FCC CFR47 PART 15 SUBPART C
CERTIFICATION
TEST REPORT

FOR

WIRELESS ACCESS POINT

MODEL NUMBER: 70410-QAB

FCC ID: T4S-70410-QAB

REPORT NUMBER: 06J10176-1B

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--	6/05/06	Initial Issue	Thu
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: HONDA R&D CO., LTD.
8-1 HONCHO, WAKO-SHI
SAITAMA -KEN, 351-0114 JAPAN

EUT DESCRIPTION: WIRELESS ACCESS POINT

MODEL: 70410-QAB

SERIAL NUMBER: CCS# 1690 & CCS# 1728

DATE TESTED: April 3 – May 23, 2006

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

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EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

THANH NGUYEN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is Dual Band Wireless Access Point operating in the 2412-2462 MHz band and 5180-5240 MHz band.

The radio module is manufactured by Atheors.

5.2. MODIFICATION

1. Adding absorber at the bottom of the main PCB.
2. Adding shielding case on the main PCB.
3. Connect antenna PCB to GND plate.
4. Add ferrite beads (BLM31P391S, MURATA) between 4-5 pins and 7-8 pins that are not used pins for Ethernet.

5.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Mode	MPE Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm^2)
802.11b	20.0	17.32	1.60	0.02
802.11g	20.0	20.12	1.60	0.03

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5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes of two 2.4GHz antennas used for diversity and also two 5GHz antennas used for diversity, with a maximum gain at each band as indicated in the table below:

Antenna Manufacturer / Model Number	**Antenna Type**	**Maximum Peak Antenna Gain (dBi)**	**Operating Mode**
DAC2450CT (2.4 GHz)	Monopole	1.6	☐ Point to Point ☒ Point to Multipoint
Flavus (5 GHz)	Monopole	4.9	☐ Point to Point ☒ Point to Multipoint
TMM1262 (2.4 GHz / 5 GHz)	Patch	1.4dBi @2.4GHz, 5.7dBi @5GHz	☐ Point to Point ☒ Point to Multipoint

The first two are internal antennas and the third one is an external antenna.

5.5. SOFTWARE AND FIRMWARE

The test utility software used during testing was ART, rev. 5.3.

5.6. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power, based on the radio test reports for this product. The highest measured output power was at 2462 MHz in 11b mode and 2437 in11g mode.

The worst-case data rate for this channel is determined to be 1Mb/s for b mode and 6Mb/s for g mode, based on previous experience with Atheros 802.11 product design architectures.

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5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Sony	PCG-VX88P	4-664-683-01	DOC
AC Adaptor for Laptop	Sony	PCGA-AC16V3	0204A0147727P	DOC
AC Adaptor for EUT	Kaga Components	S-8453	n/a	DOC

I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	2	AC Power	Un-shielded	2	N/A
2	DC	2	DC Power	Un-shielded	2	N/A
3	Ethernet	1	RJ45	Un-shielded	1	EUT to host device

TEST SETUP

The EUT is connected with a host laptop computer via a RJ45. Test software exercised the EUT.

