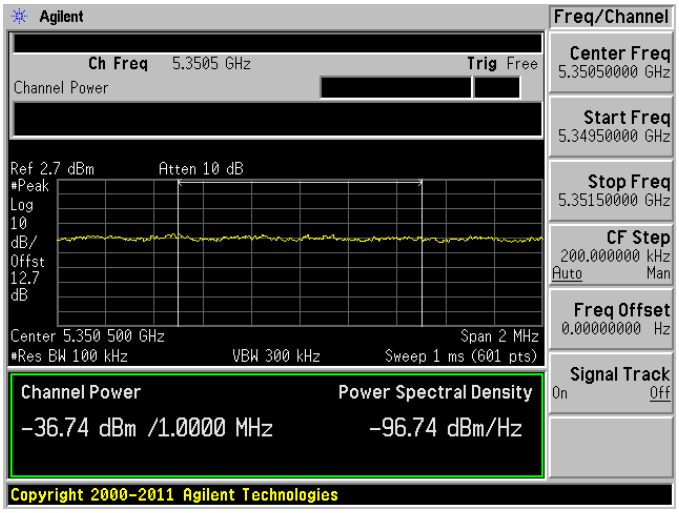
Chain 0



Chain 1



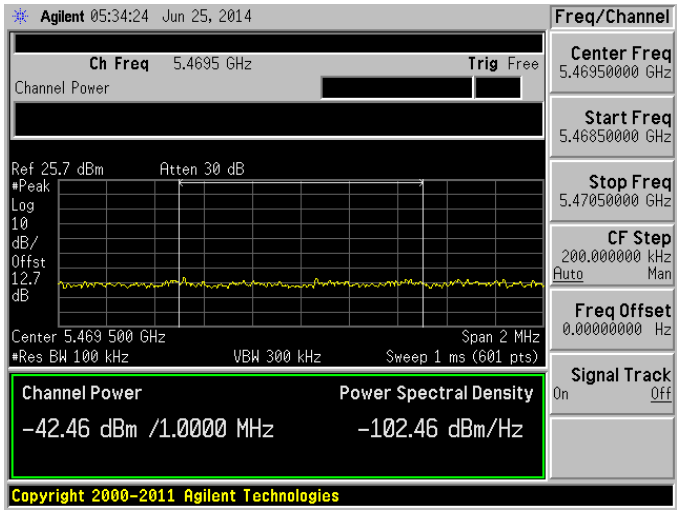
Chain 2



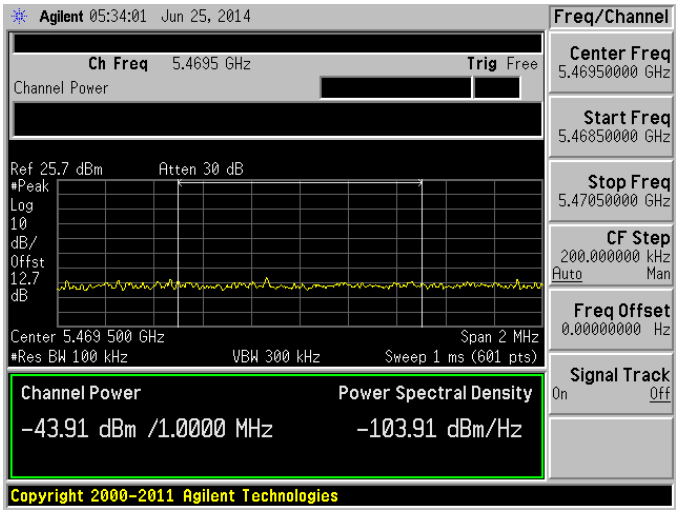
5.6 GHz Band

802.11a, Low Channel, 5500 MHz

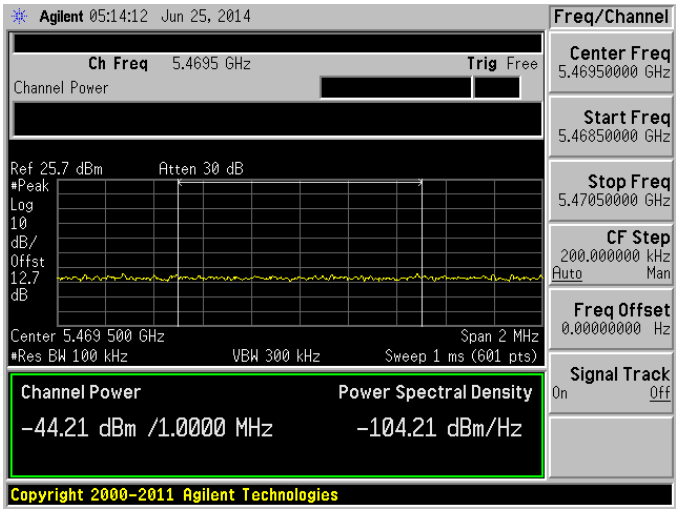
Chain 0



Chain 1

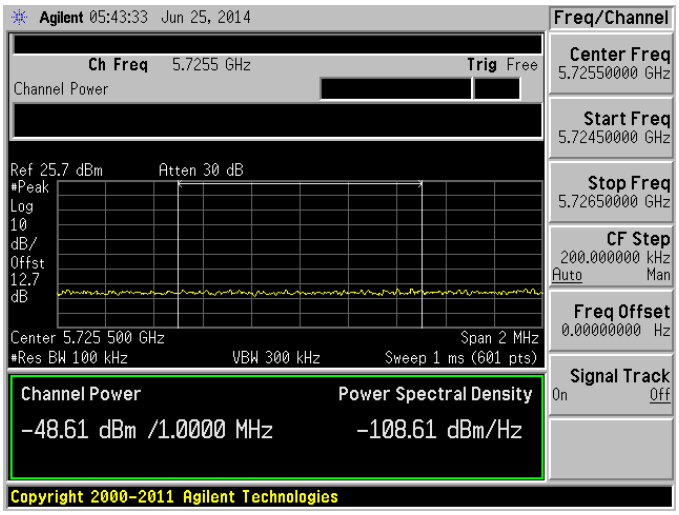


Chain 2

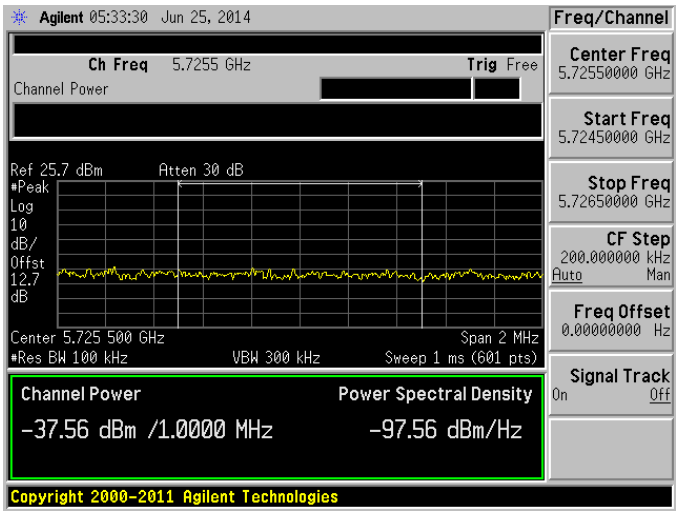


802.11a, High Channel, 5700 MHz

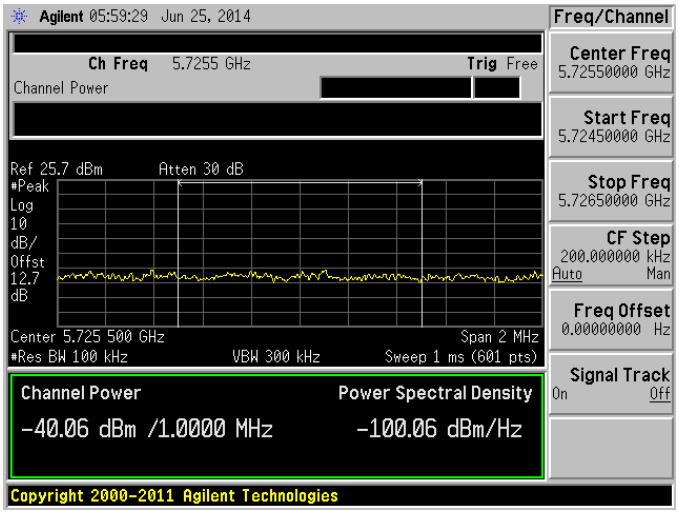
Chain 0



Chain 1

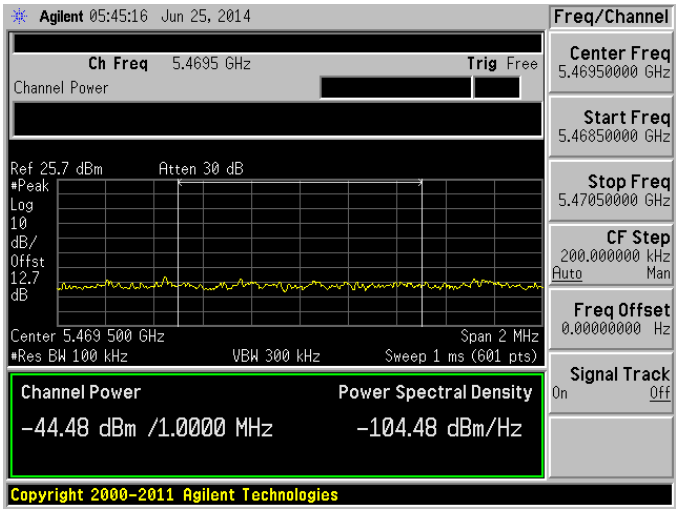


Chain 2

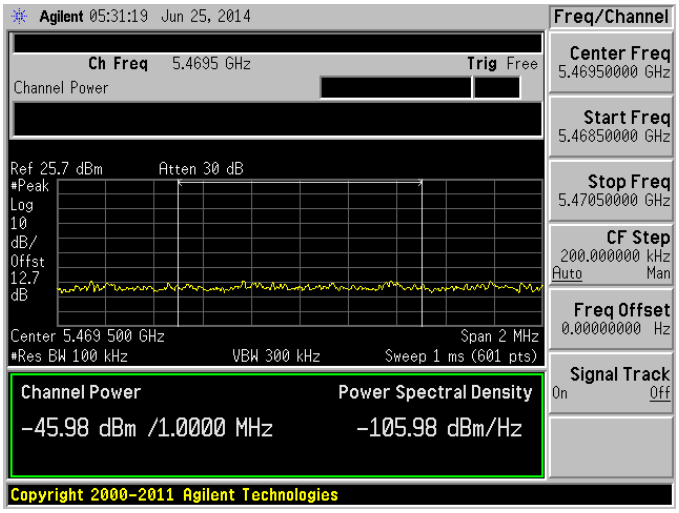


802.11n-HT 20, Low Channel 5500 MHz

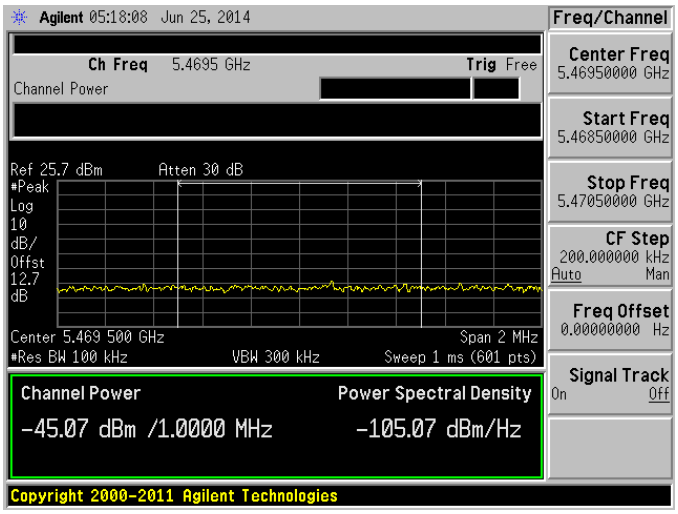
Chain 0



Chain 1

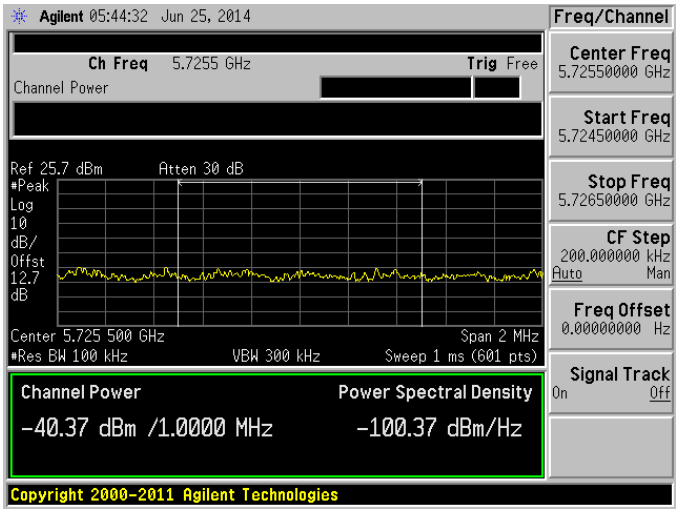


Chain 2

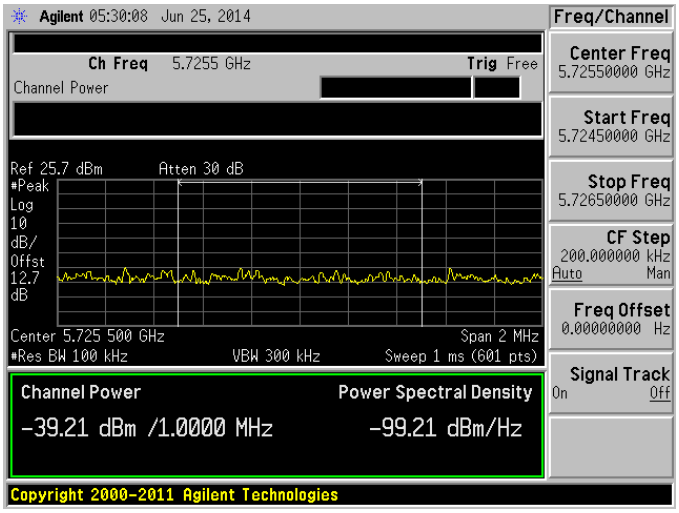


802.11n-HT20, High Channel 5700 MHz

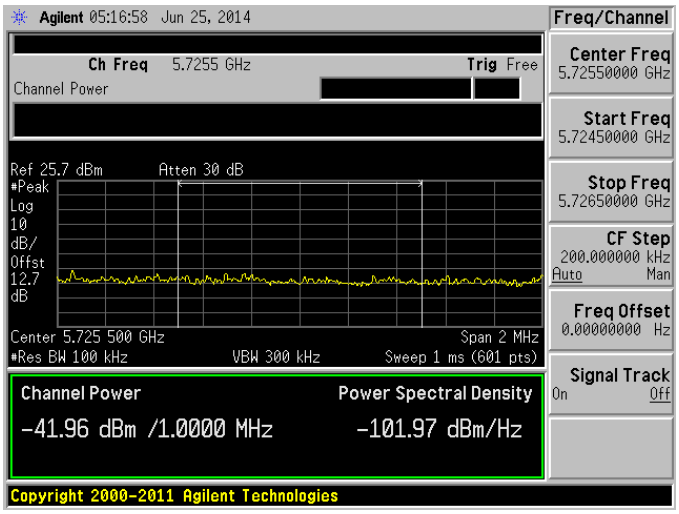
Chain 0



Chain 1

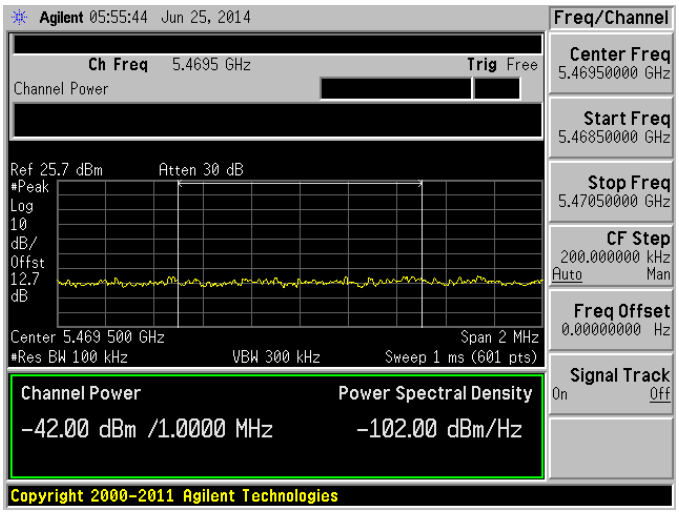


Chain 2

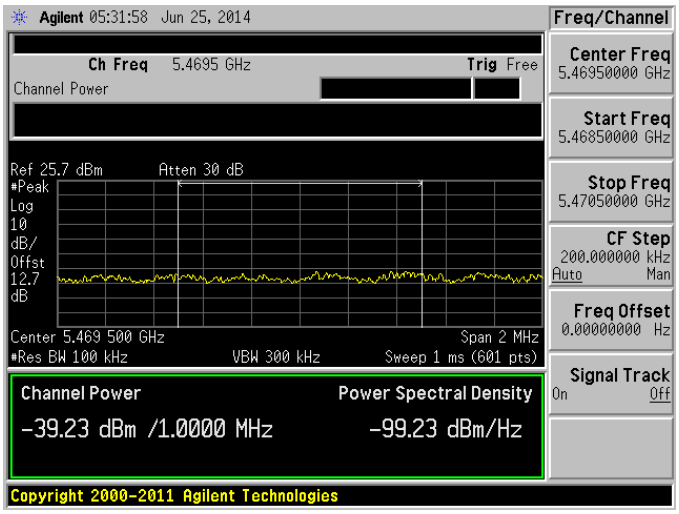


802.11n-HT40, Low Channel 5510 MHz

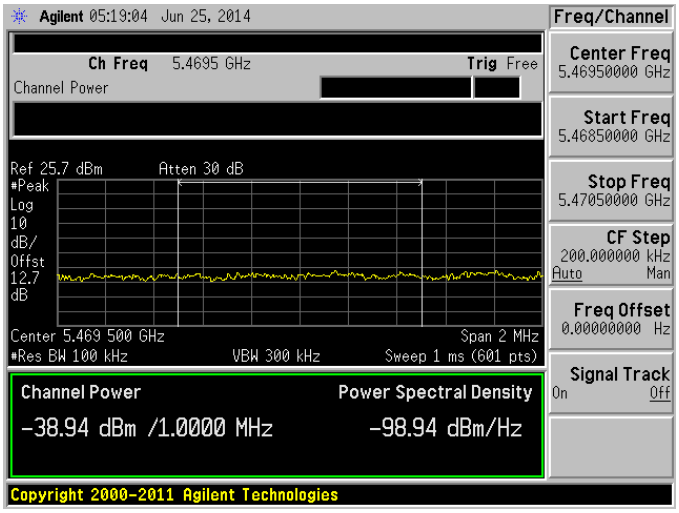
Chain 0



Chain 1

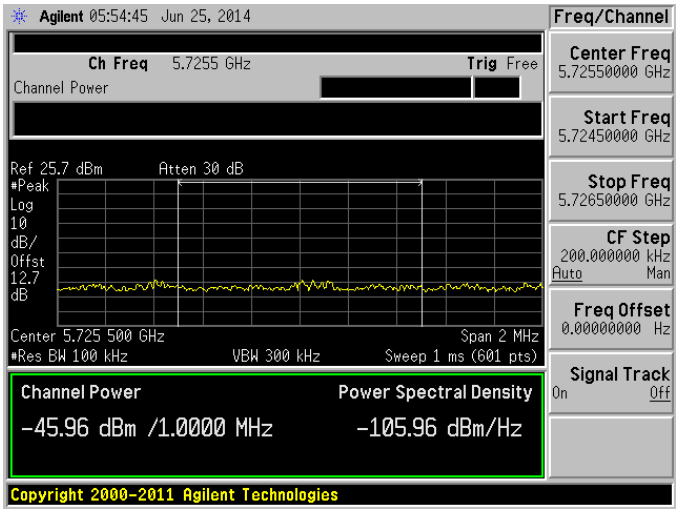


Chain 2

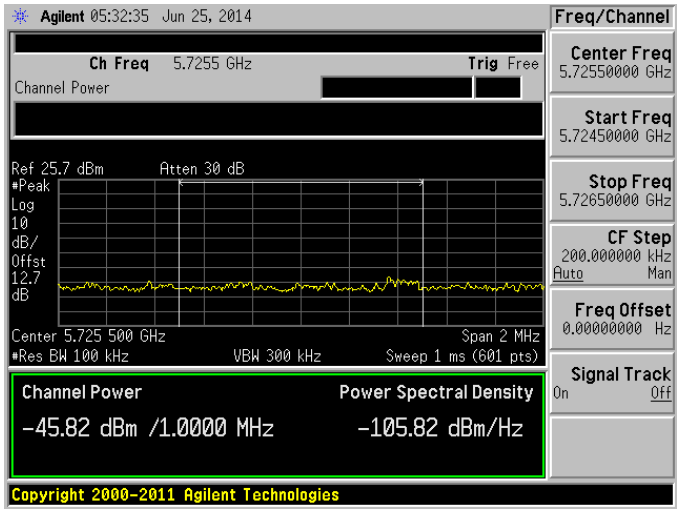


802.11n-HT40, High Channel 5670 MHz

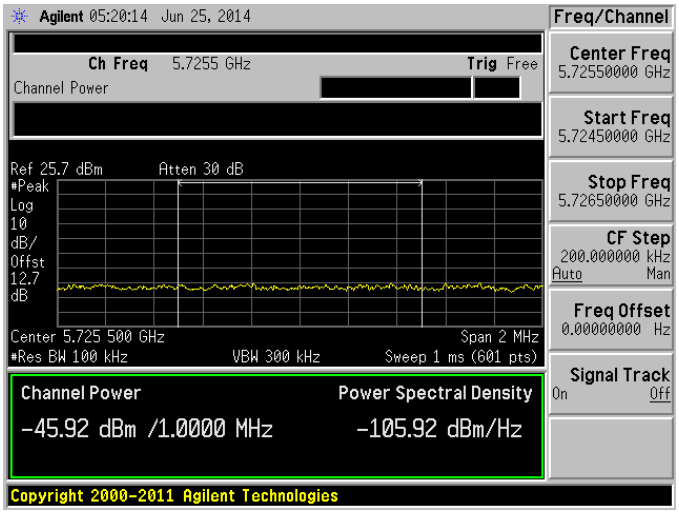
Chain 0



Chain 1

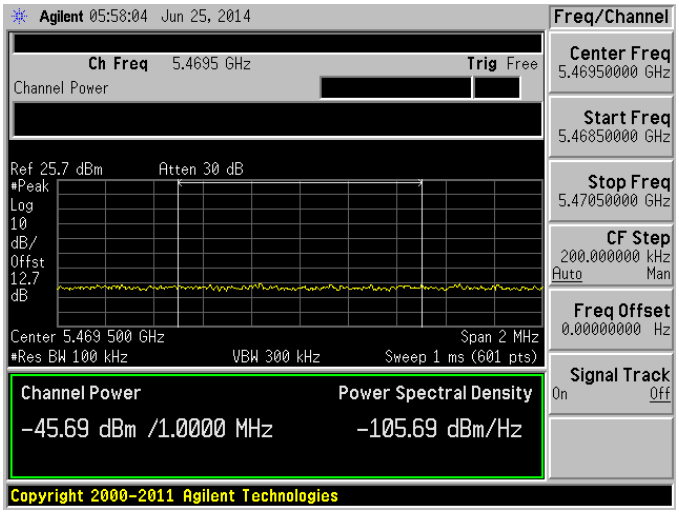


Chain 2

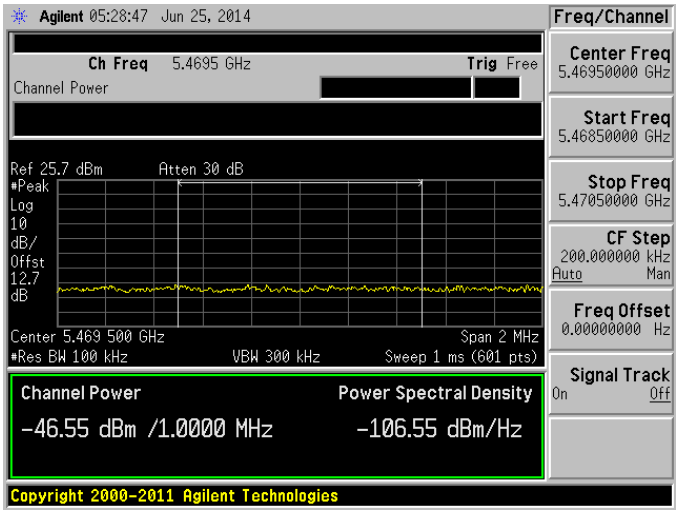


802.11ac-VHT80, 5530 MHz Lower Band Edge at 5470MHz

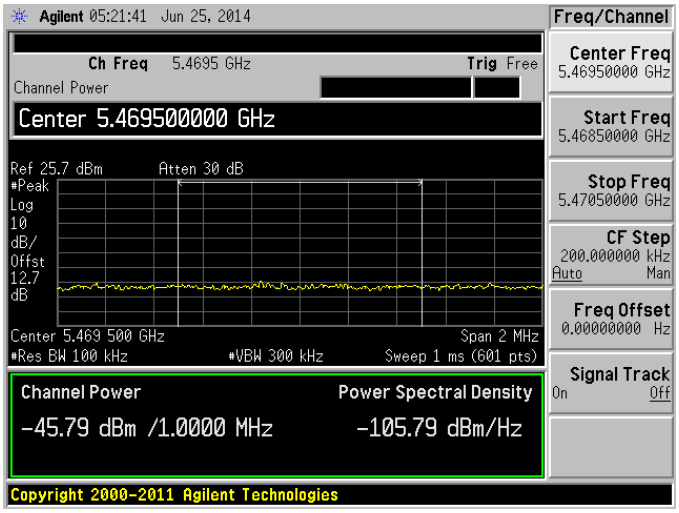
Chain 0



Chain 1

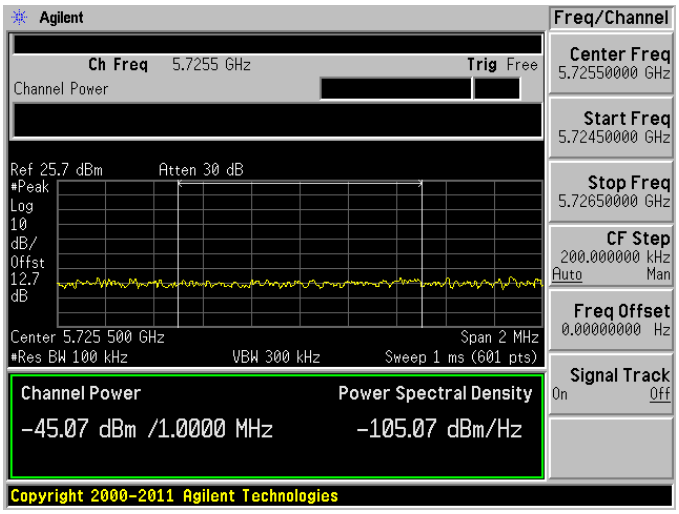


Chain 2

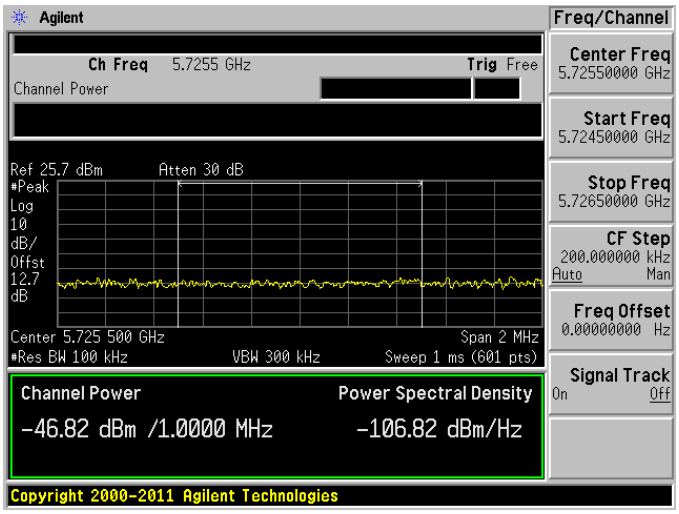


802.11ac-VHT80, 5530 MHz Higher Band Edge at 5725MHz

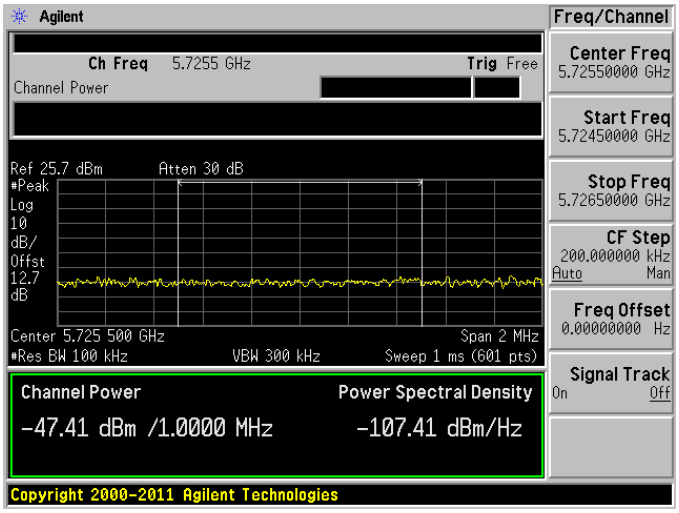
Chain 0



Chain 1



Chain 2



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

11.1 Applicable Standards

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits: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. For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz. For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

11.2 Measurement Procedure

Procedure for Unwanted Emissions Measurements below 1000 MHz.
a) Follow the requirements in section G)3), “General Requirements for Unwanted Emissions Measurements”.
b) Compliance shall be demonstrated using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz
a) Follow the requirements in section II.G.3., “General Requirements for Unwanted Emissions Measurements”.
b) Maximum emission levels are measured by setting the analyzer as follows:
(i) RBW = 1 MHz.
(ii) VBW ⩾ 3 MHz.
(iii) Detector = Peak.
(iv) Sweep time = auto.
(v) Trace mode = max hold.
(vi) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle. For example, at 50 percent duty cycle, the measurement time will increase by a factor of two relative to measurement time for continuous transmission.

11.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2013-09-29	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 2014-07-07 on 2014-07-14 at RF site.

11.5 Test Results

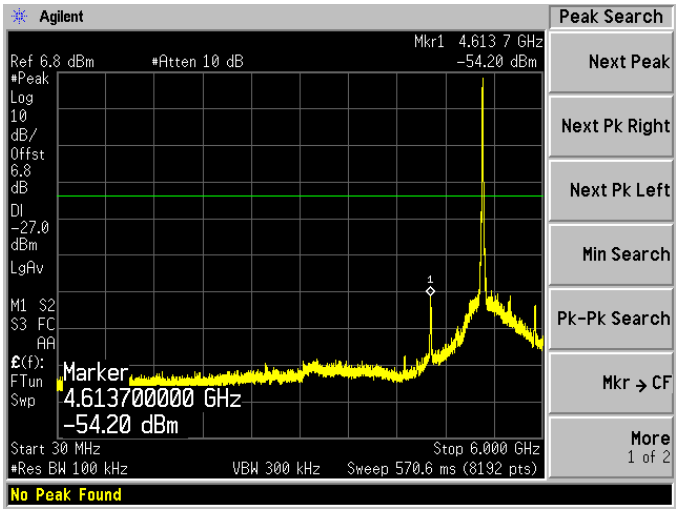
Please refer to following plots of spurious emissions.

Note: The offset include the attenuation, cable loss and 6 dBi antenna gain. And the magin between limit line and the emission covers other requirements in the KDB 789033. There should be at least 4.77dB gap between the limit and the highest emission as 3 antennas.

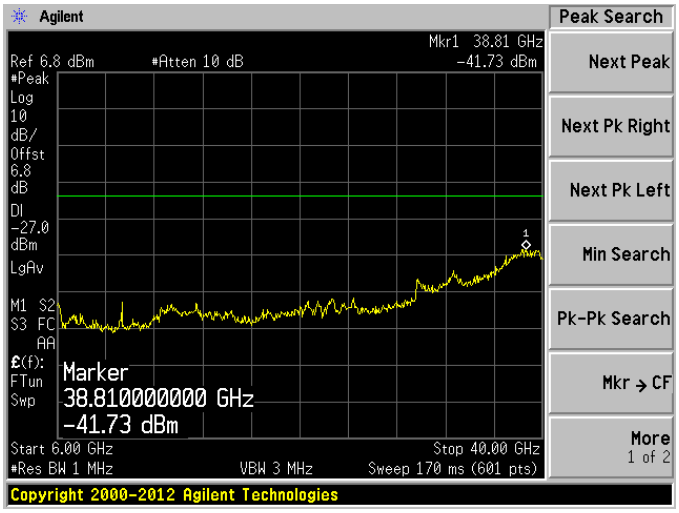
5.3 GHz Band

802.11a, Low Channel, 5260 MHz

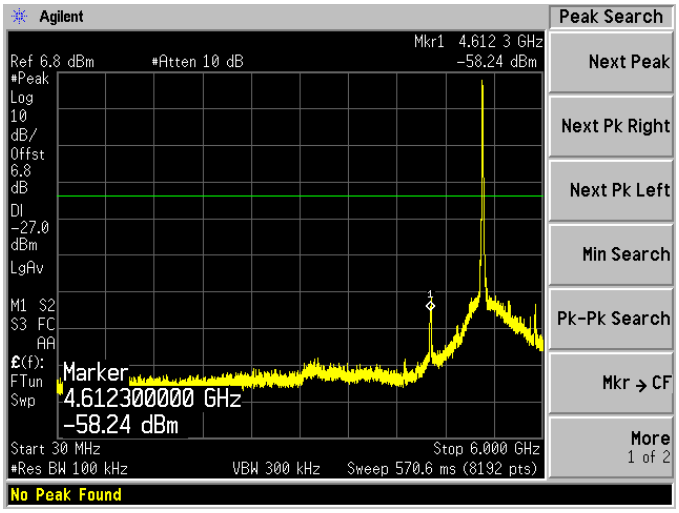
Chain 0, Plot: 30 MHz – 6 GHz



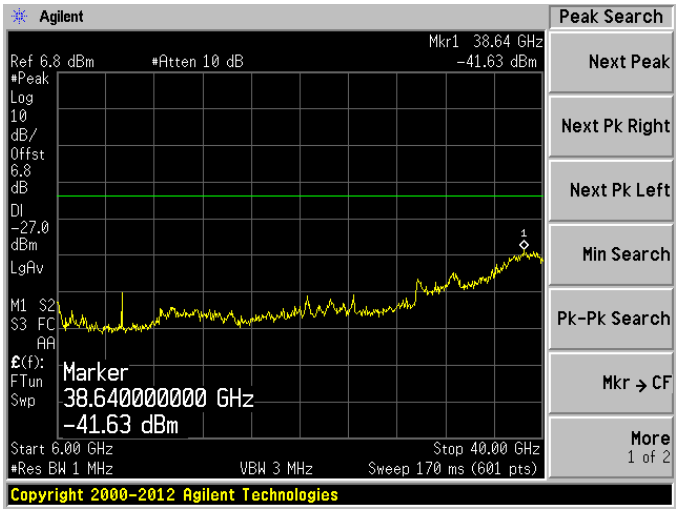
Chain 0, Plot: 6 GHz – 40 GHz



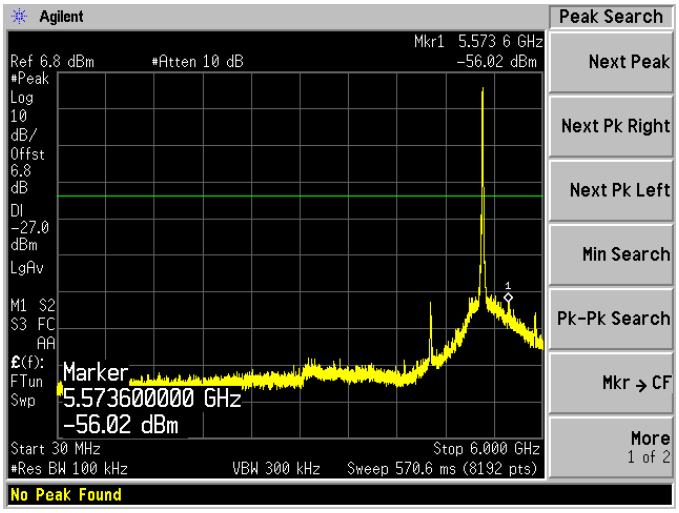
Chain 1, Plot: 30 MHz – 6 GHz



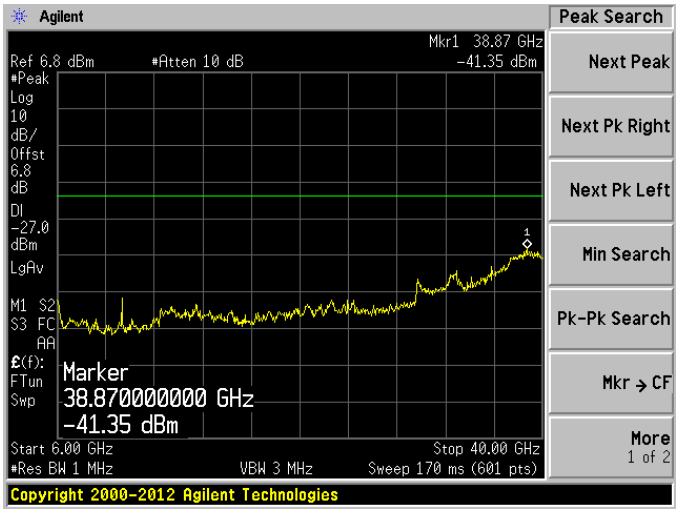
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

