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

TEST AND MEASUREMENT REPORT

For

Tropos Networks, Inc.

555 Del Rey Avenue,

Sunnyvale, CA 94085, USA

FCC ID: P9J-142402
IC: 4751A-142402

Report Type:	**Product Type:**
Original Report	802.11b/g/n Wireless Mesh Router Module

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Report Number:	R1304093-247
Report Date:	2013-11-08
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1304093-247	Original Report	2013-11-08

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *Tropos Networks, Inc*., and their product FCC ID: P9J-142402, IC: 4751A-142402, model: Tropos 1410 or the "EUT" as referred to in this report. The EUT is an 802.11 b/g/n wireless mesh router module.

1.2 Mechanical Description of EUT

The EUT measures 76 cm (L) x 24 cm (W) x 18 cm (H) and weighs approximately 1.2 kg.

The data gathered are from a production sample, serial number: R1304093. (Serial number assigned by BACL).

1.3 Objective

This report is prepared on behalf of *Tropos Networks, 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 rules for Output Power, Antenna Requirements, 6 dB Bandwidth, and power spectral density, 100 kHz Bandwidth of Band Edges Measurement, Spurious Emissions, Conducted and Radiated Spurious Emissions.

1.4 Related Submittal(s)/Grant(s)

N/A

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.

Based on CISPR16-4-2:2011, 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.

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 configured for testing according to ANSI C63.4-2009 and FCC KDB 558074 D01 DTS Meas Guidance v03r01.

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

2.2 EUT Exercise Software

The software used during the test is Atheros Radio transmissions and was verified by Bo Li from BACL.

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
Dell	Laptop	Latitude D600	CN-0X2034-48643-3A6-8307

2.6 EUT Internal Configuration Details

Manufacturers	Descriptions	Models	Serial Numbers
Tropos Networks, Inc.	Main Board	300309-00	-

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 No.	Serial No.
Phihong	AC/DC Power Adapter	PSC30U-120V	PO3111523A

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	Compliant
FCC §15.203 IC RSS-Gen §7.1.2	Antenna Requirement	Compliant
FCC §15.207(a) IC RSS-Gen §7.2.4	AC Line Conducted Emissions	Compliant
FCC §15.247 (d) IC RSS-210 §A8.5	Spurious Emissions at Antenna Port	Compliant
FCC §15.205 IC RSS-210 §2.2	Restricted Bands	Compliant
FCC §15.209, §15.247 (d) IC RSS-210 §A8.5	Radiated Spurious Emissions	Compliant
FCC §15.247(a)(2) IC RSS-210 §A8.2	6 dB Emission Bandwidth	Compliant
FCC §15.247(b)(3) IC RSS-210 §A8.4	Maximum Peak Output Power	Compliant
FCC §15.247(d) IC RSS-210 §A8.5	100 kHz Bandwidth of Frequency Band Edge	Compliant
FCC §15.247(e) IC RSS-210 §A8.2(b)	Power Spectral Density	Compliant
IC RSS-210 §2.3 & RSS-Gen §4.10	Receiver Spurious Emission	Compliant

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

Maximum peak output power at antenna input terminal (dBm):	25.03
Maximum peak output power at antenna input terminal (mW):	318.42
Prediction distance (cm):	20
Prediction frequency (MHz):	2437
Maximum Antenna Gain, typical (dBi):	7.4
Maximum Antenna Gain (numeric):	5.495409
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.3481
Power density of prediction frequency at 20.0 cm (W/m^2):	3.481
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 is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.3481mW/cm^2 (3.481W/m^2). Limit is 1.0 mW/cm^2 (10 W/m^2).

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)
Tropos	Monopole	7.4

The antenna consists of non-standard (UFL) connectors with 7.4 dBi gain; Antenna gain that exceeds 6 dBi was added to RF measurement therefore, it complies with the antenna requirement. Please refer to the internal photos.

6 FCC §15.207 & IC RSS-Gen §7.2.4 – AC 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 *	56 to 46 *
0.5-5	56	46
5-30	60	50

**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

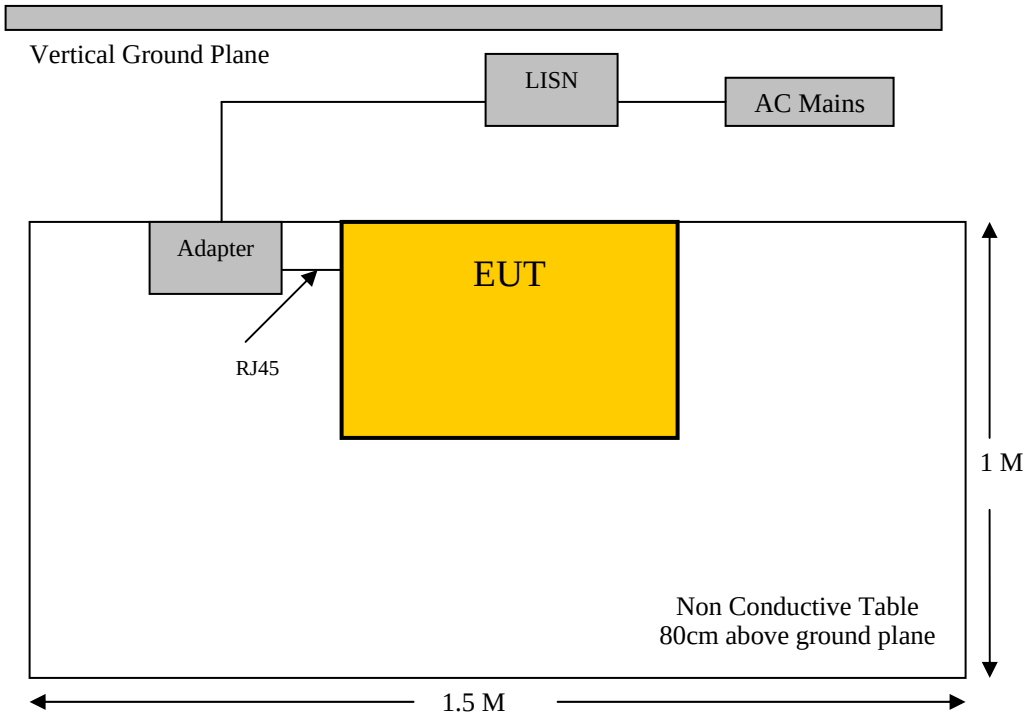
During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-2.

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

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

6.4 Test Setup Block Diagram

AC/DC Adaptor:



6.5 Corrected Amplitude & Margin Calculation

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

CA = Ai + + CL + Atten – Ga

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

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2013-03-28
Solar Electronics	LISN, EMC	9252-50-R-24-N	511205	2013-06-25
TTE	Filter, High Pass	H962-150k-50-21378	K7133	2012-05-30

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:	20 º C
Relative Humidity:	40 %
ATM Pressure:	101.9 kPa

The testing was performed by Ricky Wang on 2013-04-13 in 5 meter chamber2.

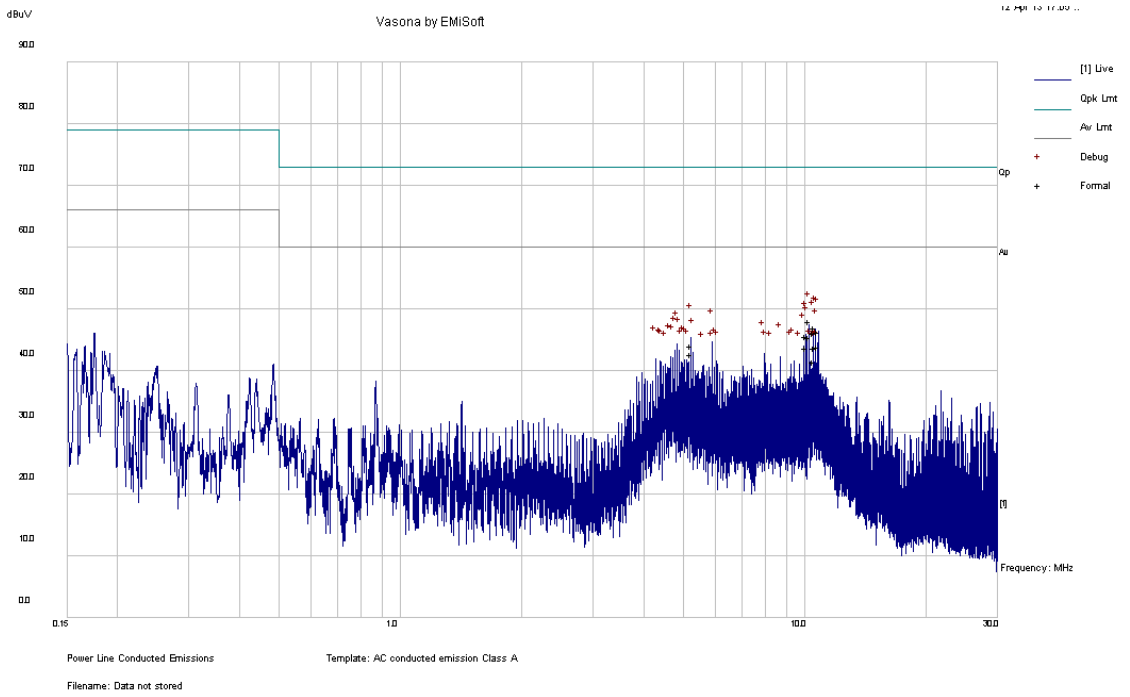
6.8 Summary of Test Results

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

Mode: 120 V/ 60 Hz			
Margin (dB)	**Frequency (MHz)**	**Conductor (Line/Neutral)**	**Range (MHz)**
-4.61	10.24347	Line	0.15-30

6.9 Conducted Emissions Test Plots and Data

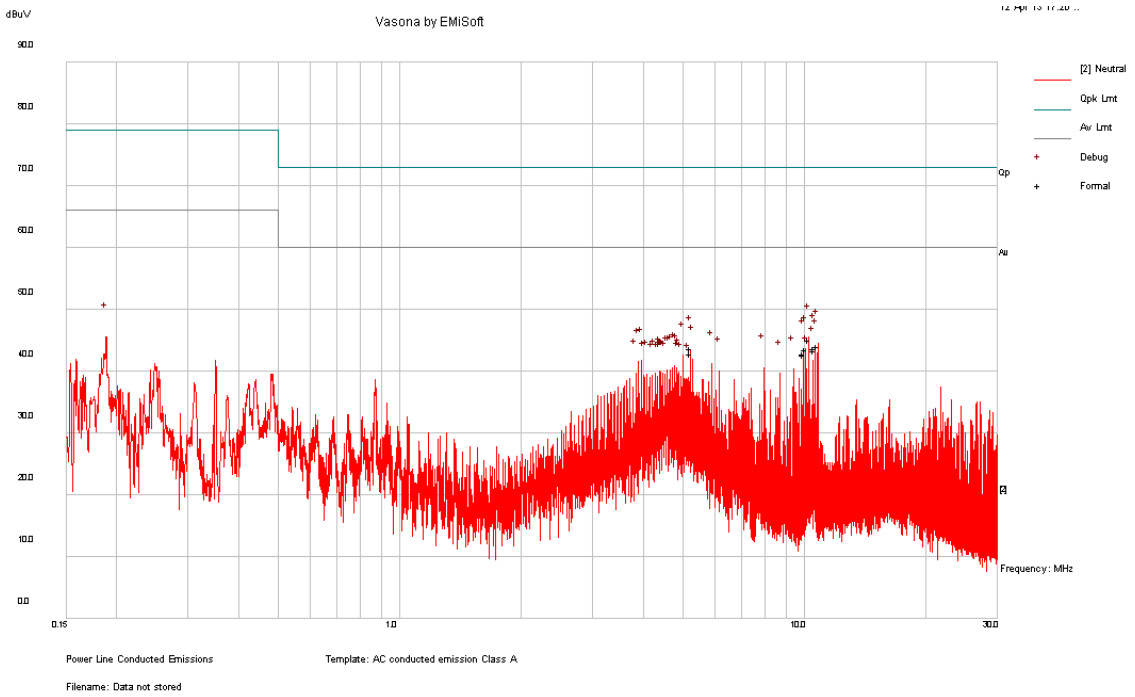
120 V, 60 Hz – Line



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave)
10.24347	48.06	Line	60	-11.94	QP
10.60964	47.02	Line	60	-12.98	QP
10.79218	46.34	Line	60	-13.66	QP
10.48817	46.07	Line	60	-13.93	QP
10.06	45.54	Line	60	-14.46	QP
5.234941	43.99	Line	60	-16.01	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave)
10.24347	45.39	Line	50	-4.61	Ave
10.79218	43.92	Line	50	-6.08	Ave
10.60964	43.78	Line	50	-6.22	Ave
10.06	43.72	Line	50	-6.28	Ave
5.234941	42.68	Line	50	-7.32	Ave
10.48817	41.53	Line	50	-8.47	Ave

120 V, 60 Hz – Neutral



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave)
10.24347	45.09	Neutral	60	-14.91	QP
10.79312	44.09	Neutral	60	-15.91	QP
10.60948	43.80	Neutral	60	-16.2	QP
5.236093	43.74	Neutral	60	-16.26	QP
10.06016	43.48	Neutral	60	-16.52	QP
9.938113	42.67	Neutral	60	-17.33	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave)
10.24347	45.17	Neutral	50	-4.83	Ave
10.79312	44.00	Neutral	50	-6.00	Ave
10.06016	43.58	Neutral	50	-6.42	Ave
10.60948	43.42	Neutral	50	-6.58	Ave
5.236093	42.94	Neutral	50	-7.06	Ave
9.938113	33.02	Neutral	50	-7.23	Ave

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

7.1 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 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.

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 11: Emissions in non-restricted frequency bands and section 12: Emissions in restricted frequency bands.

7.3 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 per the A2LA requirements, traceable to the NIST.*

7.4 Test Environmental Conditions

Temperature:	23 °C
Relative Humidity:	45 %
ATM Pressure:	101.5 kPa

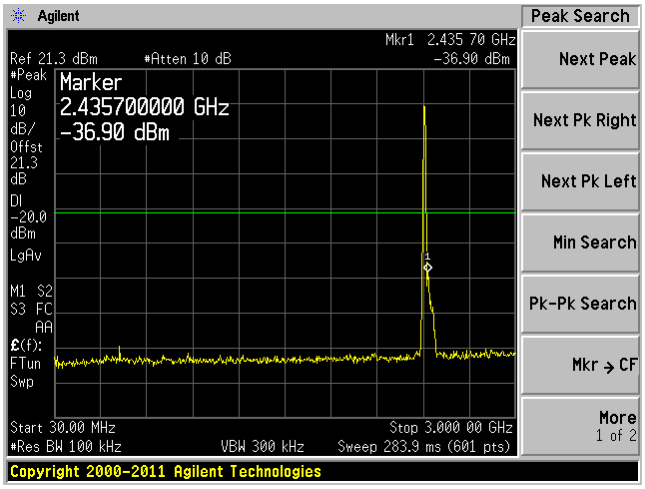
The testing was performed by Bo Li from 2013-08-22 at RF site.

7.5 Test Results

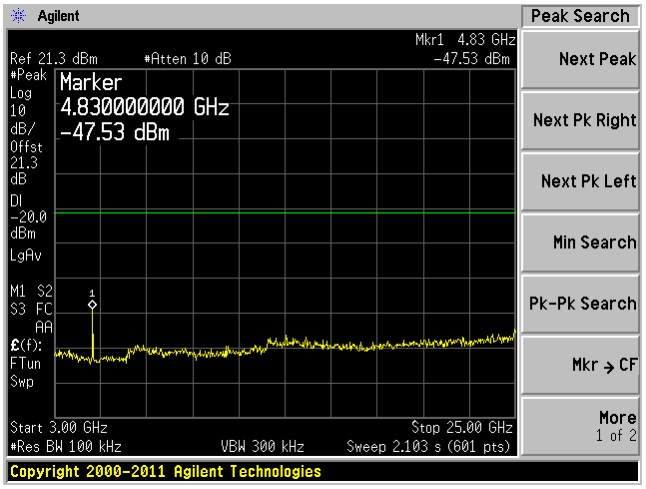
Please refer to following plots of spurious emissions.

