Lab Code: 200167-0

FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Motion Computing, Inc.

8601 Ranch Road 2222, Building 2
Austin, TX 78730, USA

FCC ID: Q3QIWM3945ABG

Report Type:	**Product Type:**
☒ Original Report	802.11 a/b/g Wireless Tablet PC

Test Engineer:	Dan Coronia
Report Number:	R0705223-247
Report Date:	2007-06-01
Reviewed By:	Daniel Deng, RF Engineering Lead
Prepared By: (63)	**Bay Area Compliance Laboratories Corp. (BACL)** 1274 Anvilwood Ave. Sunnyvale, CA 94089 Tel: (408) 732-9162 Fax: (408) 732 9164

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

This BACL measurement and test report has been compiled on behalf of *Motion Computing Inc.* and their product *FCC ID: Q3QIWM3945ABG*, or the EUT as referred to in the rest of this report which is a mobile computing and wireless communications device that supports 802.11 a/b/g wireless data protocol that operates on 2412-2462 MHz, 5150-5350 MHz and 5745-5825 MHz.

** The test data gathered in this report were from a production sample provided by the manufacturer with the serial number: 00214569-LE1700.*

Antenna Information

Yageo Multi-band Wireless LAN Antennae			
Frequency (MHz)	**Main Antenna Gain (dBi)**	**Aux Antenna Gain (dBi)**	**Aux (bottom) Antenna Gain (dBi)**
2450	-0.83	-1.90	-0.33
5150	-0.76	-0.14	1.49
5725	1.51	-0.47	2.26

EUT Photo

Additional EUT photos in Exhibit C

Mechanical Description

The *Motion Computing Inc.* product measures approximately 298 mm (L) x 245 mm (W) x 22 mm (H) and weighs approximately 1.474 kg; it is of Polycarbon and Magnesium-alloy construction.

Objective

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

The objective is to determine compliance with FCC rules for the following test items: Conducted Output Power, Antenna Requirements, AC Line Conducted Emission and Radiated Emissions in Restricted Bands.

As declared by *Motion Computing Inc.*, the transmitter module used in the model T006, is identical to the module which has been certified for Intel Corporation (FCC ID: PD9WM3945ABG, Model: WM3945ABG), with exception being the antenna. The antenna used in T006 model has less gain than the antenna in the certified WM3945ABG model. Thus, the output power has been reduced through software to comply with RF exposure (SAR) requirements.

Related Submittal(s)/Grant(s)

This submittal is related to certified transmitter module manufactured by Intel Corporation (FCC ID: PD9WM3945ABG, Model WM3945ABG tested by Aegis Labs Inc. in report: INTEL-050901F).

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.

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 $\pm$2.0 for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL.

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.

Test Facility

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

Test site at BACL 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 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 and Voluntary Control Council for Interference have the reports on file and is listed under FCC registration number: 90464 and VCCI Registration No.: C-1298 and R-1234. 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 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/ts/htdocs/210/214/scopes/2001670.htm

SYSTEM TEST CONFIGURATION

Justification

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

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

EUT Exercise Software

The EUT is programmed with the following data rate settings that were used during testing:

Channel	Mode	Frequency MHz	Date rate Mbps
1	802.11b	2412	1 - 11
6	802.11b	2437	1 - 11
11	802.11b	2462	1 - 11
1	802.11g	2412	1 - 54
6	802.11g	2437	1 - 54
11	802.11g	2462	1 - 54

Special Accessories

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

Equipment Modifications

No modifications were made to the EUT.

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Motion Computing	LE-Series Convertible Keyboard	KB004	23736UU
Motion Computing	DVD-ROM / CD-RW Drive	EDW085	CN-042020006-00381-69E-00A8
Dell	VGA Monitor	E153FPB	CN-0D5421-46633-4BR-2J8U
LEXAR	USB Flash Drive	256MB	Not labeled
LEXAR	USB Flash Drive	256MB	Not labeled
Logitek	Desktop Speakers	SP-12	Not labeled
LEXAR	SD Card	256MB	Not labeled

Interface Ports and Cabling

Cable Description	Length (M)	Cable Type	From	To
VGA	3	Shielded	Dell Monitor	EUT
Speaker	>1	Un-shielded	Desktop Speakers	EUT
Optical Disk Drive	>1	Un-shielded	ODD	EUT
DC Power Supply	3	Shielded	Delta ADP-50HH	EUT

SUMMARY OF TEST RESULTS

Results reported relate only to the product tested.

FCC Rules	Description of Test	Result
§15.247(e)(i), §2.1093	RF Exposure	Compliant, Please refer to SAR report
§15.203	Antenna Requirement	Compliant
§ 15.107 (a)	Conducted Emissions	Compliant
§15.205	Restricted Band	Compliant
§15.109 (a) & §15.247d)	Radiated Spurious Emissions	Compliant
§15.247 (a)(2)	6 dB Bandwidth	Compliant, Please refer to Aegis Labs Report: INTEL-050901F
§15.247 (b)(3)	Maximum Peak Output Power	Compliant
§ 15.247 (d)	100 kHz Bandwidth of Frequency Band Edge	Compliant, Please refer to Aegis Labs Report: INTEL-050901F
§15.247 (e)	Power Spectral Density	Compliant, Please refer to Aegis Labs Report: INTEL-050901F

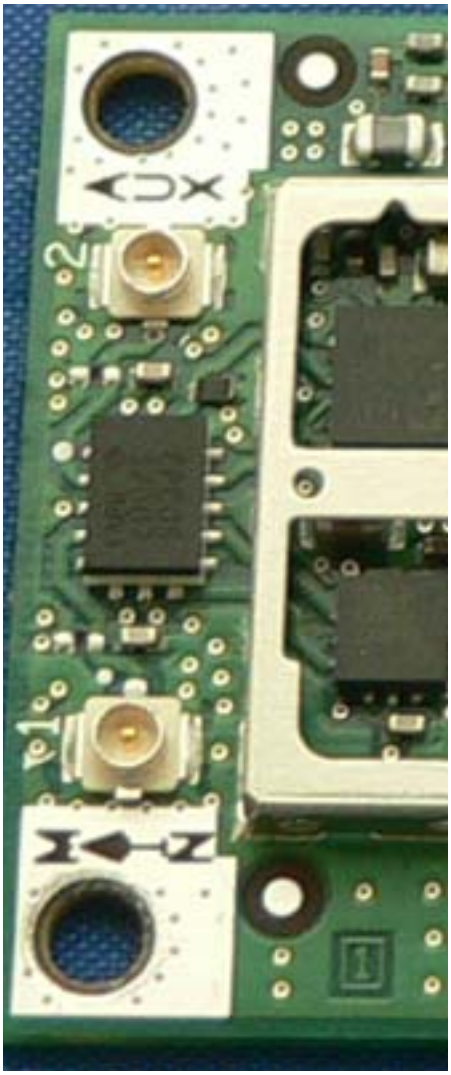
§15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 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 § 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.

Result: Compliant, the antennae for this device are dual band antennae. Each antenna features a unique connector type (U.FL) and are integral to the device:



§15.107 - CONDUCTED EMISSIONS

Section 15.107 Conducted limits:

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

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

** Decreases with the logarithm of the frequency.*

Test Setup

The measurement was performed at shielded room, using the setup per ANSI C63.4 – 2003 measurement procedure. The specification used was FCC Class B limits.

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

The EUT was connected to DC power via AC/DC adapter plugged into 120V/ 60 Hz AC Mains.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2007-03-08
Solar Electronics	LISN	9252-R-24-BNC	511205	2006-07-07

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

Test Procedure

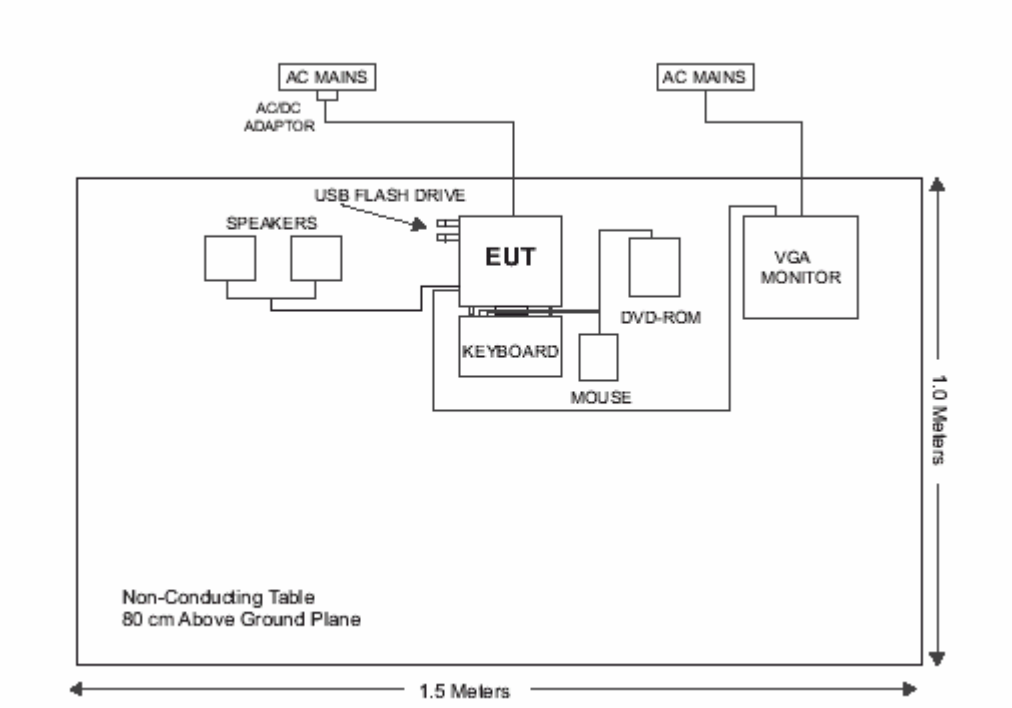
During the conducted emissions test, the power cord of the EUT was connected to the mains outlet of the LISN-1.

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".

Test Setup Diagram

Conducted Emissions



Environmental Conditions

Temperature:	20° C -23° C
Relative Humidity:	30% - 63%
ATM Pressure:	101.1 – 101.9 kPa

** The testing was performed by Dan Coronia from 2007-05-22 to 2007-05-30*

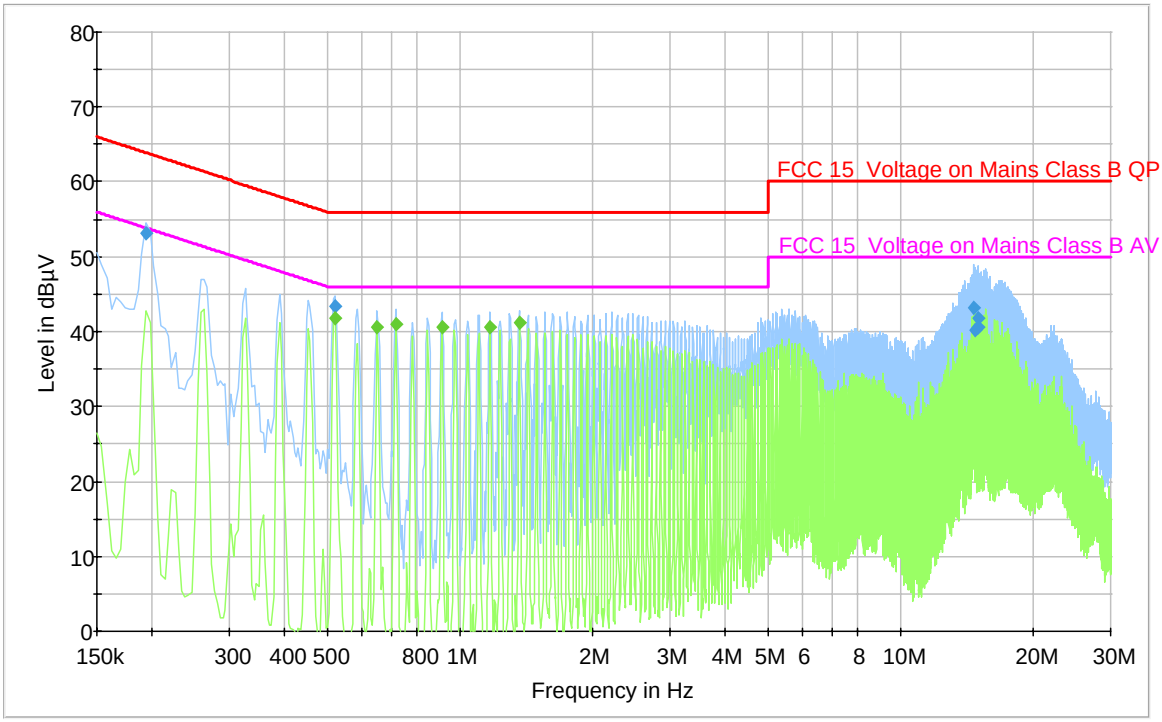
Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC standard's conducted emissions limits for Class B devices, with the *worst* margin reading of:

AC Adaptor:

-4.2 dB at **0.522000 MHz** in the **Hot** conductor mode

120 V/60 Hz Hot:



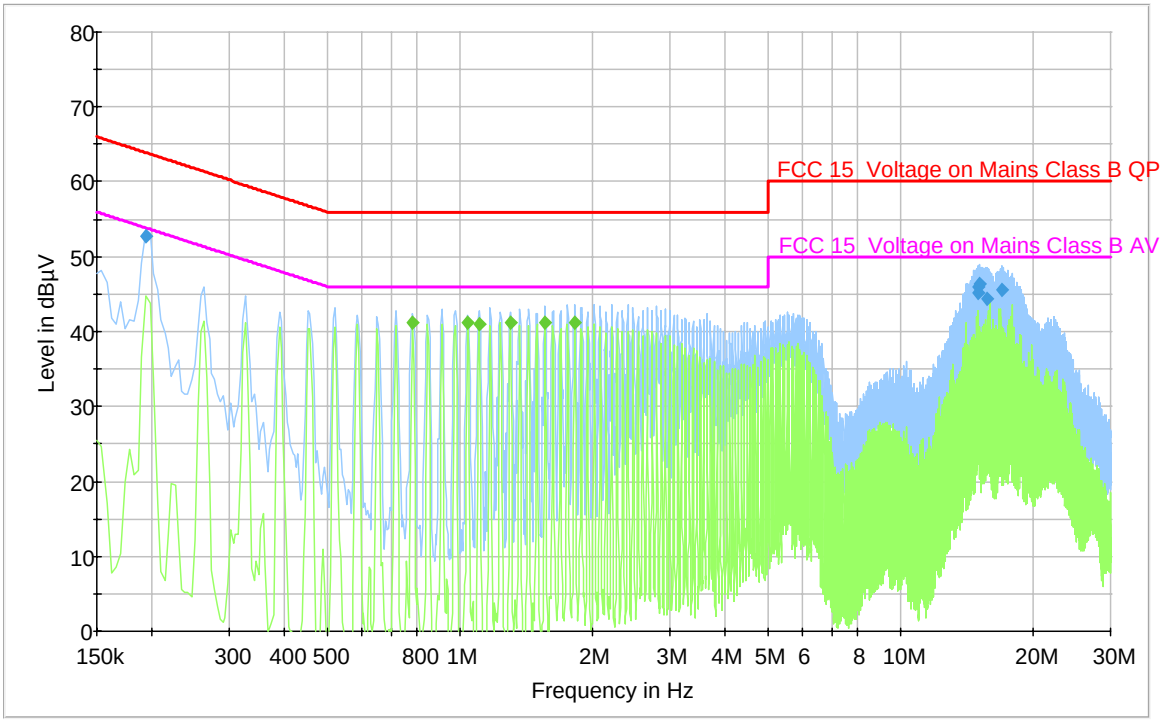
Quasi-Peak

Frequency (MHz)	Quasi Peak (dBµV)	Hot/Neutral	Correction Factor (dB)	Limit (dBµV)	Margin (dB)
0.194000	53.2	Hot	12.1	63.9	-10.7
0.522000	43.3	Hot	12.3	56.0	-12.7
14.694000	43.2	Hot	12.5	60.0	-16.8
14.758000	40.2	Hot	12.5	60.0	-19.8
14.954000	41.7	Hot	12.4	60.0	-18.3
15.018000	40.5	Hot	12.5	60.0	-19.5