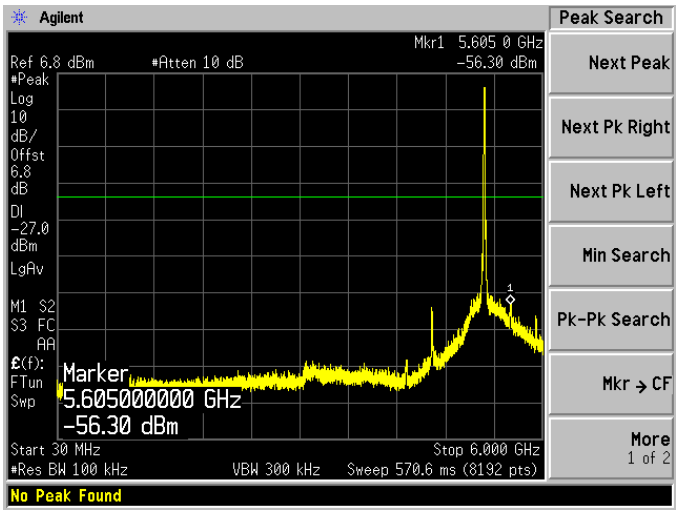


Chain 2, Plot: 6 GHz – 40 GHz

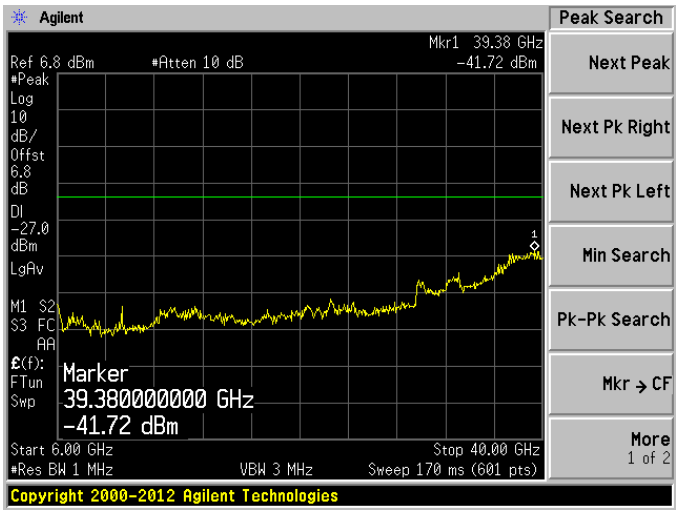


802.11a, Middle Channel, 5280 MHz

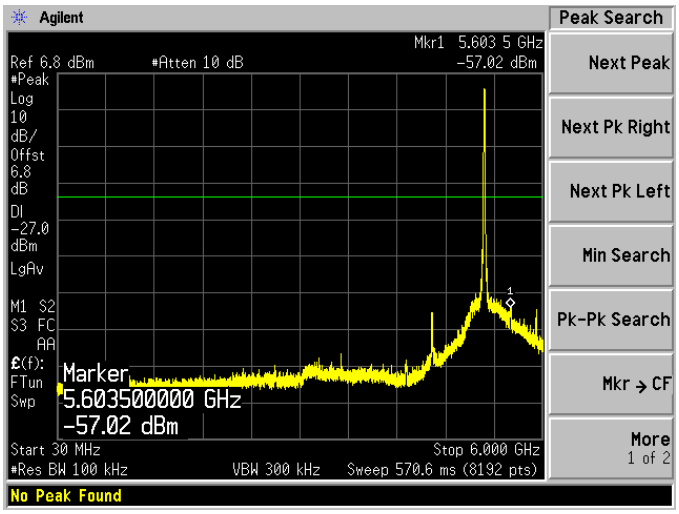
Chain 0, Plot: 30 MHz – 6 GHz



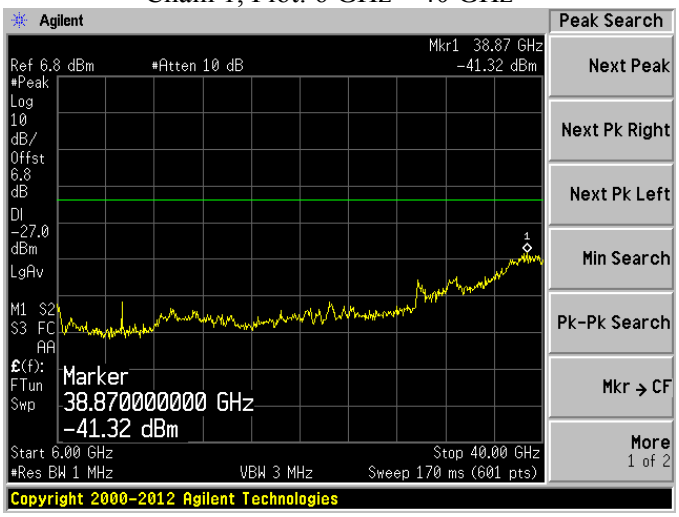
Chain 0, Plot: 6 GHz – 40 GHz



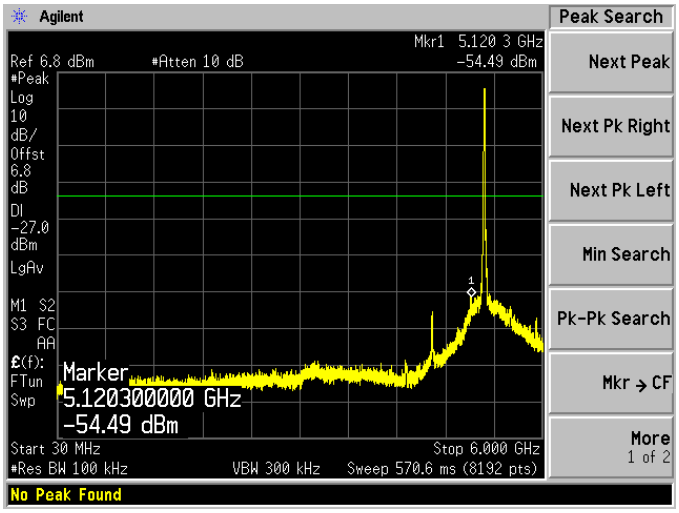
Chain 1, Plot: 30 MHz – 6 GHz



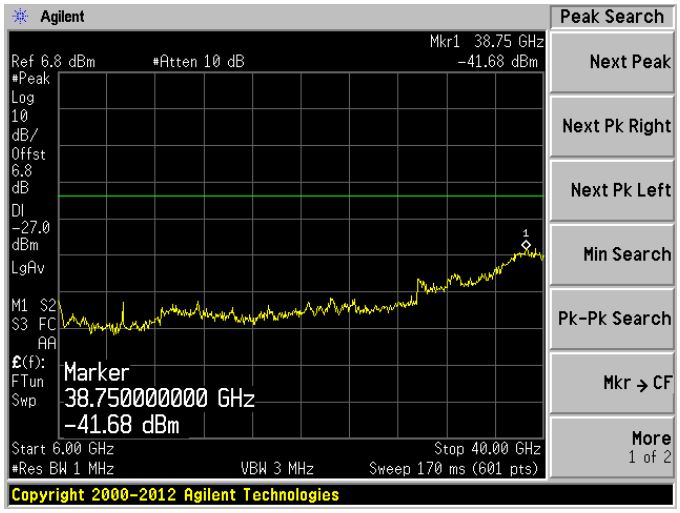
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

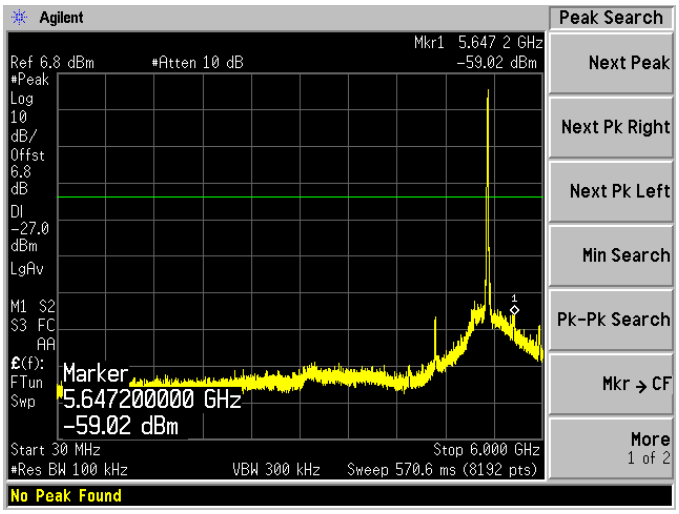


Chain 2, Plot: 6 GHz – 40 GHz

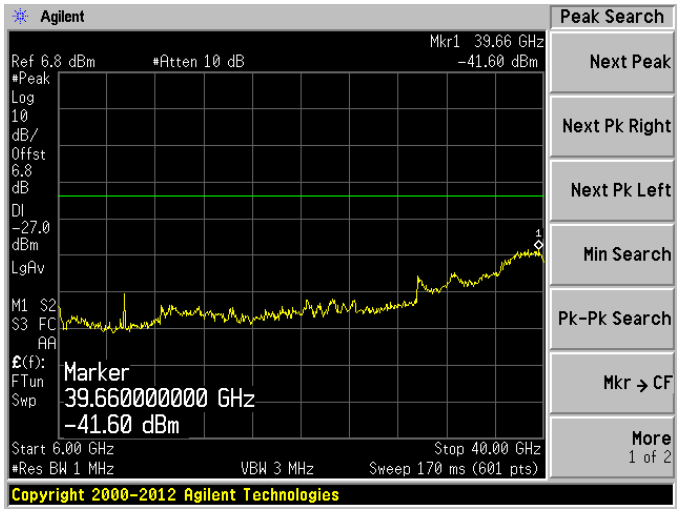


802.11a, High Channel, 5320 MHz

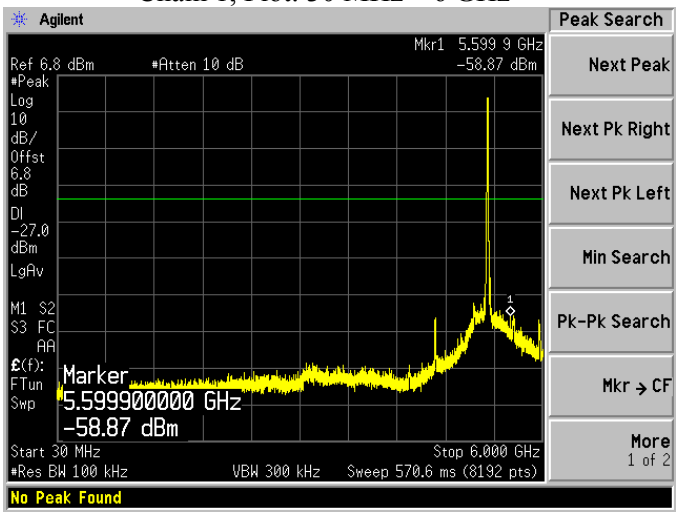
Chain 0, Plot: 30 MHz – 6 GHz



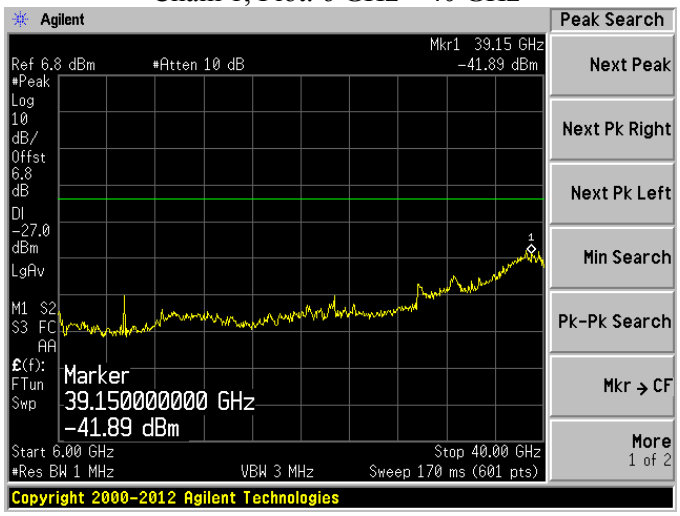
Chain 0, Plot: 6 GHz – 40 GHz



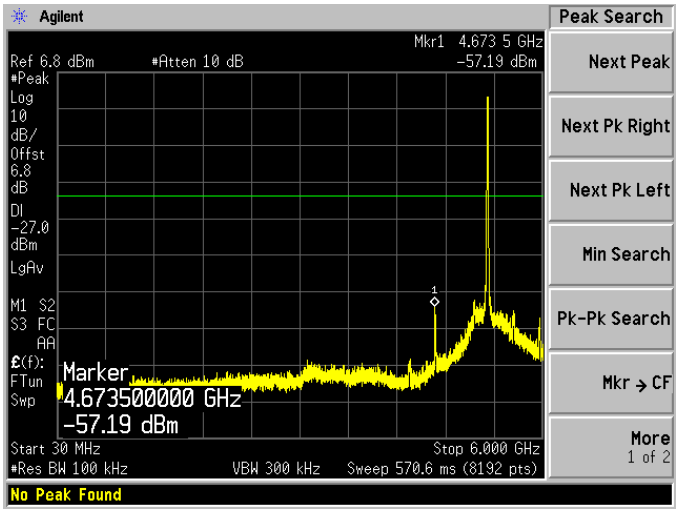
Chain 1, Plot: 30 MHz – 6 GHz



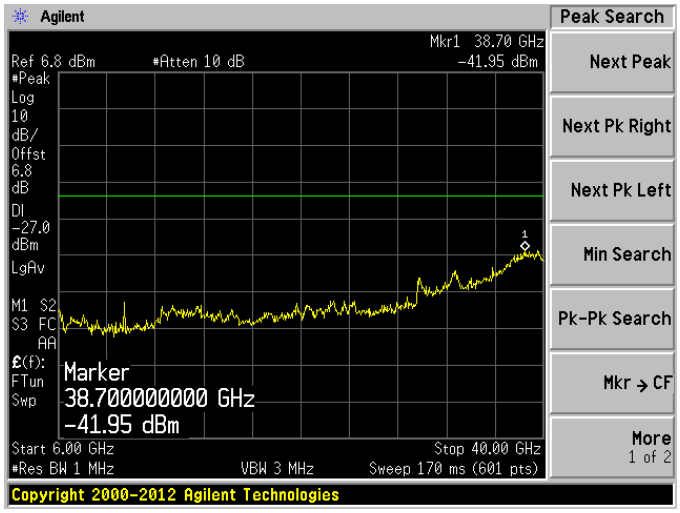
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

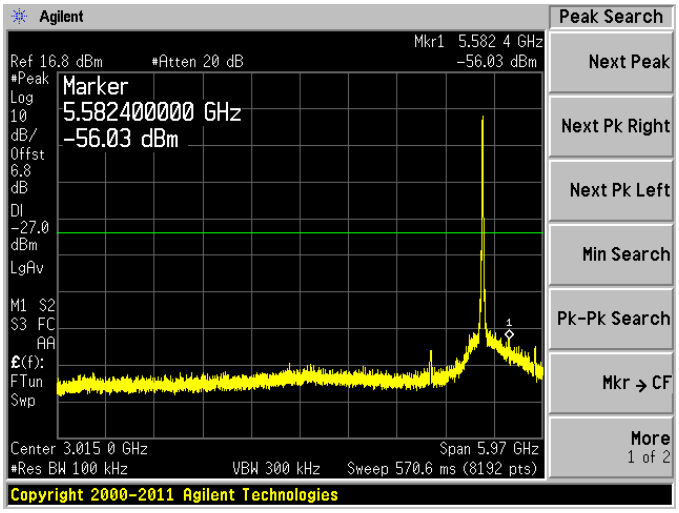


Chain 2, Plot: 6 GHz – 40 GHz

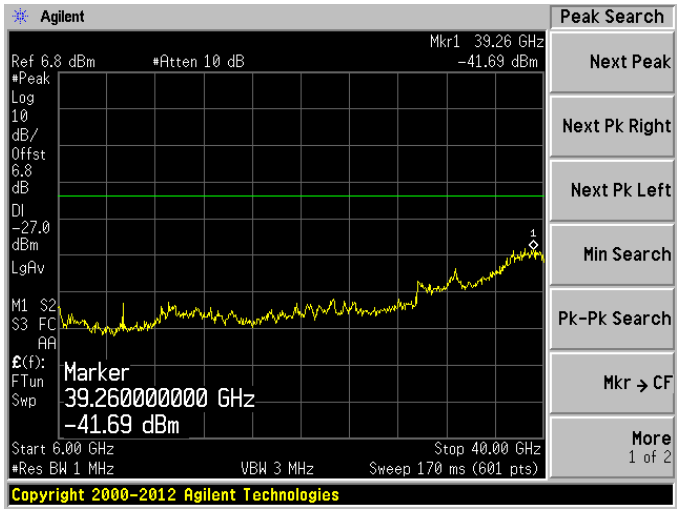


802.11n-HT20, Low Channel 5260 MHz

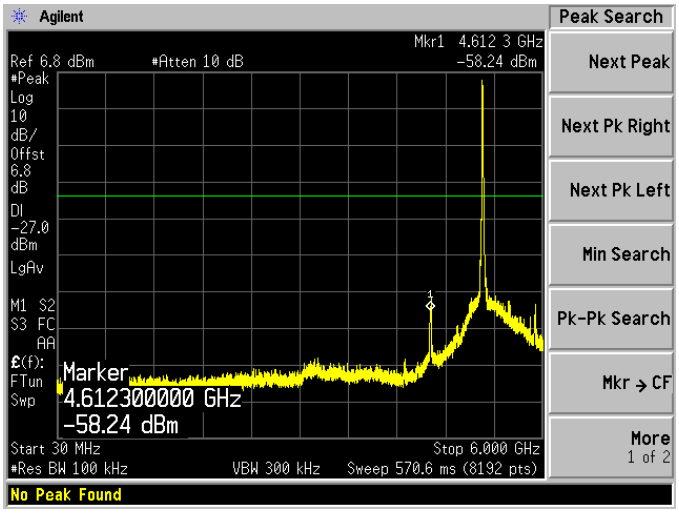
Chain 0, Plot: 30 MHz – 6 GHz



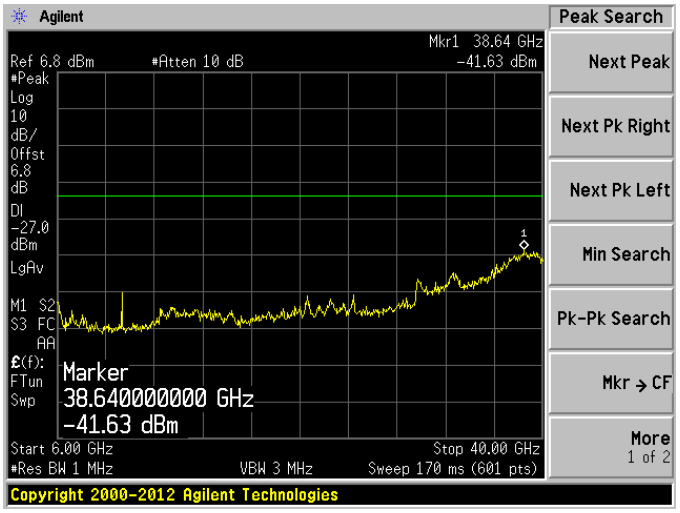
Chain 0, Plot: 6 GHz – 40 GHz



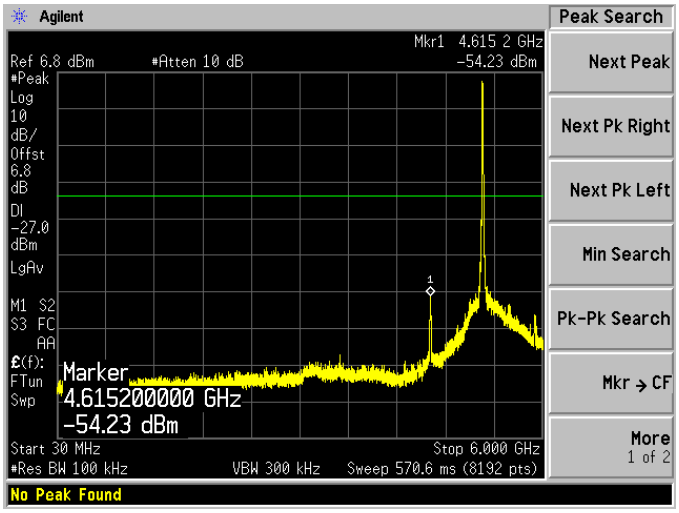
Chain 1, Plot: 30 MHz – 6 GHz



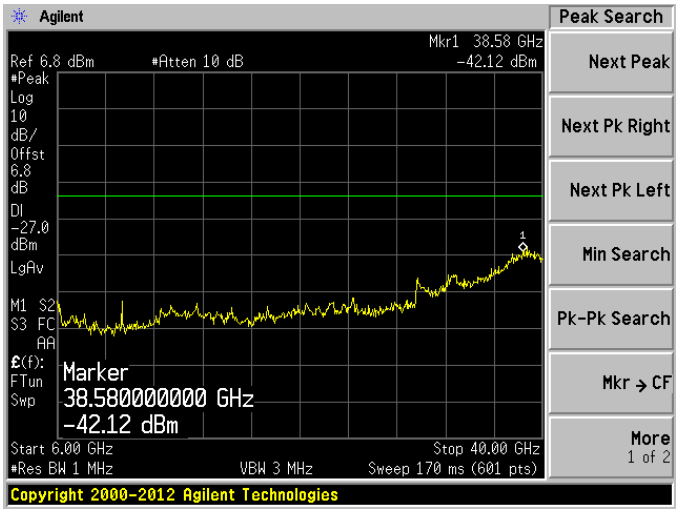
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

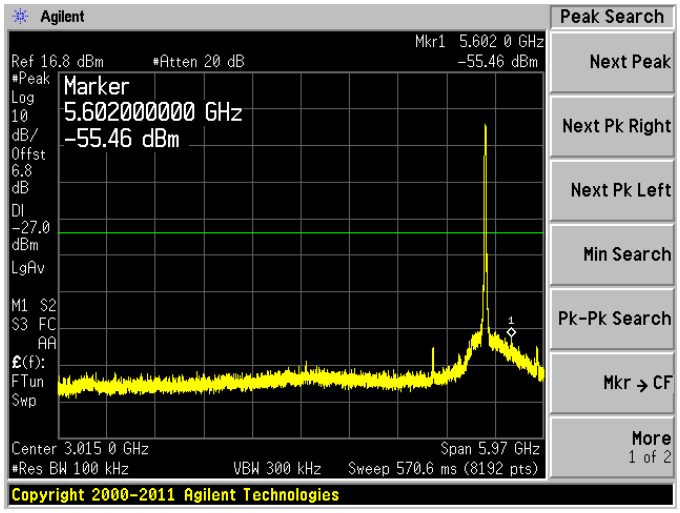


Chain 2, Plot: 6 GHz – 40 GHz

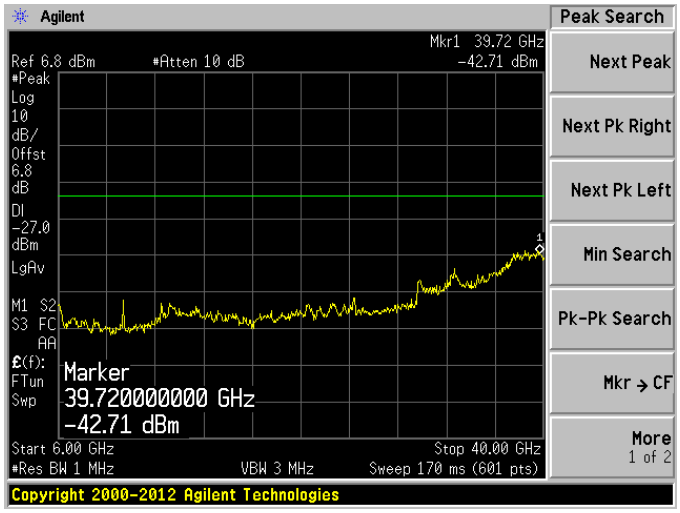


802.11n-HT20, Middle Channel 5280 MHz

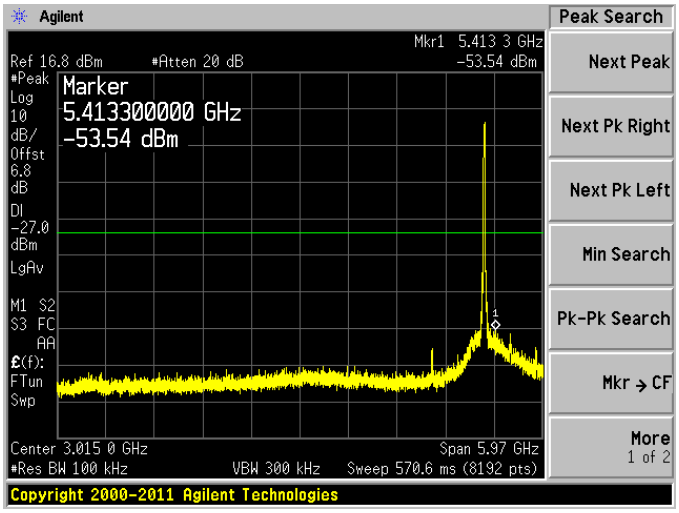
Chain 0, Plot: 30 MHz – 6 GHz



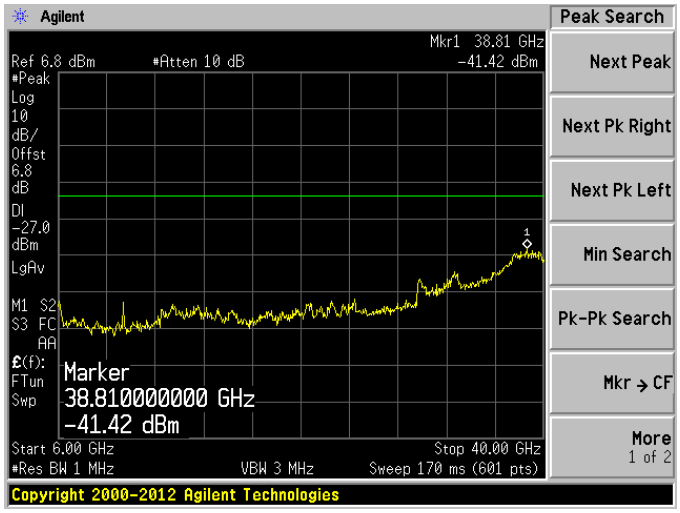
Chain 0, Plot: 6 GHz – 40 GHz



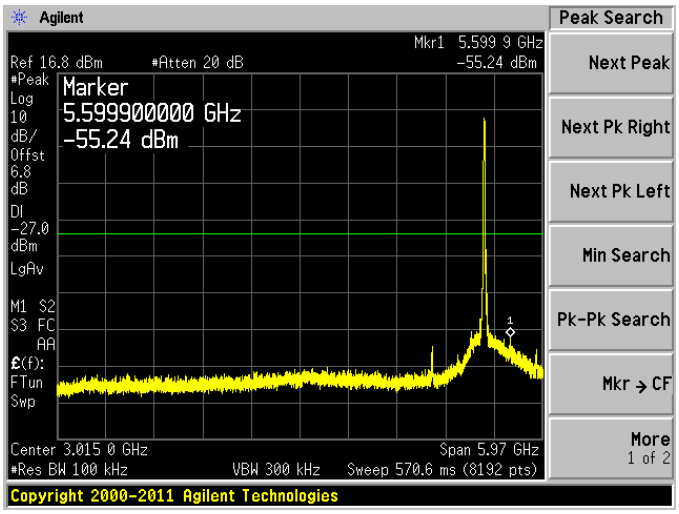
Chain 1, Plot: 30 MHz – 6 GHz



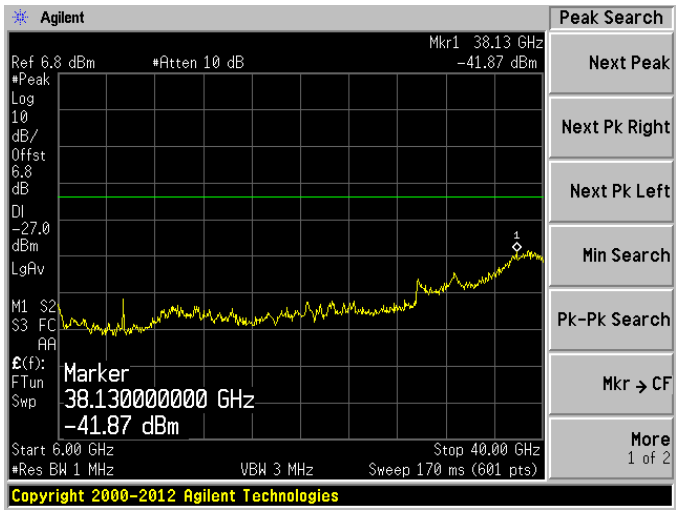
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

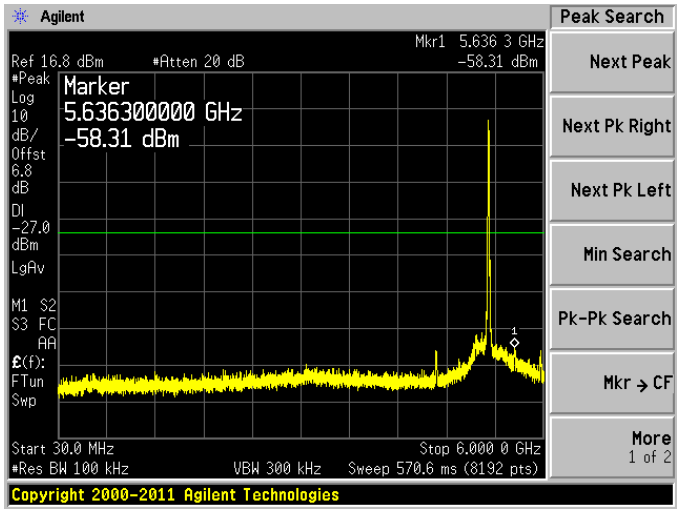


Chain 2, Plot: 6 GHz – 40 GHz

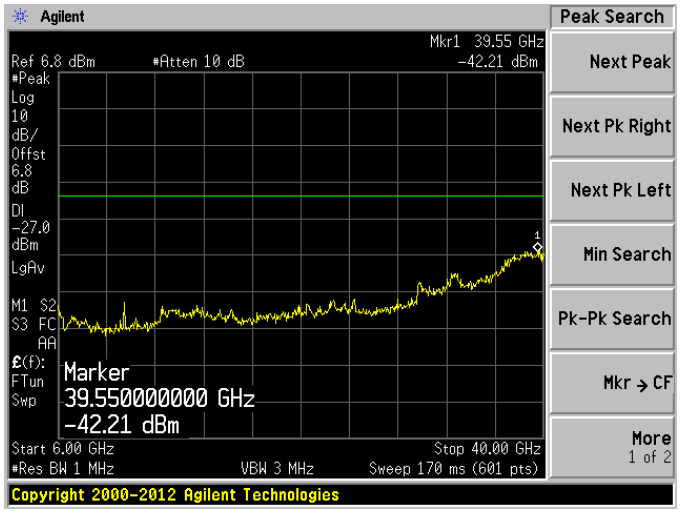


802.11n-HT20, High Channel, 5320 MHz

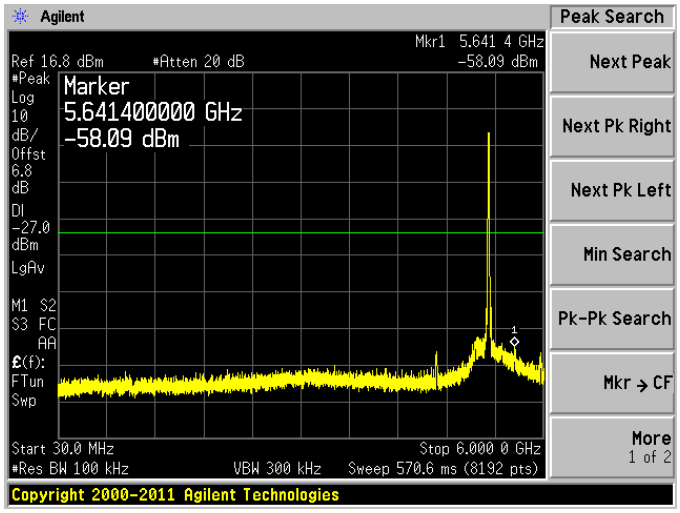
Chain 0, Plot: 30 MHz – 6 GHz



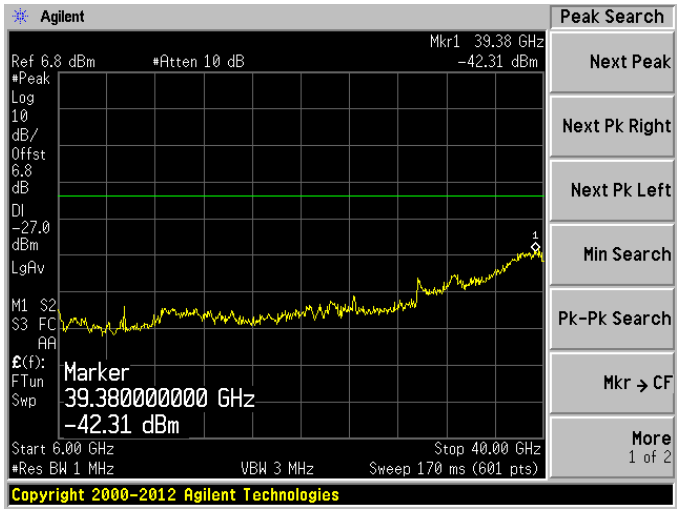
Chain 0, Plot: 6 GHz – 40 GHz



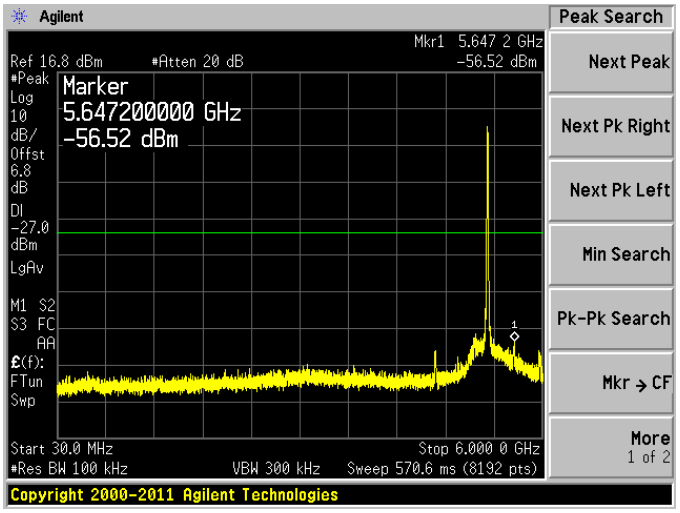
Chain 1, Plot: 30 MHz – 6 GHz



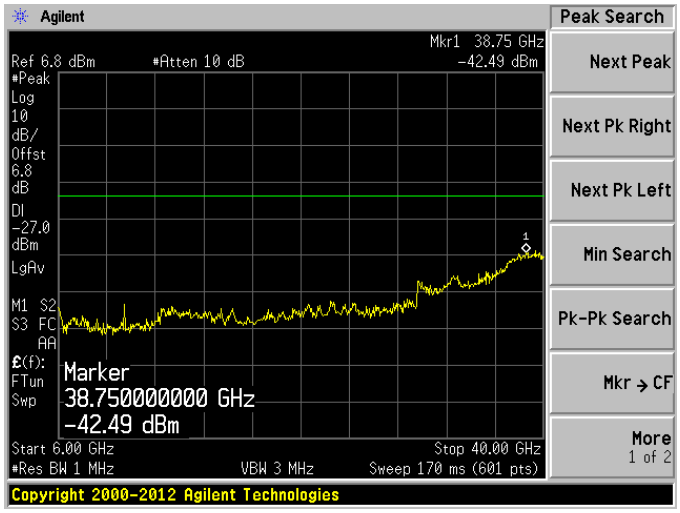
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

