

FCC CFR47 CERTIFICATION CLASS II PERMISSIVE CHANGE TEST REPORT

FOR

BROADCOM 802.11g WIRELESS LAN PCI-E MINI CARD

MODEL NUMBER: BCM94311MCG

FCC ID: QDS-BRCM1020

REPORT NUMBER: 06U10198-1

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Prepared for BOARDCOM CORP. 190 MATHILDA PLACE SUNNYVALE, CA 94086, USA

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Revision History

Rev.	Date	Revisions	Revised By
	04/13/06	Initial Issue	Thu

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1. TEST RESULT DECLARATION

COMPANY NAME:	Broadcom Corp. 190 Mathilda Place Sunnyvale, CA 94086, USA
EUT DESCRIPTION:	Broadcom 802.11g Wireless LAN PCI-E Mini Card
MODEL:	BCM94311MCG
SERIAL NUMBER:	245
DATE OF ORIGINAL TESTS:	March 31 to April 06, 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: This document reports conditions under which testing was conducted and results of tests performed. 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 or imply product endorsement by NVLAP or any agency of the US Government.

Approved & released by:

Original tests conducted by:

THU CHAN EMC SUPERVISOR COMPLIANCE CERTIFICATION SERVICES

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 ANSI C63.4-2003, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

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

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <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%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11g transceiver WLAN module, operating in 2400-2483.5 MHz band and it is manufactured by Broadcom Corp.

5.2. CLASS II PERMISSIVE CHANGE DESCRIPTION

The EUT was originally tested and reported under CCS project no. 05U3484 and granted by TCB, with a PIFA antenna which has a peak gain of 3.24dBi. The major change filed under this application is to add a PCB antenna with a maximum gain of 1.66dBi manufactured by Amphenol, P/N EAX20. Therefore only Radiated emission and Power Line Conducted emission tests were conducted under this project, with verification performed on the original output power.

5.3. MAXIMUM OUTPUT POWER

The transmitter has the same maximum peak conducted output power as original.

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB antenna with a maximum gain of 1.66dBi.

5.5. SOFTWARE AND FIRMWARE

The EUT driver software installed in the host support equipment during testing was BCM94311, version. 3.100.53.0

The test utility software used during testing was wl_tools.

5.6. WORST-CASE CONFIGURASSSSION AND MODE

The worst-case channel is determined as the channel with the highest output power. The highest measured output powers were at 2412 MHz for 11b mode and 2437 MHz for 11g mode.

The worst-case data rate for these channels are determined to be 1 Mb/s for 11b mode and 6 Mb/s for 11g mode, based on previous experience with WLAN product design architectures.

Thus all emissions tests were made in the 802.11b mode, 2412 MHz, 1 Mb/s, and 802.11g mode, 2437 MHz, 6 Mb/s.

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WORSRT-CASE POWER AND BIT RATE SETTING

02.11b							
CHANNEL	1	6	10	11	13		
(MHz)	2412	2437	2457	2462	2472		
Band Edge							
(dBm)	19	х	19	18.5	10		
Emission							
(dBm)	19	19	х	х	19		
Bit Rate							
(Mbps)	11Mbp	os for Peak re	ading & 1Mb	ops for Averag	e reading		
NOTE:	For the rest	of the RF Co	nducted and	Radiated Em	ission tests,	channel 13 is	s set
	to 19dBm fo	or worst case	power to cov	er all high ch	annels_Chanr	nel 10 (19dBr	n),
	Channel 11	(18.5dBm) &	Channel 13	(10dBm)			
02.11g							
CHANNEL	1	2	6	10	11	13	
(MHz)	2412	2417	2437	2457	2462	2472	
Band Edge						-	
(dBm)	18	19	х	19	17	10	
Emission							
(dBm)	19	х	19	х	х	19	
Bit Rate							
(Mbps)	54Mbp	os for Peak re	ading & 6Mb	ops for Averag	e reading		
NOTE:	For the rest	of the RF Co	nducted and	Radiated Em	ission tests,	channel 13 is	s set
	to 19dBm fo	or worst case	power to cov	er all high ch	annels_Chanr	nel 10 (19dBr	n),
	Channel 11	(17dBm) & C	hannel 13 (1	0dBm)			

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5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST							
Description Manufacturer Model Serial Number FCC ID							
Extended Card	ADEXELEC	PEX1-MINI	01/01/1900	N/A			
AC Adapter	HP	3751260-001	PPP017L	N/A			
laptop	HP	ZV6000	CND51501BMD	N/A			

I/O CABLES

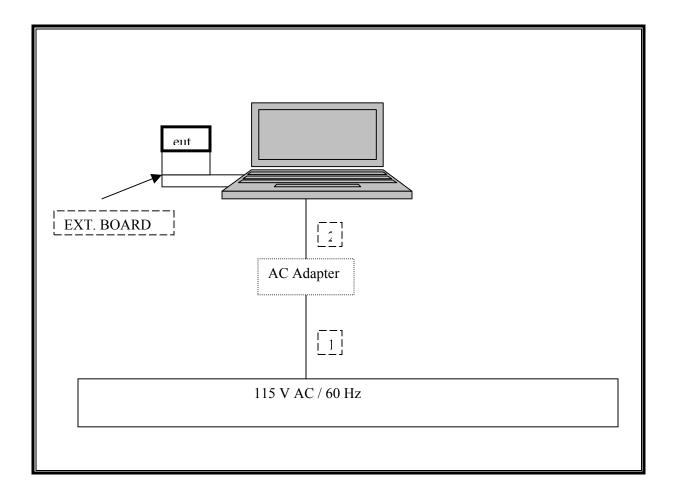
	I/O CABLE LIST							
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks		
1	AC	1	US115	Unshielded	2m	N/A		
2	DC	1	DC	Unshielded	2m	N/A		

TEST SETUP

The EUT is installed in a host laptop computer via an extension board during the tests. Test software exercised the radio card.

