FCC CFR47 PART 15 SUBPART C
CERTIFICATION TEST REPORT

FOR

MULTI-MODE WIRELESS LAN UNIT

MODEL NUMBER: WLU-2100

FCC ID: AJK8222210

REPORT NUMBER: 6U10550-1, REVISION B

ISSUE DATE: NOVEMBER 15, 2006

Prepared for
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Revision History

Rev.	Issue Date	Revisions	Revised By
--	11/02/06	Initial Issue	Thu
B	11/15/06	Editorial corrections, revised setup photos.	MH

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: ROCKWELL COLLINS, AIR TRANSPORT DIVISION
400 COLLINS ROAD N.E.
CEDAR RAPIDS, IA 52498 USA

EUT DESCRIPTION: MULTI-MODE WIRELESS LAN UNIT

MODEL: WLU-2100

SERIAL NUMBER: 2FF8V

DATE TESTED: SEPTEMBER 24 thru OCTOBER 27, 2006

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

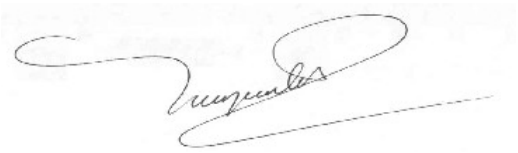
Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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:

MIKE HECKROTTE
ENGINEERING MANAGER
COMPLIANCE CERTIFICATION SERVICES

Tested By:



VIEN TRAN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.4-2003 and RTCA/DO-160D.

Since the EUT is intended for aircraft installation the setup of the EUT was configured in accordance with RTCA/DIO-160D. All other aspects of the test, including the measurement distance and the use of a turntable, were in accordance with ANSI C63.4. The test limits were in accordance with 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%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11b/g Multi-Mode Wireless transceiver unit and the radio module is manufactured by Cisco.

5.2. MAXIMUM OUTPUT POWER

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

2400 to 2483.5 MHz Authorized Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	20.12	102.80
2412 - 2462	802.11g	19.73	93.97

The power is adjustable.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes two antenna types, each with a maximum gain as follows:

1. Rockwell Collins, PMAA-2000, 822-1532-001, Patch: 8 dBi at 2.4GHz
2. Rockwell Collins, MAA-2000, 822-1531-001, Aerodynamic Blade: 5 dBi at 2.4GHz

5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was Chariot console, rev. 4.3.

5.5. WORST-CASE CONFIGURATION AND MODE

In our opinion, the worst-case data rate for the radio channel is determined to be 1 Mb/s for 802.11b mode and 6Mbps for 802.11g mode, based on previous experience with 802.11 WLAN product design architectures.

Thus all emissions tests in the 802.11b mode were made at 1 Mb/s and all emissions tests in the 802.11g mode were made at6 Mb/s.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop Computer	HP	Omni Book 6000	TW03501605	DoC
Laptop Computer	HP	Omni Book 6000	TW03908322	DoC
Laptop Computer	Dell	PPO1L	TW-09C748-12800-3059	4XZUSH-27606-MME
LISN (with 10uF Capacitor inside)	Fisher Custom Communcations	FCC-LISN-5-50-DEF-STAN59-41C	01006	N/A
LISN (with 10uF Capacitor inside)	Fisher Custom Communcations	FCC-LISN-5-50-DEF-STAN59-41C	01005	N/A
Discretes Test Box	Rockwell Collins	N/A	NA	N/A
Power Supply	Elgar	1751SL	NA	N/A

FACILITY CABLES

I/O CABLE LIST				
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**
1	AC	1	AC	Unshielded
Note: This cable is shown on the diagram below for reference only. It is not part of the test setup boundary. It is part of the facility AC Mains distribution.				

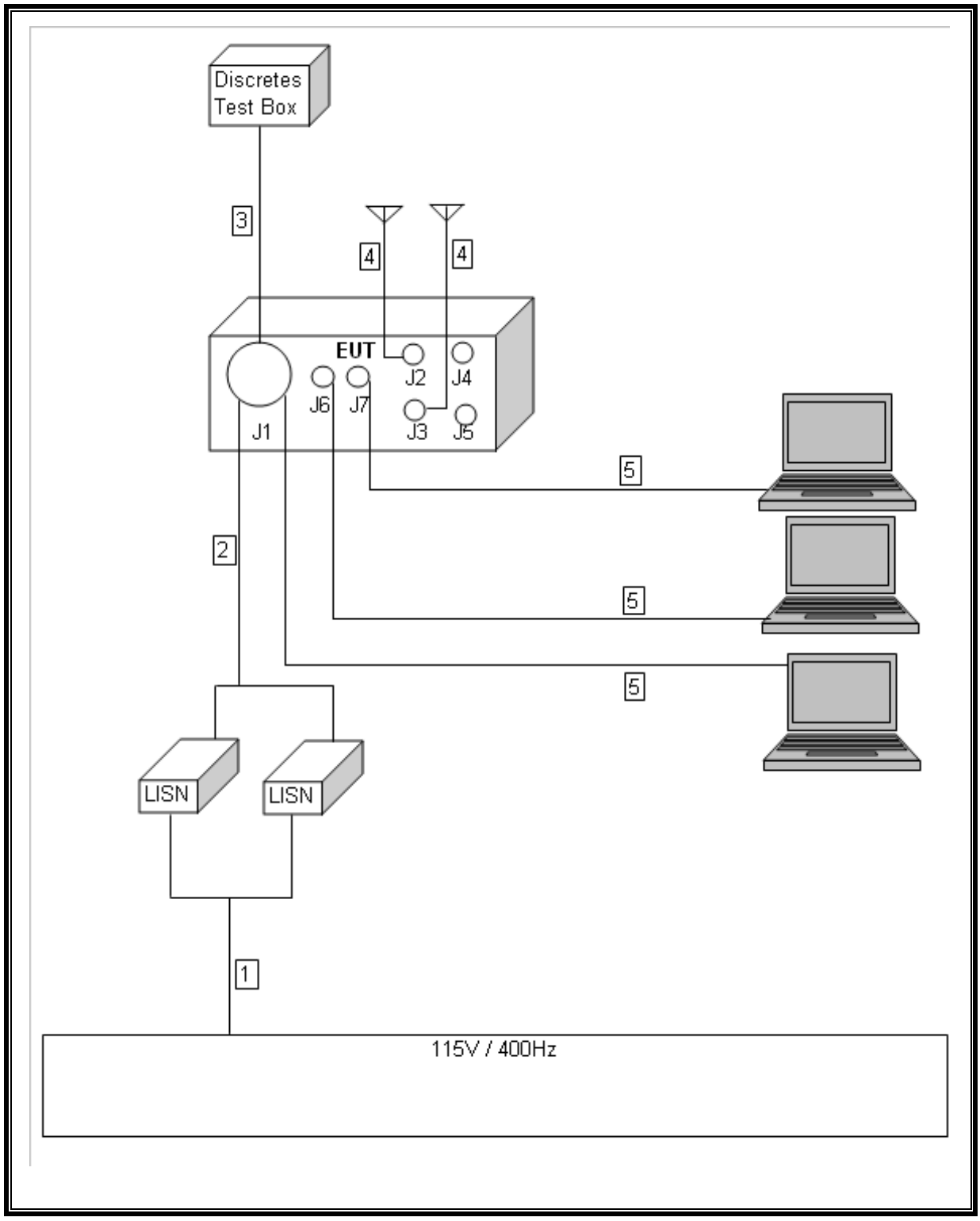
I/O CABLES

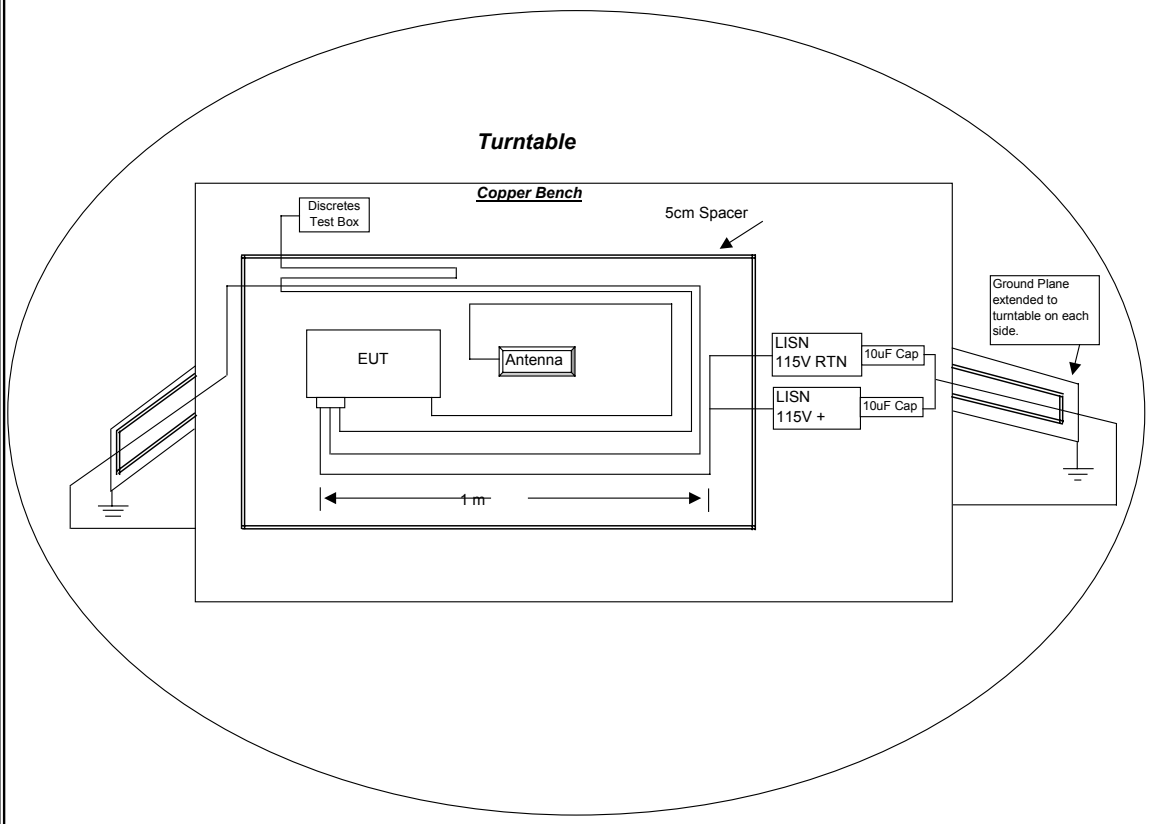
I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
2	J1	1	AC	Unshielded	1m	AC Input Bundle
3	J1	1	Signal	Unshielded	3.3m	Discretes Bundle
4	J1, J6, J7	3	RJ45	Shielded	3.3m	Ethernet Bundle

TEST SETUP

The EUT is placed on an 80 cm high tabletop, covered with a 0.5 mm copper sheet ground plane. The EUT, Discretes Test Box and LISNs are bonded to copper ground plane, which is bonded to turntable. All ethernet cables (ETH1, ETH2, & ETH3) isolated from ground plane with 5 cm foam pads. The power cable (3 wires) is is 1 m in length and is routed from the EUT to the LISNs. All I/O cables are 3.3 m in length. Test software exercised the radio card.

SETUP DIAGRAMS FOR TESTS





- EUT, Discretes Test Box, and LISNs bonded to bench which is bonded to turntable / chamber.
- Cables isolated from ground plane with 5cm spacer.
- Power Bundle: 1m to LISNs.
- I/O Cables: 3.3m total at 5cm above ground plane, first 1m alng front of setup.

1. Power Bundle - 3 wire
2. ETH 1, ETH 2, ETH 3 are bundled into single bundle.
3. Discretes Bundle.
4. Antenna Cable Lengths to match power output / antenna gain.
8dBi Patch: 18ft or 5.4864m
5dBi Airborne: 8ft or 2.4384m

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**
Quasi-Peak Adaptor	Agilent / HP	85650A	3145A01654	1/21/2008
SA Display Section 2	Agilent / HP	85662A	2816A16696	4/7/2008
Preamplifier, 1300 MHz	Agilent / HP	8447D	1937A02062	1/23/2007
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	MY43360112	5/3/2007
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	4/22/2007
Peak Power Meter	Agilent / HP	E4416A	GB41291160	12/2/2007
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A121003	9/3/2007
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00931	6/24/2007
4.0 GHz Highpass Filter	Micro-Tronics	HPM13351	1	CNR

6. LIMITS AND RESULTS

6.1. CHANNEL TESTS FOR THE 2400 TO 2483.5 MHz BAND

6.1.1. 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:

802.11b Mode

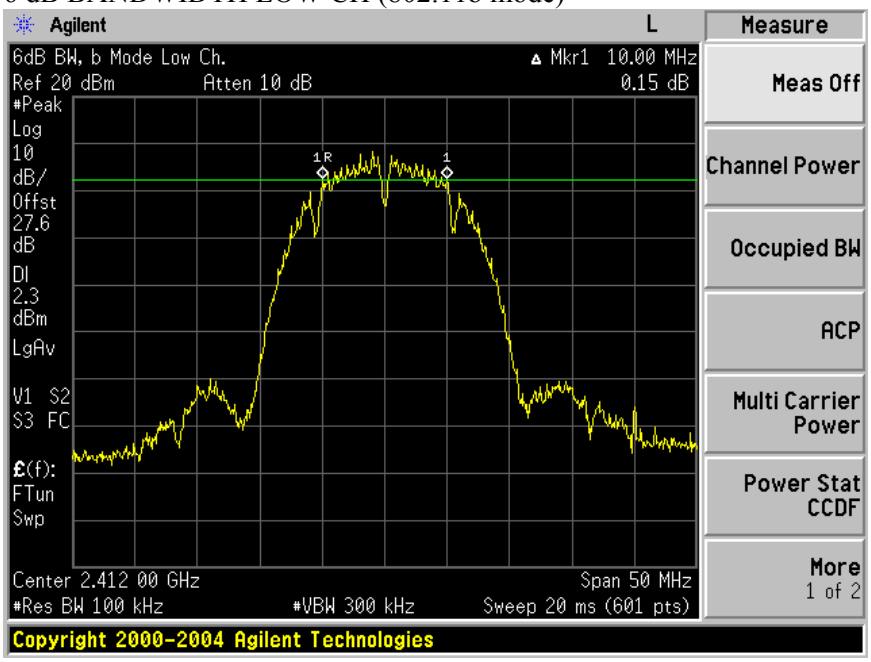
Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Margin (kHz)
Low	2412	10000	500	9500
Middle	2437	10000	500	9500
High	2462	9080	500	8580

802.11g Mode

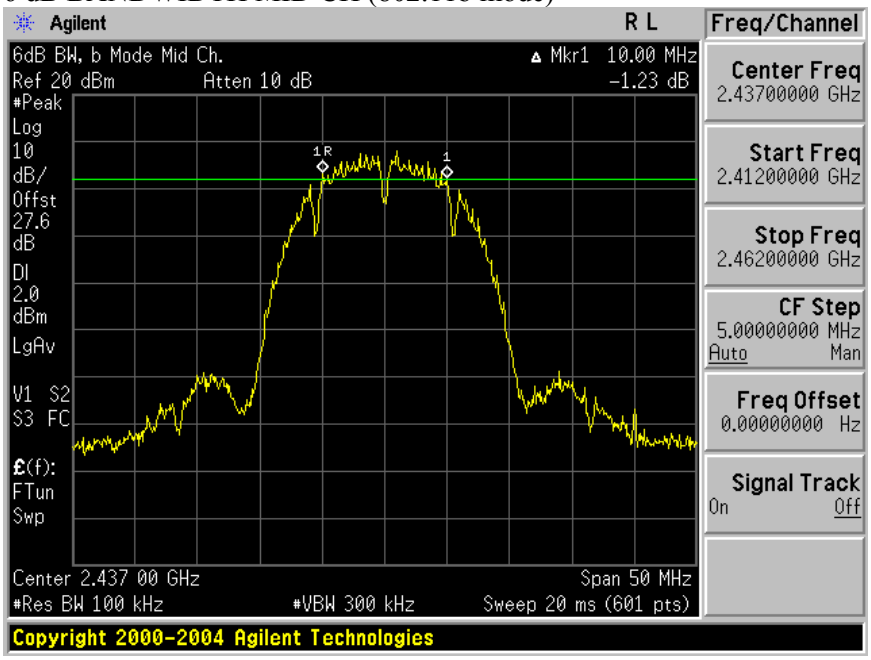
Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Margin (kHz)
Low	2412	16080	500	15580
Middle	2437	16080	500	15580
High	2462	15750	500	15250

6 dB BANDWIDTH (802.11b MODE)

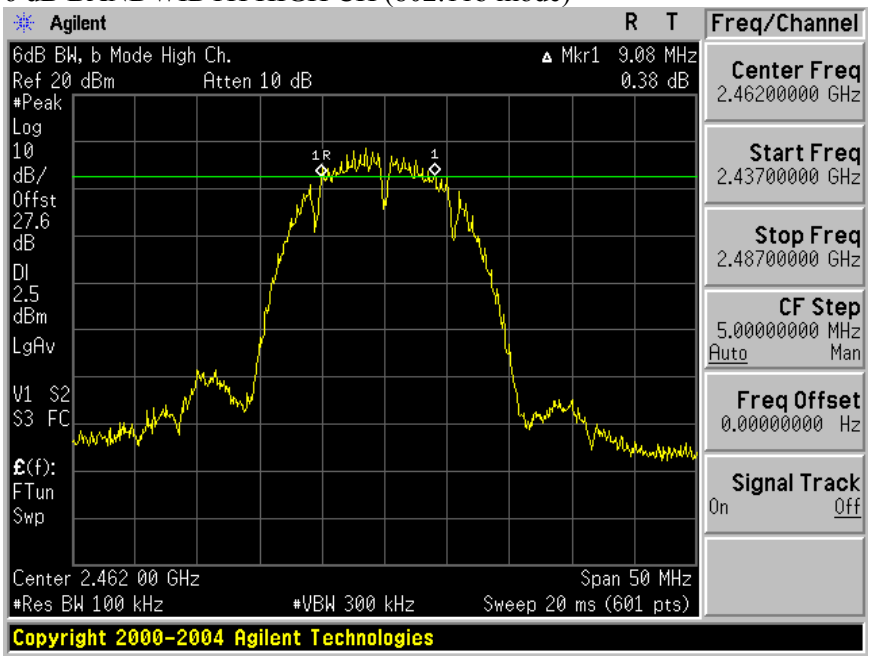
6 dB BANDWIDTH LOW CH (802.11b mode)



6 dB BANDWIDTH MID CH (802.11b mode)

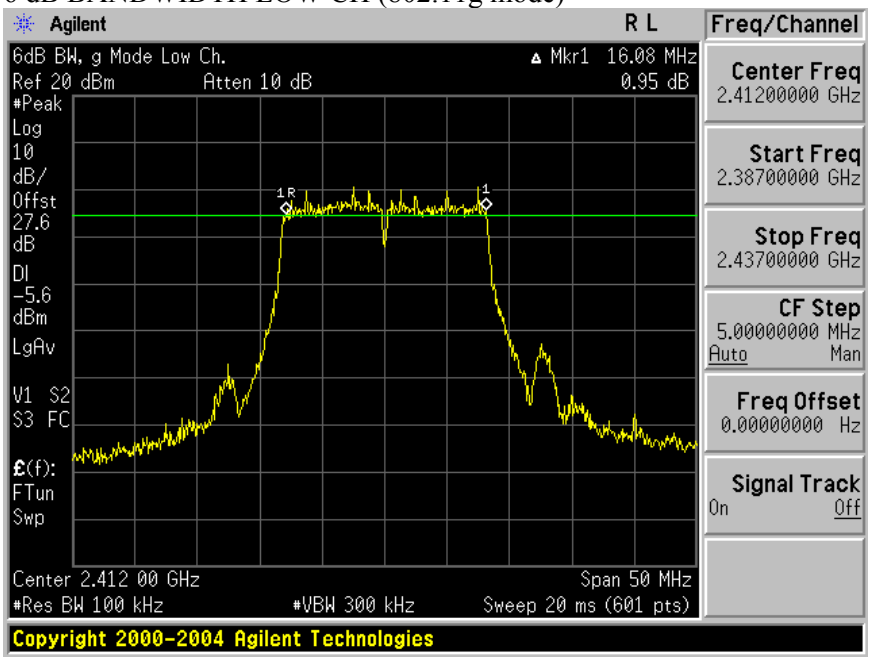


6 dB BANDWIDTH HIGH CH (802.11b mode)

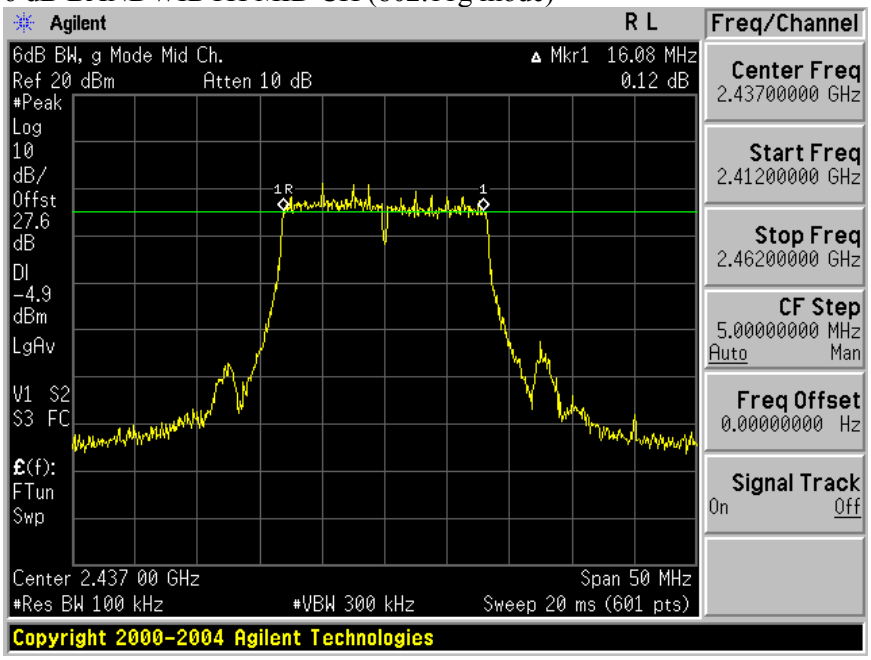


6 dB BANDWIDTH (802.11g MODE)

