FCC PART 15, SUBPART C
IC RSS-210, ISSUE 8, DECEMBER 2010

TEST AND MEASUREMENT REPORT

For

Ruckus Wireless, Inc.

350 West Java Drive,

Sunnyvale, CA 94089, USA

FCC ID: S9GT300
IC: 5912A-T300

Report Type: CIIPC Report	**Product Type:** 802.11 a/b/g/n/ac Wireless Access Point
Prepared By	Chen Ge
Report Number	R1407029-247
Report Date	2014-08-20
Reviewed By	Ivan Cao RF Lead
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1407029-247	CIIPC	2014-08-20

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: *T301, FCC ID: S9GT300, IC: 5912A-T300* or the "EUT" as referred to in this report. The EUT is a dual band 2x2 MIMO 802.11 a/b/g/n/ac RLAN Access Point.

1.2 Mechanical Description of EUT

The EUT measures approximately 238mm (L) x 198mm (W) x 115mm (H) and weighs 400 g.
Note: The EUT was tested without enclosure.

The test data gathered are from typical production sample, serial number: 21406000005 *assigned by Client.*

1.3 Objective

This report is prepared on behalf of *Ruckus Wireless, Inc*. in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commissions rules and IC RSS-210 Issue 8, Dec 2010.

The objective is to determine compliance with FCC Part 15.247 and IC RSS-210.

This is the Class II permission change application of the certified device (FCC ID: S9GT300). The difference between the original device and the current one are the antenna changed and the conducted output power reduced.

For the changes made to the device, the test item: Spurious Emissions at Antenna Port, output power, and Power Spectral Density were tested and reported.

1.4 Related Submittal(s)/Grant(s)

Original submission with FCC ID: S9GT300, IC: 5912A-T300. The Original FCC ID granted on 2014-06-05 for DTS and NII W52 band, 2014-06-25 for NII W53 and W56 band.

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz and FCC KDB 558074 D01 DTS Meas Guidance v03r01: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

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.

The following calculation follows the procedures as set forth in clause 7.2.3, ETSI TR 100 028-1 V1.4.1 (2001-12), the expression of Uncertainty in Radiated RF Testing is in accordance to ISO/IEC 17025 and TR 100 028-1 V1.4.1 (2001-12).

The expanded Measurement Uncertainty value having a confidence factor of 95%, is within a range of 5.48 dB. This means that the value of conducted RF carrier power test will be within +/- 2.74 dB of the measuring radiated emissions power versus the expected value.
The expected value is defined as the power at the antenna of the Transmitter under Test.

1.7 Test Facility

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

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

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

4- A Product Certification Body accredited to **ISO Guide 65: 1996** by **A2LA** to certify:
1- Unlicensed, Licensed radio frequency devices and Telephone Terminal Equipment for the FCC. Scope A1, A2, A3, A4, B1, B2, B3, B4 & C.
2. Radio Standards Specifications (RSS) in the Category I Equipment Standards List and All Broadcasting Technical Standards (BETS) in Category I Equipment Standards List for Industry Canada.
3. Radio Communication Equipment for Singapore.
4. Radio Equipment Specifications, GMDSS Marine Radio Equipment Specifications, and Fixed Network Equipment Specifications for Hong Kong.
5. Japan MIC Telecommunication Business Law (A1, A2) and Radio Law (B1, B2 and B3).
6. Audio/Video, Battery Charging Systems, Computers, Displays, Enterprise Servers, Imaging Equipment, Set-Top Boxes, Telephony, Televisions, Ceiling Fans, CFLs (Including GU24s),Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Ventilating Fans.

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

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies

with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2009, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

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

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

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

2 System Test Configuration

2.1 Justification

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 *T300 ART* was provided by Ruckus Wireless Inc., and was verified by *Chen Ge* to comply with the standard requirements being tested against.

2.3 Special Equipment

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

2.4 Equipment Modifications

No modifications were made to the EUT.

2.5 Local Support Equipment

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

2.6 EUT Internal Configuration Details

Manufacturer	Description	Model	Serial Number
Ruckus	Main Board (SANTORINI)	ASM 120-11257-XXX	RUK01946
Ruckus	RJ45 Port Board	120-11283-001	RUK01957
Ruckus	n version Antenna	Thunderbolt 2, ASM 120-11269-001	-

2.7 Interface Ports and Cables

Cable Description	Length (m)	From	To
RJ45	1m	DC Adaptor/POE	EUT
RJ45	1m	Laptop	DC Adaptor/POE

2.8 Power Supply List and Details

Manufacturer	Description	Model	Part Number
Ruckus	Power Supply cord	PA1024-4HU	-
Ruckus	POE Power Adapter	NPE-5818	740-64157-001

3 Summary of Test Results

Results reported relate only to the product tested.

FCC & IC Rules	Description of Test	Results
FCC §15.247(i), §2.1091 IC RSS-102	RF Exposure	Compliance
FCC §15.203 IC RSS-Gen §7.1.2	Antenna Requirement	Compliance
FCC §15.207(a) IC RSS-Gen §7.2.4	AC Line Conducted Emissions	Compliance *
FCC §15.247 (d) IC RSS-210 §A8.5	Spurious Emissions at Antenna Port	Compliance
FCC §15.205 IC RSS-210 §2.2	Restricted Bands	Compliance
FCC §15.209, §15.247 (d) IC RSS-210 §A8.5	Radiated Spurious Emissions	Compliance*
FCC §15.247(a)(2) IC RSS-210 §A8.2	6 dB Emission Bandwidth	Compliance*
FCC §15.247(b)(3) IC RSS-210 §A8.4	Maximum Output Power	Compliance
FCC §15.247(d) IC RSS-210 §A8.5	100 kHz Bandwidth of Frequency Band Edge	Compliance*
FCC §15.247(e) IC RSS-210 §A8.2(b)	Power Spectral Density	Compliance

Note: * please refer to the original report number: R1403261-247.

4 FCC §15.247 (i), §2.1091 & IC RSS-102 – RF Exposure

4.1 Applicable Standard

According to FCC §15.247(i) 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 (min)
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

2.4 GHz band:

Maximum peak output power at antenna input terminal (dBm):	23.73
Maximum peak output power at antenna input terminal (mW):	236.05
Prediction distance (cm):	20
Prediction frequency (MHz):	2437
Maximum Antenna Gain, typical (dBi):	9.0
Maximum Antenna Gain (numeric):	7.943
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.373
Power density of prediction frequency at 20.0 cm (W/m^2):	3.731
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

5.8 GH band:

Maximum peak output power at antenna input terminal (dBm):	15.79
Maximum peak output power at antenna input terminal (mW):	37.931
Prediction distance (cm):	20
Prediction frequency (MHz):	5795
Maximum Antenna Gain, typical (dBi):	15.0
Maximum Antenna Gain (numeric):	31.622
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.2386
Power density of prediction frequency at 20.0 cm (W/m^2):	2.386
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

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.

According to 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 mW or less. For devices of output powers greater than 10 mW, 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	Antenna Type/Pattern	Antenna Gain (dBi) @ 2.4 GHz
Ruckus	Internal PCB	9

Manufacturers	Antenna Type/Pattern	Antenna Gain (dBi) @ 5 GHz
Ruckus	Internal PCB	15

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

6 FCC §2.1051, §15.247(d) & IC RSS-210 §A8.5 – Spurious Emissions at Antenna Terminals

6.1 Applicable Standard

For FCC §15.247(d) and IC RSS-210 §A8.5 in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 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.

6.2 Measurement Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v03r01: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 11: Emissions in non-restricted frequency bands and section 12: Emissions in restricted frequency bands.

6.3 Test Equipment List and Details

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

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

6.4 Test Environmental Conditions

Temperature:	21-24° C
Relative Humidity:	41-46 %
ATM Pressure:	101-102 kPa

The testing was performed by Chen Ge from 2014-05-07 and 2014-05-09 at RF site.

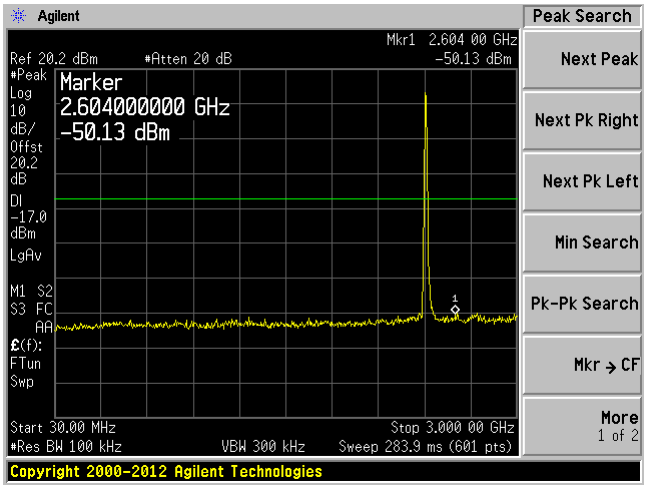
6.5 Test Results

Please refer to following plots of spurious emissions.

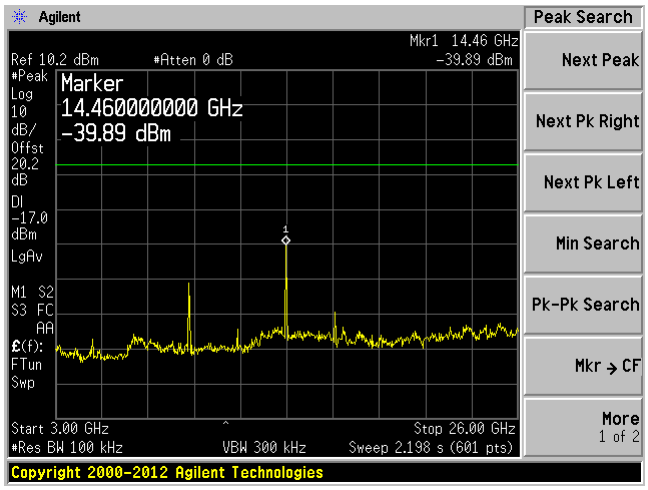
2.4 GHz Band:

802.11b, Low Channel, 2412 MHz

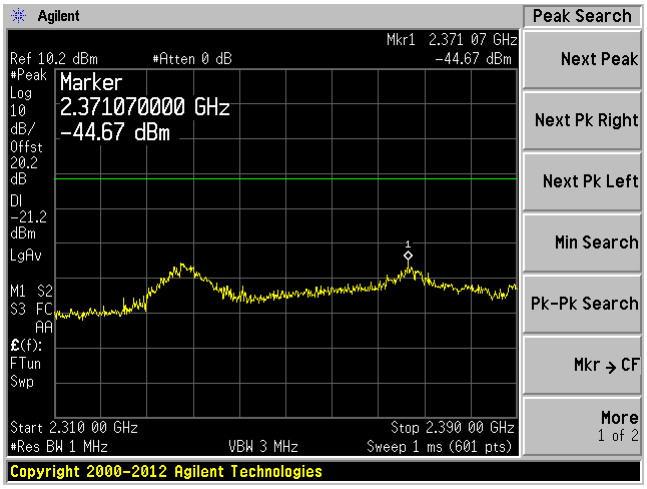
Chain J0, Plot: 30 MHz – 3 GHz



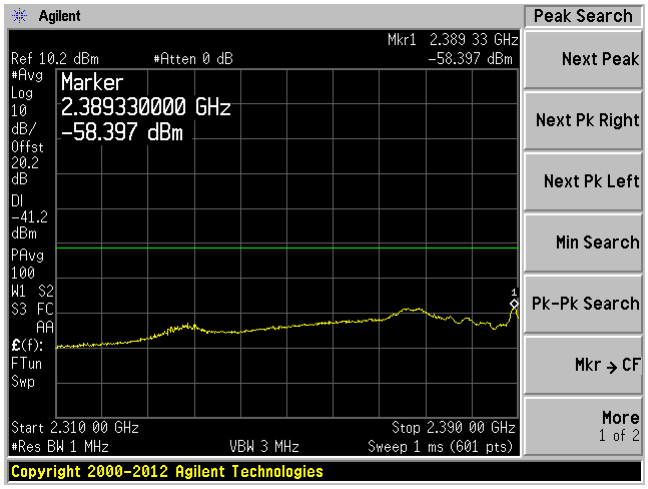
Chain J0, Plot: 3 GHz – 26 GHz



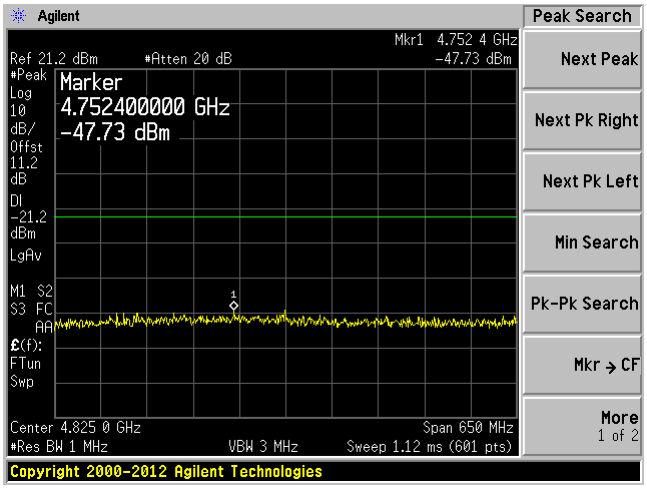
Chain J0, Plot: 2310 MHz – 2390 MHz Peak



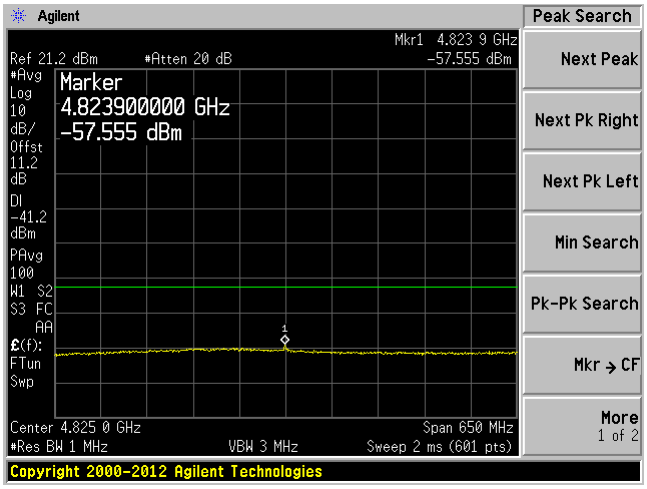
Chain J0, Plot: 2310 MHz – 2390 MHz Ave



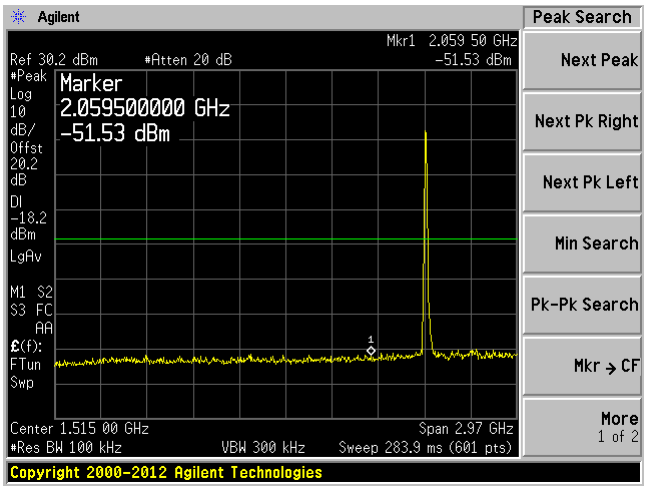
Chain J0, Plot: 4500 MHz – 5150 MHz Peak



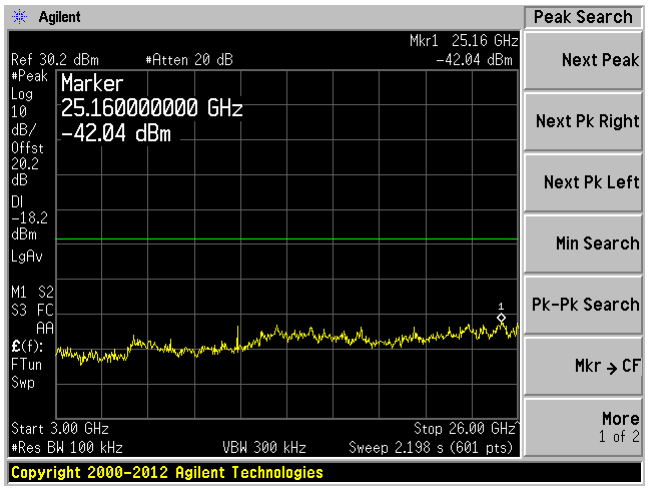
Chain J0, Plot: 4500 MHz – 5150 MHz Ave



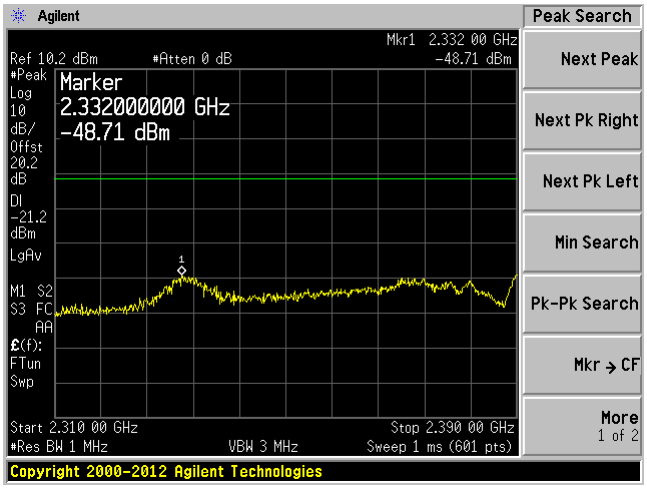
Chain J1, Plot: 30 MHz – 3 GHz



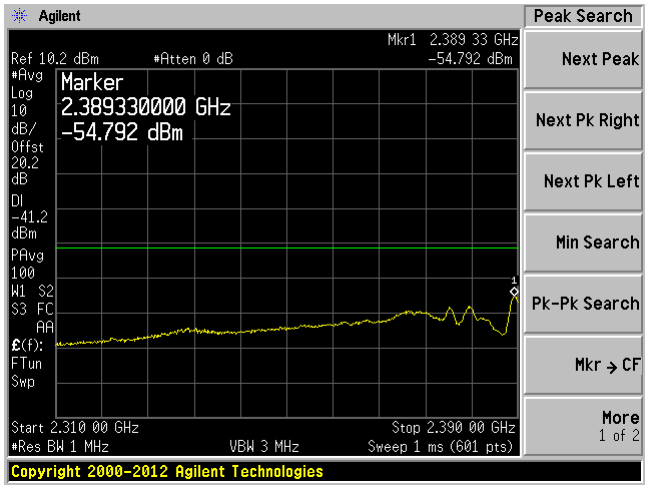
Chain J1, Plot: 3 GHz – 26 GHz



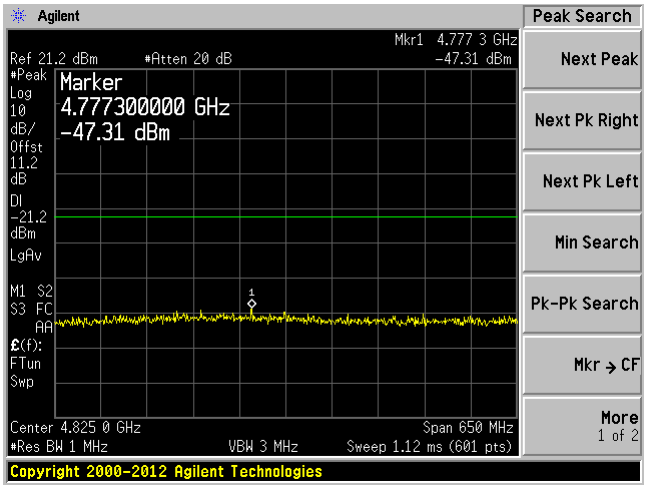
Chain J1, Plot: 2310 MHz – 2390 MHz Peak



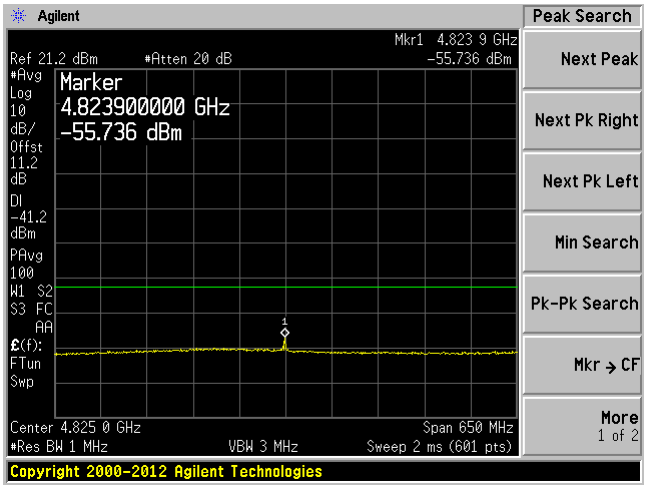
Chain J1, Plot: 2310 MHz – 2390 MHz Ave



Chain J1, Plot: 4500 MHz – 5150 MHz Peak

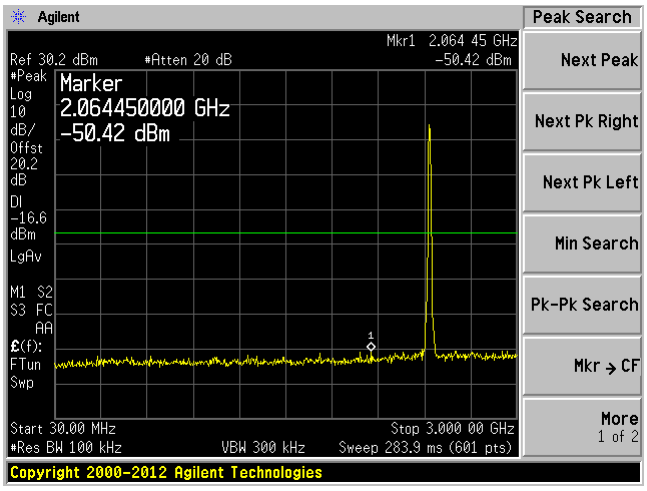


Chain J1, Plot: 4500 MHz – 5150 MHz Ave

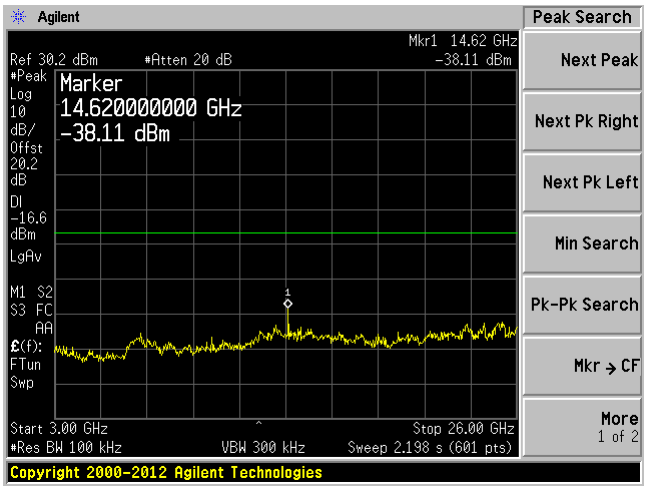


802.11b, Middle Channel, 2437 MHz

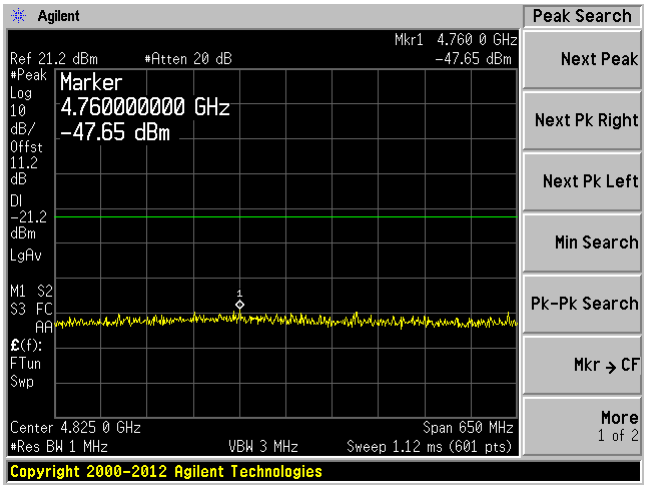
Chain J0, Plot: 30 MHz – 3 GHz



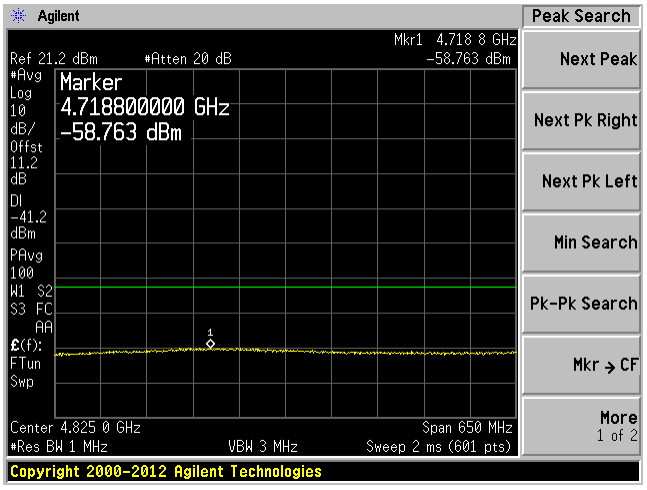
Chain J0, Plot: 3 GHz – 26 GHz



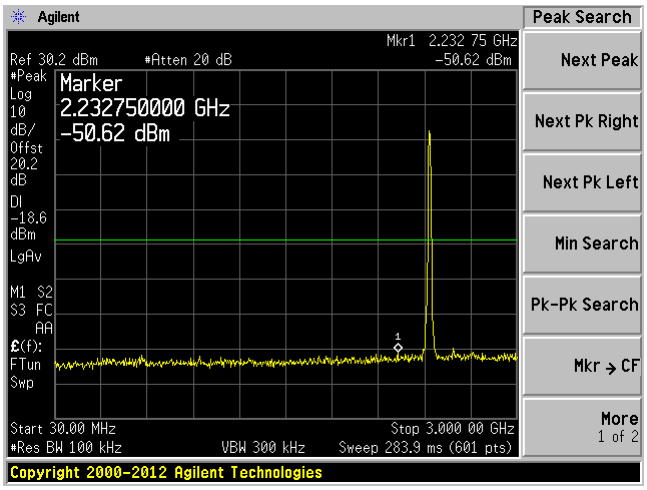
Chain J0, Plot: 4500 MHz – 5150 MHz Peak



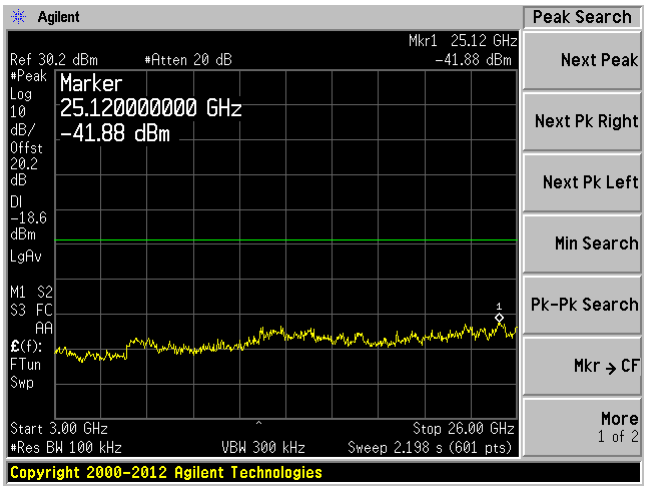
Chain J0, Plot: 4500 MHz – 5150 MHz Ave



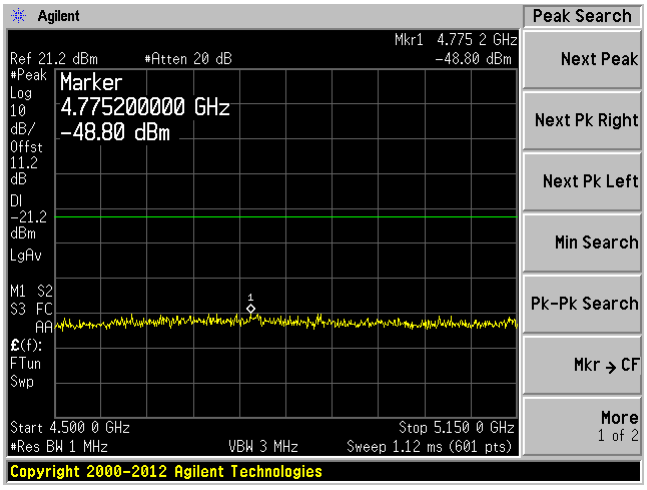
Chain J1, Plot: 30 MHz – 3 GHz



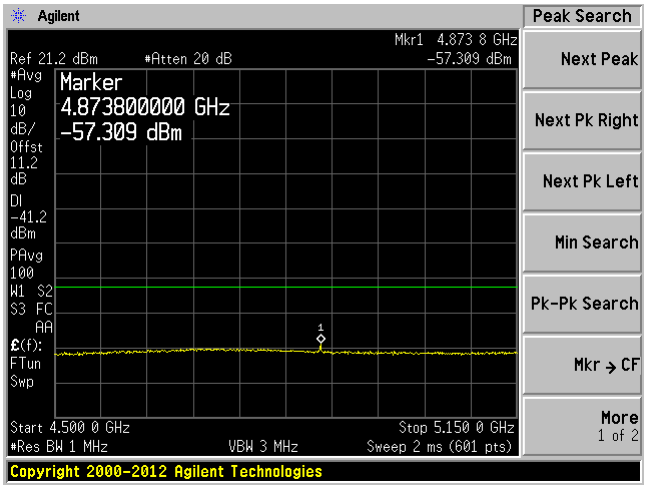
Chain J1, Plot: 3 GHz – 26 GHz



Chain J1, Plot: 4500 MHz – 5150 MHz Peak

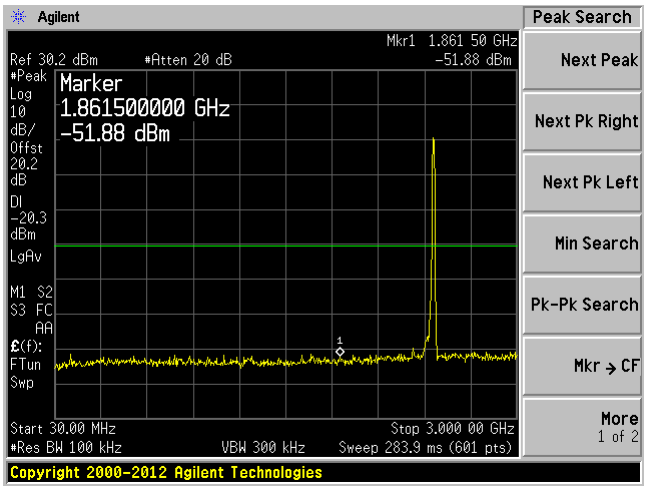


Chain J1, Plot: 4500 MHz – 5150 MHz Ave

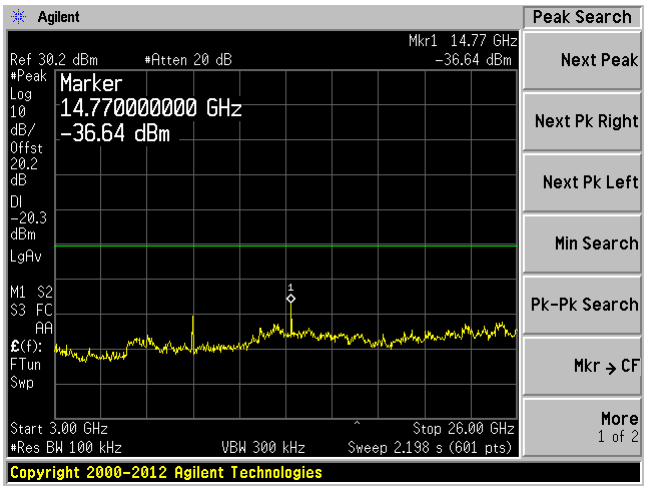


802.11b, High Channel, 2462 MHz

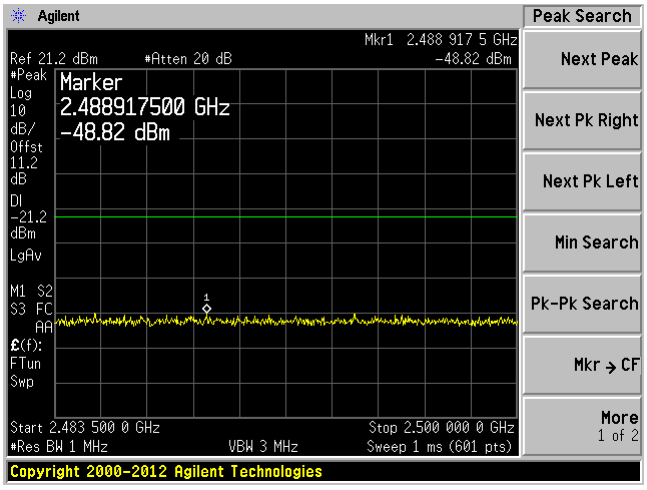
Chain J0, Plot: 30 MHz – 3 GHz



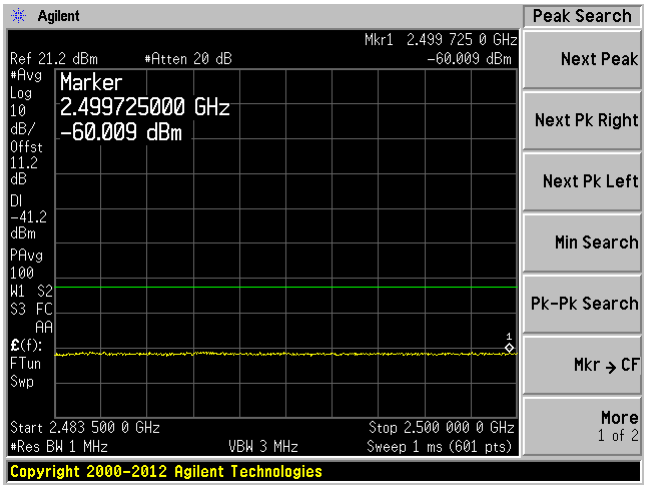
Chain J0, Plot: 3 GHz – 26 GHz



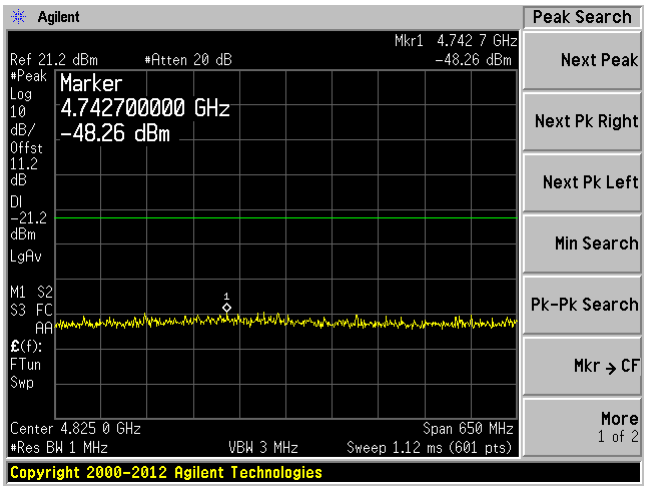
Chain J0, Plot: 2483.5 MHz – 2500 MHz Peak