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SETUP DIAGRAM



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6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST						
Description	Manufacturer	Model	Serial Number	Cal Due		
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	US42510266	10/19/2006		
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	4/22/2006		
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00561	10/3/2007		
LISN, 10 kHz ~ 30 MHz	FCC	LISN-50/250-25-2	2023	8/30/2006		
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	8/30/2006		
EMI Test Receiver	R & S	ESHS 20	827129/006	6/3/2006		
AC Power Source, 10 kVA	ACS	AFC-10K-AFC-2	J1568	CNR		
EMI Receiver, 9 kHz ~ 2.9 GHz	Agilent / HP	8542E	3942A00286	2/4/2007		
RF Filter Section	Agilent / HP	85420E	3705A00256	2/4/2007		
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A121003	3/3/2007		
4.0 High Pass Filter	Micro Tronics	HPM13351	3	N/A		
2.4 - 2.5 Band Reject Filter	Micro Tronics	N/A	1	N/A		
Peak Power Meter	Agilent / HP	E4416A	GB41291160	12/2/2007		

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7. LIMITS AND RESULTS

7.1. CHANNEL TESTS

7.1.1. 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 10.7 dB (including 10 dB pad and 0.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

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Channel	Frequency	Power
	(MHz)	(dBm)
1	2412	19.26
2	2417	19.23
6	2437	19.27
10	2457	19.19
11	2462	18.98
13	2472	10.27

802.11b Mode (Gate Average Power)

802.11g Mode (Gate Average Power)

Channel	Frequency	Power
	(MHz)	(dBm)
1	2412	18.51
2	2417	19.18
6	2437	19.23
10	2457	19.31
11	2462	17.23
13	2472	10.23

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7.2. RADIATED EMISSIONS

7.2.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

<u>LIMITS</u>

§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	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(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, and 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 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.

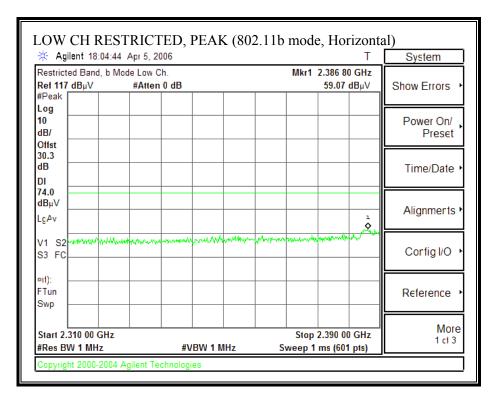
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7.2.2. TRANSMITTER ABOVE 1 GHz, b MODE

11b_CHANNEL 1, 10, 11 and 13

<u>CH 1, 2412 MHz</u> POWER = 19 dBm

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

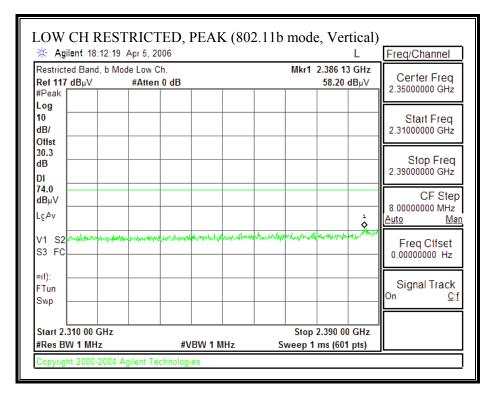


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🔆 Agilent 18:0	5:58 Apr 5, 200	6		L	System
	and, b Mode Low Ch. Mkr1 2.387 20 GH νV #Atten 0 dB 51.06 dBμλ			I 2.387 20 GHz 51.06 dBµV	Show Errors
Log					Power On/
dB/ Offst					Preset
30.3 dB					Time/Date
DI 54.0 dBu∨					
LgAv					Alignments
V1 S2 S3 FC				1	Corfig I/O
¤(1):					Deference
Swp					Reference
Start 2.310 00 GI #Res BW 1 MHz	l	#VBW 10 Hz		p 2.390 00 GHz 38 s (601 pts)	More 1 ct 3

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RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)



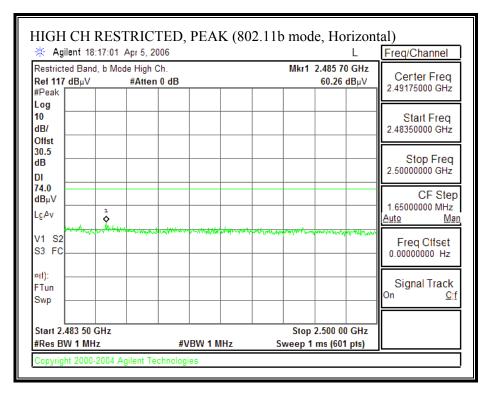
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	2:55 Apr 5, 2006	 	Freq/Channel		
Restricted Band, Ref 117 dB _µ V #Peak	b Mode Low Ch. #Atten 0 dB		Certer Freq 35000000 GHz		
Log		 _	Start Freq		
dB/ Offst 30.3		2.	31000000 GHz		
dB DI		2.	Stop Freq 39000000 GHz		
54.0 dBμV LcAv			CF Step 00000000 MHz		
V1 S2			to Mai Freq Olfset		
S3 FC			.00000000 Hz		
FTun Swp		On	Signal Track <u>C:f</u>		
Start 2.310 00 G	Hz #VBW 10	390 00 GHz			

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<u>CH 10, 2457 MHz_POWER = 19 dBm</u>

RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

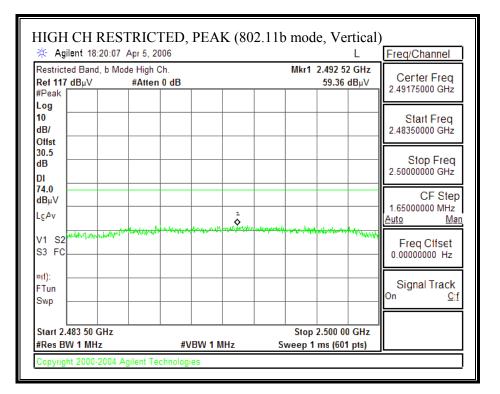


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🔆 Agilent 18:17			Mkr1 2.48		Freq/Channel
Restricted Band, b Ref 117 dB _µ V #Peak	#Atten 0			.10 dBμV	Certer Freq 2.49175000 GHz
Log					
10 dB/					Start Freq 2.48350000 GHz
Offst 30.5 dB					Stop Freq
DI					2.5000000 GHz
54.0 dBµV					CF Step 1.6500000 MHz
LgAv					Auto Ma
V1 S2 S3 FC					Freq Clfset 0.00000000 Hz
¤(1):					
FTun Swp					Signal Track ^{On <u>C</u>::}
Start 2.483 50 GH #Res BW 1 MHz	z	#VBW 10 Hz	Stop 2.50 Sweep 1.287 s (0 00 GHz	

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RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



