Lab Code: 200167-0

FCC PART 15.247

TEST AND MEASUREMENT REPORT

For

Wi2Wi, Inc.

2107 N. 1st Street, Ste.540,

San Jose, CA 95131, USA

FCC ID: U9R-W2CBW009S
Model:W2CBW009-S

Report Type:	**Product Type:**
Original Report	Wireless 802.11b/g and Bluetooth Module

Test Engineers:	Jerry Huang
Report Number:	R1003232-247
Report Date:	2010-08-09
Reviewed By:	Victor Zhang Test Engineer, RF Lead
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1003232-247	Original Report	2010-08-09

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *Wi2Wi, Inc*., and their product FCC ID: U9R-W2CBW009S, Model: *W2CBW009-S* or the "EUT" as referred to in this report. The EUT is a Wireless 802.11b/g and Bluetooth module.

1.2 Mechanical Description of EUT

The "EUT" measures approximately *16.5mm (L) x 16.5mm (W) x 1mm (H)*.

** The test data gathered are from typical production sample, serial number: GCI-011958, provided by the manufacturer.*

1.3 Objective

This report is prepared on behalf of *Wi2Wi, Inc.* in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commissions rules, June 2007.

The objective is to determine compliance with FCC rules.

1.4 Related Submittal(s)/Grant(s)

No Related Submittals.

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2003, 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 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 NIS 81, The Treatment of Uncertainty in EMC Measurements, the values range from +2.0 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.

Detailed instrumentation measurement uncertainties can be found in BACL report QAP-018.

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

1.7 Test Facility

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

The test sites at BACL have been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has 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 facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464, IC registration number: 3062A, and VCCI Registration Number: R-2463 and C-2698. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/Standards/scopes/2001670.htm

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.4-2003.

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

2.2 EUT Exercise Software

The EUT had been tested with the following data rate settings (worst case):

Radio Mode	Frequency/Data rate		
	Low CH (MHz/Mbps)	Mid CH (MHz/Mbps)	High CH (MHz)
Bluetooth	2402	2440	2480
802.11b	2412/1	2437/1	2462/1
802.11g	2412/6	2437/6	2462/6

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Special Accessories

N/A

2.5 Local Support Equipment

Manufacturer	Description	Model No.	Serial No.
IBM	Laptop	X40	-

2.6 EUT Internal Configuration Details

Manufacturers	Descriptions	Models	Serial Numbers
Wi2Wi, Inc	WiFi and Bluetooth PCB Assembly	W2CBW009-S	GCI-011958

2.7 Interface Ports and Cabling

Cable Description	Length (m)	From	To
USB cable	< 1m	EUT	Laptop
RF cable	< 1m	EUT	PSA

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)	Conducted Emissions	Compliant
§15.209,	Spurious Emissions at Antenna Port	Compliant
§15.205	Restricted Bands	Compliant
§15.209 (a) §15.247 (d)	Radiated Spurious Emissions	Compliant
§15.247 (a)(2)	Channel Bandwidth	Compliant
§15.247 (b)(3)	Maximum Peak Output Power	Compliant
§15.247(a) (1)	Hopping Channel Separation	Compliant
§15.247(a)(1)(iii)	Number of Hopping Frequencies Used	Compliant
§15.247(a)(1)(iii)	Dwell Time	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

Maximum peak output power at antenna input terminal (dBm):	16.50
Maximum peak output power at antenna input terminal (mW):	44.67
Prediction distance (cm):	20
Prediction frequency (MHz):	2462
Maximum Antenna Gain, typical (dBi):	3.0
Maximum Antenna Gain (numeric):	1.995
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.018
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.018 mW/cm^2; the Limit is 1.0 mW/cm^2

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.

And according to FCC §15.247 (b) (4)(i) For Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

5.2 Antenna Connector Construction

EUT has one Transmitter/Receiver antennae which is permanent attachment to the EUT chassis as well as non-standard connector. The Transmitter antenna has a max gain of 3 dBi which fulfills the requirements of FCC §15.203.

Frequency Band	Antenna Gain (dBi)
2.4 GHz ~ 2.4835 GHz	3.0

6 FCC §15.207 - Conducted Emissions

6.1 Applicable Standard

As per FCC Section 15.207, For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

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

** Decreases with the logarithm of the frequency.*

6.2 Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.4-2003 measurement procedure. The specification used was FCC Part15.207 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 Supporting Laptop which connects the EUT was connected with LISN-1 which provided 120 V / 60 Hz AC power.

6.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Solar Electronics	LISN	9252-R-24-BNC	511205	2009-07-31
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2009-07-23

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

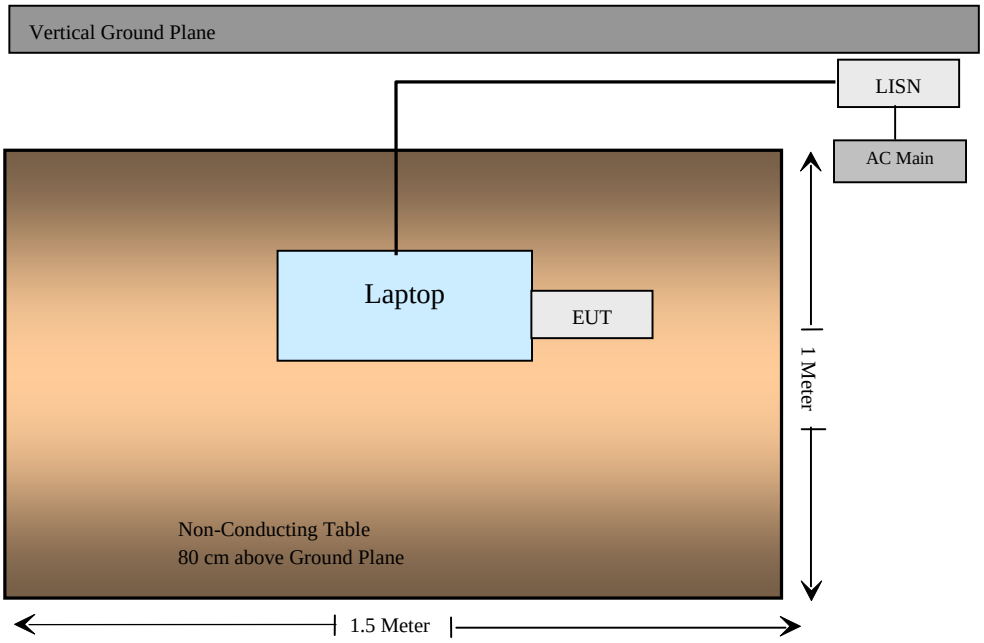
6.4 Test Procedure

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

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

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

6.5 Test Setup Block Diagram



6.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Cable Loss, and Attenuator Factor adding to the Indicated Reading. The basic equation is as follows:

Corrected Amplitude = Indicated Reading + Cable Loss + Attenuator Factor

For example, a Corrected Amplitude of 34.08 dBuV/m = Indicated Reading (23.85 dBuV) + Cable Factor (0.22 dB) + Attenuator Factor (10 dB)

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

Margin = Corrected Amplitude - Limit

6.7 Test Environmental Conditions

Temperature:	18~21 °C
Relative Humidity:	30~35 %
ATM Pressure:	101.2-102.2kPa

**The testing was performed by Jerry Huang on 2010-05-18 in 5 meter 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:

Wi-Fi:

Worst Case: Transmitting Mode, 802.11b High Channel – 2462 MHz

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor (Line/Neutral)**	**Range (MHz)**
-17.46	0.204369	Line	0.15 to 30

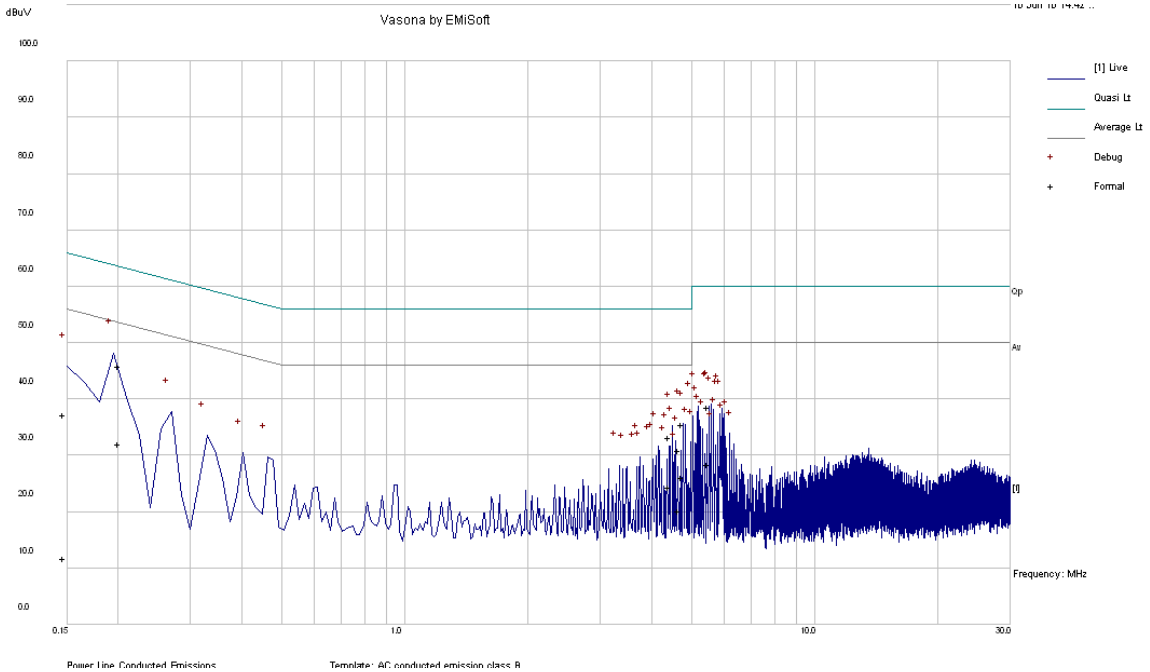
Bluetooth:

Worst Case: Transmitting Mode, High Channel – 2480 MHz

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor (Line/Neutral)**	**Range (MHz)**
-17.47	0.204712	Neutral	0.15 to 30

6.9 Conducted Emissions Test Plots and Data

120 V, 60 Hz – Line - 802.11 b Mode, High Channel (2462 MHz)



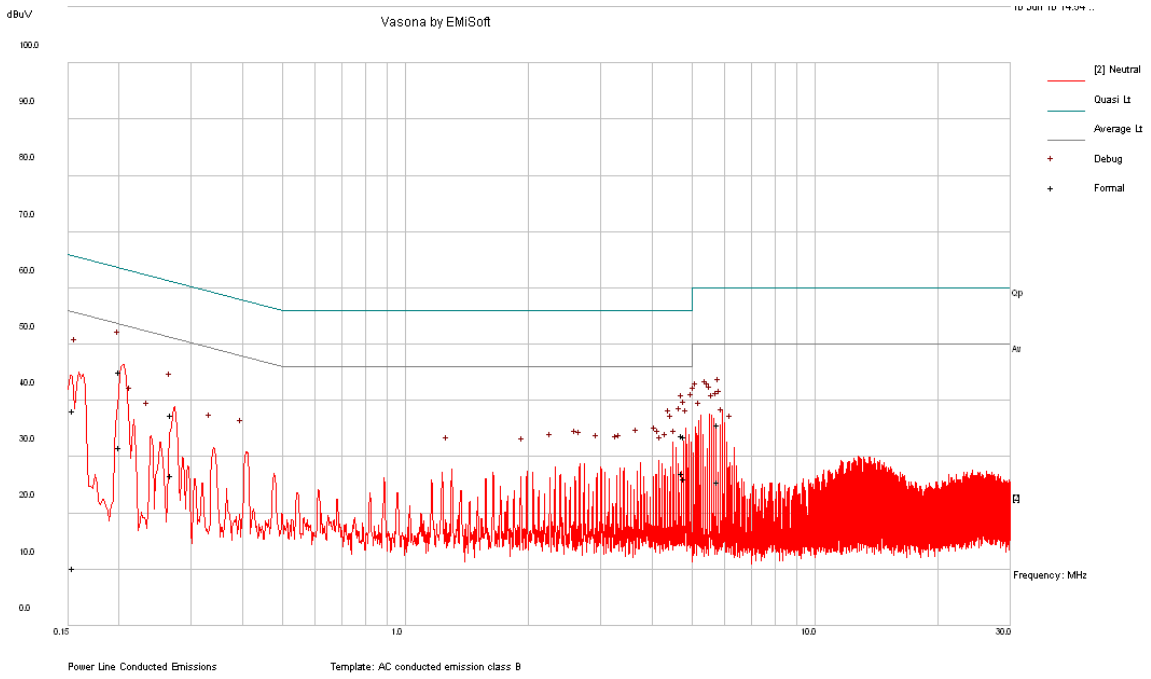
Quasi-Peak Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/ Neutral)	Limit (dBµV)	Margin (dB)
0.204369	45.97	Line	63.43	-17.46
0.150326	37.36	Line	65.98	-28.62
4.767873	30.95	Line	56	-25.05
4.838628	35.59	Line	56	-20.41
4.498989	33.19	Line	56	-22.81
5.590818	38.53	Line	60	-21.47

Average Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/ Neutral)	Limit (dBµV)	Margin (dB)
0.204369	32.11	Line	53.43	-21.33
0.150326	11.74	Line	55.98	-44.24
4.767873	20.13	Line	46	-25.87
4.838628	26.18	Line	46	-19.82
4.498989	24.45	Line	46	-21.55
5.590818	28.4	Line	50	-21.6

120 V, 60 Hz – Neutral - 802.11 b Mode, High Channel (2462 MHz)



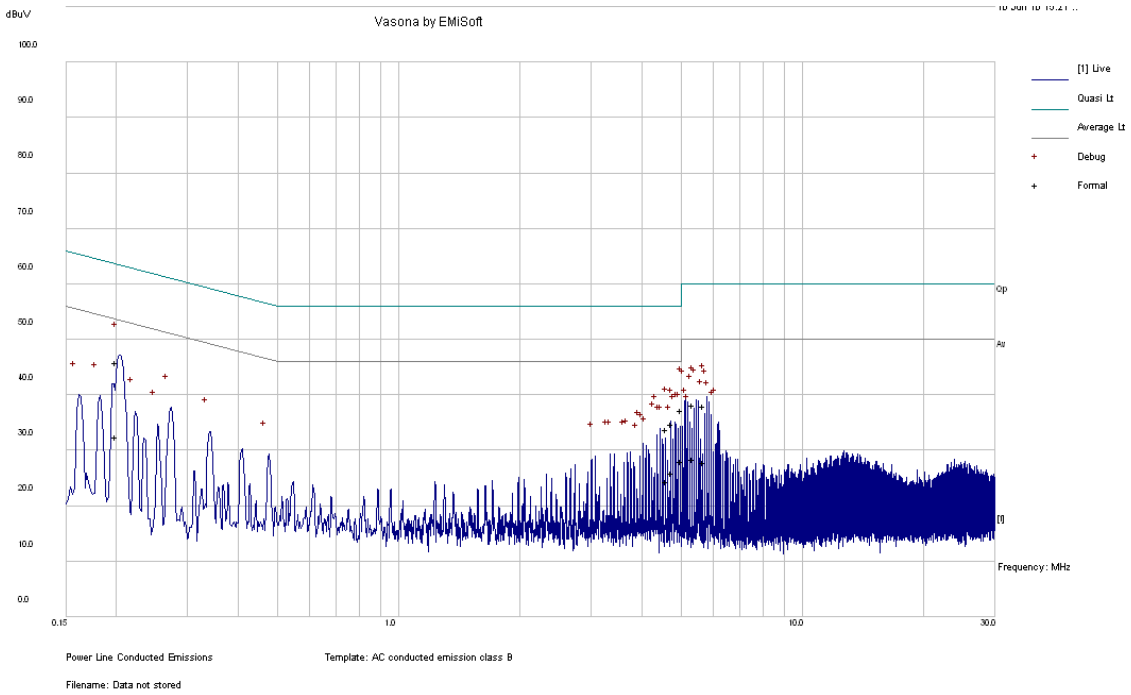
Quasi-Peak Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/ Neutral)	Limit (dBµV)	Margin (dB)
0.204352	45.18	Neutral	63.43	-18.26
0.15751	38.23	Neutral	65.59	-27.36
4.840352	33.89	Neutral	56	-22.11
5.93216	35.79	Neutral	60	-24.21
4.9085	33.61	Neutral	56	-22.39
0.273483	37.43	Neutral	61.01	-23.58

Average Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/ Neutral)	Limit (dBµV)	Margin (dB)
0.204352	31.74	Neutral	53.43	-21.69
0.15751	10.18	Neutral	55.59	-45.42
4.840352	27.16	Neutral	46	-18.84
5.93216	25.52	Neutral	50	-24.48
4.9085	26.25	Neutral	46	-19.75
0.273483	26.81	Neutral	51.01	-24.2

120 V, 60 Hz – Line – Bluetooth, High Channel (2480 MHz)



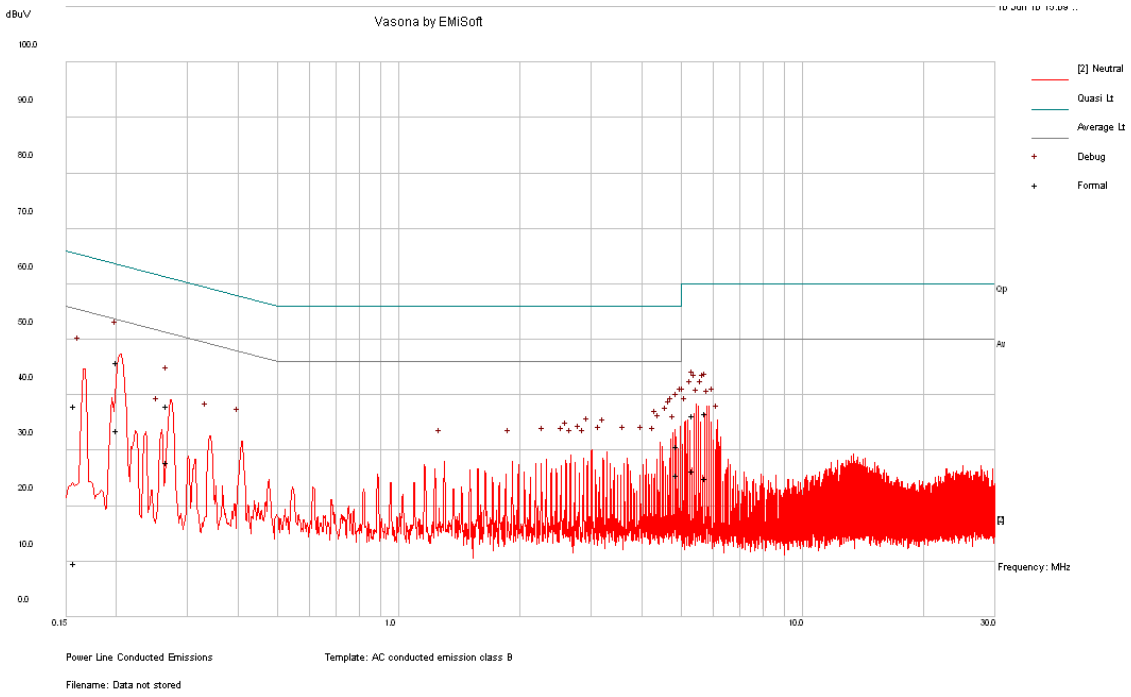
Quasi-Peak Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/ Neutral)	Limit (dBµV)	Margin (dB)
0.203758	45.82	Line	63.46	-17.64
5.798318	37.98	Line	60	-22.02
4.705496	33.78	Line	56	-22.22
5.455952	38.23	Line	60	-21.77
4.842416	34.81	Line	56	-21.19
5.11352	37.18	Line	60	-22.82

Average Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/ Neutral)	Limit (dBµV)	Margin (dB)
0.203758	32.44	Line	53.46	-21.02
5.798318	27.83	Line	50	-22.17
4.705496	24.41	Line	46	-21.59
5.455952	28.44	Line	50	-21.56
4.842416	26.04	Line	46	-19.96
5.11352	28.06	Line	50	-21.94

120 V, 60 Hz – Neutral - Bluetooth High channel (2480MHz)



Quasi-Peak Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/ Neutral)	Limit (dBµV)	Margin (dB)
0.204712	45.95	Neutral	63.42	-17.47
0.161126	38.03	Neutral	65.41	-27.37
5.454638	36.33	Neutral	60	-23.67
4.97873	30.71	Neutral	56	-25.29
0.273069	38.04	Neutral	61.02	-22.99
5.86448	36.62	Neutral	60	-23.38

Average Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/ Neutral)	Limit (dBµV)	Margin (dB)
0.204712	33.58	Neutral	53.42	-19.83
0.161126	9.67	Neutral	55.41	-45.74
5.454638	26.41	Neutral	50	-23.59
4.97873	25.66	Neutral	46	-20.34
0.273069	27.92	Neutral	51.02	-23.11
5.86448	25.09	Neutral	50	-24.91

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

7.1 Applicable Standard

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.