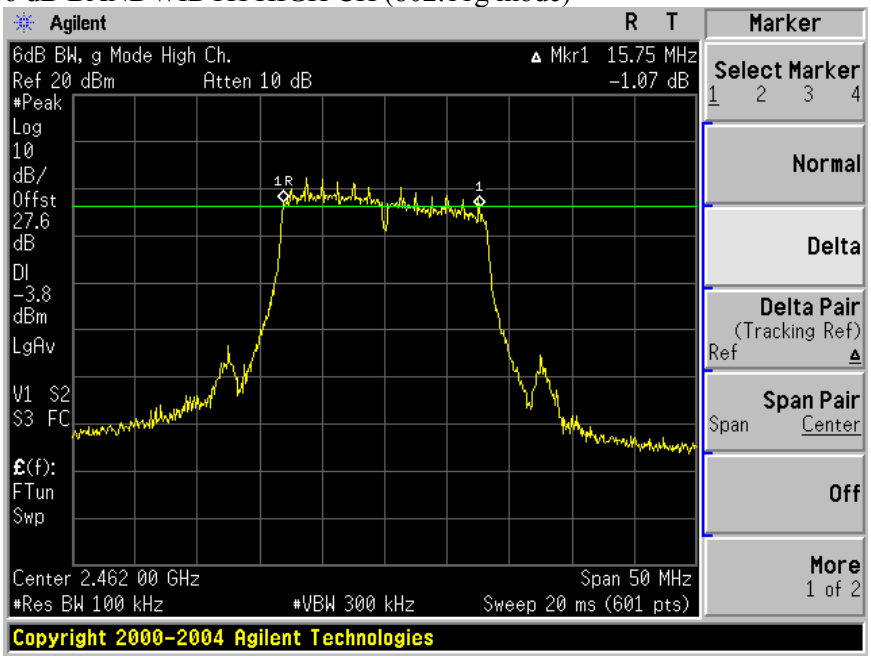
6 dB BANDWIDTH LOW CH (802.11g mode)



6 dB BANDWIDTH MID CH (802.11g mode)



6 dB BANDWIDTH HIGH CH (802.11g mode)



6.1.2. 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

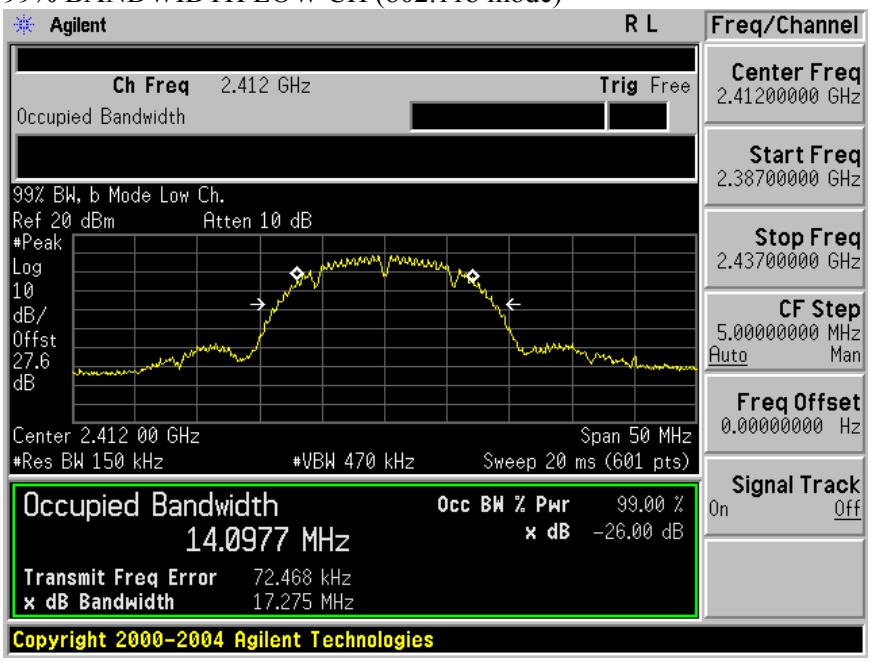
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	14.0977
Middle	2437	14.1549
High	2462	13.9636

802.11g Mode

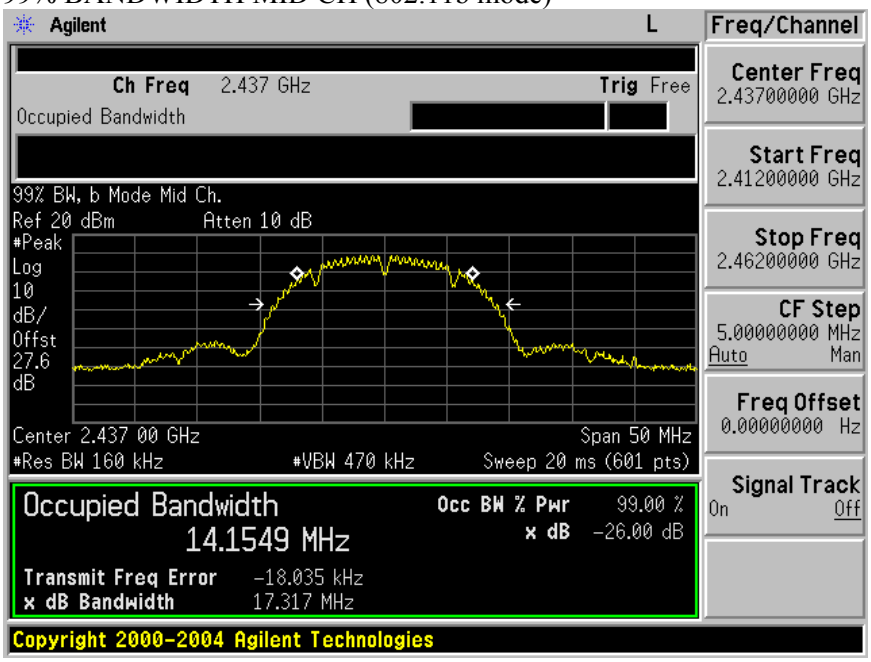
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.3436
Middle	2437	16.3484
High	2462	16.2749

99% BANDWIDTH (802.11b MODE)

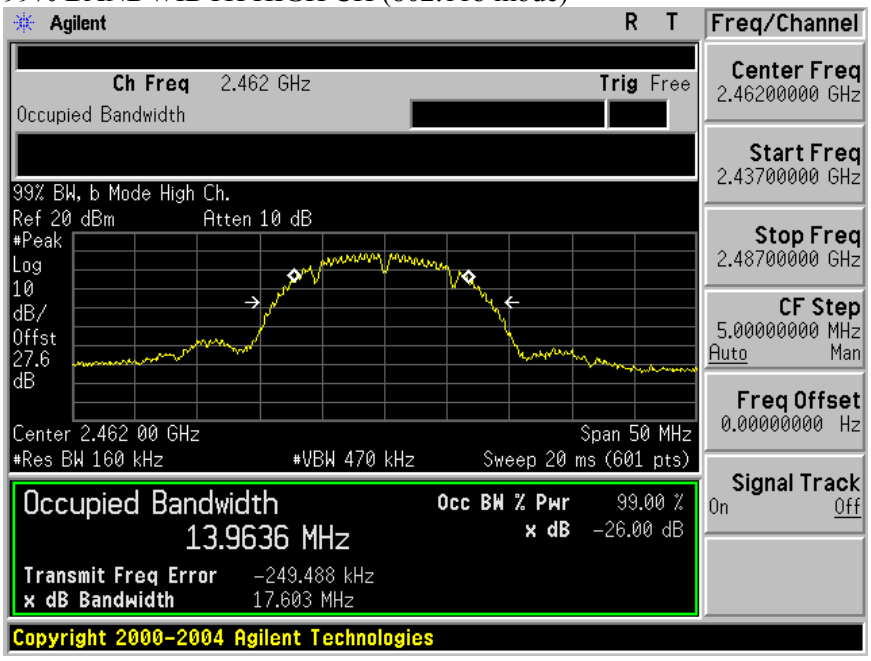
99% BANDWIDTH LOW CH (802.11b mode)



99% BANDWIDTH MID CH (802.11b mode)

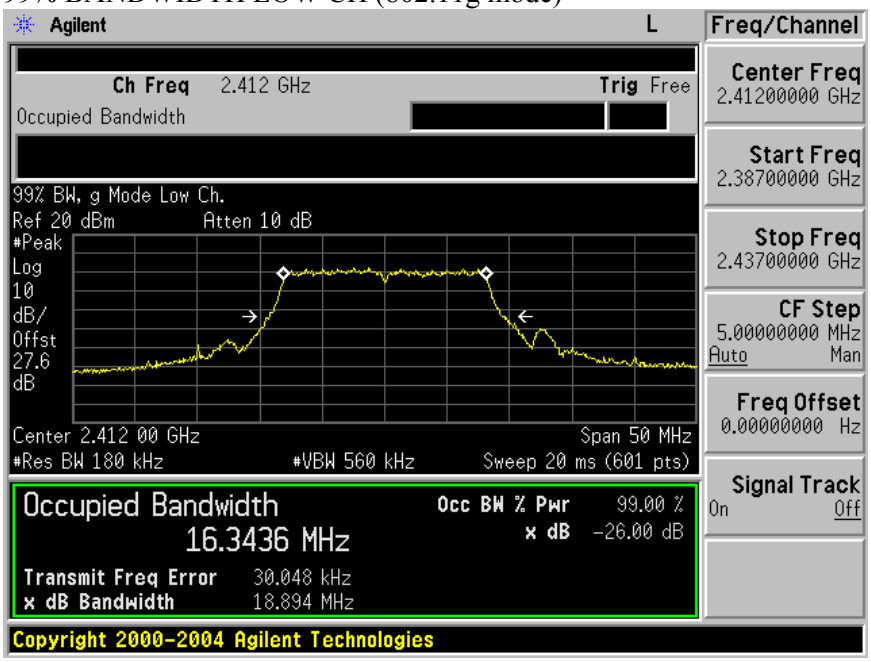


99% BANDWIDTH HIGH CH (802.11b mode)

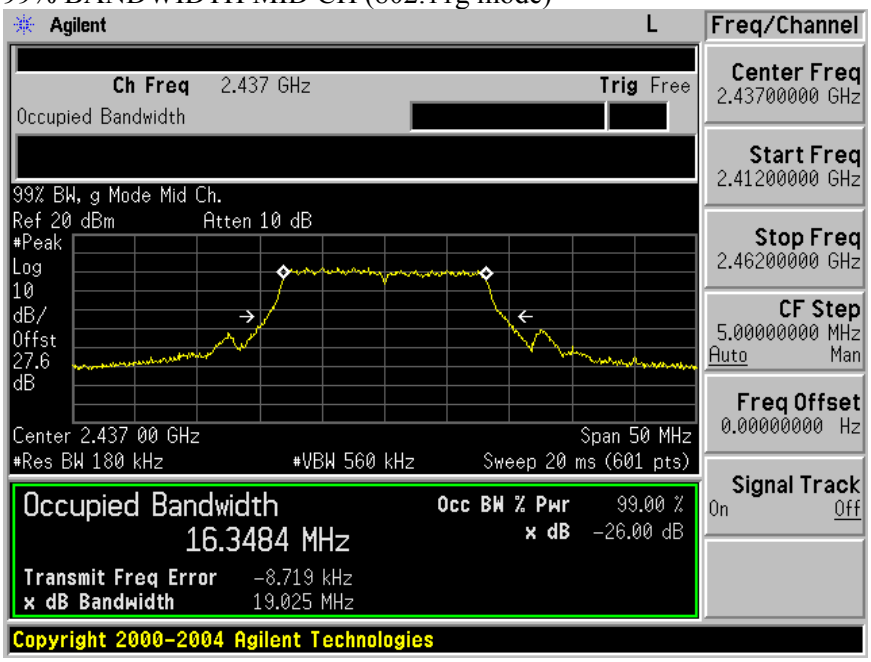


99% BANDWIDTH (802.11g MODE)

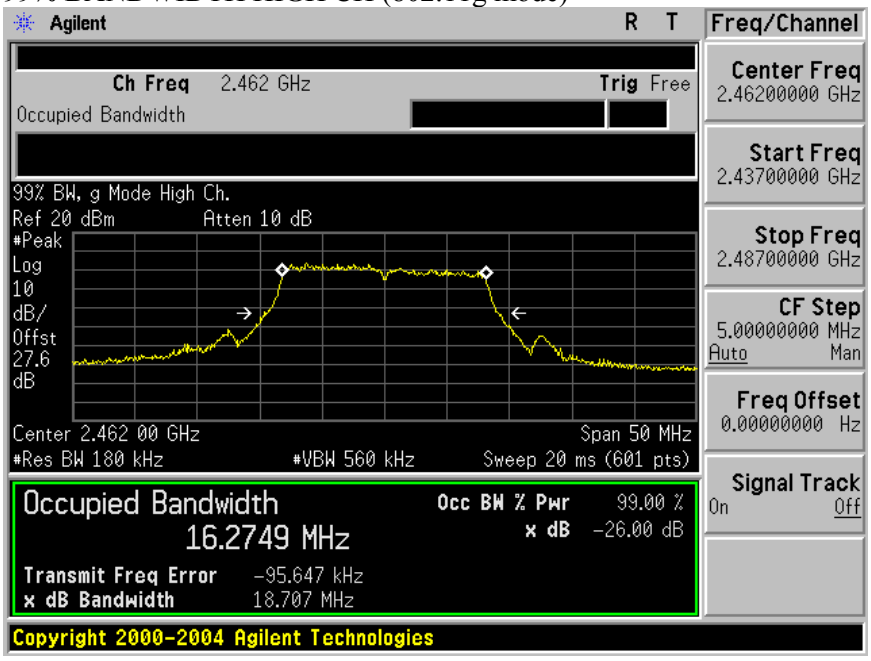
99% BANDWIDTH LOW CH (802.11g mode)



99% BANDWIDTH MID CH (802.11g mode)



99% BANDWIDTH HIGH CH (802.11g mode)



6.1.3. 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) (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in 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.

The test is performed in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005. The transmitter operates continuously therefore Power Output Option 2, Method # 1 is used.

RESULTS

The maximum antenna gain is 8dBi, therefore the limit is 28dBm.

No non-compliance noted:

802.11b Mode

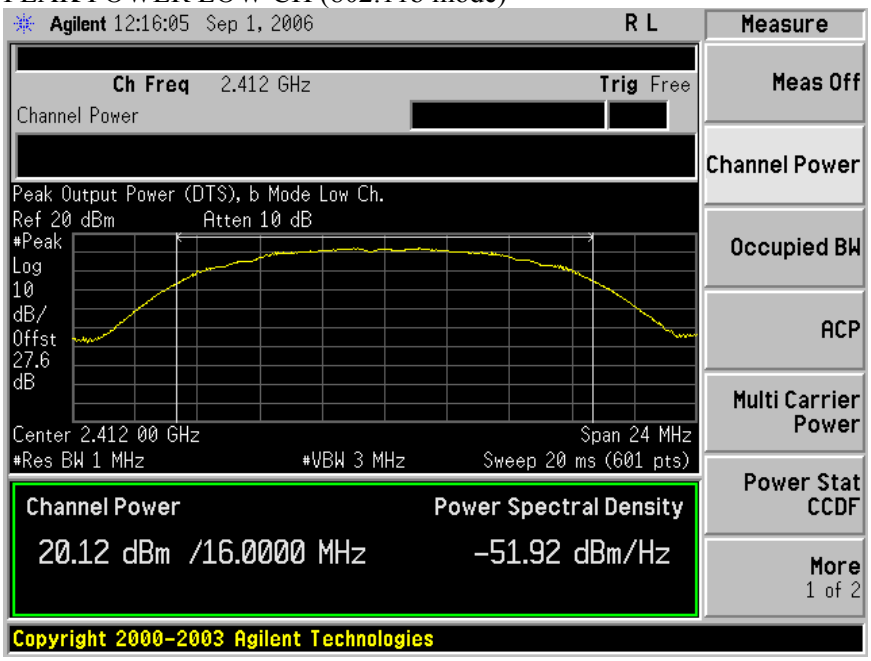
Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	20.12	28	-7.88
Middle	2437	20.08	28	-7.92
High	2462	19.99	28	-8.01

802.11g Mode

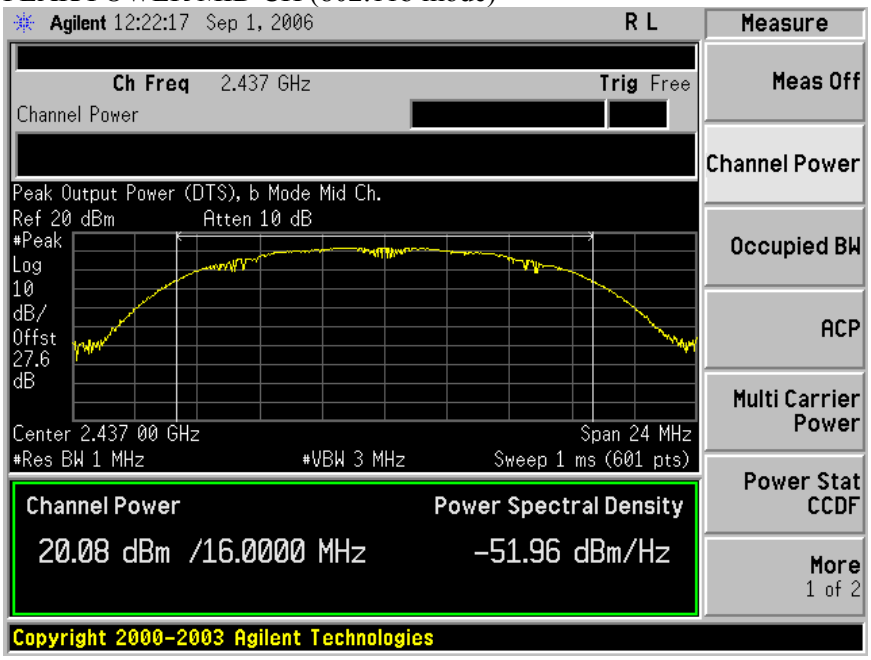
Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	19.70	28	-8.30
Middle	2437	19.63	28	-8.37
High	2462	19.73	28	-8.27

OUTPUT POWER (802.11b MODE)

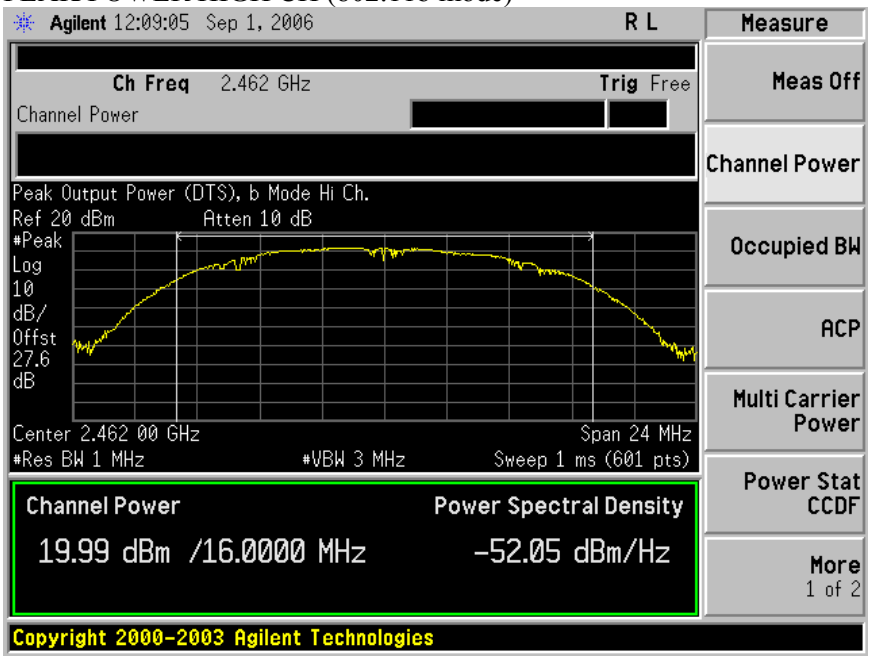
PEAK POWER LOW CH (802.11b mode)



PEAK POWER MID CH (802.11b mode)

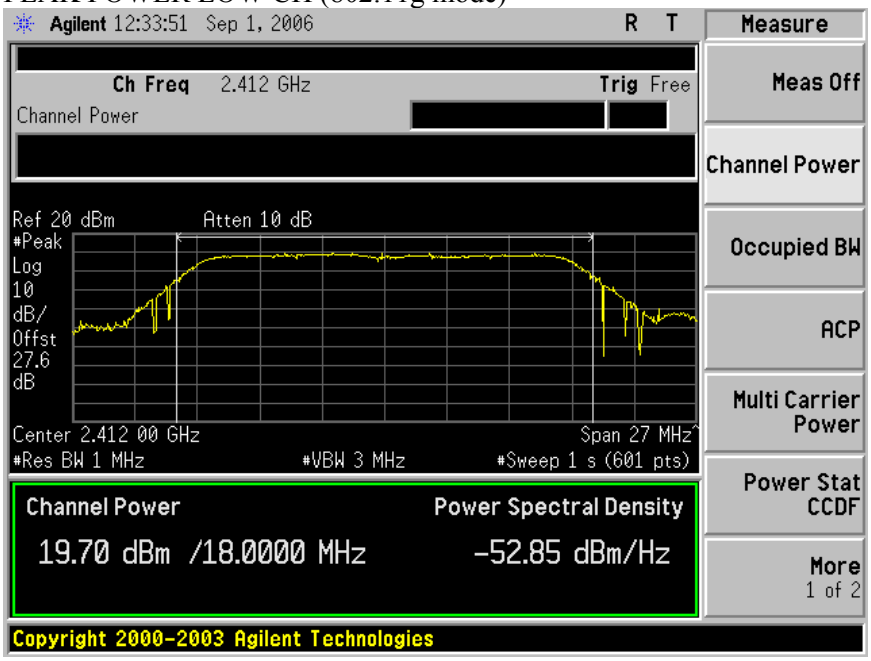


PEAK POWER HIGH CH (802.11b mode)

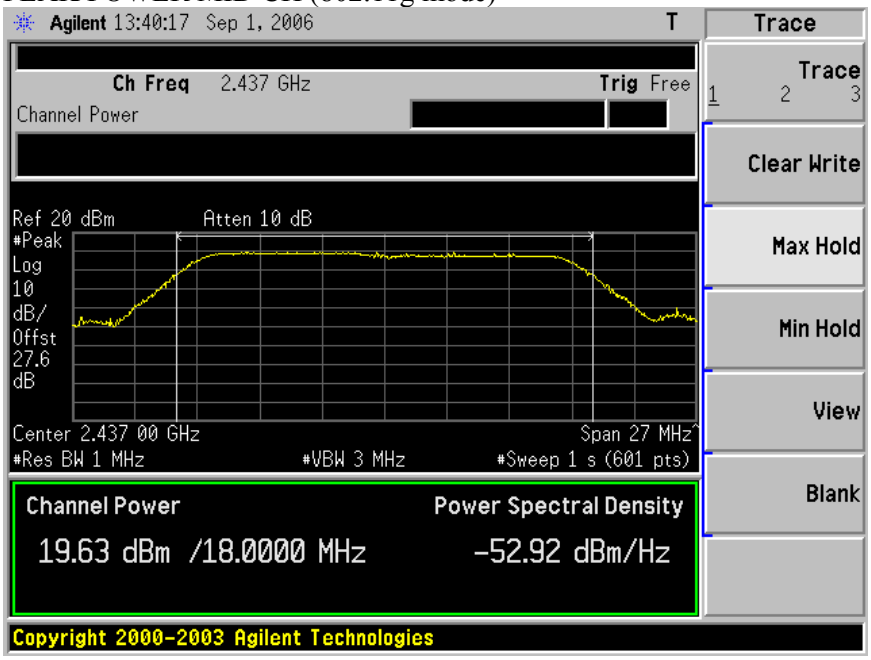


OUTPUT POWER (802.11g MODE)