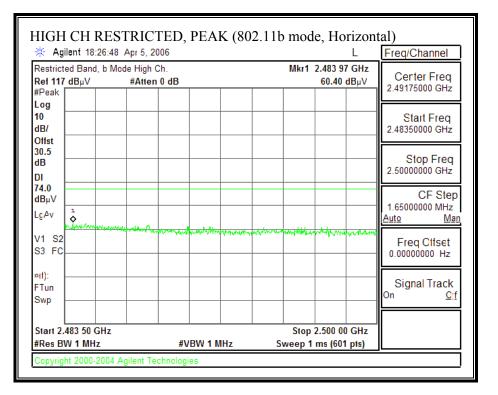
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Agilent 18:20 Restricted Band, b	:36 Apr 5, 2006 Mode High Ch		Mkr1 2.492 85	L Freq/Channel
Ref 117 dBµV #Peak	#Atten 0 dB		46.28 d	Contor From
Log				
10 dB/				Start Freq 2.48350000 GHz
30.5 dB				Stop Freq 2.5000000 GHz
DI				2.5000000 GHz
dBµV				CF Step
LgAv				1.65000000 MHz Auto Ma
V1 S2		1		Freq Offset
S3 FC				0.00000000 Hz
¤(1):				Signal Track
FTun Swp				
Start 2.483 50 GH	Ζ		Stop 2.500 00	GHz

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<u>CH 11, 2462 MHz_POWER = 18.5 dBm</u>

RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

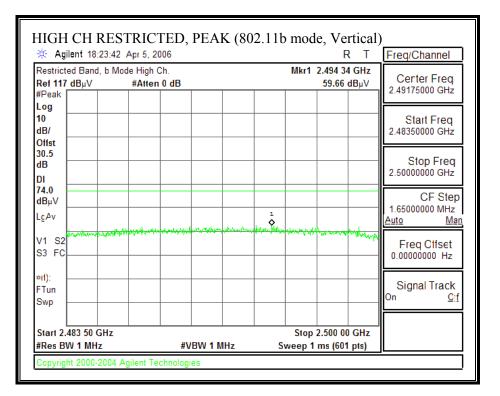


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🔆 Agilent 18:27	:27 Apr 5, 200	06		L	Peak Search
Restricted Band, b Ref 117 dB _µ V	Mode High Cl #Atten (484 52 GHz i0.29 dBµV	Next Peak
#Peak					
Log 10 dB/					Next Pk Right
Offst 30.5 dB					Next Pk Lett
DI					
LgAv					Min Search
V1 S2 S3 FC					Pk-Pk Search
¤(1): FTun					Mkr © C
Swp					
Start 2.483 50 GH #Res BW 1 MHz	z	#VBW 10 Hz	Stop 2.5 Sweep 1.287 s	500 00 GHz	More 1 ct 2

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RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



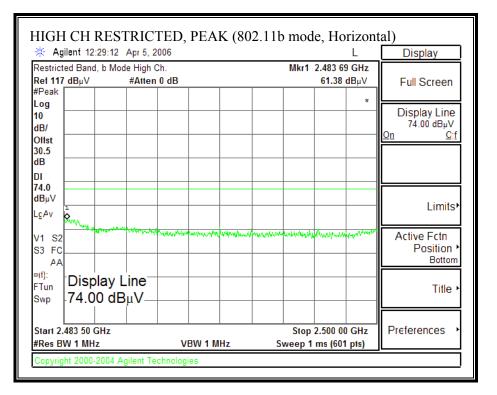
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	:08 Apr 5, 2006			L Freq/Channel
Restricted Band, b Ref 117 dB _µ V #Peak	#Atten 0 dB		Mkr1 2.492 0 46.27	Contor From
Log				
10 dB/				Start Freq 2.48350000 GHz
Offst 30.5 dB				Stop Free
DI				2.50000000 GH2
54.0 dBμV				CF Ste
LgAv				1.65000000 MHz Auto M
V1 S2 S3 FC		1		Freq Clfset
				0.0000000112
¤(1): FTun		+		Signal Track
Swp				On <u>C</u>
Start 2.483 50 GH	 z #VBW 10		Stop 2.500 00) GHz

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<u>CH 13, 2472 MHz</u> <u>POWER = 10dBm</u>

RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

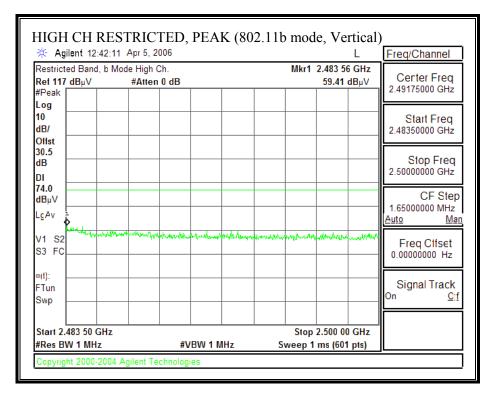


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🔆 Agilent 12:28		L	Peak Search
Restricted Band, b Ref 117 dB _µ V	Mode High Ch. #Atten 0 dB	Mkr1 2.483 72 GH: 53.76 dBµ∖	-
#Peak Log			
10 dB/ Offst			Next Pk Right
30.5 dB			Next Pk Lett
DI 54.0 dBµ∨			
LgAv			Min Search
V1 S2 S3 FC			Pk-Pk Search
¤(1): FTun			Mkr © C
Swp			
Start 2.483 50 GH #Res BW 1 MHz	z #VBW 10 H:	Stop 2.500 00 GH z Sweep 1.287 s (601 pts)	More Z 1 ct 2

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RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



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	:35 Apr 5, 2006	Mkr1 2.483 72 GHz	Freq/Channel
Restricted Band, b Ref 117 dB µV #Peak □	#Atten 0 dB	48.42 dBµV	Certer Freq 2.49175000 GHz
Log 10			Start Freq
dB/			2.48350000 GHz
30.5 dB			- Stop Freq 2.5000000 GHz
DI			_
dBµV LgAv			CF Step 1.6500000 MHz <u>Auto Ma</u>
V1 S2 S3 FC			Freq Clfset
¤(1): FTun Swp			– Signal Track On <u>Ct</u>
			<u> </u>
Start 2.483 50 GH #Res BW 1 MHz	z #VBW 10 Hz	Stop 2.500 00 GHz Sweep 1.287 s (601 pts)	

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HARMONICS AND SPURIOUS EMISSIONS (b MODE) - Channel 1, 6 & 13

Power: Channel 1, 6, & 13 = 19dBm_Bit Rate: 11Mbps for Peak and 1Mbps for Average reading.

