FCC CFR47 PART 15 SUBPART C
CLASS II PERMISSIVE CHANGE

TEST REPORT

FOR

WIRELESS BRIDGE/ROUTER

MODEL NUMBER: VIVATO 2.4 GHZ WI-FI BRIDGE/ROUTER

BRAND NAME: VIVATO WI-FI BRIDGE/ROUTER

FCC ID: QLNVP824BWFBR

REPORT NUMBER: 04U2645-1

ISSUE DATE: JULY 22, 2004

Prepared for
VIVATO, INC.
12610 E. MIRABEAU PKWY, SUITE 900
SPOKANE, WA 99216
USA

Prepared by
COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD,
MORGAN HILL, CA 95037, USA
TEL: (408) 463-0885
FAX: (408) 463-0888

TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION

COMPANY NAME: VIVATO, INC.
12610 E. MIRABEAU PKWY, SUITE 900
SPOKANE, WA 99216, USA

EUT DESCRIPTION: WIRELESS BRIDGE/ROUTER

MODEL: Vivato 2.4 GHz Wi-Fi Bridge/Router

DATE TESTED: APRIL 28 TO MAY 11, 2004

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.

Approved & Released For CCS By:

NEELESH RAJ
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

VIEN TRAN
EMC TECHNICIAN
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The EUT is 802.11b Access Point/Bridge containing two identical transceivers that operate in 2400 to 2483.5 MHz band. The maximum peak output power is 24.47 dBm.

3. CLASS II PERMISSIVE CHANGE DESCRIPTION

The EUT can be operated in the following 6 configurations with the following Antenna's. The following Panel and Omni Antenna's are used for point to multipoint operation, and all Yagi Antenna's are used for point to point operation.

CONFIG#1

ANTENNA	GAIN (dBi)	ANTENNA	GAIN (dBi)
OMNI	11	YAGI	10

CONFIG#2

ANTENNA	GAIN (dBi)	*ANTENNA	GAIN (dBi)
OMNI	11	YAGI	10
		*ANTENNA	GAIN (dBi)
		YAGI	10

*Power splitter (3dB) is used for dual operation.

CONFIG#3

ANTENNA	GAIN (dBi)	ANTENNA	GAIN (dBi)
PANEL	8	OMNI	8.5

CONFIG#4

ANTENNA	GAIN (dBi)	ANTENNA	GAIN (dBi)
OMNI	8.5	OMNI	11

CONFIG#5

ANTENNA	GAIN (dBi)	ANTENNA	GAIN (dBi)
OMNI	8.5	YAGI	10

CONFIG#6

ANTENNA	GAIN (dBi)	ANTENNA	GAIN (dBi)
PANEL	8	PANEL	8

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4/2001, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

5. 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.

No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

6. CALIBRATION AND UNCERTAINTY

6.1. 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.

6.2. 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%.

6.3. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2/15/1906	2/4/2005
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	10/13/04
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	10/13/04
Site A Line Stabilizer / Conditioner	Tripplite	LC-1800a	A0051681	CNR
EMI Test Receiver	R & S	ESHS 20	827129/006	7/17/04
Peak Power Meter	Agilent	E4416A	GB41291160	11/7/04
Peak / Average Power Sensor	Agilent	E9327A	US40440755	11/7/04
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	11/21/04
RF Filter Section	HP	85420E	3705A00256	11/21/04
30MHz---- 2Ghz	Sunol Sciences	JB1 Antenna	A121003	12/22/04
Spectrum Analyzer	HP	E4446A	US42510266	7/23/04
Amplifier 1-26GHz	MITEQ	NSP2600-SP	924341	4/25/05

7. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
LAPTOP	FUJITSU	LIFEBOOK C353	CP009840	N/A
AC ADAPTER	N/A	AM-121000	N/A	N/A
AC ADAPTER	SUMSUNG	PSCV 480103A	N/A	N/A
OMNI ANTENNA (11dBi)	MAXRAD	MFB24011PTRPC	N/A	N/A
YAGI ANTENNA (10dBi)	MAXRAD	MYP24010PTRPC	N/A	N/A
PANEL ANTENNA (8dBi)	MAXRAD	MP24008XFPTRPC	N/A	N/A
OMNI ANTENNA (8.5dBi)	SUPERPASS	SPSHG60	N/A	N/A

I/O CABLES

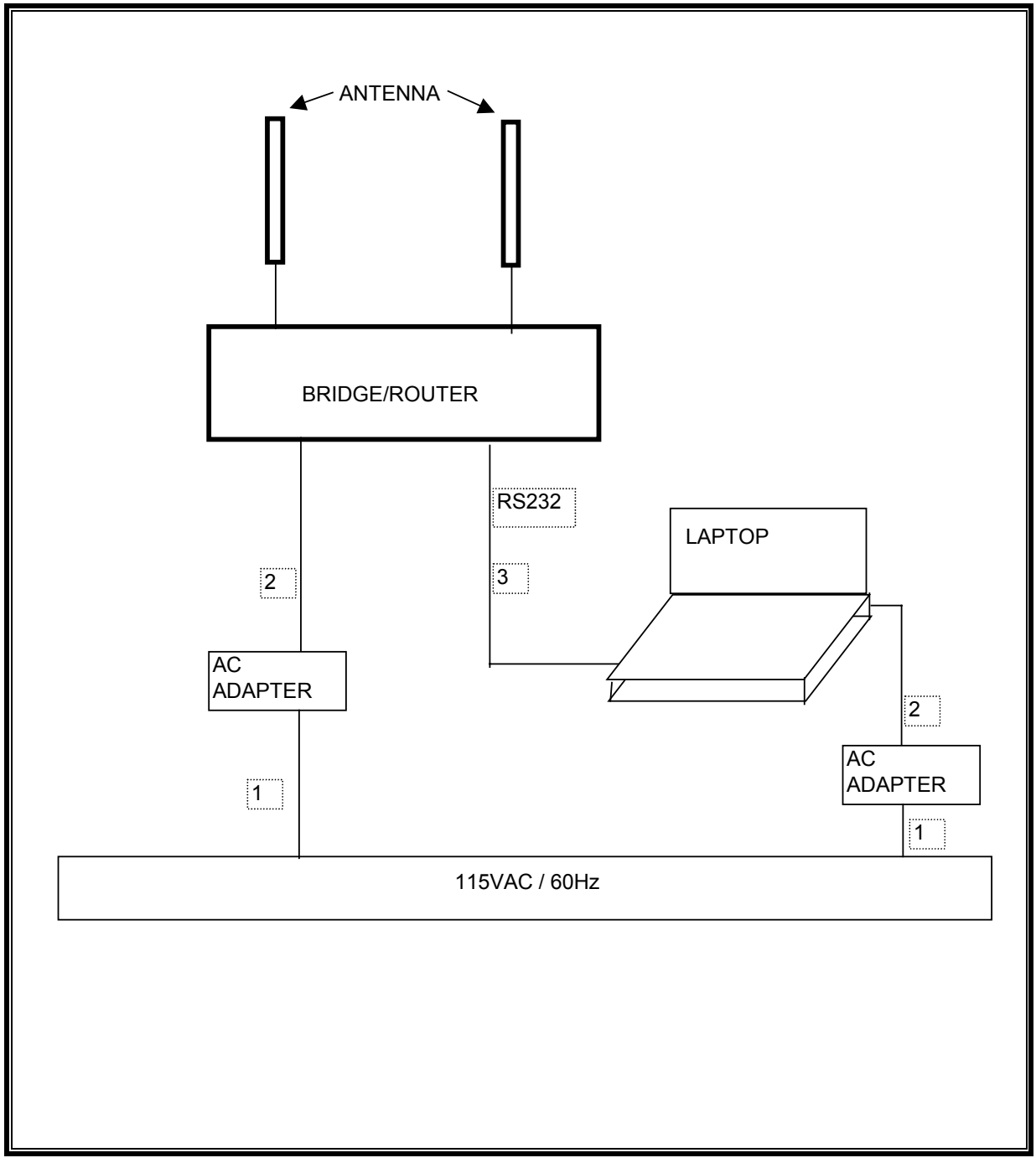
I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	2	US115	UNSHIELDED	2m	N/A
2	DC	1	DC	UNSHIELDED	2m	N/A
3	RS232	1	DB9	SHIELDED	2m	N/A

TEST SETUP

The EUT was remotely operated by the laptop. EUT was set in continuous transmit mode. All Antennas' were tested in their worst-case configurations (angles & polarization).

The transmitter was set to its rated peak output power of 24.47 dBm during all tests.

SETUP DIAGRAM FOR TESTS



SETUP FOR DIGITAL DEVICE TESTS

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
LAPTOP	FUJITSU	LIFEBOOK C353	CP009840	N/A
AC ADAPTER	N/A	AM-121000	N/A	N/A
AC ADAPTER	SUMSUNG	PSCV 480103A	N/A	N/A

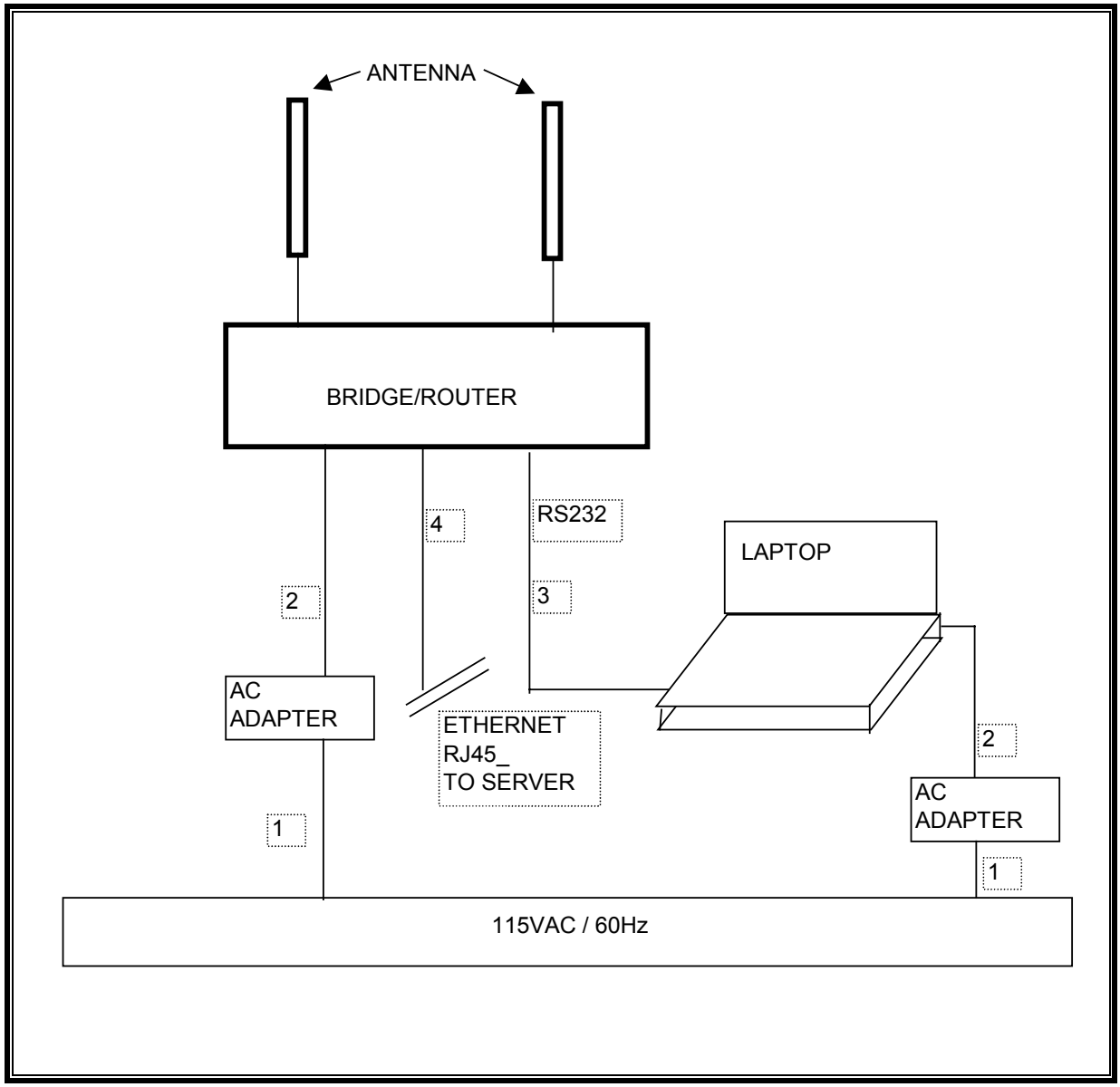
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	2	US115	UNSHIELDED	2m	N/A
2	DC	1	DC	UNSHIELDED	2m	N/A
3	RS232	1	DB9	SHIELDED	2m	N/A
4	RJ45	1	ETHERNET	UNSHIELDED	10m	N/A

TEST SETUP

The EUT was remotely operated by the laptop. EUT was set in continuous transmit mode. Config#1 was found be worst case.

SETUP DIAGRAM FOR DIGITAL DEVICE TESTS



8. APPLICABLE LIMITS AND TEST RESULTS

8.1. 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	1842/f	4.89/f	*(900/f^2)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f^2)	30

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

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

f = frequency in MHz
* = Plane-wave equivalent power density

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

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

CALCULATIONS

Given

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

and

$S = E \wedge 2 / 3770$

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 (mW) = P (W) / 1000 and
d (cm) =100 * d (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/cm^2

Substituting the logarithmic form of power and gain using:

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

yields

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

where

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

For multiple antennas, a worst-case upper bound calculation can be made by assuming that all signals are in phase. Since Power Density is proportional to Power times Gain, the total power density is = $(P_1 * G_1) + (P_2 * G_2) + ... + (P_n * G_n)$ and the MPE distance is given by

$$d = 0.282 * ((10 \wedge ((P_1 + G_1) / 20) + 10 \wedge ((P_2 + G_2) / 20) + ... + 10 \wedge ((P_n + G_n) / 20)) / \sqrt{S}$$

where

d = MPE distance in cm
P_1 = Power fed to antenna 1 in dBm
G_1 = Antenna 1 Gain in dBi
P_2 = Power fed to antenna 2 in dBm
G_2 = Antenna n Gain in dBi
P_n = Power fed to antenna 2 in dBm
G_n = Antenna n Gain in dBi
S = Power Density Limit in mW/cm^2

For all two antenna configurations, $P_1 = P_2 = P$, thus:

$$d = 0.282 * (10 ^ ((P + G_1) / 20) + 10 ^ ((P + G_2) / 20)) / \sqrt{S}$$

LIMITS

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

RESULTS

No non-compliance noted:

Antenna Configuration Number	Antenna Types / Gains	Power Density Limit (mW/cm^2)	Output Power (dBm)	Antenna Gain 1 (dBi)	Antenna Gain 2 (dBi)	MPE Distance (cm)
1	11 dBi Omni / 10 dBi Yagi	1.0	24.47	11.00	10.00	31.66
2	11 dBi Omni / 10 dBi Yagi / 10 dBi Yagi	1.0	24.47	11.00		37.86
			21.47		10.00	
			21.47		10.00	
3	8 dBi Panel / 8.5 dBi Omni	1.0	24.47	8.00	8.50	24.40
4	8.5 dBi Omni / 11 dBi Omni	1.0	24.47	8.50	11.00	29.29
5	8.5 dBi Omni / 10 dBi Yagi	1.0	24.47	8.50	10.00	27.47
6	8 dBi Panel / 8 dBi Panel	1.0	24.47	8.00	8.00	23.70

8.2. RADIATED EMISSIONS

8.2.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS LIMITS

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.

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.

RESULTS

No non-compliance noted:

No transmitter spurious emissions were detected above the system noise floor below 1GHz from all 6 configurations.

8.2.2. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHZ

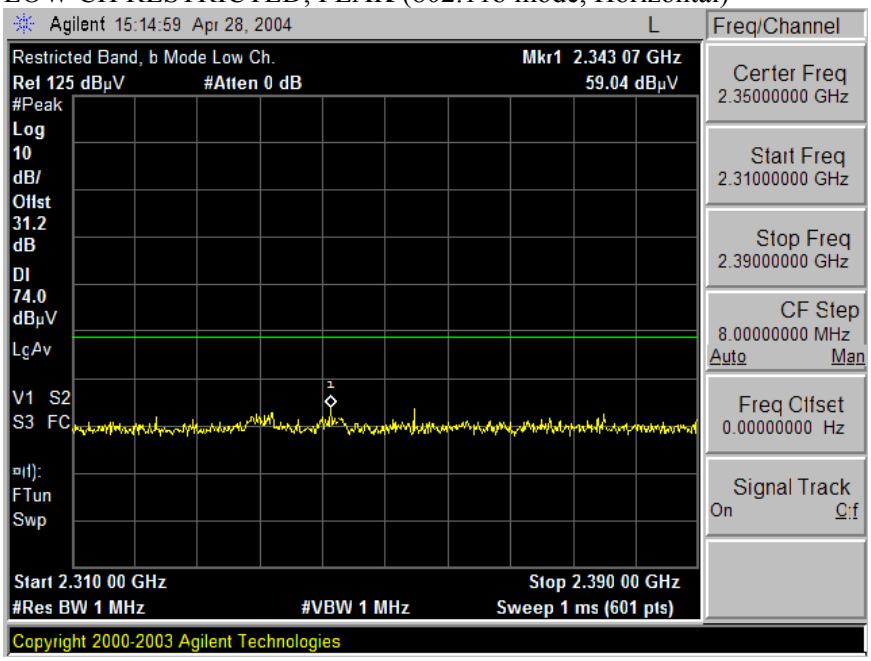
CONFIG #1:

ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
OMNI	MFB24011PTRPC	11	VERTICAL	YAGI	MYP24010PTRPC	10	HORIZONTAL

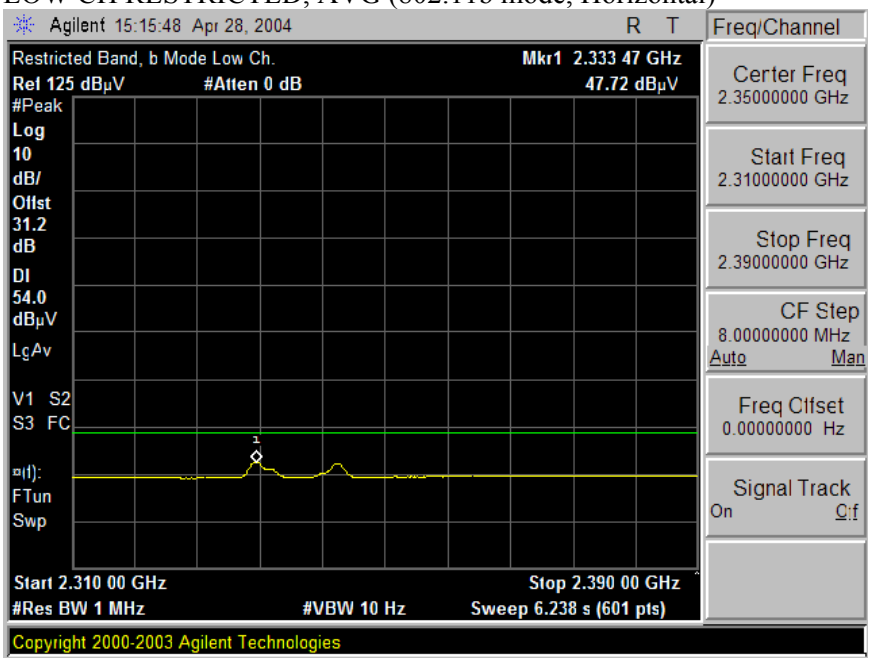
OMNI - MFB24011PTRPC

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

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

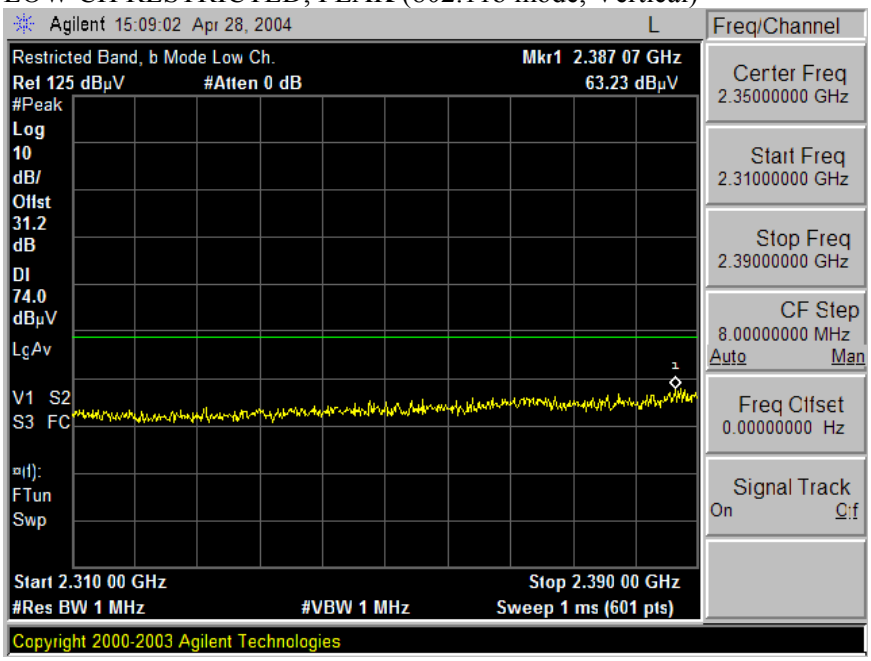


LOW CH RESTRICTED, AVG (802.11b mode, Horizontal)

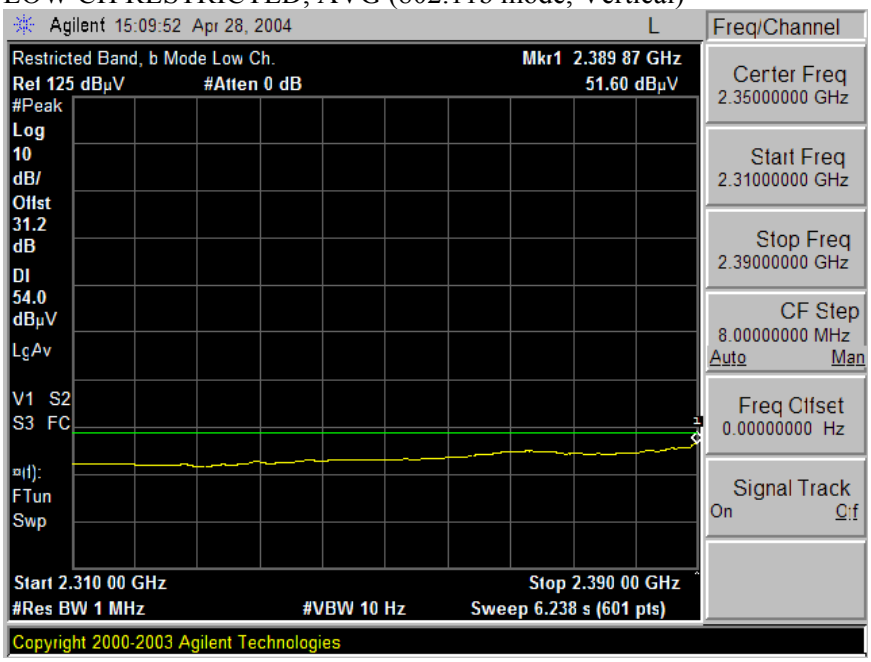


RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

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

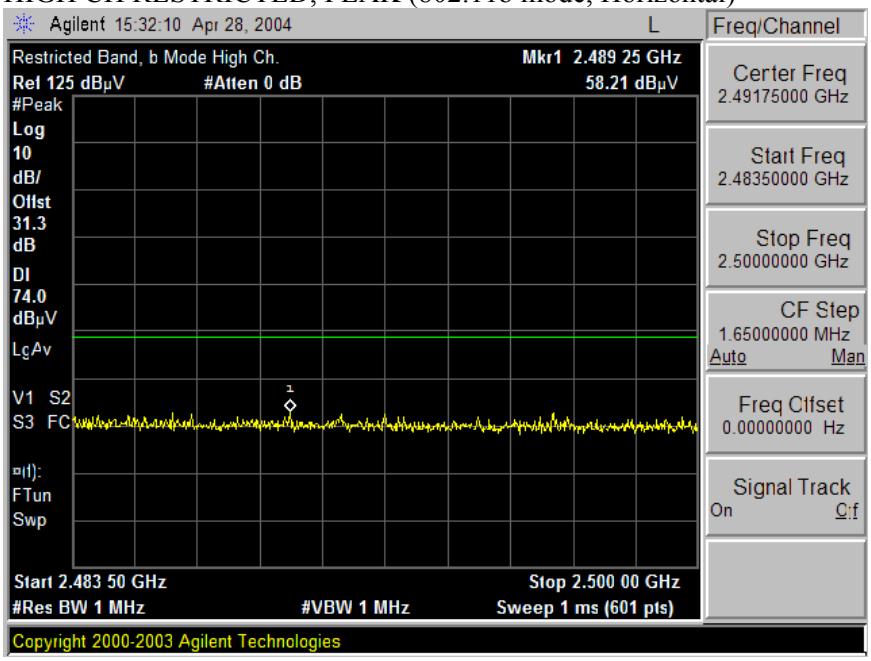


LOW CH RESTRICTED, AVG (802.11b mode, Vertical)

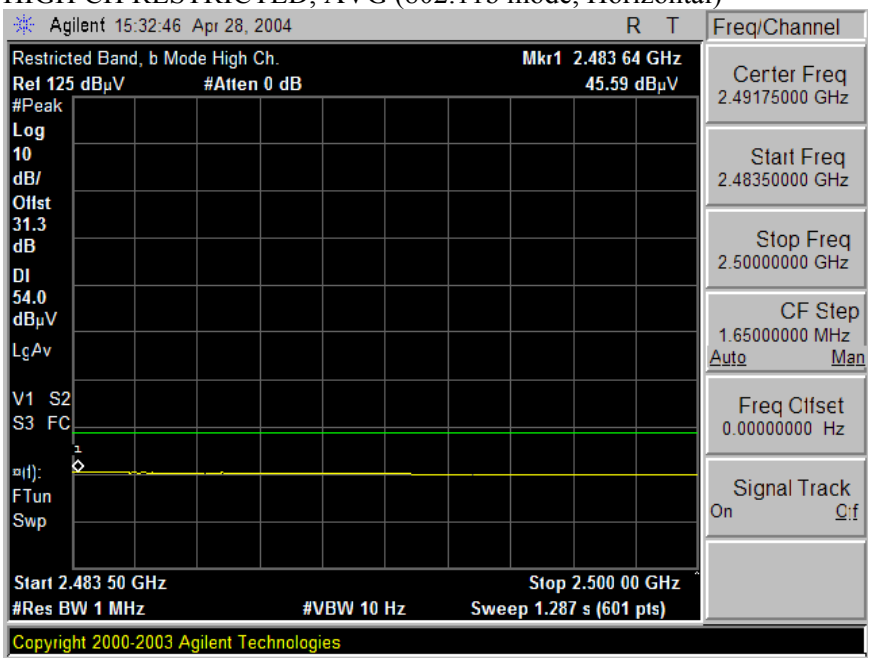


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

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

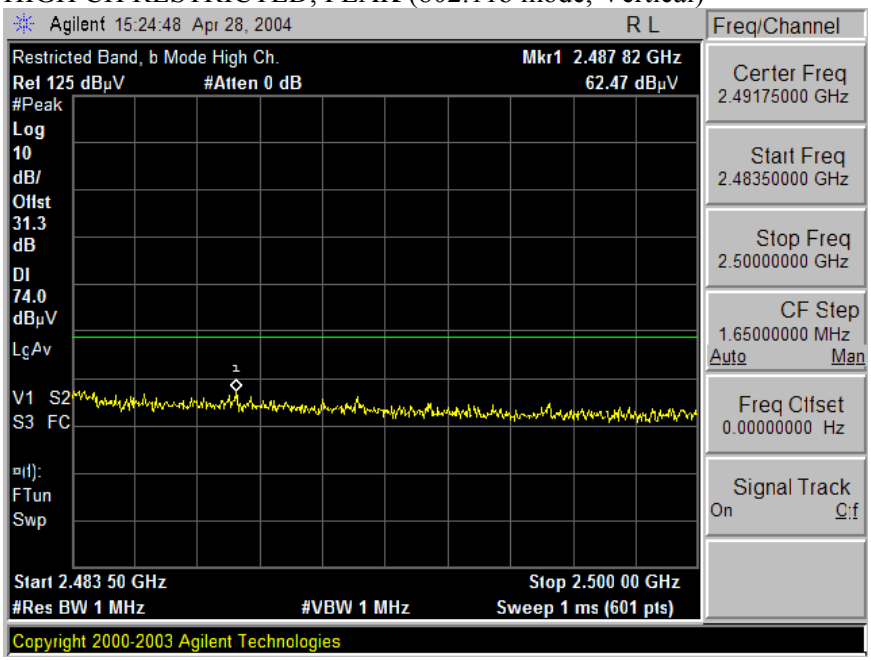


HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)

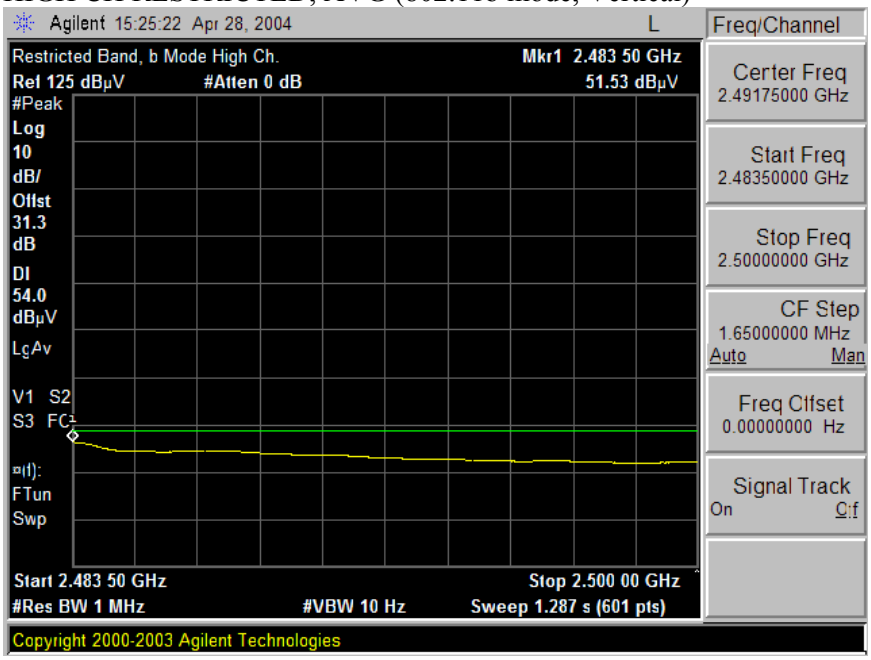


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

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

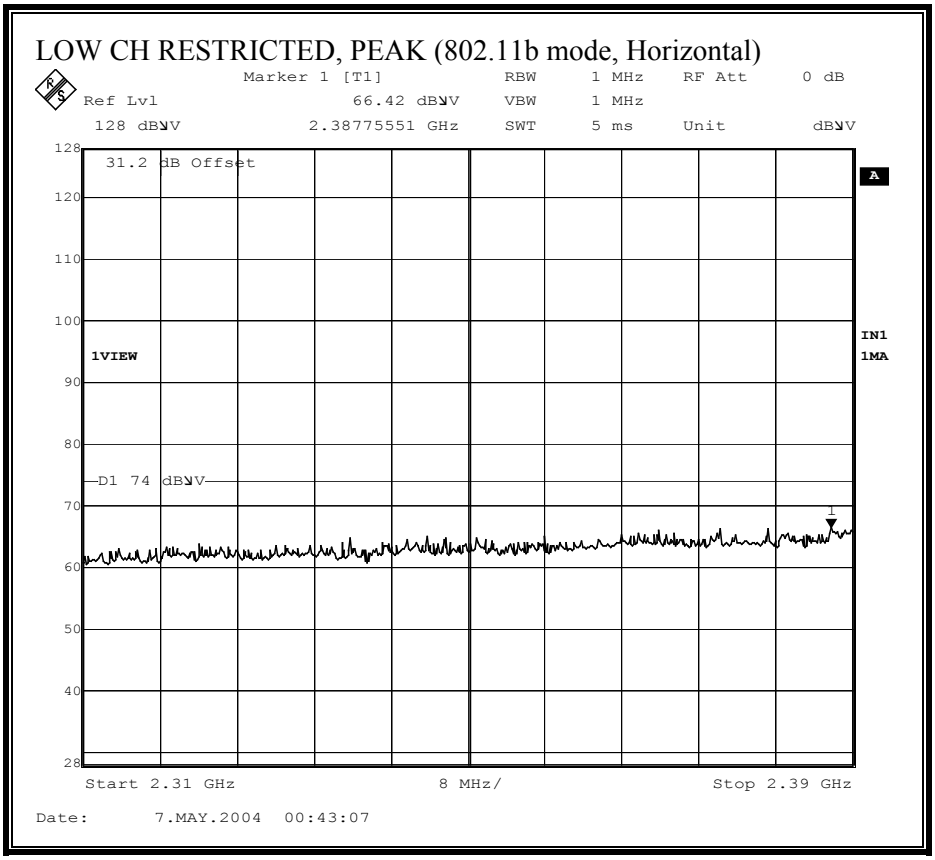


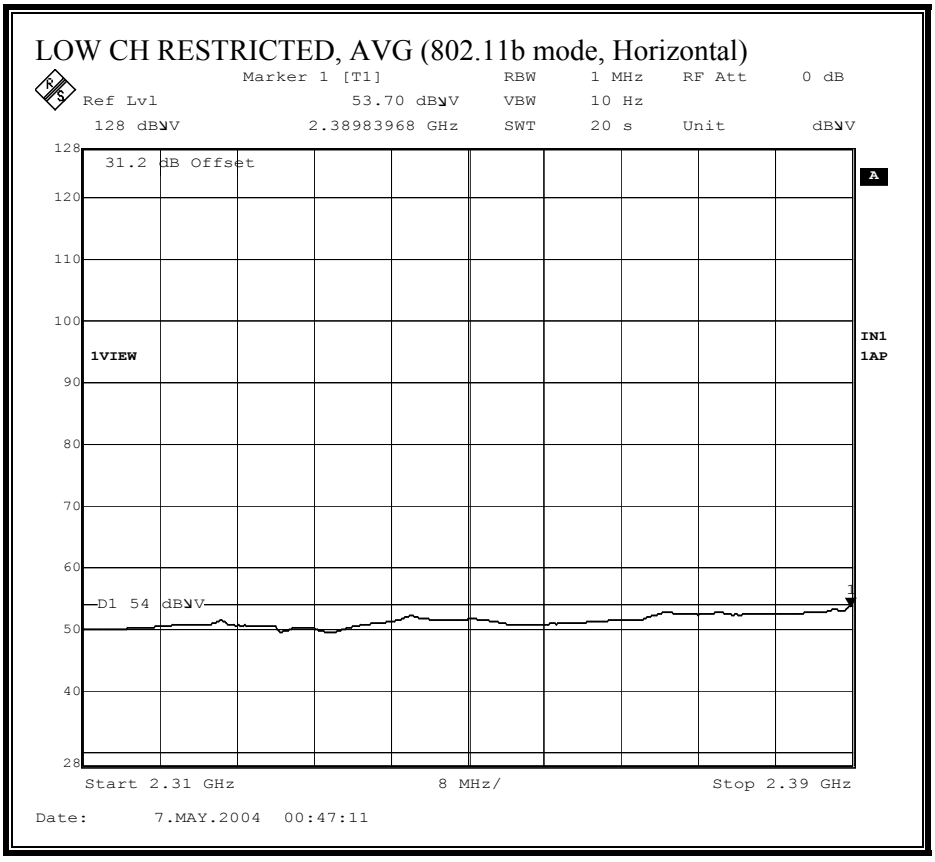
HIGH CH RESTRICTED, AVG (802.11b mode, Vertical)



