



FCC PART 15, SUBPART C TEST AND MEASUREMENT REPORT

For

Actiontec Electronics, Inc.

760 North Mary Avenue,
Sunnyvale, CA 94085, USA

FCC ID: LNQWCB3000

Report Type: Amended Report	Product Type: Multi-LAN Network Adapter
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* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "*" (BAC-2)

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1212106-247	Original Report	2013-02-01
1	R1212106A-247	Update Power Supply Information on page 8	2013-02-04

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *Actiontec Electronics, Inc.*, and their product *FCC ID: LNQWCB3000*, model: *WCB3000* or the “EUT” as referred to in this report. The EUT is a Multi-LAN network adapter with Coax with 802.11 a/b/g/n functionality that operates in 2400-2483.5 MHz, 5150-5250 MHz and 5725-5850 MHz band.

1.2 Mechanical Description of EUT

The EUT measures approximately 16.51 cm (L) x 12.7 cm (W) x 3.18 cm (H) and weighs 0.3 kg.

The test data gathered are from typical production sample, serial number: 1212106, assigned by BACL.

1.3 Objective

This report is prepared on behalf of *Actiontec Electronics, Inc.* in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15.247 rules for Output Power, Antenna Requirements, 6 dB Bandwidth, and power spectral density, 100 kHz Bandwidth of Band Edges Measurement, AC Line Conducted Emissions, Conducted and Radiated Spurious Emissions.

1.4 Related Submittal(s)/Grant(s)

FCC Part 15.407 UNI with FCC ID: LNQWCB3000.

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

1.6 Measurement Uncertainty

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

Based on CISPR16-4-2:2003, The Treatment of Uncertainty in EMC Measurements, the values ranging from ± 2.0 dB for Conducted Emissions tests and ± 4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

1.7 Test Facility

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

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

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

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

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

2 System Test Configuration

2.1 Justification

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

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

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

2.2 EUT Exercise Software

The softwares used for test were Tera Term and MP Test, provided by Actiontec Electronics, Inc., and was verified by Wei Sun to comply with the standard requirements being tested against.

2.3 Special Equipment

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

2.4 Equipment Modifications

No modifications were made to the EUT.

2.5 Local Support Equipment

Manufacturer	Description	Model	Serial Number
DELL	Laptop	Latitude E5420	-
Dell	Laptop	Latitude D600	CN-0X2034-48643-3A6-8307

2.6 EUT Internal Configuration Details

Manufacturer	Description	Model	Serial Number
Actiontec Electronic, Inc	Main PCB Board	WCB300-4B	23900020

2.7 Interface Ports and Cables

Cable Description	Length (m)	To	From
RJ 45 Cable x2	3m	LAPTOP	EUT

2.8 EUT Power Supply Information

Manufacturer	Description	Model	Serial Number
AcBel	AC/DC Power Adapter	WAC010	WC1002CD0LKA

3 Summary of Test Results

Results reported relate only to the product tested.

FCC Rules	Description of Test	Results
§15.247(i), §2.1091	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.207(a)	AC Line Conducted Emissions	Compliant
§15.247 (d)	Spurious Emissions at Antenna Port	Compliant
§15.205	Restricted Bands	Compliant
§15.209, §15.247 (d)	Radiated Spurious Emissions	Compliant
§15.247(a)(2)	6 dB Emission Bandwidth	Compliant
§15.247(b)(3)	Maximum Peak Output Power	Compliant
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247(e)	Power Spectral Density	Compliant

4 FCC §15.247 (i) & §2.1091 – 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

4.2 MPE Prediction

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

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

Where: S = power density

P = power input to antenna

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

R = distance to the center of radiation of the antenna

4.3 MPE Results

2.4 GHz band:

Maximum peak output power at antenna input terminal (dBm):	24.64
Maximum peak output power at antenna input terminal (mW):	291.07
Prediction distance (cm):	20
Prediction frequency (MHz):	2437
Maximum Antenna Gain, typical (dBi):	1.8
Maximum Antenna Gain (numeric):	1.514
Power density of prediction frequency at 20.0 cm (mW/cm ²):	0.0877
MPE limit for uncontrolled exposure at prediction frequency (mW/cm ²):	1.0

5.8 GHz band:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>26.46</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>442.59</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5745</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>3.8</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>2.4</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.21</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

The device is compliant with the MPE limit for uncontrolled exposure at 20 cm distance.

5 FCC §15.203 – Antenna Requirements

5.1 Applicable Standard

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

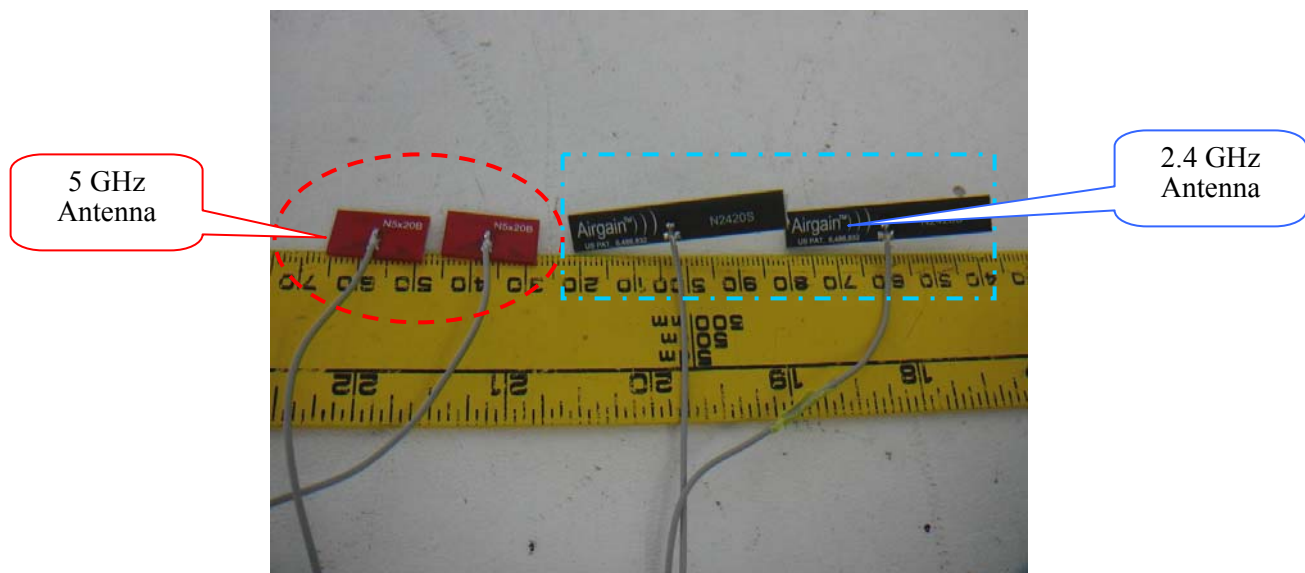
And according to FCC §15.247 (b) (4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.2 Antenna List

Manufacturers	Models/Name	Antenna Gain (dBi) @ 2.4 GHz
Airgain x2	N2420S	1.8

Manufacturers	Models/Name	Antenna Gain (dBi) @ 5.8 GHz
Airgain x2	N5x20B	3.8

The antenna consists of non-standard (UFL) connectors with less 6 dBi gain; therefore, it complies with the antenna requirement. Please refer to the photos below.



6 FCC §15.207 – AC Line Conducted Emissions

6.1 Applicable Standards

As per FCC §15.207 Conducted limits:

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

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 *	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 limits.

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

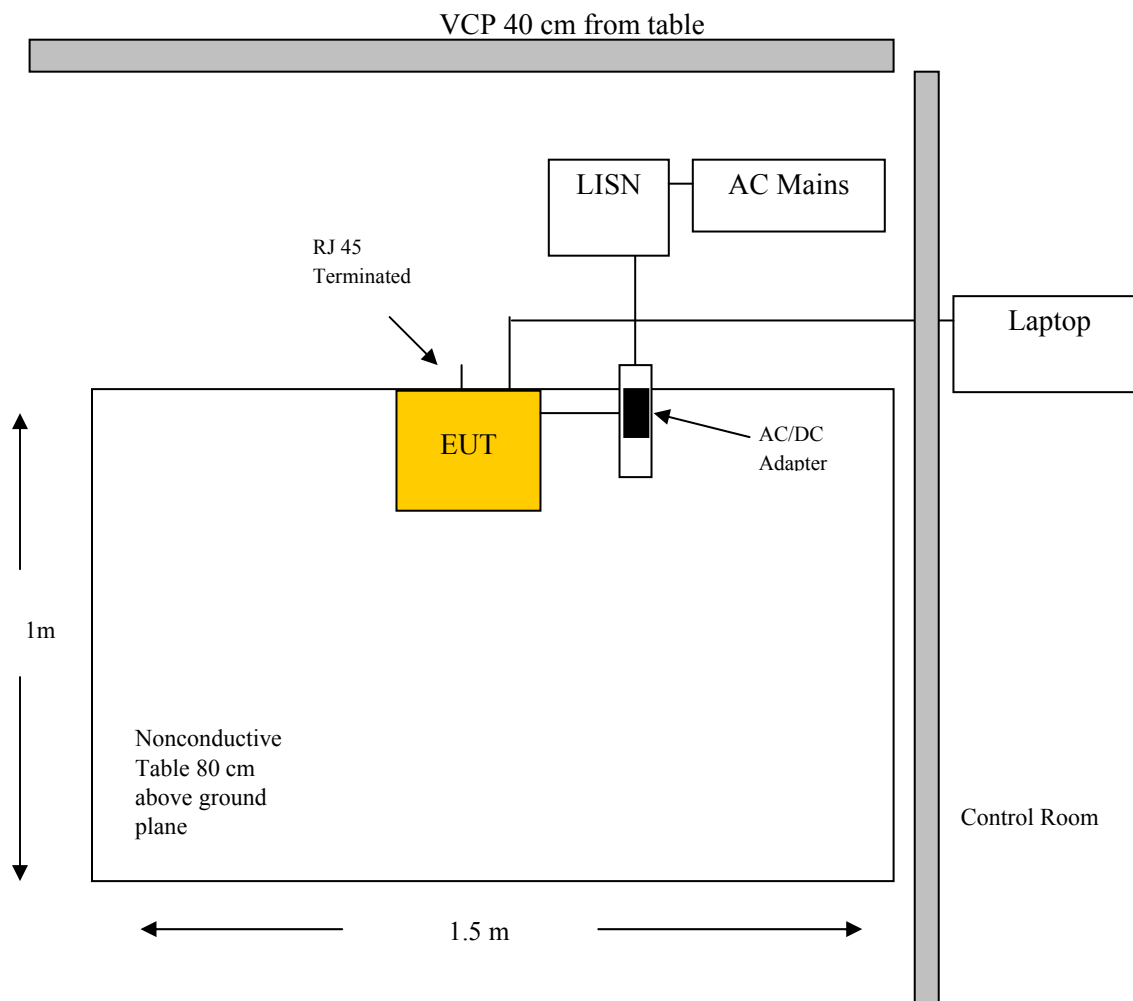
The AC/DC power adapter of the EUT was connected with LISN-1 which provided 120 V / 60 Hz AC power.

6.3 Test Procedure

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



6.5 Corrected Amplitude & Margin Calculation

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

$$CA = Ai + CL + Atten$$

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

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

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

6.6 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100044	2012-04-18	1 year
Solar Electronics	LISN	9252-R-24-BNC	511205	2012-06-25	1 year
TTE	Filter, High Pass	H9962-150K-50-21378	K7133	2012-05-30	1 year

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

6.7 Test Environmental Conditions

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

The testing was performed by Wei Sun on 2013-01-16 in 5 m chamber 3.

6.8 Summary of Test Results

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

Worst case: 802.11b mode, Middle Chanel for 2.4 GHz Band

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	Frequency (MHz)	Conductor Mode (Line/Neutral)	Range (MHz)
-16	11.11043	Neutral	0.15-30

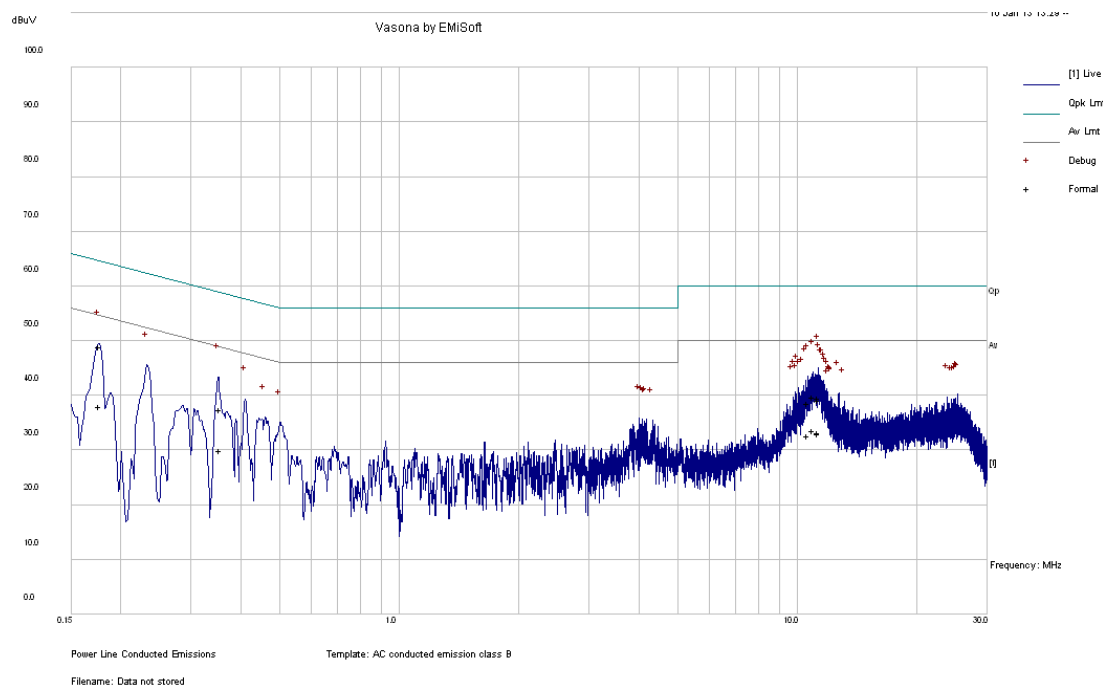
Worst case: 802.11n20 mode, Middle Chanel for 5.8 GHz Band

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	Frequency (MHz)	Conductor Mode (Line/Neutral)	Range (MHz)
-18.11	0.293236	Line	0.15-30

6.9 Conducted Emissions Test Plots and Data

Worst case: 802.11b mode, Middle Chanel for 2.4GHz Band

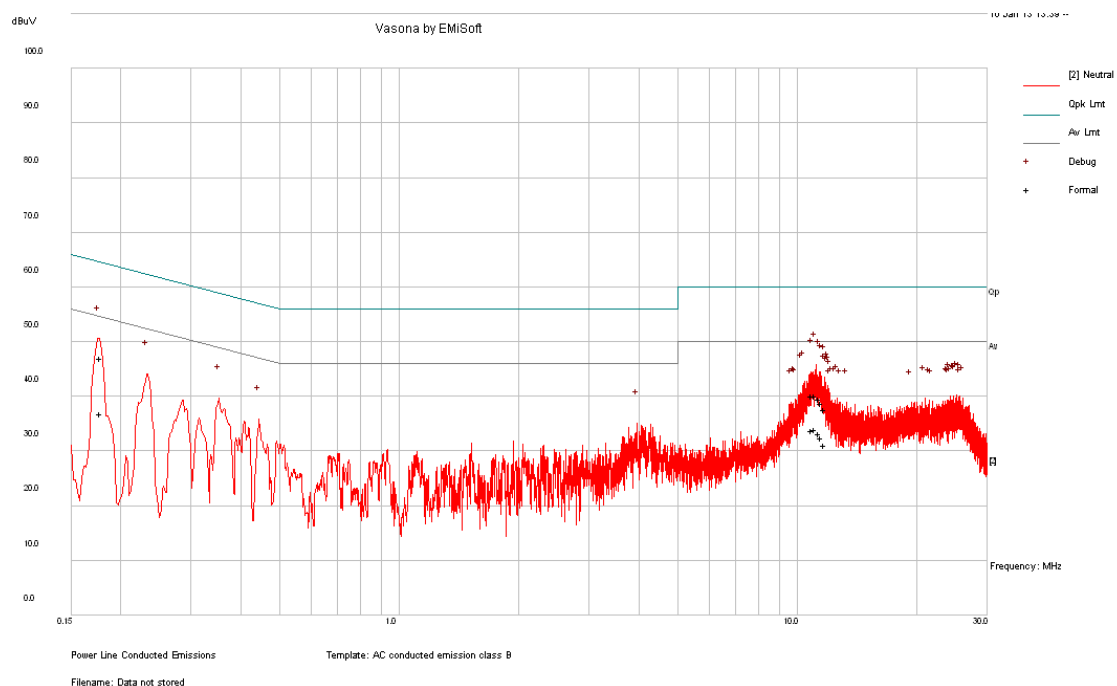
120 V, 60 Hz – Line,



Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
11.30103	39.51	Line	60	-20.49	QP
0.176549	48.92	Line	64.65	-15.73	QP
0.354498	37.48	Line	58.86	-21.37	QP
10.95696	39.73	Line	60	-20.27	QP
11.34	39.21	Line	60	-20.79	QP
10.64726	38.63	Line	60	-21.37	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
11.30103	33.22	Line	50	-16.78	Ave.
0.176549	37.97	Line	54.65	-16.68	Ave.
0.354498	29.98	Line	48.86	-18.88	Ave.
10.95696	33.57	Line	50	-16.43	Ave.
11.34	33.06	Line	50	-16.94	Ave.
10.64726	32.68	Line	50	-17.32	Ave.

120 V, 60 Hz – Neutral

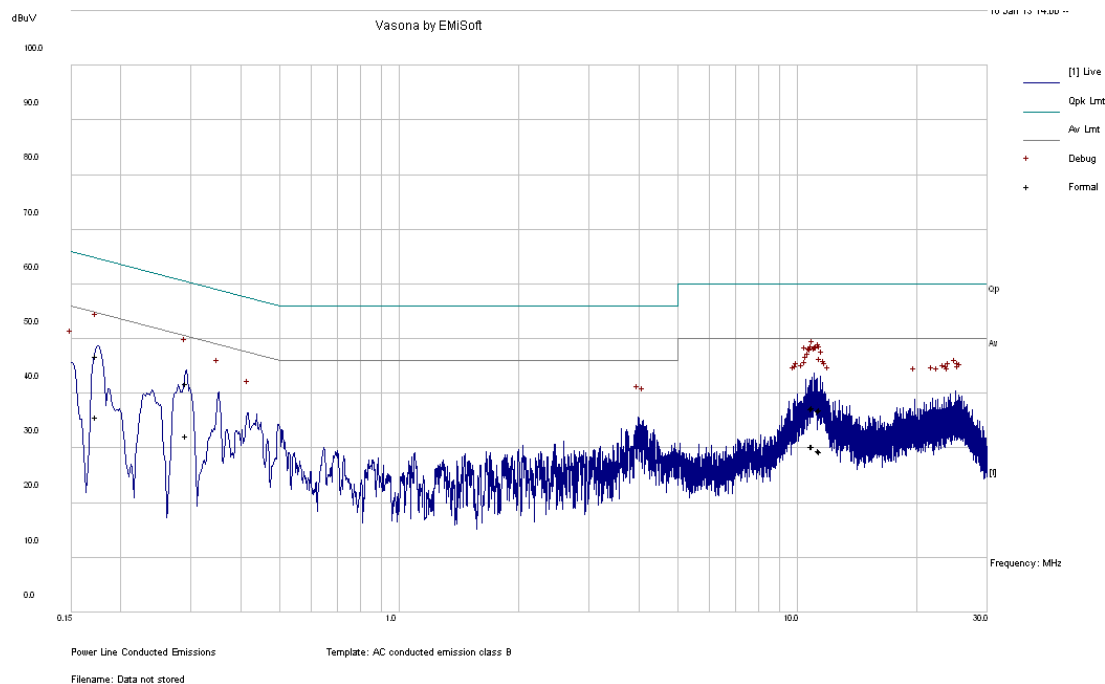


Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.177827	47.02	Neutral	64.59	-17.57	QP
11.11043	40.16	Neutral	60	-19.84	QP
10.93535	40.19	Neutral	60	-19.81	QP
11.38071	39.57	Neutral	60	-20.43	QP
11.53503	38.79	Neutral	60	-21.21	QP
11.74763	37.58	Neutral	60	-22.42	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.177827	36.81	Neutral	54.59	-17.77	Ave.
11.11043	34	Neutral	50	-16	Ave.
10.93535	33.9	Neutral	50	-16.1	Ave.
11.38071	33.28	Neutral	50	-16.72	Ave.
11.53503	32.42	Neutral	50	-17.58	Ave.
11.74763	31.16	Neutral	50	-18.84	Ave.

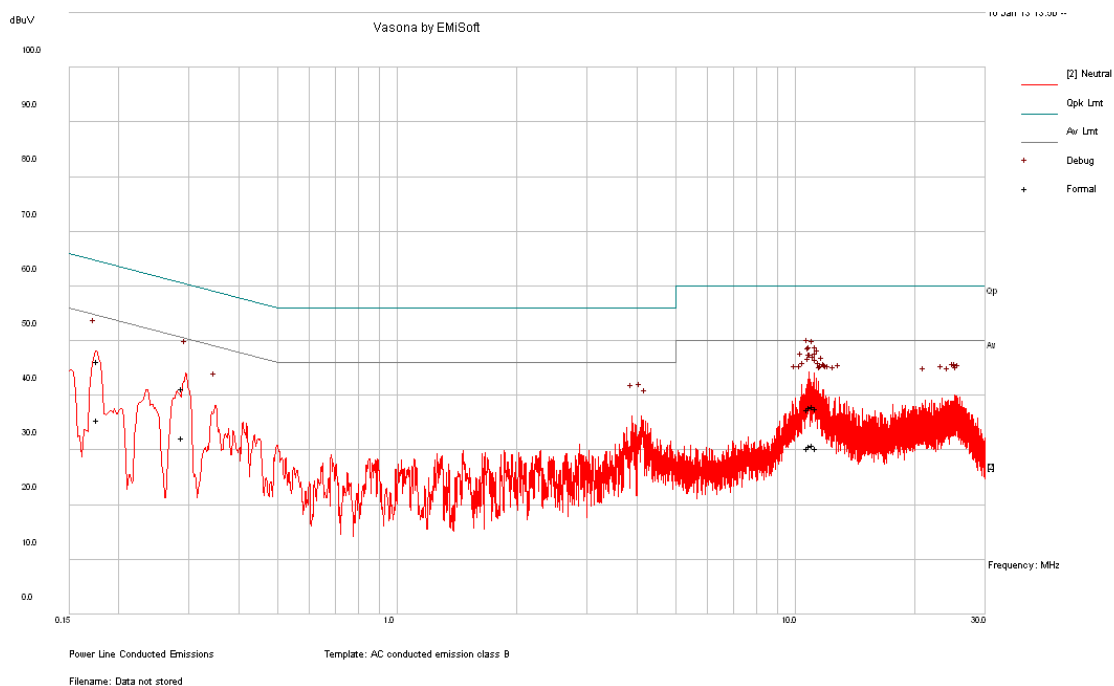
Worst case: 802.11n20 mode, Middle Channel for 5.8 GHz Band

120 V, 60 Hz – Line



Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.17391	46.87	Line	64.77	-17.9	QP
10.97016	37.51	Line	60	-22.49	QP
0.293236	41.82	Line	60.43	-18.61	QP
11.37273	36.83	Line	60	-23.17	QP
10.89645	37.35	Line	60	-22.65	QP
11.42836	37	Line	60	-23	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
0.17391	35.76	Line	54.77	-19.02	Ave.
10.97016	30.36	Line	50	-19.64	Ave.
0.293236	32.32	Line	50.43	-18.11	Ave.
11.37273	29.6	Line	50	-20.4	Ave.
10.89645	30.32	Line	50	-19.68	Ave.
11.42836	29.37	Line	50	-20.63	Ave.

120 V, 60 Hz – Neutral

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
10.77802	37.4	Neutral	60	-22.6	QP
11.12467	38.01	Neutral	60	-21.99	QP
0.28999	41.35	Neutral	60.52	-19.17	QP
0.177366	46.31	Neutral	64.61	-18.3	QP
11.32271	37.63	Neutral	60	-22.37	QP
10.89367	37.85	Neutral	60	-22.15	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
10.77802	30.43	Neutral	50	-19.57	Ave.
11.12467	30.97	Neutral	50	-19.03	Ave.
0.28999	32.32	Neutral	50.52	-18.2	Ave.
0.177366	35.6	Neutral	54.61	-19.01	Ave.
11.32271	30.4	Neutral	50	-19.6	Ave.
10.89367	30.77	Neutral	50	-19.23	Ave.

7 FCC §2.1051 & §15.247(d) – Spurious Emissions at Antenna Terminals

7.1 Applicable Standard

For 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.

7.2 Measurement Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for below 1GHz measurement and 1MHz for above 1GHz measurement. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

7.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US42221851	2012-02-28	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:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102kPa

The testing was performed by Wei Sun on 2012-12-29 at RF site.

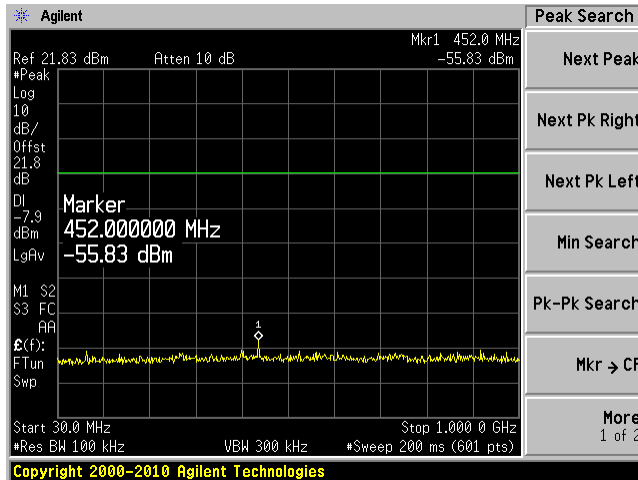
7.5 Test Results

Please refer to following plots of spurious emissions.

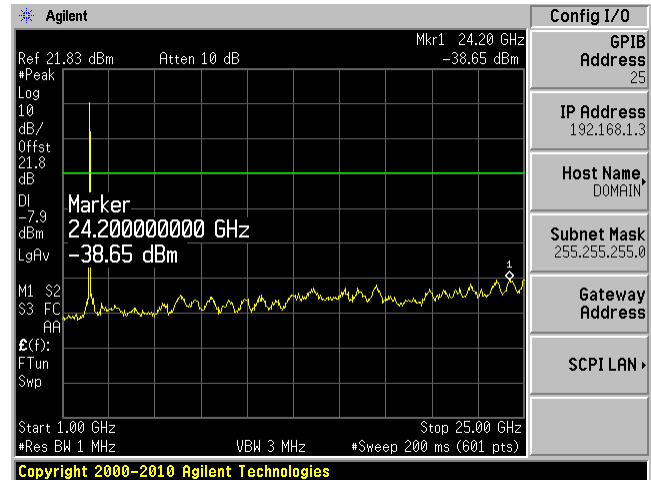
2.4 GHz Band

802.11b, Low Channel, 2412 MHz

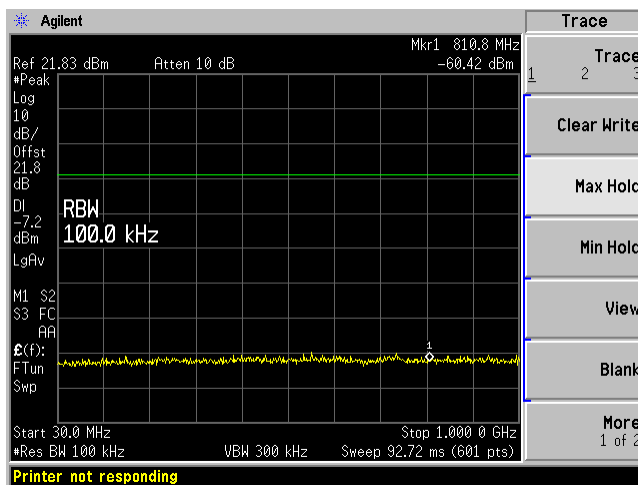
Chain J0, Plot: 30 MHz – 1 GHz



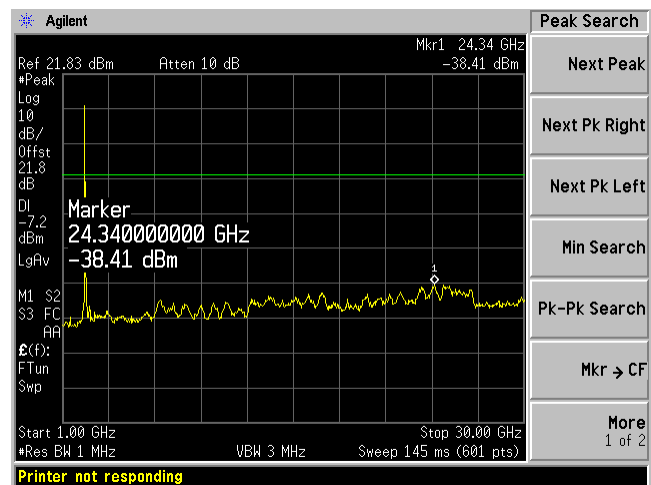
Chain J0, Plot: 1 GHz – 25 GHz



Chain J1, Plot: 30 MHz – 1 GHz

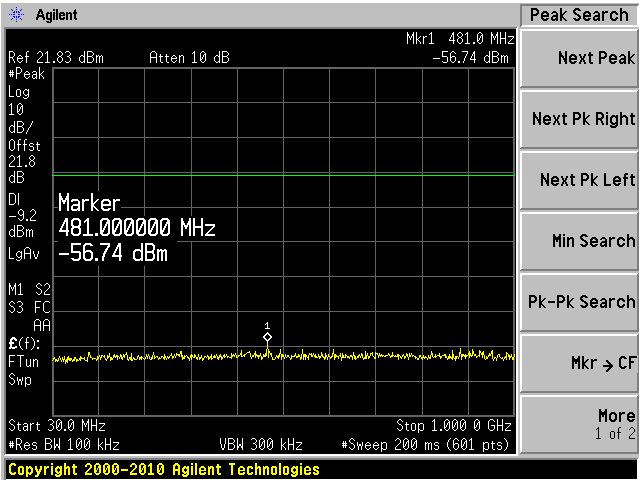


Chain J1, Plot: 1 GHz – 30 GHz

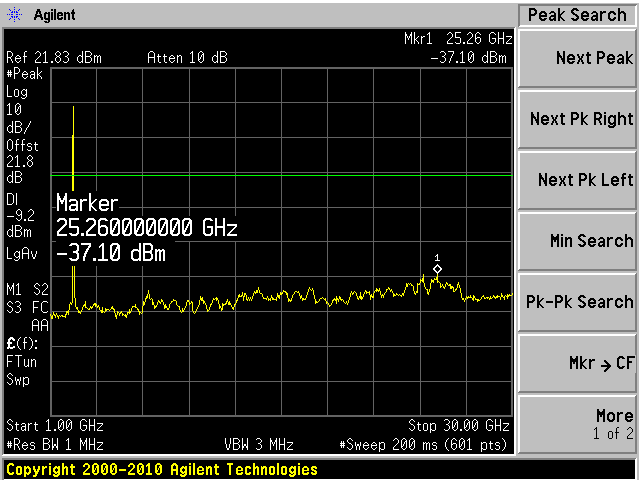


802.11b, Middle Channel, 2437 MHz

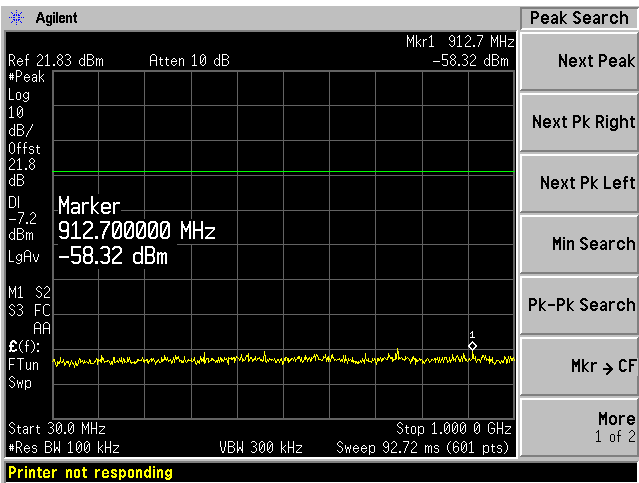
Chain J0, Plot: 30 MHz – 1 GHz



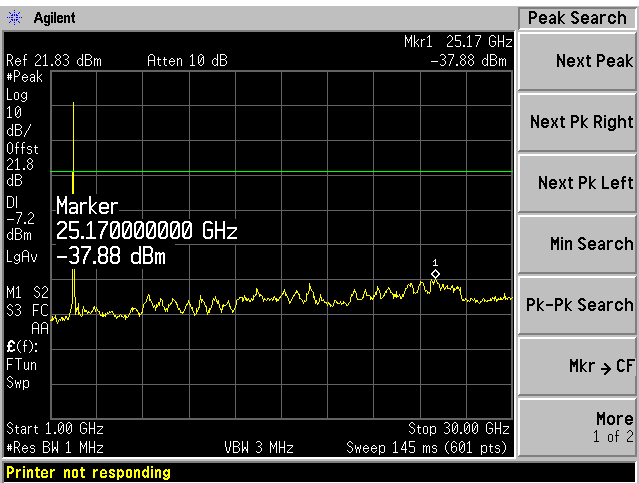
Chain J0, Plot: 1 GHz – 30 GHz



Chain J1, Plot: 30 MHz – 1 GHz



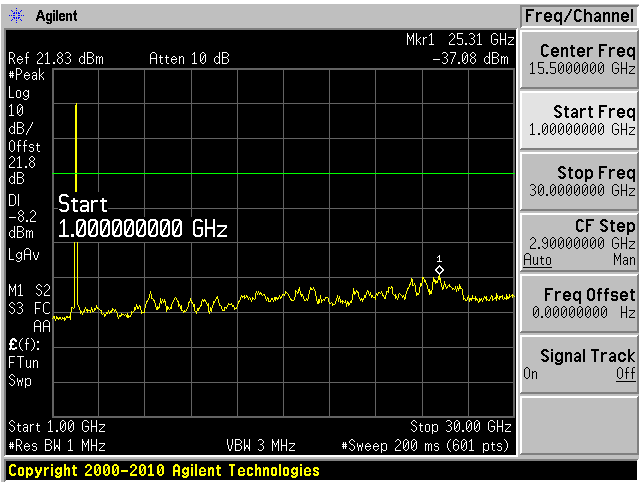
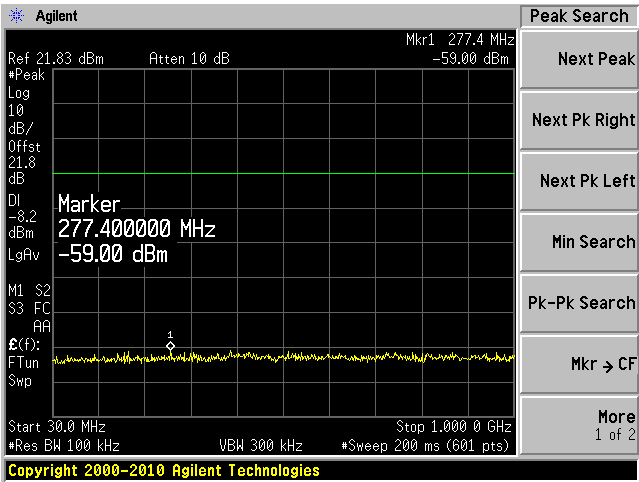
Chain J1, Plot: 1 GHz – 30 GHz



802.11b, High Channel, 2462 MHz

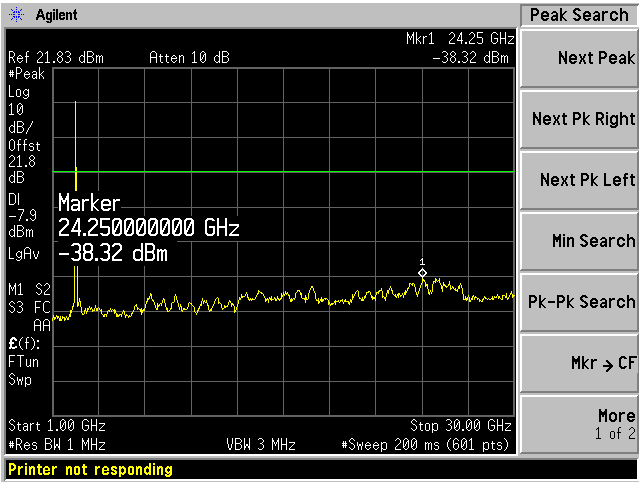
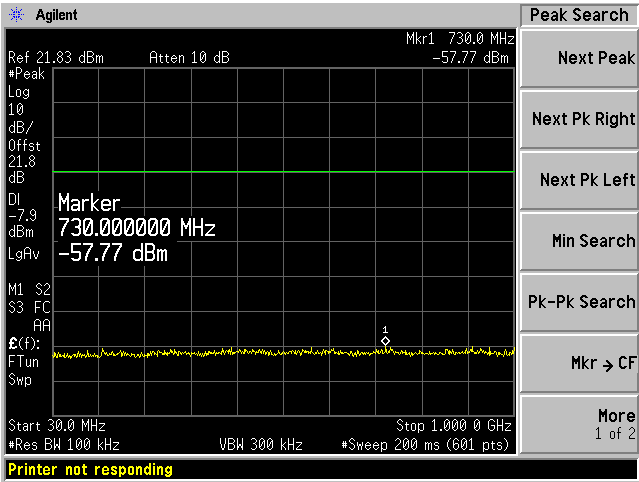
Chain J0, Plot: 30 MHz – 1 GHz

Chain J0, Plot: 1 GHz – 30 GHz



Chain J1, Plot: 30 MHz – 1 GHz

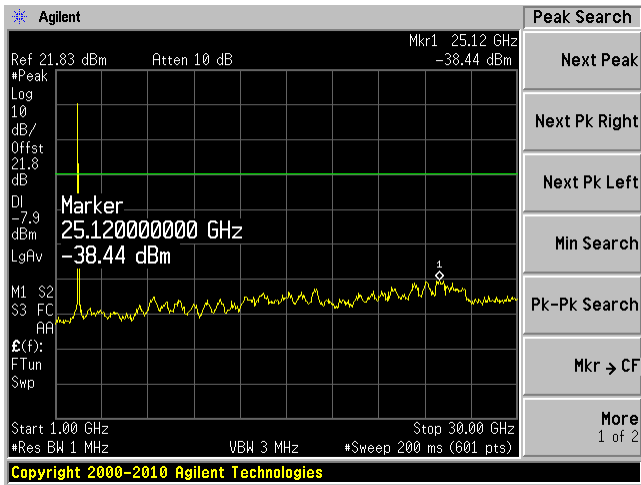
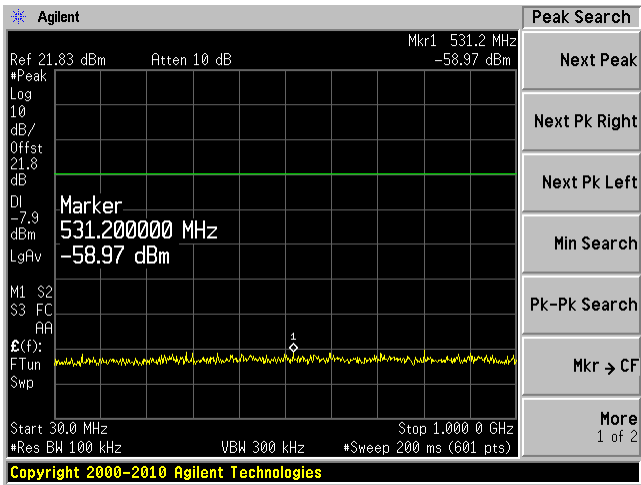
Chain J1, Plot: 1 GHz – 30 GHz



