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

For

Ruckus Wireless, Inc.

350 West Java Drive,

Sunnyvale, CA 94089, USA

FCC ID: S9GSC8800
IC: 5912A-SC8800

Report Type:	**Product Type:**
CIIPC	802.11 a/b/g/n Wireless Access Point

Test Engineers:	Bo Li
Report Number:	R1212101-407W5356
Report Date:	2013-06-30
Reviewed By:	Quinn Jiang Test Engineer

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1212101-407W5356	Original Report	2013-06-30

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: *SmartCell 8800* with FCC ID: S9GSC8800, IC: 5912A-SC8800 or the "EUT" as referred to in this report. The EUT is a 3x3 MIMO 802.11 a/b/g/n WLAN Access Point operates in 2.4 GHz and 5 GHz bands.

1.2 Mechanical Description of EUT

The EUT measures approximately 38.5 cm (L) x 30.5 cm (W) x 12 cm (H) and weighs 7.15 kg.

The test data gathered are from typical production sample, serial number: R1212101-01 assigned by BACL.

1.3 Objective

This report is prepared on behalf of *Ruckus Wireless, Inc., in* accordance with FCC CFR47 §15.407 and IC RSS-210 Issue 8, Dec 2010.

This project is a Permissive Change II submission for the purpose of adding DFS frequency bands (5250-5350 MHz; 5470-5725 MHz) to the certified device (FCC ID: S9GZF7372). The objective is to determine compliance with FCC/IC rules for Antenna Requirments, AC Line Conducted Emissions, Occupied Bandwidth, Maximum Peak Output Power, Power Spectral Density, Radiated and Conducted Spurious Emissions, and Band Edge for adding DFS bands 5250-5350 MHz and 5470-5725 MHz.

1.4 Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS with FCC ID: S9GSC8800, IC: 5912A-SC8800

1.5 Test Methodology

FCC Part 2, Part 15.407 and IC RSS-210 Issue 8, Dec 2010. ANSI C63.4-2009, ANSI C63.10-2009 and FCC KDB 789033

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 CISPR16-4-2:2007, The Treatment of Uncertainty in EMC Measurements, the values ranging from $\pm$2.0 dB for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

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

1.7 **Test Facility**

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

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2003, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: A-0027. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is an American Association for laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at

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

2 EUT Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.4-2009.

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

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

2.2 EUT Exercise Software

The test utility used was *Cyprus ART* was provided by Ruckus Wireless Inc., and was verified Bo Li 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
Lenovo	Laptop	Ideapad U310	-

2.6 EUT Internal Configuration

Manufacturer	Description	Type	Serial Number
Ruckus	PCA, Mother Board, Cyprus2	PCA	120-11190-001 rev 7.1
Ruckus	PCA, Interface Board v2, Cyprus2	PCA	120-11252-001 rev 2.0
Ruckus	Assembly, Power Supply	Sub-Assembly	705-60316-001 rev A
Ruckus	Antenna, GPS	Antenna	730-63110-002 rev A
Ruckus	Assembly, Antenna, Thunderbolt3, Cyrpus	Sub-Assembly	705-60287-001 rev A
Ruckus	Radome, Cyprus, Gray	Plastic Component	700-60255-002 rev A1
Ruckus	Mounting Plate, Antenna, Cyprus, Gray	Hardware-Metal	701-60690-002 rev B1
Ruckus	Housing, Base, Cyprus, Gray	Hardware-Metal	701-60692-002 rev B1

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 cord	-	-
Ruckus	POE Power Adapter	740-64217-001	-

3 Summary of Test Results

FCC & IC Rules	Description of Test	Result
FCC §15.407(f), §2.1091 IC RSS-102	RF Exposure	Compliant
FCC §15.203 IC RSS-Gen §7.1.2	Antenna Requirement	Compliant
FCC §15.207 IC RSS-Gen §7.2.4	AC Power Line Conducted Emissions	Compliant
FCC §15.209(a), 15.407(b) IC RSS-210 §A9.2	Spurious Radiated Emissions	Compliant
FCC §15.407(a) IC RSS-210 §A9.2	26 dB and 99% Emission Bandwidth	Compliant
FCC §407(a)(1) IC RSS-210 §A9.2	Peak Output Power Measurement	Compliant
FCC §2.1051, §15.407(b) IC RSS-210 §A9.2	Band Edges	Compliant
FCC §15.407(a)(1) IC RSS-210 §A9.2	Power Spectral Density	Compliant
FCC §15.407(a)(6)	Peak Excursion Ratio	Compliant
IC RSS-210 §2.3 IC RSS-Gen §6	Receiver Spurious Radiated Emissions	Compliant
FCC §2.1051, §15.407(b) IC RSS-210 §A9.2	Spurious Emissions at Antenna Terminals	Compliant
FCC §15.407(h) IC RSS-210 §A9.3	DFS	Note: 1

Note: [1] *please refers to DFS report, Report number: R1212101-DFS.*

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

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

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

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

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

4.2 MPE Prediction

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

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

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

4.3 MPE Results

5250-5350 MHz

Maximum peak output power at antenna input terminal (dBm):	18.25
Maximum peak output power at antenna input terminal (mW):	66.83
Prediction distance (cm):	20
Prediction frequency (MHz):	5260
Maximum Antenna Gain, typical (dBi):	8
Maximum Antenna Gain (numeric):	6.31
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.0839
Power density of prediction frequency at 20.0 cm (W/m^2):	0.839
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	10

5470-5725 MHz

Maximum peak output power at antenna input terminal (dBm):	21.89
Maximum peak output power at antenna input terminal (mW):	154.53
Prediction distance (cm):	20
Prediction frequency (MHz):	5550
Maximum Antenna Gain, typical (dBi):	8
Maximum Antenna Gain (numeric):	6.31
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.194
Power density of prediction frequency at 20.0 cm (W/m^2):	1.94
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	10

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

5 FCC §15.203 & IC RSS-Gen §7.1.2 – 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.

As per IC RSS-Gen §7.1.2: Transmitter Antenna:

A transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.
When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

5.2 Antenna List

Manufacturers	Models/Name	Antenna Gain (dBi) @ 2.4 GHz
Ruckus	TBolt3	6.0

Manufacturers	Models/Name	Antenna Gain (dBi) @ 5 GHz
Ruckus	TBolt3	8.0

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

6 FCC §15.207 & IC RSS-Gen §7.2.4 - AC Power Line Conducted Emissions

6.1 Applicable Standards

As per FCC §15.207 and IC RSS-Gen §7.2.4 Conducted limits:

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

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

Note 1 Decreases with the logarithm of the frequency.

6.2 Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.4-2009 measurement procedure. The specification used was FCC §15.207 and IC RSS-Gen §7.2.4 limits.

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

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

6.3 Test Procedure

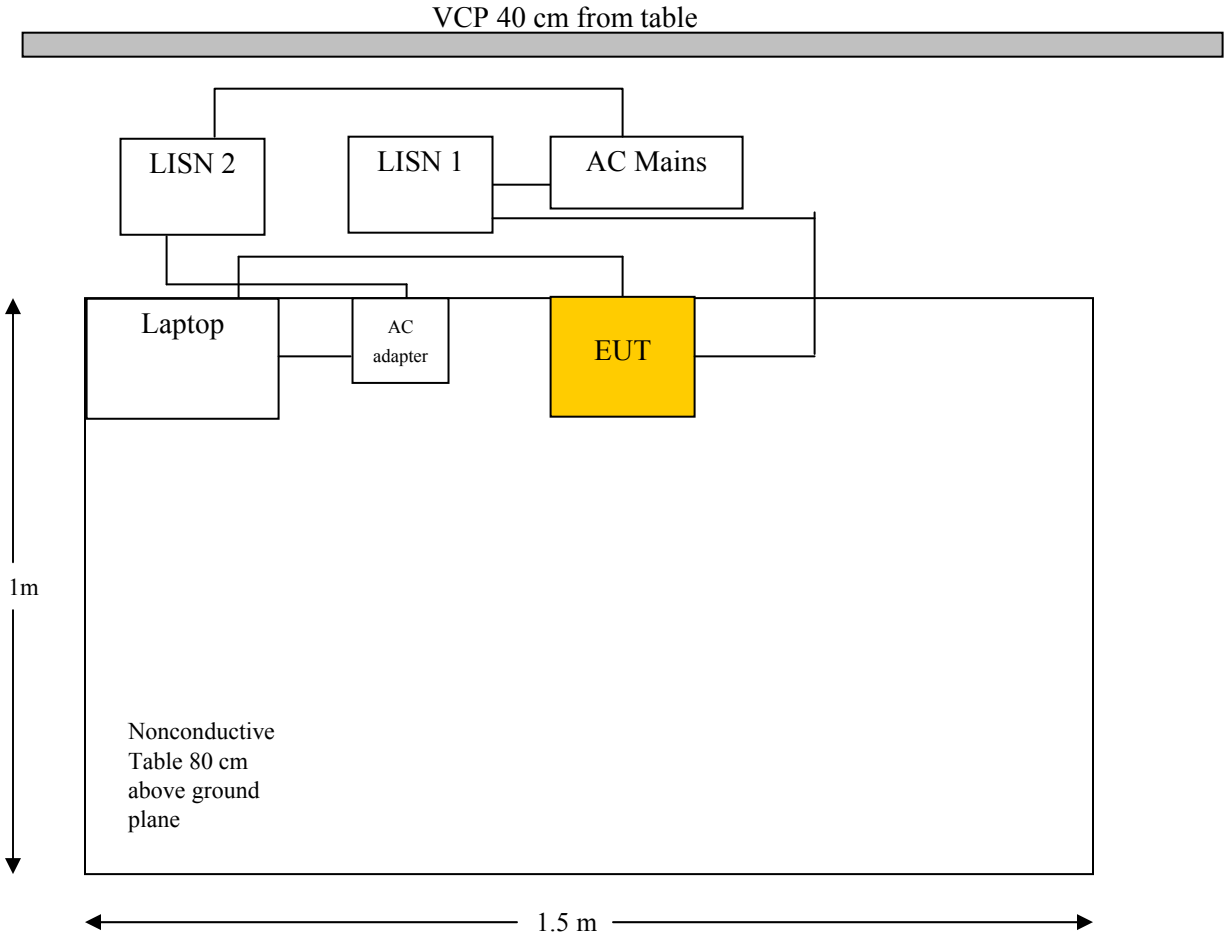
During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-1 and the power cord of the support equipment was connected to LISN-2.

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

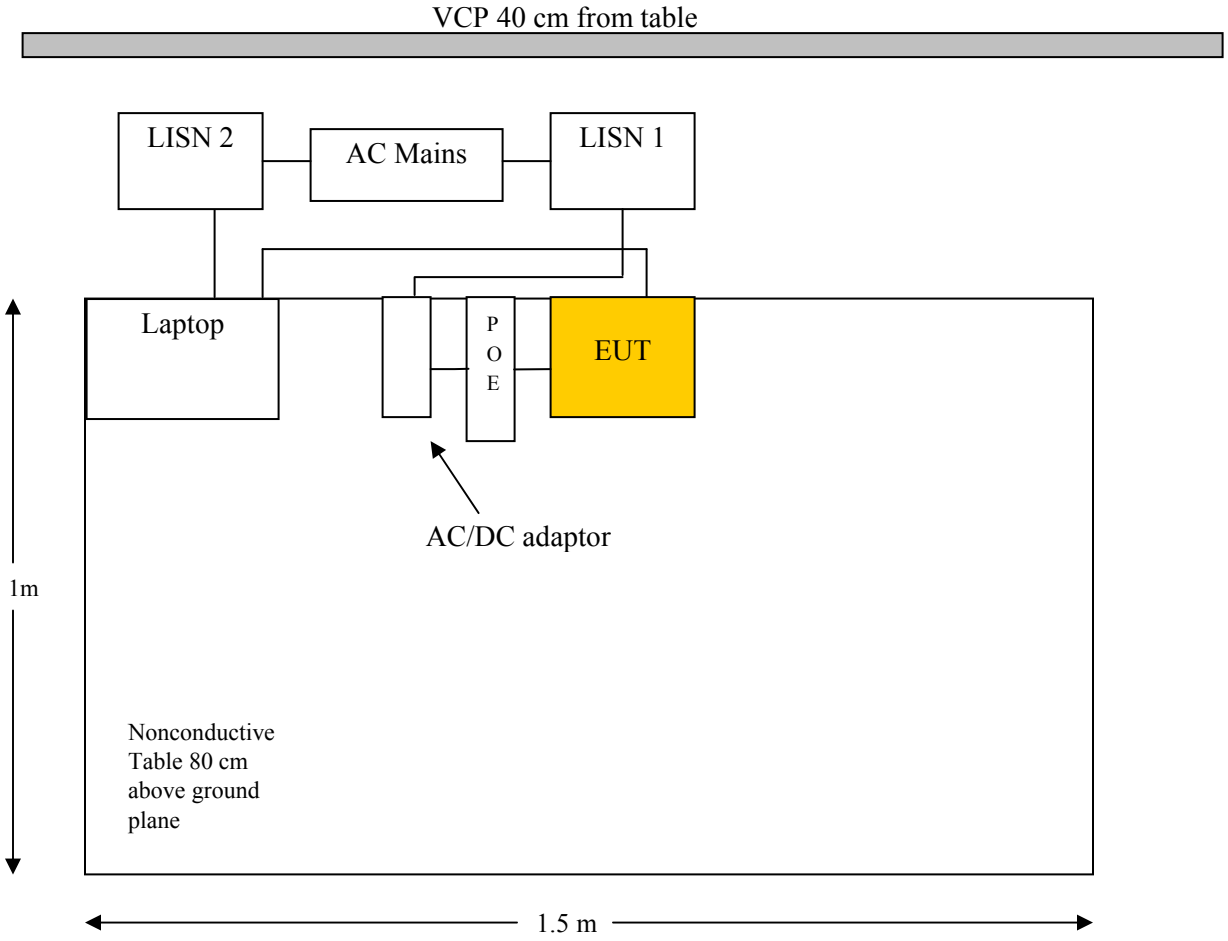
All data was recorded in the peak detection mode, quasi-peak and average. Quasi-Peak readings are distinguished with a “QP.” Average readings are distinguished with an “Ave”.

6.4 Test Setup Block Diagram

AC/DC cord**:**



POE



6.5 Corrected Amplitude & Margin Calculation

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

CA = Ai + CL + Atten

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

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

Margin = Corrected Amplitude - Limit

6.6 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2013-03-28	1 year
Solar Electronics	LISN 1	9252-50-R-24-N	511205	2012-06-25	1 year
Solar Electronics	LISN 2	9252-50-R-24-N	511213	2012-06-25	1 year
TTE	Filter, High Pass	H9962-150K-50-21378	K7133	2012-05-30	1 year

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

6.7 Test Environmental Conditions

Temperature:	21 ºC
Relative Humidity:	51%
ATM Pressure:	101.42 kPa

The testing was performed by Bo Li on 2013-03-29 in 5 m chamber 3.

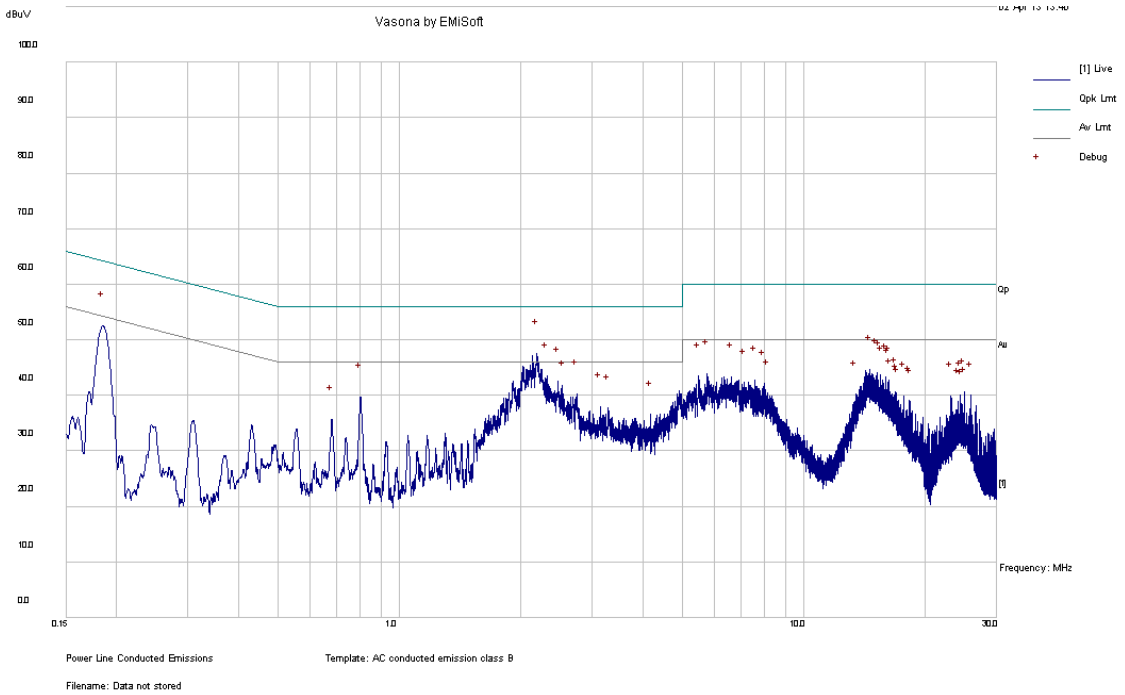
6.8 Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC 15.207 and IC RSS-Gen standard's conducted emissions limits, with the margin reading of:

Connection: AC/DC Cord connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Line/Neutral)**	**Range (MHz)**
-6.54	2.181772	Neutral	0.15-30

Connection: AC/DC adapter of POE connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Line/Neutral)**	**Range (MHz)**
-2.79	0.349635	Line	0.15-30

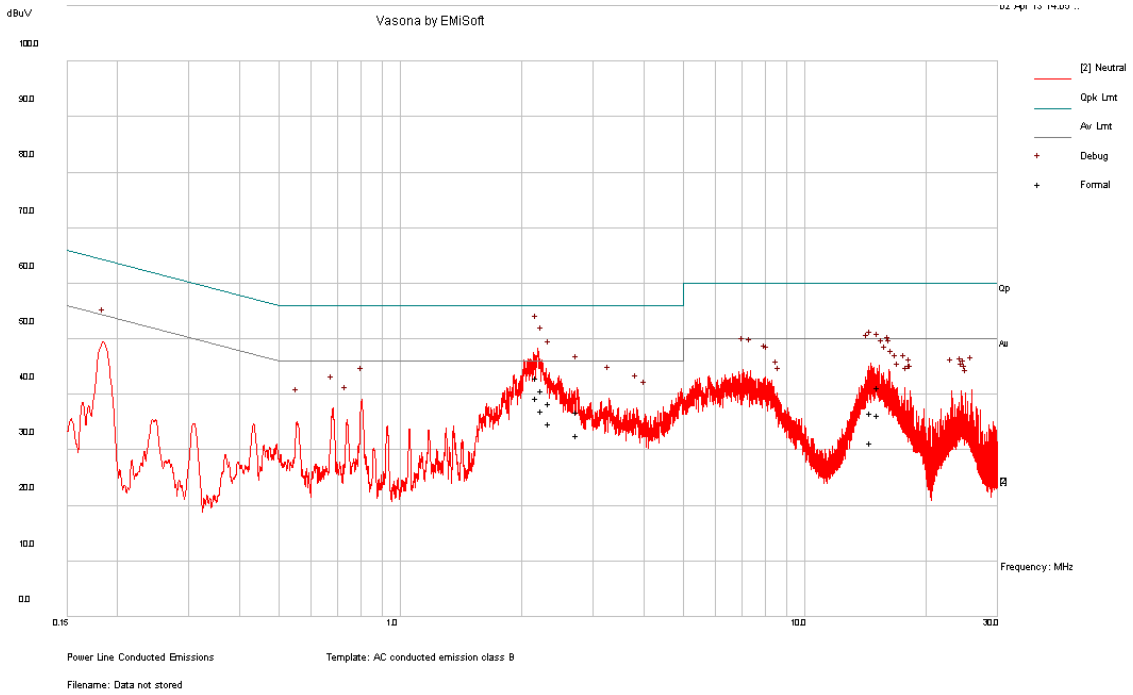
120 V, 60 Hz – Line, AC/DC cord



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
2.18104	41.85	Line	56	-14.15	QP
0.184539	51.3	Line	64.28	-12.98	QP
2.31458	38.52	Line	56	-17.48	QP
2.459606	35.63	Line	56	-20.37	QP
14.584421	36.98	Line	60	-23.02	QP
2.741454	35.26	Line	56	-20.74	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
2.18104	38.28	Line	46	-7.72	Ave.
0.184539	45.78	Line	54.28	-8.50	Ave.
2.31458	34.75	Line	46	-11.25	Ave.
2.459606	31.81	Line	46	-14.19	Ave.
14.584421	31.06	Line	50	-18.94	Ave.
2.741454	31.16	Line	46	-14.84	Ave.

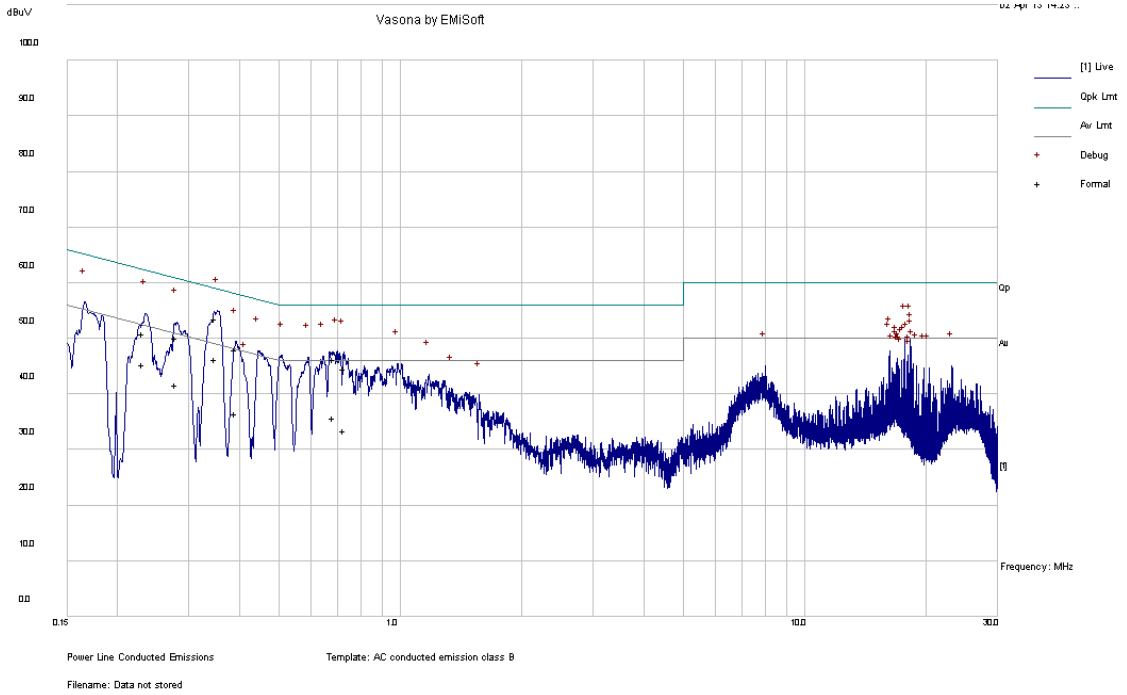
120 V, 60 Hz – Neutral, AC/DC cord



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
2.181772	42.95	Neutral	56	-13.05	QP
2.243066	40.69	Neutral	56	-15.31	QP
2.335658	38.43	Neutral	56	-17.57	QP
14.571438	36.7	Neutral	60	-23.30	QP
15.25089	41.2	Neutral	60	-18.80	QP
2.741088	36.88	Neutral	56	-19.12	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
2.181772	39.46	Neutral	46	-6.54	Ave.
2.243066	37.15	Neutral	46	-8.85	Ave.
2.335658	34.82	Neutral	46	-11.18	Ave.
14.571438	31.34	Neutral	50	-18.66	Ave.
15.25089	36.37	Neutral	50	-13.63	Ave.
2.741088	32.73	Neutral	46	-13.27	Ave.

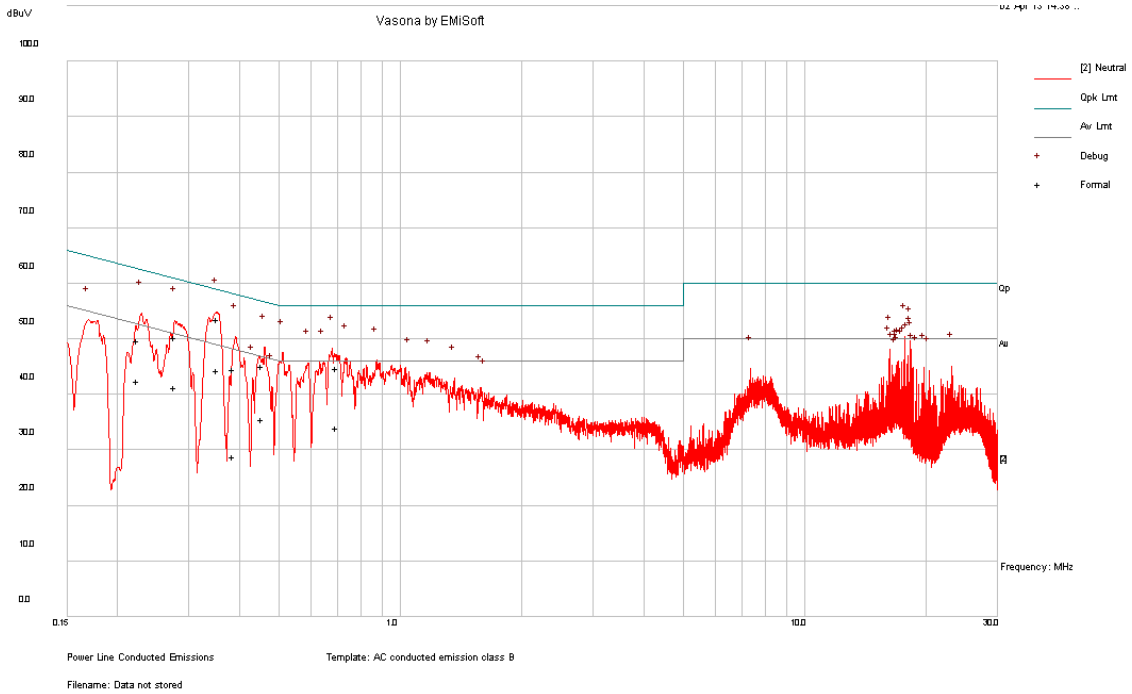
120 V, 60 Hz – Line, POE



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.349635	53.59	Line	58.97	-5.38	QP
0.230999	50.84	Line	62.41	-11.57	QP
0.278517	50.18	Line	60.86	-10.68	QP
0.683361	46.19	Line	56	-9.81	QP
0.724892	44.55	Line	56	-11.45	QP
0.39107	47.98	Line	58.04	-10.06	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.349635	46.18	Line	48.97	-2.79	Ave.
0.230999	45.33	Line	52.41	-7.08	Ave.
0.278517	41.67	Line	50.86	-9.19	Ave.
0.683361	35.67	Line	46	-10.33	Ave.
0.724892	33.4	Line	46	-12.60	Ave.
0.39107	36.42	Line	48.04	-11.62	Ave.

120 V, 60 Hz – Neutral, POE



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.352736	53.57	Neutral	58.9	-5.33	QP
0.277718	50.32	Neutral	60.88	-10.57	QP
0.385872	44.54	Neutral	58.15	-13.62	QP
0.69455	44.8	Neutral	56	-11.20	QP
0.223799	49.7	Neutral	62.68	-12.98	QP
0.454565	45.04	Neutral	56.79	-11.75	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.352736	44.44	Neutral	48.9	-4.46	Ave.
0.277718	41.28	Neutral	50.88	-9.60	Ave.
0.385872	28.81	Neutral	48.15	-19.35	Ave.
0.69455	33.95	Neutral	46	-12.05	Ave.
0.223799	42.37	Neutral	52.68	-10.30	Ave.
0.454565	35.61	Neutral	46.79	-11.18	Ave.

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

7.1 Applicable Standard

FCC §15.205, §15.209, §15.407 (b).
IC RSS-210, §2.2, §A9.2, RSS-Gen §7.2.2

7.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.4-2003. The specification used was the FCC 15C/15E and IC RSS-210/RSS-Gen limits.

The spacing between the peripherals was 10 centimeters.

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

7.3 Test Procedure

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

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

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

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

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

Above 1000 MHz:

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

7.4 Corrected Amplitude & Margin Calculation

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

CA = Ai + CL + Atten

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

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

Margin = Corrected Amplitude - Limit

7.5 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	N/R
Sunol Science Corp	Combination Antenna	JB3	A020106-3	2012-06-18	1 year
Hewlett Packard	Pre-amplifier	8447D	2944A06639	2012-06-09	1 year
Mini-Circuits	Pre-amplifier	ZVA-183-S	570400946	2012-05-09	1 year
Agilent	Spectrum Analyzer	E4446A	US44300386	2012-09-29	1 year
EMCO	Horn Antenna	3315	9511-4627	2012-10-17	1 year
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2013-03-28	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:	21-24°C
Relative Humidity:	43-46%
ATM Pressure:	101-103kPa

The testing was performed by Bo Li from 2013-4-15 to 2013-4-20 at 5 meter 3.

7.7 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Part 15, Subpart C, section 15.205, 15.209 and 15.407 & IC RSS-210, RSS-Gen standard's radiated emissions limits, and had the worst margin of:

5250-5350 MHz Band:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel, Range**
-5.04	21200	Vertical	30 MHz -40 GHz

5470-5725 MHz Band:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel, Range**
-4.35	22800	Vertical and Horizontal	30 MHz -40 GHz

7.8 Radiated Emissions Test Result Data

1) 30 MHz – 1 GHz, Measured at 3 meters

5250-5350 MHz Band, Quasi-Peak Measurements

802.11a mode

All 30 MHz–1 GHz spurious are digital, other emissions are on the noise floor level. Report only the worst case data as shown below:

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
145.59125	32.39	205	H	180	43.5	-11.11
266.2185	30.8	103	H	329	46	-15.2
120.9055	32.6	231	H	215	43.5	-10.9
247.59975	37.76	99	H	352	46	-8.24
108.81675	33.13	103	V	294	43.5	-10.37
971.28	23.3	364	H	241	54	-30.7

802.11n HT20 mode

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
120.8535	37.82	330	H	0	43.5	-5.68
72.4415	32.16	125	V	168	40	-7.84
241.72575	40.29	128	H	360	46	-5.71
168.30475	36.58	148	H	183	43.5	-6.92
125.10425	35.41	223	H	326	43.5	-8.09
171.643	31.49	152	H	143	43.5	-12.01
994.147	22.97	262	V	327	54	-31.03

802.11n HT40 mode

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
121.49725	36.91	163	H	187	43.5	-6.59
72.26375	29.42	204	V	331	40	-10.58
168.9975	37.34	130	H	346	43.5	-6.16
241.722	40.02	125	H	0	46	-5.98
124.89325	34.14	159	H	360	43.5	-9.36
171.553	31.72	108	H	331	43.5	-11.78

5470-5725 MHz Band, Quasi-Peak Measurements

802.11a mode

All 30 MHz–1 GHz spurious are digital, other emissions are on the noise floor level. Report only the worst case data as shown below:

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
119.57775	28.12	116	H	227	43.5	-15.38
249.5475	35.91	121	H	293	46	-10.09
271.8	33.38	99	H	0	46	-12.62
171.615	25.38	137	H	218	43.5	-18.12

802.11n HT20 mode

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
120.69075	37.36	251	H	330	43.5	-6.14
249.6955	39.67	100	H	0	46	-6.33
266.36525	33.98	101	H	8	46	-12.02
125.24	33.86	203	H	322	43.5	-9.64
170.0545	26.12	112	V	61	43.5	-17.38
995.55125	23.22	244	H	277	54	-30.78

802.11n HT40 mode

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
120.38275	36.14	226	H	331	43.5	-7.36
34.06775	34.44	141	V	26	40	-5.56
249.954	40.6	120	H	350	46	-5.4
266.75575	32.09	108	H	336	46	-13.91
125.2145	34.55	203	H	340	43.5	-8.95
168.36675	27.44	99	V	239	43.5	-16.06

2) 1–40 GHz, Measured at 3 meters

5250-5350 MHz Band

802.11a mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5260 MHz, measured at 3 meters											
10520	31.29	0	100	V	38.343	7	27.93	48.703	74	-25.297	Peak
10520	31.74	0	100	H	38.343	7	27.93	49.153	74	-24.847	Peak
10520	16.88	0	100	V	38.343	7	27.93	34.293	54	-19.707	Ave
10520	16.75	0	100	H	38.343	7	27.93	34.163	54	-19.837	Ave
15780	31.85	0	100	V	37.928	8.35	25.51	52.618	74	-21.382	Peak
15780	32.23	0	100	H	37.928	8.35	25.51	52.998	74	-21.002	Peak
15780	17.61	0	100	V	37.928	8.35	25.51	38.378	54	-15.622	Ave
15780	17.53	0	100	H	37.928	8.35	25.51	38.298	54	-15.702	Ave
21040	32.24	0	100	V	49.9	9.79	29	62.93	74	-11.07	Peak
21040	32.21	0	100	H	49.9	9.79	29	62.9	74	-11.1	Peak
21040	17.62	0	100	V	49.9	9.79	29	48.31	54	-5.69	Ave
21040	17.61	0	100	H	49.9	9.79	29	48.3	54	-5.7	Ave
Middle Channel 5280 MHz, measured at 3 meters											
10560	31.56	0	100	V	38.418	7.07	27.93	49.118	74	-24.882	Peak
10560	31.06	0	100	H	38.418	7.07	27.93	48.618	74	-25.382	Peak
10560	16.67	0	100	V	38.418	7.07	27.93	34.228	54	-19.772	Ave
10560	16.65	0	100	H	38.418	7.07	27.93	34.208	54	-19.792	Ave
15840	32.22	0	100	V	37.914	8.38	25.5	53.014	74	-20.986	Peak
15840	33.15	0	100	H	37.914	8.38	25.5	53.944	74	-20.056	Peak
15840	17.91	0	100	V	37.914	8.38	25.5	38.704	54	-15.296	Ave
15840	17.88	0	100	H	37.914	8.38	25.5	38.674	54	-15.326	Ave
21120	33.18	0	100	V	49.9	9.8	29.1	63.78	74	-10.22	Peak
21120	33.06	0	100	H	49.9	9.8	29.1	63.66	74	-10.34	Peak
21120	18.29	0	100	V	49.9	9.8	29.1	48.89	54	-5.11	Ave
21120	18.29	0	100	H	49.9	9.8	29.1	48.89	54	-5.11	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 5320 MHz, measured at 3 meters											
10640	31.5	0	100	V	38.418	7.07	27.74	49.248	74	-24.752	Peak
10640	31.99	0	100	H	38.418	7.07	27.74	49.738	74	-24.262	Peak
10640	16.71	0	100	V	38.418	7.07	27.74	34.458	54	-19.542	Ave
10640	16.84	0	100	H	38.418	7.07	27.74	34.588	54	-19.412	Ave
15960	32.46	0	100	V	37.902	8.39	25.4	53.352	74	-20.648	Peak
15960	32.13	0	100	H	37.902	8.39	25.4	53.022	74	-20.978	Peak
15960	17.72	0	100	V	37.902	8.39	25.4	38.612	54	-15.388	Ave
15960	17.61	0	100	H	37.902	8.39	25.4	38.502	54	-15.498	Ave
21280	32.25	0	100	V	49.9	9.79	29	62.94	74	-11.06	Peak
21280	32.28	0	100	H	49.9	9.79	29	62.97	74	-11.03	Peak
21280	17.9	0	100	V	49.9	9.79	29	48.59	54	-5.41	Ave
21280	17.88	0	100	H	49.9	9.79	29	48.57	54	-5.43	Ave

802.11n HT20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5260 MHz, measured at 3 meters											
10520	31.59	0	100	V	38.343	7	27.93	49.003	74	-24.997	Peak
10520	31.54	0	100	H	38.343	7	27.93	48.953	74	-25.047	Peak
10520	16.84	0	100	V	38.343	7	27.93	34.253	54	-19.747	Ave
10520	16.91	0	100	H	38.343	7	27.93	34.323	54	-19.677	Ave
15780	32.86	0	100	V	37.928	8.35	25.51	53.628	74	-20.372	Peak
15780	32.58	0	100	H	37.928	8.35	25.51	53.348	74	-20.652	Peak
15780	17.63	0	100	V	37.928	8.35	25.51	38.398	54	-15.602	Ave
15780	17.64	0	100	H	37.928	8.35	25.51	38.408	54	-15.592	Ave
21040	31.99	0	100	V	49.9	9.79	29	62.68	74	-11.32	Peak
21040	32.82	0	100	H	49.9	9.79	29	63.51	74	-10.49	Peak
21040	17.25	0	100	V	49.9	9.79	29	47.94	54	-6.06	Ave
21040	17.68	0	100	H	49.9	9.79	29	48.37	54	-5.63	Ave
Middle Channel 5280 MHz, measured at 3 meters											
10560	32.25	0	100	V	38.418	7.07	27.93	49.808	74	-24.192	Peak
10560	31.47	0	100	H	38.418	7.07	27.93	49.028	74	-24.972	Peak
10560	17.03	0	100	V	38.418	7.07	27.93	34.588	54	-19.412	Ave
10560	17.04	0	100	H	38.418	7.07	27.93	34.598	54	-19.402	Ave
15840	32.59	0	100	V	37.914	8.38	25.5	53.384	74	-20.616	Peak
15840	32.43	0	100	H	37.914	8.38	25.5	53.224	74	-20.776	Peak
15840	17.9	0	100	V	37.914	8.38	25.5	38.694	54	-15.306	Ave
15840	17.85	0	100	H	37.914	8.38	25.5	38.644	54	-15.356	Ave
21120	33.28	0	100	V	49.9	9.8	29.1	63.88	74	-10.12	Peak
21120	33.17	0	100	H	49.9	9.8	29.1	63.77	74	-10.23	Peak
21120	18.36	0	100	V	49.9	9.8	29.1	48.96	54	-5.04	Ave
21120	18.34	0	100	H	49.9	9.8	29.1	48.94	54	-5.06	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 5320 MHz, measured at 3 meters											
10640	31.6	0	100	V	38.418	7.07	27.74	49.348	74	-24.652	Peak
10640	31.34	0	100	H	38.418	7.07	27.74	49.088	74	-24.912	Peak
10640	16.76	0	100	V	38.418	7.07	27.74	34.508	54	-19.492	Ave
10640	16.77	0	100	H	38.418	7.07	27.74	34.518	54	-19.482	Ave
15960	32.17	0	100	V	37.902	8.39	25.4	53.062	74	-20.938	Peak
15960	32.07	0	100	H	37.902	8.39	25.4	52.962	74	-21.038	Peak
15960	17.64	0	100	V	37.902	8.39	25.4	38.532	54	-15.468	Ave
15960	17.55	0	100	H	37.902	8.39	25.4	38.442	54	-15.558	Ave
21280	33.04	0	100	V	49.9	9.79	29	63.73	74	-10.27	Peak
21280	33.22	0	100	H	49.9	9.79	29	63.91	74	-10.09	Peak
21280	17.94	0	100	V	49.9	9.79	29	48.63	54	-5.37	Ave
21280	17.9	0	100	H	49.9	9.79	29	48.59	54	-5.41	Ave

802.11n HT40 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5270 MHz, measured at 3 meters											
10540	31.61	0	100	V	38.343	7.05	27.93	49.073	74	-24.927	Peak
10540	31.25	0	100	H	38.343	7.05	27.93	48.713	74	-25.287	Peak
10540	16.49	0	100	V	38.343	7.05	27.93	33.953	54	-20.047	Ave
10540	16.42	0	100	H	38.343	7.05	27.93	33.883	54	-20.117	Ave
15810	33.07	0	100	V	37.928	8.35	25.44	53.908	74	-20.092	Peak
15810	32.43	0	100	H	37.928	8.35	25.44	53.268	74	-20.732	Peak
15810	17.37	0	100	V	37.928	8.35	25.44	38.208	54	-15.792	Ave
15810	17.33	0	100	H	37.928	8.35	25.44	38.168	54	-15.832	Ave
21080	32.81	0	100	V	49.9	9.84	29	63.55	74	-10.45	Peak
21080	32.71	0	100	H	49.9	9.84	29	63.45	74	-10.55	Peak
21080	17.86	0	100	V	49.9	9.84	29	48.6	54	-5.4	Ave
21080	17.89	0	100	H	49.9	9.84	29	48.63	54	-5.37	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 5310 MHz, measured at 3 meters											
10620	31.71	0	100	V	38.418	7.07	27.93	49.268	74	-24.732	Peak
10620	31.38	0	100	H	38.418	7.07	27.93	48.938	74	-25.062	Peak
10620	16.24	0	100	V	38.418	7.07	27.93	33.798	54	-20.202	Ave
10620	16.22	0	100	H	38.418	7.07	27.93	33.778	54	-20.222	Ave
15930	32.88	0	100	V	37.914	8.38	25.56	53.614	74	-20.386	Peak
15930	32.28	0	100	H	37.914	8.38	25.56	53.014	74	-20.986	Peak
15930	17.52	0	100	V	37.914	8.38	25.56	38.254	54	-15.746	Ave
15930	17.46	0	100	H	37.914	8.38	25.56	38.194	54	-15.806	Ave
21240	32.9	0	100	V	49.9	9.79	29	63.59	74	-10.41	Peak
21240	33.09	0	100	H	49.9	9.79	29	63.78	74	-10.22	Peak
21240	17.74	0	100	V	49.9	9.79	29	48.43	54	-5.57	Ave
21240	17.75	0	100	H	49.9	9.79	29	48.44	54	-5.56	Ave

5470-5725 GHz Band

802.11a mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5500 MHz, measured at 3 meters											
11000	32.1	0	100	V	38.382	7.36	26.92	50.922	74	-23.078	Peak
11000	32.13	0	100	H	38.382	7.36	26.92	50.952	74	-23.048	Peak
11000	17.3	0	100	V	38.382	7.36	26.92	36.122	54	-17.878	Ave
11000	17.35	0	100	H	38.382	7.36	26.92	36.172	54	-17.828	Ave
16500	33	0	100	V	38.768	8.5	26.1	54.168	74	-19.832	Peak
16500	33.11	0	100	H	38.768	8.5	26.1	54.278	74	-19.722	Peak
16500	18.18	0	100	V	38.768	8.5	26.1	39.348	54	-14.652	Ave
16500	18.19	0	100	H	38.768	8.5	26.1	39.358	54	-14.642	Ave
22000	33.27	0	100	V	49.9	9.94	29.1	64.01	74	-9.99	Peak
22000	33.27	0	100	H	49.9	9.94	29.1	64.01	74	-9.99	Peak
22000	18.32	0	100	V	49.9	9.94	29.1	49.06	54	-4.94	Ave
22000	18.32	0	100	H	49.9	9.94	29.1	49.06	54	-4.94	Ave
Middle Channel 5580 MHz, measured at 3 meters											
11160	32.22	0	100	V	38.511	7.52	26.94	51.311	74	-22.689	Peak
11160	32.92	0	100	H	38.511	7.52	26.94	52.011	74	-21.989	Peak
11160	17.31	0	100	V	38.511	7.52	26.94	36.401	54	-17.599	Ave
11160	17.42	0	100	H	38.511	7.52	26.94	36.511	54	-17.489	Ave
16740	32.83	0	100	V	39.94	8.63	26.12	55.28	74	-18.72	Peak
16740	32.61	0	100	H	39.94	8.63	26.12	55.06	74	-18.94	Peak
16740	17.83	0	100	V	39.94	8.63	26.12	40.28	54	-13.72	Ave
16740	17.85	0	100	H	39.94	8.63	26.12	40.3	54	-13.7	Ave
22320	33.08	0	100	V	49.9	9.92	29.1	63.8	74	-10.2	Peak
22320	33.5	0	100	H	49.9	9.92	29.1	64.22	74	-9.78	Peak
22320	18.56	0	100	V	49.9	9.92	29.1	49.28	54	-4.72	Ave
22320	18.109	0	100	H	49.9	9.92	29.1	48.829	54	-5.171	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 5700 MHz, measured at 3 meters											
11400	32.69	0	100	V	38.882	7.57	27	52.142	74	-21.858	Peak
11400	34.48	0	100	H	38.882	7.57	27	53.932	74	-20.068	Peak
11400	18.77	0	100	V	38.882	7.57	27	38.222	54	-15.778	Ave
11400	18.44	0	100	H	38.882	7.57	27	37.892	54	-16.108	Ave
17100	32.32	0	100	V	42.637	8.66	26.03	57.587	74	-16.413	Peak
17100	32.3	0	100	H	42.637	8.66	26.03	57.567	74	-16.433	Peak
17100	17.619	0	100	V	42.637	8.66	26.03	42.886	54	-11.114	Ave
17100	17.69	0	100	H	42.637	8.66	26.03	42.957	54	-11.043	Ave
22800	32.95	0	100	V	49.9	10.17	28.9	64.12	74	-9.88	Peak
22800	34.01	0	100	H	49.9	10.17	28.9	65.18	74	-8.82	Peak
22800	18.47	0	100	V	49.9	10.17	28.9	49.64	54	-4.36	Ave
22800	18.46	0	100	H	49.9	10.17	28.9	49.63	54	-4.37	Ave

802.11n HT20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5500 MHz, measured at 3 meters											
11000	32.42	0	100	V	38.382	7.36	26.92	51.242	74	-22.758	Peak
11000	33.38	0	100	H	38.382	7.36	26.92	52.202	74	-21.798	Peak
11000	17.72	0	100	V	38.382	7.36	26.92	36.542	54	-17.458	Ave
11000	17.9	0	100	H	38.382	7.36	26.92	36.722	54	-17.278	Ave
16500	33.32	0	100	V	38.768	8.5	26.1	54.488	74	-19.512	Peak
16500	33.36	0	100	H	38.768	8.5	26.1	54.528	74	-19.472	Peak
16500	18.69	0	100	V	38.768	8.5	26.1	39.858	54	-14.142	Ave
16500	18.71	0	100	H	38.768	8.5	26.1	39.878	54	-14.122	Ave
22000	34.06	0	100	V	49.9	9.94	29.1	64.8	74	-9.2	Peak
22000	33.27	0	100	H	49.9	9.94	29.1	64.01	74	-9.99	Peak
22000	18.82	0	100	V	49.9	9.94	29.1	49.56	54	-4.44	Ave
22000	18.83	0	100	H	49.9	9.94	29.1	49.57	54	-4.43	Ave
Middle Channel 5580 MHz, measured at 3 meters											
11160	32.4	0	100	V	38.511	7.52	26.94	51.491	74	-22.509	Peak
11160	32.19	0	100	H	38.511	7.52	26.94	51.281	74	-22.719	Peak
11160	17.88	0	100	V	38.511	7.52	26.94	36.971	54	-17.029	Ave
11160	18.01	0	100	H	38.511	7.52	26.94	37.101	54	-16.899	Ave
16740	33.32	0	100	V	39.94	8.63	26.12	55.77	74	-18.23	Peak
16740	32.9	0	100	H	39.94	8.63	26.12	55.35	74	-18.65	Peak
16740	18.34	0	100	V	39.94	8.63	26.12	40.79	54	-13.21	Ave
16740	18.34	0	100	H	39.94	8.63	26.12	40.79	54	-13.21	Ave
22320	32.74	0	100	V	49.9	9.92	29.1	63.46	74	-10.54	Peak
22320	33.46	0	100	H	49.9	9.92	29.1	64.18	74	-9.82	Peak
22320	18.6	0	100	V	49.9	9.92	29.1	49.32	54	-4.68	Ave
22320	18.61	0	100	H	49.9	9.92	29.1	49.33	54	-4.67	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 5700 MHz, measured at 3 meters											
11400	33.36	0	100	V	38.882	7.57	27	52.812	74	-21.188	Peak
11400	33.66	0	100	H	38.882	7.57	27	53.112	74	-20.888	Peak
11400	18.86	0	100	V	38.882	7.57	27	38.312	54	-15.688	Ave
11400	18.35	0	100	H	38.882	7.57	27	37.802	54	-16.198	Ave
17100	31.99	0	100	V	42.637	8.66	26.03	57.257	74	-16.743	Peak
17100	32.18	0	100	H	42.637	8.66	26.03	57.447	74	-16.553	Peak
17100	17.59	0	100	V	42.637	8.66	26.03	42.857	54	-11.143	Ave
17100	17.67	0	100	H	42.637	8.66	26.03	42.937	54	-11.063	Ave
22800	32.75	0	100	V	49.9	10.17	28.9	63.92	74	-10.08	Peak
22800	33.45	0	100	H	49.9	10.17	28.9	64.62	74	-9.38	Peak
22800	18.48	0	100	V	49.9	10.17	28.9	49.65	54	-4.35	Ave
22800	18.48	0	100	H	49.9	10.17	28.9	49.65	54	-4.35	Ave

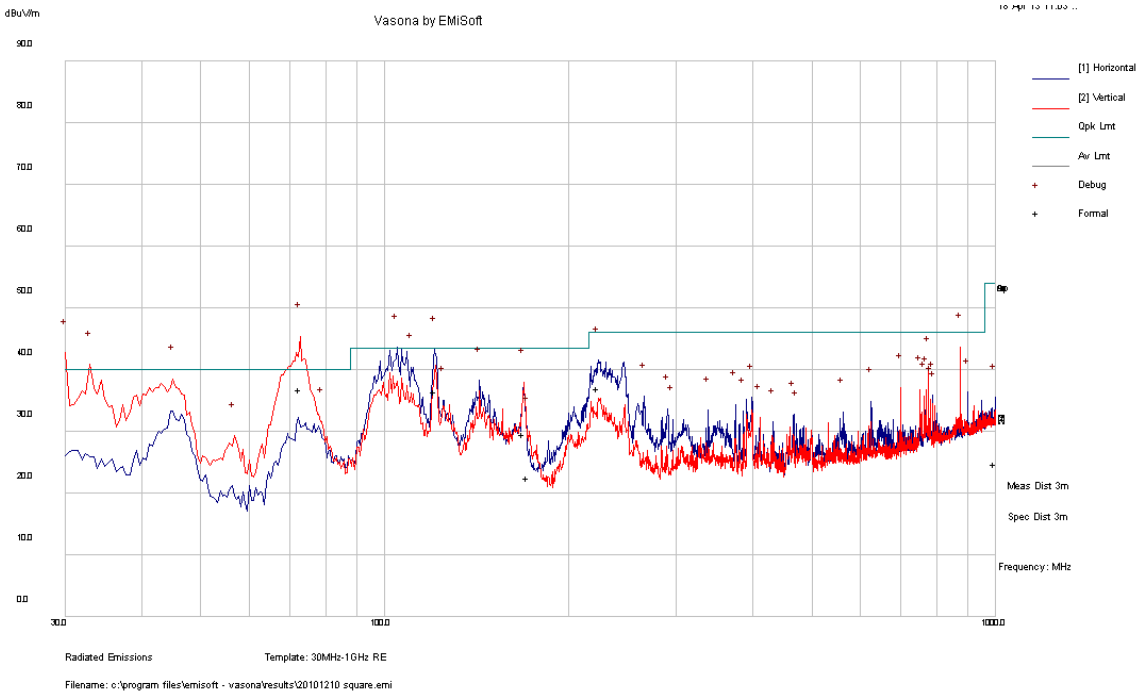
802.11n HT40 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5510 MHz, measured at 3 meters											
11020	32.2	0	100	V	38.382	7.36	26.92	51.022	74	-22.978	Peak
11020	31.83	0	100	H	38.382	7.36	26.92	50.652	74	-23.348	Peak
11020	17.67	0	100	V	38.382	7.36	26.92	36.492	54	-17.508	Ave
11020	17.65	0	100	H	38.382	7.36	26.92	36.472	54	-17.528	Ave
16530	33.27	0	100	V	38.768	8.5	26.12	54.418	74	-19.582	Peak
16530	32.99	0	100	H	38.768	8.5	26.12	54.138	74	-19.862	Peak
16530	18.43	0	100	V	38.768	8.5	26.12	39.578	54	-14.422	Ave
16530	18.44	0	100	H	38.768	8.5	26.12	39.588	54	-14.412	Ave
22040	33.36	0	100	V	49.9	9.76	29.1	63.92	74	-10.08	Peak
22040	33.2	0	100	H	49.9	9.76	29.1	63.76	74	-10.24	Peak
22040	18.65	0	100	V	49.9	9.76	29.1	49.21	54	-4.79	Ave
22040	18.62	0	100	H	49.9	9.76	29.1	49.18	54	-4.82	Ave
Middle Channel 5550 MHz, measured at 3 meters											
11100	32.45	0	100	V	38.511	7.39	26.92	51.431	74	-22.569	Peak
11100	32.44	0	100	H	38.511	7.39	26.92	51.421	74	-22.579	Peak
11100	18.09	0	100	V	38.511	7.39	26.92	37.071	54	-16.929	Ave
11100	18	0	100	H	38.511	7.39	26.92	36.981	54	-17.019	Ave
16650	33.32	0	100	V	39.256	8.55	26.11	55.016	74	-18.984	Peak
16650	32.83	0	100	H	39.256	8.55	26.11	54.526	74	-19.474	Peak
16650	18.21	0	100	V	39.256	8.55	26.11	39.906	54	-14.094	Ave
16650	18.24	0	100	H	39.256	8.55	26.11	39.936	54	-14.064	Ave
22200	32.8	0	100	V	49.9	9.91	29.1	63.51	74	-10.49	Peak
22200	32.83	0	100	H	49.9	9.91	29.1	63.54	74	-10.46	Peak
22200	18.15	0	100	V	49.9	9.91	29.1	48.86	54	-5.14	Ave
22200	17.68	0	100	H	49.9	9.91	29.1	48.39	54	-5.61	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 5670 MHz, measured at 3 meters											
11340	33.11	0	100	V	38.844	7.52	26.97	52.504	74	-21.496	Peak
11340	33.26	0	100	H	38.844	7.52	26.97	52.654	74	-21.346	Peak
11340	18.11	0	100	V	38.844	7.52	26.97	37.504	54	-16.496	Ave
11340	17.87	0	100	H	38.844	7.52	26.97	37.264	54	-16.736	Ave
17010	32.67	0	100	V	41.889	8.61	25.99	57.179	74	-16.821	Peak
17010	33.07	0	100	H	41.889	8.61	25.99	57.579	74	-16.421	Peak
17010	17.77	0	100	V	41.889	8.61	25.99	42.279	54	-11.721	Ave
17010	17.74	0	100	H	41.889	8.61	25.99	42.249	54	-11.751	Ave
22680	33.83	0	100	V	49.9	10.07	29	64.8	74	-9.2	Peak
22680	33.35	0	100	H	49.9	10.07	29	64.32	74	-9.68	Peak
22680	18.36	0	100	V	49.9	10.07	29	49.33	54	-4.67	Ave
22680	18.36	0	100	H	49.9	10.07	29	49.33	54	-4.67	Ave

3) Co-Location with 2.4 GHz and 5 GHz

Worst Case: 2.4 GHz: 802.11b mode 2437 MHz; 5.3 GHz: 802.11a mode 5320 MHz



30-1000 MHz:

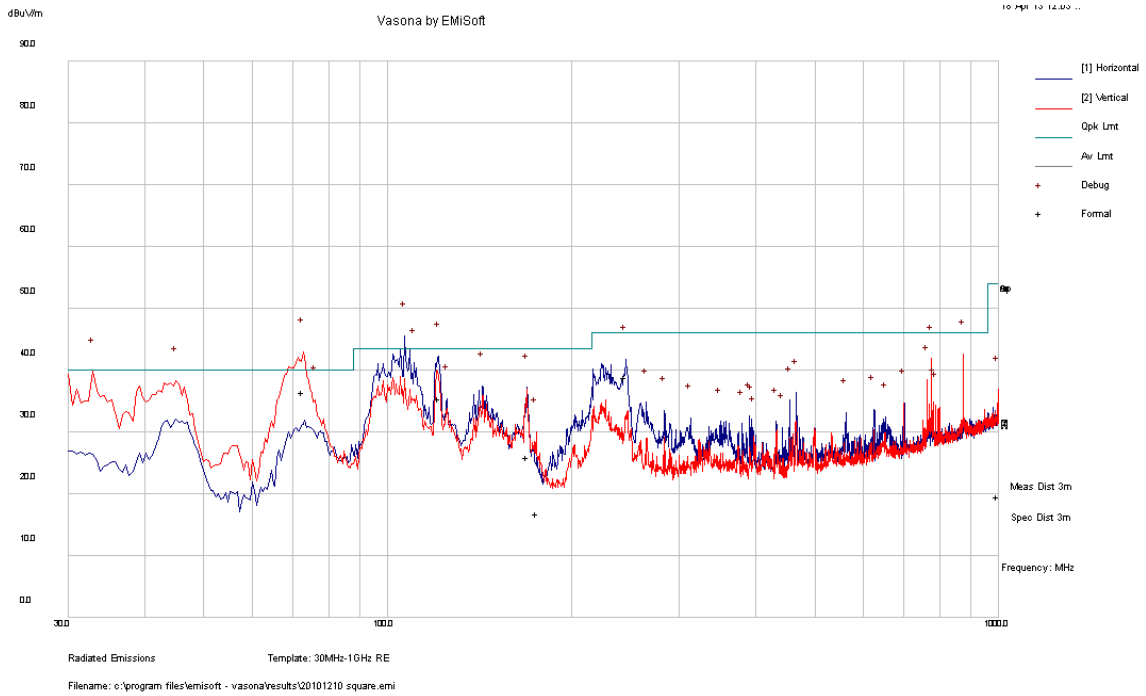
Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
72.48225	36.78	148	V	64	40	-3.22
120.74925	36.5	279	H	78	43.5	-7.00
223.56925	36.95	149	H	128	46	-9.05
168.60425	29.66	112	V	70	43.5	-13.84
171.2165	22.47	139	V	90	43.5	-21.03
996.6305	24.7	198	H	246	54	-29.30

Above 1 GHz

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

Note *: All emissions were under the noise floor/-20 dB below the limit

Worst Case**:** 2.4 GHz: b mode 2437 MHz; 5.6 GHz: HT40 mode 5550 MHz



30-1000 MHz:

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
72.60525	36.4	167	V	63	40	-3.60
121.18475	35.36	237	H	269	43.5	-8.14
244.86275	38.92	99	H	13	46	-7.08
169.19025	26	99	H	200	43.5	-17.50
175.07325	16.74	195	V	18	43.5	-26.76
996.78425	19.56	387	V	234	54	-34.44

Above 1 GHz:

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
3000	38.29	256	100	V	30.466	3.41	27.87	44.30	74	-29.70	Peak
3000	39.32	337	100	H	30.466	3.41	27.87	45.33	74	-28.67	Peak
3000	31.38	256	100	V	30.466	3.41	27.87	37.39	54	-16.61	Ave
3000	34.23	337	100	H	30.466	3.41	27.87	40.24	54	-13.76	Ave

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

8.1 Applicable Standard

FCC §15.407(a) and IC RSS-210 §A9.2.

8.2 Measurement Procedure

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

8.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2012-09-29	1 year

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

8.4 Test Environmental Conditions

Temperature:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102kPa

The testing was performed by Bo Li from 2013-4-01and 2013-4-12 at RF site.

