



FCC PART 15.407
TEST AND MEASUREMENT REPORT

For

Ruckus Wireless, Inc.

350 West Java Drive,
 Sunnyvale, CA 94089, USA

FCC ID: S9GTDBAC22N
Model: TDBAC22N

Report Type: CIIPC Report	Product Type: 802.11 a/b/g/n/ac Modular
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* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "*" (Rev.2)

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1407152-407 W53 56	Original Report	2014-10-20
1	R1407152-407 W53 56 Rev A	Revised Report	2015-01-09

1 General Description

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report has been compiled on behalf of Ruckus Wireless, Inc, and their product, model number: *TDBAC22N*, FCC ID: S9GTDBAC22N which henceforth is referred to as the EUT (Equipment Under Test.). EUT is an 802.11a/b/g/n/ac Modular.

1.2 Mechanical Description of EUT

The EUT measures approximately 15 cm (L) x 13 cm (W) x 2.0 cm (H) and weighs 114.5 g.

The test data gathered are from typical production sample, serial number: 171406000022 assigned by Client

1.3 Objective

This report is prepared on behalf of *Ruckus Wireless, 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: 5250-5350MHz, 5470-5725MHz were added.

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

1.4 Related Submittal(s)/Grant(s)

FCC 2.4 GHz DTS Part 15.247 and 5.8 GHz NII Part 15.407 with FCC ID: S9GTDBAC22N.

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 and KDB-789033 D02 General UNII Test Procedures New Rules v01

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

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

2.2 EUT Exercise Software

The test utility used was *T301s ART* was provided by Ruckus Wireless Inc., and was verified by *Rui Zhou* to comply with the standard requirements being tested against.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Local Support Equipment

Manufacturer	Description	Model	Serial Number
Ruckus	DC Adaptor/POE	NPE-5818	740-64157-001
Ruckus	AC Adaptor	PA10244HUB	740-64125-010
Dell	Laptop	Latitude E5420	CHZCMQ1

2.5 EUT Internal Configuration Details

Manufacturer	Description	Model	Serial Number
Ruckus	Main Board (SANTORINI)	ASM 120-11257-003 rev. 4	RUK02806
Ruckus	Interface	-	-

3 Summary of Test Results

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

Note: Compliant*: Please refer to BACL DFS report No.: R1407152-DFS.

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

4.1 Applicable Standard

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

Limits for General Population/Uncontrolled Exposure

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

f = frequency in MHz

* = Plane-wave equivalent power density

4.2 MPE Prediction

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

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

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

4.3 MPE Results

5250-5350 MHz:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>20.32</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>107.582</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5270</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>8</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>6.31</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.135</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

5470-5725 MHz :

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>21.88</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>154.135</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5670</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>8</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>6.31</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.193</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

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

Colocation Exposure Exclusion:

According to KDB 447498 D01 General RF Exposure Guidance v05r02, EUT has two 2.4 GHz band antenna and two 5 GHz band antenna. The power density for 2.4 GHz band is 0.2273 (refer to T301s 2.4 GHz band report R1407152-247 Final, section 4). So the sum of MPE ratio for four antennas is: 0.8406 which is smaller than 1.0. So the colocation exposure exclusion applies.

5 FCC §15.203 – Antenna Requirements

5.1 Applicable Standard

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

5.2 Antenna Description

The antenna uses a unique coupling to the EUT, which complies with the antenna requirement. And the antenna gain is 8 dBi. 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 μ H/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

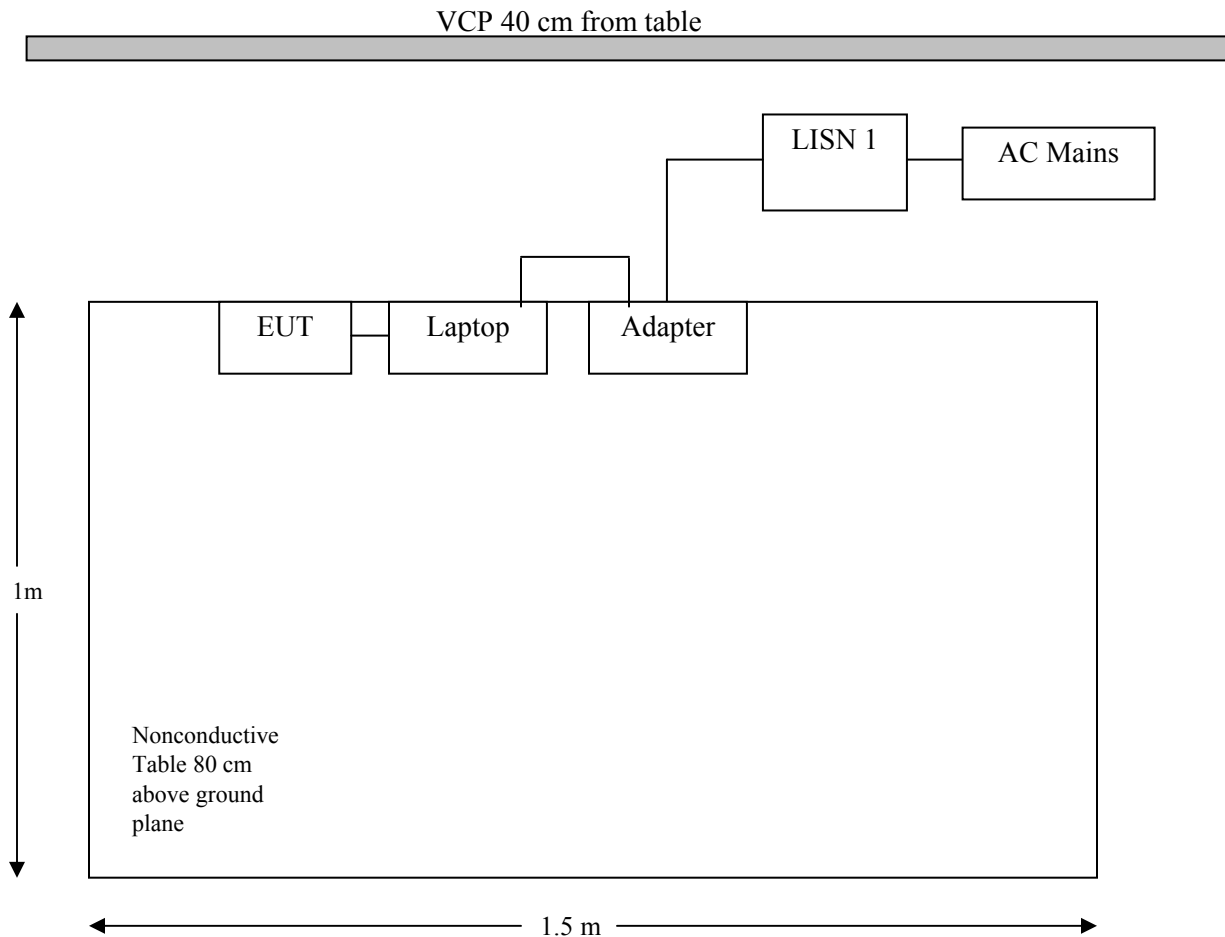
During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-1 and the power cord of the support equipment was connected to LISN-2.

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 (A_i) reading. The basic equation is as follows:

$$CA = A_i + CL + \text{Atten}$$

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:

$$\text{Margin} = \text{Corrected Amplitude} - \text{Limit}$$

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	2014-7-14	1 year
TTE	Filter, High Pass	H962-150K-50-21378	K7133	2014-06-13	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 °C
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 kPa

The testing was performed by Rui Zhou on 2014-08-20 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:

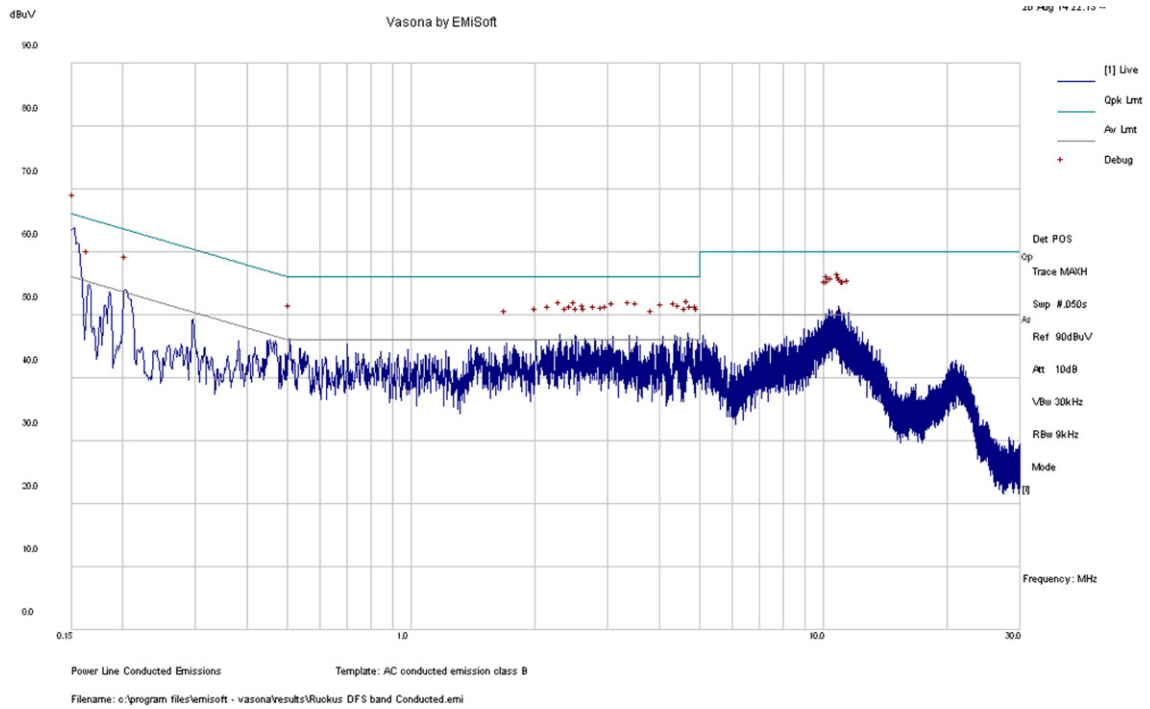
Transmitting Mode: Worst case with both 2.4 GHz and 5 GHz operating:

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	Frequency (MHz)	Conductor Mode (Line/Neutral)	Range (MHz)
-2.58	0.150162	Neutral	0.15 – 30

6.9 Conducted Emissions Test Plots and Data

Transmitting with both 5 GHz and 2.4 GHz Band:

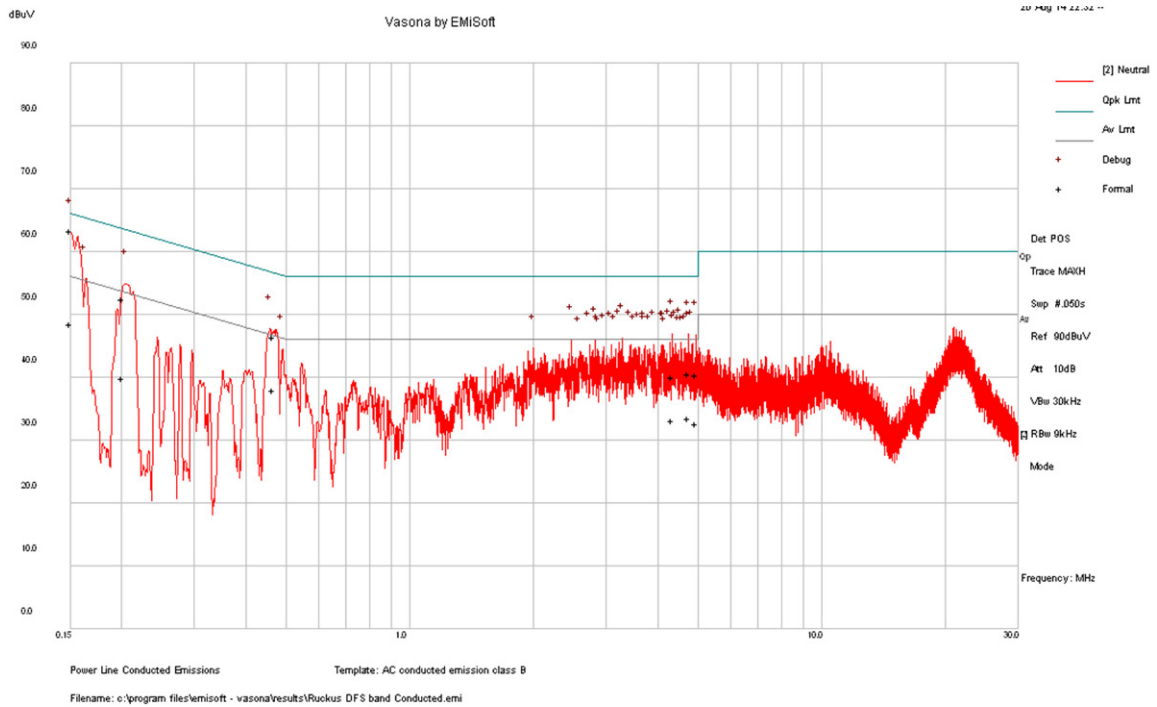
120 V, 60 Hz – Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.150408	63.24	Line	65.98	-2.74	QP
10.88771	46.17	Line	60	-13.83	QP
4.690034	41.98	Line	56	-14.02	QP
2.29948	42.18	Line	56	-13.82	QP
10.30398	46.35	Line	60	-13.65	QP
3.391159	40.81	Line	56	-15.19	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.150408	47.33	Line	55.98	-8.65	Ave.
10.88771	40.24	Line	50	-9.76	Ave.
4.690034	34.73	Line	46	-11.27	Ave.
2.29948	35.57	Line	46	-10.43	Ave.
10.30398	40.5	Line	50	-9.5	Ave.
3.391159	33.69	Line	46	-12.31	Ave.

120 V, 60 Hz – Neutral



Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.150162	63.41	Neutral	65.99	-2.58	QP
0.201303	52.45	Neutral	63.56	-11.11	QP
0.467484	46.42	Neutral	56.56	-10.14	QP
4.347593	40.1	Neutral	56	-15.9	QP
4.749824	40.65	Neutral	56	-15.35	QP
4.959653	40.52	Neutral	56	-15.48	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.150162	48.53	Neutral	55.99	-7.46	Ave.
0.201303	39.9	Neutral	53.56	-13.66	Ave.
0.467484	37.96	Neutral	46.56	-8.59	Ave.
4.347593	33.17	Neutral	46	-12.83	Ave.
4.749824	33.49	Neutral	46	-12.51	Ave.
4.959653	32.64	Neutral	46	-13.36	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.
- (4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
- (6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

7.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.4-2009. The specification used was the FCC 15C/15E limits.

The spacing between the peripherals was 10 centimeters.

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

7.3 Test Procedure

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

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

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

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

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

Above 1000 MHz:

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

7.4 Corrected Amplitude & Margin Calculation

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

$$CA = Ai + AF + CL + Atten - Ga$$

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

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

$$\text{Margin} = \text{Corrected Amplitude} - \text{Limit}$$

7.5 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Sunol Science Corp.	System Controller	SC99V	122303-1	N/R	N/R
Sunol Science Corp.	Combination Antenna	JB3	A020106-3	2014-07-24	1 year
Hewlett Packard	Pre-amplifier 1-26.5 GHz	8447D	2944A06639	2014-04-26	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 26.5-40 GHz	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:	22-24 °C
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 kPa

The testing was performed by Rui Zhou on 2014-08-18 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:

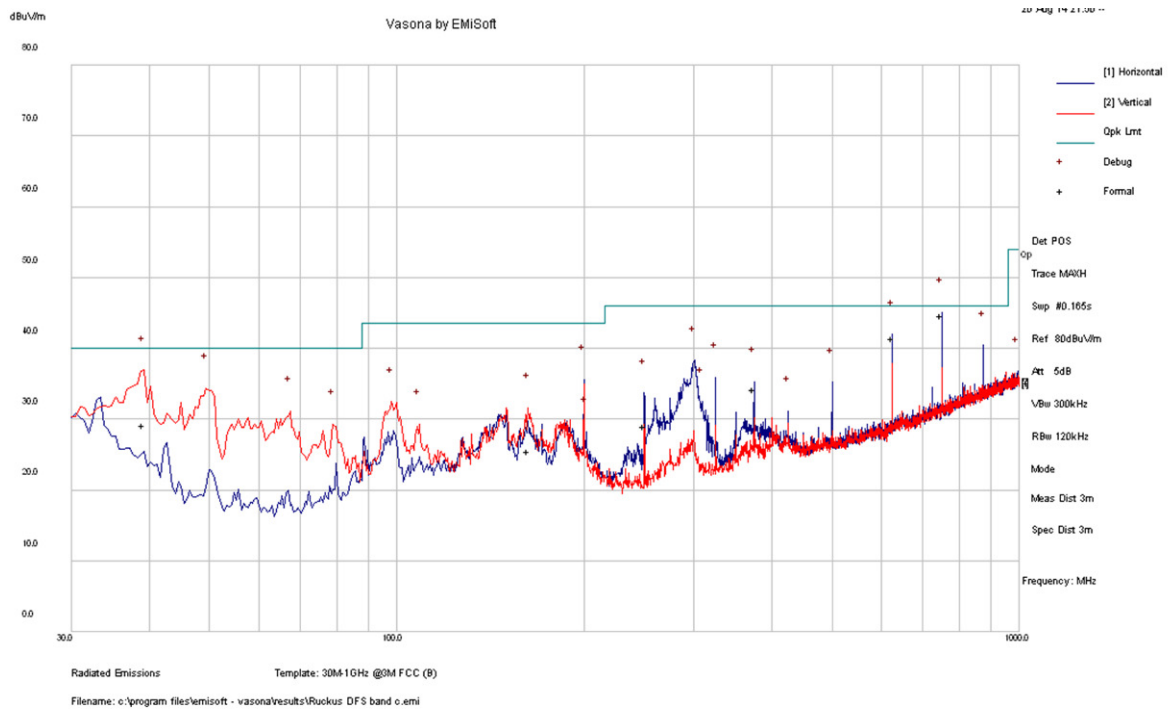
Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Range
-1.35	749.9958	H	30 MHz-1 GHz

1 GHz-40 GHz:

Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Range
-2.74	17100	V	1 GHz-40 GHz

7.8 Radiated Emissions Test Result Data

1) 30 MHz – 1 GHz



Frequency MHz	Cord. Reading (dBµV/m)	Measurement Type (PK/QP/Ave.)	Antenna Polarity (H/V)	Antenna Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
749.9958	44.65	QP	H	100	248	46	-1.35
39.12875	29.23	QP	V	187	52	40	-10.77
625.0115	41.49	QP	H	104	141	46	-4.51

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											
10520	43.44	0	100	V	38.34	7	34.49	54.29	74	-19.71	Peak
10520	43.37	0	100	H	38.34	7	34.49	54.22	74	-19.78	Peak
10520	32.35	0	100	V	38.34	7	34.49	43.20	54	-10.80	Ave
10520	31.7	0	100	H	38.34	7	34.49	42.55	54	-11.45	Ave
15780	46.57	0	100	V	37.93	8.35	34.61	58.24	74	-15.76	Peak
15780	46.35	0	100	H	37.93	8.35	34.61	58.02	74	-15.98	Peak
15780	33.92	0	100	V	37.93	8.35	34.61	45.59	54	-8.41	Ave
15780	33.98	0	100	H	37.93	8.35	34.61	45.65	54	-8.35	Ave
21040	44.74	0	100	V	34.60	9.79	34	55.13	74	-18.87	Peak
21040	46.06	0	100	H	34.60	9.79	34	56.45	74	-17.55	Peak
21040	33.17	0	100	V	34.60	9.79	34	43.56	54	-10.44	Ave
21040	32.25	0	100	H	34.60	9.79	34	42.64	54	-11.36	Ave
Middle Channel 5280 MHz, measured at 3 meters											
10560	44.09	0	100	V	38.418	7.07	34.49	55.09	74	-18.91	Peak
10560	44.67	0	100	H	38.418	7.07	34.49	55.67	74	-18.33	Peak
10560	31.96	0	100	V	38.418	7.07	34.49	42.96	54	-11.04	Ave
10560	32.45	0	100	H	38.418	7.07	34.49	43.45	54	-10.55	Ave
15840	47.24	0	100	V	37.914	8.38	34.61	58.92	74	-15.08	Peak
15840	46.82	0	100	H	37.914	8.38	34.61	58.50	74	-15.50	Peak
15840	34.47	0	100	V	37.914	8.38	34.61	46.15	54	-7.85	Ave
15840	34.72	0	100	H	37.914	8.38	34.61	46.40	54	-7.60	Ave
21120	45.65	0	100	V	34.6	9.8	34	56.05	74	-17.95	Peak
21120	46.83	0	100	H	34.6	9.8	34	57.23	74	-16.77	Peak
21120	33.75	0	100	V	34.6	9.8	34	44.15	54	-9.85	Ave
21120	32.67	0	100	H	34.6	9.8	34	43.07	54	-10.93	Ave
High Channel 5320 MHz, measured at 3 meters											
10640	43.11	0	100	V	38.42	7.07	34.49	54.11	74	-19.89	Peak
10640	43.64	0	100	H	38.42	7.07	34.49	54.64	74	-19.36	Peak
10640	31.46	0	100	V	38.42	7.07	34.49	42.46	54	-11.54	Ave
10640	31.44	0	100	H	38.42	7.07	34.49	42.44	54	-11.56	Ave
15960	46.55	0	100	V	37.90	8.39	34.61	58.23	74	-15.77	Peak
15960	45.49	0	100	H	37.90	8.39	34.61	57.17	74	-16.83	Peak
15960	34.01	0	100	V	37.90	8.39	34.61	45.69	54	-8.31	Ave
15960	33.51	0	100	H	37.90	8.39	34.61	45.19	54	-8.81	Ave
21280	44.18	0	100	V	34.60	9.79	34	54.57	74	-19.43	Peak
21280	44.33	0	100	H	34.60	9.79	34	54.72	74	-19.28	Peak
21280	33.16	0	100	V	34.60	9.79	34	43.55	54	-10.45	Ave
21280	32.05	0	100	H	34.60	9.79	34	42.44	54	-11.56	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											
10520	44.34	0	100	V	38.343	7	34.49	55.19	74	-18.81	Peak
10520	44.03	0	100	H	38.343	7	34.49	54.88	74	-19.12	Peak
10520	32.54	0	100	V	38.343	7	34.49	43.39	54	-10.61	Ave
10520	32.95	0	100	H	38.343	7	34.49	43.80	54	-10.20	Ave
15780	46.68	0	100	V	37.928	8.35	34.61	58.35	74	-15.65	Peak
15780	46.50	0	100	H	37.928	8.35	34.61	58.17	74	-15.83	Peak
15780	33.84	0	100	V	37.928	8.35	34.61	45.51	54	-8.49	Ave
15780	33.66	0	100	H	37.928	8.35	34.61	45.33	54	-8.67	Ave
21040	44.43	0	100	V	34.6	9.79	34	54.82	74	-19.18	Peak
21040	44.84	0	100	H	34.6	9.79	34	55.23	74	-18.77	Peak
21040	31.95	0	100	V	34.6	9.79	34	42.34	54	-11.66	Ave
21040	31.90	0	100	H	34.6	9.79	34	42.29	54	-11.71	Ave
Middle Channel 5280 MHz, measured at 3 meters											
10560	44.04	0	100	V	38.42	7.07	34.49	55.04	74	-18.96	Peak
10560	44.60	0	100	H	38.42	7.07	34.49	55.60	74	-18.40	Peak
10560	32.24	0	100	V	38.42	7.07	34.49	43.24	54	-10.76	Ave
10560	32.81	0	100	H	38.42	7.07	34.49	43.81	54	-10.19	Ave
15840	46.92	0	100	V	37.91	8.38	34.61	58.60	74	-15.40	Peak
15840	46.90	0	100	H	37.91	8.38	34.61	58.58	74	-15.42	Peak
15840	34.83	0	100	V	37.91	8.38	34.61	46.51	54	-7.49	Ave
15840	35.19	0	100	H	37.91	8.38	34.61	46.87	54	-7.13	Ave
21120	45.54	0	100	V	34.60	9.8	34	55.94	74	-18.06	Peak
21120	45.90	0	100	H	34.60	9.8	34	56.30	74	-17.70	Peak
21120	33.33	0	100	V	34.60	9.8	34	43.73	54	-10.27	Ave
21120	33.00	0	100	H	34.60	9.8	34	43.40	54	-10.60	Ave
High Channel 5320 MHz, measured at 3 meters											
10640	43.11	0	100	V	38.42	7.07	34.49	54.11	74	-19.89	Peak
10640	43.04	0	100	H	38.42	7.07	34.49	54.04	74	-19.96	Peak
10640	31.67	0	100	V	38.42	7.07	34.49	42.67	54	-11.33	Ave
10640	31.00	0	100	H	38.42	7.07	34.49	42.00	54	-12.00	Ave
15960	46.65	0	100	V	37.90	8.39	34.61	58.33	74	-15.67	Peak
15960	45.72	0	100	H	37.90	8.39	34.61	57.40	74	-16.60	Peak
15960	33.61	0	100	V	37.90	8.39	34.61	45.29	54	-8.71	Ave
15960	34.41	0	100	H	37.90	8.39	34.61	46.09	54	-7.91	Ave
21280	43.71	0	100	V	34.60	9.79	34	54.10	74	-19.90	Peak
21280	44.51	0	100	H	34.60	9.79	34	54.90	74	-19.10	Peak
21280	31.83	0	100	V	34.60	9.79	34	42.22	54	-11.78	Ave
21280	31.41	0	100	H	34.60	9.79	34	41.80	54	-12.20	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											
10540	43.43	0	100	V	38.34	7.05	34.49	54.33	74	-19.67	Peak
10540	43.62	0	100	H	38.34	7.05	34.49	54.52	74	-19.48	Peak
10540	31.75	0	100	V	38.34	7.05	34.49	42.65	54	-11.35	Ave
10540	30.74	0	100	H	38.34	7.05	34.49	41.64	54	-12.36	Ave
15810	46.53	0	100	V	37.93	8.35	34.61	58.20	74	-15.80	Peak
15810	46.28	0	100	H	37.93	8.35	34.61	57.95	74	-16.05	Peak
15810	33.46	0	100	V	37.93	8.35	34.61	45.13	54	-8.87	Ave
15810	34.30	0	100	H	37.93	8.35	34.61	45.97	54	-8.03	Ave
21080	44.43	0	100	V	34.60	9.84	34	54.87	74	-19.13	Peak
21080	45.21	0	100	H	34.60	9.84	34	55.65	74	-18.35	Peak
21080	31.46	0	100	V	34.60	9.84	34	41.90	54	-12.10	Ave
21080	31.53	0	100	H	34.60	9.84	34	41.97	54	-12.03	Ave
Middle Channel 5310 MHz, measured at 3 meters											
10620	43.83	0	100	V	38.42	7.07	34.49	54.83	74	-19.17	Peak
10620	44.41	0	100	H	38.42	7.07	34.49	55.41	74	-18.59	Peak
10620	32.60	0	100	V	38.42	7.07	34.49	43.60	54	-10.40	Ave
10620	31.17	0	100	H	38.42	7.07	34.49	42.17	54	-11.83	Ave
15930	47.09	0	100	V	37.91	8.38	34.61	58.77	74	-15.23	Peak
15930	47.04	0	100	H	37.91	8.38	34.61	58.72	74	-15.28	Peak
15930	33.87	0	100	V	37.91	8.38	34.61	45.55	54	-8.45	Ave
15930	34.44	0	100	H	37.91	8.38	34.61	46.12	54	-7.88	Ave
21240	44.18	0	100	V	34.60	9.79	34	54.57	74	-19.43	Peak
21240	44.55	0	100	H	34.60	9.79	34	54.94	74	-19.06	Peak
21240	31.37	0	100	V	34.60	9.79	34	41.76	54	-12.24	Ave
21240	31.51	0	100	H	34.60	9.79	34	41.90	54	-12.10	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)	
High Channel 5290 MHz, measured at 3 meters											
10580	43.55	0	100	V	38.5	7.05	34.49	54.61	74	-19.39	Peak
10580	43.98	0	100	H	38.5	7.05	34.49	55.04	74	-18.96	Peak
10580	32.54	0	100	V	38.5	7.05	34.49	43.60	54	-10.40	Ave
10580	30.94	0	100	H	38.5	7.05	34.49	42.00	54	-12.00	Ave
15870	46.56	0	100	V	38.6	8.35	34.61	58.90	74	-15.10	Peak
15870	46.37	0	100	H	38.6	8.35	34.61	58.71	74	-15.29	Peak
15870	33.49	0	100	V	38.6	8.35	34.61	45.83	54	-8.17	Ave
15870	34.53	0	100	H	38.6	8.35	34.61	46.87	54	-7.13	Ave
21160	43.88	0	100	V	34.6	9.84	34	54.32	74	-19.68	Peak
21160	44.92	0	100	H	34.6	9.84	34	55.36	74	-18.64	Peak
21160	30.78	0	100	V	34.6	9.84	34	41.22	54	-12.78	Ave
21160	31.32	0	100	H	34.6	9.84	34	41.76	54	-12.24	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											
11000	46.36	0	100	V	38.38	7.36	34.05	58.05	74	-15.95	Peak
11000	45.88	0	100	H	38.38	7.36	34.05	57.57	74	-16.43	Peak
11000	33.63	0	100	V	38.38	7.36	34.05	45.32	54	-8.68	Ave
11000	33.29	0	100	H	38.38	7.36	34.05	44.98	54	-9.02	Ave
16500	46.86	0	100	V	38.77	8.5	34.64	59.49	74	-14.51	Peak
16500	46.45	0	100	H	38.77	8.5	34.64	59.08	74	-14.92	Peak
16500	33.66	0	100	V	38.77	8.5	34.64	46.29	54	-7.71	Ave
16500	34.29	0	100	H	38.77	8.5	34.64	46.92	54	-7.08	Ave
22000	46.54	0	100	V	34.90	9.94	34.69	56.69	74	-17.31	Peak
22000	45.06	0	100	H	34.90	9.94	34.69	55.21	74	-18.79	Peak
22000	33.88	0	100	V	34.90	9.94	34.69	44.03	54	-9.97	Ave
22000	31.43	0	100	H	34.90	9.94	34.69	41.58	54	-12.42	Ave
Middle Channel 5580 MHz, measured at 3 meters											
11160	45.09	0	100	V	38.51	7.52	34.05	57.07	74	-16.93	Peak
11160	44.88	0	100	H	38.51	7.52	34.05	56.86	74	-17.14	Peak
11160	31.86	0	100	V	38.51	7.52	34.05	43.84	54	-10.16	Ave
11160	31.66	0	100	H	38.51	7.52	34.05	43.64	54	-10.36	Ave
16740	45.20	0	100	V	39.94	8.63	34.64	59.13	74	-14.87	Peak
16740	47.93	0	100	H	39.94	8.63	34.64	61.86	74	-12.14	Peak
16740	34.05	0	100	V	39.94	8.63	34.64	47.98	54	-6.02	Ave
16740	34.75	0	100	H	39.94	8.63	34.64	48.68	54	-5.32	Ave
22320	48.41	0	100	V	34.90	9.92	34.69	58.54	74	-15.46	Peak
22320	46.37	0	100	H	34.90	9.92	34.69	56.50	74	-17.50	Peak
22320	34.54	0	100	V	34.90	9.92	34.69	44.67	54	-9.33	Ave
22320	33.65	0	100	H	34.90	9.92	34.69	43.78	54	-10.22	Ave
High Channel 5700 MHz, measured at 3 meters											
11400	45.55	0	100	V	38.88	7.57	34.05	57.95	74	-16.05	Peak
11400	45.74	0	100	H	38.88	7.57	34.05	58.14	74	-15.86	Peak
11400	33.40	0	100	V	38.88	7.57	34.05	45.80	54	-8.20	Ave
11400	32.66	0	100	H	38.88	7.57	34.05	45.07	54	-8.93	Ave
17100	47.16	0	100	V	42.64	8.66	34.64	63.81	74	-10.19	Peak
17100	47.93	0	100	H	42.64	8.66	34.64	64.59	74	-9.41	Peak
17100	34.05	0	100	V	42.64	8.66	34.64	50.71	54	-3.29	Ave
17100	32.97	0	100	H	42.64	8.66	34.64	49.63	54	-4.37	Ave
22800	46.81	0	100	V	34.90	10.17	34.69	57.19	74	-16.81	Peak
22800	46.13	0	100	H	34.90	10.17	34.69	56.51	74	-17.49	Peak
22800	34.00	0	100	V	34.90	10.17	34.69	44.38	54	-9.62	Ave
22800	32.57	0	100	H	34.90	10.17	34.69	42.95	54	-11.05	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											
11000	46.27	0	100	V	38.38	7.36	34.05	57.96	74	-16.04	Peak
11000	45.89	0	100	H	38.38	7.36	34.05	57.58	74	-16.42	Peak
11000	33.52	0	100	V	38.38	7.36	34.05	45.21	54	-8.79	Ave
11000	32.56	0	100	H	38.38	7.36	34.05	44.26	54	-9.74	Ave
16500	46.36	0	100	V	38.77	8.5	34.64	58.99	74	-15.01	Peak
16500	47.50	0	100	H	38.77	8.5	34.64	60.13	74	-13.87	Peak
16500	34.24	0	100	V	38.77	8.5	34.64	46.86	54	-7.14	Ave
16500	33.11	0	100	H	38.77	8.5	34.64	45.74	54	-8.26	Ave
22000	47.15	0	100	V	34.90	9.94	34.69	57.30	74	-16.70	Peak
22000	46.00	0	100	H	34.90	9.94	34.69	56.15	74	-17.85	Peak
22000	33.56	0	100	V	34.90	9.94	34.69	43.71	54	-10.29	Ave
22000	32.53	0	100	H	34.9	9.94	34.69	42.68	54	-11.32	Ave
Middle Channel 5580 MHz, measured at 3 meters											
11160	46.27	0	100	V	38.51	7.52	34.05	58.25	74	-15.75	Peak
11160	45.89	0	100	H	38.51	7.52	34.05	57.87	74	-16.13	Peak
11160	33.52	0	100	V	38.51	7.52	34.05	45.50	54	-8.50	Ave
11160	32.56	0	100	H	38.51	7.52	34.05	44.54	54	-9.46	Ave
16740	46.00	0	100	V	39.94	8.63	34.64	59.93	74	-14.07	Peak
16740	46.92	0	100	H	39.94	8.63	34.64	60.85	74	-13.15	Peak
16740	33.08	0	100	V	39.94	8.63	34.64	47.01	54	-6.99	Ave
16740	33.11	0	100	H	39.94	8.63	34.64	47.04	54	-6.96	Ave
22320	47.15	0	100	V	34.90	9.92	34.69	57.28	74	-16.72	Peak
22320	46.00	0	100	H	34.90	9.92	34.69	56.13	74	-17.87	Peak
22320	33.56	0	100	V	34.90	9.92	34.69	43.69	54	-10.31	Ave
22320	32.53	0	100	H	34.90	9.92	34.69	42.66	54	-11.34	Ave
High Channel 5700 MHz, measured at 3 meters											
11400	46.27	0	100	V	38.88	7.57	34.05	58.67	74	-15.33	Peak
11400	45.89	0	100	H	38.88	7.57	34.05	58.29	74	-15.71	Peak
11400	33.52	0	100	V	38.88	7.57	34.05	45.92	54	-8.08	Ave
11400	31.76	0	100	H	38.88	7.57	34.05	44.16	54	-9.84	Ave
17100	46.00	0	100	V	42.64	8.66	34.64	62.65	74	-11.35	Peak
17100	46.92	0	100	H	42.64	8.66	34.64	63.58	74	-10.42	Peak
17100	33.08	0	100	V	42.64	8.66	34.64	49.74	54	-4.26	Ave
17100	34.61	0	100	H	42.64	8.66	34.64	51.26	54	-2.74	Ave
22800	48.07	0	100	V	34.90	10.17	34.69	58.45	74	-15.55	Peak
22800	46.50	0	100	H	34.90	10.17	34.69	56.88	74	-17.12	Peak
22800	34.98	0	100	V	34.90	10.17	34.69	45.36	54	-8.64	Ave
22800	33.69	0	100	H	34.90	10.17	34.69	44.07	54	-9.93	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											
11020	46.02	0	100	V	38.38	7.36	34.05	57.72	74	-16.28	Peak
11020	45.76	0	100	H	38.38	7.36	34.05	57.45	74	-16.55	Peak
11020	33.06	0	100	V	38.38	7.36	34.05	44.75	54	-9.25	Ave
11020	32.59	0	100	H	38.38	7.36	34.05	44.28	54	-9.72	Ave
16530	46.22	0	100	V	38.77	8.5	34.64	58.85	74	-15.15	Peak
16530	46.31	0	100	H	38.77	8.5	34.64	58.94	74	-15.06	Peak
16530	33.21	0	100	V	38.77	8.5	34.64	45.83	54	-8.17	Ave
16530	33.46	0	100	H	38.77	8.5	34.64	46.08	54	-7.92	Ave
22040	47.03	0	100	V	34.90	9.76	34.69	57.00	74	-17.00	Peak
22040	45.43	0	100	H	34.90	9.76	34.69	55.40	74	-18.60	Peak
22040	33.93	0	100	V	34.90	9.76	34.69	43.90	54	-10.10	Ave
22040	32.73	0	100	H	34.90	9.76	34.69	42.70	54	-11.30	Ave
Middle Channel 5550 MHz, measured at 3 meters											
11100	44.62	0	100	V	38.51	7.39	34.05	56.47	74	-17.53	Peak
11100	44.86	0	100	H	38.51	7.39	34.05	56.71	74	-17.29	Peak
11100	32.20	0	100	V	38.51	7.39	34.05	44.05	54	-9.95	Ave
11100	31.73	0	100	H	38.51	7.39	34.05	43.58	54	-10.42	Ave
16650	46.14	0	100	V	39.26	8.55	34.64	59.30	74	-14.70	Peak
16650	48.11	0	100	H	39.26	8.55	34.64	61.27	74	-12.73	Peak
16650	34.11	0	100	V	39.26	8.55	34.64	47.28	54	-6.72	Ave
16650	34.26	0	100	H	39.26	8.55	34.64	47.43	54	-6.57	Ave
22200	48.19	0	100	V	35.00	9.91	34.69	58.41	74	-15.59	Peak
22200	47.07	0	100	H	35.00	9.91	34.69	57.29	74	-16.71	Peak
22200	34.61	0	100	V	35.00	9.91	34.69	44.83	54	-9.17	Ave
22200	33.49	0	100	H	35.00	9.91	34.69	43.71	54	-10.29	Ave
High Channel 5670 MHz, measured at 3 meters											
11340	45.43	0	100	V	38.84	7.52	34.05	57.74	74	-16.26	Peak
11340	45.49	0	100	H	38.84	7.52	34.05	57.81	74	-16.19	Peak
11340	32.83	0	100	V	38.84	7.52	34.05	45.14	54	-8.86	Ave
11340	32.46	0	100	H	38.84	7.52	34.05	44.77	54	-9.23	Ave
17010	47.03	0	100	V	41.89	8.61	34.64	62.89	74	-11.11	Peak
17010	47.40	0	100	H	41.89	8.61	34.64	63.26	74	-10.74	Peak
17010	33.69	0	100	V	41.89	8.61	34.64	49.55	54	-4.45	Ave
17010	33.00	0	100	H	41.89	8.61	34.64	48.86	54	-5.14	Ave
22680	47.03	0	100	V	34.90	10.07	34.69	57.31	74	-16.69	Peak
22680	45.59	0	100	H	34.90	10.07	34.69	55.87	74	-18.13	Peak
22680	33.56	0	100	V	34.90	10.07	34.69	43.84	54	-10.16	Ave
22680	32.43	0	100	H	34.90	10.07	34.69	42.71	54	-11.29	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)	
Low Channel 5530 MHz, measured at 3 meters											
11060	45.94	0	100	V	38.38	7.36	34.05	57.63	74	-16.37	Peak
11060	46.16	0	100	H	38.38	7.36	34.05	57.85	74	-16.15	Peak
11060	32.97	0	100	V	38.38	7.36	34.05	44.66	54	-9.34	Ave
11060	32.59	0	100	H	38.38	7.36	34.05	44.29	54	-9.71	Ave
16590	46.26	0	100	V	38.77	8.5	34.64	58.89	74	-15.11	Peak
16590	46.45	0	100	H	38.77	8.5	34.64	59.08	74	-14.92	Peak
16590	33.54	0	100	V	38.77	8.5	34.64	46.17	54	-7.83	Ave
16590	33.44	0	100	H	38.77	8.5	34.64	46.07	54	-7.93	Ave
22120	46.75	0	100	V	34.90	9.76	34.69	56.72	74	-17.28	Peak
22120	46.05	0	100	H	34.90	9.76	34.69	56.02	74	-17.98	Peak
22120	33.70	0	100	V	34.90	9.76	34.69	43.67	54	-10.33	Ave
22120	32.93	0	100	H	34.90	9.76	34.69	42.90	54	-11.10	Ave
High Channel 5690 MHz, measured at 3 meters											
11380	45.80	0	100	V	38.38	7.36	34.05	57.50	74	-16.50	Peak
11380	46.00	0	100	H	38.38	7.36	34.05	57.69	74	-16.31	Peak
11380	33.15	0	100	V	38.38	7.36	34.05	44.85	54	-9.15	Ave
11380	32.86	0	100	H	38.38	7.36	34.05	44.55	54	-9.45	Ave
17070	46.96	0	100	V	38.77	8.5	34.64	59.59	74	-14.41	Peak
17070	47.30	0	100	H	38.77	8.5	34.64	59.93	74	-14.07	Peak
17070	33.79	0	100	V	38.77	8.5	34.64	46.42	54	-7.58	Ave
17070	34.43	0	100	H	38.77	8.5	34.64	47.06	54	-6.94	Ave
22760	48.08	0	100	V	34.90	9.76	34.69	58.05	74	-15.95	Peak
22760	46.26	0	100	H	34.90	9.76	34.69	56.23	74	-17.77	Peak
22760	35.24	0	100	V	34.90	9.76	34.69	45.21	54	-8.79	Ave
22760	33.26	0	100	H	34.90	9.76	34.69	43.23	54	-10.77	Ave

Note: Restricted bands limits are used for non-restricted band, which is most stringent.

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:	22-24 °C
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 kPa

The testing was performed by Rui Zhou on 2014-08-18 to 2014-08-20 at RF site.

8.5 Test Results

5.3 GHz Band:

802.11a mode

Radio Mode	Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
802.11a	Chain 0			
	Low	5260	20.85	16.6059
	Middle	5280	21.795	16.556
	High	5320	21.306	16.5632
	Chain 1			
	Low	5260	21.889	16.6207
	Middle	5280	21.351	16.5927
802.11n-HT20	Chain 0			
	Low	5260	22.461	17.7496
	Middle	5280	22.147	17.7448
	High	5320	22.242	17.7848
	Chain 1			
	Low	5260	22.401	17.7629
	Middle	5280	23.242	17.7711
802.11n-HT40	Chain 0			
	Low	5270	44.702	36.5024
	High	5310	43.967	36.5506
	Chain 1			
	Low	5270	44.789	36.542
802.11ac-VHT80	Chain 0			
	-	5290	86.889	75.8462
	Chain 1			
-	5290	87.869	76.0989	

5.6 GHz Band:

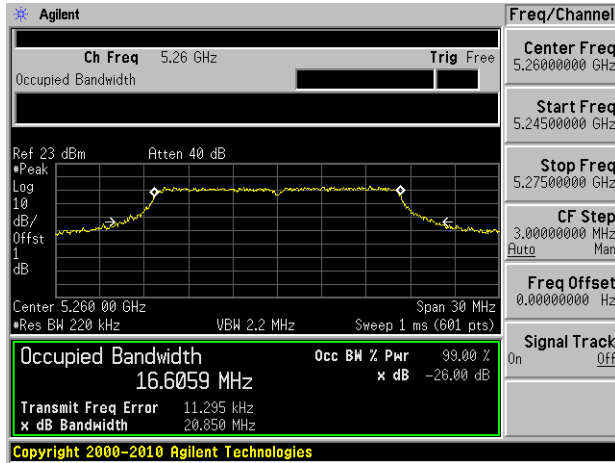
Radio Mode	Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
802.11a	Chain 0			
	Low	5500	20.798	16.5893
	Middle	5580	20.572	16.5921
	High	5700	20.971	16.5495
	Chain 1			
	Low	5500	20.582	16.6053
	Middle	5580	21.239	16.5645
802.11n-HT20	Chain 0			
	Low	5500	21.605	17.7532
	Middle	5580	21.271	17.6863
	High	5700	21.642	17.7419
	Chain 1			
	Low	5500	22.218	17.7164
	Middle	5580	22.083	17.752
802.11n-HT40	Chain 0			
	Low	5510	42.888	36.3302
	Middle	5550	42.988	36.2515
	High	5670	43.019	36.3065
	Chain 1			
	Low	5510	43.506	36.3683
	Middle	5550	43.726	36.3512
802.11ac-VHT80	Chain 0			
	Low	5530	85.811	75.8892
	High	5690	85.021	75.6468
	Chain 1			
	Low	5530	86.481	75.6032
	High	5690	88.093	75.8254

Please refer to the following plots.