802.11b, Low Channel, 2412 MHz

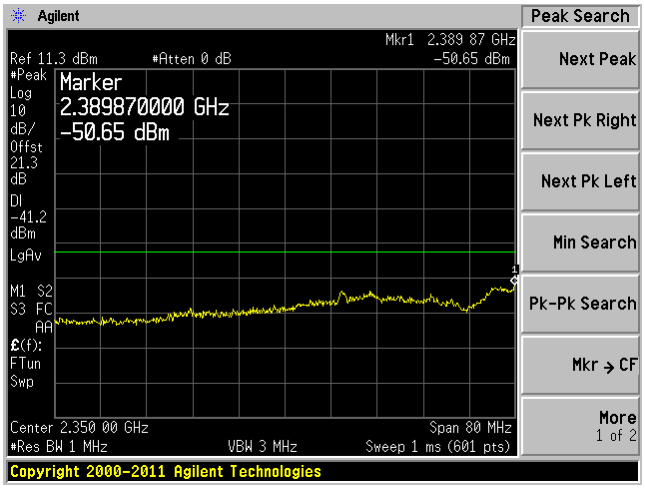
Chain J0, Plot: 30 MHz – 3 GHz



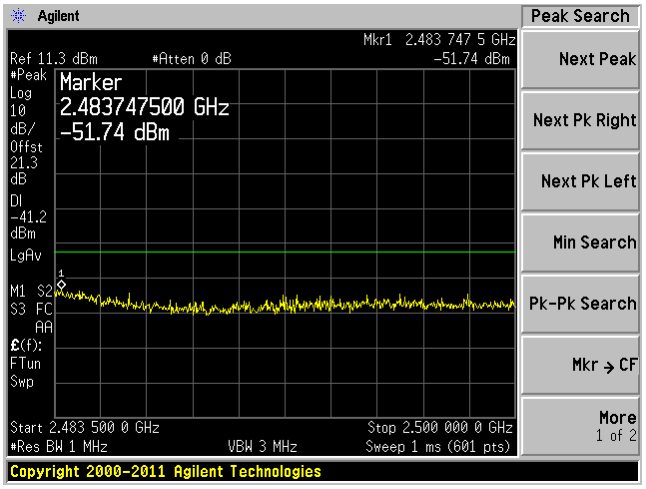
Chain J0, Plot: 3 GHz – 25 GHz



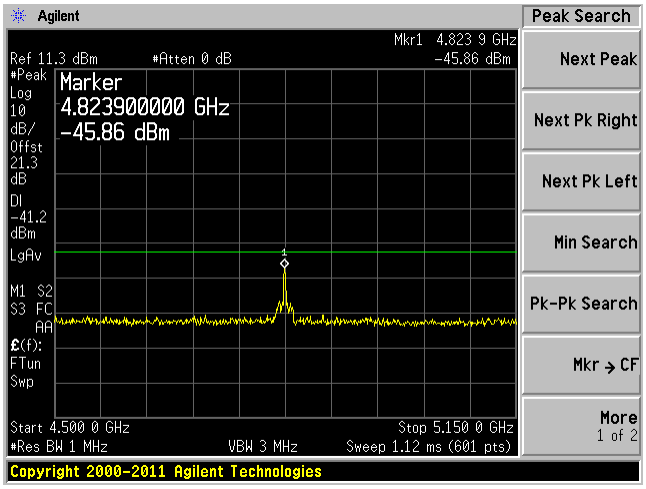
Chain J0, Plot: 2310 MHz – 2390 MHz



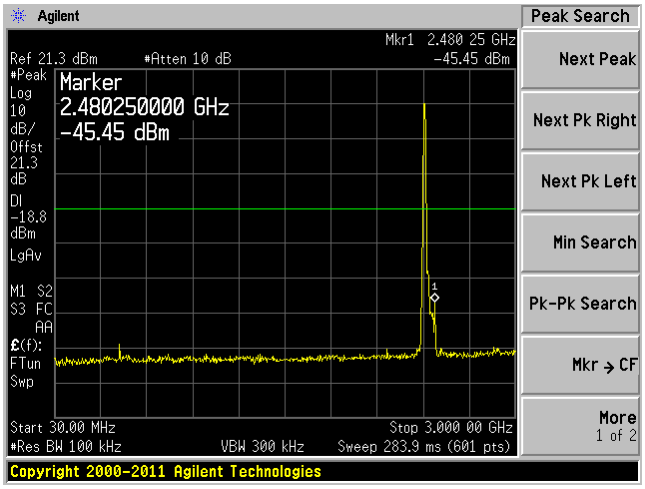
Chain J0, Plot: 2483.5MHz – 2500 MHz



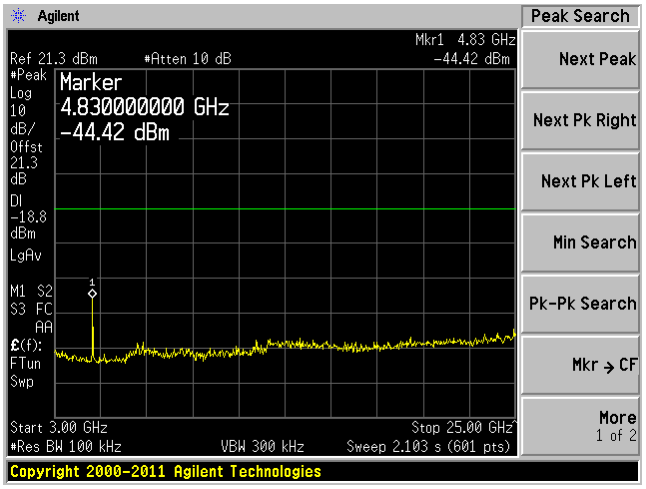
Chain J0, Plot: 4500 MHz – 5150 MHz



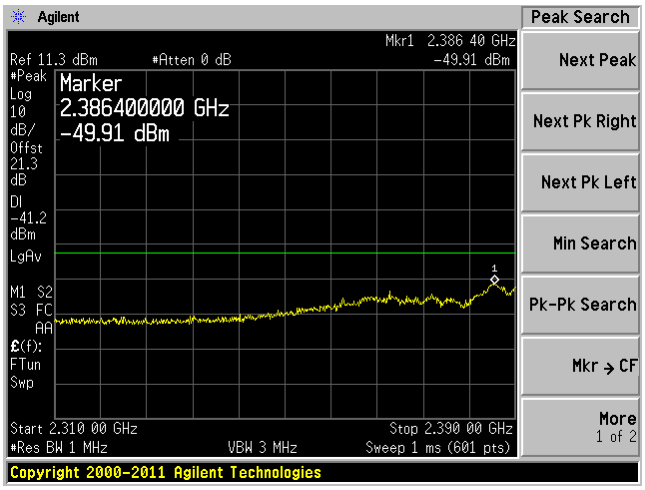
Chain J1, Plot: 30 MHz – 3 GHz



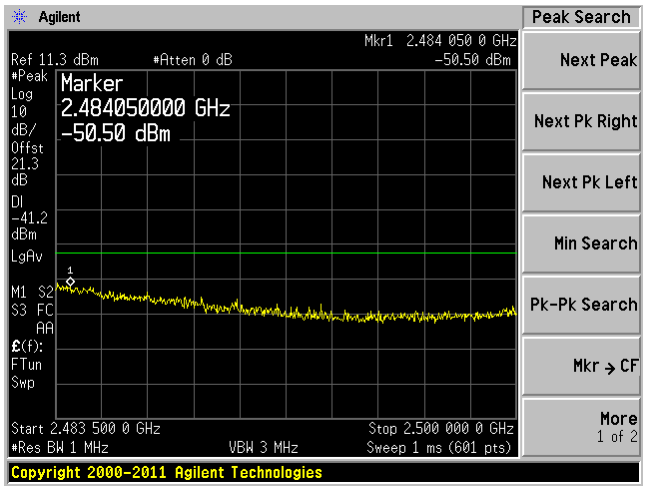
Chain J1, Plot: 3 GHz – 25 GHz



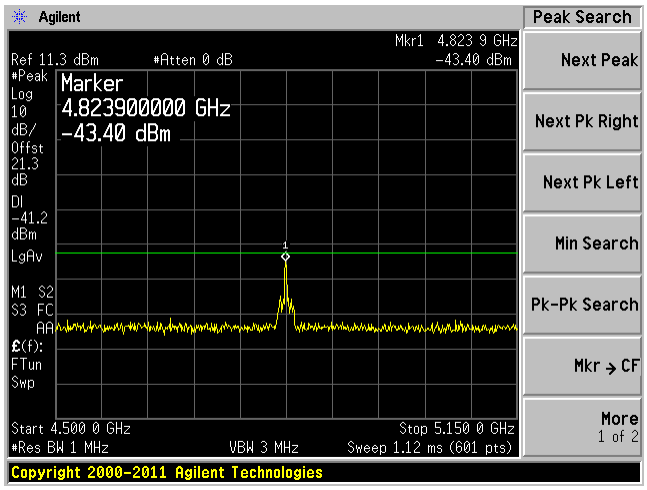
Chain J1, Plot: 2310 MHz – 2390 MHz



Chain J1, Plot: 2483.5MHz – 2500 MHz

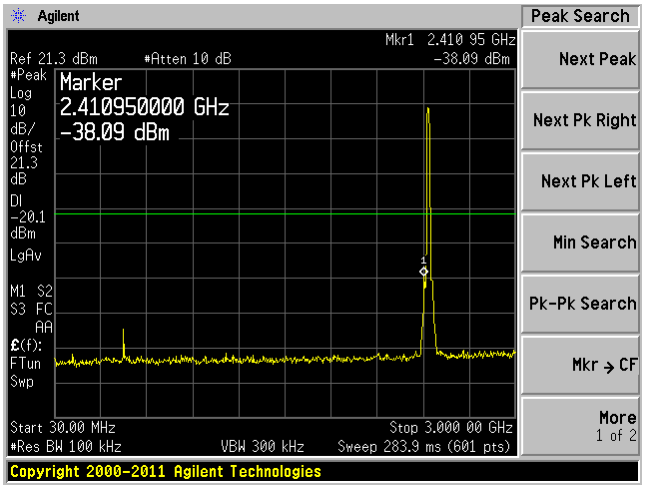


Chain J1, Plot: 4500 MHz – 5150 MHz

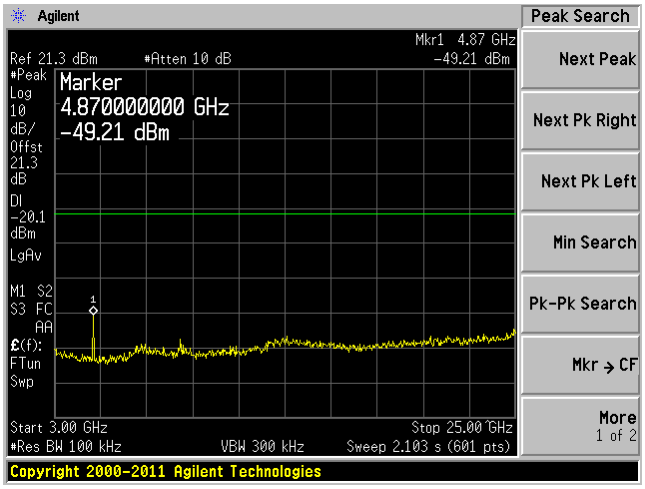


802.11b, Middle Channel, 2437 MHz

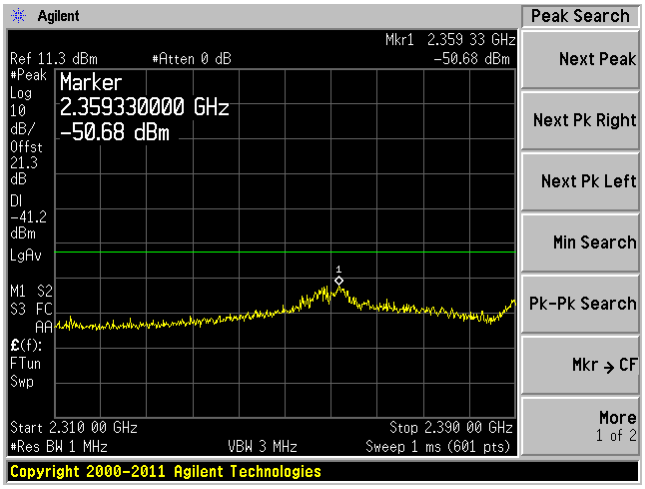
Chain J0, Plot: 30 MHz – 3 GHz



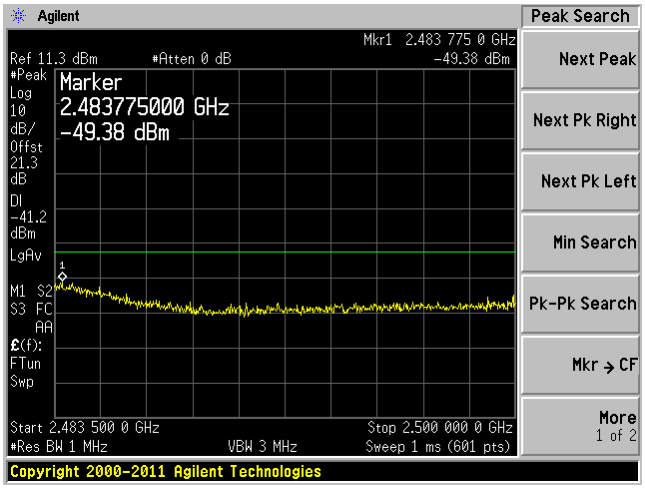
Chain J0, Plot: 3 GHz – 25 GHz



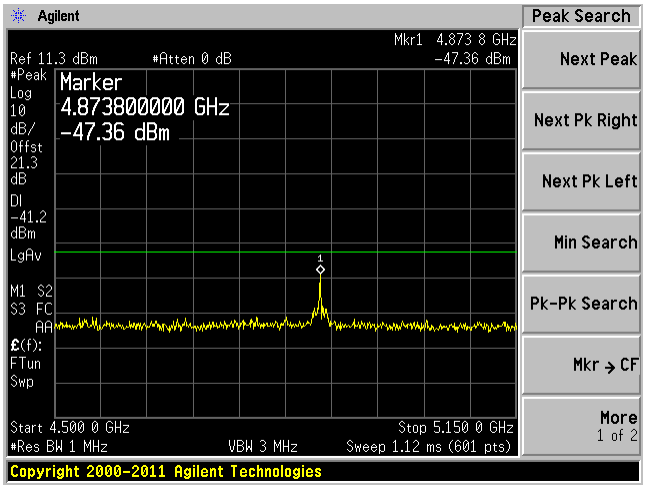
Chain J0, Plot: 2310 MHz – 2390 MHz



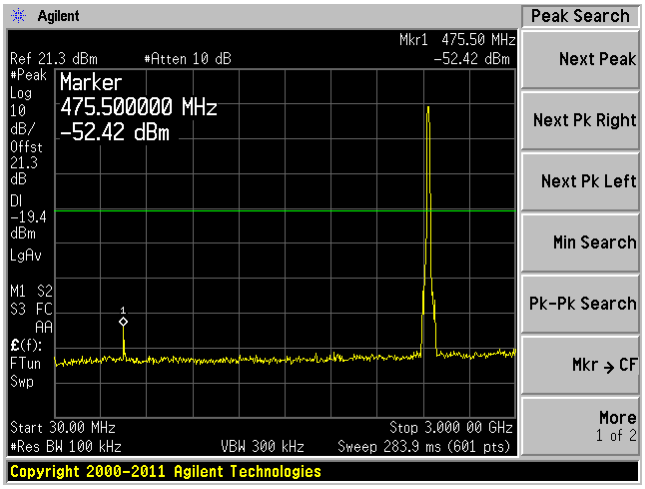
Chain J0, Plot: 2483.5MHz – 2500 MHz



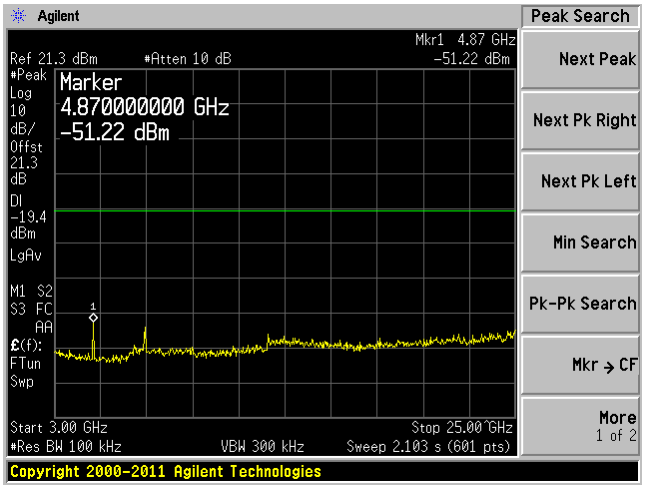
Chain J0, Plot: 4500 MHz – 5150 MHz



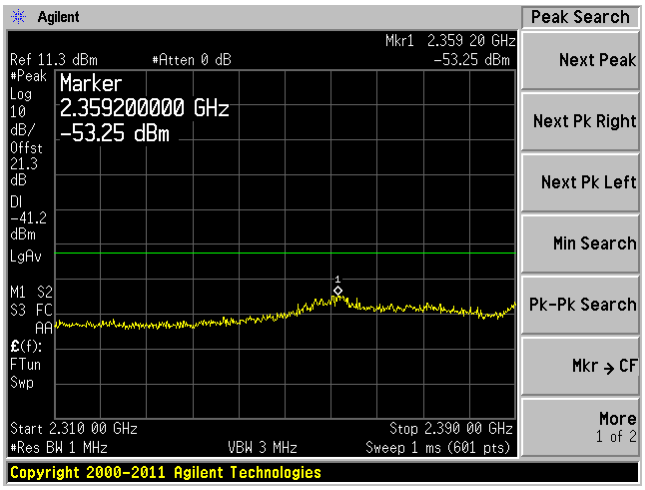
Chain J1, Plot: 30 MHz – 3 GHz



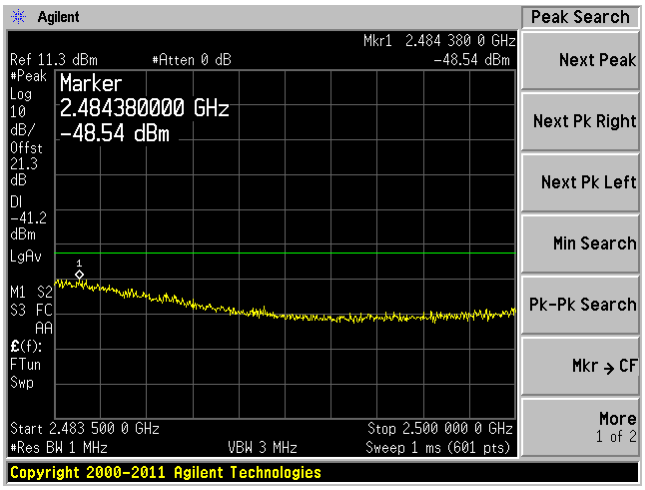
Chain J1, Plot: 3 GHz – 25 GHz



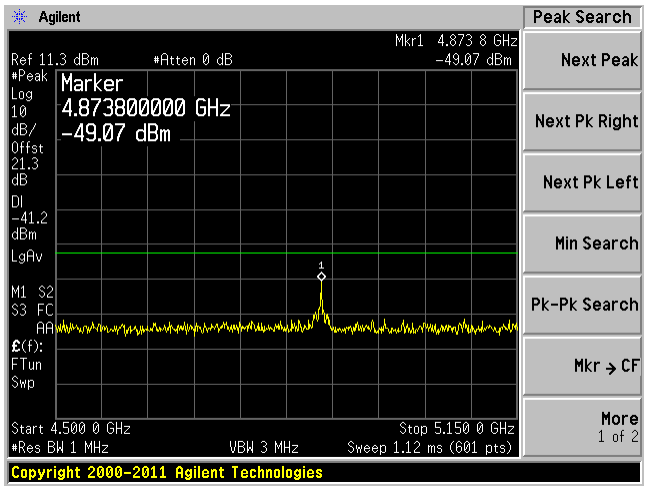
Chain J1, Plot: 2310 MHz – 2390 MHz



Chain J1, Plot: 2483.5MHz – 2500 MHz

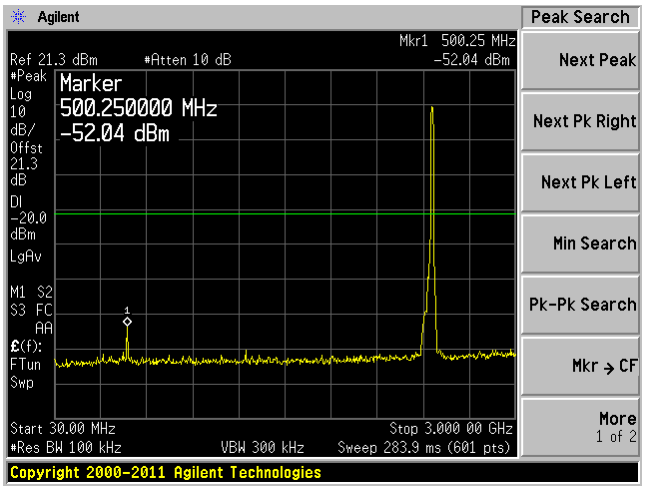


Chain J1, Plot: 4500MHz – 5150 MHz

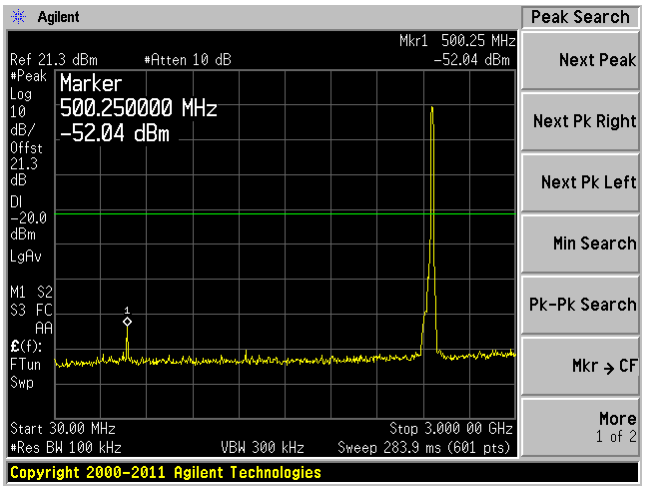


802.11b, High Channel, 2462 MHz

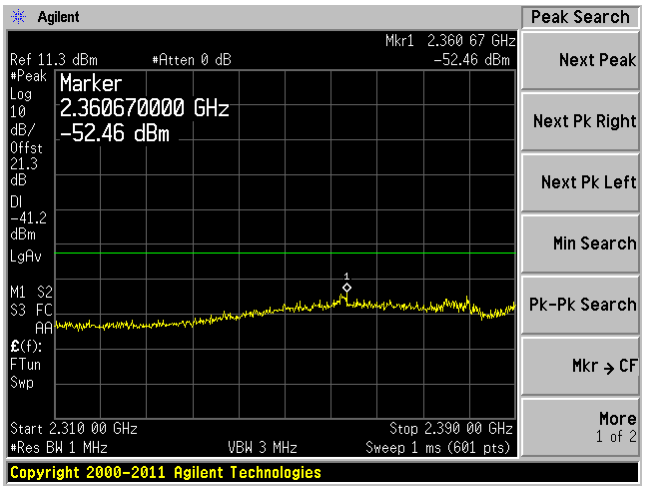
Chain J0, Plot: 30 MHz – 3 GHz



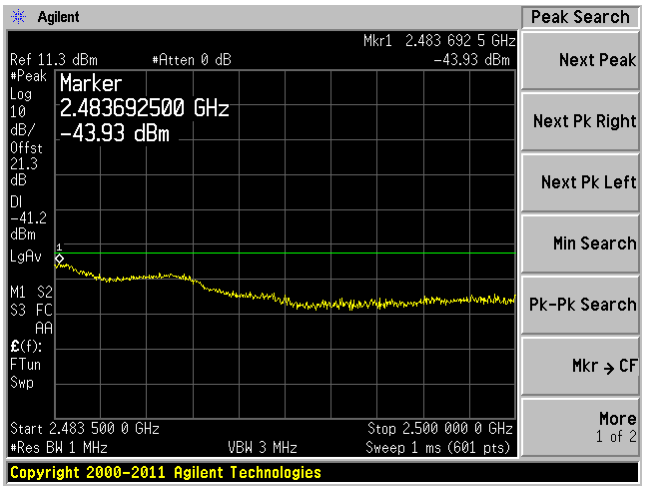
Chain J0, Plot: 3 GHz – 25 GHz



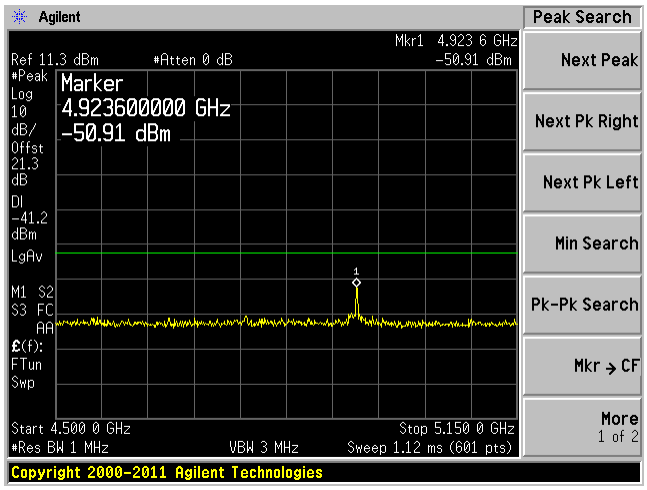
Chain J0, Plot: 2310 MHz – 2390 MHz



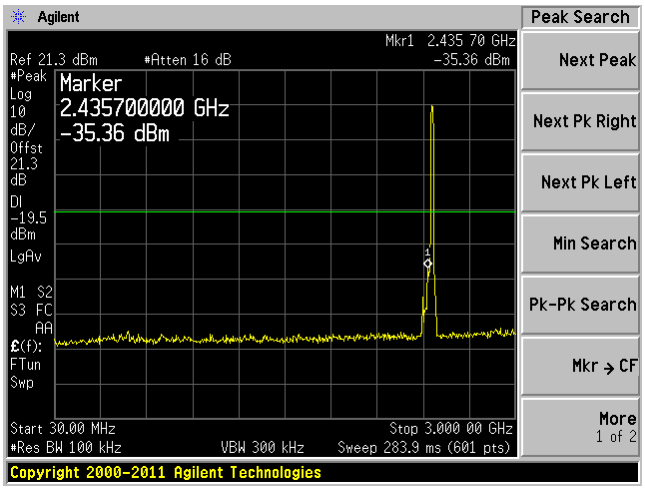
Chain J0, Plot: 2483.5MHz – 2500 MHz



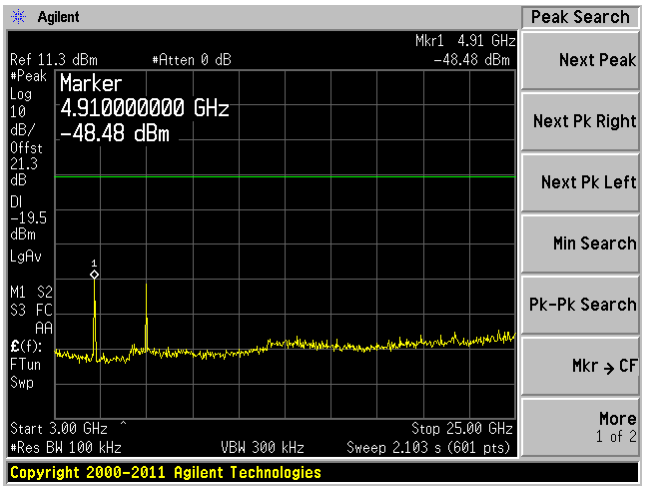
Chain J0, Plot: 4500 MHz – 5150 MHz



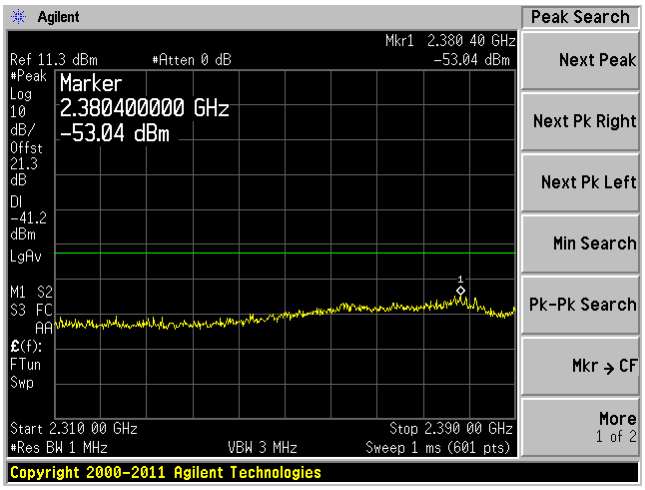
Chain J1, Plot: 30 MHz – 3 GHz



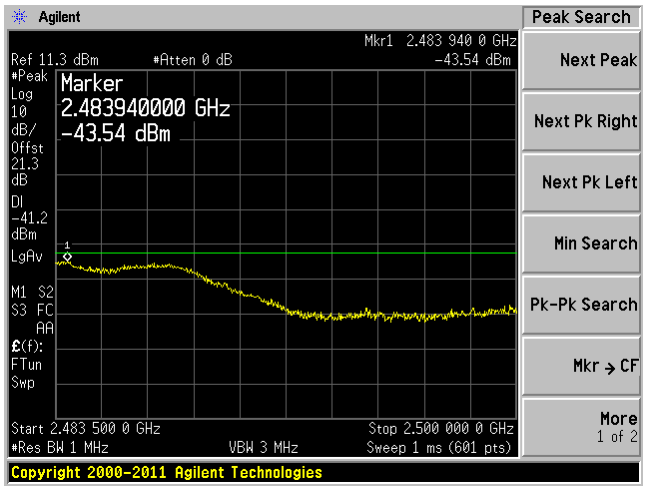
Chain J1, Plot: 3 GHz – 25 GHz



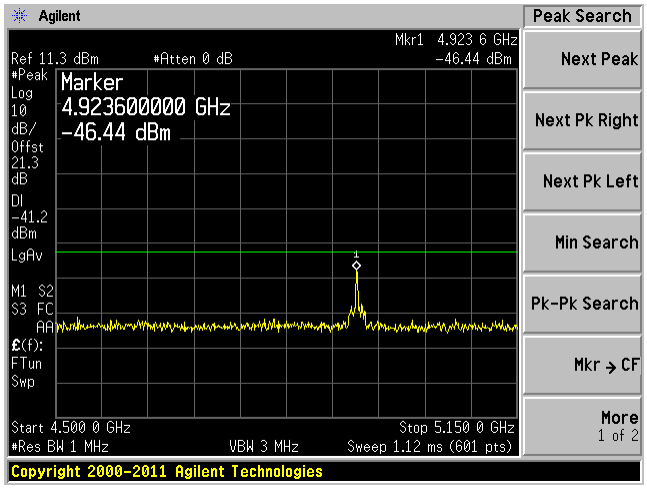
Chain J1, Plot: 2310 MHz – 2390 MHz



Chain J1, Plot: 2483.5 MHz – 2500 MHz

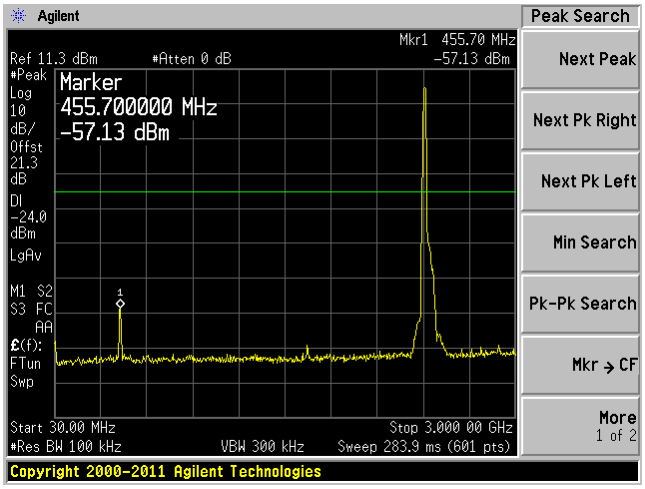


Chain J1, Plot: 4500 MHz – 5150 MHz

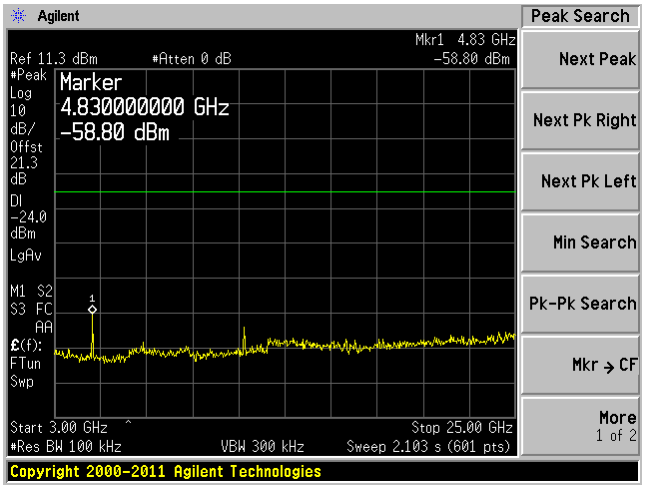


802.11g, Low Channel 2412 MHz

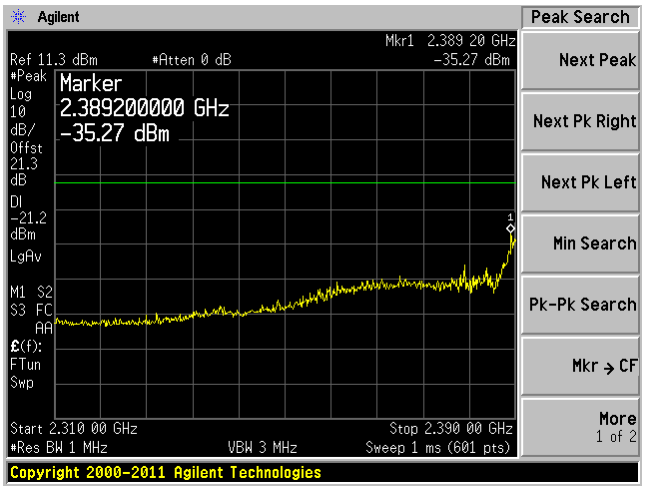
Chain J0, Plot: 30 MHz – 3 GHz



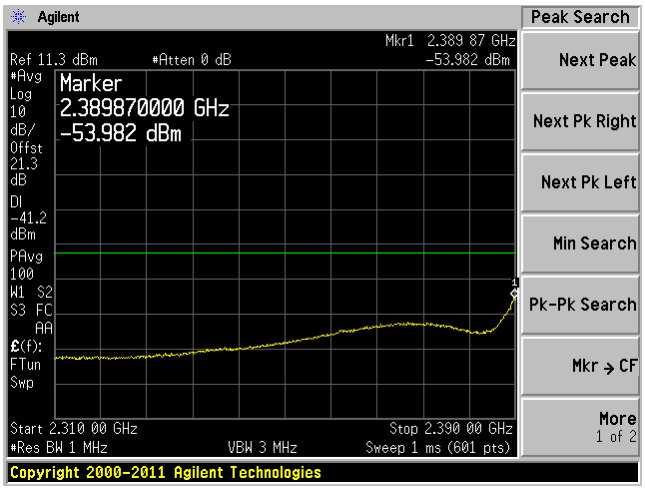
Chain J0, Plot: 3 GHz – 25 GHz



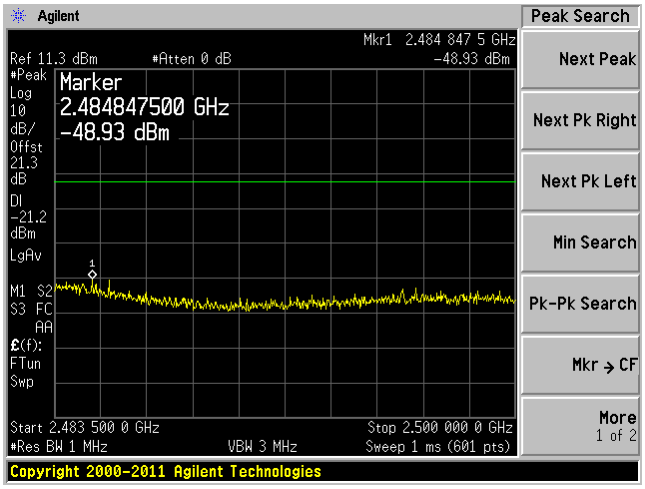
Chain J0, Plot: 2310 MHz – 2390 MHz Peak



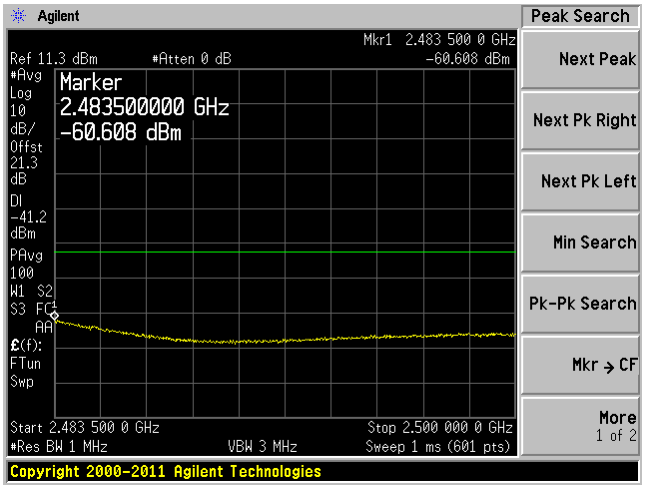
Chain J0, Plot: 2310 MHz – 2390 MHz Ave



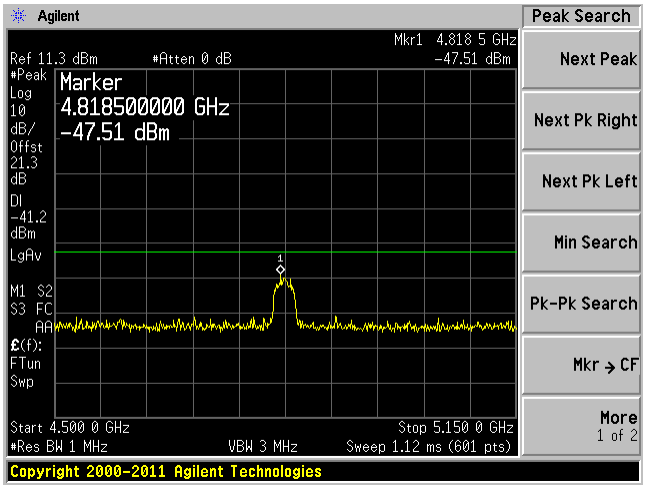
Chain J0, Plot: 2483.5 MHz – 2500 MHz Peak



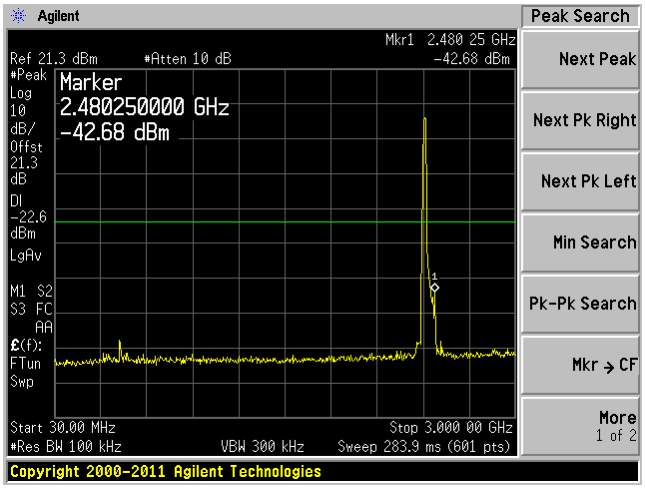
Chain J0, Plot: 2483.5 MHz – 2500 MHz Ave



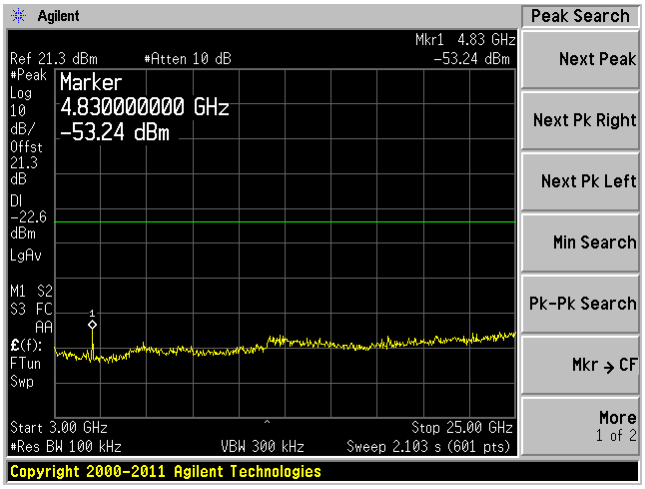
Chain J0, Plot: 4500 MHz – 5150 MHz



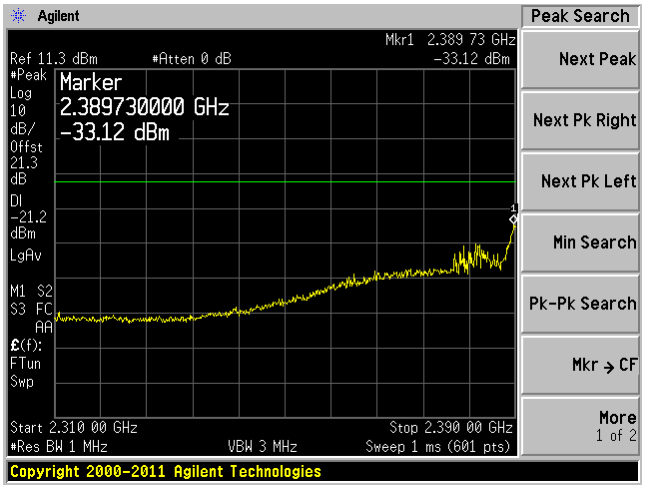
Chain J1, Plot: 30 MHz – 3 GHz



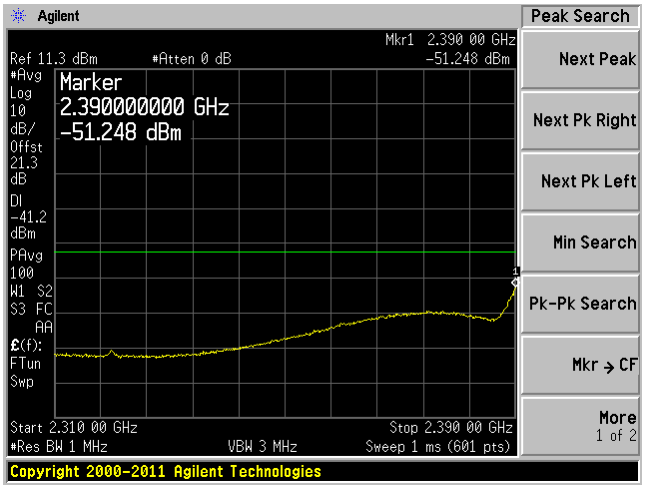
Chain J1, Plot: 3 GHz – 25 GHz



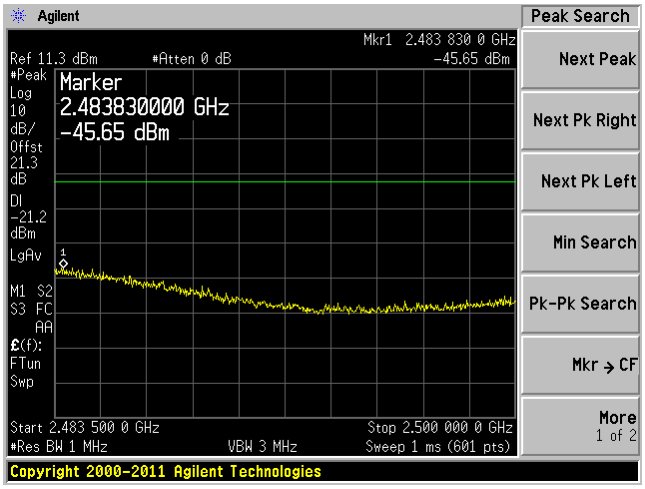
Chain J1, Plot: 2310 MHz – 2390 MHz Peak



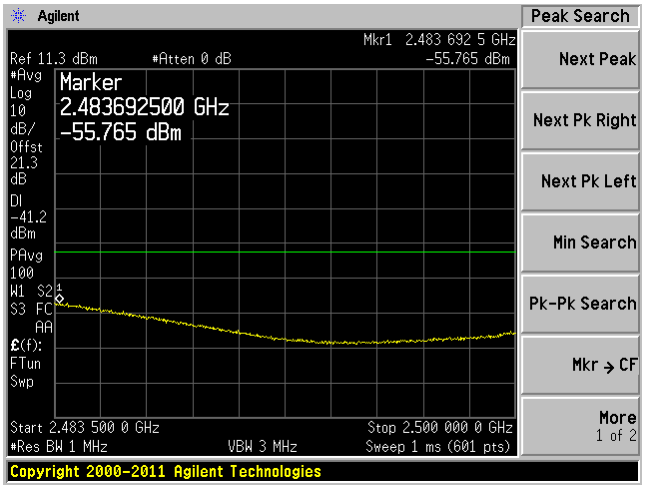
Chain J1, Plot: 2310 MHz – 2390 MHz Ave



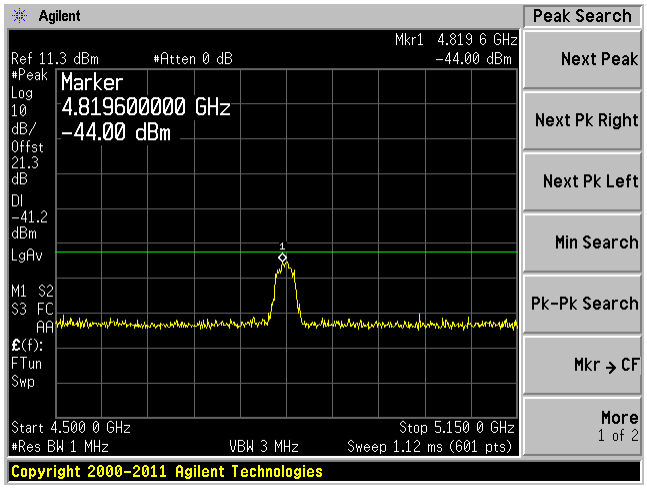
Chain J1, Plot: 2483.5 MHz – 2500 MHz Peak



