



FCC PART 15.407 TEST AND MEASUREMENT REPORT

For

Ruckus Wireless, Inc.

350 West Java Drive,
Sunnyvale, CA 94089, USA

FCC ID: S9GZF7372

Report Type: Class II Permissive Change	Product Type: 802.11 a/b/g/n Wireless Access Point
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* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "*" (Rev.3)

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1601182-407	Initial	2016-03-30

1 General Description

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *Ruckus Wireless, Inc.*, and their product model: *ZoneFlex 7372*, FCC ID: S9GZF7372 or the “EUT” as referred to in this report. The EUT is a 2x2 MIMO 802.11 a/b/g/n RLAN Access Point.

1.2 Mechanical Description of EUT

The EUT measures approximately 160 mm (L) x 160 mm (W) x 35 mm (H) and weighs 334.5g.

The test data gathered are from typical production sample, serial number: Radiated Unit: 407, and Conducted Unit: 405, provided by the manufacturer

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/IC rules for Antenna Requirements, Conducted Emissions, Occupied Bandwidth, Output Power, Power Spectral Density, Radiated and Conducted Spurious Emissions, and Band Edge. Please refer to the detail antenna list in the antenna requirement section.

1.4 Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS with FCC ID: S9GZF7372 issued on 11/11/2012

FCC Part 15.407 UNI with FCC ID: S9GZF7372 issued on 02/14/2013

1.5 Test Methodology

FCC CFR 47 Part2, Part15.407

1.6 Measurement Uncertainty

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

Based on CISPR16-4-2:2003, The Treatment of Uncertainty in EMC Measurements, the values ranging from ± 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:

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 C63.10-2013.

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 St Bernard Art_Ver_2_18_2 was provided by Ruckus Wireless Inc., and was verified by Leonard Gray to comply with the standard requirements being tested against.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Special Accessories

There were no special accessories were required, included, or intended for use with EUT during these tests.

2.5 Local Support Equipment

Manufacturer	Description	Model	Serial Number
DELL	Laptop	Latitude E5420	-

2.6 EUT Internal Configuration Details

Manufacturer	Description	Model	Serial Number
Ruckus	Motherboard	St. Bernard ASM 120-11214 REV 4	71150401520128H04A
Ruckus	Antenna (2.4 GHz)	ZF7300 Horizontal	-
Ruckus	Antenna (2.4 GHz)	ZF7300 Vertical	-
Ruckus	Antenna (5 GHz)	ZF7300 Horizontal	-
Ruckus	Antenna (5 GHz)	ZF7300 Vertical	-

2.7 Interface Ports and Cables

Cable Description	Length (m)	To	From
RF Cable	<1.0	PSA	EUT
RJ 45 Cable	<1.0	LAPTOP	EUT

2.8 Power Supply List and Details

Manufacturer	Description	Model	Part Number
Ruckus	Power Supply	HK-AD-120A100-US	740-64190-001
Ruckus	POE	NPE-5818	-
Ruckus	POE Power Adapter	8A201WU48	740-64125-010

3 Summary of Test Results

FCC Rules	Description of Test	Result
§15.407(f), §2.1091	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Power Line Conducted Emissions	Compliant
§15.209(a), 15.407(b)	Spurious Radiated Emissions	Compliant
§15.407(a)&(e)	Emission Bandwidth	Compliant
§15.407(a)(1), (a)(3)	Output Power Measurement	Compliant
§2.1051, §15.407	Band Edge	Compliant
§15.407(a)(1),(a)(3)	Power Spectral Density	Compliant
§2.1051, §15.407(b)	Spurious Emissions at Antenna Terminals	Compliant

4 FCC §15.407(f) & §2.1091 - 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

W52 Band:

Maximum peak output power at antenna input terminal (dBm):	23.58
Maximum peak output power at antenna input terminal (mW):	228.0342
Prediction distance (cm):	20
Prediction frequency (MHz):	5200
Maximum Antenna Gain, typical (dBi):	3
Maximum Antenna Gain (numeric):	1.995262
Power density of prediction frequency at 20.0 cm (mW/cm ²):	0.090517
MPE limit for uncontrolled exposure at prediction frequency (mW/cm ²):	1

W58 Band:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>22.45</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>175.7924</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5745</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>3</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>1.995262</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.06978</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1</u>

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

5 FCC §15.203 - Antenna Requirements

5.1 Applicable Standard

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

And according to FCC §15.247 (b)(4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.2 Antenna List

Manufacturers	Models/Name	Antenna Gain (dBi) @ 2.4 GHz
Ruckus	ZF7300 Horizontal	3.0
Ruckus	ZF7300 Vertical	2.0

Manufacturers	Models/Name	Antenna Gain (dBi) @ 5 GHz
Ruckus	ZF7300 Horizontal	3.0
Ruckus	ZF7300 Vertical	2.0

Note: The power setting was controlled by manufacture with different antenna configuration. The power setting of the different antenna will be set with the corresponded value and no more then the level reported.

The antenna consists of UFL connectors with less 6 dBi gain; therefore, it complies with the antenna requirement.

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 C63.4-2014 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 test support board was connected with LISN-1 which provided 120 V / 60 Hz AC power.

6.3 Test Procedure

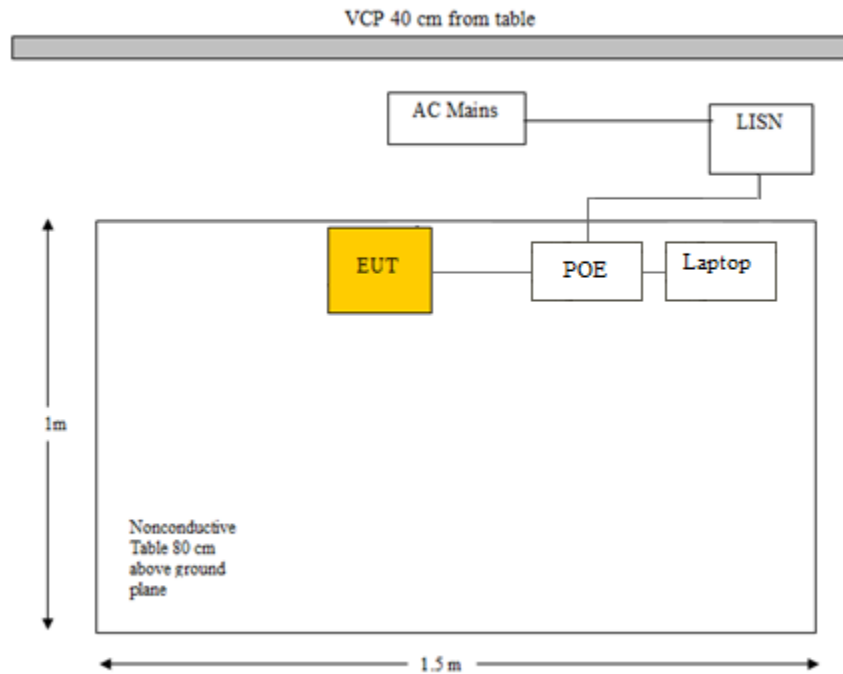
During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-2.

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

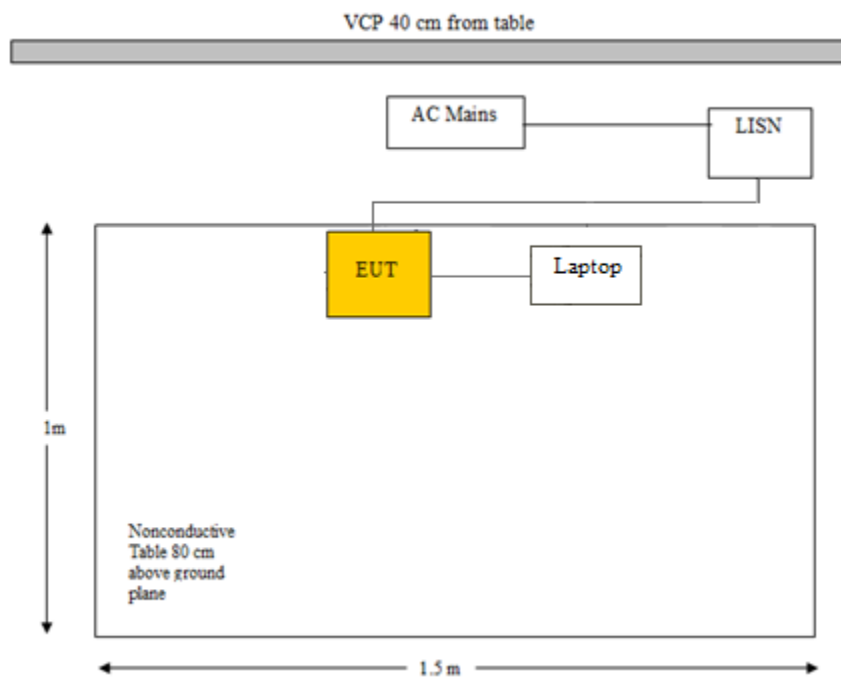
All data was recorded in the peak detection mode, quasi-peak and average. Quasi-Peak readings are distinguished with a "QP." Average readings are distinguished with an "Ave".

6.4 Test Setup Block Diagram

POE:



AC/DC Adapter:



6.5 Corrected Amplitude & Margin Calculation

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

$$CA = Ai + CL + Atten$$

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

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

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

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	2015-09-28	1 year
FCC	LISN	FCC-LISN-50-25-2-10-CISPR16	160129	2015-04-17	1 year
Solar Electronics Company	High Pass Filter	Type 7930-100	793015020 2	2015-03-06	1 Year
Suirong	30 ft conductive emission cable	LMR 400	-	2015-03-05	1 year
Hewlett-Packard	5 ft RF cable	-	1268	2015-07-29	1 year
Rohde & Schwarz	Impulse Limiter	ESH3-Z2	101963	2015-07-15	1year

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

6.7 Test Environmental Conditions

Temperature:	21 °C
Relative Humidity:	51%
ATM Pressure:	101.42 kPa

The testing was performed by Leonard Gray on 2016-02-04 in 5 m chamber 3.

6.8 Summary of Test Results

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

POE

Transmitting Mode: Worst case 5.2 GHz operating: 802.11a, 5200 MHz

Connection: 120 V/60 Hz, AC			
Margin (dB)	Frequency (MHz)	Conductor (Line/Neutral)	Range (MHz)
-11.48	0.150023	Line	0.15-30

Transmitting Mode: Worst case 5.8 GHz operating: 802.11a, 5745 MHz

Connection: 120 V/60 Hz, AC			
Margin (dB)	Frequency (MHz)	Conductor (Line/Neutral)	Range (MHz)
-12.19	0.150012	Line	0.15-30
-12.19	0.150274	Neutral	0.15-30

AC/DC Adapter

Transmitting Mode: Worst case 5.2 GHz operating: 802.11a, 5200 MHz

Connection: 120 V/60 Hz, AC			
Margin (dB)	Frequency (MHz)	Conductor (Line/Neutral)	Range (MHz)
-4.23	0.294552	Line	0.15-30

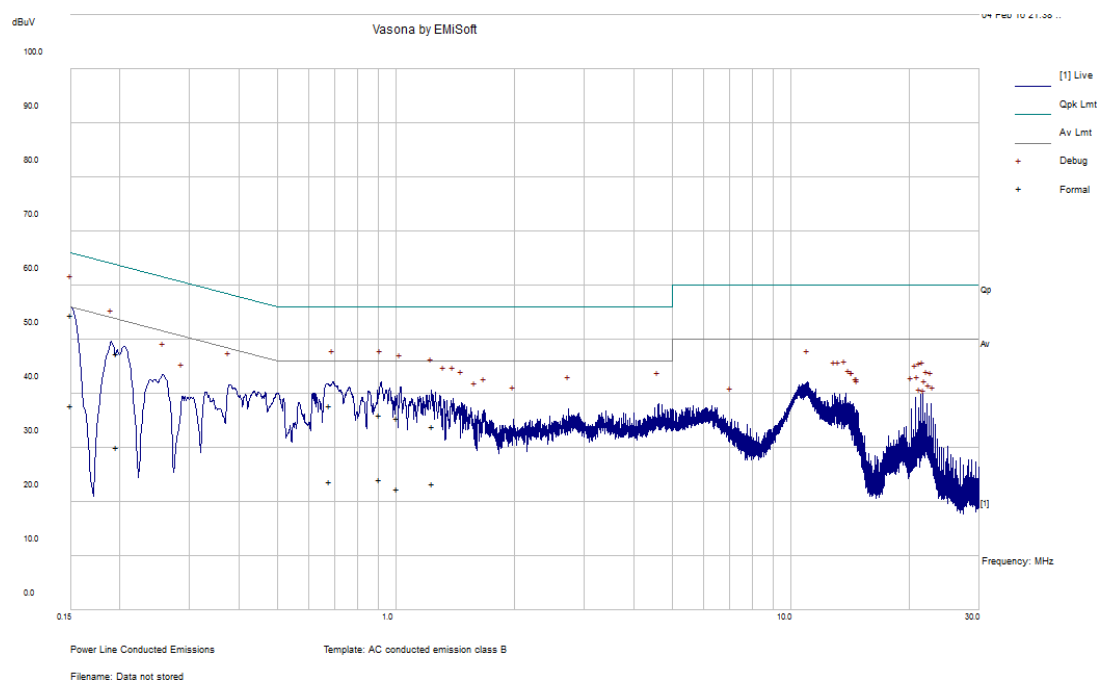
Transmitting Mode: Worst case 5.8 GHz operating: 802.11a, 5745 MHz

Connection: 120 V/60 Hz, AC			
Margin (dB)	Frequency (MHz)	Conductor (Line/Neutral)	Range (MHz)
-5.11	0.296421	Line	0.15-30

6.9 Conducted Emissions Test Plots and Data

Transmitting Mode: 5.2 GHz operating: 802.11a, 5200 MHz

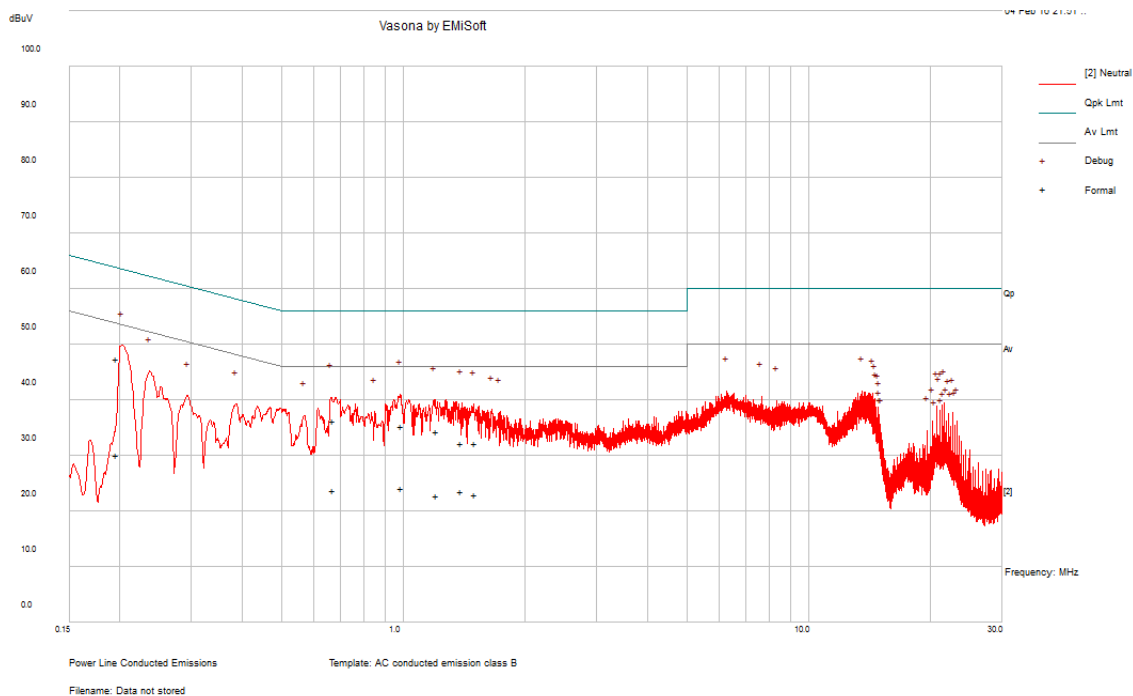
120 V, 60 Hz – Line, POE



Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.150023	54.52	Line	66	-11.48	QP
0.681666	37.8	Line	56	-18.2	QP
0.908124	36.12	Line	56	-19.88	QP
0.196077	47.38	Line	63.78	-16.39	QP
1.009059	35.44	Line	56	-20.56	QP
1.234521	33.95	Line	56	-22.05	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.150023	37.87	Line	56	-18.12	Ave.
0.681666	23.76	Line	46	-22.24	Ave.
0.908124	24.24	Line	46	-21.76	Ave.
0.196077	30.19	Line	53.78	-23.59	Ave.
1.009059	22.46	Line	46	-23.54	Ave.
1.234521	23.32	Line	46	-22.68	Ave.

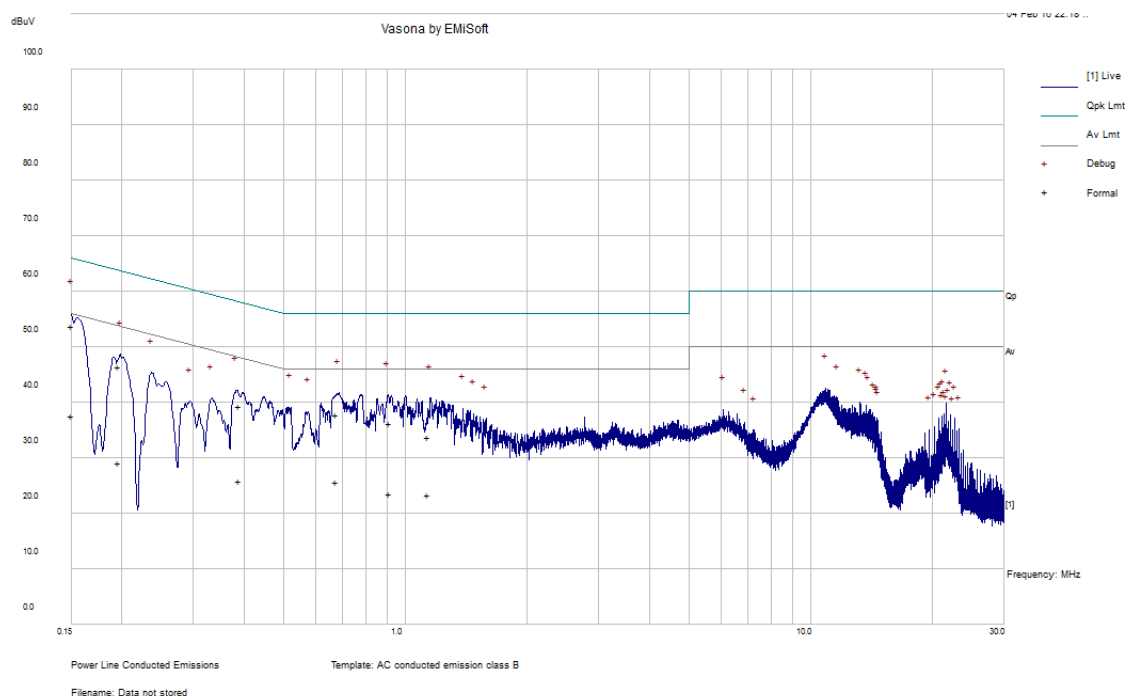
120 V, 60 Hz – Neutral, POE



Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.19593	47.35	Neutral	63.78	-16.43	QP
0.989343	35.39	Neutral	56	-20.61	QP
0.672582	36.24	Neutral	56	-19.76	QP
1.207248	34.37	Neutral	56	-21.63	QP
1.386978	32.22	Neutral	56	-23.78	QP
1.502781	32.33	Neutral	56	-23.67	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.19593	30.09	Neutral	53.78	-23.69	Ave.
0.989343	24.21	Neutral	46	-21.79	Ave.
0.672582	23.78	Neutral	46	-22.22	Ave.
1.207248	22.91	Neutral	46	-23.09	Ave.
1.386978	23.57	Neutral	46	-22.43	Ave.
1.502781	23.04	Neutral	46	-22.96	Ave.

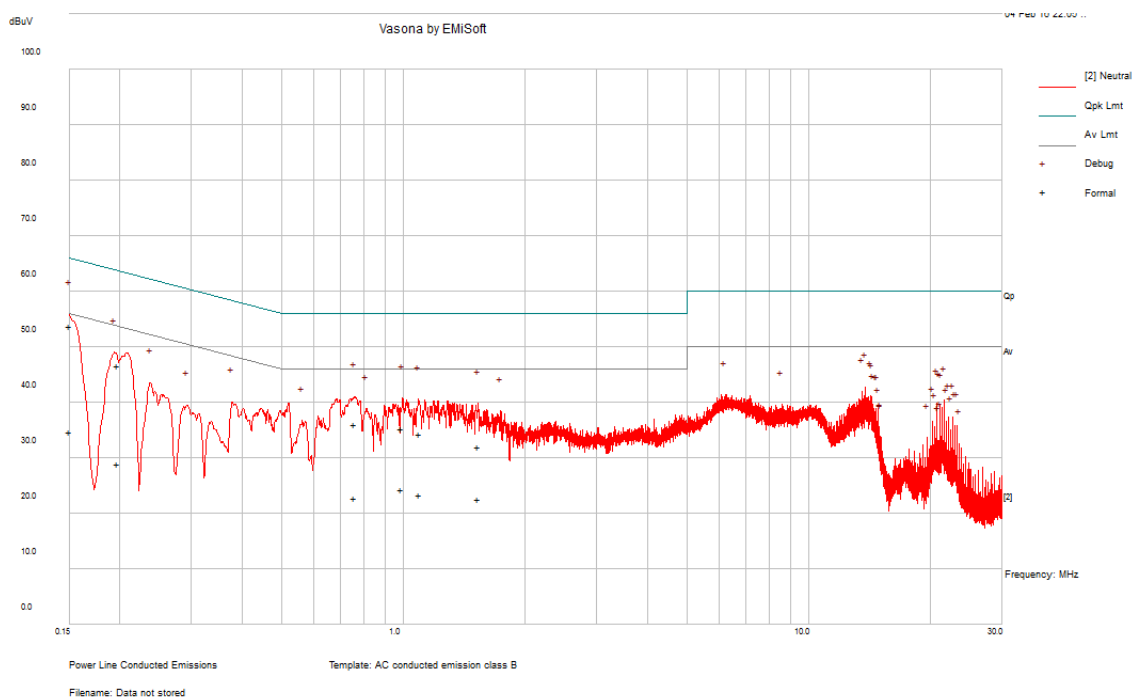
Transmitting Mode: 5.8 GHz operating: 802.11a, 5745 MHz

120 V, 60 Hz – Line, POE

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.150012	53.81	Line	66	-12.19	QP
0.675822	37.85	Line	56	-18.15	QP
0.914298	36.24	Line	56	-19.76	QP
0.196608	46.47	Line	63.75	-17.28	QP
1.139979	33.83	Line	56	-22.17	QP
0.389802	39.31	Line	58.07	-18.76	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.150012	37.66	Line	56	-18.34	Ave.
0.675822	25.64	Line	46	-20.36	Ave.
0.914298	23.53	Line	46	-22.47	Ave.
0.196608	29.17	Line	53.75	-24.58	Ave.
1.139979	23.41	Line	46	-22.59	Ave.
0.389802	25.91	Line	48.07	-22.16	Ave.

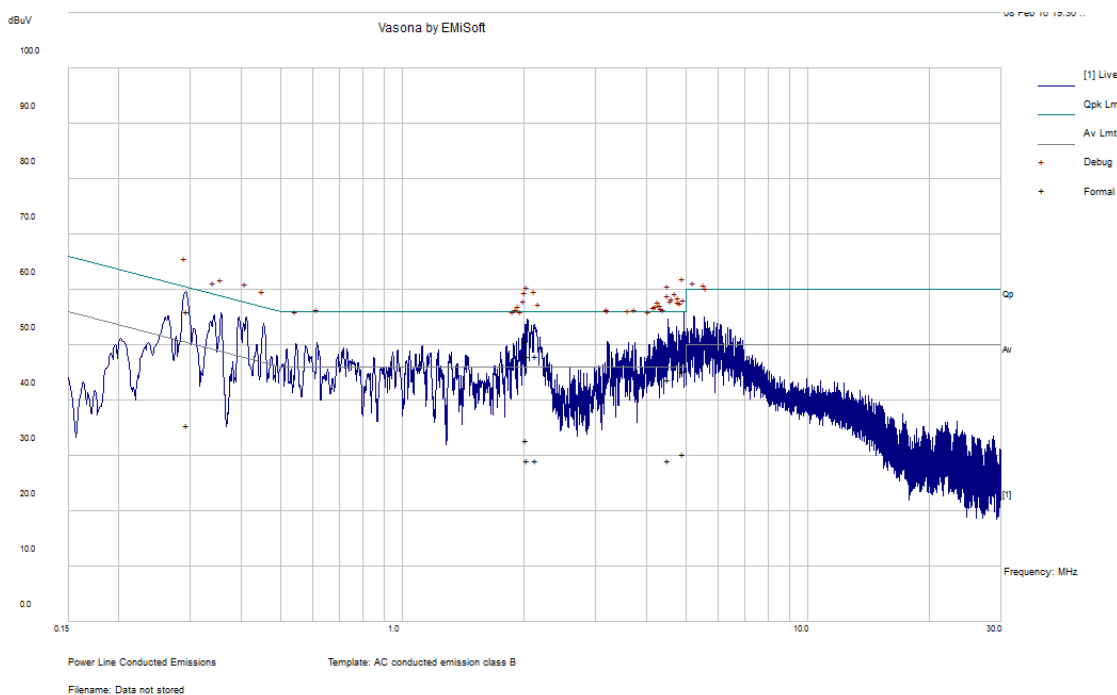
120 V, 60 Hz – Neutral, POE



Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.150274	53.79	Neutral	65.98	-12.19	QP
0.197361	46.59	Neutral	63.72	-17.13	QP
0.758634	36.06	Neutral	56	-19.94	QP
0.992328	35.37	Neutral	56	-20.63	QP
1.098603	34.35	Neutral	56	-21.65	QP
1.528371	32.1	Neutral	56	-23.9	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.150274	34.79	Neutral	55.98	-21.2	Ave.
0.197361	28.98	Neutral	53.72	-24.74	Ave.
0.758634	22.8	Neutral	46	-23.2	Ave.
0.992328	24.38	Neutral	46	-21.62	Ave.
1.098603	23.34	Neutral	46	-22.66	Ave.
1.528371	22.58	Neutral	46	-23.42	Ave.

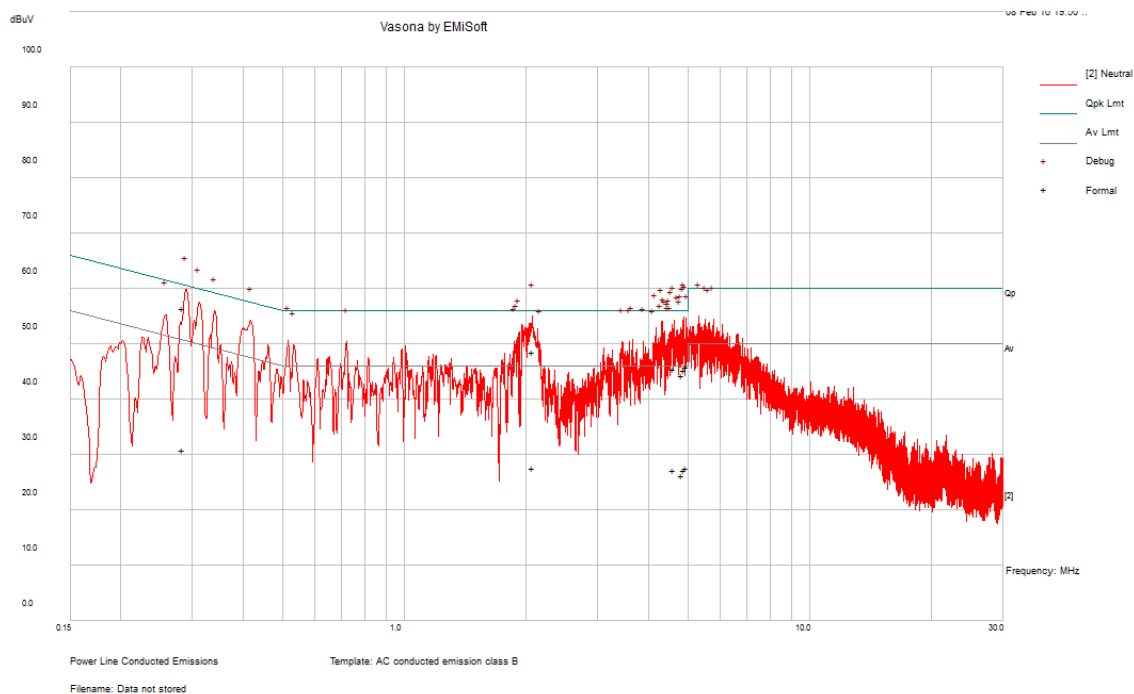
Transmitting Mode: 5.2 GHz operating: 802.11a, 5200 MHz

120 V, 60 Hz – Live, AC/DC Adapter

frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
4.941512	45.23	Line	56	-10.77	QP
0.294552	56.16	Line	60.4	-4.23	QP
4.520138	43.85	Line	56	-12.15	QP
2.040119	47.99	Line	56	-8.01	QP
2.133127	47.95	Line	56	-8.05	QP
2.018859	50.66	Line	56	-5.34	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
4.941512	30.25	Line	46	-15.75	Ave.
0.294552	35.47	Line	50.4	-14.92	Ave.
4.520138	29.21	Line	46	-16.79	Ave.
2.040119	29.17	Line	46	-16.83	Ave.
2.133127	29.13	Line	46	-16.87	Ave.
2.018859	32.9	Line	46	-13.1	Ave.

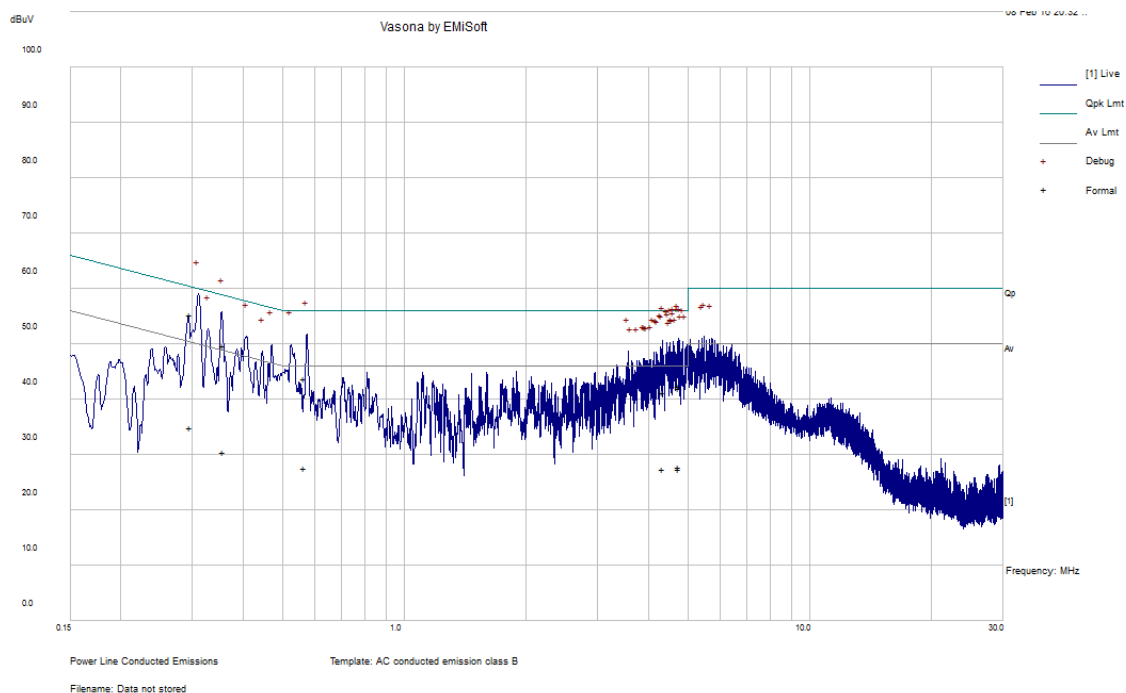
120 V, 60 Hz – Neutral, AC/DC Adapter



Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.283848	56.39	Neutral	60.7	-4.31	QP
2.076482	48.65	Neutral	56	-7.35	QP
4.904228	45.25	Neutral	56	-10.75	QP
4.950182	45.94	Neutral	56	-10.06	QP
4.62347	45.52	Neutral	56	-10.48	QP
4.847462	44.4	Neutral	56	-11.6	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.283848	30.81	Neutral	50.7	-19.89	Ave.
2.076482	27.61	Neutral	46	-18.39	Ave.
4.904228	27.16	Neutral	46	-18.84	Ave.
4.950182	27.62	Neutral	46	-18.38	Ave.
4.62347	27.17	Neutral	46	-18.83	Ave.
4.847462	26.27	Neutral	46	-19.73	Ave.

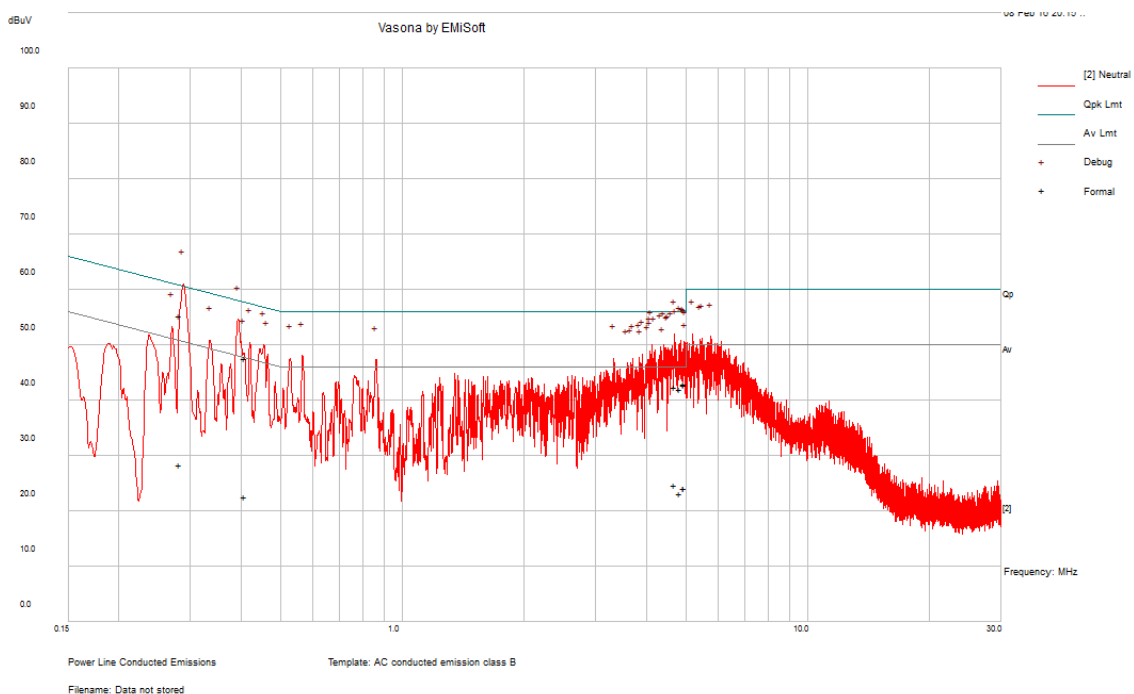
Transmitting Mode: 5.8 GHz operating: 802.11a, 5745 MHz

120 V, 60 Hz – Live, AC/DC Adapter

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.296421	55.23	Line	60.34	-5.11	QP
0.356739	49.77	Line	58.8	-9.04	QP
0.565569	43.73	Line	56	-12.27	QP
4.744826	42.08	Line	56	-13.92	QP
4.339904	41.29	Line	56	-14.71	QP
4.760978	42.49	Line	56	-13.51	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.296421	35.01	Line	50.34	-15.34	Ave.
0.356739	30.53	Line	48.8	-18.27	Ave.
0.565569	27.72	Line	46	-18.28	Ave.
4.744826	27.73	Line	46	-18.27	Ave.
4.339904	27.49	Line	46	-18.51	Ave.
4.760978	27.52	Line	46	-18.48	Ave.

120 V, 60 Hz – Neutral, AC/DC Adapter



Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.281442	55.22	Neutral	60.77	-5.55	QP
0.408435	47.56	Neutral	57.68	-10.12	QP
4.700255	42.37	Neutral	56	-13.63	QP
4.834466	42.13	Neutral	56	-13.87	QP
4.952801	43.09	Neutral	56	-12.91	QP
4.953086	42.91	Neutral	56	-13.09	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.281442	28.31	Neutral	50.77	-22.47	Ave.
0.408435	22.65	Neutral	47.68	-25.03	Ave.
4.700255	24.72	Neutral	46	-21.28	Ave.
4.834466	23.19	Neutral	46	-22.81	Ave.
4.952801	24.14	Neutral	46	-21.86	Ave.
4.953086	24.24	Neutral	46	-21.76	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.

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

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100 Note 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 §15.407(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.

7.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.10-2013. 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 was connected to the AC floor outlet.

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

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 or 1.5 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 Cable Loss (CL), the Attenuator Factor (Atten) to indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = Ai + CL + Atten$$

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

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

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

7.5 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde & Schwarz	EMI Receiver	ESCI 1166.5950K03	100044	2015-07-23	1 year
Agilent	Spectrum Analyzer	E4440A	MY44303352	2015-06-22	1 year
Sunol Science Corp	System Controller	SC99V	011003-1	N/R	N/R
Sunol Sciences	Antenna, Biconi-Log	JB1	A013105-3	2015-07-11	2 year
A.R.A	Antenna, Horn	DRG-118/A	1132	2015-09-21	2 year
HP	Pre-Amplifier	8447D	2944A06639	2015-06-08	1 year
Suirong	30 ft conductive emission cable	LMR 400	-	2015-03-05	1 year
-	SMA cable	-	C0001	Each time ¹	N/A
IW Microwave	High Frequency Cable	DC-1531	KPS- 1501A3960KPS	2015-08-10	1 year
Agilent	Pre-Amplifier	8449B	3008A01978	2015-09-02	1 year

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

7.6 Test Environmental Conditions

Temperature:	21-23 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102 kPa

The testing was performed by Leonrd Gray from 2016-02-03 to 2016-02-04 in 5 meter chamber 3.

7.7 Summary of Test Results

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

5150-5250 MHz

Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Channel, Range
-0.01	5350	Verticle	802.11n20 5240MHz, Above 1GHz

5725-5850 MHz

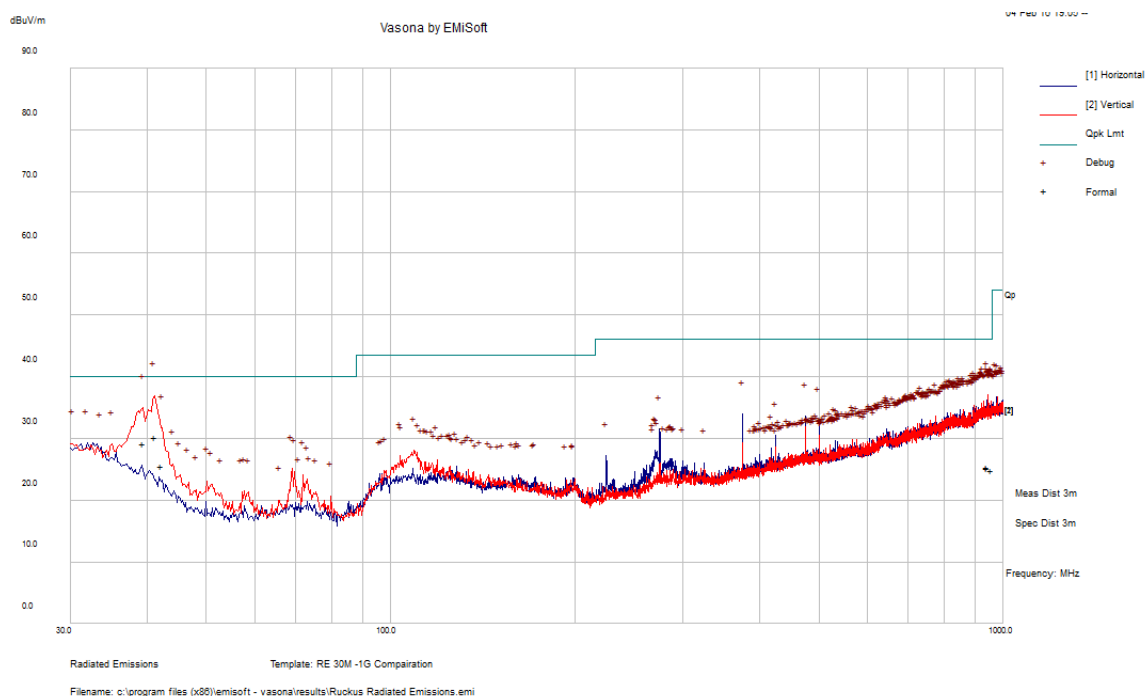
Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Channel, Range
-0.01	5715	Verticle	802.11n40 5755MHz, Above 1GHz

Note: Spurious emissions above 16 GHz are all nosie floor.

7.8 Radiated Emissions Test Result Data

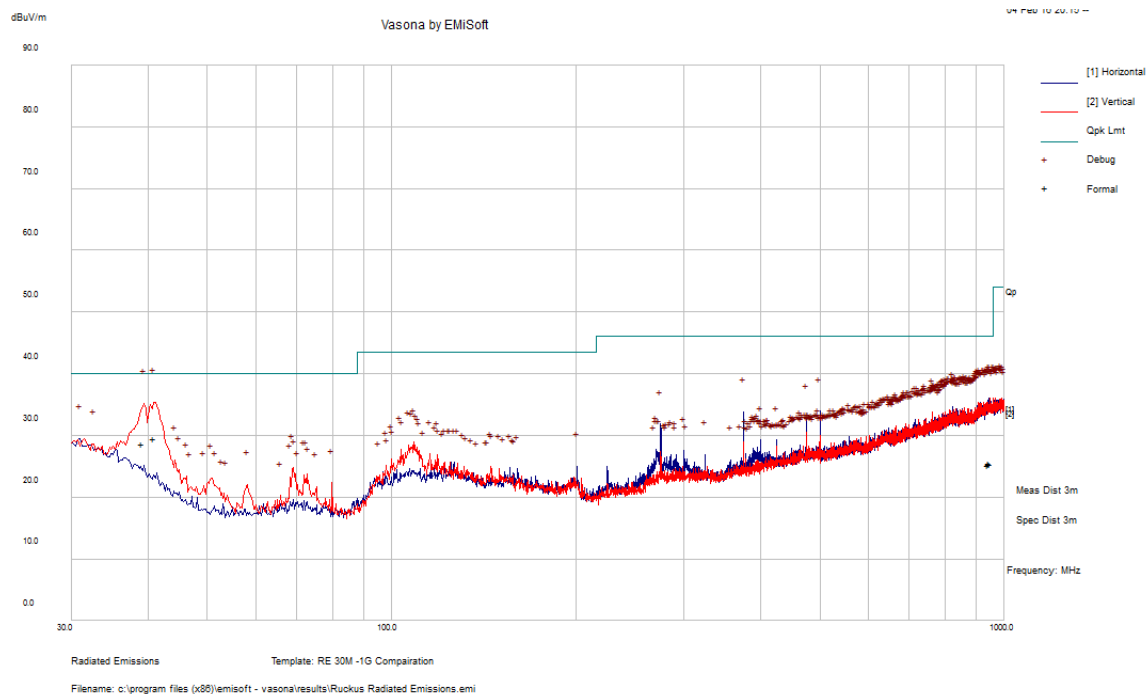
1) 30 – 1000 MHz:

Worst Case: 5.2 GHz Band, Transmitting 802.11a, 5200 MHz



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBμV/m)	Margin (dB)	Comments (PK/QP/Ave.)
41.1875	30.3	103	V	0	40	-9.7	QP
39.508	29.27	102	V	264	40	-10.73	QP
42.2875	25.5	126	V	247	40	-14.5	QP
942.074	25.3	236	V	340	46	-20.7	QP
939.8335	25.29	114	H	57	46	-20.71	QP
955.5295	24.89	259	V	115	46	-21.11	QP

Worst Case: 5.8 GHz Band, Transmitting 802.11a, 5745 MHz



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comments (PK/QP/Ave.)
40.915	29.51	113	V	256	40	-10.49	QP
39.2235	28.66	100	V	307	40	-11.34	QP
947.3515	25.43	274	V	277	46	-20.57	QP
944.9785	25.49	224	H	258	46	-20.51	QP
944.4565	25.39	265	H	195	46	-20.61	QP
940.9193	25.24	300	H	57	46	-20.76	QP

2) Above 1000 MHz:

Radiated Emission at 3 meters, 5150-5250 MHz Band

802.11a

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 5180 MHz, measured at 3 meters											
5180	74.87	315	280	V	33.509	5.26	0.00	113.64	-	-	Peak
5180	75.66	314	100	H	33.608	5.26	0.00	114.53	-	-	Peak
5180	63.35	315	280	V	33.509	5.26	0.00	102.12	-	-	Ave
5180	64.02	314	100	H	33.608	5.26	0.00	102.89	-	-	Ave
5150	30.03	315	280	V	33.509	5.26	0.00	68.80	74.00	-5.20	Peak
5150	30.18	314	100	H	33.608	5.26	0.00	69.05	74.00	-4.95	Peak
5150	14.88	315	280	V	33.509	5.26	0.00	53.65	54.00	-0.35	Ave
5150	15.03	314	100	H	33.608	5.26	0.00	53.90	54.00	-0.10	Ave
10360	45.13	324	295	V	37.51	9.760	33.52	58.88	74.00	-15.12	Peak
10360	41.8	115	286	H	38.25	9.760	33.52	56.29	74.00	-17.71	Peak
10360	29.44	324	295	V	37.51	9.760	33.52	43.19	54.00	-10.81	Ave
10360	26.42	115	286	H	38.25	9.760	33.52	40.91	54.00	-13.09	Ave
15540	45.52	0	100	V	37.60	11.900	33.60	61.42	74.00	-12.58	Peak
15540	45.62	0	100	H	39.41	11.900	33.60	63.33	74.00	-10.67	Peak
15540	31.18	0	100	V	37.60	11.900	33.60	47.08	54.00	-6.92	Ave
15540	31.05	0	100	H	39.41	11.900	33.60	48.76	54.00	-5.24	Ave
Middle Channel 5200 MHz, measured at 3 meters											
5200	76.99	332	283	V	33.509	5.260	0.00	115.76	-	-	Peak
5200	76.79	309	287	H	33.608	5.260	0.00	115.66	-	-	Peak
5200	64.91	332	283	V	33.509	5.260	0.00	103.68	-	-	Ave
5200	66.11	309	287	H	33.608	5.260	0.00	104.98	-	-	Ave
10400	41.96	40	100	V	37.51	9.720	33.52	55.67	74.00	-18.33	Peak
10400	40.7	166	291	H	38.25	9.720	33.52	55.15	74.00	-18.85	Peak
10400	26.77	40	100	V	37.51	9.720	33.52	40.48	54.00	-13.52	Ave
10400	25.43	166	291	H	38.25	9.720	33.52	39.88	54.00	-14.12	Ave
15600	46.54	0	100	V	37.455	11.860	33.82	62.04	74.00	-11.97	Peak
15600	46.36	0	100	H	39.182	11.860	33.82	63.58	74.00	-10.42	Peak
15600	31.47	0	100	V	37.455	11.860	33.82	46.97	54.00	-7.04	Ave
15600	31.52	0	100	H	39.182	11.860	33.82	48.74	54.00	-5.26	Ave

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel 5240 MHz, measured at 3 meters											
5240	76.1	304	264	V	33.51	5.26	0.00	114.87	-	-	Peak
5240	76.31	308	254	H	33.61	5.26	0.00	115.18	-	-	Peak
5240	64.08	304	264	V	33.51	5.26	0.00	102.85	-	-	Ave
5240	65.83	308	254	H	33.61	5.26	0.00	104.70	-	-	Ave
5350	27.22	304	264	V	33.57	5.60	0.00	66.39	74.00	-7.61	Peak
5350	27.59	308	254	H	33.58	5.60	0.00	66.77	74.00	-7.23	Peak
5350	14.72	304	264	V	33.57	5.60	0.00	53.89	54.00	-0.11	Ave
5350	14.47	308	254	H	33.58	5.60	0.00	53.65	54.00	-0.35	Ave
10480	44.76	45	100	V	37.66	9.720	33.55	58.59	74.00	-15.42	Peak
10480	45.68	78	100	H	38.33	9.720	33.55	60.18	74.00	-13.82	Peak
10480	29.24	45	100	V	37.66	9.720	33.55	43.07	54.00	-10.94	Ave
10480	29.02	78	100	H	38.33	9.720	33.55	43.52	54.00	-10.48	Ave
15720	46.66	0	100	V	37.27	12.000	34.09	61.84	74.00	-12.16	Peak
15720	46.48	0	100	H	38.91	12.000	34.09	63.30	74.00	-10.70	Peak
15720	31.48	0	100	V	37.27	12.000	34.09	46.66	54.00	-7.34	Ave
15720	31.44	0	100	H	38.91	12.000	34.09	48.26	54.00	-5.74	Ave

802.11n-HT20

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 5180 MHz, measured at 3 meters											
5180	74.32	311	277	V	33.509	5.26	0.00	113.09	-	-	Peak
5180	73.95	314	100	H	33.608	5.26	0.00	112.82	-	-	Peak
5180	62.81	311	277	V	33.509	5.26	0.00	101.58	-	-	Ave
5180	62.86	314	100	H	33.608	5.26	0.00	101.73	-	-	Ave
5150	28.94	311	277	V	33.509	5.26	0.00	67.71	74.00	-6.29	Peak
5150	30.65	314	100	H	33.608	5.26	0.00	69.52	74.00	-4.48	Peak
5150	14.86	311	277	V	33.509	5.26	0.00	53.63	54.00	-0.37	Ave
5150	15.03	314	100	H	33.608	5.26	0.00	53.90	54.00	-0.10	Ave
10360	40.4	42	100	V	37.51	9.720	33.52	54.11	68.26	-14.15	Peak
10360	39.43	263	193	H	38.25	9.720	33.52	53.88	68.26	-14.38	Peak
10360	26.68	42	100	V	37.51	9.720	33.52	40.39	54.00	-13.61	Ave
10360	25.26	263	193	H	38.25	9.720	33.52	39.71	54.00	-14.29	Ave
15540	45.33	0	100	V	37.60	11.860	33.60	61.19	68.26	-7.07	Peak
15540	45	0	100	H	39.41	11.860	33.60	62.67	68.26	-5.59	Peak
15540	30.62	0	100	V	37.60	11.860	33.60	46.48	54.00	-7.52	Ave
15540	30.54	0	100	H	39.41	11.860	33.60	48.21	54.00	-5.79	Ave
Middle Channel 5200 MHz, measured at 3 meters											
5200	76.28	324	283	V	33.509	5.260	0.00	115.05	-	-	Peak
5200	75.42	219	259	H	33.608	5.260	0.00	114.29	-	-	Peak
5200	64.71	324	283	V	33.509	5.260	0.00	103.48	-	-	Ave
5200	64.18	219	259	H	33.608	5.260	0.00	103.05	-	-	Ave
10400	42.21	57	133	V	37.51	9.720	33.52	55.92	74.00	-18.08	Peak
10400	40.11	90	288	H	38.25	9.720	33.52	54.56	74.00	-19.44	Peak
10400	26.14	57	133	V	37.51	9.720	33.52	39.85	54.00	-14.15	Ave
10400	25.07	90	288	H	38.25	9.720	33.52	39.52	54.00	-14.48	Ave
15600	45.87	0	100	V	37.455	11.860	33.82	61.37	74.00	-12.64	Peak
15600	45.71	0	100	H	39.182	11.860	33.82	62.93	74.00	-11.07	Peak
15600	31.23	0	100	V	37.455	11.860	33.82	46.73	54.00	-7.28	Ave
15600	31.27	0	100	H	39.182	11.860	33.82	48.49	54.00	-5.51	Ave

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel 5240 MHz, measured at 3 meters											
5240	75.32	328	286	V	33.51	5.26	0.00	114.09	-	-	Peak
5240	76.82	300	274	H	33.61	5.26	0.00	115.69	-	-	Peak
5240	64.01	328	286	V	33.51	5.26	0.00	102.78	-	-	Ave
5240	65.28	300	274	H	33.61	5.26	0.00	104.15	-	-	Ave
5350	27.8	328	286	V	33.57	5.60	0.00	66.97	74.00	-7.03	Peak
5350	27.51	300	274	H	33.58	5.60	0.00	66.69	74.00	-7.31	Peak
5350	14.82	328	286	V	33.57	5.60	0.00	53.99	54.00	-0.01	Ave
5350	14.55	300	274	H	33.58	5.60	0.00	53.73	54.00	-0.27	Ave
10480	43.79	49	103	V	37.66	9.720	33.55	57.62	74.00	-16.39	Peak
10480	42.57	80	150	H	38.33	9.720	33.55	57.07	74.00	-16.93	Peak
10480	27.95	49	103	V	37.66	9.720	33.55	41.78	54.00	-12.23	Ave
10480	27.64	80	150	H	38.33	9.720	33.55	42.14	54.00	-11.86	Ave
15720	45.85	0	100	V	37.27	12.000	34.09	61.03	74.00	-12.97	Peak
15720	46.05	0	100	H	38.91	12.000	34.09	62.87	74.00	-11.13	Peak
15720	31.48	0	100	V	37.27	12.000	34.09	46.66	54.00	-7.34	Ave
15720	31.42	0	100	H	38.91	12.000	34.09	48.24	54.00	-5.76	Ave

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Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 5190 MHz, measured at 3 meters											
5190	68.15	332	251	V	33.509	5.260	0.00	106.92	-	-	Peak
5190	67.1	306	240	H	33.608	5.260	0.00	105.97	-	-	Peak
5190	56.95	332	251	V	33.509	5.260	0.00	95.72	-	-	Ave
5190	56.67	306	240	H	33.608	5.260	0.00	95.54	-	-	Ave
5150	28.91	332	251	V	33.509	5.260	0.00	67.68	74.00	-6.32	Peak
5150	28.81	306	240	H	33.608	5.260	0.00	67.68	74.00	-6.32	Peak
5150	14.85	332	251	V	33.509	5.260	0.00	53.62	54.00	-0.38	Ave
5150	15.11	306	240	H	33.608	5.260	0.00	53.98	54.00	-0.02	Ave
10380	39.4	0	100	V	37.51	9.720	33.52	53.11	68.26	-15.15	Peak
10380	39.72	0	100	H	38.25	9.720	33.52	54.17	68.26	-14.09	Peak
10380	24.93	0	100	V	37.51	9.720	33.52	38.64	54.00	-15.36	Ave
10380	24.88	0	100	H	38.25	9.720	33.52	39.33	54.00	-14.67	Ave
15570	45.91	0	100	V	37.455	11.860	33.82	61.41	68.26	-6.86	Peak
15570	44.3	0	100	H	39.182	11.860	33.82	61.52	68.26	-6.74	Peak
15570	31.4	0	100	V	37.455	11.860	33.82	46.90	54.00	-7.11	Ave
15570	31.39	0	100	H	39.182	11.860	33.82	48.61	54.00	-5.39	Ave
High Channel 5230 MHz, measured at 3 meters											
5230	72.73	306	282	V	33.509	5.260	0.00	111.50	-	-	Peak
5230	72.65	316	227	H	33.608	5.260	0.00	111.52	-	-	Peak
5230	60.83	306	282	V	33.509	5.260	0.00	99.60	-	-	Ave
5230	61.43	316	227	H	33.608	5.260	0.00	100.30	-	-	Ave
5350	26.75	306	282	V	33.57	5.60	0.00	65.92	74.00	-8.08	Peak
5350	27.84	316	227	H	33.58	5.60	0.00	67.02	74.00	-6.98	Peak
5350	14.53	306	282	V	33.57	5.60	0.00	53.70	54.00	-0.30	Ave
5350	14.5	316	227	H	33.58	5.60	0.00	53.68	54.00	-0.32	Ave
10460	46.69	78	100	V	37.66	9.720	33.55	60.52	68.26	-7.75	Peak
10460	41.67	48	100	H	38.33	9.720	33.55	56.17	68.26	-12.09	Peak
10460	27.63	78	100	V	37.66	9.720	33.55	41.46	54.00	-12.55	Ave
10460	27.71	48	100	H	38.33	9.720	33.55	42.21	54.00	-11.79	Ave
15690	45.84	0	100	V	37.27	12.000	34.09	61.02	68.26	-7.24	Peak
15690	46.38	0	100	H	38.91	12.000	34.09	63.20	68.26	-5.06	Peak
15690	31.43	0	100	V	37.27	12.000	34.09	46.61	54.00	-7.39	Ave
15690	31.23	0	100	H	38.91	12.000	34.09	48.05	54.00	-5.95	Ave

Radiated Emission at 3 meters, 5725-5850 MHz Band

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Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 5745 MHz, measured at 3 meters											
5745	72.63	315	277	V	33.905	5.60	0.00	112.14	-	-	Peak
5745	73.4	144	256	H	33.870	5.60	0.00	112.87	-	-	Peak
5745	60.77	315	277	V	33.905	5.60	0.00	100.28	-	-	Ave
5745	62.97	114	256	H	33.870	5.60	0.00	102.44	-	-	Ave
5725	37.54	315	277	V	33.905	5.60	0.00	77.05	78.23	-1.19	Peak
5725	31.72	114	256	H	33.870	5.60	0.00	71.19	78.23	-7.04	Peak
5715	27.15	315	277	V	33.905	5.60	0.00	66.66	68.23	-1.58	Peak
5715	27.87	114	256	H	33.870	5.60	0.00	67.34	68.23	-0.89	Peak
11490	45.97	252	109	V	39.10	12.650	34.10	63.62	74.00	-10.38	Peak
11490	50.72	323	242	H	38.42	12.650	34.10	67.69	74.00	-6.31	Peak
11490	31.73	252	109	V	39.10	12.650	34.10	49.38	54.00	-4.62	Ave
11490	34.47	323	242	H	38.42	12.650	34.10	51.44	54.00	-2.56	Ave
17235	45.87	0	100	V	46.34	14.390	33.72	72.88	88.23	-15.35	Peak
17235	45.89	0	100	H	42.02	14.390	33.72	68.58	88.23	-19.65	Peak
17235	31.18	0	100	V	46.34	14.390	33.72	58.19	68.23	-10.04	Ave
17235	31.25	0	100	H	42.02	14.390	33.72	53.94	68.23	-14.29	Ave
Middle Channel 5785 MHz, measured at 3 meters											
5785	70.93	324	290	V	34.012	5.600	0.00	110.54	-	-	Peak
5785	73.21	138	295	H	33.955	5.600	0.00	112.77	-	-	Peak
5785	59.16	324	290	V	34.012	5.600	0.00	98.77	-	-	Ave
5785	62.94	138	295	H	33.955	5.600	0.00	102.50	-	-	Ave
11570	50.97	346	243	V	39.38	12.820	34.06	69.11	74.00	-4.89	Peak
11570	56.13	328	267	H	38.30	12.820	34.06	73.19	74.00	-0.81	Peak
11570	34.24	346	243	V	39.38	12.820	34.06	52.38	54.00	-1.62	Ave
11570	36.89	328	267	H	38.30	12.820	34.06	53.95	54.00	-0.05	Ave
17355	45.8	0	100	V	50.057	14.390	33.81	76.44	88.23	-11.79	Peak
17355	45.97	0	100	H	43.816	14.390	33.81	70.37	88.23	-17.86	Peak
17355	31.49	0	100	V	50.057	14.390	33.81	62.13	68.23	-6.10	Ave
17355	31.46	0	100	H	43.816	14.390	33.81	55.86	68.23	-12.37	Ave

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel 5825 MHz, measured at 3 meters											
5825	71.47	310	235	V	34.01	5.60	0.00	111.08	-	-	Peak
5825	72.8	139	266	H	33.96	5.60	0.00	112.36	-	-	Peak
5825	59.59	310	235	V	34.01	5.60	0.00	99.20	-	-	Ave
5825	62.32	139	266	H	33.96	5.60	0.00	101.88	-	-	Ave
5850	31.04	310	235	V	34.03	5.60	0.00	70.67	78.23	-7.56	Peak
5850	30.82	139	266	H	34.22	5.60	0.00	70.64	78.23	-7.59	Peak
5860	27.67	310	235	V	34.03	5.60	0.00	67.30	68.23	-0.93	Peak
5860	27.97	139	266	H	34.22	5.60	0.00	67.79	68.23	-0.44	Peak
11650	51.35	344	235	V	39.91	12.820	34.12	69.96	74.00	-4.04	Peak
11650	50.88	324	264	H	38.33	12.820	34.12	67.91	74.00	-6.09	Peak
11650	33.61	344	235	V	39.91	12.820	34.12	52.22	54.00	-1.78	Ave
11650	35.2	324	264	H	38.33	12.820	34.12	52.23	54.00	-1.77	Ave
17475	44.51	0	100	V	52.05	14.390	33.87	77.08	88.23	-11.15	Peak
17475	44.01	0	100	H	44.41	14.390	33.87	68.94	88.23	-19.29	Peak
17475	30.9	0	100	V	52.05	14.390	33.87	63.47	68.23	-4.76	Ave
17475	30.93	0	100	H	44.41	14.390	33.87	55.86	68.23	-12.37	Ave

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Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 5745 MHz, measured at 3 meters											
5745	68.84	314	236	V	33.905	5.60	0.00	108.35	-	-	Peak
5745	71.45	140	268	H	33.870	5.60	0.00	110.92	-	-	Peak
5745	57.42	314	236	V	33.905	5.60	0.00	96.93	-	-	Ave
5745	60.74	140	268	H	33.870	5.60	0.00	100.21	-	-	Ave
5725	38.07	314	236	V	33.905	5.60	0.00	77.58	78.23	-0.66	Peak
5725	35.51	140	268	H	33.870	5.60	0.00	74.98	78.23	-3.25	Peak
5715	26.78	314	236	V	33.905	5.60	0.00	66.29	68.23	-1.95	Peak
5715	26.13	140	268	H	33.870	5.60	0.00	65.60	68.23	-2.63	Peak
11490	41.58	0	100	V	39.10	12.650	34.10	59.23	74.00	-14.77	Peak
11490	41	0	100	H	38.42	12.650	34.10	57.97	74.00	-16.03	Peak
11490	26.39	0	100	V	39.10	12.650	34.10	44.04	54.00	-9.96	Ave
11490	26.35	0	100	H	38.42	12.650	34.10	43.32	54.00	-10.68	Ave
17235	44.37	0	100	V	46.34	14.390	33.72	71.38	88.23	-16.85	Peak
17235	44.24	0	100	H	42.02	14.390	33.72	66.93	88.23	-21.30	Peak
17235	31.3	0	100	V	46.34	14.390	33.72	58.31	68.23	-9.92	Ave
17235	31.35	0	100	H	42.02	14.390	33.72	54.04	68.23	-14.19	Ave
Middle Channel 5785 MHz, measured at 3 meters											
5785	71.29	318	274	V	34.012	5.600	0.00	110.90	-	-	Peak
5785	73.11	140	278	H	33.955	5.600	0.00	112.67	-	-	Peak
5785	60.46	318	274	V	34.012	5.600	0.00	100.07	-	-	Ave
5785	62.61	140	278	H	33.955	5.600	0.00	102.17	-	-	Ave
11570	48.24	195	291	V	39.38	12.820	34.06	66.38	74.00	-7.62	Peak
11570	48.21	320	279	H	38.30	12.820	34.06	65.27	74.00	-8.73	Peak
11570	31.28	195	291	V	39.38	12.820	34.06	49.42	54.00	-4.58	Ave
11570	31.65	320	279	H	38.30	12.820	34.06	48.71	54.00	-5.29	Ave
17355	44.54	0	100	V	50.057	14.350	33.81	75.14	88.23	-13.09	Peak
17355	44.72	0	100	H	43.816	14.350	33.81	69.08	88.23	-19.15	Peak
17355	31.14	0	100	V	50.057	14.350	33.81	61.74	68.23	-6.49	Ave
17355	31.18	0	100	H	43.816	14.350	33.81	55.54	68.23	-12.69	Ave

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel 5825 MHz, measured at 3 meters											
5825	71.64	310	252	V	34.01	5.60	0.00	111.25	-	-	Peak
5825	71.93	146	263	H	33.96	5.60	0.00	111.49	-	-	Peak
5825	59.92	310	252	V	34.01	5.60	0.00	99.53	-	-	Ave
5825	61.4	146	263	H	33.96	5.60	0.00	100.96	-	-	Ave
5850	31.19	310	252	V	34.03	5.60	0.00	70.82	78.23	-7.41	Peak
5850	31.76	146	263	H	34.22	5.60	0.00	71.58	78.23	-6.65	Peak
5860	28.02	310	252	V	34.03	5.60	0.00	67.65	68.23	-0.58	Peak
5860	27.93	146	263	H	34.22	5.60	0.00	67.75	68.23	-0.48	Peak
11650	47.63	311	226	V	39.91	12.820	34.12	66.24	74.00	-7.76	Peak
11650	48.83	325	259	H	38.33	12.820	34.12	65.86	74.00	-8.14	Peak
11650	30.11	311	226	V	39.91	12.820	34.12	48.72	54.00	-5.28	Ave
11650	31.67	325	259	H	38.33	12.820	34.12	48.70	54.00	-5.30	Ave
17475	42.99	0	100	V	52.05	14.350	33.87	75.52	88.23	-12.71	Peak
17475	44.16	0	100	H	44.41	14.350	33.87	69.05	88.23	-19.18	Peak
17475	30.78	0	100	V	52.05	14.350	33.87	63.31	68.23	-4.92	Ave
17475	30.51	0	100	H	44.41	14.350	33.87	55.40	68.23	-12.83	Ave

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Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 5755 MHz, measured at 3 meters											
5755	66.29	189	259	V	34.012	5.60	0.00	105.90	-	-	Peak
5755	63.94	322	250	H	34.049	5.60	0.00	103.59	-	-	Peak
5755	55.13	189	259	V	34.012	5.60	0.00	94.74	-	-	Ave
5755	52.84	322	250	H	34.049	5.60	0.00	92.49	-	-	Ave
5725	36.28	189	259	V	33.905	5.60	0.00	75.79	78.23	-2.45	Peak
5725	38.33	322	250	H	33.870	5.60	0.00	77.80	78.23	-0.43	Peak
5715	28.72	189	259	V	33.905	5.60	0.00	68.22	68.23	-0.01	Peak
5715	28.49	322	250	H	33.870	5.60	0.00	67.96	68.23	-0.27	Peak
11510	39.51	0	100	V	39.10	12.650	34.10	57.16	74.00	-16.84	Peak
11510	39.31	0	100	H	38.42	12.650	34.10	56.28	74.00	-17.72	Peak
11510	25.16	0	100	V	39.10	12.650	34.10	42.81	54.00	-11.19	Ave
11510	25.01	0	100	H	38.42	12.650	34.10	41.98	54.00	-12.02	Ave
17265	44.5	0	100	V	46.34	14.390	33.72	71.51	88.23	-16.72	Peak
17265	44.3	0	100	H	42.02	14.390	33.72	66.99	88.23	-21.24	Peak
17265	31.64	0	100	V	46.34	14.390	33.72	58.65	68.23	-9.58	Ave
17265	31.66	0	100	H	42.02	14.390	33.72	54.35	68.23	-13.88	Ave
High Channel 5795 MHz, measured at 3 meters											
5795	68.79	317	271	V	34.01	5.60	0.00	108.40	-	-	Peak
5795	71.32	140	281	H	33.96	5.60	0.00	110.88	-	-	Peak
5795	57.86	317	271	V	34.01	5.60	0.00	97.47	-	-	Ave
5795	60.4	140	281	H	33.96	5.60	0.00	99.96	-	-	Ave
5850	27.28	317	271	V	34.03	5.60	0.00	66.91	78.23	-11.32	Peak
5850	26.99	140	281	H	34.22	5.60	0.00	66.81	78.23	-11.42	Peak
5860	28.05	317	271	V	34.03	5.60	0.00	67.68	68.23	-0.55	Peak
5860	26.89	140	281	H	34.22	5.60	0.00	66.71	68.23	-1.52	Peak
11590	42.03	310	240	V	39.91	12.820	34.12	60.64	74.00	-13.36	Peak
11590	43.08	323	239	H	38.33	12.820	34.12	60.11	74.00	-13.89	Peak
11590	26.39	310	240	V	39.91	12.820	34.12	45.00	54.00	-9.00	Ave
11590	28.42	323	239	H	38.33	12.820	34.12	45.45	54.00	-8.55	Ave
17385	44.46	0	100	V	52.05	14.350	33.87	76.99	88.23	-11.24	Peak
17385	44.42	0	100	H	44.41	14.350	33.87	69.31	88.23	-18.92	Peak
17385	31.14	0	100	V	52.05	14.350	33.87	63.67	68.23	-4.56	Ave
17385	31.15	0	100	H	44.41	14.350	33.87	56.04	68.23	-12.19	Ave

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

8.1 Applicable Standard

FCC §15.407(a)

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

FCC §15.407(e)

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

8.2 Measurement Procedure

The measurements are based on FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E, section C: Emission bandwidth and section D: 99 Percent Occupied Bandwidth

8.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US42221851	2015-06-23	1 year
-	SMA Cable	-	C0001	Each Time ¹	N/A
Mini-Circuits	Attenuator	BW-S20W5	1430	Each Time ¹	N/A

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 °C
Relative Humidity:	43 %
ATM Pressure:	101.1 kPa

The testing was performed by Leonard Gray on 2016-01-29 in RF site.