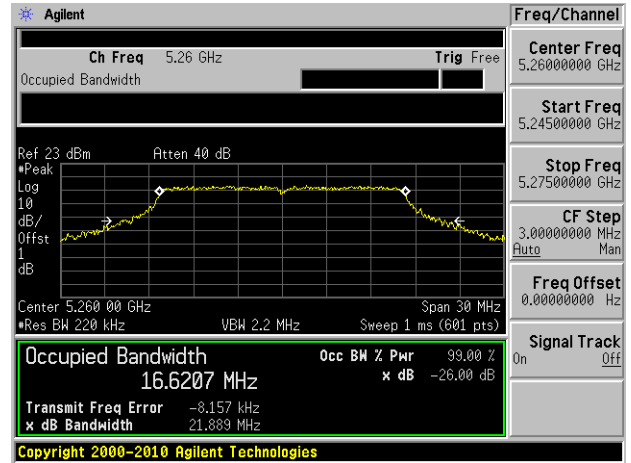
5.3 GHz Band

802.11a, Low Channel, 5260 MHz

Chain 0

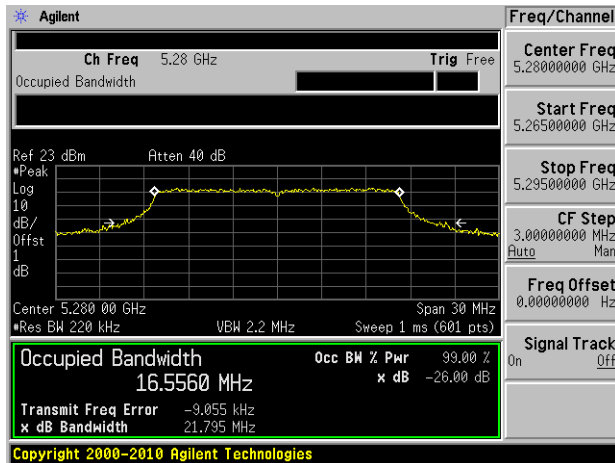


Chain 1

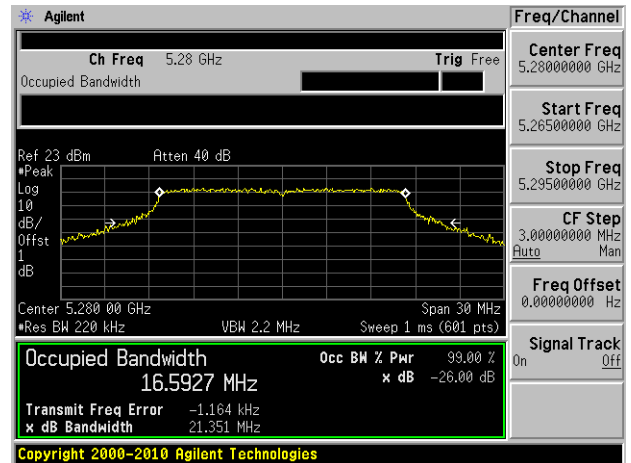


802.11a, Middle Channel, 5280 MHz

Chain 0

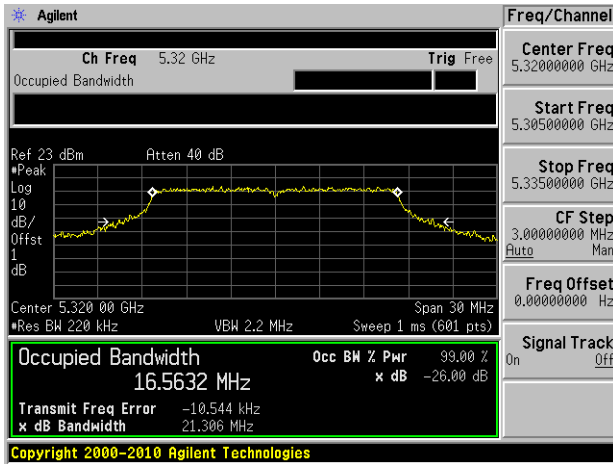


Chain 1

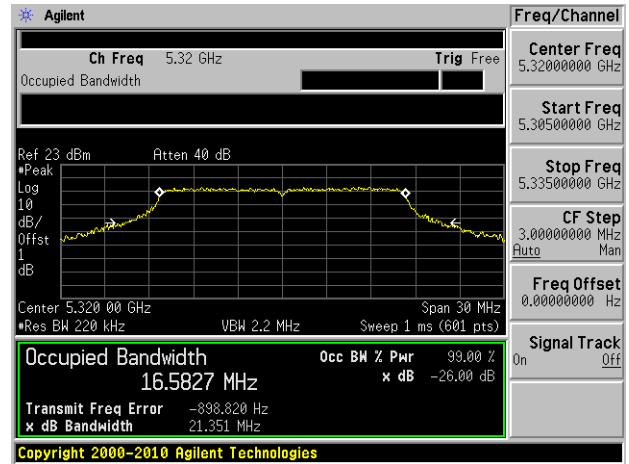


802.11a, High Channel, 5320 MHz

Chain 0

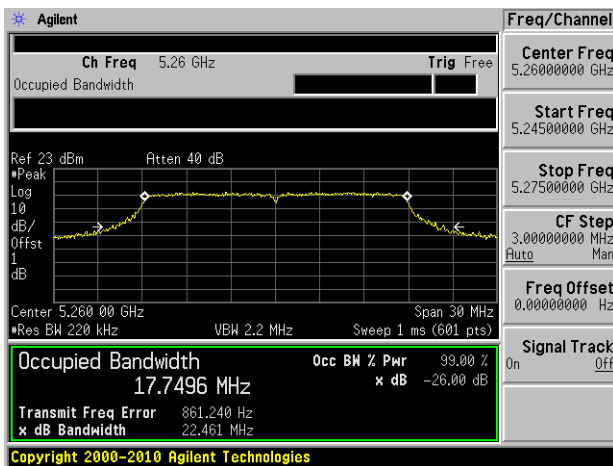


Chain 1

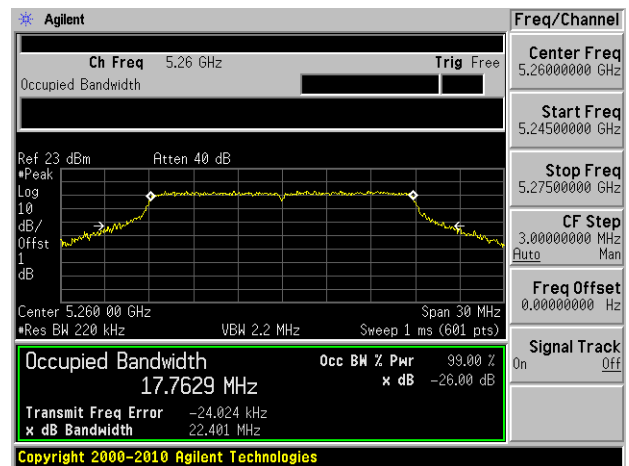


802.11n-HT 20, Low Channel 5260 MHz

Chain 0

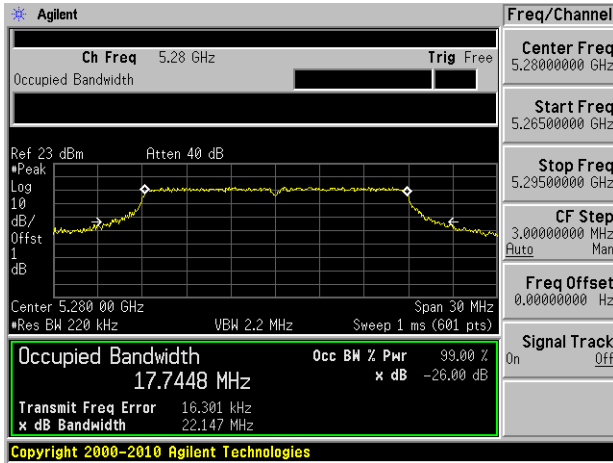


Chain 1

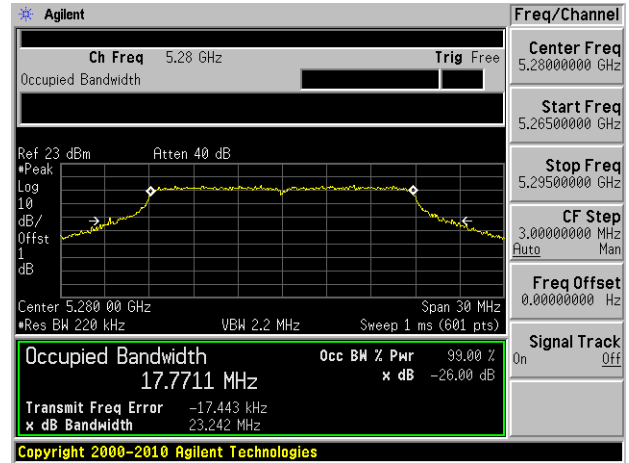


802.11n-HT20, Middle Channel 5280 MHz

Chain 0

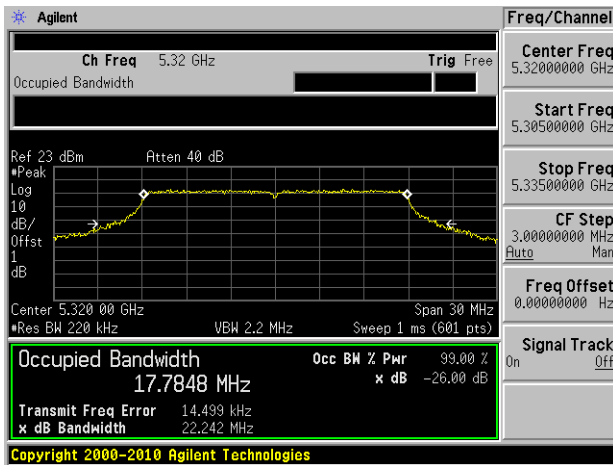


Chain 1

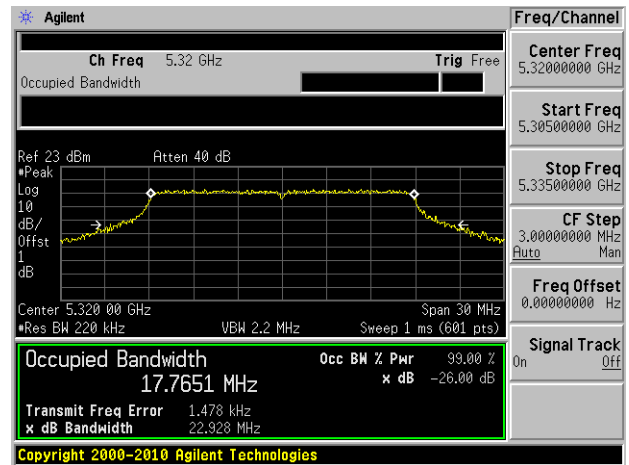


802.11n-HT20, High Channel, 5320 MHz

Chain 0

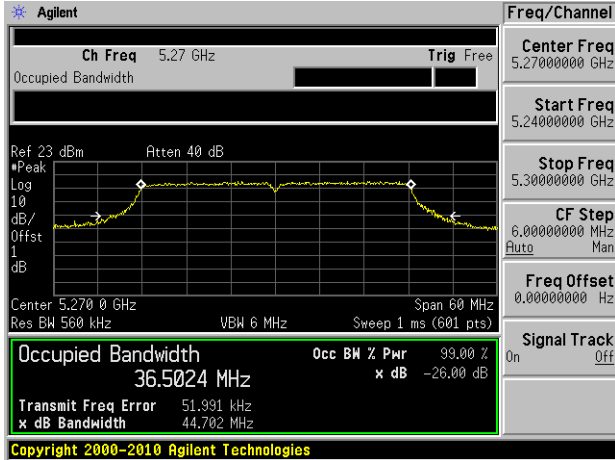


Chain 1

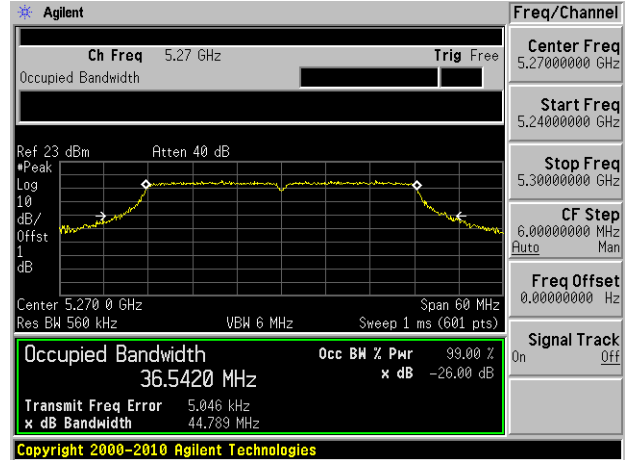


802.11n-HT40, Low Channel 5270 MHz

Chain 0

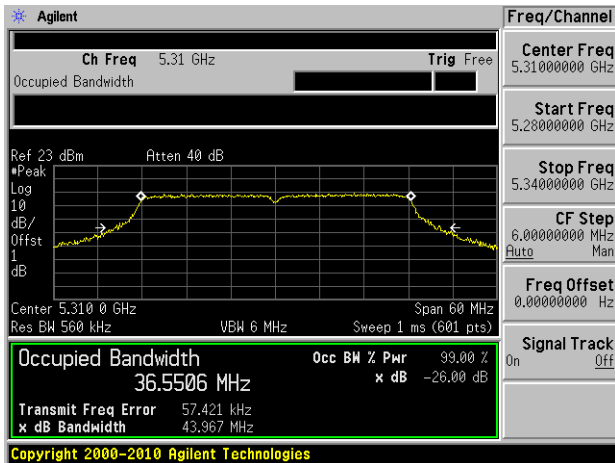


Chain 1

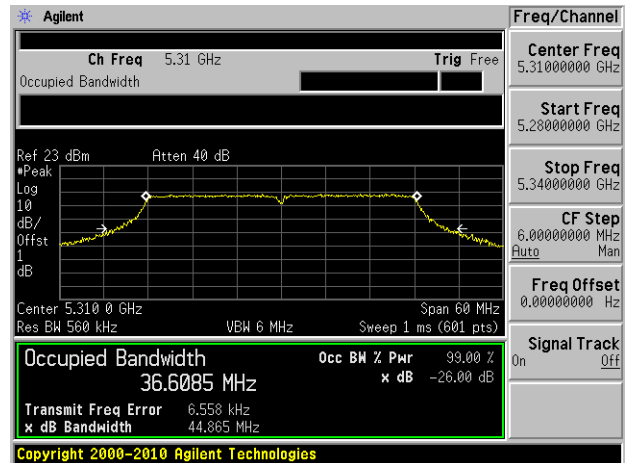


802.11n-HT40, High Channel 5310 MHz

Chain 0

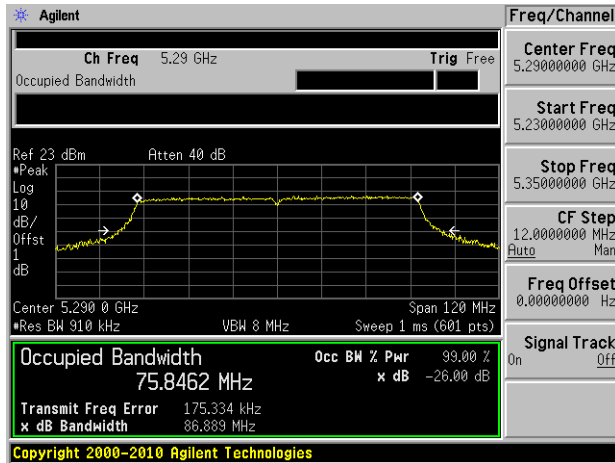


Chain 1

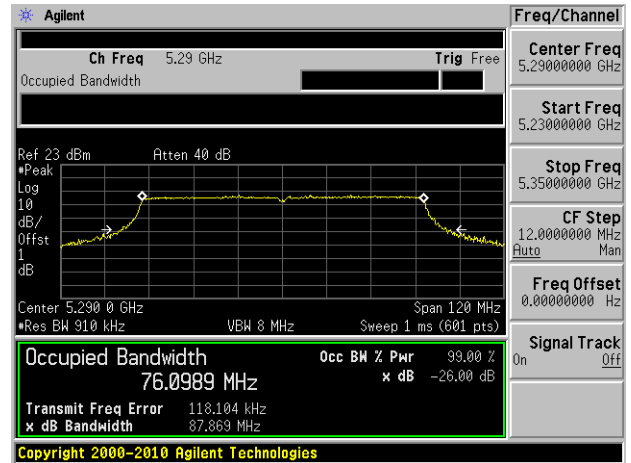


802.11ac-VHT80, High Channel 5290 MHz

Chain 0



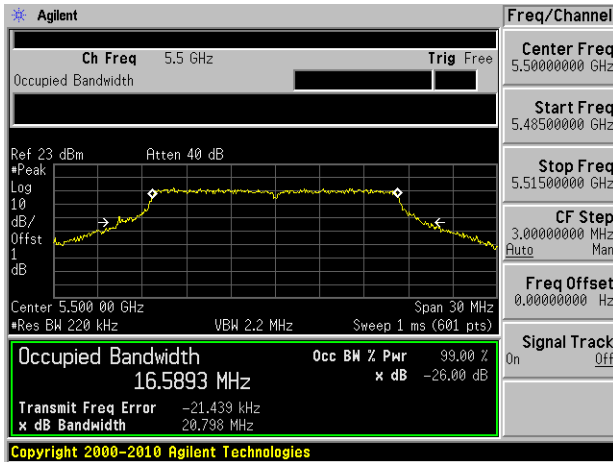
Chain 1



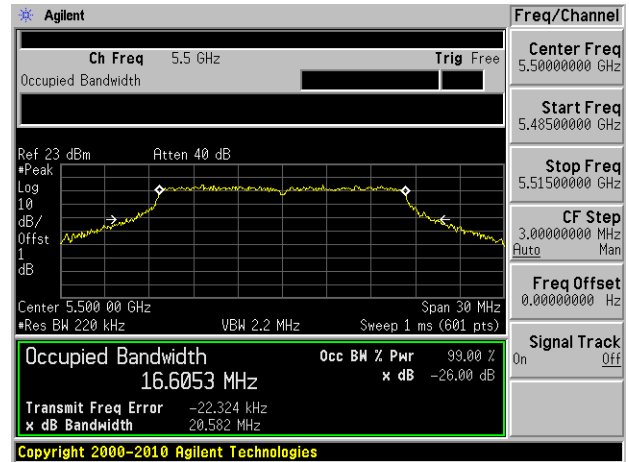
5.6 GHz Band

802.11a, Low Channel, 5500 MHz

Chain 0

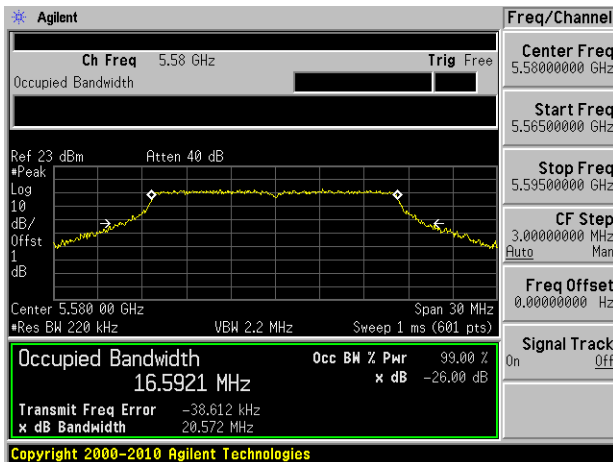


Chain 1

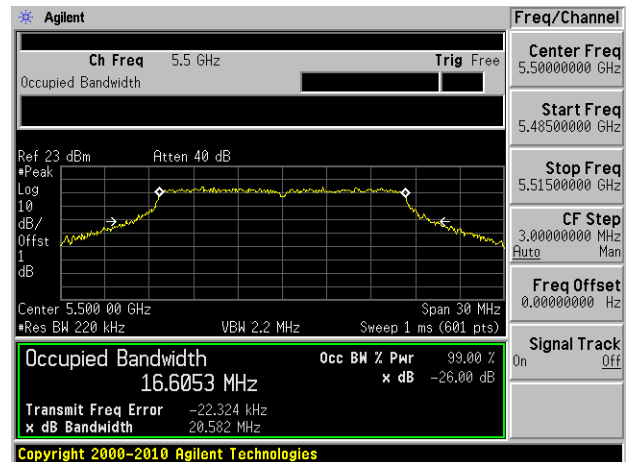


802.11a, Middle Channel, 5580 MHz

Chain 0

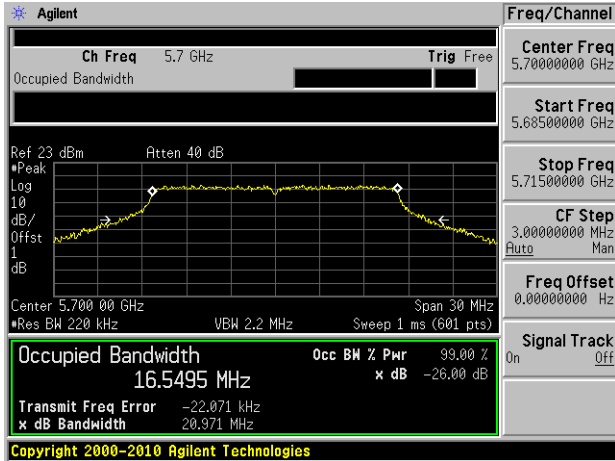


Chain 1

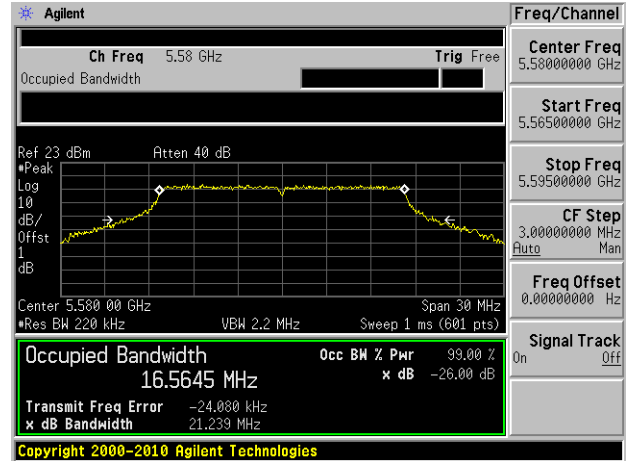


802.11a, High Channel, 5700 MHz

Chain 0

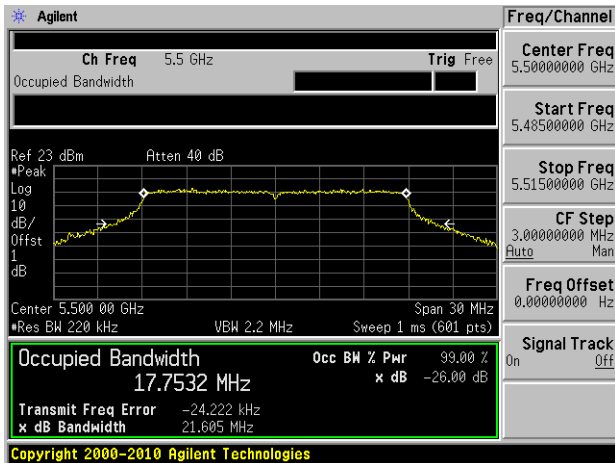


Chain 1

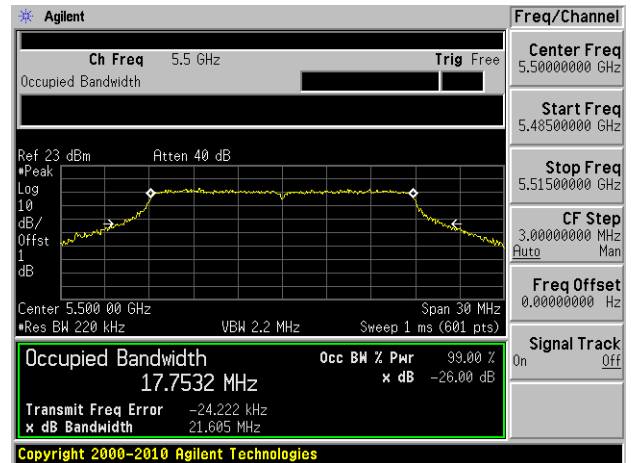


802.11n-HT 20, Low Channel 5500 MHz

Chain 0

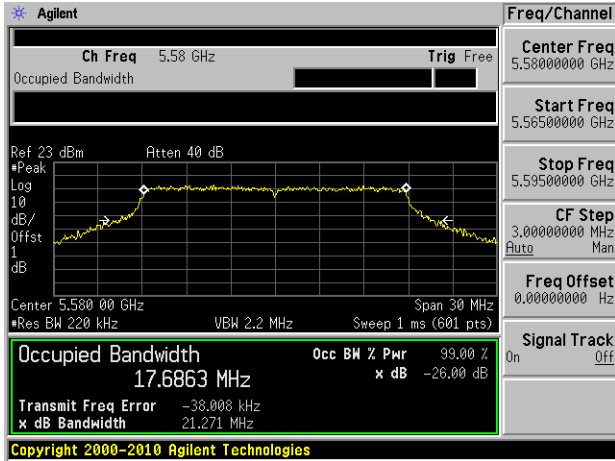


Chain 1

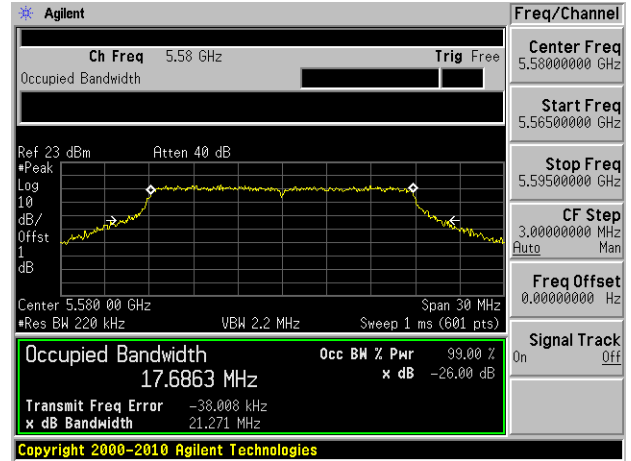


802.11n-HT20, Middle Channel 5580 MHz

Chain 0

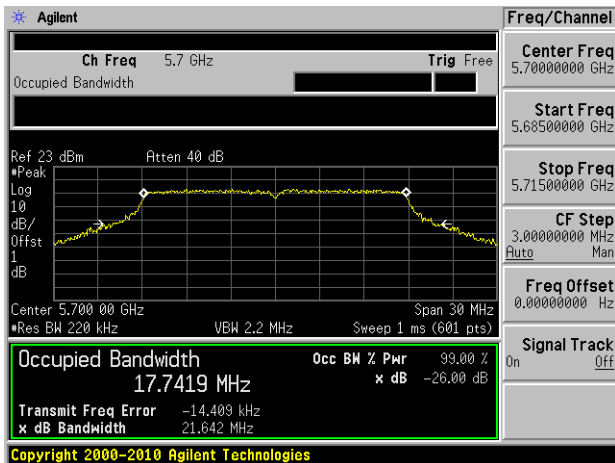


Chain 1

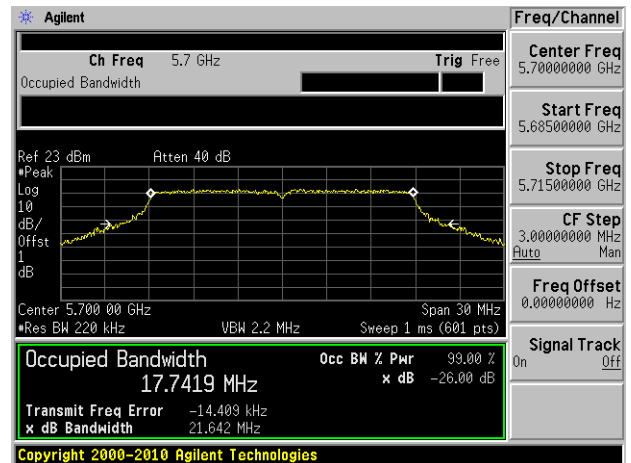


802.11n-HT20, High Channel 5700 MHz

Chain 0

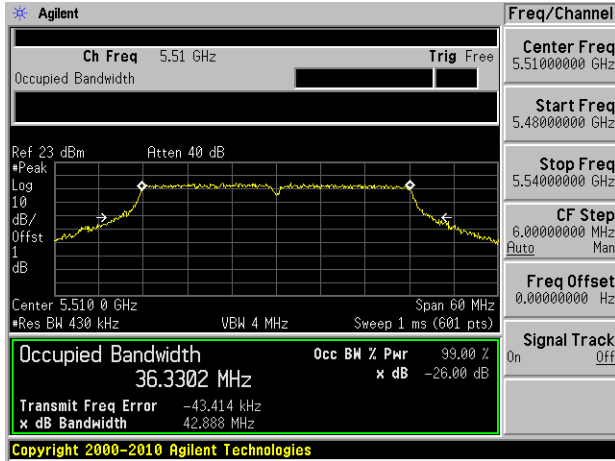


Chain 1

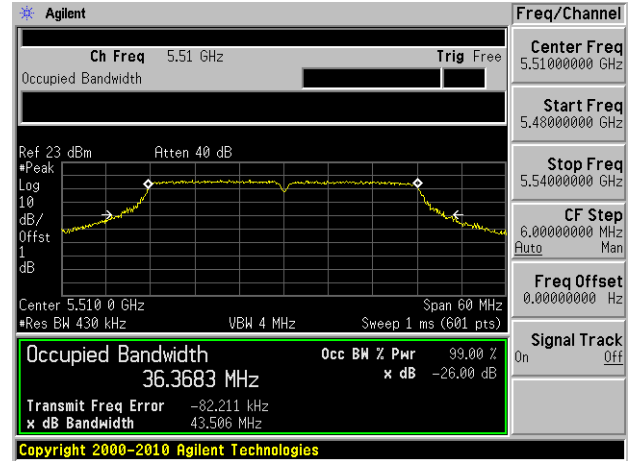


802.11n-HT40, Low Channel 5510 MHz

Chain 0

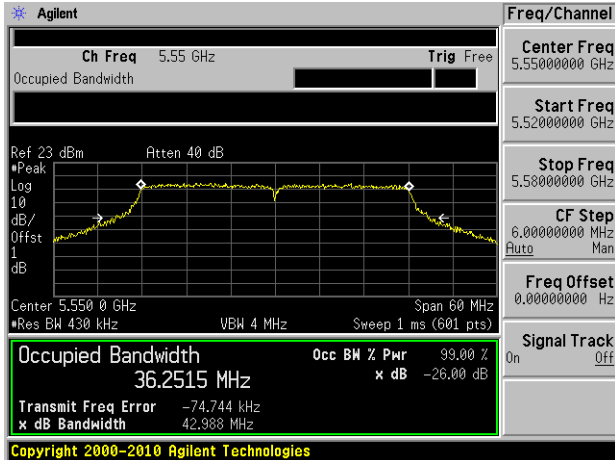


Chain 1

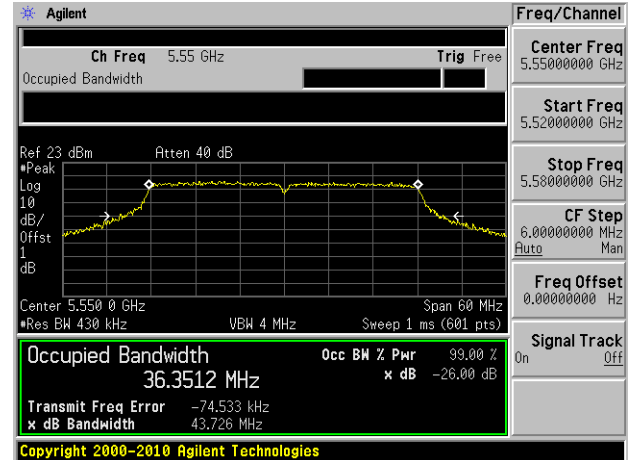


802.11n-HT40, Middle Channel 5550 MHz

Chain 0

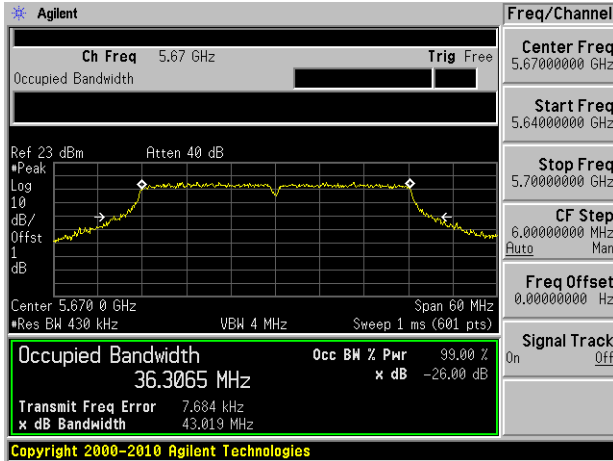


Chain 1

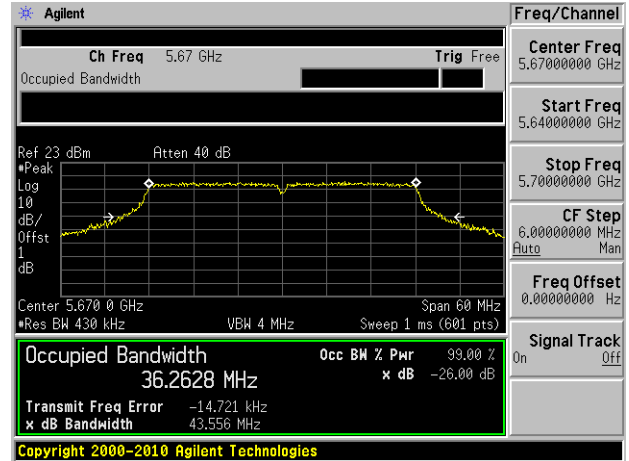


802.11n-HT40, High Channel 5670 MHz

Chain 0

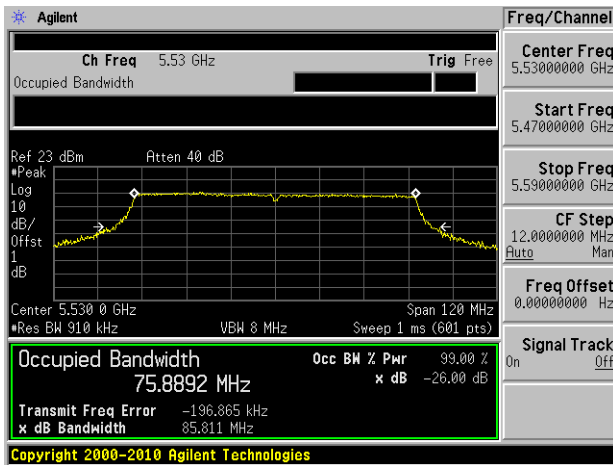


Chain 1

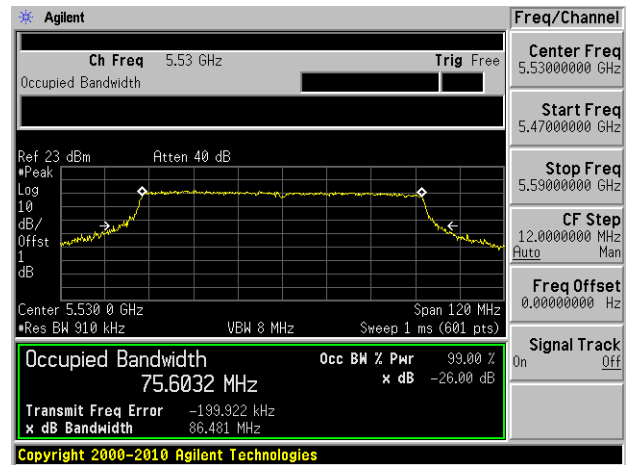


802.11ac-VHT80, Low Channel 5530 MHz

Chain 0



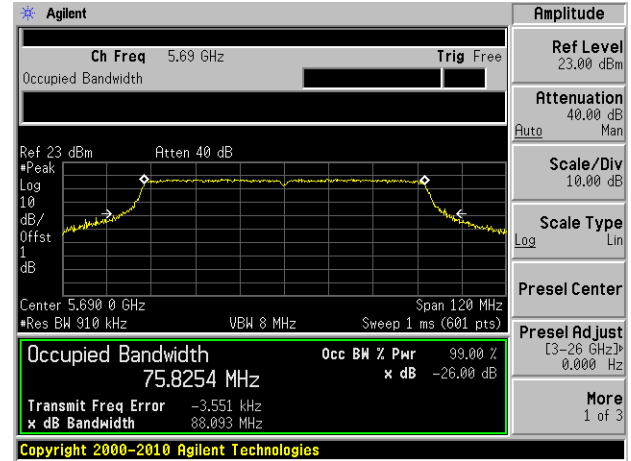
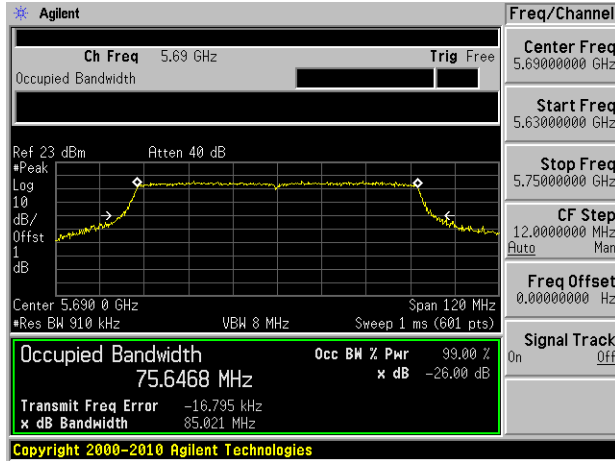
Chain 1



802.11ac-VHT80, High Channel 5690 MHz

Chain 0

Chain 1



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

9.1 Applicable Standards

According to FCC §15.407(a)

(1) For the band 5.15-5.25 GHz.

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

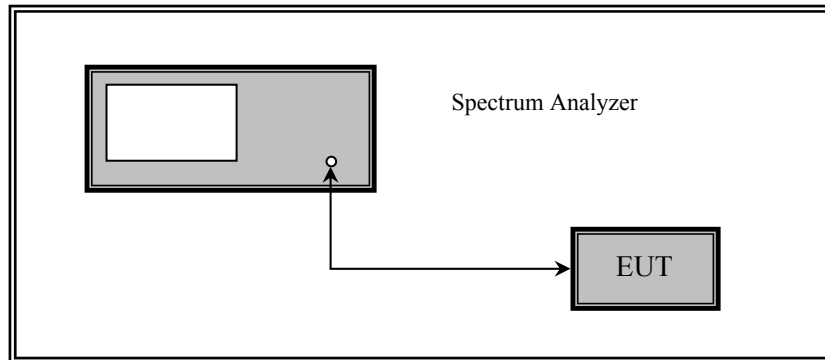
(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

9.2 Measurement Procedure

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 based on FCC KDB 789033 D02 General UNII Test Procedures New Rules v01, GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) DEVICES.

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:	22-24 °C
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 kPa

The testing was performed by Rui Zhou on 2014-08-18 to 2014-08-20 at RF site.

9.5 Test Results

5.3 GHz Band:

Radio Mode	Channel	Frequency (MHz)	Conducted Output Power (dBm)		Total Power (dBm)	Limit (dBm)	Margin (dBm)	Power Setting
			Chain 0	Chain 1				
802.11a	Low	5260	16.28	17.09	19.71	22	-2.29	16
	Middle	5280	16.69	17.06	19.89	22	-2.11	16
	High	5320	16.82	16.76	19.80	22	-2.20	16
802.11n-HT20	Low	5260	16.11	17.01	19.59	22	-2.41	16
	Middle	5280	16.56	17	19.80	22	-2.20	16
	High	5320	16.74	16.68	19.72	22	-2.28	16
802.11n-HT40	Low	5260	17.17	17.44	20.32	22	-1.68	17
	High	5320	11	11.28	14.15	22	-7.85	11
802.11ac-VHT80	-	5290	9.4	9.22	12.36	22	-9.64	15

5.6 GHz Band :

Radio Mode	Channel	Frequency (MHz)	Conducted Output Power (dBm)		Total Power (dBm)	Limit (dBm)	Margin (dBm)	Power Setting
			Chain 0	Chain 1				
802.11a	Low	5500	15.2	17.36	19.42	22	-2.58	15.5
	Middle	5580	15.92	16.95	19.48	22	-2.52	16
	High	5700	16.43	17.37	19.94	22	-2.06	16
802.11n-HT20	Low	5500	15.71	17.77	19.87	22	-2.13	16
	Middle	5580	16.43	17.42	19.96	22	-2.04	16.5
	High	5700	16.82	17.65	20.27	22	-1.73	16.5
802.11n-HT40	Low	5510	17.37	19.1	21.33	22	-0.67	18
	Middle	5550	17.85	19.12	21.54	22	-0.46	18.5
	High	5670	18.34	19.34	21.88	22	-0.12	18
802.11ac-VHT80	Low	5530	12.9	14.59	16.84	22	-5.16	14
	High	5690	18	18.84	21.45	22	-0.55	18

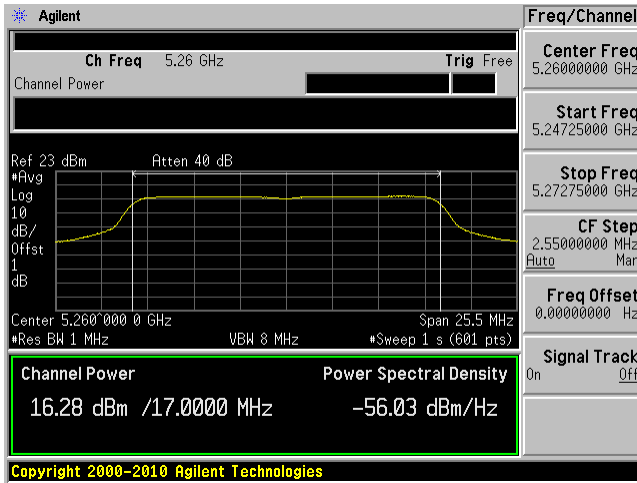
Note: The antenna gain is 8 dBi, which is over 2 dB of 6 dBi, the conducted output power shall be reduced to $24-2=22$ dBm.

Please refer to the plots as following:

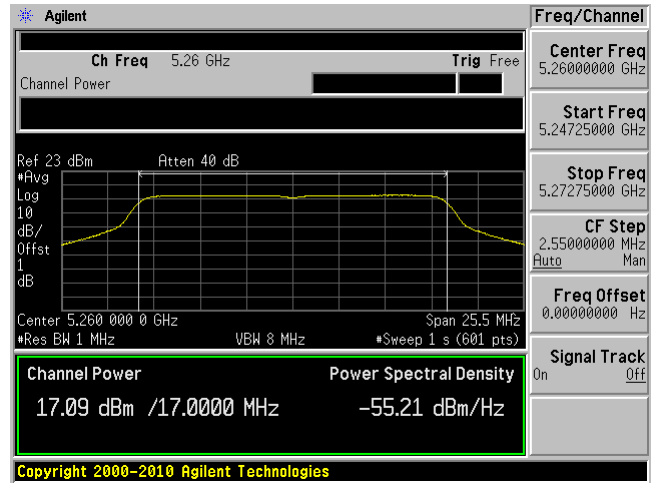
5.3 GHz Band

802.11a, Low Channel, 5260 MHz

Chain 0

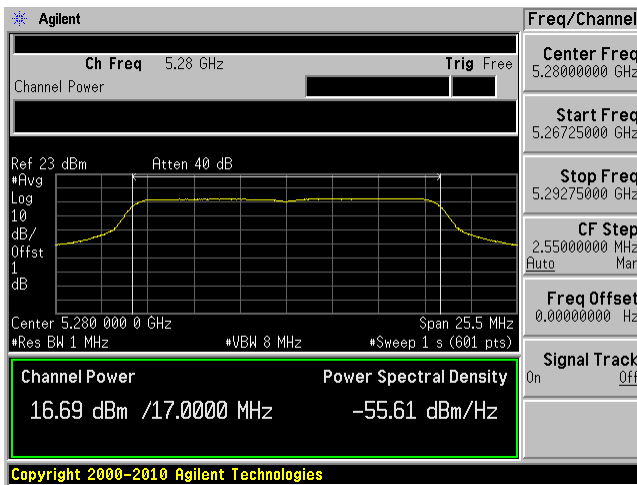


Chain 1

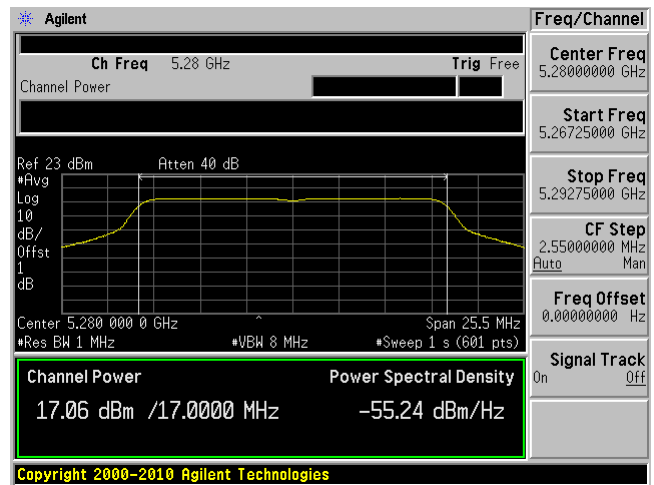


802.11a, Middle Channel, 5280 MHz

Chain 0

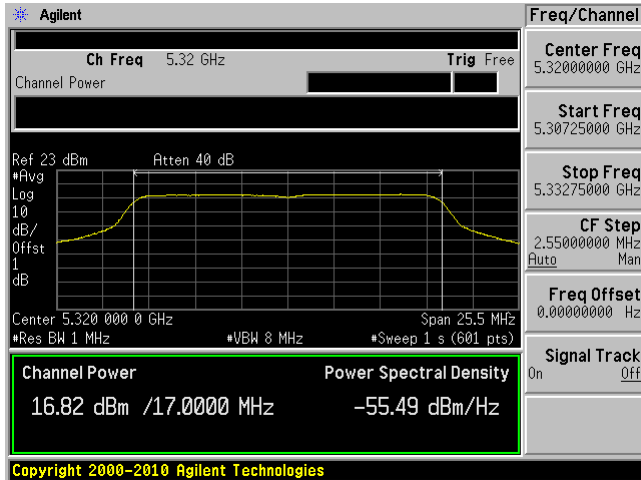


Chain 1

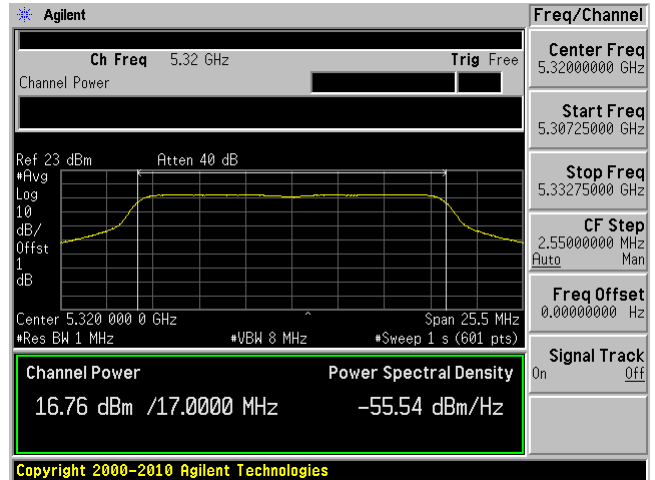


802.11a, High Channel, 5320 MHz

Chain 0

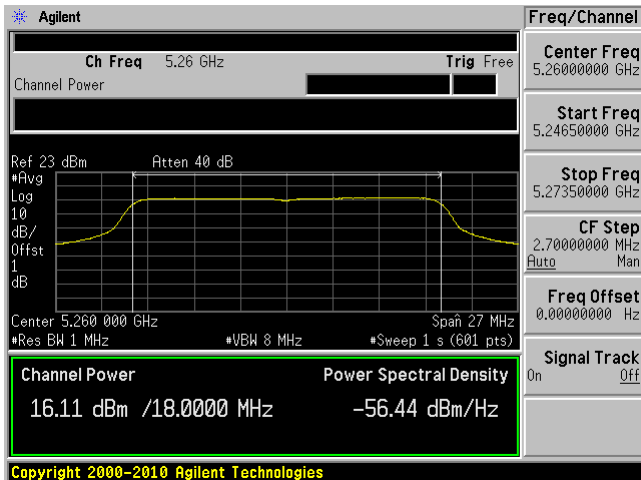


Chain 1

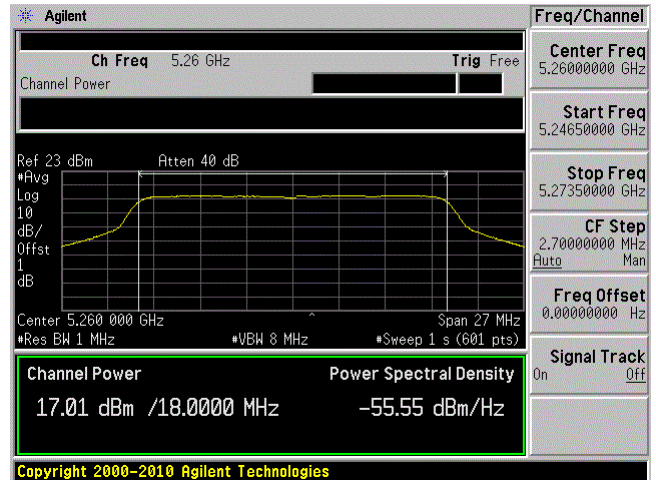


802.11n-HT 20, Low Channel 5260 MHz

Chain 0

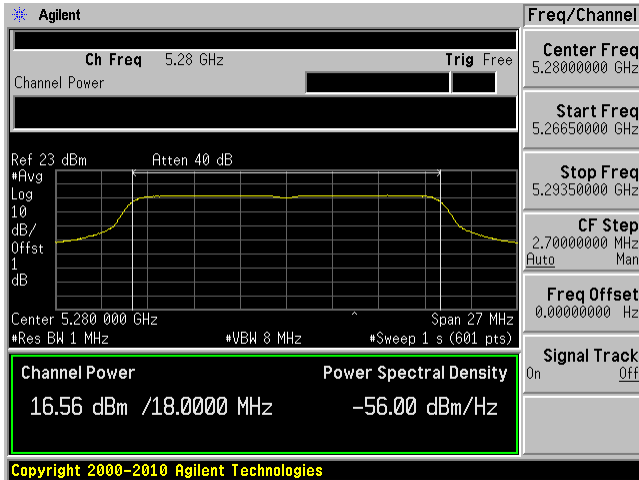


Chain 1

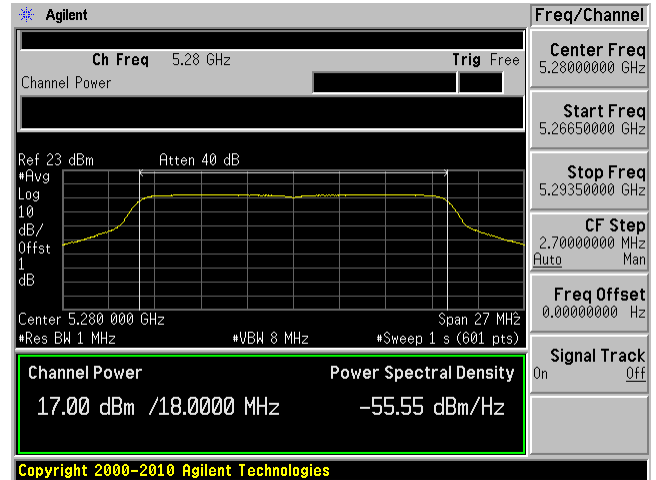


802.11n-HT20, Middle Channel 5280 MHz

Chain 0

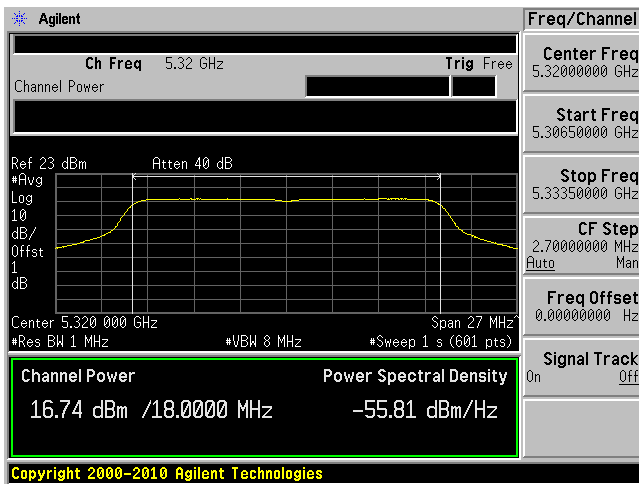


Chain 1

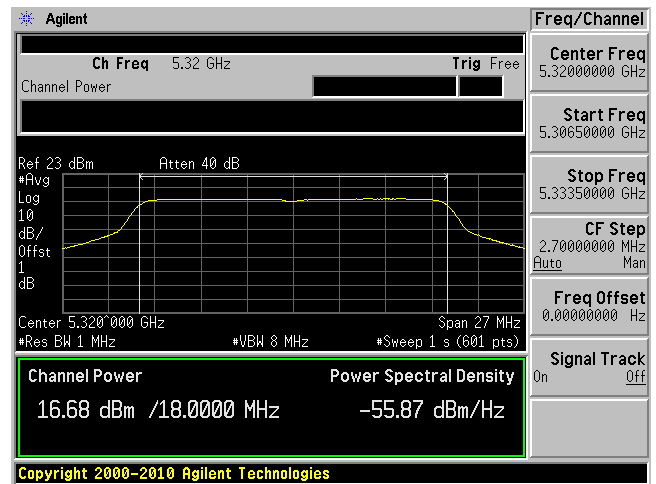


802.11n-HT20, High Channel, 5320 MHz

Chain 0

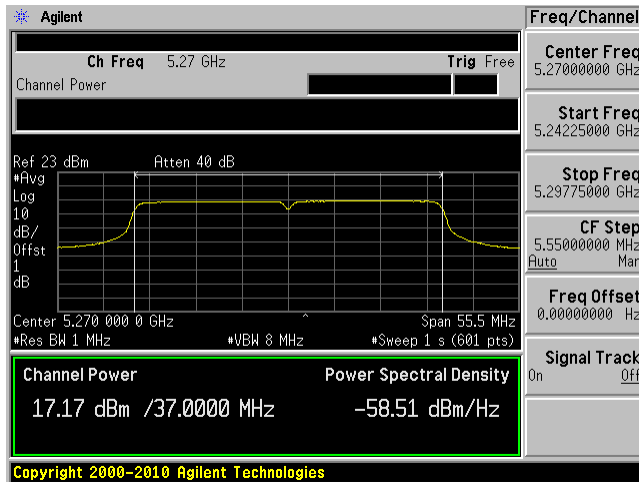


Chain 1

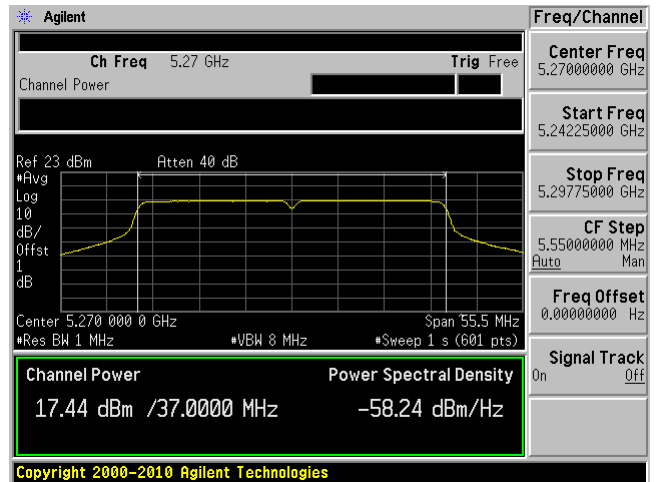


802.11n-HT40, Low Channel 5270 MHz

Chain 0

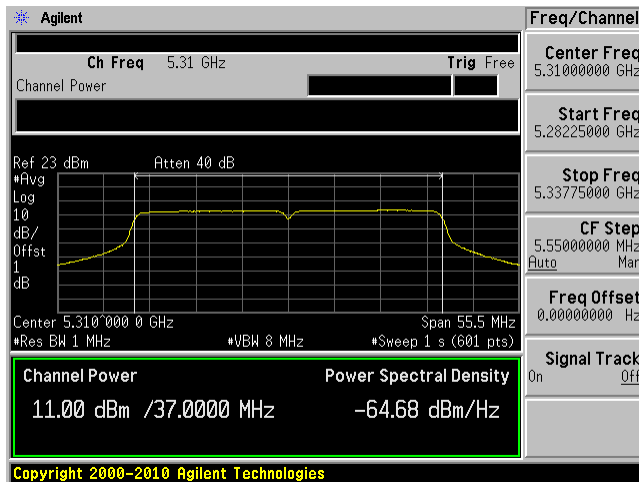


Chain 1

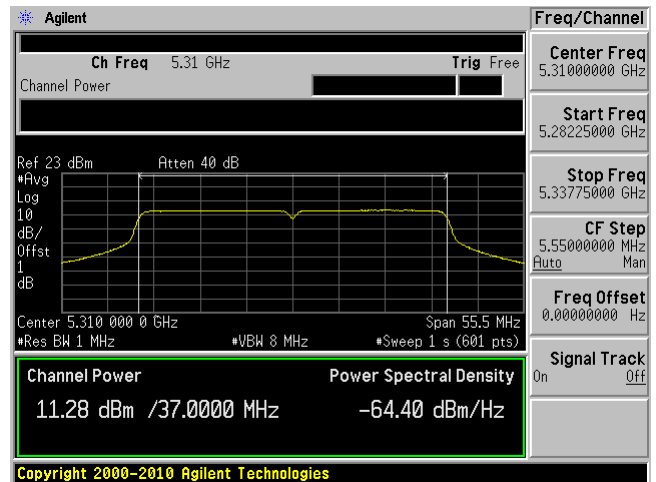


802.11n-HT40, High Channel 5310 MHz

Chain 0



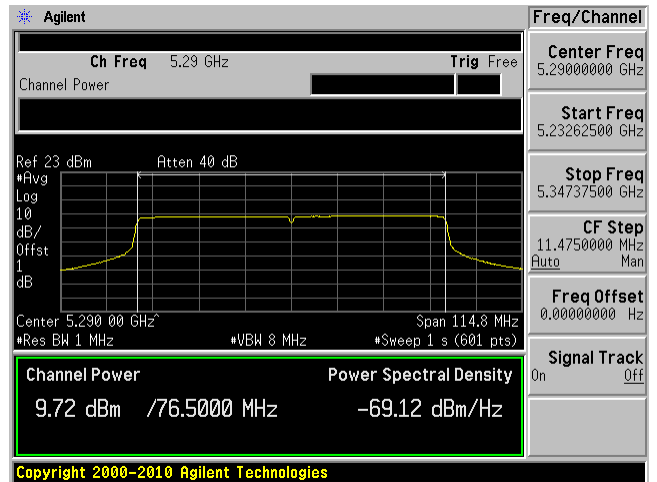
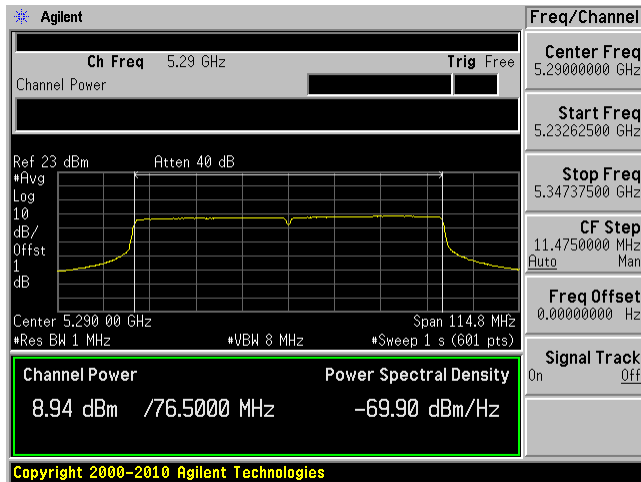
Chain 1



802.11ac-VHT80, High Channel 5290 MHz

Chain 0

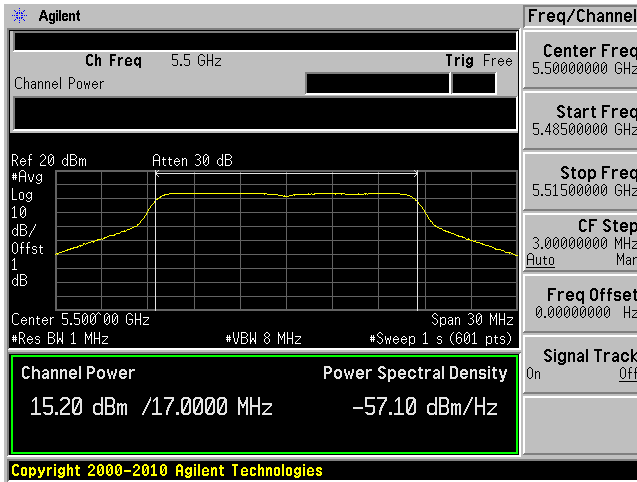
Chain 1



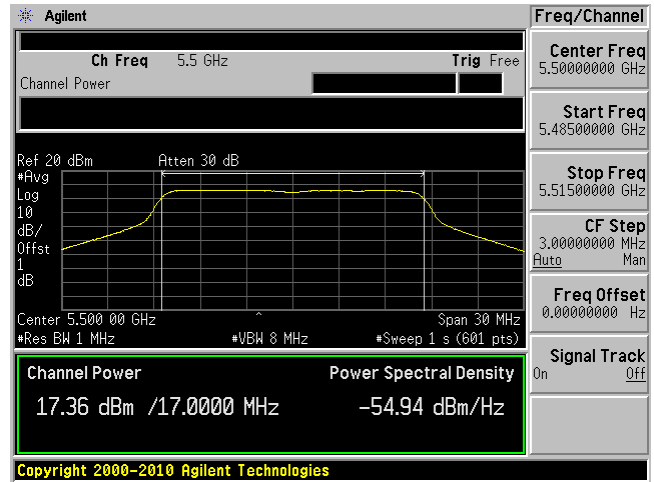
5.6 GHz Band

802.11a, Low Channel, 5500 MHz

Chain 0

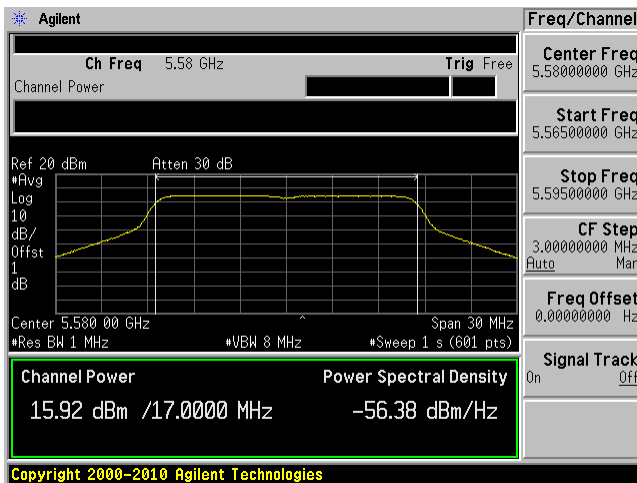


Chain 1

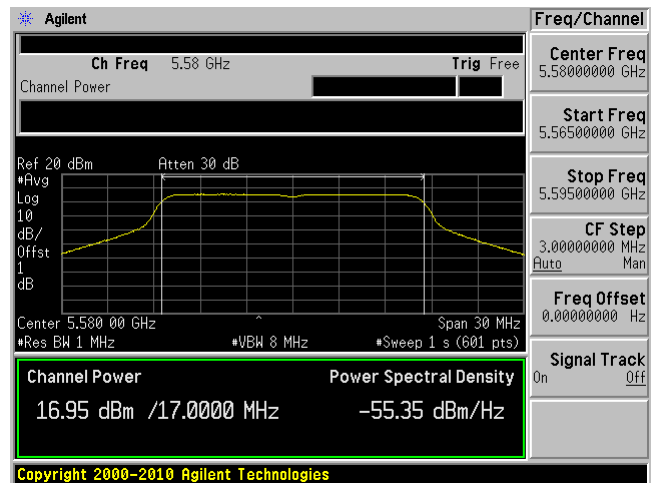


802.11a, Middle Channel, 5580 MHz

Chain 0

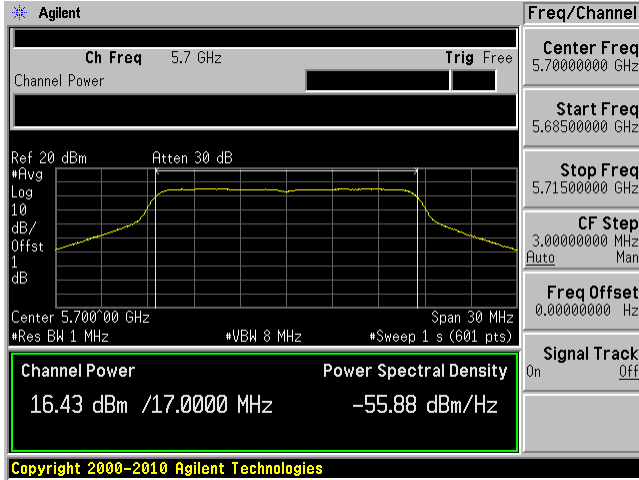


Chain 1

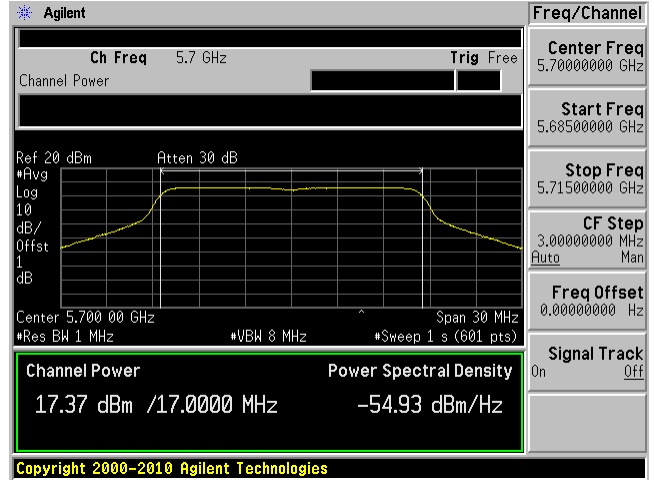


802.11a, High Channel, 5700 MHz

Chain 0

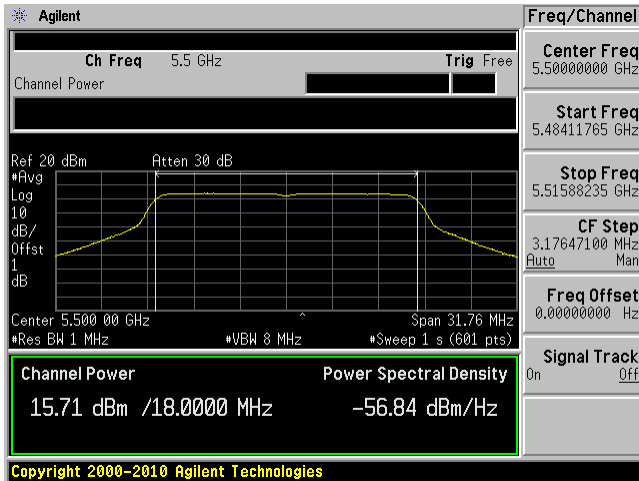


Chain 1

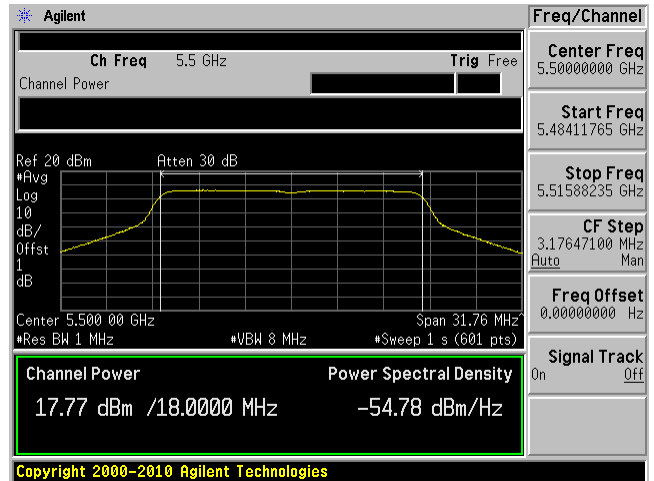


802.11n-HT 20, Low Channel 5500 MHz

Chain 0

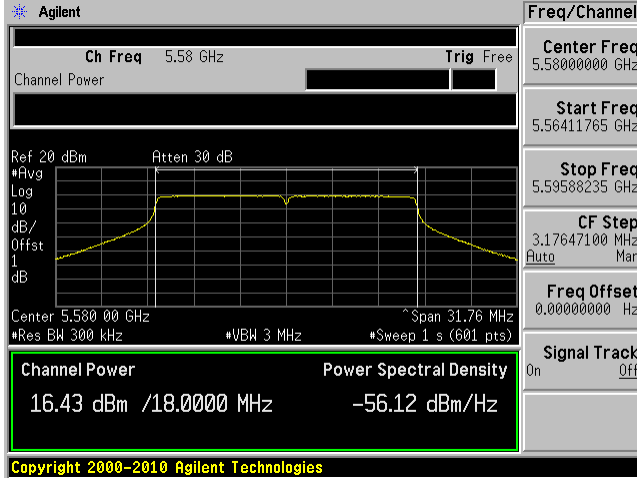


Chain 1

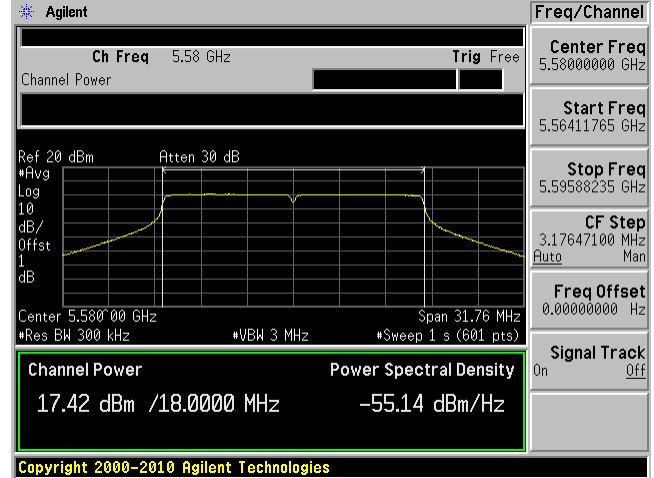


802.11n-HT20, Middle Channel 5580 MHz

Chain 0

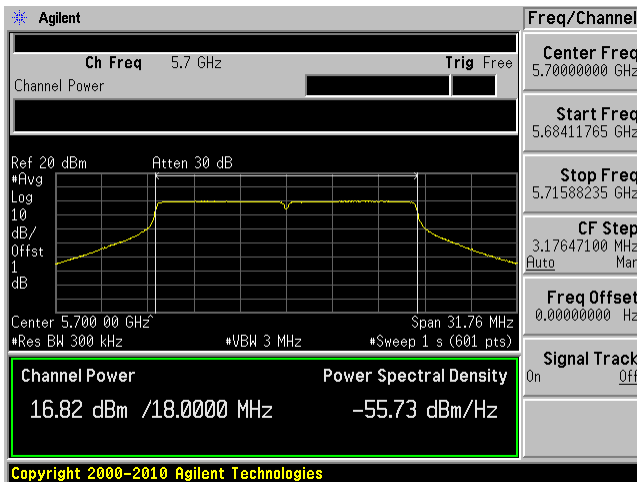


Chain 1

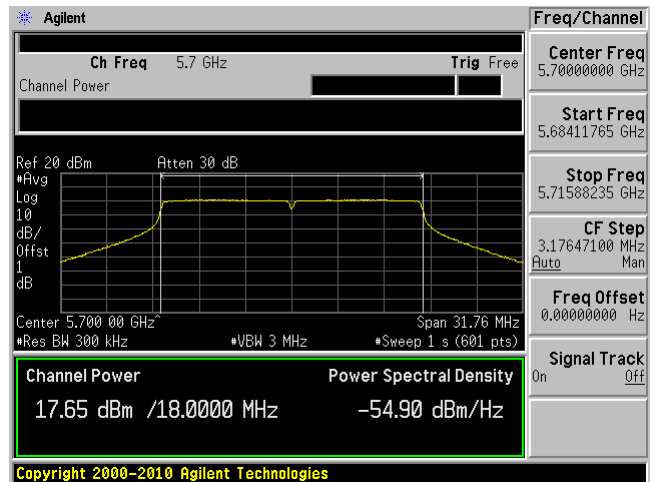


802.11n-HT20, High Channel 5700 MHz

Chain 0

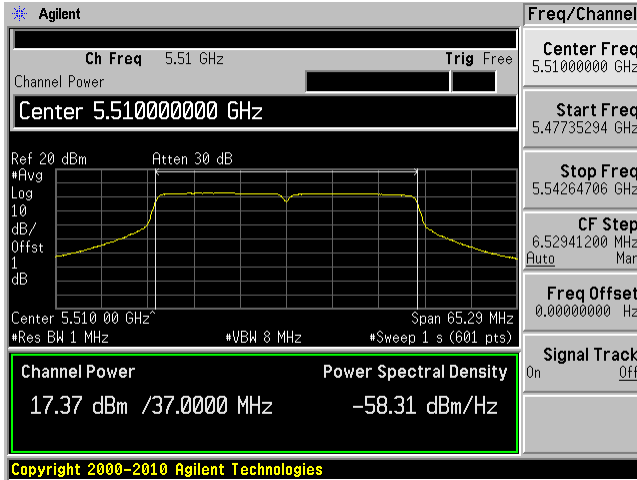


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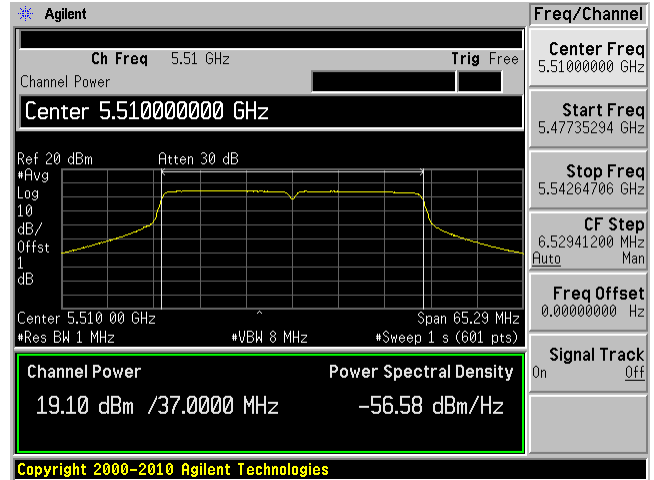


802.11n-HT40, Low Channel 5510 MHz

Chain 0

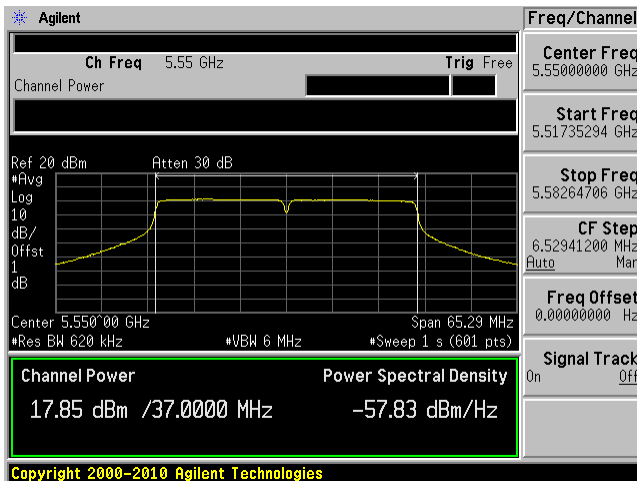


Chain 1

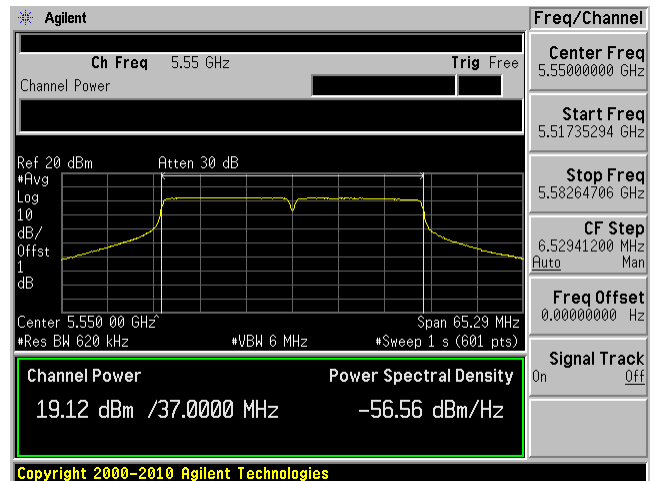


802.11n-HT40, Middle Channel 5550 MHz

Chain 0

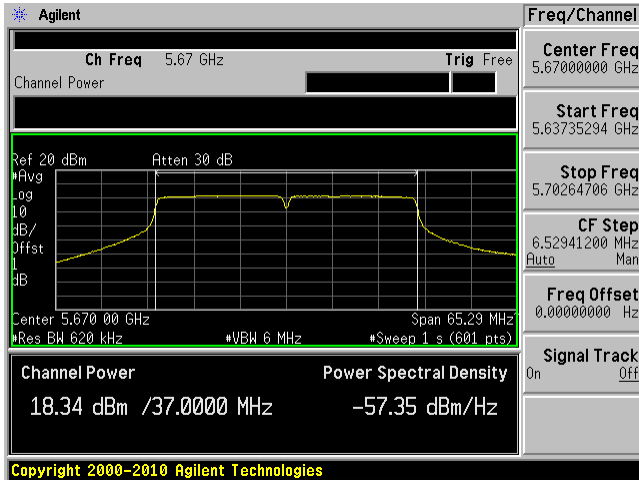


Chain 1

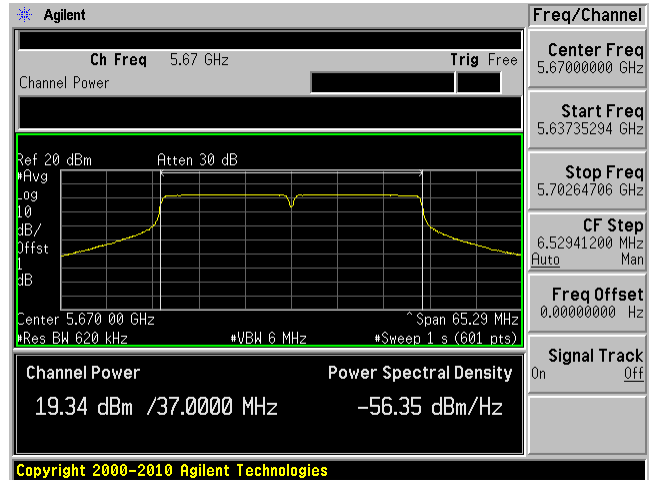


802.11n-HT40, High Channel 5670 MHz

Chain 0

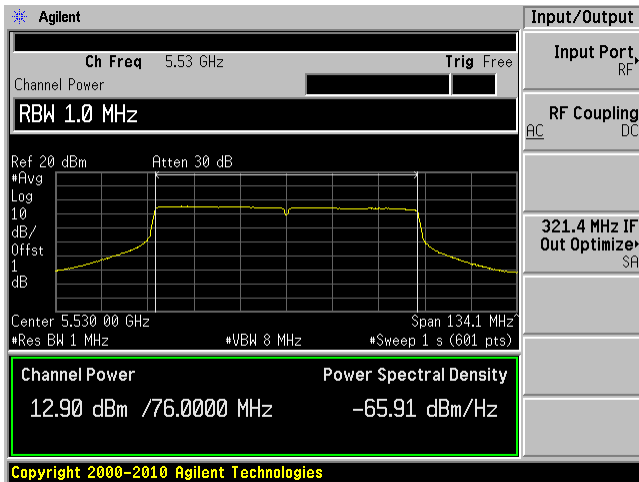


Chain 1

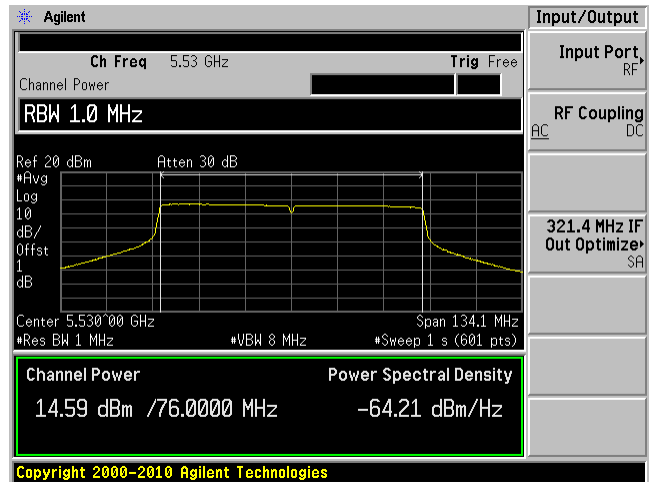


802.11ac-VHT80, Low Channel 5530 MHz

Chain 0

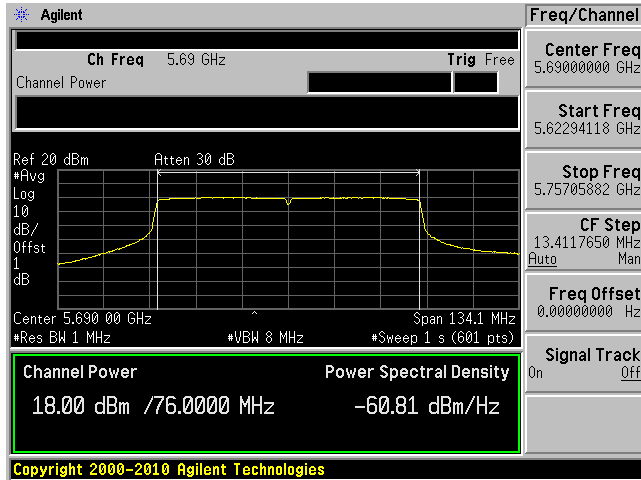


Chain 1

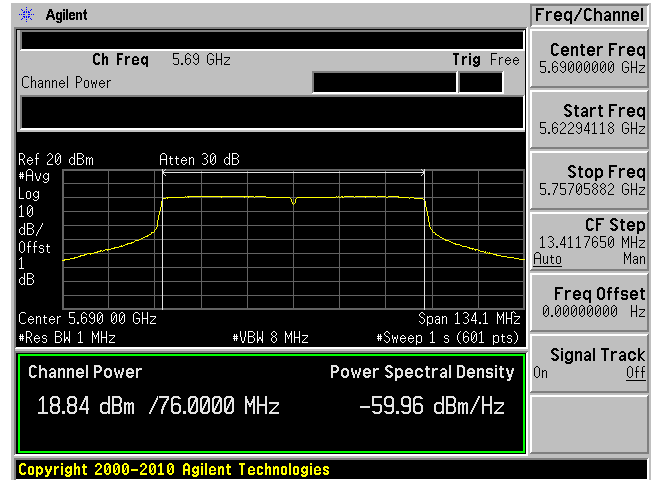


802.11ac-VHT80, High Channel 5690 MHz

Chain 0



Chain 1



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.

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

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

10.2 Measurement Procedure

The measurements are based on FCC KDB 789033 D01 General UNII Test Procedures v01r03: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section H: Unwanted emissions measurement

10.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	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 2014-08-18 to 2014-08-20 at RF site.

10.5 Test Results

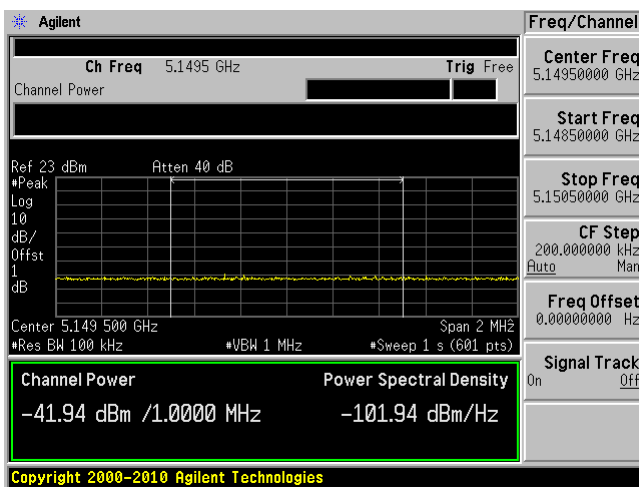
Please refer to the following plots.