802.11g, Low Channel 2412 MHz

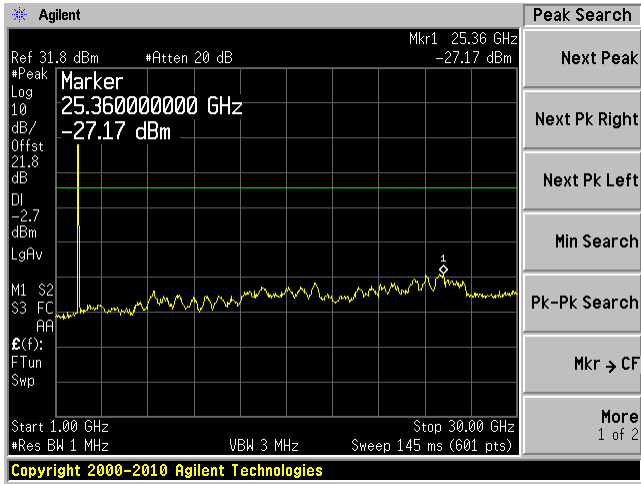
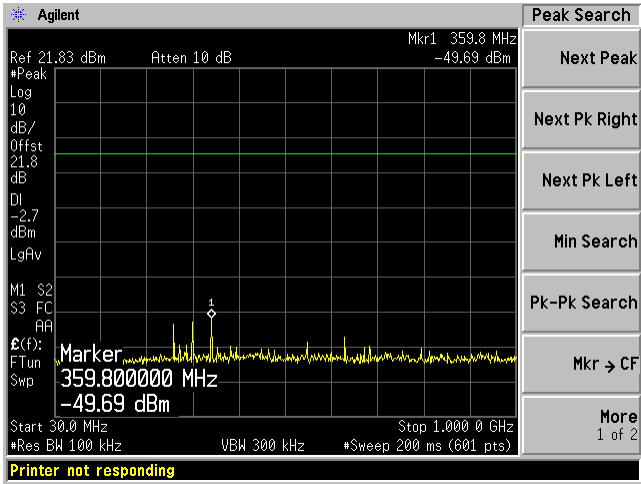
Chain J0, Plot: 30 MHz – 1 GHz

Chain J0, Plot: 1 GHz – 30 GHz



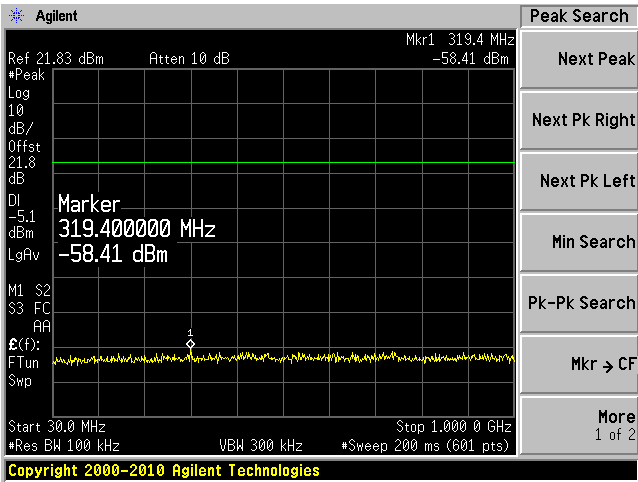
Chain J1, Plot: 30 MHz – 1 GHz

Chain J1, Plot: 1 GHz – 30 GHz

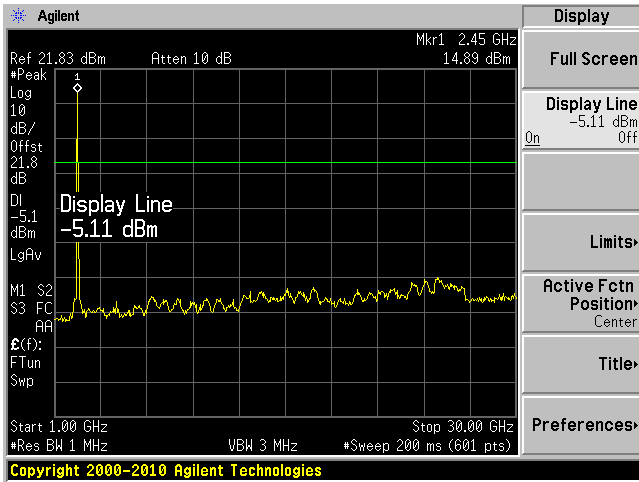


802.11g, Middle Channel 2437 MHz

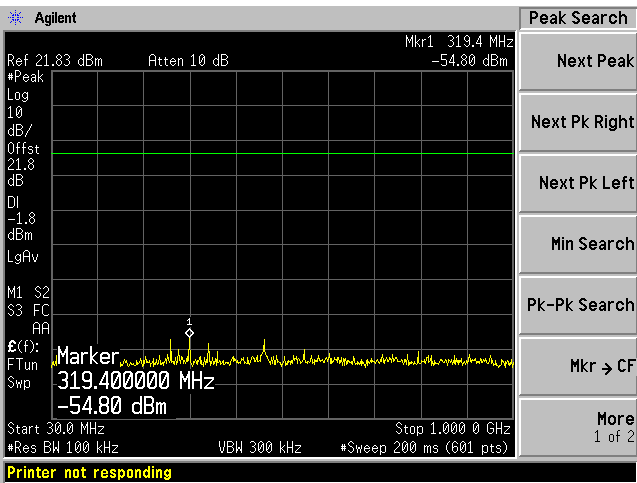
Chain J0, Plot: 30 MHz – 1 GHz



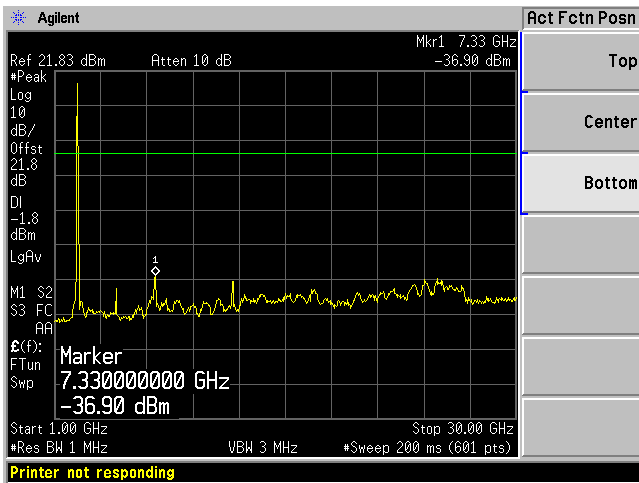
Chain J0, Plot: 1 GHz – 30 GHz



Chain J1, Plot: 30 MHz – 1 GHz

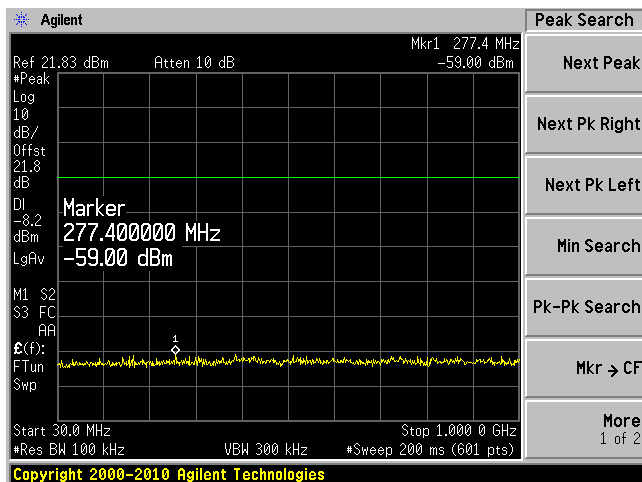


Chain J1, Plot: 1 GHz – 30 GHz

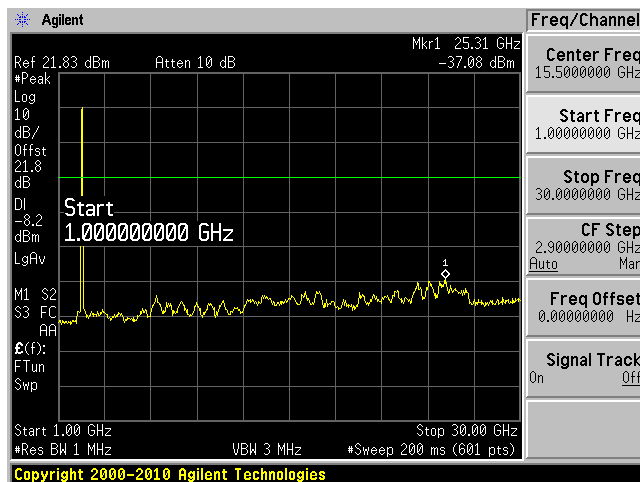


802.11g, High Channel 2462 MHz

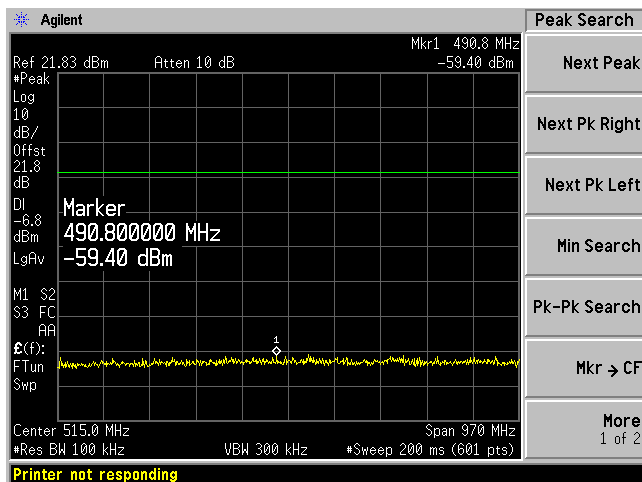
Chain J0, Plot: 30 MHz – 1 GHz



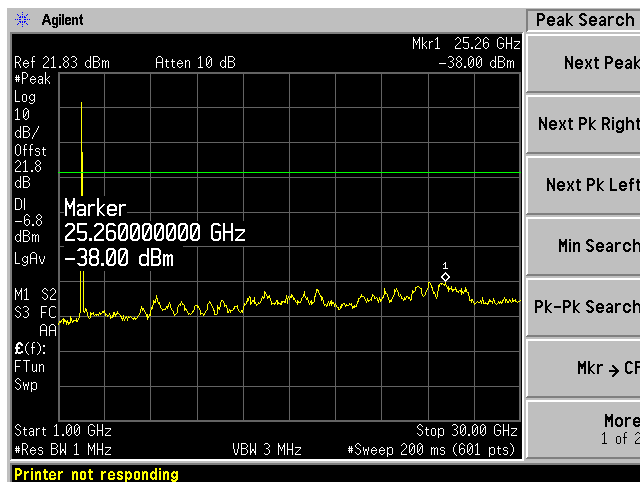
Chain J0, Plot: 1 GHz – 30 GHz



Chain J1, Plot: 30 MHz – 1 GHz

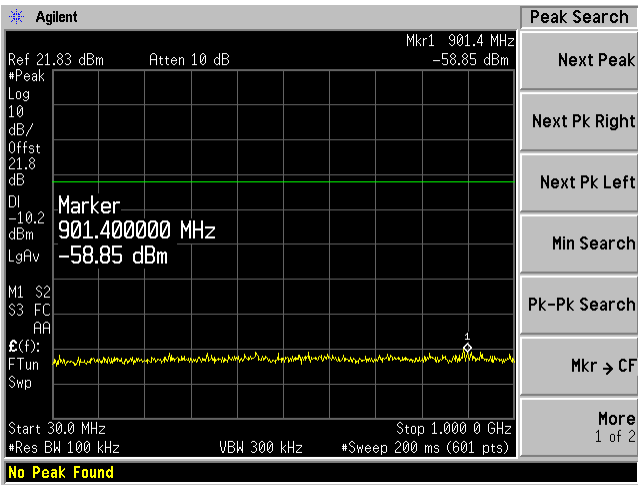


Chain J1, Plot: 1 GHz – 30 GHz

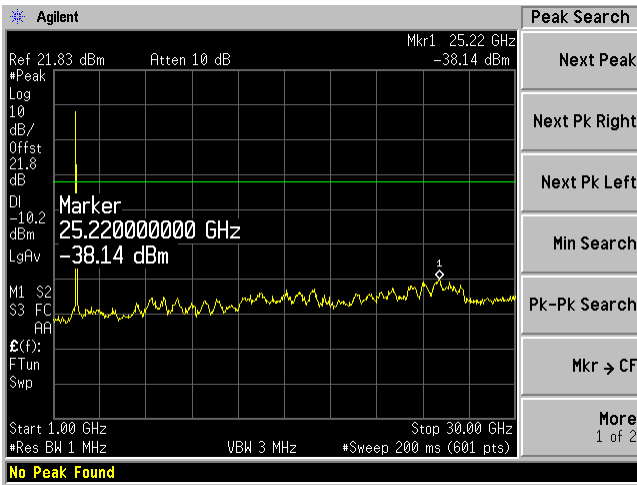


802.11n-HT20, Low Channel 2412 MHz

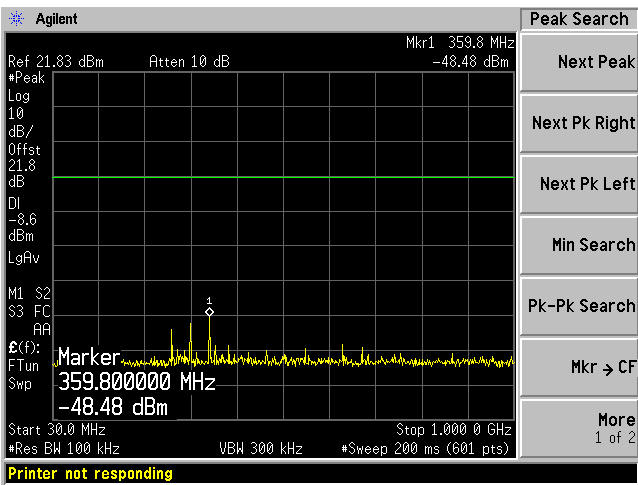
Chain J0, Plot: 30 MHz – 1 GHz



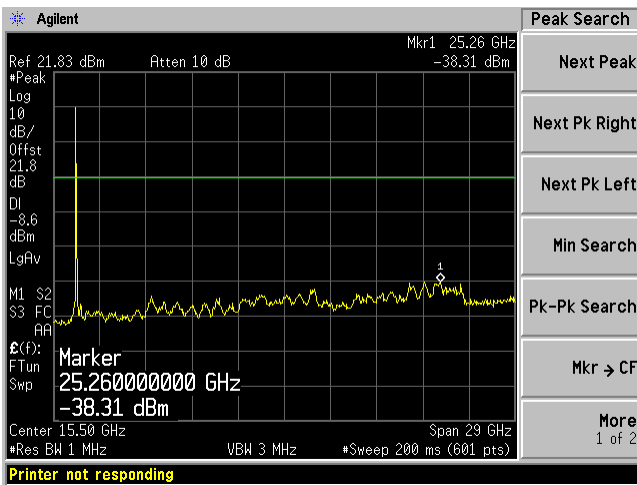
Chain J0, Plot: 1 GHz – 30 GHz



Chain J1, Plot: 30 MHz – 1 GHz

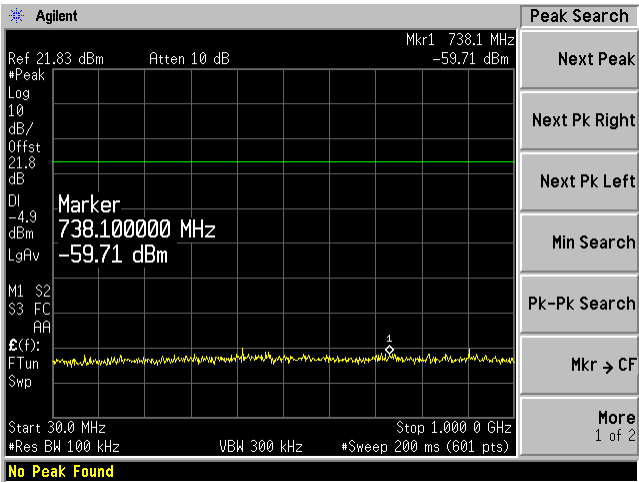


Chain J1, Plot: 1 GHz – 30 GHz

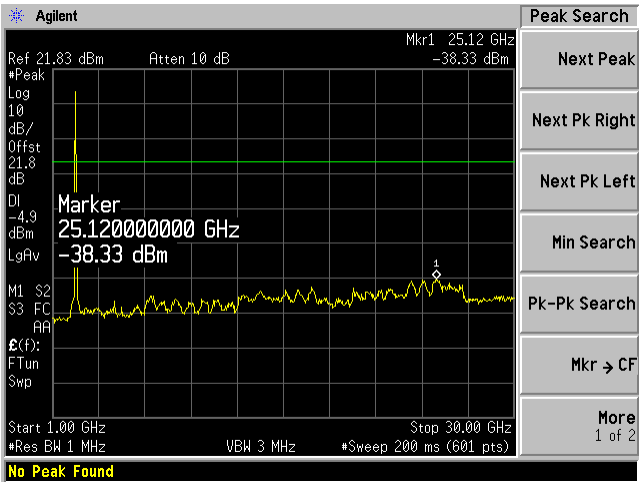


802.11n-HT20, Middle Channel 2437 MHz

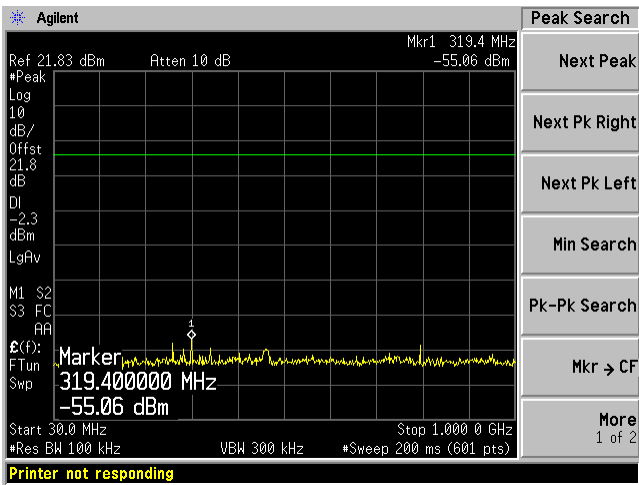
Chain J0, Plot: 30 MHz – 1 GHz



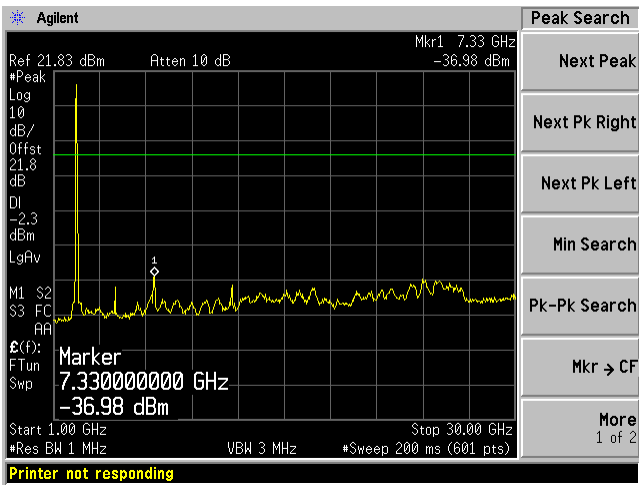
Chain J0, Plot: 1 GHz – 30 GHz



Chain J1, Plot: 30 MHz – 1 GHz

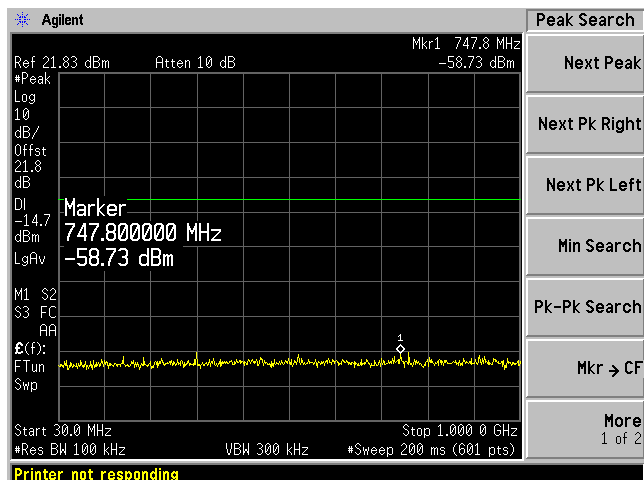


Chain J1, Plot: 1 GHz – 30 GHz

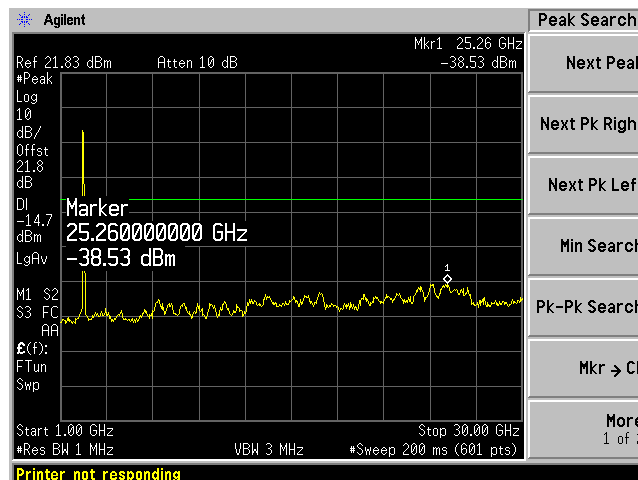


802.11n-HT20, High Channel 2462 MHz

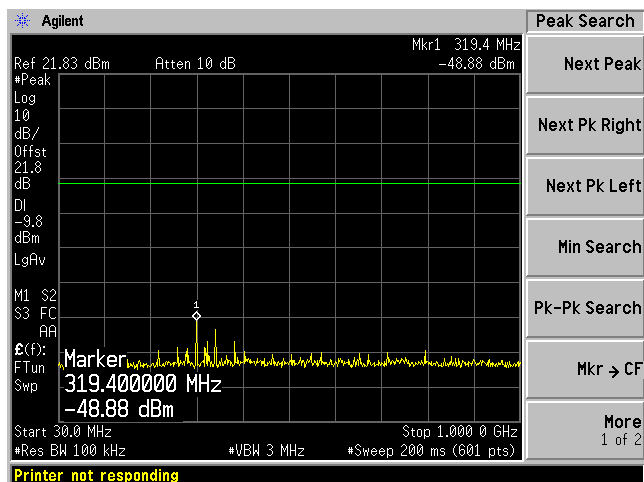
Chain J0, Plot: 30 MHz – 1 GHz



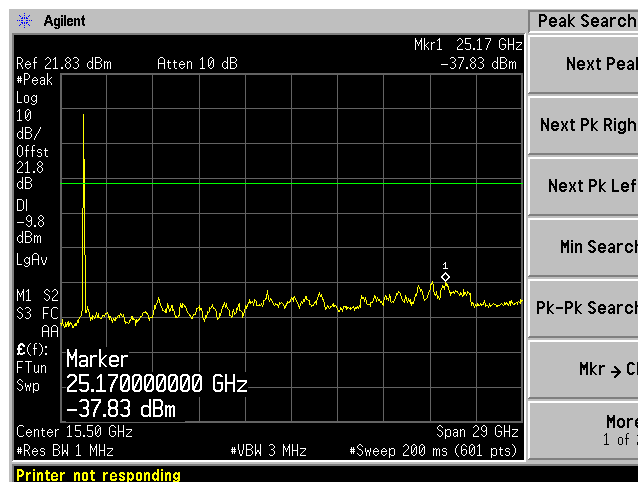
Chain J0, Plot: 1 GHz – 30 GHz



Chain J1, Plot: 30 MHz – 1 GHz

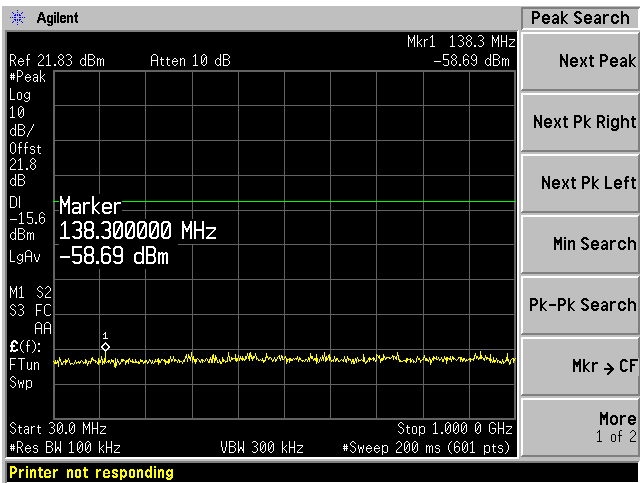


Chain J1, Plot: 1 GHz – 30 GHz

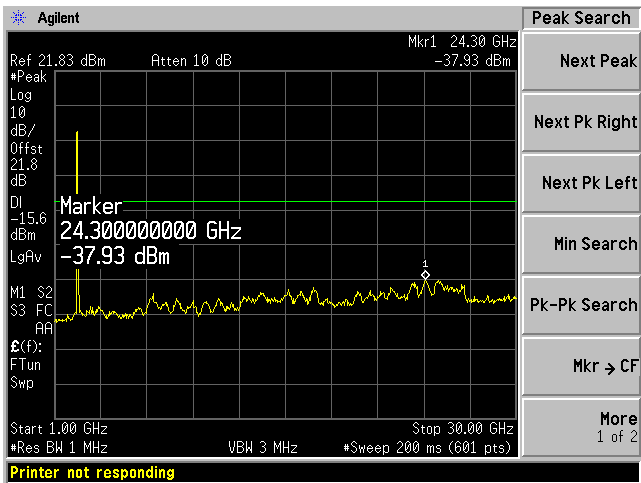


802.11n-HT40, Low Channel 2422 MHz

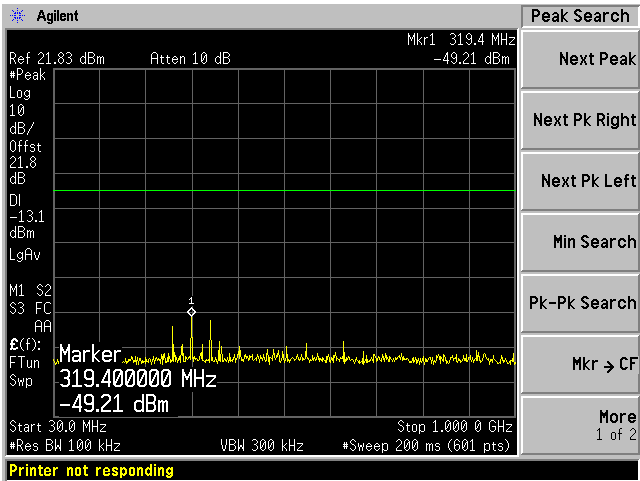
Chain J0, Plot: 30 MHz – 1 GHz



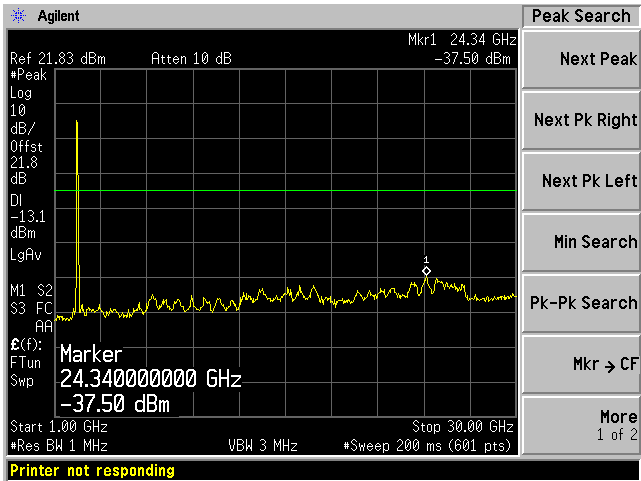
Chain J0, Plot: 1 GHz – 30 GHz



Chain J1, Plot: 30 MHz – 1 GHz

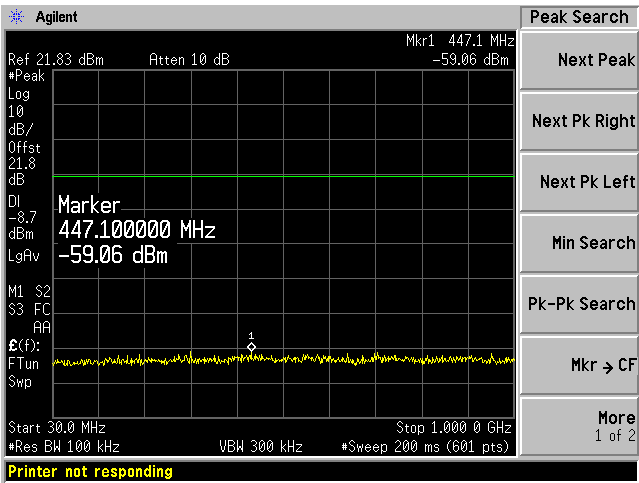


Chain J1, Plot: 1 GHz – 25 GHz

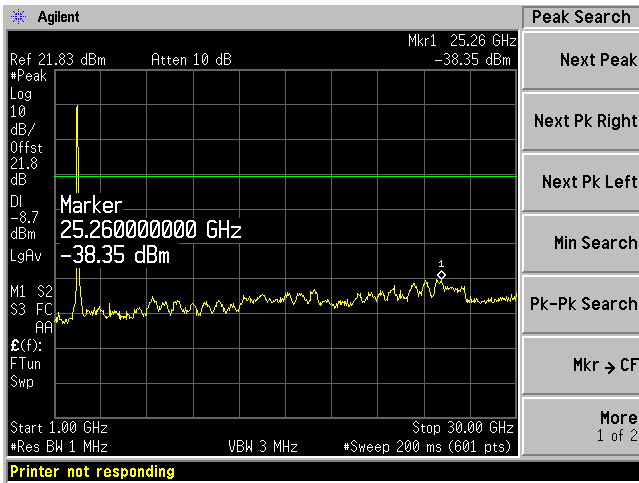


802.11n-HT40, Middle Channel 2437 MHz

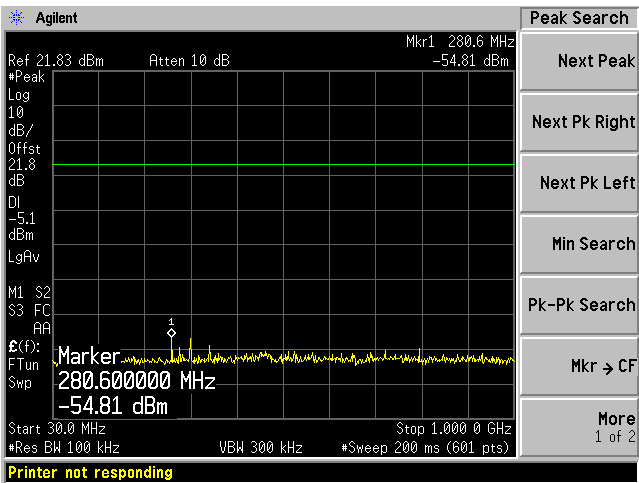
Chain J0, Plot: 30 MHz – 1 GHz



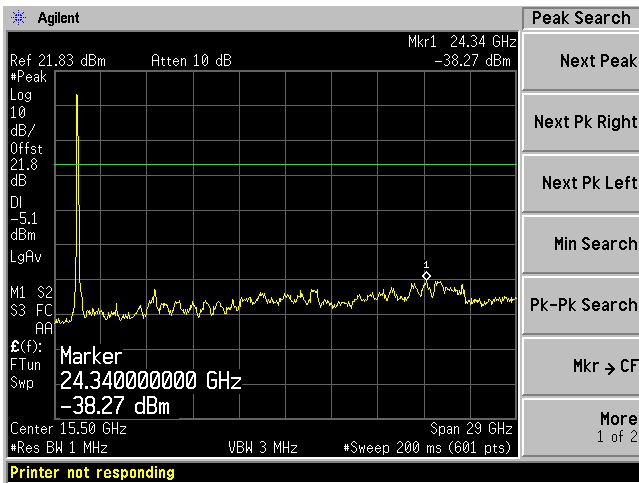
Chain J0, Plot: 1 GHz – 30 GHz



Chain J1, Plot: 30 MHz – 1 GHz

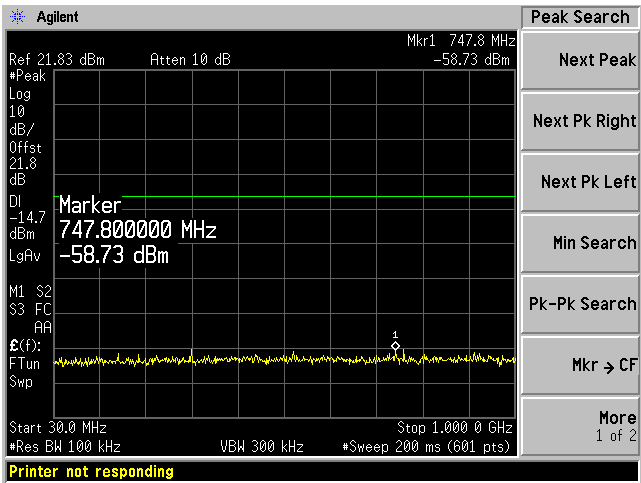


Chain J1, Plot: 1 GHz – 30 GHz

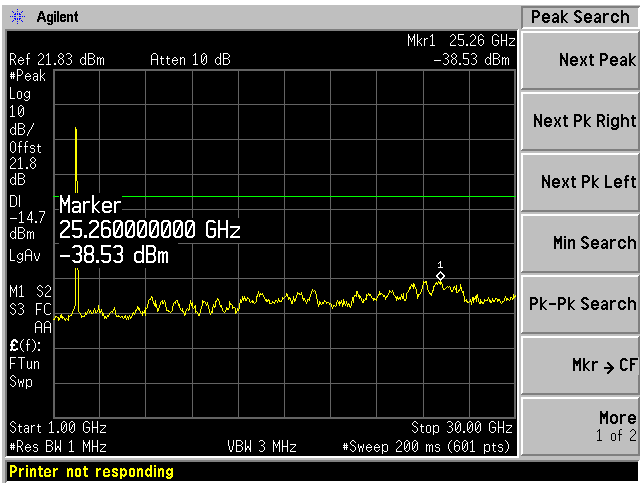


802.11n-HT40, High Channel 2452 MHz

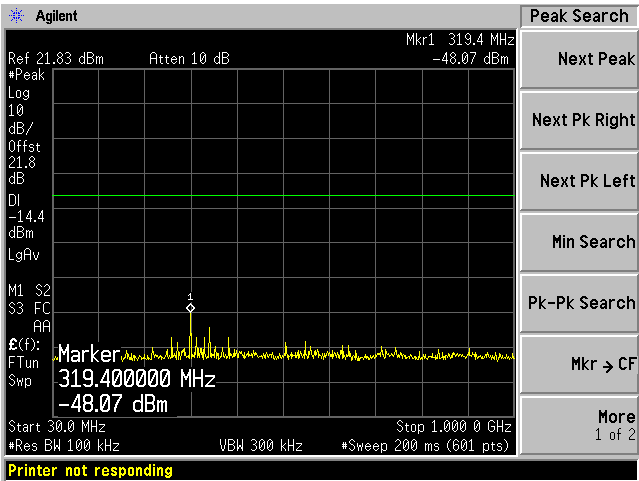
Chain J0, Plot: 30 MHz – 1 GHz



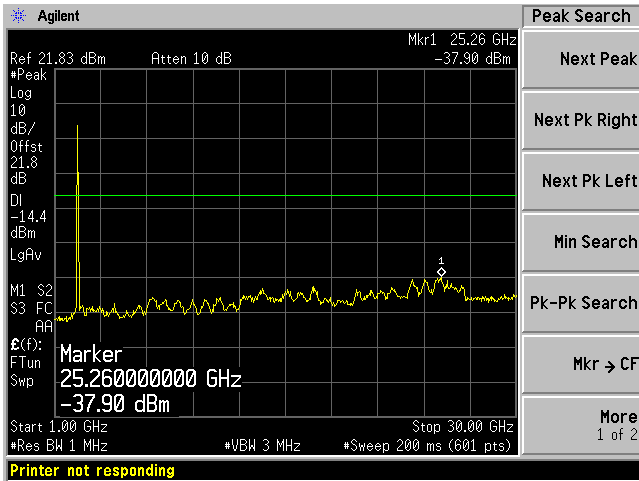
Chain J0, Plot: 1 GHz – 30 GHz



Chain J1, Plot: 30 MHz – 1 GHz



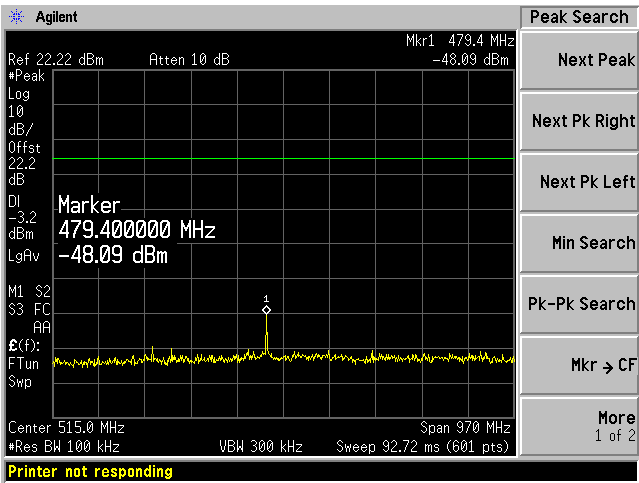
Chain J1, Plot: 1 GHz – 30 GHz



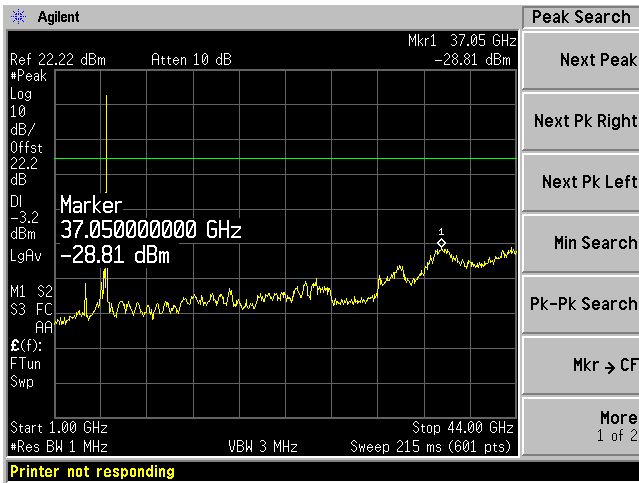
5.8 GHz Band

802.11a, Low Channel 5745 MHz

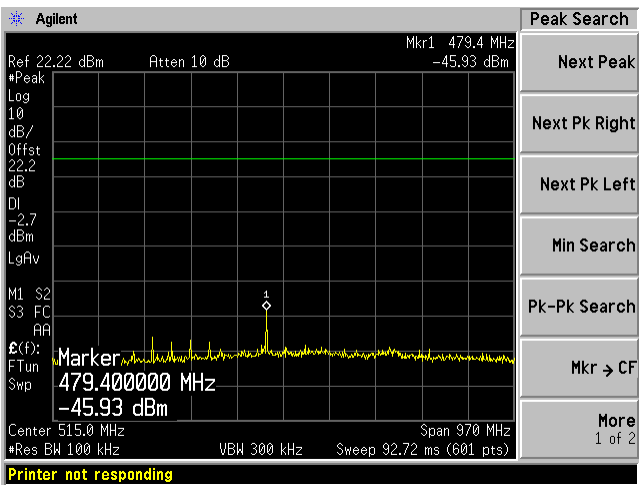
Chain J0, Plot: 30 MHz – 1 GHz



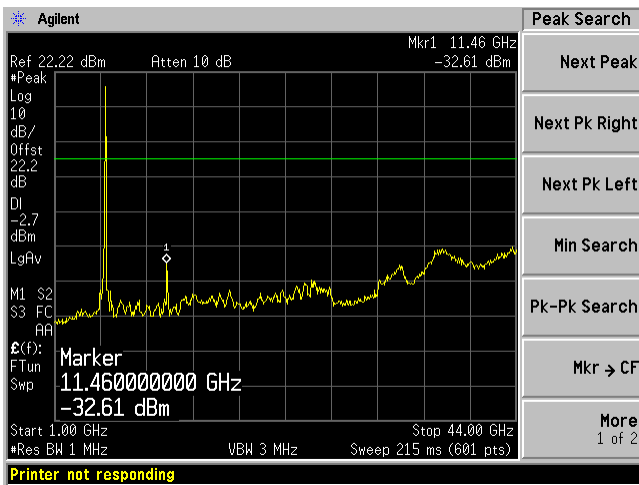
Chain J0, Plot: 1 GHz – 44 GHz



Chain J1, Plot: 30 MHz – 1 GHz



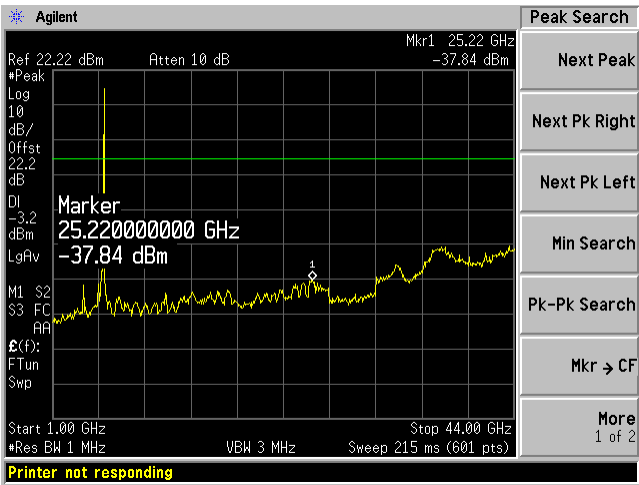
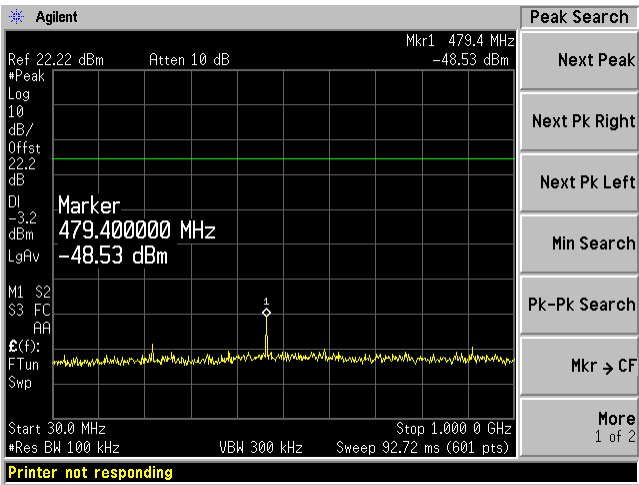
Chain J1, Plot: 1 GHz – 44 GHz



