



**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: 05U3829-1

ISSUE DATE: NOVEMBER 29, 2005

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NVLAP[®]
LAB CODE:200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
A	11/29/05	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: 407

DATE OF ORIGINAL TESTS: November 09 to 15, 2005

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 For CCS By:



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VIEN TRAN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

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

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11b/g transceiver which operating in the 2400-2484 MHz band.

The radio module is manufactured by Broadcom Corp.

5.2. CLASS II PERMISSIVE CHANGE DESCRIPTION

The EUT was originally tested and reported under CCS project no.: 05U3484-1B and granted by TCB on July 22, 2005 with a peak antenna gain of 3.24dBi. The major changes filed under this application are:

1. Adding a PIFA Stamped metal antenna with a maximum gain of 3.9dBi in the 2400 - 24835 MHz frequency range.
2. Including channel 9 data for transmitting at 19dBm in g mode.
3. For antenna gain in the range 3.24dBi to 3.9dBi, the output power for g mode transmission was lowered as follows:
 - _ Channel 10 from 19dBm to 18dBm
 - _ Channel 11 from 17dBm to 16.5dBm
 - _ Channel 12 and 13 from 12dBm to 11dBm

5.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power same as previous project 05U3484-1B.

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA Stamped metal antenna manufactured by Hitachi Cable, Ltd., Model number HFT17-DL07 with a maximum gain of 3.9 dBi.

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 CONFIGURATION 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.

WORST-CASE POWER AND BIT RATE SETTING

802.11b

CHANNEL	1	6	10	11	13
(MHz)	2412	2437	2457	2462	2472
Band Edge (dBm)	19	x	19	18.5	12
Emission (dBm)	19	19	x	x	19 *
Bit Rate (Mbps)	Mbps for Peak reading & 1Mbps for Average reading				

NOTE: * For the rest of the RF Conducted and Radiated Emission tests, channel 13 is set to 19dBm for worst case power to cover all high channels_Channel 10 (19dBm), Channel 11 (18.5dBm) & Channel 13 (12dBm)

802.11g

CHANNEL	1	2	6	9	10	11	13
(MHz)	2412	2417	2437	2452	2457	2462	2472
Band Edge (dBm)	18	19	x	19	18	16.5	11
Emission (dBm)	19	x	19	x	x	x	19 *
Bit Rate (Mbps)	54Mbps for Peak reading & 6Mbps for Average reading						

NOTE: * For the rest of the RF Conducted and Radiated Emission tests, channel 13 is set to 19dBm for worst case power to cover all high channels_Channel 9 (19dBm), Channel 10 (18dBm), Channel 11 (16.5dBm) & Channel 13 (11dBm)

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

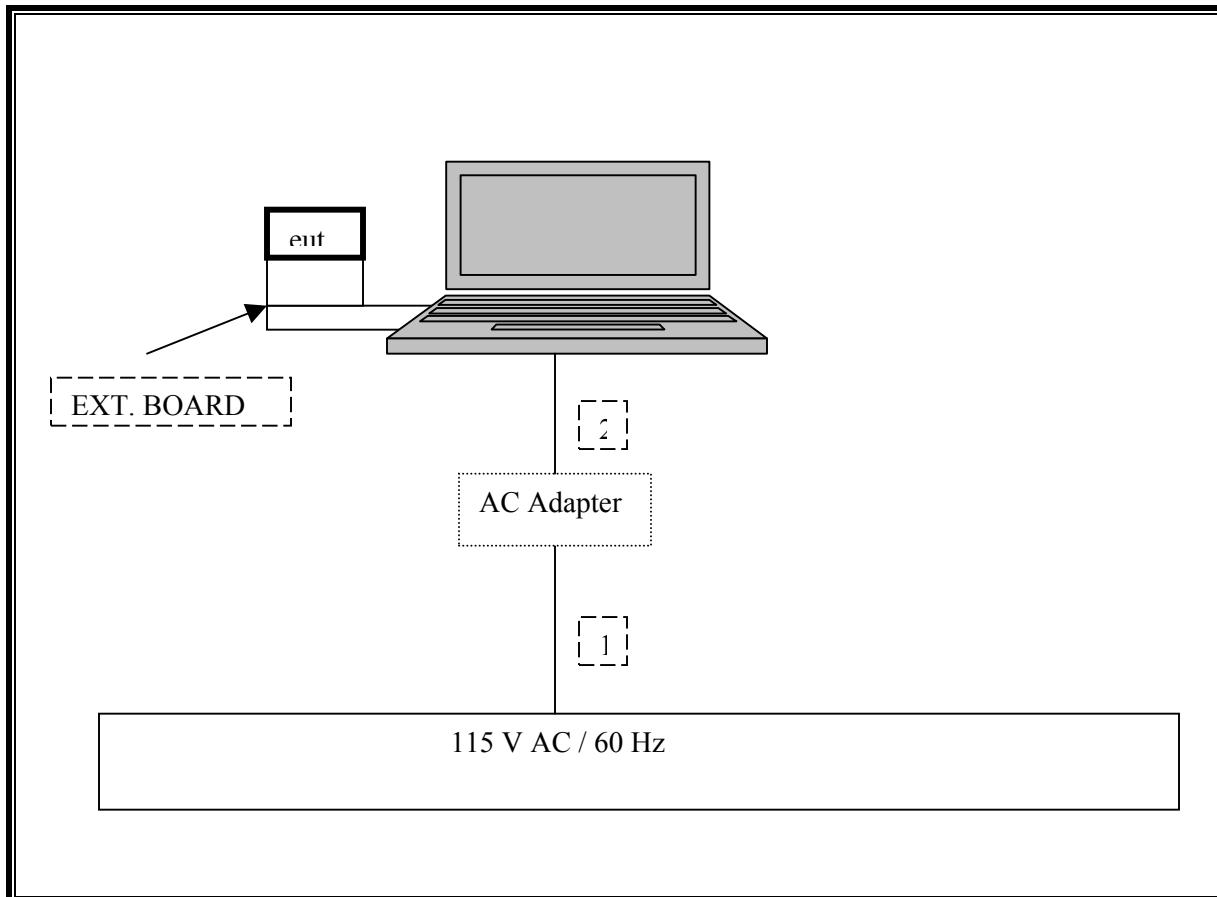
PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Extended Card	ADEXELEC	PEX1-MINI	01/01/1900	N/A
AC Adapter	HP	3751260-001	PPP017L	N/A
laptop	HP	ZV6000	CND51501BMD	N/A

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.

SETUP DIAGRAM

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
EMI Test Receiver	R & S	ESHS 20	827129/006	10/22/2006
Site A Line Stabilizer / Conditioner	Tripplite	LC-1800a	A0051681	CNR
LISN, 10 kHz ~ 30 MHz	FCC	LISN-50/250-25-2	2023	08/30/2006
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	10/21/2006
30MHz---- 2Ghz	Sunol Sciences	JB1 Antenna	A121003	09/15/2006
Preamplifier, 30-1300 MHz	HP	8447D	2944A06550	08/26/2006
Antenna, Horn 1 ~ 18 GHz	EMCO	3117	29310	09/12/2006
Antenna, Horn 18 ~ 26 GHz	ARA	SWH-28	1007	09/12/2006
Line Filter	Lindgren	LMF-3489	497	N.C.R.
Preamplifier, 1 ~ 26.5 GHz	HP	8449B	3008A00369	08/17/2006
Peak Power Meter	Agilent	E4416A	GB41291160	02/09/2006
Peak / Average Power Sensor	Agilent	E9327A	US40440755	02/10/2006
4.0 High Pass Filter	Micro Tronics	HPM13351	3	N/A
Spectrum Analyzer 20 Hz ~ 44 GHz	Agilent	E4446A	MY43360112	06/16/2006
2.4 - 2.5 Band Reject Filter	Micro Tronics	N/A	1	N/A

7. LIMITS AND RESULTS

7.1.1. MAXIMUM PERMISSIBLE EXPOSURE

LIMITS

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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500	.....	.....	f/300	6
1500–100,000	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824f	2.19/f	*(180/f ²)	30

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

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500	.....	.....	f/1500	30
1500–100,000	.....	.....	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

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

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

CALCULATIONS

Given

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

and

$$S = E^2 / 3770$$

where

E = Field Strength in Volts/meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts/square centimeter

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

$$d = \sqrt{(30 * P * G) / (3770 * S)}$$

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

$$P (\text{mW}) = P (\text{W}) / 1000 \text{ and}$$

$$d (\text{cm}) = 100 * d (\text{m})$$

yields

$$d = 100 * \sqrt{(30 * (P / 1000) * G) / (3770 * S)}$$

$$d = 0.282 * \sqrt{(P * G / S)}$$

where

d = distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power Density in mW/cm²

Substituting the logarithmic form of power and gain using:

$$P (\text{mW}) = 10^{(P (\text{dBm}) / 10)} \text{ and}$$

$$G (\text{numeric}) = 10^{(G (\text{dBi}) / 10)}$$

yields

$$d = 0.282 * 10^{(P + G) / 20} / \sqrt{S} \quad \text{Equation (1)}$$

where

d = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW/cm²

Equation (1) and the measured peak power is used to calculate the MPE distance.

LIMITS

From §1.1310 Table 1 (B), $S = 1.0 \text{ mW/cm}^2$

RESULTS

Mode	MPE Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm ²)
802.11b	20.0	21.42	3.90	0.07
802.11g	20.0	26.17	3.90	0.20

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.

7.1.2. 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.

802.11b Mode (Gate Average Power)

Channel	Frequency (MHz)	Power (dBm)
1	2412	19.30
6	2437	19.33
10	2457	19.15
11	2462	18.86
13	2472	11.98

802.11g Mode (Gate Average Power)

Channel	Frequency (MHz)	Power (dBm)
1	2412	18.43
2	2417	19.22
6	2437	19.32
9	2452	19.12
10	2457	18.32
11	2462	16.65
13	2472	11.16

7.2. RADIATED EMISSIONS

7.2.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15*
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

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

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

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

TEST PROCEDURE

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

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

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

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

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

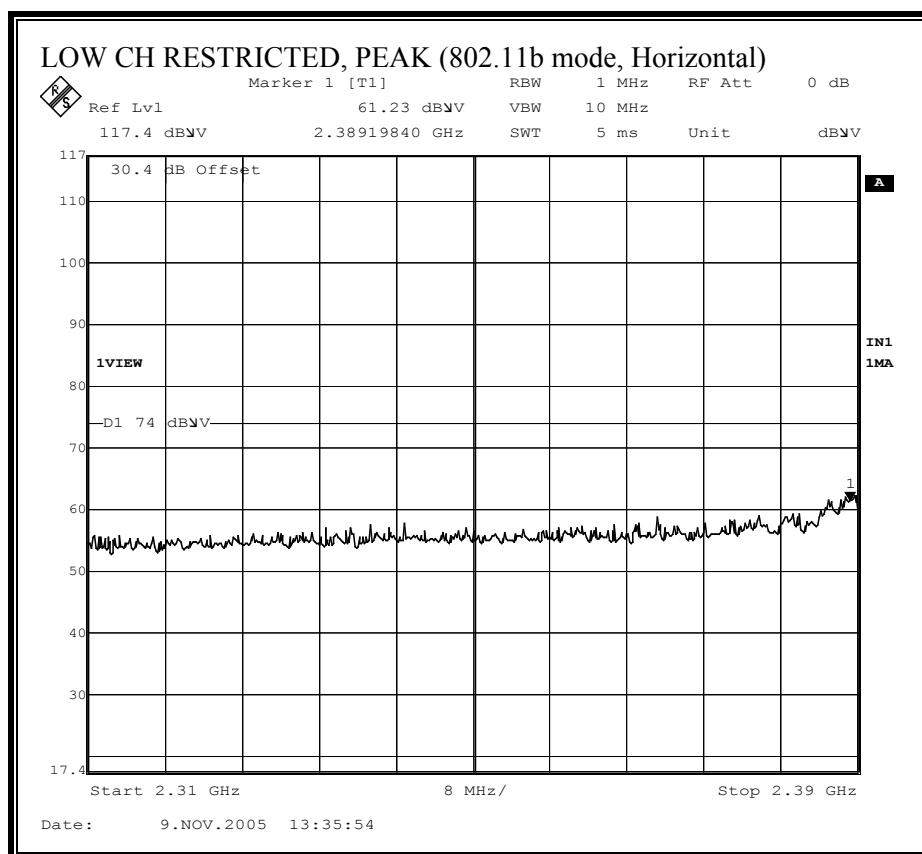
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

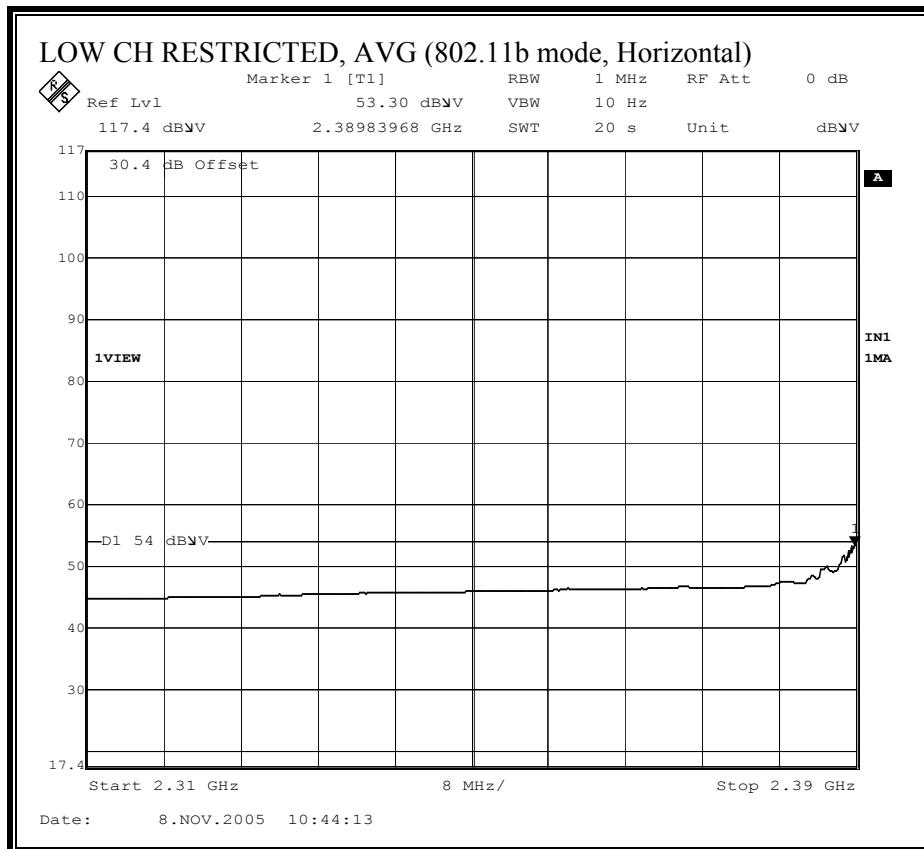
7.2.2. TRANSMITTER ABOVE 1 GHz FOR 2400 TO 2483.5 MHz BAND