8.5 Test Results

5150-5250 MHz Band

802.11a mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
Chain J0			
Low	5180	22.235	16.5700
Middle	5200	21.951	16.5492
High	5240	22.249	16.5143
Chain J1			
Low	5180	26.143	16.6201
Middle	5200	25.687	16.6207
High	5240	27.011	16.6189

802.11n-HT20 mode

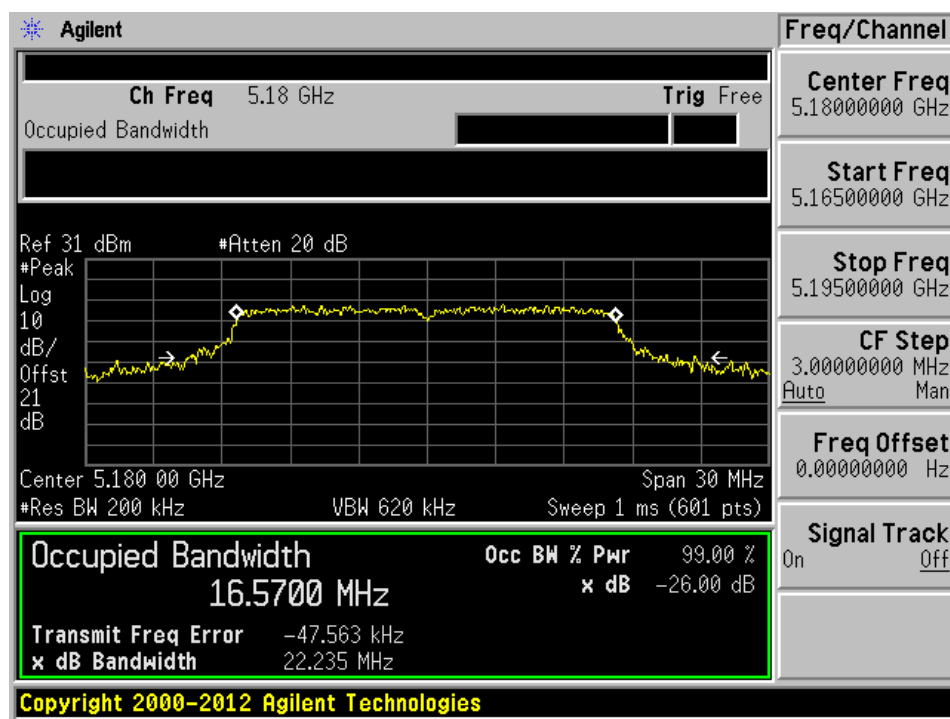
Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
Chain J0			
Low	5180	23.858	17.7005
Middle	5200	24.043	17.6833
High	5240	22.222	17.6406
Chain J1			
Low	5180	29.256	17.8139
Middle	5200	26.140	17.7442
High	5240	25.830	17.7227

802.11n-HT40 mode

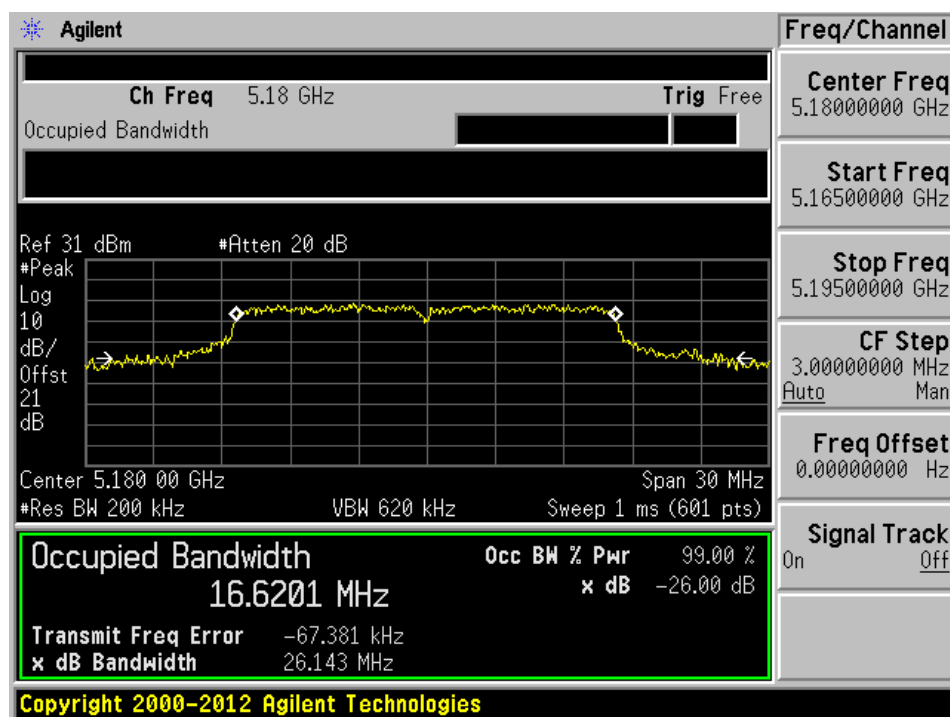
Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
Chain J0			
Low	5190	46.762	36.2243
High	5230	43.939	36.1592
Chain J1			
Low	5190	45.778	36.3691
High	5230	49.756	36.2753

5150-5250 MHz Band

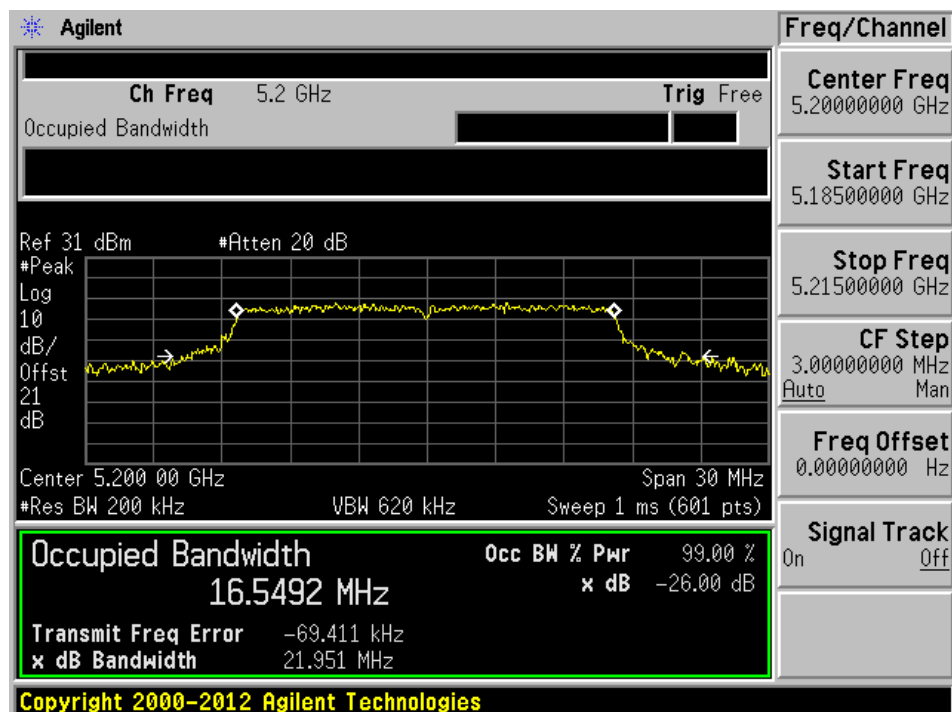
802.11a mode, 5180 MHz, Chain J0



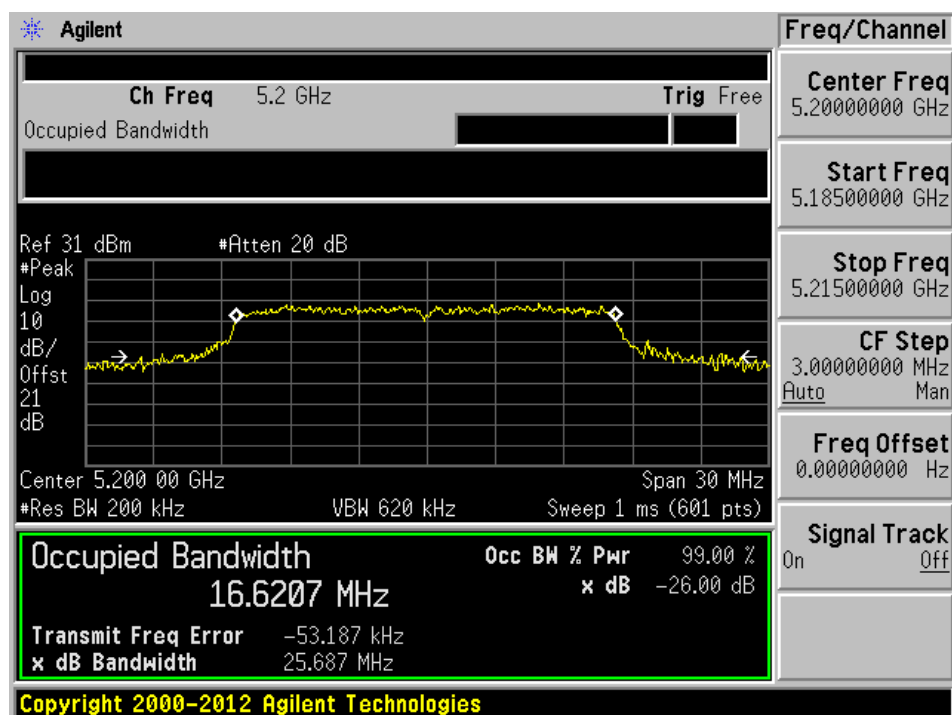
802.11a mode, 5180 MHz, Chain J1



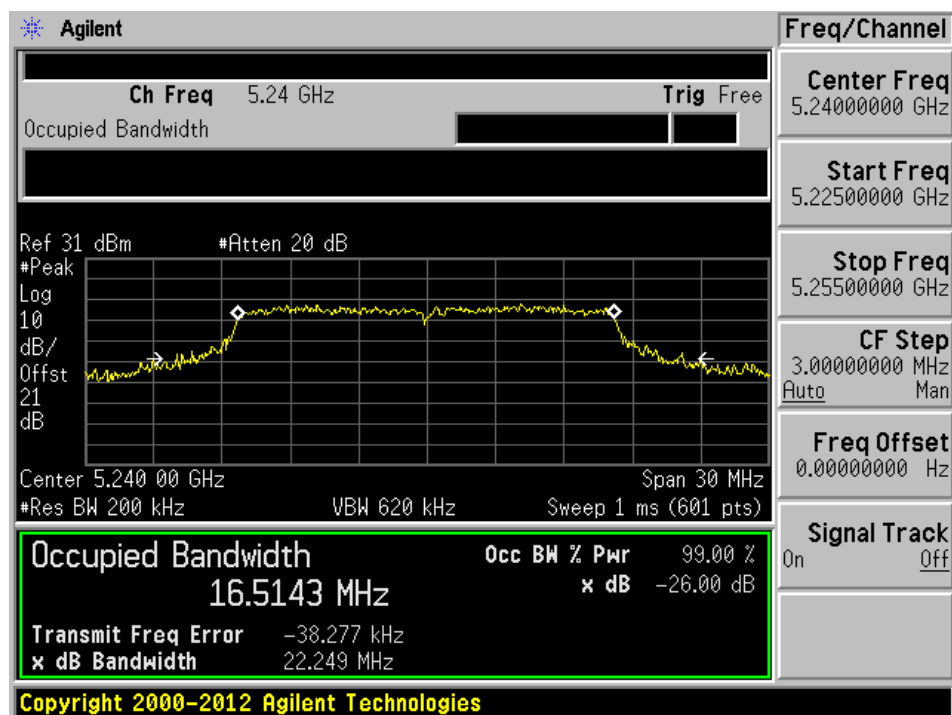
802.11a mode, 5200 MHz, Chain J0



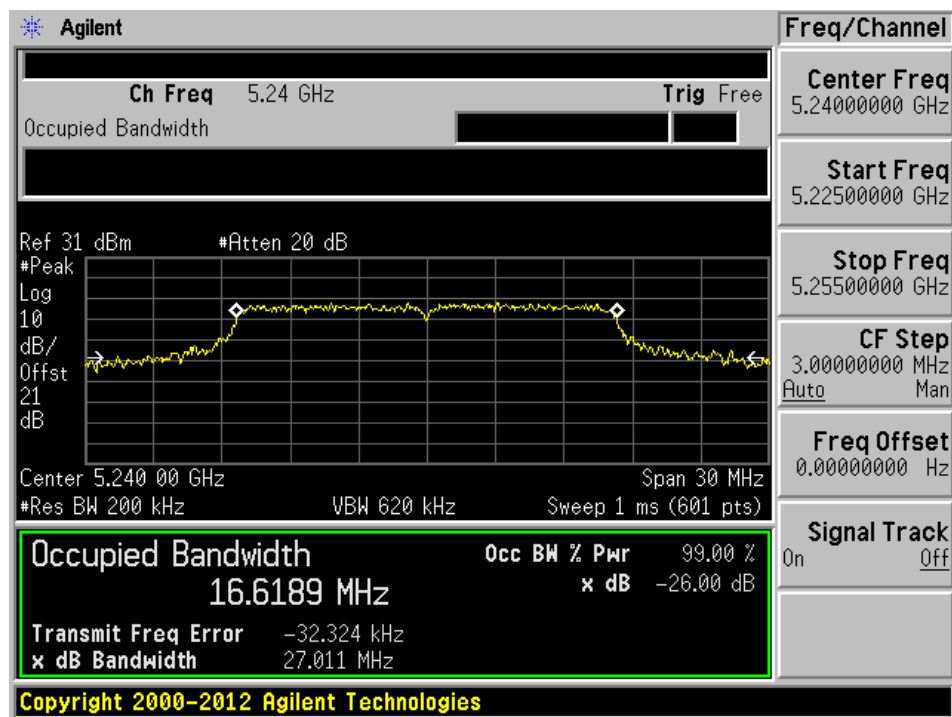
802.11a mode, 5200 MHz, Chain J1



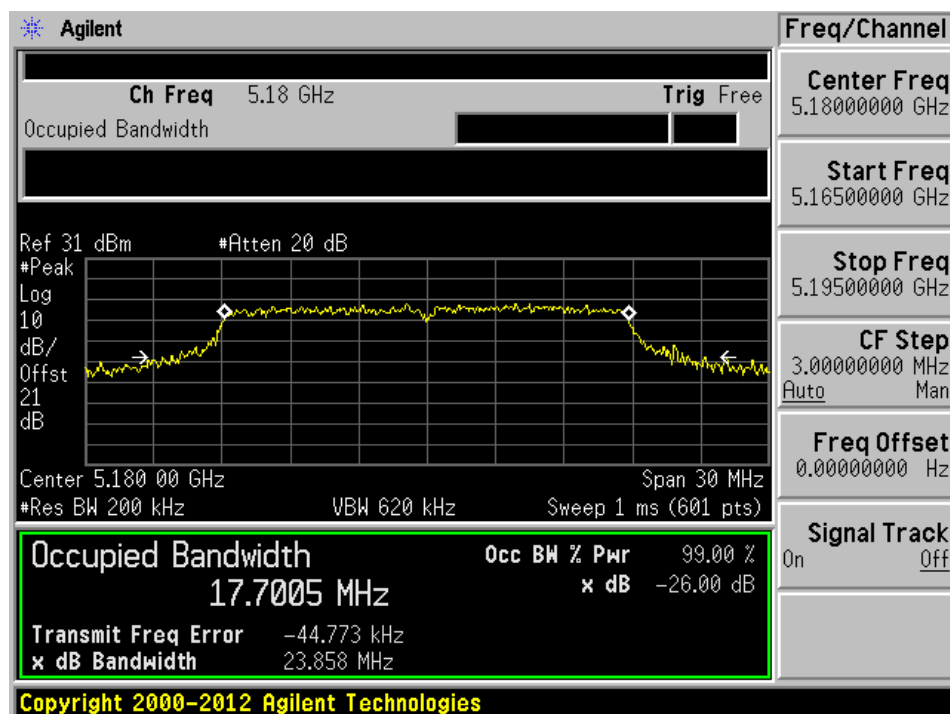
802.11a mode, 5240 MHz, Chain J0



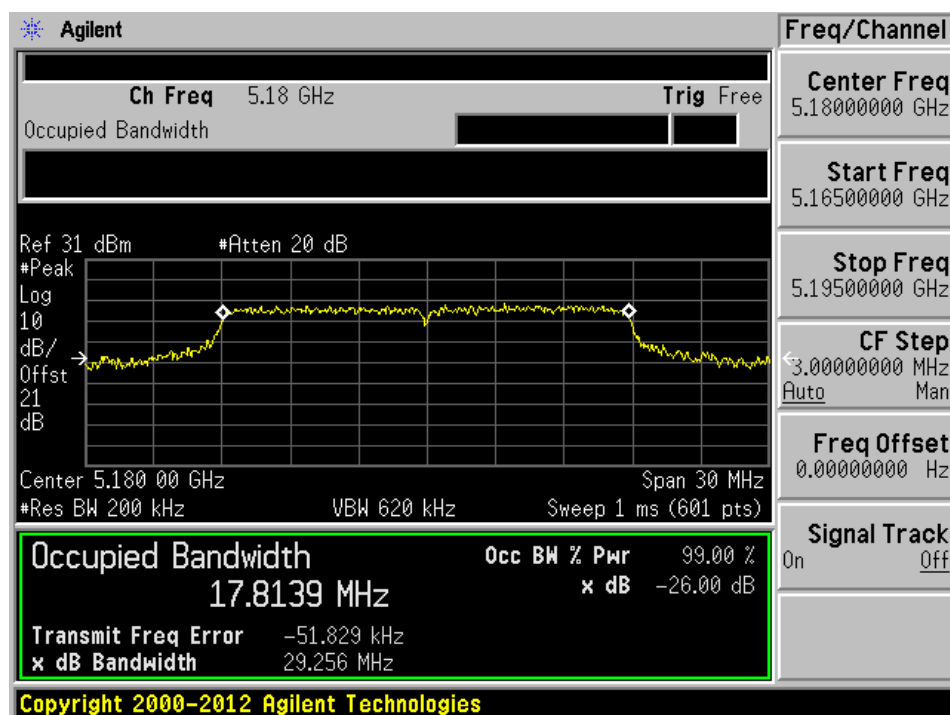
802.11a mode, 5240 MHz, Chain J1



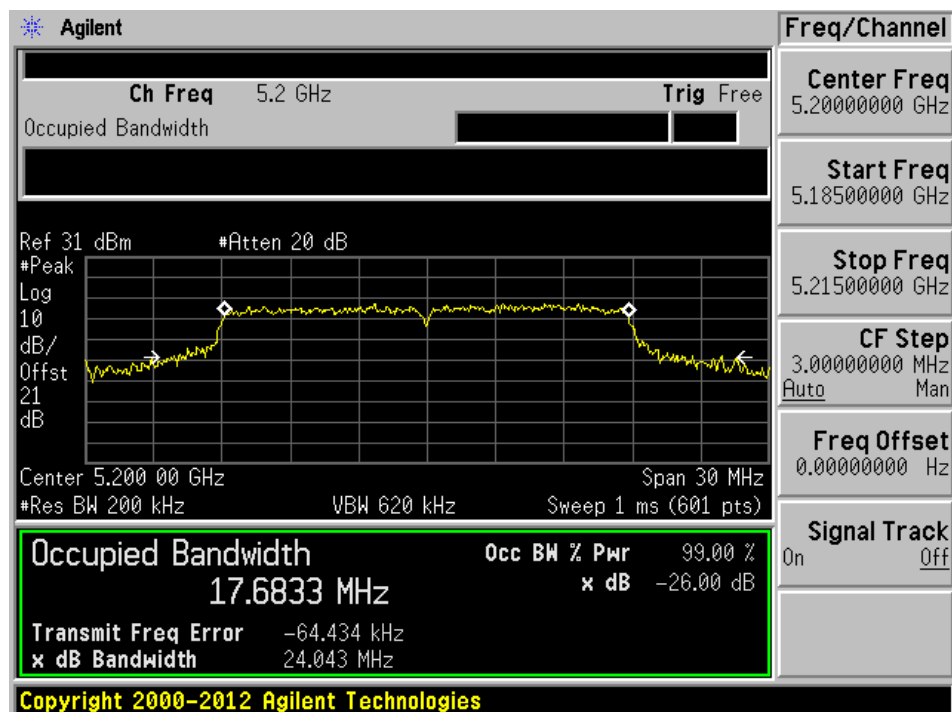
802.11n-HT20 mode, 5180 MHz, Chain J0



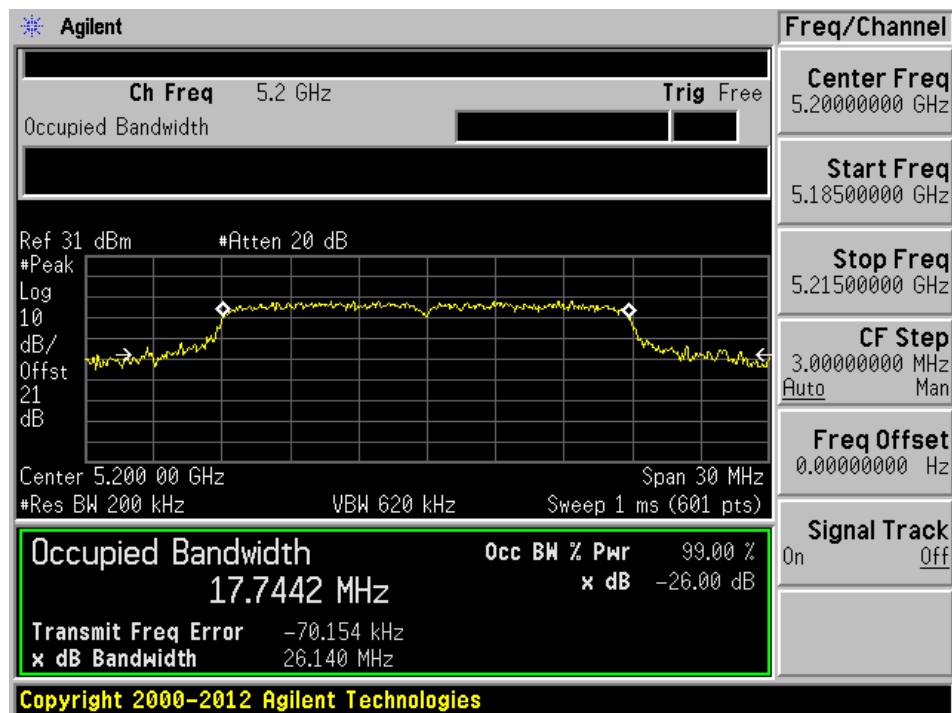
802.11n-HT20 mode, 5180 MHz, Chain J1



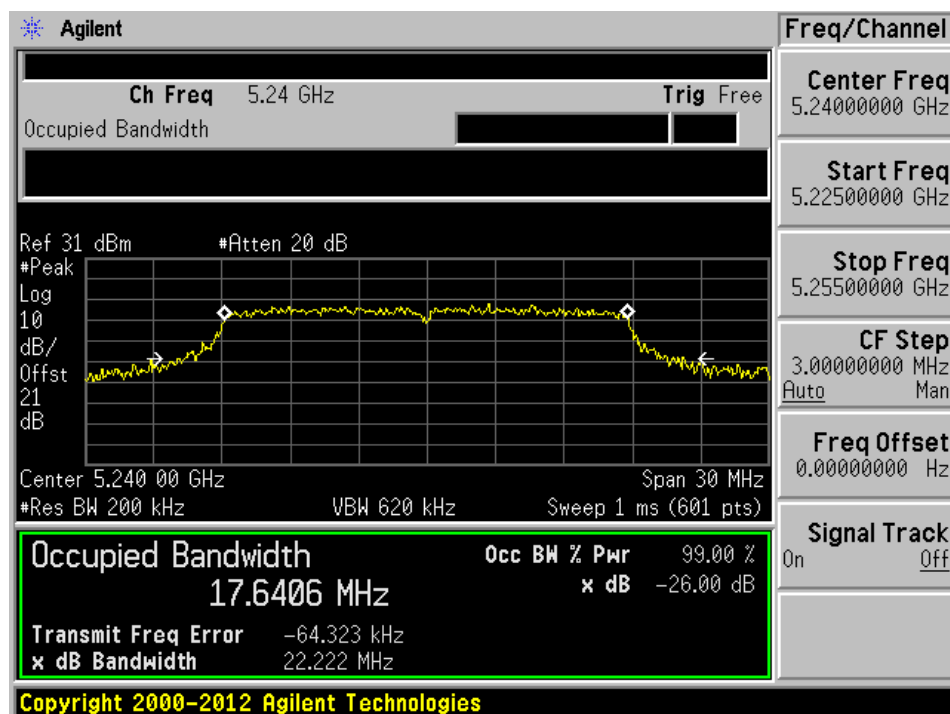
802.11n-HT20 mode, 5200 MHz, Chain J0



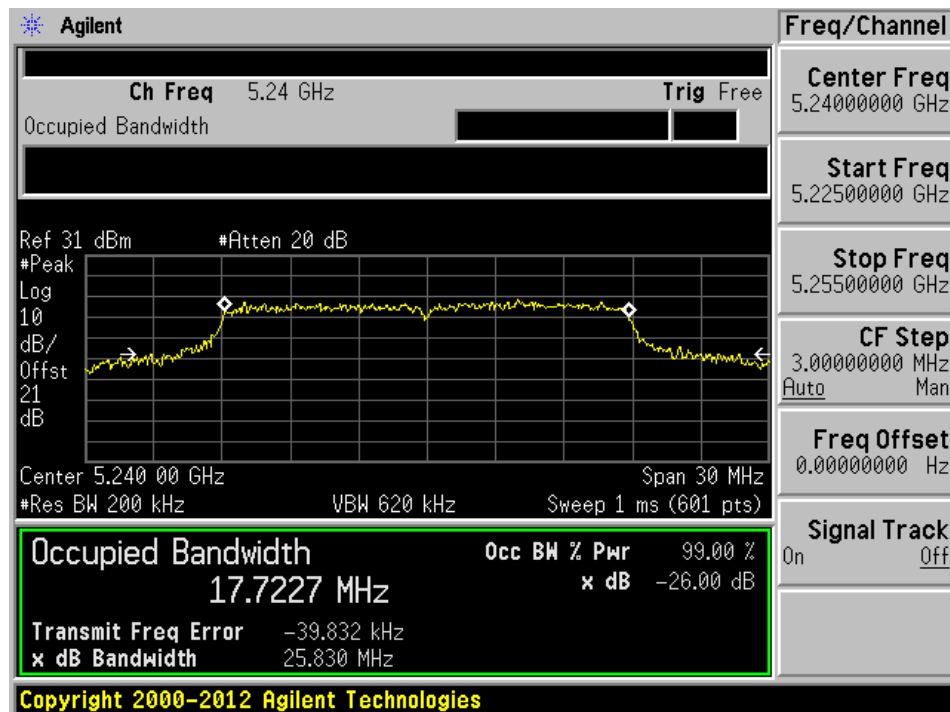
802.11n-HT20 mode, 5200 MHz, Chain J1



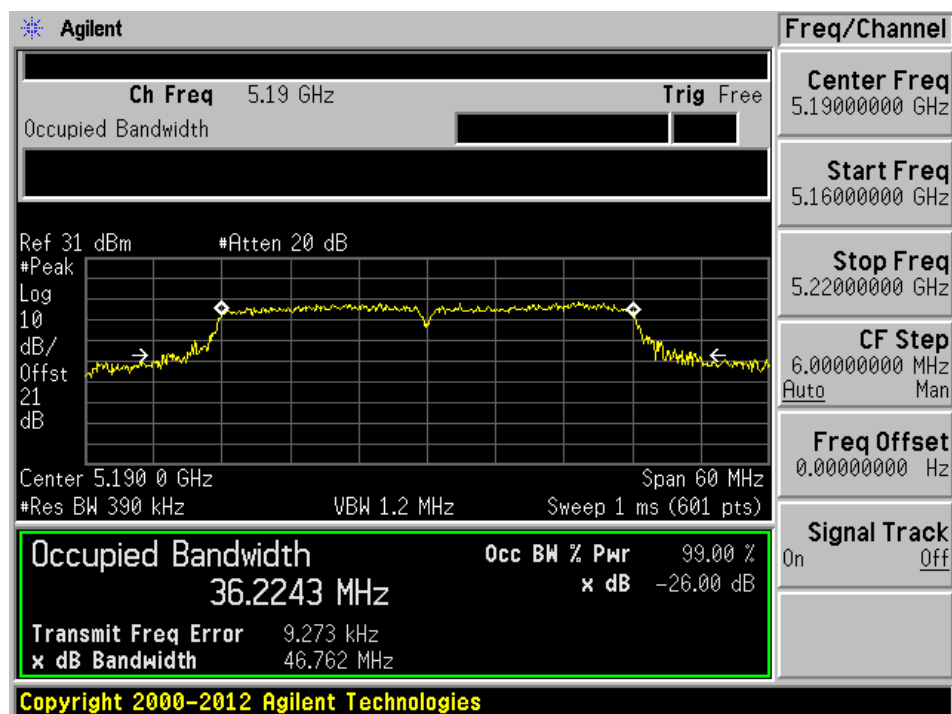
802.11n-HT20 mode, 5240 MHz, Chain J0



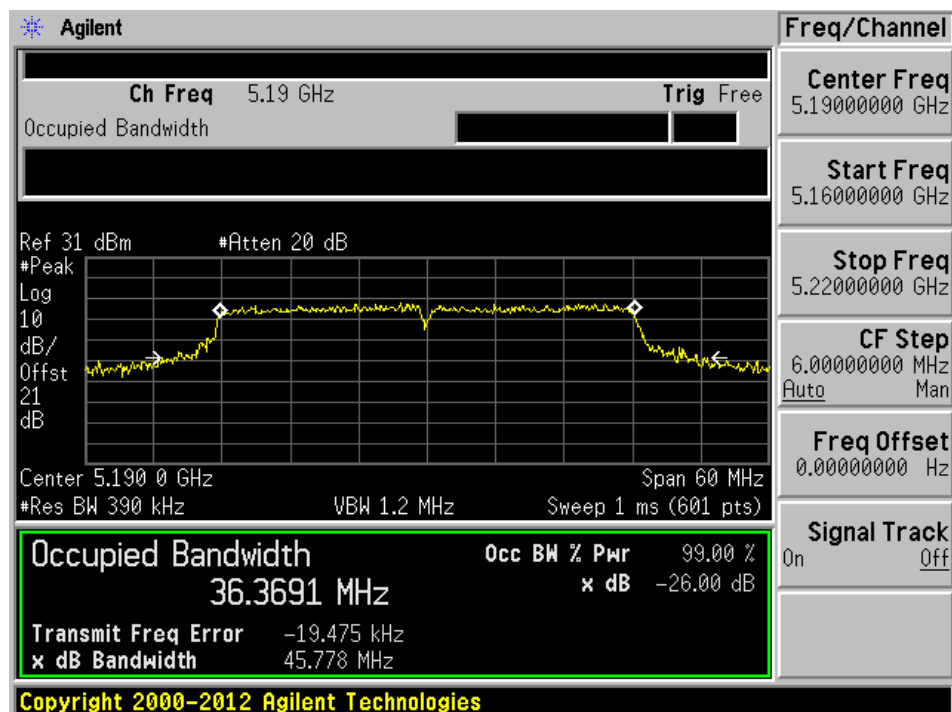
802.11n-HT20 mode, 5240 MHz, Chain J1



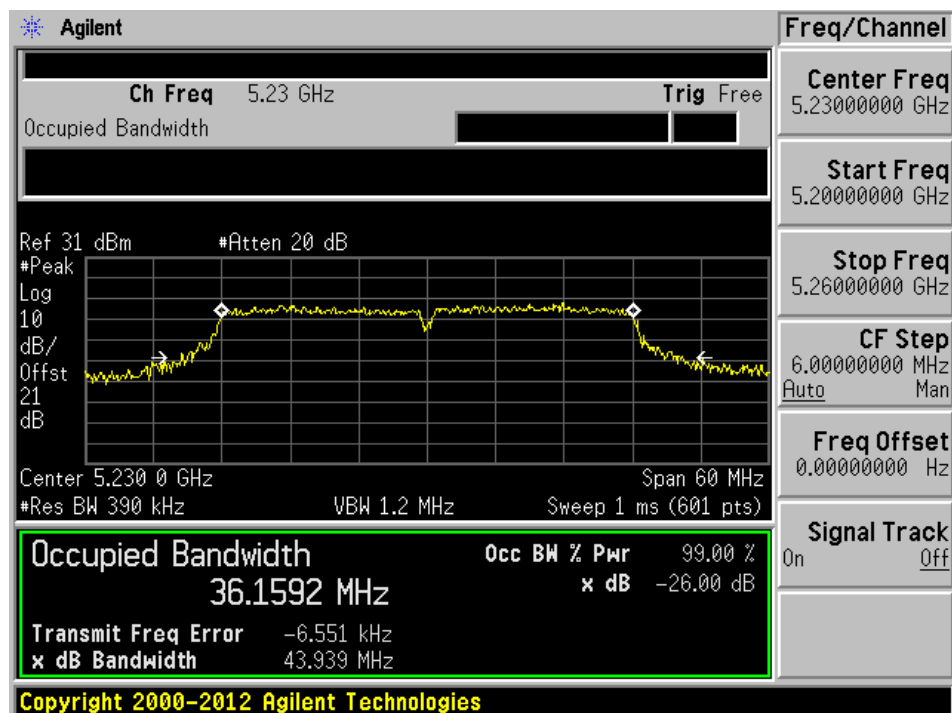
802.11n-HT40 mode, 5190 MHz, Chain J0



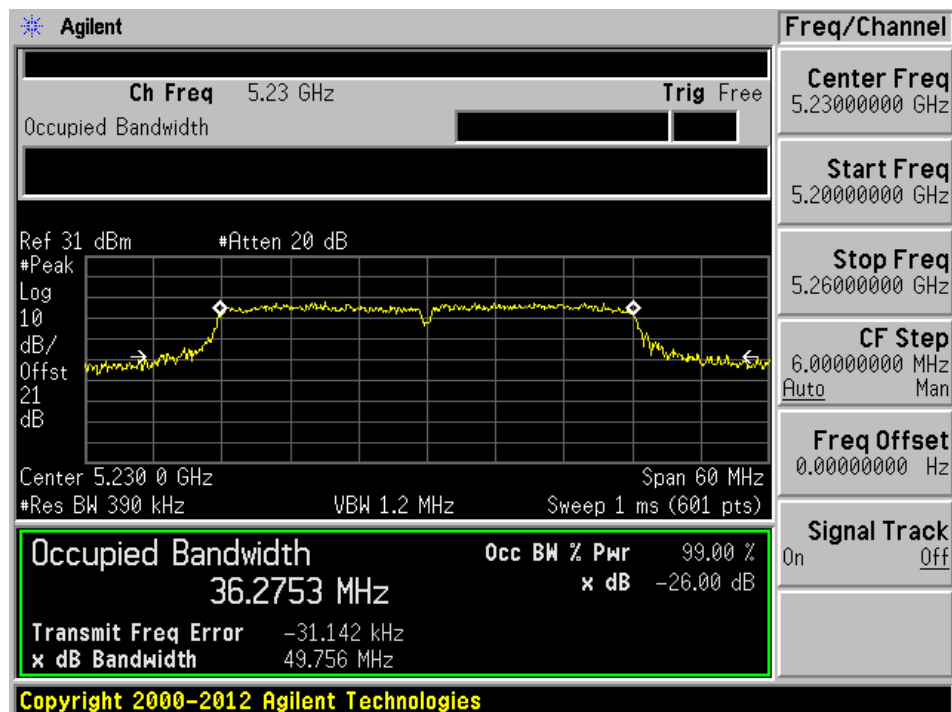
802.11n-HT40 mode, 5190 MHz, Chain J1



802.11n-HT40 mode, 5230 MHz, Chain J0



802.11n-HT40 mode, 5230 MHz, Chain J1



5725-5850 MHz Band

802.11a mode

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Limit (kHz)	Results
Chain J0					
Low	5745	16.524	16.5648	> 500	Compliant
Middle	5785	16.490	16.5982	> 500	Compliant
High	5825	16.490	16.7262	> 500	Compliant
Chain J1					
Low	5745	16.461	16.6148	> 500	Compliant
Middle	5785	16.490	16.5906	> 500	Compliant
High	5825	16.441	16.5374	> 500	Compliant

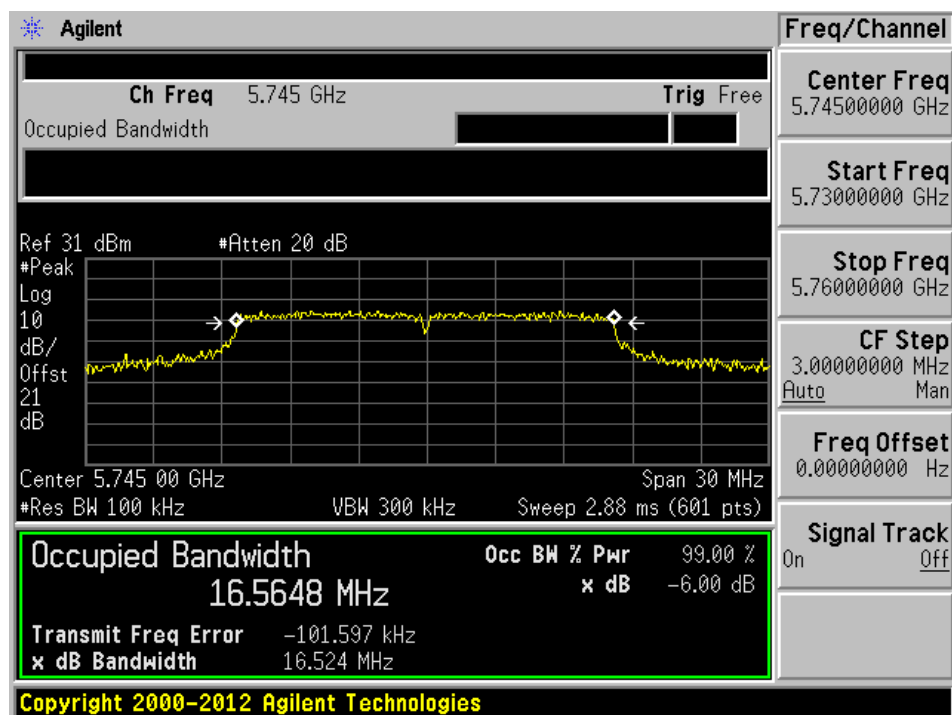
802.11n-HT20 mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Limit (kHz)	Results
Chain J0					
Low	5745	17.678	17.8024	> 500	Compliant
Middle	5785	17.740	17.7728	> 500	Compliant
High	5825	17.671	17.7627	> 500	Compliant
Chain J1					
Low	5745	17.681	17.7187	> 500	Compliant
Middle	5785	17.726	17.7798	> 500	Compliant
High	5825	17.745	17.7366	> 500	Compliant

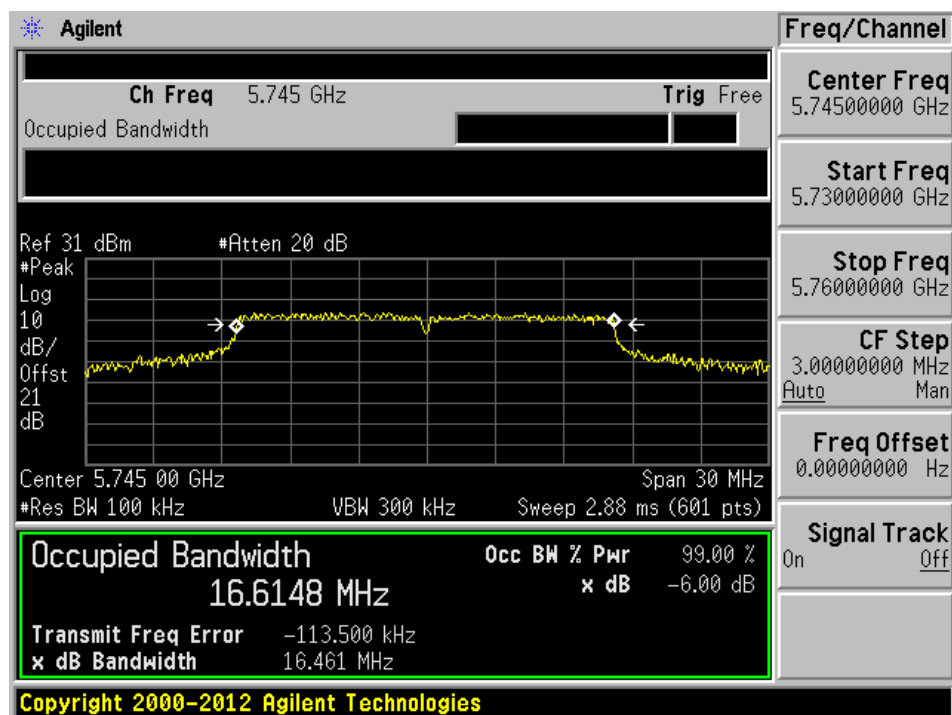
802.11n-HT40 mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Limit (kHz)	Results
Chain J0					
Low	5755	36.477	36.1449	> 500	Compliant
High	5795	36.2860	36.2860	> 500	Compliant
Chain J1					
Low	5755	36.315	36.1393	> 500	Compliant
High	5795	36.366	36.2088	> 500	Compliant