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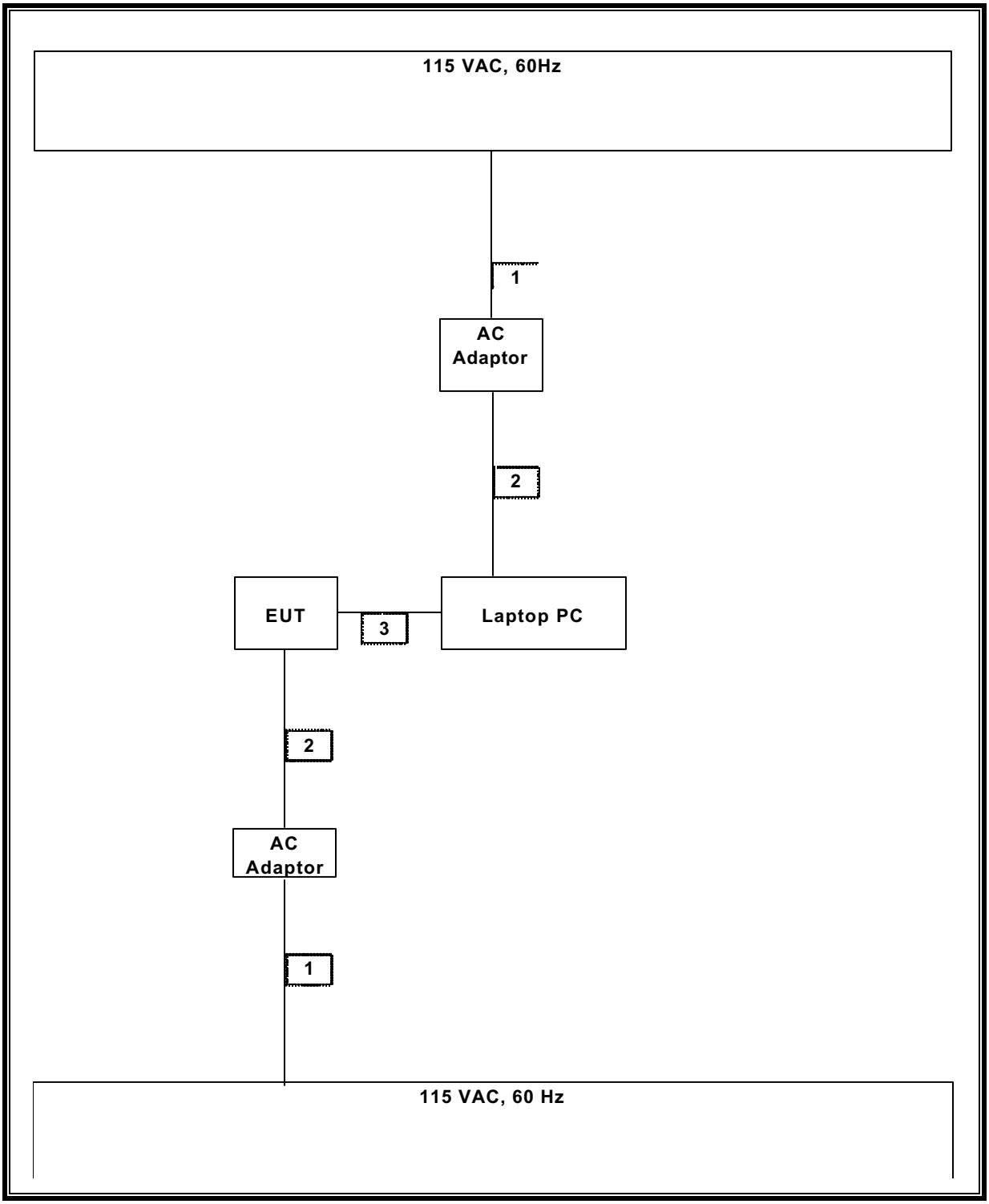
SETUP DIAGRAM FOR TESTS



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6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	4/22/2007
Antenna, Horn, 18 ~ 26 GHz	ARA	MWH-1826/B	1013	9/12/2006
Preamplifier, 1 ~ 26 GHz	HP	8449B	3008A00931	6/24/2006
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent	E4446A	US42510266	10/19/2006
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	2/4/2007
RF Filter Section	HP	85420E	3705A00256	2/4/2007
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A121003	9/3/2006
LISN, 10 kHz ~ 30 MHz	FCC	LISN-50/250-25-2	2023	8/30/2006
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	8/30/2006
EMI Test Receiver	R & S	ESHS 20	827129/006	6/3/2006
AC Power Source, 10 kVA	ACS	AFC-10K-AFC-2	J1568	N.C.R.
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent	E4446A	US42510266	10/19/06
Peak / Average Power Sensor	Agilent	E9327A	US40440755	2/10/07
Peak Power Meter	Agilent	E4416A	GB41291160	2/9/07

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7. LIMITS AND RESULTS

7.1. CHANNEL TESTS FOR THE 2400 TO 2483.5 MHz BAND

7.1.1. 6 dB BANDWIDTH

LIMIT

§15.247 (a) (2) For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

No non-compliance noted:

6 dB BW:

802.11b Mode

Channel	Frequency (MHz)	6 dB (kHz)	Minimum (kHz)	Margin (kHz)
Low	2412	11170	500	10670
Middle	2437	10170	500	9670
High	2462	12080	500	11580