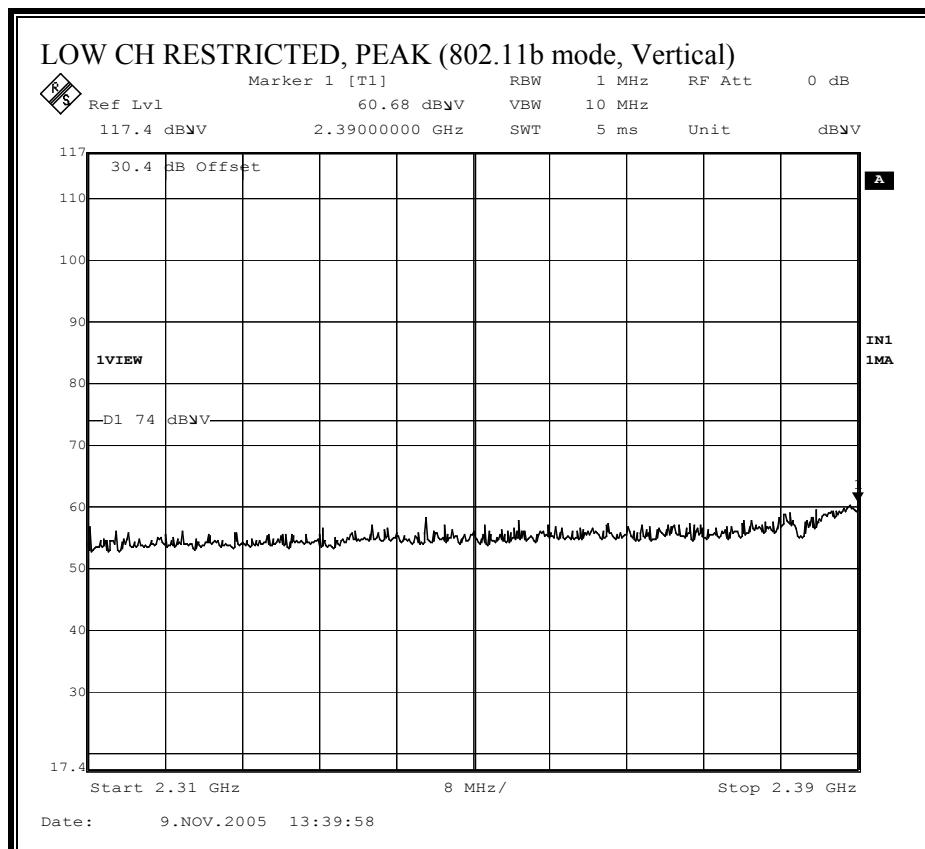
11b CHANNEL 1, 10, 11 and 13

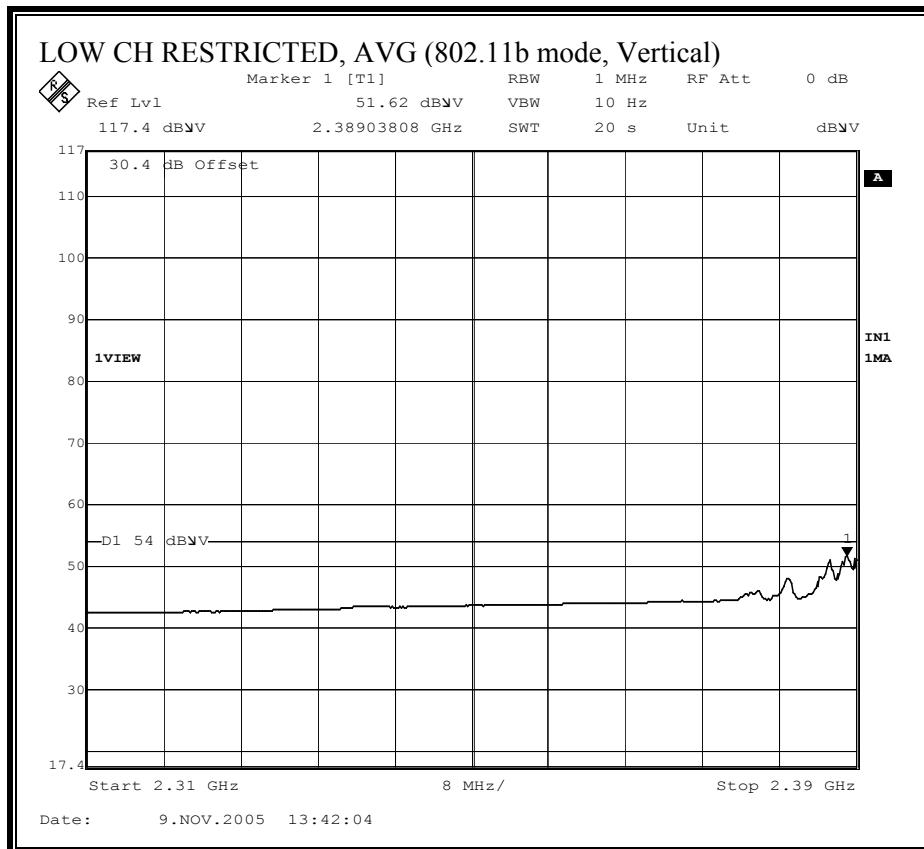
CH1, 2412 MHz POWER = 19 dBm

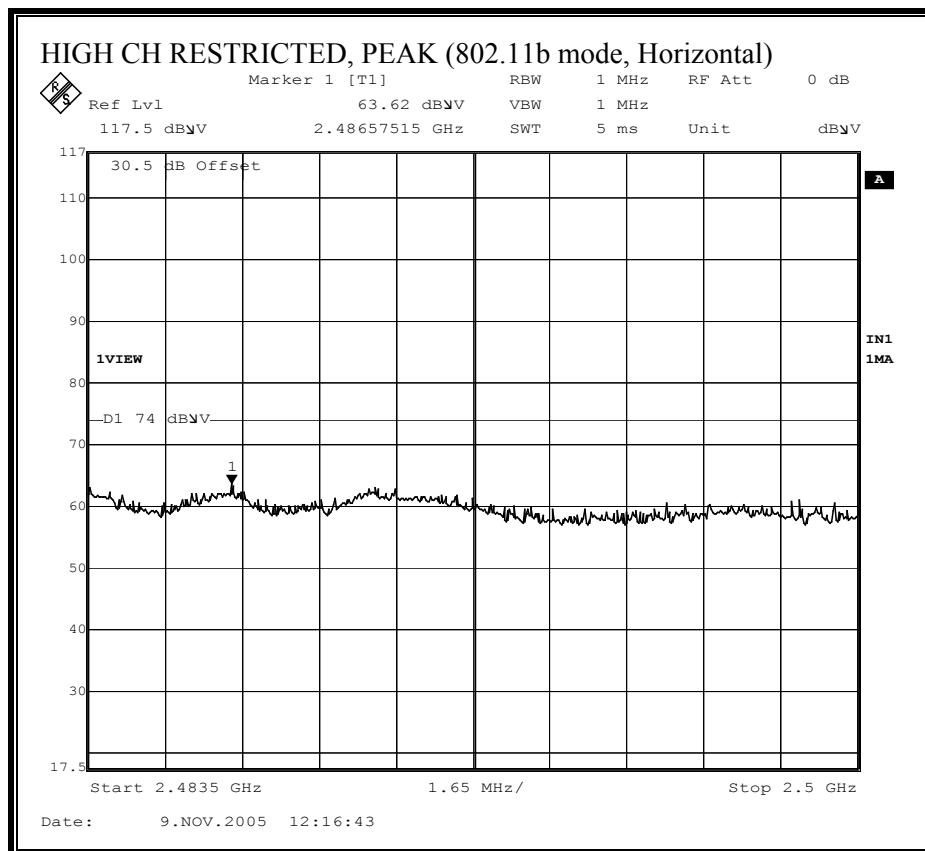
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

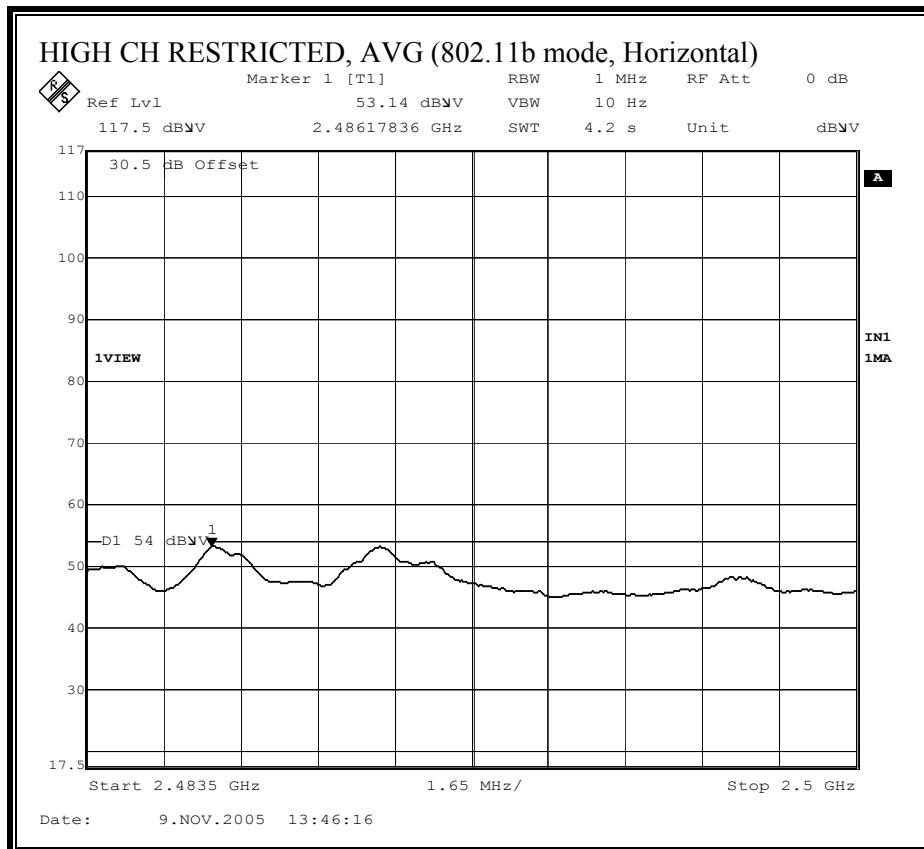


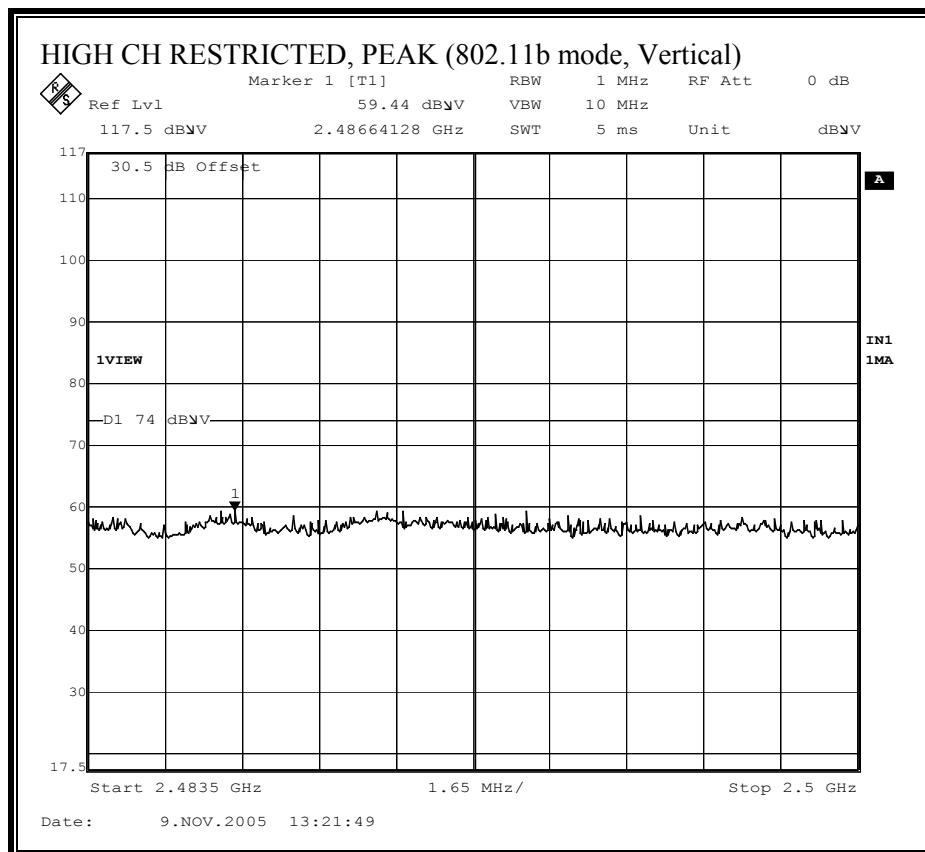


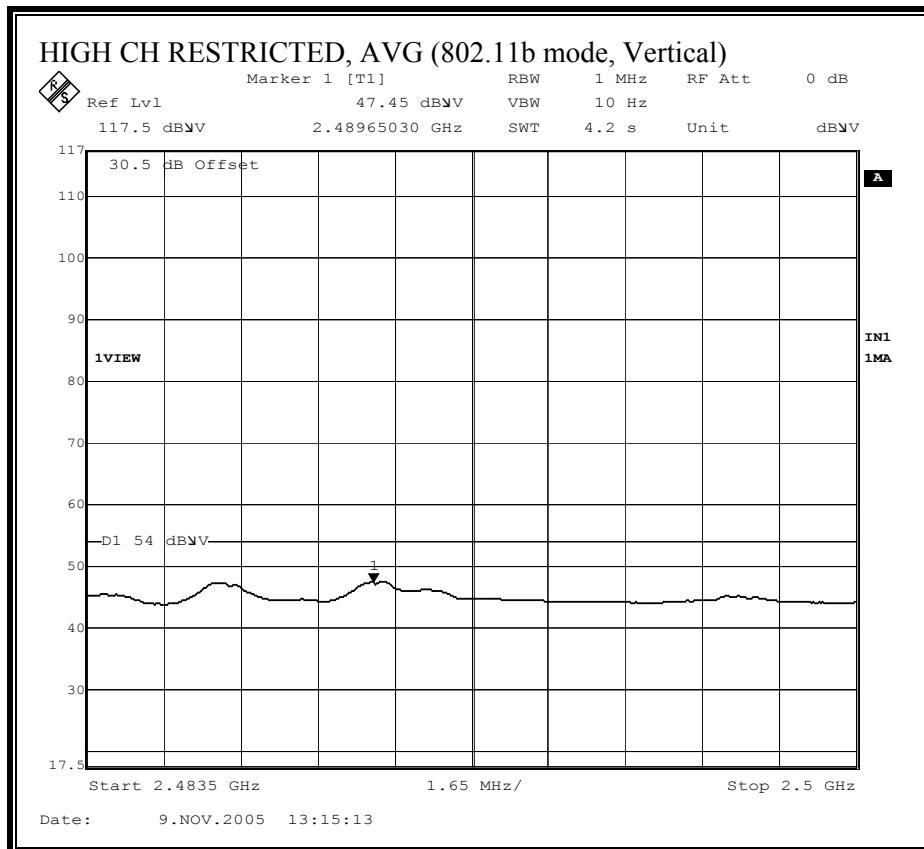
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