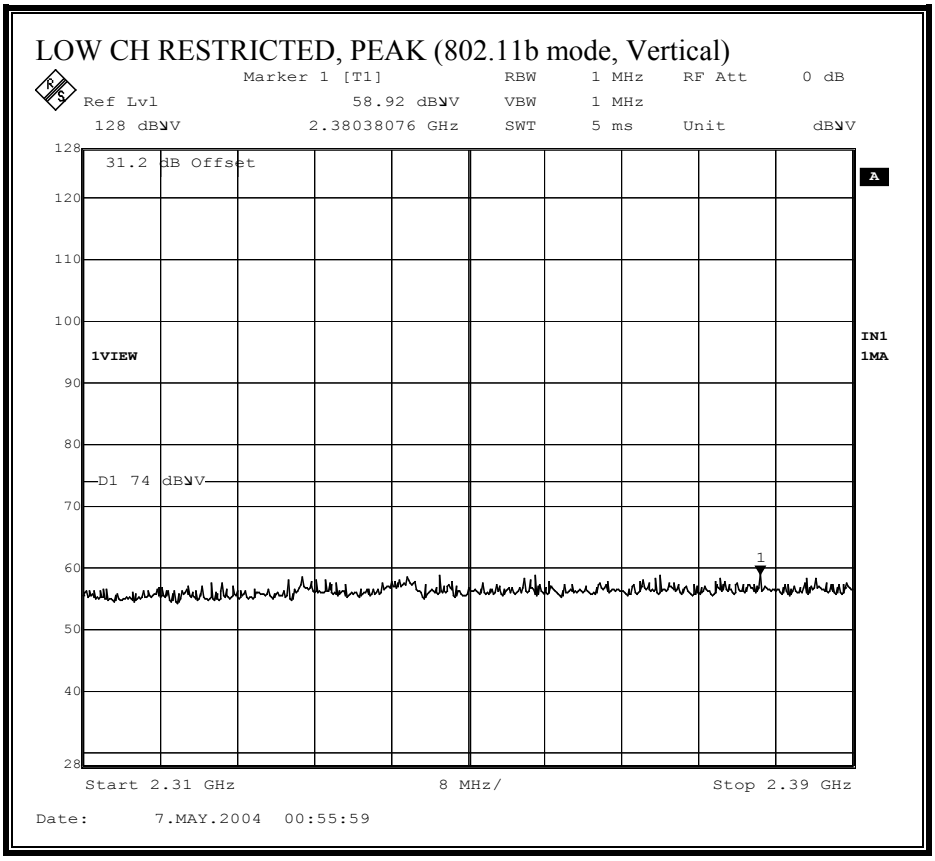
YAGI – MYP24010PTRPC

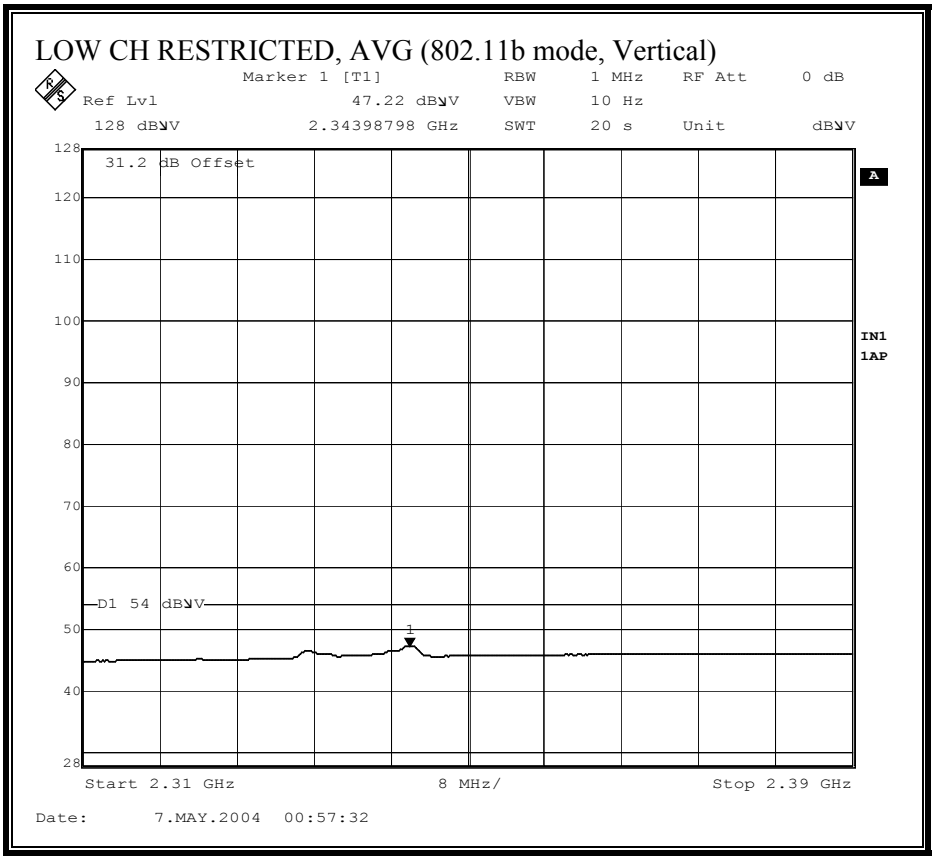
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)



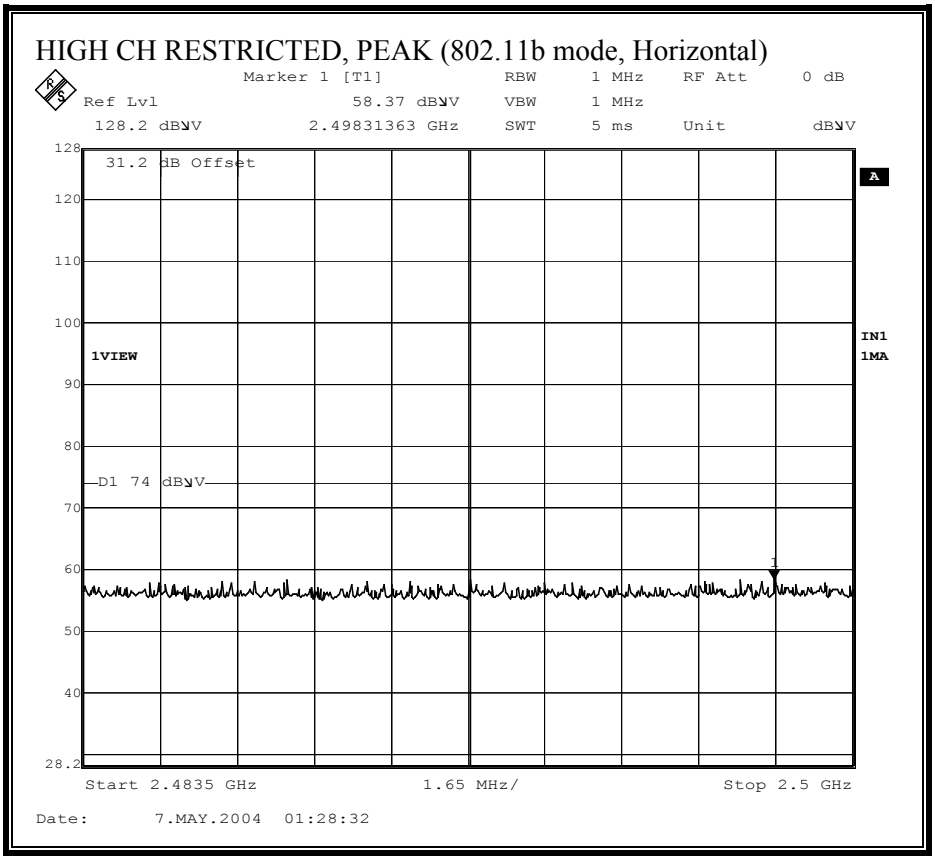


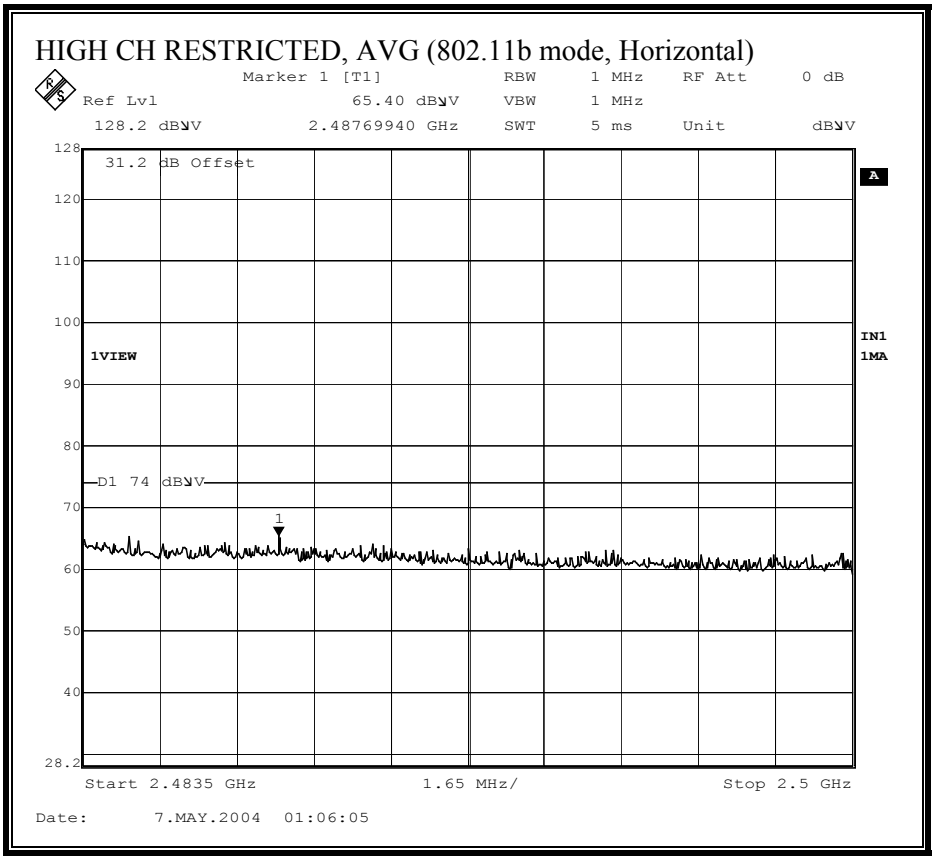
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)



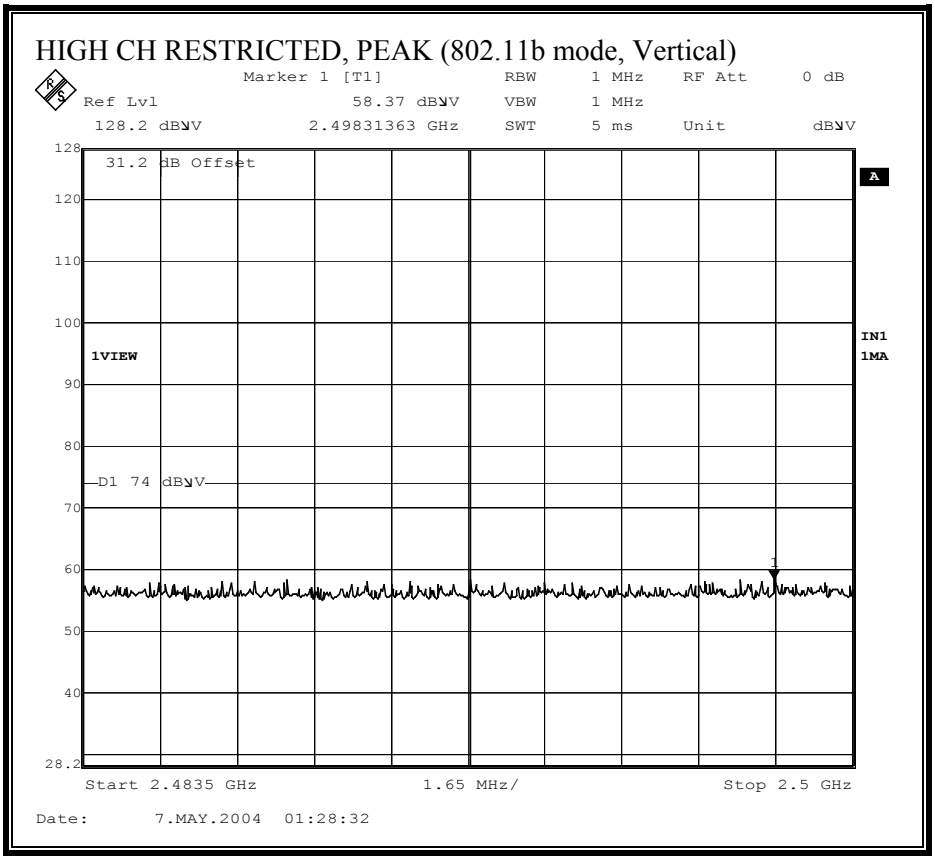


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

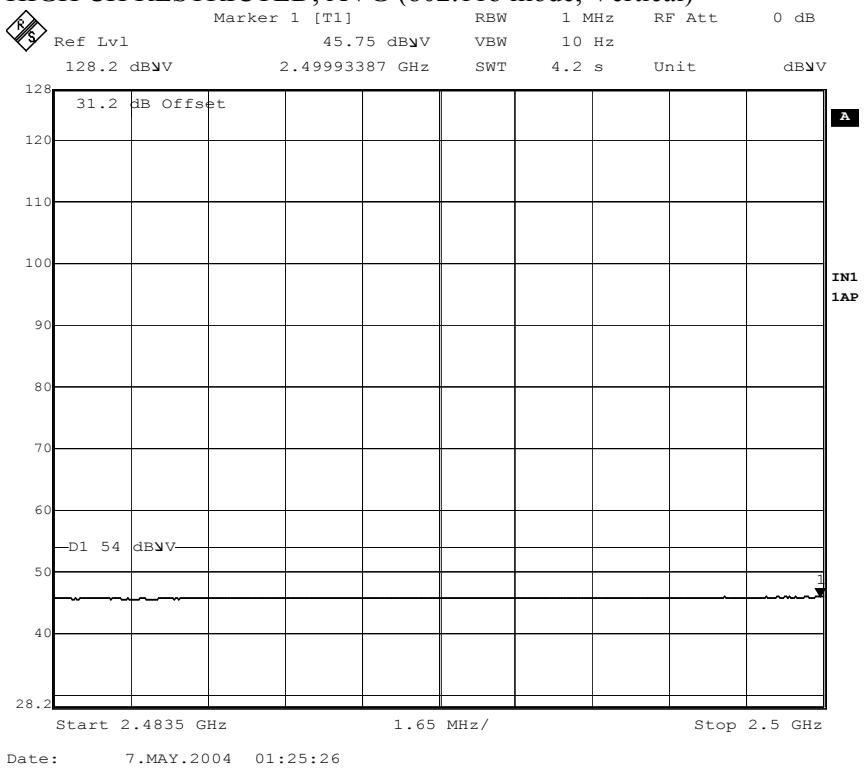




RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



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



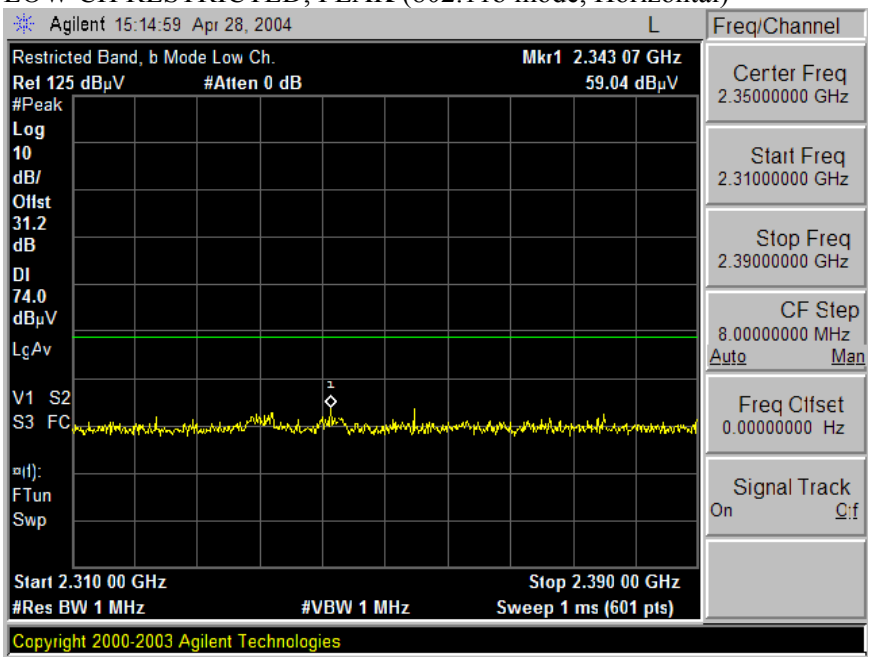
CONFIG #2:

ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
OMNI	MFB24011PTRPC	11	VERTICAL	YAGI	MYP24010PTRPC	10	HORIZONTAL
					MYP24010PTRPC	10	HORIZONTAL

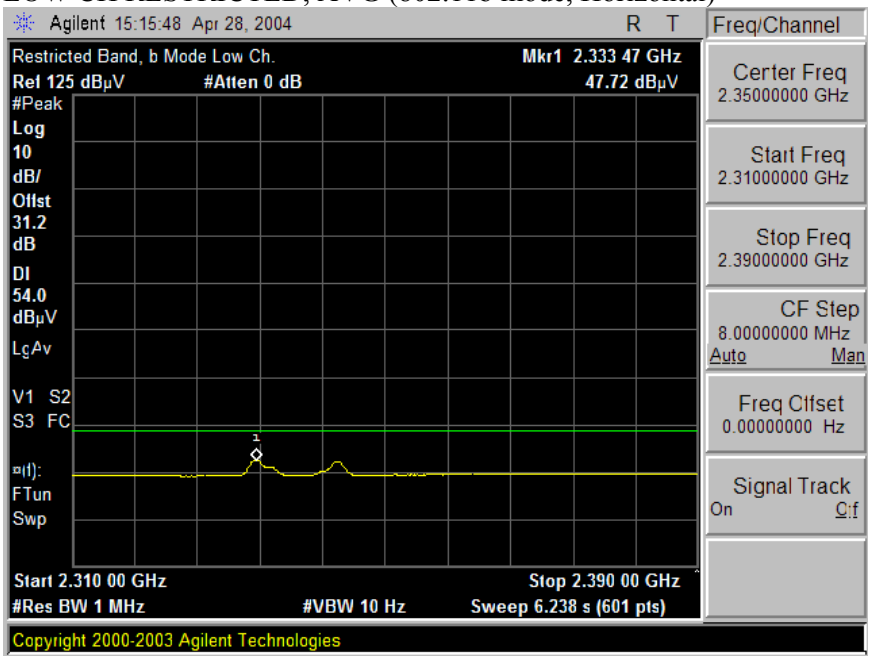
OMNI_MFB24011PTRPC

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

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

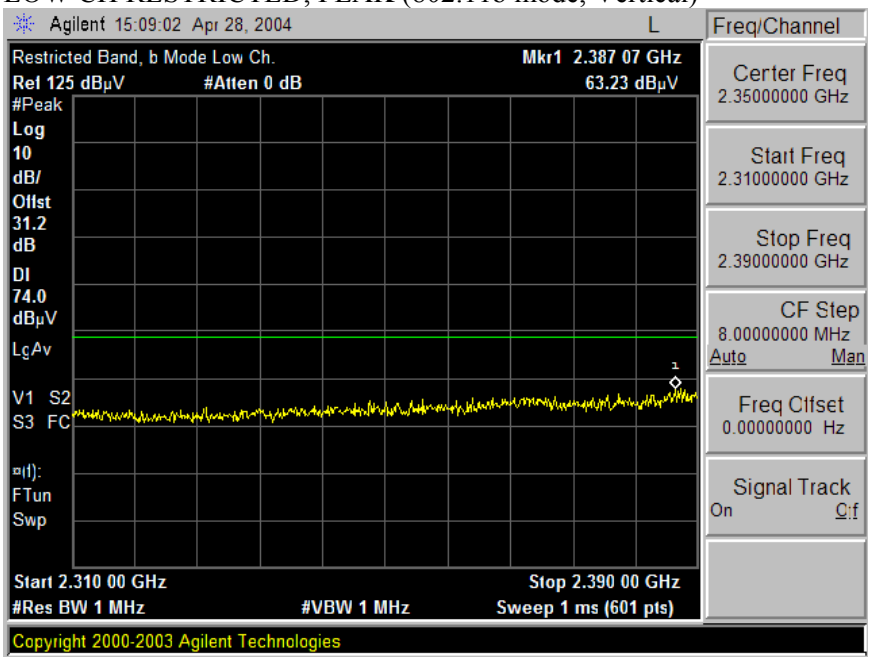


LOW CH RESTRICTED, AVG (802.11b mode, Horizontal)

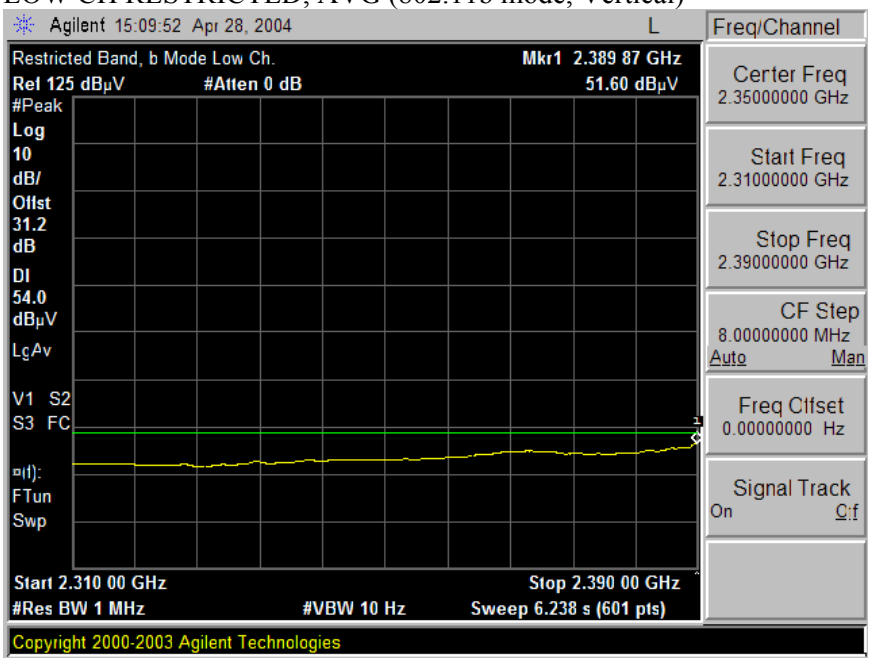


RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

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

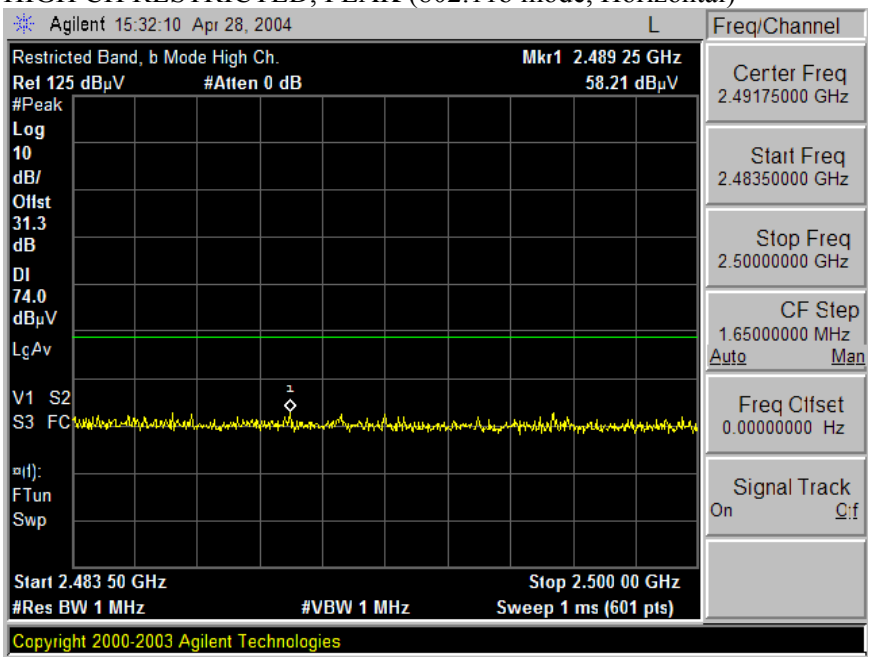


LOW CH RESTRICTED, AVG (802.11b mode, Vertical)

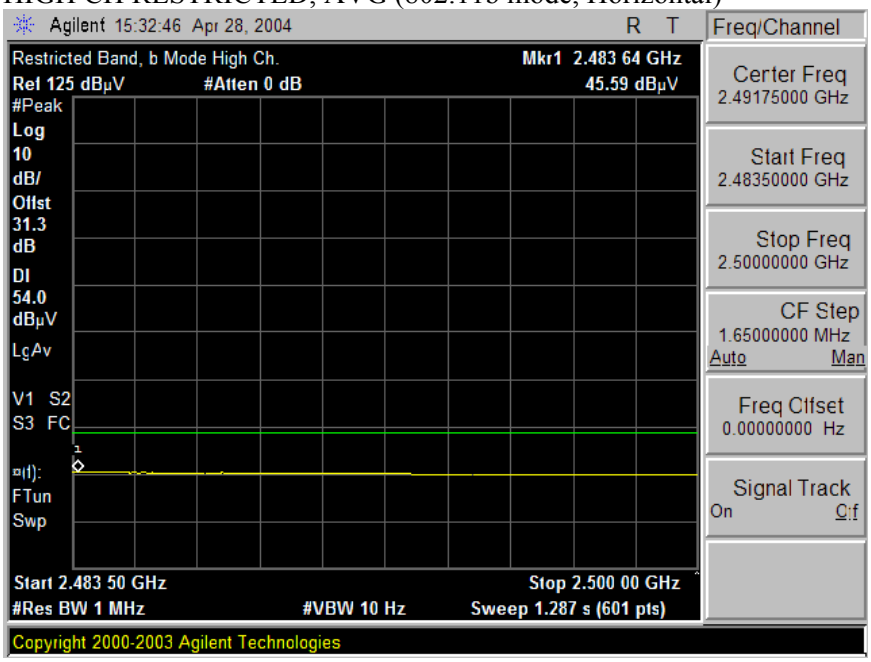


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

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

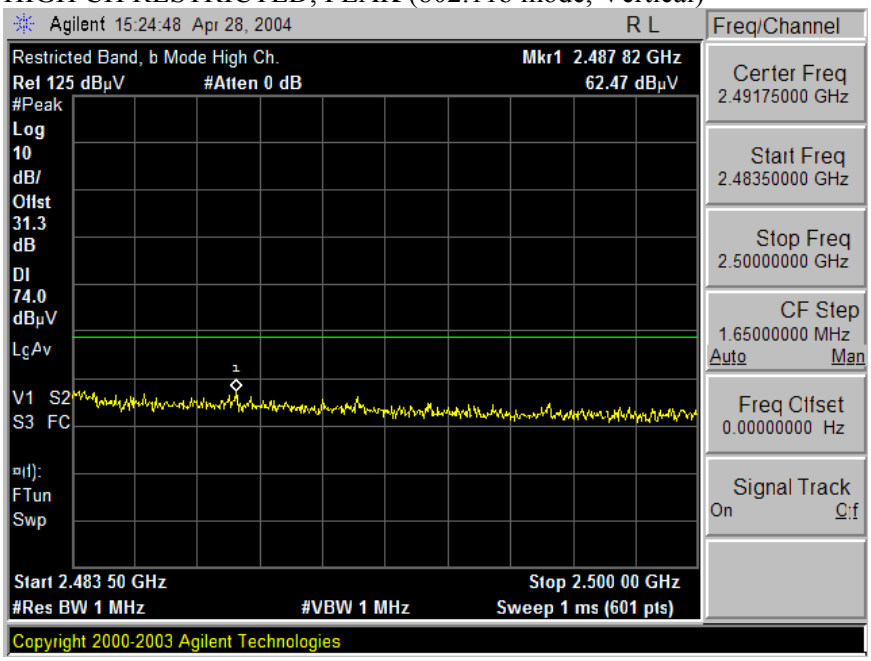


HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)

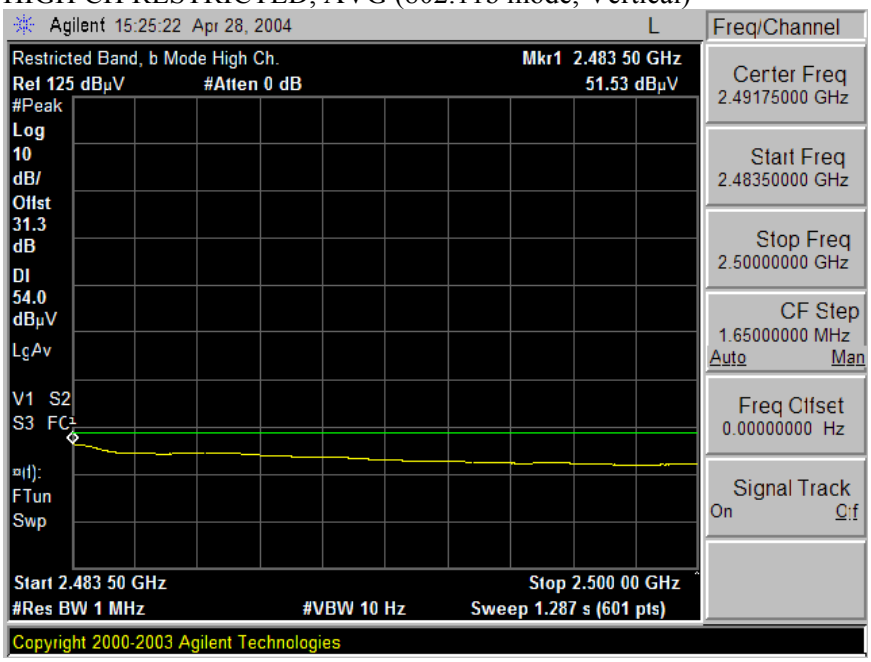


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

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

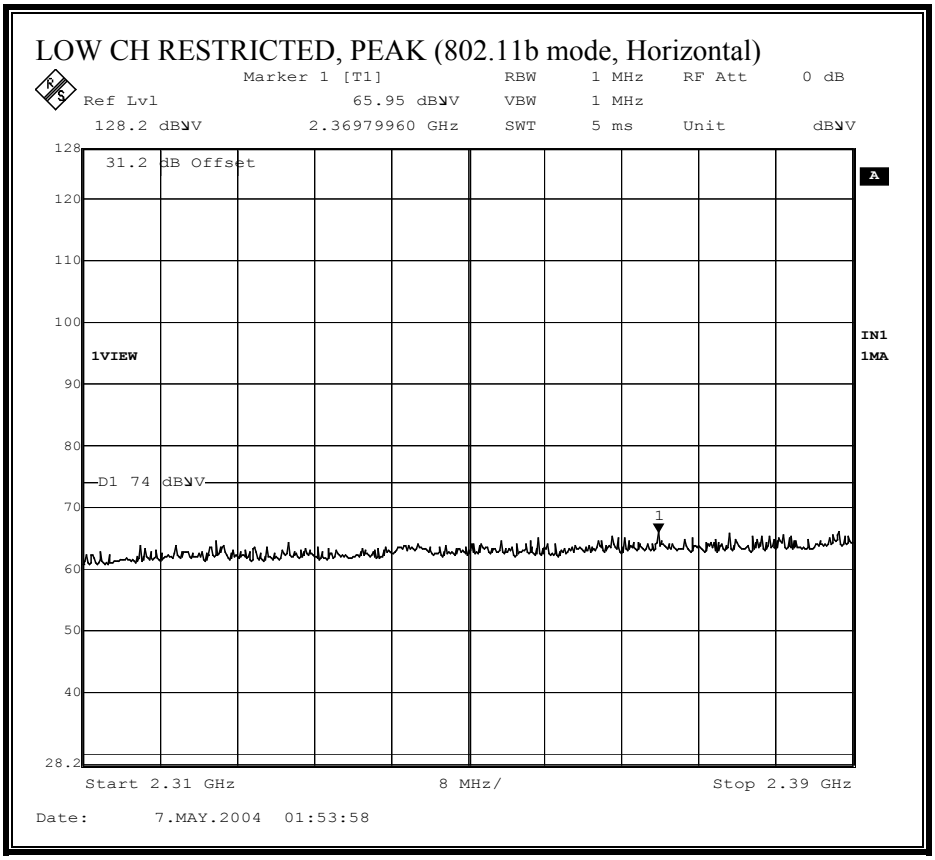


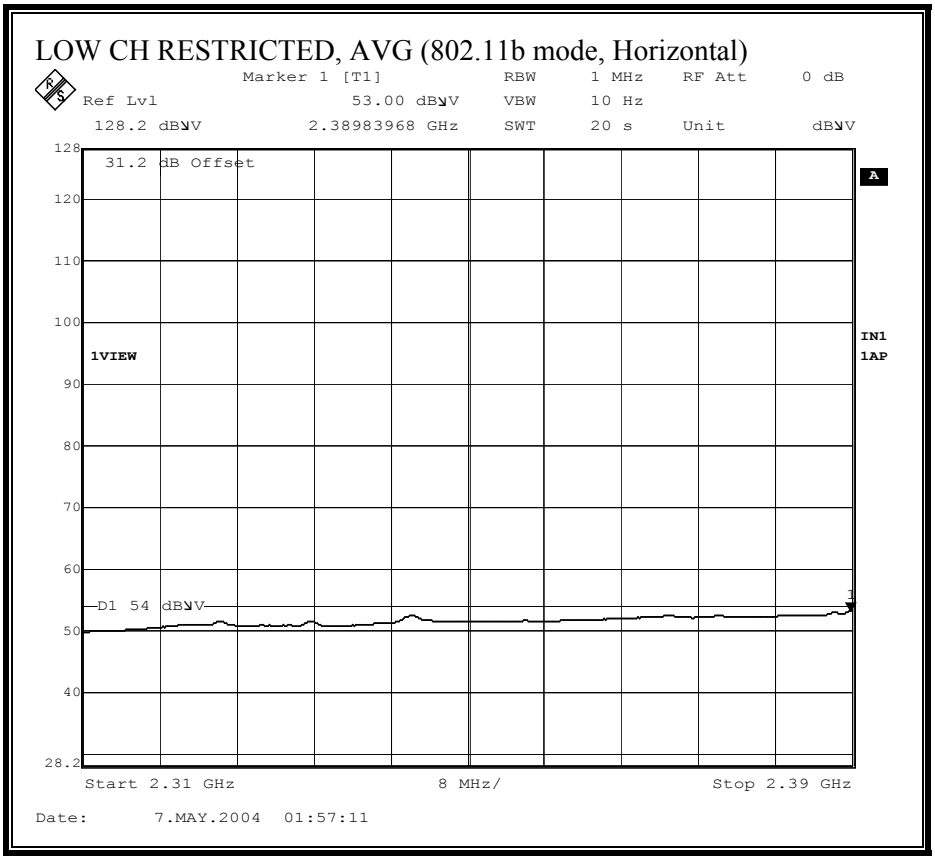
HIGH CH RESTRICTED, AVG (802.11b mode, Vertical)