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. 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
Agilent	Spectrum Analyzer	E4446A	US44300386	2009-07-23

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

7.4 Test Environmental Conditions

Temperature:	18~21 °C
Relative Humidity:	30~35 %
ATM Pressure:	101.2-102.2kPa

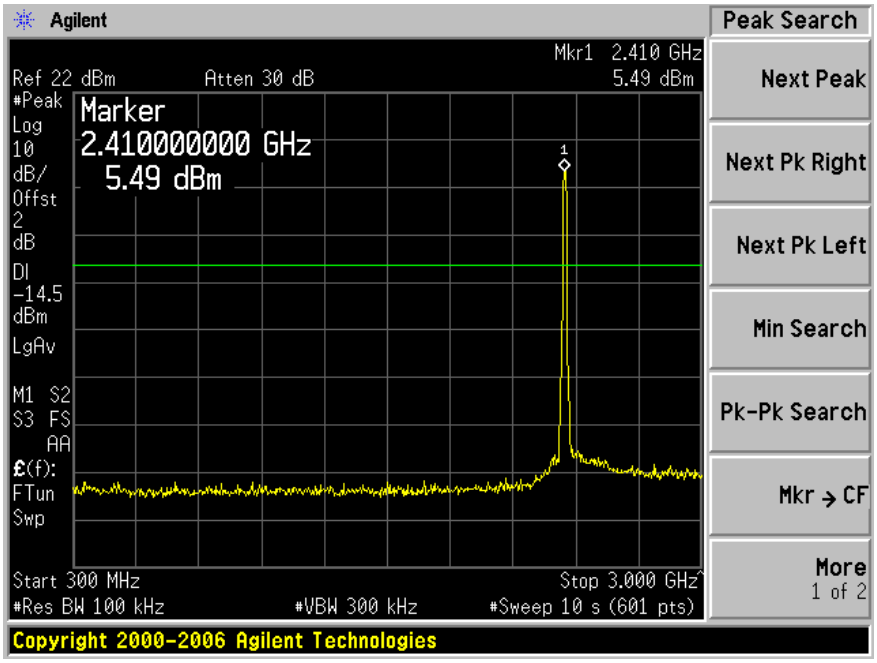
**The testing was performed by Jerry Huang on 210-05-18 in RF site.*

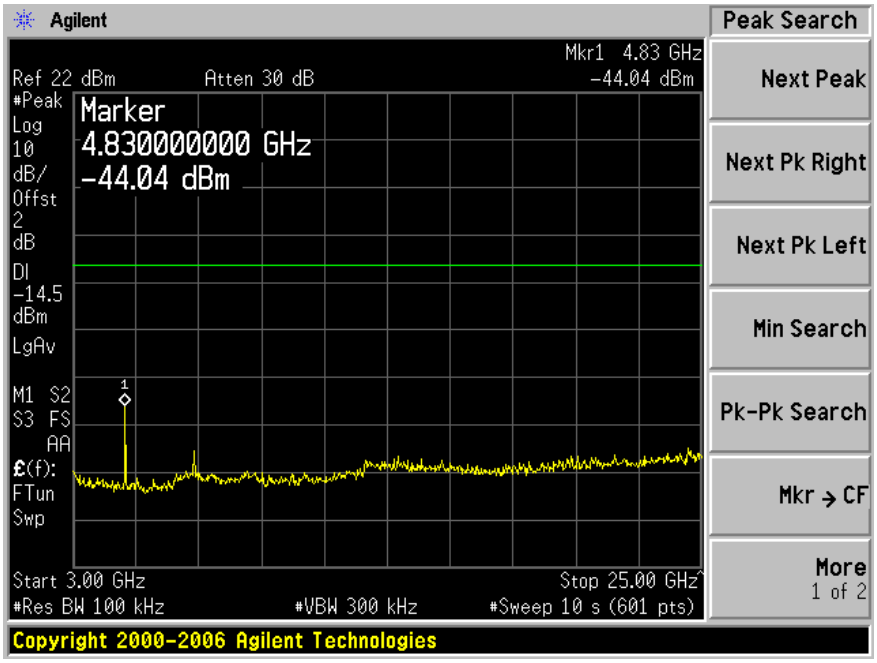
7.5 Measurement Result:

Please refer to following plots of spurious emissions.

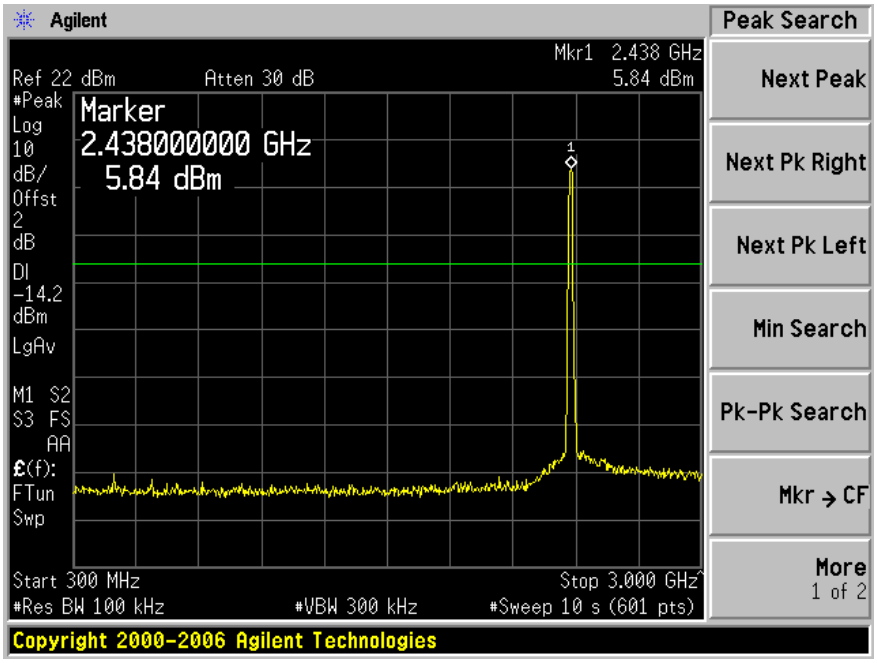
Wi-Fi 802.11 b/g mode:

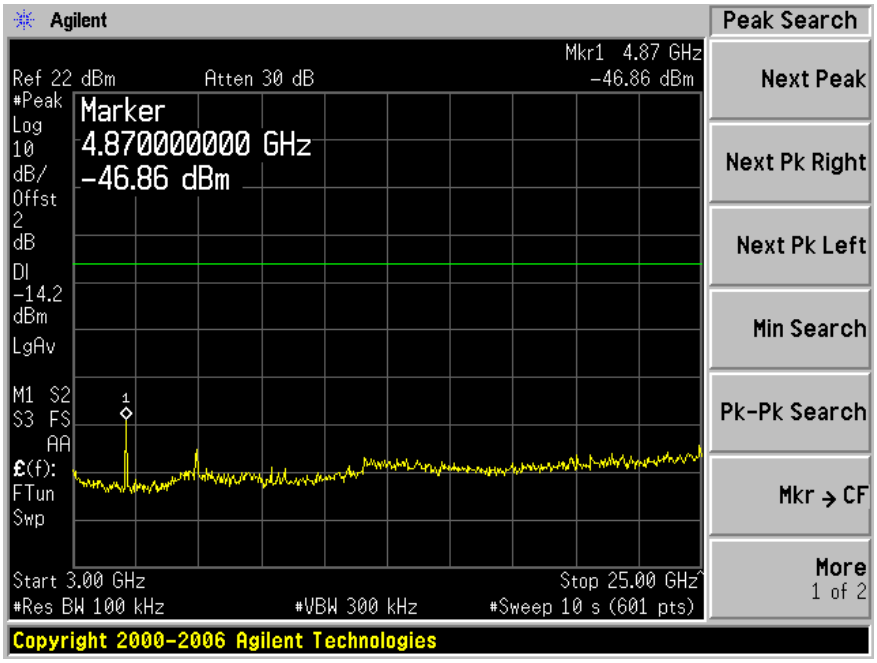
802.11 b, Low Channel 2412 MHz



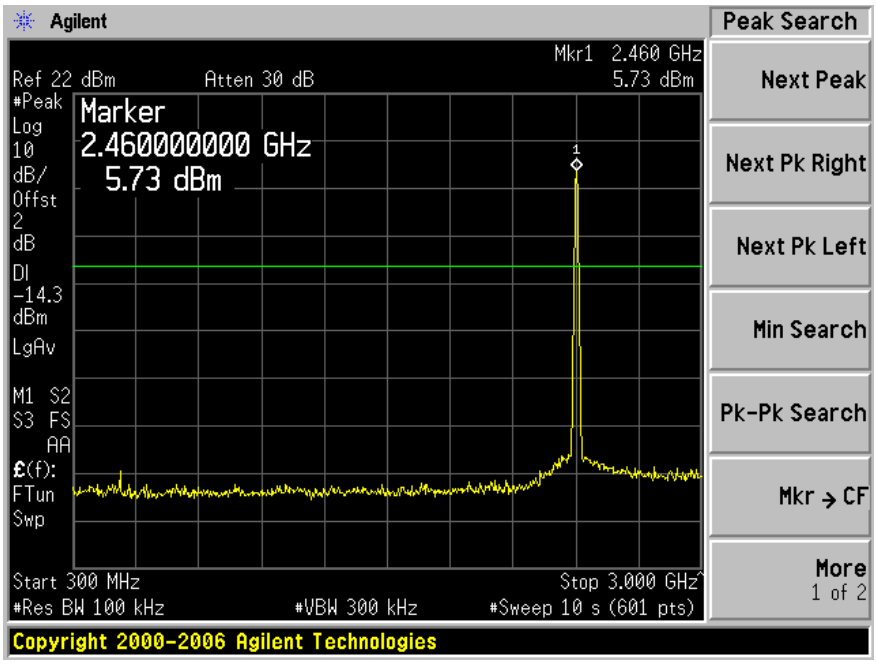


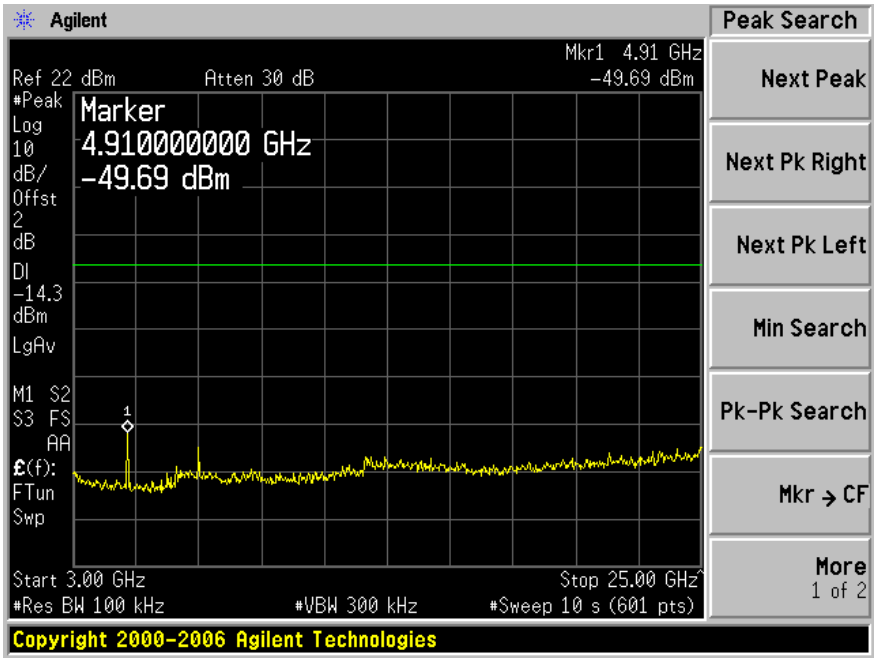
802.11 b, Middle Channel 2437 MHz



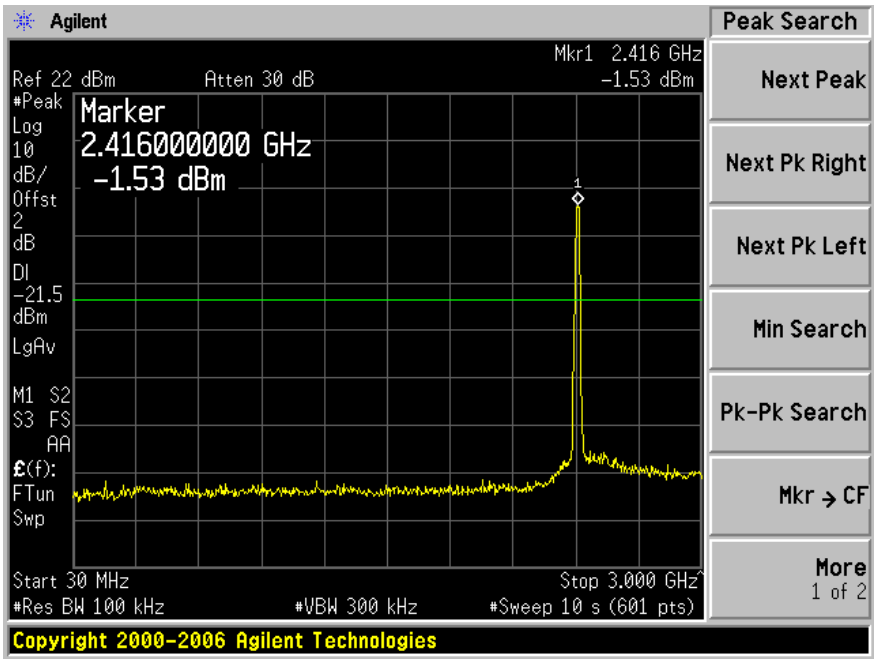


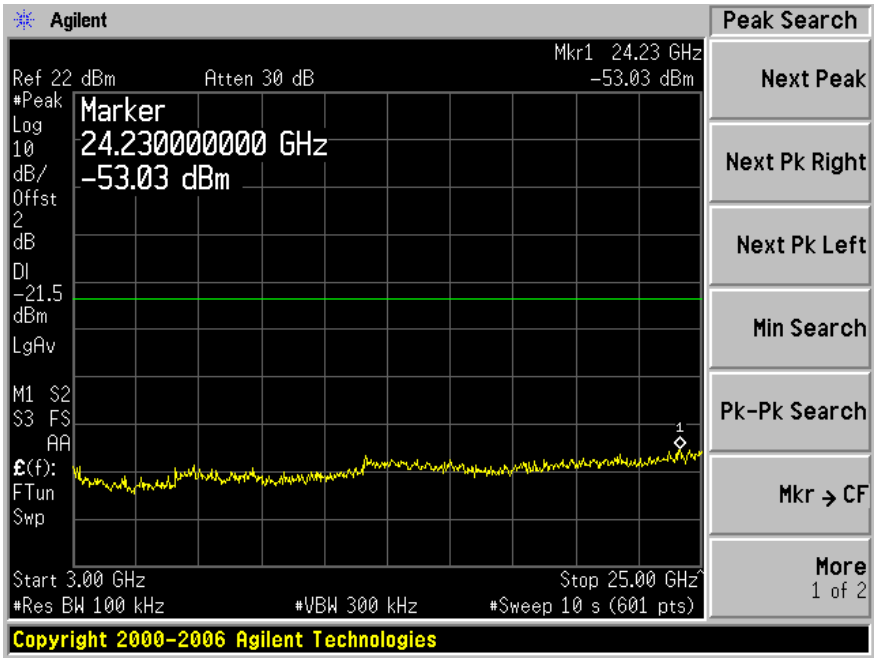
802.11 b, High Channel 2462 MHz



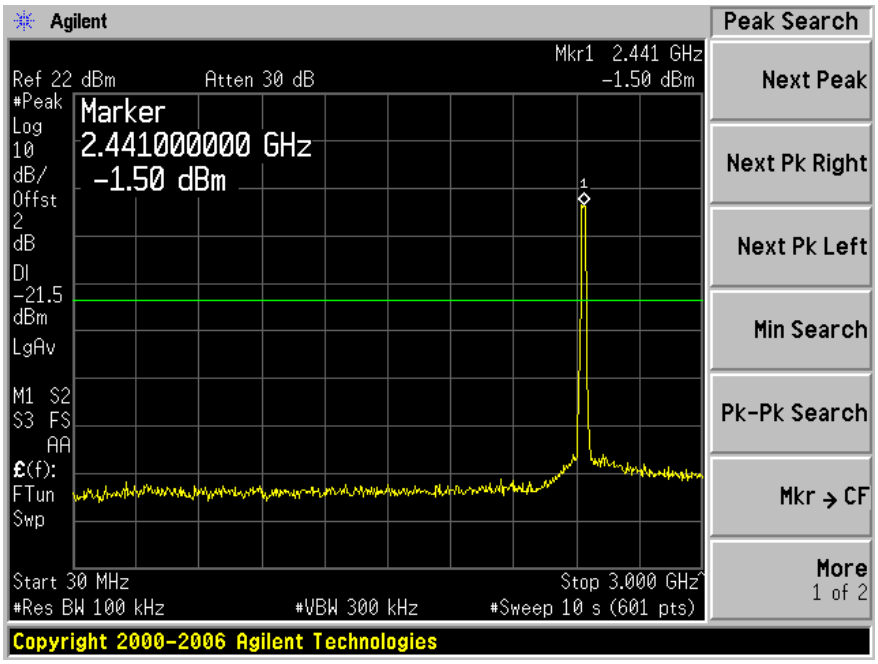


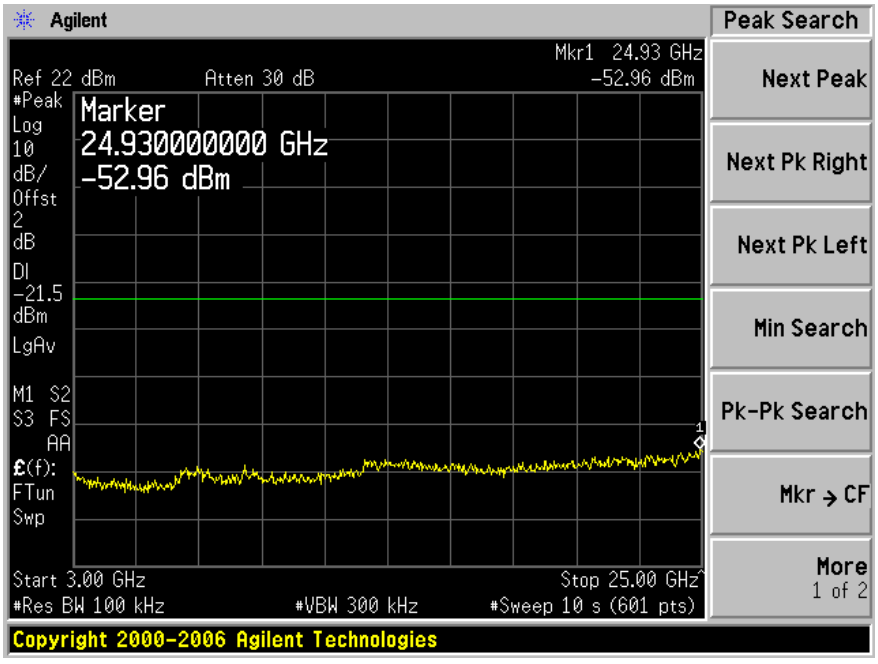
802.11 g, Low Channel 2412 MHz



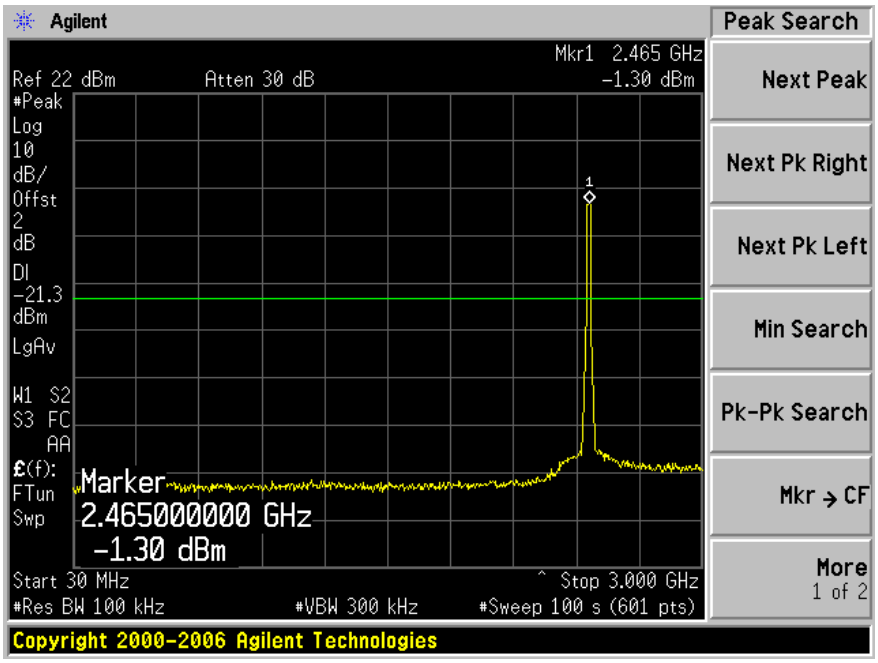


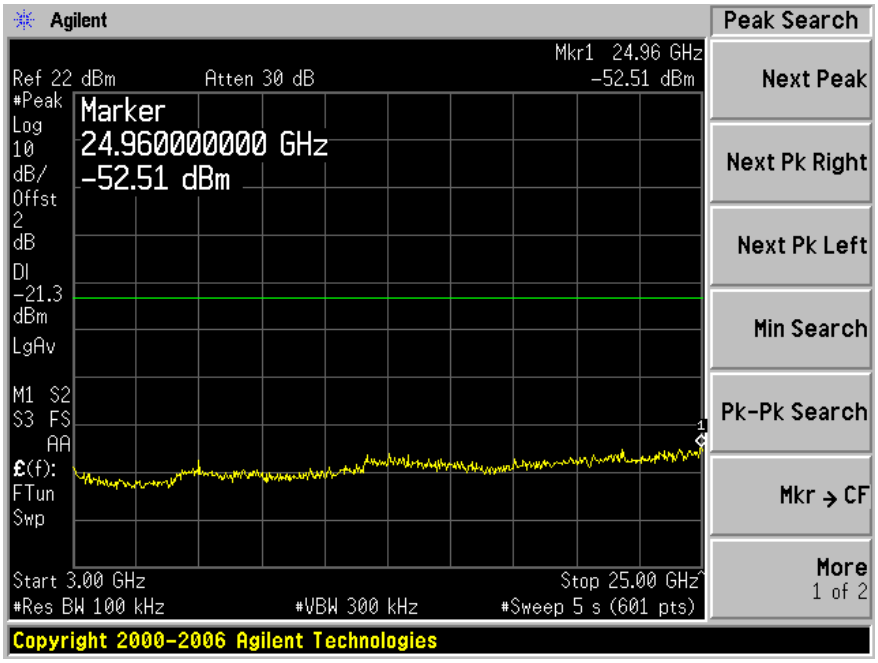
802.11 g, Middle Channel 2437 MHz





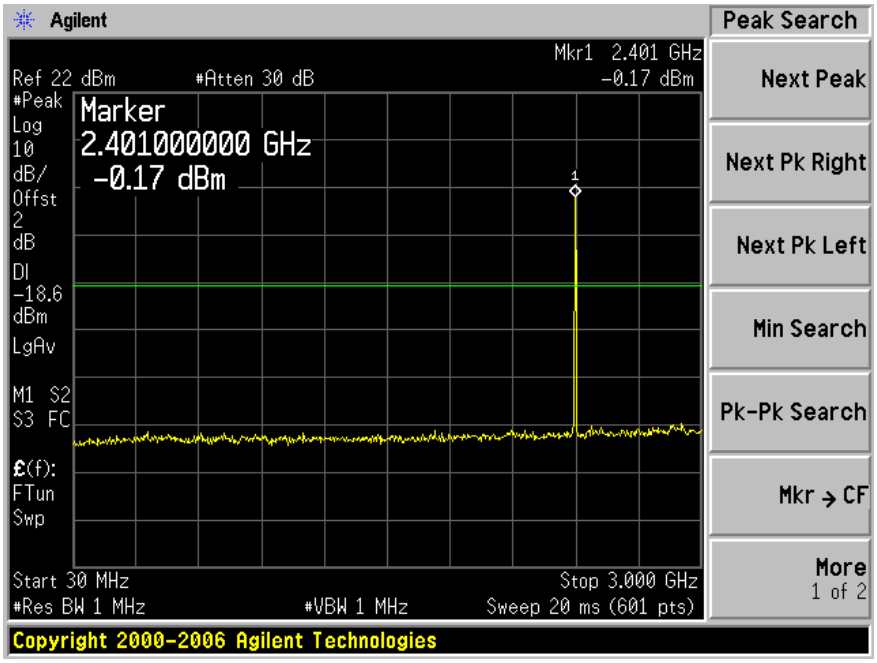
802.11 g, High Channel 2462 MHz

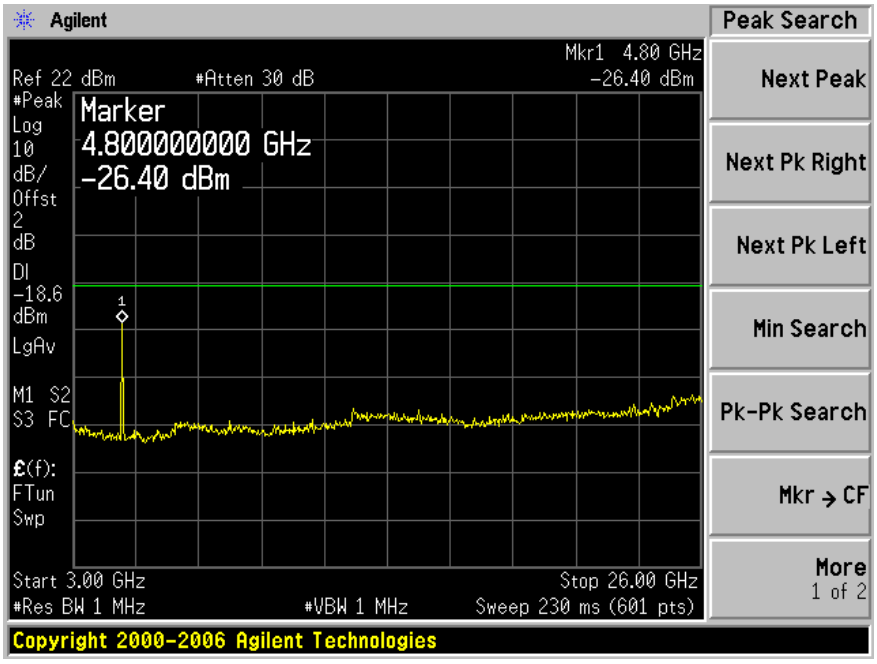




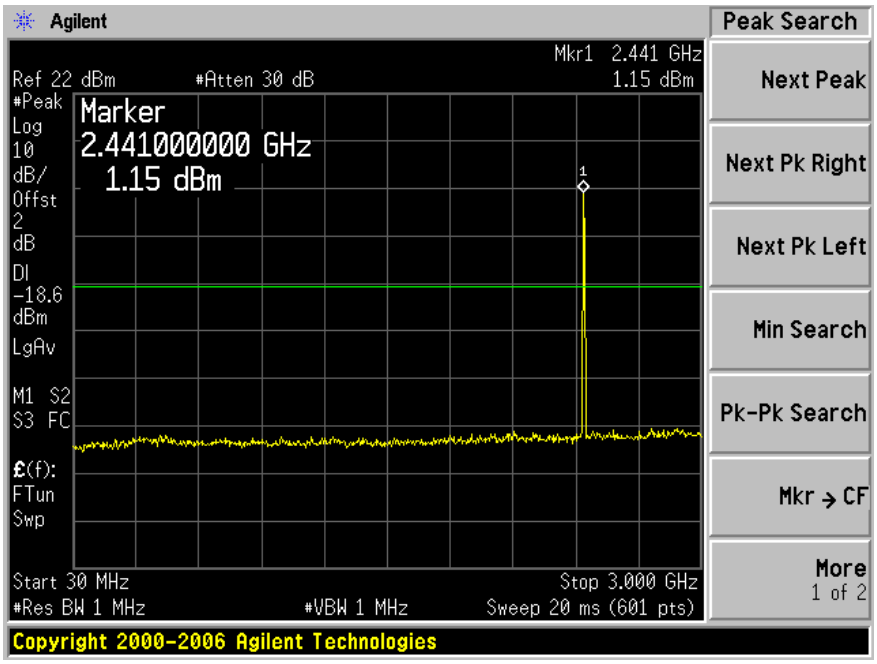
Bluetooth Mode:

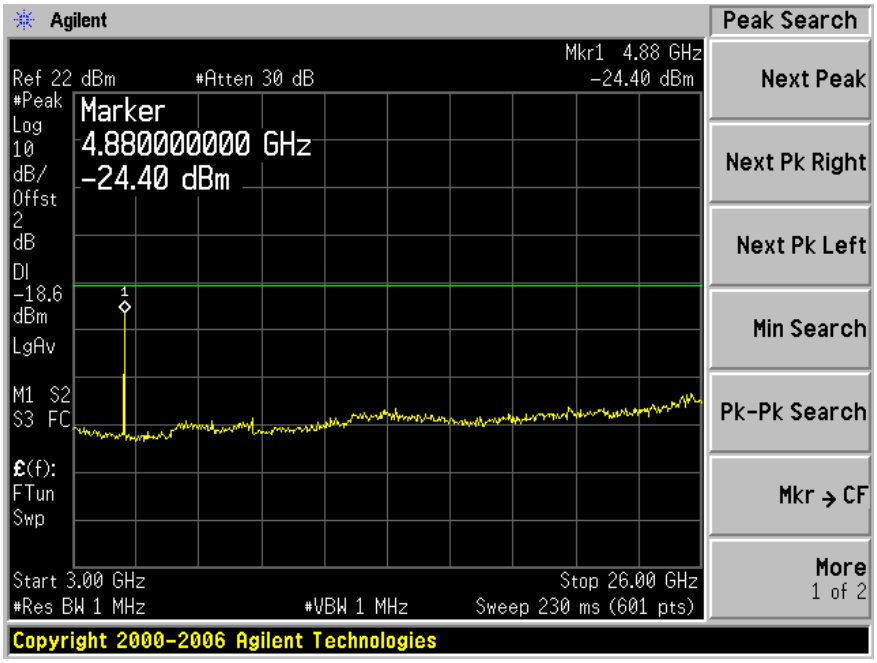
Low Channel 2402 MHz



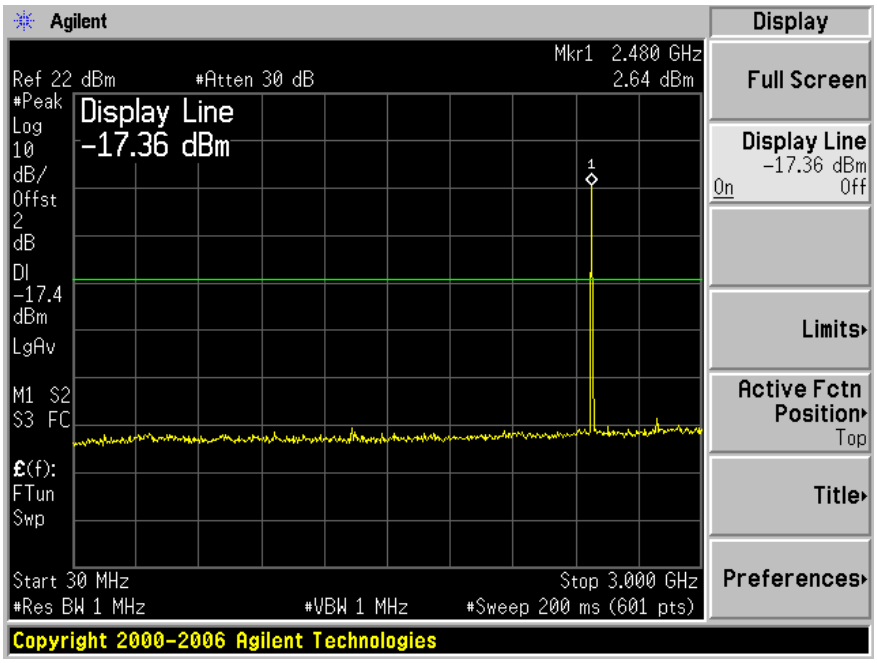


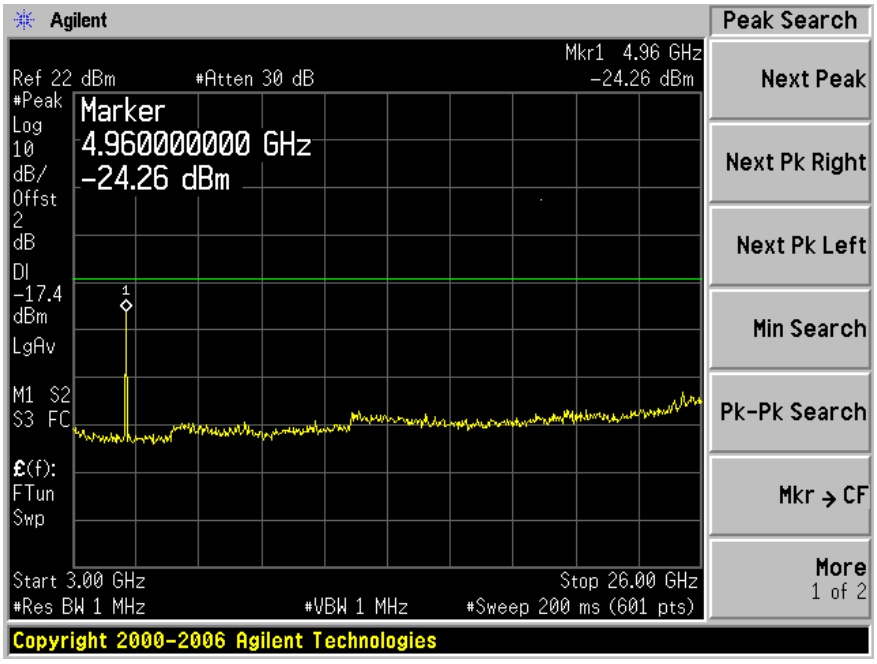
Middle Channel 2442 MHz





High Channel 2480 MHz





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): 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 C63.4-2003. The specification used was the FCC 15 Subpart C limits.

8.3 EUT Setup

The radiated emissions tests were performed using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15C limits.

The spacing between the peripherals was 10 centimeters.

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

8.4 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
HP	Pre amplifier	8449B	3147A00400	2010-02-01
Sunol Science Corp.	Combination Antenna	JB1 Antenna	A103105-3	2009-06-25
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-07-23
A. H. Systems	Antenna, Horn	SAS-200/571	261	2009-09-23

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

8.5 Test Procedure

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

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

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

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

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

Above 1000 MHz:

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

8.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Cable Loss, and Attenuator Factor adding to the Indicated Reading. The basic equation is as follows:

Corrected Amplitude = Indicated Reading + Cable Loss + Attenuator Factor

For example, a Corrected Amplitude of 34.08 dBuV/m = Indicated Reading (23.85 dBuV) + Cable Factor (0.22 dB) + Attenuator Factor (10 dB)

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

Margin = Corrected Amplitude - Limit

8.7 Test Environmental Conditions

Temperature:	21~23 °C
Relative Humidity:	30~35 %
ATM Pressure:	101.2-102.2kPa

The testing was performed by Jerry Huang on 2010-06-07 in 5 meter chamber 3.

8.8 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247 standard's radiated emissions limits, and had the worst margin of:

Wi-Fi: 802.11 b/g mode:

30-1000 MHz:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel, Range**
-10.77	249.752	Horizontal	High, 30MHz – 1GHz

Above 1 GHz:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel, Range**
-3.63	1330	Vertical	High, 1GHz – 25GHz

Bluetooth:

30-1000 MHz:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel, Range**
-13.6	266.4151	Horizontal	High, 30MHz – 1GHz

Above 1 GHz:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel, Range**
-3.63	1330	Vertical	High, 1GHz – 25GHz

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

8.9 Radiated Emissions Test Result Data

Radiated Emission at 3 meters, 30 MHz – 1 GHz

Wi-Fi

802.11b Mode - High channel (2462 MHz)

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Test Antenna		Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
		Height (cm)	Polarity (H/V)			
248.5334	30.15	115	H	246	46	-15.85
282.8631	32.47	128	H	180	46	-13.53
333.1305	26.03	327	H	87	46	-19.97
264.992	21.37	132	H	132	46	-24.63
266.4187	27.78	91	H	176	46	-18.22
399.9672	16.52	360	H	225	46	-29.48

802.11g Mode - High channel (2462 MHz)

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Test Antenna		Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
		Height (cm)	Polarity (H/V)			
248.4514	32.34	120	H	251	46	-13.66
249.752	35.73	171	H	40	46	-10.27
281.7004	29.38	166	H	222	46	-16.62
331.4334	22.98	137	V	25	46	-23.02
265.0529	18.93	268	H	37	46	-27.07
116.5573	14.68	251	H	112	43.5	-28.82

Bluetooth

High Channel (2480 MHz)

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Test Antenna		Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
		Height (cm)	Polarity (H/V)			
248.5288	29.66	155	H	254	46	-16.34
333.1087	32.44	97	H	62	46	-13.56
283.0637	30.57	142	H	149	46	-15.43
266.4151	32.9	109	H	327	46	-13.1
116.5688	29.11	322	H	179	43.5	-14.39

Radiated Emission at 3 meters, 1 GHz – 25 GHz

Wi-Fi: 802.11 b Mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	Part 15C		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz, measured at 3 meters											
1330	60.98	195	1.00	V	24.5	3.78	37.19	52.07	74	-21.93	Peak
1330	54.02	111	2.13	H	24.5	3.78	37.19	45.11	74	-28.89	Peak
1330	37.55	195	1.00	V	24.5	3.78	37.19	28.64	54	-25.36	Ave
1330	33.25	111	2.13	H	24.5	3.78	37.19	24.34	54	-29.66	Ave
Middle channel 2437 MHz measured at 3 meters											
1330	62.12	332	1.00	V	24.5	3.78	37.19	53.21	74	-20.79	Peak
1330	53.34	214	1.09	H	24.5	3.78	37.19	44.43	74	-29.57	Peak
1330	34.34	332	1.00	V	24.5	3.78	37.19	25.43	54	-28.57	Ave
1330	32.65	214	1.09	H	24.5	3.78	37.19	23.74	54	-30.26	Ave
High channel 2462 MHz measured at 3 meters											
1330	62.54	332	1.00	V	24.5	3.78	37.19	53.63	74	-20.37	Peak
1330	53.11	210	1.13	H	24.5	3.78	37.19	44.2	74	-29.8	Peak
1330	34.33	332	1.00	V	24.5	3.78	37.19	50.37	54	-3.63	Ave
1330	32.87	210	1.13	H	24.5	3.78	37.19	23.96	54	-30.04	Ave

802.11 g Mode

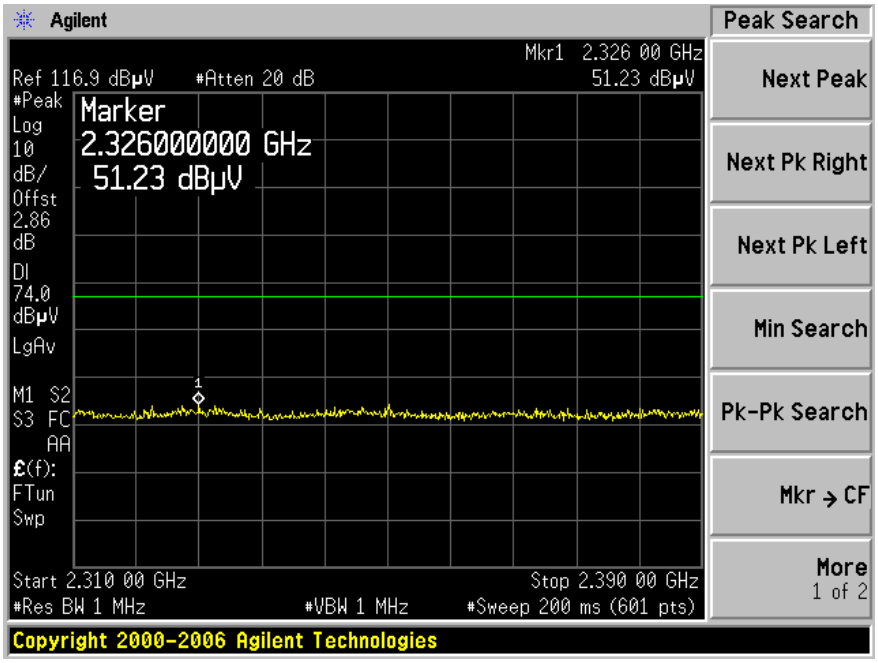
Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	Part 15C		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz, measured at 3 meters											
1330	62.76	328	100	V	24.5	3.78	37.19	53.85	74	-20.15	Peak
1330	53.11	338	137	H	24.5	3.78	37.19	44.2	74	-29.8	Peak
1330	34.37	328	100	V	24.5	3.78	37.19	25.46	54	-28.54	Ave
1330	35.43	338	137	H	24.5	3.78	37.19	26.52	54	-27.48	Ave
Middle channel 2437 MHz measured at 3 meters											
1330	62.21	336	100	V	24.5	3.78	37.19	53.3	74	-20.7	Peak
1330	53.4	210	110	H	24.5	3.78	37.19	44.49	74	-29.51	Peak
1330	34.34	336	100	V	24.5	3.78	37.19	25.43	54	-28.57	Ave
1330	32.83	210	110	H	24.5	3.78	37.19	23.92	54	-30.08	Ave
High channel 2462 MHz measured at 3 meters											
1330	62.34	334	100	V	24.5	3.78	37.19	53.43	74	-20.57	Peak
1330	53.15	211	109	H	24.5	3.78	37.19	44.24	74	-29.76	Peak
1330	34.2	334	100	V	24.5	3.78	37.19	50.37	54	-3.63	Ave
1330	32.73	211	109	H	24.5	3.78	37.19	23.82	54	-30.18	Ave

Bluetooth:

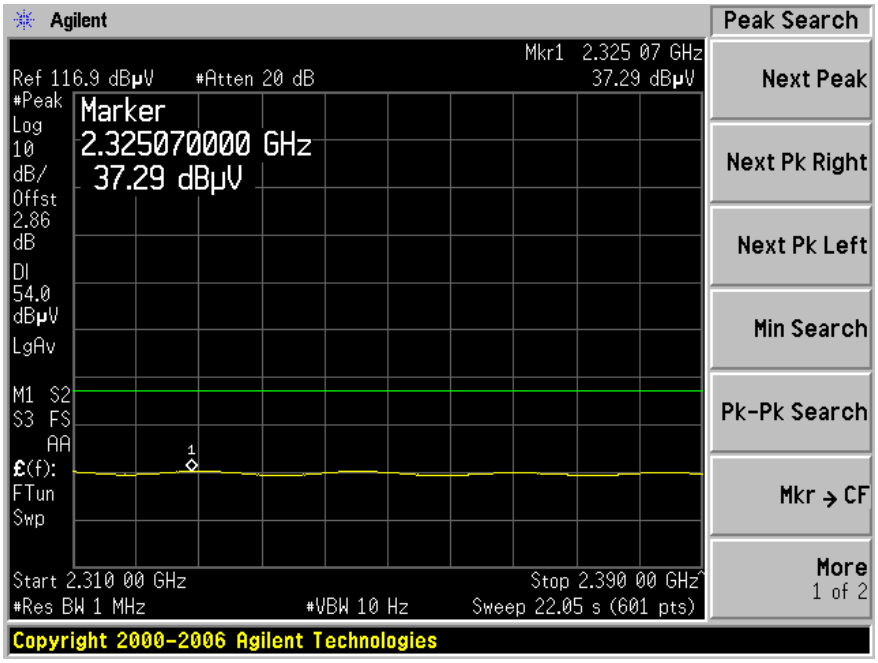
Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	Part 15C		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2402 MHz, measured at 3 meters											
1330	62.88	332	100	V	24.5	3.78	37.19	53.97	74	-20.03	peak
1330	49.25	214	111	H	24.5	3.78	37.19	40.34	74	-33.66	peak
1330	38.42	332	100	V	24.5	3.78	37.19	50.37	54	-3.63	Ave
1330	33.4	214	111	H	24.5	3.78	37.19	24.49	54	-29.51	Ave
Middle channel 2442 MHz measured at 3 meters											
1330	60.69	335	100	V	24.5	3.78	37.19	51.78	74	-22.22	peak
1330	48.51	109	212	H	24.5	3.78	37.19	39.6	74	-34.4	peak
1330	38.65	355	100	V	24.5	3.78	37.19	50.37	54	-3.63	Ave
1330	33.19	109	212	H	24.5	3.78	37.19	24.28	54	-29.72	Ave
High channel 2480 MHz measured at 3 meters											
1330	60.68	336	100	V	24.5	3.78	37.19	51.77	74	-22.23	peak
1330	49.87	214	115	H	24.5	3.78	37.19	40.96	74	-33.04	peak
1330	38.86	336	100	V	24.5	3.78	37.19	50.37	54	-3.63	Ave
1330	33.19	214	115	H	24.5	3.78	37.19	24.28	54	-29.72	Ave

Restricted Band Emissions:

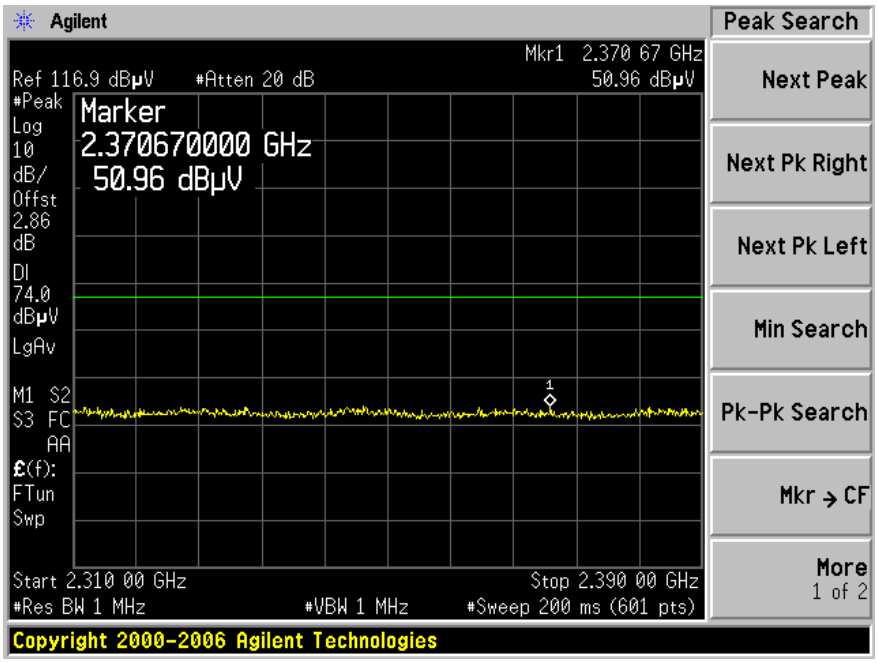
802.11 b, Lowest Channel at Horizontal, Peak



