FCC CFR47 CLASS II PERMISSIVE CHANGE CERTIFICATION

TEST REPORT

FOR

802.11 a/b/g Mini-PCI Module

MODEL NUMBER: AR5BMB-44

FCC ID: PPD-AR5BMB-00044

REPORT NUMBER: 04U2852-1

ISSUE DATE: AUGUST 11, 2004

Prepared for
ATHEROS COMMUNICATIONS, INC.
529 ALMANOR AVENUE
SUNNYVALE, CA 94085
U.S.A.

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

TABLE OF CONTENTS

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

1. TEST RESULT CERTIFICATION

COMPANY NAME: ATHEROS COMMUNICATIONS, INC.
529 ALMANOR AVENUE
SUNNYVALE, CA 94085

EUT DESCRIPTION: 802.11 a/b/g Mini-PCI Module

MODEL: AR5BMB-44

DATE TESTED: JULY 22, 2004- AUGUST 2, 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:

YAN ZHENG
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

CHIN PANG
EMC TECHNICIAN
COMPLIANCE CERTIFICATION SERVICES

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

2. EUT DESCRIPTION

2.1. DESCRIPTION OF EUT

The EUT is an 802.11a/b/g transceiver Mini PCI card module.

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

Frequency Band (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	20.85	121.62
2412 - 2462	802.11g	24.45	278.61
2437	802.11g Turbo	24.34	271.64
5745 - 5825	802.11a	25.74	374.97
5760 - 5800	802.11a Turbo	24.38	274.16

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

2.2. DESCRIPTION OF CLASS II CHANGE

The radio utilizes two integrated omni directional antennas for diversity (main and auxiliary), each with an integrated coaxial cable. The models used for 2.4 GHz band testing are the Hitachi models 91P6810 (main) / 91P6811 (auxiliary). This antenna set has a maximum antenna assembly gain of 2 dBi in the 2.4 GHz band. The models used for 5.8 GHz band testing are the SMartAnt RO222-099 (main) / RO222-100 (auxiliary). This antenna set has a maximum antenna assembly gain of 3 dBi in the 5.8 GHz band.

Following is a complete list of available antennas:

Added Antennas

Antenna Part Number	Antenna Type	Peak Assembly Gains (with Cable Loss) (dBi)		
		Cable Lengths Main/Aux (mm)	Peak Gain in 2.4GHz (dBi)	Peak Gain 5.725-5.85GHz (dBi)
Foxconn 62P4204 (main) / 62P4203 (aux)	Integrated Omnidirectional	740/845	1	0
Hitachi 91P6841 (main) / 91P6840 (aux)	Integrated Omnidirectional	755/580	1	1
Hitachi 91P6812 (main) / 91P6813 (aux)	Integrated Omnidirectional	775/670	2	2
Hitachi 91P6810 (main) / 91P6811 (aux)	Integrated Omnidirectional	750/635	2	0
Nissei 13N5743 (main) / 13N5742 (aux)	Integrated Omnidirectional	488 / 449	2	2
SMartAnt RO222-099 (main) / RO222-100 (aux)	Integrated Omnidirectional	570/610	1	3
Nissei 08K4083 (main) / 08K4084 (aux)	Integrated Omnidirectional	394/534	1	0

Gain values above Include all cable losses. All antenna types are Omni Directional.
Nominal gain for all antennas above is 3 dBi or less in 5GHz band.
Nominal gain for all antennas above is 2 dBi or less in 2.4GHz bands.

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

3. 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.

4. 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.

NVLAP®

LAB CODE:200065-0

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

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

5. CALIBRATION AND UNCERTAINTY

5.1. 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.

5.2. 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%.

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

5.3. 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**
Spectrum Analyzer	Agilent	E4446A	MY43360112	1/13/2005
Peak Power Meter	Agilent	E4416A	GB41291160	11/7/2004
Peak / Average Power Sensor	Agilent	E9327A	US40440755	11/7/2004
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	2/4/2005
Antenna, Horn 18 ~ 26 GHz	ARA	SWH-28	1007	2/24/2005
Antenna, Horn 26 ~ 40 GHz	ARA	MWH-2640/B	1029	12/3/2004
PreAmplifier 1-26GHz	MITEQ	NSP2600-SP	924341	6/10/2005
PreAmplifier 26-40 GHz	MITEQ	NSP4000-SP2	924343	6/10/2005
7.6GHz High Pass Filter	Micro-tronics	HPM13195	SN-002	N/A
4.0GHz High Pass Filter	Micro-tronics	HPM13351	SN-001	N/A
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	11/20/2004
RF Filter Section	HP	85420E	3705A00256	11/20/2004
Bilog Antenna	Sunol Sciences	JB1	A121003	12/22/2004
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	10/13/2004
Line Filter	Lindgren	LMF-3489	497	CNR
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	10/13/2004