Average

Frequency (MHz)	Average (dBµV)	Line	Correction Factor (dB)	Limit (dBµV)	Margin (dB)
0.522000	41.8	Hot	12.3	46.0	-4.2
1.366000	41.2	Hot	12.2	46.0	-4.8
0.714000	41.0	Hot	12.3	46.0	-5.0
0.910000	40.7	Hot	12.3	46.0	-5.3
0.650000	40.5	Hot	12.3	46.0	-5.5
1.170000	40.5	Hot	12.3	46.0	-5.5

120 V/60 Hz Neutral:



Quasi-Peak

Frequency (MHz)	Quasi Peak (dBµV)	Hot/Neutral	Correction Factor (dB)	Limit (dBµV)	Margin (dB)
0.194000	52.7	Neutral	12.1	63.9	-11.1
14.970000	46.0	Neutral	12.4	60.0	-14.0
15.038000	45.1	Neutral	12.5	60.0	-14.9
15.166000	46.4	Neutral	12.5	60.0	-13.6
15.750000	44.4	Neutral	12.3	60.0	-15.6
17.054000	45.5	Neutral	12.6	60.0	-14.5

Average

Frequency (MHz)	Average (dBµV)	Hot/Neutral	Correction Factor (dB)	Limit (dBµV)	Margin (dB)
0.782000	41.2	Neutral	12.3	46.0	-4.8
1.042000	41.2	Neutral	12.3	46.0	-4.8
1.106000	41.1	Neutral	12.3	46.0	-4.9
1.302000	41.2	Neutral	12.3	46.0	-4.8
1.562000	41.1	Neutral	12.3	46.0	-4.9
1.822000	41.2	Neutral	12.3	46.0	-4.8

§15.205 & §15.109 & §15.247(d) - RADIATED SPURIOUS EMISSIONS

Applicable Standard

As per 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 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 (microvolts/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 15.247(c) (1) (i): 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 conducted 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.

As Per 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:

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (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	3332 – 3339	22.01 – 23.12
8.41425 – 8.41475	167.72 – 173.2	3345.8 – 3358	23.6 – 24.0
12.29 – 12.293	240 – 285	3600 – 4400	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 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)).

Test Setup

The radiated emissions tests were performed in the 3-meter open area test site, using the setup in accordance with ANSI C63.4-2003. The specification used was the FCC 15 Subpart C 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.

The EUT was connected to DC power via AC/DC adapter plugged into 120V/ 60 Hz AC Mains.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Sonoma	Amplifier, Pre	317	260406	2007-04-30
Agilent	Pre amplifier	8449B	3008A01978	2006-08-10
Sunol Science Corp	Combination Antenna	JB3 Antenna	A020106-3	2007-03-05
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.595 0K03	100337	2007-03-08
Sunol Science Corp	System Controller	S9V	113005-1	NR
Agilent	Spectrum Analyzer	E4440A	MY44303352	2007-02-23
A.R.A	Antenna Horn	DRG-118/A	1132	2006-08-17
Agilent	Spectrum Analyzer	8565EC	3946A00131	2007-01-24

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

Test Procedure

For the radiated emissions test, the EUT, 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 mete, 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 1000MHz:

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

Above 1000MHz:

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

Corrected Amplitude & Margin Calculation

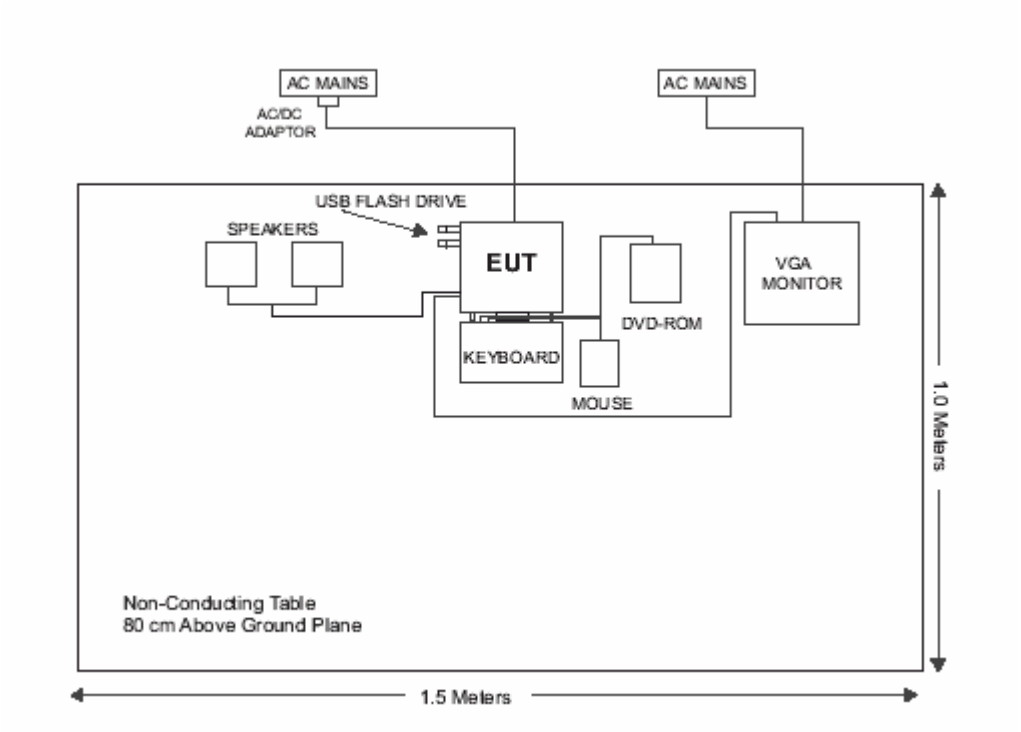
The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corrected Amplitude = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

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

Margin = Corrected Amplitude - FCC Limit

Test Setup Diagram



Environmental Conditions

Temperature:	22° C
Relative Humidity:	56 %
ATM Pressure:	104.1 kPa

** The testing was performed by Dan Coronia from 2007-05-22 to 2007-05-30*

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, and had the worst margin of:

Unintentional Emissions, (30-1000 MHz):

Mode: Receiver			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel**
-1.5	745.658750	Horizontal	NA, 30 MHz to 1000 MHz

Out of Band Emissions:

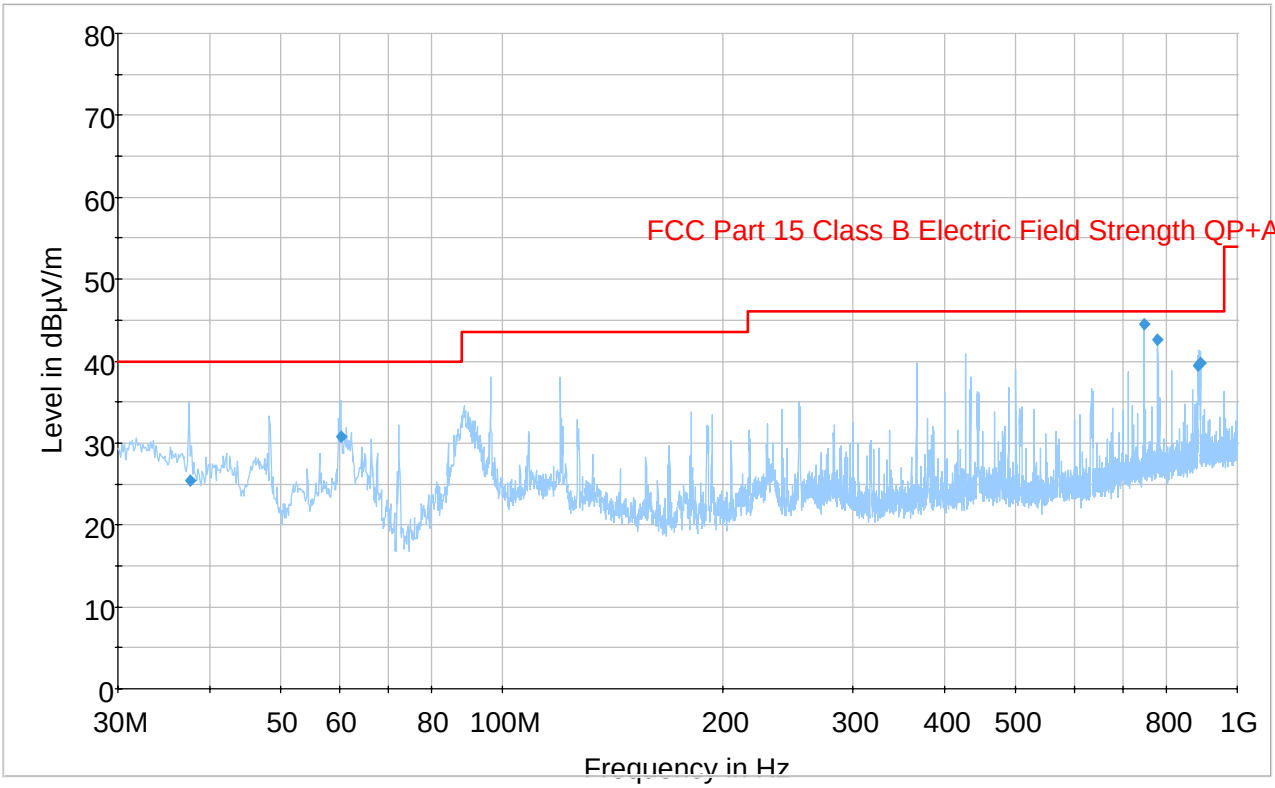
Mode: 802.11 b			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel**
-7.14	9647.988	Horizontal	Low, 1 GHz – 25GHz
-10.91	9747.368	Horizontal	Middle, 1 GHz – 25GHz
-9.48	9847.926	Vertical	High, 1 GHz – 25GHz

Mode: 802.11 g			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel**
-8.25	9651.792	Vertical	Low, 1 GHz – 25GHz
-9.75	9747.368	Horizontal	Middle, 1 GHz – 25GHz
-11.81	9847.926	Vertical	High, 1 GHz – 25GHz

Mode: 802.11 a (5745 – 5825 MHz)			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel**
-10.28	17235.12	Vertical	Low, 1 GHz – 25GHz
-10.10	17355.22	Vertical	Middle, 1 GHz – 25GHz
-9.81	17475.08	Horizontal	High, 1 GHz – 25GHz

Radiated Emissions Test plot & data:

Primary scan 30MHz -1GHz



Frequency (MHz)	Quasi-Peak (dBµV/m)	Antenna Height (cm)	Polarity (H/V)	Turntable Position (degrees)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
37.677500	25.4	100.0	V	100.0	0.2	40.0	-14.6
60.312500	30.8	100.0	H	202.0	-8.1	40.0	-9.2
745.658750	44.5	100.0	H	61.0	5.5	46.0	-1.5
779.568750	42.6	100.0	H	52.0	5.8	46.0	-3.4
885.303750	39.5	100.0	V	197.0	6.8	46.0	-6.5
890.107500	39.8	100.0	V	198.0	6.9	46.0	-6.2

802.11b mode:

Low channel

Frequency (MHz)	Reading (dBµV)	Cable loss (dB)	AF + Pre-Amplifier Gain (dB/m)	Corrected Reading (dBµV/m)	Azimuth (Degrees)	Height (cm)	Polarization (H / V)	FCC 15 C		Measurements Type
								Limit (dBµV/m)	Margin (dB)	
9647.988	35.02	4.71	7.13	46.86	115	129	H	54	-7.14	Average Max
14470.77	28.39	5.81	11.23	45.42	185	112	H	54	-8.57	Average Max
14470.77	28.39	5.81	11.23	45.42	185	112	H	54	-8.57	Average Max
4823.933	38.00	3.19	0.24	41.44	109	115	H	54	-12.57	Average Max
12056.06	23.56	5.2	9.32	38.08	281	254	V	54	-15.92	Average Max
7237.809	26.97	3.96	5.13	36.06	117	95	H	54	-17.94	Average Max
12056.06	39.7	5.2	9.32	54.22	92	289	H	74	-23.84	Peak Max
9647.988	49.02	4.71	7.13	60.86	115	129	H	74	-26.98	Peak Max
7237.809	41.89	3.96	5.13	50.98	117	95	H	74	-27.06	Peak Max
14470.77	42.87	5.81	11.23	59.9	185	112	H	74	-27.60	Peak Max
4823.933	45.53	3.19	0.24	48.96	275	101	V	74	-31.72	Peak Max

Middle channel

Frequency (MHz)	Reading (dBµV)	Cable loss (dB)	AF + Pre-Amplifier Gain (dB/m)	Corrected Reading (dBµV/m)	Azimuth (Degrees)	Height (cm)	Polarization (H / V)	FCC 15 C		Measurements Type
								Limit (dBµV/m)	Margin (dB)	
9747.368	31.19	4.71	7.19	53.09	105	143	H	54	-10.91	Average Max
14621.05	25.26	5.8	11.23	41.29	150	230	H	54	-11.71	Average Max
7310.526	32.43	3.96	5.19	36.06	115	85	V	54	-12.42	Average Max
9747.368	46.38	4.71	7.19	58.28	105	143	H	74	-15.72	Peak Max
14621.05	39.74	5.8	11.23	56.77	310	200	V	74	-17.23	Peak Max
12184.21	20.43	5.2	9.32	34.95	120	95	V	54	-19.05	Average Max
12184.21	36.57	5.2	9.32	51.09	300	220	H	74	-22.91	Peak Max
7310.526	41.80	3.96	5.19	50.98	120	100	V	74	-23.05	Peak Max
4873.684	27.29	3.2	0.45	30.95	200	122	H	54	-23.06	Average Max
4873.684	41.92	3.2	0.45	45.57	200	122	H	74	-28.43	Peak Max

