

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

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Prepared for ROCKWELL COLLINS, AIR TRANSPORT DIVISION 400 COLLINS ROAD N.E. CEDAR RAPIDS, IA 52498 USA

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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 SUBF	PART 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:

M.H

MIKE HECKROTTE ENGINEERING MANAGER COMPLIANCE CERTIFICATION SERVICES Tested By:

VIEN TRAN EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

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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 <u>http://www.ccsemc.com</u>.

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:

Frequency Range	Mode	Output Power	Output Power
(MHz)		(dBm)	(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.

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5.6. DESCRIPTION OF TEST SETUP

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

SUPPORT EQUIPMENT

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FACILITY CABLES

I/O CABLE LIST					
Cable	Port	# of	Connector	Cable	
No.		Identical	Туре	Туре	
		Ports			
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	he facility AC I	Mains distributio	n.		

I/O CABLES

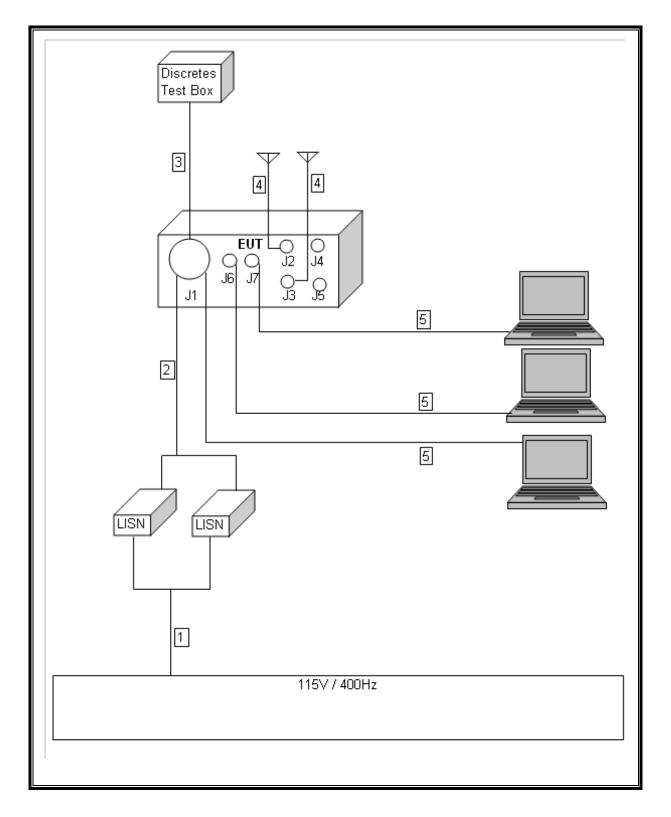
	I/O CABLE LIST					
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
2	J1	1	AC	Unshielded	1m	AC Input Bundle
3	J1	1	Signal	Unshielded	3.3m	Discretes Bundle
4	J1, J6, J7	3	RJ45	Shielded	3.3m	Ethernet Bundle

TEST SETUP

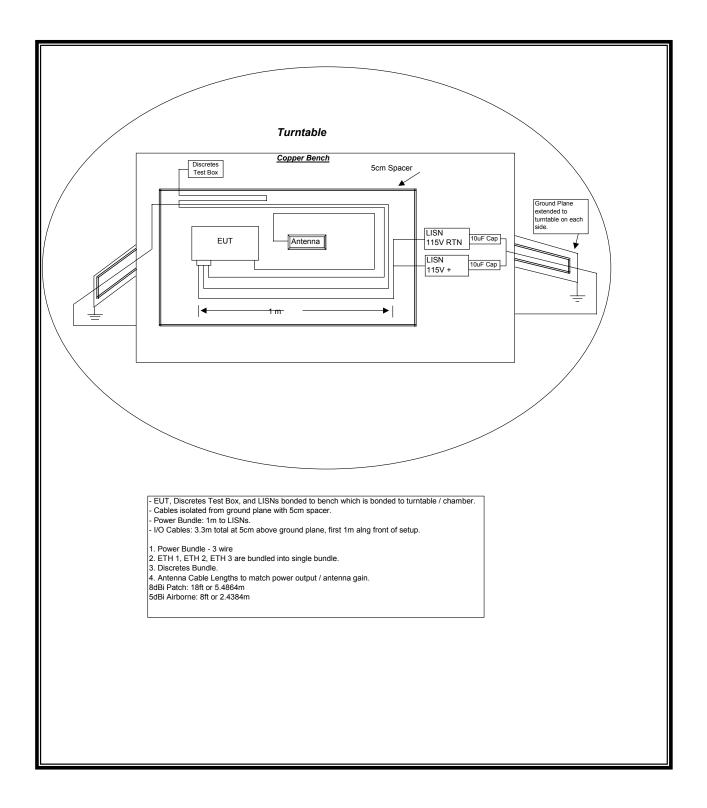
The EUT is placed on an 80 cm high tabletop, covered with a 0.5 mm copper sheet ground plane. The EUT, Discretes Test Box and LISNs are bonded to copper ground plane, which is bonded to turntable. All ethernet cables (ETH1, ETH2, & ETH3) isolated from ground plane with 5 cm foam pads. The power cable (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.

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SETUP DIAGRAMS FOR TESTS



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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	

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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

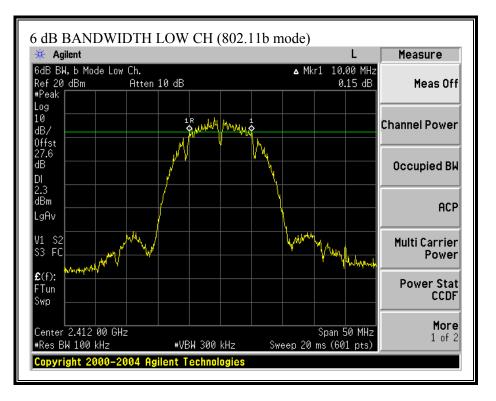
Channel	Frequency	6 dB Bandwidth	Minimum Limit	Margin
	(MHz)	(kHz)	(kHz)	(kHz)
Low	2412	10000	500	9500
Middle	2437	10000	500	9500
High	2462	9080	500	8580

802.11g Mode

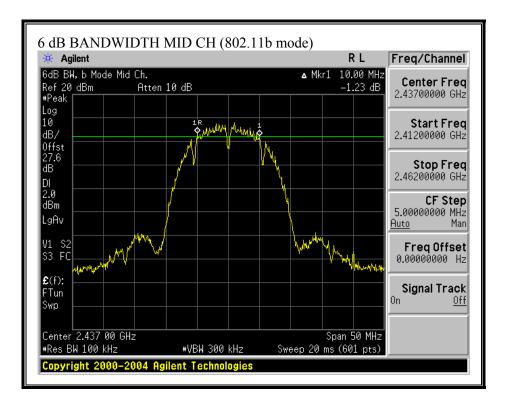
Channel	Frequency	y 6 dB Bandwidth Minimum Limit		Margin
	(MHz)	(kHz)	(kHz)	(kHz)
Low	2412	16080	500	15580
Middle	2437	16080	500	15580
High	2462	15750	500	15250

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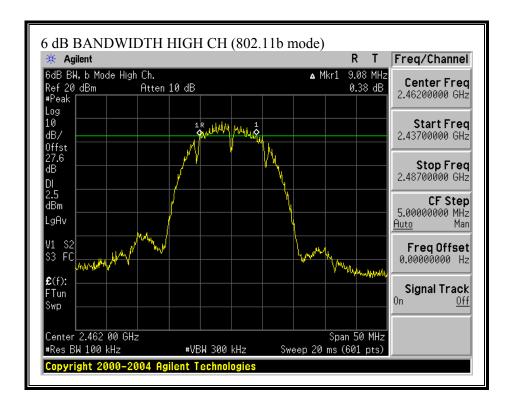
6 dB BANDWIDTH (802.11b MODE)



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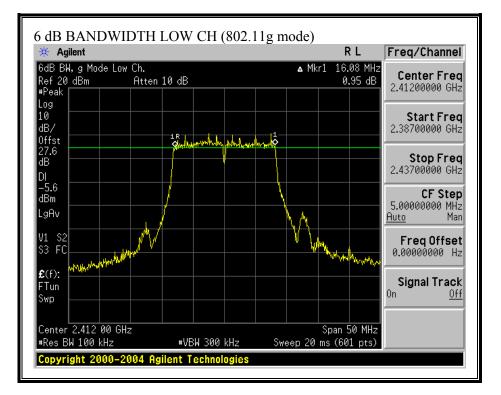


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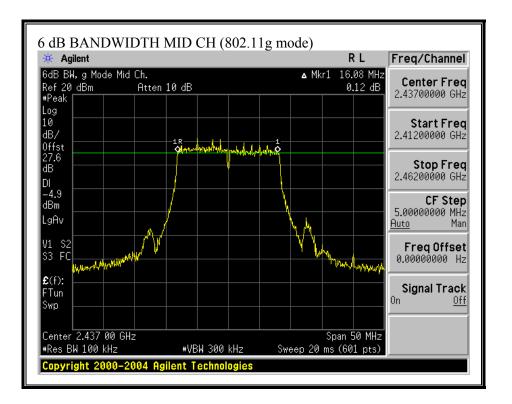


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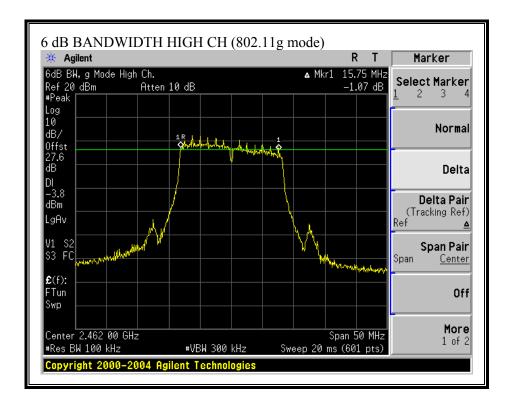
6 dB BANDWIDTH (802.11g MODE)



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6.1.2. 99% BANDWIDTH

<u>LIMIT</u>

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:

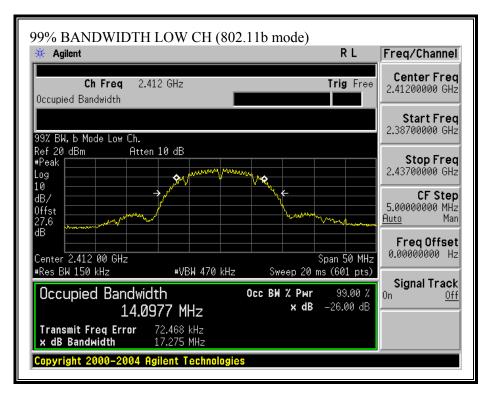
802.11b Mode				
Channel	Frequency	99% Bandwidth		
	(MHz)	(MHz)		
Low	2412	14.0977		
Middle	2437	14.1549		
High	2462	13.9636		