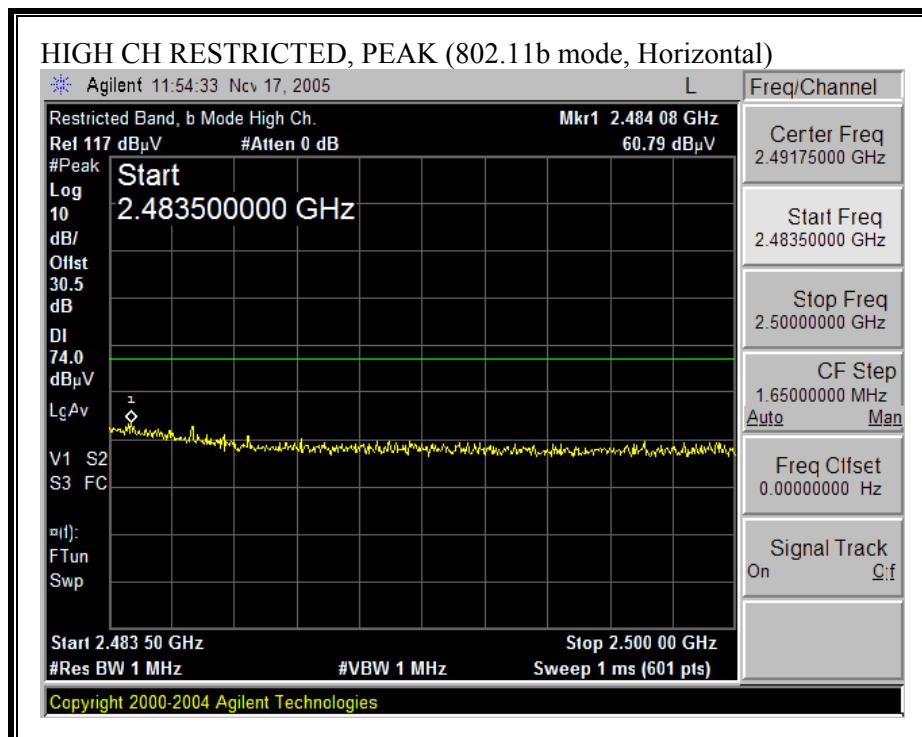


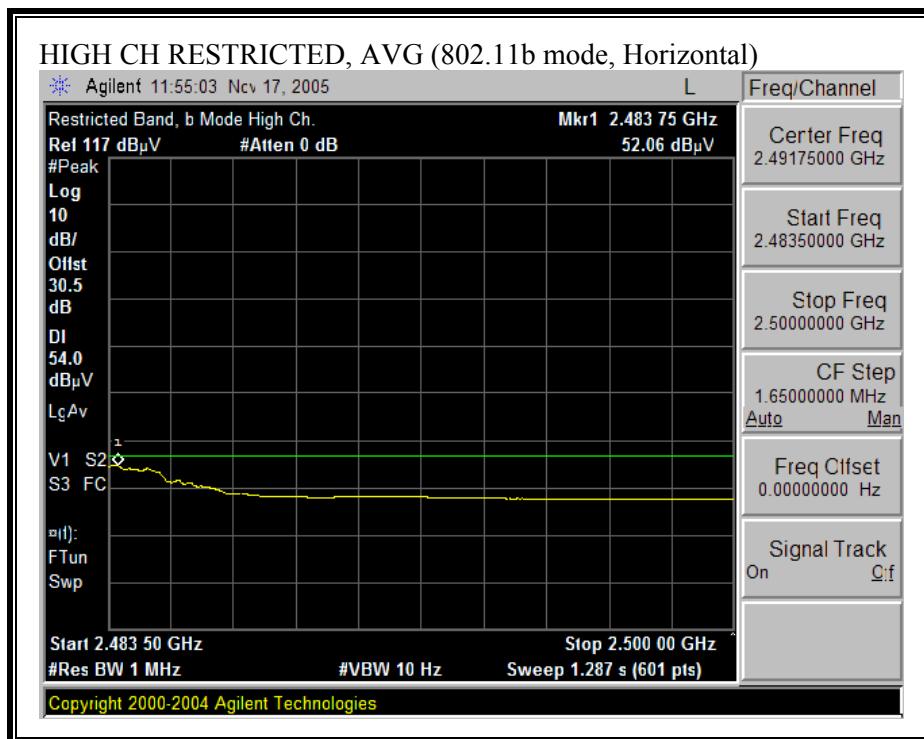
CH 10, 2457 MHz POWER = 19 dBm**RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)**

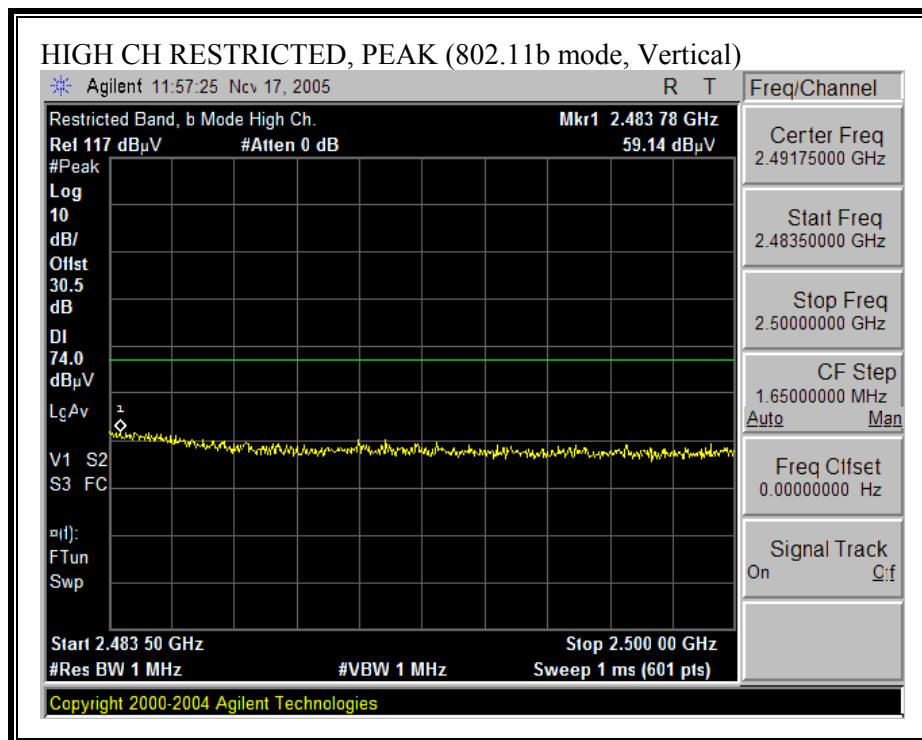


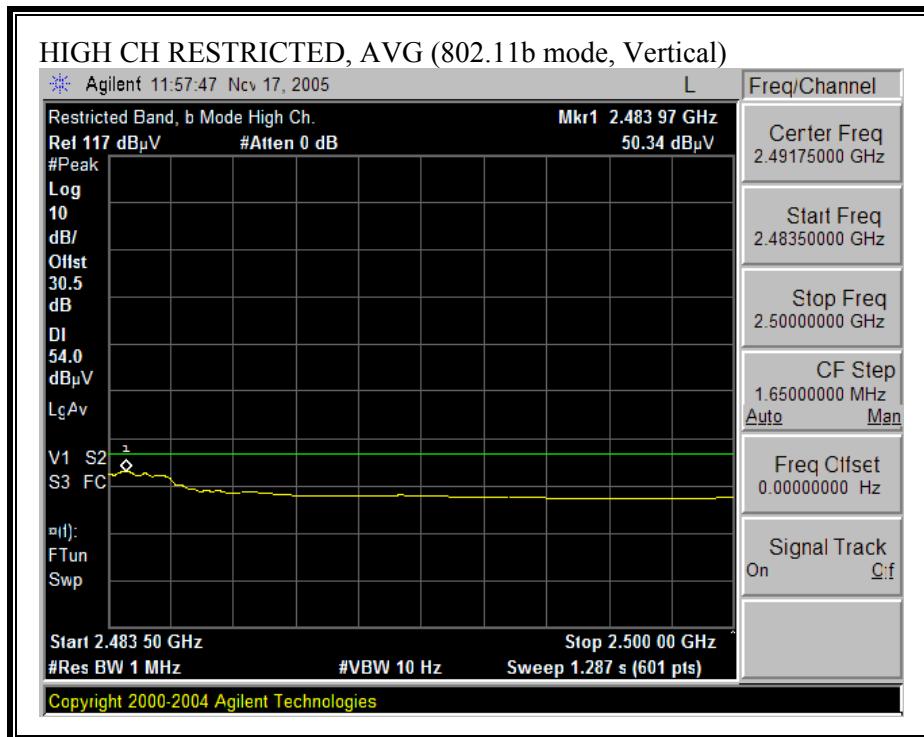
RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

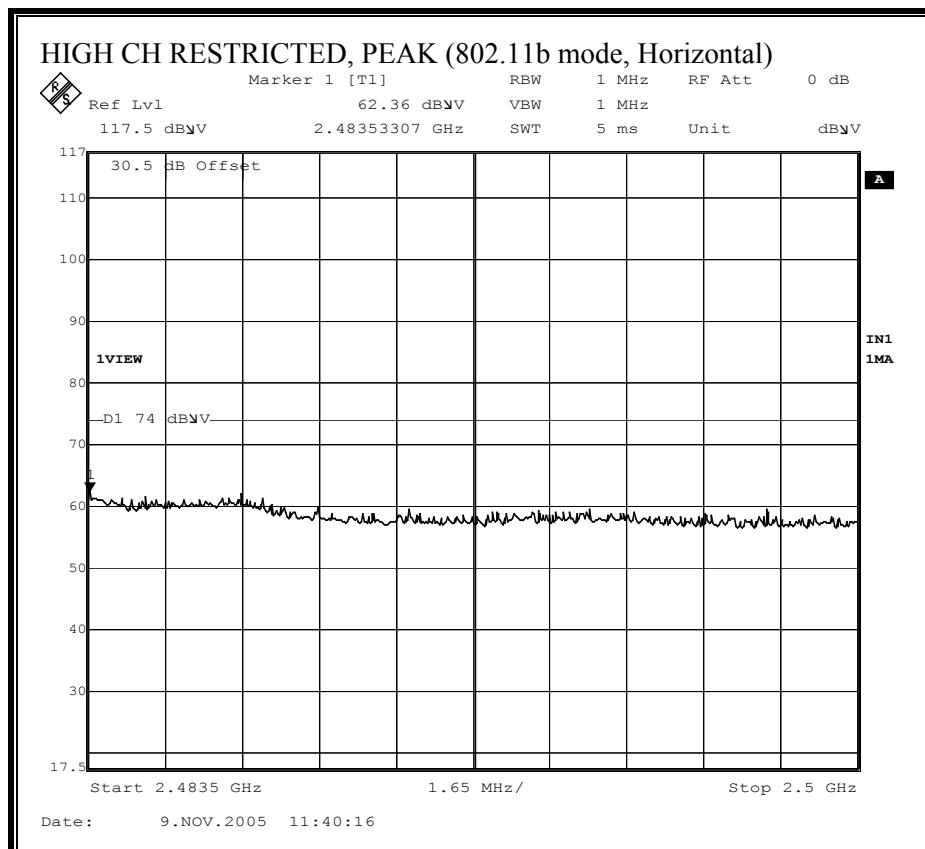


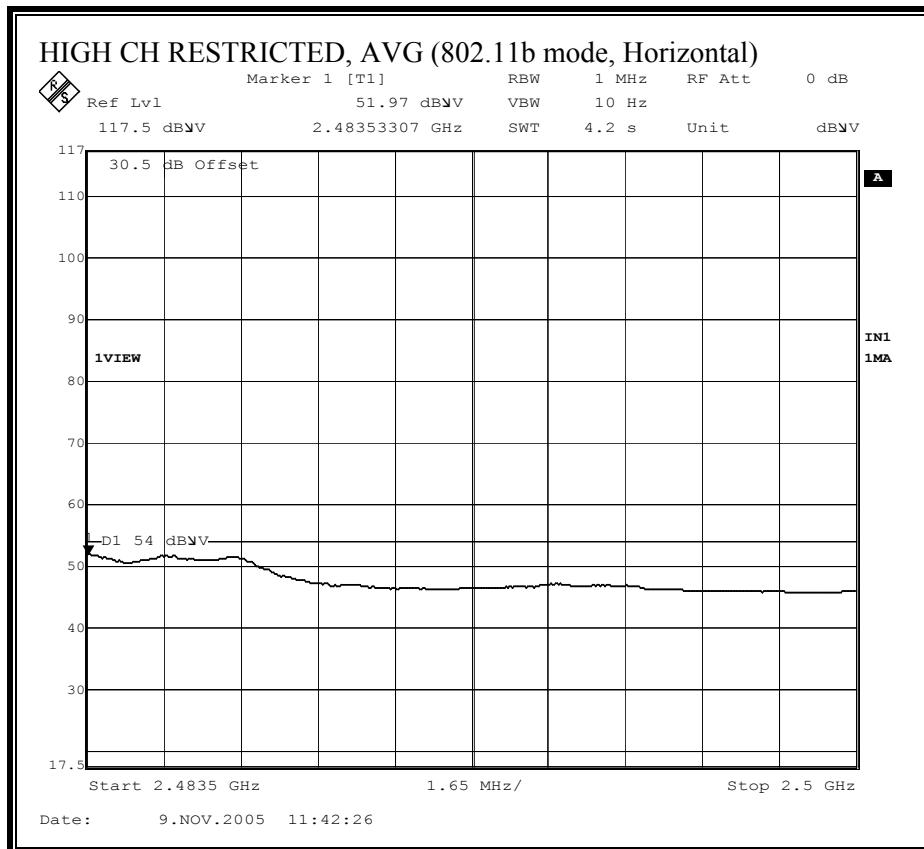
CH 11, 2462 MHz POWER = 18.5 dBm**RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)**

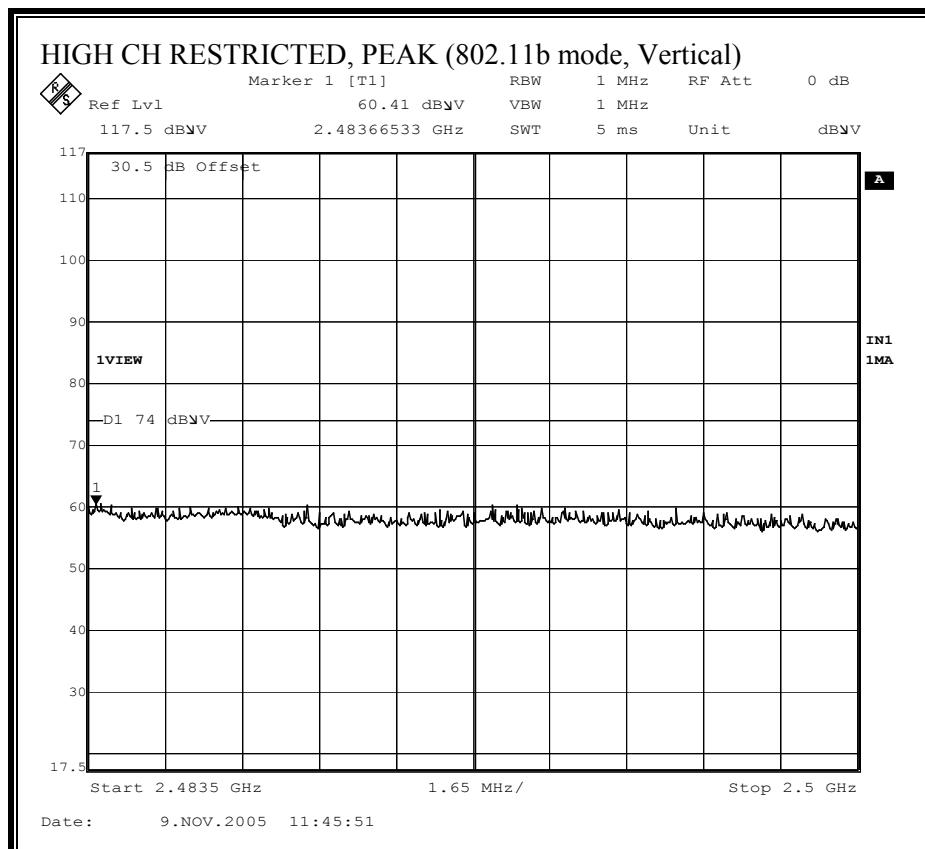


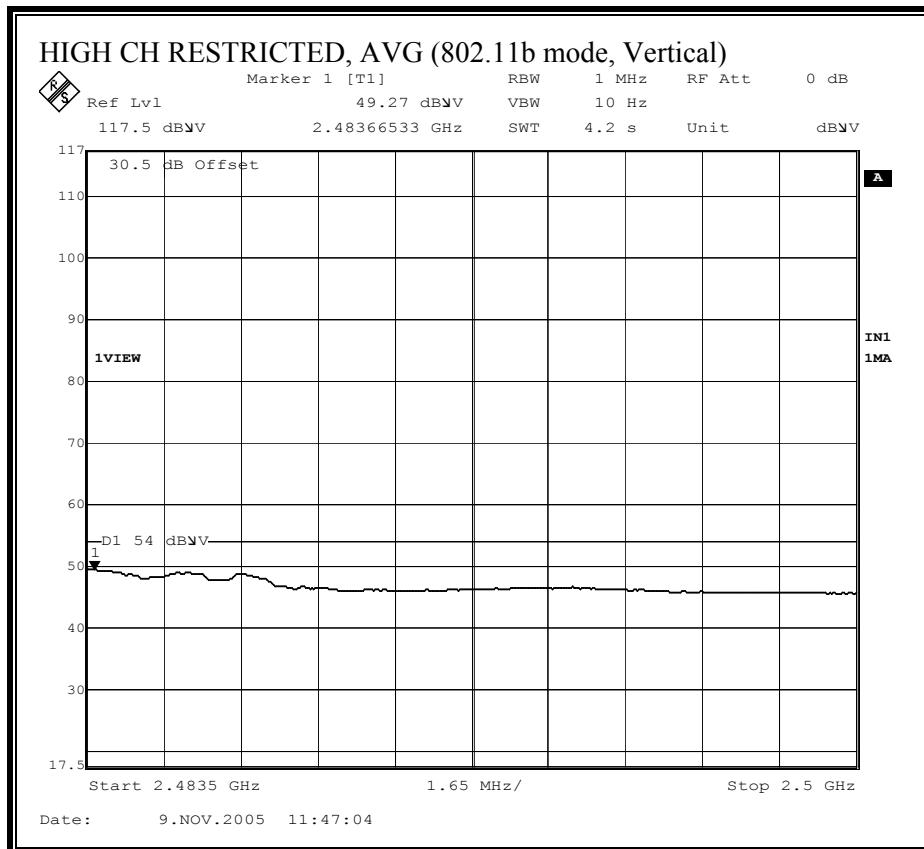
RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