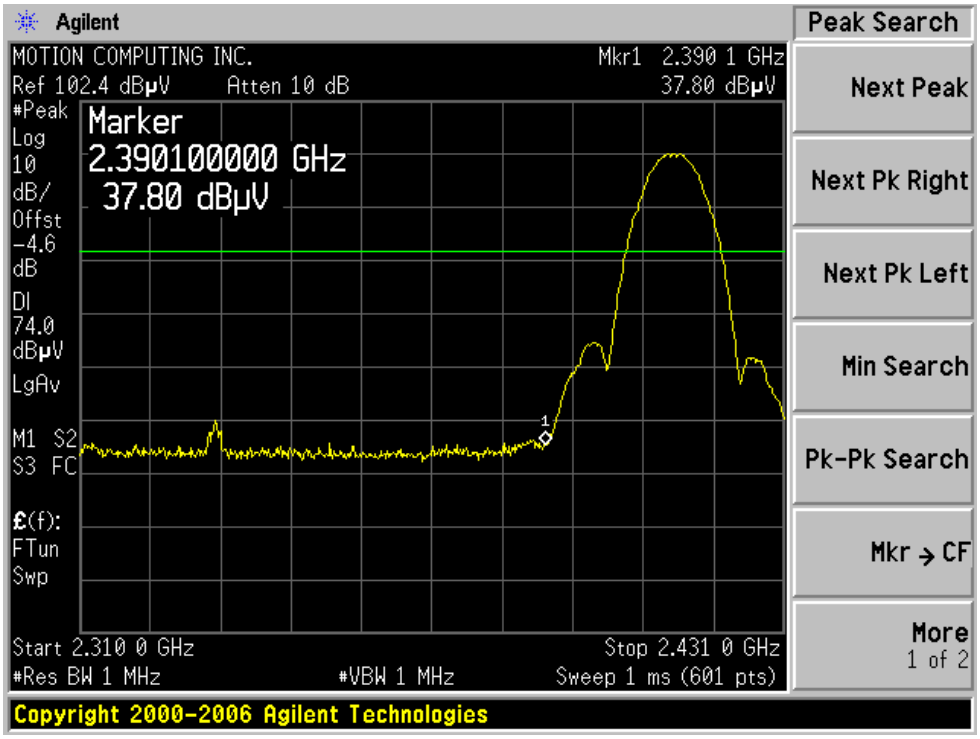
High channel

Frequency (MHz)	Reading (dBµV)	Cable loss (dB)	AF + Pre-Amplifier Gain (dB/m)	Corrected Reading (dBµV/m)	Azimuth (Degrees)	Height (cm)	Polarization (H / V)	FCC 15 C		Measurements Type
								Limit (dBµV/m)	Margin (dB)	
4923.963	41.11	3.22	0.68	45.00	103	100	V	54	-8.99	Average Max
9847.926	32.62	4.71	7.19	48.52	180	300	V	54	-9.48	Average Max
14771.89	25.82	5.8	11.23	46.85	145	260	H	54	-11.15	Average Max
9847.926	50.20	4.71	7.19	62.00	285	213	H	74	-11.90	Peak Max
14771.89	43.58	5.8	11.23	60.61	156	245	H	74	-13.39	Peak Max
12309.91	25.87	5.2	9.32	40.39	156	190	H	54	-13.61	Average Max
7385.945	28.1	3.96	5.19	37.25	230	250	H	54	-16.75	Average Max
12309.91	40.25	5.2	9.32	54.77	198	200	V	74	-19.23	Peak Max
7385.945	42.52	3.96	5.19	51.67	250	300	H	74	-22.33	Peak Max
4923.963	46.74	3.22	0.68	50.63	103	100	H	74	-23.36	Peak Max