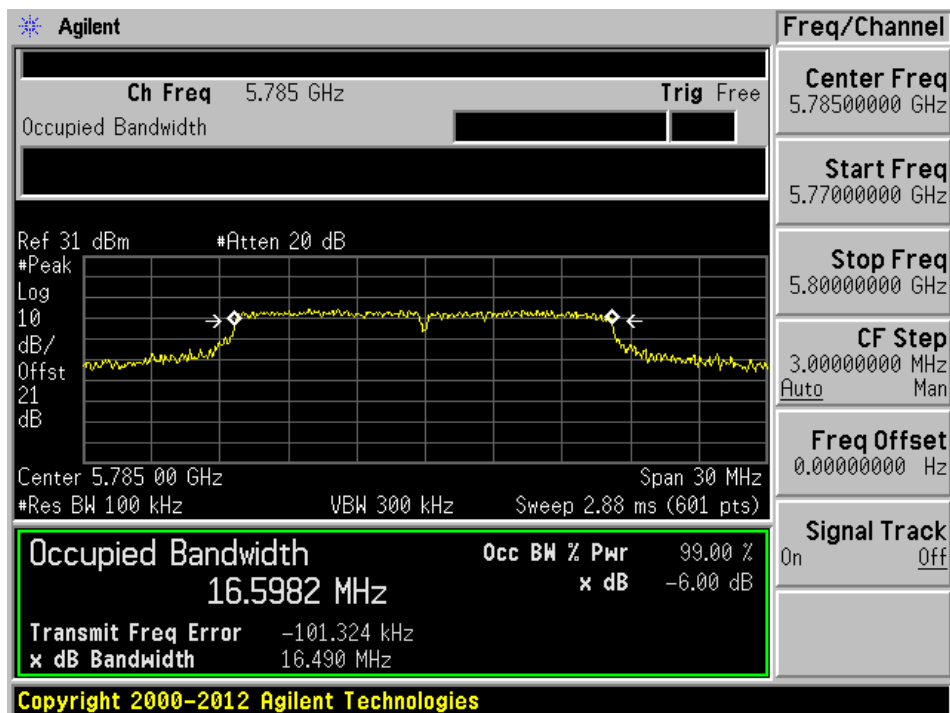
802.11a mode, 5745 MHz, Chain J0



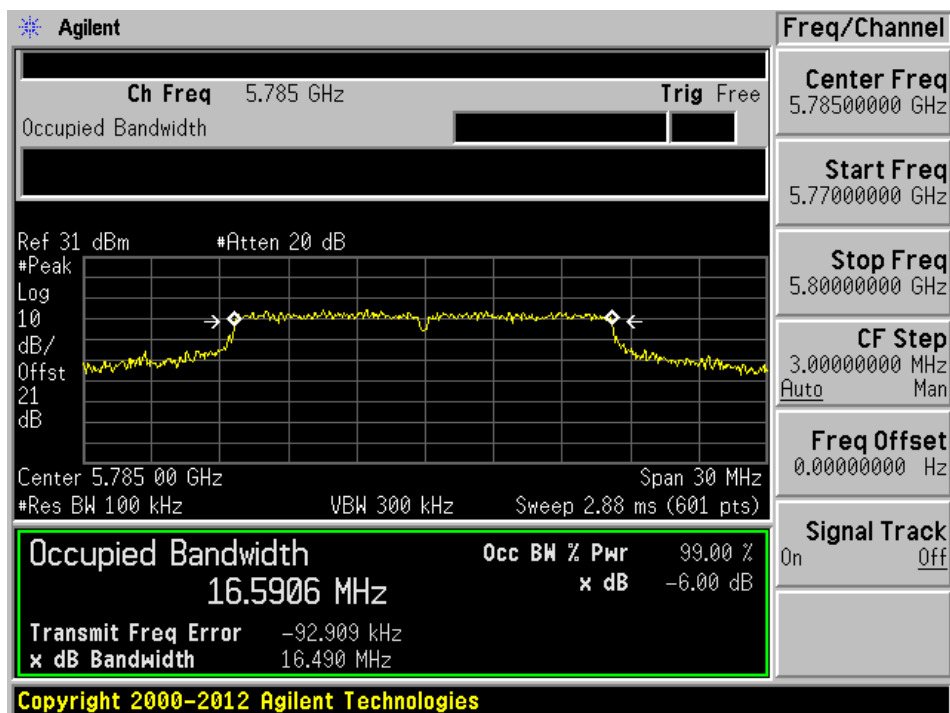
802.11a mode, 5745 MHz, Chain J1



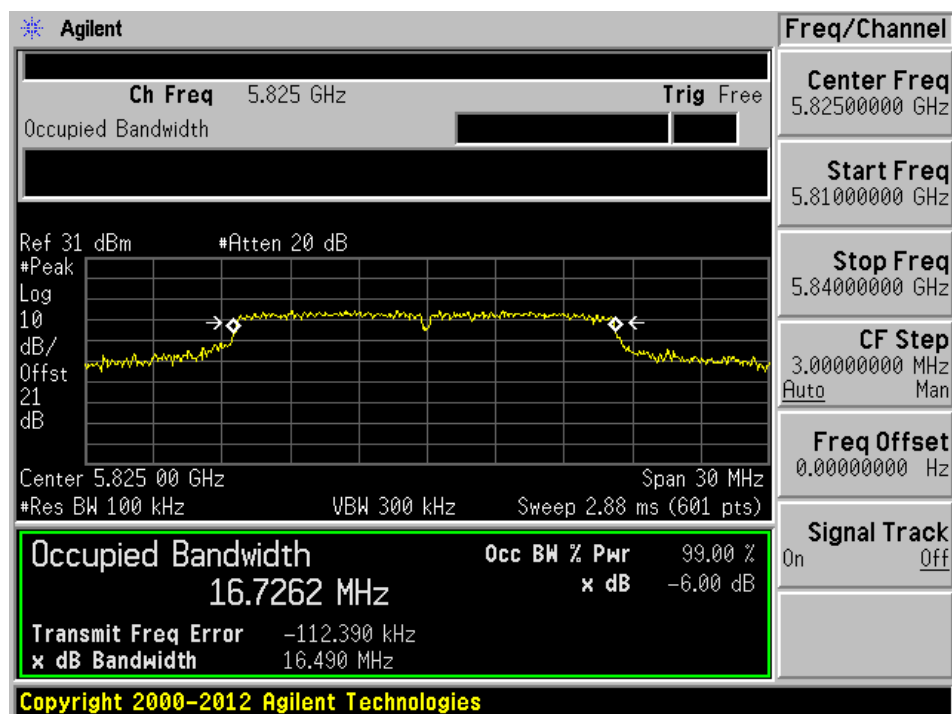
802.11a mode, 5785 MHz, Chain J0



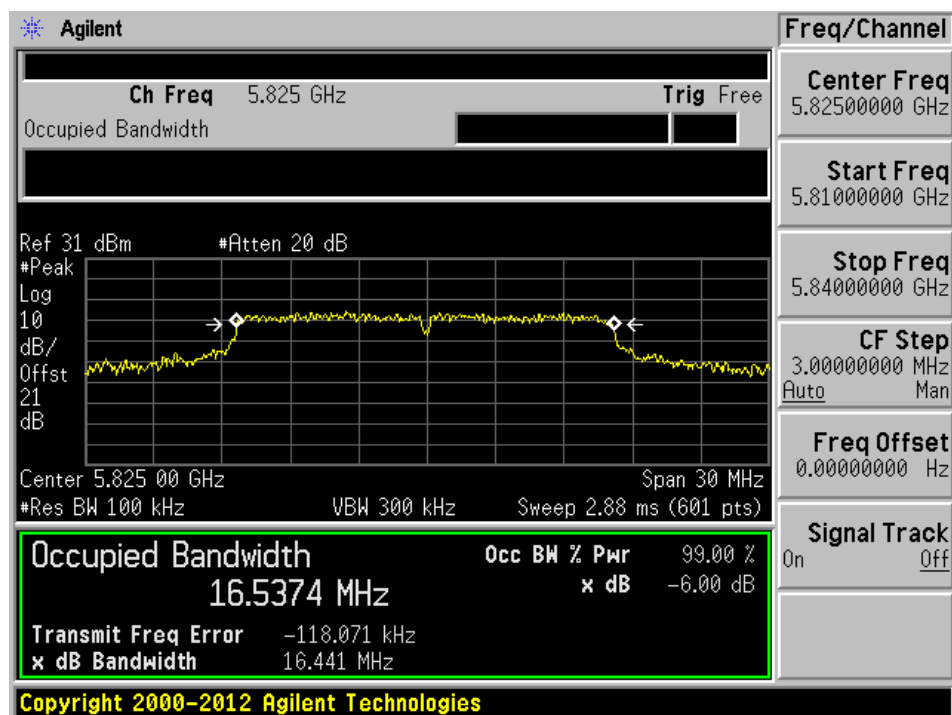
802.11a mode, 5785 MHz, Chain J1



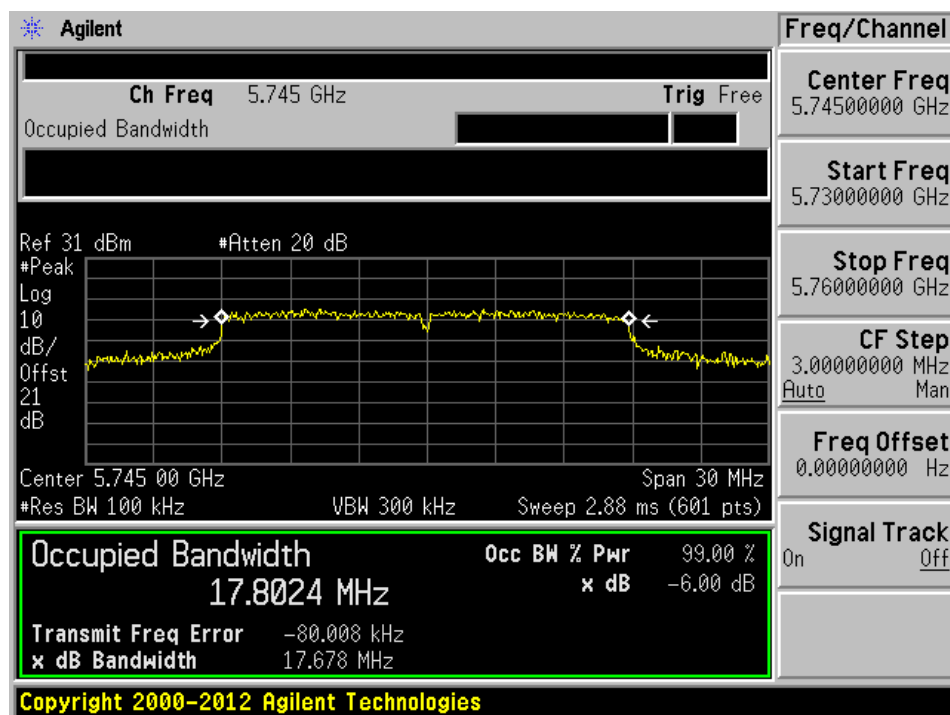
802.11a mode, 5825 MHz, Chain J0



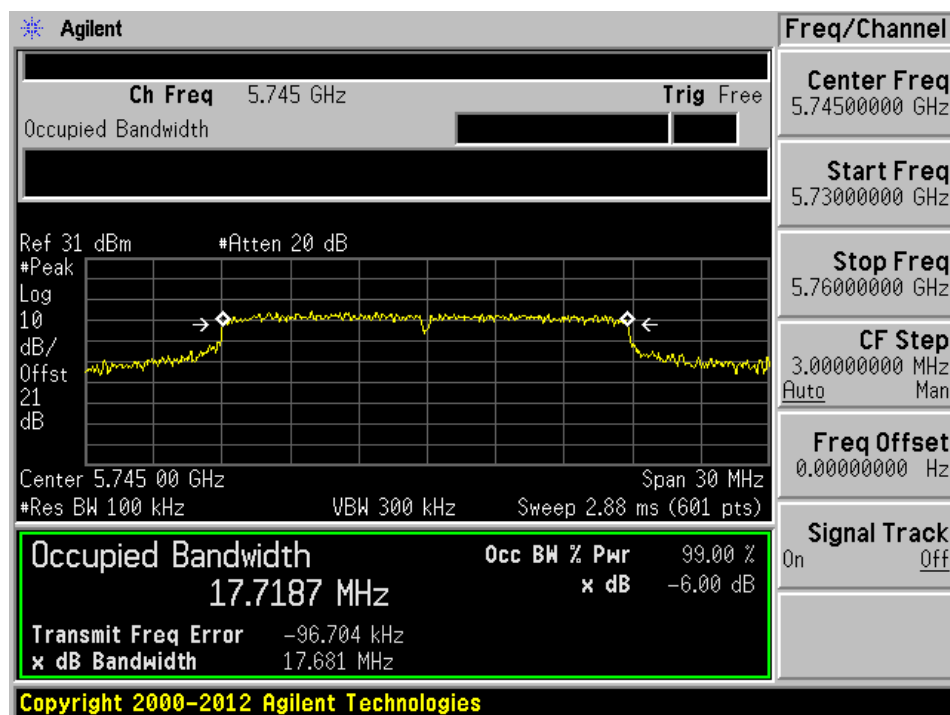
802.11a mode, 5825 MHz, Chain J1



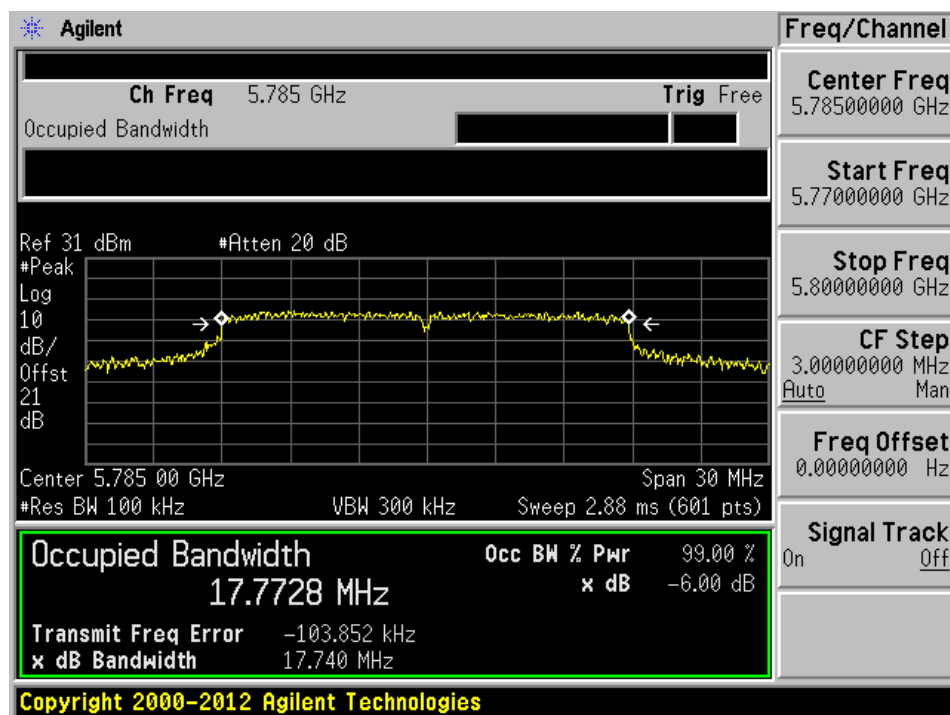
802.11n-HT20 mode, 5745 MHz, Chain J0



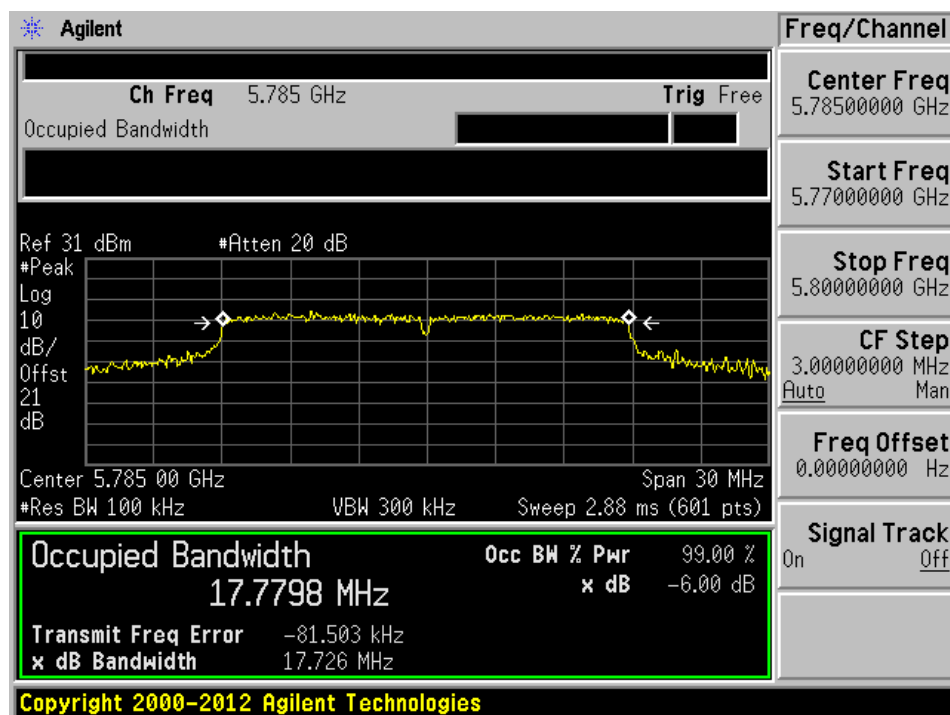
802.11n-HT20 mode, 5745 MHz, Chain J1



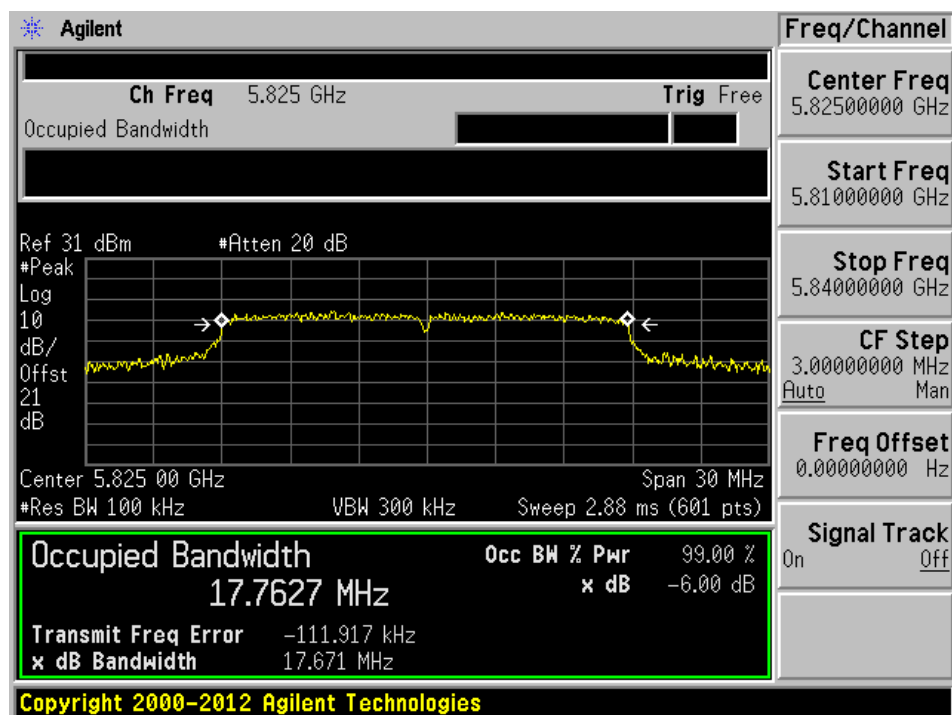
802.11n-HT20 mode, 5785 MHz, Chain J0



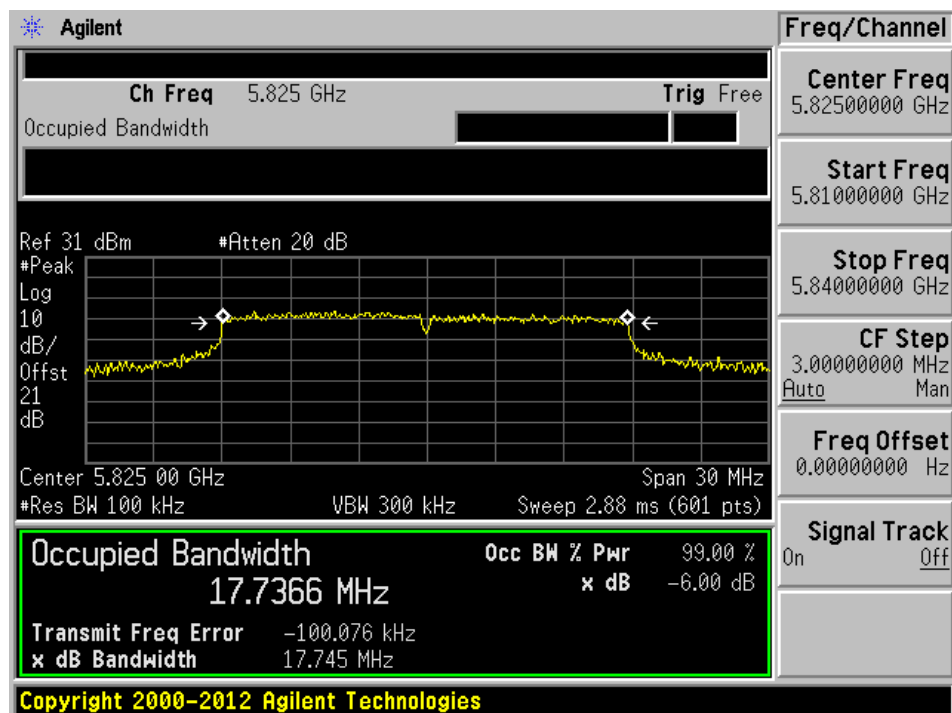
802.11n-HT20 mode, 5785 MHz, Chain J1



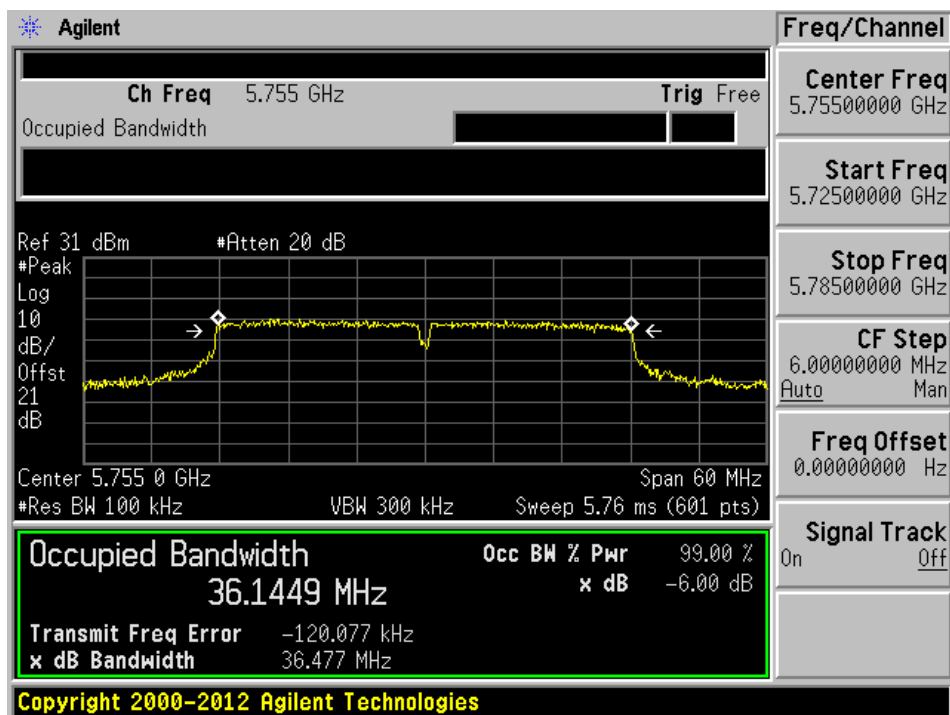
802.11n-HT20 mode, 5825 MHz, Chain J0



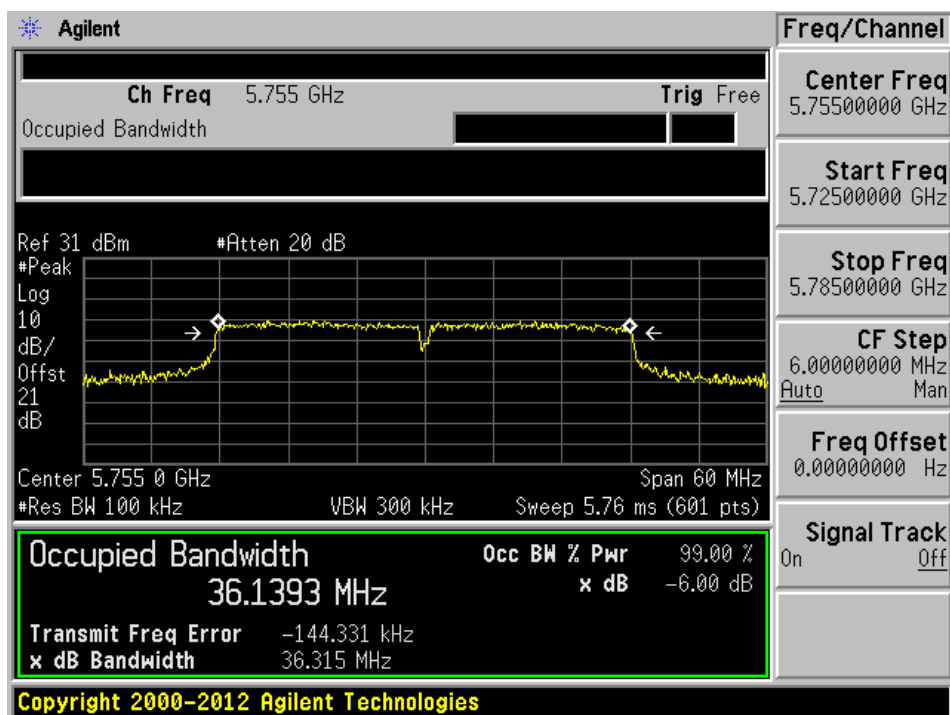
802.11n-HT20 mode, 5825 MHz, Chain J1



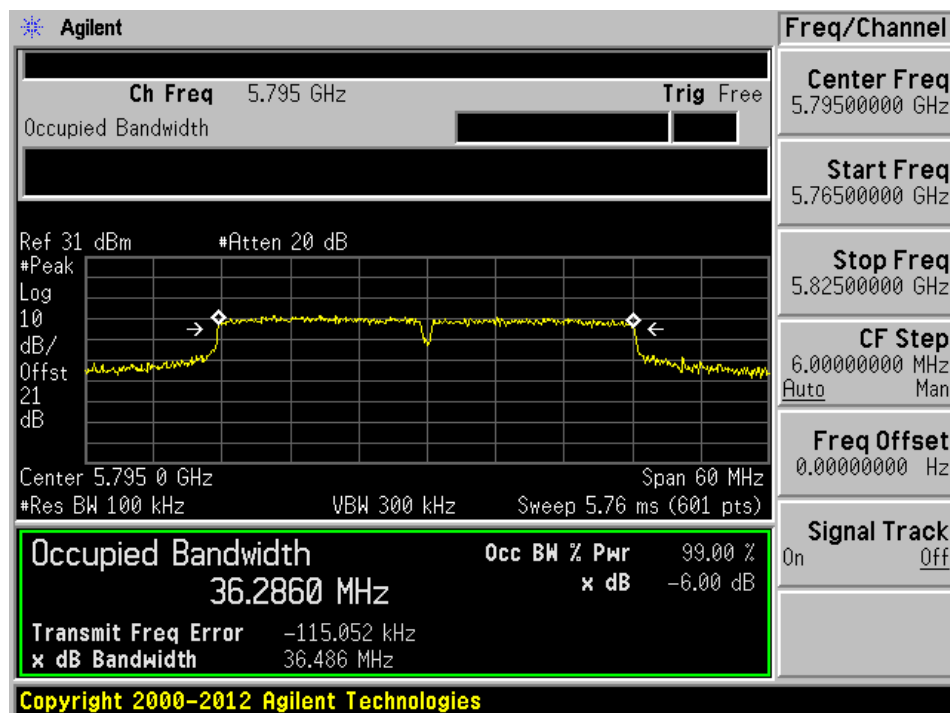
802.11n-HT40 mode, 5755 MHz, Chain J0



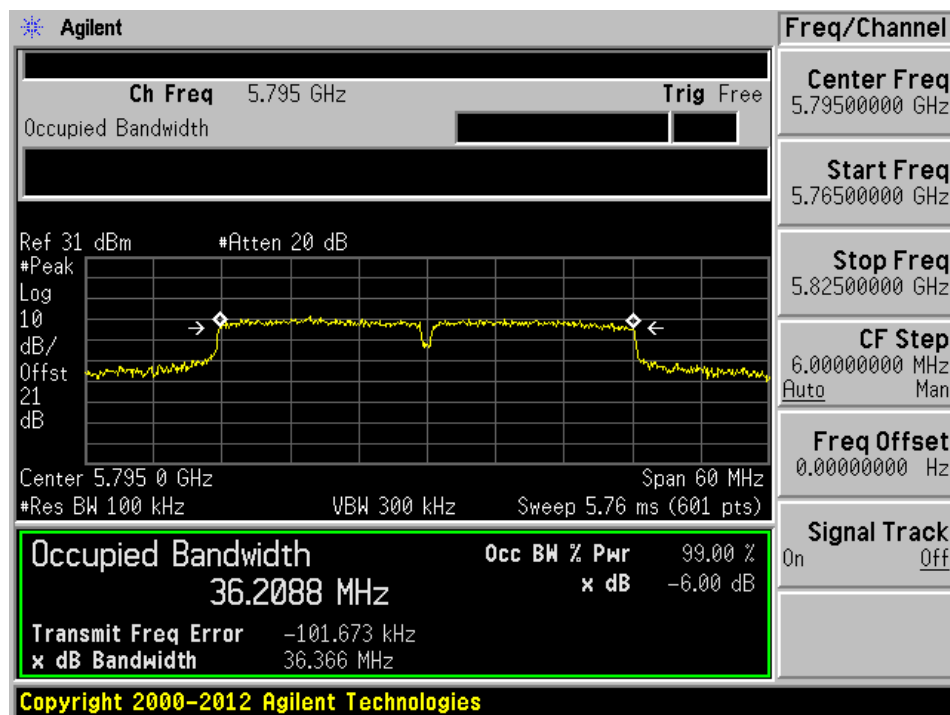
802.11n-HT40 mode, 5755 MHz, Chain J1



802.11n-HT40 mode, 5795 MHz, Chain J0



802.11n-HT40 mode, 5795 MHz, Chain J1



9 FCC §15.407(a) - Output Power Measurement

9.1 Applicable Standard

According to FCC §15.407(a)

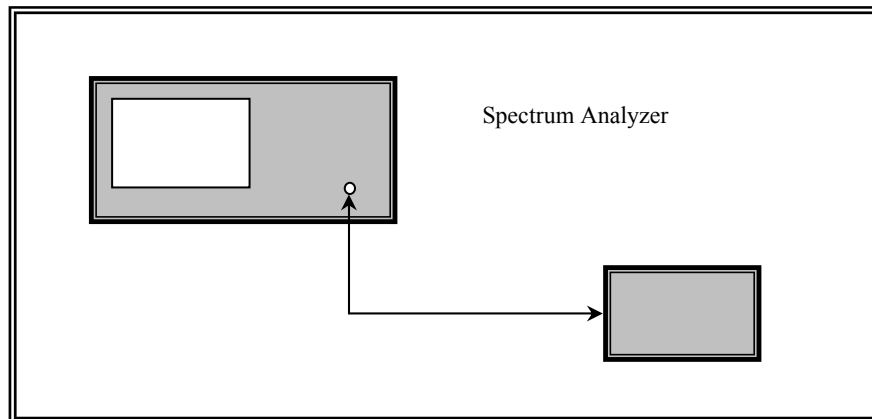
(1) For the band 5.15-5.25 GHz.

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

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

9.2 Measurement Procedure

Test measurements are based on FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01, GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E



9.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US42221851	2015-06-23	1 year
-	SMA Cable	-	C0001	Each Time ¹	N/A
Mini-Circuits	Attenuator	BW-S20W5	1430	Each Time ¹	N/A

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:	23 °C
Relative Humidity:	43 %
ATM Pressure:	101.5 kPa

The testing was performed by Leonard Gray on 2016-01-29 in RF site.

9.5 Test Results

5150-5250 MHz Band

802.11a mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5180	19.33	20.04	22.71	30	-7.29	20
Middle	5200	20.40	20.73	23.58	30	-6.42	Target
High	5240	19.72	20.72	23.26	30	-6.74	Target

802.11n-HT20 mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5180	17.96	19.10	21.58	30	-8.42	19
Middle	5200	19.91	20.75	23.36	30	-6.64	Target
High	5240	19.59	20.23	22.93	30	-7.07	Target

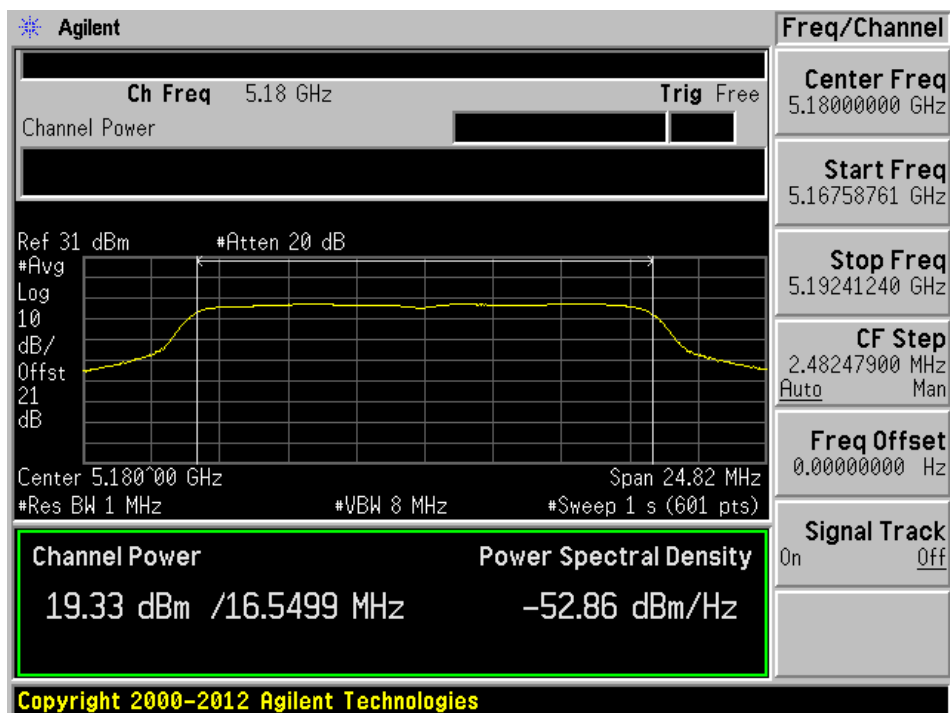
802.11n-HT40 mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5190	14.27	15.15	17.74	30	-12.26	15
High	5230	19.27	20.04	22.68	30	-7.32	Target

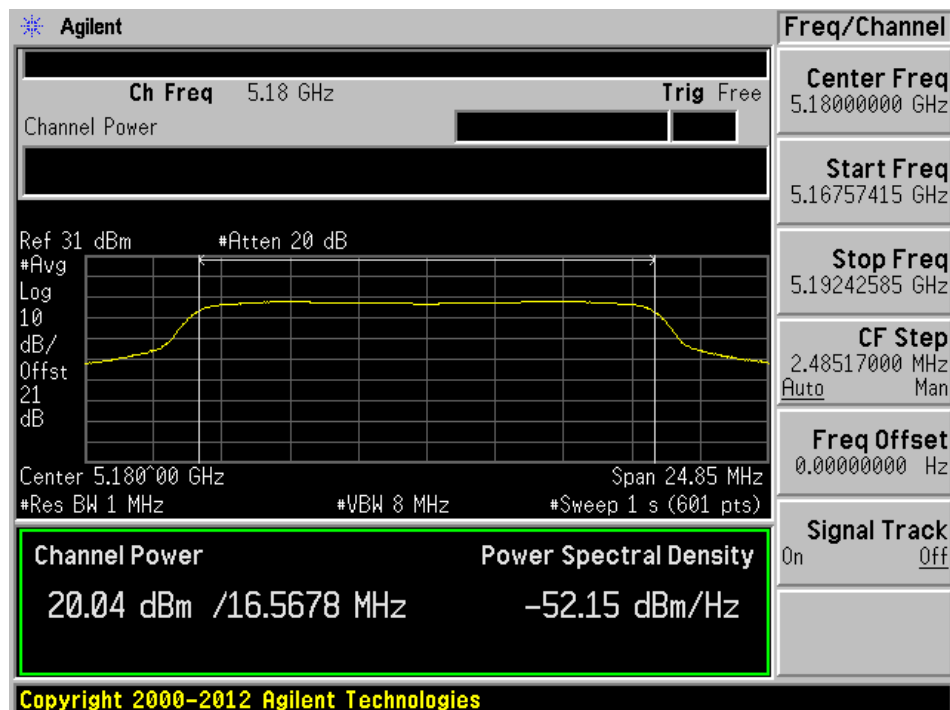
5150-5250 MHz Band

802.11a mode

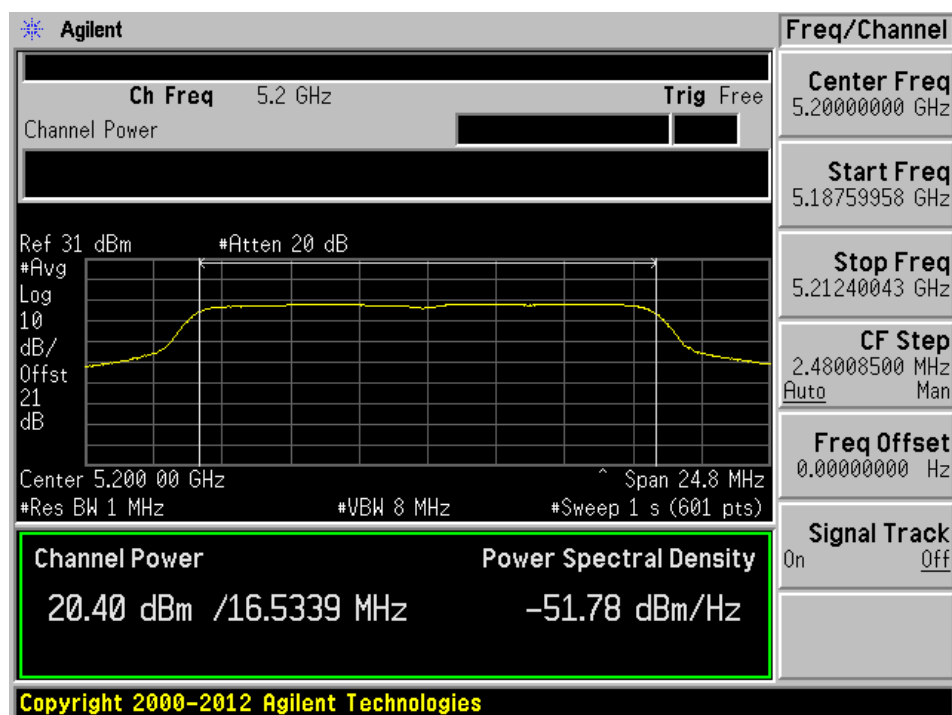
802.11a mode, 5180 MHz, Chain J0



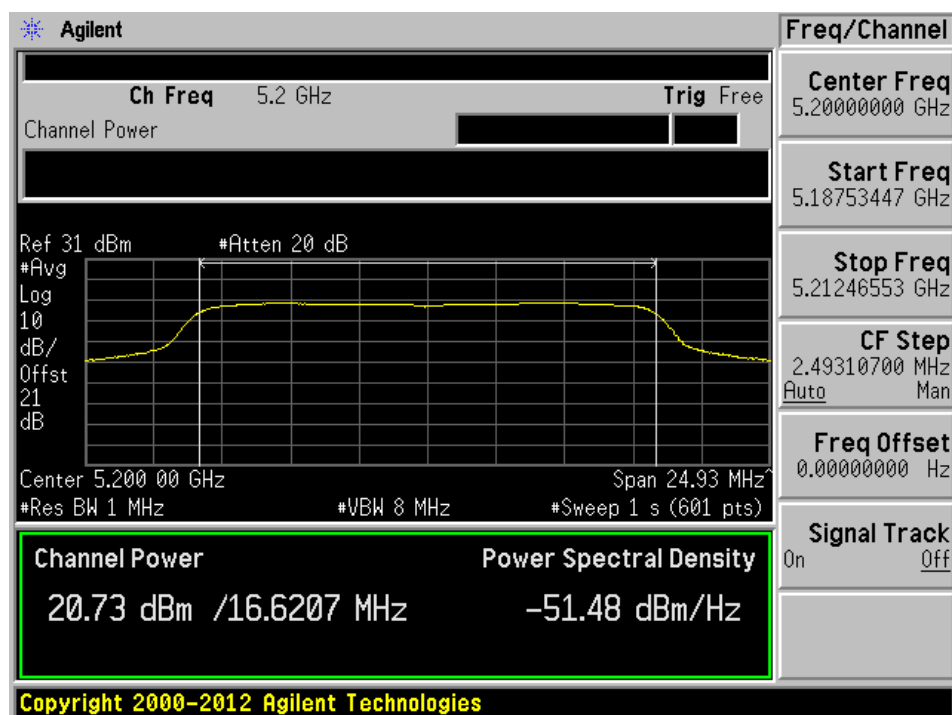
802.11a mode, 5180 MHz, Chain J1



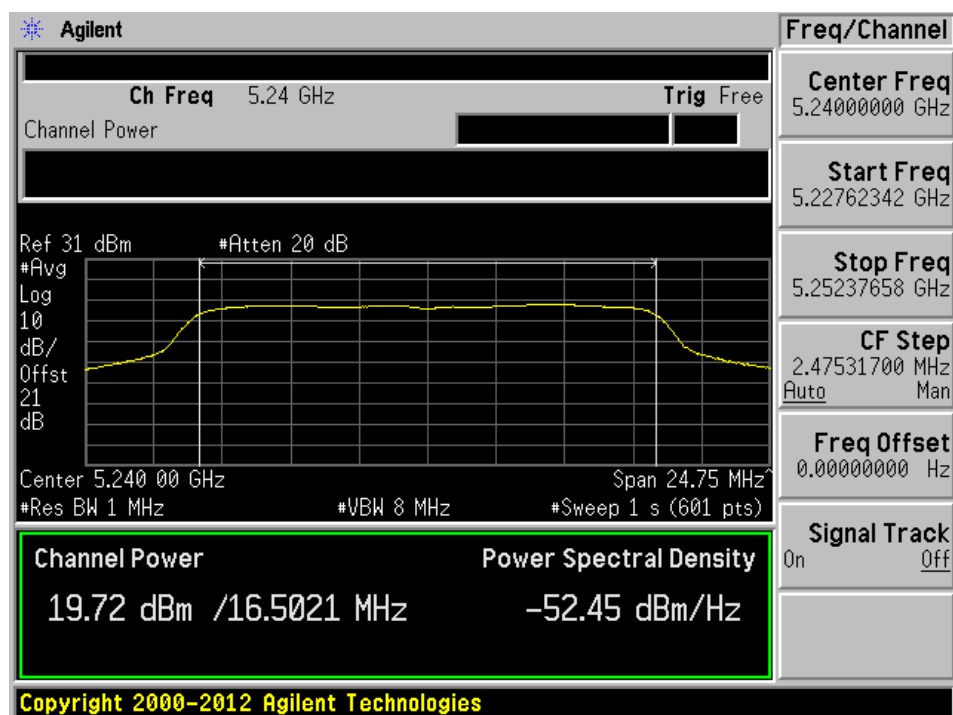
802.11a mode, 5200 MHz, Chain J0



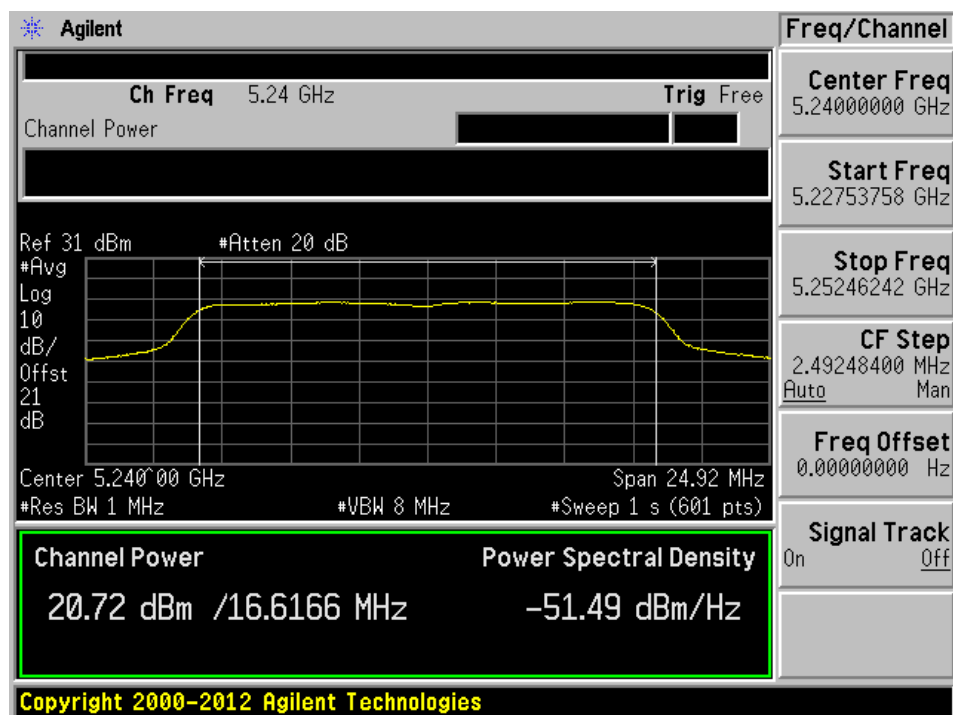
802.11a mode, 5200 MHz, Chain J1



802.11a mode, 5240 MHz, Chain J0

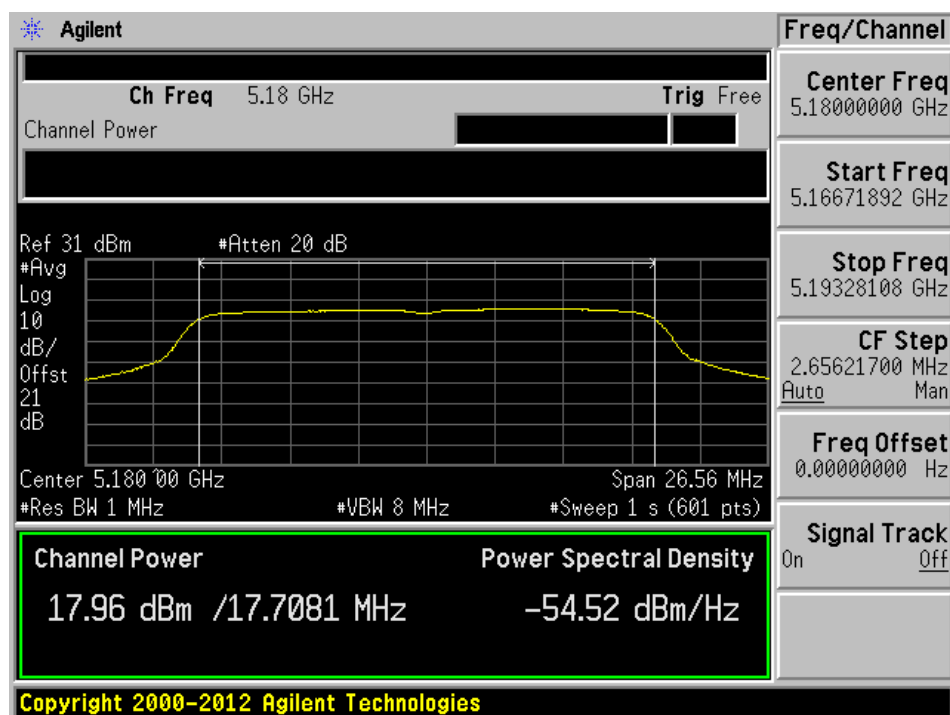


802.11a mode, 5240 MHz, Chain J1

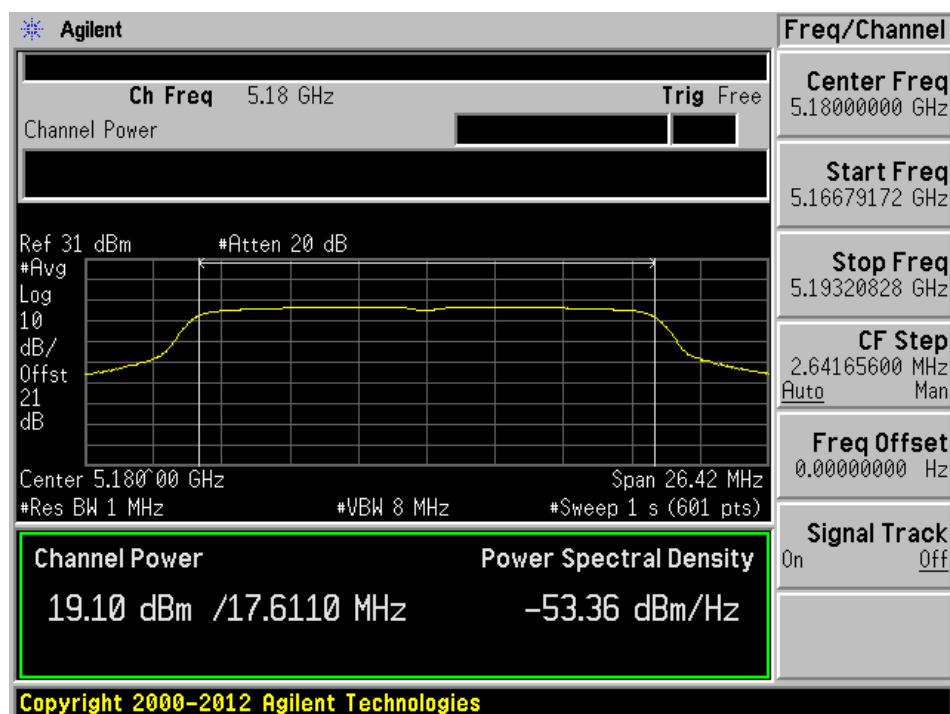


802.11n-HT20 mode

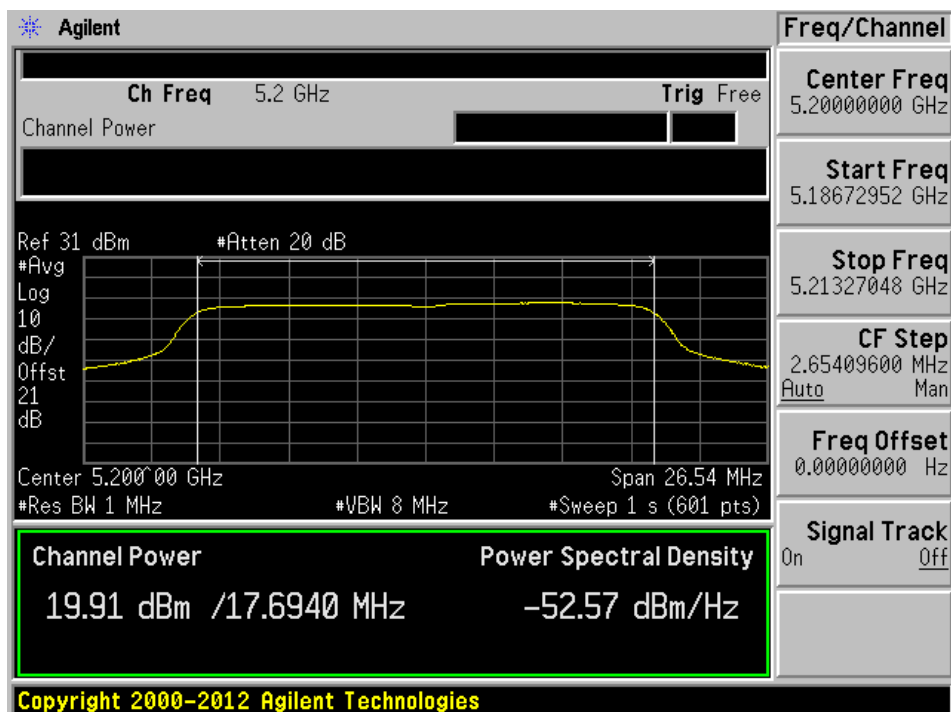
802.11n-HT20 mode, 5180 MHz, Chain J0



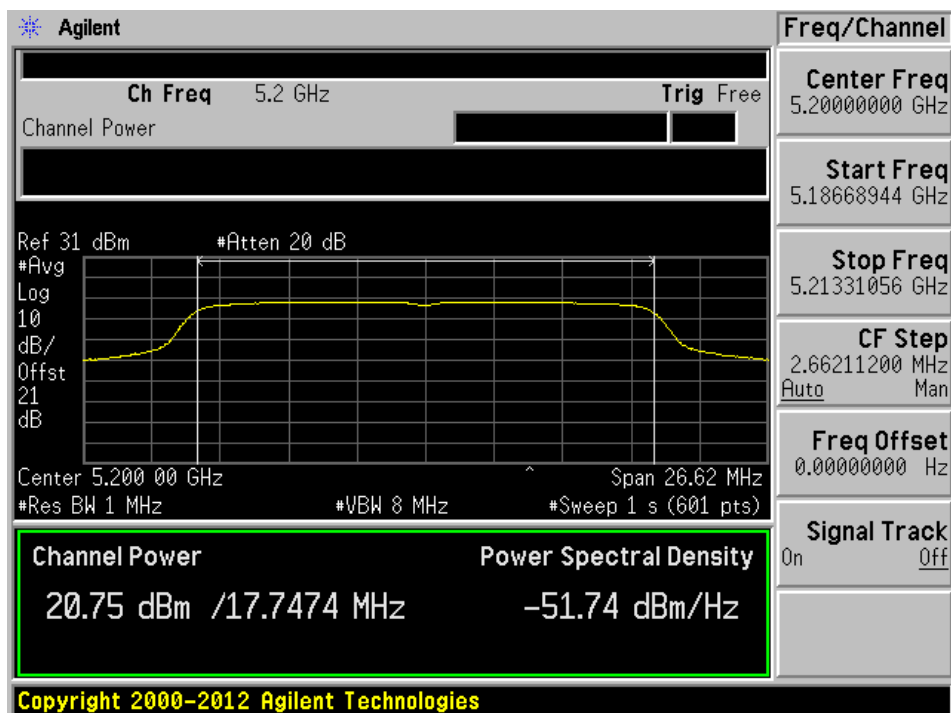
802.11n-HT20 mode, 5180 MHz, Chain J1



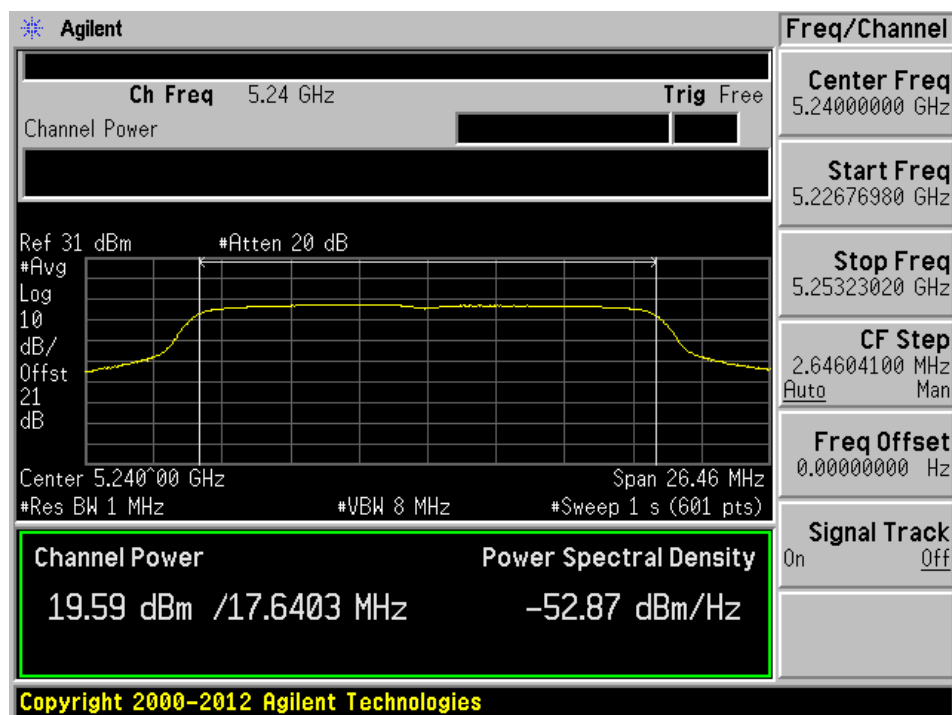
802.11n-HT20 mode, 5200 MHz, Chain J0



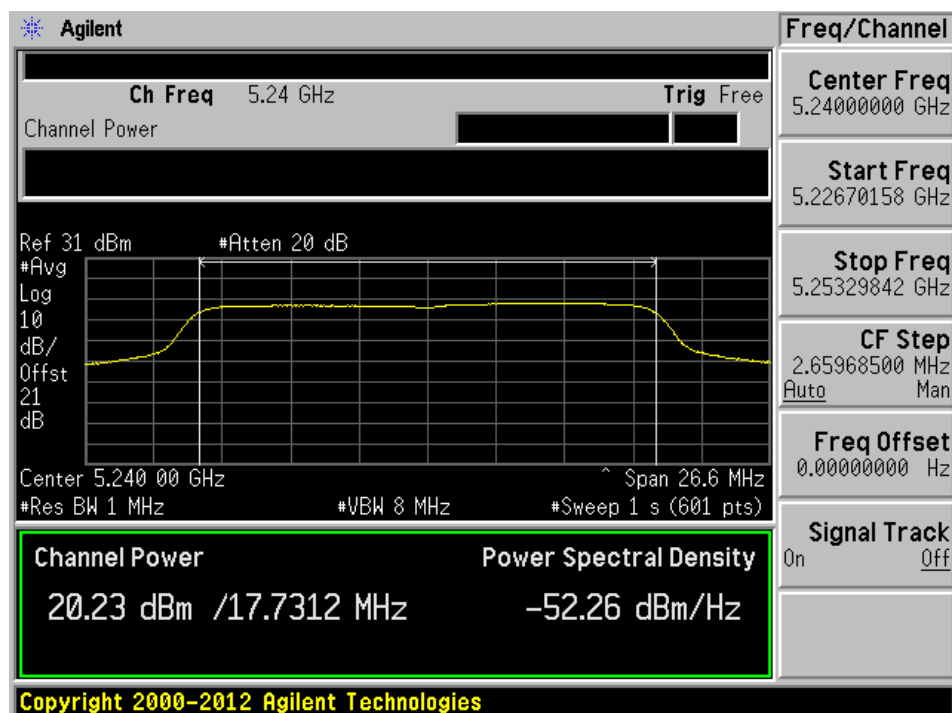
802.11n-HT20 mode, 5200 MHz, Chain J1



802.11n-HT20 mode, 5240 MHz, Chain J0

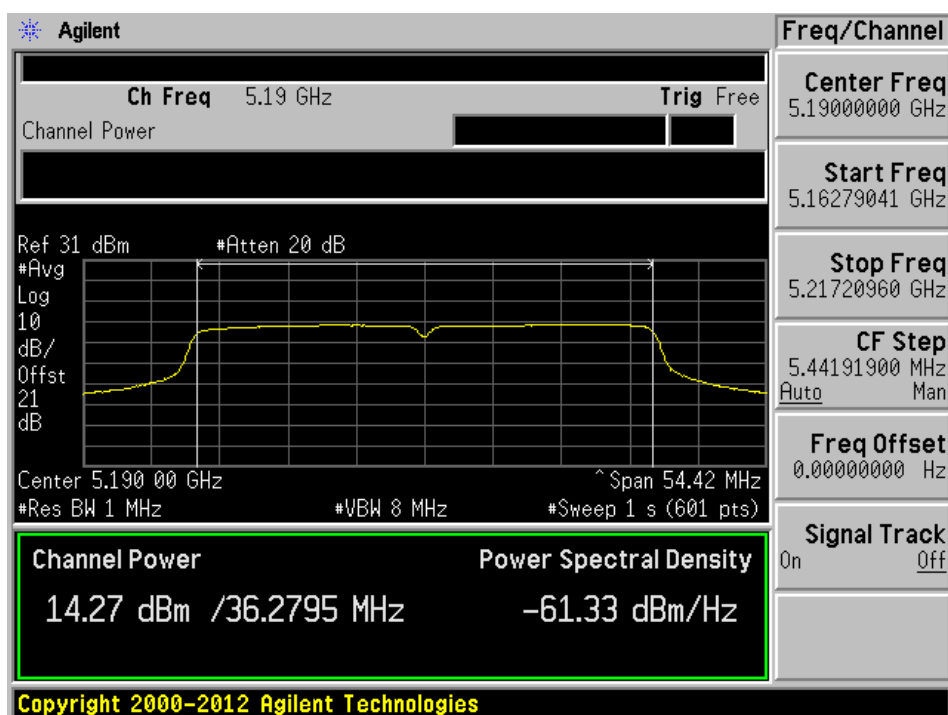


802.11n-HT20 mode, 5240 MHz, Chain J1

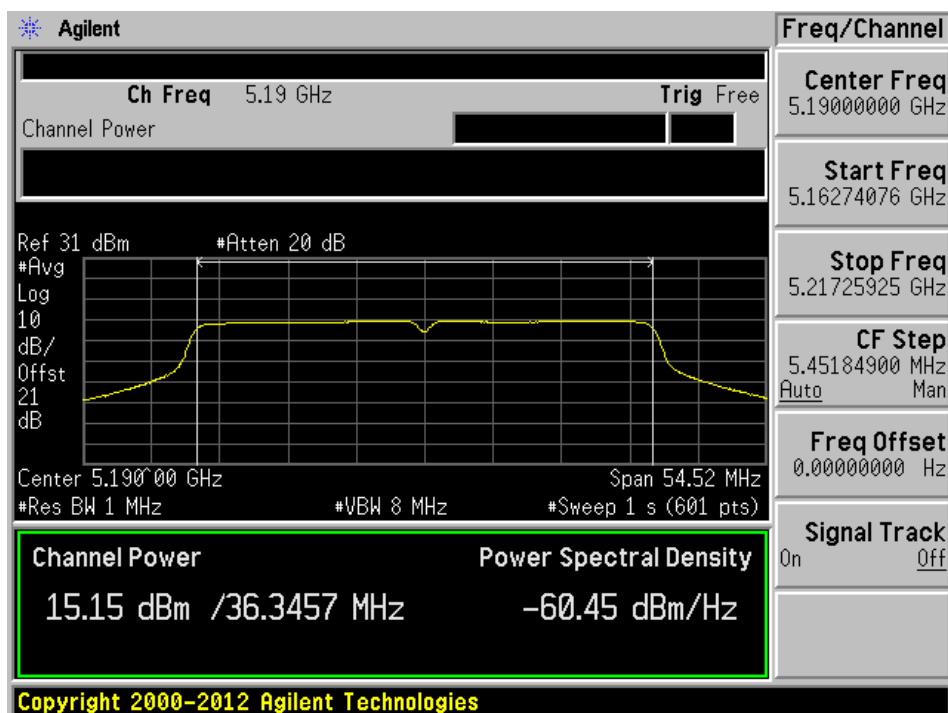


802.11n-HT40 mode

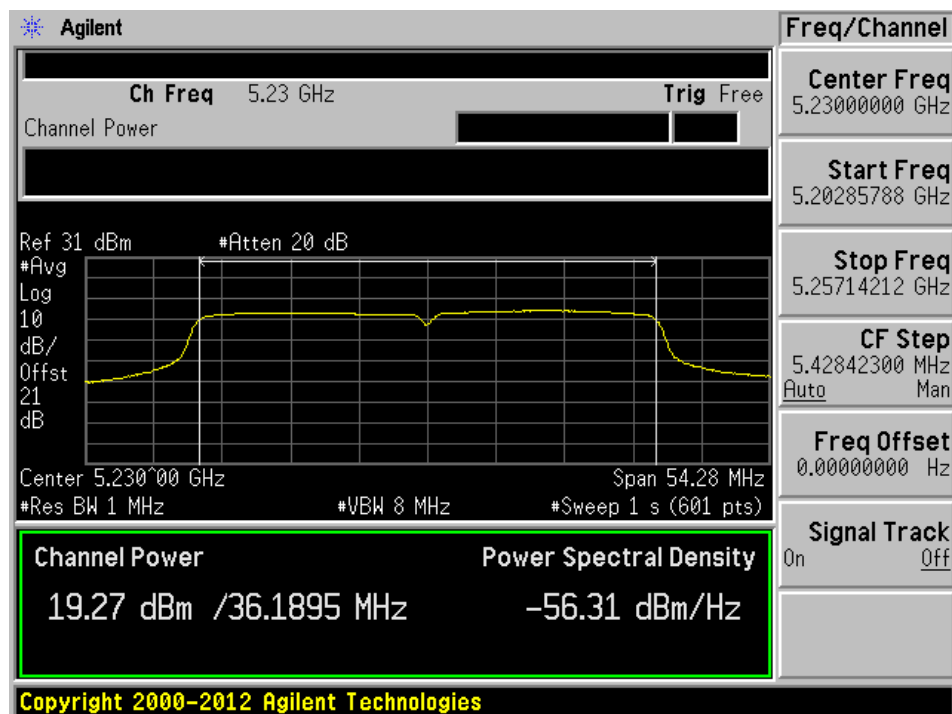
802.11n-HT40 mode, 5190 MHz, Chain J0



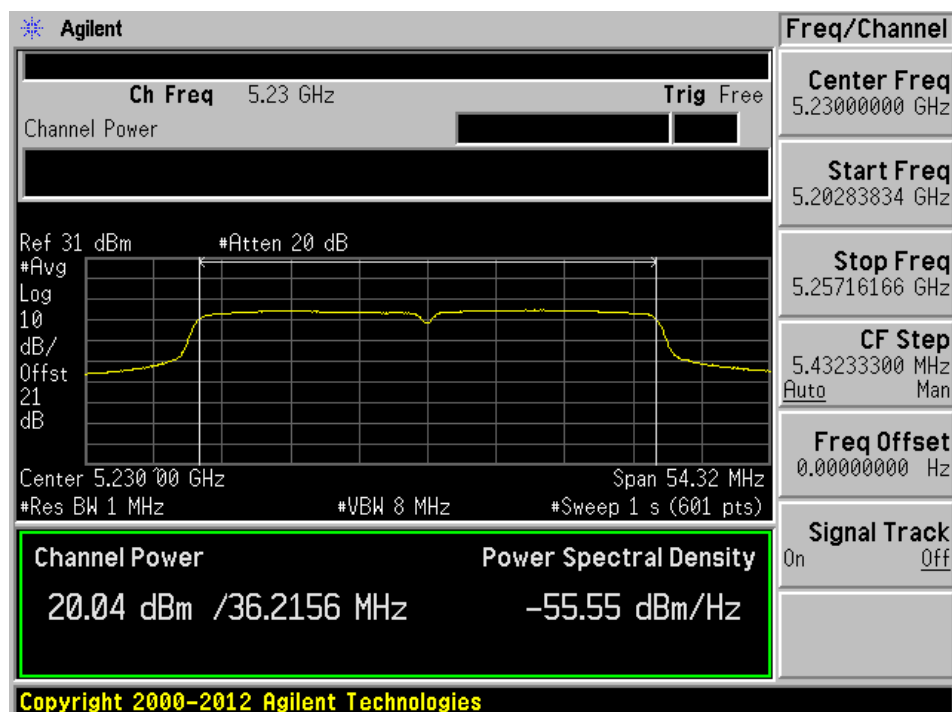
802.11n-HT40 mode, 5190 MHz, Chain J1



802.11n-HT40 mode, 5230 MHz, Chain J0



802.11n-HT40 mode, 5230 MHz, Chain J1



5725-5850 MHz Band

802.11a mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5745	19.85	18.98	22.45	30	-7.55	Target
Middle	5785	19.52	18.83	22.2	30	-7.8	Target
High	5825	19.60	18.73	22.20	30	-7.80	Target

802.11n-HT20 mode

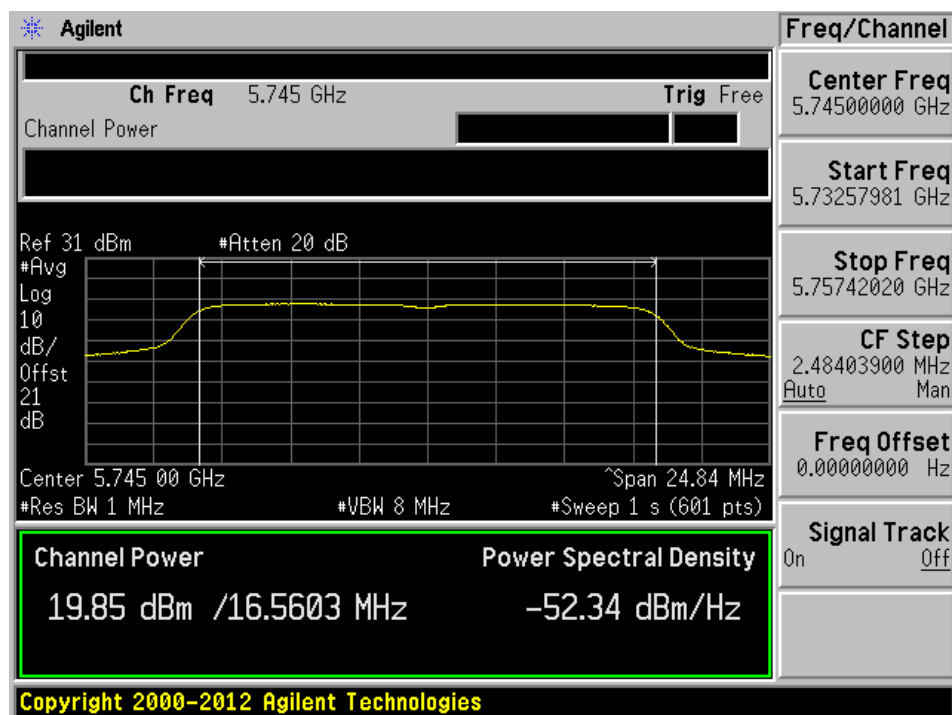
Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5745	16.40	16.51	19.47	30	-10.53	17
Middle	5785	19.72	18.86	22.32	30	-7.68	Target
High	5825	19.21	18.62	21.94	30	-8.06	Target

802.11n-HT40 mode

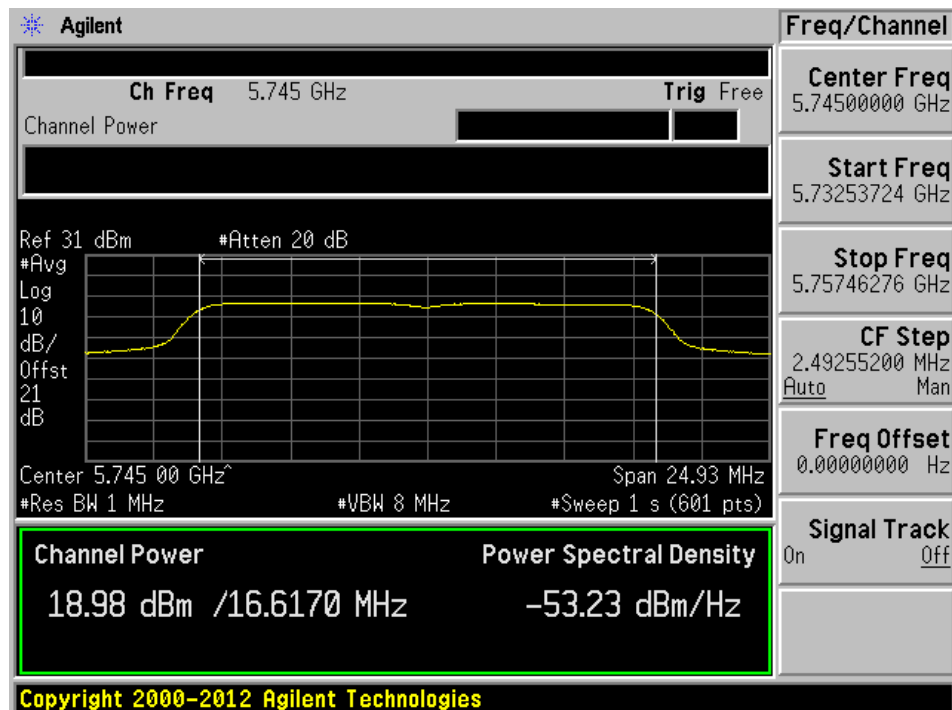
Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5755	16.65	15.97	19.33	30	-10.66	17
High	5795	19.51	18.69	22.13	30	-7.87	Target