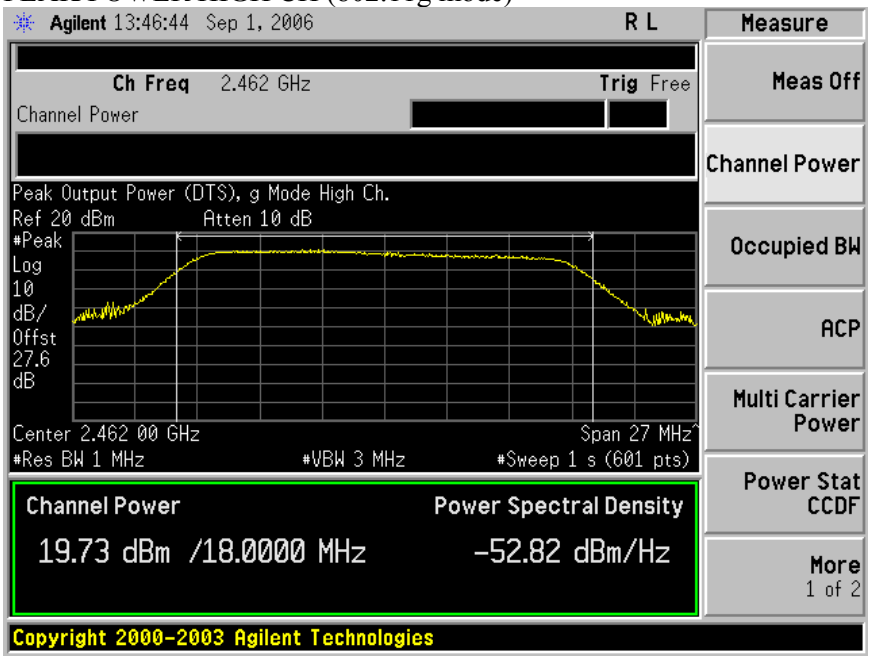
PEAK POWER LOW CH (802.11g mode)



PEAK POWER MID CH (802.11g mode)



PEAK POWER HIGH CH (802.11g mode)



6.1.4. MAXIMUM PERMISSIBLE EXPOSURE

LIMITS

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f^2)	6
30–300	61.4	0.163	1.0	6
300–1500	.....	.....	f/300	6
1500–100,000	.....	.....	5	6
(B) 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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
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

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

CALCULATIONS

Given

$E = \sqrt{(30 * P * G)} / d$

and

$S = E \wedge 2 / 377$

where

E = Field Strength in Volts/meter
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power Density in milliwatts/square centimeter

Combining equations and rearranging the terms to express the distance as a function of the remaining variables yields:

$d = \sqrt{((30 * P * G) / (377 * S))}$

Changing to units of Power to mW and Distance to cm, using:

P (mW) = P (W) / 1000 and
d (cm) =100 * d (m)

yields

$d = 100 * \sqrt{((30 * (P / 1000) * G) / (377 * S))}$
$d = 0.282 * \sqrt{(P * G / S)}$

where

d = distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power Density in mW/cm^2

Substituting the logarithmic form of power and gain using:

P (mW) = 10 ^ (P (dBm) / 10) and
G (numeric) = 10 ^ (G (dBi) / 10)

yields

$d = 0.282 * 10 \wedge ((P + G) / 20) / \sqrt{S}$

where

d = MPE distance in cm
P = Power in dBm
G = Antenna Gain in dBi
S = Power Density Limit in mW/cm^2

Rearranging terms to calculate the power density at a specific distance yields

$S = 0.0795 * 10 \wedge ((P + G) / 10) / (d^2)$

LIMITS

From §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm^2

RESULTS

Mode	MPE Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm^2)
802.11b	20.0	20.12	8.00	0.13
802.11g	20.0	19.73	8.00	0.12

NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.

6.1.5. AVERAGE POWER

AVERAGE POWER LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

No non-compliance noted:

The cable assembly insertion loss of 27.6 dB (including 20 dB pad, 6.5 dB power splitter, and 1.2 dBi cable) was entered as an offset in the power meter to allow for direct reading of power.

802.11b Mode

Channel	Frequency (MHz)	Power (dBm)
Low	2412	16.90
Middle	2437	17.16
High	2462	16.80

802.11g Mode

Channel	Frequency (MHz)	Power (dBm)
Low	2412	14.44
Middle	2437	14.35
High	2462	14.63

6.1.6. PEAK POWER SPECTRAL DENSITY

LIMIT

§15.247 (d) For direct sequence systems, the peak 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.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer, the maximum level in a 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.

RESULTS

No non-compliance noted:

802.11b Mode

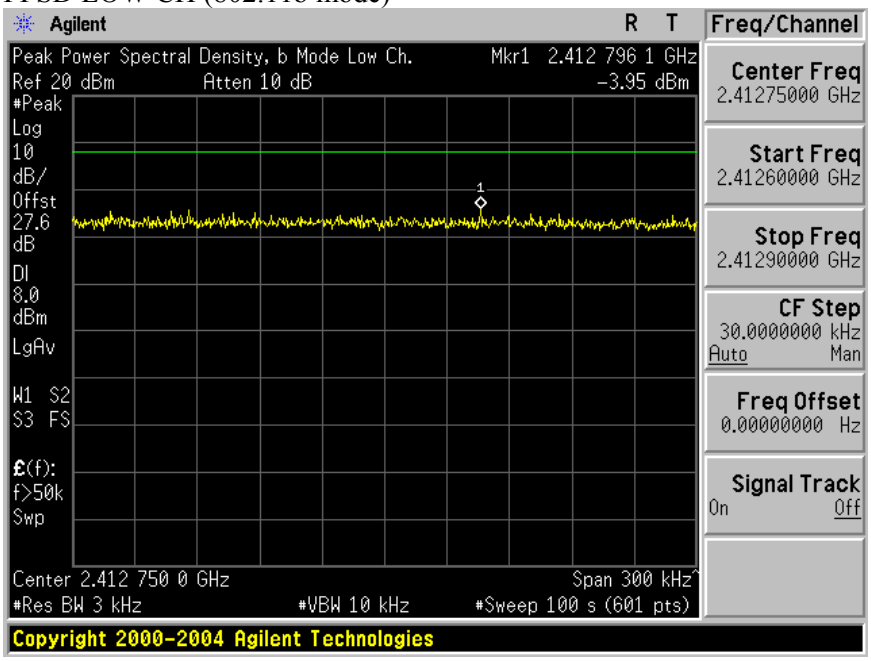
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-3.95	8	-11.95
Middle	2437	-4.42	8	-12.42
High	2462	-5.64	8	-13.64

802.11g Mode

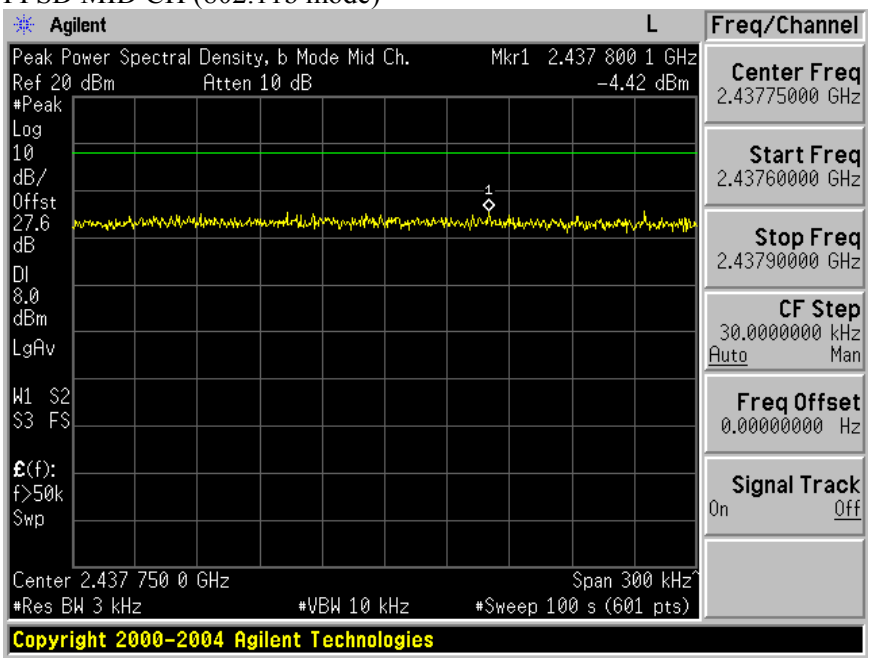
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-12.97	8	-20.97
Middle	2437	-13.11	8	-21.11
High	2462	-10.86	8	-18.86

PEAK POWER SPECTRAL DENSITY (802.11b MODE)

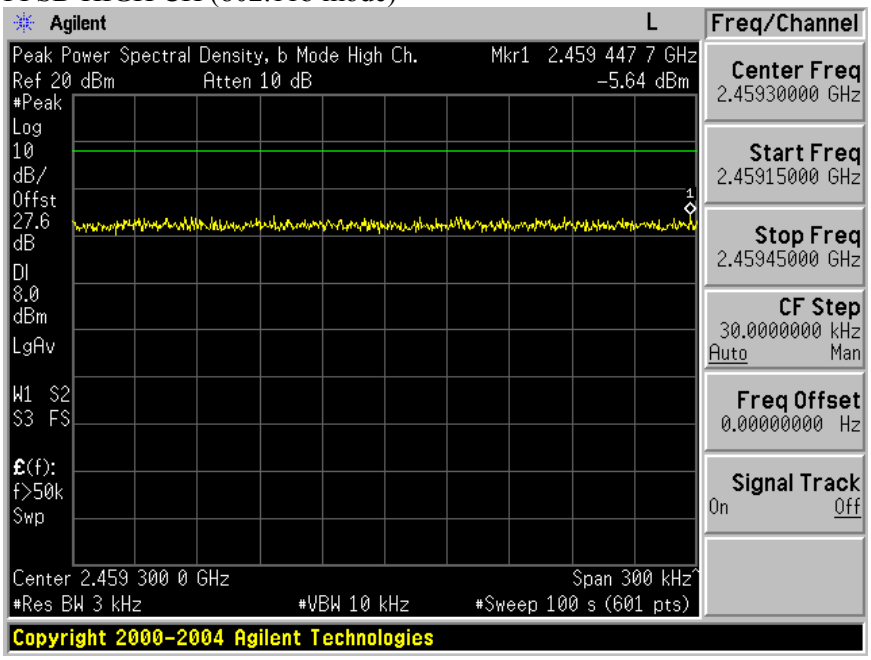
PPSD LOW CH (802.11b mode)



PPSD MID CH (802.11b mode)

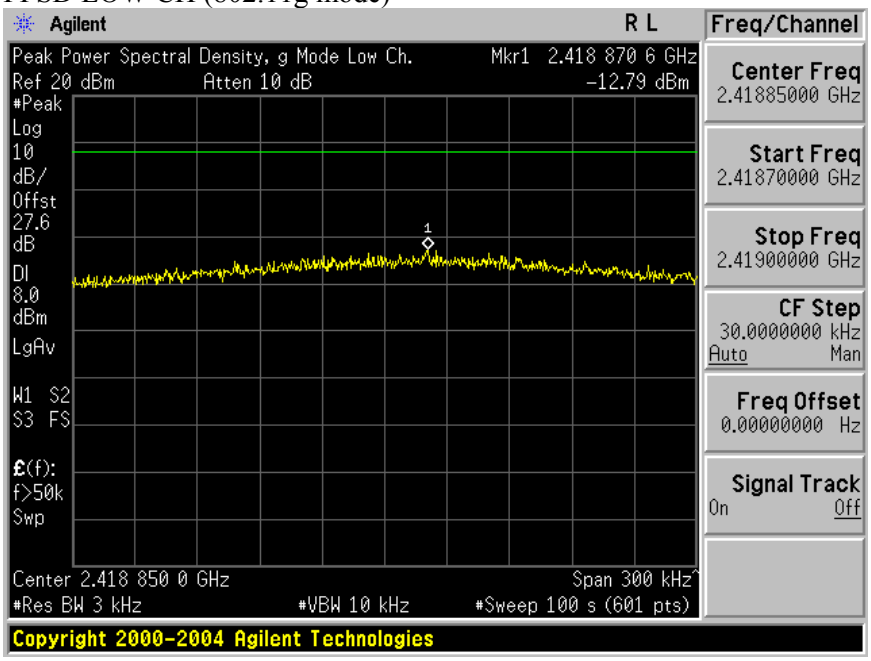


PPSD HIGH CH (802.11b mode)

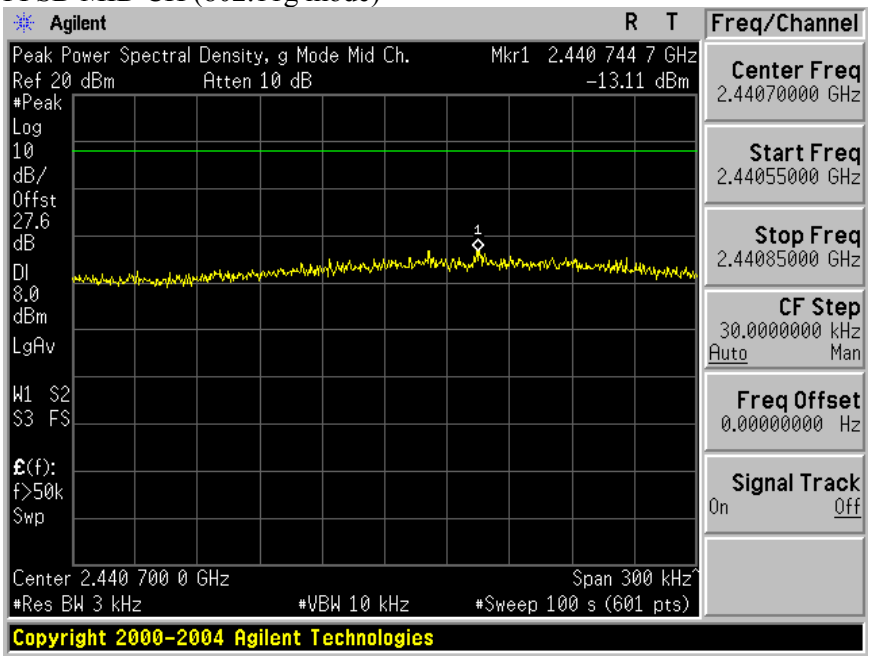


PEAK POWER SPECTRAL DENSITY (802.11g MODE)

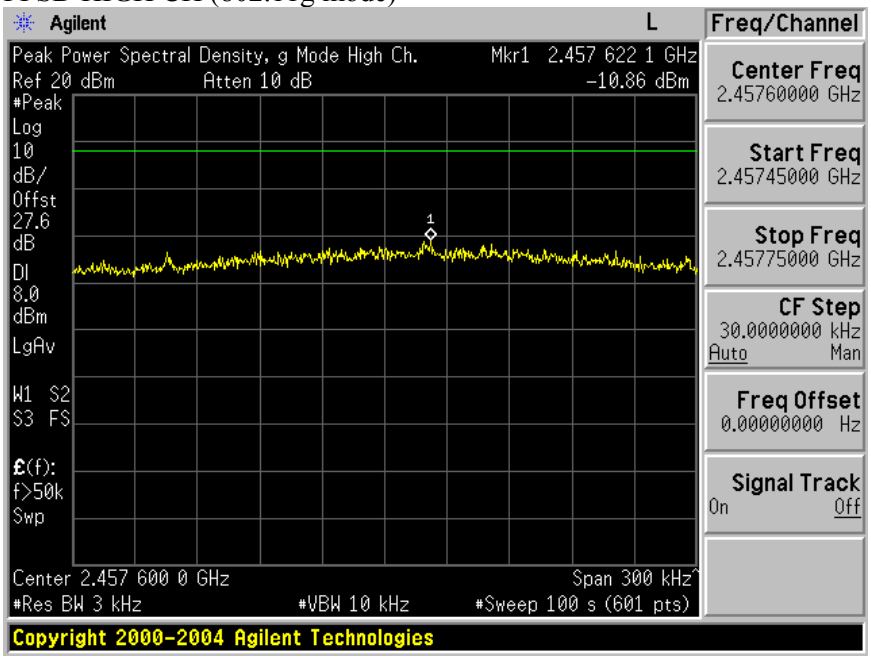
PPSD LOW CH (802.11g mode)



PPSD MID CH (802.11g mode)



PPSD HIGH CH (802.11g mode)



6.1.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

§15.247 (c) In any 100 kHz bandwidth outside the frequency band 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. 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 PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

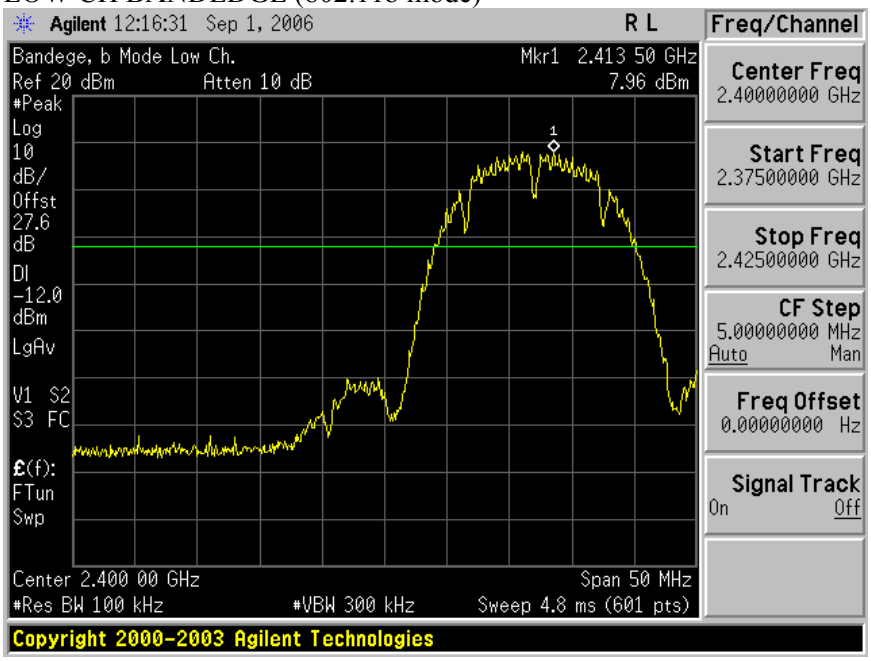
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

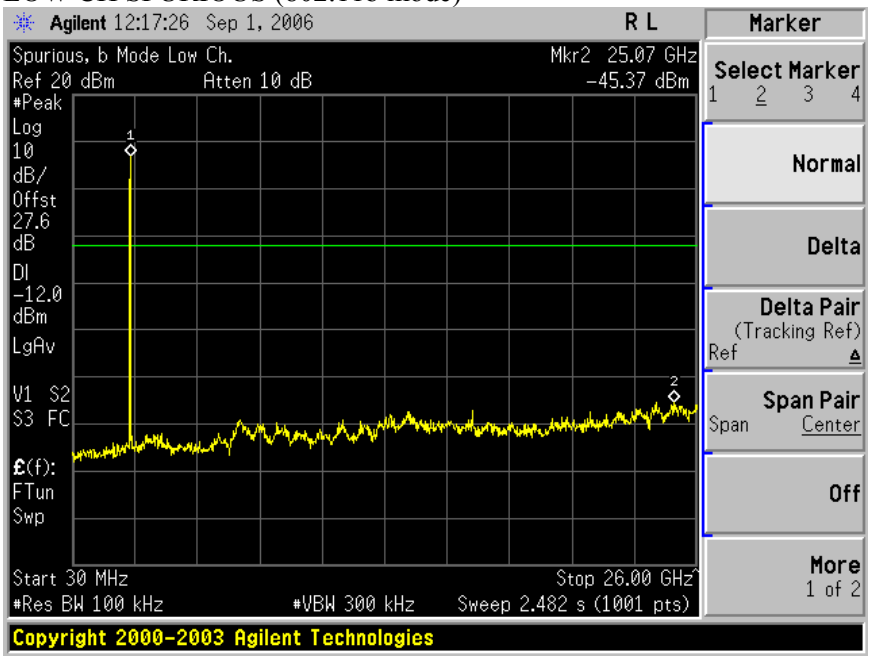
No non-compliance noted:

SPURIOUS EMISSIONS, LOW CHANNEL (802.11b MODE)

LOW CH BANDEDGE (802.11b mode)

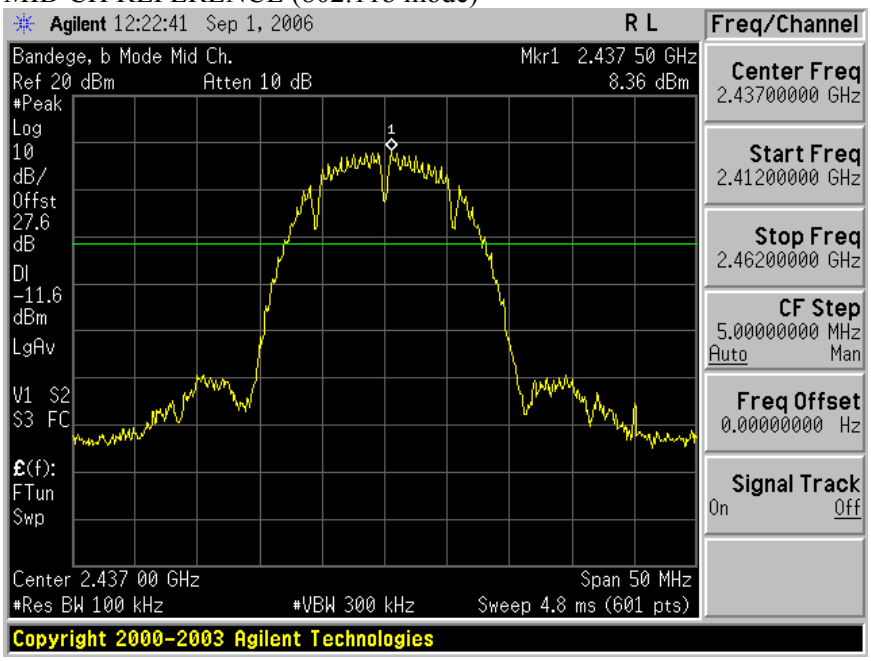


LOW CH SPURIOUS (802.11b mode)