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

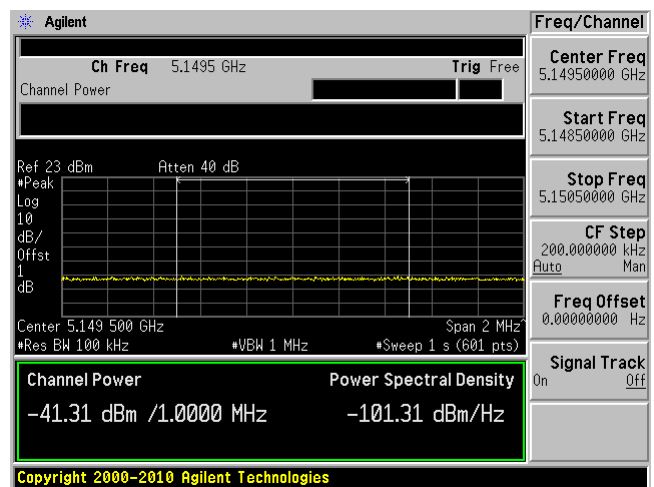
5.3 GHz Band

802.11a, Low Channel, 5260 MHz

Chain 0

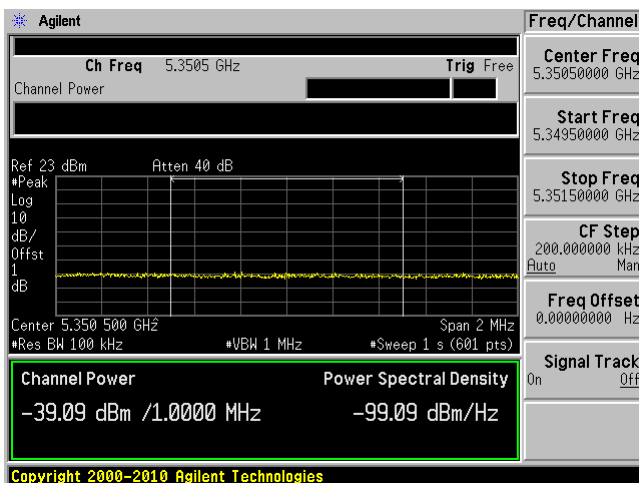


Chain 1

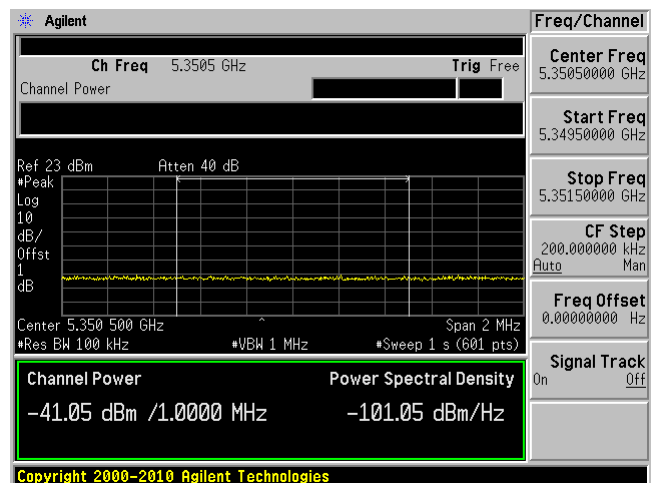


802.11a, High Channel, 5320 MHz

Chain 0

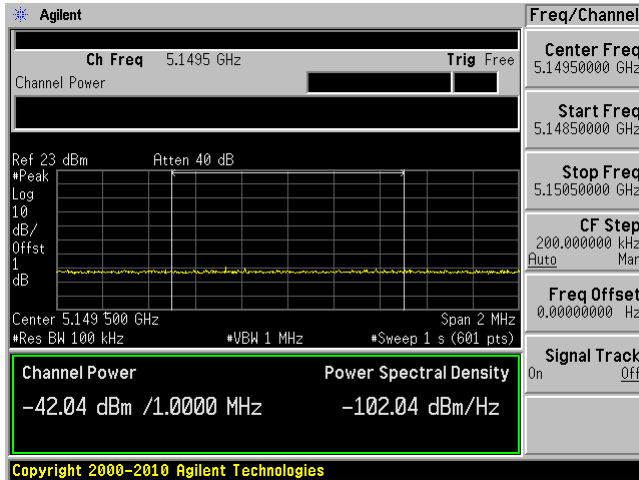


Chain 1

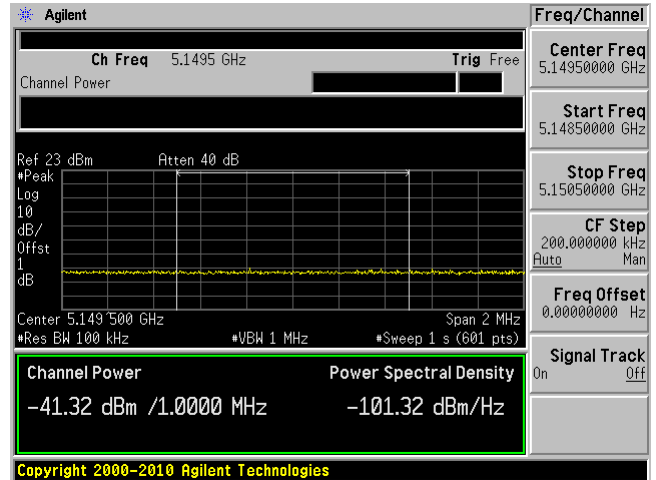


802.11n-HT 20, Low Channel 5260 MHz

Chain 0

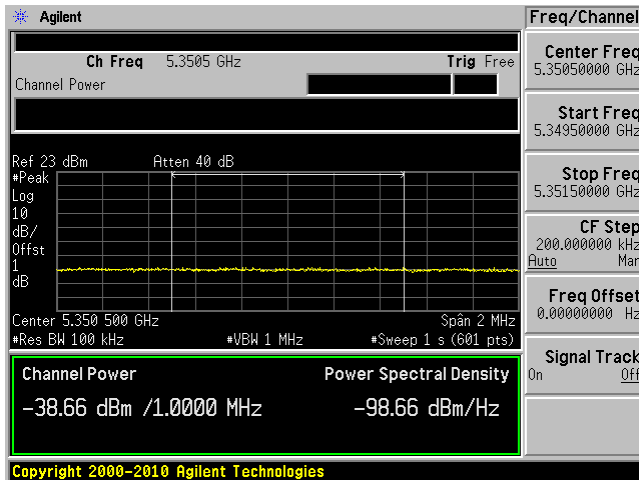


Chain 1

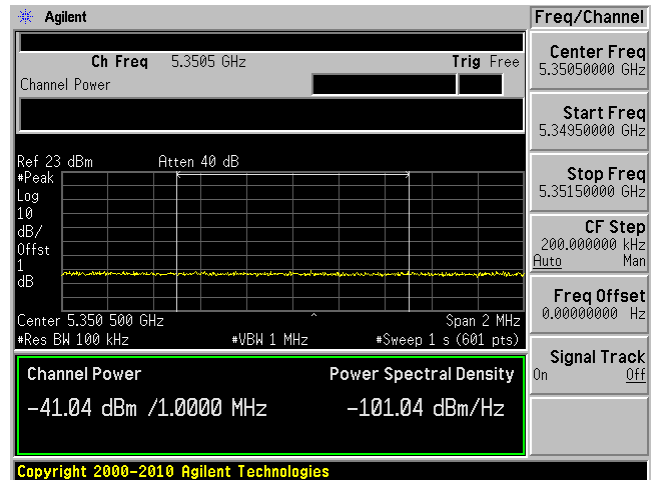


802.11n-HT20, High Channel, 5320 MHz

Chain 0

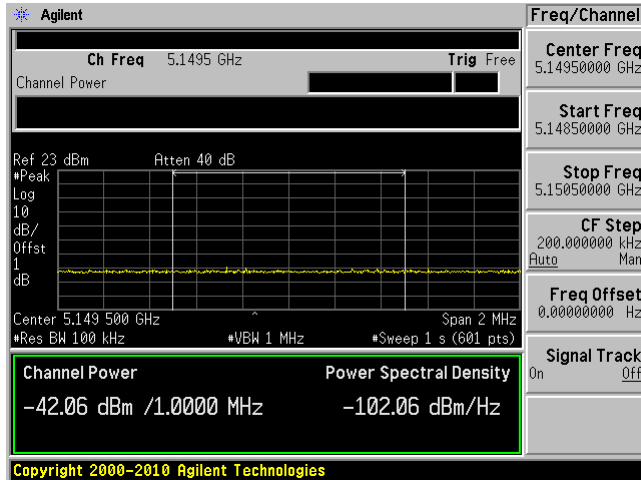


Chain 1

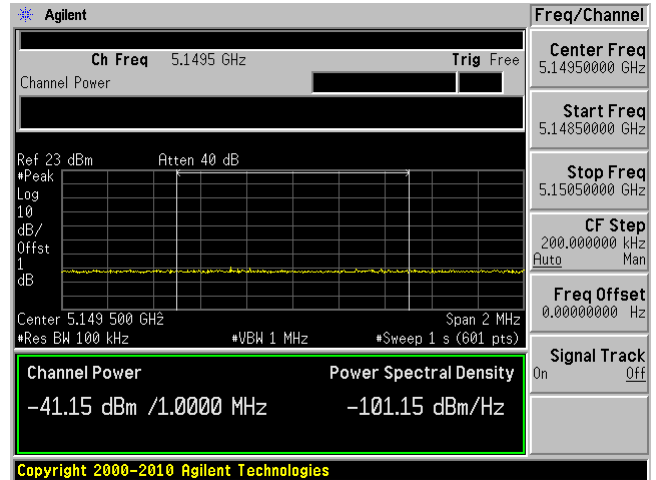


802.11n-HT40, Low Channel 5270 MHz

Chain 0

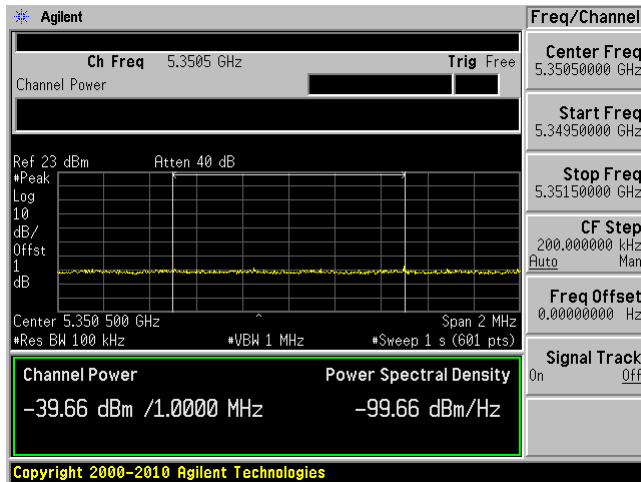


Chain 1

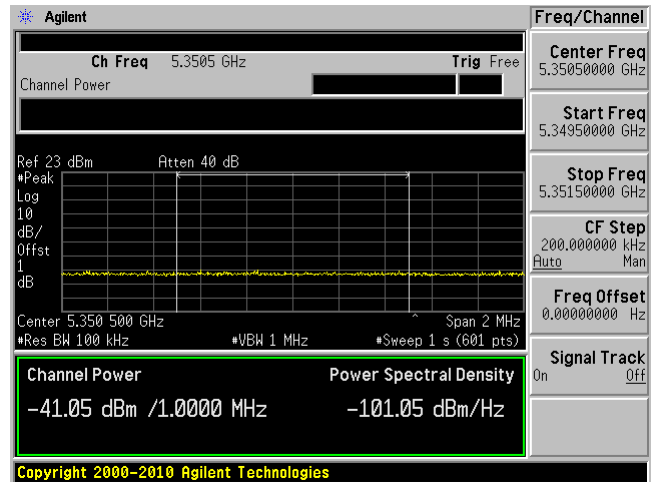


802.11n-HT40, High Channel 5310 MHz

Chain 0

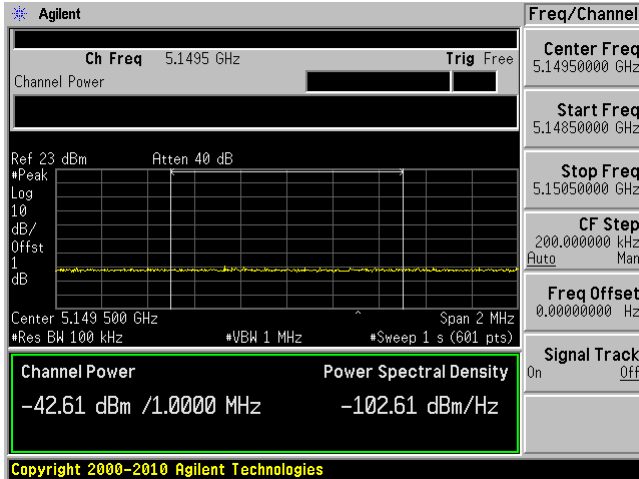


Chain 1

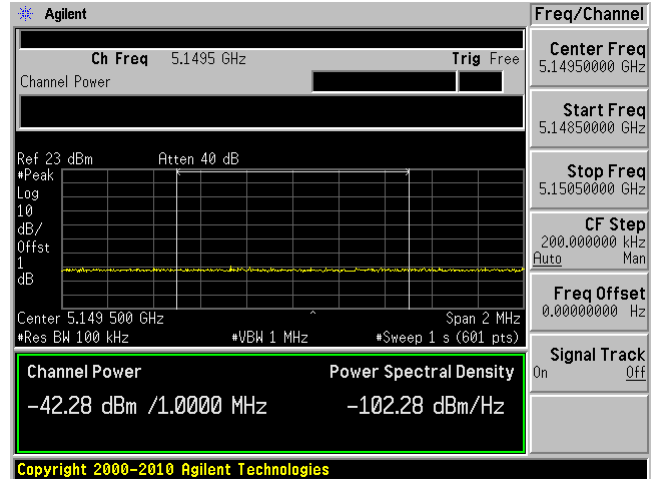


802.11ac-VHT80, Channel 5290 MHz Lower Band Edge at 5150MHz

Chain 0

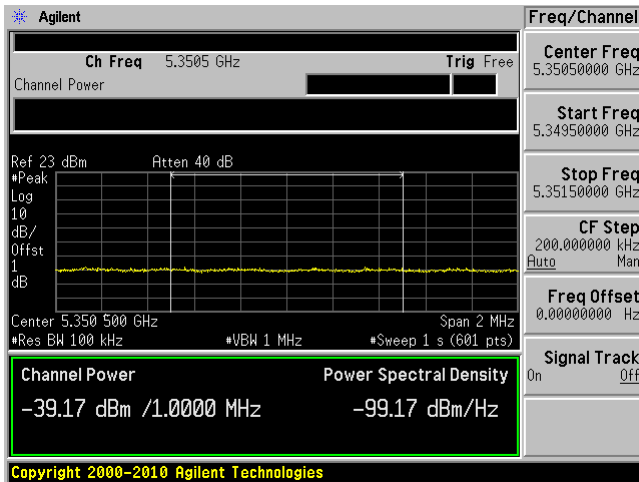


Chain 1

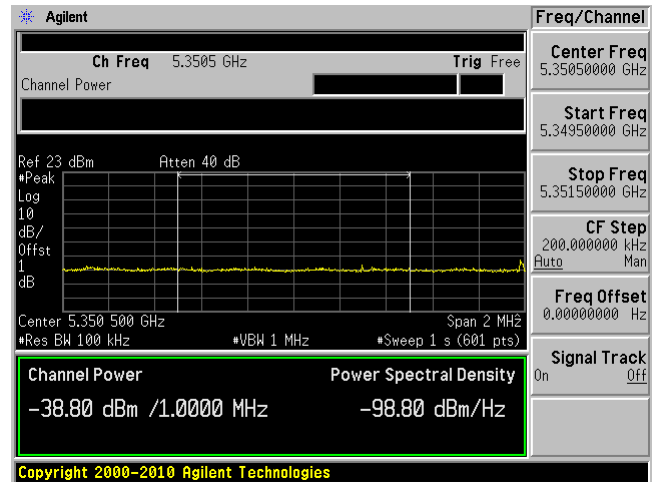


802.11ac-VHT80, Channel 5290 MHz Higher Band Edge at 5350MHz

Chain 0

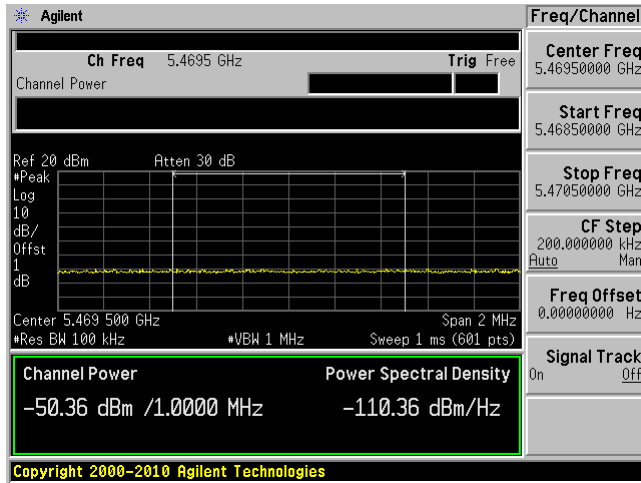


Chain 1

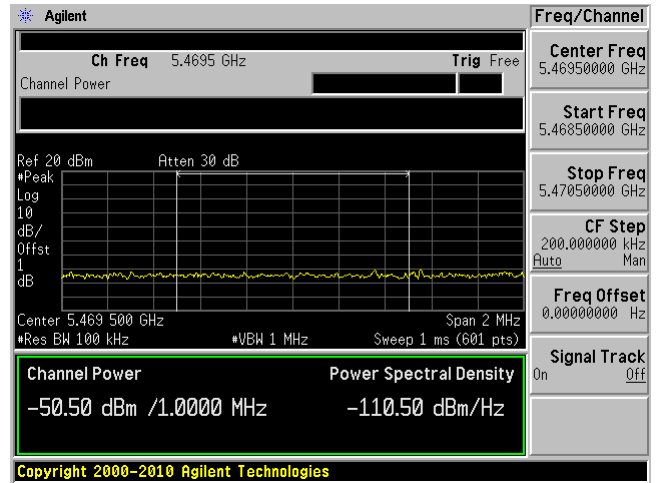


5.6 GHz Band 802.11a, Low Channel, 5260 MHz

Chain 0

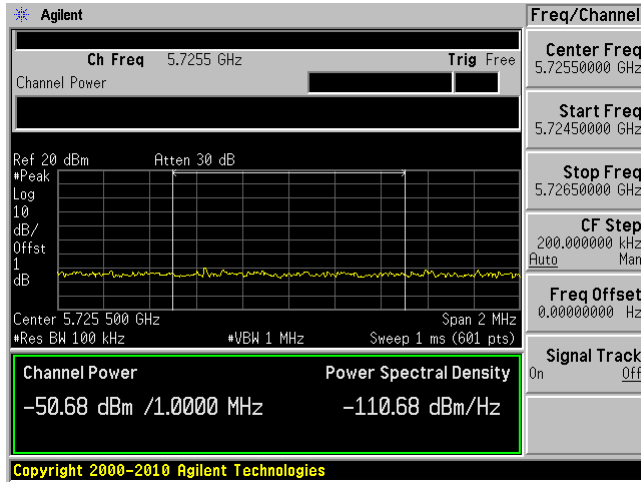


Chain 1

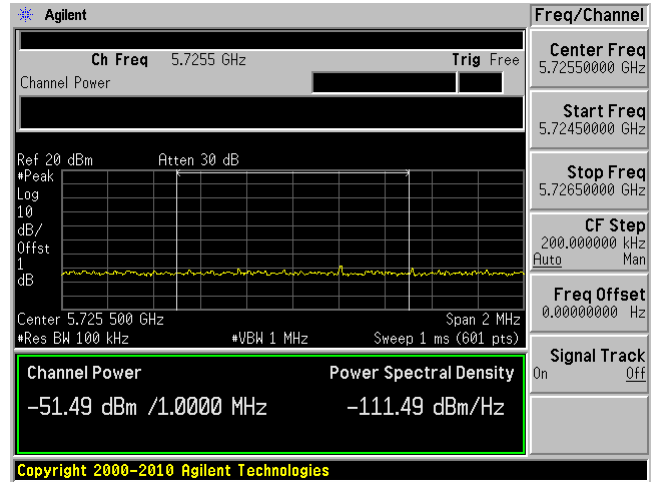


802.11a, High Channel, 5320 MHz

Chain 0

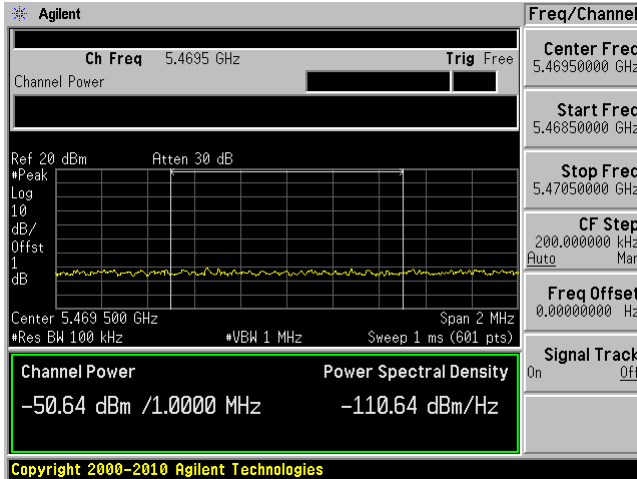


Chain 1

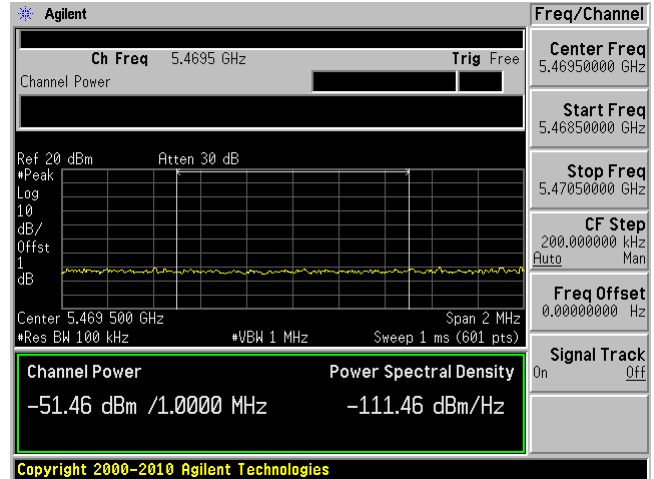


802.11n-HT 20, Low Channel 5260 MHz

Chain 0

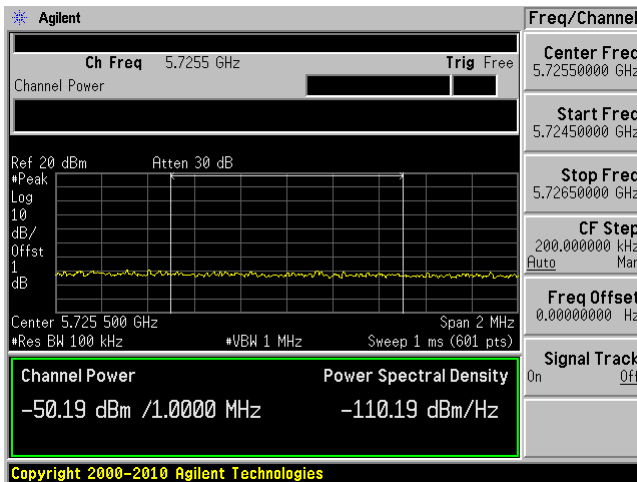


Chain 1

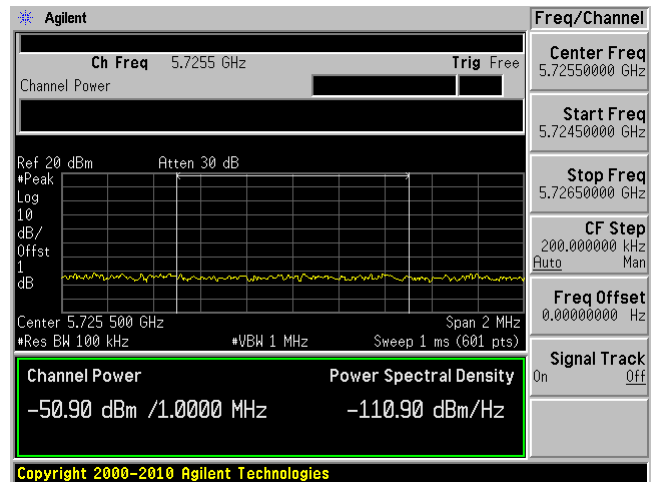


802.11n-HT20, High Channel, 5320 MHz

Chain 0

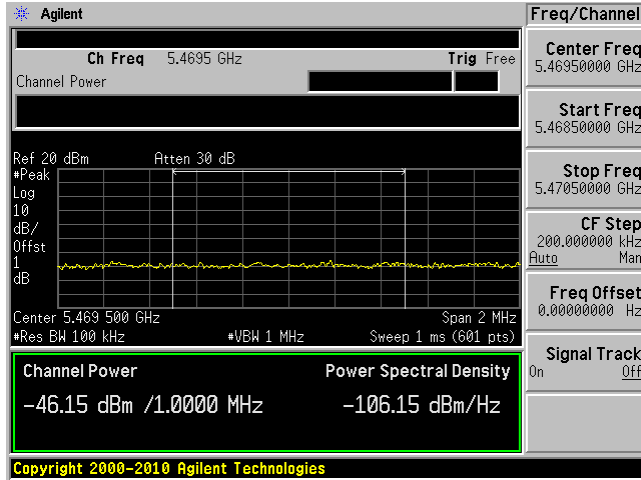


Chain 1

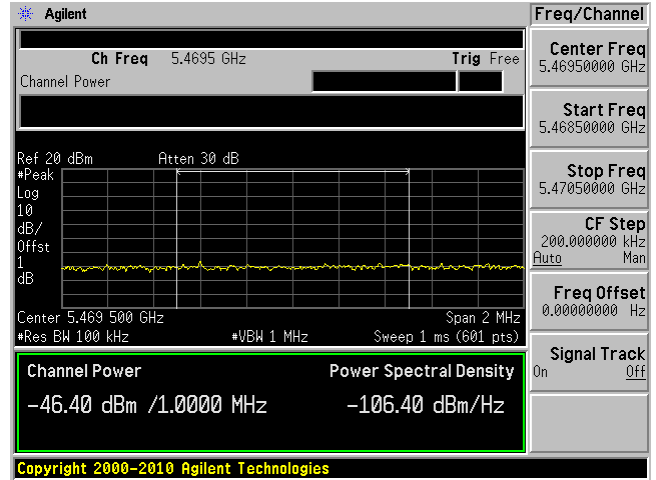


802.11n-HT40, Low Channel 5270 MHz

Chain 0

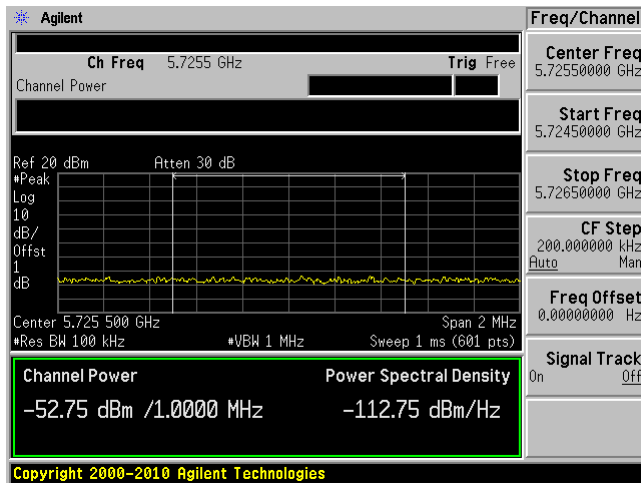


Chain 1

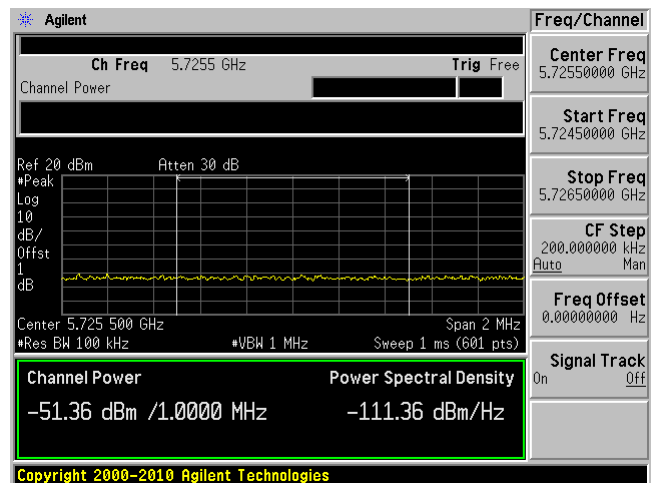


802.11n-HT40, High Channel 5310 MHz

Chain 0

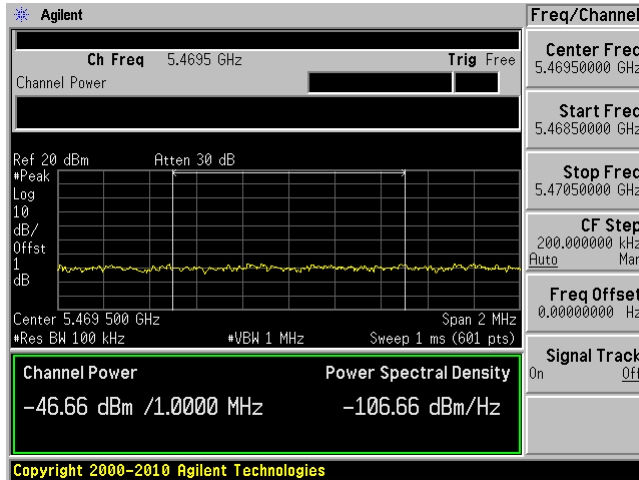


Chain 1

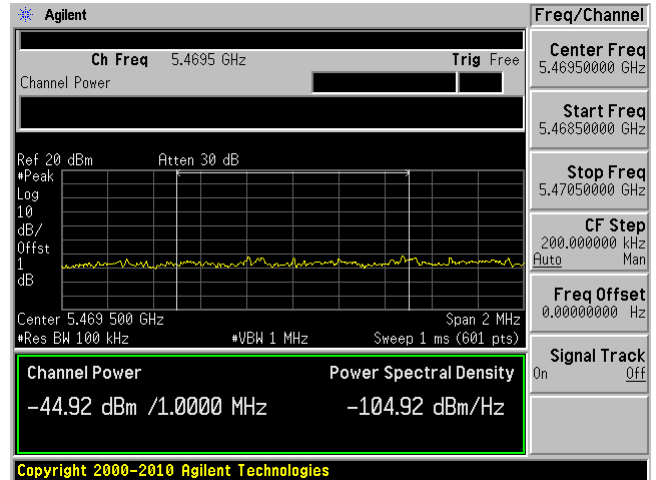


802.11ac-VHT80, Channel 5290 MHz Lower Band Edge at 5150MHz

Chain 0

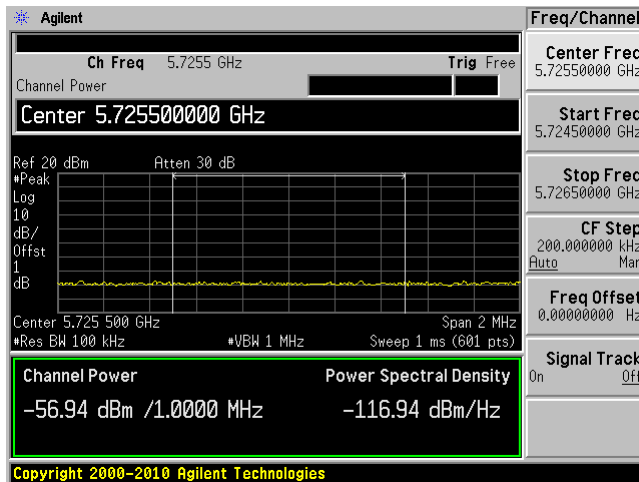


Chain 1

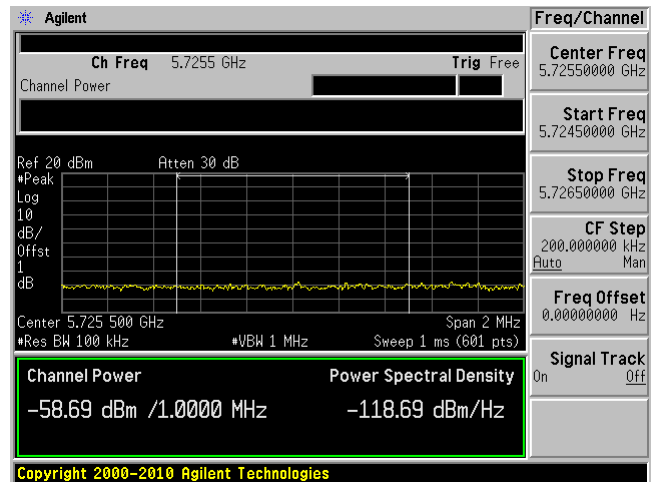


802.11ac-VHT80, Channel 5290 MHz Higher Band Edge at 5350MHz

Chain 0



Chain 1



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

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.

Procedures for Average Unwanted Emissions Measurements above 1000 MHz.

- a) Follow the requirements in section G)3), "General Requirements for Unwanted Emissions Measurements".
- b) Average emission levels shall be measured using one of the following two methods.
- c) Method AD (Average Detection): Primary method
 - (i) RBW = 1 MHz.
 - (ii) VBW \geq 3 MHz.
 - (iii) Detector = RMS, if span/(# of points in sweep) \leq RBW/2. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, the detector mode shall be set to peak.
 - (iv) Averaging type = power (i.e., RMS)
 - As an alternative, the detector and averaging type may be set for linear voltage averaging. Some analyzers require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
 - (v) Sweep time = auto.
 - (vi) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, the number of traces shall be increased by a factor of $1/x$, where x is the duty cycle. For example, with 50 percent duty cycle, at least 200 traces should be averaged.
 - (vii) If tests are performed with the EUT transmitting at a duty cycle less than 98 percent, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
 - If power averaging (RMS) mode was used in step (iv) above, the correction factor is $10 \log(1/x)$, where x is the duty cycle. For example, if the transmit duty cycle was 50 percent, then 3 dB must be added to the measured emission levels.
 - If linear voltage averaging mode was used in step (iv) above, the correction factor is $20 \log(1/x)$, where x is the duty cycle. For example, if the transmit duty cycle was 50 percent, then 6 dB must be added to the measured emission levels.

Add a correction factor (antenna gain+ Attenuator loss+cable loss) to the display.

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:	22-24 °C
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 kPa

The testing was performed by Rui Zhou 2014-08-18 on 2014-08-20 at RF site.

11.5 Test Results

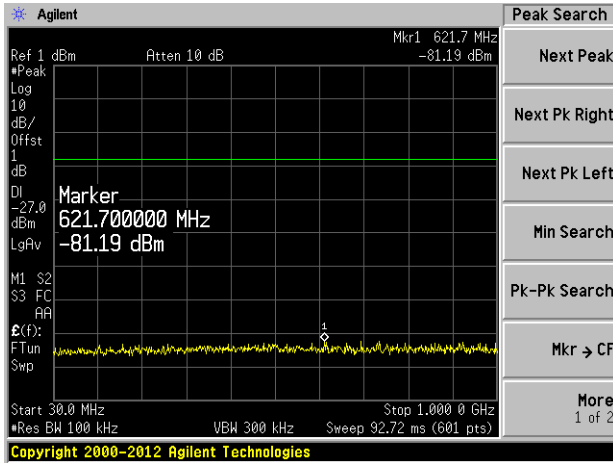
Please refer to following plots of spurious emissions.

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

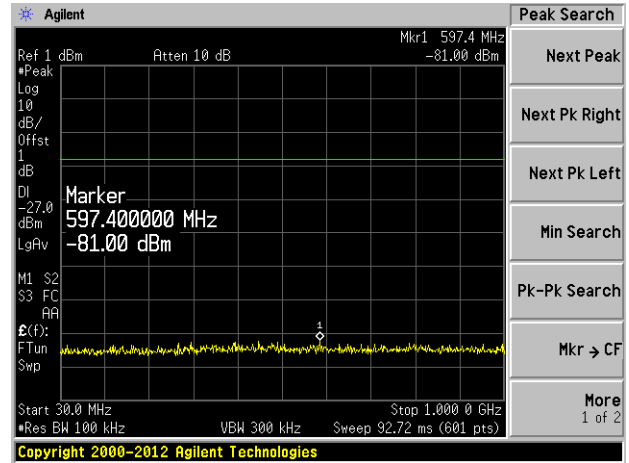
5.3 GHz Band

802.11a, Low Channel, 5260 MHz

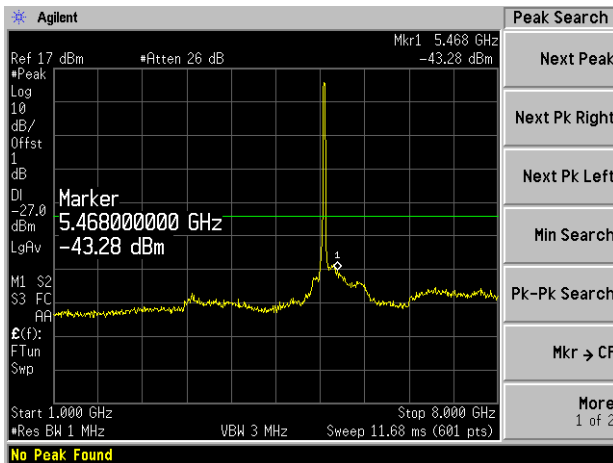
Chain 0, Plot: 30 MHz – 1 GHz



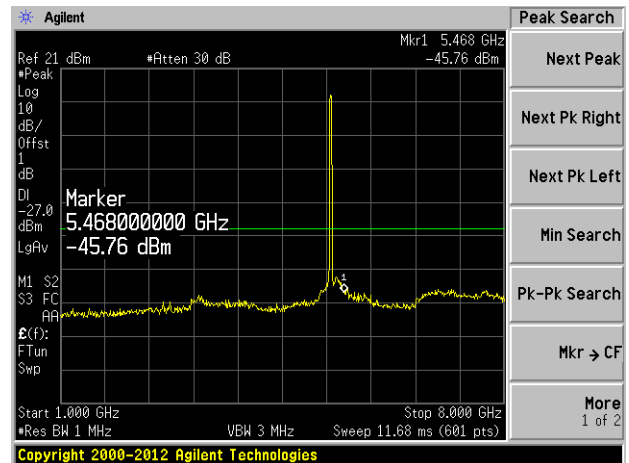
Chain 1, Plot: 30 MHz – 1 GHz



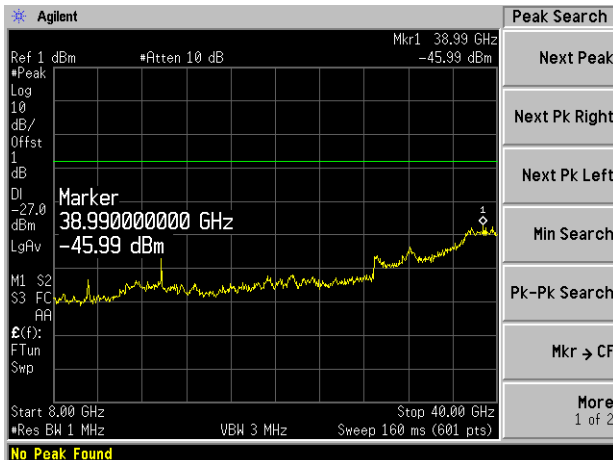
Chain 0, Plot: 1 GHz – 8 GHz



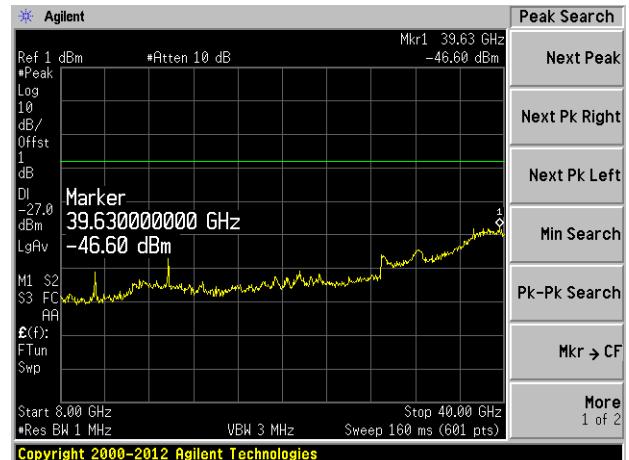
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

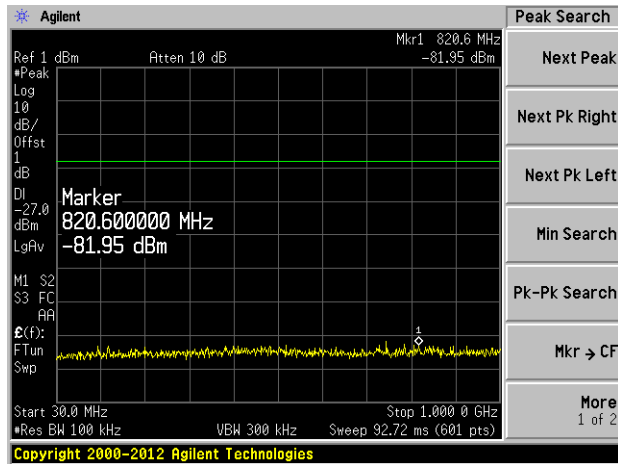


Chain 1, Plot: 8 GHz – 40 GHz

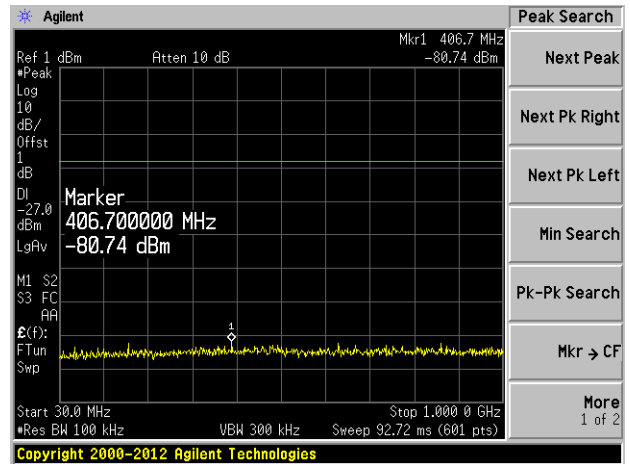


802.11a, Middle Channel, 5280 MHz

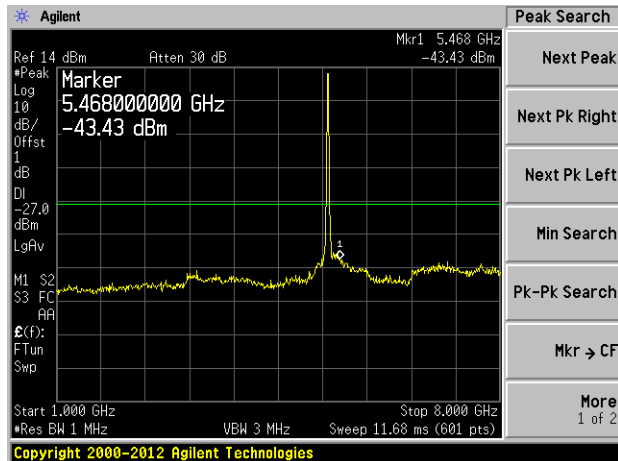
Chain 0, Plot: 30 MHz – 1 GHz



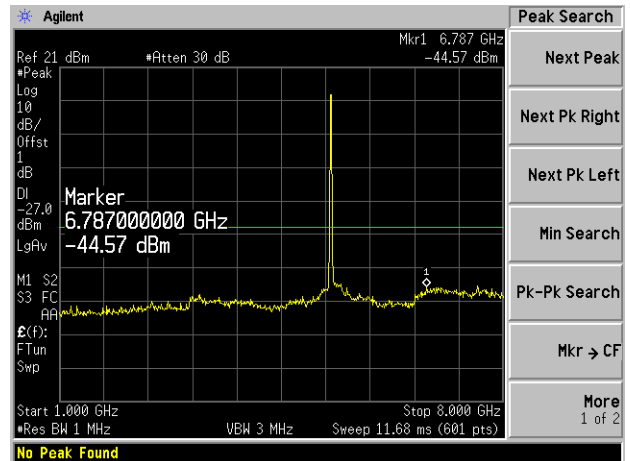
Chain 1, Plot: 30 MHz – 1 GHz



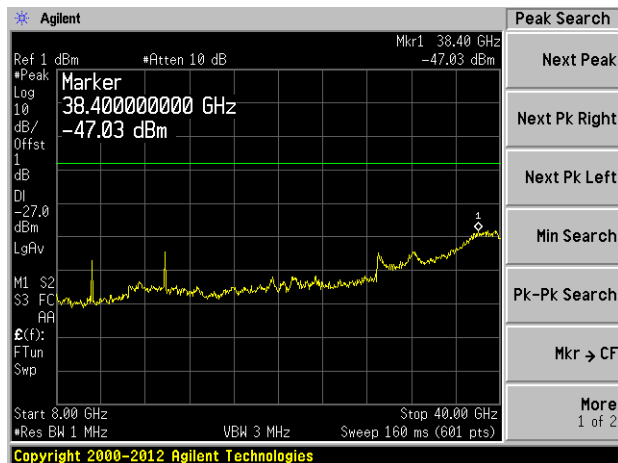
Chain 0, Plot: 1 GHz – 8 GHz



Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

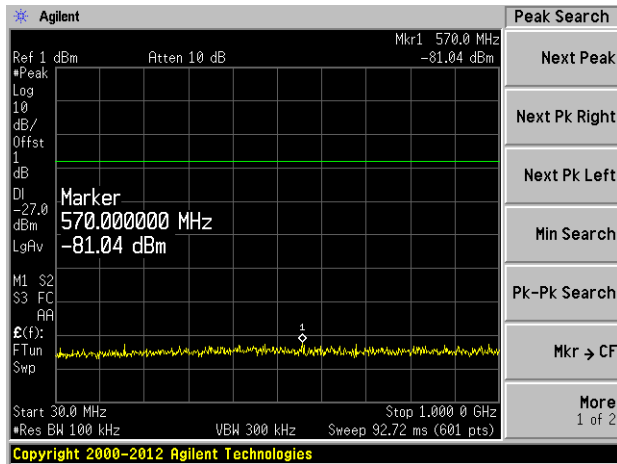


Chain 1, Plot: 8 GHz – 40 GHz

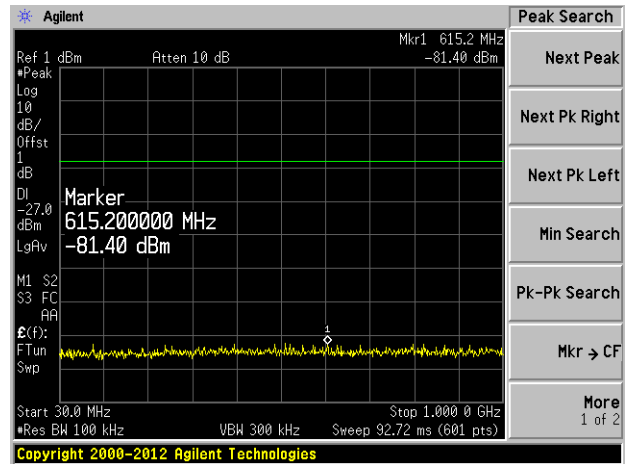


802.11a, High Channel, 5320 MHz

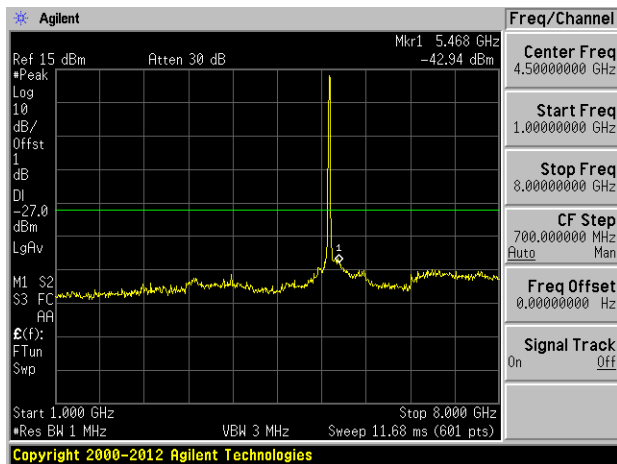
Chain 0, Plot: 30 MHz – 1 GHz



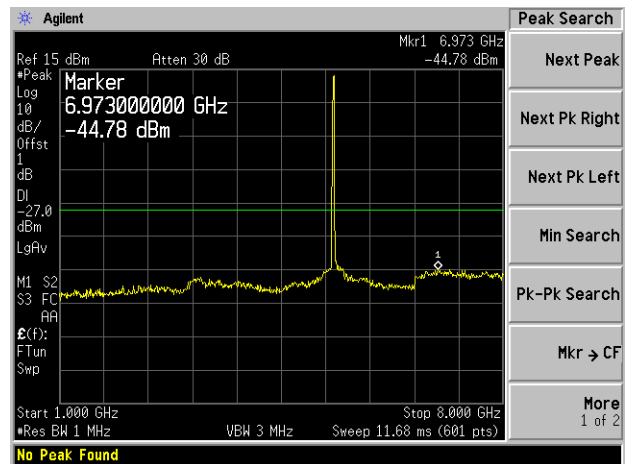
Chain 1, Plot: 30 MHz – 1 GHz



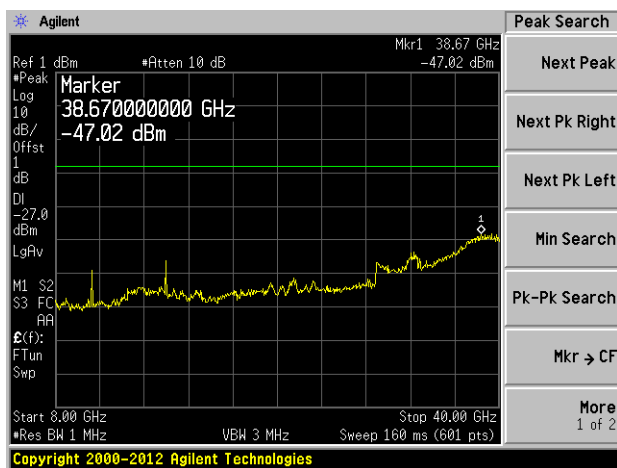
Chain 0, Plot: 1 GHz – 8 GHz



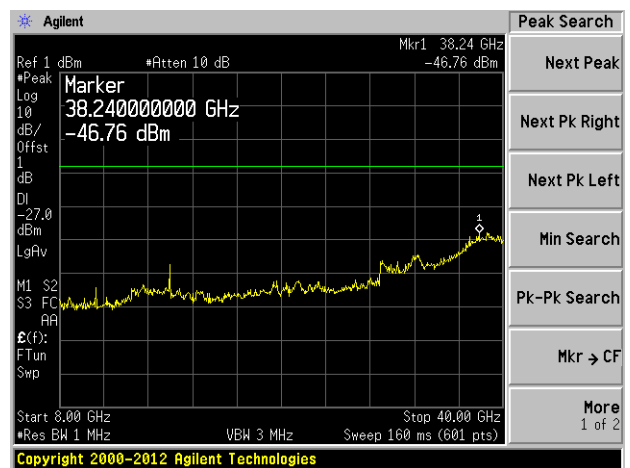
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

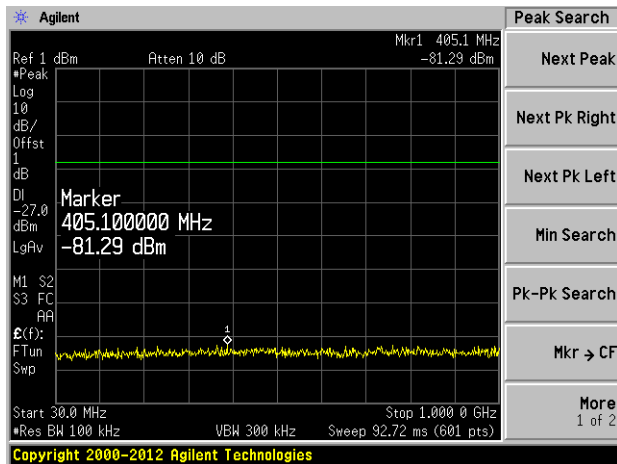


Chain 1, Plot: 8 GHz – 40 GHz

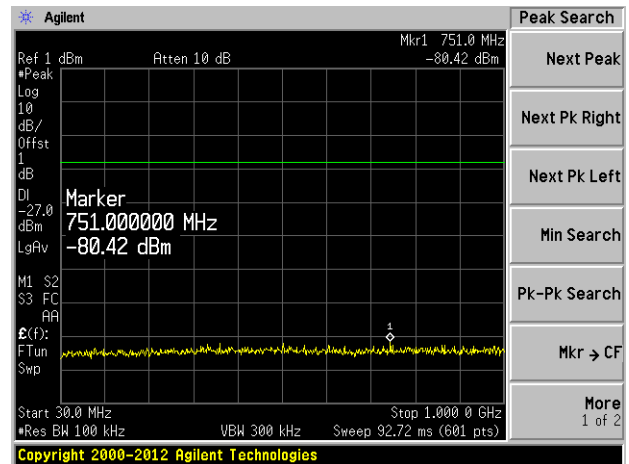


802.11n-HT 20, Low Channel 5260 MHz

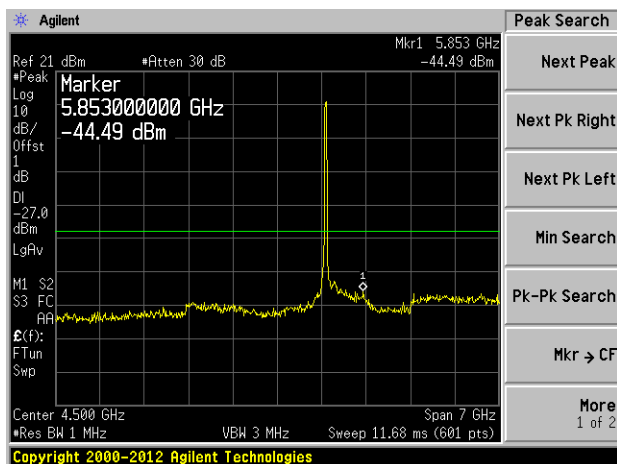
Chain 0, Plot: 30 MHz – 1 GHz



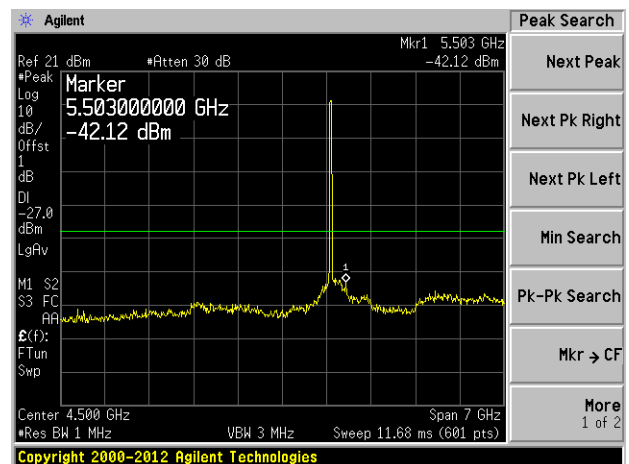
Chain 1, Plot: 30 MHz – 1 GHz



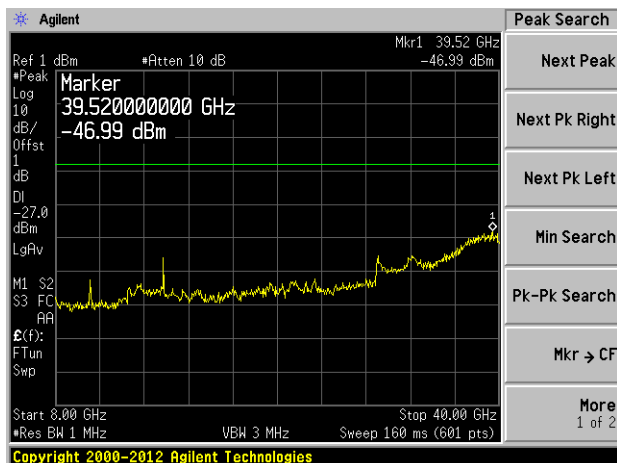
Chain 0, Plot: 1 GHz – 8 GHz



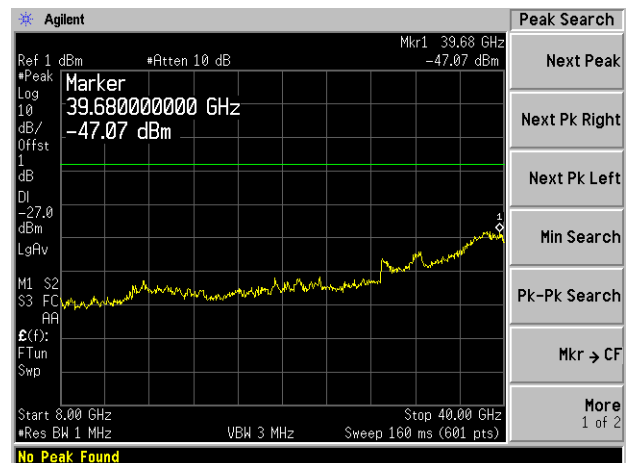
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

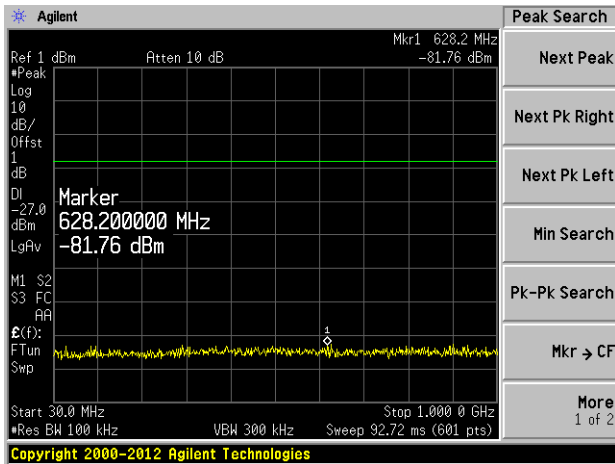


Chain 1, Plot: 8 GHz – 40 GHz

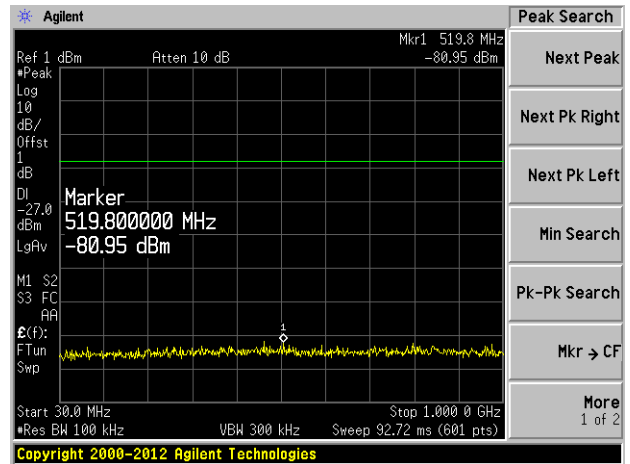


802.11n-HT20, Middle Channel 5280 MHz

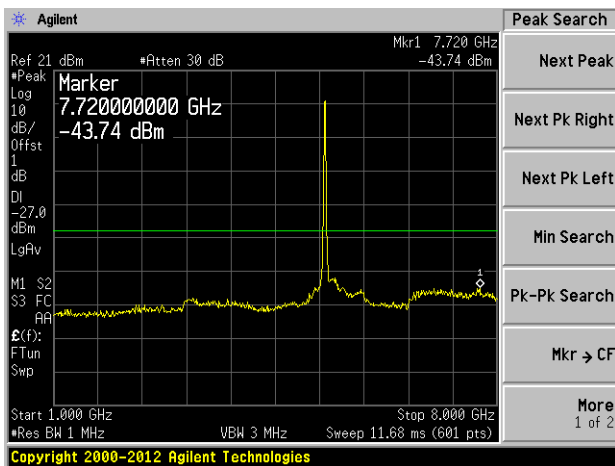
Chain 0, Plot: 30 MHz – 1 GHz



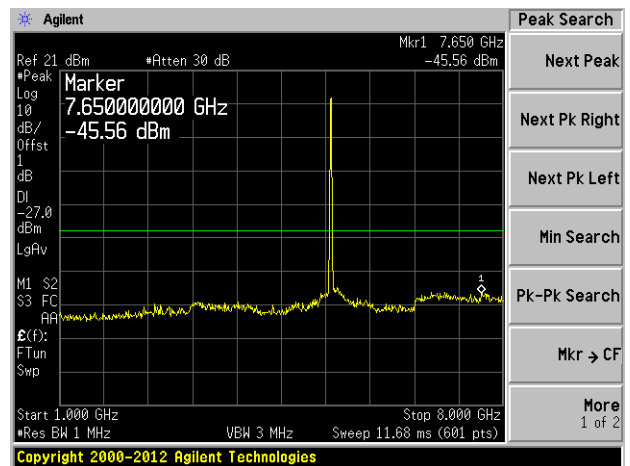
Chain 1, Plot: 30 MHz – 1 GHz



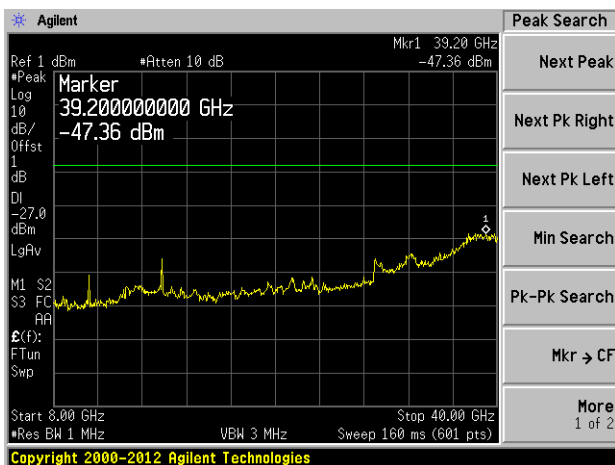
Chain 0, Plot: 1 GHz – 8 GHz



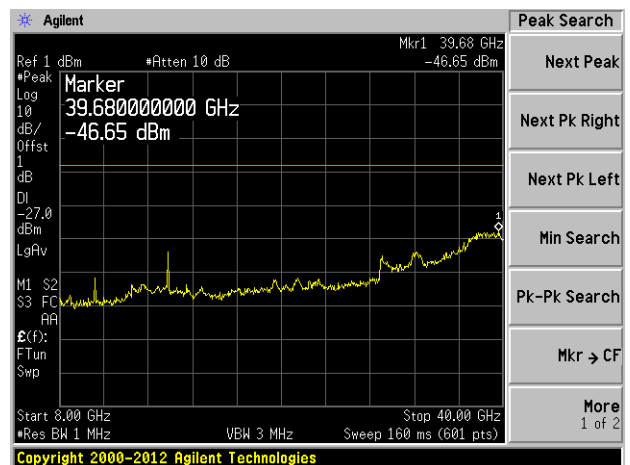
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