802.11a, Middle Channel 5785 MHz

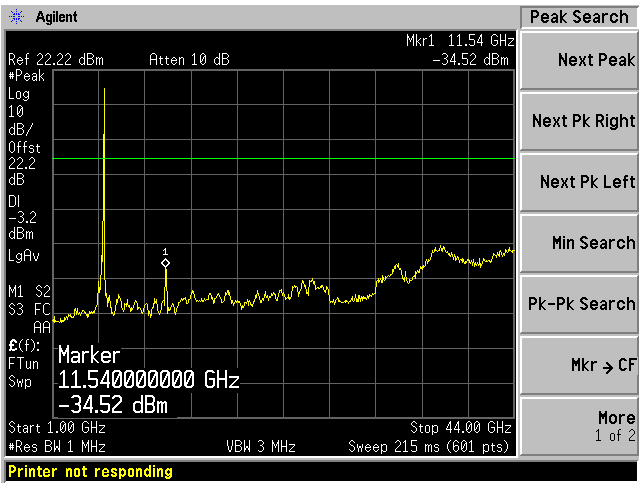
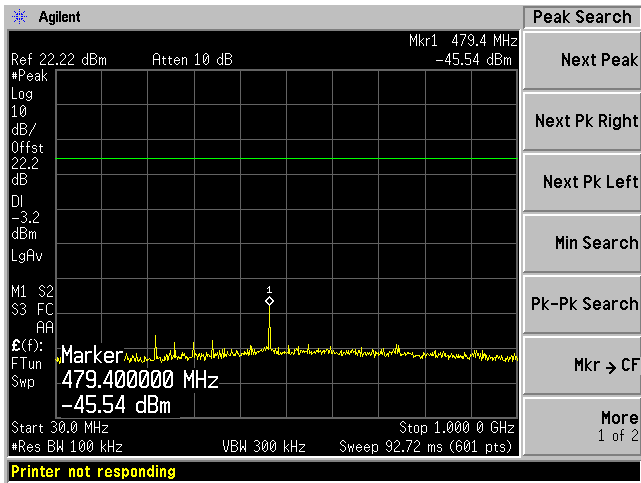
Chain J0, Plot: 30 MHz – 1 GHz

Chain J0, Plot: 1 GHz – 44 GHz



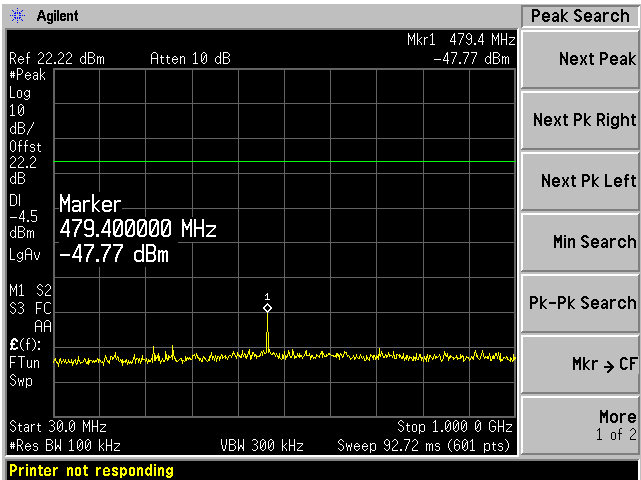
Chain J1, Plot: 30 MHz – 1 GHz

Chain J1, Plot: 1 GHz – 44 GHz

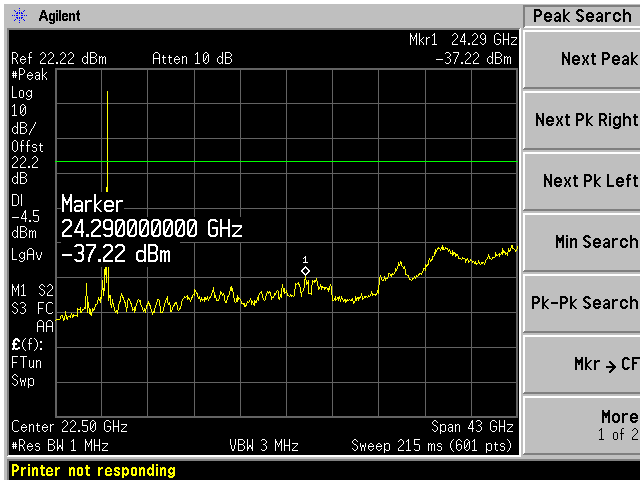


802.11a, High Channel 5825 MHz

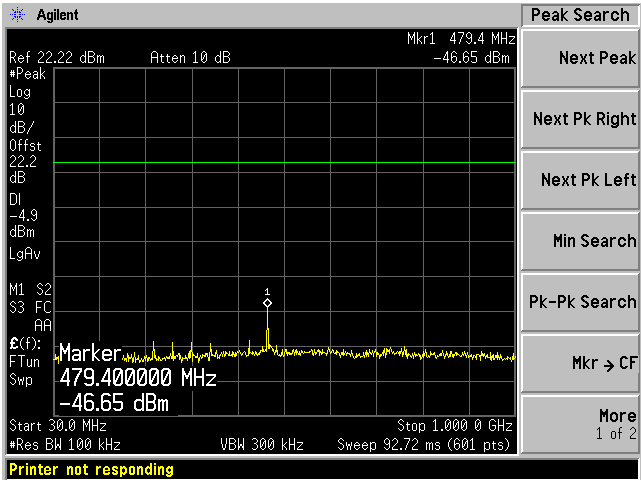
Chain J0, Plot: 30 MHz – 1 GHz



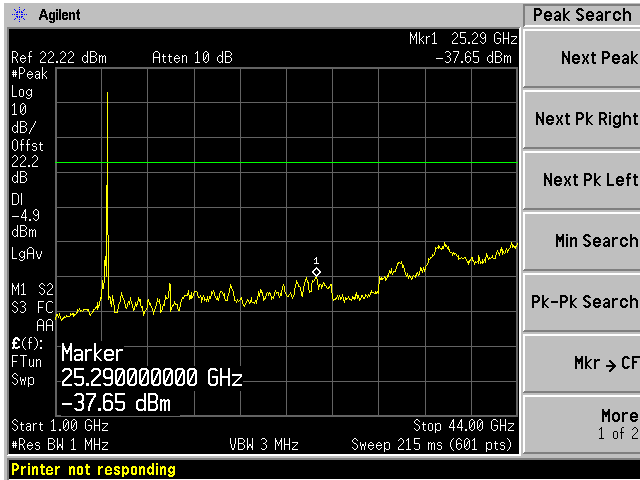
Chain J0, Plot: 1 GHz – 44 GHz



Chain J1, Plot: 30 MHz – 1 GHz

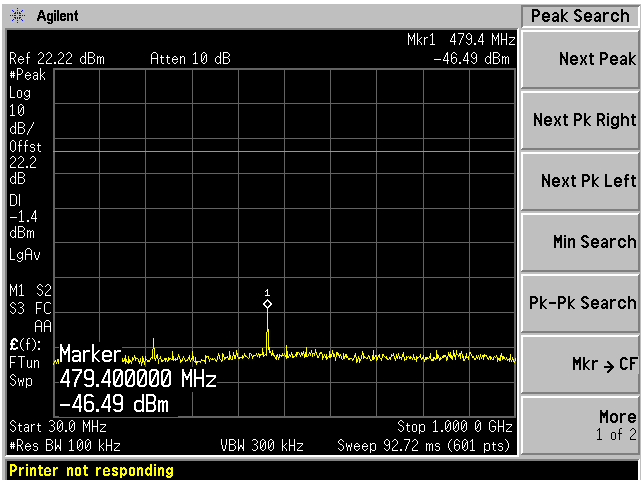


Chain J1, Plot: 1 GHz – 44 GHz

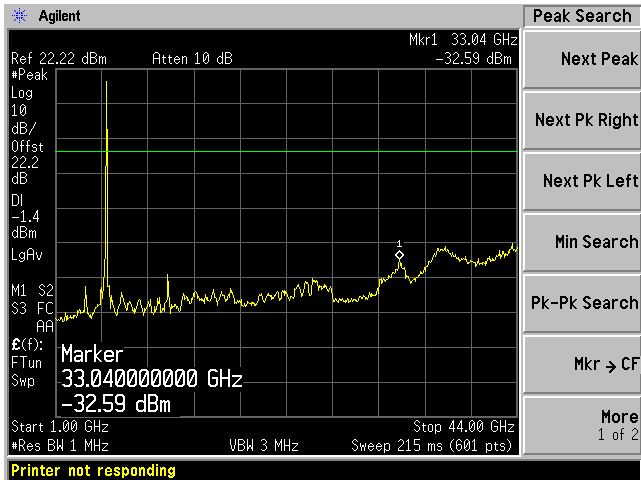


802.11n-HT20, Low Channel 5745 MHz

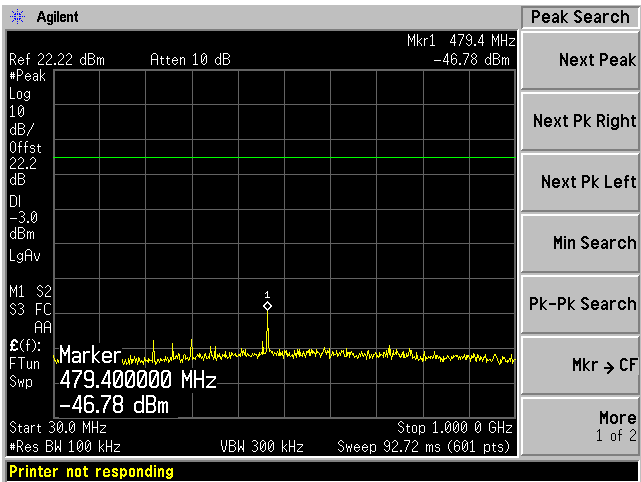
Chain J0, Plot: 30 MHz – 1 GHz



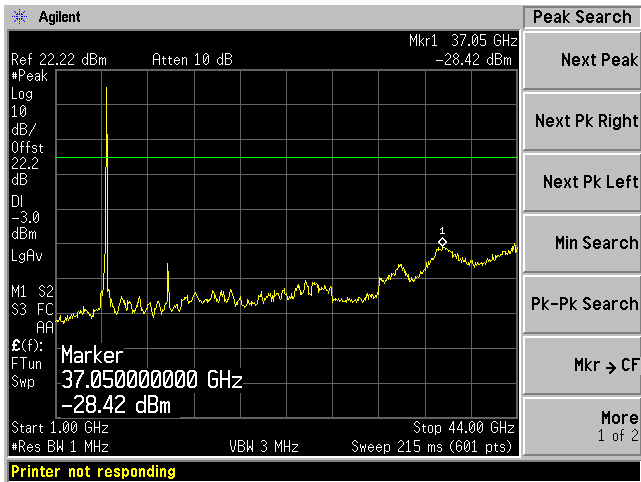
Chain J0, Plot: 1 GHz – 44 GHz



Chain J1, Plot: 30 MHz – 1 GHz

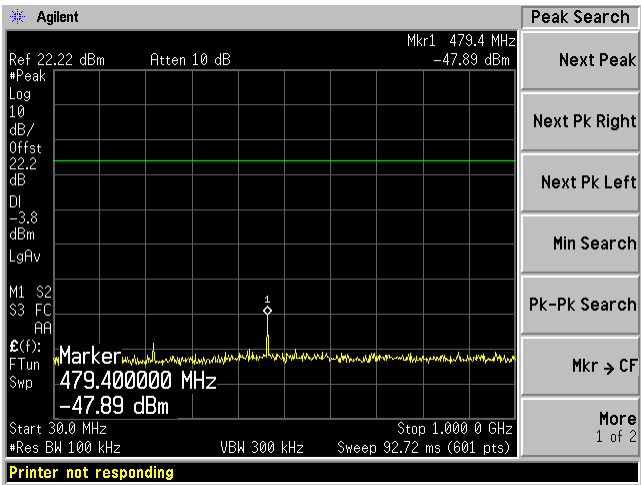


Chain J1, Plot: 1 GHz – 44 GHz

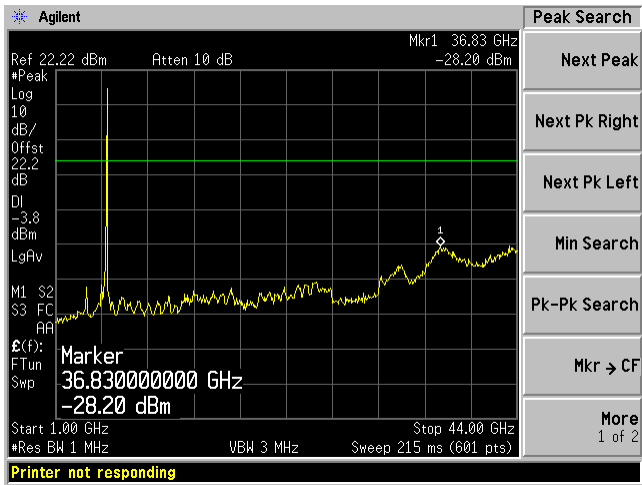


802.11n-HT20, Middle Channel 5785 MHz

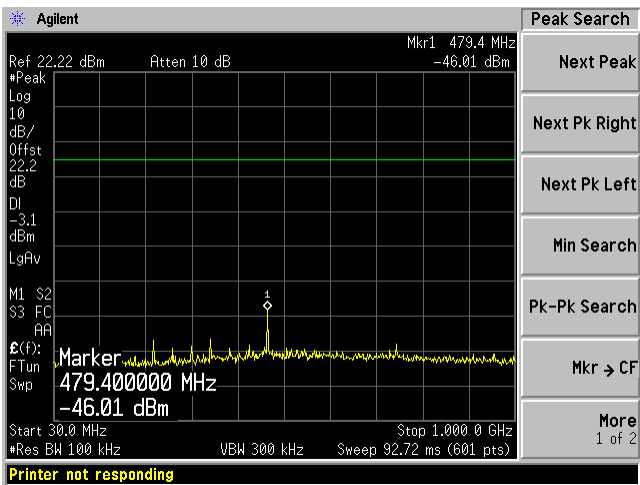
Chain J0, Plot: 30 MHz – 1 GHz



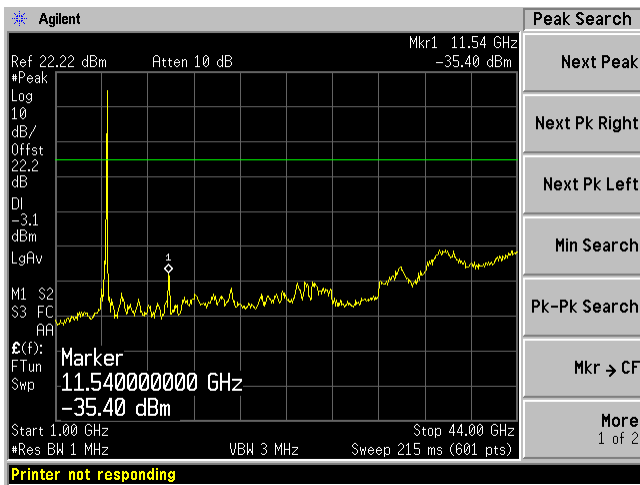
Chain J0, Plot: 1 GHz – 44 GHz



Chain J1, Plot: 30 MHz – 1 GHz

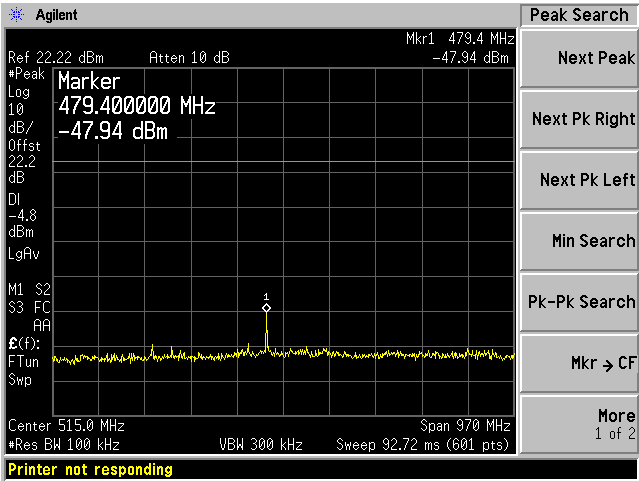


Chain J1, Plot: 1 GHz – 44 GHz

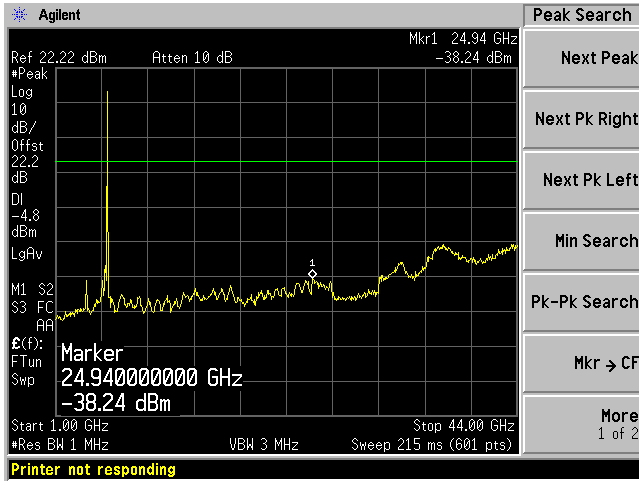


802.11n-HT20, High Channel 5825 MHz

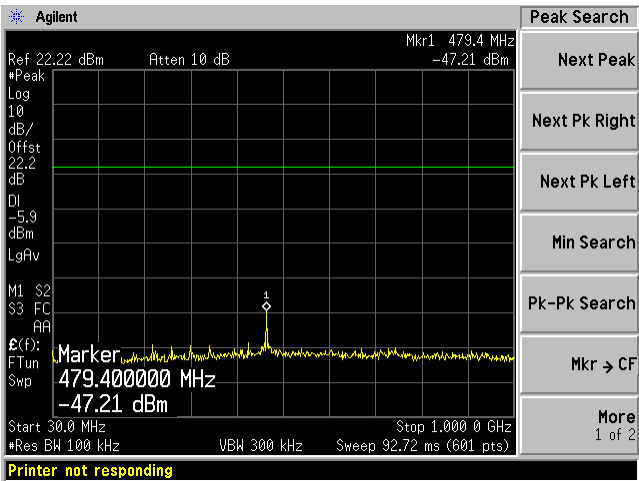
Chain J0, Plot: 30 MHz – 1 GHz



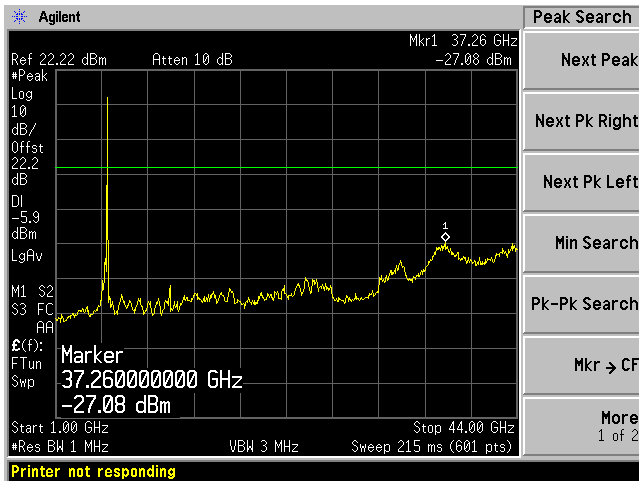
Chain J0, Plot: 1 GHz – 44 GHz



Chain J1, Plot: 30 MHz – 1 GHz

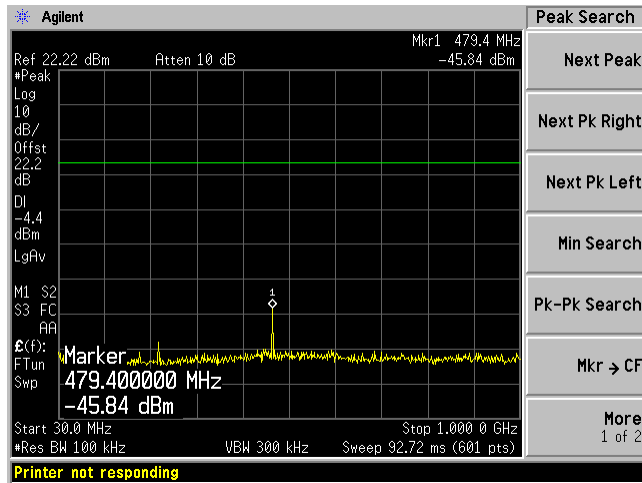


Chain J1, Plot: 1 GHz – 44 GHz

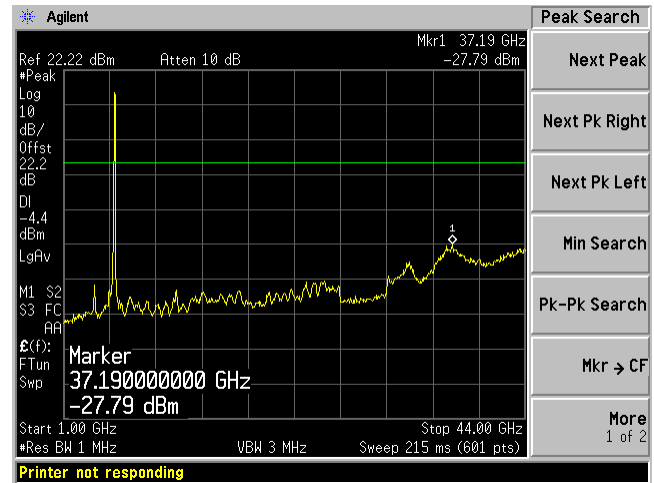


802.11n-HT40, Low Channel 5755 MHz

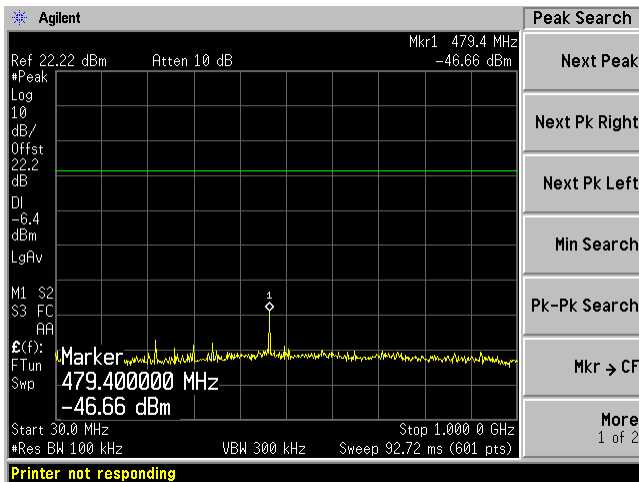
Chain J0, Plot: 30 MHz – 1 GHz



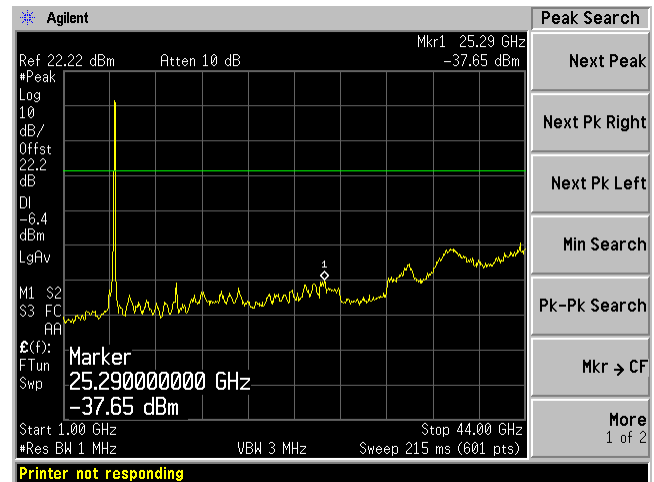
Chain J0, Plot: 1 GHz – 44 GHz



Chain J1, Plot: 30 MHz – 1 GHz

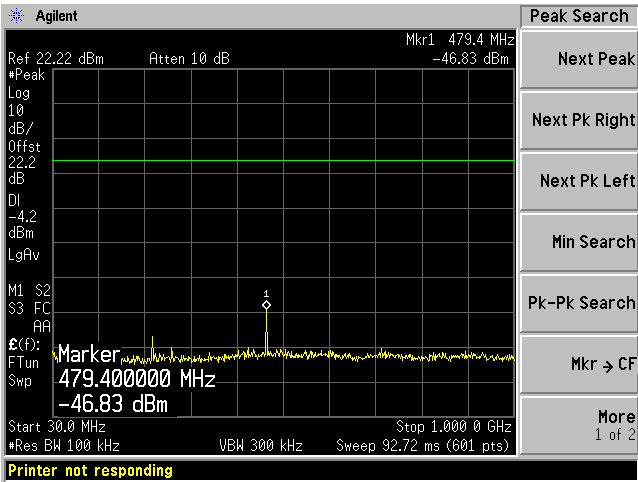


Chain J1, Plot: 1 GHz – 44 GHz

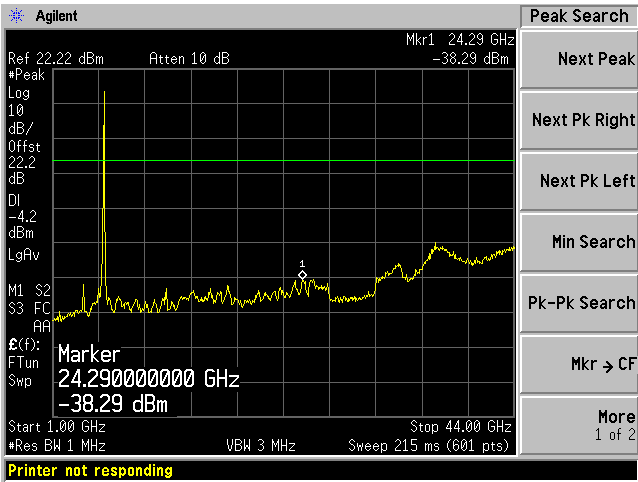


802.11n-HT40, High Channel 5795 MHz

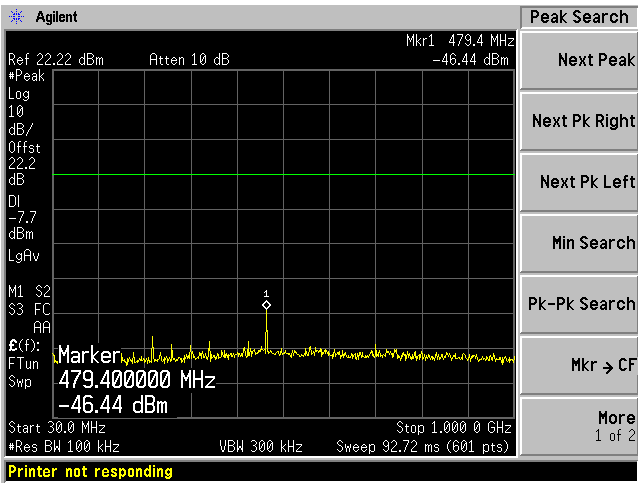
Chain J0, Plot: 30 MHz – 1 GHz



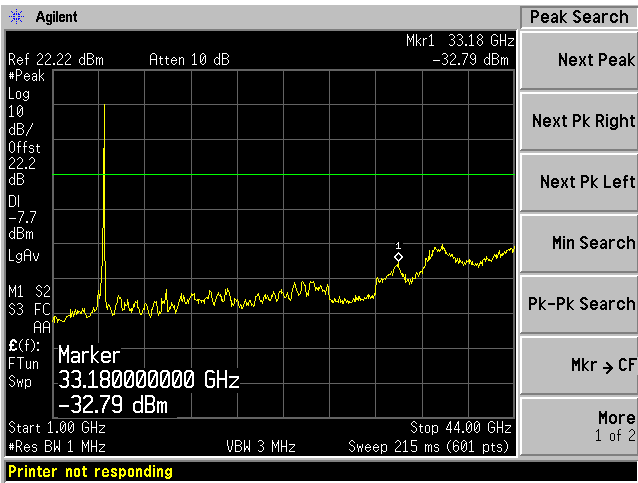
Chain J0, Plot: 1 GHz – 44 GHz



Chain J1, Plot: 30 MHz – 1 GHz



Chain J1, Plot: 1 GHz – 44 GHz



8 FCC §15.205, §15.209 & §15.247(d) – 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)).

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.

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

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:

$$\text{RBW} = 100 \text{ kHz} / \text{VBW} = 300 \text{ kHz} / \text{Sweep} = \text{Auto}$$

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:

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

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	Spectrum Analyzer	E4440A	US42221851	2012-02-28	1 year
Sunol Science Corp	Horn Antenna	DHR-118	A052704	2012-02-24	1 year
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2012-03-22	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:	101-103kPa

The testing was performed by Wei Sun from 2012-12-30 to 2012-12-31 at 5 meter 3.

8.7 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15C standard's radiated emissions limits, and had the worst margin of:

30-1000 MHz:

2.4 GHz Band

Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Mode, Channel
-4.78	250	Vertical	G mode Middle Channel

5.8 GHz Band

Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Mode, Channel
-4.98	250	Vertical	A mode Middle Channel

1– 25 GHz:

2.4 GHz Band

Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Mode, Channel
-0.36	2483.5	Vertical	N mode High Channel

1-40 GHz:

5.8 GHz Band

Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Mode, Channel
-0.79	11490	Horizontal	A 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, 2.4 GHz Band, 30 MHz–25 GHz

802.11b Mode Low Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel, 2412 MHz, measured at 3 meters											
2412	79.18	194	100	H	28.98	2.94	0	111.1	-	-	Fund/Peak
2412	78.2	109	134	V	28.98	2.94	0	110.12	-	-	Fund/Peak
2412	75.09	194	100	H	28.98	2.94	0	107.01	-	-	Fund/Ave
2412	74.31	109	134	V	28.98	2.94	0	106.23	-	-	Fund/Ave
2390	30.83	193	100	H	28.96	2.76	0	62.55	74	-11.45	Spur/Peak
2390	31.55	55	101	V	28.96	2.76	0	63.27	74	-10.73	Spur/Peak
2390	21.7	193	100	H	28.96	2.76	0	53.42	54	-0.58	Spur/Ave
2390	21.46	55	101	V	28.96	2.76	0	53.18	54	-0.82	Spur/Ave
4824	39.56	203	100	H	32.71	4.06	27.7	48.63	74	-25.37	Harm/Peak
4824	40.46	237	118	V	32.71	4.06	27.7	49.53	74	-24.47	Harm/Peak
4824	34.37	203	100	H	32.71	4.06	27.7	43.44	54	-10.56	Harm/Ave
4824	36.67	237	118	V	32.71	4.06	27.7	45.74	54	-8.26	Harm/Ave
7236	27	0	100	H	36.24	4.93	27.58	40.59	91.1	-50.51	Harm/Peak
7236	27	0	100	V	36.24	4.93	27.58	40.59	90.12	-49.53	Harm/Peak
7236	16	0	100	H	36.24	4.93	27.58	29.59	87.01	-57.42	Harm/Ave
7236	16	0	100	V	36.24	4.93	27.58	29.59	86.23	-56.64	Harm/Ave
9648	27	0	100	H	37.36	5.82	27.02	43.16	91.1	-47.94	Harm/Peak
9648	27	0	100	V	37.36	5.82	27.02	43.16	90.12	-46.96	Harm/Peak
9648	16	0	100	H	37.36	5.82	27.02	32.16	87.01	-54.85	Harm/Ave
9648	16	0	100	V	37.36	5.82	27.02	32.16	86.23	-54.07	Harm/Ave
250	48.6	247	119	V	12.1	0.86	21.21	40.35	46	-5.65	Spur/QP

802.11b Mode Middle Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Middle Channel, 2437 MHz, measured at 3 meters											
2437	80.37	175	118	H	28.98	2.94	0	112.29	-	-	Fund/Peak
2437	78.97	279	100	V	28.98	2.94	0	110.89	-	-	Fund/Peak
2437	76.28	175	118	H	28.98	2.94	0	108.2	-	-	Fund/Ave
2437	74.99	279	100	V	28.98	2.94	0	106.91	-	-	Fund/Ave
4874	44.07	185	100	H	32.86	4.1	27.76	53.27	74	-20.73	Harm/Peak
4874	45.25	208	100	V	32.86	4.1	27.76	54.45	74	-19.55	Harm/Peak
4874	41.78	185	100	H	32.86	4.1	27.76	50.98	54	-3.02	Harm/Ave
4874	43.55	208	100	V	32.86	4.1	27.76	52.75	54	-1.25	Harm/Ave
7311	27	0	100	H	36.52	4.88	27.51	40.89	74	-33.11	Harm/Peak
7311	27	0	100	V	36.52	4.88	27.51	40.89	74	-33.11	Harm/Peak
7311	16	0	100	H	36.52	4.88	27.51	29.89	54	-24.11	Harm/Ave
7311	16	0	100	V	36.52	4.88	27.51	29.89	54	-24.11	Harm/Ave
9748	27	0	100	H	37.33	5.74	26.98	43.09	92.29	-49.2	Harm/Peak
9748	27	0	100	V	37.33	5.74	26.98	43.09	90.89	-47.8	Harm/Peak
9748	16	0	100	H	37.33	5.74	26.98	32.09	88.2	-56.11	Harm/Ave
9748	16	0	100	V	37.33	5.74	26.98	32.09	86.91	-54.82	Harm/Ave
250	49.29	265	129	V	12.1	0.86	21.21	41.04	46	-4.96	Spur/QP

802.11b Mode High Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel, 2462 MHz, measured at 3 meters											
2462	78.58	206	119	H	29.12	3.01	0	110.71	-	-	Fund/Peak
2462	78.43	105	131	V	29.12	3.01	0	110.56	-	-	Fund/Peak
2462	74.75	206	119	H	29.12	3.01	0	106.88	-	-	Fund/Ave
2462	74.61	105	131	V	29.12	3.01	0	106.74	-	-	Fund/Ave
2483.5	28	116	100	H	29.12	3.01	0	60.13	74	-13.87	Spur/Peak
2483.5	29.95	269	100	V	29.12	3.01	0	62.08	74	-11.92	Spur/Peak
2483.5	14.19	116	100	H	29.12	3.01	0	46.32	54	-7.68	Spur/Ave
2483.5	21.51	269	100	V	29.12	3.01	0	53.64	54	-0.36	Spur/Ave
4924	41.77	30	100	H	32.86	4.1	27.75	50.98	74	-23.02	Harm/Peak
4924	42.51	116	118	V	32.86	4.1	27.75	51.72	74	-22.28	Harm/Peak
4924	34.88	30	100	H	32.86	4.1	27.75	44.09	54	-9.91	Harm/Ave
4924	36.39	116	118	V	32.86	4.1	27.75	45.6	54	-8.4	Harm/Ave
7386	27	0	100	H	36.43	4.89	27.51	40.81	74	-33.19	Harm/Peak
7386	27	0	100	V	36.43	4.89	27.51	40.81	74	-33.19	Harm/Peak
7386	16	0	100	H	36.43	4.89	27.51	29.81	54	-24.19	Harm/Ave
7386	16	0	100	V	36.43	4.89	27.51	29.81	54	-24.19	Harm/Ave
9848	27	0	100	H	37.38	5.77	26.98	43.17	90.71	-47.54	Harm/Peak
9848	27	0	100	V	37.38	5.77	26.98	43.17	90.56	-47.39	Harm/Peak
9848	16	0	100	H	37.38	5.77	26.98	32.17	86.88	-54.71	Harm/Ave
9848	16	0	100	V	37.38	5.77	26.98	32.17	86.74	-54.57	Harm/Ave
250	47.46	239	110	V	12.1	0.86	21.21	39.21	46	-6.79	Spur/QP