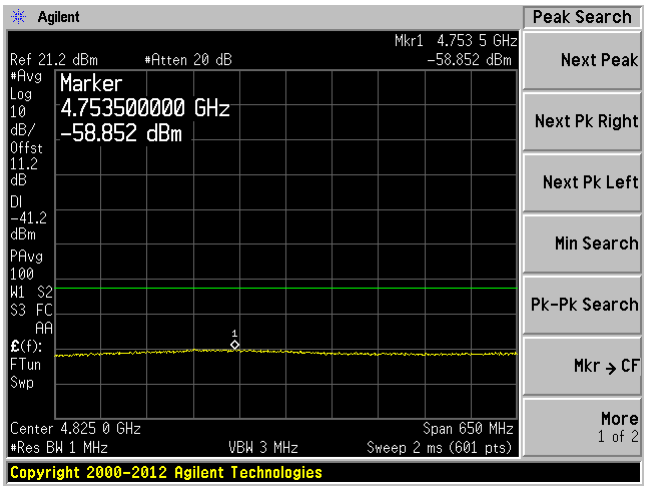
Chain J0, Plot: 2483.5 MHz – 2500 MHz Ave



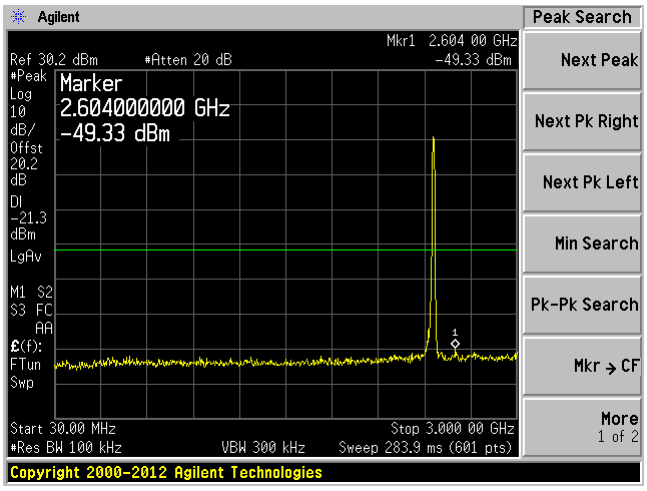
Chain J0, Plot: 4500 MHz – 5150 MHz Peak



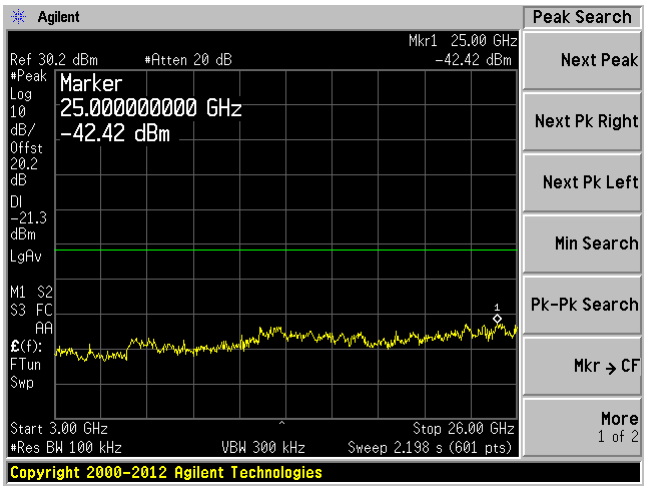
Chain J0, Plot: 4500 MHz – 5150 MHz Ave



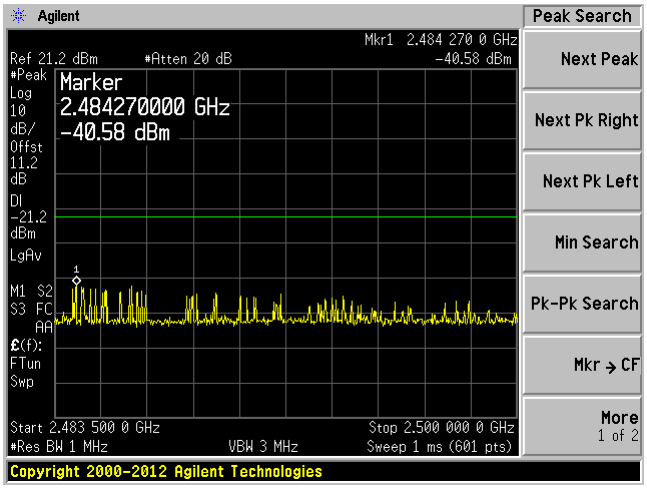
Chain J1, Plot: 30 MHz – 3 GHz



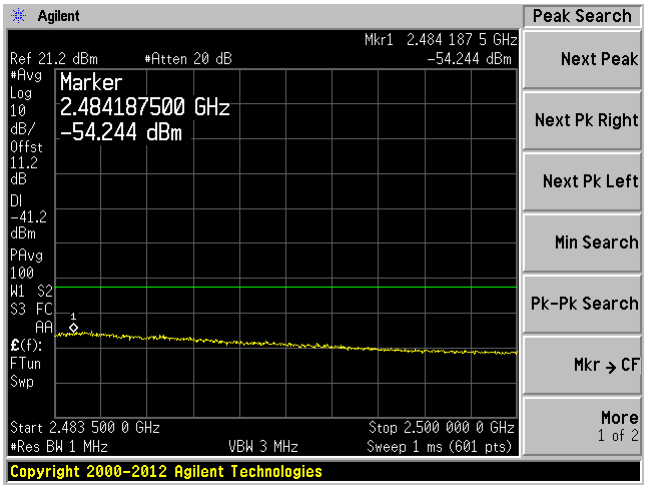
Chain J1, Plot: 3 GHz – 26 GHz



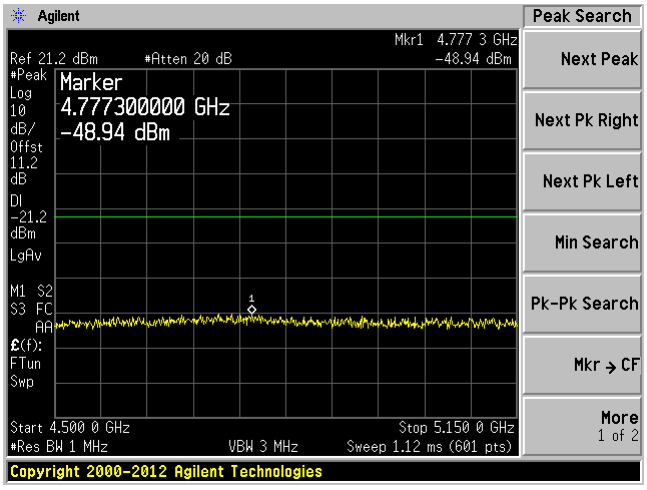
Chain J1, Plot: 2483.5 MHz – 2500 MHz Peak



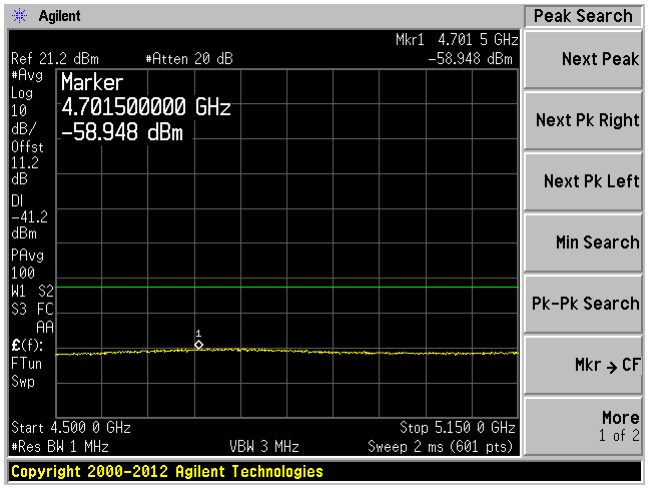
Chain J1, Plot: 2483.5 MHz – 2500 MHz Ave



Chain J1, Plot: 4500 MHz – 5150 MHz Peak

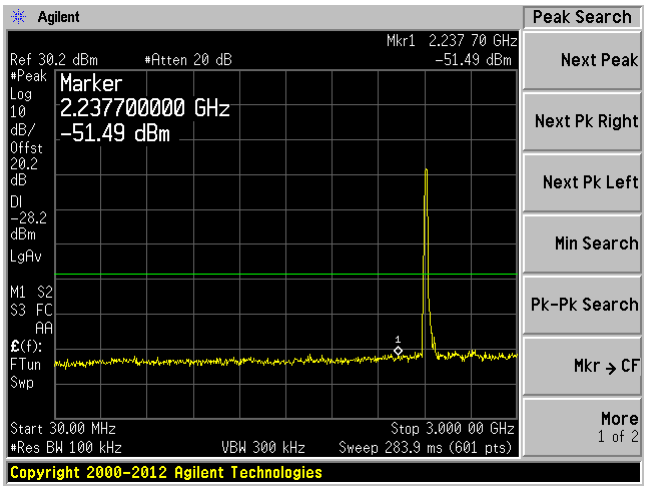


Chain J1, Plot: 4500 MHz – 5150 MHz Ave

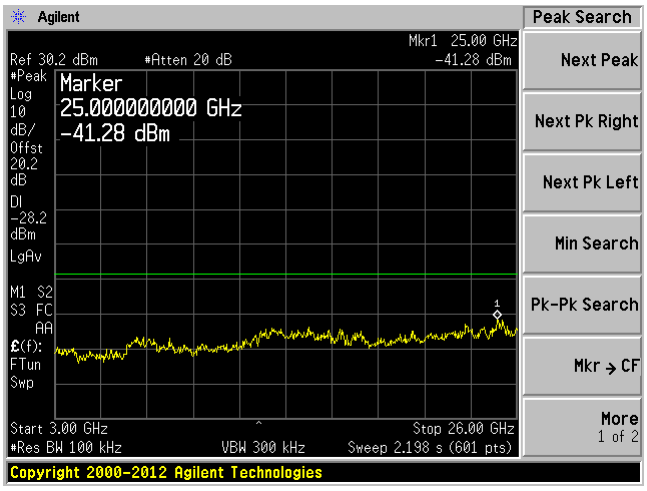


802.11g, Low Channel 2412 MHz

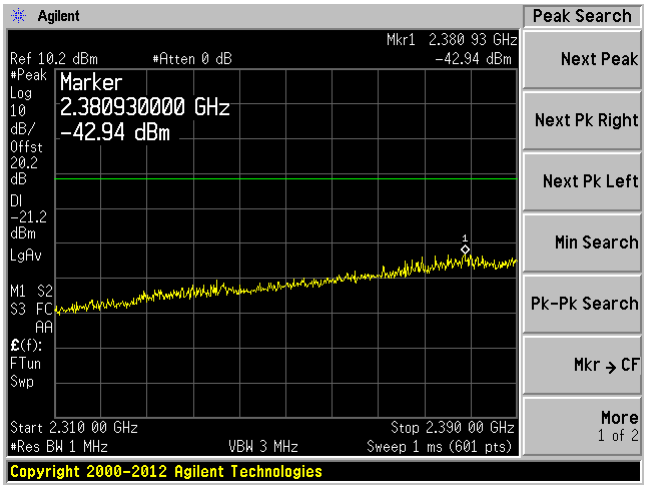
Chain J0, Plot: 30 MHz – 3 GHz



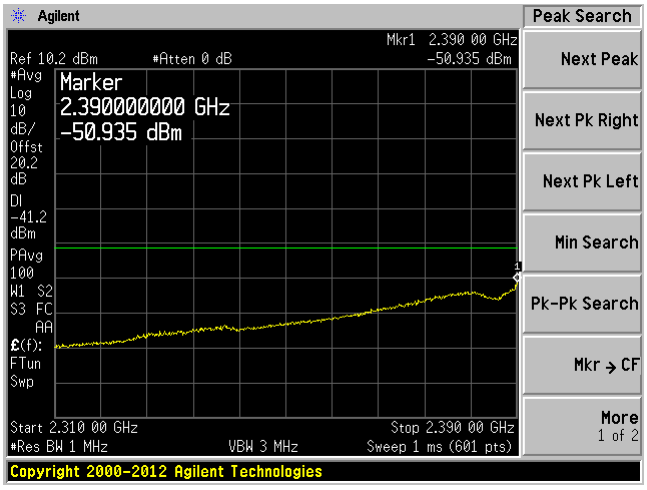
Chain J0, Plot: 3 GHz – 26 GHz



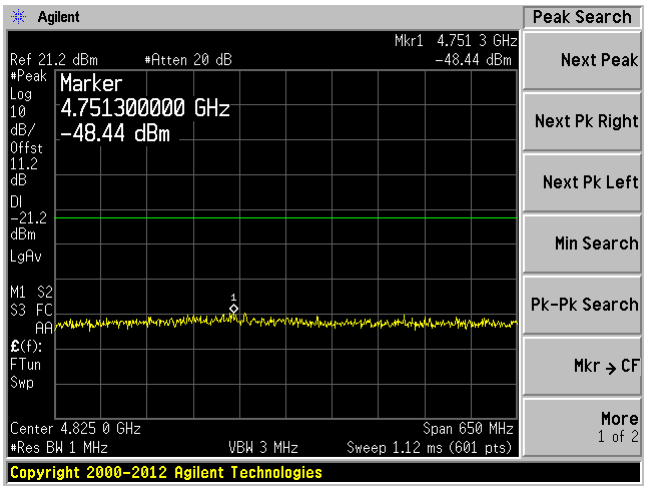
Chain J0, Plot: 2310 MHz – 2390 MHz Peak



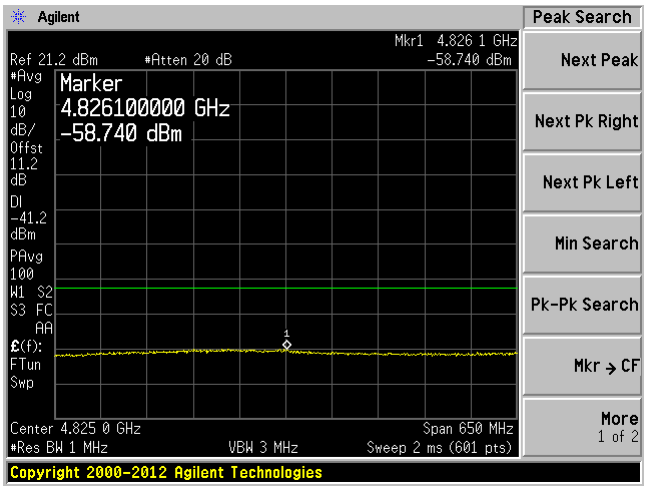
Chain J0, Plot: 2310 MHz – 2390 MHz Ave



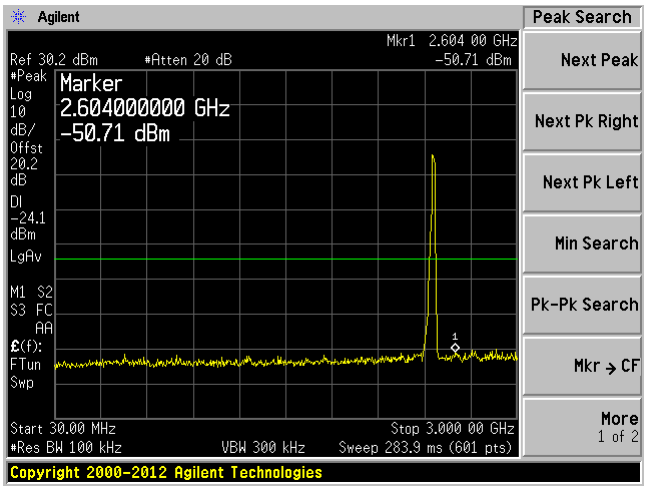
Chain J0, Plot: 4500 MHz – 5150 MHz Peak



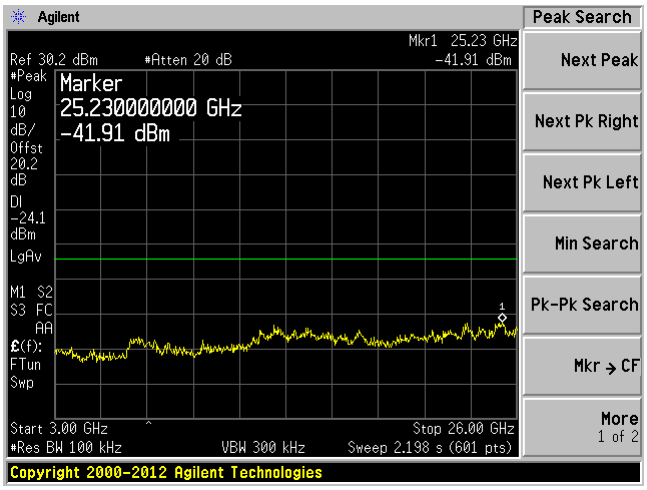
Chain J0, Plot: 4500 MHz – 5150 MHz Ave



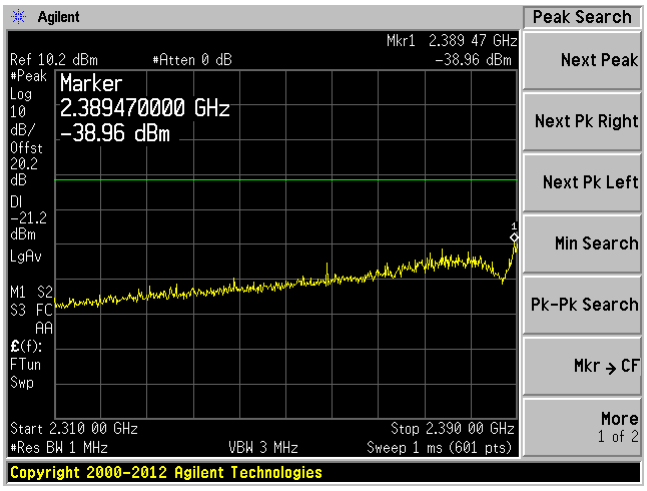
Chain J1, Plot: 30 MHz – 3 GHz



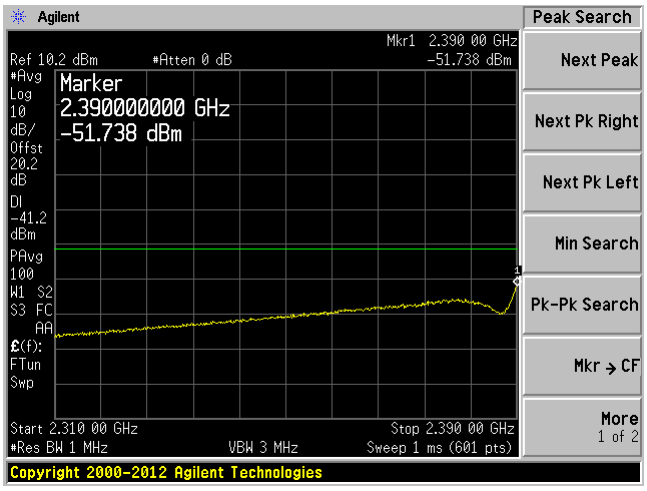
Chain J1, Plot: 3 GHz – 26 GHz



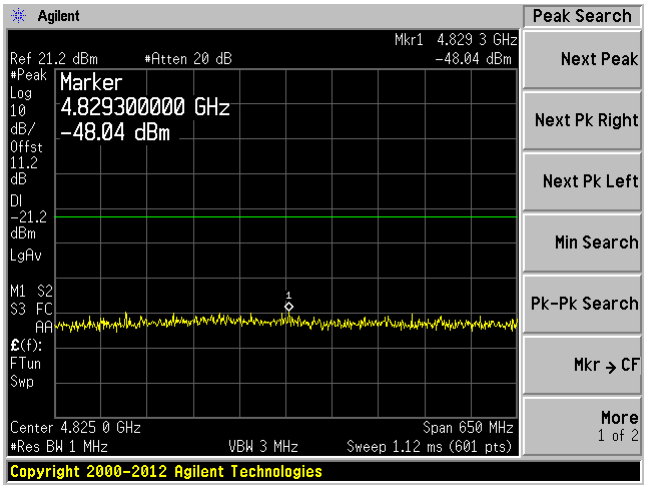
Chain J1, Plot: 2310 MHz – 2390 MHz Peak



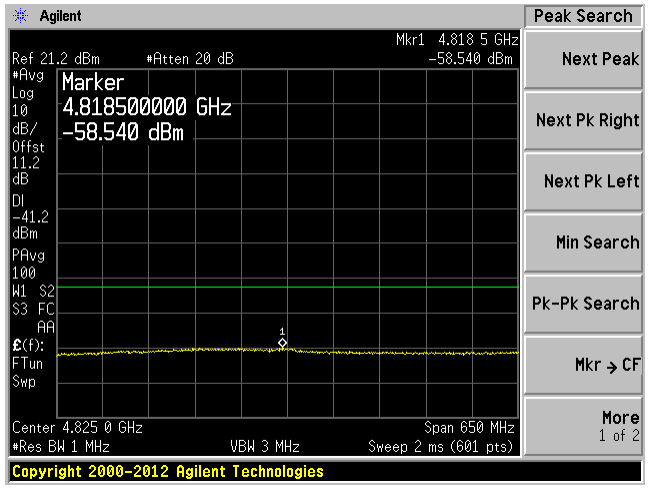
Chain J1, Plot: 2310 MHz – 2390 MHz Ave



Chain J1, Plot: 4500 MHz – 5150 MHz Peak

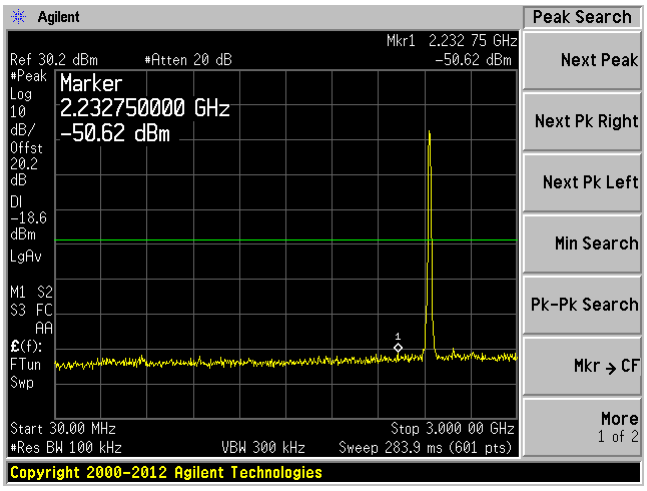


Chain J1, Plot: 4500 MHz – 5150 MHz Ave

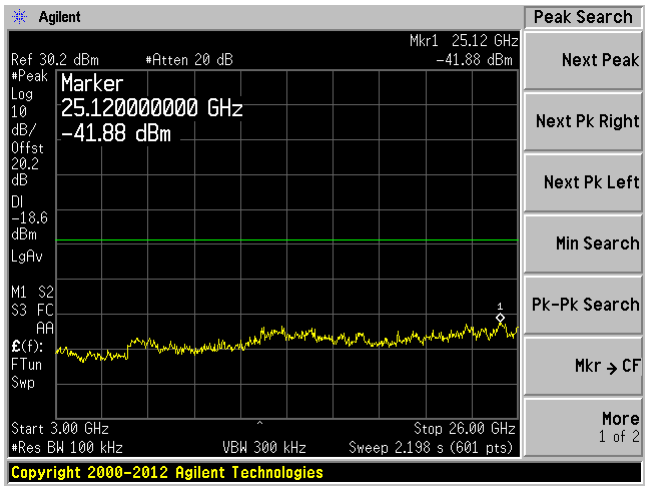


802.11g, Middle Channel 2437 MHz

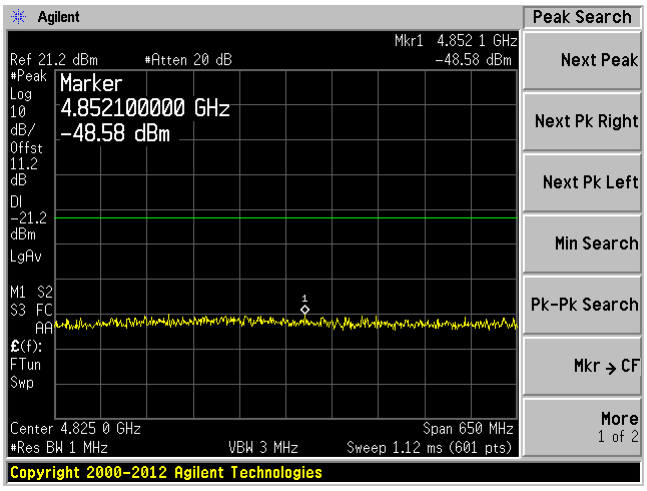
Chain J0, Plot: 30 MHz – 3 GHz



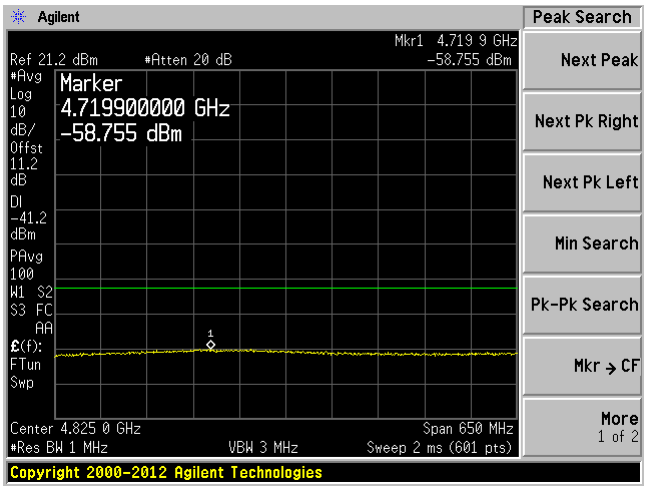
Chain J0, Plot: 3 GHz – 26 GHz



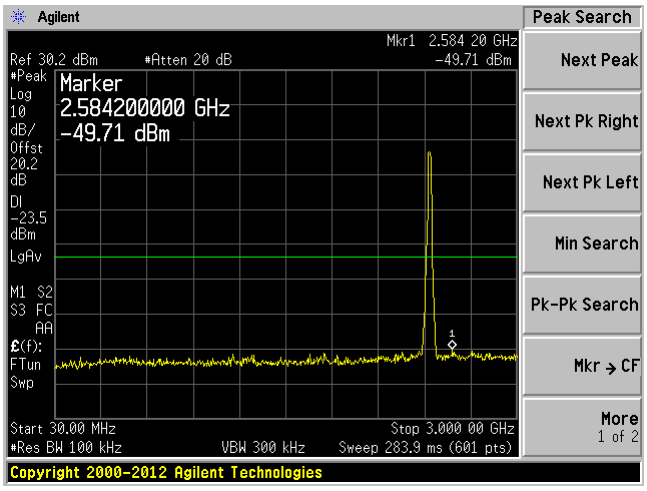
Chain J0, Plot: 4500 MHz – 5150 MHz Peak