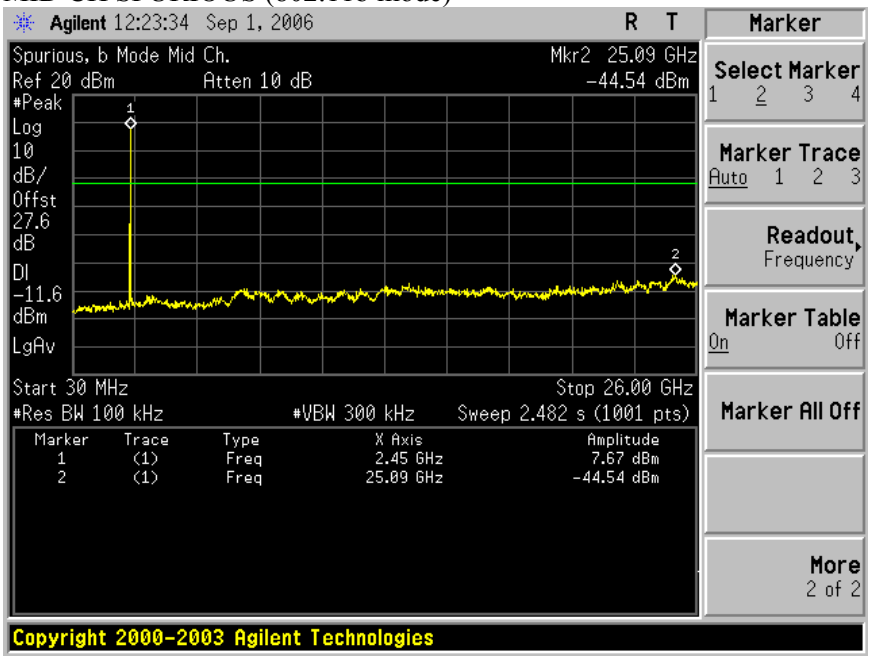


SPURIOUS EMISSIONS, MID CHANNEL (802.11b MODE)

MID CH REFERENCE (802.11b mode)

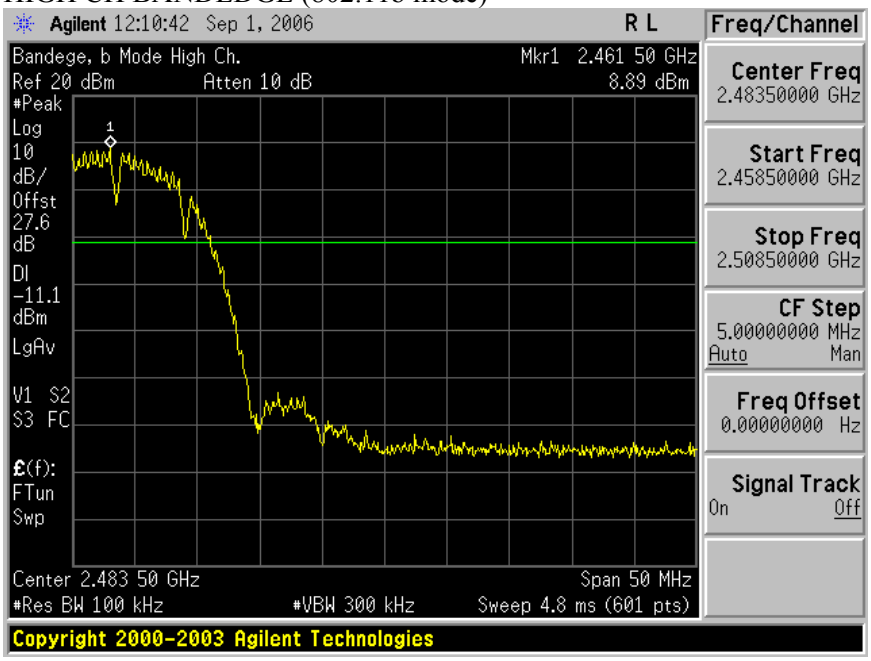


MID CH SPURIOUS (802.11b mode)

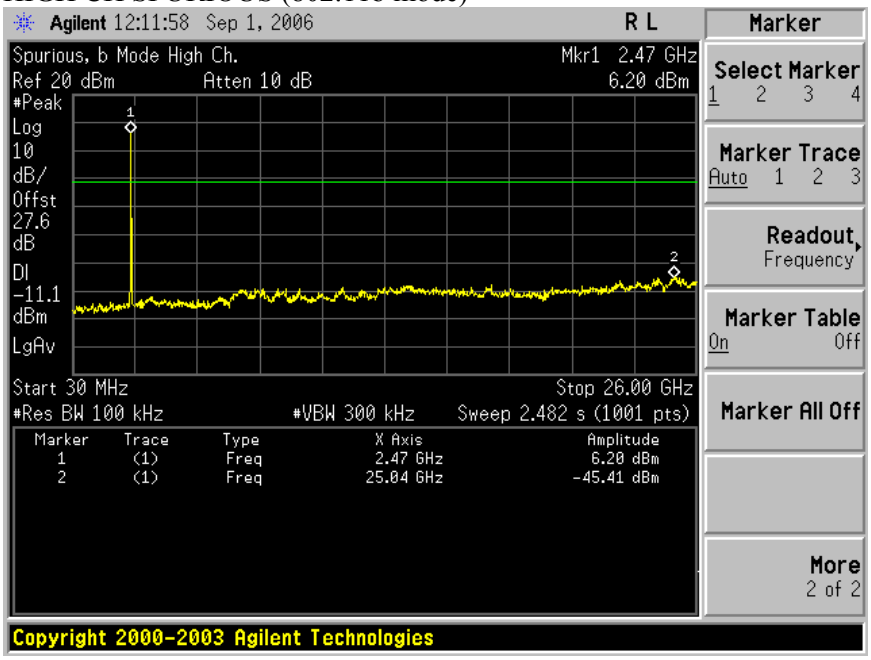


SPURIOUS EMISSIONS, HIGH CHANNEL (802.11b MODE)

HIGH CH BANDEDGE (802.11b mode)

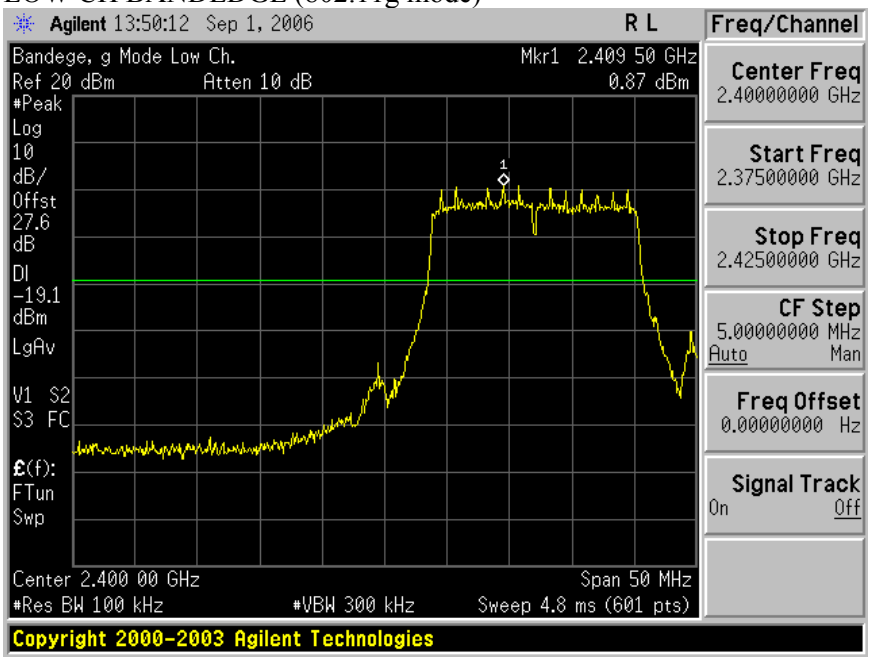


HIGH CH SPURIOUS (802.11b mode)

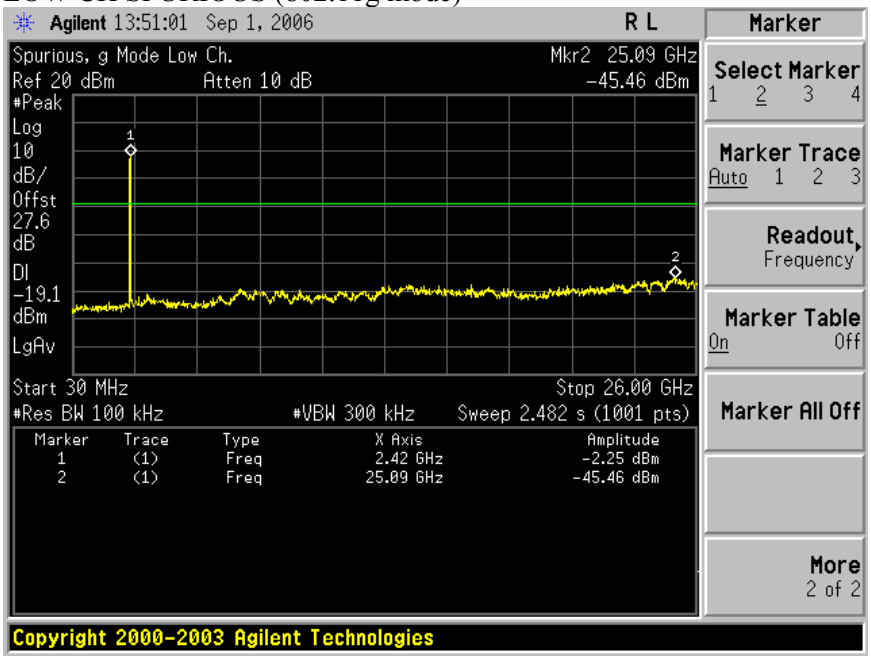


SPURIOUS EMISSIONS, LOW CHANNEL (802.11g MODE)

LOW CH BANDEDGE (802.11g mode)

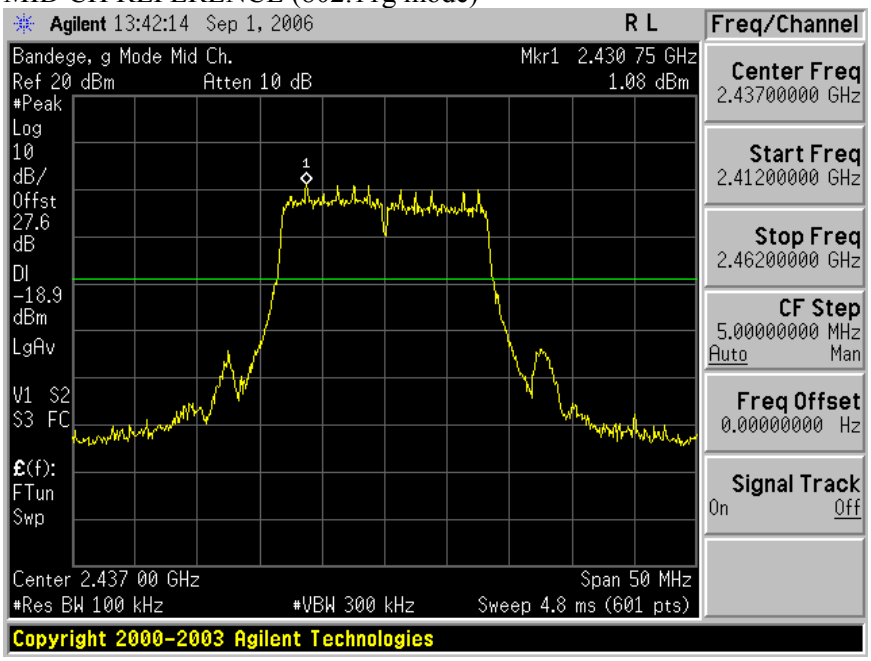


LOW CH SPURIOUS (802.11g mode)

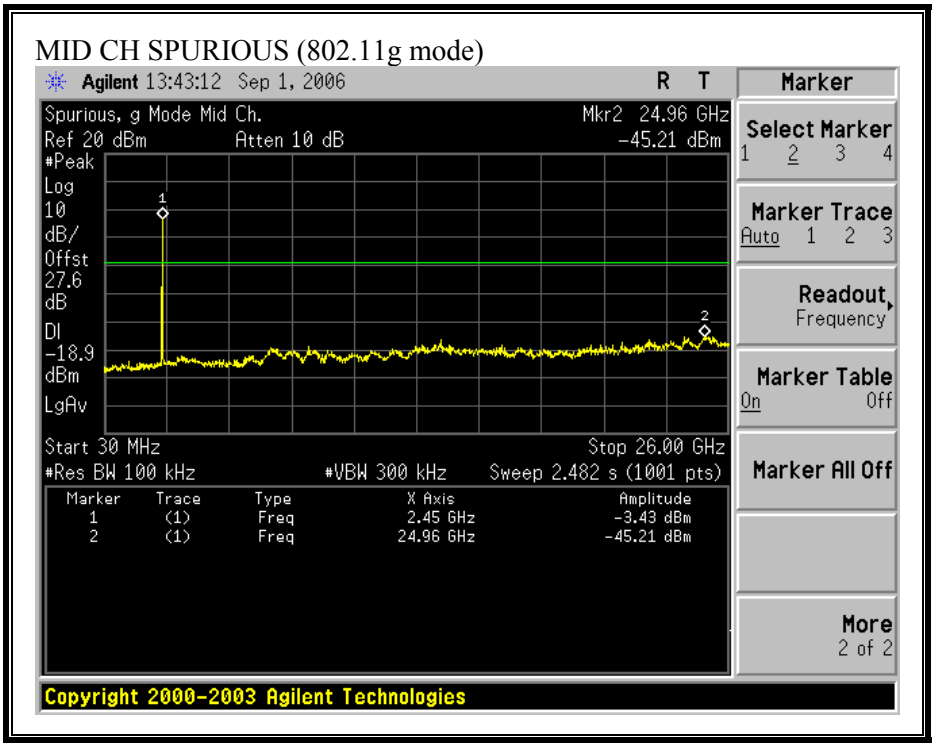


SPURIOUS EMISSIONS, MID CHANNEL (802.11g MODE)

MID CH REFERENCE (802.11g mode)

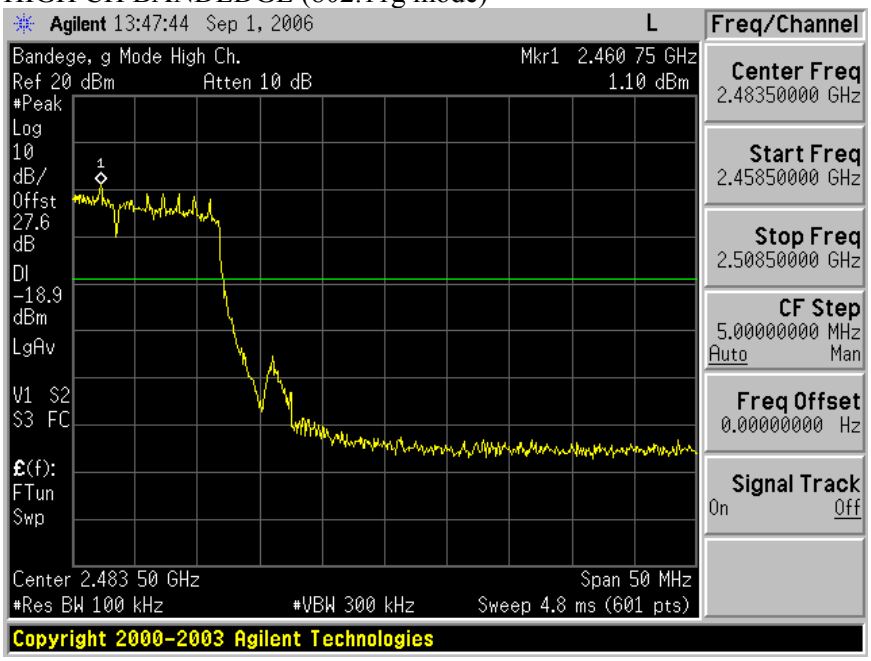


MID CH SPURIOUS (802.11g mode)

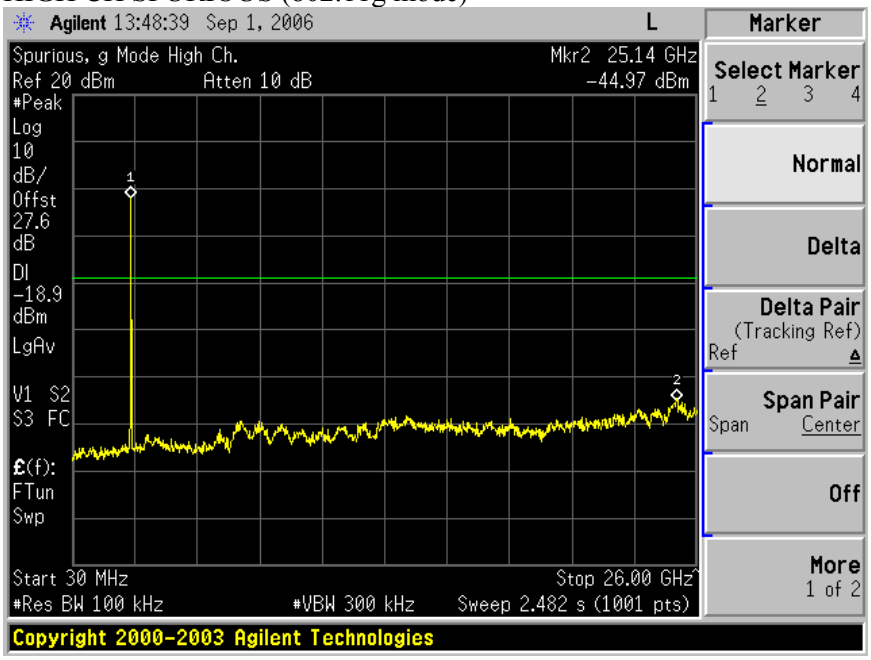


SPURIOUS EMISSIONS, HIGH CHANNEL (802.11g MODE)

HIGH CH BANDEDGE (802.11g mode)



HIGH CH SPURIOUS (802.11g mode)



6.2. RADIATED EMISSIONS

6.2.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

LIMITS

§15.205 (a) Except as shown 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	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§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)
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.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

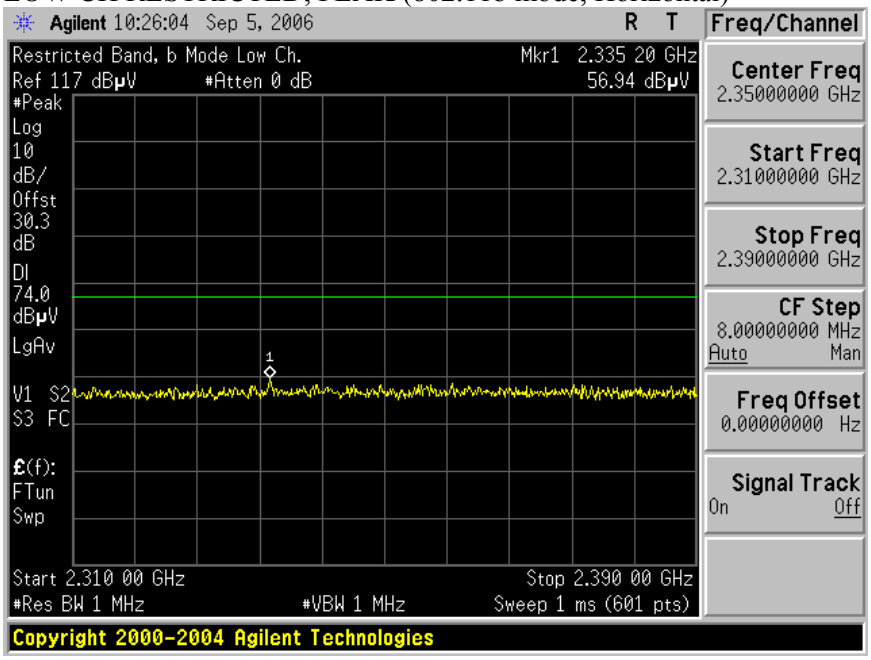
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 5 GHz band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

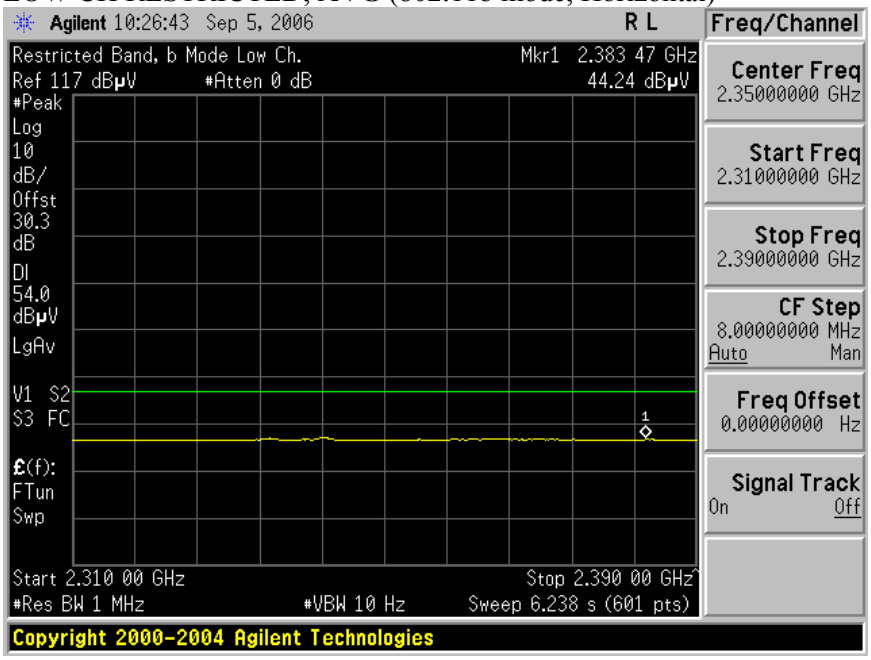
6.2.2. TRANSMITTER ABOVE 1 GHz WITH BLADE ANTENNA

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (802.11b mode, Horizontal)

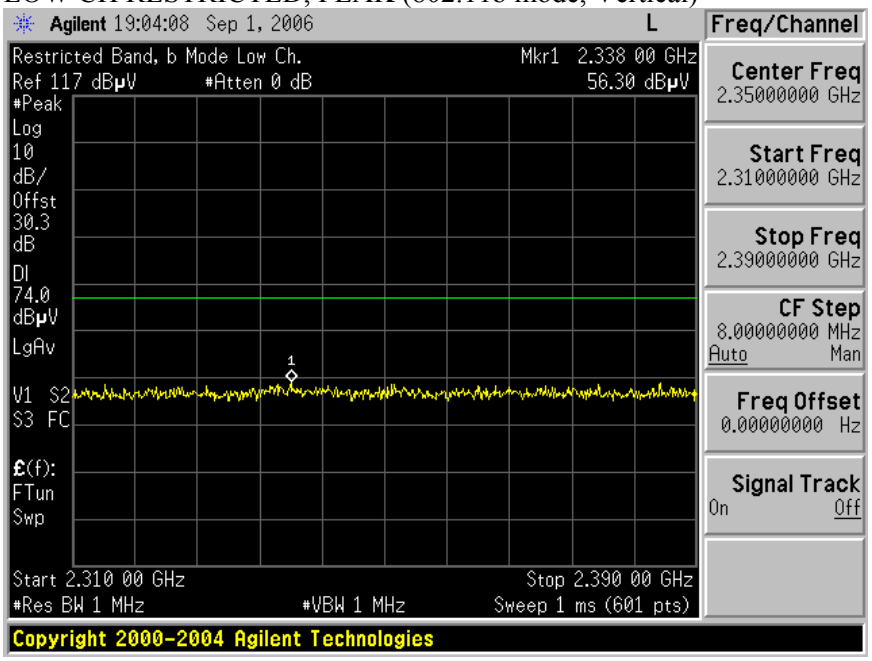


LOW CH RESTRICTED, AVG (802.11b mode, Horizontal)