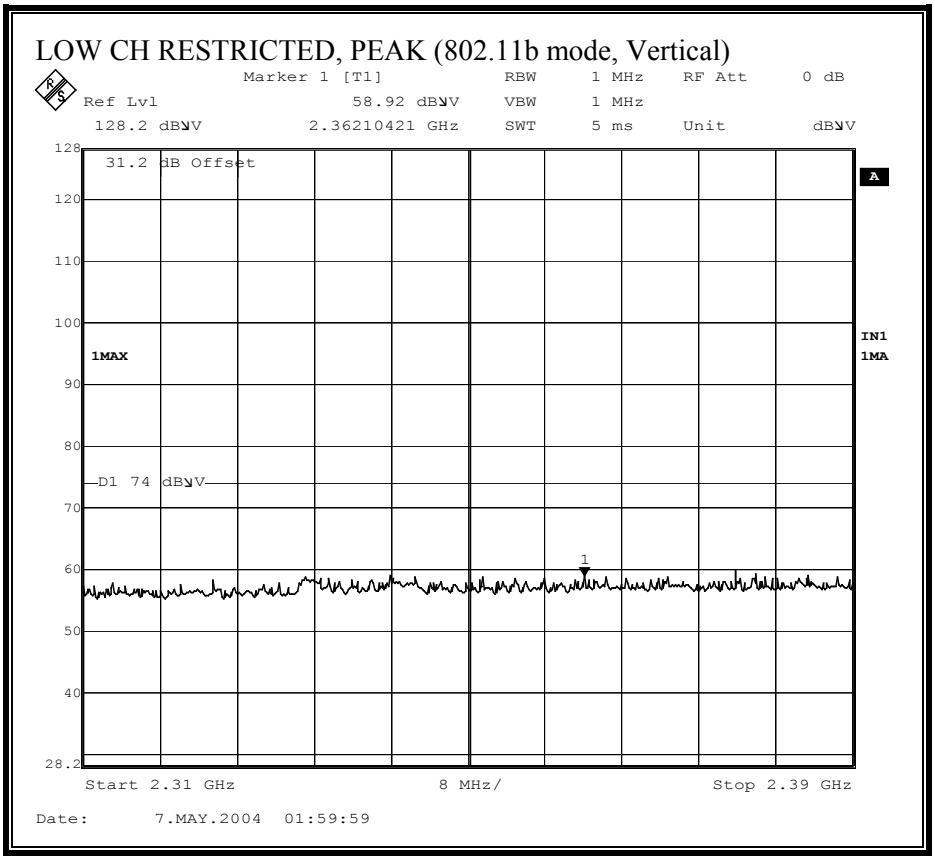
DUAL YAGI – MYP24010PTRPC

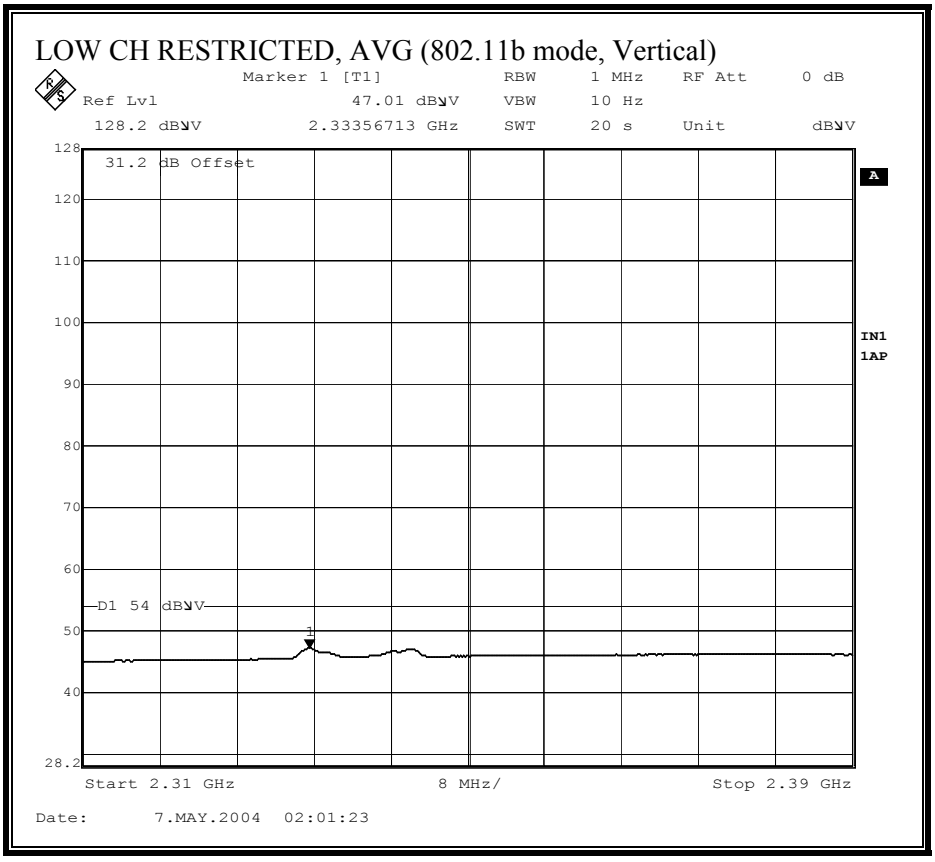
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)



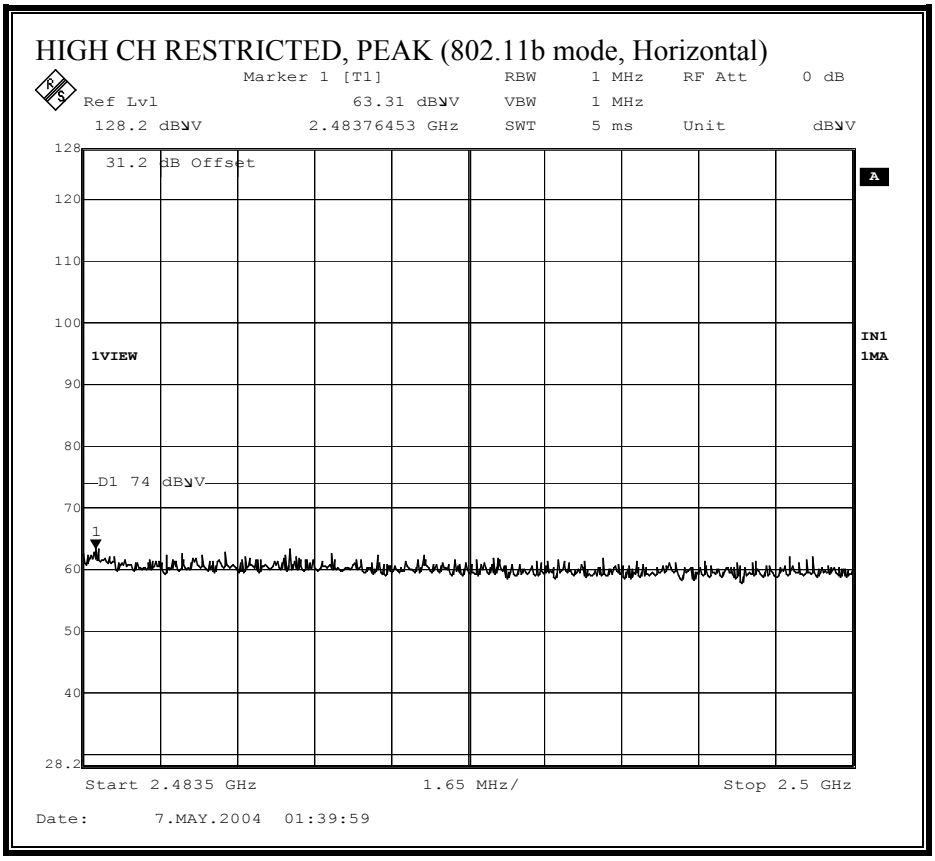


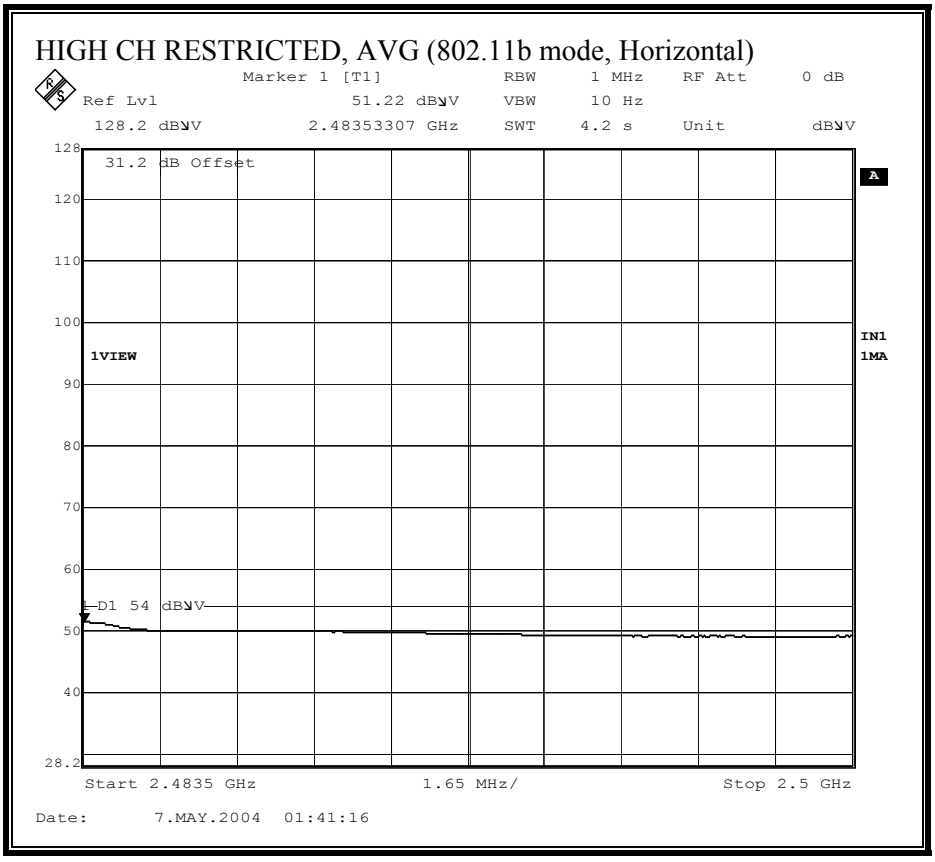
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)



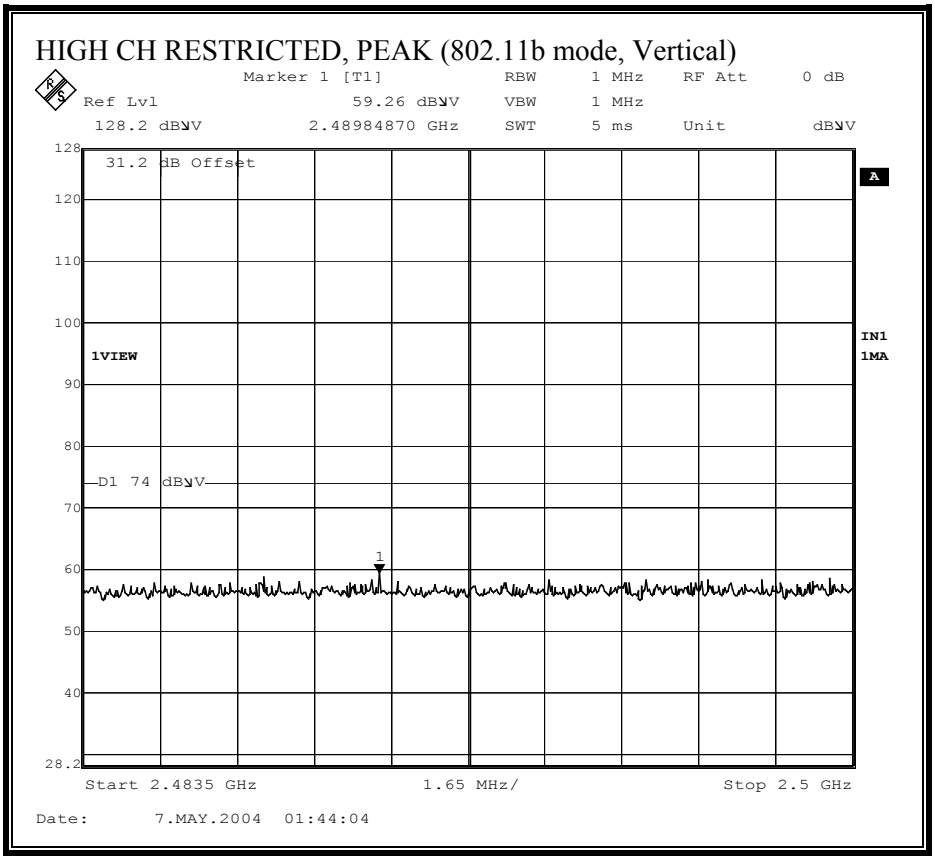


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

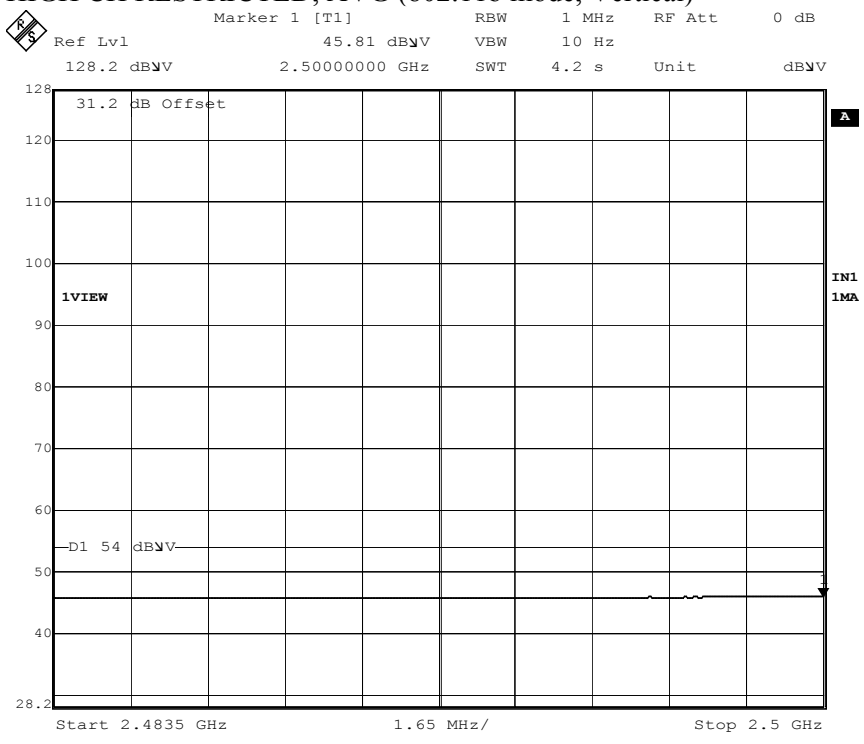




RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



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



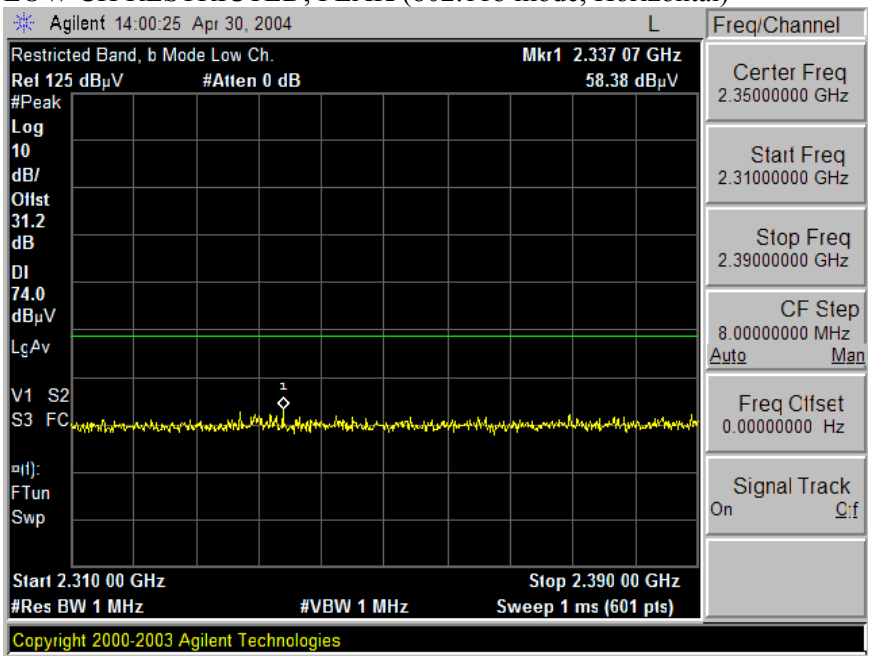
CONFIG #3:

ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
OMNI	SPSHG60	8.5	HORIZONTAL	PANEL	M24008XFPTRPC	8	HORIZONTAL

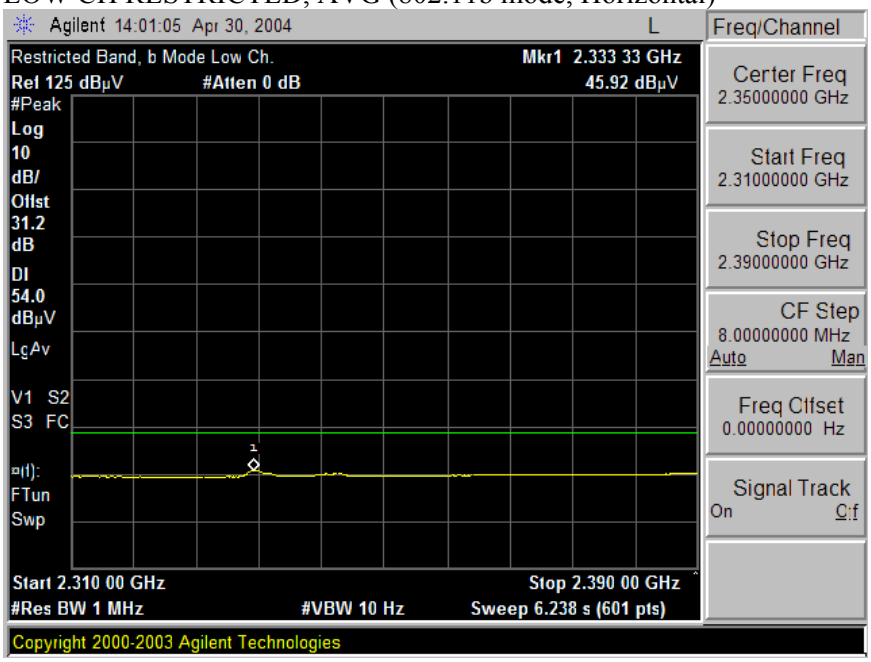
0MNI – SPSHG60

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

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

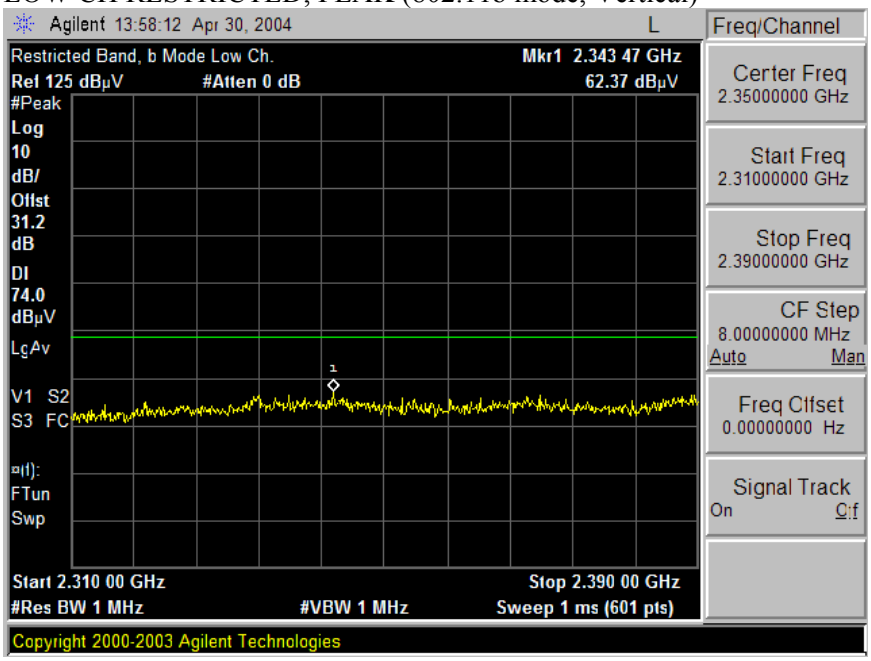


LOW CH RESTRICTED, AVG (802.11b mode, Horizontal)

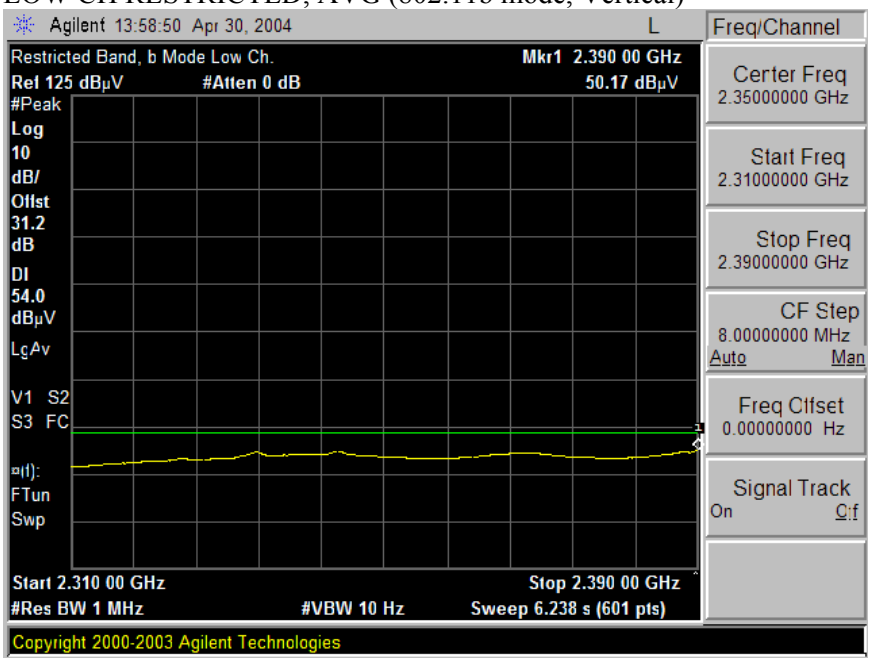


RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

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

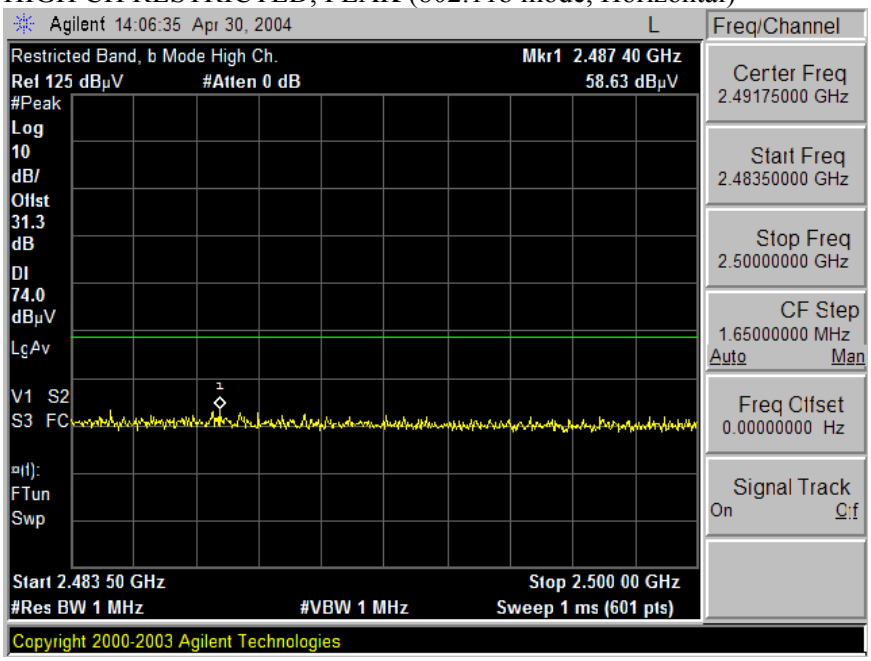


LOW CH RESTRICTED, AVG (802.11b mode, Vertical)

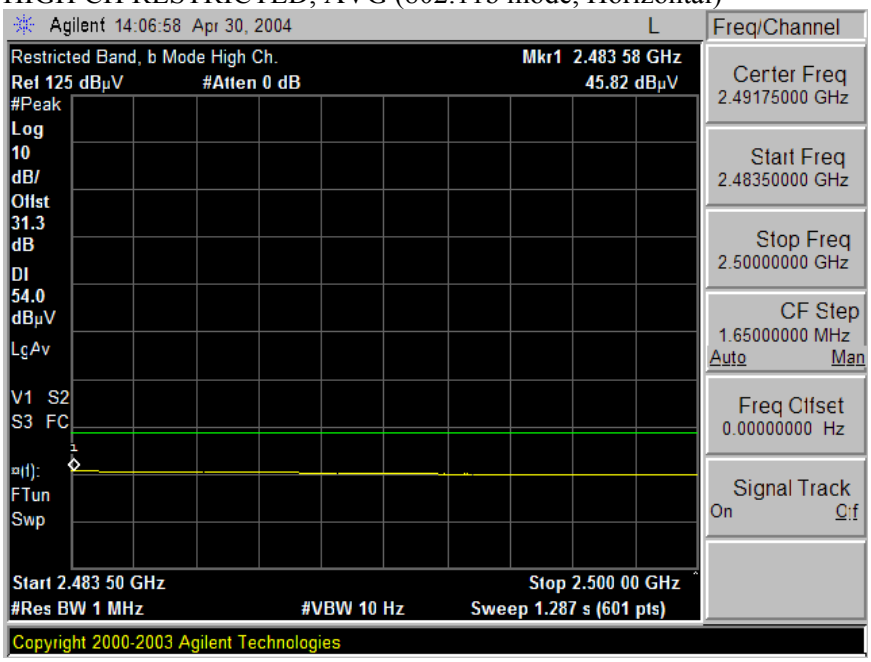


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

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

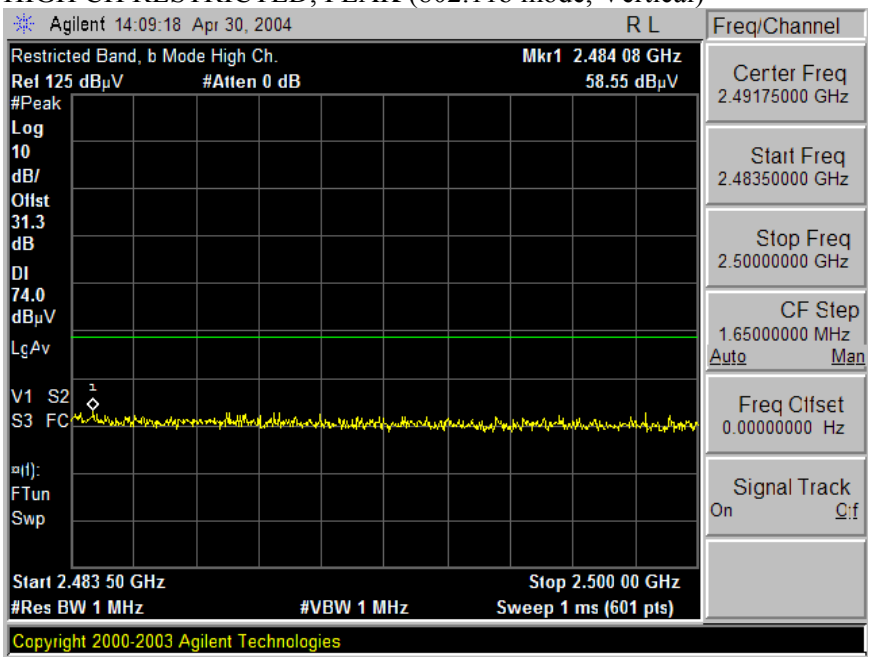


HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)

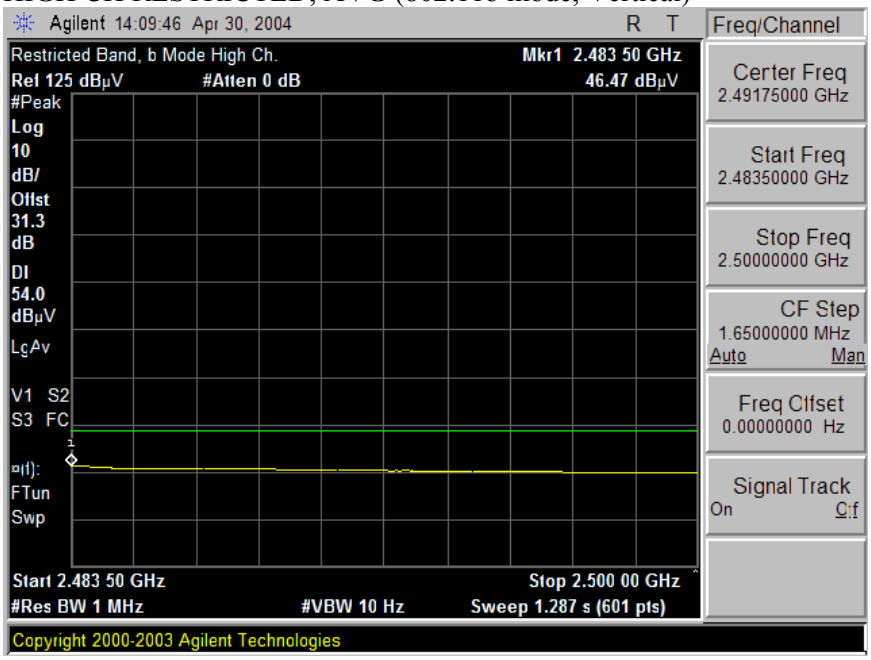


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

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



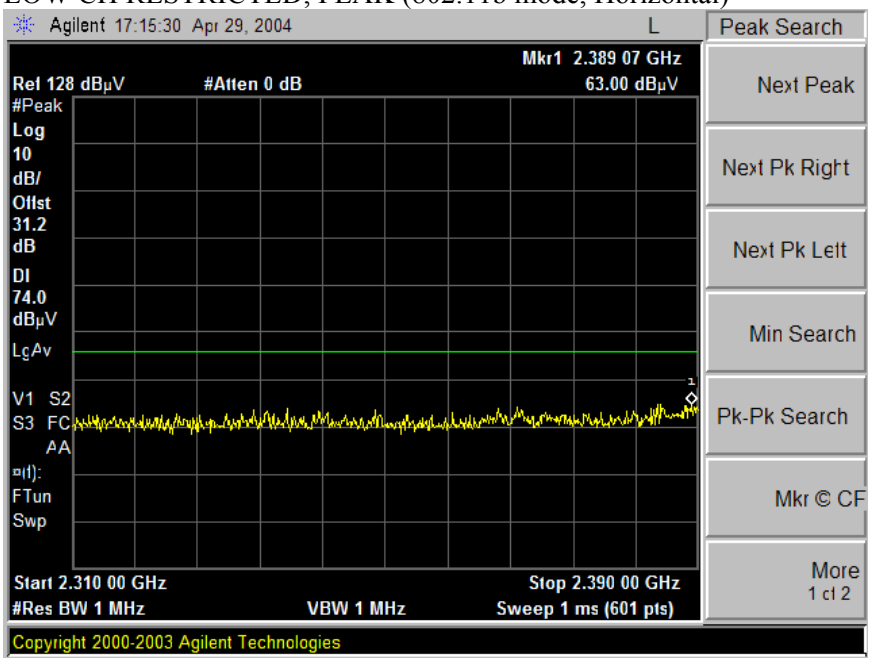
HIGH CH RESTRICTED, AVG (802.11b mode, Vertical)