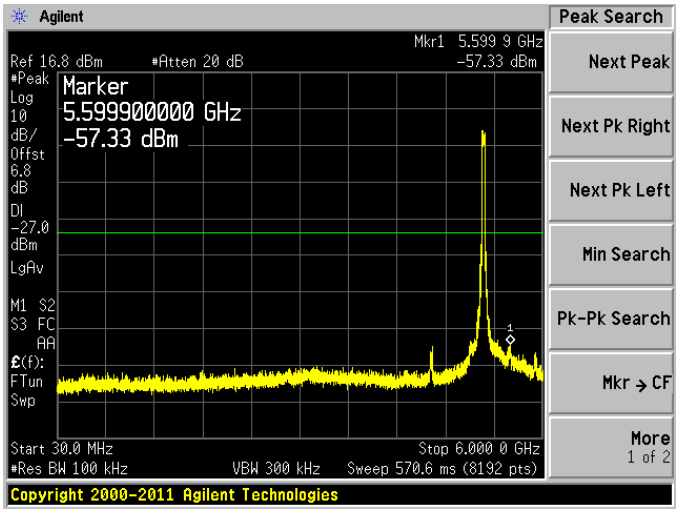


Chain 2, Plot: 6 GHz – 40 GHz

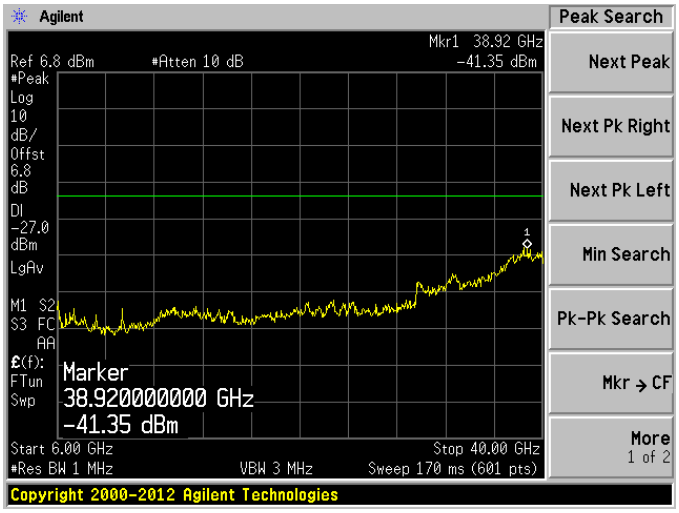


802.11n-HT40, Low Channel 5270 MHz

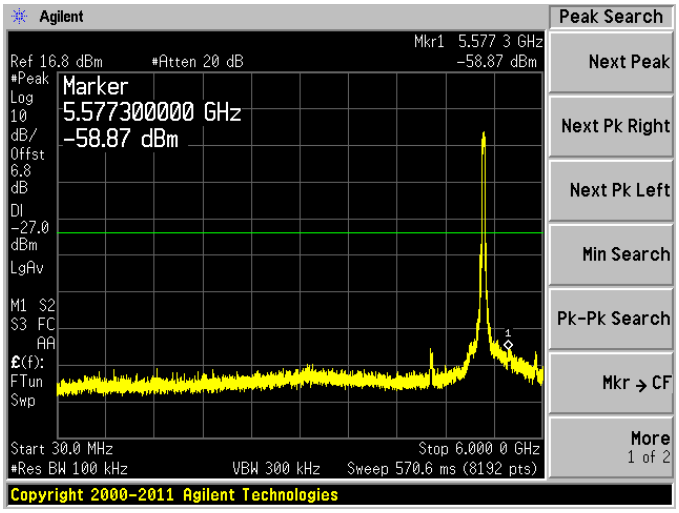
Chain 0, Plot: 30 MHz – 6 GHz



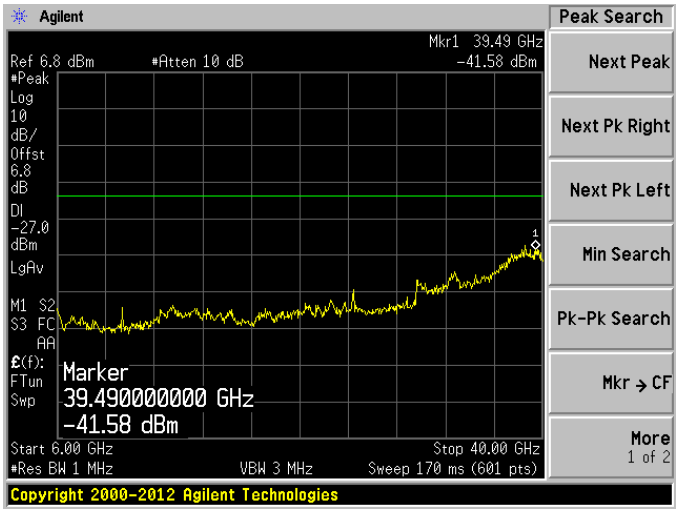
Chain 0, Plot: 6 GHz – 40 GHz



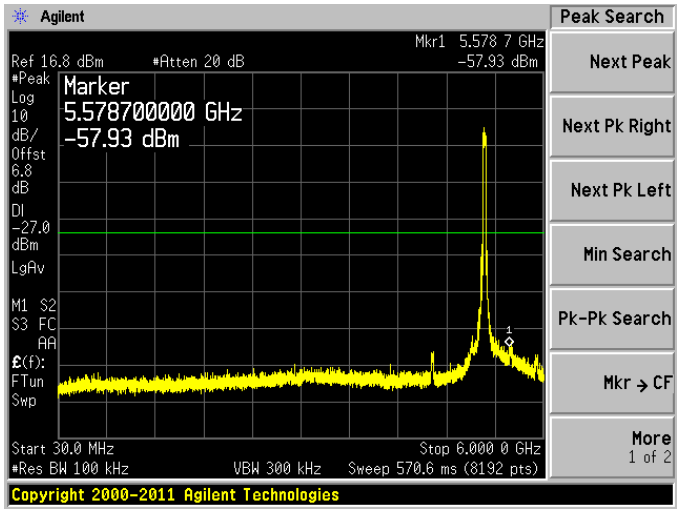
Chain 1, Plot: 30 MHz – 6 GHz



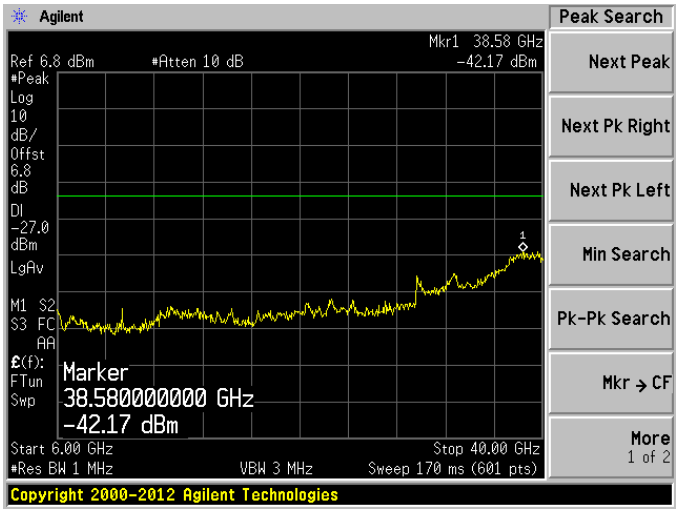
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

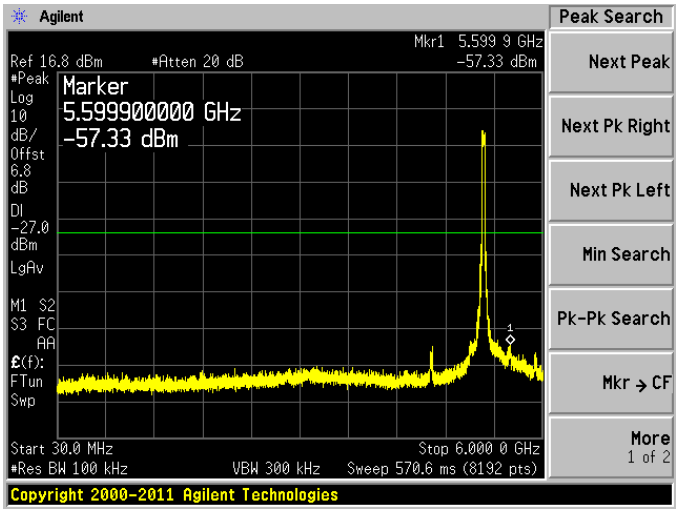


Chain 2, Plot: 6 GHz – 40 GHz

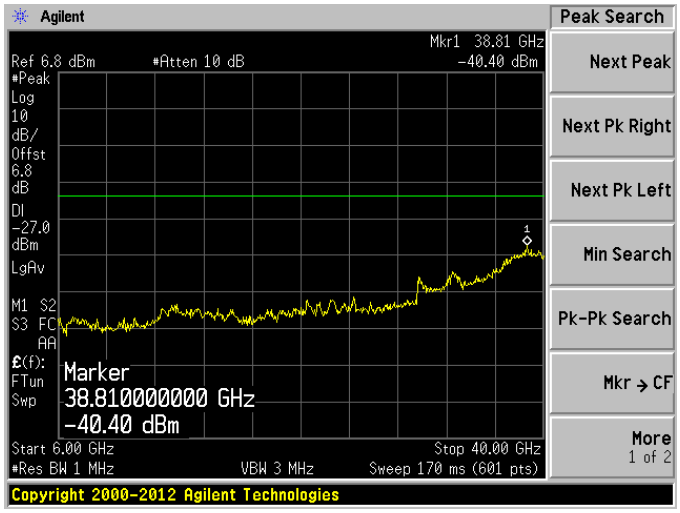


802.11n-HT40, High Channel 5310 MHz

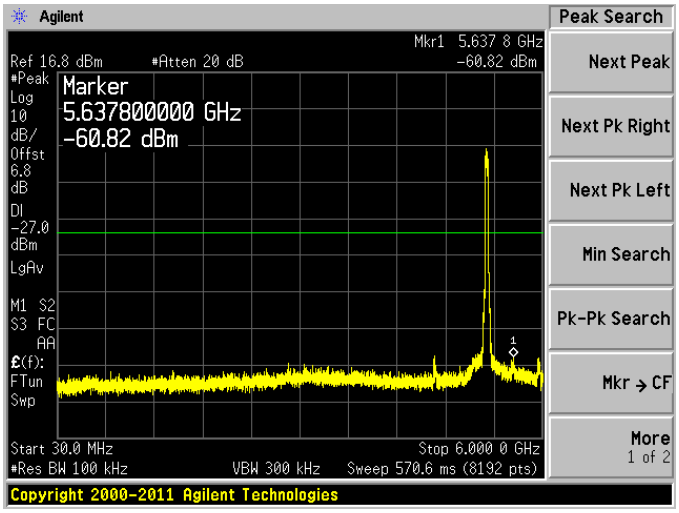
Chain 0, Plot: 30 MHz – 6 GHz



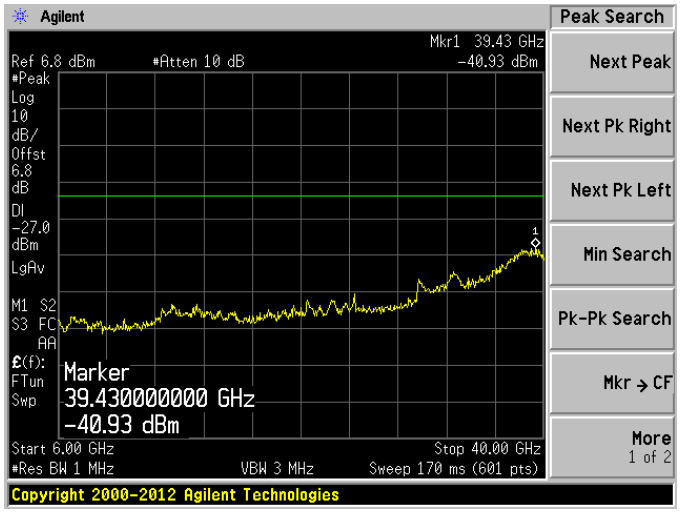
Chain 0, Plot: 6 GHz – 40 GHz



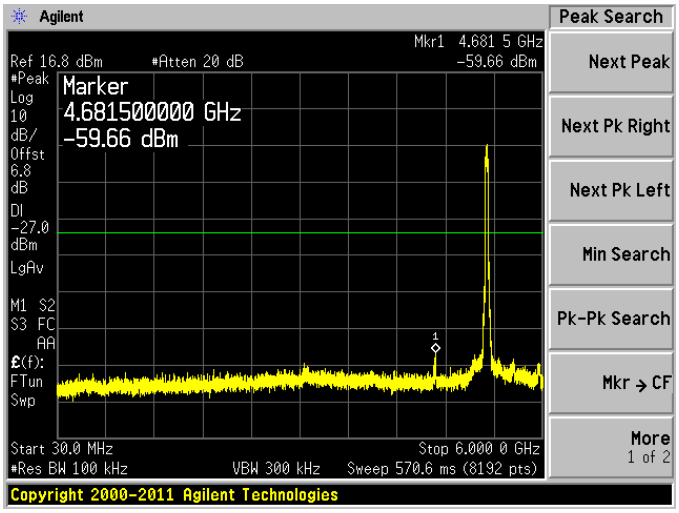
Chain 1, Plot: 30 MHz – 6 GHz



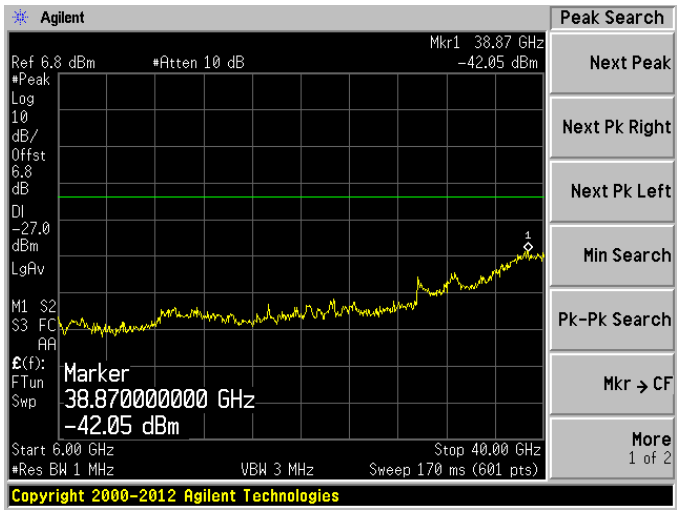
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

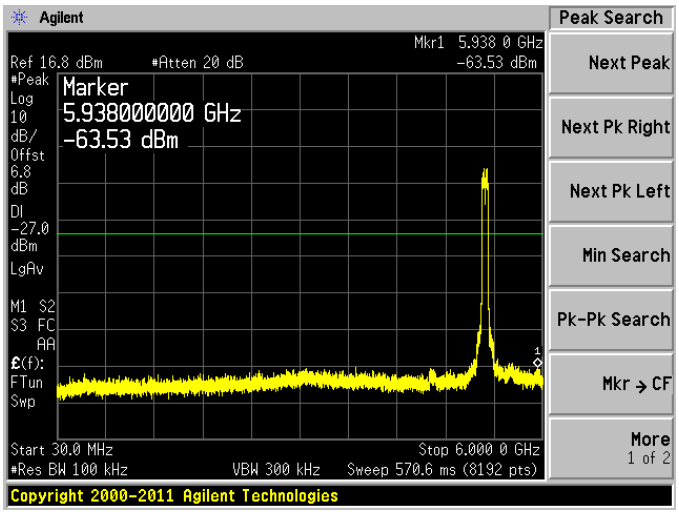


Chain 2, Plot: 6 GHz – 40 GHz

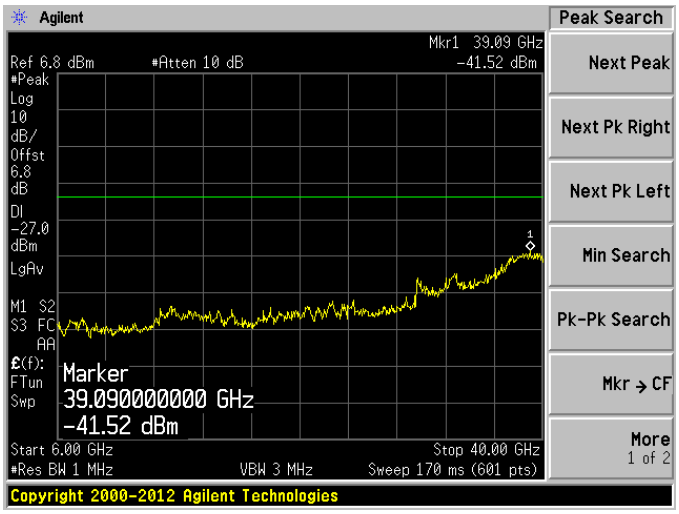


802.11ac-VHT80, High Channel 5290 MHz

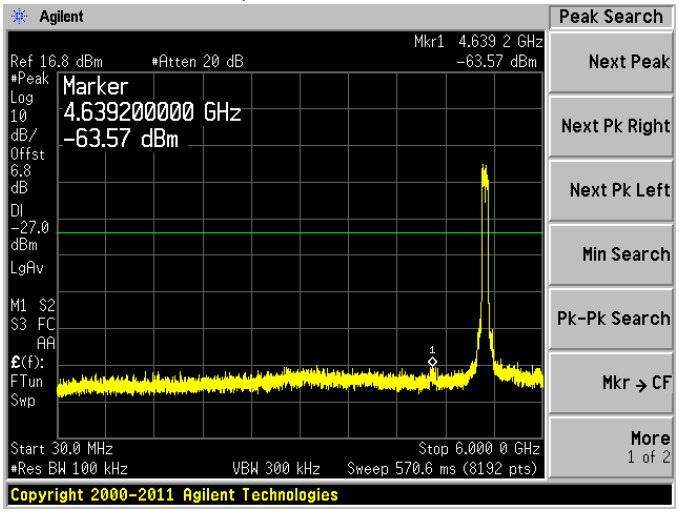
Chain 0, Plot: 30 MHz – 6 GHz



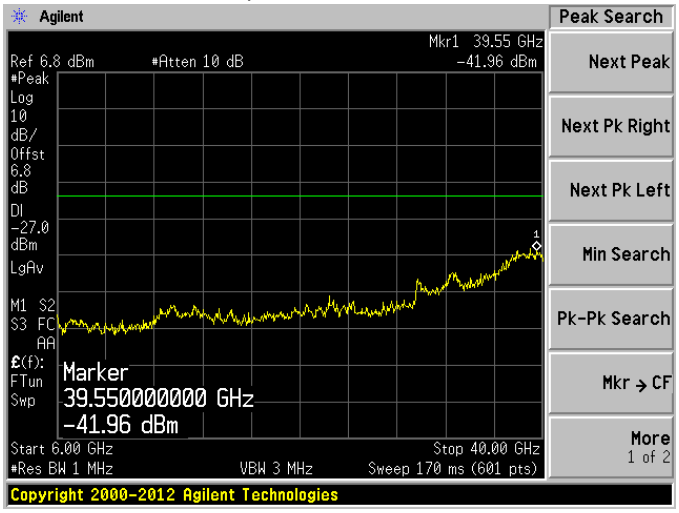
Chain 0, Plot: 6 GHz – 40 GHz



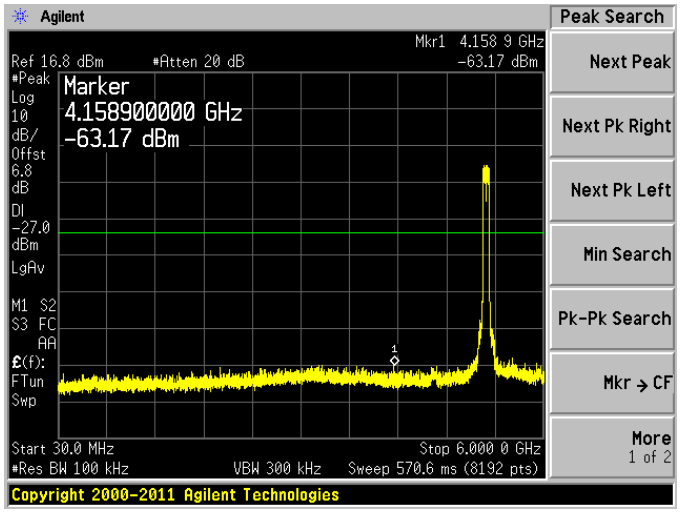
Chain 1, Plot: 30 MHz – 6 GHz



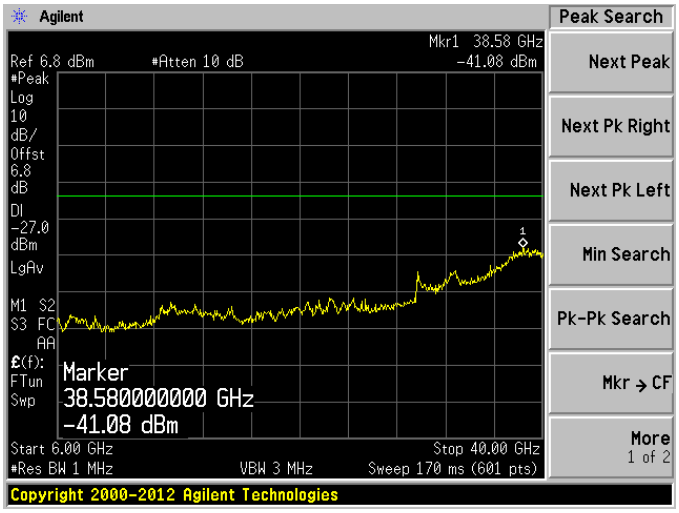
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz



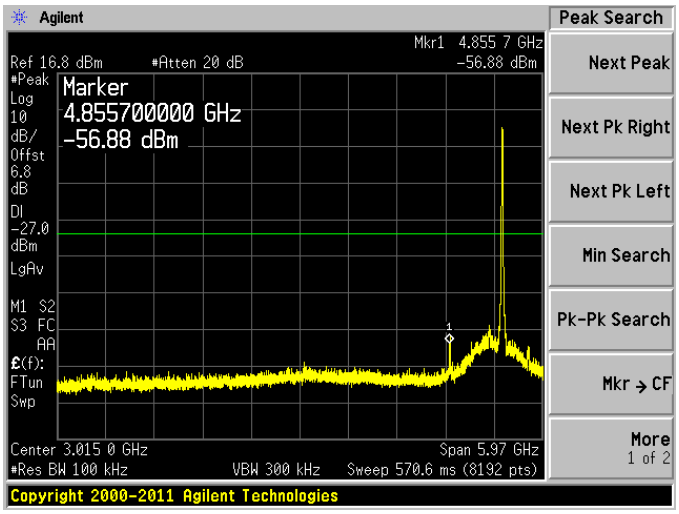
Chain 2, Plot: 6 GHz – 40 GHz



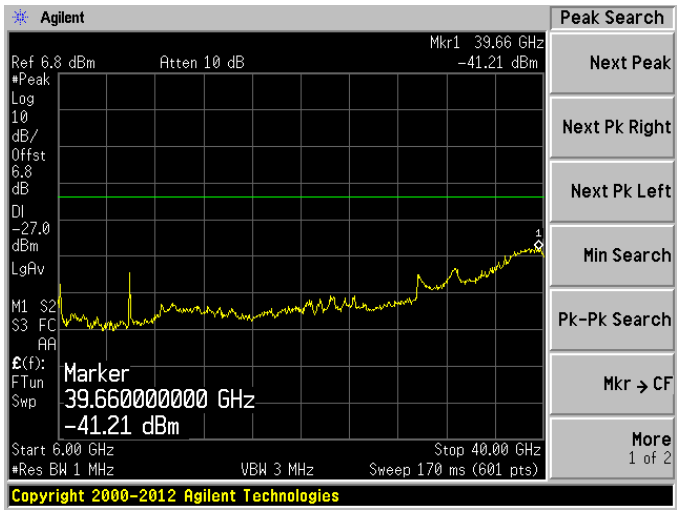
5.6 GHz Band

802.11a, Low Channel, 5500 MHz

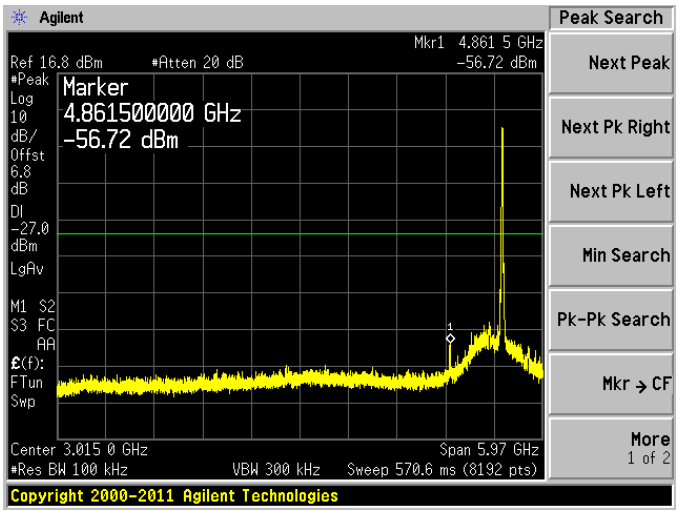
Chain 0, Plot: 30 MHz – 6 GHz



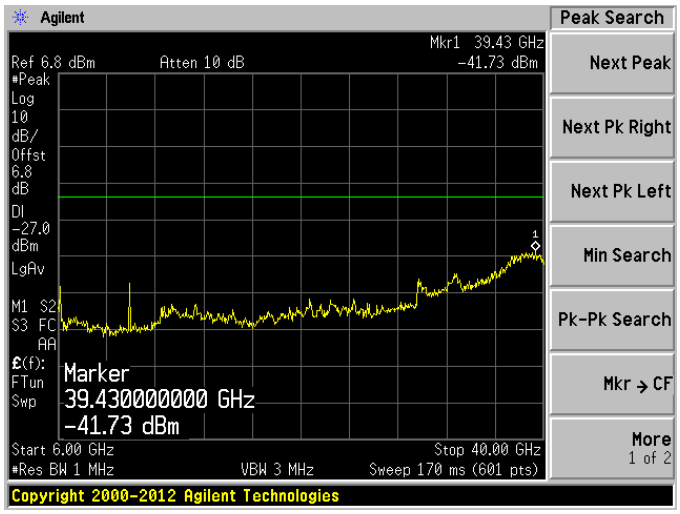
Chain 0, Plot: 6 GHz – 40 GHz



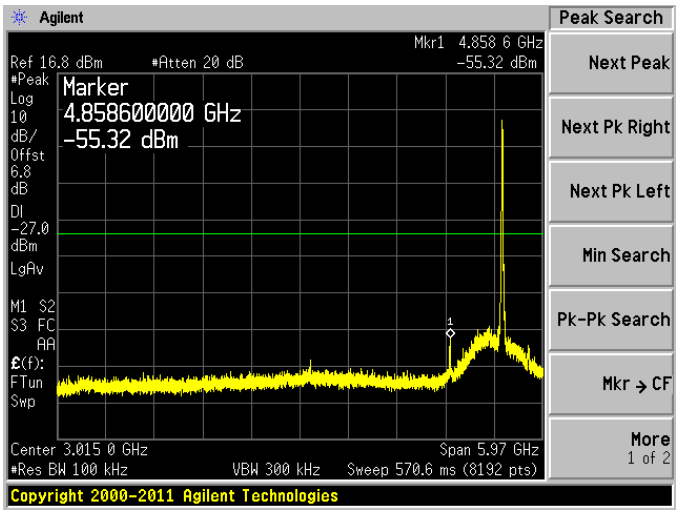
Chain 1, Plot: 30 MHz – 6 GHz



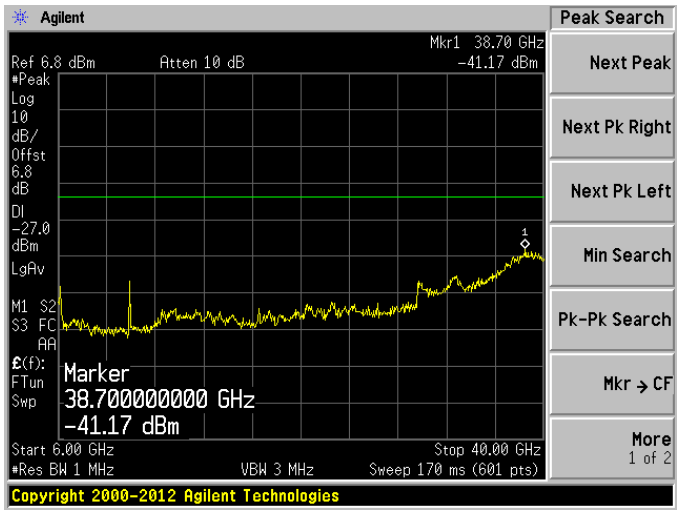
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

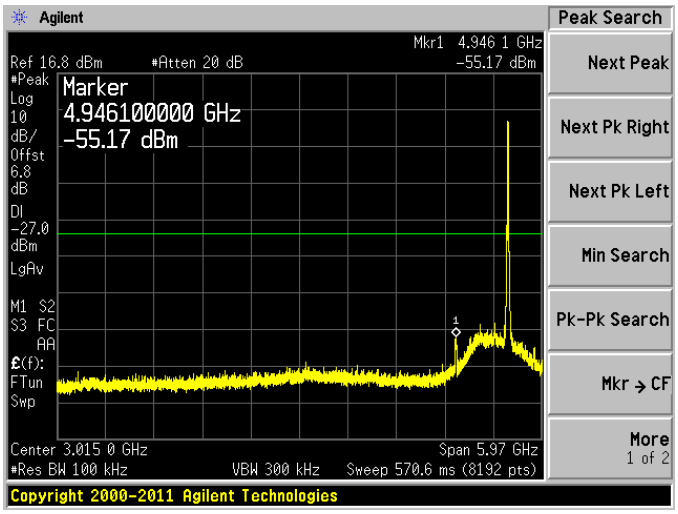


Chain 2, Plot: 6 GHz – 40 GHz

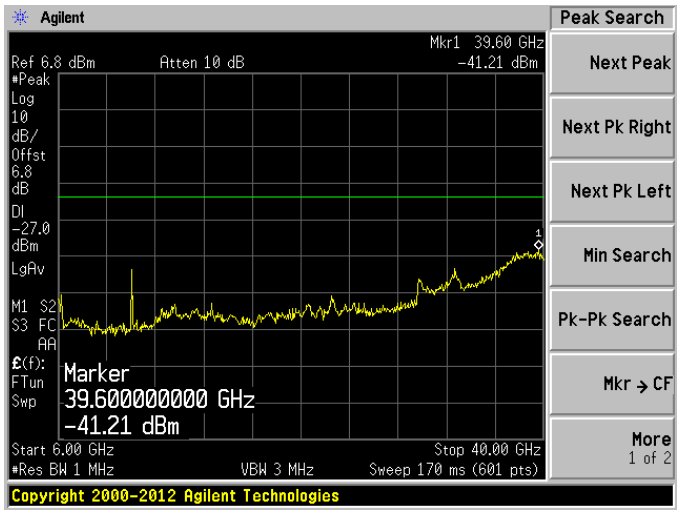


802.11a, Middle Channel, 5580 MHz

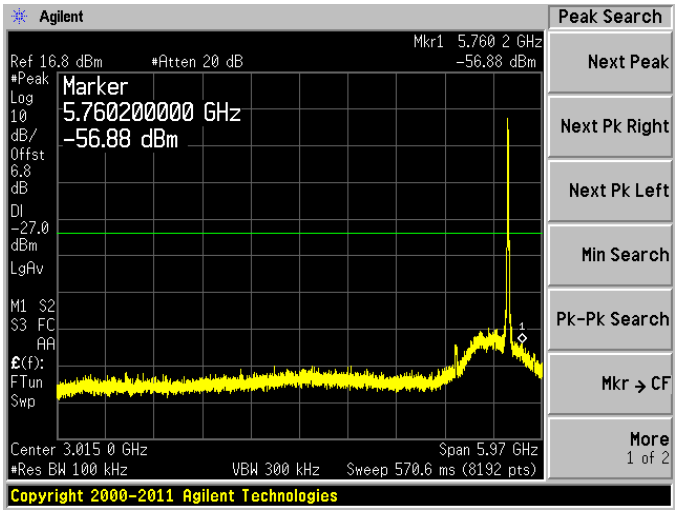
Chain 0, Plot: 30 MHz – 6 GHz



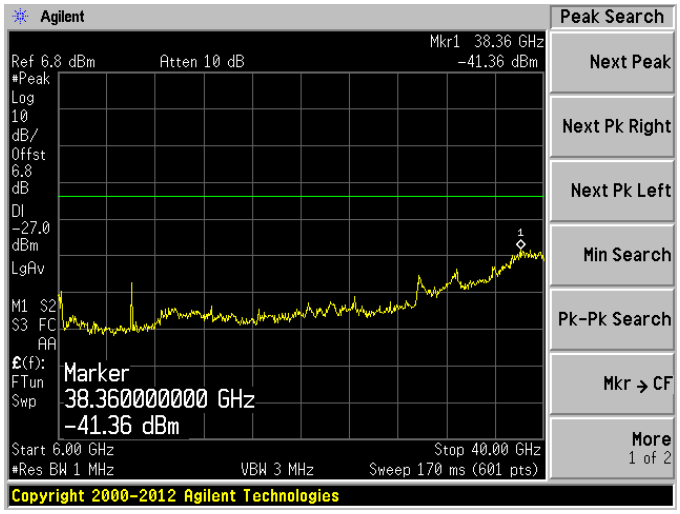
Chain 0, Plot: 6 GHz – 40 GHz



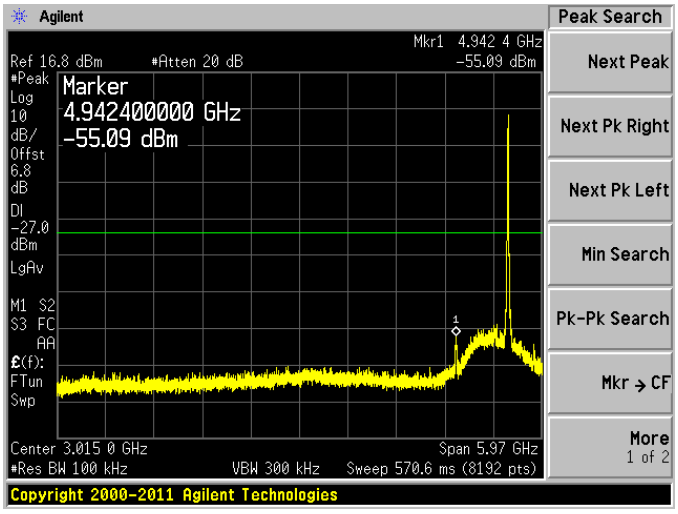
Chain 1, Plot: 30 MHz – 6 GHz



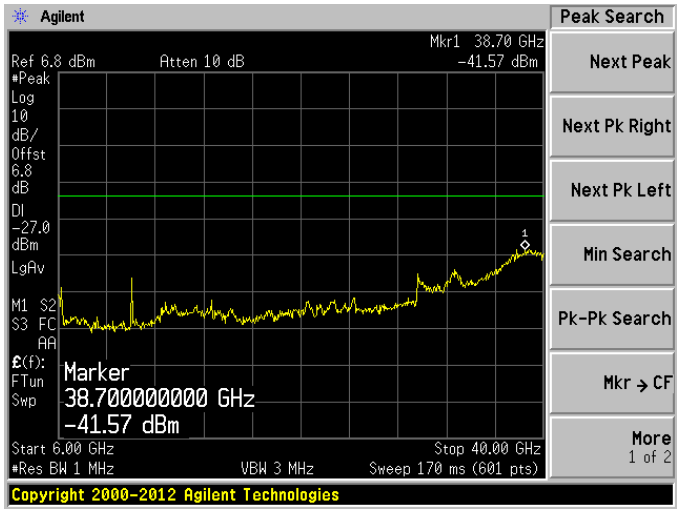
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

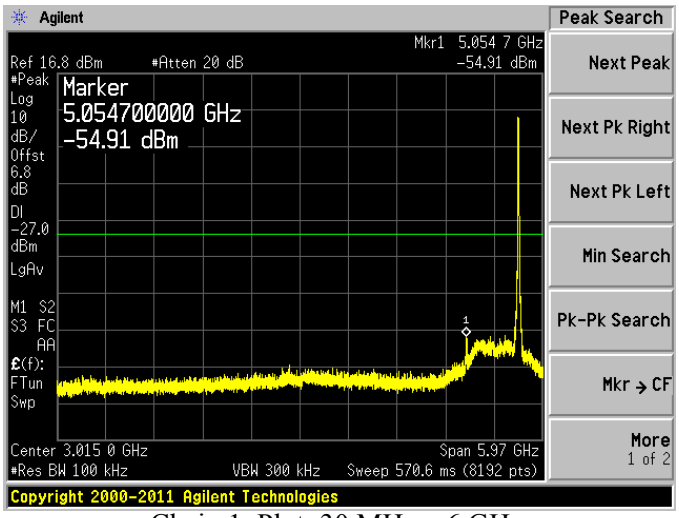


Chain 2, Plot: 6 GHz – 40 GHz

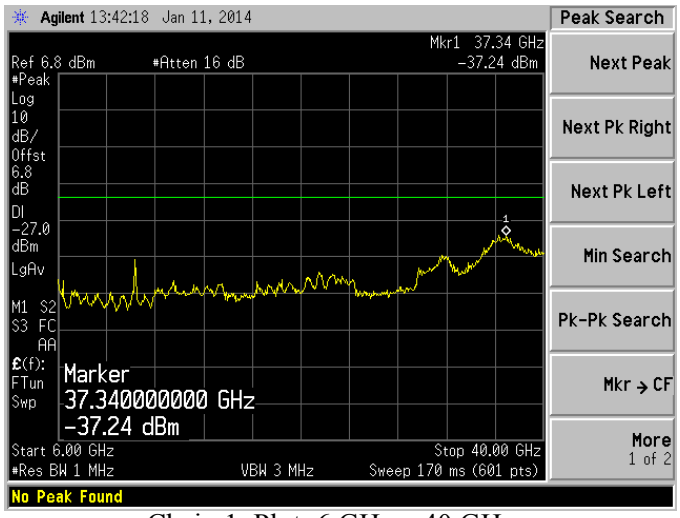


802.11a, High Channel, 5700 MHz

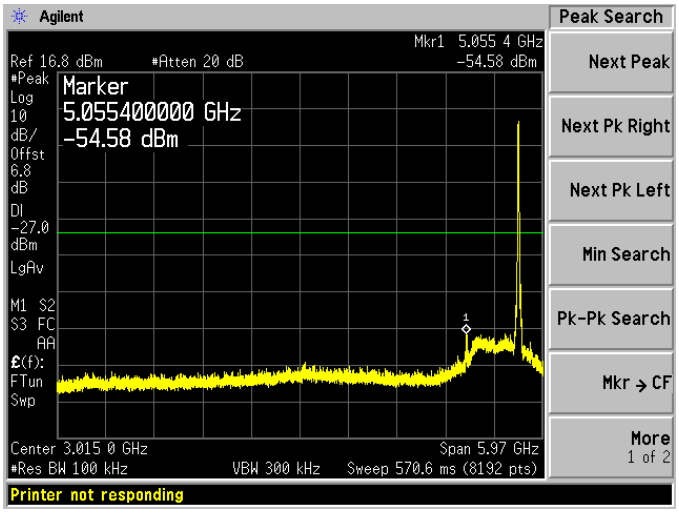
Chain 0, Plot: 30 MHz – 6 GHz



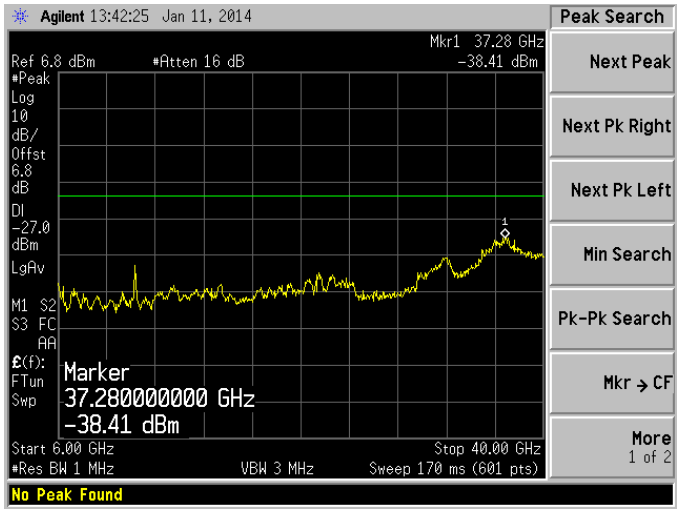
Chain 0, Plot: 6 GHz – 40 GHz



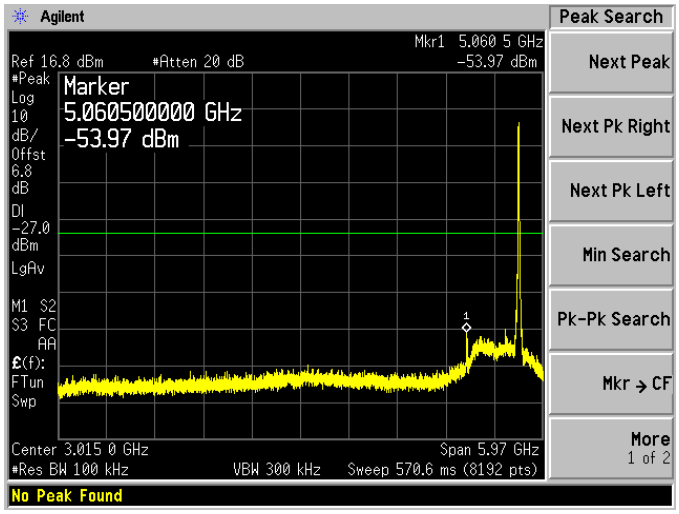
Chain 1, Plot: 30 MHz – 6 GHz



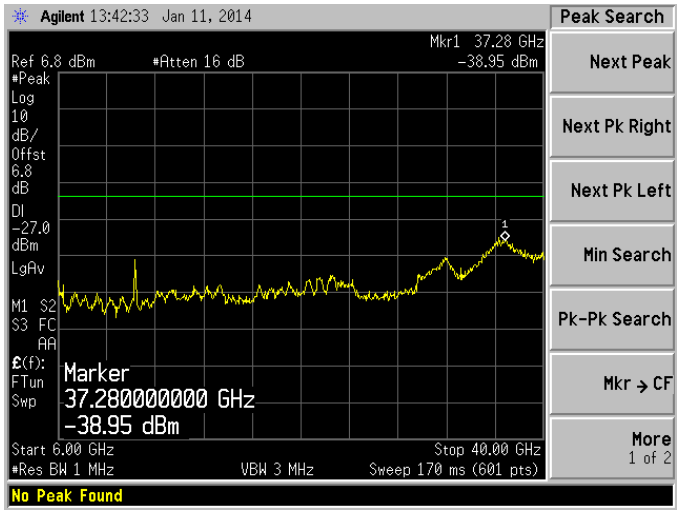
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