802.11g Mode

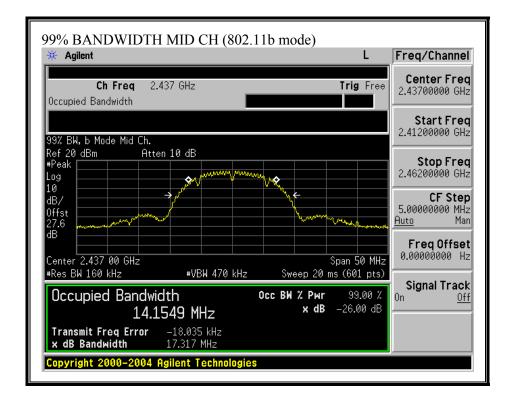
Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	16.3436
Middle	2437	16.3484
High	2462	16.2749

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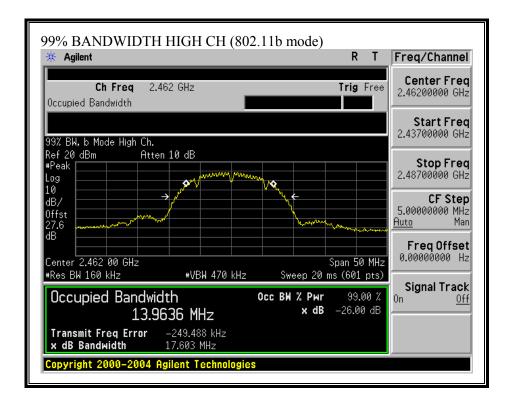
99% BANDWIDTH (802.11b MODE)



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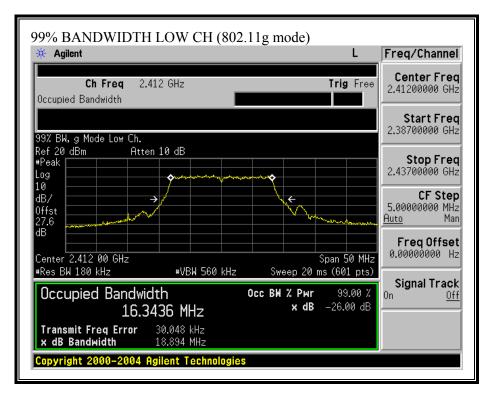


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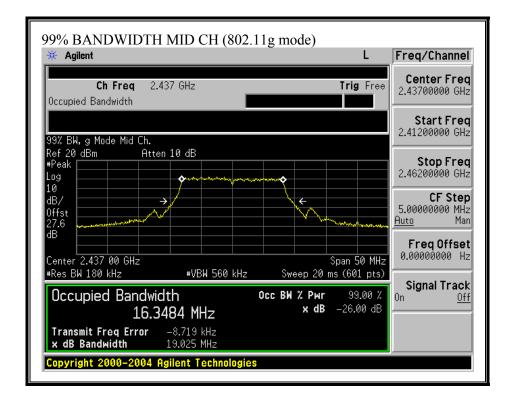


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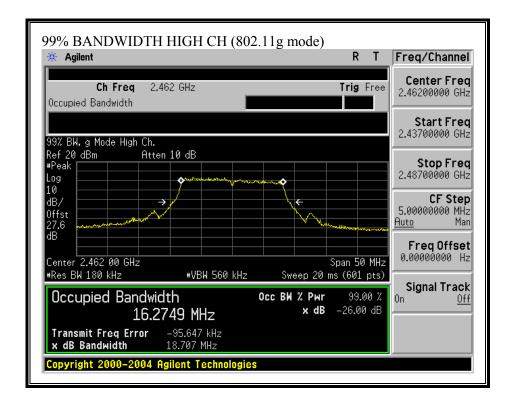
99% BANDWIDTH (802.11g MODE)



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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.

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RESULTS

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

No non-compliance noted:

802.11b Mode

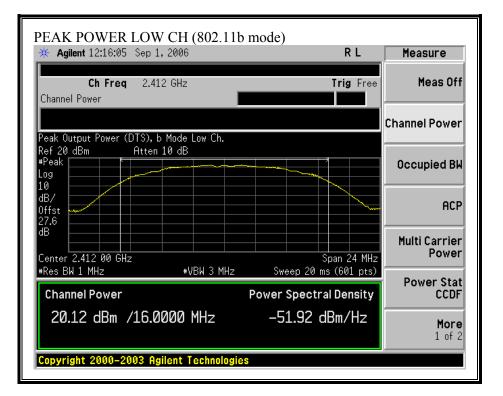
Channel	Frequency	Frequency Peak Power		Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	20.12	28	-7.88
Middle	2437	20.08	28	-7.92
High	2462	19.99	28	-8.01

802.11g Mode

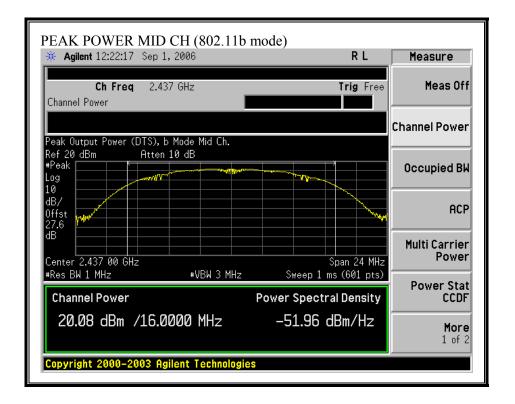
Channel	Frequency	Peak Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	19.70	28	-8.30
Middle	2437	19.63	28	-8.37
High	2462	19.73	28	-8.27

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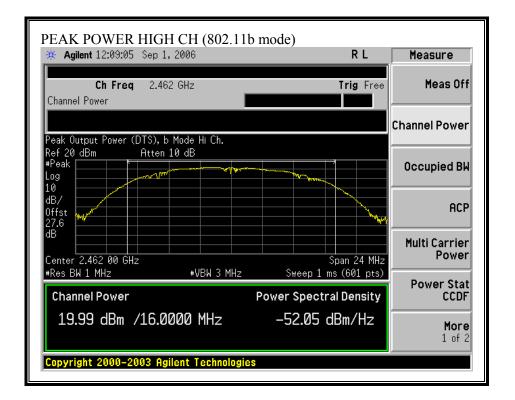
OUTPUT POWER (802.11b MODE)



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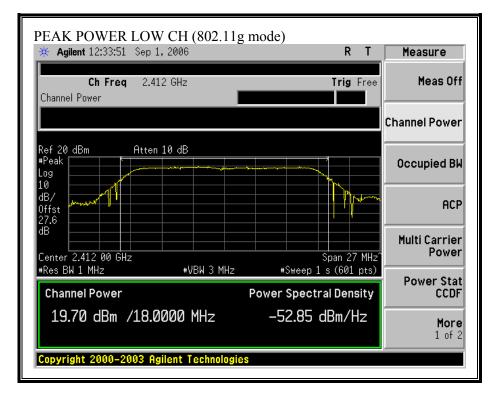


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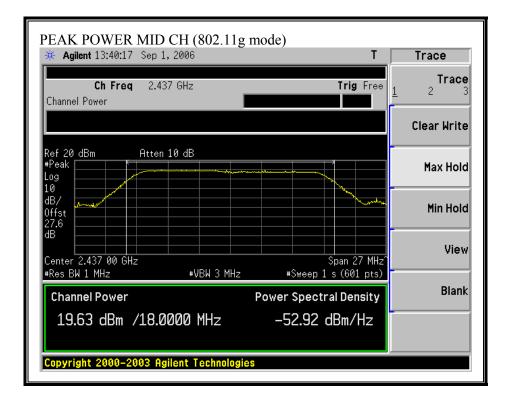


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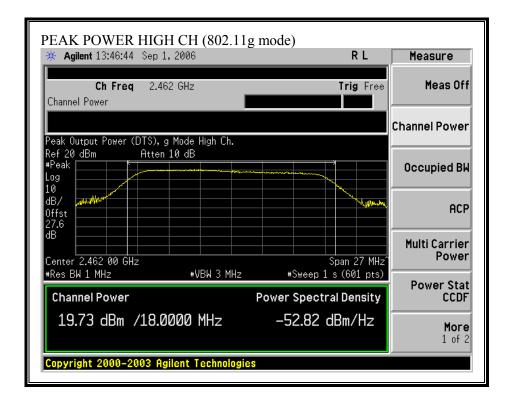
OUTPUT POWER (802.11g MODE)



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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.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
(A) Lim	its for Occupational	I/Controlled Exposu	res	
0.3–3.0 3.0–30 30–300 300–1500 1500–100,000	614 1842/f 61.4	1.63 4.89/f 0.163	*(100) *(900/f²) 1.0 f/300 5	6 6 6 6
(B) Limits	for General Populati	ion/Uncontrolled Exp	posure	
0.3–1.34 1.34–30	614 824 <i>/</i> f	1.63 2.19/f	*(100) *(180/f²)	30 30

TABLE 1-LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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/cm²)	Averaging time (minutes)
30–300 300–1500 1500–100.000		0.073	0.2 f/1500 1.0	30 30 30

f = frequency in MHz

t = trequency 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 is exposure also apply in situations when an individual is transient through a location where occupational/controlled is posed as a consequence of the potential for exposure.
 NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations 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.

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CALCULATIONS

Given

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

where

and

E = Field Strength in Volts/meter

P = Power in Watts

 $S = E^{2}/377$

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

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

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

 $S = 0.0795 * 10^{(P+G)} / 10) / (d^2)$

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LIMITS

From 1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm²

RESULTS

Mode	MPE	Output	Antenna	Power
	Distance	Power	Gain	Density
	(cm)	(dBm)	(dBi)	(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.