CH 13, 2472 MHz POWER = 12 dBm**RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)**



RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS (b MODE)

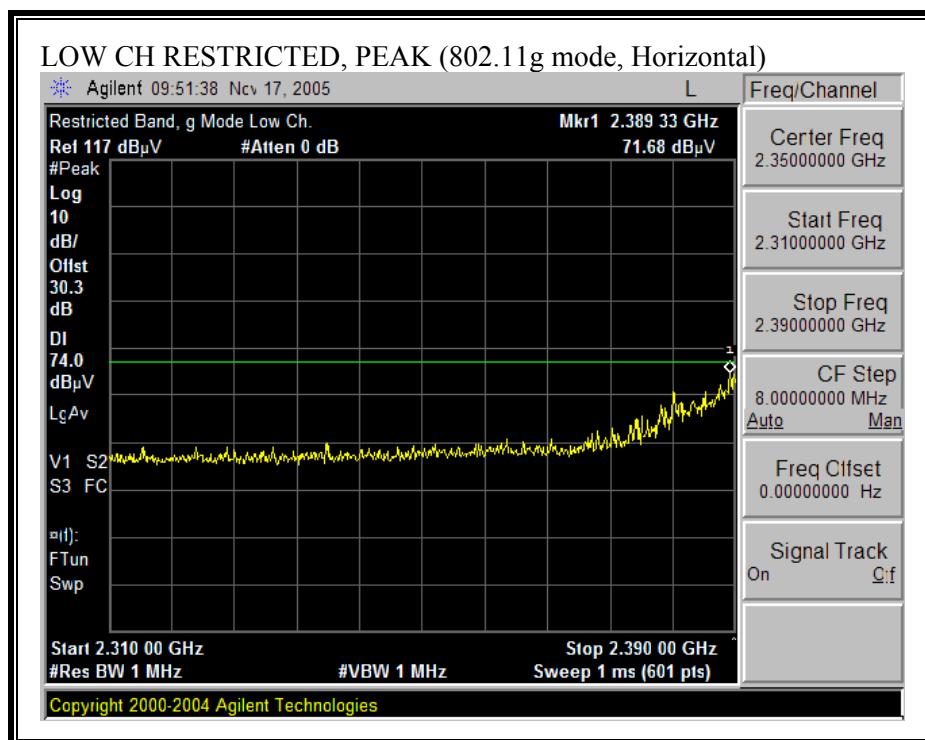
Power: Channel 1, 6, & 13 = 19dBm Bit Rate: 11Mbps for Peak and 1Mbps for Average reading.

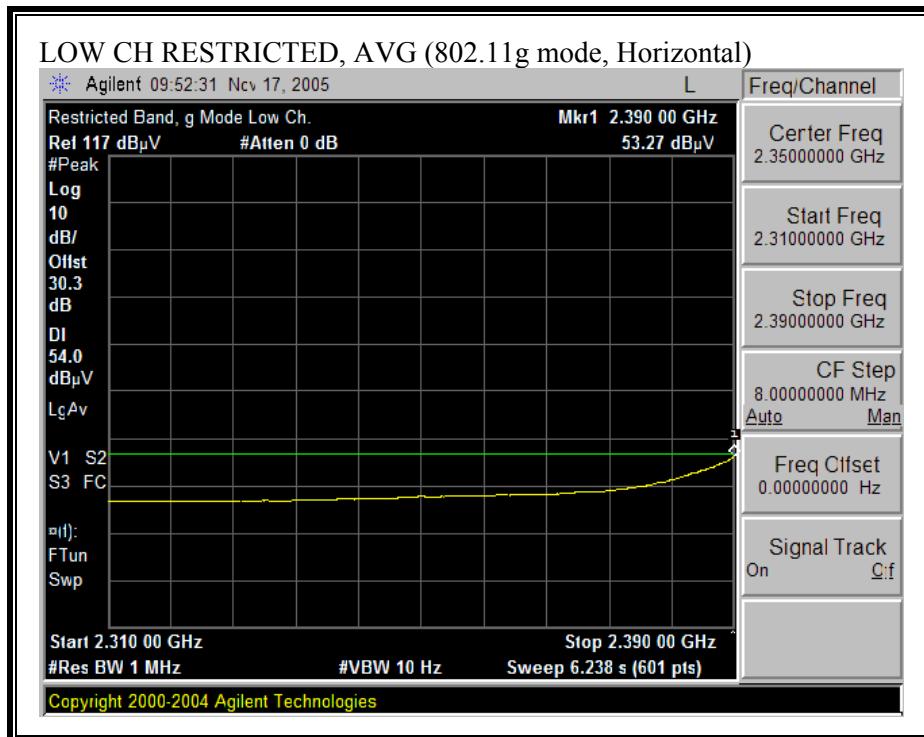
11/11/05 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site																			
Test Engr: Vien Tran Project #:05U3829 Company:BroadCom Corporation EUT Descrip.:802.11b/g WLAN PCI-E Mini Card EUT M/N:BCM94311MCG Test Target:FCC Part 15.247 Mode Oper:Tx b Mode																			
Test Equipment:																			
Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz				Limit												
T60; S/N: 2238 @3m	T34 HP 8449B										FCC 15.209								
Hi Frequency Cables																			
2 foot cable		3 foot cable			12 foot cable			HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz							
Vien 177079005					Vien 197209005			HPF_4.0GHz				Average Measurements RBW=1MHz ; VBW=10Hz							
f GHz	Dist (m)	Read Pk dBuV	Read Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)				
Tx Low Channel 2412MHz																			
4.824	3.0	53.5	49.4	33.6	3.4	-34.8	0.0	0.6	56.2	52.1	74	54	-17.8	-1.9	V				
7.236	3.0	48.9	37.1	36.1	3.9	-34.1	0.0	0.6	55.4	43.5	74	54	-18.6	-10.5	V				
9.648	3.0	43.1	31.0	38.1	4.6	-33.6	0.0	0.8	53.0	40.9	74	54	-21.0	-13.1	V				
4.824	3.0	54.0	50.0	33.6	3.4	-34.8	0.0	0.6	56.7	52.7	74	54	-17.3	-1.3	H				
7.236	3.0	41.9	34.7	36.1	3.9	-34.1	0.0	0.6	48.3	41.1	74	54	-25.7	-12.9	H				
9.648	3.0	41.4	28.9	38.1	4.6	-33.6	0.0	0.8	51.3	38.8	74	54	-22.7	-15.2	H				
Tx Mid Channel 2437MHz																			
4.874	3.0	53.7	49.8	33.7	3.4	-34.8	0.0	0.6	56.5	52.6	74	54	-17.5	-1.4	V				
7.311	3.0	49.6	38.3	36.2	3.9	-34.1	0.0	0.6	56.2	44.9	74	54	-17.8	-9.1	V				
9.748	3.0	44.0	32.0	38.1	4.6	-33.3	0.0	0.8	54.3	42.3	74	54	-19.7	-11.7	V				
4.874	3.0	54.1	50.1	33.7	3.4	-34.8	0.0	0.6	56.9	52.9	74	54	-17.1	-1.1	H				
7.311	3.0	42.5	35.5	36.2	3.9	-34.1	0.0	0.6	49.1	42.1	74	54	-24.9	-11.9	H				
9.748	3.0	42.0	30.1	38.1	4.6	-33.3	0.0	0.8	52.3	40.4	74	54	-21.7	-13.6	H				
Tx High Channel 2472MHz																			
4.944	3.0	44.3	36.0	33.7	3.4	-34.8	0.0	0.6	47.3	39.0	74	54	-26.7	-15.0	V				
7.416	3.0	45.7	34.3	36.3	3.9	-34.1	0.0	0.6	52.5	41.1	74	54	-21.5	-12.9	V				
4.944	3.0	48.2	42.1	33.7	3.4	-34.8	0.0	0.6	51.2	45.1	74	54	-22.8	-8.9	H				
7.416	3.0	42.6	33.0	36.3	3.9	-34.1	0.0	0.6	49.4	39.8	74	54	-24.6	-14.2	H				
No other emissions were detected above 3rd harmonic.																			
f	Measurement Frequency			Amp	Preamp Gain			D Corr			Avg Lim			Average Field Strength Limit					
Dist	Distance to Antenna			Avg	Distance Correct to 3 meters			Pk Lim			Peak Field Strength Limit								
Read	Analyzer Reading			Peak	Average Field Strength @ 3 m			Avg Mar			Margin vs. Average Limit								
AF	Antenna Factor			HPF	Calculated Peak Field Strength			Pk Mar			Margin vs. Peak Limit								
CL	Cable Loss																		

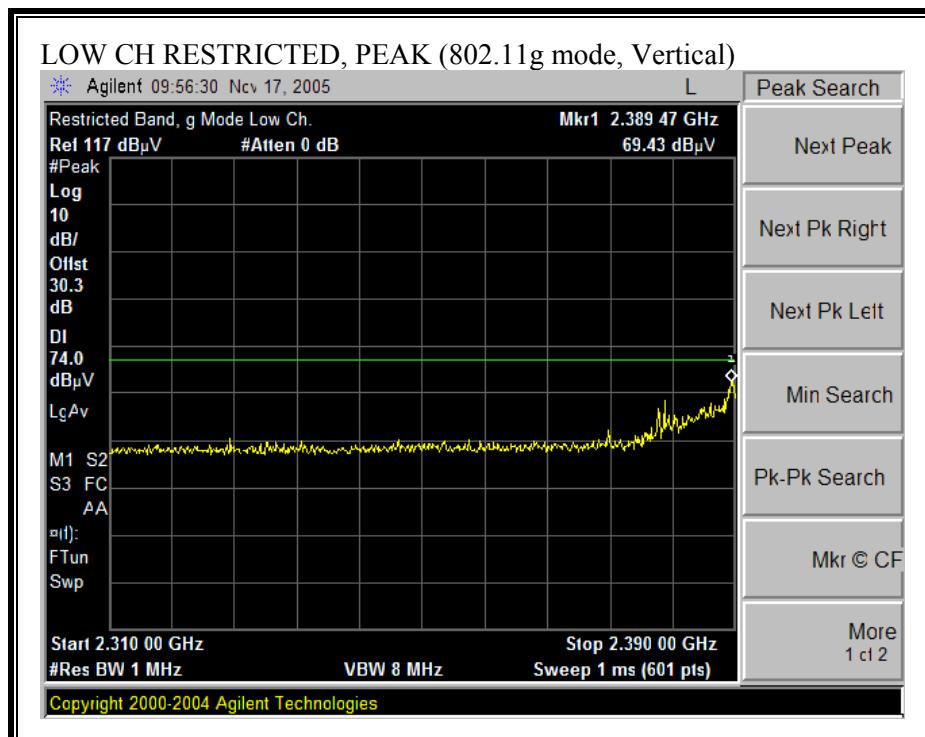
11g CHANNEL 1, 2, 9, 10, 11, and 13

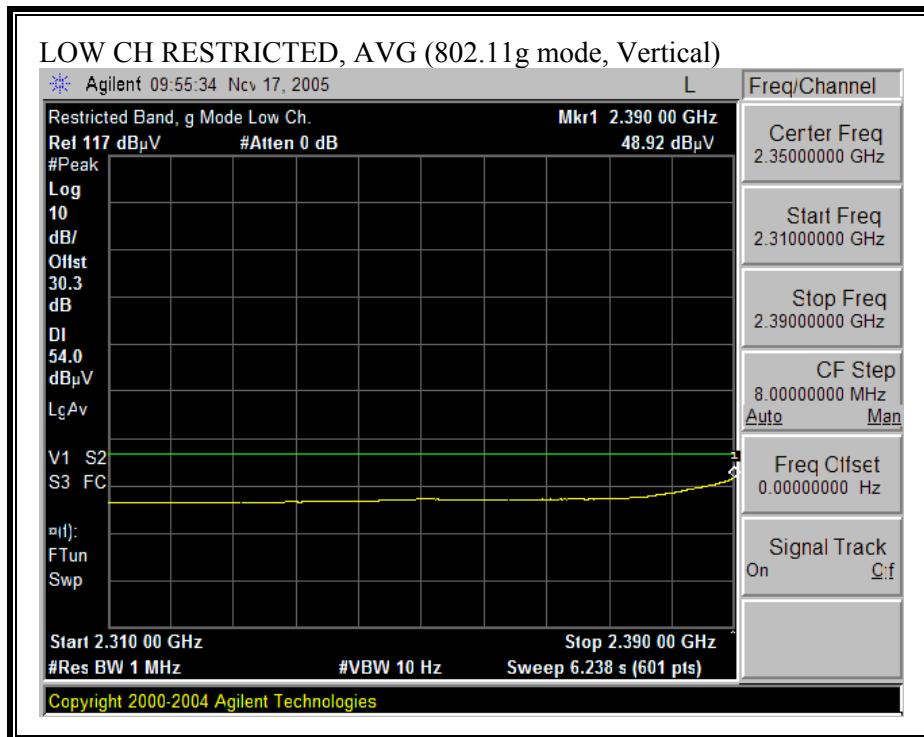
CH 1, 2412 MHz, TRANSMITTING POWER = 18 dBm

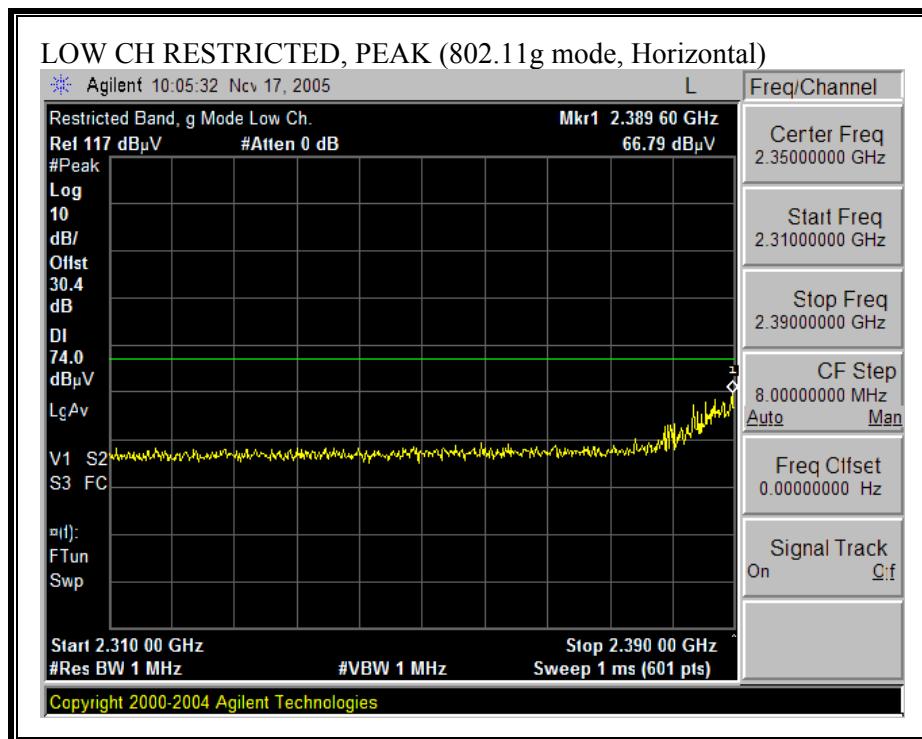
RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)