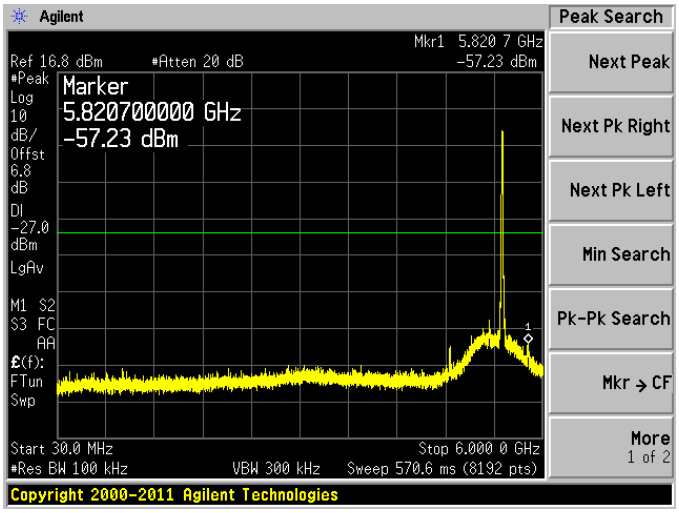


Chain 2, Plot: 6 GHz – 40 GHz

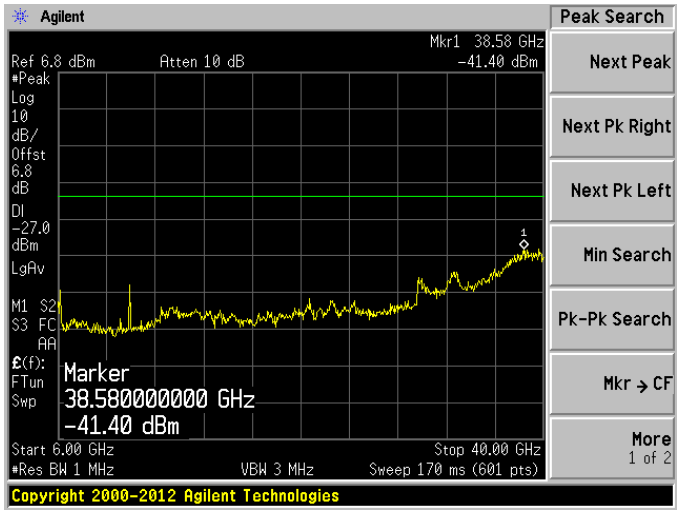


802.11n-HT 20, Low Channel 5500 MHz

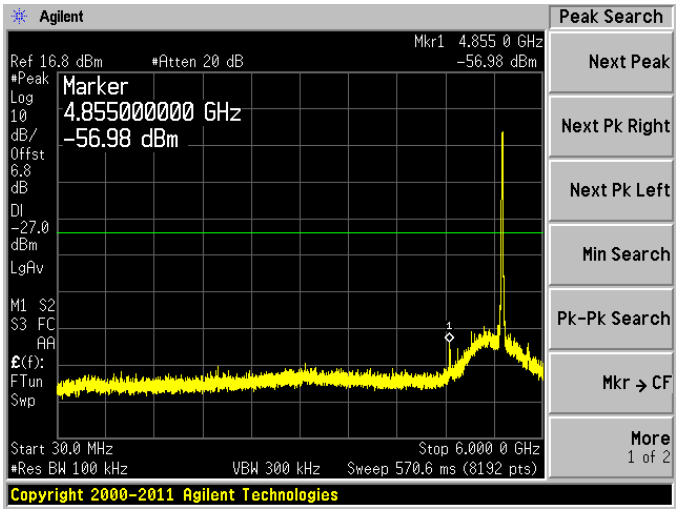
Chain 0, Plot: 30 MHz – 6 GHz



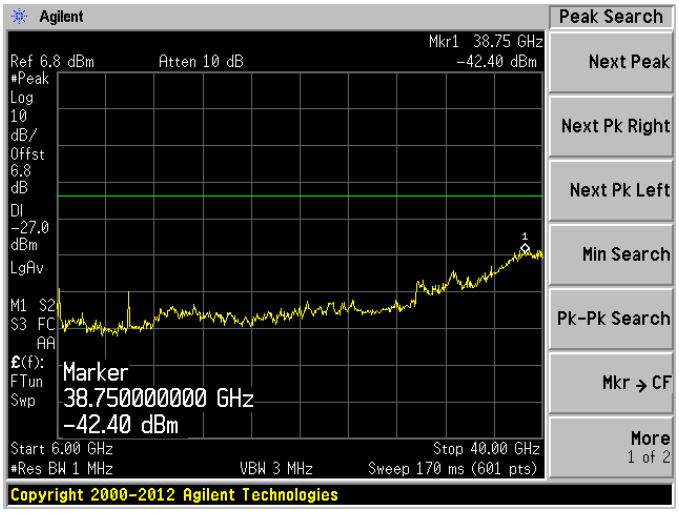
Chain 0, Plot: 6 GHz – 40 GHz



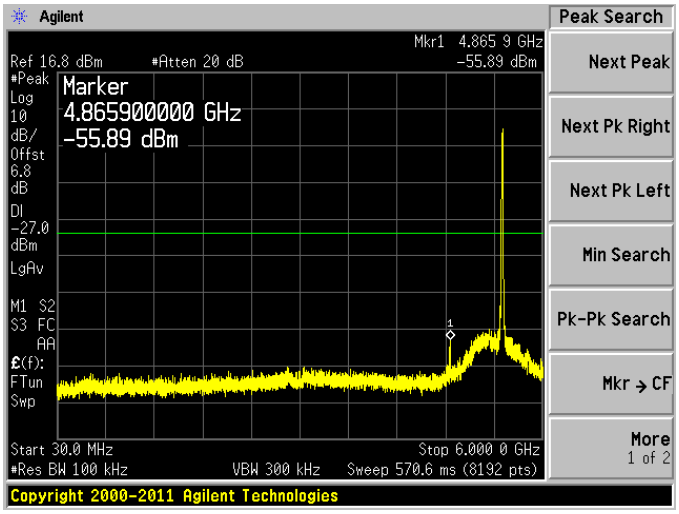
Chain 1, Plot: 30 MHz – 6 GHz



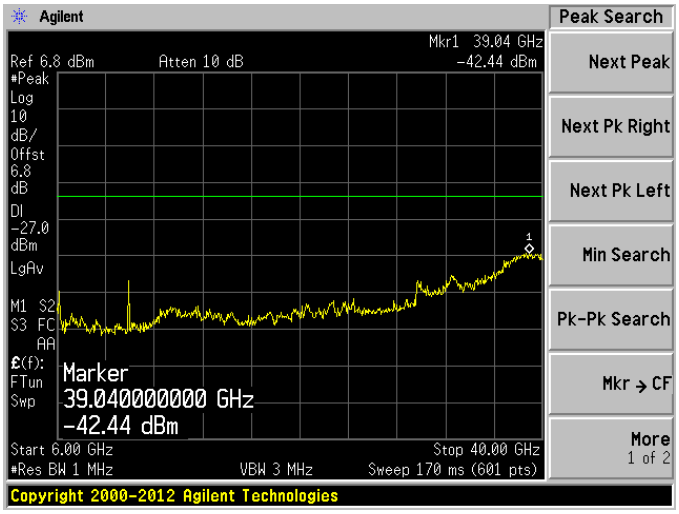
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

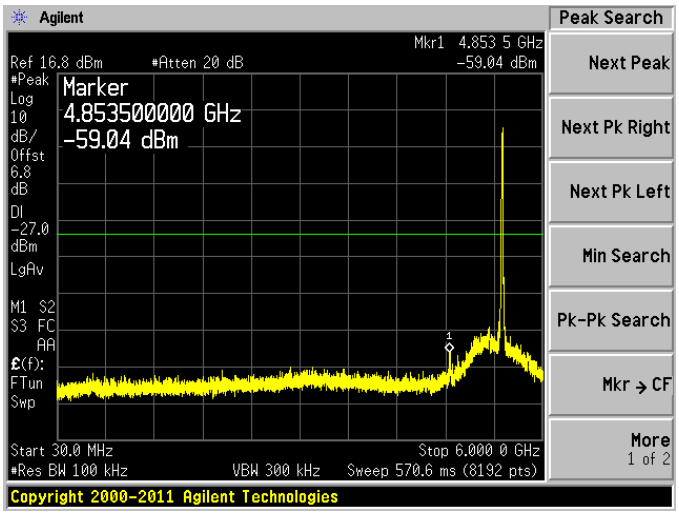


Chain 2, Plot: 6 GHz – 40 GHz

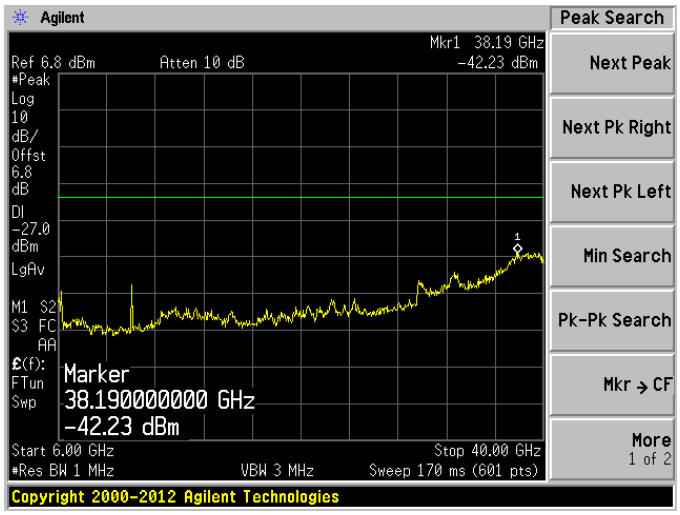


802.11n-HT20, Middle Channel 5580 MHz

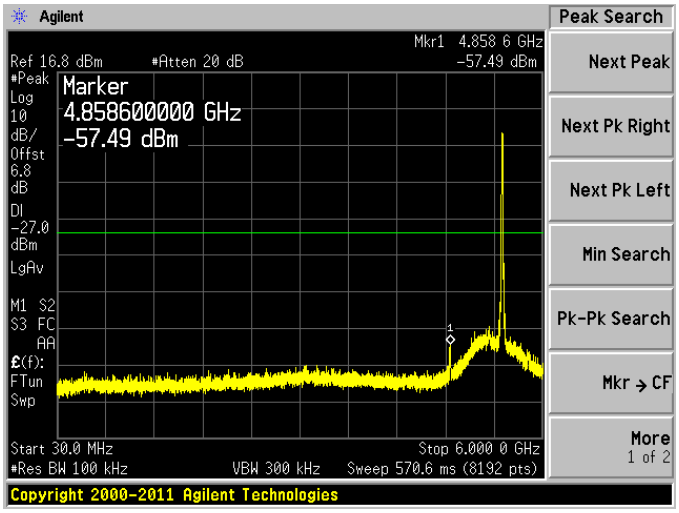
Chain 0, Plot: 30 MHz – 6 GHz



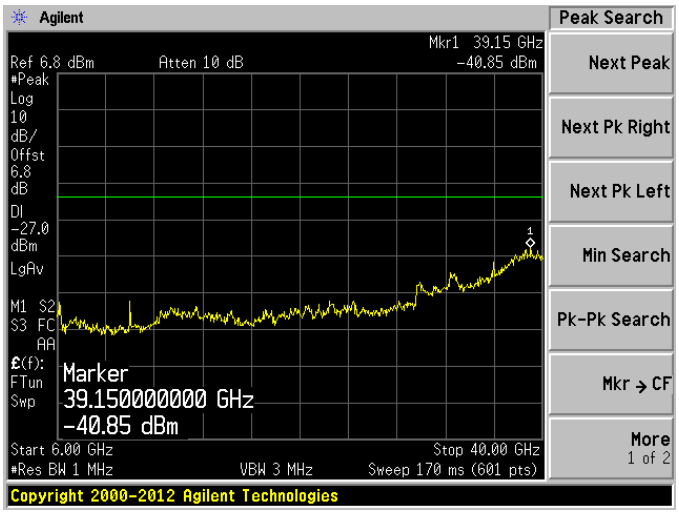
Chain 0, Plot: 6 GHz – 40 GHz



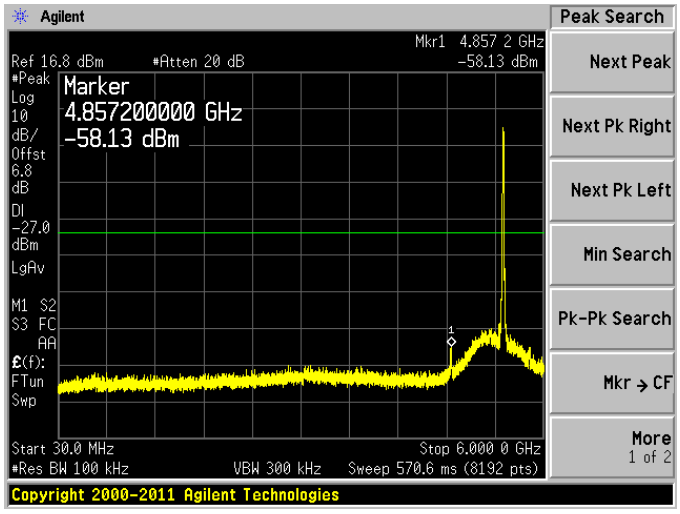
Chain 1, Plot: 30 MHz – 6 GHz



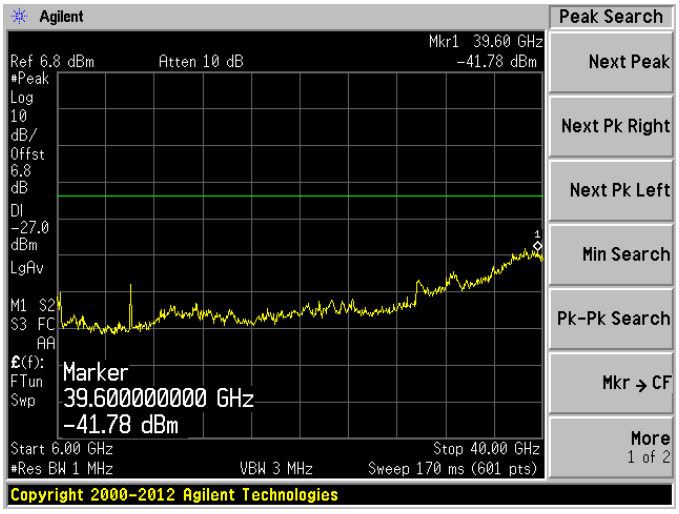
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

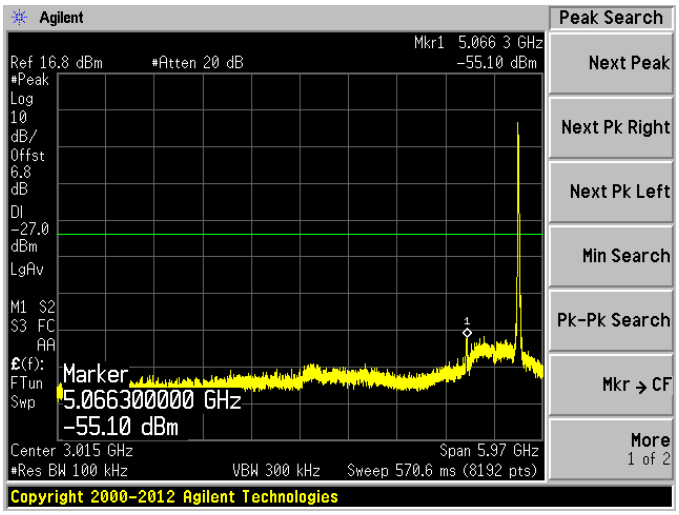


Chain 2, Plot: 6 GHz – 40 GHz

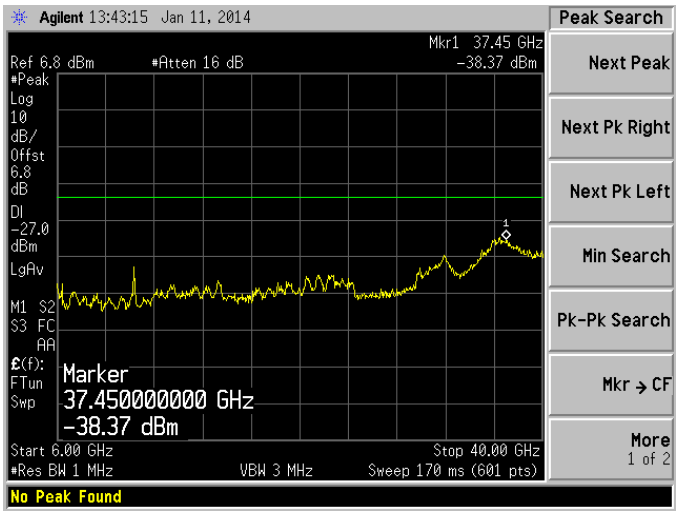


802.11n-HT20, High Channel 5700 MHz

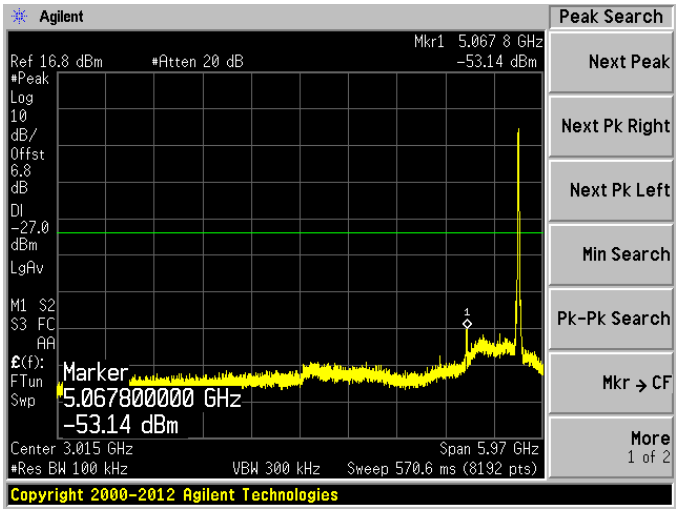
Chain 0, Plot: 30 MHz – 6 GHz



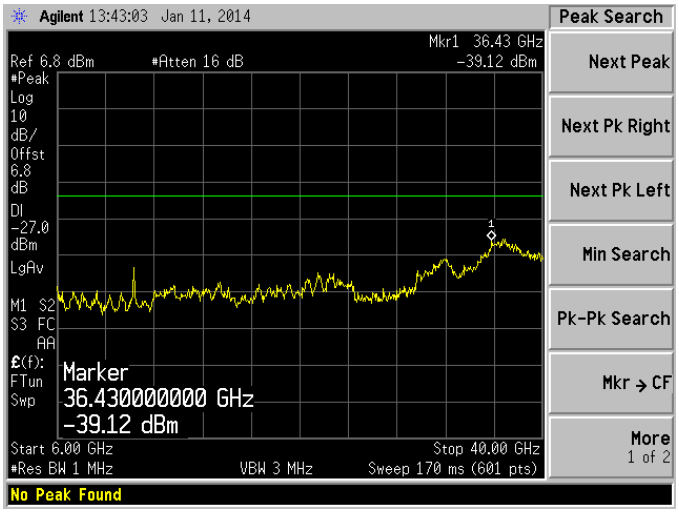
Chain 0, Plot: 6 GHz – 40 GHz



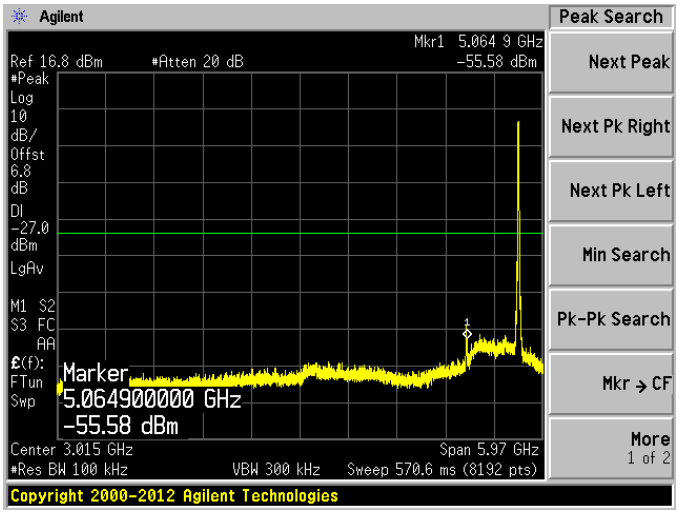
Chain 1, Plot: 30 MHz – 6 GHz



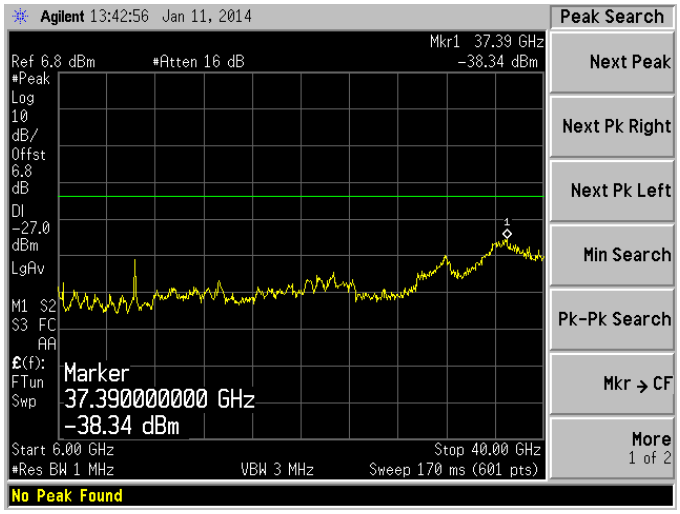
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

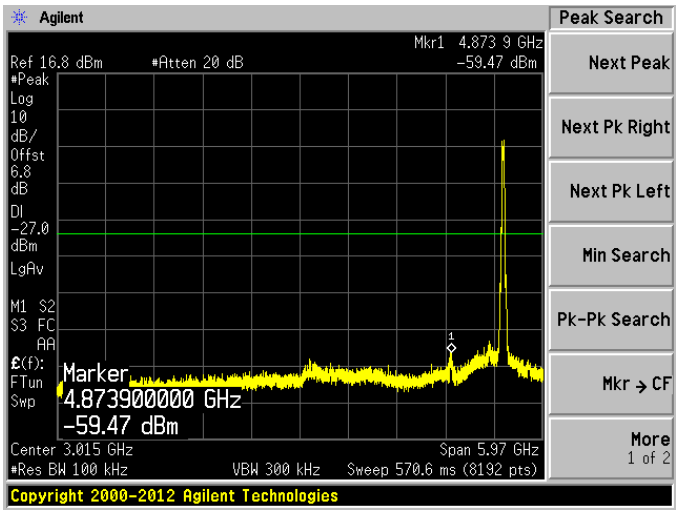


Chain 2, Plot: 6 GHz – 40 GHz

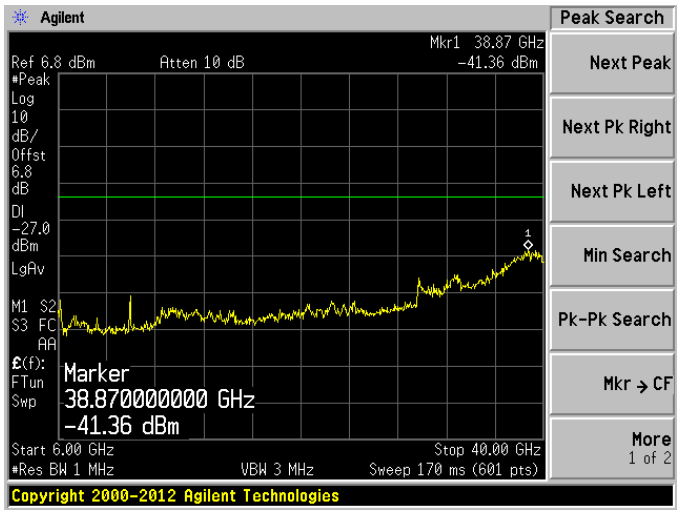


802.11n-HT40, Low Channel 5510 MHz

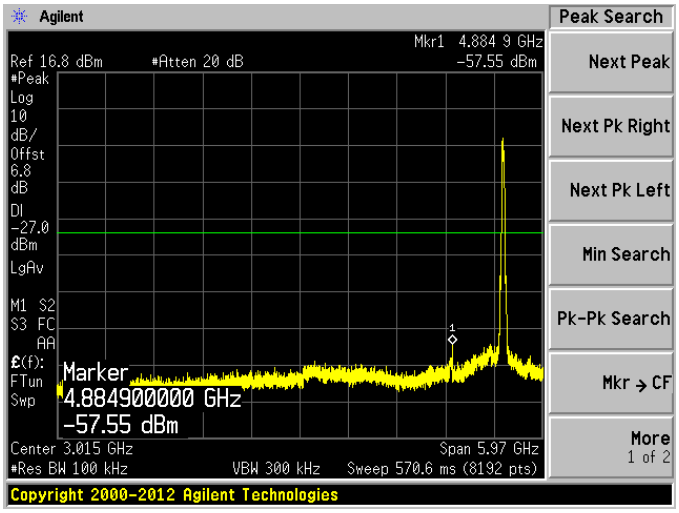
Chain 0, Plot: 30 MHz – 6 GHz



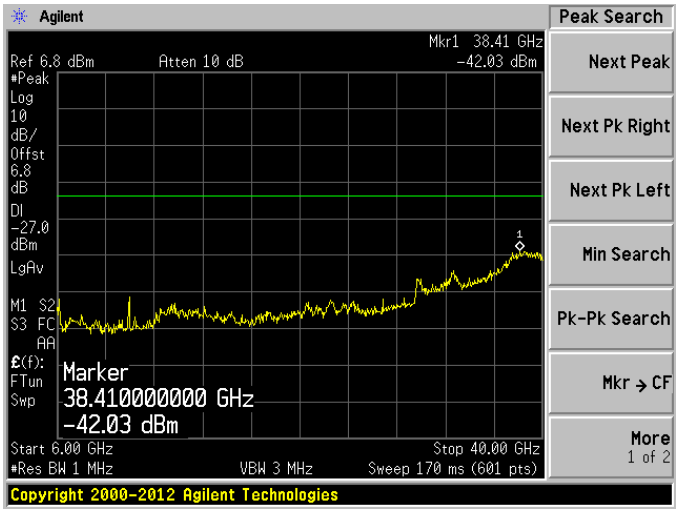
Chain 0, Plot: 6 GHz – 40 GHz



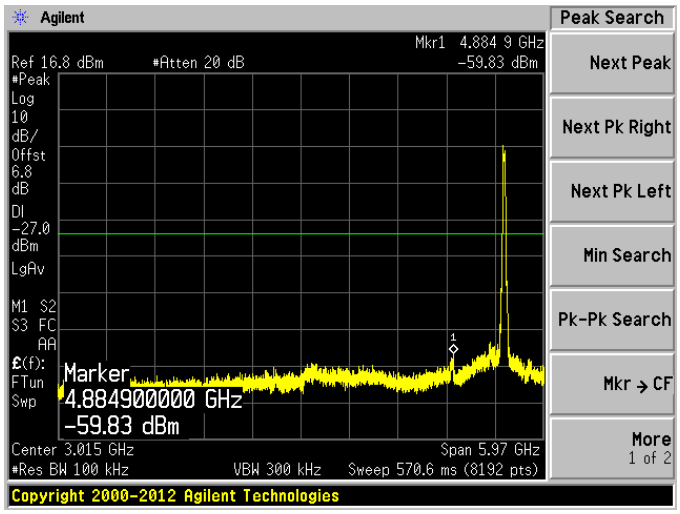
Chain 1, Plot: 30 MHz – 6 GHz



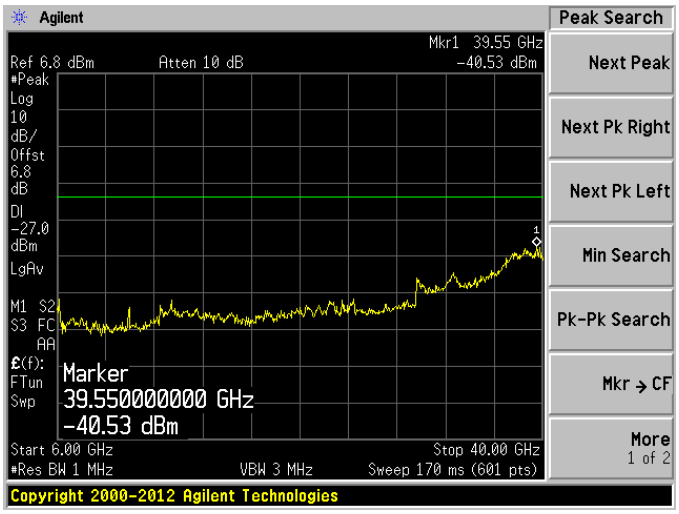
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

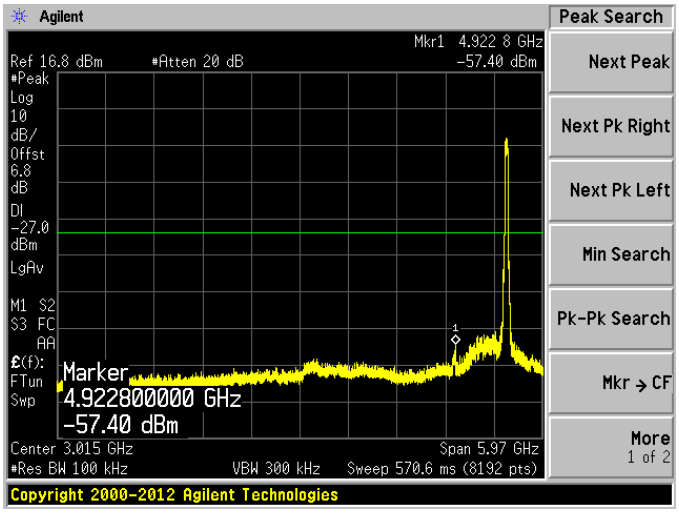


Chain 2, Plot: 6 GHz – 40 GHz

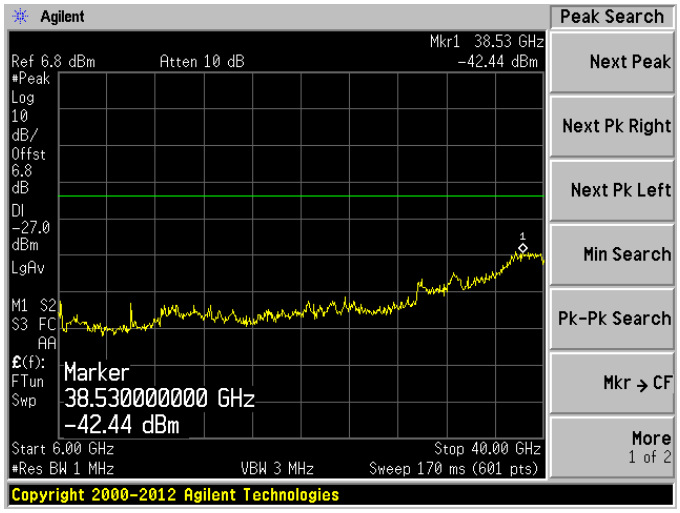


802.11n-HT40, Middle Channel 5550 MHz

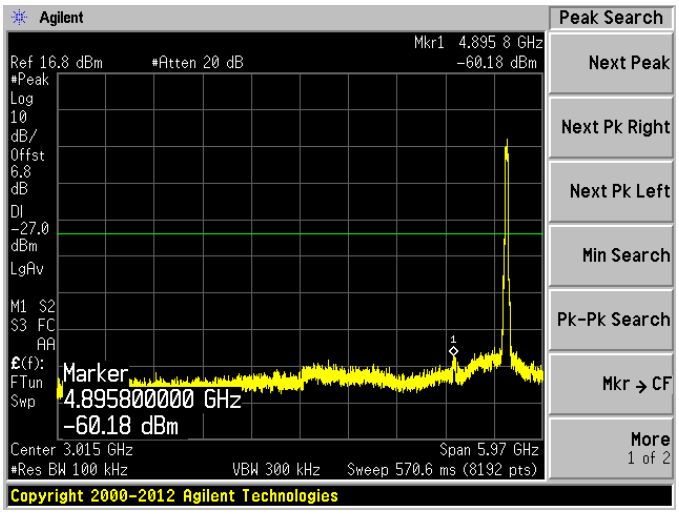
Chain 0, Plot: 30 MHz – 6 GHz



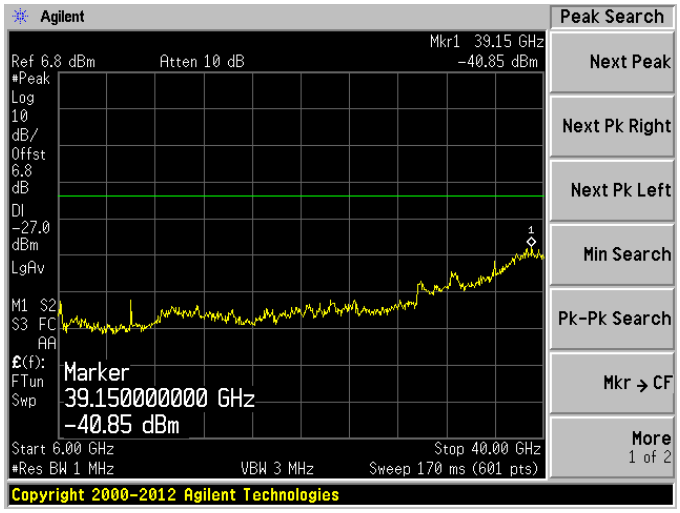
Chain 0, Plot: 6 GHz – 40 GHz



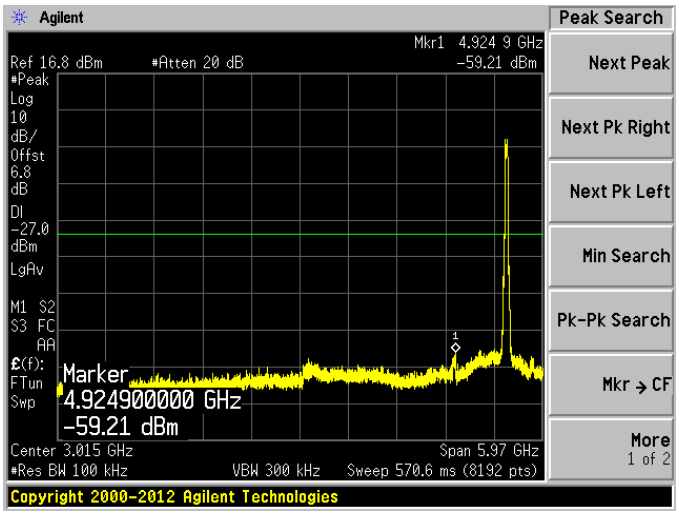
Chain 1, Plot: 30 MHz – 6 GHz



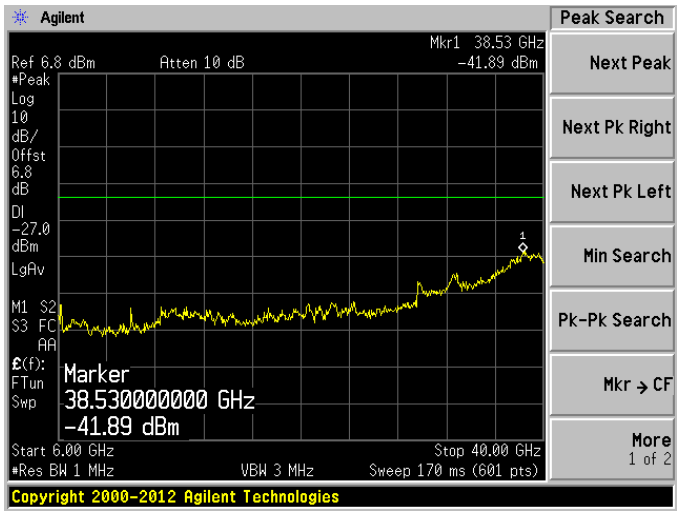
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