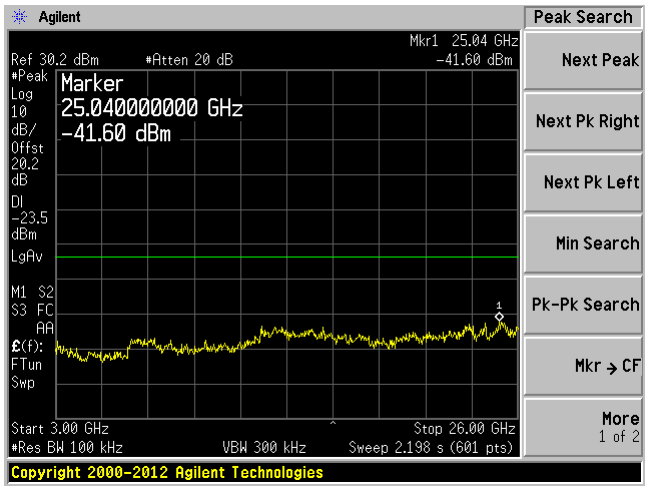
Chain J0, Plot: 4500 MHz – 5150 MHz Ave



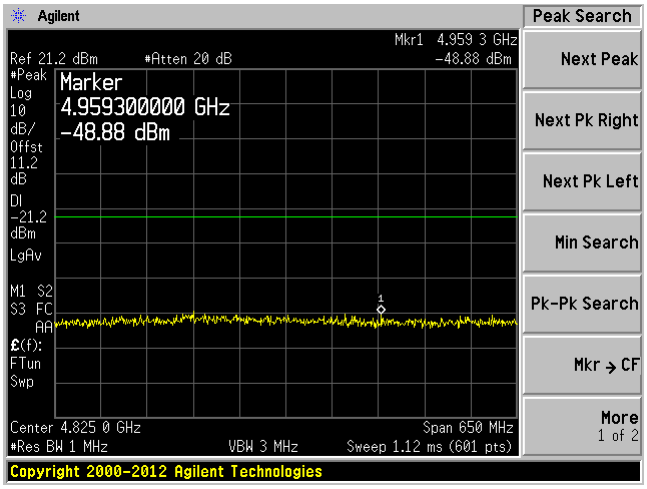
Chain J1, Plot: 30 MHz – 3 GHz



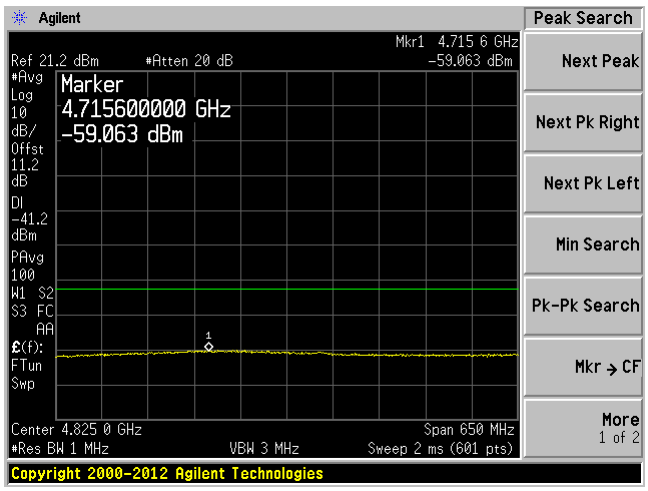
Chain J1, Plot: 3 GHz – 26 GHz



Chain J1, Plot: 4500 MHz – 5150 MHz Peak

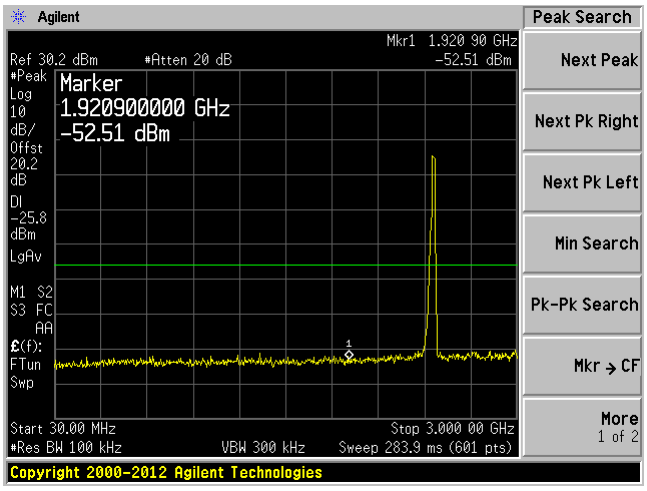


Chain J1, Plot: 4500 MHz – 5150 MHz Ave

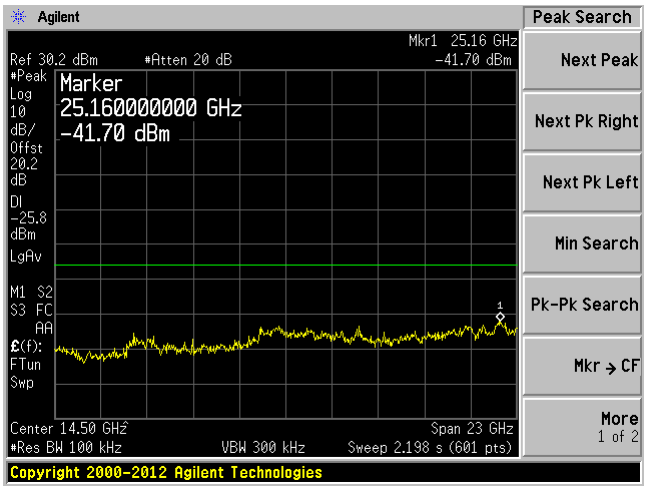


802.11g, High Channel 2462 MHz

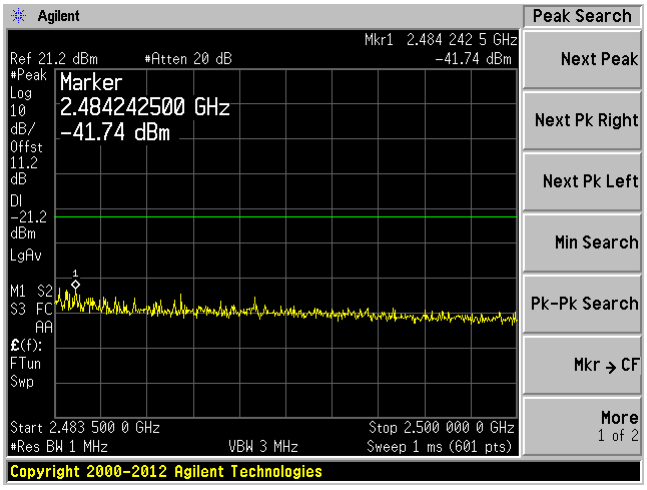
Chain J0, Plot: 30 MHz – 3 GHz



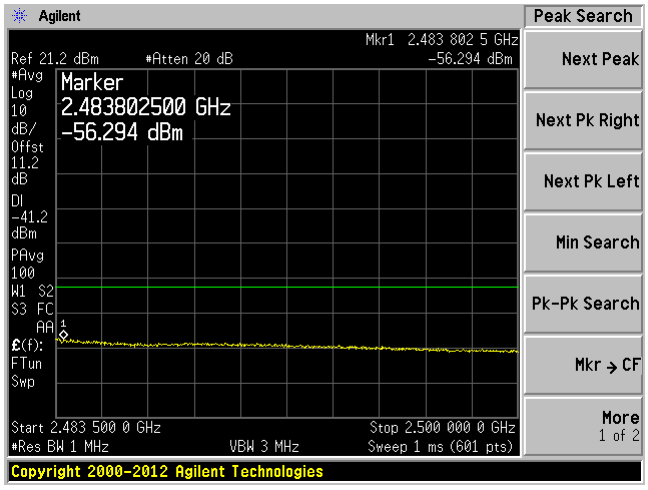
Chain J0, Plot: 3 GHz – 26 GHz



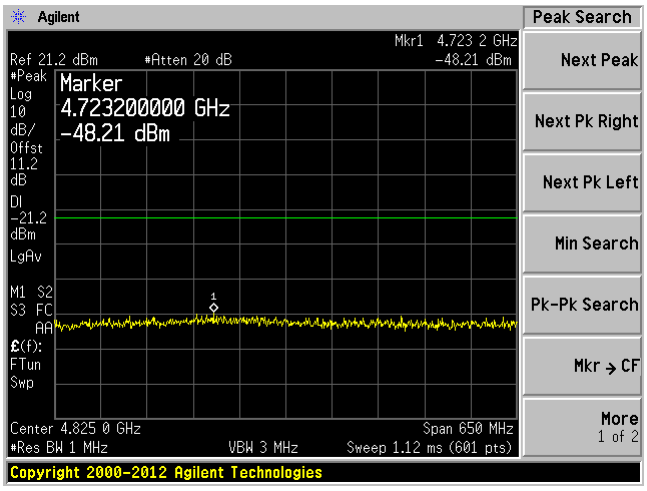
Chain J0, Plot: 2483.5 MHz – 2500 MHz Peak



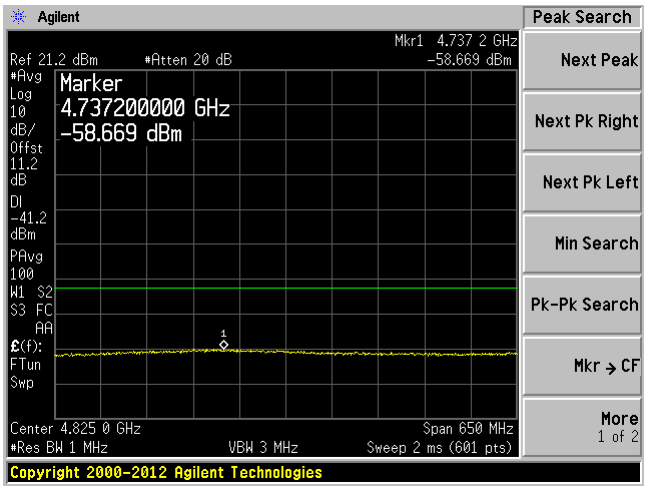
Chain J0, Plot: 2483.5 MHz – 2500 MHz Ave



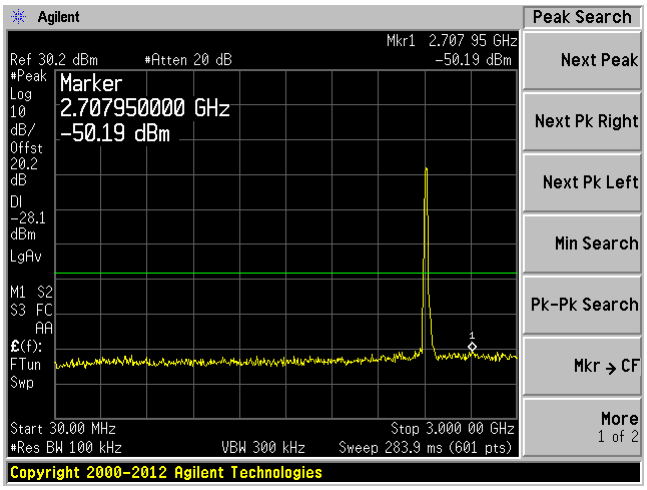
Chain J0, Plot: 4500 MHz – 5150 MHz Peak



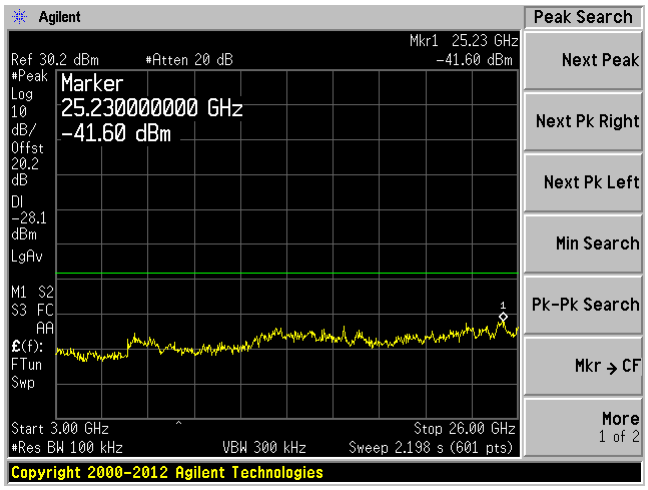
Chain J0, Plot: 4500 MHz – 5150 MHz Ave



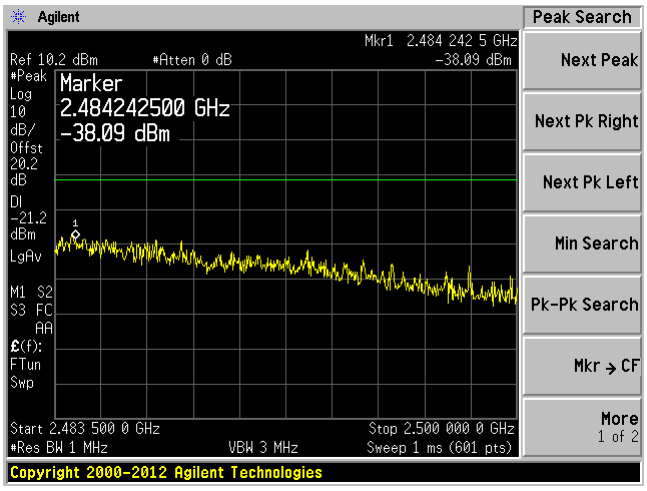
Chain J1, Plot: 30 MHz – 3 GHz



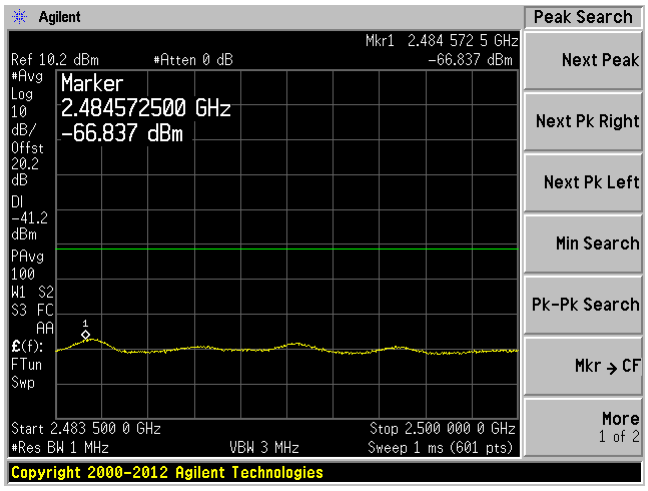
Chain J1, Plot: 3 GHz – 26 GHz



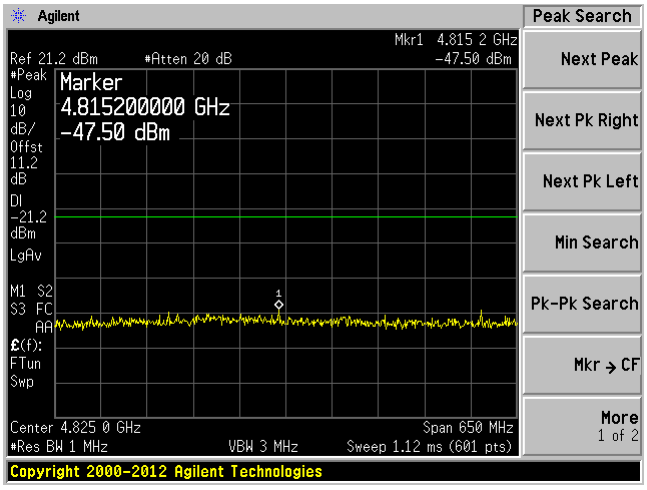
Chain J1, Plot: 2483.5 MHz – 2500 MHz Peak



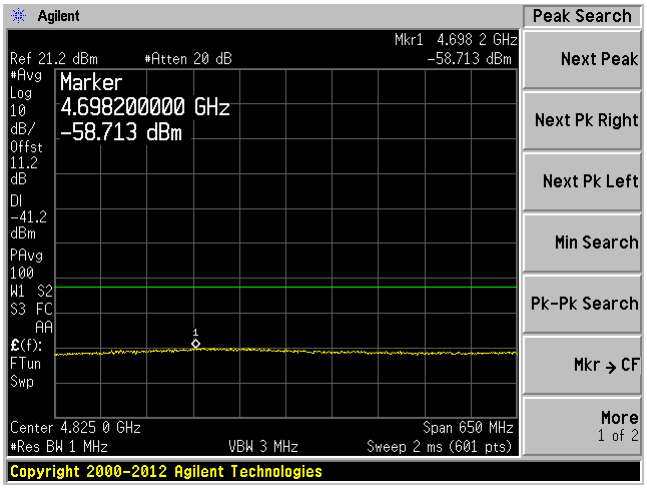
Chain J1, Plot: 2483.5 MHz – 2500 MHz Ave



Chain J1, Plot: 4500 MHz – 5150 MHz Peak

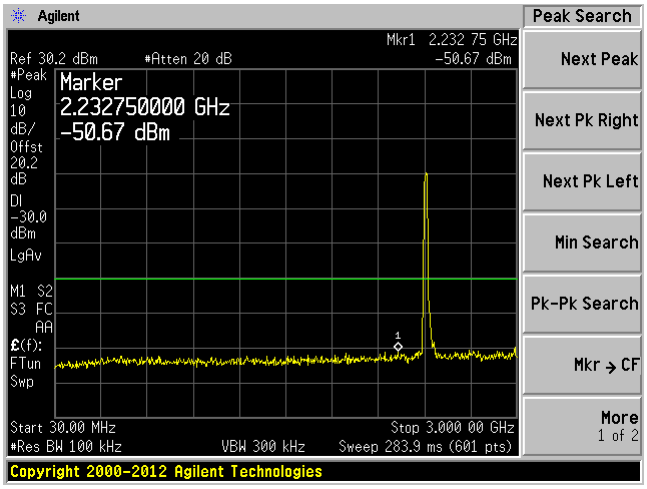


Chain J1, Plot: 4500 MHz – 5150 MHz Ave

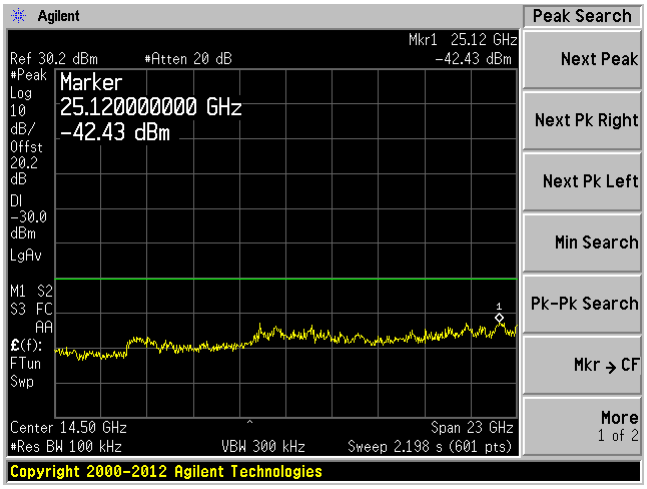


802.11n-HT20, Low Channel 2412 MHz

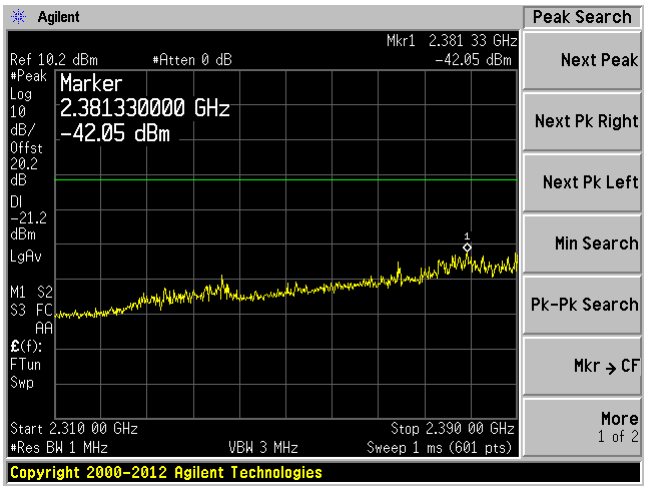
Chain J0, Plot: 30 MHz – 3 GHz



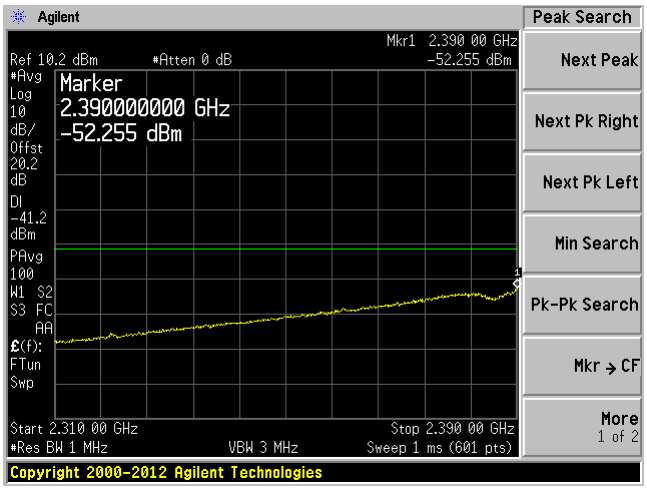
Chain J0, Plot: 3 GHz – 26 GHz



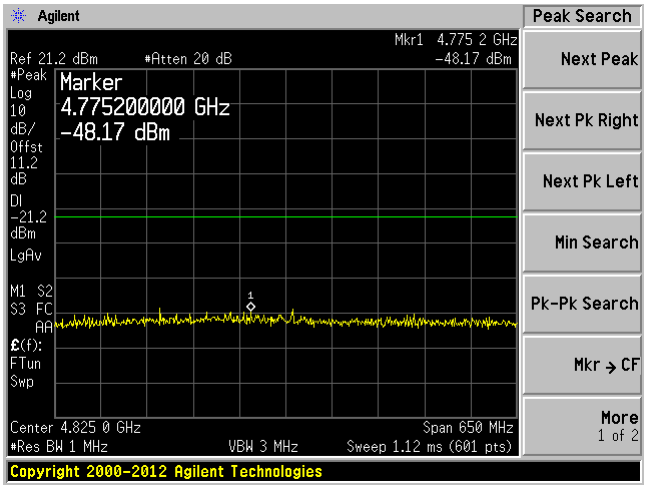
Chain J0, Plot: 2310 MHz – 2390 MHz Peak



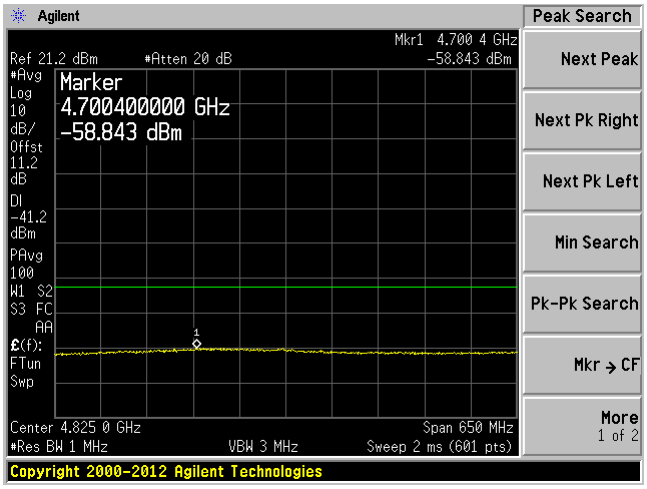
Chain J0, Plot: 2310 MHz – 2390 MHz Ave



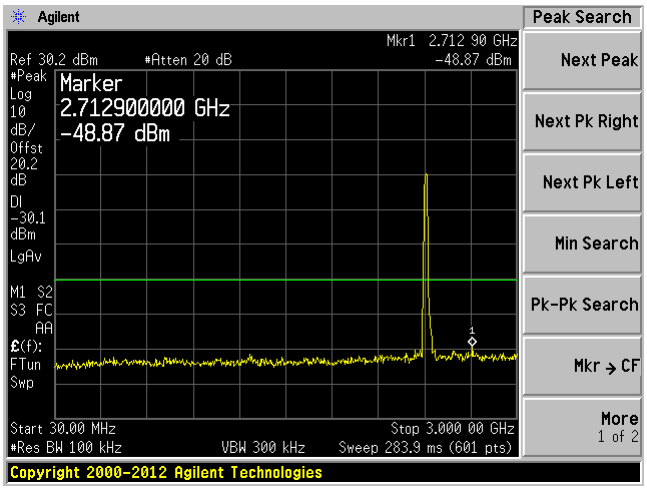
Chain J0, Plot: 4500 MHz – 5150 MHz Peak



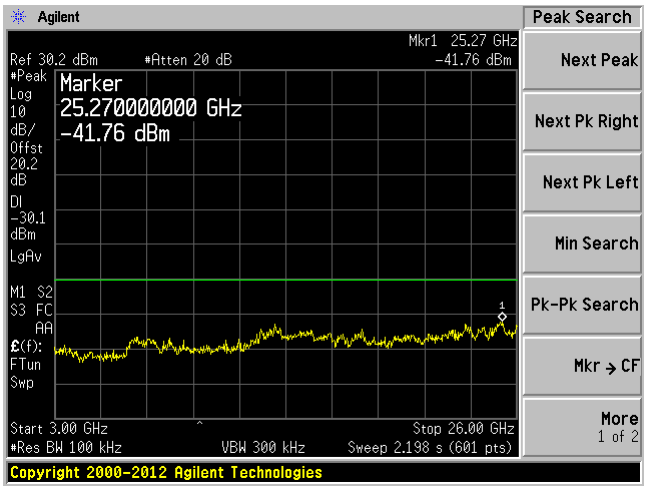
Chain J0, Plot: 4500 MHz – 5150 MHz Ave



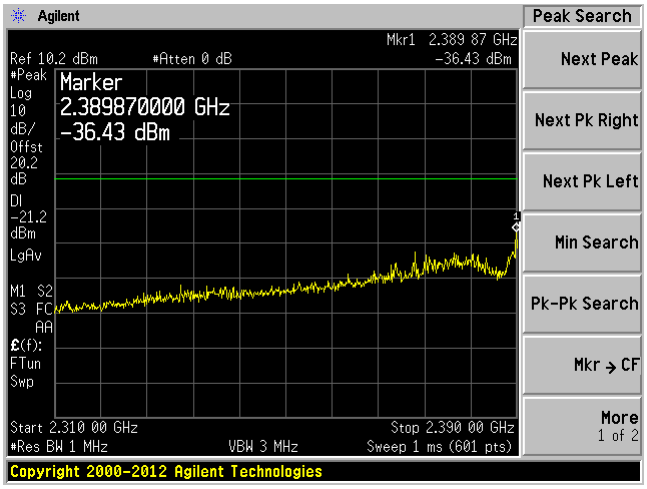
Chain J1, Plot: 30 MHz – 3 GHz



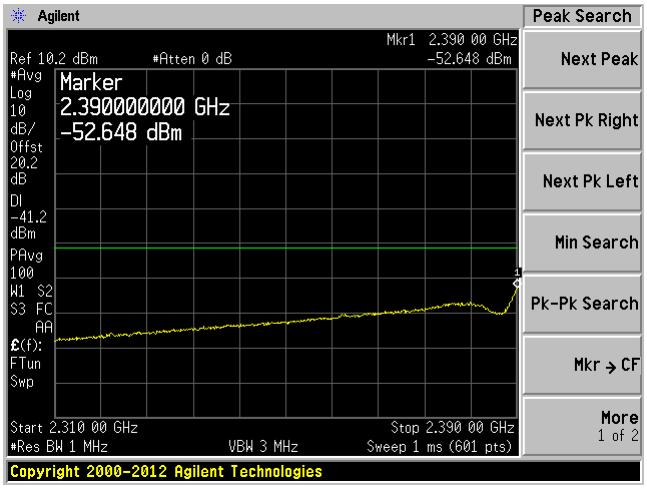
Chain J1, Plot: 3 GHz – 26 GHz



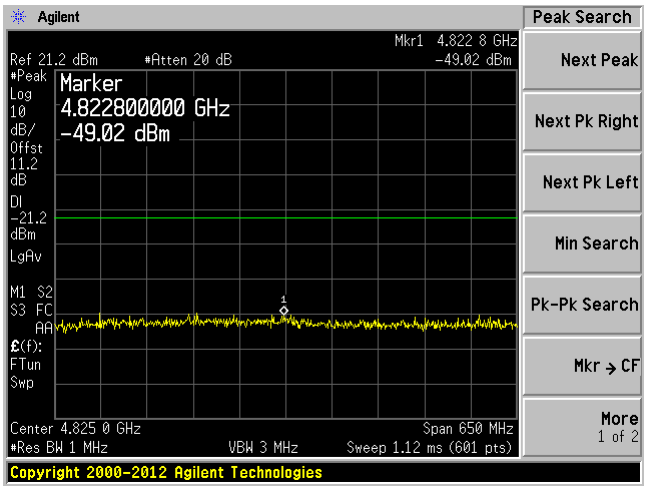
Chain J1, Plot: 2310 MHz – 2390 MHz Peak



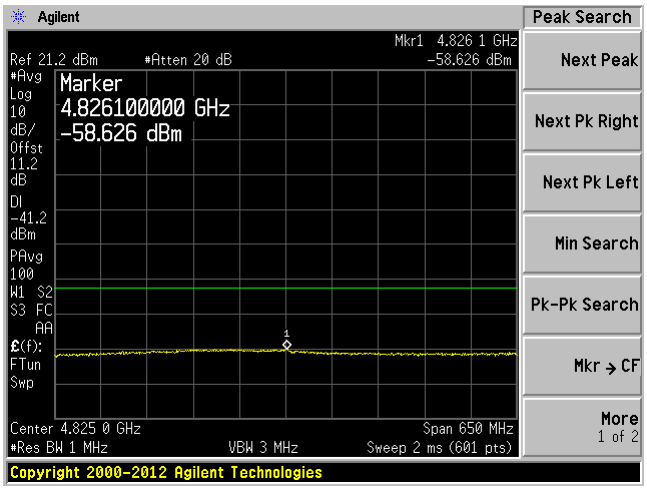
Chain J1, Plot: 2310 MHz – 2390 MHz Ave



Chain J1, Plot: 4500 MHz – 5150 MHz Peak

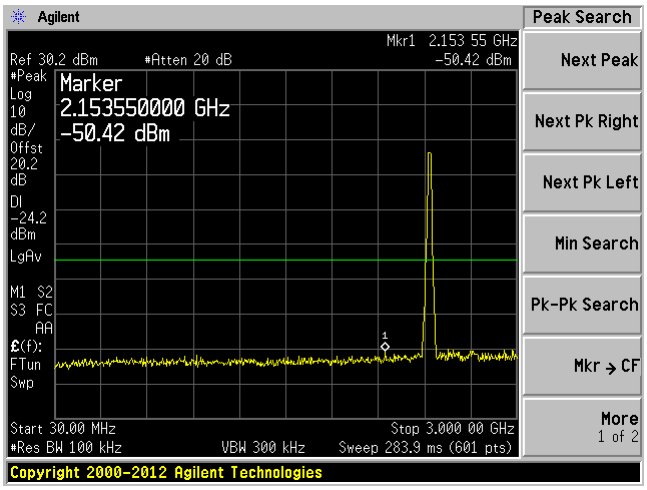


Chain J1, Plot: 4500 MHz – 5150 MHz Ave

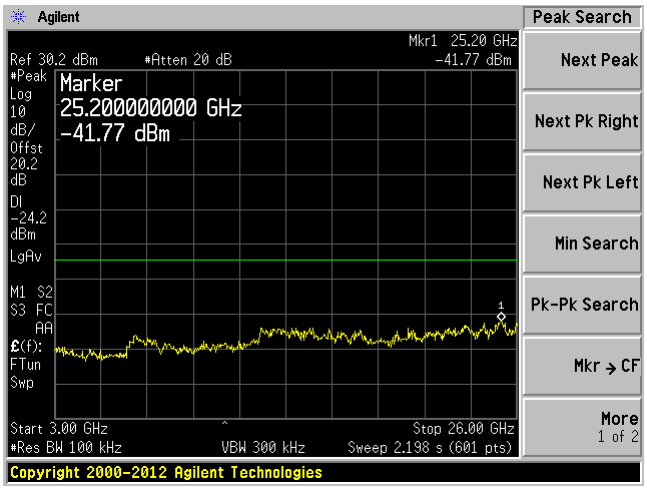


802.11n-HT20, Middle Channel 2437 MHz

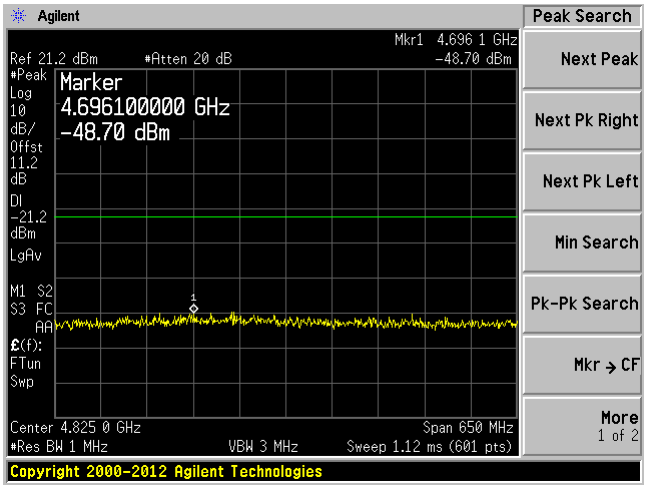
Chain J0, Plot: 30 MHz – 3 GHz



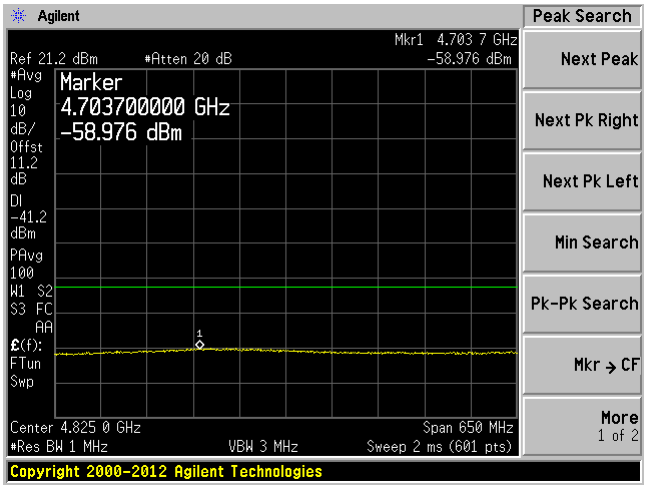
Chain J0, Plot: 3 GHz – 26 GHz



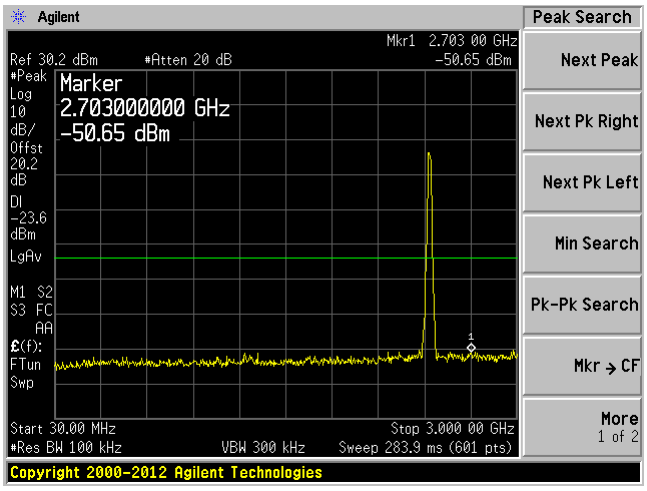
Chain J0, Plot: 4500 MHz – 5150 MHz Peak