8.5 Test Results

5250-5350 MHz Band:

802.11a mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Results
Chain J0				
Low	5260	21.832	16.5927	Compliant
Middle	5280	21.641	16.5948	Compliant
High	5320	21.974	16.6266	Compliant
Chain J1				
Low	5260	21.606	16.5866	Compliant
Middle	5280	21.380	16.5127	Compliant
High	5320	21.344	16.5736	Compliant
Chain J2				
Low	5260	21.556	16.5071	Compliant
Middle	5280	21.376	16.4748	Compliant
High	5320	21.225	16.5106	Compliant

802.11n HT20 mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Results
Chain J0				
Low	5260	22.532	17.7405	Compliant
Middle	5280	21.939	17.6973	Compliant
High	5320	22.737	17.6925	Compliant
Chain J1				
Low	5260	22.147	17.7430	Compliant
Middle	5280	22.396	17.6589	Compliant
High	5320	22.378	17.6472	Compliant
Chain J2				
Low	5260	22.370	17.6299	Compliant
Middle	5280	22.622	17.6681	Compliant
High	5320	21.928	17.6722	Compliant

802.11n HT40 mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Results
Chain J0				
Low	5270	46.131	36.3589	Compliant
High	5310	47.528	36.5493	Compliant
Chain J1				
Low	5270	43.873	36.3035	Compliant
High	5310	44.162	36.2639	Compliant
Chain J2				
Low	5270	44.628	36.3503	Compliant
High	5310	45.965	36.3786	Compliant

5470-5725 MHz Band:

802.11a mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Results
Chain J0				
Low	5500	21.517	16.6168	Compliant
Middle	5580	21.570	16.5684	Compliant
High	5700	22.307	16.5979	Compliant
Chain J1				
Low	5500	21.087	16.5103	Compliant
Middle	5580	21.117	16.5601	Compliant
High	5700	21.670	16.5028	Compliant
Chain J2				
Low	5500	21.271	16.5112	Compliant
Middle	5580	21.098	16.5425	Compliant
High	5700	21.363	16.4644	Compliant

802.11n HT20 mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Results
Chain J0				
Low	5500	22.409	17.7834	Compliant
Middle	5580	22.534	17.8013	Compliant
High	5700	21.758	17.6201	Compliant
Chain J1				
Low	5500	22.029	17.6390	Compliant
Middle	5580	23.830	17.8195	Compliant
High	5700	23.322	17.7355	Compliant
Chain J2				
Low	5500	21.668	17.6609	Compliant
Middle	5580	21.754	17.6687	Compliant
High	5700	21.677	17.6369	Compliant

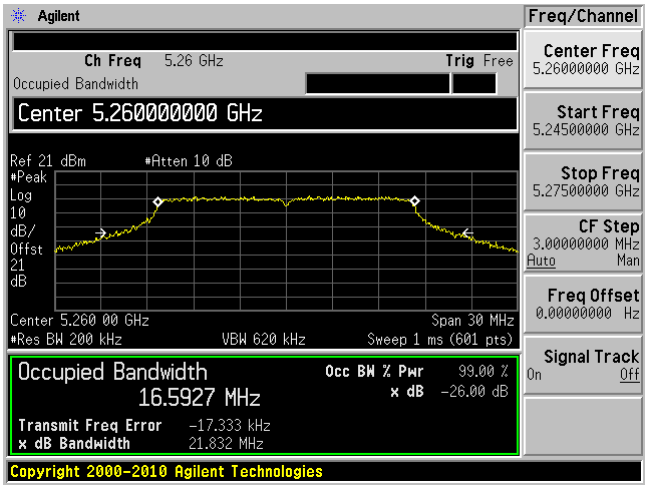
802.11n HT40 mode

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Results
Chain J0				
Low	5510	45.271	36.3668	Compliant
Middle	5550	44.817	36.3780	Compliant
High	5670	46.392	36.6019	Compliant
Chain J1				
Low	5510	45.292	36.2534	Compliant
Middle	5550	45.268	36.3316	Compliant
High	5670	45.203	36.3060	Compliant
Chain J2				
Low	5510	45.253	36.2847	Compliant
Middle	5550	44.665	36.3242	Compliant
High	5670	44.183	36.2661	Compliant

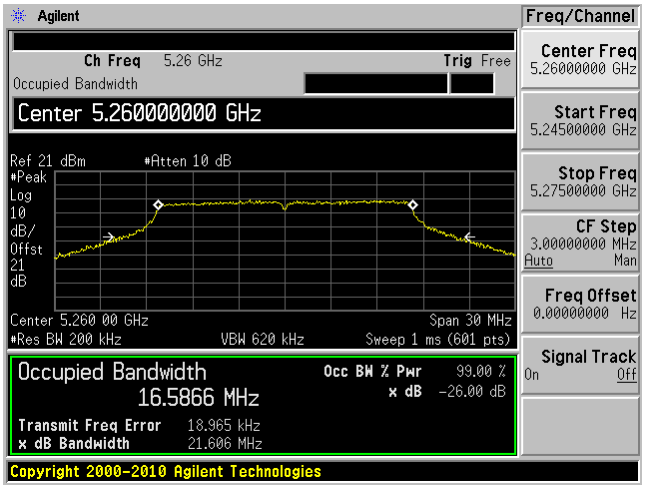
Please refer to the following plots.

5250-5350 MHz Band

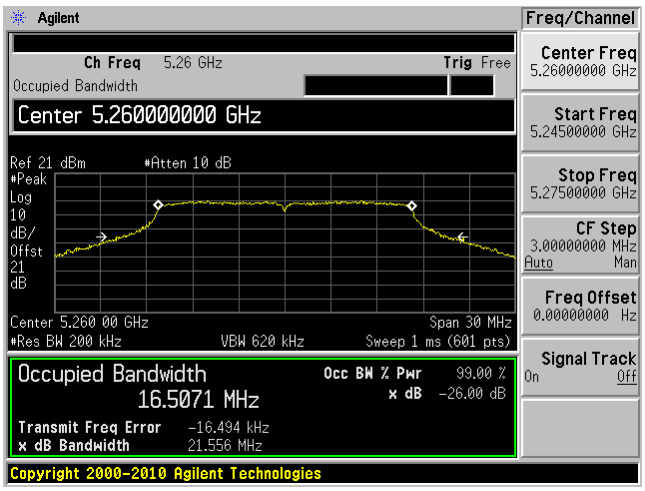
802.11a mode, 5260 MHz, Chain J0



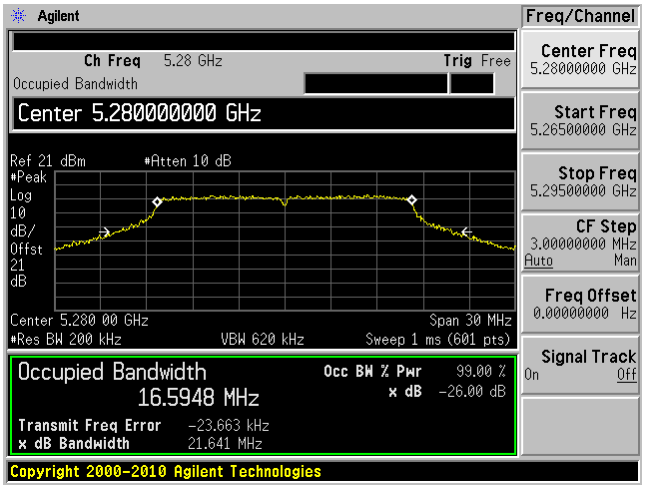
802.11a mode, 5260 MHz, Chain J1



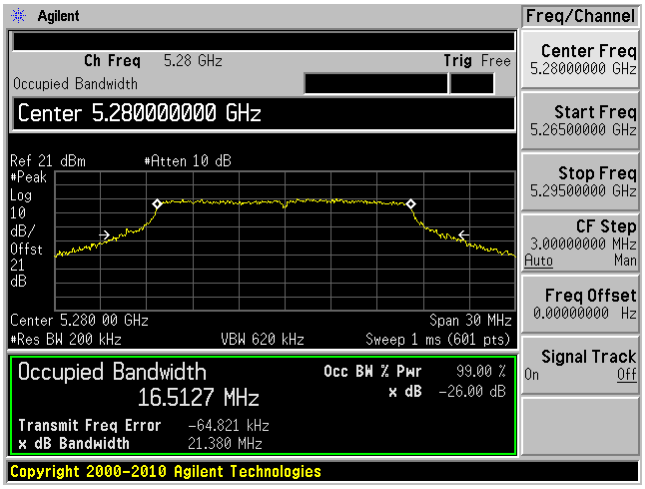
802.11a mode, 5260 MHz, Chain J2



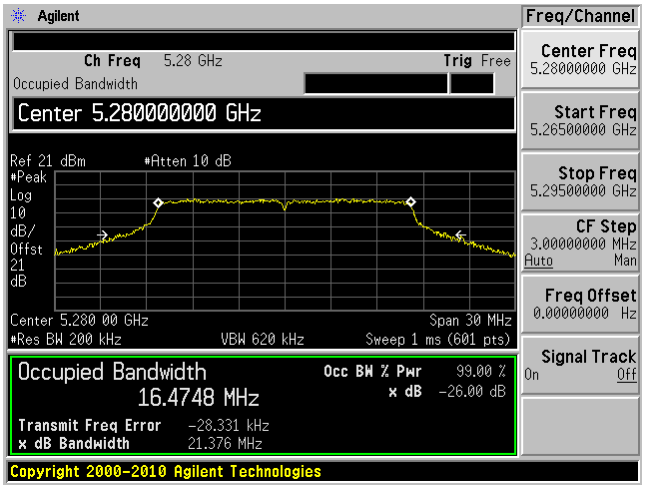
802.11a mode, 5280 MHz, Chain J0



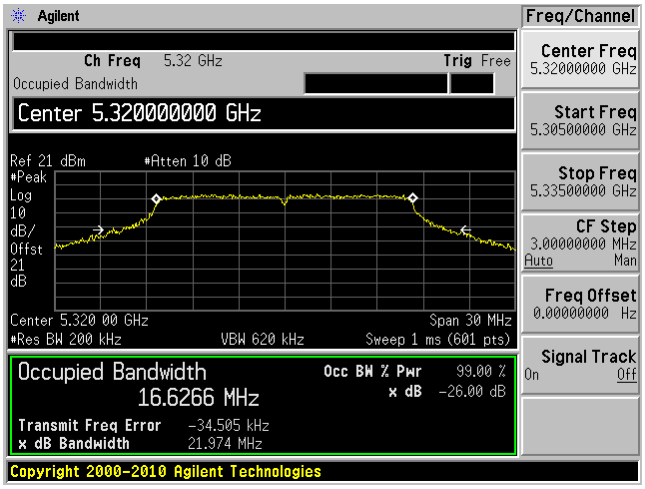
802.11a mode, 5280 MHz, Chain J1



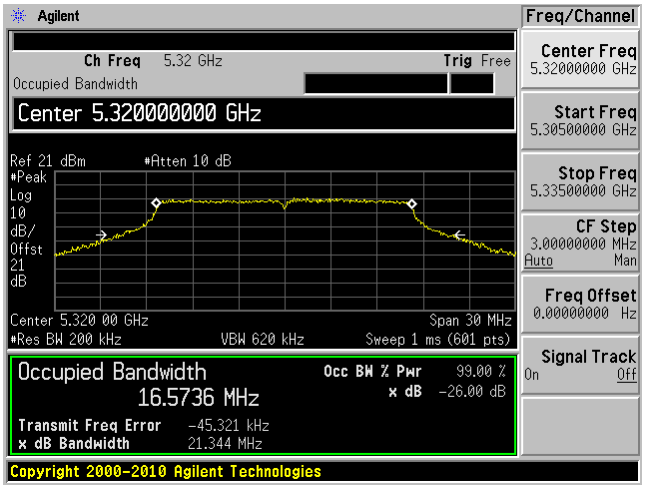
802.11a mode, 5280 MHz, Chain J2



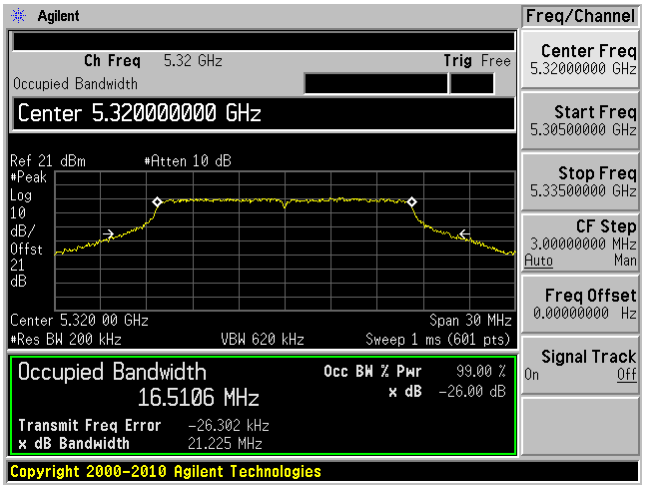
802.11a mode, 5320 MHz, Chain J0



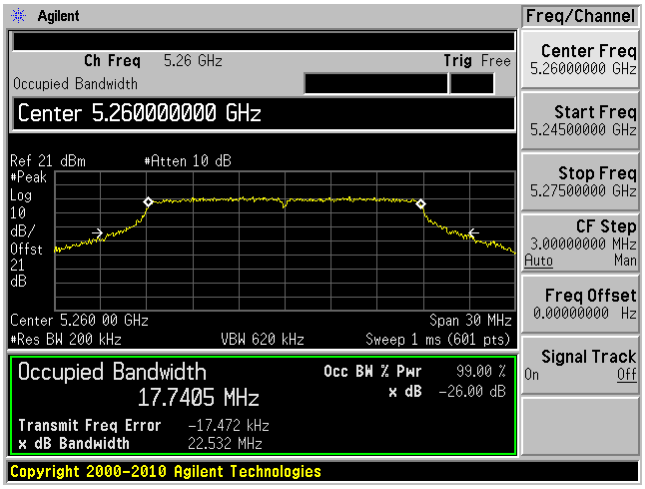
802.11a mode, 5320 MHz, Chain J1



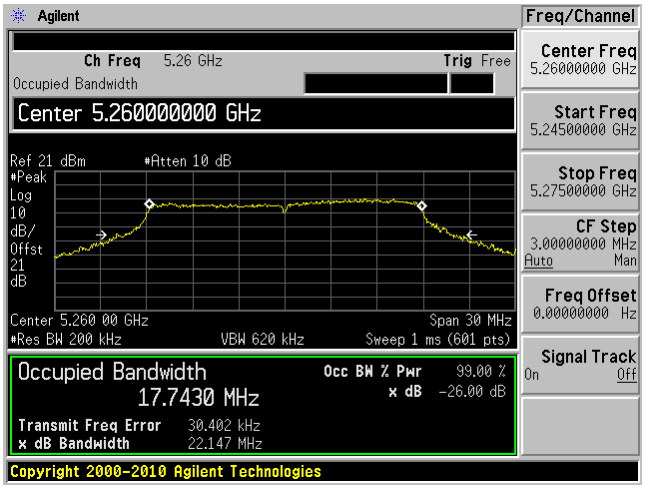
802.11a mode, 5320 MHz, Chain J2



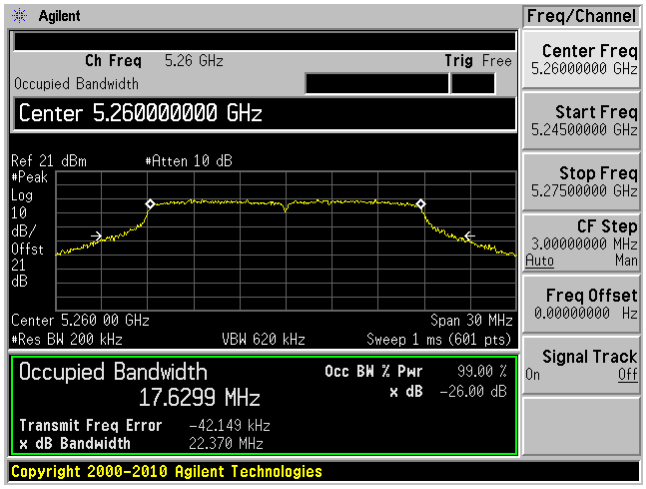
802.11n HT20 mode, 5260 MHz, Chain J0



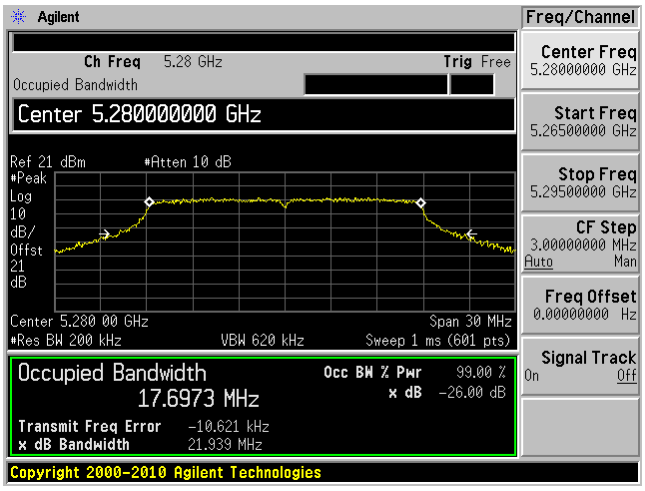
802.11n HT20 mode, 5260 MHz, Chain J1



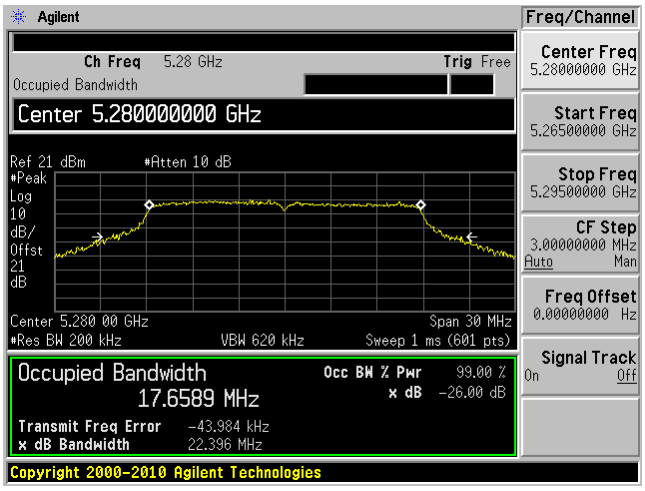
802.11n HT20 mode, 5260 MHz, Chain J2



802.11n HT20 mode, 5280 MHz, Chain J0



802.11n HT20 mode, 5280 MHz, Chain J1



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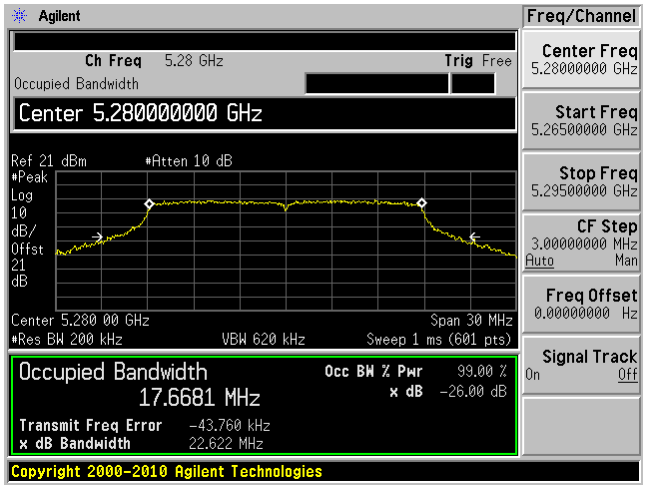
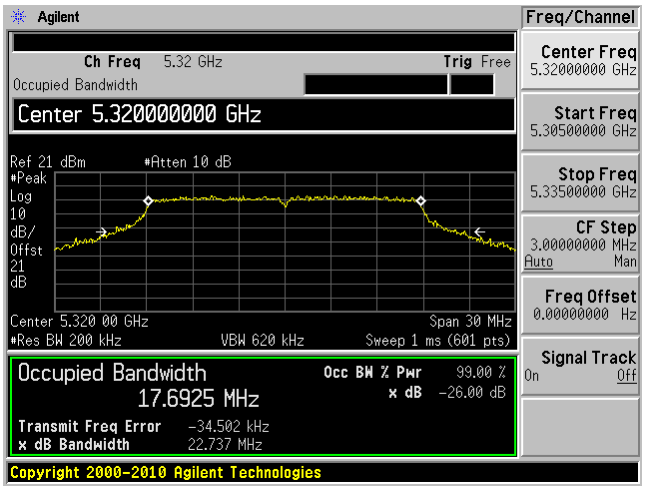
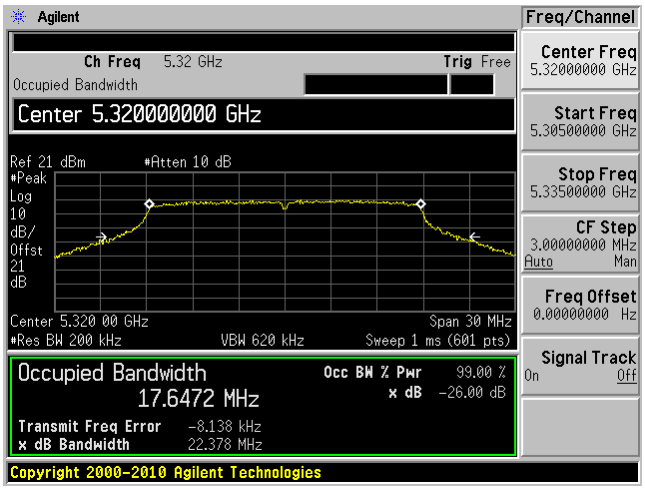


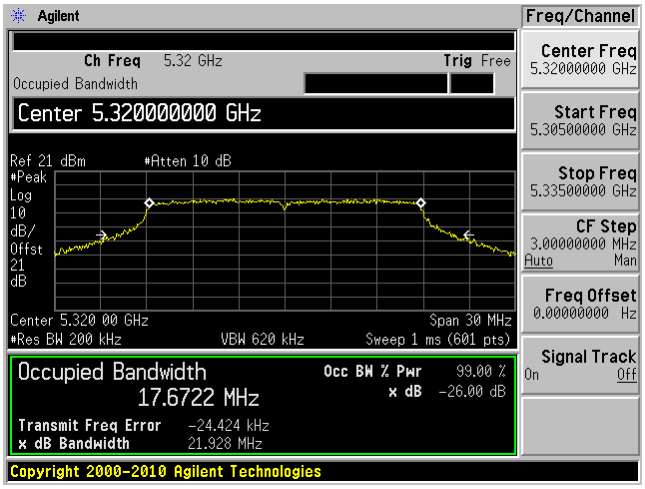
802.11n HT20 mode, 5320 MHz, Chain J0



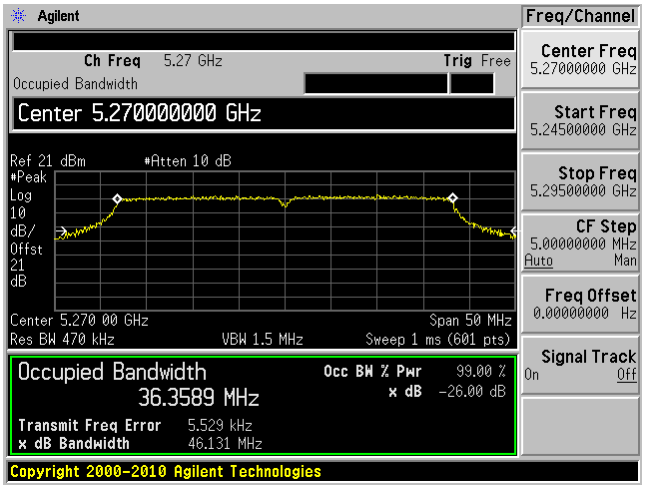
802.11n HT20 mode, 5320 MHz, Chain J1



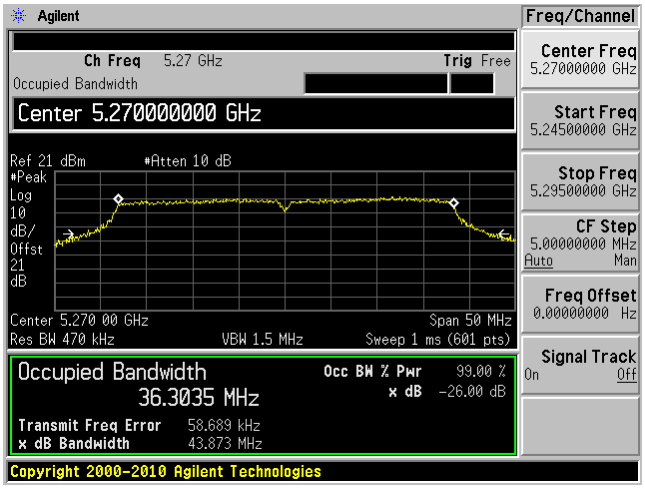
802.11n HT20 mode, 5320 MHz, Chain J2



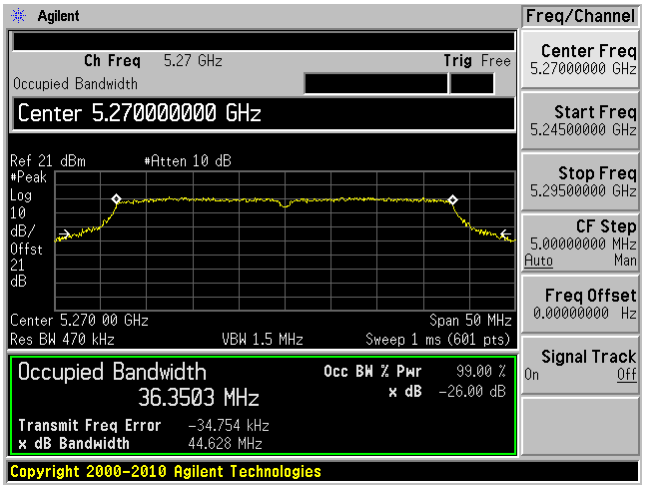
802.11n HT40 mode, 5270 MHz, Chain J0



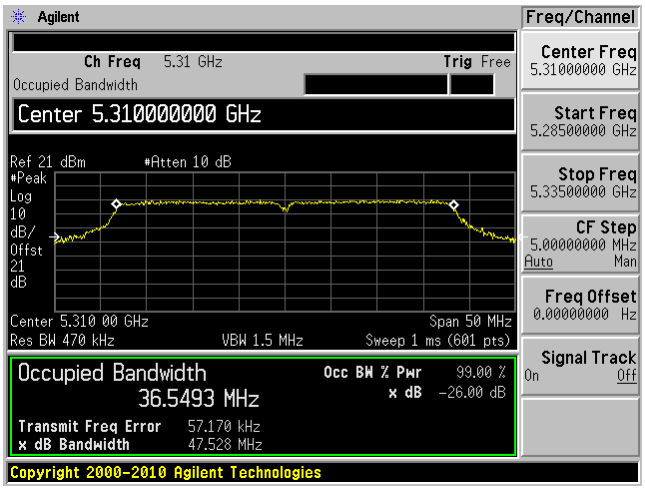
802.11n HT40 mode, 5270 MHz, Chain J1



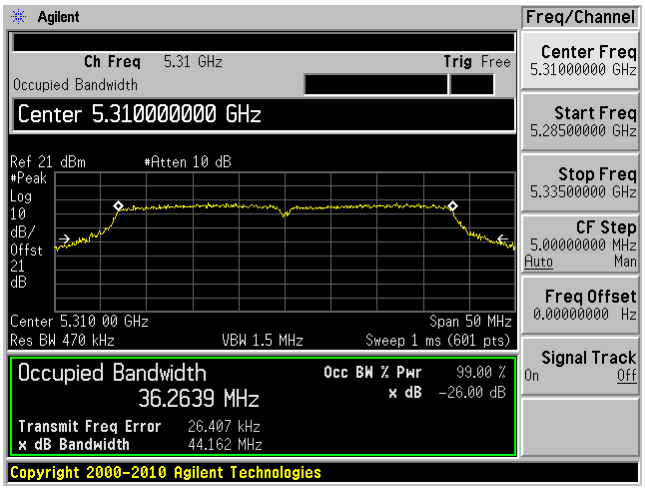
802.11n HT40 mode, 5270 MHz, Chain J2



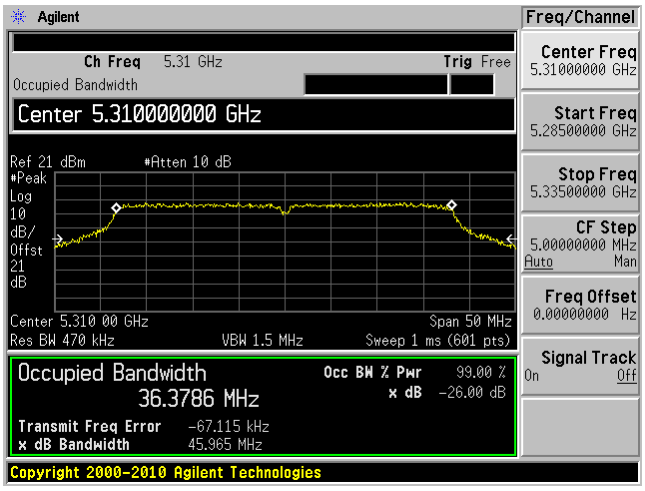
802.11n HT40 mode, 5310 MHz, Chain J0



802.11n HT40 mode, 5310 MHz, Chain J1

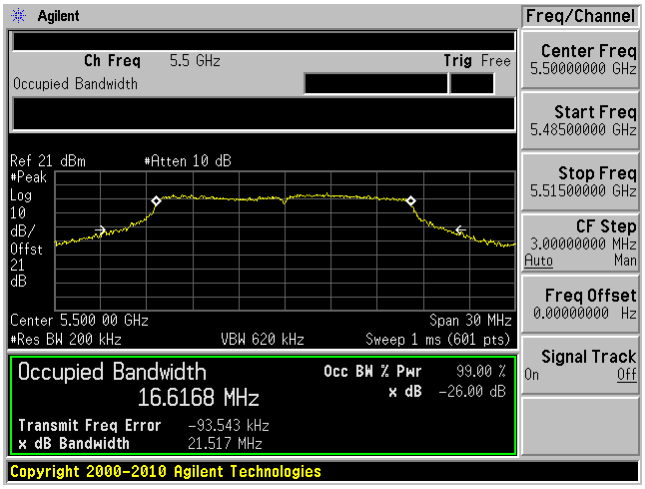


802.11n HT40 mode, 5310 MHz, Chain J2

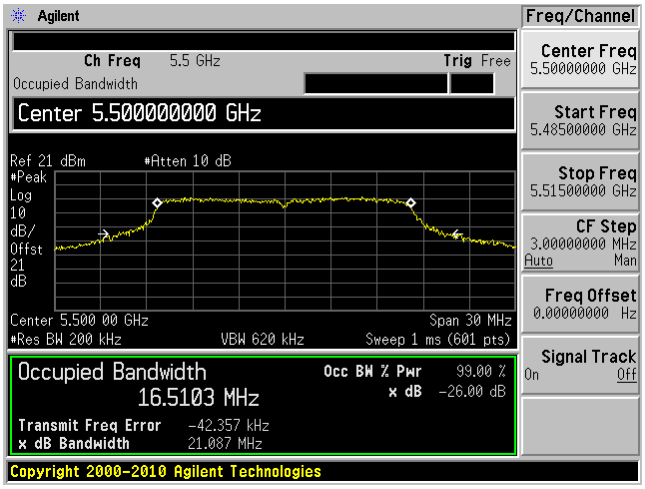


5470-5725 MHz Band

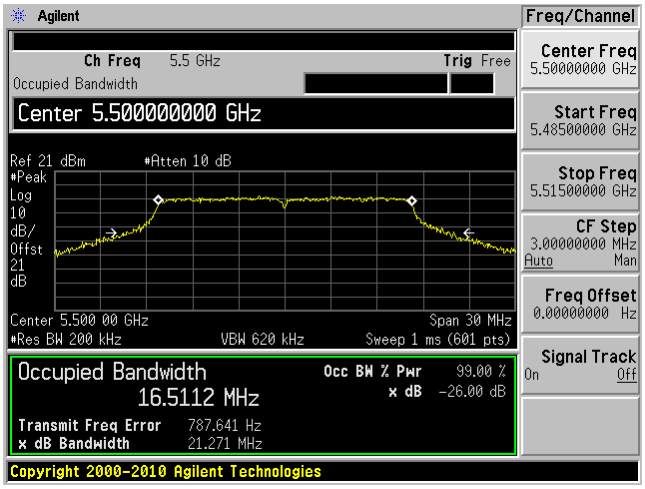
802.11a mode, 5550 MHz, Chain J0



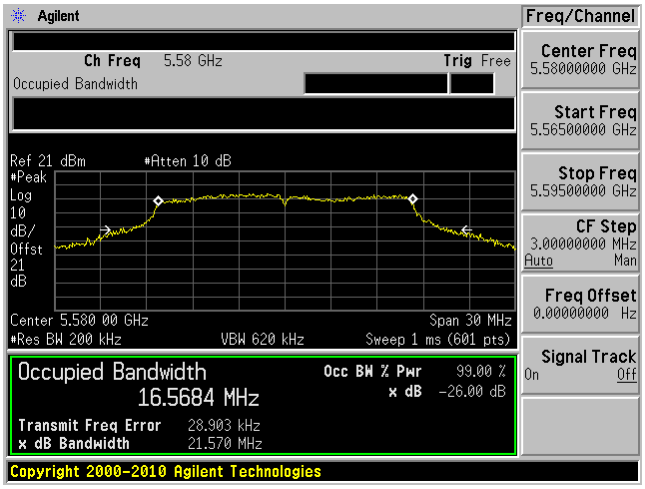
802.11a mode, 5550 MHz, Chain J1



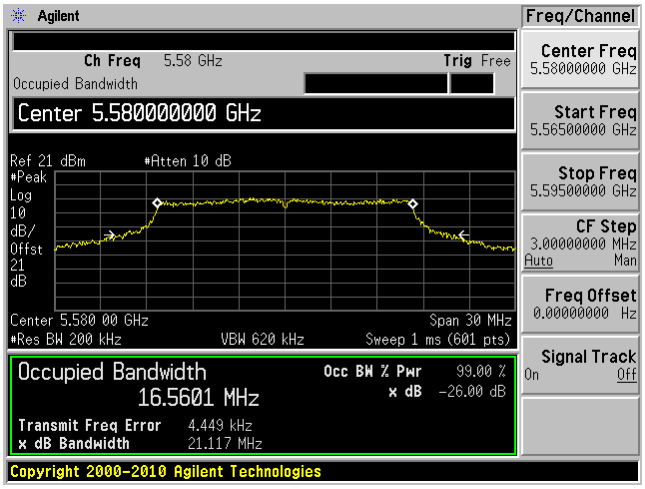
802.11a mode, 5550 MHz, Chain J2



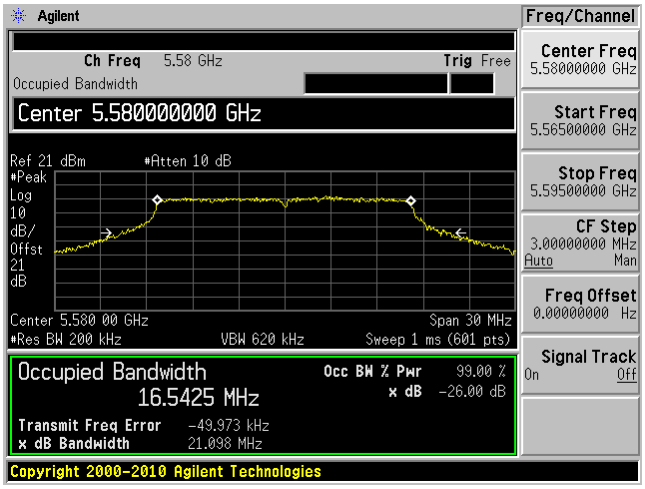
802.11a mode, 5580 MHz, Chain J0



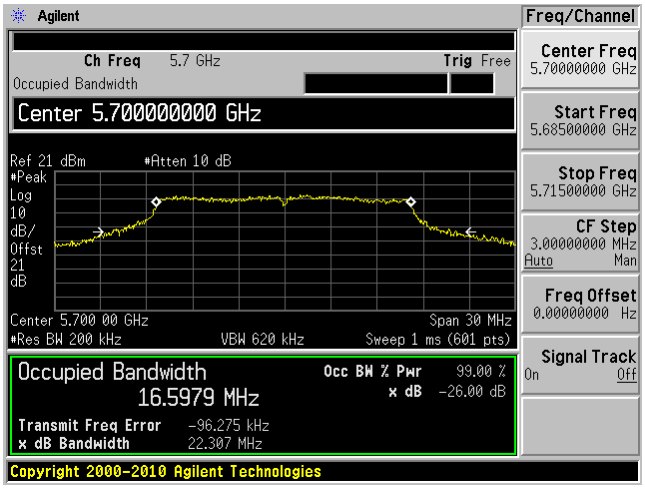
802.11a mode, 5580 MHz, Chain J1



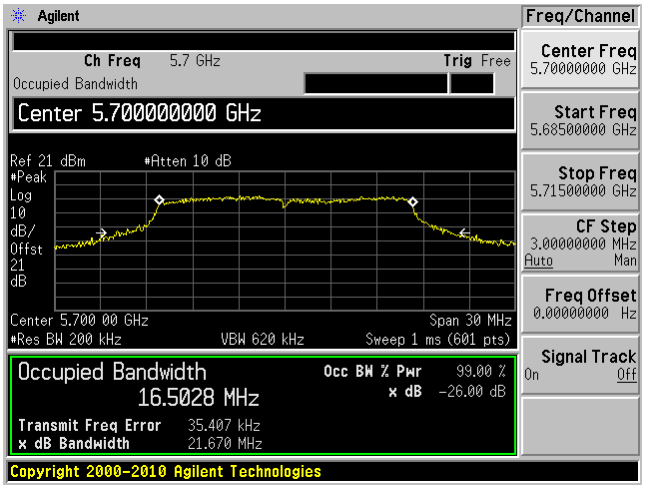
802.11a mode, 5580 MHz, Chain J2



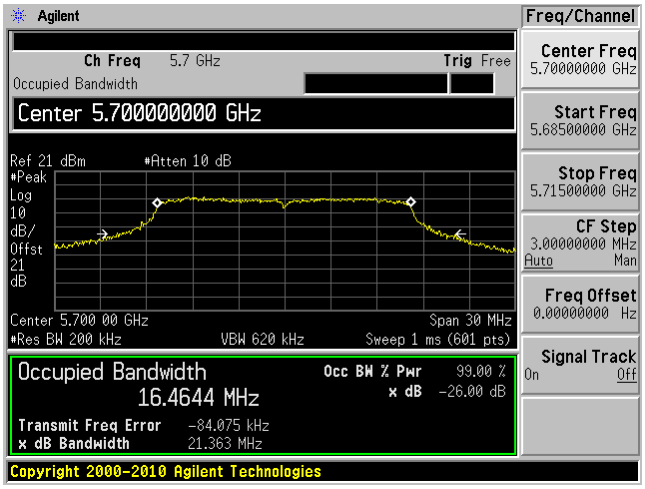
802.11a mode, 5700 MHz, Chain J0



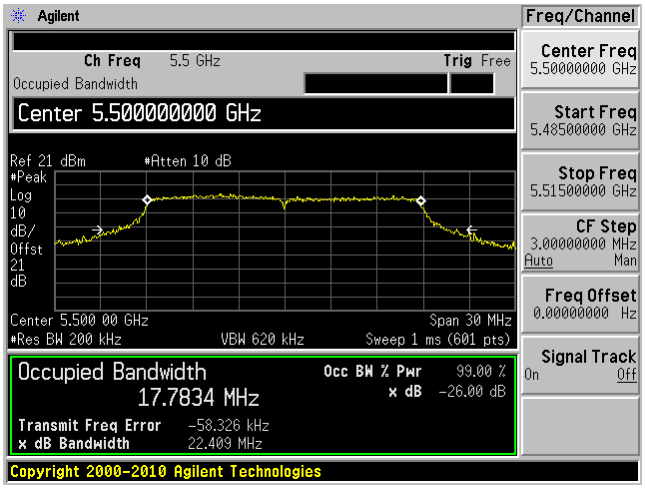
802.11a mode, 5700 MHz, Chain J1



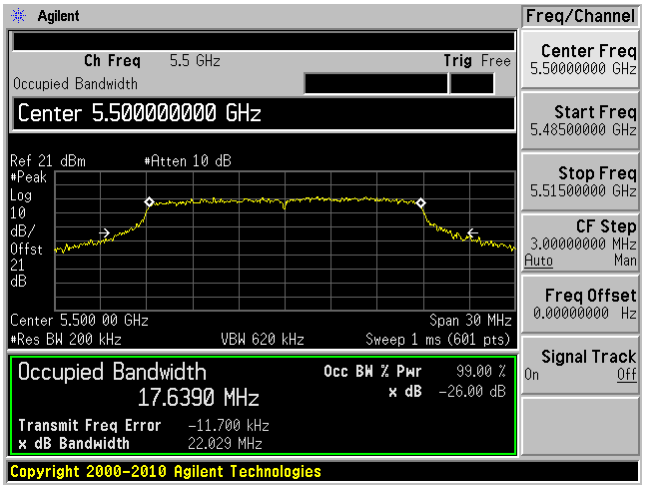
802.11a mode, 5700 MHz, Chain J2



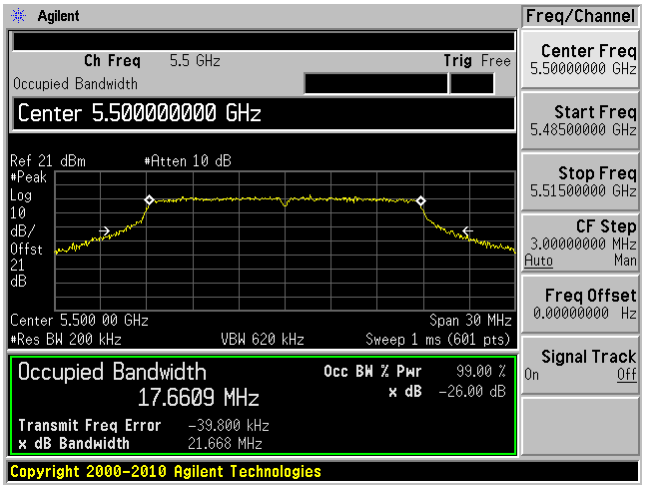
802.11n HT20 mode, 5500 MHz, Chain J0



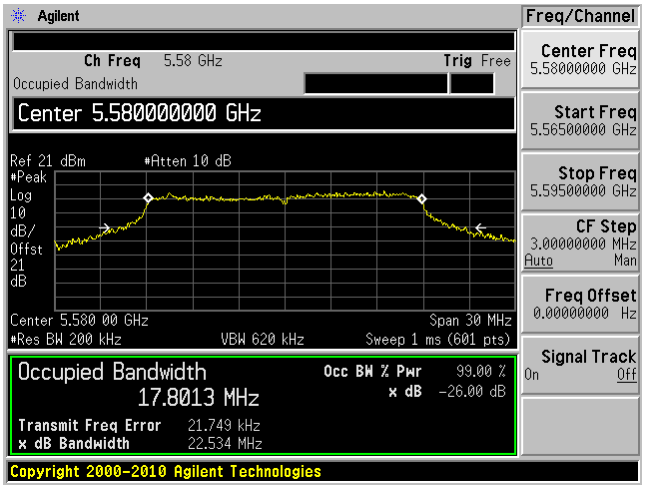
802.11n HT20 mode, 5500 MHz, Chain J1



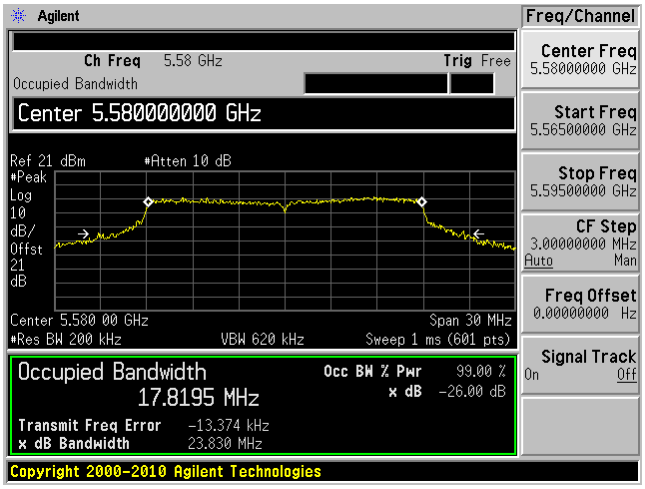
802.11n HT20 mode, 5500 MHz, Chain J2



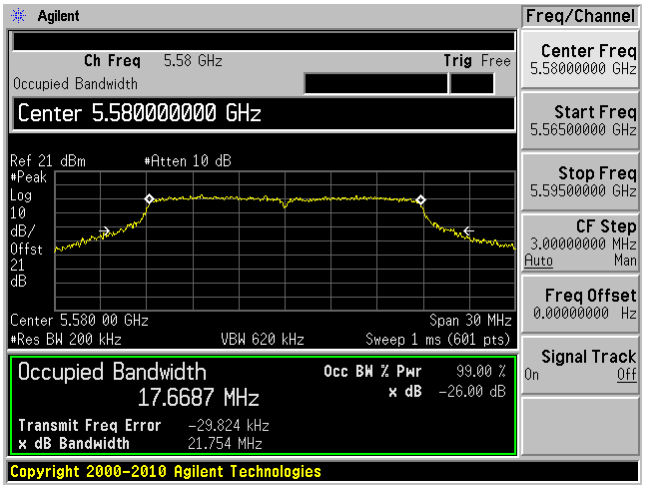
802.11n HT20 mode, 5580 MHz, Chain J0



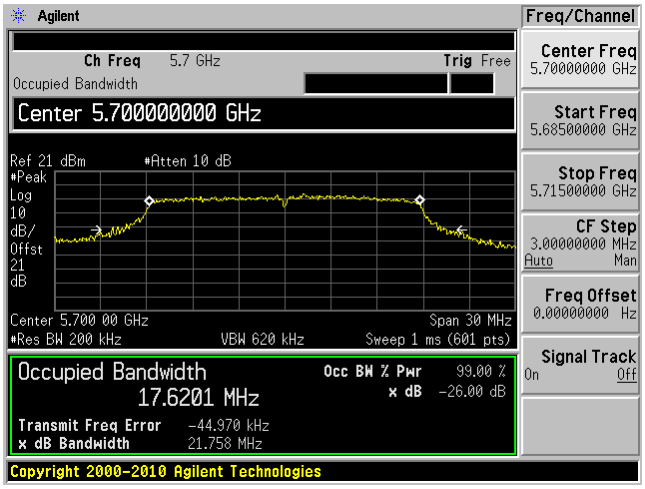
802.11n HT20 mode, 5580 MHz, Chain J1



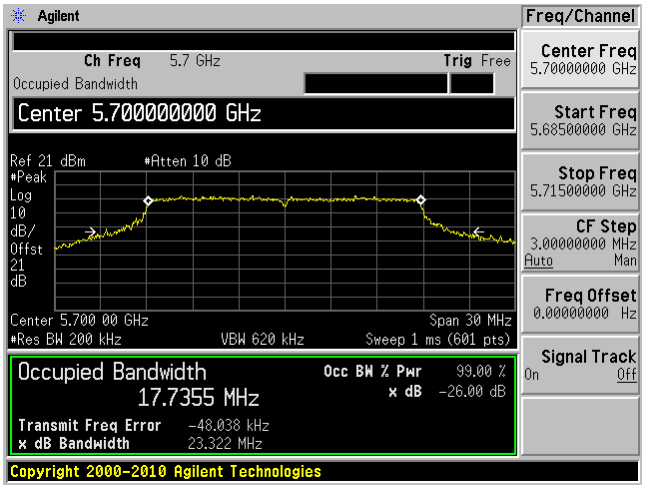
802.11n HT20 mode, 5580 MHz, Chain J2



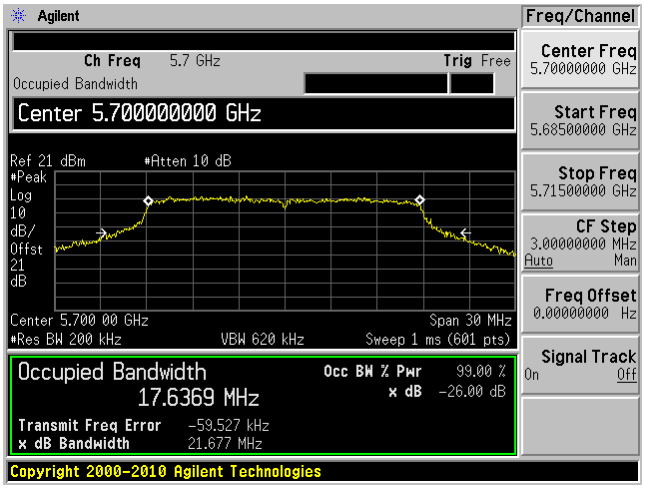
802.11n HT20 mode, 5700 MHz, Chain J0



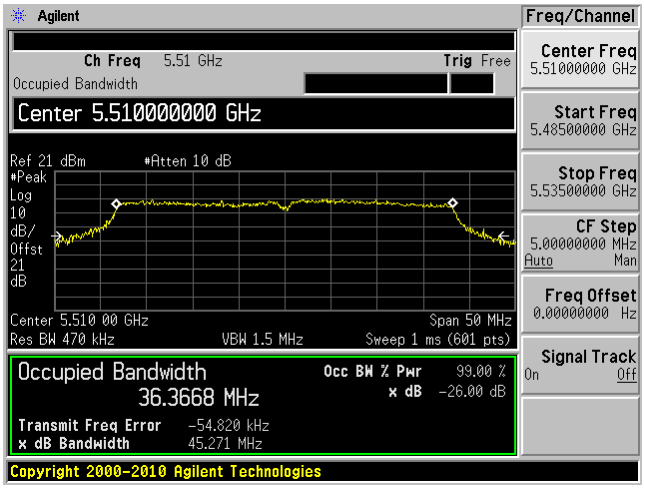
802.11n HT20 mode, 5700 MHz, Chain J1



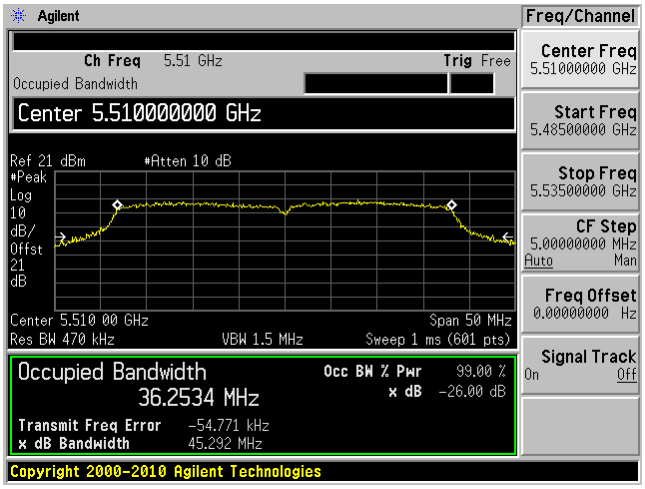
802.11n HT20 mode, 5700 MHz, Chain J2



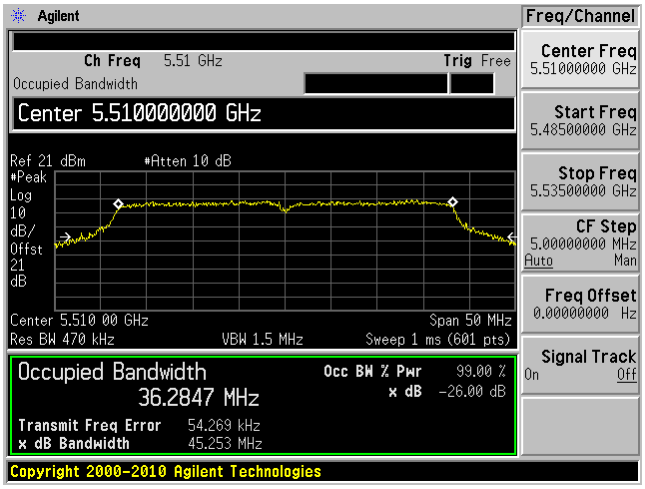
802.11n HT40 mode, 5510 MHz, Chain J0



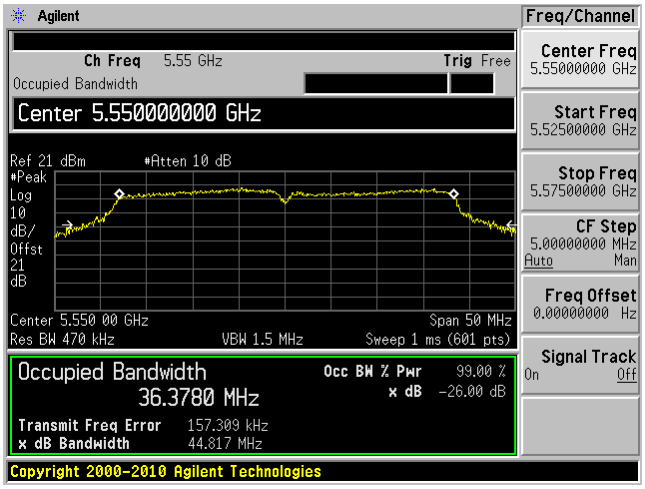
802.11n HT40 mode, 5510 MHz, Chain J1



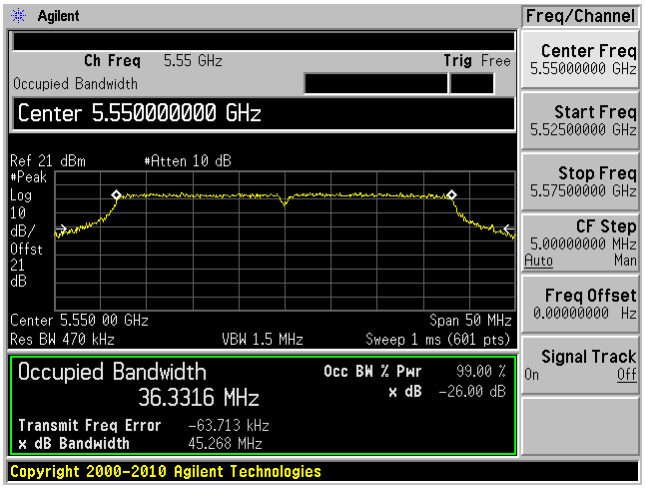
802.11n HT40 mode, 5510 MHz, Chain J2



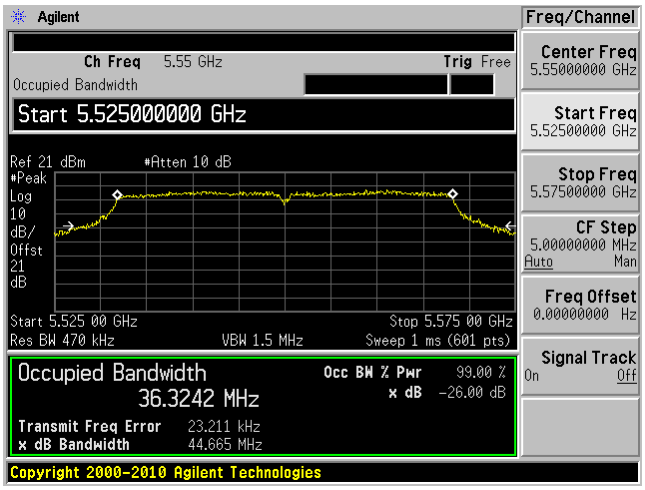
802.11n HT40 mode, 5550 MHz, Chain J0



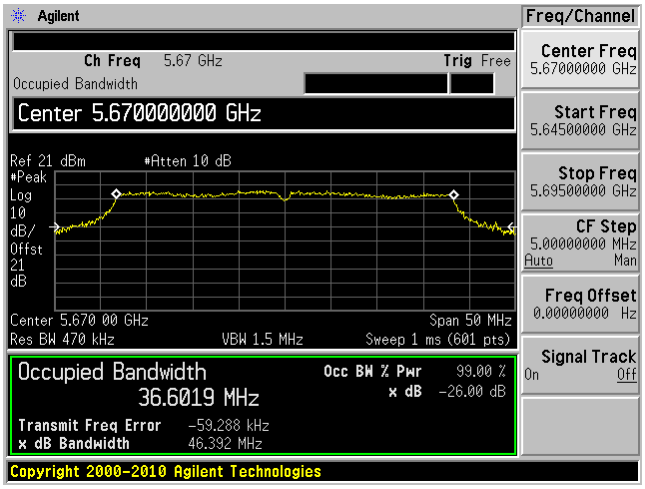
802.11n HT40 mode, 5550 MHz, Chain J1



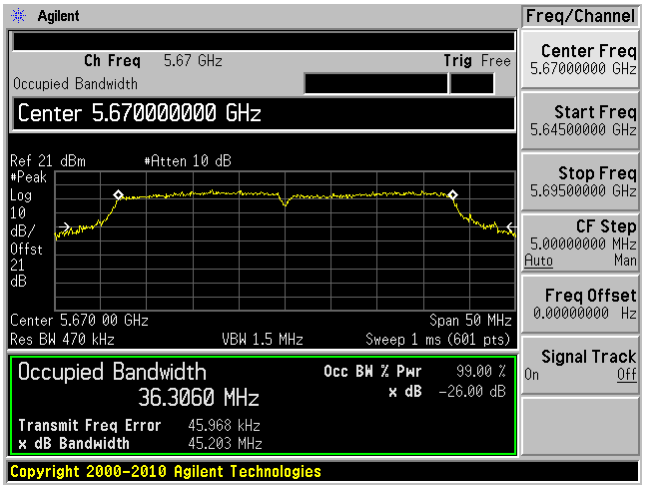
802.11n HT40 mode, 5550 MHz, Chain J2



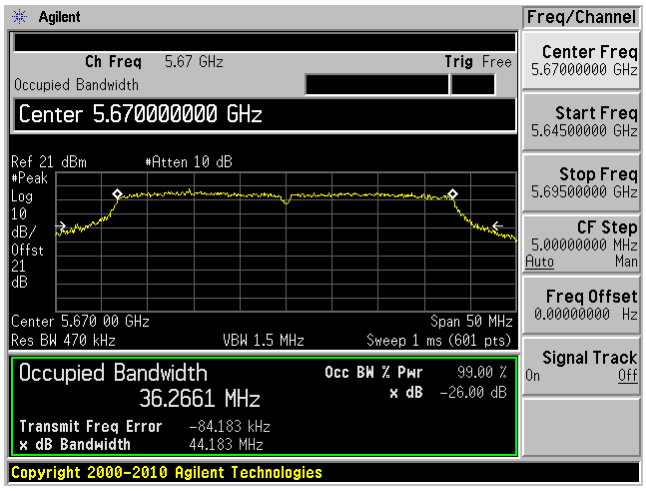
802.11n HT40 mode, 5670 MHz, Chain J0



802.11n HT40 mode, 5670 MHz, Chain J1



802.11n HT40 mode, 5670 MHz, Chain J2



9 FCC §407(a)(1) & IC RSS-210 §A9.2 - Peak Output Power Measurement

9.1 Applicable Standard

According to FCC §15.407(a)(1)

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

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

According to IC RSS-210 §A9.2:

For the 5.15–5.35 GHz, 5.47-5.6 GHz, and 5.650–5.725 GHz bands, the maximum conducted output power shall not exceed 250 mW or 11 dBm + 10 log B, whichever power is less. The power spectral density shall not exceed 11 dBm in any 1 megahertz band. The maximum e.i.r.p shall not exceed 1.0W or 17 + 10 10B, dbm, whichever is less. B is the 99% emission bandwidth in MHz.

9.2 Measurement Procedure

(i) Set span to encompass the entire emission bandwidth (EBW) of the signal.
(ii) Set RBW = 1 MHz.
(iii) Set VBW ≥ 3 MHz.
(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
(v) Sweep time = auto.
(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".
(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
(ix) Compute power by integrating the spectrum across the 26 dB EBW of the signal using the spectrum analyzer's band power measurement function with band limits set equal to the EBW band edges. If the spectrum analyzer does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW of the spectrum.

9.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2012-09-29	1 year

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

9.4 Test Environmental Conditions

Temperature:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102kPa

The testing was performed by Bo Li from 2013-4-01 and 2013-4-12 at RF site.

9.5 Test Results

5250-5350 MHz Band:

802.11a mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	TX Chain J2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5260	13.18	11.31	10.31	16.54	22	-5.46	12.5
Middle	5280	13.98	11.49	11.9	17.37	22	-4.63	13
High	5320	15.07	12.17	12.61	18.25	22	-3.75	14.5

802.11n HT20 mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	TX Chain J2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5260	13.21	10.41	11.32	16.58	22	-5.42	12.5
Middle	5280	13.35	11.48	11.23	16.9	22	-5.10	12.5
High	5320	14.61	11.97	12.53	17.96	22	-4.04	14

802.11n HT40 mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	TX Chain J2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5270	13.59	10.95	11.37	16.9	22	-5.10	12.5
High	5310	10.86	7.93	8.59	14.09	22	-7.91	9.5

5470-5725 MHz Band :

802.11a mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	TX Chain J2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5500	15.03	13.44	14.36	19.1	22	-2.90	13.5
Middle	5580	15.66	12.9	13.8	19.05	22	-2.95	13
High	5700	14.48	14.81	13.82	19.16	22	-2.84	13.5

802.11n HT20 mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	TX Chain J2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5500	15.54	13.95	14.69	19.55	22	-2.45	14
Middle	5580	16.3	13.83	14.82	19.87	22	-2.13	14
High	5700	15.08	15.18	14.22	19.62	22	-2.38	14

802.11n HT40 mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	TX Chain J2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5510	11.15	9.34	10.27	15.09	22	-6.91	9
Middle	5550	17.97	16.12	17.06	21.89	22	-0.11	16.5
High	5670	16.65	16.67	17.14	21.6	22	-0.40	16

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

10.1 Applicable Standard

According to FCC §15.407(b)

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

For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz

According to RSS-210 §A8.5, in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required.

10.2 Measurement Procedure

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

10.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2012-09-29	1 year

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

10.4 Test Environmental Conditions

Temperature:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102kPa

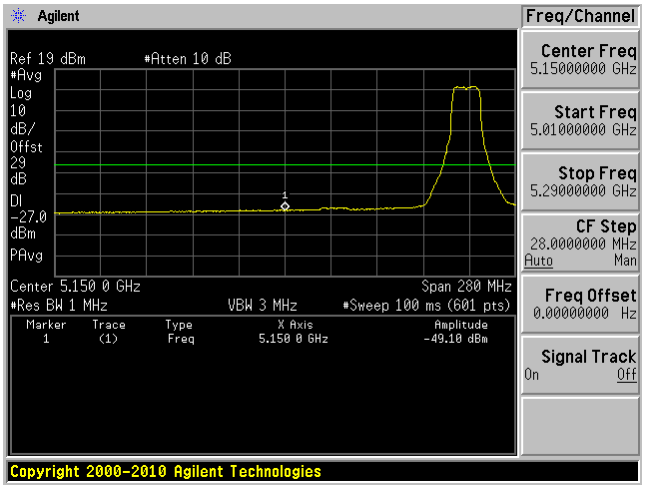
The testing was performed by Bo Li from 2013-4-01and 2013-4-12 at RF site.