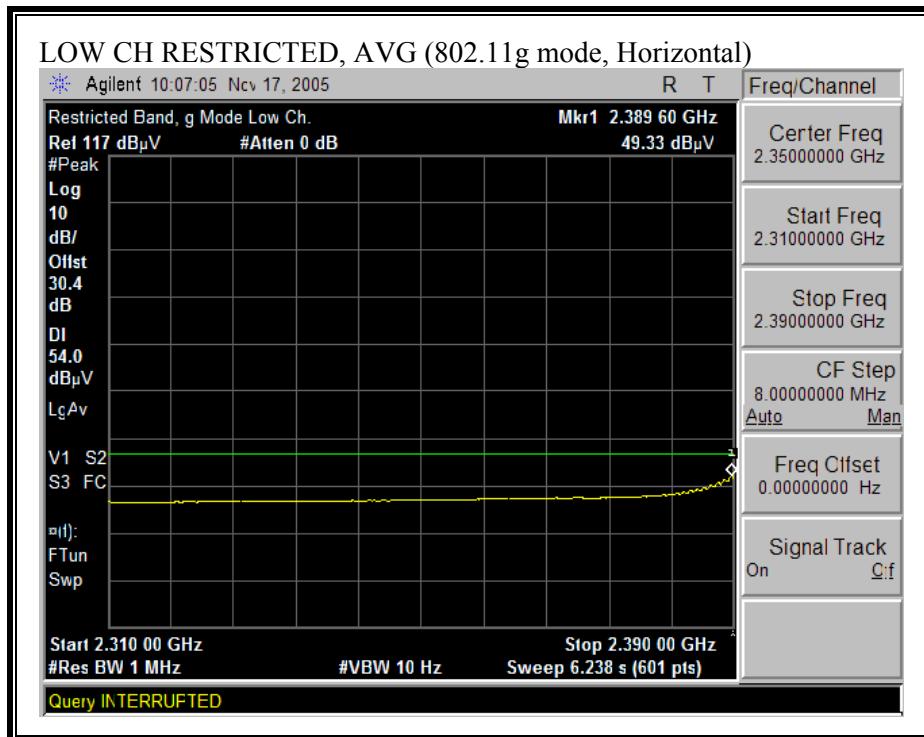


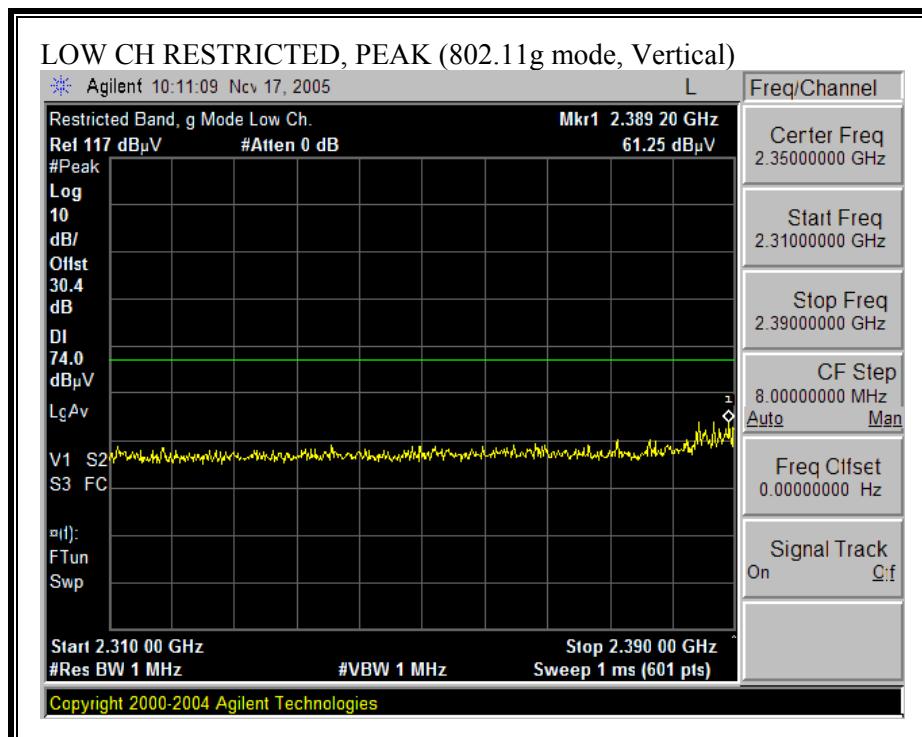


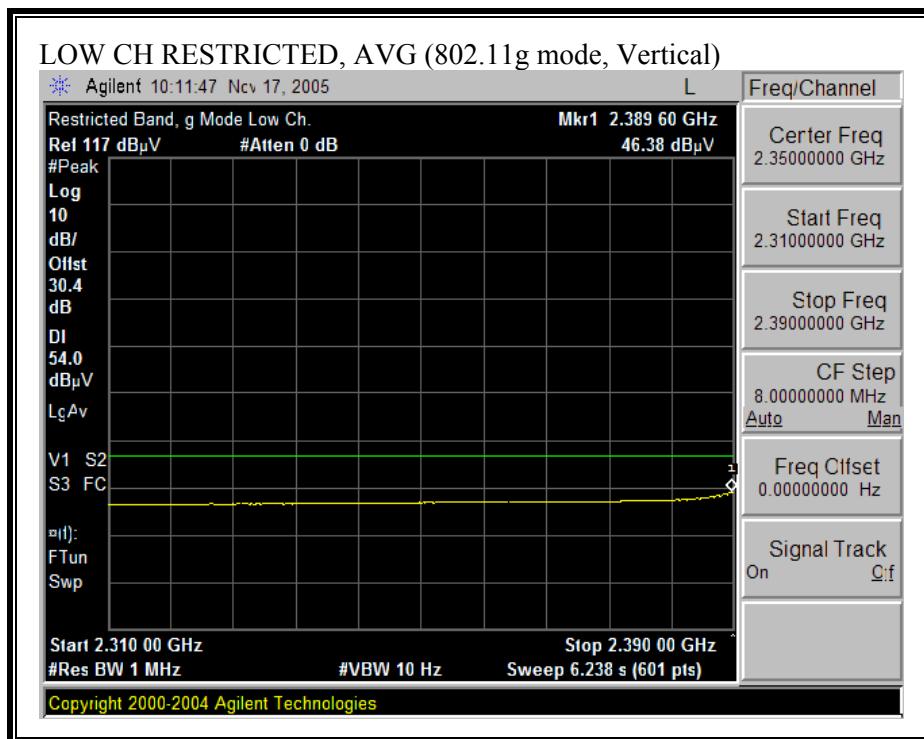
RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)

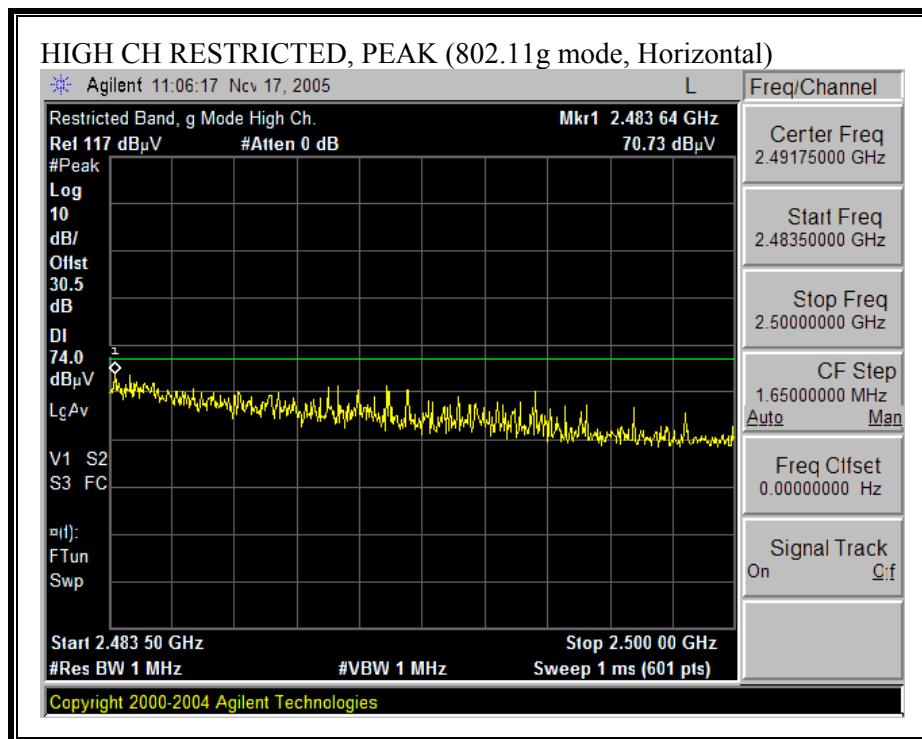


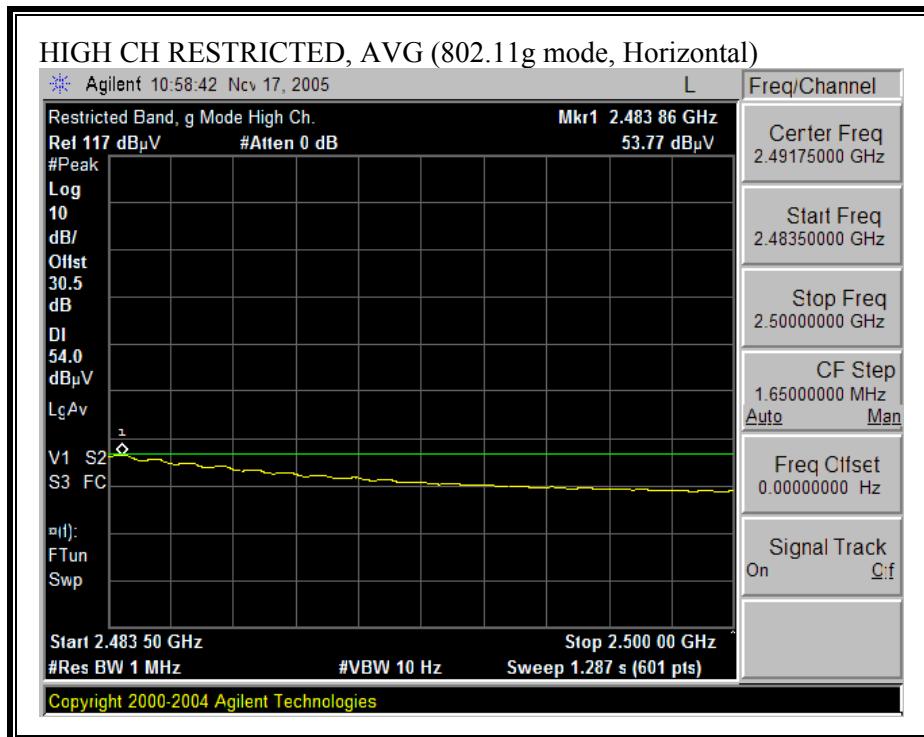
CH 2, 2417 MHz, TRANSMITTING POWER = 19 dBm**RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)**

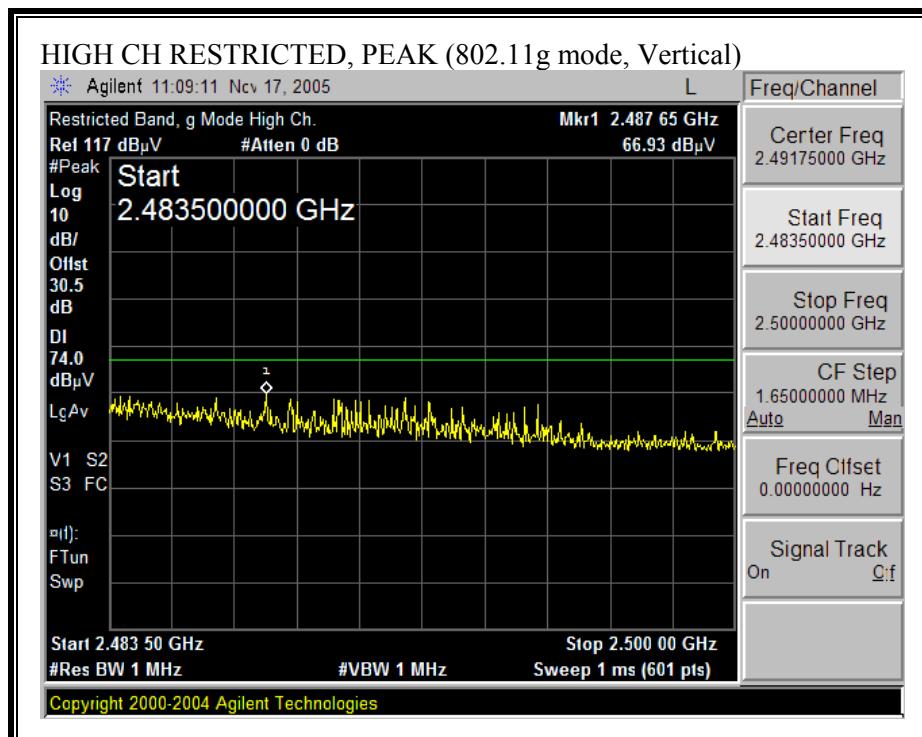


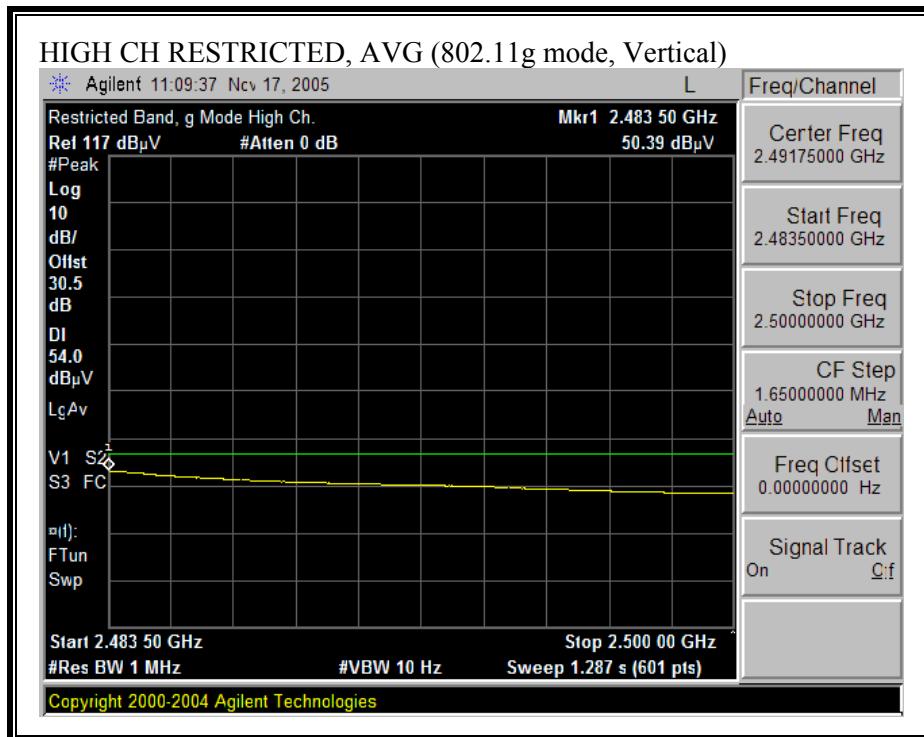
RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)