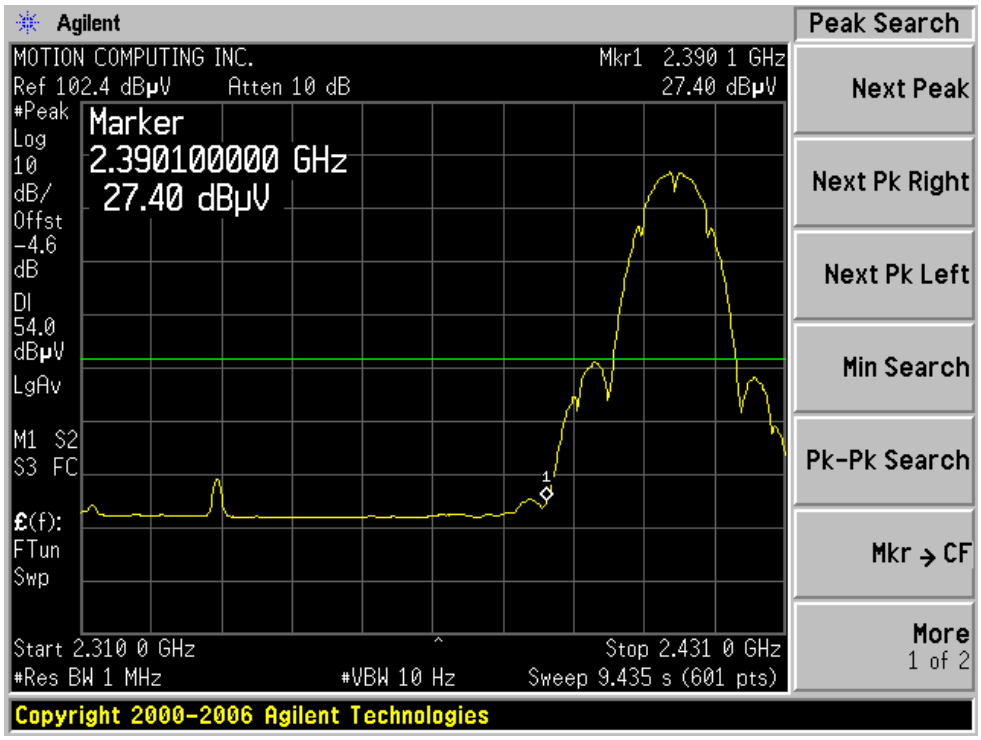
Restricted band edge

Low channel

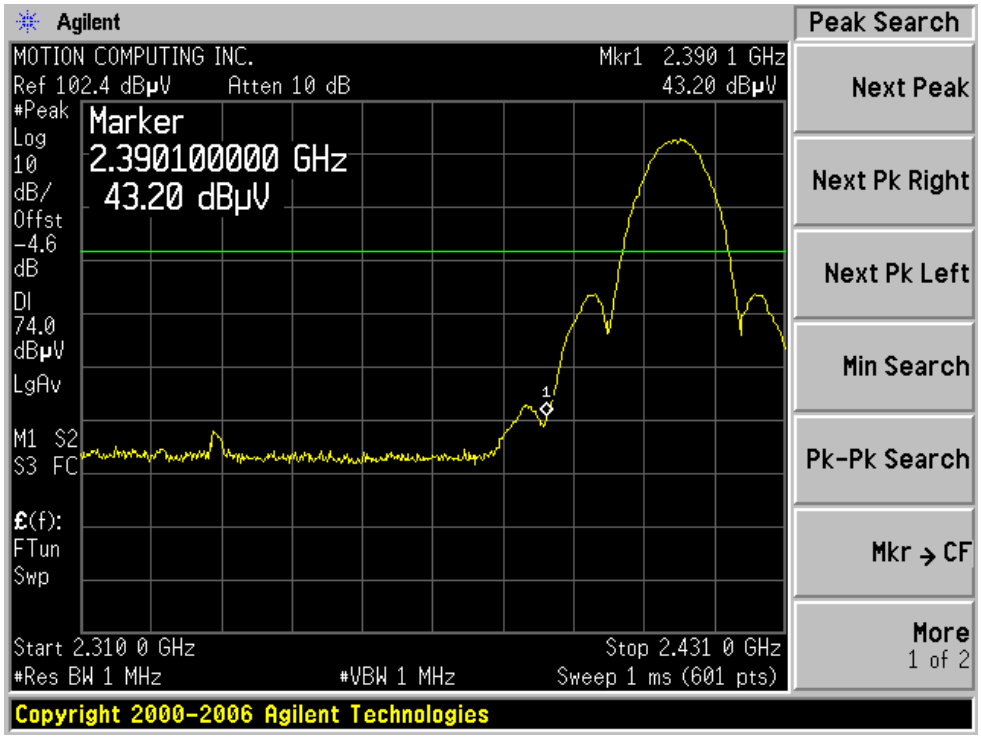
Peak, Horizontal



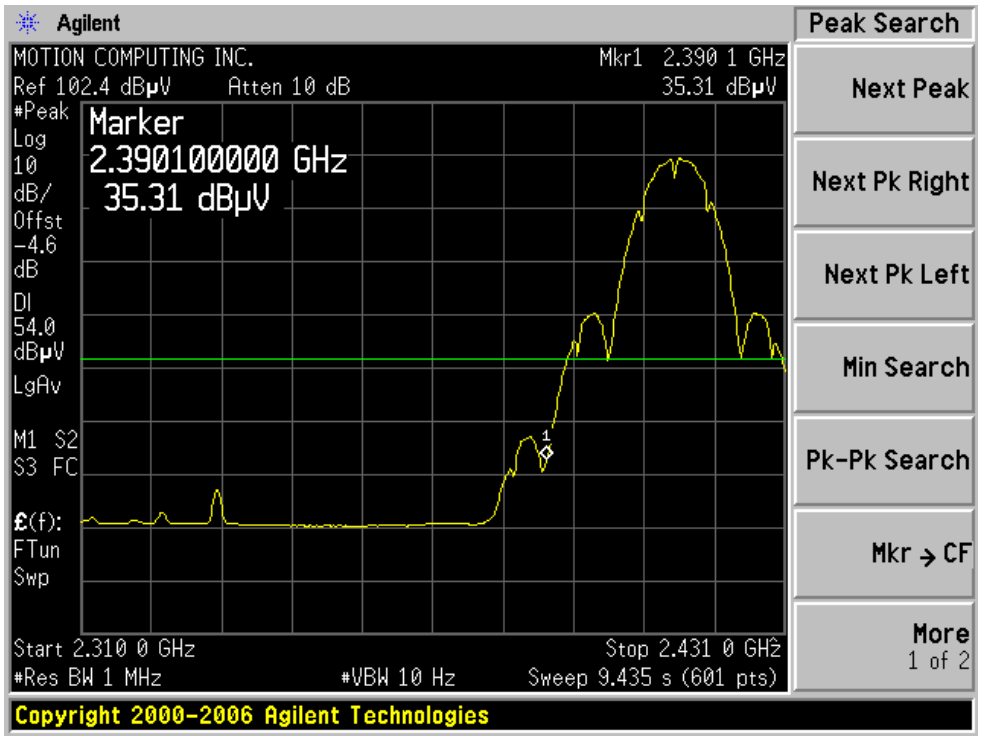
Average, Horizontal



Peak, Vertical

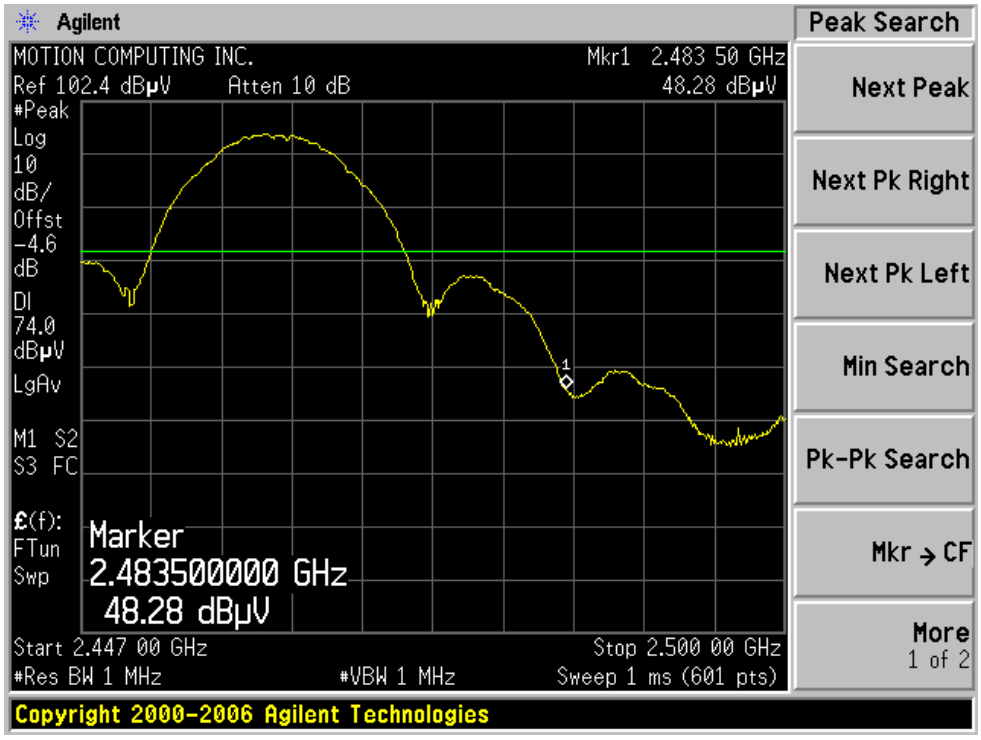


Average, Vertical

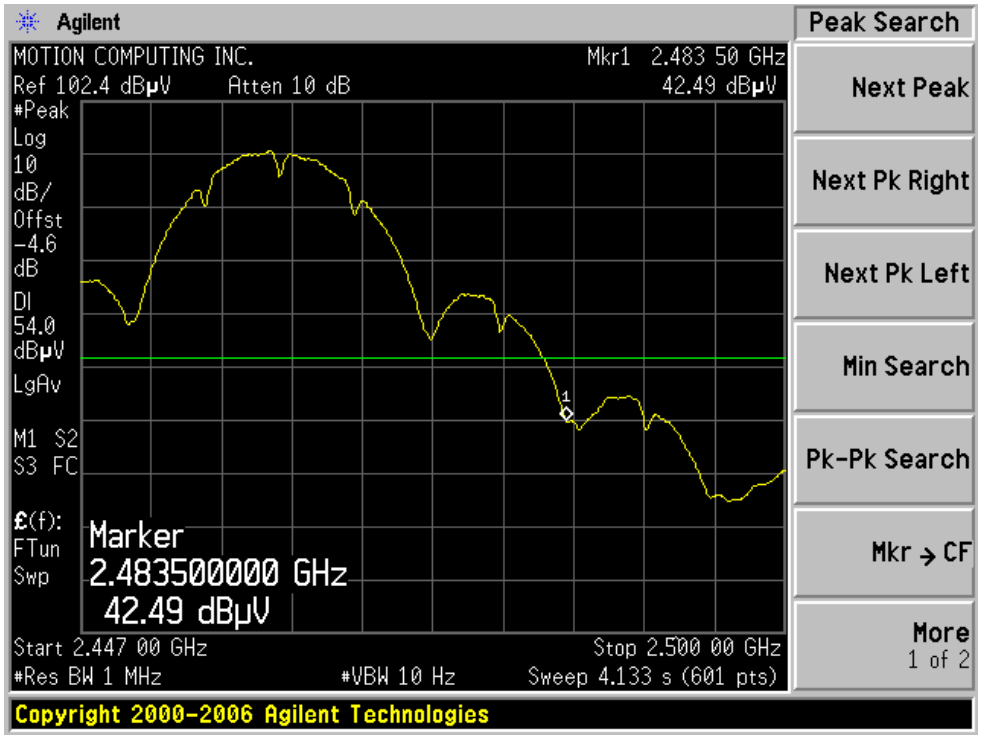


High channel

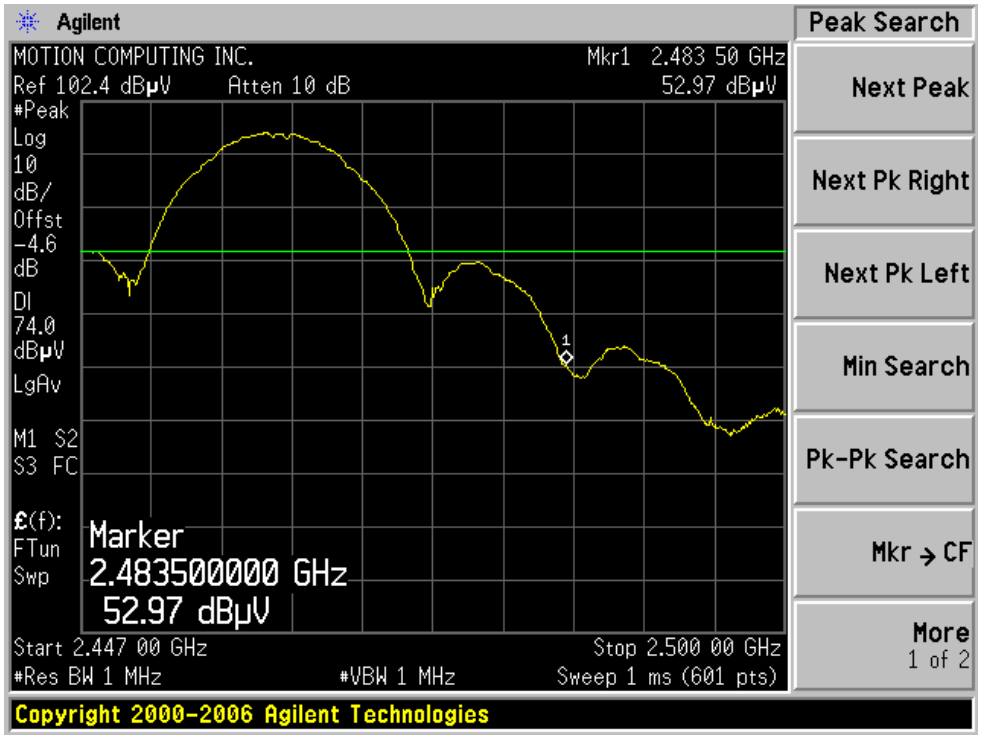
Peak, Horizontal



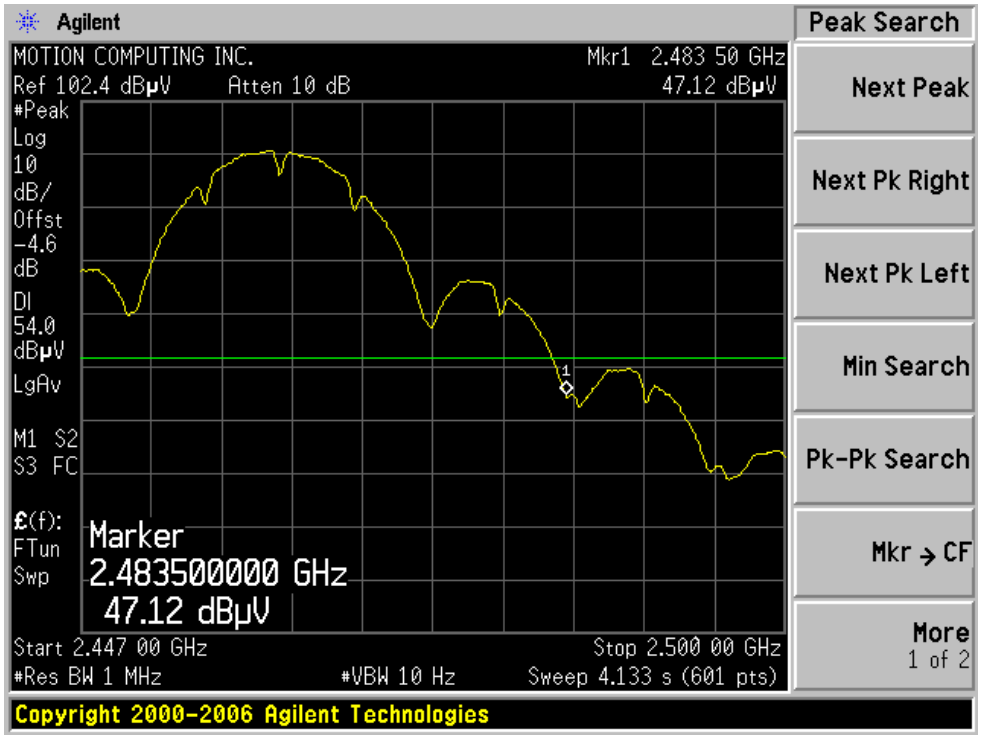
Average, Horizontal



Peak, Vertical



Average Vertical



802.11g mode:

Low channel

Frequency (MHz)	Reading (dBµV)	Cable loss (dB)	AF + Pre-Amplifier Gain (dB/m)	Corrected Reading (dBµV/m)	Azimuth (Degrees)	Height (cm)	Polarization (H / V)	FCC 15 C		Measurements Type
								Limit (dBµV/m)	Margin (dB)	
9651.792	33.92	4.70	7.13	45.75	100	120	V	54	-8.25	Average Max
12064.74	25.52	5.2	9.32	40.04	170	332	H	54	-13.96	Average Max
14477.69	22.37	5.81	11.23	39.41	299	356	H	54	-14.59	Average Max
7238.844	29.27	3.96	5.13	38.36	208	215	V	54	-15.64	Average Max
9651.792	43.60	4.70	7.13	55.43	191	123	V	74	-18.57	Peak Max
4826.98	27.04	3.19	0.26	30.49	230	150	H	54	-23.51	Average Max
4826.980	42.30	3.19	0.26	45.75	170	332	H	74	-28.25	Peak Max
12064.74	28.65	5.20	9.32	43.17	299	356	H	74	-30.83	Peak Max
14477.69	25.50	5.81	11.23	42.54	208	215	H	74	-31.46	Peak Max
7238.844	32.40	3.96	5.13	41.49	200	310	V	74	-32.51	Peak Max

Middle channel

Frequency (MHz)	Reading (dBµV)	Cable loss (dB)	AF + Pre-Amplifier Gain (dB/m)	Corrected Reading (dBµV/m)	Azimuth (Degrees)	Height (cm)	Polarization (H / V)	FCC 15 C		Measurements Type
								Limit (dBµV/m)	Margin (dB)	
9747.368	32.35	4.71	7.19	44.25	143	105	H	54	-9.75	Average Max
14621.05	26.3	5.8	11.23	43.33	230	150	H	54	-10.67	Average Max
7310.526	33.94	3.96	5.19	43.09	85	115	H	54	-10.91	Average Max
9747.368	47.58	4.71	7.19	59.48	143	105	H	74	-14.52	Peak Max
14621.05	40.12	5.8	11.23	57.15	200	310	H	74	-16.85	Peak Max
12184.21	21.72	5.2	9.32	36.24	95	120	V	54	-17.76	Average Max
12184.21	37.9	5.2	9.32	52.42	220	300	H	74	-21.58	Peak Max
7310.526	42.76	3.96	5.19	51.91	100	120	H	74	-22.09	Peak Max
4873.684	28.19	3.2	0.45	31.84	122	200	H	54	-22.16	Average Max
4873.684	42.56	3.2	0.45	46.21	122	200	V	74	-27.79	Peak Max

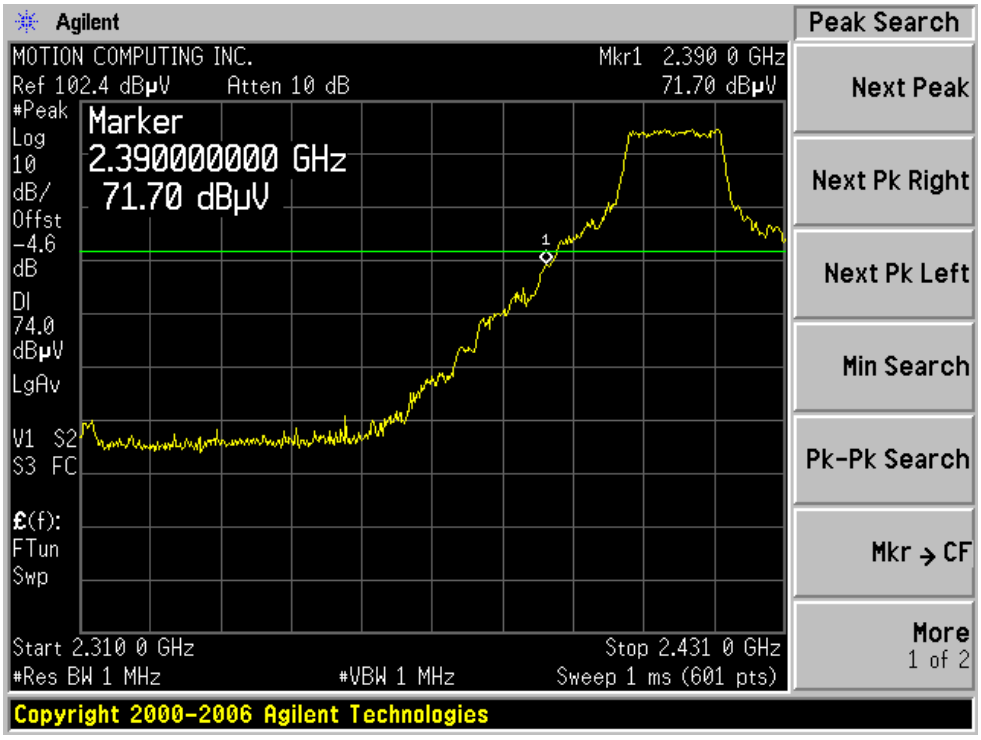
High channel

Frequency (MHz)	Reading (dBµV)	Cable loss (dB)	AF + Pre-Amplifier Gain (dB/m)	Corrected Reading (dBµV/m)	Azimuth (Degrees)	Height (cm)	Polarization (H / V)	FCC 15 C		Measurements Type
								Limit (dBµV/m)	Margin (dB)	
4923.963	39.24	3.22	0.68	43.14	138	115	V	54	-10.86	Average Max
9847.926	30.29	4.71	7.19	42.19	302	182	V	54	-11.81	Average Max
9847.926	48.90	4.71	7.19	60.8	229	319	H	74	-13.20	Peak Max
14771.89	23.63	5.8	11.23	40.66	229	319	H	54	-13.34	Average Max
14771.89	41.36	5.8	11.23	58.39	138	115	V	74	-15.61	Peak Max
12309.91	23.6	5.2	9.32	38.12	95	101	H	54	-15.88	Average Max
7385.945	26.58	3.96	5.19	35.73	113	210	V	54	-18.27	Average Max
12309.91	38.89	5.2	9.32	53.41	95	101	H	74	-20.59	Peak Max
7385.945	40.68	3.96	5.19	49.83	113	210	V	74	-24.17	Peak Max
4923.963	44.89	3.22	0.68	48.79	253	13	V	74	-25.21	Peak Max