802.11a mode

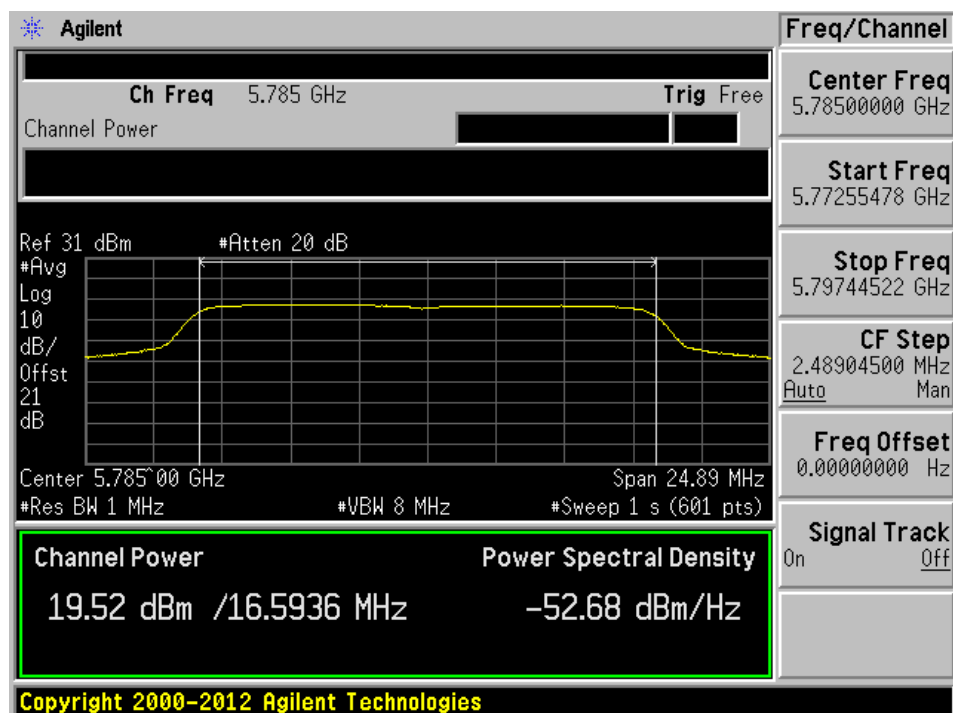
802.11a mode, 5745 MHz, Chain J0



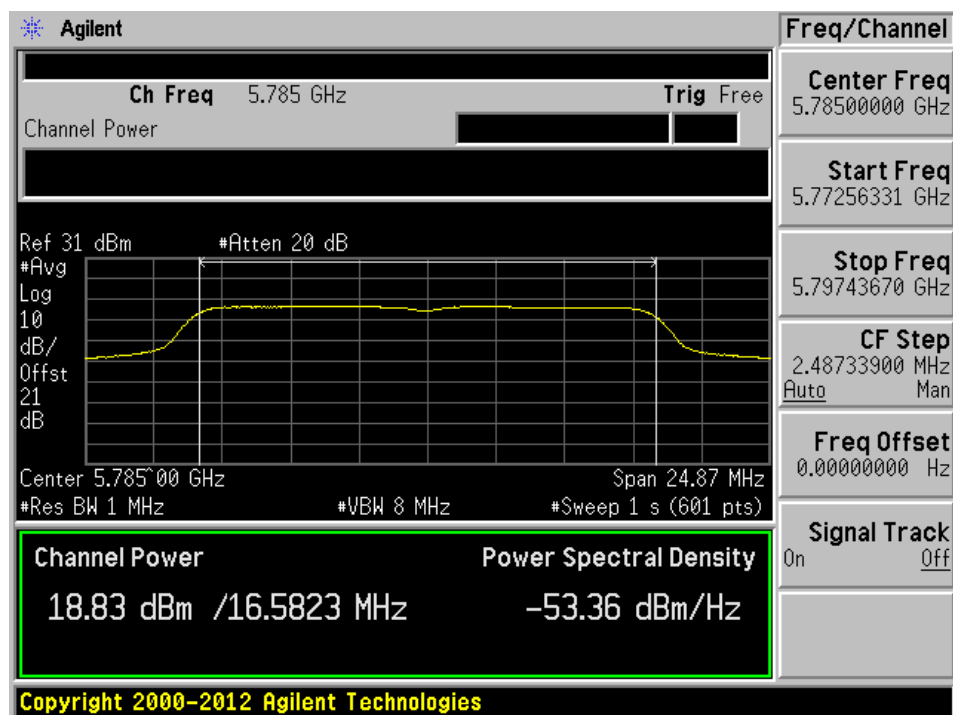
802.11a mode, 5745 MHz, Chain J1



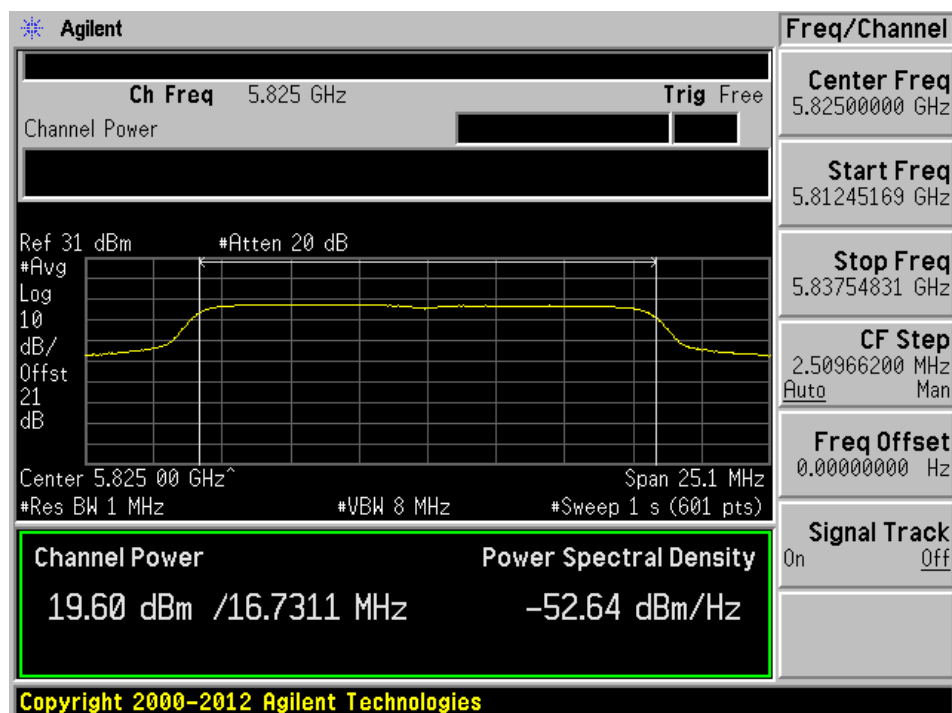
802.11a mode, 5785 MHz, Chain J0



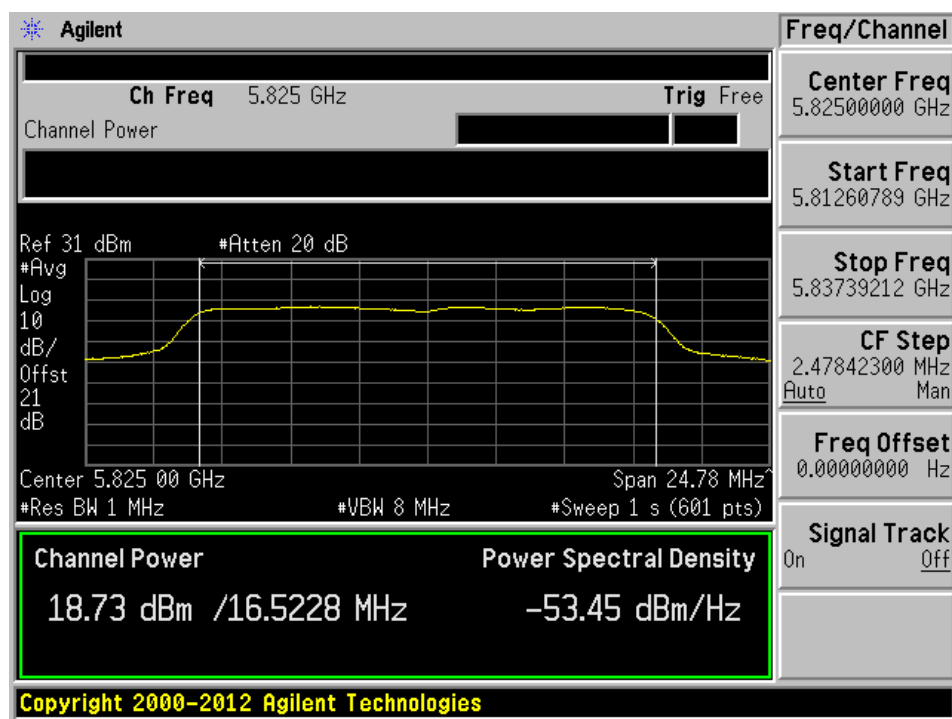
802.11a mode, 5785 MHz, Chain J1



802.11a mode, 5825 MHz, Chain J0

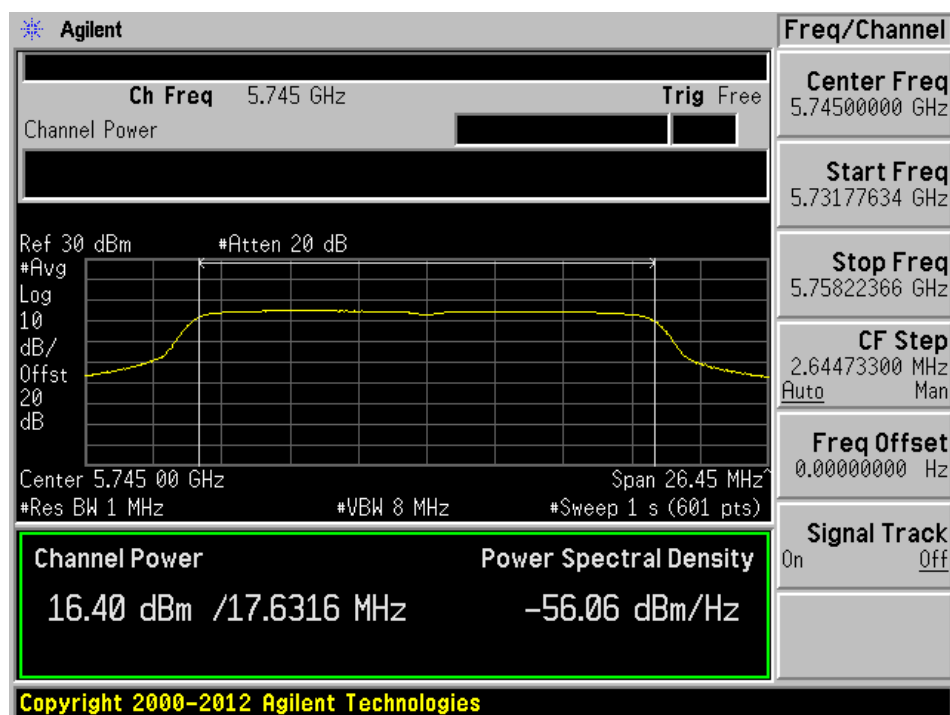


802.11a mode, 5825 MHz, Chain J1

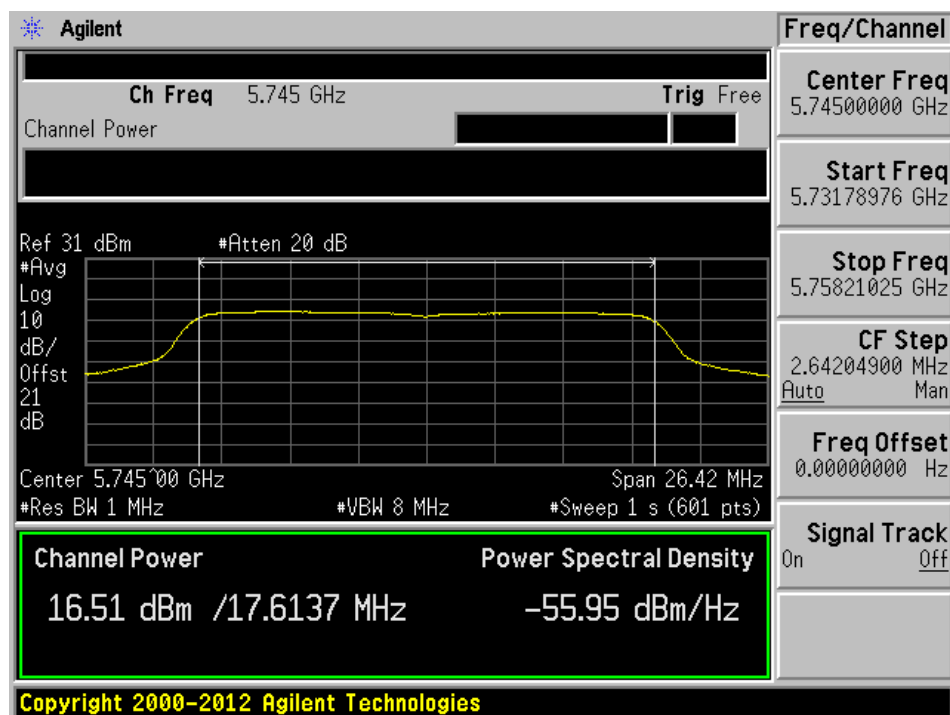


802.11n-HT20 mode

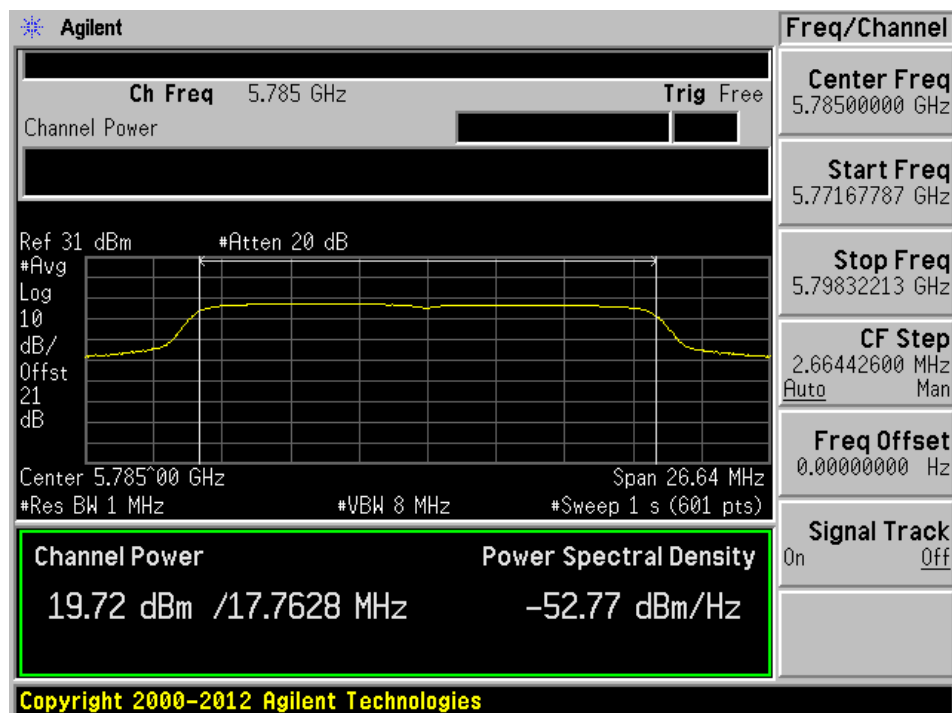
802.11n-HT20 mode, 5745 MHz, Chain J0



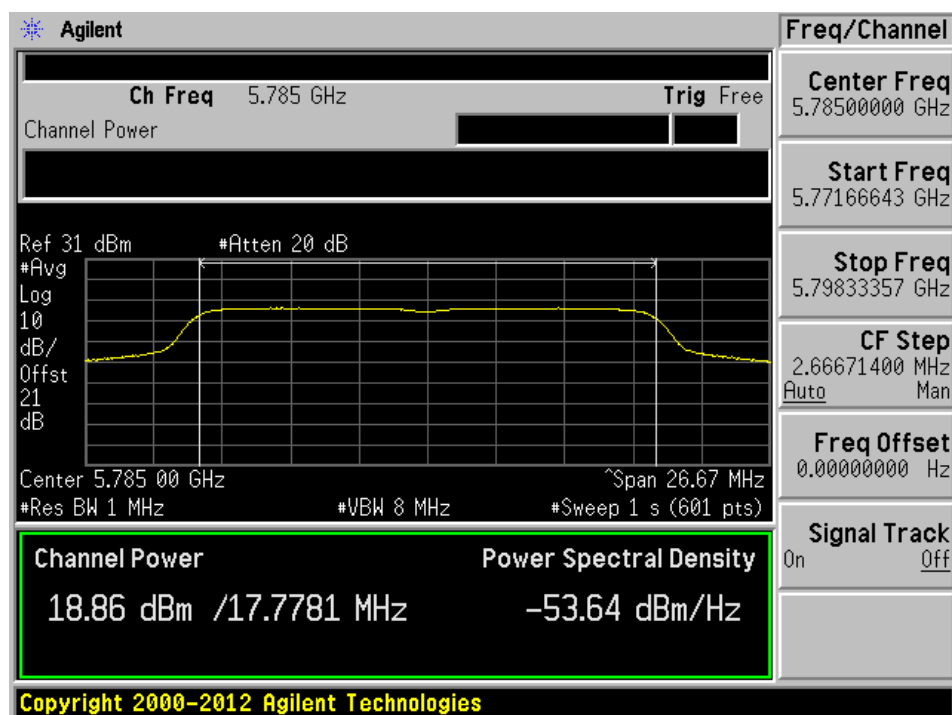
802.11n-HT20 mode, 5745 MHz, Chain J1



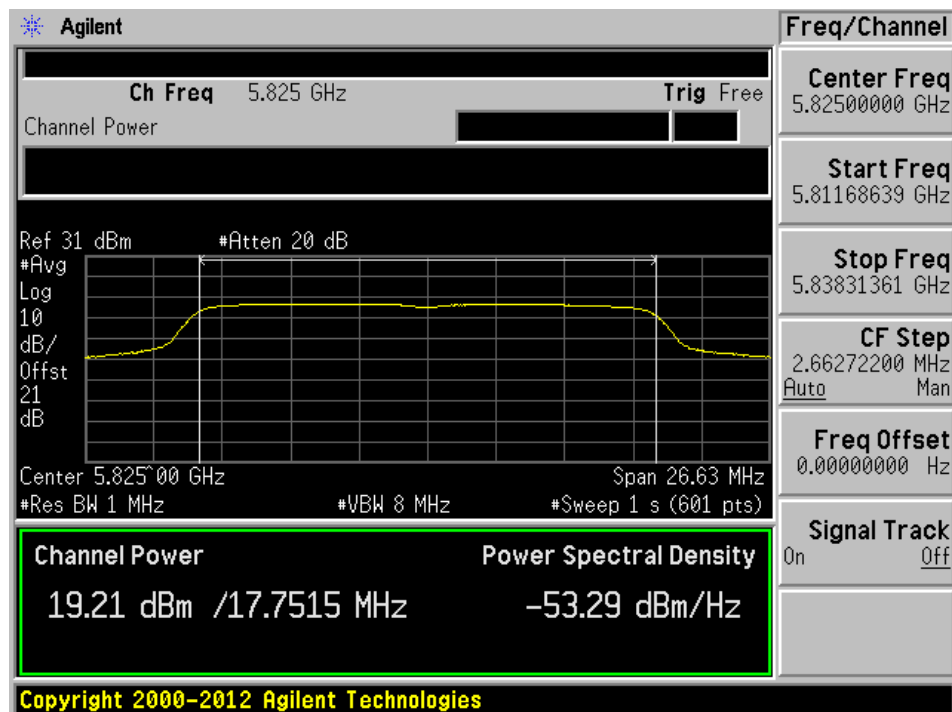
802.11n-HT20 mode, 5785 MHz, Chain J0



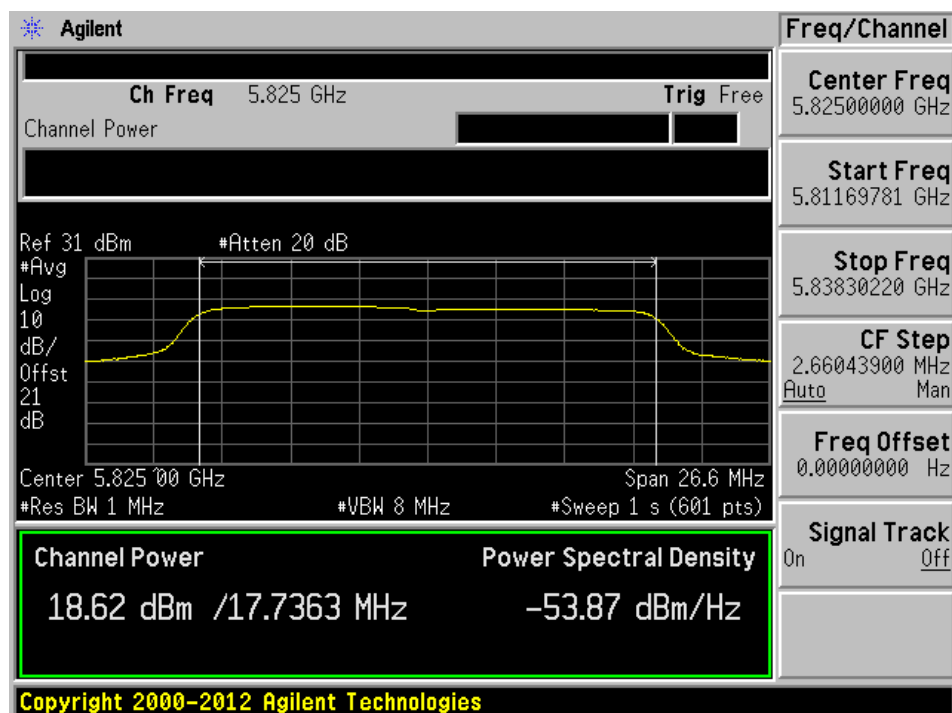
802.11n-HT20 mode, 5785 MHz, Chain J1



802.11n-HT20 mode, 5825 MHz, Chain J0

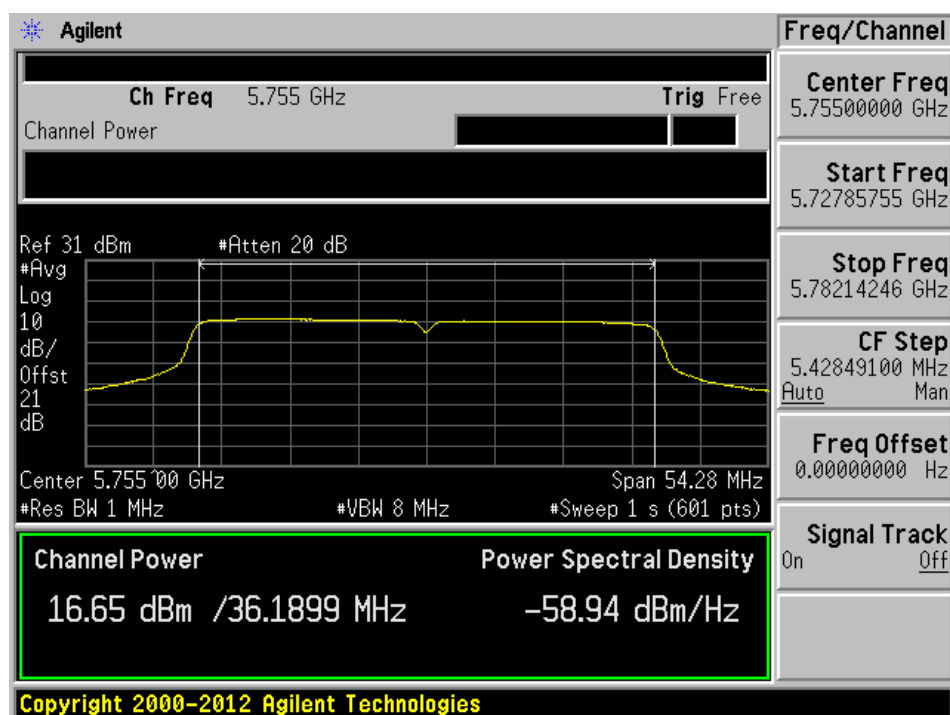


802.11n-HT20 mode, 5825 MHz, Chain J1

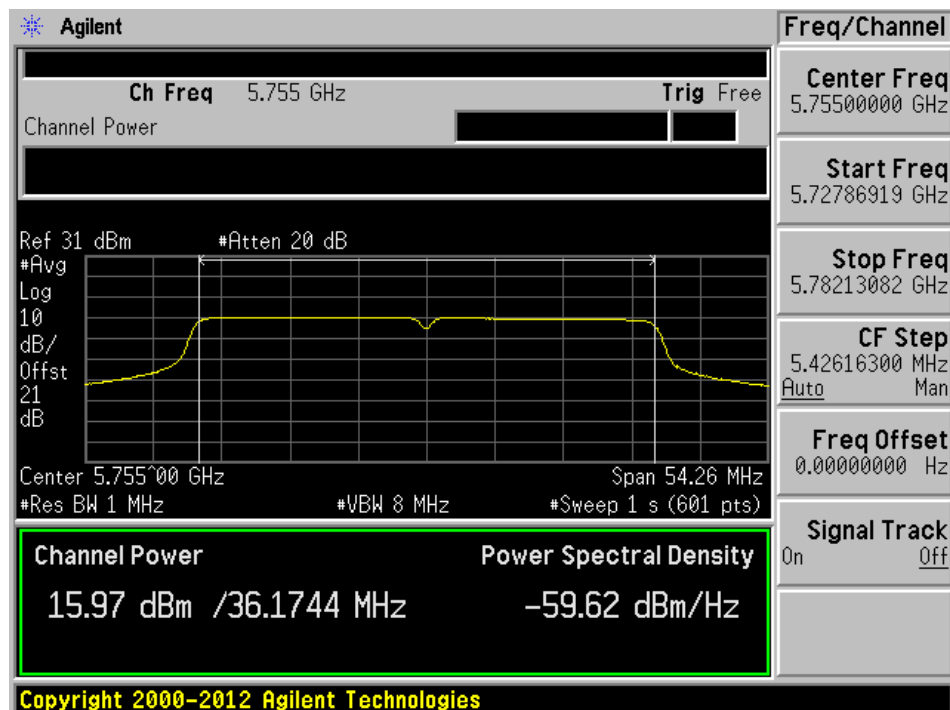


802.11n-HT40 mode

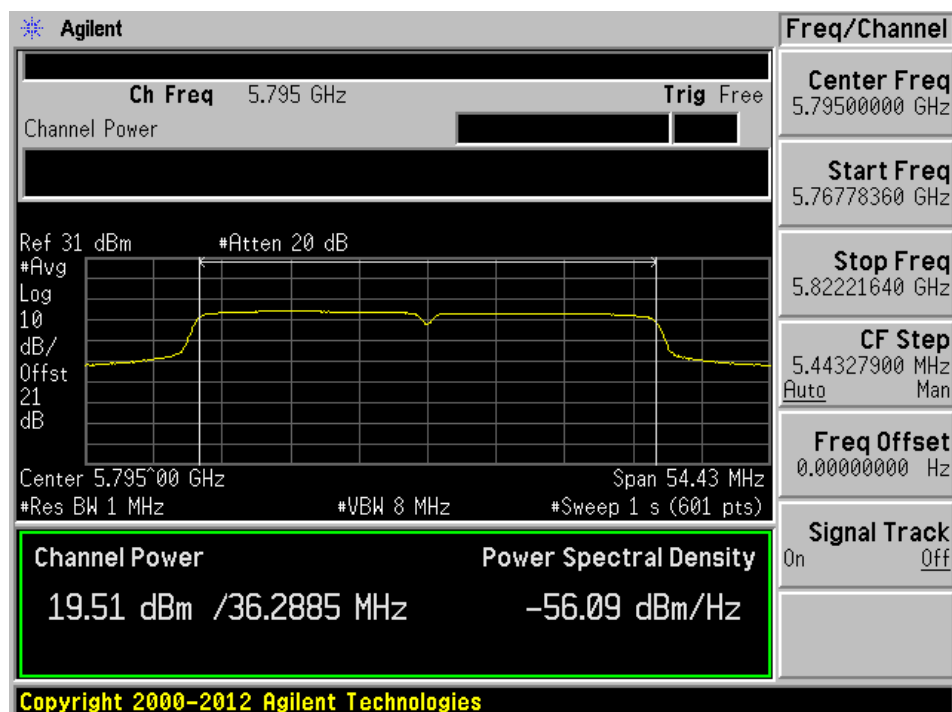
802.11n-HT40 mode, 5755 MHz, Chain J0



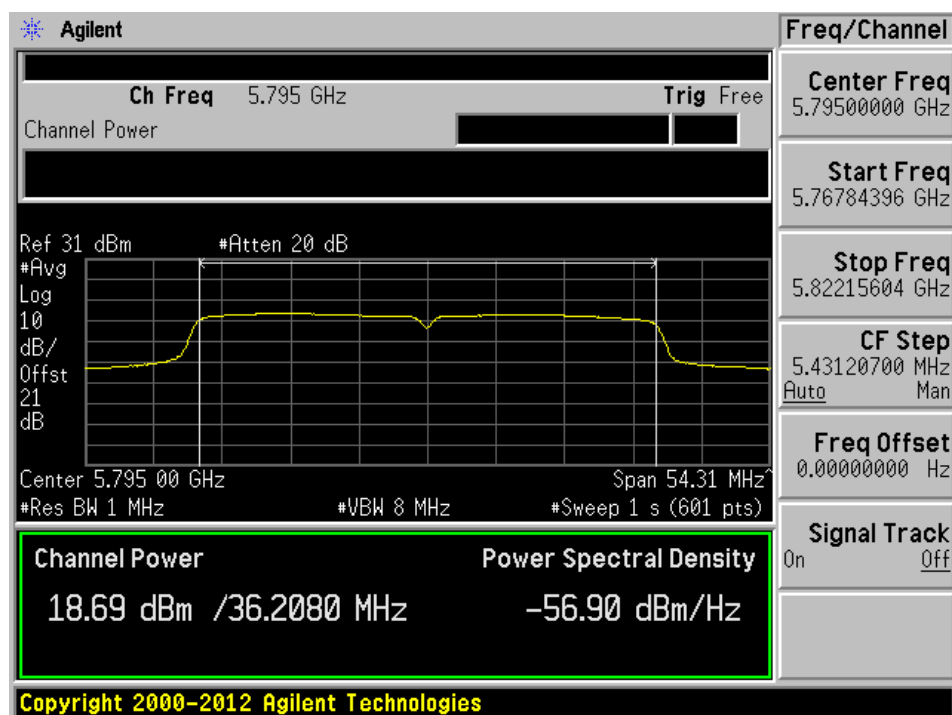
802.11n-HT40 mode, 5755 MHz, Chain J1



802.11n-HT40 mode, 5795 MHz, Chain J0



802.11n-HT40 mode, 5795 MHz, Chain J1



10 FCC §15.407(b) - Band Edge

10.1 Applicable Standard

According to FCC §15.407(b)

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

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

10.2 Measurement Procedure

The measurements are base on FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section G: Unwanted emissions measurement

10.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US42221851	2015-06-23	1 year
-	SMA Cable	-	C0001	Each Time ¹	N/A
Mini-Circuits	Attenuator	BW-S20W5	1430	Each Time ¹	N/A

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:	23 °C
Relative Humidity:	44 %
ATM Pressure:	101.2 kPa

The testing was performed by Leonard Gray on 2016-01-29 in RF site.

10.5 Test Results

Please refer to following pages for plots of band edge.

5150-5250 MHz Band

802.11a mode

Channel	Frequency (MHz)	E.I.R.P J0 (dBm/MHz)	E.I.R.P J1 (dBm/MHz)	Total E.I.R.P (dBm/MHz)	Limit E.I.R.P (dBm/MHz)	Result
Low	5180	-35.66	-37.39	-33.43	-27	Compliant
High	5240	-47.67	-45.65	-43.53	-27	Compliant

802.11n-HT20 mode

Channel	Frequency (MHz)	E.I.R.P J0 (dBm/MHz)	E.I.R.P J1 (dBm/MHz)	Total E.I.R.P (dBm/MHz)	Limit E.I.R.P (dBm/MHz)	Result
Low	5180	-34.62	-34.74	-31.67	-27	Compliant
High	5240	-46.87	-46.83	-43.84	-27	Compliant

802.11n-HT40 mode

Channel	Frequency (MHz)	E.I.R.P J0 (dBm/MHz)	E.I.R.P J1 (dBm/MHz)	Total E.I.R.P (dBm/MHz)	Limit E.I.R.P (dBm/MHz)	Result
Low	5190	-35.99	-40.74	-34.74	-27	Compliant
High	5230	-46.15	-45.58	-42.85	-27	Compliant

5725-5850 MHz Band

(1) 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

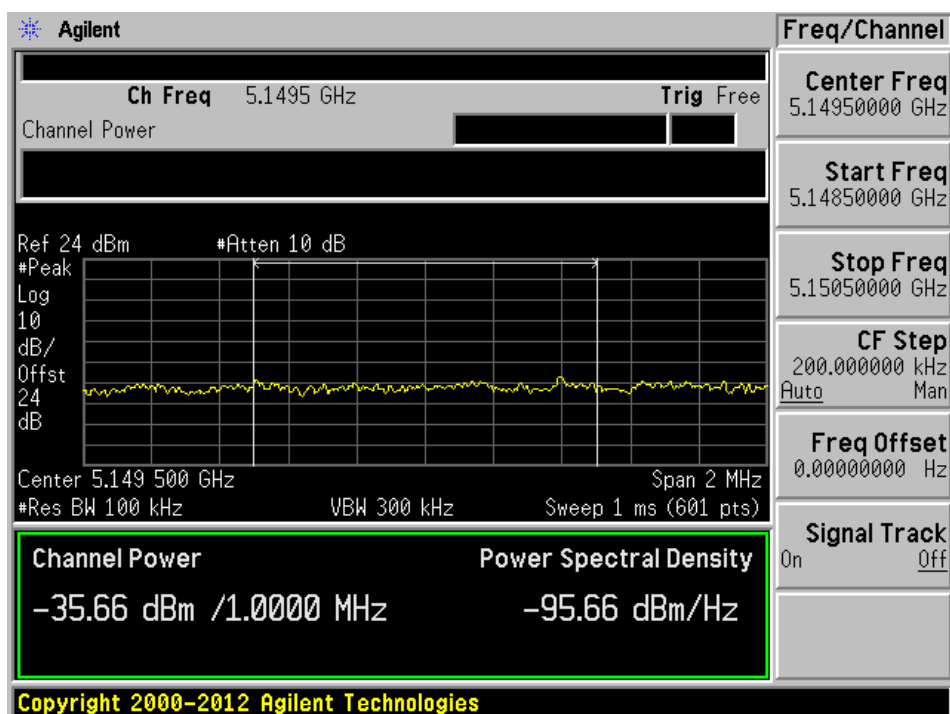
Channel	Frequency (MHz)	E.I.R.P J0 (dBm/MHz)	E.I.R.P J1 (dBm/MHz)	Total E.I.R.P (dBm/MHz)	Limit E.I.R.P (dBm/MHz)	Result
802.11a mode						
Low	5745	-22.56	-24.19	-24.09	-17	Compliant
High	5825	-34.77	-36.76	-36.22	-17	Compliant
802.11n-HT20 mode						
Low	5745	-31.75	-30.81	-28.24	-17	Compliant
High	5825	-33.16	-36.19	-31.41	-17	Compliant
802.11n-HT40 mode						
Low	5745	-31.52	-30.46	-27.95	-17	Compliant
High	5825	-37.75	-40.98	-36.06	-17	Compliant

(2) 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.

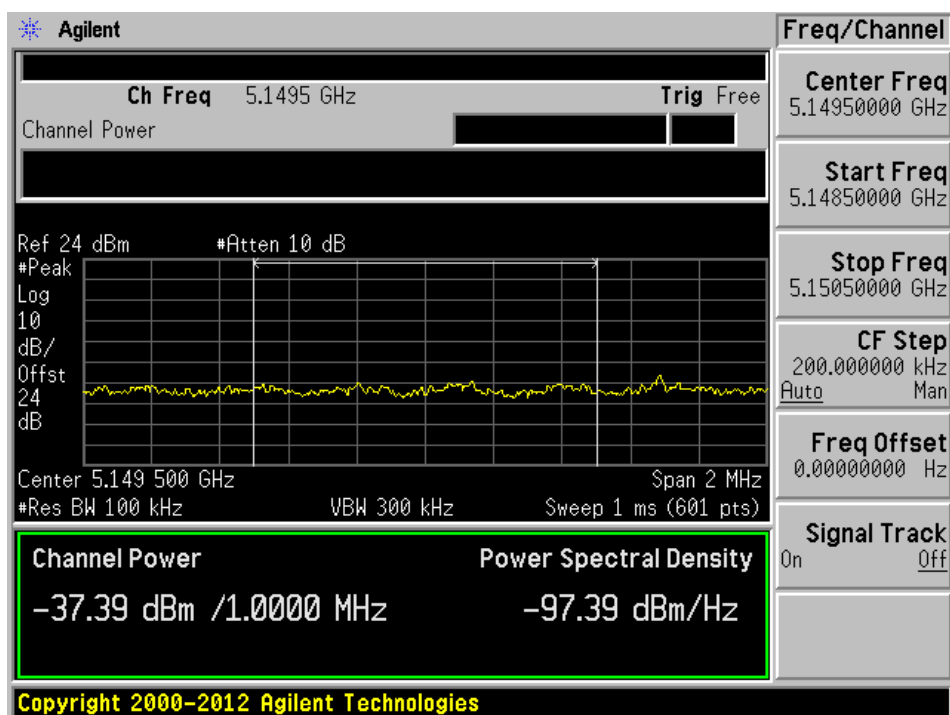
Channel	Frequency (MHz)	E.I.R.P J0 (dBm/MHz)	E.I.R.P J1 (dBm/MHz)	Total E.I.R.P (dBm/MHz)	Limit E.I.R.P (dBm/MHz)	Result
802.11a mode						
Low	5745	-36.11	-39.15	-34.36	-27	Compliant
High	5825	-41.50	-42.48	-38.95	-27	Compliant
802.11n-HT20 mode						
Low	5745	-40.07	-44.37	-38.70	-27	Compliant
High	5825	-41.73	-43.23	-39.41	-27	Compliant
802.11n-HT40 mode						
Low	5745	-35.00	-33.05	-30.91	-27	Compliant
High	5825	-41.66	-42.39	-39.00	-27	Compliant

5150-5250 MHz Band

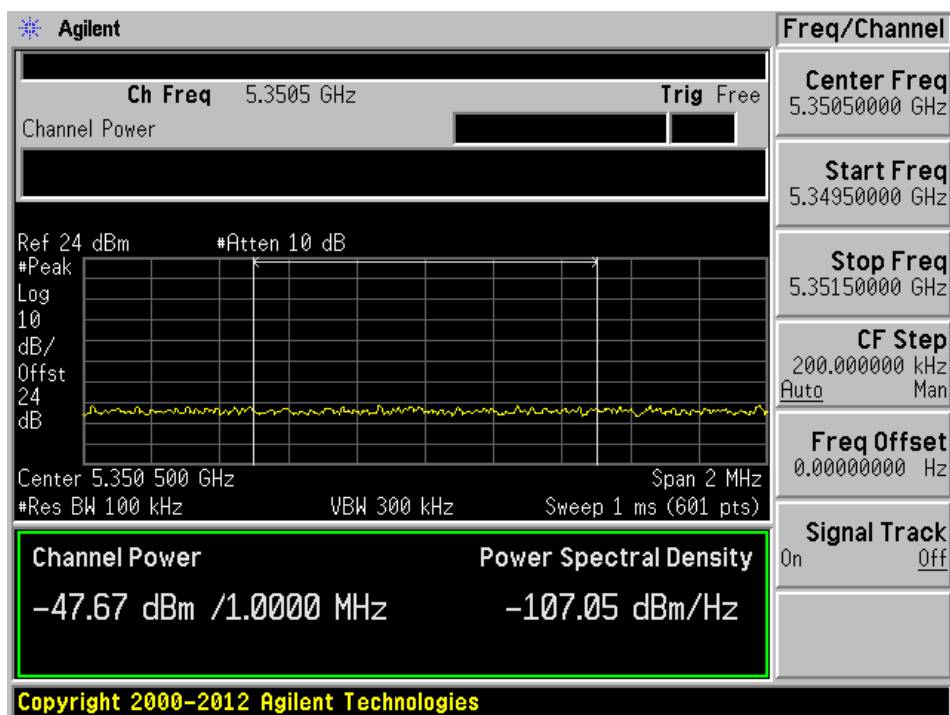
802.11a mode, Lowest Channel, Chain J0, 5149.5 MHz



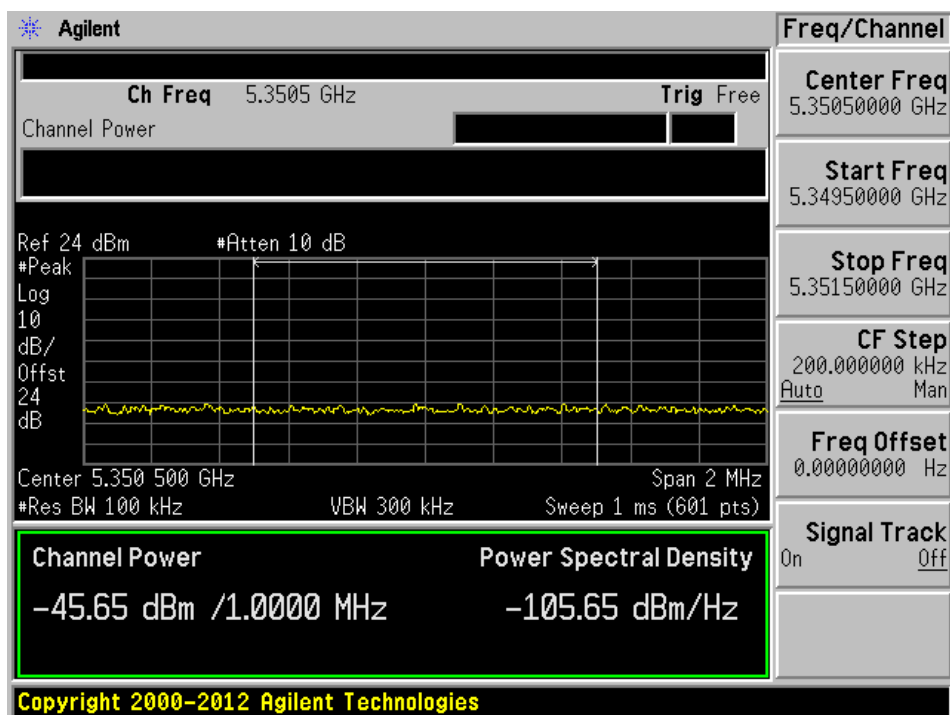
802.11a mode, Lowest Channel, Chain J1, 5149.5 MHz



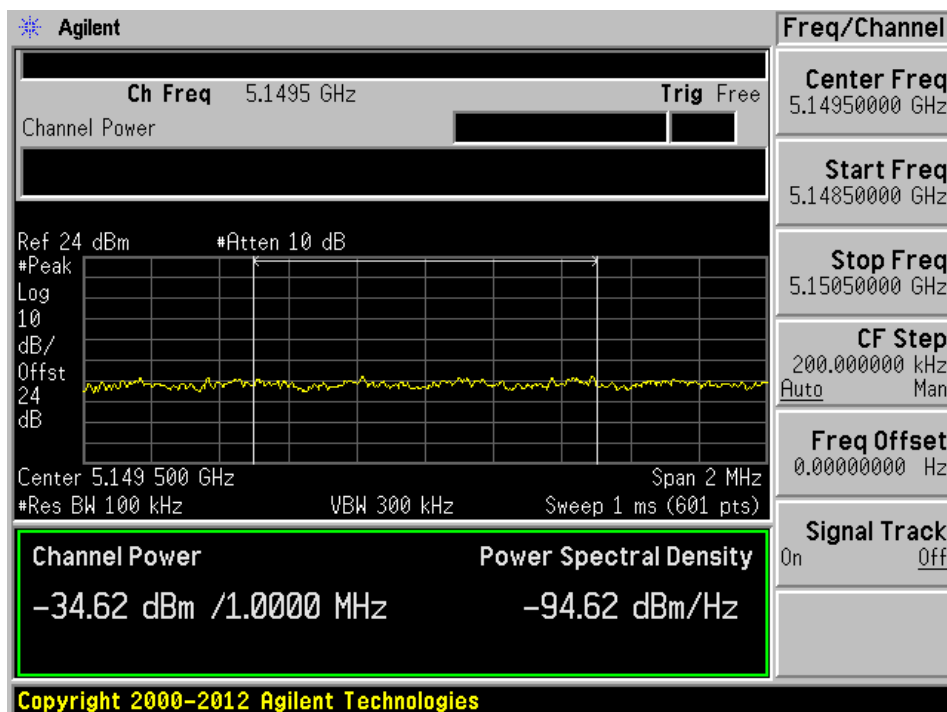
802.11a mode, Highest Channel, Chain J0, 5350.5 MHz



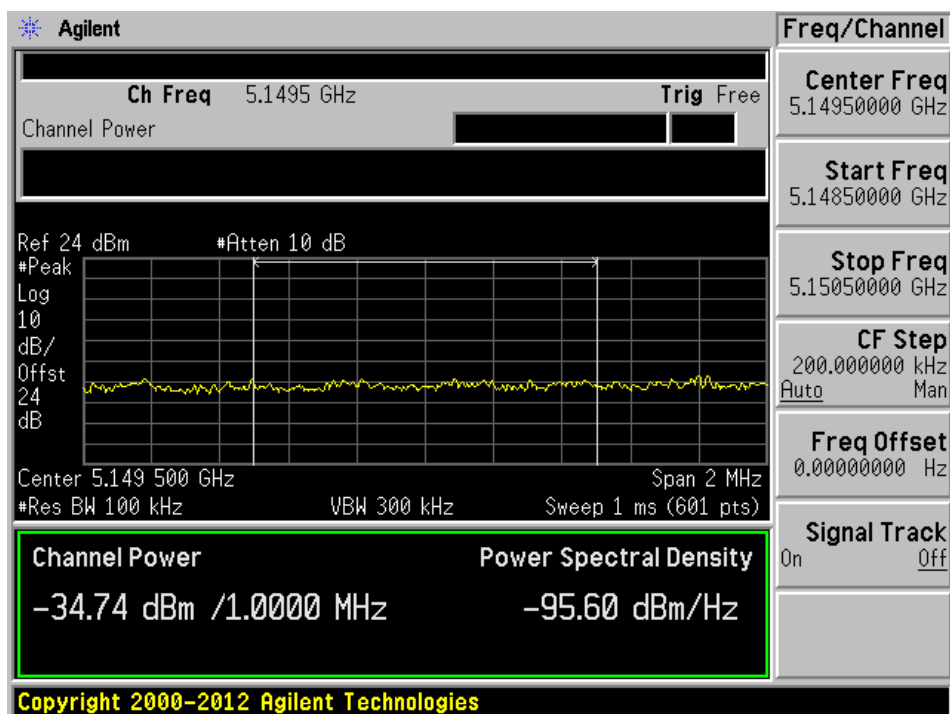
802.11a mode, Highest Channel, Chain J1, 5350.5 MHz



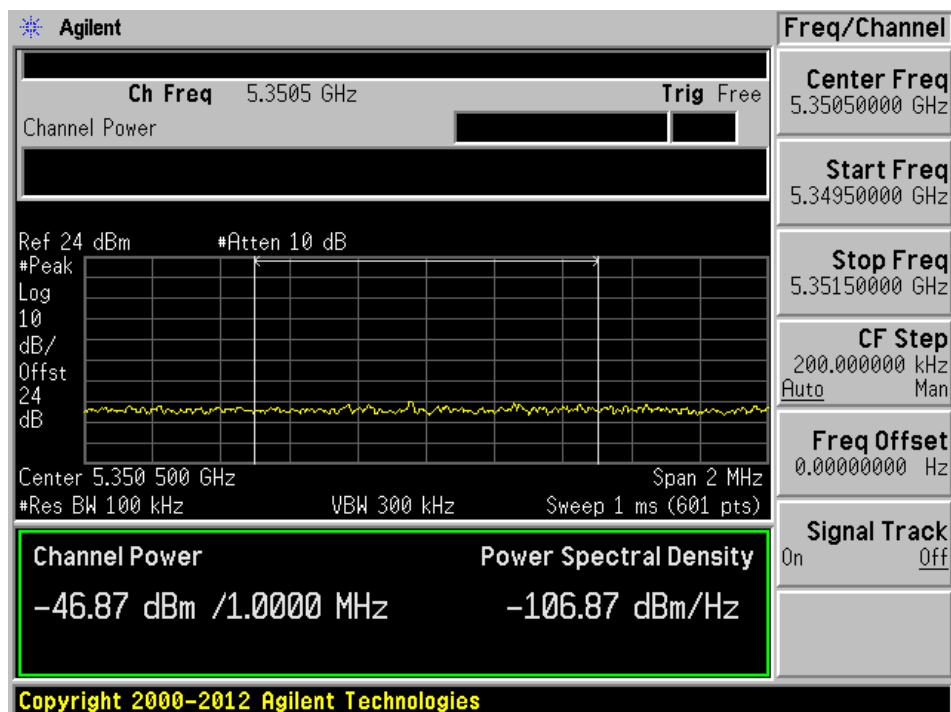
802.11n20 mode, Lowest Channel, Chain J0, 5149.5 MHz



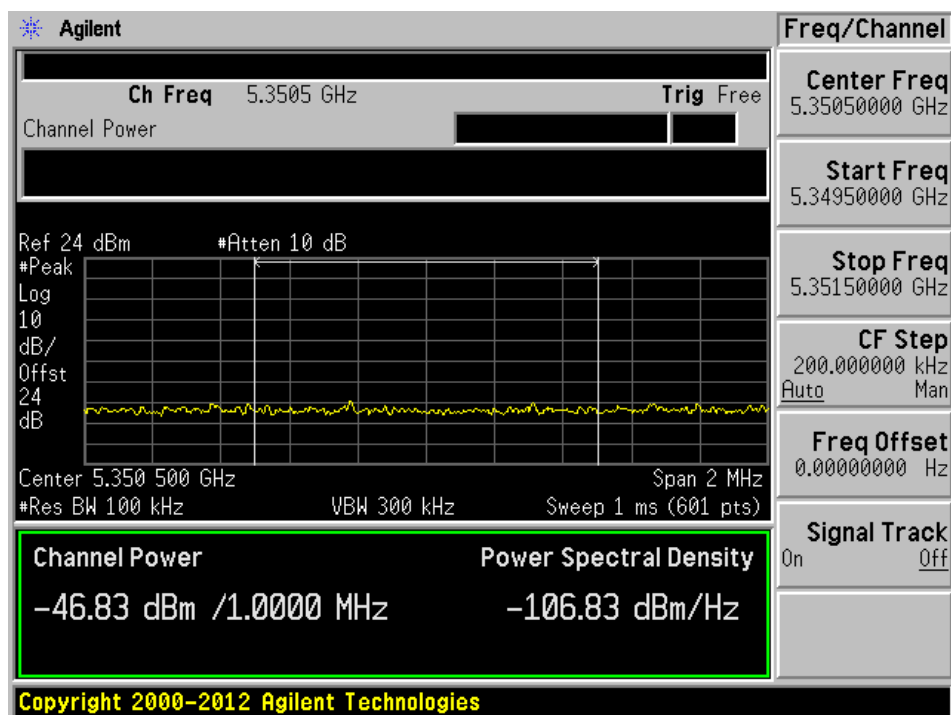
802.11n20 mode, Lowest Channel, Chain J1, 5149.5 MHz



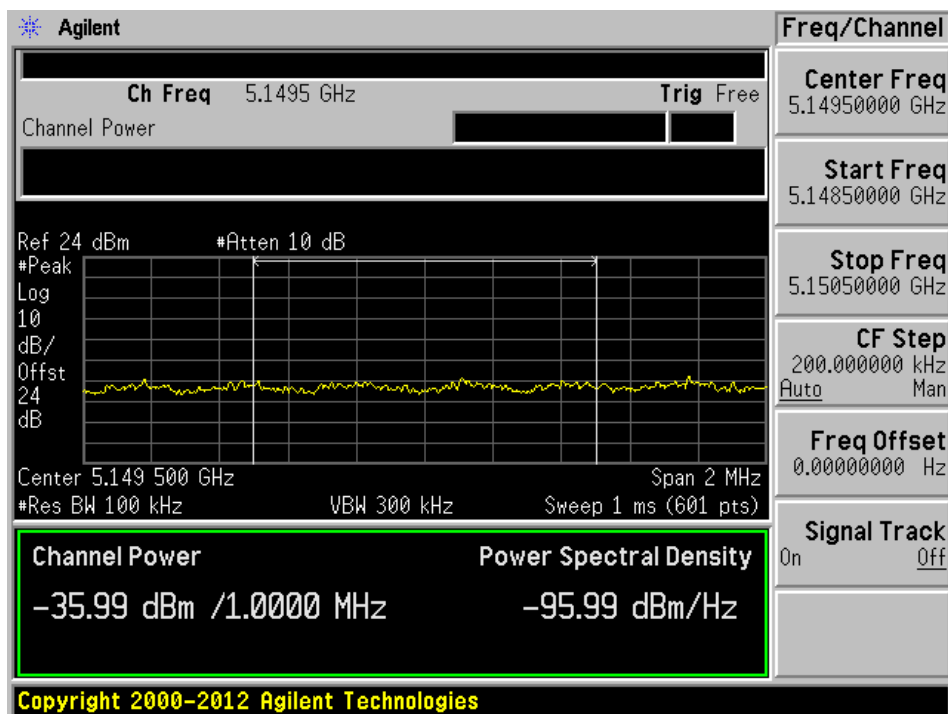
802.11n20 mode, Highest Channel, Chain J0, 5350.5 MHz



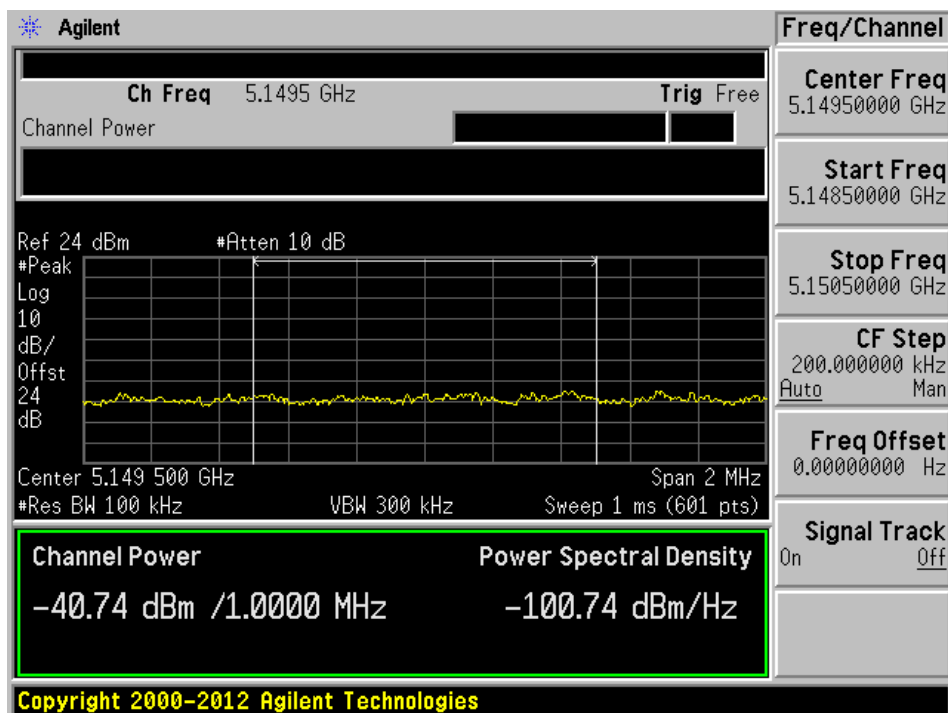
802.11n20 mode, Highest Channel, Chain J1, 5350.5 MHz



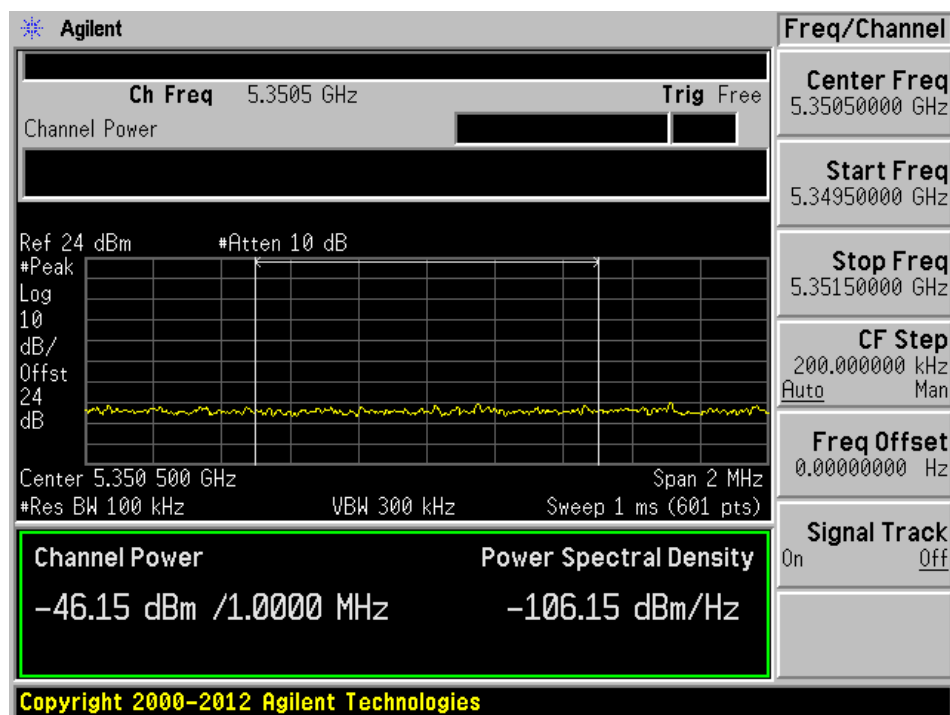
802.11n40 mode, Lowest Channel, Chain J0, 5149.5 MHz



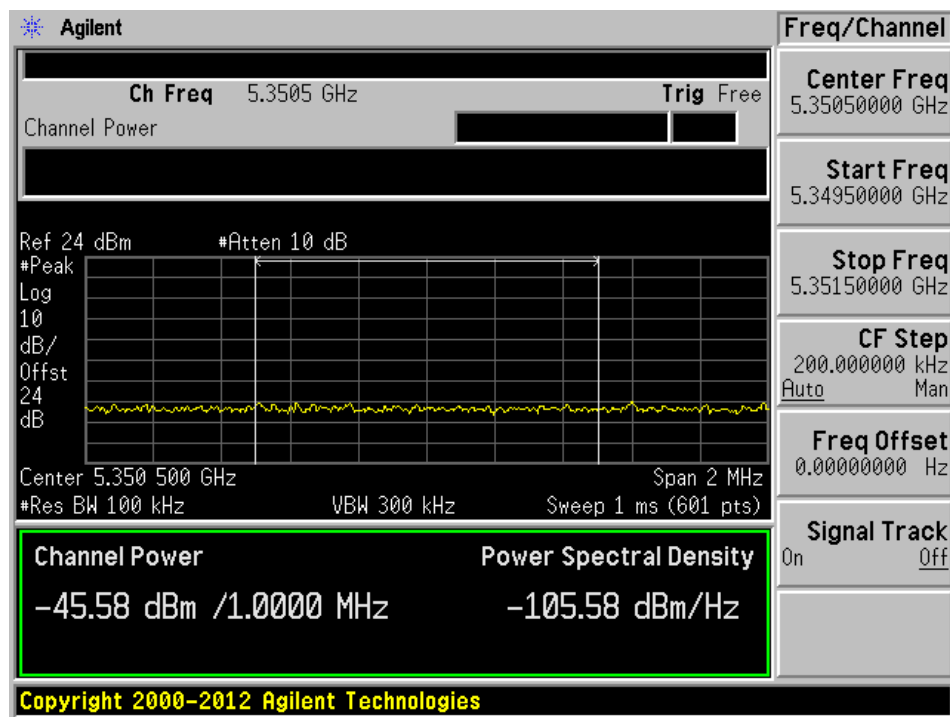
802.11n40 mode, Lowest Channel, Chain J1, 5149.5 MHz