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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	Power
	(MHz)	(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

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6.1.6. PEAK POWER SPECTRAL DENSITY

<u>LIMIT</u>

§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

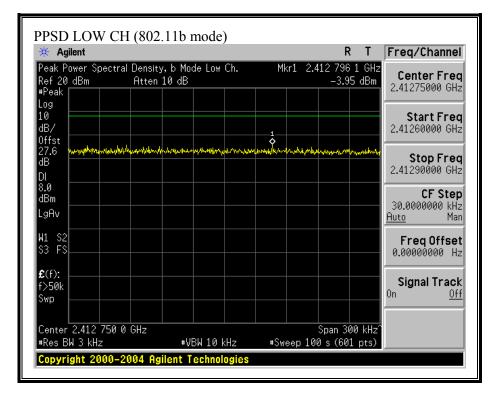
Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-3.95	8	-11.95
Middle	2437	-4.42	8	-12.42
High	2462	-5.64	8	-13.64

802.11g Mode

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

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PEAK POWER SPECTRAL DENSITY (802.11b MODE)



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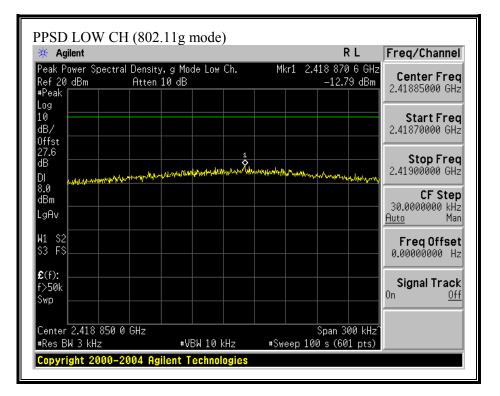
🔆 Agilent				L	Freq/Channel
Peak Power Spect Ref 20 dBm #Peak			Mkr1 2.	.437 800 1 GHz -4.42 dBm	Center Freq 2.43775000 GHz
Log 10 dB/ 0ffst			1		Start Freq 2.43760000 GHz
27.6 wm.ww/w/w/w dB DI	underson and the	lufinningertentengennen	the short the second	yahannanay salashaayaya	Stop Freq 2.43790000 GHz
8.0 dBm LgAv					CF Step 30.0000000 kHz <u>Auto</u> Man
W1 S2 S3 FS					Freq Offset 0.00000000 Hz
£(f): f>50k Swp					Signal Track On <u>Off</u>
Center 2.437 750 #Res BW 3 kHz		 ≢VBW 10 kHz	#Sweep 10	Span 300 kHz´ 00 s (601 pts)	

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🔆 Agilent				L	Freq/Channel
Ref 20 dBm #Peak	ectral Density, I Atten 10	o Mode High Ch. dB	Mkr1 2.	459 447 7 GHz -5.64 dBm	Center Fred 2.45930000 GHz
Log 10 dB/ 0ffst				1	Start Freq 2.45915000 GHz
27.6 dB DI	nerently blanced	eternista in the terretail of the second	alende Weiter og en allen og en allen som at her hande som at her hande som at her hande som at her hande som a	างหมู่ประเทศขางหมายหน้า	Stop Fred 2.45945000 GHz
8.0 dBm LgAv					CF Step 30.0000000 kHz <u>Auto</u> Mar
W1 S2 S3 FS					Freq Offset 0.00000000 Hz
£ (f): f>50k Swp					Signal Track On <u>Off</u>
Center 2.459 3 #Res BW 3 kHz	00 0 GHz	#VBW 10 kHz	#Sweep 10	Span 300 kHz^ 0 s (601 pts)	

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PEAK POWER SPECTRAL DENSITY (802.11g MODE)



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🔆 Agilent			RT	Freq/Channel
Peak Power Spectra Ref 20 dBm #Peak	l Density, g Mode Mid Atten 10 dB	ICh. Mkr1	2.440 744 7 GHz -13.11 dBm	Center Freq 2.44070000 GHz
Log 10 dB/ Offst				Start Freq 2.44055000 GHz
27.6 dB DI anterdation	prophyprogram. Materia	hallow the man Mary Mary Mary	wanter and the second states of the second states o	Stop Freq 2.44085000 GHz
8.0 dBm LgAv				CF Step 30.0000000 kHz <u>Auto</u> Man
W1 S2 S3 FS				FreqOffset 0.00000000 Hz
£(f): f>50k Swp				Signal Track On <u>Off</u>
Center 2.440 700 0 #Res BW 3 kHz		kHz #Sweep	Span 300 kHz^ 100 s (601 pts)	

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🔆 Agilent					L	Freq/Channel
Peak Power Spect Ref 20 dBm #Peak			. Mkr	1 2.457 62 -10	22 1 GHz .86 dBm	Center Freq 2.45760000 GHz
Log 10 dB/ Offst						Start Freq 2.45745000 GHz
27.6 dB DI antulyanoparant	wyonewspliceropertition	wayahiyaki attaraktikara	1 Mayman	-	malphanta	Stop Freq 2.45775000 GHz
8.0 dBm LgAv						CF Step 30.0000000 kHz <u>Auto</u> Man
W1 S2 S3 FS						Freq Offset 0.00000000 Hz
£ (f): f>50k Swp						Signal Track On <u>Off</u>
Center 2.457 600 #Res BW 3 kHz	0 GHz	#VBW 10 kHz	#Swee	Span ep 100 s (6	300 kHz^	

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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 §15.205(a).

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.

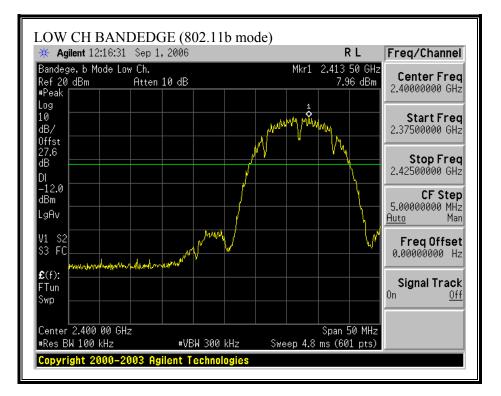
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

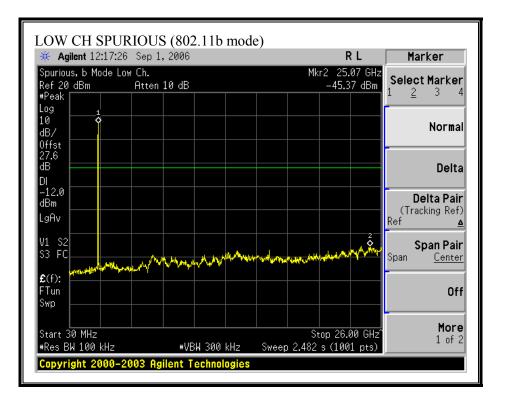
No non-compliance noted:

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SPURIOUS EMISSIONS, LOW CHANNEL (802.11b MODE)

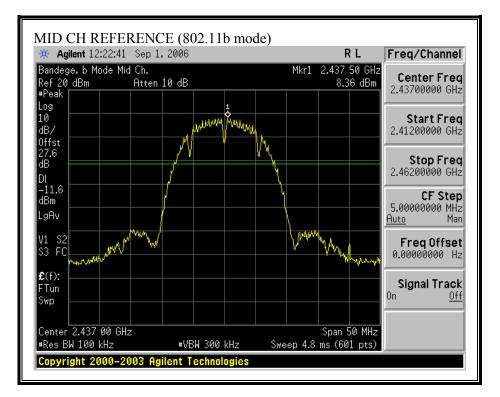


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SPURIOUS EMISSIONS, MID CHANNEL (802.11b MODE)

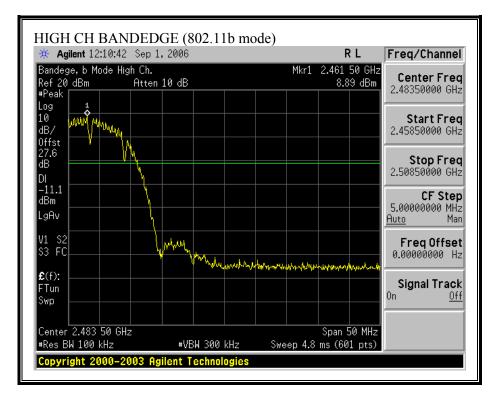


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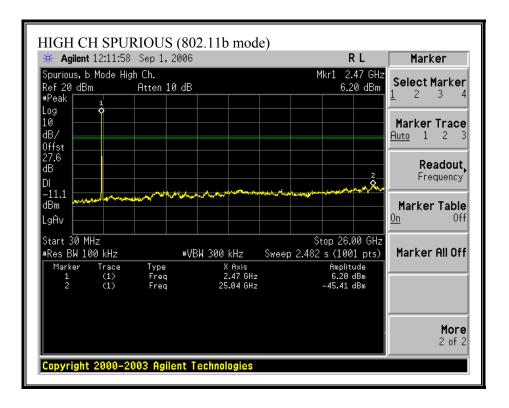
MID CH SPURI # Agilent 12:23:34	,	11b mode)	1	RT	Marker
Spurious, b Mode Mid Ref 20 dBm #Peak 11	Ch. Atten 10 dB		Mk	r2 25.09 GHz -44.54 dBm	Select Marker
Log 0 10 dB/ 0 0ffst					Marker Trace <u>Auto</u> 1 2 3
27.6 dB DI				2	Readout, Frequency
–11.6 dBm LgAv					Marker Table On Off
Start 30 MHz #Res BW 100 kHz Marker Trace	Type	W 300 kHz X Axis		Amplitude	Marker All Off
1 (1) 2 (1)	Freq Freq	2.45 GHz 25.09 GHz		7.67 dBm -44.54 dBm	
					More 2 of 2
Copyright 2000-20	03 Agilent T	echnologies			

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SPURIOUS EMISSIONS, HIGH CHANNEL (802.11b MODE)

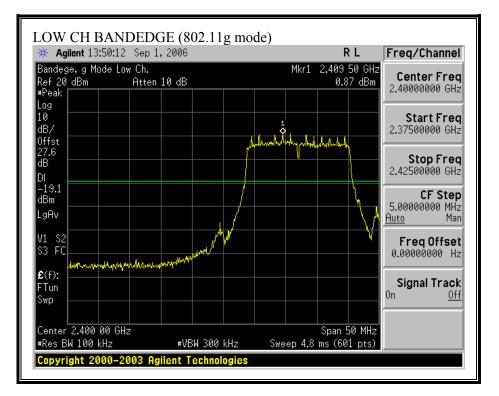


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SPURIOUS EMISSIONS, LOW CHANNEL (802.11g MODE)

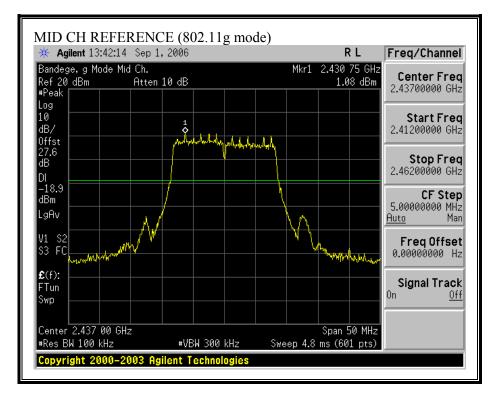


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LOW CH SPUE	RIOUS (802.1	1g mode)		
🔆 Agilent 13:51:01	Sep 1,2006		RL	Marker
Spurious, g Mode Lov Ref 20 dBm #Peak Log			Mkr2 25.09 GHz -45.46 dBm	Select Marker 1 <u>2</u> 3 4
10				Marker Trace Auto 1 2 3
27.6 dB DI -19.1		ىيە بىرىنى بى	22	Readout, Frequency
dBm				Marker Table
Start 30 MHz #Res BW 100 kHz Marker Trace	Туре	X Axis	Stop 26.00 GHz p 2.482 s (1001 pts) Amplitude	Marker All Off
1 (1) 2 (1)	Freq Freq	2.42 GHz 25.09 GHz	-2.25 dBm -45.46 dBm	
Copyright 2000-2	002 Onilont Tool	hanlastica		More 2 of 2
copyright 2000-2	vos Agnent Teci	monugies		

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SPURIOUS EMISSIONS, MID CHANNEL (802.11g MODE)