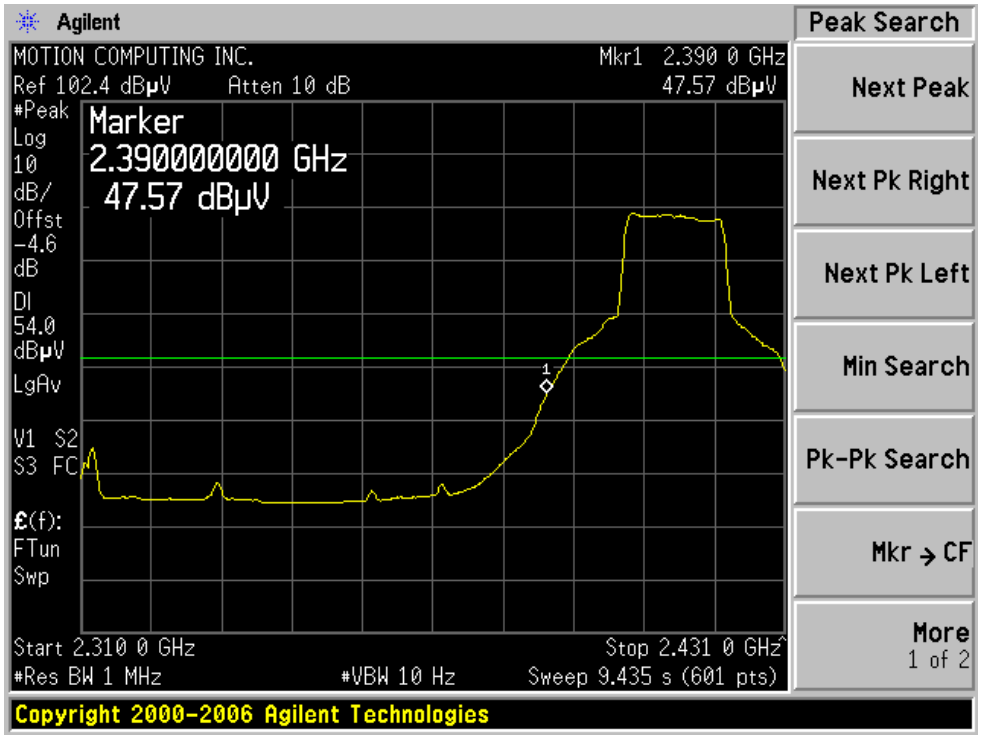
Restricted band edge

Low channel

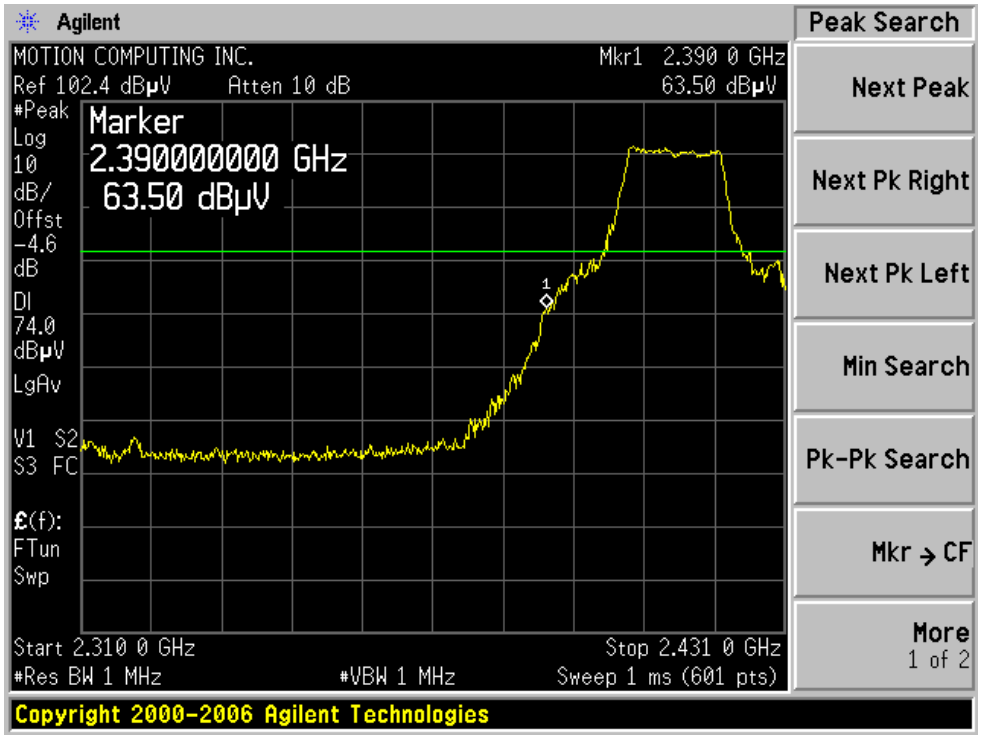
Peak, Horizontal



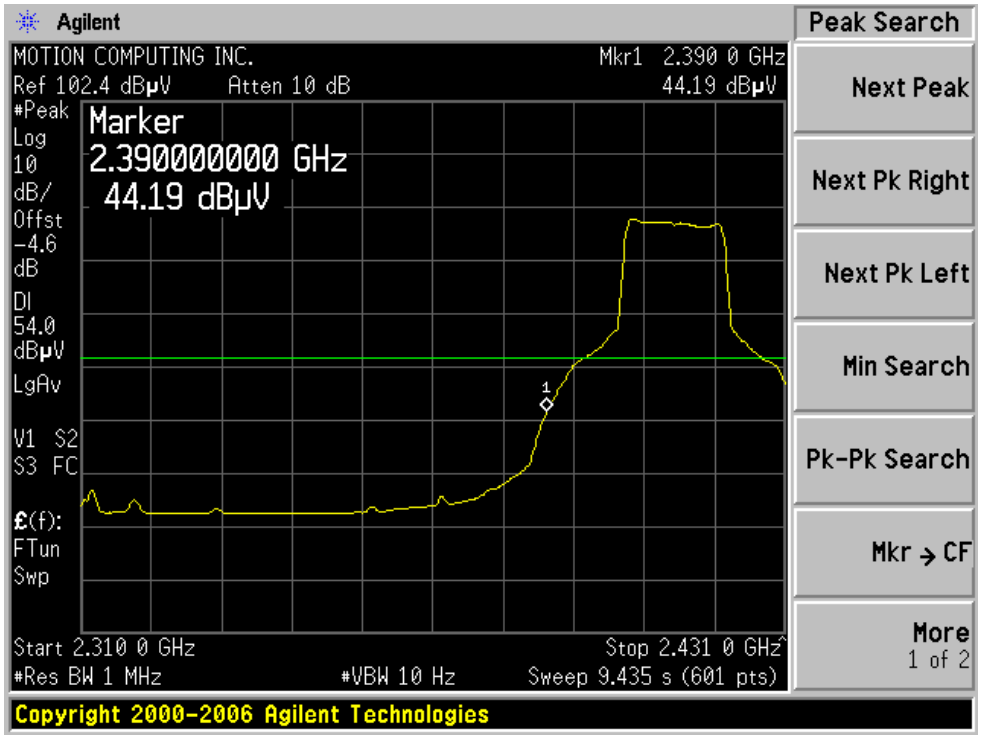
Average, Horizontal



Peak, Vertical

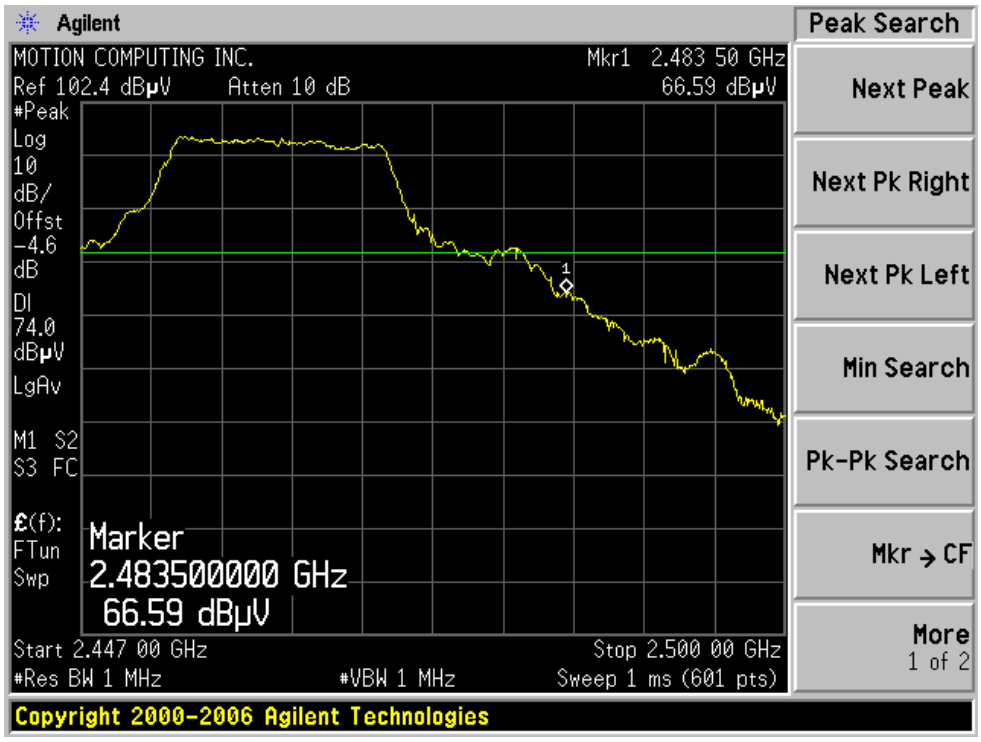


Average, Vertical

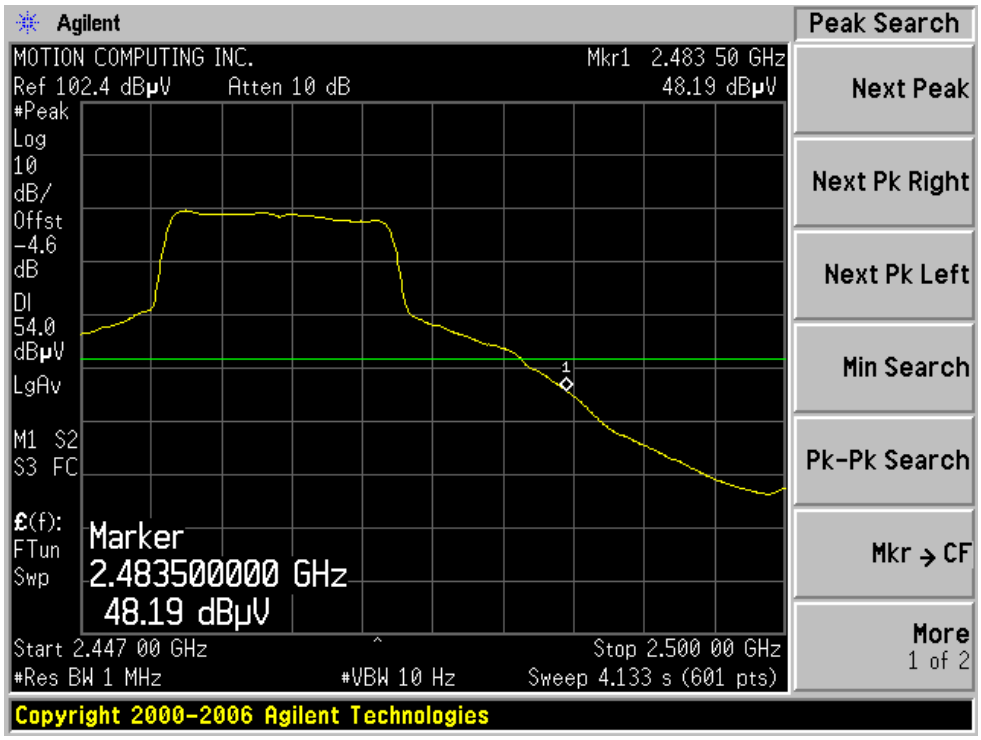


High channel

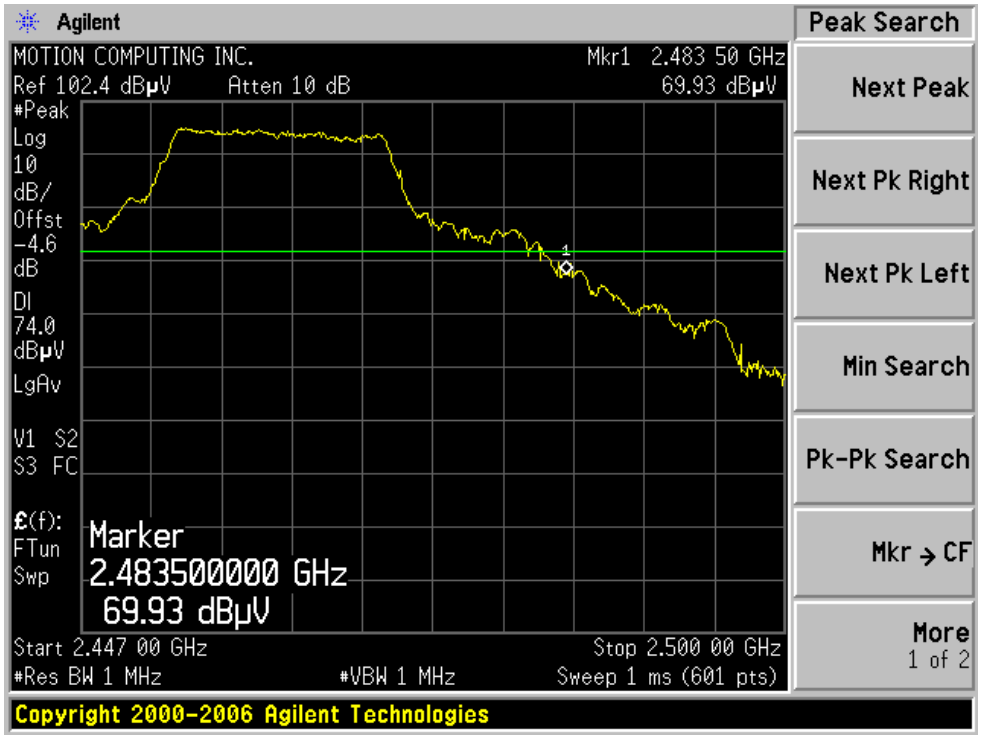
Peak, Horizontal



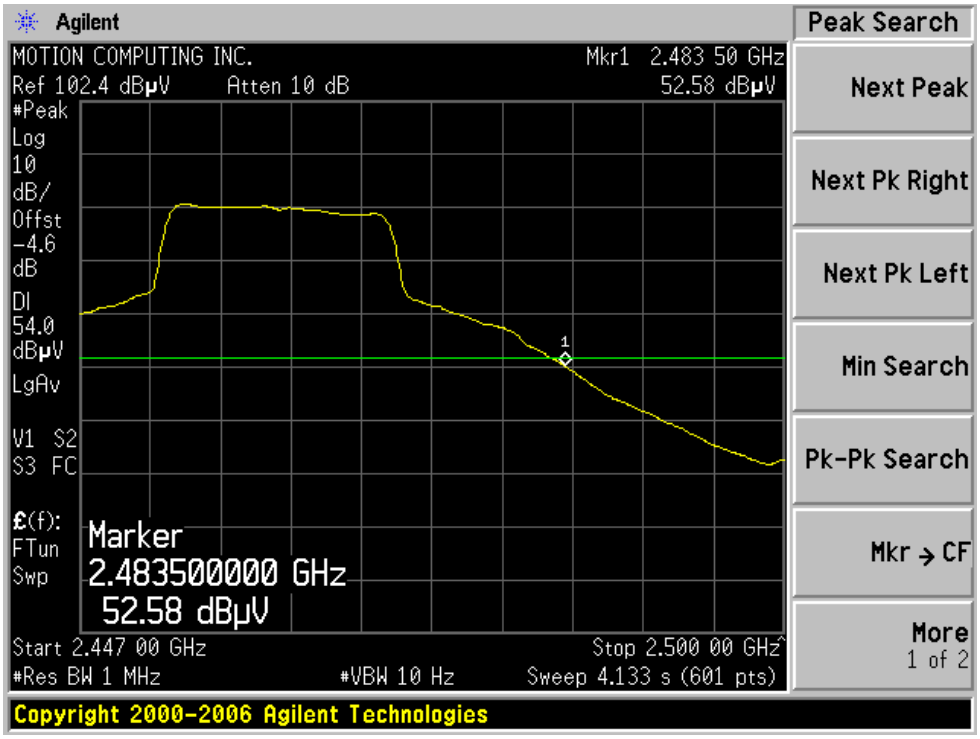
Average, Horizontal



Peak, Vertical



Average, Vertical



802.11a *for 5745 – 5825 MHz band*:

Low channel

Frequency (MHz)	Reading (dBµV)	Cable loss (dB)	AF + Pre-Amplifier Gain (dB/m)	Corrected Reading (dBµV/m)	Azimuth (Degrees)	Height (cm)	Polarization (H / V)	FCC 15 C		Measurements Type
								Limit (dBµV/m)	Margin (dB)	
*17882.71	24.29	6.49	13.19	43.97	276	199	V	54	-10.03	Average Max
*18000.00	24.13	6.53	13.11	43.77	274	18	H	54	-10.23	Average Max
*18000.00	24.09	6.53	13.11	43.73	142	288	H	54	-10.27	Average Max
17235.12	24.46	6.49	12.77	43.72	158	62	V	54	-10.28	Average Max
11490.18	29	5.12	8.05	42.17	109	102	H	54	-11.83	Average Max
*14310.61	25.83	5.66	10.59	42.08	248	353	V	54	-11.92	Average Max
*18000.00	40.55	6.53	13.11	60.19	274	18	H	74	-13.81	Peak Max
17235.12	40.76	6.49	12.77	60.02	158	62	V	74	-13.98	Peak Max
*17882.71	40.3	6.49	13.19	59.98	276	199	V	74	-14.02	Peak Max
*18000.00	40.01	6.53	13.11	59.65	142	288	H	74	-14.35	Peak Max
11490.18	45.5	5.12	8.05	58.67	109	102	H	74	-15.33	Peak Max
*14310.61	41.66	5.66	10.59	57.91	248	353	V	74	-16.09	Peak Max

Middle channel

Frequency (MHz)	Reading (dBµV)	Cable loss (dB)	AF + Pre-Amplifier Gain (dB/m)	Corrected Reading (dBµV/m)	Azimuth (Degrees)	Height (cm)	Polarization (H / V)	FCC 15 C		Measurements Type
								Limit (dBµV/m)	Margin (dB)	
*17798.25	24.35	6.56	13.25	44.16	146	68	V	54	-9.84	Average Max
17355.22	24.43	6.38	13.09	43.9	206	286	V	54	-10.1	Average Max
*18000.00	24.12	6.53	13.11	43.76	254	344	H	54	-10.24	Average Max
*17998.61	24.11	6.53	13.11	43.75	255	10	H	54	-10.25	Average Max
17355.22	40.82	6.38	13.09	60.29	98	140	H	74	-13.71	Peak Max
*17798.25	40.24	6.56	13.25	60.05	146	68	V	74	-13.95	Peak Max
*18000.00	39.88	6.53	13.11	59.52	254	344	H	74	-14.48	Peak Max
*17998.61	39.87	6.53	13.11	59.51	255	10	H	74	-14.49	Peak Max
11570.12	23.41	5.13	8.23	36.77	116	214	V	54	-17.23	Average Max
11570.12	39.03	5.13	8.23	52.39	147	187	H	74	-21.61	Peak Max