802.11n40 mode, Highest Channel, Chain J0, 5350.5 MHz

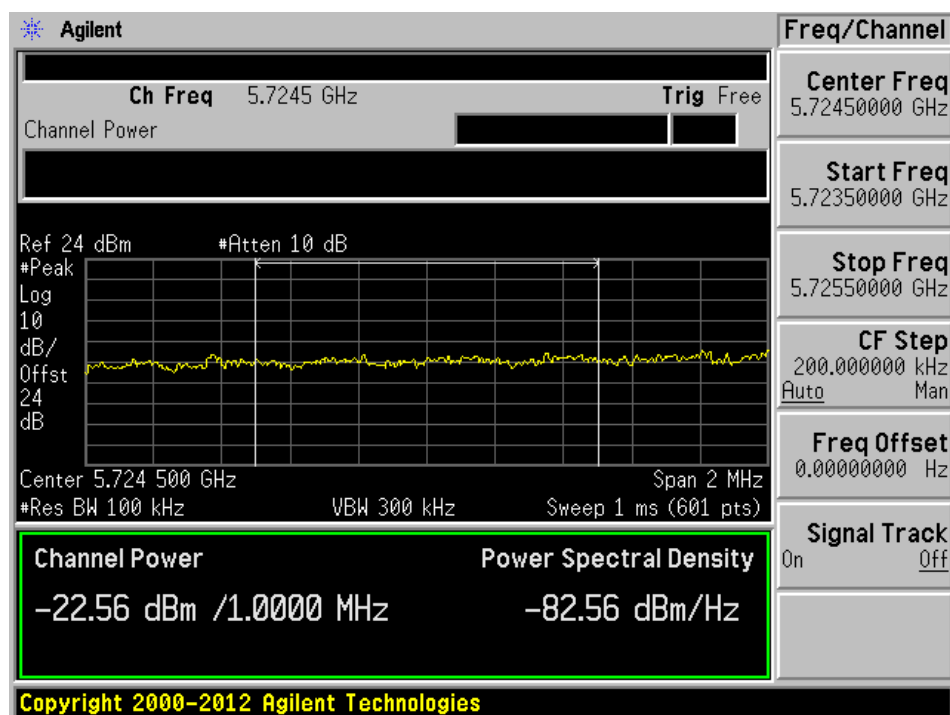


802.11n40 mode, Highest Channel, Chain J1, 5350.5 MHz

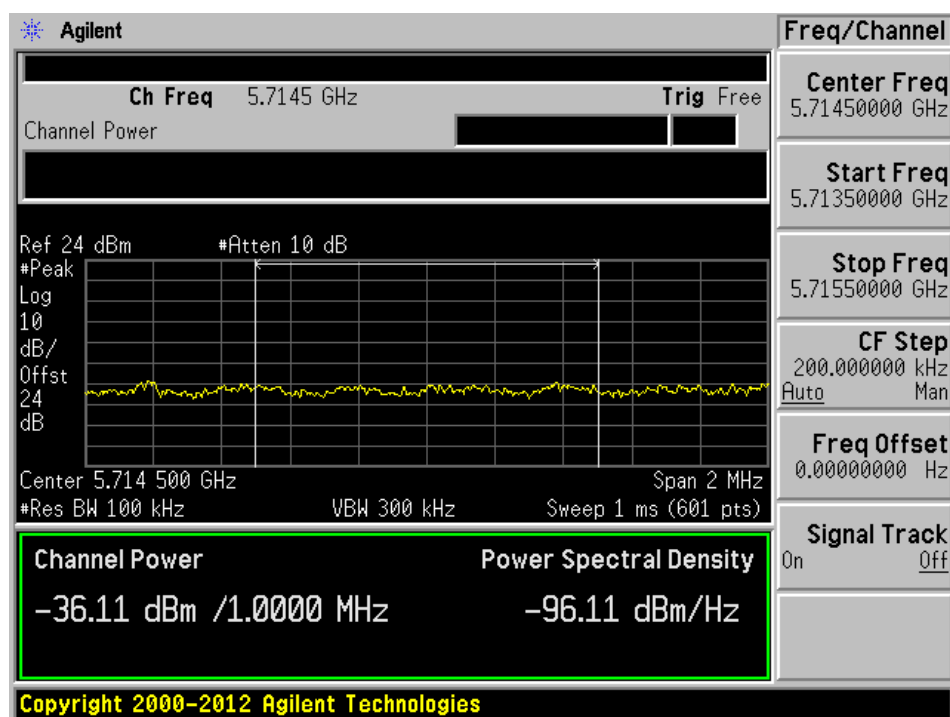


5725-5850 MHz Band

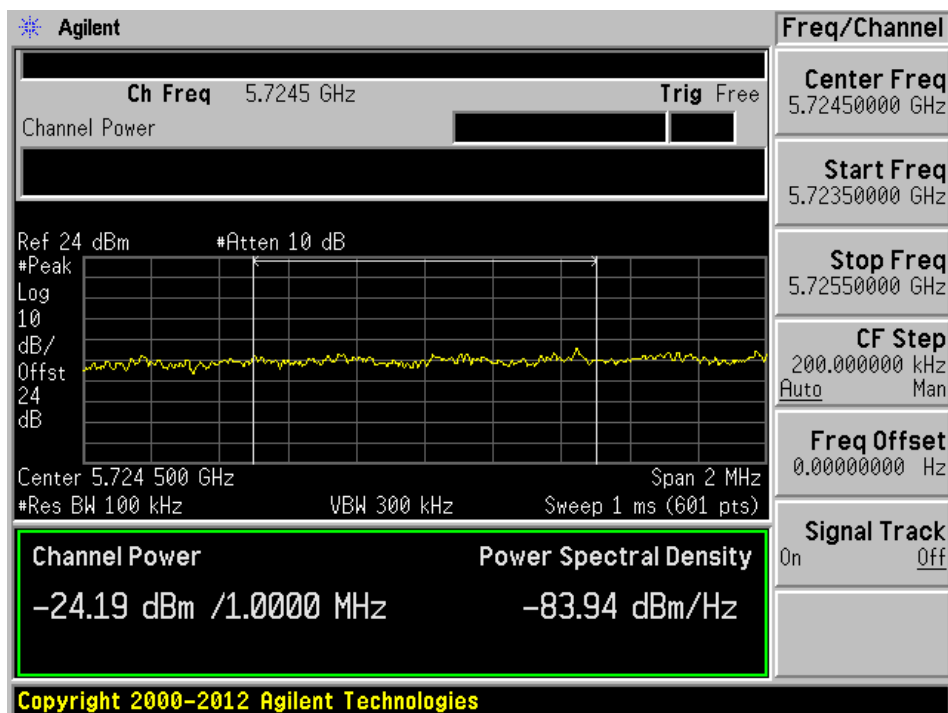
802.11a mode, Lowest Channel, Chain J0, 5724.5 MHz



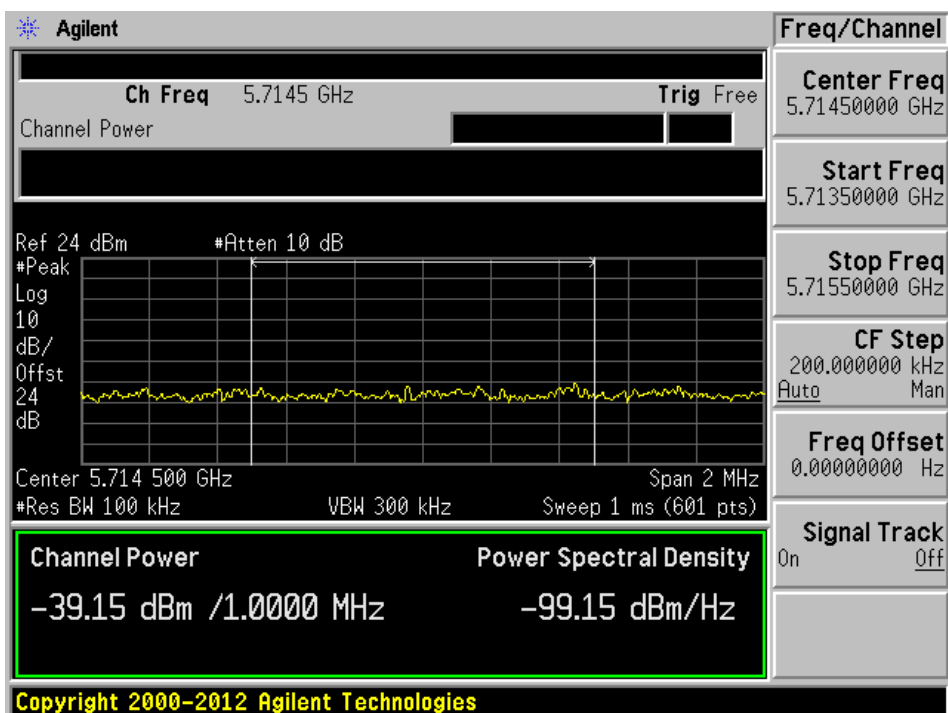
802.11a mode, Lowest Channel, Chain J0, 5714.5 MHz



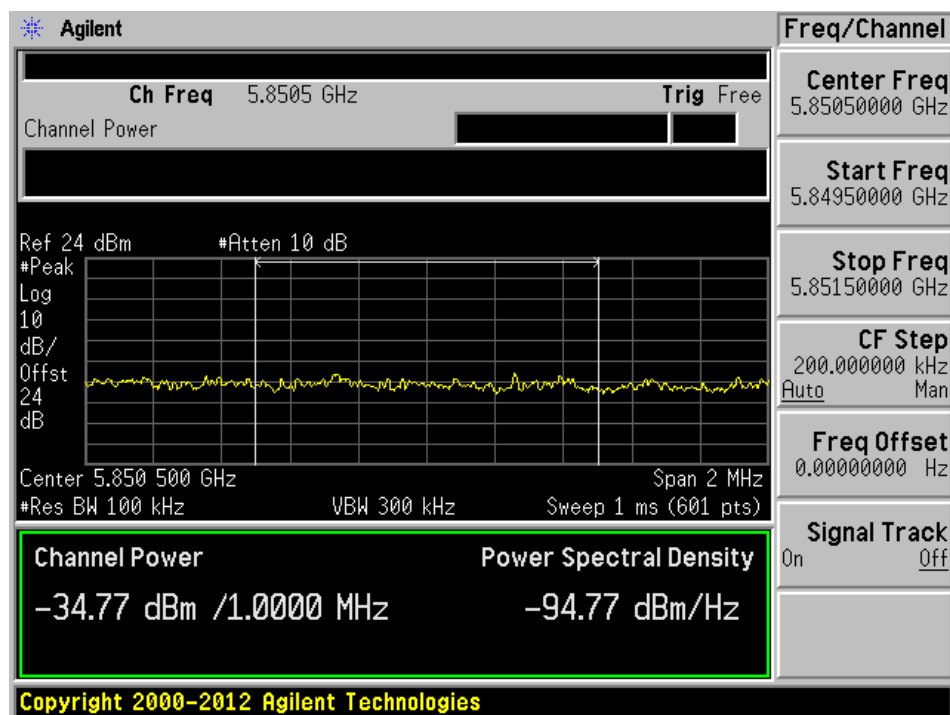
802.11a mode, Lowest Channel, Chain J1, 5724.5 MHz



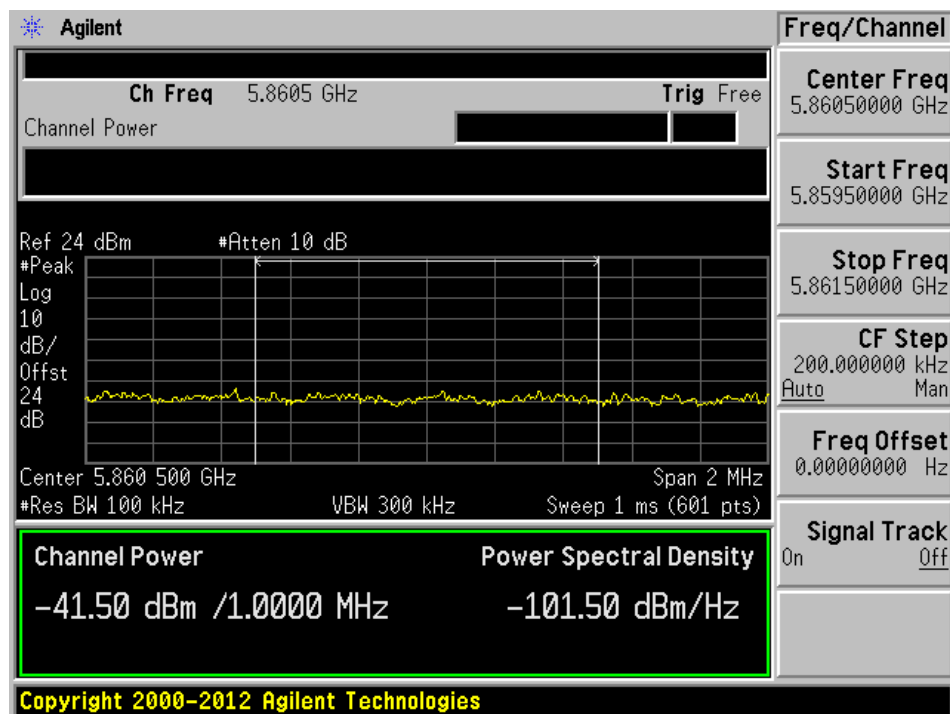
802.11a mode, Lowest Channel, Chain J1, 5714.5 MHz



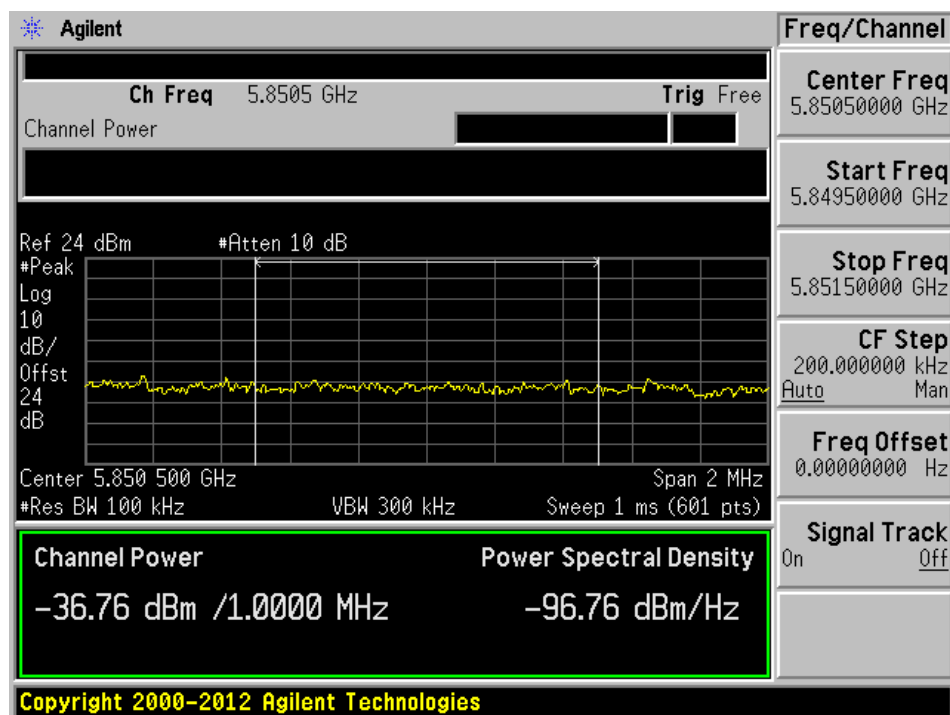
802.11a mode, Highest Channel, Chain J0, 5850.5 MHz



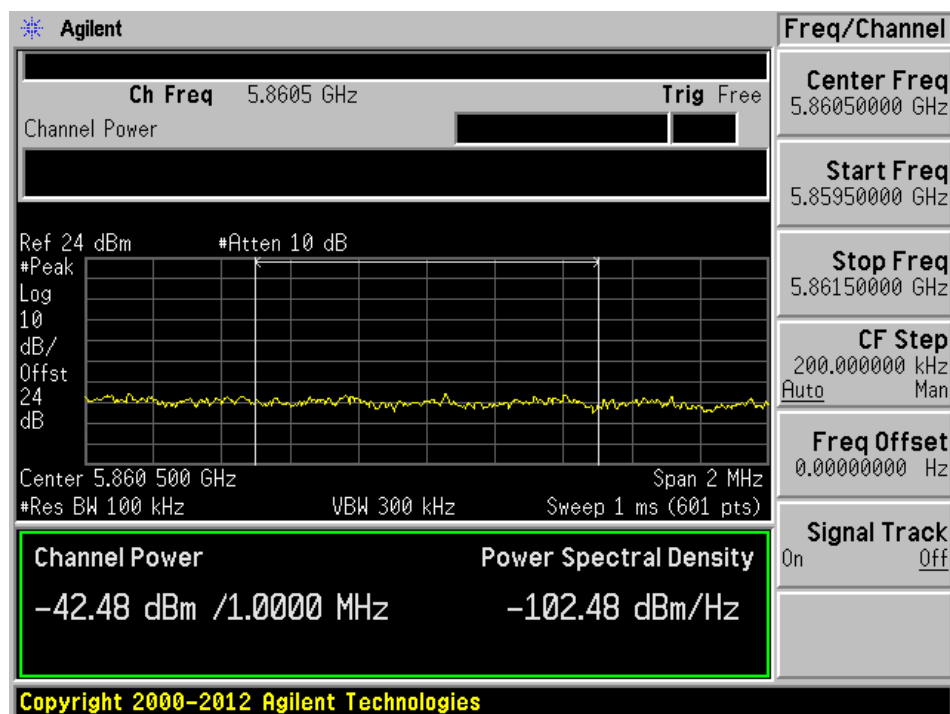
802.11a mode, Highest Channel, Chain J0, 5860.5 MHz



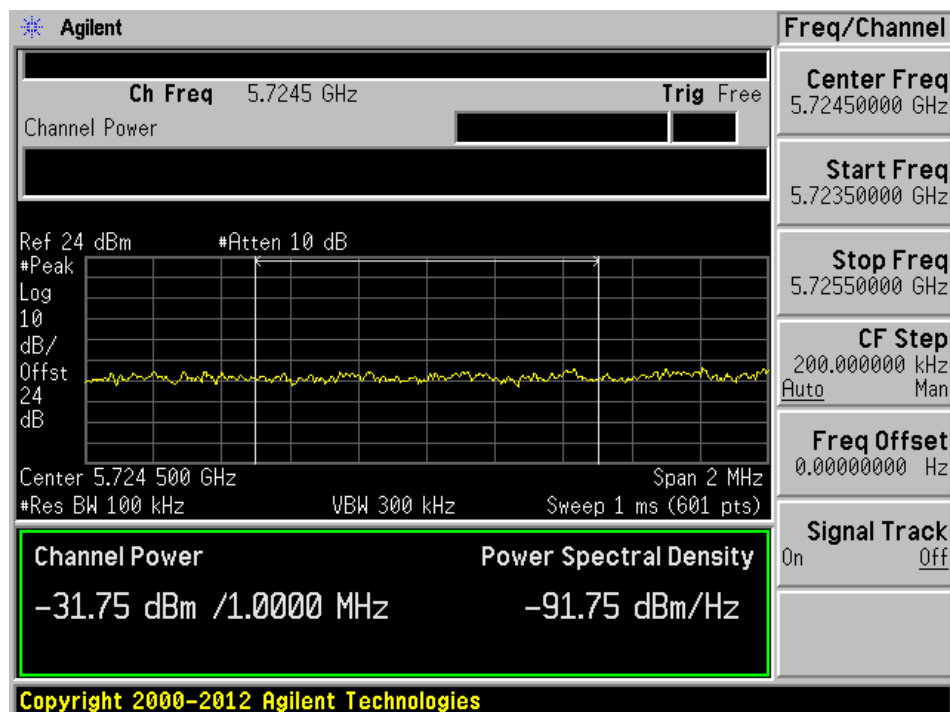
802.11a mode, Highest Channel, Chain J1, 5850.5 MHz



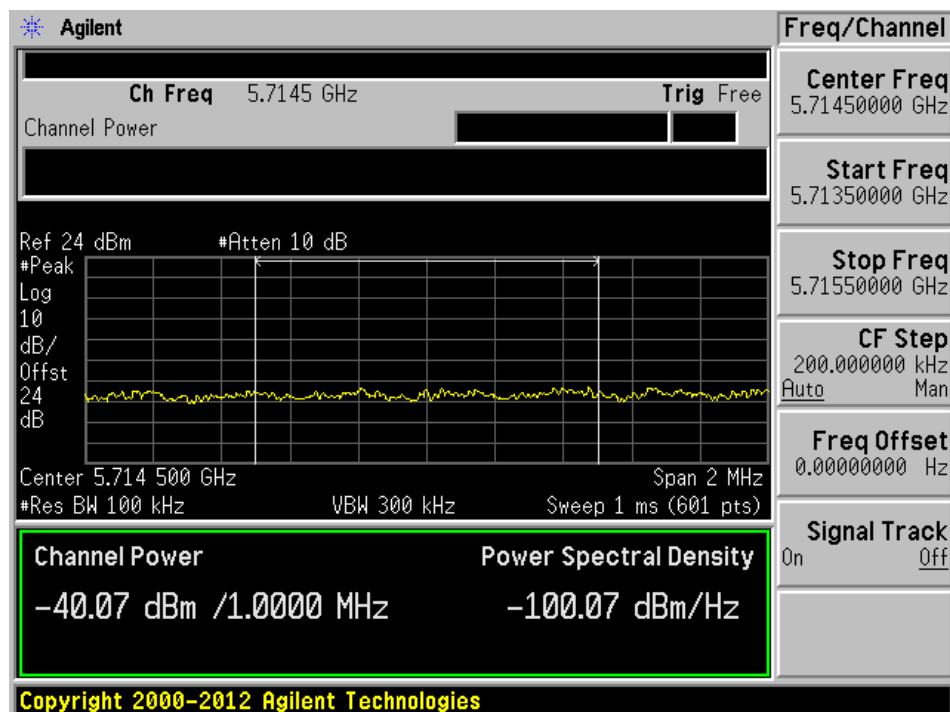
802.11a mode, Highest Channel, Chain J1, 5860.5 MHz



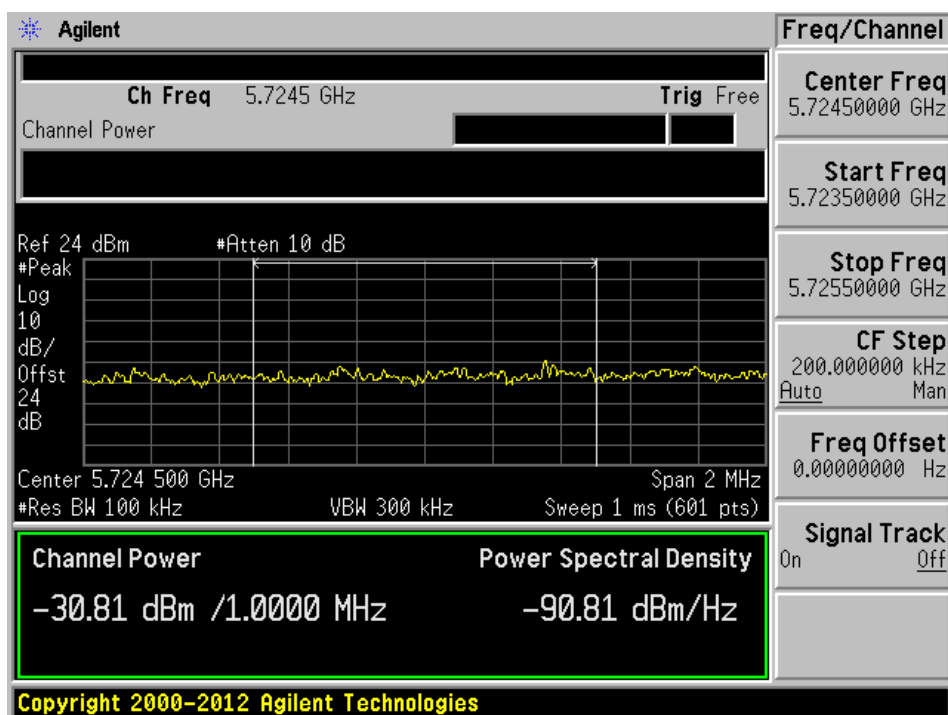
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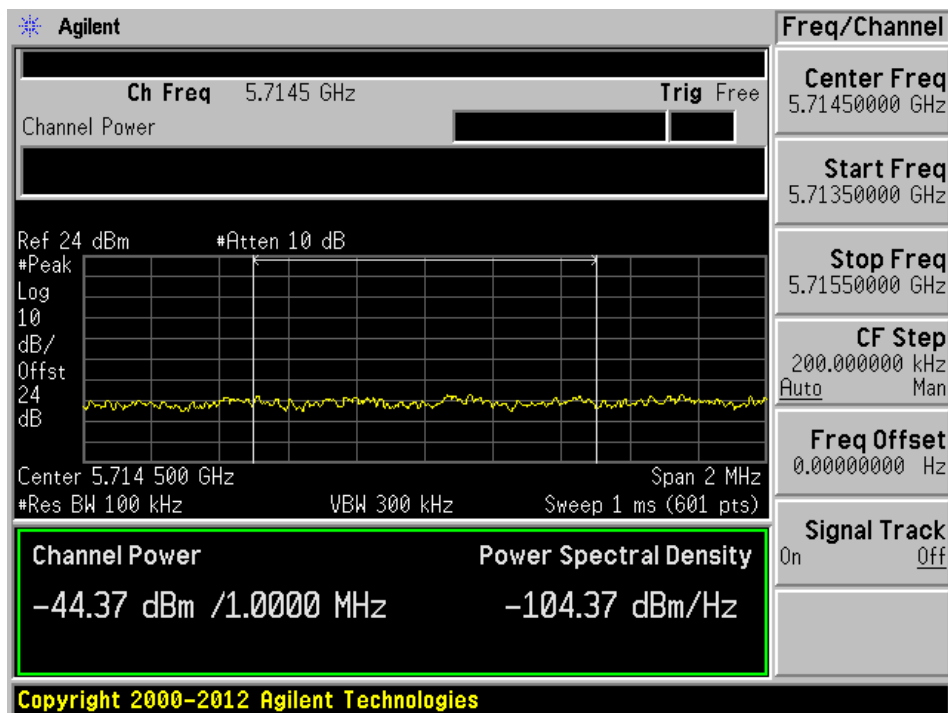
802.11n20 mode, Lowest Channel, Chain J0, 5714.5 MHz



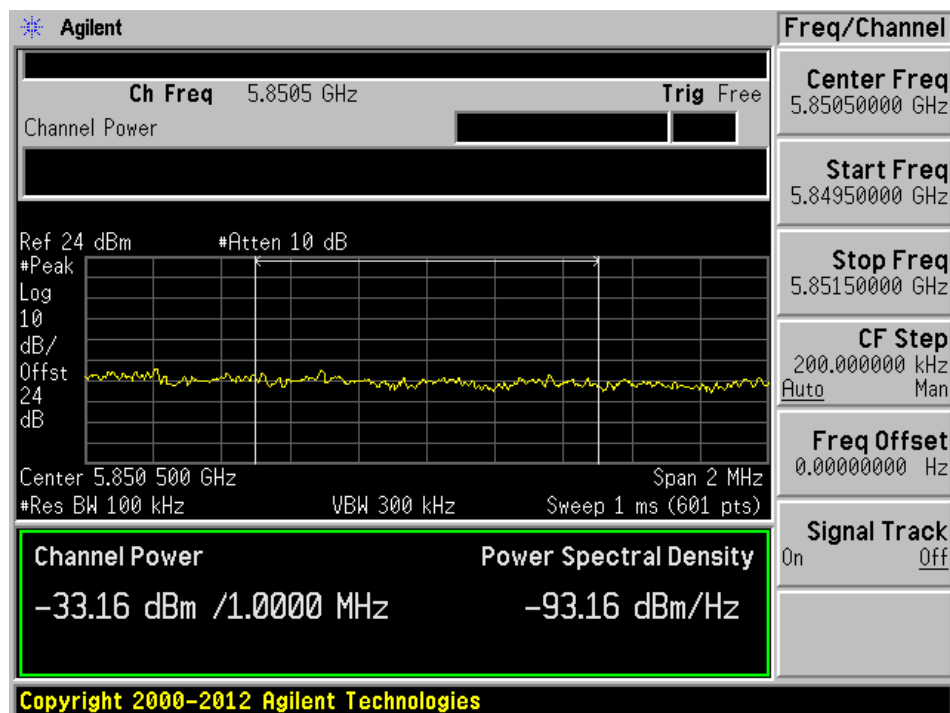
802.11n20 mode, Lowest Channel, Chain J1, 5724.5 MHz



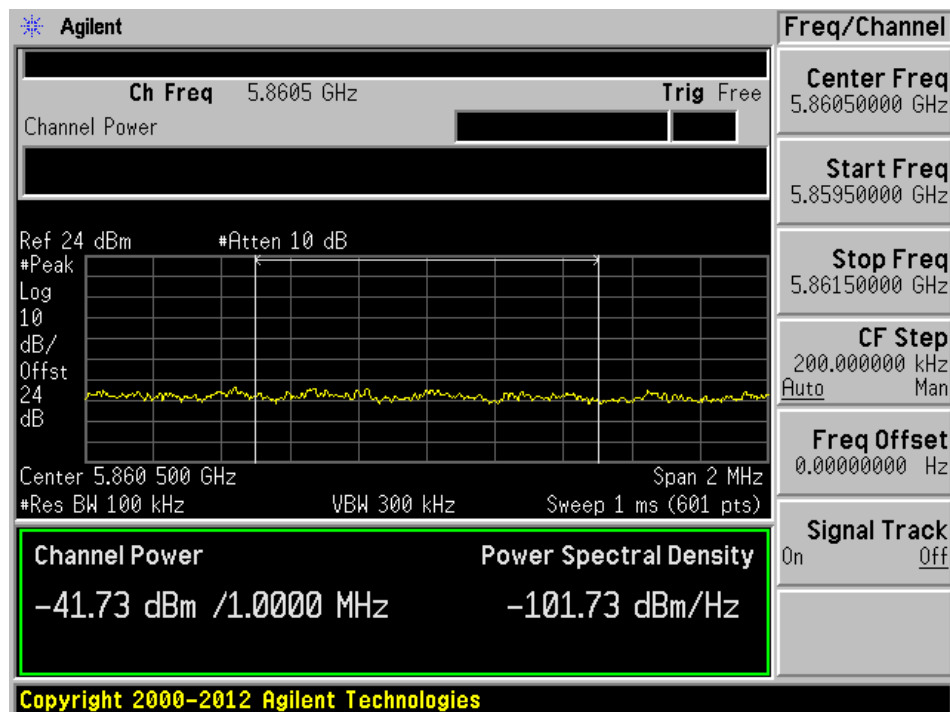
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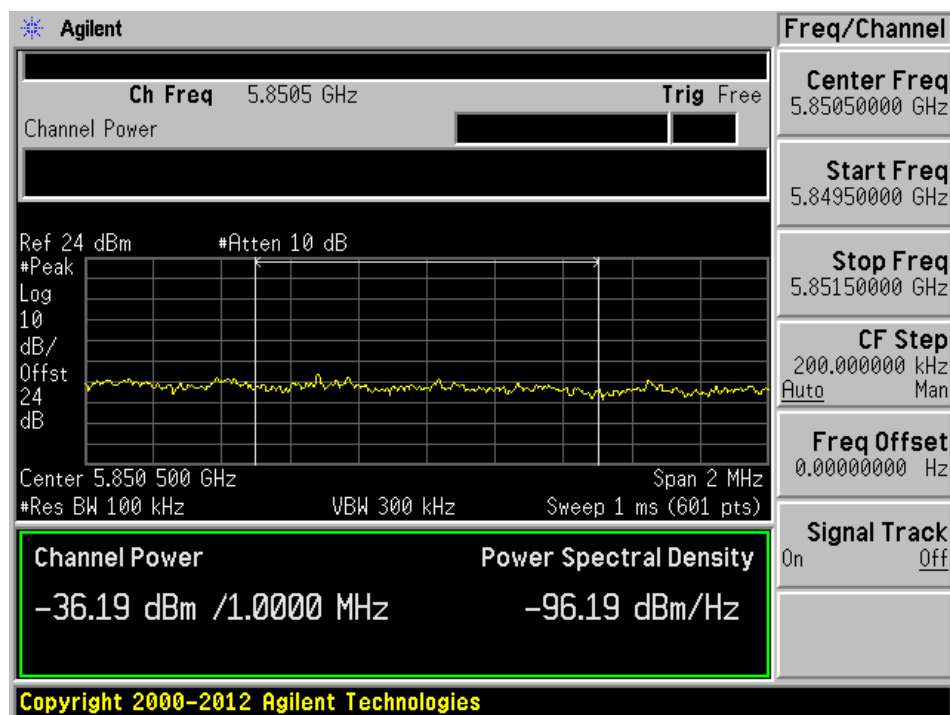
802.11n20 mode, Highest Channel, Chain J0, 5850.5 MHz



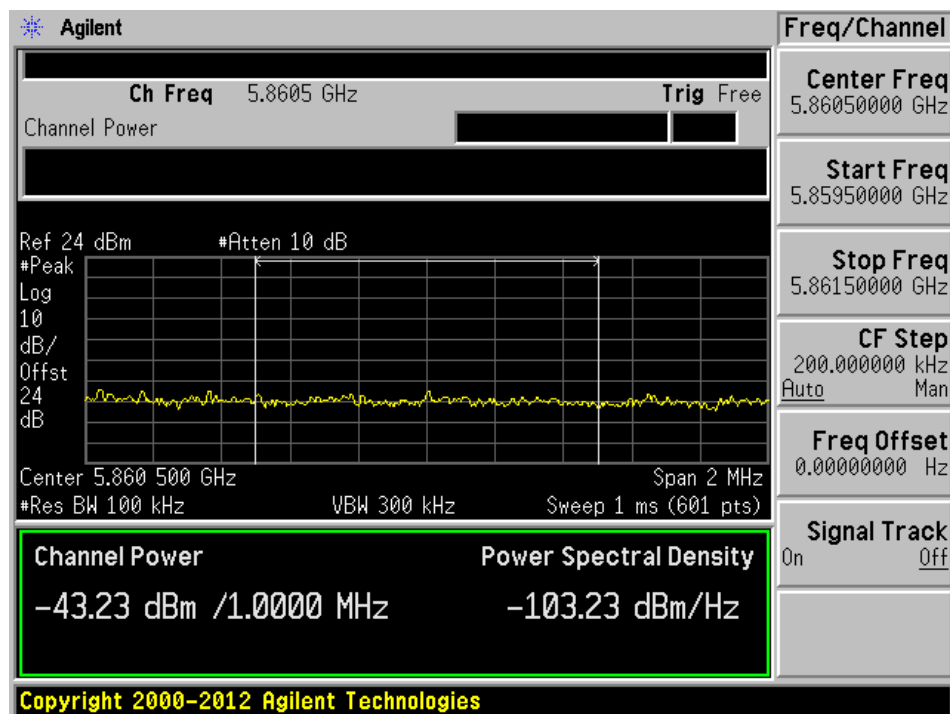
802.11n20 mode, Highest Channel, Chain J0, 5860.5 MHz



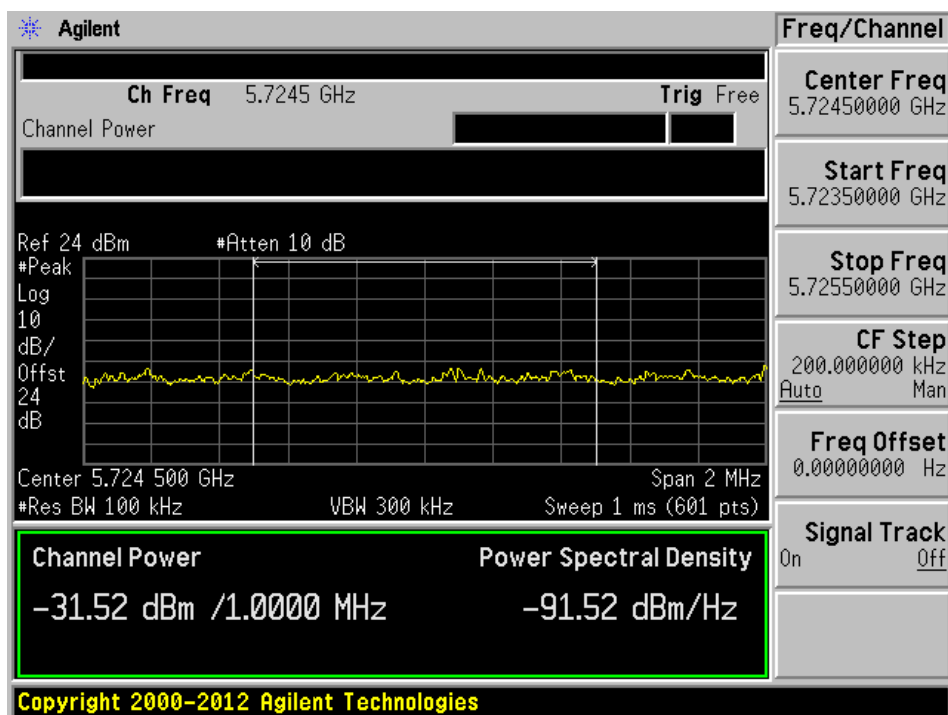
802.11n20 mode, Highest Channel, Chain J1, 5850.5 MHz



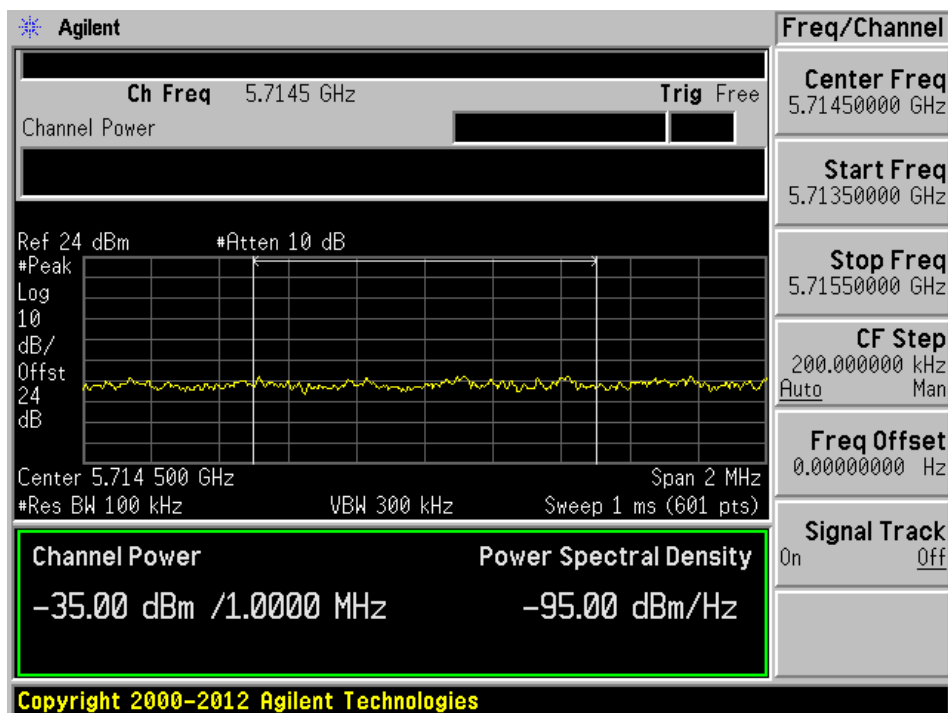
802.11n20 mode, Highest Channel, Chain J1, 5860.5 MHz



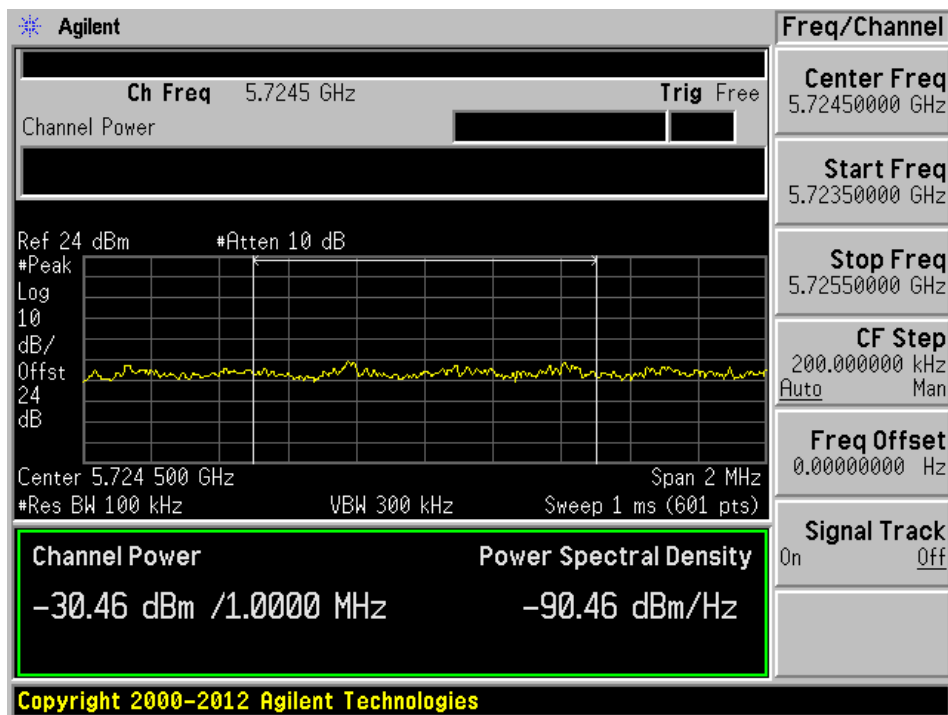
802.11n40 mode, Lowest Channel, Chain J0, 5724.5 MHz



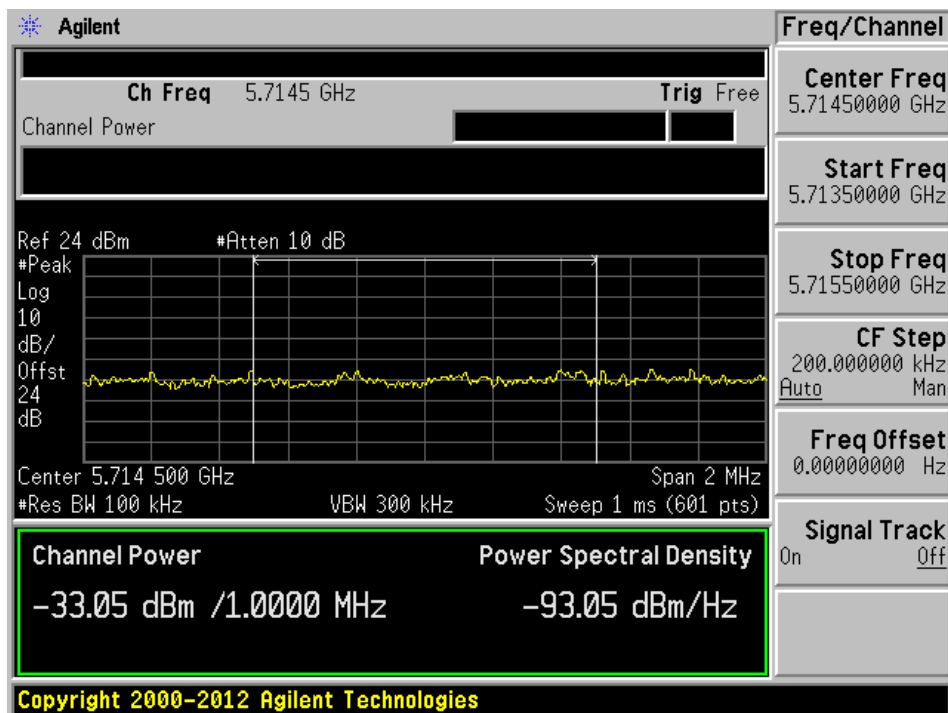
802.11n40 mode, Lowest Channel, Chain J0, 5714.5 MHz



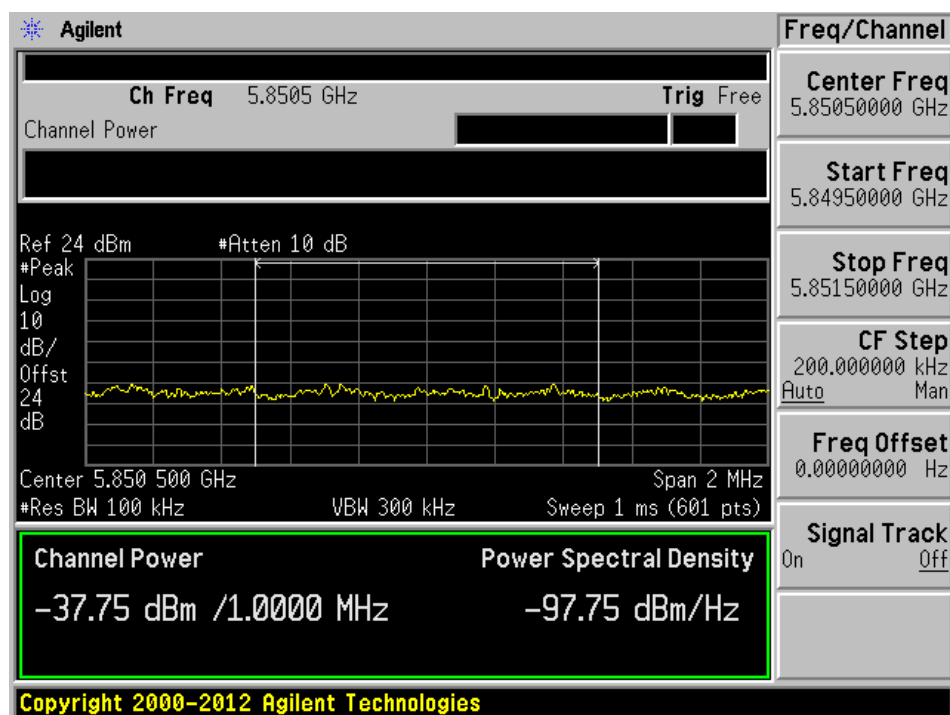
802.11n40 mode, Lowest Channel, Chain J1, 5724.5 MHz



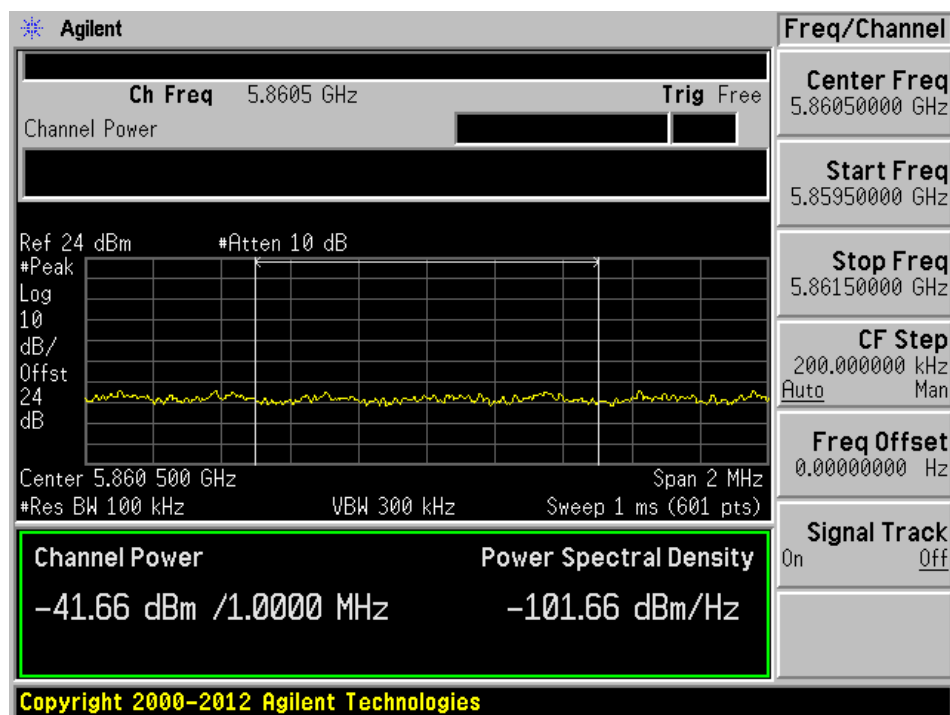
802.11n40 mode, Lowest Channel, Chain J1, 5714.5 MHz



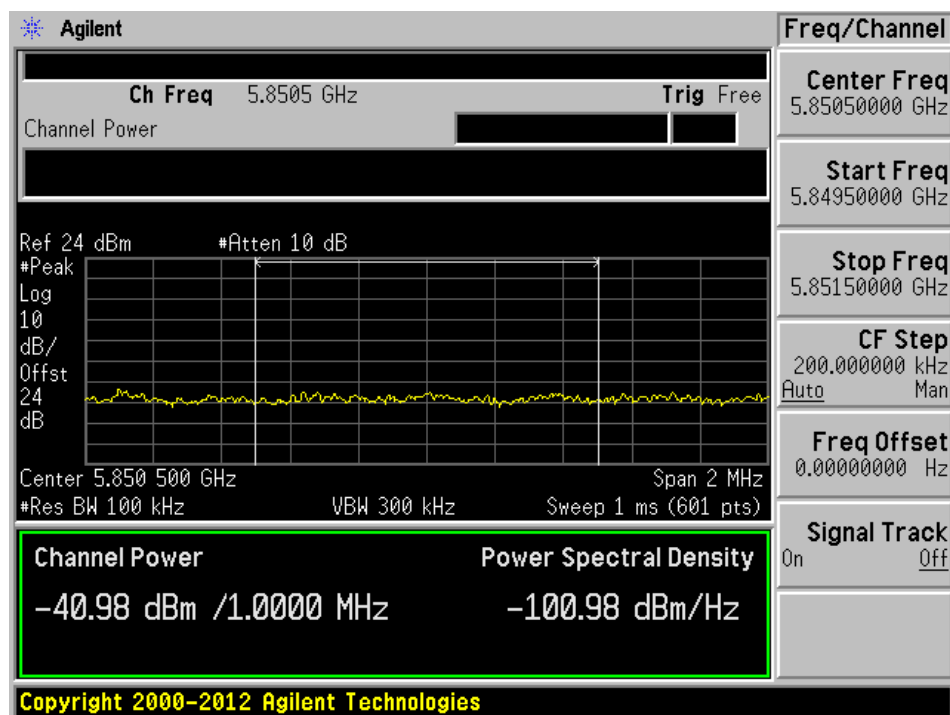
802.11n40 mode, Highest Channel, Chain J0, 5850.5 MHz



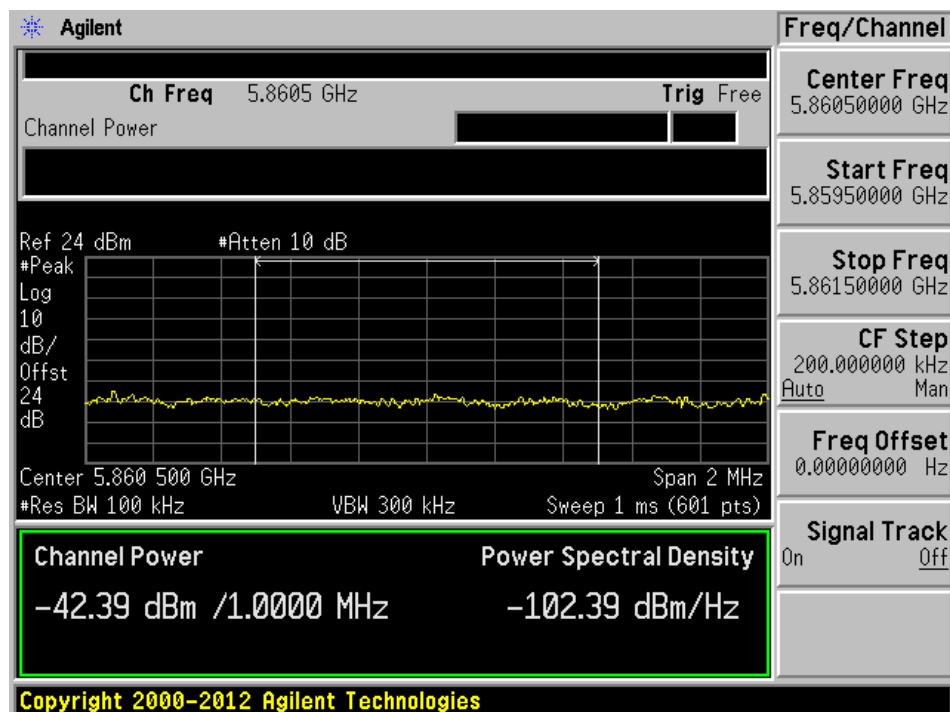
802.11n40 mode, Highest Channel, Chain J0, 5860.5 MHz



802.11n40 mode, Highest Channel, Chain J1, 5850.5 MHz



802.11n40 mode, Highest Channel, Chain J1, 5860.5 MHz



11 FCC §15.407(a) - Power Spectral Density

11.1 Applicable Standard

According to FCC §15.407(a)

(1) For the band 5.15-5.25 GHz.

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

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

11.2 Measurement Procedure

The measurements are base on FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section F: Peak power spectral density (PPSD)

11.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US42221851	2015-06-23	1 year
-	SMA Cable	-	C0001	Each Time ¹	N/A
Mini-Circuits	Attenuator	BW-S20W5	1430	Each Time ¹	N/A

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:	23 °C
Relative Humidity:	43 %
ATM Pressure:	101.5 kPa

The testing was performed by Leonard Gray on 2016-01-29 in RF site.

11.5 Test Results

5150-5250 MHz Band

802.11a mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm/MHz)	TX Chain J1 Power (dBm/MHz)	Total Power (dBm/MHz)	Limit (dBm/MHz)	Margin (dB)
Low	5180	8.222	8.983	11.63	17	-5.37
Middle	5200	9.571	9.870	12.73	17	-4.27
High	5240	9.059	9.705	12.4	17	-4.6

802.11n HT20 mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm/MHz)	TX Chain J1 Power (dBm/MHz)	Total Power (dBm/MHz)	Limit (dBm/MHz)	Margin (dB)
Low	5180	6.949	7.814	10.41	17	-6.59
Middle	5200	8.889	9.534	12.23	17	-4.74
High	5240	8.322	9.222	11.8	17	-5.2

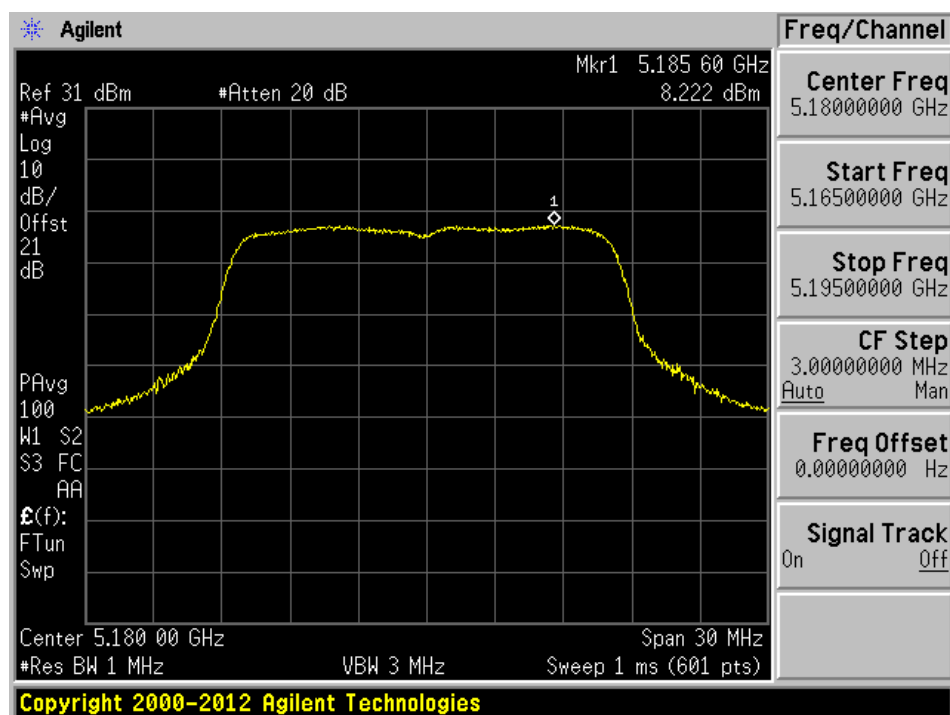
802.11n HT40 mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm/MHz)	TX Chain J8 Power (dBm/MHz)	Total Power (dBm/MHz)	Limit (dBm/MHz)	Margin (dB)
Low	5190	0.099	0.464	3.30	17	-13.70
High	5230	5.492	5.988	8.76	17	-8.24

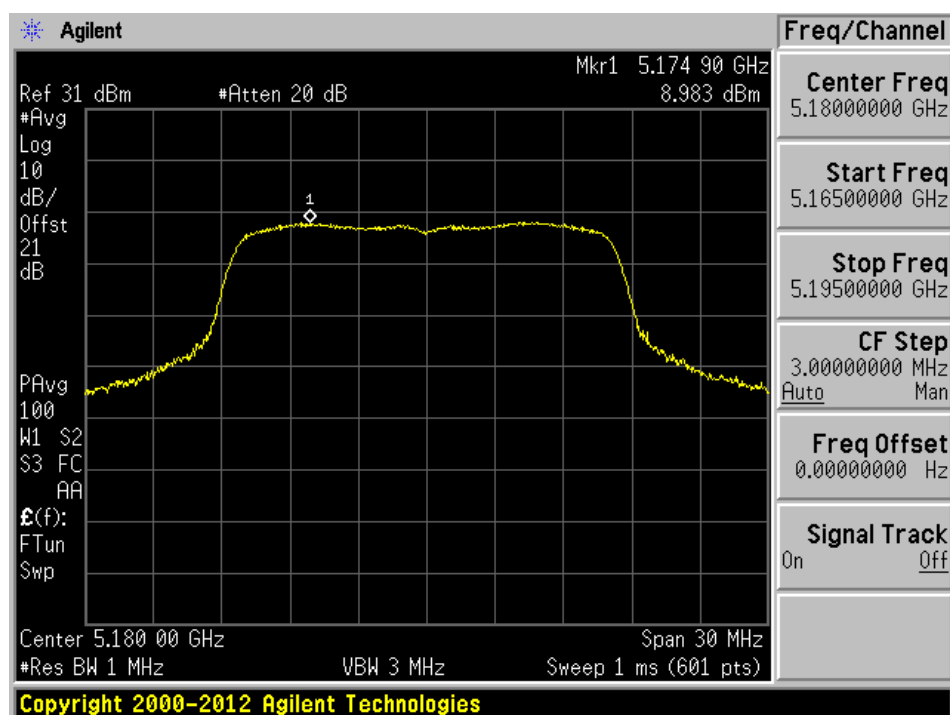
Please refer to the following plots.

802.11a mode

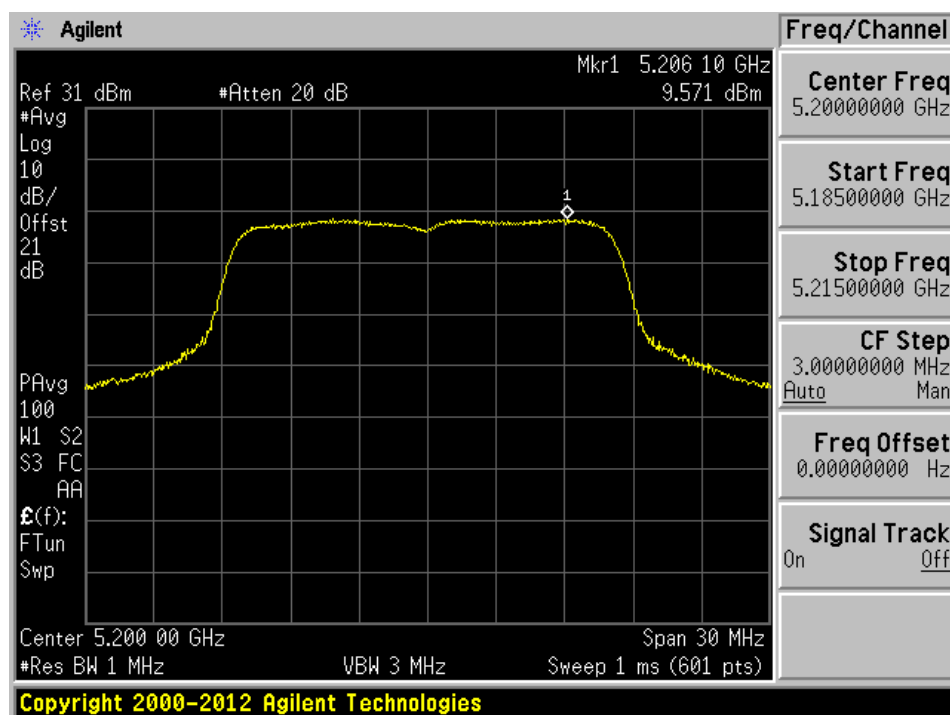
802.11a mode, 5180 MHz, Chain J0



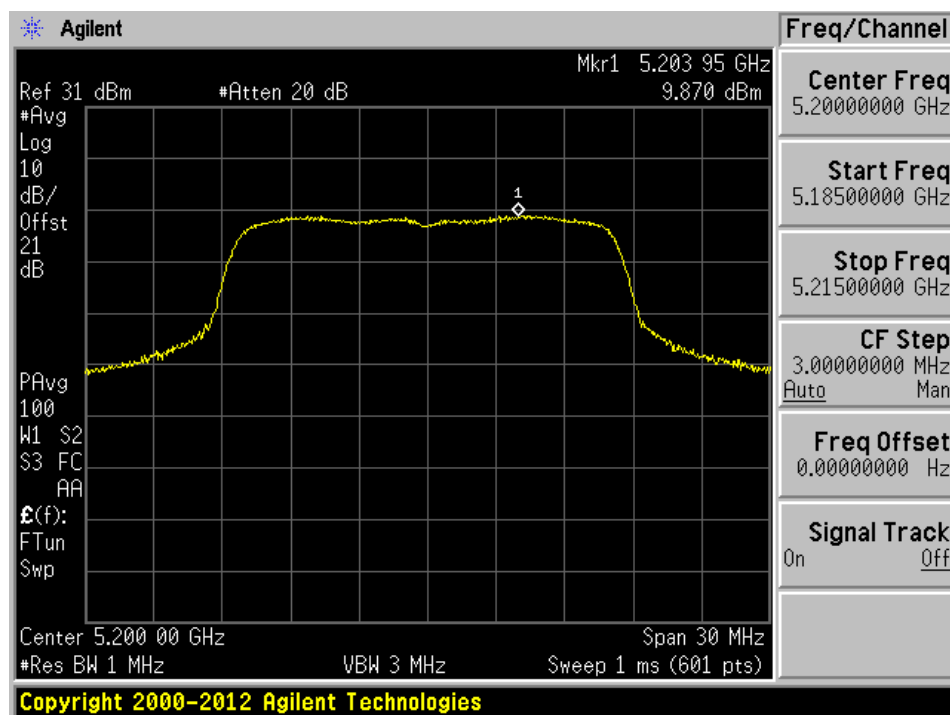
802.11a mode, 5180 MHz, Chain J1



802.11a mode, 5200 MHz, Chain J0



802.11a mode, 5200 MHz, Chain J1



The screenshot displays a spectrum analyzer interface. The main plot shows a signal trace with a peak labeled '1' at approximately 5.244 GHz. The y-axis represents power in dBm, with a reference level of 31 dBm and an attenuation of 20 dB. The x-axis represents frequency in GHz, with a center frequency of 5.240 GHz and a span of 30 MHz. The signal trace is a yellow line on a black background with a grid. The peak is marked with a white diamond and the number '1'.