Chain J1, Plot: 2483.5 MHz – 2500 MHz Ave

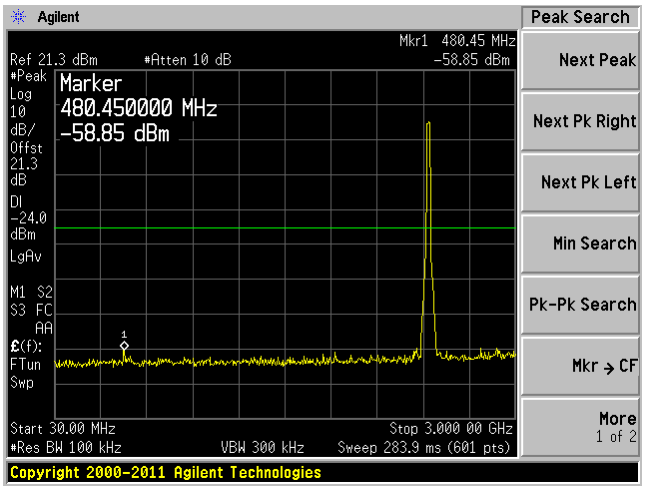


Chain J0, Plot: 4500MHz – 5150 MHz

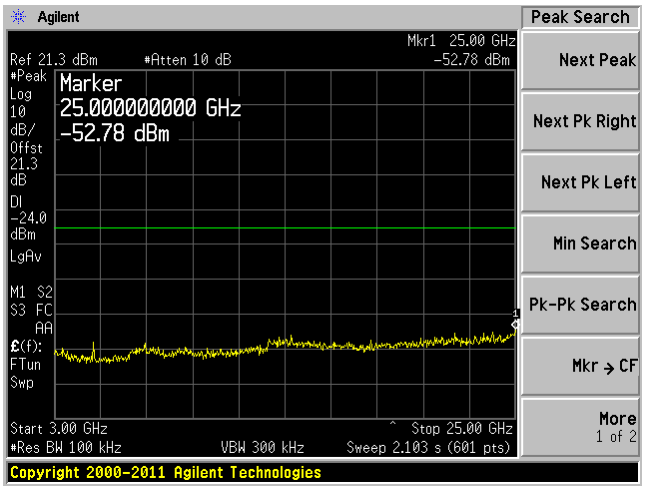


802.11g, Middle Channel 2437 MHz

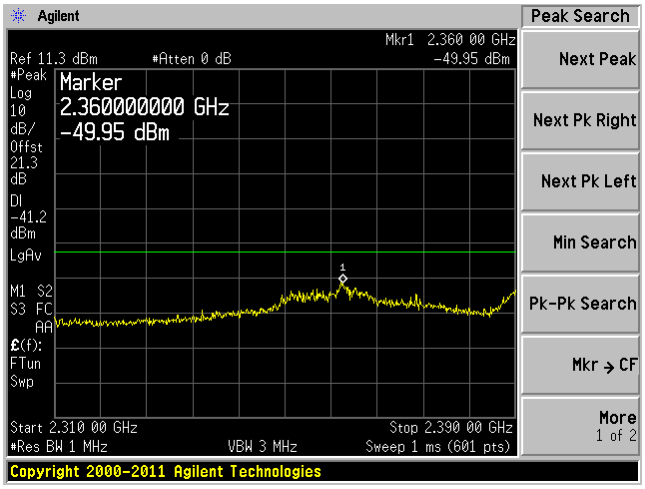
Chain J0, Plot: 30 MHz – 3 GHz



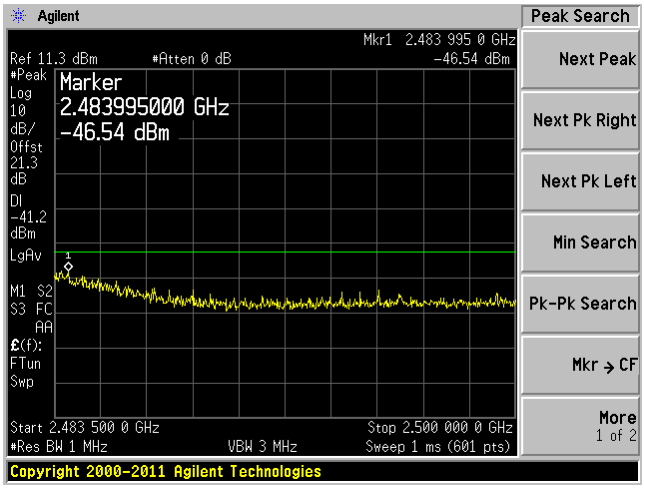
Chain J0, Plot: 3 GHz – 25 GHz



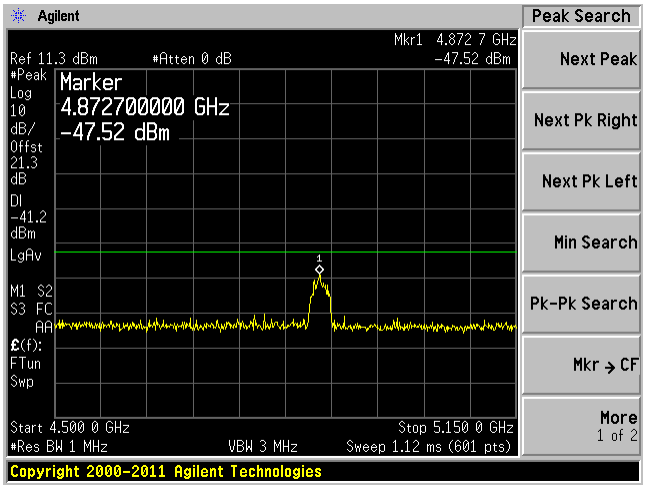
Chain J0, Plot: 2310 MHz – 2390 MHz



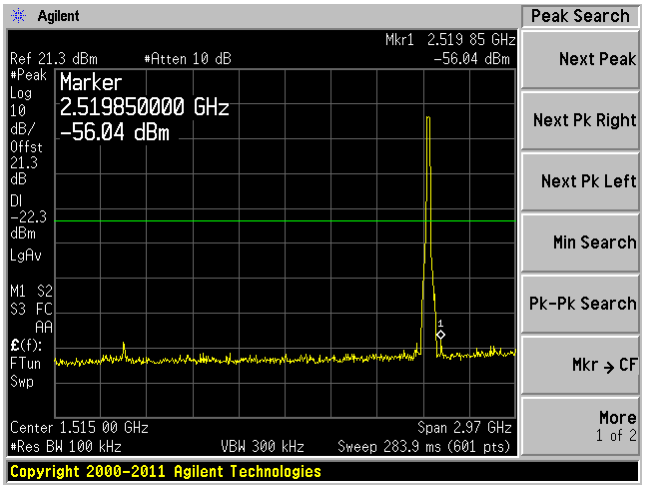
Chain J0, Plot: 2483.5 MHz – 2500 MHz



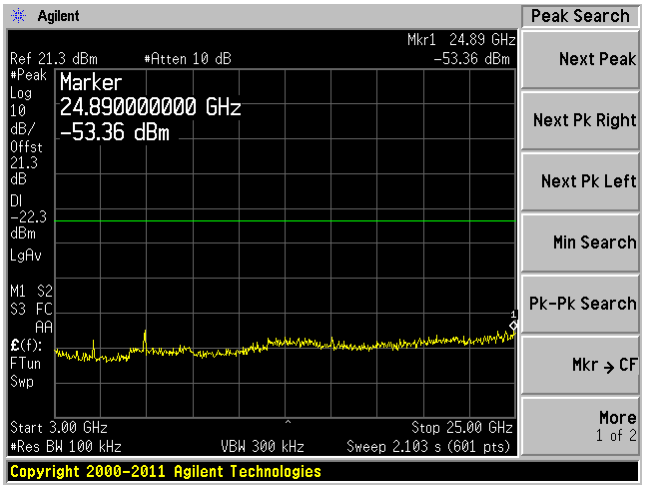
Chain J0, Plot: 4500 MHz – 5150 MHz



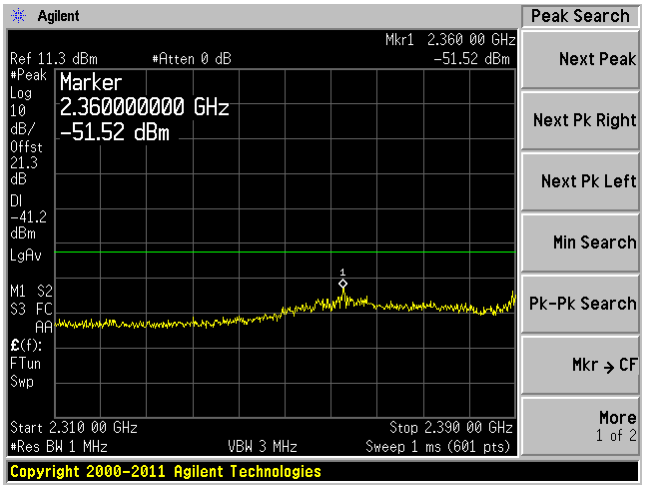
Chain J1, Plot: 30 MHz – 3 GHz



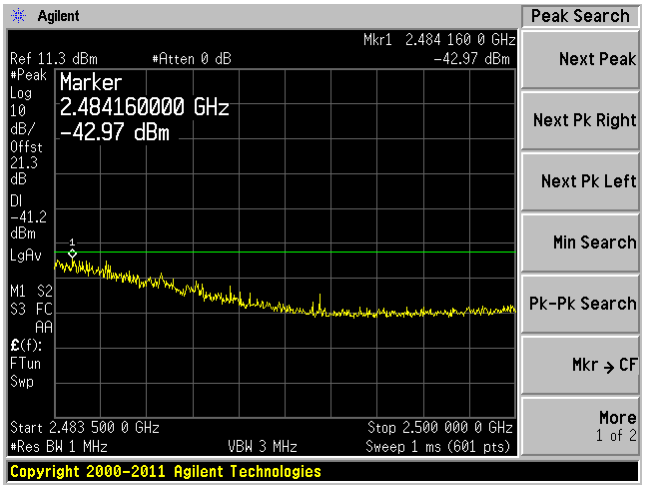
Chain J1, Plot: 3 GHz – 25 GHz



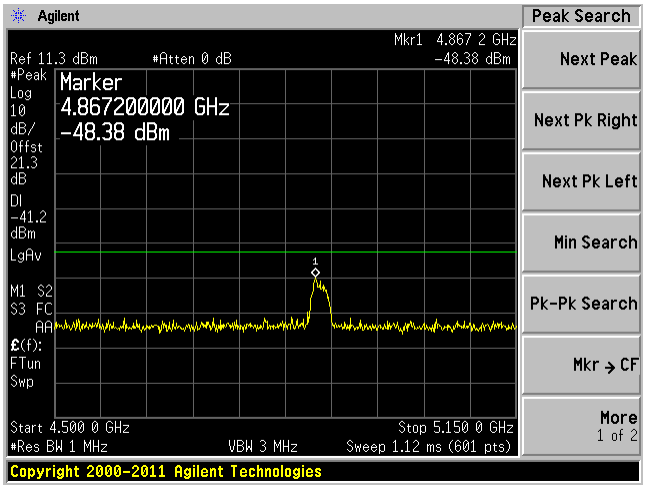
Chain J1, Plot: 2310 MHz – 2390 MHz



Chain J1, Plot: 2483.5 MHz – 2500 MHz

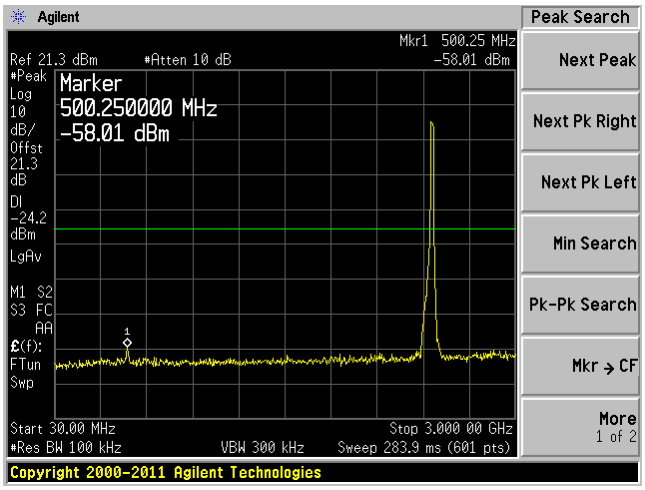


Chain J1, Plot: 4500 MHz – 5150 MHz

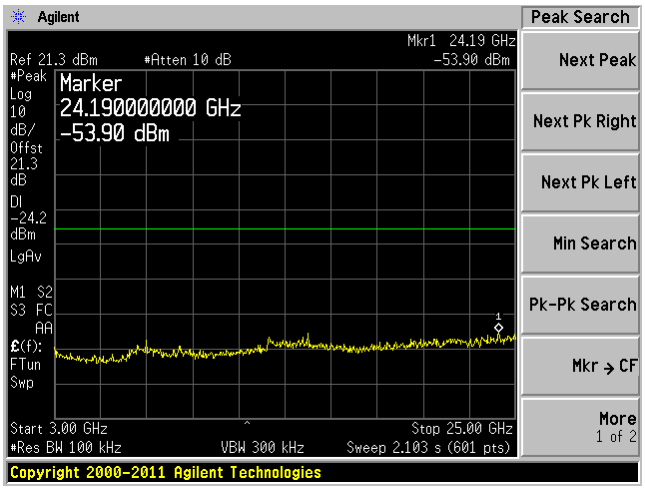


802.11g, High Channel 2462 MHz

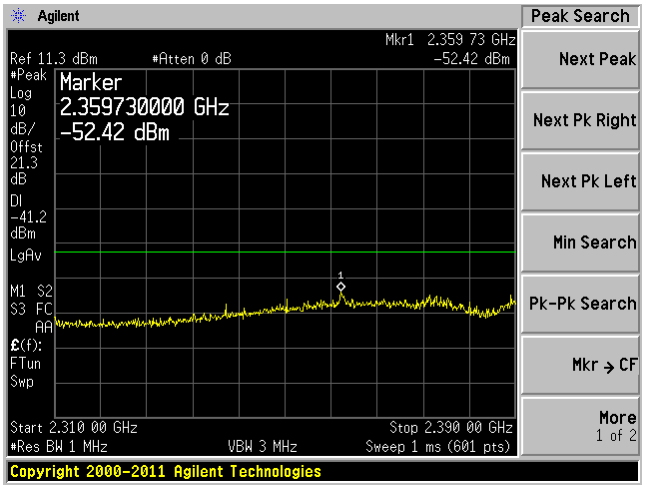
Chain J0, Plot: 30 MHz – 3 GHz



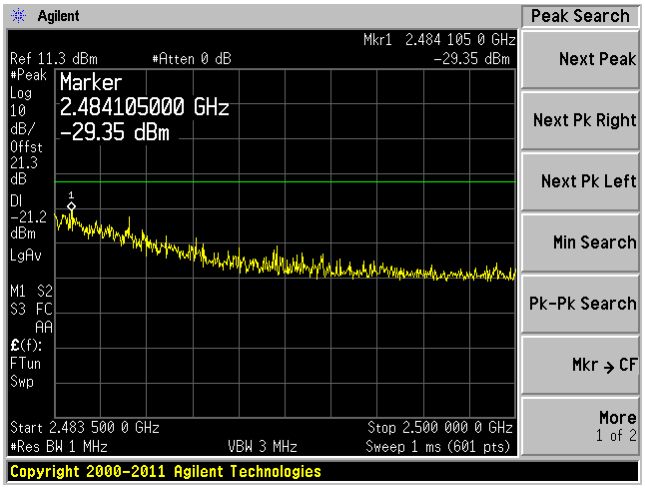
Chain J0, Plot: 3 GHz – 25 GHz



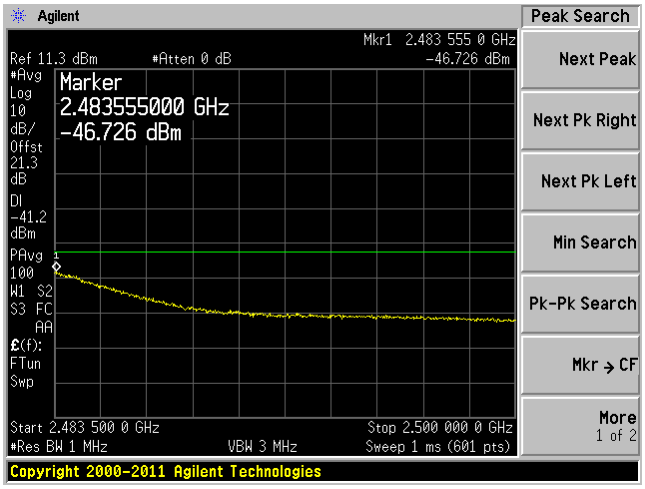
Chain J0, Plot: 2310 MHz – 2390 MHz



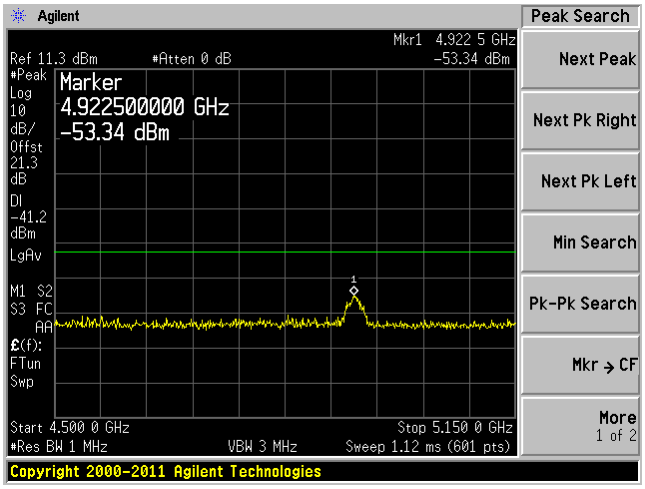
Chain J0, Plot: 2483.5 MHz – 2500 MHz Peak



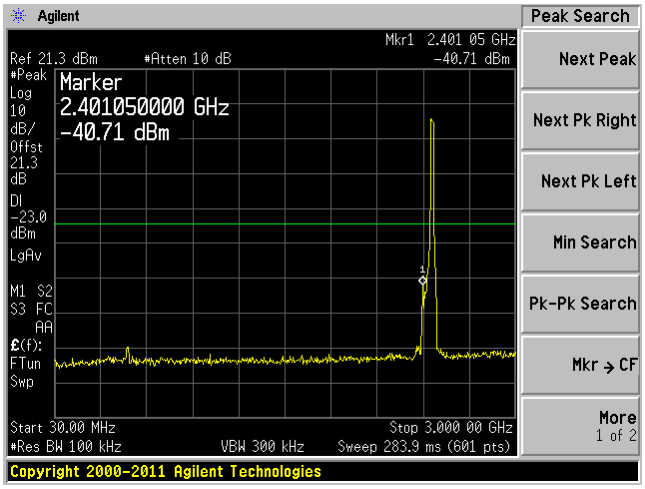
Chain J0, Plot: 2483.5MHz – 2500 MHz Ave



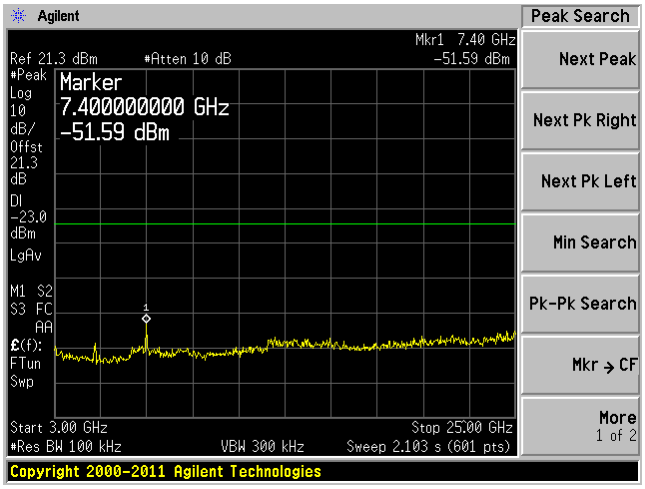
Chain J0, Plot: 4500MHz – 5150 MHz



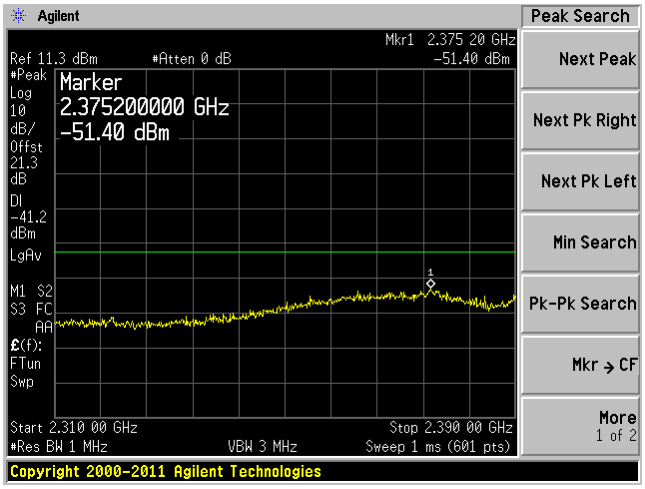
Chain J1, Plot: 30 MHz – 3 GHz



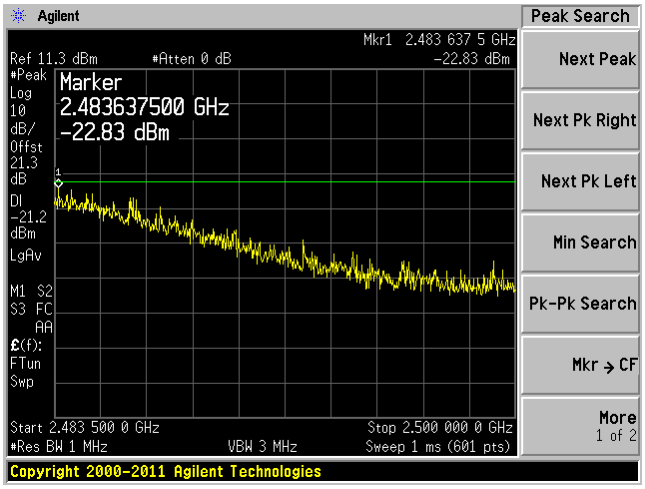
Chain J1, Plot: 3 GHz – 25 GHz



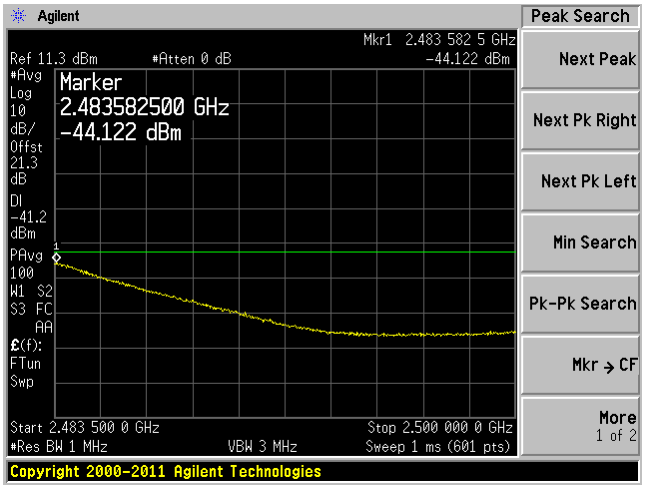
Chain J1, Plot: 2310 MHz – 2390 MHz



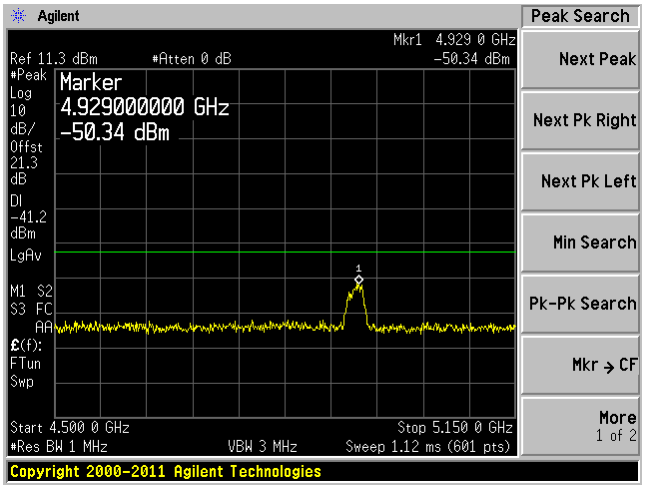
Chain J1, Plot: 2483.5MHz – 2500 MHz Peak



Chain J1, Plot: 2483.5MHz – 2500 MHz Ave

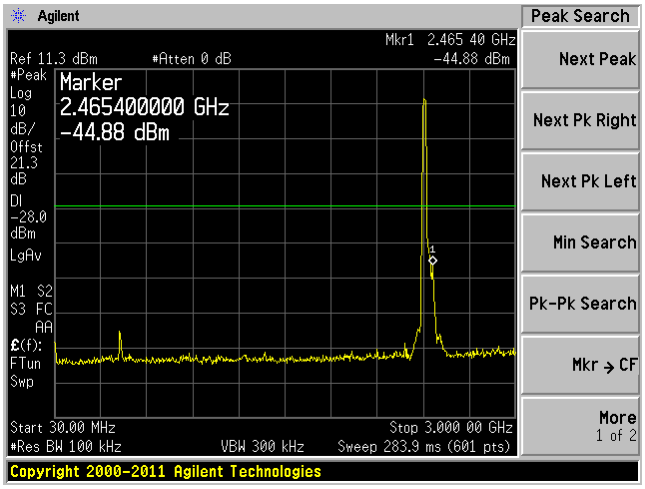


Chain J1, Plot: 4500MHz – 5150 MHz

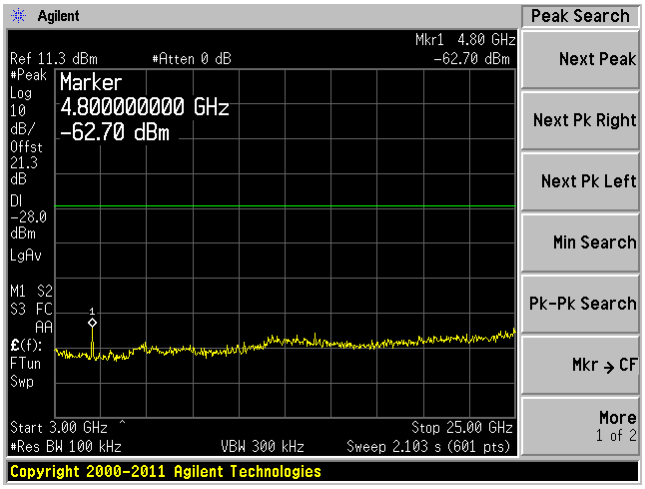


802.11n-HT20, Low Channel 2412 MHz

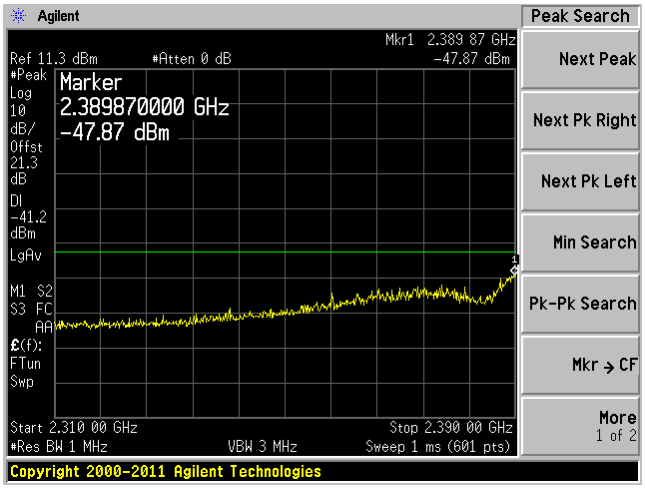
Chain J0, Plot: 30 MHz – 3 GHz



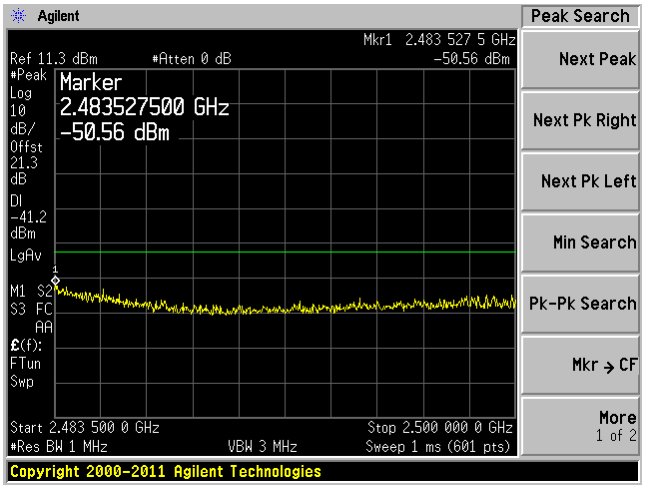
Chain J0, Plot: 3 GHz – 25 GHz



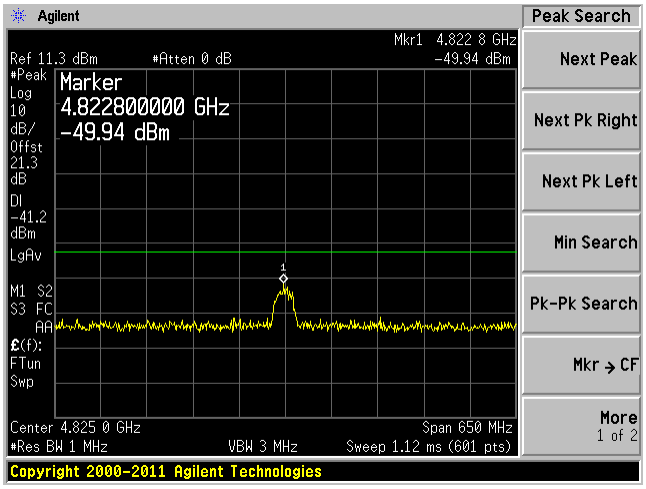
Chain J0, Plot: 2310 MHz – 2390 MHz



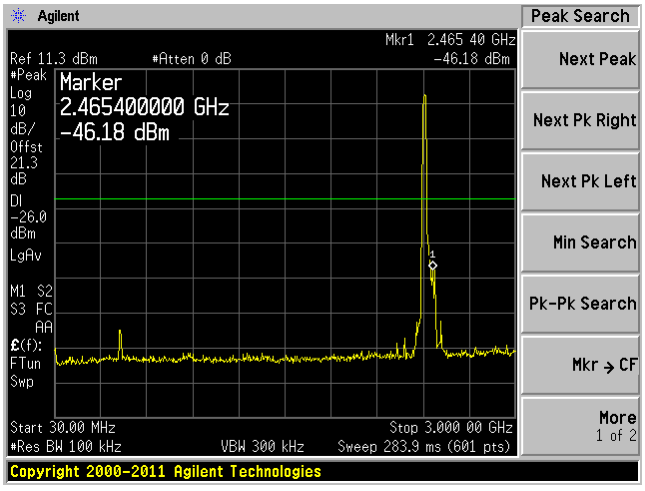
Chain J0, Plot: 2483.5 MHz – 2500 MHz



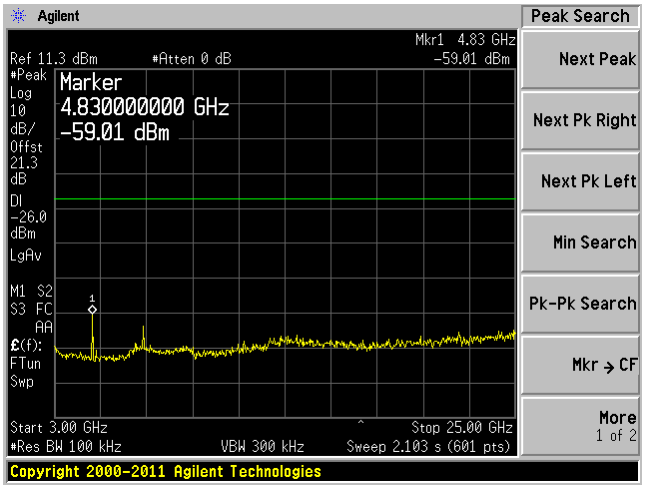
Chain J0, Plot: 4500 MHz – 5150 MHz



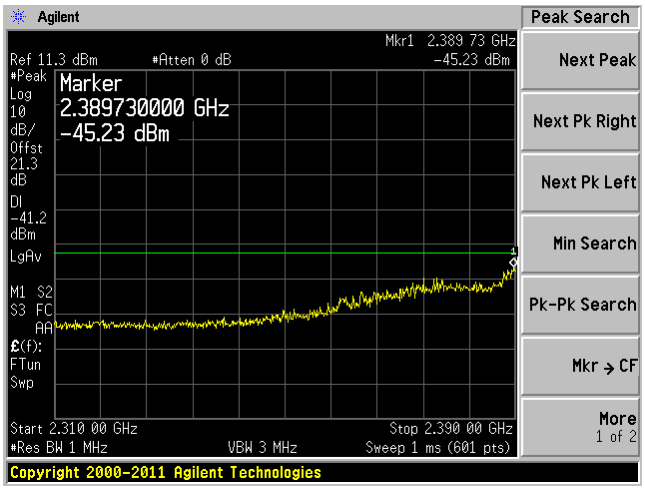
Chain J1, Plot: 30 MHz – 3 GHz



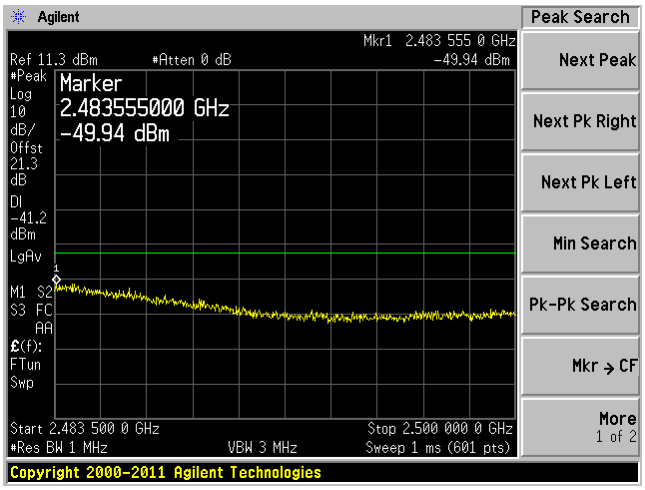
Chain J1, Plot: 3 GHz – 25 GHz



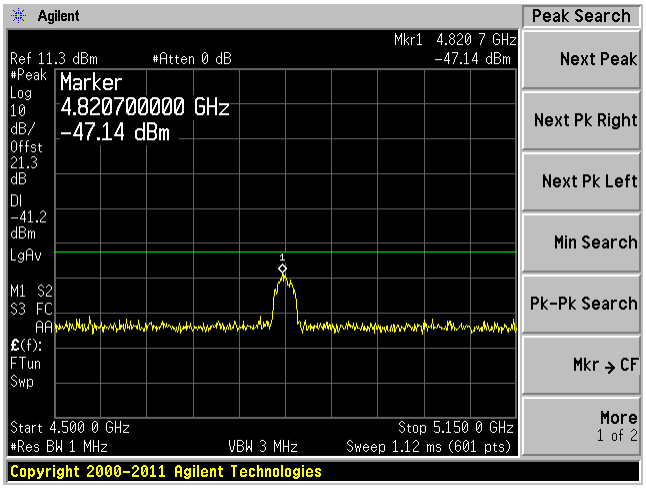
Chain J1, Plot: 2310 MHz – 2390 MHz



Chain J1, Plot: 2483.5 MHz – 2500 MHz

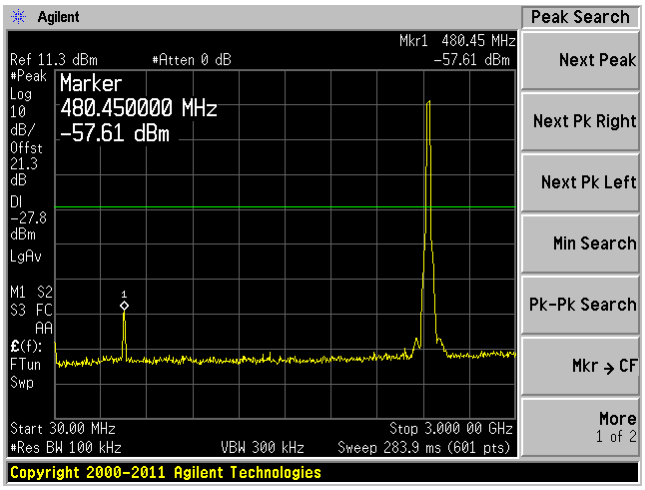


Chain J1, Plot: 4500 MHz – 5150 MHz

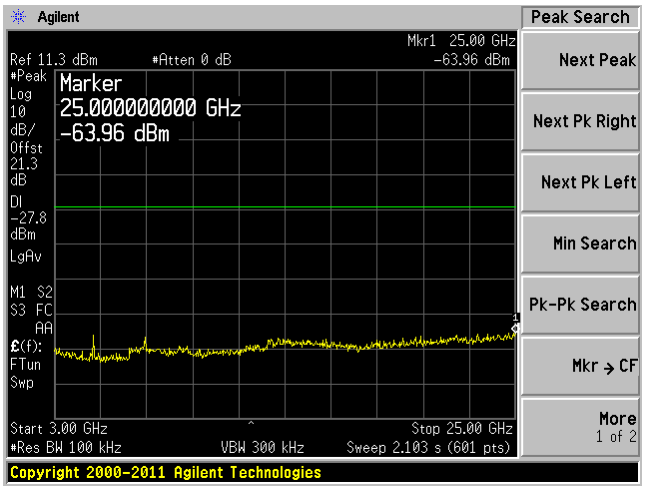


802.11n-HT20, Middle Channel 2437 MHz

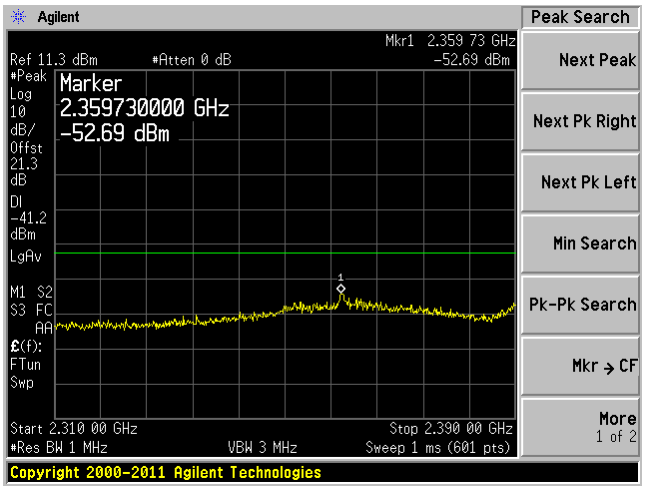
Chain J0, Plot: 30 MHz – 3 GHz



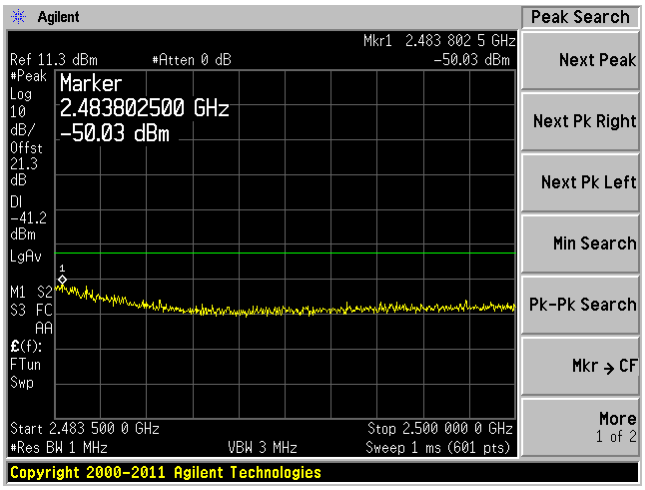
Chain J0, Plot: 3 GHz – 25 GHz



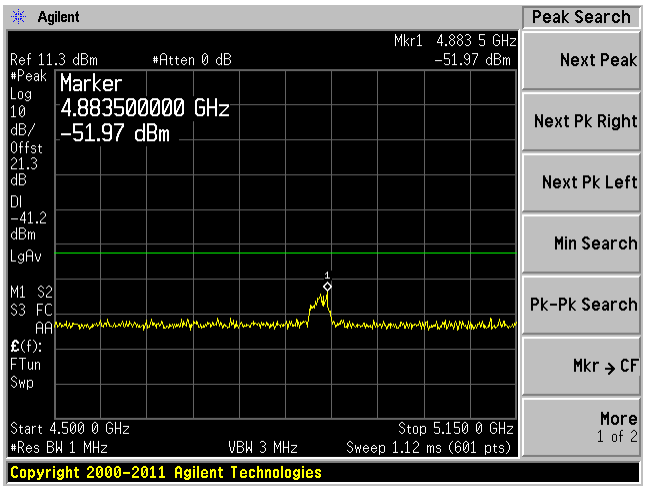
Chain J0, Plot: 2310 MHz – 2390 MHz



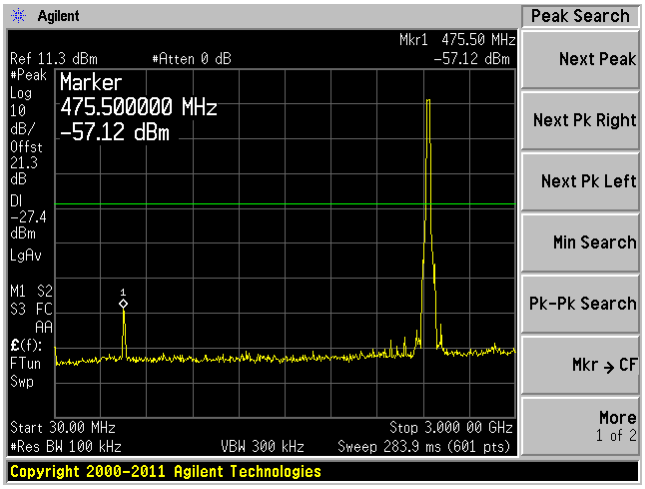
Chain J0, Plot: 2483.5 MHz – 2500 MHz



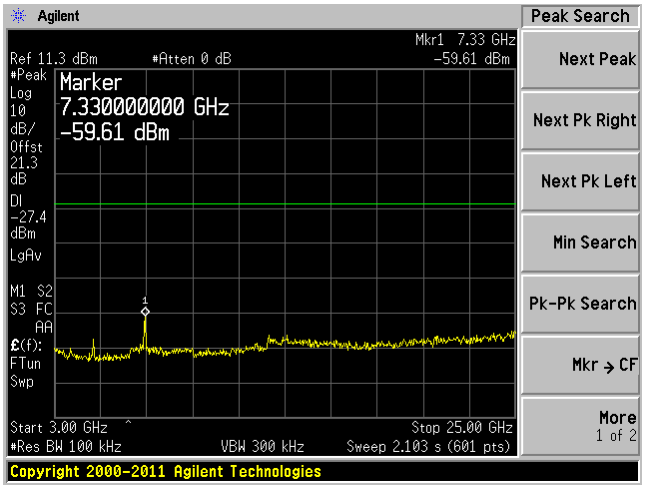
Chain J0, Plot: 4500 MHz – 5150 MHz



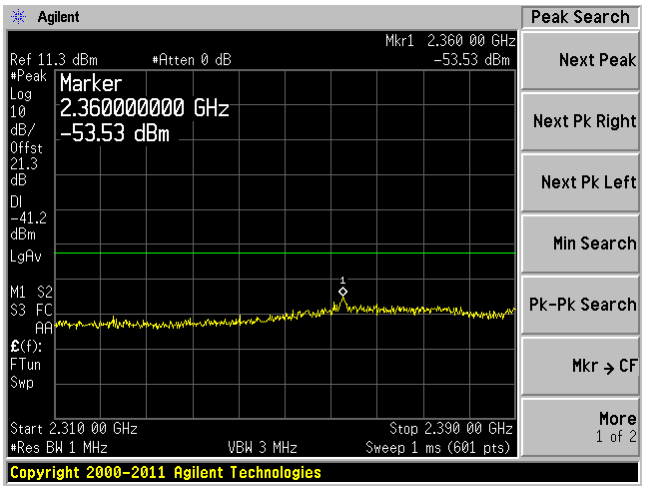
Chain J1, Plot: 30 MHz – 3 GHz



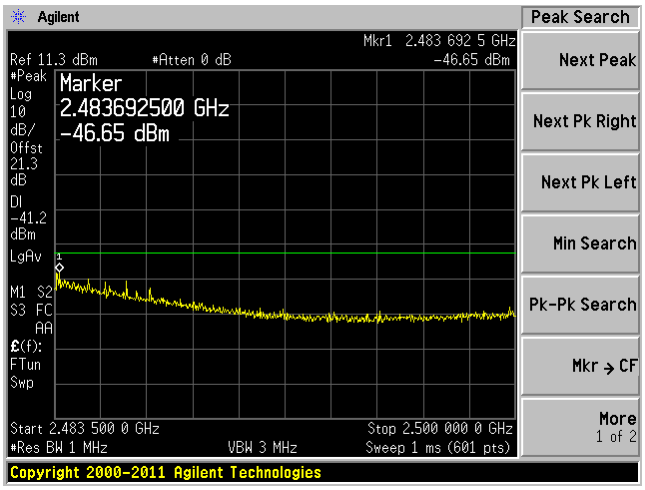
Chain J1, Plot: 3 GHz – 25 GHz



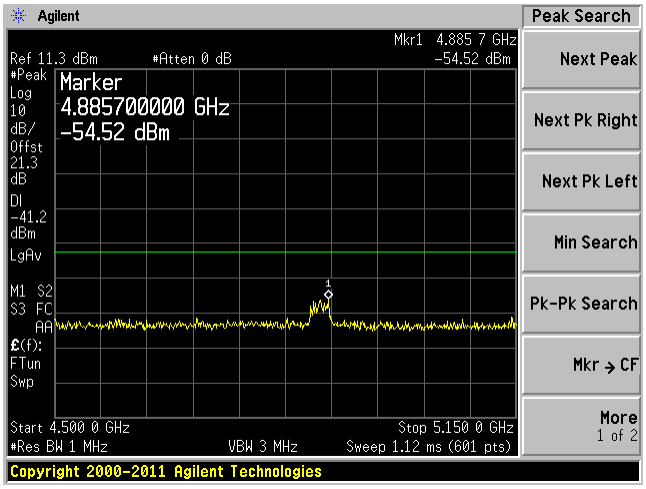
Chain J1, Plot: 2310 MHz – 2390 MHz



Chain J1, Plot: 2483.5 MHz – 2500 MHz

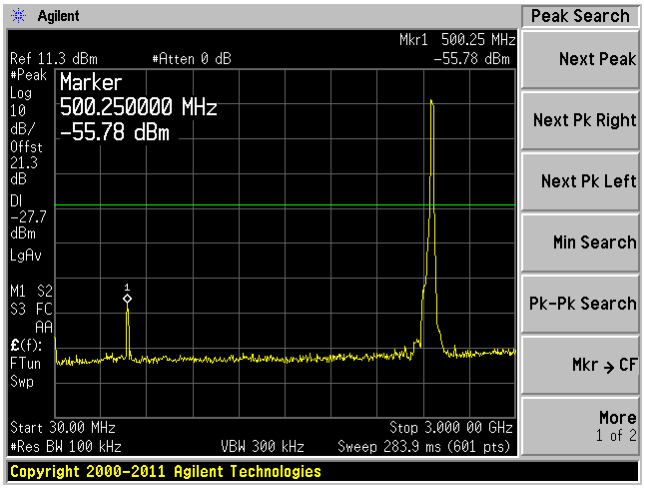


Chain J1, Plot: 4500 MHz – 5150 MHz

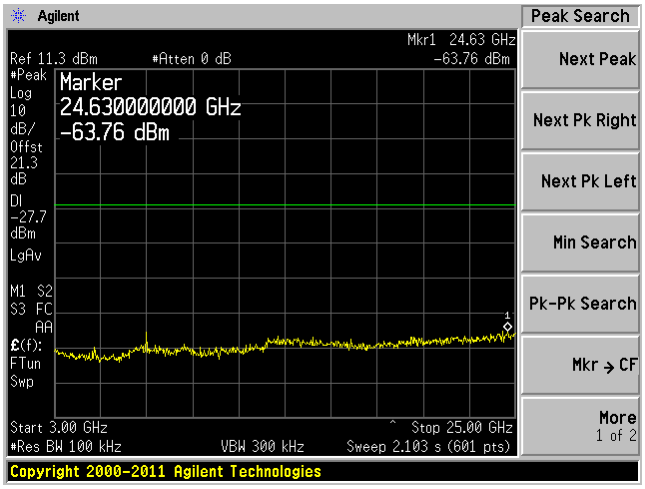


802.11n-HT20, High Channel 2462 MHz

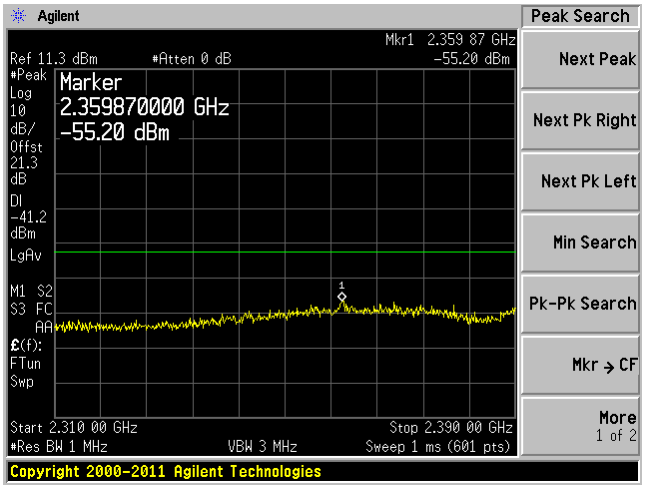
Chain J0, Plot: 30 MHz – 3 GHz



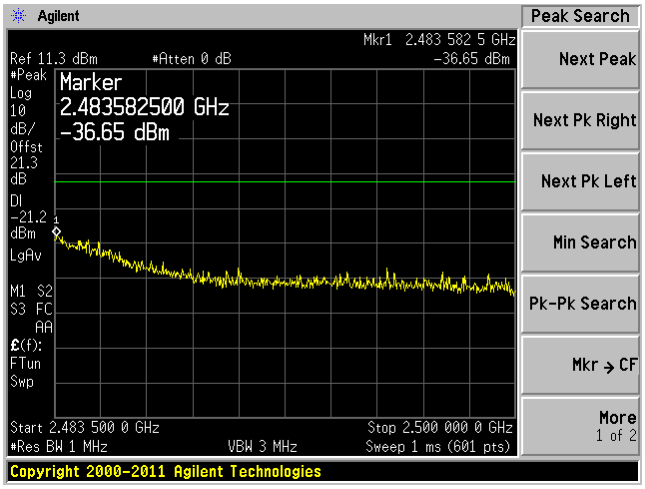
Chain J0, Plot: 3 GHz – 25 GHz



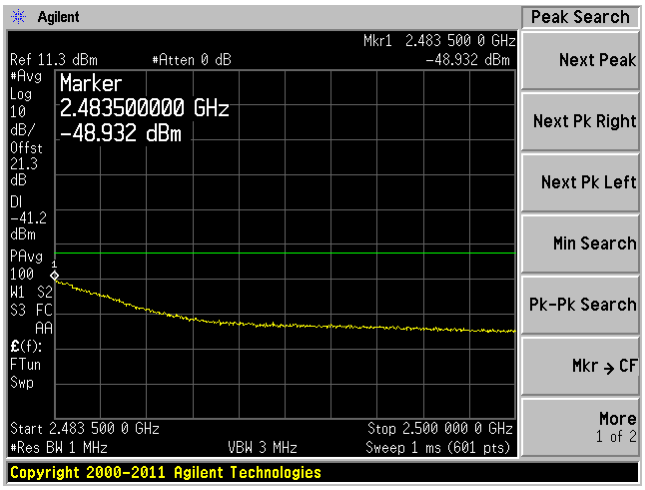
Chain J0, Plot: 2310 MHz – 2390 MHz



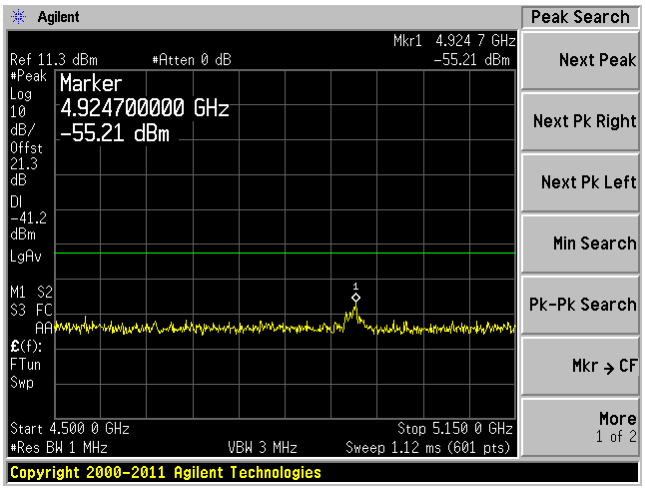
Chain J0, Plot: 2483.5 MHz – 2500 MHz Peak