802.11g Mode Low Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel, 2412 MHz, measured at 3 meters											
2412	76.73	186	100	H	28.98	2.94	0	108.65	-	-	Fund/Peak
2412	76.48	26	100	V	28.98	2.94	0	108.4	-	-	Fund/Peak
2412	66.92	186	100	H	28.98	2.94	0	98.84	-	-	Fund/Ave
2412	66.51	266	100	V	28.98	2.94	0	98.43	-	-	Fund/Ave
2390	40.2	319	100	H	28.98	2.94	0	72.12	74	-1.88	Spur/Peak
2390	37.2	237	100	V	28.98	2.94	0	69.12	74	-4.88	Spur/Peak
2390	21.42	319	100	H	28.98	2.94	0	53.34	54	-0.66	Spur/Ave
2390	19.15	237	100	V	28.98	2.94	0	51.07	54	-2.93	Spur/Ave
4824	52.92	174	146	H	32.71	5.14	34.29	56.48	74	-17.52	Harm/Peak
4824	52.77	96	120	V	32.71	5.14	34.29	56.33	74	-17.67	Harm/Peak
4824	38.45	174	146	H	32.71	5.14	34.29	42.01	54	-11.99	Harm/Ave
4824	39.26	96	120	V	32.71	5.14	34.29	42.82	54	-11.18	Harm/Ave
7236	27	0	100	H	36.24	4.93	27.58	40.59	88.65	-48.06	Harm/Peak
7236	27	0	100	V	36.24	4.93	27.58	40.59	88.4	-47.81	Harm/Peak
7236	16	0	100	H	36.24	4.93	27.58	29.59	78.84	-49.25	Harm/Ave
7236	16	0	100	V	36.24	4.93	27.58	29.59	78.43	-48.84	Harm/Ave
9648	27	0	100	H	37.36	5.82	27.02	43.16	88.65	-45.49	Harm/Peak
9648	27	0	100	V	37.36	5.82	27.02	43.16	88.4	-45.24	Harm/Peak
9648	16	0	100	H	37.36	5.82	27.02	32.16	78.84	-46.68	Harm/Ave
9648	16	0	100	V	37.36	5.82	27.02	32.16	78.43	-46.27	Harm/Ave
250	48.01	241	117	V	12.1	0.86	21.21	39.76	46	-6.24	Spur/QP

802.11g Mode Middle Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Middle Channel, 2437 MHz, measured at 3 meters											
2437	82.74	206	100	H	28.98	2.94	0	114.66	-	-	Fund/Peak
2437	82.81	110	100	V	28.98	2.94	0	114.73	-	-	Fund/Peak
2437	72.74	206	100	H	28.98	2.94	0	104.66	-	-	Fund/Ave
2437	72.83	110	100	V	28.98	2.94	0	104.75	-	-	Fund/Ave
4874	60.21	170	136	H	32.86	5.22	34.33	63.96	74	-10.04	Harm/Peak
4874	61.57	317	100	V	32.86	5.22	34.33	65.32	74	-8.68	Harm/Peak
4874	47.96	170	136	H	32.86	5.22	34.33	51.71	54	-2.29	Harm/Ave
4874	49.3	317	100	V	32.86	5.22	34.33	53.05	54	-0.95	Harm/Ave
7311	42.64	162	100	H	36.52	4.88	27.51	56.53	74	-17.47	Harm/Peak
7311	47.47	255	113	V	36.52	4.88	27.51	61.36	74	-12.64	Harm/Peak
7311	24.14	162	100	H	36.52	4.88	27.51	38.03	54	-15.97	Harm/Ave
7311	31.25	255	113	V	36.52	4.88	27.51	45.14	54	-8.86	Harm/Ave
9748	27	0	100	H	37.33	5.74	26.98	43.09	94.66	-51.57	Harm/Peak
9748	27	0	100	V	37.33	5.74	26.98	43.09	94.73	-51.64	Harm/Peak
9748	16	0	100	H	37.33	5.74	26.98	32.09	84.66	-52.57	Harm/Ave
9748	16	0	100	V	37.33	5.74	26.98	32.09	84.75	-52.66	Harm/Ave
250	49.47	244	121	V	12.1	0.86	21.21	41.22	46	-4.78	Spur/QP

802.11g Mode High Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel, 2462 MHz, measured at 3 meters											
2462	77.79	207	100	H	29.12	3.01	0	109.92	-	-	Fund/Peak
2462	77.09	114	100	V	29.12	3.01	0	109.22	-	-	Fund/Peak
2462	67.7	207	100	H	29.12	3.01	0	99.83	-	-	Fund/Ave
2462	67.05	114	100	V	29.12	3.01	0	99.18	-	-	Fund/Ave
2483.5	34.61	319	100	H	29.12	3.01	0	66.74	74	-7.26	Spur/Peak
2483.5	38.7	94	100	V	29.12	3.01	0	70.83	74	-3.17	Spur/Peak
2483.5	16.6	319	100	H	29.12	3.01	0	48.73	54	-5.27	Spur/Ave
2483.5	21.17	94	100	V	29.12	3.01	0	53.3	54	-0.7	Spur/Ave
4924	54.62	172	119	H	32.86	5.23	34.42	58.29	74	-15.71	Harm/Peak
4924	58.16	319	100	V	32.86	5.23	34.42	61.83	74	-12.17	Harm/Peak
4924	40.6	172	119	H	32.86	5.23	34.42	44.27	54	-9.73	Harm/Ave
4924	43.95	319	100	V	32.86	5.23	34.42	47.62	54	-6.38	Harm/Ave
7386	27	0	100	H	36.43	4.89	27.51	40.81	74	-33.19	Harm/Peak
7386	27	0	100	V	36.43	4.89	27.51	40.81	74	-33.19	Harm/Peak
7386	16	0	100	H	36.43	4.89	27.51	29.81	54	-24.19	Harm/Ave
7386	16	0	100	V	36.43	4.89	27.51	29.81	54	-24.19	Harm/Ave
9848	27	0	100	H	37.38	5.77	26.98	43.17	89.92	-46.75	Harm/Peak
9848	27	0	100	V	37.38	5.77	26.98	43.17	89.22	-46.05	Harm/Peak
9848	16	0	100	H	37.38	5.77	26.98	32.17	79.83	-47.66	Harm/Ave
9848	16	0	100	V	37.38	5.77	26.98	32.17	79.18	-47.01	Harm/Ave
250	48.16	235	115	V	12.1	0.86	21.21	39.91	46	-6.09	Spur/QP

802.11n-HT20 Mode Low Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel, 2412 MHz, measured at 3 meters											
2412	76.74	187	100	H	28.98	2.94	0	108.66	-	-	Fund/Peak
2412	76.34	265	101	V	28.98	2.94	0	108.26	-	-	Fund/Peak
2412	66.4	187	100	H	28.98	2.94	0	98.32	-	-	Fund/Ave
2412	66.27	265	101	V	28.98	2.94	0	98.19	-	-	Fund/Ave
2390	39.82	85	100	H	28.96	2.94	0	71.72	74	-2.28	Spur/Peak
2390	39.46	56	100	V	28.96	2.94	0	71.36	74	-2.64	Spur/Peak
2390	20.11	85	100	H	28.96	2.94	0	52.01	54	-1.99	Spur/Ave
2390	21.12	56	100	V	28.96	2.94	0	53.02	54	-0.98	Spur/Ave
4824	53.94	175	142	H	32.71	5.14	34.29	57.5	74	-16.5	Harm/Peak
4824	55.22	101	116	V	32.71	5.14	34.29	58.78	74	-15.22	Harm/Peak
4824	38.26	175	142	H	32.71	5.14	34.29	41.82	54	-12.18	Harm/Ave
4824	38.71	101	116	V	32.71	5.14	34.29	42.27	54	-11.73	Harm/Ave
7236	27	0	100	H	36.24	4.93	27.58	40.59	88.66	-48.07	Harm/Peak
7236	27	0	100	V	36.24	4.93	27.58	40.59	88.26	-47.67	Harm/Peak
7236	16	0	100	H	36.24	4.93	27.58	29.59	78.32	-48.73	Harm/Ave
7236	16	0	100	V	36.24	4.93	27.58	29.59	78.19	-48.6	Harm/Ave
9648	27	0	100	H	37.36	5.82	27.02	43.16	88.66	-45.5	Harm/Peak
9648	27	0	100	V	37.36	5.82	27.02	43.16	88.26	-45.1	Harm/Peak
9648	16	0	100	H	37.36	5.82	27.02	32.16	78.32	-46.16	Harm/Ave
9648	16	0	100	V	37.36	5.82	27.02	32.16	78.19	-46.03	Harm/Ave
250	48	248	114	V	12.1	0.86	21.21	39.75	46	-6.25	Spur/QP

802.11n-HT20 Mode Middle Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Middle Channel, 2437 MHz, measured at 3 meters											
2437	82.33	207	100	H	28.98	2.94	0	114.25	-	-	Fund/Peak
2437	82.64	108	100	V	28.98	2.94	0	114.56	-	-	Fund/Peak
2437	72.38	207	100	H	28.98	2.94	0	104.3	-	-	Fund/Ave
2437	72.39	108	100	V	28.98	2.94	0	104.31	-	-	Fund/Ave
4874	60.61	172	117	H	32.86	5.22	34.33	64.36	74	-9.64	Harm/Peak
4874	64.85	12	120	V	32.86	5.22	34.33	68.6	74	-5.4	Harm/Peak
4874	45.9	172	117	H	32.86	5.22	34.33	49.65	54	-4.35	Harm/Ave
4874	49.52	12	120	V	32.86	5.22	34.33	53.27	54	-0.73	Harm/Ave
7311	43.36	187	107	H	36.52	4.88	27.51	57.25	74	-16.75	Harm/Peak
7311	48.1	267	118	V	36.52	4.88	27.51	61.99	74	-12.01	Harm/Peak
7311	25.7	187	107	H	36.52	4.88	27.51	39.59	54	-14.41	Harm/Ave
7311	30.41	267	118	V	36.52	4.88	27.51	44.3	54	-9.7	Harm/Ave
9748	27	0	100	H	37.33	5.74	26.98	43.09	94.25	-51.16	Harm/Peak
9748	27	0	100	V	37.33	5.74	26.98	43.09	94.56	-51.47	Harm/Peak
9748	16	0	100	H	37.33	5.74	26.98	32.09	84.3	-52.21	Harm/Ave
9748	16	0	100	V	37.33	5.74	26.98	32.09	84.31	-52.22	Harm/Ave
250	49.21	247	106	V	12.1	0.86	21.21	40.96	46	-5.04	Spur/QP

802.11n-HT20 Mode High Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel, 2462 MHz, measured at 3 meters											
2462	76.01	207	100	H	29.12	3.01	0	108.14	-	-	Fund/Peak
2462	75.93	108	128	V	29.12	3.01	0	108.06	-	-	Fund/Peak
2462	66.09	207	100	H	29.12	3.01	0	98.22	-	-	Fund/Ave
2462	65.97	108	128	V	29.12	3.01	0	98.1	-	-	Fund/Ave
2483.5	36.23	87	100	H	29.12	3.01	0	68.36	74	-5.64	Spur/Peak
2483.5	38.9	270	100	V	29.12	3.01	0	71.03	74	-2.97	Spur/Peak
2483.5	17.83	87	100	H	29.12	3.01	0	49.96	54	-4.04	Spur/Ave
2483.5	20.89	270	100	V	29.12	3.01	0	53.02	54	-0.98	Spur/Ave
4924	54.62	172	119	H	32.86	5.23	34.42	58.29	74	-15.71	Harm/Peak
4924	58.16	319	100	V	32.86	5.23	34.42	61.83	74	-12.17	Harm/Peak
4924	40.6	172	119	H	32.86	5.23	34.42	44.27	54	-9.73	Harm/Ave
4924	43.95	319	100	V	32.86	5.23	34.42	47.62	54	-6.38	Harm/Ave
7386	27	0	100	H	36.43	4.89	27.51	40.81	74	-33.19	Harm/Peak
7386	27	0	100	V	36.43	4.89	27.51	40.81	74	-33.19	Harm/Peak
7386	16	0	100	H	36.43	4.89	27.51	29.81	54	-24.19	Harm/Ave
7386	16	0	100	V	36.43	4.89	27.51	29.81	54	-24.19	Harm/Ave
9848	27	0	100	H	37.38	5.77	26.98	43.17	88.14	-44.97	Harm/Peak
9848	27	0	100	V	37.38	5.77	26.98	43.17	88.06	-44.89	Harm/Peak
9848	16	0	100	H	37.38	5.77	26.98	32.17	78.22	-46.05	Harm/Ave
9848	16	0	100	V	37.38	5.77	26.98	32.17	78.1	-45.93	Harm/Ave
250	48.22	245	116	V	12.1	0.86	21.21	39.97	46	-6.03	Spur/QP

802.11n-HT40 Mode Low Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel, 2422 MHz, measured at 3 meters											
2422	76.58	215	100	H	28.98	3.12	0	108.68	-	-	Fund/Peak
2422	76.21	280	100	V	28.98	3.12	0	108.31	-	-	Fund/Peak
2422	66.14	215	100	H	28.98	3.12	0	98.24	-	-	Fund/Ave
2422	66.09	280	100	V	28.98	3.12	0	98.19	-	-	Fund/Ave
2390	39.17	131	100	H	28.98	3.12	0	71.27	74	-2.73	Spur/Peak
2390	39.28	88	100	V	28.98	3.12	0	71.38	74	-2.62	Spur/Peak
2390	20.21	131	100	H	28.98	3.12	0	52.31	54	-1.69	Spur/Ave
2390	20.94	88	100	V	28.98	3.12	0	53.04	54	-0.96	Spur/Ave
4844	53.28	206	133	H	32.71	4.56	27.7	62.85	74	-11.15	Harm/Peak
4844	54.19	171	111	V	32.71	4.56	27.7	63.76	74	-10.24	Harm/Peak
4844	37.29	206	133	H	32.71	4.56	27.7	46.86	54	-7.14	Harm/Ave
4844	37.55	171	111	V	32.71	4.56	27.7	47.12	54	-6.88	Harm/Ave
7266	27	0	100	H	36.52	5.49	27.56	41.45	88.68	-47.23	Harm/Peak
7266	27	0	100	V	36.52	5.49	27.56	41.45	88.31	-46.86	Harm/Peak
7266	16	0	100	H	36.52	5.49	27.56	30.45	78.24	-47.79	Harm/Ave
7266	16	0	100	V	36.52	5.49	27.56	30.45	78.19	-47.74	Harm/Ave
9688	27	0	100	H	37.33	6.56	26.98	43.91	88.68	-44.77	Harm/Peak
9688	27	0	100	V	37.33	6.56	26.98	43.91	88.31	-44.4	Harm/Peak
9688	16	0	100	H	37.33	6.56	26.98	32.91	78.24	-45.33	Harm/Ave
9688	16	0	100	V	37.33	6.56	26.98	32.91	78.19	-45.28	Harm/Ave
250	48.19	255	100	V	12.1	0.86	21.21	39.94	46	-6.06	Spur/QP

802.11n-HT40 Mode Middle Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Middle Channel, 2437 MHz, measured at 3 meters											
2437	82.29	315	100	H	28.98	2.94	0	114.21	-	-	Fund/Peak
2437	82.91	123	100	V	28.98	2.94	0	114.83	-	-	Fund/Peak
2437	71.88	315	100	H	28.98	2.94	0	103.8	-	-	Fund/Ave
2437	71.67	123	100	V	28.98	2.94	0	103.59	-	-	Fund/Ave
4874	60.46	184	137	H	32.86	5.22	34.33	64.21	74	-9.79	Spur/Peak
4874	63.31	92	155	V	32.86	5.22	34.33	67.06	74	-6.94	Spur/Peak
4874	45.42	184	137	H	32.86	5.22	34.33	49.17	54	-4.83	Spur/Ave
4874	48.66	92	155	V	32.86	5.22	34.33	52.41	54	-1.59	Spur/Ave
7311	27	0	100	H	36.52	4.88	27.51	40.89	74	-33.11	Harm/Peak
7311	27	0	100	V	36.52	4.88	27.51	40.89	74	-33.11	Harm/Peak
7311	16	0	100	H	36.52	4.88	27.51	29.89	54	-24.11	Harm/Ave
7311	16	0	100	V	36.52	4.88	27.51	29.89	54	-24.11	Harm/Ave
9748	27	0	100	H	37.33	5.74	26.98	43.09	94.21	-51.12	Harm/Peak
9748	27	0	100	V	37.33	5.74	26.98	43.09	94.83	-51.74	Harm/Peak
9748	16	0	100	H	37.33	5.74	26.98	32.09	83.8	-51.71	Harm/Ave
9748	16	0	100	V	37.33	5.74	26.98	32.09	83.59	-51.5	Harm/Ave
250	49.01	281	110	H	12.1	0.86	21.21	40.76	46	-5.24	Harm/Peak

802.11n-HT40 Mode High Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel, 2452 MHz, measured at 3 meters											
2452	76.84	315	100	H	29.12	3.25	0	109.21	-	-	Fund/Peak
2452	75.77	123	137	V	29.12	3.25	0	108.14	-	-	Fund/Peak
2452	66.69	315	100	H	29.12	3.25	0	99.06	-	-	Fund/Ave
2452	65.56	123	137	V	29.12	3.25	0	97.93	-	-	Fund/Ave
2483.5	35.22	157	100	H	29.12	3.12	0	67.46	74	-6.54	Spur/Peak
2483.5	38.71	329	100	V	29.12	3.12	0	70.95	74	-3.05	Spur/Peak
2483.5	18.54	157	100	H	29.12	3.12	0	50.78	54	-3.22	Spur/Ave
2483.5	20.89	329	100	V	29.12	3.12	0	53.13	54	-0.87	Spur/Ave
4904	53.88	191	105	H	32.86	4.52	27.75	63.51	74	-10.49	Harm/Peak
4904	58.24	200	100	V	32.86	4.52	27.75	67.87	74	-6.13	Harm/Peak
4904	39.55	191	105	H	32.86	4.52	27.75	49.18	54	-4.82	Harm/Ave
4904	42.01	200	100	V	32.86	4.52	27.75	51.64	54	-2.36	Harm/Ave
7356	27	0	100	H	36.43	5.62	27.57	41.48	74	-32.52	Harm/Peak
7356	27	0	100	V	36.43	5.62	27.57	41.48	74	-32.52	Harm/Peak
7356	16	0	100	H	36.43	5.62	27.57	30.48	54	-23.52	Harm/Ave
7356	16	0	100	V	36.43	5.62	27.57	30.48	54	-23.52	Harm/Ave
9808	27	0	100	H	37.38	6.58	27.02	43.94	89.21	-45.27	Harm/Peak
9808	27	0	100	V	37.38	6.58	27.02	43.94	88.14	-44.2	Harm/Peak
9808	16	0	100	H	37.38	6.58	27.02	32.94	79.06	-46.12	Harm/Ave
9808	16	0	100	V	37.38	6.58	27.02	32.94	77.93	-44.99	Harm/Ave
250	48.27	294	100	V	12.1	0.86	21.21	40.02	46	-5.98	Spur/QP

2) Radiated Emission at 3 meters, 5.8 GHz Band, 30 MHz– 40 GHz**802.11a Mode Low Channel**

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel, 5745 MHz, measured at 3 meters											
5745	78.45	181	130	H	33.71	4.62	0	116.78	-	-	Fund/Peak
5745	75.89	307	100	V	33.71	4.62	0	114.22	-	-	Fund/Peak
5745	68.28	181	130	H	33.71	4.62	0	106.61	-	-	Fund/Ave
5745	66.06	307	100	V	33.71	4.62	0	104.39	-	-	Fund/Ave
11490	46.9	268	215	H	39.41	6.9	26.94	66.27	74	-7.73	Harm/Peak
11490	45.11	306	144	V	39.41	6.9	26.94	64.48	74	-9.52	Harm/Peak
11490	33.84	268	215	H	39.41	6.9	26.94	53.21	54	-0.79	Harm/Ave
11490	31.97	306	144	V	39.41	6.9	26.94	51.34	54	-2.66	Harm/Ave
17235	50.26	116	123	H	45.87	8.49	25.94	78.68	96.78	-18.1	Harm/Peak
17235	45.1	120	127	V	45.87	8.49	25.94	73.52	94.22	-20.7	Harm/Peak
17235	34.9	116	123	H	45.87	8.49	25.94	63.32	86.61	-23.29	Harm/Ave
17235	28.94	120	127	V	45.87	8.49	25.94	57.36	84.39	-27.03	Harm/Ave
22980	30	0	100	H	46.47	9.74	25.33	60.88	74	-13.12	Harm/Peak
22980	30	0	100	V	46.47	9.74	25.33	60.88	74	-13.12	Harm/Peak
22980	17	0	100	H	46.47	9.74	25.33	47.88	54	-6.12	Harm/Ave
22980	17	0	100	V	46.47	9.74	25.33	47.88	54	-6.12	Harm/Ave
250	49.09	245	121	V	12.1	0.86	21.21	40.84	46	-5.16	Spur/QP

802.11a Mode Middle Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Middle Channel, 5785 MHz, measured at 3 meters											
5785	76.04	179	129	H	33.64	4.72	0	114.4	-	-	Fund/Peak
5785	75.51	307	100	V	33.64	4.72	0	113.87	-	-	Fund/Peak
5785	66.32	179	129	H	33.64	4.72	0	104.68	-	-	Fund/Ave
5785	65.12	307	100	V	33.64	4.72	0	103.48	-	-	Fund/Ave
11570	41.15	282	100	H	40.14	6.14	26.99	60.44	74	-13.56	Harm/Peak
11570	43.17	101	100	V	40.14	6.14	26.99	62.46	74	-11.54	Harm/Peak
11570	29.61	282	100	H	40.14	6.14	26.99	48.9	54	-5.1	Harm/Ave
11570	30.11	101	100	V	40.14	6.14	26.99	49.4	54	-4.6	Harm/Ave
17355	39.27	117	130	H	45.87	8.49	25.86	67.77	94.4	-26.63	Harm/Peak
17355	33.85	258	100	V	45.87	8.49	25.86	62.35	93.87	-31.52	Harm/Peak
17355	24.89	117	130	H	45.87	8.49	25.86	53.39	84.68	-31.29	Harm/Ave
17355	19.03	258	100	V	45.87	8.49	25.86	47.53	83.48	-35.95	Harm/Ave
23140	30	0	100	H	46.47	9.74	25.23	60.98	94.4	-33.42	Harm/Peak
23140	30	0	100	V	46.47	9.74	25.23	60.98	93.87	-32.89	Harm/Peak
23140	17	0	100	H	46.47	9.74	25.23	47.98	84.68	-36.7	Harm/Ave
23140	17	0	100	V	46.47	9.74	25.23	47.98	83.48	-35.5	Harm/Ave
250	49.27	246	121	V	12.1	0.86	21.21	41.02	46	-4.98	Spur/QP

802.11a Mode High Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel, 5825 MHz, measured at 3 meters											
5825	75.31	181	137	H	33.64	4.72	0	113.67	-	-	Fund/Peak
5825	75.14	306	100	V	33.64	4.72	0	113.5	-	-	Fund/Peak
5825	64.99	181	137	H	33.64	4.72	0	103.35	-	-	Fund/Ave
5825	64.15	306	100	V	33.64	4.72	0	102.51	-	-	Fund/Ave
11650	40.61	0	135	H	40.47	6.2	27.04	60.24	74	-13.76	Harm/Peak
11650	41.29	352	100	V	40.47	6.2	27.04	60.92	74	-13.08	Harm/Peak
11650	26.88	0	135	H	40.47	6.2	27.04	46.51	54	-7.49	Harm/Ave
11650	26.82	352	100	V	40.47	6.2	27.04	46.45	54	-7.55	Harm/Ave
17475	47.71	115	131	H	46.21	8.49	25.79	76.62	93.67	-17.05	Harm/Peak
17475	39.95	260	100	V	46.21	8.49	25.79	68.86	93.5	-24.64	Harm/Peak
17475	32.03	115	131	H	46.21	8.49	25.79	60.94	83.35	-22.41	Harm/Ave
17475	24.44	260	100	V	46.21	8.49	25.79	53.35	82.51	-29.16	Harm/Ave
23300	30	0	100	H	46.47	9.74	25.23	60.98	93.67	-32.69	Harm/Peak
23300	30	0	100	V	46.47	9.74	25.23	60.98	93.5	-32.52	Harm/Peak
23300	17	0	100	H	46.47	9.74	25.23	47.98	83.35	-35.37	Harm/Ave
23300	17	0	100	V	46.47	9.74	25.23	47.98	82.51	-34.53	Harm/Ave
250	48.81	245	121	V	12.1	0.86	21.21	40.56	46	-5.44	Spur/QP

802.11n-HT20 Mode Low Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel, 5745 MHz, measured at 3 meters											
5745	77.83	179	104	H	33.71	4.62	0	116.16	-	-	Fund/Peak
5745	75.93	306	117	V	33.71	4.62	0	114.26	-	-	Fund/Peak
5745	67.77	179	104	H	33.71	4.62	0	106.1	-	-	Fund/Ave
5745	65.88	306	117	V	33.71	4.62	0	104.21	-	-	Fund/Ave
11490	43.31	288	100	H	40.47	6.2	26.94	63.04	74	-10.96	Harm/Peak
11490	43.7	245	128	V	40.47	6.2	26.94	63.43	74	-10.57	Harm/Peak
11490	27.43	288	100	H	40.47	6.2	26.94	47.16	54	-6.84	Harm/Ave
11490	27.77	245	128	V	40.47	6.2	26.94	47.5	54	-6.5	Harm/Ave
17235	49.35	116	130	H	45.87	8.49	25.94	77.77	96.16	-18.39	Harm/Peak
17235	45.4	252	110	V	45.87	8.49	25.94	73.82	94.26	-20.44	Harm/Peak
17235	33.58	116	130	H	45.87	8.49	25.94	62	86.1	-24.1	Harm/Ave
17235	28.5	252	110	V	45.87	8.49	25.94	56.92	84.21	-27.29	Harm/Ave
22980	30	0	100	H	46.47	9.74	25.33	60.88	74	-13.12	Harm/Peak
22980	30	0	100	V	46.47	9.74	25.33	60.88	74	-13.12	Harm/Peak
22980	17	0	100	H	46.47	9.74	25.33	47.88	54	-6.12	Harm/Ave
22980	17	0	100	V	46.47	9.74	25.33	47.88	54	-6.12	Harm/Ave
250	49.06	247	124	V	12.1	0.86	21.21	40.81	46	-5.19	Spur/QP

802.11n-HT20 Mode Middle Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Middle Channel, 5785 MHz, measured at 3 meters											
5785	75.32	179	145	H	33.64	4.72	0	113.68	-	-	Fund/Peak
5785	74.87	308	100	V	33.64	4.72	0	113.23	-	-	Fund/Peak
5785	65.41	179	145	H	33.64	4.72	0	103.77	-	-	Fund/Ave
5785	64.46	308	100	V	33.64	4.72	0	102.82	-	-	Fund/Ave
11570	46.46	351	100	H	40.14	6.14	26.99	65.75	74	-8.25	Harm/Peak
11570	43.96	339	133	V	40.14	6.14	26.99	63.25	74	-10.75	Harm/Peak
11570	26.91	351	100	H	40.14	6.14	26.99	46.2	54	-7.8	Harm/Ave
11570	27.86	339	133	V	40.14	6.14	26.99	47.15	54	-6.85	Harm/Ave
17355	48.48	113	134	H	45.87	8.49	25.86	76.98	93.68	-16.7	Harm/Peak
17355	38.99	258	100	V	45.87	8.49	25.86	67.49	93.23	-25.74	Harm/Peak
17355	30.05	113	134	H	45.87	8.49	25.86	58.55	83.77	-25.22	Harm/Ave
17355	21.44	258	100	V	45.87	8.49	25.86	49.94	82.82	-32.88	Harm/Ave
23140	30	0	100	H	46.47	9.74	25.23	60.98	93.68	-32.7	Harm/Peak
23140	30	0	100	V	46.47	9.74	25.23	60.98	93.23	-32.25	Harm/Peak
23140	17	0	100	H	46.47	9.74	25.23	47.98	83.77	-35.79	Harm/Ave
23140	17	0	100	V	46.47	9.74	25.23	47.98	82.82	-34.84	Harm/Ave
250	49.12	247	124	V	12.1	0.86	21.21	40.87	46	-5.13	Spur/QP

802.11n-HT20 Mode High Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel, 5825 MHz, measured at 3 meters											
5825	74.6	179	149	H	33.64	4.72	0	112.96	-	-	Fund/Peak
5825	74.39	306	100	V	33.64	4.72	0	112.75	-	-	Fund/Peak
5825	64.27	179	149	H	33.64	4.72	0	102.63	-	-	Fund/Ave
5825	63.41	306	100	V	33.64	4.72	0	101.77	-	-	Fund/Ave
11650	41.95	321	131	H	40.47	6.2	27.04	61.58	74	-12.42	Harm/Peak
11650	42.39	352	100	V	40.47	6.2	27.04	62.02	74	-11.98	Harm/Peak
11650	25.48	321	131	H	40.47	6.2	27.04	45.11	54	-8.89	Harm/Ave
11650	25.74	352	100	V	40.47	6.2	27.04	45.37	54	-8.63	Harm/Ave
17475	48.24	115	132	H	46.21	8.49	25.79	77.15	92.96	-15.81	Harm/Peak
17475	48.21	116	125	V	46.21	8.49	25.79	77.12	92.75	-15.63	Harm/Peak
17475	29.17	115	132	H	46.21	8.49	25.79	58.08	82.63	-24.55	Harm/Ave
17475	30.1	116	125	V	46.21	8.49	25.79	59.01	81.77	-22.76	Harm/Ave
23300	30	0	100	H	46.47	9.74	25.23	60.98	92.96	-31.98	Harm/Peak
23300	30	0	100	V	46.47	9.74	25.23	60.98	92.75	-31.77	Harm/Peak
23300	17	0	100	H	46.47	9.74	25.23	47.98	82.63	-34.65	Harm/Ave
23300	17	0	100	V	46.47	9.74	25.23	47.98	81.77	-33.79	Harm/Ave
250	48.99	247	124	V	12.1	0.86	21.21	40.74	46	-5.26	Spur/QP

802.11n-HT40 Mode Low Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel, 5755 MHz, measured at 3 meters											
5755	77.76	106	100	H	34.14	4.82	0	116.72	-	-	Fund/Peak
5755	75.59	312	121	V	34.14	4.82	0	114.55	-	-	Fund/Peak
5755	67.55	6	100	H	34.14	4.82	0	106.51	-	-	Fund/Ave
5755	65.72	312	121	V	34.14	4.82	0	104.68	-	-	Fund/Ave
11510	43.08	323	100	H	39.41	7.6	26.94	63.15	74	-10.85	Harm/Peak
11510	43.51	208	133	V	39.41	7.6	26.94	63.58	74	-10.42	Harm/Peak
11510	27.2	323	100	H	39.41	7.6	26.94	47.27	54	-6.73	Harm/Ave
11510	27.09	208	133	V	39.41	7.6	26.94	47.16	54	-6.84	Harm/Ave
17265	48.69	168	129	H	45.87	8.63	25.94	77.25	96.72	-19.47	Harm/Peak
17265	45.94	230	107	V	45.87	8.63	25.94	74.5	94.55	-20.05	Harm/Peak
17265	33.01	168	129	H	45.87	8.63	25.94	61.57	86.51	-24.94	Harm/Ave
17265	28.97	230	107	V	45.87	8.63	25.94	57.53	84.68	-27.15	Harm/Ave
23020	30	0	100	H	46.47	9.74	25.33	60.88	74	-13.12	Harm/Peak
23020	30	0	100	V	46.47	9.74	25.33	60.88	74	-13.12	Harm/Peak
23020	17	0	100	H	46.47	9.74	25.33	47.88	54	-6.12	Harm/Ave
23020	17	0	100	V	46.47	9.74	25.33	47.88	54	-6.12	Harm/Ave
250	48.57	234	115	V	12.1	0.86	21.21	40.32	46	-5.68	Spur/QP

802.11n-HT40 Mode High Channel

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel, 5795 MHz, measured at 3 meters											
5795	73.89	195	157	H	34.14	4.82	0	112.85	-	-	Fund/Peak
5795	73.68	281	100	V	34.14	4.82	0	112.64	-	-	Fund/Peak
5795	63.61	195	157	H	34.14	4.82	0	102.57	-	-	Fund/Ave
5795	63.06	281	100	V	34.14	4.82	0	102.02	-	-	Fund/Ave
11590	41.34	273	120	H	39.68	7.69	26.99	61.72	74	-12.28	Harm/Peak
11590	42.73	335	100	V	39.68	7.69	26.99	63.11	74	-10.89	Harm/Peak
11590	25.12	273	120	H	39.68	7.69	26.99	45.5	54	-8.5	Harm/Ave
11590	24.86	335	100	V	39.68	7.69	26.99	45.24	54	-8.76	Harm/Ave
17385	48.45	221	157	H	46.21	8.66	25.86	77.46	92.85	-15.39	Harm/Peak
17385	48.76	139	112	V	46.21	8.66	25.86	77.77	92.64	-14.87	Harm/Peak
17385	29.08	221	157	H	46.21	8.66	25.86	58.09	82.57	-24.48	Harm/Ave
17385	30.25	139	112	V	46.21	8.66	25.86	59.26	82.02	-22.76	Harm/Ave
23180	30	0	100	H	46.47	9.74	25.23	60.98	92.85	-31.87	Harm/Peak
23180	30	0	100	V	46.47	9.74	25.23	60.98	92.64	-31.66	Harm/Peak
23180	17	0	100	H	46.47	9.74	25.23	47.98	82.57	-34.59	Harm/Ave
23180	17	0	100	V	46.47	9.74	25.23	47.98	82.02	-34.04	Harm/Ave
250	48.92	250	131	V	12.1	0.86	21.21	40.67	46	-5.33	Spur/QP
610.4	35.69	193	127	V	19.4	1.44	21.75	34.78	46	-11.22	Spur/QP

3) Co-Location**Worst Case:** 2.4 GHz 802.11b: Middle Channel 2437 MHz, 5.8 GHz 802.11a: Low Channel 5745 MHz

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
4874	40.28	44	100	H	32.86	4.1	27.75	49.49	74	-24.51	Peak
4874	41.79	100	129	V	32.86	4.1	27.75	51	74	-23	Peak
4874	33.57	44	100	H	32.86	4.1	27.75	42.78	54	-11.22	Ave
4874	36.26	100	129	V	32.86	4.1	27.75	45.47	54	-8.53	Ave
11490	46.9	268	215	H	39.41	6.9	26.94	66.27	74	-7.73	Peak
11490	45.11	306	144	V	39.41	6.9	26.94	64.48	74	-9.52	Peak
11490	33.84	268	215	H	39.41	6.9	26.94	53.21	54	-0.79	Ave
11490	31.97	306	144	V	39.41	6.9	26.94	51.34	54	-2.66	Ave
250	49.05	241	111	V	12.1	0.86	21.21	40.8	46	-5.2	QP

9 FCC §15.247(a)(2) – 6 dB & 99% Emission Bandwidth

9.1 Applicable Standard

According to FCC §15.247(a) (2), 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

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emissions bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

9.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US42221851	2012-02-28	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:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102kPa

The testing was performed by Wei Sun from 2012-12-09 at RF site.

9.5 Test Results

Please refer to the following tables and plots.