Agilent

Ref 31 dBm #Atten 20 dB Mkr1 5.244 40 GHz 9.059 dBm

#Avg Log 10 dB/ Offst 21 dB

PAvg 100 W1 S2 S3 FC AA

Ⓔ(f): FTun Swp

Center 5.240 00 GHz Span 30 MHz

#Res BW 1 MHz VBW 3 MHz Sweep 1 ms (601 pts)

Freq/Channel Center Freq 5.24000000 GHz Start Freq 5.22500000 GHz Stop Freq 5.25500000 GHz CF Step 3.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off

Copyright 2000–2012 Agilent Technologies

Agilent

Ref 31 dBm #Atten 21 dB

Mkr1 5.246 35 GHz 9.705 dBm

Center 5.240 00 GHz Span 30 MHz

#Res BW 1 MHz VBW 3 MHz Sweep 1 ms (601 pts)

PAvg 100

W1 S2

S3 FC

AA

£(f):

FTun

Swp

Center Freq 5.2400000 GHz

Start Freq 5.2250000 GHz

Stop Freq 5.2550000 GHz

CF Step 3.0000000 MHz

Auto Man

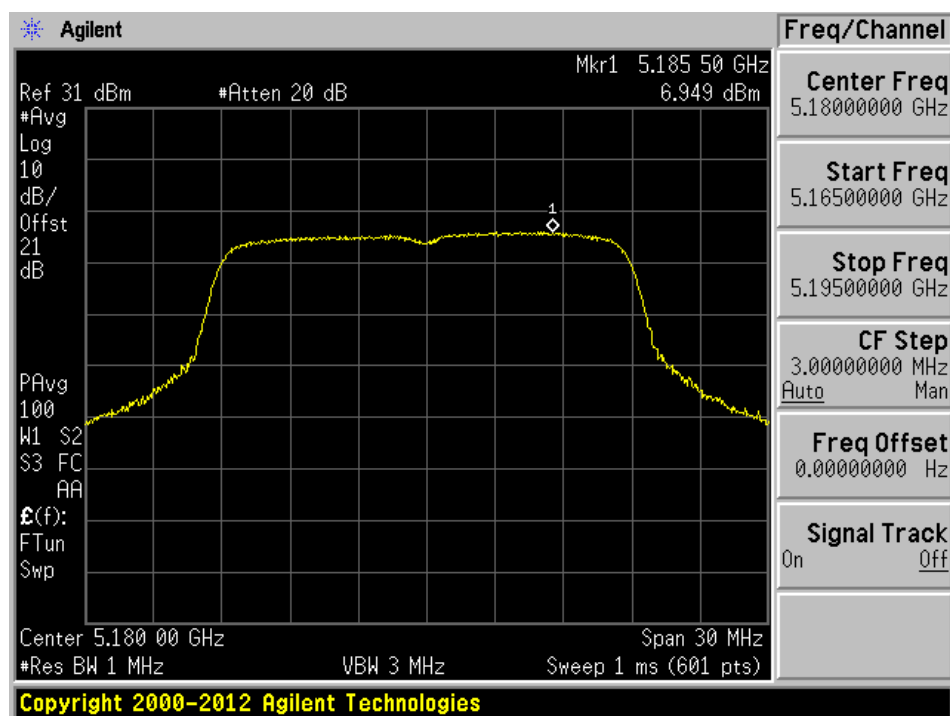
Freq Offset 0.0000000 Hz

Signal Track On Off

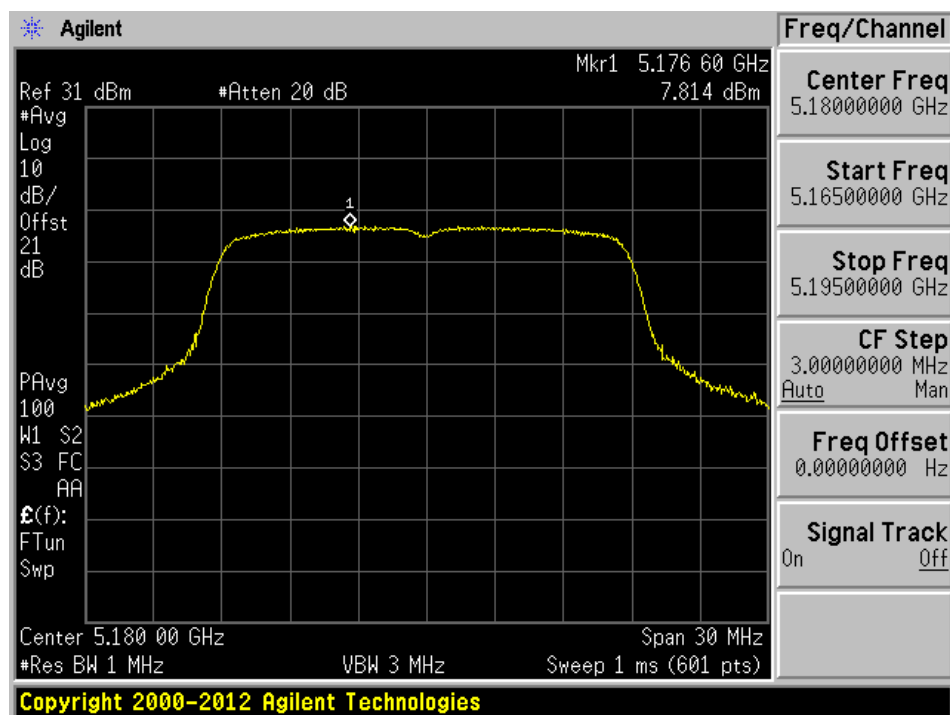
Copyright 2000-2012 Agilent Technologies

802.11n-HT20 mode

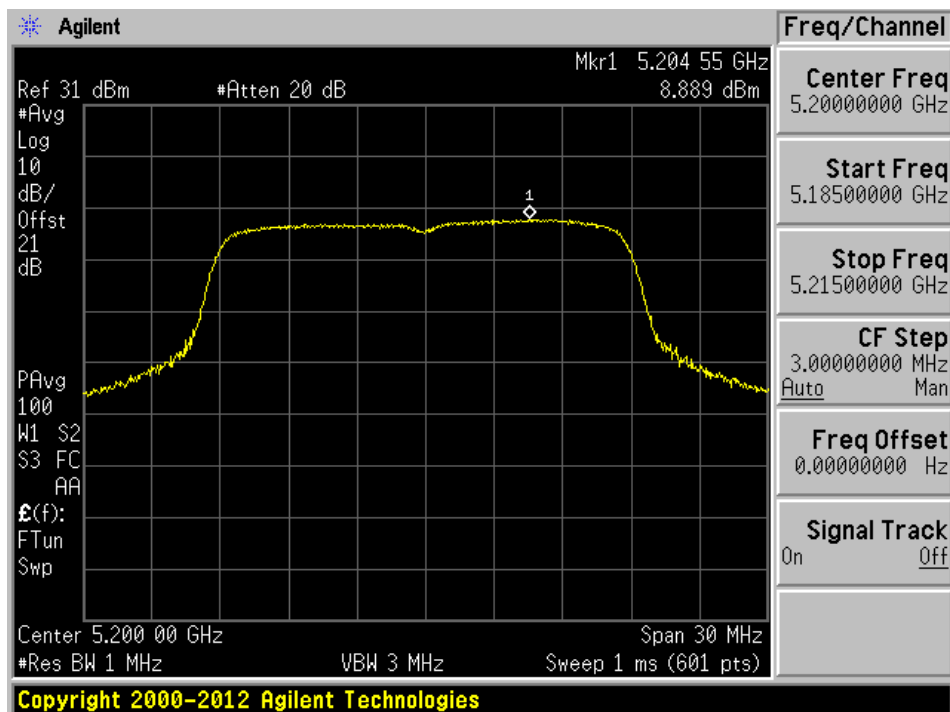
802.11n HT20 mode, 5180 MHz, Chain J0



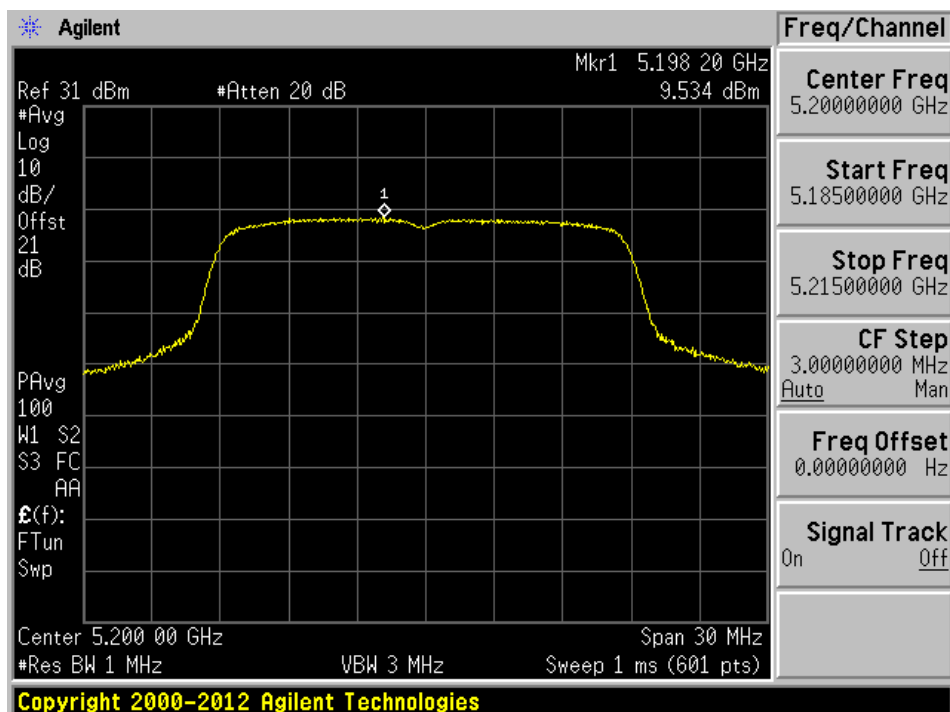
802.11n HT20 mode, 5180 MHz, Chain J1



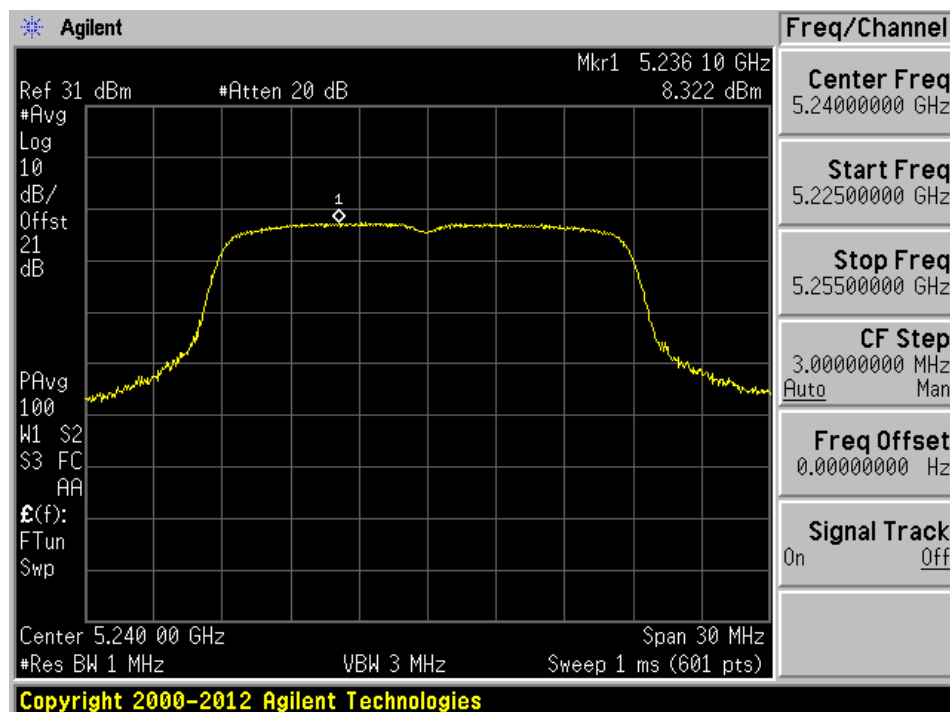
802.11n HT20 mode, 5200 MHz, Chain J0



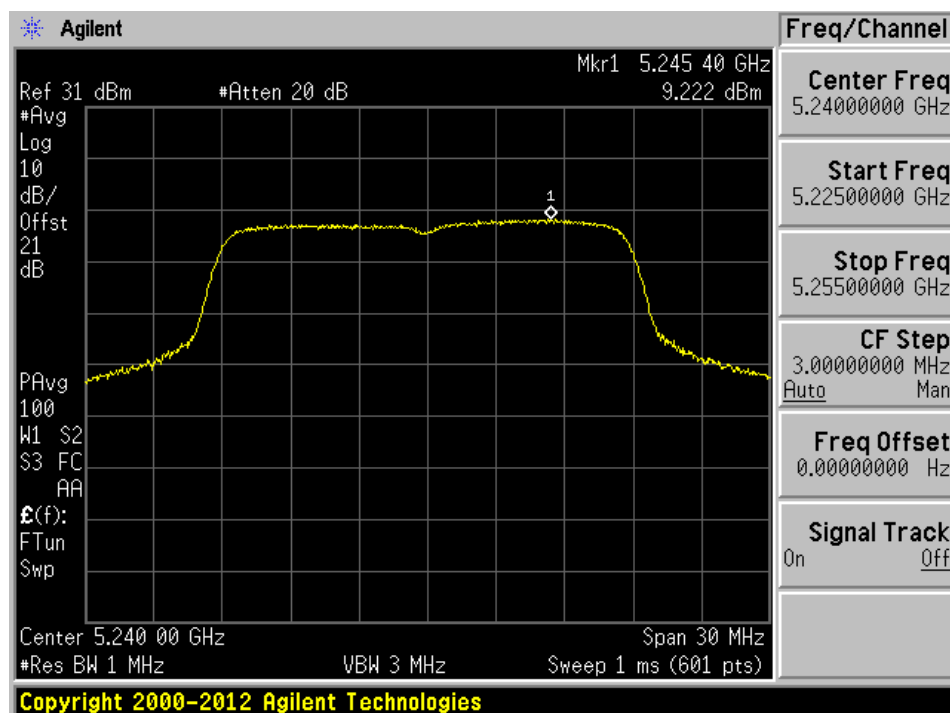
802.11n HT20 mode, 5200 MHz, Chain J1



802.11n HT20 mode, 5240 MHz, Chain J0

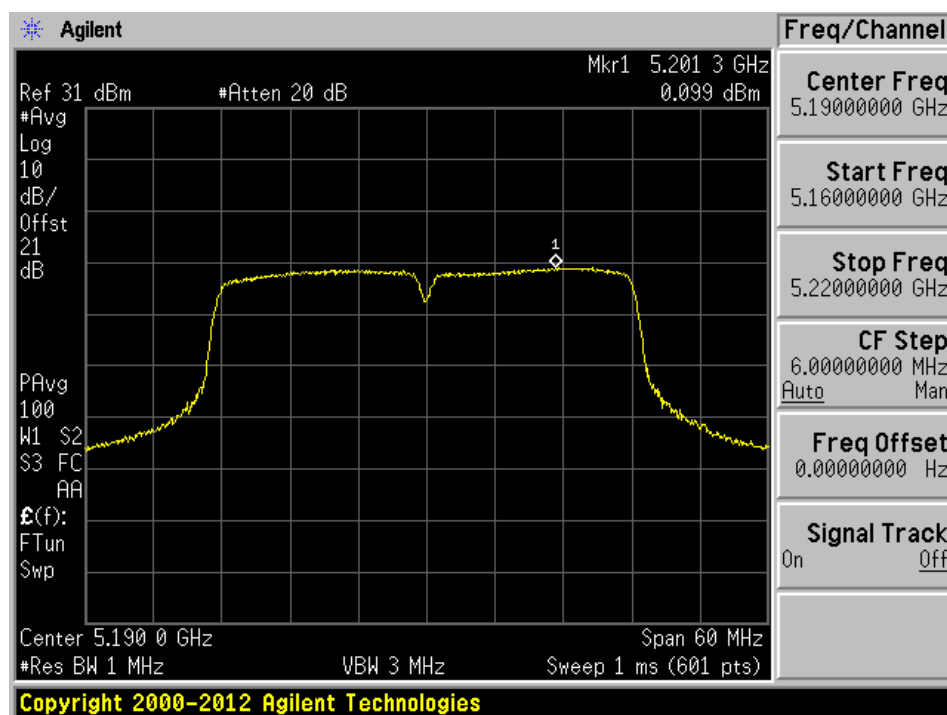


802.11n HT20 mode, 5240 MHz, Chain J1

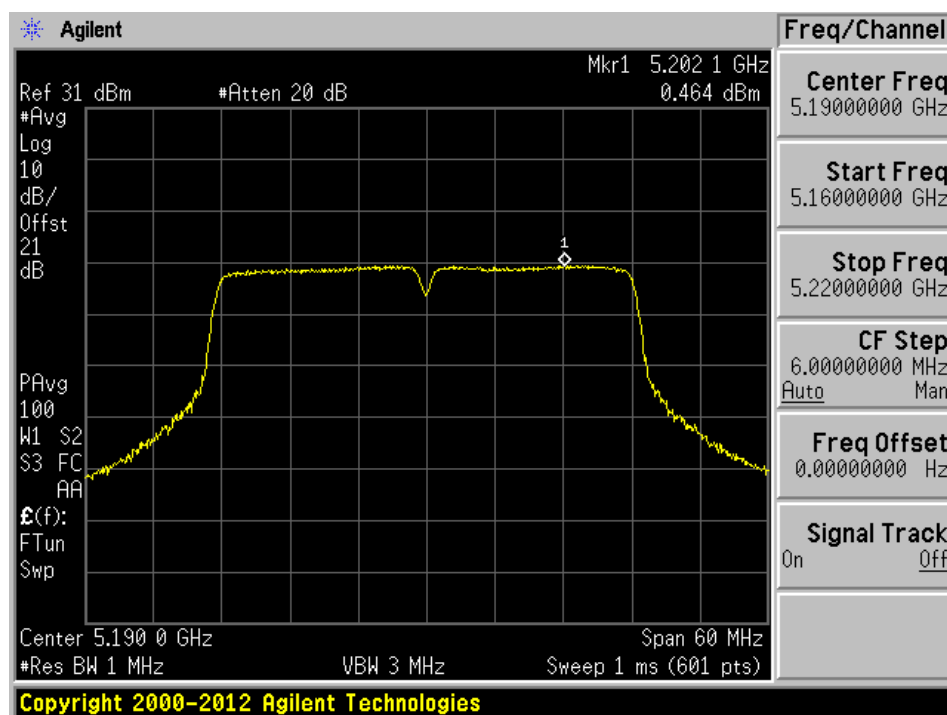


802.11n-HT40 mode

802.11n HT40 mode, 5190 MHz, Chain J0



802.11n HT40 mode, 5190 MHz, Chain J1



Agilent

Ref 31 dBm #Atten 20 dB Mkr1 5.238 9 GHz 5.492 dBm

#Avg Log 10 dB/ Offst 21 dB

PAvg 100 W1 S2 S3 FC AA

E(f): FTun Swp

Center 5.230 0 GHz Span 60 MHz

#Res BW 1 MHz VBW 3 MHz Sweep 1 ms (601 pts)

Freq/Channel Center Freq 5.23000000 GHz Start Freq 5.20000000 GHz Stop Freq 5.26000000 GHz CF Step 6.00000000 MHz Auto Mar Freq Offset 0.00000000 Hz Signal Track On Off

Copyright 2000-2012 Agilent Technologies

Agilent

Ref 31 dBm #Atten 20 dB Mkr1 5.238 6 GHz 5.988 dBm

#Avg Log 10 dB/ Offst 21 dB

PAvg 100 W1 S2 S3 FC AA

Ⓔ(f): FTun Swp

Center 5.230 0 GHz Span 60 MHz

#Res BW 1 MHz VBW 3 MHz Sweep 1 ms (601 pts)

Freq/Channel

Center Freq 5.23000000 GHz

Start Freq 5.20000000 GHz

Stop Freq 5.26000000 GHz

CF Step 6.00000000 MHz

Freq Offset 0.00000000 Hz

Signal Tracking On Off

Copyright 2000-2012 Agilent Technologies

5725-5850 MHz Band

802.11a mode

Channel	Frequency (MHz)	Chain J0 PSD After add RBW factor (dBm)	Chain J1 PSD After add RBW factor (dBm)	Total PSD After add RBW factor (dBm)	Limit (dBm)	Margin (dB)
Low	5745	6.64	5.76	9.23	30	-20.77
Middle	5785	6.47	5.65	9.09	30	-20.91
High	5825	6.15	5.68	8.94	30	-21.06

802.11n HT20 mode

Channel	Frequency (MHz)	Chain J0 PSD After add RBW factor (dBm)	Chain J1 PSD After add RBW factor (dBm)	Total PSD After add RBW factor (dBm)	Limit (dBm)	Margin (dB)
Low	5745	3.66	3.02	6.36	30	-23.64
Middle	5785	6.27	5.07	8.72	30	-21.28
High	5825	5.69	5.80	8.75	30	-21.25

802.11n HT40 mode

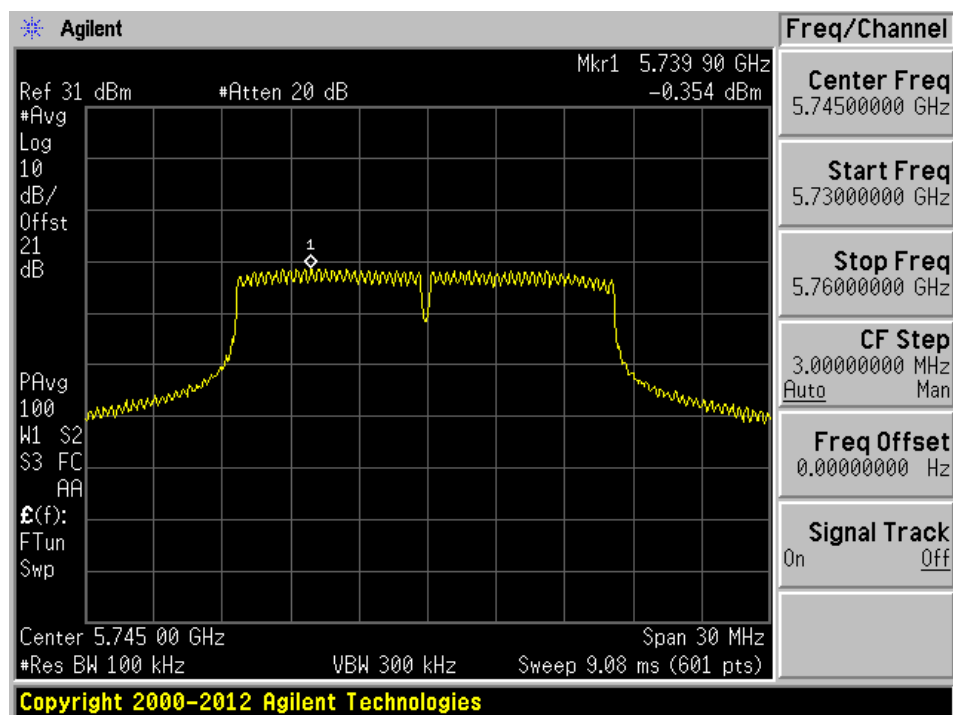
Channel	Frequency (MHz)	Chain J0 PSD After add RBW factor (dBm)	Chain J1 PSD After add RBW factor (dBm)	Total PSD After add RBW factor (dBm)	Limit (dBm)	Margin (dB)
Low	5755	0.08	-0.84	2.66	30	-27.34
High	5795	2.96	2.31	5.66	30	-24.34

Please refer to the following plots.

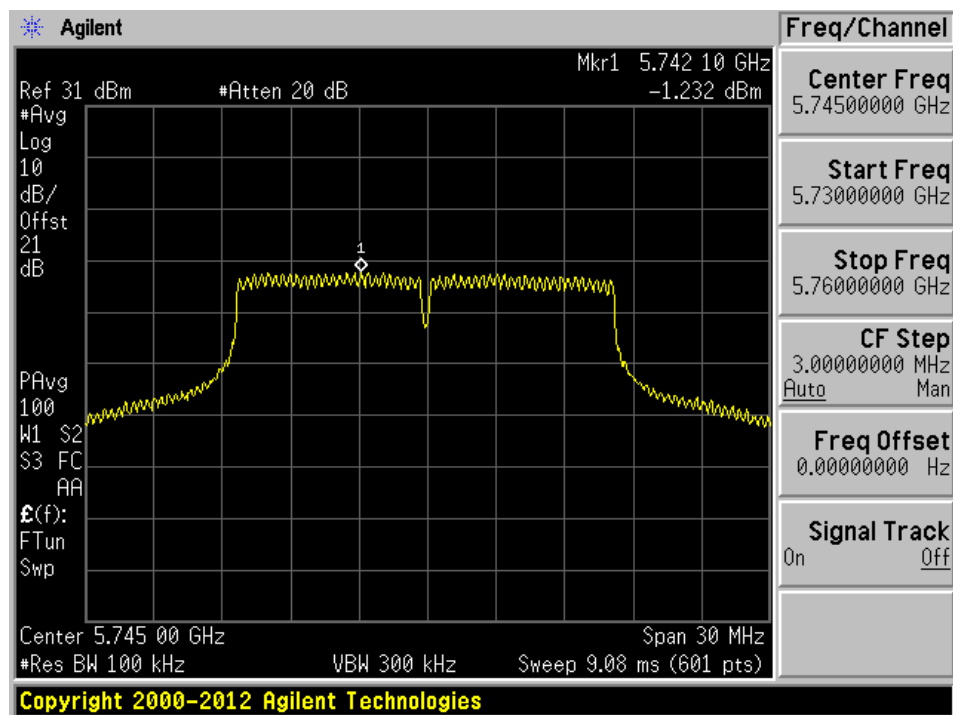
Note: A RBW Factor of 10log(500kHz/100kHz) was added to the results to account for the correct bandwidth.

802.11a mode

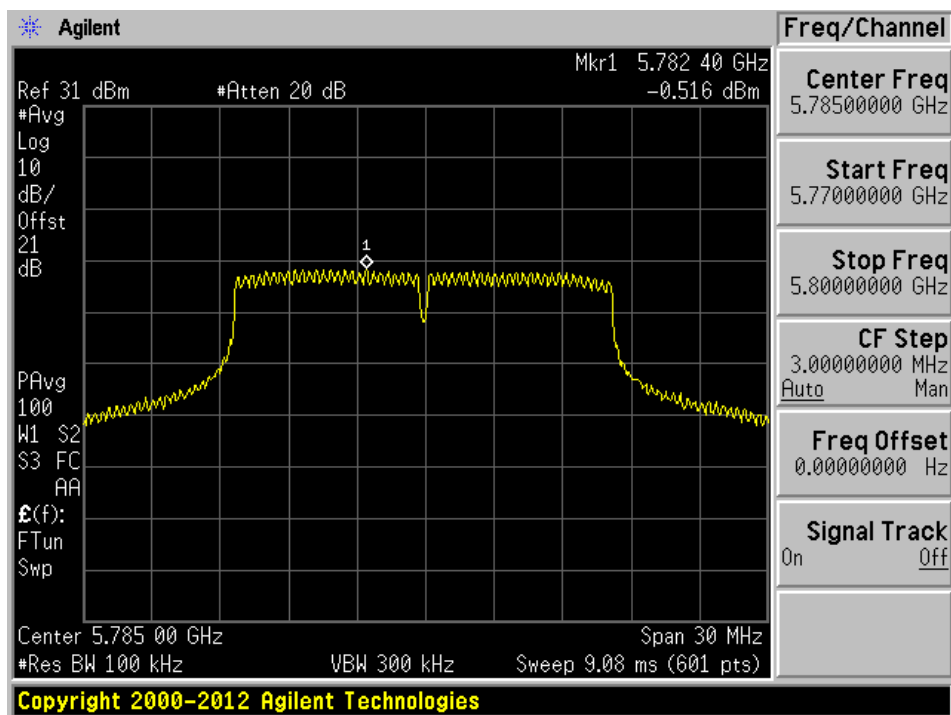
802.11a mode, 5745 MHz, Chain J0



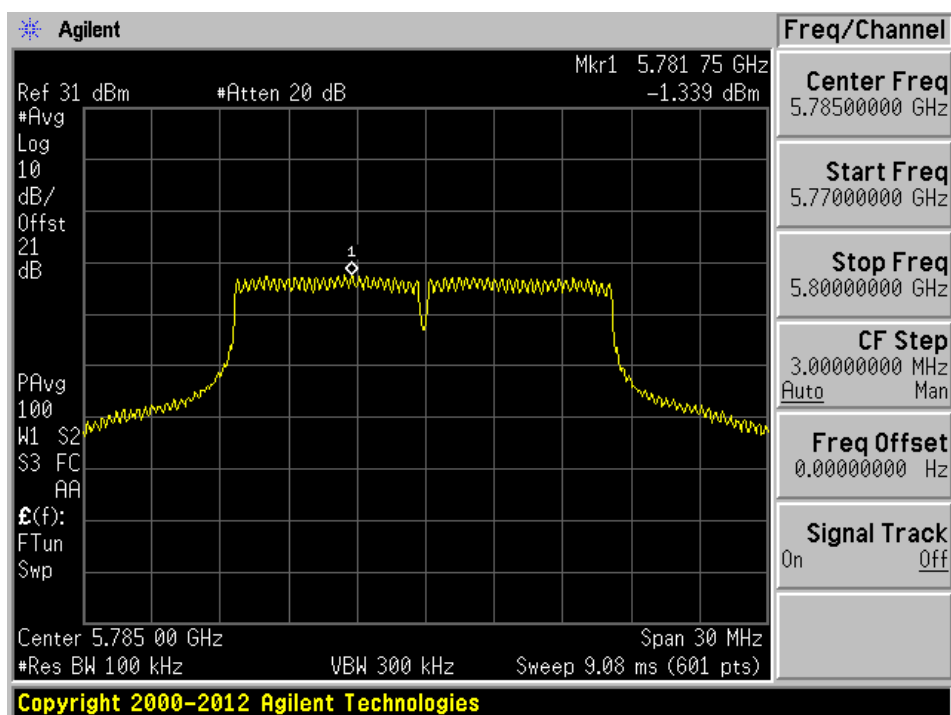
802.11a mode, 5745 MHz, Chain J1



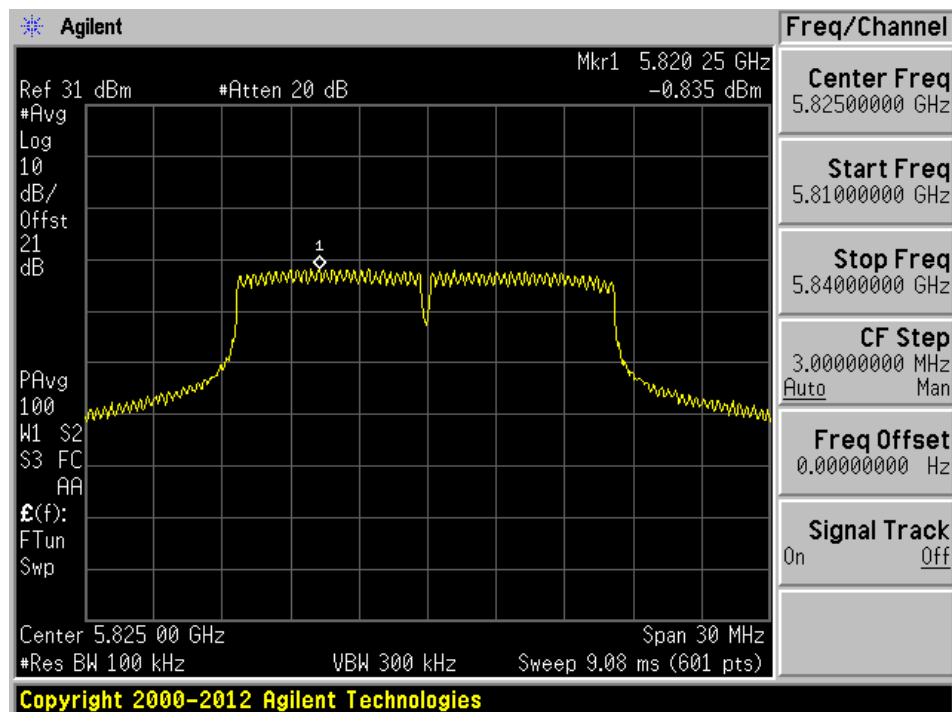
802.11a mode, 5785 MHz, Chain J0



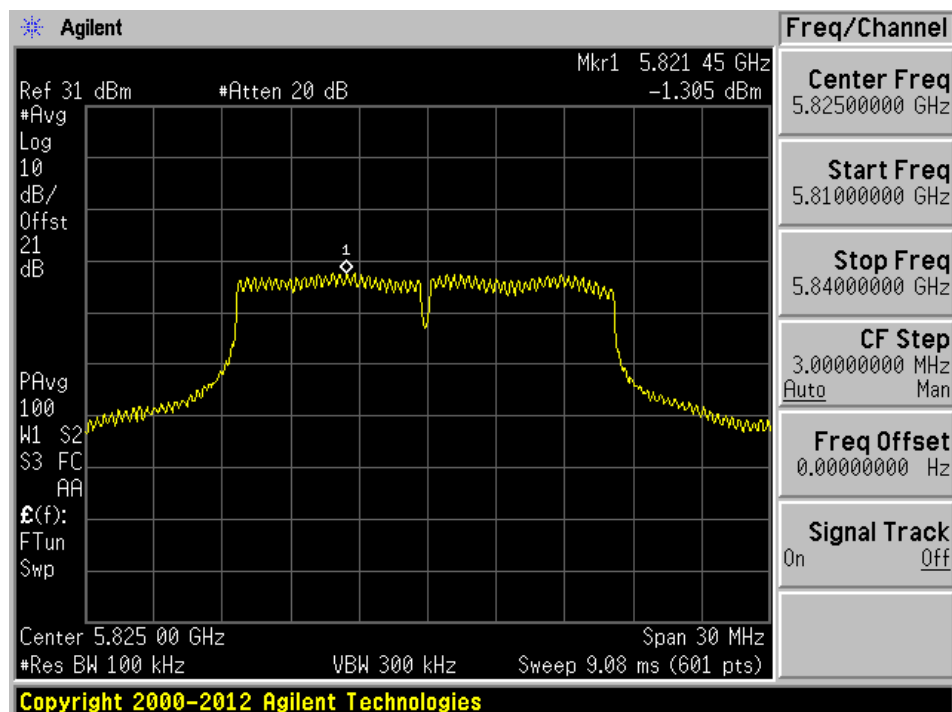
802.11a mode, 5785 MHz, Chain J1



802.11a mode, 5825 MHz, Chain J0

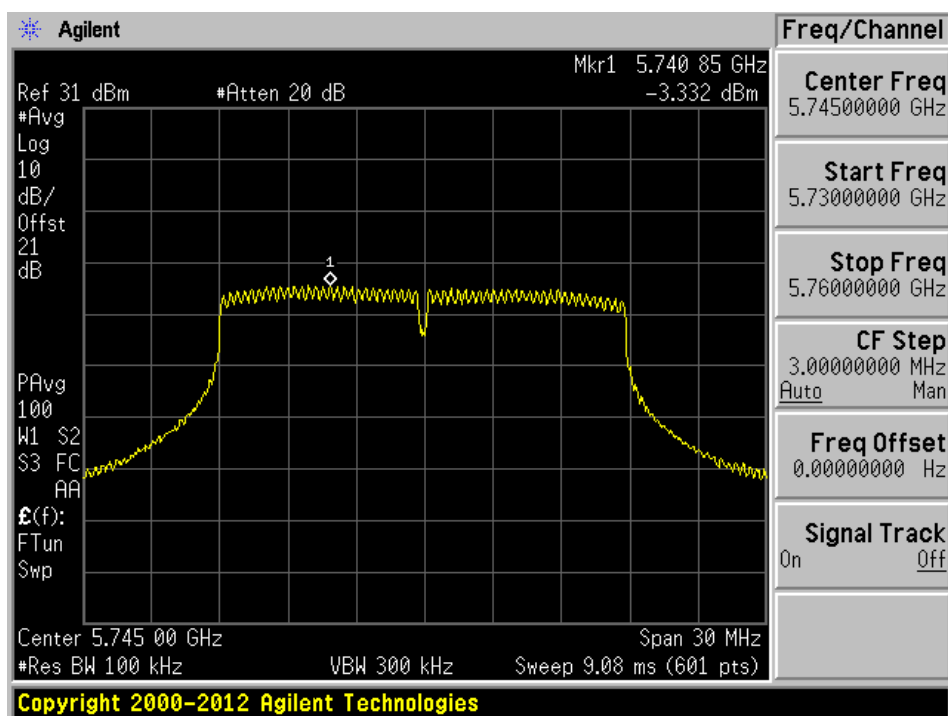


802.11a mode, 5825 MHz, Chain J1

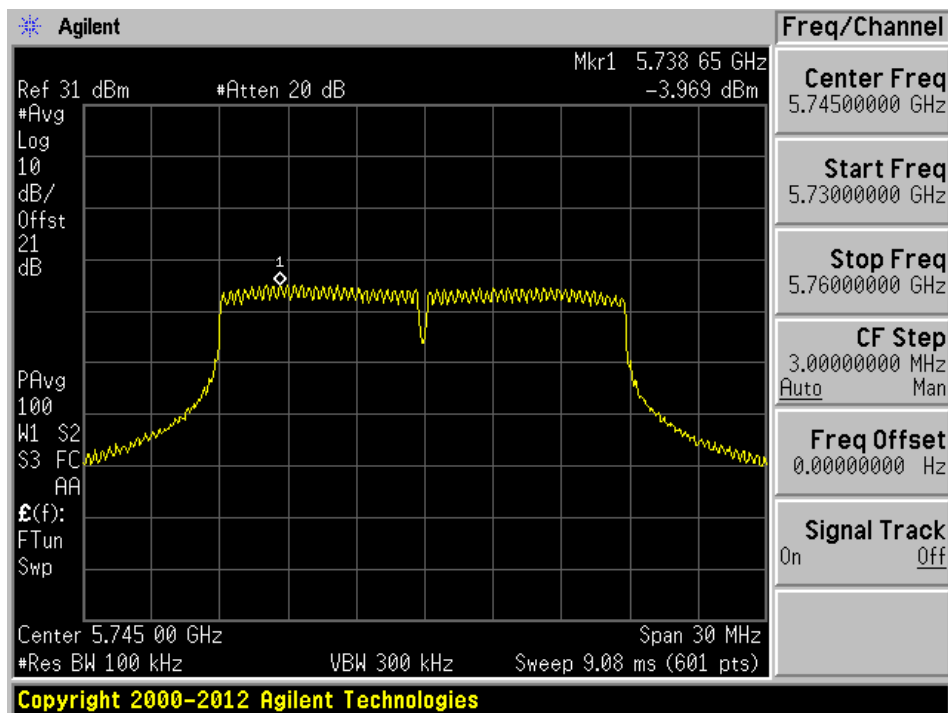


802.11n20 mode

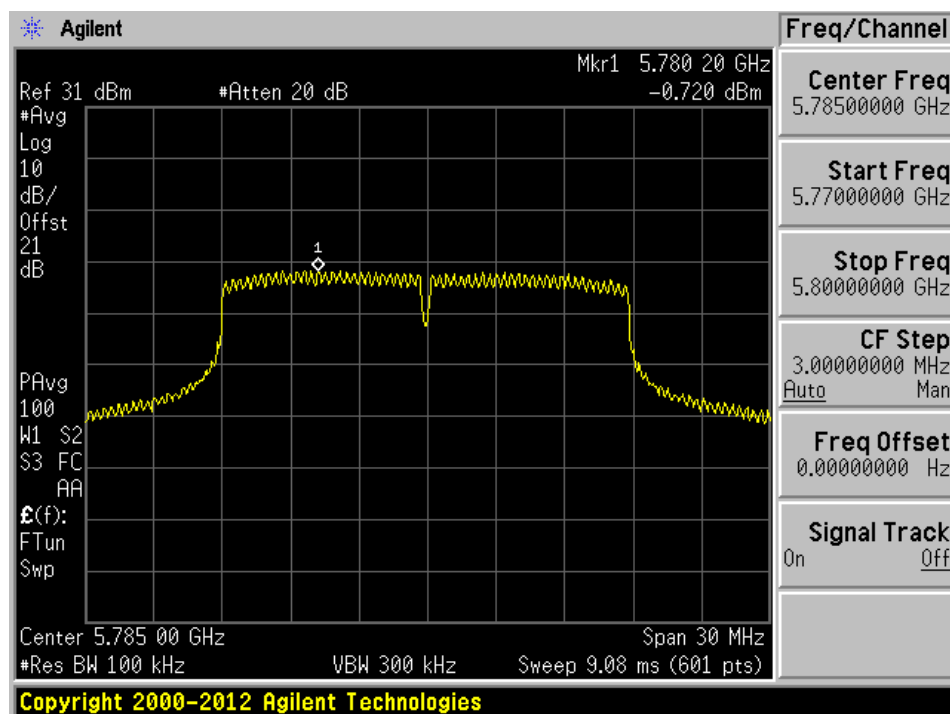
802.11n20 mode, 5745 MHz, Chain J0



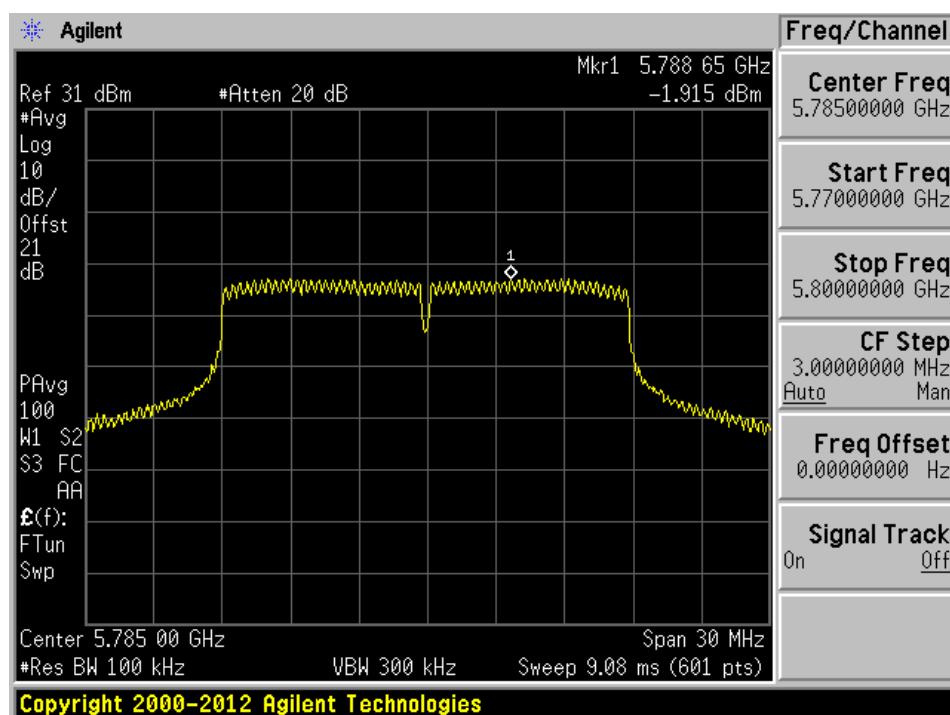
802.11n20 mode, 5745 MHz, Chain J1



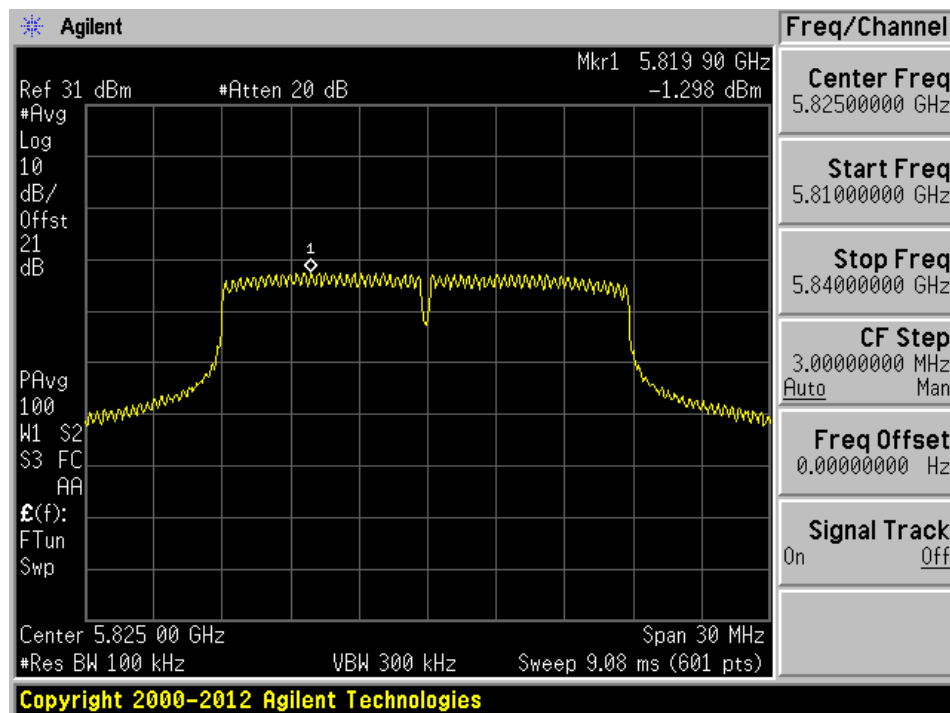
802.11n20 mode, 5785 MHz, Chain J0



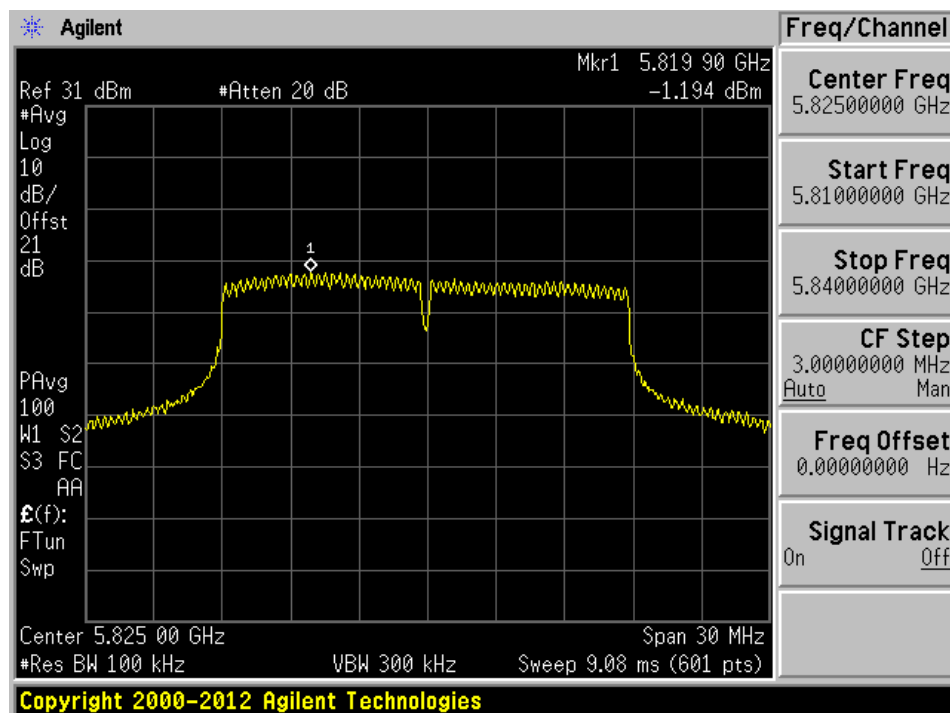
802.11n20 mode, 5785 MHz, Chain J1



802.11n20 mode, 5825 MHz, Chain J0

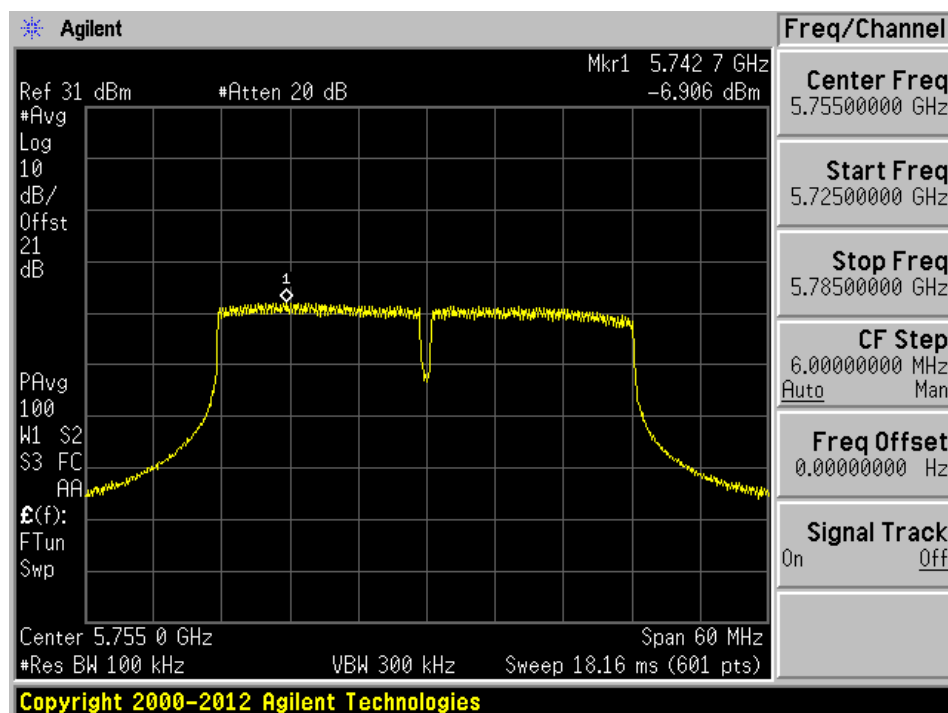


802.11n20 mode, 5825 MHz, Chain J1

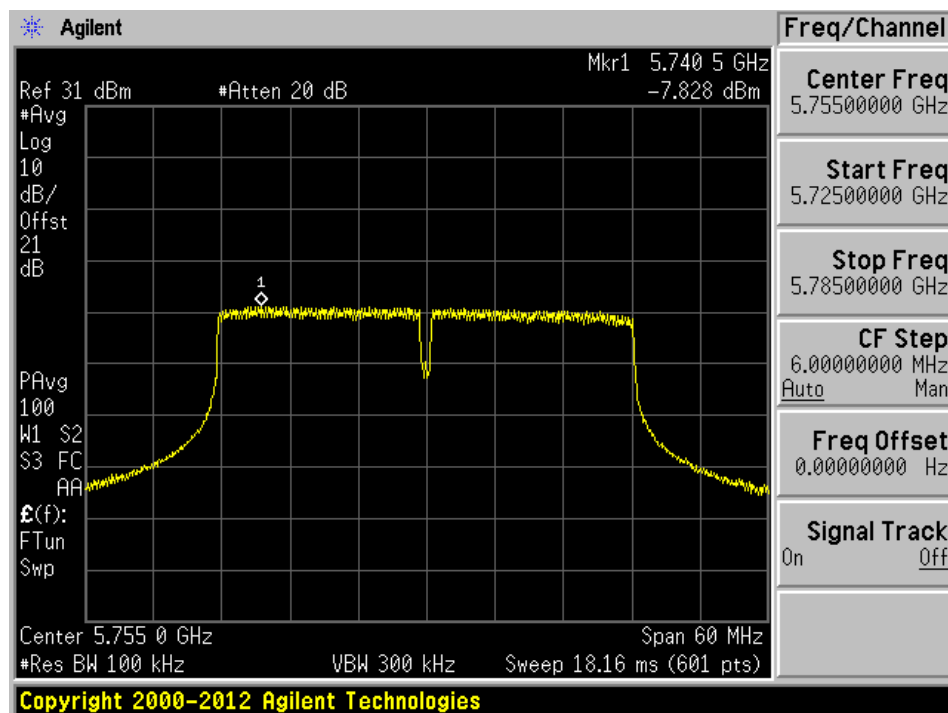


802.11n-HT40 mode

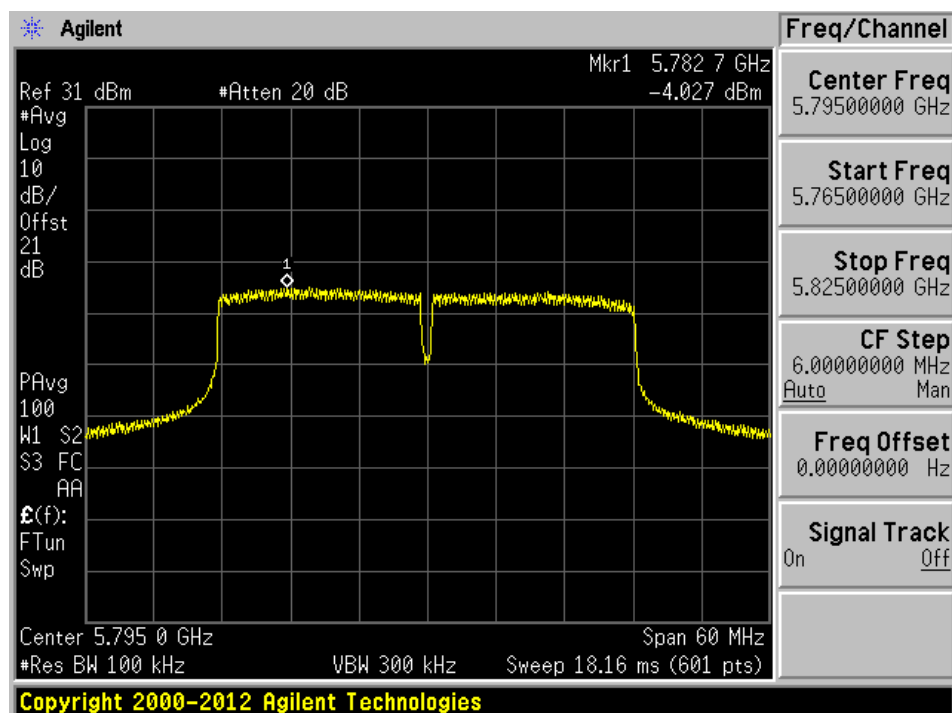
802.11n-HT40 mode, 5755 MHz, Chain J0



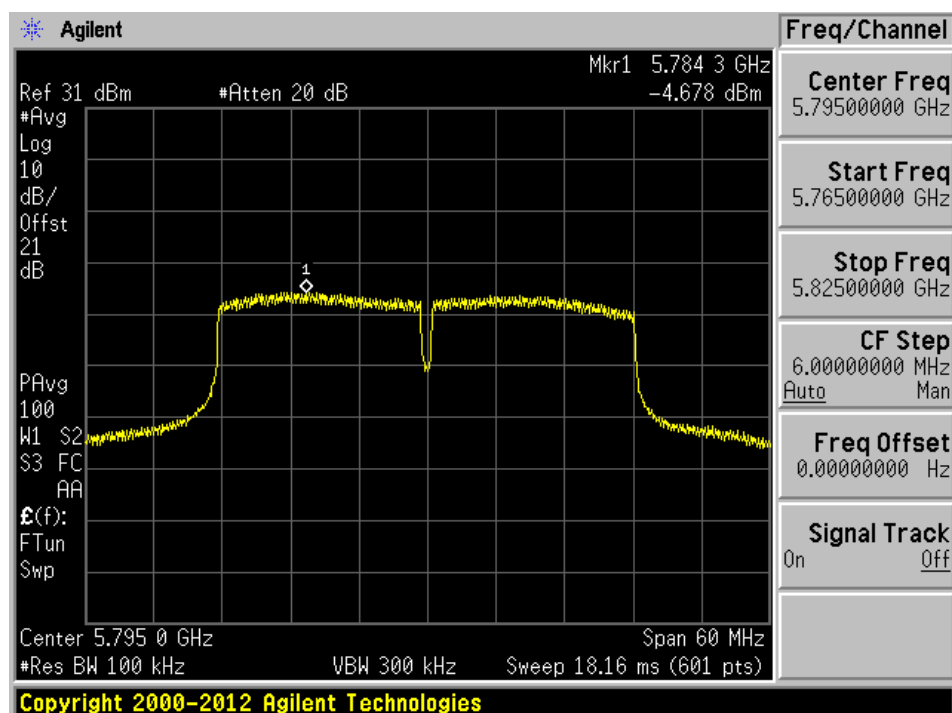
802.11n-HT40 mode, 5755 MHz, Chain J1



802.11n-HT40 mode, 5795 MHz, Chain J0



802.11n-HT40 mode, 5795 MHz, Chain J1



12 FCC §15.407(b) - Spurious Emissions at Antenna Terminals

12.1 Applicable Standard

According to FCC §15.407(b)

(b) (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

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

12.2 Measurement Procedure

The measurements are base on FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section G: Unwanted emissions measurement

12.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US42221851	2015-06-23	1 year
-	SMA Cable	-	C0001	Each Time ¹	N/A
Mini-Circuits	Attenuator	BW-S20W5	1430	Each Time ¹	N/A

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

12.4 Test Environmental Conditions

Temperature:	24 °C
Relative Humidity:	44 %
ATM Pressure:	101.3kPa

The testing was performed by Leonard Gray on 2016-01-29 in RF site.

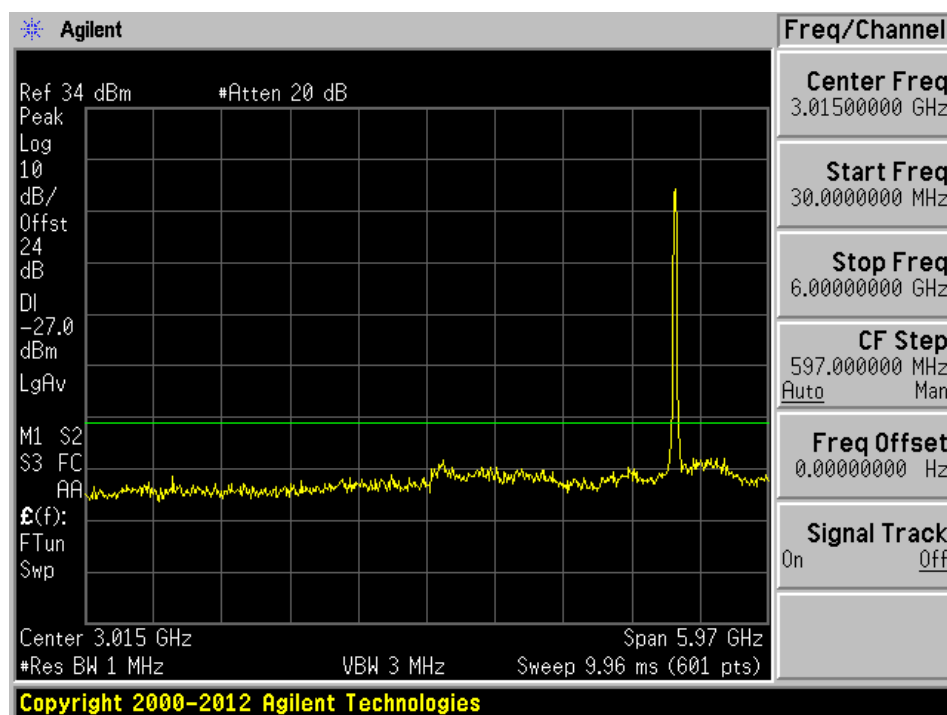
12.5 Test Results

Please refer to following plots of spurious emissions.