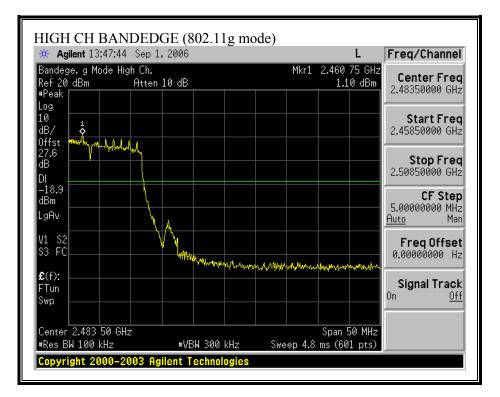


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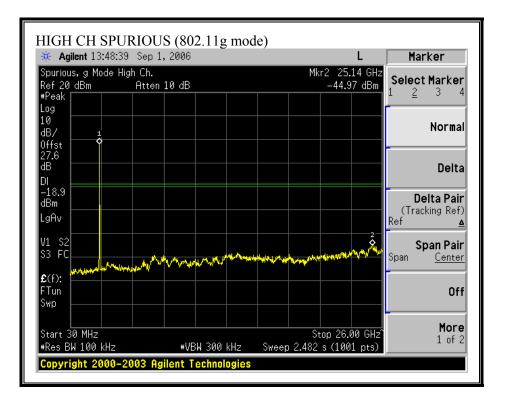
MID CH SPUR	IOUS (802.	11g mode)			
🔆 Agilent 13:43:12	Sep 1,2006			RT	Marker
Spurious, g Mode Mid Ref 20 dBm #Peak			Mk	r2 24.96 GHz -45.21 dBm	Select Marker 1 <u>2</u> 3 4
Log 10 dB/ 0ffst					Marker Trace <u>Auto</u> 1 2 3
27.6 dB DI -18.9				2	Readout, Frequency
dBm	and the second				Marker Table On Off
Start 30 MHz #Res BW 100 kHz Marker Trace	Type	X Axis	Sweep 2.482	top 26.00 GHz s (1001 pts) Amplitude	
$ \begin{array}{cccc} 1 & (1) \\ 2 & (1) \end{array} $	Freq Freq	2.45 GHz 24.96 GHz		-3.43 dBm -45.21 dBm	
Copyright 2000-20	003 Agilent To	echnologies			More 2 of 2

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SPURIOUS EMISSIONS, HIGH CHANNEL (802.11g MODE)



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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.

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\$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.

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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.

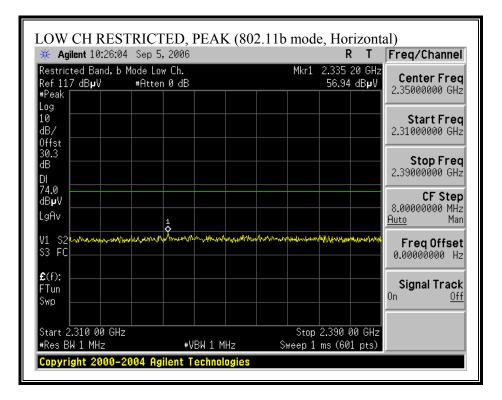
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 5 GHz band.

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.

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6.2.2. TRANSMITTER ABOVE 1 GHz WITH BLADE ANTENNA

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

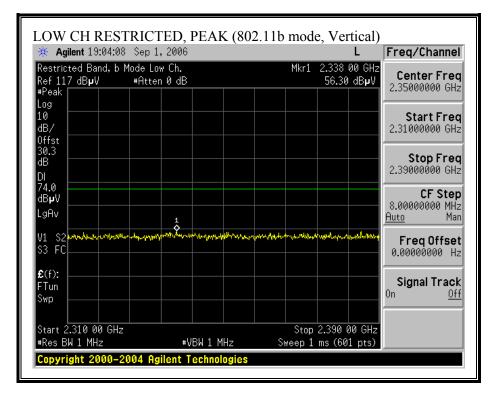


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🔆 Agilent 10:26:43	3 Sep 5,2006			RL	Freq/Channel
Restricted Band, b Ref 117 dB µ V			Mkr1	2.383 47 GHz 44.24 dBµV	
#Peak Log					
10 dB/ Offst					Start Freq 2.31000000 GHz
dB					Stop Freq 2.39000000 GHz
54.0 dB µ V					CF Step 8.00000000 MHz
V1 S2					<u>Auto</u> Man
\$3 FC				1 Q	Freq Offset 0.00000000 Hz
£(f):					Signal Track
Swp					
Start 2.310 00 GHz #Res BW 1 MHz		10 Hz		2.390 00 GHz s (601 pts)	

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RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

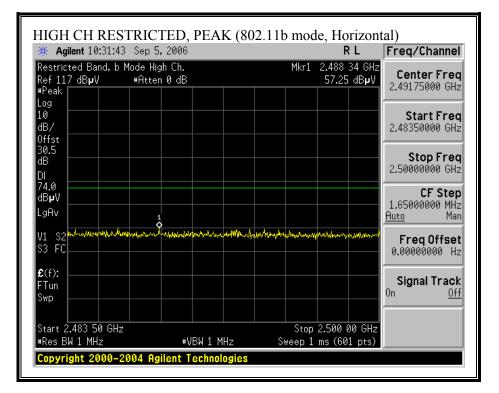


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🔆 Agilent 10:21:39	Sep 5,2006	RT	Peak Search
Restricted Band, b Moo Ref 117 dBµV + #Peak		2.338 80 GHz 44.65 dBµV	Next Peak
+reak Log 10 dB/ 0ffst			Next Pk Right
30.3 dB DI 54.0			Next Pk Left
dBµV LgAv			Min Search
V1 S2 S3 FC AA		 	Pk-Pk Search
£(f): FTun Swp			Mkr → CF
Start 2.310 00 GHz #Res BW 1 MHz	#VBW 10	.390 00 GHz^ s (601 pts)	More 1 of 2

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RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

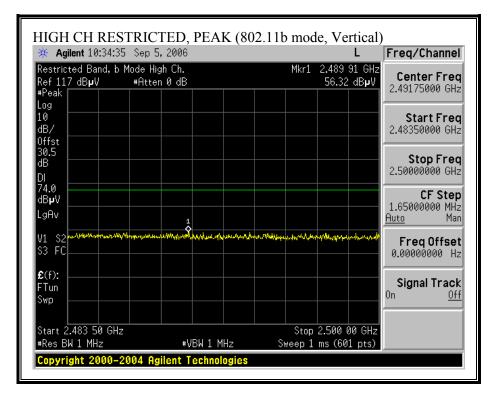


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🔆 Agilent 10:32:12	Sep 5,2006		L	Freq/Channel
Restricted Band, b M Ref 117 dBµV			83 83 GHz .43 dB µ V	Center Freq 2.49175000 GHz
#Peak Log				2.49175000 6H2
10 dB/ Offst				Start Freq 2.48350000 GHz
30.5 dB DI				Stop Freq 2.5000000 GHz
54.0 dB µ V				CF Step 1.65000000 MHz Auto Man
V1 S2 S3 FC				Freq Offset 0.00000000 Hz
£(f):				Signal Track
Start 2.483 50 GHz #Res BW 1 MHz	1	BW 10 Hz	10 00 GHzî (601 pto)	

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RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



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🔆 Agilent 10:35:00	Sep 5,2006			RL	Freq/Channel
Restricted Band, b M Ref 117 dBµV			Mkr1	2.483 50 GHz 44.48 dBµV	
#Peak Log					
10 dB/ 0ffst					Start Freq 2.48350000 GHz
30.5 dB					Stop Freq 2.5000000 GHz
DI 54.0 dB µ V					CF Step
LgAv					1.65000000 MHz <u>Auto</u> Man
V1 S2 S3 FC 2					FreqOffset 0.00000000 Hz
£(f): FTun Swp					Signal Track On <u>Off</u>
Start 2.483 50 GHz #Res BW 1 MHz		BW 10 Hz		2.500 00 GHzî 7 s (601 pts)	

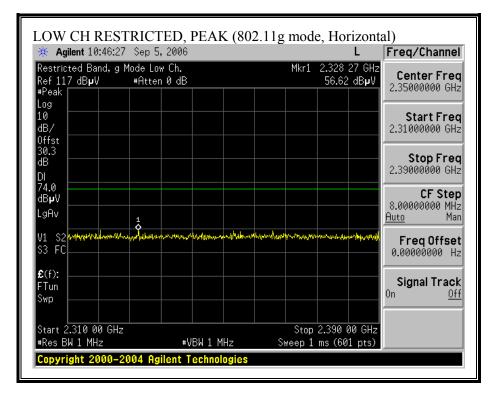
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HARMONICS AND SPURIOUS EMISSIONS (b MODE)

T73; S/N: Hi Frequen	n 1-18 :6717@				1-260	Hz	Pre-am	plifer	26-40GH	z	н	orn > 18(GHz		Limit
Hi Frequen		ษ∕ว⊞ -	- T144 M	liteq 30				pinor		-				-	FCC Class B 🖵
	ncy Cable	_													
2 f	foot c		3	foot c	able		12	foot c	able		HPF	Re	ject Filte		<u>Measurements</u>
		-	. Vien	1872150	02	•	Vien 19	72090)5 🗸	HPI	F_4.0GHz	-		Avera	W=VBW=1MHz ge Measurements 1MHz ; VBW=10Hz
		D 171	D 1:		07		I. C.	179.							
	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)
W CHANI	NEL, 24 3.0	412 MHz 45.6	32.6	33.3	2.9	-36.5	0.0	6.0	46.0	33.0	74	54	-28.0	-21.0	v
24 :	3.0	44.5	32.6 31.9	33.3	29 29	-36.5 -36.5	0.0	a.u a.u	40.0 44.9	32.3	74 74	54 54	-28.0 -29.1	-21.0 -21.7	Y H
	3.0	37 MHz 44.8	32.6	33.4	3.0	-36.5	0.0	6.0	45.3	33.1	74	54	- 28. 7	-20.9	v
	3.0	43.8	31.7	33.4	3.0	-36.5	0.0	6.0	44.3	32.2	74	54	- 29. 7	-21.8	Н
24 :	3.0	43.7	32.7	33.4	3.1	-36.5	0.0	0.0	44.3	33.3	74	54	-29.7	-20.7	V
24 :	3.0	42.9	30.9	33.4	3.1	-36.5	0.0	0.0	43.5	31.5	74	54	-30.5	-22.5	Н
f Di Re Al Cl	ist D ead A F A	Measureme Distance to Analyzer Re Antenna Fa Cable Loss	eading ctor	7			Average	Corre Field S d Peal	ct to 3 mete Strength @ c Field Stre	3 m		Pk Lim Avg Mar	Peak Field Margin vs.	Field Strengt I Strength L . Average L . Peak Limit	imit imit

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RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)