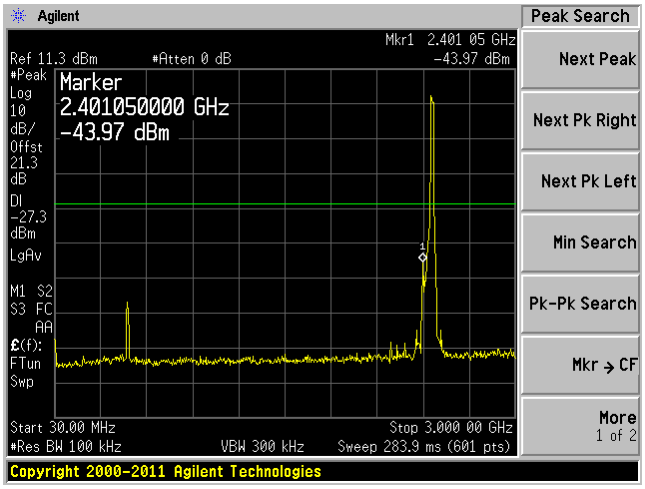
Chain J0, Plot: 2483.5MHz – 2500 MHz Ave



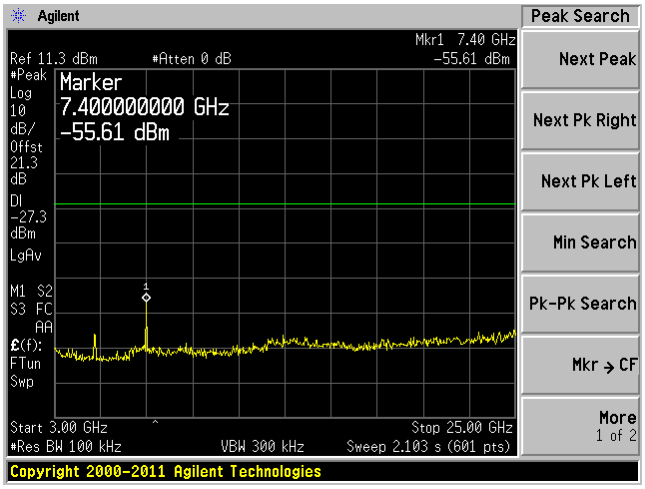
Chain J0, Plot: 4500 MHz – 5150 MHz



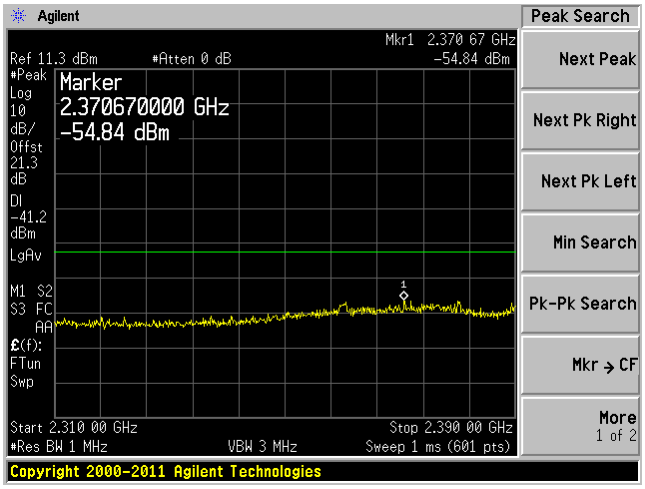
Chain J1, Plot: 30 MHz – 3 GHz



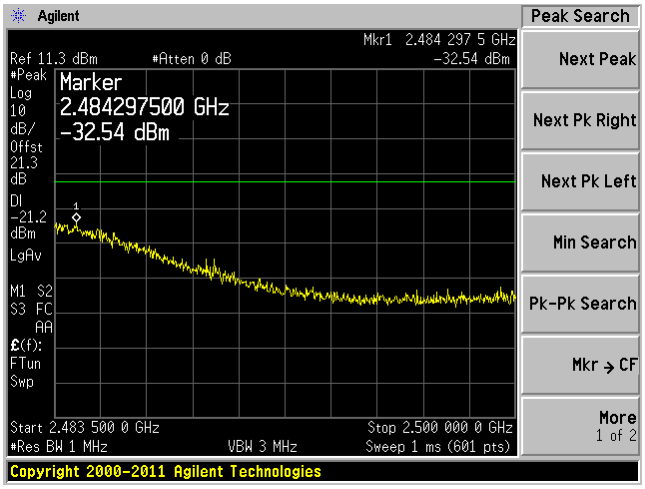
Chain J1, Plot: 3 GHz – 25 GHz



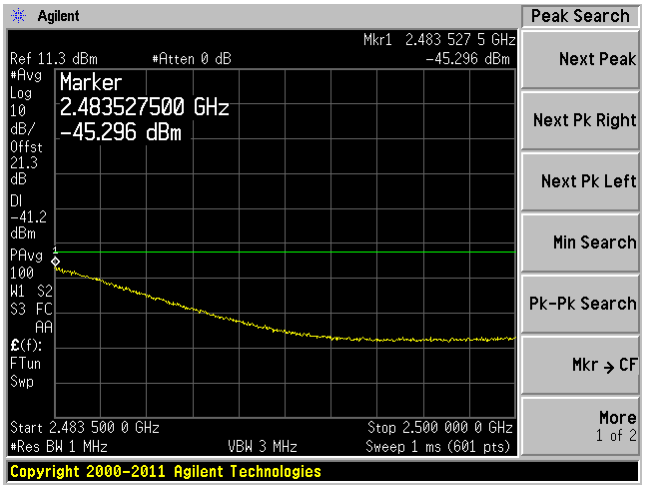
Chain J1, Plot: 2310 MHz – 2390 MHz



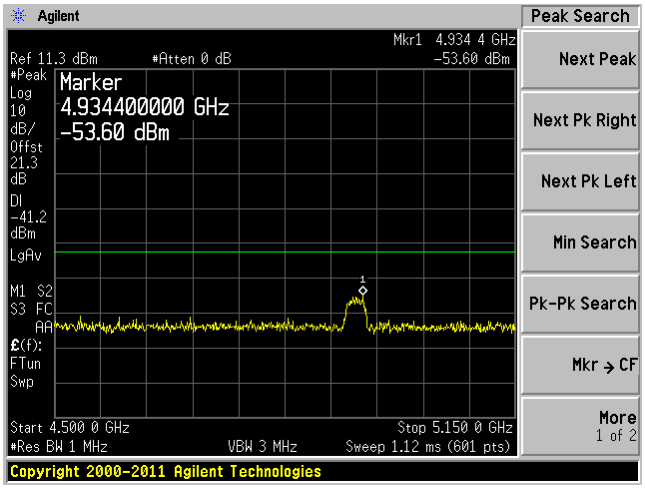
Chain J1, Plot: 2483.5MHz – 2500 MHz Peak



Chain J1, Plot: 2483.5MHz – 2500 MHz Ave

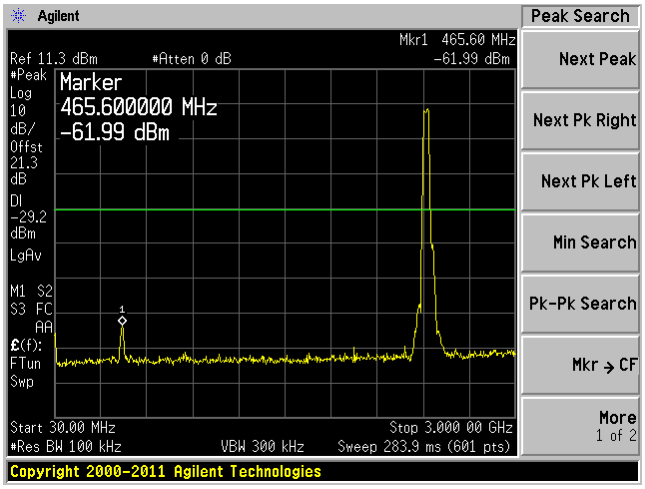


Chain J1, Plot: 4500MHz – 5150 MHz

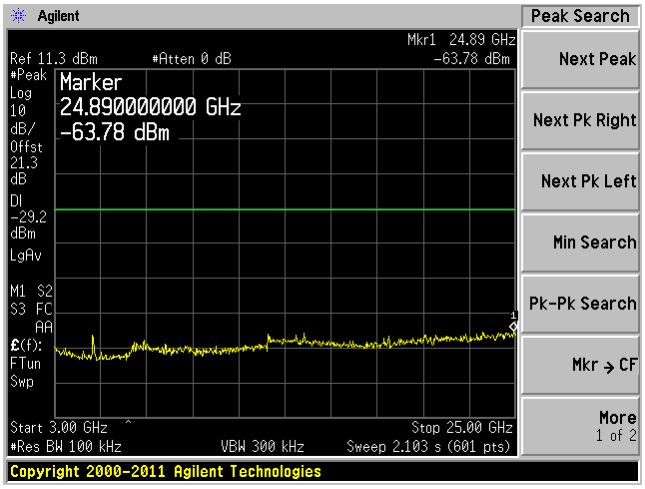


802.11n -T40, Low Channel 2422 MHz

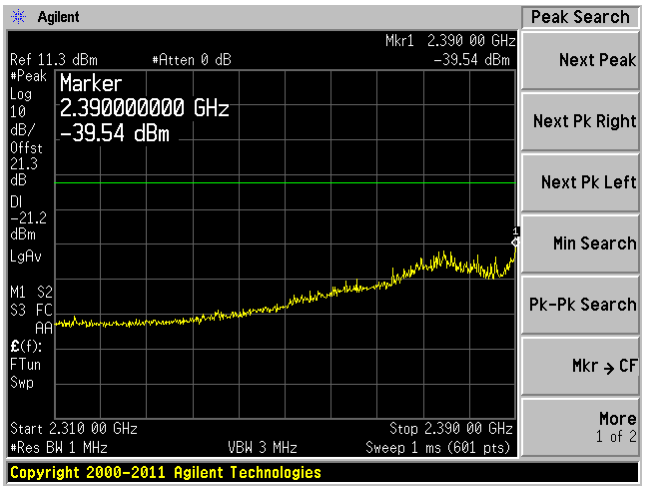
Chain J0, Plot: 30 MHz – 3 GHz



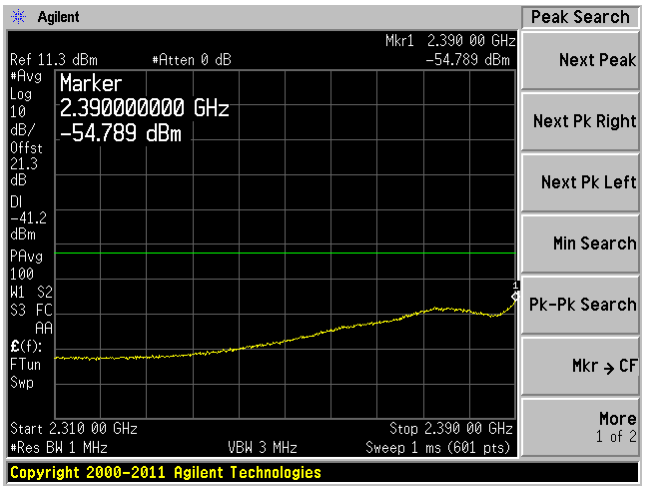
Chain J0, Plot: 3 GHz – 25 GHz



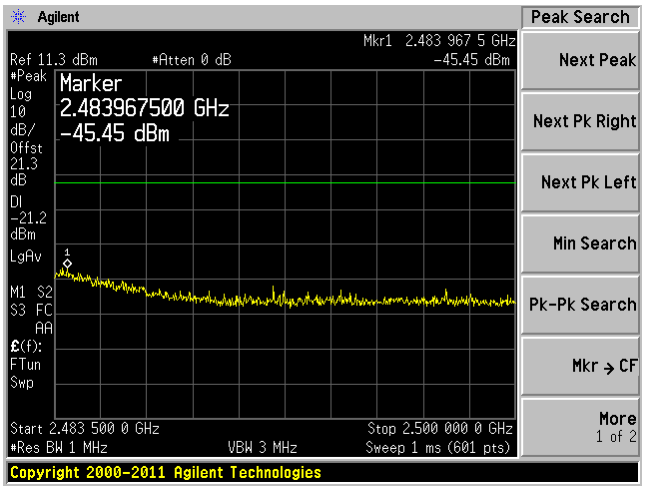
Chain J0, Plot: 2310 MHz – 2390 MHz Peak



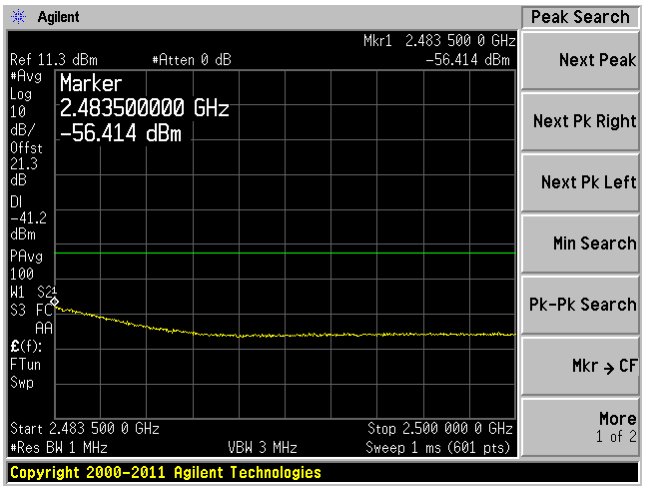
Chain J0, Plot: 2310 MHz – 2390 MHz Ave



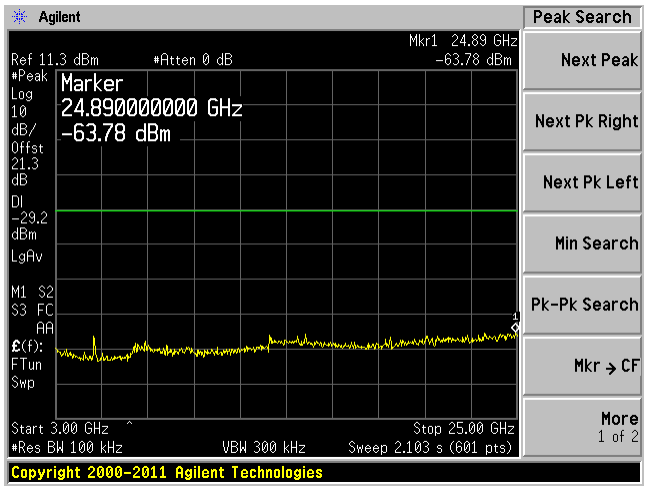
Chain J0, Plot: 2483.5 MHz – 2500 MHz Peak



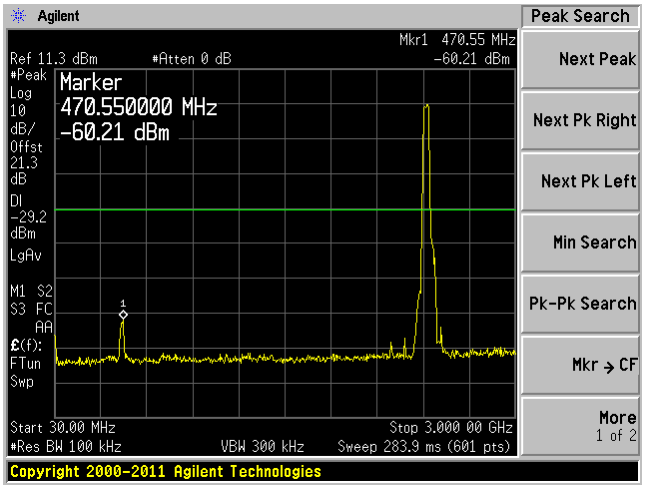
Chain J0, Plot: 2483.5 MHz – 2500 MHz Ave



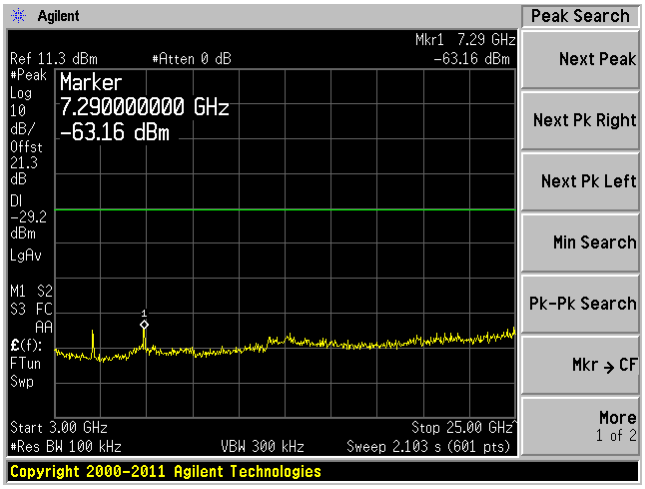
Chain J0, Plot: 4500 MHz – 5150 MHz



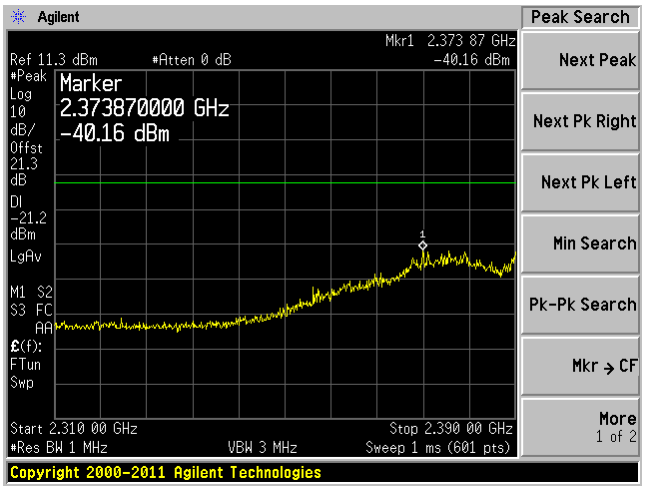
Chain J1, Plot: 30 MHz – 3 GHz



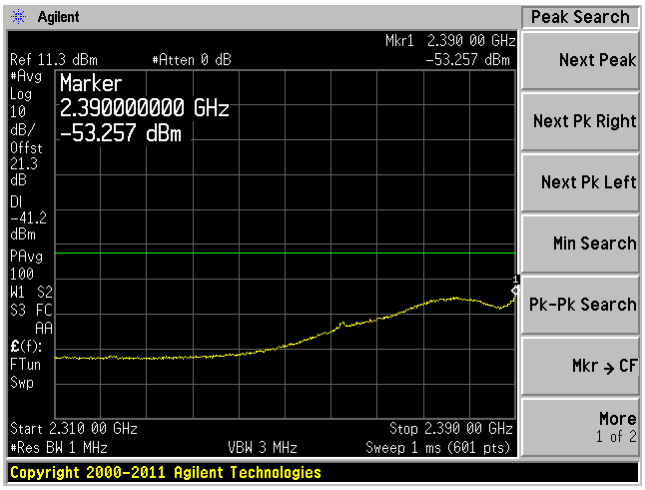
Chain J1, Plot: 3 GHz – 25 GHz



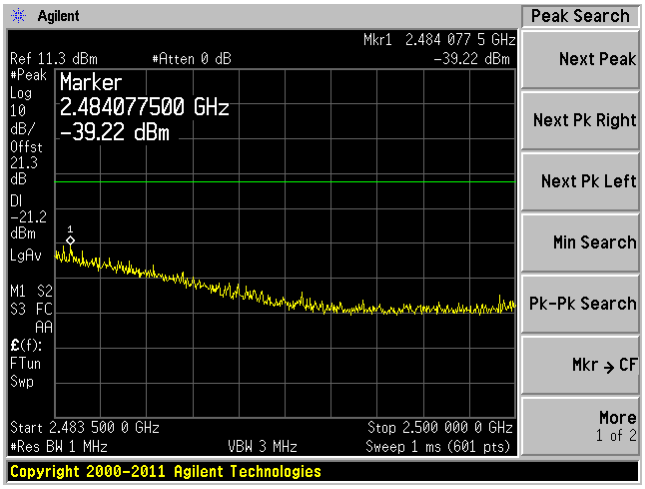
Chain J1, Plot: 2310 MHz – 2390 MHz Peak



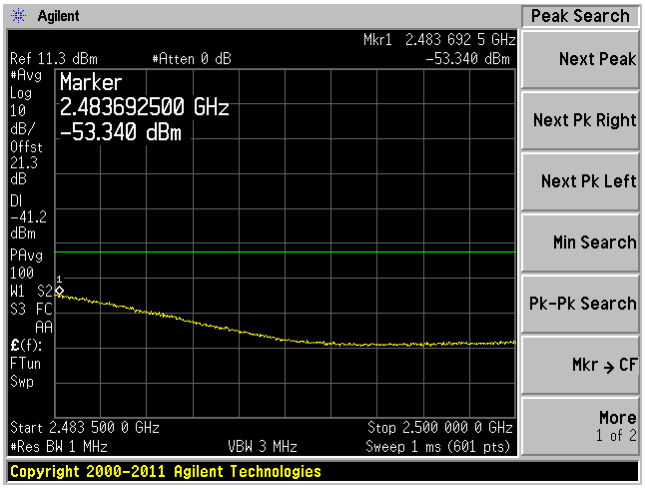
Chain J1, Plot: 2310 MHz – 2390 MHz Ave



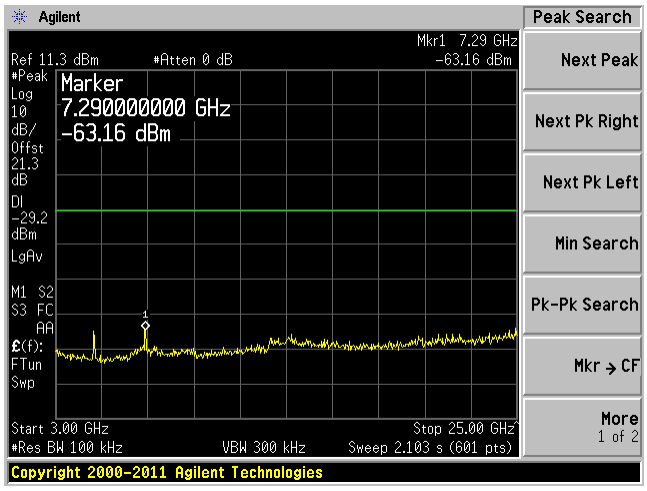
Chain J1, Plot: 2483.5 MHz – 2500 MHz Peak



Chain J1, Plot: 2483.5 MHz – 2500 MHz Ave

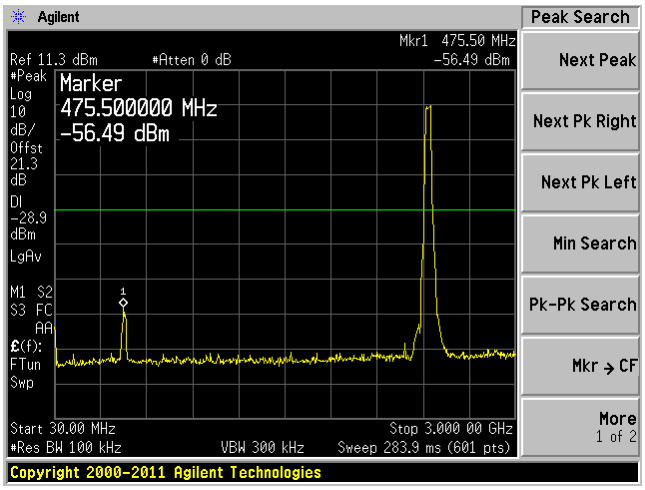


Chain J1, Plot: 4500 MHz – 5150 MHz

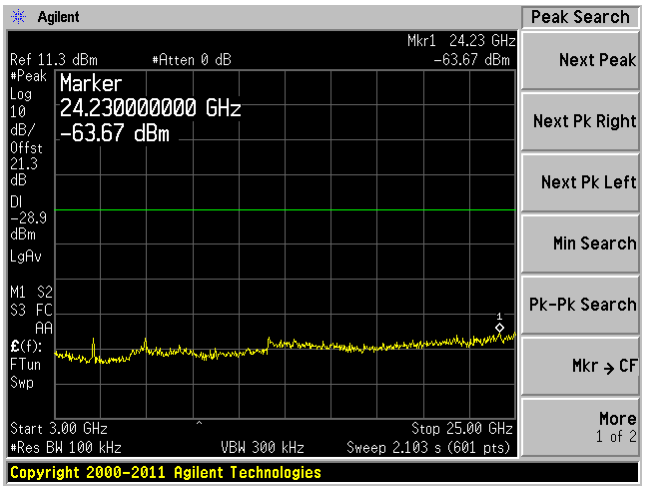


802.11n-HT40, Middle Channel 2437 MHz

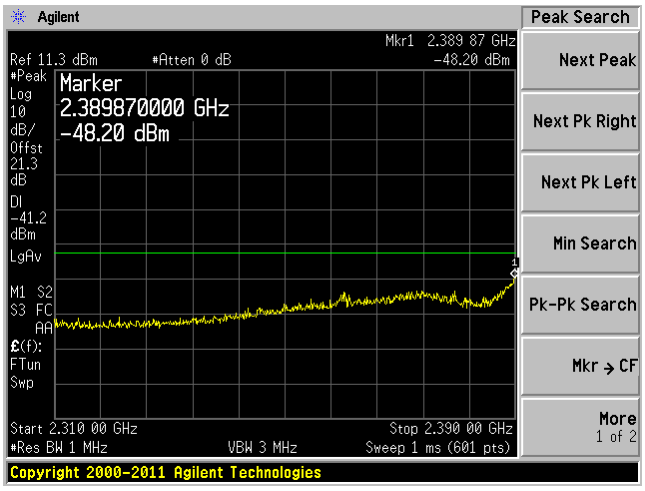
Chain J0, Plot: 30 MHz – 3 GHz



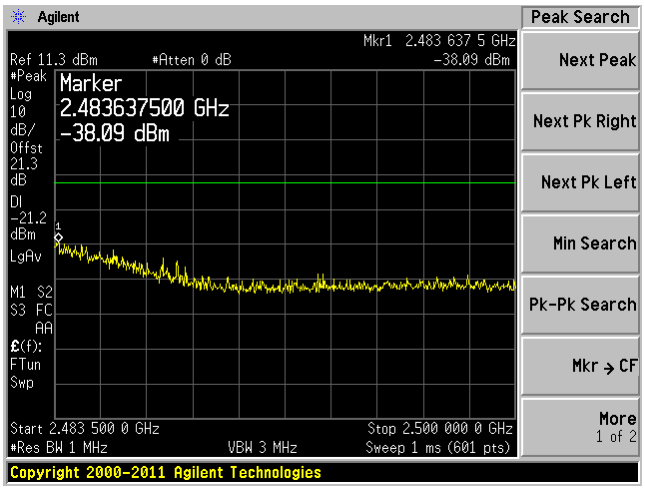
Chain J0, Plot: 3 GHz – 25 GHz



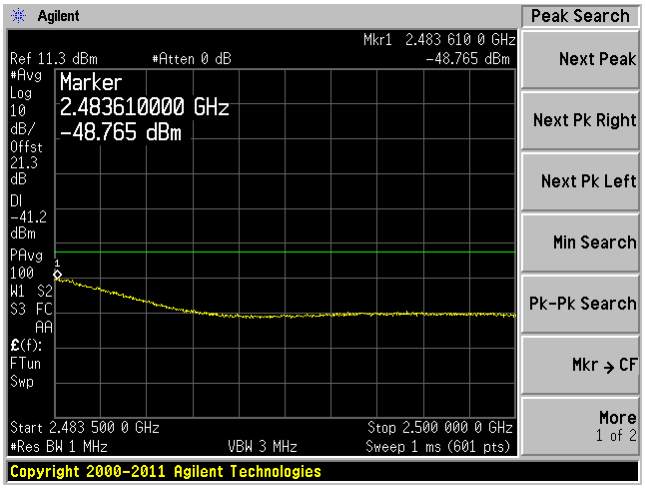
Chain J0, Plot: 2310 MHz – 2390 MHz



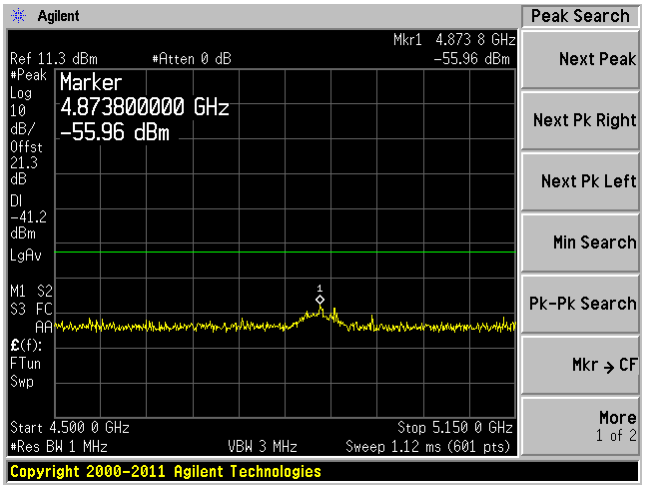
Chain J0, Plot: 2483.5 MHz – 2500 MHz Peak



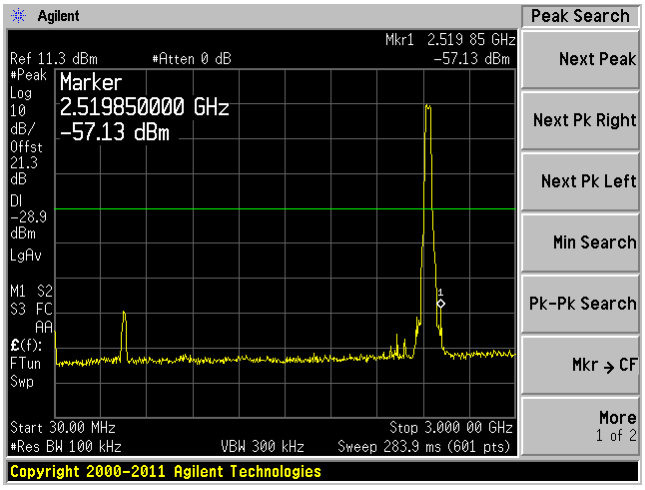
Chain J0, Plot: 2483.5 MHz – 2500 MHz Ave