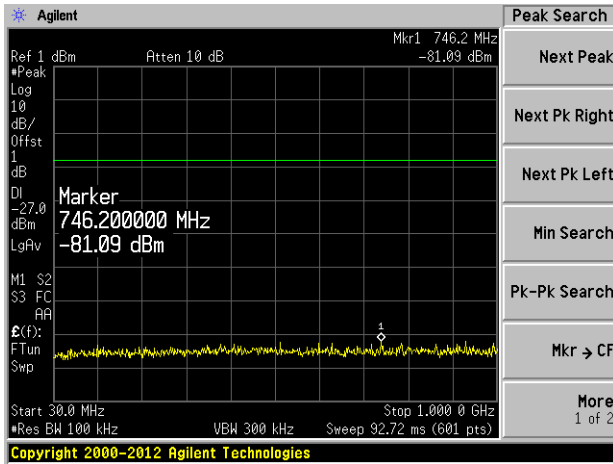


Chain 1, Plot: 8 GHz – 40 GHz

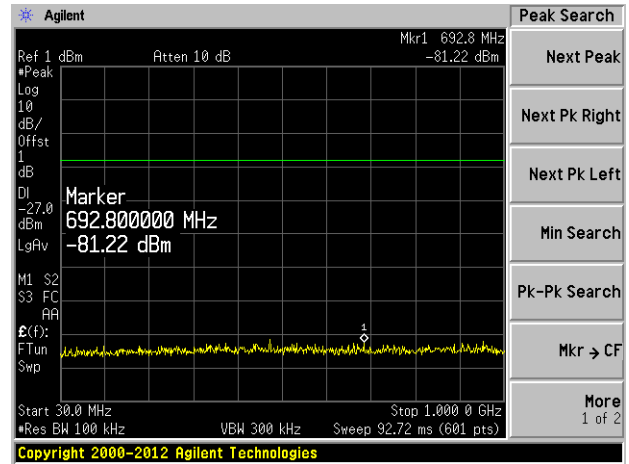


802.11n-HT20, High Channel, 5320 MHz

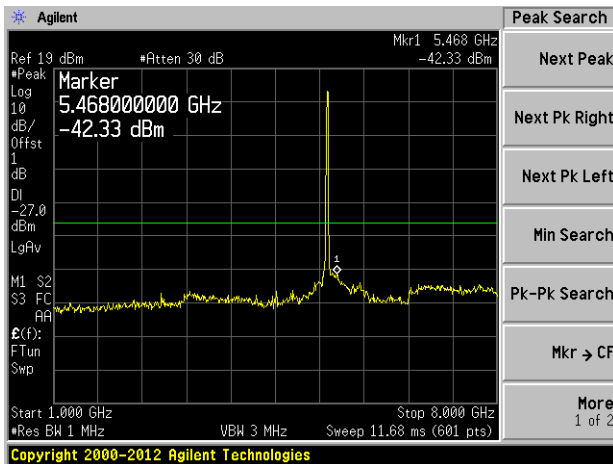
Chain 0, Plot: 30 MHz – 1 GHz



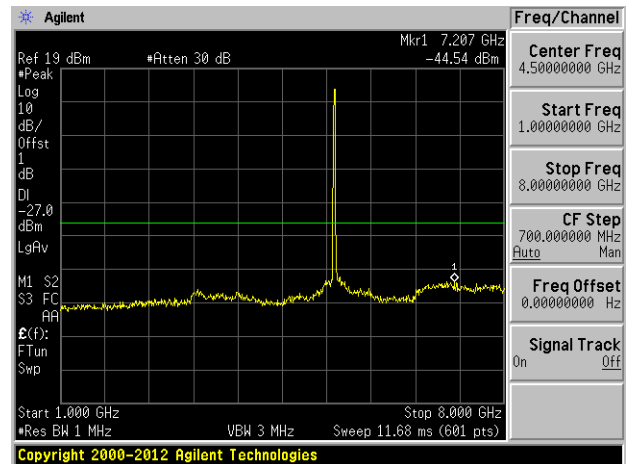
Chain 1, Plot: 30 MHz – 1 GHz



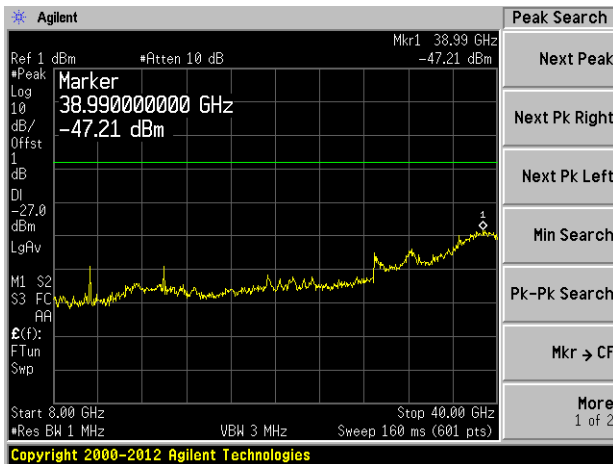
Chain 0, Plot: 1 GHz – 8 GHz



Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

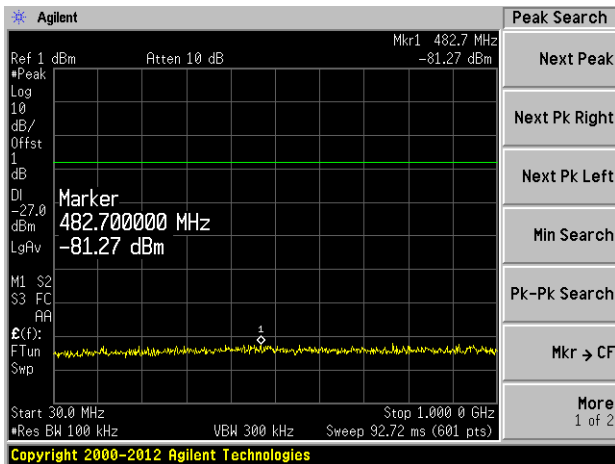


Chain 1, Plot: 8 GHz – 40 GHz

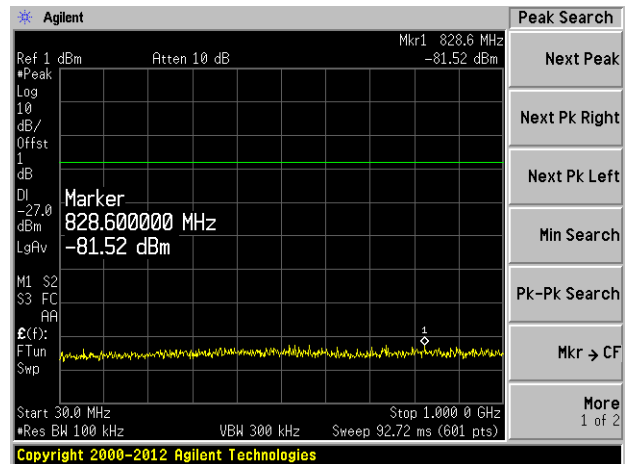


802.11n-HT40, Low Channel 5270 MHz

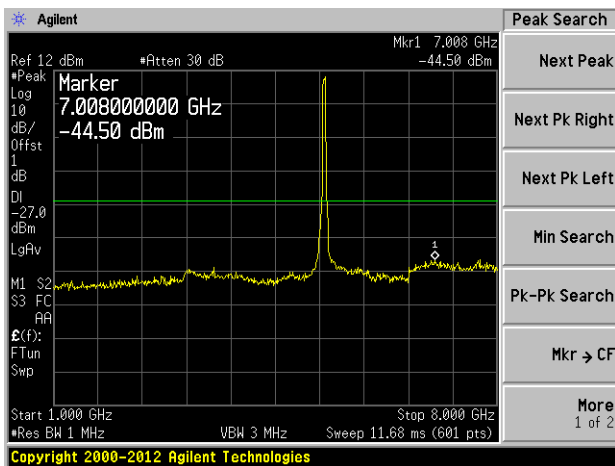
Chain 0, Plot: 30 MHz – 1 GHz



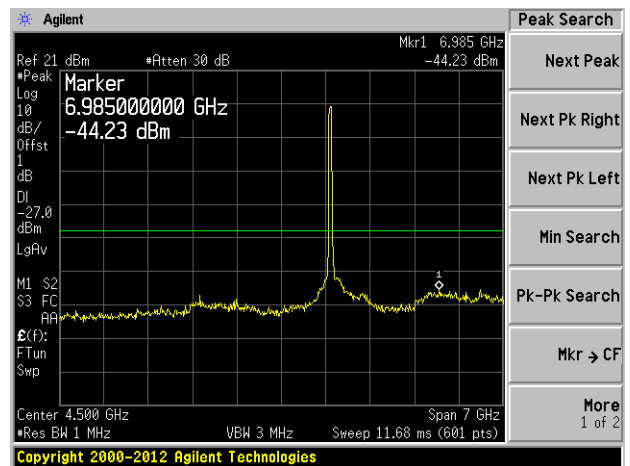
Chain 1, Plot: 30 MHz – 1 GHz



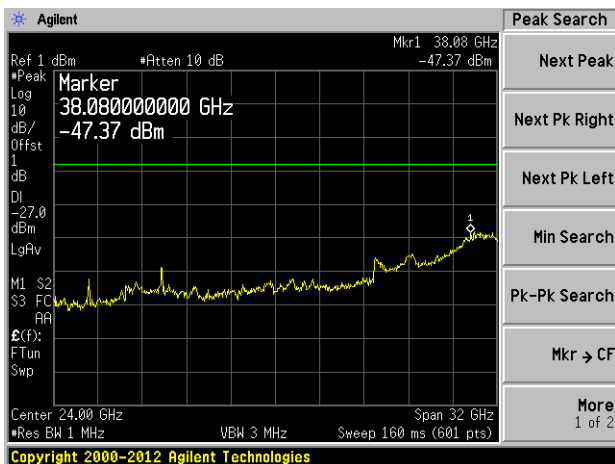
Chain 0, Plot: 1 GHz – 8 GHz



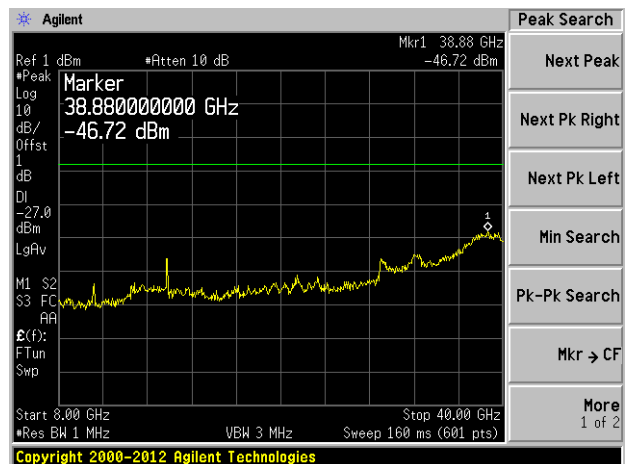
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

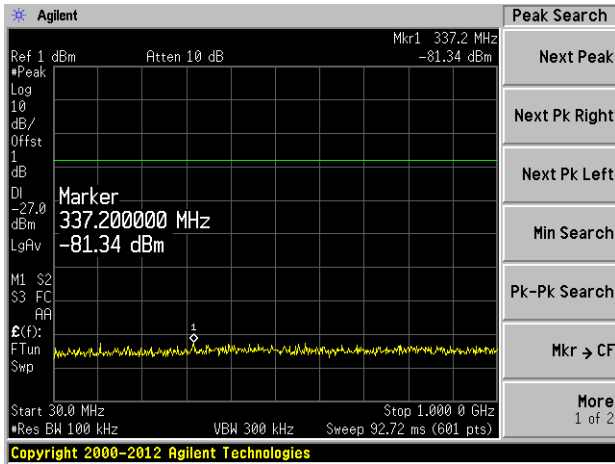


Chain 1, Plot: 8 GHz – 40 GHz

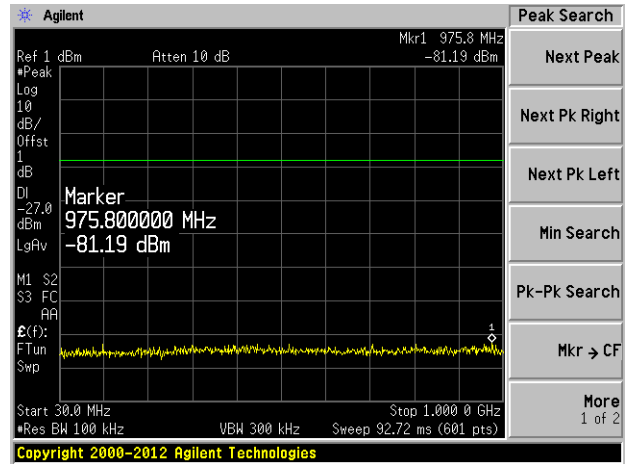


802.11n-HT40, High Channel 5310 MHz

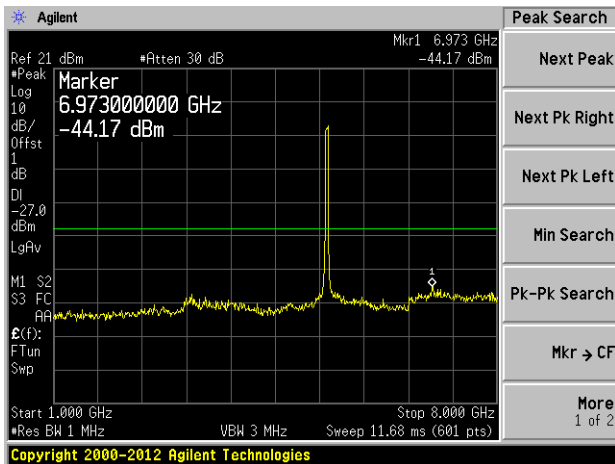
Chain 0, Plot: 30 MHz – 1 GHz



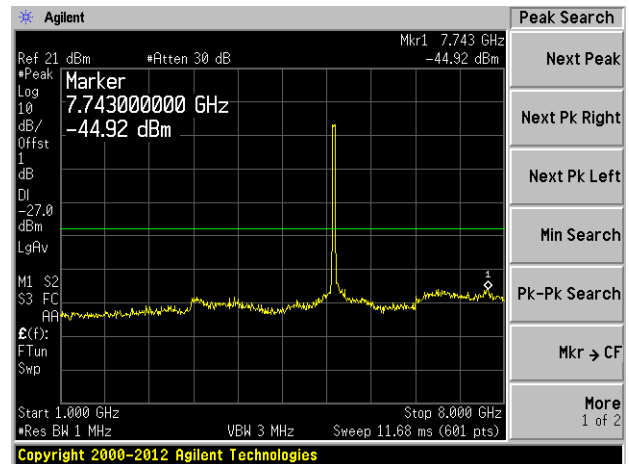
Chain 1, Plot: 30 MHz – 1 GHz



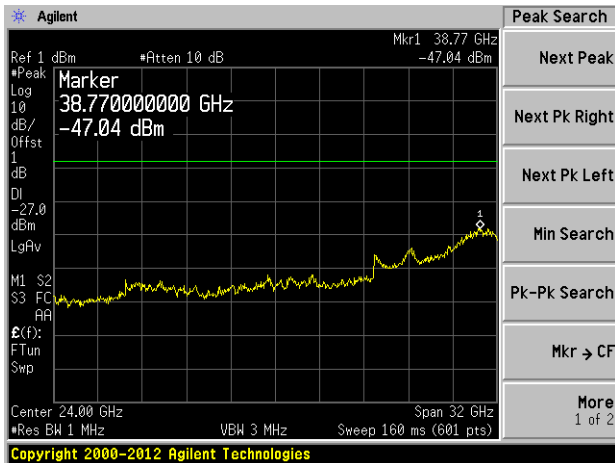
Chain 0, Plot: 1 GHz – 8 GHz



Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

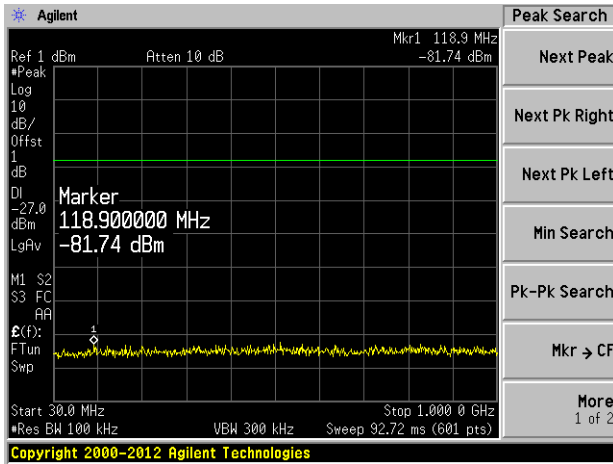


Chain 1, Plot: 8 GHz – 40 GHz

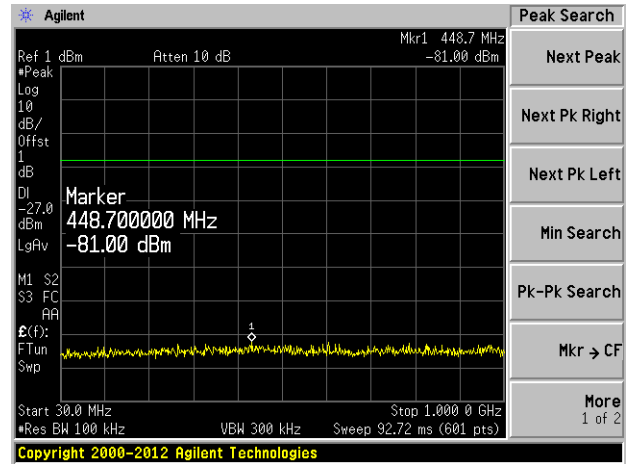


802.11ac-VHT80, High Channel 5290 MHz

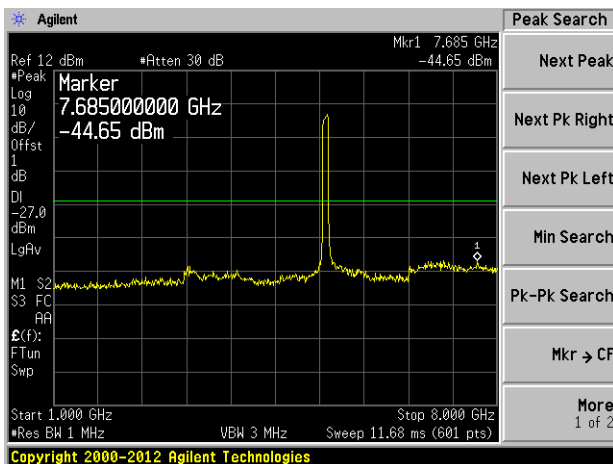
Chain 0, Plot: 30 MHz – 1 GHz



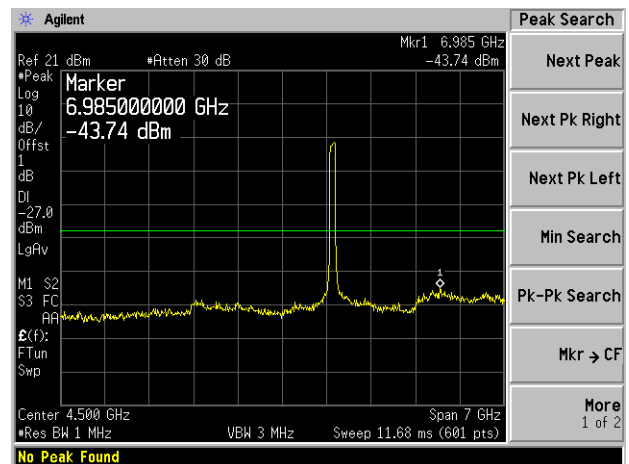
Chain 1, Plot: 30 MHz – 1 GHz



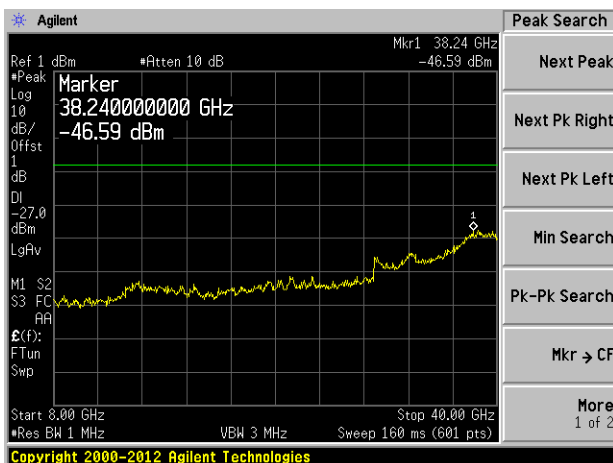
Chain 0, Plot: 1 GHz – 8 GHz



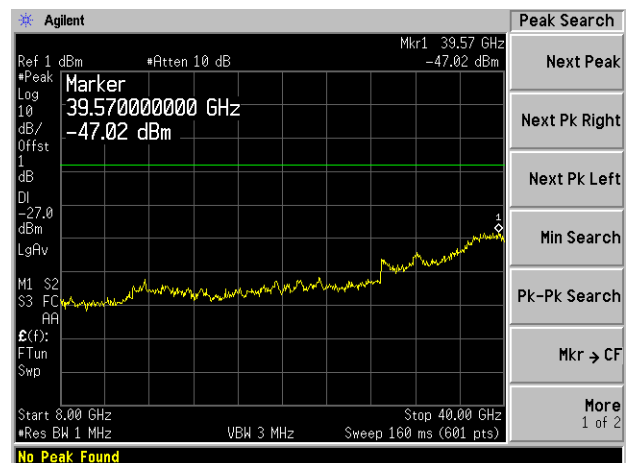
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz



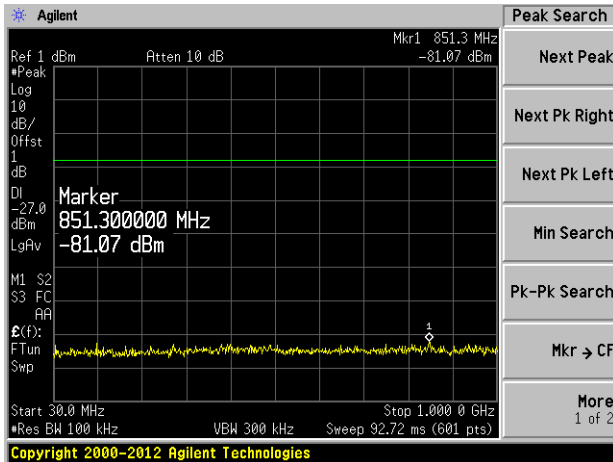
Chain 1, Plot: 8 GHz – 40 GHz



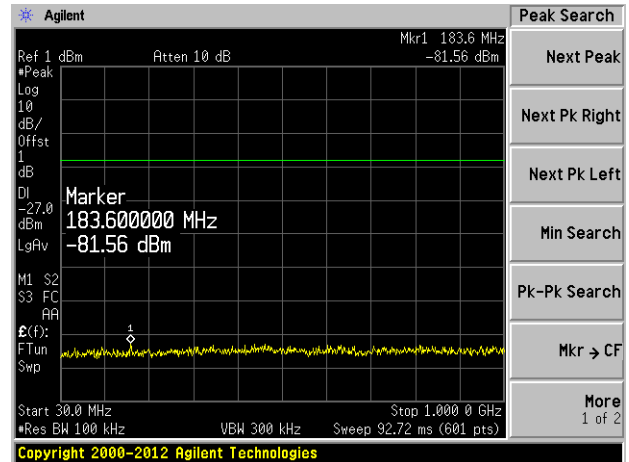
5.6 GHz Band

802.11a, Low Channel, 5500 MHz

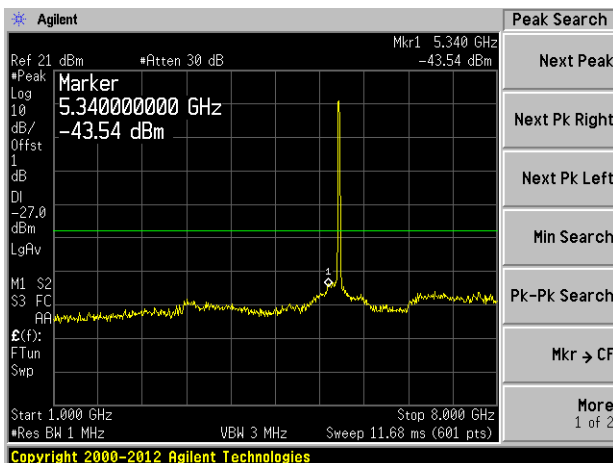
Chain 0, Plot: 30 MHz – 1 GHz



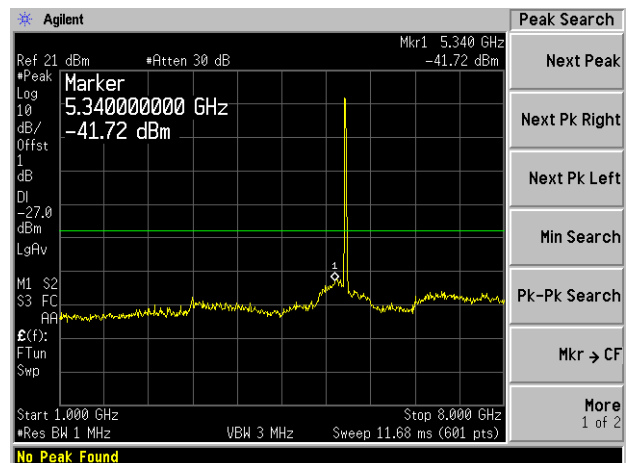
Chain 1, Plot: 30 MHz – 1 GHz



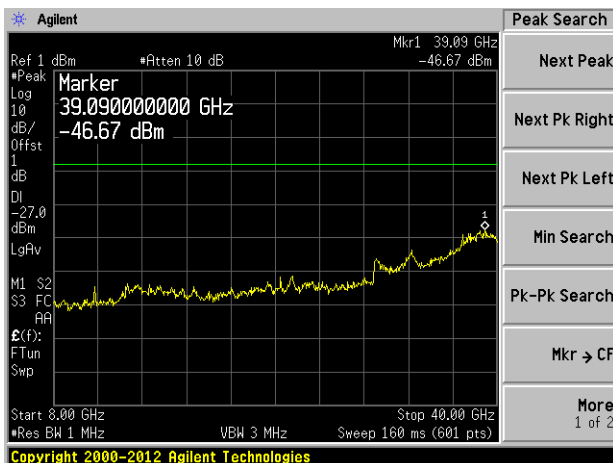
Chain 0, Plot: 1 GHz – 8 GHz



Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

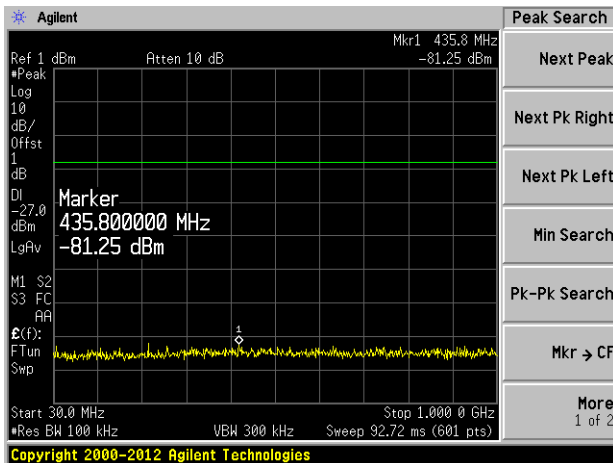


Chain 1, Plot: 8 GHz – 40 GHz

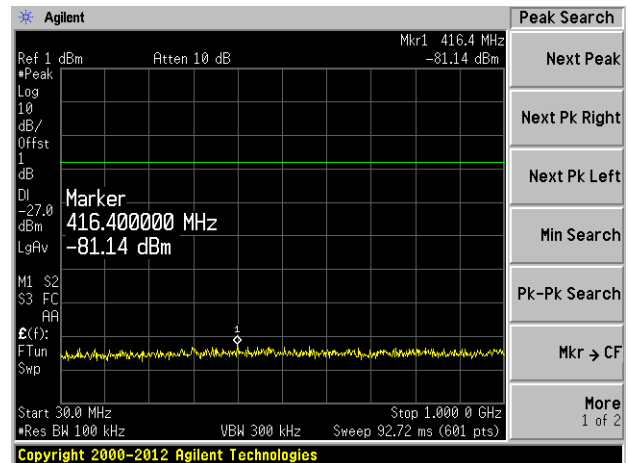


802.11a, Middle Channel, 5580 MHz

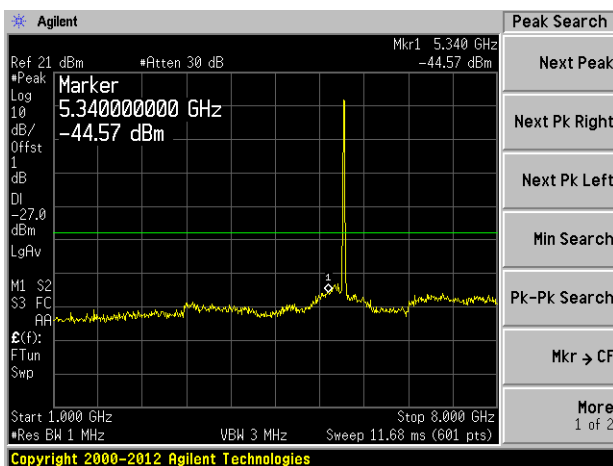
Chain 0, Plot: 30 MHz – 1 GHz



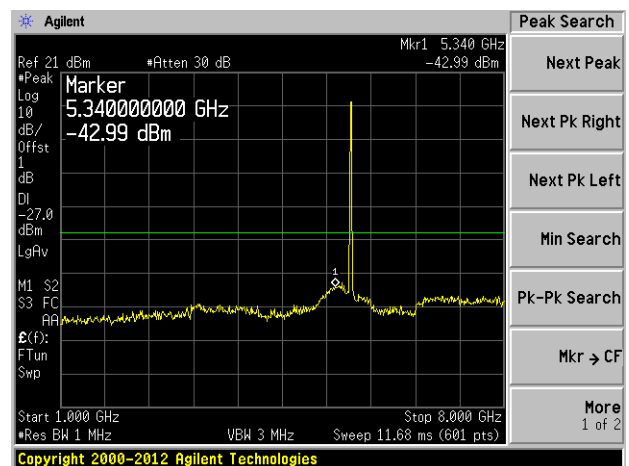
Chain 1, Plot: 30 MHz – 1 GHz



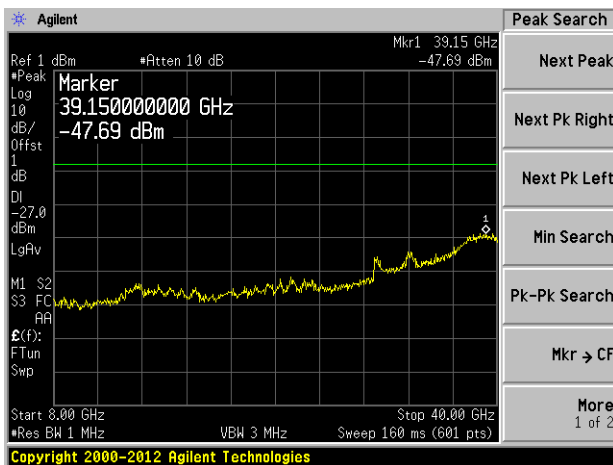
Chain 0, Plot: 1 GHz – 8 GHz



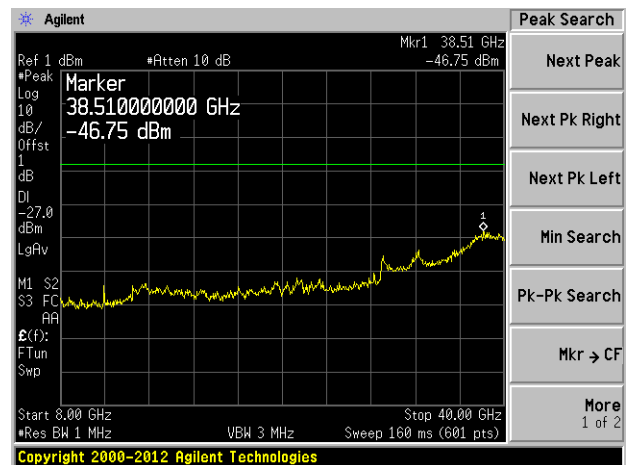
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

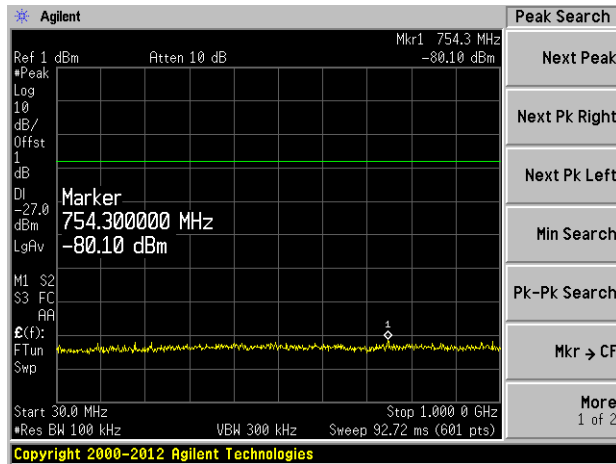


Chain 1, Plot: 8 GHz – 40 GHz

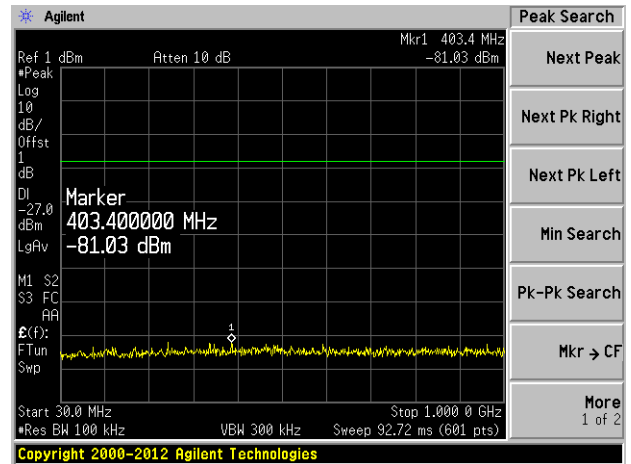


802.11a, High Channel, 5700 MHz

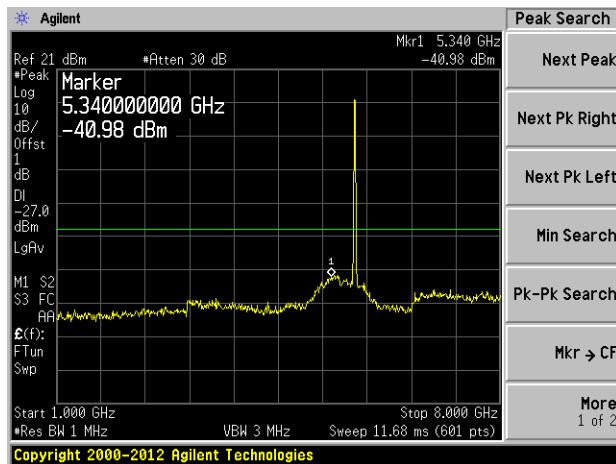
Chain 0, Plot: 30 MHz – 1 GHz



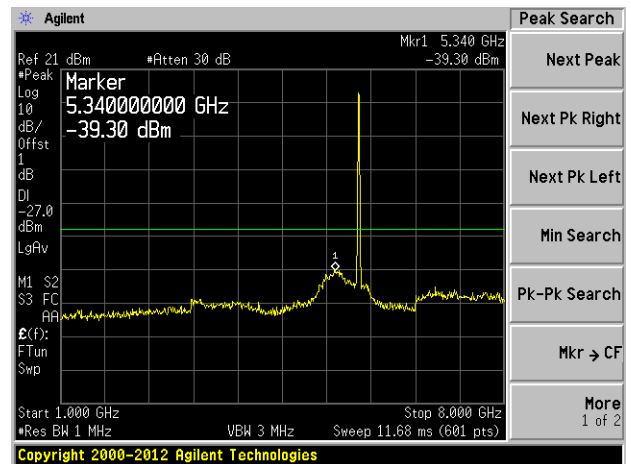
Chain 1, Plot: 30 MHz – 1 GHz



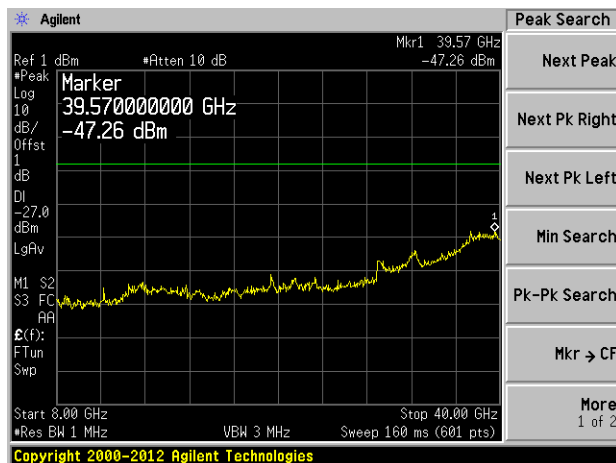
Chain 0, Plot: 1 GHz – 8 GHz



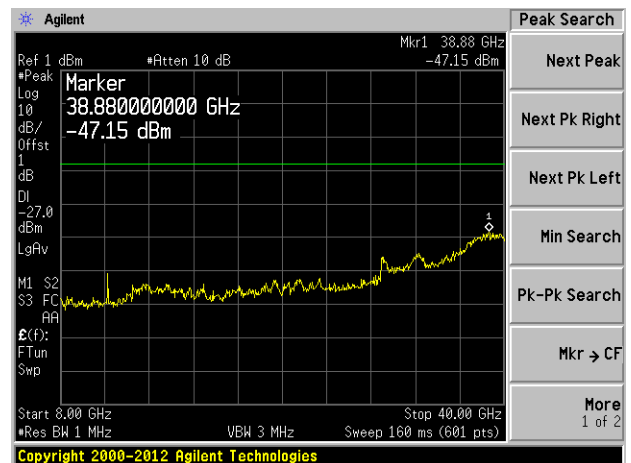
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

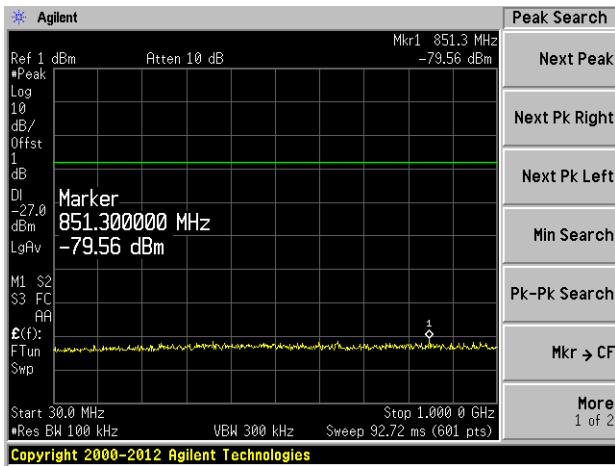


Chain 1, Plot: 8 GHz – 40 GHz

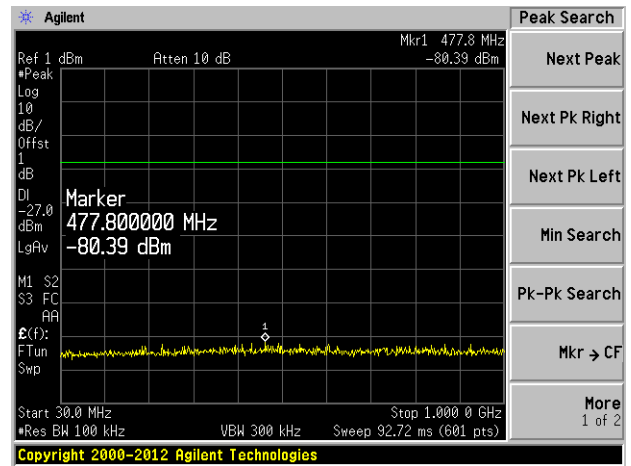


802.11n-HT 20, Low Channel 5500 MHz

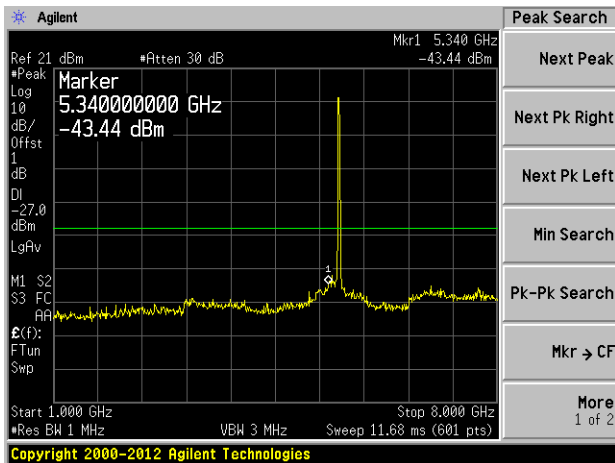
Chain 0, Plot: 30 MHz – 1 GHz



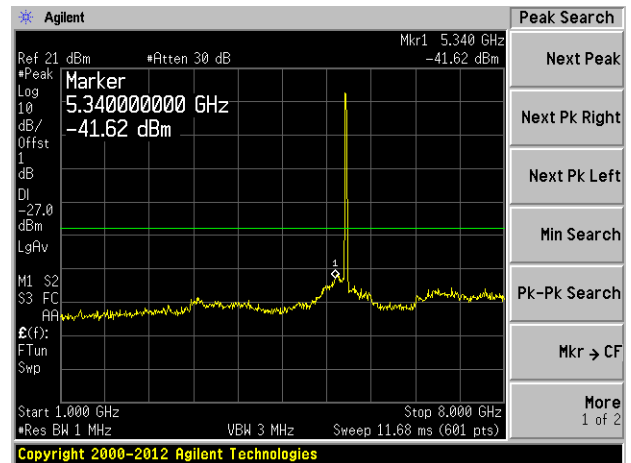
Chain 1, Plot: 30 MHz – 1 GHz



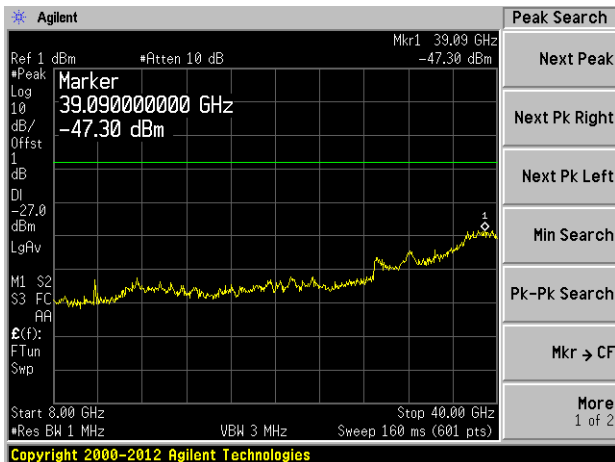
Chain 0, Plot: 1 GHz – 8 GHz



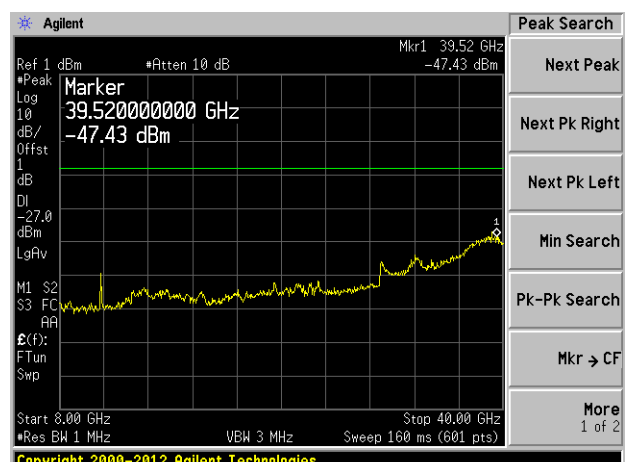
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

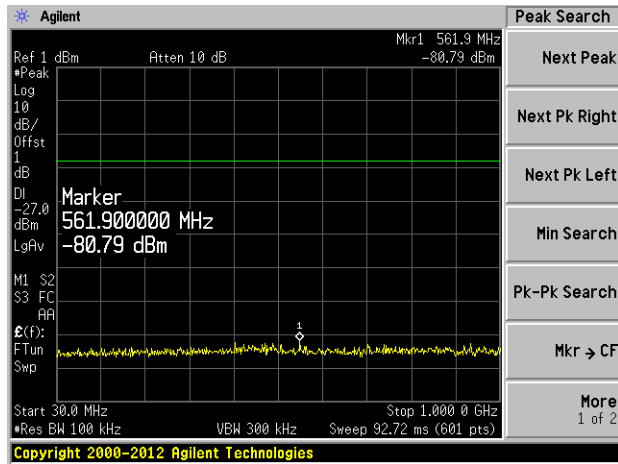


Chain 1, Plot: 8 GHz – 40 GHz

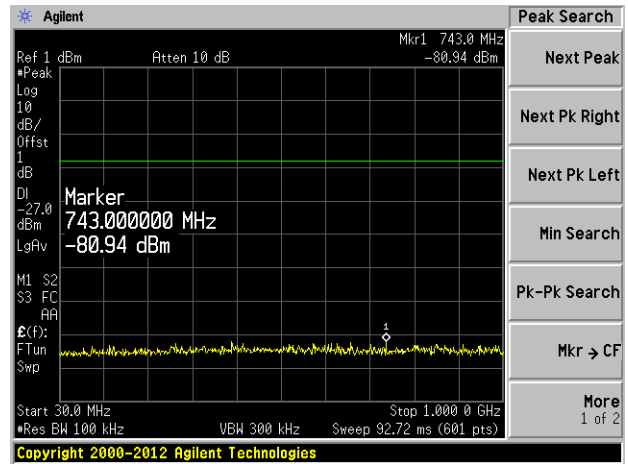


802.11n-HT20, Middle Channel 5580 MHz

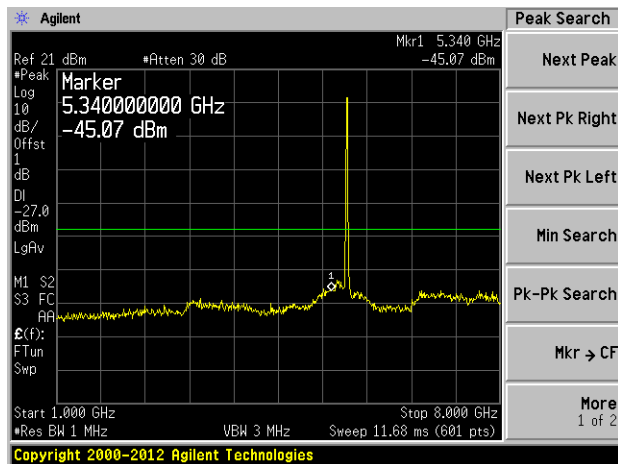
Chain 0, Plot: 30 MHz – 1 GHz



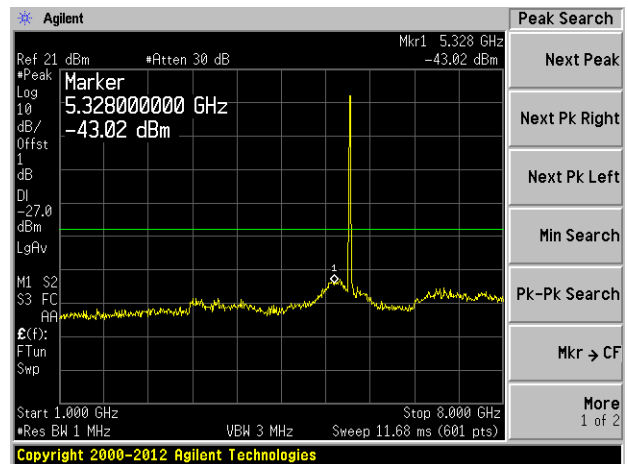
Chain 1, Plot: 30 MHz – 1 GHz



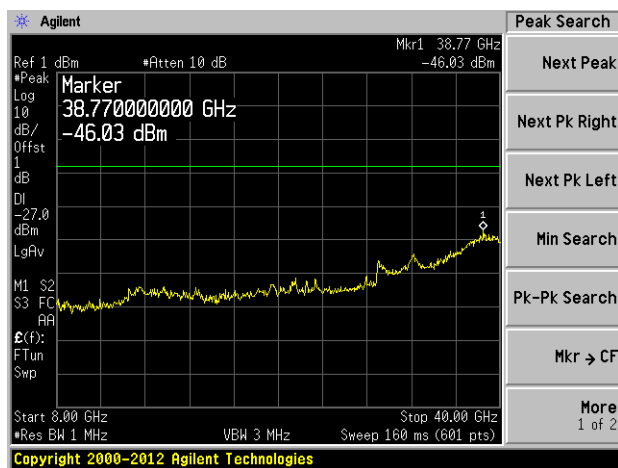
Chain 0, Plot: 1 GHz – 8 GHz



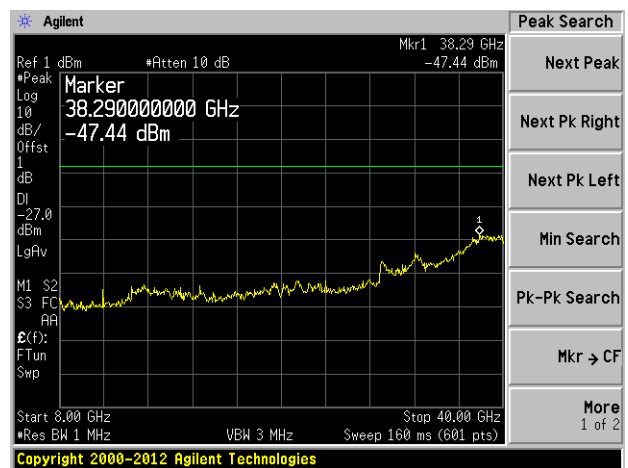
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