High channel

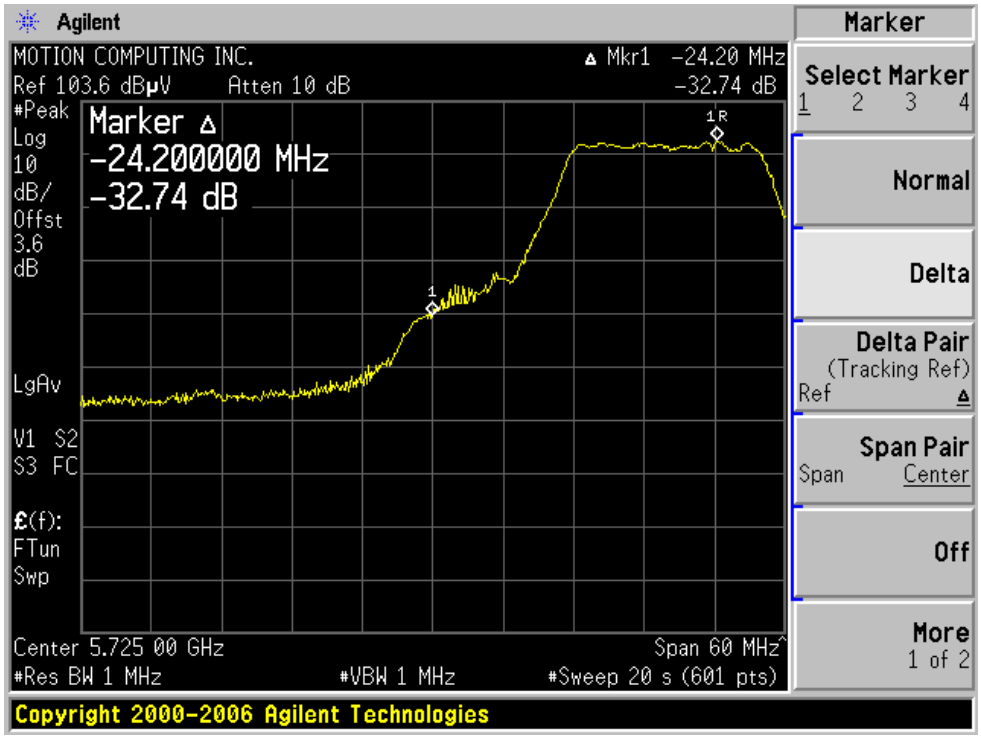
Frequency (MHz)	Reading (dBµV)	Cable loss (dB)	AF + Pre-Amplifier Gain (dB/m)	Corrected Reading (dBµV/m)	Azimuth (Degrees)	Height (cm)	Polarization (H / V)	FCC 15 C		Measurements Type
								Limit (dBµV/m)	Margin (dB)	
17475.09	24.4	6.38	13.41	44.19	108	97	H	54	-9.81	Average Max
*17948.29	24.45	6.55	13.15	44.15	221	163	H	54	-9.85	Average Max
*17999.28	24.14	6.53	13.11	43.78	260	58	H	54	-10.22	Average Max
*18000.00	24.13	6.53	13.11	43.77	262	60	V	54	-10.23	Average Max
*17948.29	40.98	6.55	13.15	60.68	221	163	H	74	-13.32	Peak Max
*17999.28	40.38	6.53	13.11	60.02	200	31	V	74	-13.98	Peak Max
17475.09	40.21	6.38	13.41	60	226	84	V	74	-14.00	Peak Max
*18000.00	40.11	6.53	13.11	59.75	192	7	H	74	-14.25	Peak Max
11650.29	23.88	5.19	8.43	37.5	289	-2	H	54	-16.5	Average Max
11650.29	39.78	5.19	8.43	53.4	226	270	V	74	-20.6	Peak Max