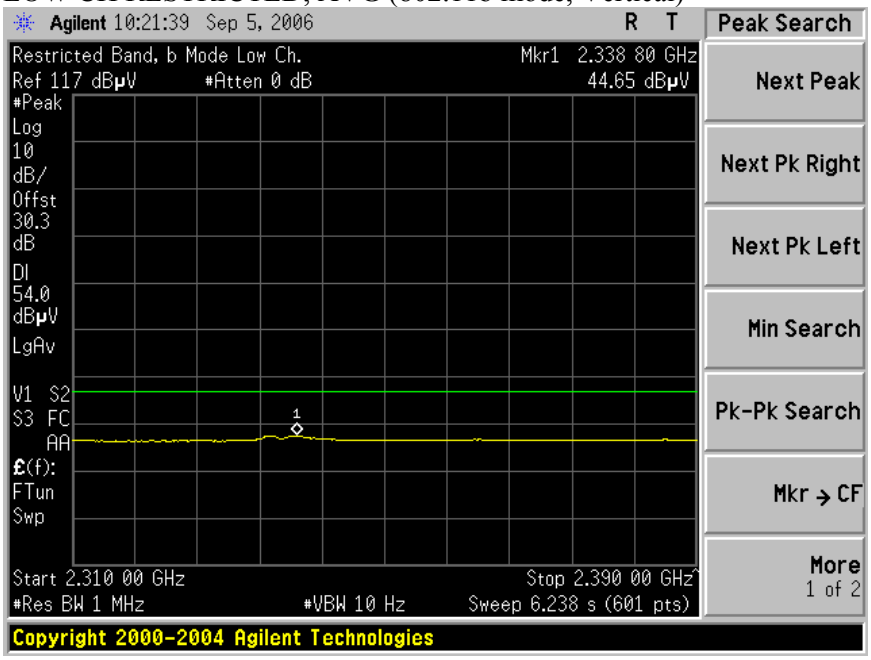


RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (802.11b mode, Vertical)

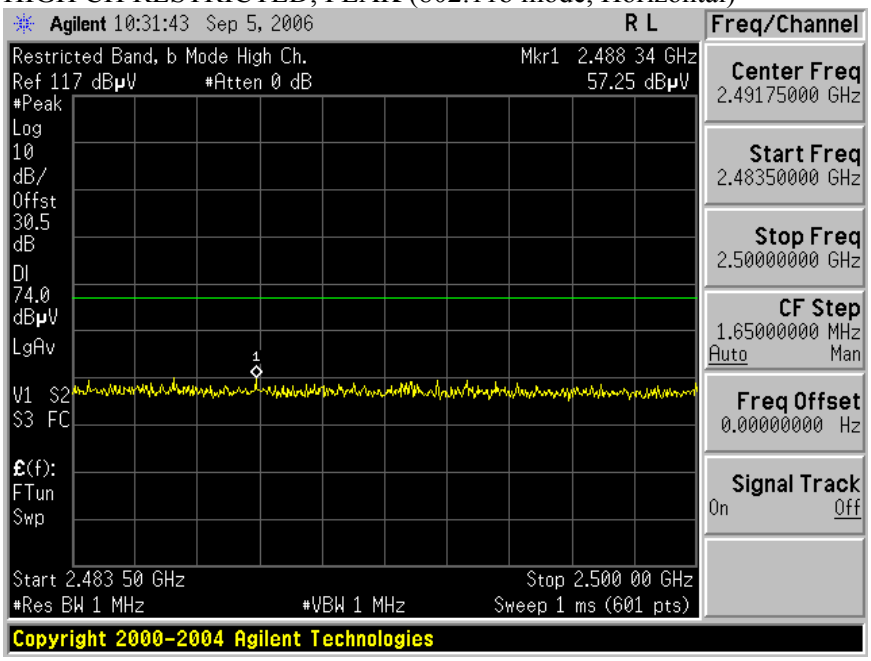


LOW CH RESTRICTED, AVG (802.11b mode, Vertical)

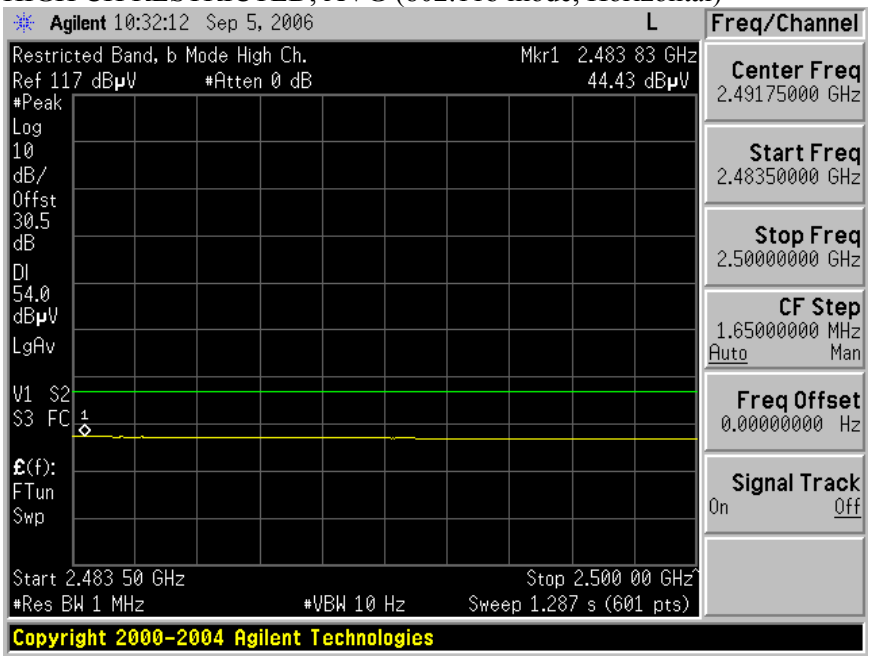


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (802.11b mode, Horizontal)

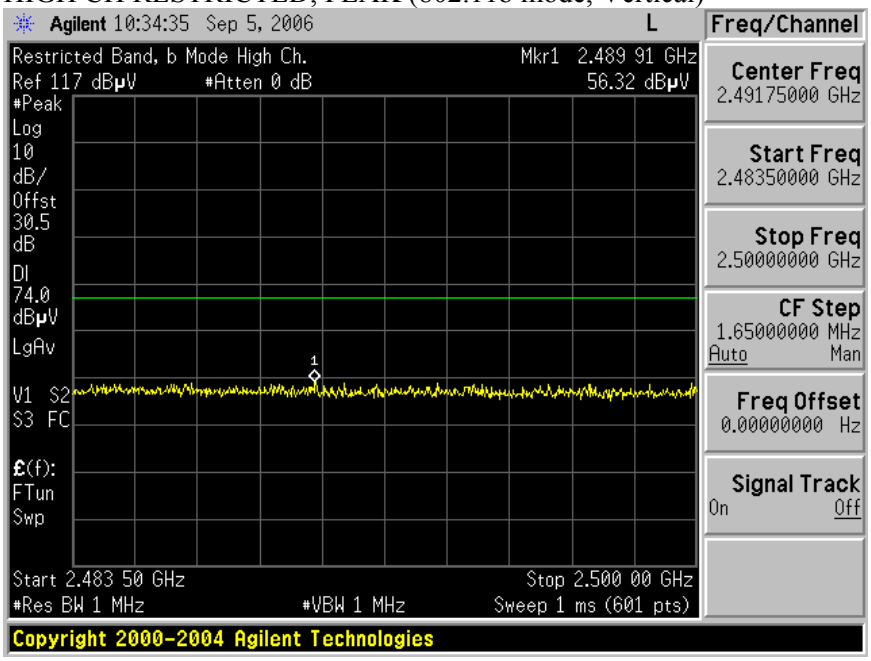


HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)

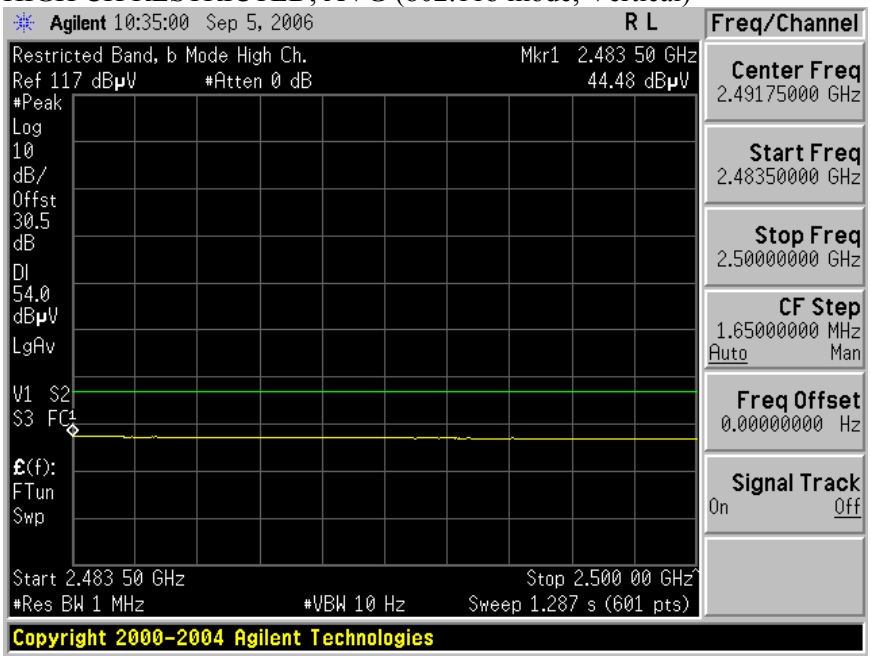


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (802.11b mode, Vertical)



HIGH CH RESTRICTED, AVG (802.11b mode, Vertical)



HARMONICS AND SPURIOUS EMISSIONS (b MODE)

High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Company: Rockwell Collins
Project #: 06U10550
Date: 09/05/06
Test Engineer: Vien Tran
Configuration: EUT with Aerodynamic Blade Antenna (5dBi)
Mode: Tx 11b mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC Class B

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Vien 187215002	Vien 197209005	HPF_4.0GHz	

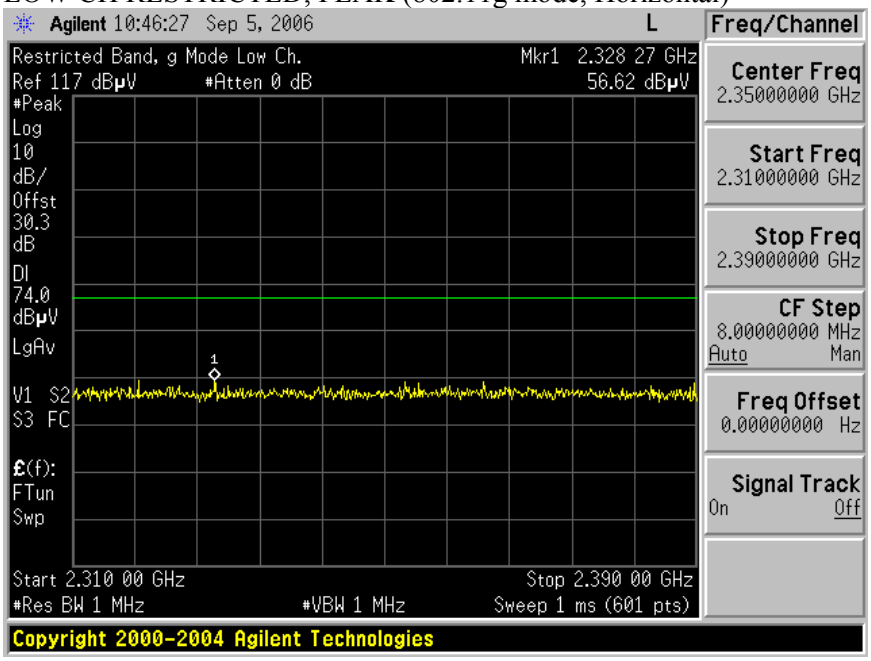
Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 2412 MHz															
4.824	3.0	45.6	32.6	33.3	2.9	-36.5	0.0	0.6	46.0	33.0	74	54	-28.0	-21.0	V
4.824	3.0	44.5	31.9	33.3	2.9	-36.5	0.0	0.6	44.9	32.3	74	54	-29.1	-21.7	H
MID CHANNEL, 2437 MHz															
4.874	3.0	44.8	32.6	33.4	3.0	-36.5	0.0	0.6	45.3	33.1	74	54	-28.7	-20.9	V
4.874	3.0	43.8	31.7	33.4	3.0	-36.5	0.0	0.6	44.3	32.2	74	54	-29.7	-21.8	H
HI CHANNEL, 2462 MHz															
4.924	3.0	43.7	32.7	33.4	3.1	-36.5	0.0	0.6	44.3	33.3	74	54	-29.7	-20.7	V
4.924	3.0	42.9	30.9	33.4	3.1	-36.5	0.0	0.6	43.5	31.5	74	54	-30.5	-22.5	H
No other emissiond were detected above system noise floor															

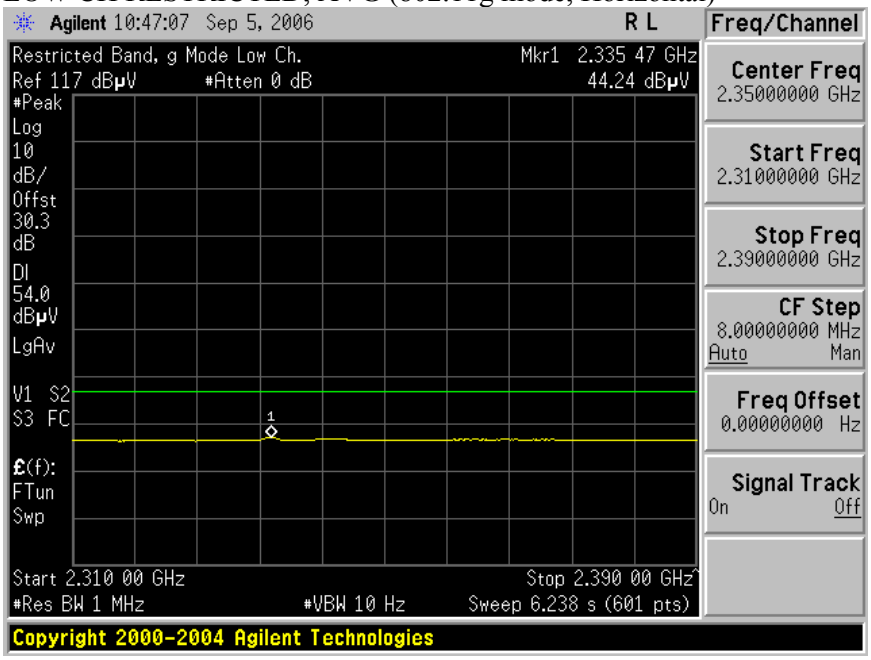
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (802.11g mode, Horizontal)

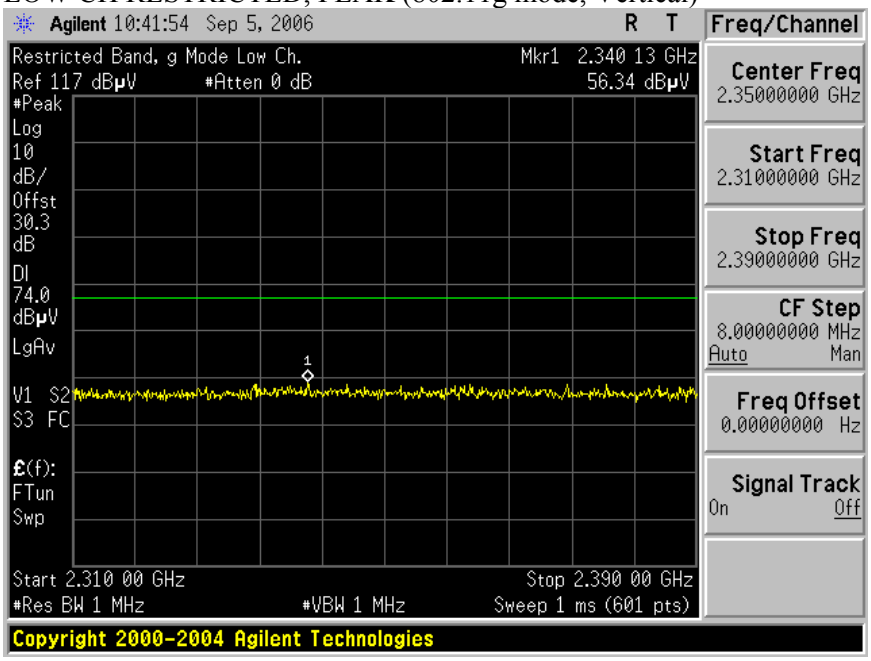


LOW CH RESTRICTED, AVG (802.11g mode, Horizontal)

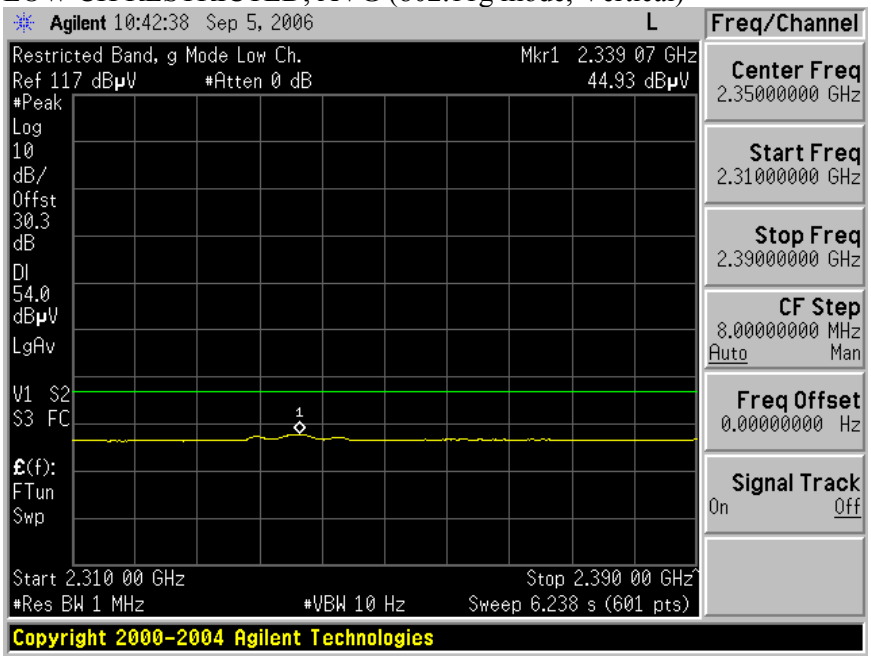


RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (802.11g mode, Vertical)

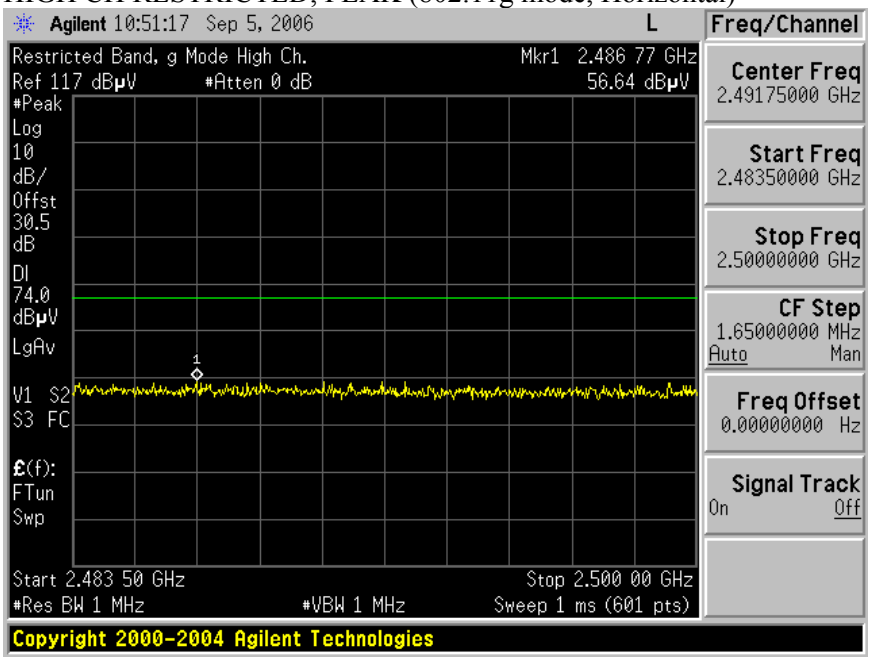


LOW CH RESTRICTED, AVG (802.11g mode, Vertical)

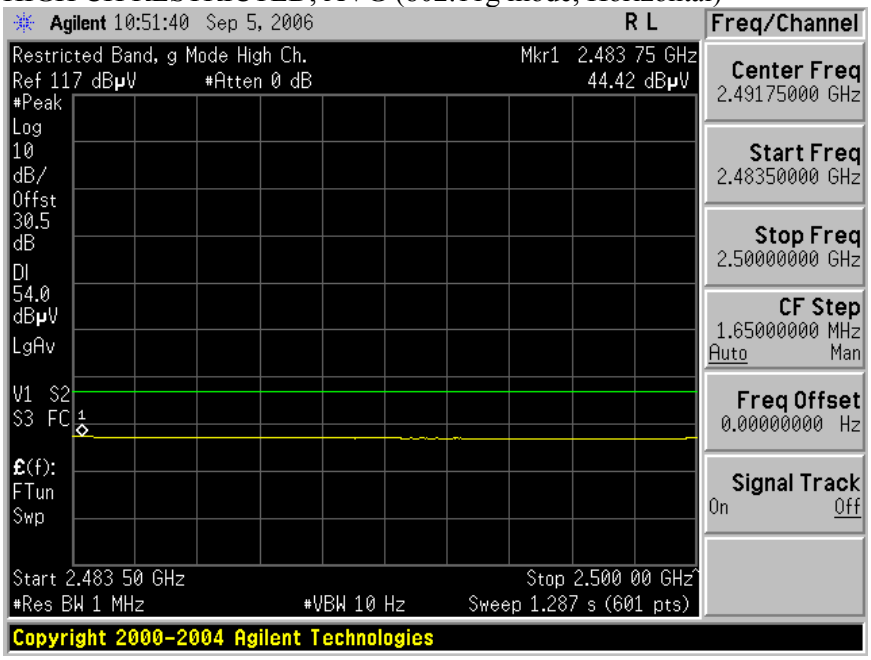


RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (802.11g mode, Horizontal)