802.11g Normal Mode

Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Margin (kHz)
Low	2412	16500	500	16000
Middle	2437	16330	500	15830
High	2462	16420	500	15920

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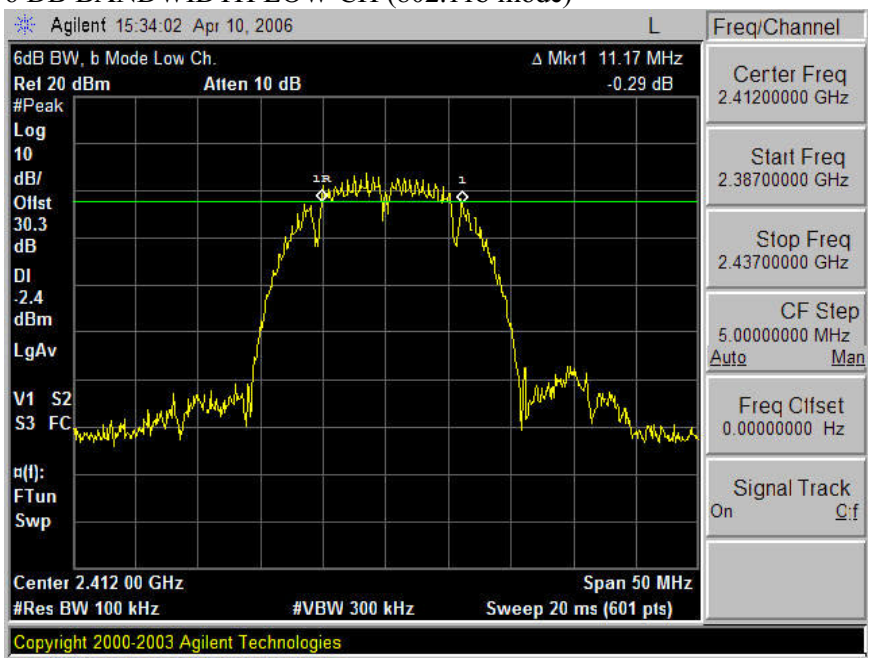
6 DB BANDWIDTH (802.11b MODE)

6 DB BANDWIDTH LOW CH (802.11b mode)



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6 DB BANDWIDTH MID CH (802.11b mode)

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6 DB BANDWIDTH HIGH CH (802.11b mode)

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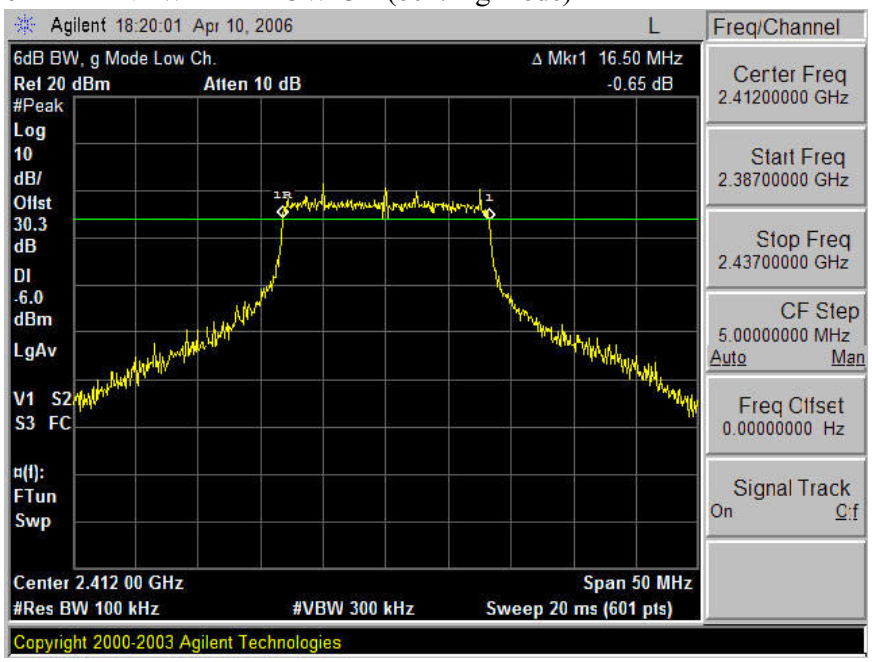
6 DB BANDWIDTH (802.11g MODE)