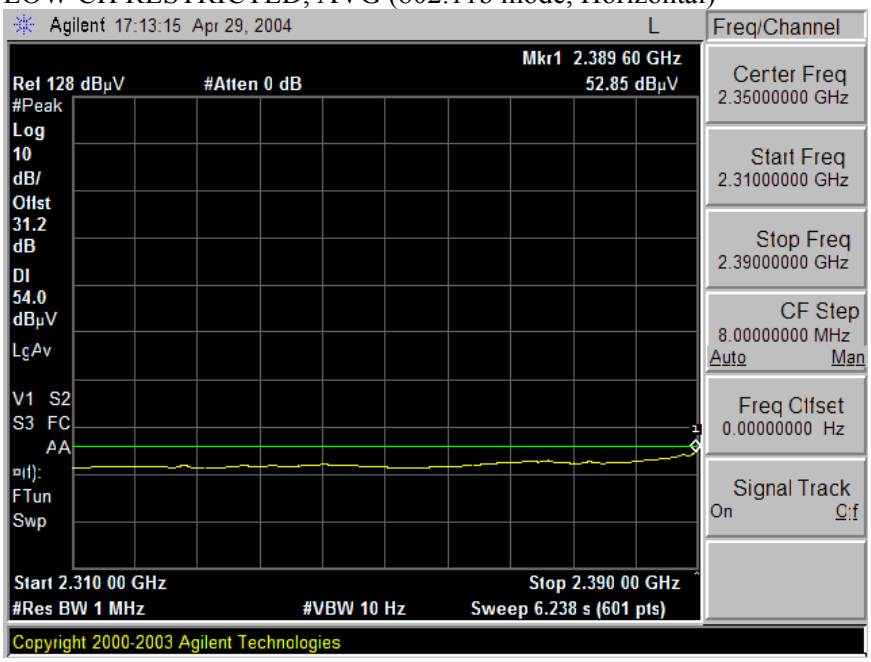
PANEL – M24008XFPTRPC

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

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

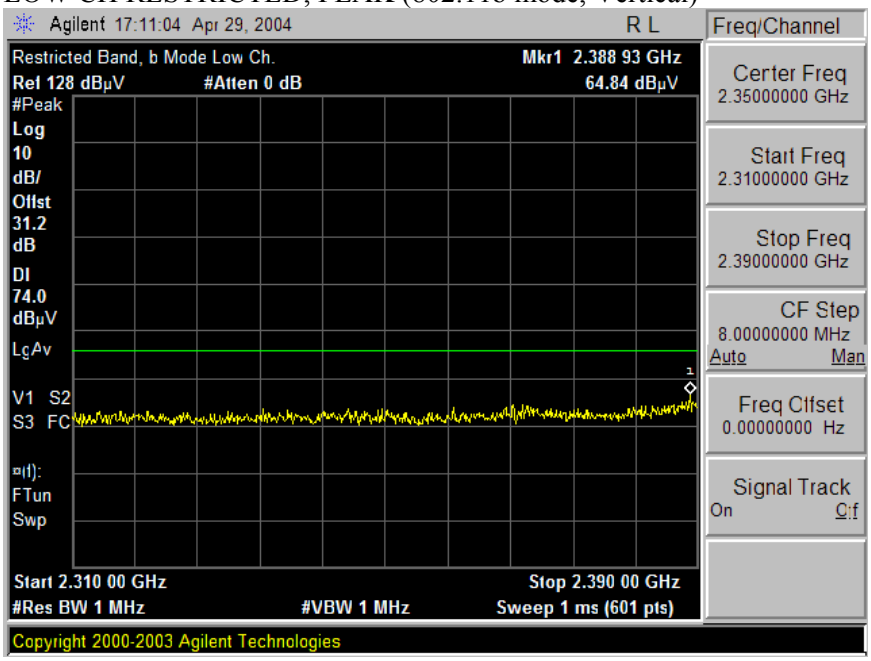


LOW CH RESTRICTED, AVG (802.11b mode, Horizontal)

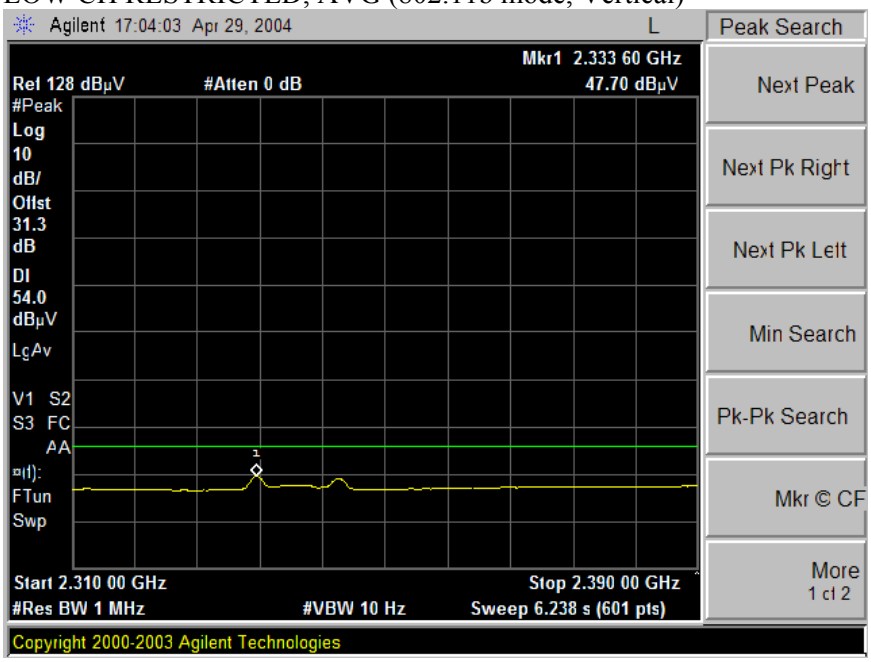


RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

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

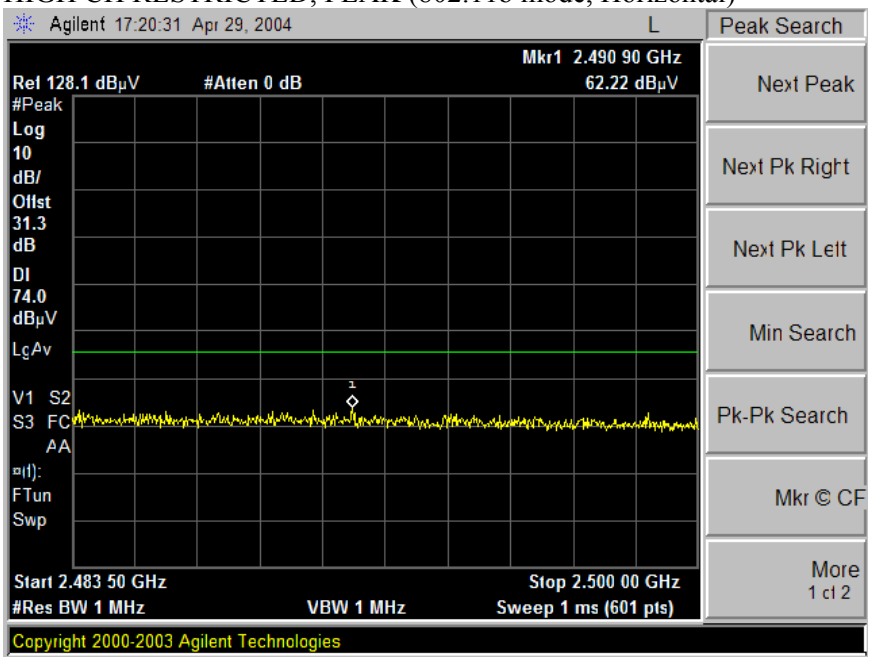


LOW CH RESTRICTED, AVG (802.11b mode, Vertical)

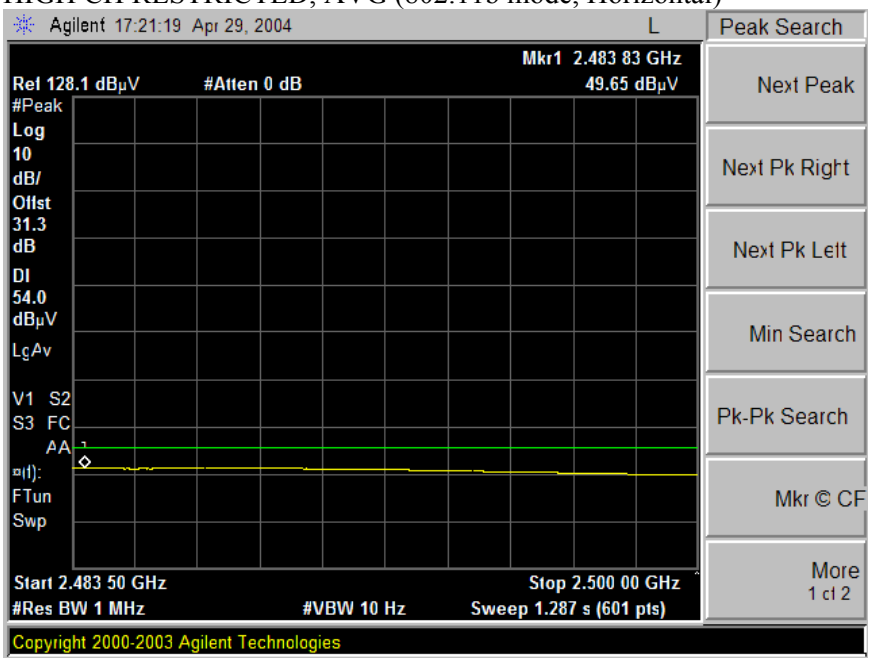


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

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

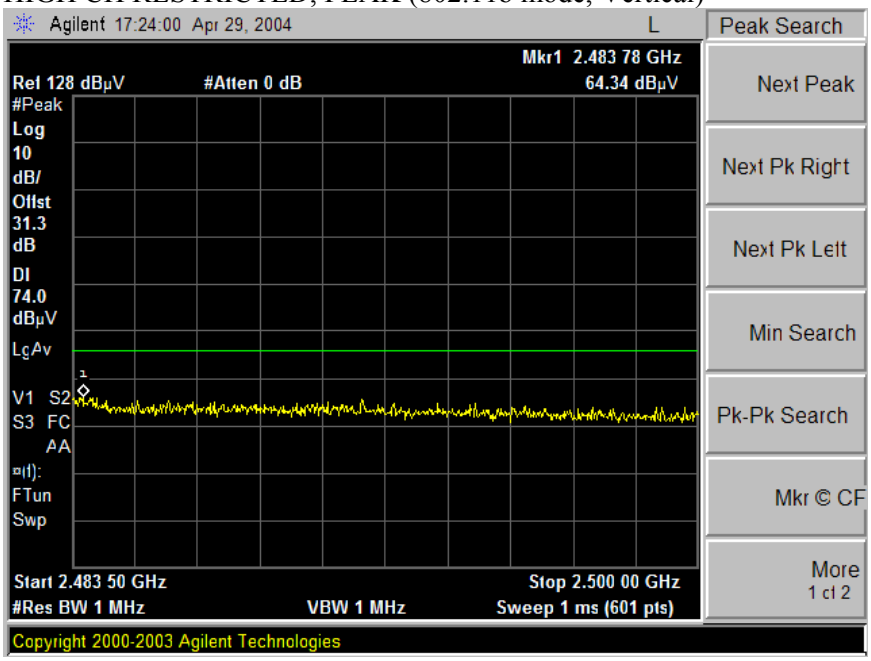


HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)

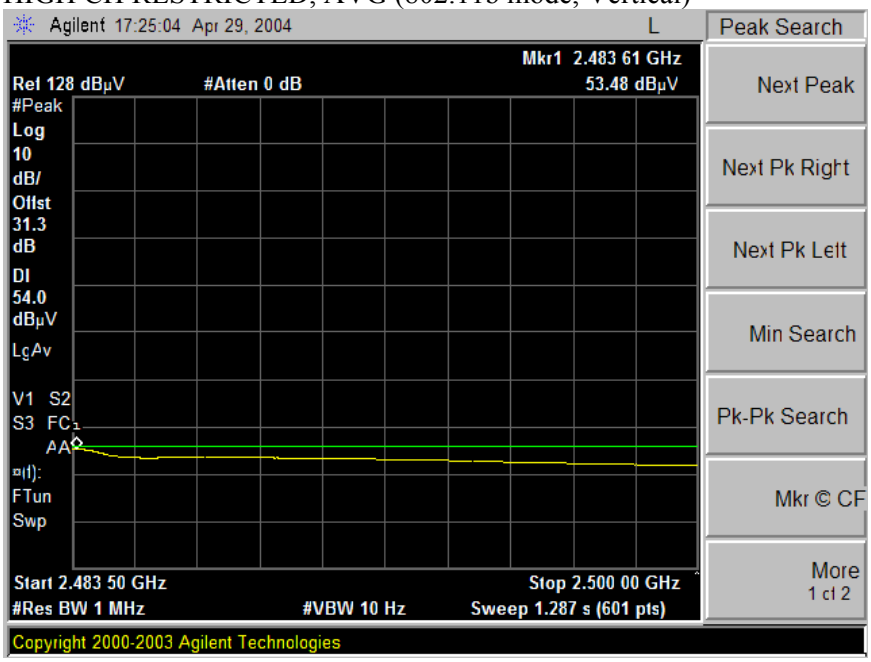


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

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



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



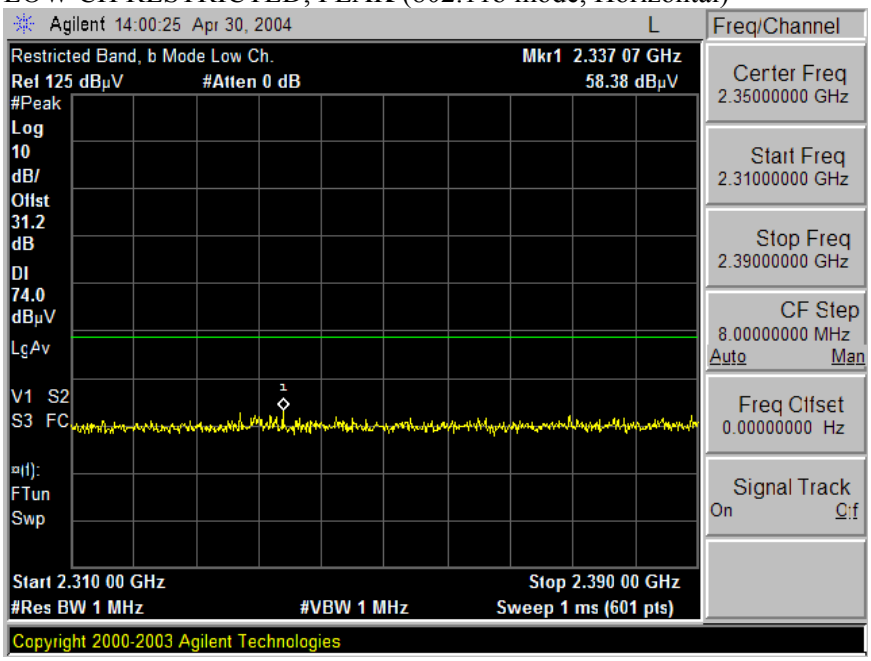
CONFIG #4:

ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
OMNI	SPSHG60	8.5	HORIZONTAL	OMNI	MFB24011PTRPC	11	VERTICAL

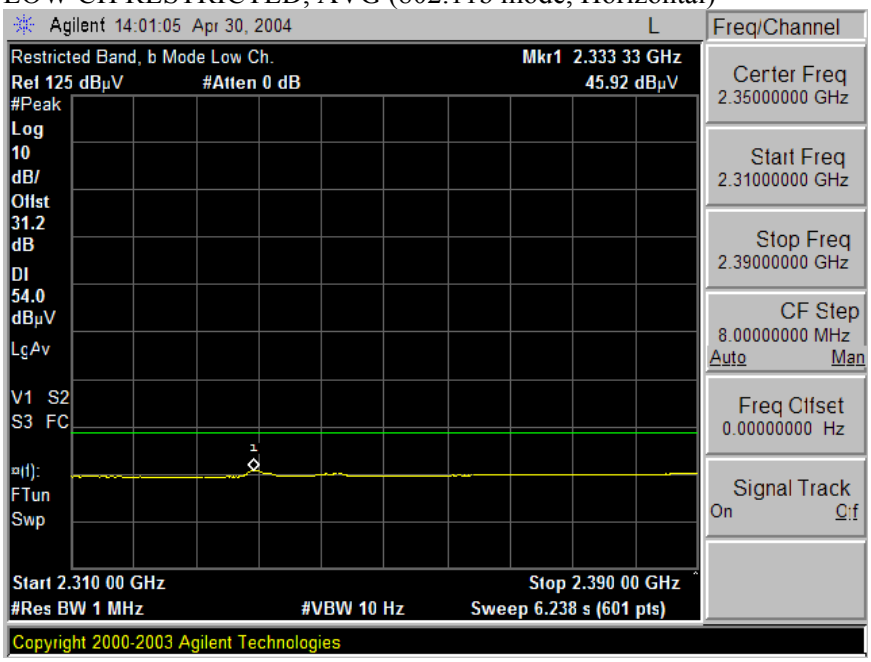
0MNI – SPSHG60

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

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

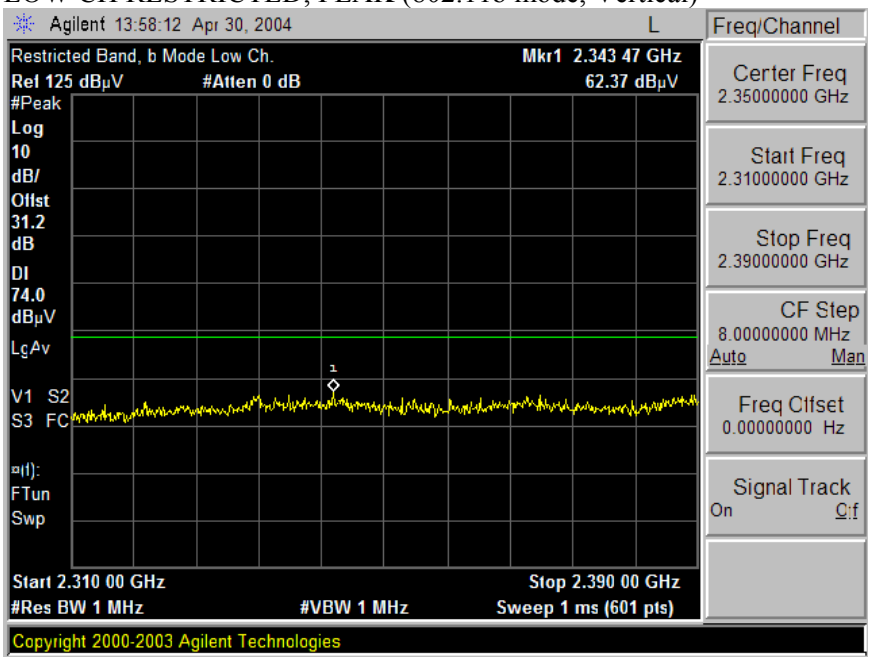


LOW CH RESTRICTED, AVG (802.11b mode, Horizontal)

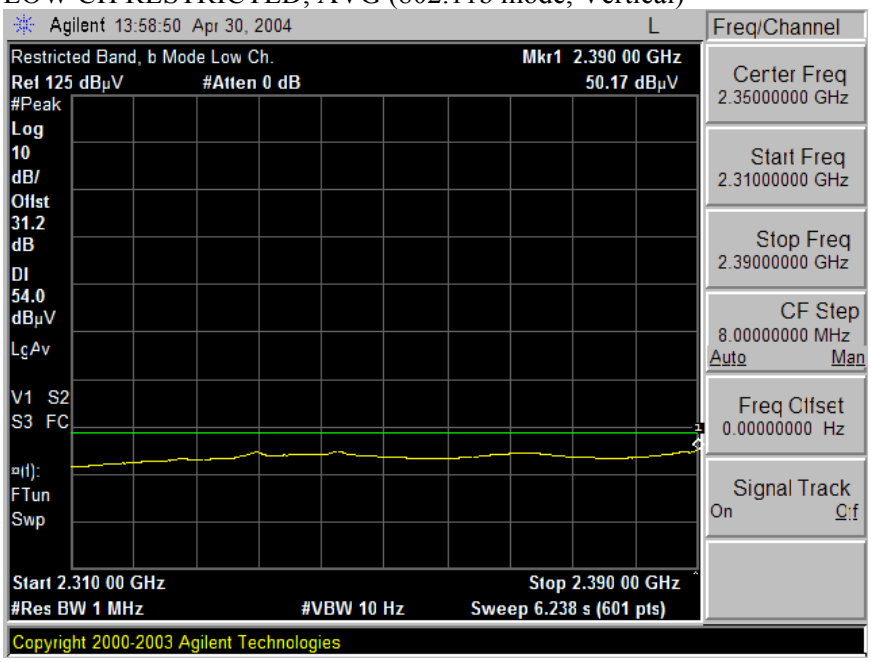


RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

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

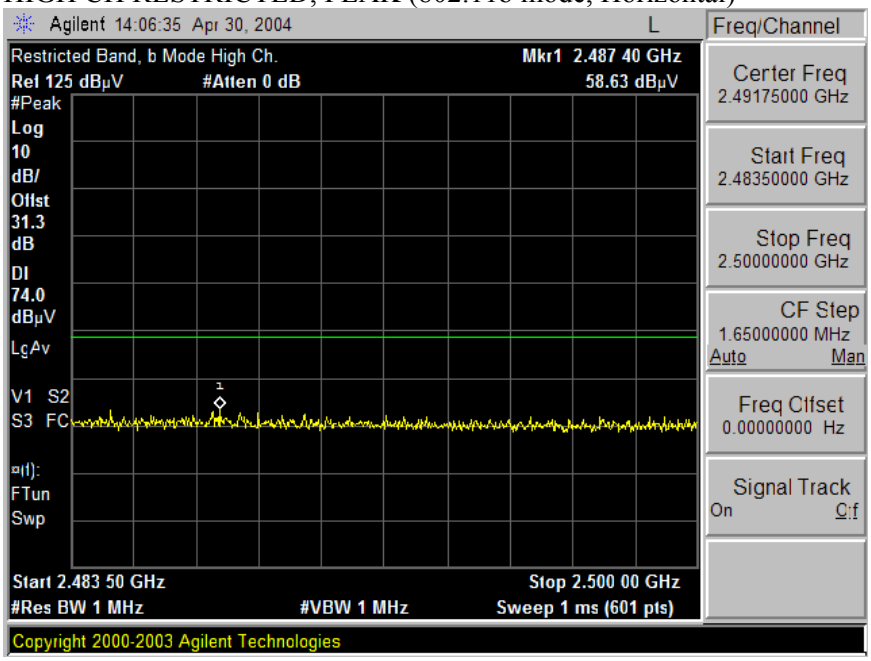


LOW CH RESTRICTED, AVG (802.11b mode, Vertical)

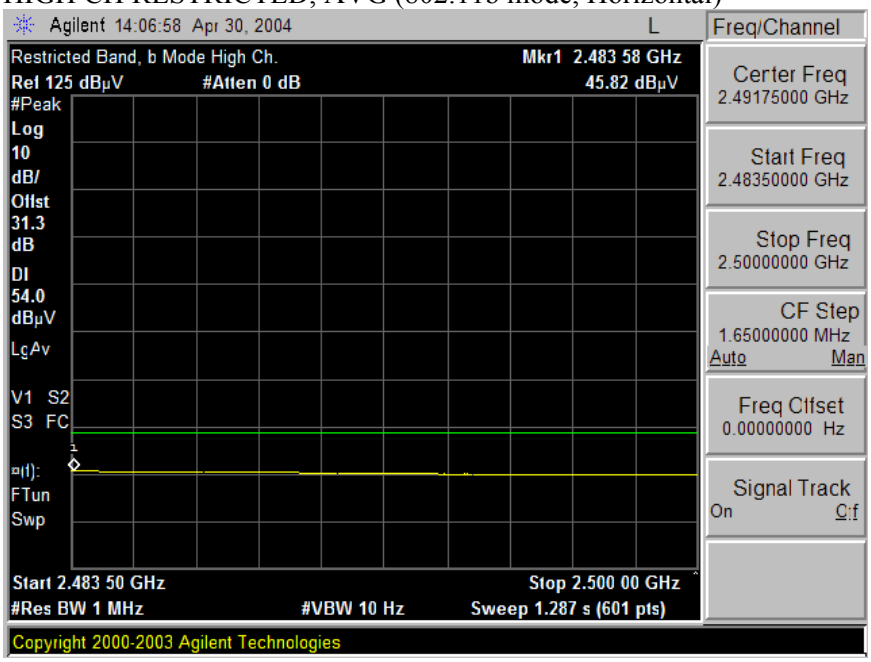


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

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

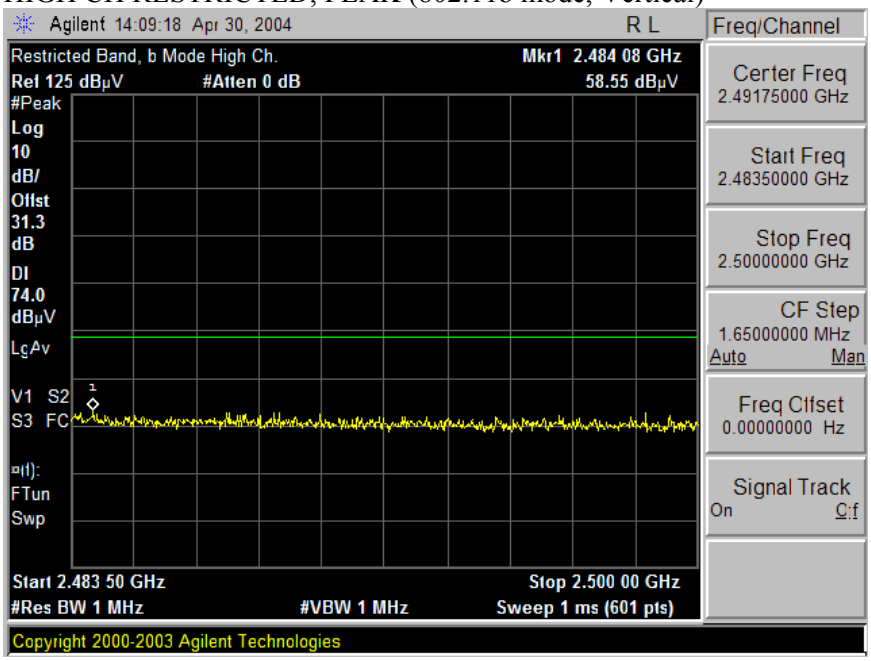


HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)

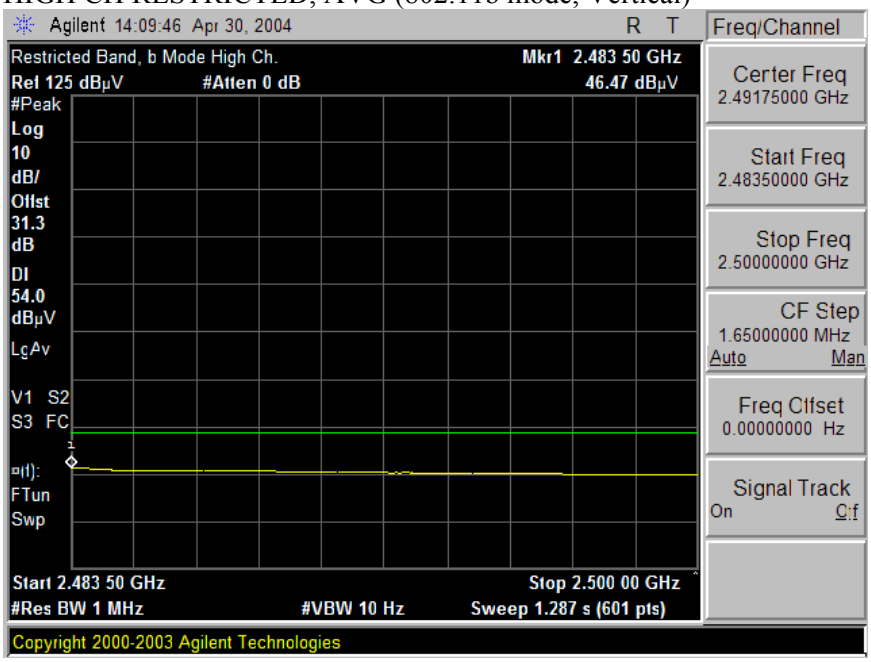


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

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



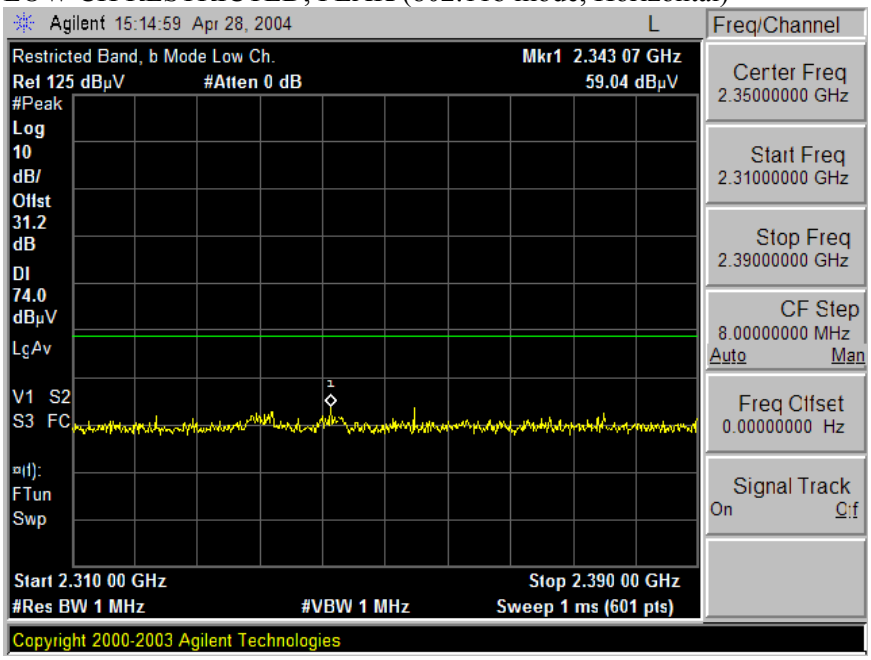
HIGH CH RESTRICTED, AVG (802.11b mode, Vertical)



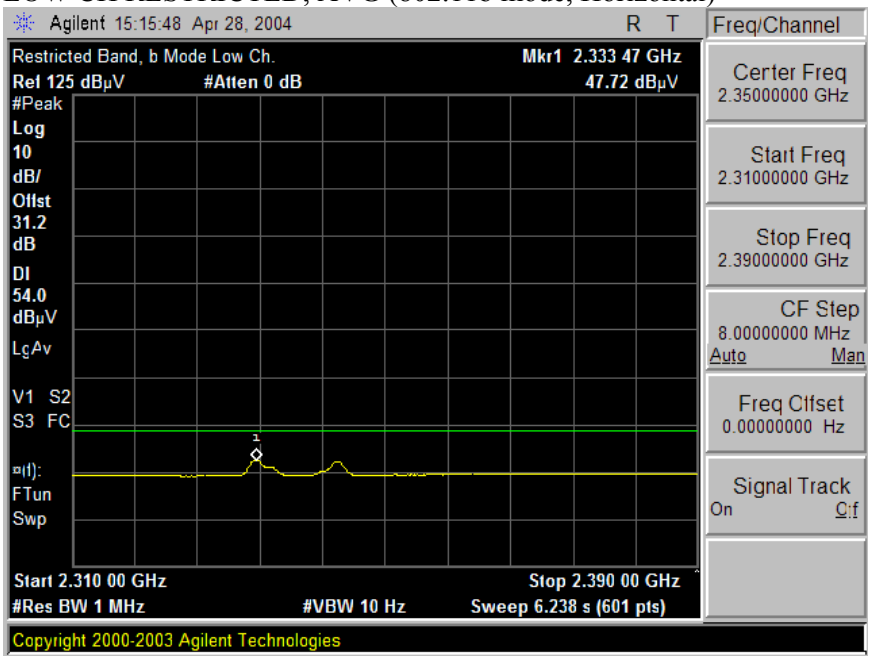
OMNI - MFB24011PTRPC

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

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

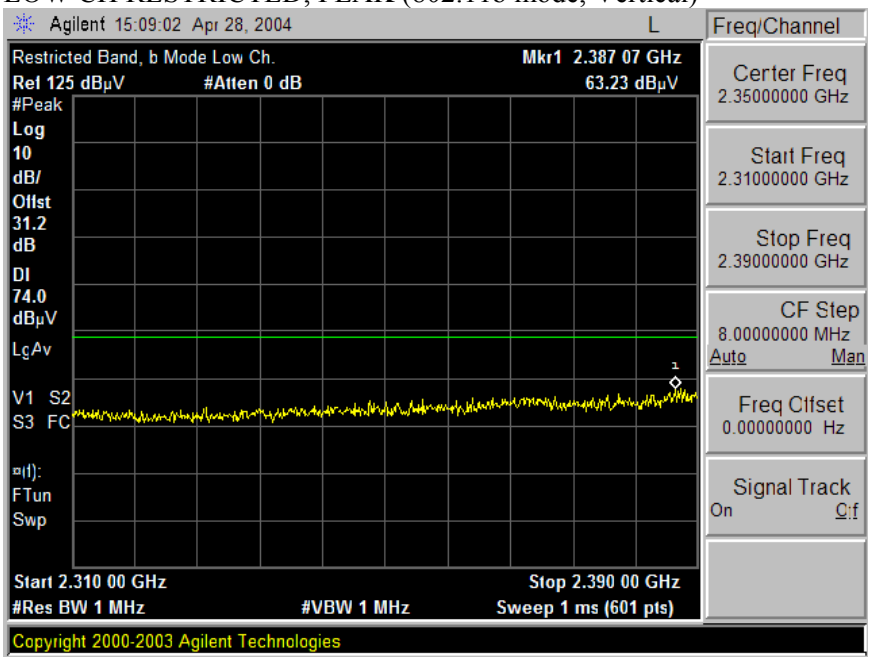


LOW CH RESTRICTED, AVG (802.11b mode, Horizontal)