2.4 GHz Band:

802.11 b 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	10.038	10.100	14.9282	14.7582	> 0.5	Compliant
Middle	2437	10.053	10.088	14.6688	14.7057	> 0.5	Compliant
High	2462	10.033	10.099	14.9164	14.9260	> 0.5	Compliant

802.11 g 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	16.580	16.556	16.4736	16.4724	> 0.5	Compliant
Middle	2437	16.581	16.579	16.5309	16.5453	> 0.5	Compliant
High	2462	16.575	16.569	16.4660	16.4657	> 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	17.777	17.845	17.6502	17.6687	> 0.5	Compliant
Middle	2437	17.836	17.778	17.7751	17.7444	> 0.5	Compliant
High	2462	17.782	17.754	17.6626	17.6708	> 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	36.525	36.527	36.0170	36.0198	> 0.5	Compliant
Middle	2437	36.543	36.530	36.0577	36.0817	> 0.5	Compliant
High	2452	36.495	36.492	35.9625	35.9586	> 0.5	Compliant

5.8 GHz Band:

802.11a 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	5745	16.533	17.753	18.6380	19.2069	> 0.5	Compliant
Middle	5785	16.531	17.780	17.8823	17.9468	> 0.5	Compliant
High	5825	16.560	17.767	16.6065	17.7952	> 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	5745	17.752	17.844	19.1357	19.0103	> 0.5	Compliant
Middle	5785	17.722	17.788	19.1523	17.9378	> 0.5	Compliant
High	5825	17.780	17.750	17.9152	17.8257	> 0.5	Compliant

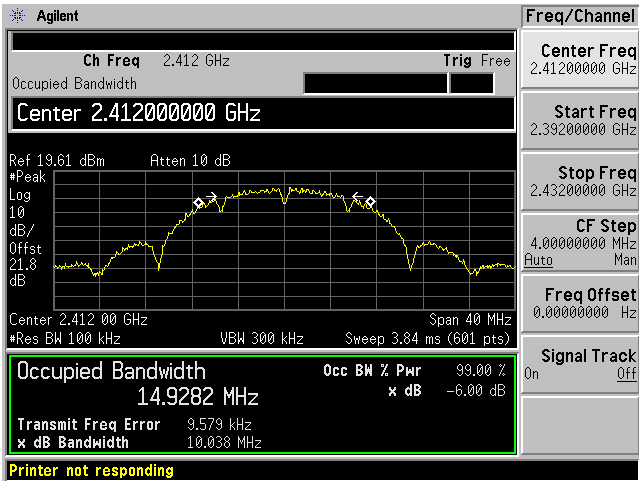
802.11n-HT40 mode:

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	5755	36.483	36.429	36.3603	36.3528	> 0.5	Compliant
High	5795	36.515	36.506	36.2792	36.2261	> 0.5	Compliant

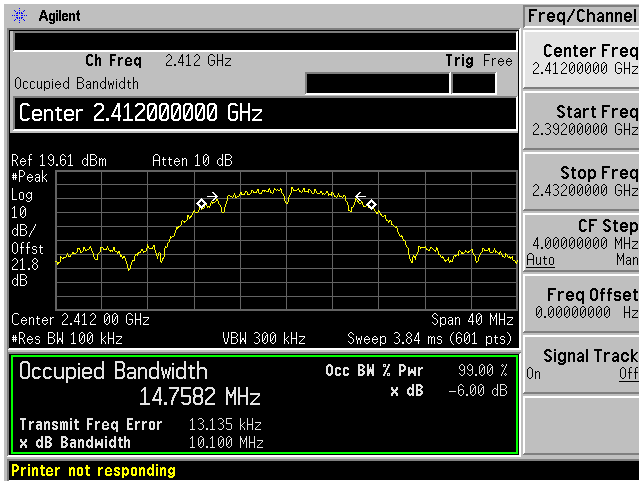
2.4 GHz Band

802.11b mode

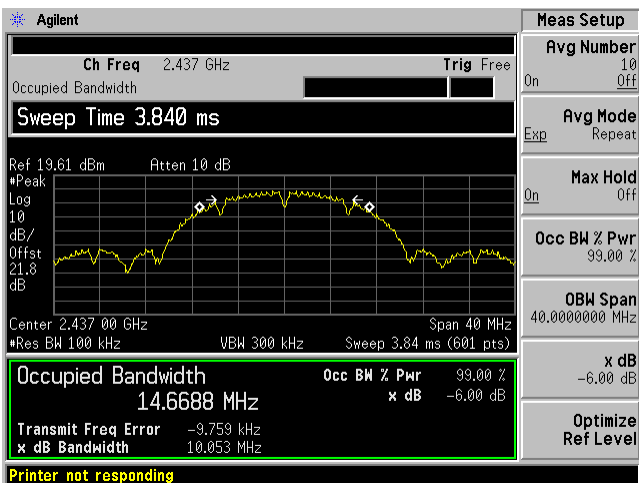
Low channel: 2412 MHz Chain J0



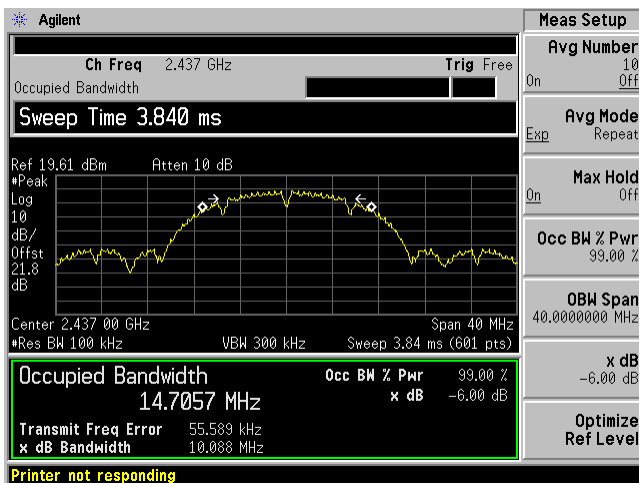
Low channel: 2412 MHz Chain J1



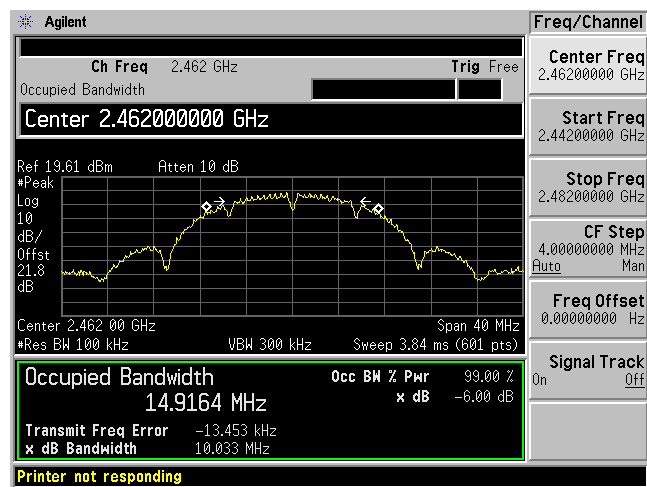
Middle channel: 2437 MHz Chain J0



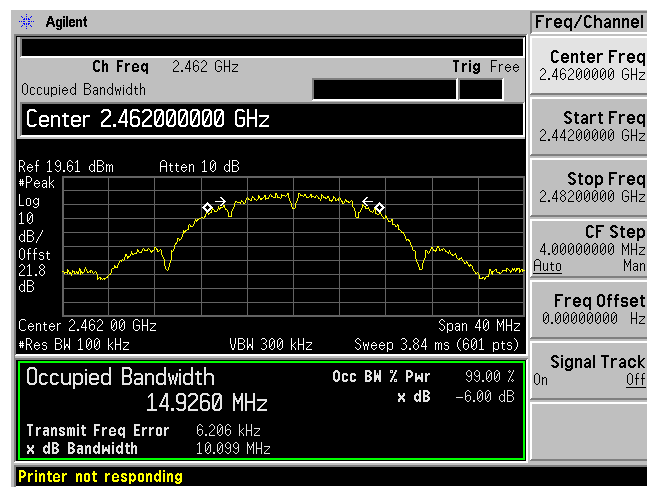
Middle channel: 2437 MHz Chain J1



High channel: 2462 MHz Chain J0

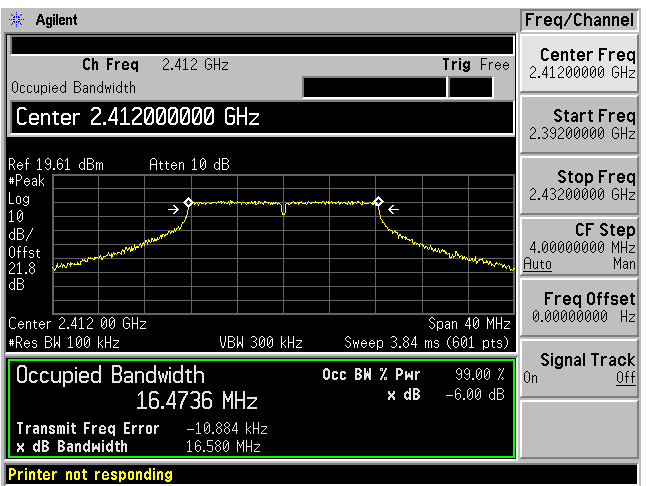


High channel: 2462 MHz Chain J1

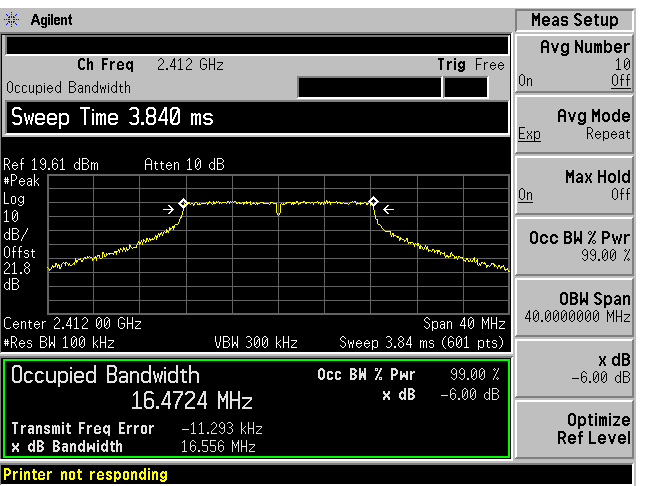


802.11g mode

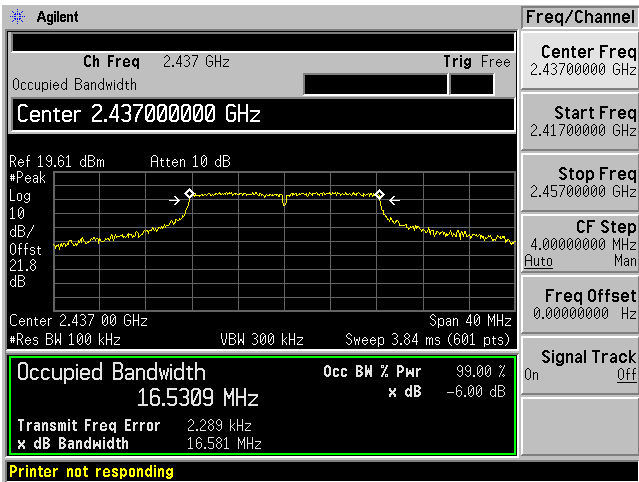
Low channel: 2412 MHz Chain J0



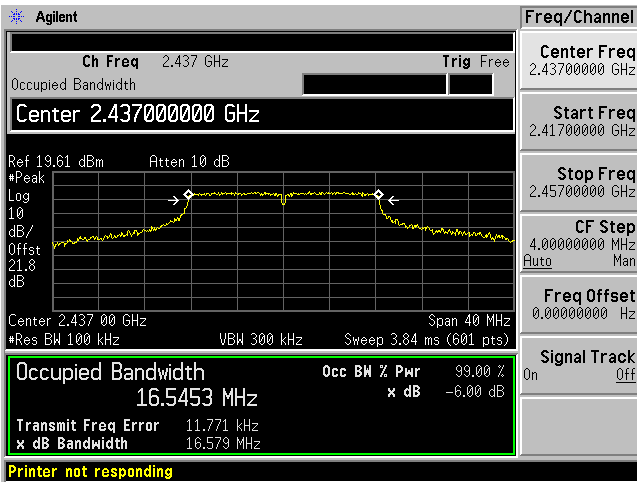
Low channel: 2412 MHz Chain J1



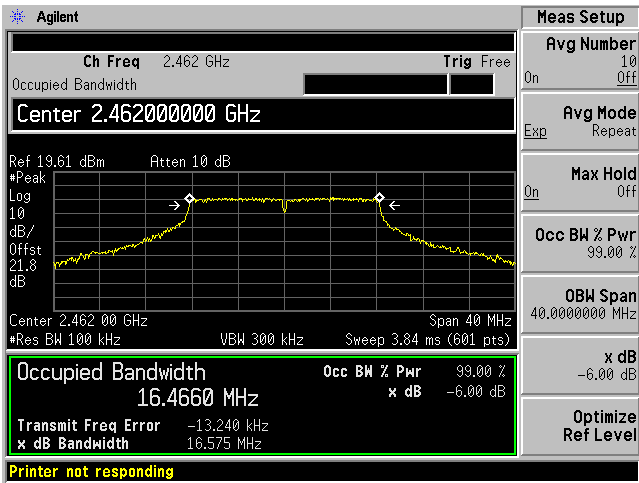
Middle channel: 2437 MHz Chain J0



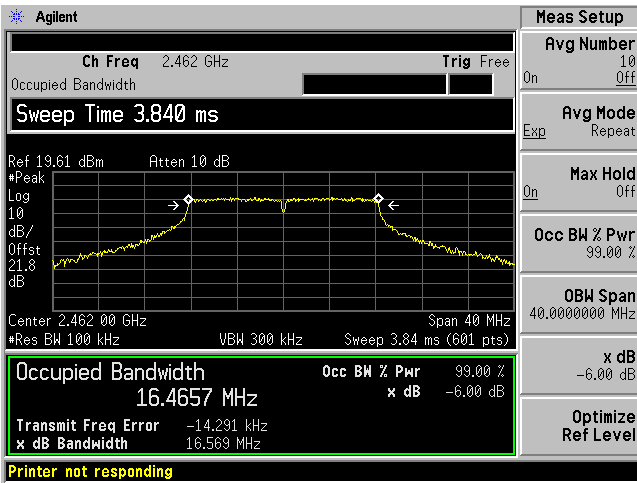
Middle channel: 2437 MHz Chain J1



High channel: 2462 MHz Chain J0

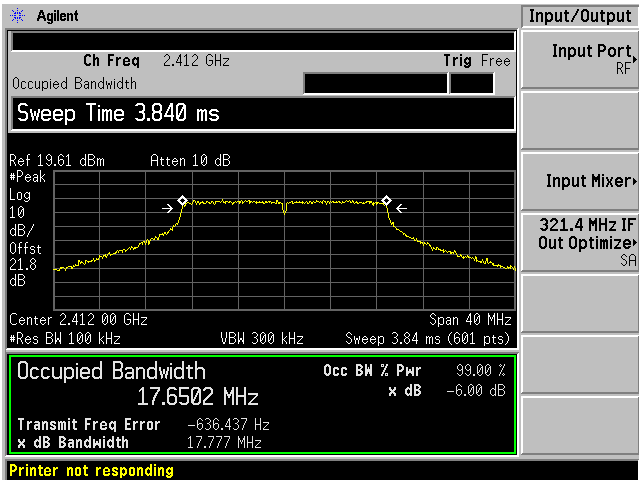


High channel: 2462 MHz Chain J1

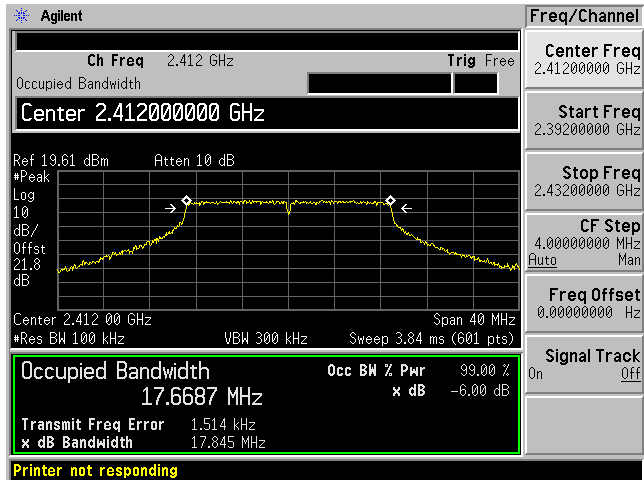


802.11n-HT20 mode

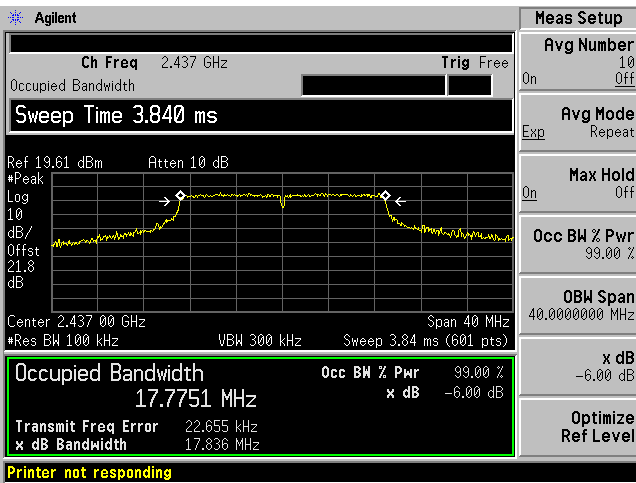
Low channel: 2412 MHz Chain J0



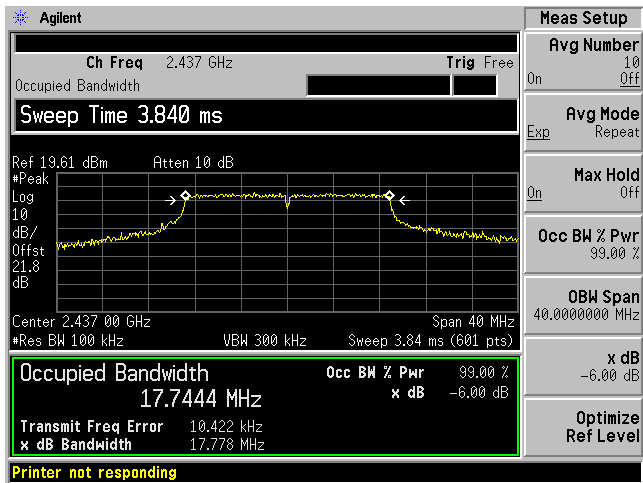
Low channel: 2412 MHz Chain J1



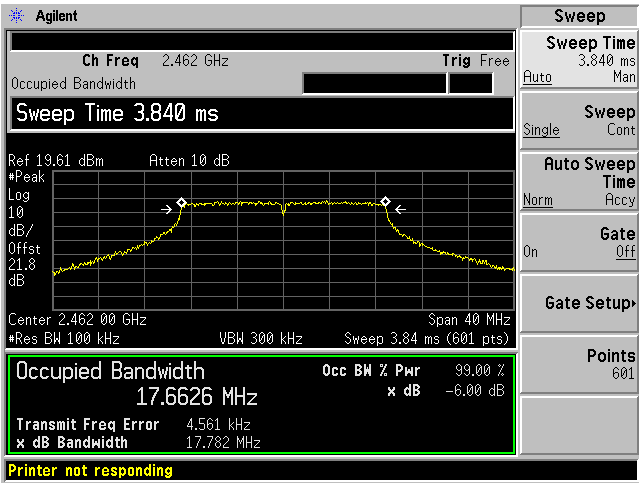
Middle channel: 2437 MHz Chain J0



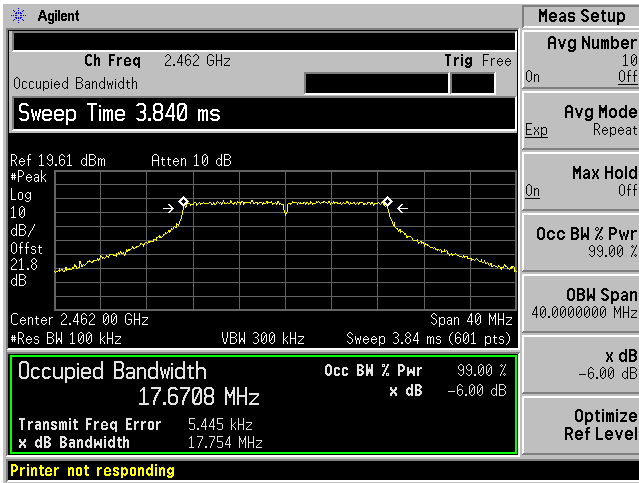
Middle channel: 2437 MHz Chain J1



High channel: 2462 MHz Chain J0

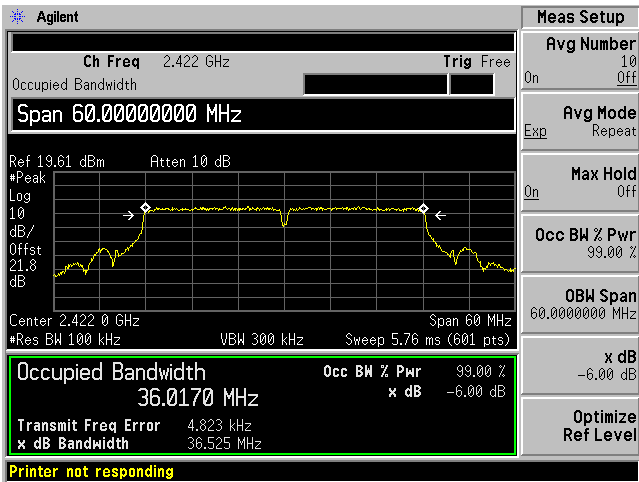


High channel: 2462 MHz Chain J1

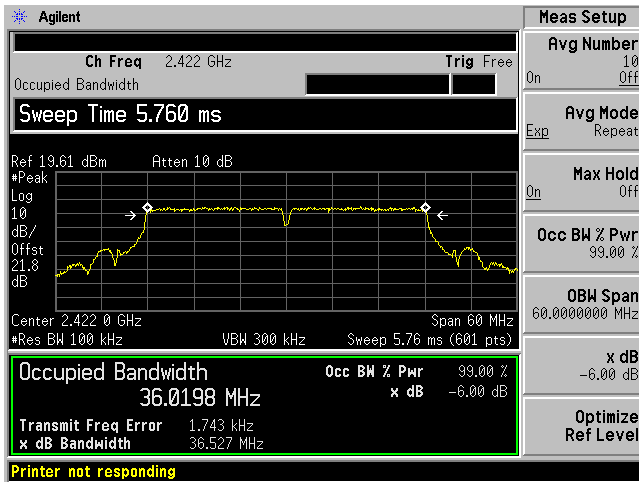


802.11n-HT40 mode

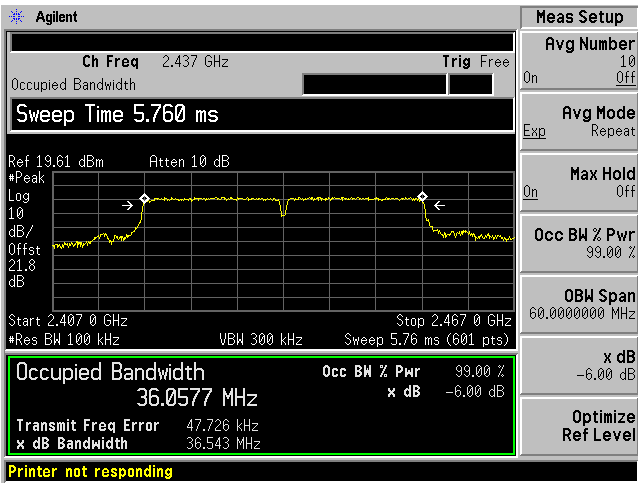
Low channel: 2422MHz Chain J0



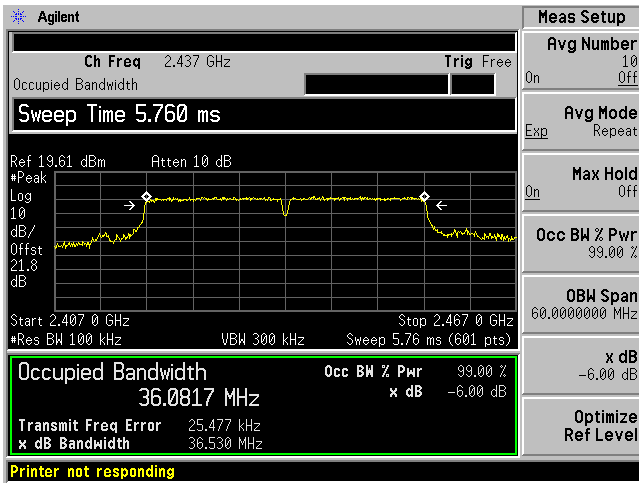
Low channel: 2422MHz Chain J1



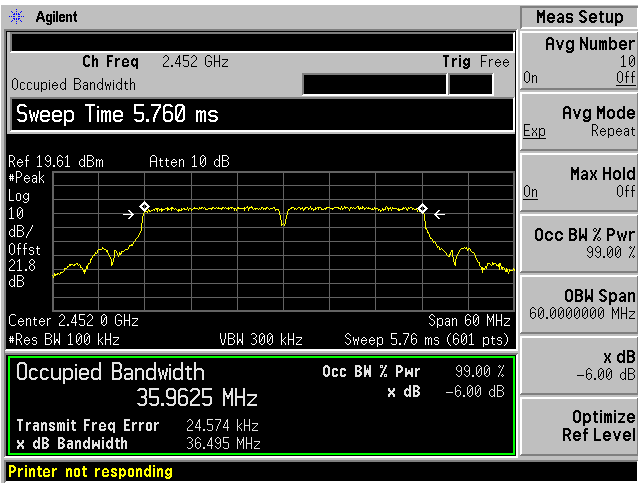
Middle channel: 2437 MHz Chain J0



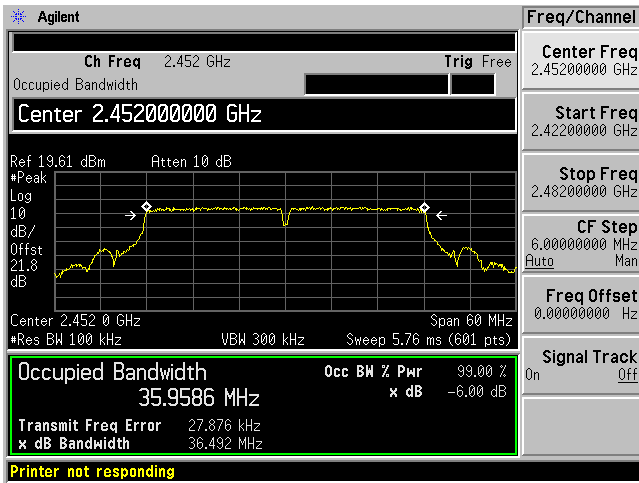
Middle channel: 2437 MHz Chain J1



High channel: 2452MHz Chain J0



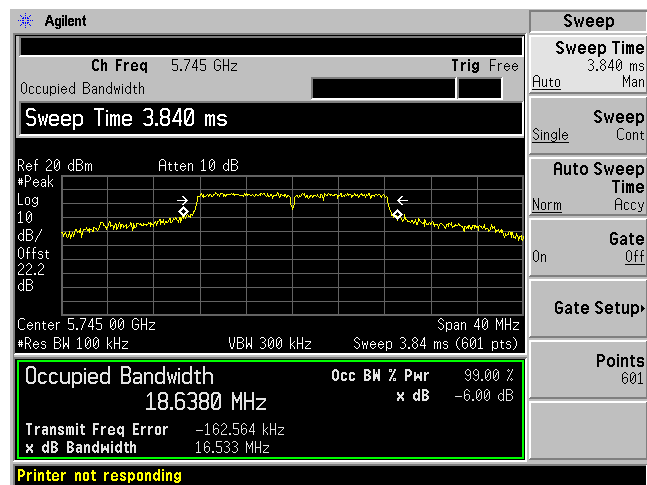
High channel: 245 MHz Chain J1



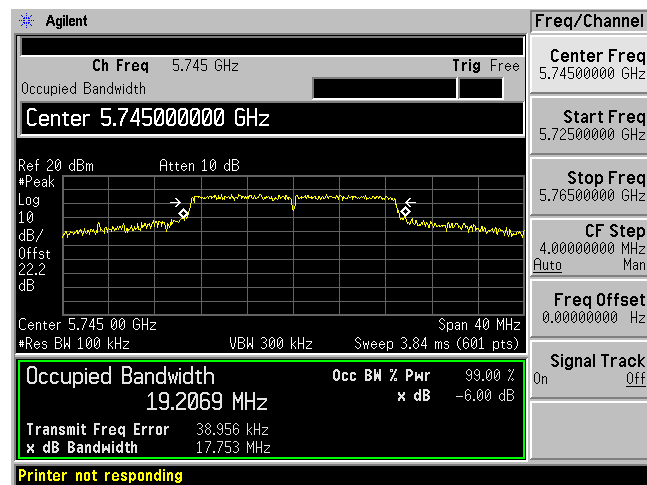
5.8 GHz Band

802.11a mode

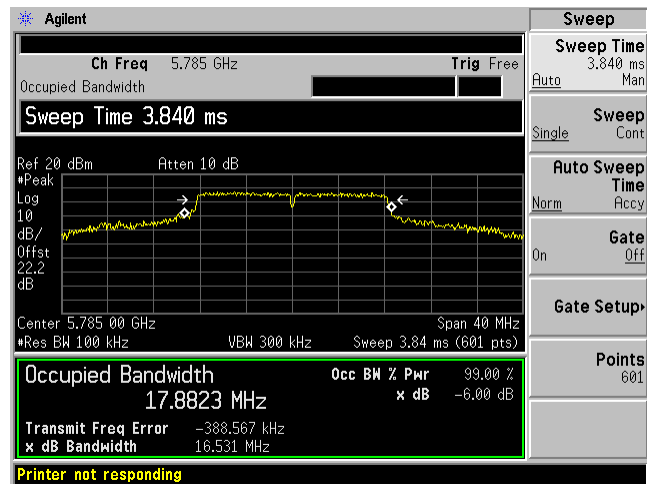
Low channel: 5745 MHz Chain J0



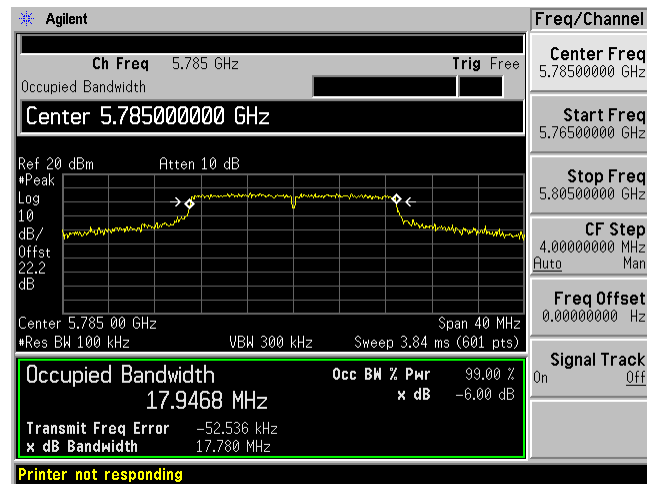
Low channel: 5745 MHz Chain J1



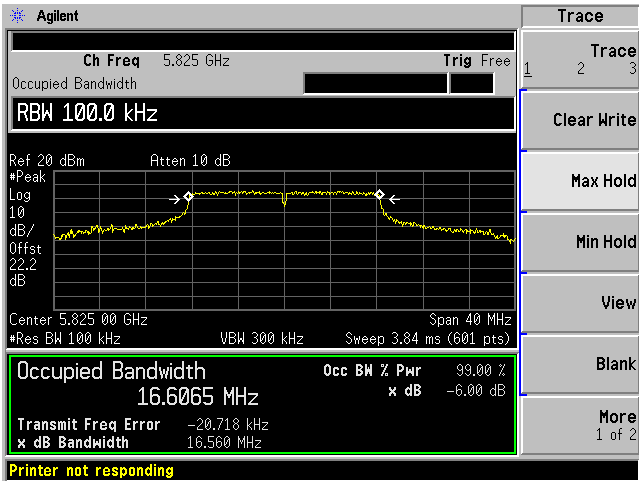
Middle channel: 5785 MHz Chain J0



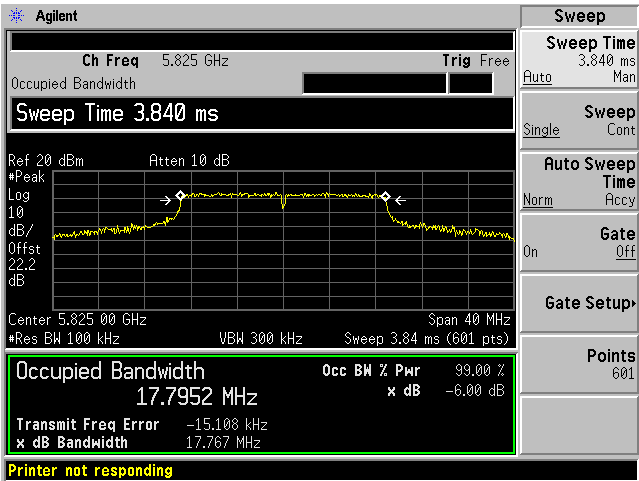
Middle channel: 5785 MHz Chain J1



High channel: 5825 MHz Chain J0

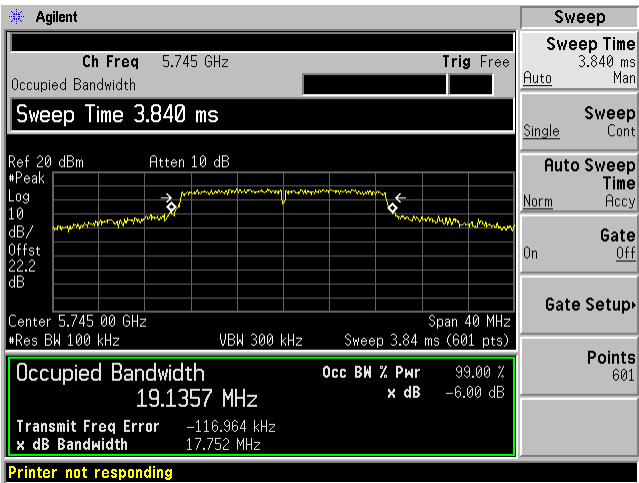


High channel: 5825 MHz Chain J1

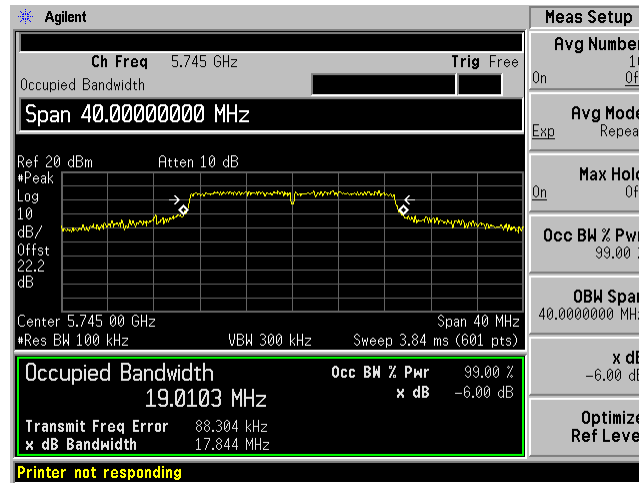


802.11n-HT20 mode

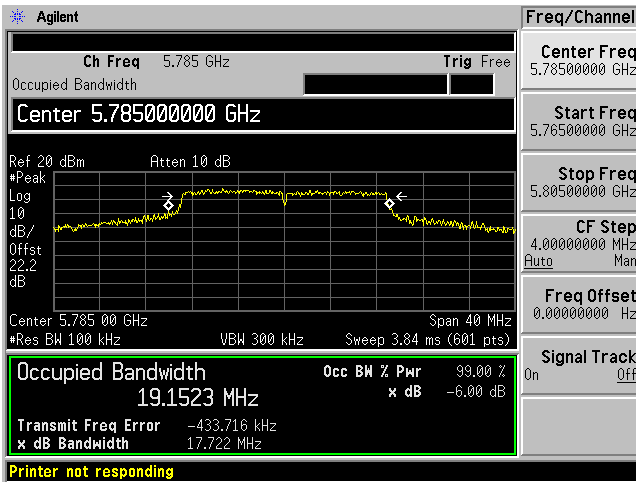
Low channel: 5745 MHz Chain J0



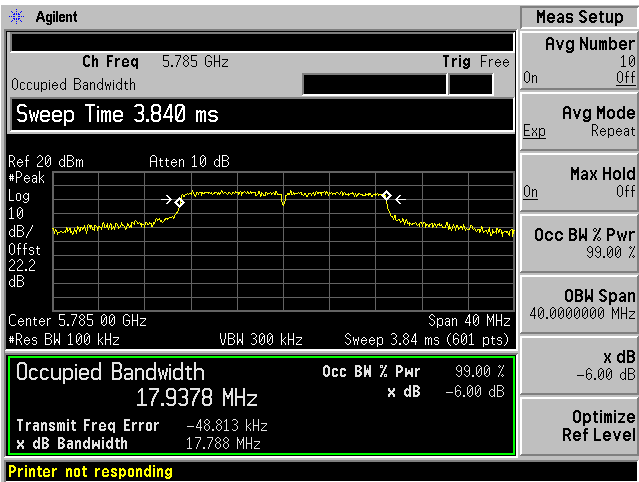
Low channel: 5745 MHz Chain J1



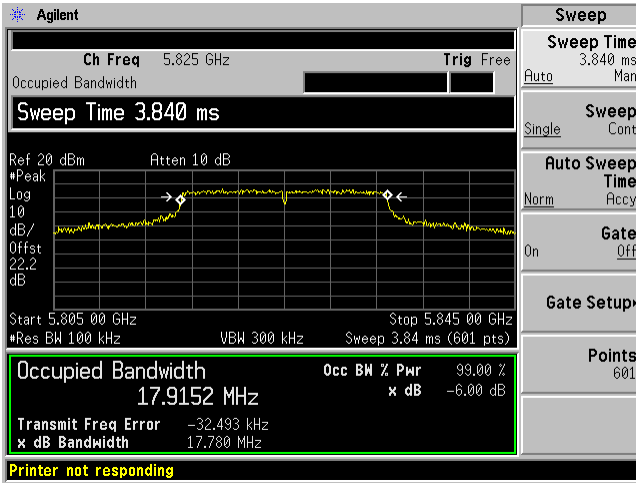
Middle channel: 5785 MHz Chain J0



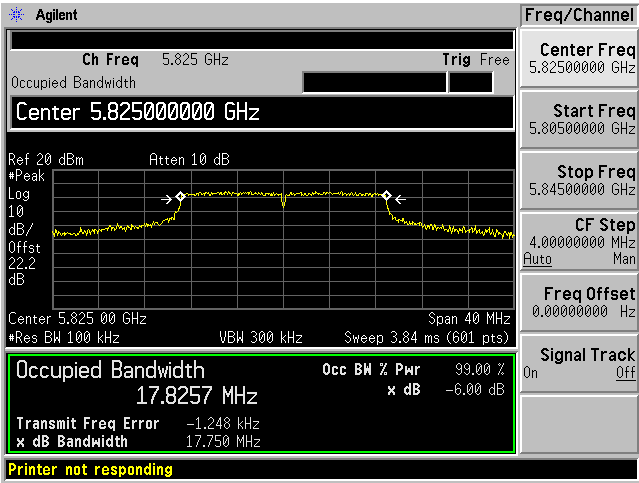
Middle channel: 5785 MHz Chain J1



High channel: 5825 MHz Chain J0

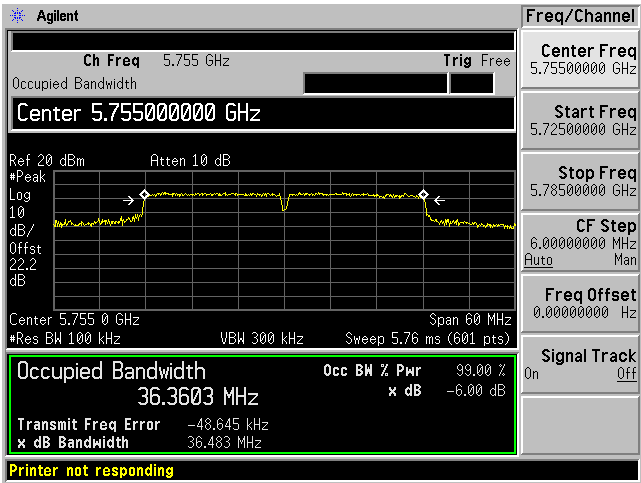


High channel: 5825 MHz Chain J1

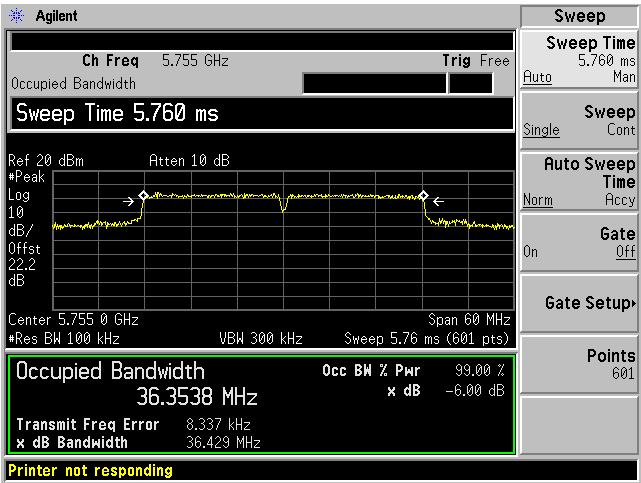


802.11n-HT40 mode

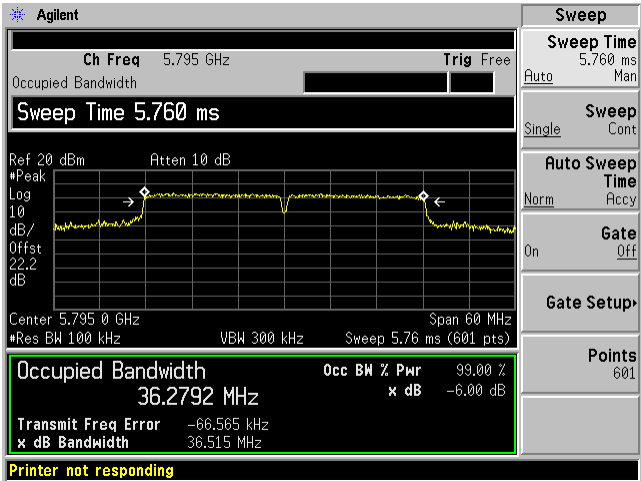
Low channel: 5755MHz Chain J0



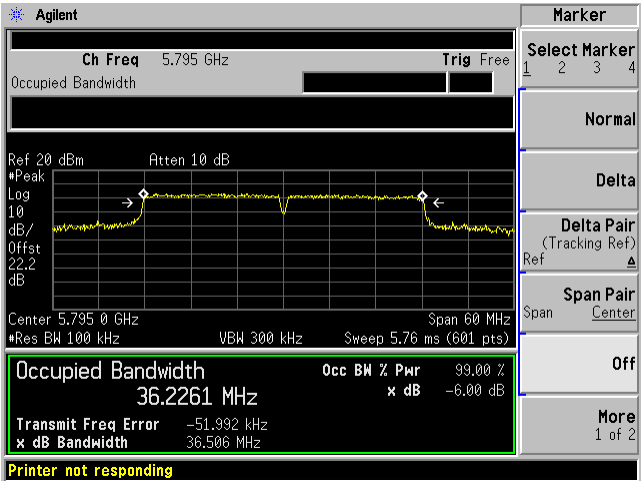
Low channel: 5755 MHz Chain J1



High channel: 5795 MHz Chain J0



High channel: 5795 MHz Chain J1



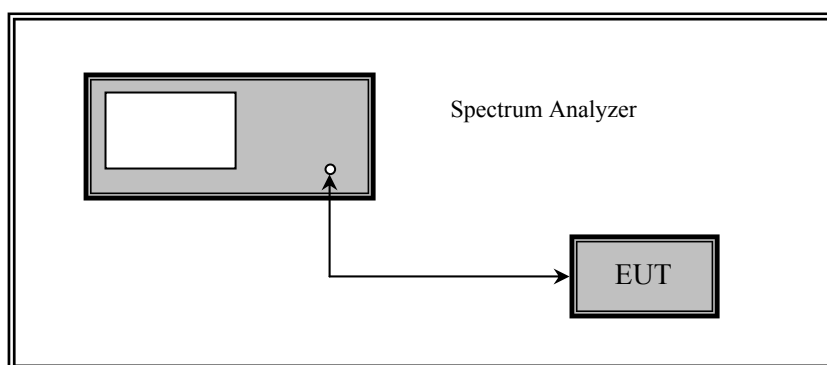
10 FCC §15.247(b) - Peak Output Power Measurement

10.1 Applicable Standard

According to FCC §15.247(b) and 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

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a spectrum analyzer.
3. Add a correction factor to the display.