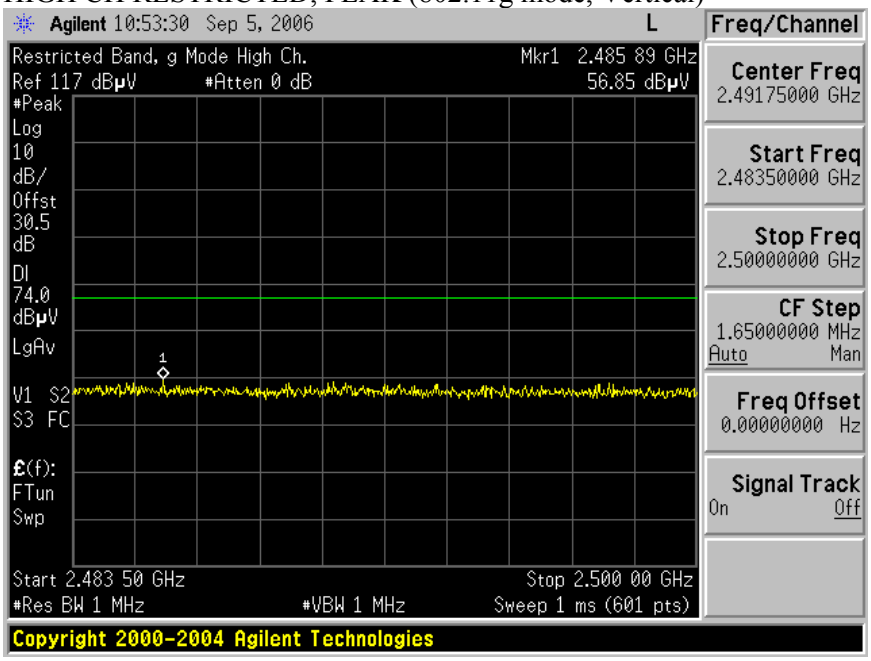


HIGH CH RESTRICTED, AVG (802.11g mode, Horizontal)

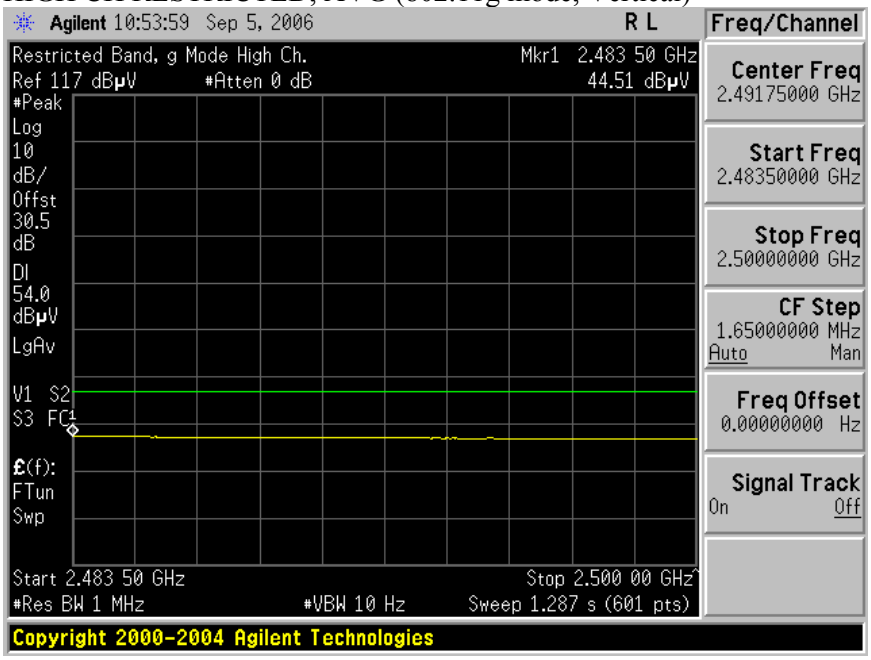


RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (802.11g mode, Vertical)



HIGH CH RESTRICTED, AVG (802.11g mode, Vertical)



HARMONICS AND SPURIOUS EMISSIONS (g MODE)

High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Company: Rockwell Collins
Project #: 06U10550
Date: 09/05/06
Test Engineer: Vien Tran
Configuration: EUT with Aerodynamic Blade Antenna (5dBi)
Mode: Tx 11g mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC Class B

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Vien 187215002	Vien 197209005	HPF_4.0GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

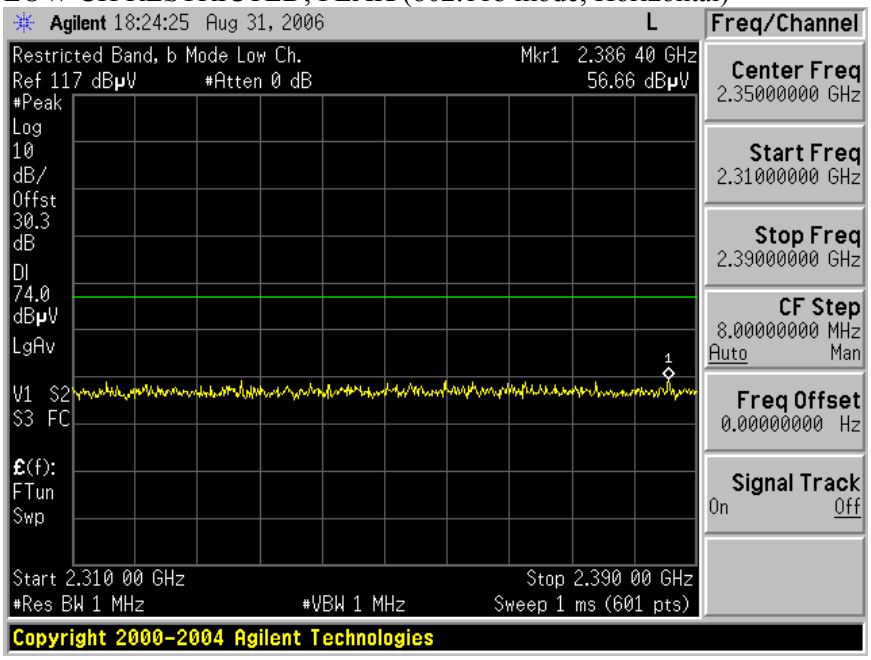
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 2412 MHz															
4.824	3.0	43.6	31.0	33.3	2.9	-36.5	0.0	0.6	44.0	31.4	74	54	-30.0	-22.6	V
4.824	3.0	42.8	30.7	33.3	2.9	-36.5	0.0	0.6	43.2	31.1	74	54	-30.8	-22.9	H
MID CHANNEL, 2437 MHz															
4.874	3.0	43.7	31.4	33.4	3.0	-36.5	0.0	0.6	44.2	31.9	74	54	-29.8	-22.1	V
4.874	3.0	43.4	31.2	33.4	3.0	-36.5	0.0	0.6	43.9	31.7	74	54	-30.1	-22.3	H
HI CHANNEL, 2462 MHz															
4.924	3.0	42.4	31.2	33.4	3.1	-36.5	0.0	0.6	43.0	31.8	74	54	-31.0	-22.2	V
4.924	3.0	41.4	30.9	33.4	3.1	-36.5	0.0	0.6	42.0	31.5	74	54	-32.0	-22.5	H
No other emissiond were detected above system noise floor															

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

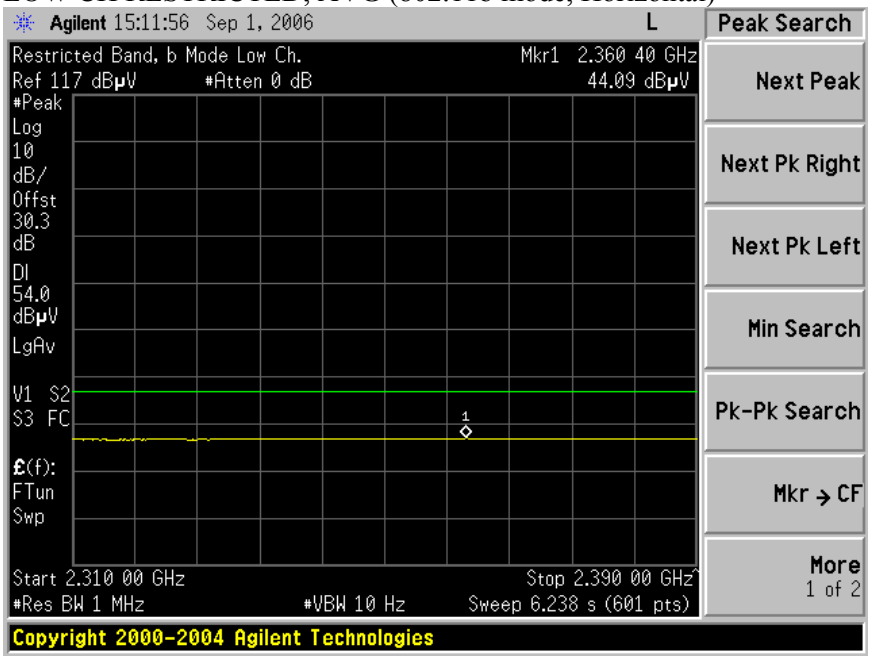
6.2.3. TRANSMITTER ABOVE 1 GHz WITH PATCH ANTENNA

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (802.11b mode, Horizontal)

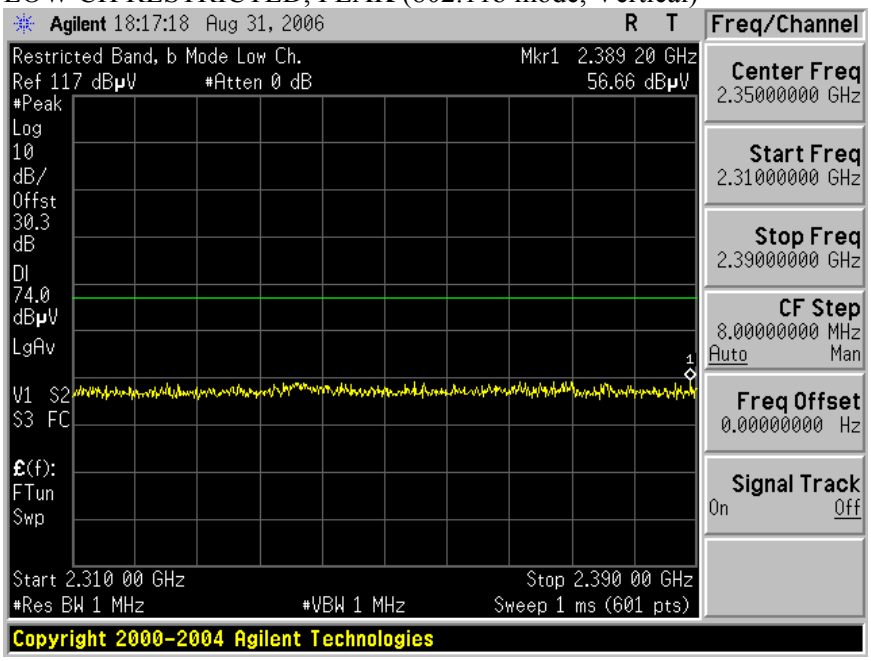


LOW CH RESTRICTED, AVG (802.11b mode, Horizontal)

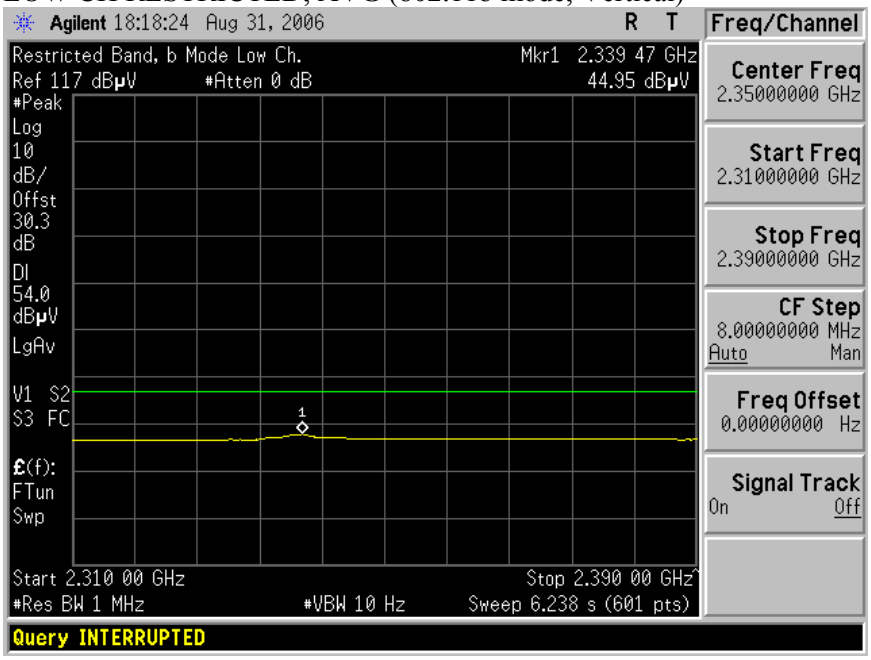


RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (802.11b mode, Vertical)

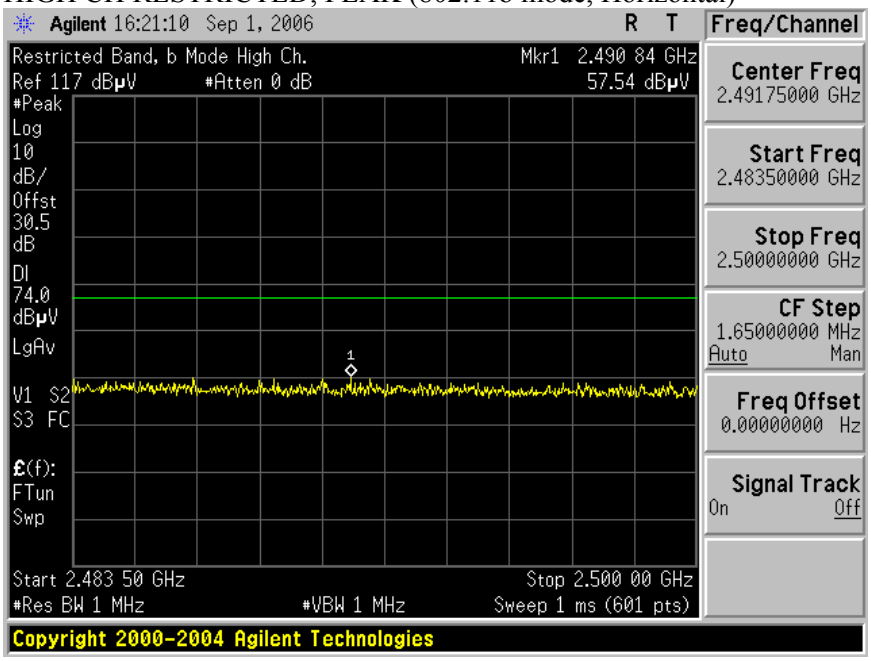


LOW CH RESTRICTED, AVG (802.11b mode, Vertical)

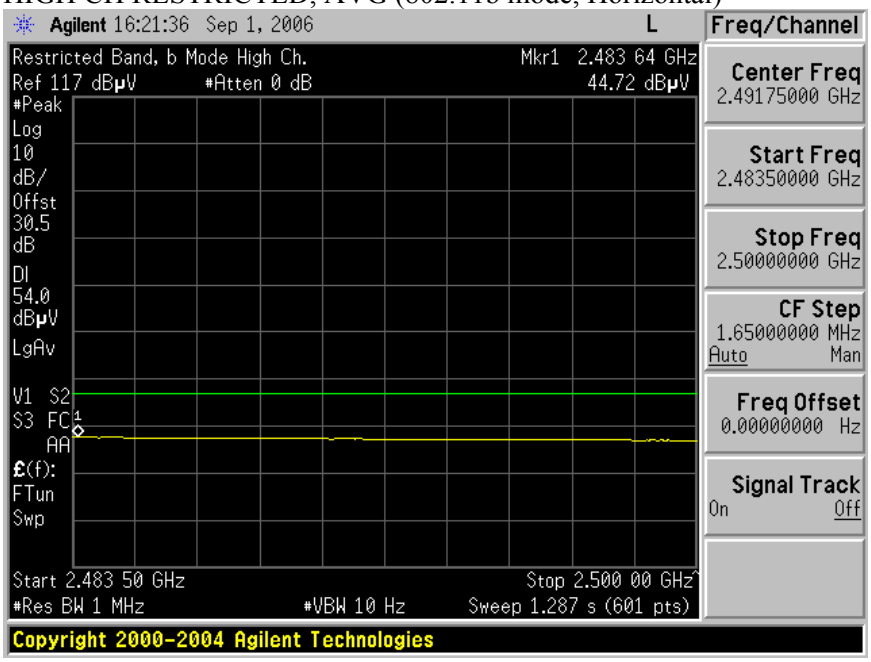


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (802.11b mode, Horizontal)

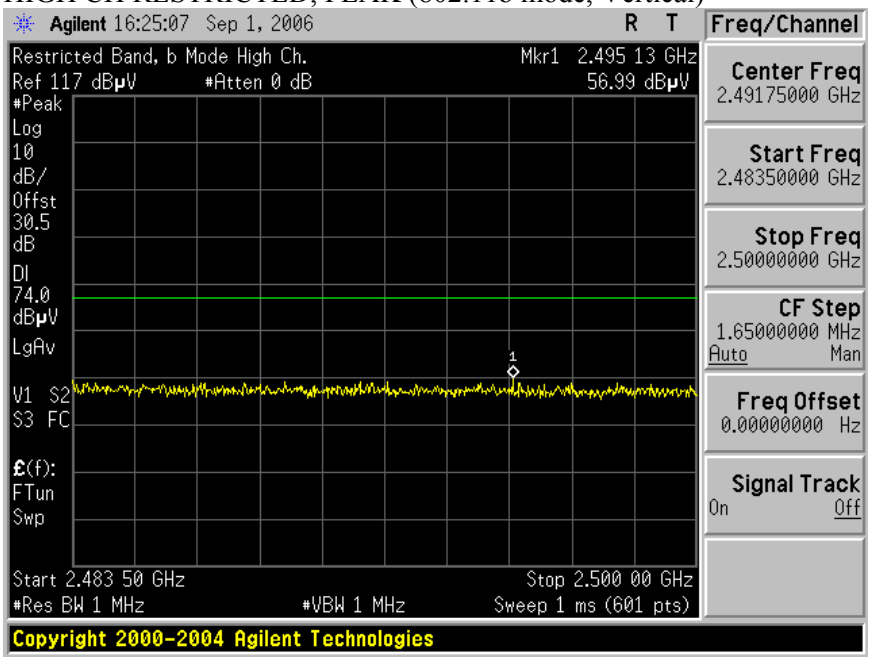


HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)

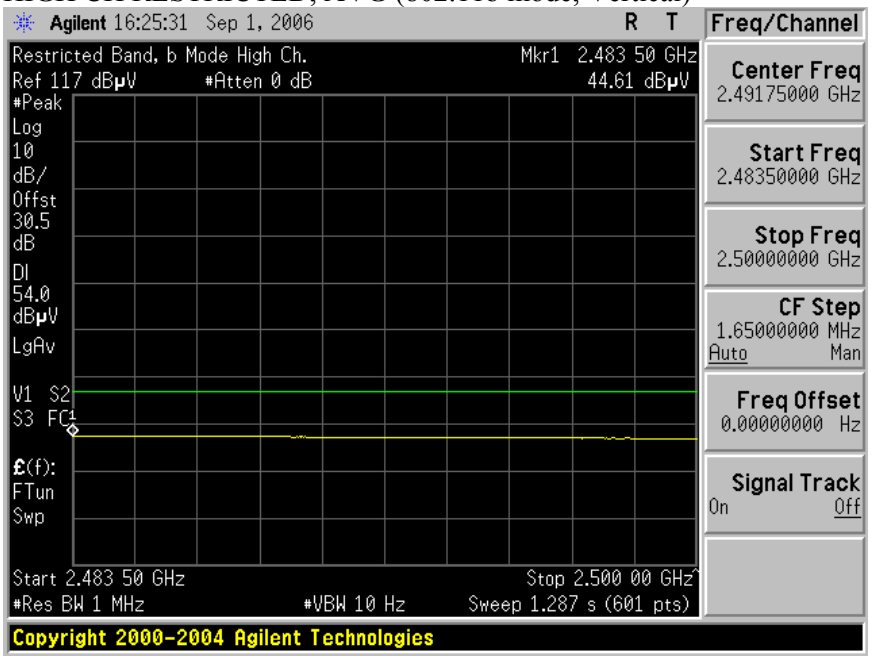


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (802.11b mode, Vertical)



HIGH CH RESTRICTED, AVG (802.11b mode, Vertical)



HARMONICS AND SPURIOUS EMISSIONS (b MODE)

High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Company: Rockwell Collins
Project #: 06U10550
Date: 09/01/06
Test Engineer: Vien Tran
Configuration: EUT with Patch Antenna (8dBi)
Mode: Tx 11b mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC Class B

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Vien 187215002	Vien 197209005	HPF_4.0GHz	

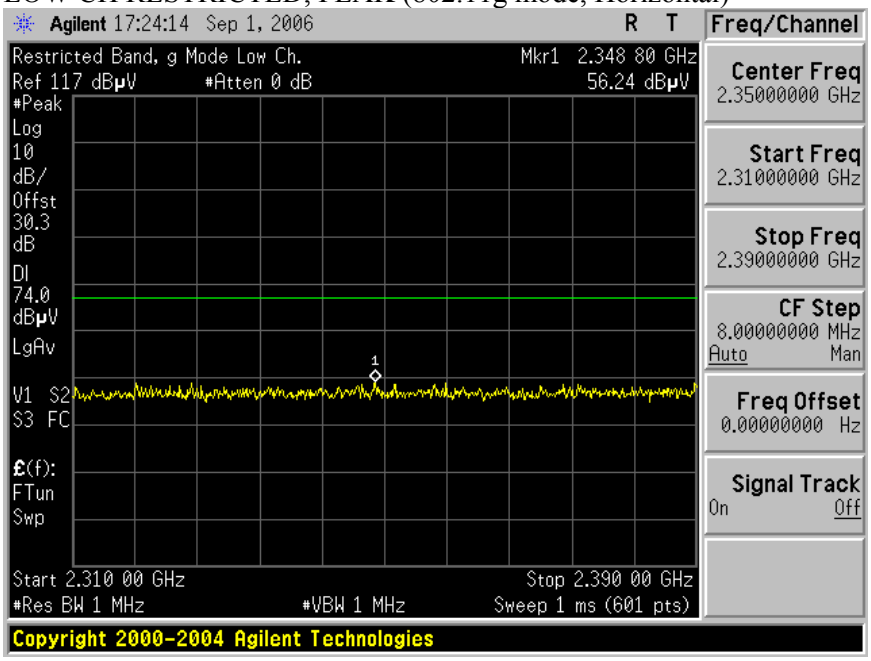
Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 2412 MHz															
4.824	3.0	43.9	31.5	33.3	2.9	-36.5	0.0	0.6	44.3	31.9	74	54	-29.7	-22.1	V
4.824	3.0	42.7	30.1	33.3	2.9	-36.5	0.0	0.6	43.1	30.5	74	54	-30.9	-23.5	H
MID CHANNEL, 2437 MHz															
4.874	3.0	44.9	33.1	33.4	3.0	-36.5	0.0	0.6	45.4	33.6	74	54	-28.6	-20.4	V
4.874	3.0	43.8	32.0	33.4	3.0	-36.5	0.0	0.6	44.3	32.5	74	54	-29.7	-21.5	H
HI CHANNEL, 2462 MHz															
4.924	3.0	43.7	31.5	33.4	3.1	-36.5	0.0	0.6	44.3	32.1	74	54	-29.7	-21.9	V
4.924	3.0	43.3	30.9	33.4	3.1	-36.5	0.0	0.6	43.9	31.5	74	54	-30.1	-22.5	H
No other emissiond were detected above system noise floor															