Compan CUT De CUT M/ Cest Ta	escrip.: /N: BCI rget: F0	ADCOM 802.11g M M94311M CC 15.247	ini PCI Exp CG_CARD # 83.5 MHz_0	#24 5		Hz, CH6	5_2437 M	Hz, C	H13_2472	MHz					
	uipmen	_					_								
	orn 1- S/N: 223	18GHz	_	mplifer			Pre-am	plifer	26-40GH	z	н	orn > 180	GHz		Limit FCC 15.209
			- 1145 F	Agrient a	00040	- DC				-				-	100 13.203
	uency Cal 2 foot		3) foot c	able		121	foot c	able		HPF	Re	eject Filte		<u>x Measurements</u> W=VBW=1MHz
			Vien	1872150	02	-	Vien 19	72090)5 🚽	HP	F_4.0GHz	-		• Avera	ge Measurements 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)
		Average = 19	lBm												(1/1)
.824	3.0	52.0	48.9	33.6	2.9 4.2	-34.8 -34.7	0.0	0.6	54.3 51.2	51.2 40.3	74 74	54	-19.7 -22.8	-2.8 -13.7	H
.236 .648	3.0 3.0	45.0 43.0	34.1 32.3	36.1 38.1	4.2	-34.7	0.0	0.6 0.8	51.2 51.6	40.3	74 74	54 54	-22.8 -22.4	-13.7 -13.1	H H, NOISE FLOOR
824	3.0	50.0	46.2	33.6	2.9	-34.8	0.0	0.6	52.3	48.5	74	54	-21.7	-5.5	V
236	3.0	44.0	32.5	36.1	4.2	-34.7	0.0	0.6	50.2	38.7	74	54	-23.8	-15.3	V
.648	3.0	42.6	32.9	38.1	4.7	-35.0	0.0	0.8	51.2	41.5	74	54	-22.8	-12.5	V, NOISE FLOOR
H6 243	7 MH A	verage = 19d	Bm												
.874	3.0	48.8	43.5	33.7	3.0	-34.9	0.0	0.6	51.2	45.9	74	54	-22.8	- 8.1	H
.311	3.0	43.0	33.1	36.2	4.2	-34.7	0.0	0.6	49.3	39.4	74	54	-24.7	- 14.6	Н
.748	3.0	42.3	31.5	38.1	4.7	-35.0	0.0	0.8	51.0	40.2	74	54	-23.0	- 13.8	H, NOISE FLOOR
.874	3.0	46.8	40.8	33.7	3.0	-34.9	0.0	0.6	49.2	43.2	74	54	-24.8	-10.8	V
.311 .748	3.0 3.0	43.8 41.5	32.3 32.3	36.2 38.1	4.2 4.7	-34.7 -35.0	0.0	0.6 0.8	50.1 50.2	38.6 41.0	74 74	54 54	-23.9 -23.8	-15.4 -13.0	V V, NOISE FLOOR
./40	3.0	41.5	34.3	36.1	4./	-35.0	0.0	0.8	50.2	41.0	/4	34	-43.8	-13.0	V, NOISE FLOOK
H13_24	72 MHz	Average = 1	9dBm										l		
.944	3.0	47.2	41.1	33.7	3.1	-34.9	0.0	0.6	49.8	43.7	74	54	-24.2	-10.3	H
.416	3.0	45.9	38.3	36.3	4.2	-34.6	0.0	0.6	52.4	44.8	74	54	-21.6	-9.2	H
.888 .944	3.0 3.0	44.0 44.7	31.8 35.5	38.3 33.7	4.7 3.1	-35.1 -34.9	0.0 0.0	0.8 0.6	52.8 47.3	40.6 38.1	74 74	54 54	-21.2 -26.7	-13.4 -15.9	H, NOISE FLOOR V
.416	3.0	45.0	34.2	36.3	4.2	-34.6	0.0	0.6	51.5	40.7	74	54 54	-22.5	-13.3	v
.888	3.0	43.7	33.0	38.3	4.7	-35.1	0.0	0.8	52.5	41.8	74	54	-21.5	-12.2	V, NOISE FLOOR
		L	L	l.,											
	No oth	er emissions	were detected	above sy	stem no	ise floor									
	f Dist		ent Frequenc Antenna eading actor			Amp	Average	Corre Field S d Peal	et to 3 mete Strength @ c Field Stre	3 m		Pk Lim Avg Mar	Peak Field Margin vs	field Strengt 1 Strength Li . Average Li . Peak Limit	imit imit

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7.2.3. TRANSMITTER ABOVE 1 GHz, g MODE

11g CHANNEL 1, 2, 10, 11, and 13

CHANNEL 1, TRANSMITTING POWER = 18 dBm

RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)

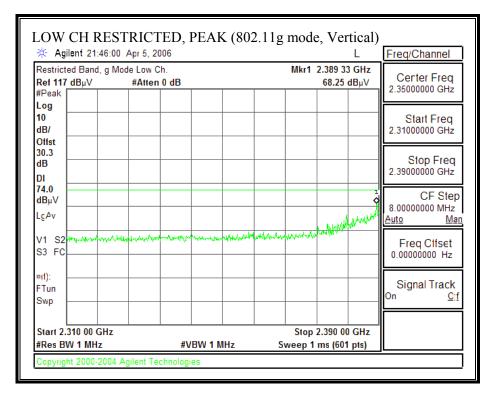
Agilent 21:43:0	05 Apr 5, 2006			L	Freq/Channel
estricted Band, g I e t 117 dB μV Peak	Mode Low Ch. #Atten 0 dB		Mkr1 2.389 73 66.33 d		Center Freq 2.3500000 GHz
99 3/ 1st					Start Freq 2.31000000 GHz
.3					Stop Frec 2.3900000 GHz
.0 βμV				1	CF Ste 8.0000000 MHz
AV I S2404/14/14/14/14/14/14/14/14/14/14/14/14/14	name a substitution of the substitution of the	where whether a hard	winning	- And Andrewson	Auto M Freq Clfset 0.00000000 Hz
): 'un vp					Signal Track ^{On <u>C</u>}
art 2.310 00 GHz Res BW 1 MHz		1 MHz	Stop 2.390 00 Sweep 1 ms (601		