***Note:** *All frequencies from 1GHz to 40 GHz have been investigated.*
The restricted band limit is 54 dBµV/m.

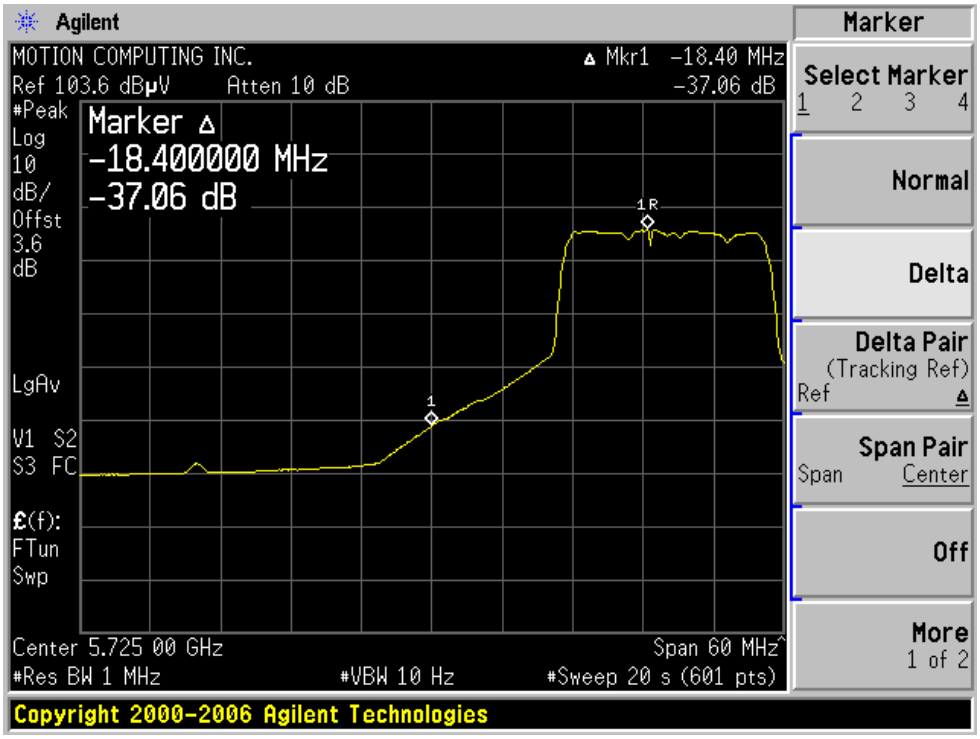
Restricted band edge

Low channel

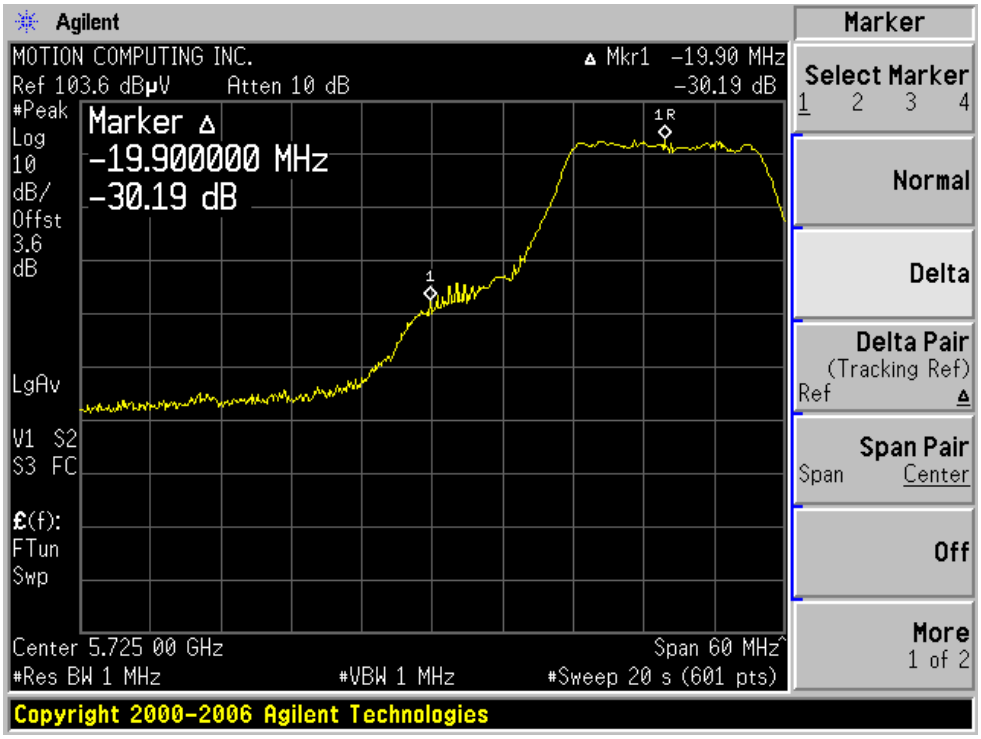
Peak, Horizontal



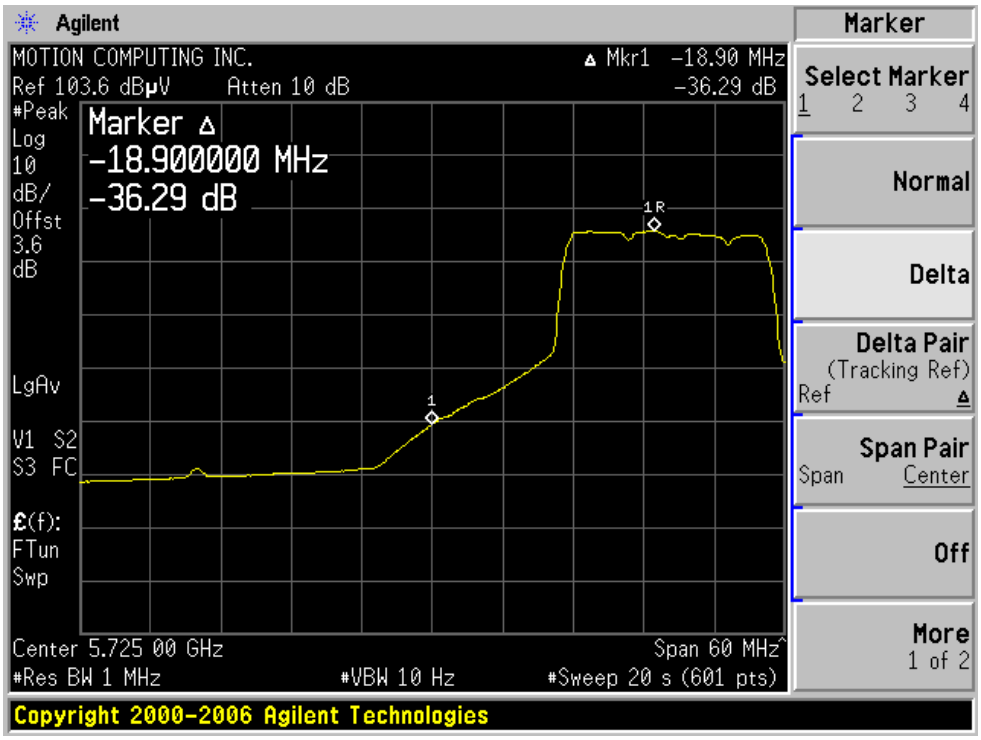
Average, Horizontal



Peak, Vertical

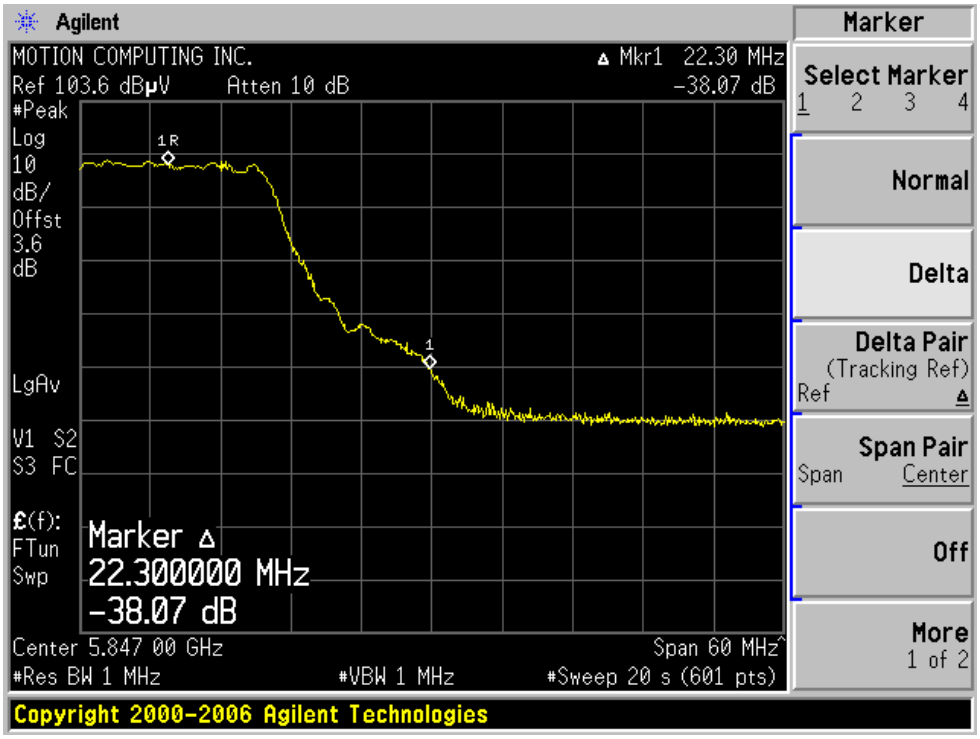


Average, Vertical

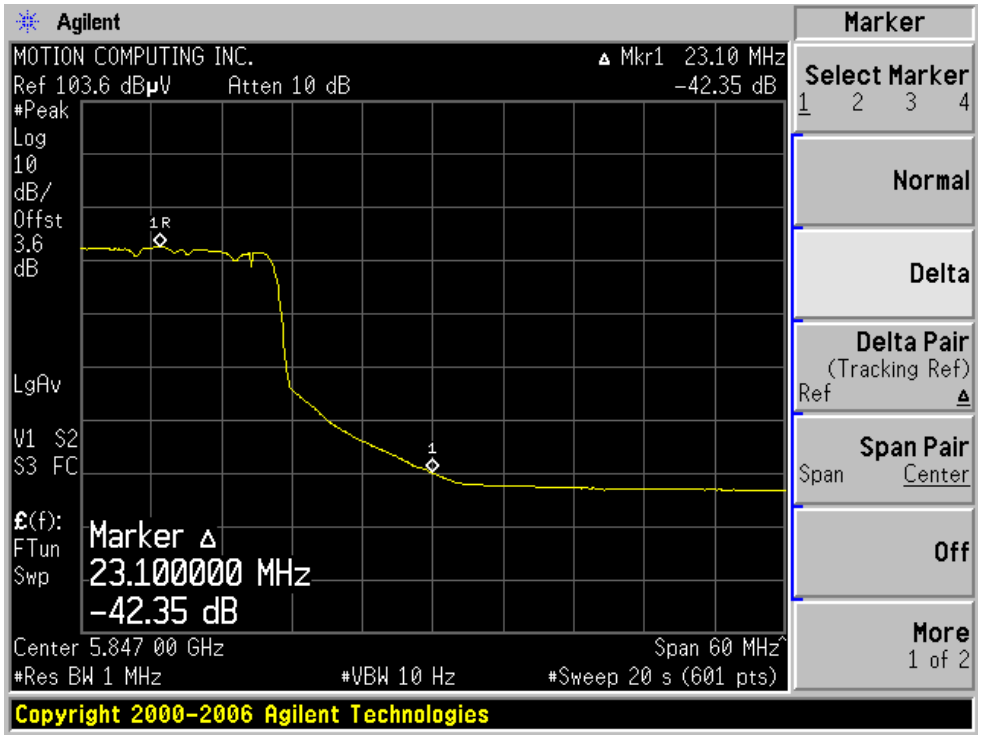


High channel

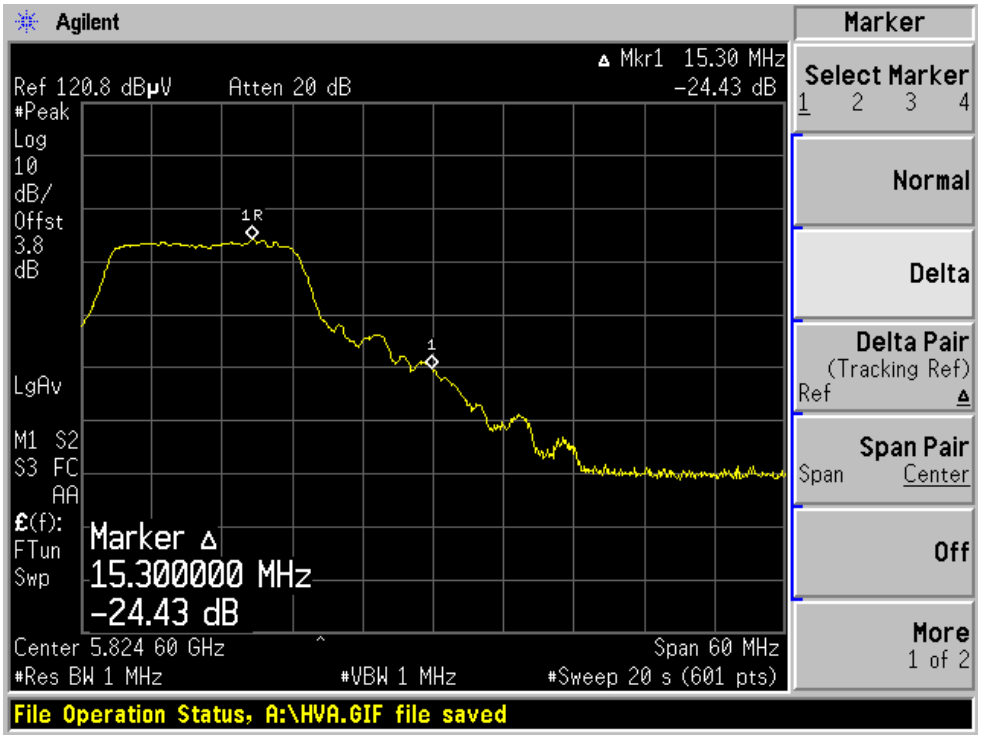
Peak, Horizontal



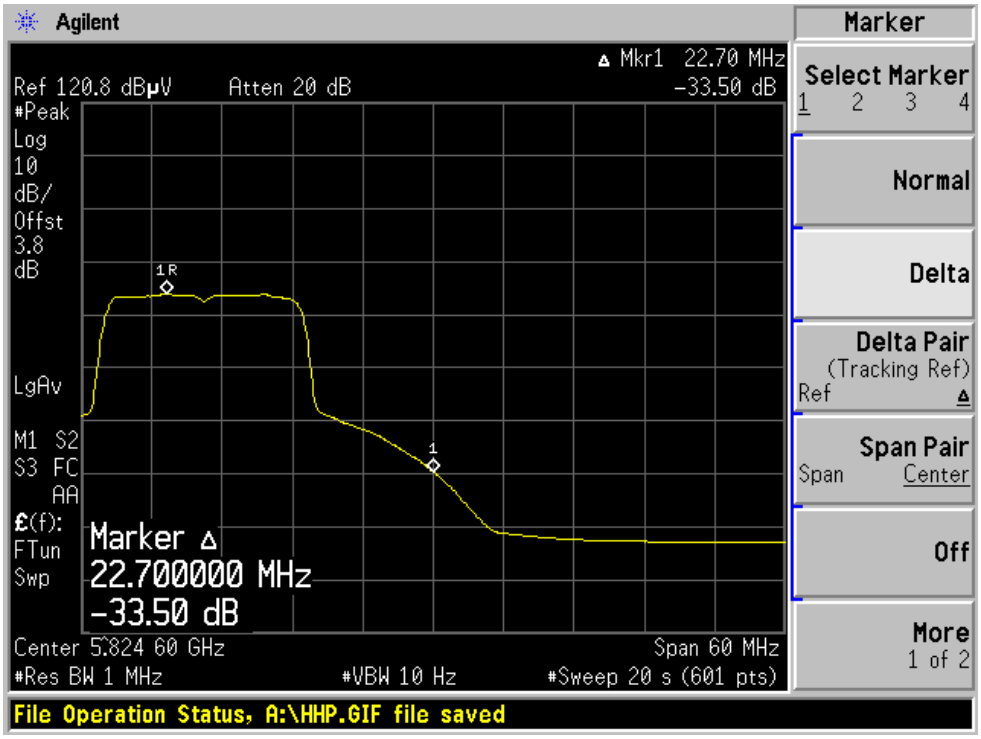
Average, Horizontal



Peak, Vertical



Average, Vertical



§15.247(a) (2) – 6 dB BANDWIDTH

Applicable Standard

According to §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

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. (6 dB bandwidth for DTS)
4. Repeat above procedures until all frequencies measured were complete.

Test Equipment

Please refer to the following test report:
(FCC ID: PD9WM3945ABG tested by Aegis Labs Inc. in report: INTEL-050901F).

Test Setup Diagram

Please refer to the following test report:
(FCC ID: PD9WM3945ABG tested by Aegis Labs Inc. in report: INTEL-050901F).

Environmental Conditions

Please refer to the following test report:
(FCC ID: PD9WM3945ABG tested by Aegis Labs Inc. in report: INTEL-050901F).

Measurement Results

Please refer to the following test report:
(FCC ID: PD9WM3945ABG tested by Aegis Labs Inc. in report: INTEL-050901F).

§15.247(b) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

§15.247(b) The maximum peak output power of the intentional radiator shall not exceed the following:

§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.

§15.247(b) (4) (i) 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.

Measurement Procedure

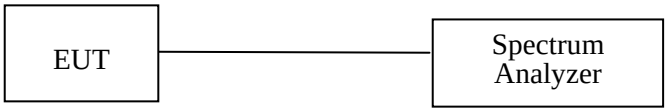
1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a spectrum analyzer.
3. Add a correction factor to the display.

Equipment Lists

Manufacturer	Description	Model	Serial Number	Cal. Date
Spectrum Analyzer	E4440A	Agilent	MY44303352	2007-02-23

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

Test Setup Diagram



Environmental Conditions

Temperature:	22° C
Relative Humidity:	56 %
ATM Pressure:	104.1 kPa

** The testing was performed by Dan Coronia from 2007-05-22 to 2007-05-30*

Test Result

802.11b mode:

Channel	Frequency (MHz)	Analyzer Reading (dBm)	Cable Loss (dB)	Peak Power Output (mw)	Peak Output (dBm)	Limit (dBm)	Compliant/Fail
1	2412	14.68	0.6	33.73	15.28	30	Compliant
6	2437	14.87	0.6	35.24	15.47	30	Compliant
11	2462	14.01	0.6	28.91	14.61	30	Compliant

802.11g mode:

Channel	Frequency (MHz)	Analyzer Reading (dBm)	Cable Loss (dB)	Peak Power Output (mw)	Peak Output (dBm)	Limit (dBm)	Compliant/Fail
1	2412	14.49	0.6	32.28	15.09	30	Compliant
6	2437	14.33	0.6	31.12	14.93	30	Compliant
11	2462	13.00	0.6	22.91	13.60	30	Compliant

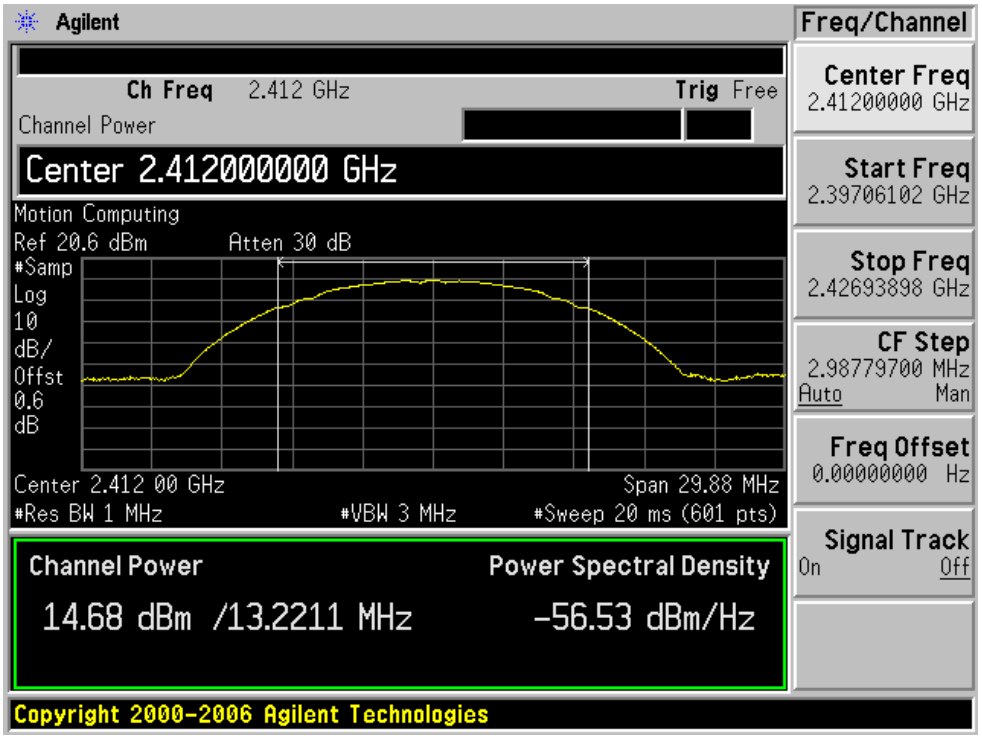
802.11a: *For 5745 – 5825 MHz*

Frequency (MHz)	Peak Power Output (dBm)	Peak Power Output (mw)	Limit (dBm)	Compliant/Fail
5745	10.93	12.39	30.00	Compliant
5785	10.42	11.02	30.00	Compliant
5825	10.52	11.27	30.00	Compliant

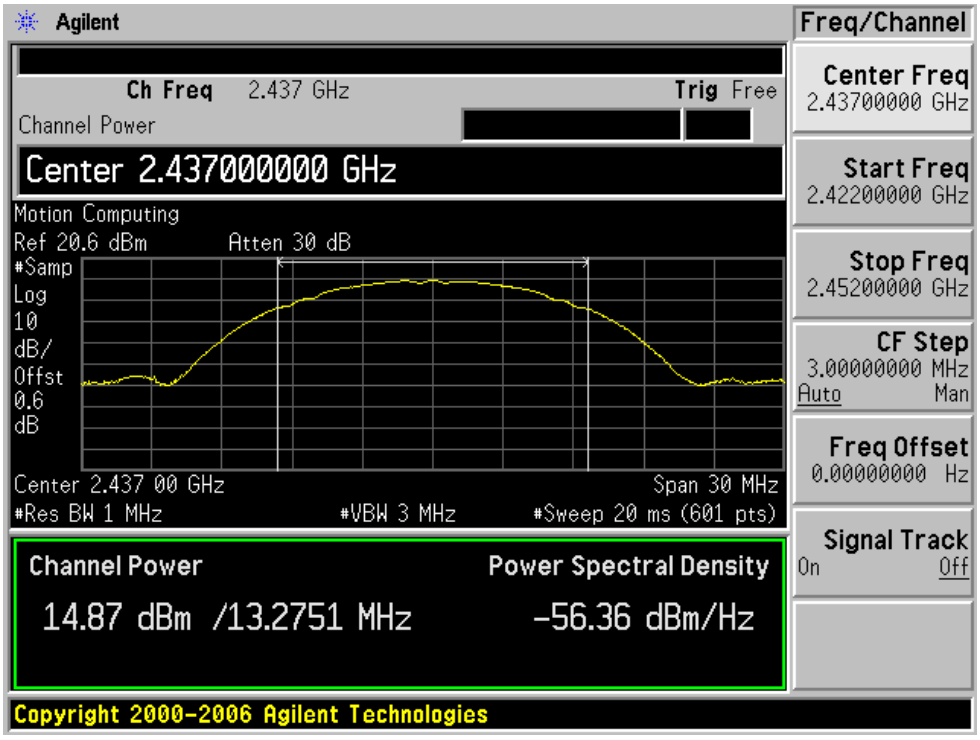
Please refer to the following plots:

802.11b mode:

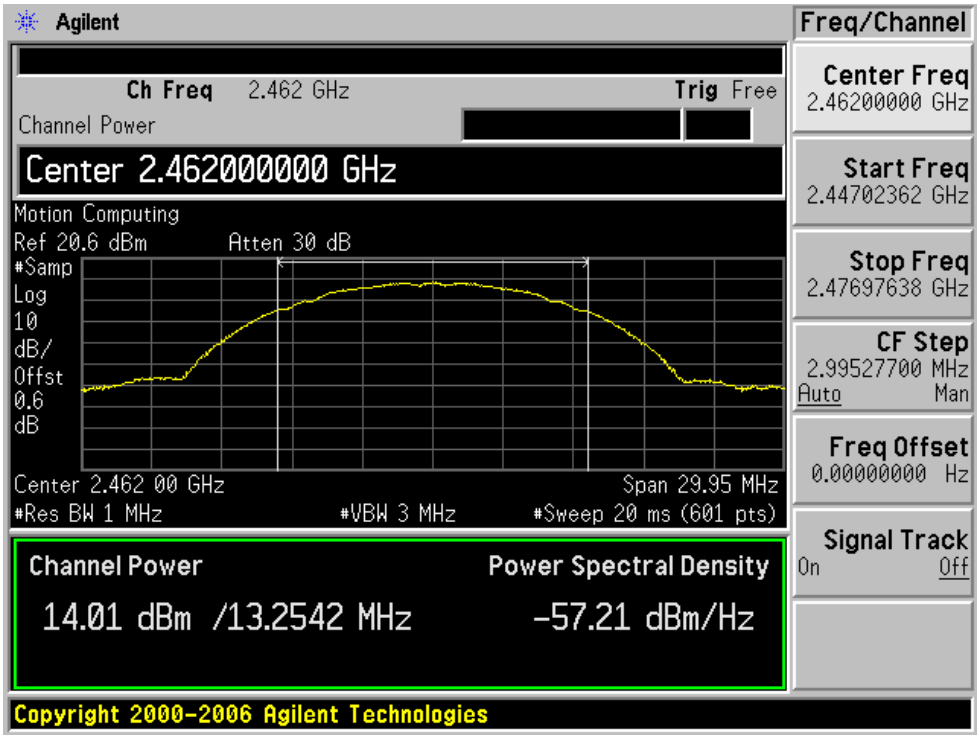
Low channel



Middle channel

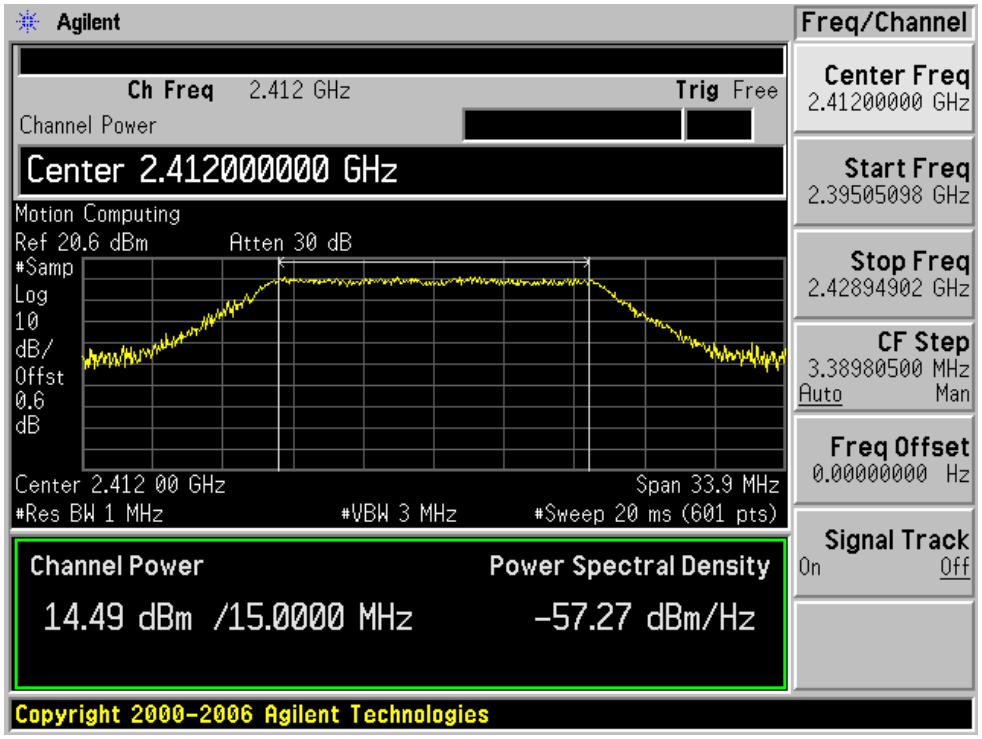


High channel

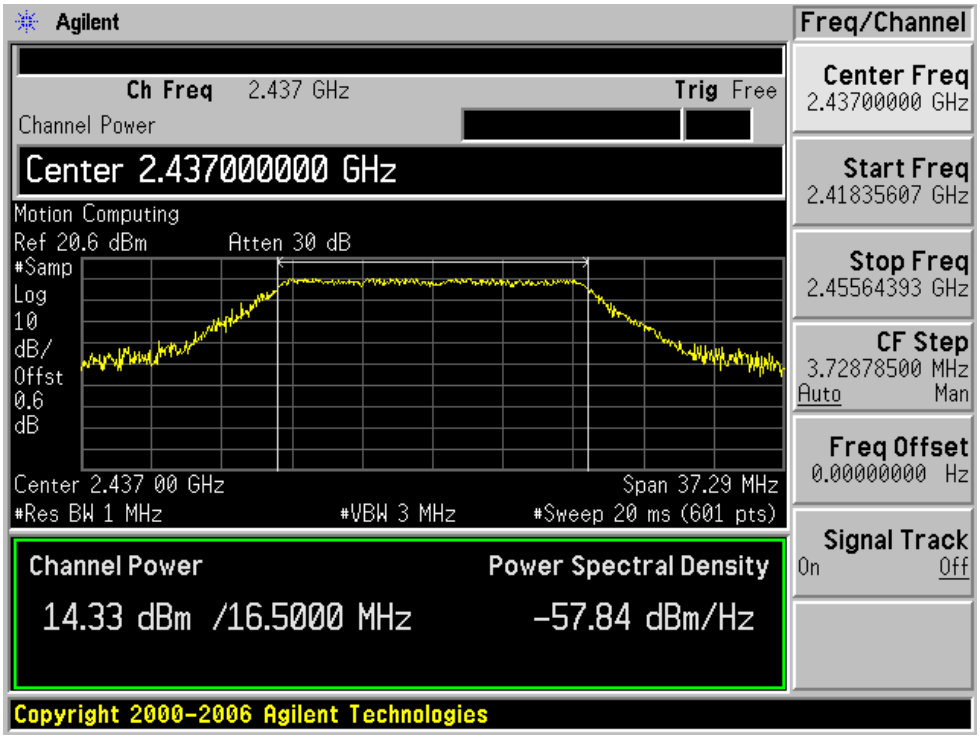


802.11g mode:

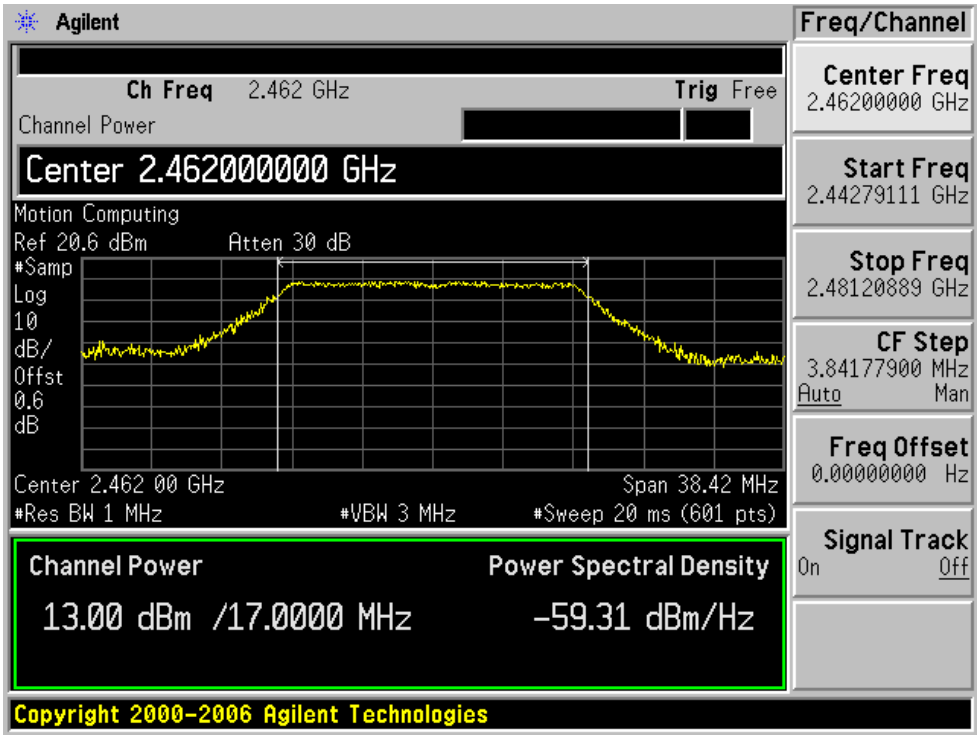
Low channel



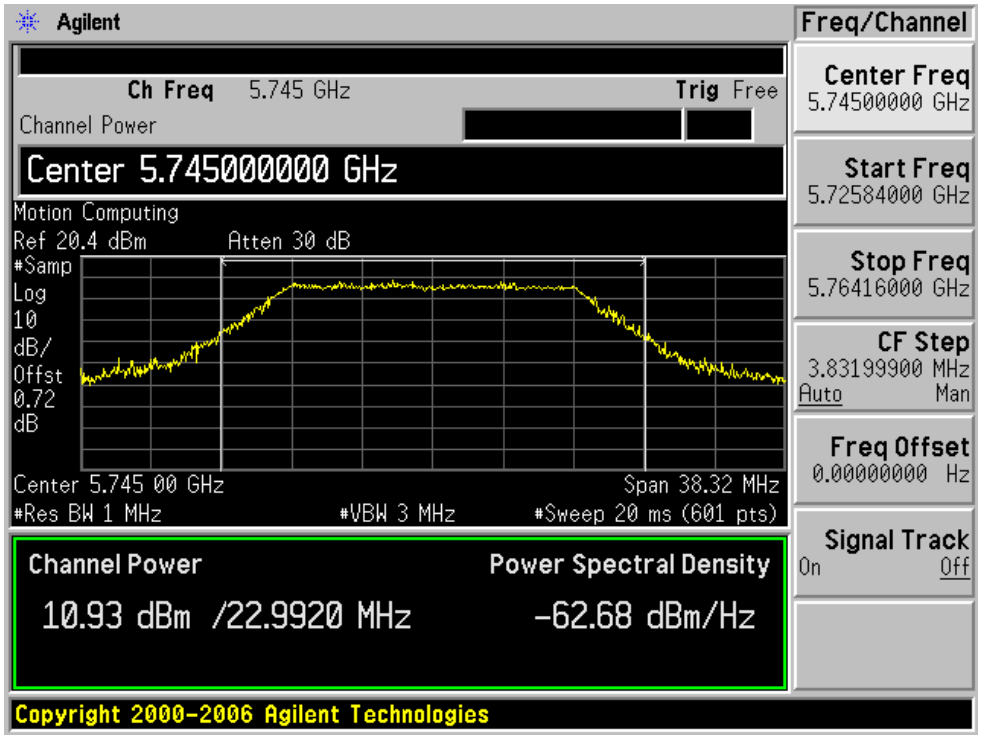
Middle channel

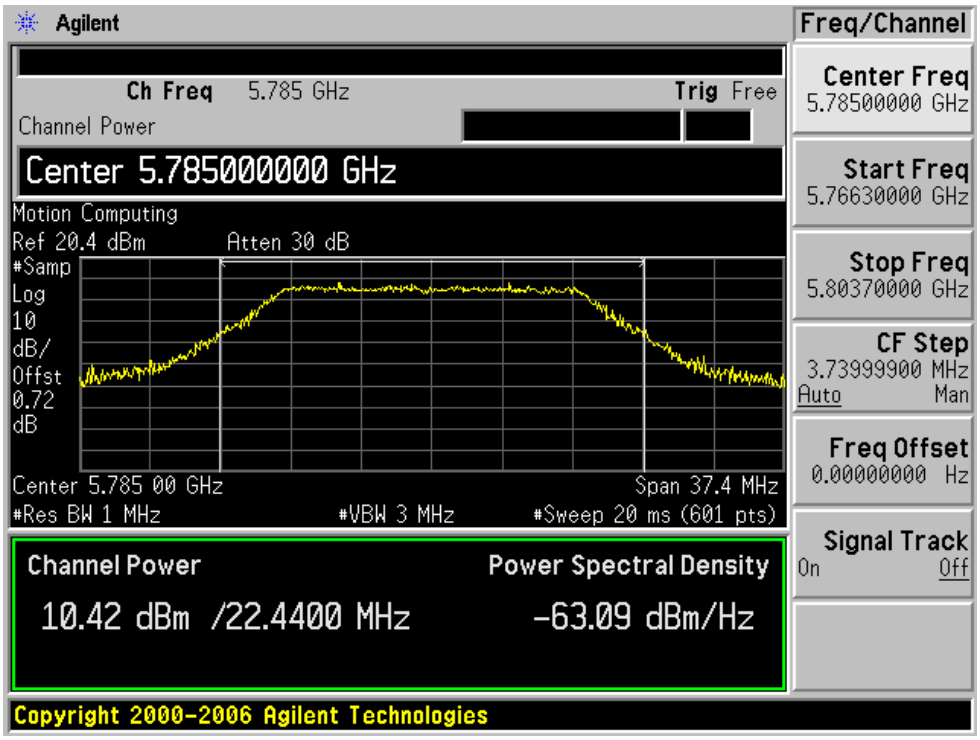


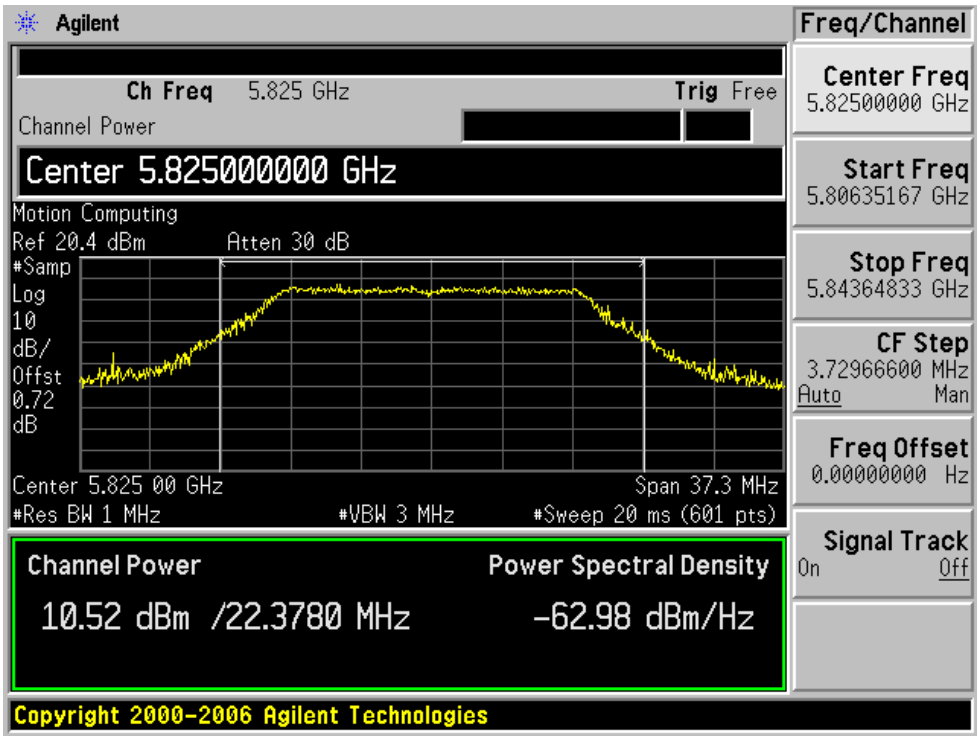
High channel



For 5725 – 5825 MHz: **802.11a**






Agilent
Freq/Channel
Ch Freq 5.825 GHz
Trig Free
Channel Power
Center 5.825000000 GHz
Motion Computing
Ref 20.4 dBm
Atten 30 dB
#Samp
Log
10
dB/
Offst
0.72
dB
Center 5.825 00 GHz
Span 37.3 MHz
#Res BW 1 MHz
#VBW 3 MHz
#Sweep 20 ms (601 pts)
Channel Power
10.52 dBm /22.3780 MHz
Power Spectral Density
-62.98 dBm/Hz
Center Freq
5.82500000 GHz
Start Freq
5.80635167 GHz
Stop Freq
5.84364833 GHz
CF Step
3.72966600 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
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§15.247(d) - 100 kHz BANDWIDTH OF BAND EDGES

Applicable Standard

According to §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)).

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.

Test Equipment

Please refer to the following test report:
(FCC ID: PD9WM3945ABG tested by Aegis Labs Inc. in report: INTEL-050901F).

Test Setup Diagram

Please refer to the following test report:
(FCC ID: PD9WM3945ABG tested by Aegis Labs Inc. in report: INTEL-050901F).

Environmental Conditions

Please refer to the following test report:
(FCC ID: PD9WM3945ABG tested by Aegis Labs Inc. in report: INTEL-050901F).

Measurement Results

Please refer to the following test report:
(FCC ID: PD9WM3945ABG tested by Aegis Labs Inc. in report: INTEL-050901F).

§15.247(e) – PEAK POWER SPECTRAL DENSITY

Applicable Standard

According to §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.

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. The maximum level in 3 kHz bandwidth is measured with the spectrum analyzer using RBW= 3 kHz and VBW > 3 kHz, sweep time = span / 3 kHz, and video averaging is turned off, the PPSD is the highest level found across the emission in any 3 kHz band.
4. Repeat above procedures until all frequencies measured were complete.

Test Equipment

Please refer to the following test report:
(FCC ID: PD9WM3945ABG tested by Aegis Labs Inc. in report: INTEL-050901F).

Test Setup Diagram

Please refer to the following test report:
(FCC ID: PD9WM3945ABG tested by Aegis Labs Inc. in report: INTEL-050901F).

Environmental Conditions

Please refer to the following test report:
(FCC ID: PD9WM3945ABG tested by Aegis Labs Inc. in report: INTEL-050901F).

Measurement Results

Please refer to the following test report:
(FCC ID: PD9WM3945ABG tested by Aegis Labs Inc. in report: INTEL-050901F).