10.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US42221851	2012-02-28	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:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102kPa

The testing was performed by Wei Sun on 2012-12-29 at RF site.

10.5 Test Results

2.4 GHz Band

802.11b mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	17.46	17.76	20.62	30	-9.38
Middle	2437	21.90	21.34	24.64	30	-5.36
High	2462	19.21	19.20	22.22	30	-7.78

802.11g mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	16.09	15.97	19.04	30	-10.96
Middle	2437	20.10	21.08	23.63	30	-6.37
High	2462	16.11	16.04	19.09	30	-10.91

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	15.61	15.73	18.68	30	-11.32
Middle	2437	20.43	20.87	23.66	30	-6.34
High	2462	14.75	14.62	17.70	30	-12.3

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	15.08	15.17	18.14	30	-11.86
Middle	2437	20.47	20.85	23.67	30	-6.33
High	2452	14.28	14.33	17.32	30	-12.68

5.8 GHz Band

802.11a mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	23.46	23.01	26.25	30	-3.75
Middle	5785	22.60	22.28	25.45	30	-4.55
High	5825	22.57	22.33	25.46	30	-4.54

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	5745	23.48	23.41	26.46	30	-3.54
Middle	5785	23.23	22.91	26.08	30	-3.92
High	5825	23.16	22.79	25.99	30	-4.01

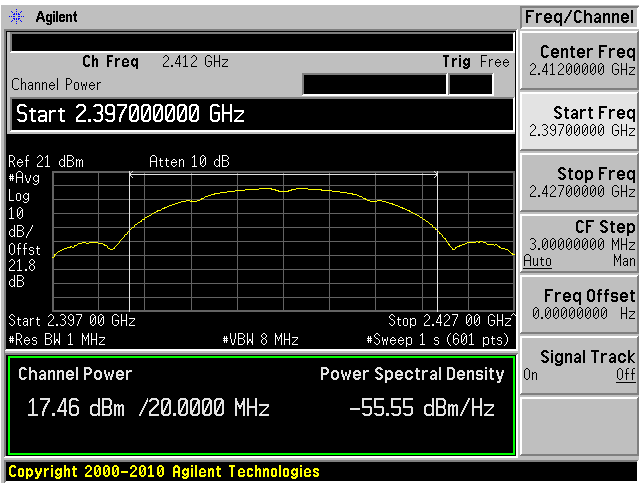
802.11n-HT40 mode

Channel	Frequency (MHz)	TX Chain J0 Power (dBm)	TX Chain J1 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5755	22.81	22.89	25.86	30	-4.14
High	5795	23.03	22.97	26.01	30	-3.99

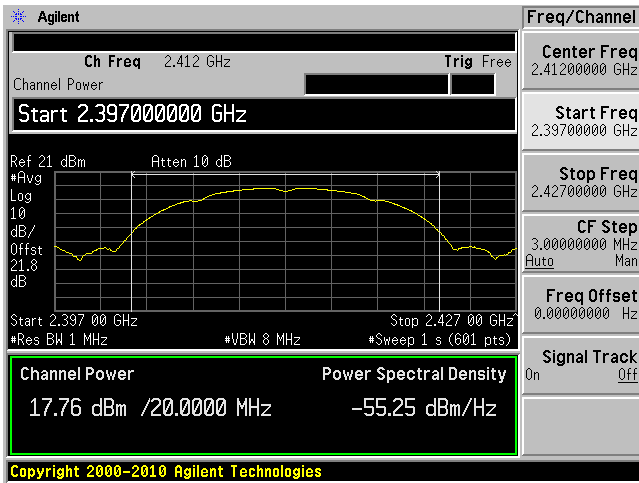
2.4 GHz Band

802.11b mode

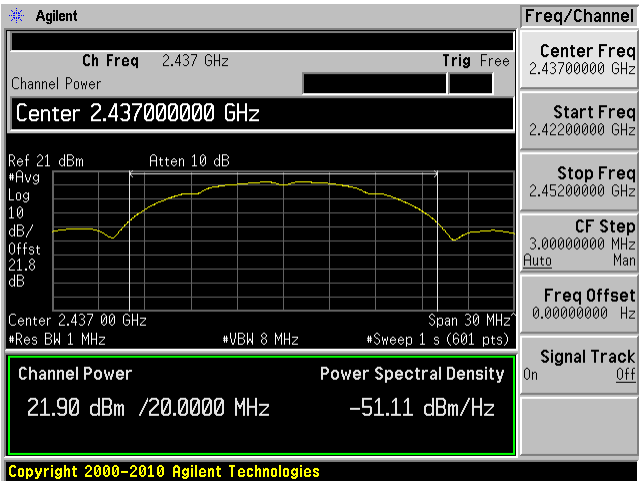
Low channel: 2412 MHz Chain J0



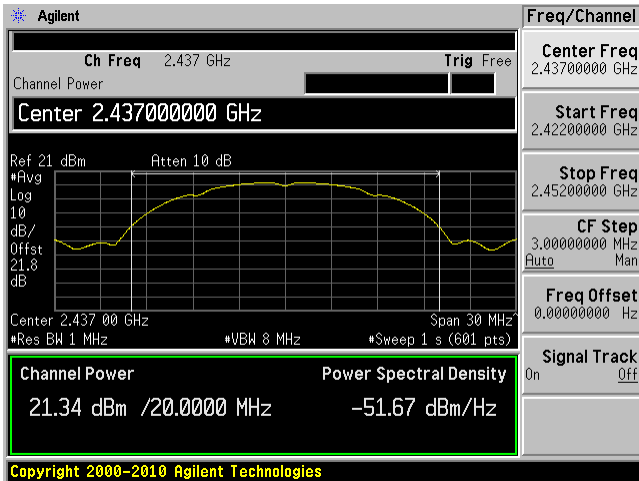
Low channel: 2412 MHz Chain J1



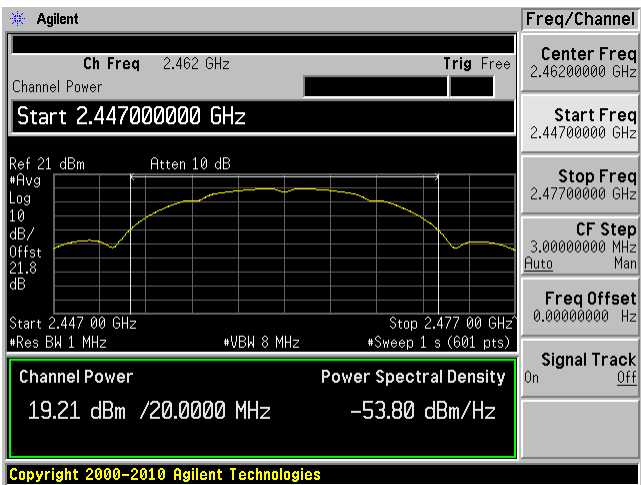
Middle channel: 2437 MHz Chain J0



Middle channel: 2437 MHz Chain J1



High channel: 2462 MHz Chain J0

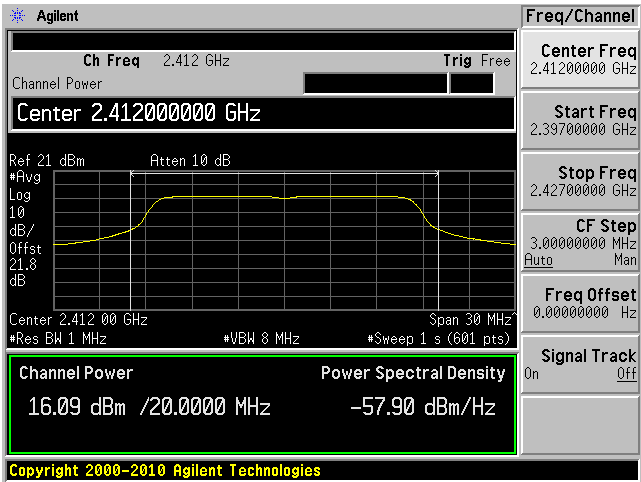


High channel: 2462 MHz Chain J1

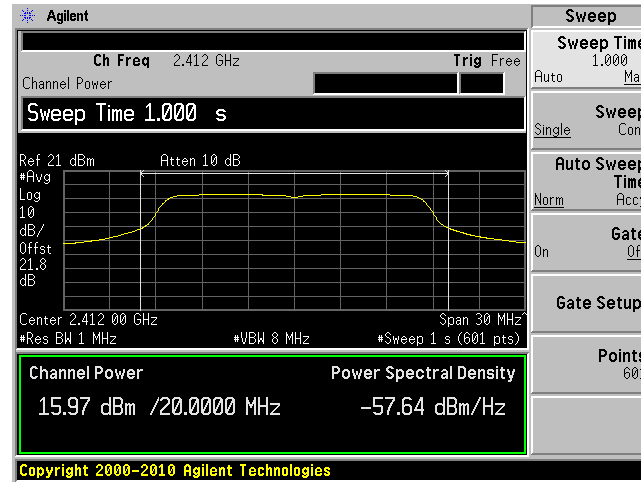


802.11g mode

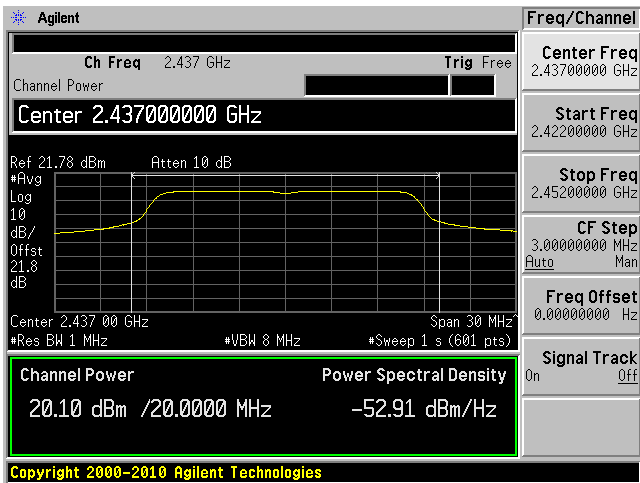
Low channel: 2412 MHz Chain J0



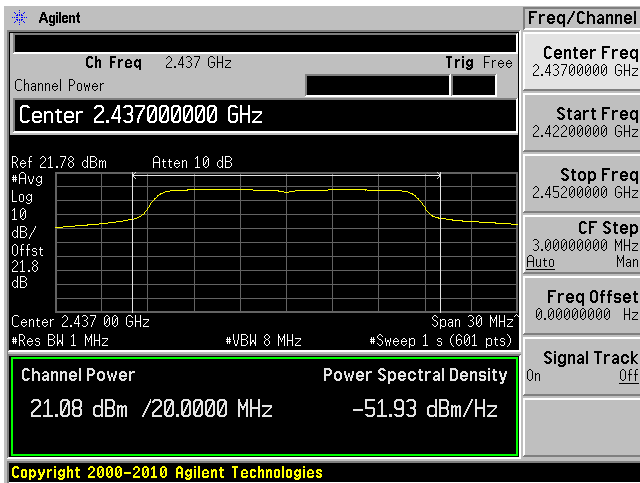
Low channel: 2412 MHz Chain J1



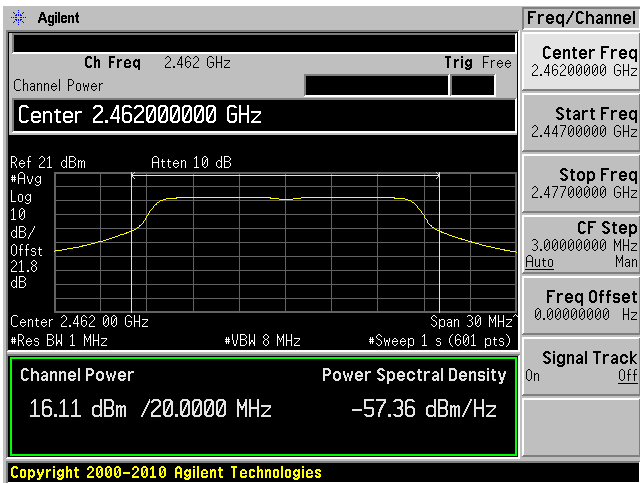
Middle channel: 2437 MHz Chain J0



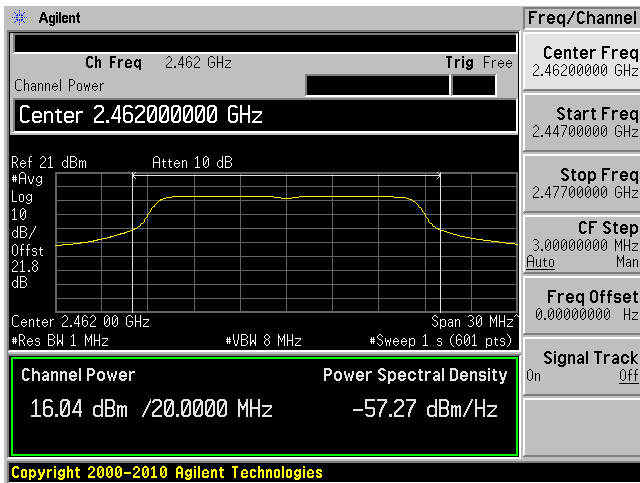
Middle channel: 2437 MHz Chain J1



High channel: 2462 MHz Chain J0



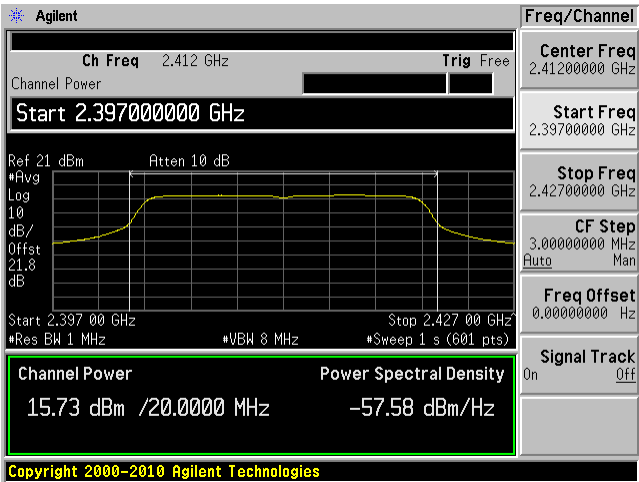
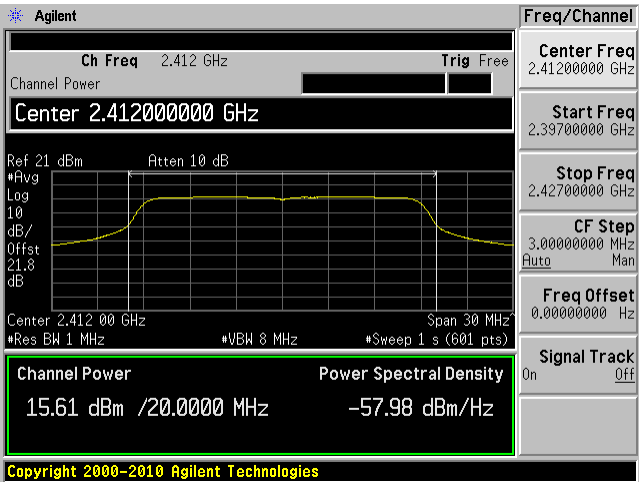
High channel: 2462 MHz Chain J1



802.11n-HT20 mode

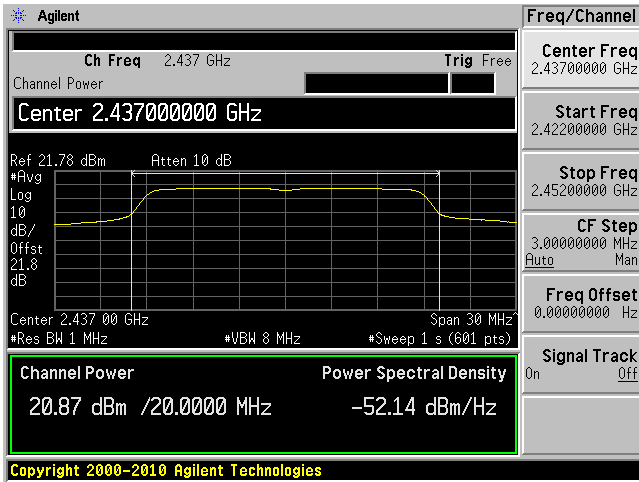
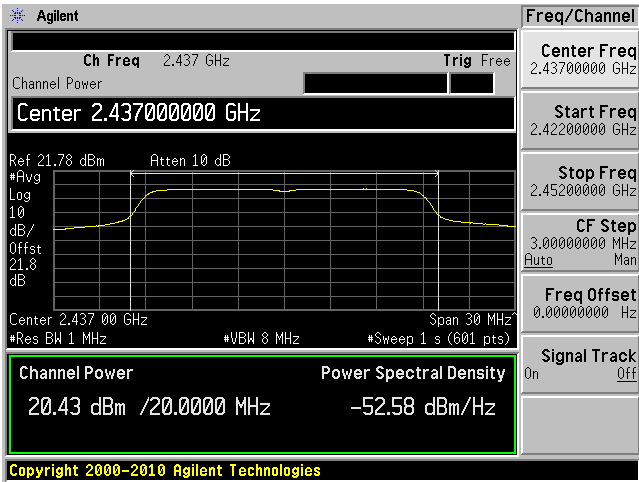
Low channel: 2412 MHz Chain J0

Low channel: 2412 MHz Chain J1

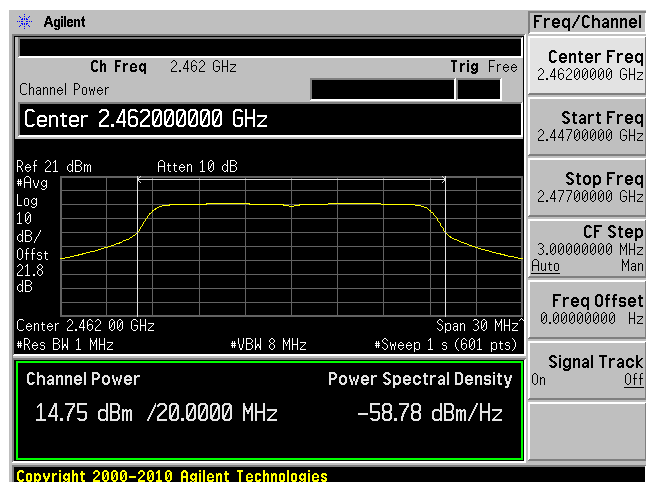


Middle channel: 2437 MHz Chain J0

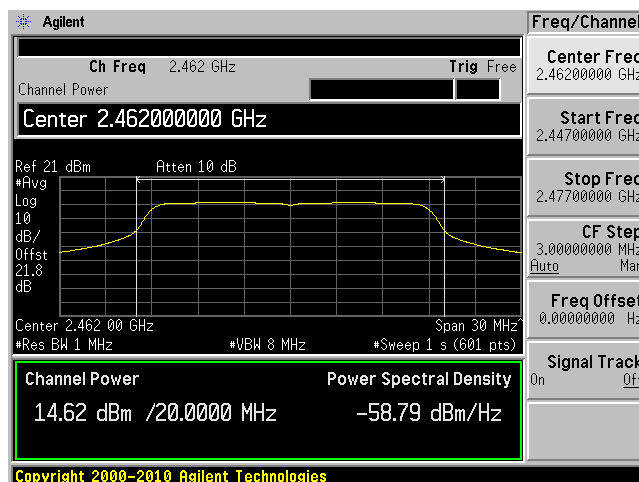
Middle channel: 2437 MHz Chain J1



High channel: 2462 MHz Chain J0

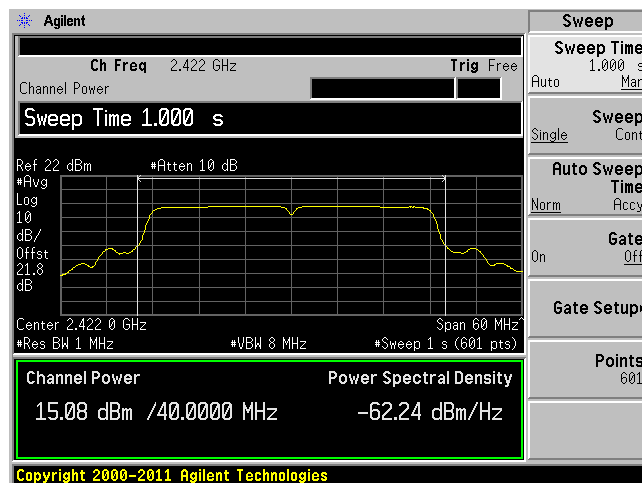


High channel: 2462 MHz Chain J1

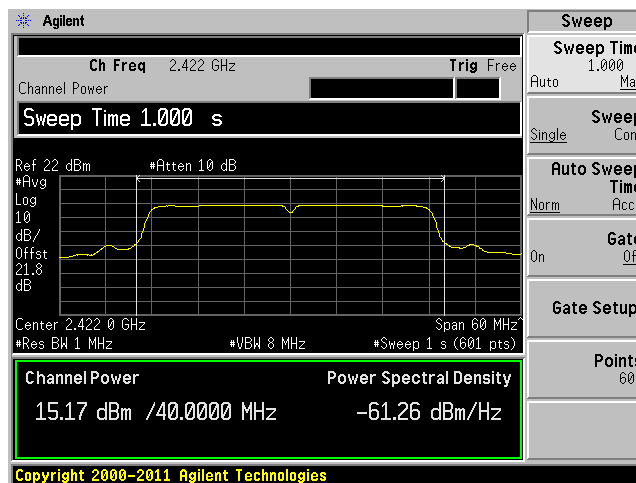


802.11n-HT40 mode

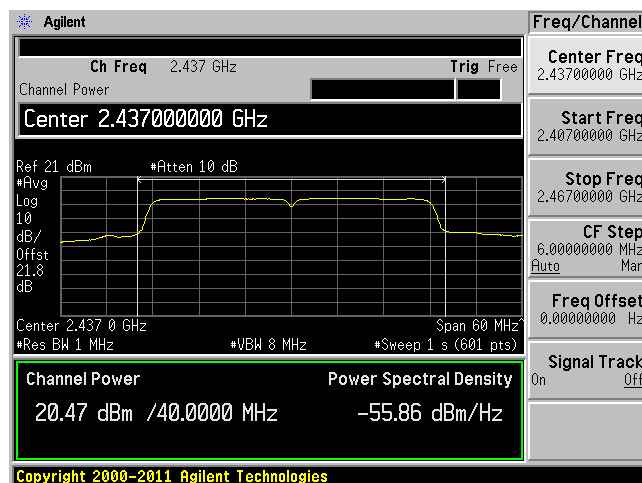
Low channel: 2422 MHz Chain J0



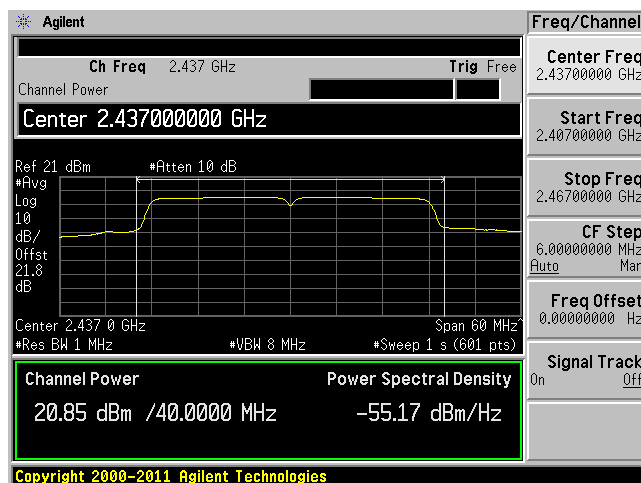
Low channel: 2422 MHz Chain J1



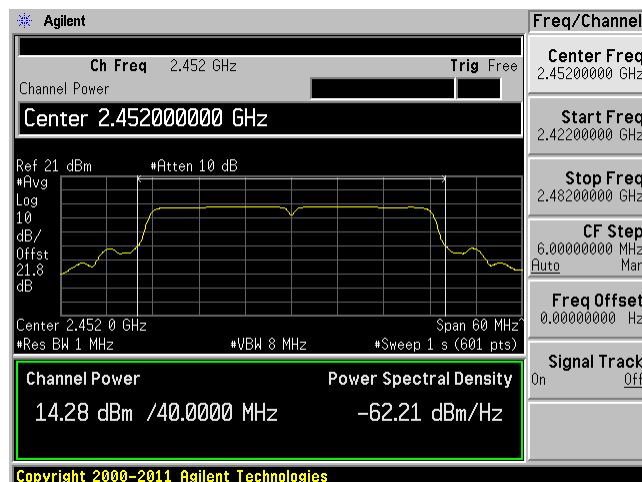
Middle channel: 2437 MHz Chain J0



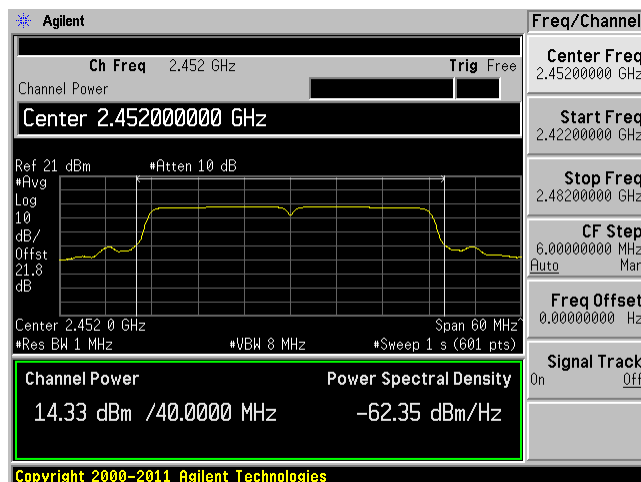
Middle channel: 2437 MHz Chain J1



High channel: 2452 MHz Chain J0



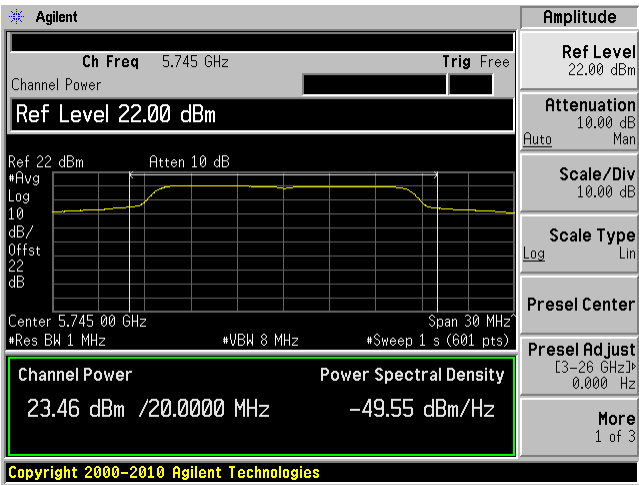
High channel: 2452 MHz Chain J1



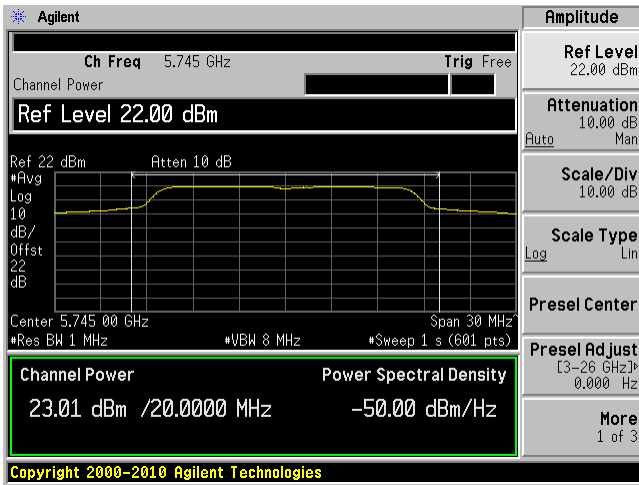
5.8 GHz Band

802.11a mode

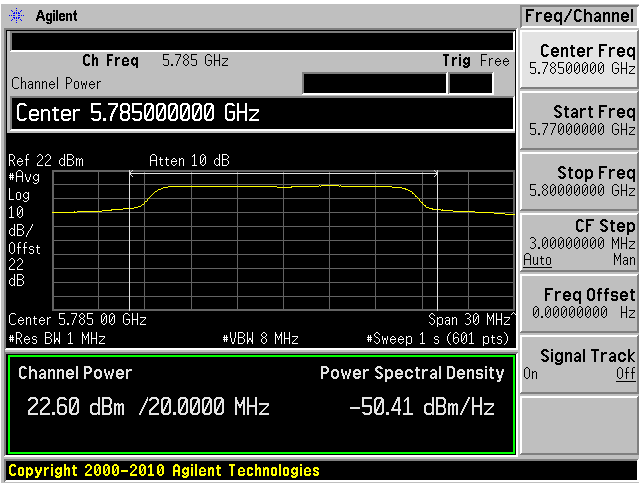
Low channel: 5745 MHz Chain J0



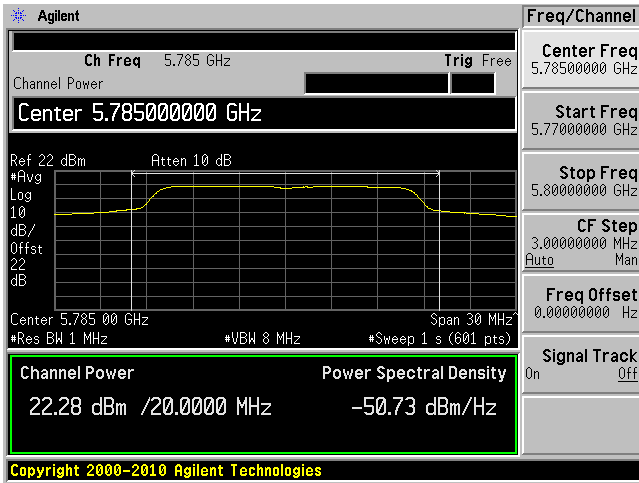
Low channel: 5745 MHz Chain J1



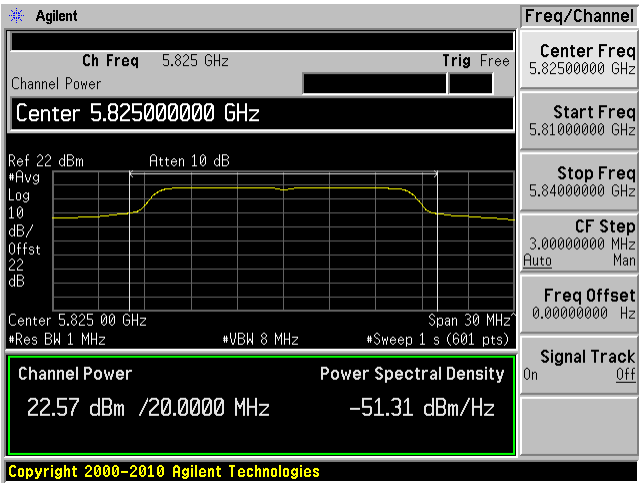
Middle channel: 5785 MHz Chain J0



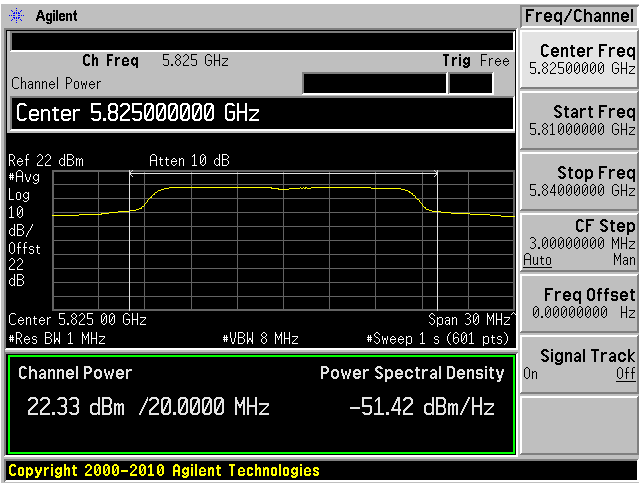
Middle channel: 5785 MHz Chain J1



High channel: 5825 MHz Chain J0

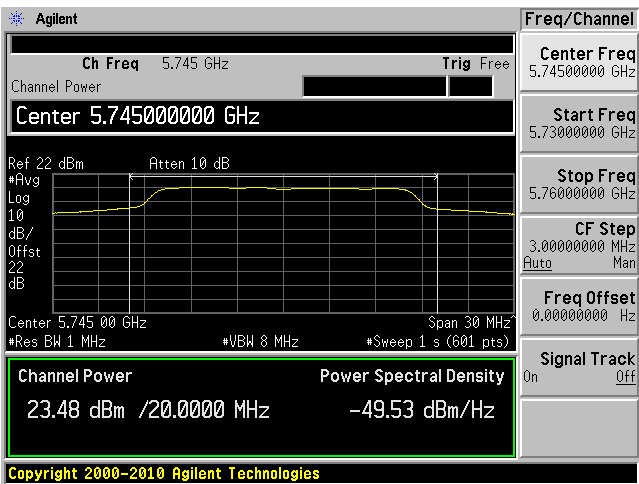


High channel: 5825 MHz Chain J1

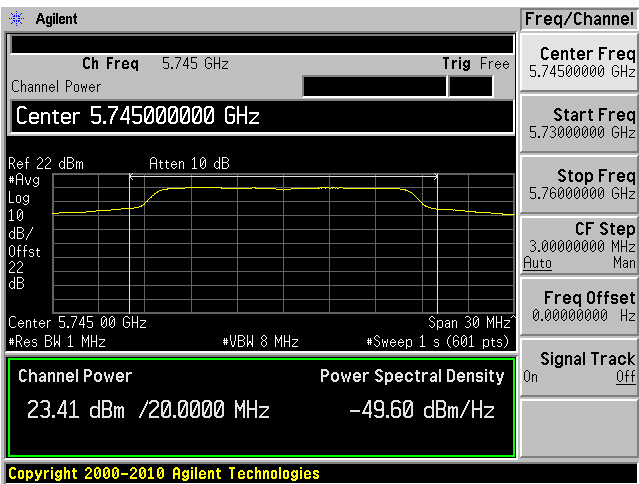


802.11n-HT20 mode

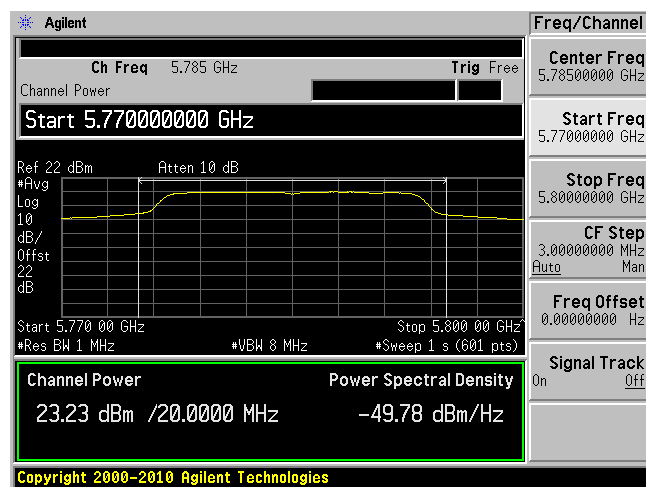
Low channel: 5745 MHz Chain J0



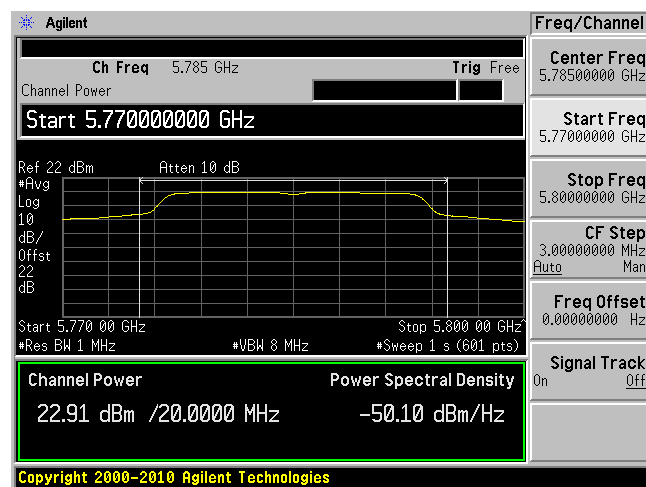
Low channel: 5745 MHz Chain J1



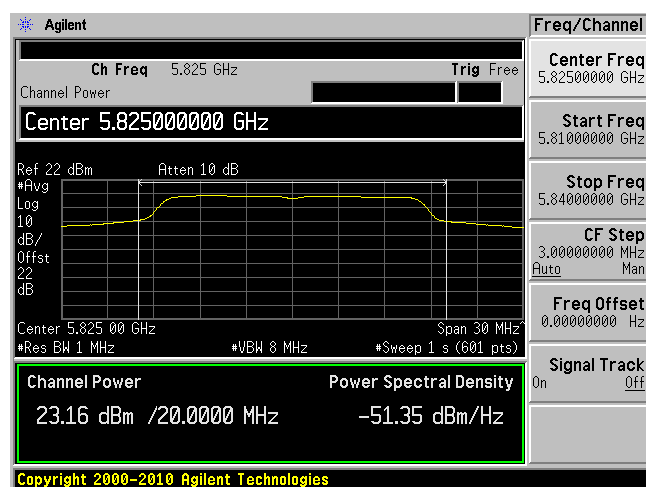
Middle channel: 5785 MHz Chain J0



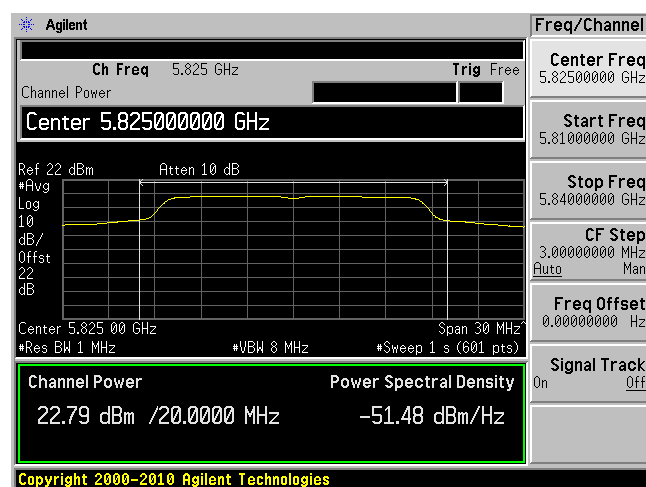
Middle channel: 5785 MHz Chain J1



High channel: 5825 MHz Chain J0

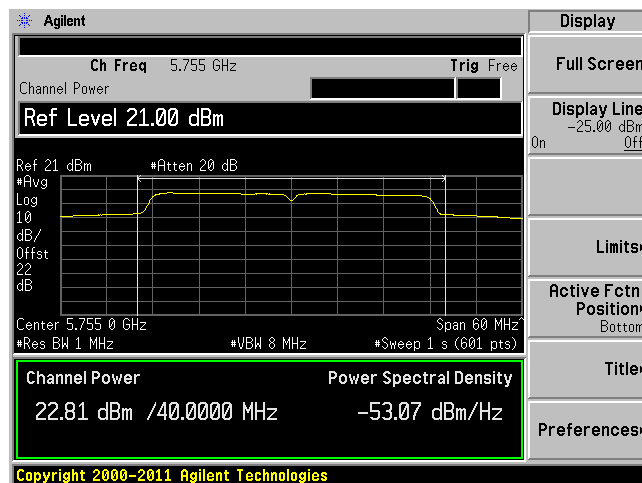


High channel: 5825 MHz Chain J1

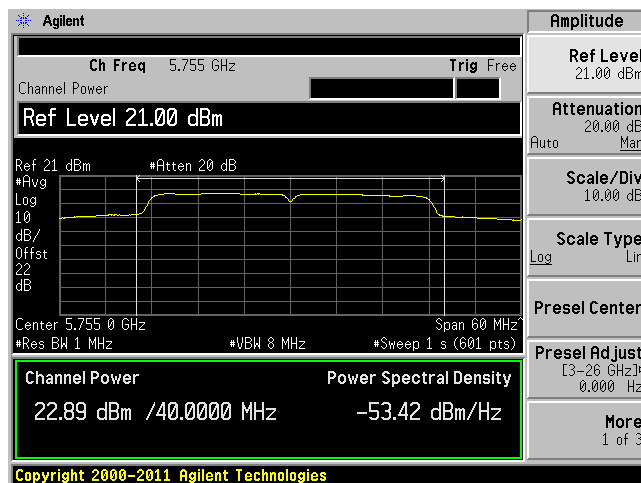


802.11n-HT40 mode

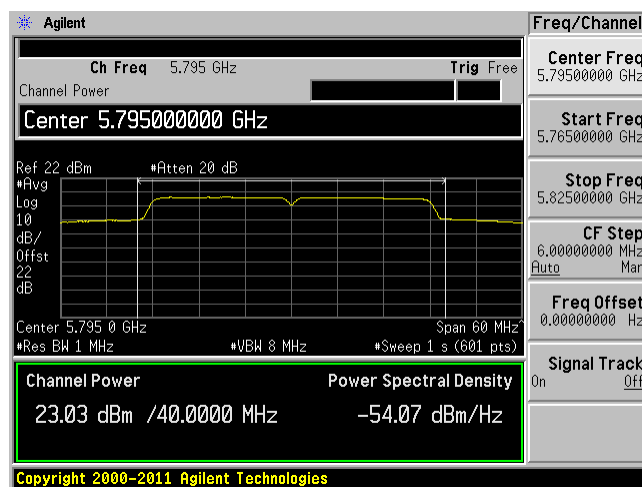
Low channel: 5755 MHz Chain J0



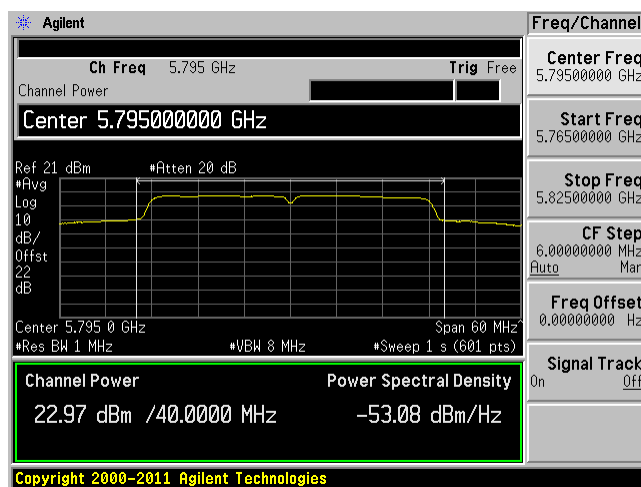
Low channel: 5755 MHz Chain J1



High channel: 5795 MHz Chain J0



High channel: 5795 MHz Chain J1



11 FCC §15.247(d) – 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).

11.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

11.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US42221851	2012-02-28	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:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102kPa