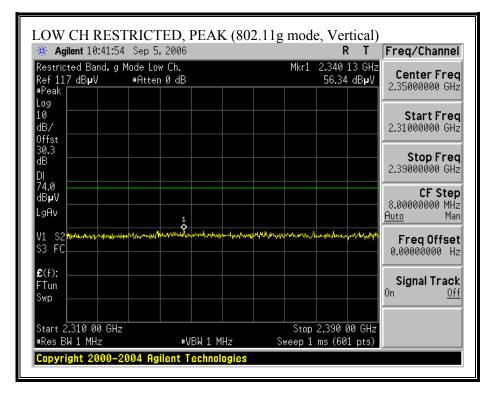


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🔆 Agilent 10:47:07	Sep 5,2006			RL	Freq/Channel
Restricted Band, g Ref 117 dB µ V			Mkr1	2.335 47 GHz 44.24 dBµV	Contor Eroa
#Peak Log					
10 dB/					Start Freq 2.31000000 GHz
0ffst 30.3 dB					Stop Freq
DI 54.0 dBµV					CF Step
LgAv					8.00000000 MHz <u>Auto</u> Man
V1 S2 S3 FC	1 Q				FreqOffset 0.00000000 Hz
£(f): FTun Swp					Signal Track On <u>Off</u>
Start 2.310 00 GHz #Res BW 1 MHz		√ 10 Hz		2.390 00 GHz 8 s (601 pts)	

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RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)

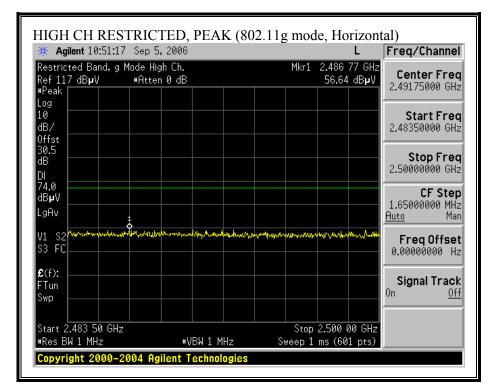


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🔆 Agilent 10:42:3	• •		L	Freq/Channel
Restricted Band, g Ref 117 dB µ V			2.339 07 GHz 44.93 dB µ V	Center Fred 2.35000000 GHz
ŧPeak _og				
10 dB/				Start Fred 2.31000000 GHz
Offst 30.3 dB				Stop Frec 2.39000000 GHz
54.0 38µV				CF Step 8.0000000 MHz
_gAv				<u>Auto</u> Mar
И \$2 53 FC		 		Freq Offset 0.00000000 Hz
E(f):				Signal Track
бжр				
Start 2.310 00 GH;		Stop 2	.390 00 GHzî	

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RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)

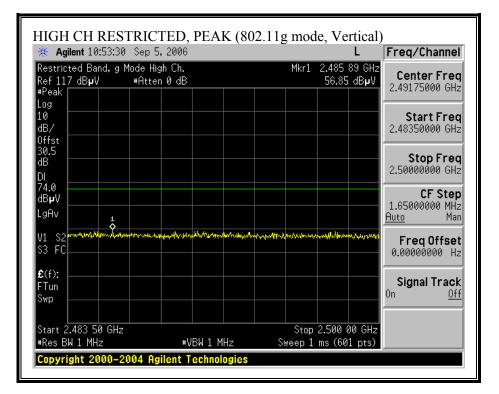


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🔆 Agilent 10:51:40	Sep 5,2006			RL	Freq/Channel
Restricted Band, g M Ref 117 dB µ V			Mkr1 2	2.483 75 GHz 44.42 dB µ V	Center Freq 2.49175000 GHz
#Peak Log					
10 dB/ Offst					Start Freq 2.48350000 GHz
30.5 dB DI					Stop Freq 2.50000000 GHz
54.0 dBµV LgAv					CF Step 1.65000000 MHz Auto Man
V1 S2 S3 FC					FreqOffset 0.00000000 Hz
£(f): FTun Swp					Signal Track On <u>Off</u>
Start 2.483 50 GHz #Res BW 1 MHz	#1	/BW 10 Hz		2.500 00 GHzî s (601 p+s)	

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RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)



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Agilent 10:53:59	Sep 5, 2008	6		RL	Freq/Channel
Restricted Band, g M Ref 117 dBµV			Mkr1	2.483 50 GHz 44.51 dBµV	
#Peak Log					
10 dB/					Start Freq 2.48350000 GHz
Offst 30.5 dB					Stop Freq 2.50000000 GHz
DI 54.0 dBµV					CF Step 1.6500000 MHz
LgAv					<u>Auto</u> Man
V1 S2 S3 FC					Freq Offset 0.00000000 Hz
£(f): FTun Swp					Signal Track On <u>Off</u>
410					
Start 2.483 50 GHz #Res BW 1 MHz		VBW 10 Hz		2.500 00 GHz 7 s (601 pts)	1

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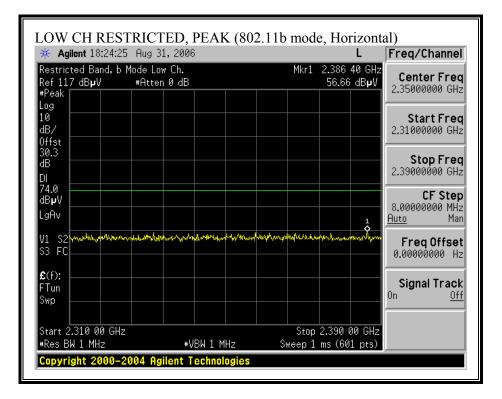
HARMONICS AND SPURIOUS EMISSIONS (g MODE)

DW CHAINEL, 2412 MHz 31 33 29 365 0.0 0.6 44.0 31.4 74 54 -30.0 -22.6 V 324 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 324 3.0 42.8 30.7 33.3 2.9 -36.5 0.0 0.6 44.2 31.1 74 54 -30.8 -22.9 H D CHAINEL, 2437 MHz
2 foot cable 3 foot cable 12 foot cable HPF Reject Filter Peak Measurements RBW=UBW=1MHz 1 <t< th=""></t<>
f Dist Read Pk Read Avg. AF CL Amp D Corr Flr Peak Avg Pk Lim Avg Lim Pk Mar Avg Mar Notes GHz (m) dBuV dBuV dB dB dB dB dBuV/m dBuV/m dBuV/m dBuV/m dB dB (V/H) WCHANNEL, 2412 MHz (V/H) dB dB dB dB dB //m dB //m dB //m
GHz (m) dBuV dBuV dB dW/m dBuV/m dBuV/m dBuV/m dB dB (V/H) DW CHANNEL, 2412 MHz 1 333 2.9 -36.5 0.0 0.6 44.0 31.4 74 54 -30.0 -22.6 V S24 3.0 43.6 31.0 33.3 2.9 -36.5 0.0 0.6 44.2 31.9 74 54 -30.0 -22.6 V DC CHANNEL, 2437 MHz
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 824 3.0 42.8 30.7 33.3 2.9 -36.5 0.0 0.6 44.0 31.4 74 54 -30.8 -22.9 H DCHANNEL, 2437 MH
D CHANNEL, 2437 MHz Image: Constraint of the second s
174 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 174 3.0 43.4 31.2 33.4 30 -36.5 0.0 0.6 44.2 31.9 74 54 -29.8 -22.1 V 174 3.0 43.4 31.2 33.4 30 -36.5 0.0 0.6 43.9 31.7 74 54 -30.1 -22.3 H 124 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 124 3.0 41.4 30.9 33.4 3.1 -36.5 0.0 0.6 42.0 31.5 74 54 -31.0 -22.2 V 124 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 124 3.0 <td< td=""></td<>
CHANNEL, 2462 MHz Image: Channel of the second
24 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 Dist Distance to Antenna D Corr Distance Correct to 3 meters Avg Lim Average Field Strength Limit Read Analyzer Reading Avg Average Field Strength @ 3 m Avg Mar Margin vs. Average Limit
No other emissiond were detected above system noise floor Aug Lim Average Field Strength Limit 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
CL Cable Loss HPF High Pass Filter

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6.2.3. TRANSMITTER ABOVE 1 GHz WITH PATCH ANTENNA

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

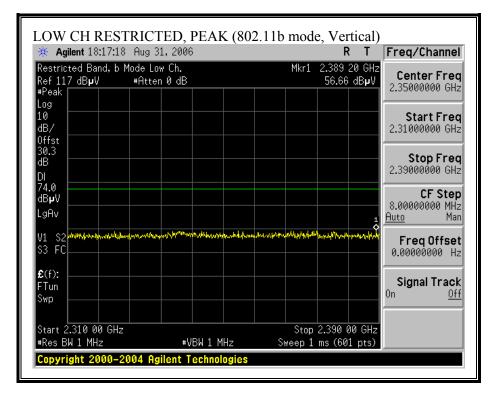


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LOW CH REST		4 V G (80	2.110	mode,	Horizo	
Agilent 15:11:56					L	 Peak Search
Restricted Band, b M Ref 117 dBµV #Peak				Mkr1 2	2.360 40 44.09 dE	Next Peak
+reak Log 10 dB/ Offst						Next Pk Right
30.3 dB DI 54.0						Next Pk Left
dBµV LgAv						Min Search
V1 S2 S3 FC			1			Pk-Pk Search
€(f): FTun Swp						Mkr → CF
Start 2.310 00 GHz #Res BW 1 MHz	#V	BW 10 Hz	Swe	Stop 2 9 6.238	.390 00 s (601 p	More 1 of 2

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RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

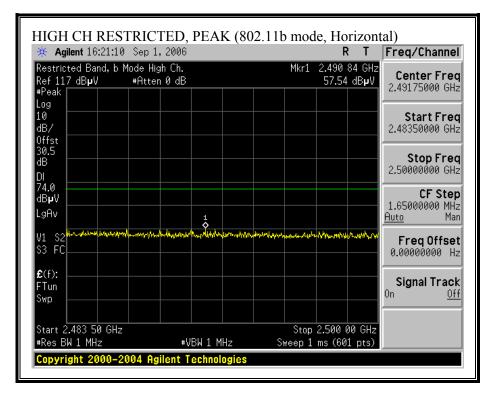


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Agilent 18:18:2	4 Aug 31,2006			RT	Freq/Channel
Restricted Band, b Ref 117 dB µ V				339 47 GHz 4.95 dB µ V	Center Freq 2.35000000 GHz
#Peak Log					2.53666666 012
10 dB/					Start Freq 2.31000000 GHz
Offst 30.3 dB					Stop Freq 2,39000000 GHz
DI 54.0 dBµV					CF Step
LgAv					8.00000000 MHz <u>Auto</u> Man
V1 S2 S3 FC					Freq Offset 0.00000000 Hz
£ (f): FTun Swp					Signal Track On <u>Off</u>
Start 2.310 00 GH #Res BW 1 MHz	z #VBW :	10.11- 0	Stop 2.3 weep 6.238 s	90 00 GHzî	

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RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