10.5 Test Results

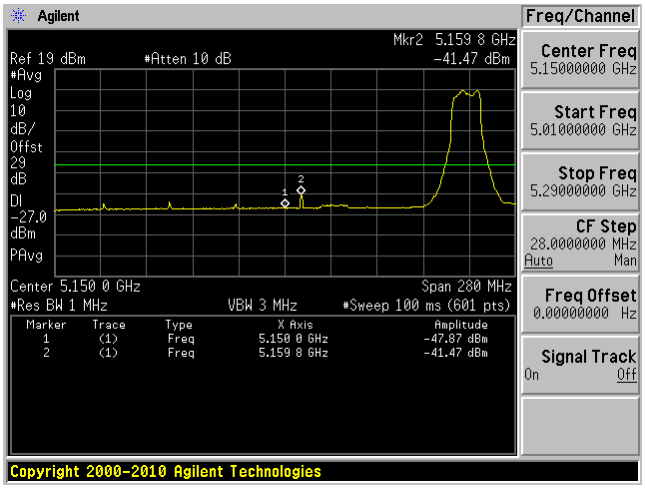
Please refer to following plots.

5250-5350 MHz Band

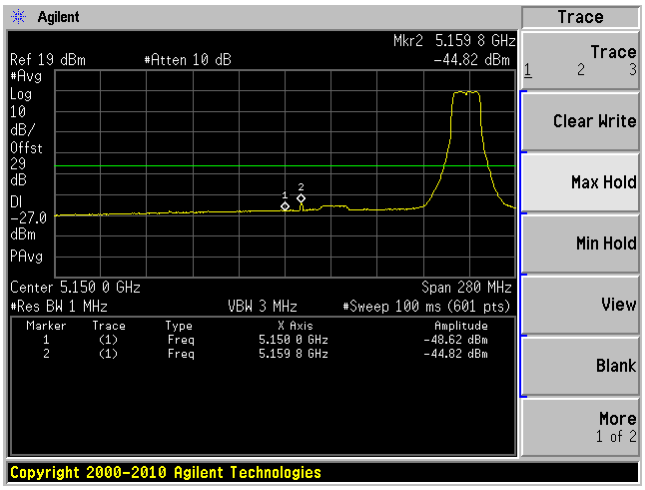
802.11a mode, 5260 MHz, Chain J0



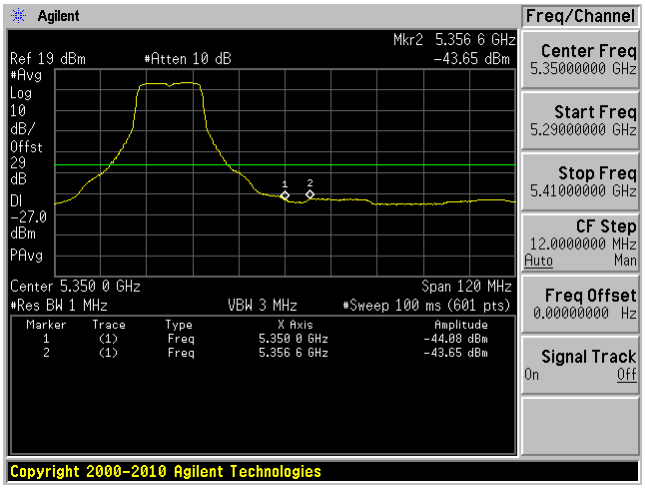
802.11a mode, 5260 MHz, Chain J1



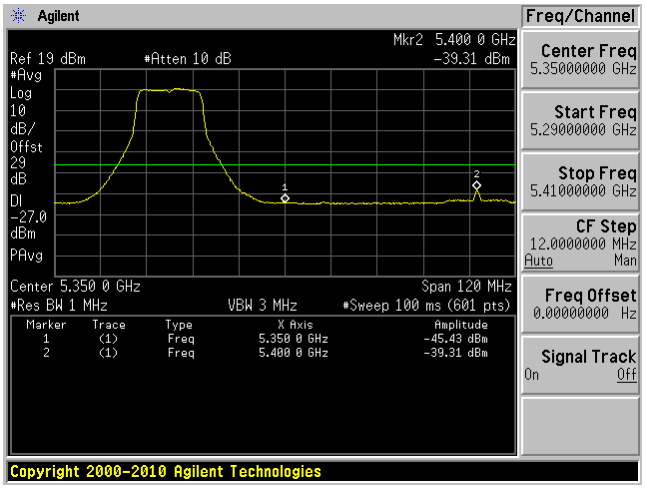
802.11a mode, 5260 MHz, Chain J2



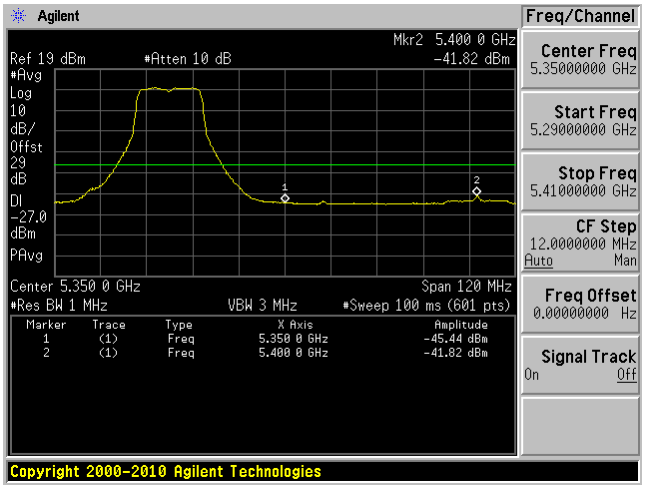
802.11a mode, 5320 MHz, Chain J0



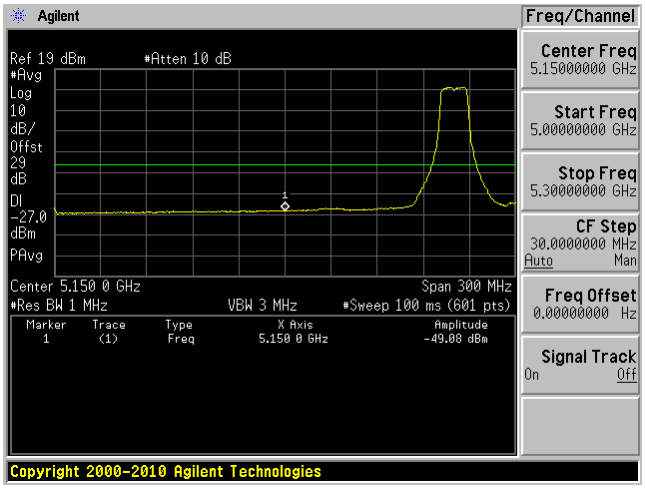
802.11a mode, 5320 MHz, Chain J1



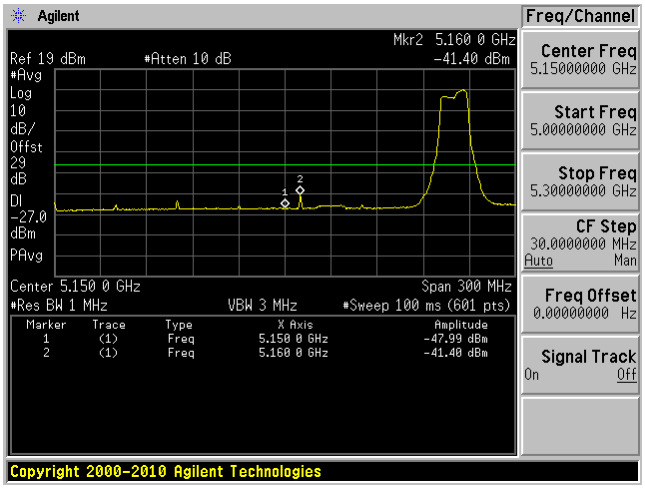
802.11a mode, 5320 MHz, Chain J2



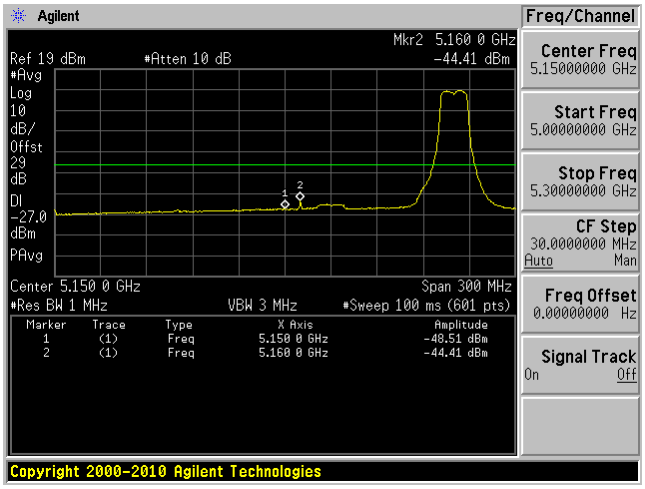
802.11n HT20 mode, 5260 MHz, Chain J0



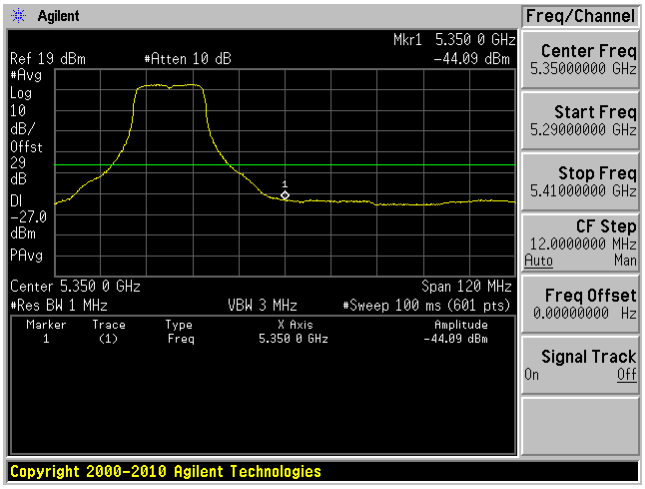
802.11n HT20 mode, 5260 MHz, Chain J1



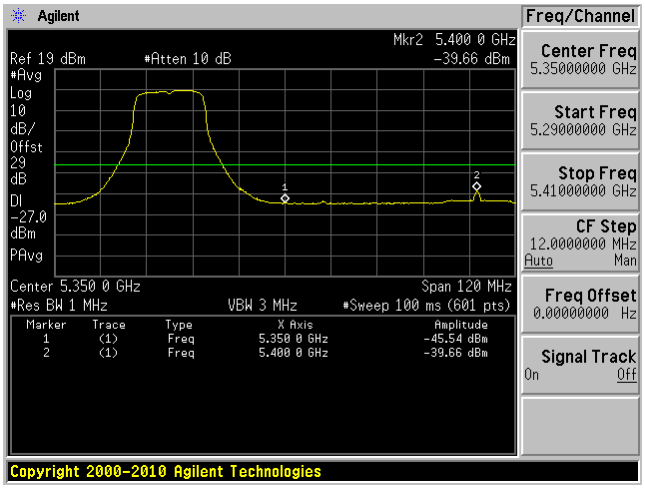
802.11n HT20 mode, 5260 MHz, Chain J2



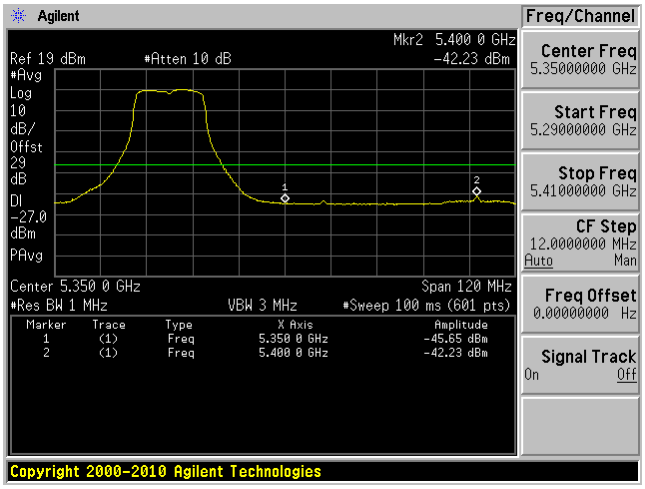
802.11n HT20 mode, 5320 MHz, Chain J0



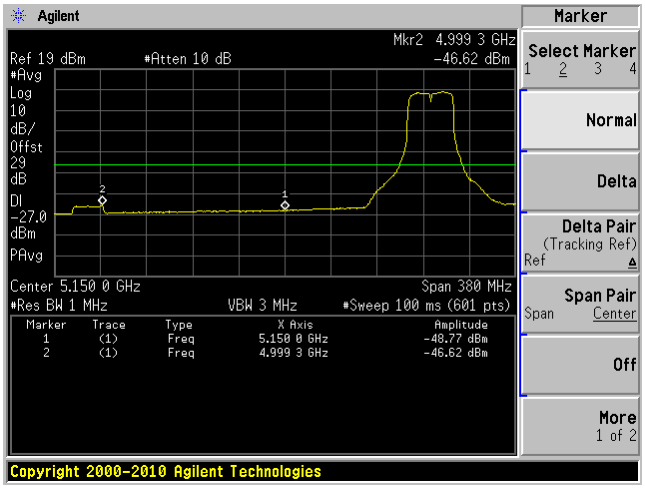
802.11n HT20 mode, 5320 MHz, Chain J1



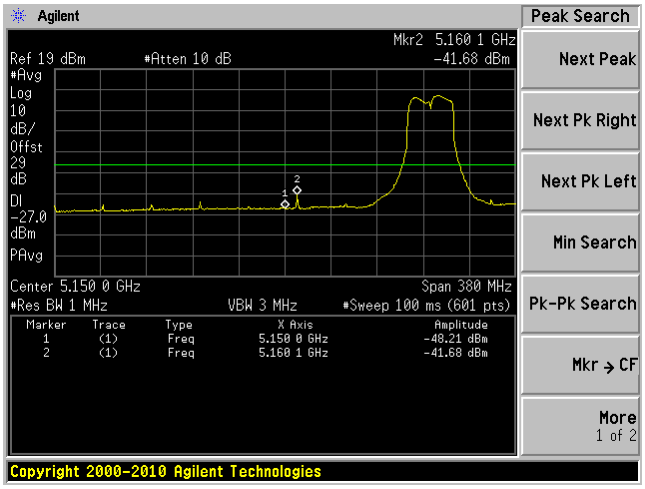
802.11n HT20 mode, 5320 MHz, Chain J2



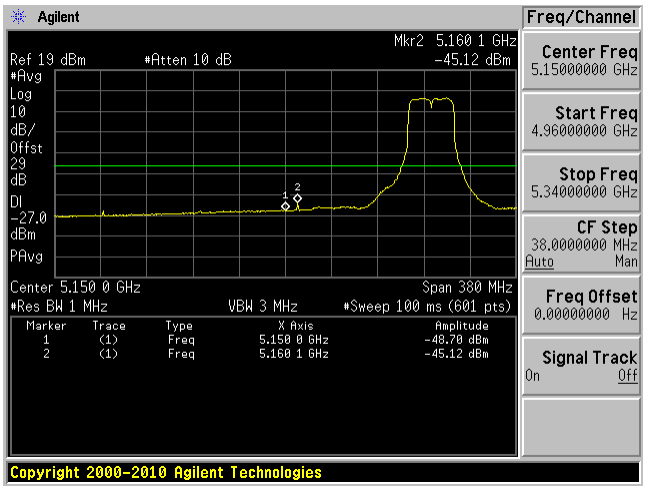
802.11n HT40 mode, 5270 MHz, Chain J0



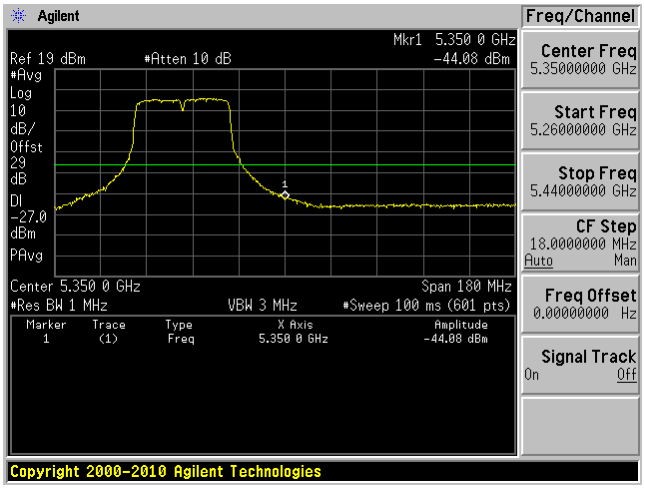
802.11n HT40 mode, 5270 MHz, Chain J1



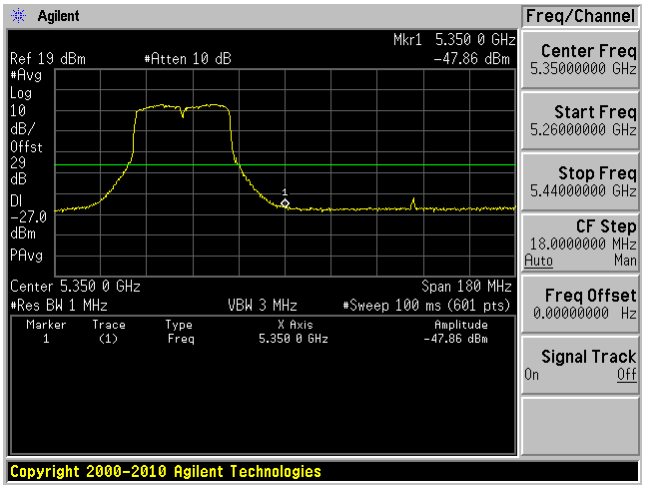
802.11n HT40 mode, 5270 MHz, Chain J2



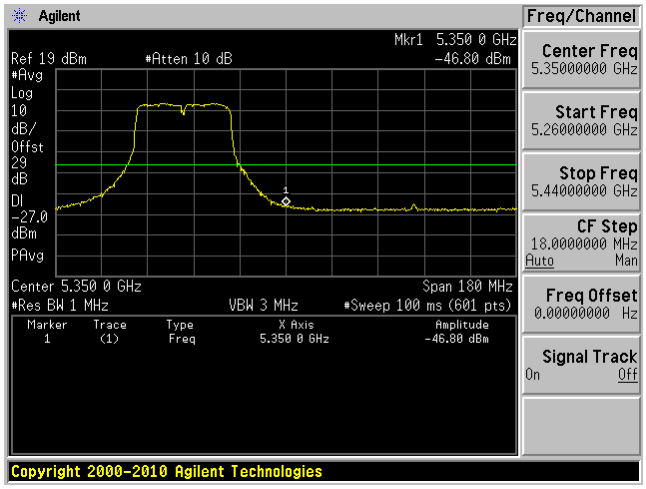
802.11n HT40 mode, 5310 MHz, Chain J0



802.11n HT40 mode, 5310 MHz, Chain J1

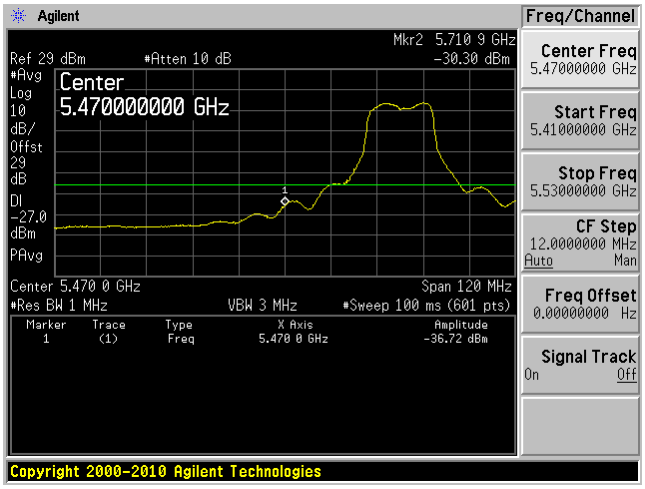


802.11n HT40 mode, 5310 MHz, Chain J2

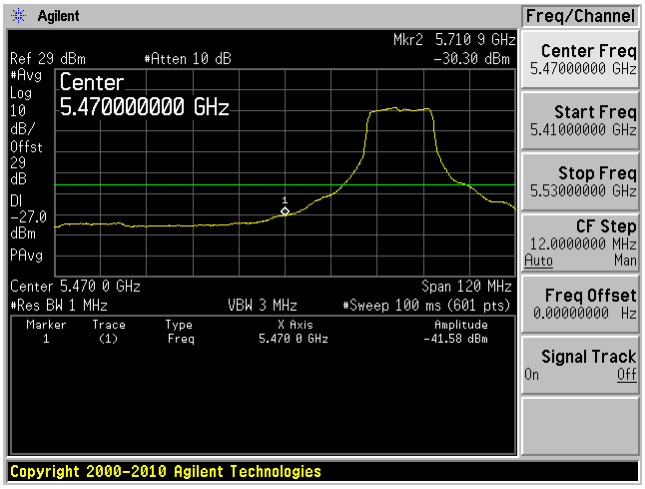


5470-5725 MHz Band

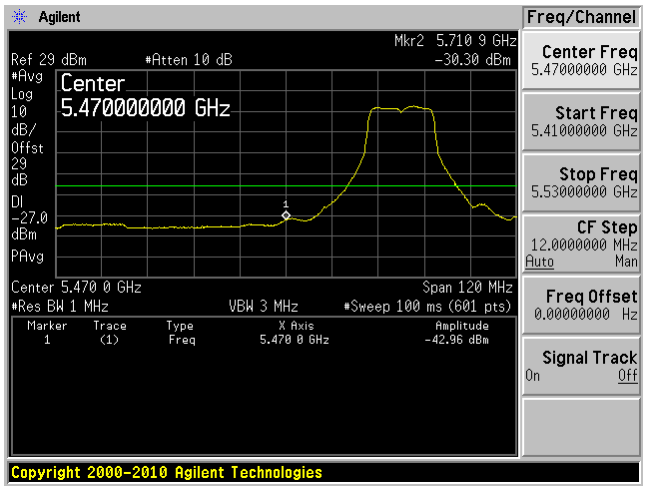
802.11a mode, 5500 MHz, Chain J0



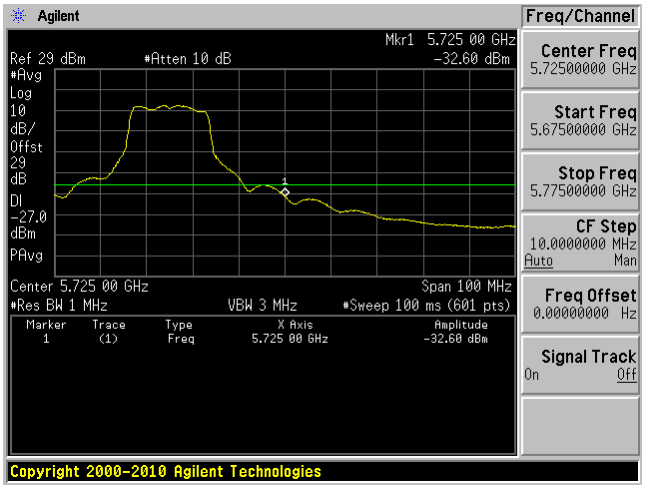
802.11a mode, 5500 MHz, Chain J1



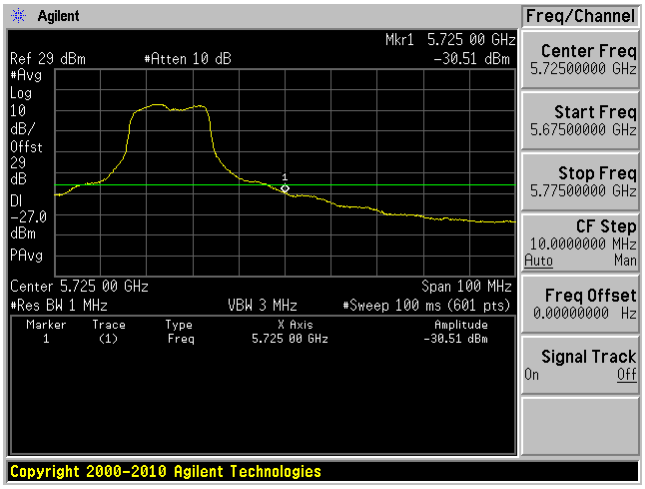
802.11a mode, 5500 MHz, Chain J2



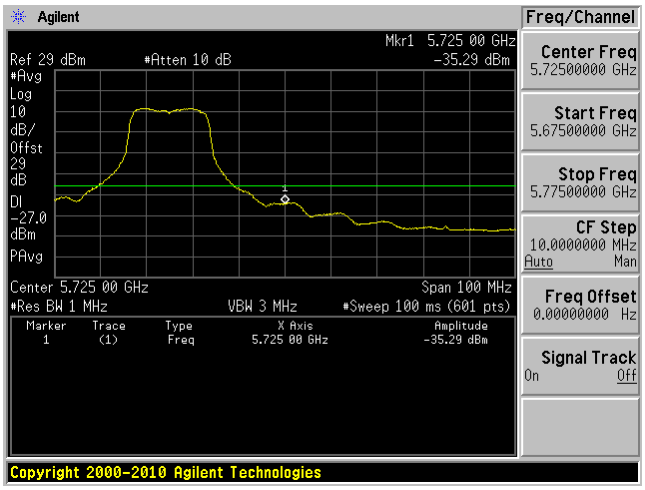
802.11a mode, 5700 MHz, Chain J0



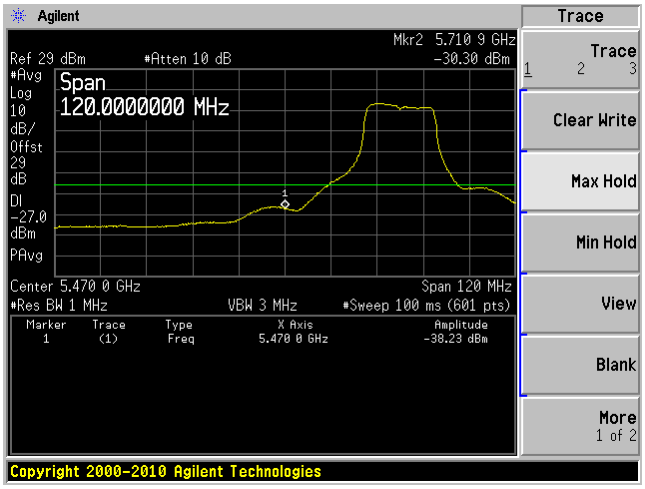
802.11a mode, 5700 MHz, Chain J1



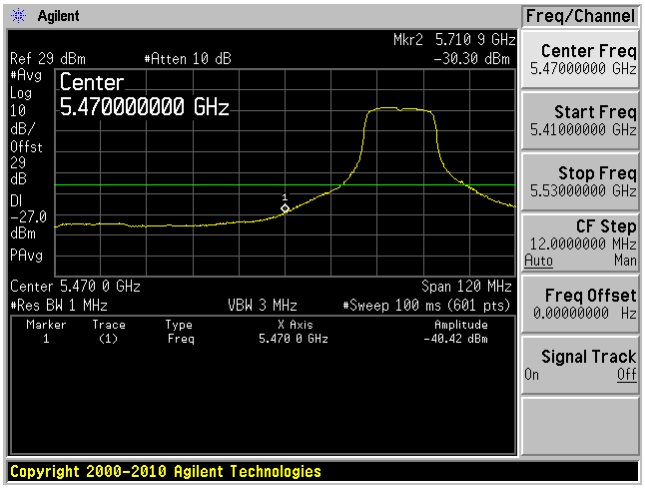
802.11a mode, 5700 MHz, Chain J2



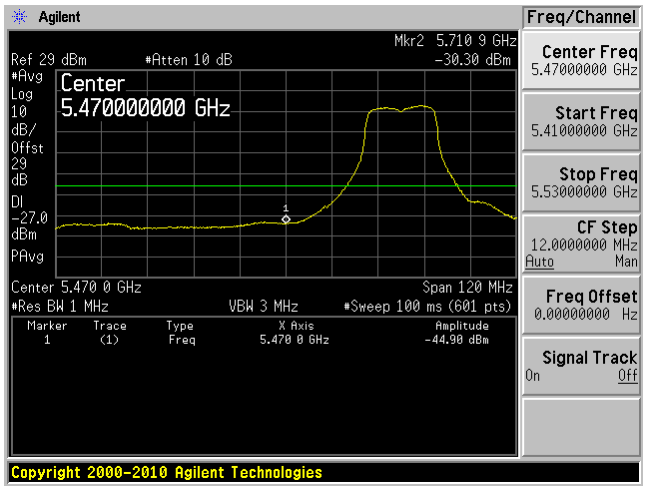
802.11n HT20 mode, 5500 MHz, Chain J0



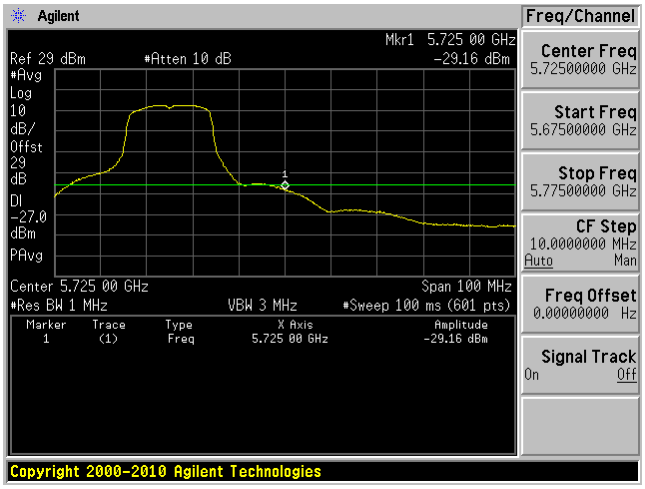
802.11n HT20 mode, 5500 MHz, Chain J1



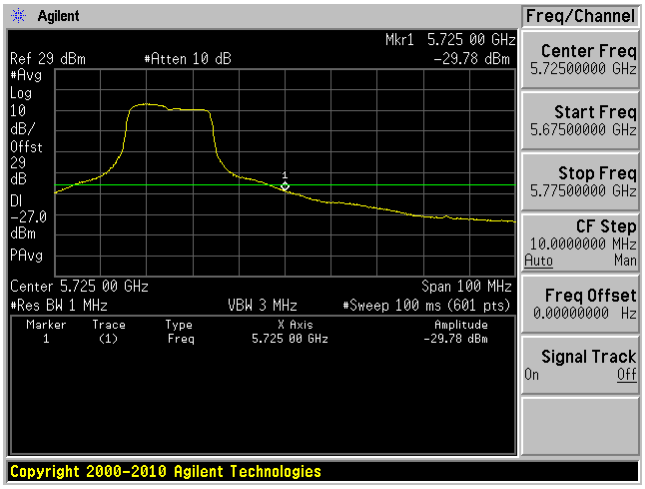
802.11n HT20 mode, 5500 MHz, Chain J2



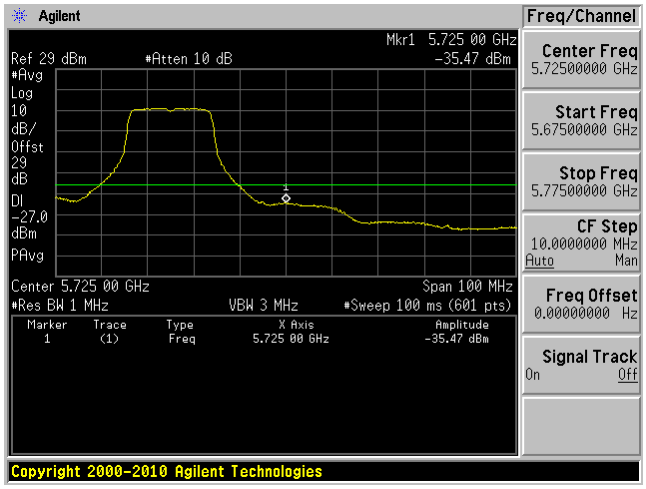
802.11n HT20 mode, 5700 MHz, Chain J0



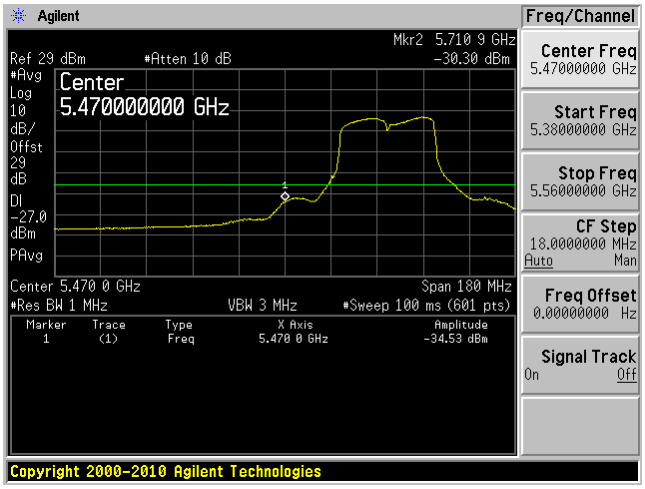
802.11n HT20 mode, 5700 MHz, Chain J1



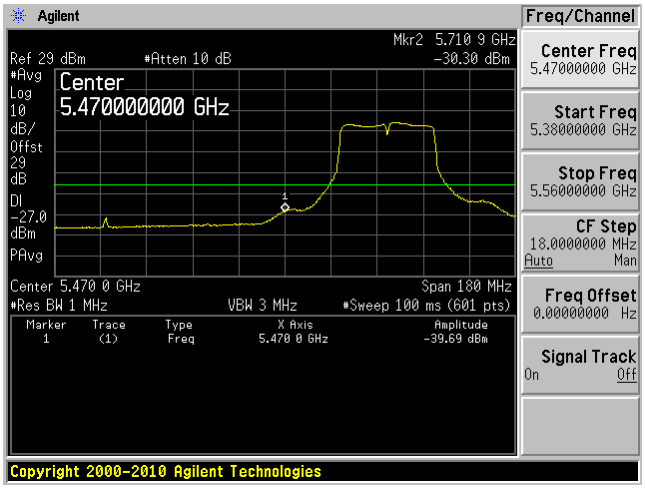
802.11n HT20 mode, 5700 MHz, Chain J2



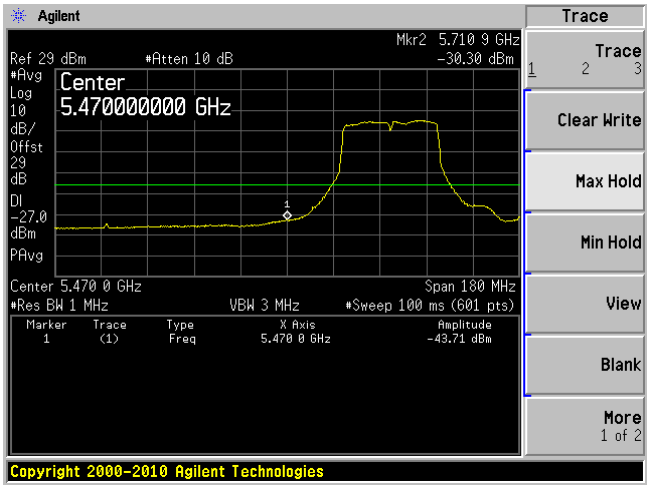
802.11n HT40 mode, 5510 MHz, Chain J0



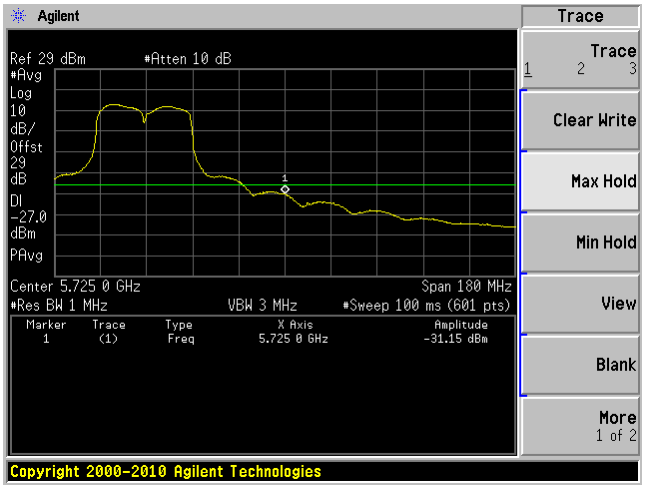
802.11n HT40 mode, 5510 MHz, Chain J1



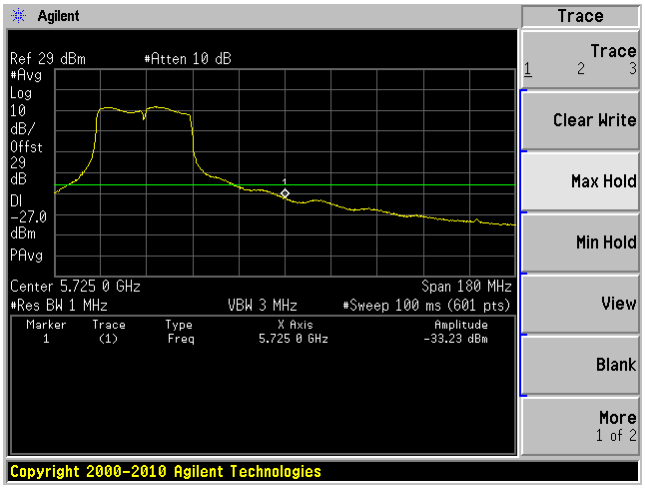
802.11n HT40 mode, 5510 MHz, Chain J2



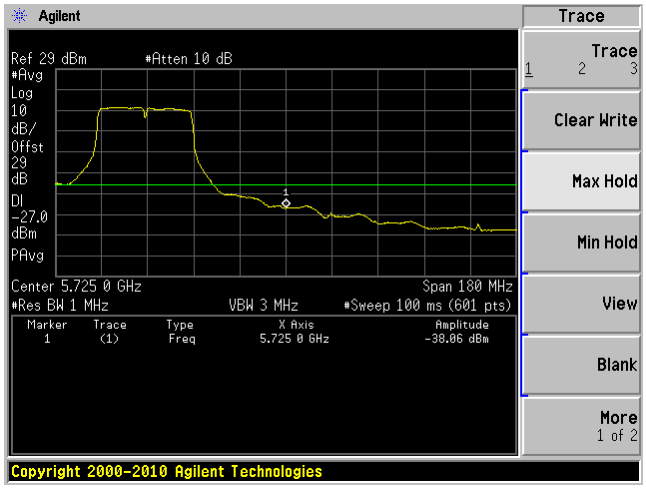
802.11n HT40 mode, 5670 MHz, Chain J0



802.11n HT40 mode, 5670 MHz, Chain J1



802.11n HT40 mode, 5670 MHz, Chain J2



11 FCC §15.407(a)(1) & IC RSS-210 §A9.2 - Power Spectral Density

11.1 Applicable Standard

According to FCC §15.407(a)(1)

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

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

According to IC RSS-210 §A9.2:

5150-5250 MHz the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

For the 5.25–5.35 GHz, 5.47-5.6 GHz, and 5.650–5.725 GHz bands, the maximum conducted output power shall not exceed 250 mW or 11 dBm + 10 log B, whichever power is less. The power spectral density shall not exceed 11 dBm in any 1 megahertz band. The maximum e.i.r.p shall not exceed 1.0W or 17 + 10 10B, dbm, whichever is less. B is the 99% emission bandwidth in MHz.

11.2 Measurement Procedure

(i) Set span to encompass the entire emission bandwidth (EBW) of the signal.
(ii) Set RBW = 1 MHz.
(iii) Set VBW ≥ 3 MHz.
(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
(v) Sweep time = auto.
(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".
(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
(ix) Compute power by integrating the spectrum across the 26 dB EBW of the signal using the spectrum analyzer's band power measurement function with band limits set equal to the EBW band edges. If the spectrum analyzer does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW of the spectrum.

11.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2012-09-29	1 year

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

11.4 Test Environmental Conditions

Temperature:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102kPa

The testing was performed by Bo Li from 2013-4-01and 2013-4-12 at RF site.

11.5 Test Results

5250-5350 MHz Band:

802.11a mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm)	TX Chain J1 PSD (dBm)	TX Chain J2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5260	2.196	-0.28	0.455	5.69	9	-3.31	12.5
Middle	5280	2.936	1.214	0.983	6.57	9	-2.43	13
High	5320	3.873	1.115	1.572	7.13	9	-1.87	14.5

802.11n HT20 mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm)	TX Chain J1 PSD (dBm)	TX Chain J2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5260	1.849	-0.207	0.041	5.43	9	-3.57	12.5
Middle	5280	1.739	0.617	-0.068	5.6	9	-3.40	12.5
High	5320	3.145	0.527	1.169	6.53	9	-2.47	14

802.11n HT40 mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm)	TX Chain J1 PSD (dBm)	TX Chain J2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5270	0.491	-2.392	-2.869	3.45	9	-5.55	12.5
High	5310	-3.56	-6.204	-5.935	-0.29	9	-9.29	9.5

5470-5725 MHz Band :

802.11a mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm)	TX Chain J1 PSD (dBm)	TX Chain J2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5550	4.955	2.891	3.707	8.71	9	-0.29	13.5
Middle	5580	5.404	1.424	3.092	8.39	9	-0.61	13
High	5700	3.577	4.587	2.978	8.54	9	-0.46	13.5

802.11n HT20 mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm)	TX Chain J1 PSD (dBm)	TX Chain J2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5500	5.395	2.929	3.503	8.85	9	-0.15	14
Middle	5580	5.691	2.606	3.598	8.93	9	-0.07	14
High	5700	4.724	4.06	3.033	8.76	9	-0.24	14

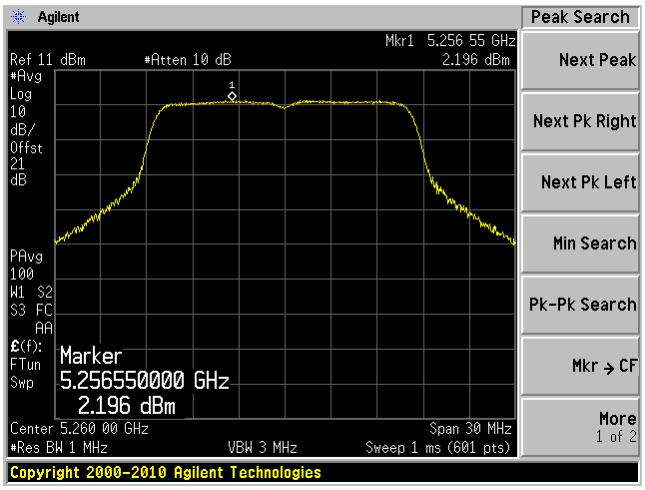
802.11n HT40 mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm)	TX Chain J1 PSD (dBm)	TX Chain J2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5510	-2.432	-4.729	-4.034	1.15	9	-7.85	9
Middle	5550	3.947	2.181	3.072	7.9	9	-1.10	16.5
High	5670	3.437	2.244	2.905	7.66	9	-1.34	16

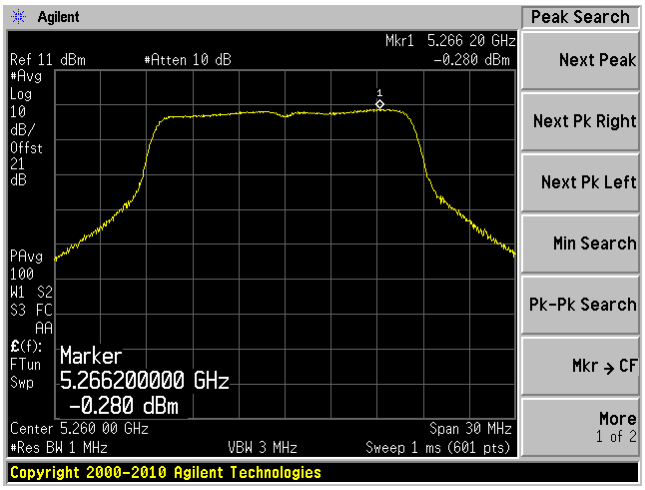
Please refer to the following plots.