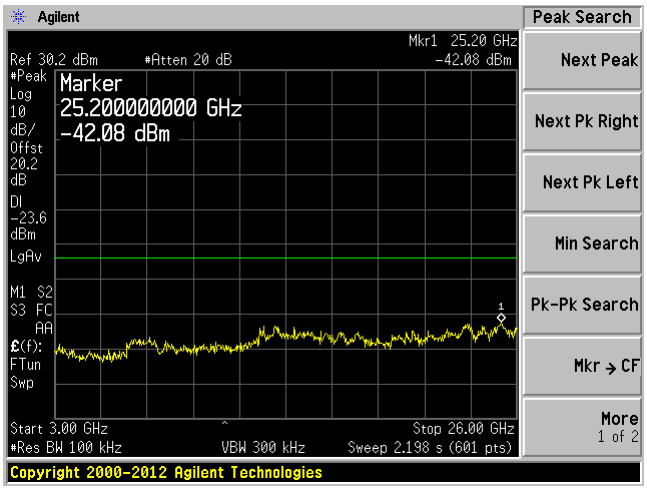
Chain J0, Plot: 4500 MHz – 5150 MHz Ave



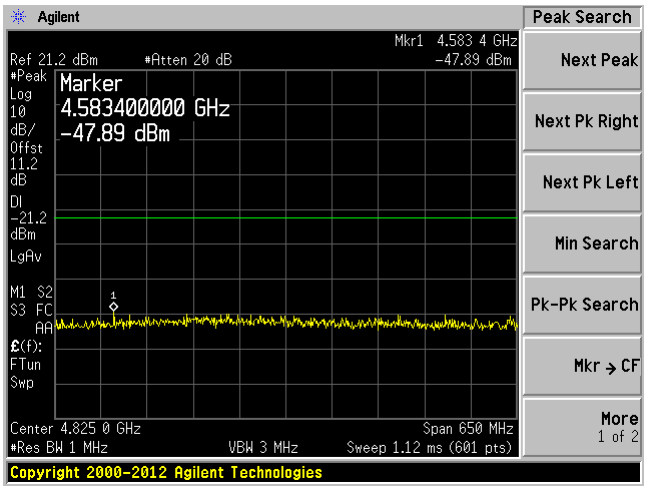
Chain J1, Plot: 30 MHz – 3 GHz



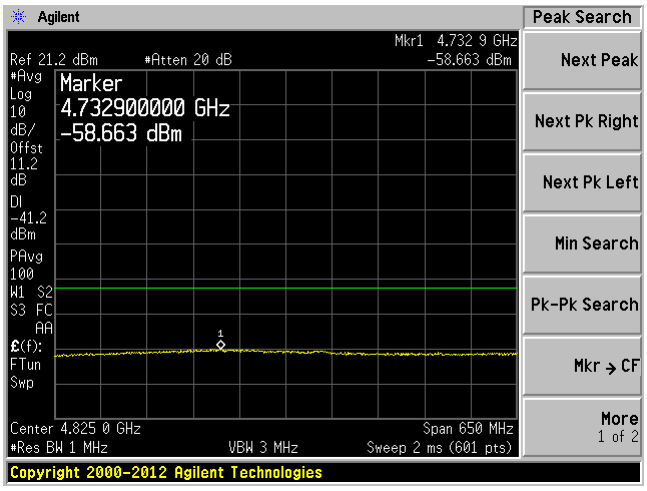
Chain J1, Plot: 3 GHz – 26 GHz



Chain J1, Plot: 4500 MHz – 5150 MHz Peak

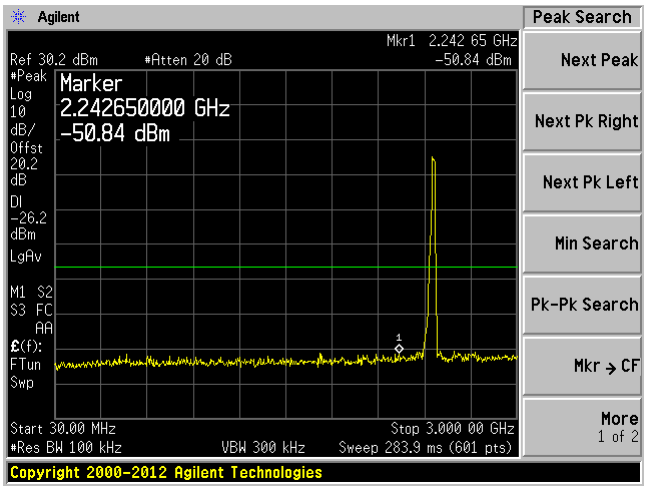


Chain J1, Plot: 4500 MHz – 5150 MHz Ave

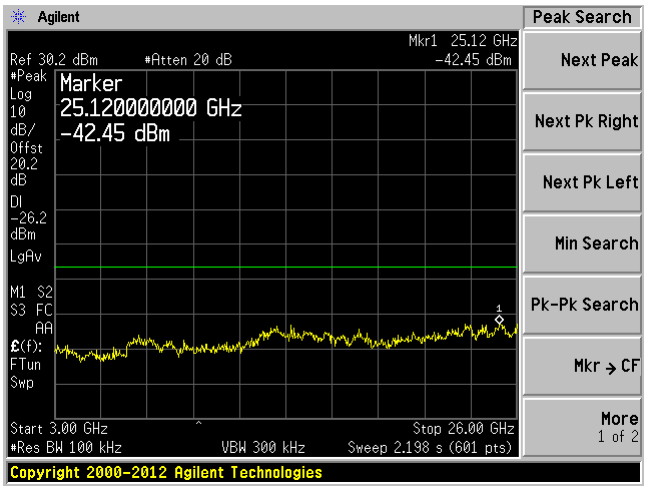


802.11n-HT20, High Channel 2462 MHz

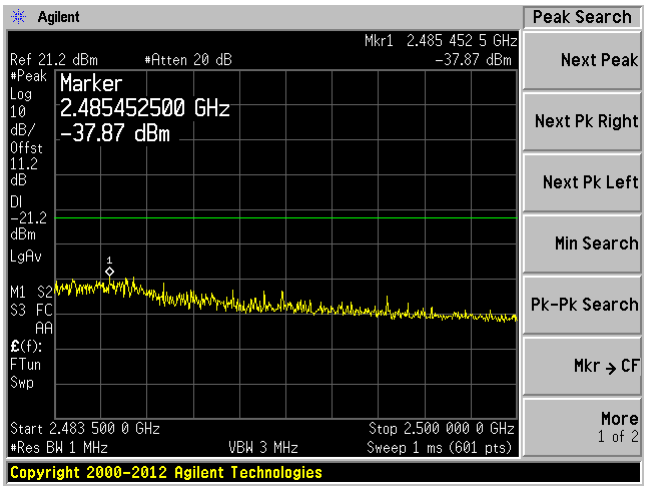
Chain J0, Plot: 30 MHz – 3 GHz



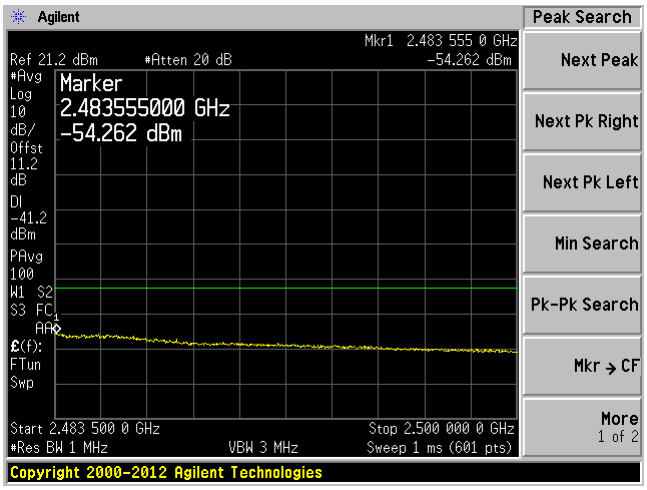
Chain J0, Plot: 3 GHz – 26 GHz



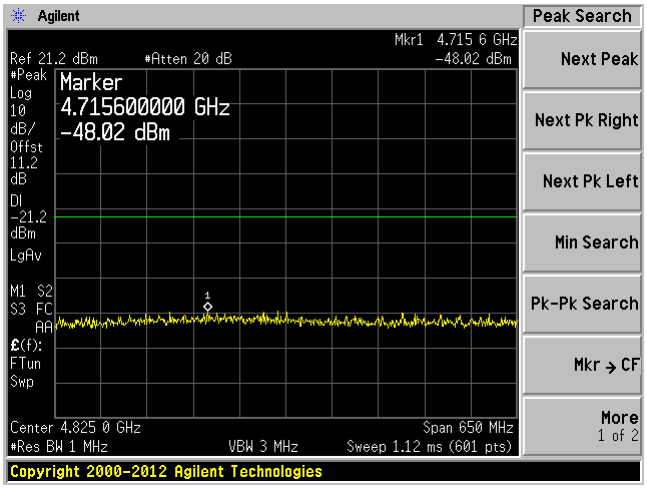
Chain J0, Plot: 2483.5 MHz – 2500 MHz Peak



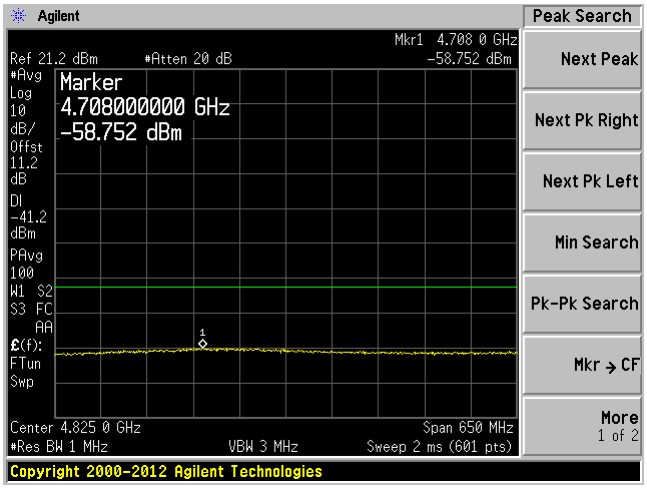
Chain J0, Plot: 2483.5 MHz – 2500 MHz Ave



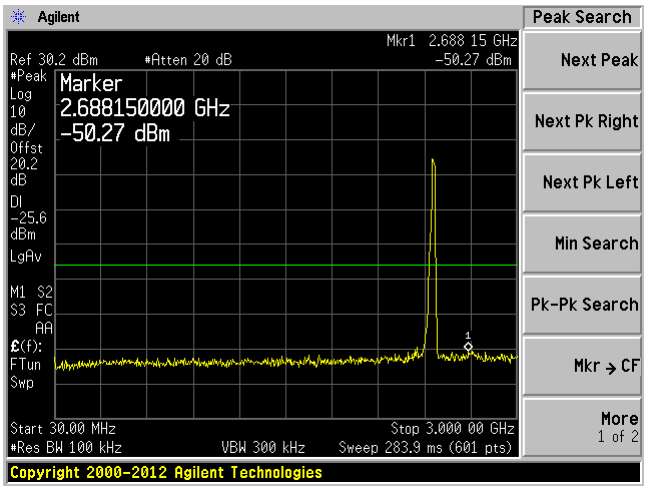
Chain J0, Plot: 4500 MHz – 5150 MHz Peak



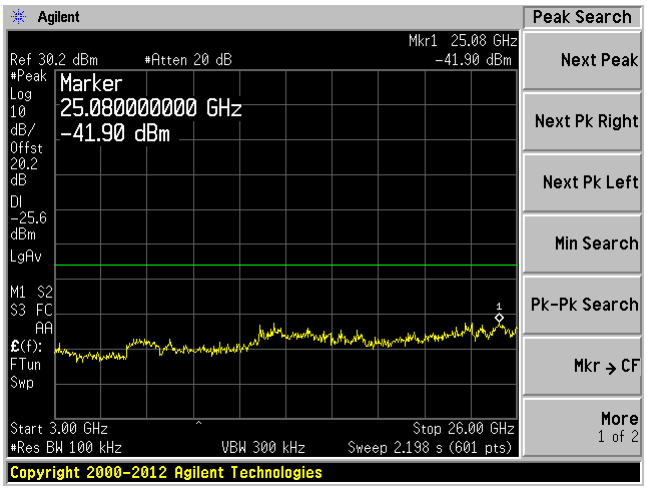
Chain J0, Plot: 4500 MHz – 5150 MHz Ave



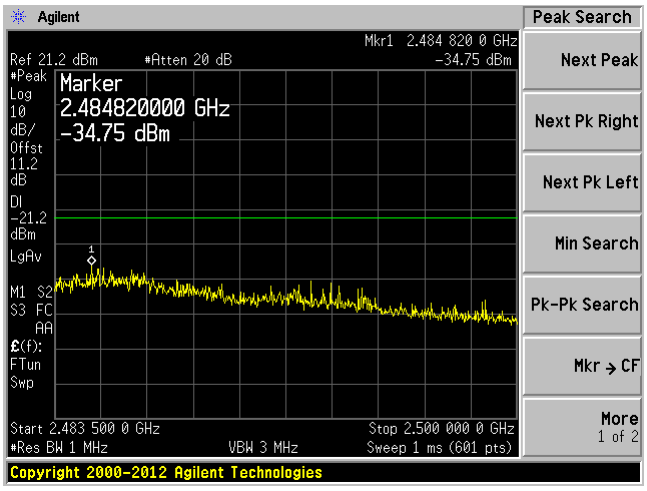
Chain J1, Plot: 30 MHz – 3 GHz



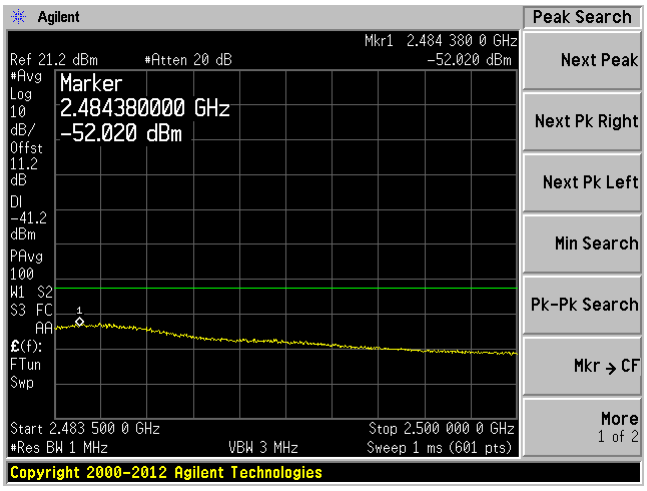
Chain J1, Plot: 3 GHz – 26 GHz



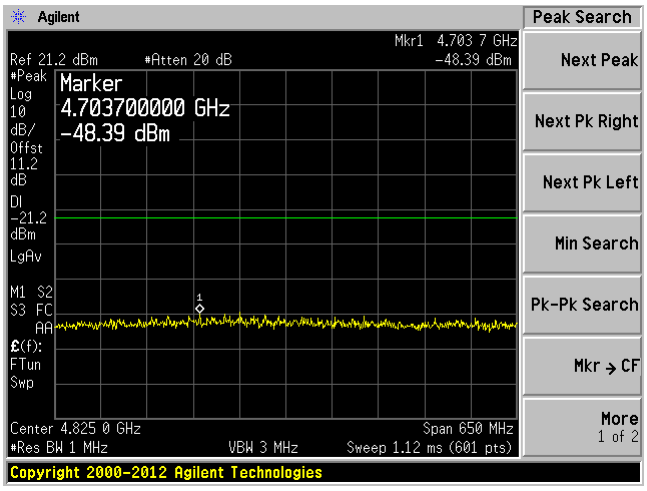
Chain J1, Plot: 2483.5 MHz – 2500 MHz Peak



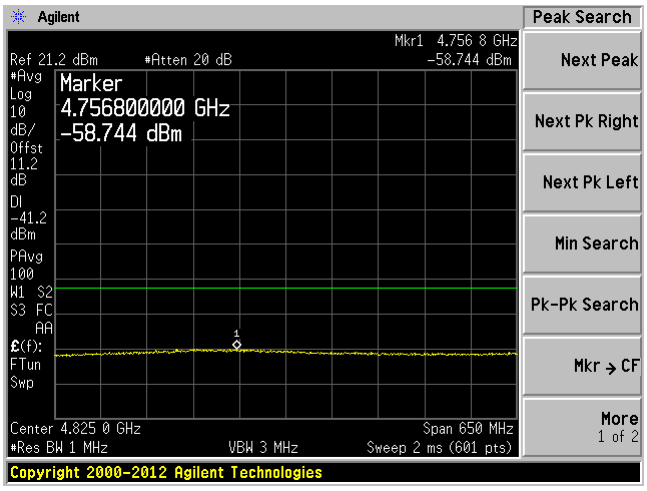
Chain J1, Plot: 2483.5 MHz – 2500 MHz Ave



Chain J1, Plot: 4500 MHz – 5150 MHz Peak

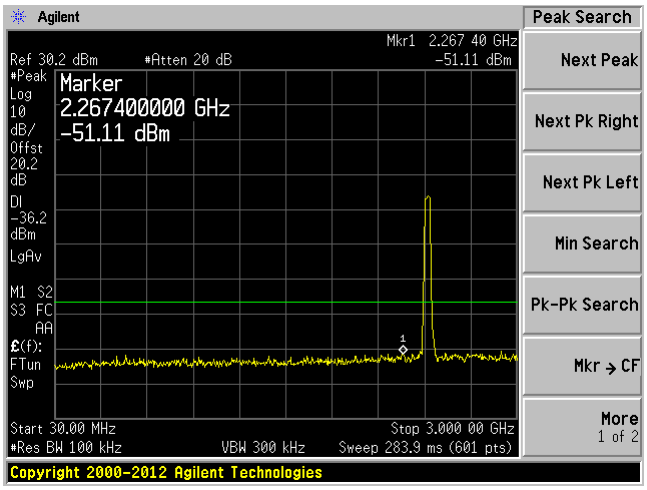


Chain J1, Plot: 4500 MHz – 5150 MHz Ave

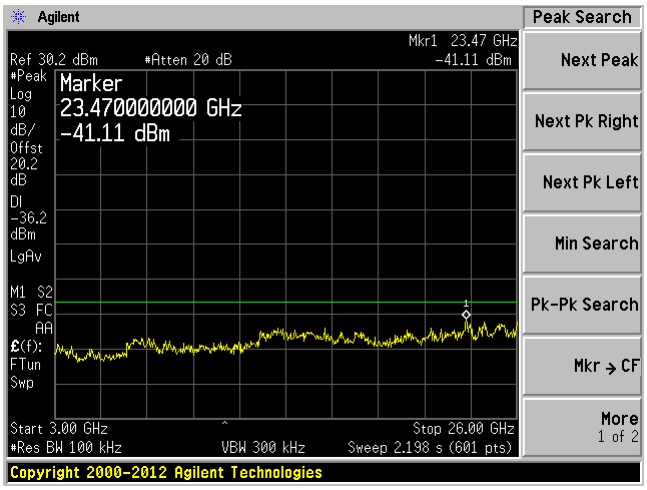


802.11n HT40, Low Channel 2422 MHz

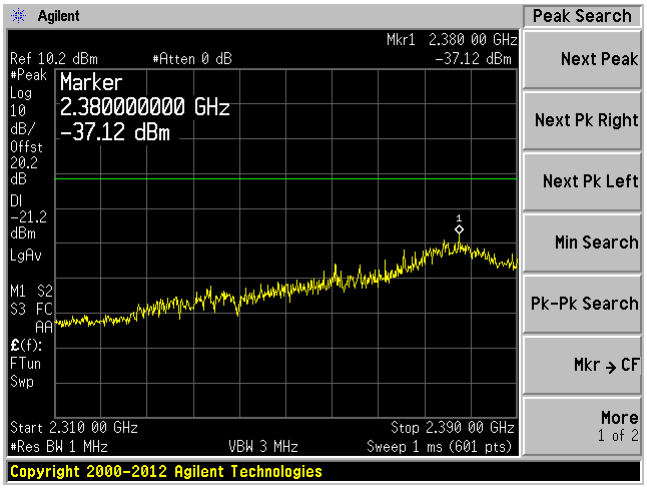
Chain J0, Plot: 30 MHz – 3 GHz



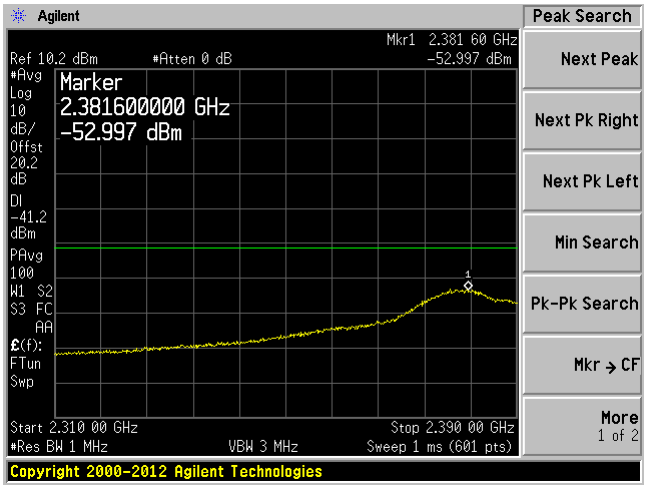
Chain J0, Plot: 3 GHz – 26 GHz



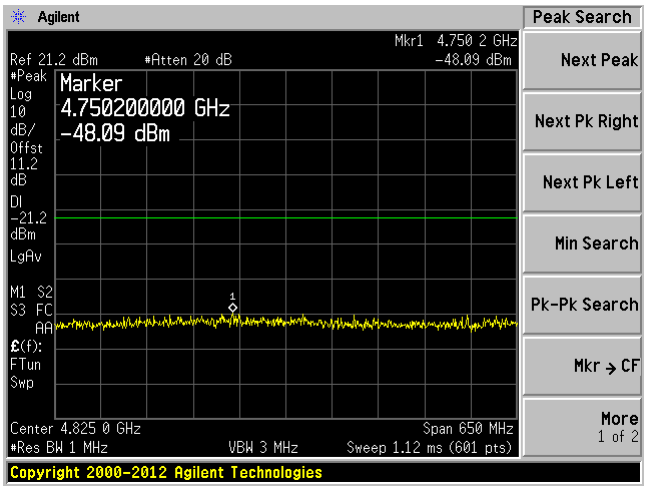
Chain J0, Plot: 2310 MHz – 2390 MHz Peak



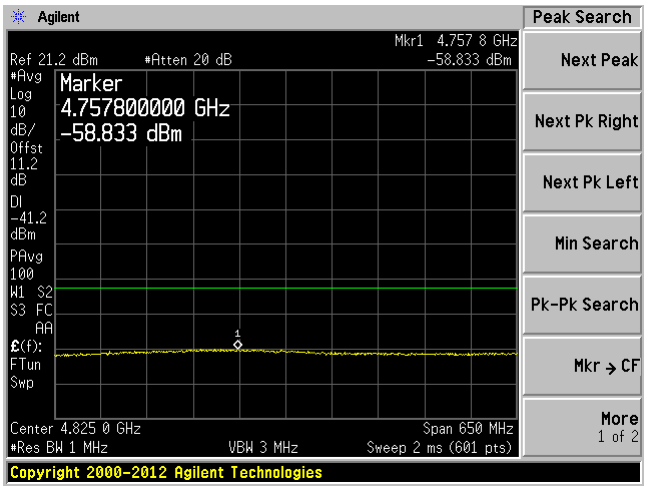
Chain J0, Plot: 2310 MHz – 2390 MHz Ave



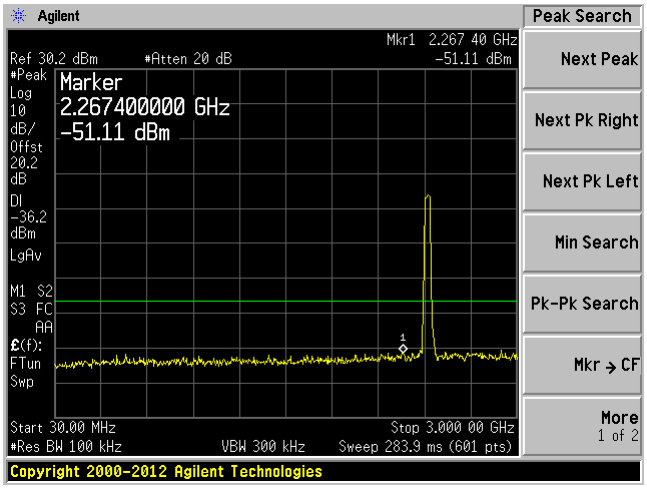
Chain J0, Plot: 4500 MHz – 5150 MHz Peak



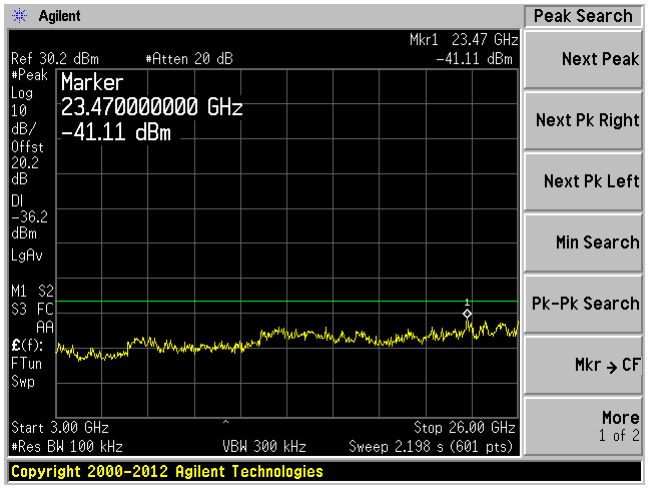
Chain J0, Plot: 4500 MHz – 5150 MHz Ave



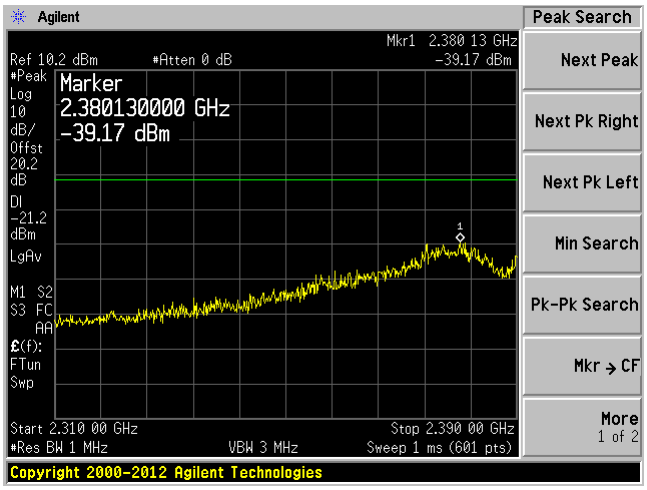
Chain J1, Plot: 30 MHz – 3 GHz



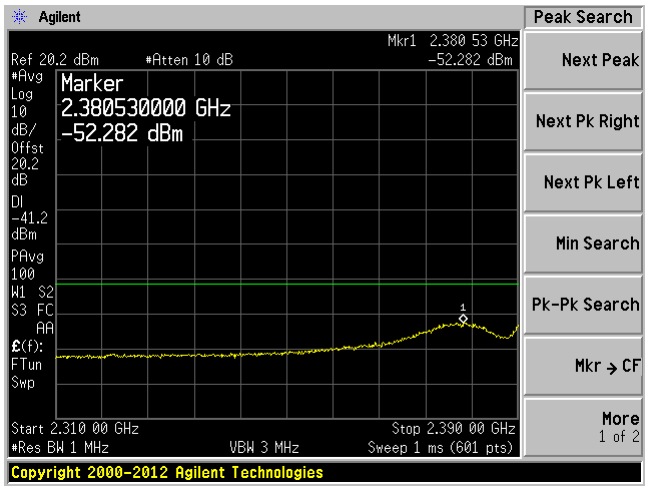
Chain J1, Plot: 3 GHz – 26 GHz



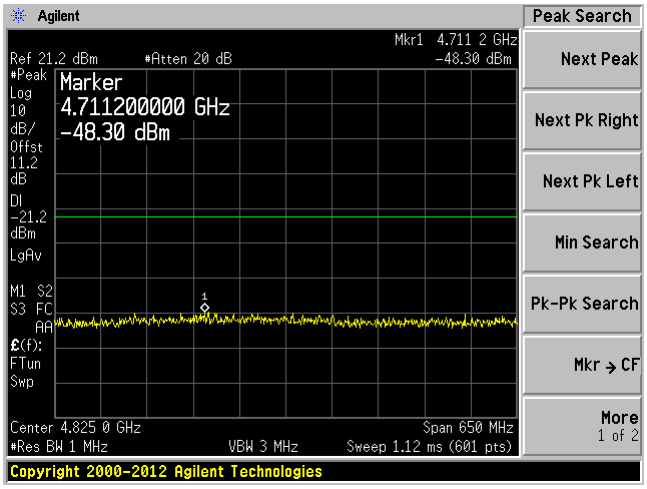
Chain J1, Plot: 2310 MHz – 2390 MHz Peak