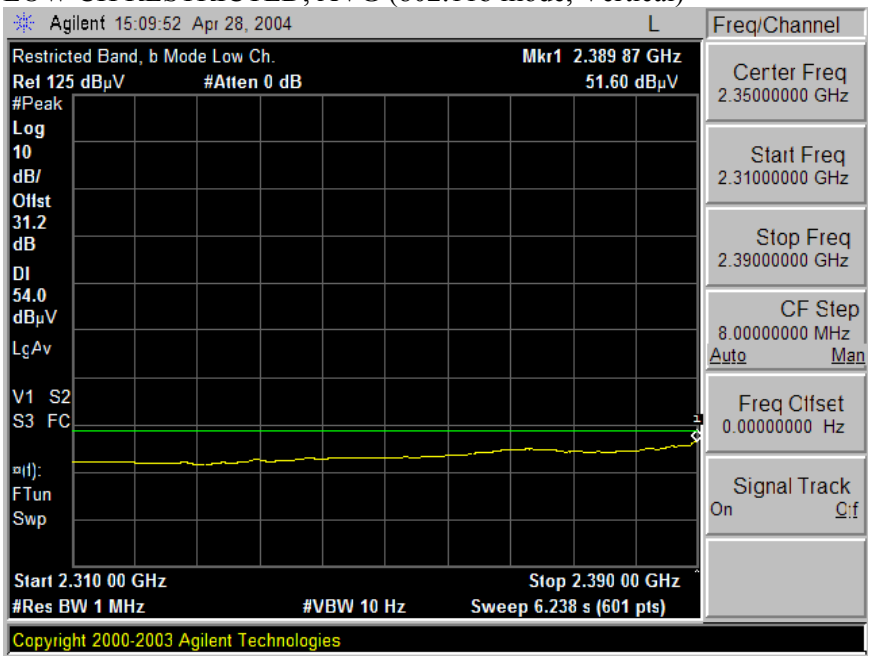


RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

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

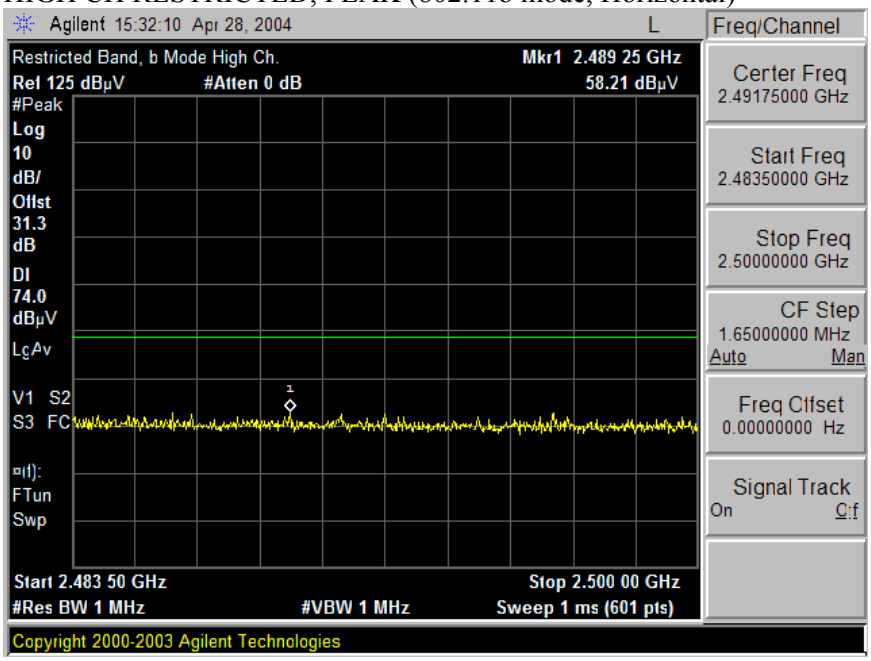


LOW CH RESTRICTED, AVG (802.11b mode, Vertical)

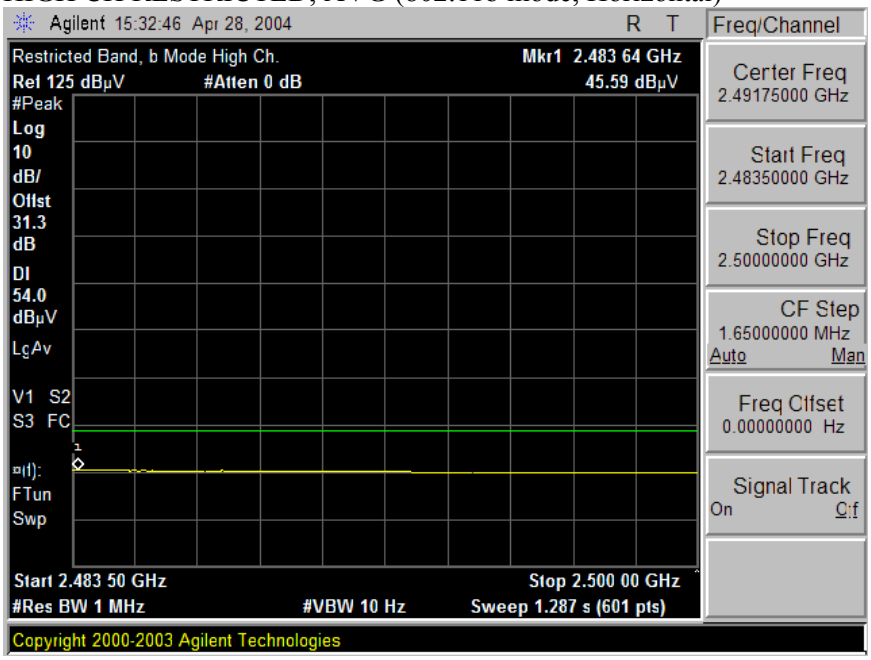


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

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

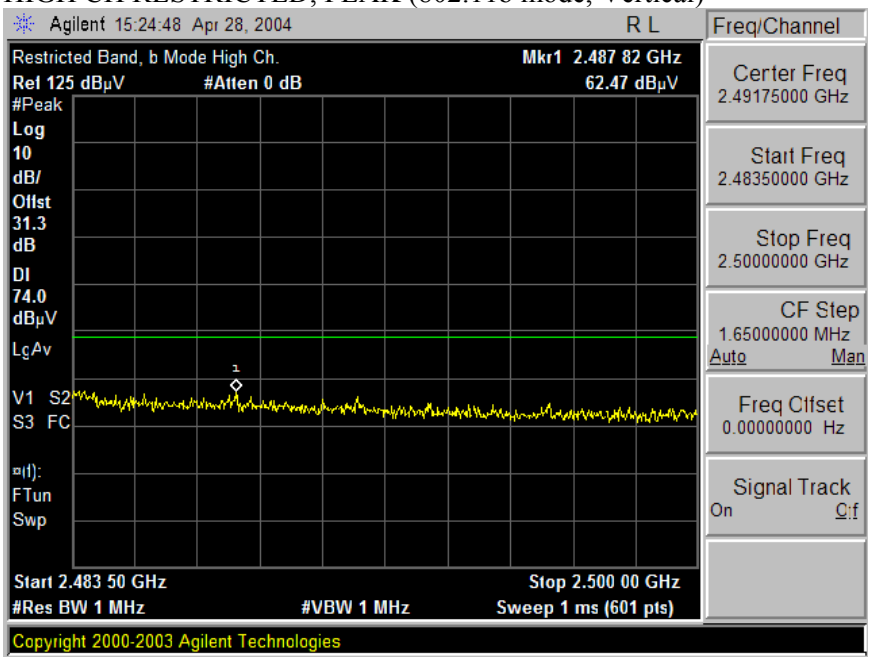


HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)

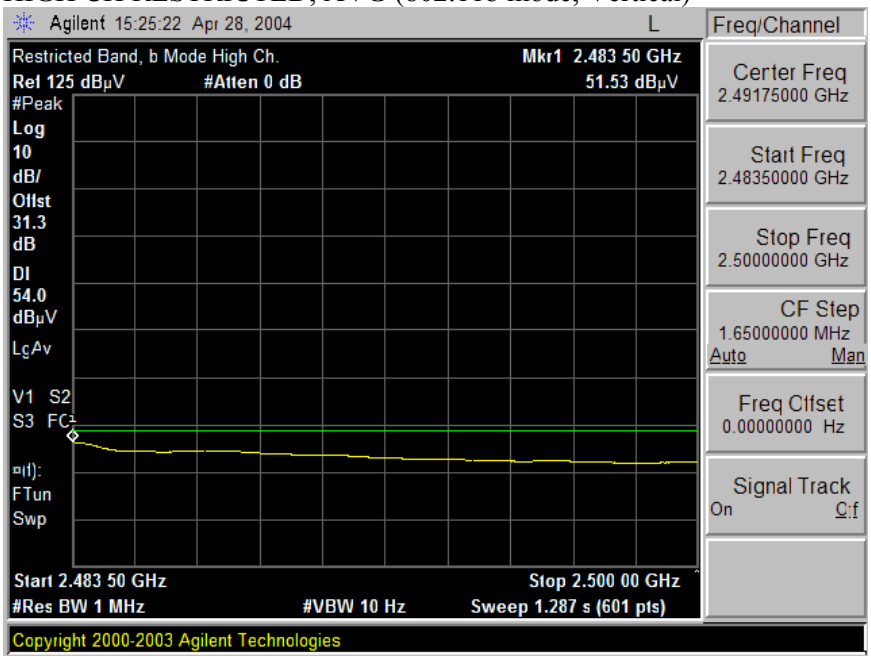


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

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



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



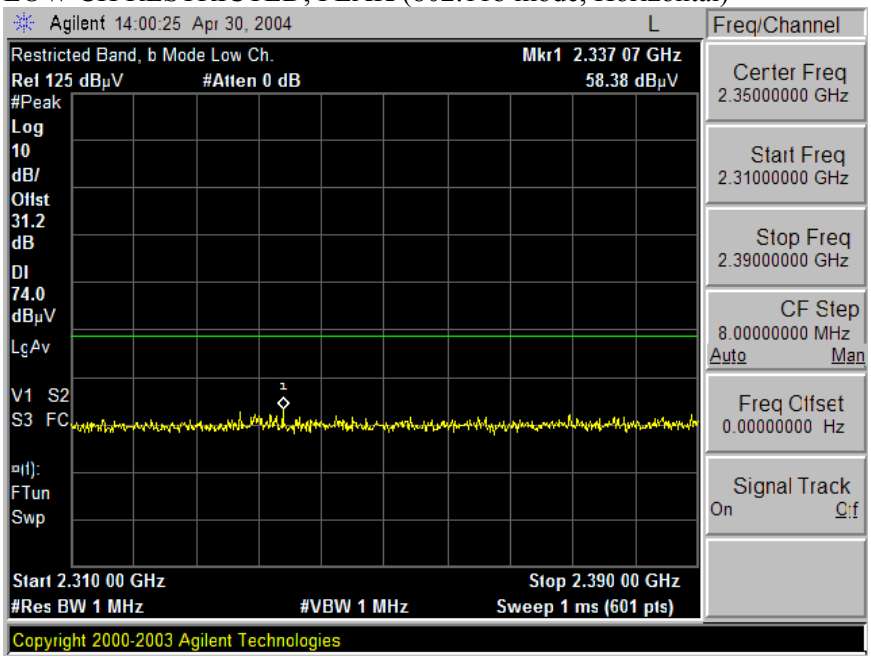
CONFIG #5:

ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
OMNI	SPSHG60	8.5	HORIZONTAL	YAGI	MYP24010PTRPC	10	HORIZONTAL

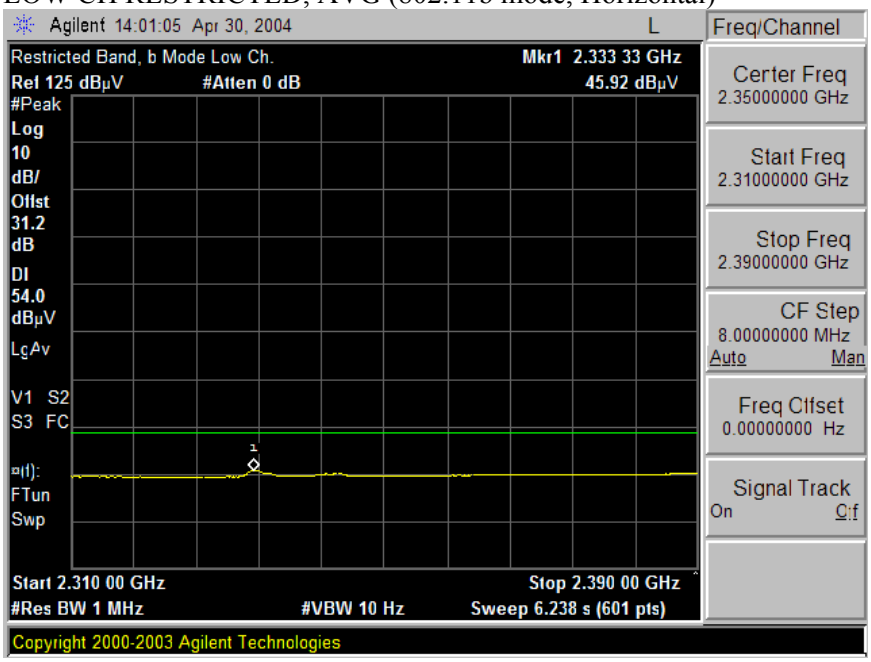
0MNI – SPSHG60

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

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

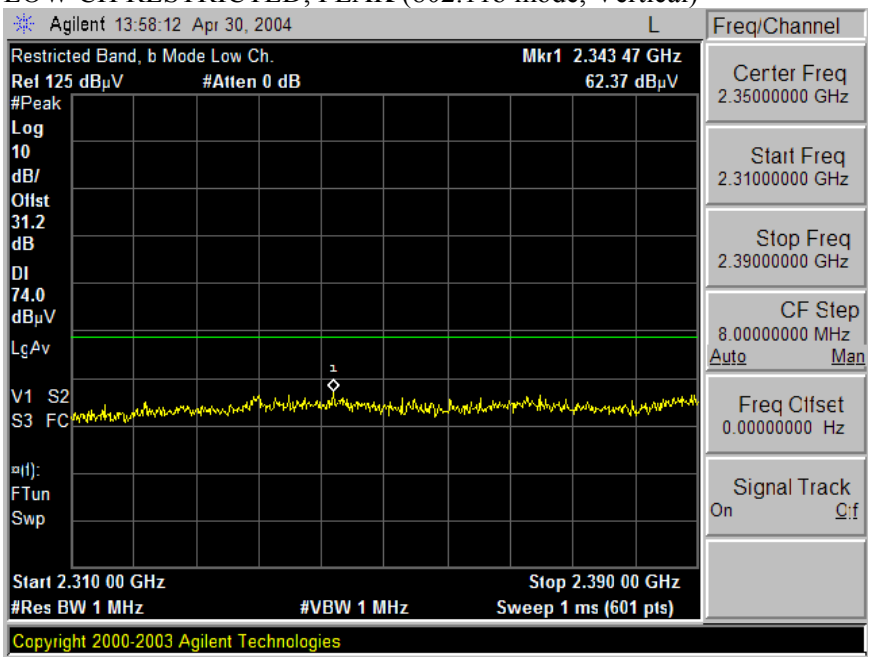


LOW CH RESTRICTED, AVG (802.11b mode, Horizontal)

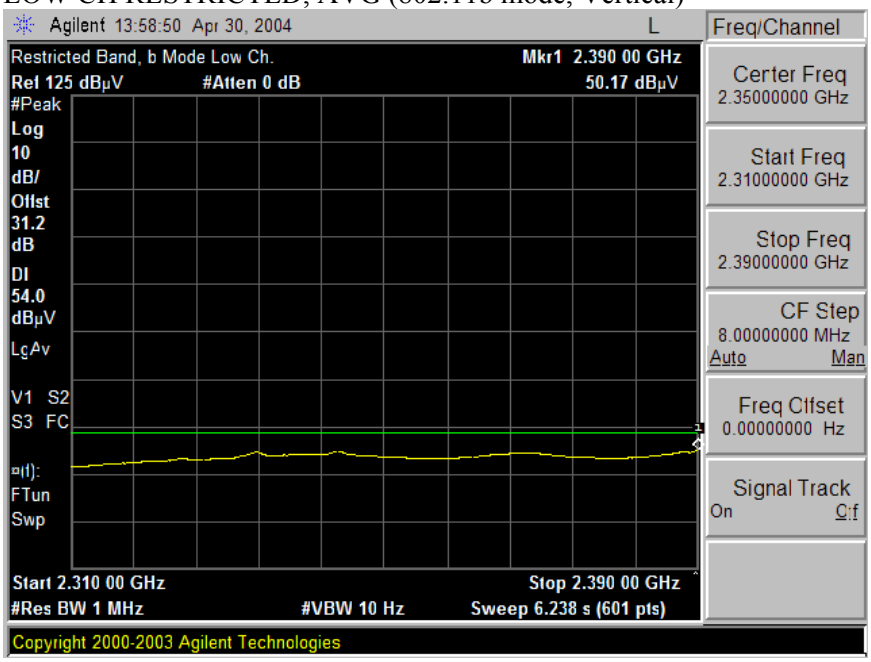


RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

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

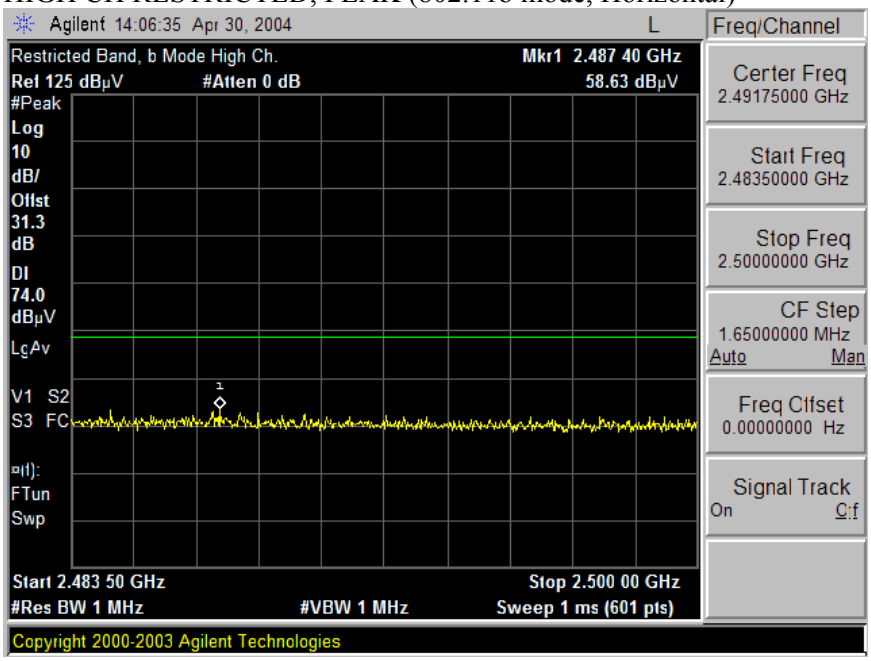


LOW CH RESTRICTED, AVG (802.11b mode, Vertical)

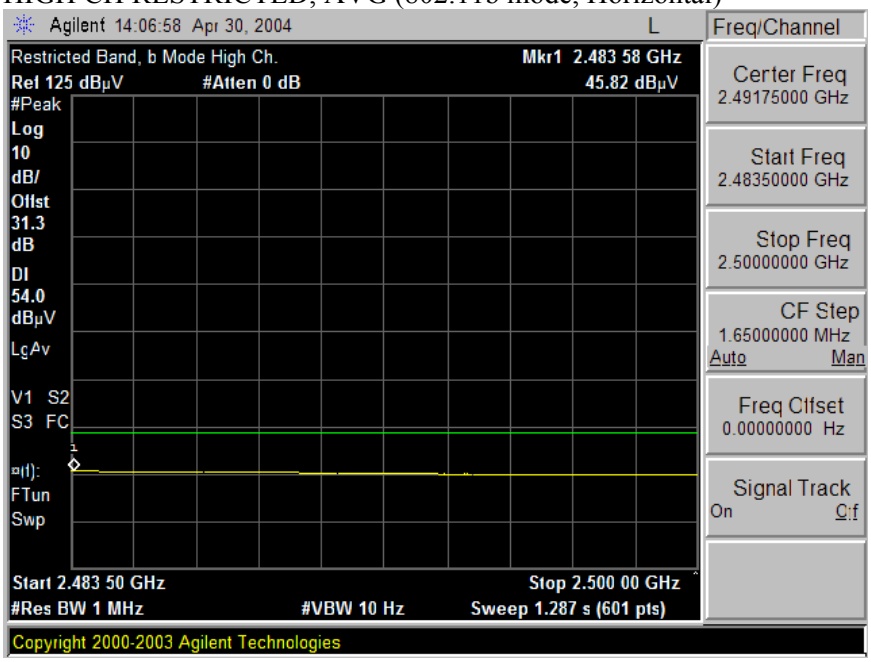


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

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

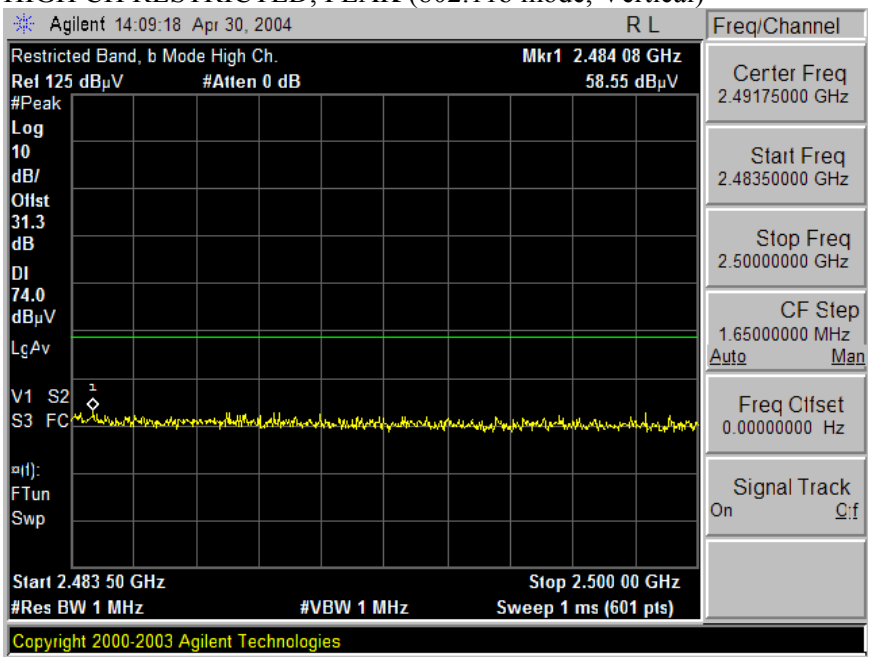


HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)

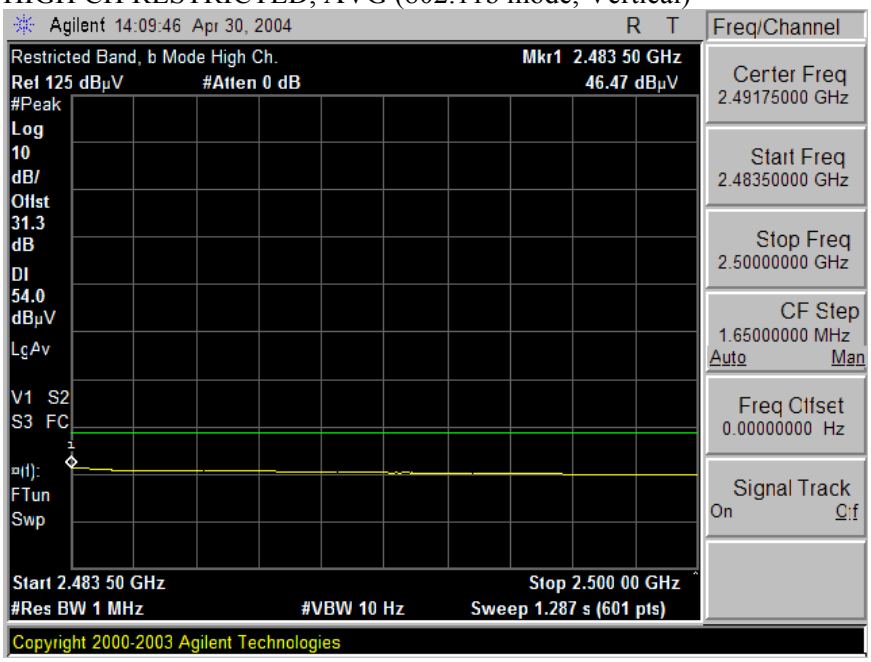


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

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

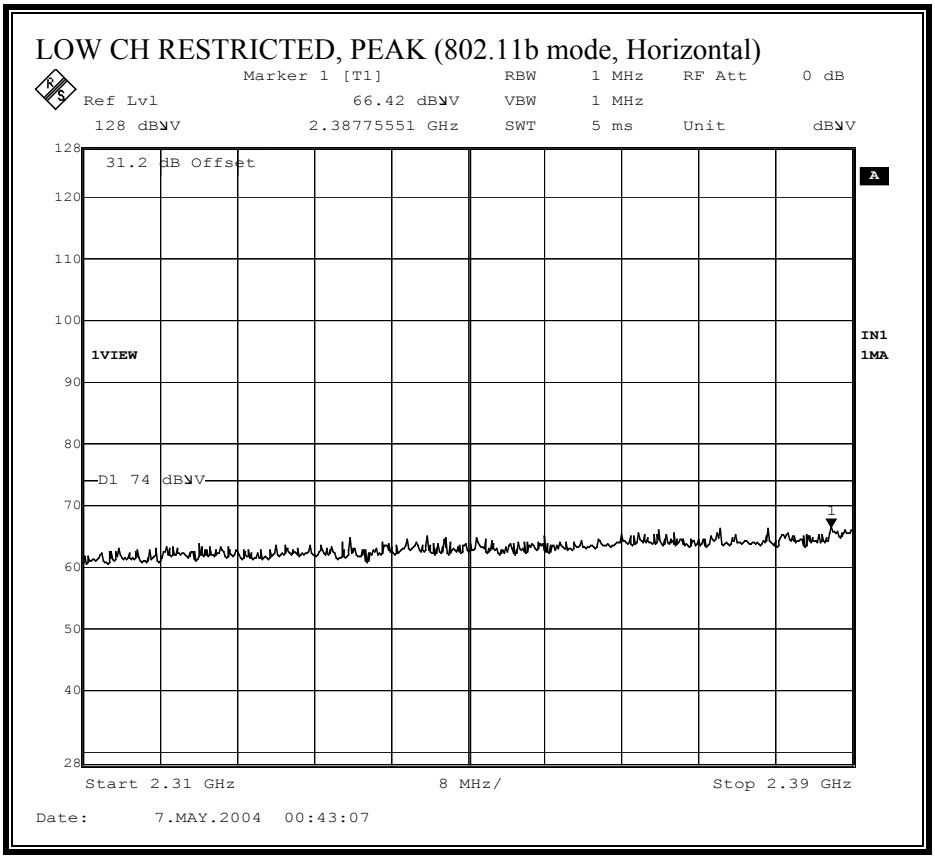


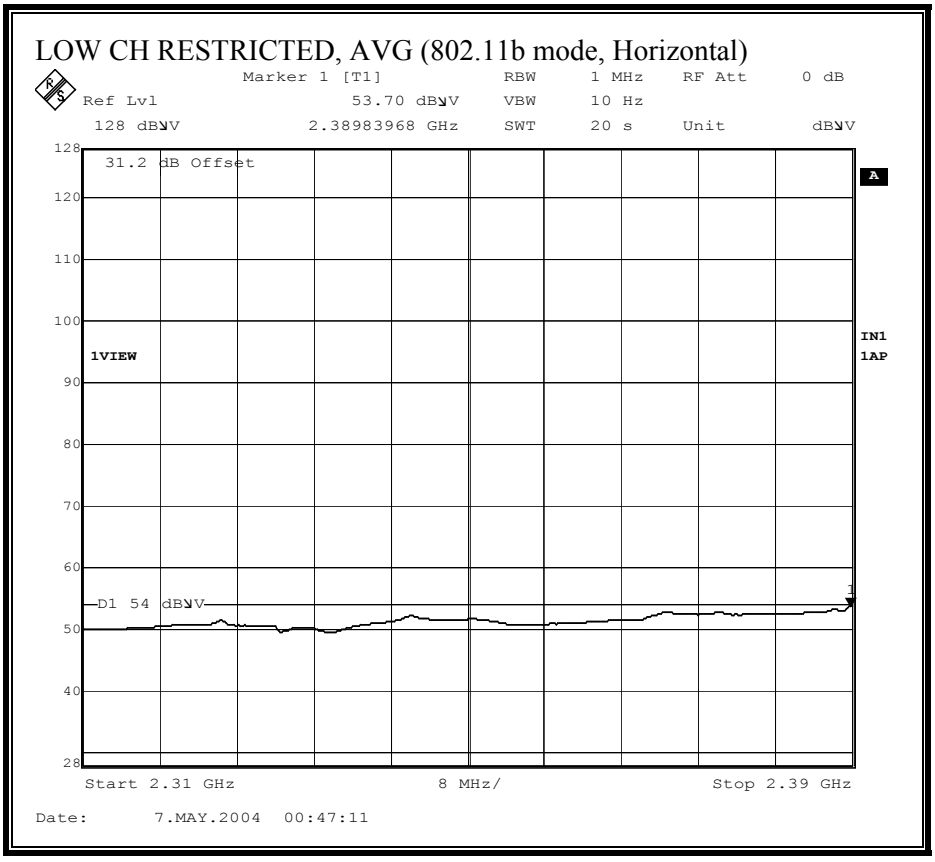
HIGH CH RESTRICTED, AVG (802.11b mode, Vertical)



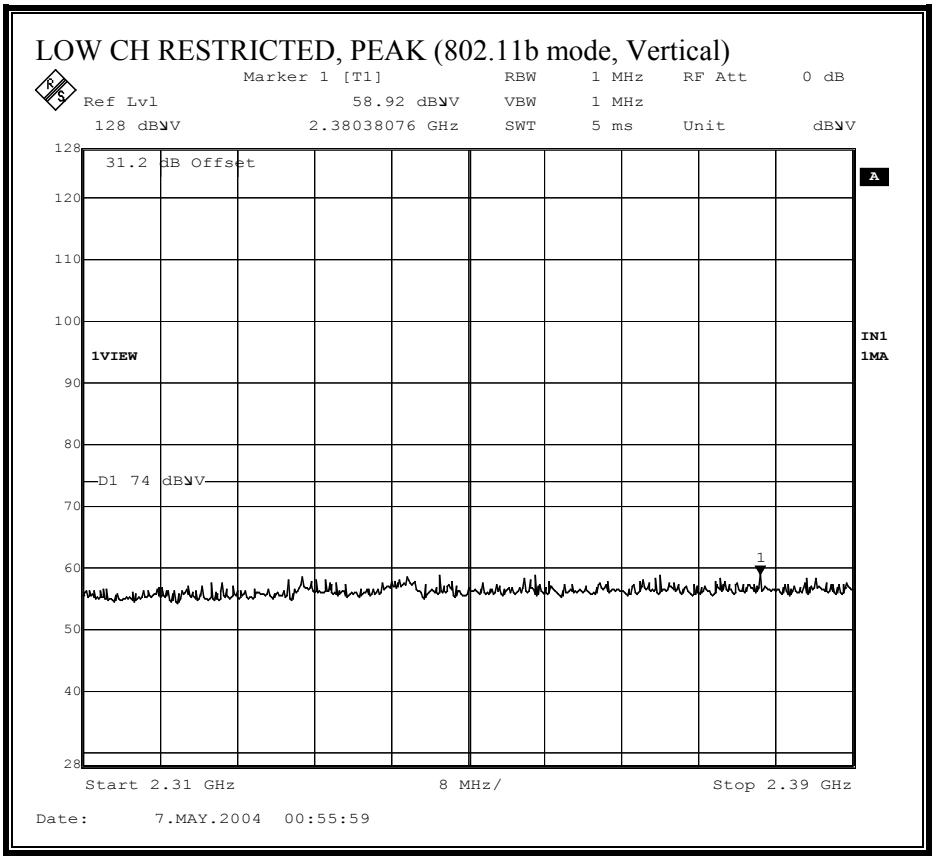
YAGI – MYP24010PTRPC

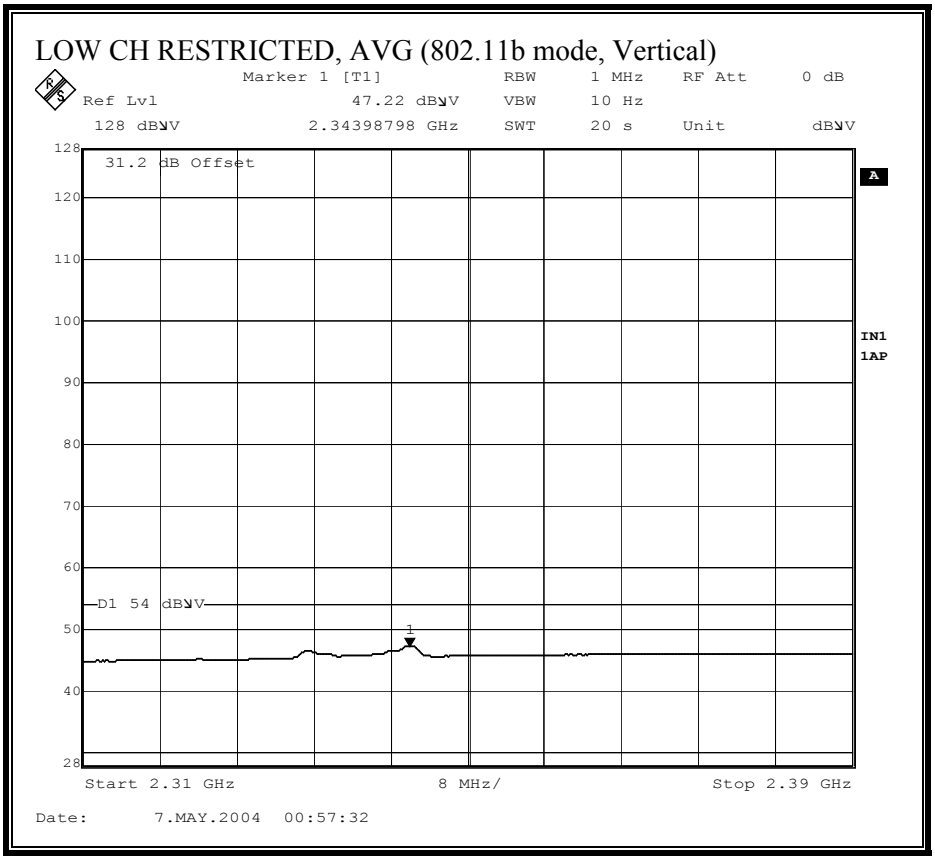
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)