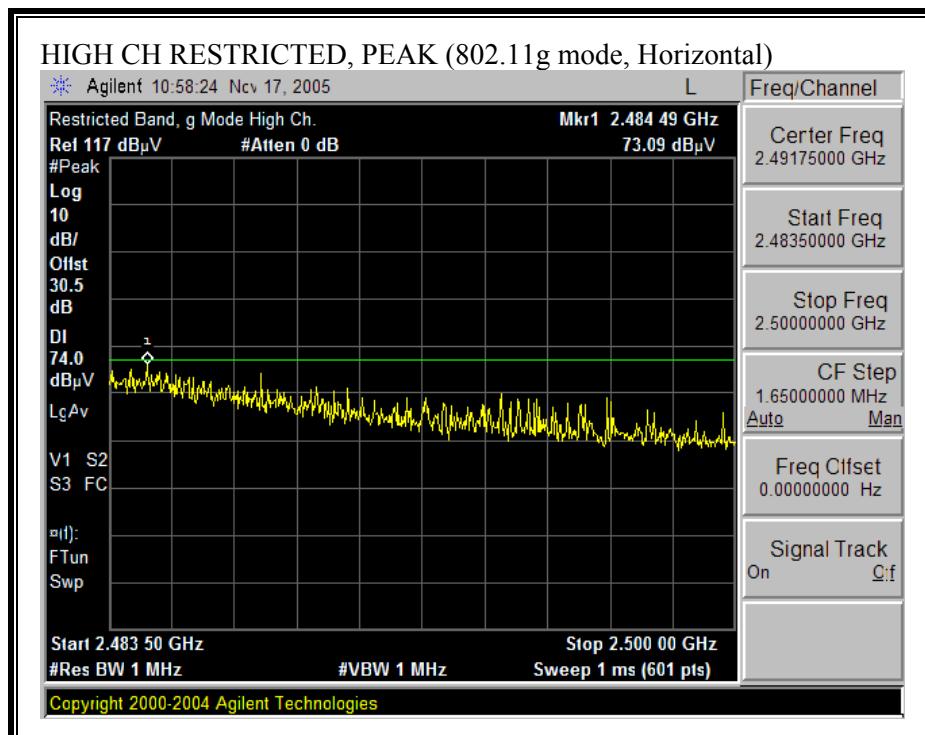


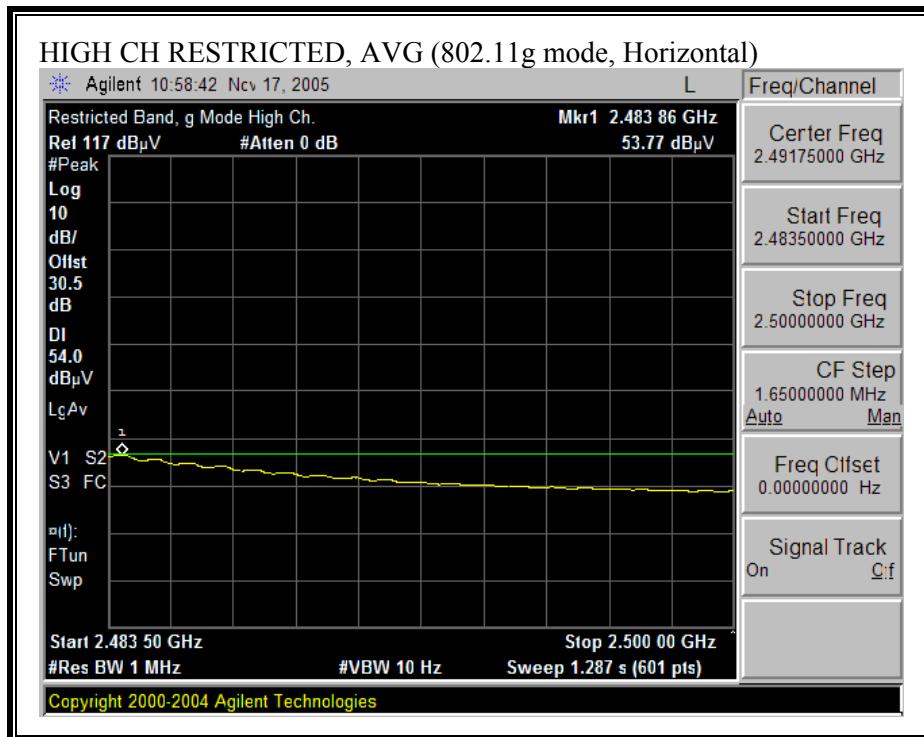
CH 9, 2452 MHz, TRANSMITTING POWER = 19 dBm**RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)**

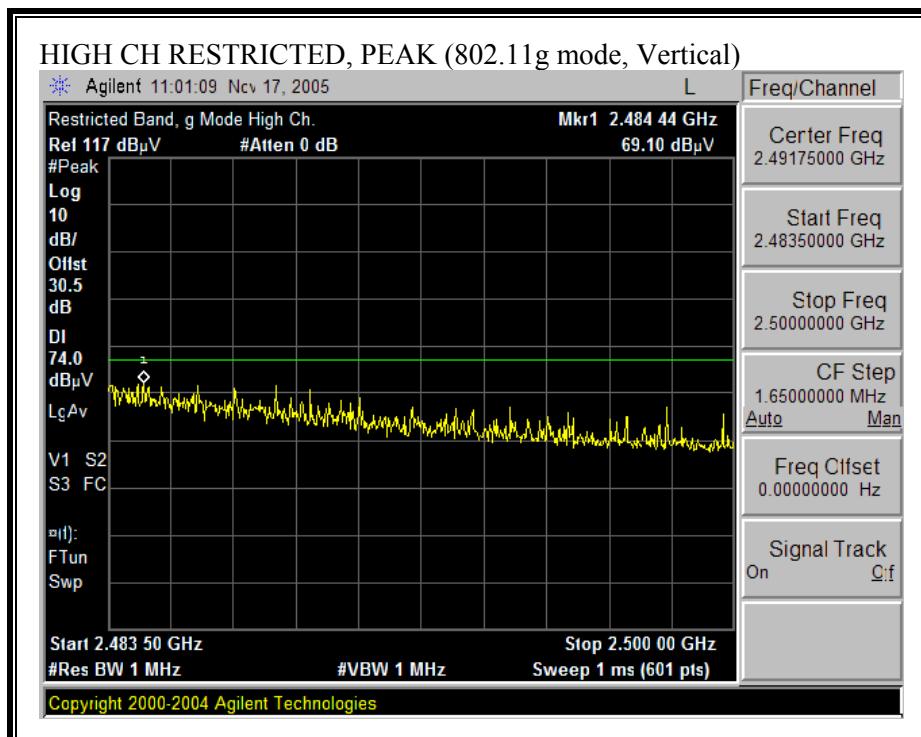


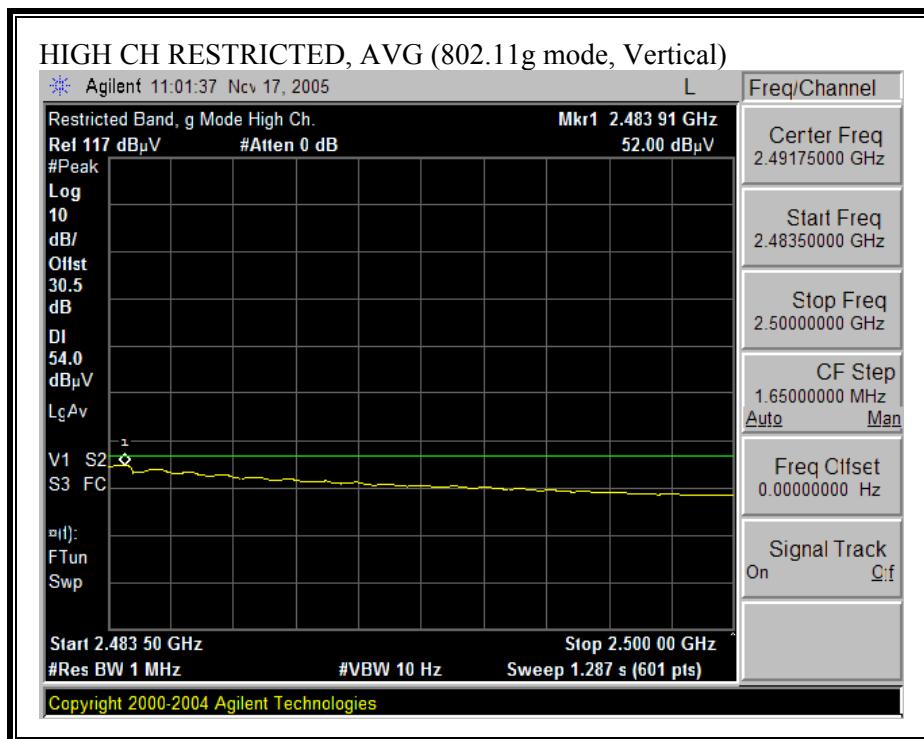
RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)

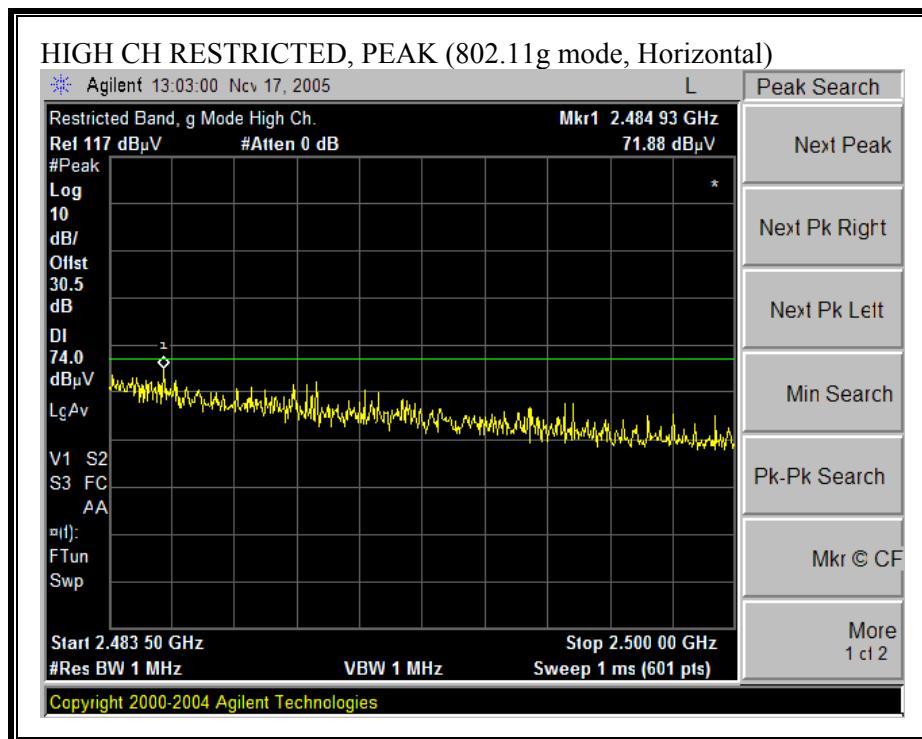


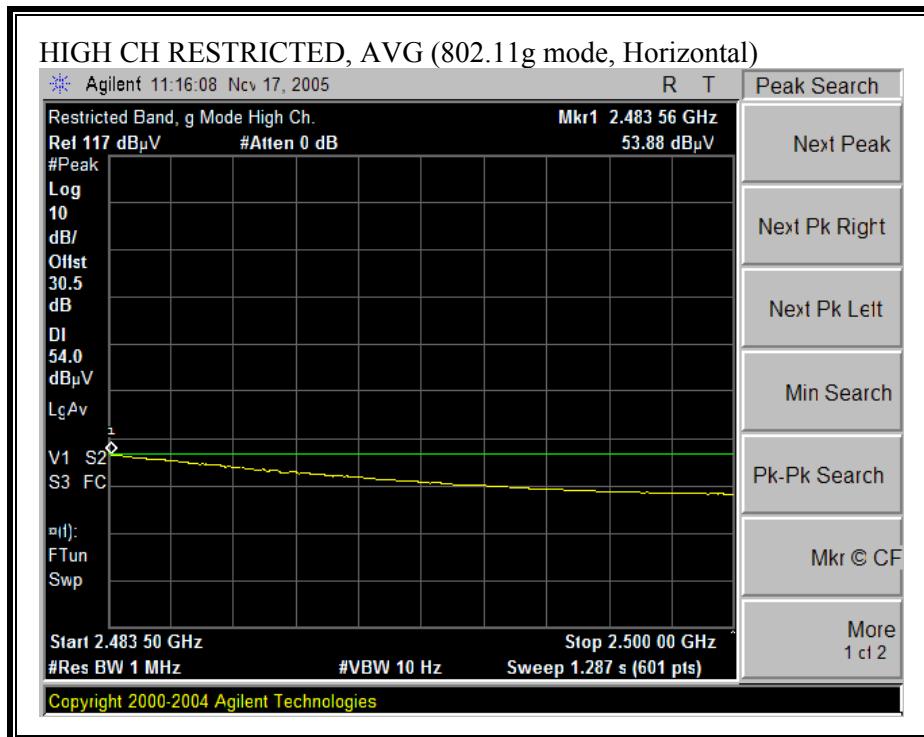
CH 10, 2457 MHz, TRANSMITTING POWER = 18 dBm**RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)**

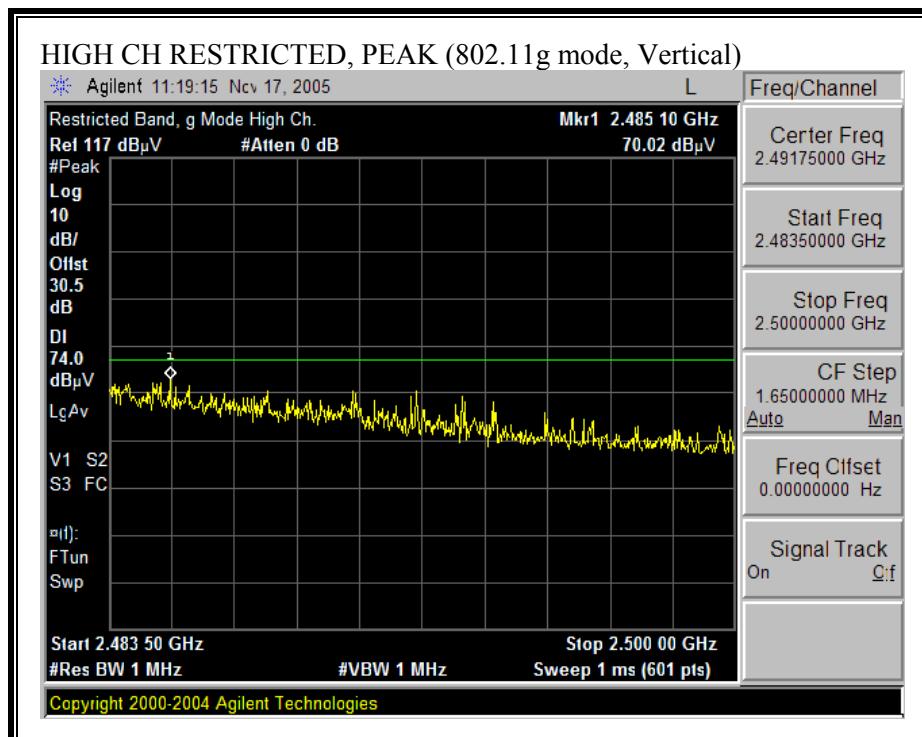


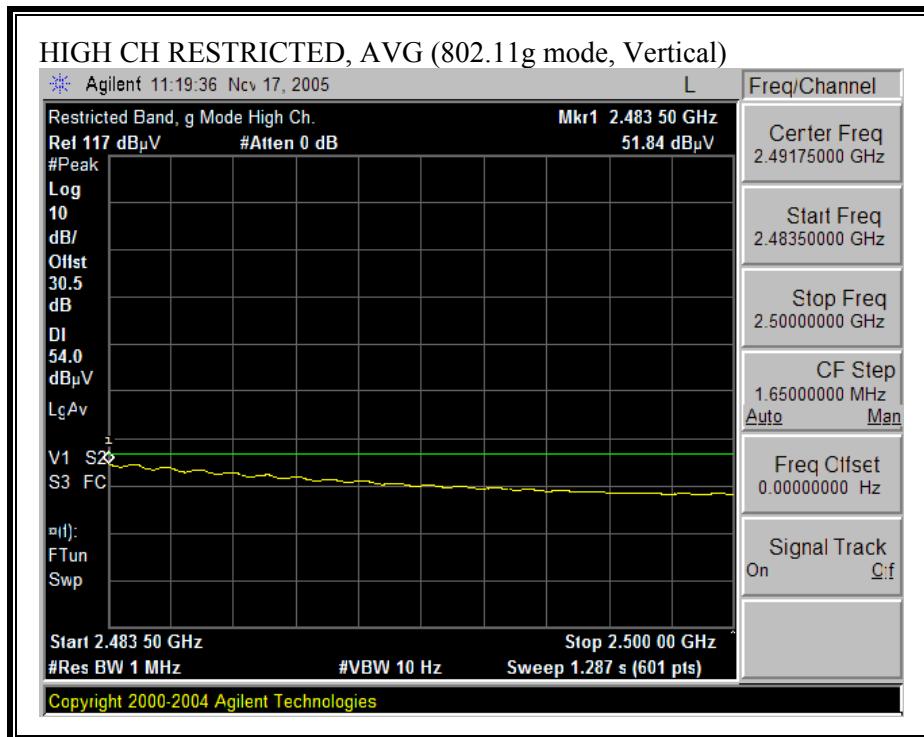
RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)