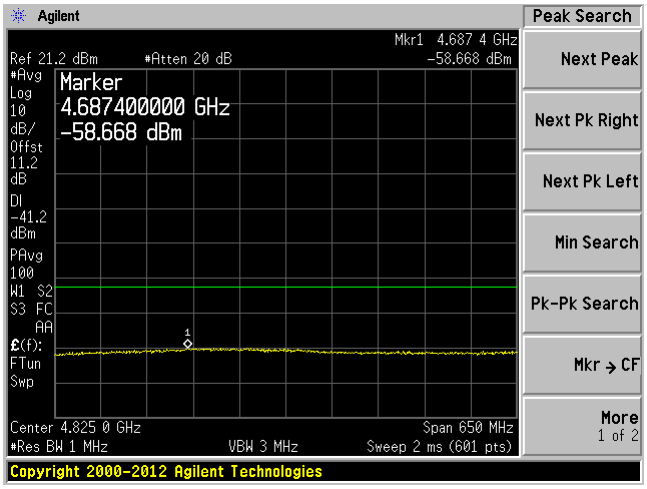
Chain J1, Plot: 2310 MHz – 2390 MHz Ave



Chain J1, Plot: 4500 MHz – 5150 MHz Peak

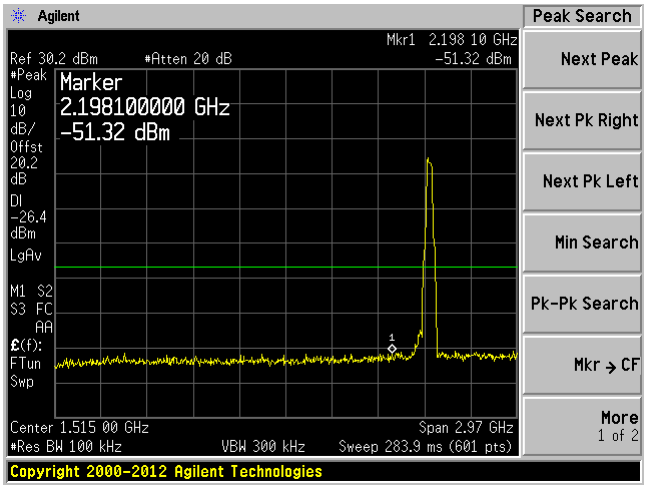


Chain J1, Plot: 4500 MHz – 5150 MHz Ave

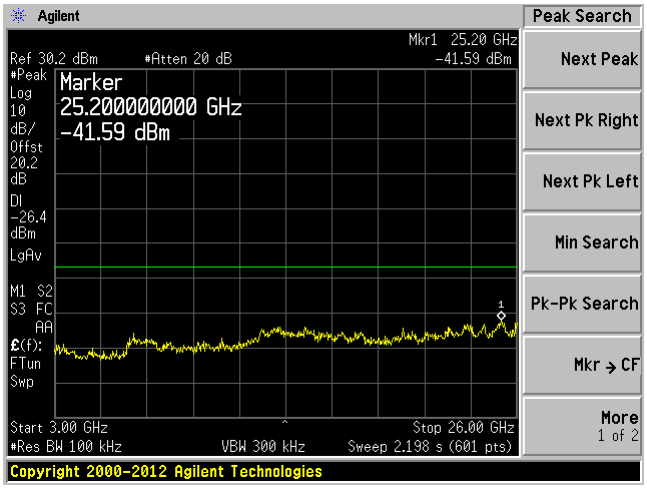


802.11n-HT40, Middle Channel 2437 MHz

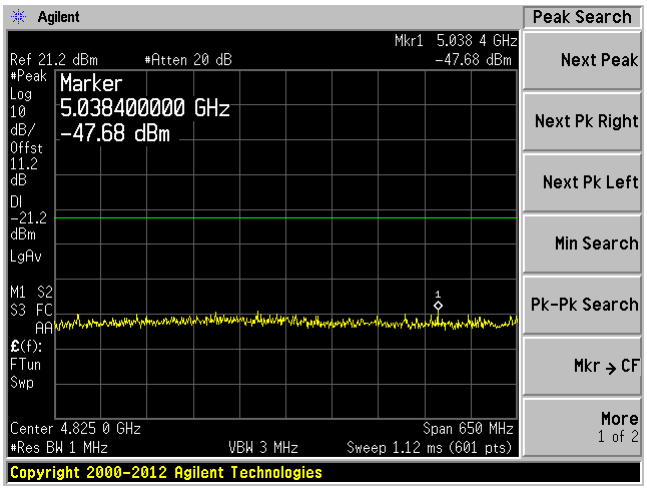
Chain J0, Plot: 30 MHz – 3 GHz



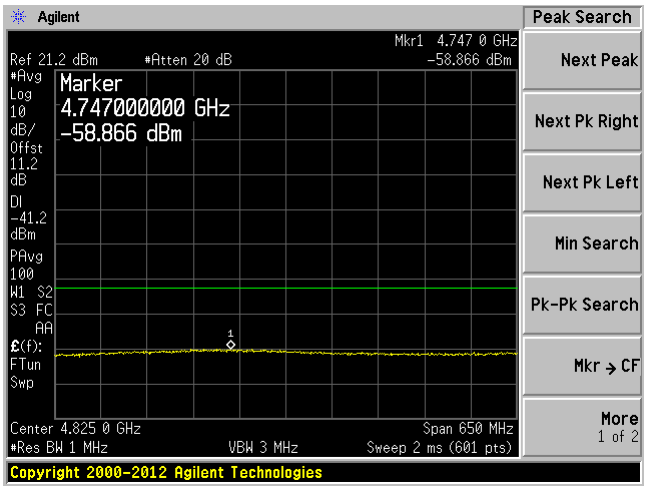
Chain J0, Plot: 3 GHz – 26 GHz



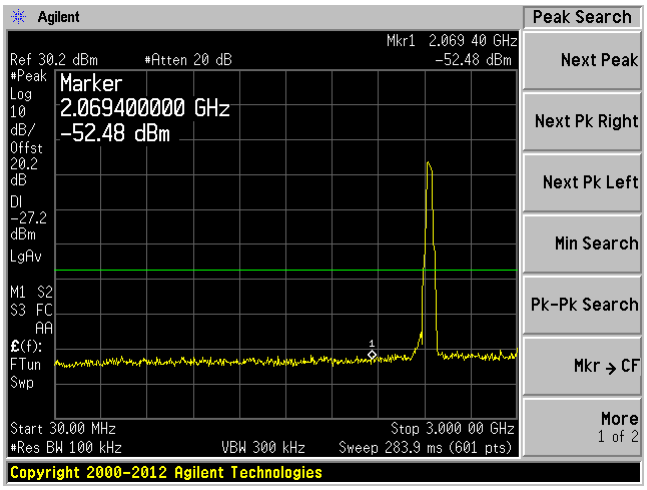
Chain J0, Plot: 4500 MHz – 5150 MHz Peak



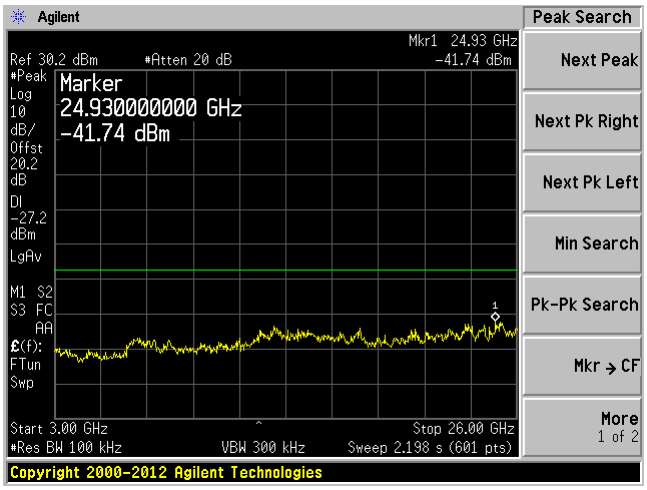
Chain J0, Plot: 4500 MHz – 5150 MHz Ave



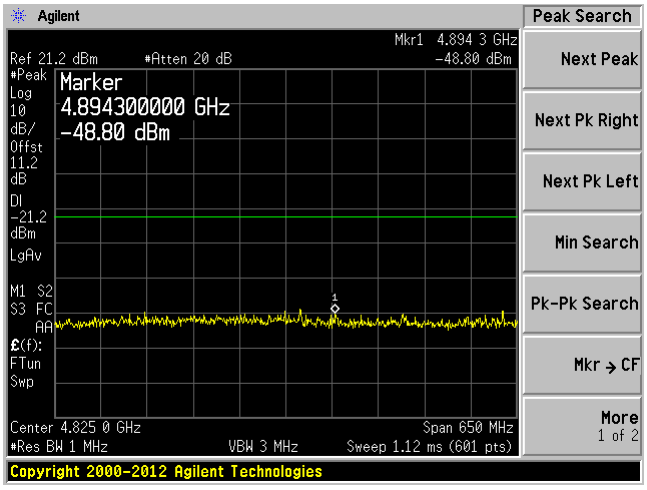
Chain J1, Plot: 30 MHz – 3 GHz



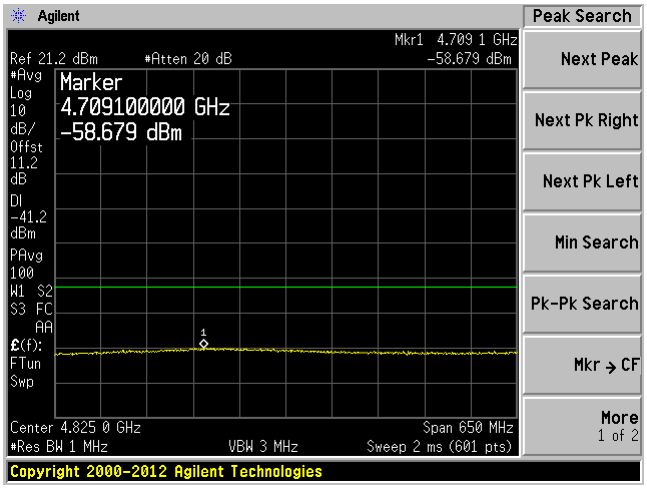
Chain J1, Plot: 3 GHz – 26 GHz



Chain J1, Plot: 4500 MHz – 5150 MHz Peak

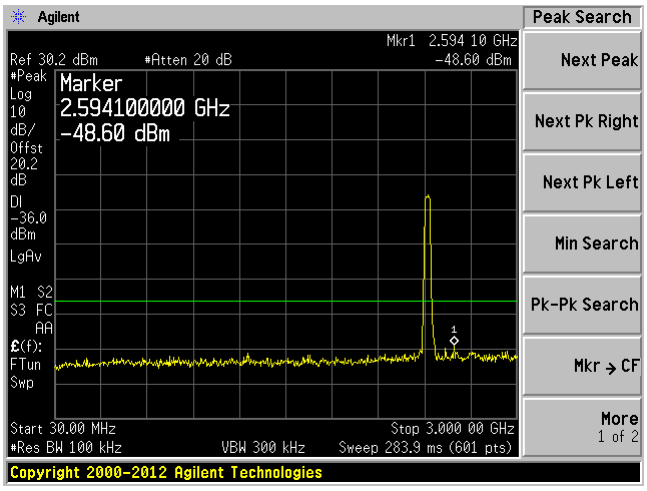


Chain J1, Plot: 4500 MHz – 5150 MHz Ave

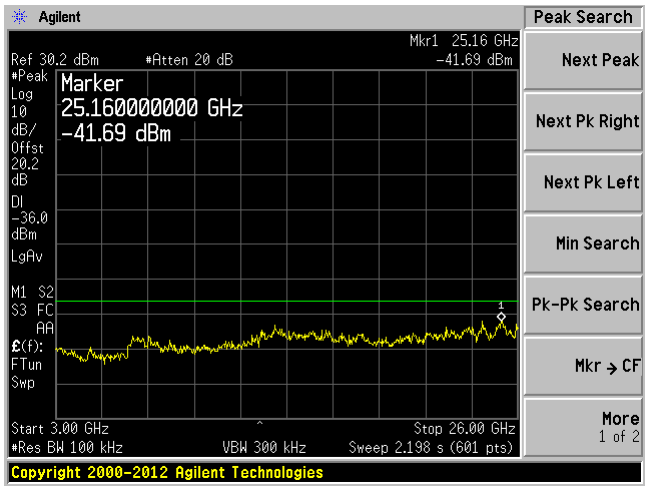


802.11n-HT40, High Channel 2452 MHz

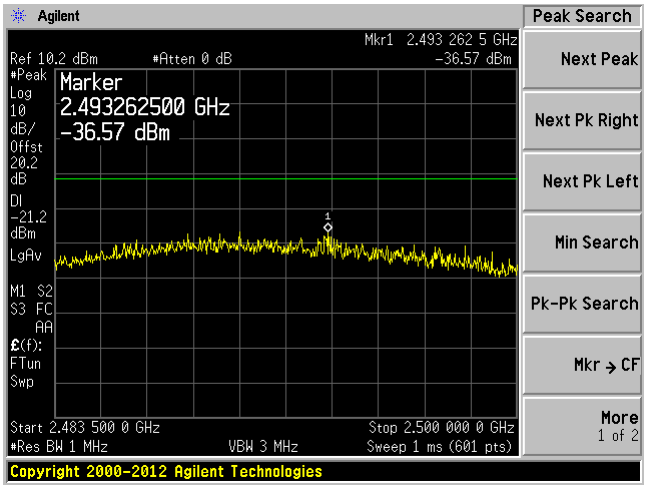
Chain J0, Plot: 30 MHz – 3 GHz



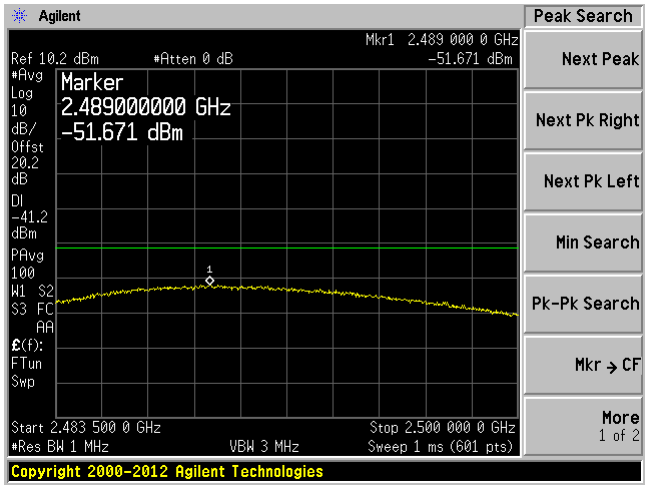
Chain J0, Plot: 3 GHz – 26 GHz



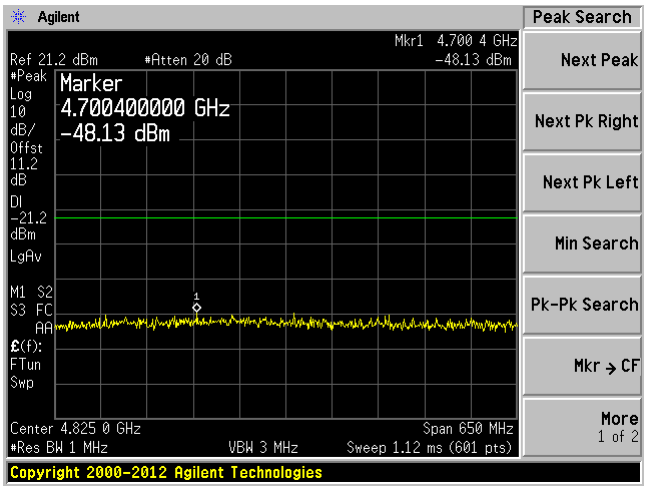
Chain J0, Plot: 2483.5 MHz – 2500 MHz Peak



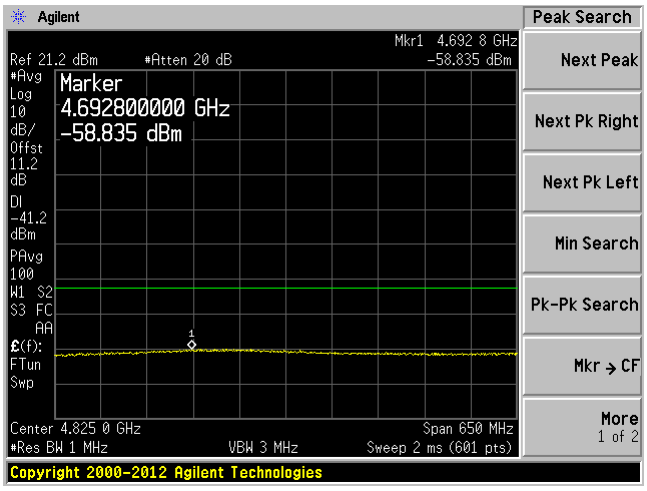
Chain J0, Plot: 2483.5 MHz – 2500 MHz Ave



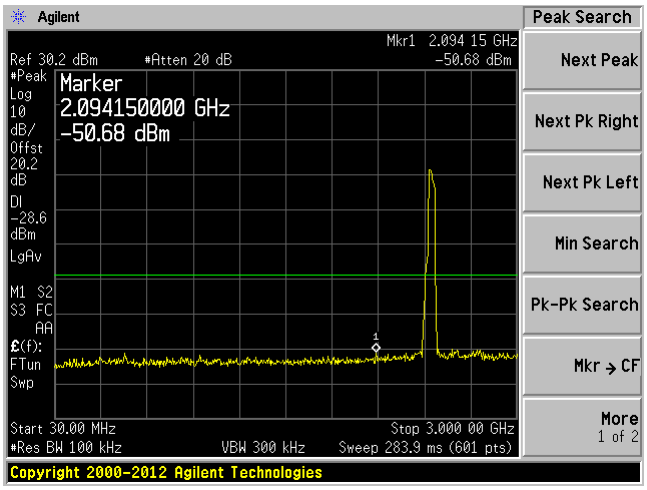
Chain J0, Plot: 4500 MHz – 5150 MHz Peak



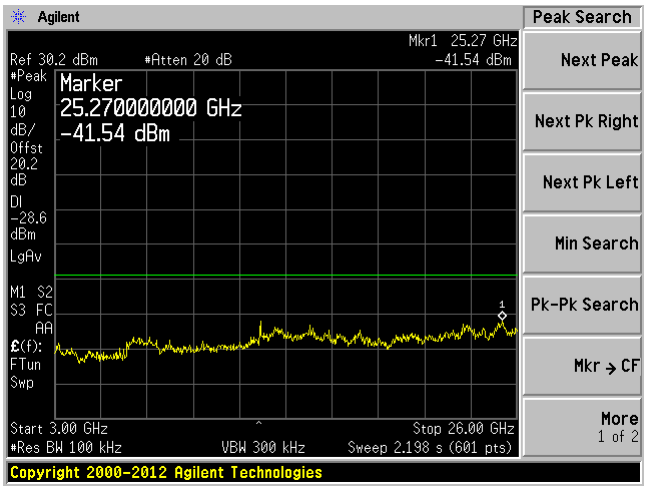
Chain J0, Plot: 4500 MHz – 5150 MHz Ave



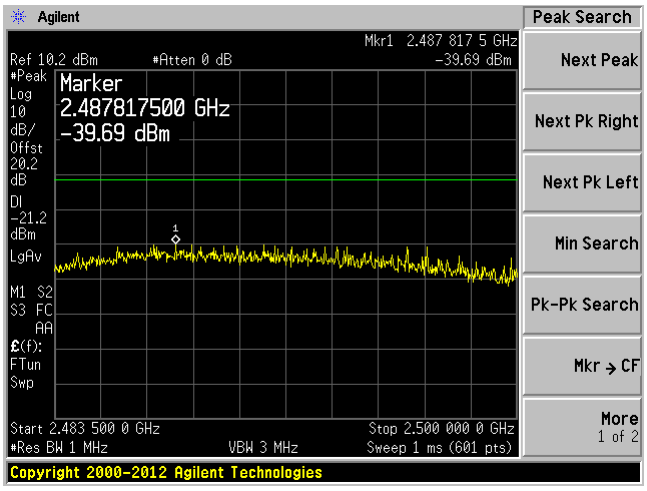
Chain J1, Plot: 30 MHz – 3 GHz



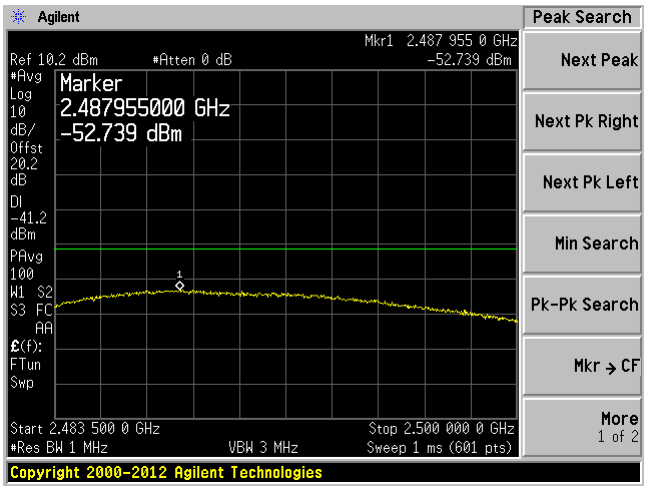
Chain J1, Plot: 3 GHz – 26 GHz



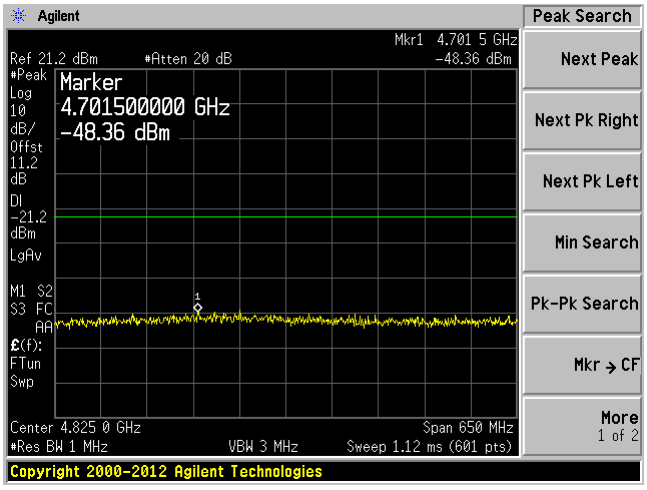
Chain J1, Plot: 2483.5 MHz – 2500 MHz Peak



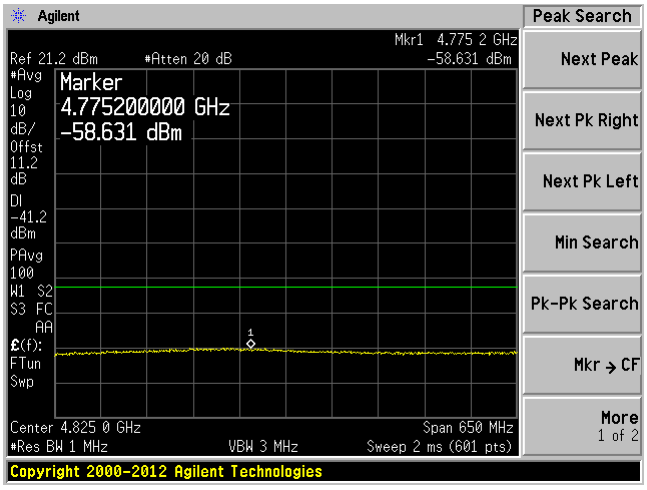
Chain J1, Plot: 2483.5 MHz – 2500 MHz Ave



Chain J1, Plot: 4500 MHz – 5150 MHz Peak



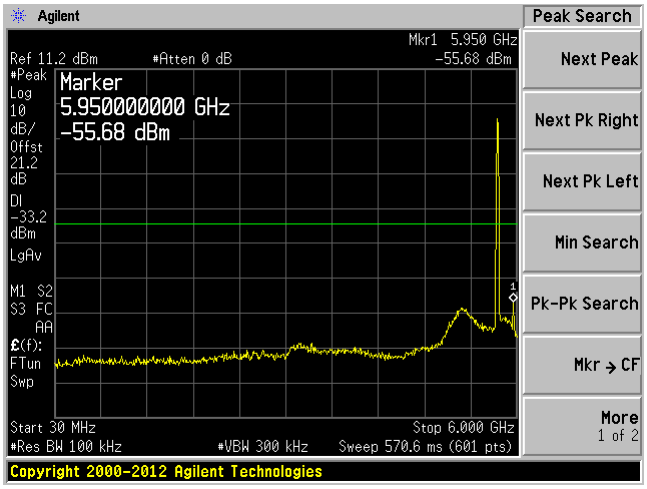
Chain J1, Plot: 4500 MHz – 5150 MHz Ave



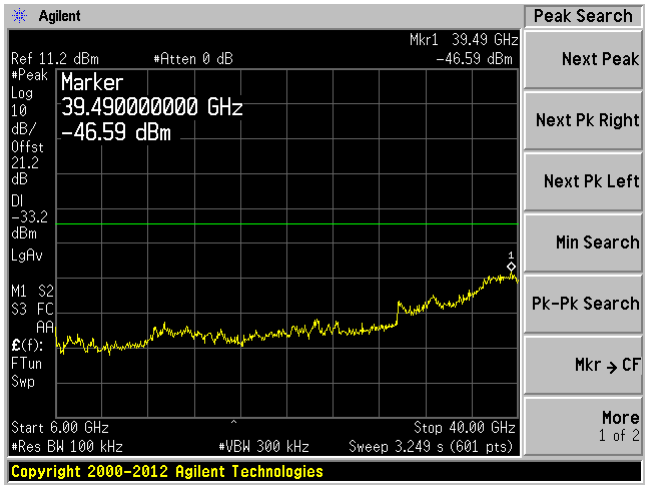
5.8 GHz Band:

802.11a, Low Channel 5745 MHz

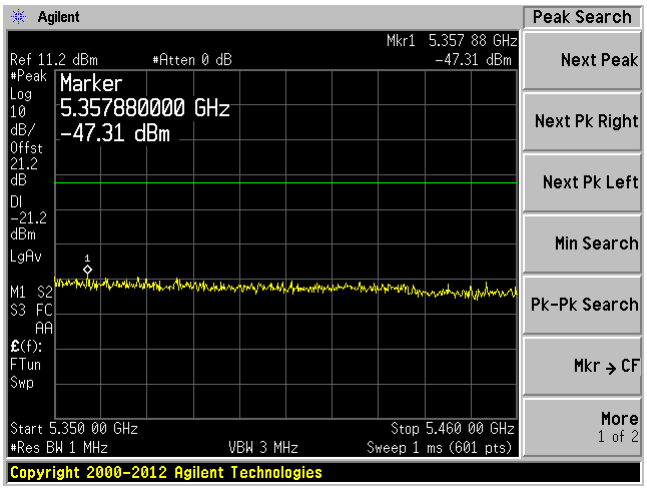
Chain J0, Plot: 30 MHz – 6 GHz



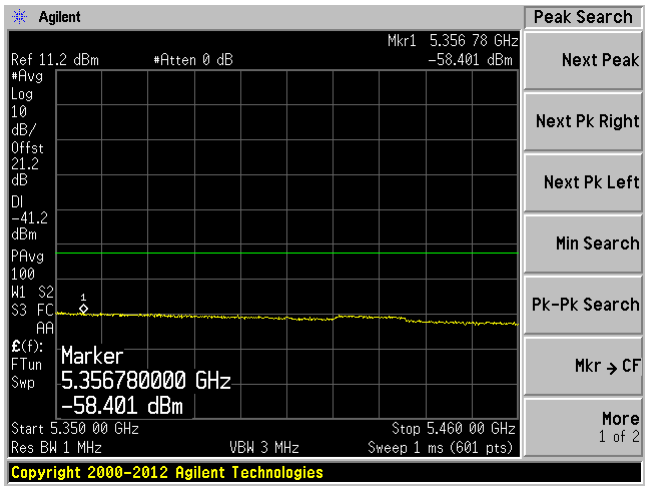
Chain J0, Plot: 6 GHz – 40 GHz



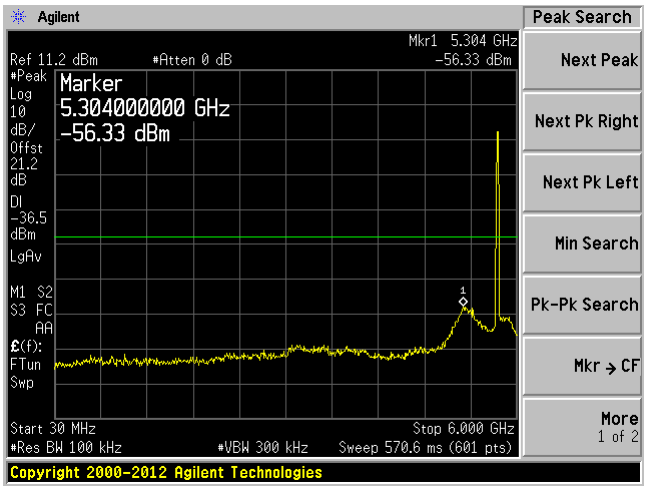
Chain J0, Plot: 5350 MHz – 5460 MHz Peak