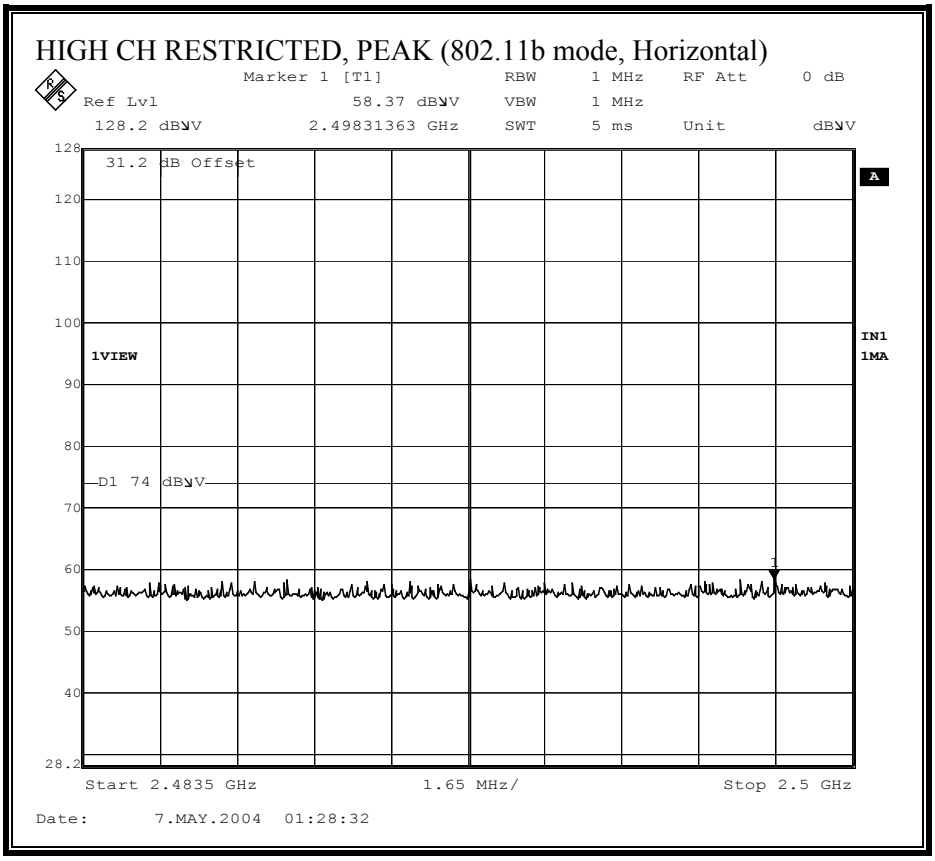


RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

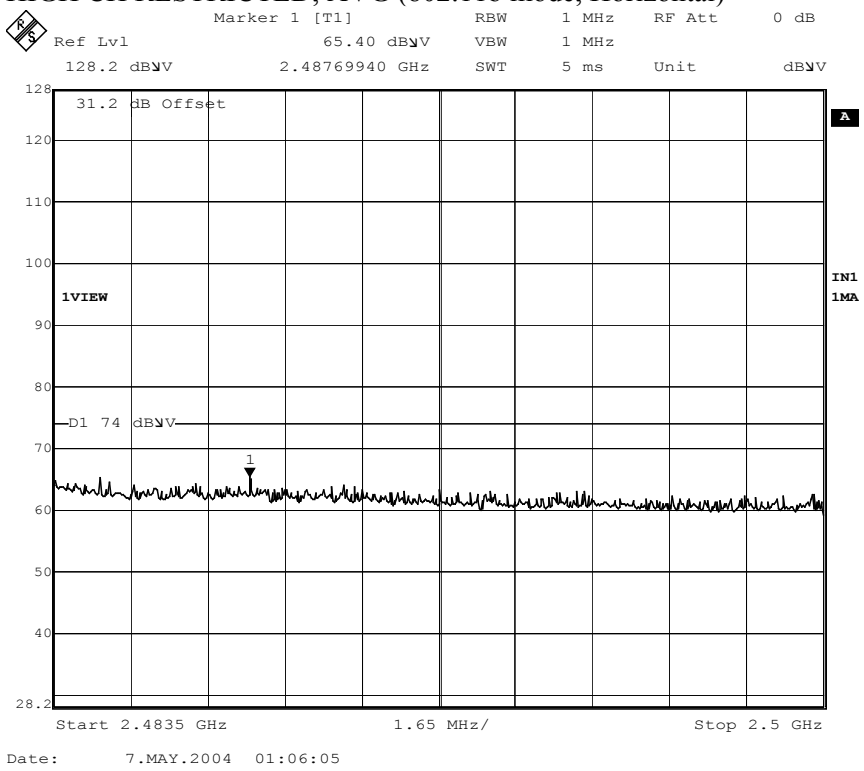




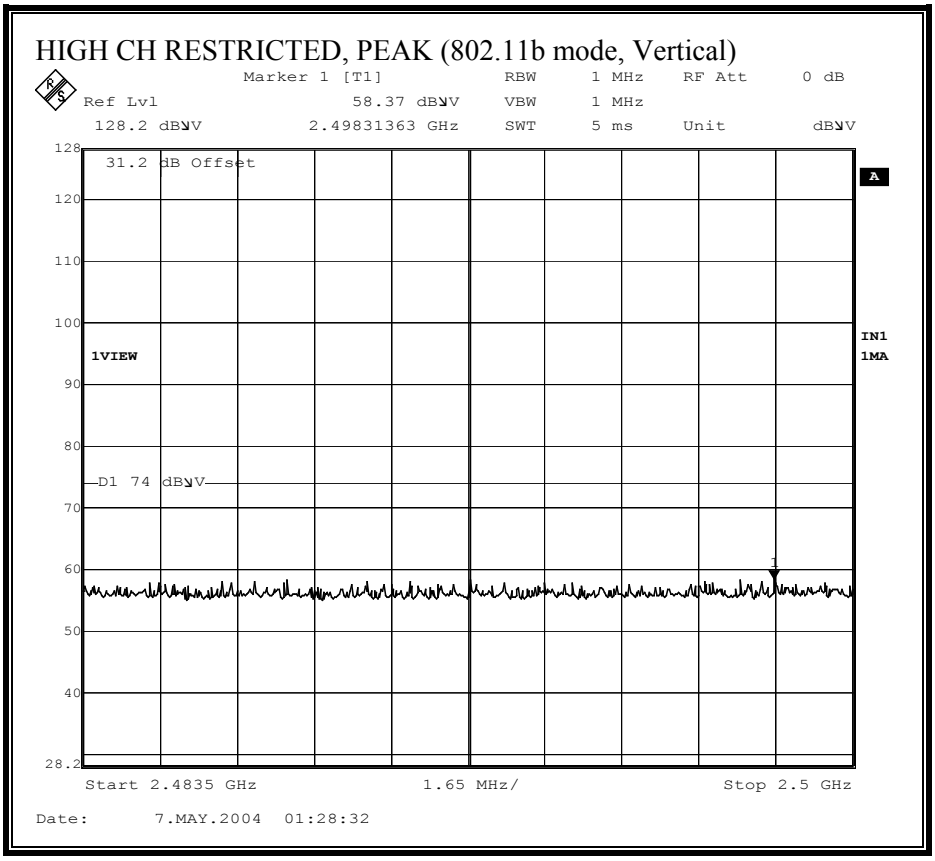
RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)



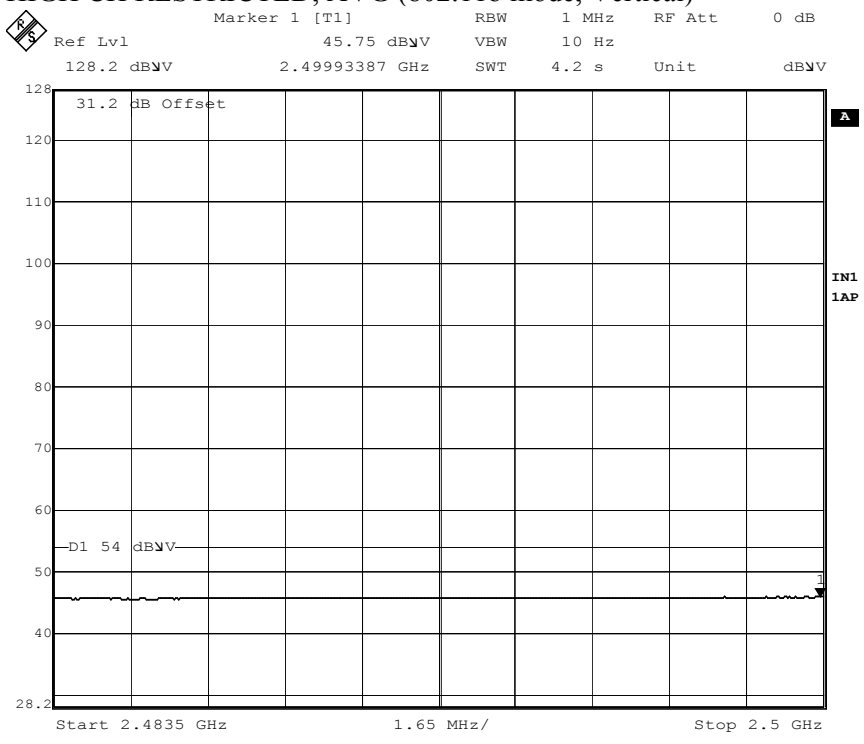
HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)



RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



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

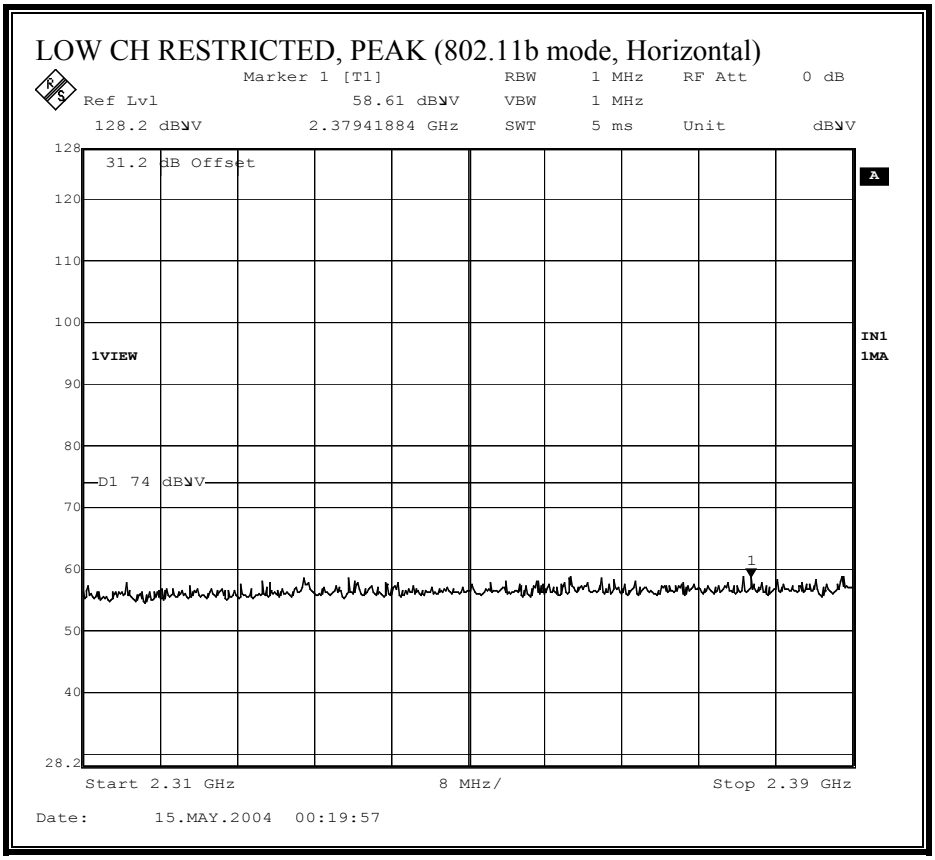


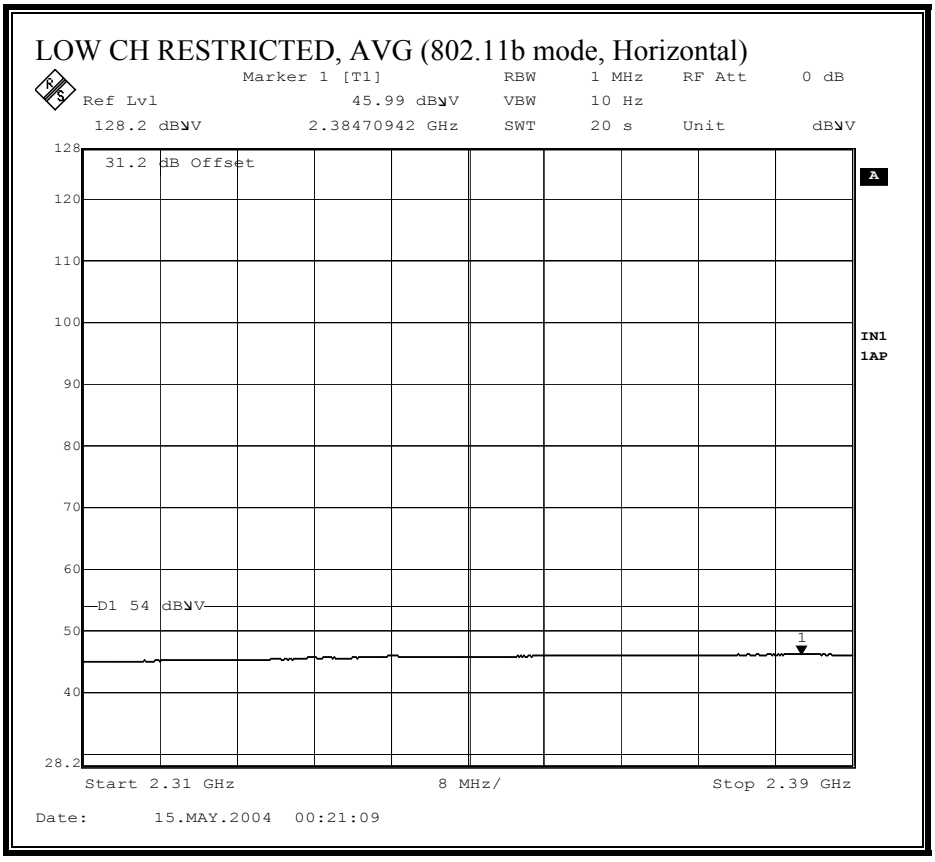
CONFIG #6:

ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
PANEL	M24008XFPTRPC	8	HORIZONTAL	PANEL	M24008XFPTRPC	8	HORIZONTAL

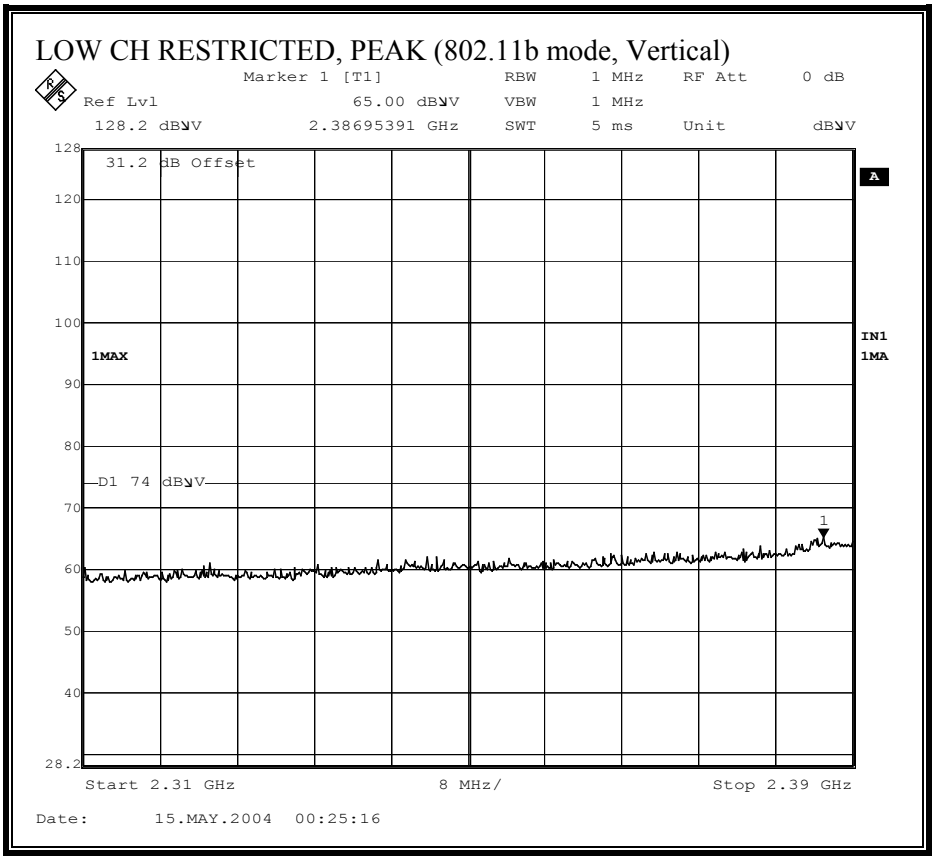
PANEL – M24008XFPTRPC

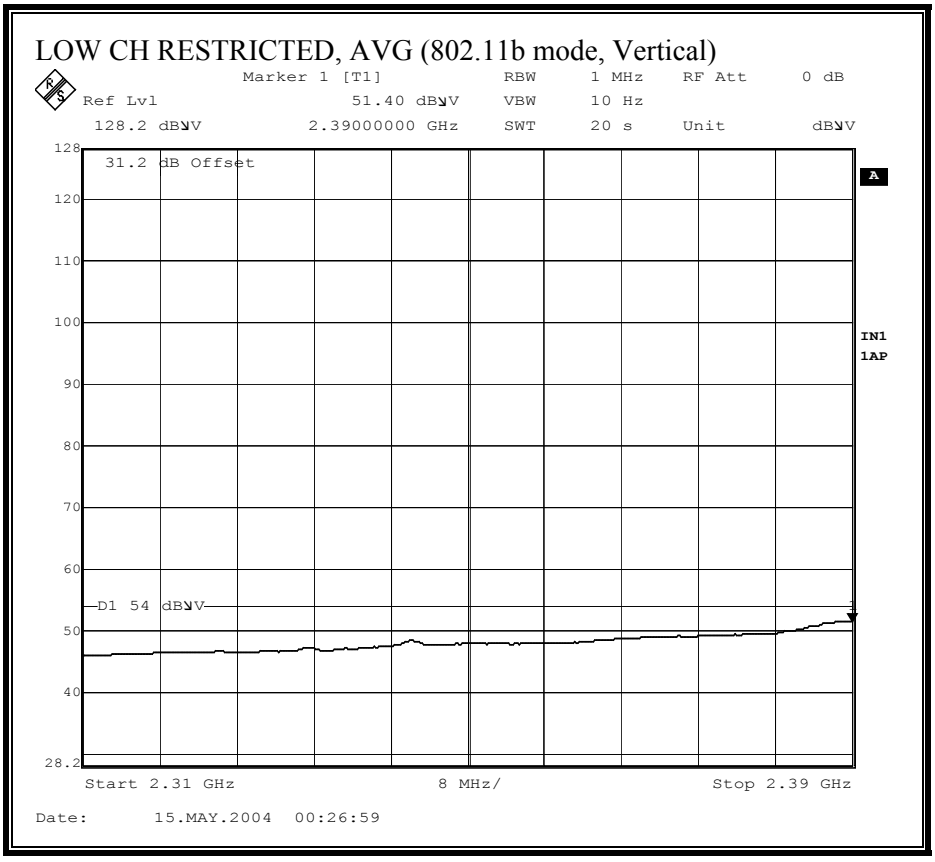
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)



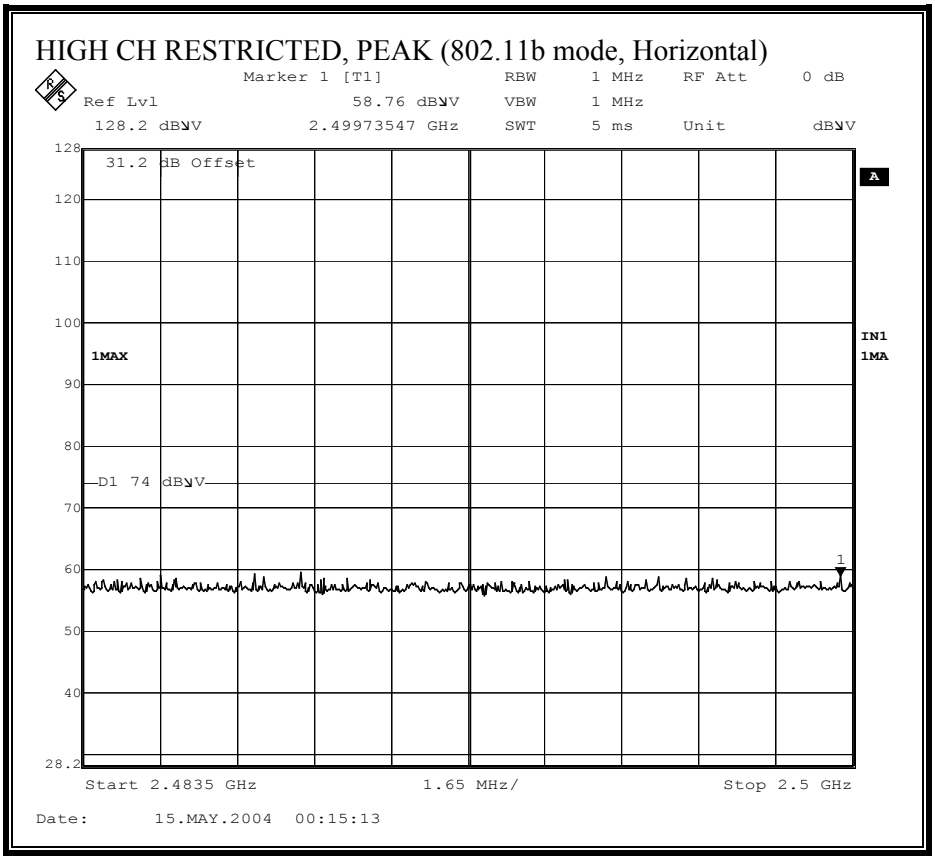


RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

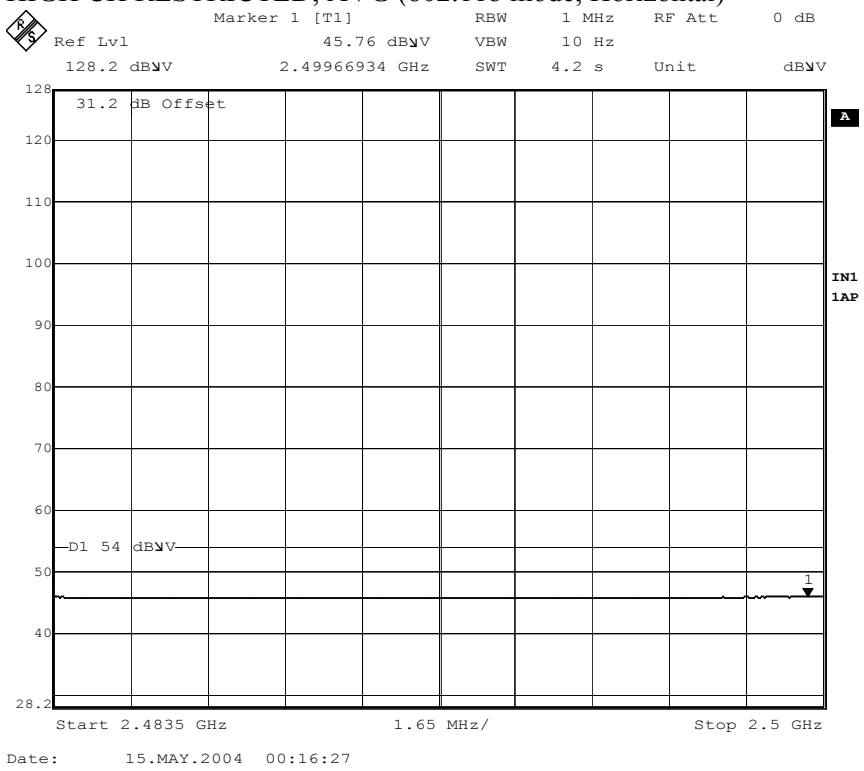




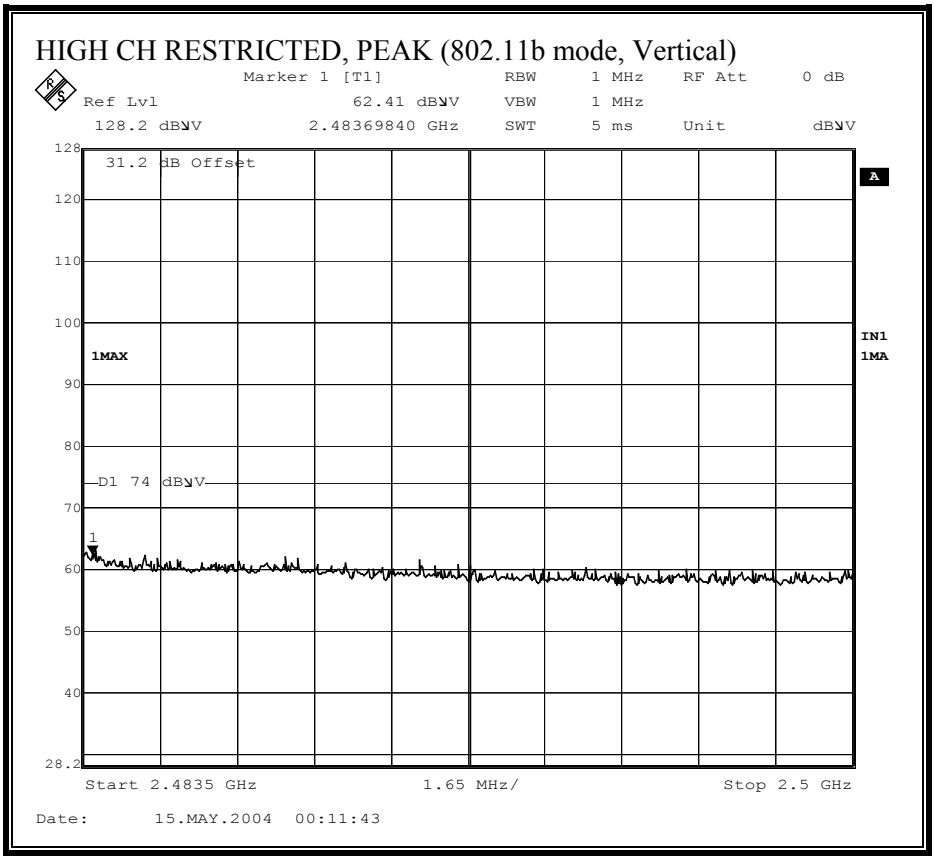
RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

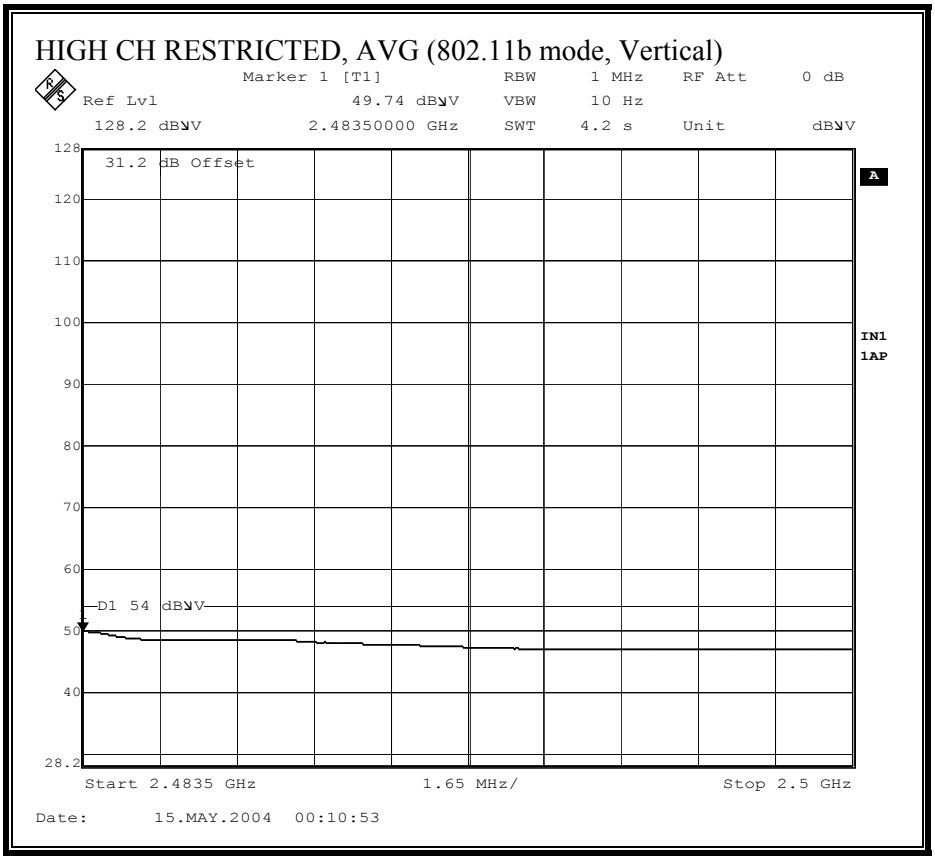


HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)



RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

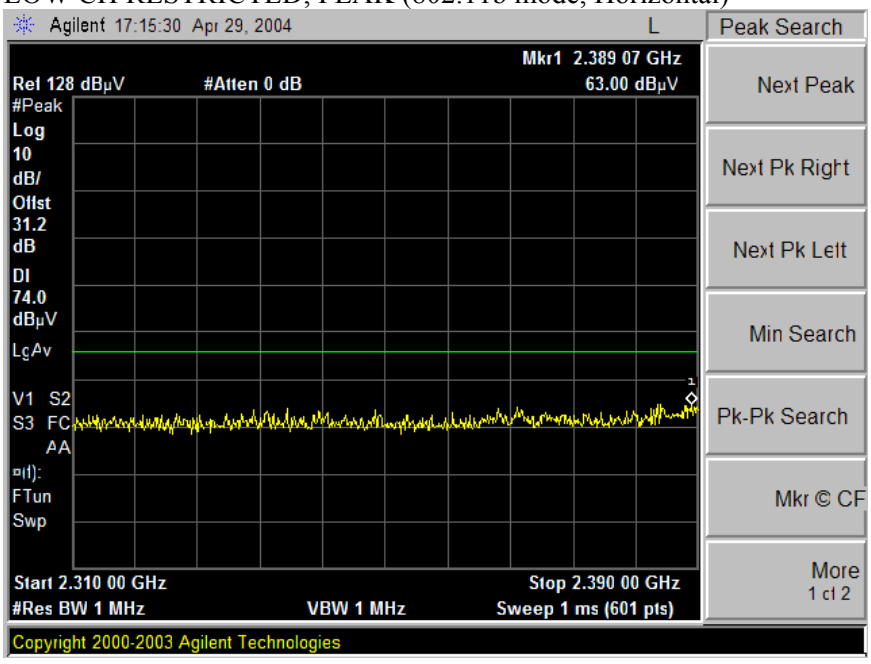




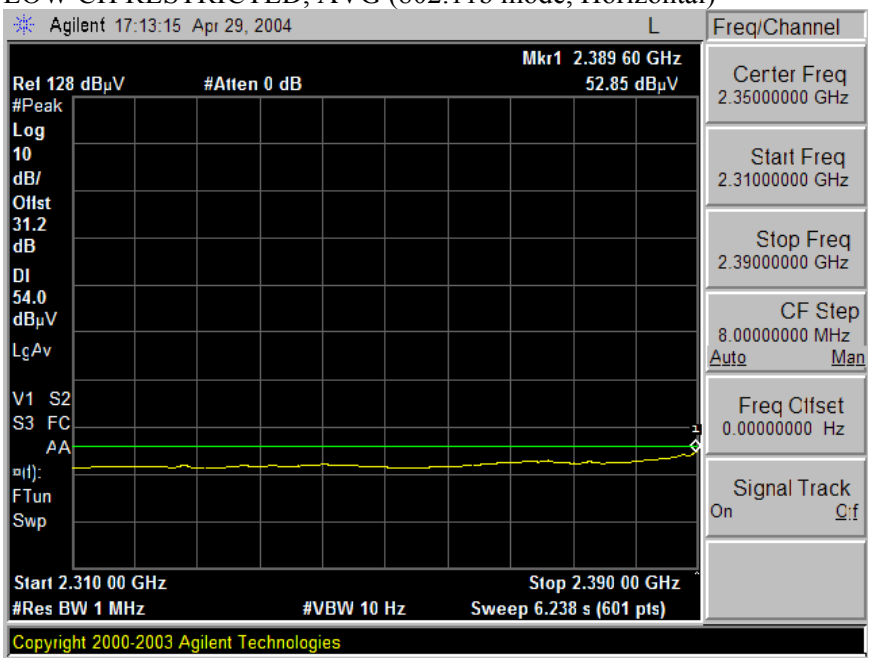
PANEL – M24008XFPTRPC

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

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

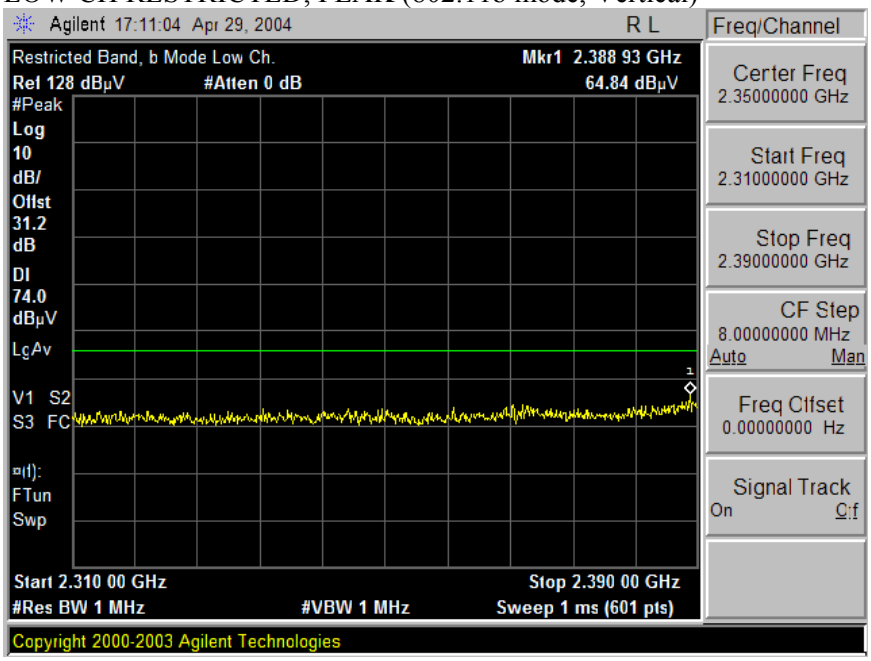


LOW CH RESTRICTED, AVG (802.11b mode, Horizontal)