6 DB BANDWIDTH LOW CH (802.11g mode)



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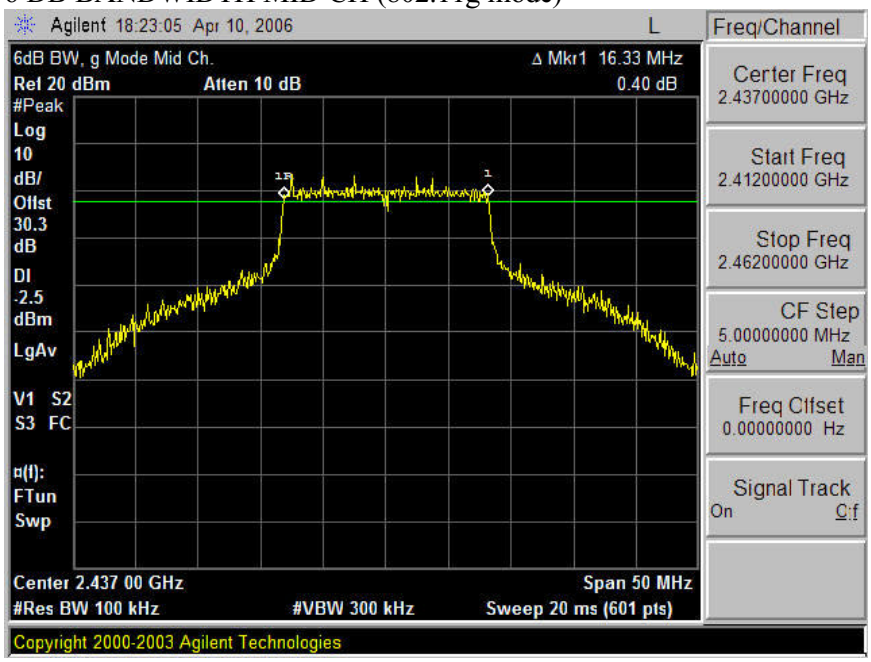
6 DB BANDWIDTH MID CH (802.11g mode)



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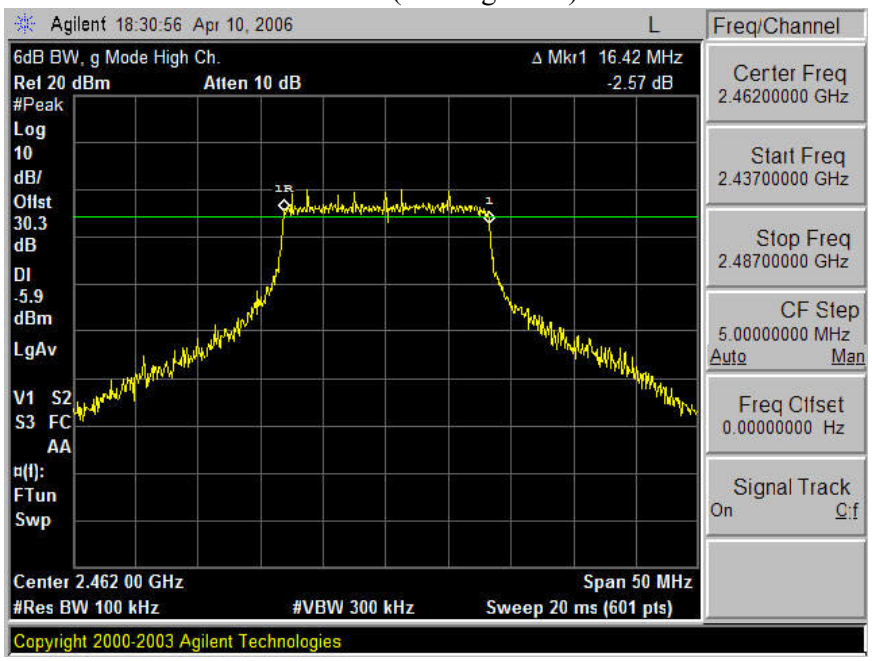
6 DB BANDWIDTH HIGH CH (802.11g mode)