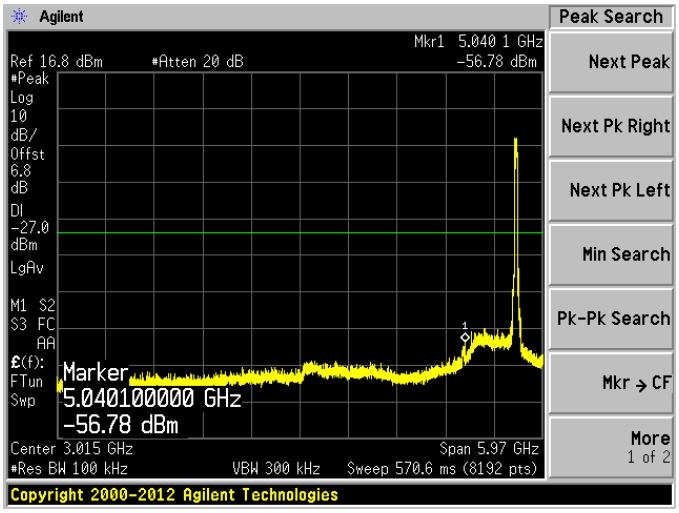


Chain 2, Plot: 6 GHz – 40 GHz

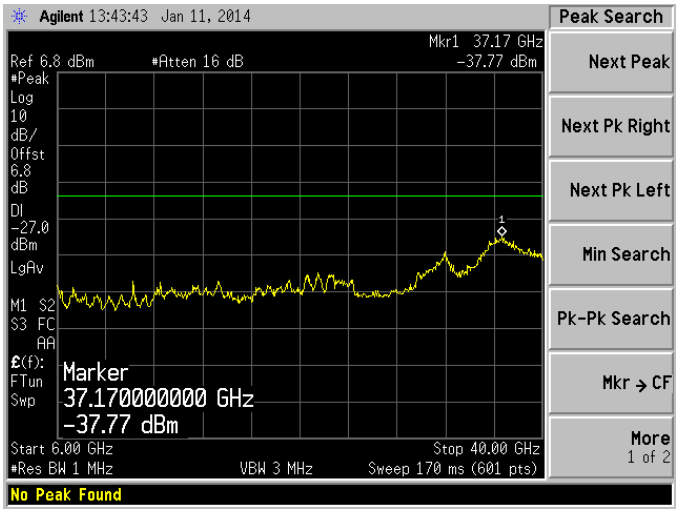


802.11n-HT40, High Channel 5670 MHz

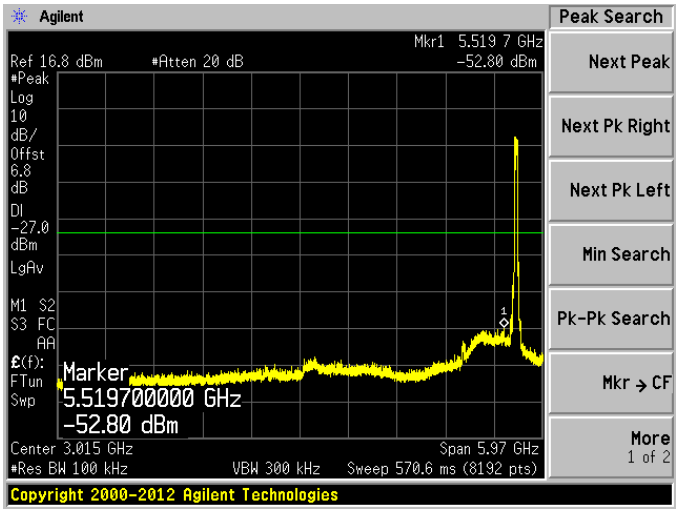
Chain 0, Plot: 30 MHz – 6 GHz



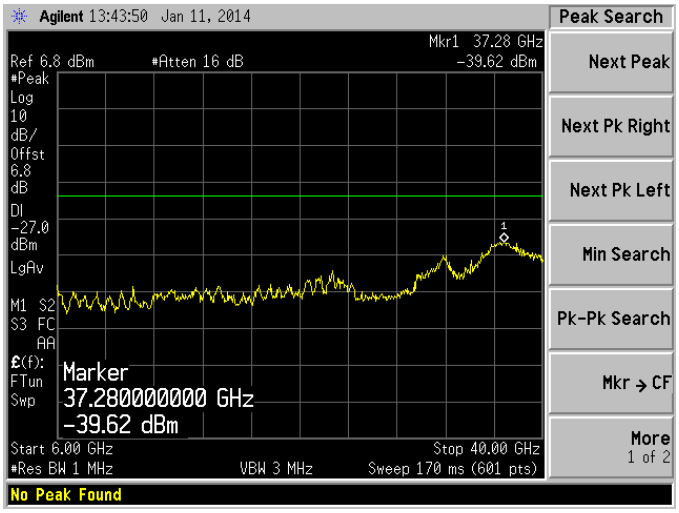
Chain 0, Plot: 6 GHz – 40 GHz



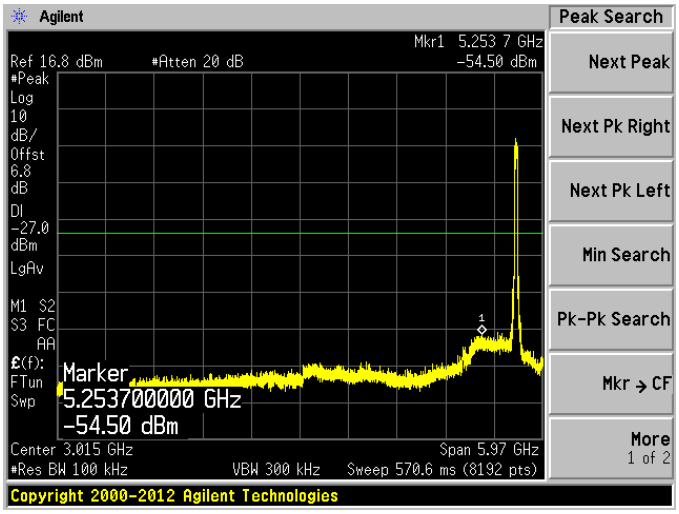
Chain 1, Plot: 30 MHz – 6 GHz



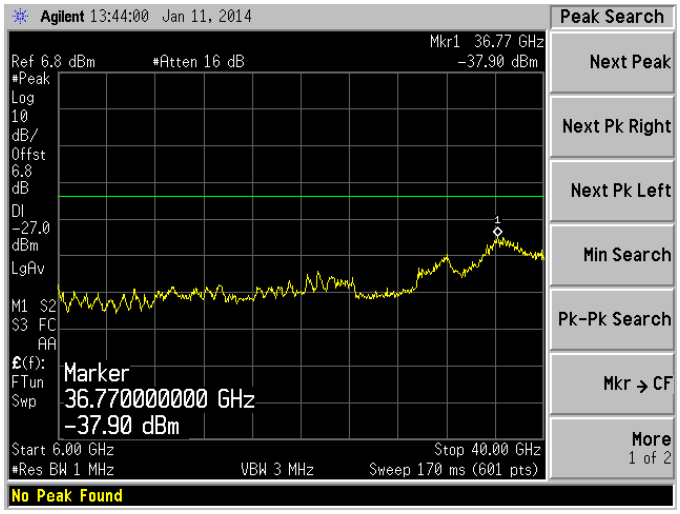
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz

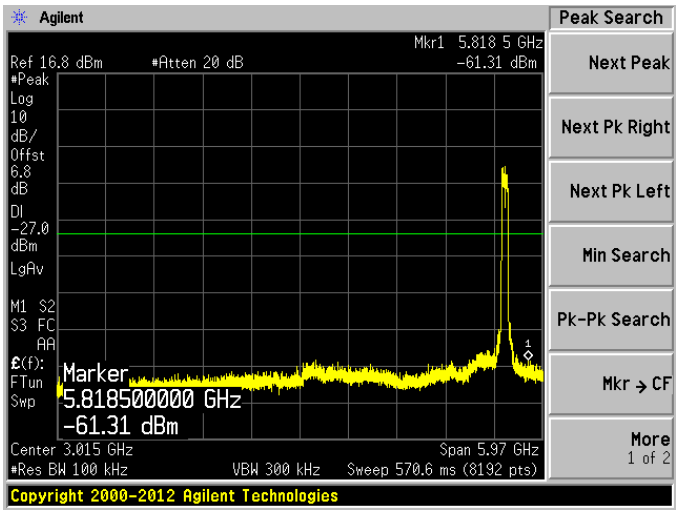


Chain 2, Plot: 6 GHz – 40 GHz

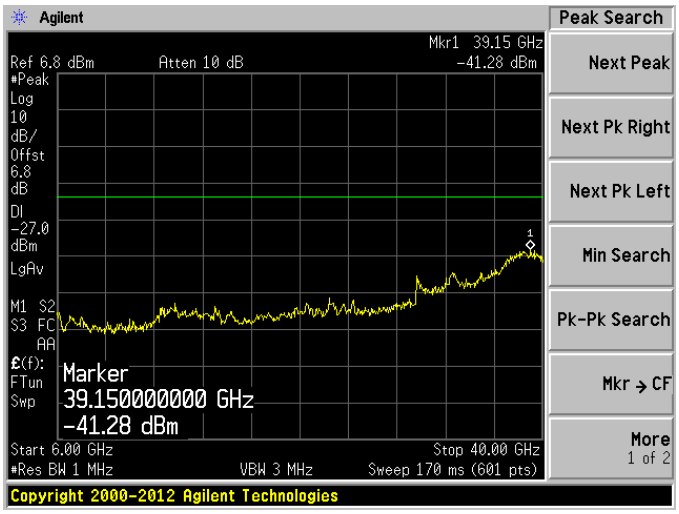


802.11ac-VHT80, High Channel 5530 MHz

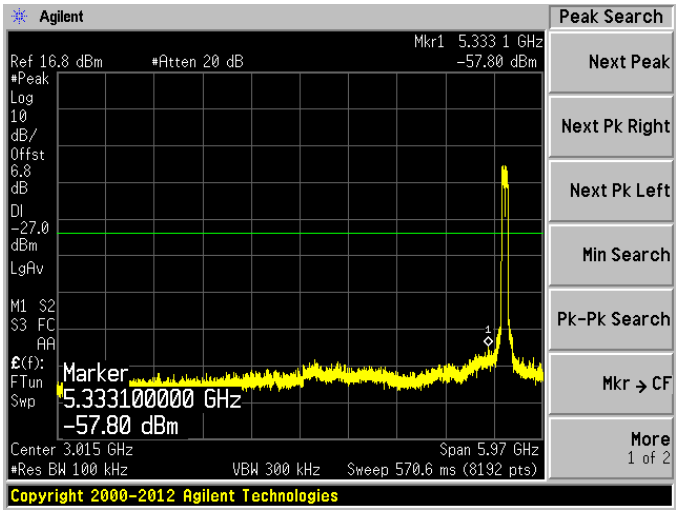
Chain 0, Plot: 30 MHz – 6 GHz



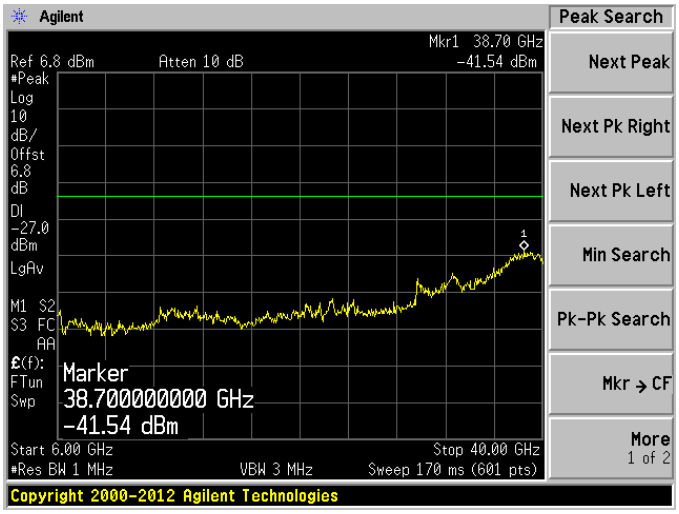
Chain 0, Plot: 6 GHz – 40 GHz



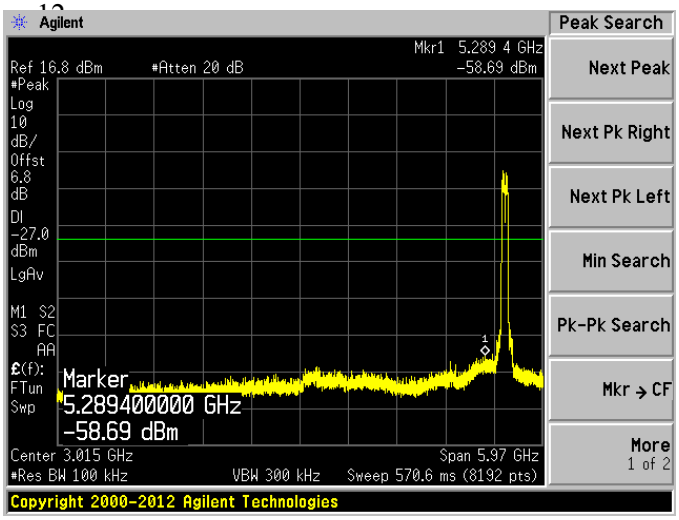
Chain 1, Plot: 30 MHz – 6 GHz



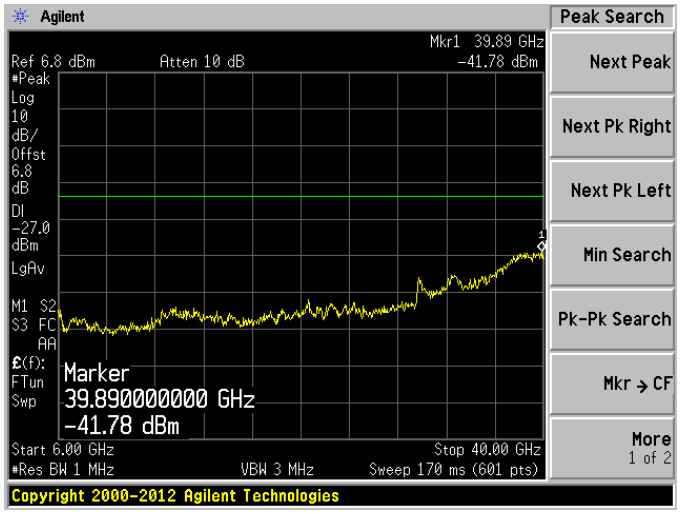
Chain 1, Plot: 6 GHz – 40 GHz



Chain 2, Plot: 30 MHz – 6 GHz



Chain 2, Plot: 6 GHz – 40 GHz



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

12.1 Applicable Standard

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

12.2 Test Procedure

The measurements are base on FCC KDB 789033 D01 General UNII Test Procedures v01r04

12.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2013-09-29	1 year

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

12.4 Test Environmental Conditions

Temperature:	21 °C
Relative Humidity:	43 %
ATM Pressure:	101-102 kPa

The testing was performed by Rui Zhou on 2014-07-07 to 2014-07-14 at RF site.

12.5 Test Results

5.3 GHz Band

8
02.11a mode

Channel	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Limit (dBm)
Low	5260	9.78	9.401	8.425	13
Middle	5280	9.18	8.731	8.59	13
High	5320	8.919	8.95	8.176	13

802.11n-HT20 mode

Channel	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Limit (dBm)
Low	5260	9.02	8.664	8.88	13
Middle	5280	8.91	9.01	7.966	13
High	5320	8.62	8.535	7.82	13

802.11n-HT40 mode

Channel	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Limit (dBm)
Low	5270	8.89	7.673	8.56	13
High	5310	8.577	9.29	8.973	13

802.11ac-VHT80 mode

Channel	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Limit (dBm)
-	5290	8.986	10.9	10.54	13

5.6 GHz Band

802.11a mode

Channel	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Limit (dBm)
Low	5550	10.068	9.561	8.68	13
Middle	5580	9.86	9.431	9.16	13
High	5700	9.795	9.2	8.559	13

802.11n-HT20 mode

Channel	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Limit (dBm)
Low	5500	8.38	8.57	9.44	13
Middle	5580	8.986	8.58	8.372	13
High	5700	9.37	9.026	8.43	13

802.11n-HT40 mode

Channel	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Limit (dBm)
Low	5510	9.273	9.35	8.963	13
Middle	5550	9.71	8.659	9.11	13
High	5670	8.723	8.96	8.901	13

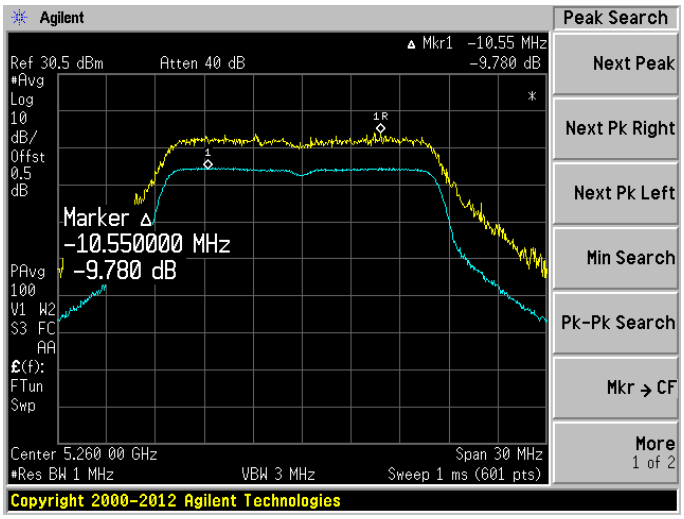
802.11ac-VHT80 mode

Channel	Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Chain 2 (dBm)	Limit (dBm)
-	5530	10.8	10.344	10.04	13

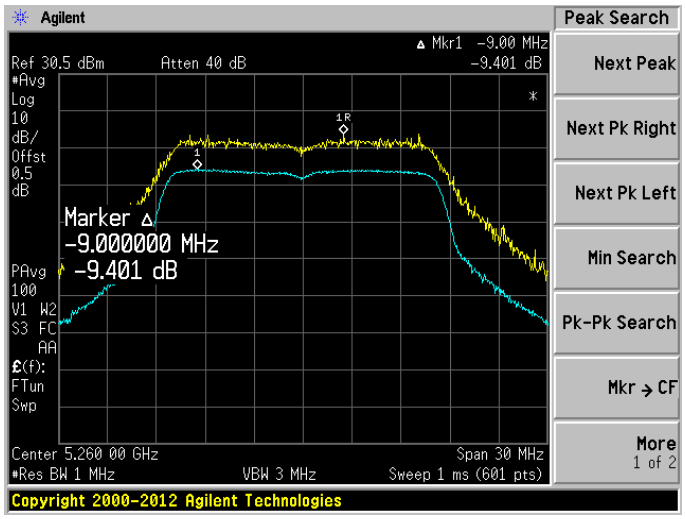
Please refer to the following plots.