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🔆 Agilent 21:43	:45 Apr 5, 2006			L	Freq/Channel
	Mode Low Ch. #Atten 0 dB		Mkr1	2.390 00 GHz 49.97 dBµV	Certer Freq 2.3500000 GHz
#Peak Log					2.0000000000
10 dB/					Start Freq 2.31000000 GHz
Offst 30.3 dB					Stop Freq 2.3900000 GHz
DI 54.0 dBµV					CF Step
LgAv					8.00000000 MHz <u>Auto Ma</u>
V1 S2 S3 FC					Freq Clfset 0.00000000 Hz
¤(1):					Signal Track
Swp					On <u>Oif</u>
Start 2.310 00 GH #Res BW 1 MHz	-	VBW 10 Hz	Stop Sweep 6.238	2.390 00 GHz	

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RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)



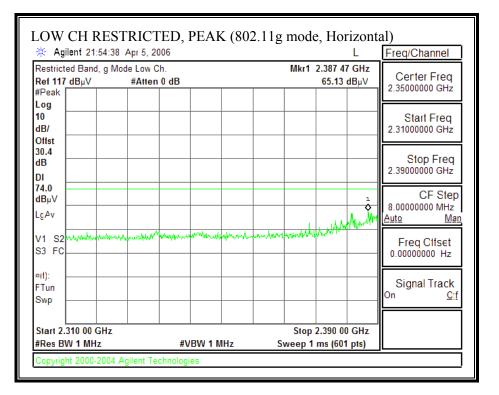
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· •	6:39 Apr 5, 2006			L	Freq/Channel
			Mkr1 2.390 00 GHz 50.63 dBμ∨		Certer Freq 2.35000000 GHz
Log 10					Start Freq
dB/ Offst					2.31000000 GHz
30.3 dB					Stop Freq 2.39000000 GHz
DI					CF Step
dBµV LgAv					8.00000000 MHz Auto Mar
V1 S2 S3 FC					Freq Olfset 0.00000000 Hz
¤(1):					Signal Track
Swp					On <u>Cif</u>
Start 2.310 00 G #Res BW 1 MHz		N 10 Hz	Stop 2.3 Sweep 6.238 s	390 00 GHz	

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CHANNEL 2, TRANSMITTING POWER = 19 dBm

RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)

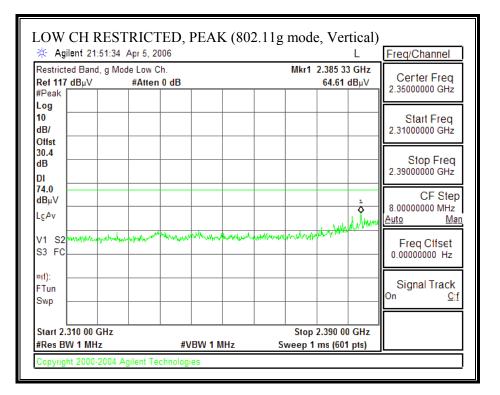


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🔆 Agilent 21:5				L	Freq/Channel	
	g Mode Low Ch. #Atten 0 dB	•	Mkr1 2	2.390 00 GHz 49.30 dBµV	Certer Freq 2.3500000 GHz	
#Peak Log					2.0000000000	
10 dB/					Start Freq 2.31000000 GHz	
Offst 30.4 dB					Stop Freq 2.3900000 GHz	
DI 54.0 dBµV					CF Step	
LgAv					8.00000000 MHz <u>Auto Ma</u>	
V1 S2 S3 FC					Freq Clfset 0.00000000 Hz	
¤(1):					Signal Track	
FTun Swp					On <u>Qit</u>	
Start 2.310 00 GF #Res BW 1 MHz		#VBW 10 Hz	Stop 2 Sweep 6.238	.390 00 GHz		

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RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)



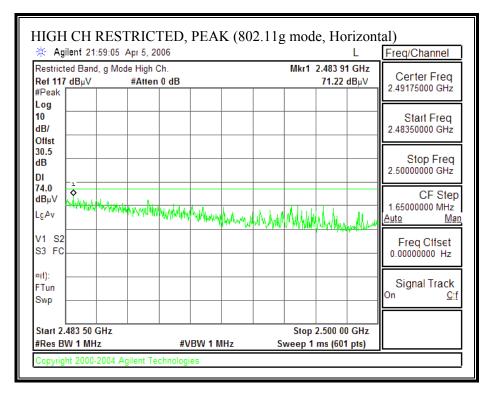
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· •	2:11 Apr 5, 2006			L	Freq/Channel
Restricted Band, Ref 117 dB _µ V #Peak	g Mode Low Ch. #Atten 0	lВ	Mkr1 2	2.390 00 GHz 48.57 dBµ∨	Certer Freq 2.35000000 GHz
Log					
10 dB/ Offst					Start Freq 2.31000000 GHz
30.4 dB					Stop Freq 2.3900000 GHz
DI					CF Step
dBµV LgAv					8.00000000 MHz Auto Ma
V1 S2 S3 FC					Freq Clfset
¤(1):					Signal Track
FTun Swp					On <u>Qif</u>
Start 2.310 00 G #Res BW 1 MHz		#VBW 10 Hz	Stop 2 Sweep 6.238	2.390 00 GHz	

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CHANNEL 10, TRANSMITTING POWER = 19 dBm

RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)

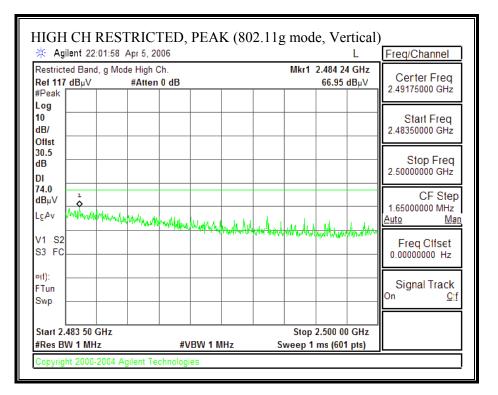


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	39 Apr 5, 2006			R T	Freq/Channel
Restricted Band, g Ref 117 dB _µ V #Peak	Mode High Ch. #Atten 0 d	JB	Mkr1	2.483 83 GHz 52.83 dBµ∨	Certer Freq 2.49175000 GHz
Log 10					Start Freq
dB/ Offst 30.5					2.48350000 GHz
dB DI					Stop Freq 2.5000000 GHz
54.0 dBμV					CF Step 1.6500000 MHz
LgAv					<u>Auto Ma</u>
V1 S2 S3 FC					Freq Clfset 0.00000000 Hz
¤(1): FTun Swp					Signal Track ^{On <u>C</u>it}
Start 2.483 50 GH: #Res BW 1 MHz	z	#VBW 10 Hz	Stop Sweep 1.28	2.500 00 GHz	