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
IBM Laptop	IBM	Thinkpad	NA	DOC
AC Adapter	IBM	NA	NA	DOC

I/O CABLES

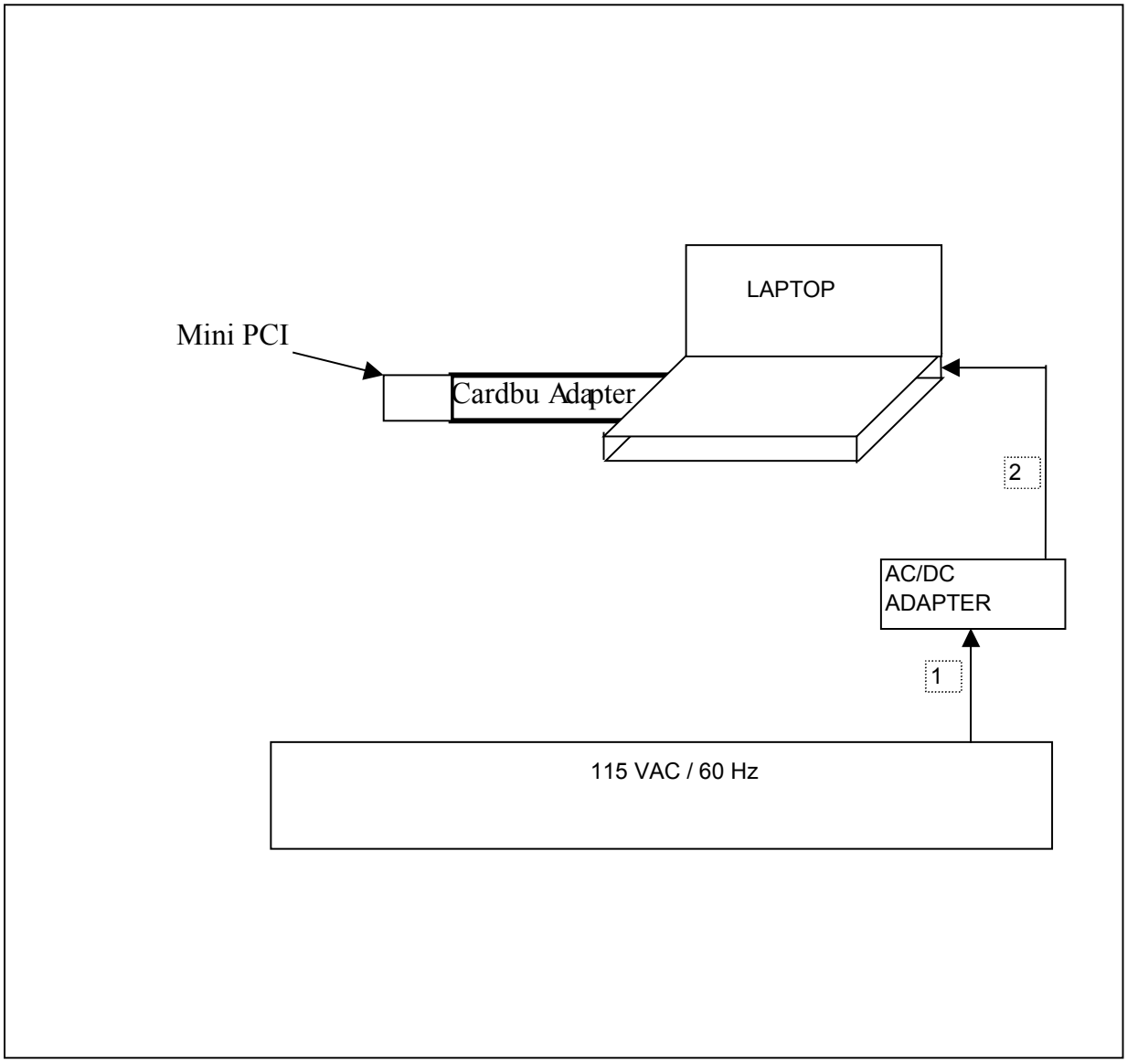
I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	1	US 115V	Un-shielded	2m	N/A
2	DC	1	DC	Un-shielded	1m	N/A

TEST SETUP

The EUT is installed in a host laptop computer via a cardbus-to-miniPCI adapter / extension board during the tests. Test software exercised the radio card.