5250-5350 MHz Band

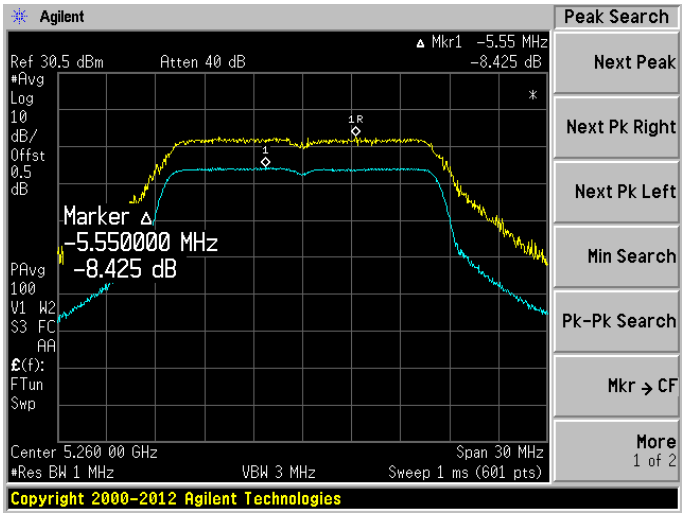
802.11a mode, 5260 MHz, Chain 1



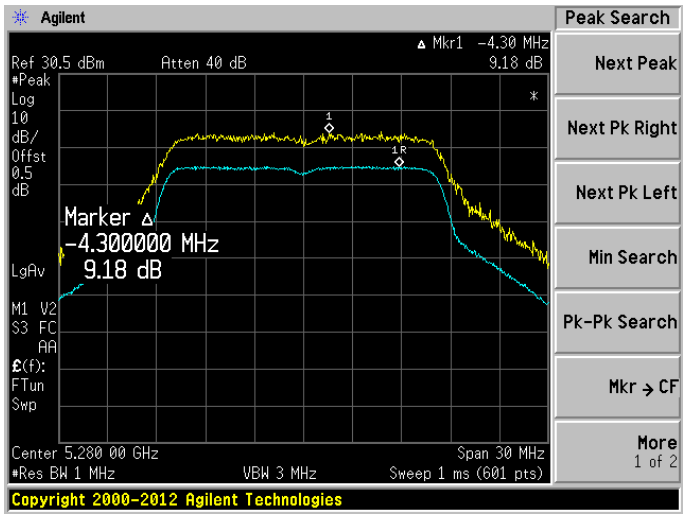
802.11a mode, 5260 MHz, Chain 2



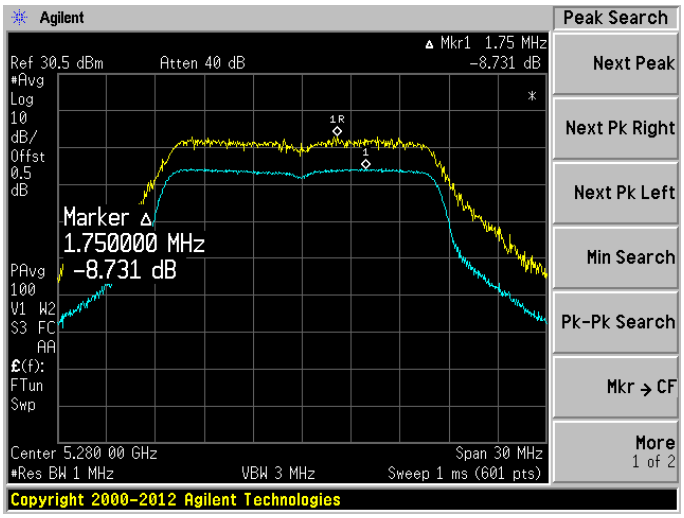
802.11a mode, 5260 MHz, Chain 3



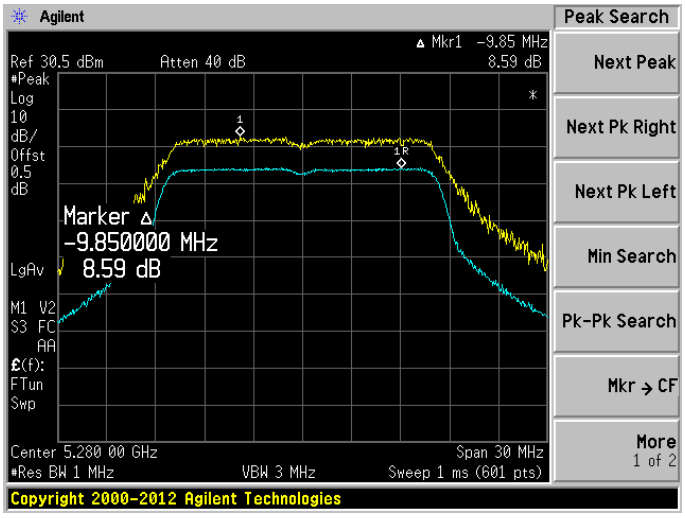
802.11a mode, 5280 MHz, Chain 1



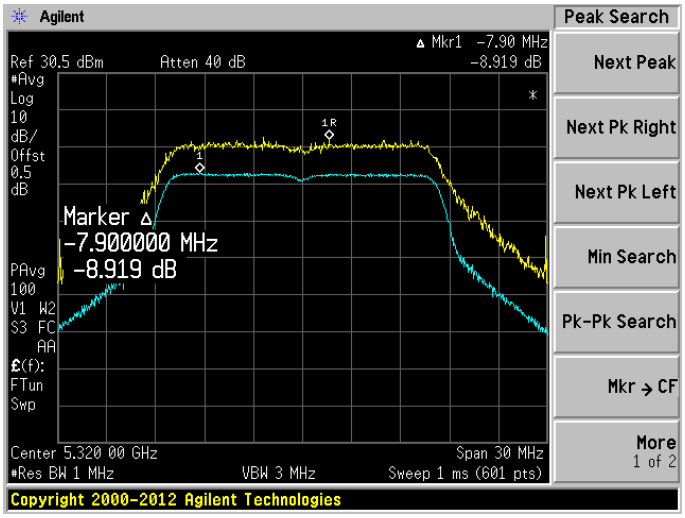
802.11a mode, 5280 MHz, Chain 2



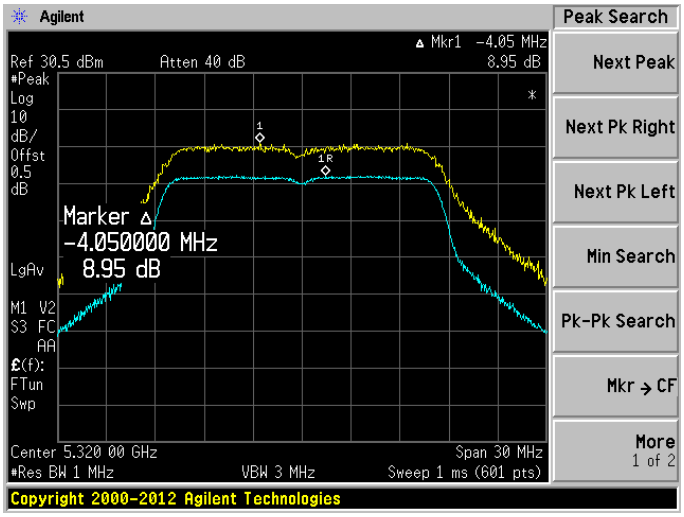
802.11a mode, 5280 MHz, Chain 3



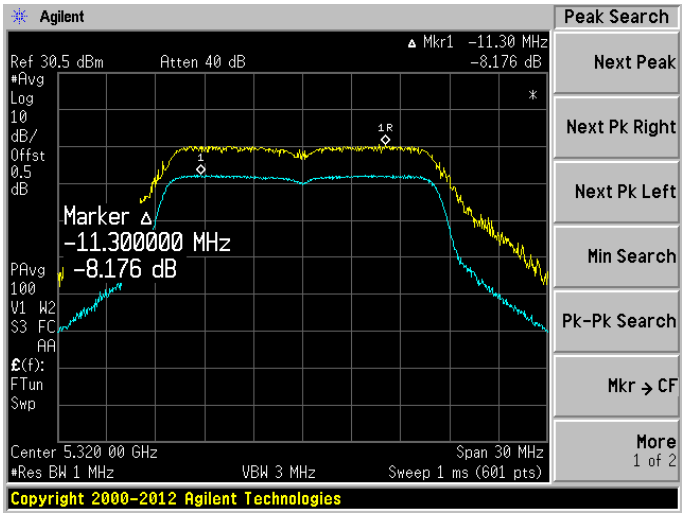
802.11a mode, 5320 MHz, Chain 1



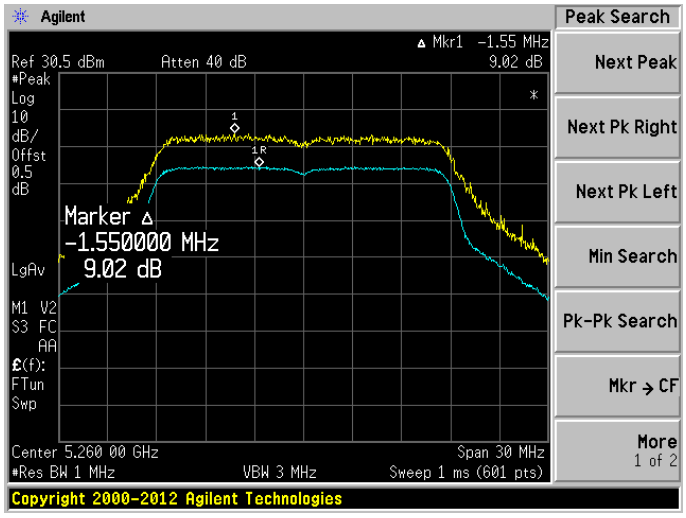
802.11a mode, 5320 MHz, Chain2



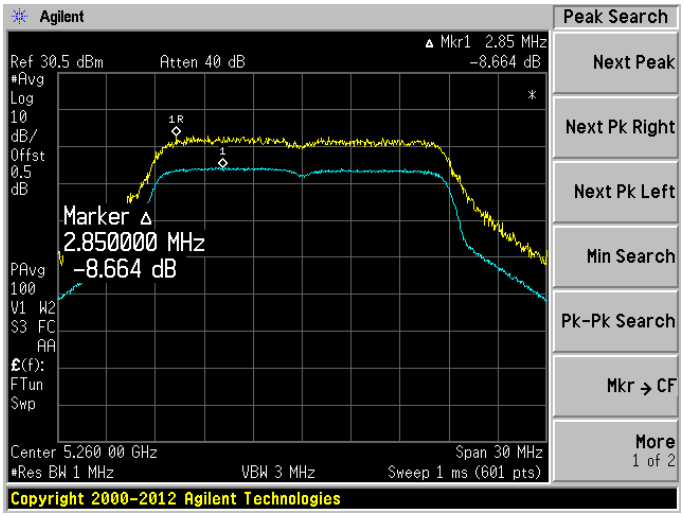
802.11a mode, 5320 MHz, Chain 3



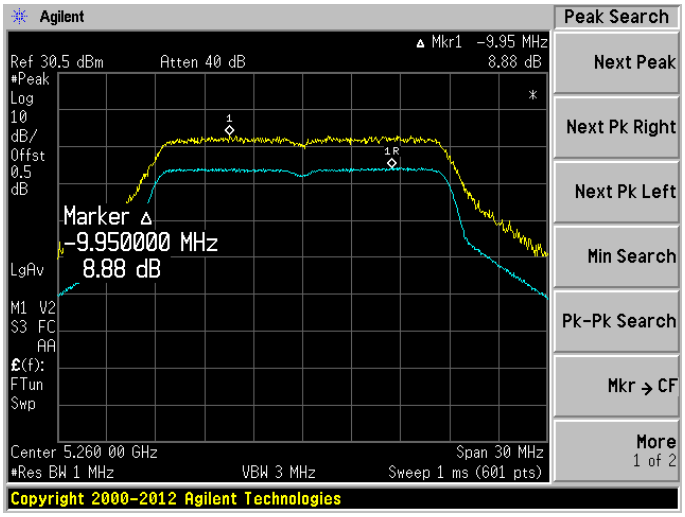
802.11n-HT20 mode, 5260 MHz, Chain 1



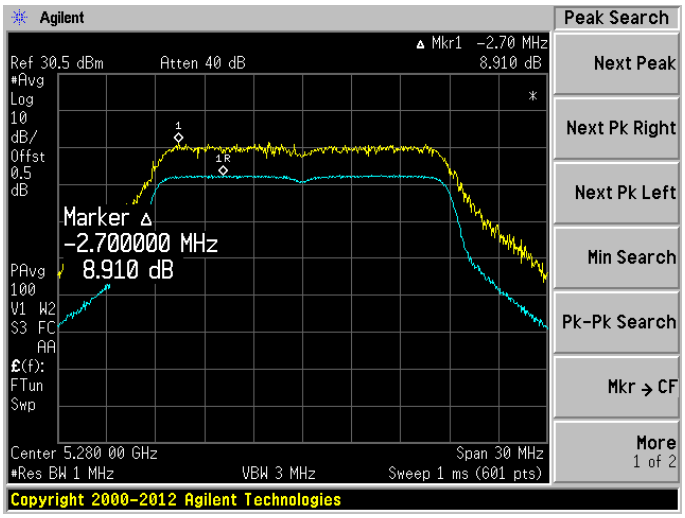
802.11n-HT20 mode, 5260 MHz, Chain 2



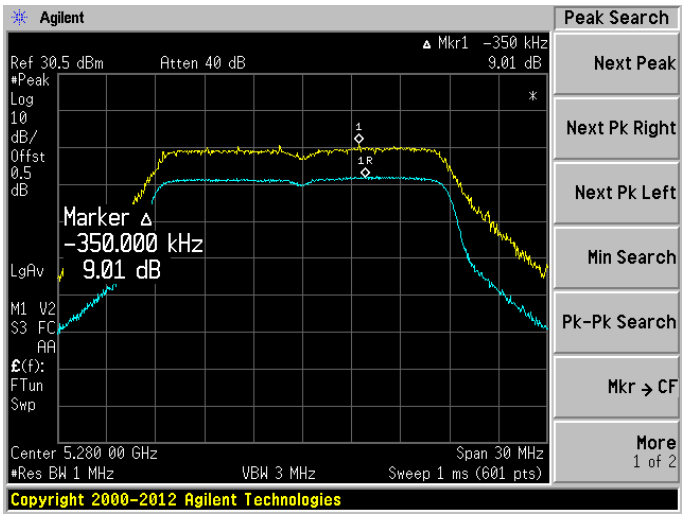
802.11n-HT20 mode, 5260 MHz, Chai 3



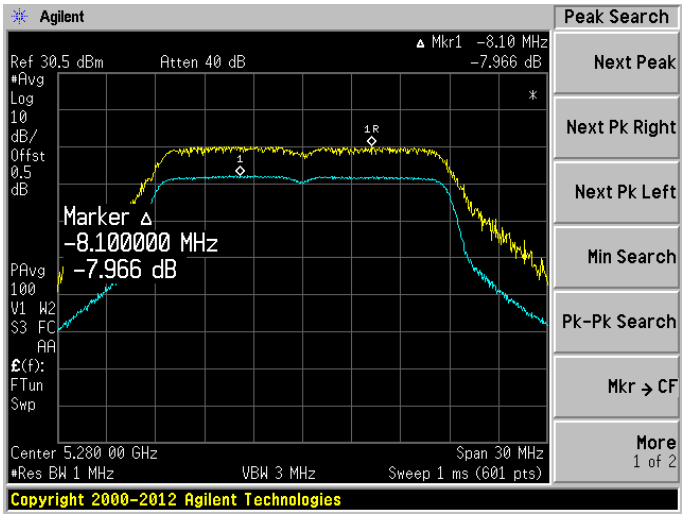
802.11n-HT20 mode, 5280 MHz, Chain 1



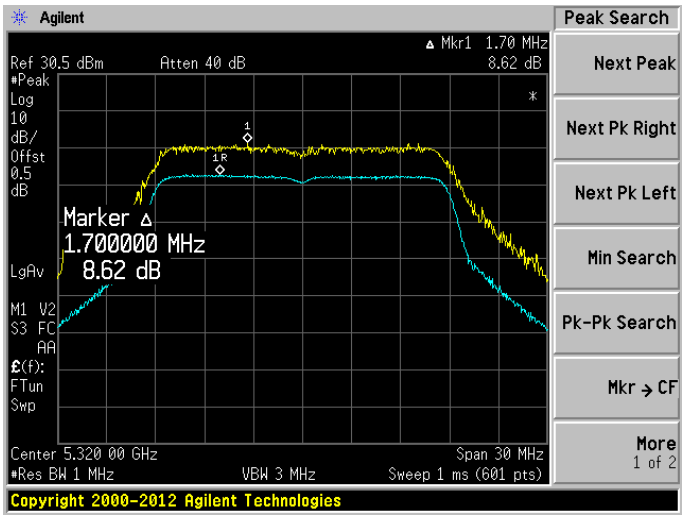
802.11n-HT20 mode, 5280 MHz, Chain 2



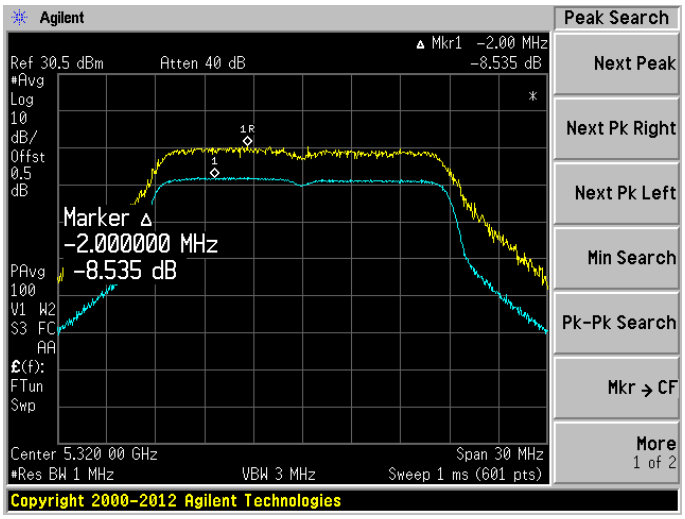
802.11n-HT20 mode, 5280 MHz, Chain 3



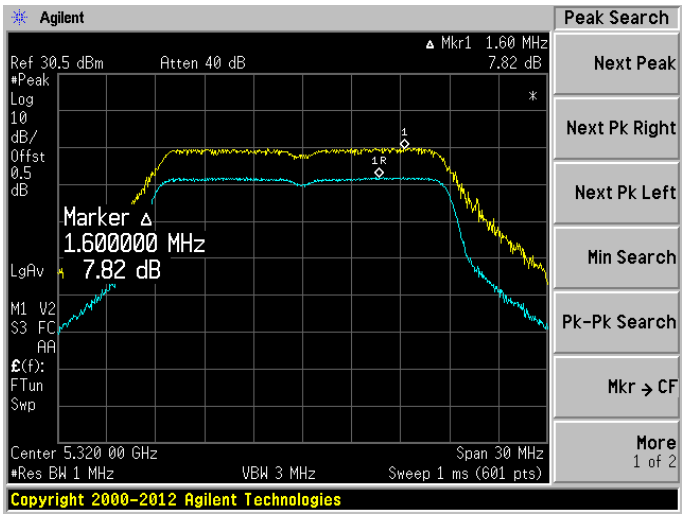
802.11n-HT20 mode, 5320 MHz, Chain 1



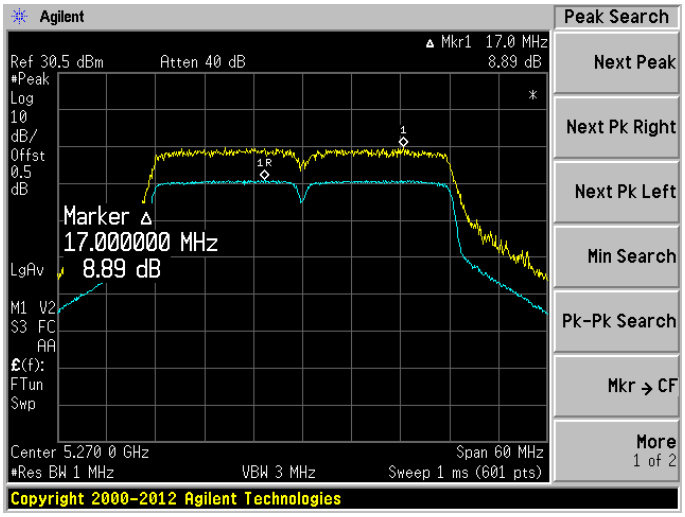
802.11n-HT20 mode, 5320 MHz, Chain 2



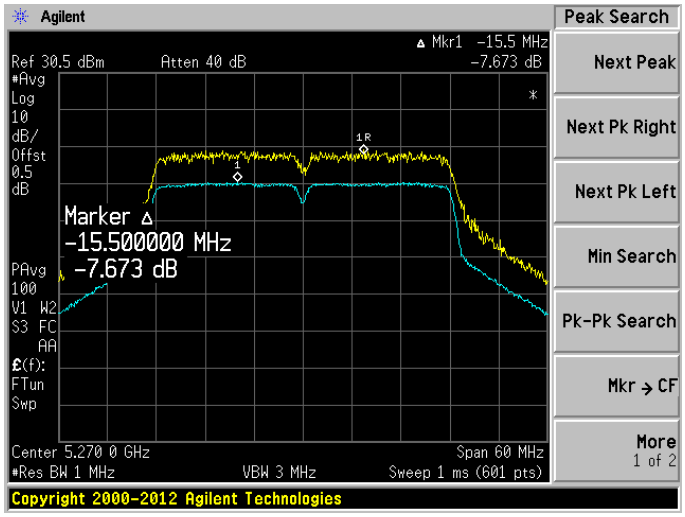
802.11n-HT20 mode, 5320 MHz, Chain 2



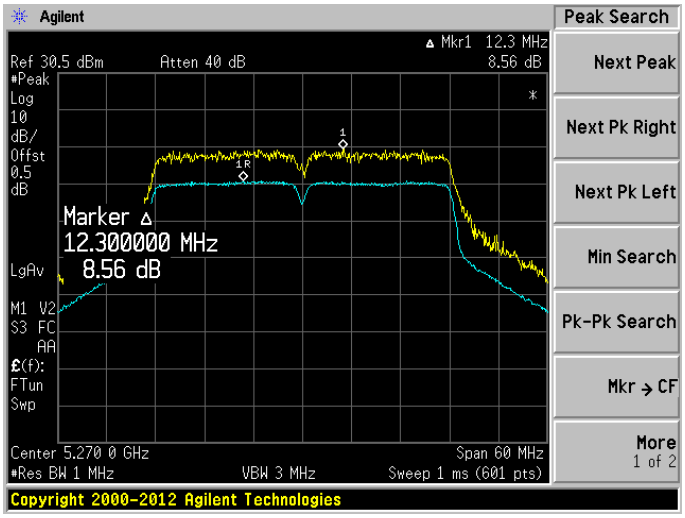
802.11n-HT40 mode, 5270 MHz, Chain 1



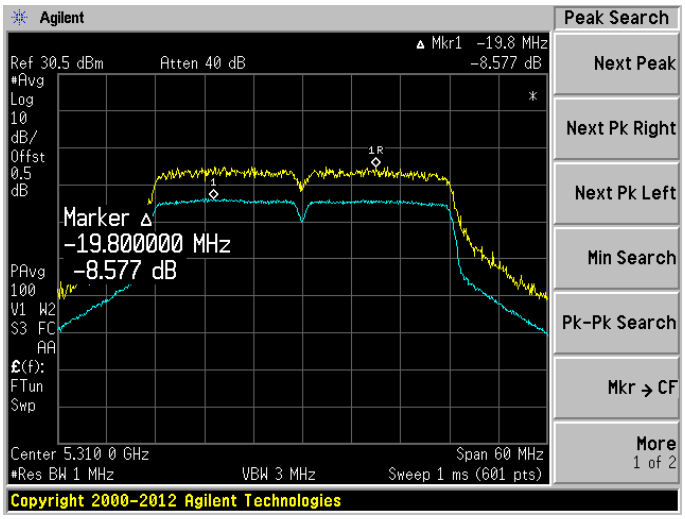
802.11n-HT40 mode, 5270 MHz, Chain 2



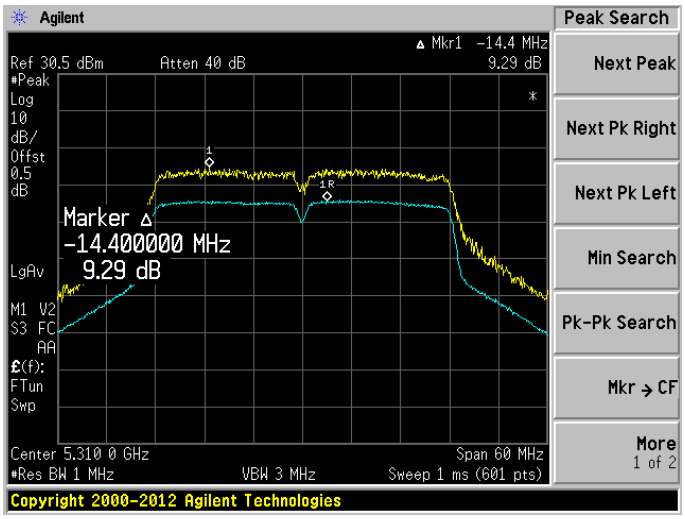
802.11n-HT40 mode, 5270 MHz, Chain 3



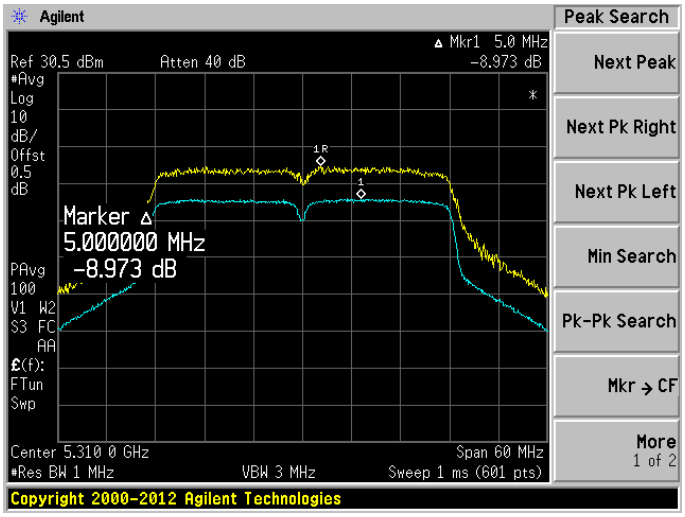
802.11n-HT40 mode, 5310 MHz, Chain 1



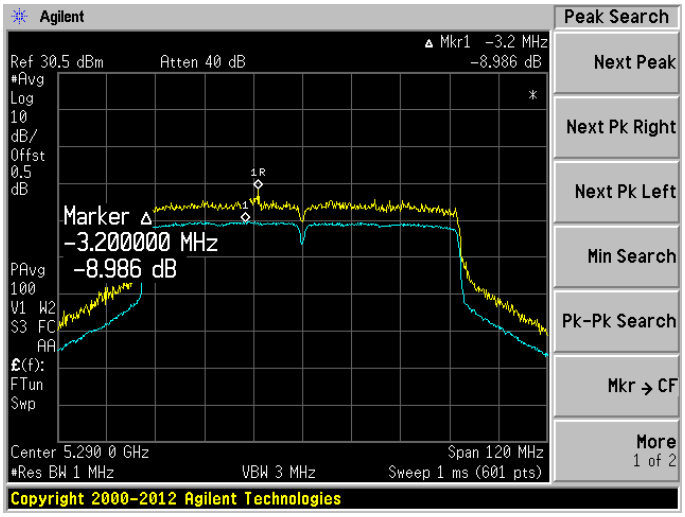
802.11n-HT40 mode, 5310 MHz, Chain 2



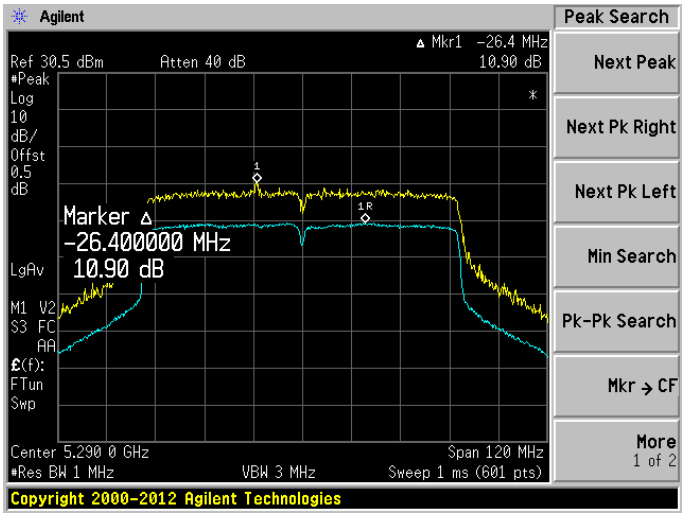
802.11n-HT40 mode, 5310 MHz, Chain 3



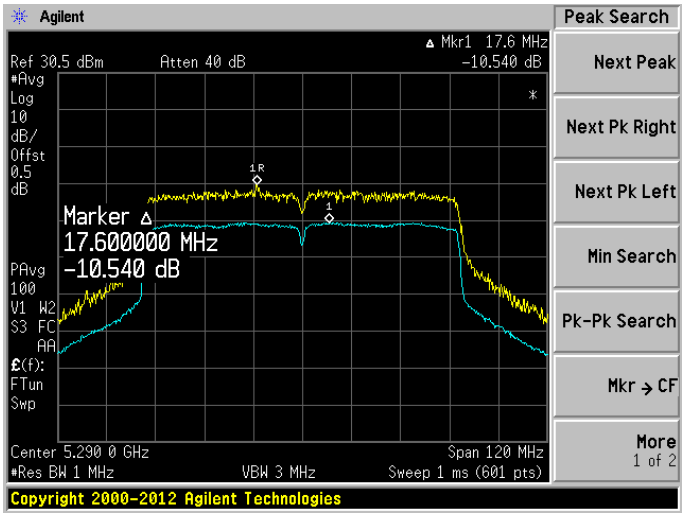
802.11ac-VHT80 mode, 5290 MHz, Chain 1



802.11ac-VHT80 mode, 5290 MHz, Chain 2

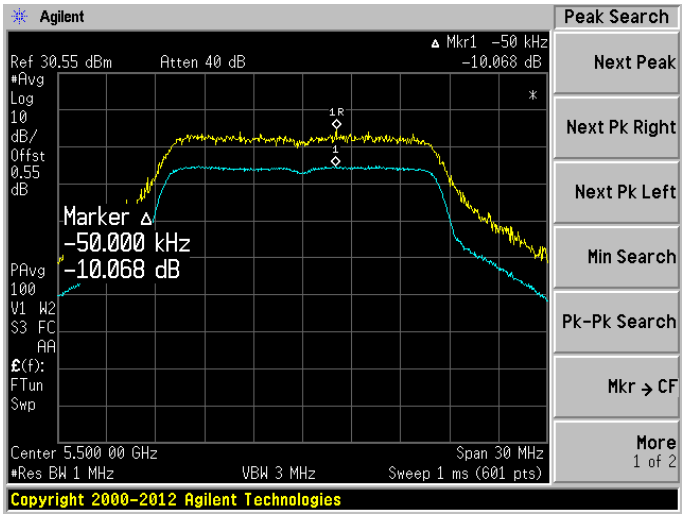


802.11ac-VHT80 mode, 5290 MHz, Chain 3

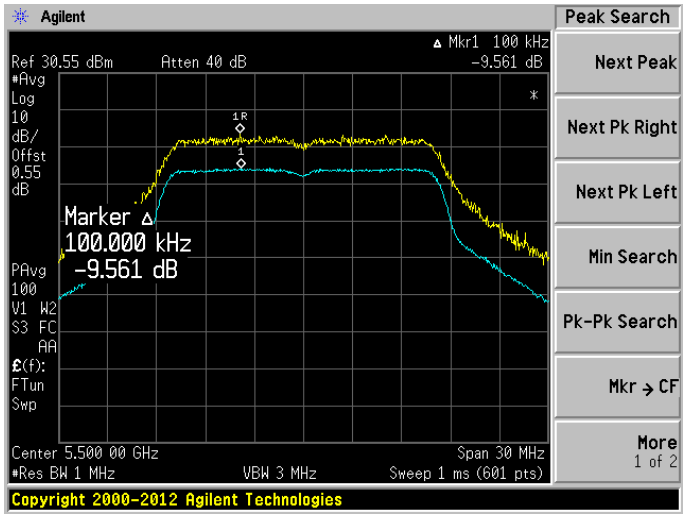


5470-5725 MHz Band

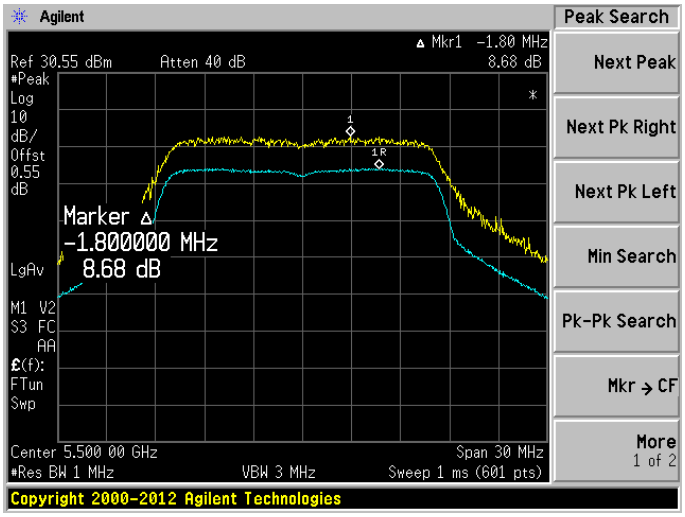
802.11a mode, 5500 MHz, Chain 1



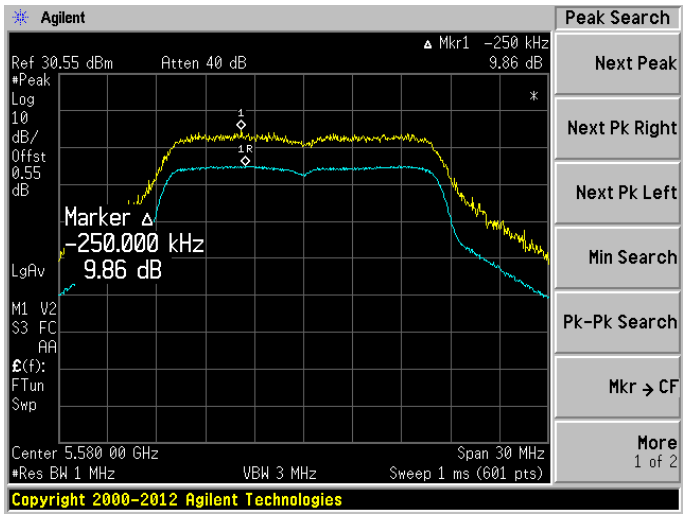
802.11a mode, 5500 MHz, Chain 2



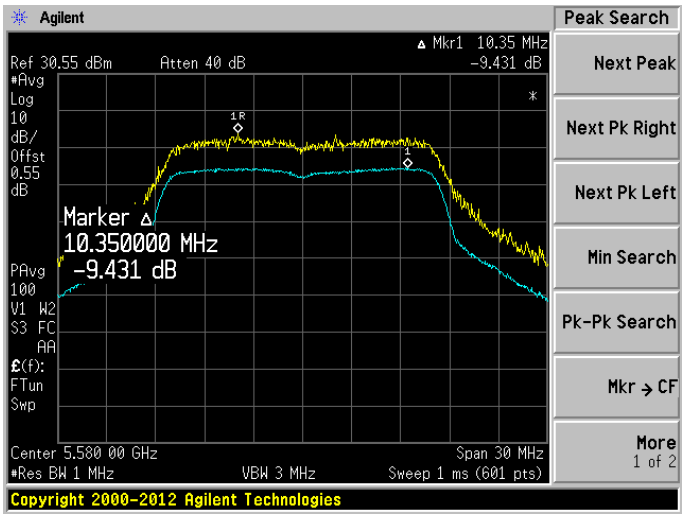
802.11a mode, 5500 MHz, Chain 3



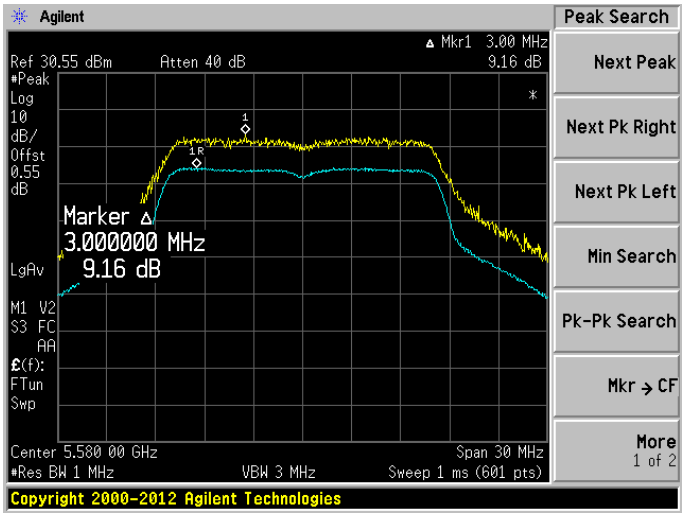
802.11a mode, 5580 MHz, Chain 1



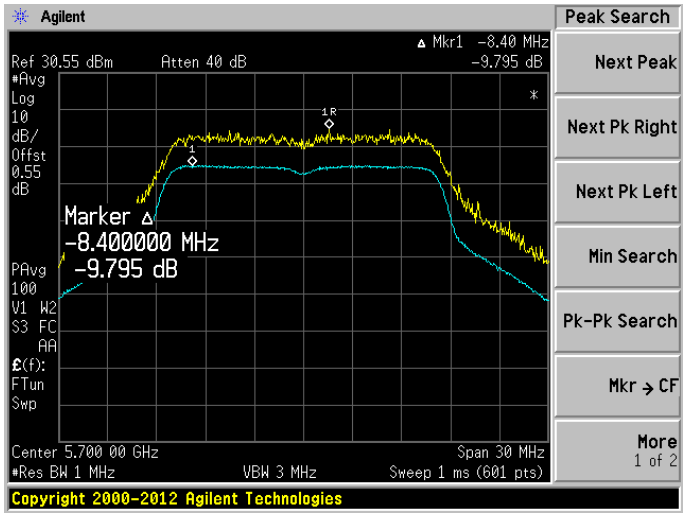
802.11a mode, 5580 MHz, Chain 2



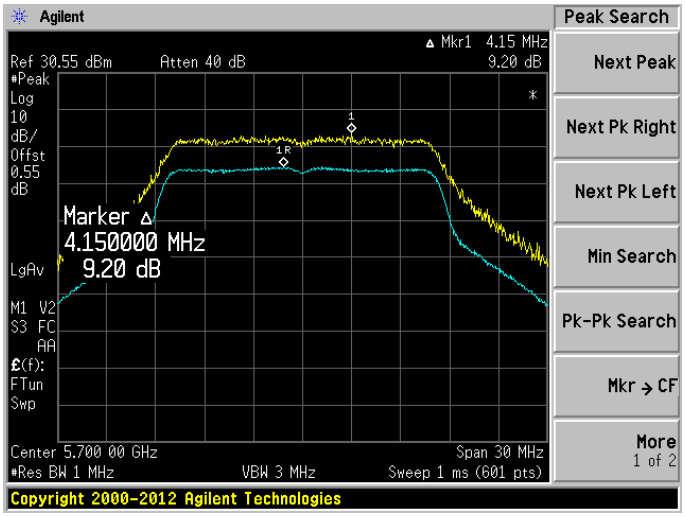
802.11a mode, 5580 MHz, Chain 3



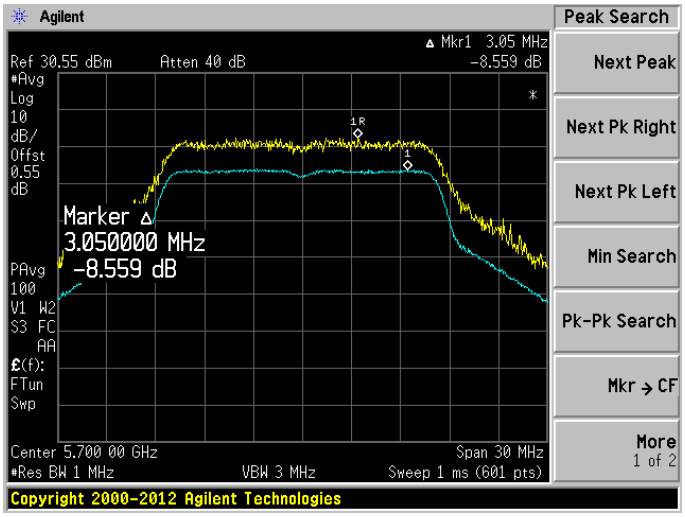
802.11a mode, 5700 MHz, Chain 1



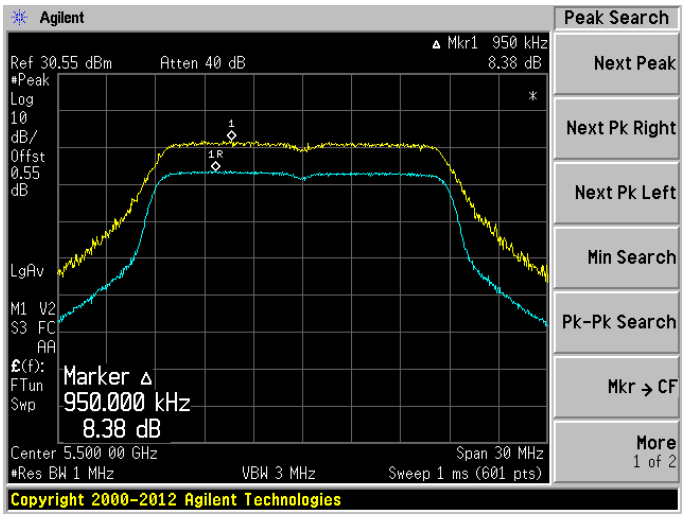
802.11a mode, 5700 MHz, Chain 2



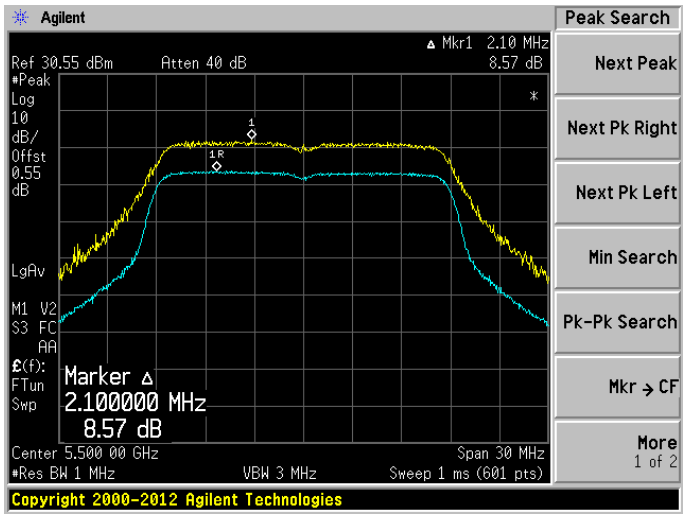
802.11a mode, 5700 MHz, Chain 3



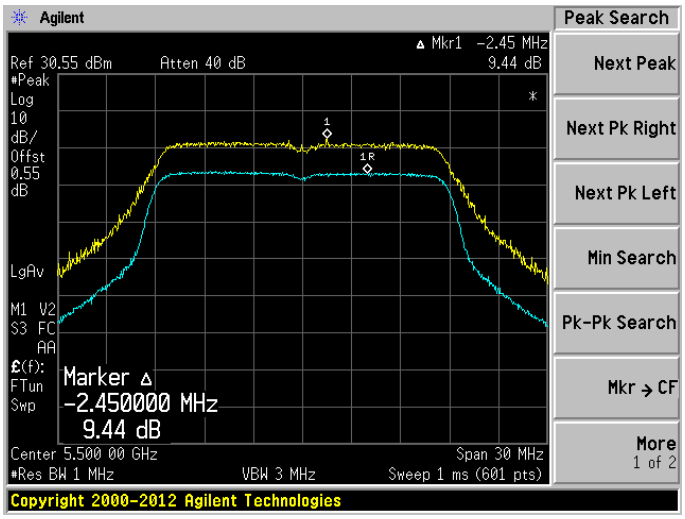
802.11n-HT20 mode, 5500 MHz, Chain 1



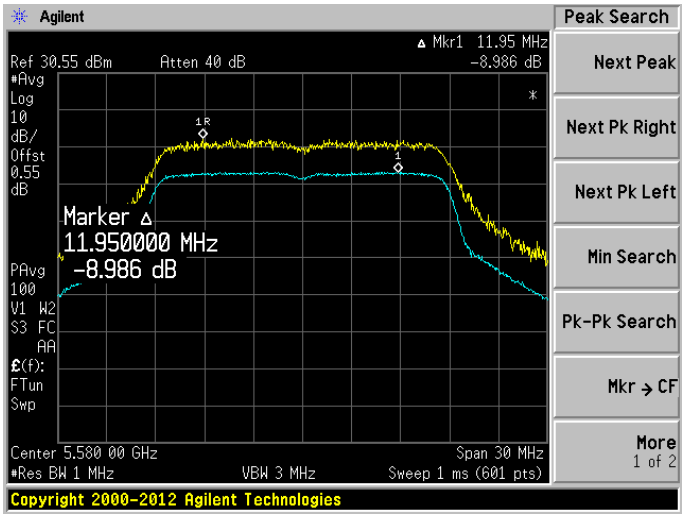
802.11n-HT20 mode, 5500 MHz, Chain 2



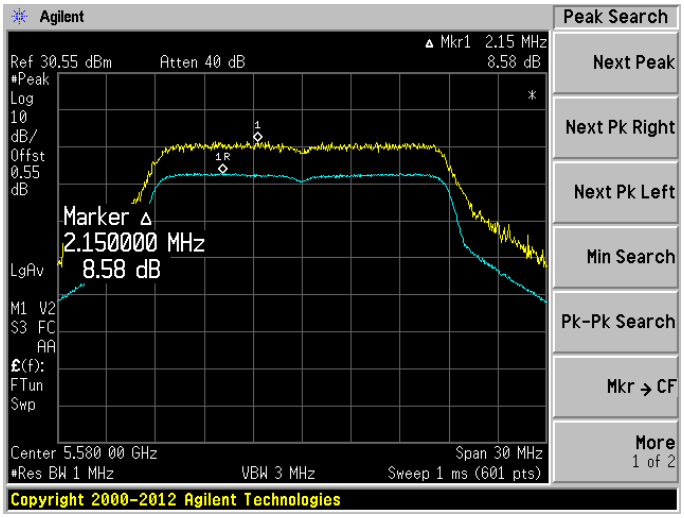
802.11n-HT20 mode, 5500 MHz, Chain 3



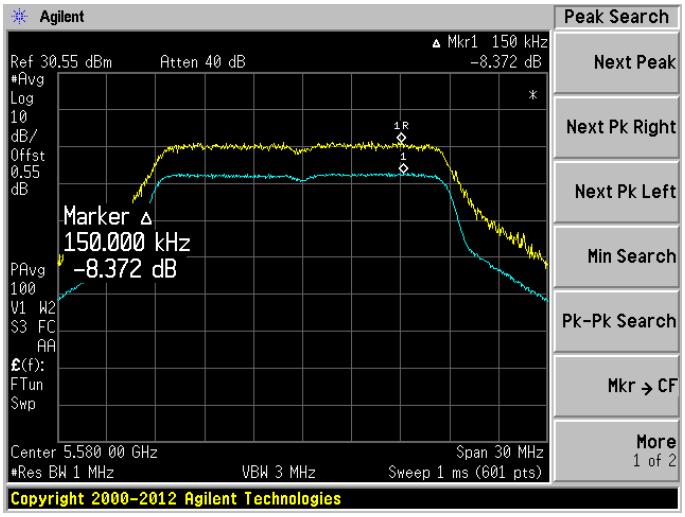
802.11n-HT20 mode, 5580 MHz, Chain 1



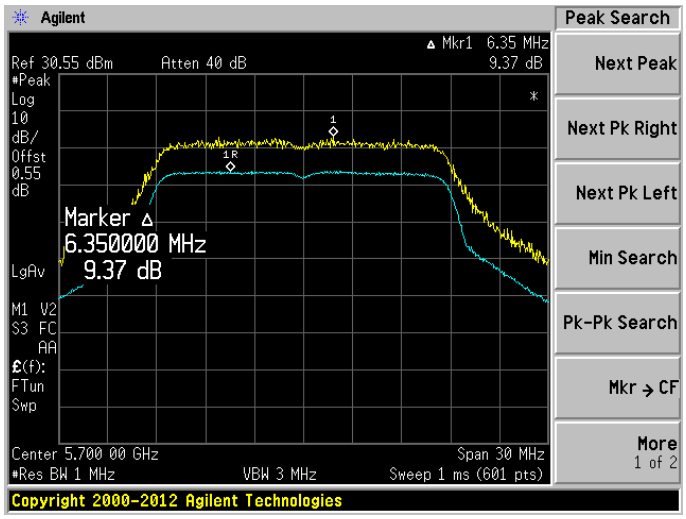