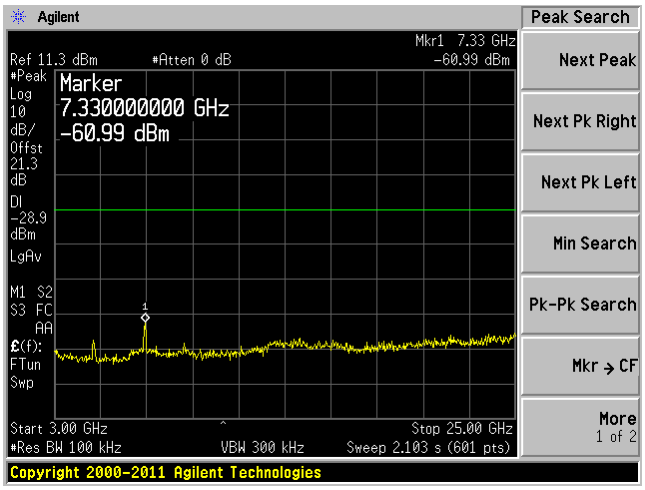
Chain J0, Plot: 4500 MHz – 5150 MHz



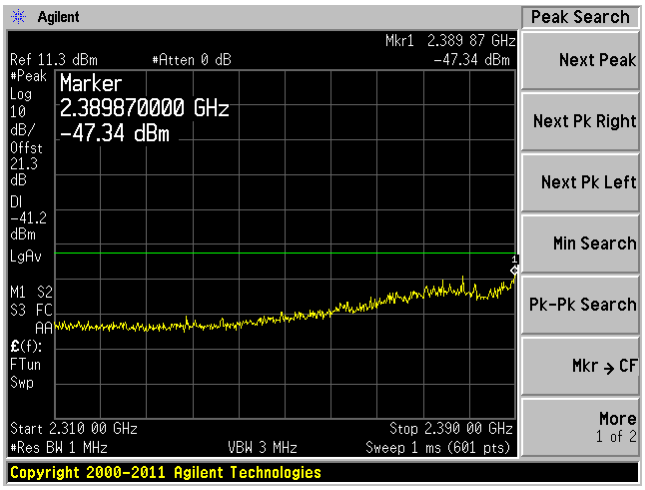
Chain J1, Plot: 30 MHz – 3 GHz



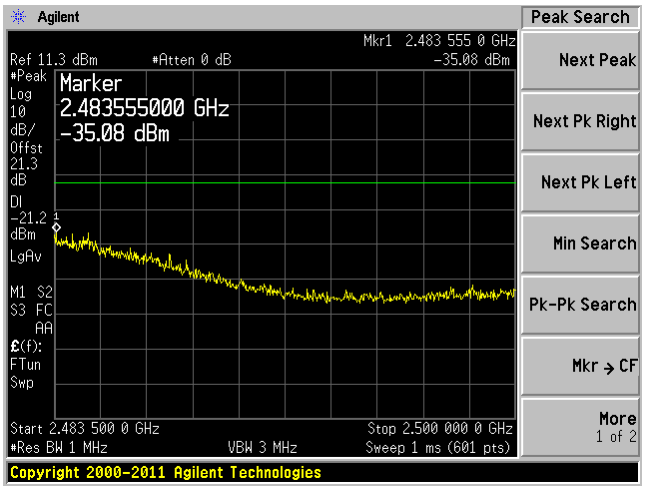
Chain J1, Plot: 3 GHz – 25 GHz



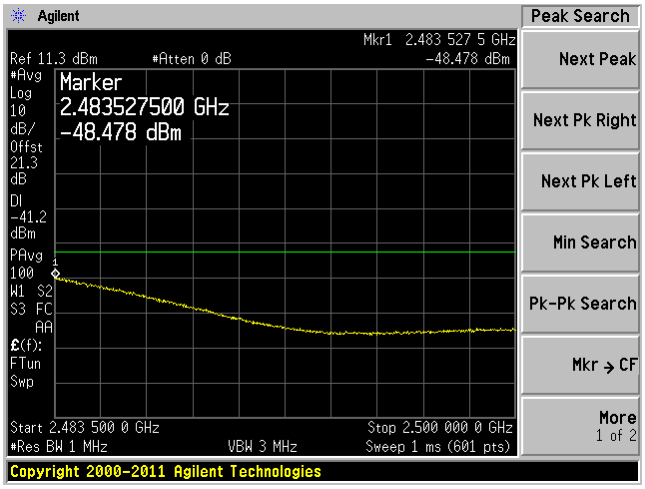
Chain J1, Plot: 2310 MHz – 2390 MHz



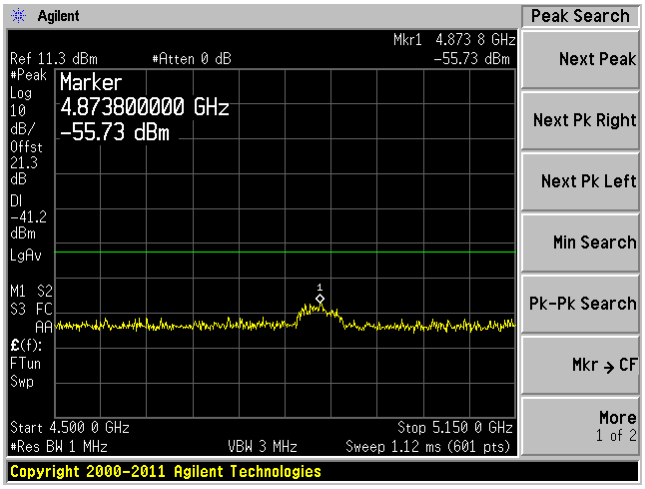
Chain J1, Plot: 2483.5 MHz – 2500 MHz Peak



Chain J1, Plot: 2483.5 MHz – 2500 MHz Ave

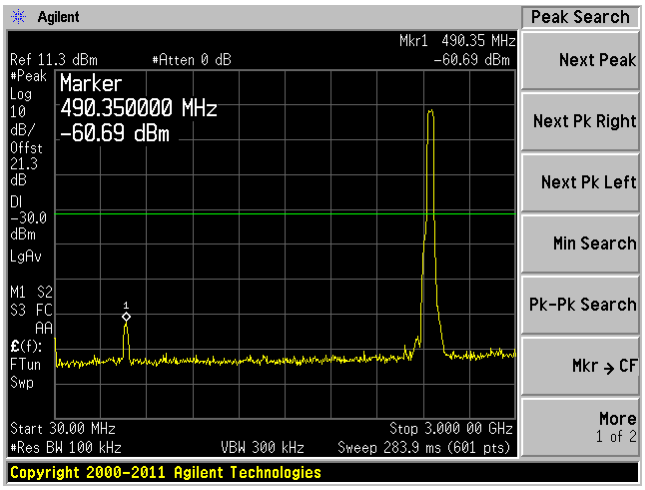


Chain J1, Plot: 4500 MHz – 5150 MHz

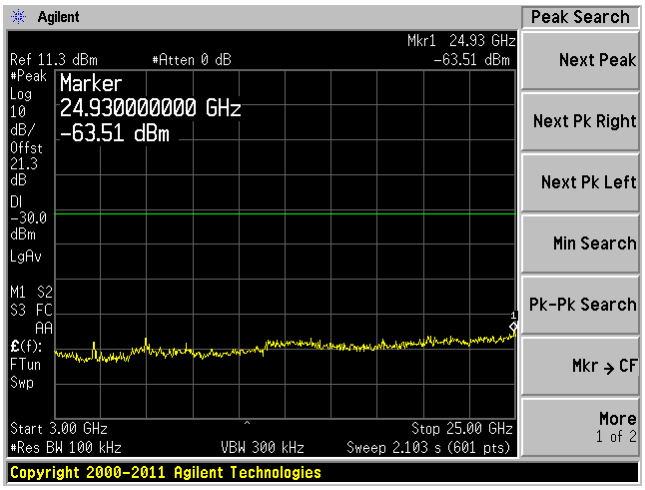


802.11n-HT40, High Channel 2452 MHz

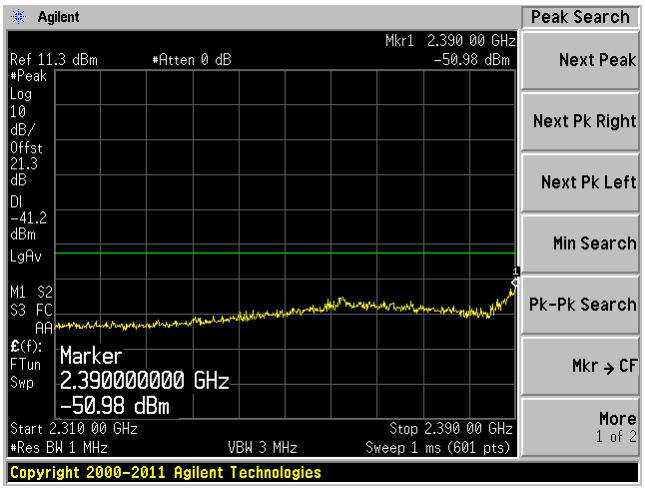
Chain J0, Plot: 30 MHz – 3 GHz



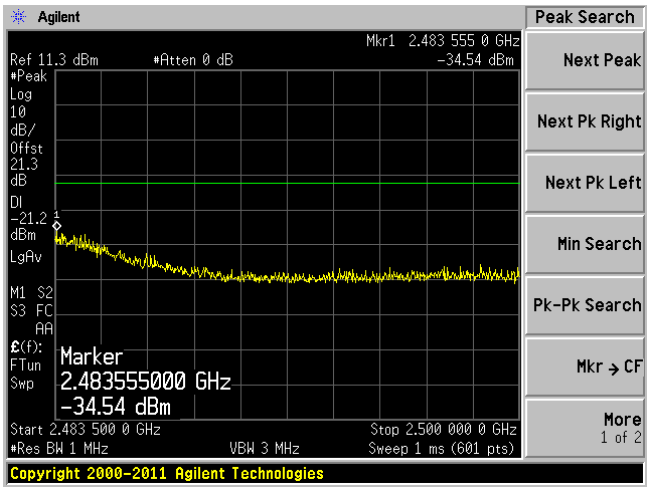
Chain J0, Plot: 3 GHz – 25 GHz



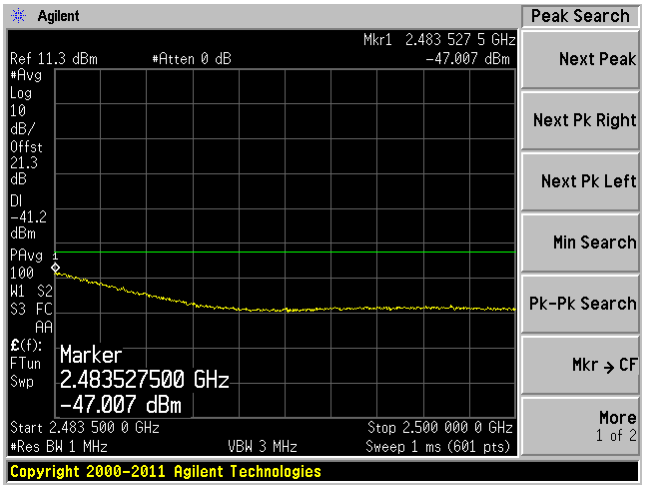
Chain J0, Plot: 2310 MHz – 2390 MHz



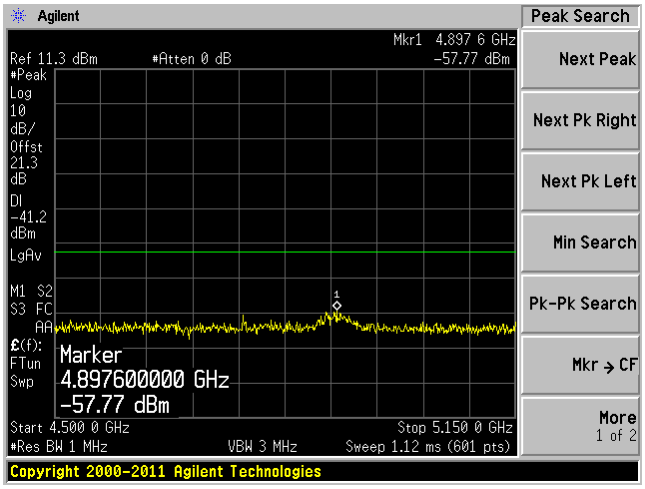
Chain J0, Plot: 2483.5 MHz – 2500 MHz Peak



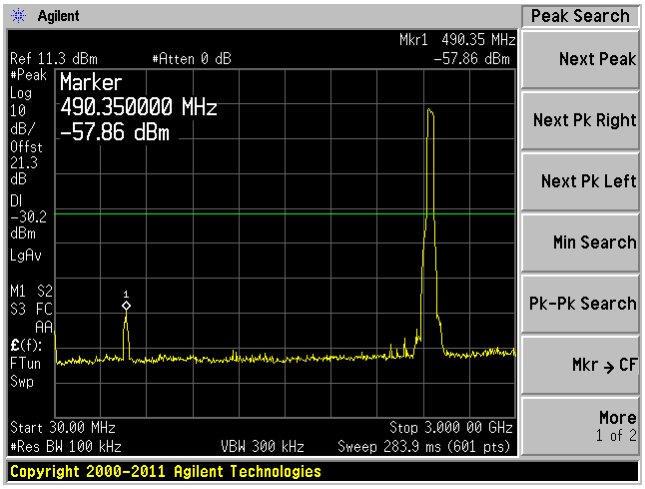
Chain J0, Plot: 2483.5MHz – 2500 MHz Ave



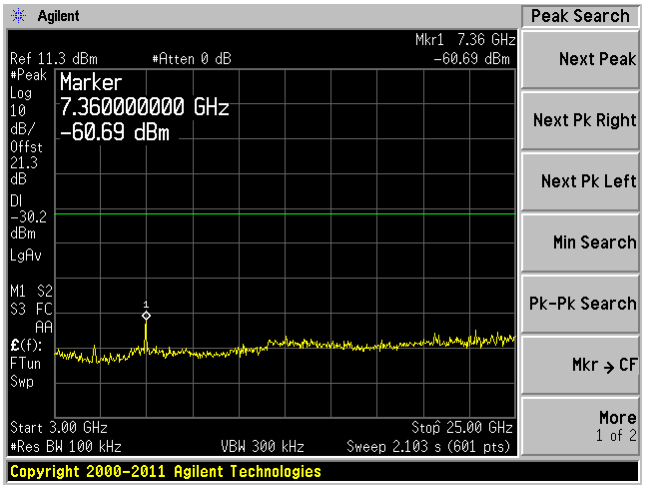
Chain J0, Plot: 4500 MHz – 5150 MHz



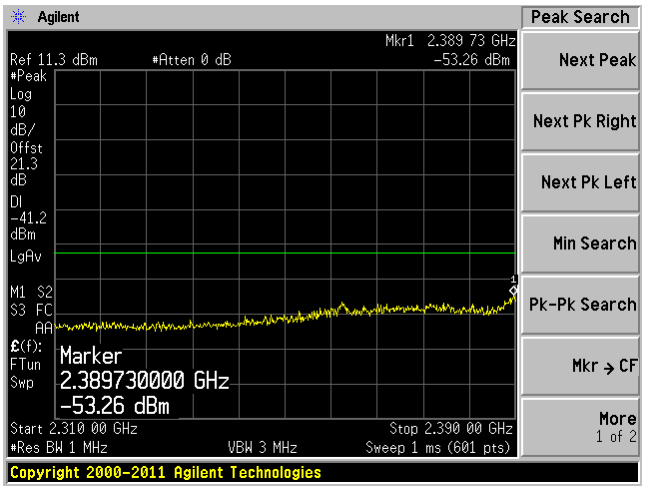
Chain J1, Plot: 30 MHz – 3 GHz



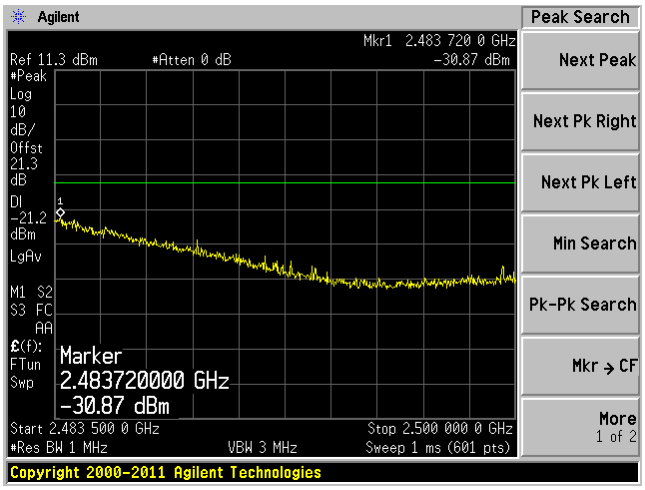
Chain J1, Plot: 3 GHz – 25 GHz



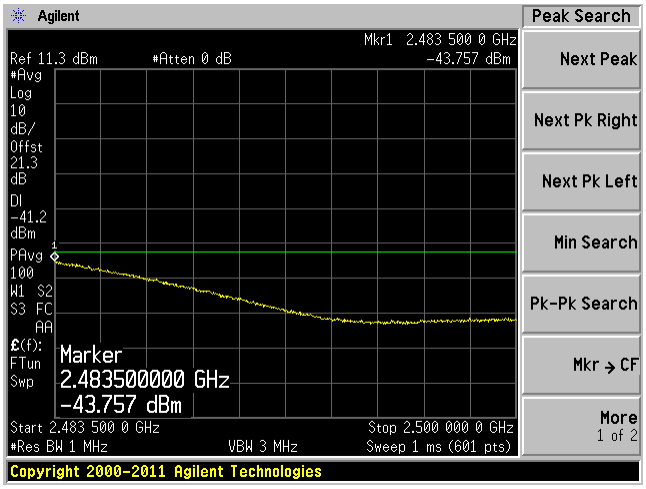
Chain J1, Plot: 2310 MHz – 2390 MHz



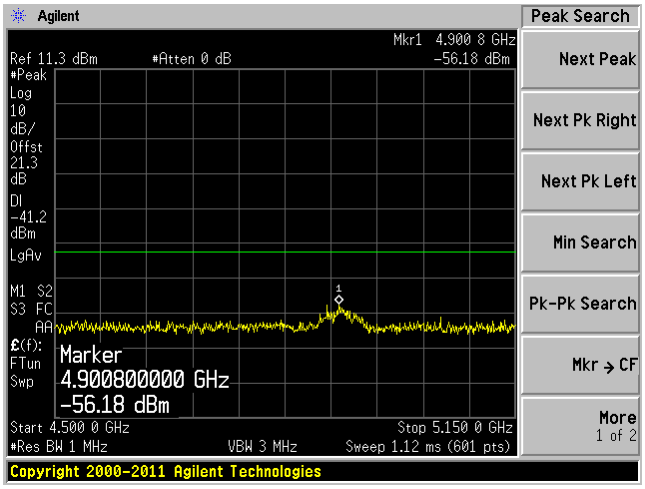
Chain J1, Plot: 2483.5 MHz – 2500 MHz Peak



Chain J1, Plot: 2483.5MHz – 2500 MHz Ave



Chain J1, Plot: 4500 MHz – 5150 MHz



8 FCC §15.205, §15.209 & §15.247(d) & IC RSS-210 §A8.5 – Spurious Radiated Emissions

8.1 Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As per FCC §15.209(a) and RSS-210: Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	960 – 1240	4. 5 – 5. 15
0.495 – 0.505	16.69475 – 16.69525	1300 – 1427	5. 35 – 5. 46
2.1735 – 2.1905	25.5 – 25.67	1435 – 1626.5	7.25 – 7.75
4.125 – 4.128	37.5 – 38.25	1645.5 – 1646.5	8.025 – 8.5
4.17725 – 4.17775	73 – 74.6	1660 – 1710	9.0 – 9.2
4.20725 – 4.20775	74.8 – 75.2	1718.8 – 1722.2	9.3 – 9.5
6.215 – 6.218	108 – 121.94	2200 – 2300	10.6 – 12.7
6.26775 – 6.26825	123 – 138	2310 – 2390	13.25 – 13.4
6.31175 – 6.31225	149.9 – 150.05	2483.5 – 2500	14.47 – 14.5
8.291 – 8.294	156.52475 – 156.52525	2690 – 2900	15.35 – 16.2
8.362 – 8.366	156.7 – 156.9	3260 – 3267	17.7 – 21.4
8.37625 – 8.38675	162.0125 –167.17	3.332 – 3.339	22.01 – 23.12
8.41425 – 8.41475	167.72 – 173.2	3 3458 – 3 358	23.6 – 24.0
12.29 – 12.293	240 – 285	3.600 – 4.400	31.2 – 31.8
12.51975 – 12.52025	322 – 335.4		36.43 – 36.5
12.57675 – 12.57725	399.9 – 410		Above 38.6
13.36 – 13.41	608 – 614		

As per FCC §15.247 (d) 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 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 paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

As per IC RSS-210 A8.5 Out-of-band Emissions, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square 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 field strength limits specified in RSS-Gen is not required.

8.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.4-2009. The specification used was the FCC 15 Subpart C and IC RSS-210 limits.

The spacing between the peripherals was 3 centimeters.

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

8.3 Test 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 11: Emissions in non-restricted frequency bands and section 12: Emissions in restricted frequency bands. As well as ANSI C63.4: 2009 as described below:

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

8.4 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

8.5 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	A020106-2	2012-08-15	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	PSA Series Spectrum Analyzer	E4440A	MY44303352	2012-10-16	1 year
EMCO	Horn Antenna	3115	9511-4627	2012-10-17	1 year
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100044	2012-04-18	1 year

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

8.6 Test Environmental Conditions

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

The testing was performed by Wei Sun on 2013-04-11 at 5 meter 2.

8.7 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Part 15.205, 15.209 and 15.247 & IC RSS-210, RSS-Gen standard's radiated emissions limits, and had the worst margin (only based on the verification data only) of:

30-1000 MHz:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, Channel**
-4.46	250	Vertical	802.11g mode Low channel

1– 25 GHz:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, Channel**
-1.1	4824	Vertical	802.11b mode Low Channel

Please refer to the following table and plots for specific test result details

8.8 Radiated Emissions Test Data and Plots

1) Radiated Emission at 3 meters, 30 MHz–25 GHz

802.11b 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, 2412 MHz, measured at 3 meters											
2412	67.5	129	100	H	28.71	2.94	0	99.15	-	-	Fund/Peak
2412	79.28	53	134	V	28.71	2.94	0	110.93	-	-	Fund/Peak
2412	62.84	129	100	H	28.71	2.94	0	94.49	-	-	Fund/Ave
2412	75.28	53	134	V	28.71	2.94	0	106.93	-	-	Fund/Ave
2390	24	0	100	H	28.71	2.76	0	55.47	74	-18.53	Spur/Peak
2390	24	0	100	V	28.71	2.76	0	55.47	74	-18.53	Spur/Peak
2390	12	0	100	H	28.71	2.76	0	43.47	54	-10.53	Spur/Ave
2390	12	0	100	V	28.71	2.76	0	43.47	54	-10.53	Spur/Ave
4824	41.74	135	138	H	32.58	4.06	27.7	50.68	74	-23.32	Harm/Peak
4824	45.63	234	100	V	32.58	4.06	27.7	54.57	74	-19.43	Harm/Peak
4824	38.75	135	138	H	32.58	4.06	27.7	47.69	54	-6.31	Harm/Ave
4824	43.96	234	100	V	32.58	4.06	27.7	52.9	54	-1.1	Harm/Ave
7236	30	0	100	H	36.46	4.93	27.58	43.81	79.15	-35.34	Harm/Peak
7236	30	0	100	V	36.46	4.93	27.58	43.81	90.93	-47.12	Harm/Peak
7236	20	0	100	H	36.46	4.93	27.58	33.81	74.49	-40.68	Harm/Ave
7236	20	0	100	V	36.46	4.93	27.58	33.81	96.93	-63.12	Harm/Ave
9648	30	0	100	H	37.25	5.82	27.02	46.05	79.15	-33.1	Harm/Peak
9648	30	0	100	V	37.25	5.82	27.02	46.05	90.93	-44.88	Harm/Peak
9648	20	0	100	H	37.25	5.82	27.02	36.05	74.49	-38.44	Harm/Ave
9648	20	0	100	V	37.25	5.82	27.02	36.05	96.93	-60.88	Harm/Ave
250	49.31	100	327	V	12.1	0.86	21.21	41.06	46	-4.94	Spur/QP

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)	
Middle Channel, 2437 MHz, measured at 3 meters											
2437	70.87	32	149	H	28.71	2.94	0	102.52	-	-	Fund/Peak
2437	82.03	320	114	V	28.71	2.94	0	113.68	-	-	Fund/Peak
2437	67.2	32	149	H	28.71	2.94	0	98.85	-	-	Fund/Ave
2437	78.27	320	114	V	28.71	2.94	0	109.92	-	-	Fund/Ave
4874	38.43	325	100	H	32.75	4.1	27.76	47.52	74	-26.48	Harm/Peak
4874	44.11	0	100	V	32.75	4.1	27.76	53.2	74	-20.8	Harm/Peak
4874	31.14	325	100	H	32.75	4.1	27.76	40.23	54	-13.77	Harm/Ave
4874	41.6	0	100	V	32.75	4.1	27.76	50.69	54	-3.31	Harm/Ave
7311	30	0	100	H	36.61	4.88	27.51	43.98	74	-30.02	Harm/Peak
7311	30	0	100	V	36.61	4.88	27.51	43.98	74	-30.02	Harm/Peak
7311	20	0	100	H	36.61	4.88	27.51	33.98	54	-20.02	Harm/Ave
7311	20	0	100	V	36.61	4.88	27.51	33.98	54	-20.02	Harm/Ave
9748	30	0	100	H	37.18	5.74	26.98	45.94	82.52	-36.58	Harm/Peak
9748	30	0	100	V	37.18	5.74	26.98	45.94	93.68	-47.74	Harm/Peak
9748	20	0	100	H	37.18	5.74	26.98	35.94	78.85	-42.91	Harm/Ave
9748	20	0	100	V	37.18	5.74	26.98	35.94	89.92	-53.98	Harm/Ave
250	49.41	100	327	V	12.1	0.86	21.21	41.16	46	-4.84	Spur/QP
High Channel, 2462 MHz, measured at 3 meters											
2462	65.17	167	100	H	28.94	3.01	0	97.12	-	-	Fund/Peak
2462	78.83	133	100	V	28.94	3.01	0	110.78	-	-	Fund/Peak
2462	60.91	167	100	H	28.94	3.01	0	92.86	-	-	Fund/Ave
2462	73.12	133	100	V	28.94	3.01	0	105.07	-	-	Fund/Ave
2483.5	24	0	100	H	28.94	3.01	0	55.95	74	-18.05	Spur/Peak
2483.5	24	0	100	V	28.94	3.01	0	55.95	74	-18.05	Spur/Peak
2483.5	12	0	100	H	28.94	3.01	0	43.95	54	-10.05	Spur/Ave
2483.5	12	0	100	V	28.94	3.01	0	43.95	54	-10.05	Spur/Ave
4924	36.71	307	100	H	32.75	4.1	27.75	45.81	74	-28.19	Harm/Peak
4924	42.01	42	100	V	32.75	4.1	27.75	51.11	74	-22.89	Harm/Peak
4924	28.79	307	100	H	32.75	4.1	27.75	37.89	54	-16.11	Harm/Ave
4924	38.73	42	100	V	32.75	4.1	27.75	47.83	54	-6.17	Harm/Ave
7386	30	0	100	H	36.51	4.89	27.51	43.89	74	-30.11	Harm/Peak
7386	30	0	100	V	36.51	4.89	27.51	43.89	74	-30.11	Harm/Peak
7386	20	0	100	H	36.51	4.89	27.51	33.89	54	-20.11	Harm/Ave
7386	20	0	100	V	36.51	4.89	27.51	33.89	54	-20.11	Harm/Ave
9848	30	0	100	H	37.3	5.77	26.98	46.09	77.12	-31.03	Harm/Peak
9848	30	0	100	V	37.3	5.77	26.98	46.09	90.78	-44.69	Harm/Peak
9848	20	0	100	H	37.3	5.77	26.98	36.09	72.86	-36.77	Harm/Ave
9848	20	0	100	V	37.3	5.77	26.98	36.09	85.07	-48.98	Harm/Ave
250	49.42	100	327	V	12.1	0.86	21.21	41.17	46	-4.83	Spur/QP

802.11g 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, 2412 MHz, measured at 3 meters											
2412	70.25	132	152	H	28.71	2.94	0	101.9	-	-	Fund/Peak
2412	81.15	258	129	V	28.71	2.94	0	112.8	-	-	Fund/Peak
2412	59.08	132	152	H	28.71	2.94	0	90.73	-	-	Fund/Ave
2412	69.68	258	129	V	28.71	2.94	0	101.33	-	-	Fund/Ave
2390	24	0	100	H	28.71	2.76	0	55.47	74	-18.53	Spur/Peak
2390	24	0	100	V	28.71	2.76	0	55.47	74	-18.53	Spur/Peak
2390	12	0	100	H	28.71	2.76	0	43.47	54	-10.53	Spur/Ave
2390	12	0	100	V	28.71	2.76	0	43.47	54	-10.53	Spur/Ave
4824	30	0	100	H	32.58	4.06	27.7	38.94	74	-35.06	Harm/Peak
4824	30	0	100	V	32.58	4.06	27.7	38.94	74	-35.06	Harm/Peak
4824	20	0	100	H	32.58	4.06	27.7	28.94	54	-25.06	Harm/Ave
4824	20	0	100	V	32.58	4.06	27.7	28.94	54	-25.06	Harm/Ave
7236	30	0	100	H	36.46	4.93	27.58	43.81	81.9	-38.09	Harm/Peak
7236	30	0	100	V	36.46	4.93	27.58	43.81	92.8	-48.99	Harm/Peak
7236	20	0	100	H	36.46	4.93	27.58	33.81	70.73	-36.92	Harm/Ave
7236	20	0	100	V	36.46	4.93	27.58	33.81	81.33	-47.52	Harm/Ave
9648	30	0	100	H	37.25	5.82	27.02	46.05	81.9	-35.85	Harm/Peak
9648	30	0	100	V	37.25	5.82	27.02	46.05	92.8	-46.75	Harm/Peak
9648	20	0	100	H	37.25	5.82	27.02	36.05	70.73	-34.68	Harm/Ave
9648	20	0	100	V	37.25	5.82	27.02	36.05	81.33	-45.28	Harm/Ave
250	49.79	100	327	V	12.1	0.86	21.21	41.54	46	-4.46	Spur/QP

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)	
Middle Channel, 2437 MHz, measured at 3 meters											
2437	70.36	109	120	H	28.71	2.94	0	102.01	-	-	Fund/Peak
2437	80.25	64	127	V	28.71	2.94	0	111.9	-	-	Fund/Peak
2437	58.3	109	120	H	28.71	2.94	0	89.95	-	-	Fund/Ave
2437	68.39	64	127	V	28.71	2.94	0	100.04	-	-	Fund/Ave
4874	30	0	100	H	32.75	4.1	27.76	39.09	74	-34.91	Harm/Peak
4874	30	0	100	V	32.75	4.1	27.76	39.09	74	-34.91	Harm/Peak
4874	20	0	100	H	32.75	4.1	27.76	29.09	54	-24.91	Harm/Ave
4874	20	0	100	V	32.75	4.1	27.76	29.09	54	-24.91	Harm/Ave
7311	30	0	100	H	36.61	4.88	27.51	43.98	74	-30.02	Harm/Peak
7311	30	0	100	V	36.61	4.88	27.51	43.98	74	-30.02	Harm/Peak
7311	20	0	100	H	36.61	4.88	27.51	33.98	54	-20.02	Harm/Ave
7311	20	0	100	V	36.61	4.88	27.51	33.98	54	-20.02	Harm/Ave
9748	30	0	100	H	37.18	5.74	26.98	45.94	82.01	-36.07	Harm/Peak
9748	30	0	100	V	37.18	5.74	26.98	45.94	91.19	-45.25	Harm/Peak
9748	20	0	100	H	37.18	5.74	26.98	35.94	69.95	-34.01	Harm/Ave
9748	20	0	100	V	37.18	5.74	26.98	35.94	80.04	-44.1	Harm/Ave
250	49.32	100	327	V	12.1	0.86	21.21	41.07	46	-4.93	Spur/QP
High Channel, 2462 MHz, measured at 3 meters											
2462	70.18	32	150	H	28.94	3.01	0	102.13	-	-	Fund/Peak
2462	82.2	317	114	V	28.94	3.01	0	114.15	-	-	Fund/Peak
2462	58.34	32	150	H	28.94	3.01	0	90.29	-	-	Fund/Ave
2462	70.6	317	114	V	28.94	3.01	0	102.55	-	-	Fund/Ave
2483.5	24	0	100	H	28.94	3.01	0	55.95	74	-18.05	Spur/Peak
2483.5	31.49	299	107	V	28.94	3.01	0	63.44	74	-10.56	Spur/Peak
2483.5	14	0	100	H	28.94	3.01	0	45.95	54	-8.05	Spur/Ave
2483.5	14.95	299	107	V	28.94	3.01	0	46.9	54	-7.1	Spur/Ave
4924	30	0	100	H	32.75	4.1	27.75	39.1	74	-34.9	Harm/Peak
4924	30	0	100	V	32.75	4.1	27.75	39.1	74	-34.9	Harm/Peak
4924	20	0	100	H	32.75	4.1	27.75	29.1	54	-24.9	Harm/Ave
4924	20	0	100	V	32.75	4.1	27.75	29.1	54	-24.9	Harm/Ave
7386	30	0	100	H	36.51	4.89	27.51	43.89	74	-30.11	Harm/Peak
7386	30	0	100	V	36.51	4.89	27.51	43.89	74	-30.11	Harm/Peak
7386	20	0	100	H	36.51	4.89	27.51	33.89	54	-20.11	Harm/Ave
7386	20	0	100	V	36.51	4.89	27.51	33.89	54	-20.11	Harm/Ave
9848	30	0	100	H	37.3	5.77	26.98	46.09	82.13	-36.04	Harm/Peak
9848	30	0	100	V	37.3	5.77	26.98	46.09	94.15	-48.06	Harm/Peak
9848	20	0	100	H	37.3	5.77	26.98	36.09	70.29	-34.2	Harm/Ave
9848	20	0	100	V	37.3	5.77	26.98	36.09	82.55	-46.46	Harm/Ave
250	49.18	100	327	V	12.1	0.86	21.21	40.93	46	-5.07	Spur/QP

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, 2412 MHz, measured at 3 meters											
2412	66.77	166	100	H	28.71	2.94	0	98.42	-	-	Fund/Peak
2412	79.02	64	133	V	28.71	2.94	0	110.67	-	-	Fund/Peak
2412	54.24	166	100	H	28.71	2.94	0	85.89	-	-	Fund/Ave
2412	67.47	64	133	V	28.71	2.94	0	99.12	-	-	Fund/Ave
2390	24	0	100	H	28.71	2.76	0	55.47	74	-18.53	Spur/Peak
2390	24	0	100	V	28.71	2.76	0	55.47	74	-18.53	Spur/Peak
2390	12	0	100	H	28.71	2.76	0	43.47	54	-10.53	Spur/Ave
2390	12	0	100	V	28.71	2.76	0	43.47	54	-10.53	Spur/Ave
4824	30	0	100	H	32.58	4.06	27.7	38.94	74	-35.06	Harm/Peak
4824	30	0	100	V	32.58	4.06	27.7	38.94	74	-35.06	Harm/Peak
4824	20	0	100	H	32.58	4.06	27.7	28.94	54	-25.06	Harm/Ave
4824	20	0	100	V	32.58	4.06	27.7	28.94	54	-25.06	Harm/Ave
7236	30	0	100	H	36.46	4.93	27.58	43.81	78.42	-34.61	Harm/Peak
7236	30	0	100	V	36.46	4.93	27.58	43.81	90.67	-46.86	Harm/Peak
7236	20	0	100	H	36.46	4.93	27.58	33.81	65.89	-32.08	Harm/Ave
7236	20	0	100	V	36.46	4.93	27.58	33.81	79.12	-45.31	Harm/Ave
9648	30	0	100	H	37.25	5.82	27.02	46.05	78.42	-32.37	Harm/Peak
9648	30	0	100	V	37.25	5.82	27.02	46.05	90.67	-44.62	Harm/Peak
9648	20	0	100	H	37.25	5.82	27.02	36.05	65.89	-29.84	Harm/Ave
9648	20	0	100	V	37.25	5.82	27.02	36.05	79.12	-43.07	Harm/Ave
250	49.25	100	327	V	12.1	0.86	21.21	41	46	-5	Spur/QP

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)	
Middle Channel, 2437 MHz, measured at 3 meters											
2437	70.34	110	148	H	28.71	2.94	0	101.99	-	-	Fund/Peak
2437	79.8	65	131	V	28.71	2.94	0	111.45	-	-	Fund/Peak
2437	58.54	110	148	H	28.71	2.94	0	90.19	-	-	Fund/Ave
2437	68.09	65	131	V	28.71	2.94	0	99.74	-	-	Fund/Ave
4874	30	0	100	H	32.75	4.1	27.76	39.09	74	-34.91	Harm/Peak
4874	30	0	100	V	32.75	4.1	27.76	39.09	74	-34.91	Harm/Peak
4874	20	0	100	H	32.75	4.1	27.76	29.09	54	-24.91	Harm/Ave
4874	20	0	100	V	32.75	4.1	27.76	29.09	54	-24.91	Harm/Ave
7311	30	0	100	H	36.61	4.88	27.51	43.98	74	-30.02	Harm/Peak
7311	30	0	100	V	36.61	4.88	27.51	43.98	74	-30.02	Harm/Peak
7311	20	0	100	H	36.61	4.88	27.51	33.98	54	-20.02	Harm/Ave
7311	20	0	100	V	36.61	4.88	27.51	33.98	54	-20.02	Harm/Ave
9748	30	0	100	H	37.18	5.74	26.98	45.94	81.99	-36.05	Harm/Peak
9748	30	0	100	V	37.18	5.74	26.98	45.94	91.45	-45.51	Harm/Peak
9748	20	0	100	H	37.18	5.74	26.98	35.94	70.19	-34.25	Harm/Ave
9748	20	0	100	V	37.18	5.74	26.98	35.94	79.74	-43.8	Harm/Ave
250	49.3	100	327	V	12.1	0.86	21.21	41.05	46	-4.95	Spur/QP
High Channel, 2462 MHz, measured at 3 meters											
2462	69.54	108	153	H	28.94	3.01	0	101.49	-	-	Fund/Peak
2462	78.25	42	100	V	28.94	3.01	0	110.2	-	-	Fund/Peak
2462	57.72	108	153	H	28.94	3.01	0	89.67	-	-	Fund/Ave
2462	66.42	42	100	V	28.94	3.01	0	98.37	-	-	Fund/Ave
2483.5	24	0	100	H	28.94	3.01	0	55.95	74	-18.05	Spur/Peak
2483.5	31.7	34	130	V	28.94	3.01	0	63.65	74	-10.35	Spur/Peak
2483.5	14	0	100	H	28.94	3.01	0	45.95	54	-8.05	Spur/Ave
2483.5	14.57	34	130	V	28.94	3.01	0	46.52	54	-7.48	Spur/Ave
4924	30	0	100	H	32.75	4.1	27.75	39.1	74	-34.9	Harm/Peak
4924	30	0	100	V	32.75	4.1	27.75	39.1	74	-34.9	Harm/Peak
4924	20	0	100	H	32.75	4.1	27.75	29.1	54	-24.9	Harm/Ave
4924	20	0	100	V	32.75	4.1	27.75	29.1	54	-24.9	Harm/Ave
7386	30	0	100	H	36.51	4.89	27.51	43.89	74	-30.11	Harm/Peak
7386	30	0	100	V	36.51	4.89	27.51	43.89	74	-30.11	Harm/Peak
7386	20	0	100	H	36.51	4.89	27.51	33.89	54	-20.11	Harm/Ave
7386	20	0	100	V	36.51	4.89	27.51	33.89	54	-20.11	Harm/Ave
9848	30	0	100	H	37.3	5.77	26.98	46.09	81.49	-35.4	Harm/Peak
9848	30	0	100	V	37.3	5.77	26.98	46.09	90.2	-44.11	Harm/Peak
9848	20	0	100	H	37.3	5.77	26.98	36.09	69.67	-33.58	Harm/Ave
9848	20	0	100	V	37.3	5.77	26.98	36.09	78.37	-42.28	Harm/Ave
250	49.36	100	327	V	12.1	0.86	21.21	41.11	46	-4.89	Spur/QP