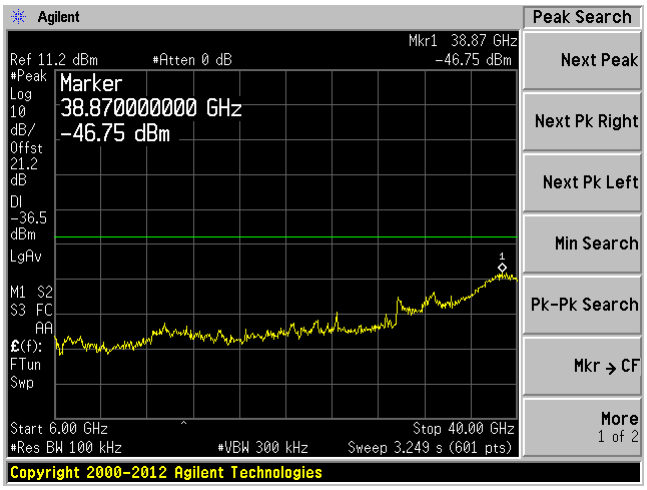
Chain J0, Plot: 5350 MHz – 5460 MHz Ave



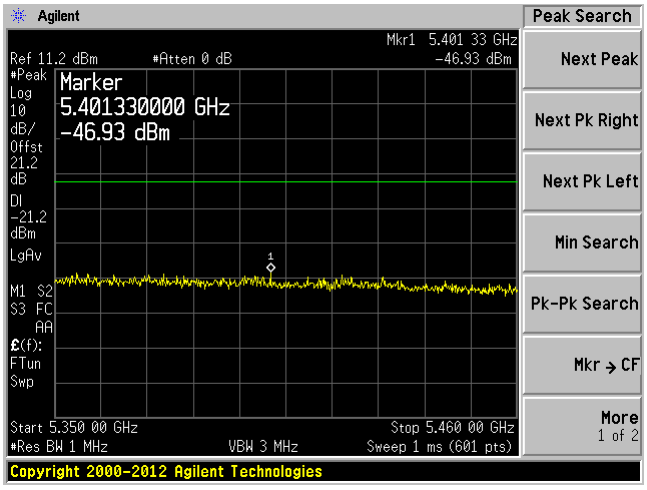
Chain J1, Plot: 30 MHz – 6 GHz



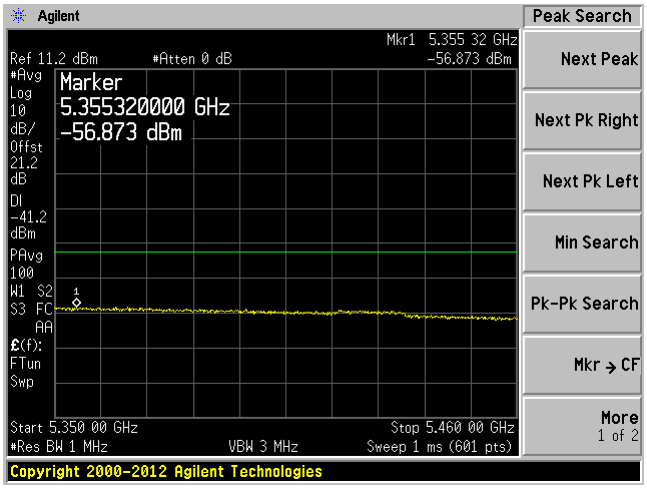
Chain J1, Plot: 6 GHz – 40 GHz



Chain J1, Plot: 5350 MHz – 5460 MHz Peak

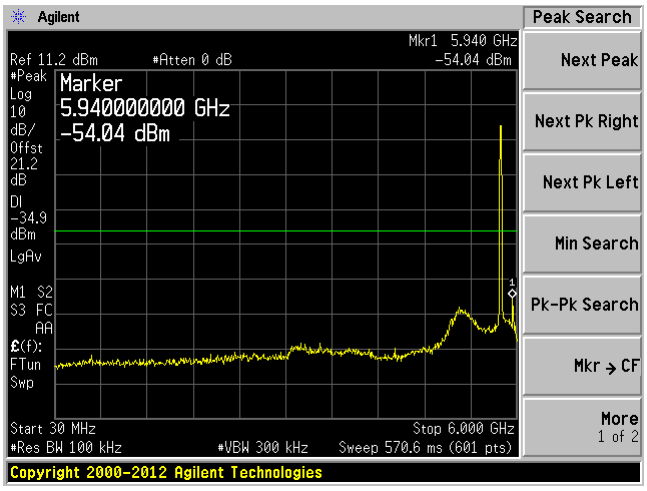


Chain J1, Plot: 5350 MHz – 5460 MHz Ave

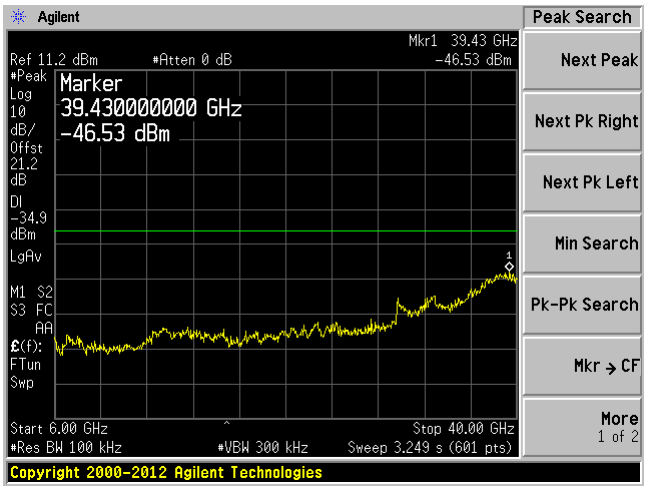


802.11a, Middle Channel 5785 MHz

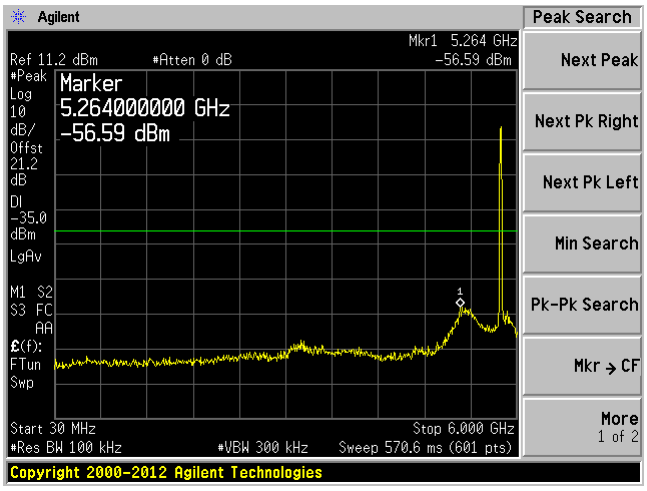
Chain J0, Plot: 30 MHz – 6 GHz



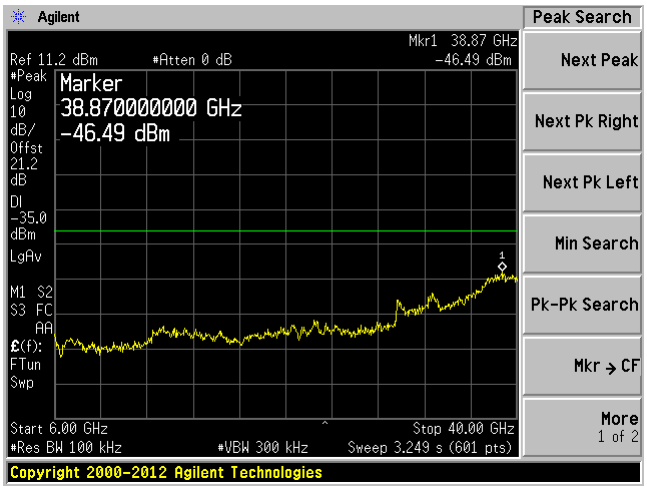
Chain J0, Plot: 6 GHz – 40 GHz



Chain J1, Plot: 30 MHz – 6 GHz

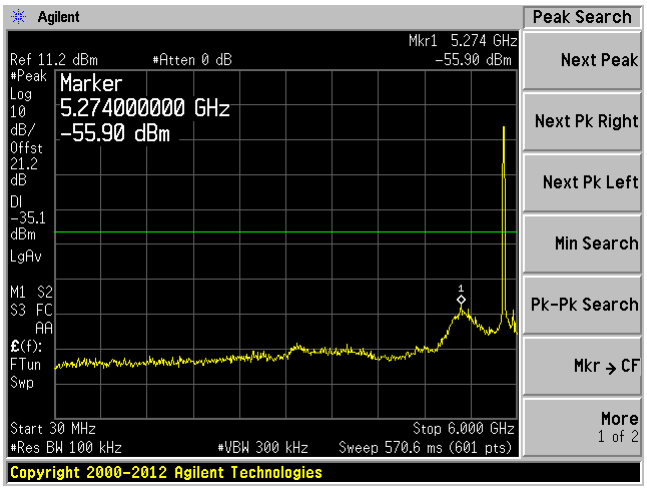


Chain J1, Plot: 6 GHz – 40 GHz

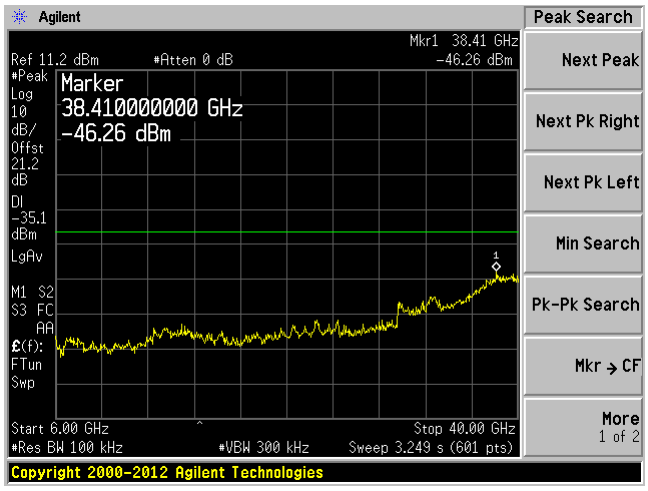


802.11a, High Channel 5825 MHz

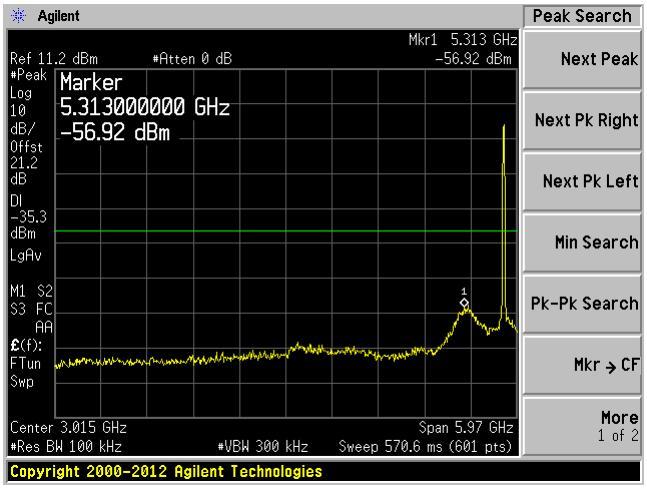
Chain J0, Plot: 30 MHz – 6 GHz



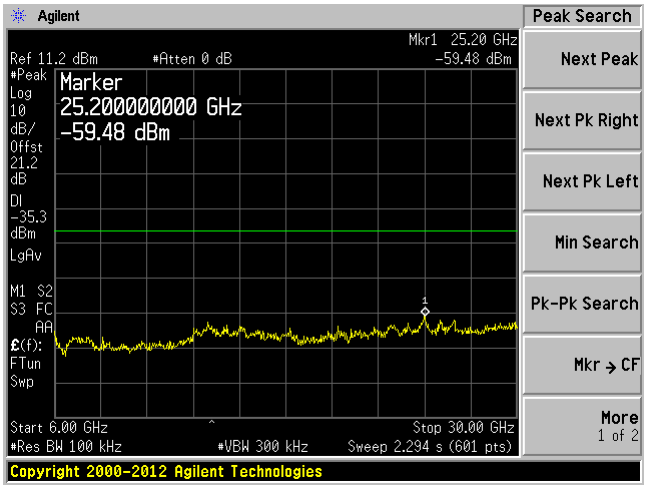
Chain J0, Plot: 6 GHz – 40 GHz



Chain J1, Plot: 30 MHz – 6 GHz

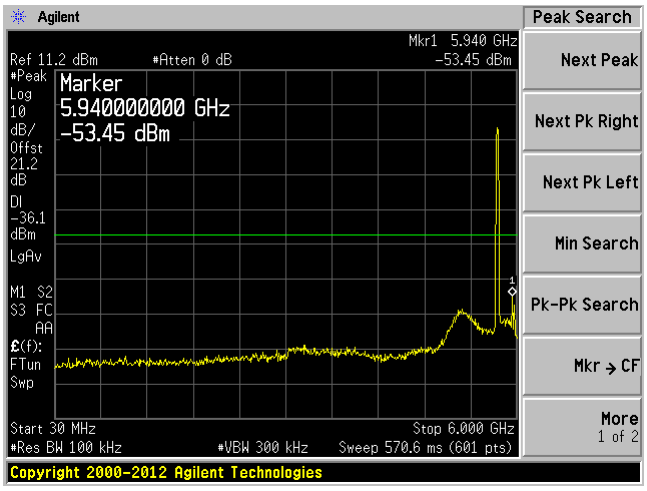


Chain J1, Plot: 6 GHz – 40 GHz

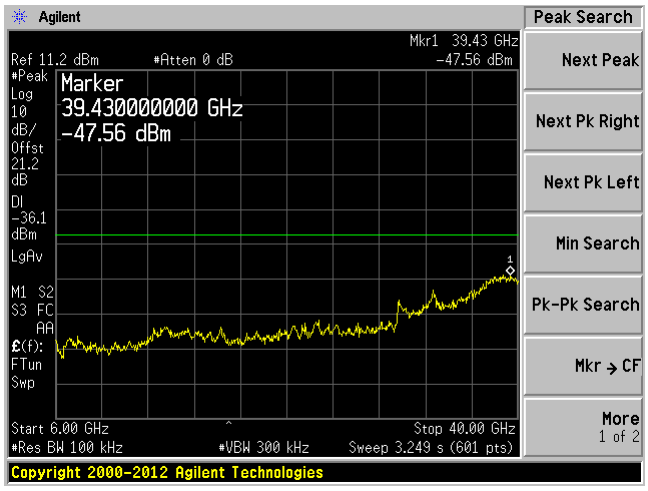


802.11n-HT20, Low Channel 5745 MHz

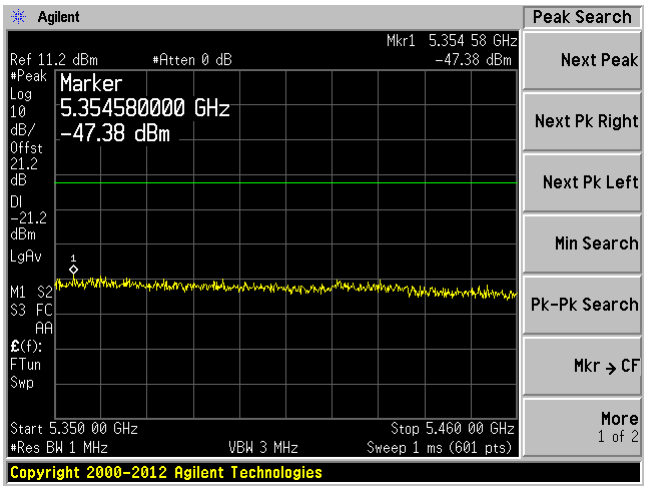
Chain J0, Plot: 30 MHz – 6 GHz



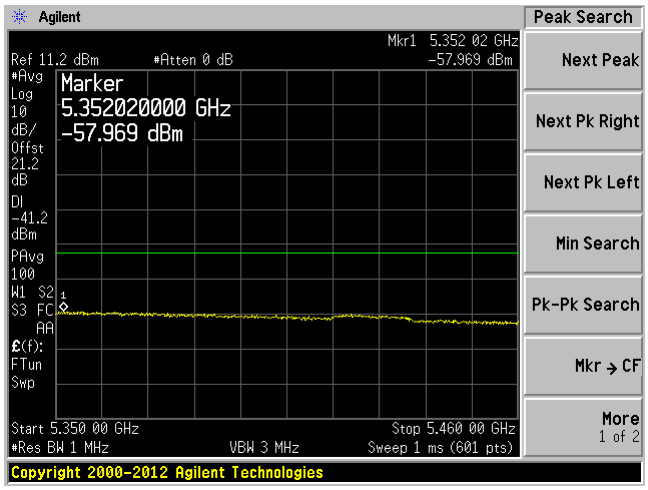
Chain J0, Plot: 6 GHz – 40 GHz



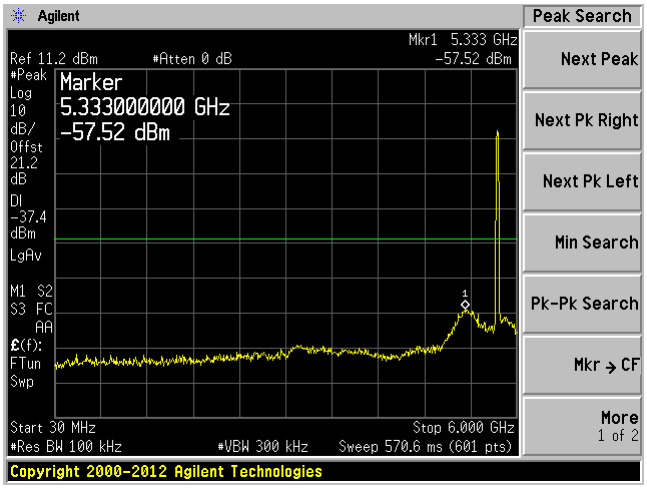
Chain J0, Plot: 5350 MHz – 5460 MHz Peak



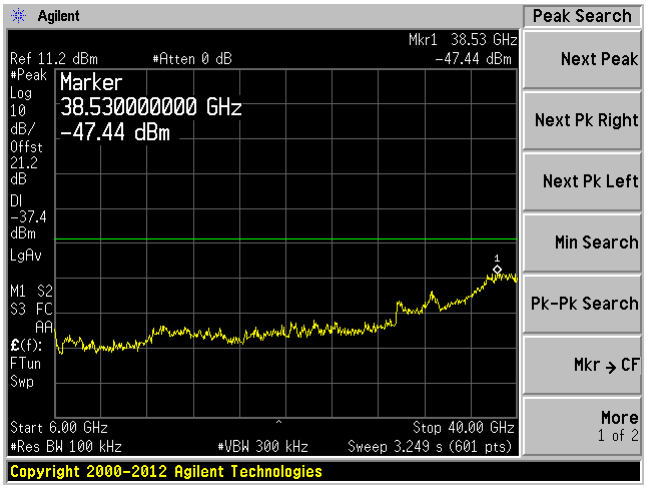
Chain J0, Plot: 5350 MHz – 5460 MHz Ave



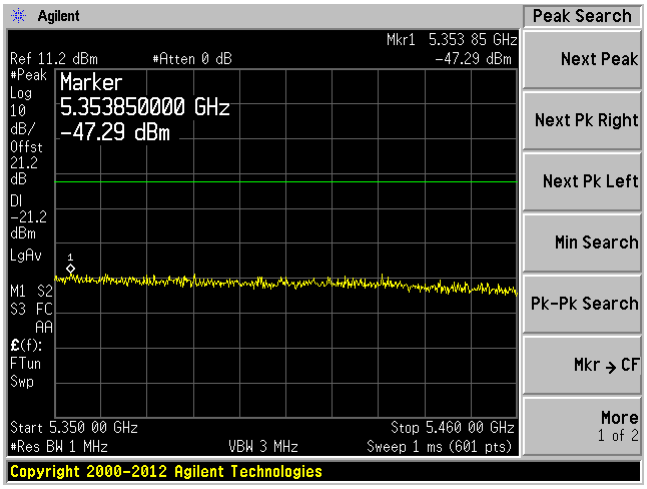
Chain J1, Plot: 30 MHz – 6 GHz



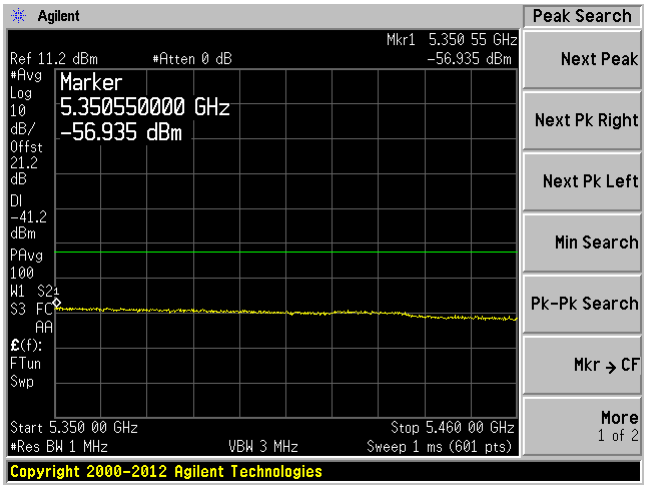
Chain J1, Plot: 6 GHz – 40 GHz



Chain J1, Plot: 5350 MHz – 5460 MHz Peak

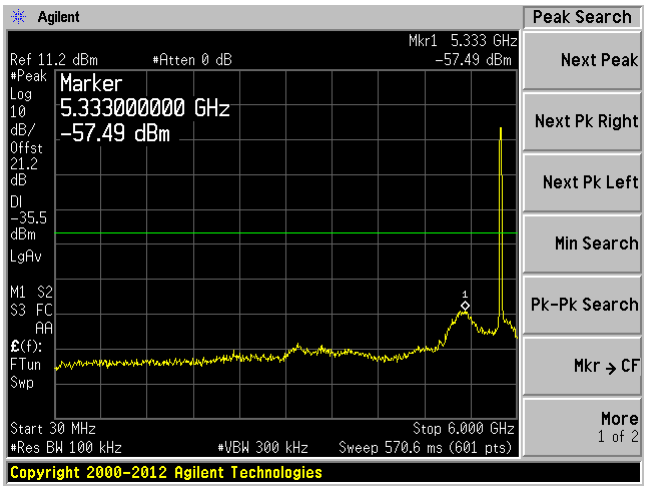


Chain J1, Plot: 5350 MHz – 5460 MHz Ave

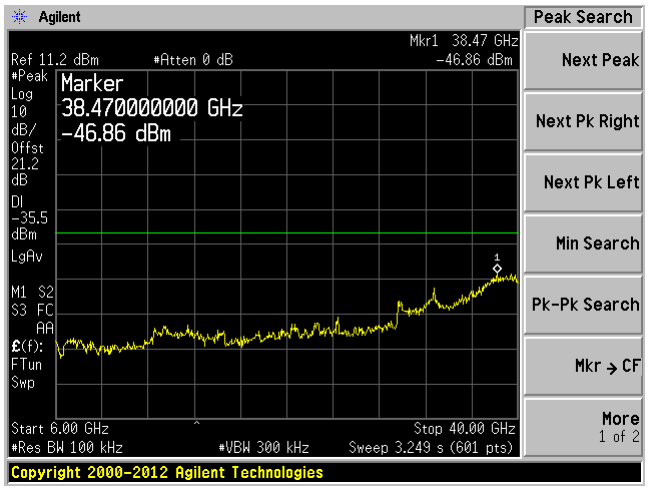


802.11n-HT20, Middle Channel 5785 MHz

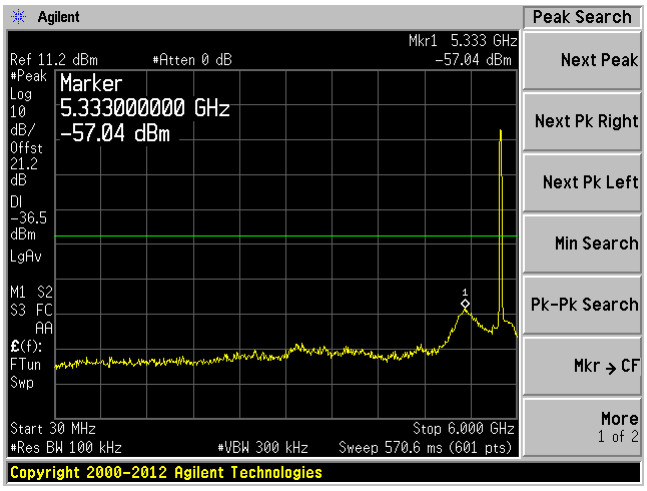
Chain J0, Plot: 30 MHz – 6 GHz



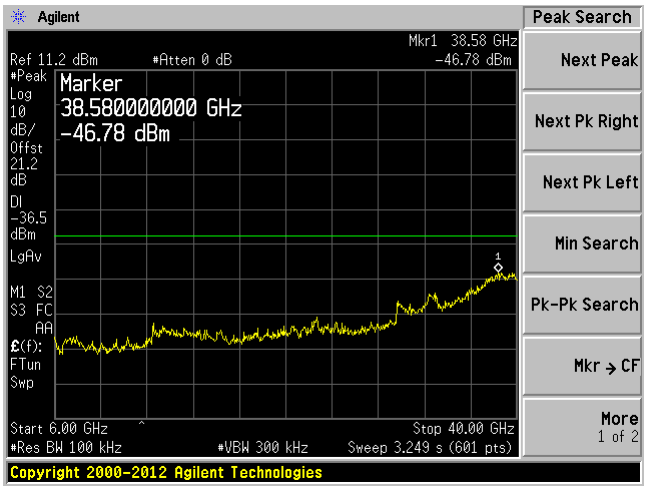
Chain J0, Plot: 6 GHz – 40 GHz



Chain J1, Plot: 30 MHz – 6 GHz

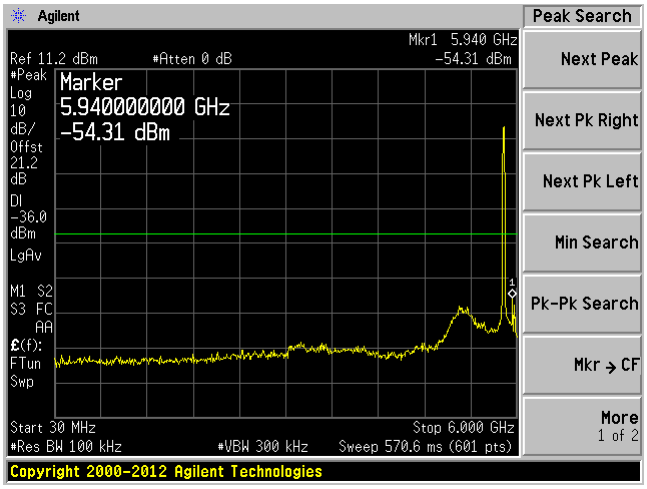


Chain J1, Plot: 6 GHz – 40 GHz

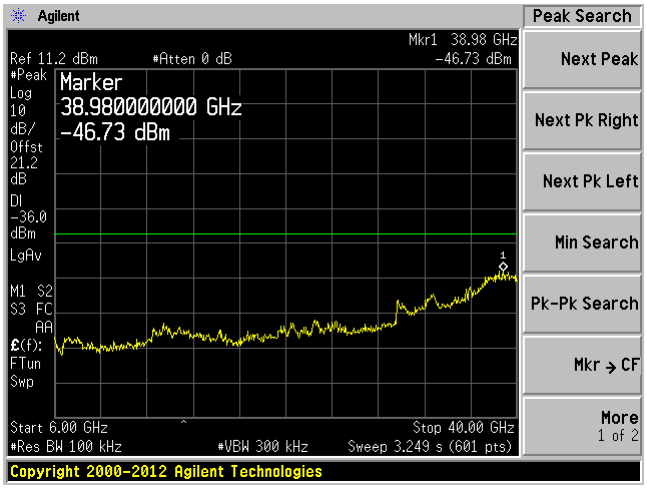


802.11n-HT20, High Channel 5825 MHz

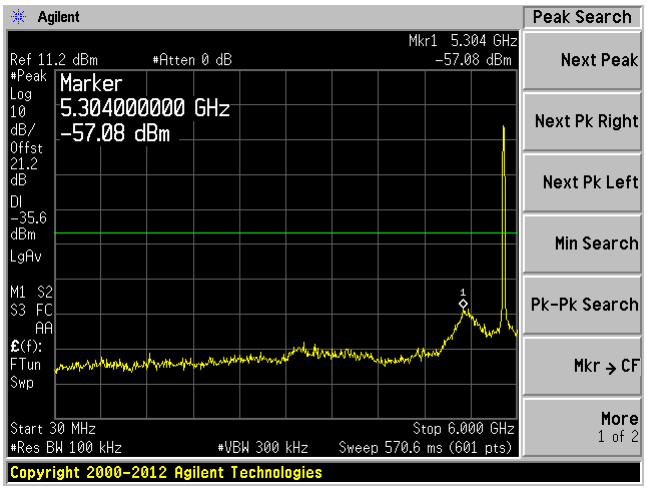
Chain J0, Plot: 30 MHz – 6 GHz



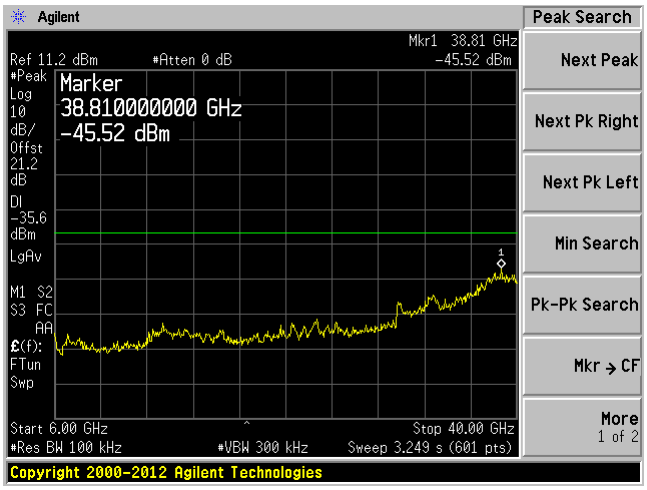
Chain J0, Plot: 6 GHz – 40 GHz



Chain J1, Plot: 30 MHz – 6 GHz

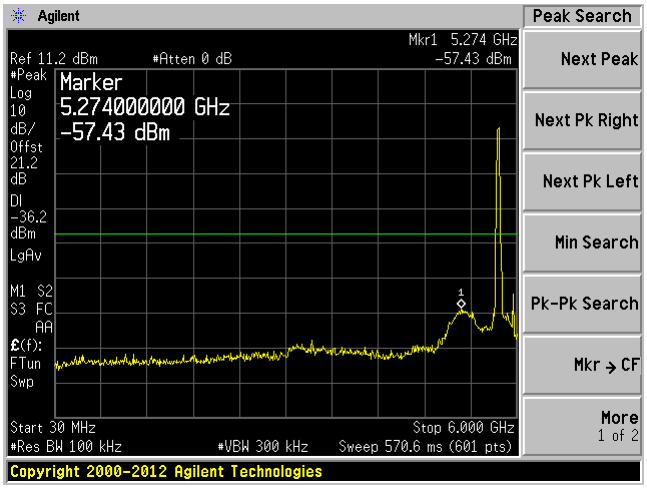


Chain J1, Plot: 6 GHz – 40 GHz

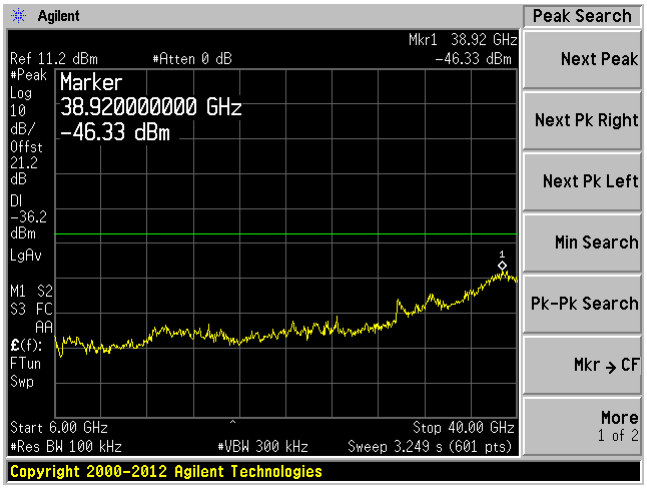


802.11n-HT40, Low Channel 5755 MHz

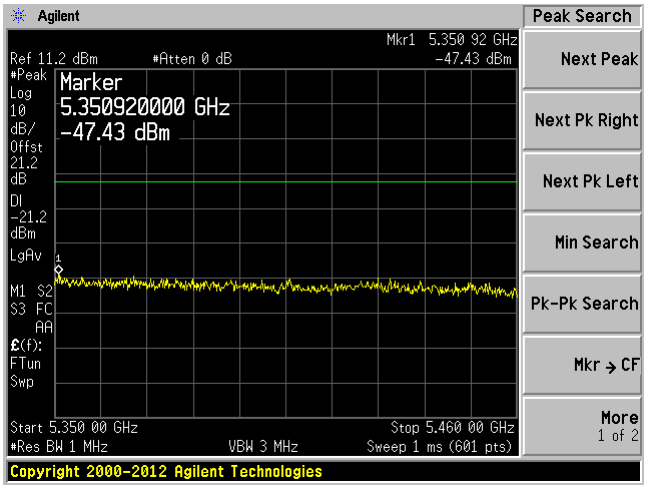
Chain J0, Plot: 30 MHz – 6 GHz



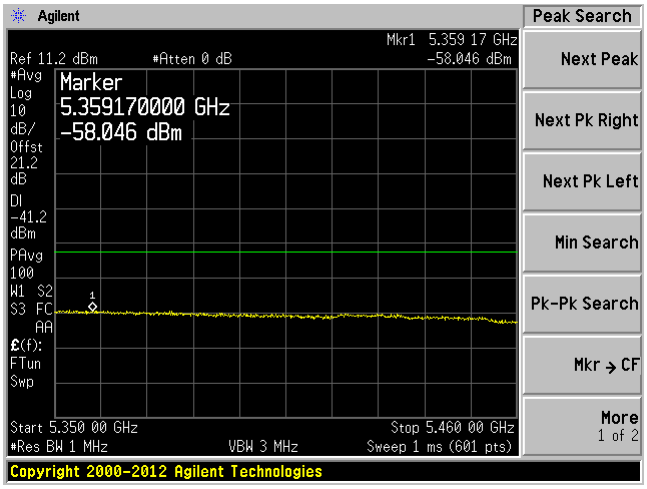
Chain J0, Plot: 6 GHz – 40 GHz



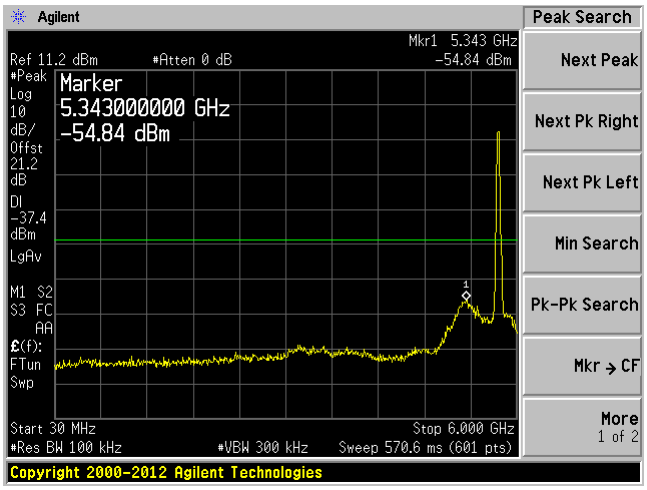
Chain J0, Plot: 5350 MHz – 5460 MHz Peak