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RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)



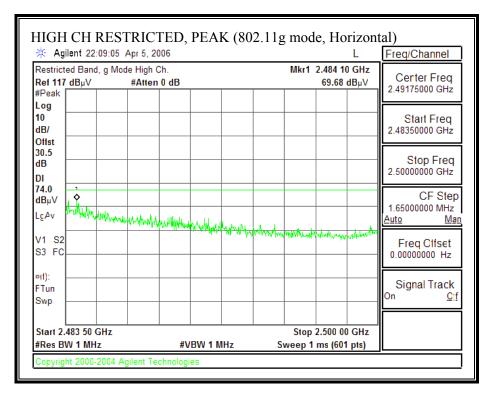
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	27 Apr 5, 2006			L	Freq/Channel
Restricted Band, g Ref 117 dB _µ V #Peak	Mode High Ch. #Atten 0 dB	1 1		.483 50 GHz 50.42 dBµ∨	Certer Freq 2.49175000 GHz
Log					
10 dB/					Start Freq 2.48350000 GHz
Offst 30.5 dB					Stop Freq 2.5000000 GHz
DI					CF Step
LgAv					1.65000000 MHz Auto Ma
V1 S2 S3 FC					Freq Clfset 0.00000000 Hz
¤(1):					Signal Track
Swp					On <u>Ot</u>
Start 2.483 50 GH	Z		Stop 2.	500 00 GHz	

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CHANNEL 11, TRANSMITTING POWER = 17 dBm

RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)

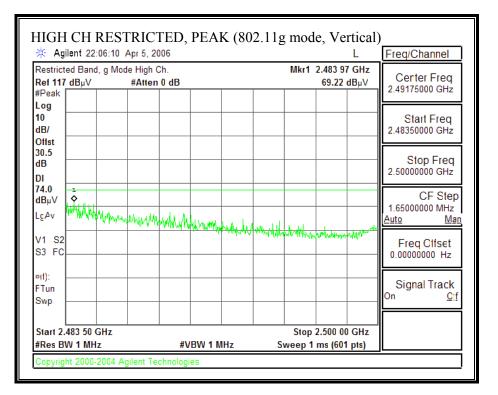


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🔆 Agilent 22:09					req/Channel	
Restricted Band, g Ref 117 dB _µ V #Peak	Mode High Ch. #Atten 0 dB		Mkr1 2.483 5 50.40	dBuV	Certer Freq 2.49175000 GHz	
Log				⊢⊩		
10 dB/					Start Freq 2.48350000 GHz	
Offst 30.5 dB					Stop Freq 2.5000000 GHz	
DI 54.0 dBuV				╞	CF Step	
LgAv				I III -	1.65000000 MHz outo <u>Ma</u>	
V1 S2 S3 FC					Freq Offset 0.00000000 Hz	
¤(1): ETun				┢	Signal Track	
Swp)n <u>O</u> []	
Start 2.483 50 GH #Res BW 1 MHz	_	/ 10 Hz	Stop 2.500 0 Sweep 1.287 s (601			

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RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)



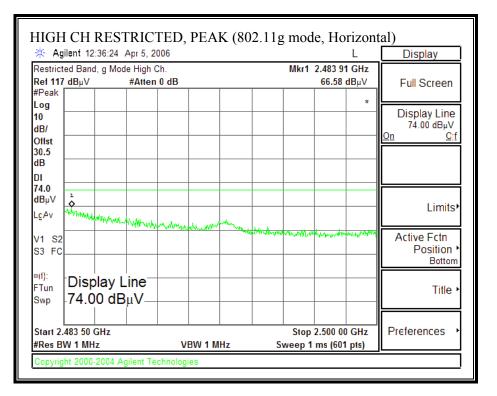
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	6:34 Apr 5, 200		 2.500 00 GHz	Freq/Channel
Restricted Band, g Ref 117 dBµV #Peak	#Atten (50.77 dB _μ V	Center Freq 2.49175000 GHz
Log				
10 dB/ Offst				Start Freq 2.48350000 GHz
30.5 dB				Stop Freq
DI				
dBµV				CF Step 1.6500000 MHz
LgAv				Auto Ma
V1 S2 S3 FC		· · · · · · · · · · · · · · · · · · ·		Freq Clfset
¤(f):				
FTun Swp				Signal Track
Start 2.483 50 GH #Res BW 1 MHz	z	#VBW 10 Hz	2.500 00 GHz 87 s (601 pts)	-

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CHANNEL 13, TRANSMITTING POWER = 10 dBm

RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)

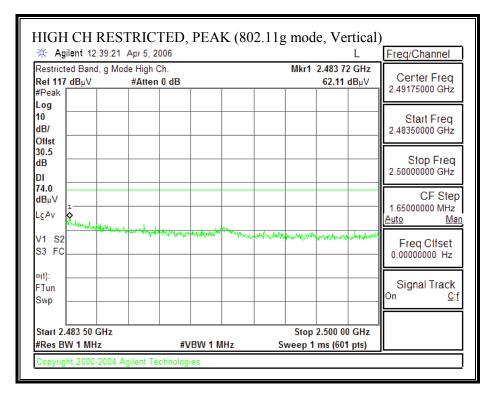


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🔆 Ag	ilent 12:34:38	Apr 5, 200	6						Т	Peak Search
Ref 117	ed Band, g Mo dBμV	-					Mkr1	2.483 8 53.96		Next Peak
#Peak										
Log 10 dB/										Next Pk Right
Offst 30.5 dB										Next Pk Lett
DI 54.0 dBµV										
LgAv										Min Search
V1 S2 S3 FC	<u>ه</u>				$\overline{}$					Pk-Pk Search
¤(1):	- N A = 1/ = 1 -									
FTun Swp	Marker 2.48380	0000 G	Hz							Mkr © Cl
	53.96 d	ΒμV								More
	483 50 GHz W 1 MHz		#VF	3W 10	Hz	Swe	Stop ep 1.28	2.500 00 7 s (601		1 ct 2

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RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)



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Agilent 12:39 Restricted Band, g	:47 Apr 5, 2006	Mkr1 2.483 94 GHz	Freq/Channel
-	#Atten 0 dB	49.68 dBµV	Contor From
Log			Start Freq
dB/ Offst 30.5			2.48350000 GHz
dB DI			Stop Freq 2.5000000 GHz
54.0 dBμV			CF Step 1.65000000 MHz
LgAv			<u>Auto Ma</u>
S3 FC			Freq Clfset
¤(1): FTun Swp			Signal Track On <u>Cit</u>
Start 2.483 50 GH #Res BW 1 MHz	z #VBW 10 Hz	Stop 2.500 00 GHz Sweep 1.287 s (601 pts)	

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TRANSMITTER HARMONICS AND SPURIOUS EMISSIONS (g MODE) - Channel 1, 6 & 13

Power: Channel 1, 6, & 13 = 19dBm_Bit Rate: 54Mbps for Peak and 6Mbps for Average reading.