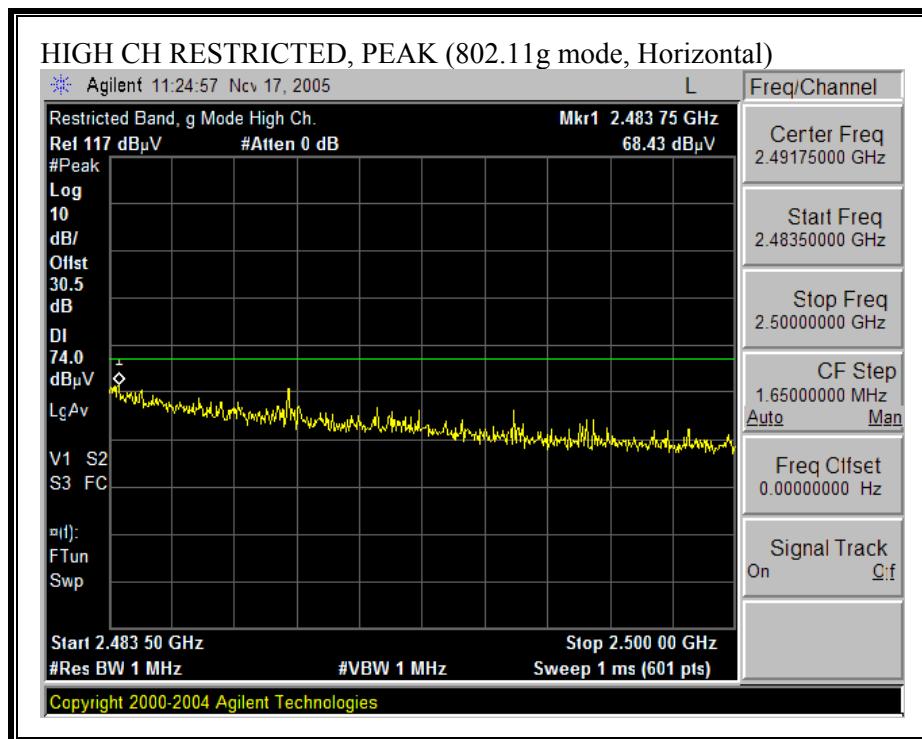


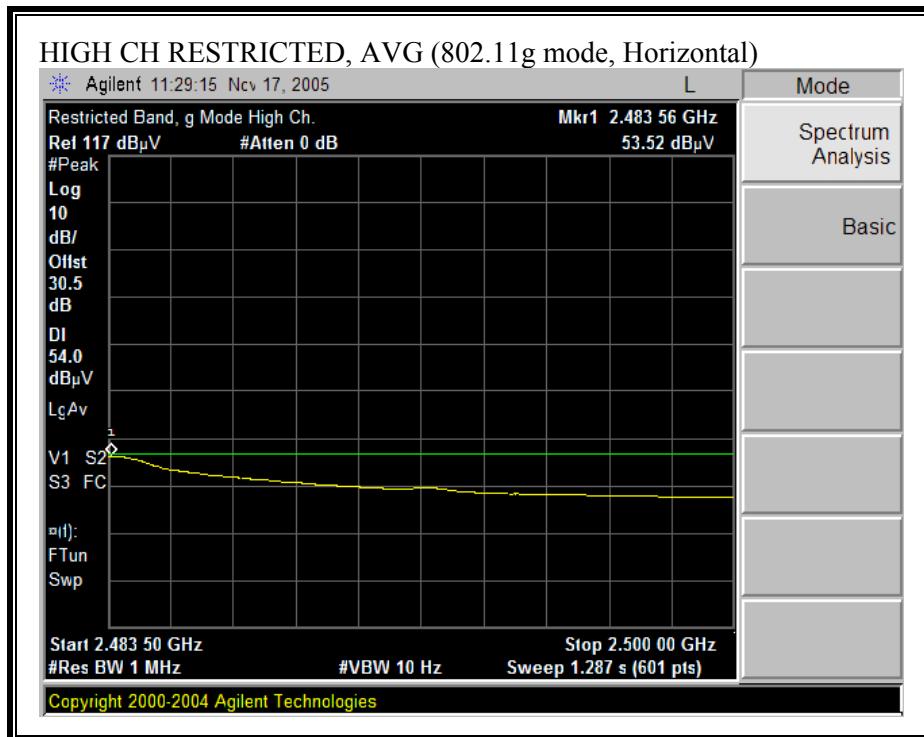
CH 11, 2462 MHz, TRANSMITTING POWER = 16.5 dBm**RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)**

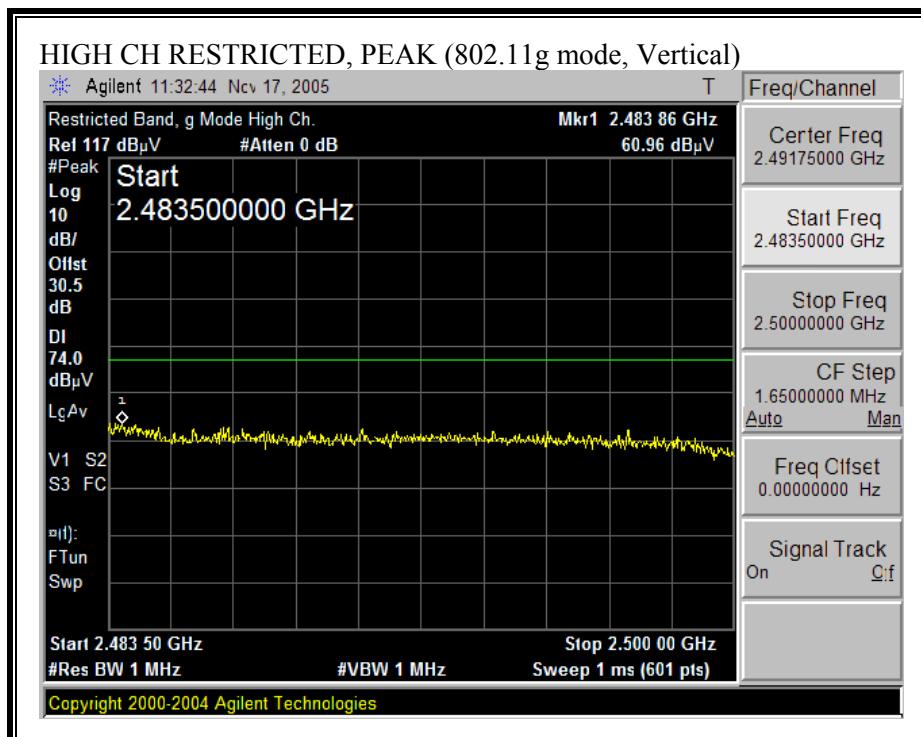


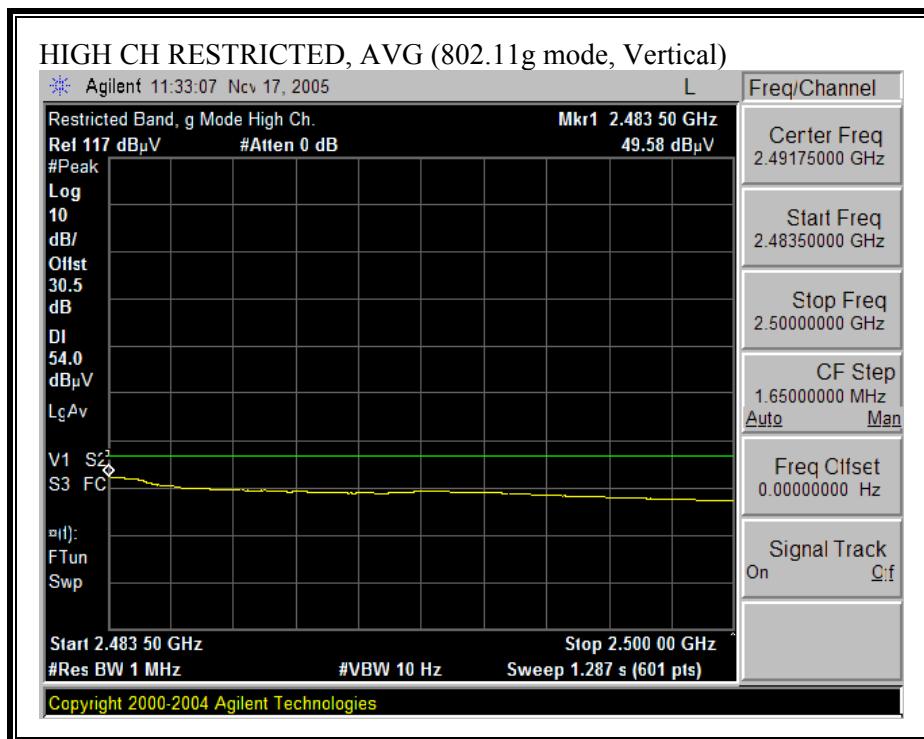
RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)



CH 13, 2472 MHz, TRANSMITTING POWER = 11 dBm**RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)**



RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)



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

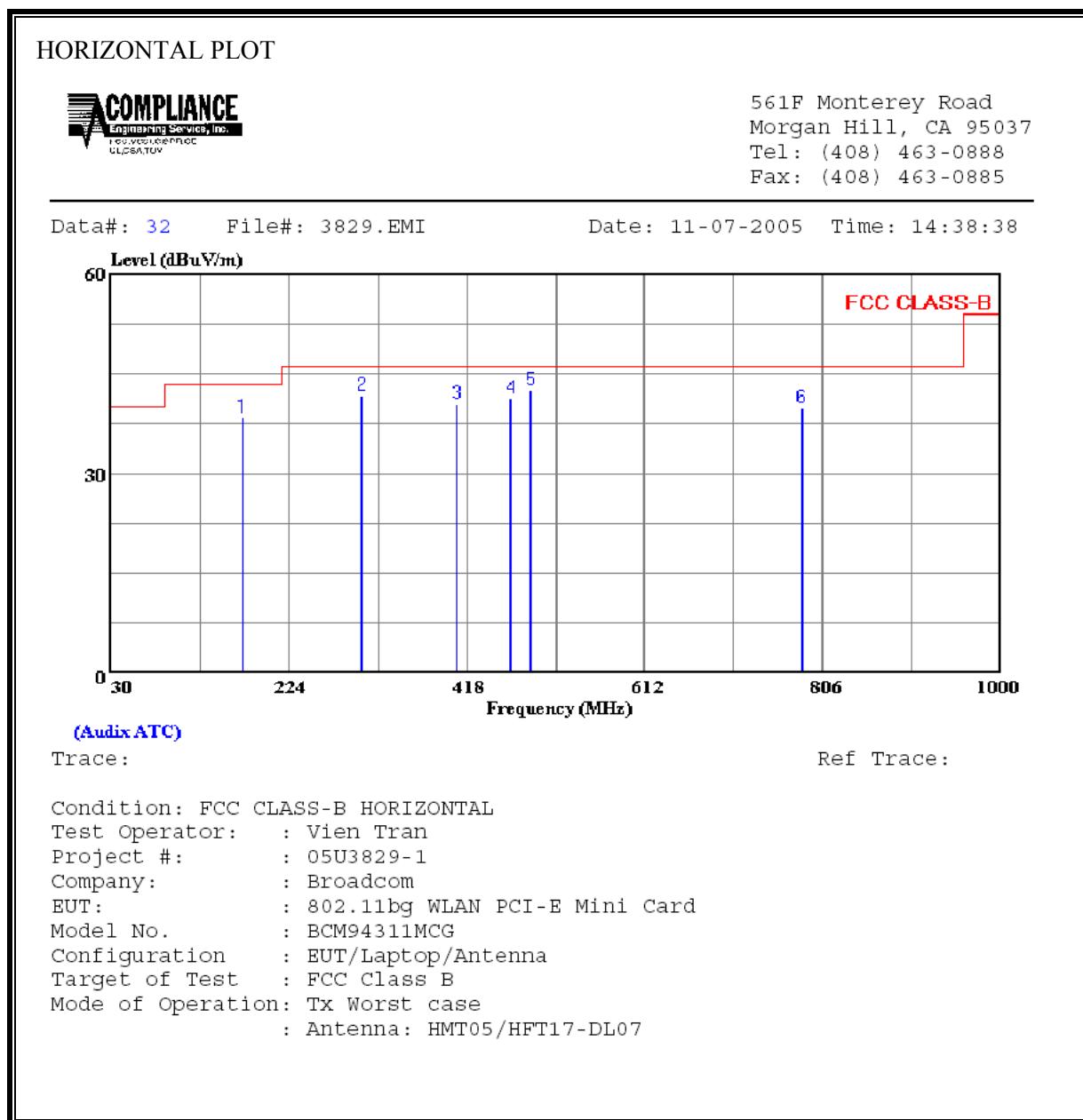
Power: Channel 1, 6, & 13 = 19dBm Bit Rate: 54Mbps for Peak and 6Mbps for Average reading.