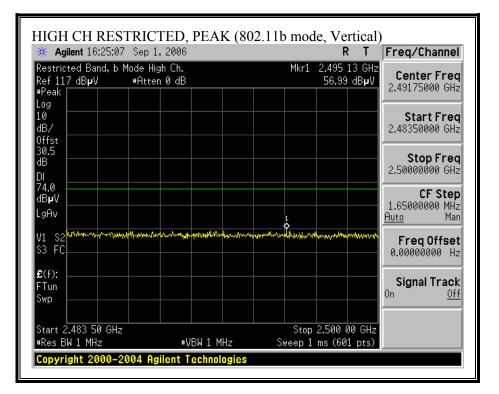


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	Sep 1, 2006		L Freq/Channel
stricted Band, b Mod 117 dBµV #		Mkr1 2.43 44	33 64 GHz .72 dBµV 2.49175000 GHz
eak and a second s			
			2.48350000 GHz
st 5			Stop Freq 2,50000000 GHz
0 µV			CF Step 1.65000000 MHz
v V			Auto Man
S2 FC AA			Freq Offset 0.00000000 Hz
F):			Signal Track
			0n <u>0ff</u>
rt 2.483 50 GHz		Stop 2.50	10 00 GHzî
			Г

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RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



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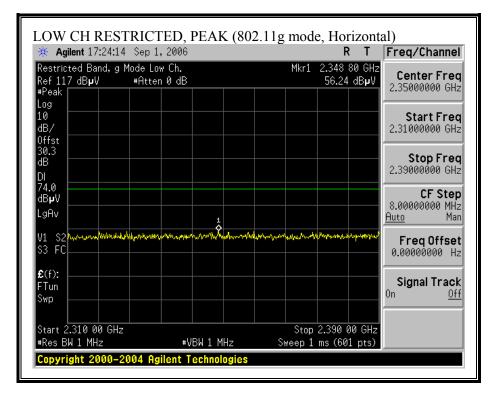
* Agilent 16:25:31	Sep 1, 2006		RT	Freq/Channel
Restricted Band, b 1 Ref 117 dBµV		Mkr1	2.483 50 GHz 44.61 dBµV	Center Freq 2.49175000 GHz
#Peak				
10 dB/				Start Freq 2.48350000 GHz
Offst 30.5 dB				Stop Freq 2.5000000 GHz
DI 54.0 dB µ V				CF Step
LgAv				Auto Man
V1 S2 S3 FC				FreqOffset 0.00000000 Hz
€(f): FTun				Signal Track
Swp				
Start 2.483 50 GHz		Stop 2	2.500 00 GHzî	

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HARMONICS AND SPURIOUS EMISSIONS (b MODE)

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RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)

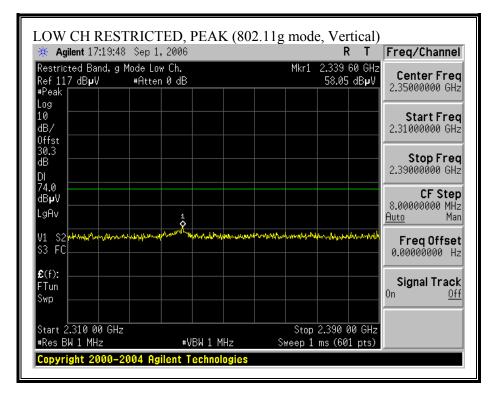


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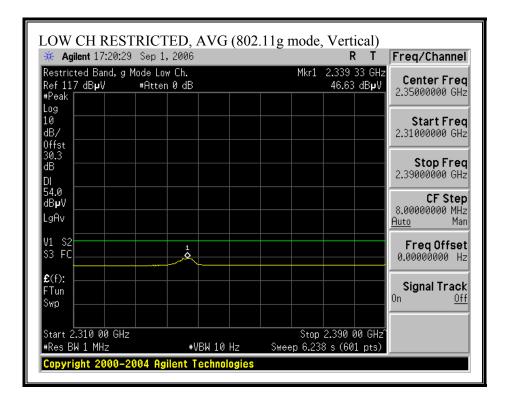
* Agilent 17:24:5	2 Sep 1, 2006		L	Freq/Channel
Restricted Band, g Ref 117 dB µ V			.390 00 GHz 44.15 dBµV	Center Freq 2.35000000 GHz
#Peak Log				2.33000000 0H2
10 dB/				Start Freq 2.31000000 GHz
0ffst 30.3 dB DI				Stop Freq 2.39000000 GHz
54.0 dBµV LgAv				CF Step 8.00000000 MHz Auto Man
V1 S2 S3 FC				Freq Offset
£(f):				Signal Track
Swp				
Start 2.310 00 GH #Res BW 1 MHz		3W 10 Hz	390 00 GHz [^]	

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RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)

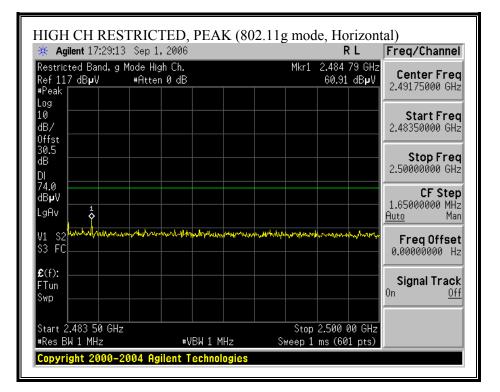


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RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)

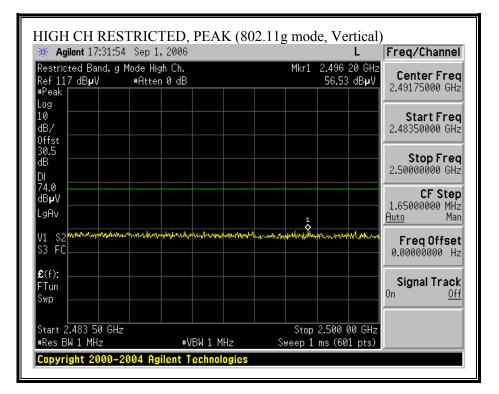


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🔆 Agilent 17:29:49	Sep 1, 2006			RT	Freq/Channel
Restricted Band, g Ref 117 dBµV			Mkr1	2.483 50 GHz 44.67 dBµV	Contor From
#Peak Log					
10 dB/					Start Freq 2.48350000 GHz
0ffst 30.5 dB					Stop Freq
DI 54.0 dBµV					CF Step
LgAv					Auto Man
V1 S2 S3 FC					FreqOffset 0.00000000 Hz
£ (f):					Signal Track
Swp					On <u>Off</u>
Start 2.483 50 GHz			Stop	2.500 00 GHz	
#Res BW 1 MHz		VBW 10 Hz		7 s (601 pts)	

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RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)



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Sep 1,2006		N I	Freq/Channel
1ode High Ch. #Atten 0 dB			Center Freq 2.49175000 GHz
			2.10173000 0112
			Start Freq 2.48350000 GHz
			Stop Freq 2.50000000 GHz
			CF Step
			Auto Man
			Freq Offset 0.00000000 Hz
			Signal Track
	Stop 2	500 00 GHz	
		*Atten 0 dB	*Atten 0 dB 44.39 dBµV

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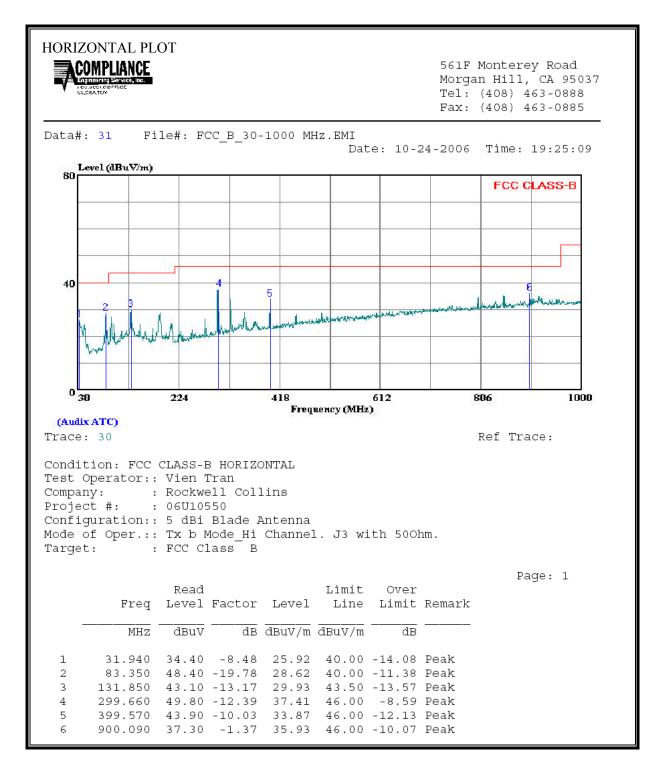
HARMONICS AND SPURIOUS EMISSIONS (g MODE)