ц	uipmen orn 1.	<u></u> 18GHz	Pre-ar	nplifer	1.260	Hz	Pre-am	nlifer	26-40GH	7	ц	orn > 18	GH7		Limit
	S/N: 223			Agilent 3			r re-am	piner	20-40011				0112	-	FCC 15.209
	quency Ca														
	2 foot		3) foot c	able		12 1	foot c	able		HPF	Re	eject Filter		Measurements W=VBW=1MHz
		·	Vien	1872150	02	-	Vien 19	72090	•	HPI	F_4.0GHz	•		Avera	ge Measurements 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)
		Average = 190		ulb/m							uDu V/III	ubu (/iii			((),,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
.824	3.0	47.8	37.2	33.6	2.9	-34.8	0.0	0.6	50.1	39.5	74	54	-23.9	-14.5	H
.236 .824	3.0 3.0	43.8 46.4	32.5 35.9	36.1 33.6	4.2 2.9	-34.7 -34.8	0.0 0.0	0.6 0.6	50.0 48.7	38.7 38.2	74 74	54 54	-24.0 -25.3	-15.3 -15.8	H, NOISE FLOOR V
.236	3.0	43.5	32.2	36.1	4.2	-34.7	0.0	0.6	49.7	38.4	74	54	-24.3	-15.6	V, NOISE FLOOR
H6 243	7 MH A	verage = 19dl	Bm												
.874	3.0	44.2	33.2	33.7	3.0	-34.9	0.0	0.6	46.6	35.6	74	54	-27.4	-18.4	Н
.311	3.0	43.0	32.4	36.2	4.2	-34.7	0.0	0.6	49.3	38.7	74	54	-24.7	-15.3	H, NOISE FLOOR
.874 .311	3.0 3.0	42.6 43.4	31.2 32.1	33.7 36.2	3.0 4.2	-34.9 -34.7	0.0 0.0	0.6 0.6	45.0 49.7	33.6 38.4	74 74	54 54	-29.0 -24.3	-20.4 -15.6	V V, NOISE FLOOR
							~.0				. 4	~~	- 1		.,
		Average = 19													
4.944 7.416	3.0 3.0	43.2 47.5	32.8 36.8	33.7 36.3	3.1 4.2	-34.9 -34.6	0.0 0.0	0.6 0.6	45.8 54.0	35.4 43.3	74 74	54 54	-28.2 -20.0	-18.6 -10.7	H H, NOISE FLOOR
.944	3.0	47.5	30.8 31.2	30.3	4.2 3.1	-34.0 -34.9	0.0	0.6	54.0 45.9	43.3 33.8	74 74	54 54	-20.0	-10.7 -20.2	H, NOISE FLOOK
.416	3.0	45.0	33.7	36.3	4.2	-34.6	0.0	0.6	51.5	40.2	74	54	-22.5	-13.8	V, NOISE FLOOR
	No otl	er emissions	were detected	above sy	stem no	ise floor									
			_				_								
	f		ent Frequenc	у		Amp	Preamp (-	-	ield Strength	
		Distance to	Antenna						ct to 3 mete			Pk Lim		Strength Li	
	Dist	A 1 7	41				Average	Field S	Strength @	2 m		Avg Mar	Margin vs.	Average Li	mit
		Analyzer R Antenna Fa				Avg Peak	-		c Field Stre			Pk Mar	-	Peak Limit	
	Read						-					-	-	-	

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7.2.4. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZO	ONTAL							
							Morga Tel:	Monterey Road an Hill, CA 9503 (408) 463-0888 (408) 463-0885
Data# Audix		le#: 30	-1000MH	Hz.EMI	Dat	ce: 03-3	30-2006	Time: 12:06:22
Test Proje Compa EUT Model Confi Mode	iny	: Vie : 06U : Brc : 802 : BCM : EUT on: TX	en Tran 910198 9adcom 94311M 94311M 7 / Lapt worst o	LAN PCI CG cop case	-E Mini	Card		
		_						Page: 1
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	
	MHz	dBuV	dB	$\overline{\mathrm{dBuV}/\mathrm{m}}$	dBuV/m	dB		
1 2 3 4 5 6	30.970 175.500 581.930 611.030 638.190 999.030	24.16 18.76 19.17 17.67	13.16 21.31 21.67 22.15	37.32 40.07 40.84 39.82	46.00 46.00 46.00	-6.18 -5.93 -5.16 -6.18	Peak Peak Peak Peak	

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SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTI	CAL PLOT							
							Morga Tel:	Monterey Road an Hill, CA 9503 (408) 463-0888 (408) 463-0885
Data‡ Audi>		le#: 30	0-1000MH	Hz.EMI	Dat	:e: 03-3	30-2006	Time: 14:03:54
Test Proje Compa EUT Mode] Confi Mode	any	: Vie : 060 : Bro : 802 : BCN : EUT on: TX	en Tran J10198 Dadcom 2.11g WI 494311M(F / Lapt worst (LAN PCI CG Cop Case	-E Mini	Card		
		Read			Limit	Over		Page: 1
	Freq		Factor	Level			Remark	
	MHz	dBuV	dB	<u>d</u> BuV/m	$\overline{\mathrm{dBuV}/\mathrm{m}}$	dB		
1 2 3 4 5 6	31.940 97.900 342.340 610.060 834.130 969.930	22.16 21.65 15.30 16.05	10.85 16.68 21.67	33.00 38.33 36.96 41.04	43.50 46.00	-10.50 -7.67 -9.04 -4.96	Peak Peak Peak Peak	

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7.3. POWERLINE CONDUCTED EMISSIONS

<u>LIMIT</u>

\$15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

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

Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

No non-compliance noted:

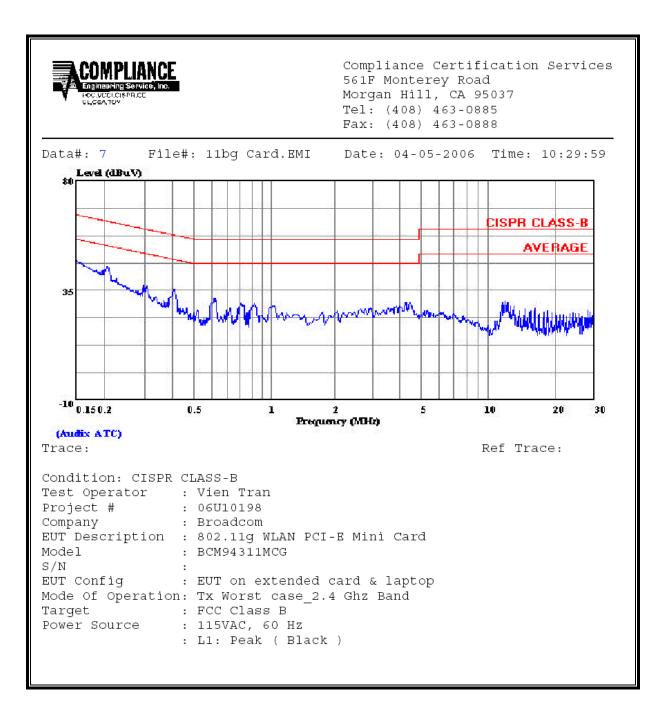
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6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	FCC_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1/L2
0.15	46.82			0.00	66.00	56.00	-19.18	-9.18	L1
0.21	44.80			0.00	63.21	53.21	-18.41	-8.41	L1
0.30	37.00			0.00	60.33	50.33	-23.33	-13.33	L1
0.15	46.98			0.00	66.00	56.00	-19.02	-9.02	L2
0.21	46.82			0.00	63.21	53.21	-16.39	-6.39	L2
0.30	38.58			0.00	60.33	50.33	-21.75	-11.75	L2
6 Worst Data									

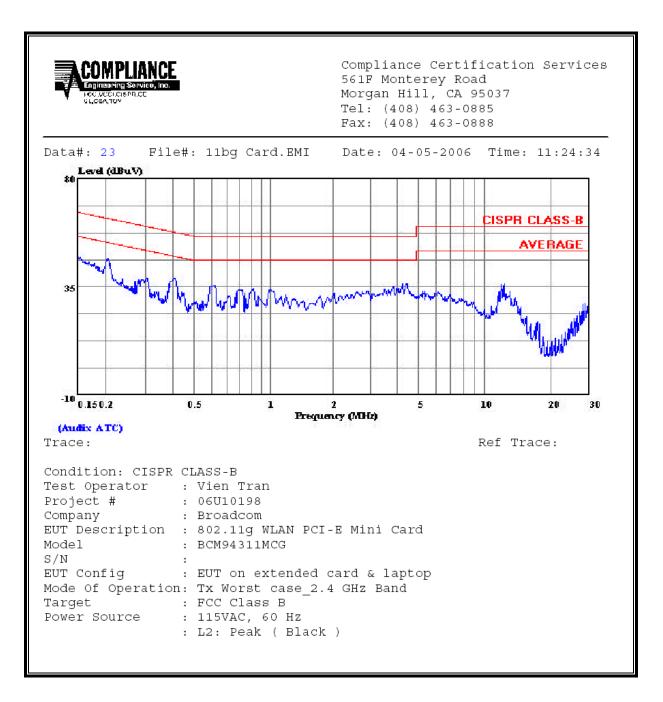
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LINE 1 RESULTS



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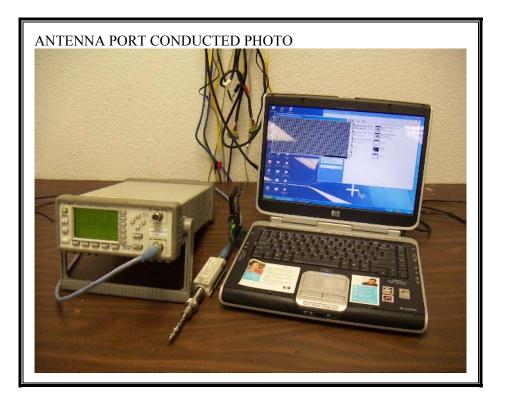
LINE 2 RESULTS



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8. SETUP PHOTOS

RF CONDUCTED SETUP

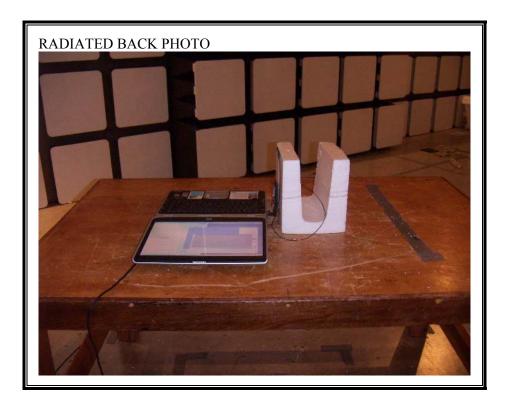


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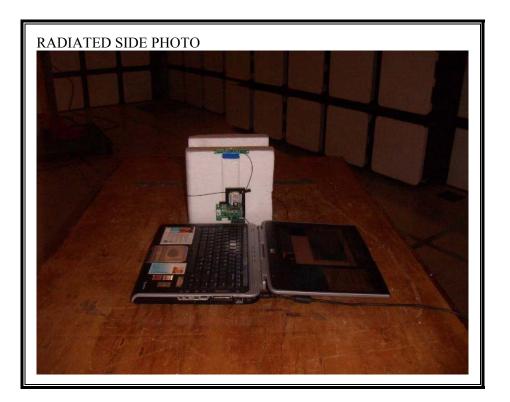
RADIATED RF MEASUREMENT SETUP



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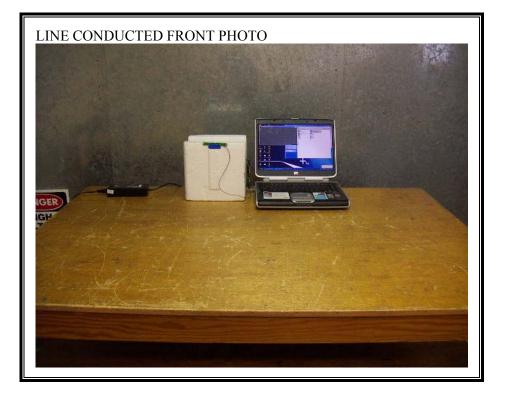


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POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP



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END OF REPORT

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