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7.1.2. 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

No non-compliance noted:

802.11b Mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	15.5059
Middle	2437	15.6698
High	2462	15.7020

802.11g Normal Mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.9368
Middle	2437	20.6509
High	2462	16.8260

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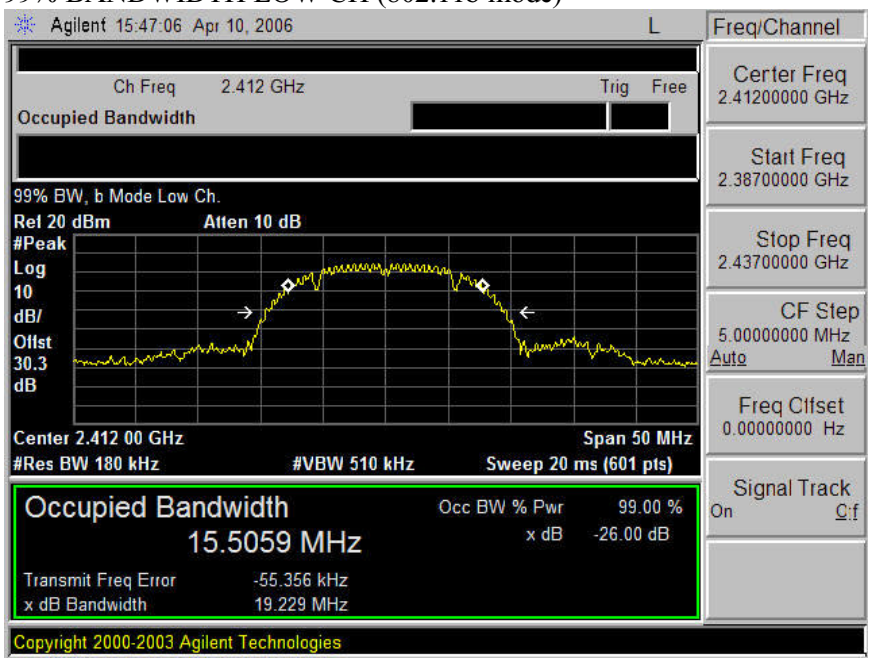
99% BANDWIDTH (802.11b MODE)

99% BANDWIDTH LOW CH (802.11b mode)



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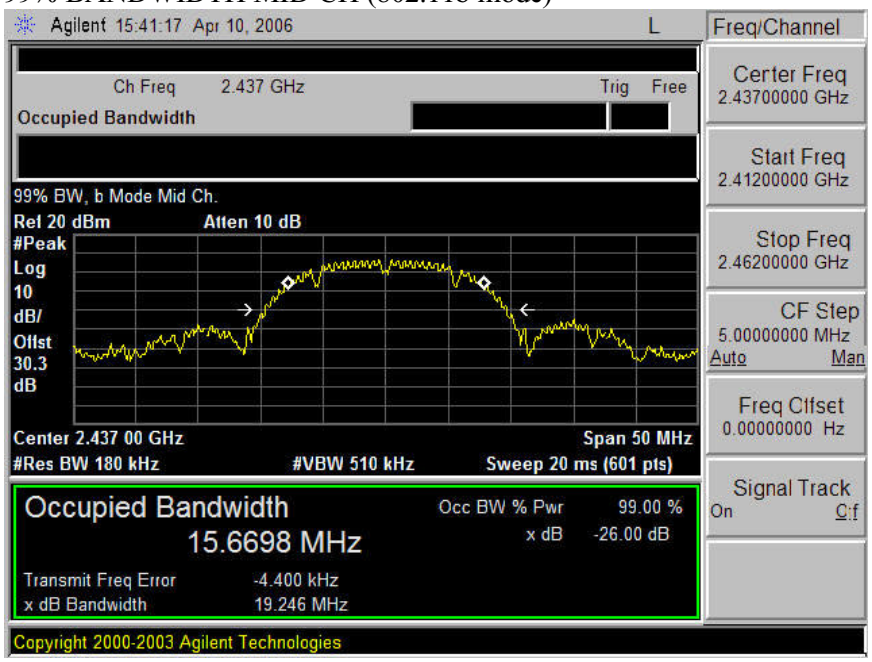
99% BANDWIDTH MID CH (802.11b mode)