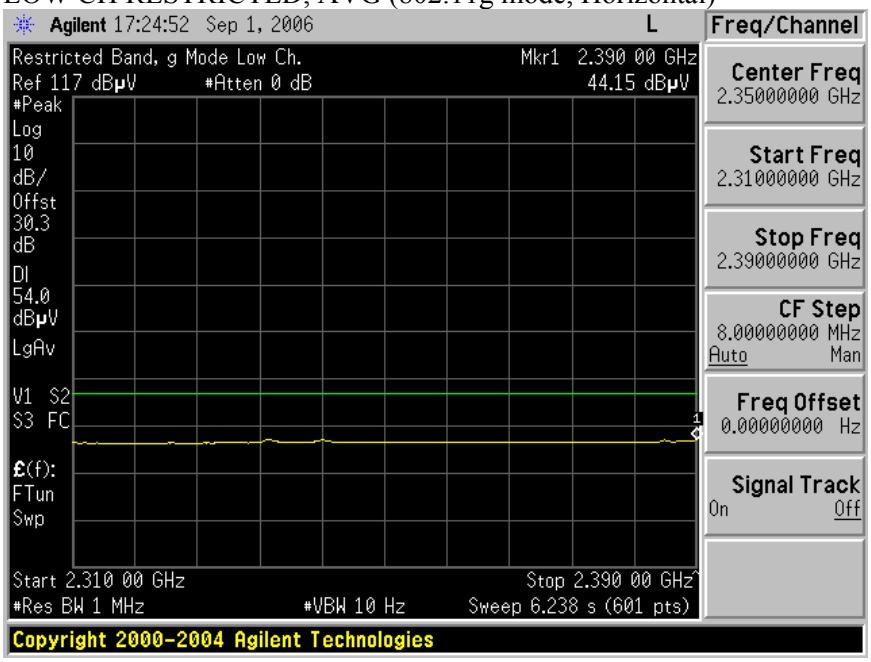
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (802.11g mode, Horizontal)

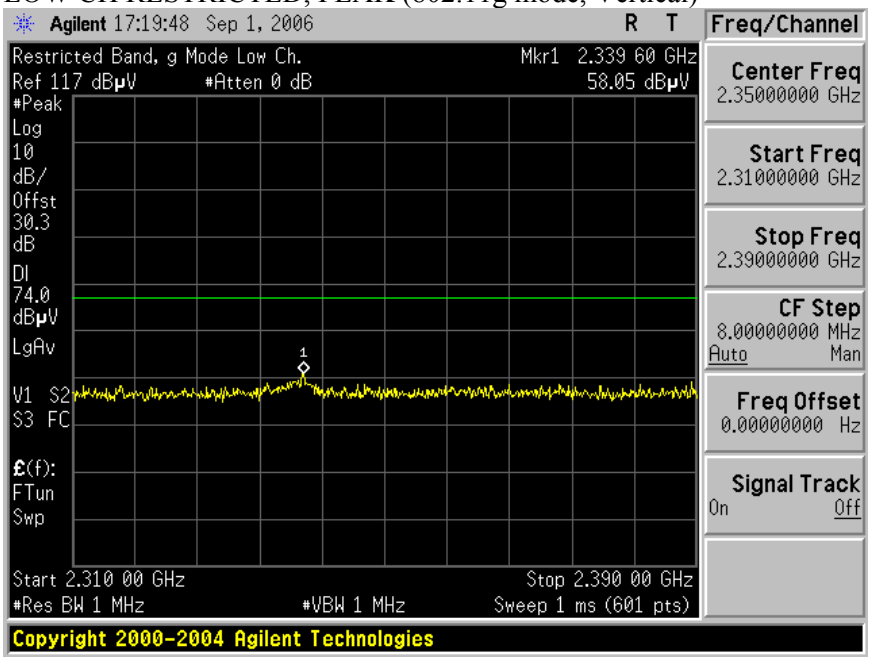


LOW CH RESTRICTED, AVG (802.11g mode, Horizontal)

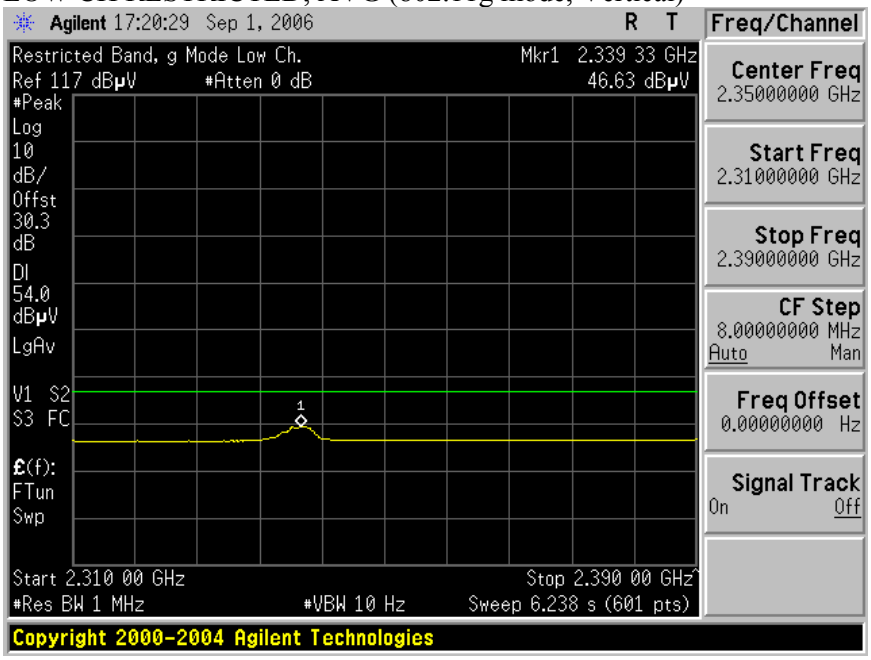


RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (802.11g mode, Vertical)

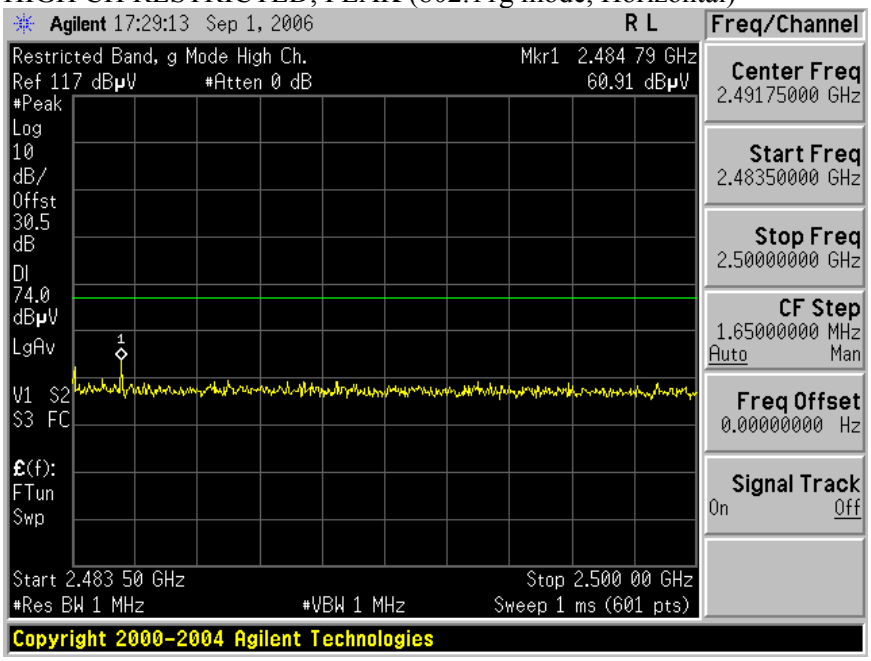


LOW CH RESTRICTED, AVG (802.11g mode, Vertical)

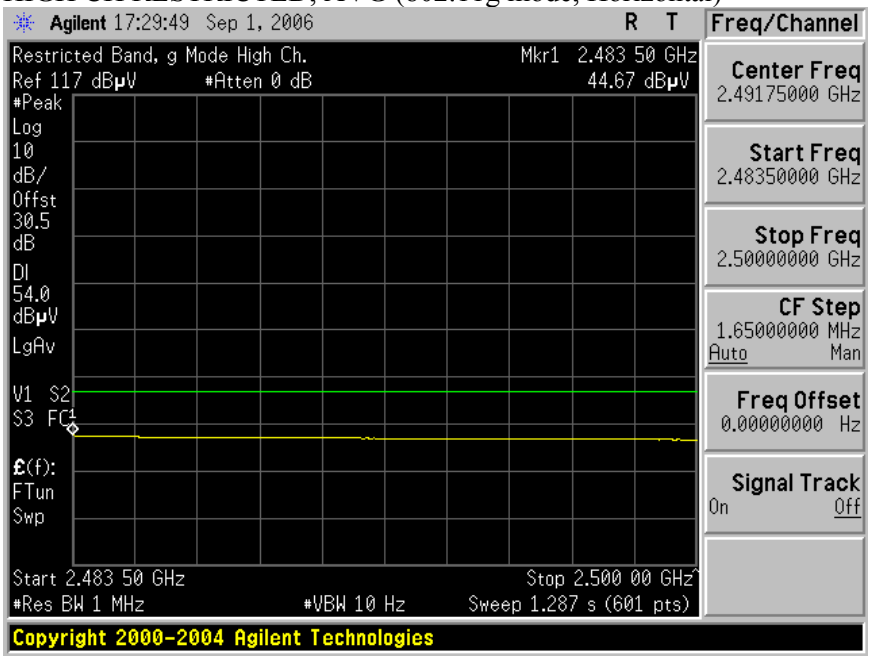


RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (802.11g mode, Horizontal)

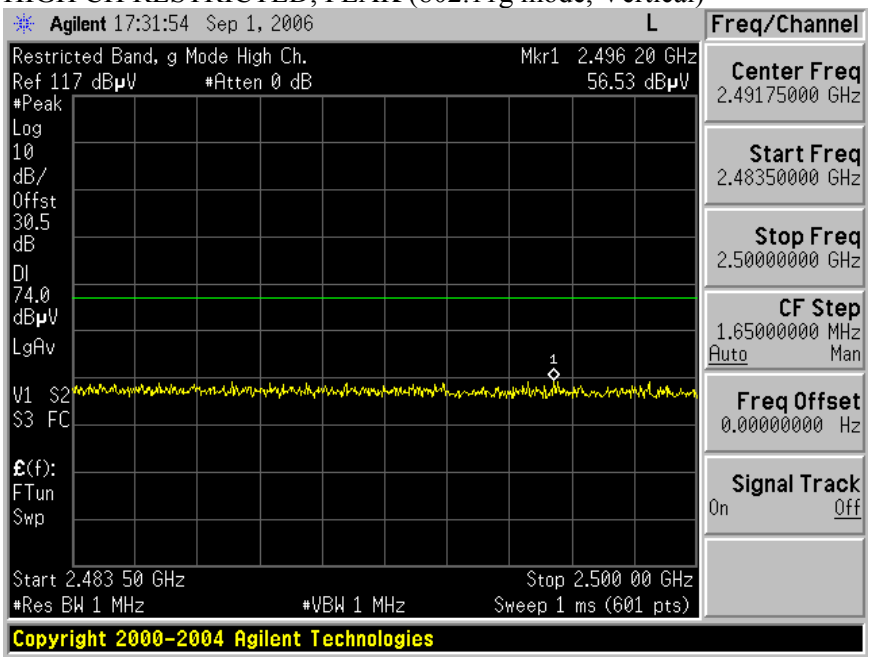


HIGH CH RESTRICTED, AVG (802.11g mode, Horizontal)

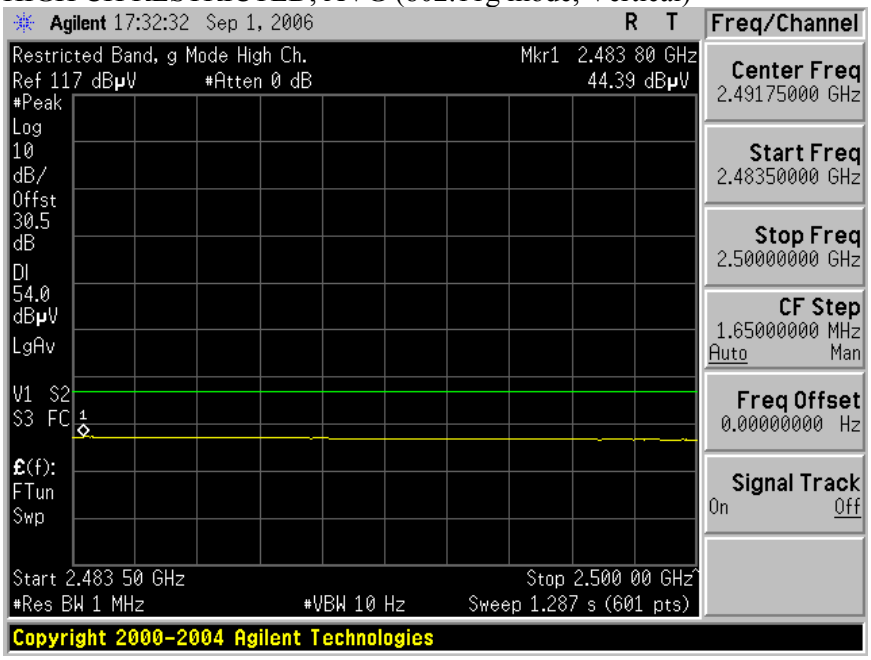


RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (802.11g mode, Vertical)



HIGH CH RESTRICTED, AVG (802.11g mode, Vertical)



HARMONICS AND SPURIOUS EMISSIONS (g MODE)

High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Company: Rockwell Collins
Project #: 06U10550
Date: 09/01/06
Test Engineer: Vien Tran
Configuration: EUT with Patch Antenna (8dBi)
Mode: Tx 11g mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC Class B

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Vien 187215002	Vien 197209005	HPF_4.0GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 2412 MHz															
4.824	3.0	44.3	32.5	33.3	2.9	-36.5	0.0	0.6	44.7	32.9	74	54	-29.3	-21.1	V
4.824	3.0	43.8	32.0	33.3	2.9	-36.5	0.0	0.6	44.2	32.4	74	54	-29.8	-21.6	H
MID CHANNEL, 2437 MHz															
4.874	3.0	45.2	33.5	33.4	3.0	-36.5	0.0	0.6	45.7	34.0	74	54	-28.3	-20.0	V
4.874	3.0	44.2	32.8	33.4	3.0	-36.5	0.0	0.6	44.7	33.3	74	54	-29.3	-20.7	H
HI CHANNEL, 2462 MHz															
4.924	3.0	44.7	32.5	33.4	3.1	-36.5	0.0	0.6	45.3	33.1	74	54	-28.7	-20.9	V
4.924	3.0	44.3	31.8	33.4	3.1	-36.5	0.0	0.6	44.9	32.4	74	54	-29.1	-21.6	H
No other emissiond were detected above system noise floor															

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

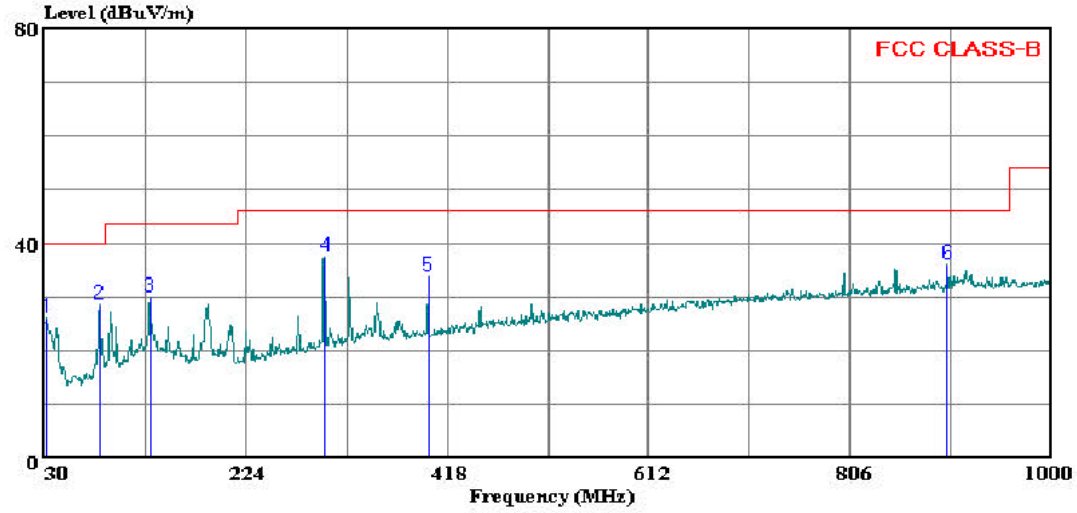
6.2.4. RADIATED EMISSIONS BELOW 1 GHz WITH BLADE ANTENNA

SPURIOUS EMISSIONS 30 TO 1000 MHz (802.11b MODE, HORIZONTAL)

HORIZONTAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 31 File#: FCC_B_30-1000 MHz.EMI
Date: 10-24-2006 Time: 19:25:09



(Audix ATC)

Trace: 30 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator:: Vien Tran
Company: : Rockwell Collins
Project #: : 06U10550
Configuration:: 5 dBi Blade Antenna
Mode of Oper.:: Tx b Mode_Hi Channel. J3 with 50Ohm.
Target: : FCC Class B

Page: 1

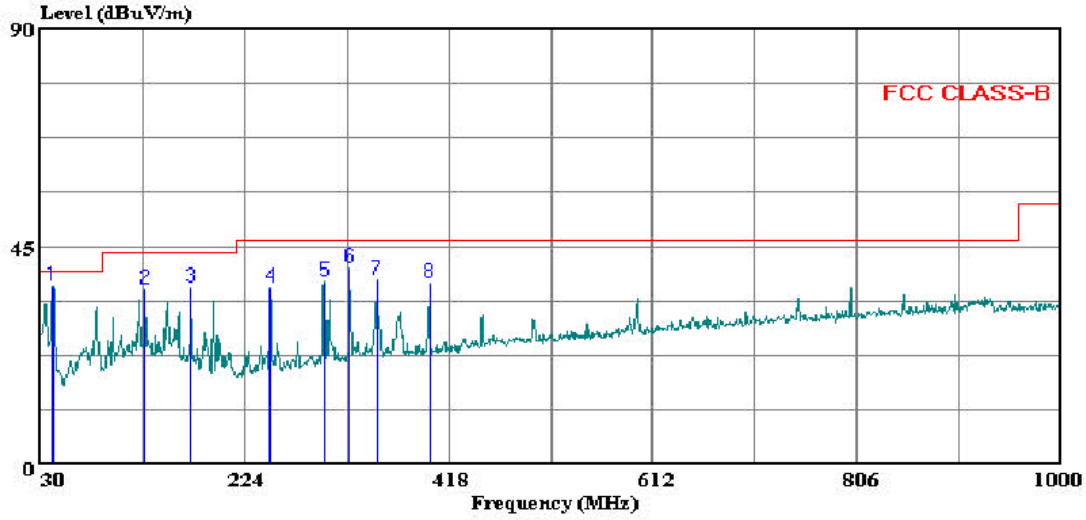
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	31.940	34.40	-8.48	25.92	40.00	-14.08	Peak
2	83.350	48.40	-19.78	28.62	40.00	-11.38	Peak
3	131.850	43.10	-13.17	29.93	43.50	-13.57	Peak
4	299.660	49.80	-12.39	37.41	46.00	-8.59	Peak
5	399.570	43.90	-10.03	33.87	46.00	-12.13	Peak
6	900.090	37.30	-1.37	35.93	46.00	-10.07	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (802.11b MODE, VERTICAL)

VERTICAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 35 File#: FCC_B_30-1000 MHz.EMI
Date: 10-25-2006 Time: 09:49:19



(Audix ATC)
Trace: 34 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator:: Yu-Chien Ho
Company: : Rockwell Collins
Project #: : 06U10550
Configuration:: 5 dBi Blade Antenna
Mode of Oper.:: Tx b Mode_Hi Channel. J3 with 50Ohm.
Target: : FCC Class B

Page: 1

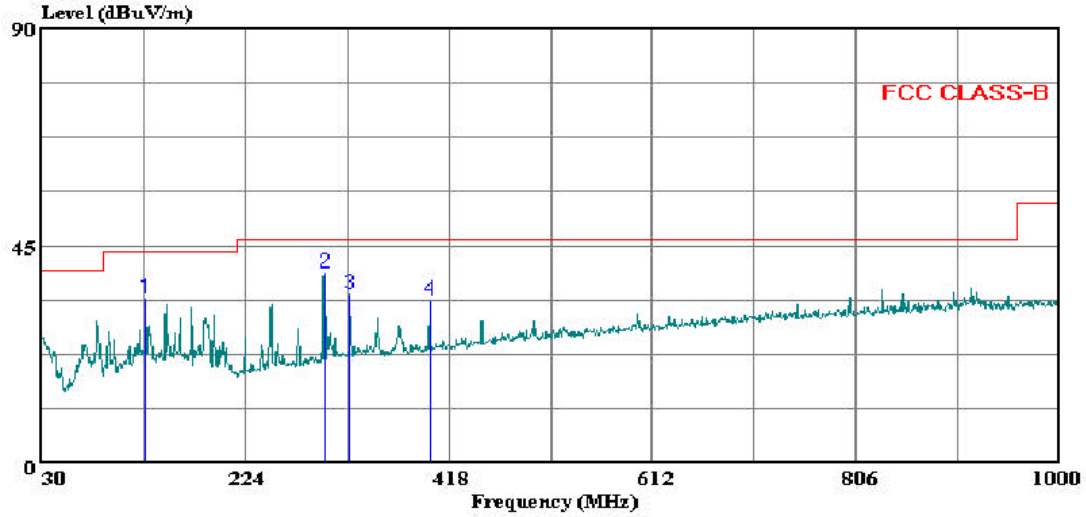
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	41.640	50.15	-13.52	36.63	40.00	-3.37	Peak
2	128.940	49.10	-13.09	36.01	43.50	-7.49	Peak
3	172.590	51.40	-14.84	36.56	43.50	-6.94	Peak
4	248.250	50.70	-14.22	36.48	46.00	-9.52	Peak
5	299.660	50.00	-12.39	37.61	46.00	-8.39	Peak
6	323.910	52.20	-11.76	40.44	46.00	-5.56	Peak
7	349.130	49.30	-11.16	38.14	46.00	-7.86	Peak
8	399.570	47.50	-10.03	37.47	46.00	-8.53	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (802.11g MODE, HORIZONTAL)

HORIZONTAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 43 File#: FCC_B_30-1000 MHz.EMI
Date: 10-25-2006 Time: 10:16:53



(Audix ATC)
Trace: 42 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator:: Yu-Chien Ho
Company: : Rockwell Collins
Project #: : 06U10550
Configuration:: 5 dBi Blade Antenna
Mode of Oper.:: Tx g Mode_Hi Channel. J3 with 50Ohm.
Target: : FCC Class B

Page: 1

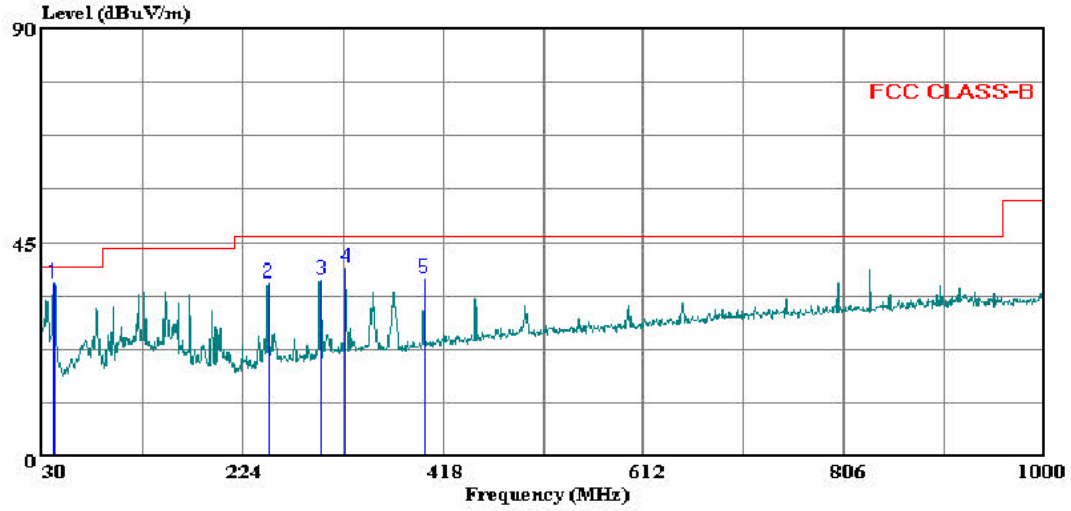
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	128.940	47.10	-13.09	34.01	43.50	-9.49	Peak
2	299.660	51.50	-12.39	39.11	46.00	-6.89	Peak
3	323.910	46.50	-11.76	34.74	46.00	-11.26	Peak
4	399.570	43.80	-10.03	33.77	46.00	-12.23	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (802.11g MODE, VERTICAL)

VERTICAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 41 File#: FCC_B_30-1000 MHz.EMI
Date: 10-25-2006 Time: 10:10:05



(Audix ATC)
Trace: 40 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator:: Yu-Chien Ho
Company: : Rockwell Collins
Project #: : 06U10550
Configuration:: 5 dBi Blade Antenna
Mode of Oper.:: Tx g Mode_Hi Channel. J3 with 50Ohm.
Target: : FCC Class B

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	41.640	49.95	-13.52	36.43	40.00	-3.57	Peak
2	249.220	50.60	-14.18	36.42	46.00	-9.58	Peak
3	299.660	49.60	-12.39	37.21	46.00	-8.79	Peak
4	323.910	51.40	-11.76	39.64	46.00	-6.36	Peak
5	399.570	47.50	-10.03	37.47	46.00	-8.53	Peak

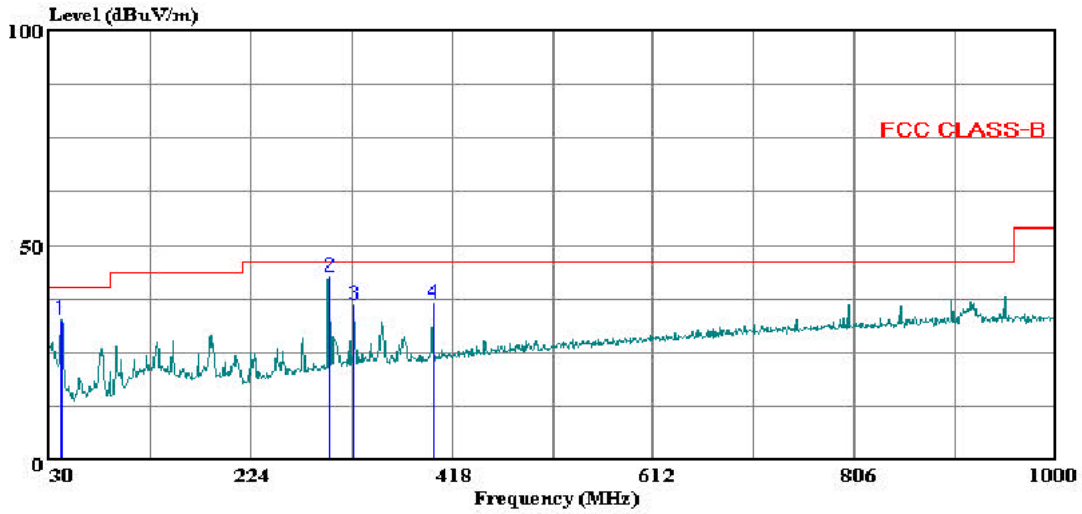
6.2.5. RADIATED EMISSIONS BELOW 1 GHz WITH PATCH ANTENNA

SPURIOUS EMISSIONS 30 TO 1000 MHz (802.11b MODE, HORIZONTAL)

HORIZONTAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 9 File#: FCC_B_30-1000 MHz.EMI
Date: 10-24-2006 Time: 16:48:23



(Audix ATC)
Trace: 8 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator:: Yu-Chien Ho
Company: : Rockwell Collins
Project #: : 06U10550
Configuration:: 8 dBi Patch Antenna
Mode of Oper.:: B Mode_Mid Channel. J2 with 50Ohm.
Target: : FCC Class B

Page: 1

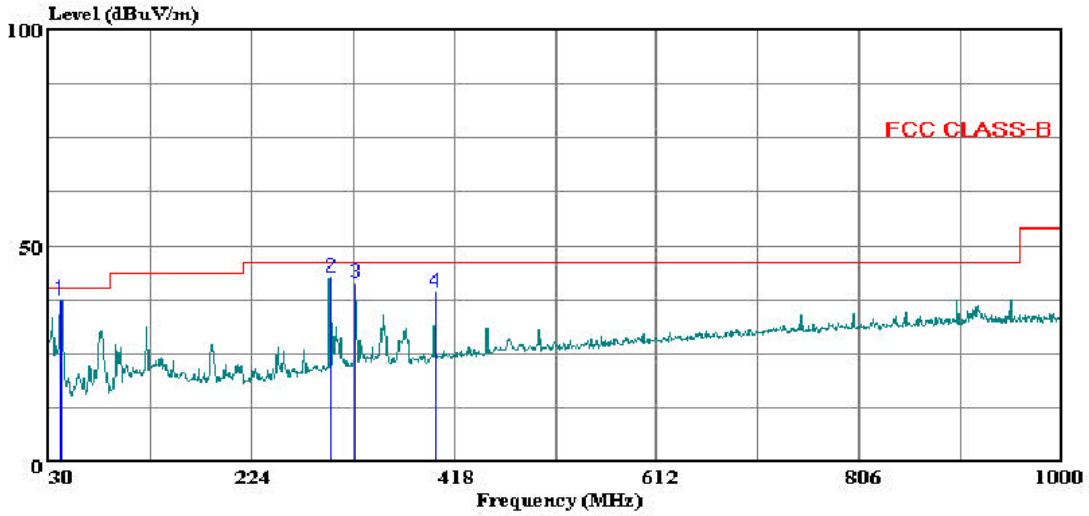
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	41.640	46.15	-13.52	32.63	40.00	-7.37	Peak
2	299.660	54.80	-12.39	42.41	46.00	-3.59	Peak
3	323.910	47.60	-11.76	35.84	46.00	-10.16	Peak
4	399.570	46.30	-10.03	36.27	46.00	-9.73	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (802.11b MODE, VERTICAL)

VERTICAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 7 File#: FCC_B_30-1000 MHz.EMI
Date: 10-24-2006 Time: 16:39:50



Trace: 6 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator:: Yu-Chien Ho
Company: : Rockwell Collins
Project #: : 06U10550
Configuration:: 8 dBi Patch Antenna
Mode of Oper.:: B Mode_Mid Channel. J2 with 50Ohm.
Target: : FCC Class B

Page: 1

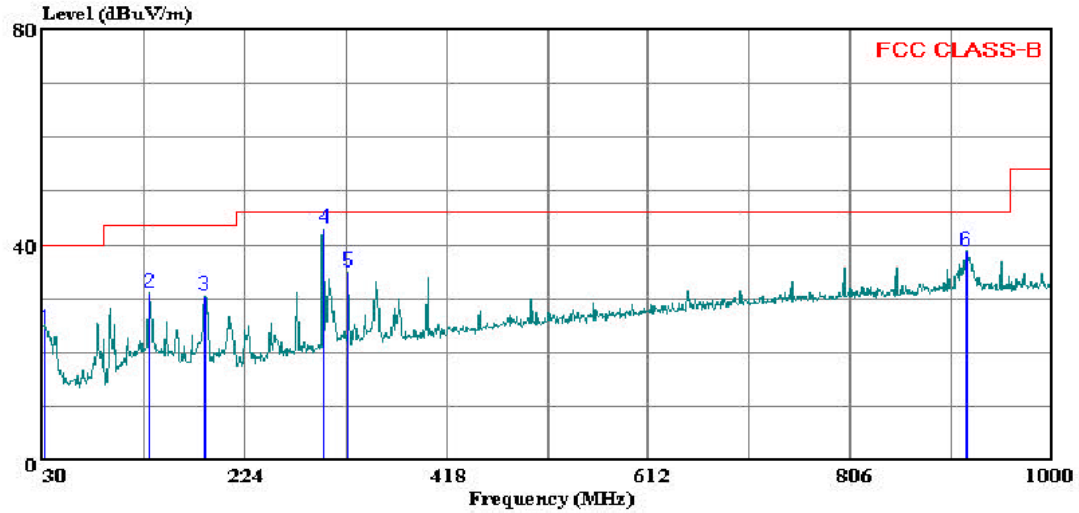
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	41.640	50.95	-13.52	37.43	40.00	-2.57	Peak
2	299.660	54.80	-12.39	42.41	46.00	-3.59	Peak
3	323.910	52.90	-11.76	41.14	46.00	-4.86	Peak
4	399.570	49.10	-10.03	39.07	46.00	-6.93	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (802.11g MODE, HORIZONTAL)

HORIZONTAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 23 File#: FCC_B_30-1000 MHz.EMI
Date: 10-24-2006 Time: 18:13:10



Trace: 22 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator:: Vien Tran
Company: : Rockwell Collins
Project #: : 06U10550
Configuration:: 8 dBi Patch Antenna
Mode of Oper.:: Tx 11g_Mid Channel. J2 with 50Ohm.
Target: : FCC Class B

Page: 1

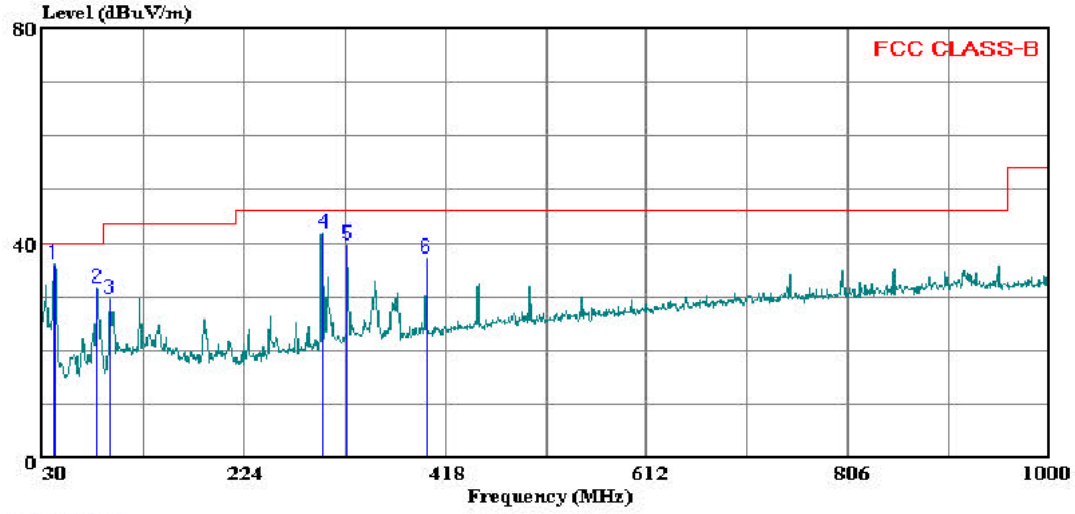
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	31.940	32.80	-8.48	24.32	40.00	-15.68	Peak
2	132.820	44.30	-13.18	31.12	43.50	-12.38	Peak
3	185.200	45.90	-15.33	30.57	43.50	-12.93	Peak
4	299.660	55.20	-12.39	42.81	46.00	-3.19	Peak
5	323.910	46.70	-11.76	34.94	46.00	-11.06	Peak
6	917.550	40.10	-1.29	38.81	46.00	-7.19	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (802.11g MODE, VERTICAL)

VERTICAL PLOT

COMPLIANCE Engineering Services, Inc.
561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 25 File#: FCC_B_30-1000 MHz.EMI
Date: 10-24-2006 Time: 18:20:59



(Audix ATC)
Trace: 24 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator:: Vien Tran
Company: : Rockwell Collins
Project #: : 06U10550
Configuration:: 8 dBi Patch Antenna
Mode of Oper.:: Tx 11g_Mid Channel. J2 with 50Ohm.
Target: : FCC Class B

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	41.640	49.55	-13.52	36.03	40.00	-3.97	Peak
2	82.380	51.30	-19.67	31.63	40.00	-8.37	Peak
3	94.990	47.80	-18.15	29.65	43.50	-13.85	Peak
4	299.660	54.30	-12.39	41.91	46.00	-4.09	Peak
5	323.910	51.40	-11.76	39.64	46.00	-6.36	Peak
6	399.570	47.10	-10.03	37.07	46.00	-8.93	Peak

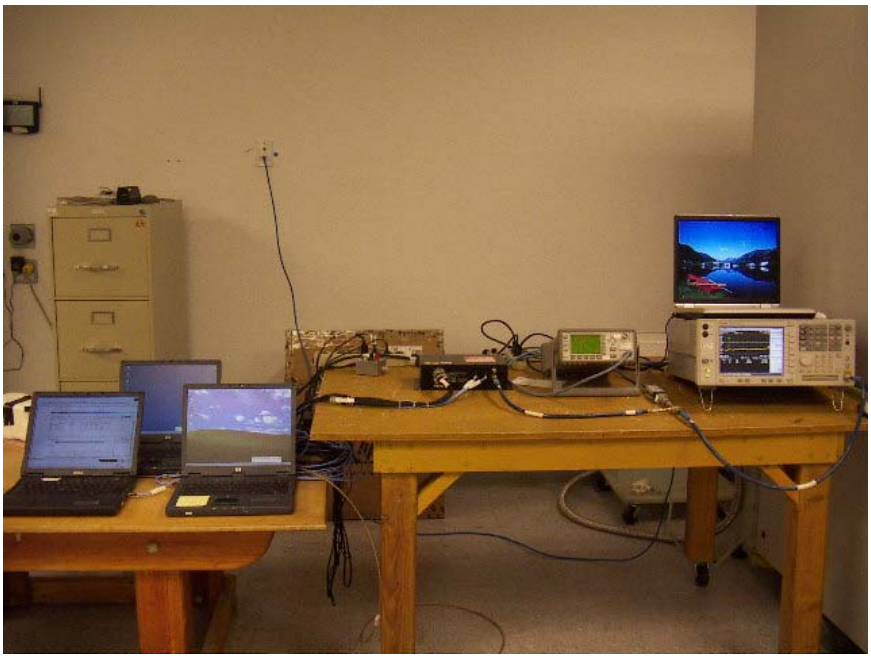
6.3. POWERLINE CONDUCTED EMISSIONS

Not applicable. The EUT is not intended to be powered from public utility. AC Mains.

7. SETUP PHOTOS

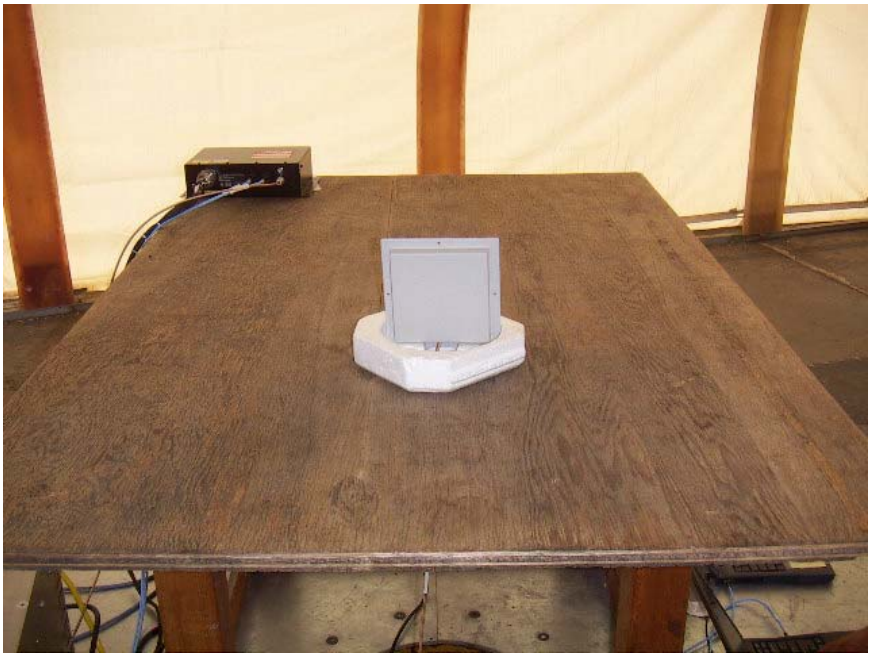
ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED PHOTO



RADIATED RF MEASUREMENT SETUP ABOVE 1 GHZ WITH PATCH ANTENNA

RADIATED FRONT PHOTO



RADIATED BACK PHOTO

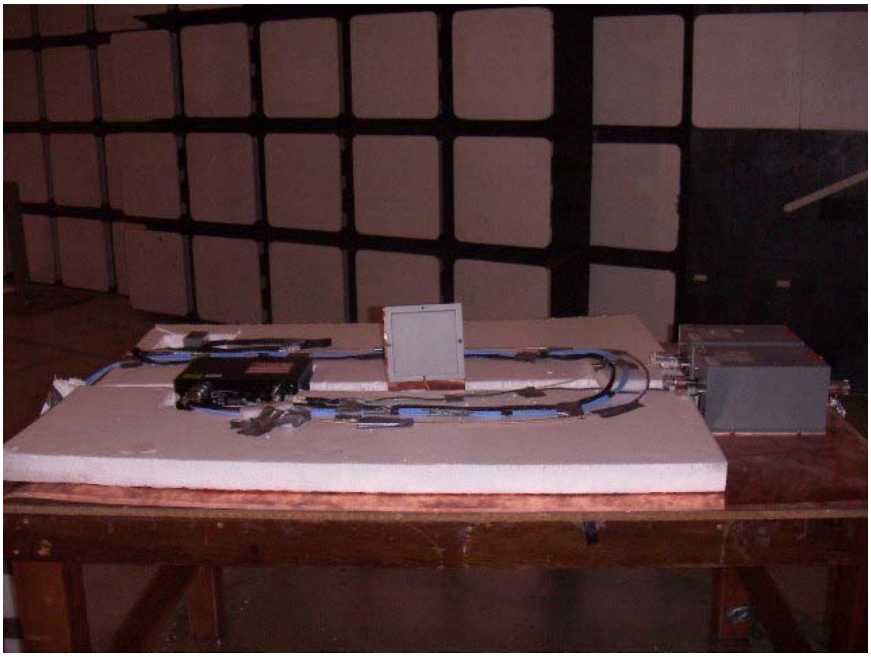
RADIATED RF MEASUREMENT SETUP ABOVE 1 GHZ WITH AERODYNAMIC BLADE ANTENNA

RADIATED FRONT PHOTO

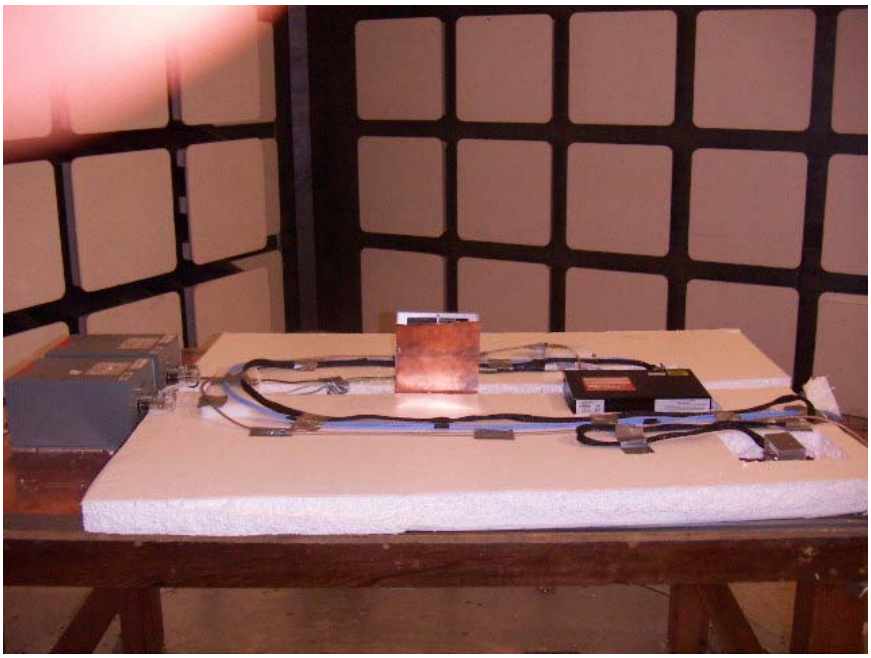
RADIATED BACK PHOTO

RADIATED RF MEASUREMENT SETUP BELOW 1 GHZ WITH PATCH ANTENNA

RADIATED FRONT PHOTO



RADIATED BACK PHOTO



RADIATED RF MEASUREMENT SETUP BELOW 1 GHZ WITH AERODYNAMIC BLADE ANTENNA

RADIATED FRONT PHOTO

RADIATED BACK PHOTO

RADIATED RF MEASUREMENT SETUP BELOW 1 GHZ – DETAILS OF CABLE ROUTING BETWEEN TABLE TOP GROUND PLANE AND CHAMBER GROUND PLANE

RADIATED SIDE PHOTO

RADIATED SIDE PHOTO

END OF REPORT