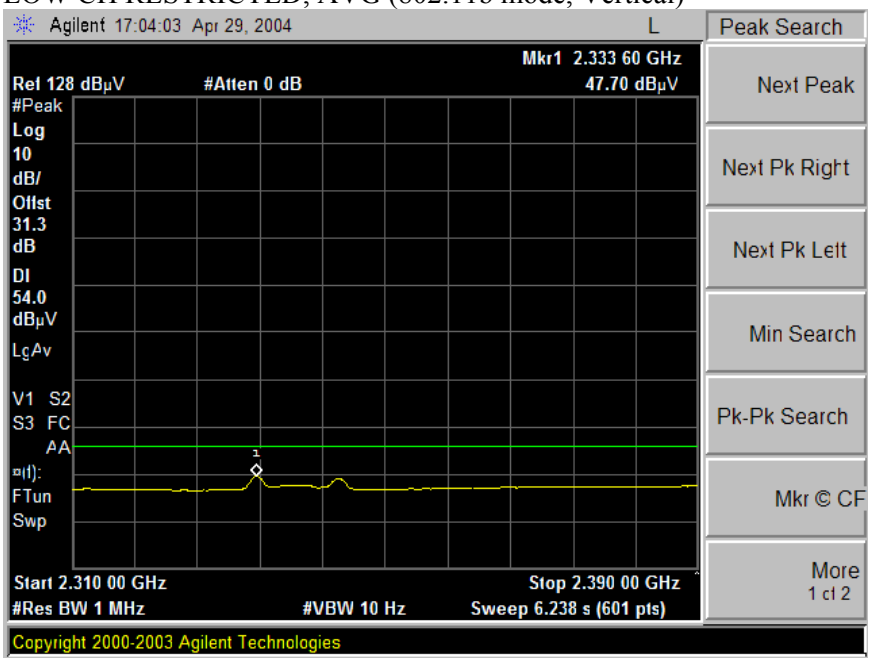


RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

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

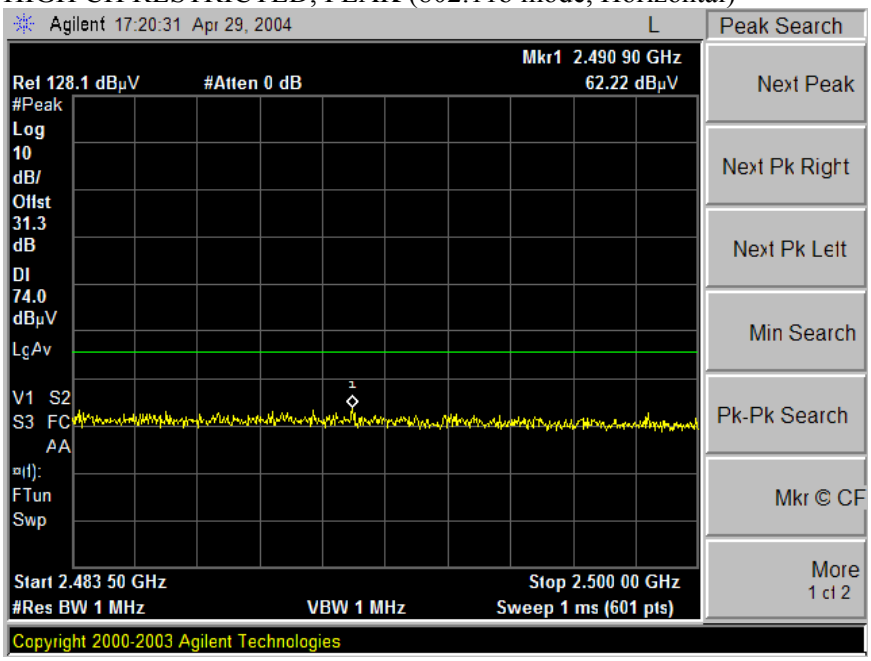


LOW CH RESTRICTED, AVG (802.11b mode, Vertical)

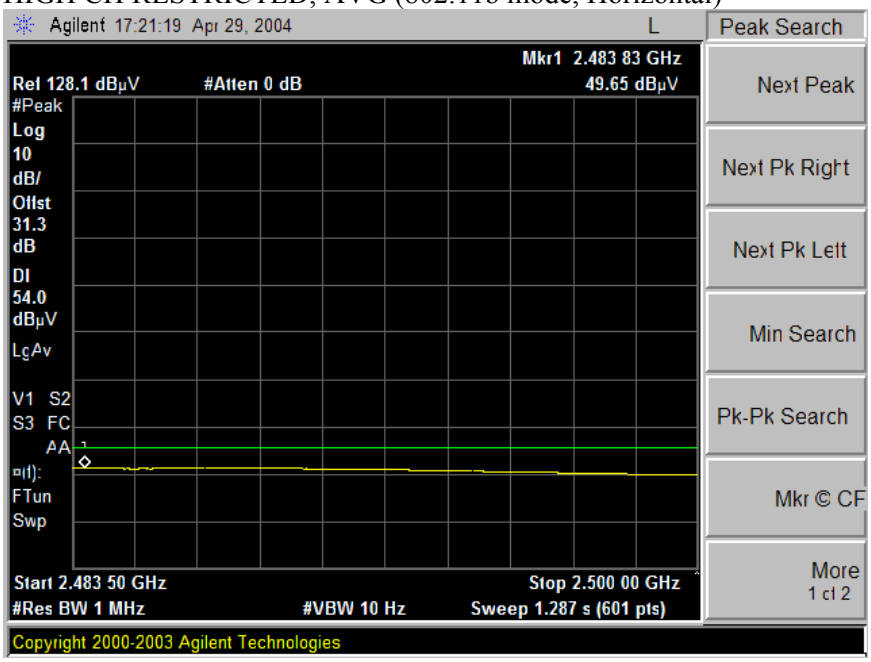


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

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

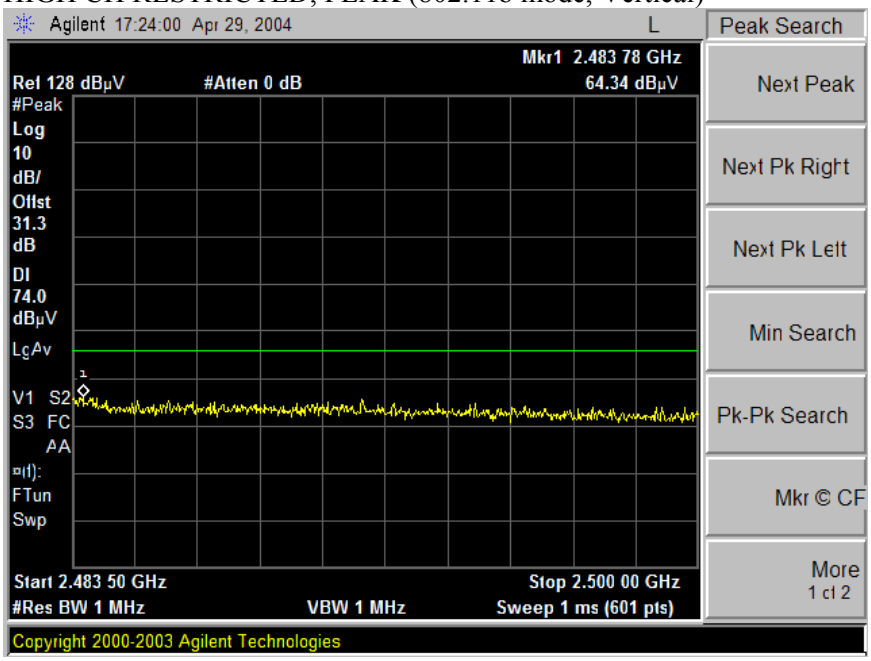


HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)

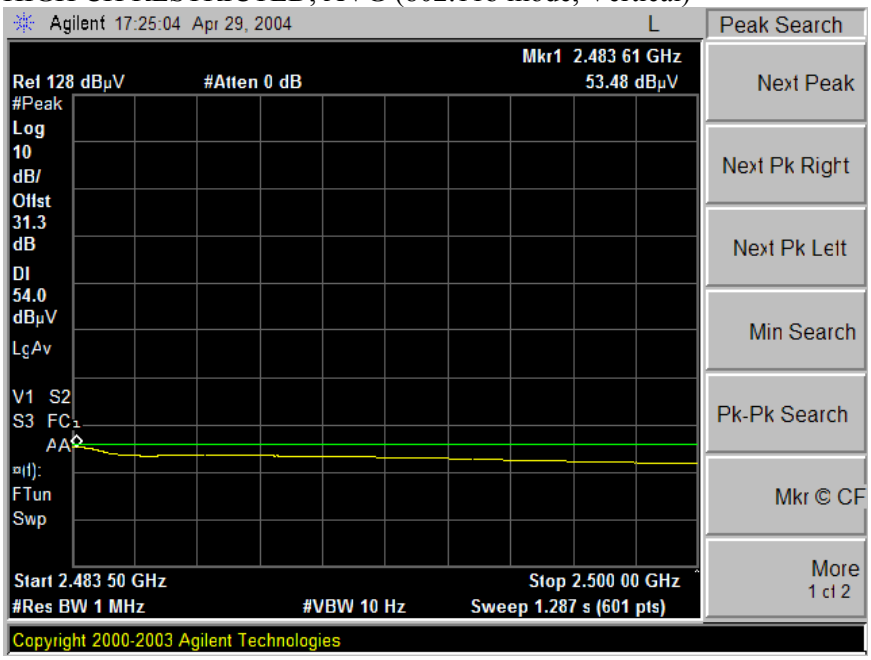


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

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



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



HARMONICS AND SPURIOUS EMISSIONS (b MODE)

CONFIG #1:

ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
OMNI	MFB24011PTRPC	11	VERTICAL	YAGI	MYP24010PTRPC	10	HORIZONTAL

OMNI - MFB24011PTRPC

05/07/04 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2645-1
Company: VIVATO
EUT Descrip.: 802.11b 2.4GHz BRIDGE / ROUTER
EUT M/N: MFB24011PTRPC_OMNI 11dBi
Test Target: FCC15 CLASS B _ HARMONIC / SPUR
Mode Oper: TX LOW/ MID / HI _ CONFIG #1 (OMNI 11dBi VERTICAL & YAGI 10dBi HORIZONTAL_WLAN1: OMNI)

Test Equipment:

EMCO Horn 1-18GHz	Spectrum Analyzer	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz
T60; S/N: 2238 @3m	HP 8593EM Analyzer	T87 Miteq 924342		

Hi Frequency Cables: ☑ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Limit: FCC 15.209

Peak Measurements: 1 MHz Resolution Bandwidth, 1MHz Video Bandwidth
Average Measurements: 1 MHz Resolution Bandwidth, 10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
LOW CH 2412MHz															
4.824	9.8	51.4	37.6	33.1	2.9	-44.7	0.0	1.0	43.7	29.9	74.0	54.0	-30.3	-24.1	V
12.060	9.8	49.7	35.7	39.3	6.2	-42.2	0.0	1.0	54.0	40.0	74.0	54.0	-20.0	-14.0	V_NOISE FLOOR
4.824	9.8	52.3	39.3	33.1	2.9	-44.7	0.0	1.0	44.5	31.6	74.0	54.0	-29.5	-22.4	H
12.060	9.8	50.0	37.8	39.3	6.2	-42.2	0.0	1.0	54.3	42.1	74.0	54.0	-19.7	-11.9	H_NOISE FLOOR
MID CH 2437MHz															
4.874	9.8	51.4	36.7	33.1	2.9	-44.7	0.0	1.0	43.7	29.0	74.0	54.0	-30.3	-25.0	V
7.311	9.8	54.0	39.6	36.2	3.8	-44.5	0.0	1.0	50.5	36.1	74.0	54.0	-23.5	-17.9	V_NOISE FLOOR
4.874	9.8	53.2	39.7	33.1	2.9	-44.7	0.0	1.0	45.5	32.0	74.0	54.0	-28.5	-22.0	H
7.311	9.8	60.0	46.8	36.2	3.8	-44.5	0.0	1.0	56.5	43.2	74.0	54.0	-17.5	-10.8	H_NOISE FLOOR
HI CH2462MHz															
4.924	9.8	50.9	36.8	33.2	2.9	-44.8	0.0	1.0	43.2	29.1	74.0	54.0	-30.8	-24.9	V
7.386	9.8	51.4	37.5	36.3	3.9	-44.5	0.0	1.0	48.1	34.2	74.0	54.0	-25.9	-19.8	V_NOISE FLOOR
4.924	9.8	51.0	38.4	33.2	2.9	-44.8	0.0	1.0	43.3	30.7	74.0	54.0	-30.7	-23.3	H
7.386	9.8	52.5	37.3	36.3	3.9	-44.5	0.0	1.0	49.1	34.0	74.0	54.0	-24.9	-20.0	H_NOISE FLOOR

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

YAGI – MYP24010PTRPC

05/07/04 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2645-1
Company: VIVATO
EUT Descrip.: 802.11b 2.4GHz BRIDGE / ROUTER
EUT M/N: MYP24010PTRPC_YAGI 10dB
Test Target: FCC15 CLASS B _ HARMONIC / SPUR
Mode Oper: TX LOW/ MID / HI _ CONFIG #1 (OMNI 11dBi VERTICAL & YAGI 10dBi HORIZONTAL_WLAN2:YAGI)

Test Equipment:

EMCO Horn 1-18GHz	Spectrum Analyzer	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz
T60; S/N: 2238 @3m	HP 8593EM Analyzer	T87 Miteq 924342		

Hi Frequency Cables: ☑ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Limit: FCC 15.205

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
LOW CH 2412MHz															
4.824	9.8	49.1	35.0	33.1	2.9	-44.7	0.0	1.0	41.4	27.2	74.0	54.0	-32.6	-26.8	V
12.060	9.8	48.9	35.8	39.3	6.2	-42.2	0.0	1.0	53.1	40.1	74.0	54.0	-20.9	-13.9	V_NOISE FLOOR
4.824	9.8	53.9	37.3	33.1	2.9	-44.7	0.0	1.0	46.1	29.6	74.0	54.0	-27.9	-24.4	H
12.060	9.8	48.4	35.7	39.3	6.2	-42.2	0.0	1.0	52.7	40.0	74.0	54.0	-21.3	-14.0	H_NOISE FLOOR
MID CH 2437MHz															
4.874	9.8	48.5	35.6	33.1	2.9	-44.7	0.0	1.0	40.8	27.9	74.0	54.0	-33.2	-26.1	V
7.311	9.8	50.6	36.8	36.2	3.8	-44.5	0.0	1.0	47.1	33.3	74.0	54.0	-26.9	-20.7	V_NOISE FLOOR
4.874	9.8	49.7	35.1	33.1	2.9	-44.7	0.0	1.0	42.0	27.4	74.0	54.0	-32.0	-26.6	H
7.311	9.8	50.4	36.8	36.2	3.8	-44.5	0.0	1.0	46.9	33.2	74.0	54.0	-27.1	-20.8	H_NOISE FLOOR
HI CH2462MHz															
4.924	9.8	49.1	35.7	33.2	2.9	-44.8	0.0	1.0	41.4	28.0	74.0	54.0	-32.6	-26.0	V
7.386	9.8	50.1	36.5	36.3	3.9	-44.5	0.0	1.0	46.8	33.2	74.0	54.0	-27.2	-20.8	V_NOISE FLOOR
4.924	9.8	55.5	43.3	33.2	2.9	-44.8	0.0	1.0	47.8	35.6	74.0	54.0	-26.2	-18.4	H
7.386	9.8	52.3	39.3	36.3	3.9	-44.5	0.0	1.0	49.0	36.0	74.0	54.0	-25.0	-18.0	H_NOISE FLOOR

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

CONFIG #2:

ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
OMNI	MFB24011PTRPC	11	VERTICAL	YAGI	MYP24010PTRPC	10	HORIZONTAL
					MYP24010PTRPC	10	HORIZONTAL

OMNI - MFB24011PTRPC

05/07/04 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2645-1
Company: VIVATO
EUT Descrip.: 802.11b 2.4GHz BRIDGE / ROUTER
EUT M/N: MFB24011PTRPC_OMNI 11dBi
Test Target: FCC15 CLASS B _ HARMONIC / SPUR
Mode Oper: TX LOW/ MID / HI _ CONFIG #2 (OMNI 11dBi VERTICAL & YAGI 10dBi HORIZONTAL_WLAN1: OMNI

Test Equipment:

EMCO Horn 1-18GHz	Spectrum Analyzer	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz
T60; S/N: 2238 @3m	HP 8593EM Analyzer	T87 Miteq 924342		

Hi Frequency Cables: ☑ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Limit: FCC 15.209

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
LOW CH 2412MHz															
4.824	9.8	51.4	37.6	33.1	2.9	-44.7	0.0	1.0	43.7	29.9	74.0	54.0	-30.3	-24.1	V
12.060	9.8	49.7	35.7	39.3	6.2	-42.2	0.0	1.0	54.0	40.0	74.0	54.0	-20.0	-14.0	V_NOISE FLOOR
4.824	9.8	52.3	39.3	33.1	2.9	-44.7	0.0	1.0	44.5	31.6	74.0	54.0	-29.5	-22.4	H
12.060	9.8	50.0	37.8	39.3	6.2	-42.2	0.0	1.0	54.3	42.1	74.0	54.0	-19.7	-11.9	H_NOISE FLOOR
MID CH 2437MHz															
4.874	9.8	51.4	36.7	33.1	2.9	-44.7	0.0	1.0	43.7	29.0	74.0	54.0	-30.3	-25.0	V
7.311	9.8	54.0	39.6	36.2	3.8	-44.5	0.0	1.0	50.5	36.1	74.0	54.0	-23.5	-17.9	V_NOISE FLOOR
4.874	9.8	53.2	39.7	33.1	2.9	-44.7	0.0	1.0	45.5	32.0	74.0	54.0	-28.5	-22.0	H
7.311	9.8	60.0	46.8	36.2	3.8	-44.5	0.0	1.0	56.5	43.2	74.0	54.0	-17.5	-10.8	H_NOISE FLOOR
HI CH2462MHz															
4.924	9.8	50.9	36.8	33.2	2.9	-44.8	0.0	1.0	43.2	29.1	74.0	54.0	-30.8	-24.9	V
7.386	9.8	51.4	37.5	36.3	3.9	-44.5	0.0	1.0	48.1	34.2	74.0	54.0	-25.9	-19.8	V_NOISE FLOOR
4.924	9.8	51.0	38.4	33.2	2.9	-44.8	0.0	1.0	43.3	30.7	74.0	54.0	-30.7	-23.3	H
7.386	9.8	52.5	37.3	36.3	3.9	-44.5	0.0	1.0	49.1	34.0	74.0	54.0	-24.9	-20.0	H_NOISE FLOOR

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

DUAL YAGI – MYP24010PTRPC

05/07/04 **High Frequency Measurement**

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2645-1
Company: VIVATO
EUT Descrip.: 802.11b 2.4GHz BRIDGE / ROUTER
EUT M/N: MYP24010TRPC_DUAL YAGI 10dBi
Test Target: FCC15 CLASS B _ HARMONIC / SPUR
Mode Oper: TX LOW/ MID / HI _ CONFIG #2 (OMNI 11dBi VERTICAL & DUAL YAGI 10dBi HORIZONTAL_WLAN2:YAGI))

Test Equipment:

EMCO Horn 1-18GHz	Spectrum Analyzer	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz
T60; S/N: 2238 @3m	HP 8593EM Analyzer	T87 Miteq 924342		

Hi Frequency Cables: ☑ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Limit: FCC 15.209

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
LOW CH 2412MHz															
4.824	9.8	48.5	35.4	33.1	2.9	-44.7	0.0	1.0	40.7	27.7	74.0	54.0	-33.3	-26.3	V
12.060	9.8	49.7	37.0	39.3	6.2	-42.2	0.0	1.0	54.0	41.3	74.0	54.0	-20.0	-12.7	V_NOISE FLOOR
4.824	9.8	49.9	35.5	33.1	2.9	-44.7	0.0	1.0	42.2	27.8	74.0	54.0	-31.8	-26.2	H
12.060	9.8	50.8	36.9	39.3	6.2	-42.2	0.0	1.0	55.1	41.2	74.0	54.0	-18.9	-12.8	H_NOISE FLOOR
MID CH 2437MHz															
4.874	9.8	49.5	35.6	33.1	2.9	-44.7	0.0	1.0	41.8	27.9	74.0	54.0	-32.2	-26.1	V
7.311	9.8	50.2	37.0	36.2	3.8	-44.5	0.0	1.0	46.7	33.5	74.0	54.0	-27.3	-20.5	V_NOISE FLOOR
4.874	9.8	48.7	35.8	33.1	2.9	-44.7	0.0	1.0	41.0	28.1	74.0	54.0	-33.0	-25.9	H
7.311	9.8	50.4	37.0	36.2	3.8	-44.5	0.0	1.0	46.9	33.5	74.0	54.0	-27.1	-20.5	H_NOISE FLOOR
HI CH2462MHz															
4.924	9.8	48.2	35.5	33.2	2.9	-44.8	0.0	1.0	40.5	27.8	74.0	54.0	-33.5	-26.2	V
7.386	9.8	50.0	36.8	36.3	3.9	-44.5	0.0	1.0	46.7	33.5	74.0	54.0	-27.3	-20.5	V_NOISE FLOOR
4.924	9.8	48.5	35.3	33.2	2.9	-44.8	0.0	1.0	40.8	27.6	74.0	54.0	-33.2	-26.4	H
7.386	9.8	51.2	36.7	36.3	3.9	-44.5	0.0	1.0	47.9	33.4	74.0	54.0	-26.1	-20.6	H_NOISE FLOOR

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

CONFIG #3:							
ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
PANEL	M24008XFPTRPC	8	HORIZONTAL	OMNI	SPSHG60	8.5	HORIZONTAL

PANEL – M24008XFPTRPC

05/10/04 **High Frequency Measurement**

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2645-1
Company: VIVATO
EUT Descrip.: 802.11b 2.4GHz BRIDGE / ROUTER
EUT M/N: PANEL 8dBi (MP24008XFPTRPC)
Test Target: FCC15 CLASS B _ HARMONIC / SPUR
Mode Oper: TX LOW/ MID / HI _ CONFIG #3 (PANEL 8dBi (MP24008XFPTRPC)_HORIZONTAL & OMNI 8.5dBi (SPHSG60) HORIZONTALL_ WLAN1: PANEL 8dBi)

Test Equipment:

EMCO Horn 1-18GHz	Spectrum Analyzer	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz
T60; S/N: 2238 @3m	HP 8593EM Analyzer	T87 Miteq 924342		

Hi Frequency Cables: ☑ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Limit: FCC 15.209

Peak Measurements: 1 MHz Resolution Bandwidth, 1MHz Video Bandwidth

Average Measurements: 1 MHz Resolution Bandwidth, 10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
LOW CH 2412MHz															
4.824	9.8	48.5	36.8	33.1	2.9	-44.7	0.0	1.0	40.7	29.1	74.0	54.0	-33.3	-24.9	V
12.060	9.8	45.0	35.0	39.3	6.2	-42.2	0.0	1.0	49.3	39.3	74.0	54.0	-24.7	-14.7	V_NOISE FLOOR
4.824	9.8	48.0	36.8	33.1	2.9	-44.7	0.0	1.0	40.3	29.1	74.0	54.0	-33.7	-24.9	H
12.060	9.8	46.6	35.9	39.3	6.2	-42.2	0.0	1.0	50.9	40.2	74.0	54.0	-23.1	-13.8	H_NOISE FLOOR
MID CH 2437MHz															
4.874	9.8	49.5	35.6	33.1	2.9	-44.7	0.0	1.0	41.8	27.9	74.0	54.0	-32.2	-26.1	V
7.311	9.8	50.2	36.7	36.2	3.8	-44.5	0.0	1.0	46.7	33.2	74.0	54.0	-27.3	-20.8	V_NOISE FLOOR
4.874	9.8	48.9	36.0	33.1	2.9	-44.7	0.0	1.0	41.2	28.3	74.0	54.0	-32.8	-25.7	H
7.311	9.8	50.4	37.0	36.2	3.8	-44.5	0.0	1.0	46.9	33.5	74.0	54.0	-27.1	-20.5	H_NOISE FLOOR
HI CH2462MHz															
4.924	9.8	50.0	36.8	33.2	2.9	-44.8	0.0	1.0	42.3	29.1	74.0	54.0	-31.7	-24.9	V
7.386	9.8	49.0	35.0	36.3	3.9	-44.5	0.0	1.0	45.7	31.7	74.0	54.0	-28.3	-22.3	V_NOISE FLOOR
4.924	9.8	48.5	35.3	33.2	2.9	-44.8	0.0	1.0	40.8	27.6	74.0	54.0	-33.2	-26.4	H
7.386	9.8	47.4	34.8	36.3	3.9	-44.5	0.0	1.0	44.1	31.5	74.0	54.0	-29.9	-22.5	H_NOISE FLOOR

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

OMNI – SPSHG60

05/10/04 **High Frequency Measurement**

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2645-1
Company: VIVATO
EUT Descrip.: 802.11b 2.4GHz BRIDGE / ROUTER
EUT M/N: SPHSG60_OMNI 8.5dBi
Test Target: FCC15 CLASS B _ HARMONIC / SPUR
Mode Oper: TX LOW/ MID / HI _ CONFIG #3 (PANEL 8dBi (MP24008XFPTRPC)_HORIZONTAL & OMNI 8.5dBi (SPHSG60) HORIZONTALL_ WLAN2: OMNI 8.5dBi)

Test Equipment:

EMCO Horn 1-18GHz	Spectrum Analyzer	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz
T60; S/N: 2238 @3m	HP 8593EM Analyzer	T87 Miteq 924342		

Hi Frequency Cables: ☑ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Limit: FCC 15.209

Peak Measurements: 1 MHz Resolution Bandwidth, 1MHz Video Bandwidth

Average Measurements: 1 MHz Resolution Bandwidth, 10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
LOW CH 2412MHz															
4.824	9.8	55.0	42.8	33.1	2.9	-44.7	0.0	1.0	47.3	35.1	74.0	54.0	-26.7	-18.9	V
12.060	9.8	46.0	36.0	39.3	6.2	-42.2	0.0	1.0	50.3	40.3	74.0	54.0	-23.7	-13.7	V_NOISE FLOOR
4.824	9.8	52.0	41.0	33.1	2.9	-44.7	0.0	1.0	44.3	33.3	74.0	54.0	-29.7	-20.7	H
12.060	9.8	46.6	35.9	39.3	6.2	-42.2	0.0	1.0	50.9	40.2	74.0	54.0	-23.1	-13.8	H_NOISE FLOOR
MID CH 2437MHz															
4.874	9.8	58.5	47.8	33.1	2.9	-44.7	0.0	1.0	50.8	40.1	74.0	54.0	-23.2	-13.9	V
7.311	9.8	53.0	43.0	36.2	3.8	-44.5	0.0	1.0	49.5	39.5	74.0	54.0	-24.5	-14.5	V_NOISE FLOOR
4.874	9.8	55.0	43.2	33.1	2.9	-44.7	0.0	1.0	47.3	35.5	74.0	54.0	-26.7	-18.5	H
7.311	9.8	49.2	36.7	36.2	3.8	-44.5	0.0	1.0	45.7	33.2	74.0	54.0	-28.3	-20.8	H_NOISE FLOOR
HI CH2462MHz															
4.924	9.8	59.4	47.2	33.2	2.9	-44.8	0.0	1.0	51.7	39.5	74.0	54.0	-22.3	-14.5	V
7.386	9.8	51.1	37.4	36.3	3.9	-44.5	0.0	1.0	47.8	34.1	74.0	54.0	-26.2	-19.9	V_NOISE FLOOR
4.924	9.8	54.8	43.6	33.2	2.9	-44.8	0.0	1.0	47.1	35.9	74.0	54.0	-26.9	-18.1	H
7.386	9.8	49.0	36.7	36.3	3.9	-44.5	0.0	1.0	45.7	33.4	74.0	54.0	-28.3	-20.6	H_NOISE FLOOR

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

CONFIG #4:							
ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
OMNI	SPSHG60	8.5	HORIZONTAL	OMNI	MFB24011PTRPC	11	VERTICAL

OMNI – SPSHG60

05/10/04 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2645-1
Company: VIVATO
EUT Descrip.: 802.11b 2.4GHz BRIDGE / ROUTER
EUT M/N: SPHSG60_OMNI 8.5dBi
Test Target: FCC15 CLASS B _ HARMONIC / SPUR
Mode Oper: TX LOW/ MID / HI _ CONFIG #4 (OMNI 8.5dBi (SPHSG60) HORIZONTAL & OMNI 11dBi (MFP24011PTRPC)_VERTICAL(WLAN1: OMN

Test Equipment:

EMCO Horn 1-18GHz	Spectrum Analyzer	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz
T60; S/N: 2238 @3m	HP 8593EM Analyzer	T87 Miteq 924342		

Hi Frequency Cables: ☑ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Limit: FCC 15.209

Peak Measurements: 1 MHz Resolution Bandwidth, 1MHz Video Bandwidth
Average Measurements: 1 MHz Resolution Bandwidth, 10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
LOW CH 2412MHz															
4.824	9.8	55.0	42.8	33.1	2.9	-44.7	0.0	1.0	47.3	35.1	74.0	54.0	-26.7	-18.9	V
12.060	9.8	46.0	36.0	39.3	6.2	-42.2	0.0	1.0	50.3	40.3	74.0	54.0	-23.7	-13.7	V_NOISE FLOOR
4.824	9.8	52.0	41.0	33.1	2.9	-44.7	0.0	1.0	44.3	33.3	74.0	54.0	-29.7	-20.7	H
12.060	9.8	46.6	35.9	39.3	6.2	-42.2	0.0	1.0	50.9	40.2	74.0	54.0	-23.1	-13.8	H_NOISE FLOOR
MID CH 2437MHz															
4.874	9.8	58.5	47.8	33.1	2.9	-44.7	0.0	1.0	50.8	40.1	74.0	54.0	-23.2	-13.9	V
7.311	9.8	53.0	43.0	36.2	3.8	-44.5	0.0	1.0	49.5	39.5	74.0	54.0	-24.5	-14.5	V_NOISE FLOOR
4.874	9.8	55.0	43.2	33.1	2.9	-44.7	0.0	1.0	47.3	35.5	74.0	54.0	-26.7	-18.5	H
7.311	9.8	49.2	36.7	36.2	3.8	-44.5	0.0	1.0	45.7	33.2	74.0	54.0	-28.3	-20.8	H_NOISE FLOOR
HI CH2462MHz															
4.924	9.8	59.4	47.2	33.2	2.9	-44.8	0.0	1.0	51.7	39.5	74.0	54.0	-22.3	-14.5	V
7.386	9.8	51.1	37.4	36.3	3.9	-44.5	0.0	1.0	47.8	34.1	74.0	54.0	-26.2	-19.9	V_NOISE FLOOR
4.924	9.8	54.8	43.6	33.2	2.9	-44.8	0.0	1.0	47.1	35.9	74.0	54.0	-26.9	-18.1	H
7.386	9.8	49.0	36.7	36.3	3.9	-44.5	0.0	1.0	45.7	33.4	74.0	54.0	-28.3	-20.6	H_NOISE FLOOR

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

OMNI - MFB24011PTRPC

05/07/04 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2645-1
Company: VIVATO
EUT Descrip.: 802.11b 2.4GHz BRIDGE / ROUTER
EUT M/N: MFB24011PTRPC_OMNI 11dBi
Test Target: FCC15 CLASS B _ HARMONIC / SPUR
Mode Oper: TX LOW/ MID / HI _ CONFIG #4 (OMNI 8.5dBi (SPHSG60) HORIZONTAL & OMNI 11dBi VERTICAL (WLAN2: OMNI 11dBi)

Test Equipment:

EMCO Horn 1-18GHz	Spectrum Analyzer	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz
T60; S/N: 2238 @3m	HP 8593EM Analyzer	T87 Miteq 924342		

Hi Frequency Cables: ☑ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Limit: FCC 15.209

Peak Measurements: 1 MHz Resolution Bandwidth, 1MHz Video Bandwidth

Average Measurements: 1 MHz Resolution Bandwidth, 10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
LOW CH 2412MHz															
4.824	9.8	50.5	36.7	33.1	2.9	-44.7	0.0	1.0	42.8	29.0	74.0	54.0	-31.2	-25.0	V
12.060	9.8	48.8	34.8	39.3	6.2	-42.2	0.0	1.0	53.1	39.1	74.0	54.0	-20.9	-14.9	V_NOISE FLOOR
4.824	9.8	51.4	38.4	33.1	2.9	-44.7	0.0	1.0	43.6	30.7	74.0	54.0	-30.4	-23.3	H
12.060	9.8	49.1	36.9	39.3	6.2	-42.2	0.0	1.0	53.4	41.2	74.0	54.0	-20.6	-12.8	H_NOISE FLOOR
MID CH 2437MHz															
4.874	9.8	50.5	35.8	33.1	2.9	-44.7	0.0	1.0	42.8	28.1	74.0	54.0	-31.2	-25.9	V
7.311	9.8	53.1	38.7	36.2	3.8	-44.5	0.0	1.0	49.6	35.2	74.0	54.0	-24.4	-18.8	V_NOISE FLOOR
4.874	9.8	52.3	38.8	33.1	2.9	-44.7	0.0	1.0	44.6	31.1	74.0	54.0	-29.4	-22.9	H
7.311	9.8	59.1	45.9	36.2	3.8	-44.5	0.0	1.0	55.6	42.3	74.0	54.0	-18.4	-11.7	H_NOISE FLOOR
HI CH2462MHz															
4.924	9.8	50.0	35.9	33.2	2.9	-44.8	0.0	1.0	42.3	28.2	74.0	54.0	-31.7	-25.8	V
7.386	9.8	50.5	36.6	36.3	3.9	-44.5	0.0	1.0	47.2	33.3	74.0	54.0	-26.8	-20.7	V_NOISE FLOOR
4.924	9.8	50.1	37.5	33.2	2.9	-44.8	0.0	1.0	42.4	29.8	74.0	54.0	-31.6	-24.2	H
7.386	9.8	51.6	36.4	36.3	3.9	-44.5	0.0	1.0	48.2	33.1	74.0	54.0	-25.8	-20.9	H_NOISE FLOOR