5250-5350 MHz Band

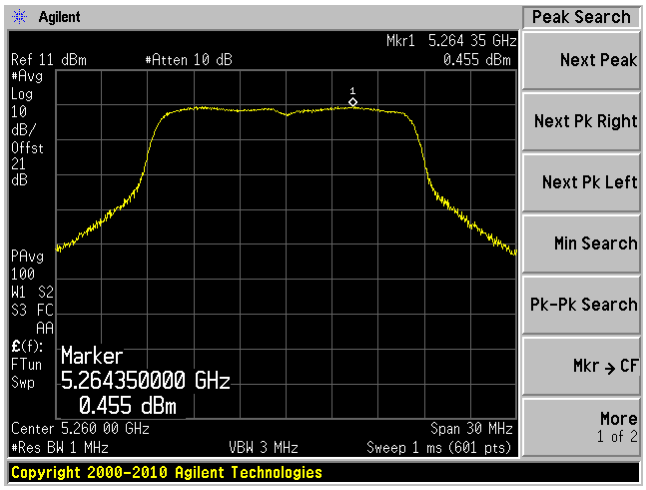
802.11a mode, 5260 MHz, Chain J0



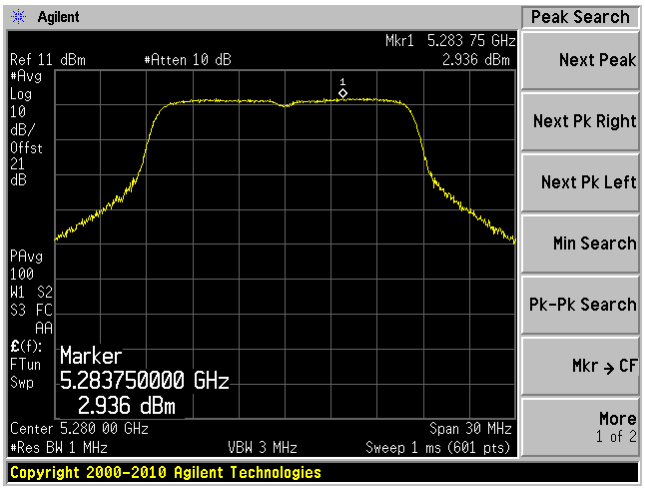
802.11a mode, 5260 MHz, Chain J1



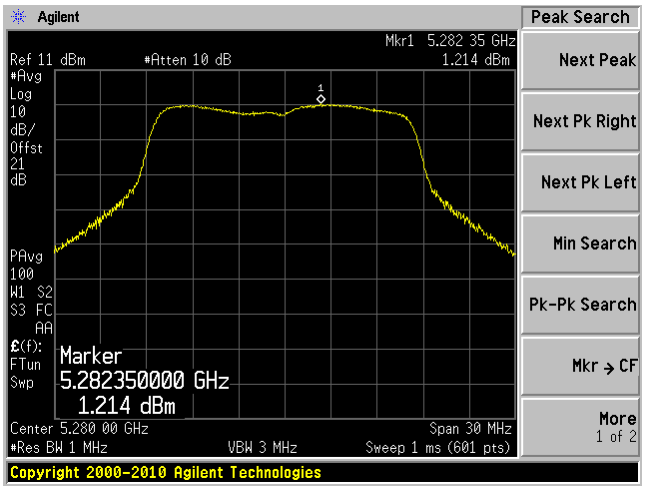
802.11a mode, 5260 MHz, Chain J2



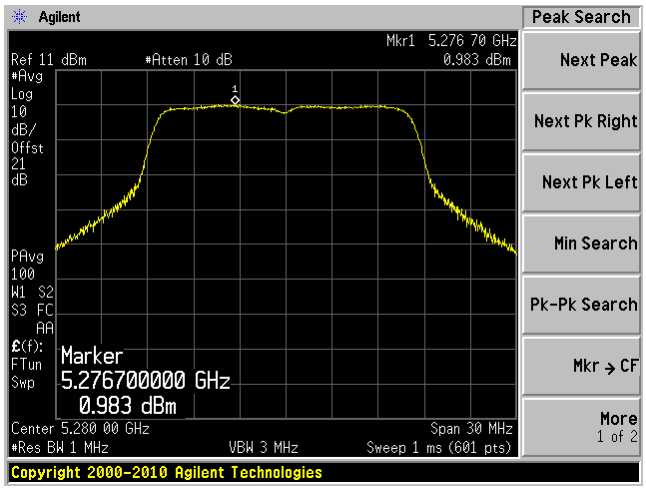
802.11a mode, 5280 MHz, Chain J0



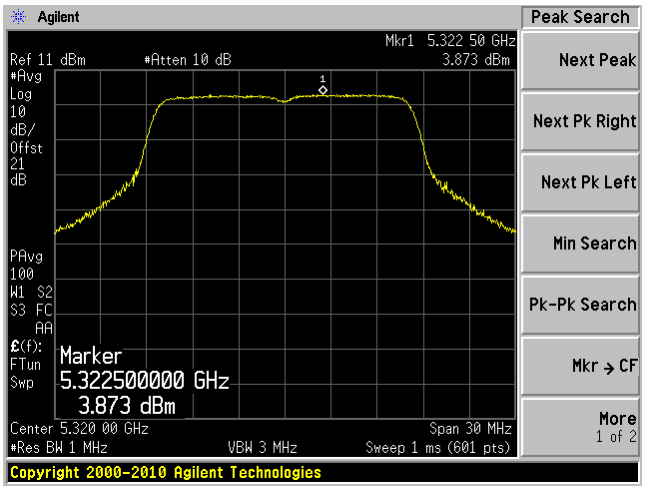
802.11a mode, 5280 MHz, Chain J1



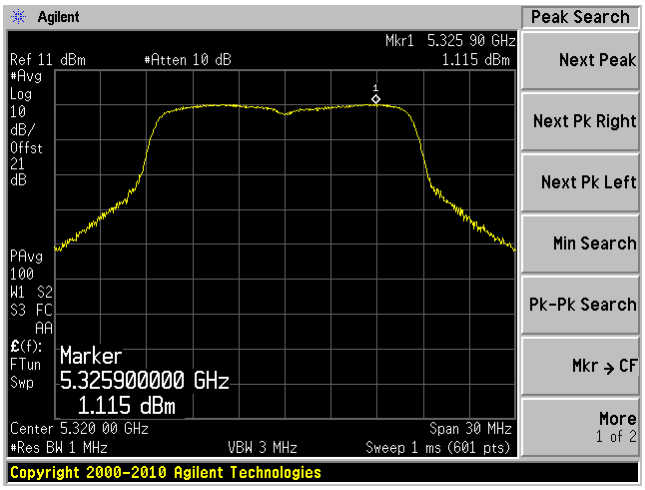
802.11a mode, 5280 MHz, Chain J2



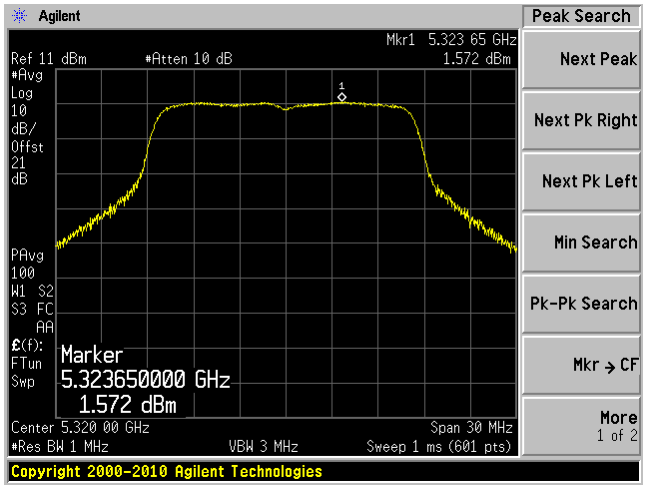
802.11a mode, 5320 MHz, Chain J0



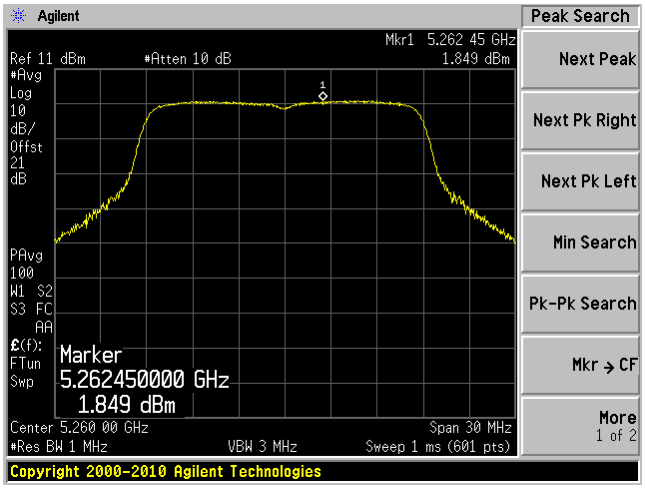
802.11a mode, 5320 MHz, Chain J1



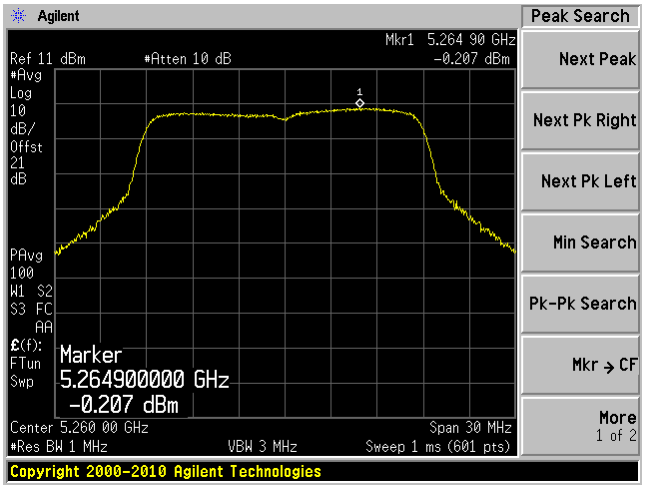
802.11a mode, 5320 MHz, Chain J2



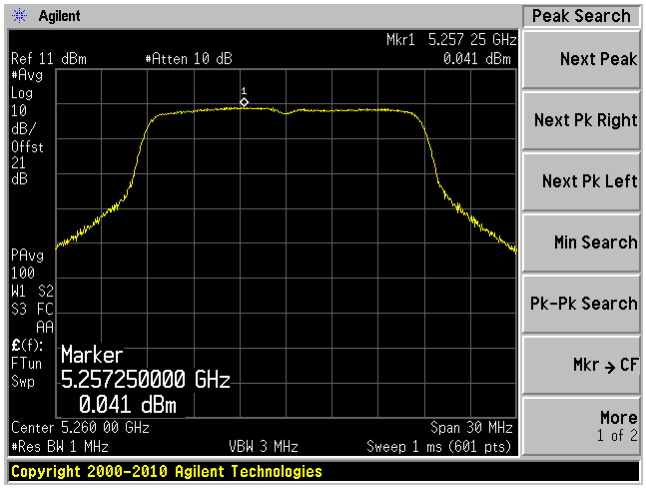
802.11n HT20 mode, 5260 MHz, Chain J0



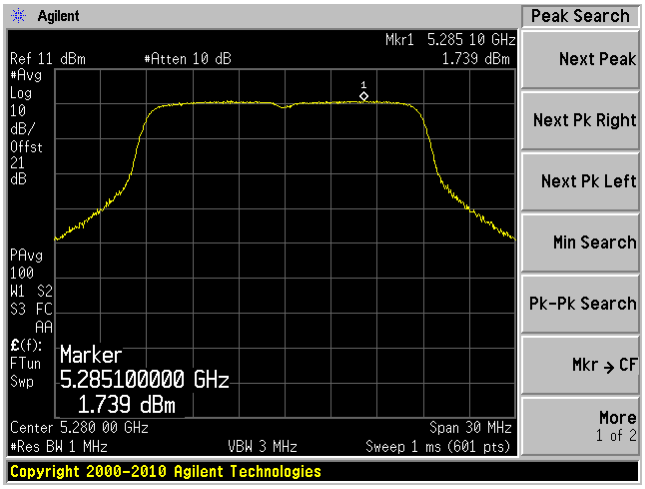
802.11n HT20 mode, 5260 MHz, Chain J1



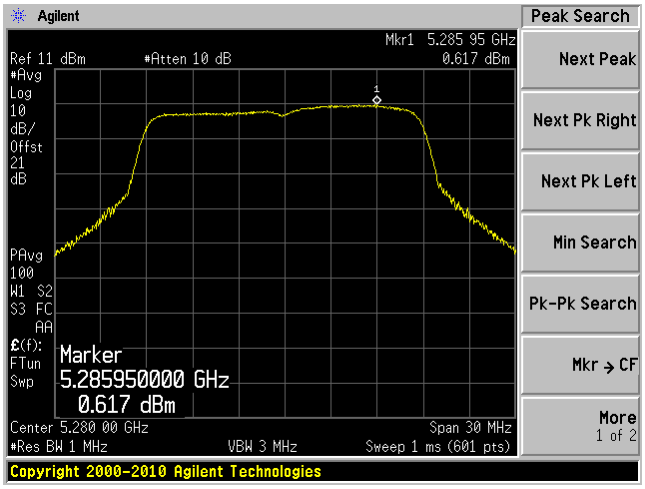
802.11n HT20 mode, 5260 MHz, Chain J2



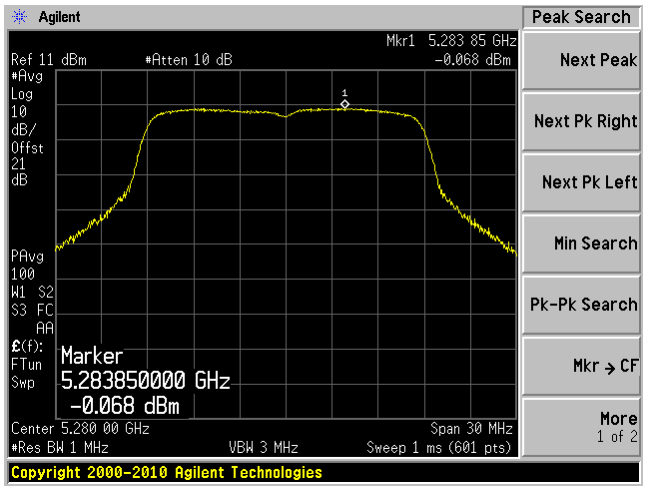
802.11n HT20 mode, 5280 MHz, Chain J0



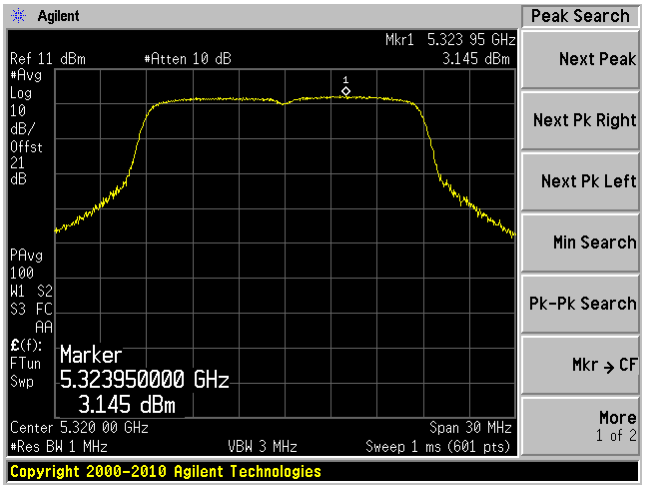
802.11n HT20 mode, 5280 MHz, Chain J1



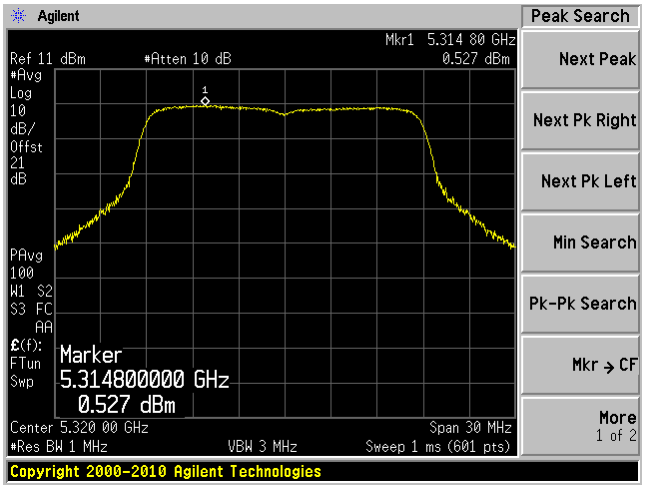
802.11n HT20 mode, 5280 MHz, Chain J2



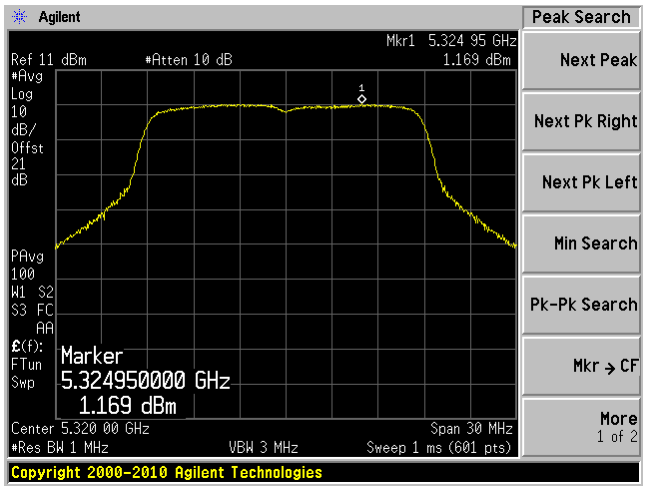
802.11n HT20 mode, 5320 MHz, Chain J0



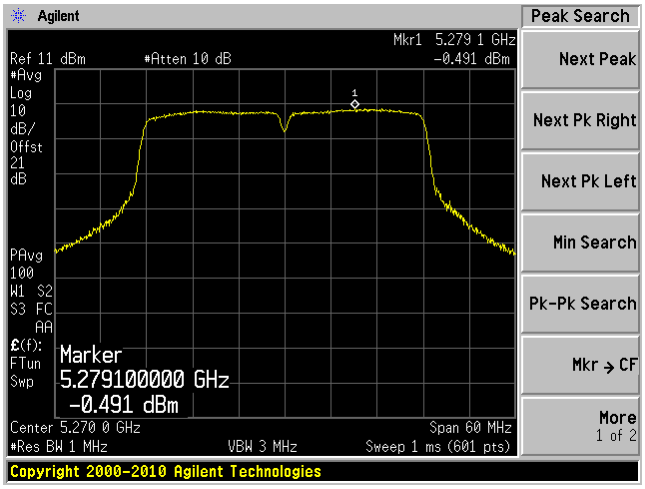
802.11n HT20 mode, 5320 MHz, Chain J1



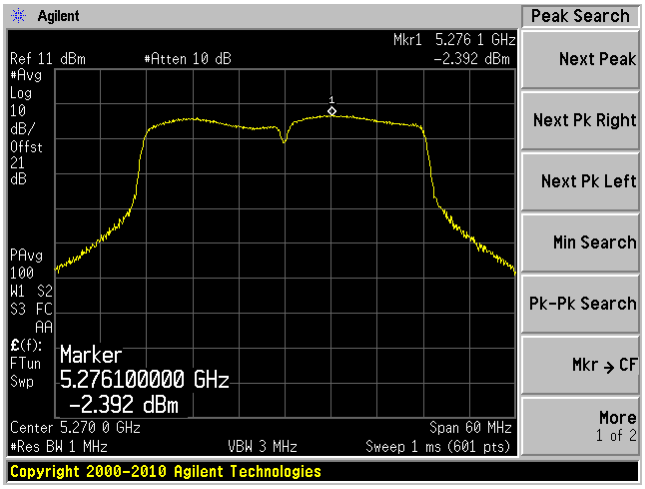
802.11n HT20 mode, 5320 MHz, Chain J2



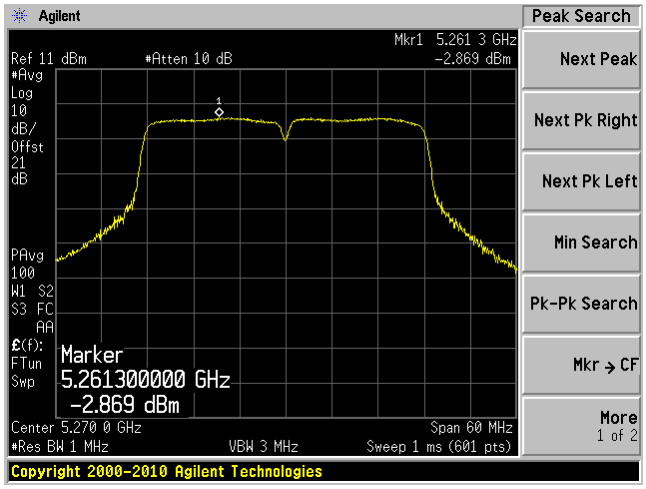
802.11n HT40 mode, 5270 MHz, Chain J0



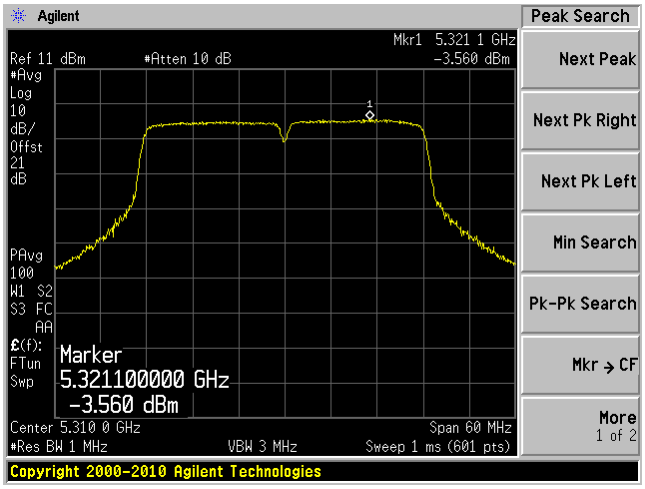
802.11n HT40 mode, 5270 MHz, Chain J1



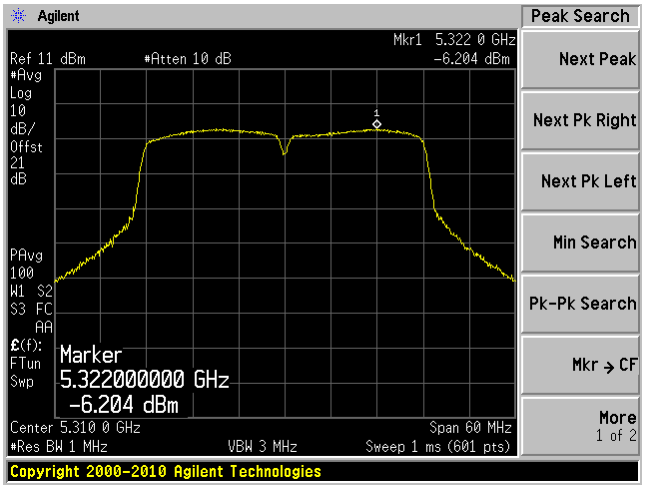
802.11n HT40 mode, 5270 MHz, Chain J2



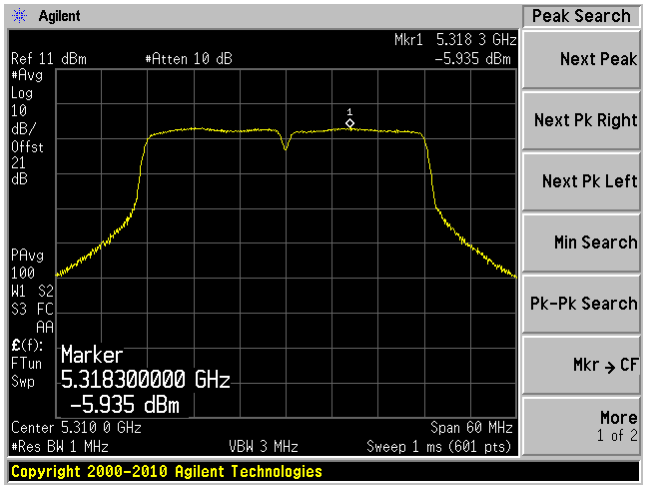
802.11n HT40 mode, 5310 MHz, Chain J0



802.11n HT40 mode, 5310 MHz, Chain J1

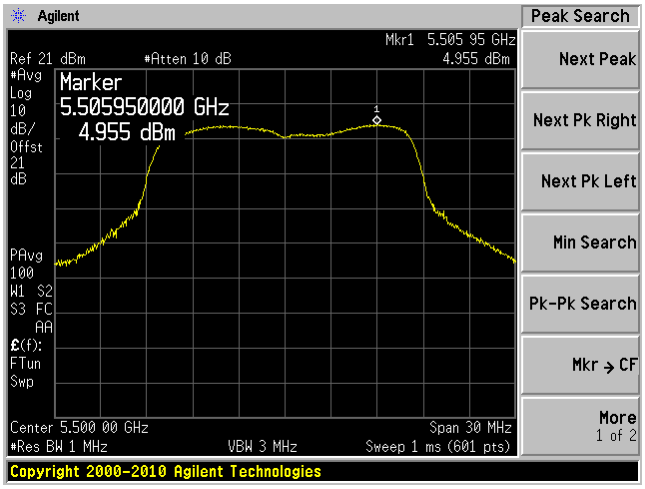


802.11n HT40 mode, 5310 MHz, Chain J2

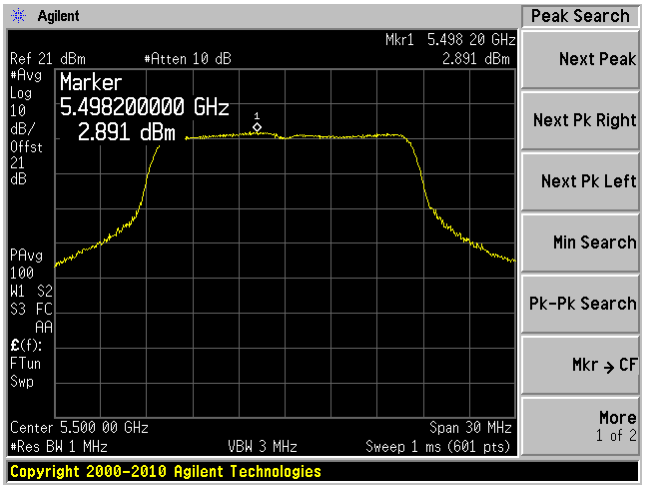


5470-5725 MHz Band

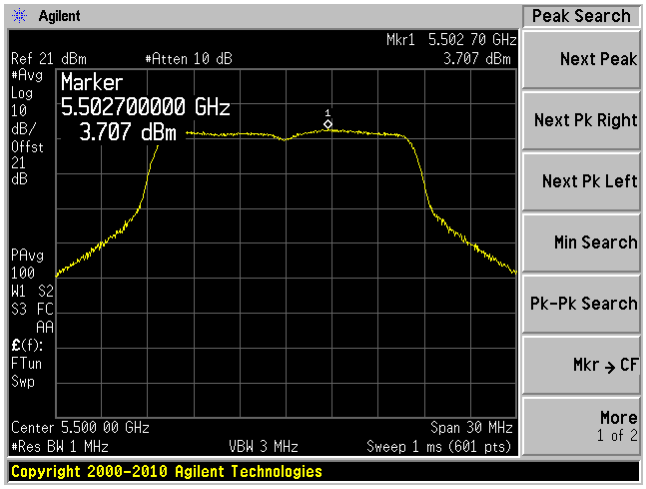
802.11a mode, 5550 MHz, Chain J0



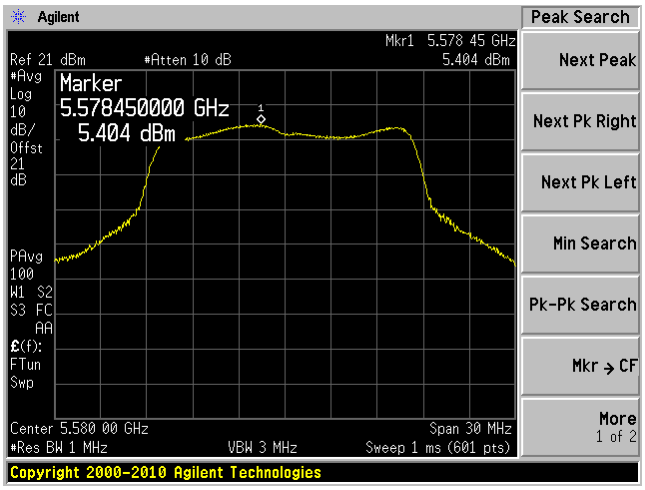
802.11a mode, 5550 MHz, Chain J1



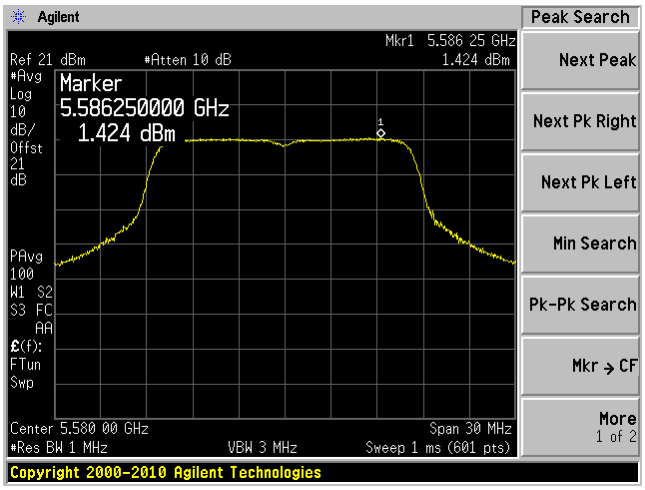
802.11a mode, 5550 MHz, Chain J2



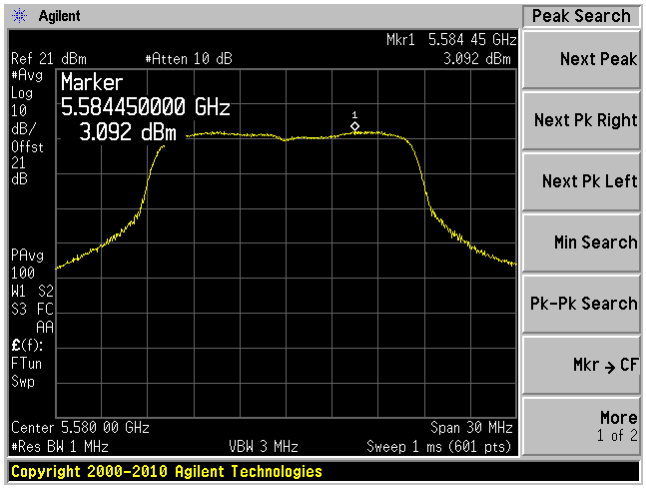
802.11a mode, 5580 MHz, Chain J0



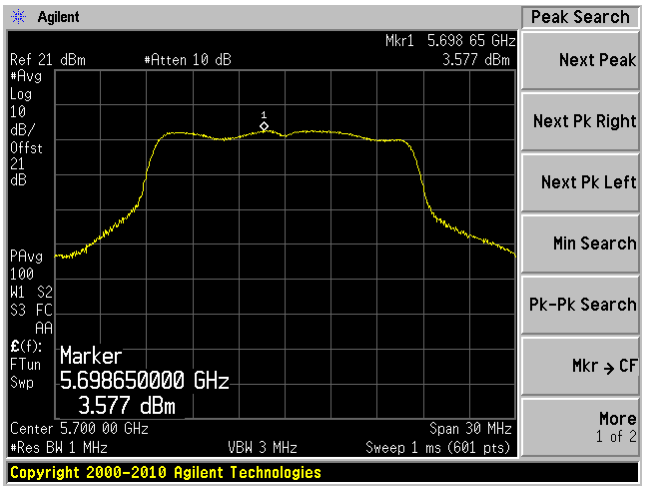
802.11a mode, 5580 MHz, Chain J1



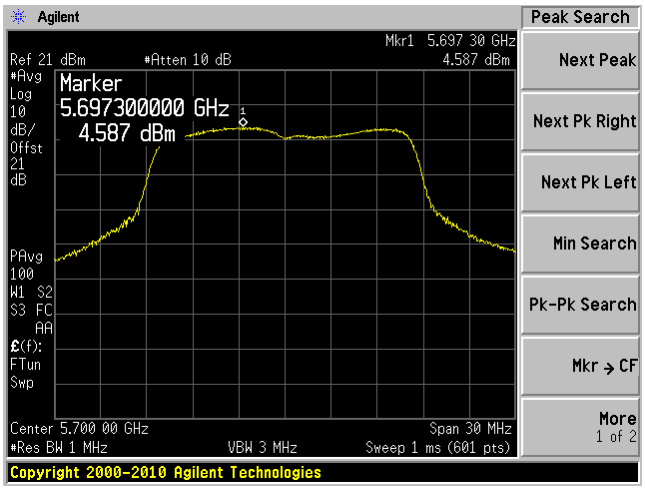
802.11a mode, 5580 MHz, Chain J2



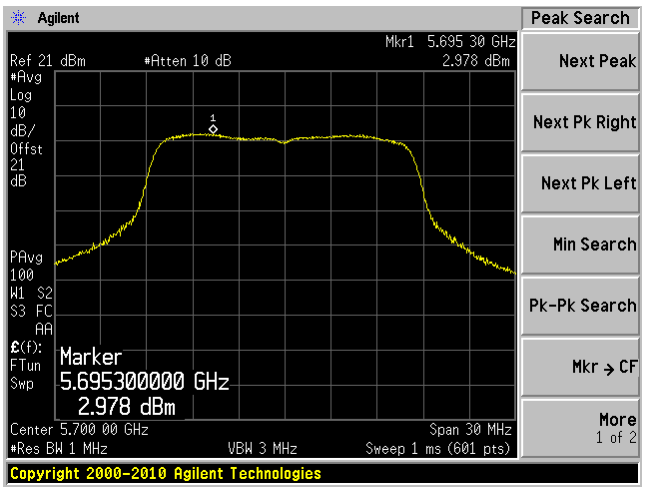
802.11a mode, 5700 MHz, Chain J0



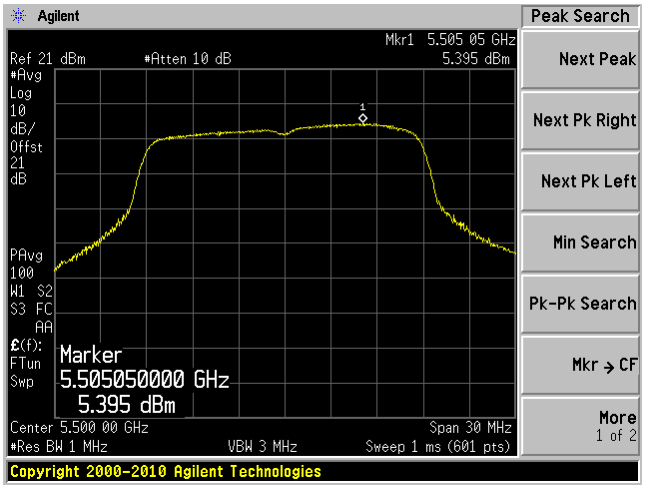
802.11a mode, 5700 MHz, Chain J1



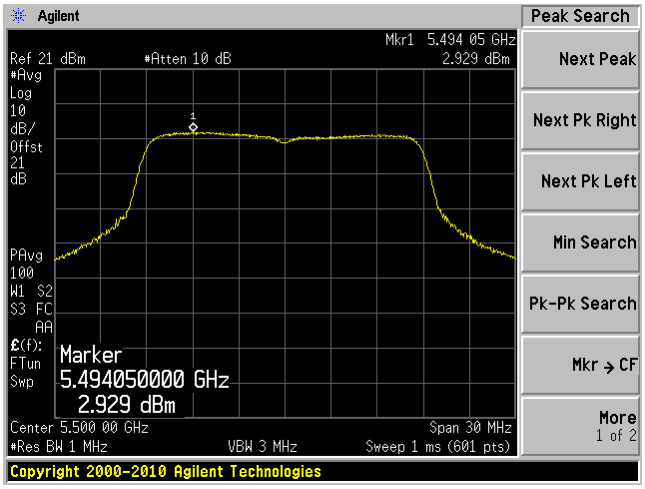
802.11a mode, 5700 MHz, Chain J2



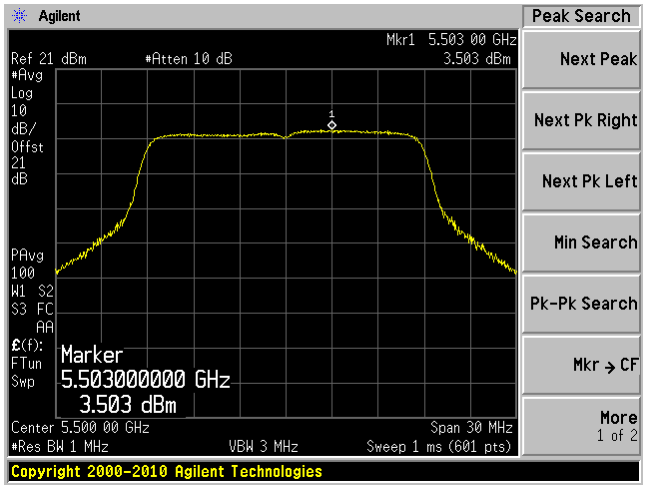
802.11n HT20 mode, 5500 MHz, Chain J0



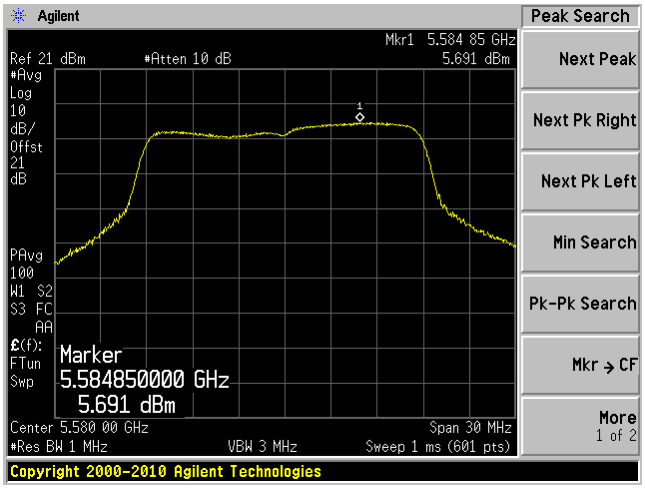
802.11n HT20 mode, 5500 MHz, Chain J1



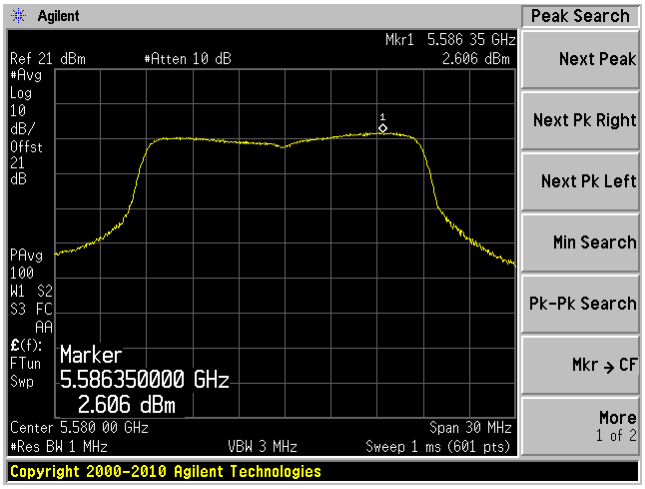
802.11n HT20 mode, 5500 MHz, Chain J2



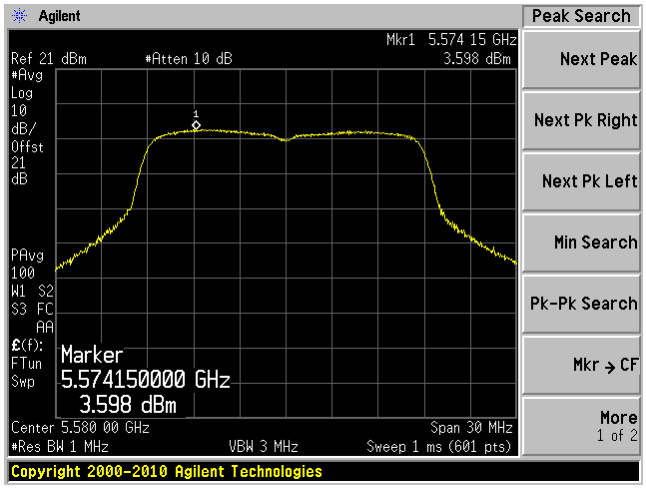
802.11n HT20 mode, 5580 MHz, Chain J0



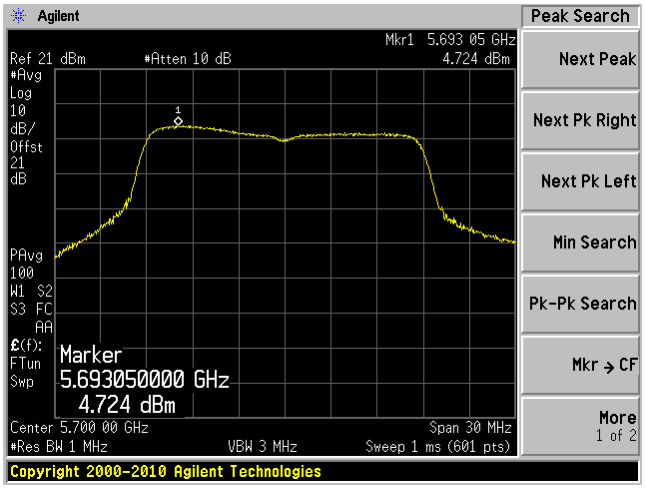
802.11n HT20 mode, 5580 MHz, Chain J1



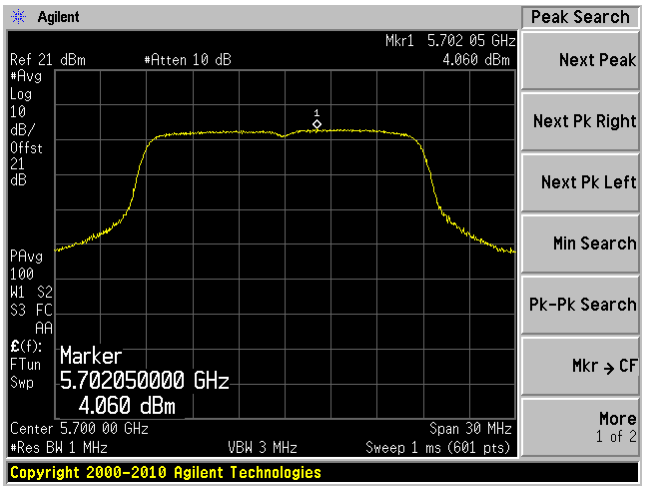
802.11n HT20 mode, 5580 MHz, Chain J2



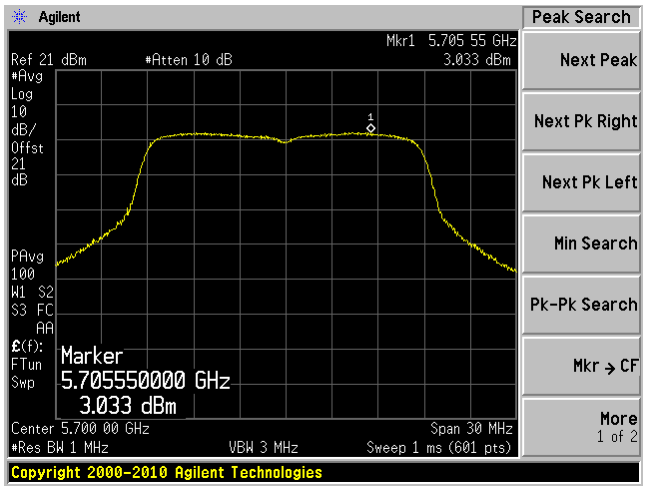
802.11n HT20 mode, 5700 MHz, Chain J0



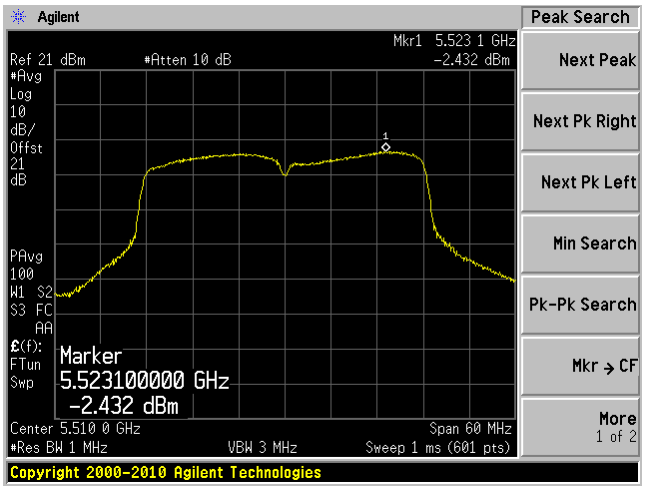
802.11n HT20 mode, 5700 MHz, Chain J1



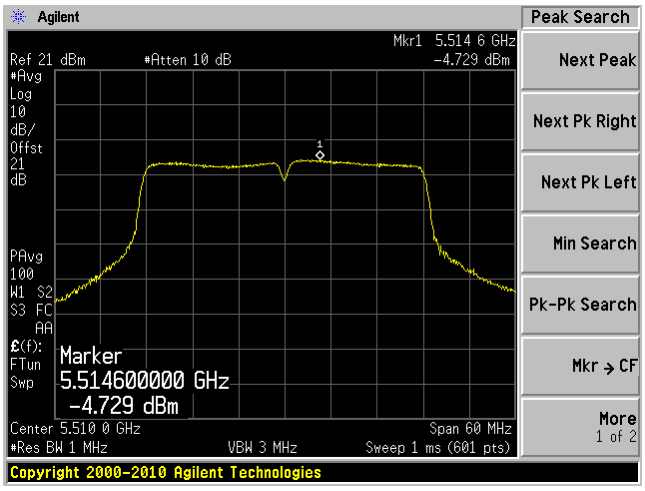
802.11n HT20 mode, 5700 MHz, Chain J2



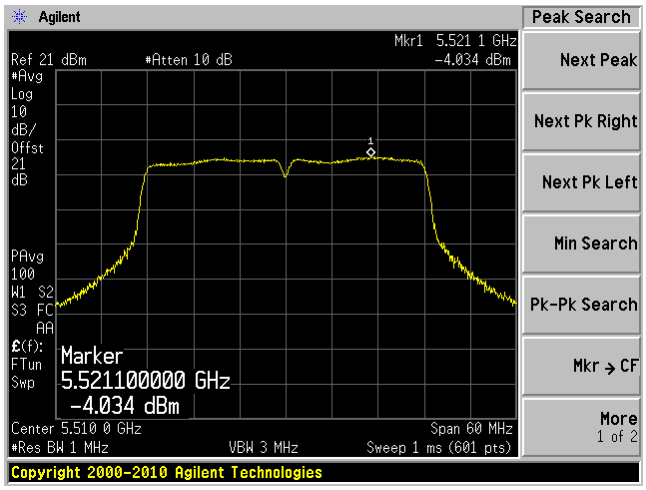
802.11n HT40 mode, 5510 MHz, Chain J0



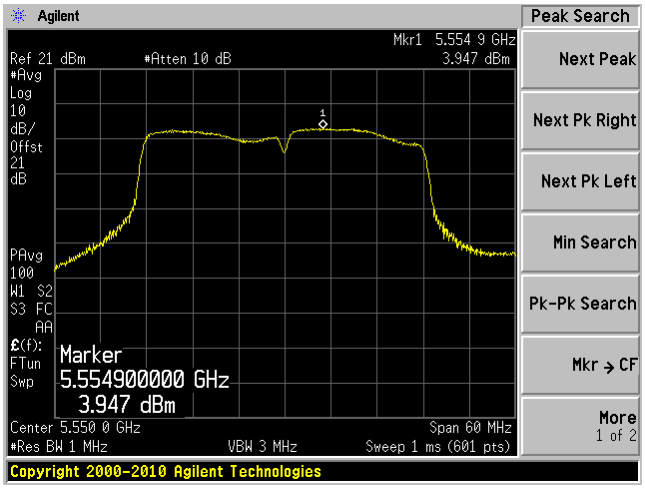
802.11n HT40 mode, 5510 MHz, Chain J1



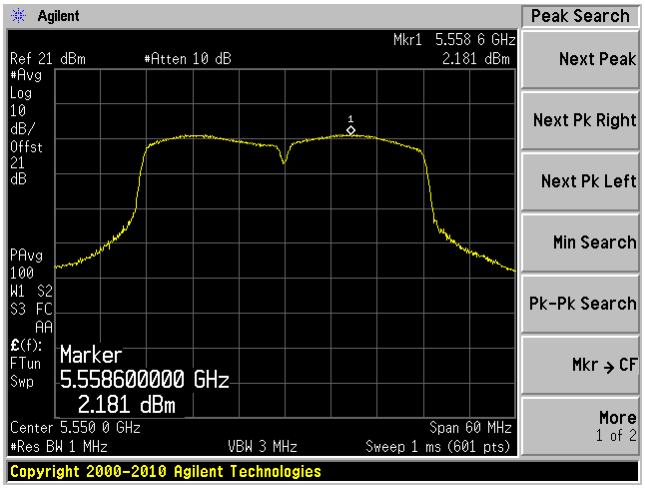
802.11n HT40 mode, 5510 MHz, Chain J2



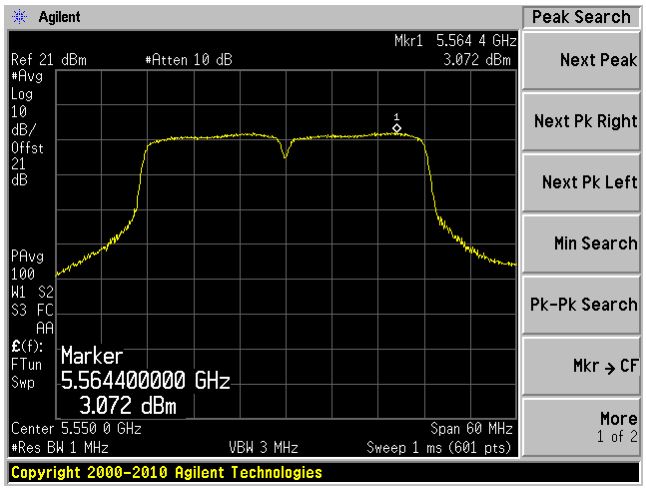
802.11n HT40 mode, 5550 MHz, Chain J0



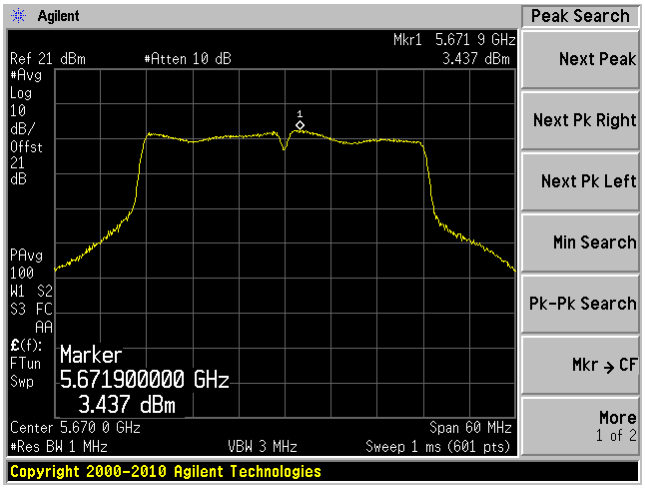
802.11n HT40 mode, 5550 MHz, Chain J1



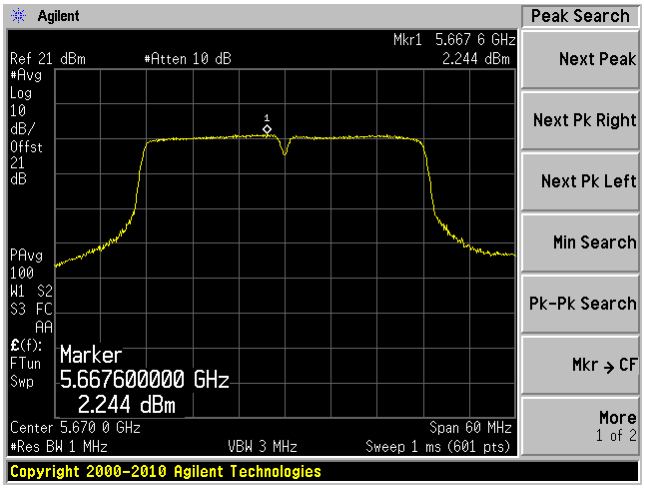
802.11n HT40 mode, 5550 MHz, Chain J2



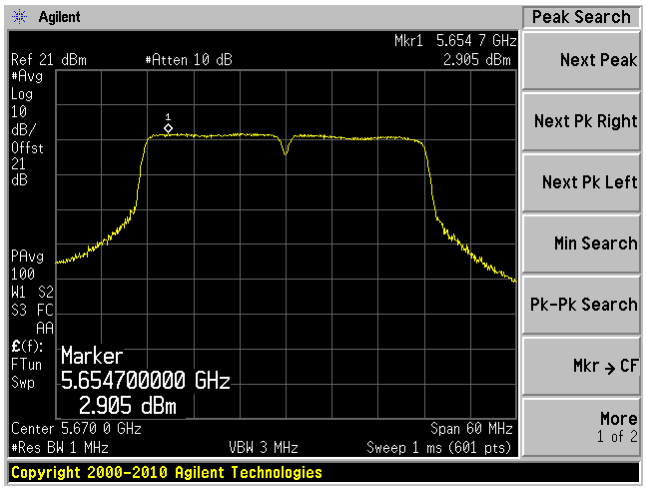
802.11n HT40 mode, 5670 MHz, Chain J0



802.11n HT40 mode, 5670 MHz, Chain J1



802.11n HT40 mode, 5670 MHz, Chain J2



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

12.1 Applicable Standard

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

12.2 Test Procedure

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

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

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

New:
(i) Set span to encompass the entire emission bandwidth (EBW) of the signal.
(ii) Set RBW = 1 MHz.
(iii) Set VBW ≥ 3 MHz.
(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
(v) Sweep time = auto.
(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".
(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
(ix) Compute power by integrating the spectrum across the 26 dB EBW of the signal using the spectrum analyzer's band power measurement function with band limits set equal to the EBW band edges. If the spectrum analyzer does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW of the spectrum.

12.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2012-09-29	1 year

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

12.4 Test Environmental Conditions

Temperature:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102kPa

The testing was performed by Bo Li from 2013-4-01and 2013-4-12 at RF site.

12.5 Test Results

5250-5350 MHz Band

Channel	Frequency (MHz)	TX Chain J0 PER (dB)	TX Chain J1 PER (dB)	Limit (dB)
802.11a mode				
Low	5260	9.765	9.046	13
Middle	5280	10.659	8.742	
High	5320	8.325	8.340	
802.11n HT20 mode				
Low	5260	9.414	8.653	13
Middle	5280	9.278	9.123	
High	5320	8.770	8.847	
802.11n HT40 mode				
Low	5270	9.657	8.230	13
High	5310	10.070	9.167	

5470-5725 MHz Band

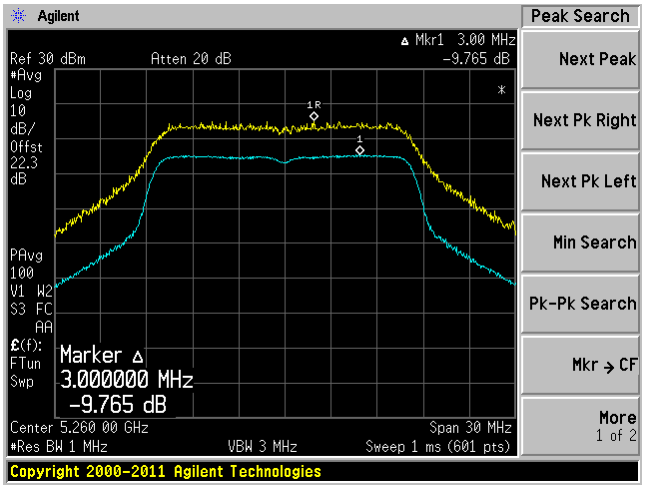
Channel	Frequency (MHz)	TX Chain J0 PER (dB)	TX Chain J1 PER (dB)	Limit (dB)
802.11a mode				
Low	5500	9.356	8.953	13
Middle	5580	8.948	8.305	
High	5700	10.107	8.237	
802.11n HT20 mode				
Low	5500	7.919	8.375	13
Middle	5580	8.261	8.687	
High	5700	8.451	8.802	
802.11n HT40 mode				
Low	5510	8.555	8.653	13
Middle	5550	8.776	8.858	
High	5670	8.606	8.231	

Note: According to KDB 789033 D01, testing of 2 ports is sufficient to demonstrate complinace with the peak excursion requirement for MIMO devices.

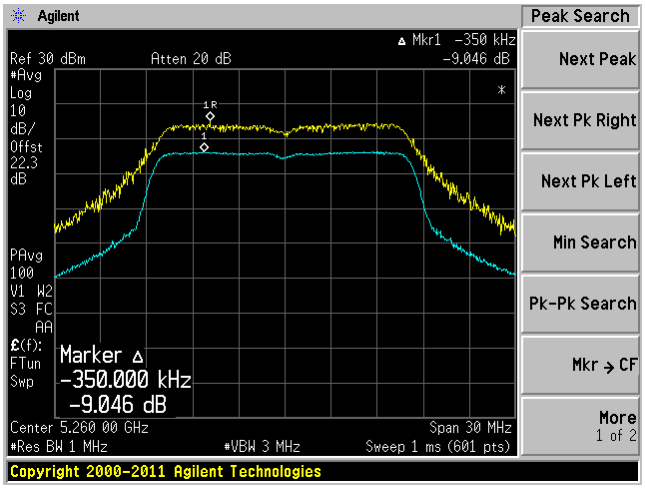
Please refer to the following plots for detailed test results:

5250-5350 MHz Band

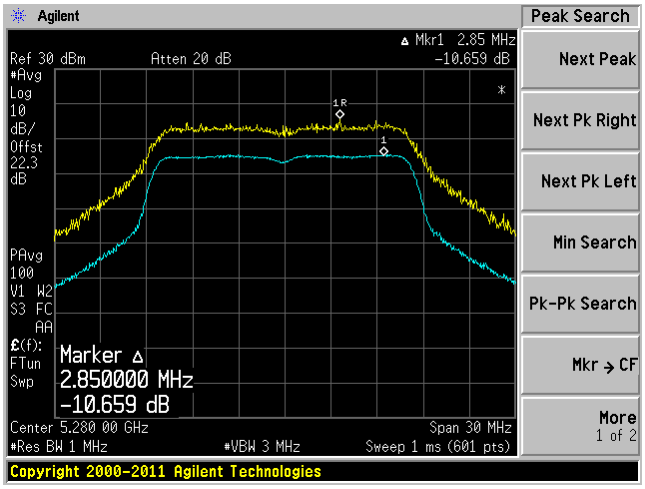
802.11a mode, 5260 MHz, Chain J0



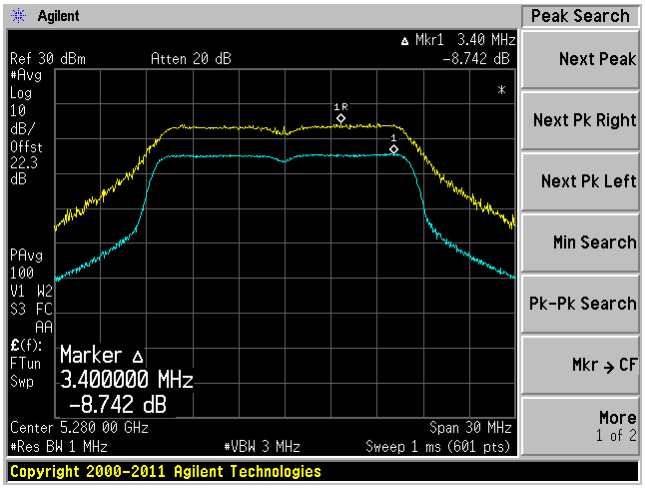
802.11a mode, 5260 MHz, Chain J1



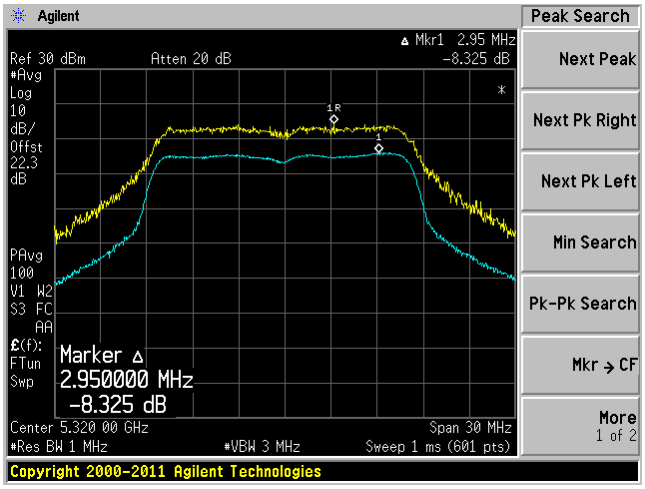
802.11a mode, 5280 MHz, Chain J0



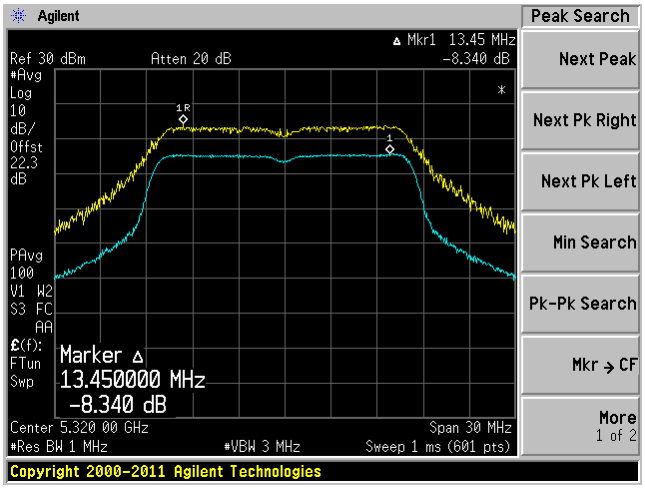
802.11a mode, 5280 MHz, Chain J1



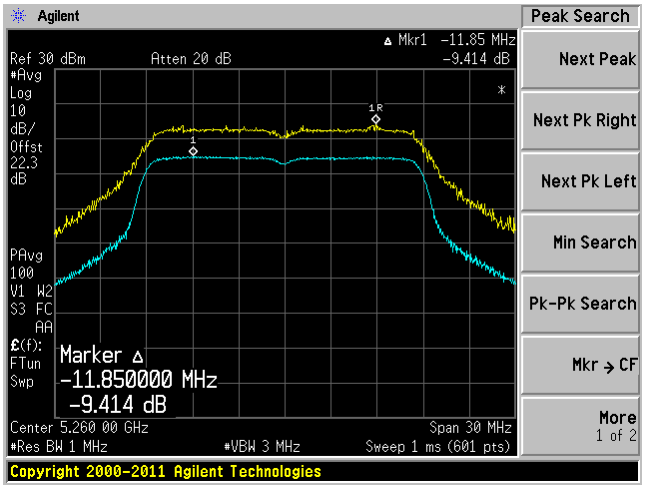
802.11a mode, 5320 MHz, Chain J0



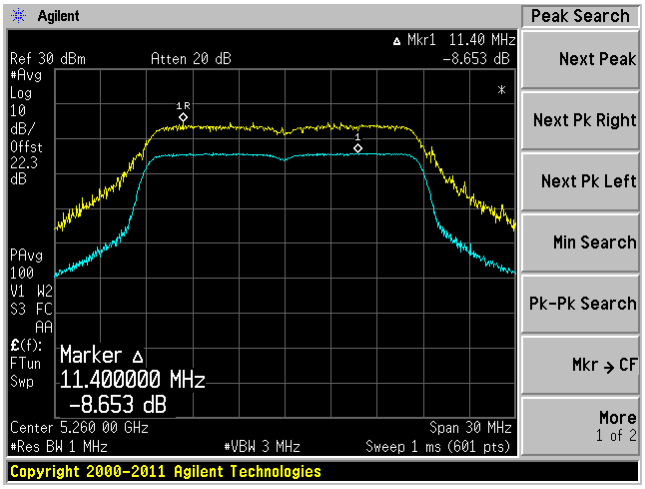
802.11a mode, 5320 MHz, Chain J1



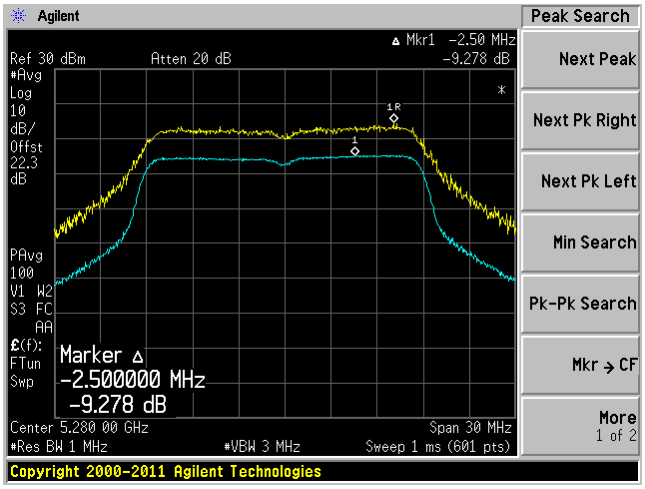
802.11n HT20 mode, 5260 MHz, Chain J0



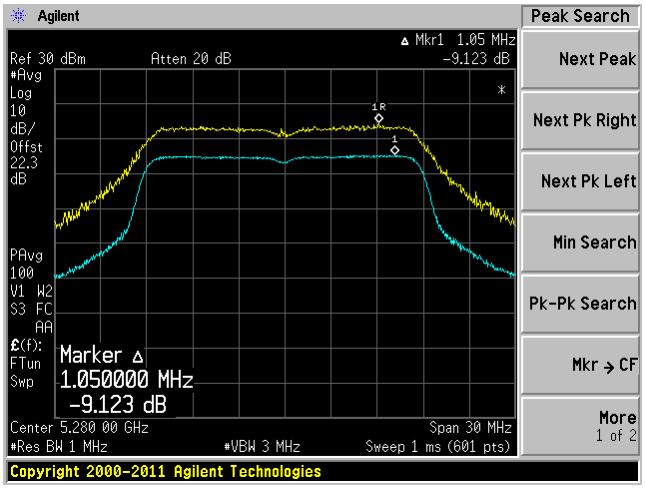
802.11n HT20 mode, 5260 MHz, Chain J1



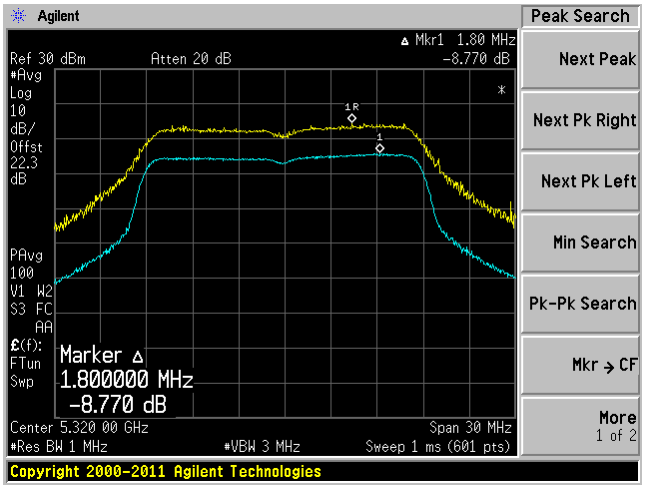
802.11n HT20 mode, 5280 MHz, Chain J0



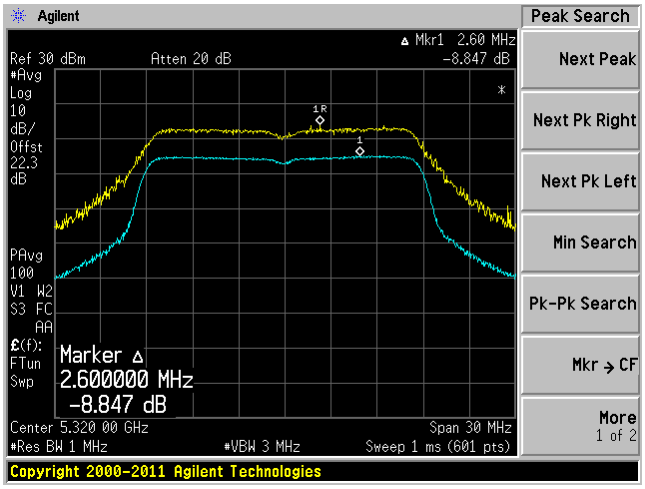
802.11n HT20 mode, 5280 MHz, Chain J1



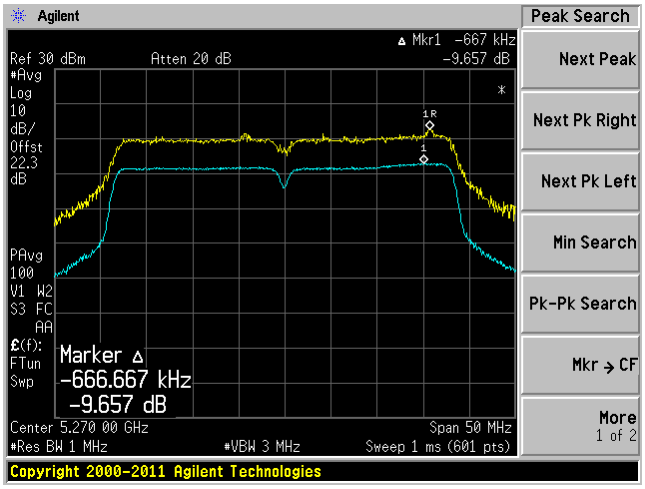
802.11n HT20 mode, 5320 MHz, Chain J0



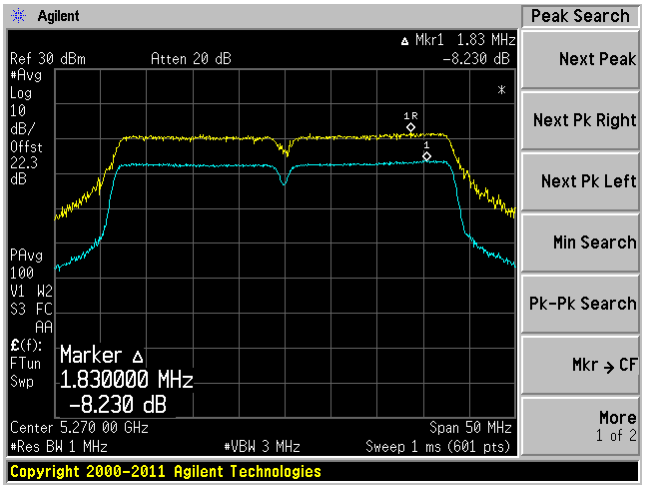
802.11n HT20 mode, 5320 MHz, Chain J1



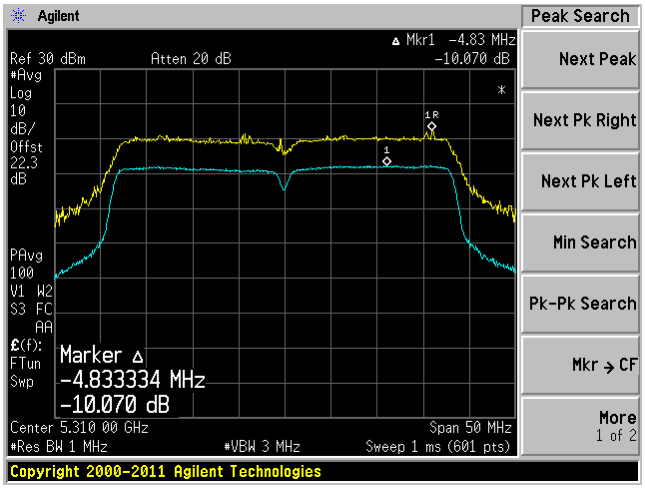
802.11n HT40 mode, 5270 MHz, Chain J0



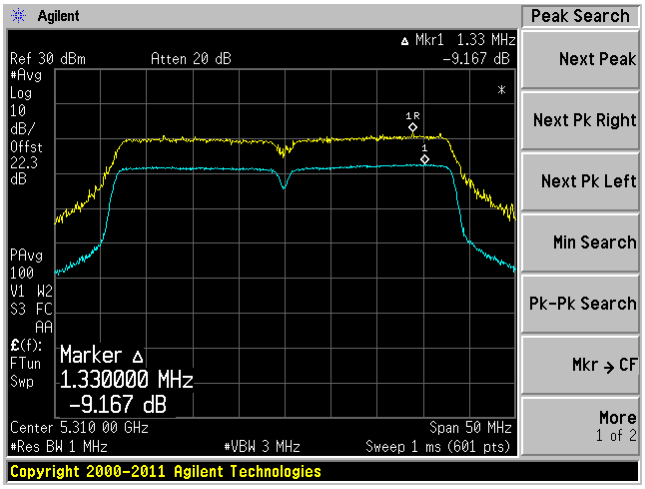
802.11n HT40 mode, 5270 MHz, Chain J1



802.11n HT40 mode, 5310 MHz, Chain J0

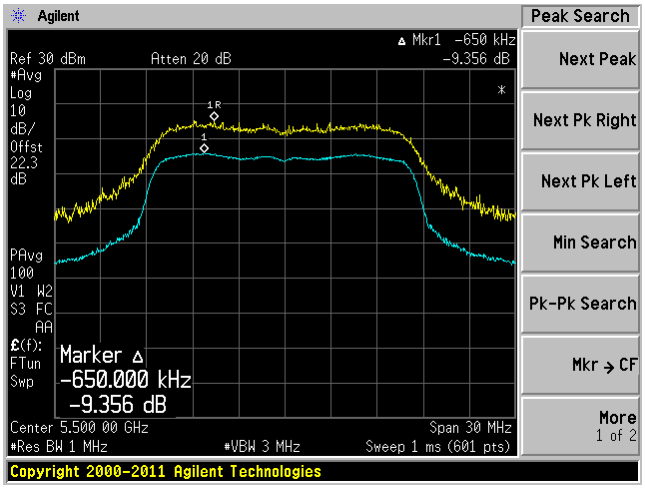


802.11n HT40 mode, 5310 MHz, Chain J1

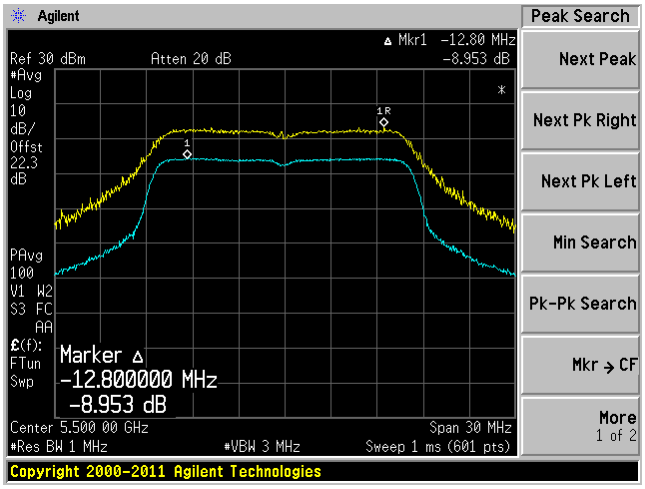


5470-5725 MHz Band

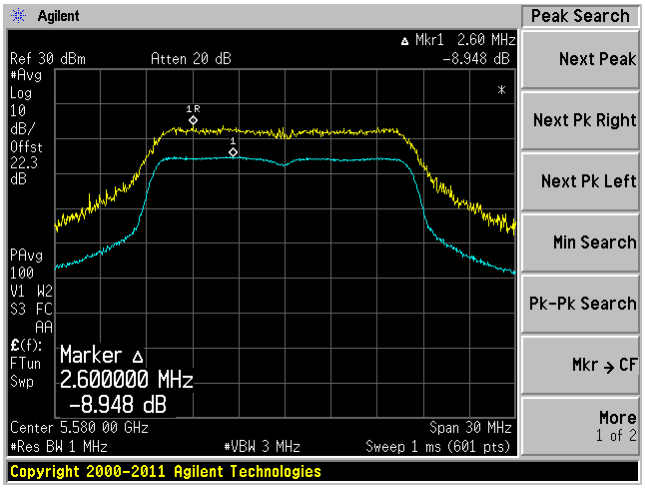
802.11a mode, 5500 MHz, Chain J0



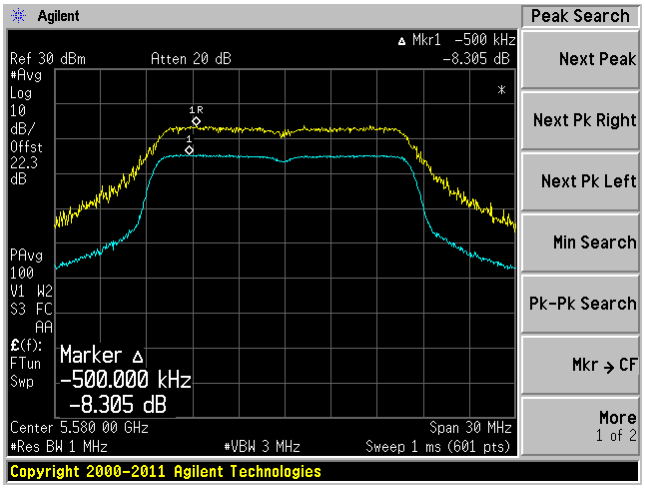
802.11a mode, 5500 MHz, Chain J1



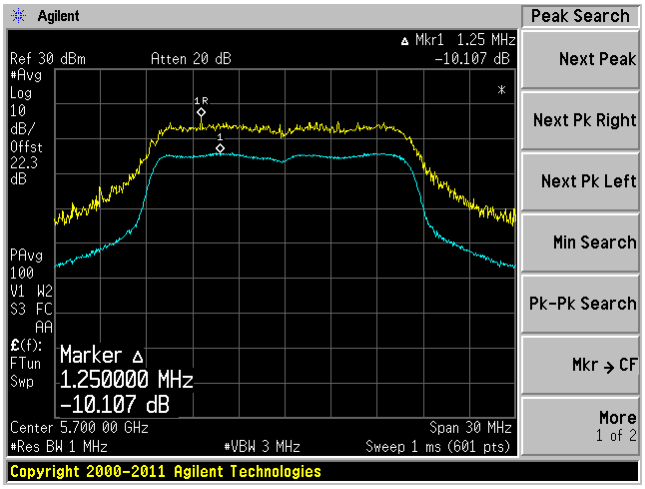
802.11a mode, 5580 MHz, Chain J0



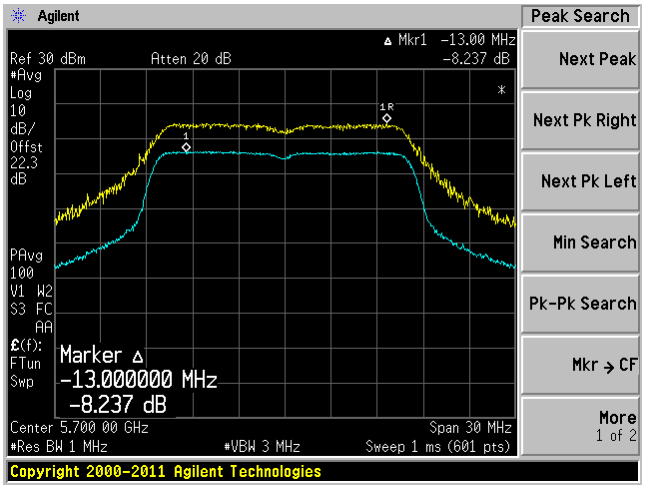
802.11a mode, 5580 MHz, Chain J1



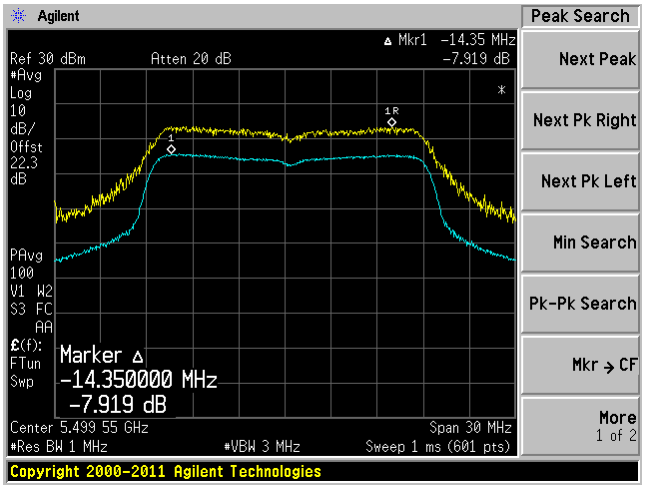
802.11a mode, 5700 MHz, Chain J0



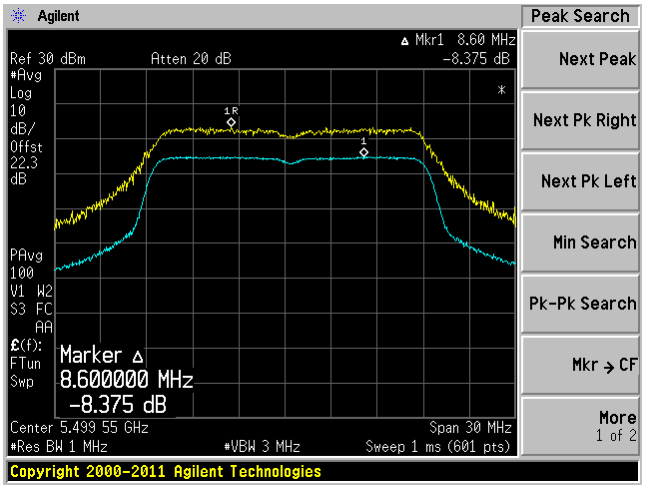
802.11a mode, 5700 MHz, Chain J1



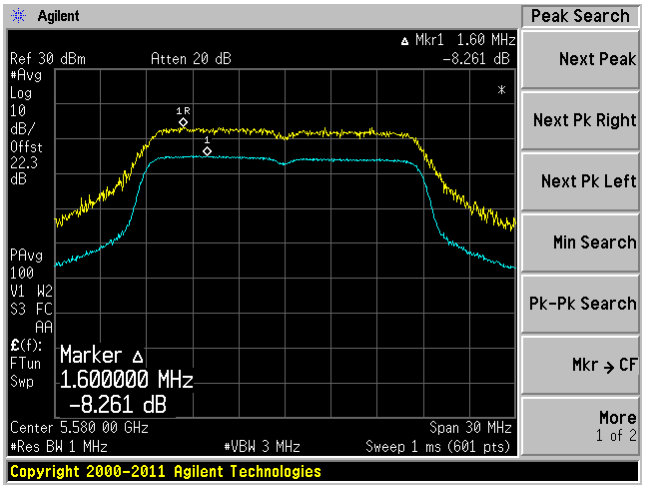
802.11n HT20 mode, 5500 MHz, Chain J0



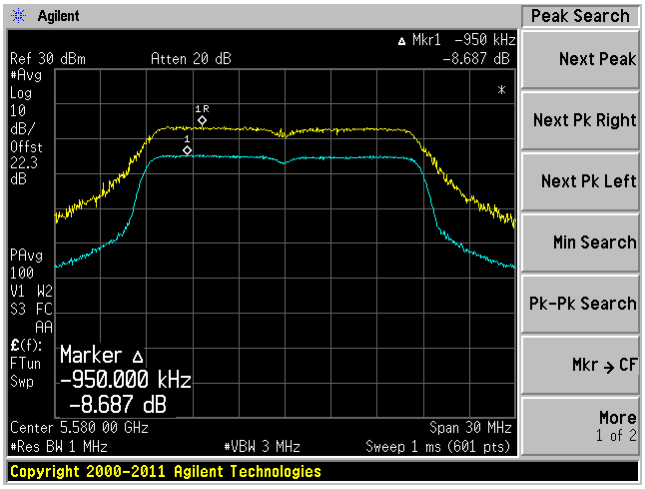
802.11n HT20 mode, 5500 MHz, Chain J1



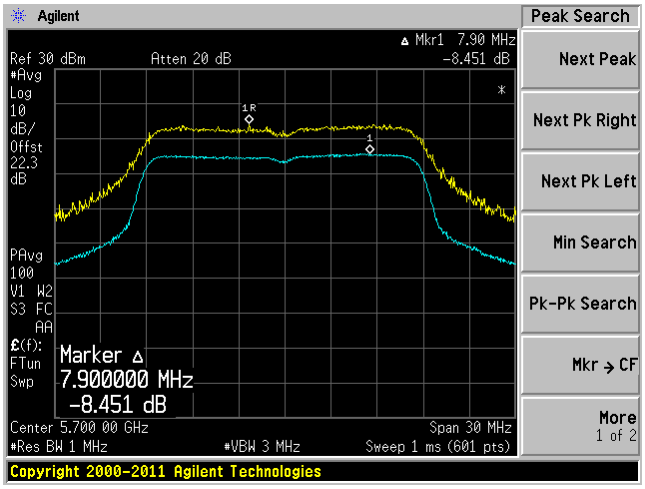
802.11n HT20 mode, 5580 MHz, Chain J0



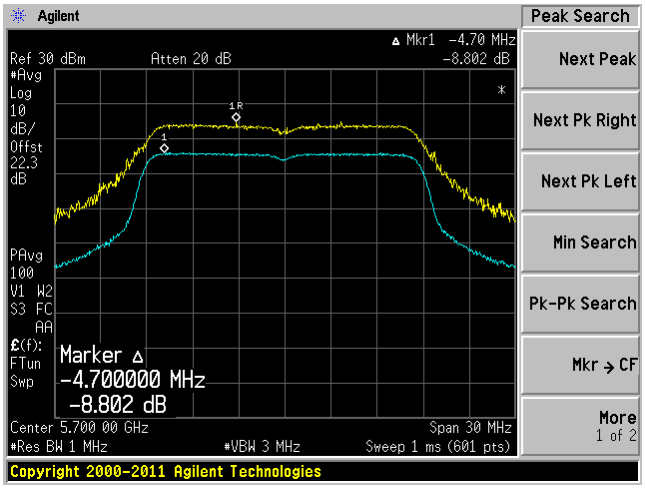
802.11n HT20 mode, 5580 MHz, Chain J1



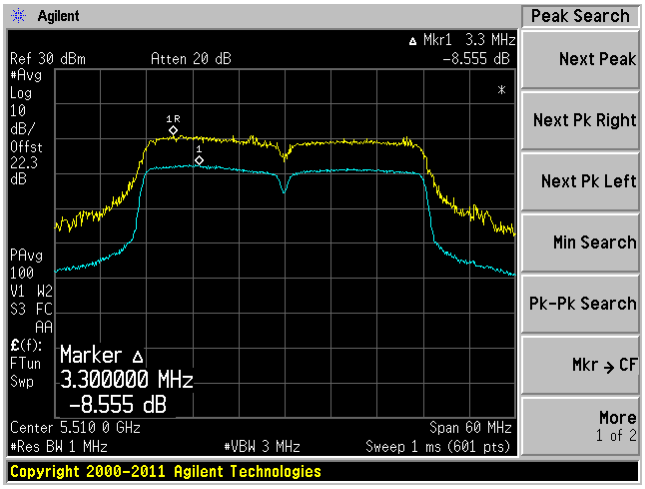
802.11n HT20 mode, 5700 MHz, Chain J0



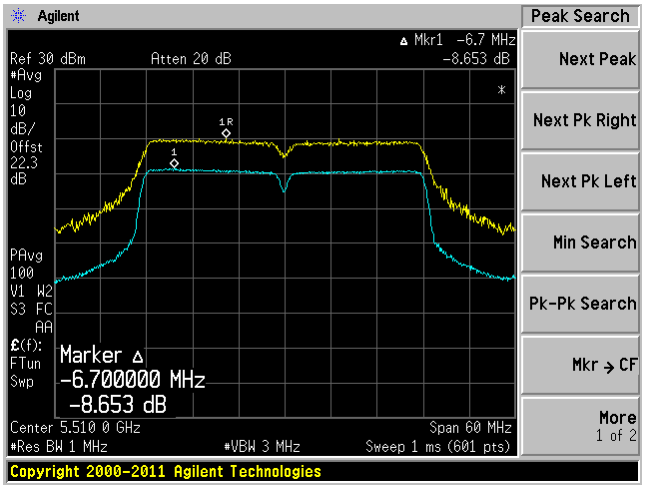
802.11n HT20 mode, 5700 MHz, Chain J1



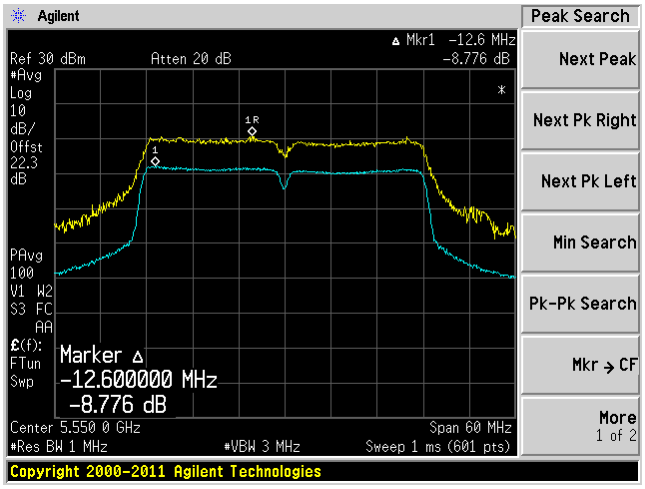
802.11n HT40 mode, 5510 MHz, Chain J0



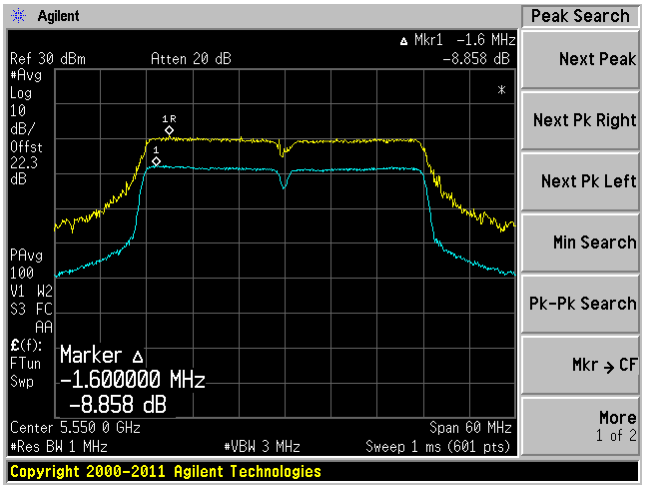
802.11n HT40 mode, 5510 MHz, Chain J1



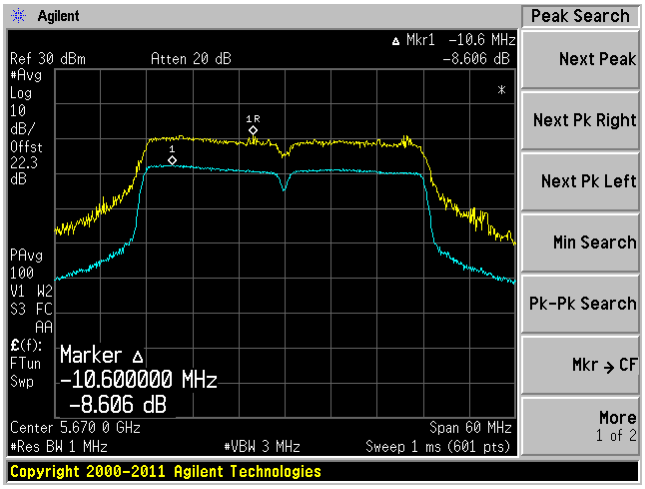
802.11n HT40 mode, 5550 MHz, Chain J0



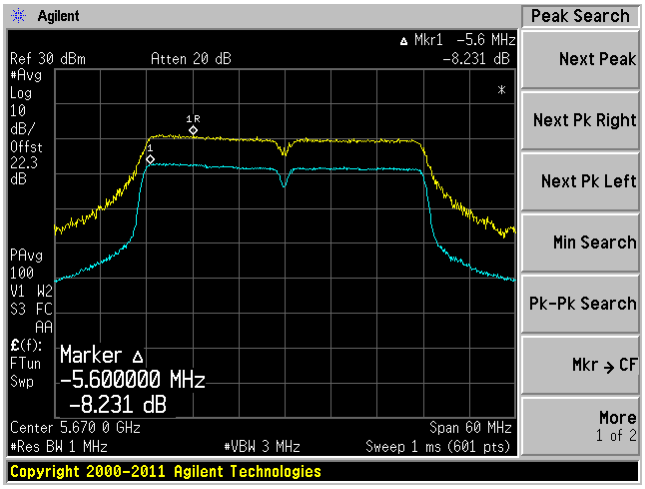
802.11n HT40 mode, 5550 MHz, Chain J1



802.11n HT40 mode, 5670 MHz, Chain J0



802.11n HT40 mode, 5670 MHz, Chain J1



13 IC RSS-210 §2.3 & RSS-Gen §6 - Receiver Spurious Radiated Emissions

13.1 Applicable Standard

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

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

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

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

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

According to RSS-Gen §6.1, Table 2, the radiated limit of receiver spurious emissions

Frequency (MHz)	Field Strength (Microvolts/m at 3 meters)
30-88	100
88-216	150
216-960	200
Above 960	500

13.2 EUT Setup

The radiated emissions tests were performed in the 3 meter chamber, using the setup in accordance with ANSI C63.4-2003.

13.3 Test Procedure

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

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

13.4 Corrected Amplitude & Margin Calculation

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

CA = Ai + AF + CL + Atten – Ga

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

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

Margin = Corrected Amplitude - Limit

13.5 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	N/R
Sunol Science Corp	Combination Antenna	JB3	A020106-3	2012-06-18	1 year
Hewlett Packard	Pre-amplifier	8447D	2944A06639	2012-06-09	1 year
Mini-Circuits	Pre-amplifier	ZVA-183-S	570400946	2012-05-09	1 year
Agilent	Spectrum Analyzer	E4446A	US44300386	2012-09-29	1 year
EMCO	Horn Antenna	3315	9511-4627	2012-10-17	1 year
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2013-03-28	1 year

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

13.6 Test Environmental Conditions

Temperature:	21-24°C
Relative Humidity:	43-46%
ATM Pressure:	101-103kPa

The testing was performed by Bo Li from 2013-4-15 to 2013-4-20 at 5 meter 3.

13.7 Summary of Test Results

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

Below 1 GHz:

Mode: Receiving			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Range (MHz)**
-2.18	168.7445	Horizontal	30-1000

Above 1 GHz:

Mode: Receiving			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Range (MHz)**
-21.29	1592	Horizontal	1000-18000

13.8 Test Results and Plots

1) 30-1000 MHz, Measured at 3 meters

With AC/DC cord

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (QP/Ave.)
34.58725	31.76	172	V	286	40	-8.24	QP
120.39275	30.56	365	H	148	43.5	-12.94	QP
249.521	39.38	118	H	334	46	-6.62	QP
125.2515	34.77	255	H	321	43.5	-8.73	QP
168.68	29.62	100	V	127	43.5	-13.88	QP
993.4375	23.03	296	V	166	54	-30.97	QP

With POE

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (QP/Ave.)
168.7445	41.32	260	H	349	43.5	-2.18	QP
72.4335	27.46	316	V	40	40	-12.54	QP
119.9435	34.1	164	V	251	43.5	-9.4	QP
229.68425	38.2	109	H	42	46	-7.8	QP
172.29125	34.42	146	H	347	43.5	-9.08	QP
268.69725	33.98	107	H	289	46	-12.02	QP
249.98425	31.47	149	H	144	46	-14.53	QP
975.77475	19.2	99	V	6	54	-34.8	QP

2) Above 1 GHz Measured at 3 meters

With AC/DC cord

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comment
1592	27.29	115	V	211	54	-26.71	Ave
1592	26.82	100	H	77	54	-27.18	Ave
1592	52.46	115	V	211	74	-21.54	Peak
1592	52.71	100	H	77	74	-21.29	Peak
1098	22.85	100	V	191	54	-31.15	Ave
1098	22.72	100	H	80	54	-31.28	Ave
1098	45.9	100	V	191	74	-28.1	Peak
1098	51.76	100	H	80	74	-22.24	Peak

With POE

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comment
1592	26.4	102	V	205	54	-27.6	Ave
1592	25.86	100	H	88	54	-28.14	Ave
1592	48.27	102	V	205	74	-25.73	Peak
1592	48.04	100	H	88	74	-25.96	Peak
1972	25.67	100	V	113	54	-28.33	Ave
1972	25.01	117	H	20	54	-28.99	Ave
1972	47.8	100	V	113	74	-26.2	Peak
1972	46.45	117	H	20	74	-27.55	Peak

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

14.1 Applicable Standard

According to FCC §15.407(b)

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

For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz

According to RSS-210 §A8.5, in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required.

14.2 Measurement Procedure

Old version:

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1 MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

New version:

Procedure for Unwanted Emissions Measurements below 1000 MHz.

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

Procedures for Average Unwanted Emissions Measurements above 1000 MHz.

a) Follow the requirements in section G)3), “General Requirements for Unwanted Emissions Measurements”.
b) Average emission levels shall be measured using one of the following two methods.
c) Method AD (Average Detection): Primary method
(i) RBW = 1 MHz.
(ii) VBW ≥ 3 MHz.
(iii) Detector = RMS, if span/(# of points in sweep) ≤ RBW/2. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, the detector mode shall be set to peak.
(iv) Averaging type = power (i.e., RMS)

• As an alternative, the detector and averaging type may be set for linear voltage averaging. Some analyzers require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
(v) Sweep time = auto.
(vi) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, the number of traces shall be increased by a factor of 1/x, where x is the duty cycle. For example, with 50 percent duty cycle, at least 200 traces should be averaged.
(vii) If tests are performed with the EUT transmitting at a duty cycle less than 98 percent, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
• If power averaging (RMS) mode was used in step (iv) above, the correction factor is10 log(1/x), where x is the duty cycle. For example, if the transmit duty cycle was 50 percent, then 3 dB must be added to the measured emission levels.
• If linear voltage averaging mode was used in step (iv) above, the correction factor is 20 log(1/x), where x is the duty cycle. For example, if the transmit duty cycle was 50 percent, then 6 dB must be added to the measured emission levels.

14.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2012-09-29	1 year

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

14.4 Test Environmental Conditions

Temperature:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102kPa

The testing was performed by Bo Li from 2013-4-01and 2013-4-12 at RF site.

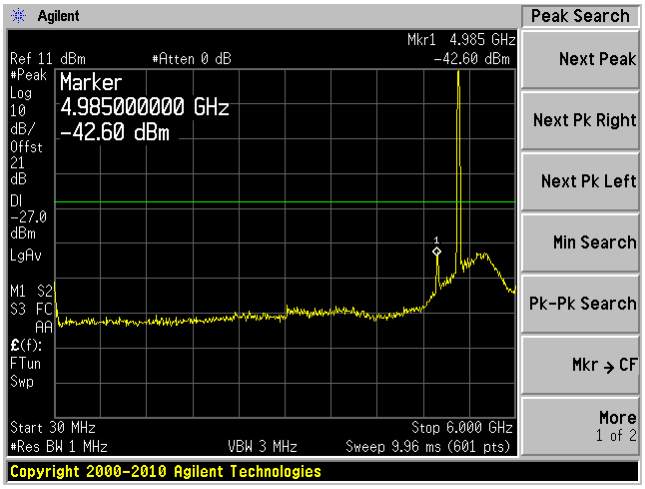
14.5 Test Results

Please refer to following plots.

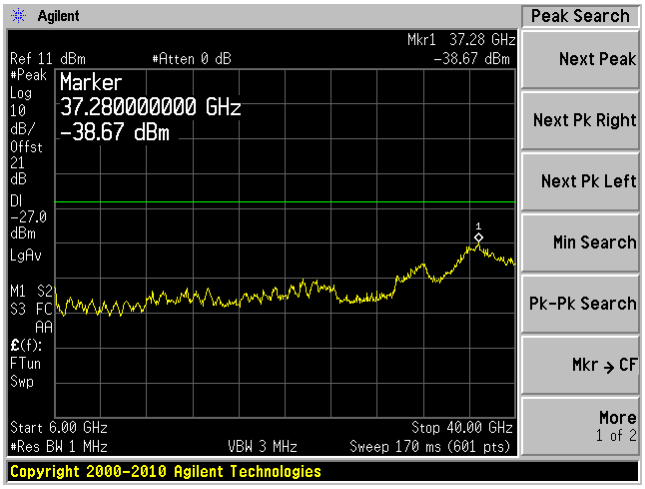
5250-5350 MHz Band

802.11a, Low Channel, 5260 MHz

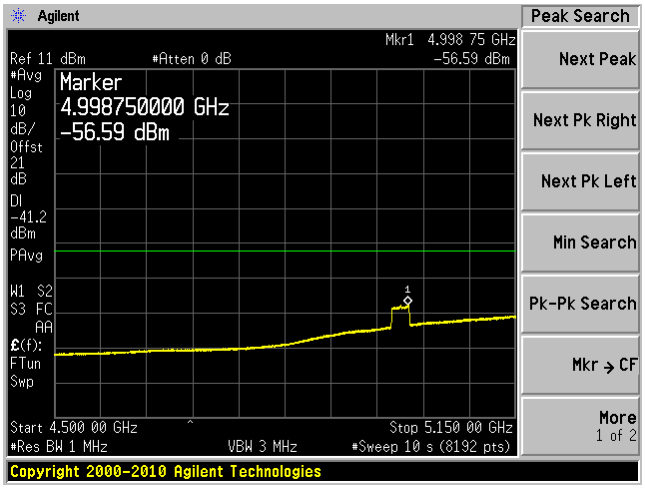
Chain J0, Plot: 30 MHz – 6 GHz



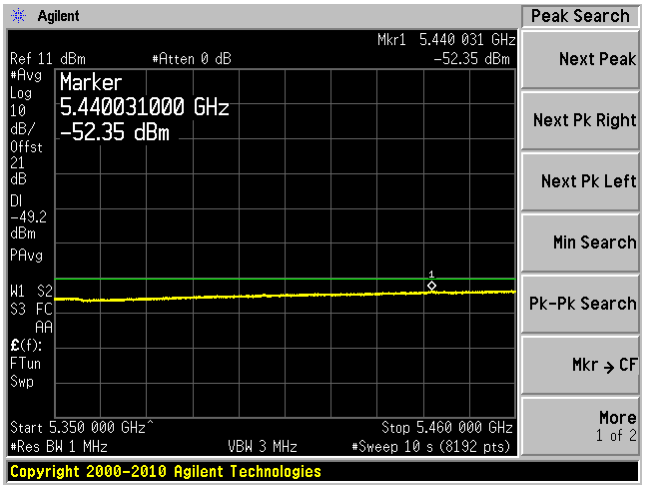
Chain J0, Plot: 6 GHz – 40 GHz



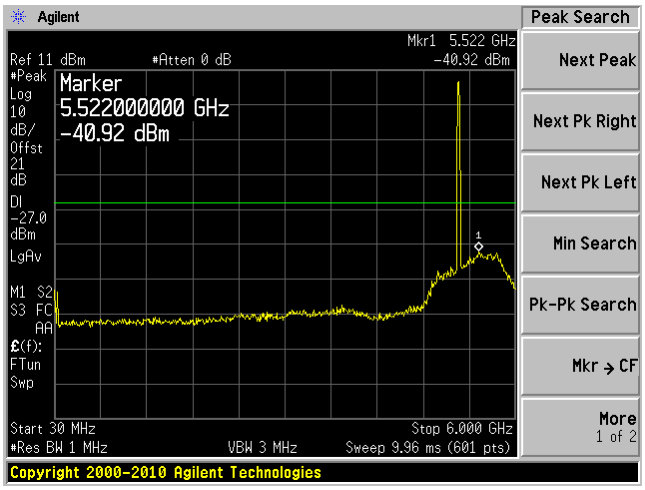
Chain J0, Plot: 4500 MHz – 5150 MHz



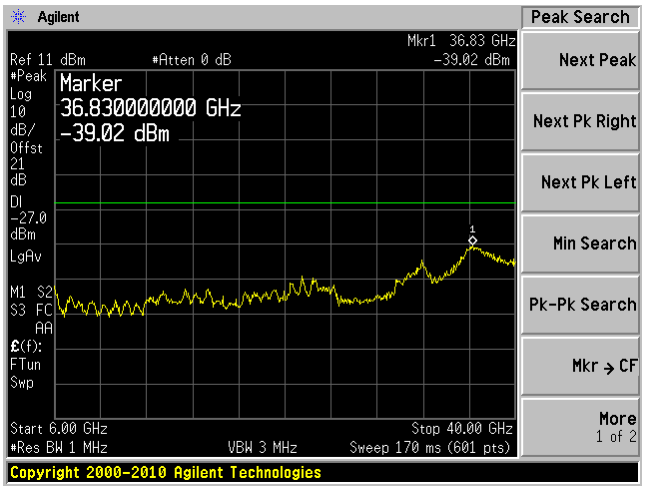
Chain J0, Plot: 5350MHz – 5460 MHz



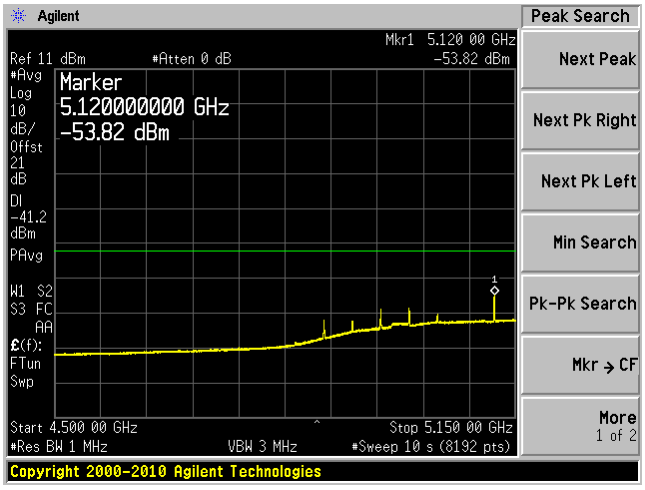
Chain J1, Plot: 30 MHz – 6 GHz



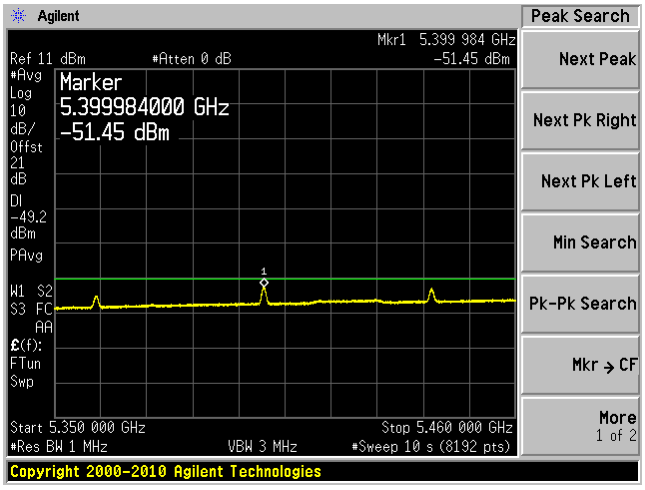
Chain J1, Plot: 6 GHz – 40 GHz



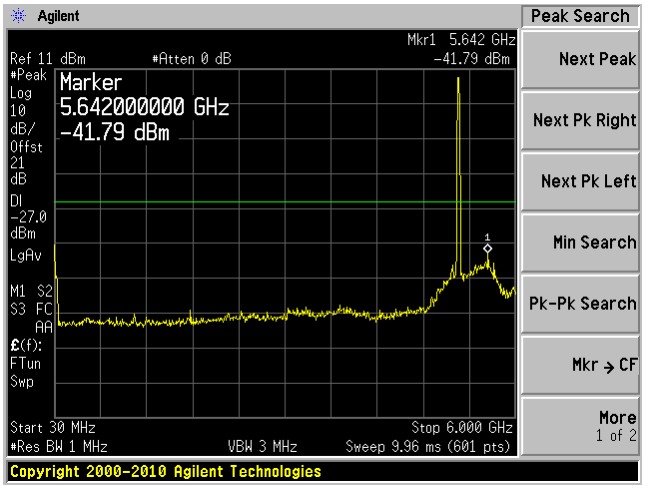
Chain J1, Plot: 4500 MHz – 5150 MHz



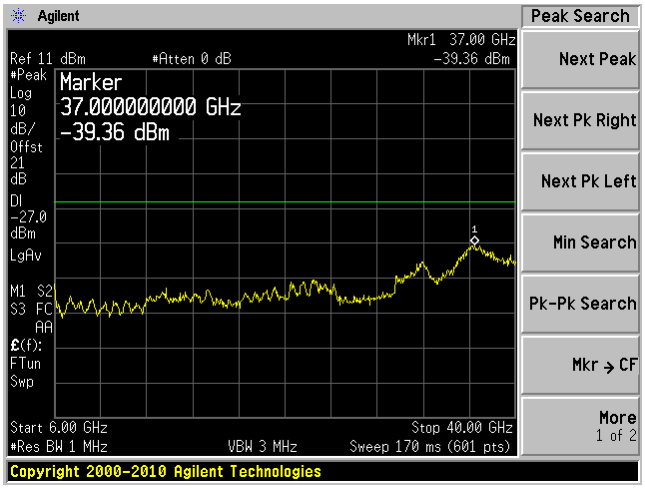
Chain J1, Plot: 5350MHz – 5460 MHz



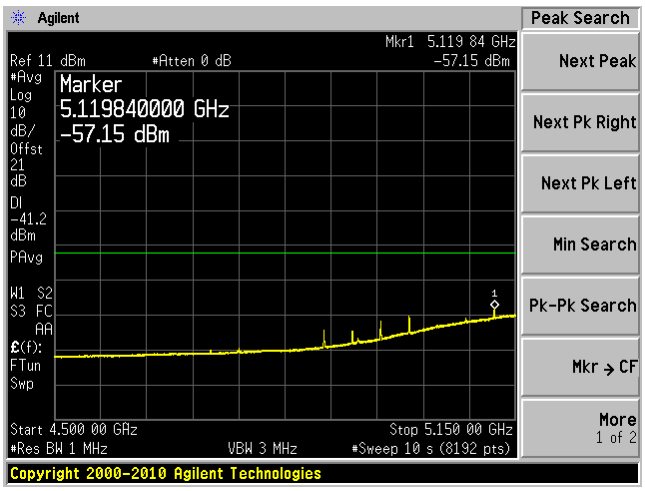
Chain J2, Plot: 30 MHz – 6 GHz



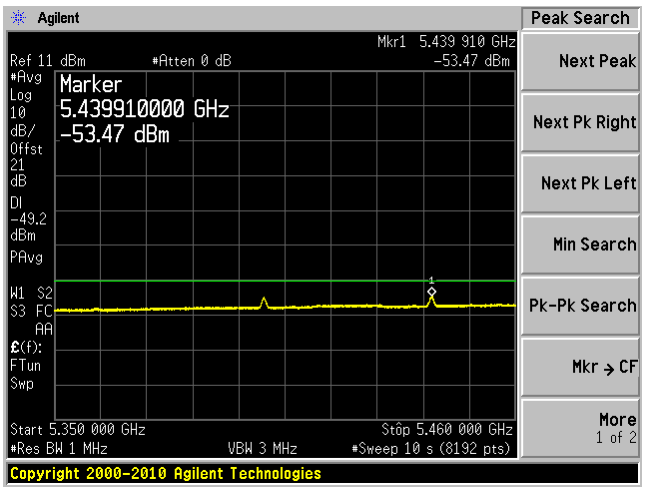
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

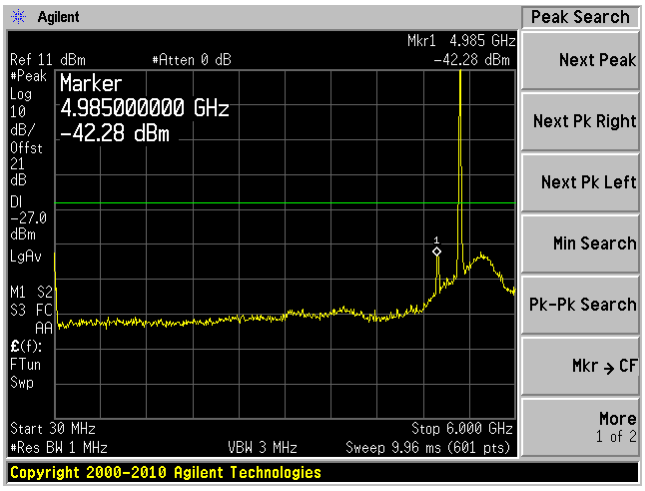


Chain J2, Plot: 5350MHz – 5460 MHz

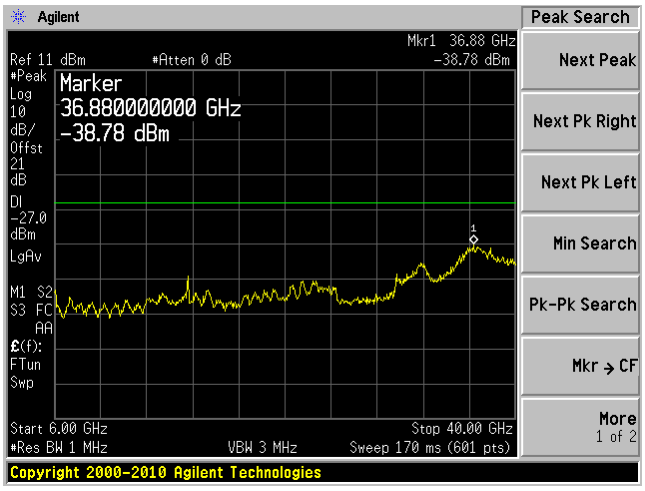


802.11a, Middle Channel, 5280 MHz

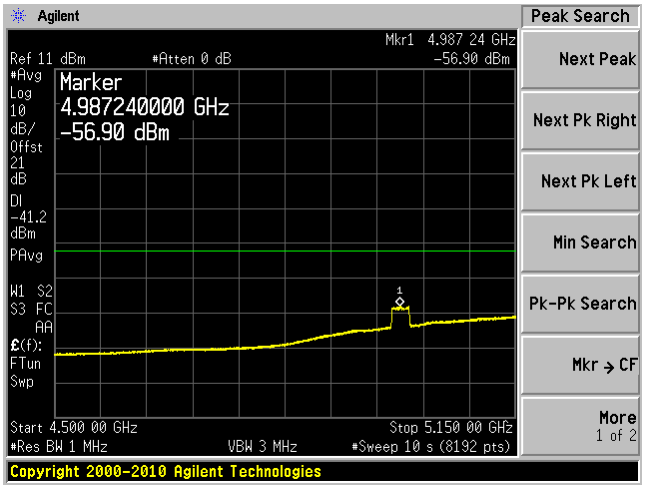
Chain J0, Plot: 30 MHz – 6 GHz



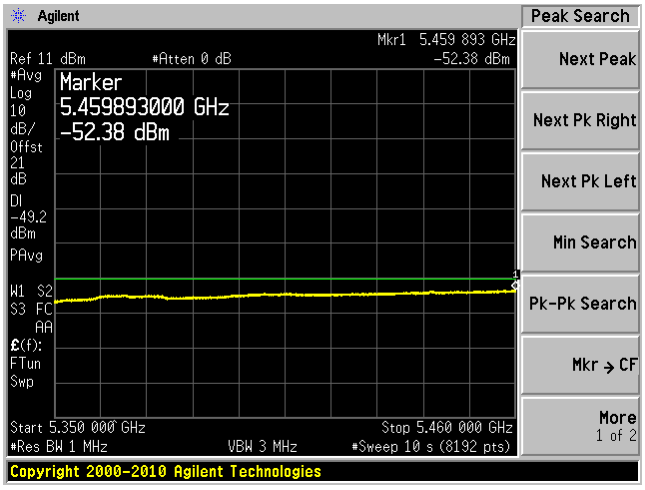
Chain J0, Plot: 6 GHz – 40 GHz



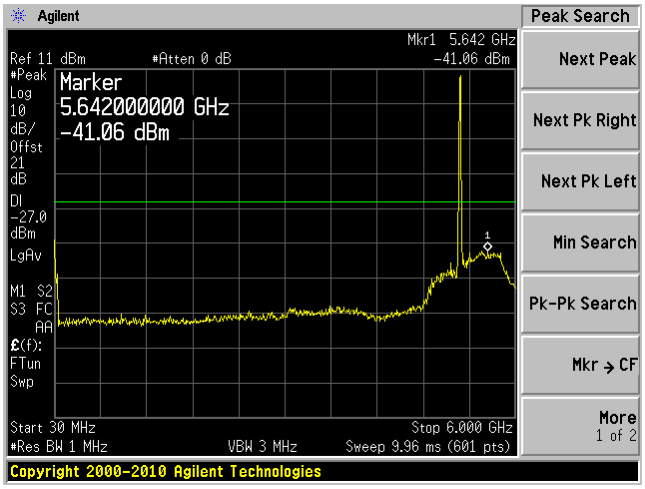
Chain J0, Plot: 4500 MHz – 5150 MHz



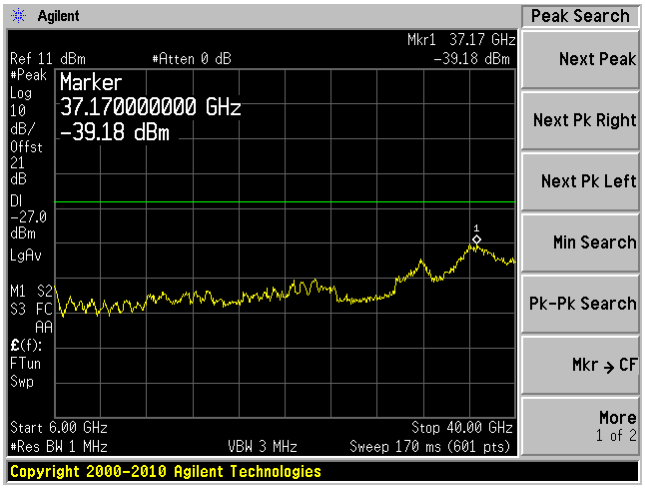
Chain J0, Plot: 5350MHz – 5460 MHz



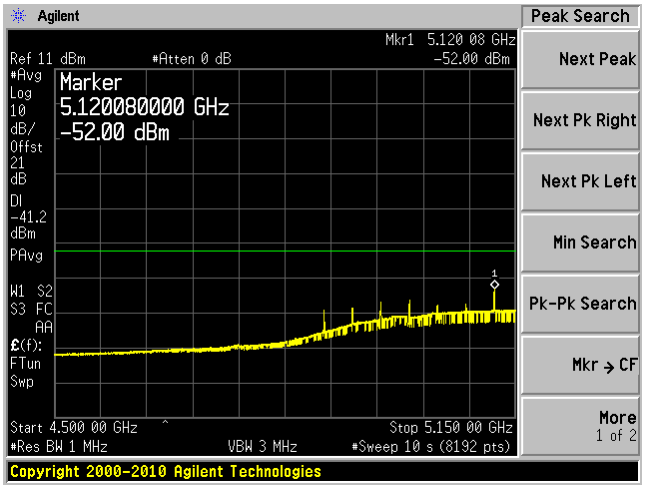
Chain J1, Plot: 30 MHz – 6 GHz



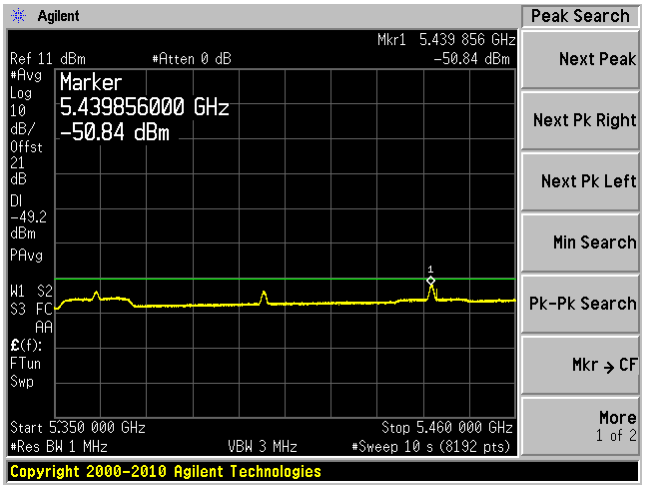
Chain J1, Plot: 6 GHz – 40 GHz



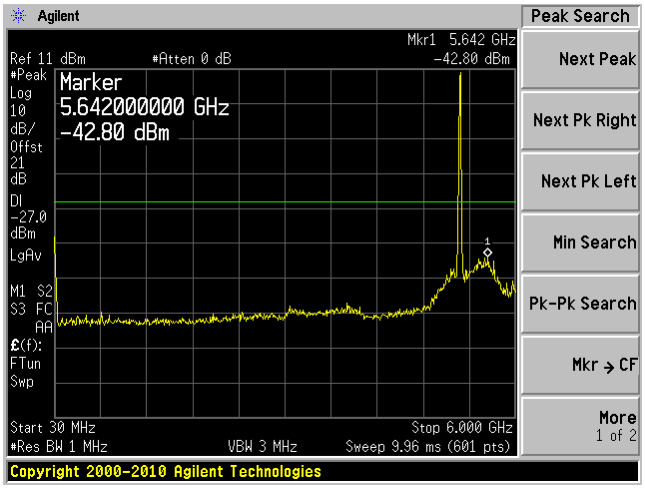
Chain J1, Plot: 4500 MHz – 5150 MHz



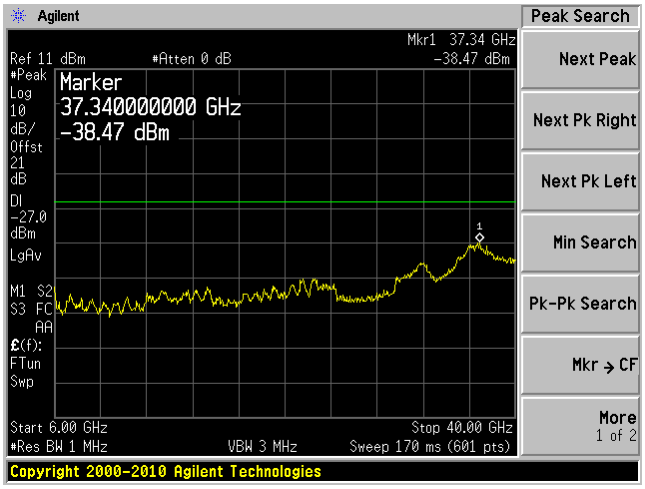
Chain J1, Plot: 5350MHz – 5460 MHz



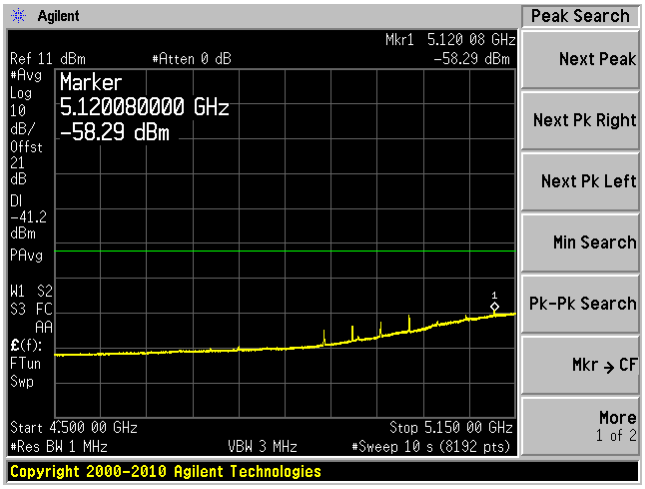
Chain J2, Plot: 30 MHz – 6 GHz



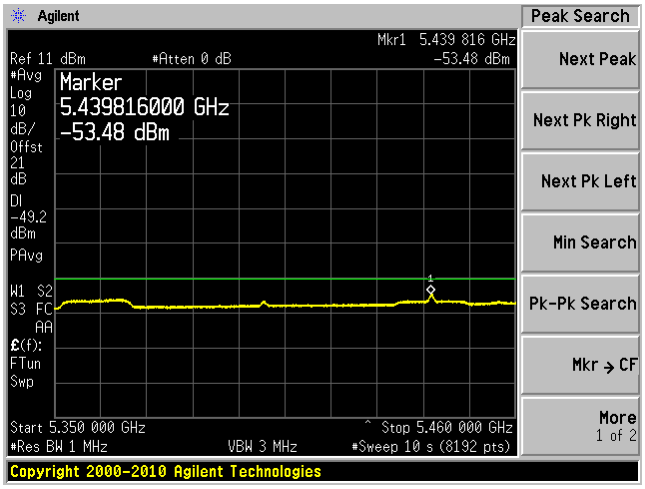
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

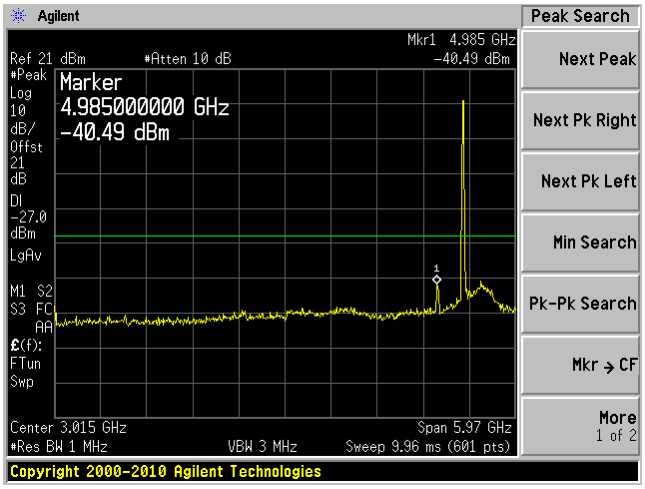


Chain J2, Plot: 5350MHz – 5460 MHz

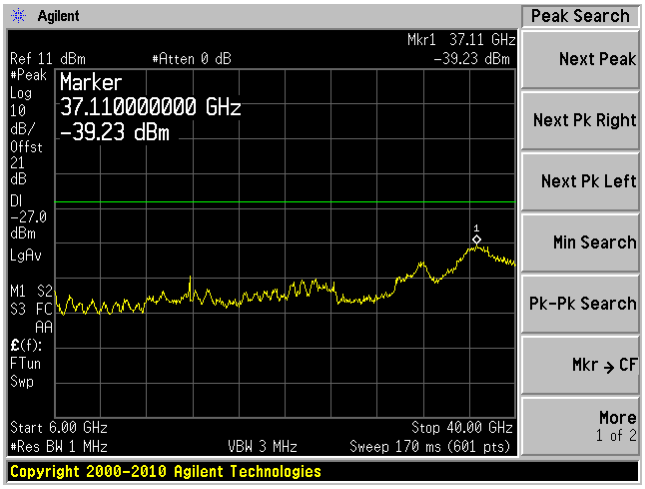


802.11a, High Channel, 5320 MHz

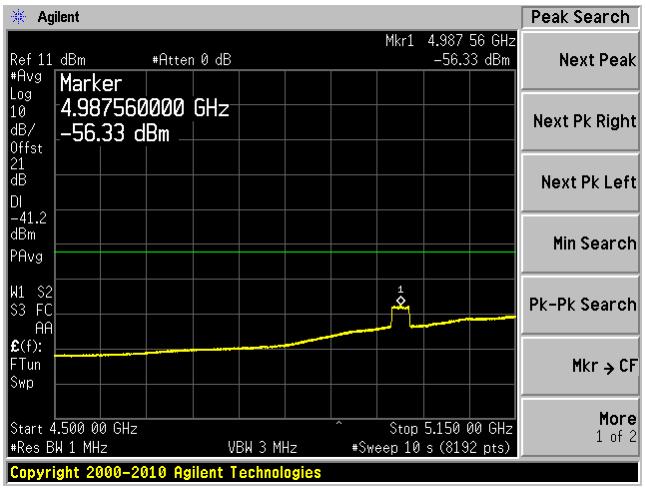
Chain J0, Plot: 30 MHz – 6 GHz



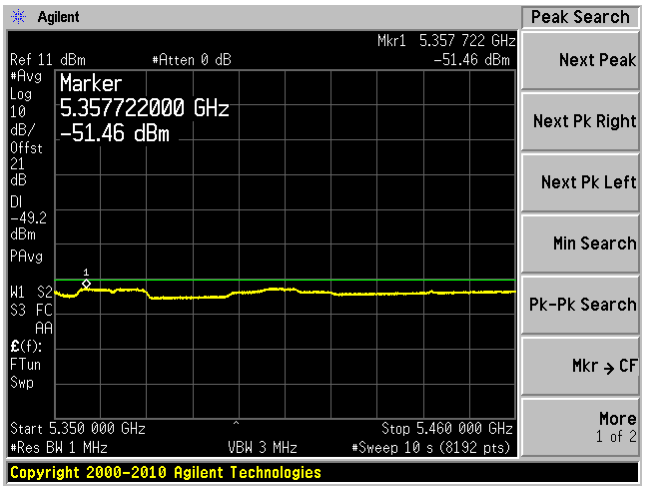
Chain J0, Plot: 6 GHz – 40 GHz



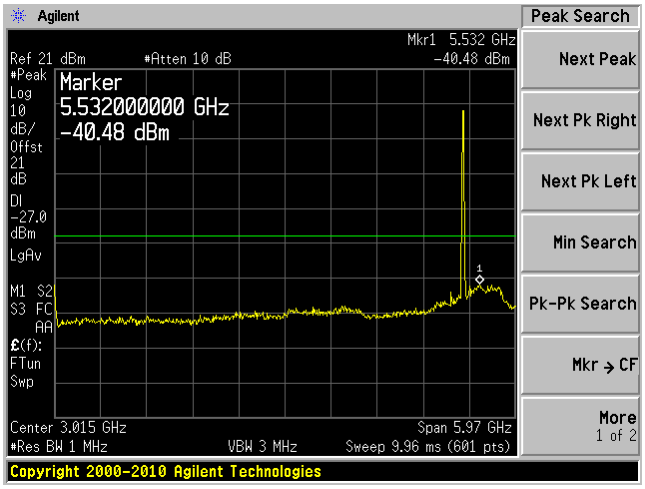
Chain J0, Plot: 4500 MHz – 5150 MHz



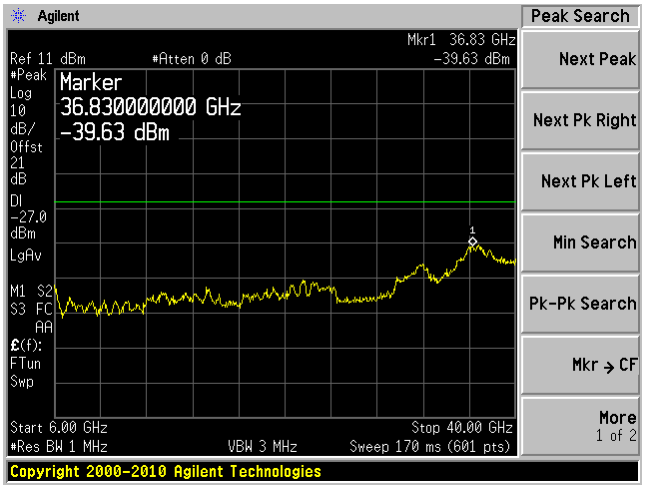
Chain J0, Plot: 5350MHz – 5460 MHz



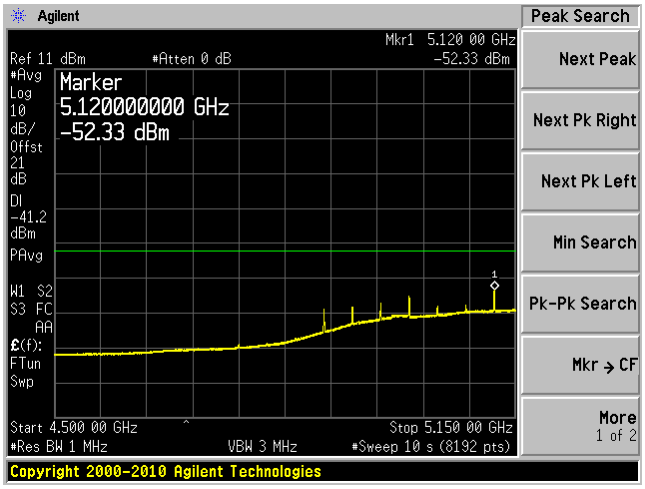
Chain J1, Plot: 30 MHz – 6 GHz



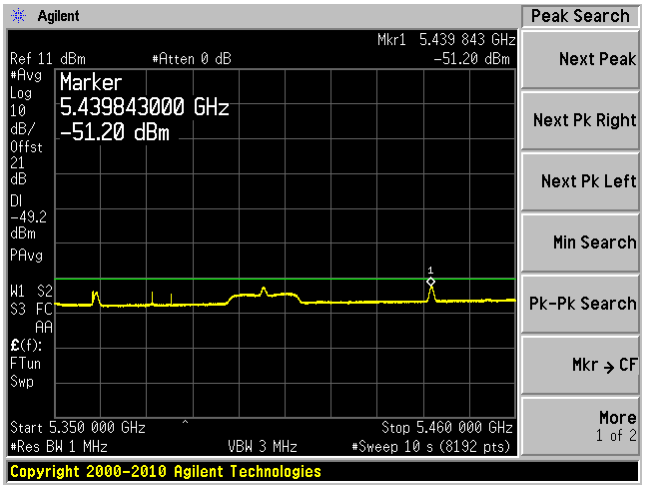
Chain J1, Plot: 6 GHz – 40 GHz



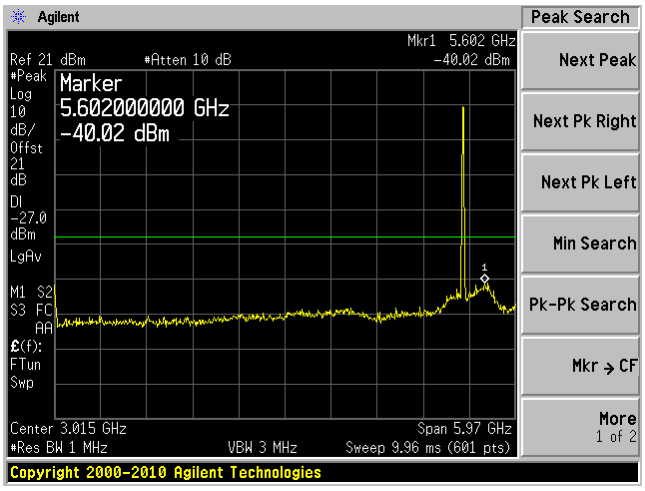
Chain J1, Plot: 4500 MHz – 5150 MHz



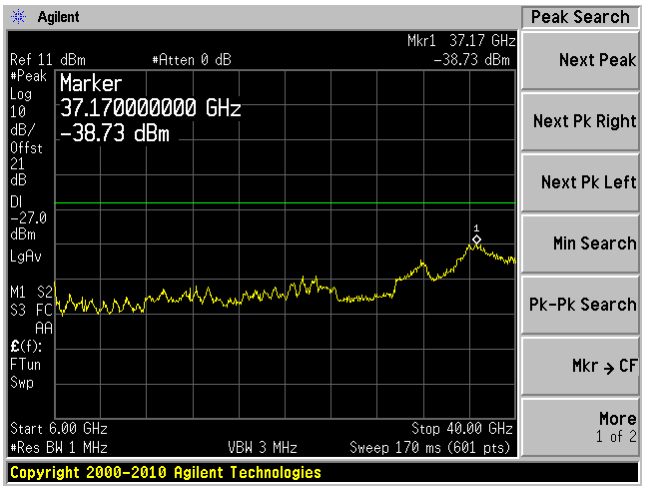
Chain J1, Plot: 5350MHz – 5460 MHz



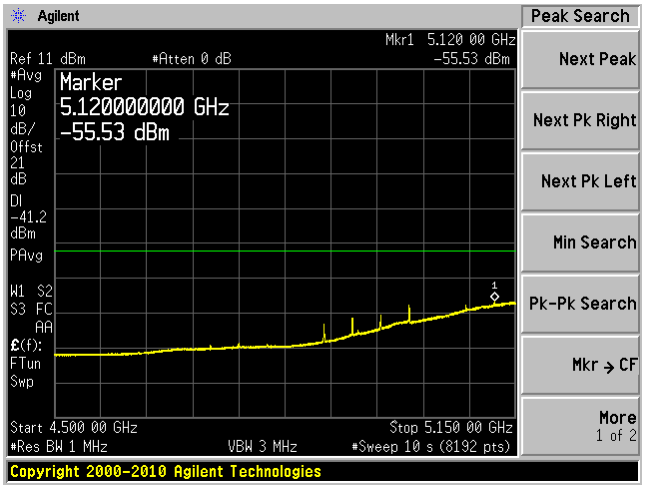
Chain J2, Plot: 30 MHz – 6 GHz



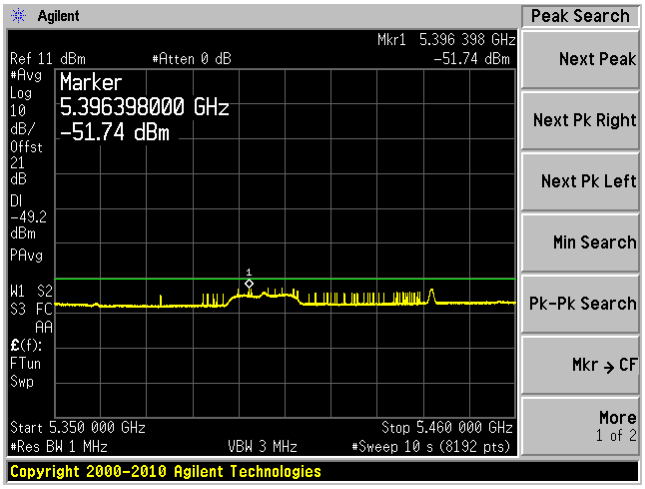
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