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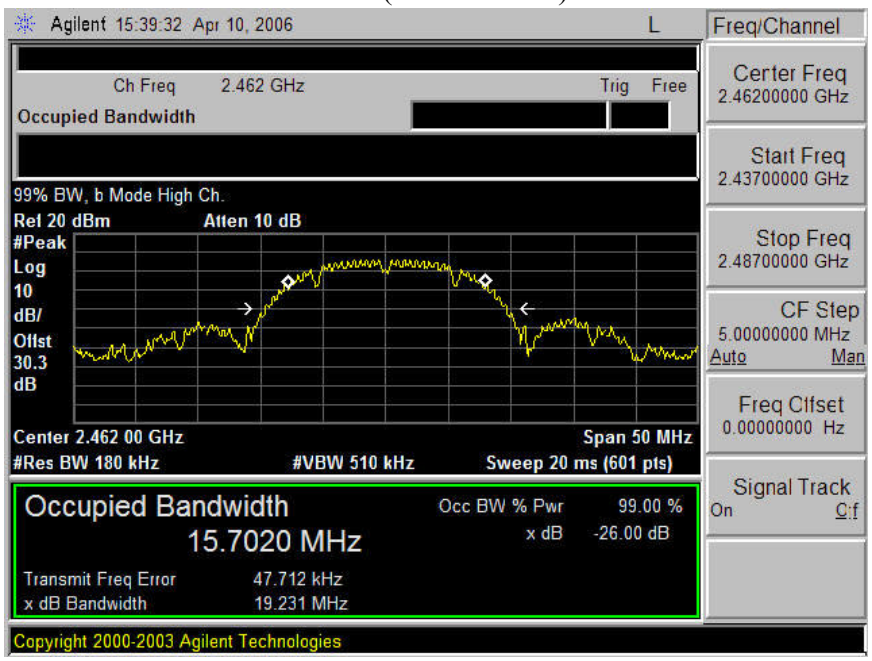
99% BANDWIDTH HIGH CH (802.11b mode)



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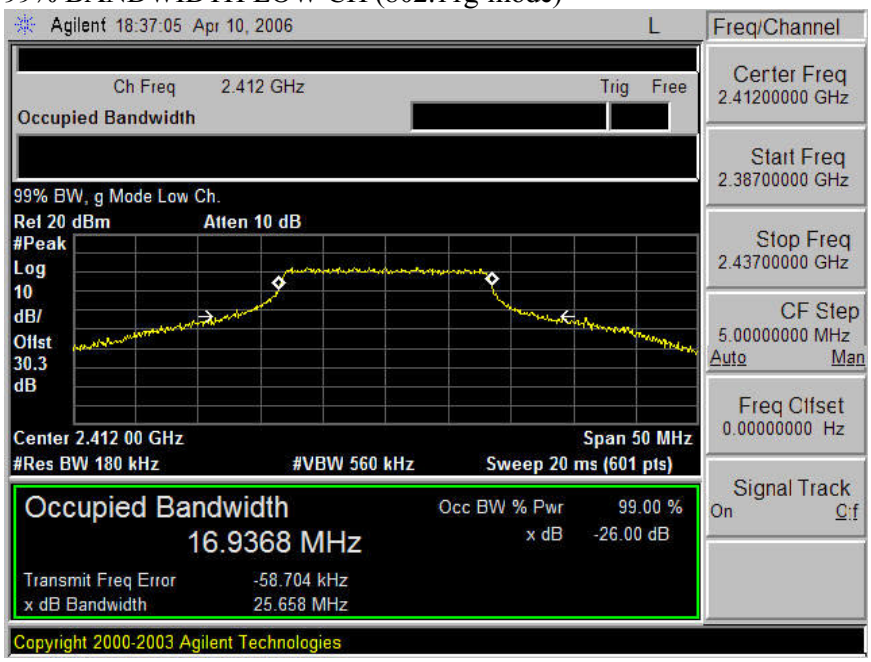
99% BANDWIDTH (802.11g MODE)

99% BANDWIDTH LOW CH (802.11g mode)