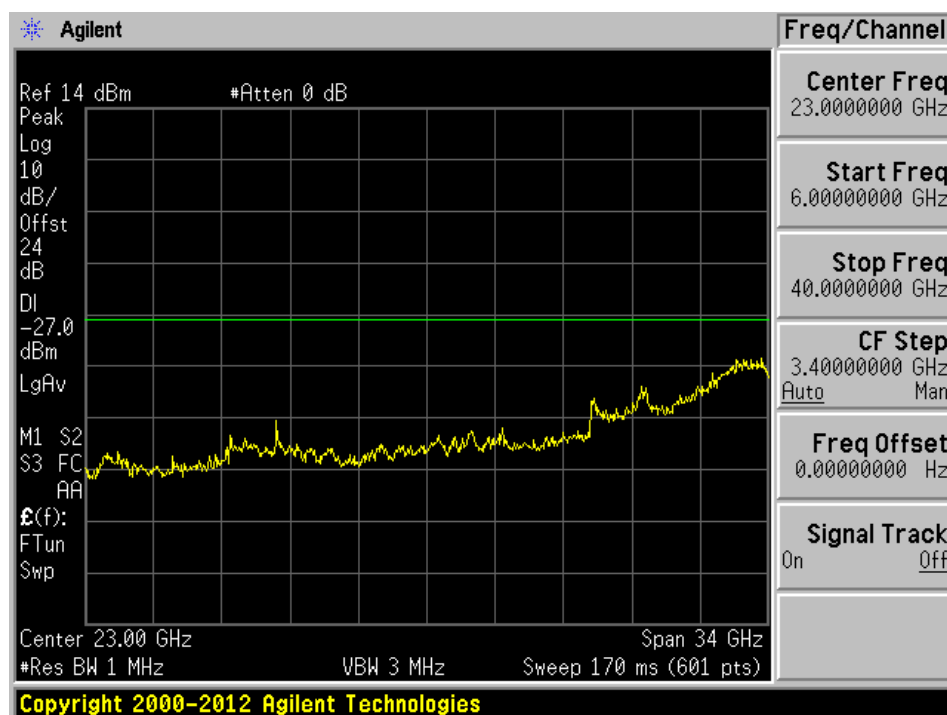
5150-5250 MHz Band

802.11a mode, Low Channel

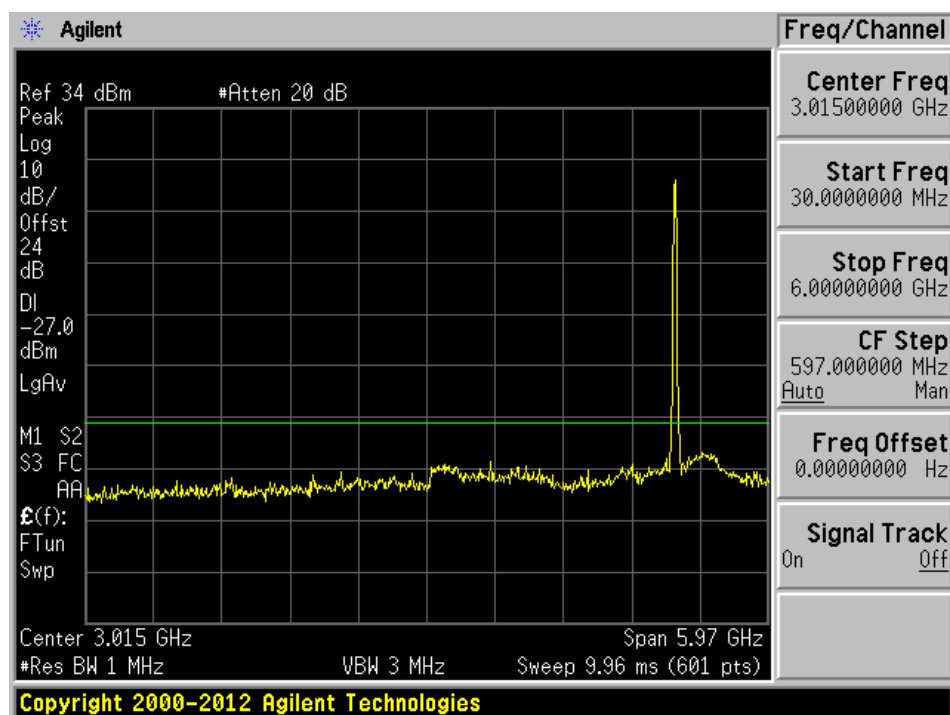
802.11a mode, 5180MHz, Chain J0 1



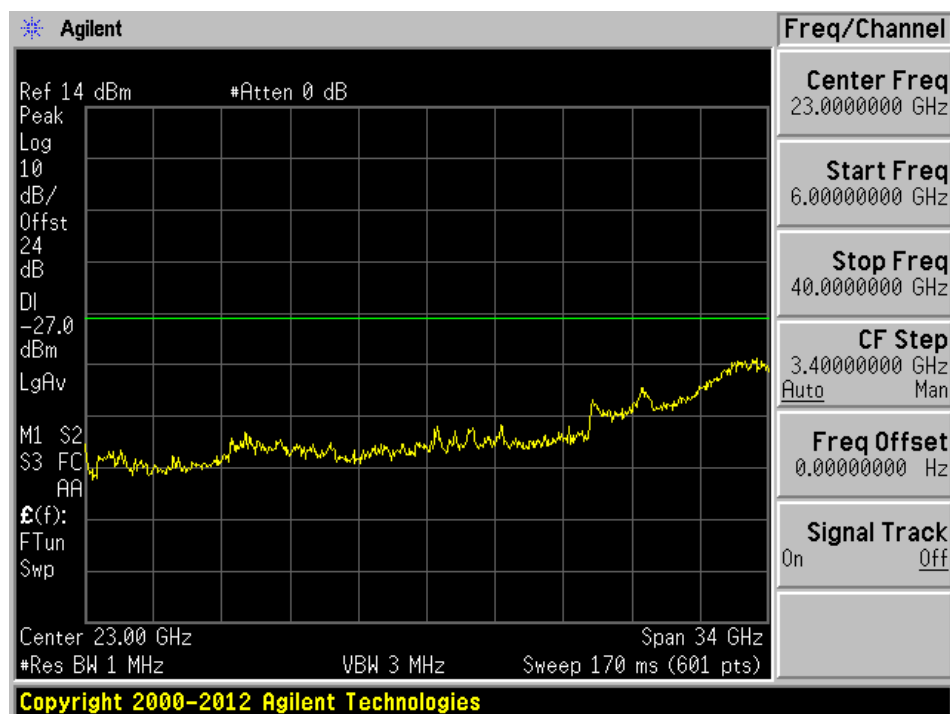
802.11a mode, 5180 MHz, Chain J0 2



802.11a mode, 5180 MHz, Chain J1 1

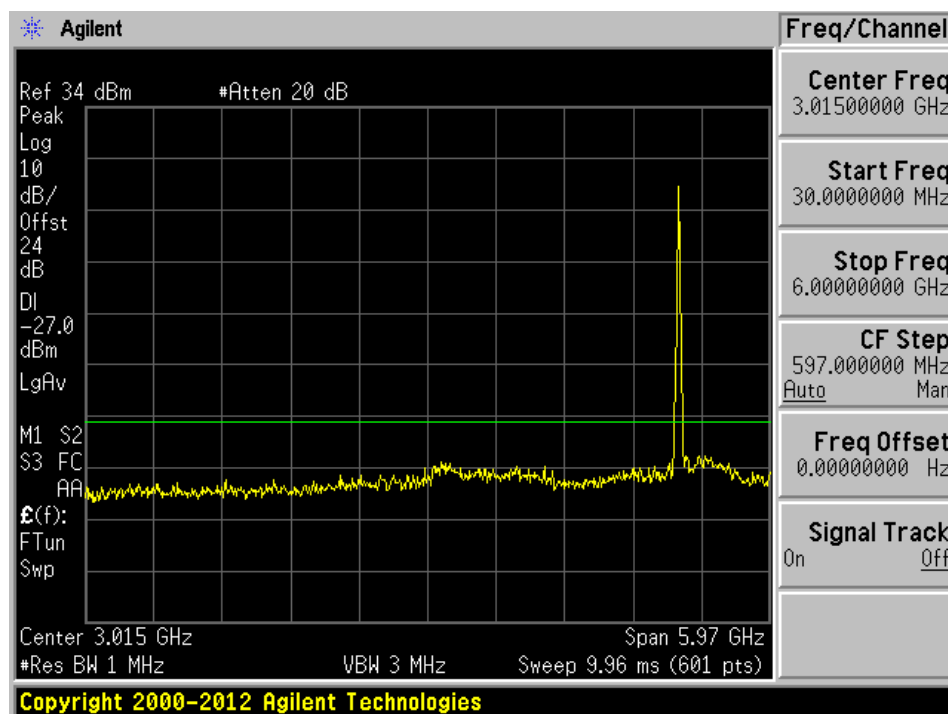


802.11a mode, 5180 MHz, Chain J1 2



802.11a mode, Middle Channel

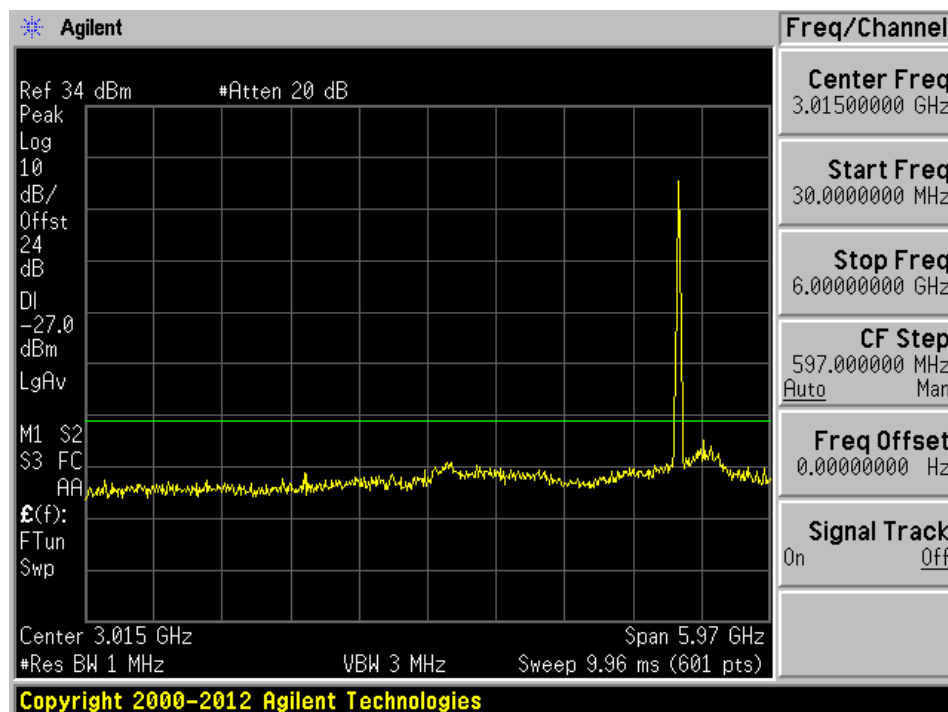
802.11a mode, 5200 MHz, Chain J0 1



802.11a mode, 5200 MHz, Chain J0 2



802.11a mode, 5200 MHz, Chain J1_1

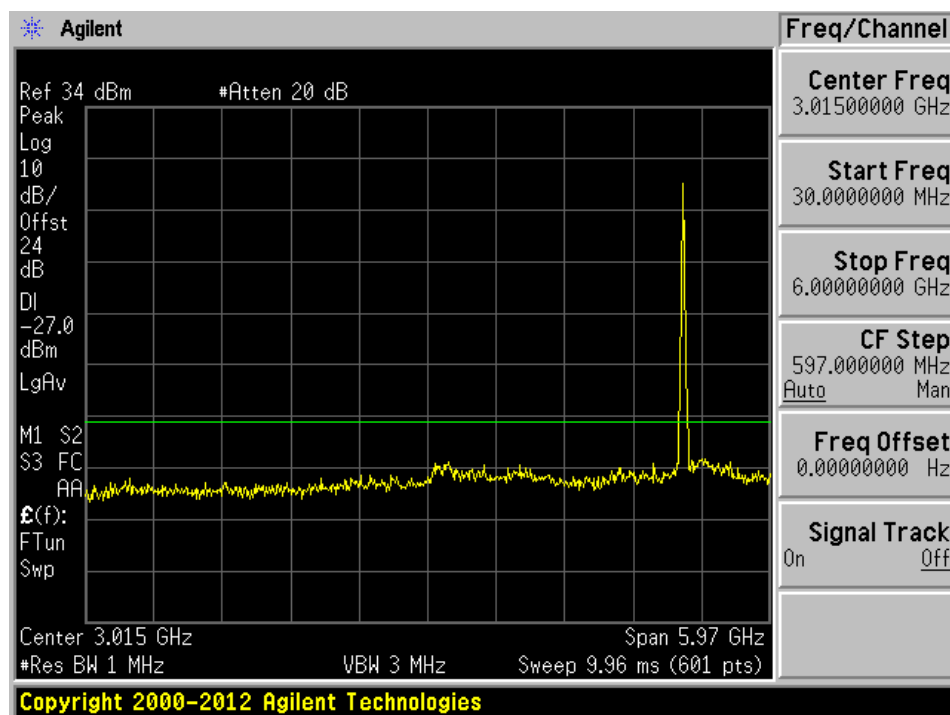


802.11a mode, 5200 MHz, Chain J1_2



802.11a mode, High Channel

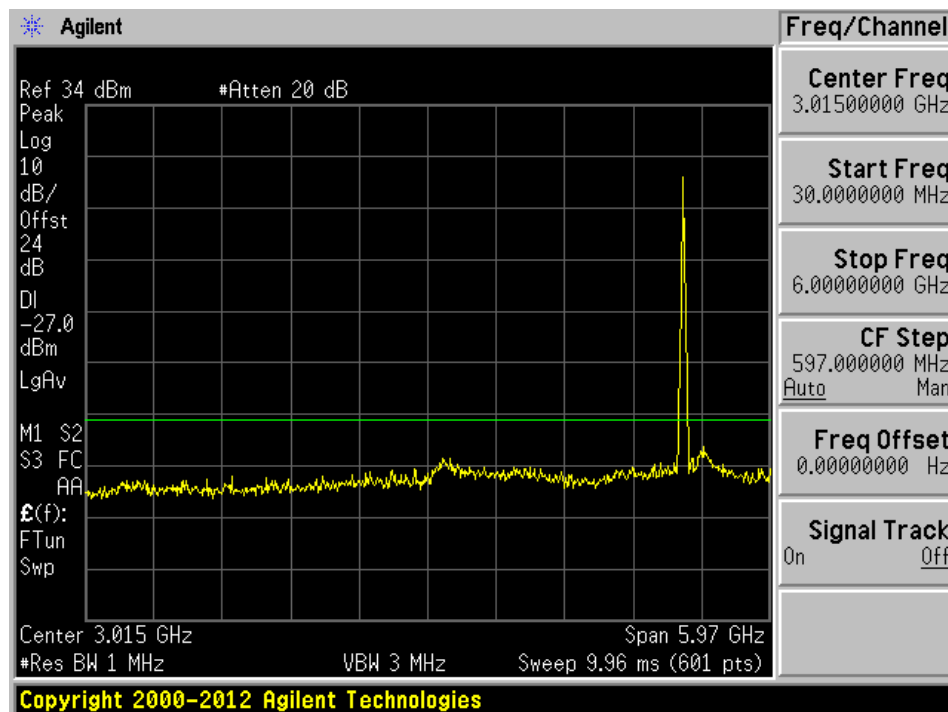
802.11a mode, 5240 MHz, Chain J0 1



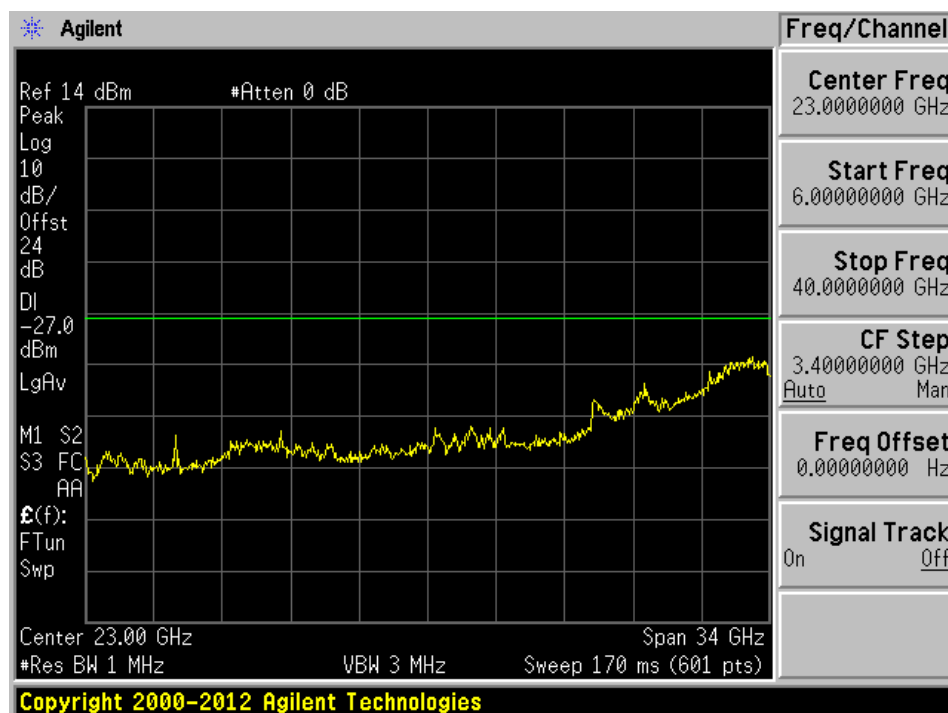
802.11a mode, 5240 MHz, Chain J0 2



802.11a mode, 5240 MHz, Chain J1 1

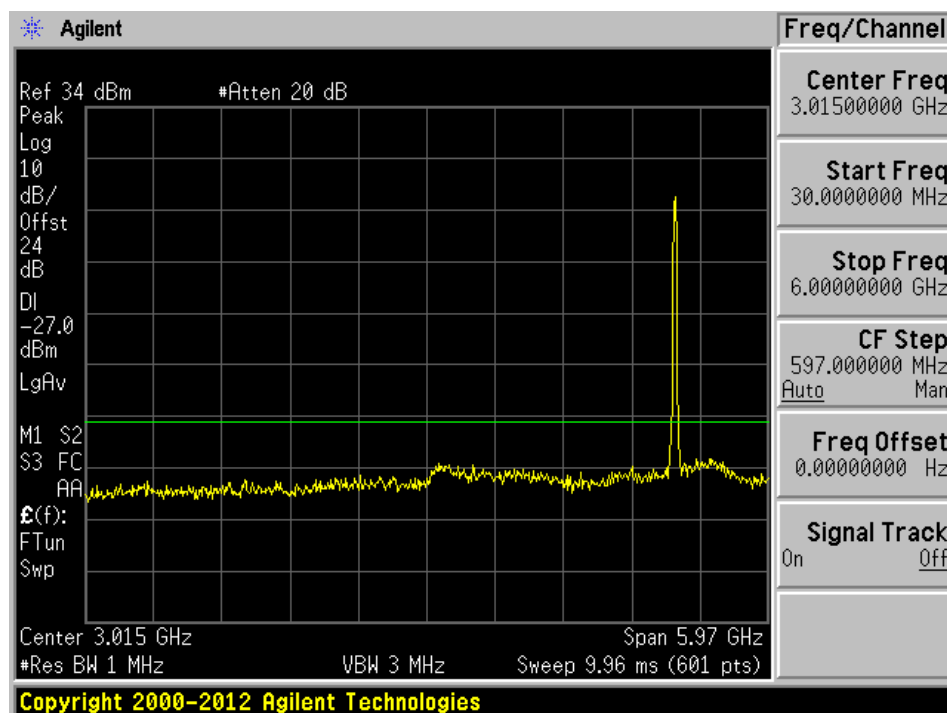


802.11a mode, 5240 MHz, Chain J1 2

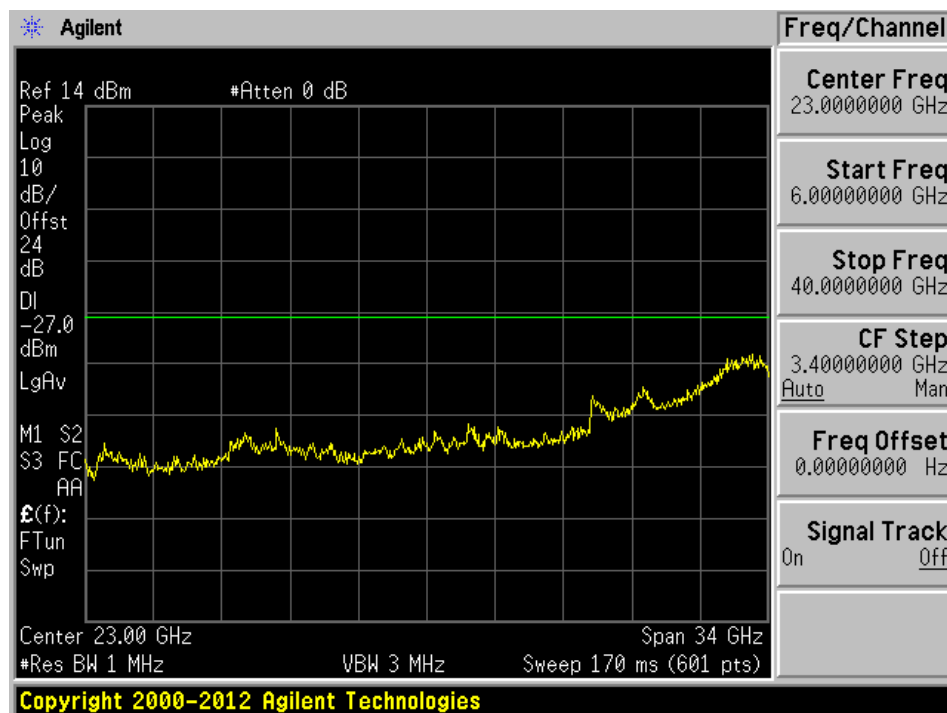


802.11 n HT20 mode, Low channel

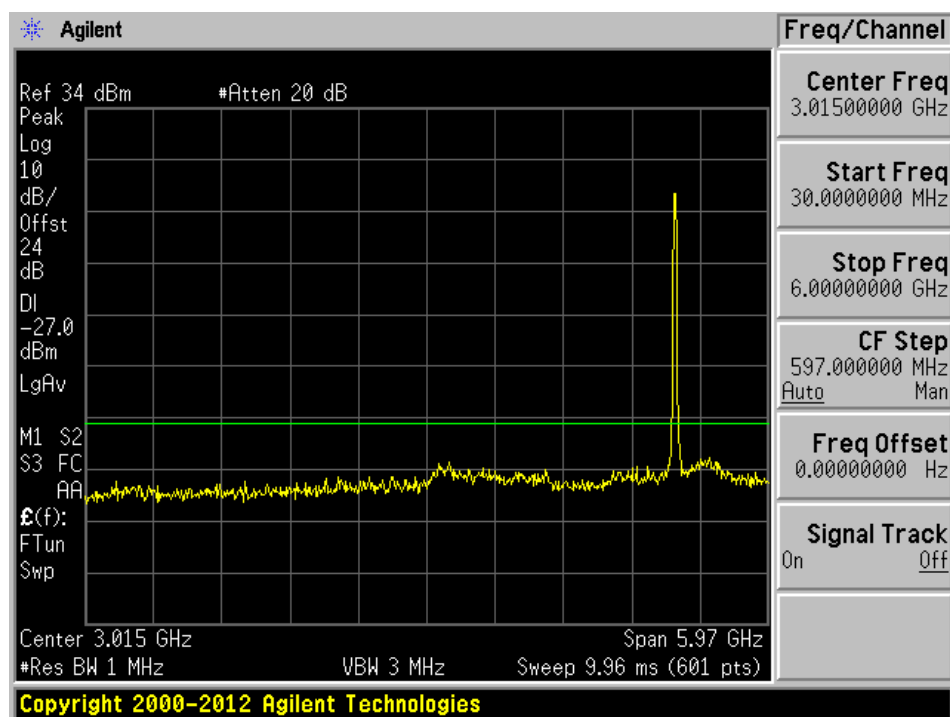
802.11n HT20 mode, 5180 MHz, Chain J0 1



802.11n HT20 mode, 5180 MHz, Chain J0 2



802.11n HT20 mode, 5180 MHz, Chain J1 1

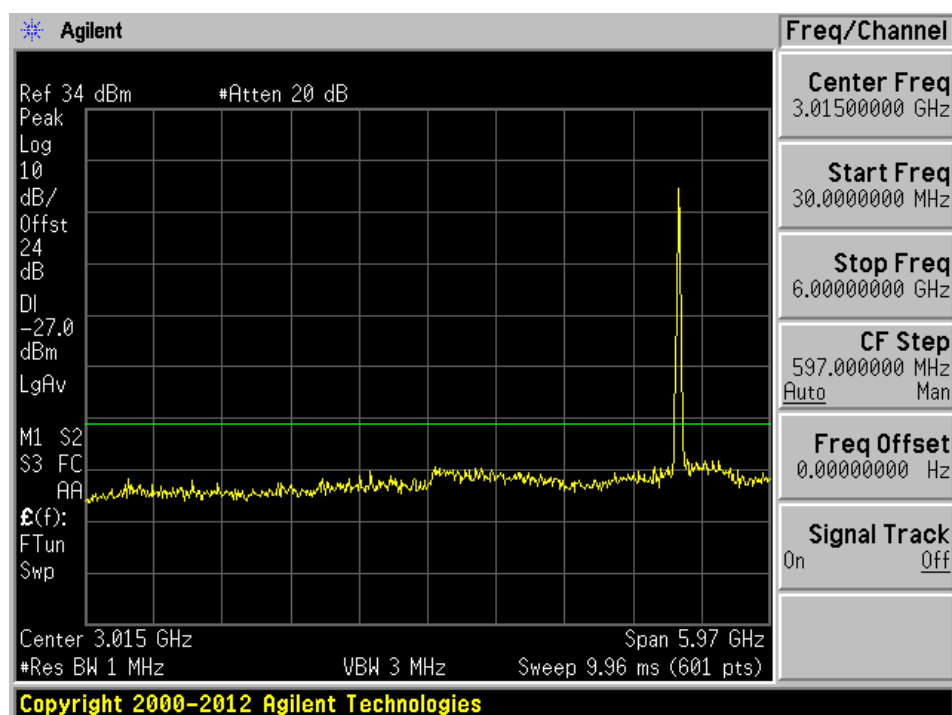


802.11n HT20 mode, 5180 MHz, Chain J1 2

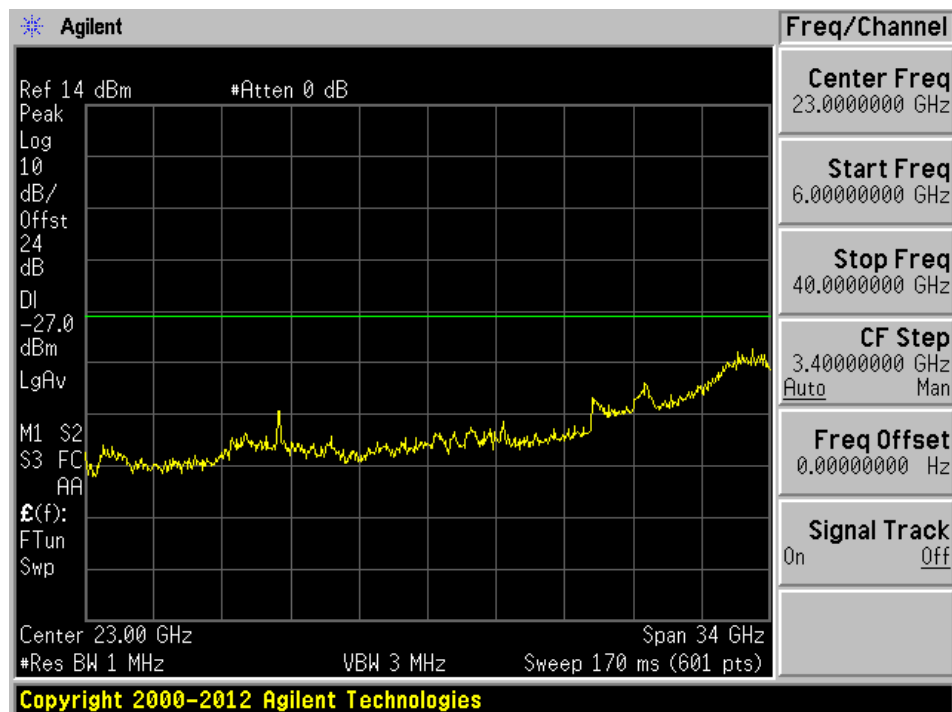


802.11n-HT20 mode, Middle Channel

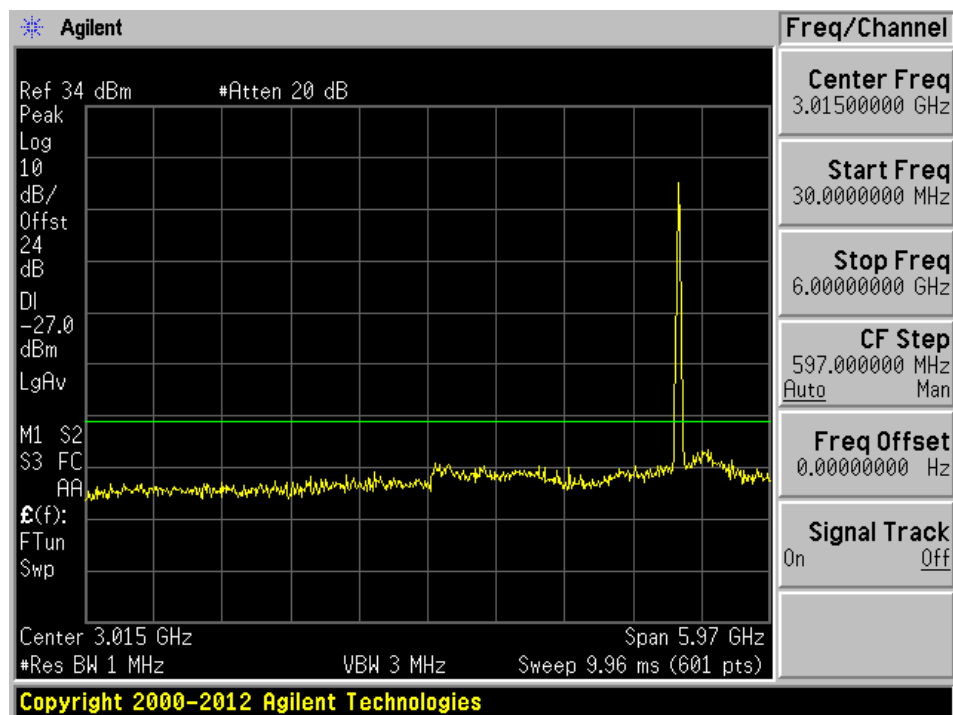
802.11n HT20 mode, 5200 MHz, Chain J0 1



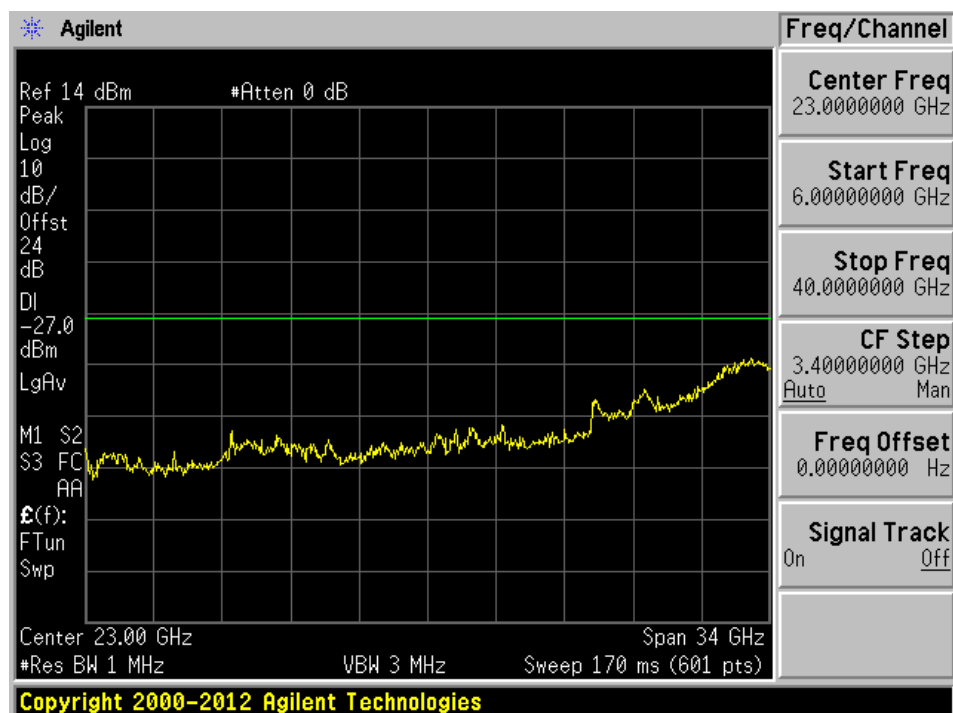
802.11n HT20 mode, 5200 MHz, Chain J0 2



802.11n HT20 mode, 5200 MHz, Chain J1 1

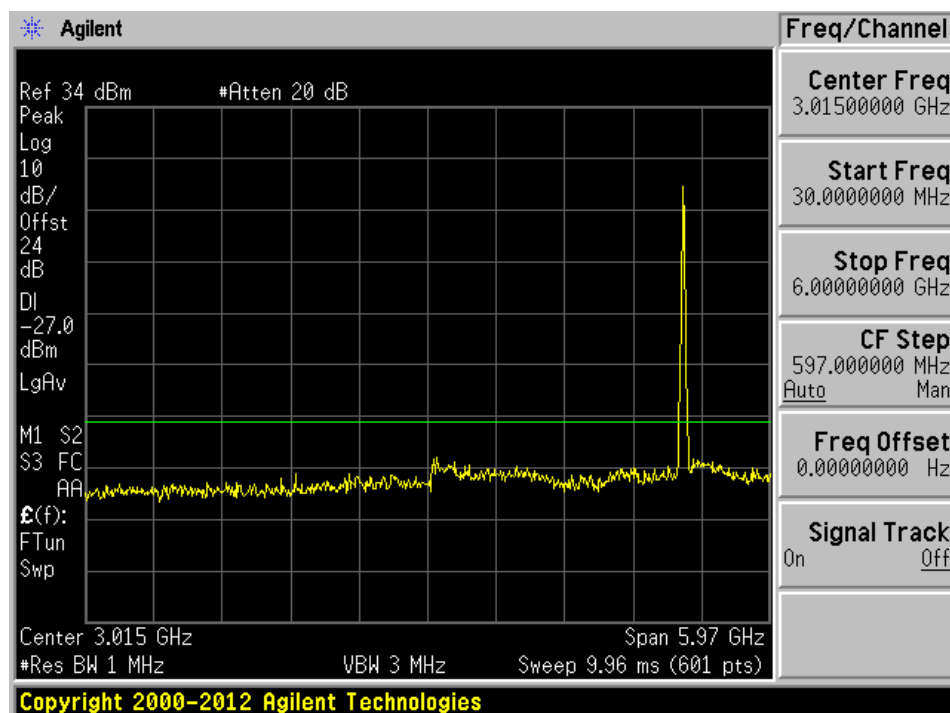


802.11n HT20 mode, 5200 MHz, Chain J1 2

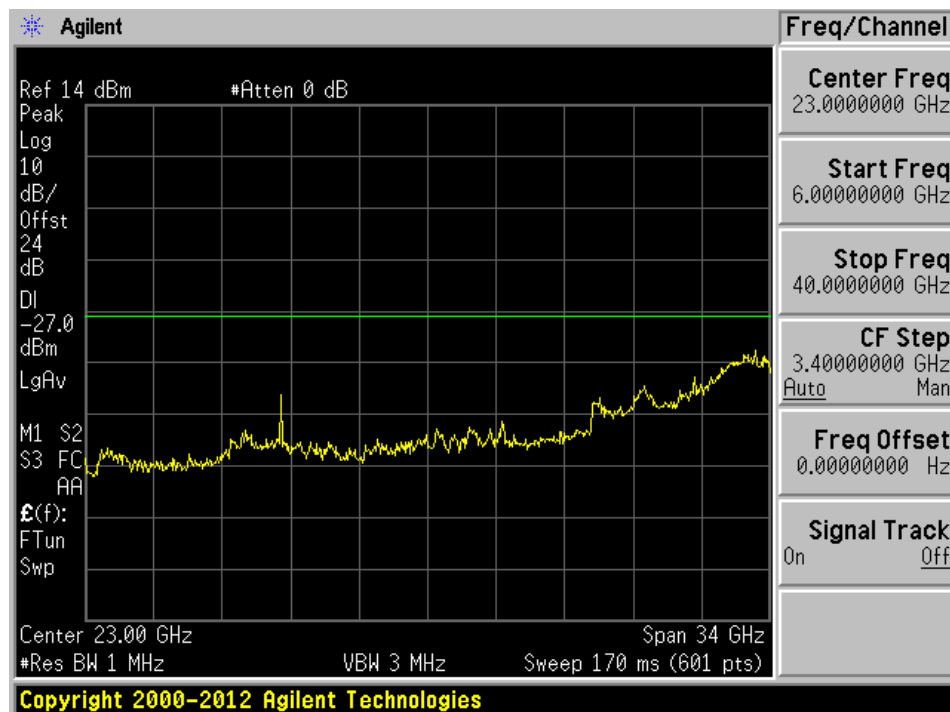


802.11n-HT20 mode, High Channel

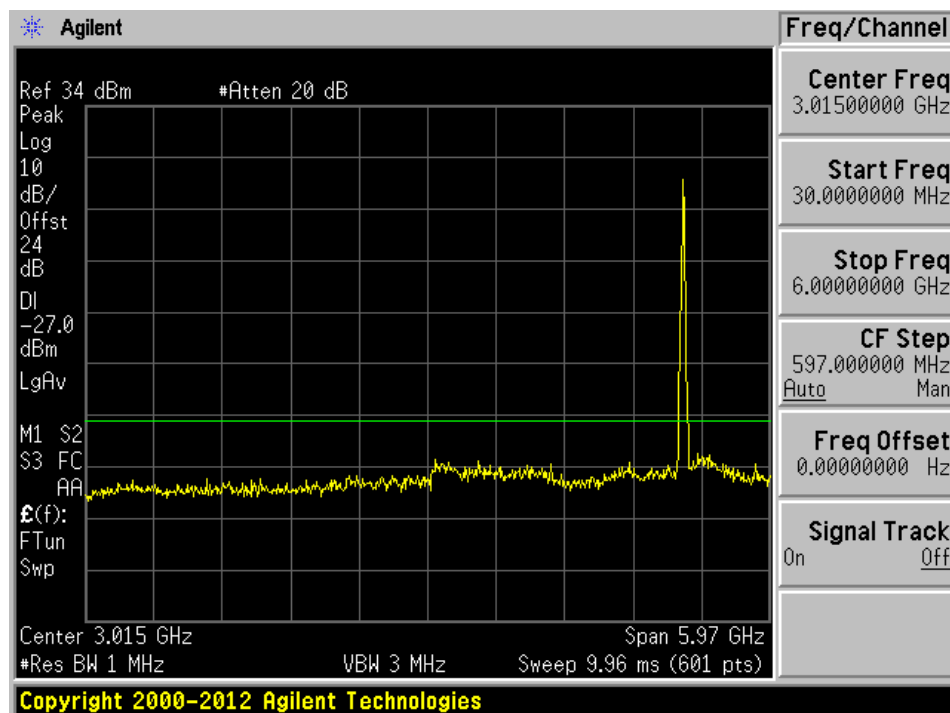
802.11n HT20 mode, 5240 MHz, Chain J0 1



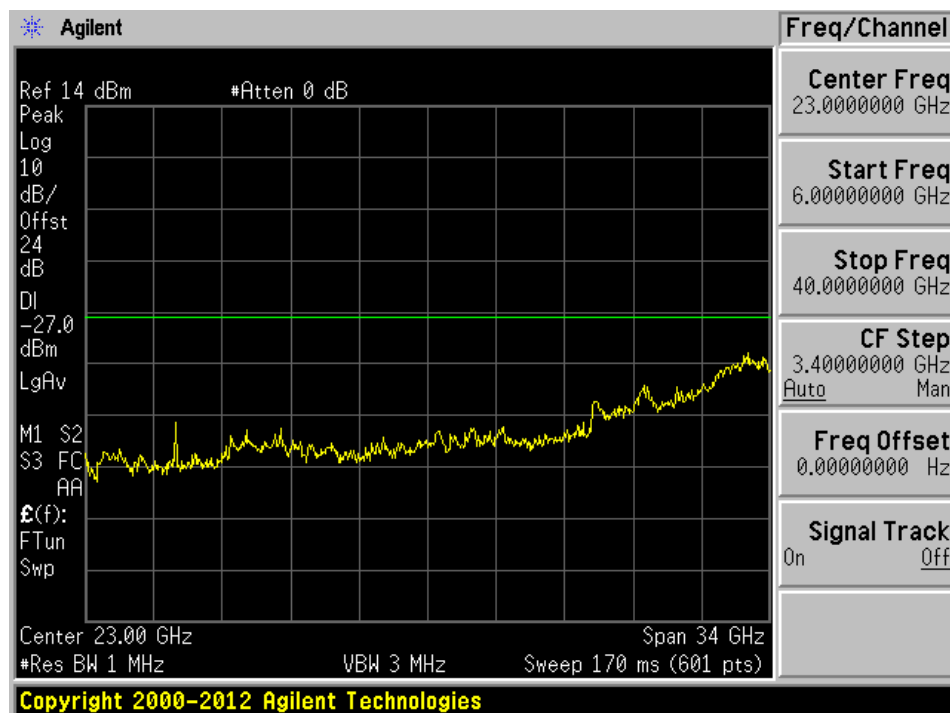
802.11n HT20 mode, 5240 MHz, Chain J0 2



802.11n HT20 mode, 5240 MHz, Chain J1 1

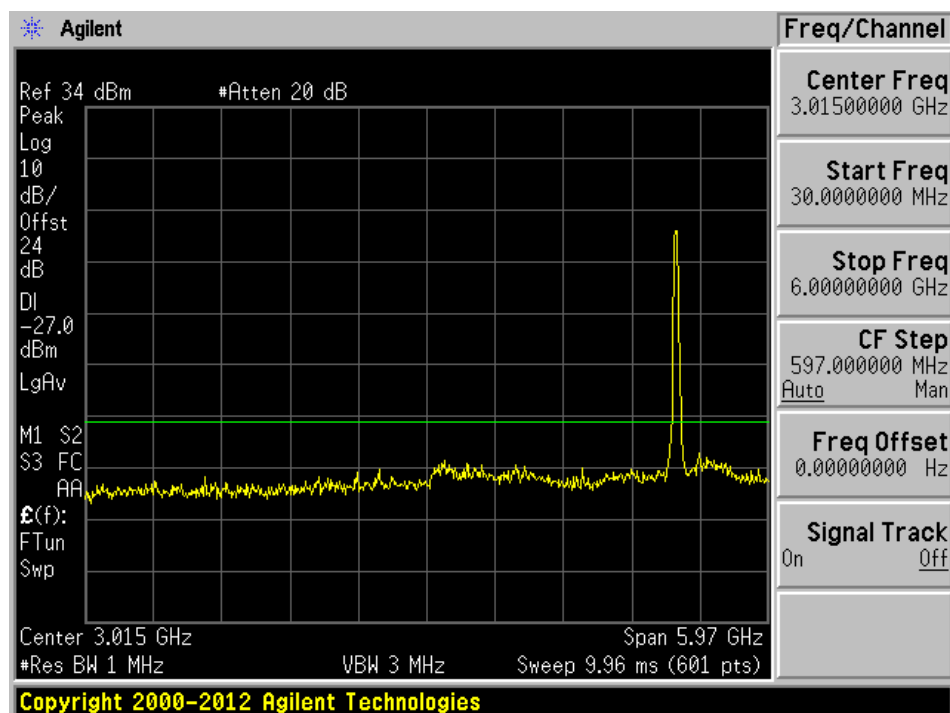


802.11n HT20 mode, 5240 MHz, Chain J1 2

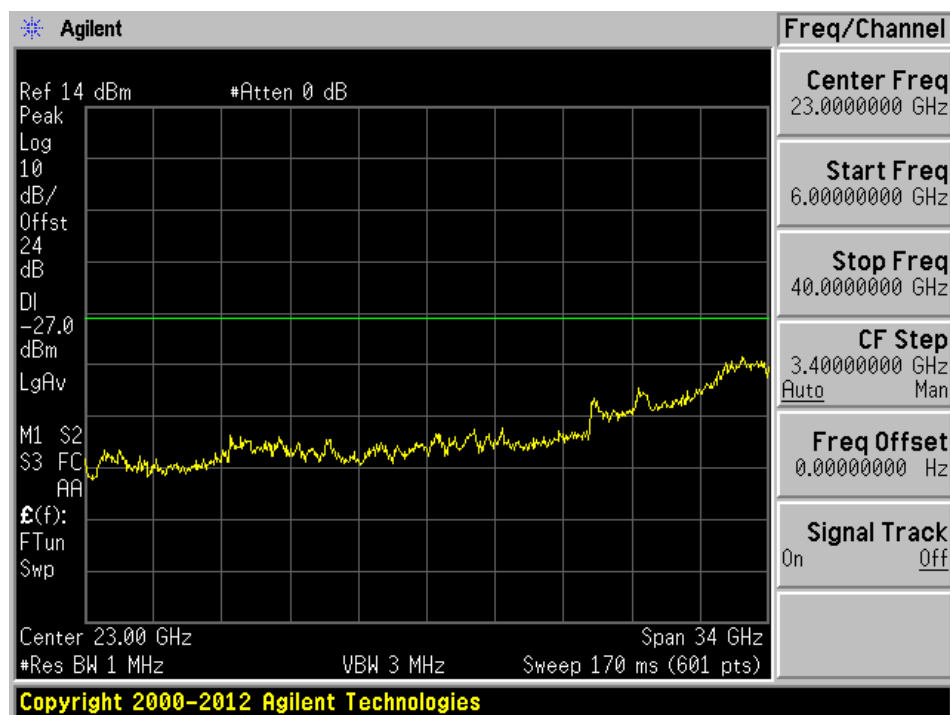


802.11n-HT40 mode, Low channel

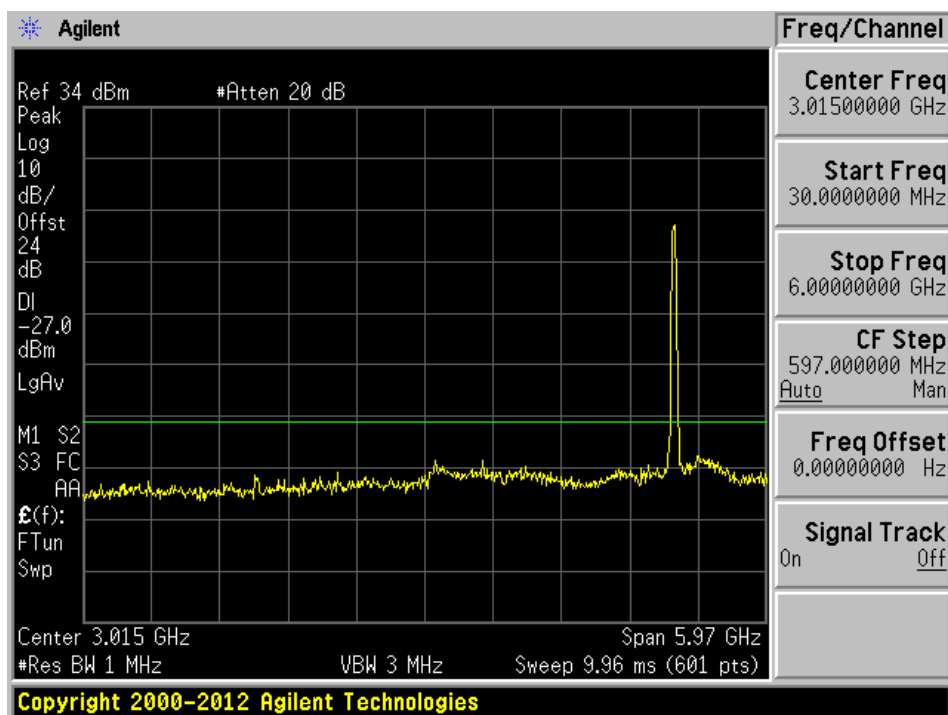
802.11n HT40 mode, 5190 MHz, Chain J0 1



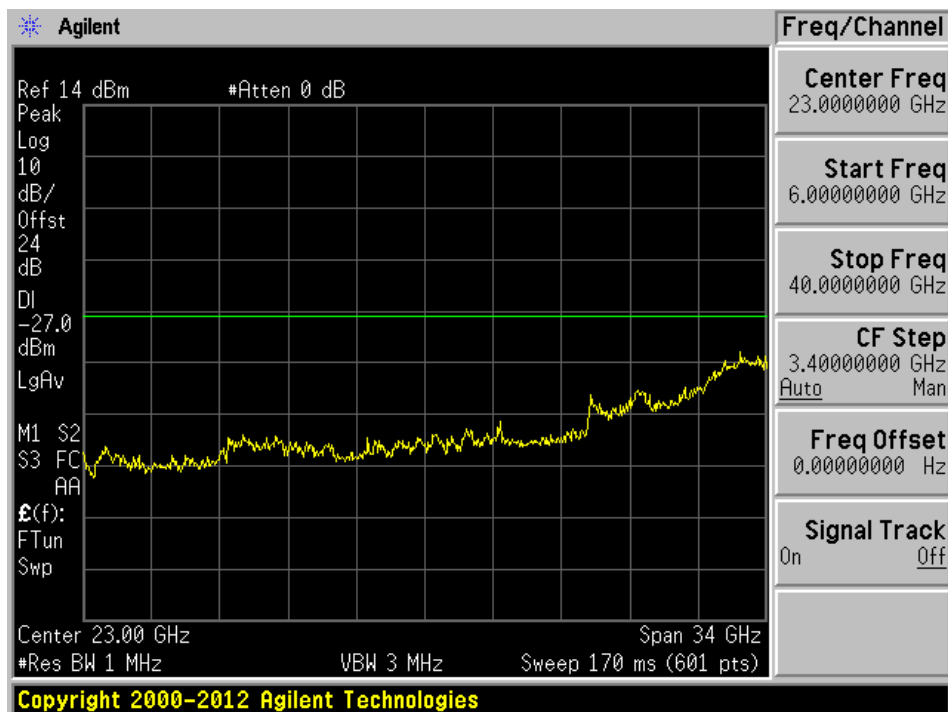
802.11n HT40 mode, 5190 MHz, Chain J0 2



802.11n HT40 mode, 5190 MHz, Chain J1 1

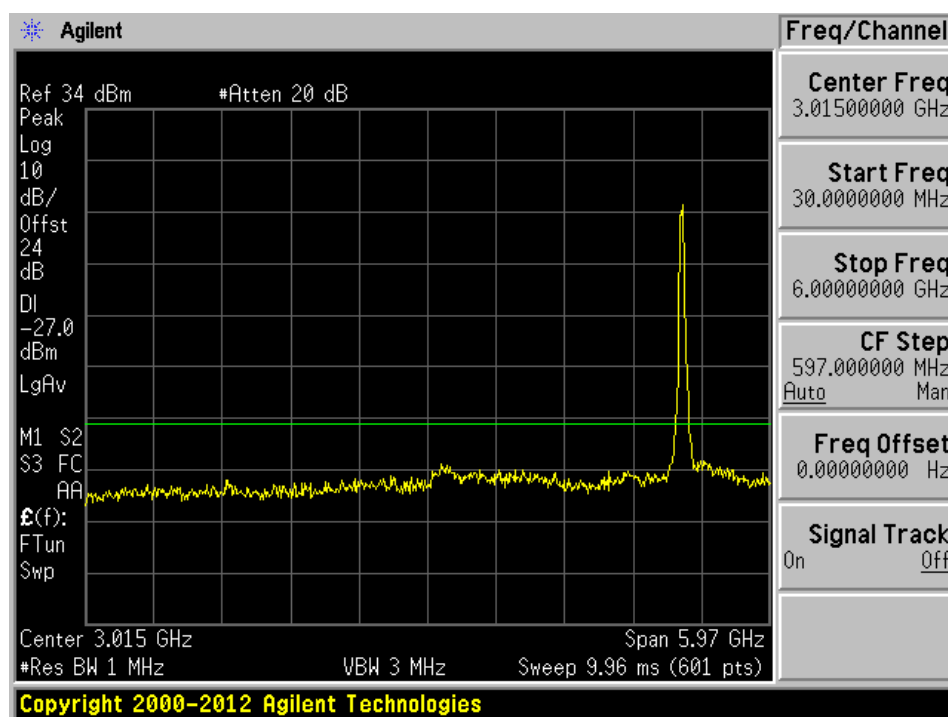


802.11n HT40 mode, 5190 MHz, Chain J1 2

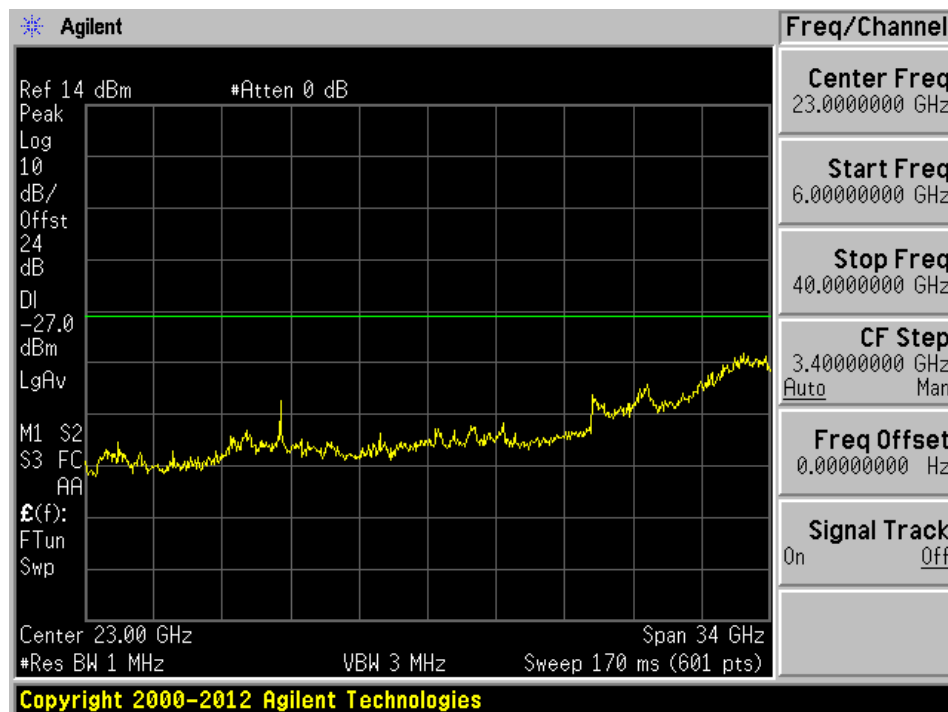


802.11n-HT40 mode, High Channel

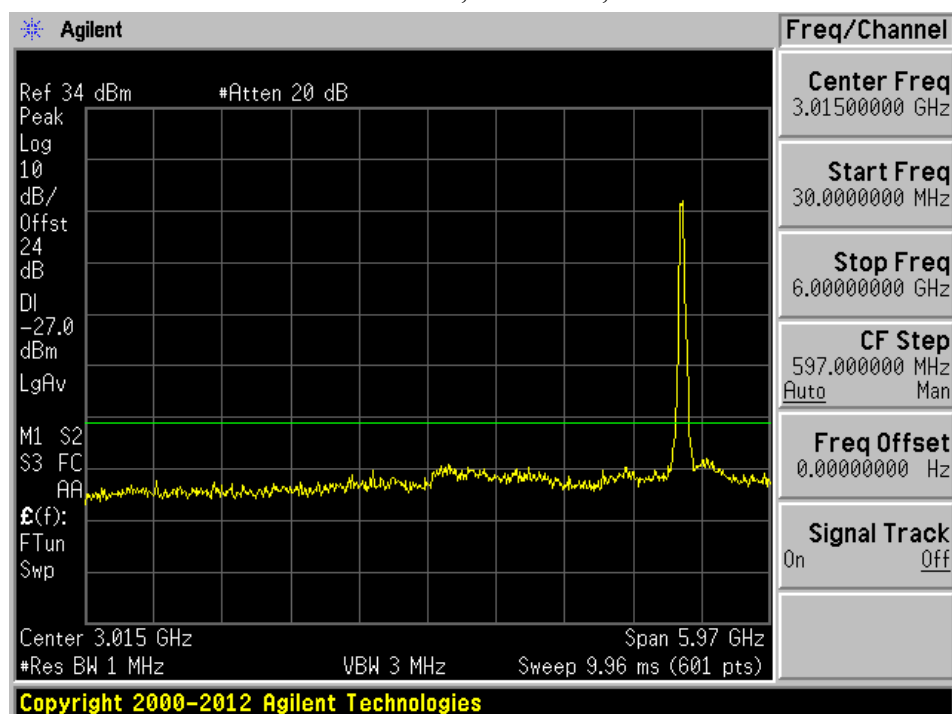
802.11n HT40 mode, 5230 MHz, Chain J0 1



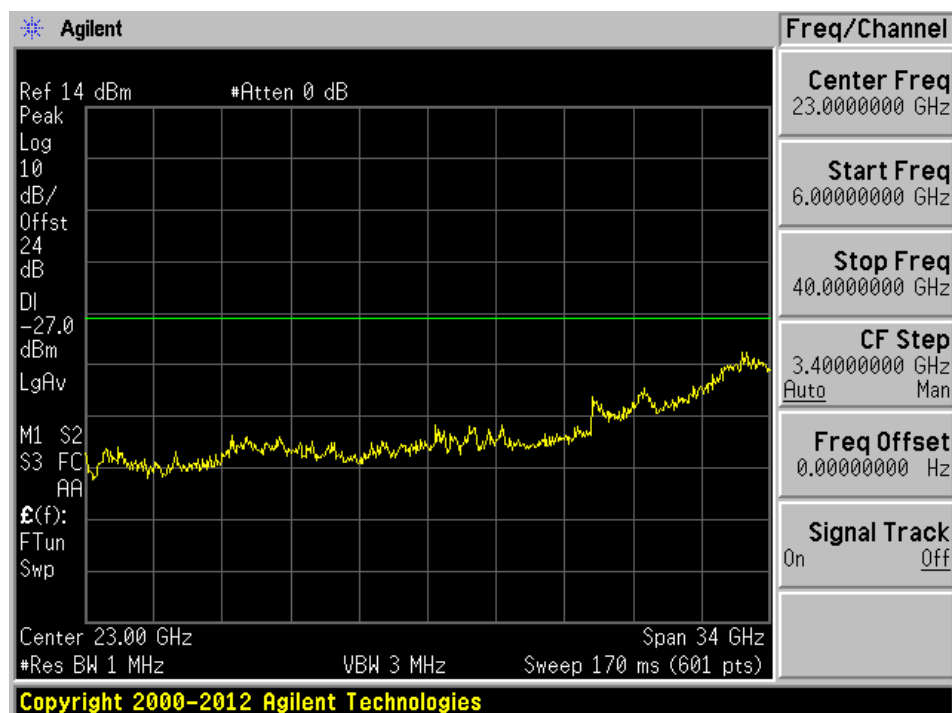
802.11n HT40 mode, 5230 MHz, Chain J0 2



802.11n HT40 mode, 5230 MHz, Chain J1 1



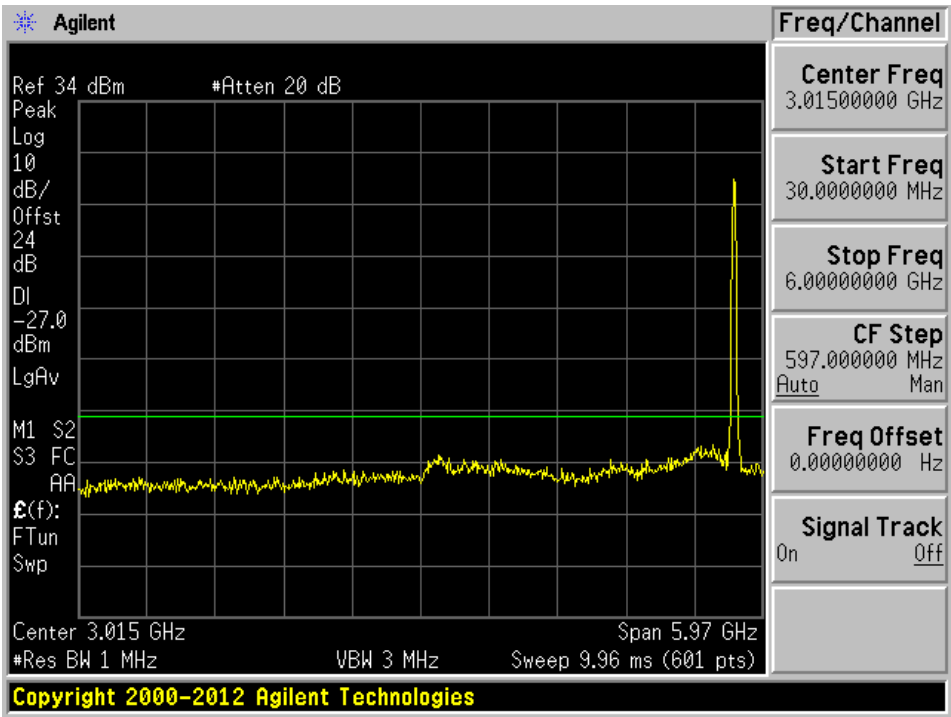