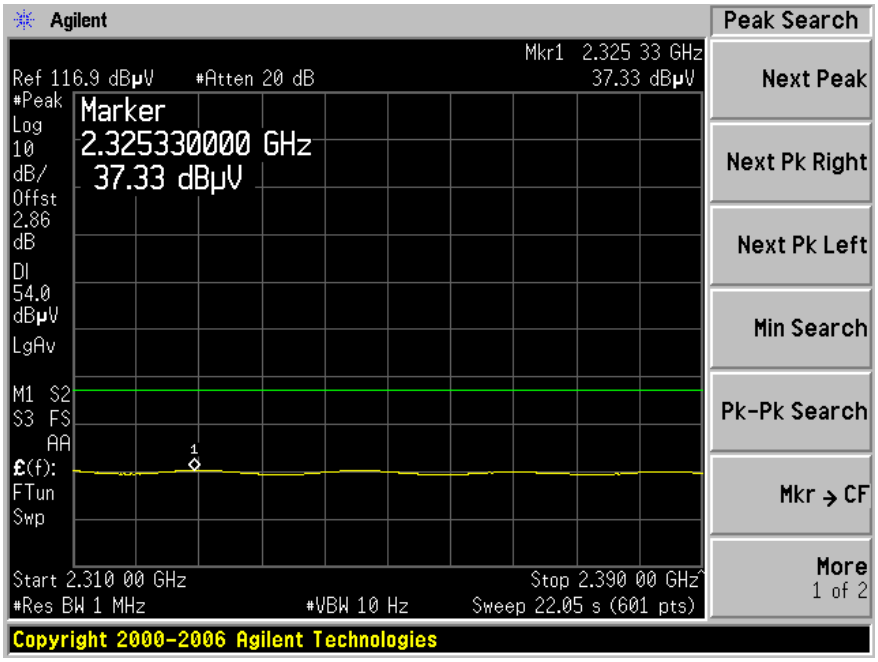
802.11b, Lowest Channel at Horizontal, Average



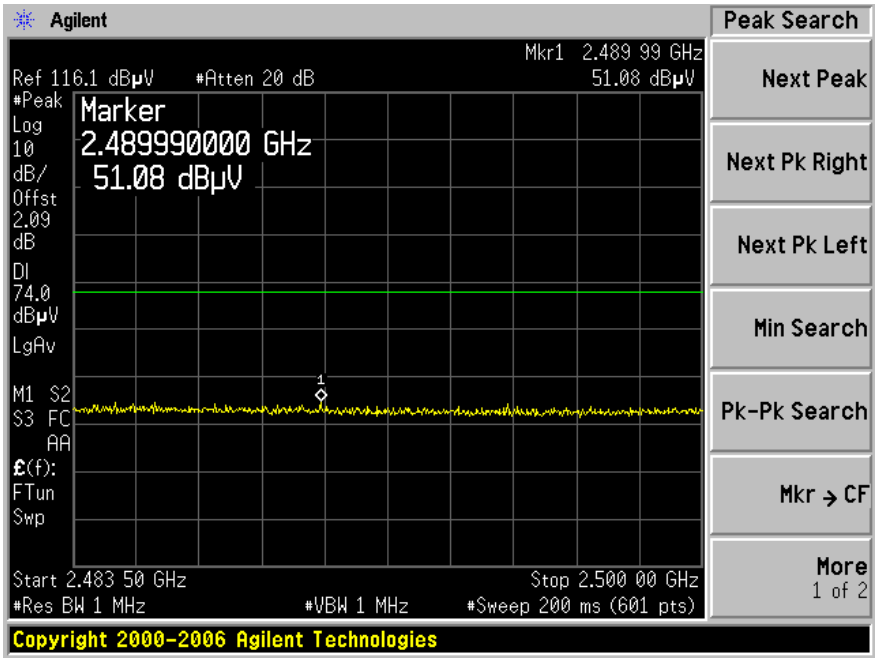
802.11b, Lowest Channel at Vertical, Peak



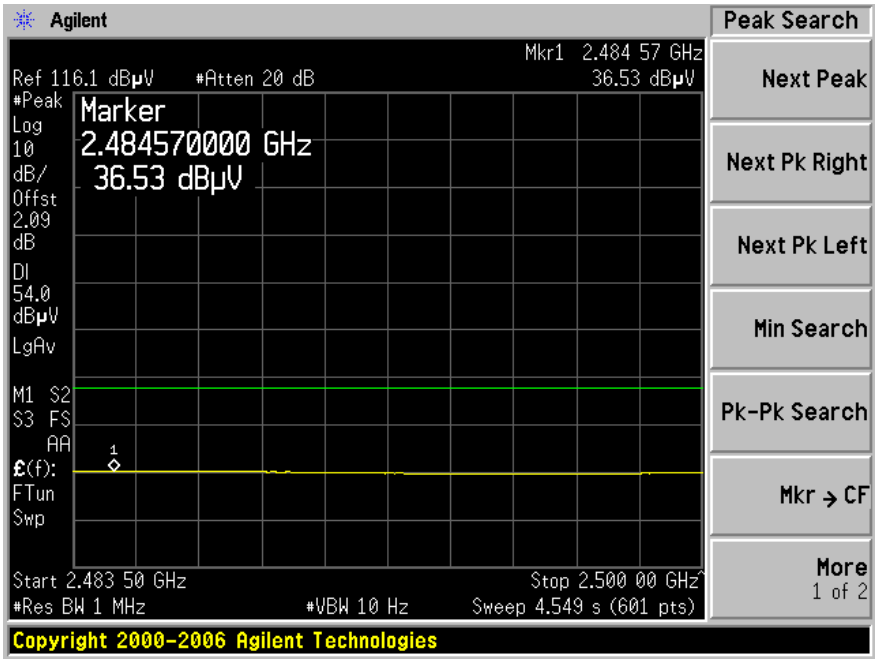
802.11b, Lowest Channel at Vertical, Average



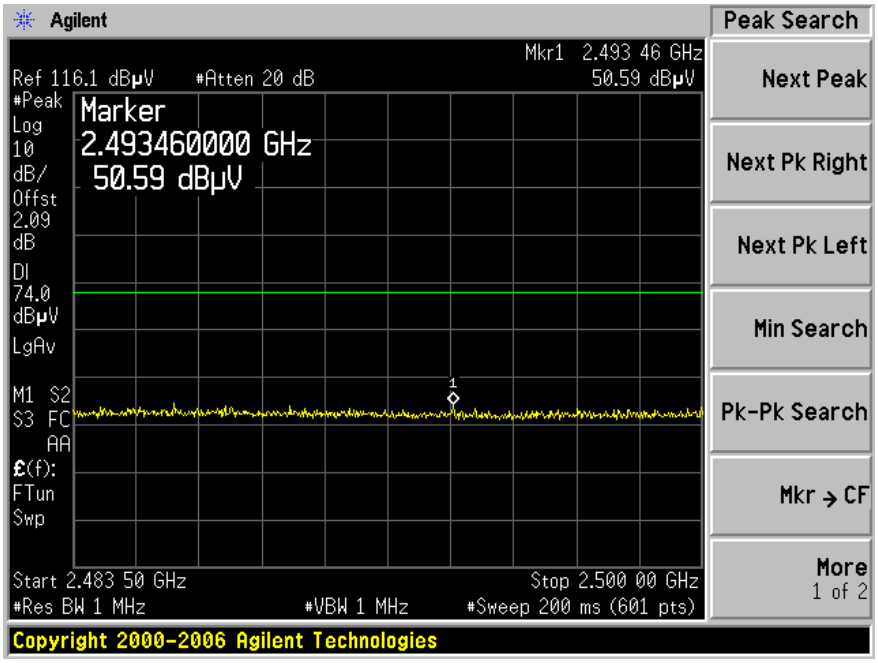
802.11b, Highest Channel at Horizontal, Peak



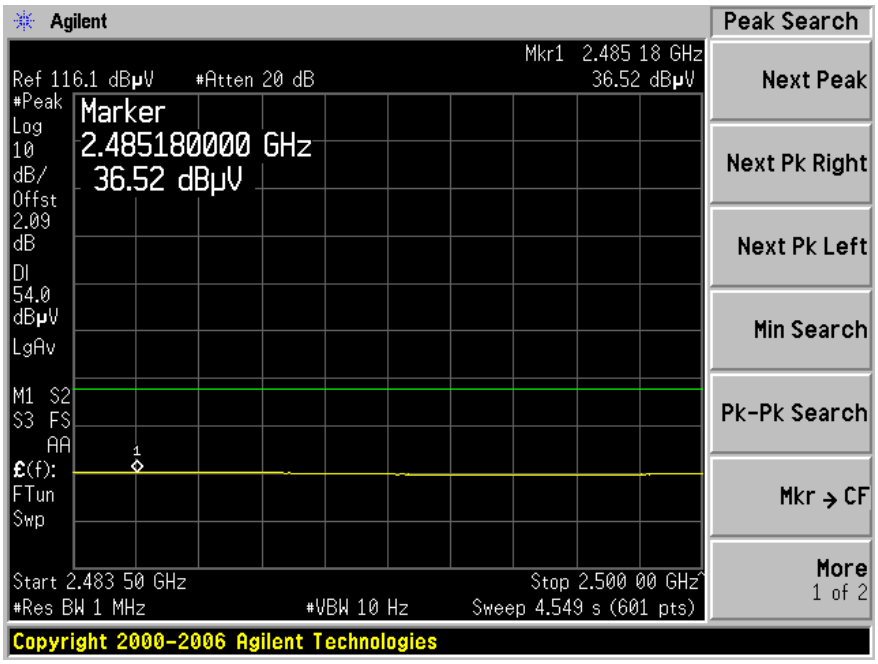
802.11b, Highest Channel at Horizontal, Average



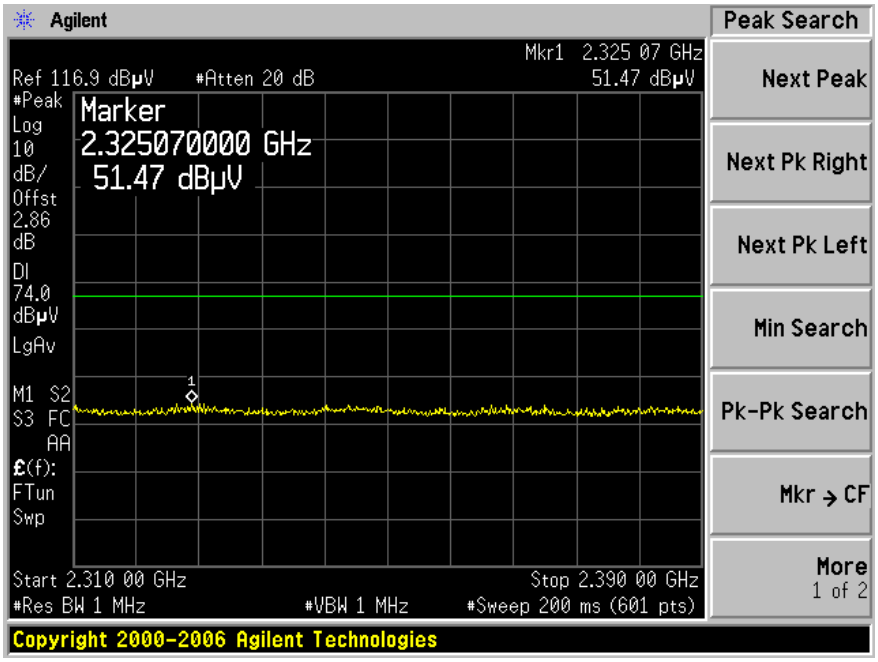
802.11b, Highest Channel at Vertical, Peak



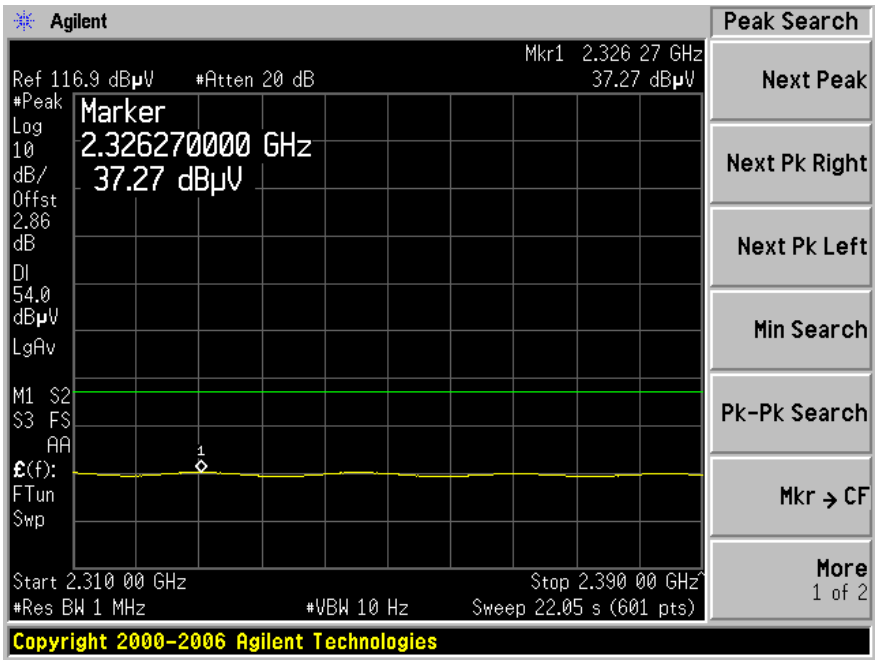
802.11b, Highest Channel at Vertical, Average



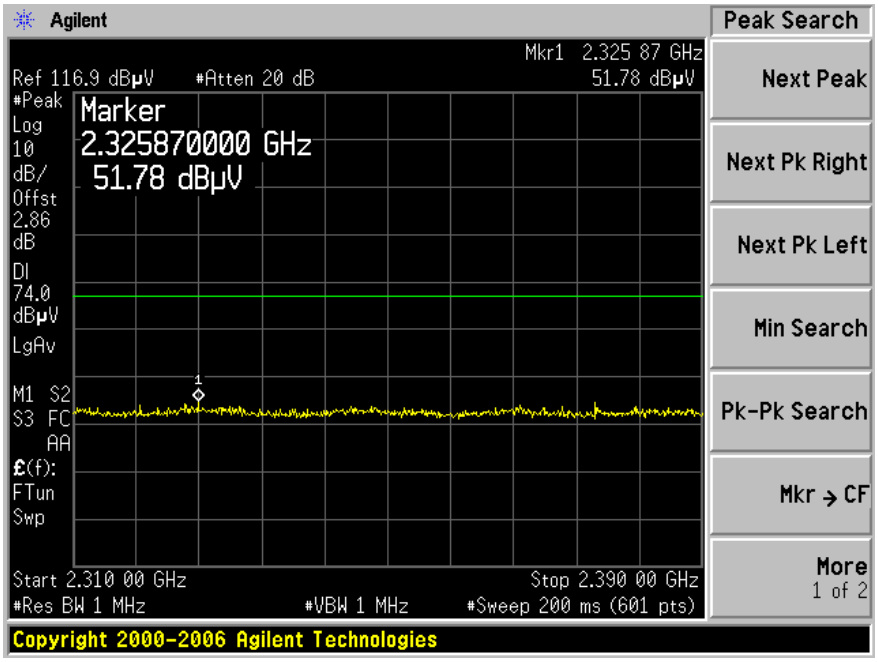
802.11 g, Lowest Channel at Horizontal, Peak



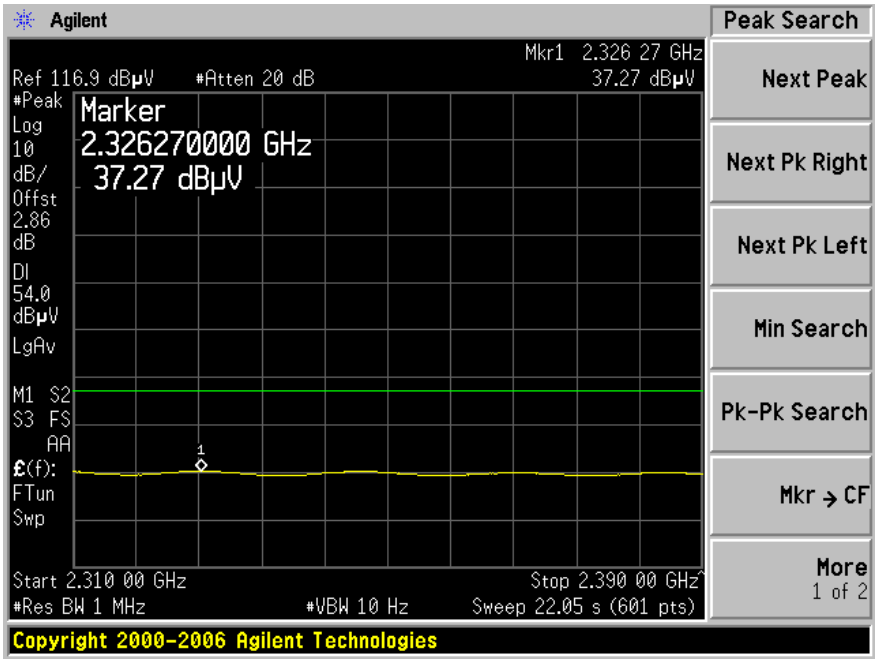
802.11g, Lowest Channel at Horizontal, Average



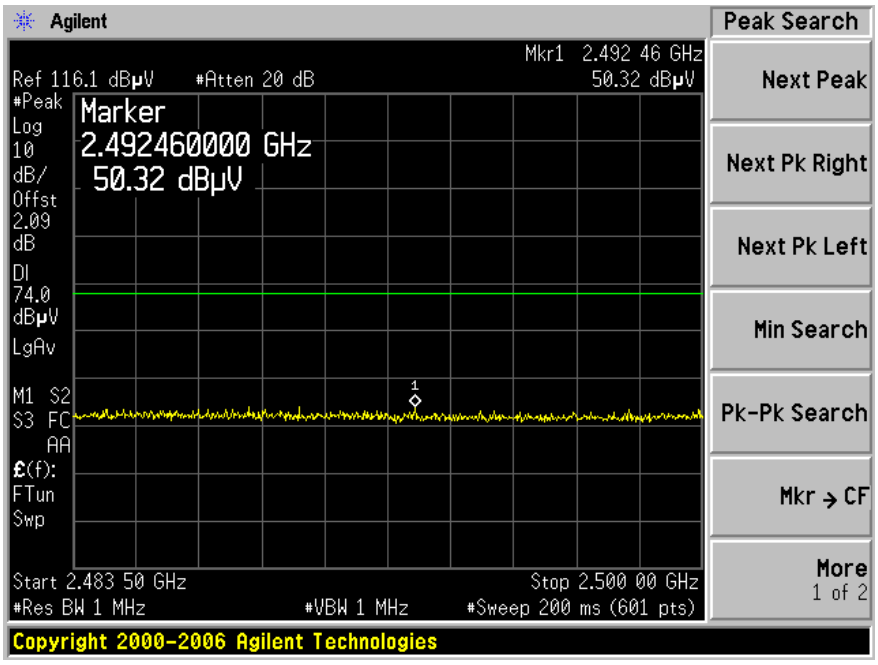
802.11g, Lowest Channel at Vertical, Peak



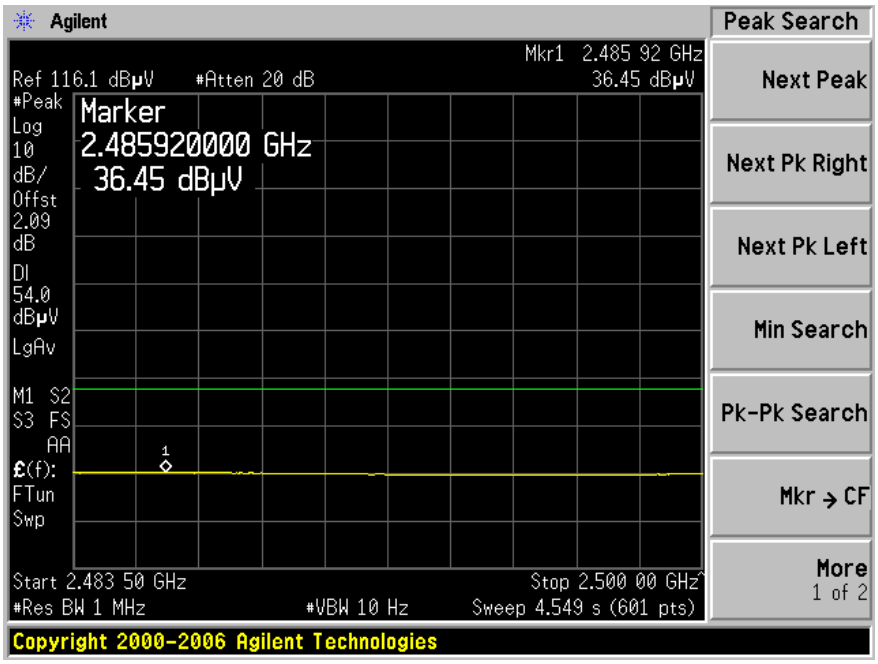
802.11g, Lowest Channel at Vertical, Average



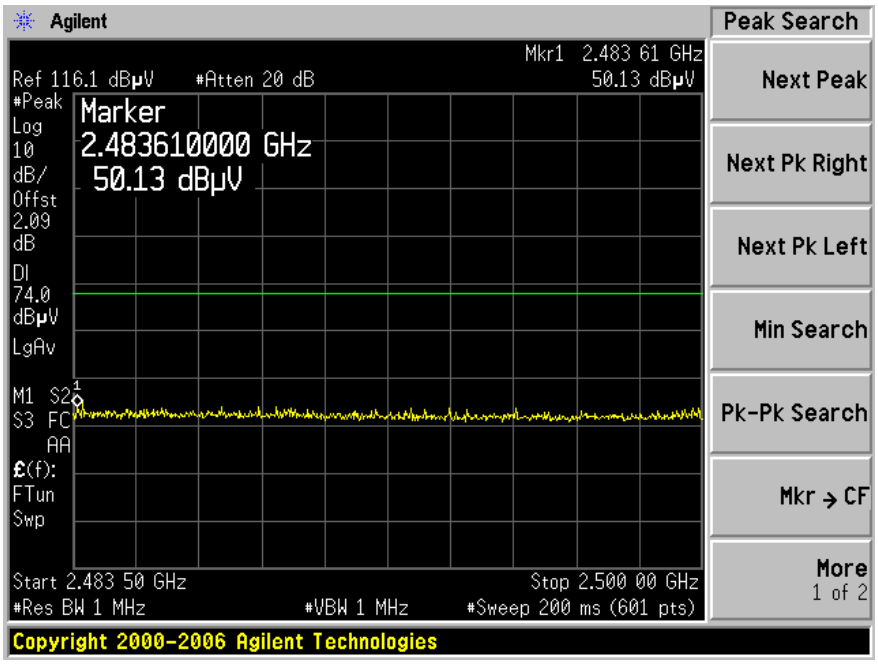
802.11g, Highest Channel at Horizontal, Peak