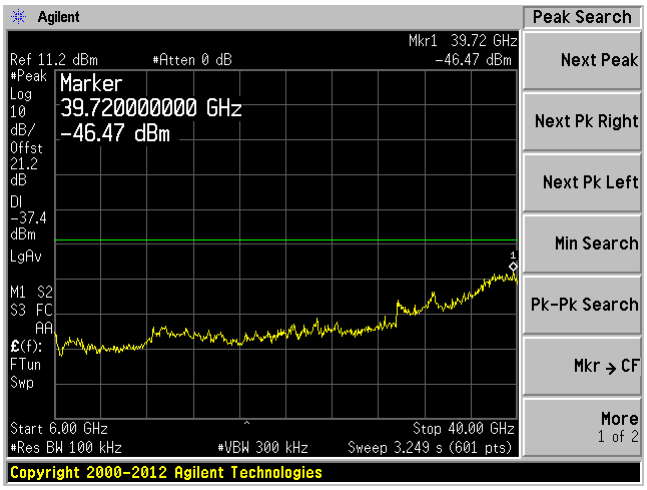
Chain J0, Plot: 5350 MHz – 5460 MHz Ave



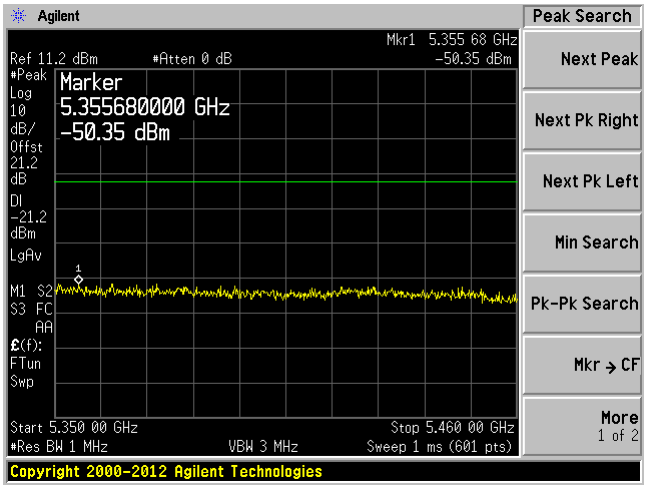
Chain J1, Plot: 30 MHz – 6 GHz



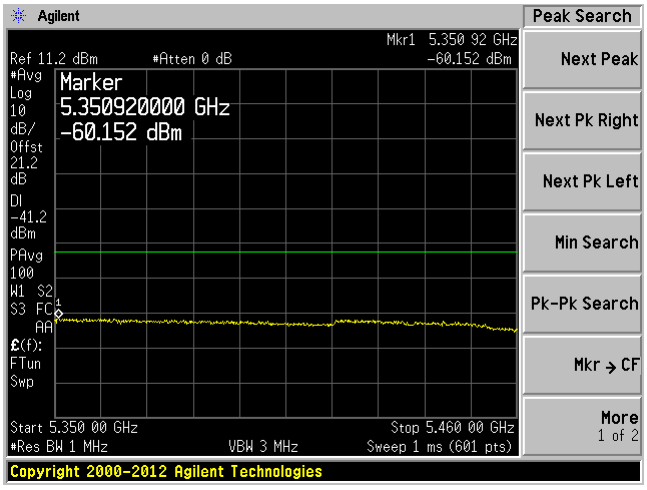
Chain J1, Plot: 6 GHz – 40 GHz



Chain J1, Plot: 5350 MHz – 5460 MHz Peak

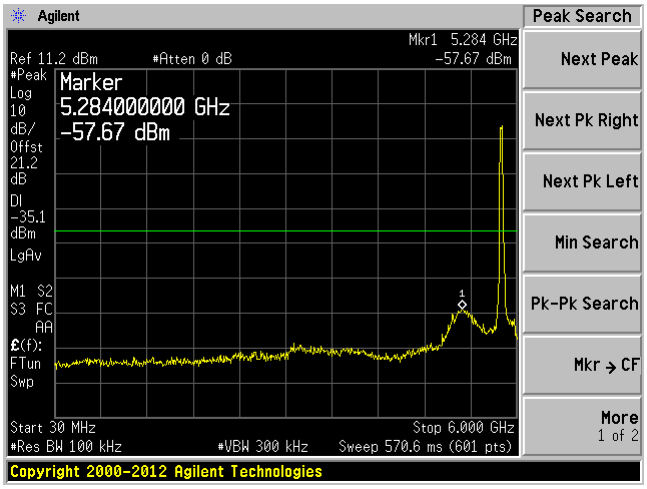


Chain J1, Plot: 5350 MHz – 5460 MHz Ave

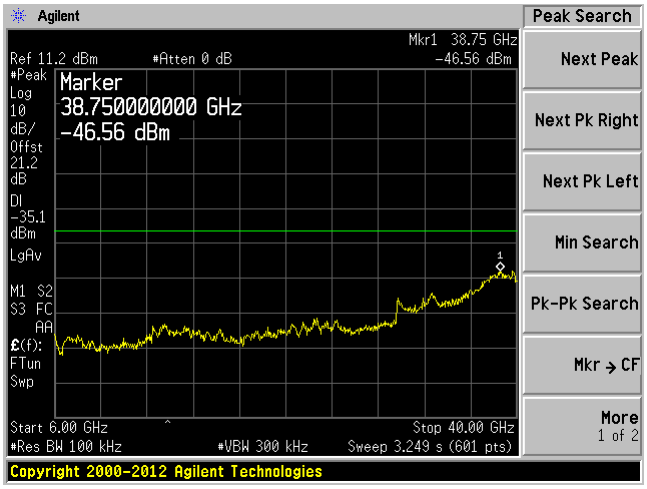


802.11n-HT40, High Channel 5795 MHz

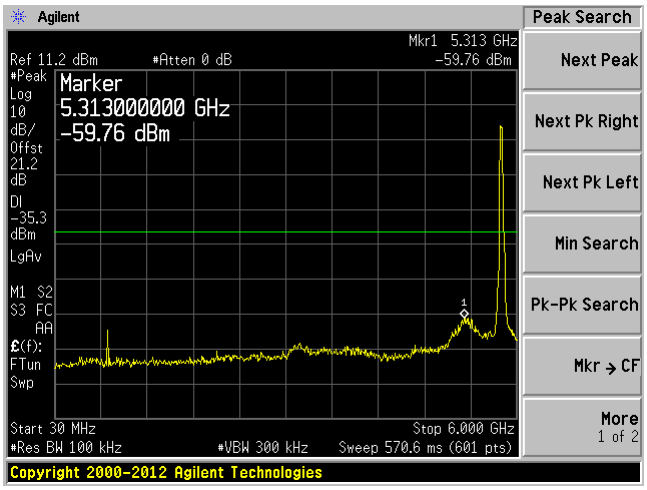
Chain J0, Plot: 30 MHz – 6 GHz



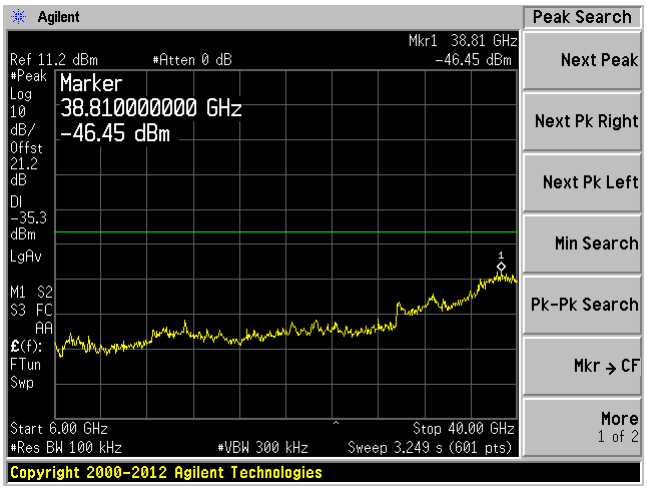
Chain J0, Plot: 6 GHz – 40 GHz



Chain J1, Plot: 30 MHz – 6 GHz

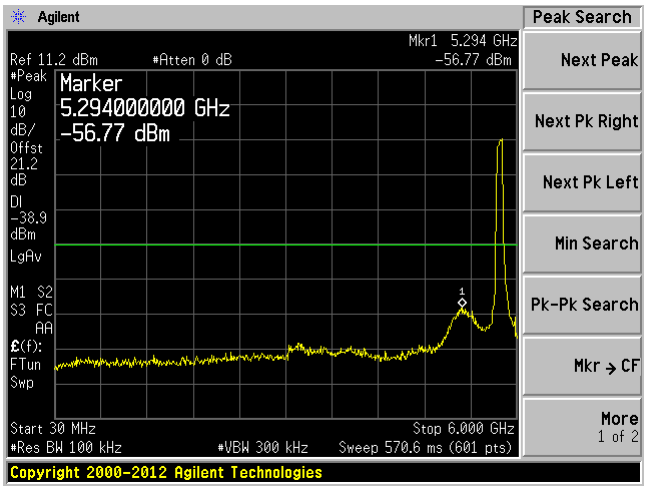


Chain J1, Plot: 6 GHz – 40 GHz

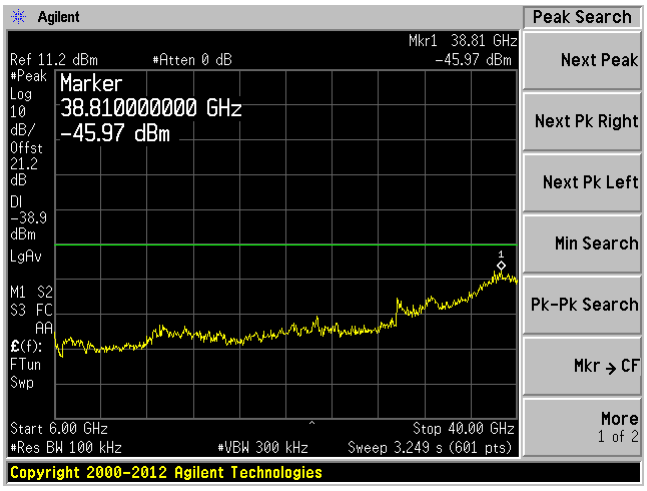


802.11ac-80, Channel 5775 MHz

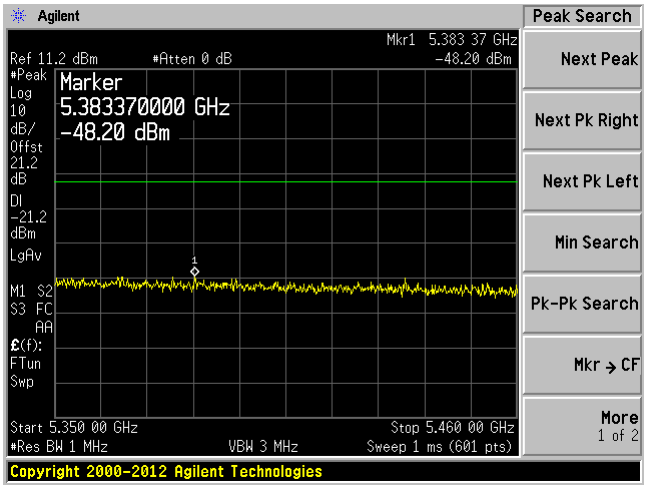
Chain J0, Plot: 30 MHz – 6 GHz



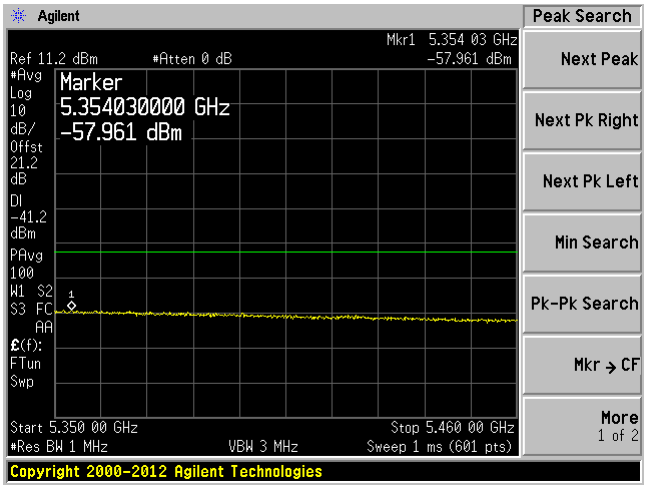
Chain J0, Plot: 6 GHz – 40 GHz



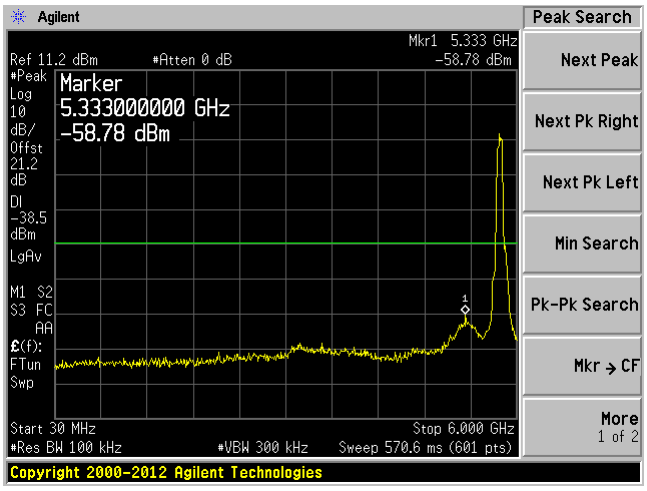
Chain J0, Plot: 5350 MHz – 5460 MHz Peak



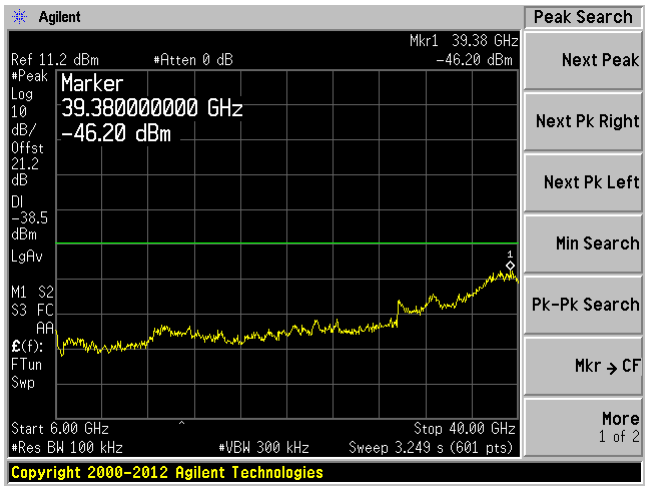
Chain J0, Plot: 5350 MHz – 5460 MHz Ave



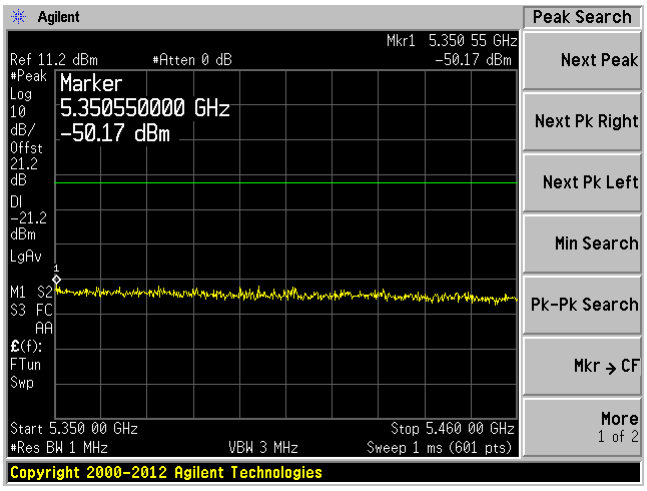
Chain J1, Plot: 30 MHz – 6 GHz



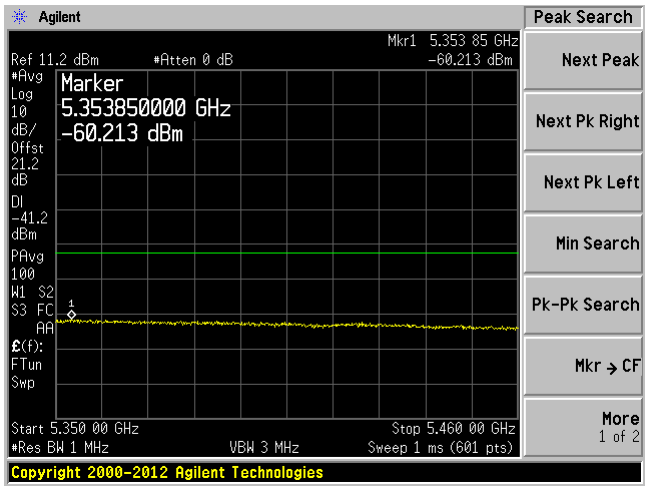
Chain J1, Plot: 6 GHz – 40 GHz



Chain J1, Plot: 5350 MHz – 5460 MHz Peak



Chain J1, Plot: 5350 MHz – 5460 MHz Ave



7 FCC §15.247(b) & IC RSS-210 §A8.4 – Peak Output Power Measurement

7.1 Applicable Standard

According to FCC §15.247(b) and IC RSS-210 §A8.4 (4) for systems using digital modulation in the 902~928 MHz, 2400~2483.5 MHz, and 5725~5850 MHz bands: 1 Watt.

7.2 Measurement Procedure

The measurements are base on FCC KDB 558074 D01 DTS Meas Guidance v03r01: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 9: Fundamental emission output power

7.3 Test Equipment List and Details

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

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

7.4 Test Environmental Conditions

Temperature:	21-24° C
Relative Humidity:	41-46 %
ATM Pressure:	101-102 kPa

The testing was performed by Chen Ge from 2014-05-07 and 2014-05-09 at RF site.

7.5 Test Results

2.4 GHz Band:

Channel	Frequency (MHz)	Conducted Output Power (dBm)		Total Output Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
		Chain J0	Chain J1				
802.11b mode							
Low	2412	20.79	20.44	23.63	27	-3.37	Target
Middle	2437	20.04	19.58	22.82	27	-4.18	Target
High	2462	19.49	18.12	21.87	27	-5.13	Target
802.11g mode							
Low	2412	16.1	16.14	19.13	27	-7.87	17
Middle	2437	20.87	20.24	23.57	27	-3.43	Target
High	2462	19.68	19.12	22.42	27	-4.58	Target
802.11n-HT20 mode							
Low	2412	14.88	14.99	17.95	27	-9.05	16
Middle	2437	20.98	20.45	23.73	27	-3.27	Target
High	2462	19.18	18.68	21.95	27	-5.05	22
802.11n-HT40 mode							
Low	2422	12.38	12.11	15.26	27	-11.74	12
Middle	2437	20.87	20.41	23.65	27	-3.35	Target
High	2452	18.38	17.38	20.92	27	-6.08	20

5.8 GHz Band:

Channel	Frequency (MHz)	Conducted Output Power (dBm)		Total Output Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
		Chain J0	Chain J1				
802.11a mode							
Low	5745	9.5	8.28	11.94	21	-9.06	10
Middle	5785	10.39	9.23	12.86	21	-8.14	10.5
High	5825	10.26	9.68	12.99	21	-8.01	10.5
802.11n-HT20 mode							
Low	5745	9.4	8.24	11.87	21	-9.13	10
Middle	5785	10.33	9.18	12.80	21	-8.20	10.5
High	5825	10.21	9.63	12.94	21	-8.06	10.5
802.11n-HT40 mode							
Low	5755	12.19	11.64	14.93	21	-6.07	13
High	5795	12.97	12.59	15.79	21	-5.21	13.5
802.11ac-80 mode							
-	5775	12.3	11.92	15.12	21	-5.88	12.5

Note: Adjust limit per 15.247, the power limit for 2.4 GHz band is 30-(9-6)=27 dBm, and for W58 band: 30-(15-6)=21 dBm.

8 FCC §15.247(e) & IC RSS-210 §A8.2 (b) – Power Spectral Density

8.1 Applicable Standard

According to FCC §15.247(e) and RSS-210 §A8.2 (b) , for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

8.2 Measurement Procedure

The measurements are base on FCC KDB 558074 D01 DTS Meas Guidance v03r01: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 10: Maximum power spectral density level in the fundamental emission

8.3 Test Equipment List and Details

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

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

8.4 Test Environmental Conditions

Temperature:	21-24° C
Relative Humidity:	41-46 %
ATM Pressure:	101-102 kPa

The testing was performed by Chen Ge from 2014-05-07 and 2014-05-09 at RF site.

8.5 Test Results

2.4 GHz Band:

Channel	Frequency (MHz)	PSD (dBm)		Total PSD (dBm)	Limit (dBm)	Margin (dB)
		Chain J0	Chain J1			
802.11b mode						
Low	2412	-1.11	-1.73	1.60	5	-6.40
Middle	2437	-1.13	-1.98	1.48	5	-6.52
High	2462	-1.60	-2.74	0.88	5	-7.12
802.11g mode						
Low	2412	-9.71	-9.59	-6.64	5	-14.64
Middle	2437	-3.96	-4.54	-1.23	5	-9.23
High	2462	-6.07	-6.60	-3.32	5	-11.32
802.11n-HT20 mode						
Low	2412	-9.90	-10.78	-7.31	5	-15.31
Middle	2437	-4.15	-4.93	-1.51	5	-9.51
High	2462	-6.12	-6.76	-3.42	5	-11.42
802.11n-HT40 mode						
Low	2422	-16.01	-16.49	-13.23	5	-21.23
Middle	2437	-7.80	-8.16	-4.97	5	-12.97
High	2452	-6.02	-9.88	-4.52	5	-12.52

5.8 GHz Band:

Channel	Frequency (MHz)	PSD (dBm)		Total PSD (dBm)	Limit (dBm)	Margin (dB)
		Chain J0	Chain J1			
802.11a mode						
Low	5745	-16.23	-17.18	-13.67	-1	-21.67
Middle	5785	-14.68	-16.56	-12.51	-1	-20.51
High	5825	-15.84	-16.05	-12.93	-1	-20.93
802.11n-HT20 mode						
Low	5745	-16.09	-17.60	-13.77	-1	-21.77
Middle	5785	-16.06	-16.77	-13.39	-1	-21.39
High	5825	-15.00	-16.33	-12.60	-1	-20.6
802.11n-HT40 mode						
Low	5755	-16.33	-16.34	-13.32	-1	-21.32
High	5795	-15.71	-16.01	-12.85	-1	-20.85
802.11ac-80 mode						
Middle	5775	-19.40	-14.13	-13.00	-1	-21.00

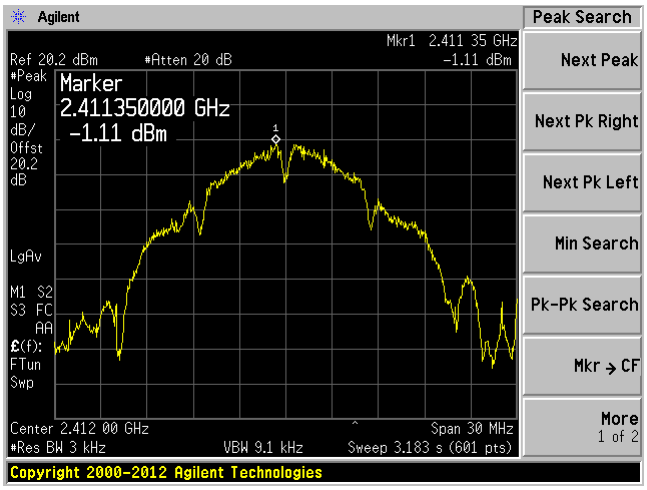
Note: Adjust limit per 15.247, the PSD limit for 2.4 GHz band is 8-(9-6) = 5 dBm, and for W58 band: 8-(15-6) =-1 dBm.

Please refer to the following plots for detailed test results:

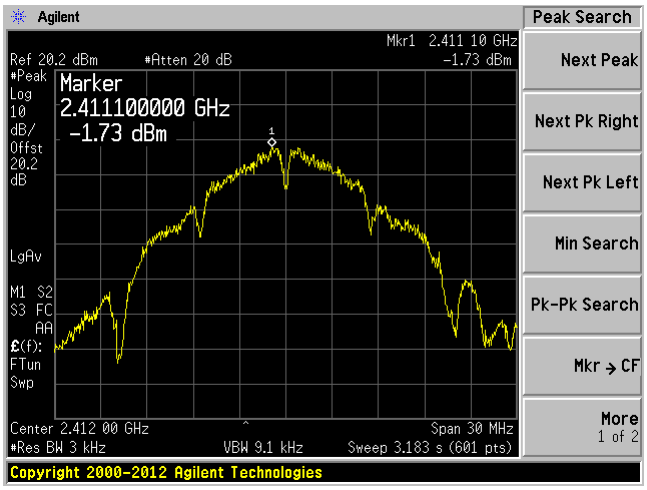
2.4 GHz Band

802.11b mode

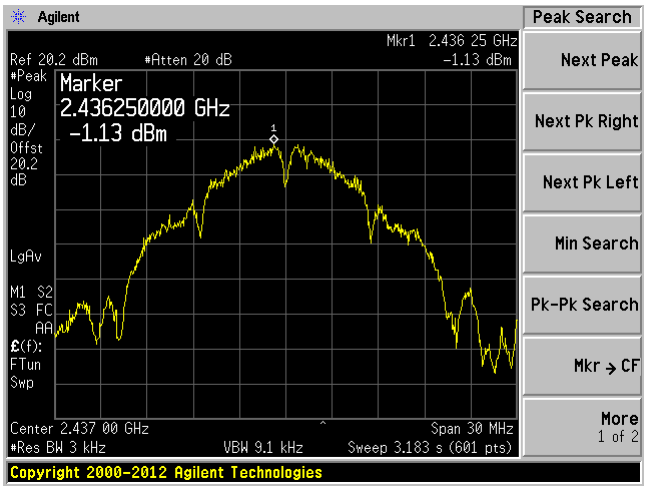
Low channel J0: 2412 MHz



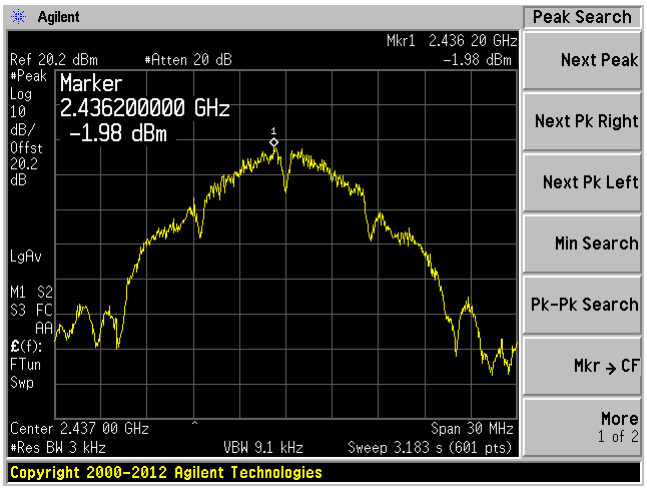
Low channel J1: 2412 MHz



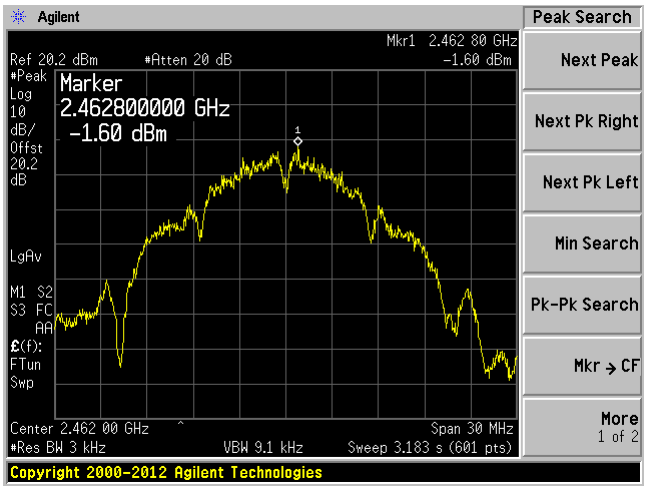
Middle channel J0: 2437 MHz



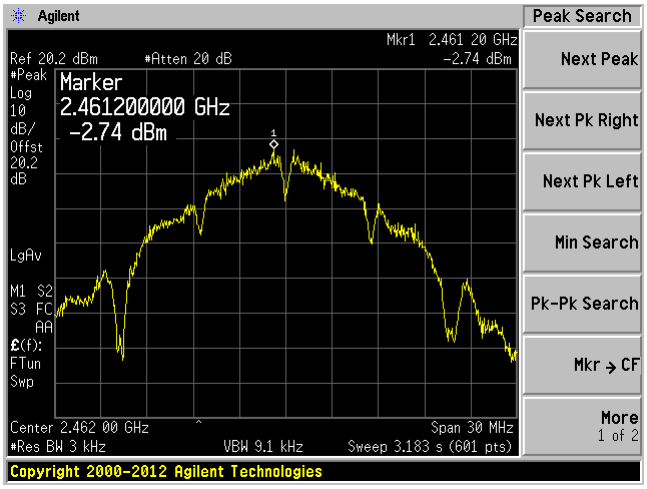
Middle channel J1: 2437 MHz



High channel J0: 2462 MHz

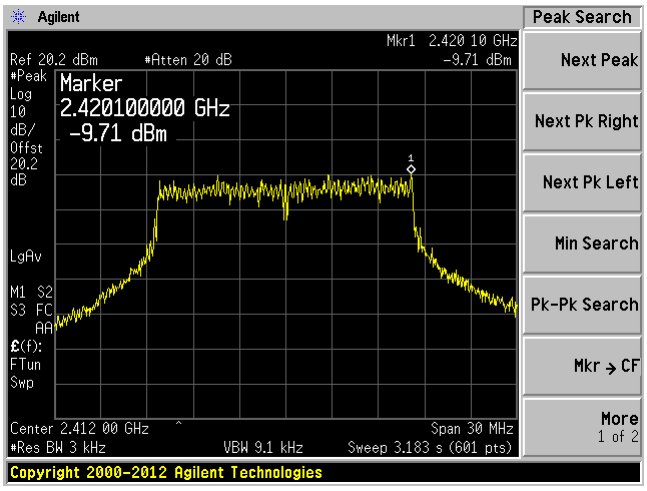


High channel J1: 2462 MHz

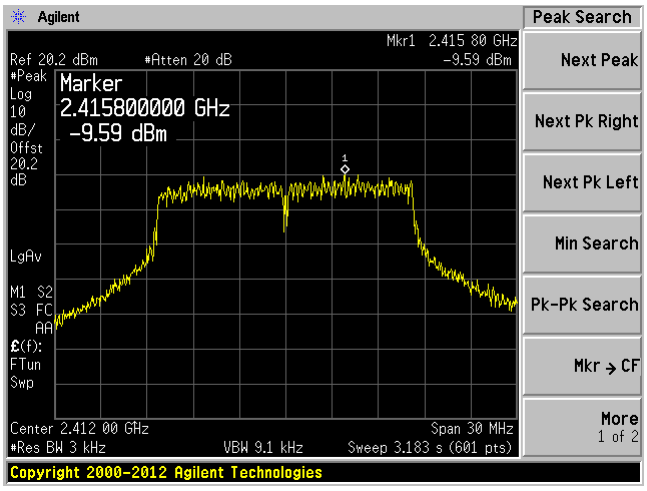


802.11g mode

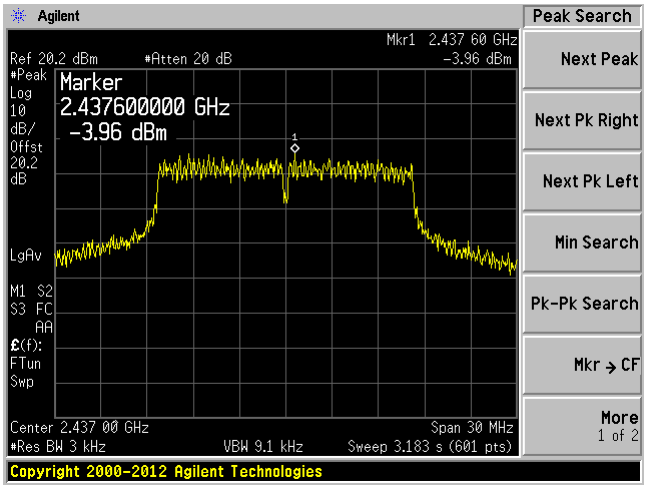
Low channel J0: 2412 MHz



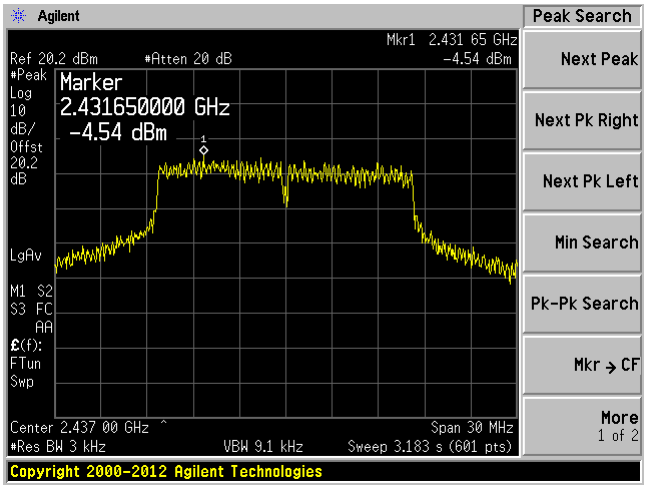
Low channel J1: 2412 MHz



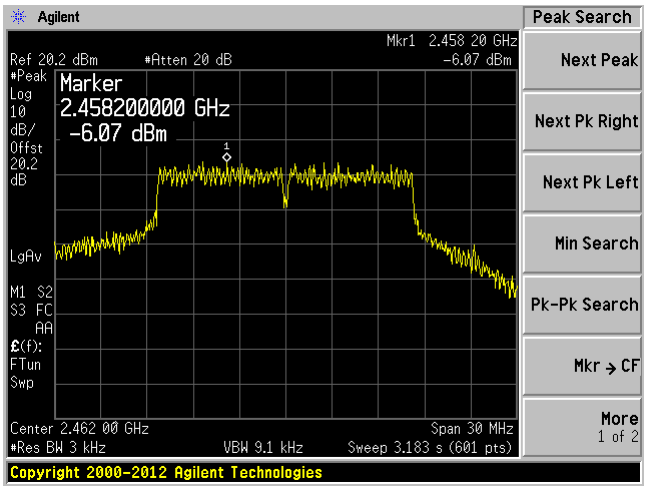
Middle channel J0: 2437 MHz



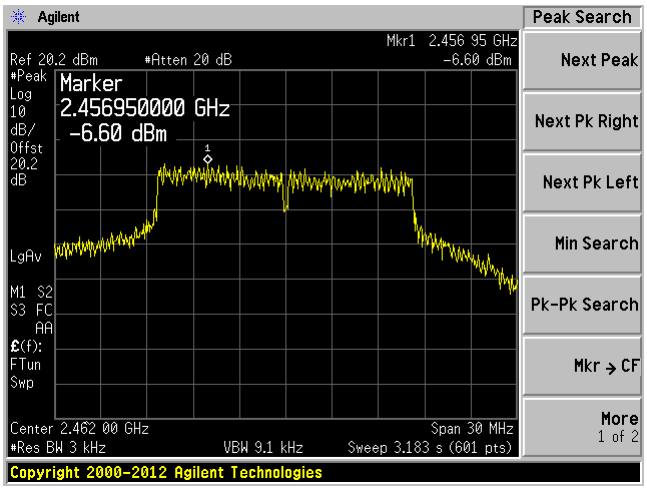
Middle channel J1: 2437 MHz



High channel J0: 2462 MHz

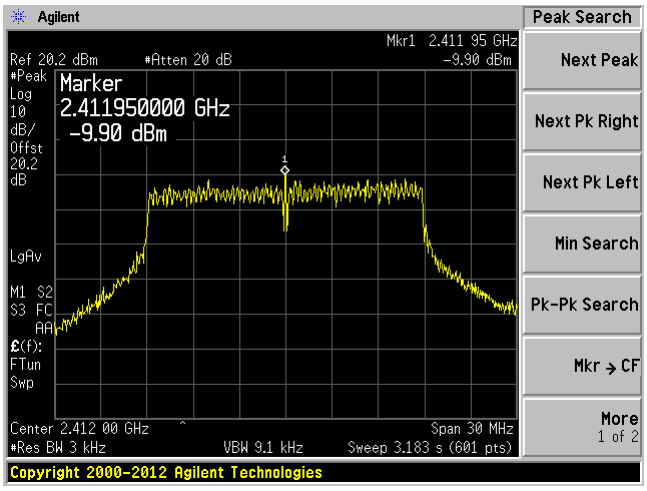


High channel J1: 2462 MHz

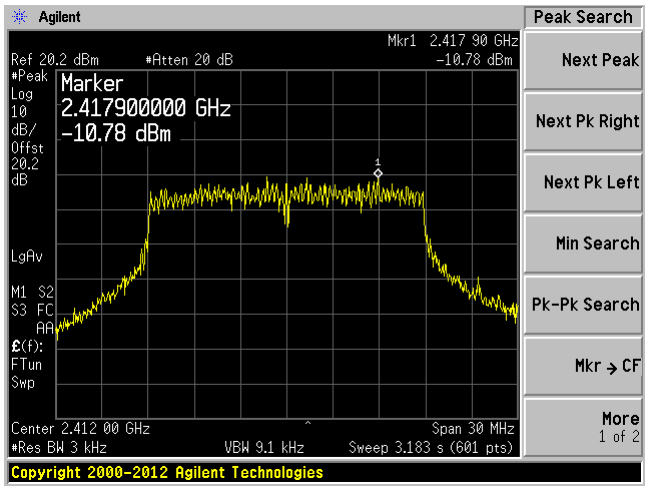


802.11n-HT20 mode

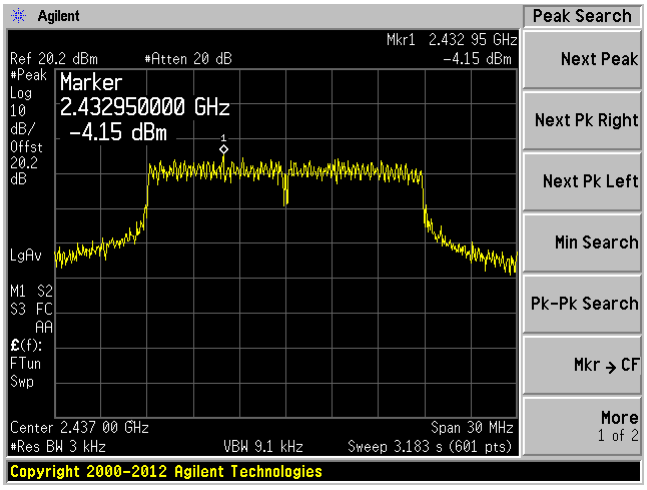
Low channel J0: 2412 MHz



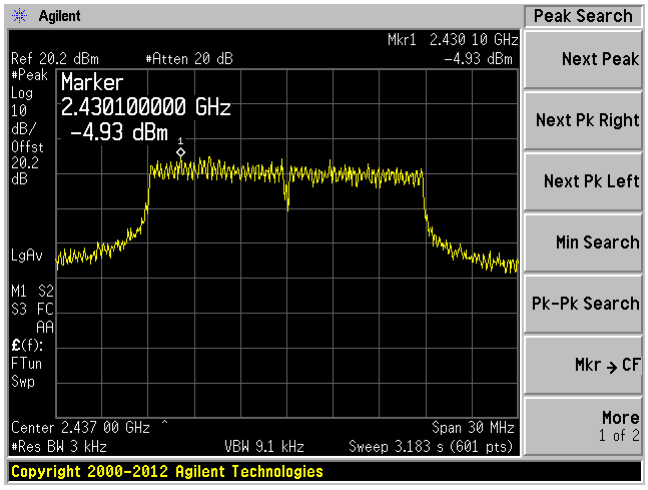
Low channel J1: 2412 MHz



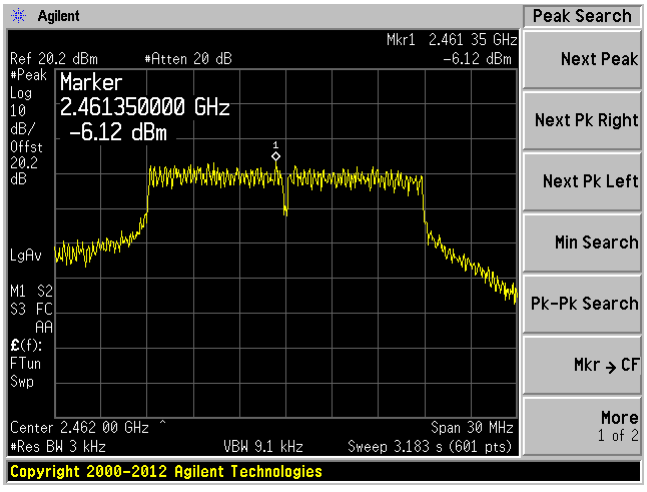
Middle channel J0: 2437 MHz



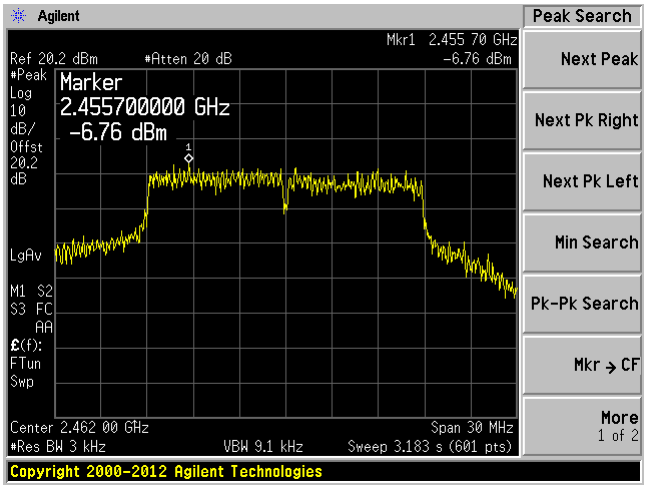
Middle channel J1: 2437 MHz



High channel J0: 2462 MHz

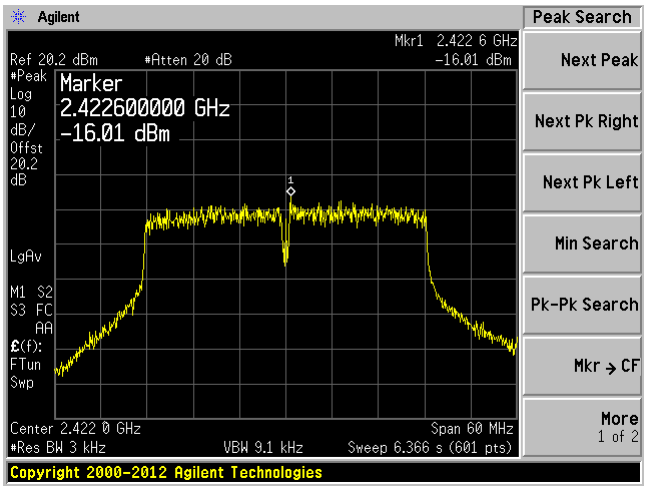


High channel J1: 2462 MHz

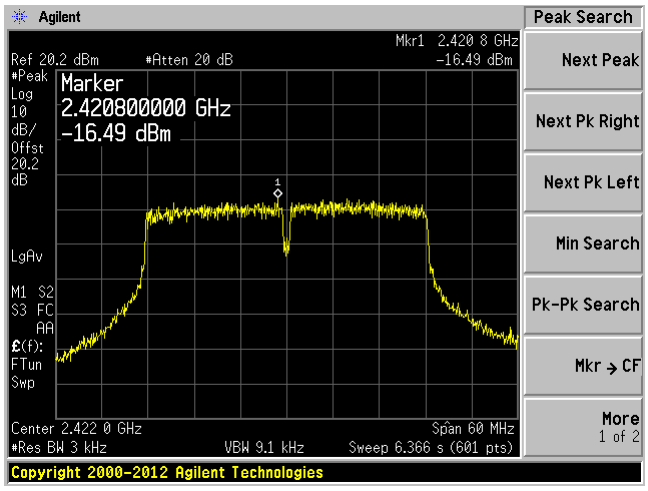


802.11n-HT40 mode

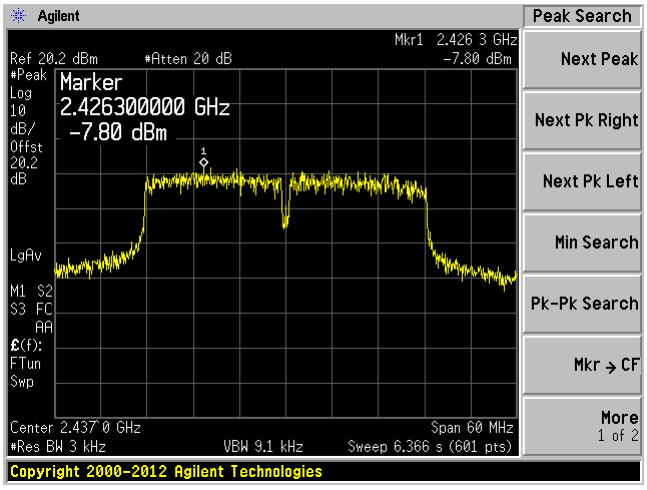
Low channel J0: 2422 MHz



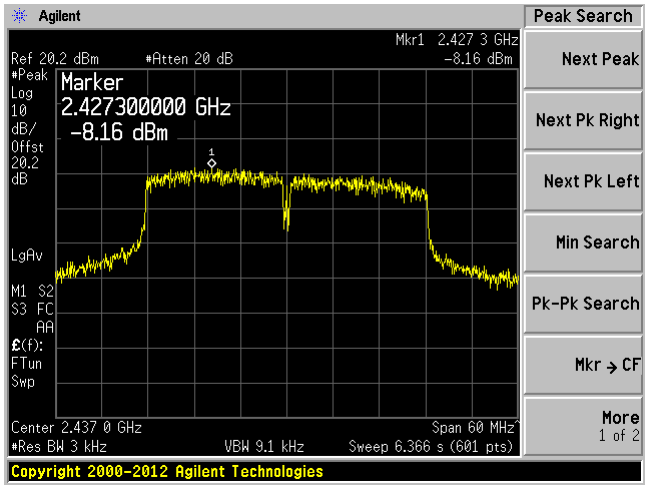
Low channel J1: 2422 MHz



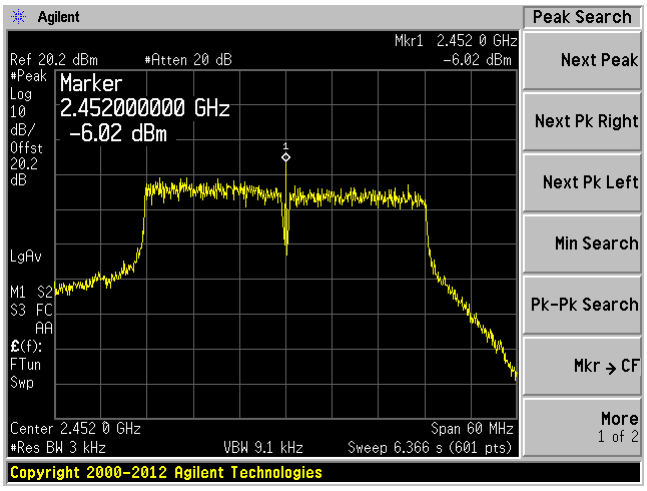
Middle channel J0: 2437 MHz



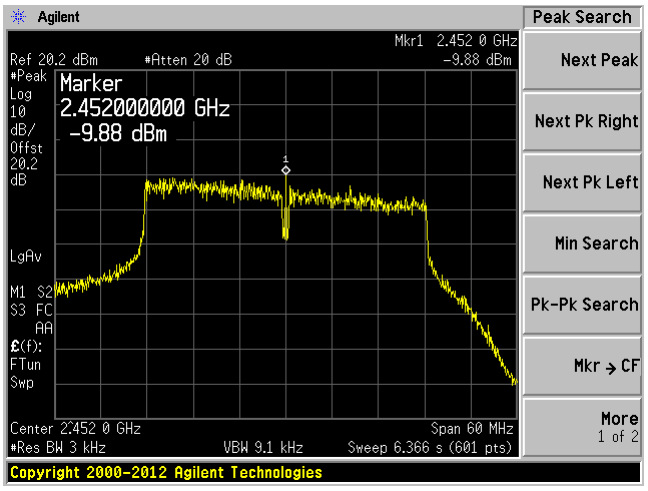
Middle channel J1: 2437 MHz



High channel J0: 2452 MHz



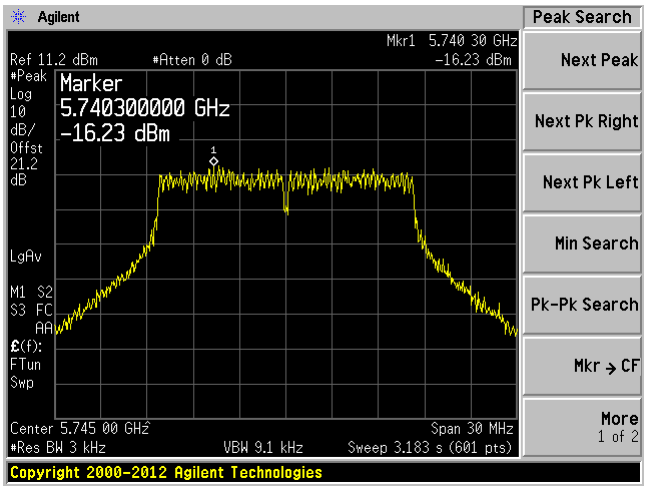
High channel J1: 2452 MHz



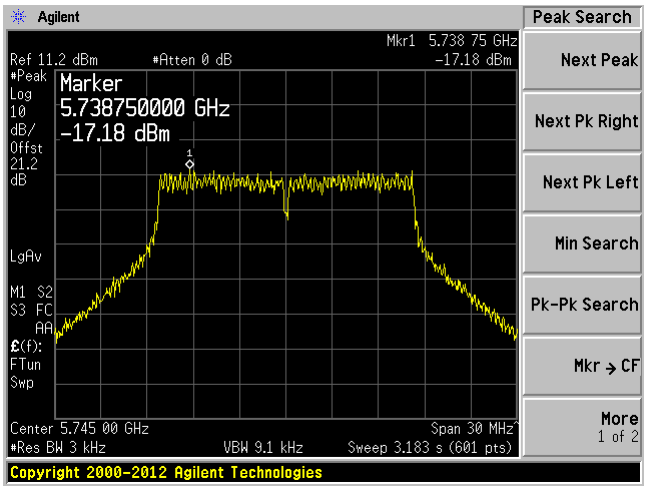
5.8 GHz Band

802.11a mode

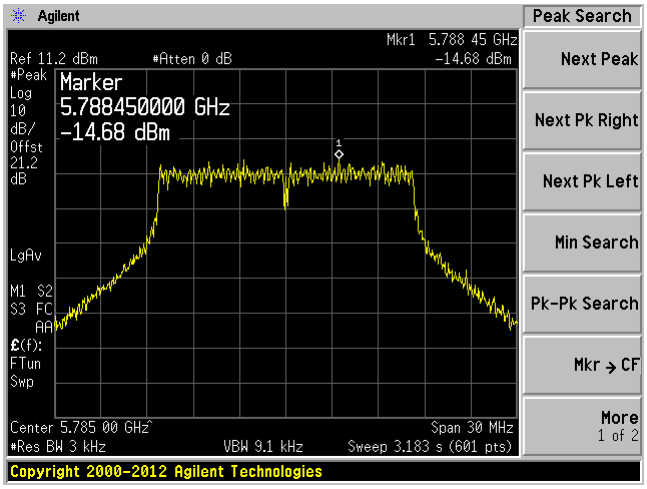
Low channel J0: 5745 MHz



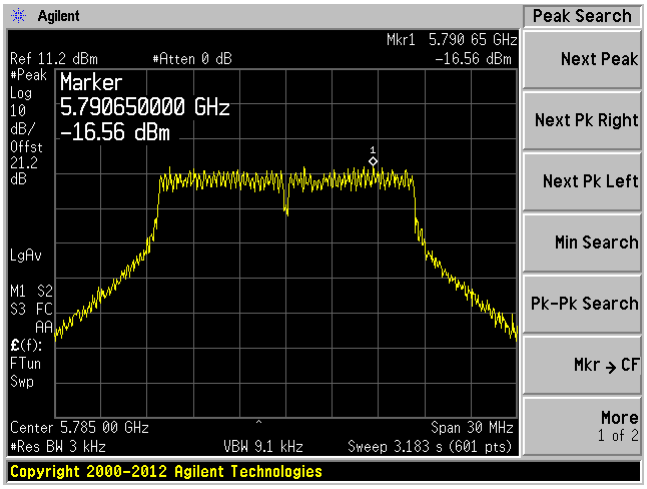
Low channel J1: 5745 MHz



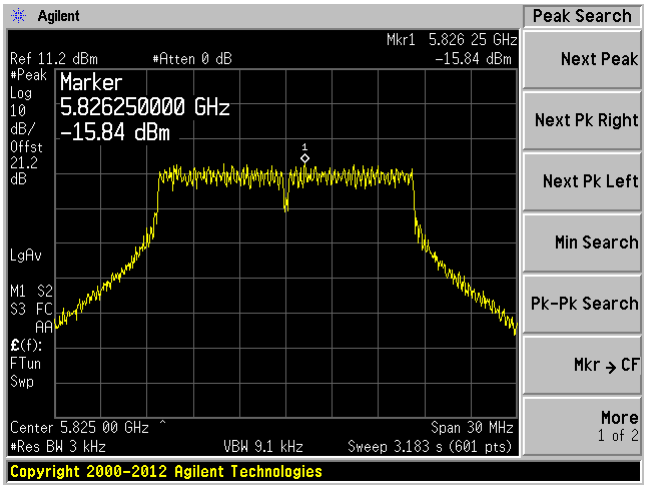
Middle channel J0: 5785 MHz



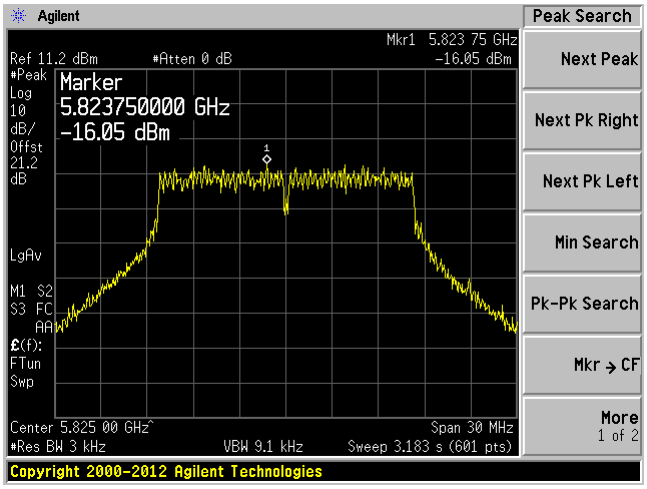
Middle channel J1: 5785 MHz



High channel J0: 5825 MHz

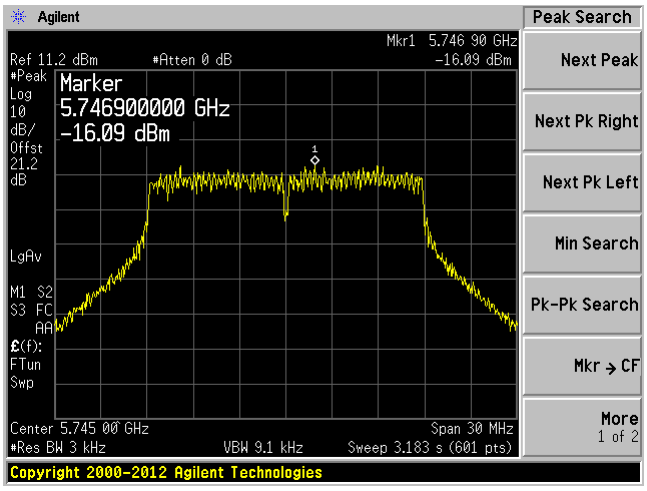


High channel J1: 5825 MHz

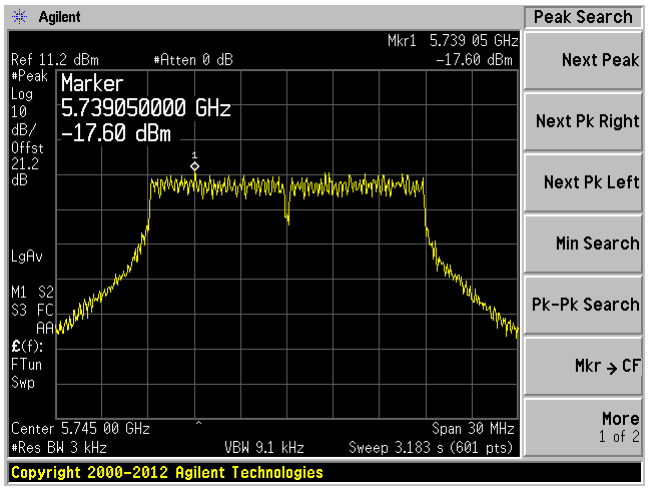


802.11n-HT20 mode

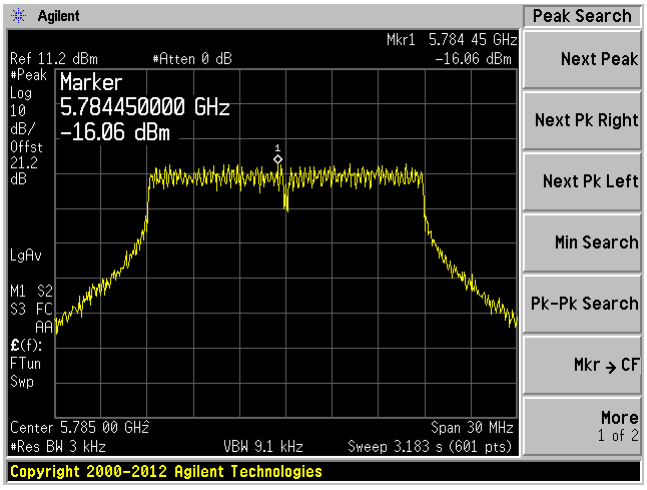
Low channel J0: 5745 MHz



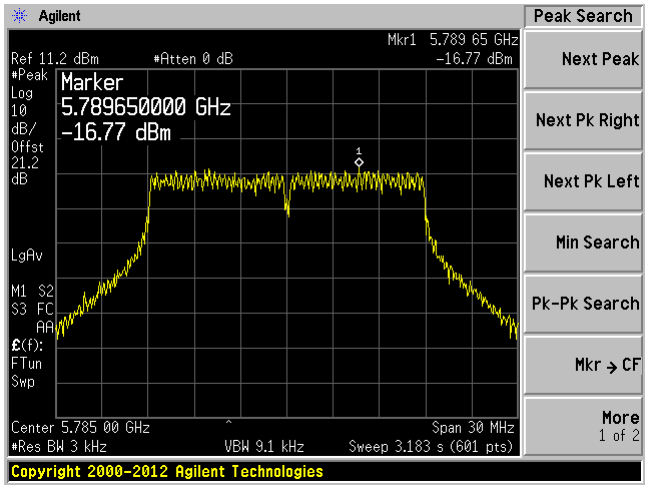
Low channel J1: 5745 MHz



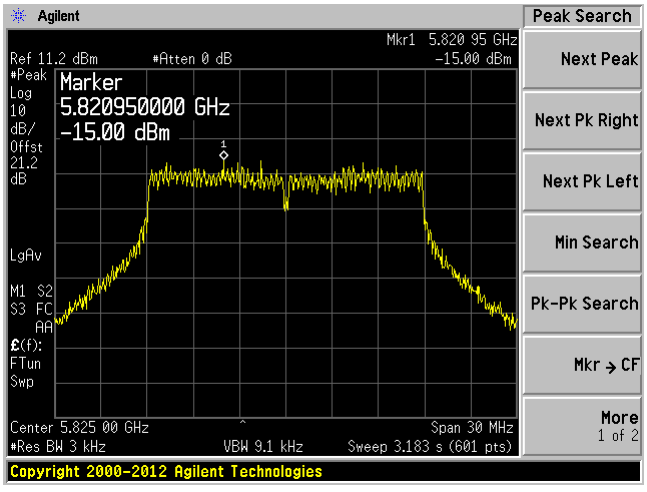
Middle channel J0: 5785 MHz



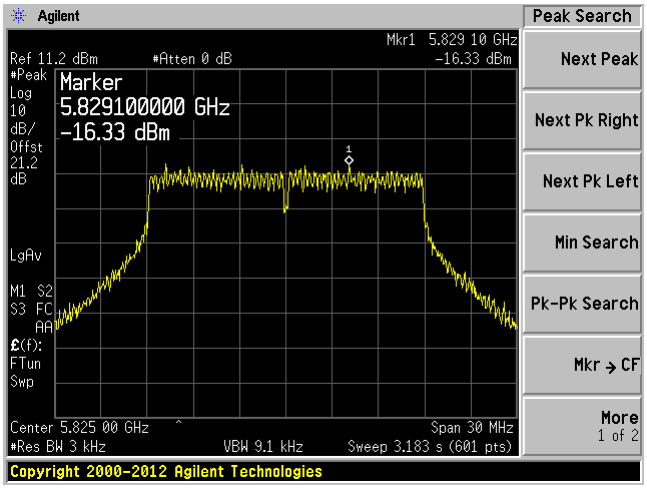
Middle channel J1: 5785 MHz



High channel J0: 5825 MHz

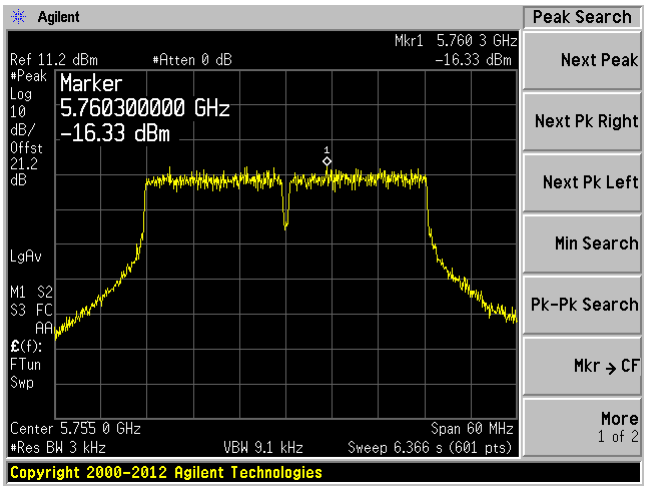


High channel J1: 5825 MHz

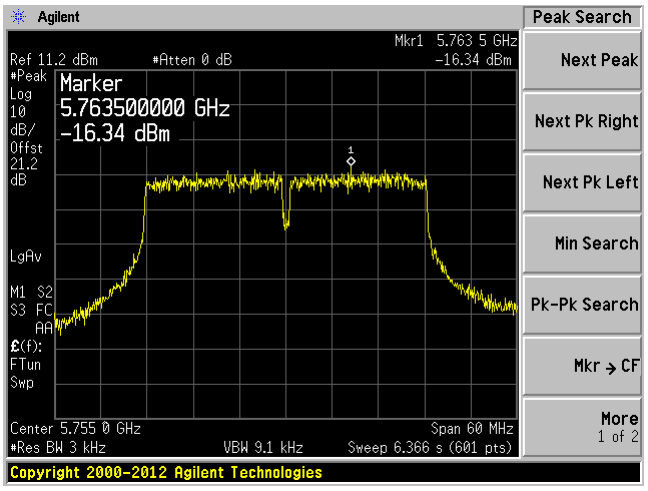


802.11n-HT40 mode

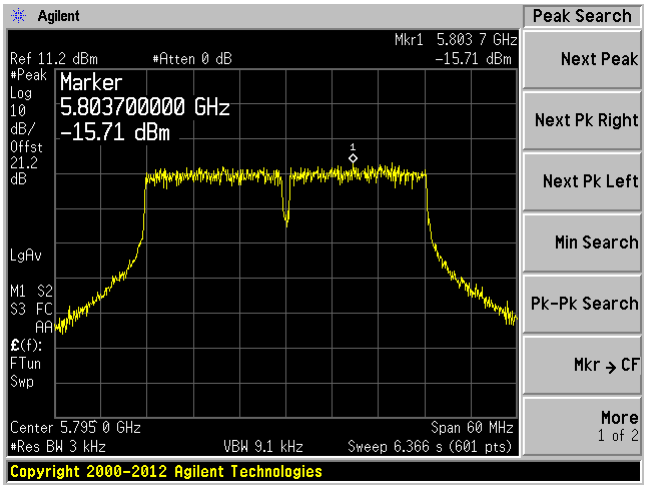
Low channel J0: 5755 MHz



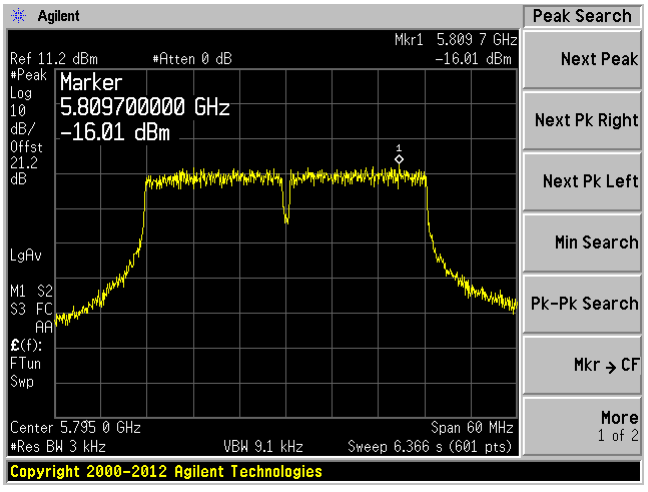
Low channel J1: 5755 MHz



High channel J0: 5795 MHz

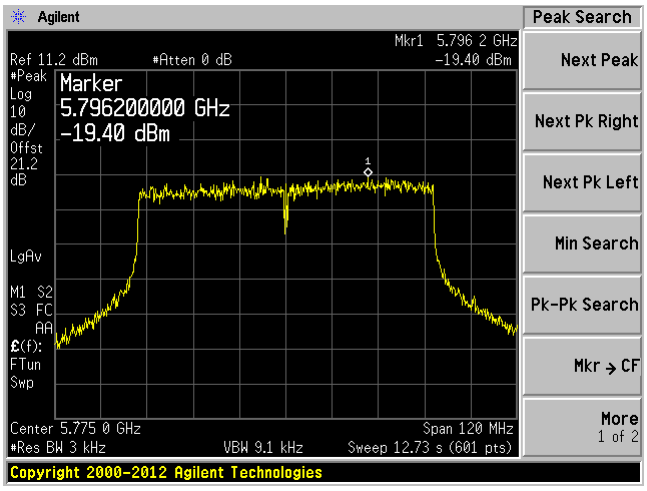


High channel J1: 5795 MHz



802.11ac-80 mode

Middle channel J0: 5775 MHz



Middle channel J1: 5775 MHz