11/11/05 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site																			
Test Engr: Vien Tran Project #: 05U3829 Company: BroadCom Corporation EUT Descrip.: 802.11a/b/g WLAN PCI-E Mini Card EUT M/N: BCM94311MCG Test Target: FCC Part 15.247 Mode Oper: Tx g Mode																			
Test Equipment:																			
Horn 1-18GHz		Pre-amplifier 1-26GHz		Pre-amplifier 26-40GHz		Horn > 18GHz		Limit											
T60; S/N: 2238 @3m		T34 HP 8449B						FCC 15.209											
Hi Frequency Cables																			
2 foot cable		3 foot cable		12 foot cable		HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz									
Vien 177079005				Vien 197209005		HPF_4.0GHz													
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)				
Tx Low Channel 2412MHz																			
4.824	3.0	48.0	34.5	33.6	3.4	-34.8	0.0	0.6	50.7	37.2	74	54	-23.3	-16.8	V				
7.236	3.0	50.0	37.0	36.1	3.9	-34.1	0.0	0.6	56.4	43.4	74	54	-17.6	-10.6	Noise Floor				
4.824	3.0	50.0	36.0	33.6	3.4	-34.8	0.0	0.6	52.7	38.8	74	54	-21.3	-15.2	H				
7.236	3.0	48.9	32.9	36.1	3.9	-34.1	0.0	0.6	55.3	39.3	74	54	-18.7	-14.7	Noise Floor				
Tx Mid Channel 2437MHz																			
4.874	3.0	49.1	36.8	33.7	3.4	-34.8	0.0	0.6	51.9	39.6	74	54	-22.1	-14.4	V				
7.311	3.0	51.0	36.0	36.2	3.9	-34.1	0.0	0.6	57.6	42.6	74	54	-16.4	-11.4	Noise Floor				
4.874	3.0	50.1	36.6	33.7	3.4	-34.8	0.0	0.6	52.9	39.4	74	54	-21.1	-14.6	H				
7.311	3.0	50.4	37.0	36.2	3.9	-34.1	0.0	0.6	57.0	43.6	74	54	-17.0	-10.4	Noise Floor				
Tx High Channel 2472MHz																			
4.944	3.0	49.5	37.0	33.7	3.4	-34.8	0.0	0.6	52.5	40.0	74	54	-21.5	-14.0	V				
7.416	3.0	50.4	35.7	36.3	3.9	-34.1	0.0	0.6	57.2	42.5	74	54	-16.8	-11.5	Noise Floor				
4.944	3.0	51.5	35.9	33.7	3.4	-34.8	0.0	0.6	54.5	38.9	74	54	-19.5	-15.1	V				
7.416	3.0	51.7	36.9	36.3	3.9	-34.1	0.0	0.6	58.5	43.7	74	54	-15.5	-10.3	Noise Floor				
No other emissions were detected above 3rd harmonic.																			
f Measurement Frequency Dist Distance to Antenna Read Analyzer Reading AF Antenna Factor CL Cable Loss				Amp Preamp Gain D Corr Distance Correct to 3 meters Avg Average Field Strength @ 3 m Peak Calculated Peak Field Strength HPF High Pass Filter				Avg Lim Average Field Strength Limit Pk Lim Peak Field Strength Limit Avg Mar Margin vs. Average Limit Pk Mar Margin vs. Peak Limit											

7.2.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

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

Worst Case Channel



HORIZONTAL DATA

Freq	Read		Level	Limit	Over	Limit	Remark
	Level	Factor					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	173.560	27.52	10.80	38.31	43.50	-5.19	Peak
2	303.540	26.38	15.37	41.75	46.00	-4.25	Peak
3	407.330	22.95	17.52	40.47	46.00	-5.53	Peak
4	465.530	22.53	18.70	41.23	46.00	-4.77	Peak
5	487.840	23.30	19.17	42.47	46.00	-3.53	Peak
6	783.690	16.36	23.44	39.80	46.00	-6.20	Peak

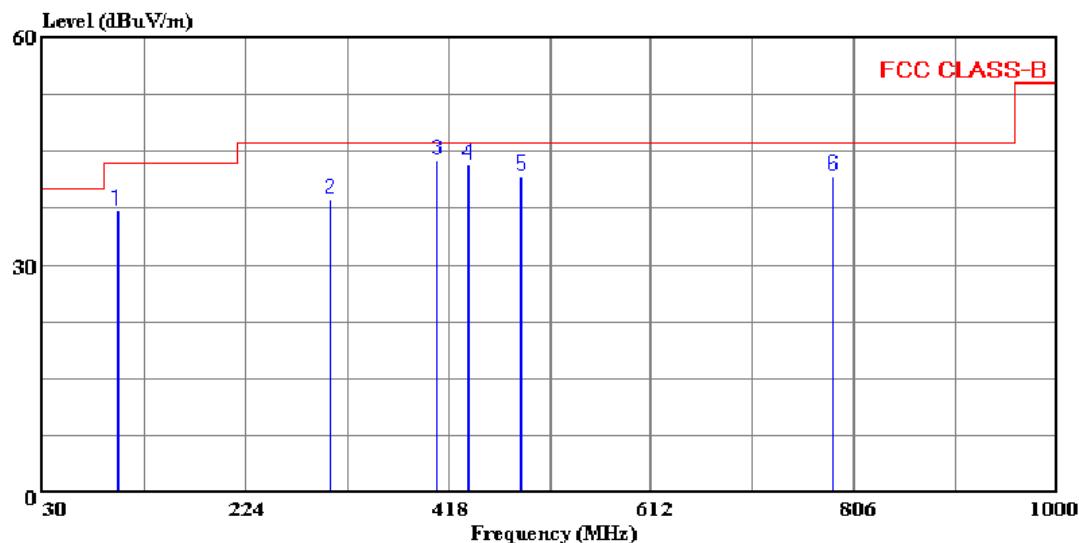
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



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

Data#: 21 File#: 3829.EMI Date: 11-07-2005 Time: 13:56:46



(Audix ATC)

Trace:

Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: : Vien Tran
Project #: : 05U3829-1
Company: : Broadcom
EUT: : 802.11bg WLAN PCI-E Mini Card
Model No. : BCM94311MCG
Configuration : EUT/Laptop/Antenna
Target of Test : FCC Class B
Mode of Operation: Tx Worst case
: Antenna HMT05/HFT17-DL07

VERTICAL DATA

Freq	Read		Level	Limit	Over	Limit	Remark
	Level	Factor					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	101.780	25.33	11.74	37.07	43.50	-6.43	Peak
2	305.480	23.18	15.41	38.59	46.00	-7.41	Peak
3	407.330	26.39	17.52	43.91	46.00	-2.09	Peak
4	436.430	25.09	18.10	43.19	46.00	-2.81	Peak
5	487.840	22.54	19.17	41.71	46.00	-4.29	Peak
6	785.630	18.23	23.44	41.67	46.00	-4.33	Peak

7.3. POWERLINE CONDUCTED EMISSIONS

LIMIT

§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 Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST 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.

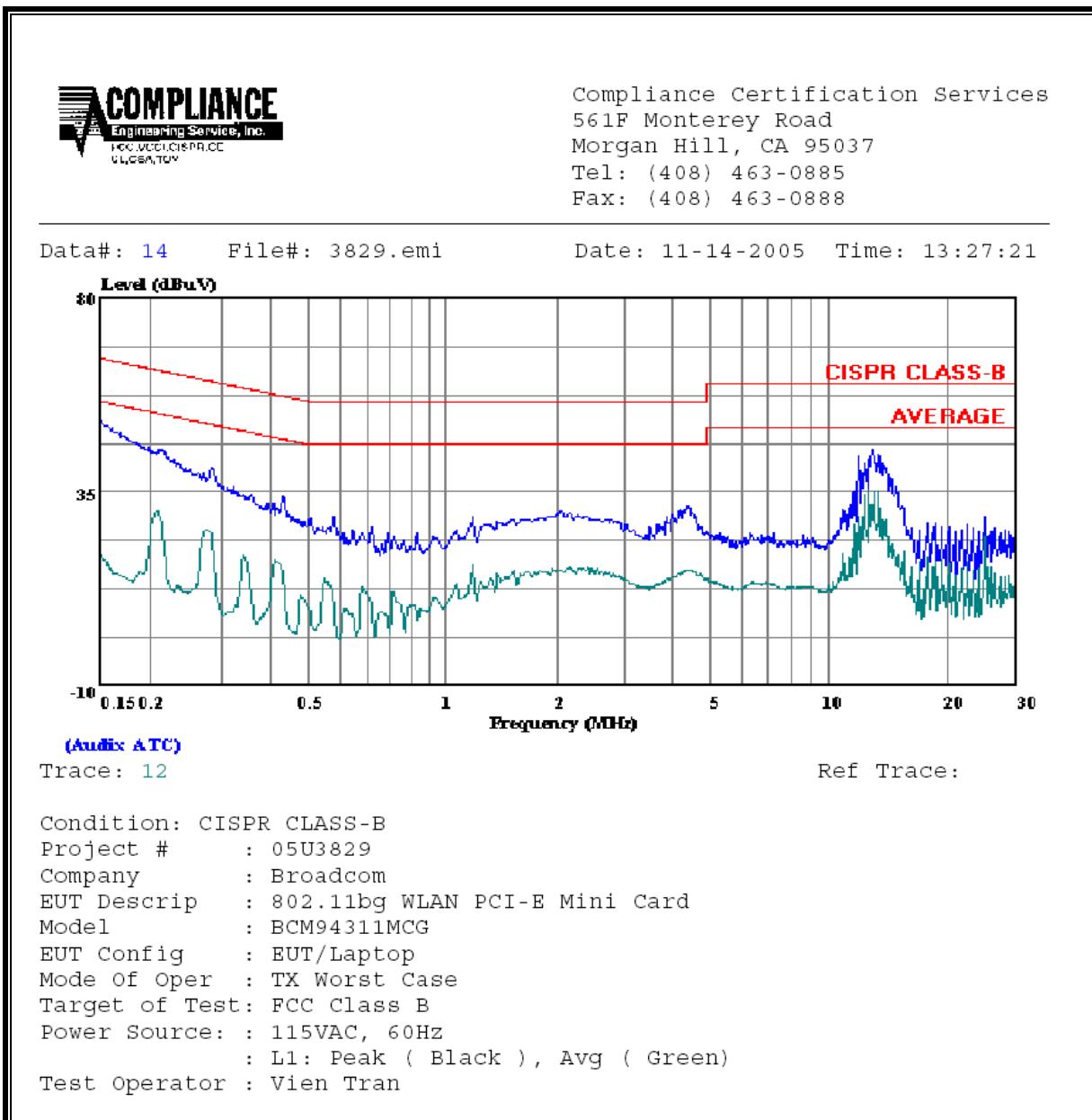
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

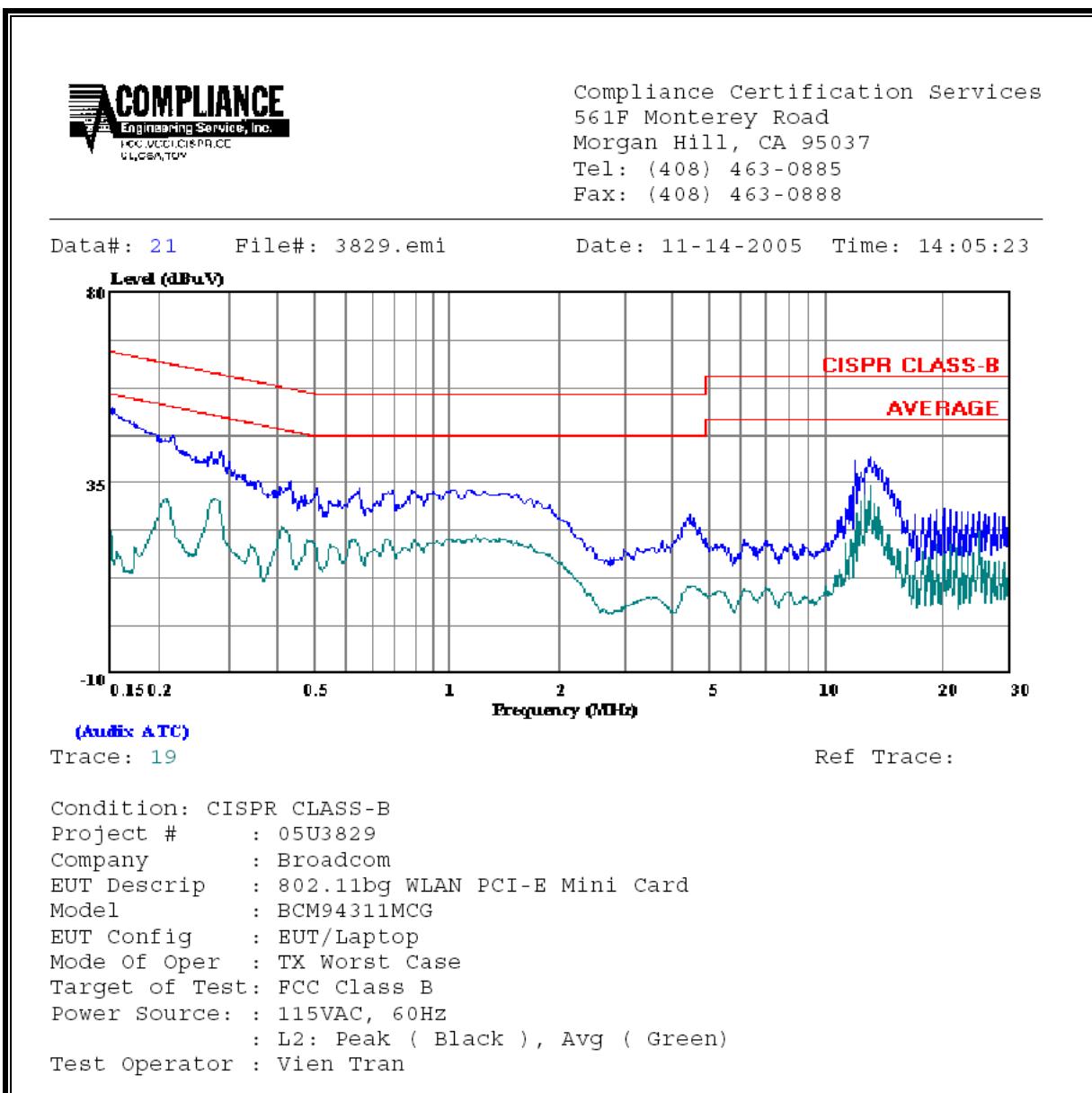
No non-compliance noted:

6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)										
Freq. (MHz)	Reading			Closs (dB)	Limit	FCC B		Margin		Remark
	PK (dBuV)	QP (dBuV)	AV (dBuV)			QP	AV	QP (dB)	AV (dB)	
0.15	51.64	--	--	0.00	66.00	56.00	-14.36	-4.36	L1	
0.21	45.00	--	--	0.00	63.21	53.21	-18.21	-8.21	L1	
12.99	44.50	--	--	0.00	60.00	50.00	-15.50	-5.50	L1	
0.15	51.12	--	--	0.00	66.00	56.00	-14.88	-4.88	L2	
0.21	45.92	--	--	0.00	63.21	53.21	-17.29	-7.29	L2	
12.99	42.40	--	--	0.00	60.00	50.00	-17.60	-7.60	L2	
6 Worst Data										

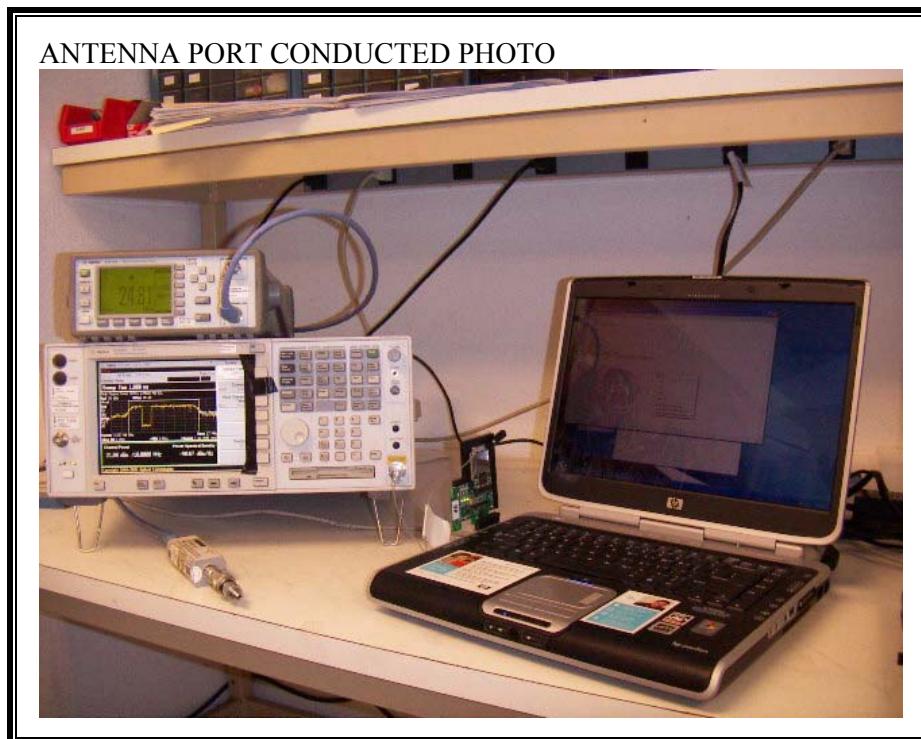
LINE 1 RESULTS

LINE 2 RESULTS



8. SETUP PHOTOS

RF CONDUCTED SETUP



RADIATED RF MEASUREMENT SETUP

RADIATED FRONT PHOTO – FOR ABOVE 1GHZ TEST



RADIATED BACK PHOTO – FOR ABOVE 1GHZ TEST



RADIATED SIDE PHOTO – FOR ABOVE 1GHZ TEST



RADIATED PHOTO – FOR BELOW 1GHZ TEST



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

LINE CONDUCTED FRONT PHOTO



LINE CONDUCTED BACK PHOTO

**END OF REPORT**