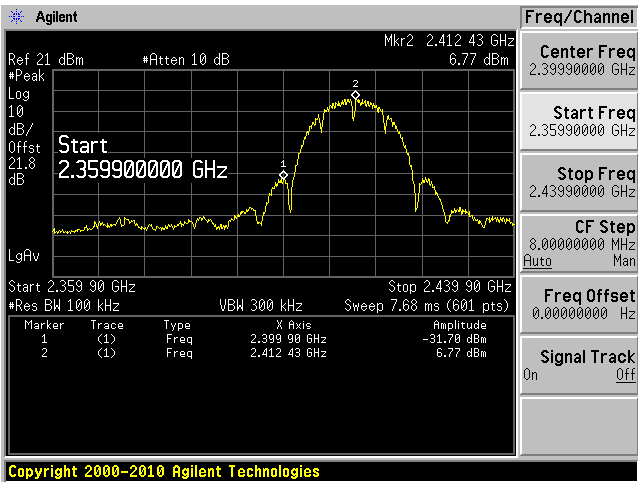
The testing was performed by Wei Sun on 2012-12-29 at RF site.

11.5 Test Results

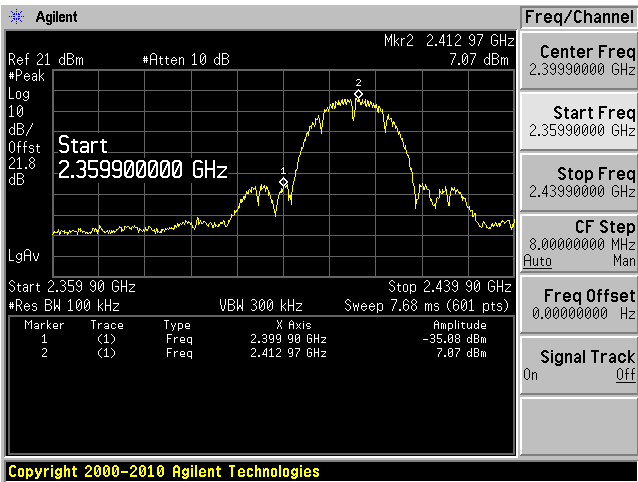
Please refer to following pages for plots of band edge.

2.4 GHz Band

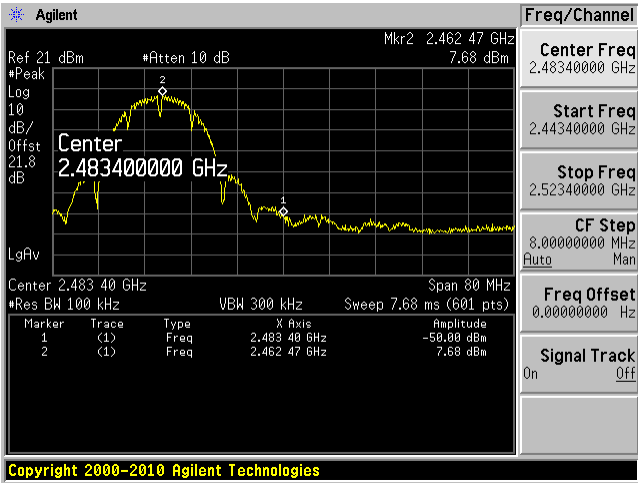
802.11b, Chain J0 Low Band Edge



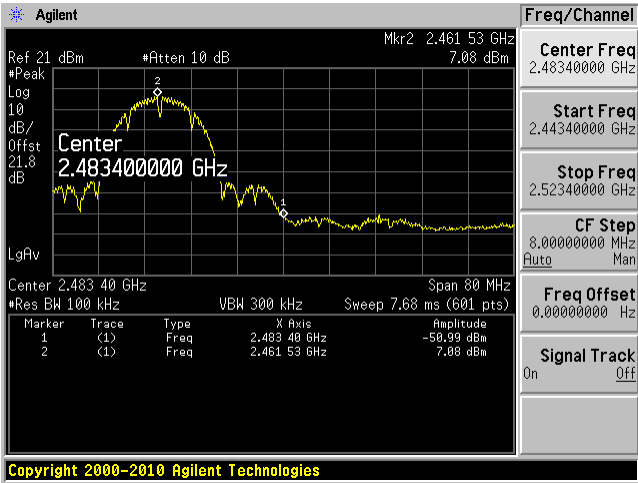
802.11b, Chain J1 Low Band Edge



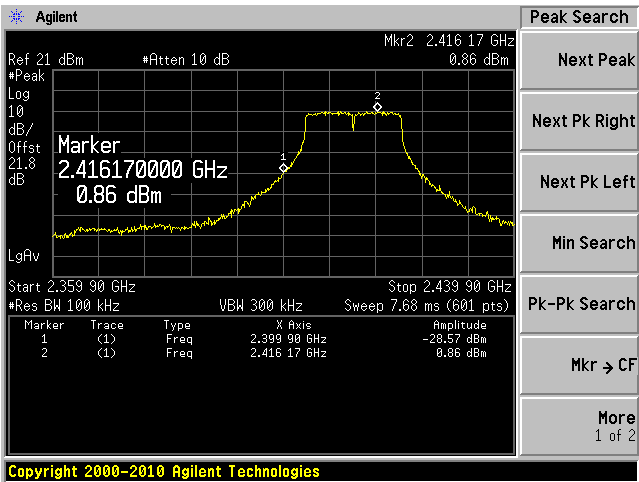
802.11b, Chain J0 High Band Edge



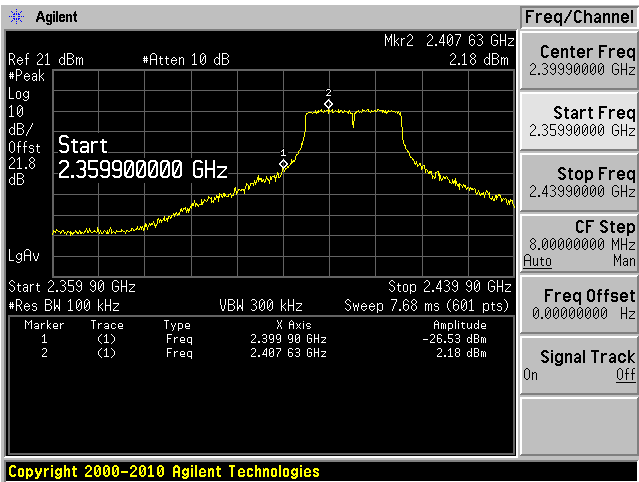
802.11b, Chain J1 High Band Edge



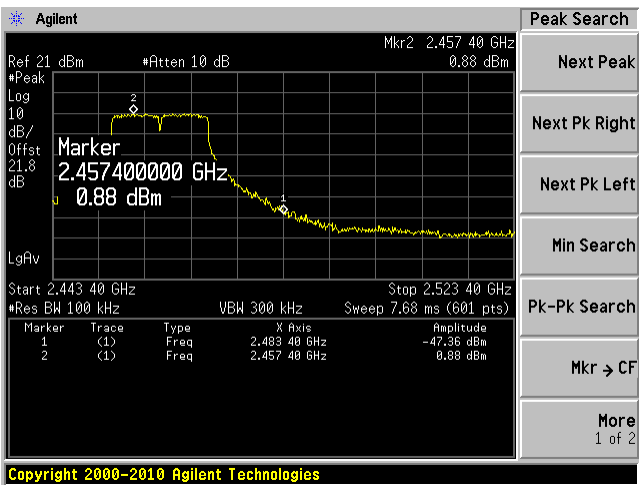
802.11g, Chain J0 Low Band Edge



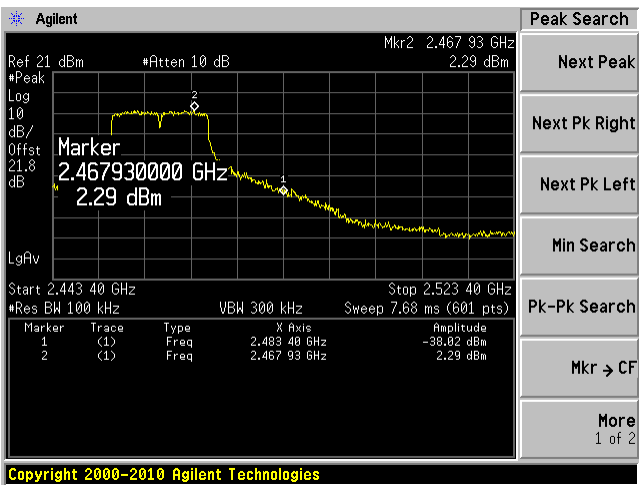
802.11g, Chain J1 Low Band Edge



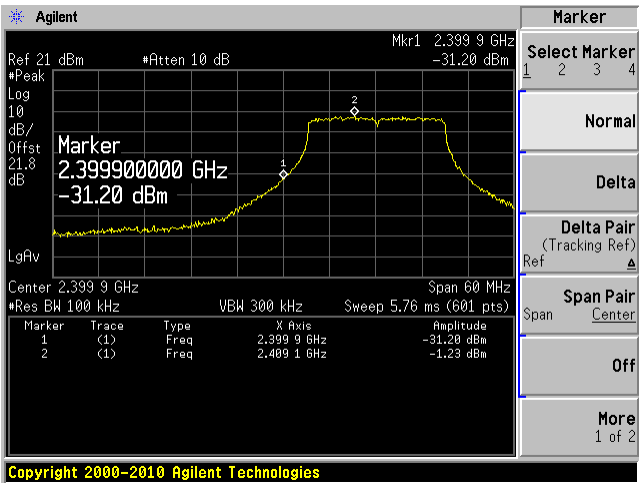
802.11g, Chain J0 High Band Edge



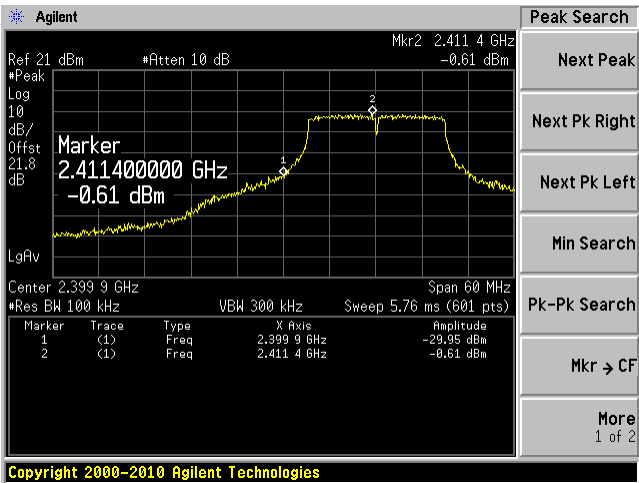
802.11g, Chain J1 High Band Edge



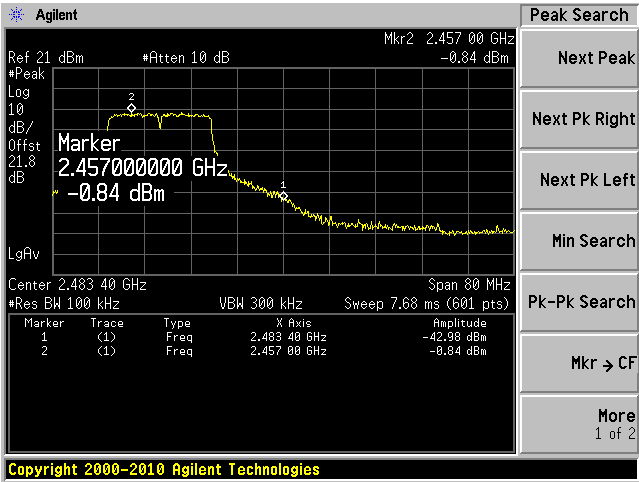
802.11n-HT20, Chain J0 Low Band Edge



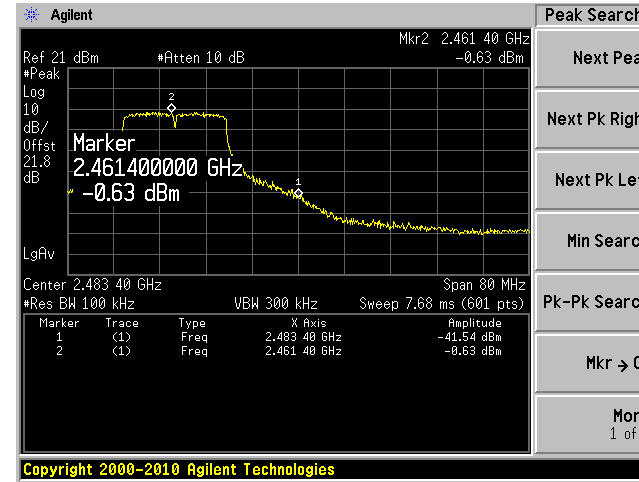
802.11n-HT20, Chain J1 Low Band Edge



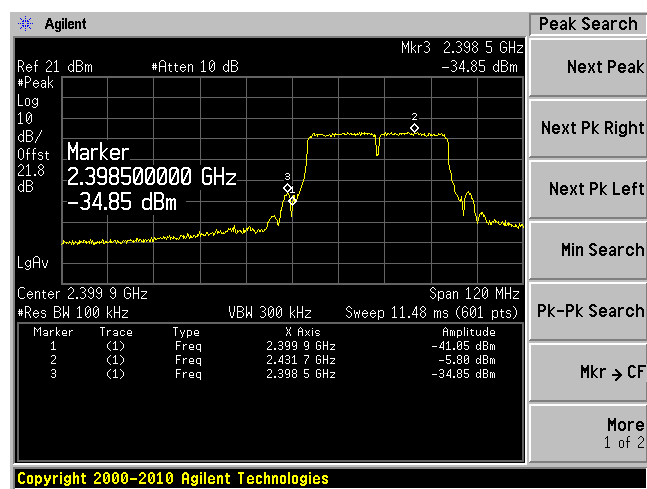
802.11n-HT20, Chain J0 High Band Edge



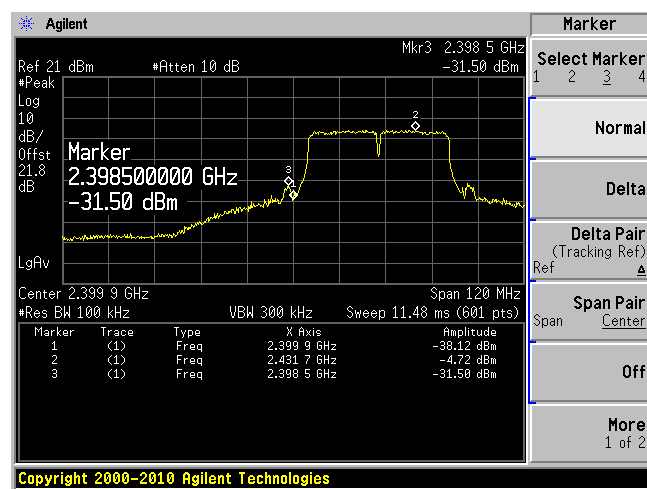
802.11n-HT20, Chain J1 High Band Edge



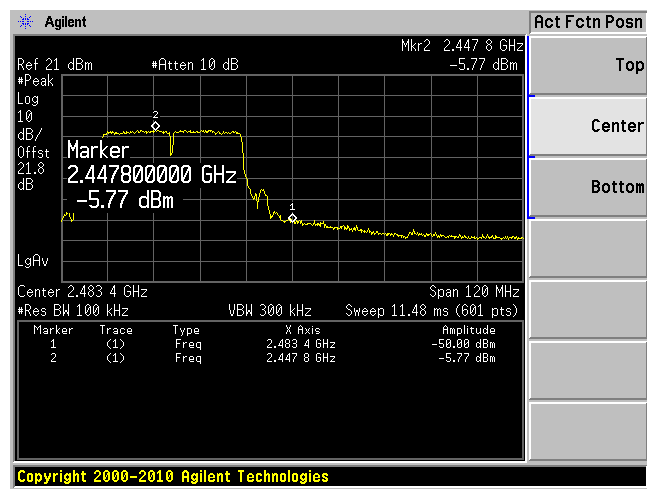
802.11n-HT40, Chain J0 Low Band Edge



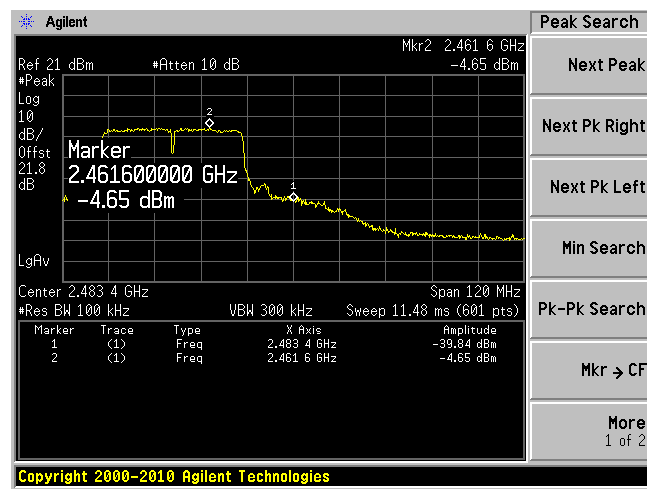
802.11n-HT40, Chain J1 Low Band Edge



802.11n-HT40, Chain J0 High Band Edge

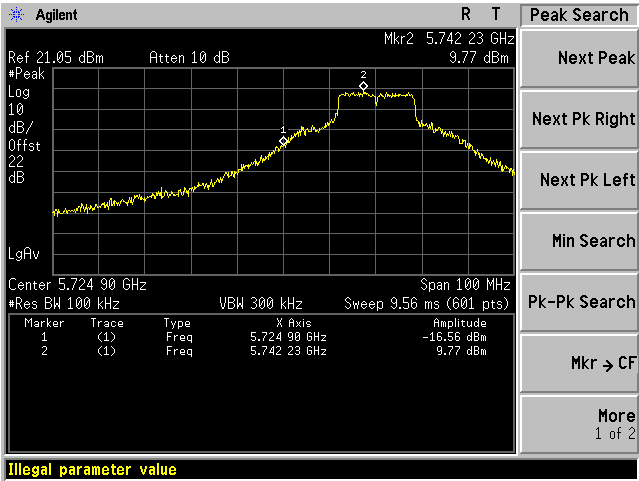


802.11n-HT40, Chain J1 High Band Edge

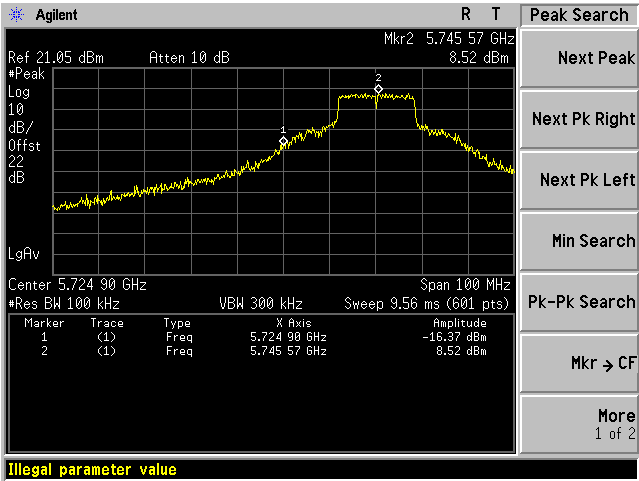


5.8 GHz Band

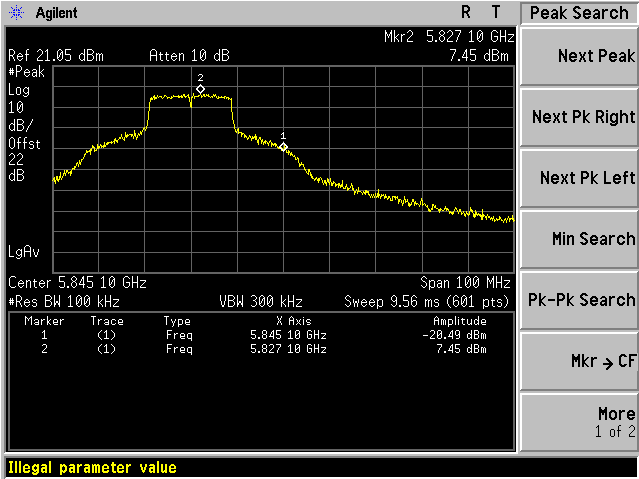
802.11a, Chain J0 Low Band Edge



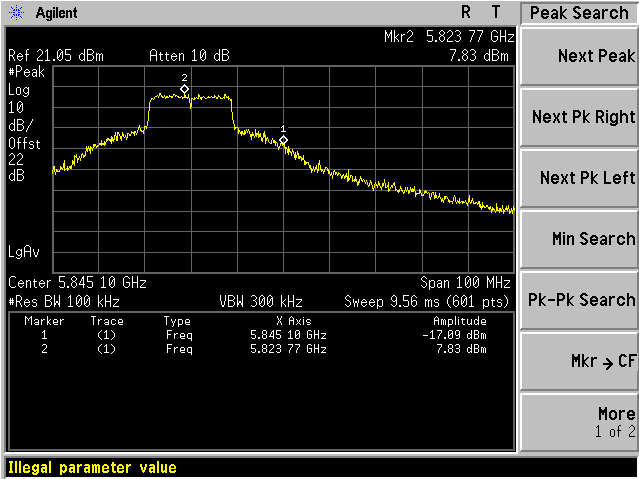
802.11a, Chain J1 Low Band Edge



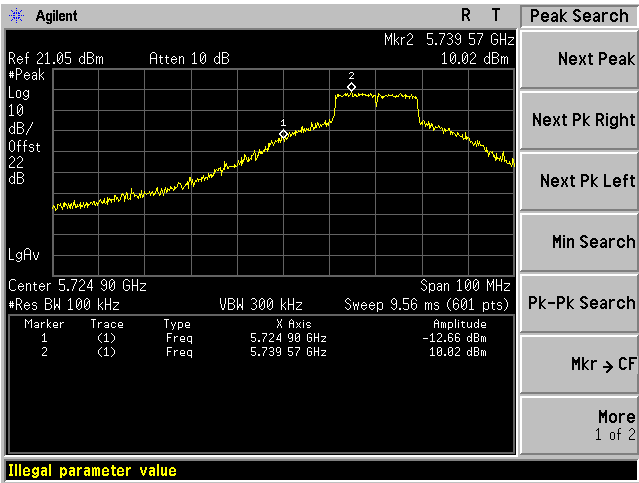
802.11a, Chain J0 High Band Edge



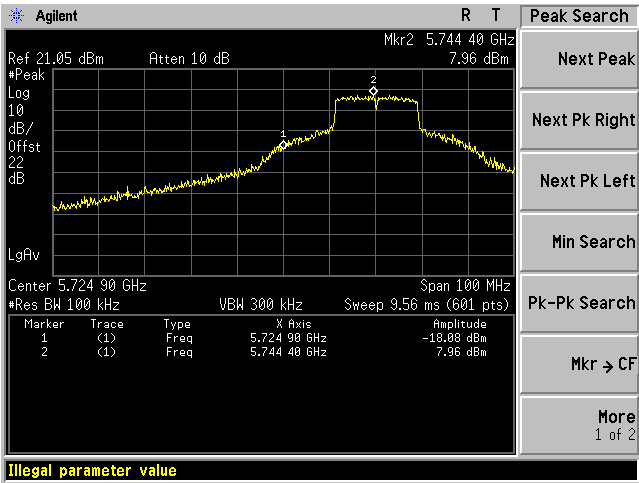
802.11a, Chain J1 High Band Edge



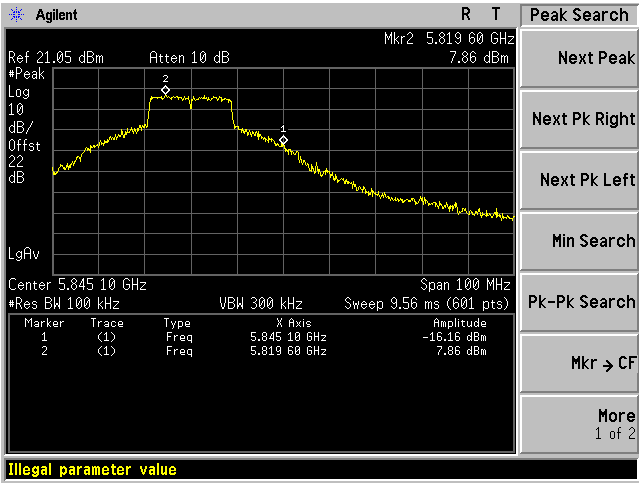
802.11n-HT20, Chain J0 Low Band Edge



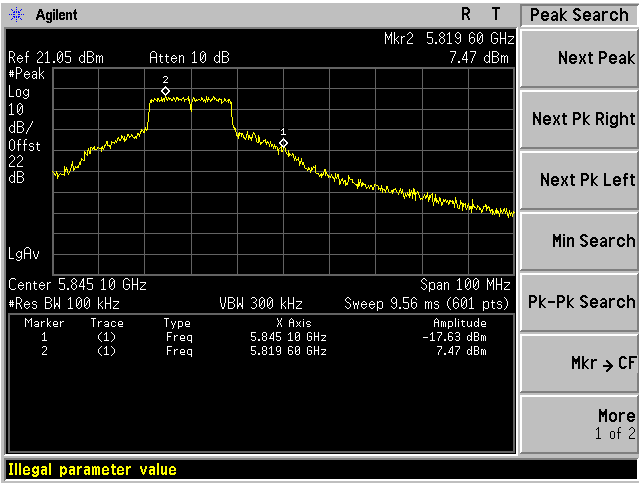
802.11n-HT20, Chain J1 Low Band Edge



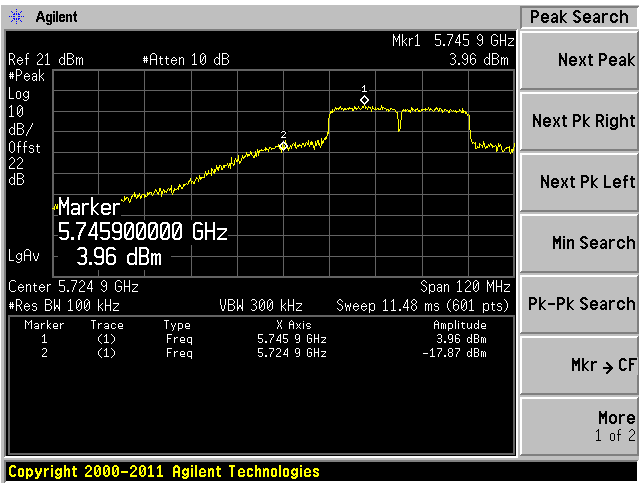
802.11n-HT20, Chain J0 High Band Edge



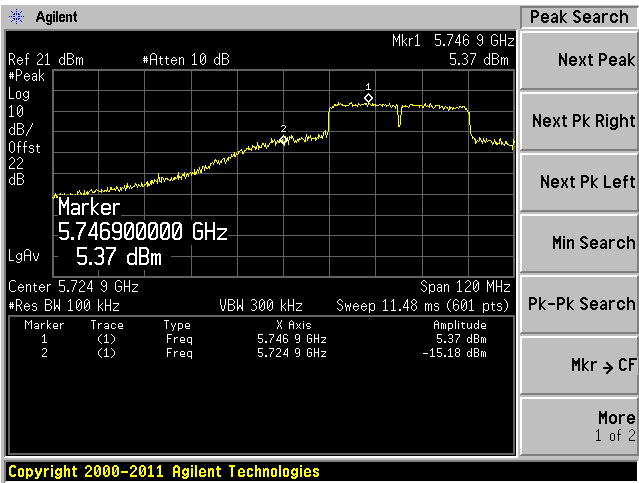
802.11n-HT20, Chain J1 High Band Edge



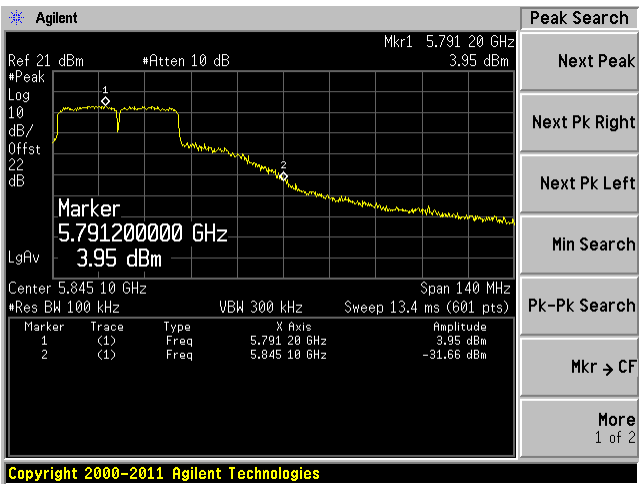
802.11n-HT40, Chain J0 Low Band Edge



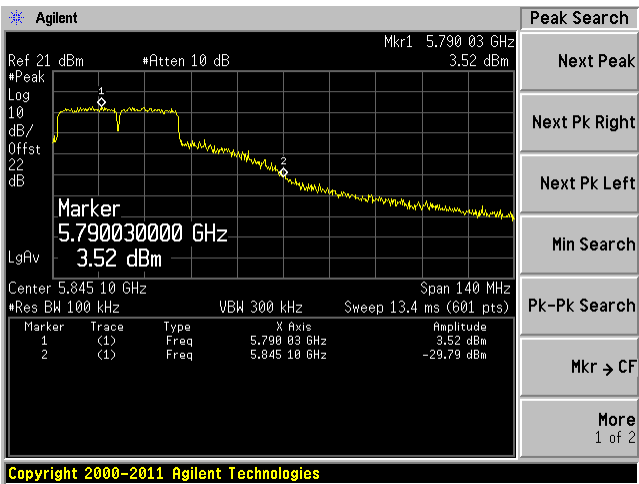
802.11n-HT40, Chain J1 Low Band Edge



802.11n-HT40, Chain J0 High Band Edge



802.11n-HT40, Chain J1 High Band Edge



12 FCC §15.247(e) – Power Spectral Density

12.1 Applicable Standard

According to FCC §15.247(e), 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

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW = 3 kHz.
4. Set the VBW $\geq 3 \times$ RBW
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

12.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US42221851	2012-02-28	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:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102kPa

The testing was performed by Wei on 2012-12-31 at RF site.

12.5 Test Results

Please refer to the following tables and plots.