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

SETUP DIAGRAM FOR TESTS



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

APPLICABLE LIMITS AND TEST RESULTS

7.1. RADIATED EMISSIONS

7.1.1. 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.

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

§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.

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

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 of 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 of the 5.8 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.

RESULTS

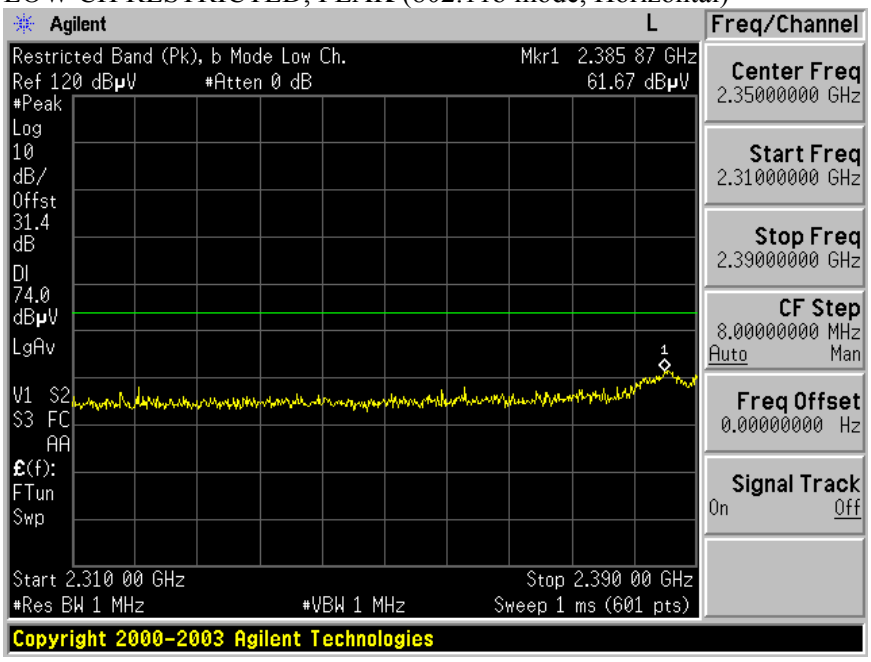
No non-compliance noted:

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

7.1.2. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHZ

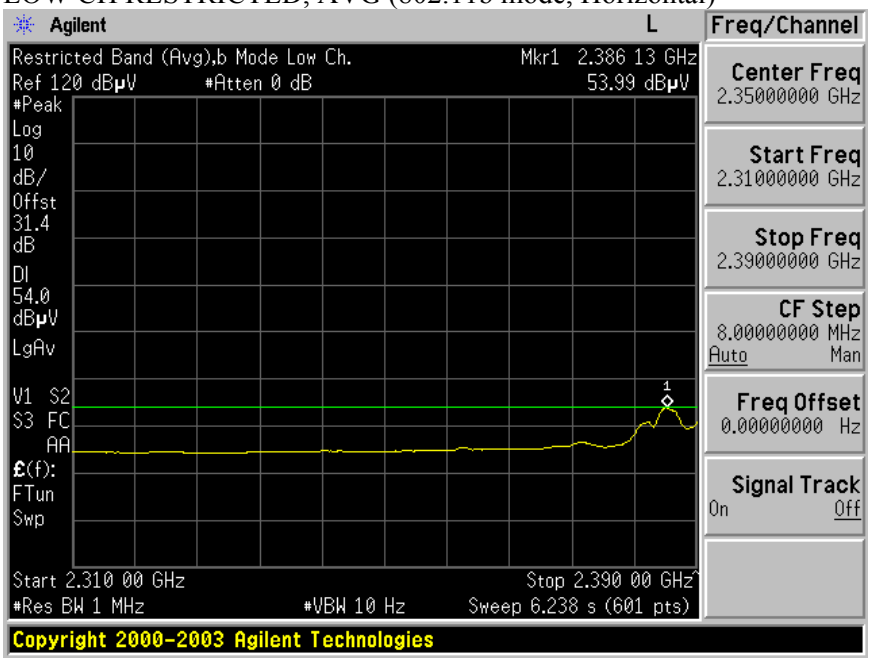
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