802.11n-HT20 mode, 5580 MHz, Chain 2



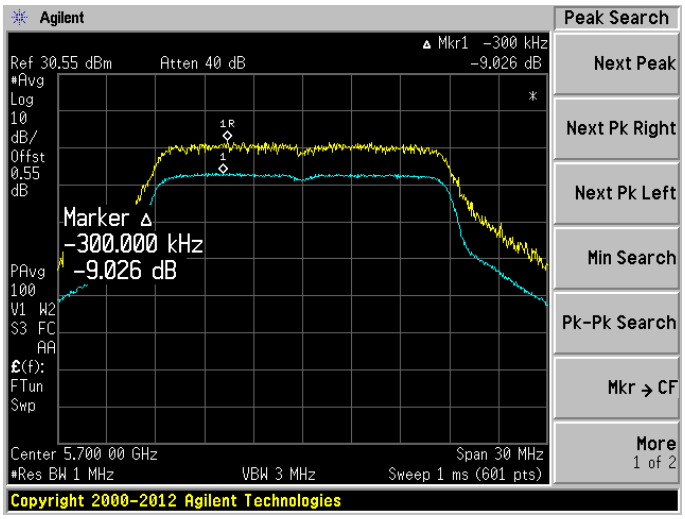
802.11n-HT20 mode, 5580 MHz, Chain 3



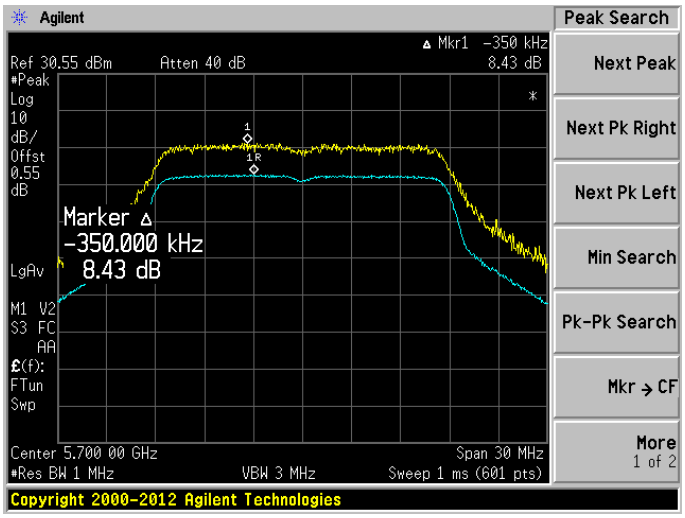
802.11n-HT20 mode, 5700 MHz, Chain 1



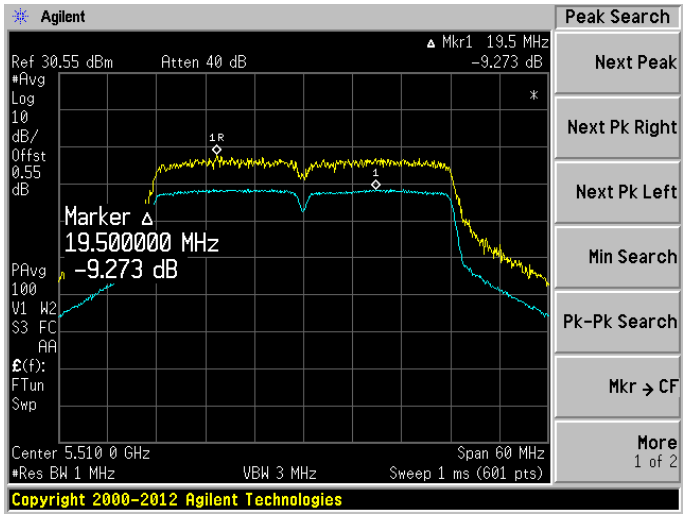
802.11n-HT20 mode, 5700 MHz, Chain 2



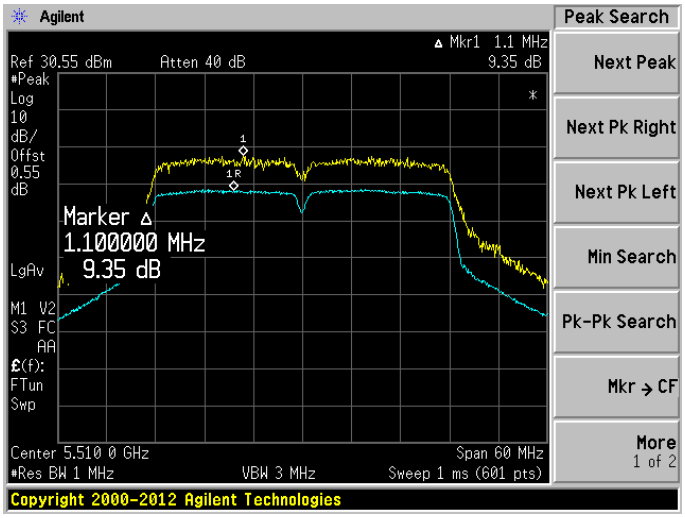
802.11n-HT20 mode, 5700 MHz, Chain 3



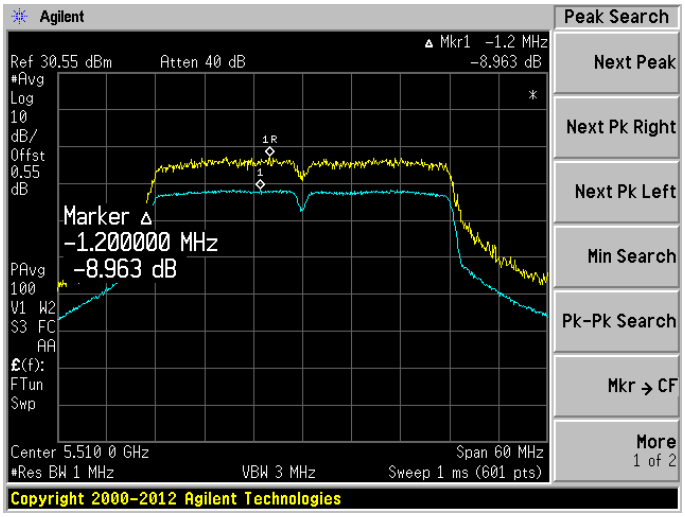
802.11n-HT40 mode, 5510 MHz, Chain 1



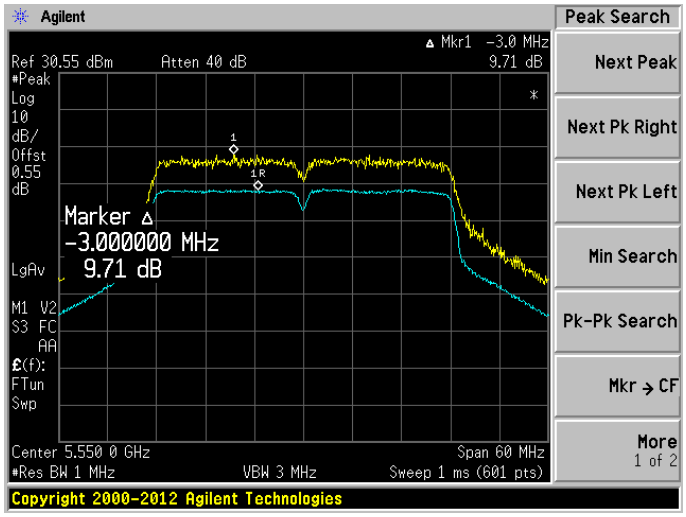
802.11n-HT40 mode, 5510 MHz, Chain 2



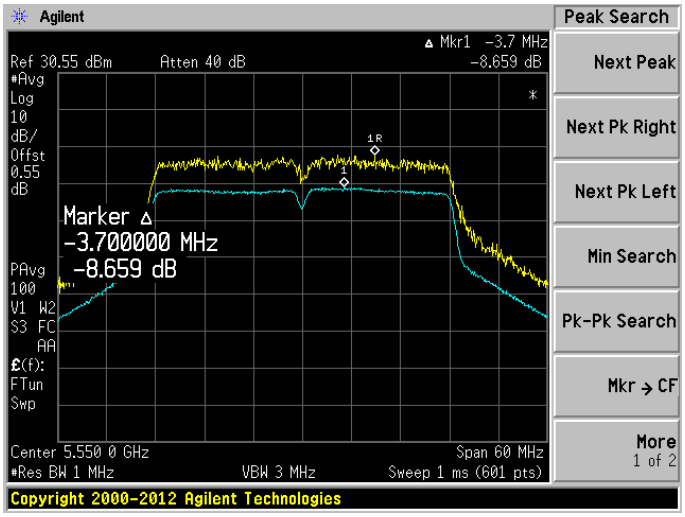
802.11n-HT40 mode, 5510 MHz, Chain 3



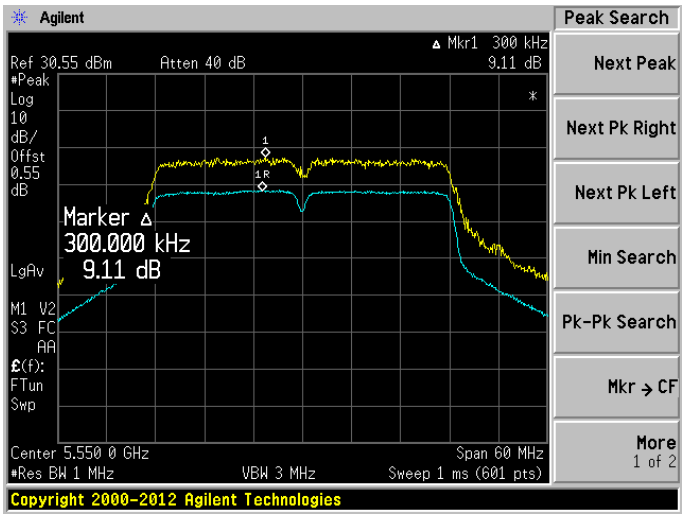
802.11n-HT40 mode, 5550 MHz, Chain 1



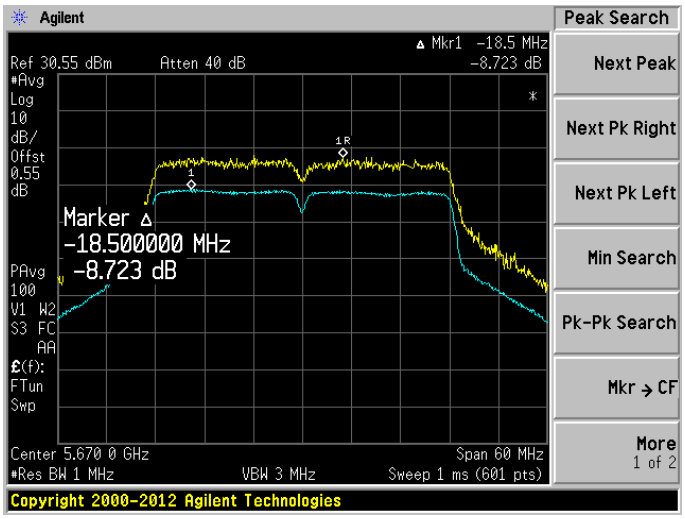
802.11n-HT40 mode, 5550 MHz, Chain 2



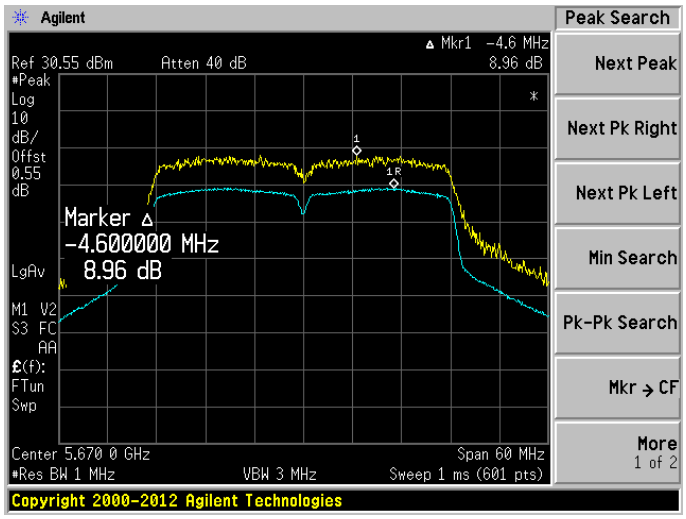
802.11n-HT40 mode, 5550 MHz, Chain 3



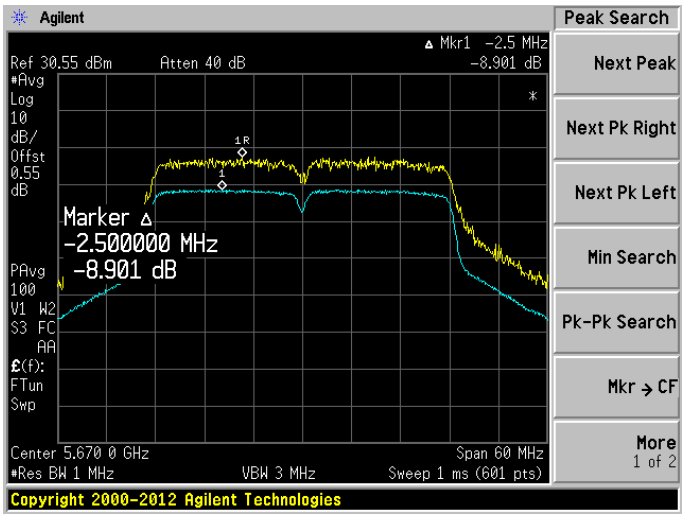
802.11n-HT40 mode, 5670 MHz, Chain 1



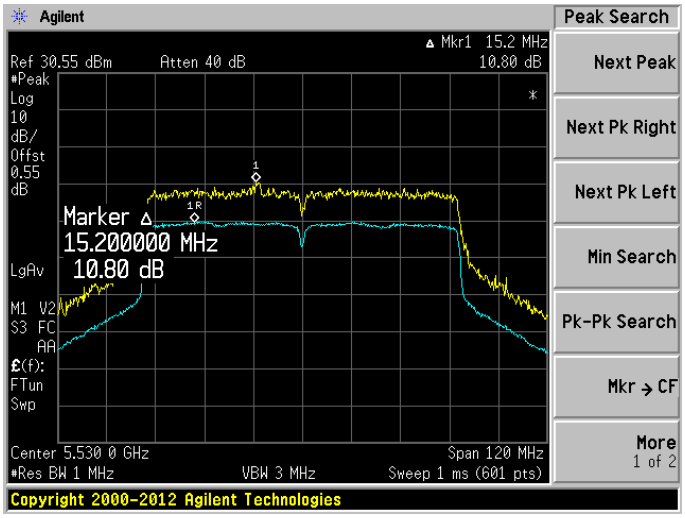
802.11n-HT40 mode, 5670 MHz, Chain 2



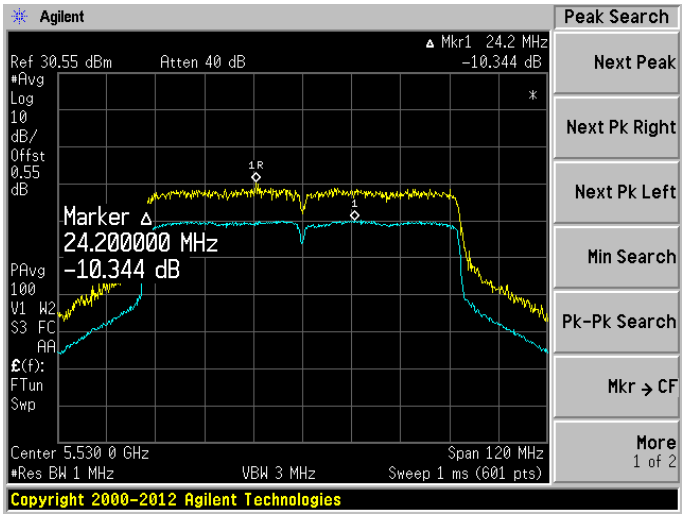
802.11n-HT40 mode, 5670 MHz, Chain 3



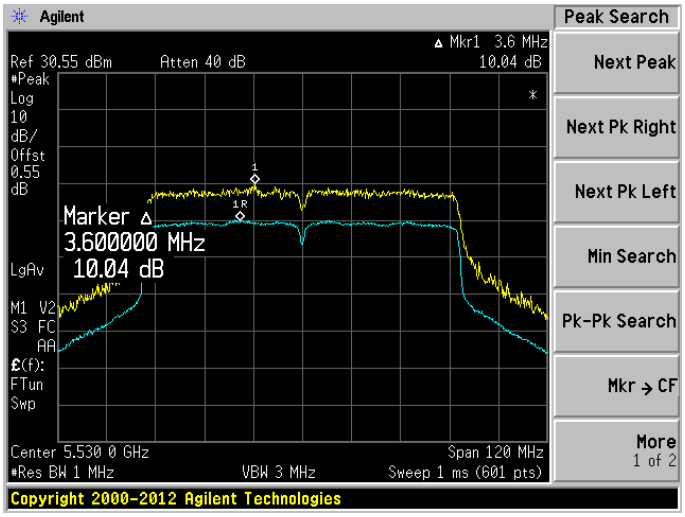
802.11a-80 mode, 5530 MHz, Chain 1



802.11a-80 mode, 5530 MHz, Chain 2



802.11a-80 mode, 5530 MHz, Chain 3



13 FCC §15.407(a) - Power Spectral Density

13.1 Applicable Standards

FCC §15.407(a)

13.2 Measurement Procedure

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

The measurements are base on FCC KDB 789033 D01 General UNII Test Procedures v01r04

13.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2013-09-29	1 year

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

13.4 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 on 2014-07-07 to 2014-07-14 at RF site.

13.5 Test Results

Note: Duty Cycle is 99%, no duty factor should be added

5.3 GHz Band

802.11a mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)
Low	5260	5.092	5.005	5.361	9.93	11
Middle	5280	5.473	5.102	4.917	9.94	11
High	5320	3.502	2.7	2.777	7.78	11

802.11n-HT20 mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)
Low	5260	5.164	4.909	5.151	9.85	11
Middle	5280	5.249	4.936	5.000	9.83	11
High	5320	3.071	2.286	2.299	7.34	11

802.11n-HT40 mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)
Low	5270	1.482	0.735	1.202	5.92	11
High	5310	-3.362	-3.831	-3.409	1.24	11

802.11ac-VHT80 mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)
-	5290	-9.517	-10.044	-9.983	-5.07	11

5.6 GHz Band

802.11a mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Chain2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)
Low	5550	5.166	4.568	4.277	9.46	11
Middle	5580	5.211	4.75	4.434	9.58	11
High	5700	5.038	4.88	4.144	9.48	11

802.11n-HT20 mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)
Low	5500	3.246	3.304	3.543	8.14	11
Middle	5580	3.557	3.496	3.468	8.28	11
High	5700	3.922	3.528	3.122	8.31	11

802.11n-HT40 mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)
Low	5510	-0.467	-0.613	-0.709	4.18	11
Middle	5550	-0.729	-0.359	-0.831	4.14	11
High	5670	-0.75	-0.465	-0.584	4.17	11

802.11ac-VHT80 mode

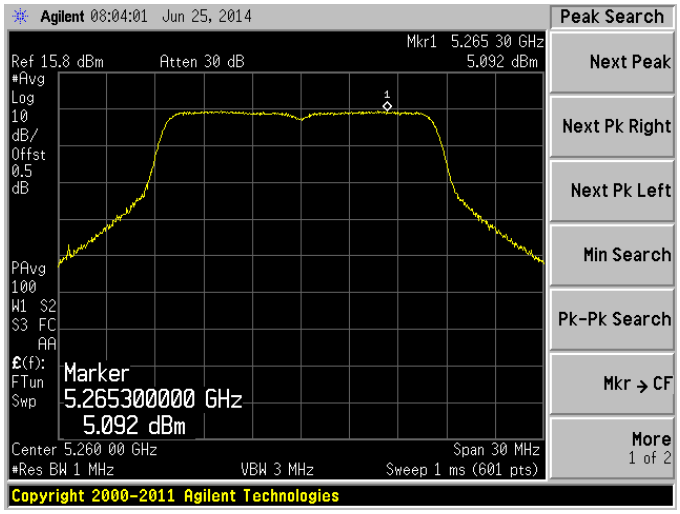
Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)
-	5530	-8.849	-8.849	-8.856	-4.08	11

Please refer to the following plots.