802.11n HT40 mode, 5230 MHz, Chain J1 2



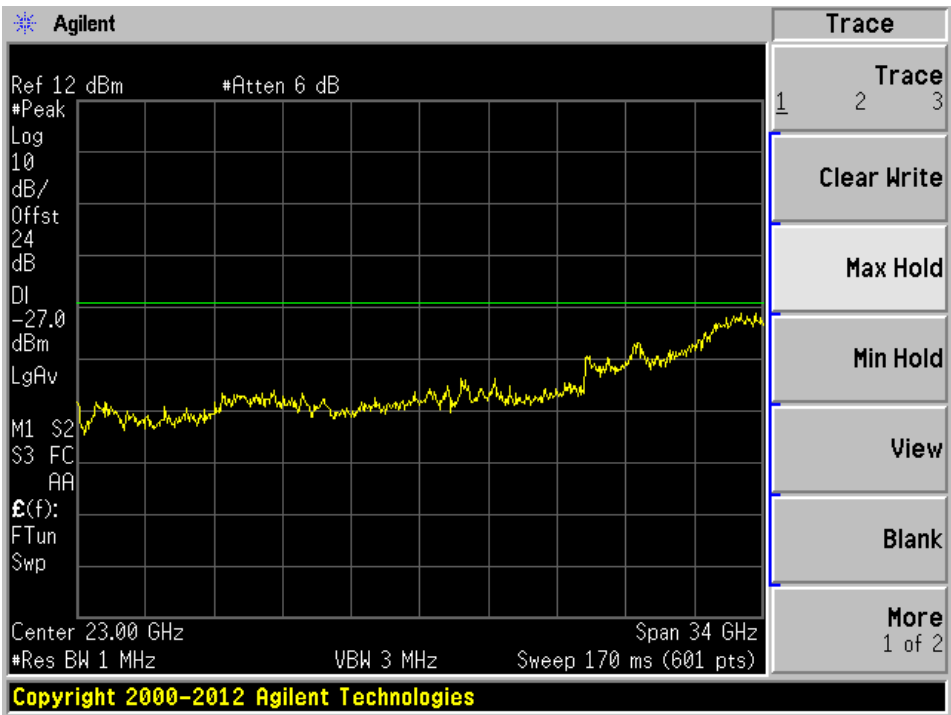
5725-5850 MHz Band

802.11a mode, Low Channel

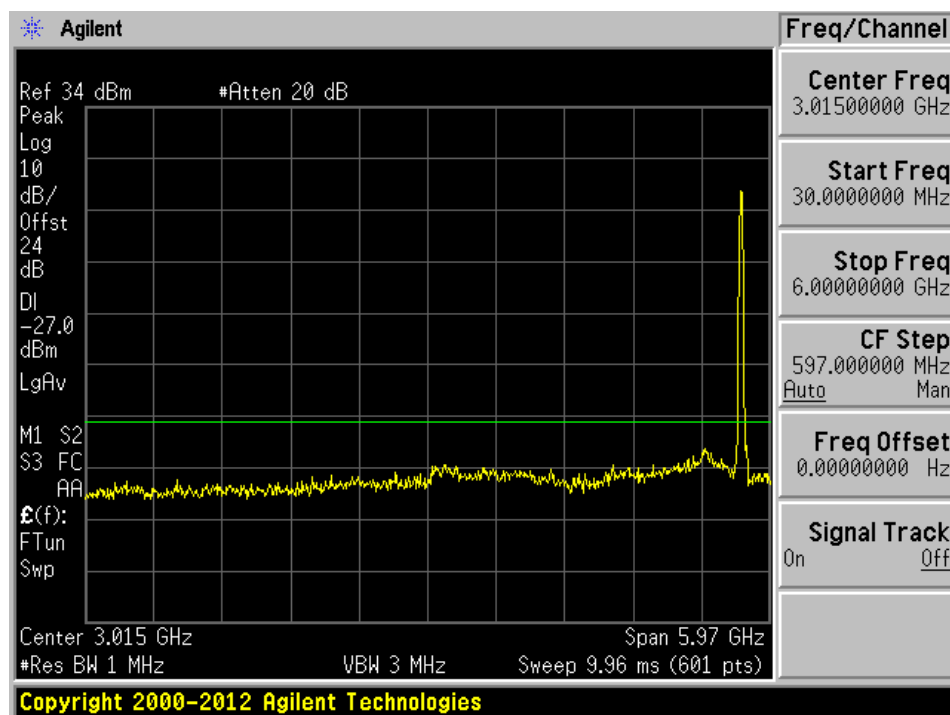
802.11a mode, 5745MHz, Chain J0 1



802.11a mode, 5745 MHz, Chain J0 2



802.11a mode, 5745MHz, Chain J1 1

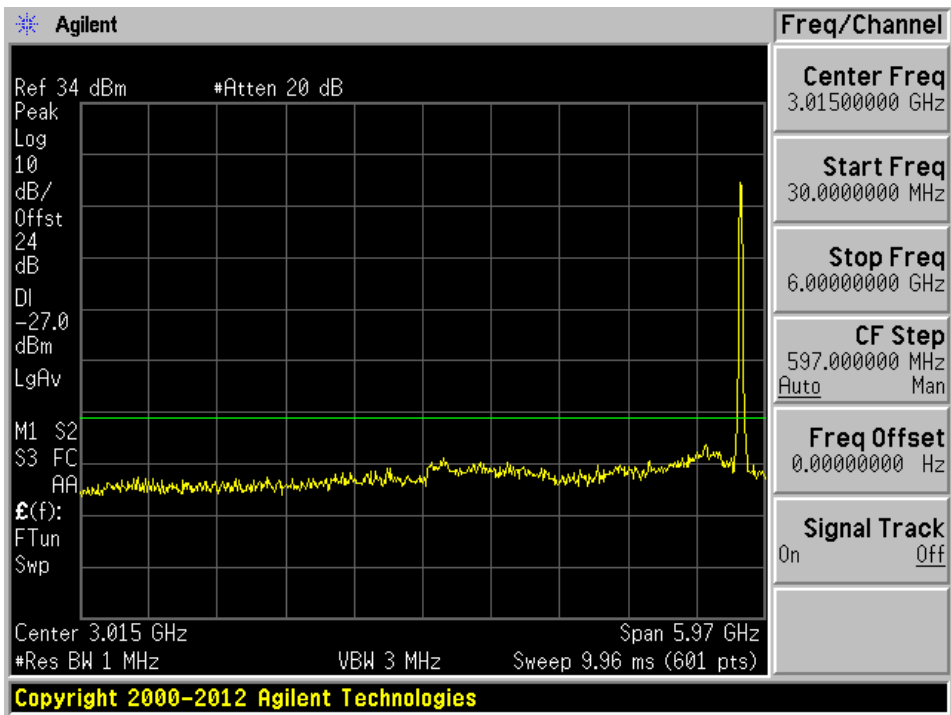


802.11a mode, 5745 MHz, Chain J1 2

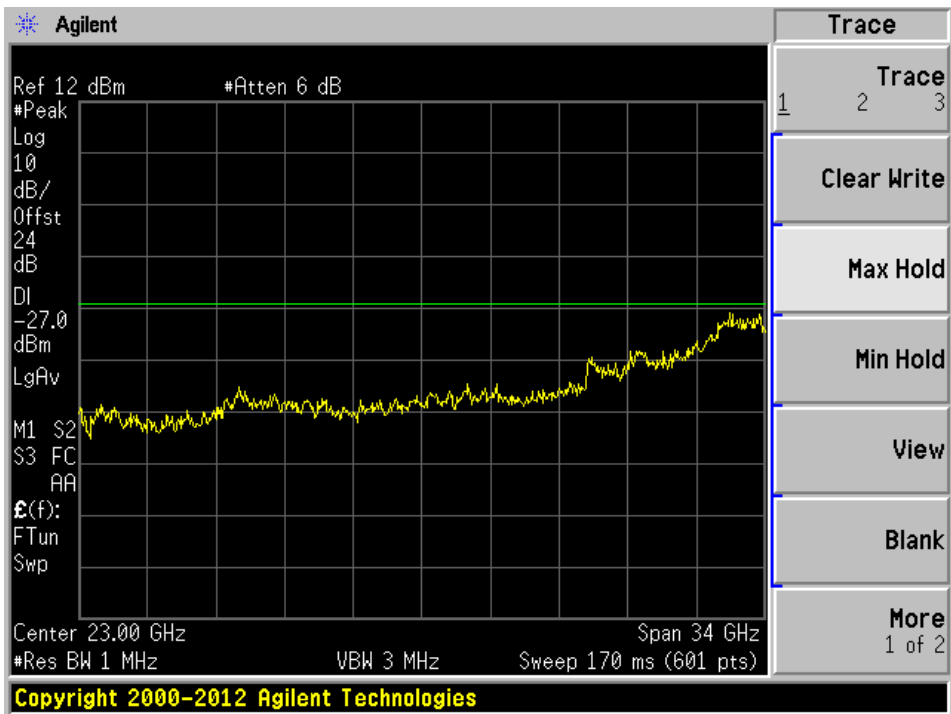


802.11a mode, Middle Channel

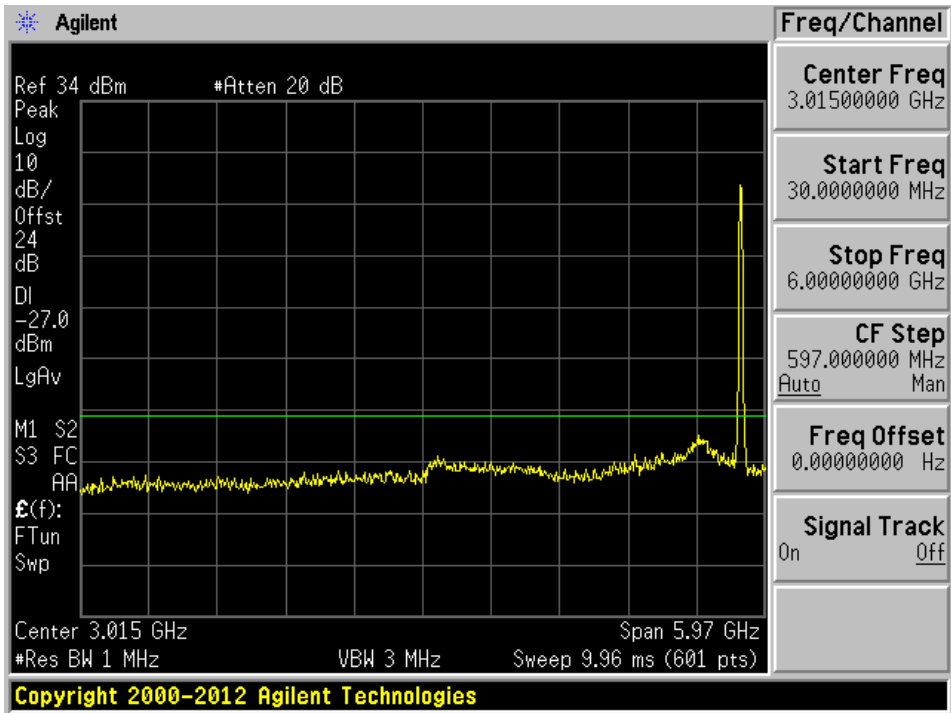
802.11a mode, 5785MHz, Chain J0 1



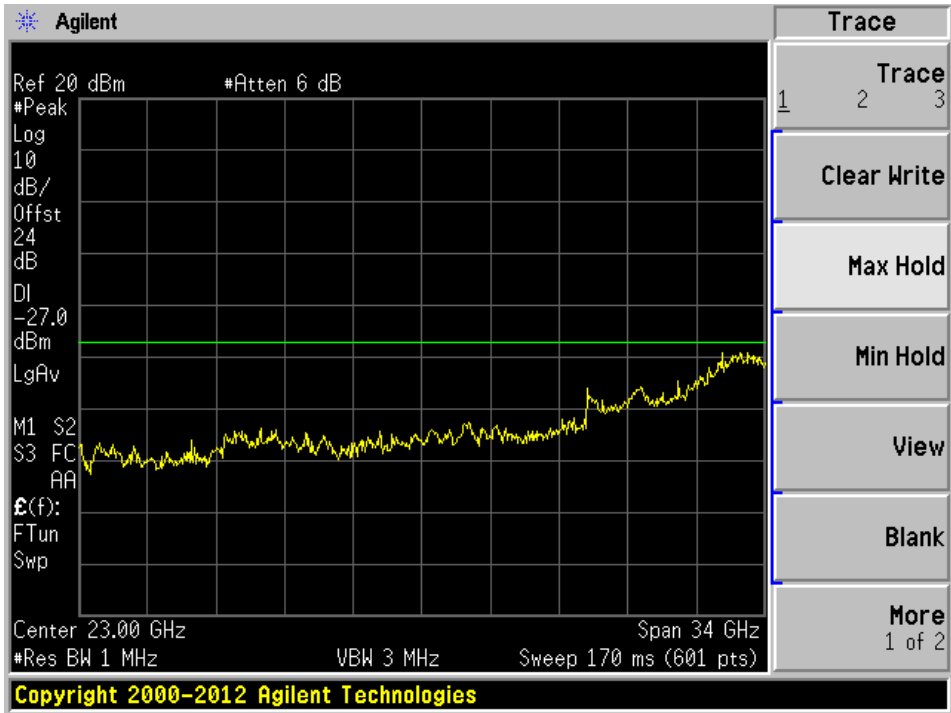
802.11a mode, 5785 MHz, Chain J0 2



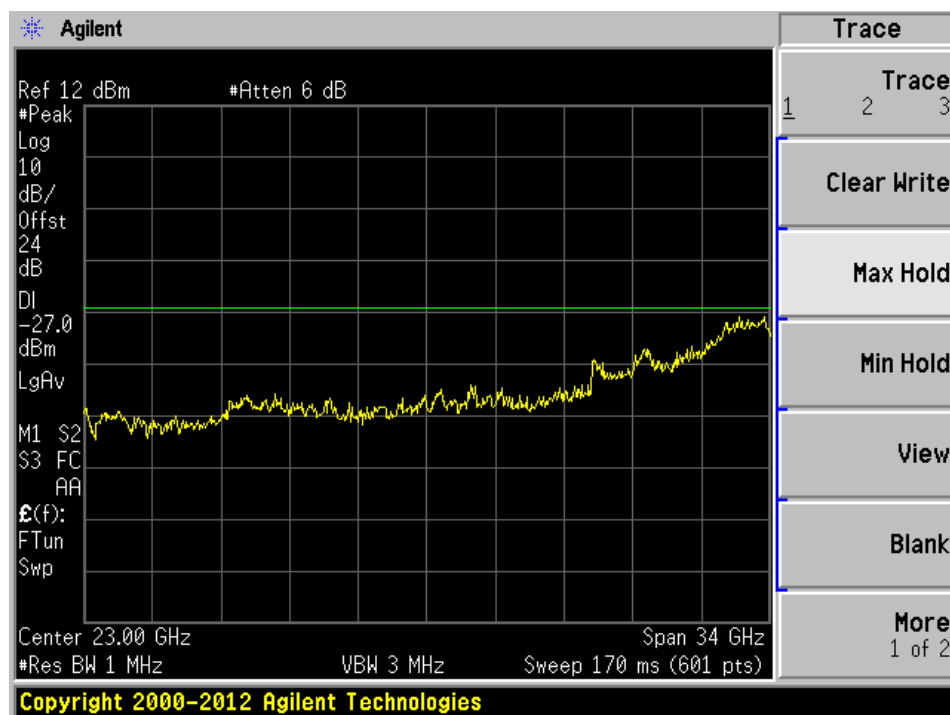
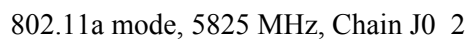
802.11a mode, 5785MHz, Chain J1 1



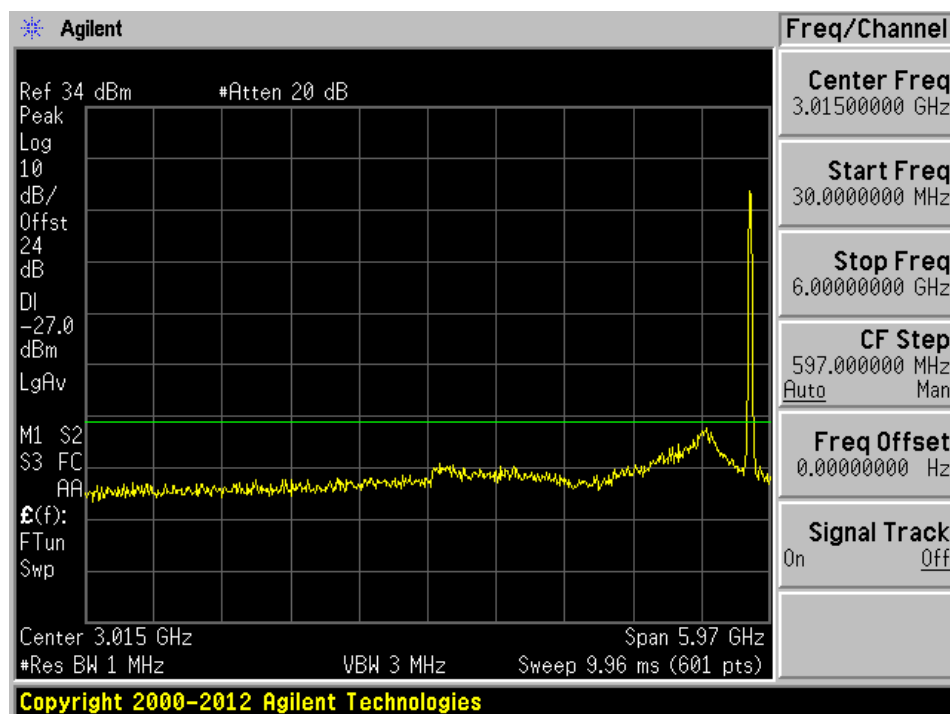
802.11a mode, 5785 MHz, Chain J1 2



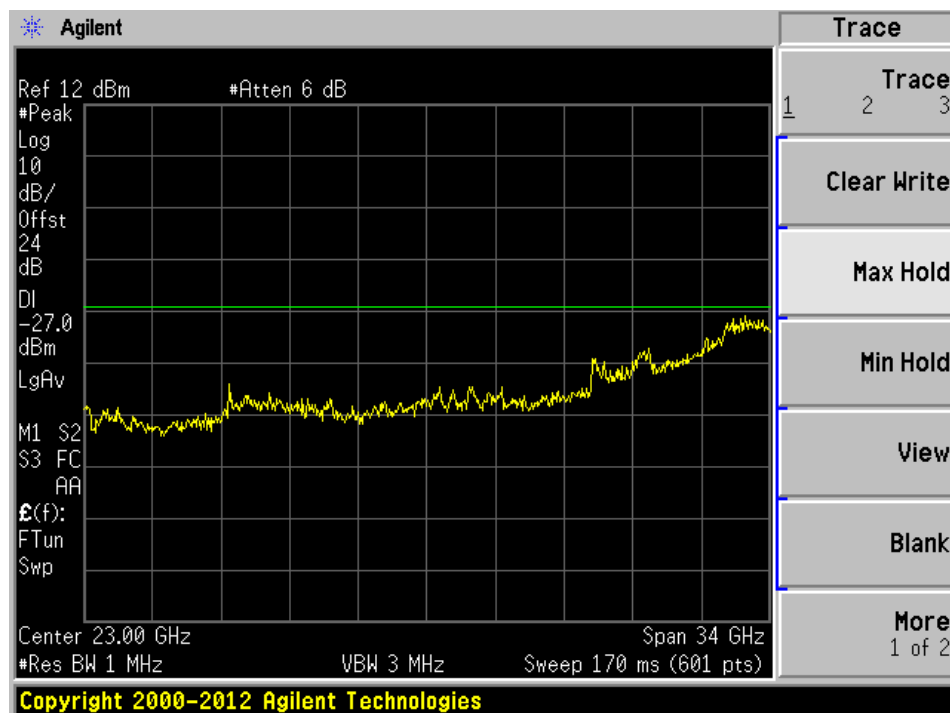
802.11a mode, 5825MHz, Chain J0 1



802.11a mode, 5825MHz, Chain J1 1

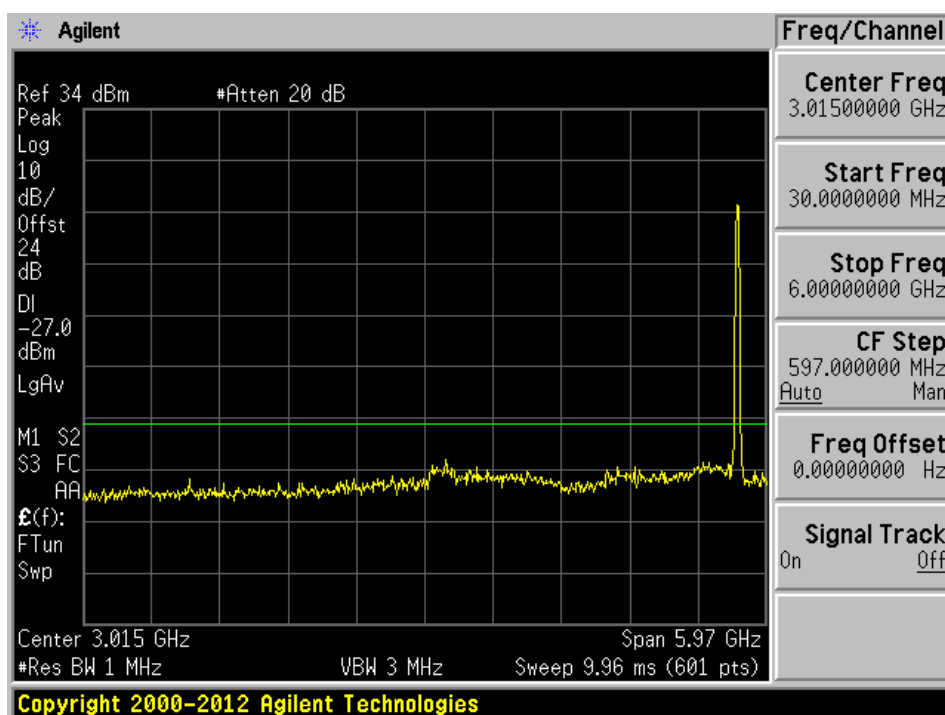


802.11a mode, 5825 MHz, Chain J1 2

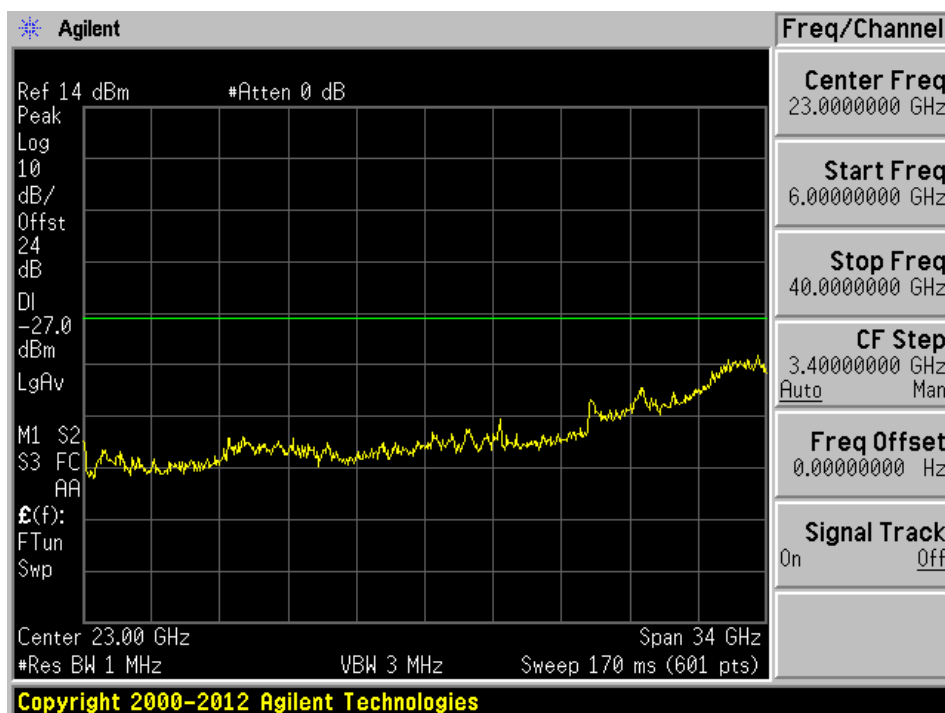


802.11n-HT20 mode, Low channel

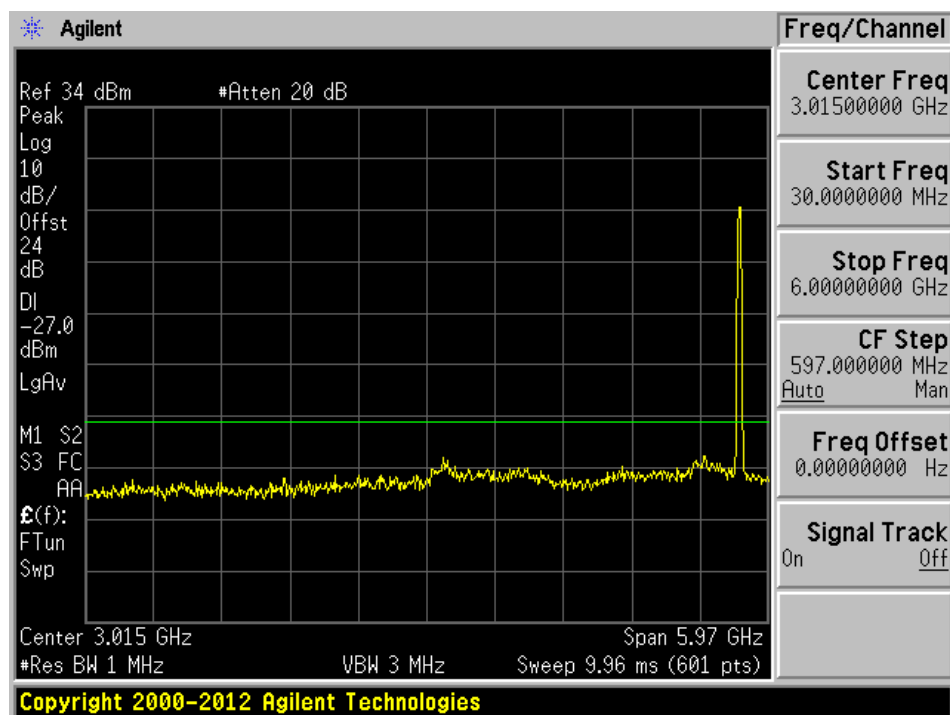
802.11n HT20 mode, 5745 MHz, Chain J0 1



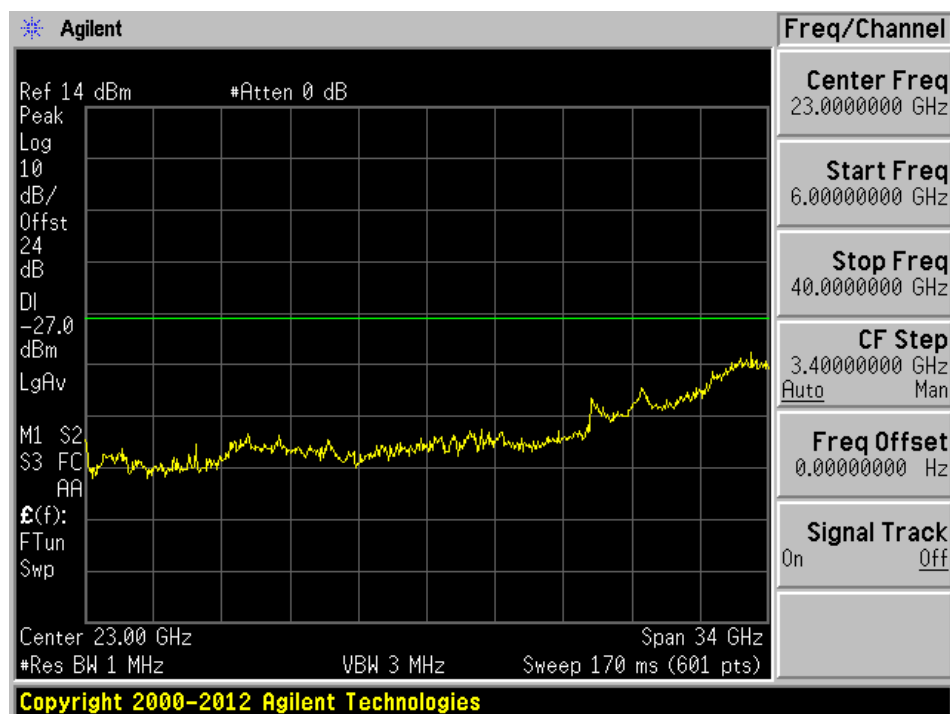
802.11n HT20 mode, 5745 MHz, Chain J0 2



802.11n HT20 mode, 5745 MHz, Chain J1 1

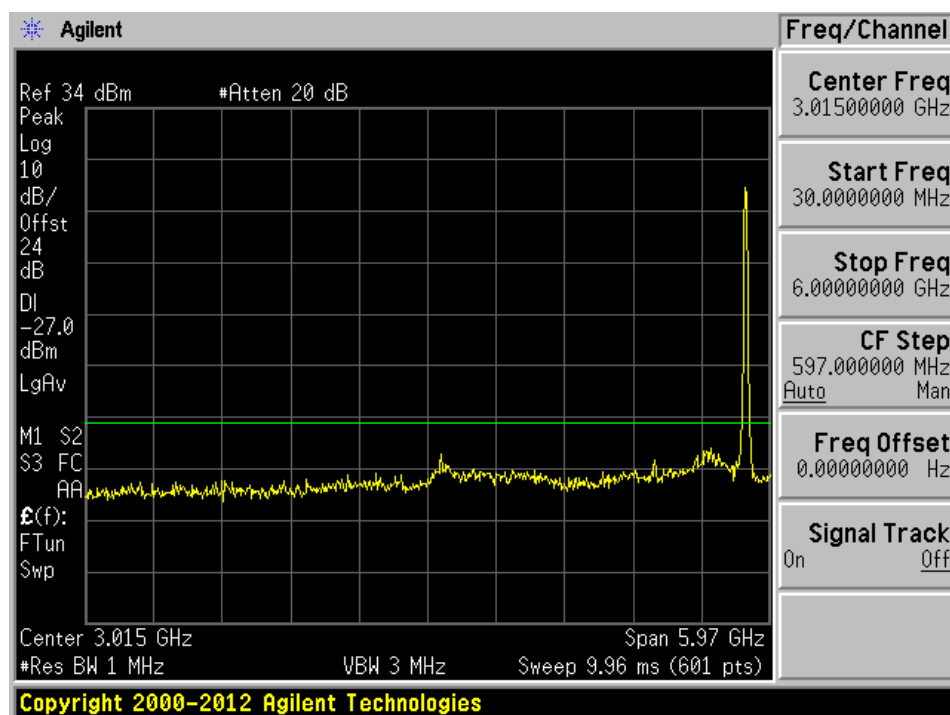


802.11n HT20 mode, 5745 MHz, Chain J1 2

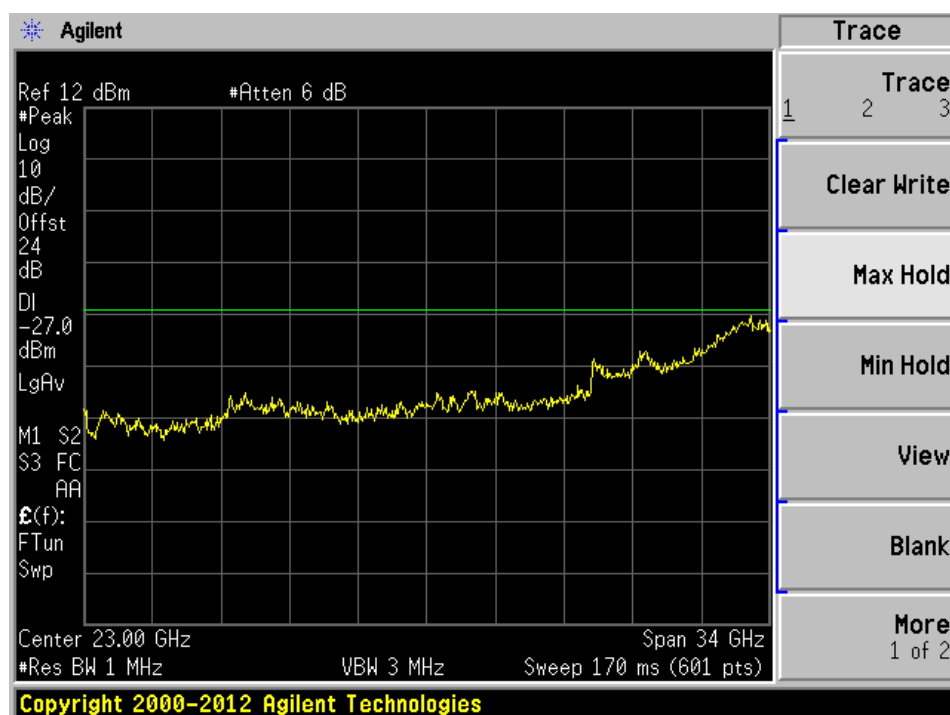


802.11n-HT20 mode, Middle Channel

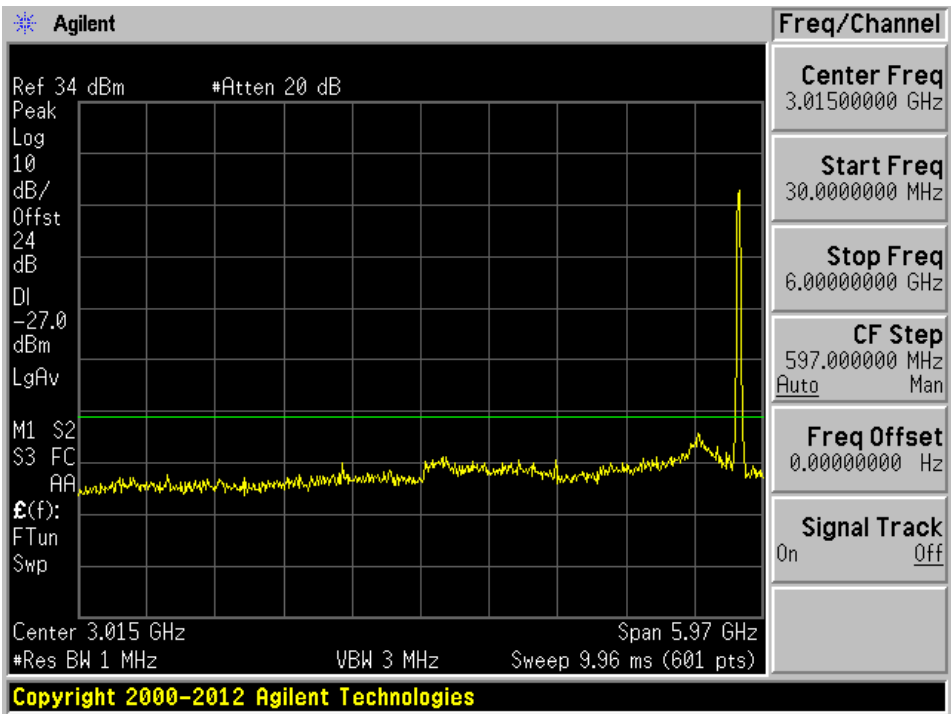
802.11n HT20 mode, 5785 MHz, Chain J0 1



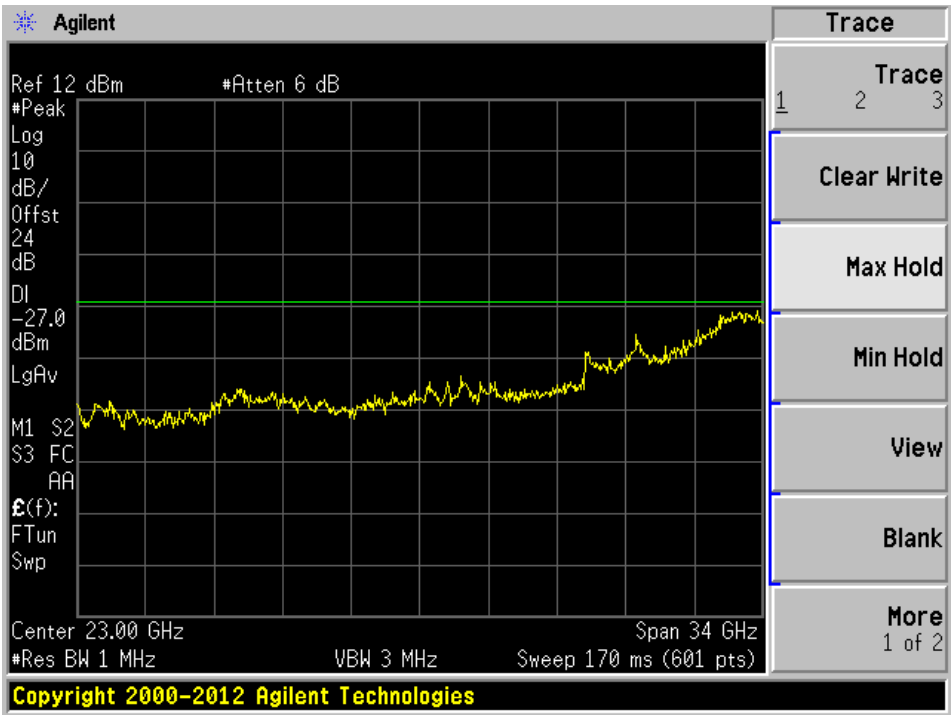
802.11n HT20 mode, 5785 MHz, Chain J0 2



802.11n HT20 mode, 5785 MHz, Chain J1 1

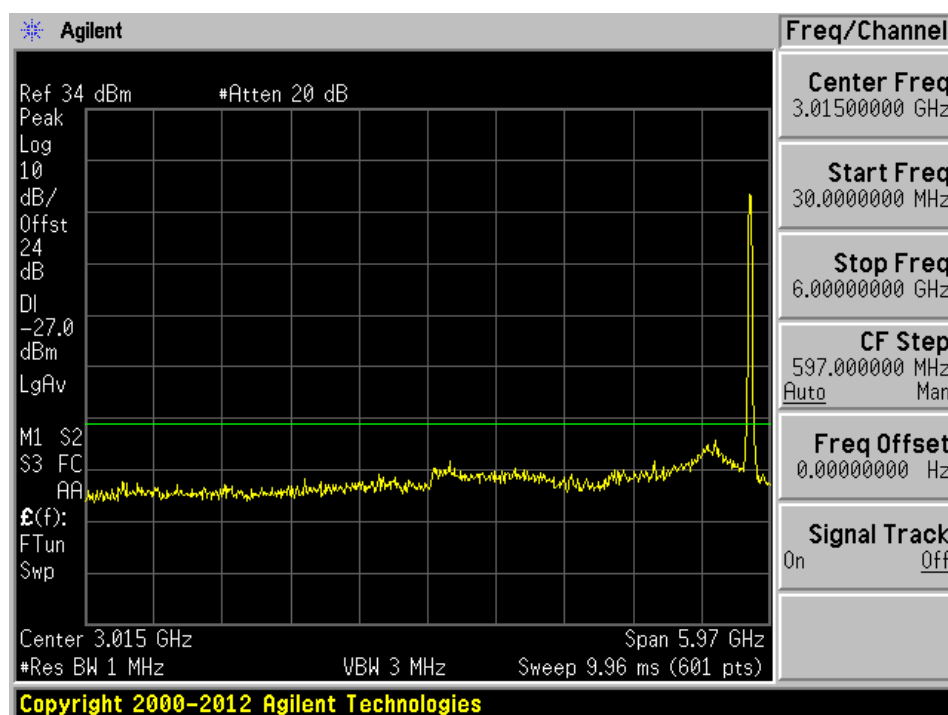


802.11n HT20 mode, 5785 MHz, Chain J1 2

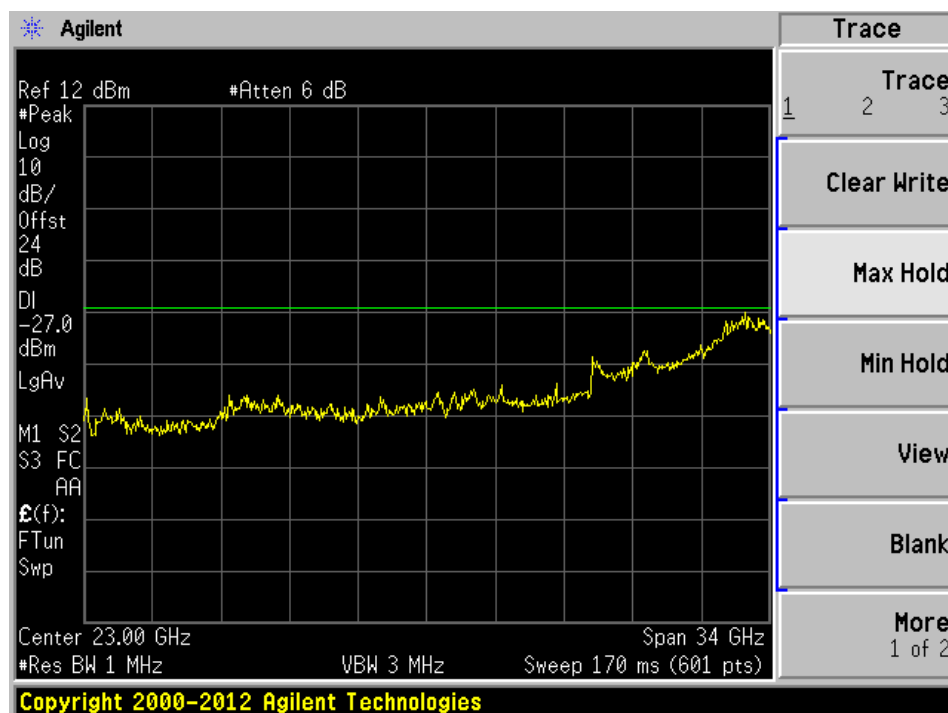


802.11n- HT20 mode, High Channel

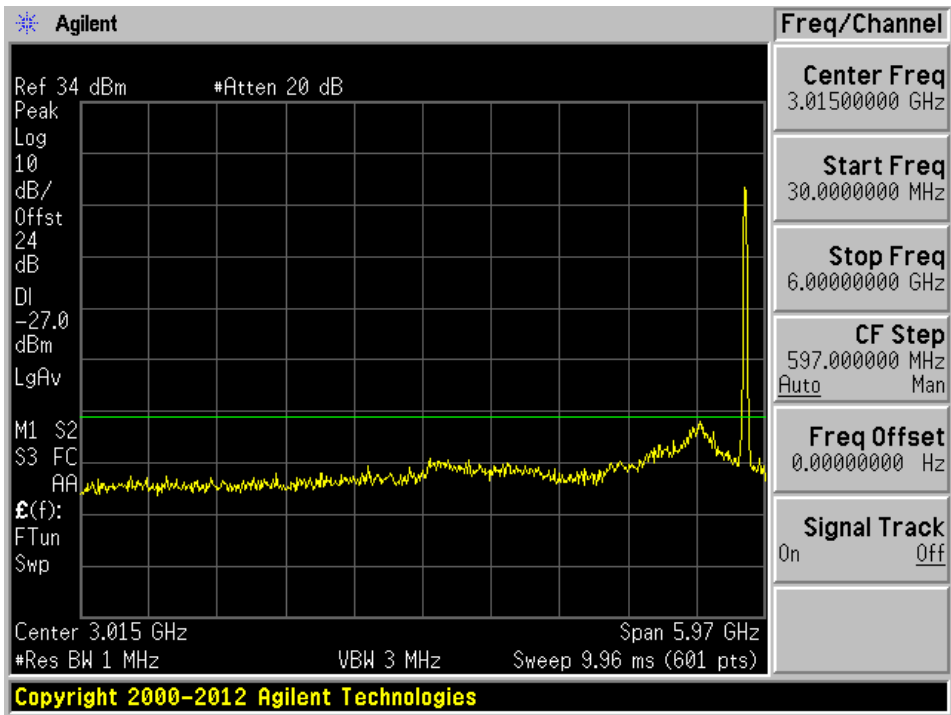
802.11n HT20 mode, 5825 MHz, Chain J0 1



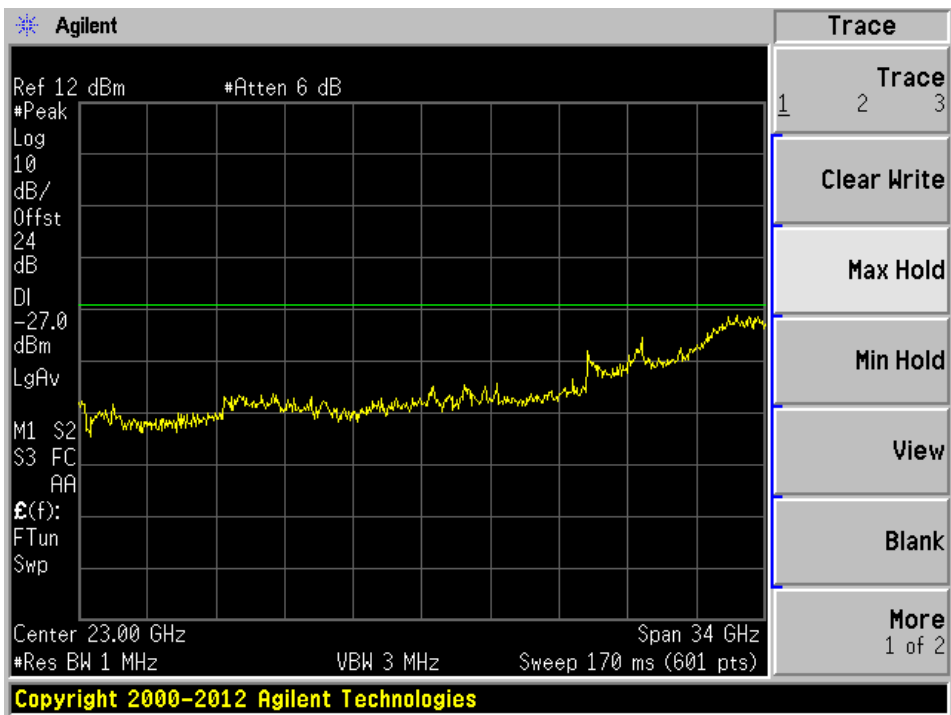
802.11n HT20 mode, 5825 MHz, Chain J0 2



802.11n HT20 mode, 5825 MHz, Chain J1 1

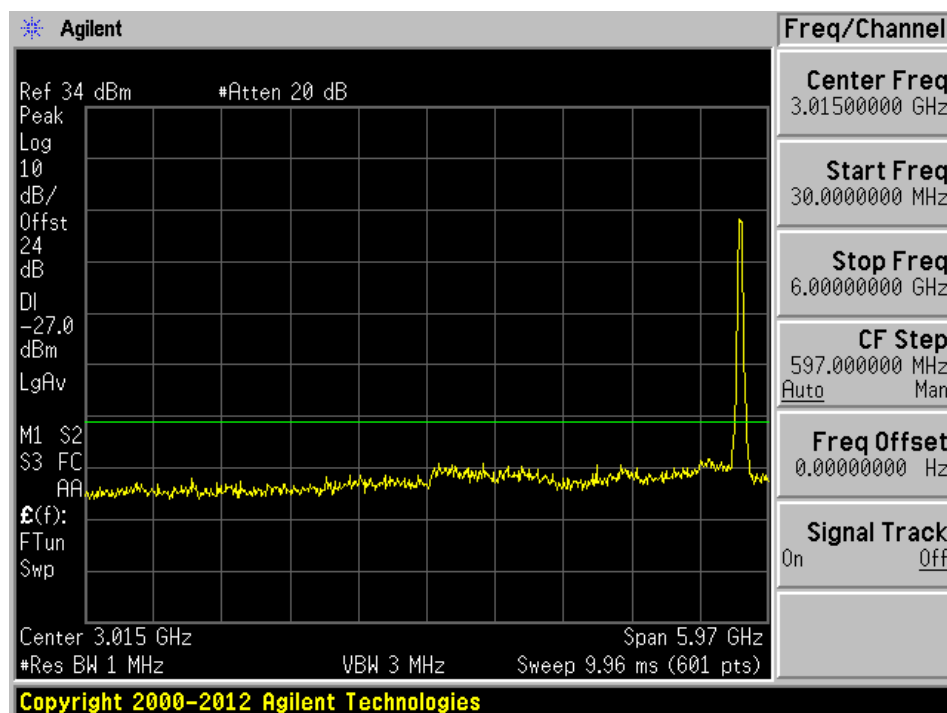


802.11n HT20 mode, 5825 MHz, Chain J1 2



802.11n-HT40 mode, Low Channel

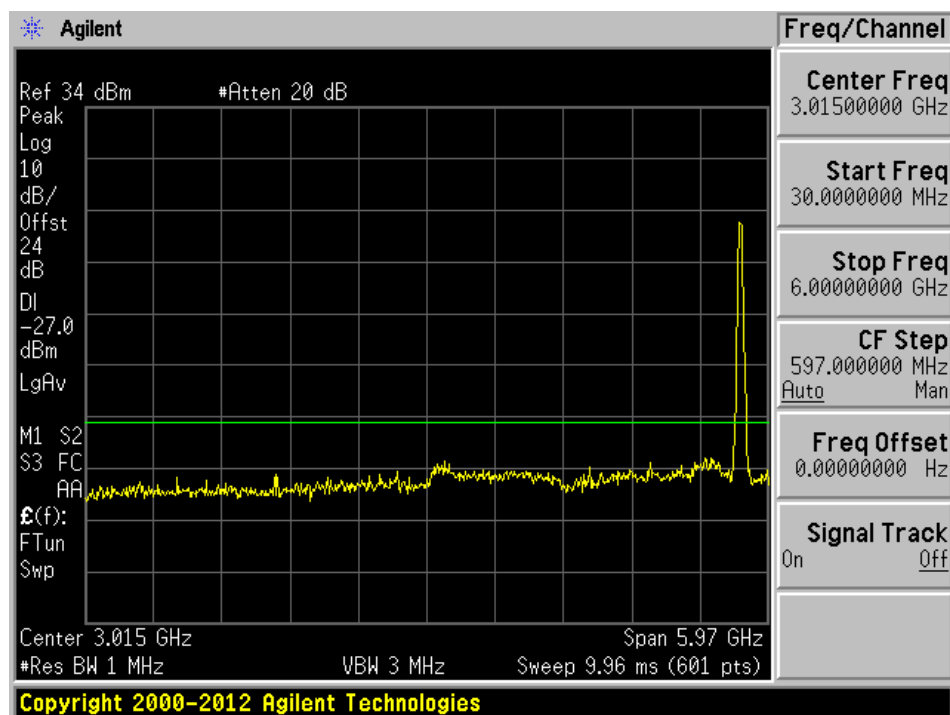
802.11n HT40 mode, 5755 MHz, Chain J0 1



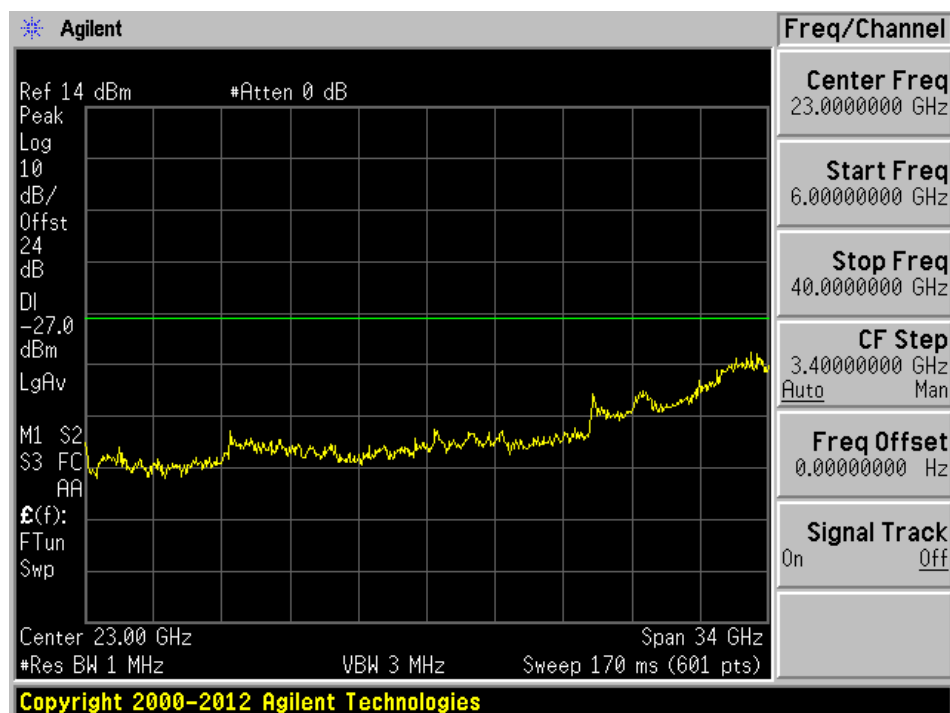
802.11n HT40 mode, 5755 MHz, Chain J0 2



802.11n HT40 mode, 5755 MHz, Chain J1 1

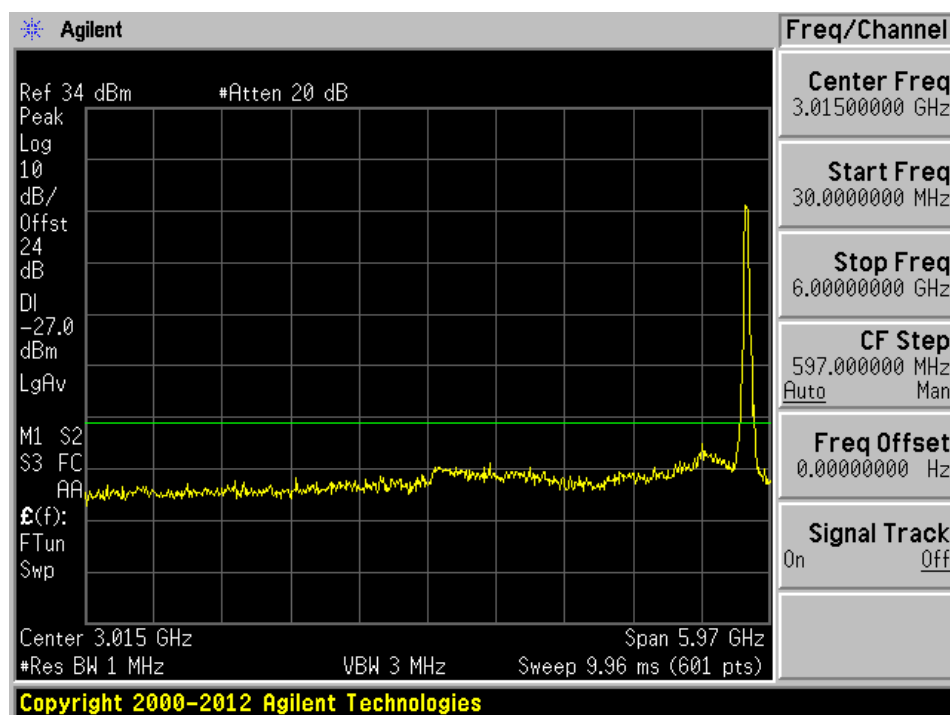


802.11n HT40 mode, 5755 MHz, Chain J1 2

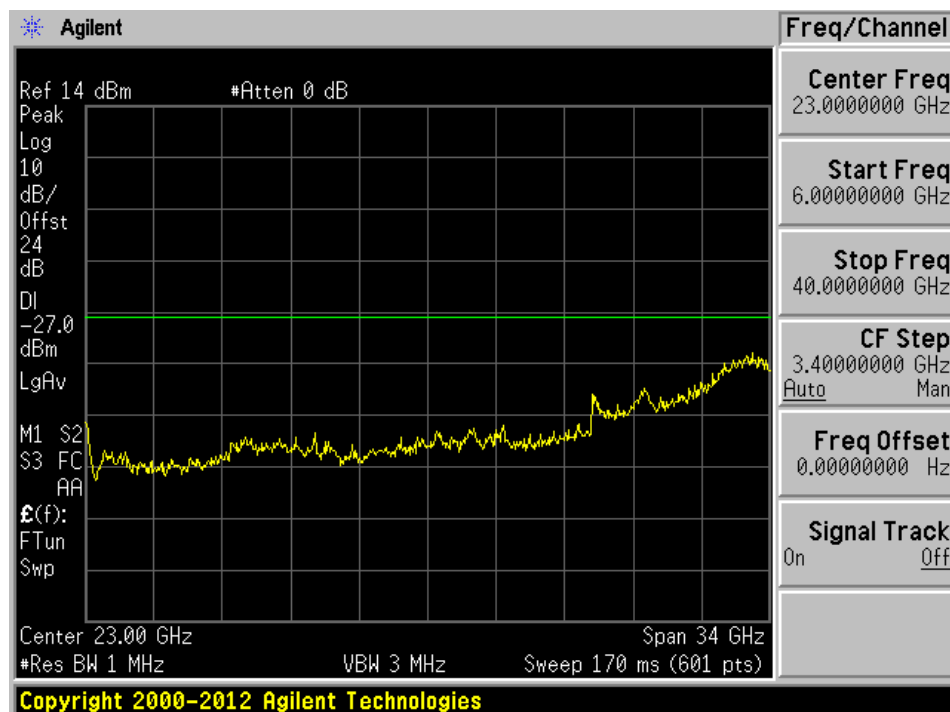


802.11n-HT40 mode, High Channel

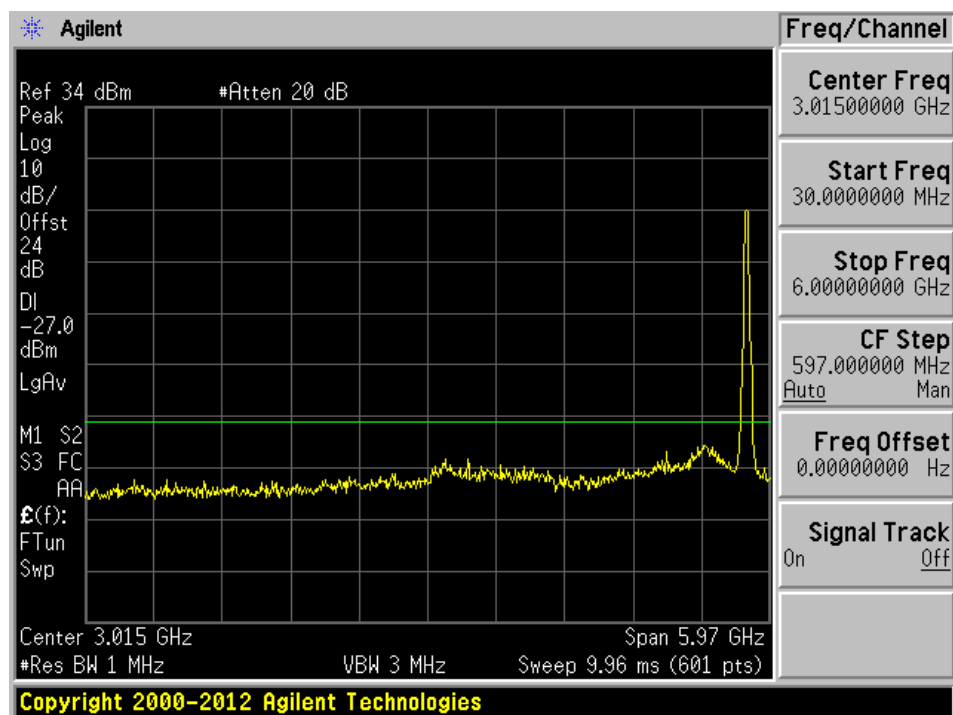
802.11n HT40 mode, 5795 MHz, Chain J0 1



802.11n HT40 mode, 5795 MHz, Chain J0 2



802.11n HT40 mode, 5795 MHz, Chain J1 1



802.11n HT40 mode, 5795 MHz, Chain J1 2