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



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

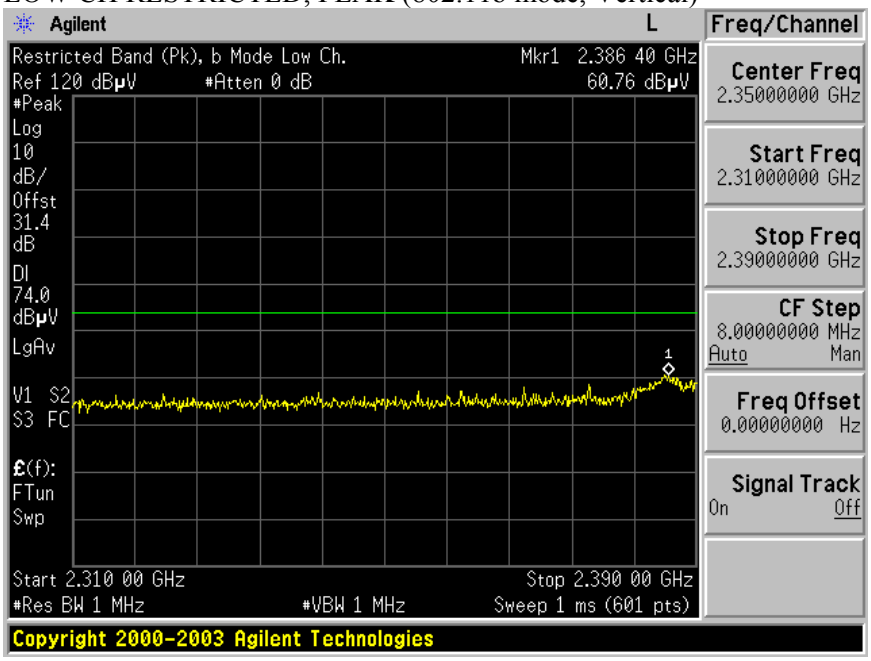
LOW CH RESTRICTED, AVG (802.11b mode, Horizontal)



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

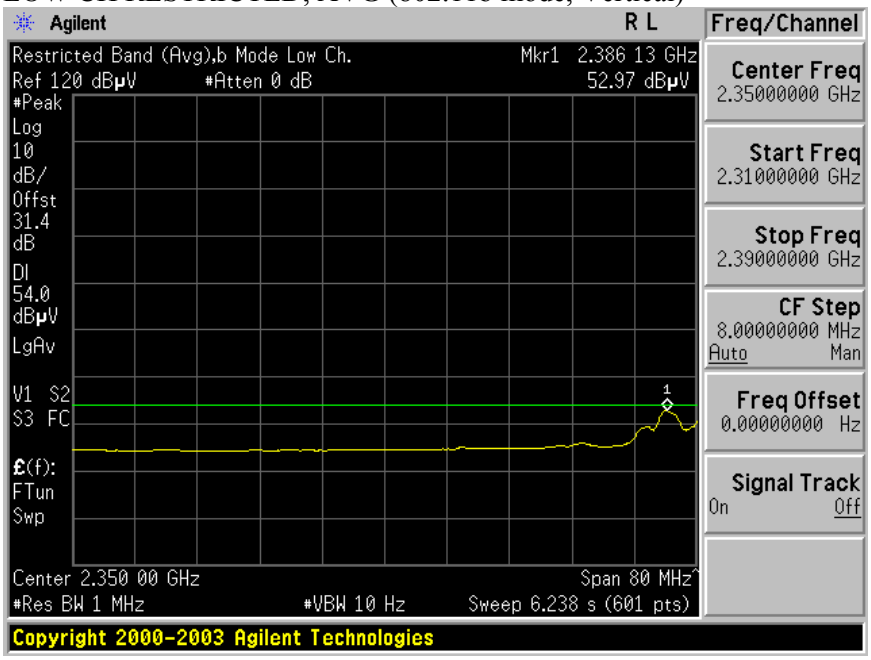
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