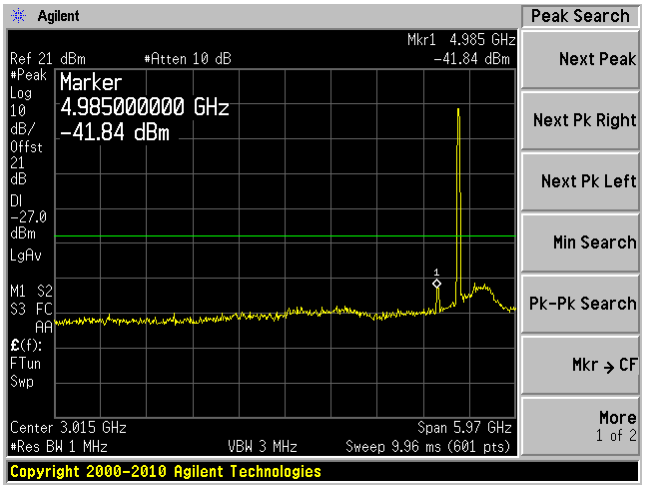


Chain J2, Plot: 5350MHz – 5460 MHz

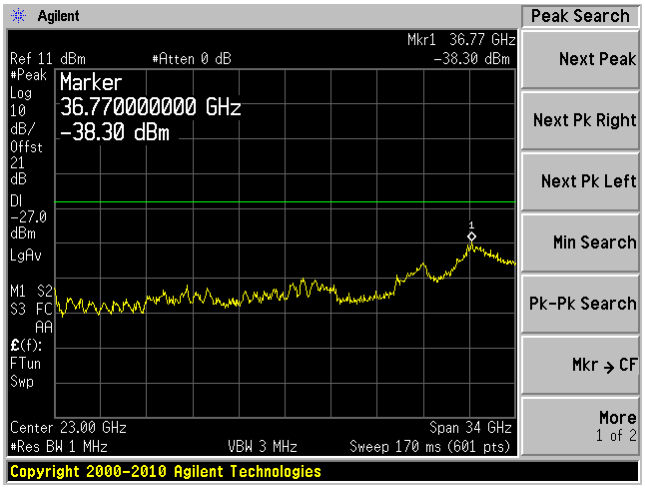


802.11n HT20, Low Channel 5260 MHz

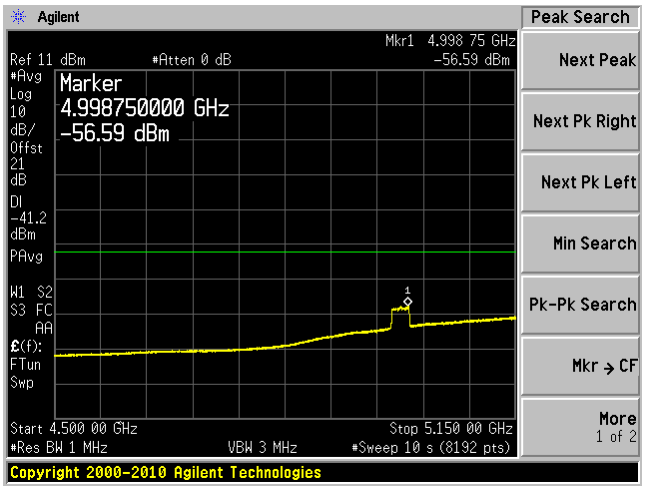
Chain J0, Plot: 30 MHz – 6 GHz



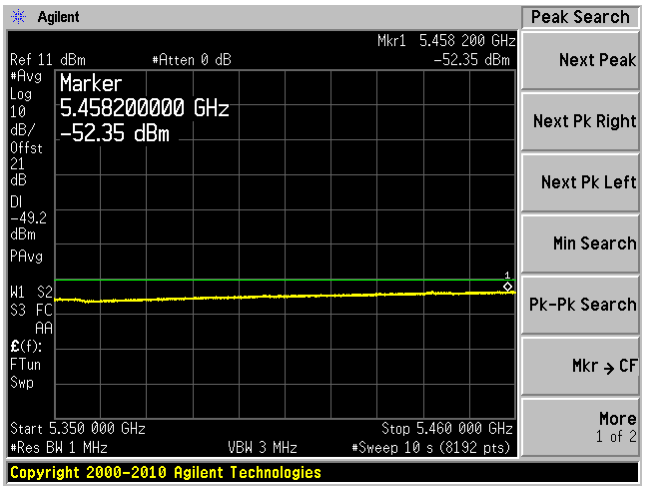
Chain J0, Plot: 6 GHz – 40 GHz



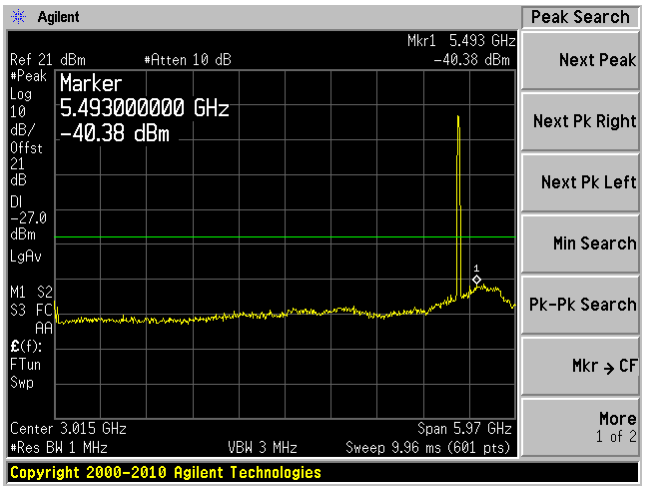
Chain J0, Plot: 4500 MHz – 5150 MHz



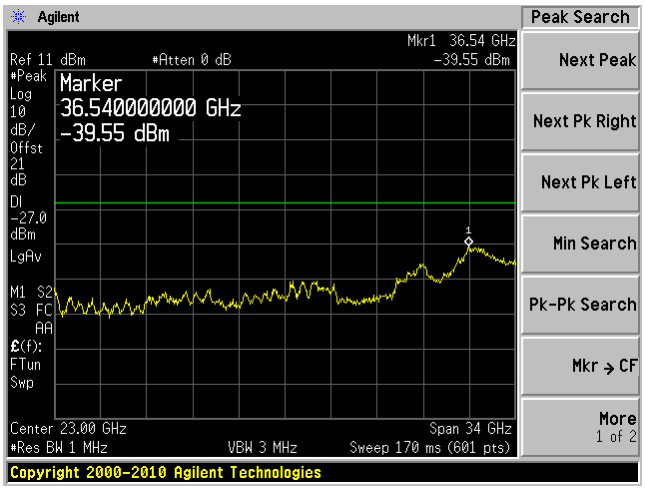
Chain J0, Plot: 5350MHz – 5460 MHz



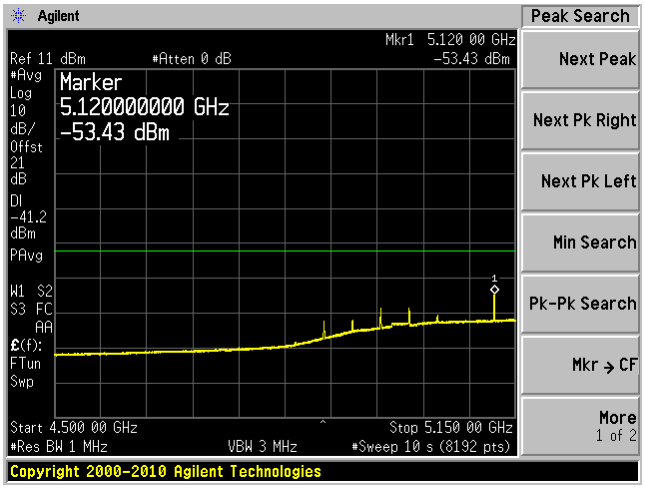
Chain J1, Plot: 30 MHz – 6 GHz



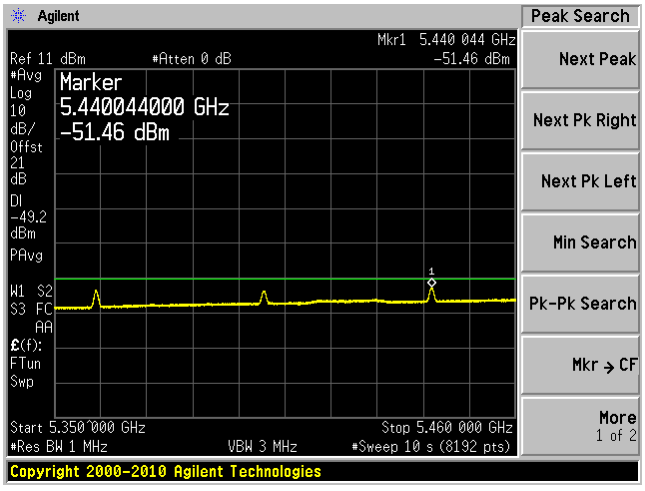
Chain J1, Plot: 6 GHz – 40 GHz



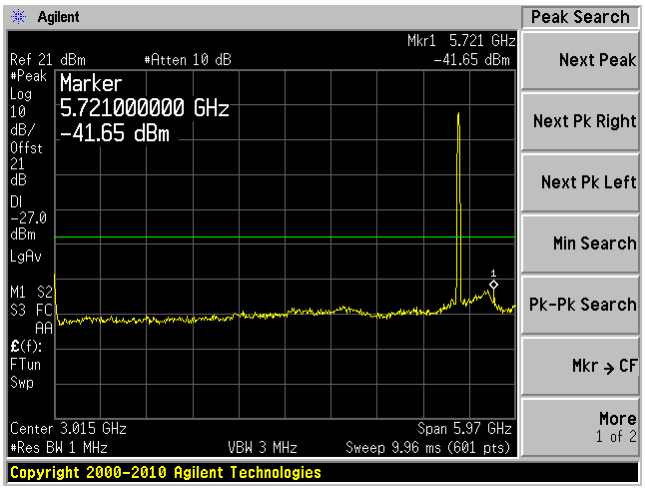
Chain J1, Plot: 4500 MHz – 5150 MHz



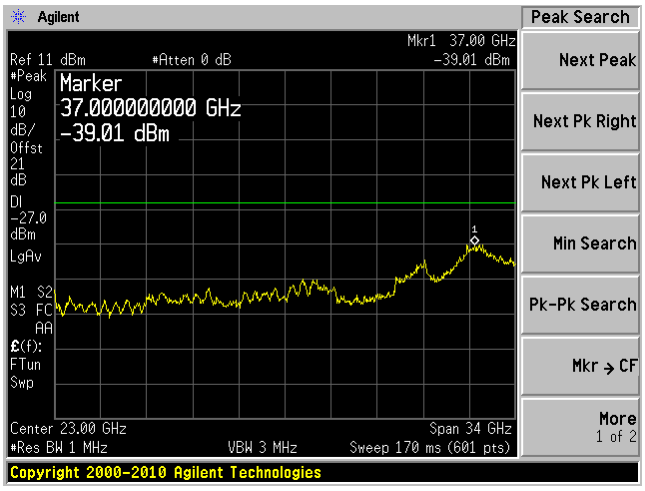
Chain J1, Plot: 5350MHz – 5460 MHz



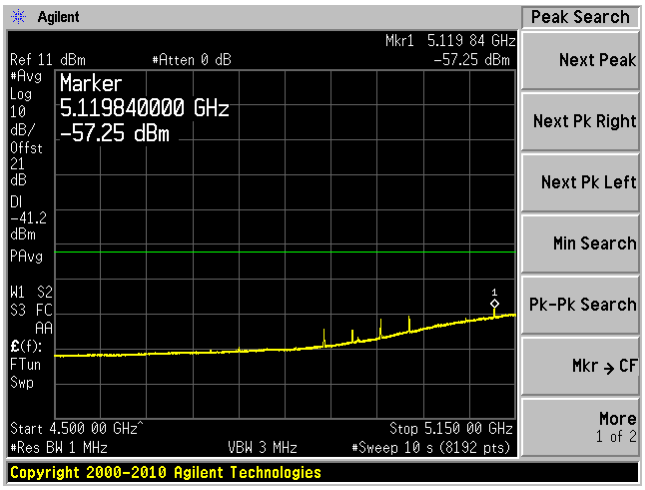
Chain J2, Plot: 30 MHz – 6 GHz



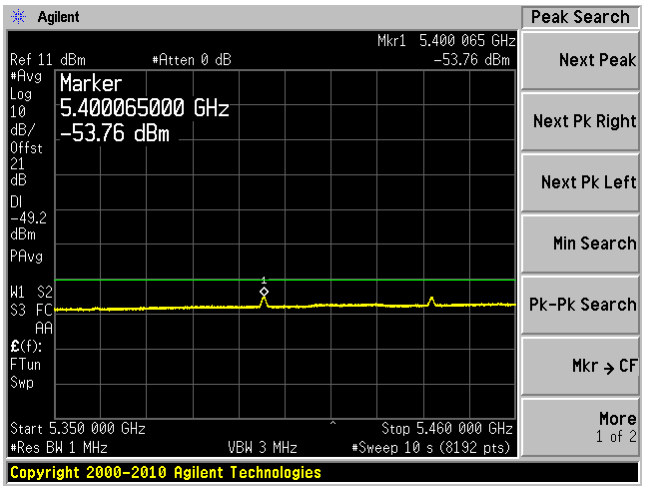
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

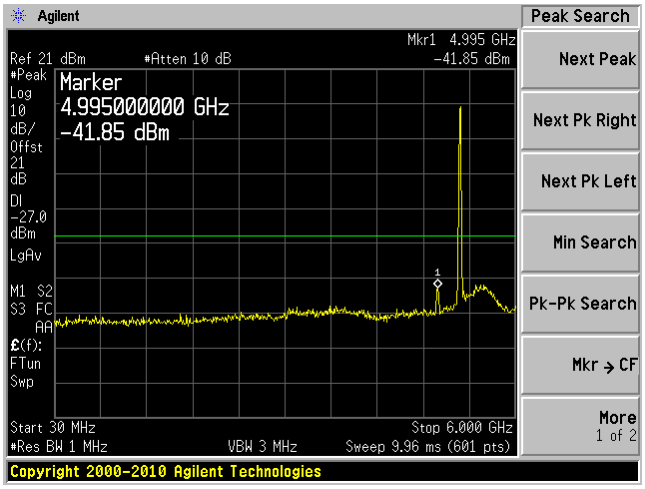


Chain J2, Plot: 5350MHz – 5460 MHz

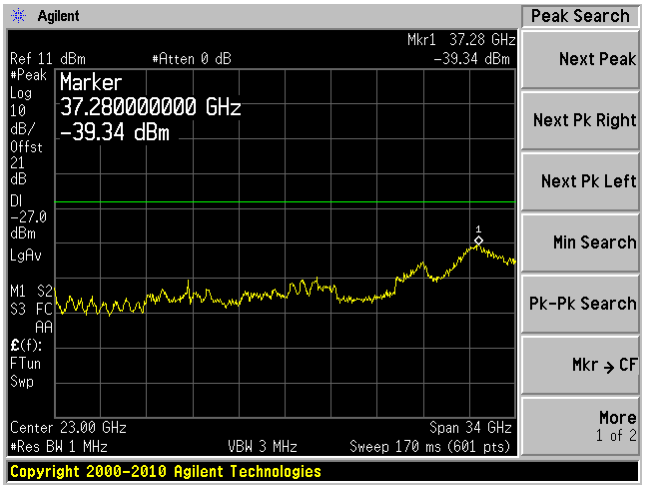


802.11n HT20, Middle Channel 5280 MHz

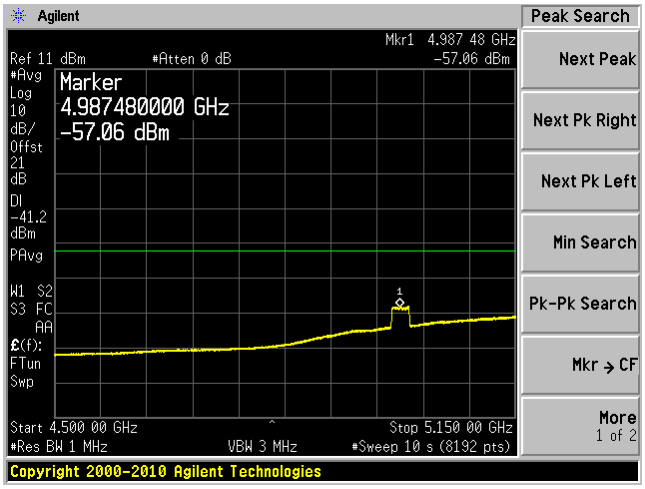
Chain J0, Plot: 30 MHz – 6 GHz



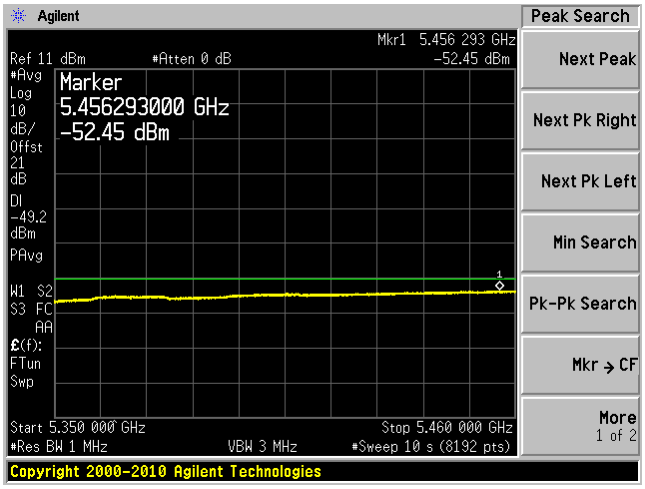
Chain J0, Plot: 6 GHz – 40 GHz



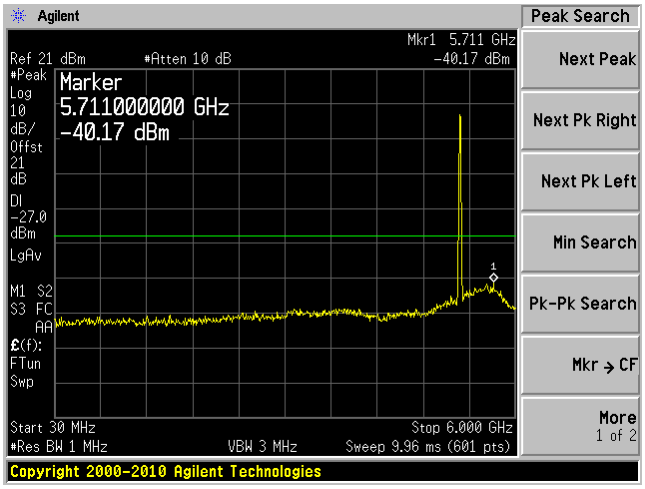
Chain J0, Plot: 4500 MHz – 5150 MHz



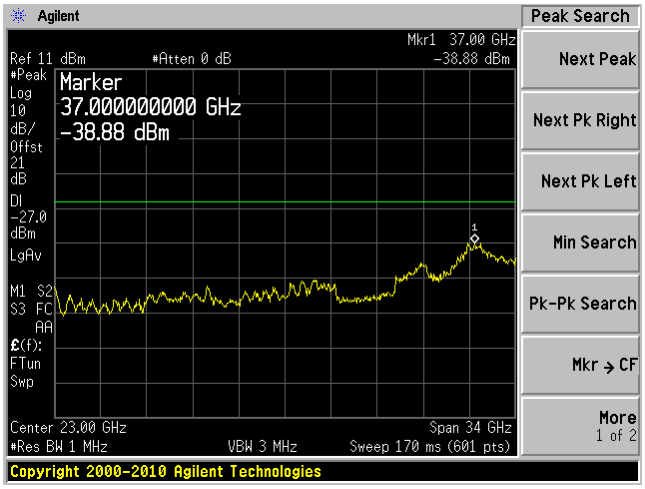
Chain J0, Plot: 5350MHz – 5460 MHz



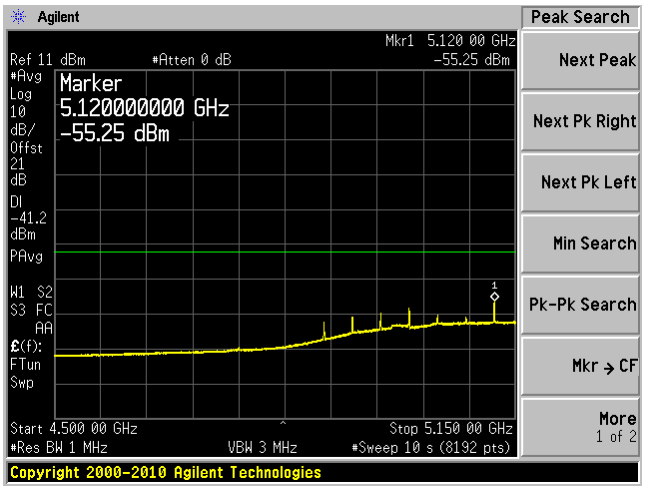
Chain J1, Plot: 30 MHz – 6 GHz



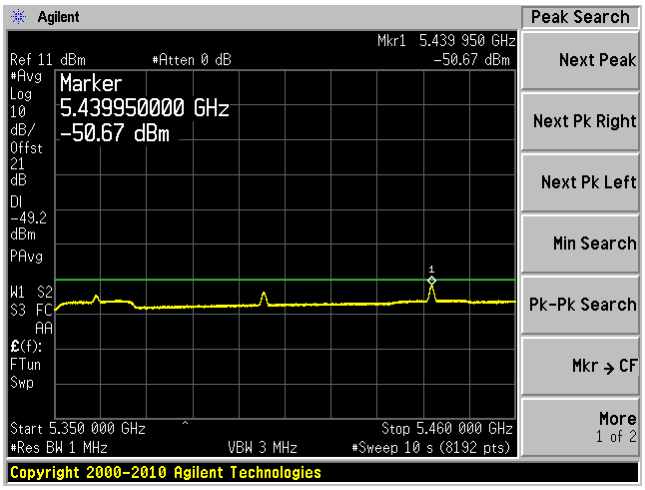
Chain J1, Plot: 6 GHz – 40 GHz



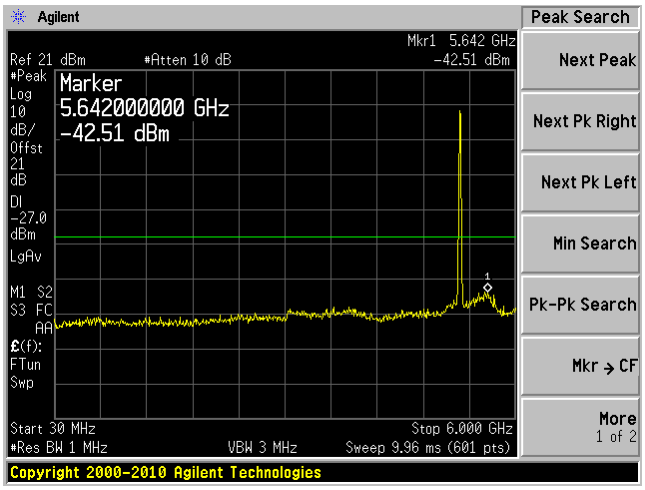
Chain J1, Plot: 4500 MHz – 5150 MHz



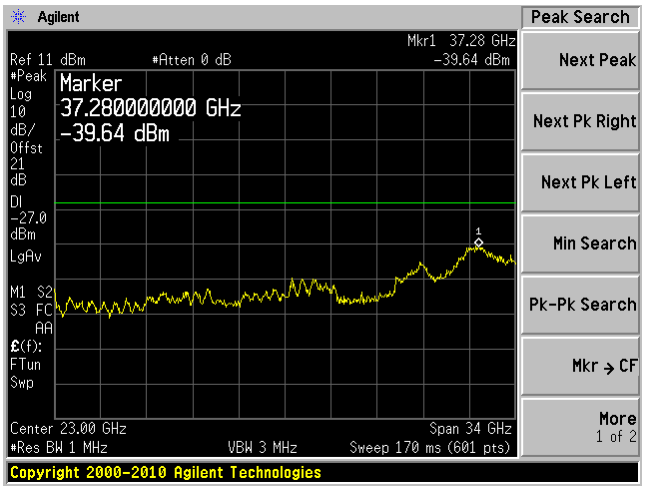
Chain J1, Plot: 5350MHz – 5460 MHz



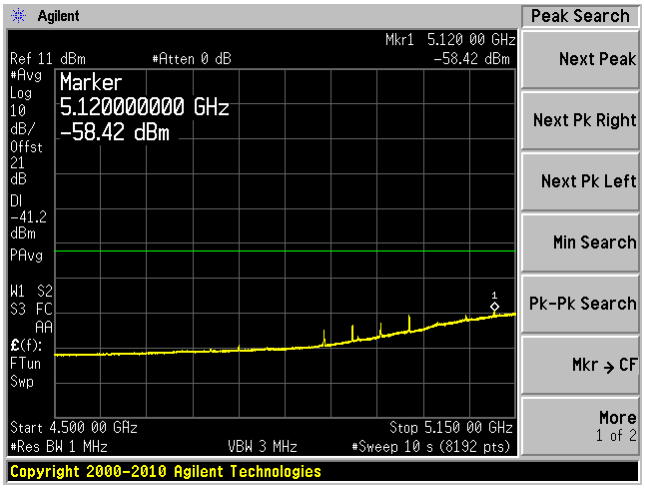
Chain J2, Plot: 30 MHz – 6 GHz



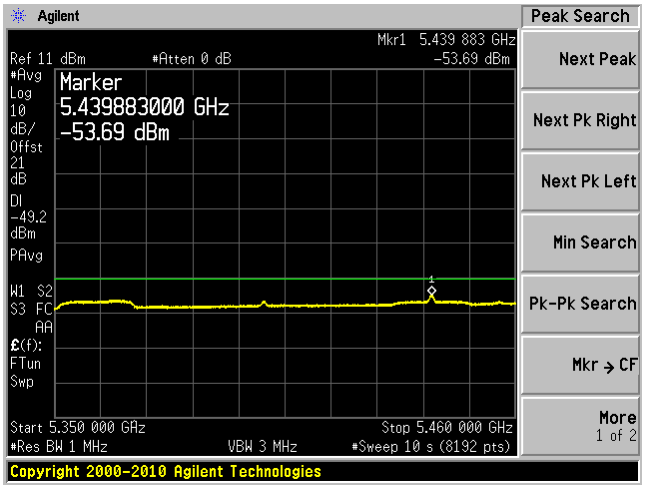
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

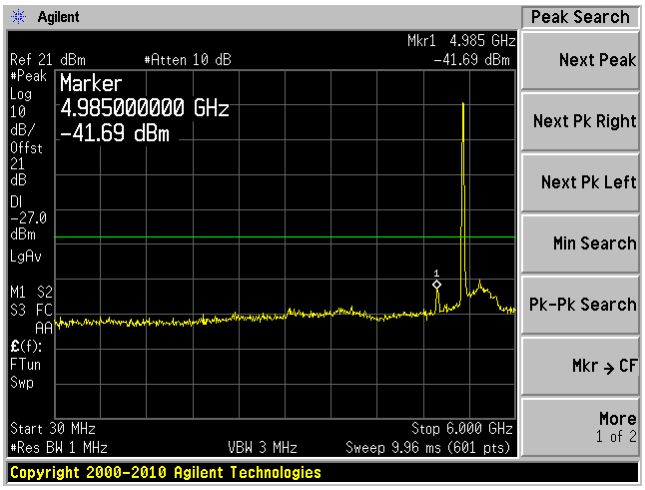


Chain J2, Plot: 5350MHz – 5460 MHz

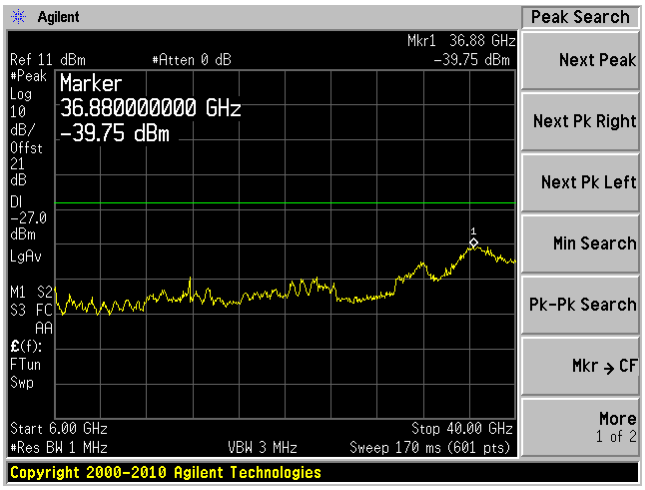


802.11n HT20, High Channel 5320 MHz

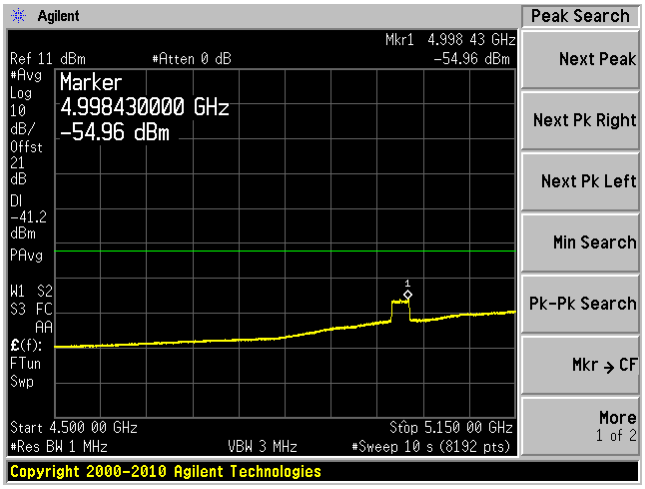
Chain J0, Plot: 30 MHz – 6 GHz



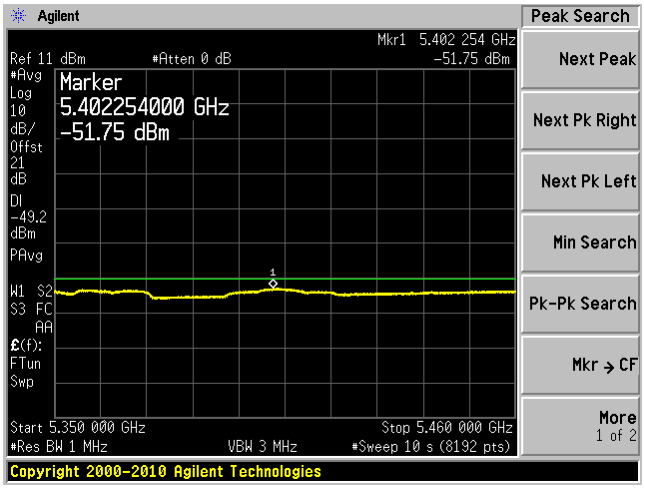
Chain J0, Plot: 6 GHz – 40 GHz



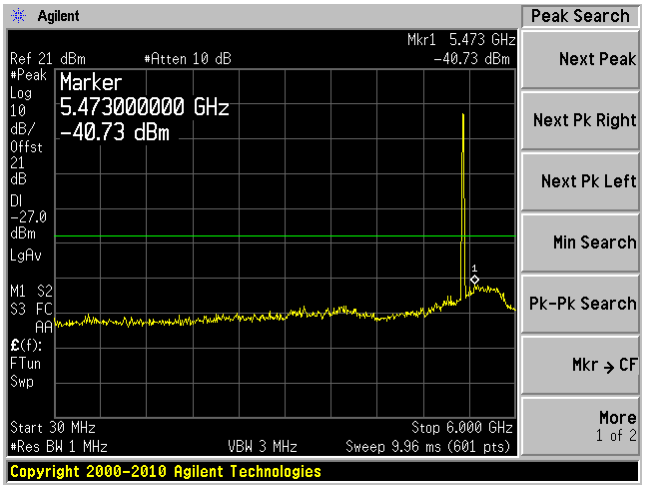
Chain J0, Plot: 4500 MHz – 5150 MHz



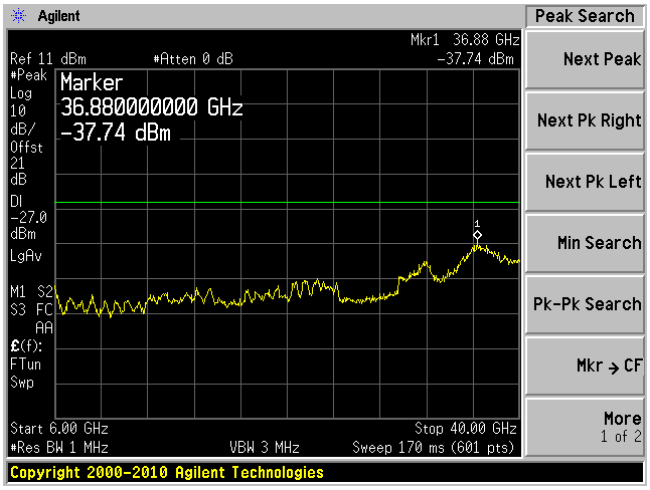
Chain J0, Plot: 5350MHz – 5460 MHz



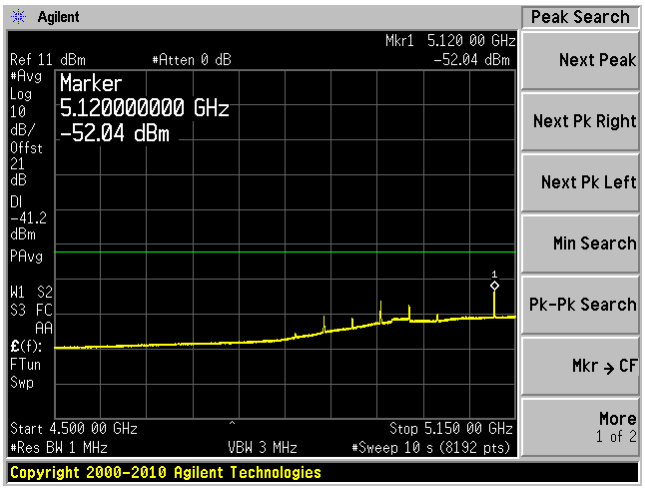
Chain J1, Plot: 30 MHz – 6 GHz



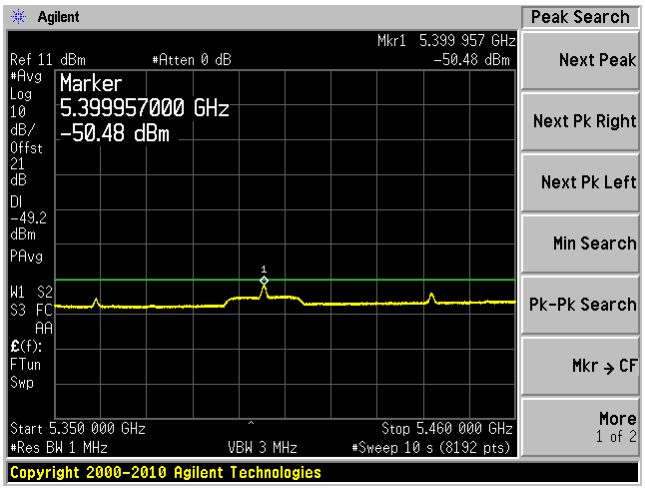
Chain J1, Plot: 6 GHz – 40 GHz



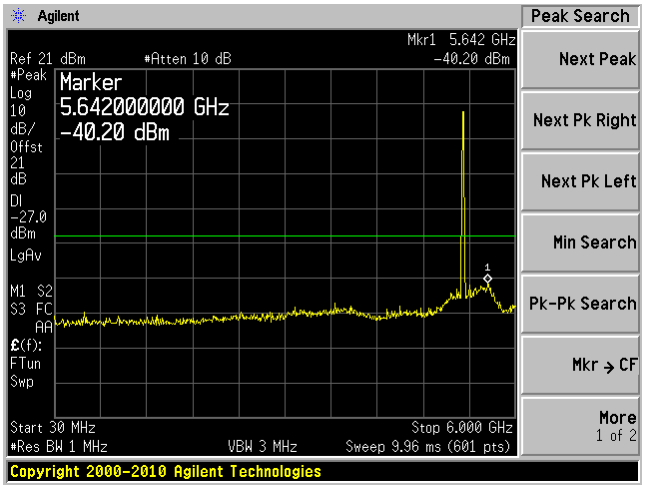
Chain J1, Plot: 4500 MHz – 5150 MHz



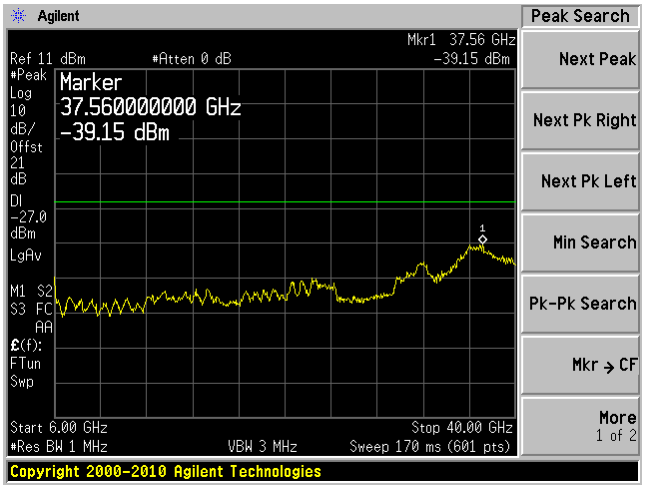
Chain J1, Plot: 5350MHz – 5460 MHz



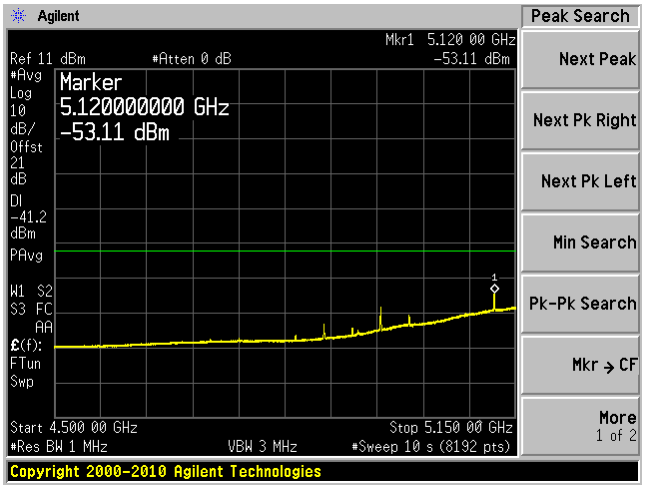
Chain J2, Plot: 30 MHz – 6 GHz



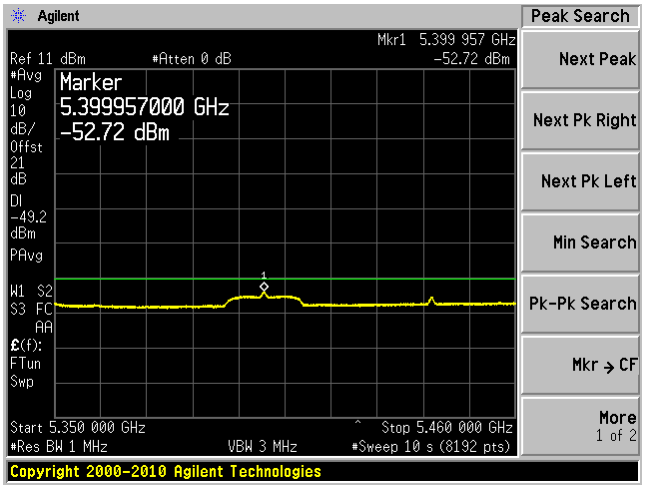
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

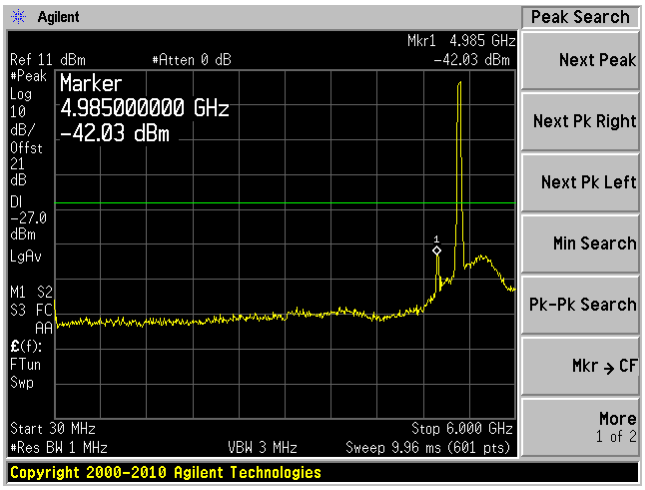


Chain J2, Plot: 5350MHz – 5460 MHz

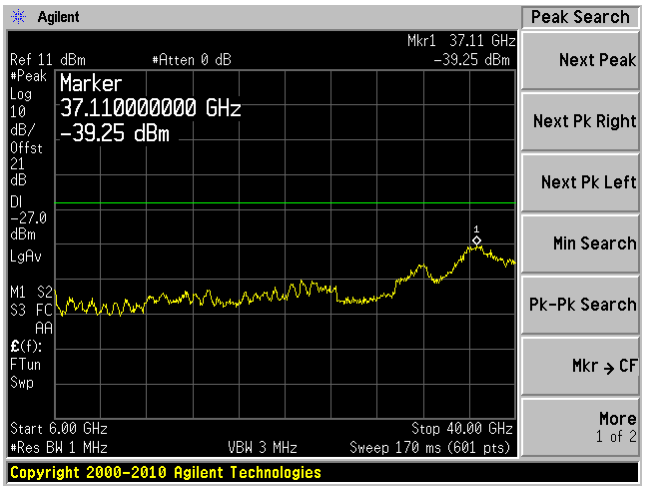


802.11n HT40, Low Channel 5270 MHz

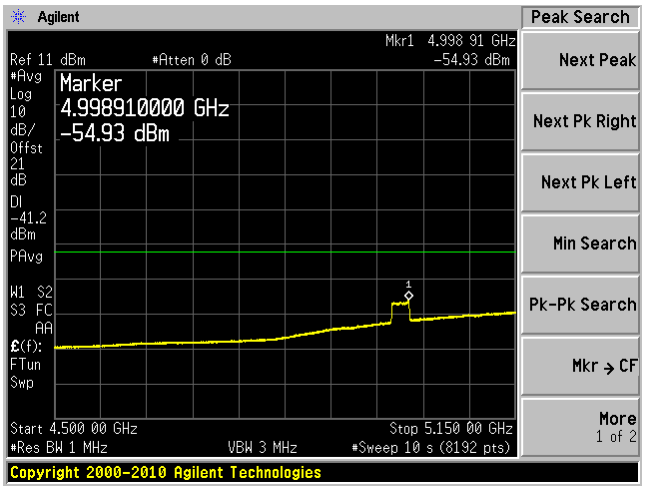
Chain J0, Plot: 30 MHz – 6 GHz



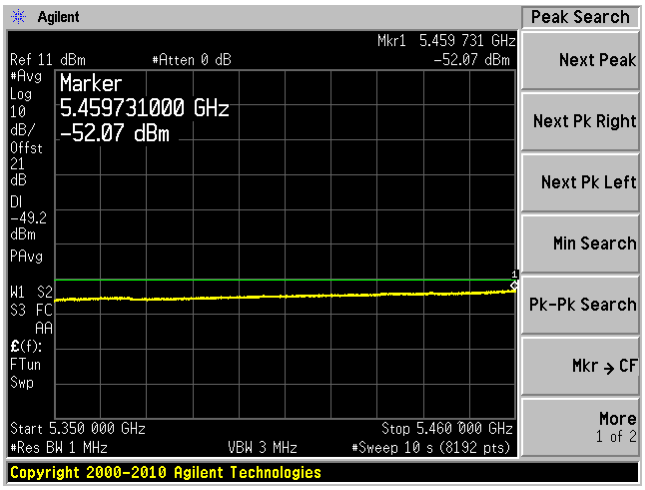
Chain J0, Plot: 6 GHz – 40 GHz



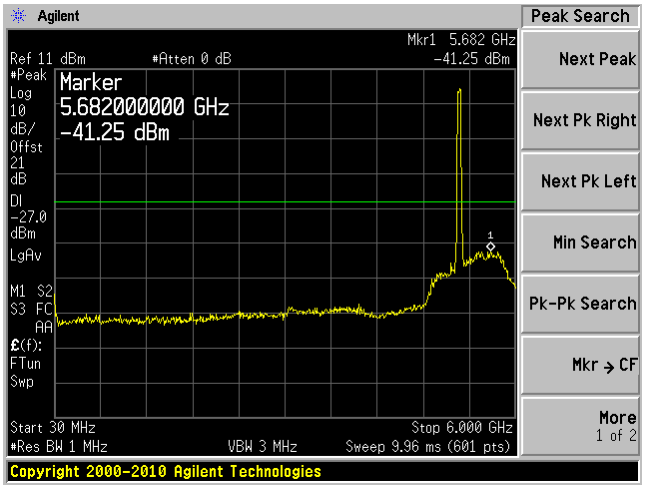
Chain J0, Plot: 4500 MHz – 5150 MHz



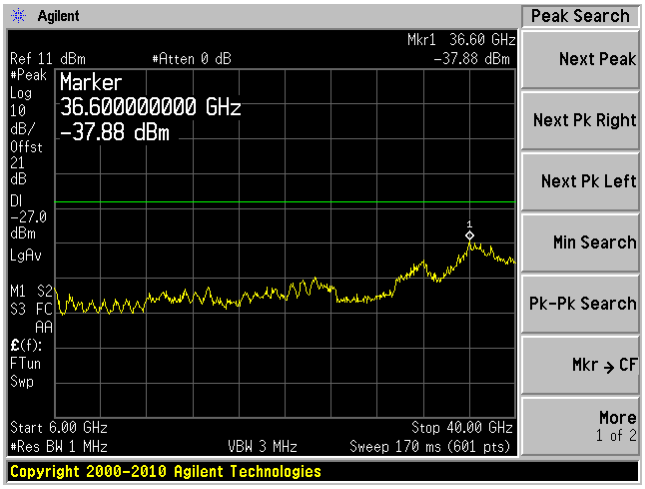
Chain J0, Plot: 5350MHz – 5460 MHz



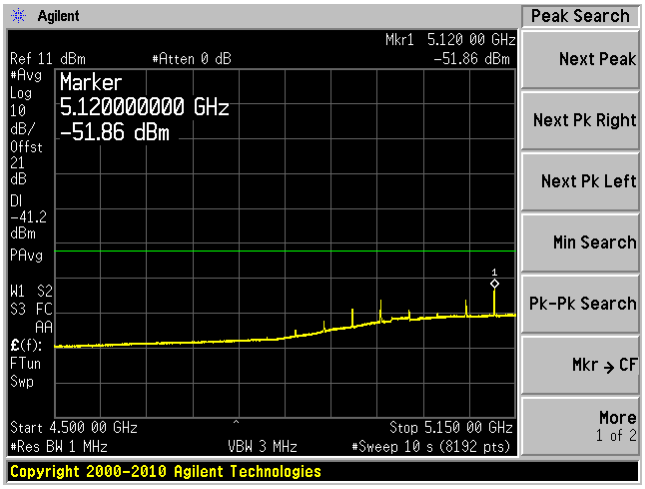
Chain J1, Plot: 30 MHz – 6 GHz



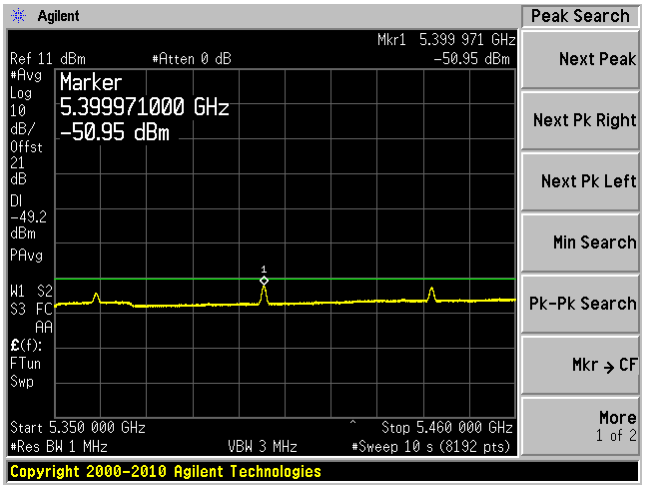
Chain J1, Plot: 6 GHz – 40 GHz



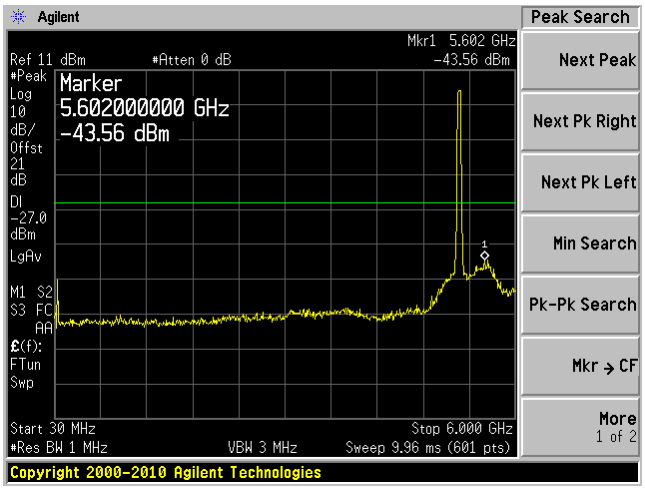
Chain J1, Plot: 4500 MHz – 5150 MHz



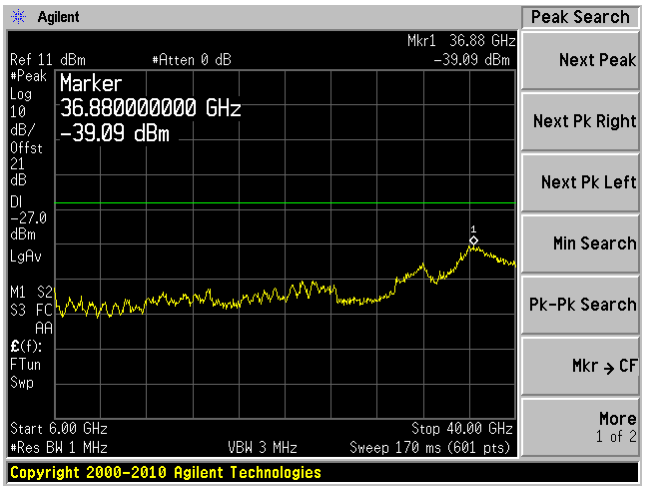
Chain J1, Plot: 5350MHz – 5460 MHz



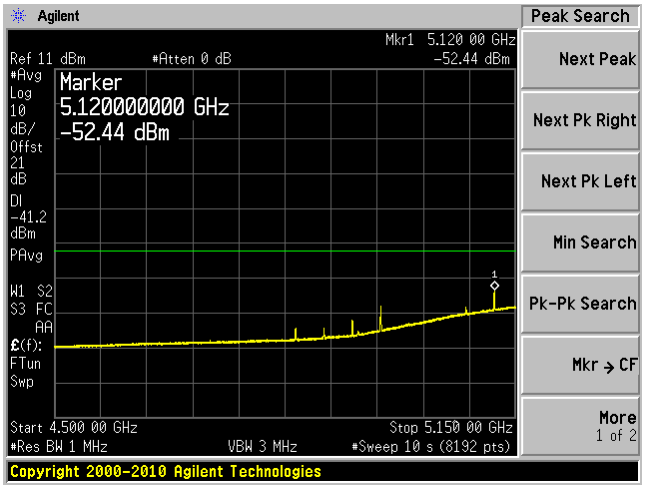
Chain J2, Plot: 30 MHz – 6 GHz



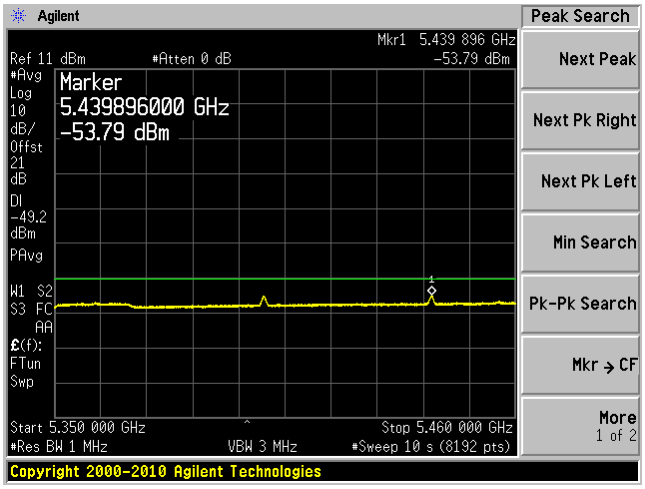
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

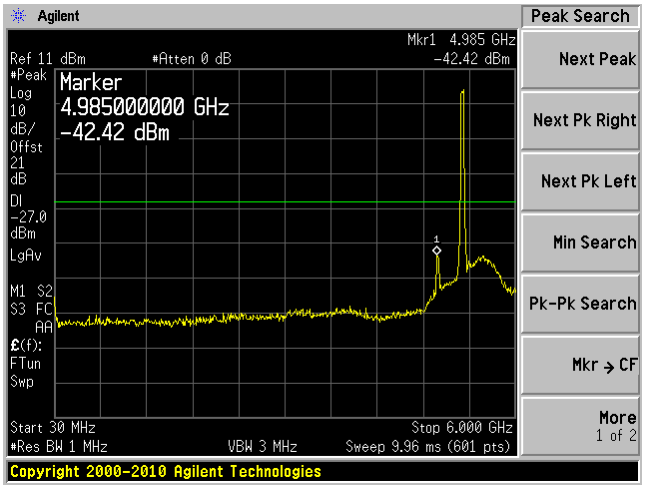


Chain J2, Plot: 5350MHz – 5460 MHz

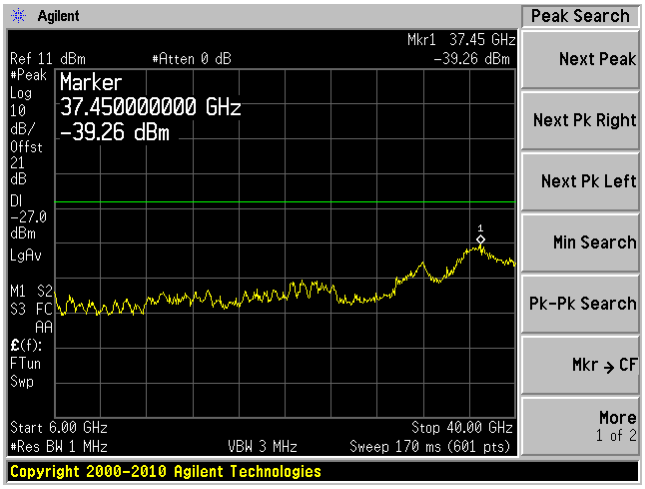


802.11n HT40, High Channel 5310 MHz

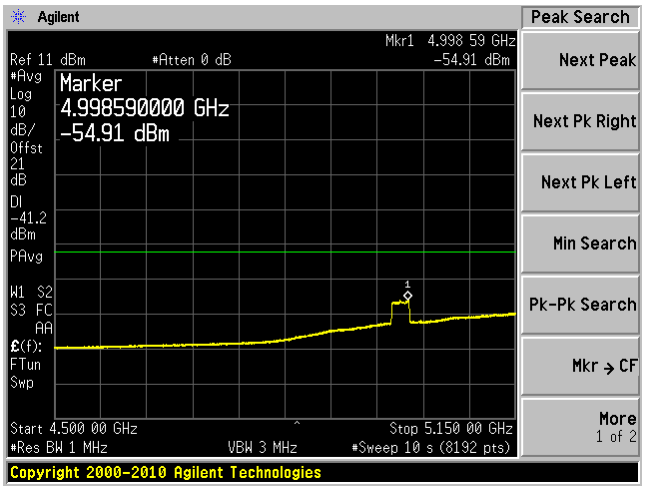
Chain J0, Plot: 30 MHz – 6 GHz



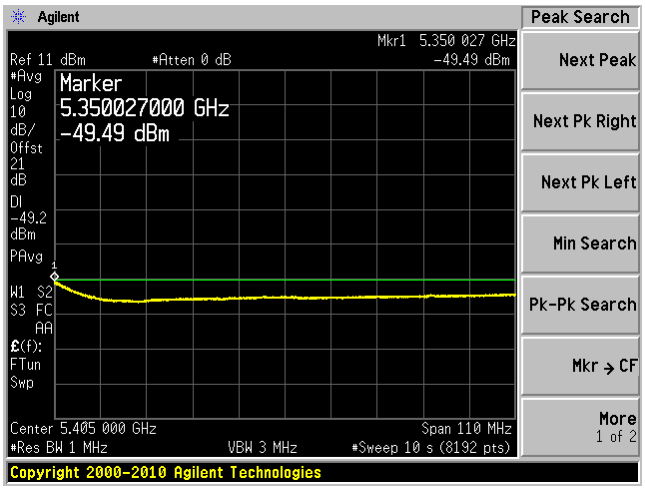
Chain J0, Plot: 6 GHz – 40 GHz



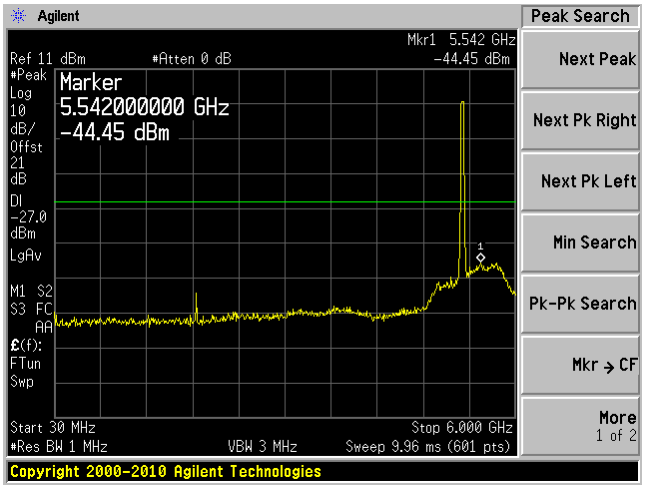
Chain J0, Plot: 4500 MHz – 5150 MHz



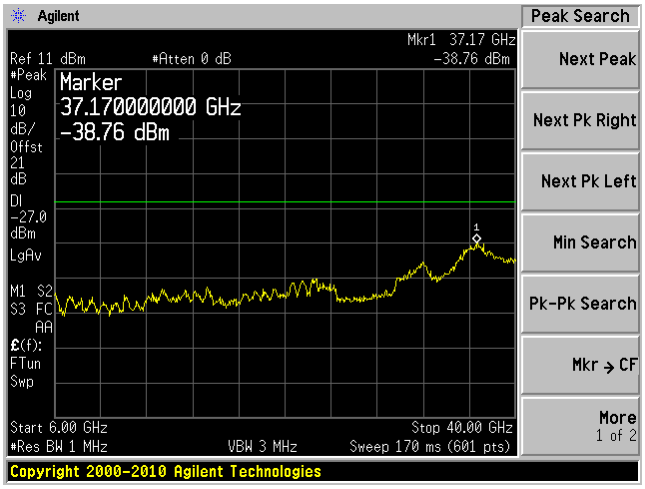
Chain J0, Plot: 5350MHz – 5460 MHz



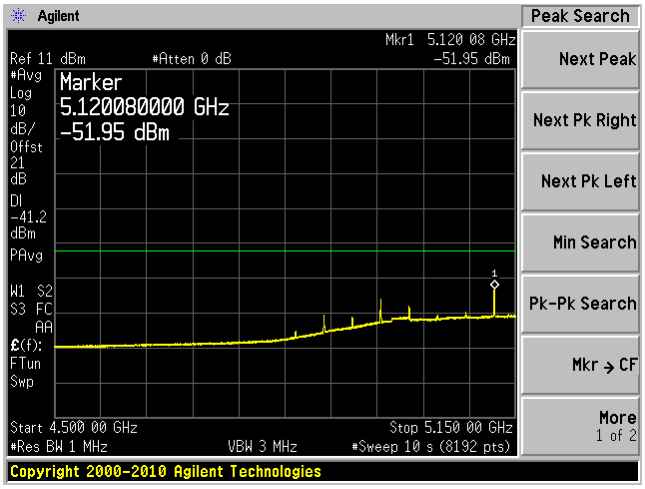
Chain J1, Plot: 30 MHz – 6 GHz



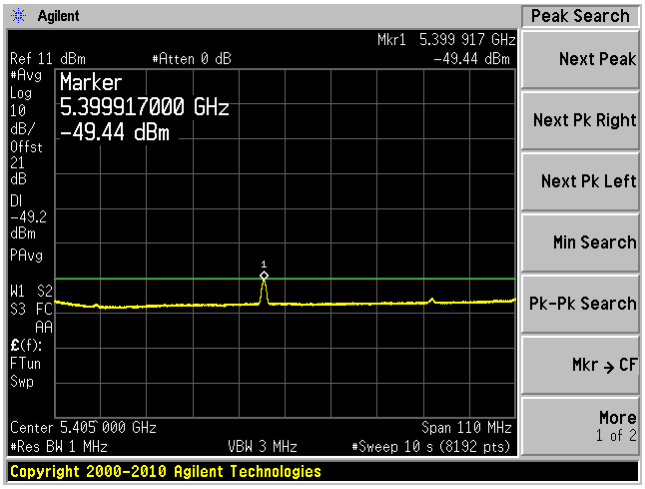
Chain J1, Plot: 6 GHz – 40 GHz



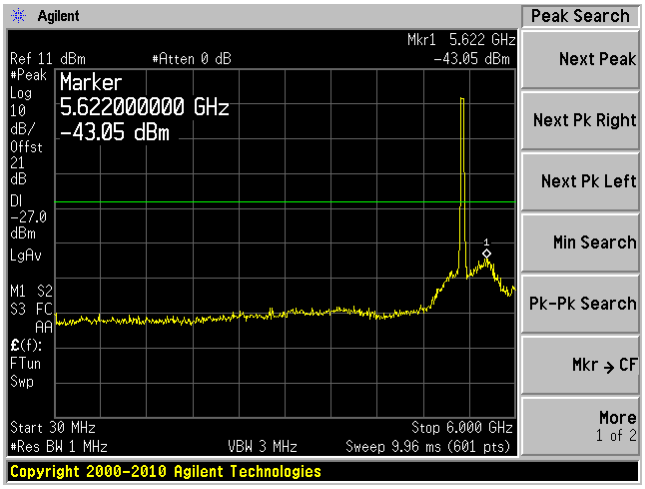
Chain J1, Plot: 4500 MHz – 5150 MHz



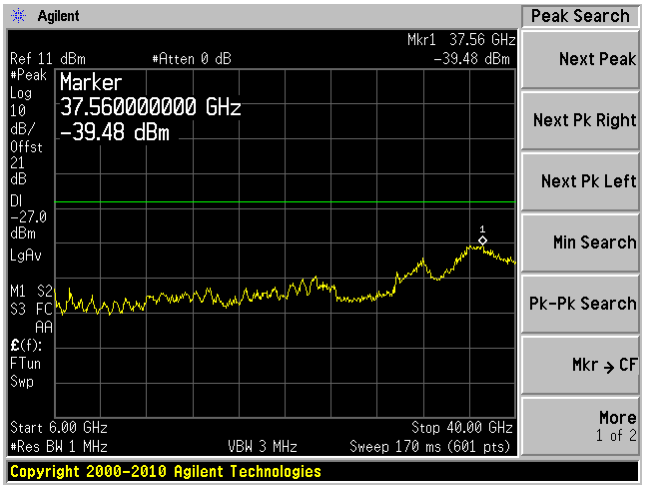
Chain J1, Plot: 5350MHz – 5460 MHz



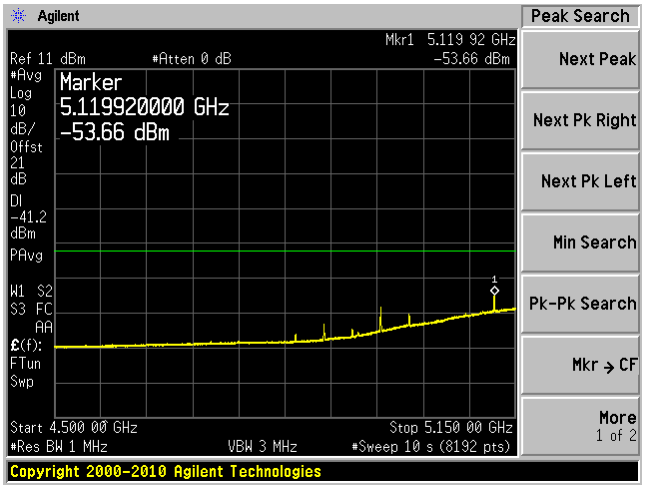
Chain J2, Plot: 30 MHz – 6 GHz



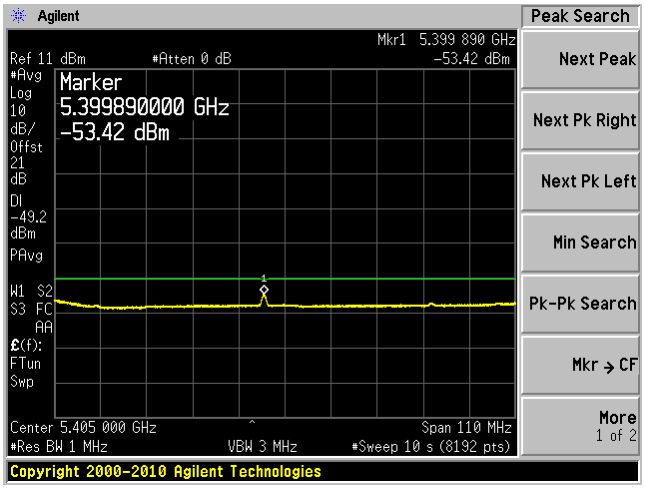
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz