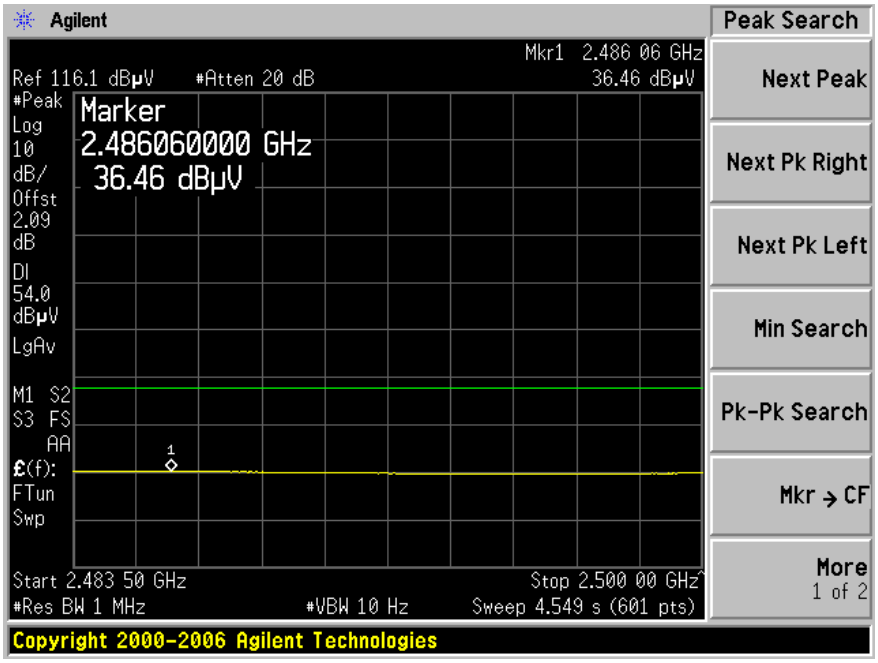
80.211g, Highest Channel at Horizontal, Average



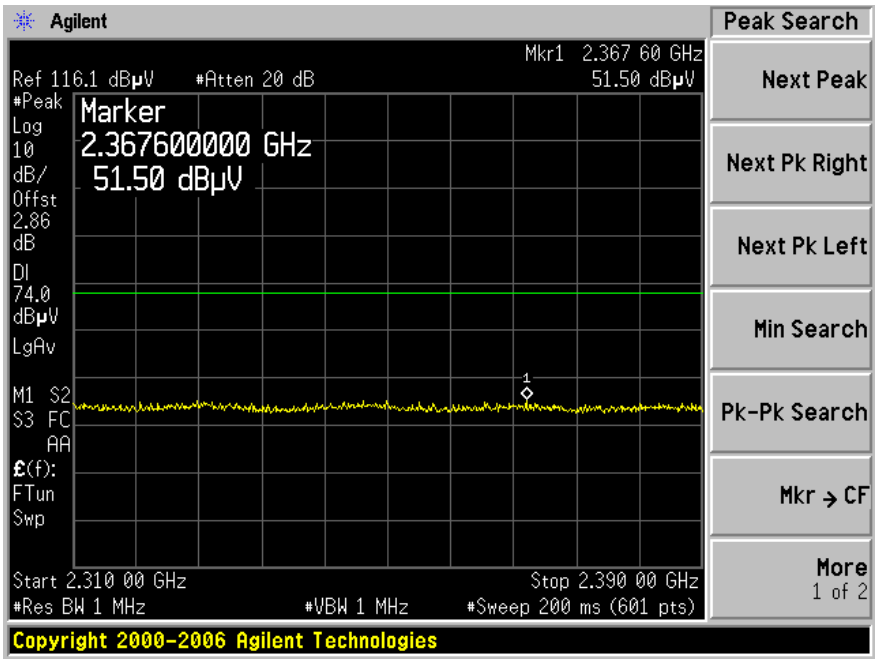
802.11g, Highest Channel at Vertical, Peak



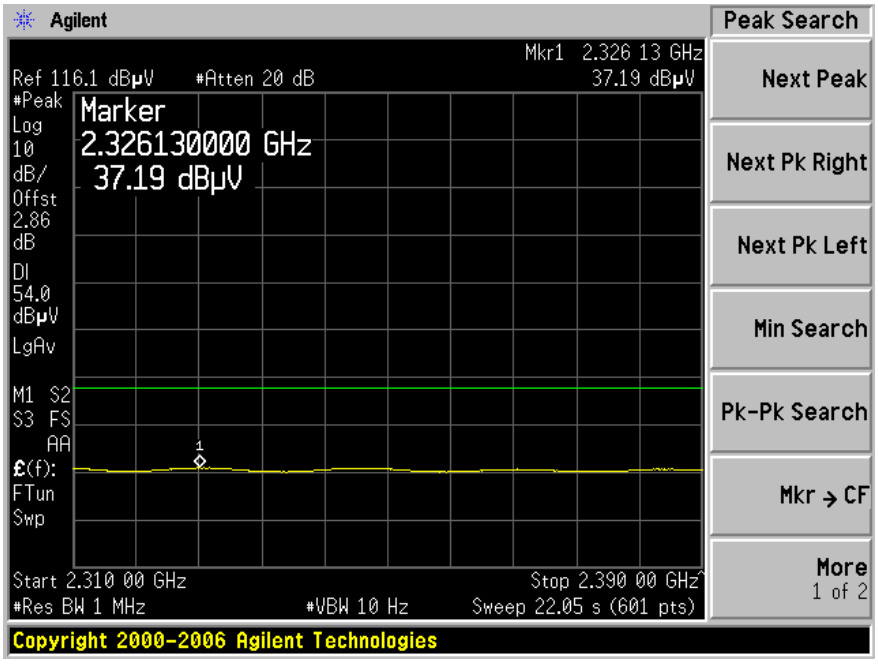
802.11g, Highest Channel at Vertical, Average



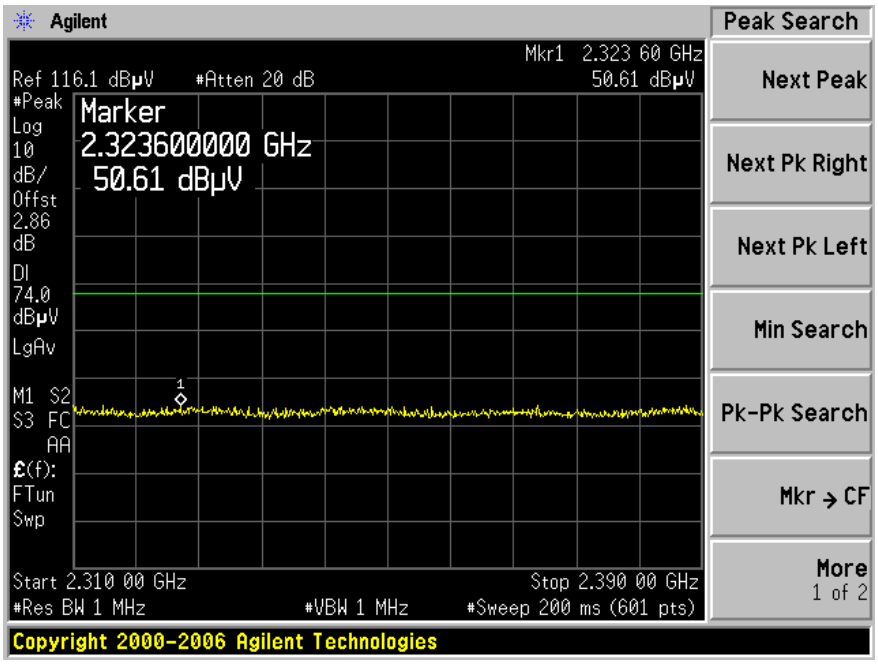
Bluetooth, Lowest Channel at Horizontal, Peak



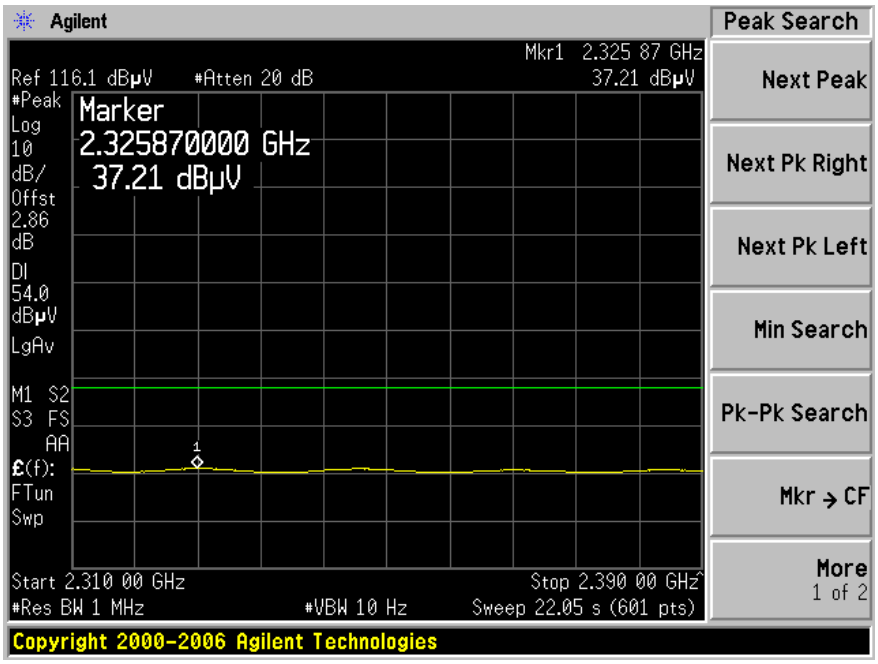
Bluetooth, Lowest Channel at Horizontal, Average



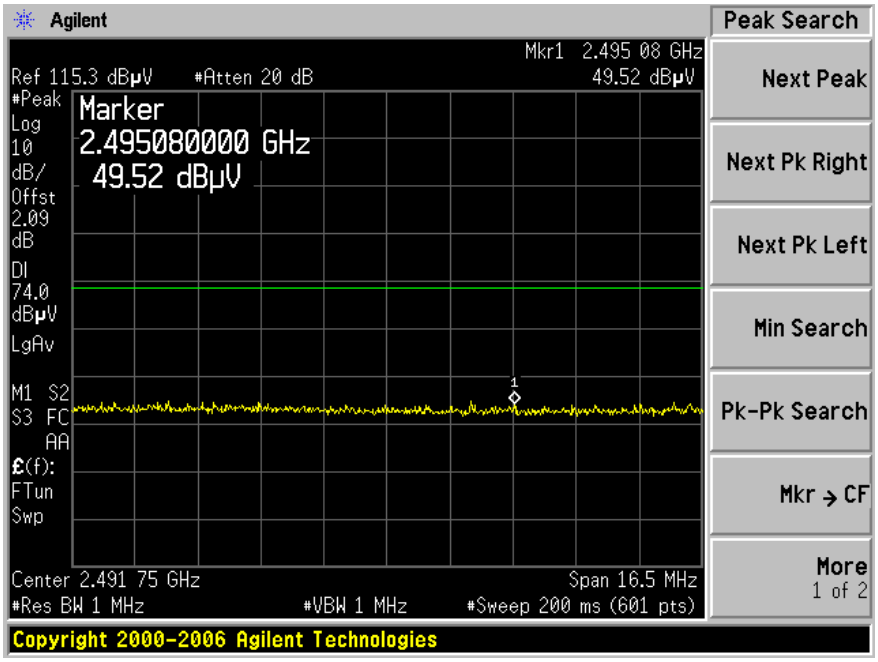
Bluetooth, Lowest Channel at Vertical, Peak



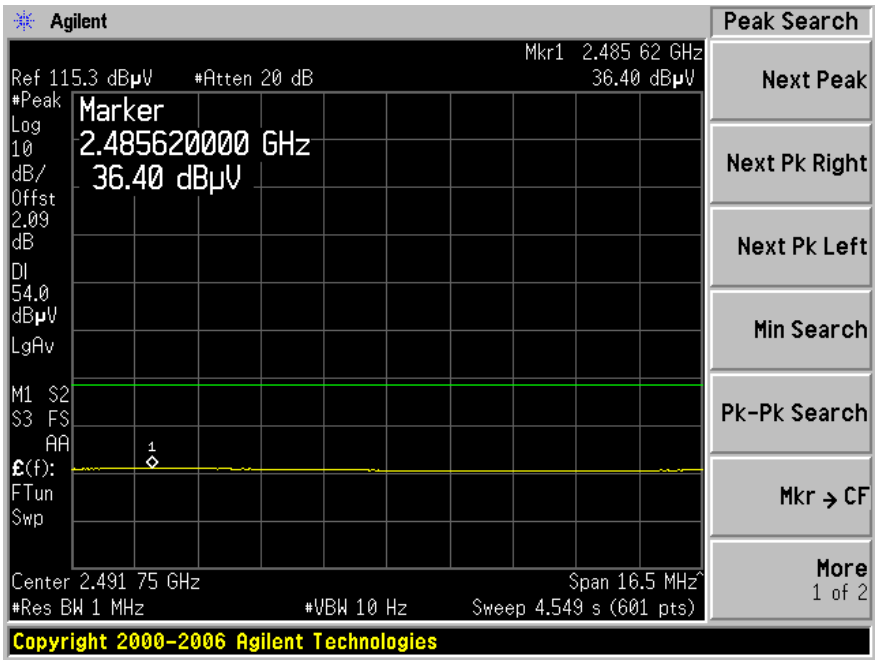
Bluetooth, Lowest Channel at Vertical, Average



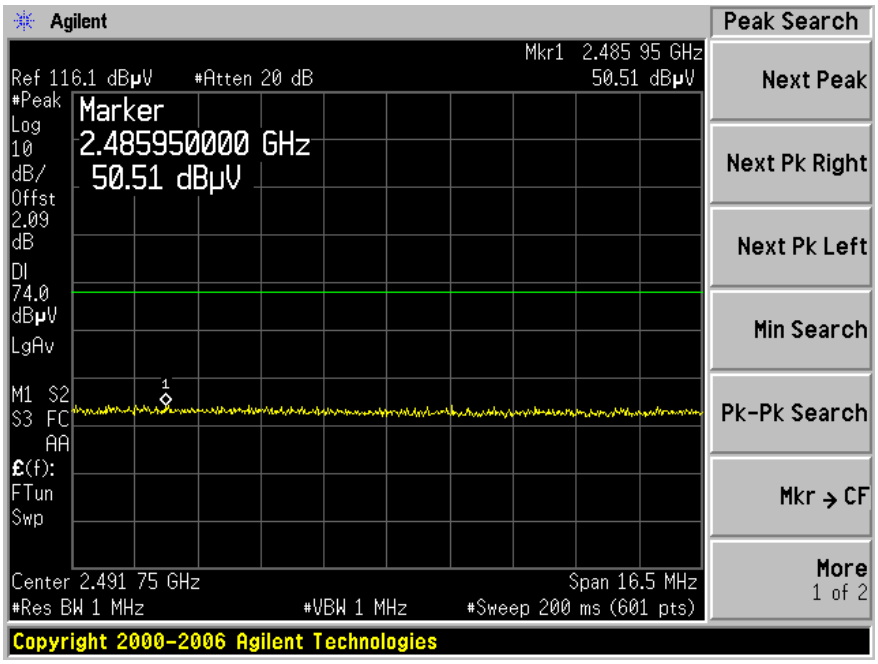
Bluetooth, Highest Channel at Horizontal, Peak



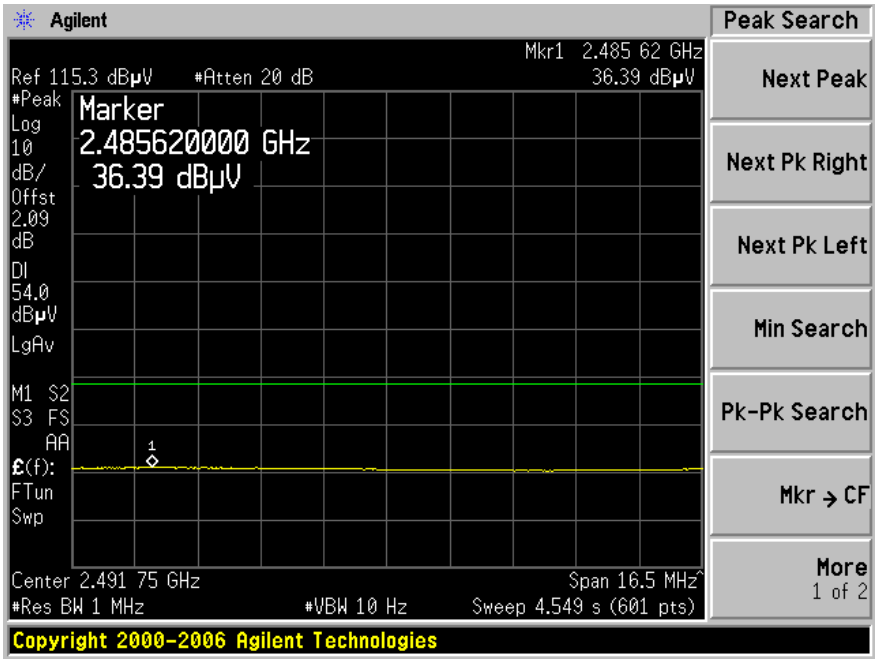
Bluetooth, Highest Channel at Horizontal, Average



Bluetooth, Highest Channel at Vertical, Peak



Bluetooth, Highest Channel at Vertical, Average



9 FCC§15.247(a)(2) – Channel Bandwidth

9.1 Applicable Standard

According to FCC §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

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
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-07-23

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

9.4 Test Environmental Conditions

Temperature:	18~21 °C
Relative Humidity:	30~35 %
ATM Pressure:	101.2-102.2kPa

**The testing was performed by Jerry Huang on 2010-05-18 in RF site.*

9.5 Summary of Test Results

Wi-Fi 802.11 b/g :

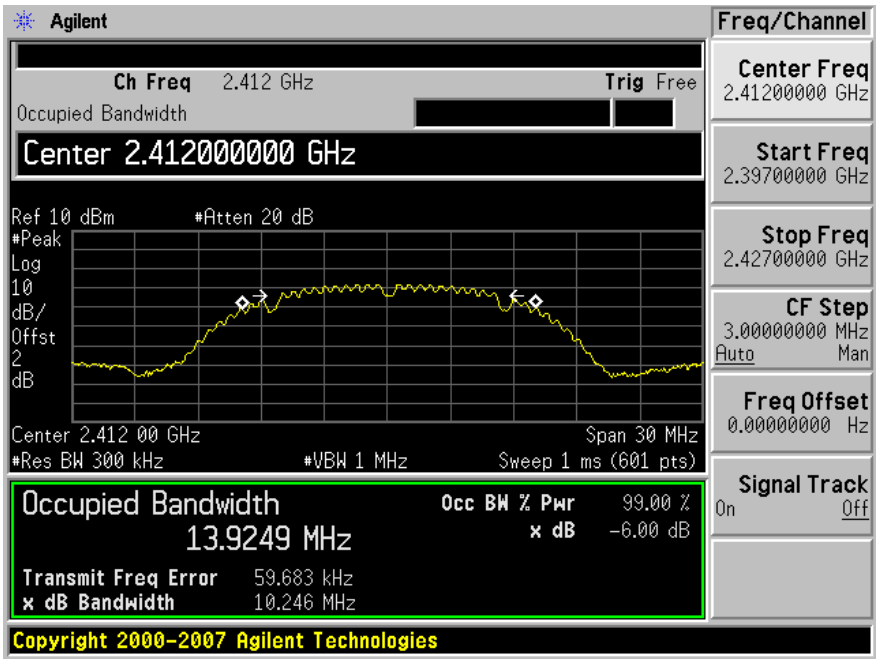
Mode	Channel	Frequency (MHz)	6 dB Channel Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (kHz)	Results
802.11b	Low	2412	10.246	13.925	>500	Compliant
	Middle	2437	10.259	13.883	>500	Compliant
	High	2462	10.262	13.872	>500	Compliant
802.11g	Low	2412	16.416	16.804	>500	Compliant
	Middle	2437	16.436	16.827	>500	Compliant
	High	2462	16.473	16.833	>500	Compliant

Bluetooth:

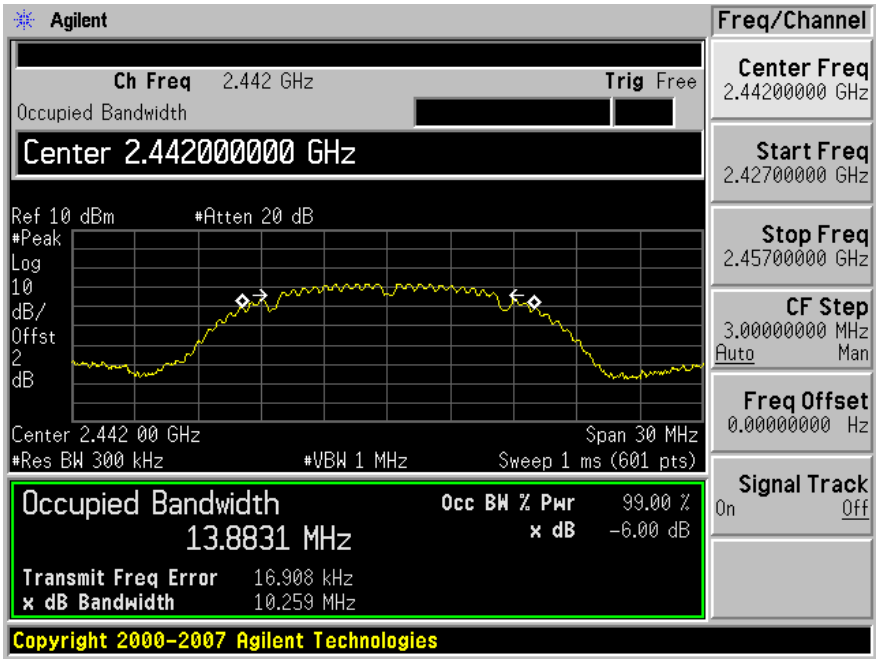
Channel	Frequency (MHz)	20 dB Channel Bandwidth (MHz)
Low	2402	0.898
Mid	2440	0.914
High	2480	0.915