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



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

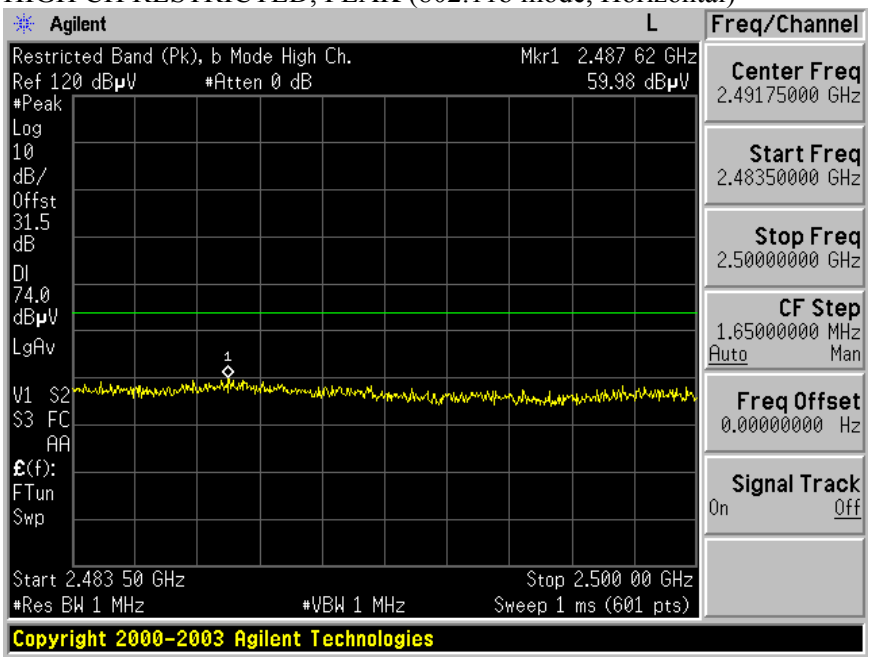
LOW CH RESTRICTED, AVG (802.11b mode, Vertical)



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

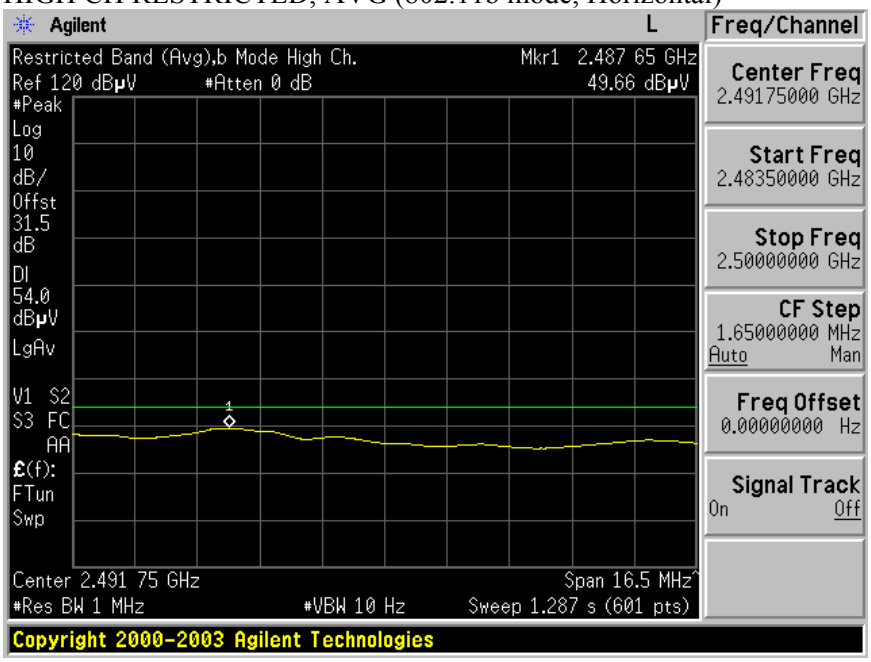
RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