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, 2422 MHz, measured at 3 meters											
2422	64.9	129	100	H	28.71	3.12	0	96.73	-	-	Fund/Peak
2422	75.51	65	130	V	28.71	3.12	0	107.34	-	-	Fund/Peak
2422	53.01	129	100	H	28.71	3.12	0	84.84	-	-	Fund/Ave
2422	64.89	65	130	V	28.71	3.12	0	96.72	-	-	Fund/Ave
2390	24	0	100	H	28.71	3.12	0	55.83	74	-18.17	Spur/Peak
2390	24	0	100	V	28.71	3.12	0	55.83	74	-18.17	Spur/Peak
2390	12	0	100	H	28.71	3.12	0	43.83	54	-10.17	Spur/Ave
2390	12	0	100	V	28.71	3.12	0	43.83	54	-10.17	Spur/Ave
4844	30	0	100	H	32.58	4.56	27.7	39.44	74	-34.56	Harm/Peak
4844	30	0	100	V	32.58	4.56	27.7	39.44	74	-34.56	Harm/Peak
4844	20	0	100	H	32.58	4.56	27.7	29.44	54	-24.56	Harm/Ave
4844	20	0	100	V	32.58	4.56	27.7	29.44	54	-24.56	Harm/Ave
7266	30	0	100	H	36.61	5.49	27.56	44.54	76.73	-32.19	Harm/Peak
7266	30	0	100	V	36.61	5.49	27.56	44.54	87.34	-42.8	Harm/Peak
7266	20	0	100	H	36.61	5.49	27.56	34.54	64.84	-30.3	Harm/Ave
7266	20	0	100	V	36.61	5.49	27.56	34.54	76.72	-42.18	Harm/Ave
9688	30	0	100	H	37.18	6.56	26.98	46.76	76.73	-29.97	Harm/Peak
9688	30	0	100	V	37.18	6.56	26.98	46.76	87.34	-40.58	Harm/Peak
9688	20	0	100	H	37.18	6.56	26.98	36.76	64.84	-28.08	Harm/Ave
9688	20	0	100	V	37.18	6.56	26.98	36.76	76.72	-39.96	Harm/Ave
250	49.15	100	327	V	12.1	0.86	21.21	40.9	46	-5.1	Spur/QP

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)	
Middle Channel, 2437 MHz, measured at 3 meters											
2437	67.76	110	155	H	28.71	3.25	0	99.72	-	-	Fund/Peak
2437	76.45	53	135	V	28.71	3.25	0	108.41	-	-	Fund/Peak
2437	56.36	110	155	H	28.71	3.25	0	88.32	-	-	Fund/Ave
2437	64.95	53	135	V	28.71	3.25	0	96.91	-	-	Fund/Ave
4874	30	0	100	H	32.75	4.54	27.22	40.07	74	-33.93	Harm/Peak
4874	30	0	100	V	32.75	4.54	27.22	40.07	74	-33.93	Harm/Peak
4874	20	0	100	H	32.75	4.54	27.22	30.07	54	-23.93	Harm/Ave
4874	20	0	100	V	32.75	4.54	27.22	30.07	54	-23.93	Harm/Ave
7311	30	0	100	H	36.61	5.57	27.51	44.67	74	-29.33	Harm/Peak
7311	30	0	100	V	36.61	5.57	27.51	44.67	74	-29.33	Harm/Peak
7311	20	0	100	H	36.61	5.57	27.51	34.67	54	-19.33	Harm/Ave
7311	20	0	100	V	36.61	5.57	27.51	34.67	54	-19.33	Harm/Ave
9748	30	0	100	H	37.18	6.62	26.98	46.82	79.72	-32.9	Harm/Peak
9748	30	0	100	V	37.18	6.62	26.98	46.82	88.41	-41.59	Harm/Peak
9748	20	0	100	H	37.18	6.62	26.98	36.82	68.32	-31.5	Harm/Ave
9748	20	0	100	V	37.18	6.62	26.98	36.82	76.91	-40.09	Harm/Ave
250	49.15	100	327	V	12.1	0.86	21.21	40.9	46	-5.1	Spur/QP
High Channel, 2452 MHz, measured at 3 meters											
2452	68.13	32	186	H	28.94	3.25	0	100.32	-	-	Fund/Peak
2452	78.71	244	133	V	28.94	3.25	0	110.9	-	-	Fund/Peak
2452	56.83	32	186	H	28.94	3.25	0	89.02	-	-	Fund/Ave
2452	66.64	244	133	V	28.94	3.25	0	98.83	-	-	Fund/Ave
2483.5	24	0	100	H	28.94	3.12	0	56.06	74	-17.94	Spur/Peak
2483.5	36.62	336	119	V	28.94	3.12	0	68.68	74	-5.32	Spur/Peak
2483.5	12	0	100	H	28.94	3.12	0	44.06	54	-9.94	Spur/Ave
2483.5	18.43	336	119	V	28.94	3.12	0	50.49	54	-3.51	Spur/Ave
4904	30	0	100	H	32.75	4.52	27.75	39.52	74	-34.48	Harm/Peak
4904	30	0	100	V	32.75	4.52	27.75	39.52	74	-34.48	Harm/Peak
4904	20	0	100	H	32.75	4.52	27.75	29.52	54	-24.48	Harm/Ave
4904	20	0	100	V	32.75	4.52	27.75	29.52	54	-24.48	Harm/Ave
7356	30	0	100	H	36.51	5.62	27.57	44.56	74	-29.44	Harm/Peak
7356	30	0	100	V	36.51	5.62	27.57	44.56	74	-29.44	Harm/Peak
7356	20	0	100	H	36.51	5.62	27.57	34.56	54	-19.44	Harm/Ave
7356	20	0	100	V	36.51	5.62	27.57	34.56	54	-19.44	Harm/Ave
9808	30	0	100	H	37.3	6.58	27.02	46.86	80.32	-33.46	Harm/Peak
9808	30	0	100	V	37.3	6.58	27.02	46.86	90.9	-44.04	Harm/Peak
9808	20	0	100	H	37.3	6.58	27.02	36.86	69.02	-32.16	Harm/Ave
9808	20	0	100	V	37.3	6.58	27.02	36.86	78.83	-41.97	Harm/Ave
250	49.04	100	327	V	12.1	0.86	21.21	40.79	46	-5.21	Spur/QP

9 FCC§15.247(a)(2) & IC RSS-210 §A8.2 – 6 dB & 99% Emission Bandwidth

9.1 Applicable Standard

According to FCC §15.247(a)(2) and IC RSS-210 A8.2 (a), systems using digital modulation techniques may operate in the 902~928 MHz, 2400~2483.5 MHz, and 5725~5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz

9.2 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 8: DTS bandwidth

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 per the A2LA requirements, traceable to the NIST.*

9.4 Test Environmental Conditions

Temperature:	23 °C
Relative Humidity:	45 %
ATM Pressure:	101.5 kPa

The testing was performed by Bo Li from 2013-08-22 at RF site.

9.5 Test Results

802.11b mode:

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz) J0	6 dB Emission Bandwidth (MHz) J1	99% Emission Bandwidth (MHz) J0	99% Emission Bandwidth (MHz) J1	Limit (MHz)	Results
Low	2412	10.131	10.079	13.6395	13.6320	> 0.5	Compliant
Middle	2437	10.008	10.081	13.8181	13.6699	> 0.5	Compliant
High	2462	10.128	9.641	13.6072	13.6907	> 0.5	Compliant

802.11g mode:

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz) J0	6 dB Emission Bandwidth (MHz) J1	99% Emission Bandwidth (MHz) J0	99% Emission Bandwidth (MHz) J1	Limit (MHz)	Results
Low	2412	16.532	16.530	16.4438	16.4691	> 0.5	Compliant
Middle	2437	16.575	16.555	16.5356	16.5321	> 0.5	Compliant
High	2462	16.524	16.529	16.4824	16.4911	> 0.5	Compliant

802.11n-HT20 mode:

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz) J0	6 dB Emission Bandwidth (MHz) J1	99% Emission Bandwidth (MHz) J0	99% Emission Bandwidth (MHz) J1	Limit (MHz)	Results
Low	2412	17.745	17.717	17.6245	17.6398	> 0.5	Compliant
Middle	2437	17.795	17.798	17.677	17.6700	> 0.5	Compliant
High	2462	17.752	17.814	17.6657	17.6705	> 0.5	Compliant

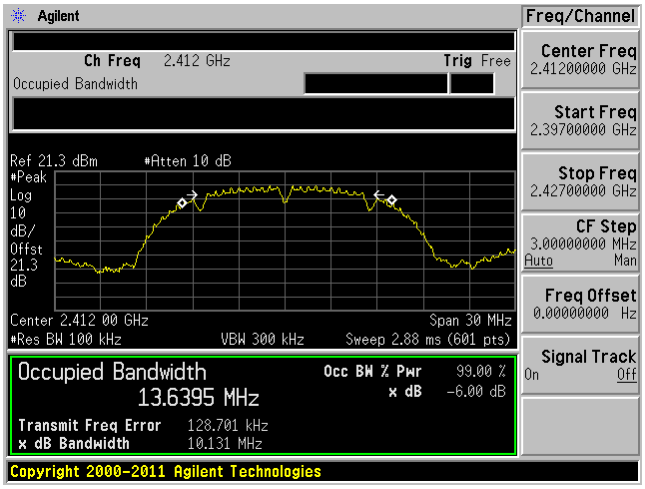
802.11n-HT40 mode:

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz) J0	6 dB Emission Bandwidth (MHz) J1	99% Emission Bandwidth (MHz) J0	99% Emission Bandwidth (MHz) J1	Limit (MHz)	Results
Low	2422	36.575	36.568	36.1613	36.1077	> 0.5	Compliant
Middle	2437	36.616	36.599	36.2413	36.1989	> 0.5	Compliant
High	2452	36.575	36.574	36.1461	36.2074	> 0.5	Compliant

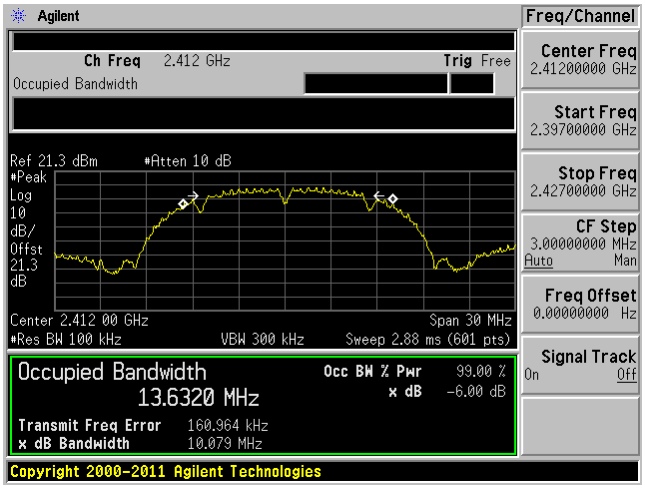
Please refer to the following plots for detailed test results

802.11 b mode

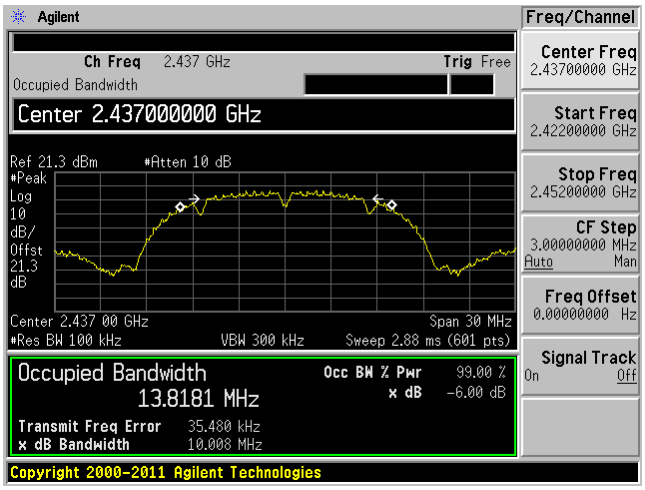
Low channel: 2412 MHz Chain J0



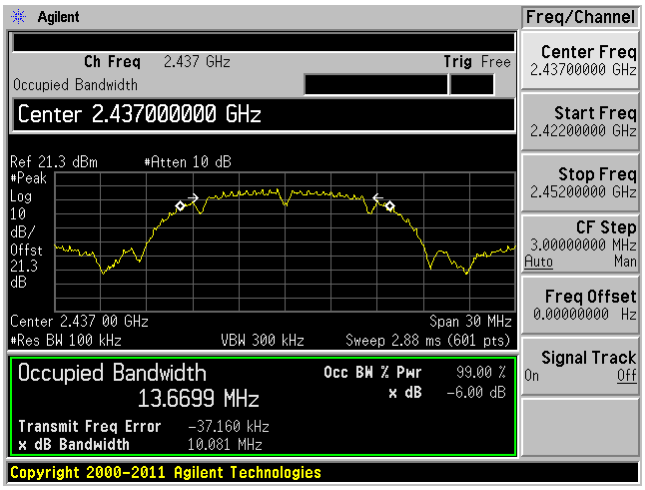
Low channel: 2412 MHz Chain J1



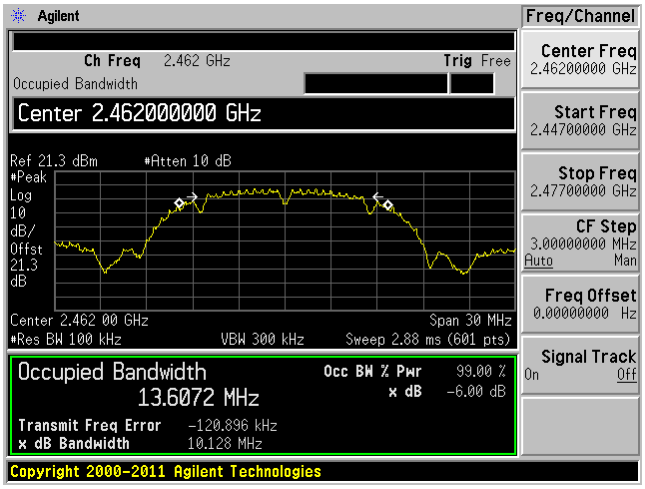
Middle channel: 2437 MHz Chain J0



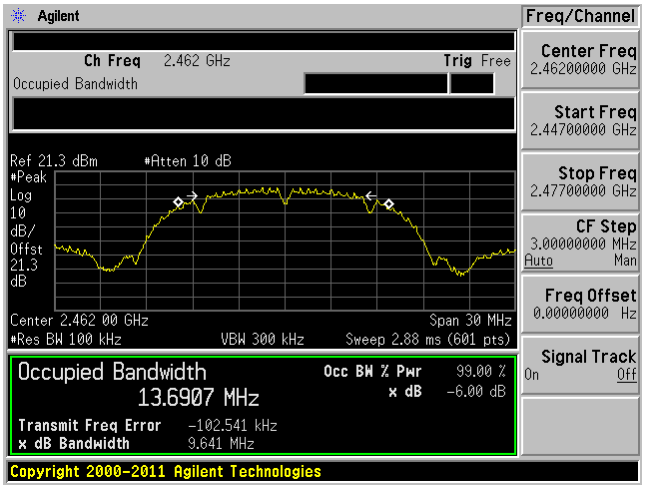
Middle channel: 2437 MHz Chain J1



High channel: 2462 MHz Chain J0

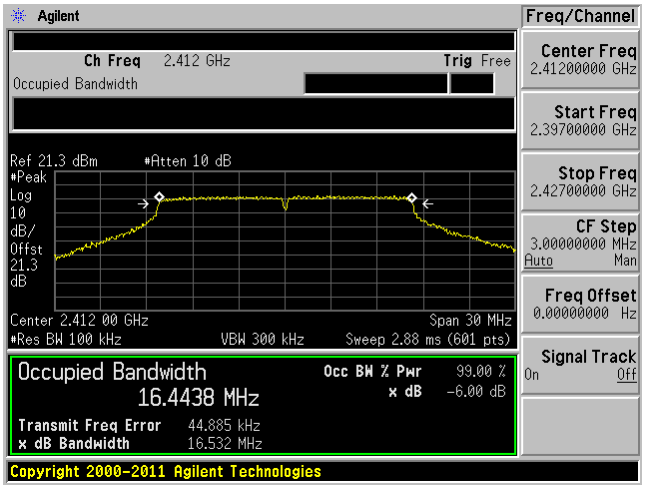


High channel: 2462 MHz Chain J1

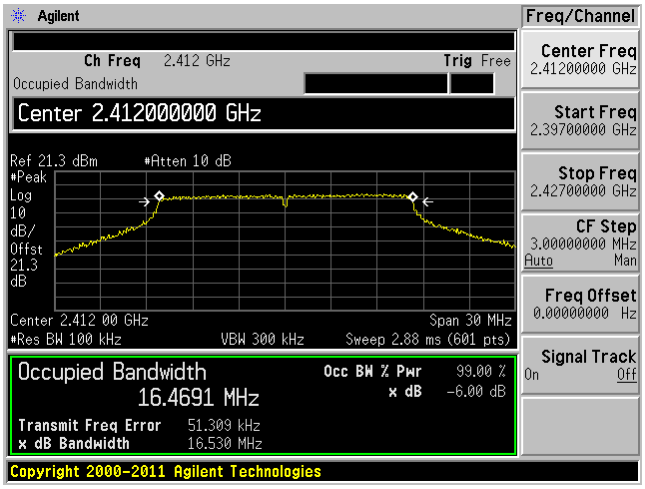


802.11 g mode

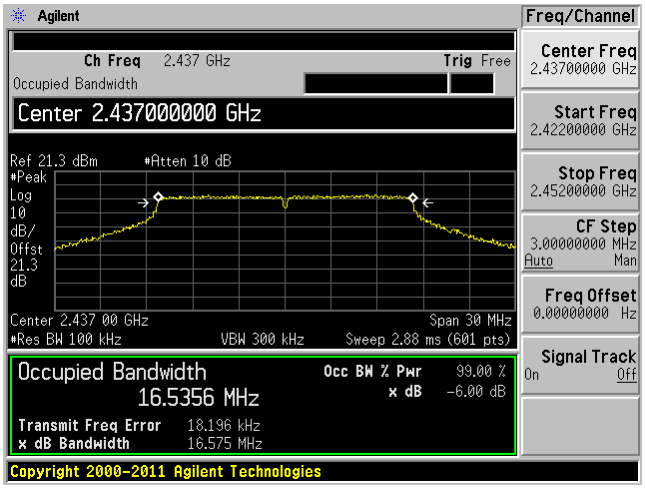
Low channel: 2412 MHz Chain J0



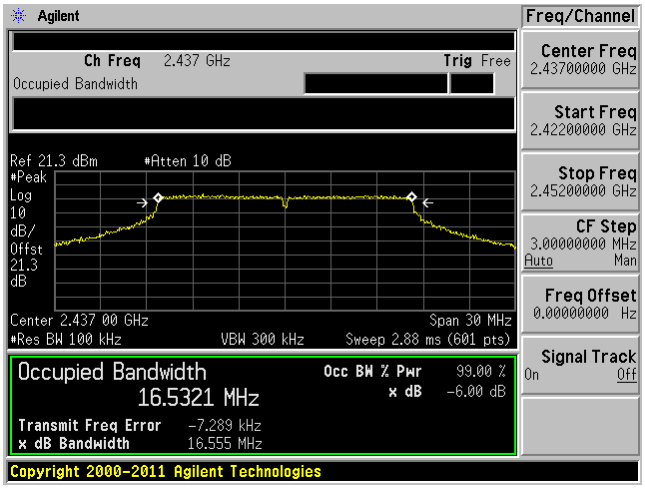
Low channel: 2412 MHz Chain J1



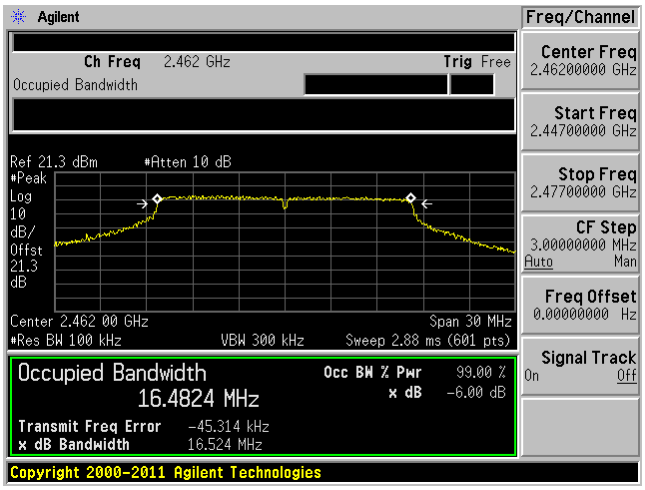
Middle channel: 2437 MHz Chain J0



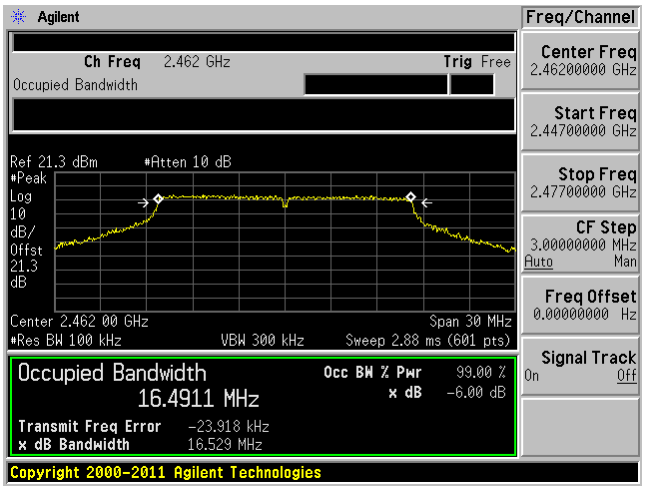
Middle channel: 2437 MHz Chain J1



High channel: 2462 MHz Chain J0

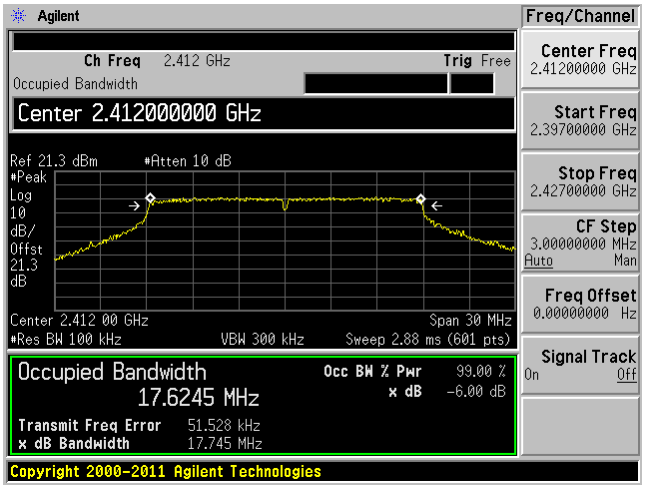


High channel: 2462 MHz Chain J1

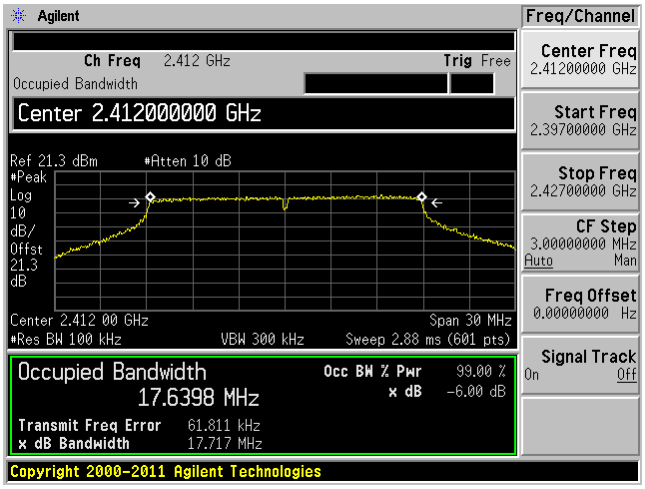


802.11n-HT20 mode

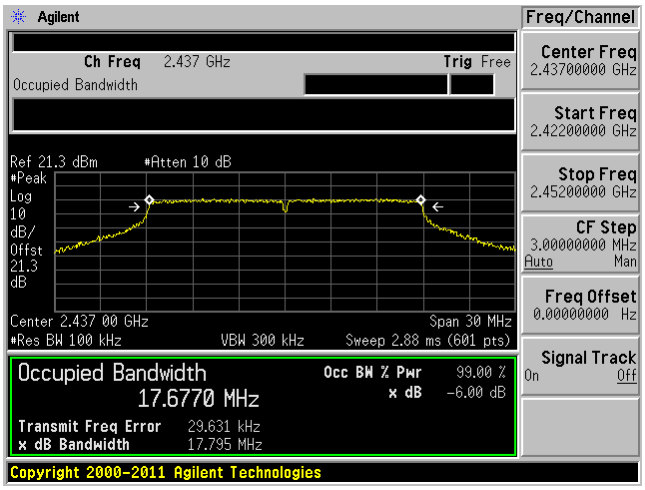
Low channel: 2412 MHz Chain J0



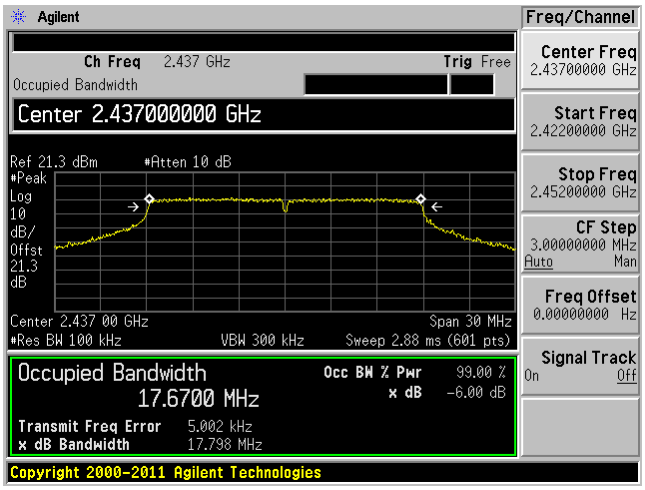
Low channel: 2412 MHz Chain J1



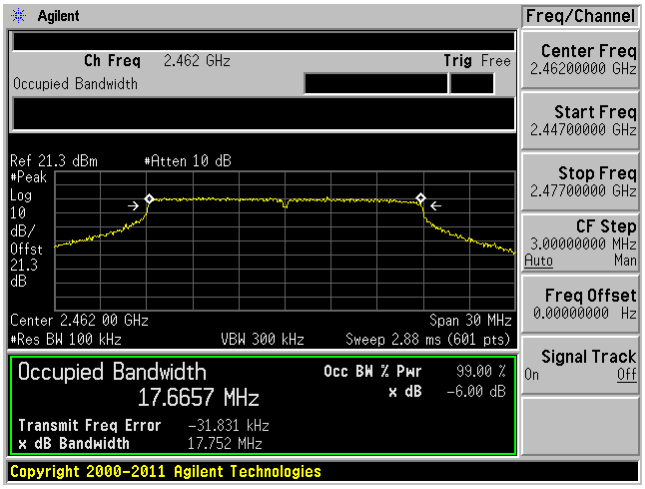
Middle channel: 2437 MHz Chain J0



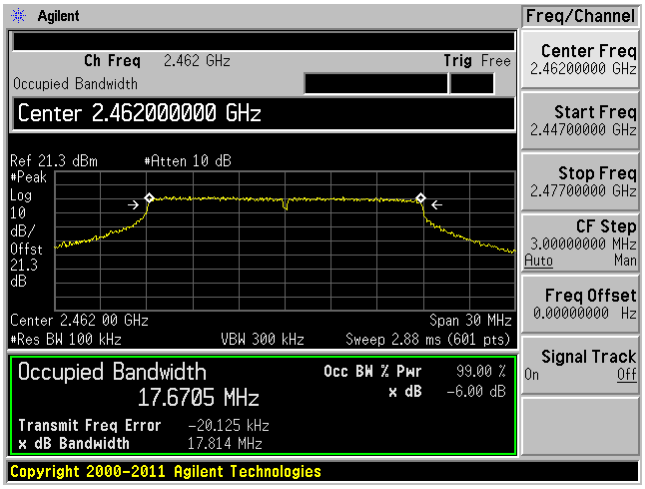
Middle channel: 2437 MHz Chain J1



High channel: 2462 MHz Chain J0

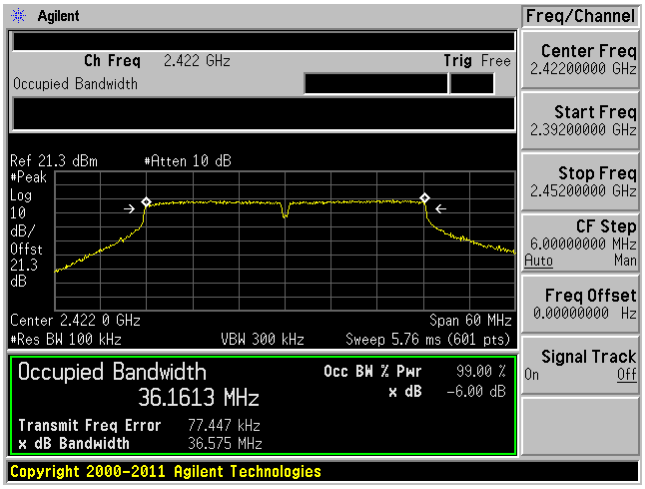


High channel: 2462 MHz Chain J1

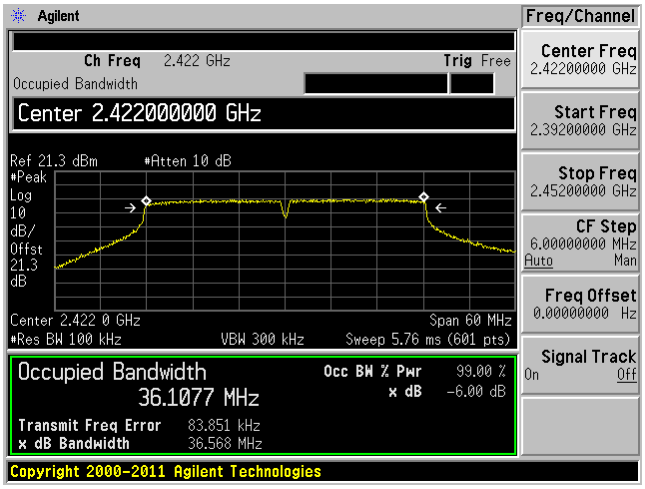


802.11n-HT40 mode

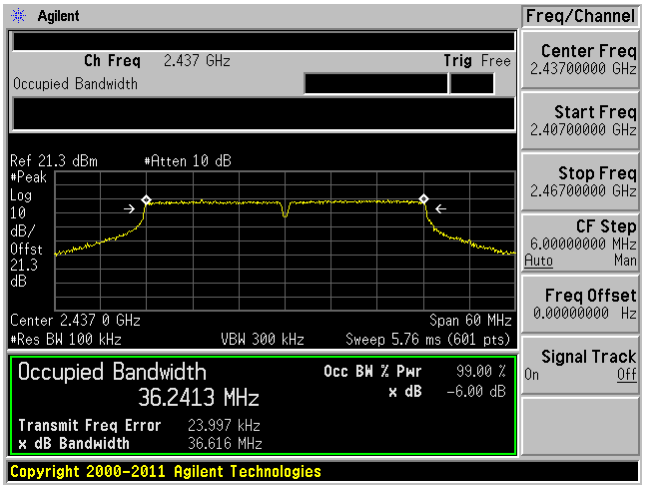
Low channel: 2422 MHz Chain J0



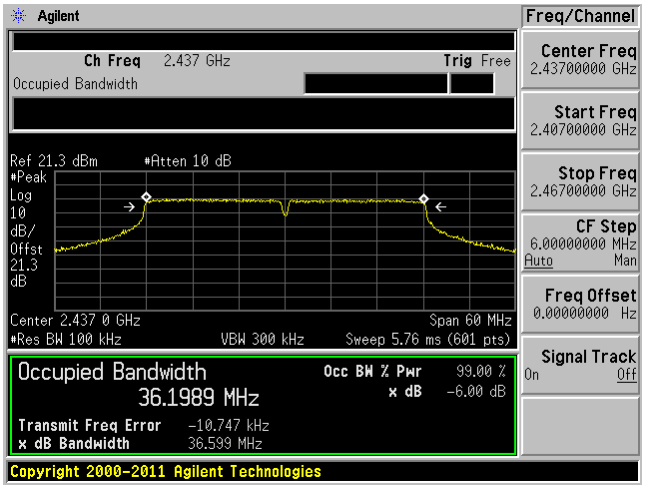
Low channel: 2422 MHz Chain J1



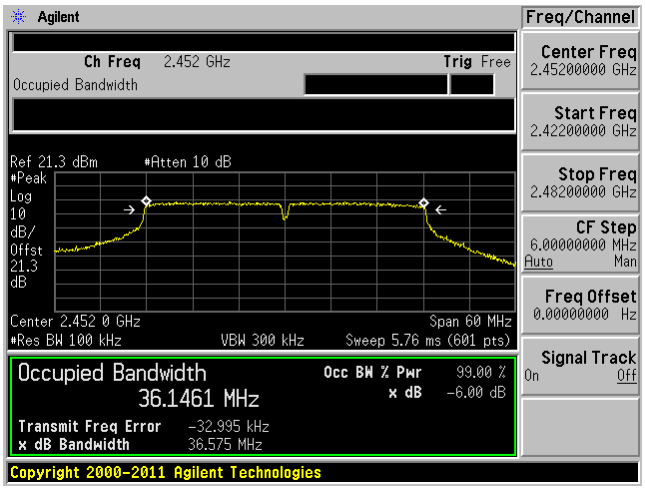
Middle channel: 2437 MHz Chain J0



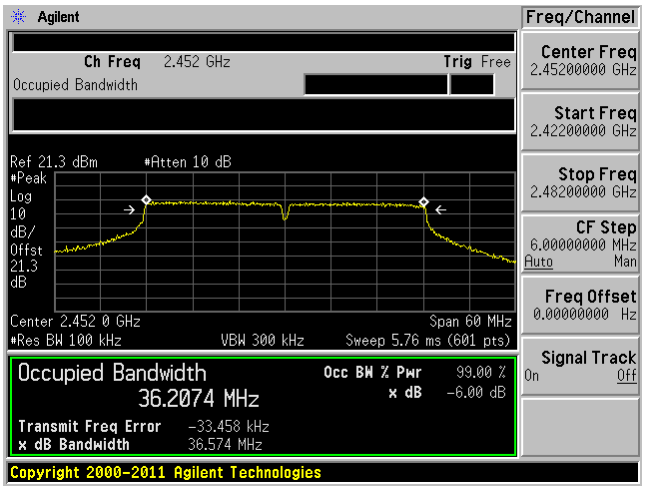
Middle channel: 2437 MHz Chain J1



High channel: 2452 MHz Chain J0



High channel: 2452 MHz Chain J1



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

10.1 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.

10.2 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 9: Fundamental emission output power

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 per the A2LA requirements, traceable to the NIST.*

10.4 Test Environmental Conditions

Temperature:	23 °C
Relative Humidity:	45 %
ATM Pressure:	101.5 kPa

The testing was performed by Bo Li from 2013-08-22 at RF site.