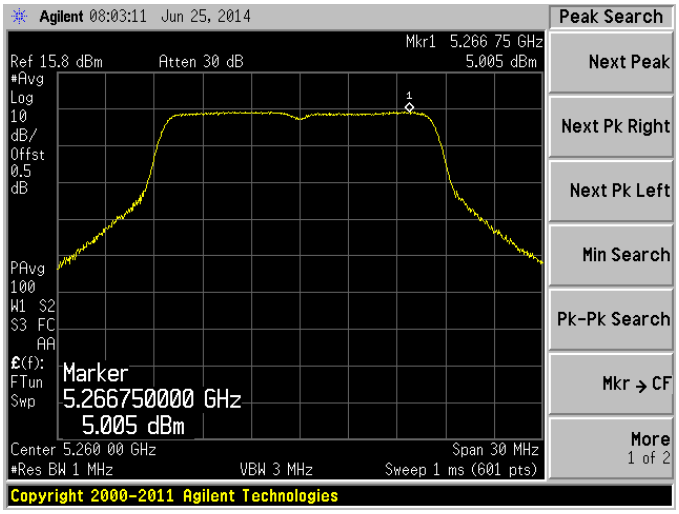
5.3 GHz Band

802.11a, Low Channel, 5260 MHz

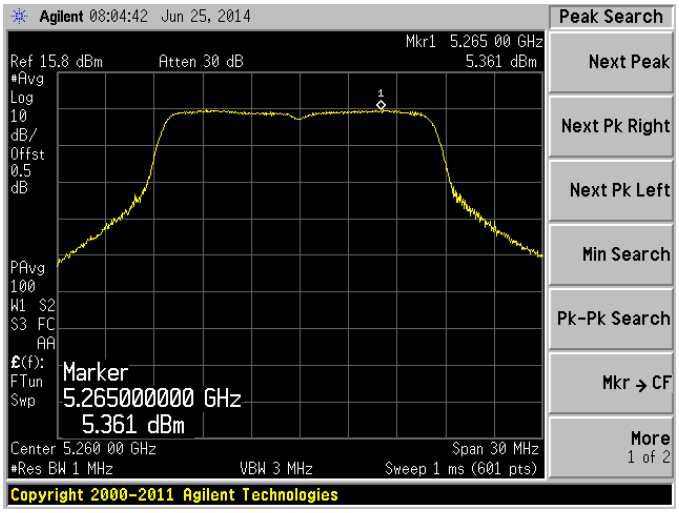
Chain 0



Chain 1

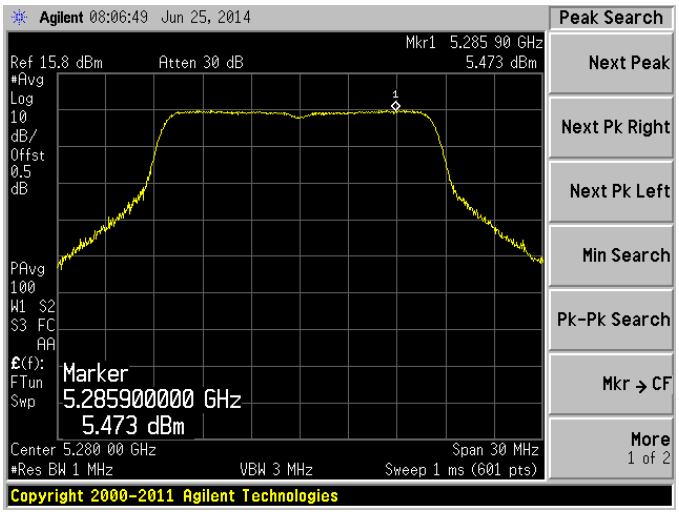


Chain 2

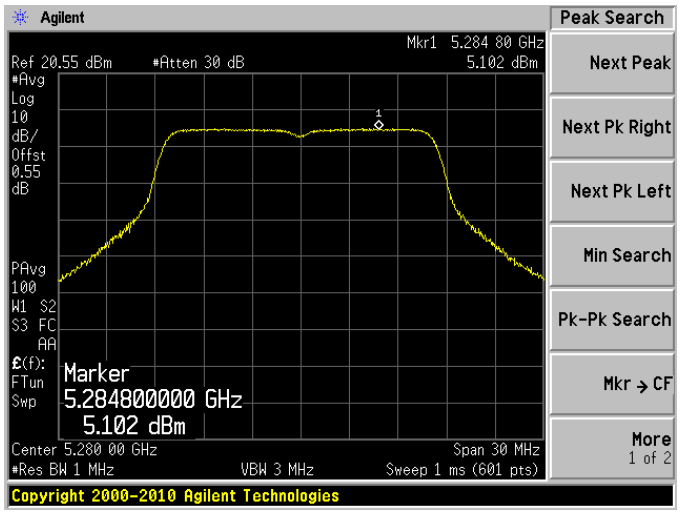


802.11a, Middle Channel, 5280 MHz

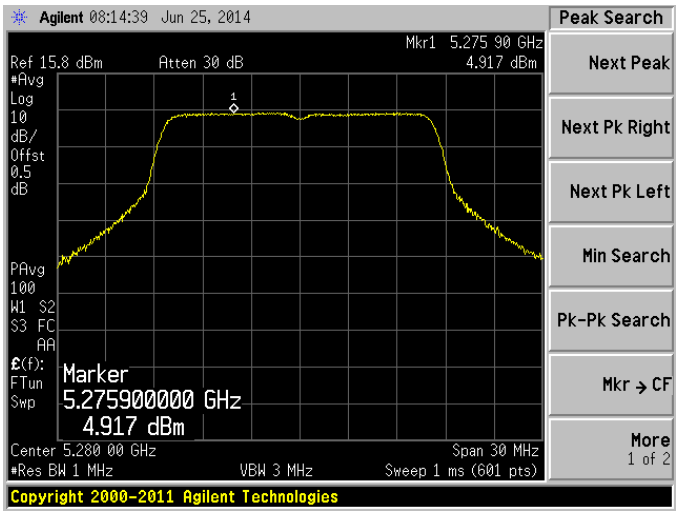
Chain 0



Chain 1

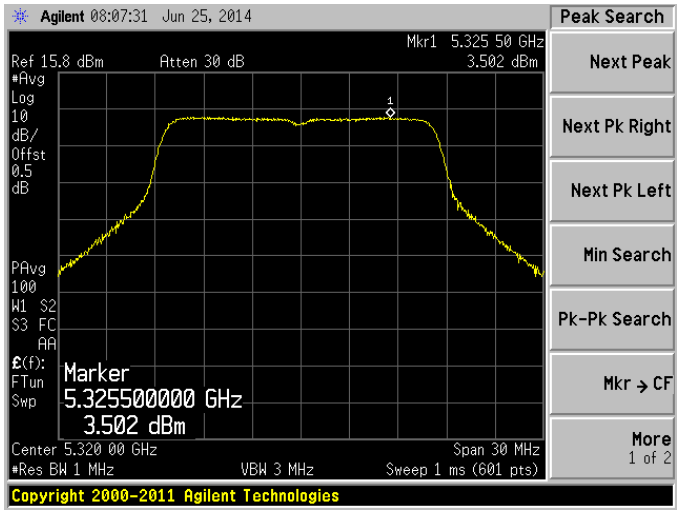


Chain 2

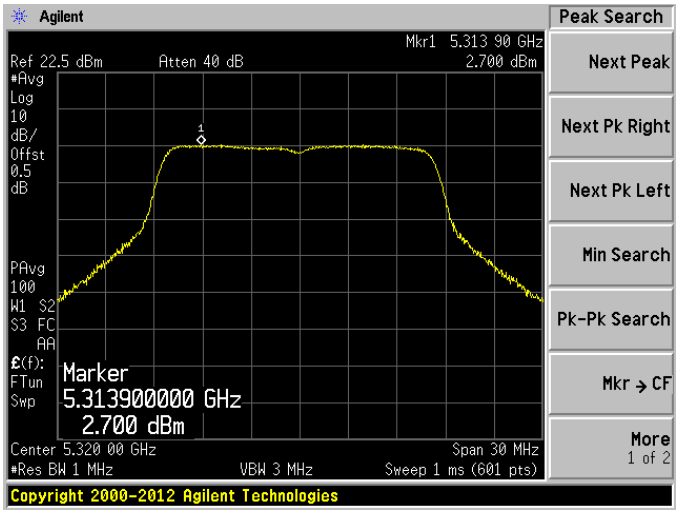


802.11a, High Channel, 5320 MHz

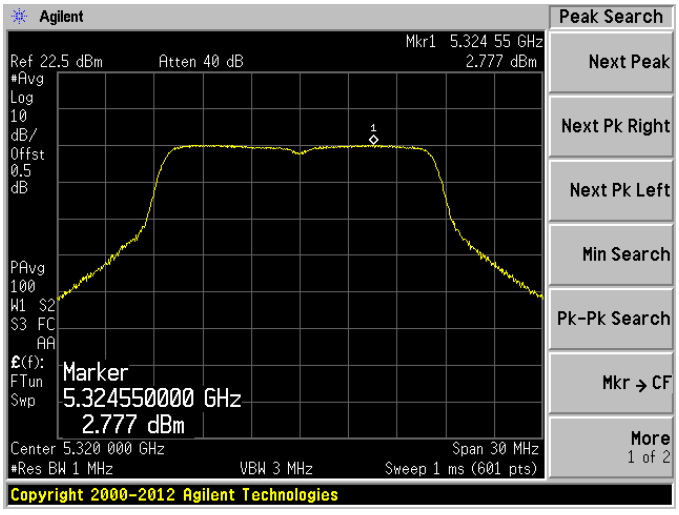
Chain 0



Chain 1

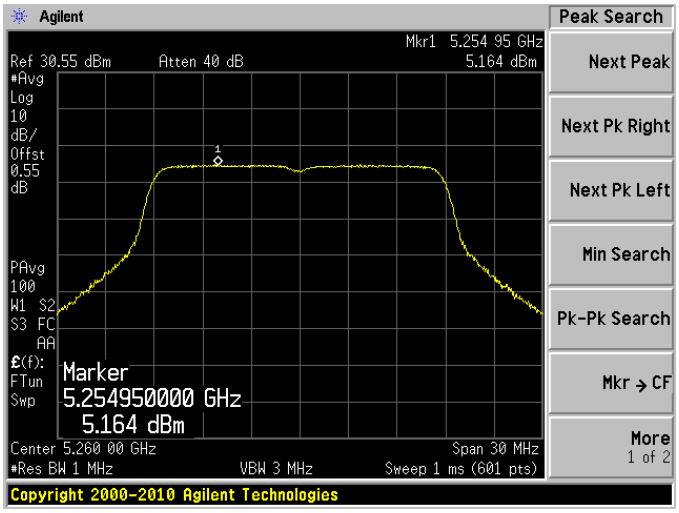


Chain 2

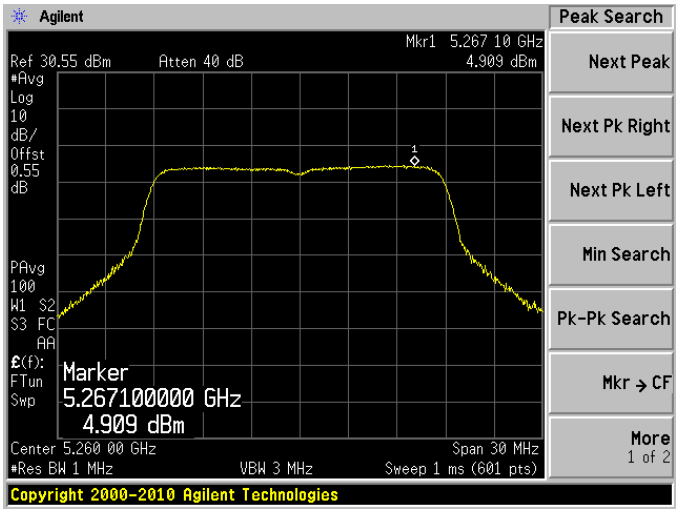


802.11n-HT20, Low Channel 5260 MHz

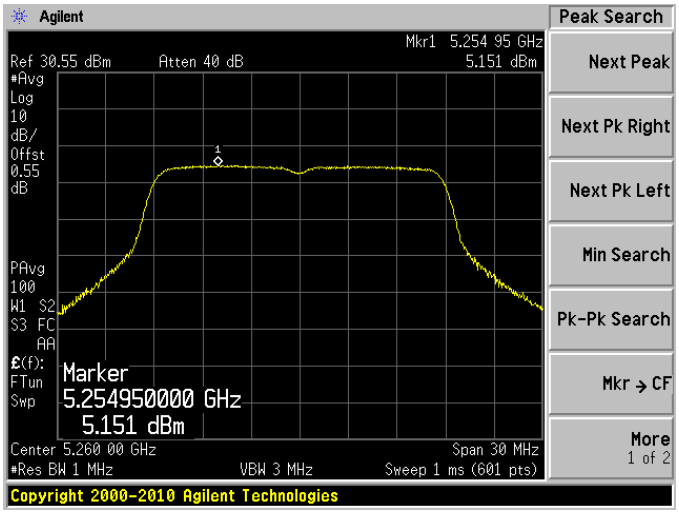
Chain 0



Chain 1

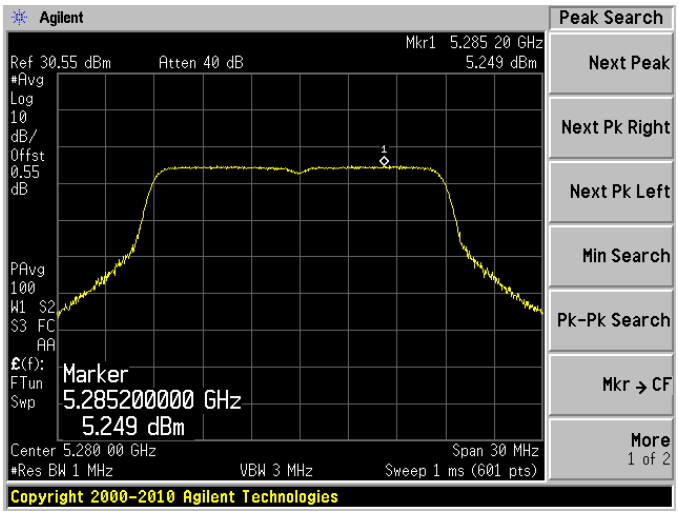


Chain 2

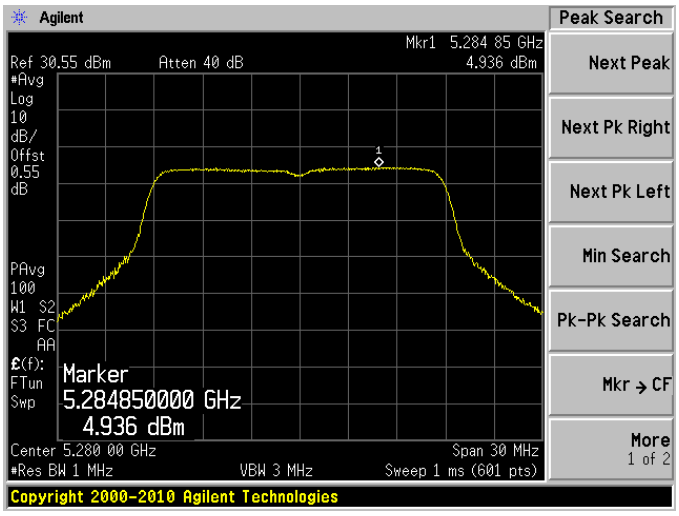


802.11n-HT20, Middle Channel 5280 MHz

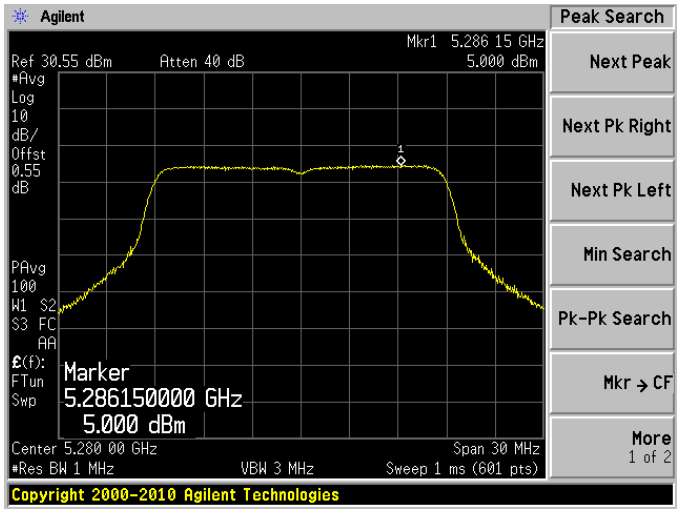
Chain 0



Chain 1

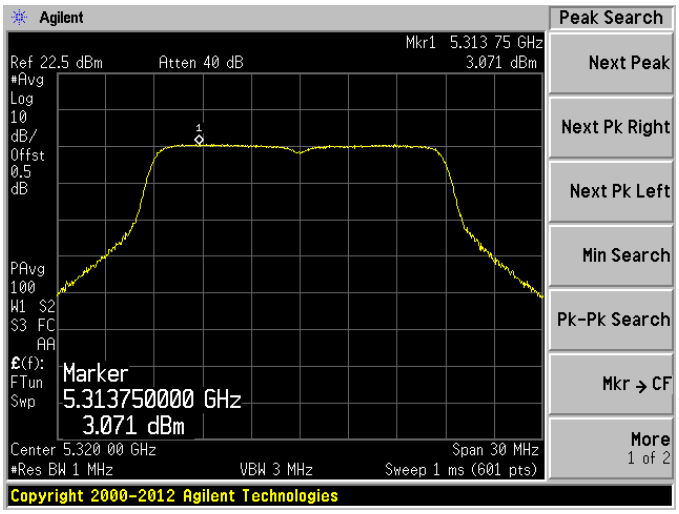


Chain 2

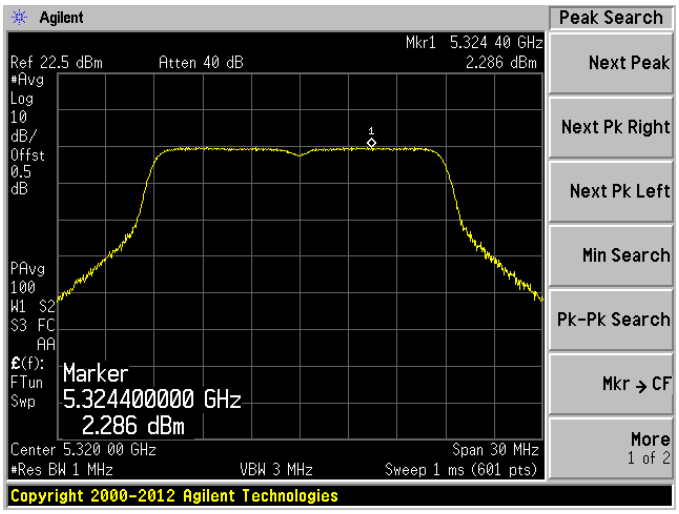


802.11n-HT20, High Channel, 5320 MHz

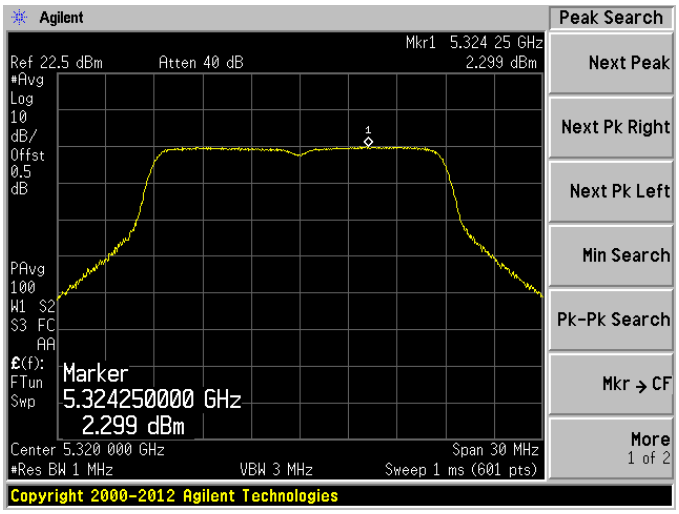
Chain 0



Chain 1

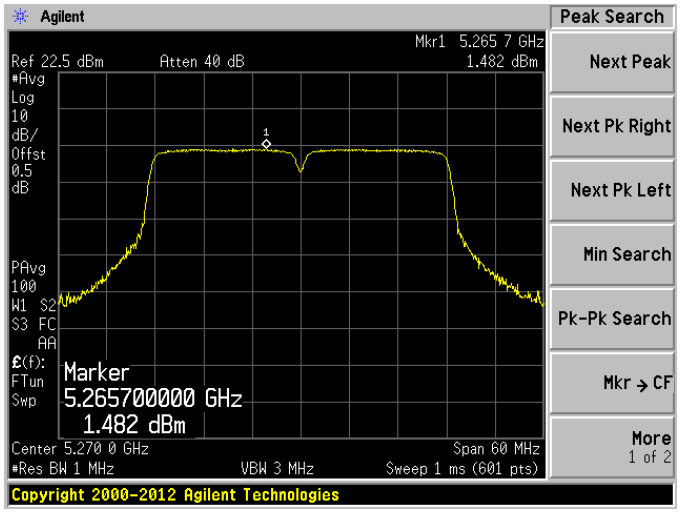


Chain 2

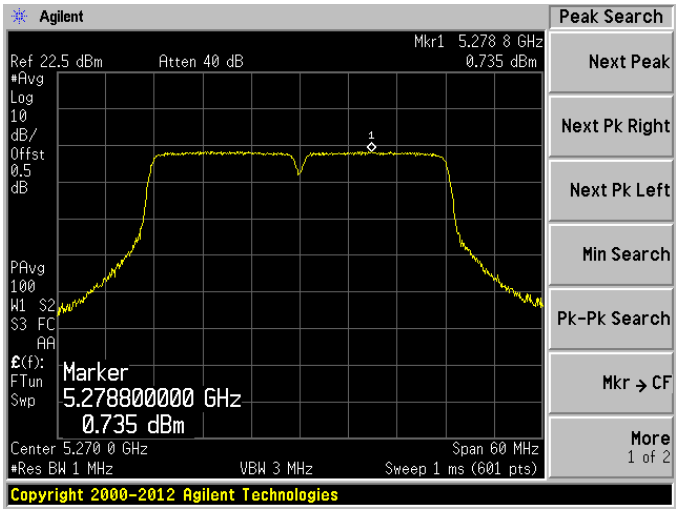


802.11n-HT40, Low Channel 5270 MHz

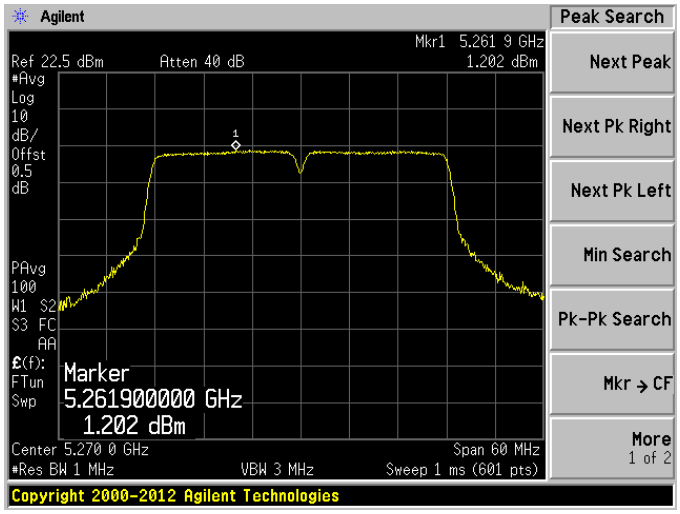
Chain 0



Chain 1

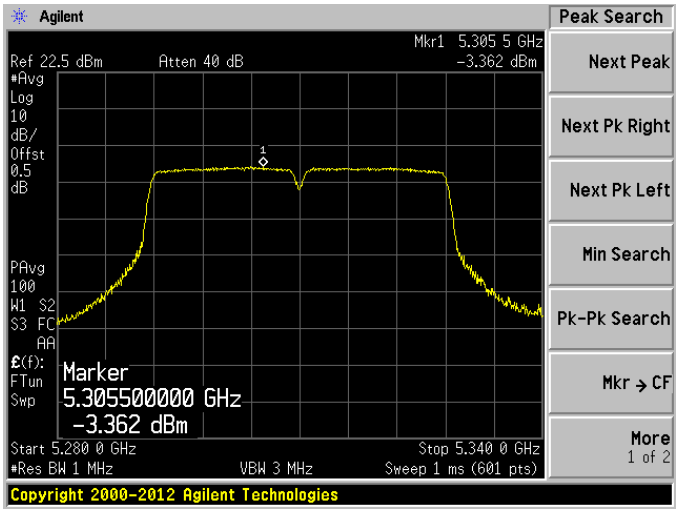


Chain 2

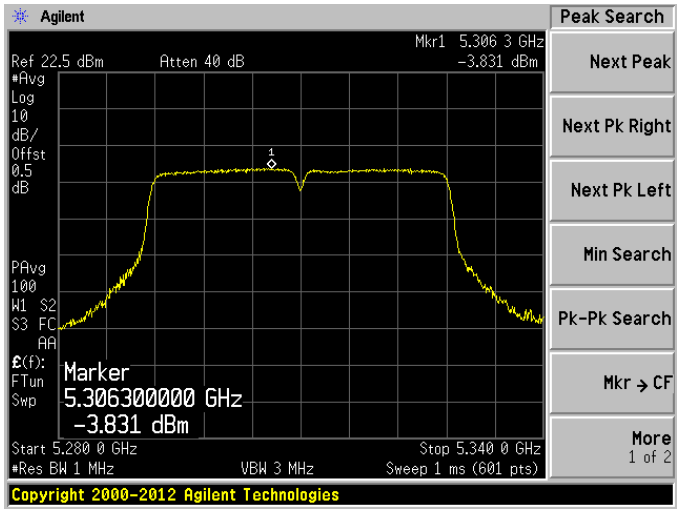


802.11n-HT40, High Channel 5310 MHz

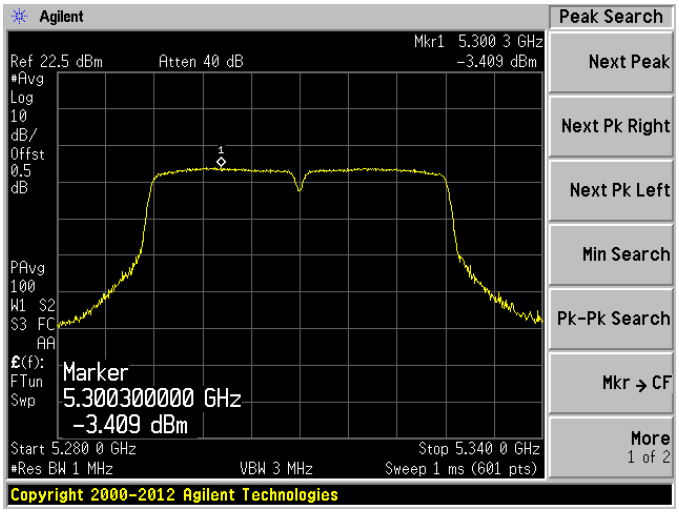
Chain 0



Chain 1

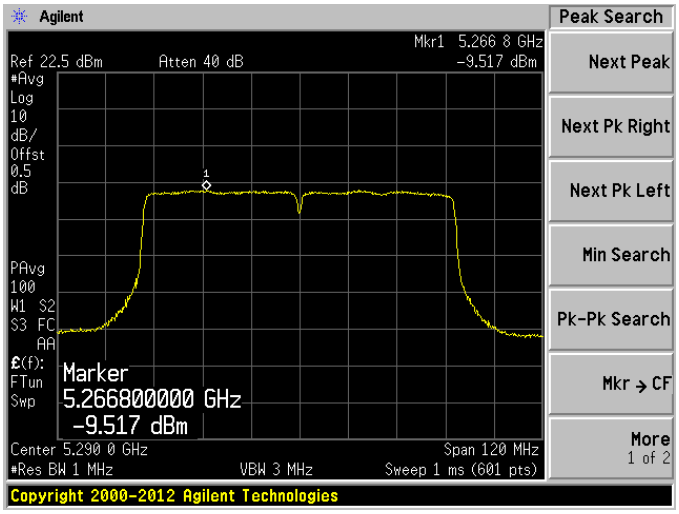


Chain 2

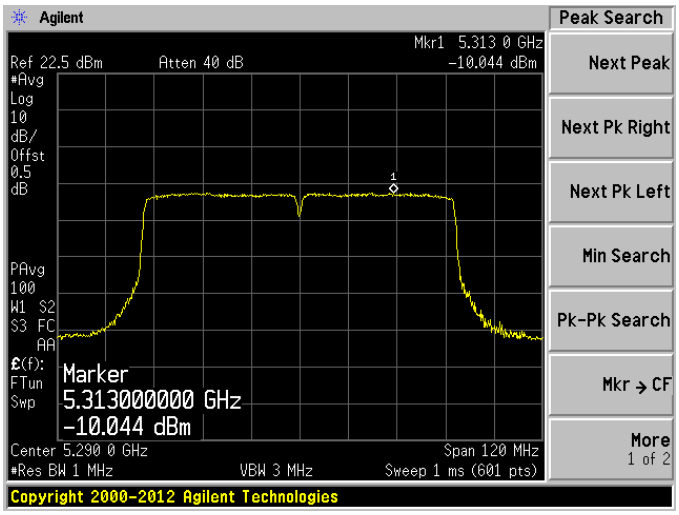


802.11ac-VHT80, High Channel 5290 MHz

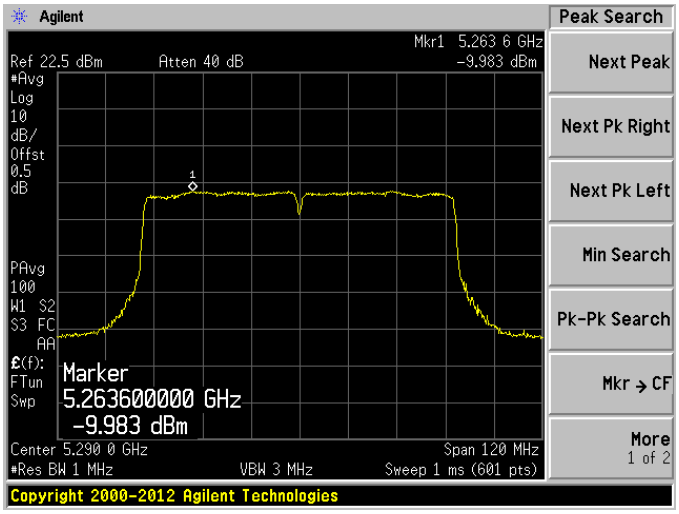
Chain 0



Chain 1



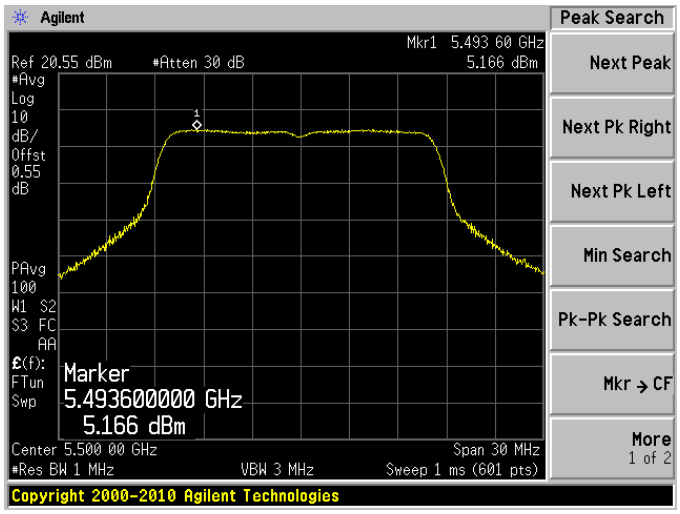
Chain 2



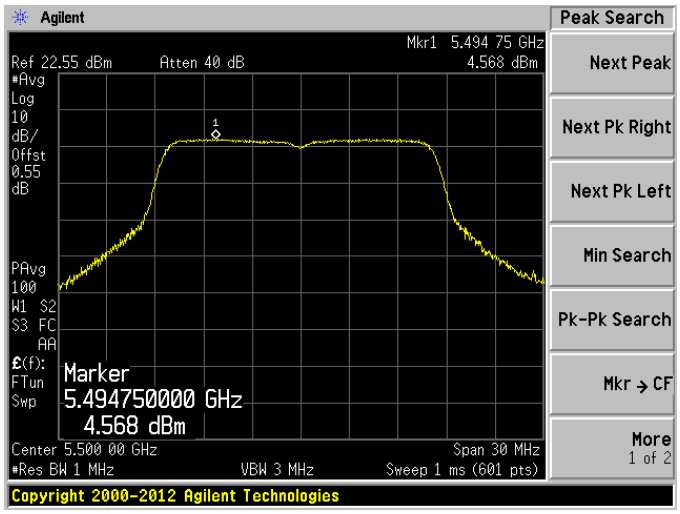
5.6 GHz Band

802.11a, Low Channel, 5500 MHz

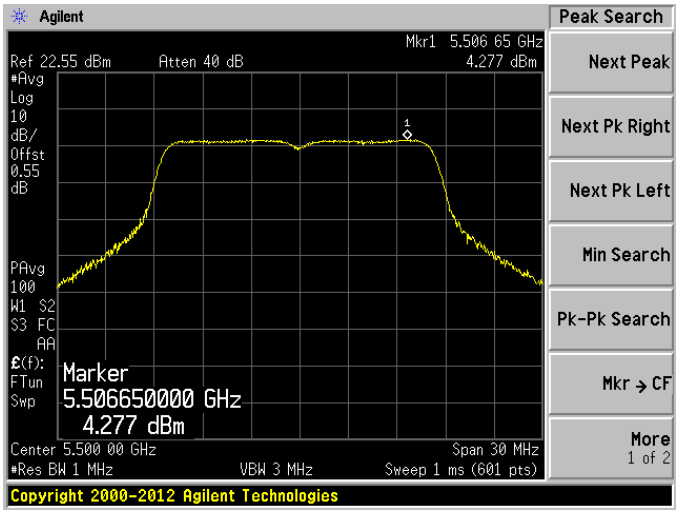
Chain 0



Chain 1

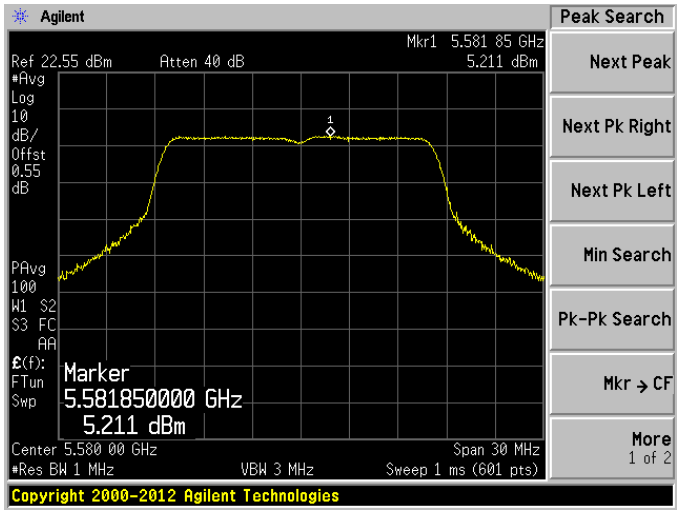


Chain 2

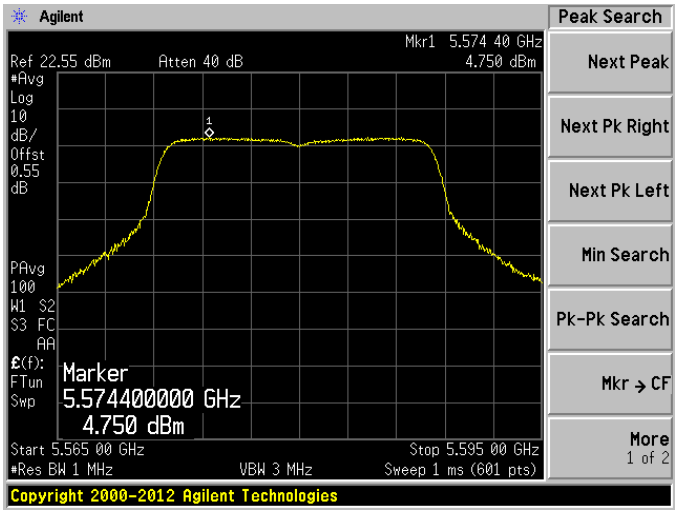


802.11a, Middle Channel, 5580 MHz

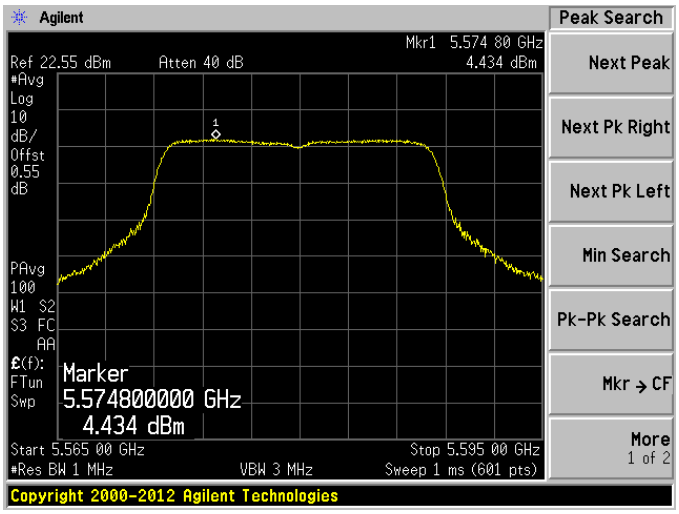
Chain 0



Chain 1

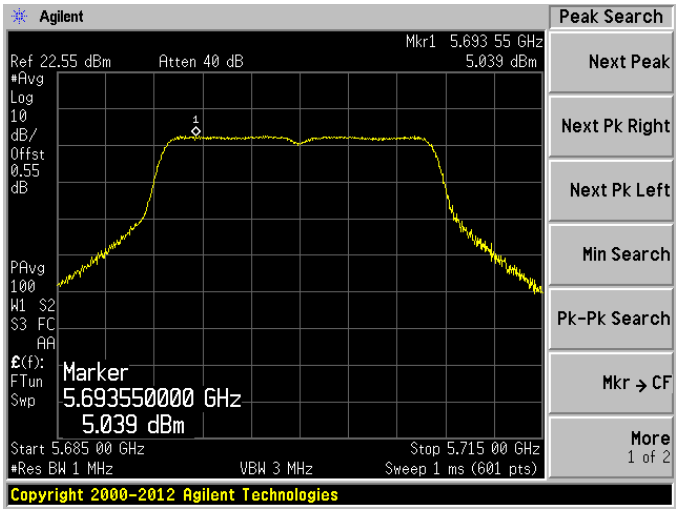


Chain 2

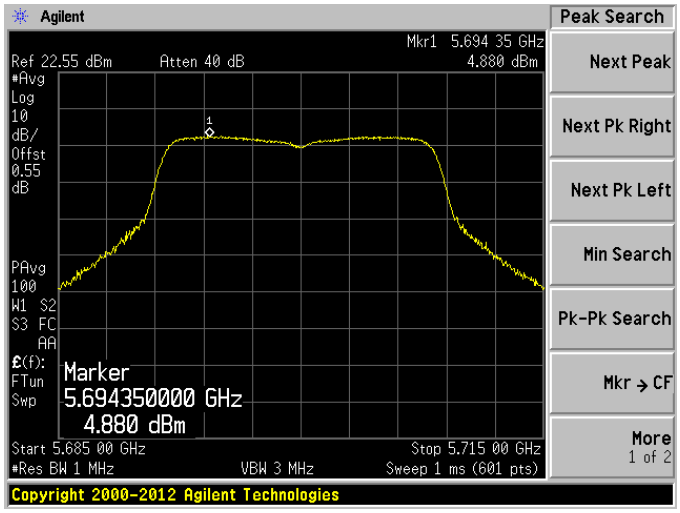


802.11a, High Channel, 5700 MHz

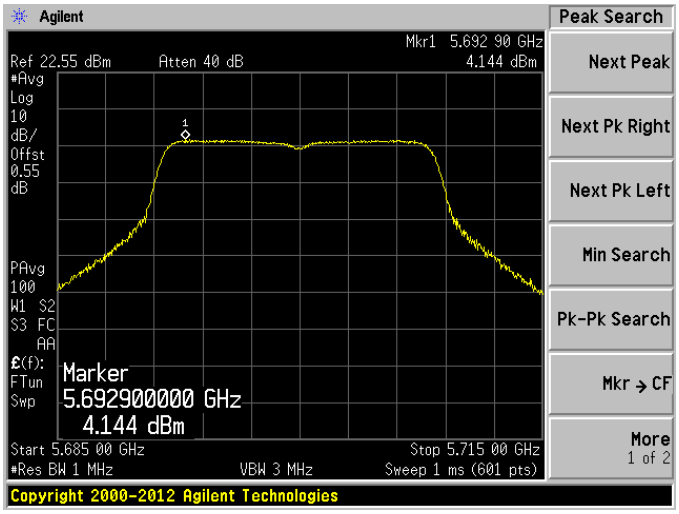
Chain 0



Chain 1

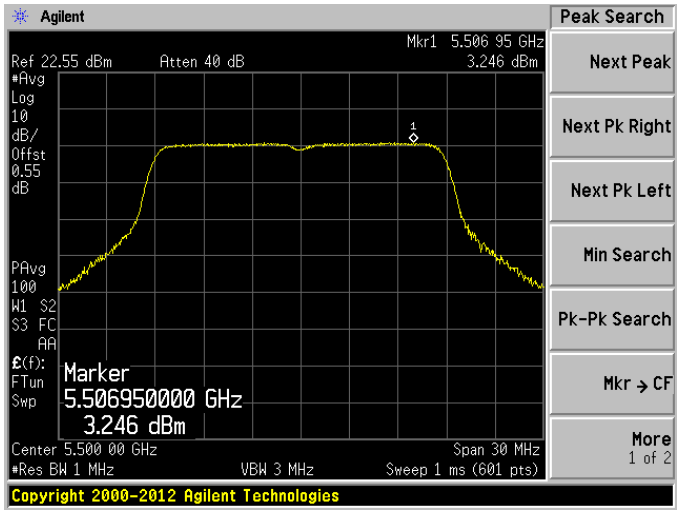


Chain 2

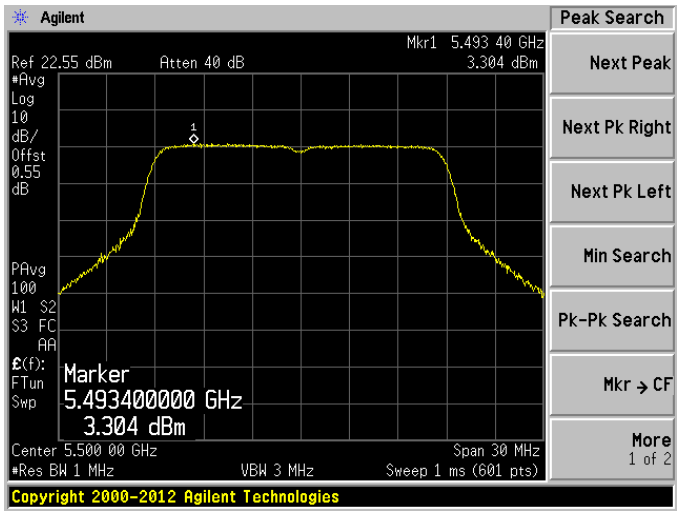


802.11n-HT 20, Low Channel 5500 MHz

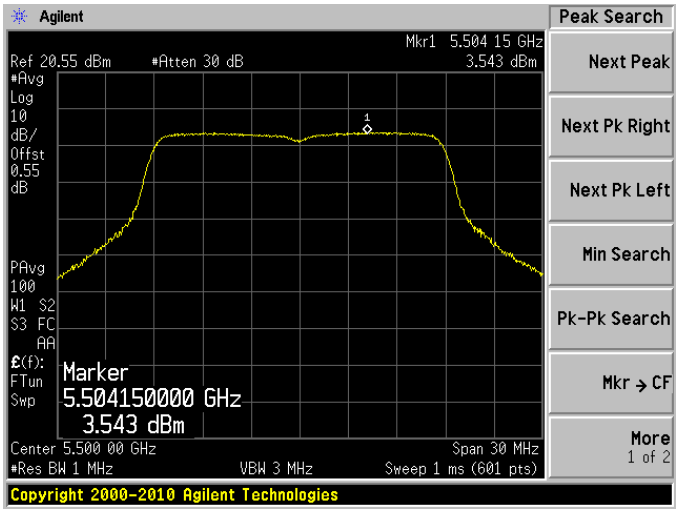
Chain 0



Chain 1

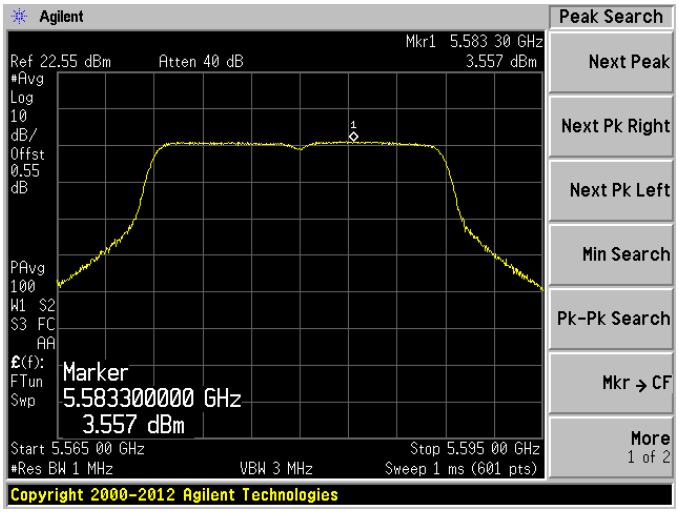


Chain 2

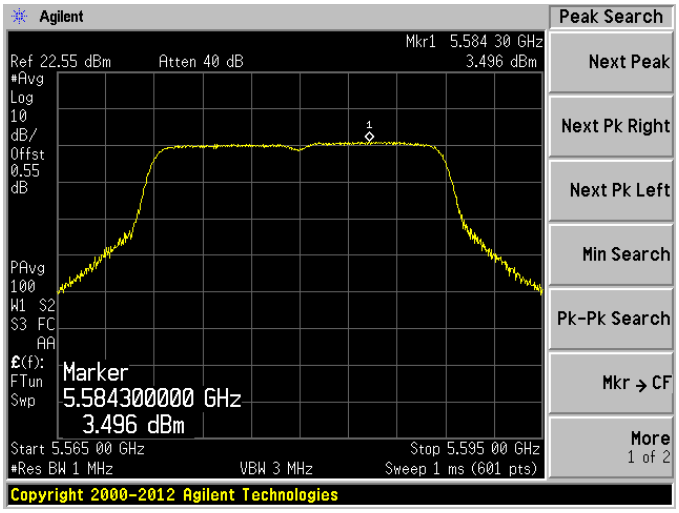


802.11n-HT20, Middle Channel 5580 MHz

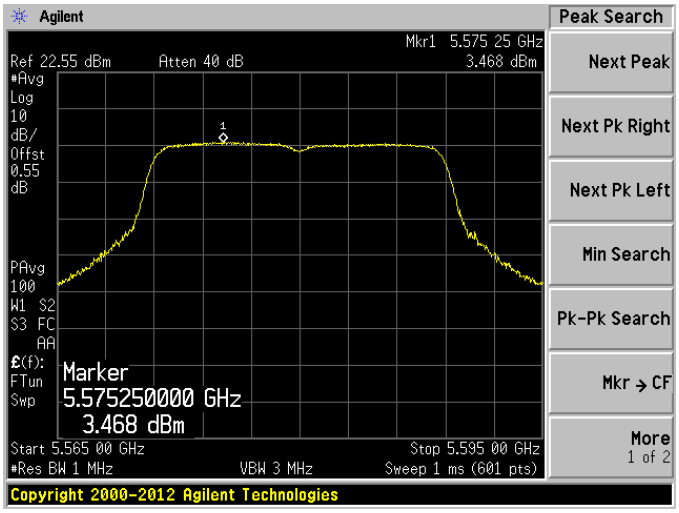
Chain 0



Chain 1

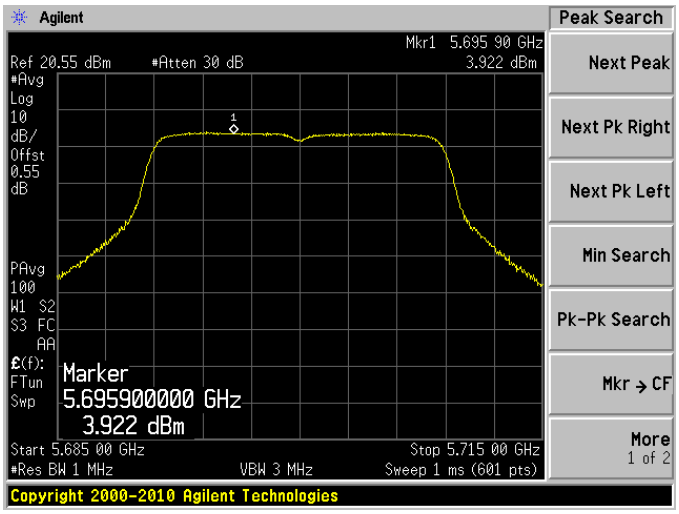


Chain 2

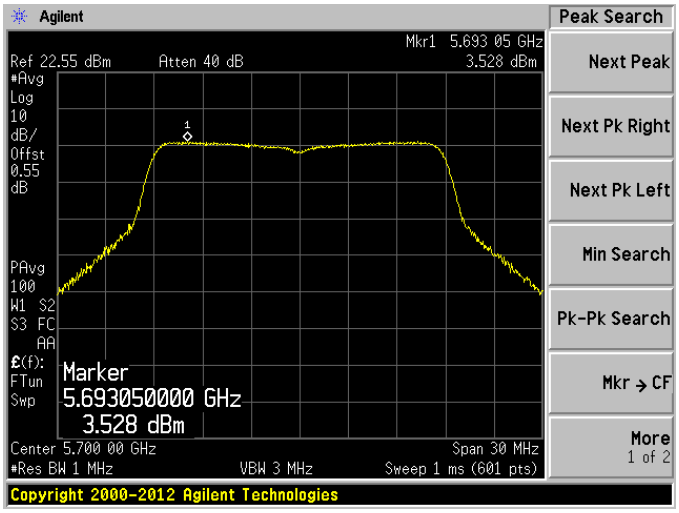


802.11n-HT20, High Channel 5700 MHz

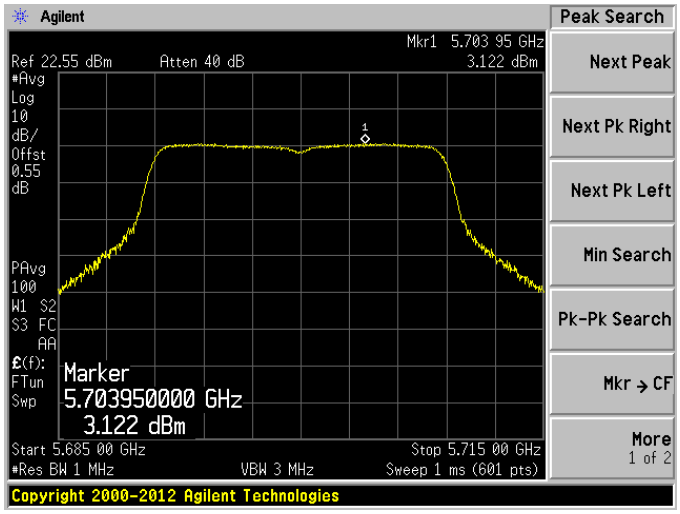
Chain 0



Chain 1

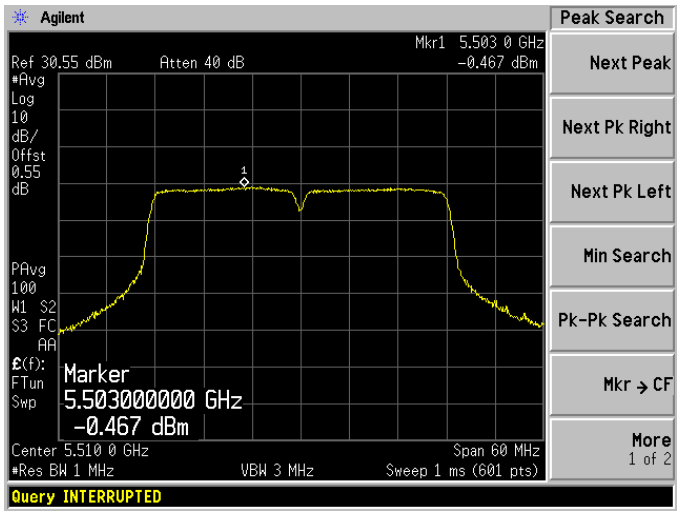


Chain 2

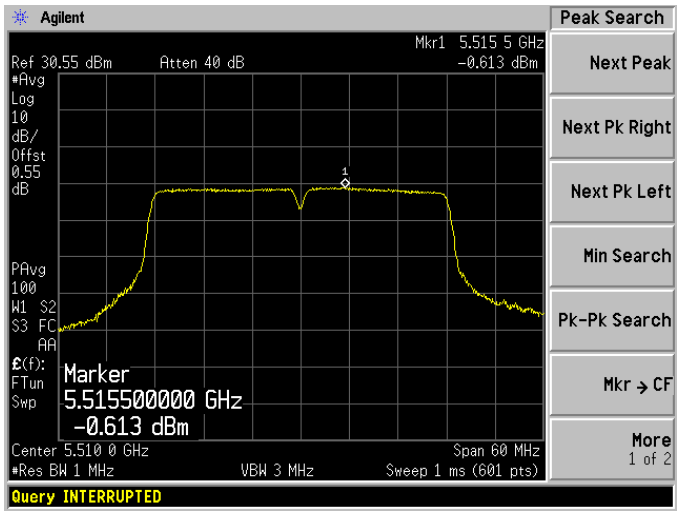


802.11n-HT40, Low Channel 5510 MHz

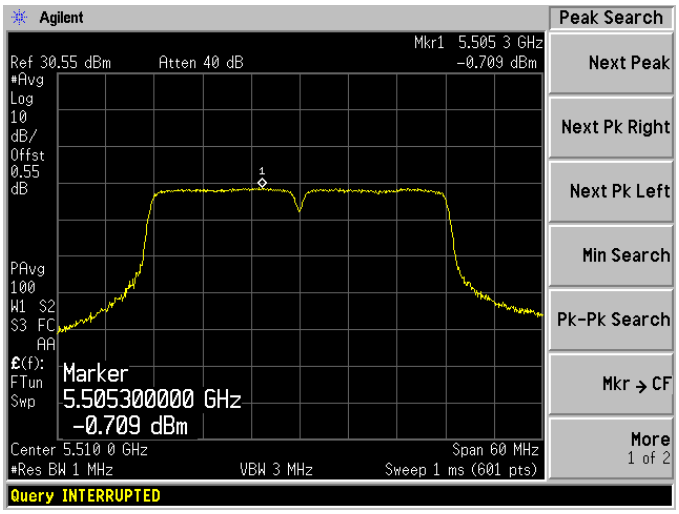
Chain 0



Chain 1

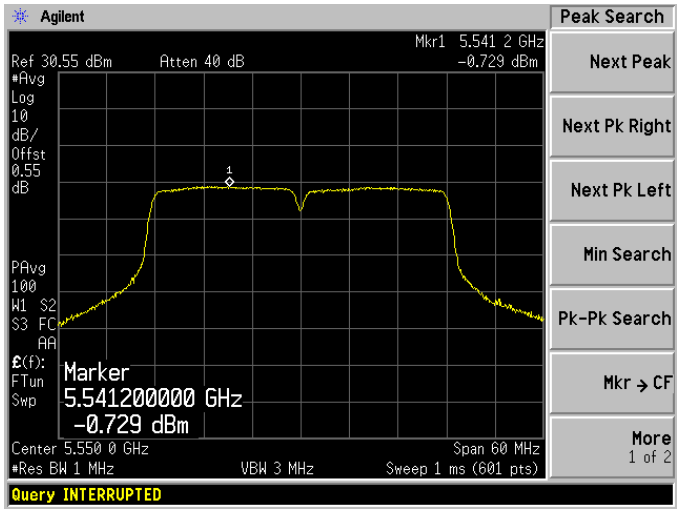


Chain 2

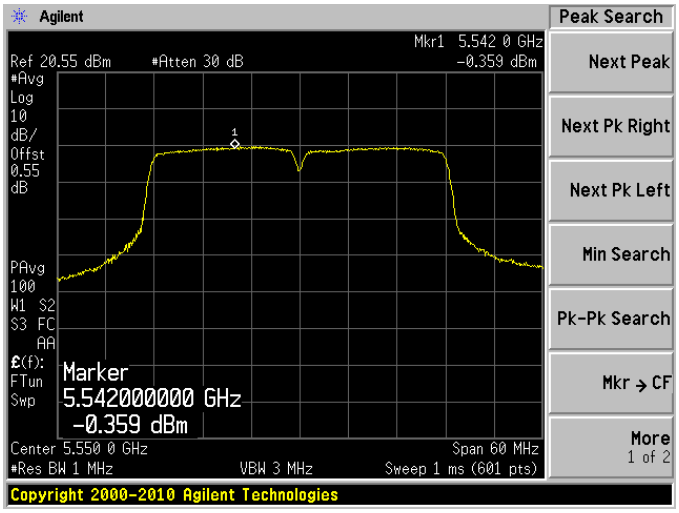


802.11n-HT40, Middle Channel 5550 MHz

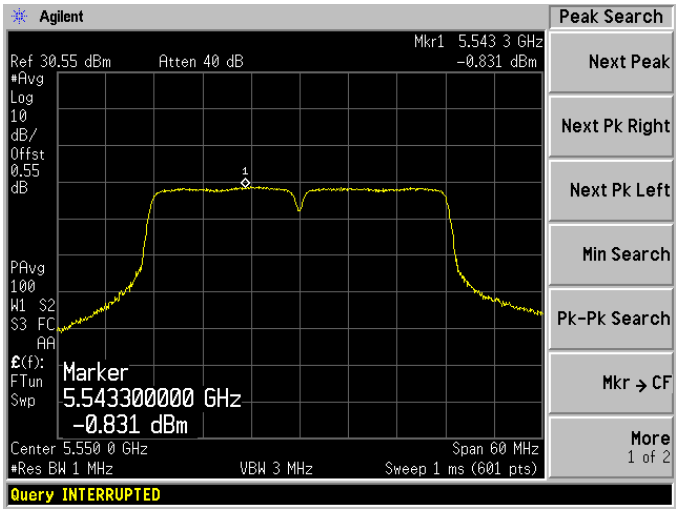
Chain 0



Chain 1

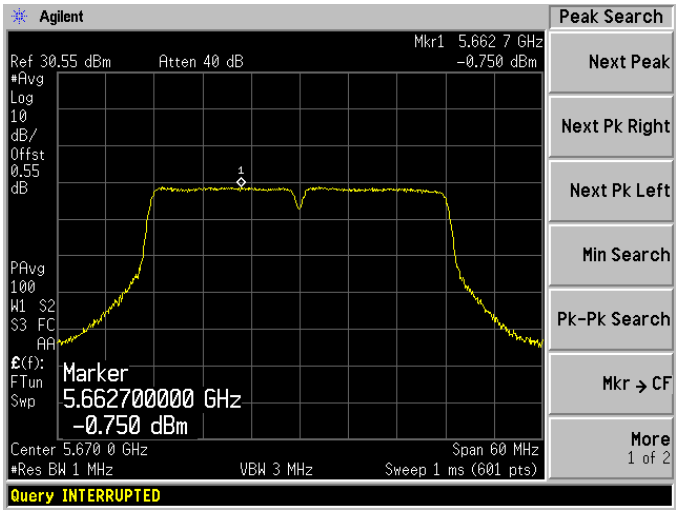


Chain 2

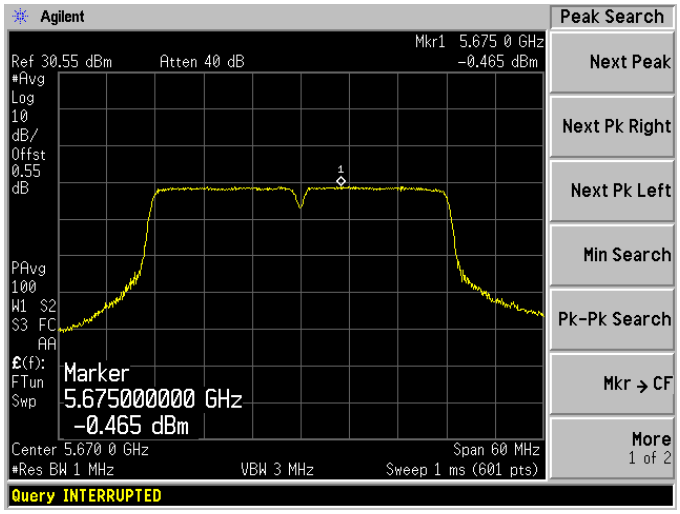


802.11n-HT40, High Channel 5670 MHz

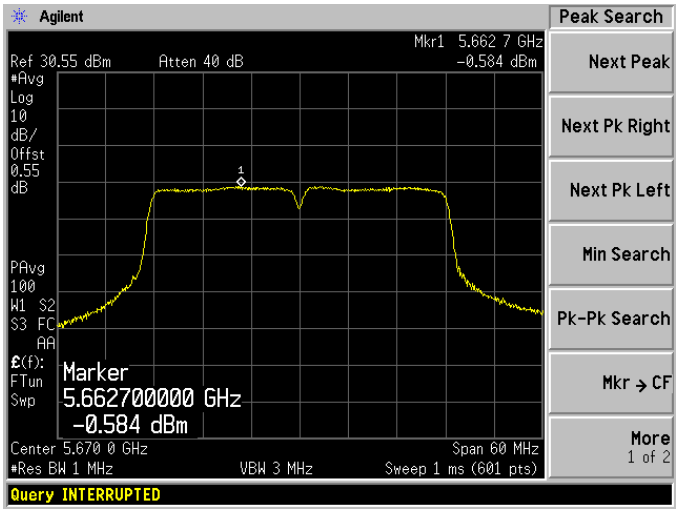
Chain 0



Chain 1

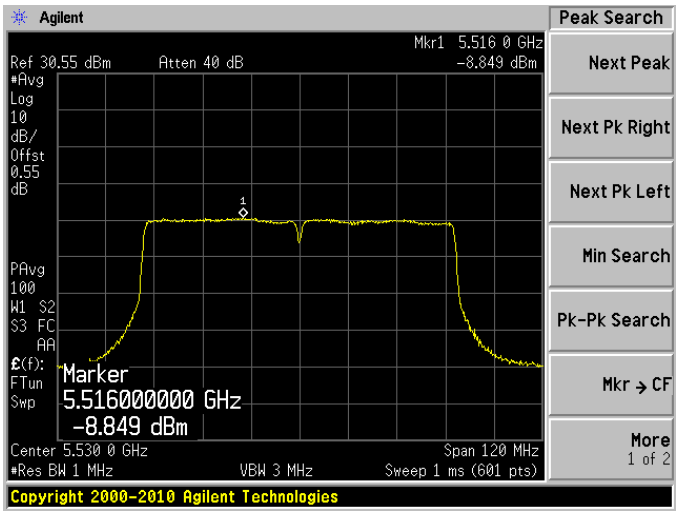


Chain 2

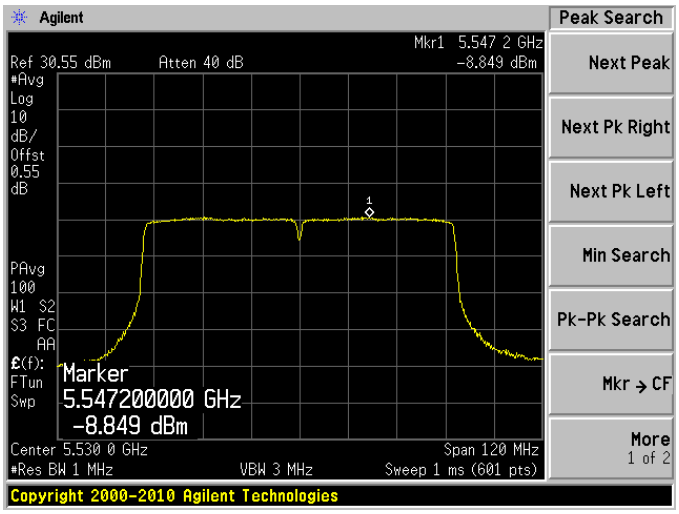


802.11ac-VHT80, 5530 MHz

Chain 0



Chain 1



Chain 2