H Frequency Cables 3 foot cable 12 foot cable HPF Reject Filter Peak Measurem Wien 187215002 Wien 197209005 HPF_4.0GHz Phy Reject Filter Peak Measurem f Dist Read Pk Read Avg AF CL Amp D Corr Fltr Peak Avg Pk Lim Avg Lim Pk Mar Avg Mar Note GHz (n) dBuV dBuV dBuV dBu dB dB dB dB U/m Note V24 3.0 443 32.5 33.3 2.9 -36.5 0.0 0.6 44.7 32.9 74 54 -29.3 -21.1 V V24 3.0 44.3 32.5 33.4 3.0 -36.5 0.0 0.6 44.7 32.9 74 54 -29.3 -21.6 H D CHANNEL, 2423 MHz 0 0 0.4 45.2 33.4 3.0 -36.5 0.0 0.6 45.7 34.0 74 54 -29.3 -21.6 H D CHANNEL, 2423 MHz	Horn 1	1-18GHz	Pre-a	mplifer	1-260	GHz	Pre-am	plifer	26-40GH	z	H	orn > 180	GHz		Limit
2 foot cable 3 foot cable 12 foot cable HPF Reject Filter Peak Measurement RBW=1MA Average Measurement RBW=1MA average Measurement RBW=1MA average Measurement Frequency f Dist Read Pk Read Avg AF CL Amp D Corr Fltr Peak Avg Lim Avg Lim Pk Mar Avg Mar Note f Dist Read Pk Read Avg AF CL Amp D Corr Fltr Peak Avg Lim Avg Lim Pk Mar Avg Mar Note gHz in dBuV dBuV dB dB dB dB dBuV/m dB	73; S/N: 67	717@3m	- T144 I	Miteq 300	08A009	31 🖵				-				•	FCC Class B
Image: Structure Vien 187215002 Vien 197209005 Vie	i Frequency C	Cables	1												
Vien 187215002 Vien 197209005 HPF_4.0GHz Average Measurer RBW=1MHz; VBW f Dist Read Pk Read Avg. AF CL Amp D Corr Fltr Peak Avg Pk Lin Avg Lin Pk Mar Avg Mar Note 3Hz (n) dBuV dBuV dB dB dB dB dB dB W Note dB Way Note 24 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 24 3.0 43.8 32.0 33.3 2.9 -36.5 0.0 0.6 44.2 32.4 74 54 -29.3 -21.1 V 74 3.0 45.2 33.3 3.0 -36.5 0.0 0.6 45.7 34.0 74 54 -29.8 -21.6 H CHANNEL, 2402 MHz	2 foo	ot cable	3	3 foot c	able		12	foot c	able		HPF	Re	ject Filte		
f Dist Read Pk Read Avg. AF CL Amp D Corr Flr Peak Avg Pk Lin Avg Lin Pk Mar Avg Mar Note HLz (n) (BuV (BuV (B/m dB (B (B (B (B (B (V/r) (BuV/m (BuV/m (B (U/r) (U/r) (U/r) (B (U/r) (U/r) (U/r) (B (U/r) (U/r) (U/r) (B (U/r)		-	. Vien	1872150	02	•	Vien 19	972090	•	HPI	F_4.0GHz	-		Avera	nge Measurements
CHA (m) dBuV dB/m dB dV/m dBuV/m dBuV/m dB dB dB (V/r V CHANNEL, 2412 MHz 1 <th>f Die</th> <th>st Read Pk</th> <th>Read Avg</th> <th>AF</th> <th>CI.</th> <th>Amp</th> <th>D Corr</th> <th>Fltr</th> <th>Peak</th> <th>Ανσ</th> <th>Pk Line</th> <th>AvgLim</th> <th>Pk Mar</th> <th></th> <th></th>	f Die	st Read Pk	Read Avg	AF	CI.	Amp	D Corr	Fltr	Peak	Ανσ	Pk Line	AvgLim	Pk Mar		
14 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 14 3.0 43.8 32.0 33.3 2.9 -36.5 0.0 0.6 44.7 32.9 74 54 -29.3 -21.1 V 14 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 1 0 0.6 44.2 32.4 74 54 -29.8 -21.6 H 1 0 0.6 45.7 34.0 74 54 -28.3 -20.0 V 4 3.0 44.2 32.8 33.4 3.0 -36.5 0.0 0.6 44.7 33.3 74 54 -28.3 -20.0 V 14 3.0 44.3 31.8 33.4 3.1 -36.5 0.0 0.6 44.9 32.4 74 54 -28.7 -20.9	Hz (m)	ı) dBuV	÷						1	Ŭ		-			(V/H)
4 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 CHANNEL, 2437 MHz 4 3.0 .36.5 0.0 0.6 44.2 .32.4 74 54 .29.8 .21.6 H 4 3.0 .45.2 .33.5 .33.4 3.0 .36.5 0.0 0.6 45.7 .34.0 74 .54 .29.8 .21.6 H 4 3.0 .44.2 .32.8 .33.4 .30 .36.5 0.0 0.6 44.7 .33.3 .74 .54 .29.3 .20.0 V 4 3.0 .44.7 .32.5 .33.4 .31 .36.5 0.0 0.6 .45.3 .33.1 .74 .54 .29.3 .20.9 V 4 3.0 .44.3 .31.8 .33.4 .31 .36.5 0.0 0.6 .45.3 .33.1 .74 .54 .29.1 .21.6 H Vo other emissiond were detected above system noise floor			32.5	33.3	2.9	-36.5	0.0	0.6	44.7	32.9	74	54	.20.3	-21.1	v
4 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 3.0 44.2 32.8 33.4 3.0 -36.5 0.0 0.6 44.7 33.3 74 54 -28.3 -20.0 V HANNEL, 2462 MHz	4 3.0	0 43.8													
4 30 44.2 32.8 33.4 3.0 -36.5 0.0 0.6 44.7 33.3 7.4 5.4 -29.3 -20.7 H HANNEL, 2462 MHz 4 3.0 -36.5 0.0 0.6 44.7 33.3 7.4 5.4 -29.3 -20.7 H 4 3.0 44.7 32.5 33.4 3.1 -36.5 0.0 0.6 44.9 32.4 7.4 5.4 -28.7 -20.9 V 4 3.0 44.3 31.8 33.4 3.1 -36.5 0.0 0.6 44.9 32.4 7.4 5.4 -29.1 -21.6 H No other emissiond were detected above system noise floor </td <td></td> <td></td> <td>33.5</td> <td>33.4</td> <td>3.0</td> <td>-36.5</td> <td>0.0</td> <td>0.6</td> <td>45.7</td> <td>34.0</td> <td>74</td> <td>54</td> <td>-28.3</td> <td>-20.0</td> <td>v</td>			33.5	33.4	3.0	-36.5	0.0	0.6	45.7	34.0	74	54	-28.3	-20.0	v
4 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 3.0 44.3 31.8 33.4 3.1 -36.5 0.0 0.6 44.9 32.4 74 54 -28.7 -20.9 V 4 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 V f Measurement Frequency Amp Preamp Gain Avg Lim Average Field Strength Limit	4 3.0	0 44.2													
4 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			32.5	33.4	3,1	-36.5	۵O	0.6	45.3	33.1	74	54	-28.7	-20.9	v
f Measurement Frequency Amp Preamp Gain Avg Lim Average 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 Physical Strength Pk Mar Margin vs. Peak Limit	Dist Distance to Antenna D Corr Read Analyzer Reading Avg AF Antenna Factor Peak						Distance Correct to 3 meters Average Field Strength @ 3 m Calculated Peak Field Strength					Pk Lim Peak Field Strength Limit Avg Mar Margin vs. Average Limit			

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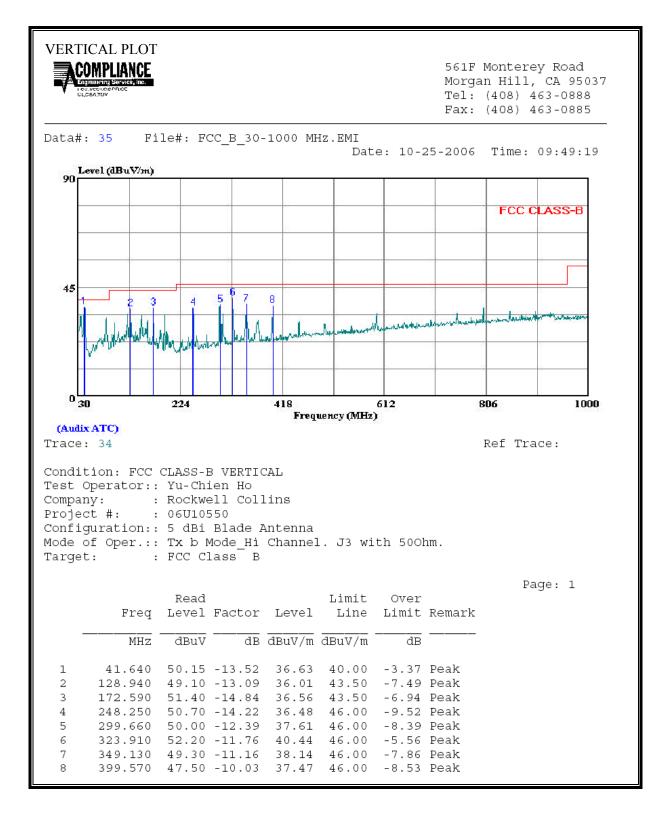
6.2.4. RADIATED EMISSIONS BELOW 1 GHz WITH BLADE ANTENNA

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



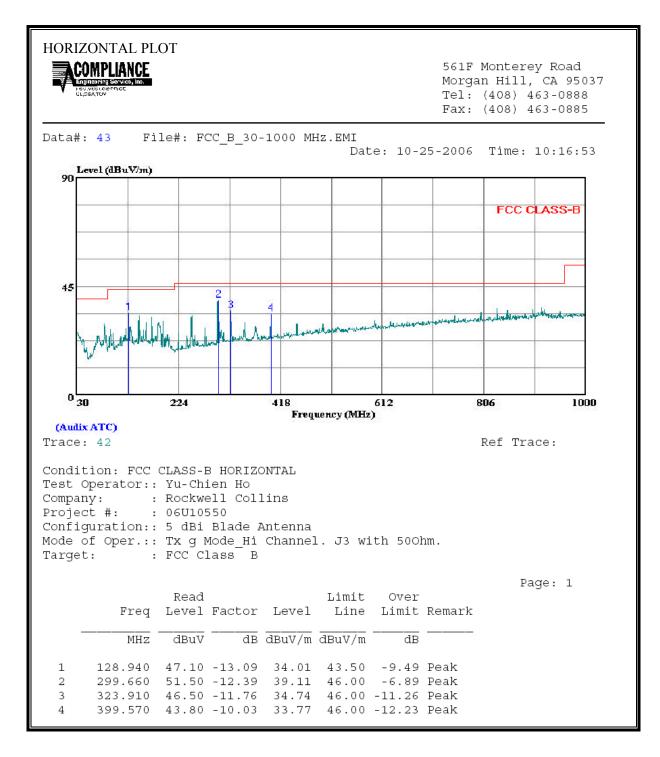
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SPURIOUS EMISSIONS 30 TO 1000 MHz (802.11b MODE, VERTICAL)



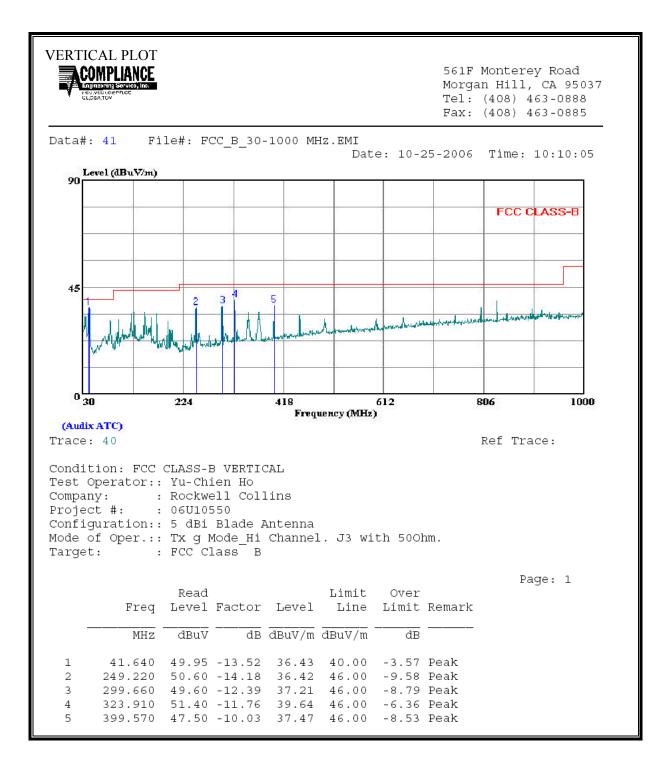
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SPURIOUS EMISSIONS 30 TO 1000 MHz (802.11g MODE, HORIZONTAL)