10.5 Test Results

802.11b mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	Highest Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	22.43	22.68	22.68	28.6	-5.92
Middle	2437	22.78	22.72	22.78	28.6	-5.82
High	2462	21.99	22.59	22.59	28.6	-6.01

802.11g mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	Highest Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	22.83	22.94	22.94	28.6	-5.66
Middle	2437	23.28	23.30	23.3	28.6	-5.3
High	2462	22.38	22.89	22.89	28.6	-5.71

802.11n-HT20 mode

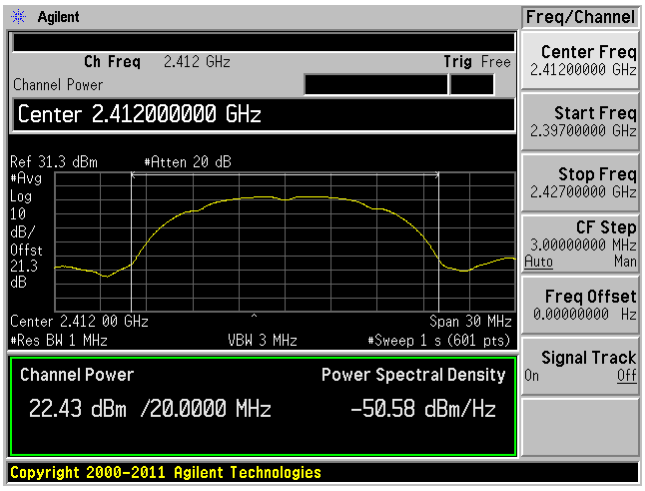
Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	22.01	22.02	25.03	28.6	-3.57
Middle	2437	21.83	21.94	24.90	28.6	-3.70
High	2462	21.00	21.66	24.35	28.6	-4.25

802.11n-HT40 mode

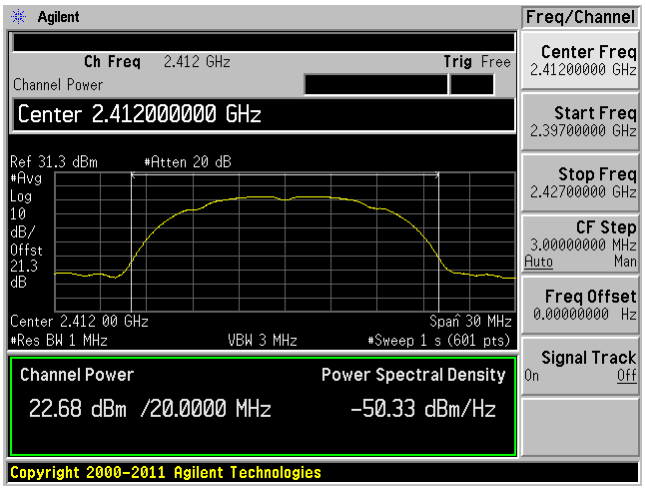
Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2422	21.68	22.3	25.01	28.6	-3.59
Middle	2437	21.63	21.93	24.79	28.6	-3.81
High	2452	21.4	21.66	24.54	28.6	-4.06

802.11b mode

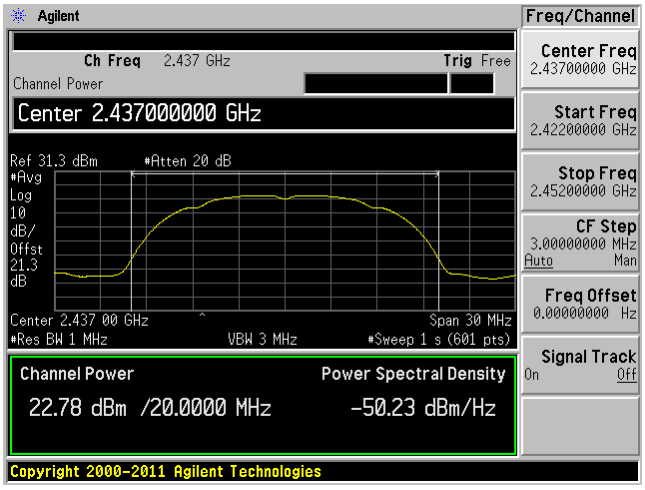
Low channel: 2412 MHz Chain J0



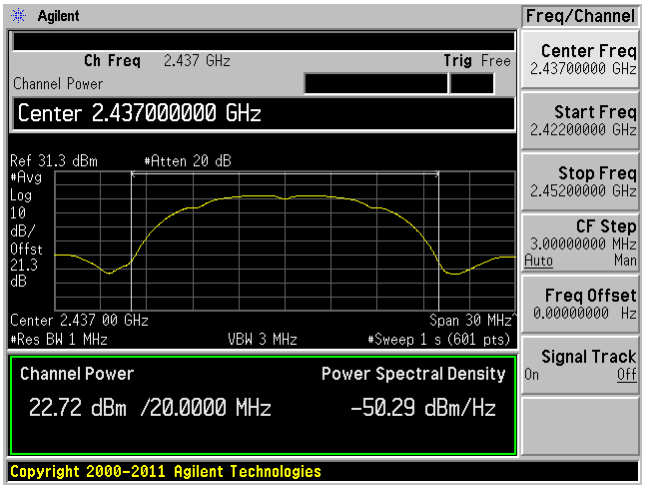
Low channel: 2412 MHz Chain J1



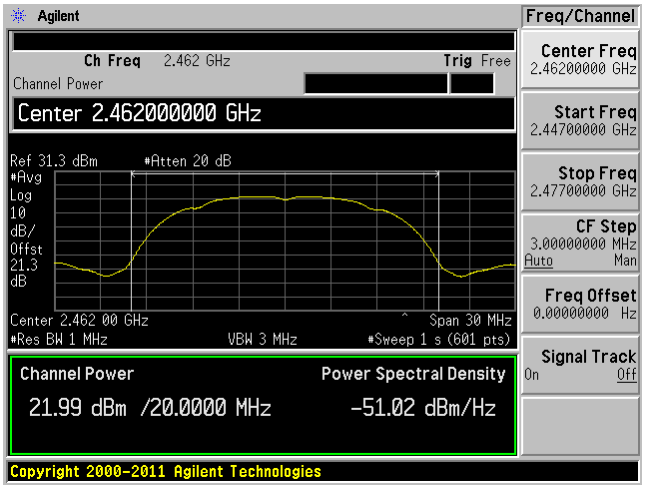
Middle channel: 2437 MHz Chain J0



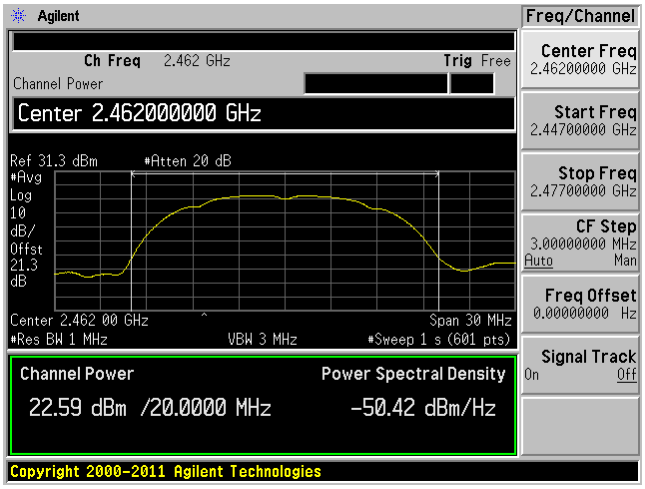
Middle channel: 2437 MHz Chain J1



High channel: 2462 MHz Chain J0

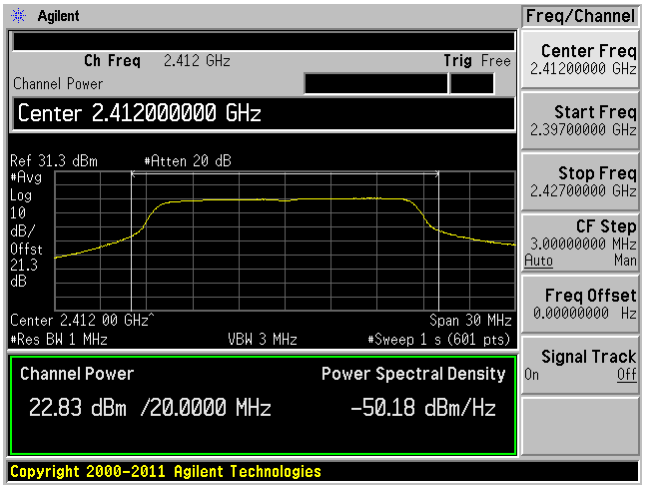


High channel: 2462 MHz Chain J1

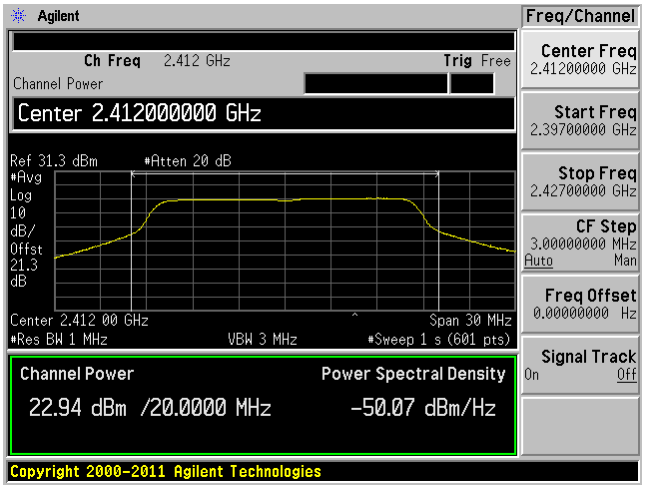


802.11g mode

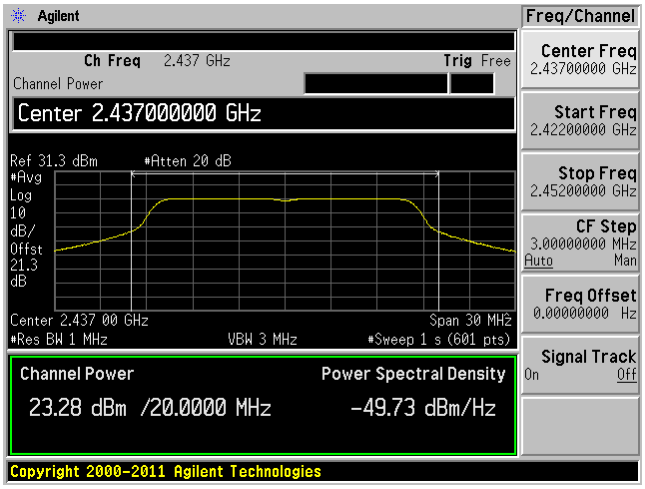
Low channel: 2412 MHz Chain J0



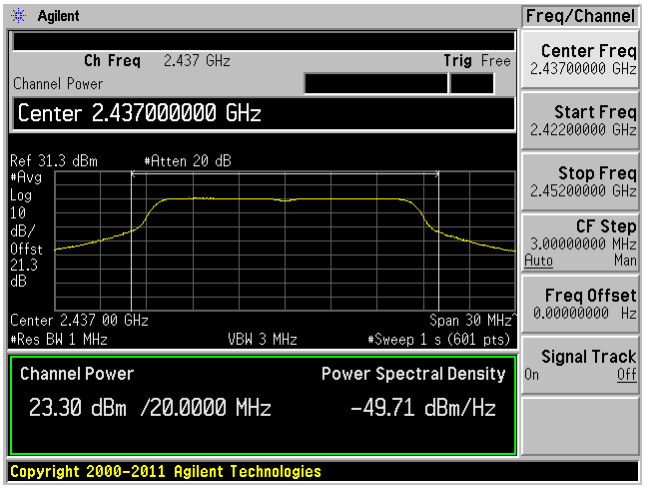
Low channel: 2412 MHz Chain J1



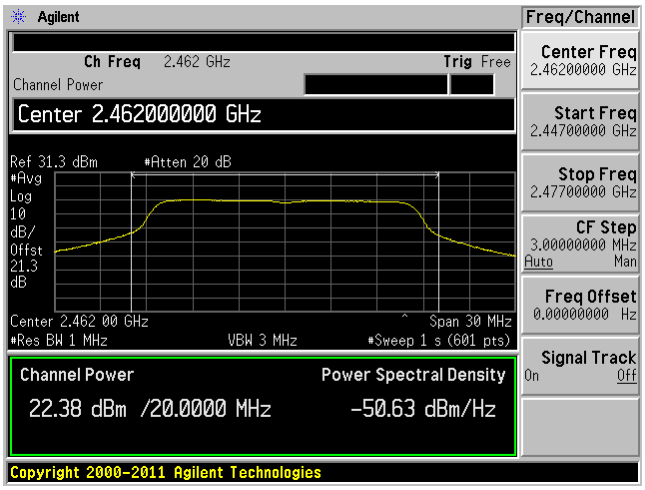
Middle channel: 2437 MHz Chain J0



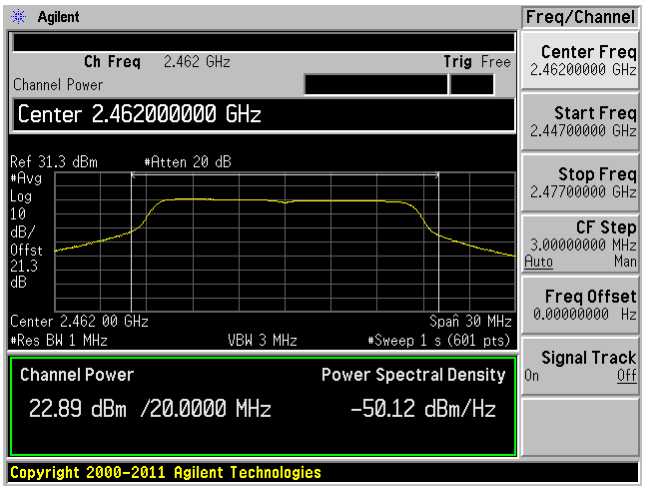
Middle channel: 2437 MHz Chain J1



High channel: 2462 MHz Chain J0

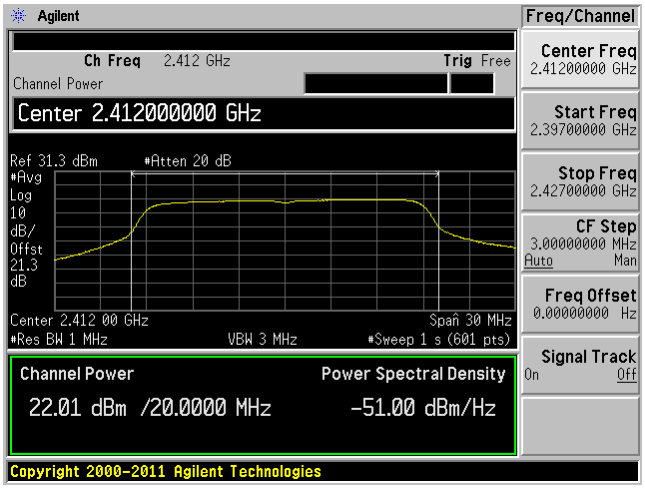


High channel: 2462 MHz Chain J1

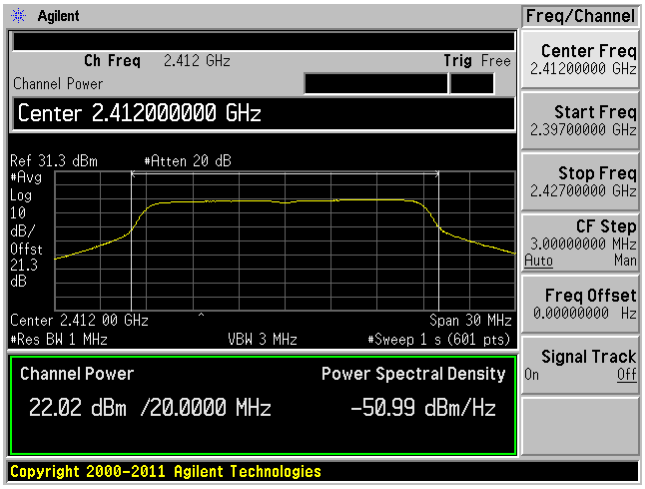


802.11n-HT20 mode

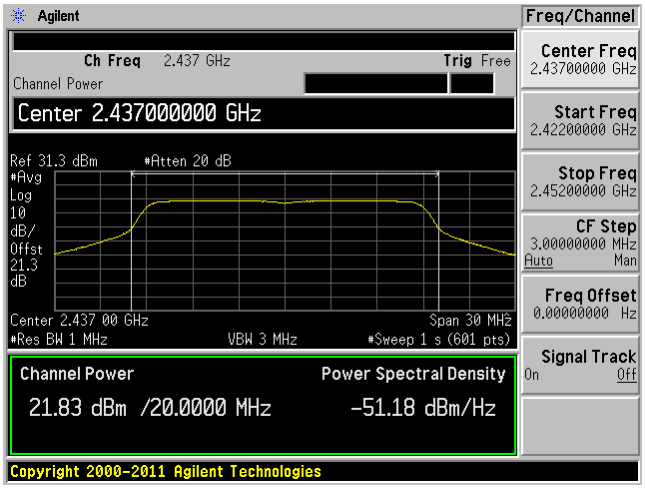
Low channel: 2412 MHz Chain J0



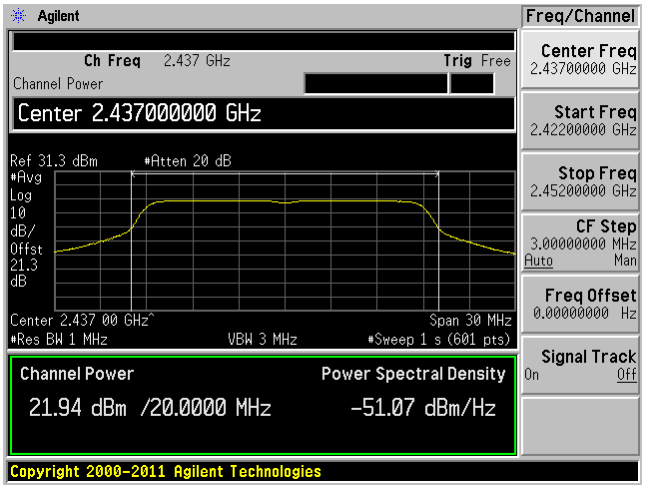
Low channel: 2412 MHz Chain J1



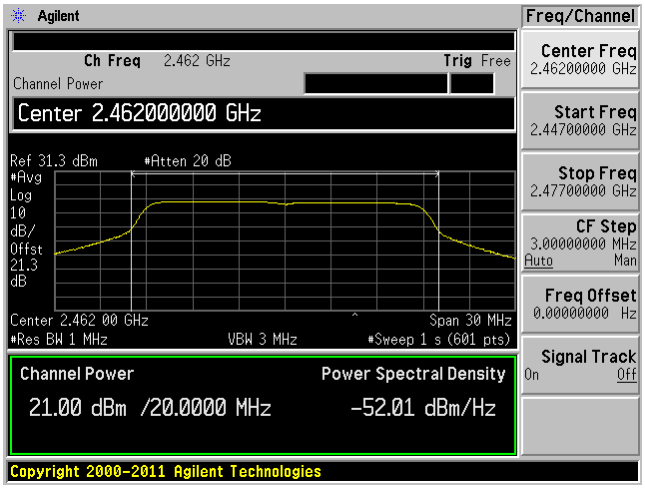
Middle channel: 2437 MHz Chain J0



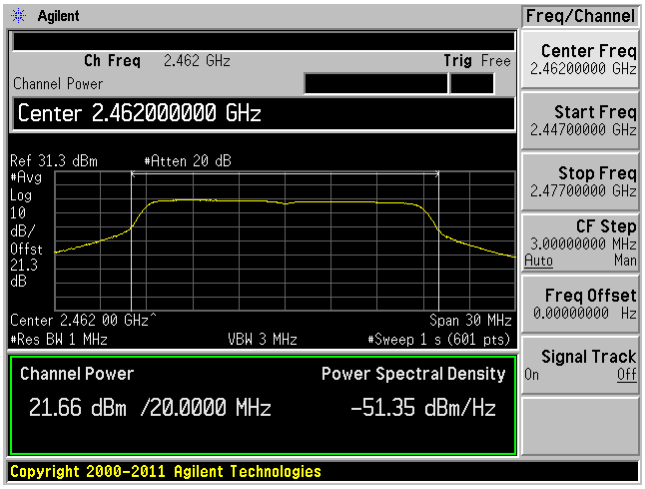
Middle channel: 2437 MHz Chain J1



High channel: 2462 MHz Chain J0

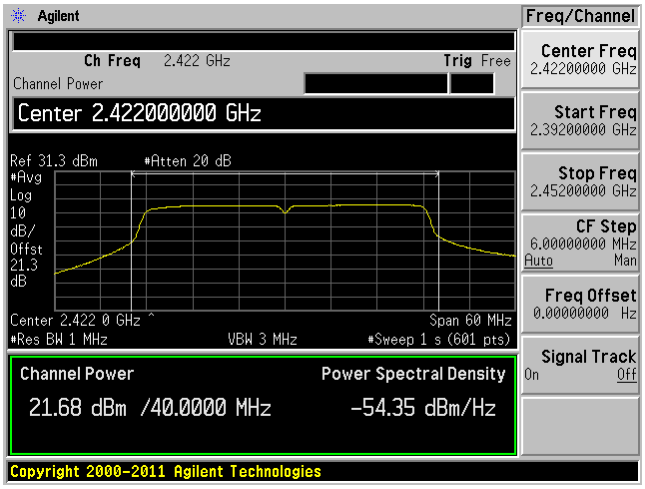


High channel: 2462 MHz Chain J1

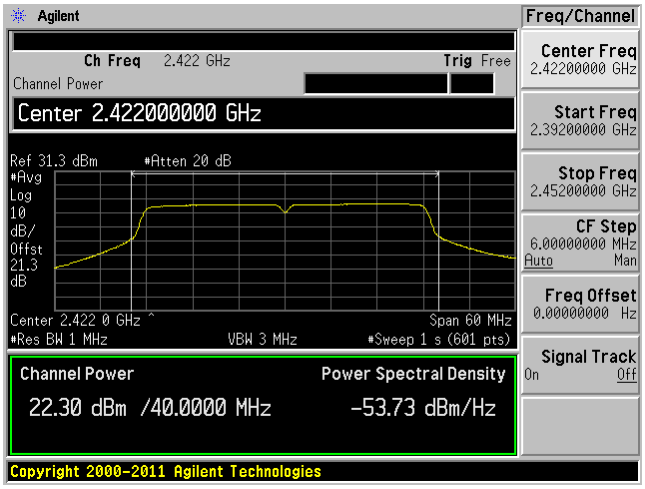


802.11n-HT40 mode

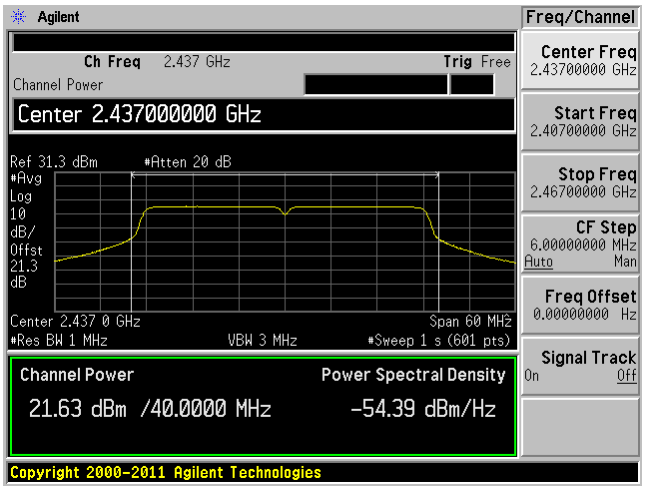
Low channel: 2422 MHz Chain J0



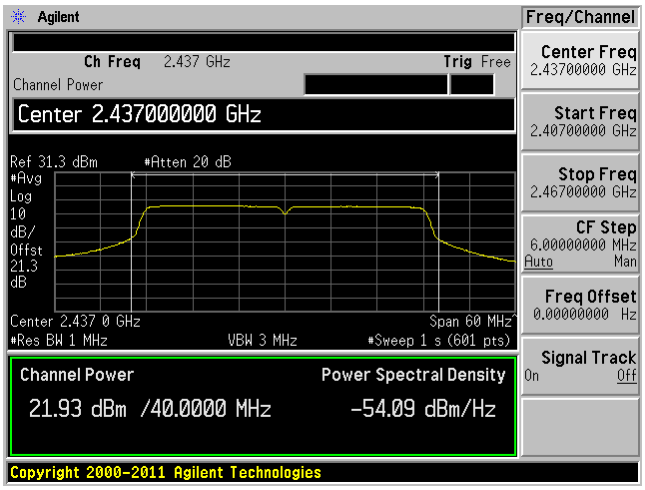
Low channel: 2422 MHz Chain J1



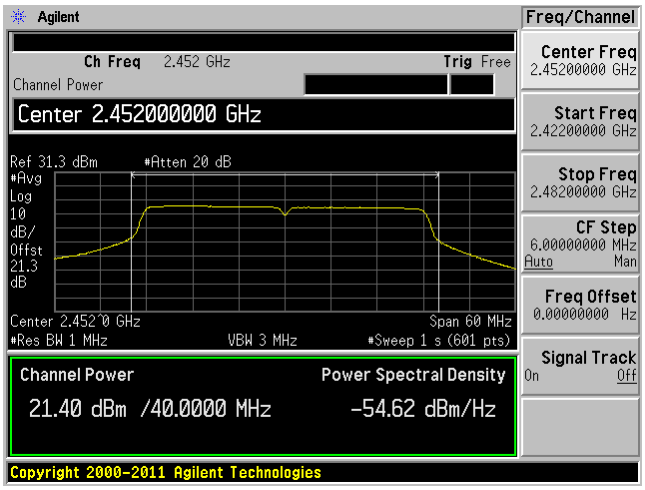
Middle channel: 2437 MHz Chain J0



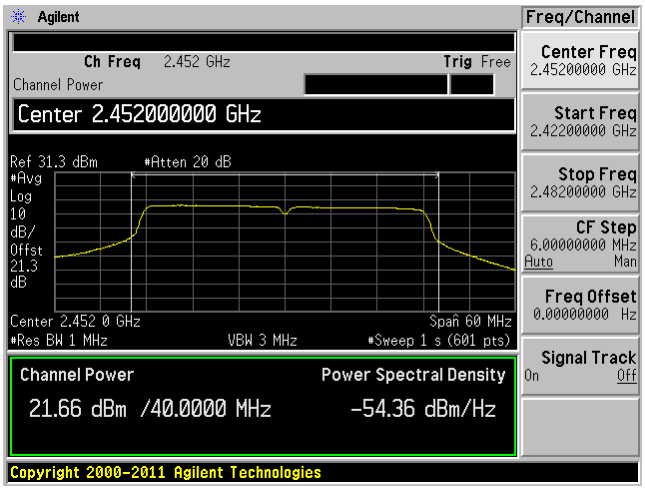
Middle channel: 2437 MHz Chain J1



High channel: 2452 MHz Chain J0



High channel: 2452 MHz Chain J1



11 FCC §15.247(d) & IC RSS-210 §A8.5 – 100 kHz Bandwidth of Band Edges

11.1 Applicable Standard

According to FCC §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emissions limits specified in §15.209(a) see §15.205(c).

According to IC 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.

11.2 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 13: Band-edge measurements

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 per the A2LA requirements, traceable to the NIST.*

11.4 Test Environmental Conditions

Temperature:	23 °C
Relative Humidity:	45 %
ATM Pressure:	101.5 kPa

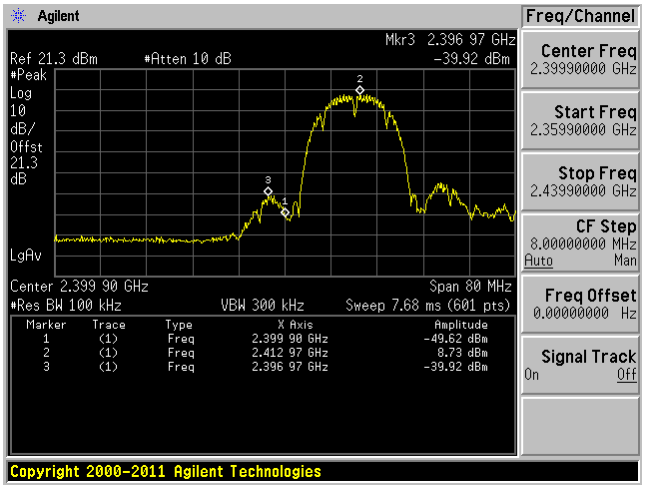
The testing was performed by Bo Li from 2013-08-22 at RF site.

11.5 Test Results

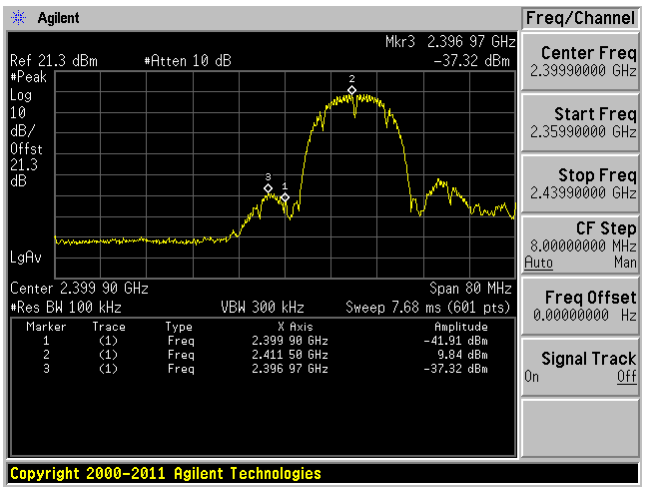
Please refer to following pages for plots of band edge.