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



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

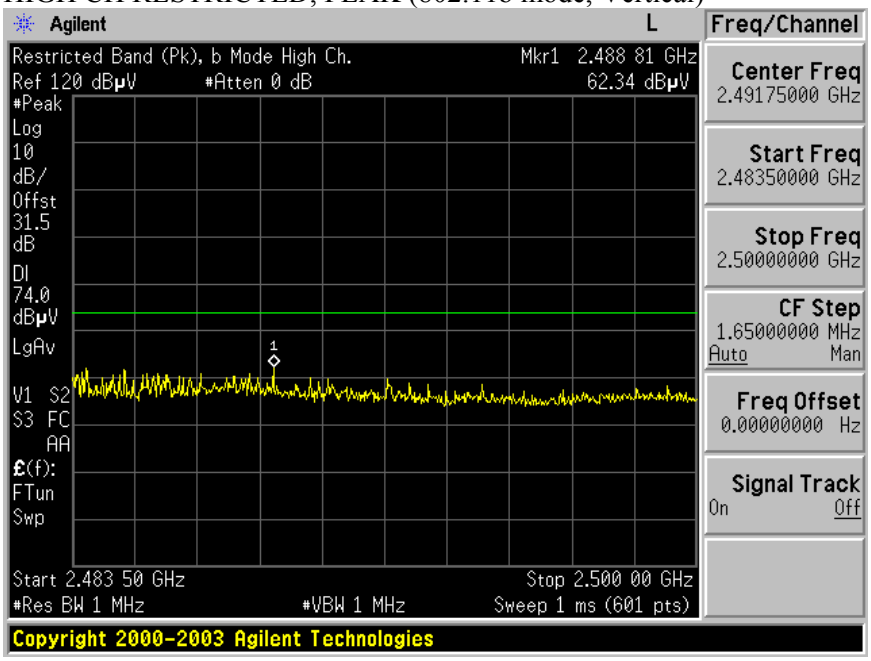
HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

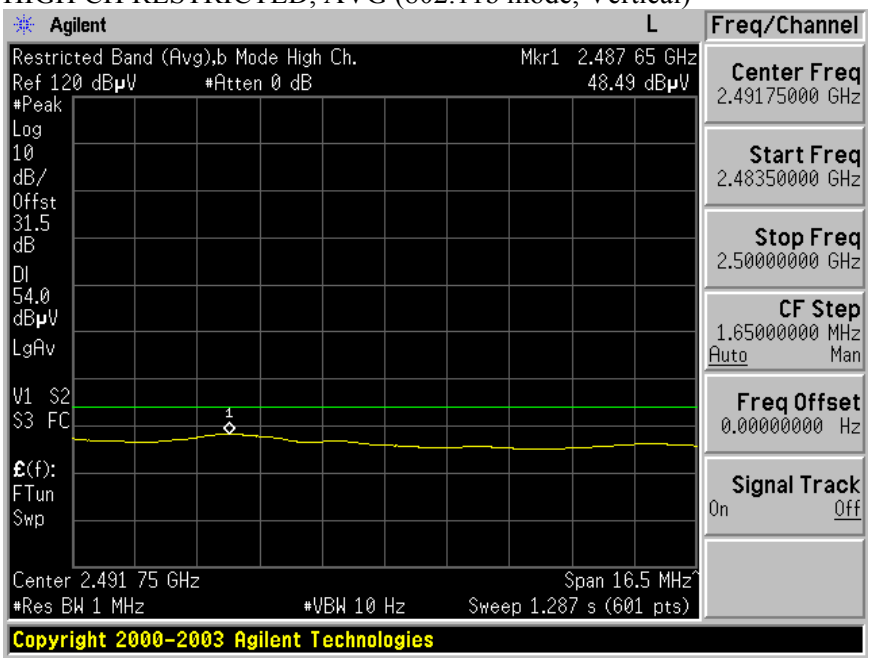
RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

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



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

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



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

HARMONICS AND SPURIOUS EMISSIONS (b MODE)