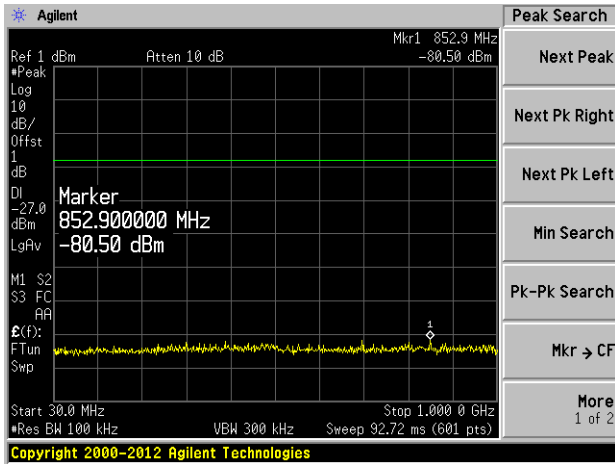


Chain 1, Plot: 8 GHz – 40 GHz

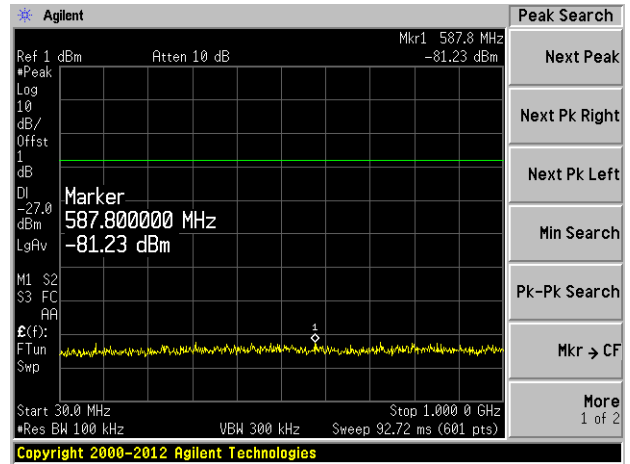


802.11n-HT20, High Channel 5700 MHz

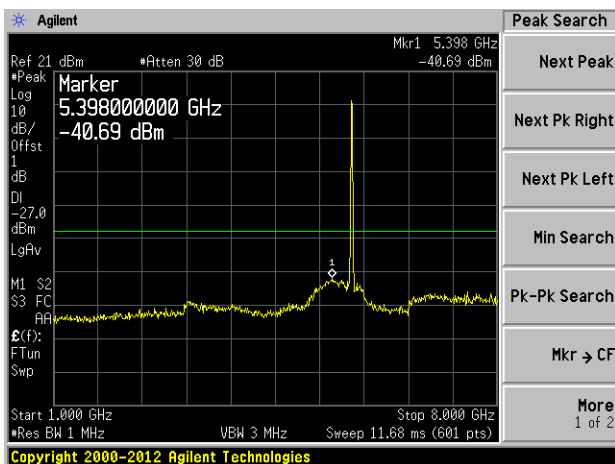
Chain 0, Plot: 30 MHz – 1 GHz



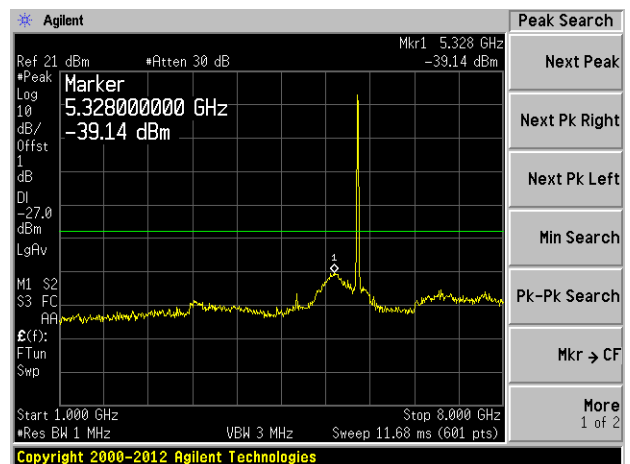
Chain 1, Plot: 30 MHz – 1 GHz



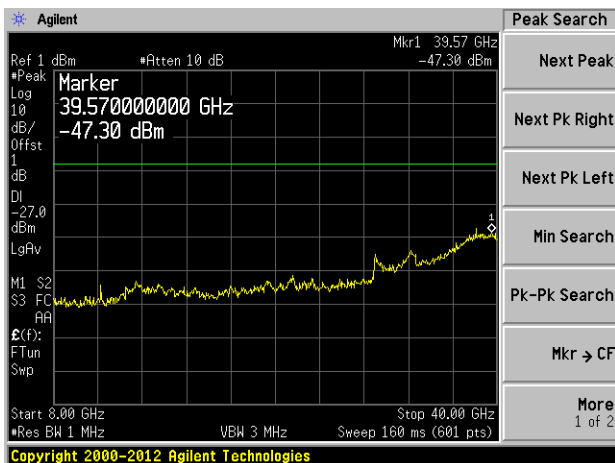
Chain 0, Plot: 1 GHz – 8 GHz



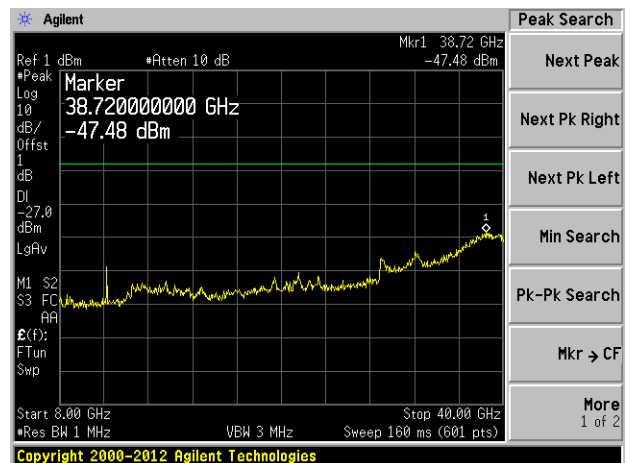
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

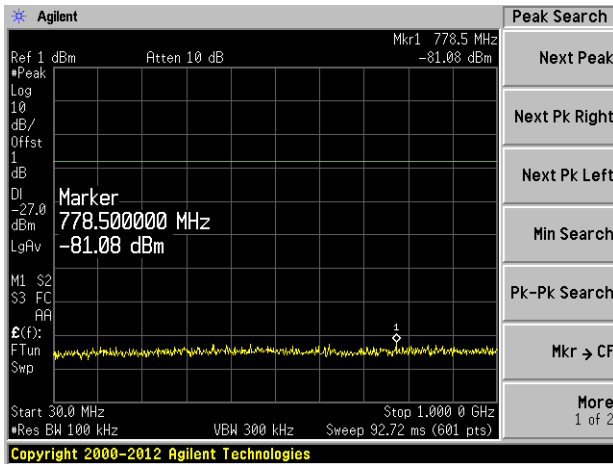


Chain 1, Plot: 8 GHz – 40 GHz

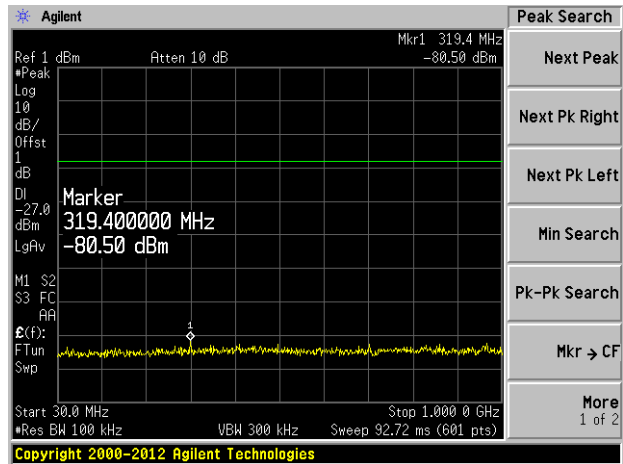


802.11n-HT40, Low Channel 5510 MHz

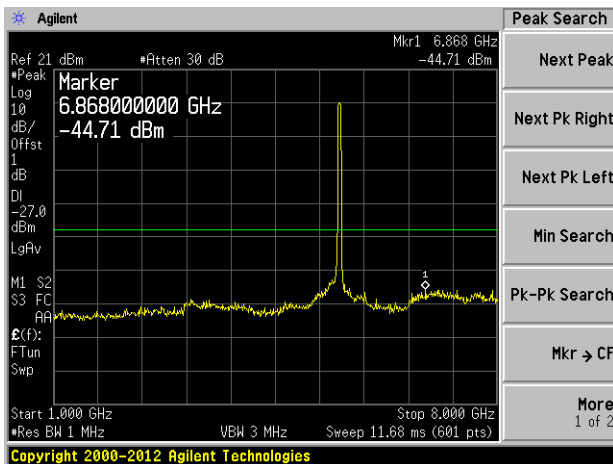
Chain 0, Plot: 30 MHz – 1 GHz



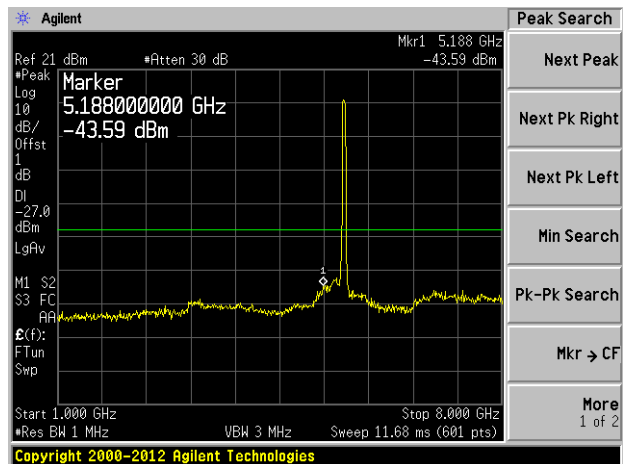
Chain 1, Plot: 30 MHz – 1 GHz



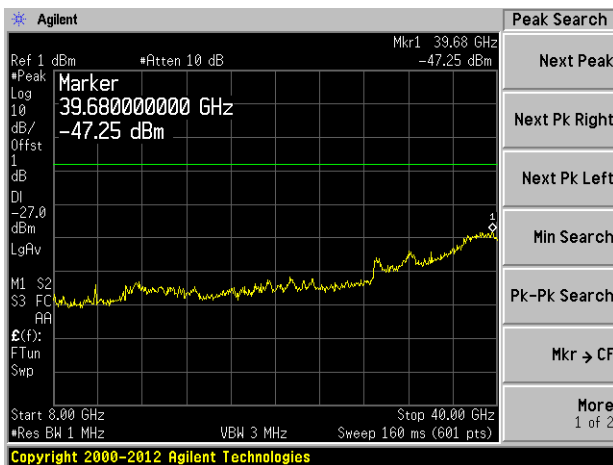
Chain 0, Plot: 1 GHz – 8 GHz



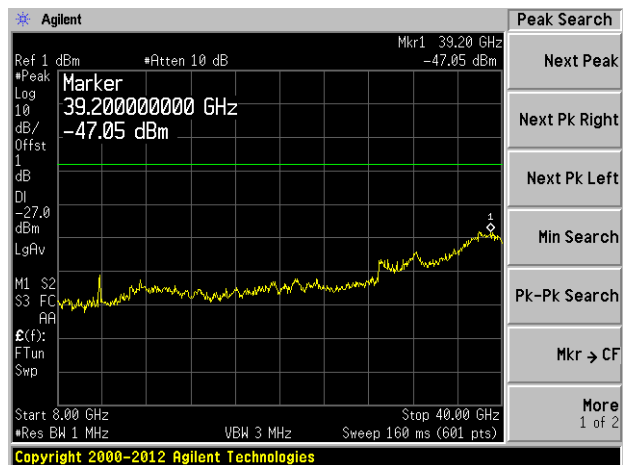
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

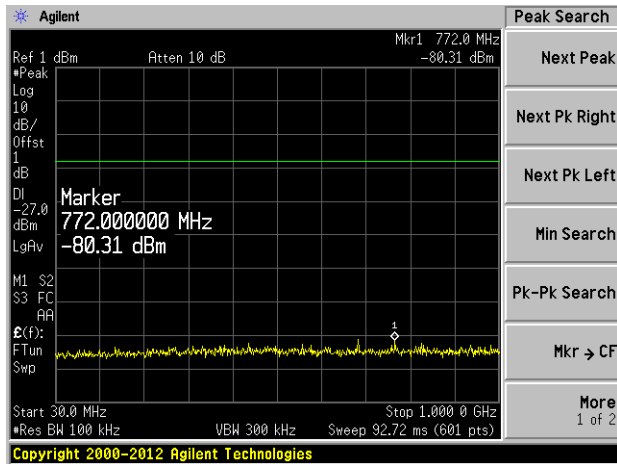


Chain 1, Plot: 8 GHz – 40 GHz

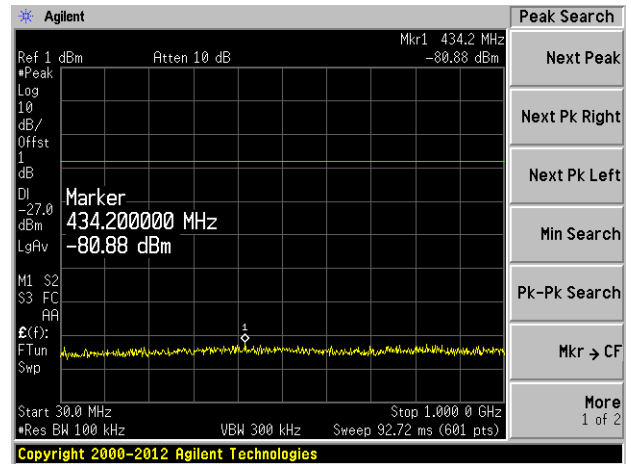


802.11n-HT40, Middle Channel 5550 MHz

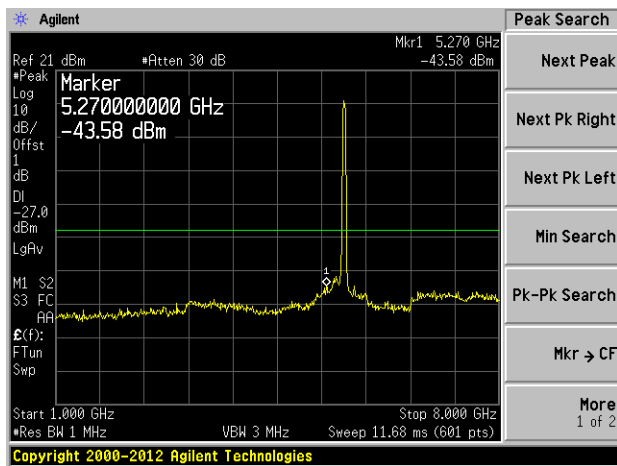
Chain 0, Plot: 30 MHz – 1 GHz



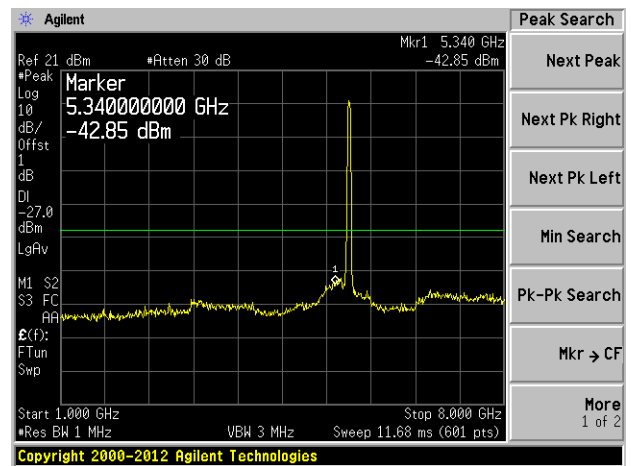
Chain 1, Plot: 30 MHz – 1 GHz



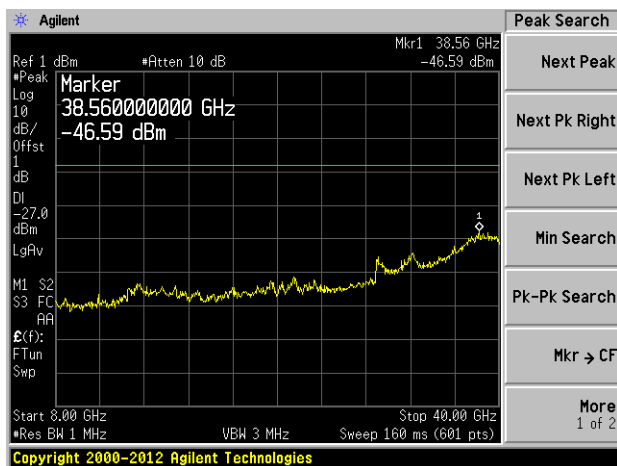
Chain 0, Plot: 1 GHz – 8 GHz



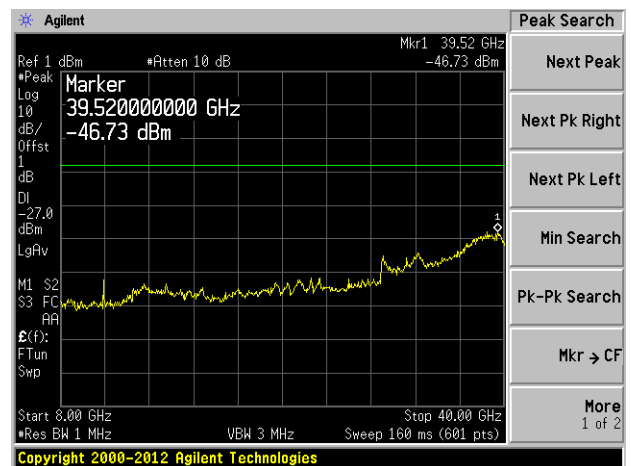
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz



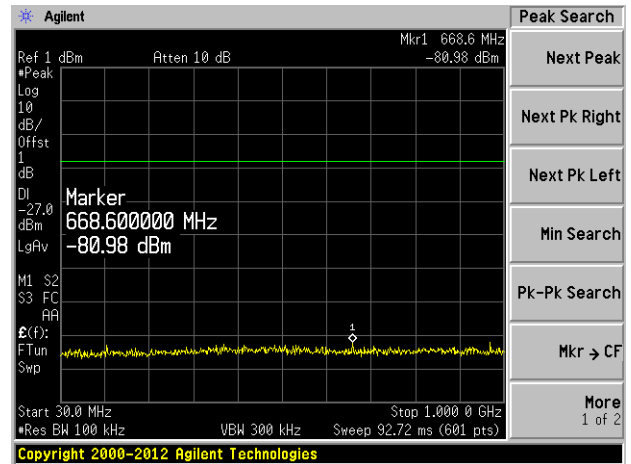
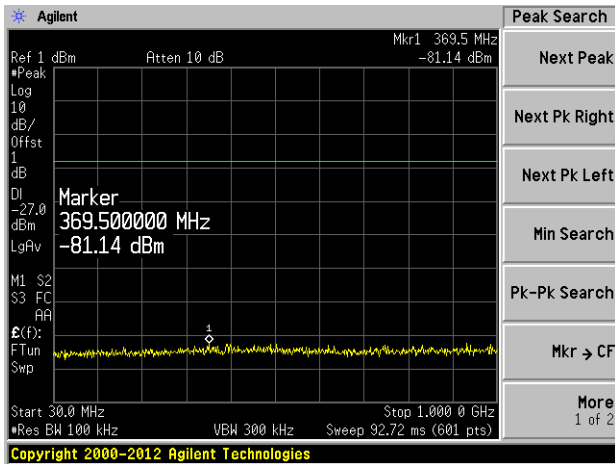
Chain 1, Plot: 8 GHz – 40 GHz



802.11n-HT40, High Channel 5670 MHz

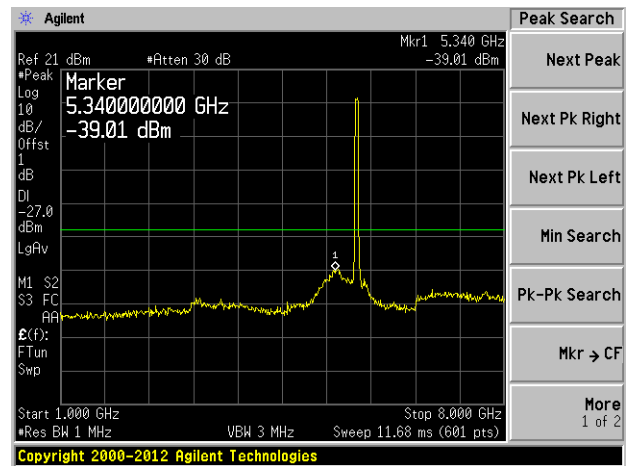
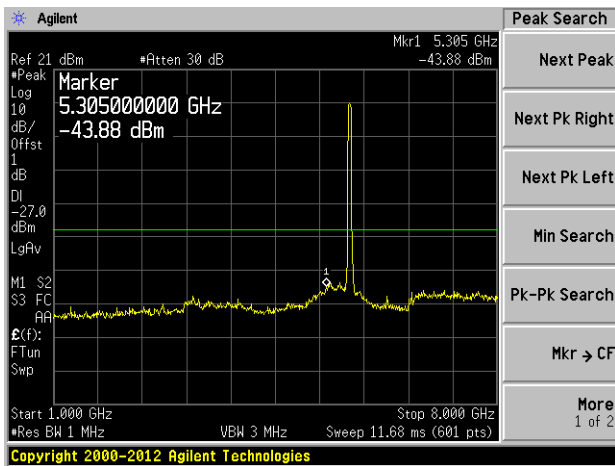
Chain 0, Plot: 30 MHz – 1 GHz

Chain 1, Plot: 30 MHz – 1 GHz



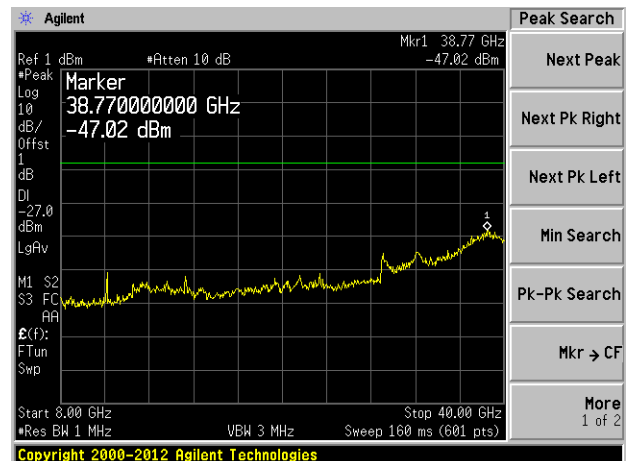
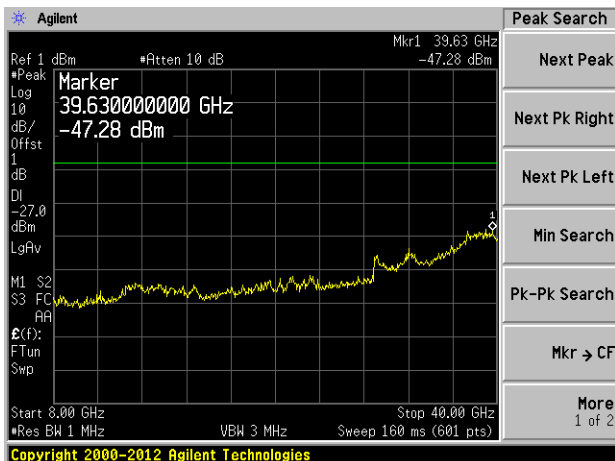
Chain 0, Plot: 1 GHz – 8 GHz

Chain 1, Plot: 1 GHz – 8 GHz



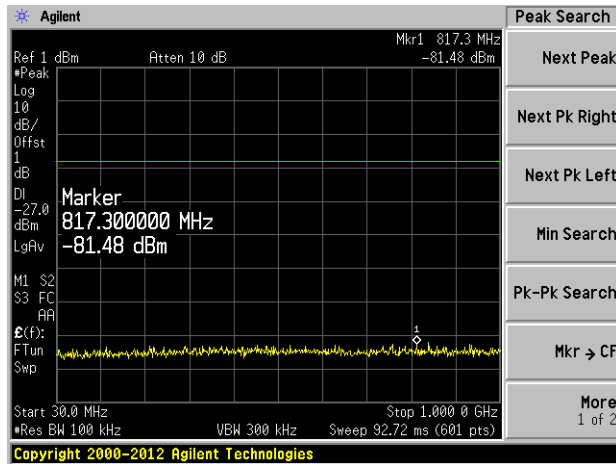
Chain 0, Plot: 8 GHz – 40 GHz

Chain 1, Plot: 8 GHz – 40 GHz

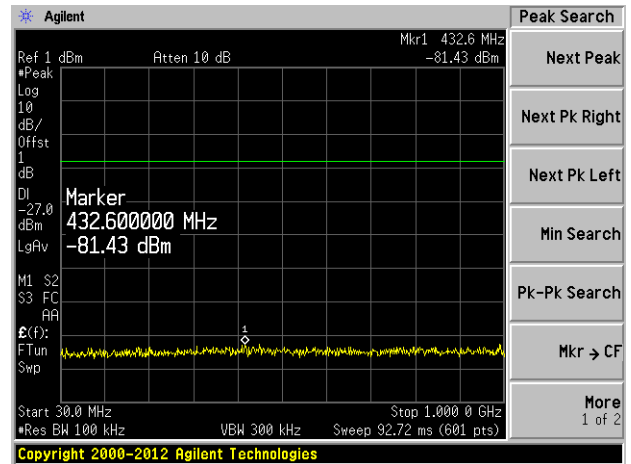


802.11ac-VHT80, Low Channel 5530 MHz

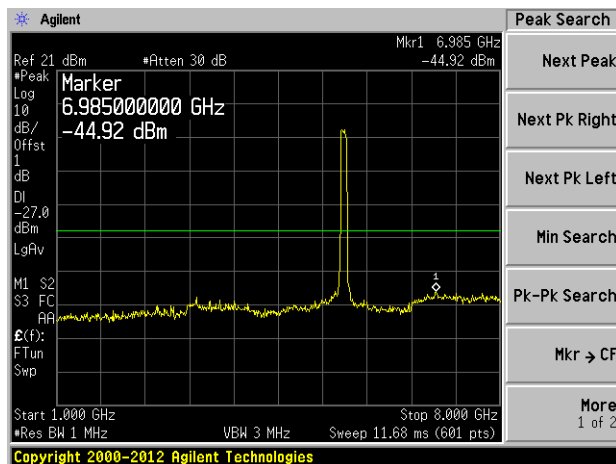
Chain 0, Plot: 30 MHz – 1 GHz



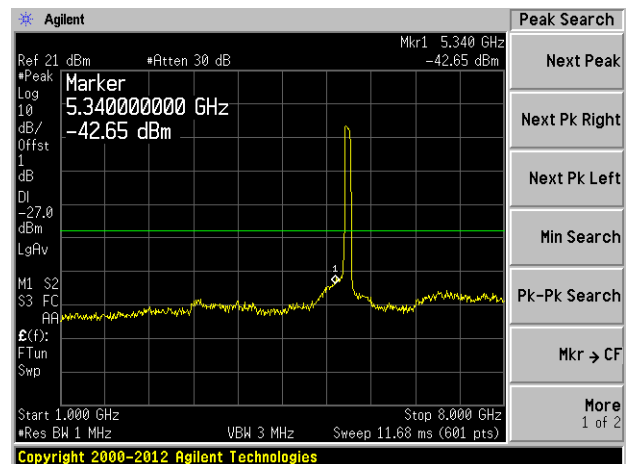
Chain 1, Plot: 30 MHz – 1 GHz



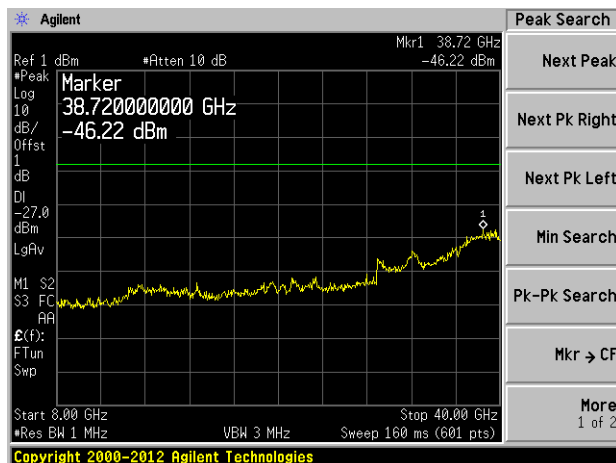
Chain 0, Plot: 1 GHz – 8 GHz



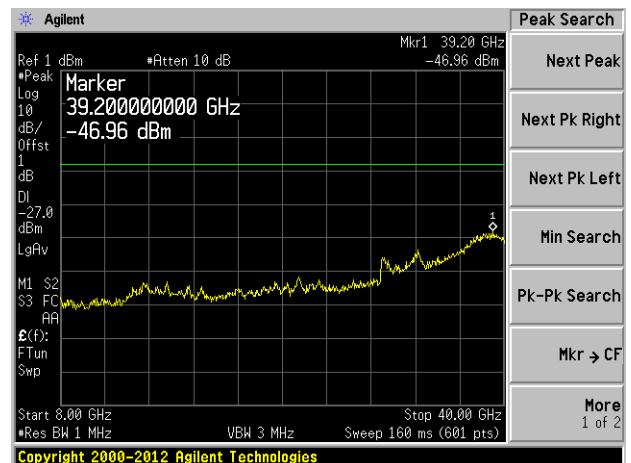
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz

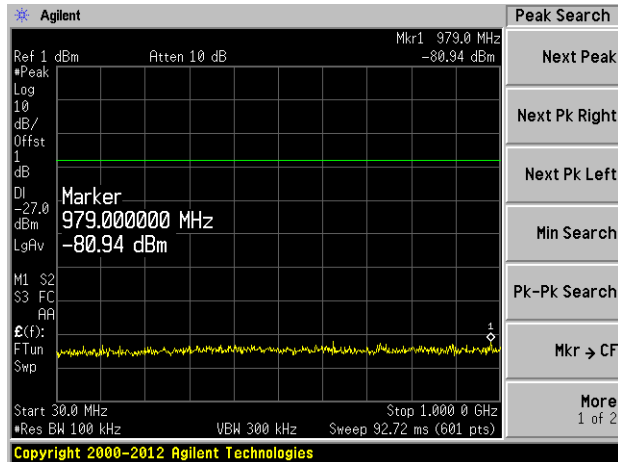


Chain 1, Plot: 8 GHz – 40 GHz

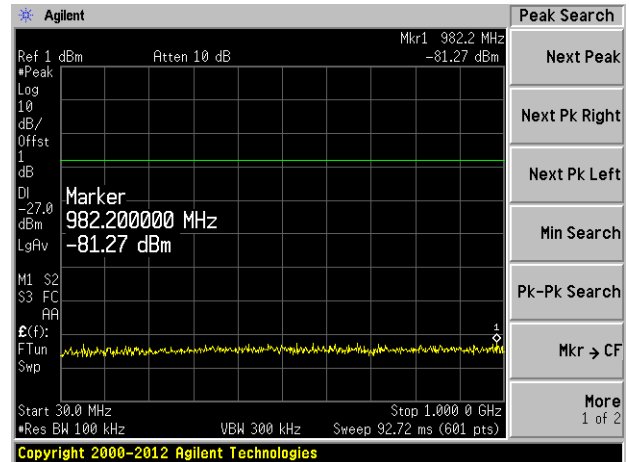


802.11ac-VHT80, High Channel 5690 MHz

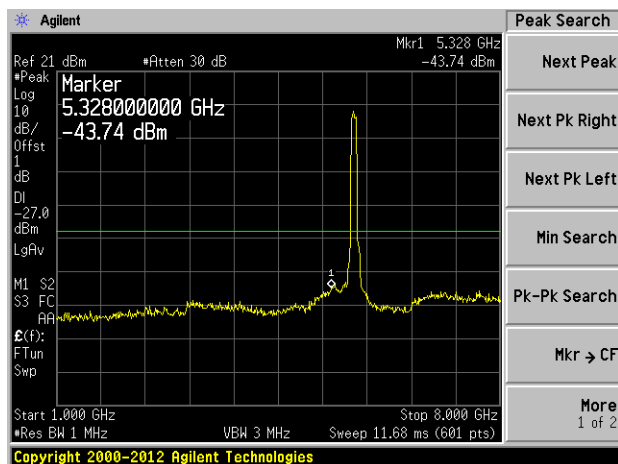
Chain 0, Plot: 30 MHz – 1 GHz



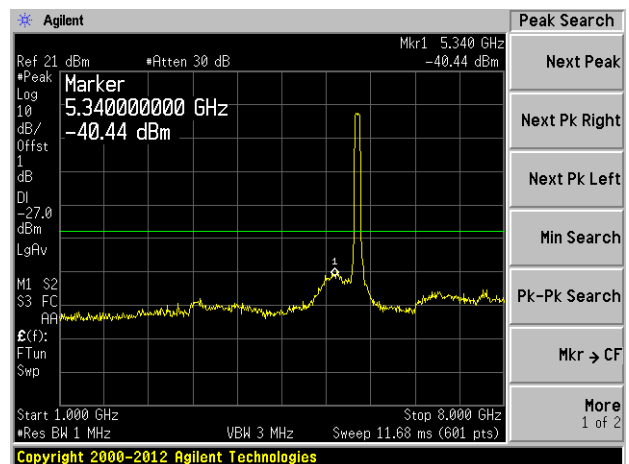
Chain 1, Plot: 30 MHz – 1 GHz



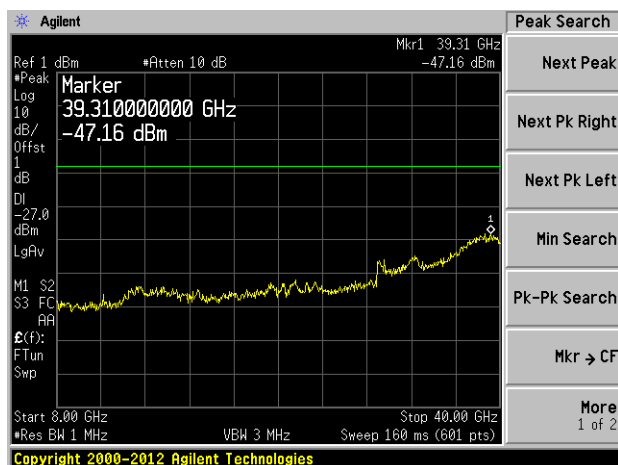
Chain 0, Plot: 1 GHz – 8 GHz



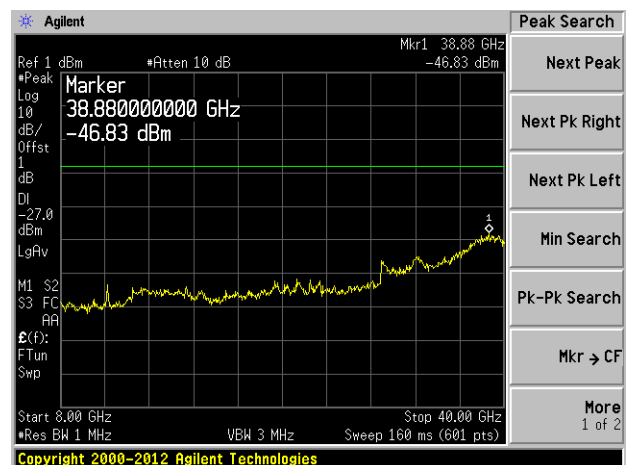
Chain 1, Plot: 1 GHz – 8 GHz



Chain 0, Plot: 8 GHz – 40 GHz



Chain 1, Plot: 8 GHz – 40 GHz

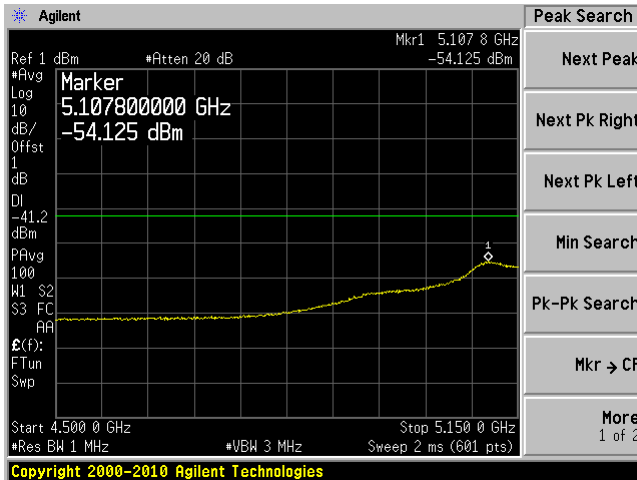


Restrict Band Measurement

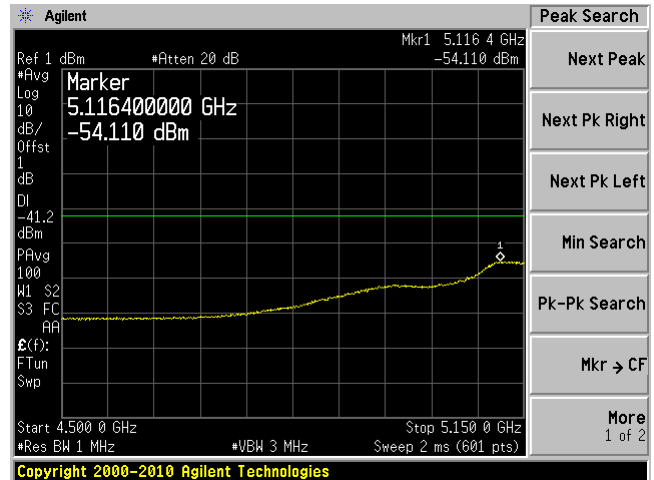
5.3 GHz Band

802.11a, Low Channel, 5260 MHz, 4500MHz—5150MHz

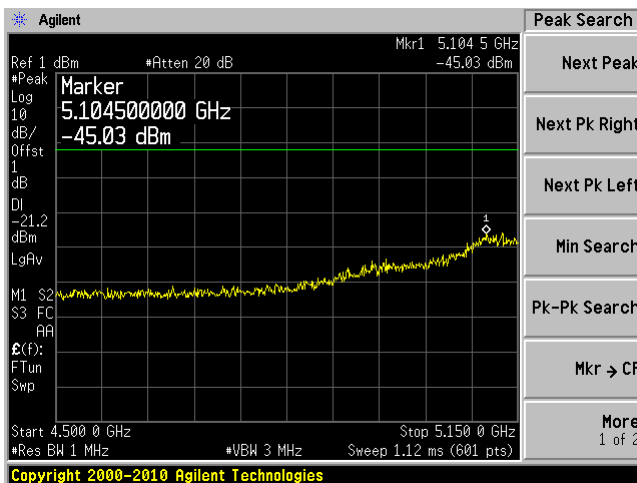
Chain 0 AVG



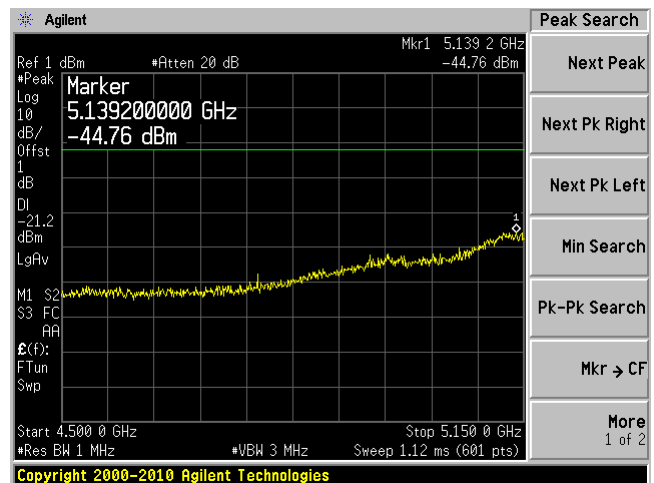
Chain 1 AVG



Chain 0 PEAK

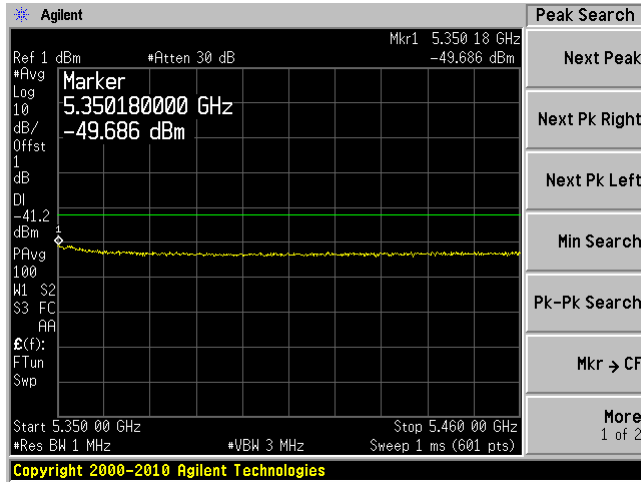


Chain 1 PEAK

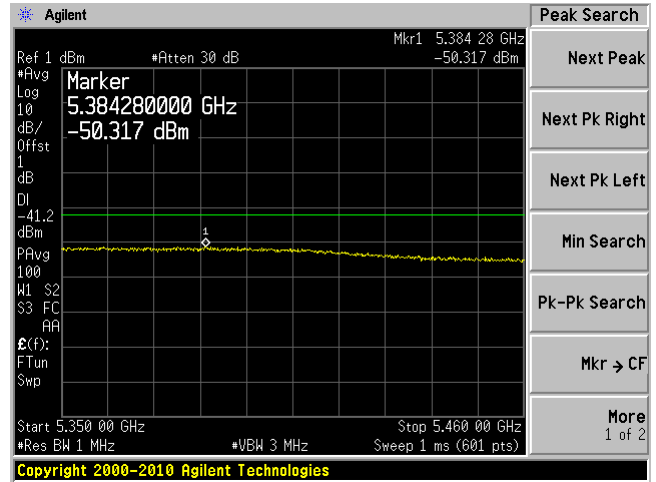


802.11a, Low Channel, 5260 MHz, 5350MHz—5460MHz

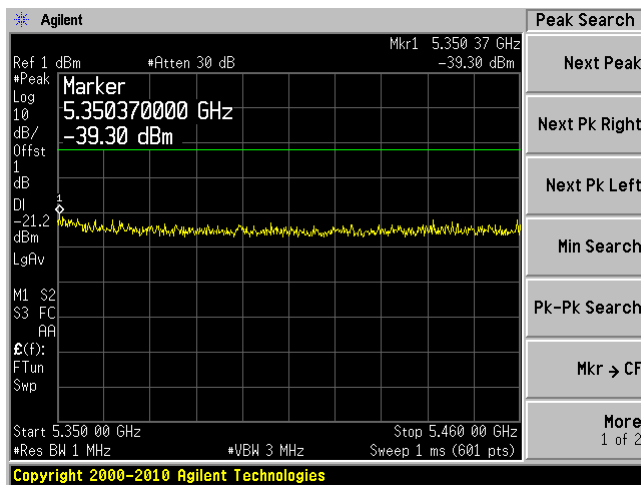
Chain 0 AVG



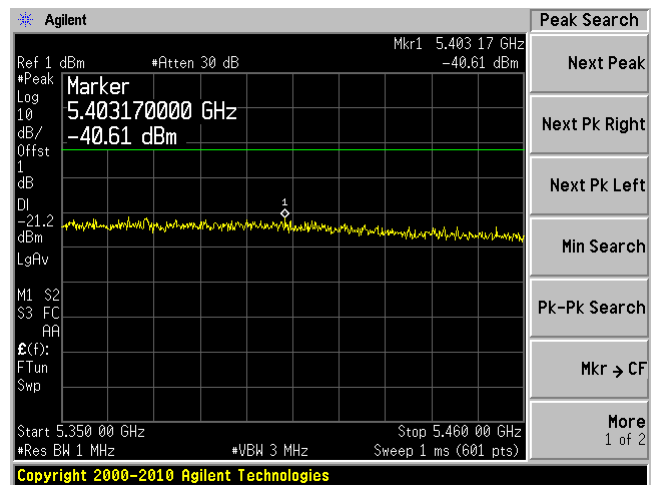
Chain 1 AVG



Chain 0 PEAK

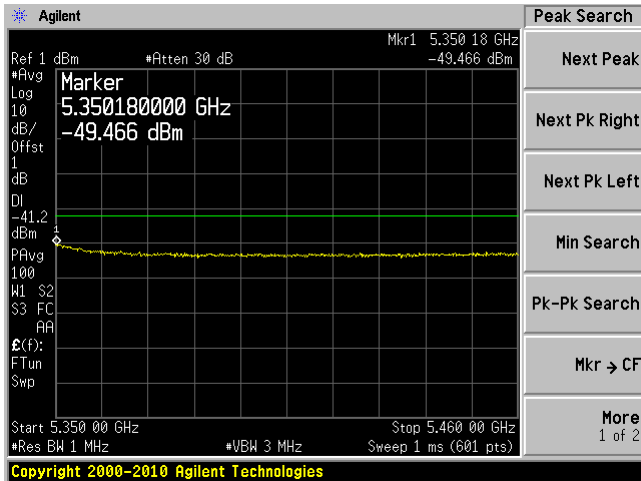


Chain 1 PEAK

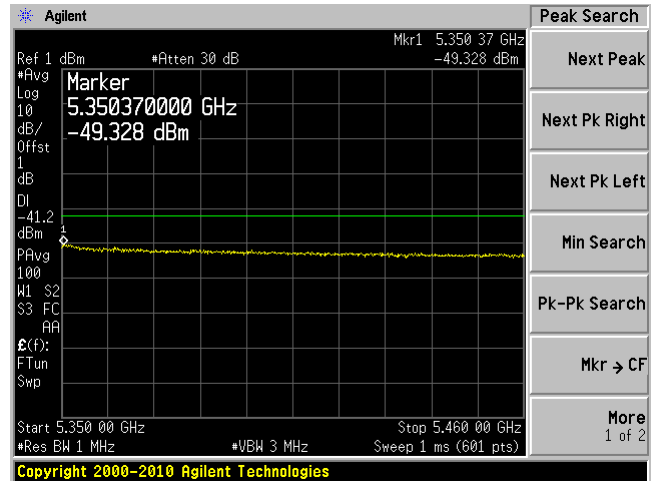


802.11a, High Channel, 5320 MHz

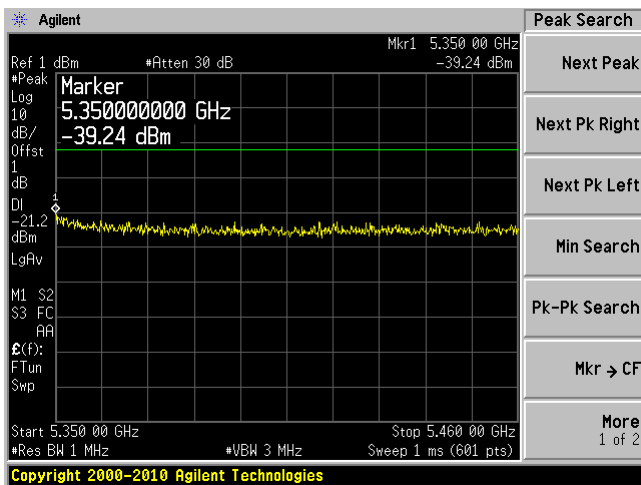
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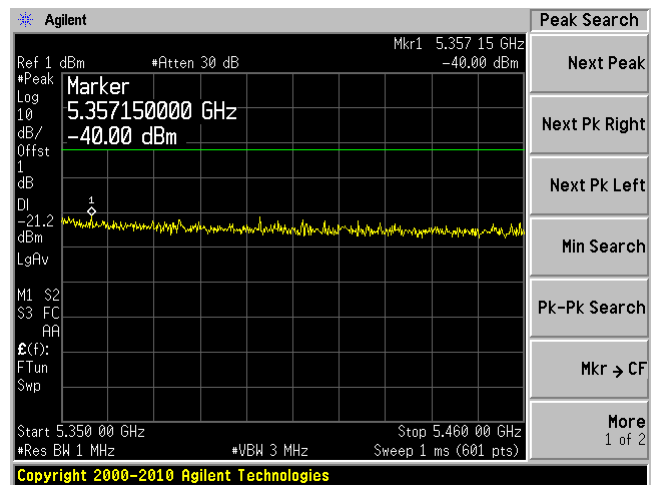
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Chain 0 PEAK