Please refer to the following plots for detailed test results:

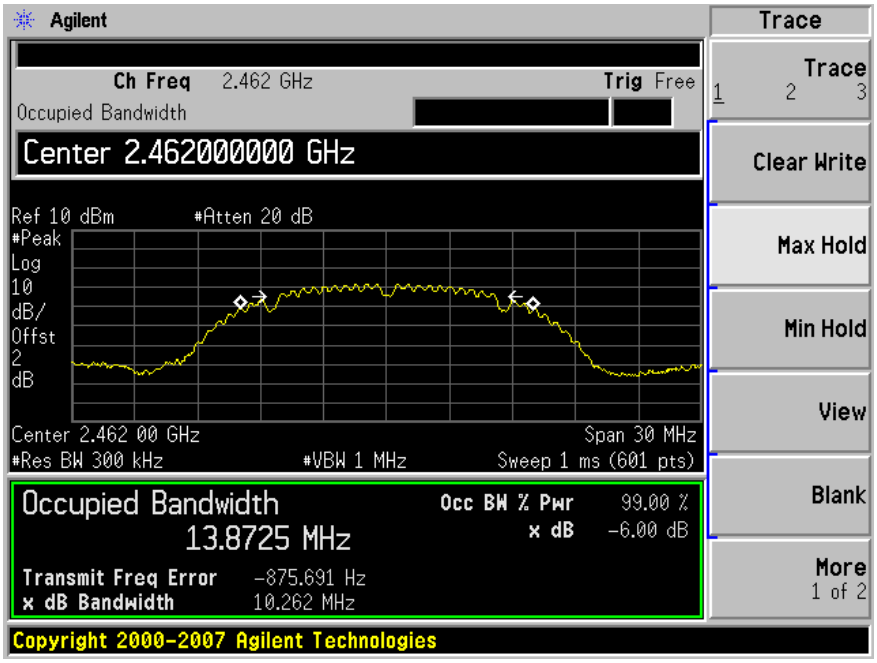
802.11b, Low Channel 2412 MHz



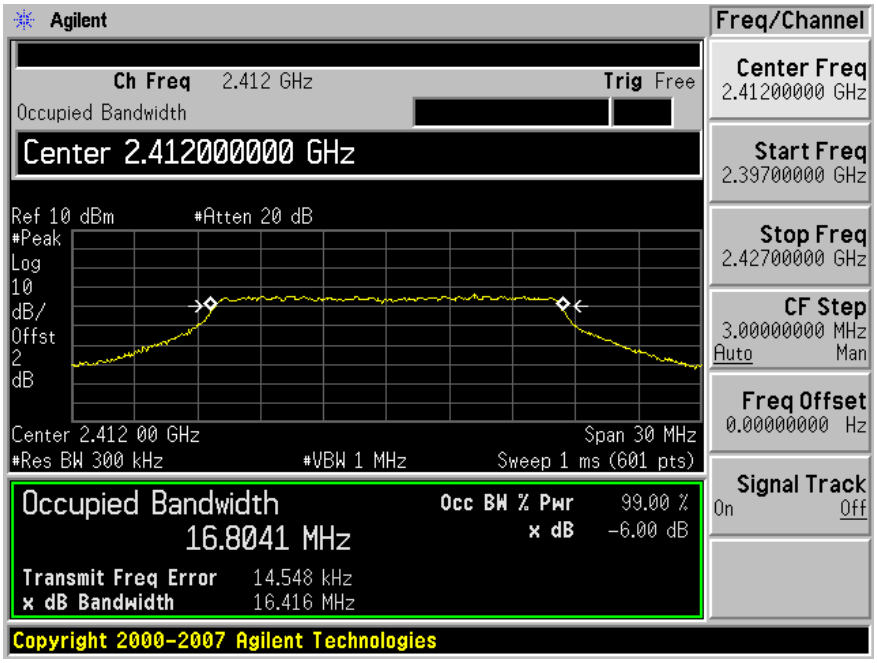
802.11b, Middle Channel 2437 MHz



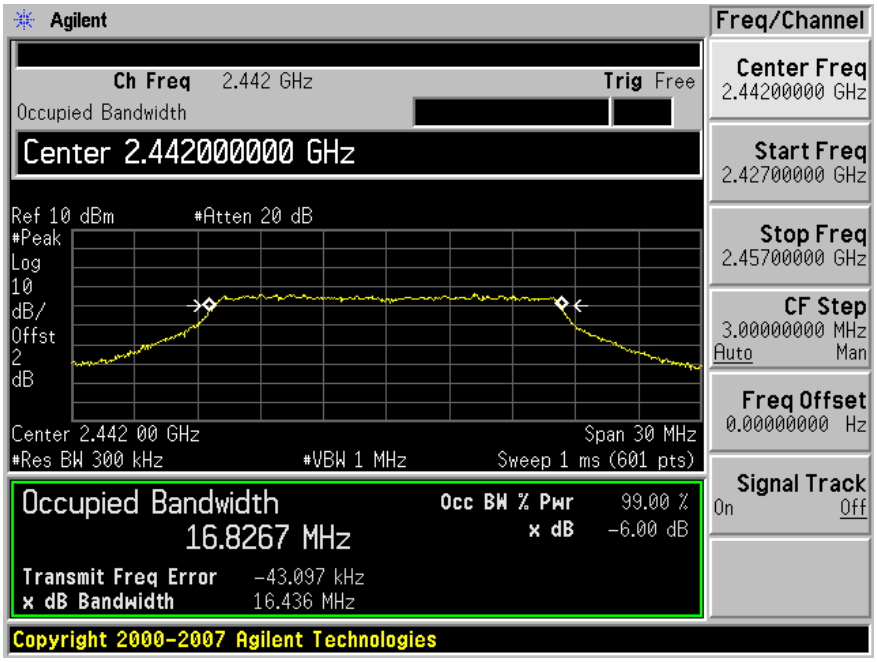
802.11b, High Channel 2462 MHz



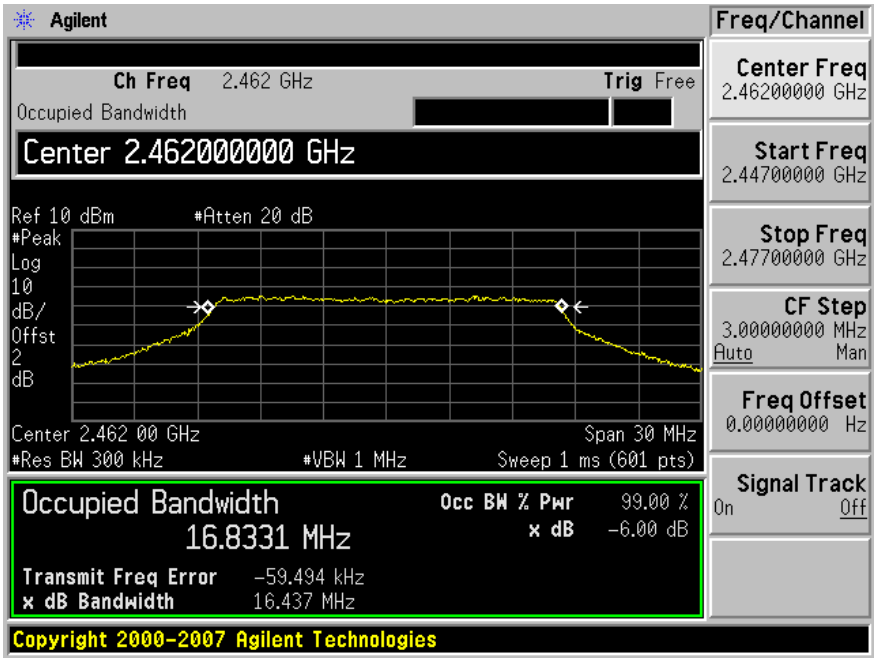
802.11 g, Low Channel 2412 MHz



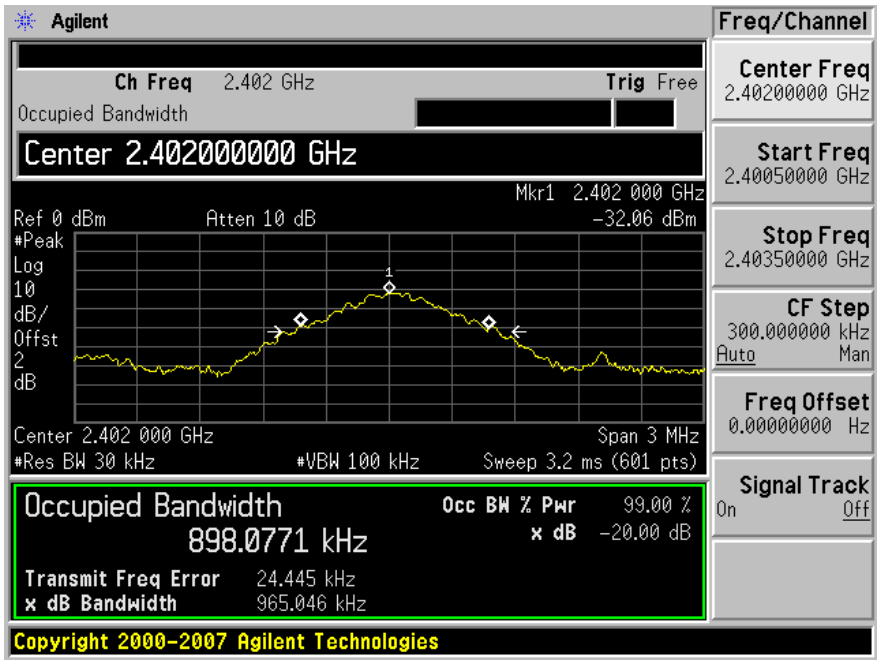
802.11g, Middle Channel 2437 MHz



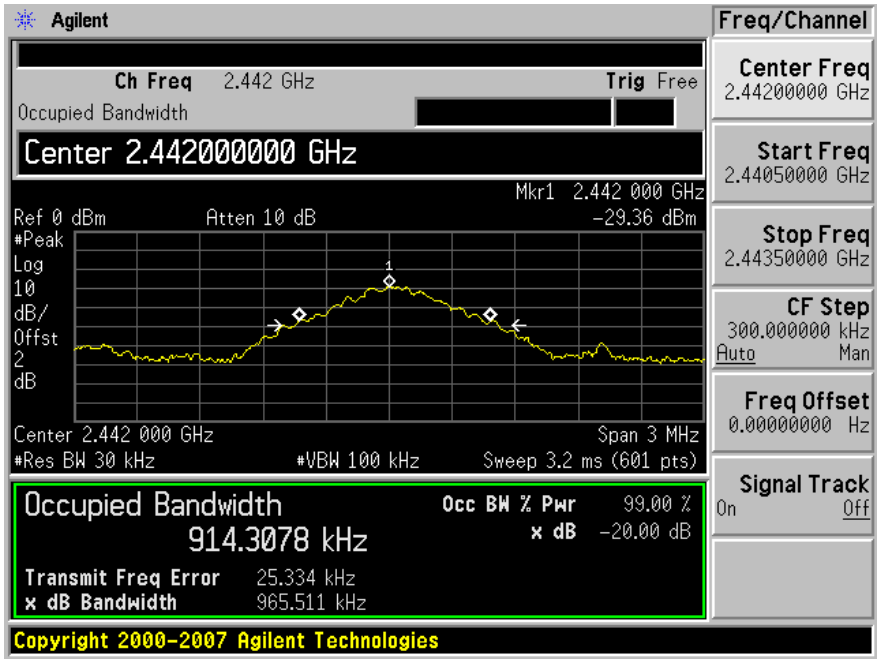
802.11g, High Channel 2462 MHz



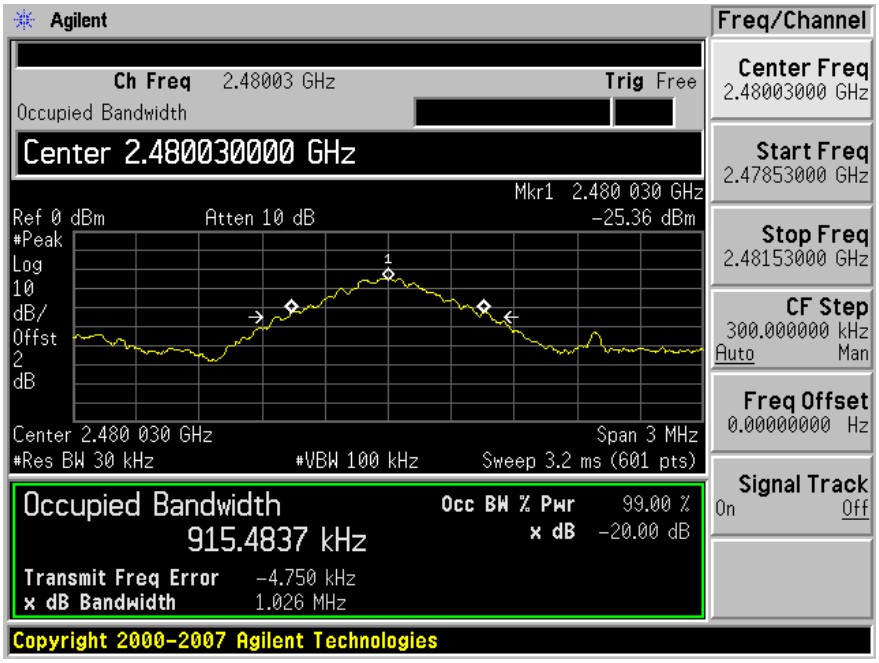
Bluetooth, Low Channel 2412 MHz



Bluetooth, Middle Channel 2440 MHz



Bluetooth, High Channel 2480 MHz



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

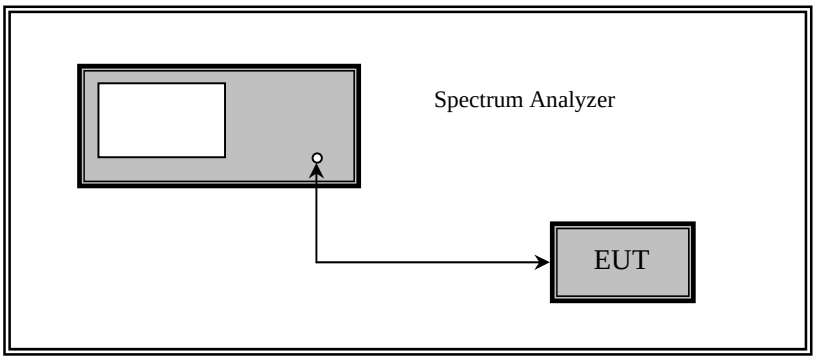
10.1 Applicable Standard

According to FCC §15.247(b)(3) for systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

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
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-07-23

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

10.4 Test Environmental Conditions

Temperature:	18~21 °C
Relative Humidity:	30~35 %
ATM Pressure:	101.2-102.2kPa

**The testing was performed by Jerry Huang on 2010-05-18 in RF site.*

10.5 Summary of Test Results

Wi-Fi:

Mode	Channel	Frequency (MHz)	Max Peak Output Power		Limit (mw)	Result
			(dBm)	(mw)		
802.11b	Low	2412	16.25	42.17	1000	Pass
	Mid	2437	16.50	44.67	1000	Pass
	High	2462	16.50	44.67	1000	Pass
802.11g	Low	2412	12.50	17.78	1000	Pass
	Mid	2437	12.76	18.88	1000	Pass
	High	2462	12.77	18.92	1000	Pass

Bluetooth:

Channel	Frequency (MHz)	Max Peak Output Power		Limit (mw)	Result
		(dBm)	(mw)		
Low	2402	-0.91	0.81	125	Pass
Mid	2440	0.18	1.04	125	Pass
High	2480	1.08	1.28	125	Pass

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
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-07-23

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

11.4 Test Environmental Conditions

Temperature:	18~21 °C
Relative Humidity:	30~35 %
ATM Pressure:	101.2-102.2kPa

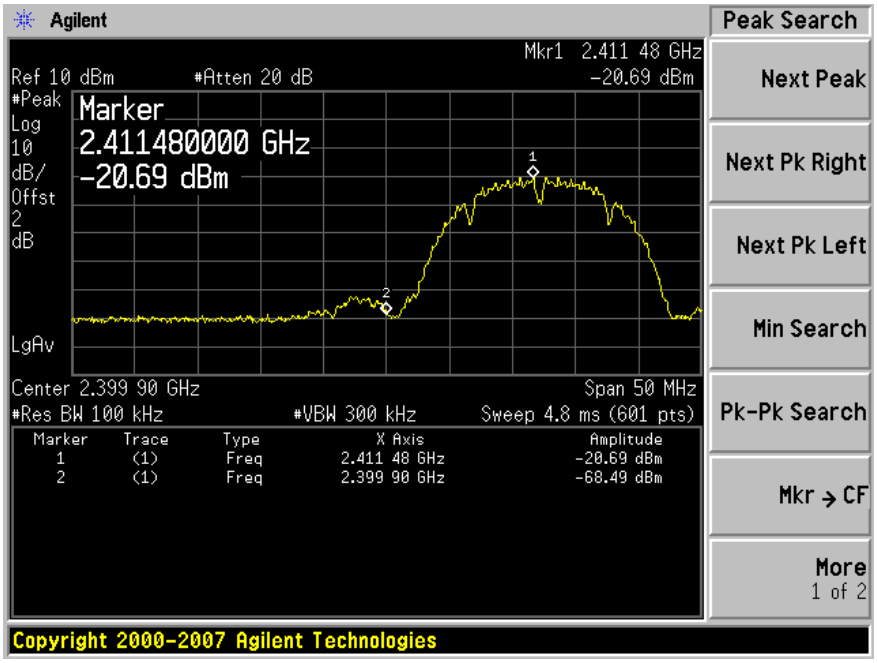
**The testing was performed by Jerry Huang on 2010-05-18 in RF site.*

11.5 Measurement Results

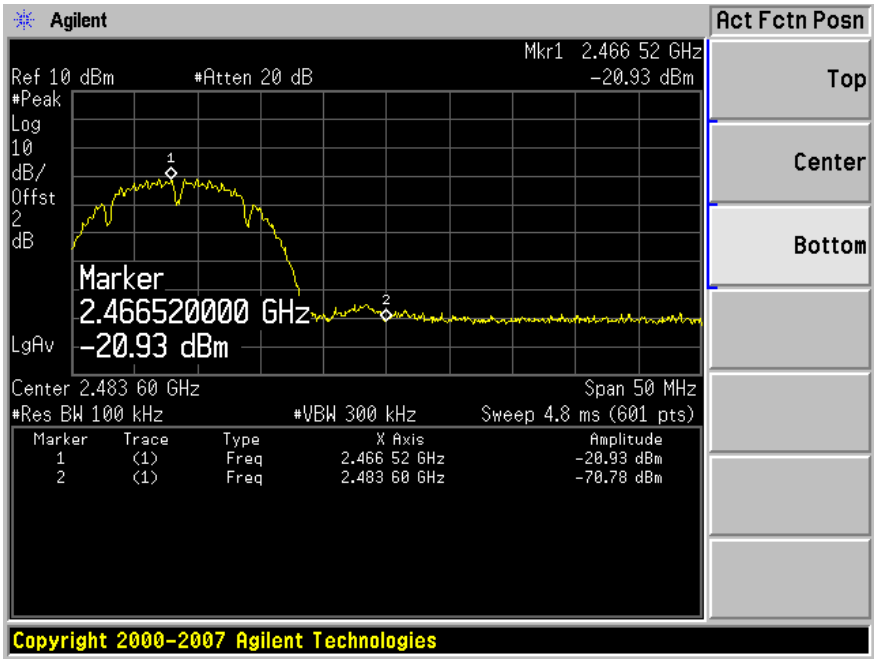
Please refer to following pages for plots of band edge.