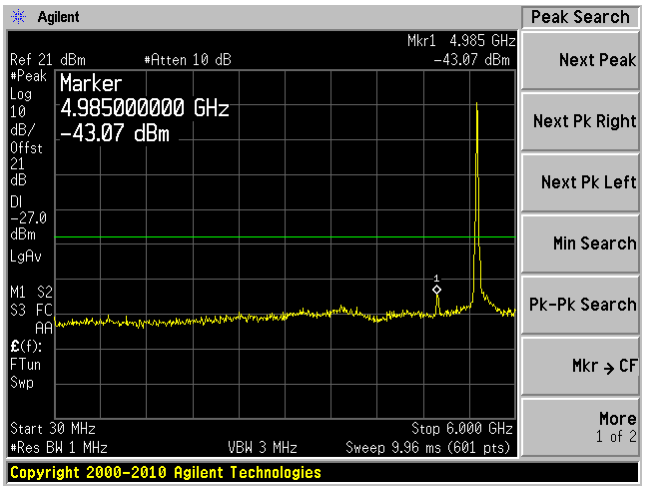
Chain J2, Plot: 5350MHz – 5460 MHz



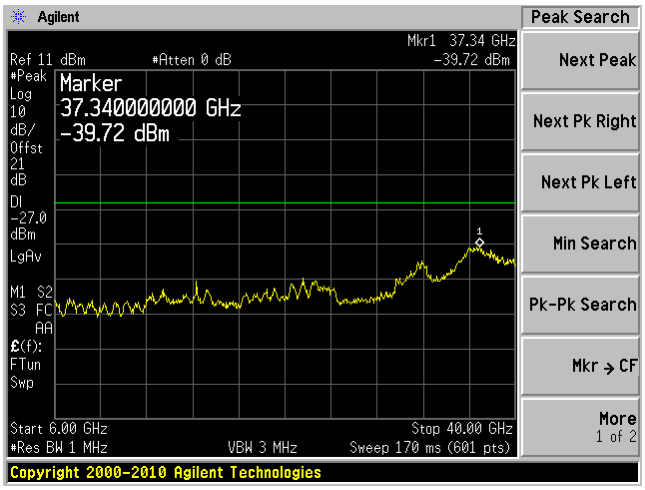
5470-5725 MHz Band

802.11a, Low Channel, 5500 MHz

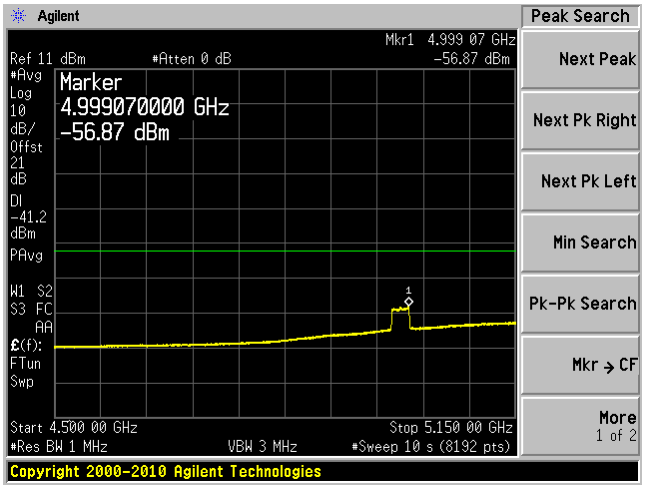
Chain J0, Plot: 30 MHz – 6 GHz



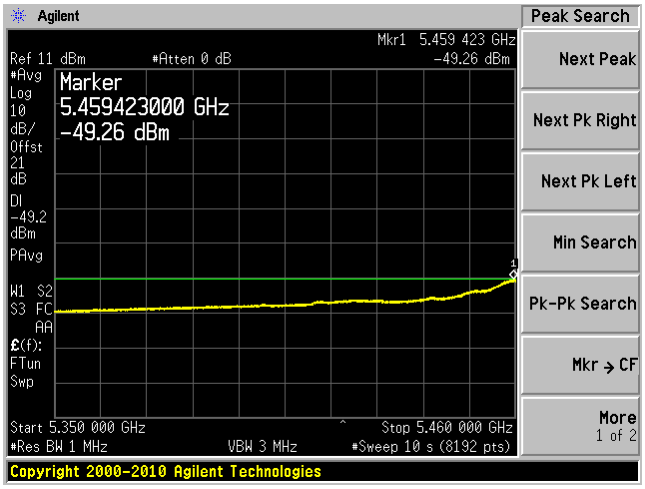
Chain J0, Plot: 6 GHz – 40 GHz



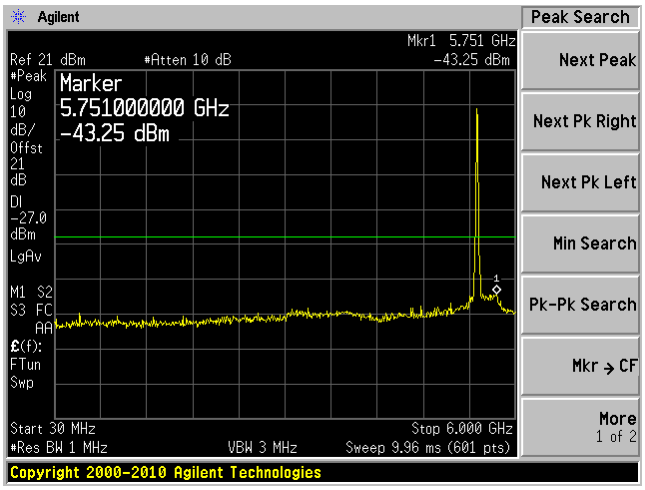
Chain J0, Plot: 4500 MHz – 5150 MHz



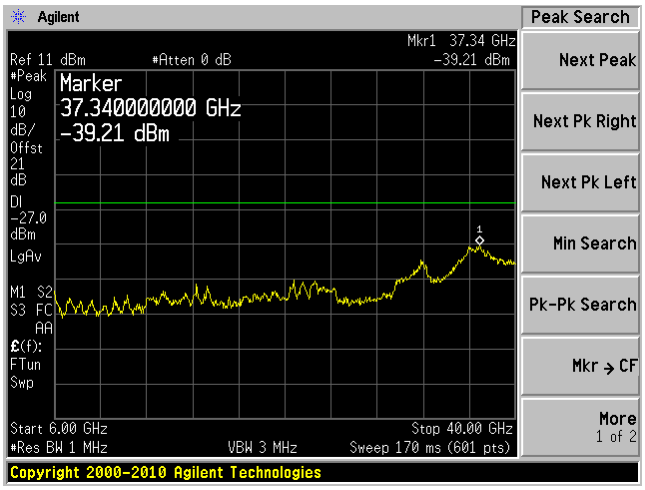
Chain J0, Plot: 5350MHz – 5460 MHz



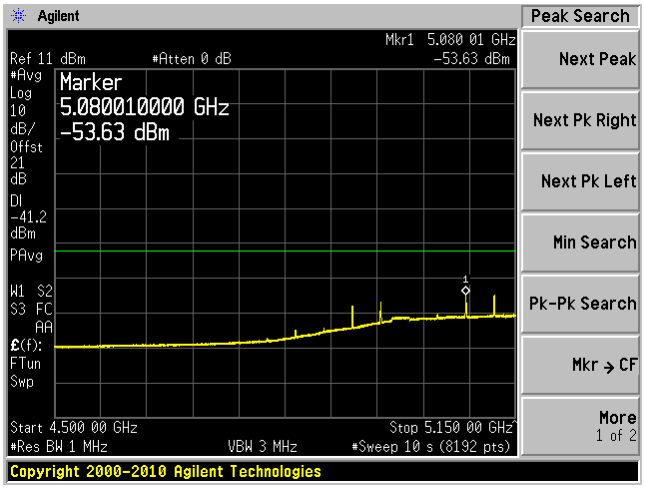
Chain J1, Plot: 30 MHz – 6 GHz



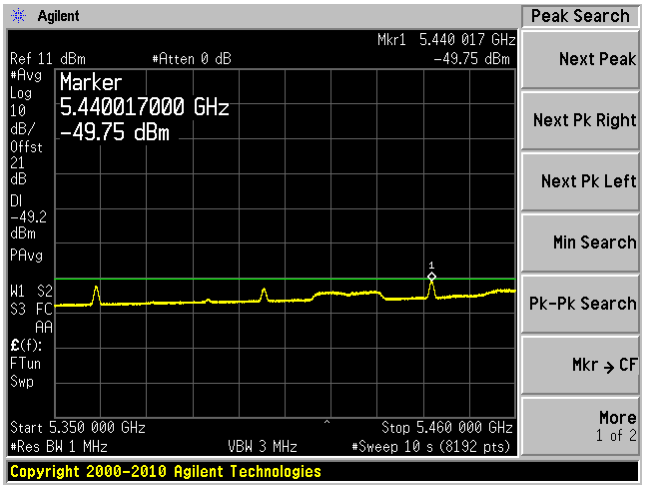
Chain J1, Plot: 6 GHz – 40 GHz



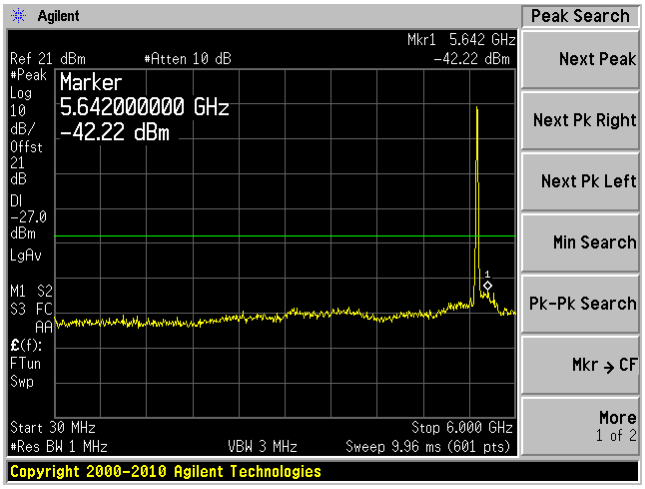
Chain J1, Plot: 4500 MHz – 5150 MHz



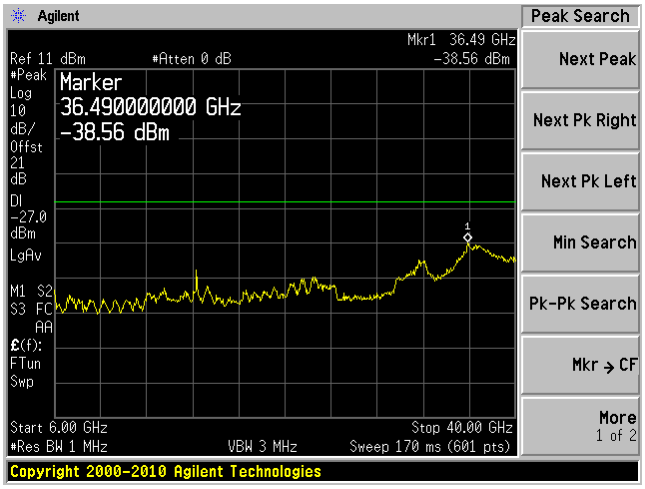
Chain J1, Plot: 5350MHz – 5460 MHz



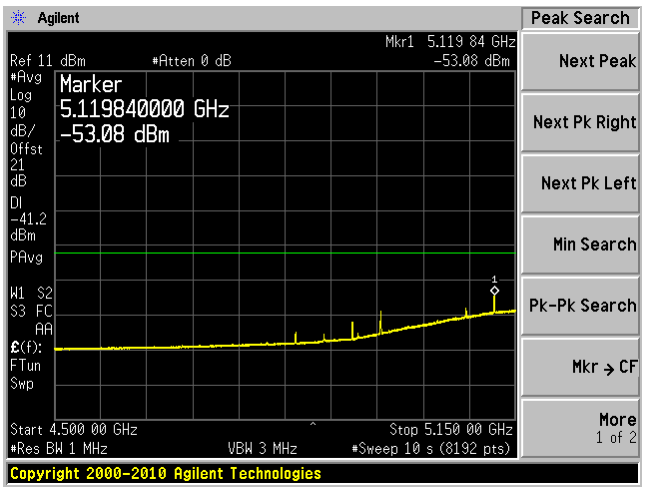
Chain J2, Plot: 30 MHz – 6 GHz



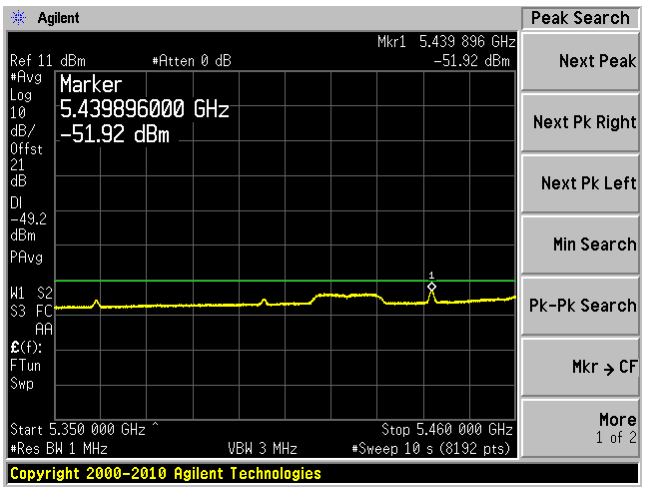
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

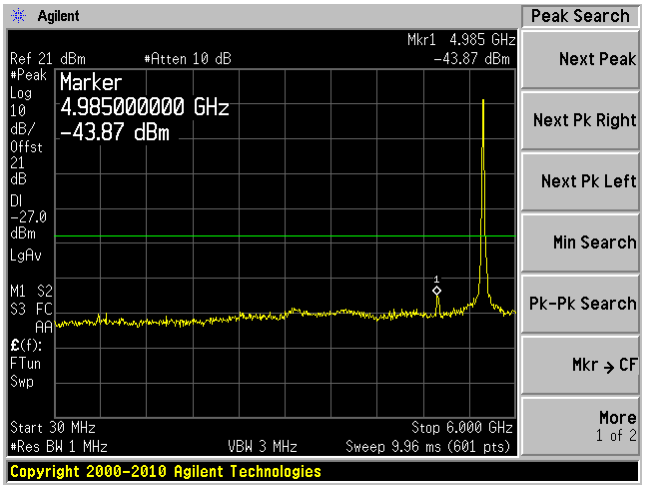


Chain J2, Plot: 5350MHz – 5460 MHz

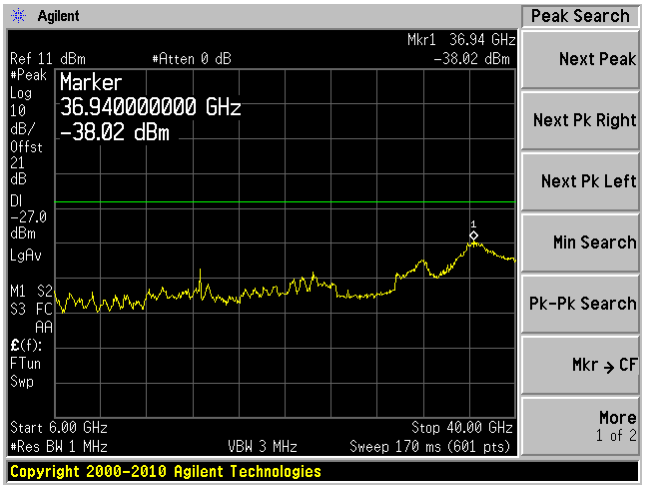


802.11a, Middle Channel, 5580 MHz

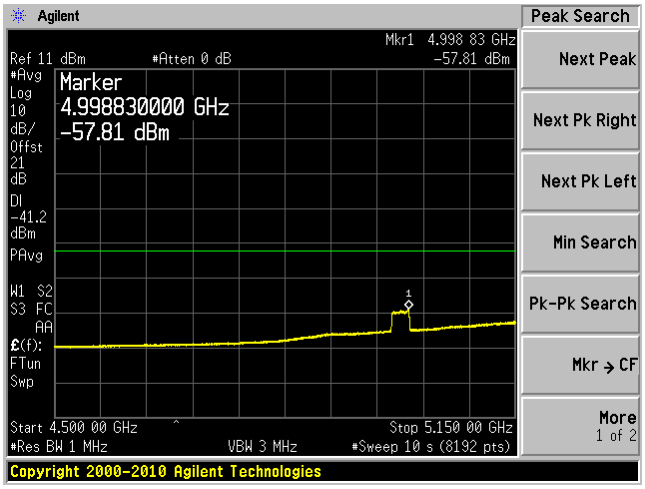
Chain J0, Plot: 30 MHz – 6 GHz



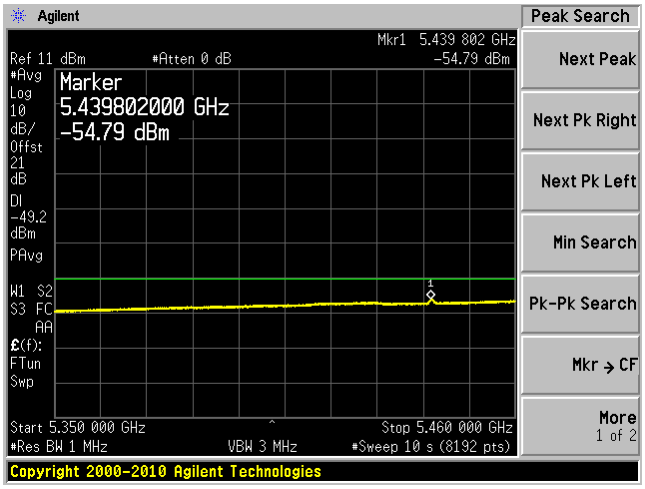
Chain J0, Plot: 6 GHz – 40 GHz



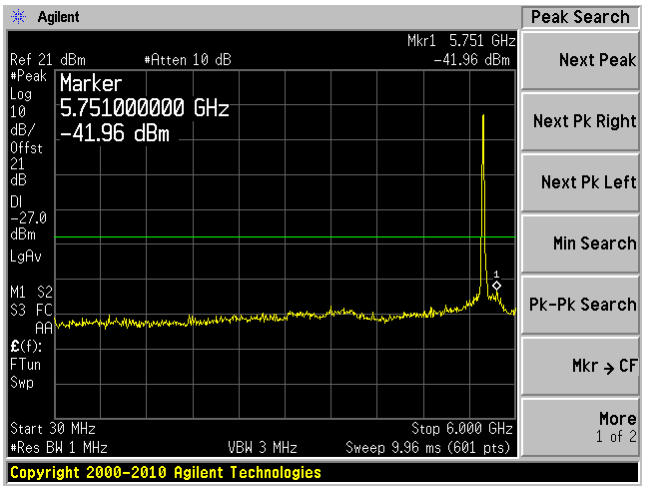
Chain J0, Plot: 4500 MHz – 5150 MHz



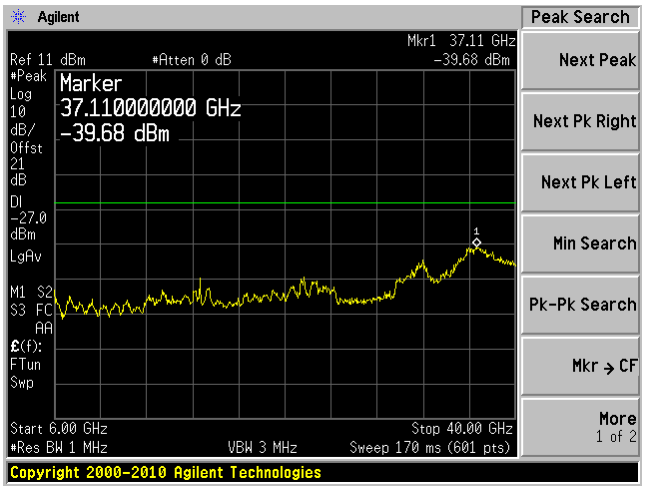
Chain J0, Plot: 5350MHz – 5460 MHz



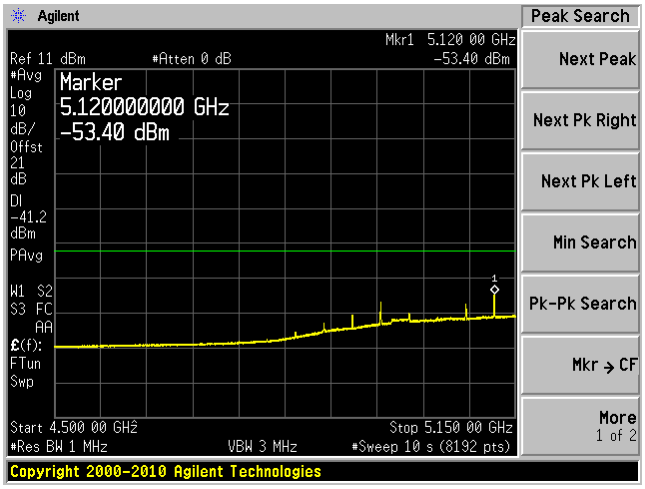
Chain J1, Plot: 30 MHz – 6 GHz



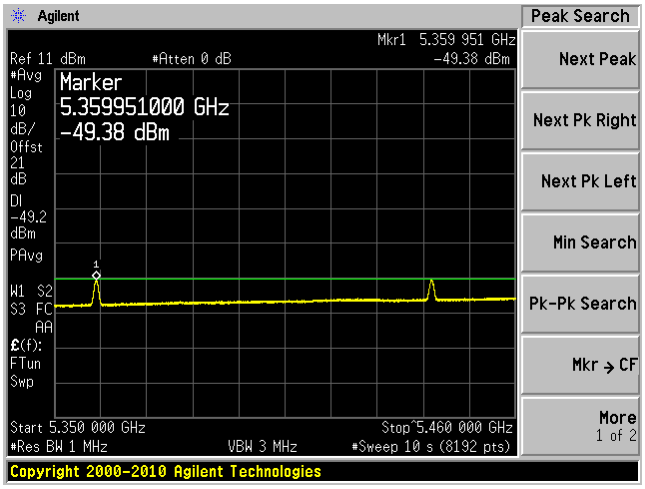
Chain J1, Plot: 6 GHz – 40 GHz



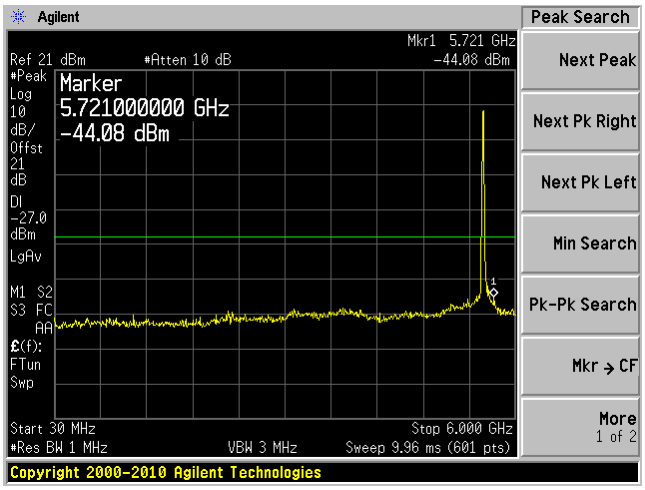
Chain J1, Plot: 4500 MHz – 5150 MHz



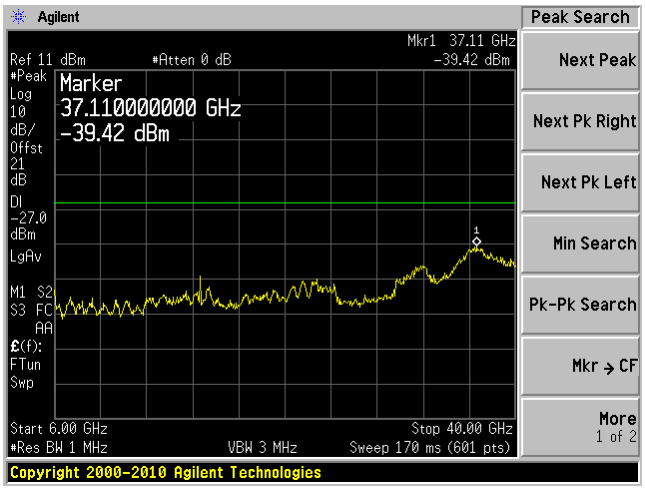
Chain J1, Plot: 5350MHz – 5460 MHz



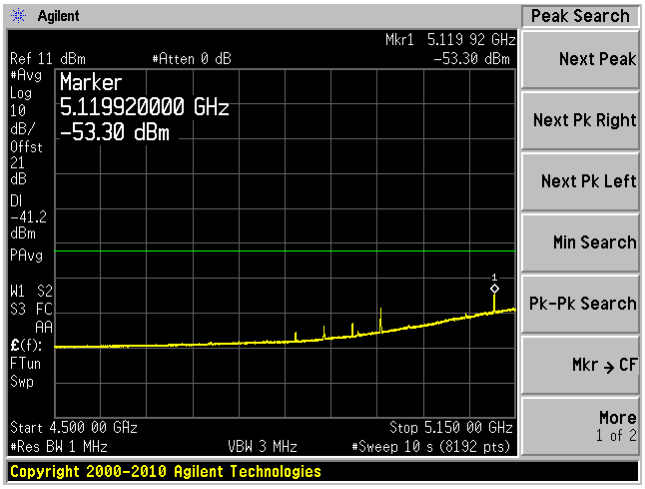
Chain J2, Plot: 30 MHz – 6 GHz



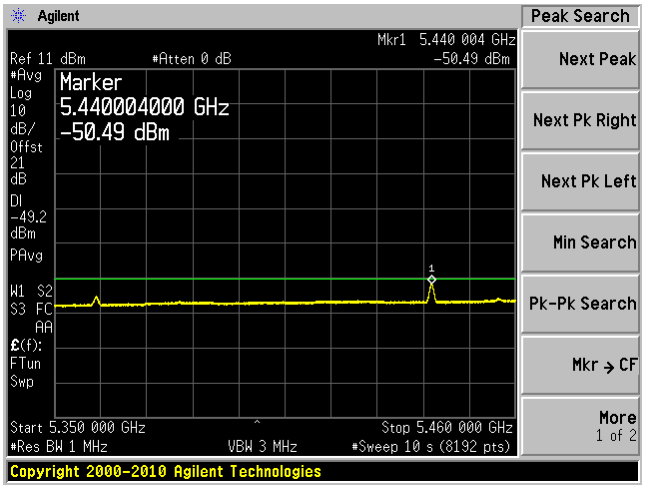
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

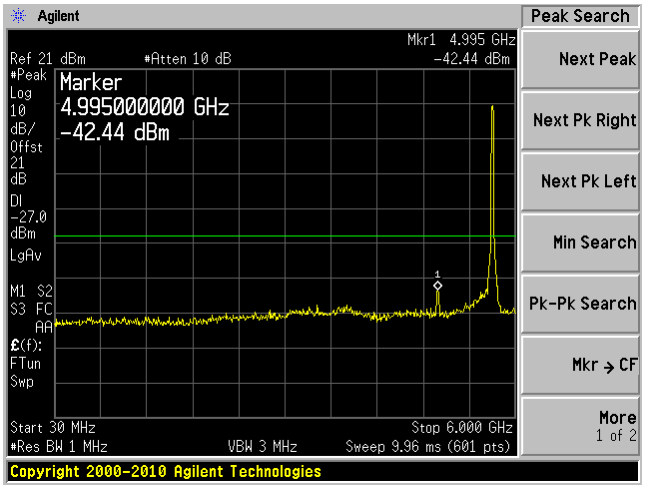


Chain J2, Plot: 5350MHz – 5460 MHz

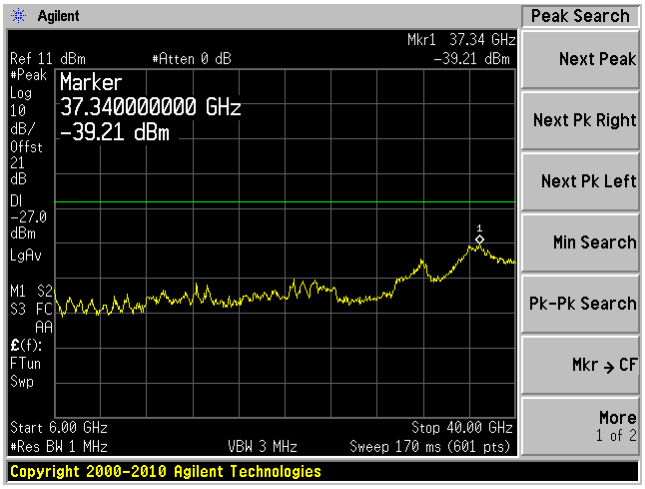


802.11a, High Channel, 5700 MHz

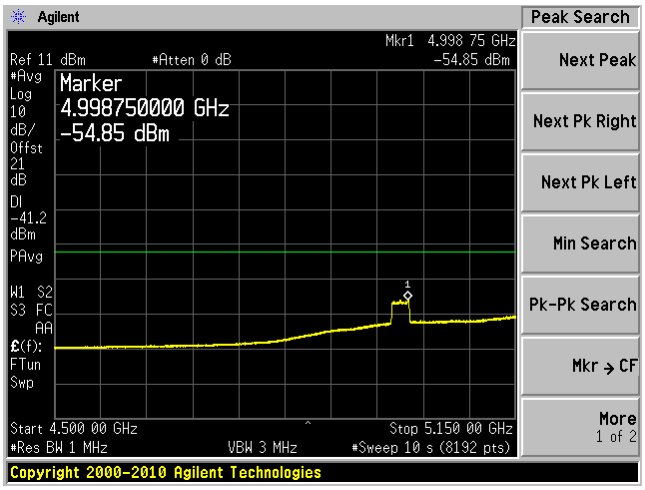
Chain J0, Plot: 30 MHz – 6 GHz



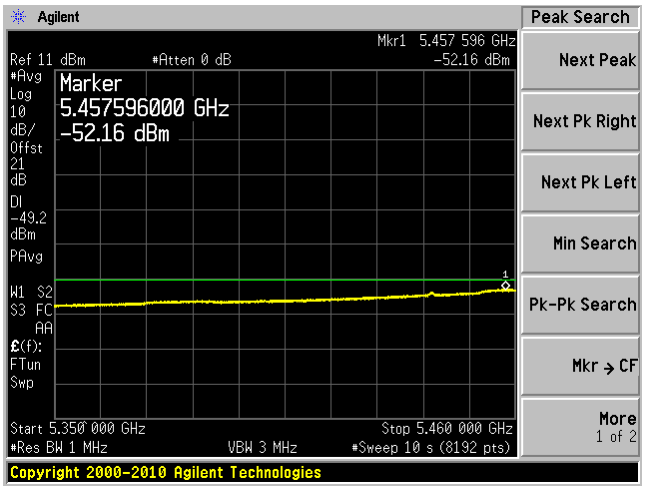
Chain J0, Plot: 6 GHz – 40 GHz



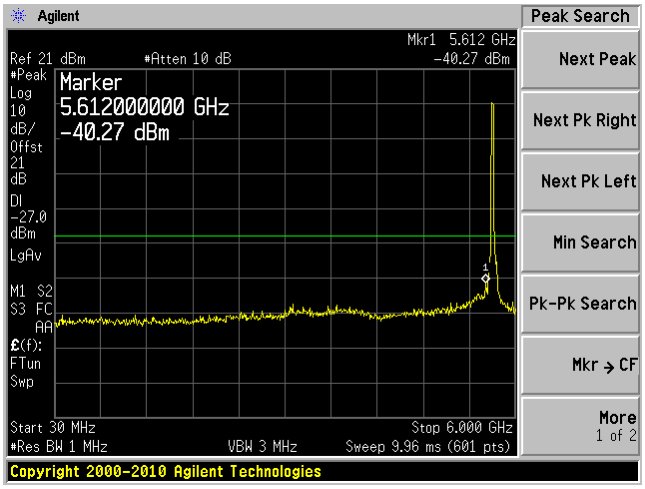
Chain J0, Plot: 4500 MHz – 5150 MHz



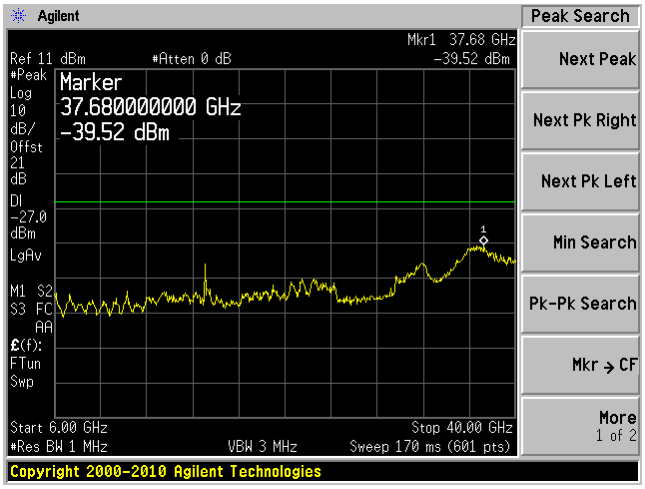
Chain J0, Plot: 5350MHz – 5460 MHz



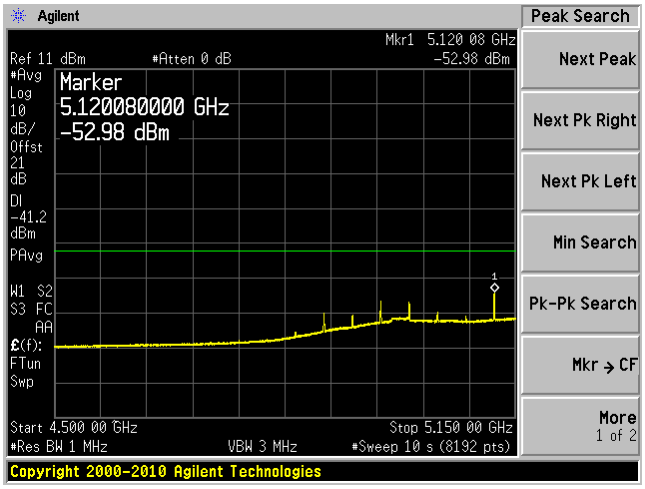
Chain J1, Plot: 30 MHz – 6 GHz



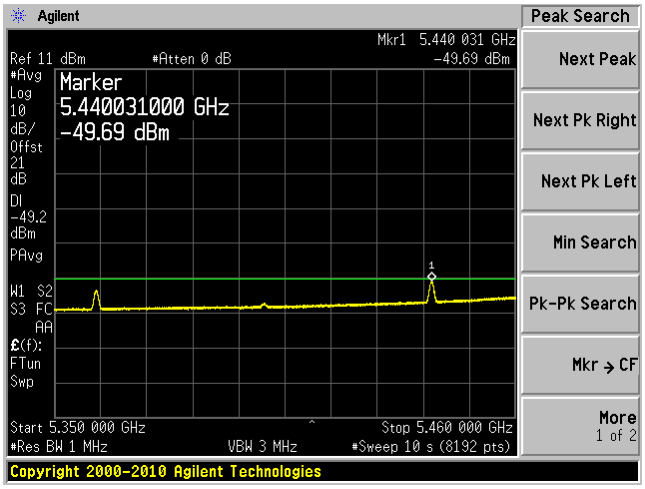
Chain J1, Plot: 6 GHz – 40 GHz



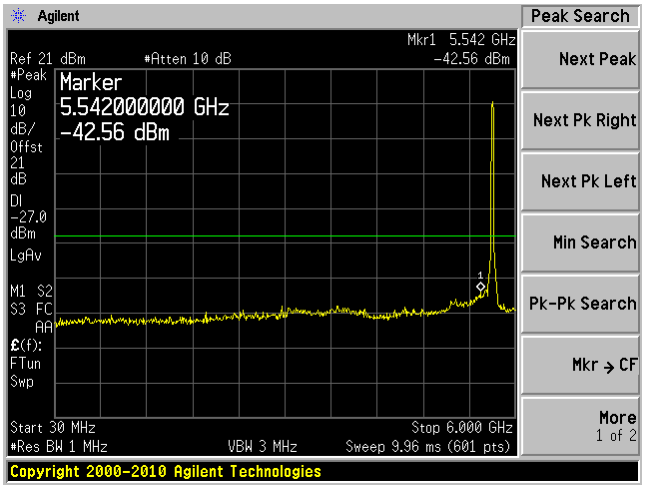
Chain J1, Plot: 4500 MHz – 5150 MHz



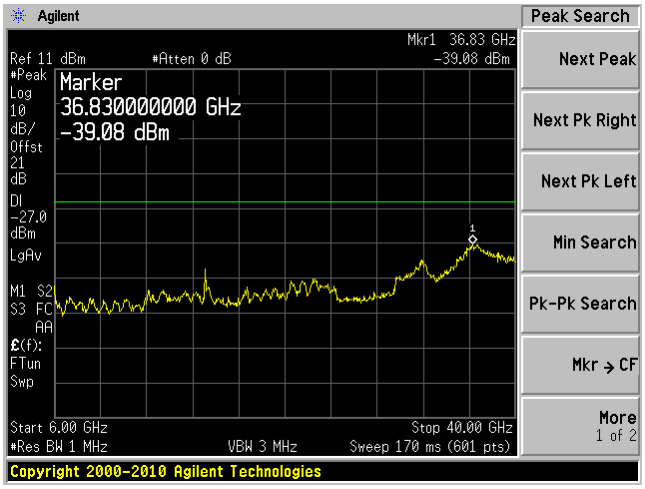
Chain J1, Plot: 5350MHz – 5460 MHz



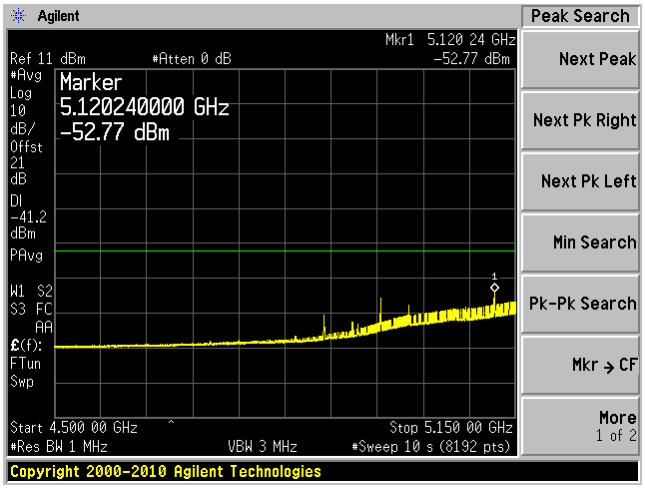
Chain J2, Plot: 30 MHz – 6 GHz



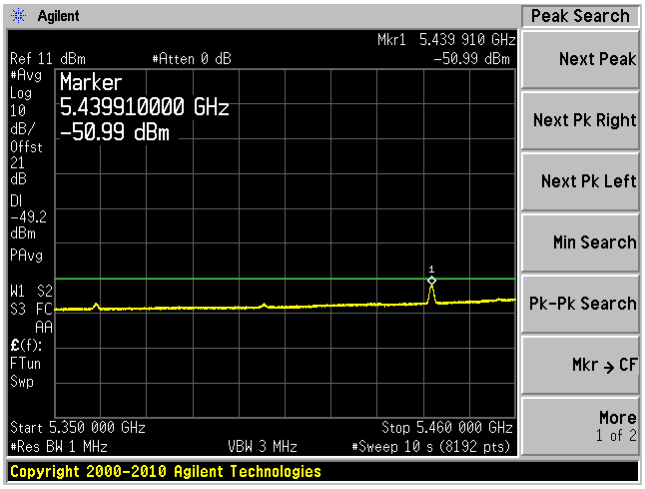
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

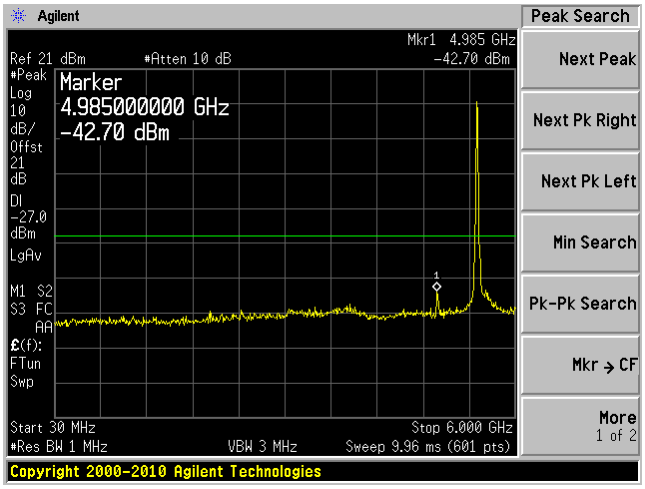


Chain J2, Plot: 5350MHz – 5460 MHz

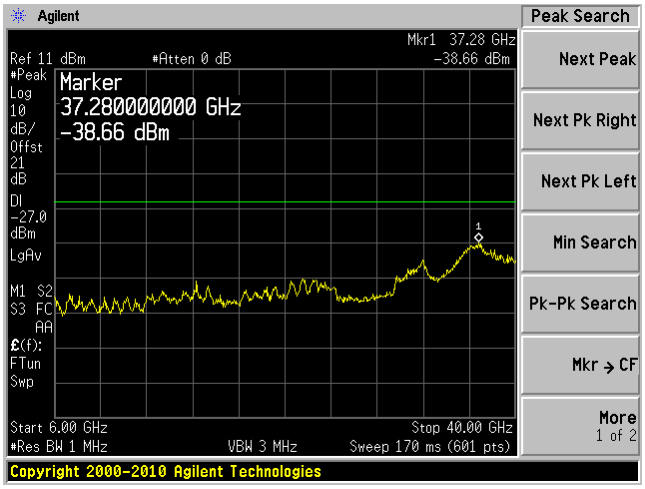


802.11n HT20, Low Channel 5500 MHz

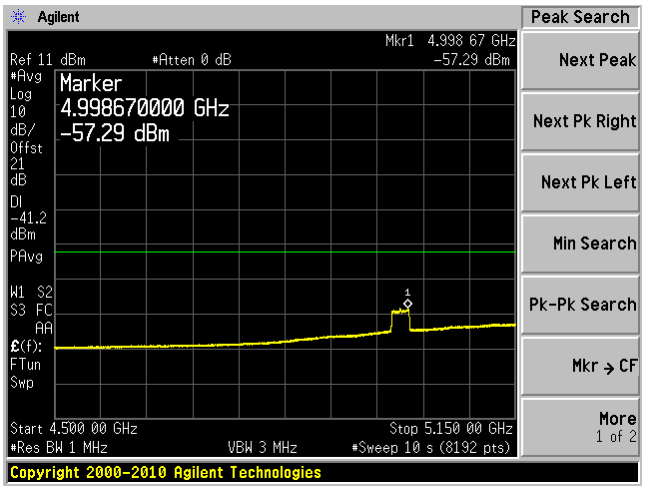
Chain J0, Plot: 30 MHz – 6 GHz



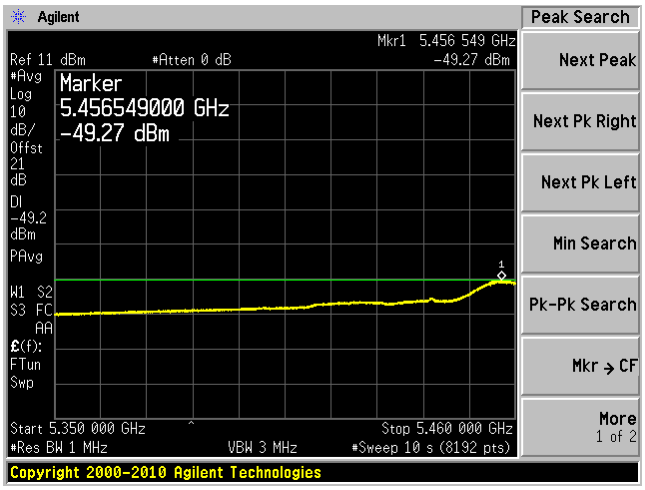
Chain J0, Plot: 6 GHz – 40 GHz



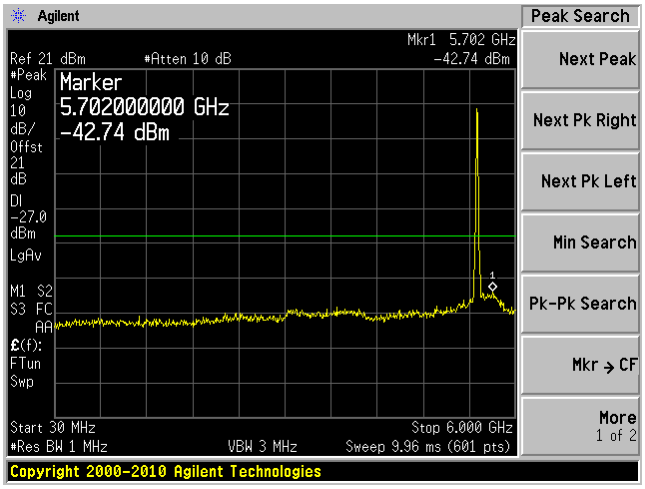
Chain J0, Plot: 4500 MHz – 5150 MHz



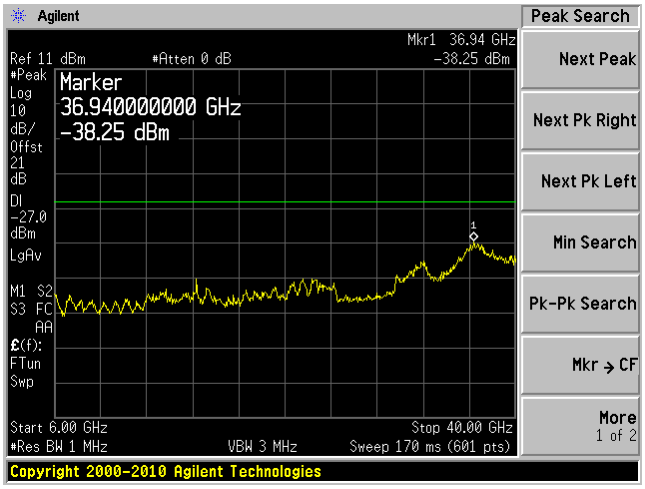
Chain J0, Plot: 5350MHz – 5460 MHz



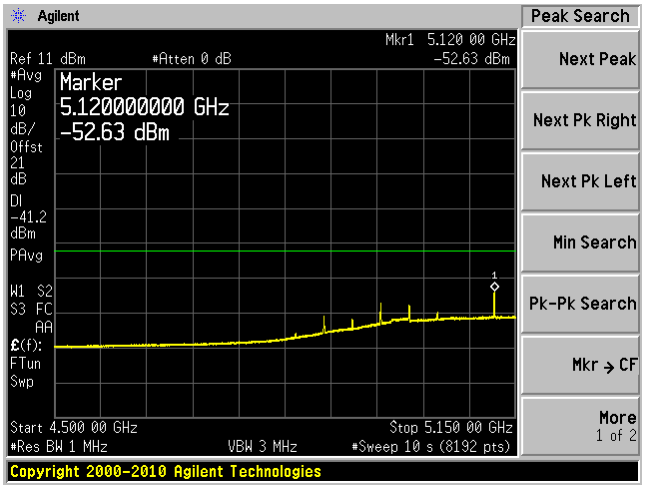
Chain J1, Plot: 30 MHz – 6 GHz



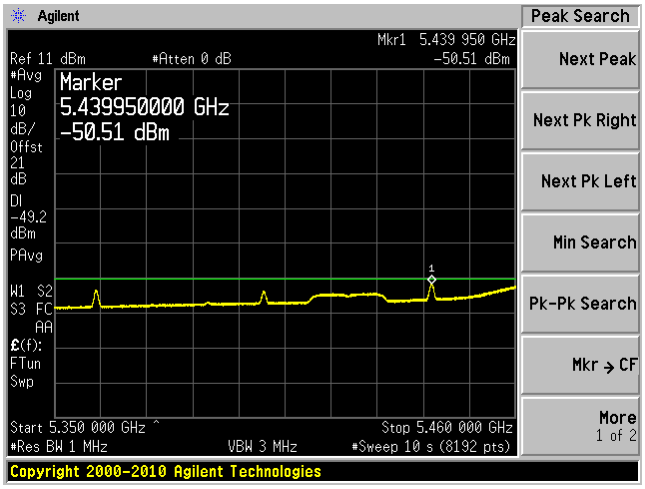
Chain J1, Plot: 6 GHz – 40 GHz



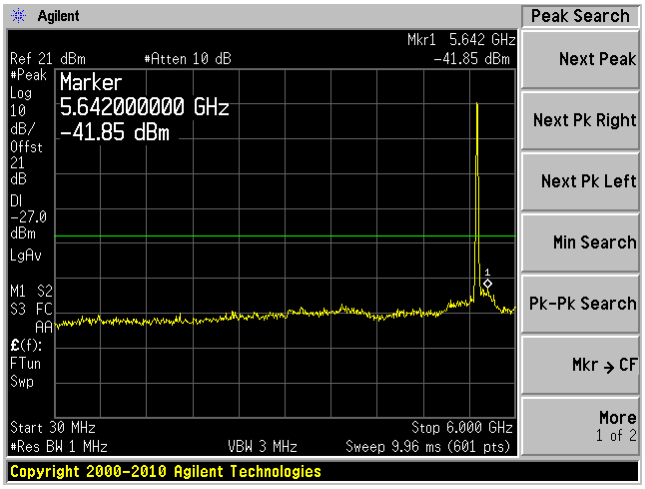
Chain J1, Plot: 4500 MHz – 5150 MHz



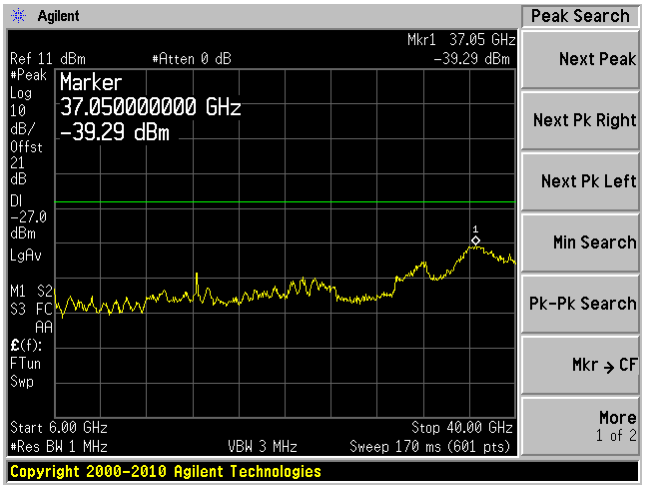
Chain J1, Plot: 5350MHz – 5460 MHz



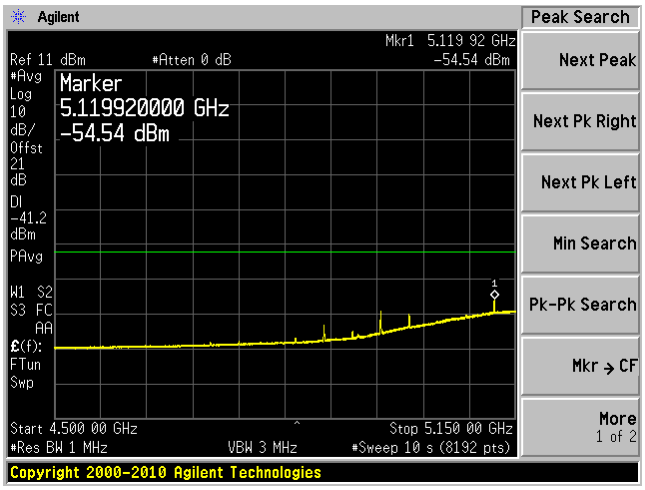
Chain J2, Plot: 30 MHz – 6 GHz



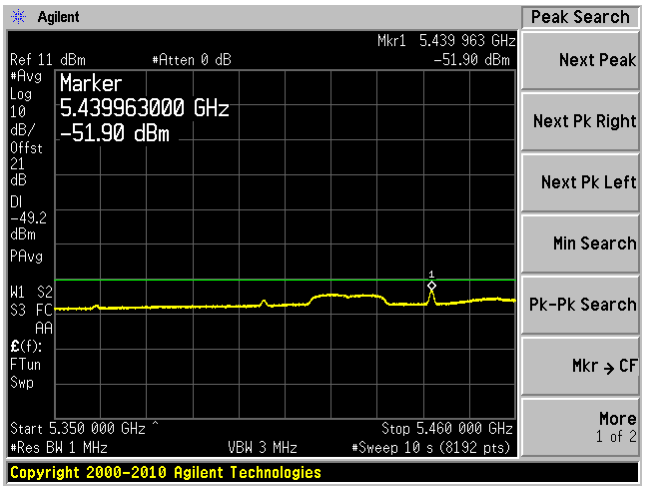
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