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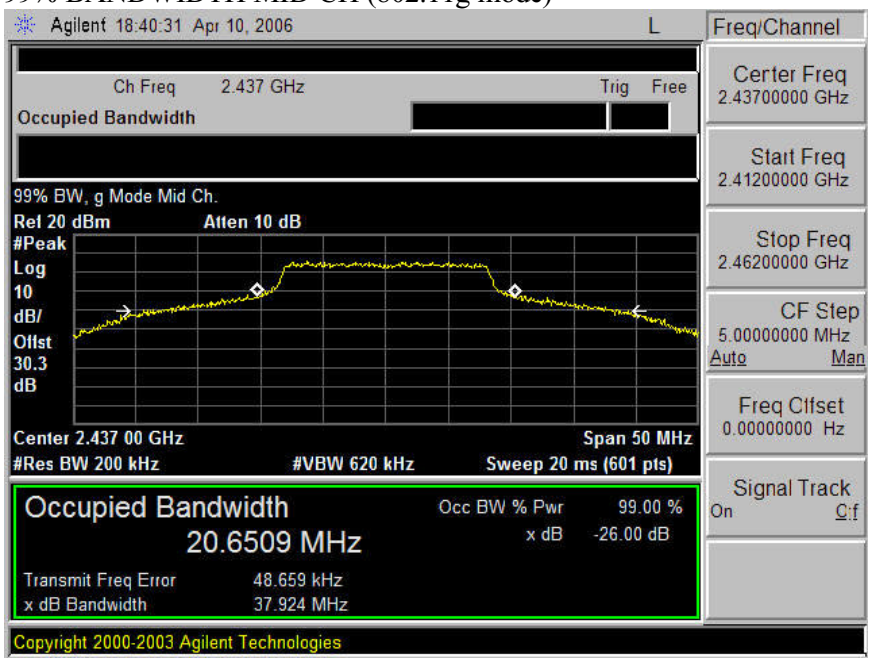
99% BANDWIDTH MID CH (802.11g mode)



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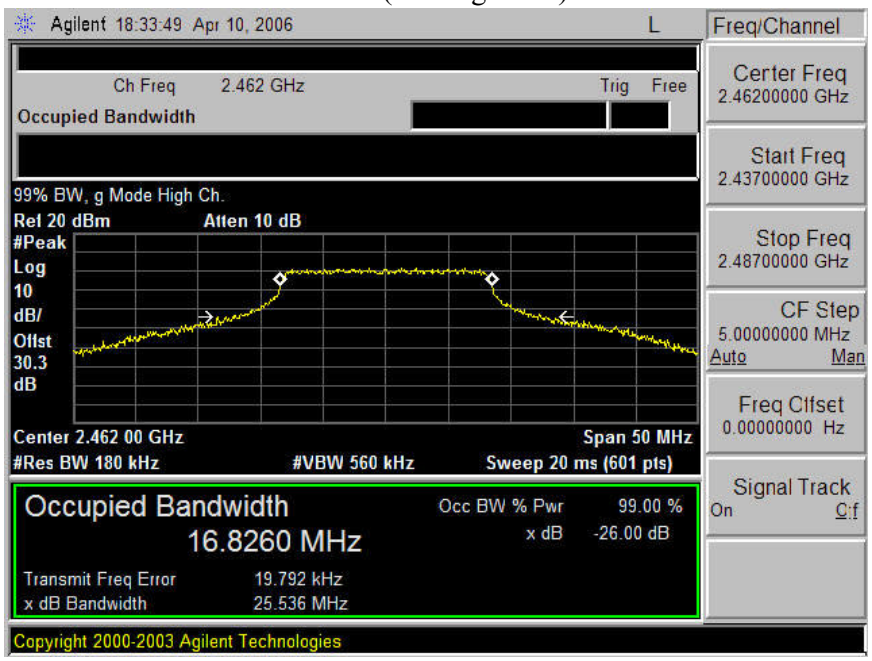
99% BANDWIDTH HIGH CH (802.11g mode)



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7.1.3. PEAK OUTPUT POWER

PEAK POWER LIMIT

§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) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz , and 5725-5850 MHz bands: 1 watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

§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.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer and the analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth.

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