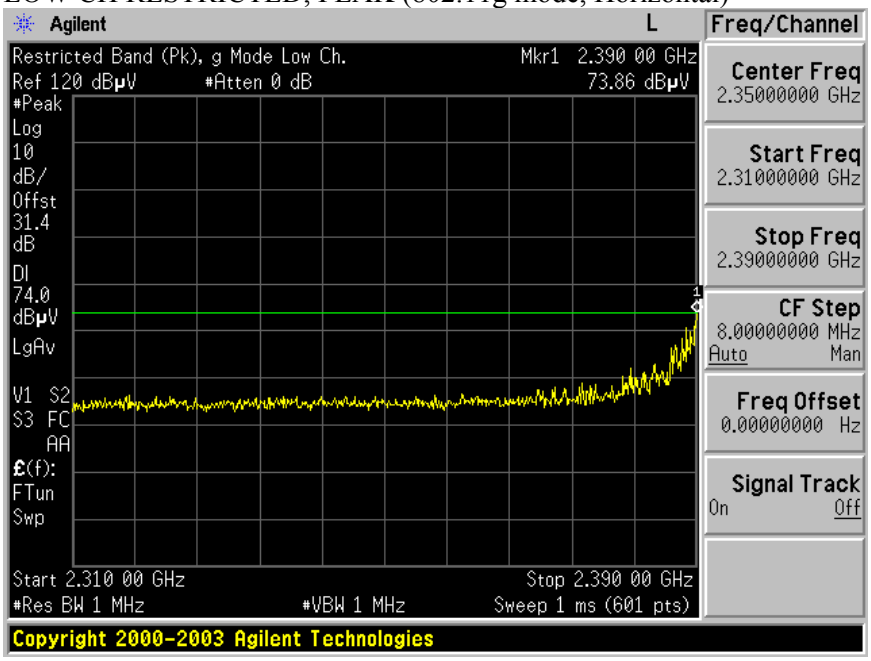
f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
b Mode, 2412MHz															
4.824	9.8	54.2	36.4	33.4	3.0	-35.3	0.0	1.0	56.2	38.3	74.0	54.0	-17.8	-15.7	V
4.824	9.8	49.9	37.0	33.4	3.0	-35.3	0.0	1.0	51.8	39.0	74.0	54.0	-22.2	-15.0	H
7.236	9.8	45.8	35.2	35.7	3.9	-34.6	0.0	1.0	51.7	41.1	74.0	54.0	-22.3	-12.9	V
7.236	9.8	43.6	31.8	35.7	3.9	-34.6	0.0	1.0	49.5	37.7	74.0	54.0	-24.5	-16.3	H
b Mode, 2437MHz															
4.874	9.8	53.0	33.7	33.4	3.0	-35.3	0.0	1.0	55.1	35.7	74.0	54.0	-18.9	-18.3	V
4.874	9.8	49.9	35.5	33.4	3.0	-35.3	0.0	1.0	52.0	37.6	74.0	54.0	-22.0	-16.4	H
7.311	9.8	46.0	36.2	35.8	3.9	-34.6	0.0	1.0	52.2	42.3	74.0	54.0	-21.8	-11.7	V
7.311	9.8	45.9	34.5	35.8	3.9	-34.6	0.0	1.0	52.0	40.6	74.0	54.0	-22.0	-13.4	H
b Mode, 2462MHz															
4.924	9.8	49.1	36.2	33.5	3.0	-35.3	0.0	1.0	51.2	38.3	74.0	54.0	-22.8	-15.7	V
4.924	9.8	51.0	37.8	33.5	3.0	-35.3	0.0	1.0	53.2	40.0	74.0	54.0	-20.8	-14.0	H
7.386	9.8	51.0	41.1	36.0	3.9	-34.5	0.0	1.0	57.3	47.4	74.0	54.0	-16.7	-6.6	V
7.386	9.8	50.3	41.6	36.0	3.9	-34.5	0.0	1.0	56.6	47.9	74.0	54.0	-17.4	-6.1	H

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		

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

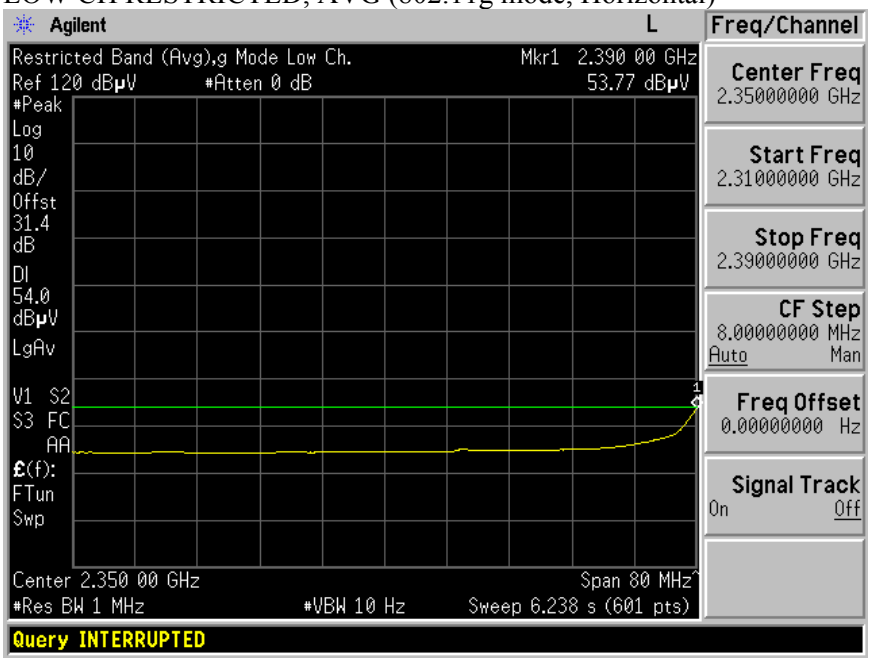
RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)