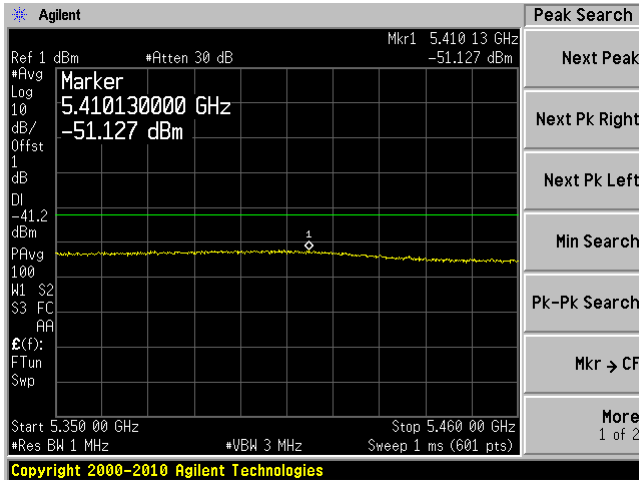


Chain 1 PEAK

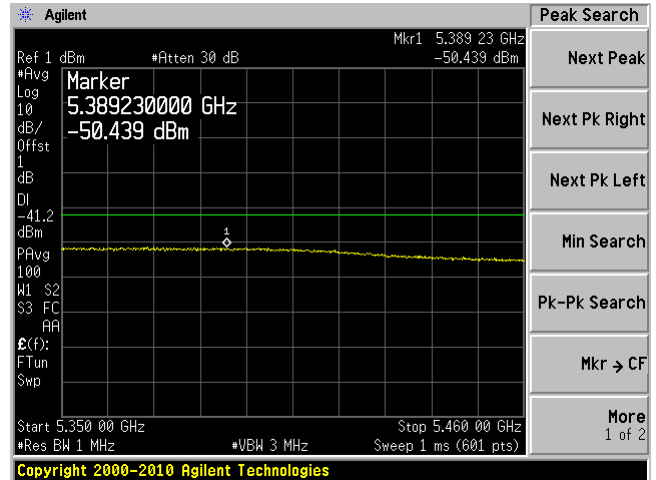


802.11n-HT 20, Low Channel 5260 MHz 5350MHz—5460MHz

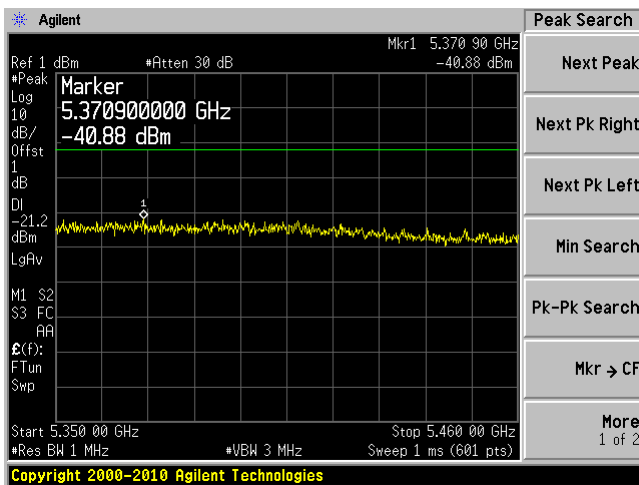
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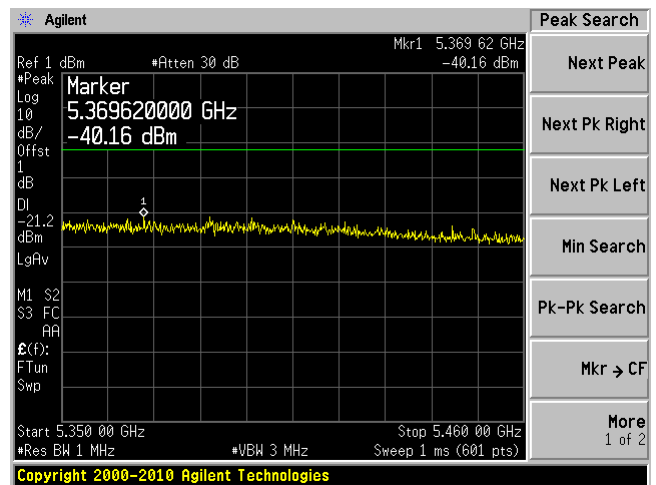
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Chain 0 PEAK

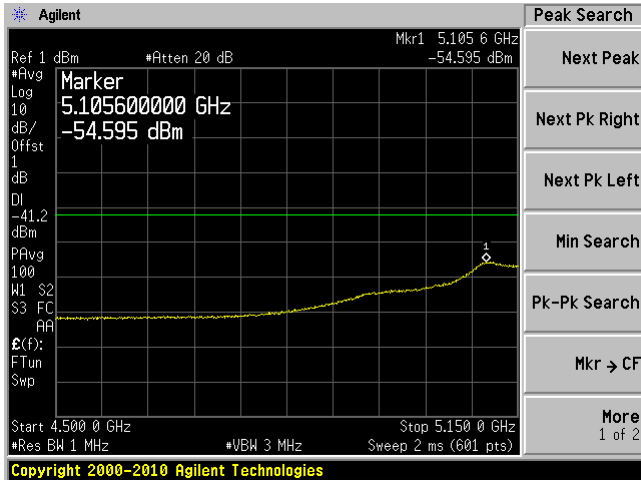


Chain 1 PEAK

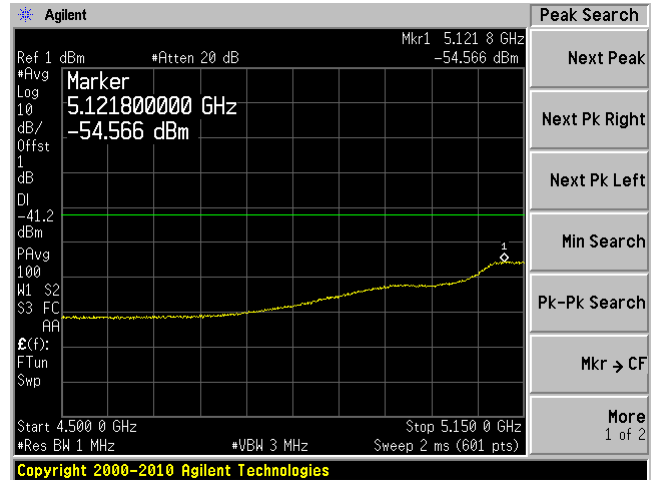


802.11n-HT 20, Low Channel 5260 MHz, 4500MHz—5150MHz

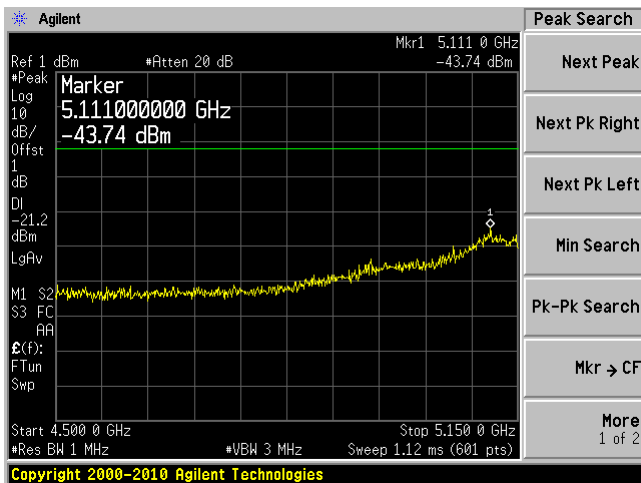
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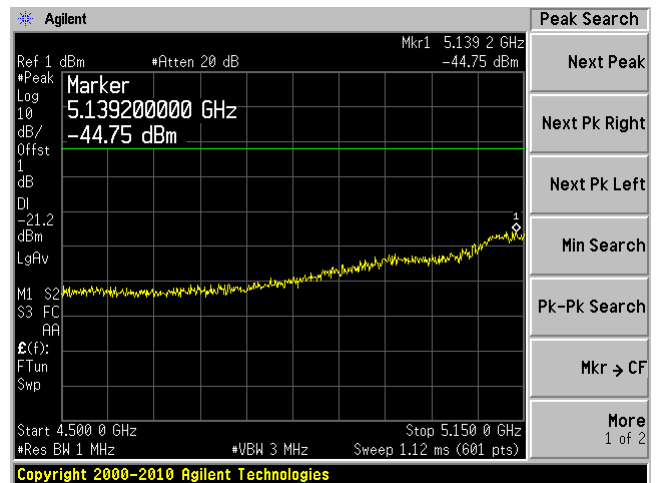
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Chain 0 PEAK

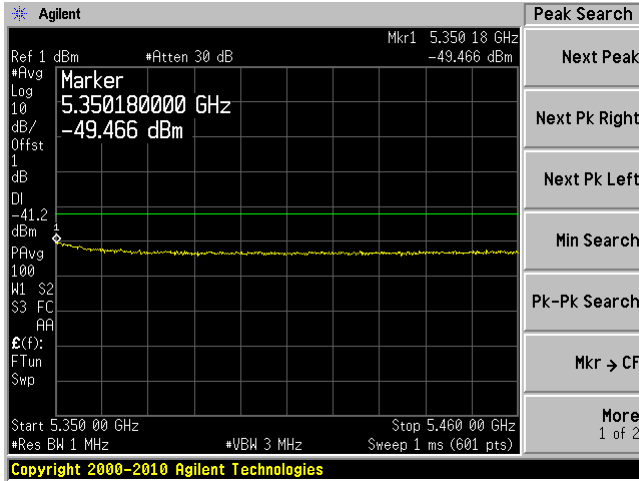


Chain 1 PEAK

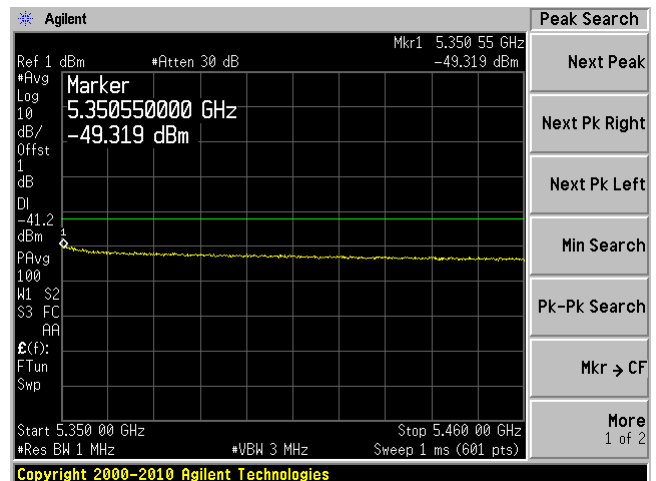


802.11n20, High Channel, 5320 MHz

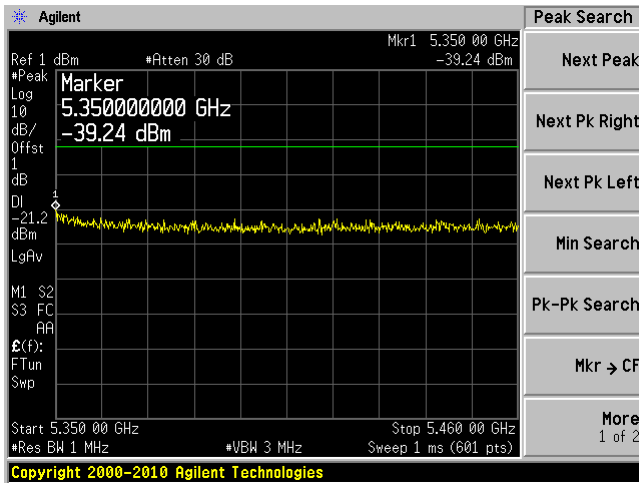
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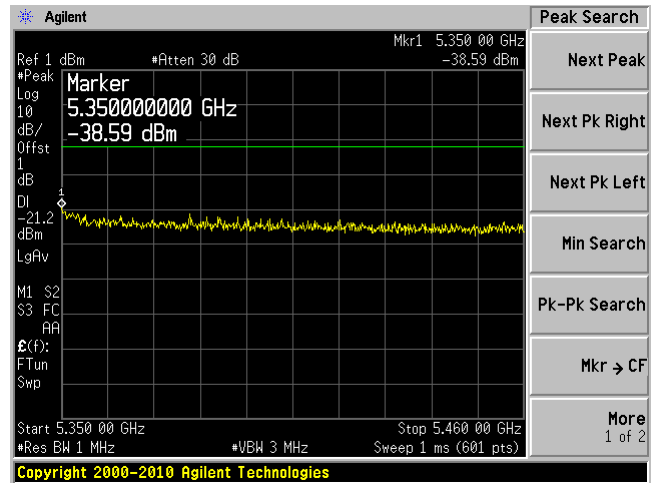
Chain 1 AVG



Chain 0 PEAK

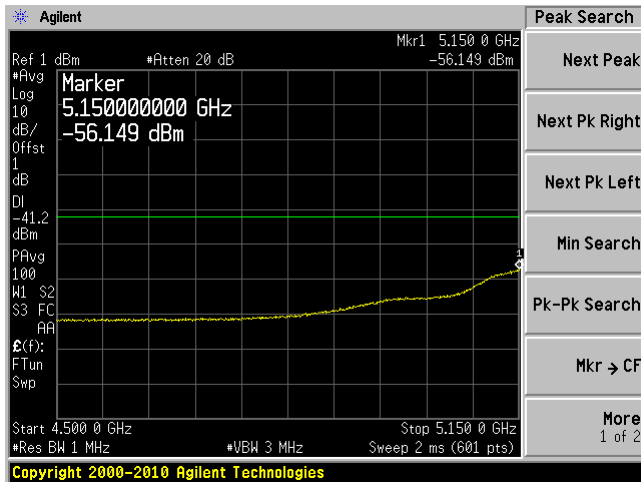


Chain 1 PEAK

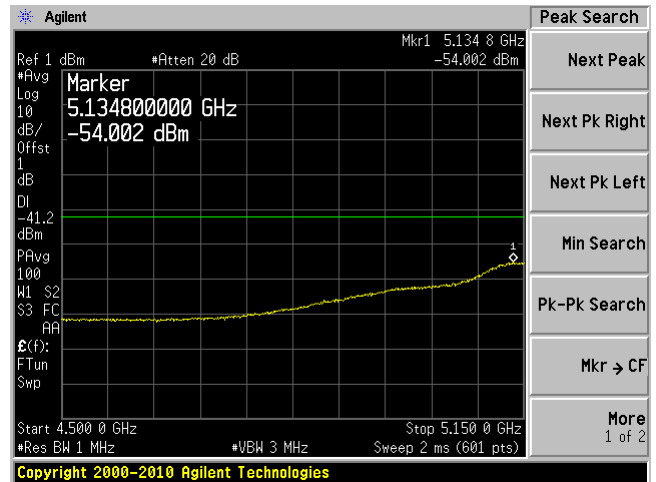


802.11n-HT40, Low Channel 5270 MHz 4500MHz—5150MHz

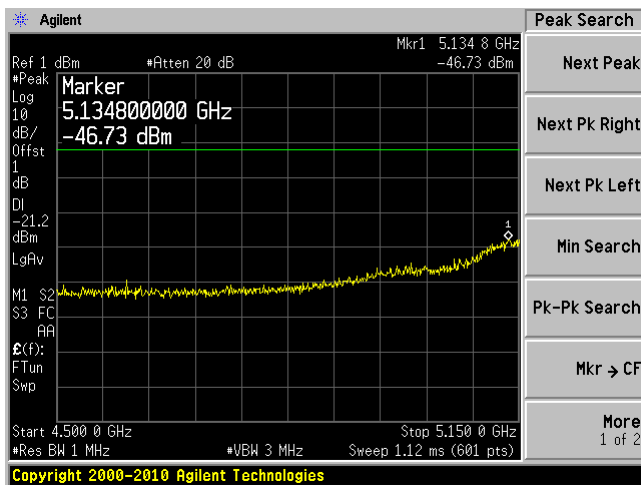
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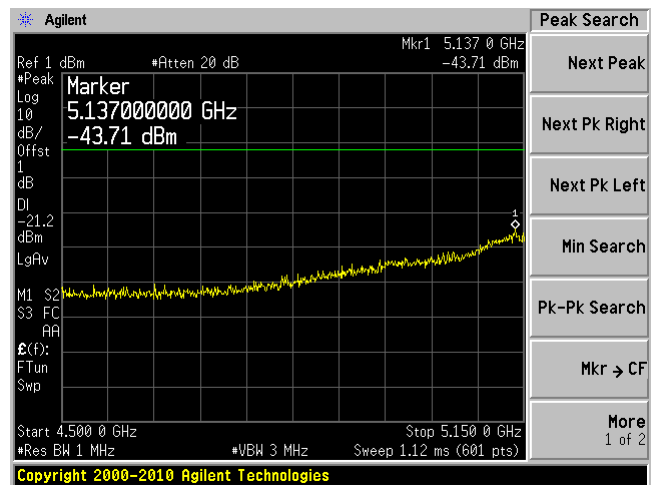
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Chain 0 PEAK

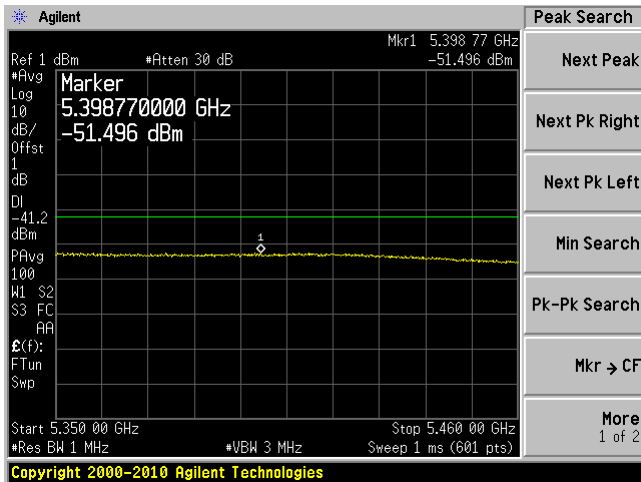


Chain 1 PEAK

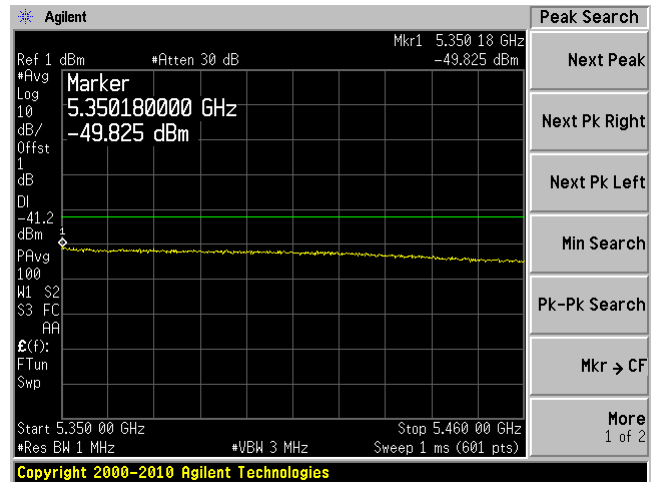


802.11n-HT40, Low Channel 5270 MHz 5350MHz—5460MHz

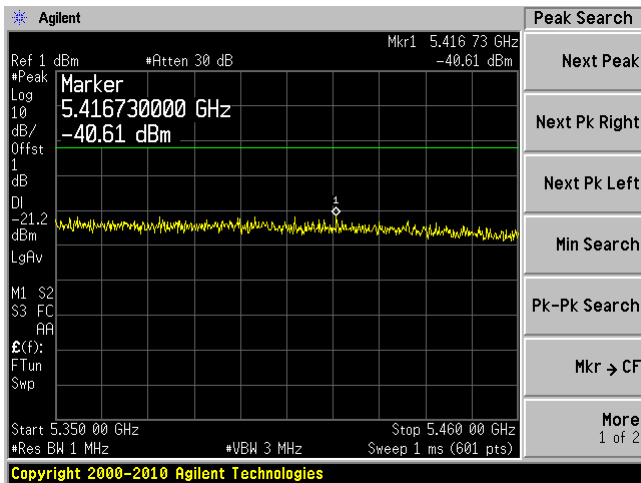
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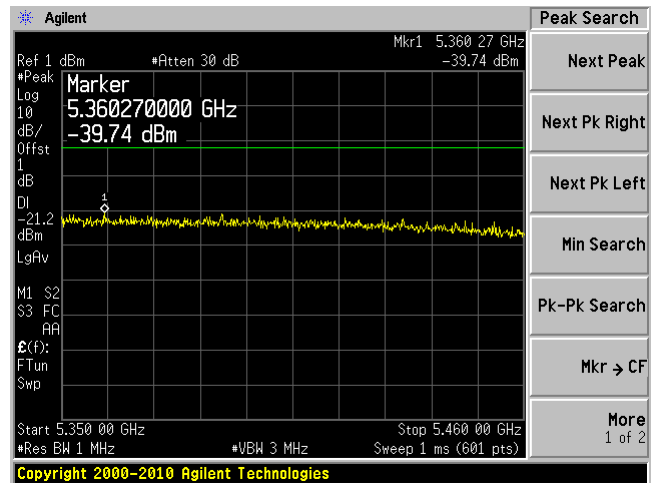
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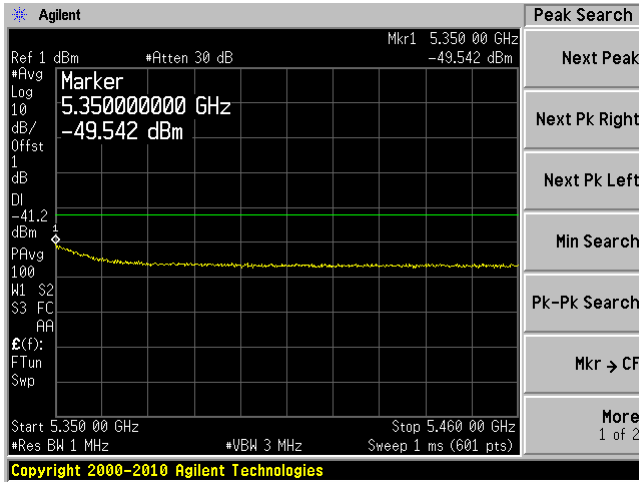


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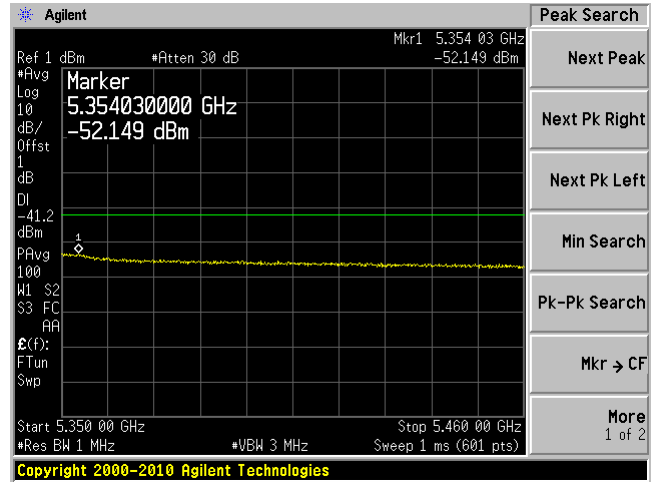


802.11n40, High Channel, 5310 MHz

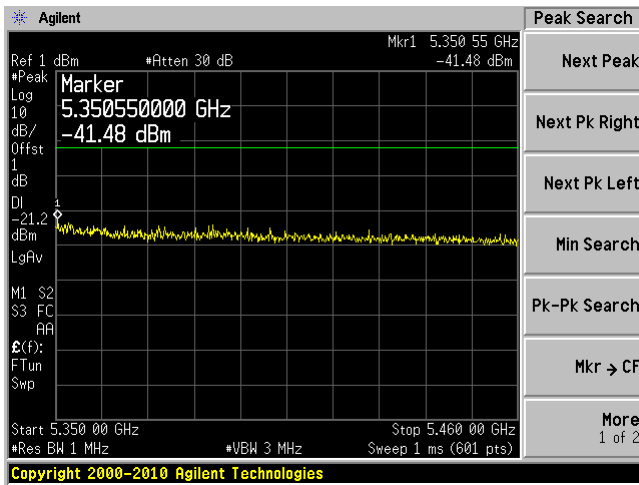
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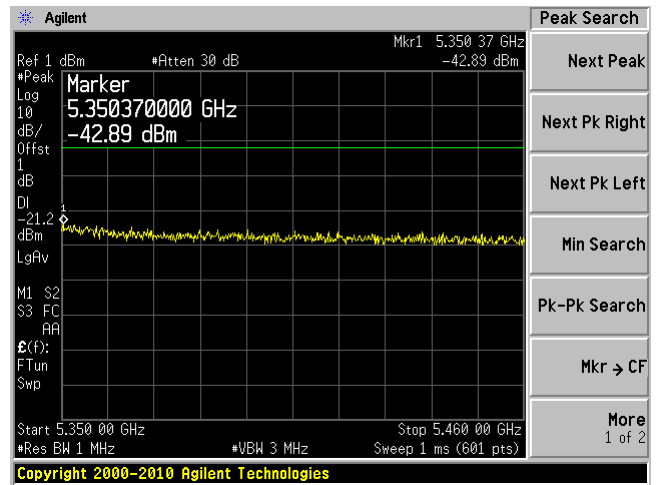
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Chain 0 PEAK

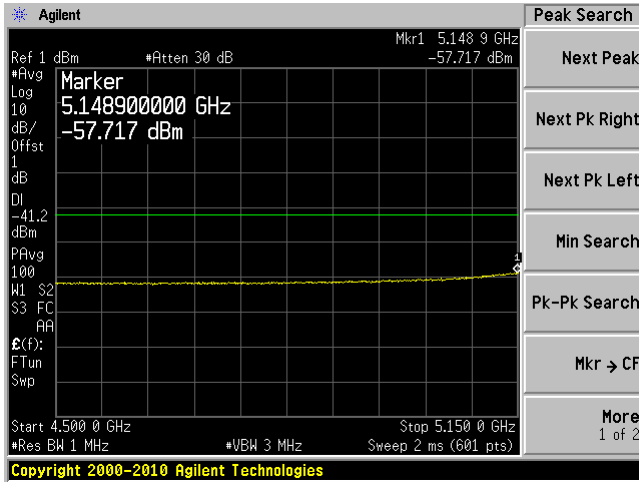


Chain 1 PEAK

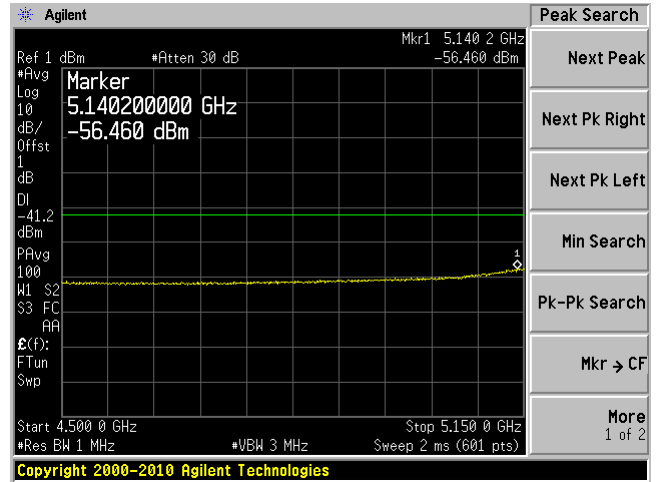


802.11ac-VHT80, 5290 MHz 4500MHz—5150MHz

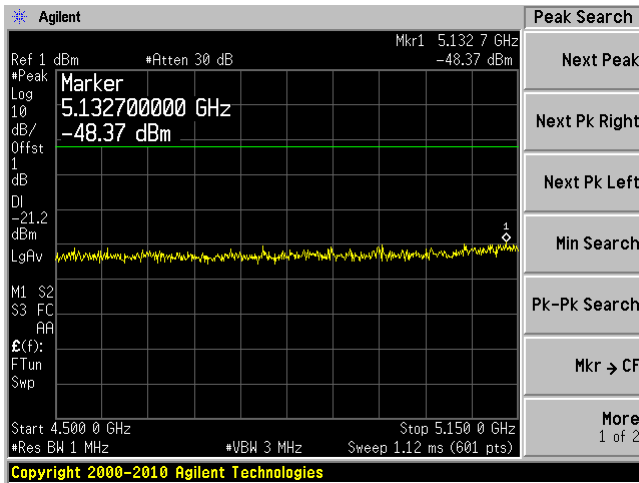
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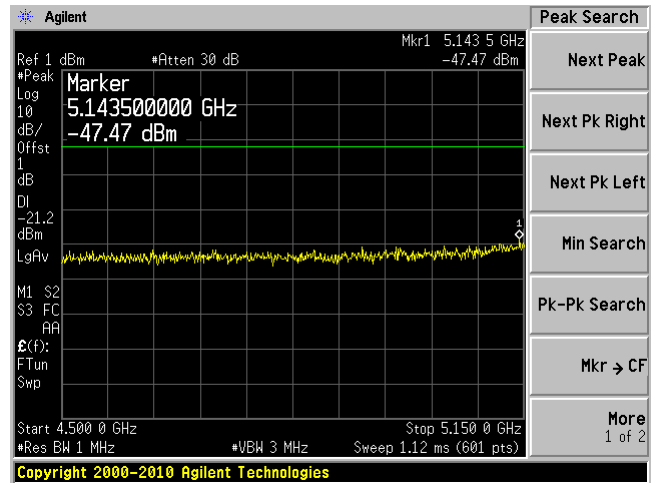
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Chain 0 PEAK

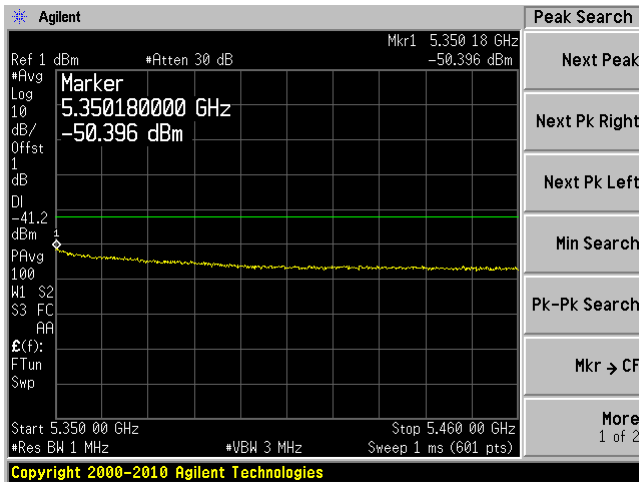


Chain 1 PEAK

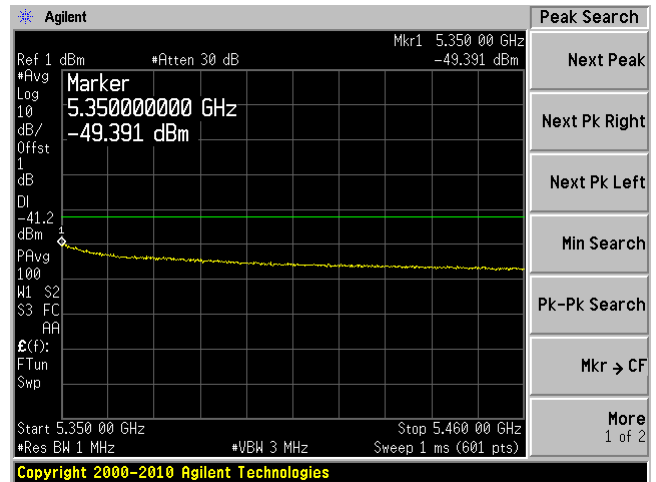


802.11ac-VHT80, 5290 MHz, 5350MHz—5460MHz

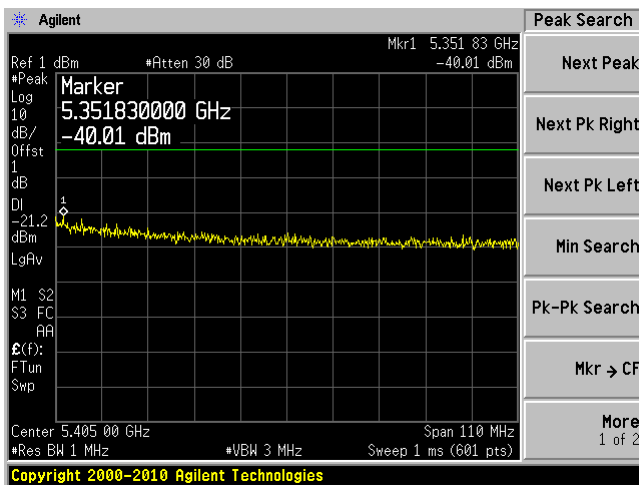
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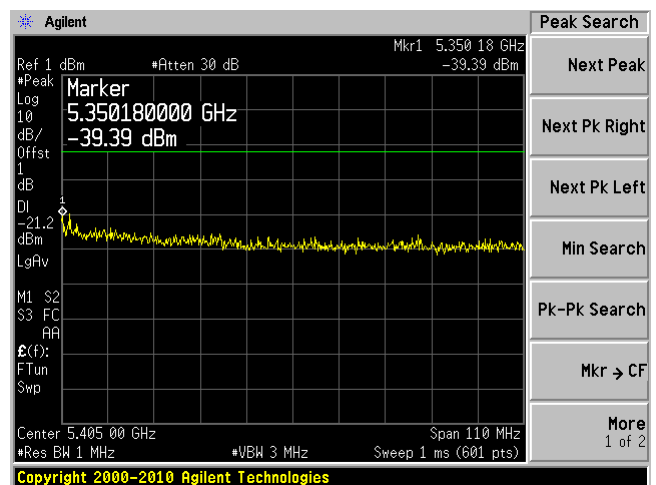
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Chain 0 PEAK

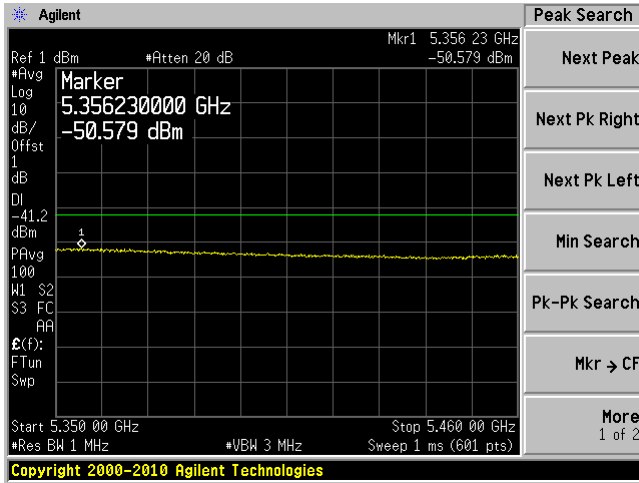


Chain 1 PEAK

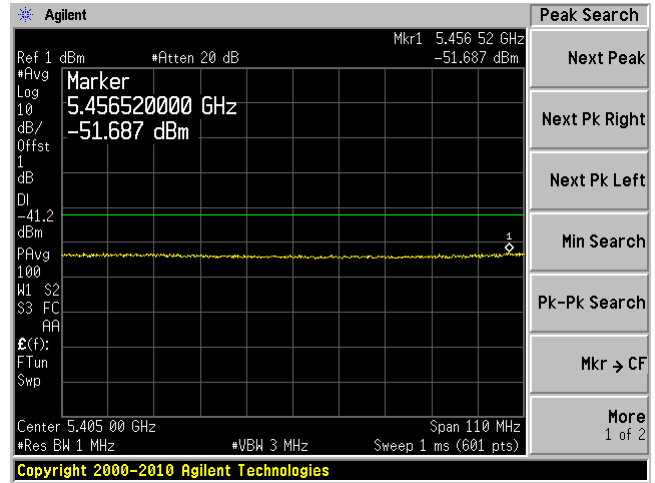


5.6 GHz Band 802.11a, Low Channel, 5500 MHz

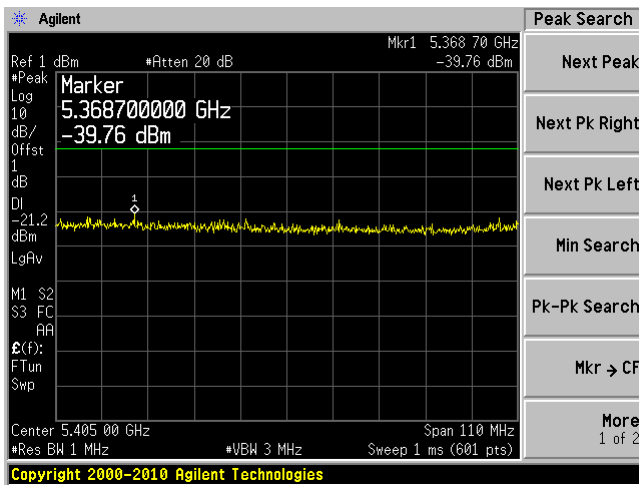
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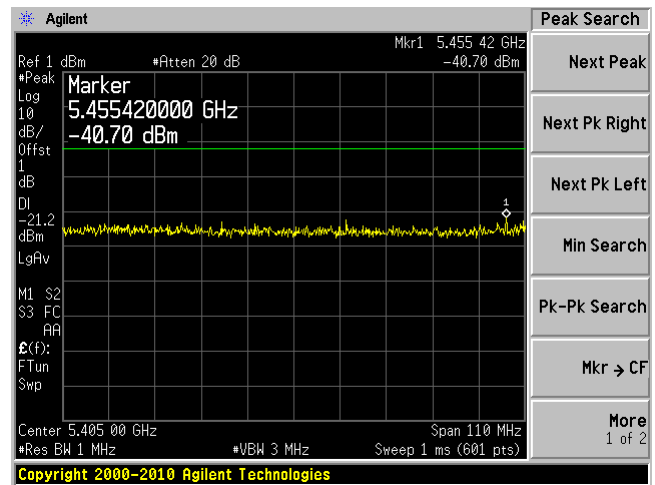
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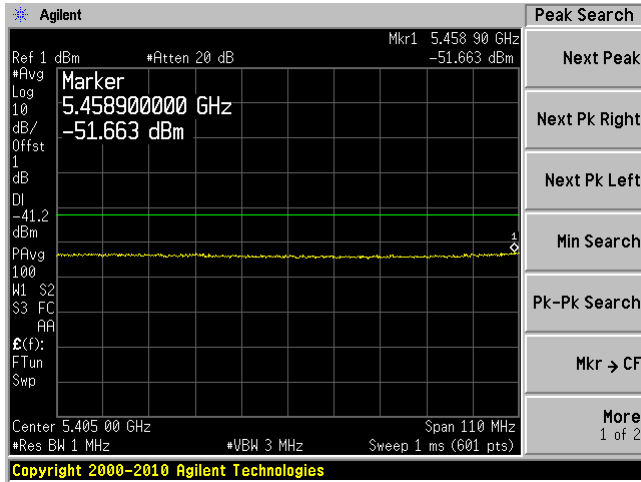


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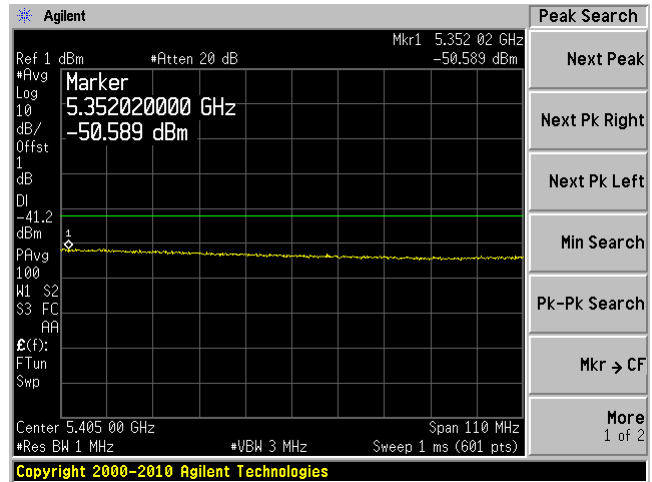


802.11n-HT 20, Low Channel 5500 MHz

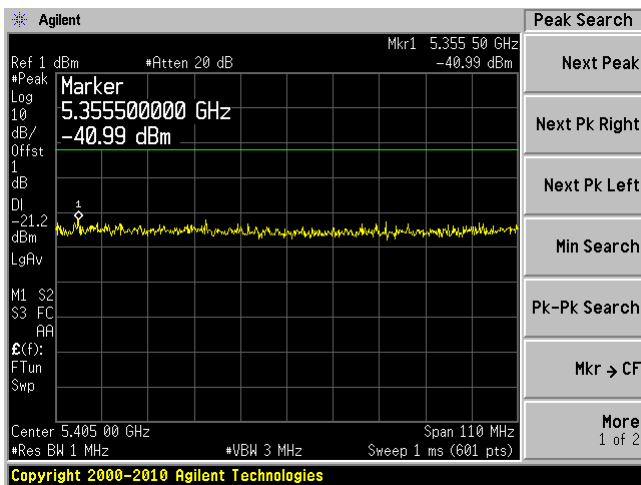
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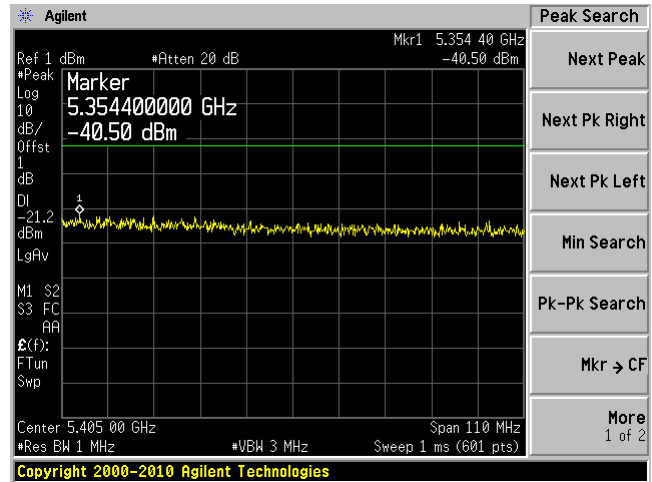
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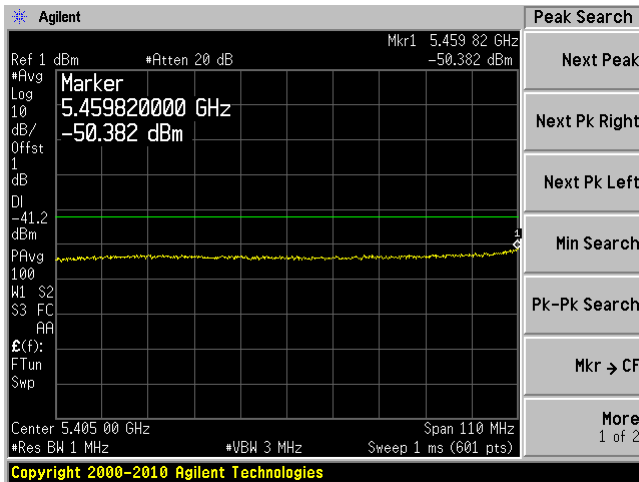


Chain 1 PEAK

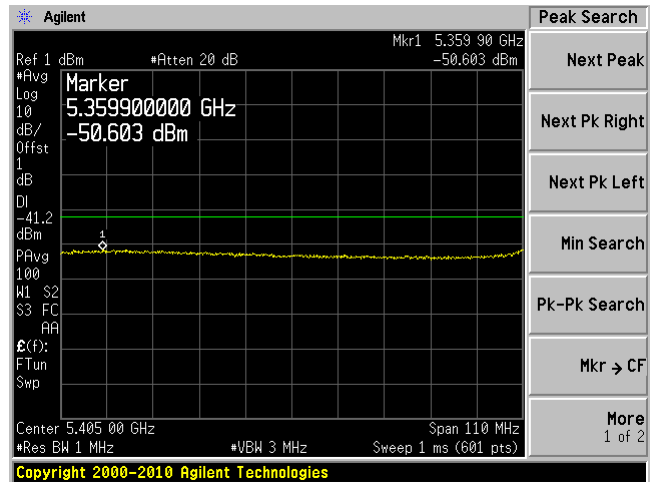


802.11n-HT40, Low Channel 5510 MHz

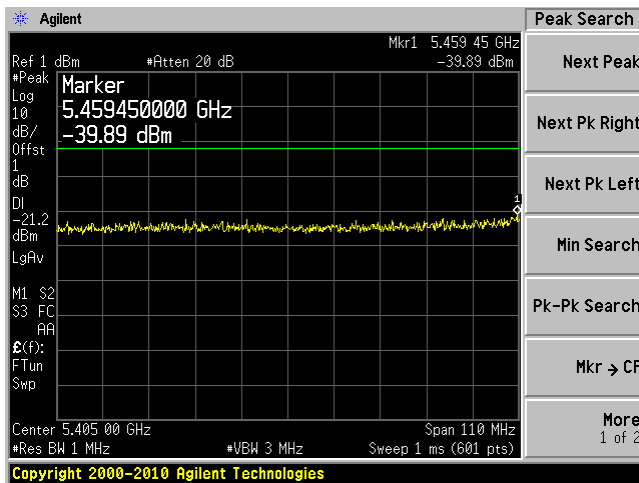
Chain 0 AVG



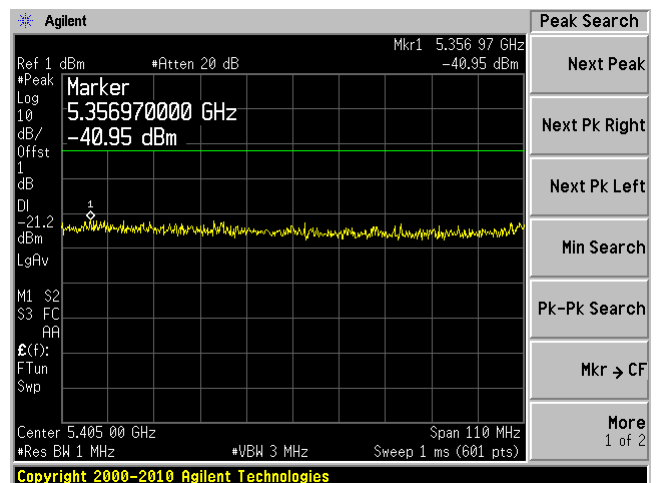
Chain 1 AVG



Chain 0 PEAK

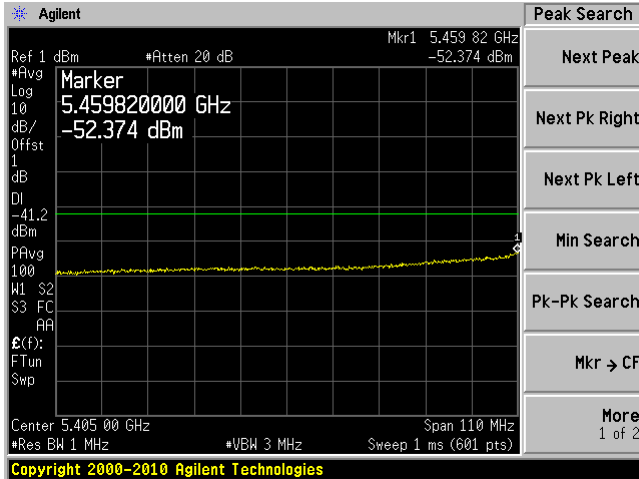


Chain 1 PEAK

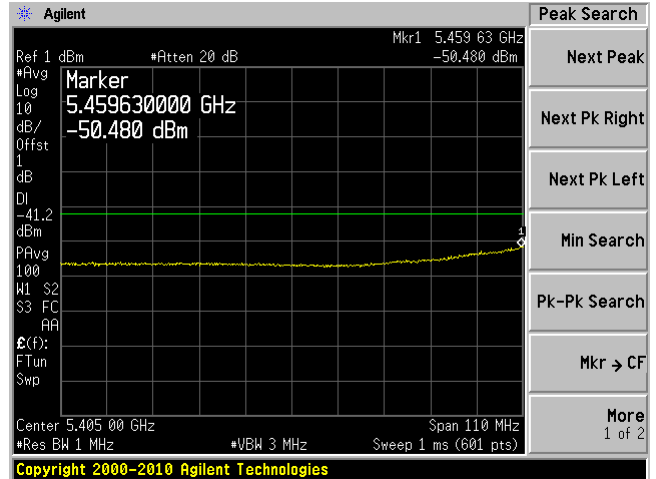


802.11ac-VHT80, 5530 MHz

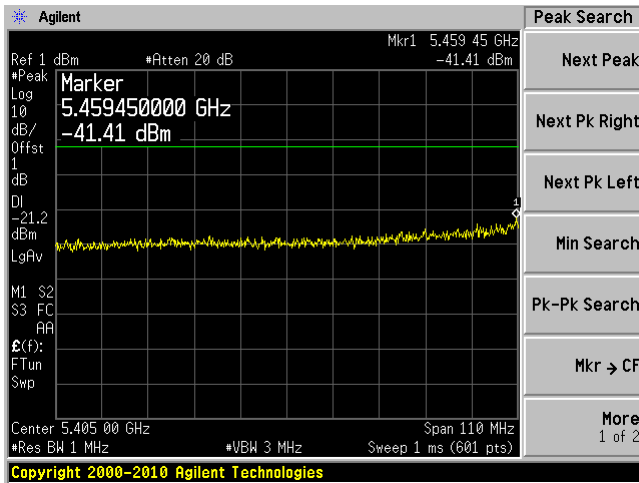
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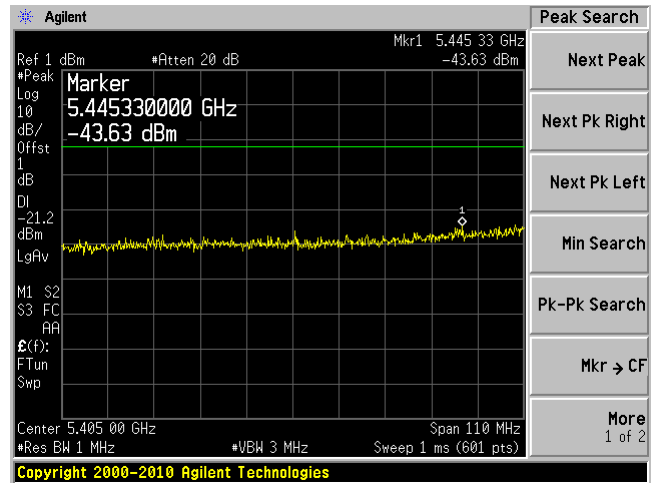
Chain 1 AVG



Chain 0 PEAK



Chain 1 PEAK



12 FCC §15.407(a) - Power Spectral Density

12.1 Applicable Standards

According to FCC §15.407(a)

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

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

12.2 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 based on FCC KDB 789033 D02 General UNII Test Procedures New Rules v01, GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) DEVICES.