Wi-Fi:

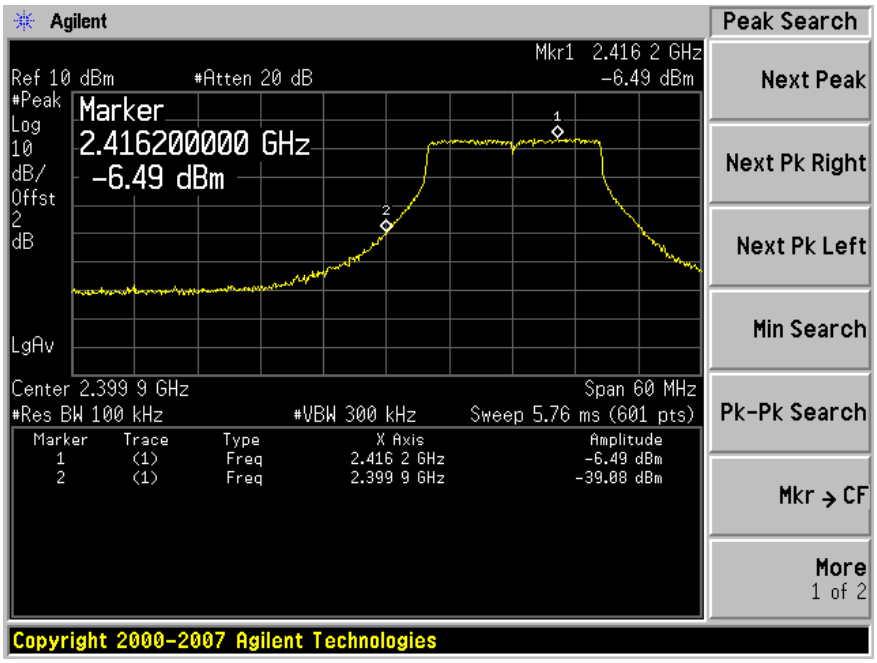
802.11b, Low Band Edge



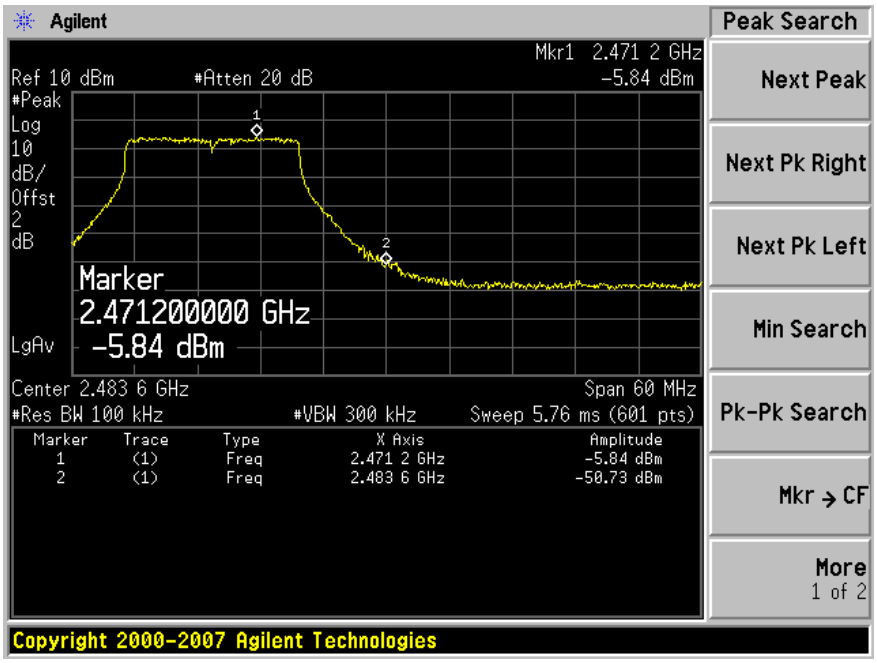
802.11b, High Band Edge



802.11g, Low Band Edge

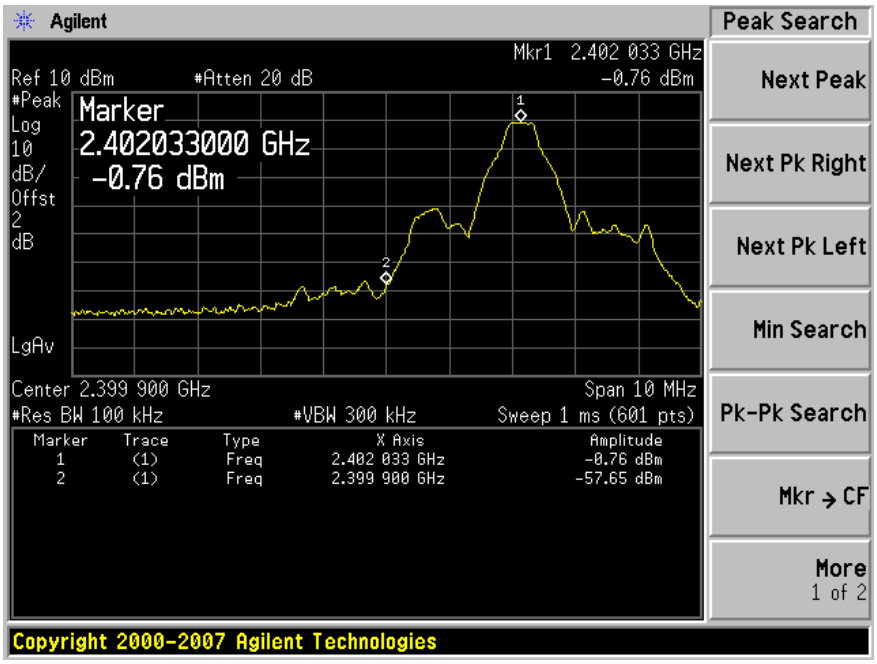


802.11g, High Band Edge

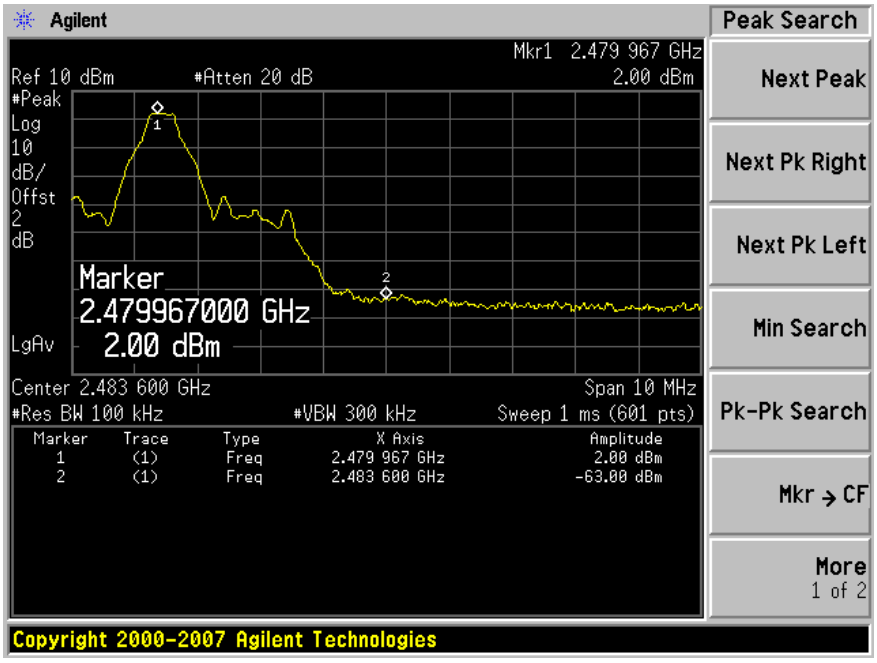


Bluetooth:

Bluetooth, Low Band Edge



Bluetooth, 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. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set 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. Adjust the center frequency of SA on any frequency be measured and set SA to 1.5MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Repeat above procedures until all frequencies measured were complete.

12.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-07-23

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

12.4 Test Environmental Conditions

Temperature:	18~21 °C
Relative Humidity:	30~35 %
ATM Pressure:	101.2-102.2kPa

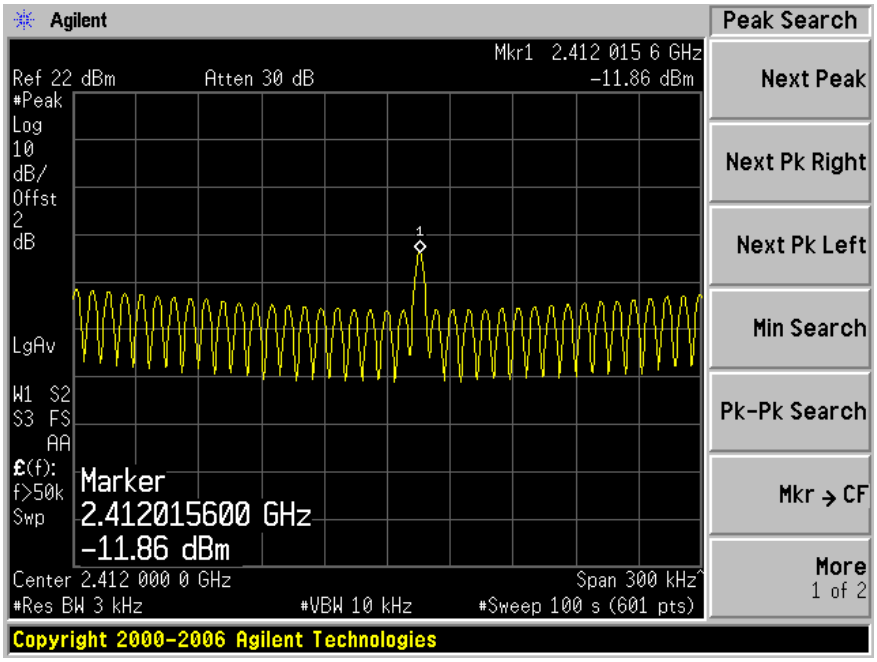
**The testing was performed by Jerry on 2010-05-18 in RF site.*

12.5 Summary of Test Results

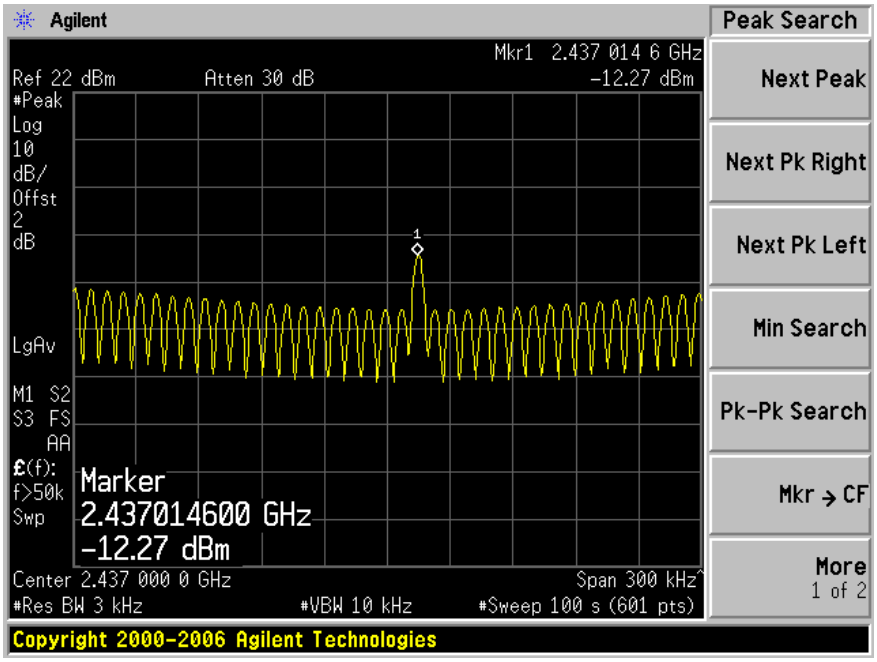
Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit (dBm)	Results
802.11b	Low	2412	-11.86	8	Pass
	Mid	2437	-12.27	8	Pass
	High	2462	-13.59	8	Pass
802.11g	Low	2412	-10.61	8	Pass
	Mid	2437	-10.98	8	Pass
	High	2462	-10.67	8	Pass

Please refer to the following plots for detailed test results:

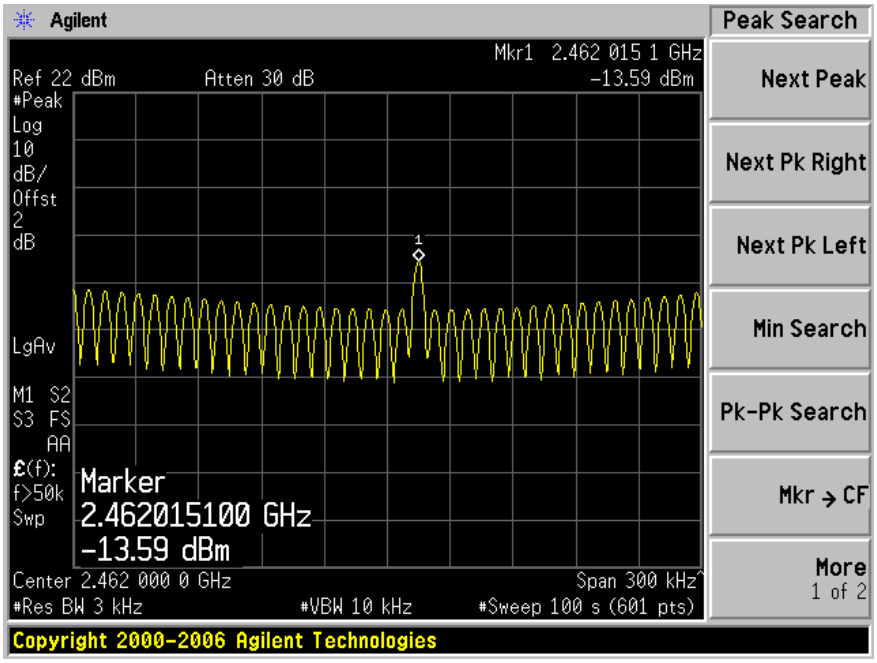
802.11 b, Low Channel 2412 MHz



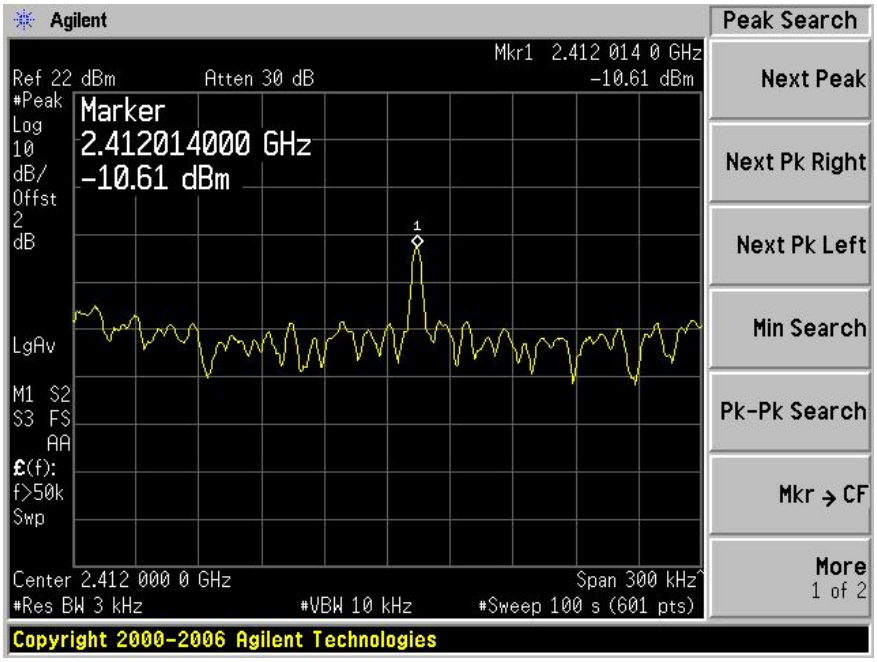
802.11 b, Middle Channel 2437 MHz



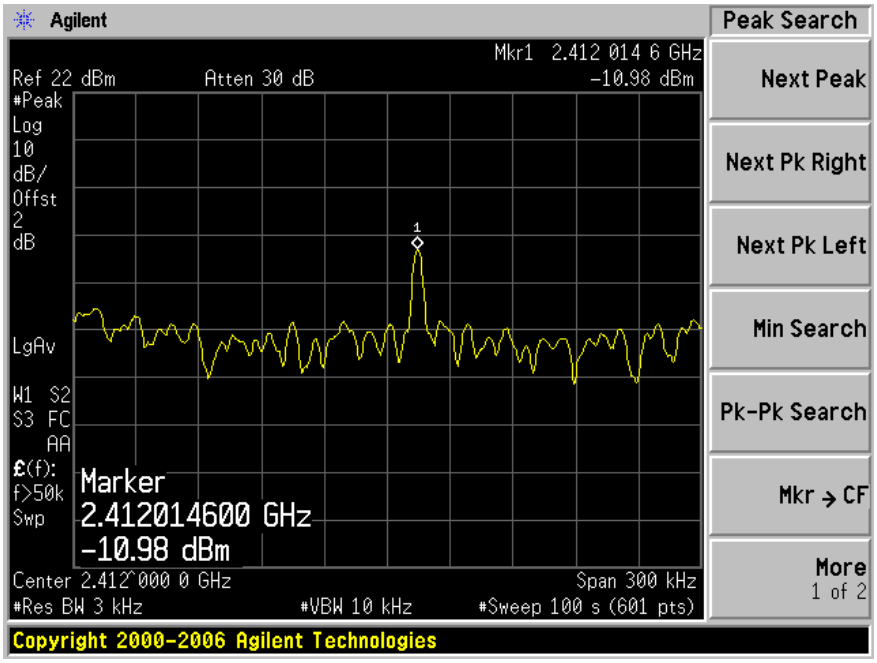
802.11 b, High Channel 2462 MHz



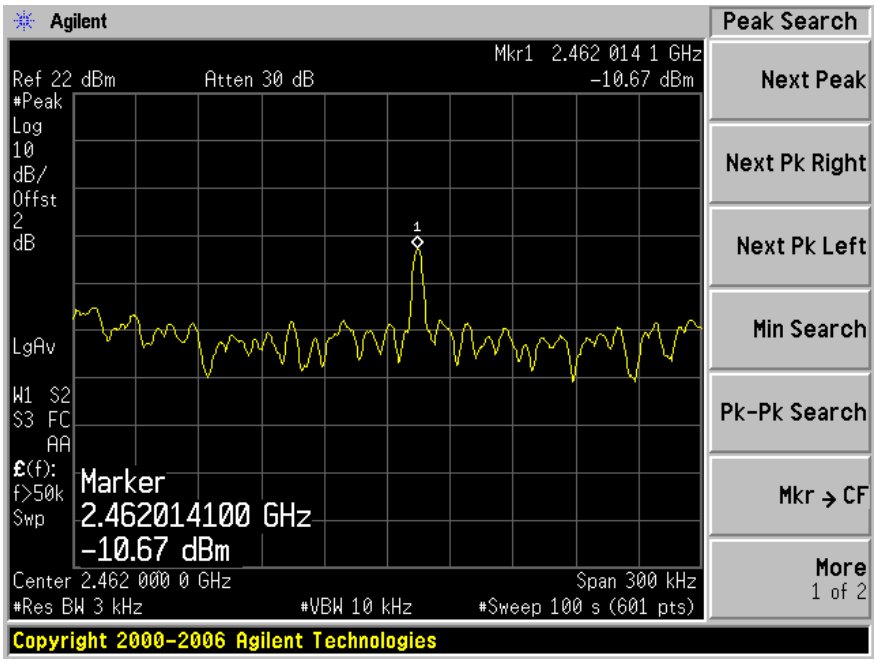
802.11 g, Low Channel 2412 MHz



802.11 g, Middle Channel 2437 MHz



802.11 g, High Channel 2462 MHz



13 FCC §15.247(a)(1) - Hopping Channel Separation

13.1 Applicable Standard

According to FCC §15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

13.2 Measurement Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on a bench without connection to measurement instrument Turn on the EUT and set it to any one convenient frequency within its operating range.
3. By using the Max-Hold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function, and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

13.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-07-23

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

13.4 Test Environmental Conditions

Temperature:	18~21 °C
Relative Humidity:	30~35 %
ATM Pressure:	101.2-102.2kPa

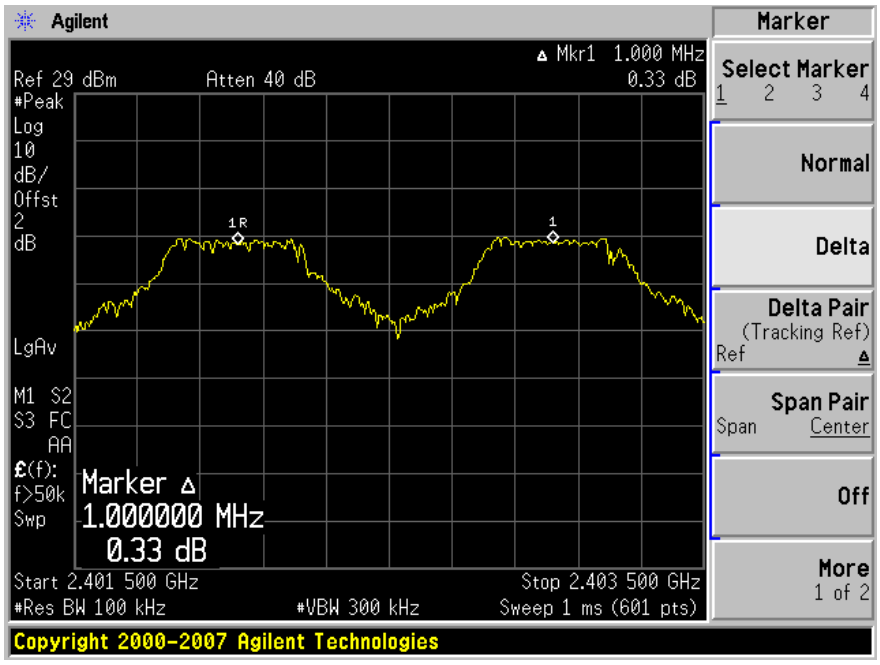
**The testing was performed by Jerry Huang on 2010-05-18 in RF site.*

13.5 Measurement Results

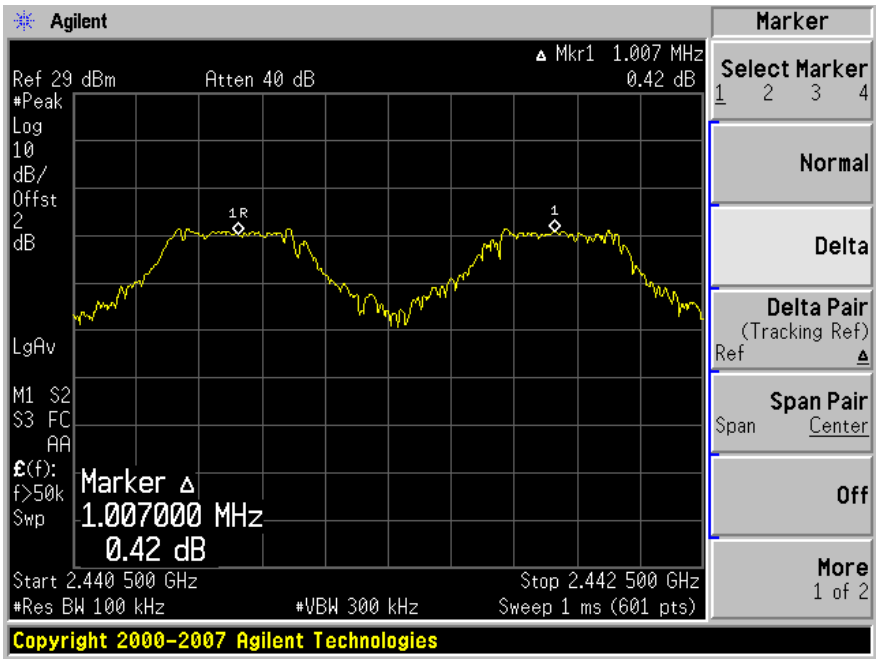
Channel	Frequency (MHz)	Channel Separation (kHz)	Limit > 2/3 20 dB BW (kHz)
Low	2402	1000	598.7
Mid	2440	1007	609.3
High	2480	1007	610.0

Please refer to the following plots.