2.4 GHz Band

802.11b mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm/3 kHz)	TX Chain J1 PSD (dBm/3 kHz)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2412	-12.35	-11.66	-9.0	8	17
Middle	2437	-8.06	-9.31	-5.64	8	13.64
High	2462	-11.20	-11.29	-8.24	8	16.24

802.11 g mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm/3 kHz)	TX Chain J1 PSD (dBm/3 kHz)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2412	-15.02	-13.37	-11.14	8	19.14
Middle	2437	-8.25	-7.16	-4.66	8	12.66
High	2462	-13.30	-13.38	-10.32	8	18.32

802.11n-HT20 mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm/3 kHz)	TX Chain J1 PSD (dBm/3 kHz)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2412	-12.76	-11.86	-9.28	8	17.28
Middle	2437	-8.50	-6.90	-4.69	8	12.69
High	2462	-14.65	-13.89	-11.25	8	19.25

802.11n-HT40 mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm/3 kHz)	TX Chain J1 PSD (dBm/3 kHz)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2422	-14.78	-15.04	-11.94	8	20.94
Middle	2437	-10.76	-10.24	-7.42	8	15.42
High	2452	-15.89	-17.11	-13.47	8	21.47

5.8 GHz Band

802.11a mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm/3 kHz)	TX Chain J1 PSD (dBm/3 kHz)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	5745	-5.00	-5.89	-2.41	8	10.41
Middle	5785	-5.71	-6.63	-3.13	8	11.13
High	5825	-6.35	-7.31	-3.79	8	11.79

802.11n-HT20 mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm/3 kHz)	TX Chain J1 PSD (dBm/3 kHz)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	5745	-6.55	-5.45	-2.96	8	10.96
Middle	5785	-5.92	-6.32	-3.07	8	11.07
High	5825	-7.23	-6.50	-3.84	8	11.84

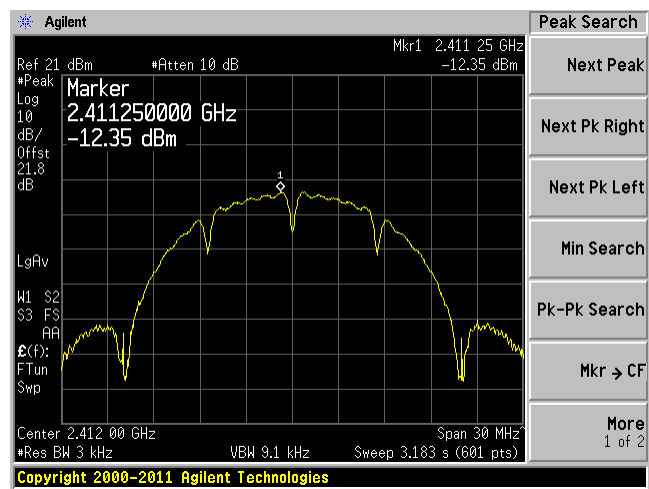
802.11n-HT40 mode

Channel	Frequency (MHz)	TX Chain J0 PSD (dBm/3 kHz)	TX Chain J1 PSD (dBm/3 kHz)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	5755	-7.58	-7.13	-4.33	8	12.33
High	5795	-7.11	-8.70	-4.81	8	12.81

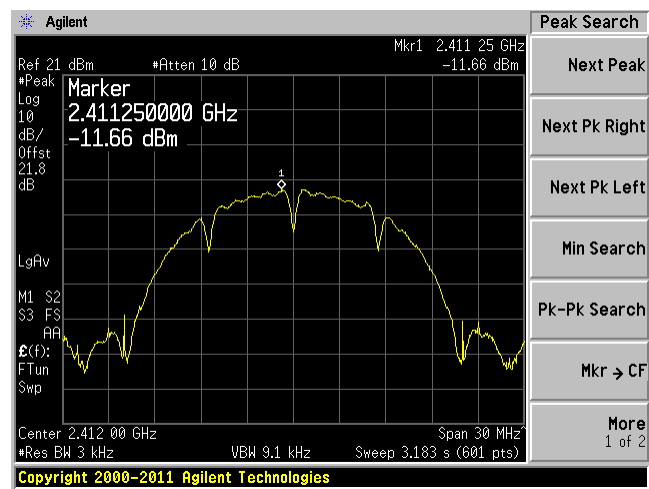
2.4 GHz Band

802.11b mode

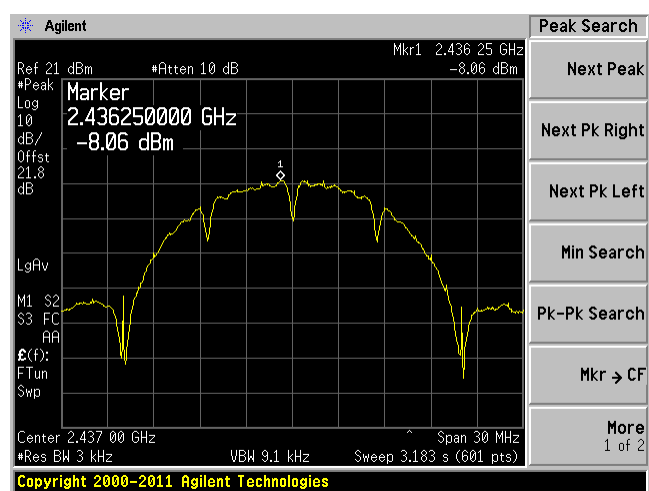
Low channel J0: 2412 MHz



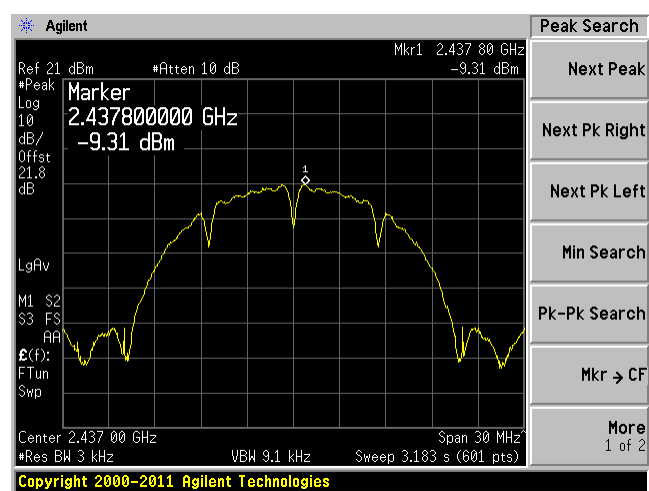
Low channel J1: 2412 MHz



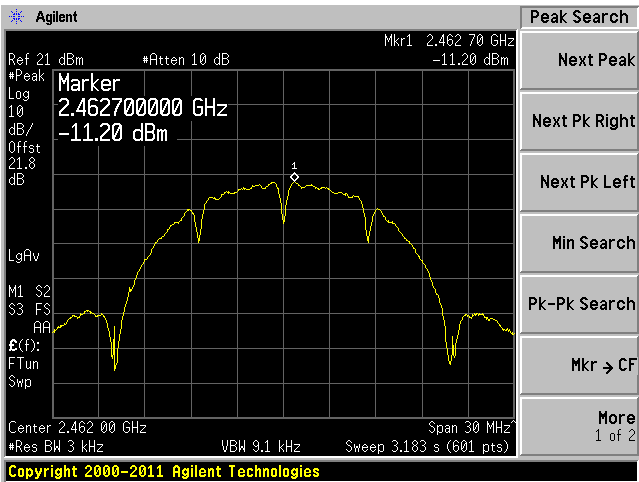
Middle channel J0: 2437 MHz



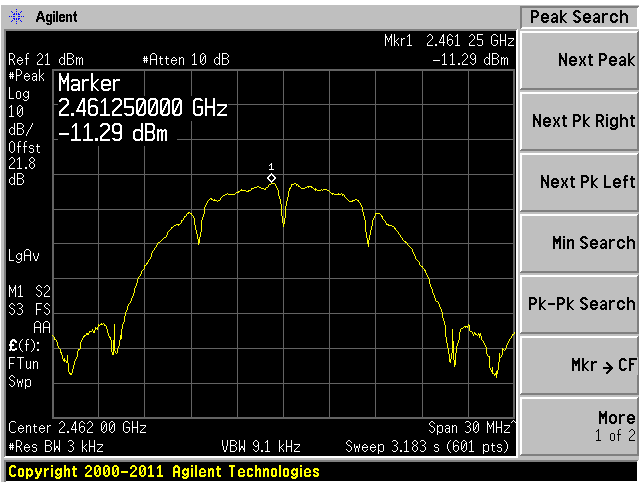
Middle channel J1: 2437 MHz



High channel J0: 2462 MHz

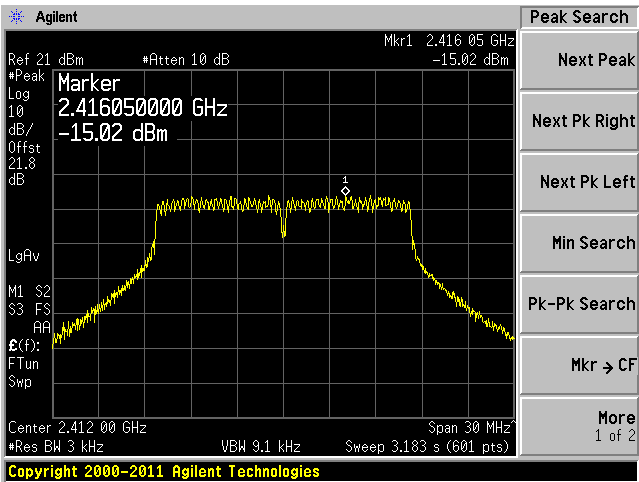


High channel J1: 2462 MHz

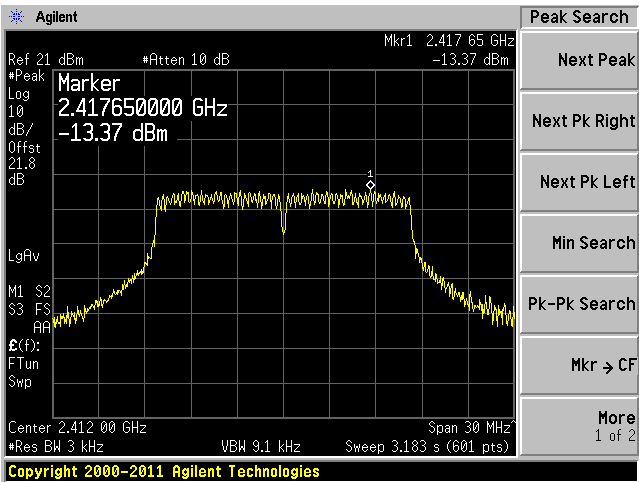


802.11g mode

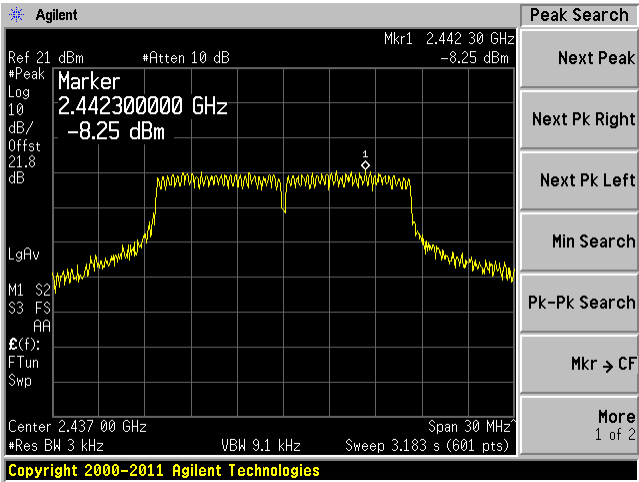
Low channel J0: 2412 MHz



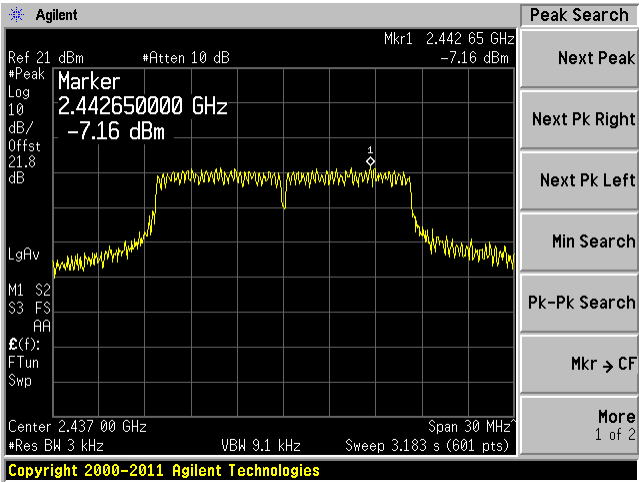
Low channel J1: 2412 MHz



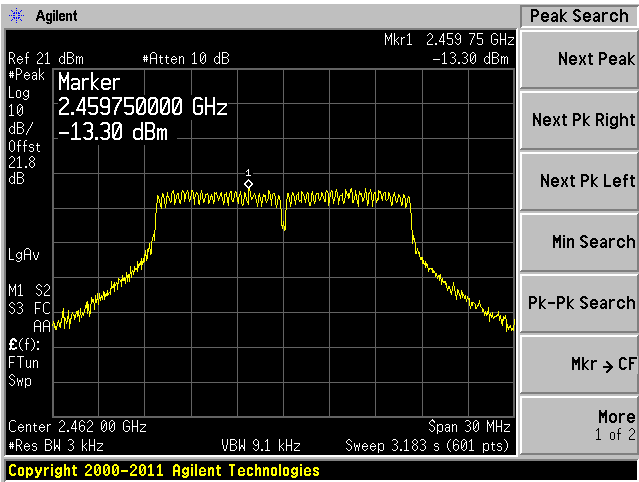
Middle channel J0: 2437 MHz



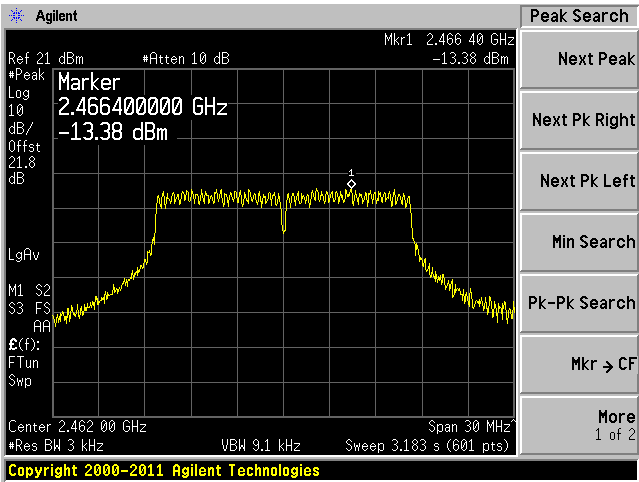
Middle channel J1: 2437 MHz



High channel J0: 2462 MHz

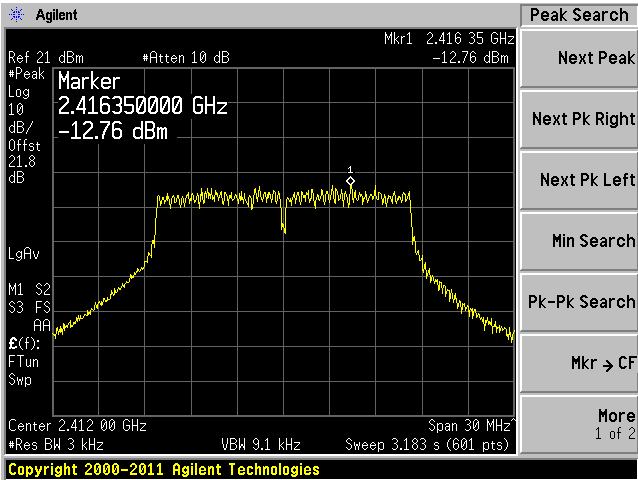


High channel J1: 2462 MHz

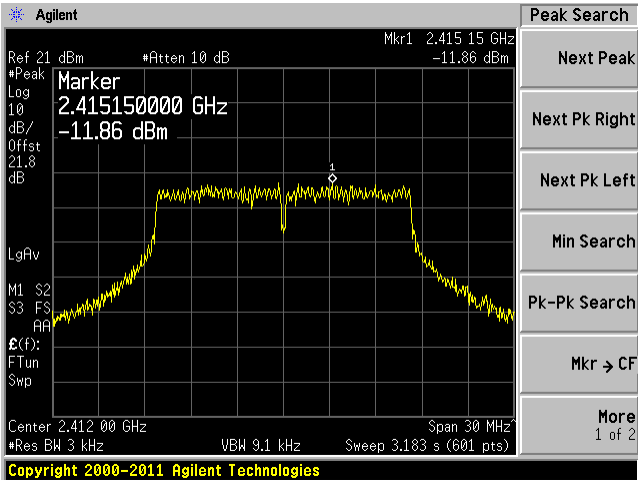


802.11n-HT20 mode

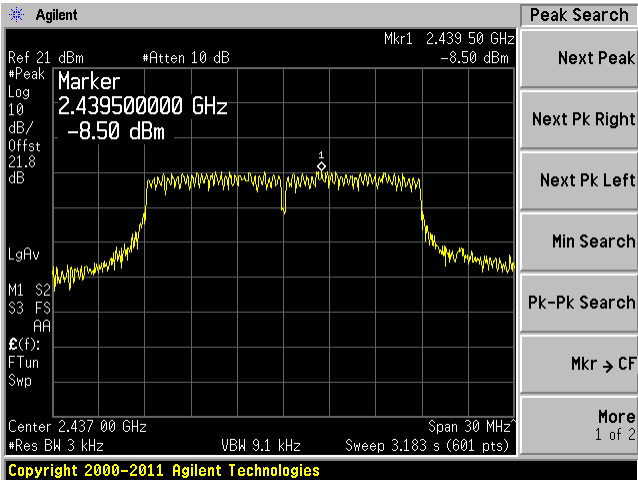
Low channel J0: 2412 MHz



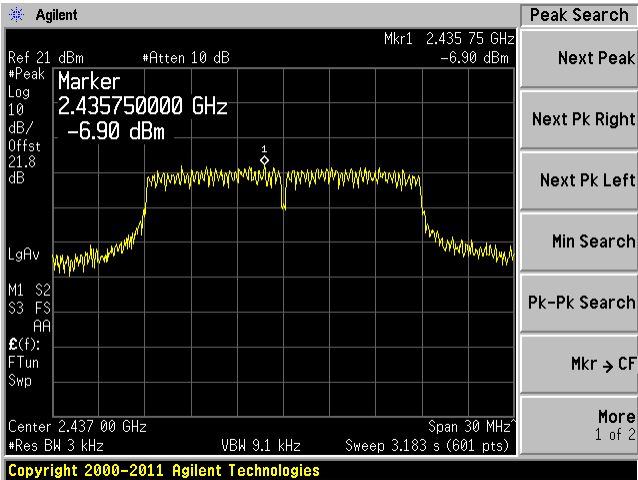
Low channel J1: 2412 MHz



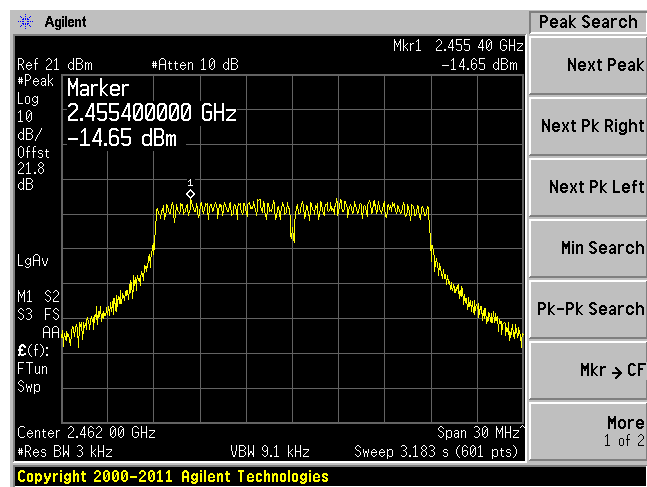
Middle channel J0: 2437 MHz



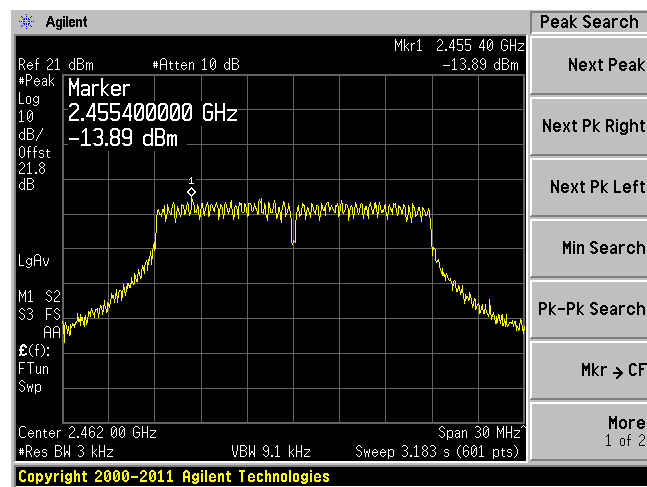
Middle channel J1: 2437 MHz



High channel J0: 2462 MHz

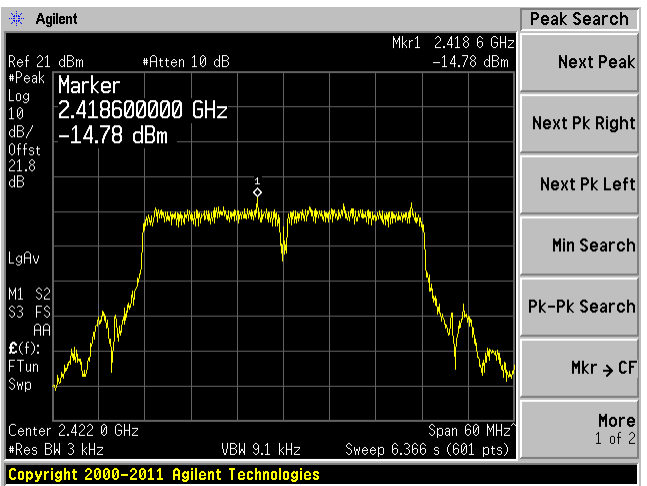


High channel J1: 2462 MHz

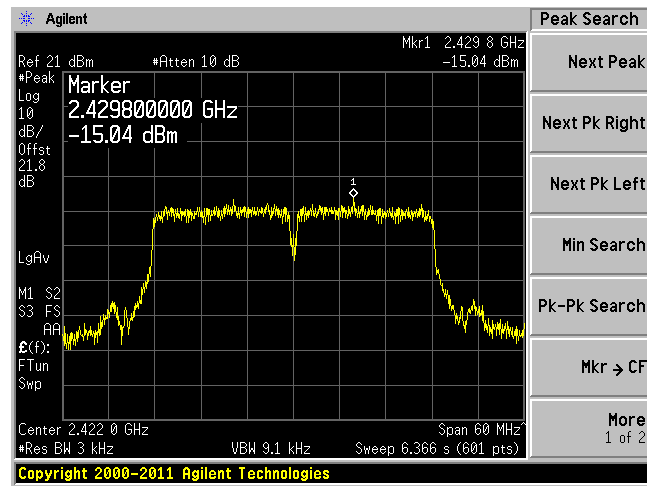


802.11n-HT40 mode

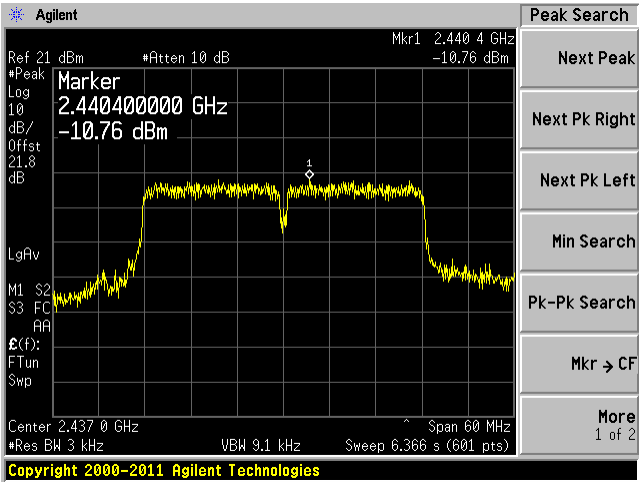
Low channel J0: 2422 MHz



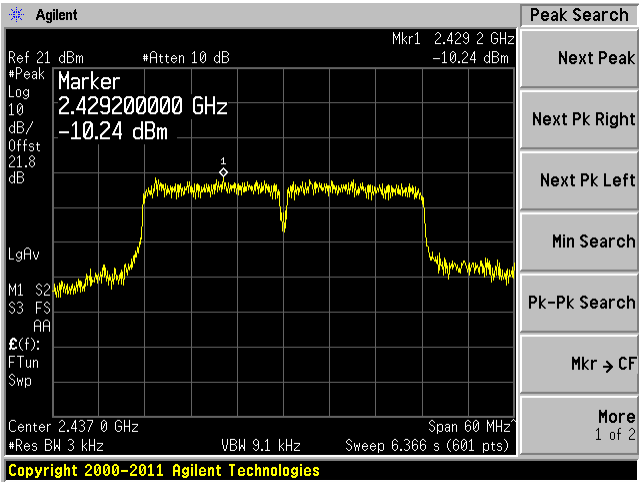
Low channel J1: 2422 MHz



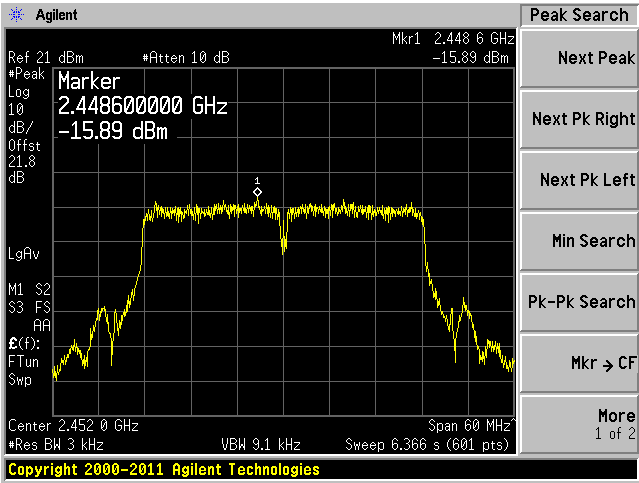
Middle channel J0: 2437 MHz



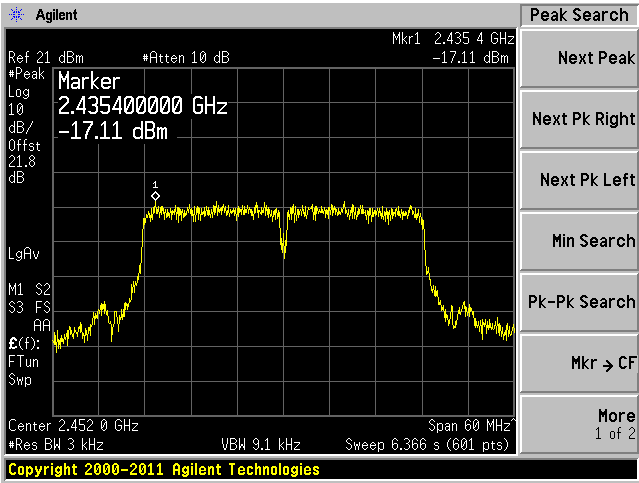
Middle channel J1: 2437 MHz



High channel J0: 2452 MHz



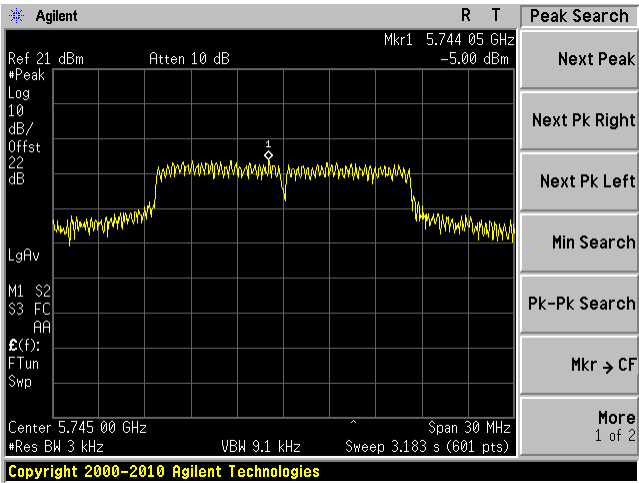
High channel J1: 2452 MHz



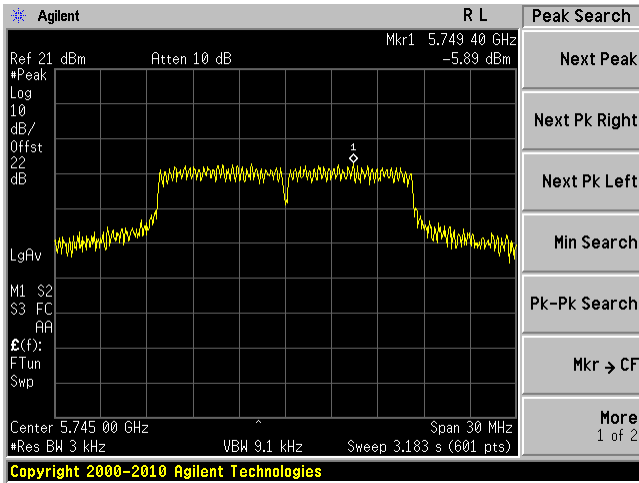
5.8 GHz Band

802.11a mode

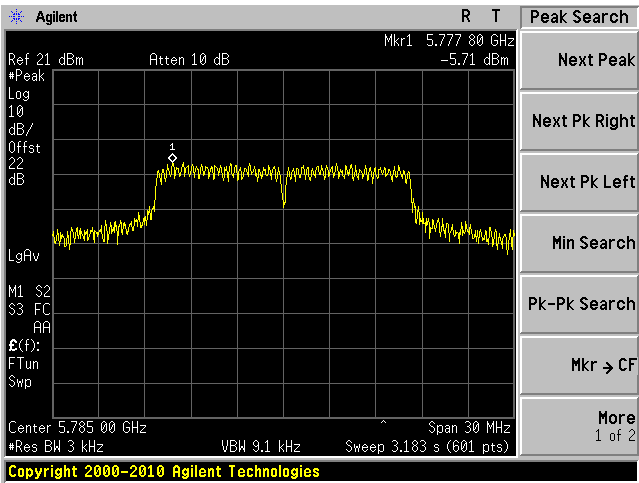
Low channel J0: 5745 MHz



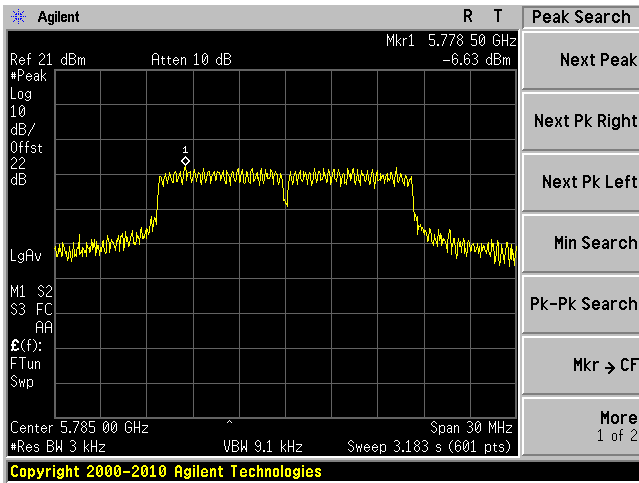
Low channel J1: 5745 MHz



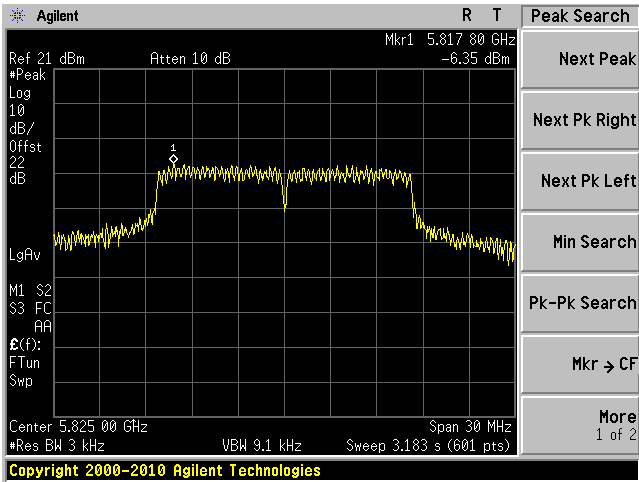
Middle channel J0: 5785 MHz



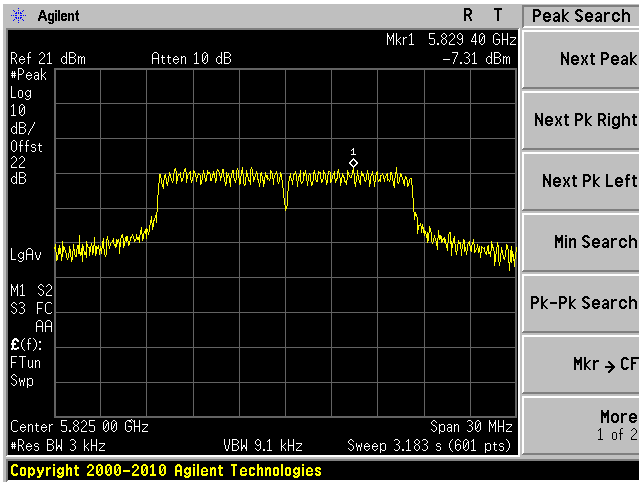
Middle channel J1: 5785 MHz



High channel J0: 5825 MHz

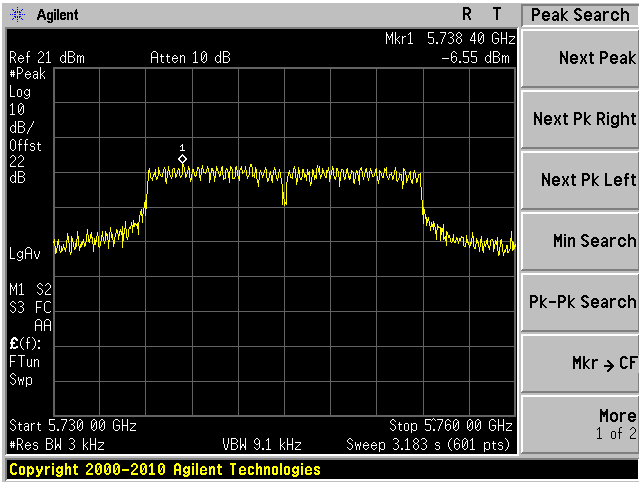


High channel J1: 5825 MHz

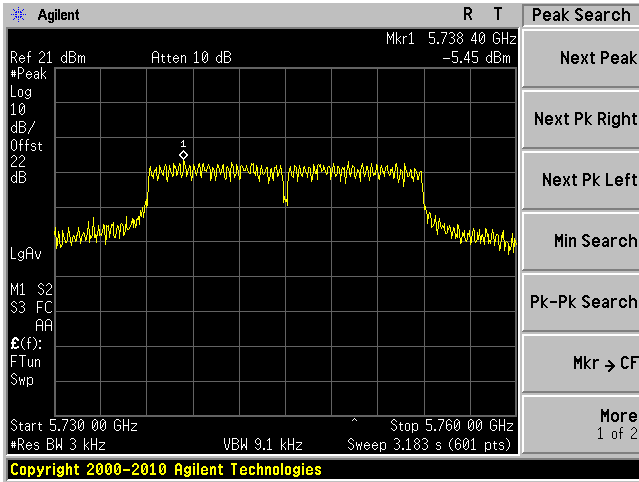


802.11n-HT20 mode

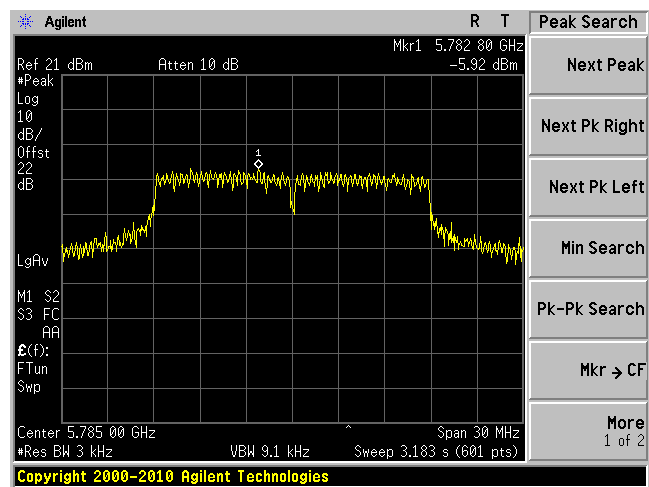
Low channel J0: 5745 MHz



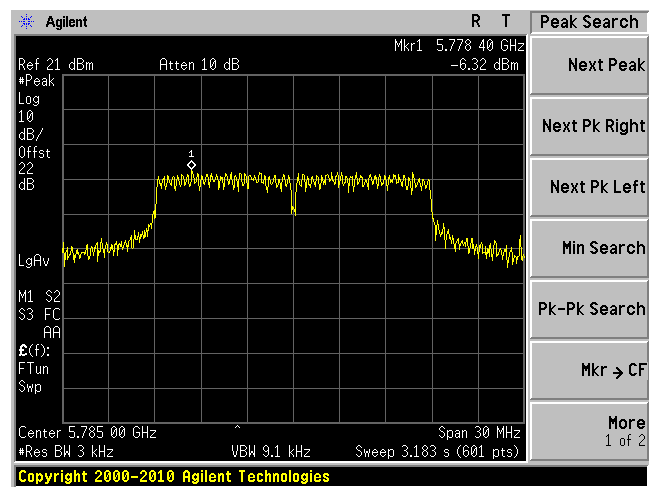
Low channel J1: 5745 MHz



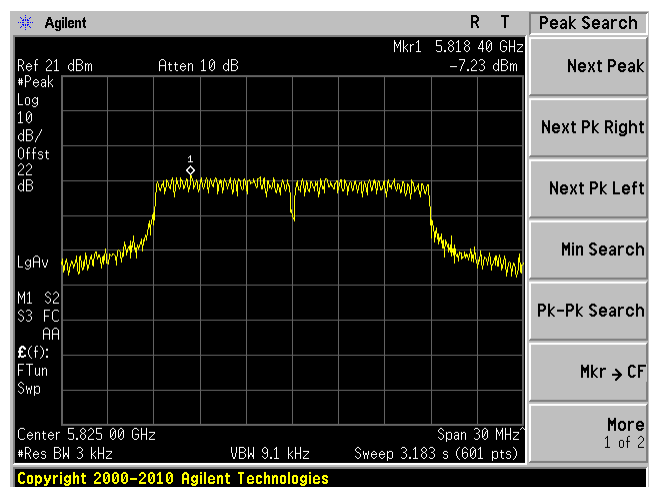
Middle channel J0: 5785 MHz



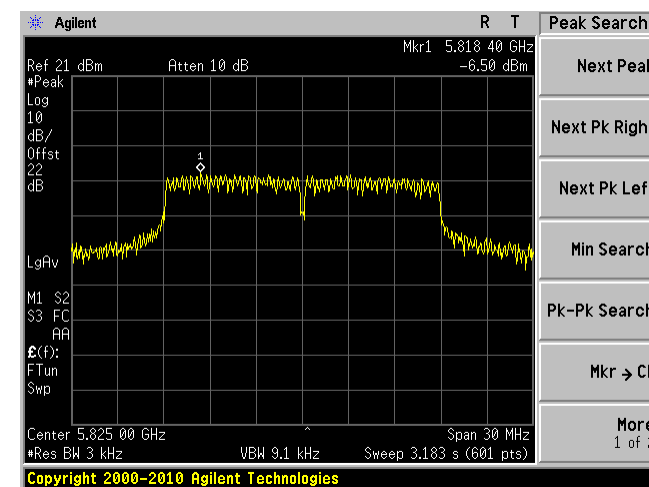
Middle channel J1: 5785 MHz



High channel J0: 5825 MHz

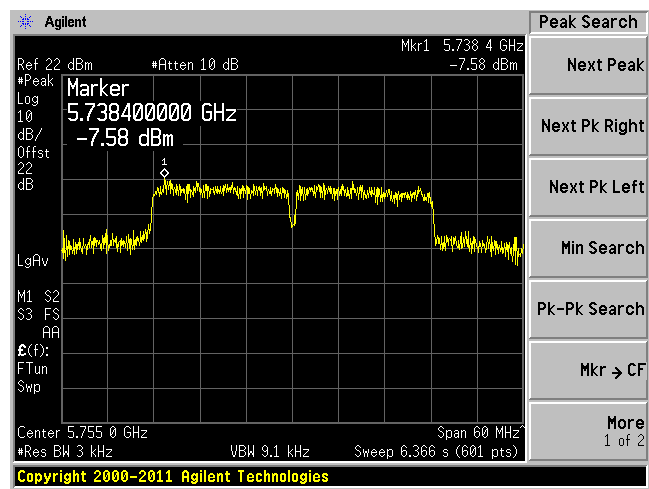


High channel J1: 5825 MHz

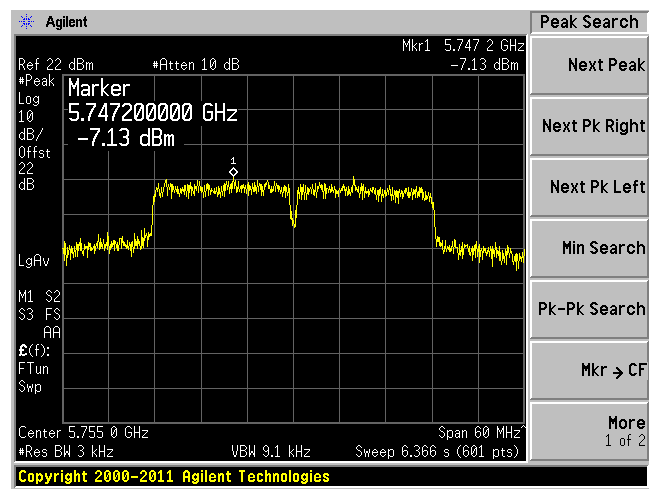


802.11n-HT40 mode

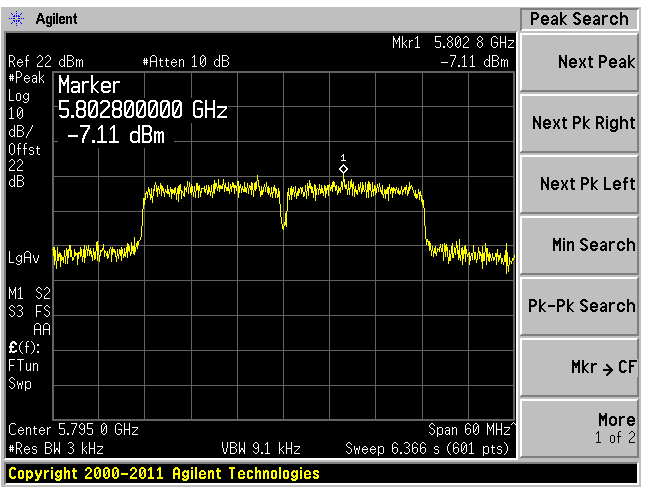
Low channel J0: 5755 MHz



Low channel J1: 5755 MHz



High channel J0: 5795 MHz



High channel J1: 5795 MHz