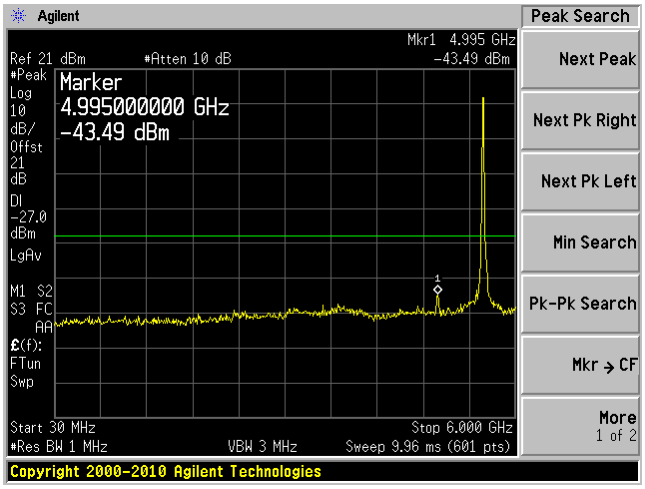


Chain J2, Plot: 5350MHz – 5460 MHz

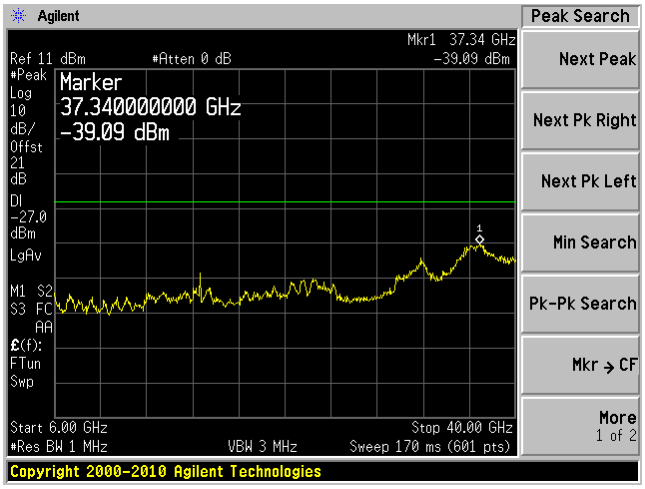


802.11n HT20, Middle Channel 5580 MHz

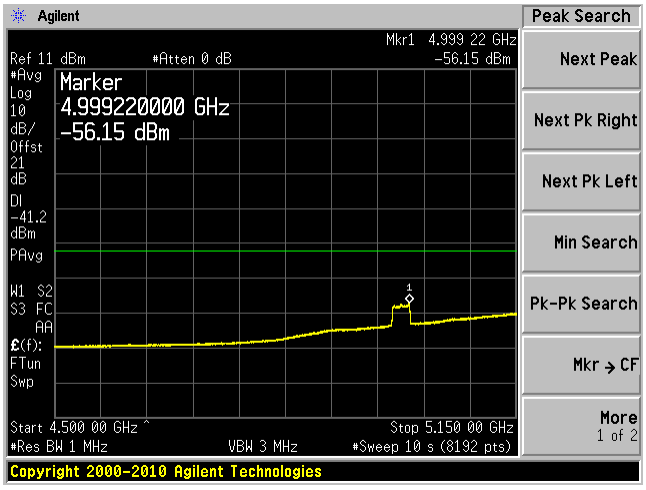
Chain J0, Plot: 30 MHz – 6 GHz



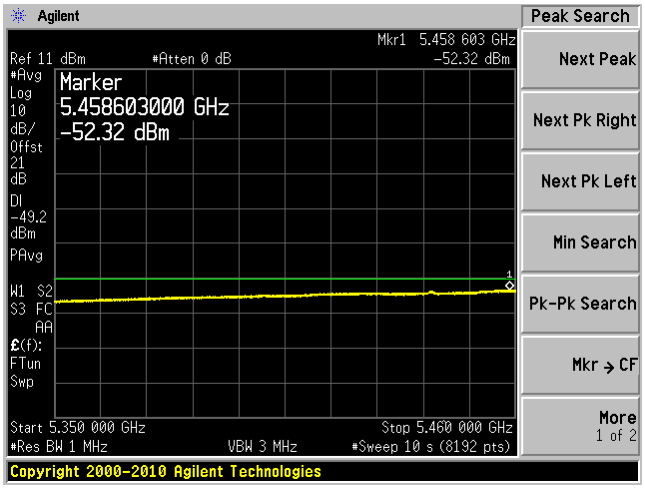
Chain J0, Plot: 6 GHz – 40 GHz



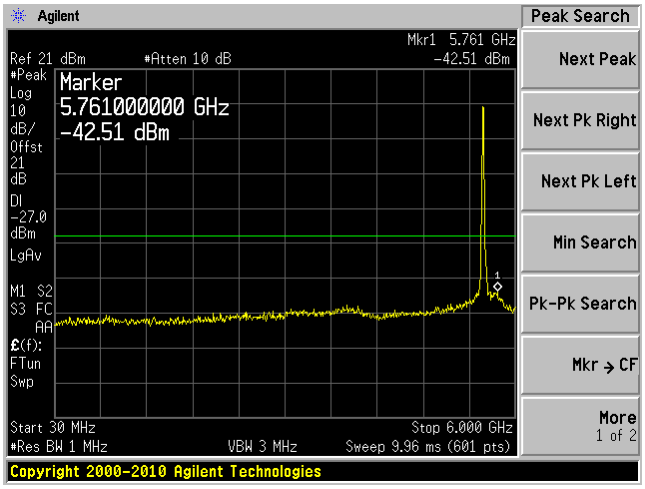
Chain J0, Plot: 4500 MHz – 5150 MHz



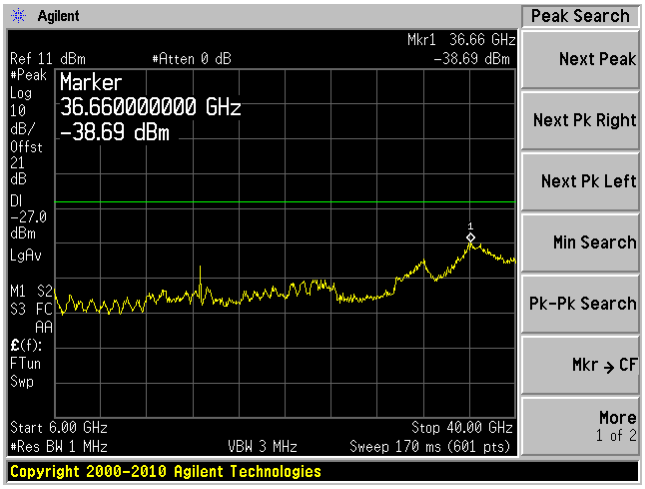
Chain J0, Plot: 5350MHz – 5460 MHz



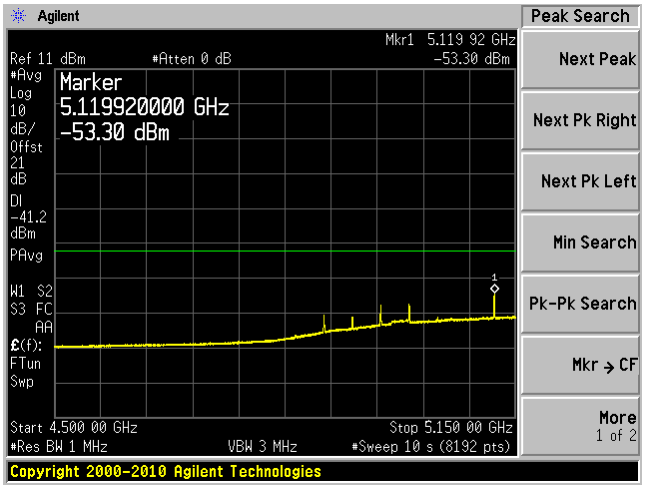
Chain J1, Plot: 30 MHz – 6 GHz



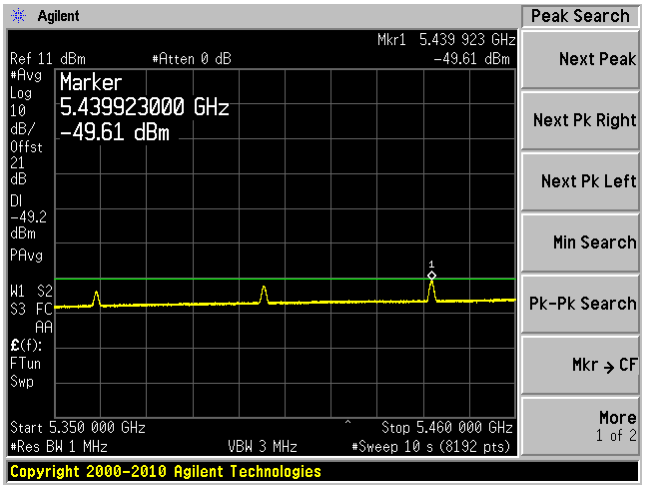
Chain J1, Plot: 6 GHz – 40 GHz



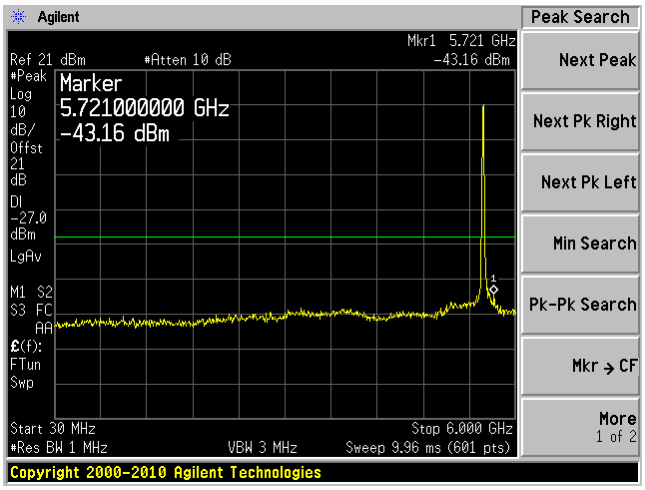
Chain J1, Plot: 4500 MHz – 5150 MHz



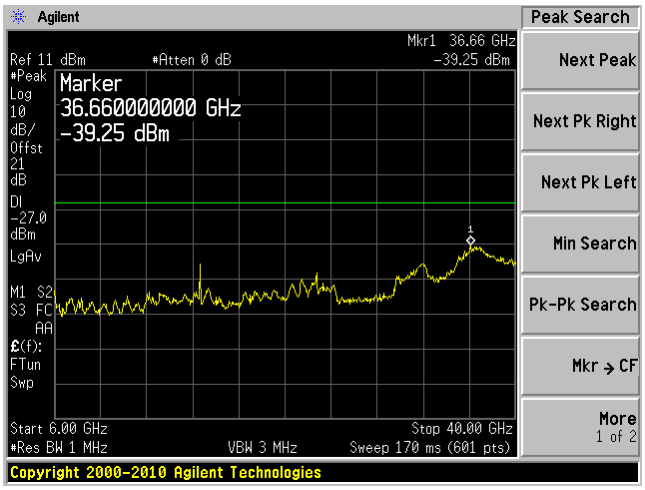
Chain J1, Plot: 5350MHz – 5460 MHz



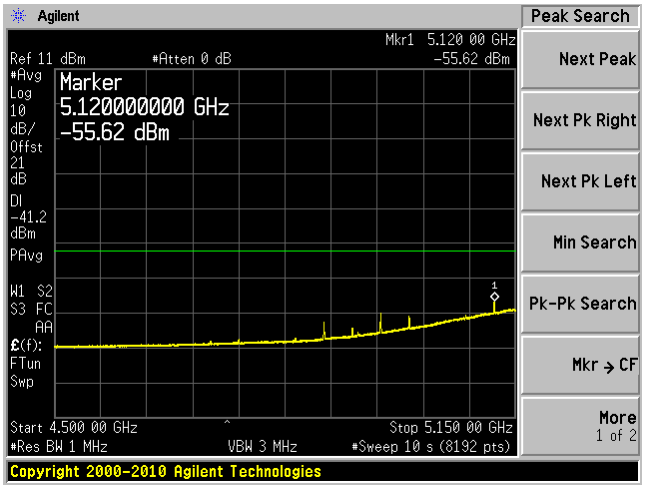
Chain J2, Plot: 30 MHz – 6 GHz



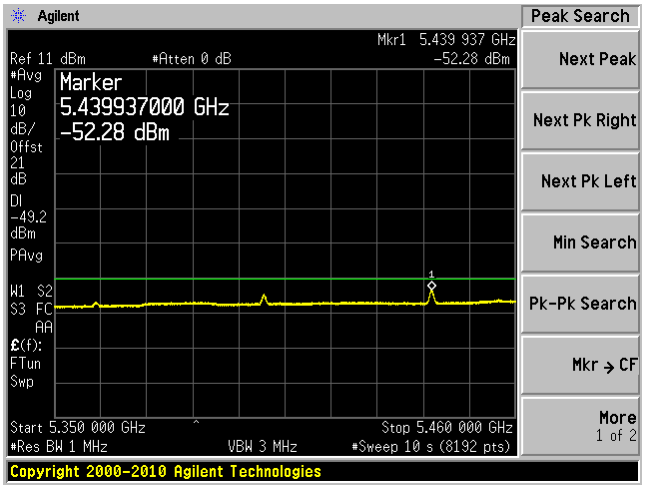
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

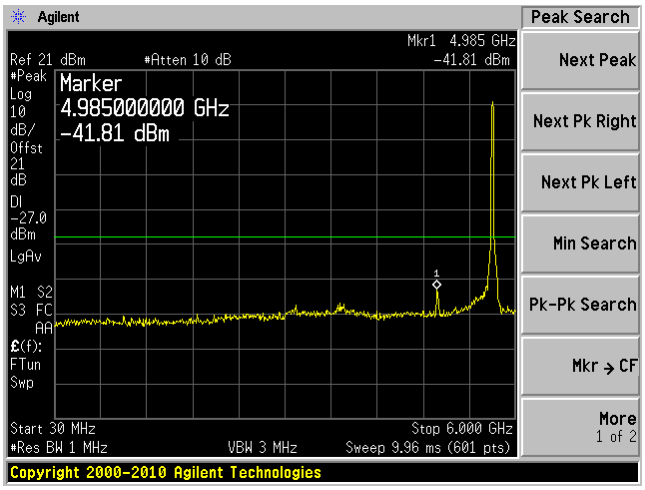


Chain J2, Plot: 5350MHz – 5460 MHz

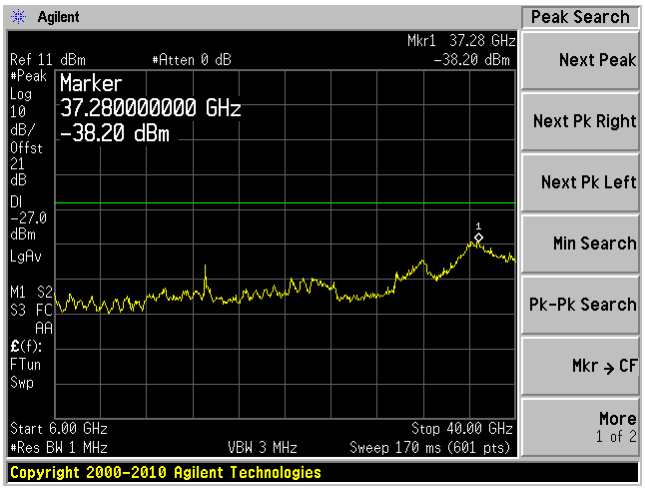


802.11n HT20, High Channel 5700 MHz

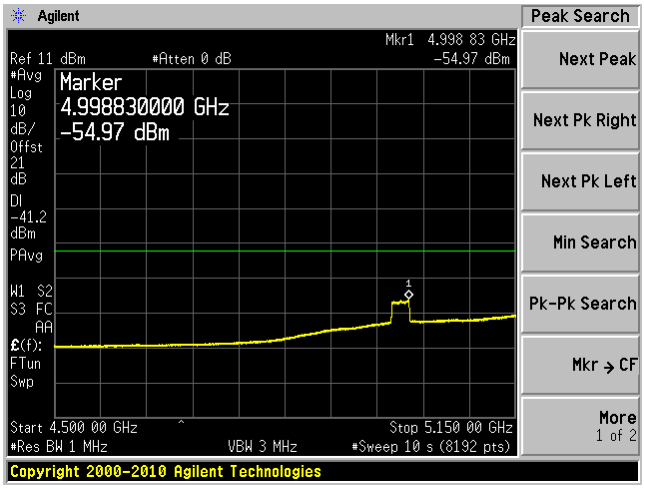
Chain J0, Plot: 30 MHz – 6 GHz



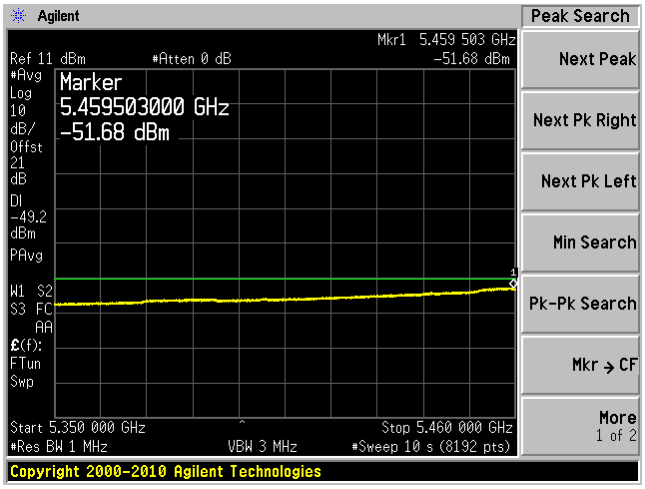
Chain J0, Plot: 6 GHz – 40 GHz



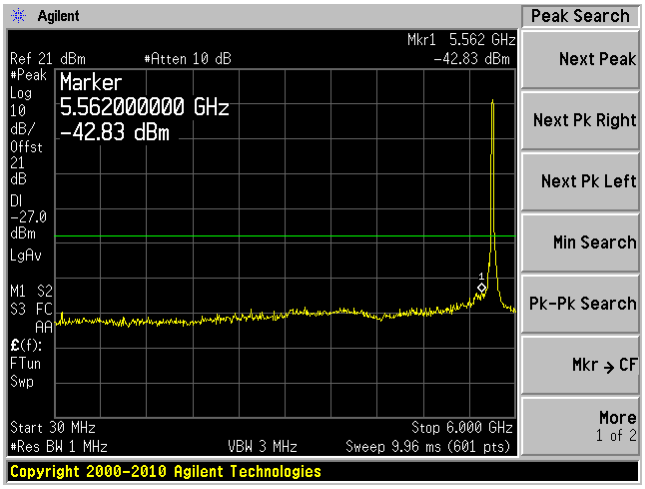
Chain J0, Plot: 4500 MHz – 5150 MHz



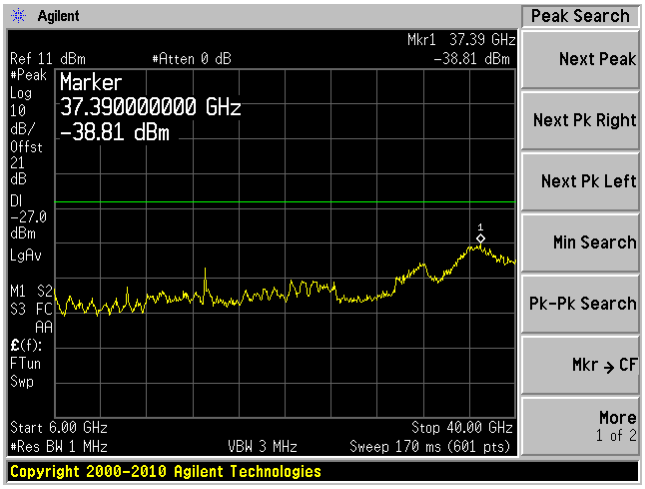
Chain J0, Plot: 5350MHz – 5460 MHz



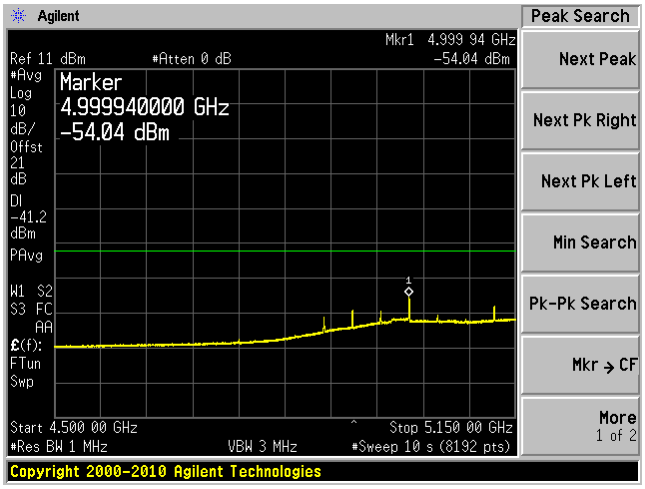
Chain J1, Plot: 30 MHz – 6 GHz



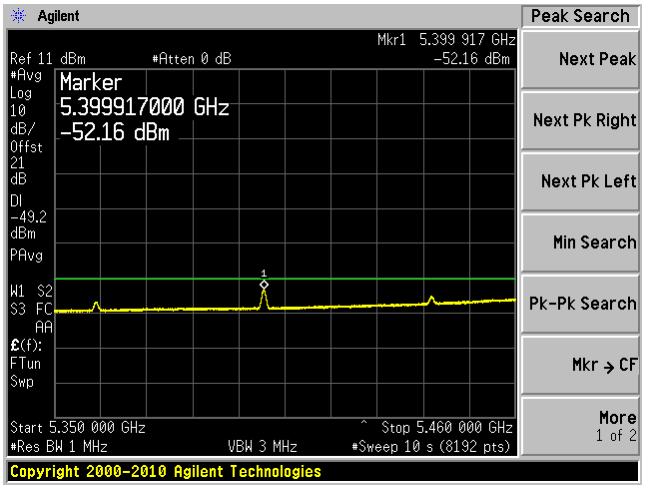
Chain J1, Plot: 6 GHz – 40 GHz



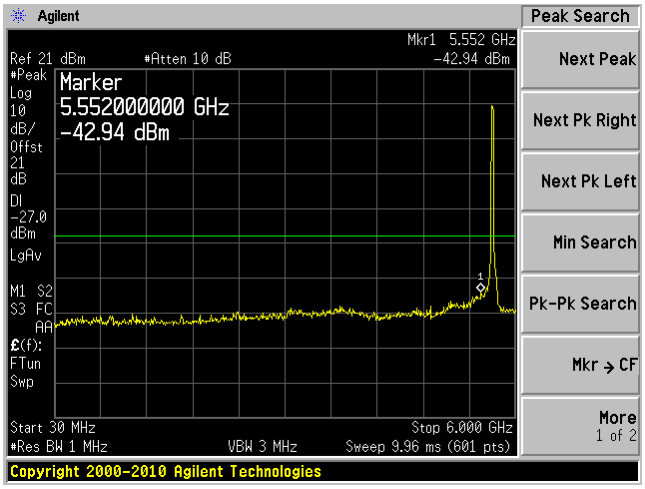
Chain J1, Plot: 4500 MHz – 5150 MHz



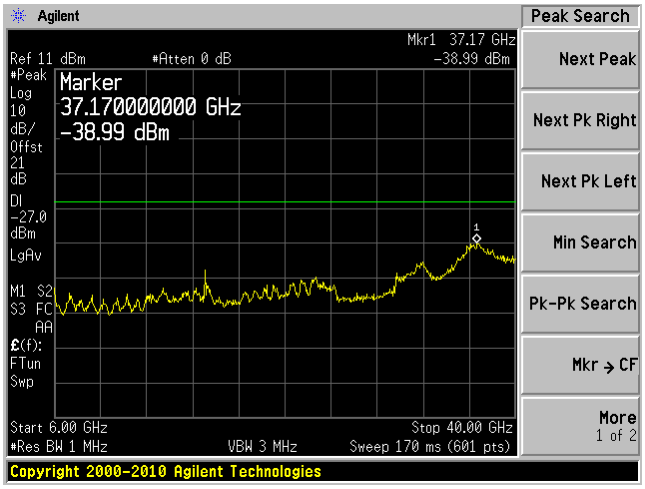
Chain J1, Plot: 5350MHz – 5460 MHz



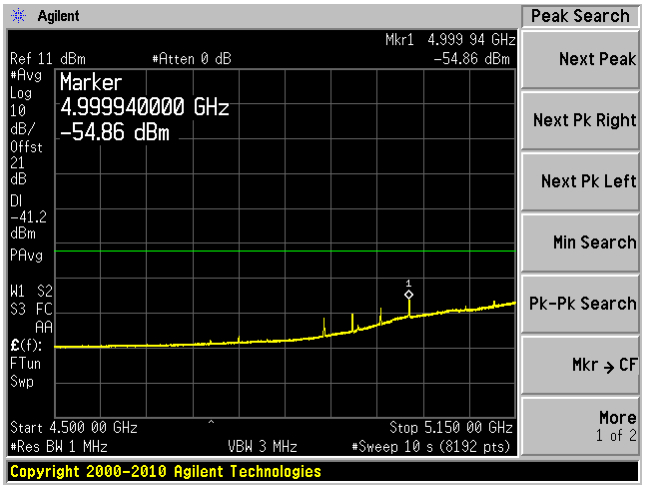
Chain J2, Plot: 30 MHz – 6 GHz



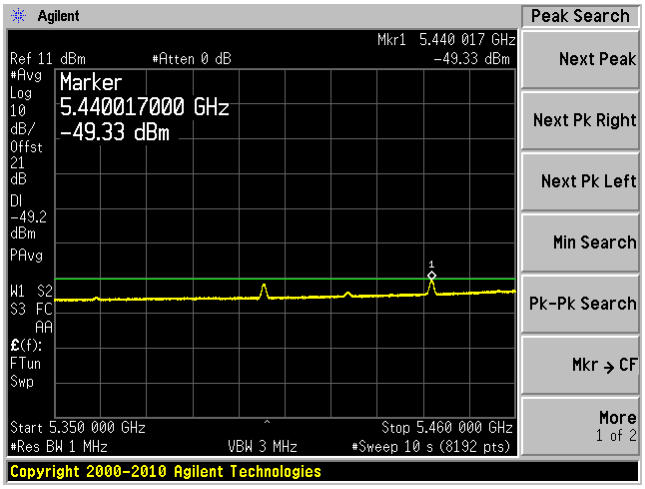
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

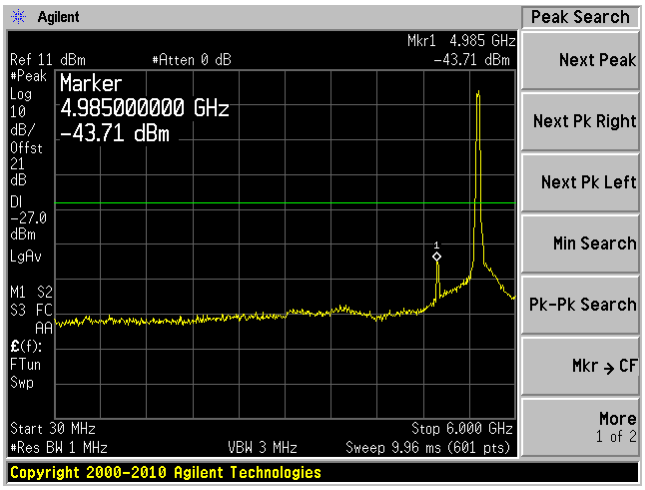


Chain J2, Plot: 5350MHz – 5460 MHz

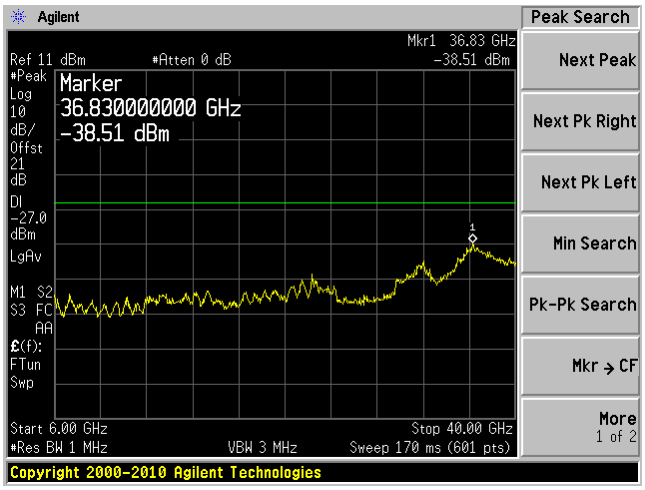


802.11n HT40, Low Channel 5510 MHz

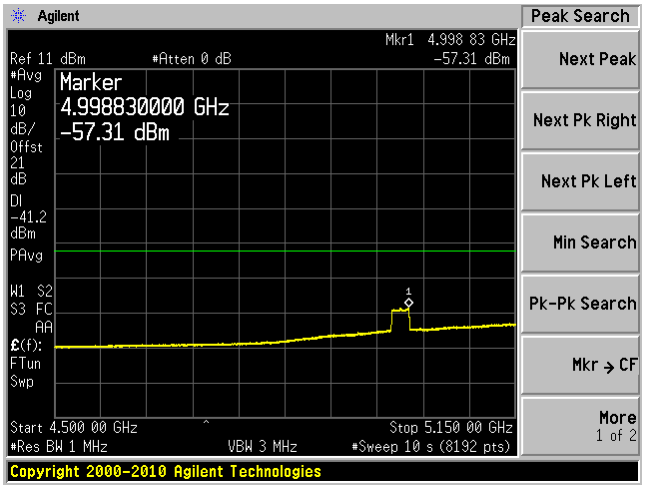
Chain J0, Plot: 30 MHz – 6 GHz



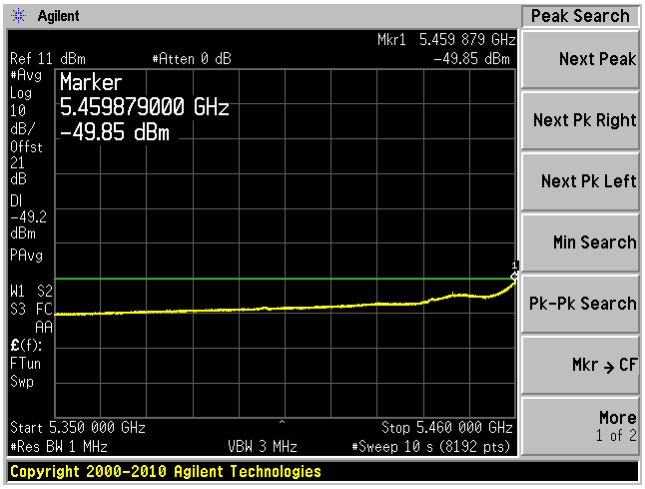
Chain J0, Plot: 6 GHz – 40 GHz



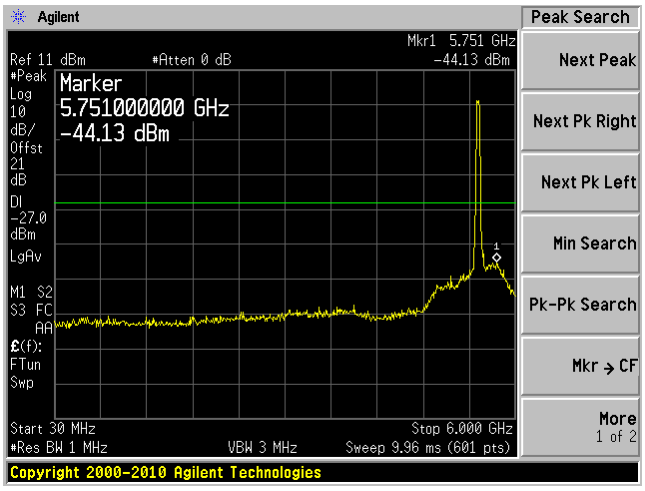
Chain J0, Plot: 4500 MHz – 5150 MHz



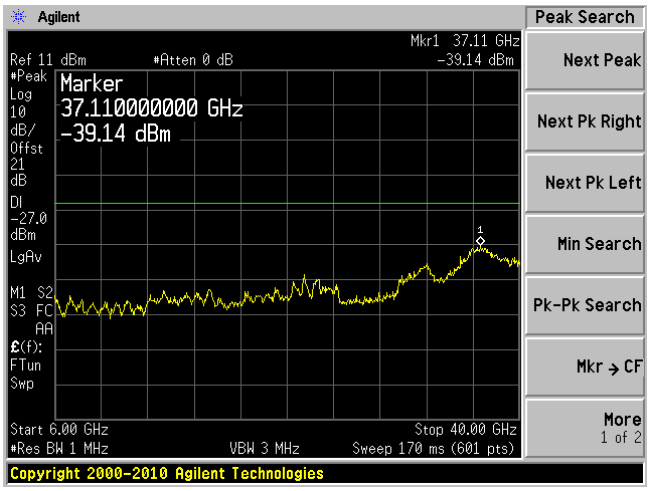
Chain J0, Plot: 5350MHz – 5460 MHz



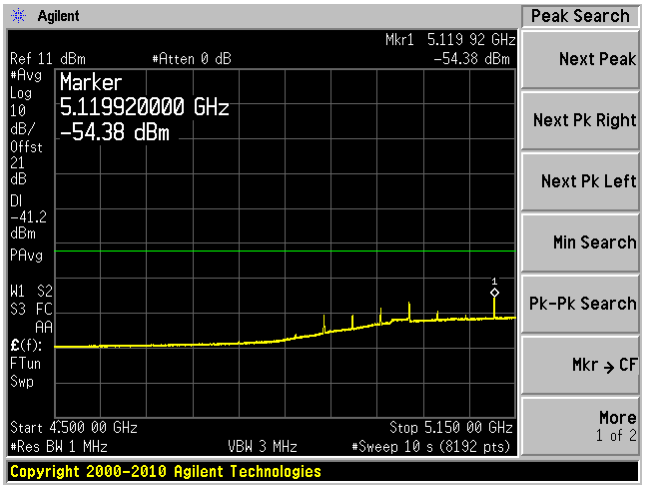
Chain J1, Plot: 30 MHz – 6 GHz



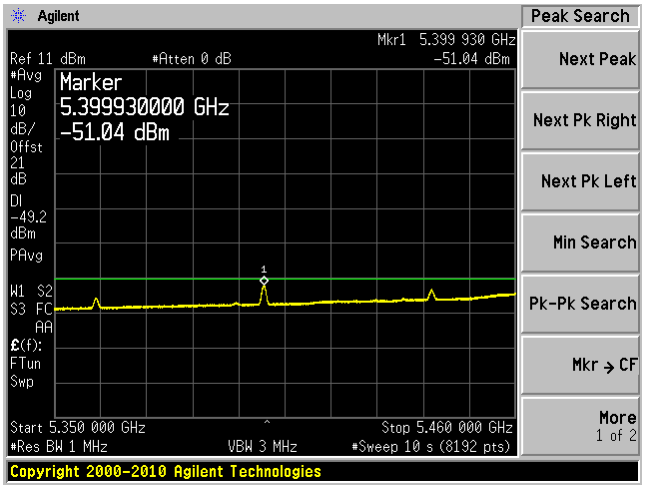
Chain J1, Plot: 6 GHz – 40 GHz



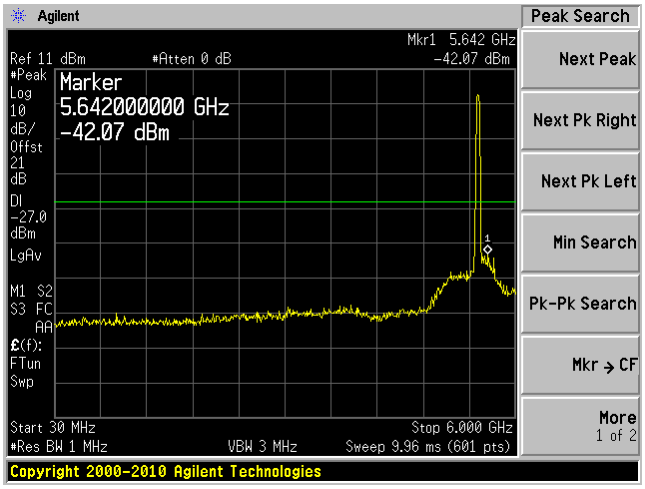
Chain J1, Plot: 4500 MHz – 5150 MHz



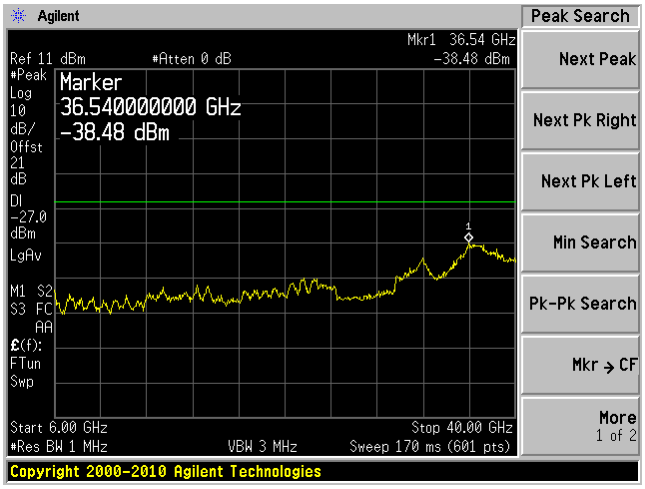
Chain J1, Plot: 5350MHz – 5460 MHz



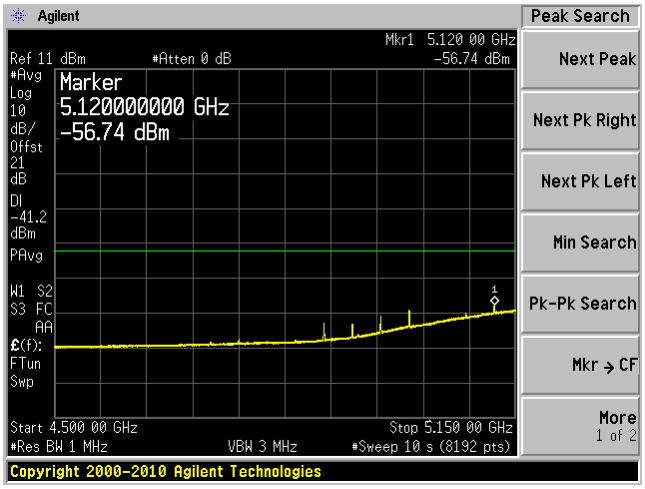
Chain J2, Plot: 30 MHz – 6 GHz



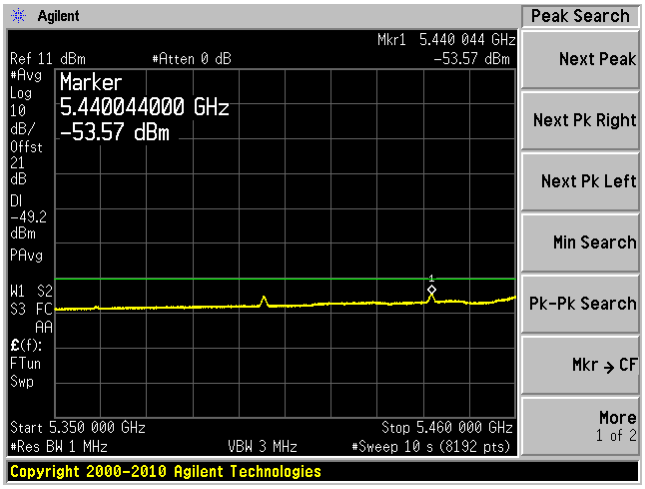
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

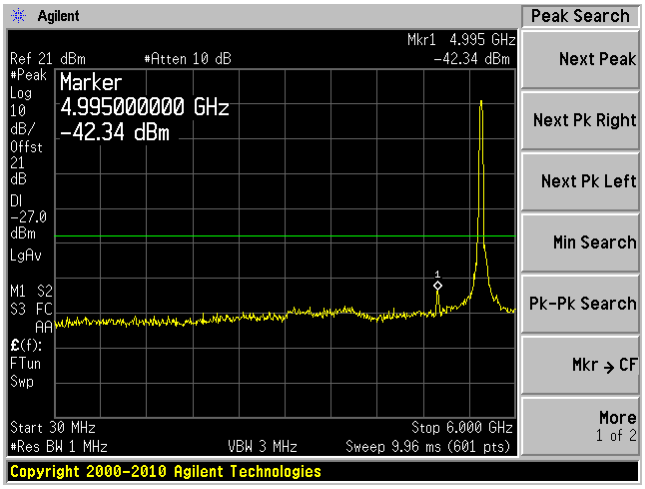


Chain J2, Plot: 5350MHz – 5460 MHz

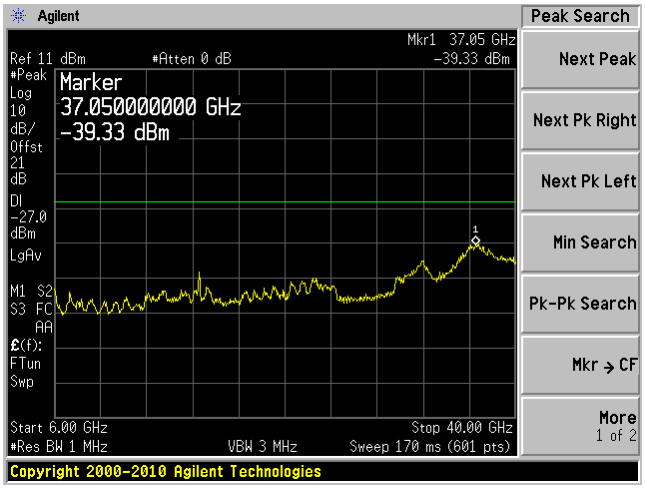


802.11n HT40, Middle Channel 5550 MHz

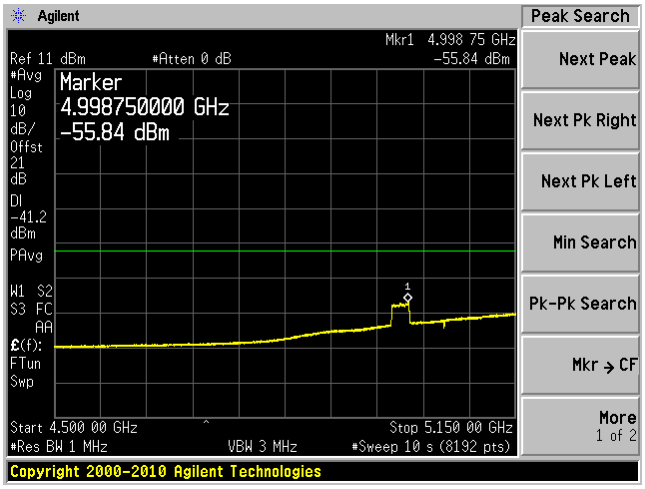
Chain J0, Plot: 30 MHz – 6 GHz



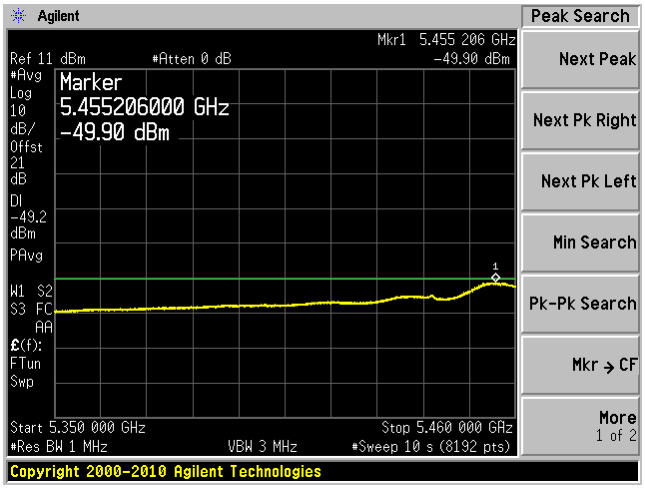
Chain J0, Plot: 6 GHz – 40 GHz



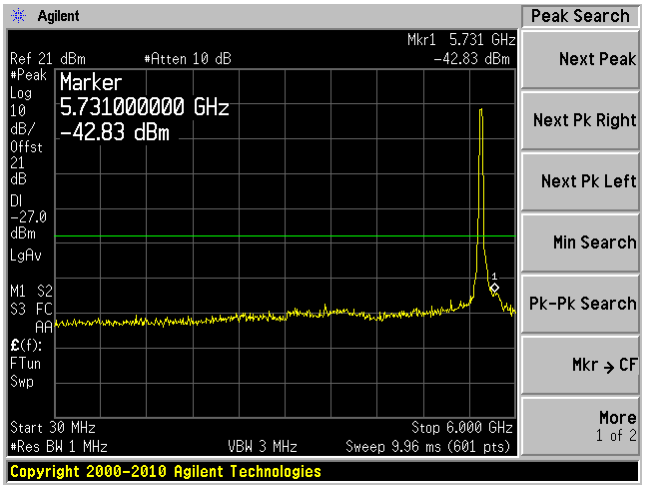
Chain J0, Plot: 4500 MHz – 5150 MHz



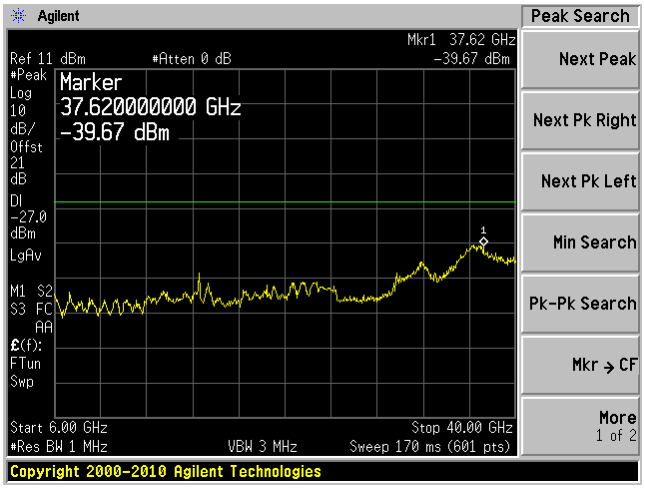
Chain J0, Plot: 5350MHz – 5460 MHz



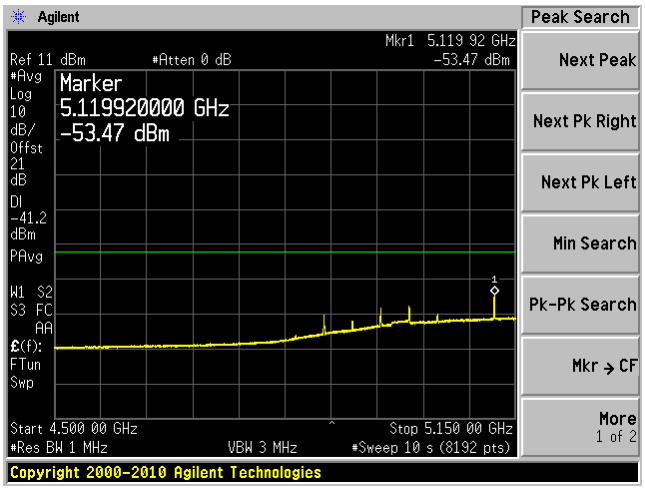
Chain J1, Plot: 30 MHz – 6 GHz



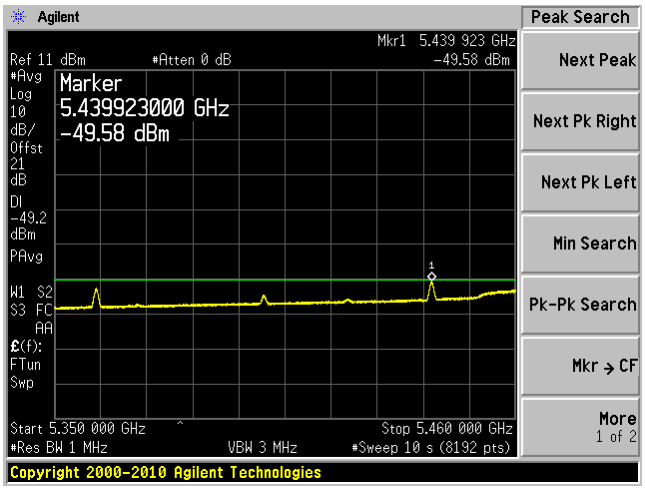
Chain J1, Plot: 6 GHz – 40 GHz



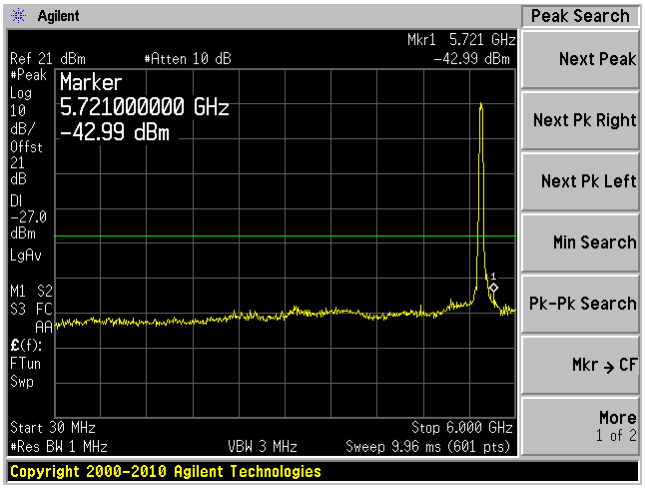
Chain J1, Plot: 4500 MHz – 5150 MHz



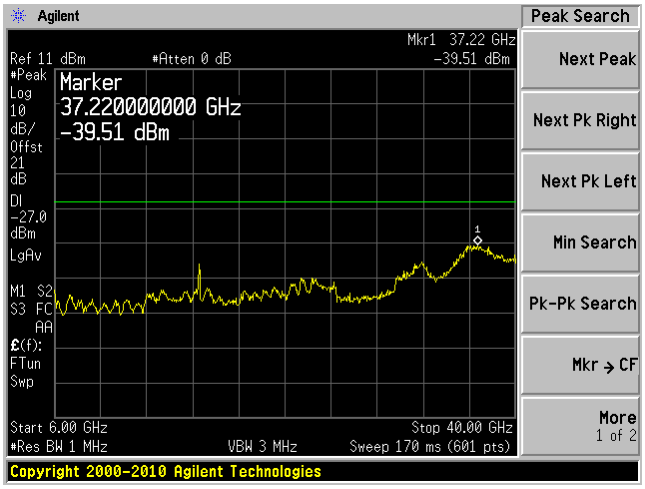
Chain J1, Plot: 5350MHz – 5460 MHz



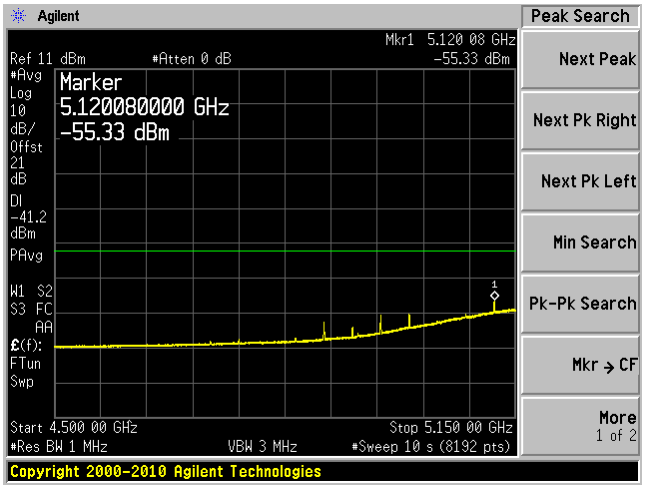
Chain J2, Plot: 30 MHz – 6 GHz



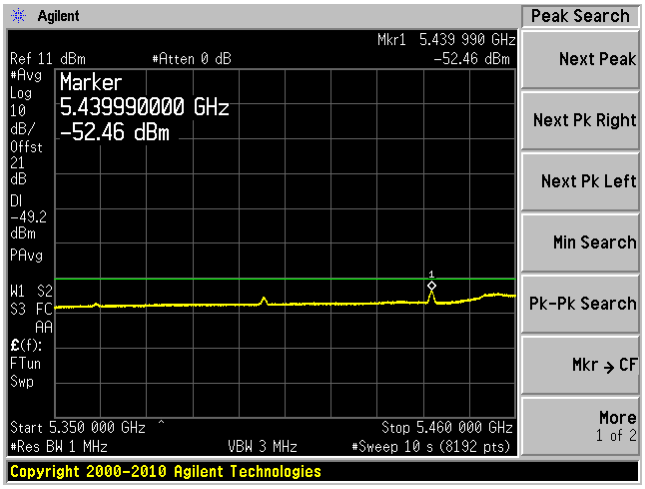
Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz

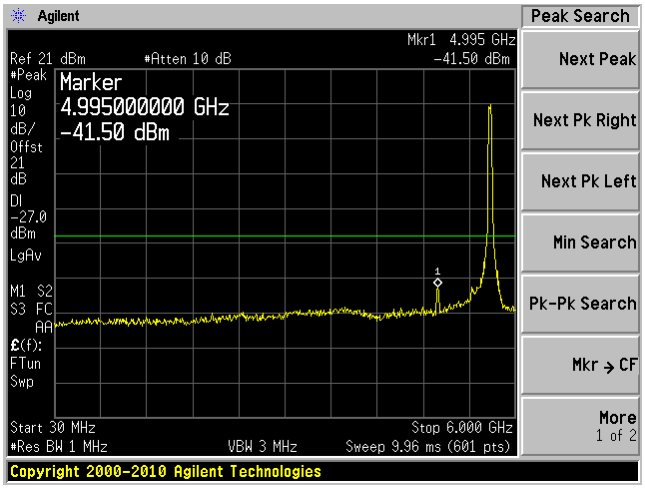


Chain J2, Plot: 5350MHz – 5460 MHz

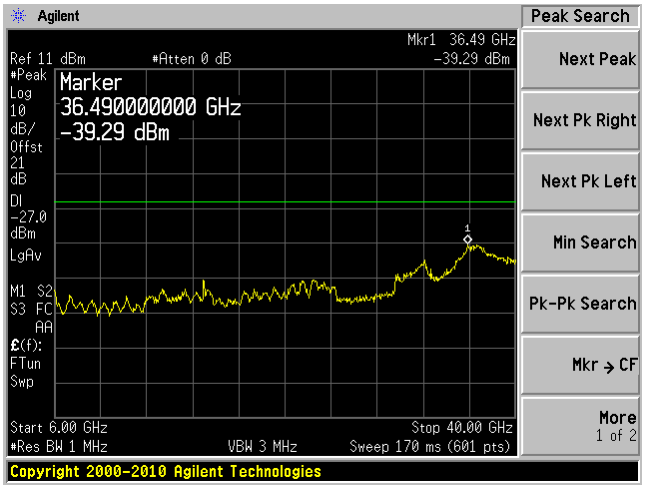


802.11n HT40, Middle Channel 5670 MHz

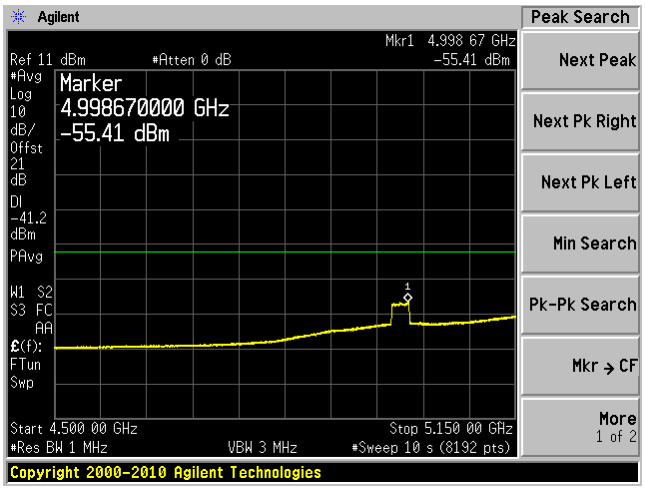
Chain J0, Plot: 30 MHz – 6 GHz



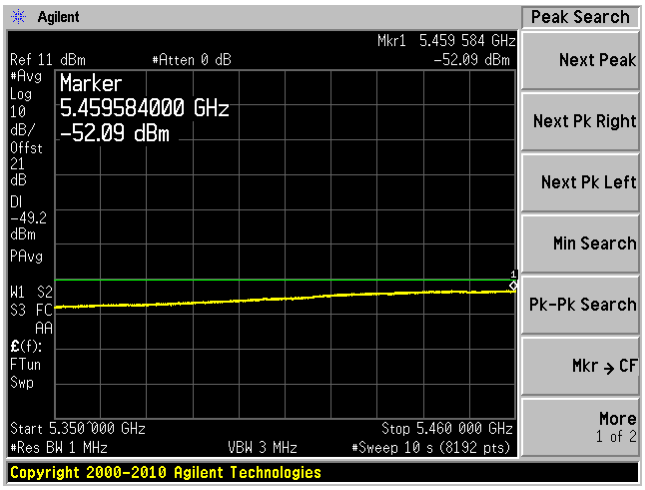
Chain J0, Plot: 6 GHz – 40 GHz



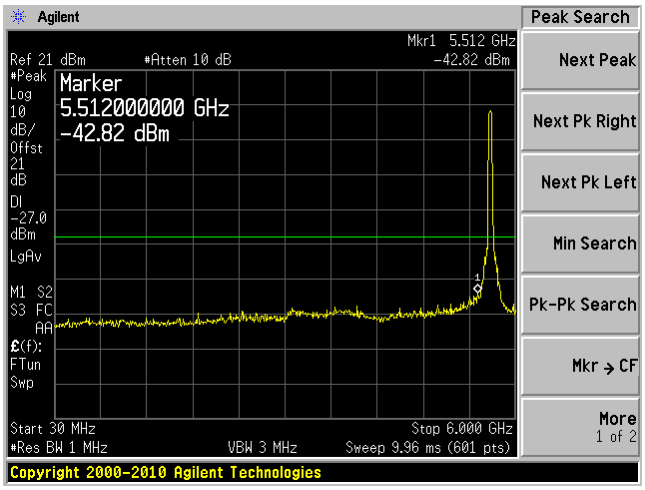
Chain J0, Plot: 4500 MHz – 5150 MHz



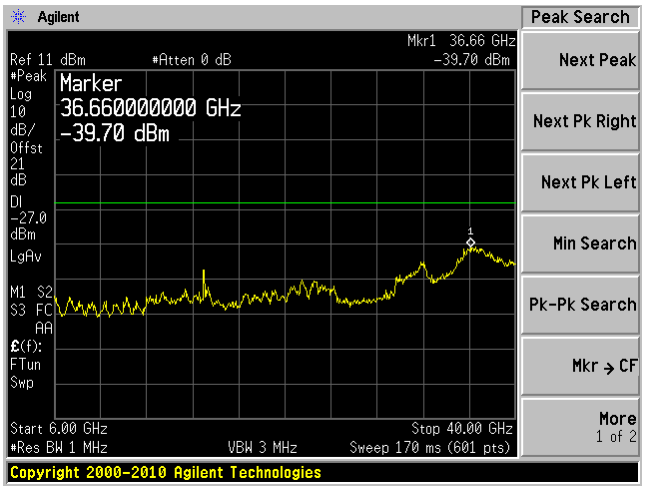
Chain J0, Plot: 5350MHz – 5460 MHz



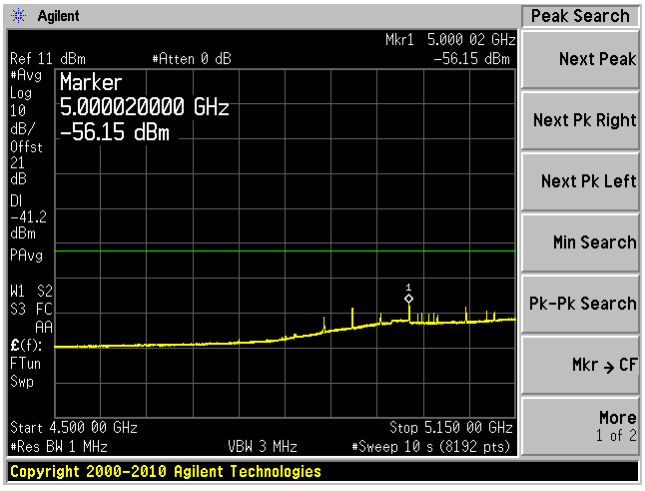
Chain J1, Plot: 30 MHz – 6 GHz



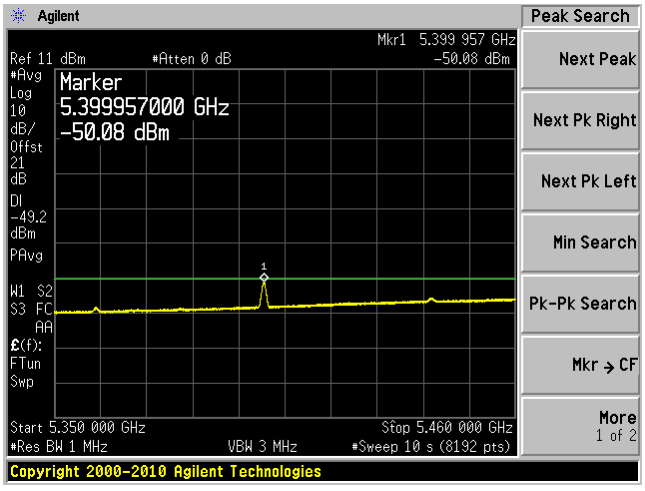
Chain J1, Plot: 6 GHz – 40 GHz



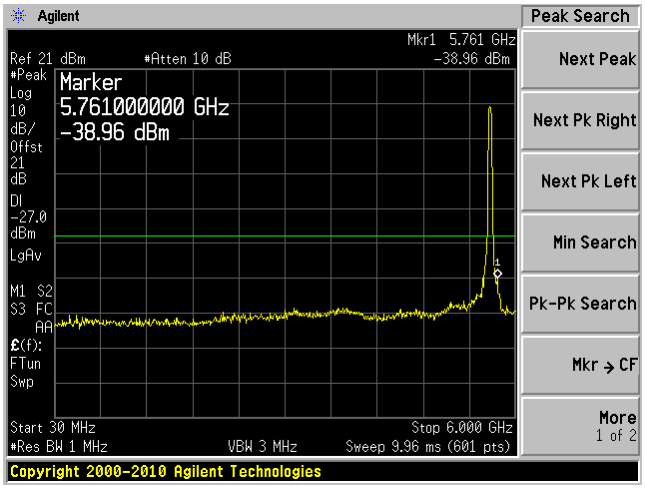
Chain J1, Plot: 4500 MHz – 5150 MHz



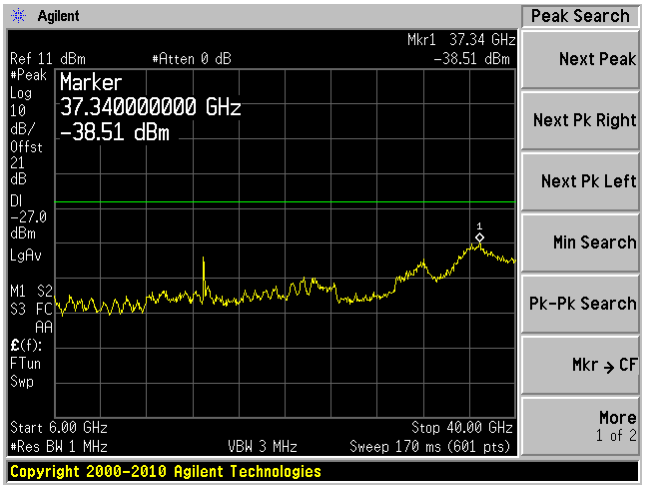
Chain J1, Plot: 5350MHz – 5460 MHz



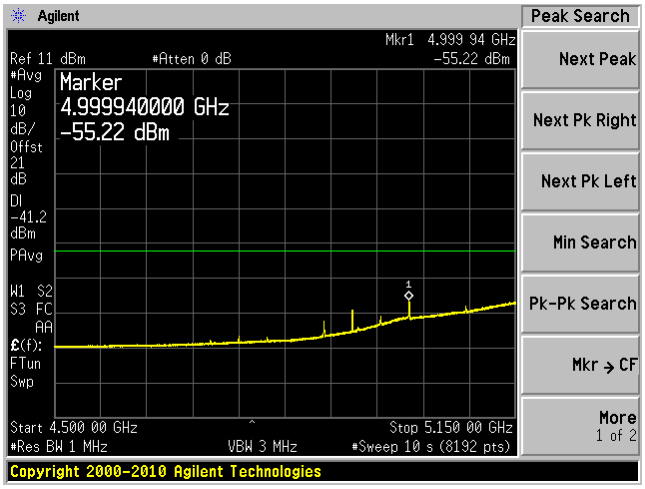
Chain J2, Plot: 30 MHz – 6 GHz



Chain J2, Plot: 6 GHz – 40 GHz



Chain J2, Plot: 4500 MHz – 5150 MHz



Chain J2, Plot: 5350MHz – 5460 MHz