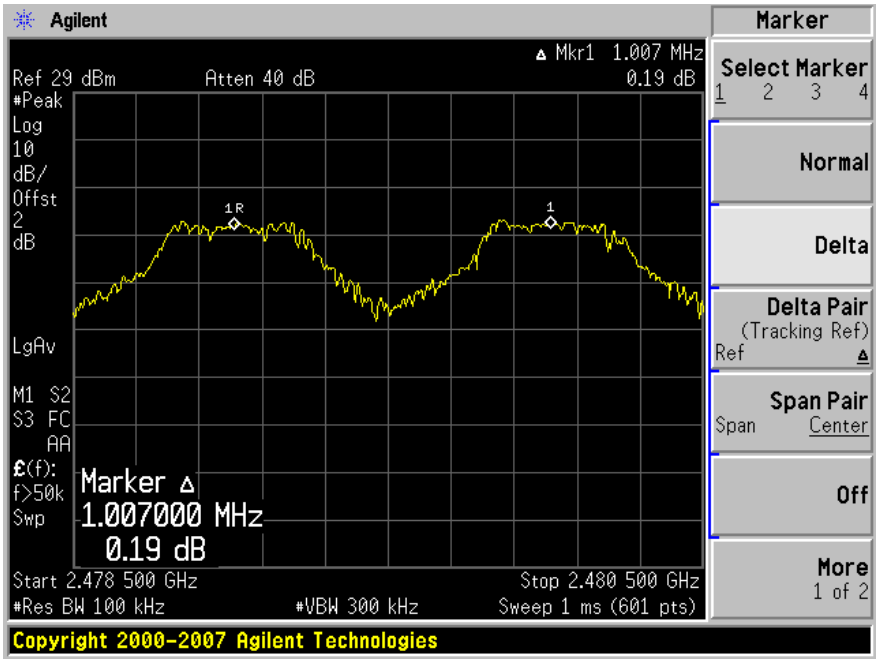
Low Channel



Middle Channel



High Channel



14 FCC §15.247(a)(1)(iii) – Number of Hopping Frequencies Used

14.1 Applicable Standard

According to FCC §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

14.2 Measurement Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the bench without connection to measurement instrument. Turn on the EUT and set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the SA on Max-Hold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

14.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-07-23

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

14.4 Test Environmental Conditions

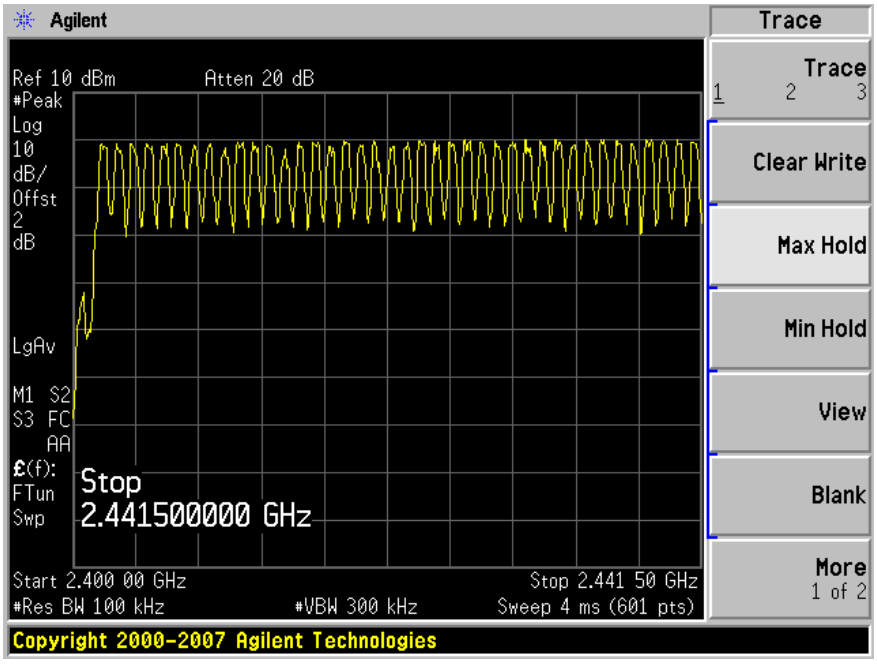
Temperature:	18~21°C
Relative Humidity:	30~35 %
ATM Pressure:	101.2-102.2kPa

**The testing was performed by Jerry Huang on 2010-05-18 in RF site.*

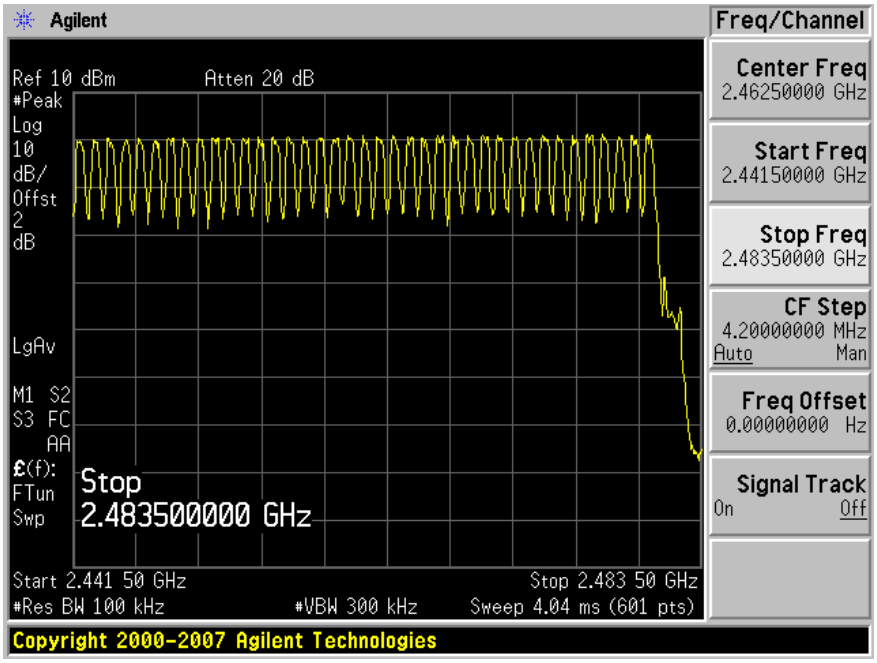
14.5 Measurement Result

79 channels, please refer to the following plots:

Hopping Channel Number



40 Channels between 2400 to 2441.5 MHz



39 Channels between 2441.5 to 2483.5 MHz

15 FCC §15.247(a)(1)(iii) - Dwell Time

15.1 Applicable Standard

According to FCC §15.247 (a)(1)(iii), the average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

15.2 Measurement Procedure

5. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
6. Position the EUT was set 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.
7. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
8. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
9. Repeat above procedures until all frequencies measured were complete.

15.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-07-23

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

15.4 Test Environmental Conditions

Temperature:	18~21 °C
Relative Humidity:	30~35 %
ATM Pressure:	101.2-102.2kPa

**The testing was performed by Jerry Huang on 05-03-2010 in RF site.*

15.5 Measurement Results:

DH1

Channel	Frequency (MHz)	Pulse Width (ms)	Dwell Time (Sec.)	Limit (Sec.)	Results
Low	2402	0.3945	0.1262	0.4	Compliant
Mid	2440	0.3916	0.1253	0.4	Compliant
High	2480	0.396	0.1267	0.4	Compliant

DH3

Channel	Frequency (MHz)	Pulse Width (ms)	Dwell Time (Sec.)	Limit (Sec.)	Results
Low	2402	1.659	0.2654	0.4	Compliant
Mid	2440	1.652	0.2643	0.4	Compliant
High	2480	1.652	0.2643	0.4	Compliant

DH5

Channel	Frequency (MHz)	Pulse Width (ms)	Dwell Time (Sec.)	Limit (Sec.)	Results
Low	2402	2.91	0.3104	0.4	Compliant
Mid	2440	2.91	0.3104	0.4	Compliant
High	2480	2.901	0.3094	0.4	Compliant

Note:

Dwell time = Pulse time*(hop rate/2/number of channels)*31.6 sec(DH1)
Dwell time = Pulse time*(hop rate/4/number of channels)*31.6 sec(DH3)
Dwell time = Pulse time*(hop rate/6/number of channels)*31.6 sec(DH5)

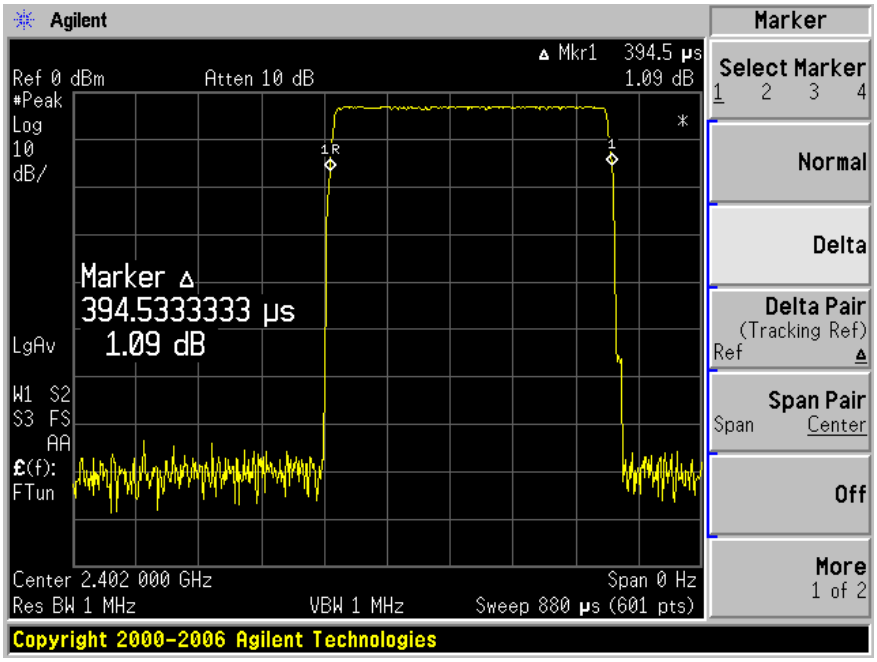
• Hop Rate = 1600
• Number of Channels = 79

Dwell time = Pulse time*(800/2/79)*6.4 sec

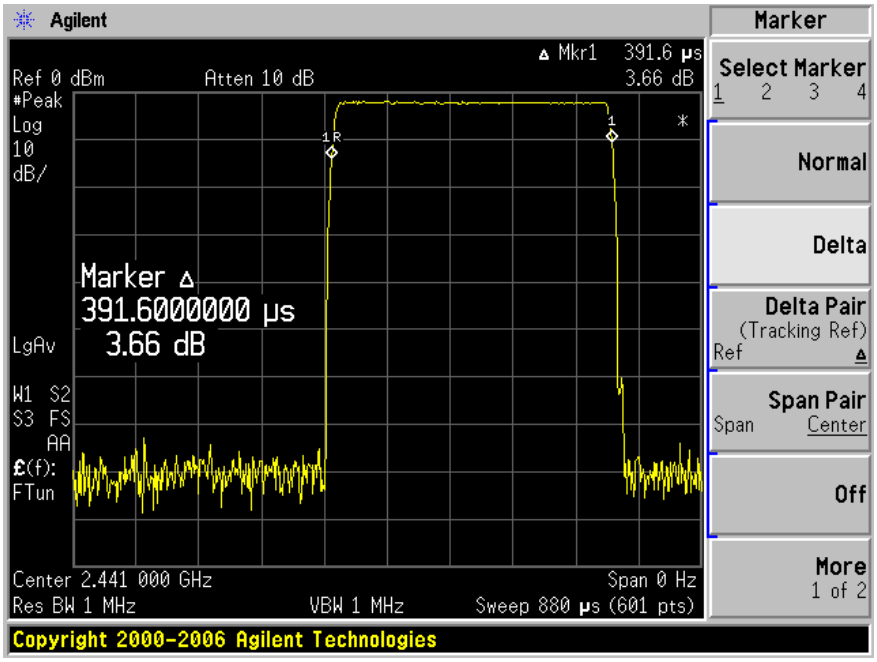
Please refer the following plots.

DH1

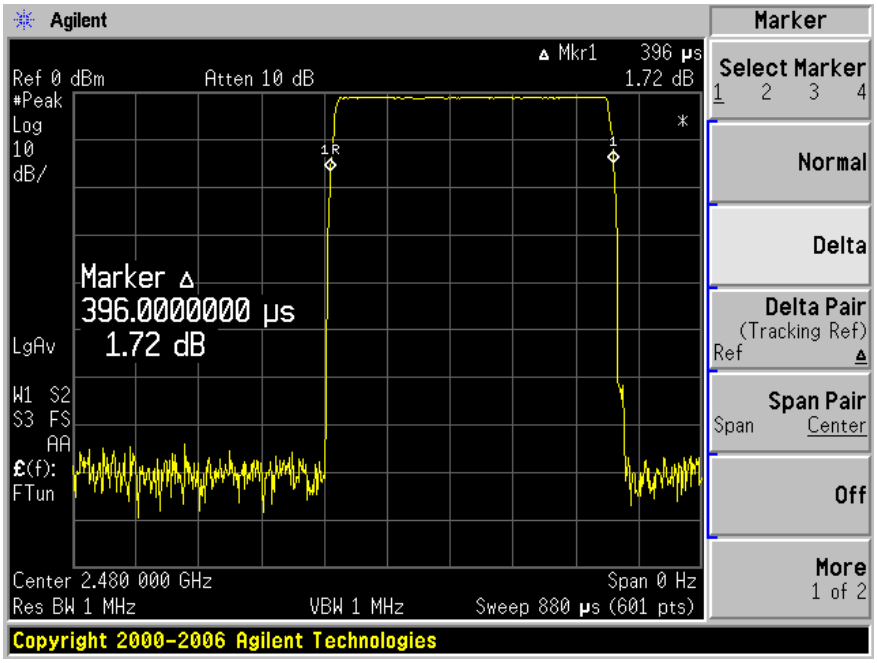
Low Channel



Middle Channel

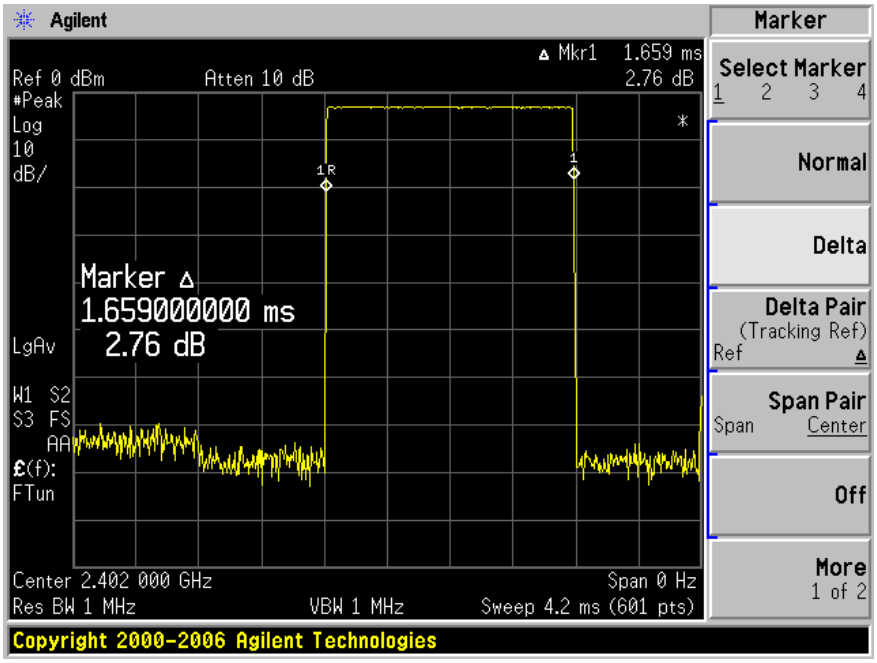


High Channel

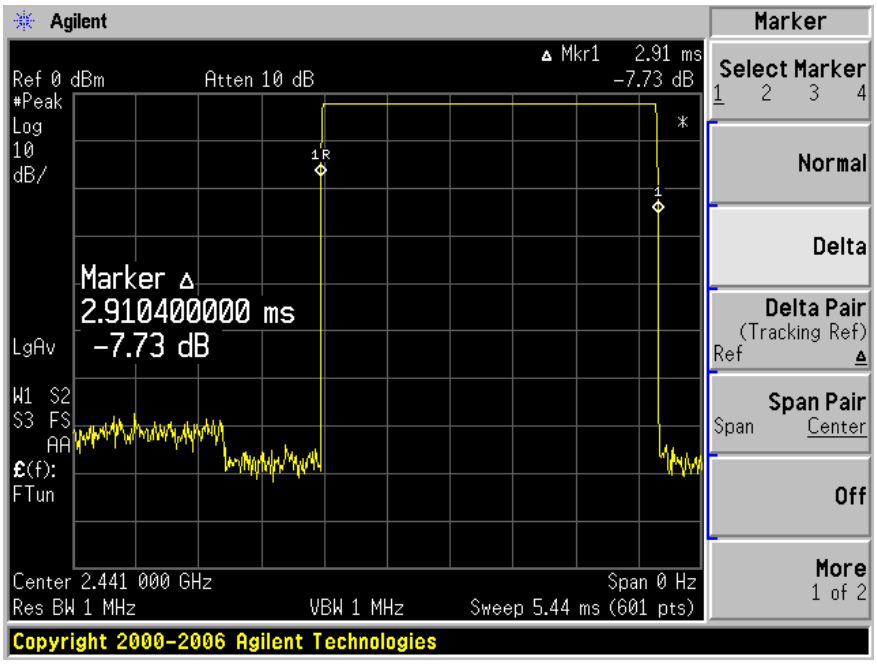


DH3

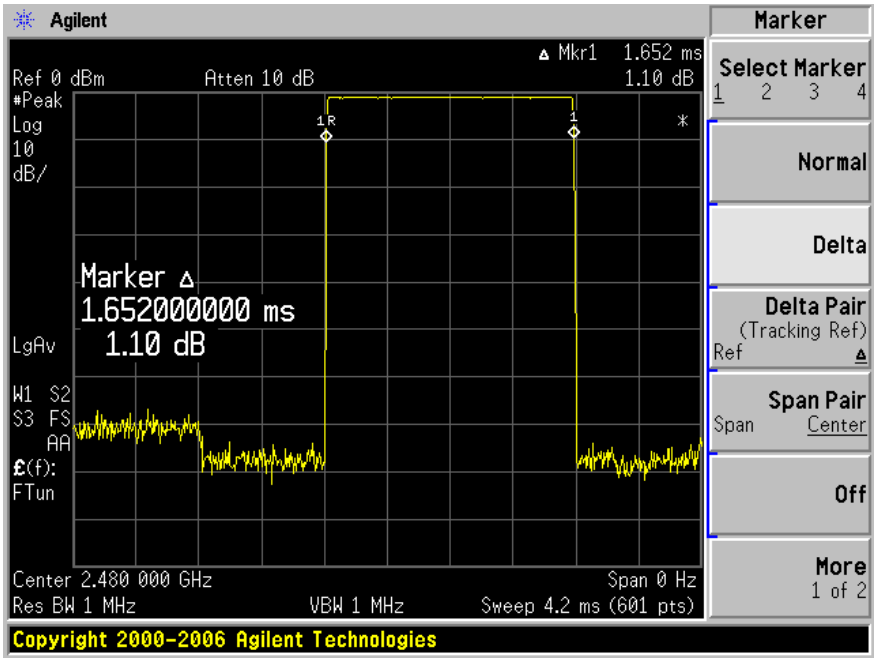
Low Channel



Middle Channel

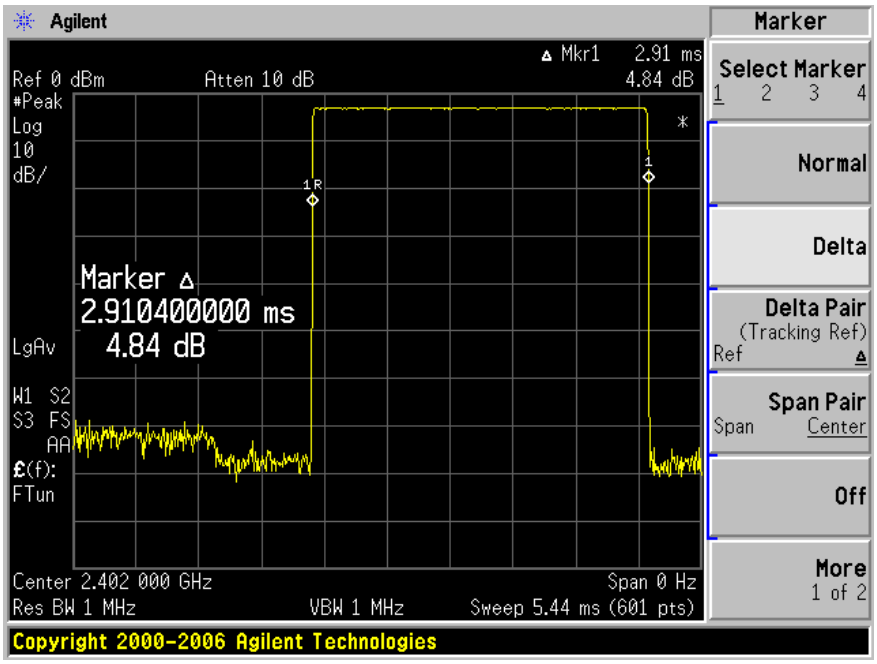


High Channel

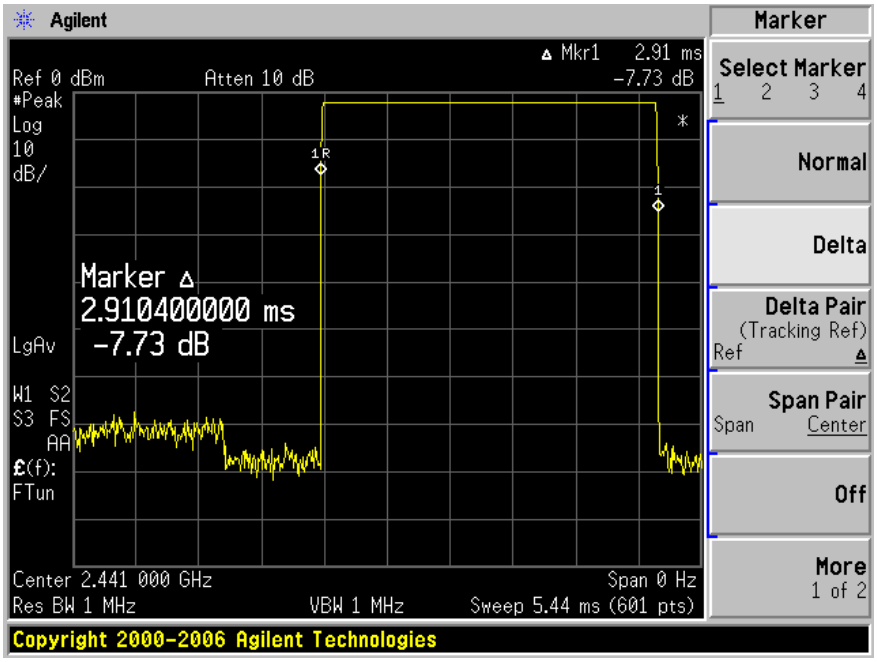


DH5

Low Channel



Middle Channel



High Channel