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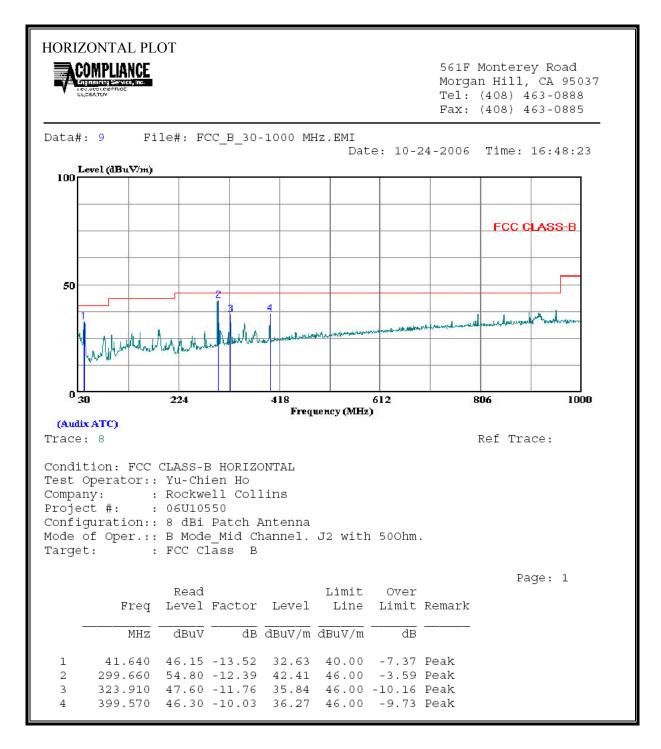
SPURIOUS EMISSIONS 30 TO 1000 MHz (802.11g MODE, VERTICAL)



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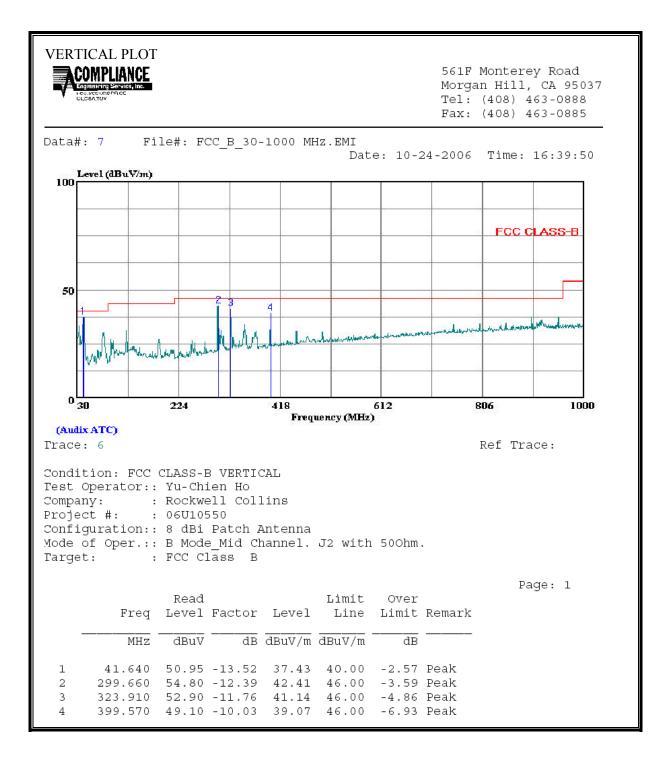
6.2.5. RADIATED EMISSIONS BELOW 1 GHz WITH PATCH ANTENNA

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



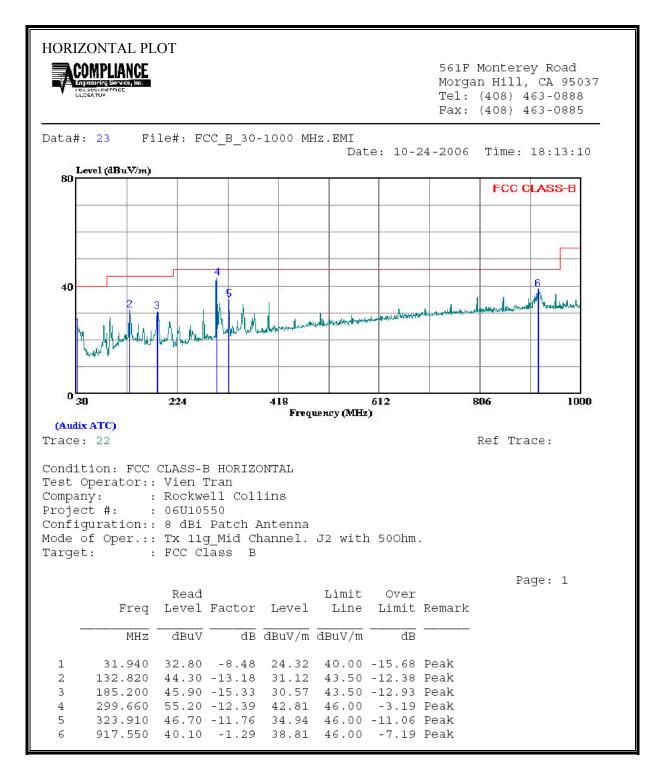
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SPURIOUS EMISSIONS 30 TO 1000 MHz (802.11b MODE, VERTICAL)



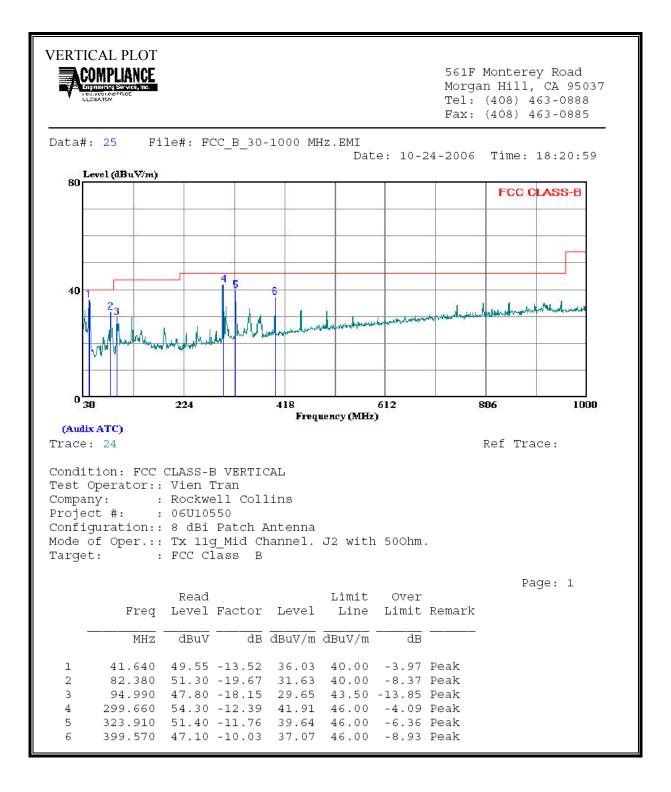
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SPURIOUS EMISSIONS 30 TO 1000 MHz (802.11g MODE, HORIZONTAL)



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



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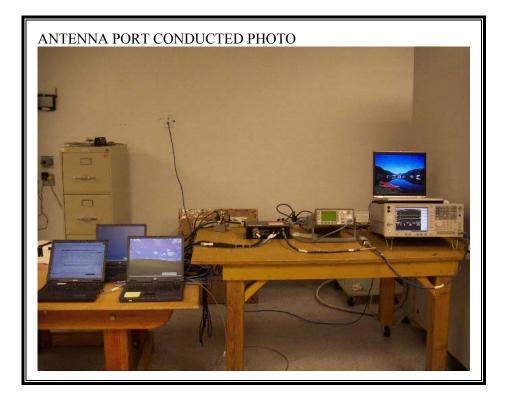
6.3. **POWERLINE CONDUCTED EMISSIONS**

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

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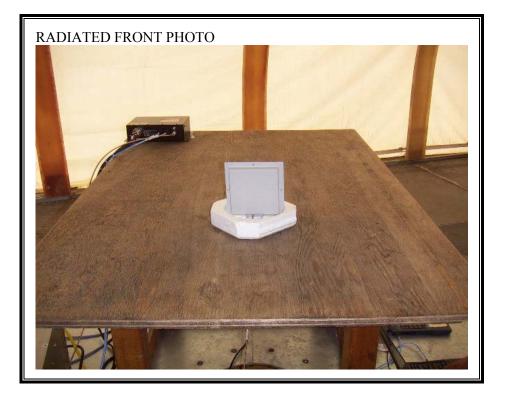
7. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



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RADIATED RF MEASUREMENT SETUP ABOVE 1 GHZ WITH PATCH ANTENNA



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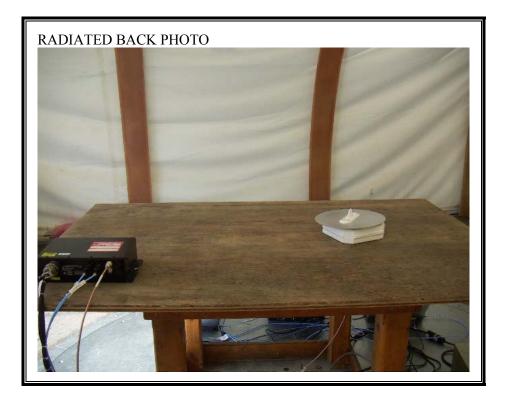


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RADIATED RF MEASUREMENT SETUP ABOVE 1 GHZ WITH AERODYNAMIC BLADE ANTENNA



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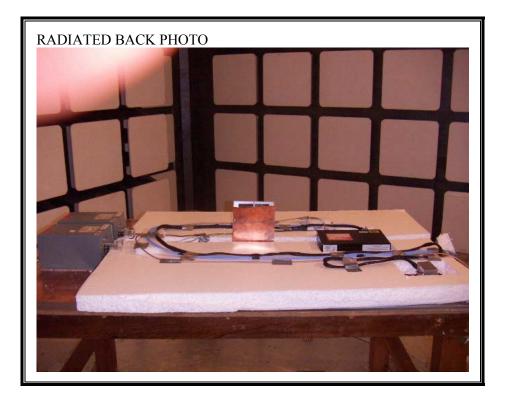


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RADIATED RF MEASUREMENT SETUP BELOW 1 GHZ WITH PATCH ANTENNA



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RADIATED RF MEASUREMENT SETUP BELOW 1 GHZ WITH AERODYNAMIC BLADE ANTENNA



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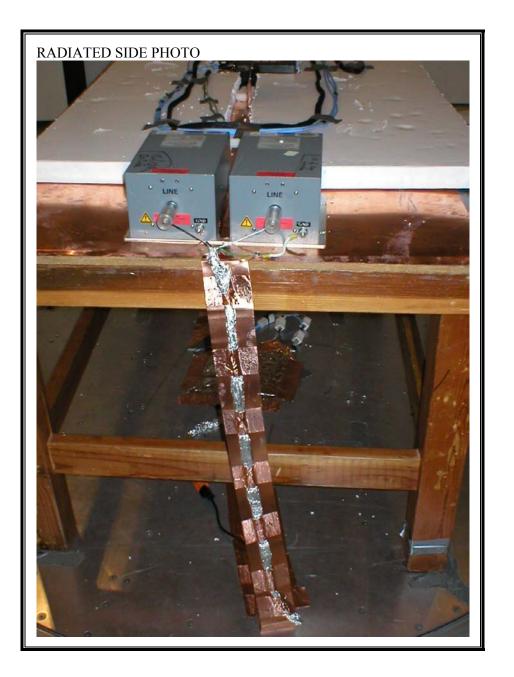


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RADIATED RF MEASUREMENT SETUP BELOW 1 GHZ – DETAILS OF CABLE ROUTING BETWEEN TABLE TOP GROUND PLANE AND CHAMBER GROUND PLANE



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END OF REPORT

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