802.11b mode

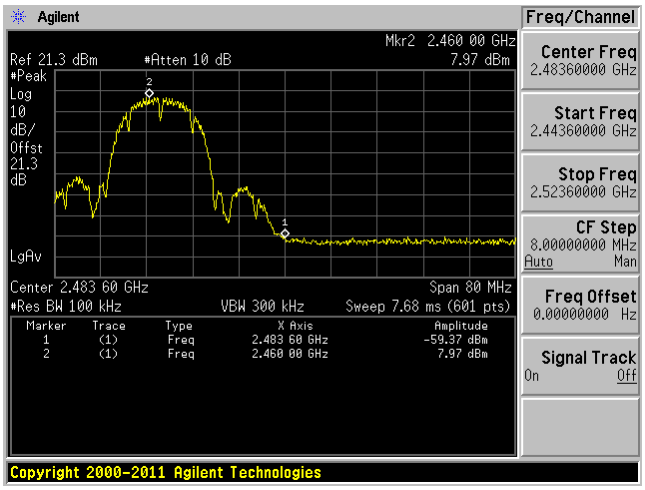
802.11b, Chain J0 Low Band Edge



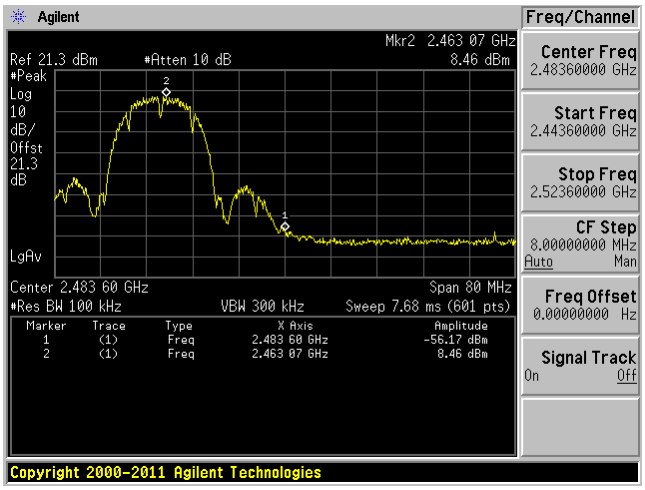
802.11b, Chain J1 Low Band Edge



802.11b, Chain J0 High Band Edge

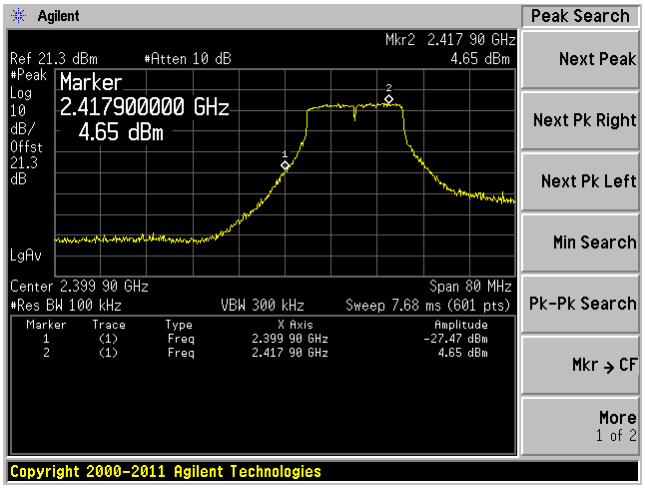


802.11b, Chain J1 High Band Edge

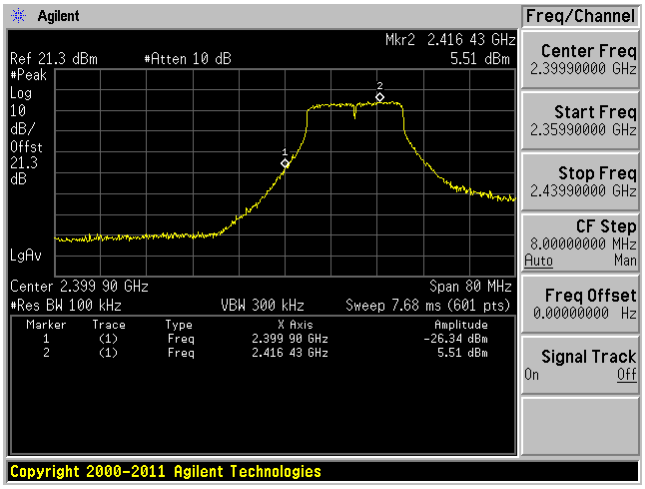


802.11g mode

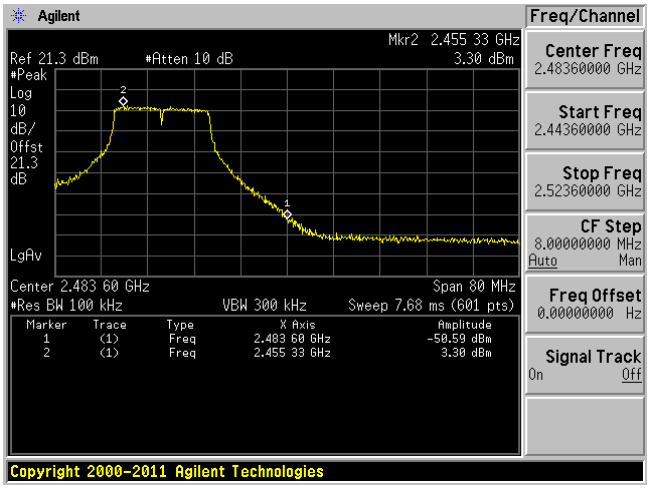
802.11g, Chain J0 Low Band Edge



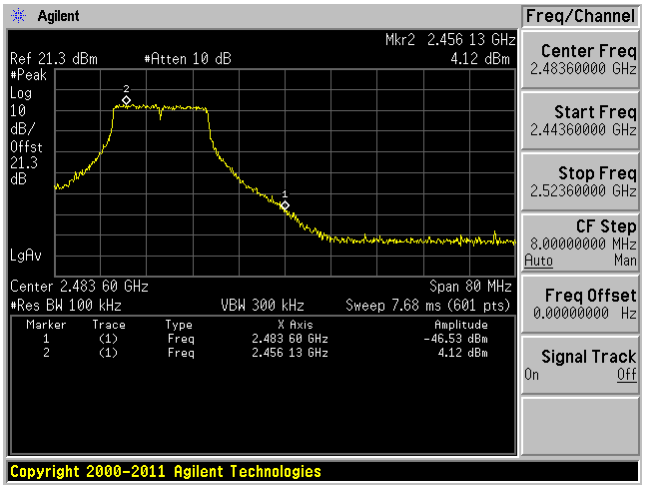
802.11g, Chain J1 Low Band Edge



802.11g, Chain J0 High Band Edge

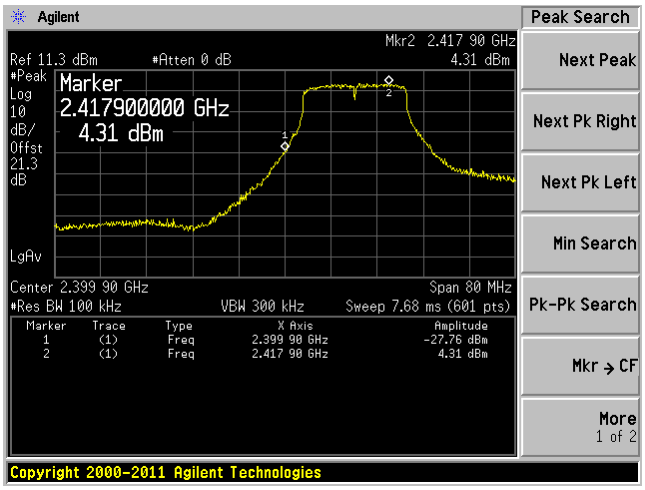


802.11g, Chain J1 High Band Edge

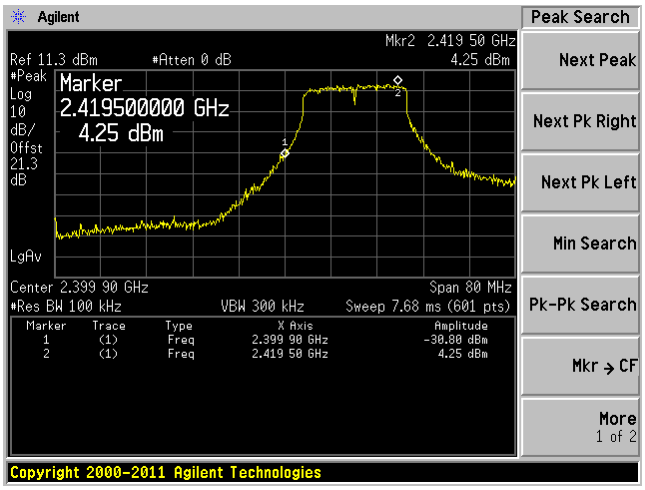


802.11n-HT20 mode

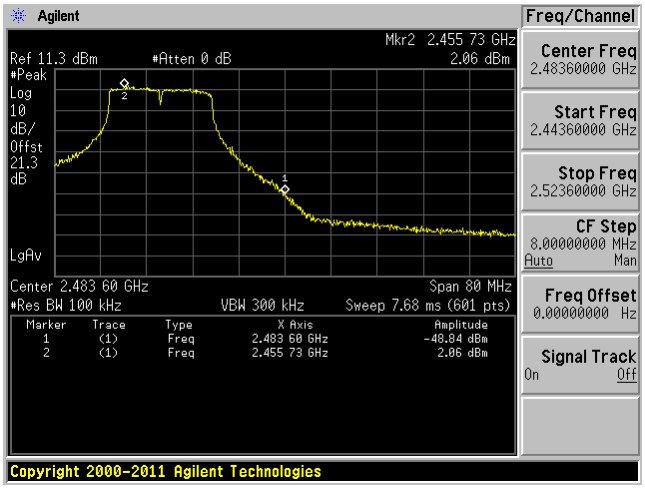
802.11n-HT20, Chain J0 Low Band Edge



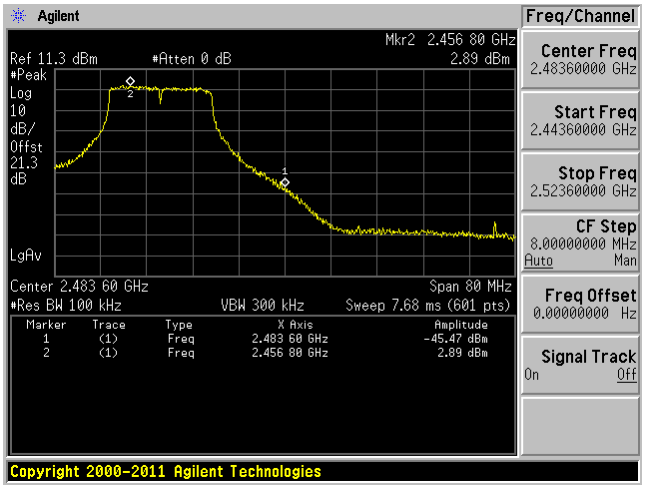
802.11n-HT20, Chain J1 Low Band Edge



802.11n-HT20, Chain J0 High Band Edge

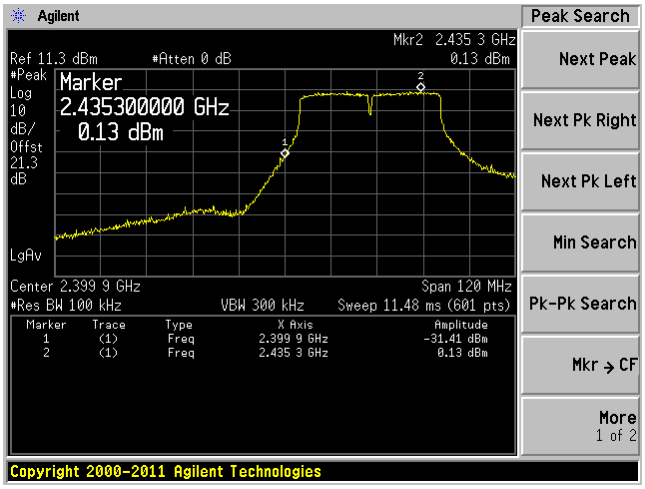


802.11n-HT20, Chain J1 High Band Edge

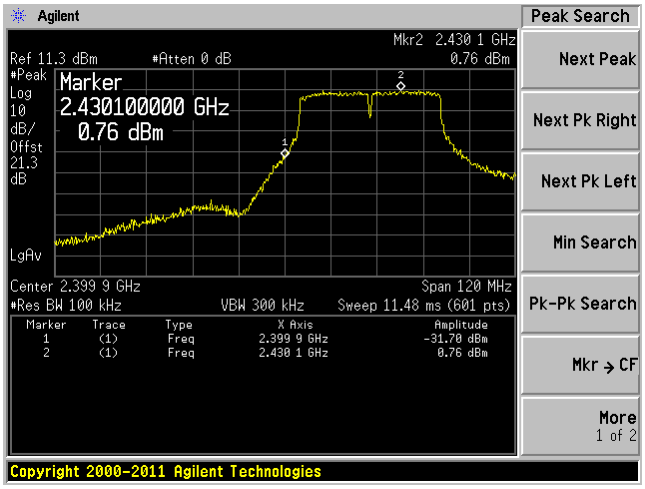


802.11n-HT40 mode

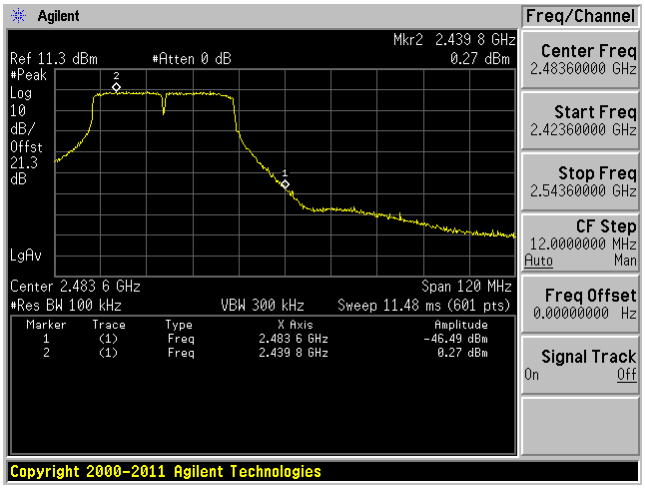
802.11n-HT40, Chain J0 Low Band Edge



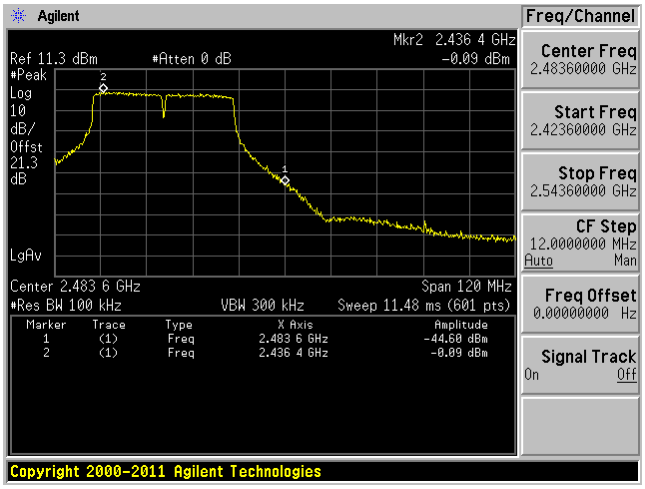
802.11n-HT40, Chain J1 Low Band Edge



802.11n-HT40, Chain J0 High Band Edge



802.11n-HT40, Chain J1 High Band Edge



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

12.1 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.

12.2 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

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 per the A2LA requirements, traceable to the NIST.*

12.4 Test Environmental Conditions

Temperature:	23 °C
Relative Humidity:	45 %
ATM Pressure:	101.5 kPa

The testing was performed by Bo Li from 2013-08-22 at RF site.

12.5 Test Results

802.11b mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm)	TX Chain J1 PSD (dBm)	Highest PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-3.57	-1.96	-1.96	6.6	-8.56
Middle	2437	-3.07	-2.87	-2.87	6.6	-9.47
High	2462	-3.3	-1.62	-1.62	6.6	-8.22

802.11 g mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm)	TX Chain J1 PSD (dBm)	Highest PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-4.53	-4.14	-4.14	6.6	-10.74
Middle	2437	-4.75	-4.51	-4.51	6.6	-11.11
High	2462	-3.68	-3.83	-3.68	6.6	-10.28

802.11n-HT20 mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm)	TX Chain J1 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-5.71	-4.78	-2.21	6.6	-8.81
Middle	2437	-6.16	-5.93	-3.03	6.6	-9.63
High	2462	-6.66	-5.39	-2.97	6.6	-9.57

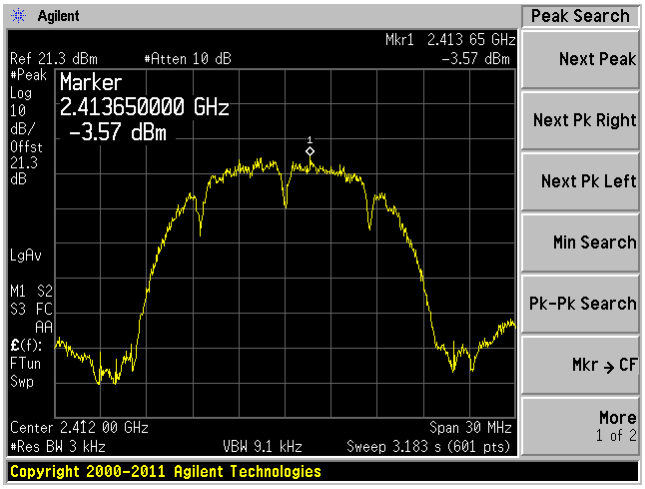
802.11n-HT40 mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm)	TX Chain J1 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2422	-8.57	-7.19	-4.82	6.6	-11.42
Middle	2437	-9.04	-8.09	-5.53	6.6	-12.13
High	2452	-8.87	-7.04	-4.85	6.6	-11.45

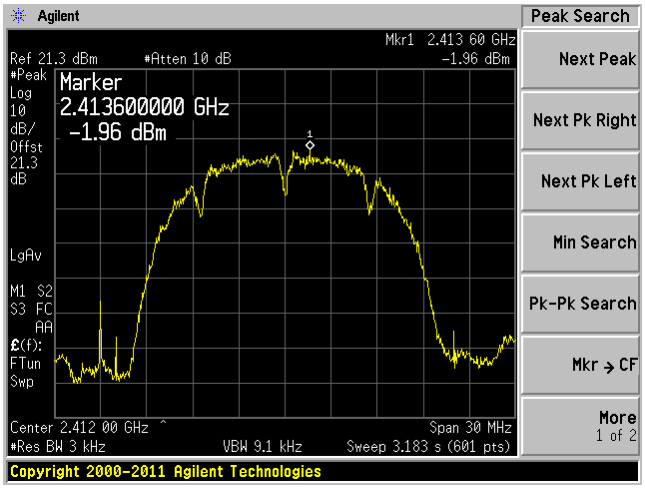
Please refer to the following plots for detailed test results:

802.11b mode

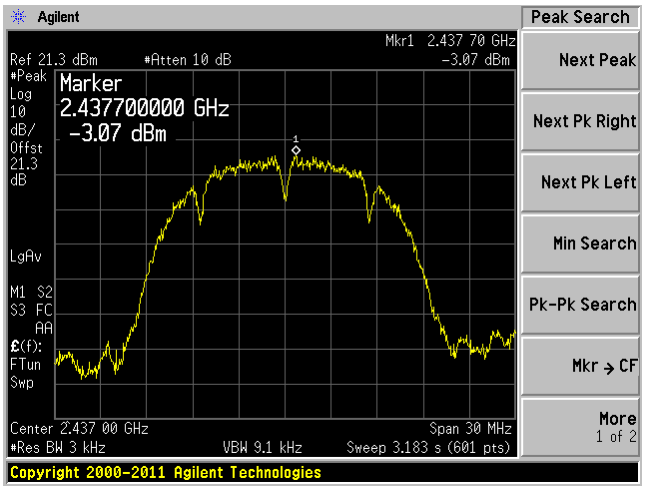
Low channel J0: 2412 MHz



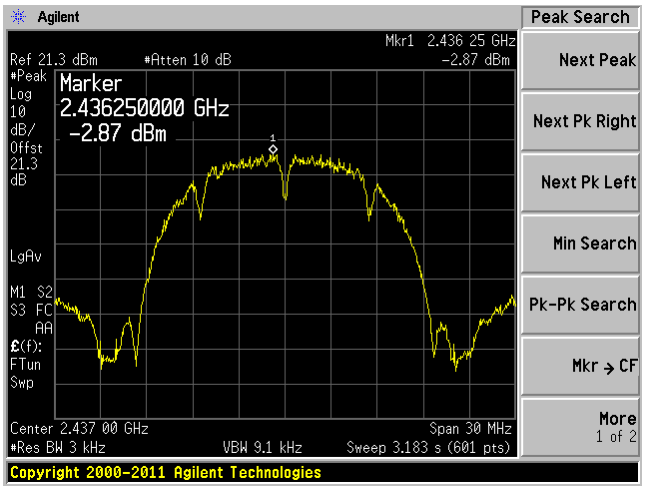
Low channel J1: 2412 MHz



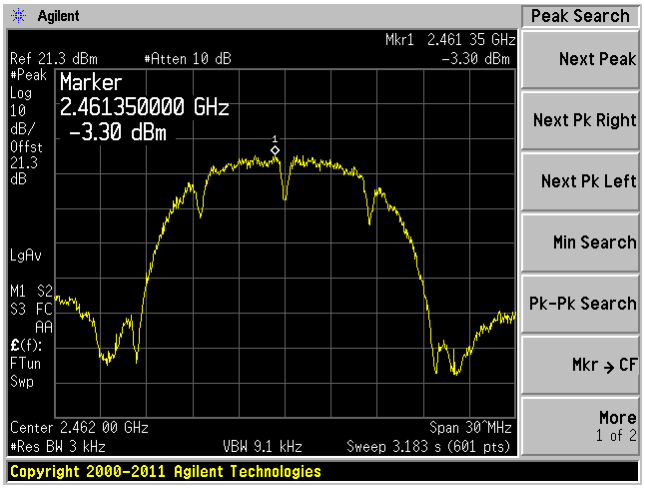
Middle channel J0: 2437 MHz



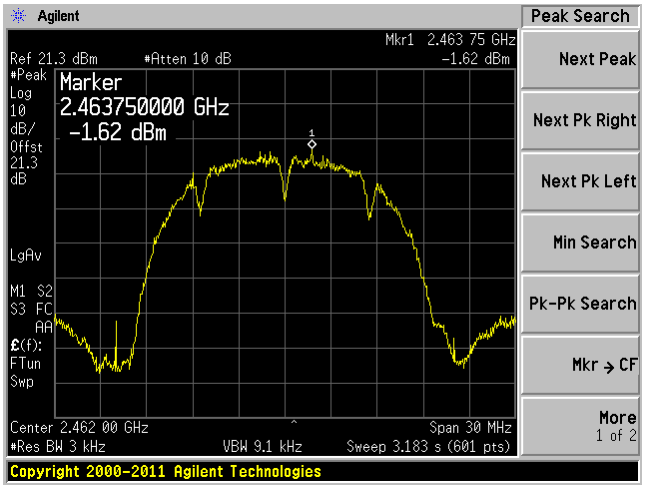
Middle channel J1: 2437 MHz



High channel J0: 2462 MHz

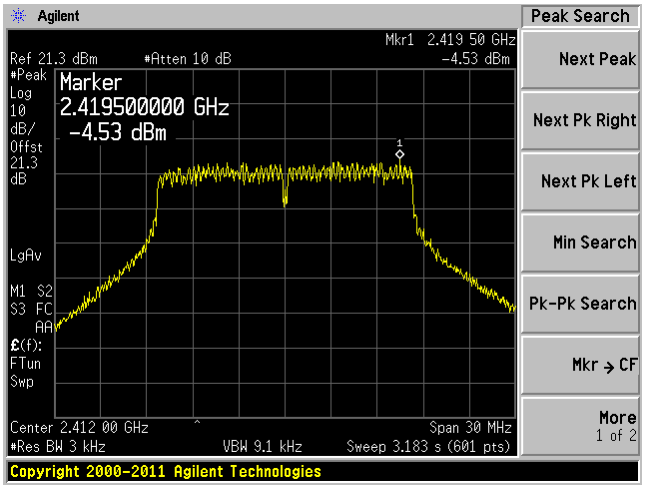


High channel J1: 2462 MHz

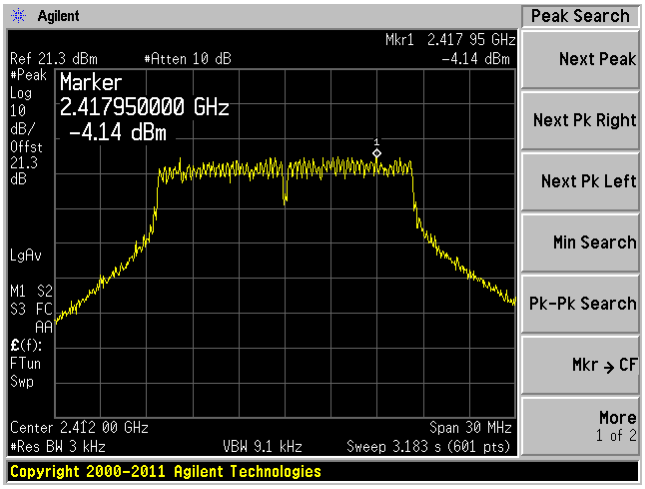


802.11g mode

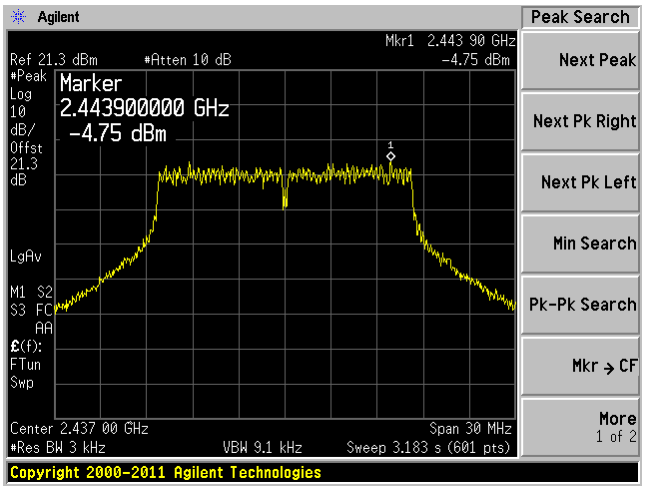
Low channel J0: 2412 MHz



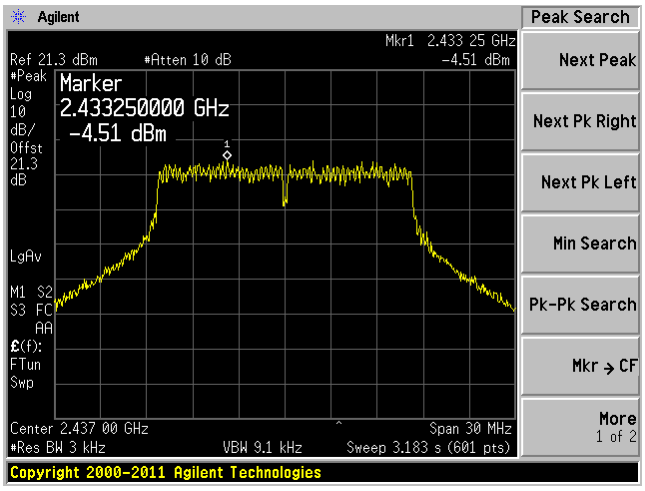
Low channel J1: 2412 MHz



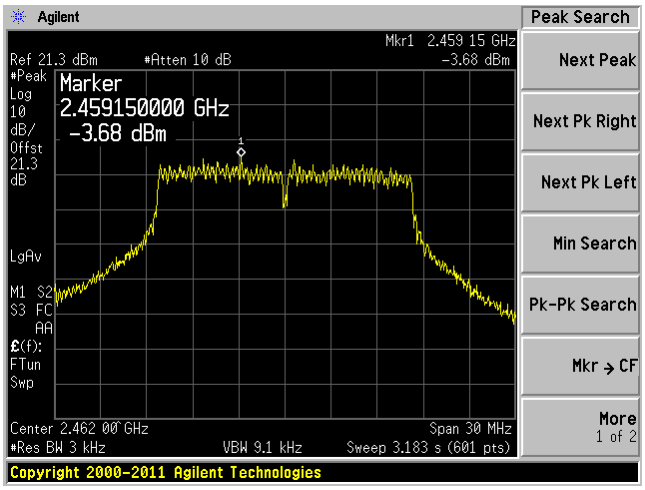
Middle channel J0: 2437 MHz



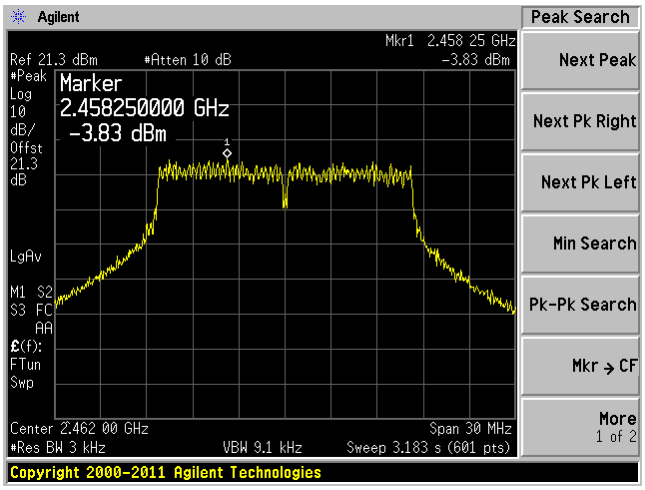
Middle channel J1: 2437 MHz



High channel J0: 2462 MHz

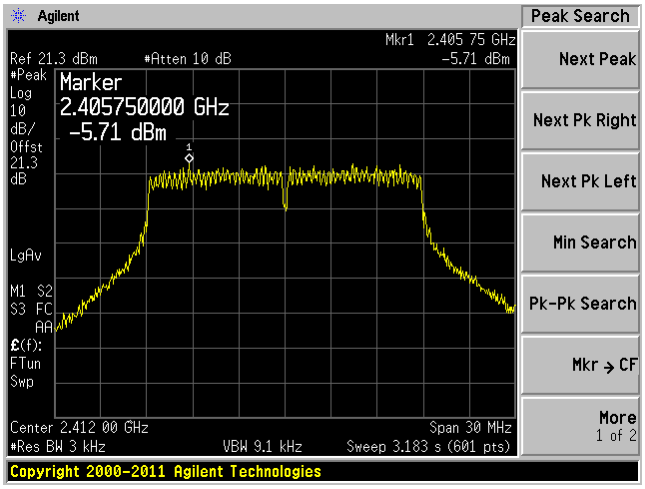


High channel J1: 2462 MHz

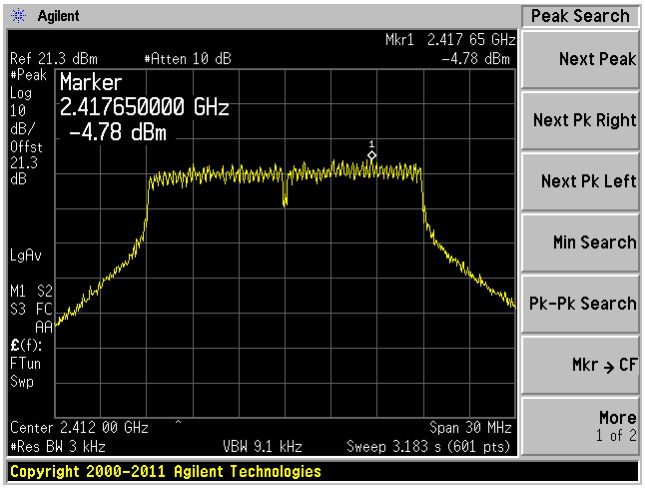


802.11n-HT20 mode

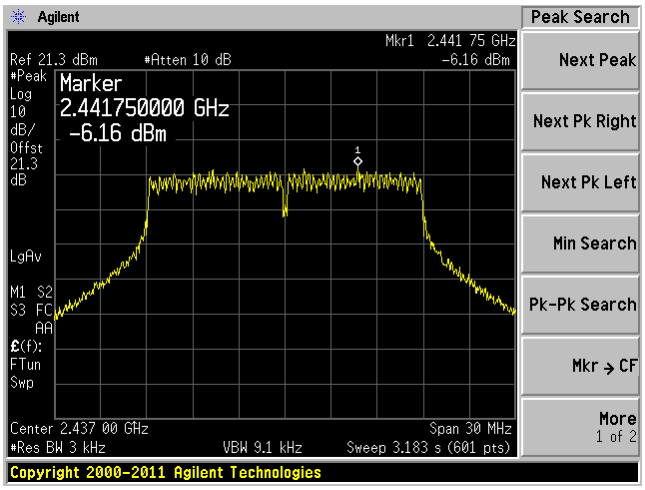
Low channel J0: 2412 MHz



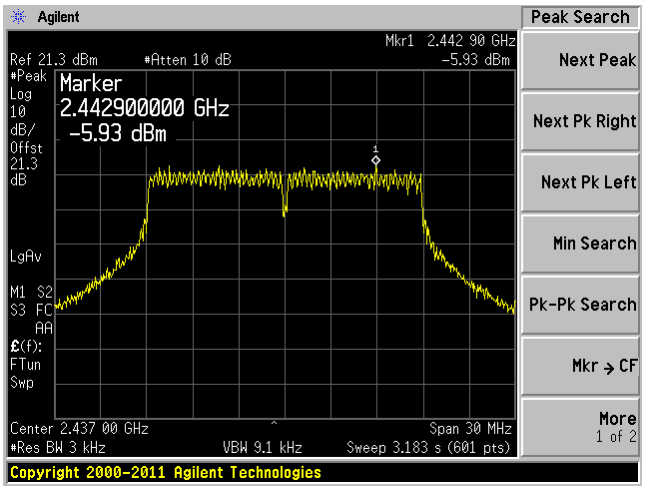
Low channel J1: 2412 MHz



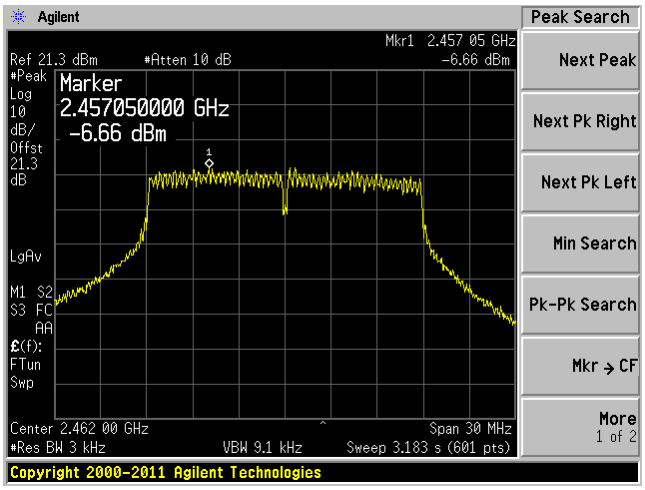
Middle channel J0: 2437 MHz



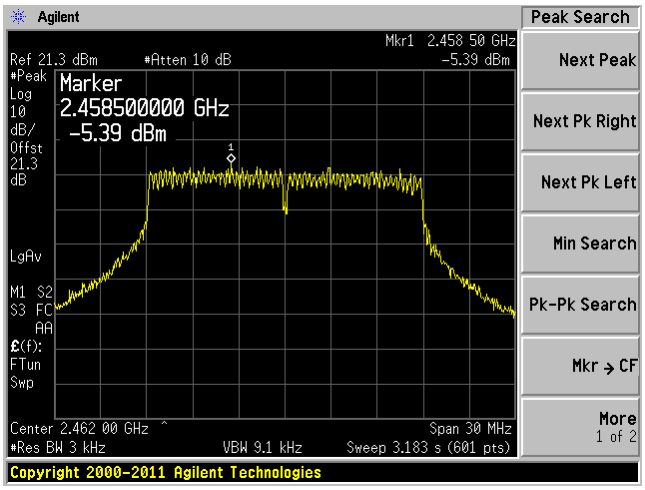
Middle channel J1: 2437 MHz



High channel J0: 2462 MHz

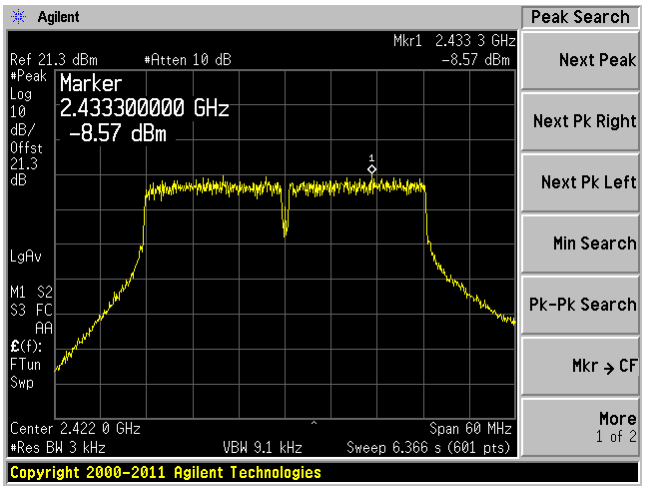


High channel J1: 2462 MHz

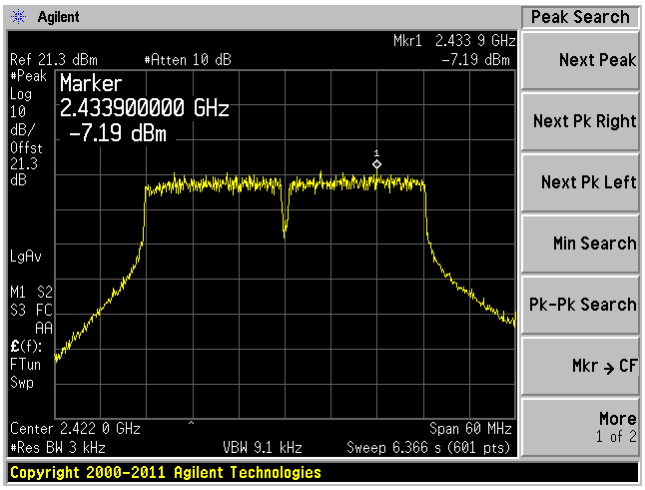


802.11n-HT40 mode

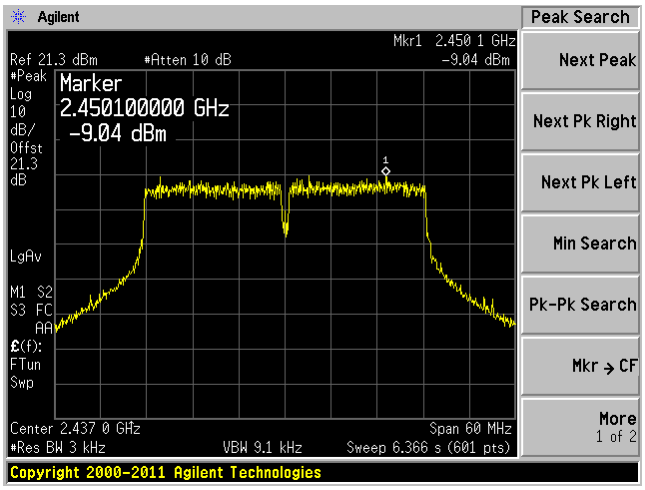
Low channel J0: 2422 MHz



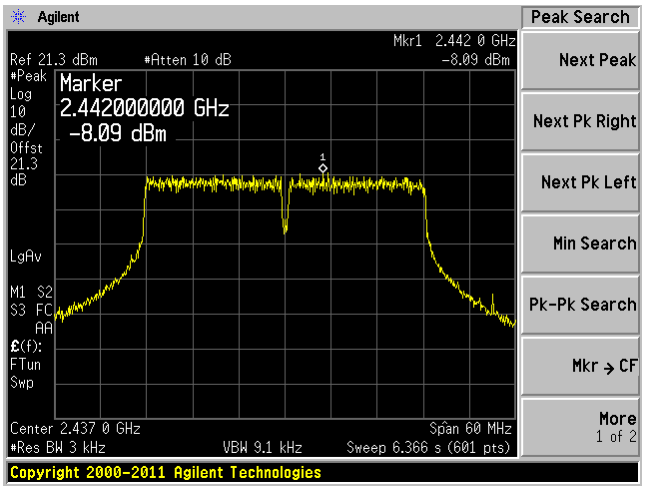
Low channel J1: 2422 MHz



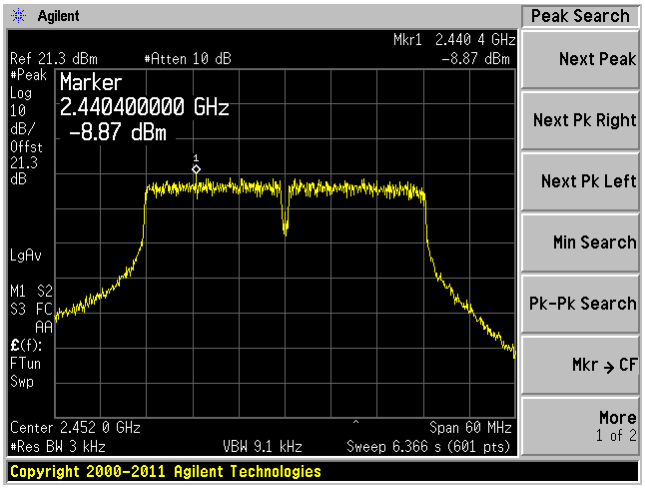
Middle channel J0: 2437 MHz



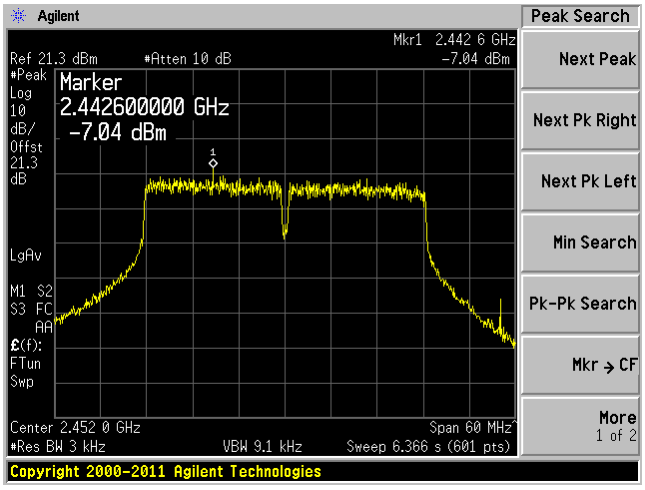
Middle channel J1: 2437 MHz



High channel J0: 2452 MHz



High channel J1: 2452 MHz



13 IC RSS-210 §2.3 & RSS-Gen §4.10 – 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, Tables 2 show the general field strength limits of receiver spurious emissions

Table 2: Radiated Limits 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 C63.4-2009.

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 Lists and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	N/R
Sunol Science Corp	Combination Antenna	JB3	A020106-3	2013-06-18	1 year
Hewlett Packard	Pre-amplifier	8447D	2944A06639	2013-06-09	1 year
Mini-Circuits	Pre-amplifier	ZVA-183-S	570400946	2013-05-09	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 attests that all calibrations have been performed per the A2LA requirements, traceable to NIST.*

13.6 Test Environmental Conditions

Temperature:	22 °C
Relative Humidity:	47 %
ATM Pressure:	102.1 kPa

The testing was performed by Wei Sun on 2013-7-05 at 5 meter 3.

13.7 Summary of Test Results

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

30 MHz – 1 GHz

Mode: Receiving			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Range (MHz)**
-2.04	201.973	Vertical	30-1000

1 GHz – 12.75 GHz

Mode: Receiving			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Range (MHz)**
-2.955	13790	Horizontal and Vertical	1000-12750

13.8 Test Results

1) 30-1000 MHz, Measured at 3 meters

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (QP/Ave.)
189.145	30.23	106	V	284	43.5	-13.27	QP
201.973	41.46	99	V	319	43.5	-2.04	QP
143.51275	34.34	186	H	160	43.5	-9.16	QP
378.4015	40.43	119	V	107	46	-5.57	QP
33.462	24.16	161	V	262	40	-15.84	QP
227.84725	36.07	99	V	323	46	-9.93	QP
720.033	25.26	214	V	76	46	-20.74	QP

2) Above 1 GHz Measured at 3 meters

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comment
6774	54.254	100	H	0	74	-19.746	Peak
6774	54.094	100	V	0	74	-19.906	Peak
6774	39.274	100	H	0	54	-14.726	Ave
6774	39.724	100	V	0	54	-14.276	Ave
13790	65.535	100	H	0	74	-8.465	Peak
13790	66.065	100	V	0	74	-7.935	Peak
13790	51.045	100	H	0	54	-2.955	Ave
13790	51.045	100	V	0	54	-2.955	Ave