CONFIG #5:							
ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
OMNI	SPSHG60	8.5	HORIZONTAL	YAGI	MYP24010PTRPC	10	HORIZONTAL

OMNI – SPSHG60

05/10/04 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2645-1
Company: VIVATO
EUT Descrip.: 802.11b 2.4GHz BRIDGE / ROUTER
EUT M/N: SPHSG60_OMNI 8.5dBi
Test Target: FCC15 CLASS B _ HARMONIC / SPUR
Mode Oper: TX LOW/ MID / HI _ CONFIG #5 (OMNI 8.5dBi (SPHSG60) HORIZONTAL & YAGI 10dBi (MYP24010PTRPC) VERTICAL_WLAN1: OMNI)

Test Equipment:

EMCO Horn 1-18GHz	Spectrum Analyzer	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz
T60; S/N: 2238 @3m	HP 8593EM Analyzer	T87 Miteq 924342		

Hi Frequency Cables: ☑ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Limit: FCC 15.209

Peak Measurements: 1 MHz Resolution Bandwidth, 1MHz Video Bandwidth

Average Measurements: 1 MHz Resolution Bandwidth, 10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
LOW CH 2412MHz															
4.824	9.8	55.0	42.8	33.1	2.9	-44.7	0.0	1.0	47.3	35.1	74.0	54.0	-26.7	-18.9	V
12.060	9.8	46.0	36.0	39.3	6.2	-42.2	0.0	1.0	50.3	40.3	74.0	54.0	-23.7	-13.7	V_NOISE FLOOR
4.824	9.8	52.0	41.0	33.1	2.9	-44.7	0.0	1.0	44.3	33.3	74.0	54.0	-29.7	-20.7	H
12.060	9.8	46.6	35.9	39.3	6.2	-42.2	0.0	1.0	50.9	40.2	74.0	54.0	-23.1	-13.8	H_NOISE FLOOR
MID CH 2437MHz															
4.874	9.8	58.5	47.8	33.1	2.9	-44.7	0.0	1.0	50.8	40.1	74.0	54.0	-23.2	-13.9	V
7.311	9.8	53.0	43.0	36.2	3.8	-44.5	0.0	1.0	49.5	39.5	74.0	54.0	-24.5	-14.5	V_NOISE FLOOR
4.874	9.8	55.0	43.2	33.1	2.9	-44.7	0.0	1.0	47.3	35.5	74.0	54.0	-26.7	-18.5	H
7.311	9.8	49.2	36.7	36.2	3.8	-44.5	0.0	1.0	45.7	33.2	74.0	54.0	-28.3	-20.8	H_NOISE FLOOR
HI CH2462MHz															
4.924	9.8	59.4	47.2	33.2	2.9	-44.8	0.0	1.0	51.7	39.5	74.0	54.0	-22.3	-14.5	V
7.386	9.8	51.1	37.4	36.3	3.9	-44.5	0.0	1.0	47.8	34.1	74.0	54.0	-26.2	-19.9	V_NOISE FLOOR
4.924	9.8	54.8	43.6	33.2	2.9	-44.8	0.0	1.0	47.1	35.9	74.0	54.0	-26.9	-18.1	H
7.386	9.8	49.0	36.7	36.3	3.9	-44.5	0.0	1.0	45.7	33.4	74.0	54.0	-28.3	-20.6	H_NOISE FLOOR

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

YAGI – MYP24010PTRPC

05/12/04 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2645-1
Company: VIVATO
EUT Descrip.: 802.11b 2.4GHz BRIDGE / ROUTER
EUT M/N: MYP24011PTRPCYAGI 10dBi
Test Target: FCC15 CLASS B _ HARMONIC / SPUR
Mode Oper: TX LOW/ MID / HI _ CONFIG #5 (OMNI 8.5dBi HORIZONTAL & YAGI 10dBi VERTICAL_WLAN2:YAGI)

Test Equipment:

EMCO Horn 1-18GHz	Spectrum Analyzer	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz
T60; S/N: 2238 @3m	HP 8593EM Analyzer	T87 Miteq 924342		

Hi Frequency Cables: ☑ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Limit: FCC 15.209

Peak Measurements: 1 MHz Resolution Bandwidth, 1MHz Video Bandwidth
Average Measurements: 1 MHz Resolution Bandwidth, 10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
LOW CH 2412MHz															
4.824	9.8	48.8	35.6	33.1	2.9	-44.7	0.0	1.0	41.1	27.9	74.0	54.0	-32.9	-26.1	V
12.060	9.8	48.0	33.0	39.3	6.2	-42.2	0.0	1.0	52.3	37.3	74.0	54.0	-21.7	-16.7	V_NOISE FLOOR
4.824	9.8	46.0	34.6	33.1	2.9	-44.7	0.0	1.0	38.3	26.9	74.0	54.0	-35.7	-27.1	H
12.060	9.8	44.5	32.0	39.3	6.2	-42.2	0.0	1.0	48.8	36.3	74.0	54.0	-25.2	-17.7	H_NOISE FLOOR
MID CH 2437MHz															
4.874	9.8	53.9	40.6	33.1	2.9	-44.7	0.0	1.0	46.1	32.9	74.0	54.0	-27.9	-21.1	V
7.311	9.8	50.0	36.8	36.2	3.8	-44.5	0.0	1.0	46.5	33.3	74.0	54.0	-27.5	-20.7	V_NOISE FLOOR
4.874	9.8	47.8	35.1	33.1	2.9	-44.7	0.0	1.0	40.1	27.4	74.0	54.0	-33.9	-26.6	H
7.311	9.8	49.1	36.5	36.2	3.8	-44.5	0.0	1.0	45.6	33.0	74.0	54.0	-28.4	-21.0	H_NOISE FLOOR
HI CH2462MHz															
4.924	9.8	54.0	41.2	33.2	2.9	-44.8	0.0	1.0	46.2	33.5	74.0	54.0	-27.8	-20.5	V
7.386	9.8	48.7	37.0	36.3	3.9	-44.5	0.0	1.0	45.3	33.7	74.0	54.0	-28.7	-20.3	V_NOISE FLOOR
4.924	9.8	48.0	36.8	33.2	2.9	-44.8	0.0	1.0	40.3	29.1	74.0	54.0	-33.7	-24.9	H
7.386	9.8	50.0	37.0	36.3	3.9	-44.5	0.0	1.0	46.7	33.7	74.0	54.0	-27.3	-20.3	H_NOISE FLOOR

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

CONFIG #6:							
ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
PANEL	M24008XFPTRPC	8	HORIZONTAL	PANEL	M24008XFPTRPC	8	HORIZONTAL

PANEL – M24008XFPTRPC

05/14/04 **High Frequency Measurement**

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2645-1
Company: VIVATO
EUT Descrip.: 802.11b 2.4GHz BRIDGE / ROUTER
EUT M/N: MP24008XFPTRPC_PANEL 8dBi
Test Target: FCC15 CLASS B _ HARMONIC / SPUR
Mode Oper: TX LOW/ MID / HI _ CONFIG #6_PANEL 8dBi (MP24008XFPTRPC)_HORIZONTAL & PANEL 8dBi (MP24008XFPTRPC)_ WLAN1: PANEL 8dBi)

Test Equipment:

EMCO Horn 1-18GHz: T60; S/N: 2238 @3m
Spectrum Analyzer: HP 8593EM Analyzer
Pre-amplifer 1-26GHz: T87 Miteq 924342
Pre-amplifer 26-40GHz:
Horn > 18GHz:

Hi Frequency Cables: ☑ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Limit: FCC 15.209

Peak Measurements: 1 MHz Resolution Bandwidth, 1MHz Video Bandwidth
Average Measurements: 1 MHz Resolution Bandwidth, 10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
LOW CH 2412MHz															
4.824	9.8	51.9	39.6	33.1	2.9	-44.7	0.0	1.0	44.2	31.9	74.0	54.0	-29.8	-22.1	V
12.060	9.8	46.0	35.8	39.3	6.2	-42.2	0.0	1.0	50.3	40.1	74.0	54.0	-23.7	-13.9	V_NOISE FLOOR
4.824	9.8	50.2	37.7	33.1	2.9	-44.7	0.0	1.0	42.5	29.9	74.0	54.0	-31.5	-24.1	H
12.060	9.8	47.3	36.5	39.3	6.2	-42.2	0.0	1.0	51.6	40.8	74.0	54.0	-22.4	-13.2	H_NOISE FLOOR
MID CH 2437MHz															
4.874	9.8	55.9	43.8	33.1	2.9	-44.7	0.0	1.0	48.2	36.1	74.0	54.0	-25.8	-17.9	V
7.311	9.8	51.5	38.0	36.2	3.8	-44.5	0.0	1.0	47.9	34.5	74.0	54.0	-26.1	-19.5	V_NOISE FLOOR
4.874	9.8	50.0	37.3	33.1	2.9	-44.7	0.0	1.0	42.3	29.6	74.0	54.0	-31.7	-24.4	H
7.311	9.8	50.4	38.1	36.2	3.8	-44.5	0.0	1.0	46.9	34.6	74.0	54.0	-27.1	-19.4	H_NOISE FLOOR
HI CH2462MHz															
4.924	9.8	53.8	42.1	33.2	2.9	-44.8	0.0	1.0	46.1	34.4	74.0	54.0	-27.9	-19.6	V
7.386	9.8	51.7	37.6	36.3	3.9	-44.5	0.0	1.0	48.4	34.3	74.0	54.0	-25.6	-19.7	V_NOISE FLOOR
4.924	9.8	50.8	36.9	33.2	2.9	-44.8	0.0	1.0	43.0	29.2	74.0	54.0	-31.0	-24.8	H
7.386	9.8	48.8	35.7	36.3	3.9	-44.5	0.0	1.0	45.5	32.4	74.0	54.0	-28.5	-21.6	H_NOISE FLOOR

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

PANEL – M24008XFPTRPC

05/14/04 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2645-1
Company: VIVATO
EUT Descrip.: 802.11b 2.4GHz BRIDGE / ROUTER
EUT M/N: MP24008XFPTRPC_PANEL 8dBi
Test Target: FCC15 CLASS B _ HARMONIC / SPUR
Mode Oper: TX LOW/ MID / HI _ CONFIG #6_PANEL 8dBi (MP24008XFPTRPC)_HORIZONTAL & PANEL 8dBi (MP24008XFPTRPC)_ WLAN2: PANEL 8dBi)

Test Equipment:

EMCO Horn 1-18GHz	Spectrum Analyzer	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz
T60; S/N: 2238 @3m	HP 8593EM Analyzer	T87 Miteq 924342		

Hi Frequency Cables: ☑ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Limit: FCC 15.209

Peak Measurements: 1 MHz Resolution Bandwidth, 1MHz Video Bandwidth

Average Measurements: 1 MHz Resolution Bandwidth, 10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
LOW CH 2412MHz															
4.824	9.8	48.8	37.1	33.1	2.9	-44.7	0.0	1.0	41.0	29.4	74.0	54.0	-33.0	-24.6	V
12.060	9.8	45.3	35.3	39.3	6.2	-42.2	0.0	1.0	49.6	39.6	74.0	54.0	-24.4	-14.4	V_NOISE FLOOR
4.824	9.8	48.3	37.1	33.1	2.9	-44.7	0.0	1.0	40.6	29.4	74.0	54.0	-33.4	-24.6	H
12.060	9.8	46.9	36.2	39.3	6.2	-42.2	0.0	1.0	51.2	40.5	74.0	54.0	-22.8	-13.5	H_NOISE FLOOR
MID CH 2437MHz															
4.874	9.8	49.8	35.9	33.1	2.9	-44.7	0.0	1.0	42.1	28.2	74.0	54.0	-31.9	-25.8	V
7.311	9.8	50.5	37.0	36.2	3.8	-44.5	0.0	1.0	47.0	33.5	74.0	54.0	-27.0	-20.5	V_NOISE FLOOR
4.874	9.8	49.2	36.3	33.1	2.9	-44.7	0.0	1.0	41.5	28.6	74.0	54.0	-32.5	-25.4	H
7.311	9.8	50.7	37.3	36.2	3.8	-44.5	0.0	1.0	47.2	33.8	74.0	54.0	-26.8	-20.2	H_NOISE FLOOR
HI CH2462MHz															
4.924	9.8	50.3	37.1	33.2	2.9	-44.8	0.0	1.0	42.6	29.4	74.0	54.0	-31.4	-24.6	V
7.386	9.8	49.3	35.3	36.3	3.9	-44.5	0.0	1.0	46.0	32.0	74.0	54.0	-28.0	-22.0	V_NOISE FLOOR
4.924	9.8	48.8	35.6	33.2	2.9	-44.8	0.0	1.0	41.1	27.9	74.0	54.0	-32.9	-26.1	H
7.386	9.8	47.7	35.1	36.3	3.9	-44.5	0.0	1.0	44.4	31.8	74.0	54.0	-29.6	-22.2	H_NOISE FLOOR

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

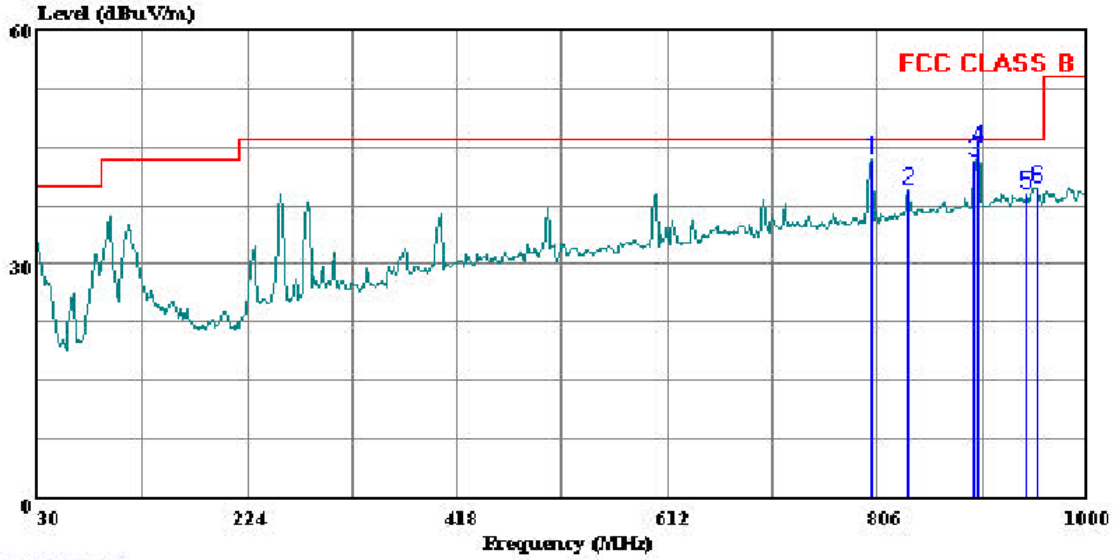
8.2.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

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

HORIZONTAL PLOT

COMPLIANCE Engineering Service, Inc.
561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 18 File#: VIVATO.EMI Date: 05-03-2004 Time: 12:31:48



(Audix ATC)
Trace: 17 Ref Trace:

Condition: FCC CLASS B_HORIZONTAL
Test Operator: : VIEN TRAN
Project #: : 04U2654-1
Company: : VIVATO
EUT: : 80211b 2.4GHz BRIDGE / ROUTER
Model No: : VIVATO WIFI BRIDGE / ROUTER
Configuration: : CONFIG #6: PANEL 15dBi &
: PANEL 8dBi/RS232/RJ45
Target of Test: : CISPR B
Mode of Operation: Tx WORST CASE
: 30-1000MHZ

HORIZONTAL DATA

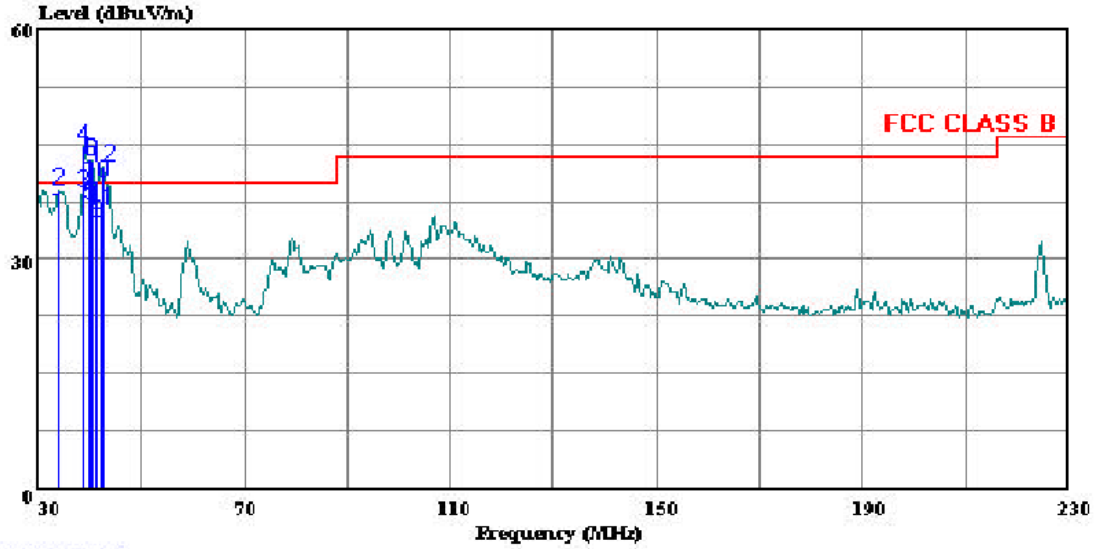
	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	800.180	Peak	18.39	25.02	43.41	46.00	-2.59
2	834.130	Peak	14.09	25.34	39.43	46.00	-6.57
3	895.240	Peak	16.87	26.12	42.99	46.00	-3.01
4	900.090	Peak	18.78	26.18	44.96	46.00	-1.04
5	943.740	Peak	12.16	26.88	39.04	46.00	-6.96
6	953.440	Peak	12.82	26.91	39.73	46.00	-6.27

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

VERTICAL PLOT _30-230MHz

COMPLIANCE Engineering Services, Inc.
561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 14 File#: VIVATO.EMI Date: 05-03-2004 Time: 12:16:29



Trace: 9 Ref Trace:

Condition: FCC CLASS B_VERICAL
Test Operator: : VIEN TRAN
Project #: : 04U2654-1
Company: : VIVATO
EUT: : 80211b 2.4GHz BRIDGE / ROUTER
Model No: : VIVATO WIFI BRIDGE / ROUTER
Configuration: : CONFIG #6: PANEL 15dBi &
: PANEL 8dBi/RS232/RJ45
Target of Test: : CISPR B
Mode of Operation: Tx WORST CASE

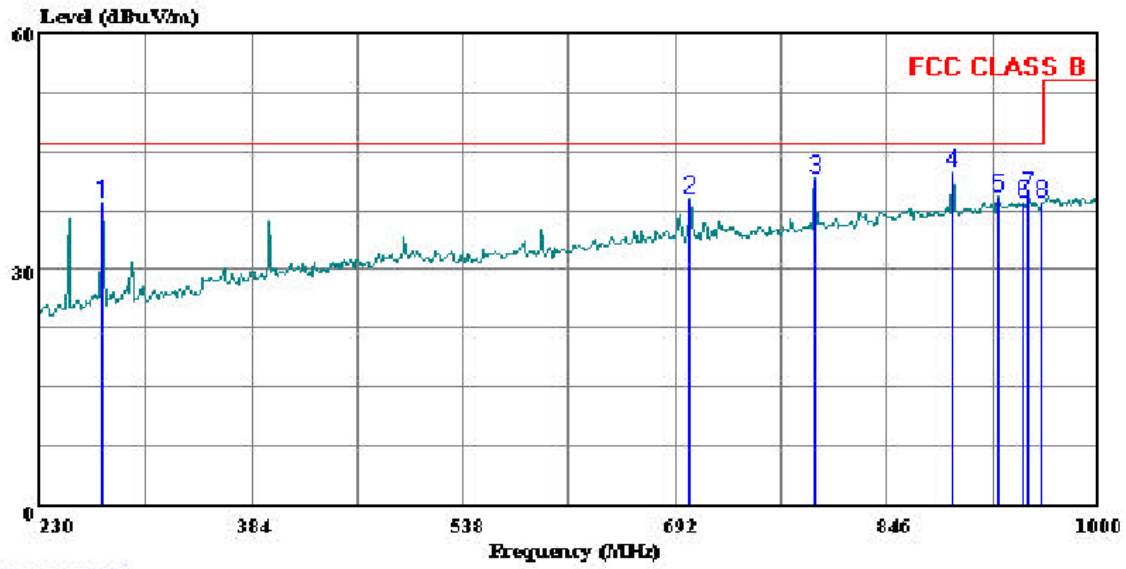
VERTICAL DATA_30-230MHz

		Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
		MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1		33.800	QP	15.60	20.15	35.75	40.00	-4.25
2		33.800	Peak	18.75	20.30	39.05	40.00	-0.95
3		38.800	QP	22.12	16.47	38.59	40.00	-1.41
4	*	38.800	Peak	28.09	16.63	44.72	40.00	4.72
5		40.000	QP	21.55	15.68	37.23	40.00	-2.77
6	*	40.000	Peak	27.11	15.73	42.84	40.00	2.84
7		40.400	QP	21.67	15.37	37.04	40.00	-2.96
8	*	40.400	Peak	27.48	15.37	42.85	40.00	2.85
9		41.200	QP	19.90	14.80	34.70	40.00	-5.30
10		41.200	Peak	25.05	14.87	39.92	40.00	-0.08
11		42.200	QP	22.35	14.05	36.40	40.00	-3.60
12	*	42.400	Peak	28.19	13.97	42.16	40.00	2.16

VERTICAL PLOT _230-1000MHz

COMPLIANCE Engineering Services, Inc.
561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-088
Fax: (408) 463-088

Data#: 16 File#: VIVATO.EMI Date: 05-03-2004 Time: 12:25:55



(Audix ATC)

Trace: 15 Ref Trace:

Condition: FCC CLASS B_VERTICAL
Test Operator: : VIEN TRAN
Project #: : 04U2654-1
Company: : VIVATO
EUT: : 80211b 2.4GHz BRIDGE / ROUTER
Model No: : VIVATO WIFI BRIDGE / ROUTER
Configuration: : CONFIG #6: PANEL 15dBi &
: PANEL 8dBi/RS232/RJ45
Target of Test: : CISPR B
Mode of Operation: Tx WORST CASE
: 230-1000MHZ

VERTICAL DATA_230-1000MHz

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	275.430	Peak	23.21	15.29	38.50	46.00	-7.50
2	702.780	Peak	15.27	23.59	38.86	46.00	-7.14
3	793.640	Peak	16.57	24.90	41.47	46.00	-4.53
4	893.740	Peak	16.17	26.09	42.26	46.00	-3.75
5	926.080	Peak	12.59	26.75	39.34	46.00	-6.66
6	945.330	Peak	11.65	26.87	38.51	46.00	-7.49

8.3. 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 µH/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

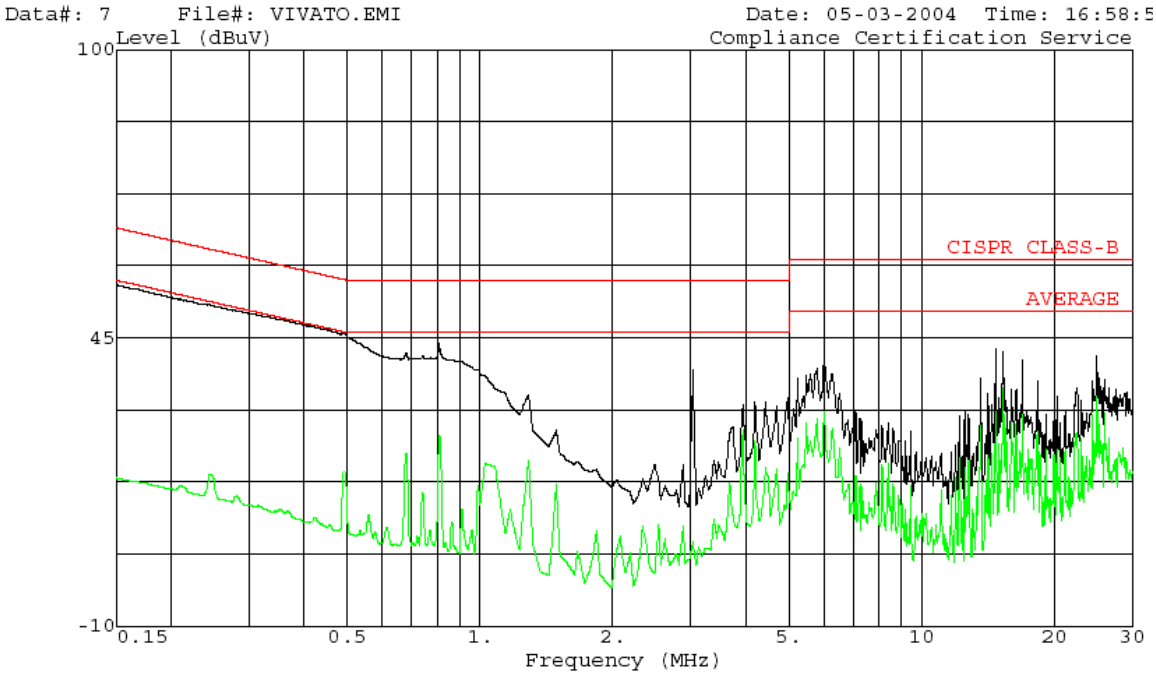
No non-compliance noted:

6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	47.60	--	18.40	0.00	66.00	56.00	-18.40	-37.60	L1
3.92	39.86	--	25.49	0.00	56.00	46.00	-16.14	-20.51	L1
14.75	43.80	--	36.00	0.00	60.00	50.00	-16.20	-14.00	L1
0.34	50.69	--	20.64	0.00	60.69	50.69	-10.00	-30.05	L2
0.81	44.04	--	29.91	0.00	56.00	46.00	-11.96	-16.09	L2
14.75	43.80	--	36.97	0.00	60.00	50.00	-16.20	-13.03	L2
6 Worst Data									

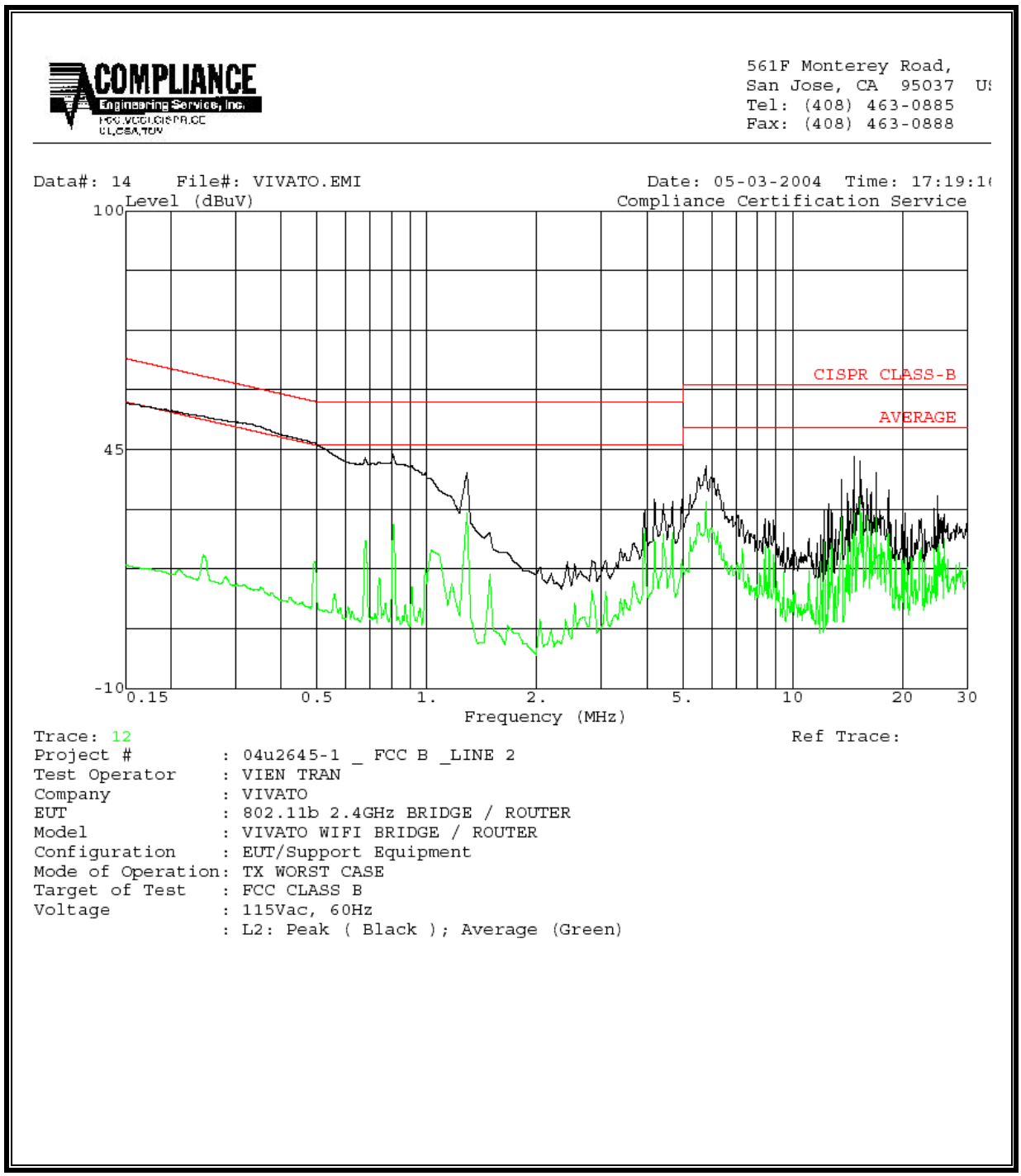
LINE 1 RESULTS

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



Trace: 5 Ref Trace:
Project # : 04u2645-1
Test Operator : VIEN TRAN
Company : VIVATO
EUT : 802.11b 2.4GHz BRIDGE / ROUTER
Model : VIVATO WIFI BRIDGE / ROUTER
Configuration : EUT/Support Equipment
Mode of Operation: TX WORST CASE
Target of Test : CISPR B
Voltage : 115Vac, 60Hz
: L1: Peak (Black); Average (Green)

LINE 2 RESULTS



9. SETUP PHOTOS

RADIATED RF MEASUREMENT SETUP

CONFIG #1:							
ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
OMNI	MFB24011PTRPC	11	VERTICAL	YAGI	MYP24010PTRPC	10	HORIZONTAL

RADIATED FRONT PHOTO

RADIATED BACK PHOTO

CONFIG #2:							
ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
OMNI	MFB24011PTRPC	11	VERTICAL	YAGI	MYP24010PTRPC	10	HORIZONTAL
					MYP24010PTRPC	10	HORIZONTAL

RADIATED FRONT PHOTO

RADIATED BACK PHOTO

CONFIG #3:							
ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
PANEL	M24008XFPTRPC	8	HORIZONTAL	OMNI	SPSHG60	8.5	HORIZONTAL

RADIATED FRONT PHOTO

RADIATED BACK PHOTO

CONFIG #4:							
ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
OMNI	SPSHG60	8.5	HORIZONTAL	OMNI	MFB24011PTRPC	11	VERTICAL

RADIATED FRONT PHOTO

RADIATED BACK PHOTO

CONFIG #5:							
ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
OMNI	SPSHG60	8.5	HORIZONTAL	YAGI	MYP24010PTRPC	10	HORIZONTAL

RADIATED FRONT PHOTO

RADIATED BACK PHOTO

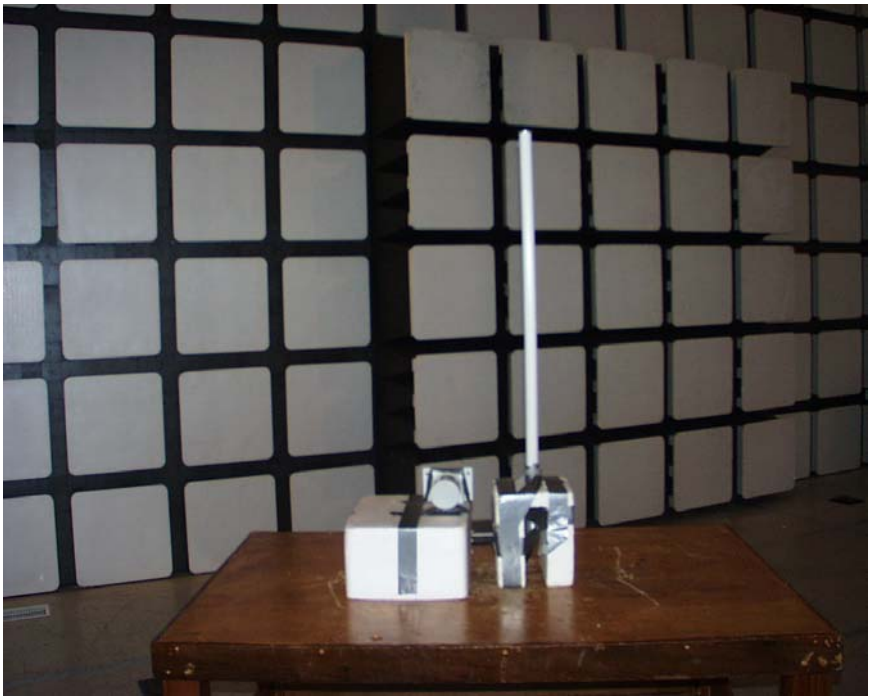
CONFIG #6:							
ANTENNA1	MODEL	GAIN 1 (dBi)	POLARIZATION	ANTENNA2	MODEL	GAIN 2 (dBi)	POLARIZATION
PANEL	M24008XFPTRPC	8	HORIZONTAL	PANEL	M24008XFPTRPC	8	HORIZONTAL

RADIATED BACK PHOTO

RADIATED FRONT PHOTO

DIGITAL DEVICE RADIATED EMISSIONS SETUP

DIGITAL DEVICE FRONT PHOTO



DIGITAL DEVICE BACK PHOTO

POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

LINE CONDUCTED FRONT PHOTO

LINE CONDUCTED BACK PHOTO

END OF REPORT