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:	22-24 °C
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 kPa

The testing was performed by Rui Zhou on 2014-08-18 to 2014-08-20 at RF site.

12.5 Test Results**5.3 GHz Band**

802.11a mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dBm)
Low	5260	5.211	5.869	8.56	9	-0.44
Middle	5280	5.244	5.81	8.55	9	-0.45
High	5320	5.53	5.355	8.45	9	-0.55

802.11n-HT20 mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dBm)
Low	5260	4.502	5.641	8.12	9	-0.88
Middle	5280	4.957	5.397	8.19	9	-0.81
High	5320	5.376	4.906	8.16	9	-0.84

802.11n-HT40 mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dBm)
Low	5270	3.022	2.761	5.90	9	-3.10
High	5310	-3.5	-3.565	-0.52	9	-9.52

802.11ac-VHT80 mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dBm)
-	5290	-8.511	-8.233	-5.36	9	-14.36

5.6 GHz Band

802.11a mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dBm)
Low	5500	4.246	6.286	8.39	9	-0.61
Middle	5580	4.512	5.828	8.23	9	-0.77
High	5700	5.05	5.813	8.46	9	-0.54

802.11n-HT20 mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dBm)
Low	5500	4.337	6.548	8.59	9	-0.41
Middle	5580	4.723	5.755	8.28	9	-0.72
High	5700	5.249	5.847	8.57	9	-0.43

802.11n-HT40 mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dBm)
Low	5510	3.21	4.425	6.87	9	-2.13
Middle	5550	3.304	4.575	7.00	9	-2.00
High	5670	3.479	4.571	7.07	10	-2.93

802.11ac-VHT80 mode

Channel	Frequency (MHz)	Chain 0 PSD (dBm)	Chain 1 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dBm)
Low	5530	-4.342	-2.652	-0.41	9	-9.41
High	5690	-0.499	0.767	3.19	9	-5.81

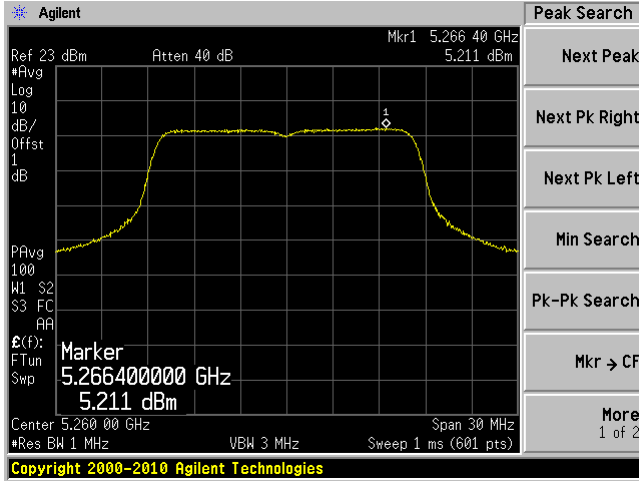
Note: The antenna gain is 8 dBi which is over 2 dB of 6 dBi. The PSD limit shall be reduced to $11-2=9$ dBm.

Please refer to the following plots.

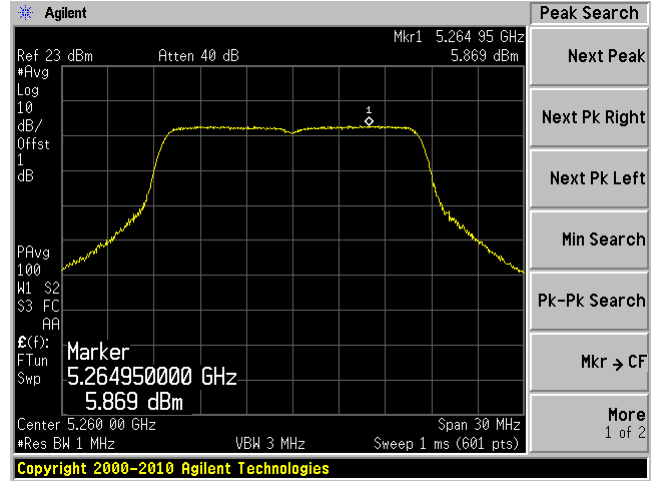
5.3 GHz Band

802.11a, Low Channel, 5260 MHz

Chain 0

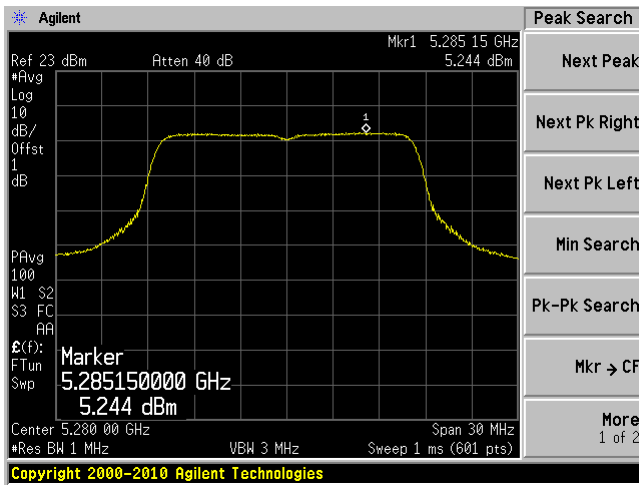


Chain 1

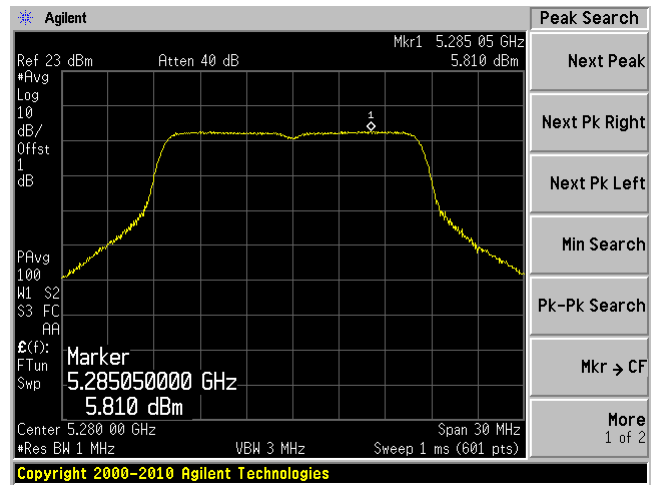


802.11a, Middle Channel, 5280 MHz

Chain 0

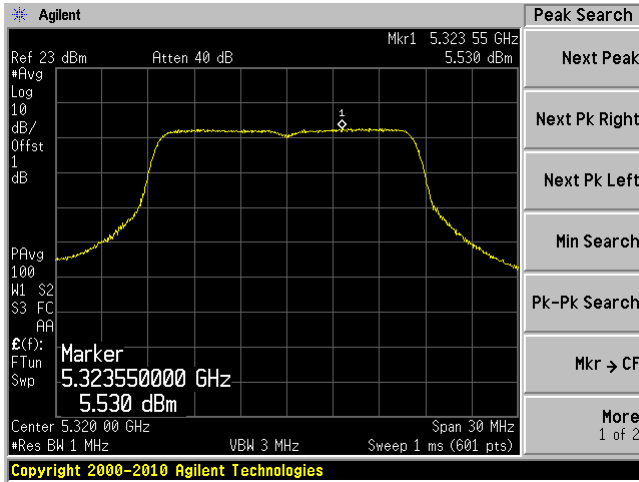


Chain 1

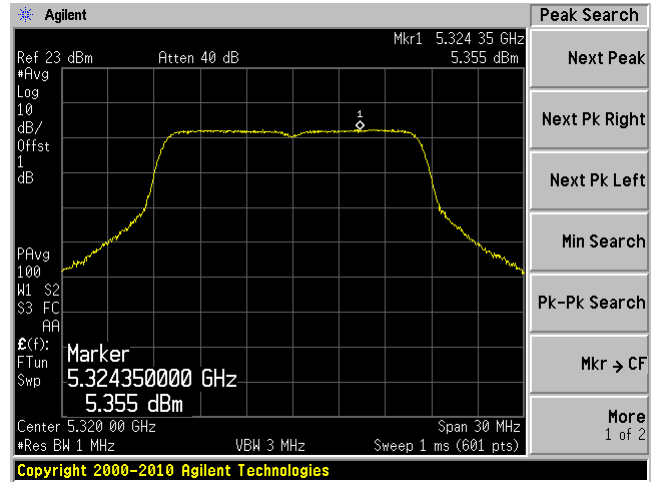


802.11a, High Channel, 5320 MHz

Chain 0

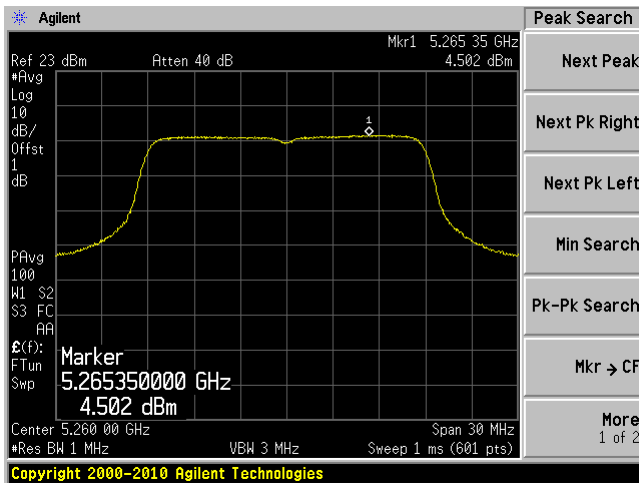


Chain 1

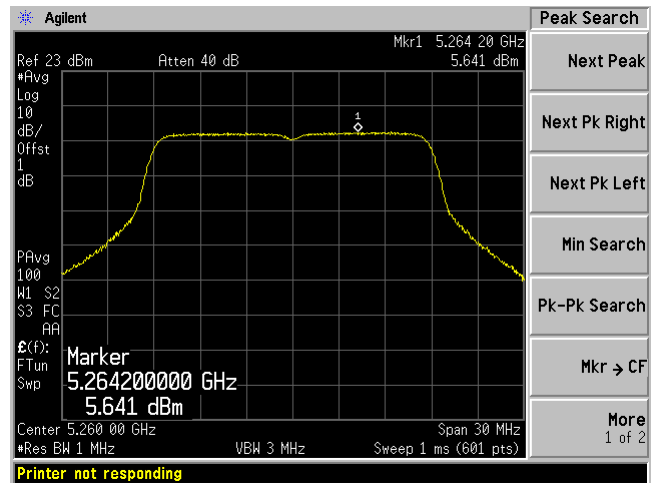


802.11n-HT 20, Low Channel 5260 MHz

Chain 0

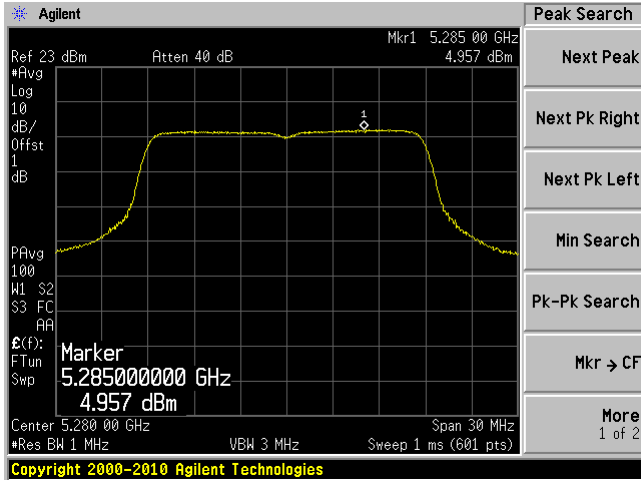


Chain 1

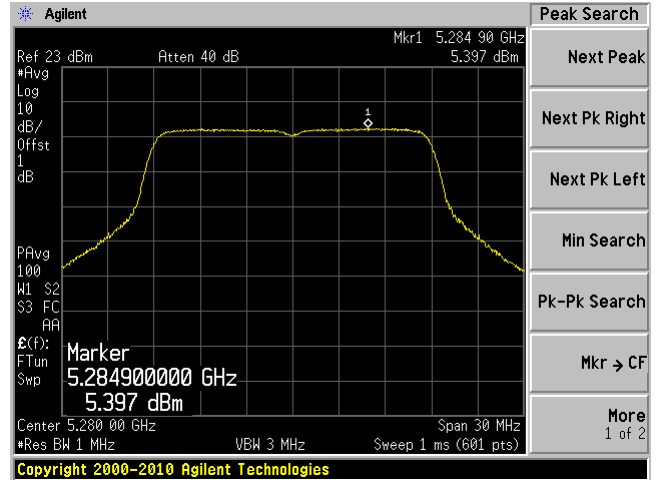


802.11n-HT20, Middle Channel 5280 MHz

Chain 0

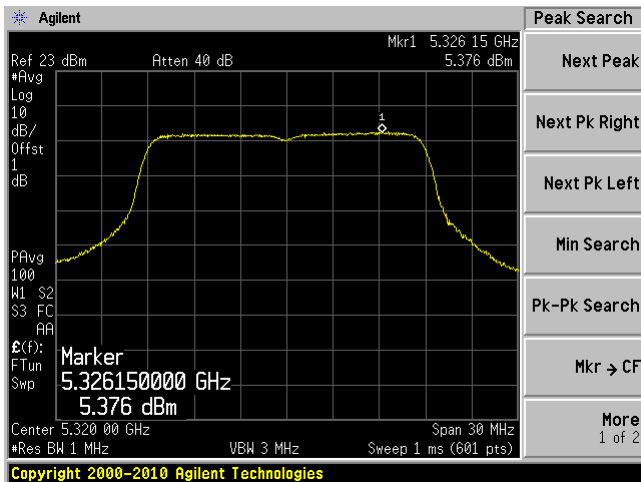


Chain 1

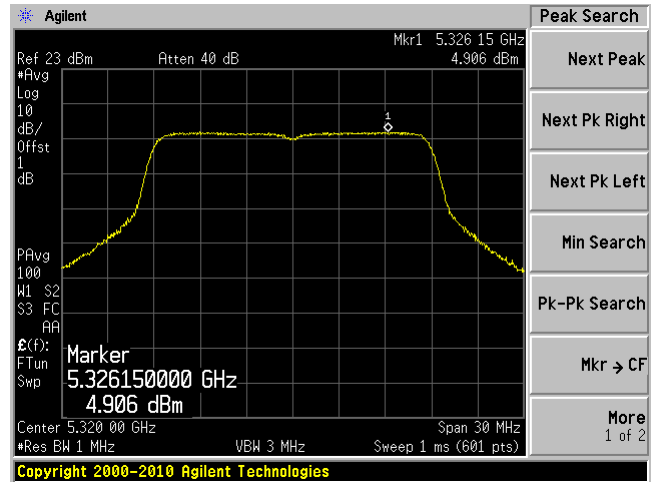


802.11n-HT20, High Channel, 5320 MHz

Chain 0

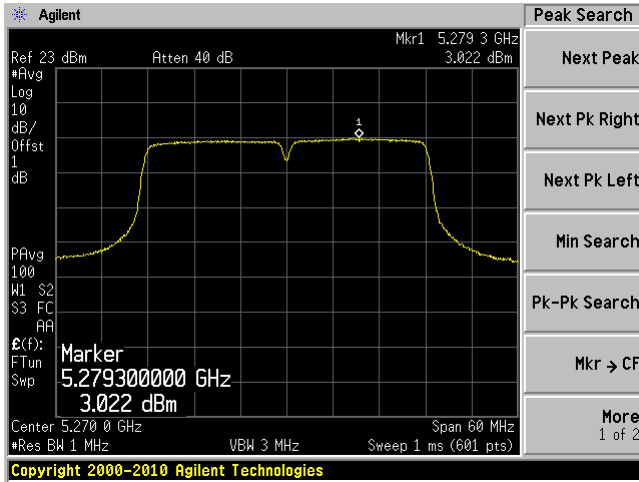


Chain 1

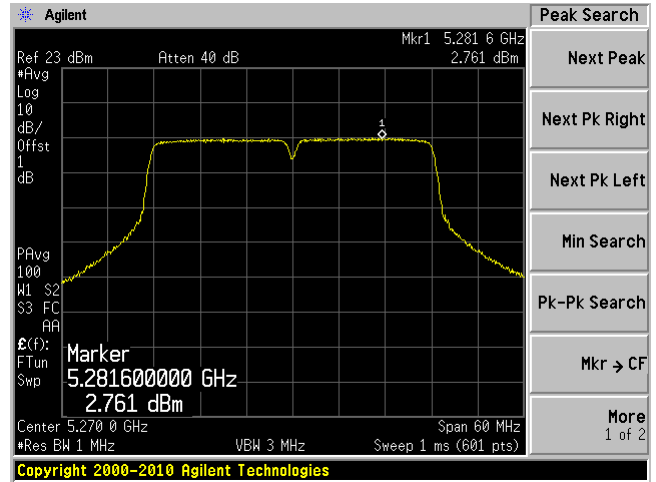


802.11n-HT40, Low Channel 5270 MHz

Chain 0

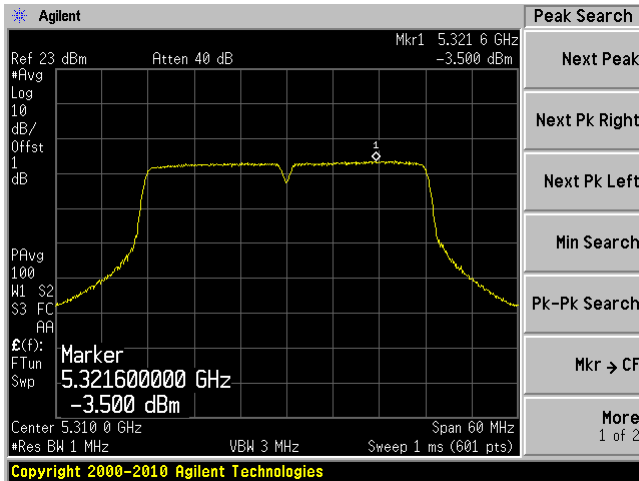


Chain 1

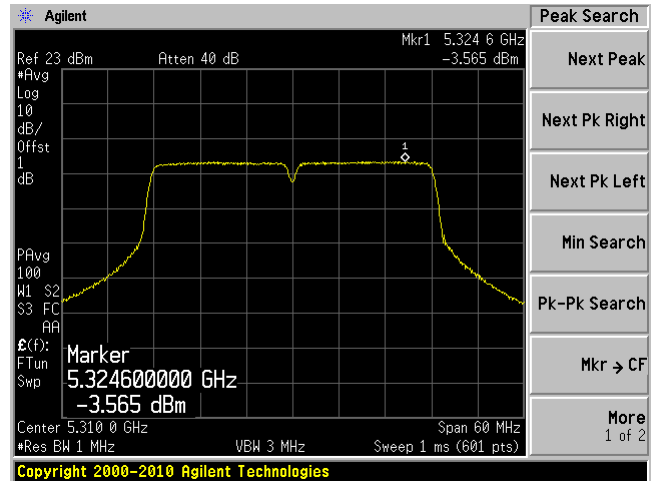


802.11n-HT40, High Channel 5310 MHz

Chain 0

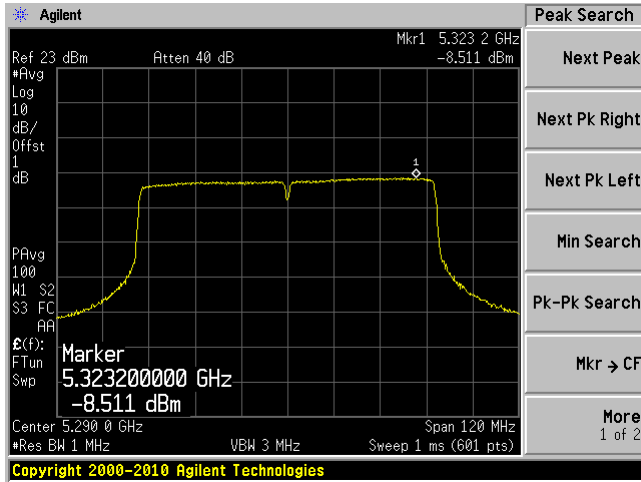


Chain 1

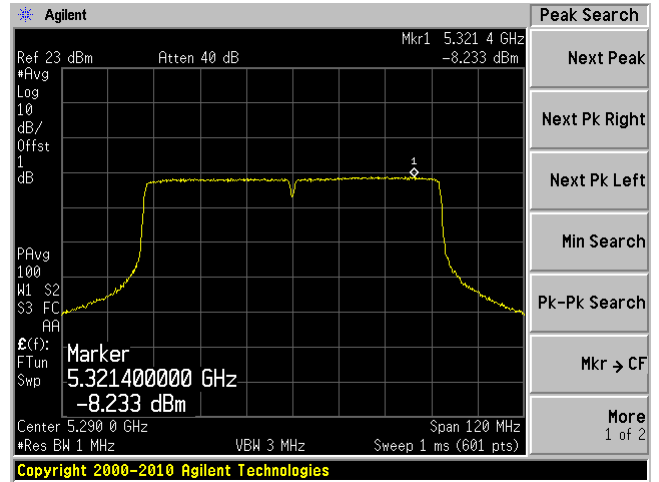


802.11ac-VHT80, High Channel 5290 MHz

Chain 0



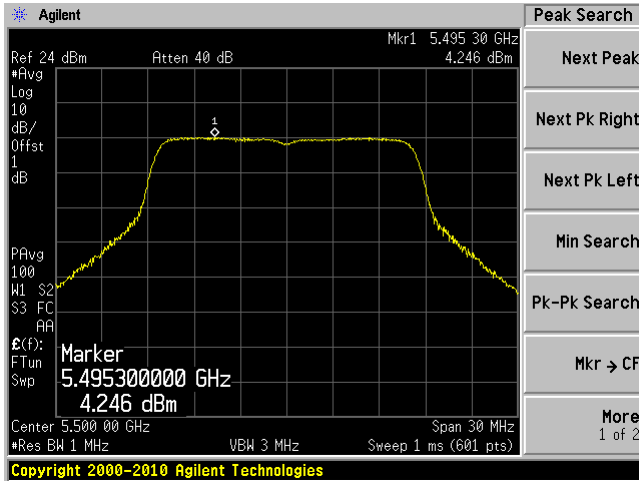
Chain 1



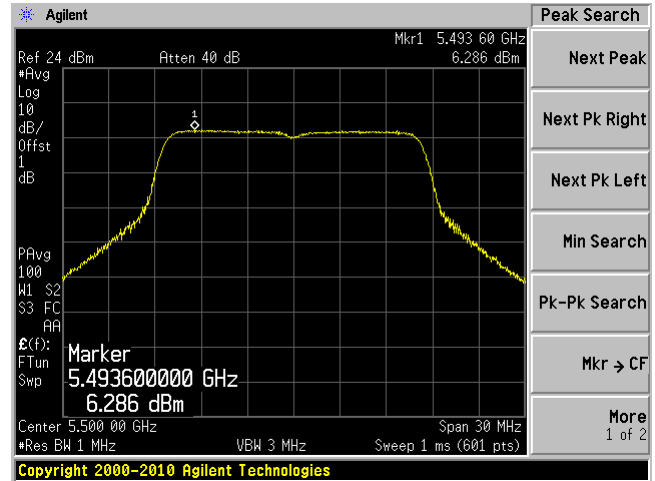
5.6 GHz Band

802.11a, Low Channel, 5500 MHz

Chain 0

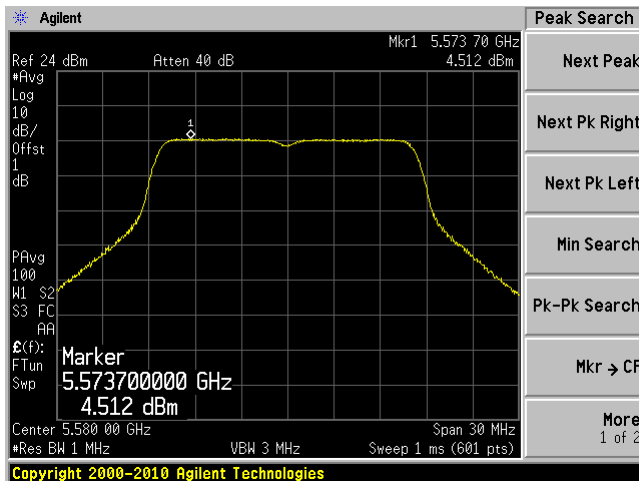


Chain 1

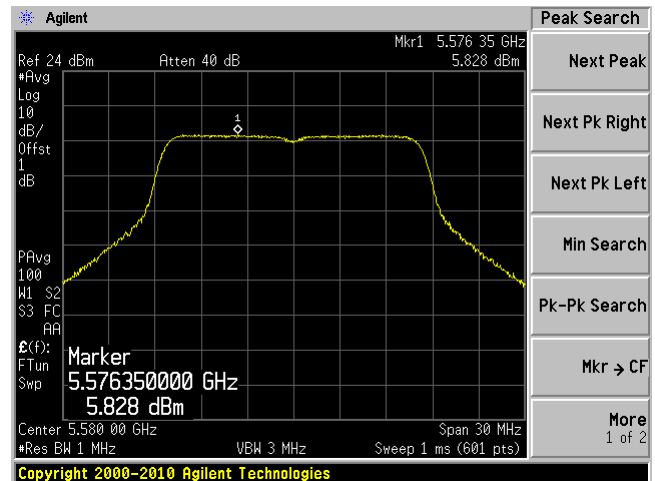


802.11a, Middle Channel, 5580 MHz

Chain 0

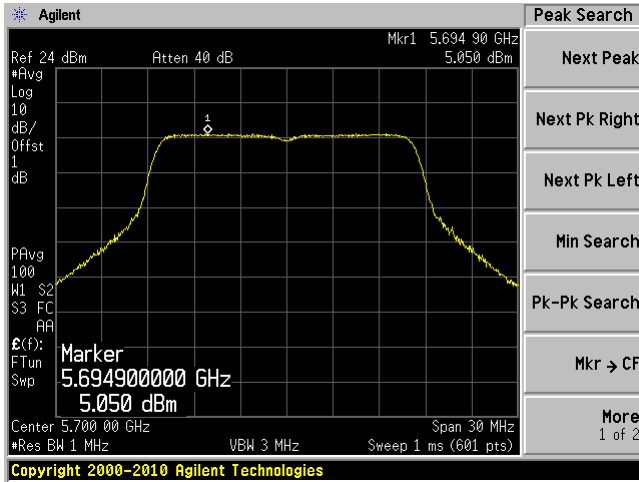


Chain 1

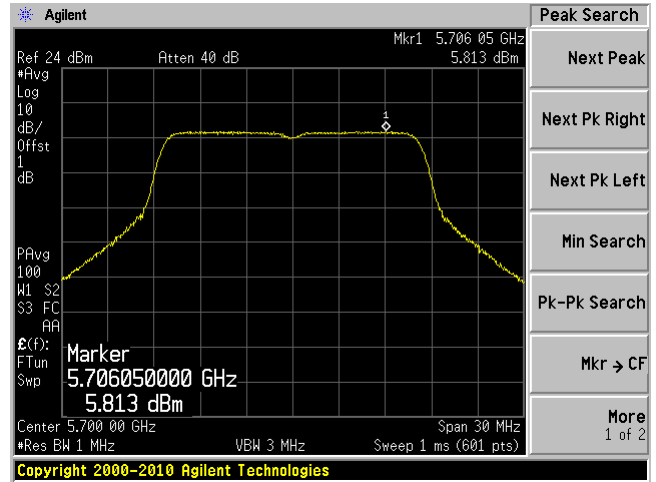


802.11a, High Channel, 5700 MHz

Chain 0

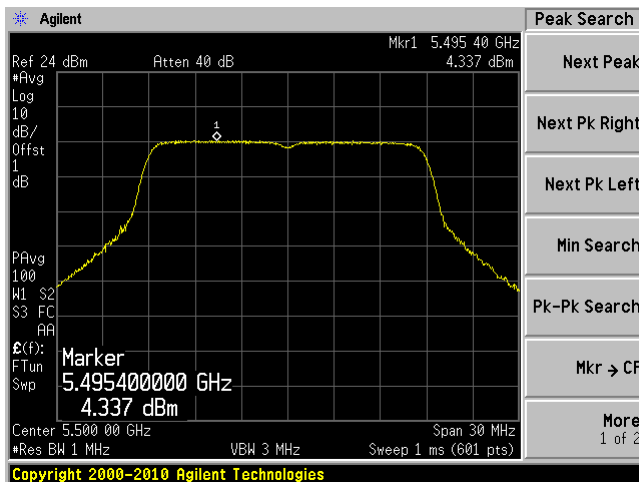


Chain 1

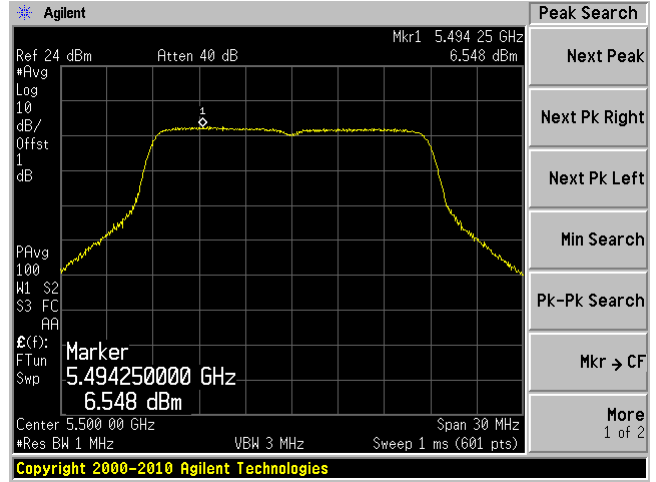


802.11n-HT 20, Low Channel 5500 MHz

Chain 0

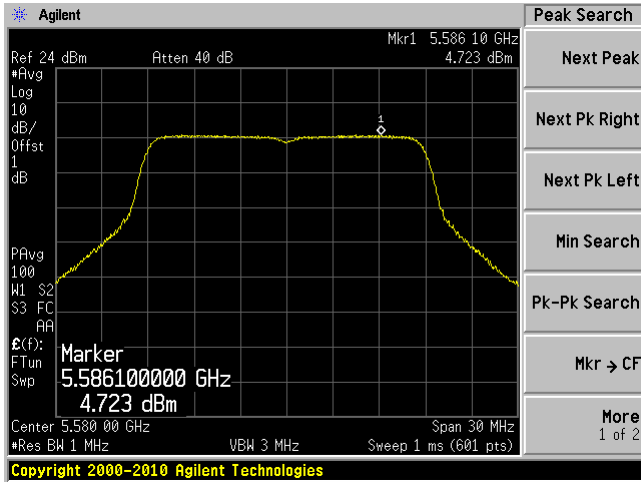


Chain 1

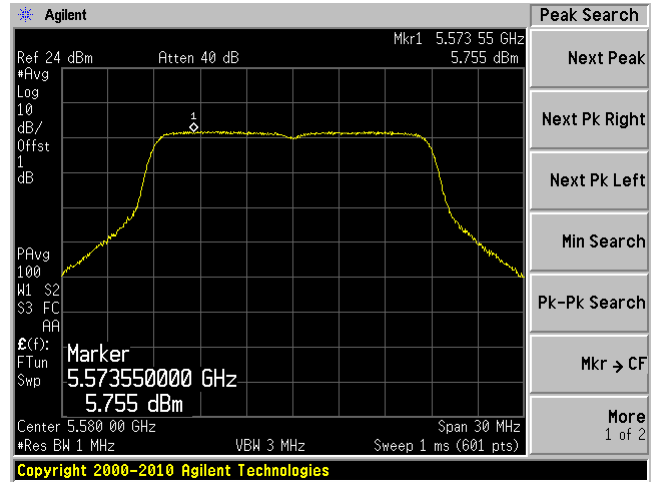


802.11n-HT20, Middle Channel 5580 MHz

Chain 0

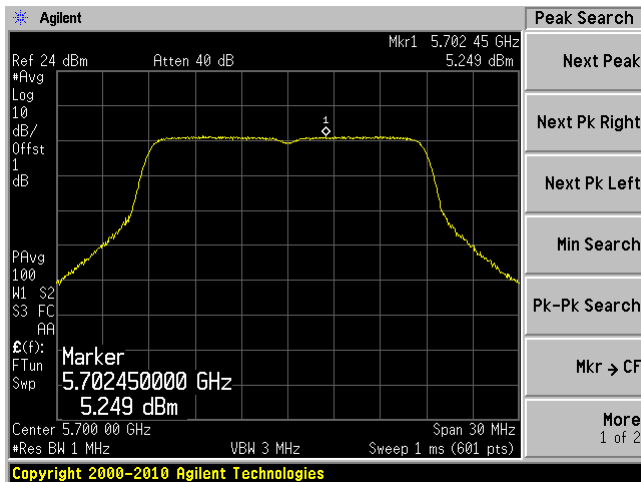


Chain 1

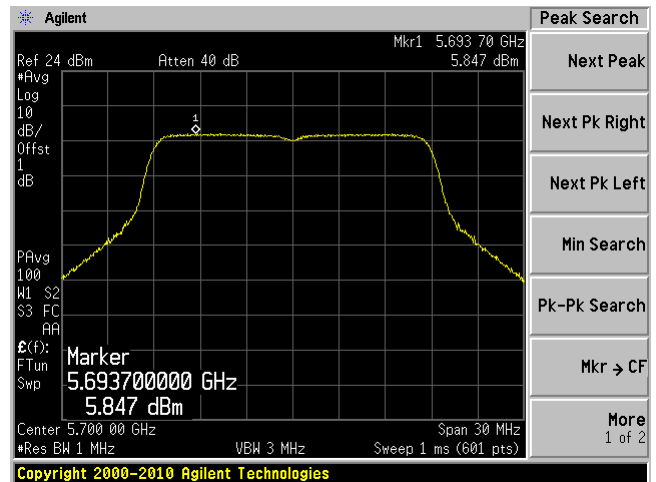


802.11n-HT20, High Channel 5700 MHz

Chain 0

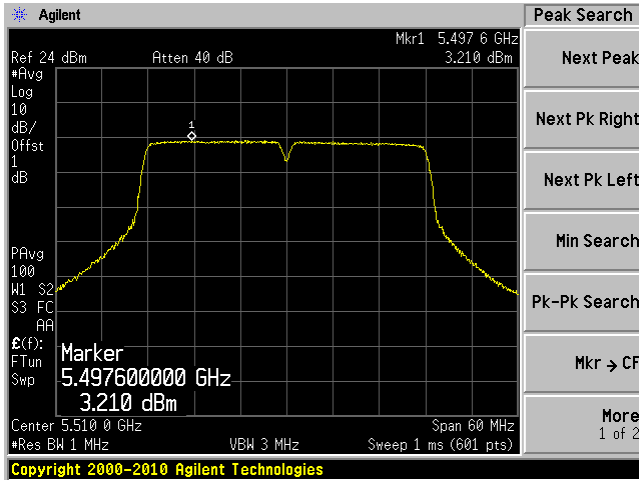


Chain 1

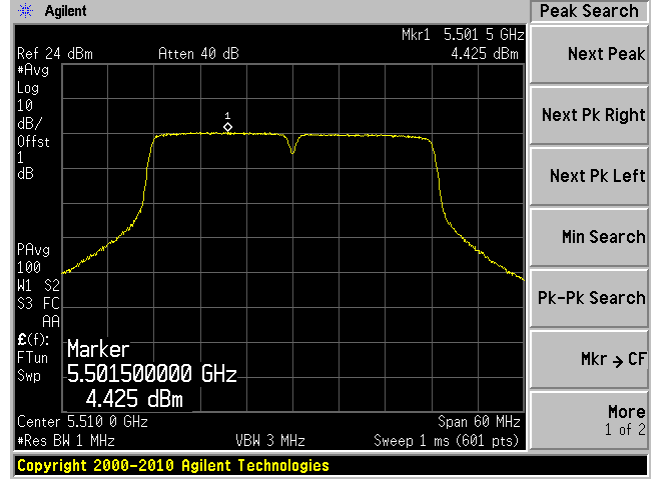


802.11n-HT40, Low Channel 5510 MHz

Chain 0

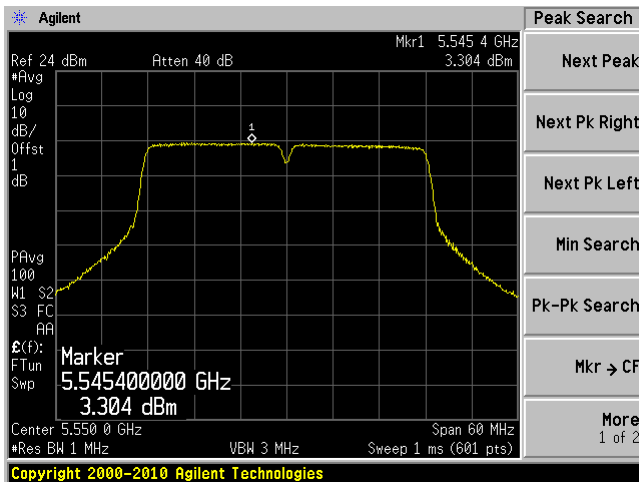


Chain 1

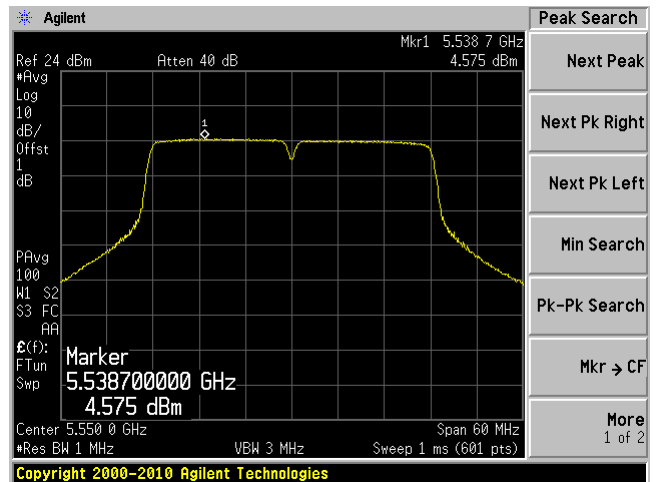


802.11n-HT40, Middle Channel 5550 MHz

Chain 0

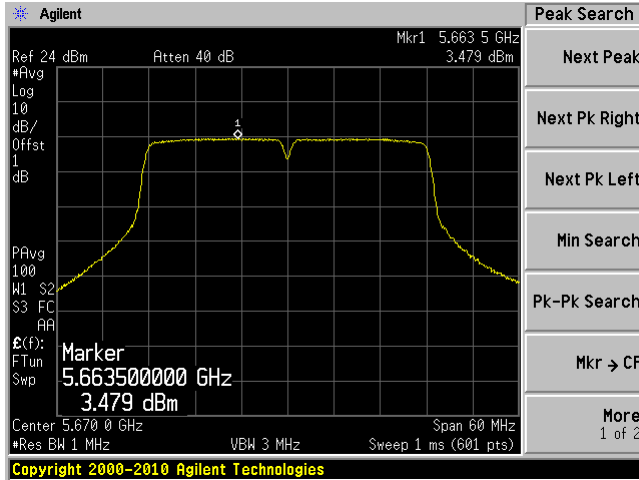


Chain 1

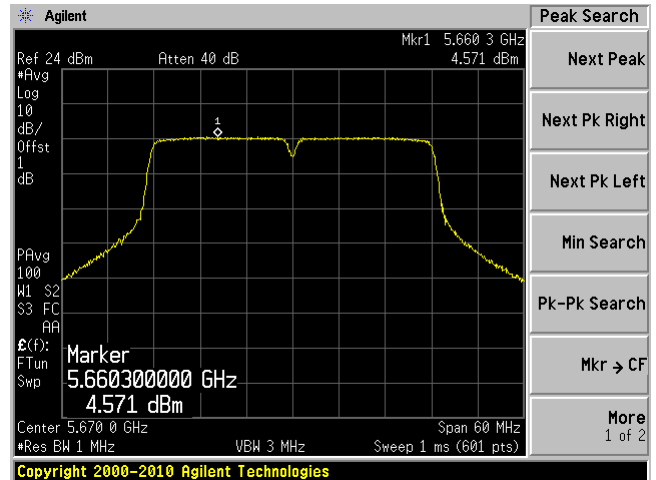


802.11n-HT40, High Channel 5670 MHz

Chain 0

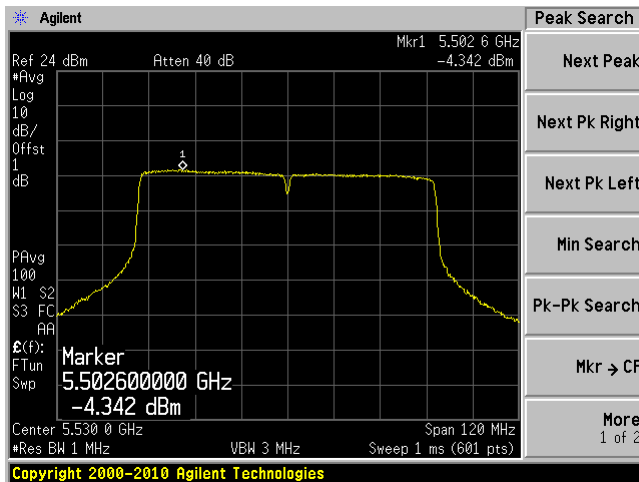


Chain 1

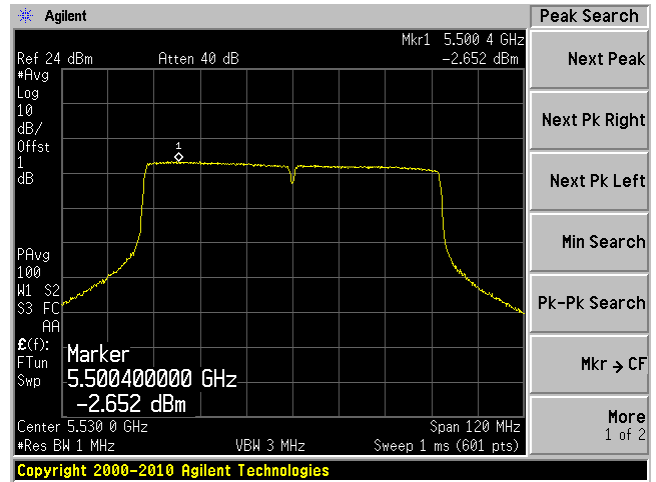


802.11ac-VHT80, Low Channel 5530 MHz

Chain 0



Chain 1



802.11ac-VHT80, High Channel 5690 MHz

Chain 0

Chain 1