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



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

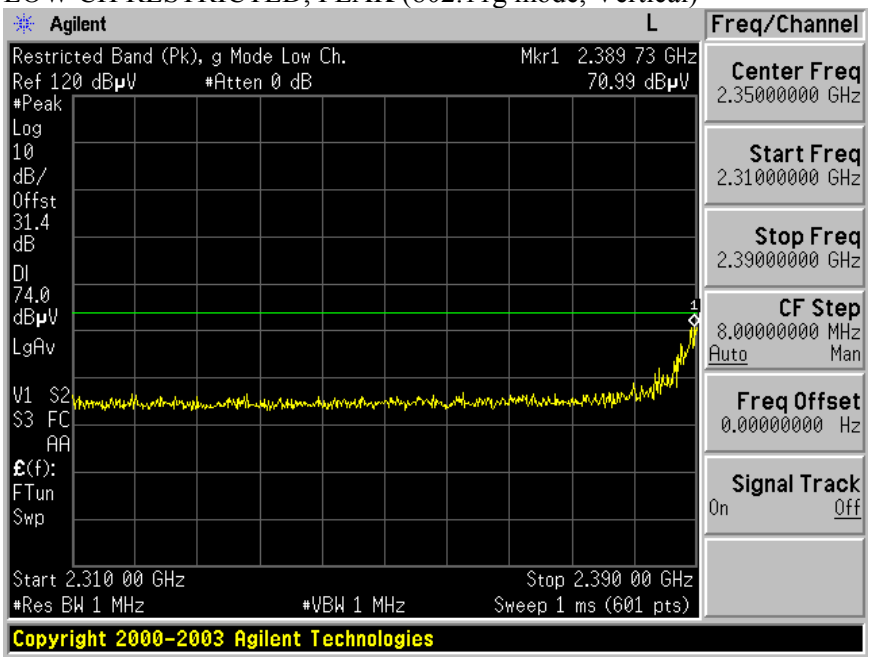
LOW CH RESTRICTED, AVG (802.11g mode, Horizontal)



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

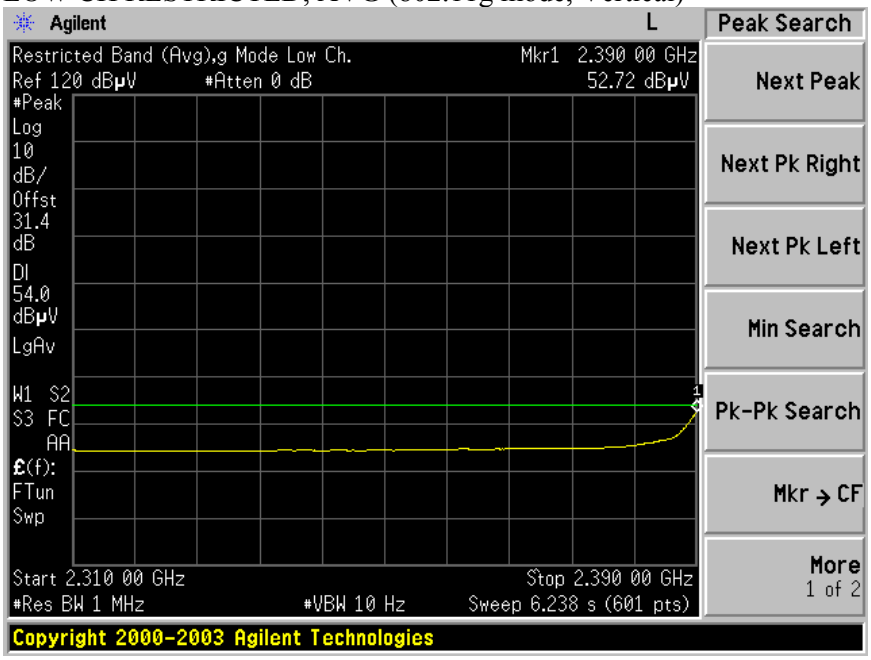
RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)

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



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

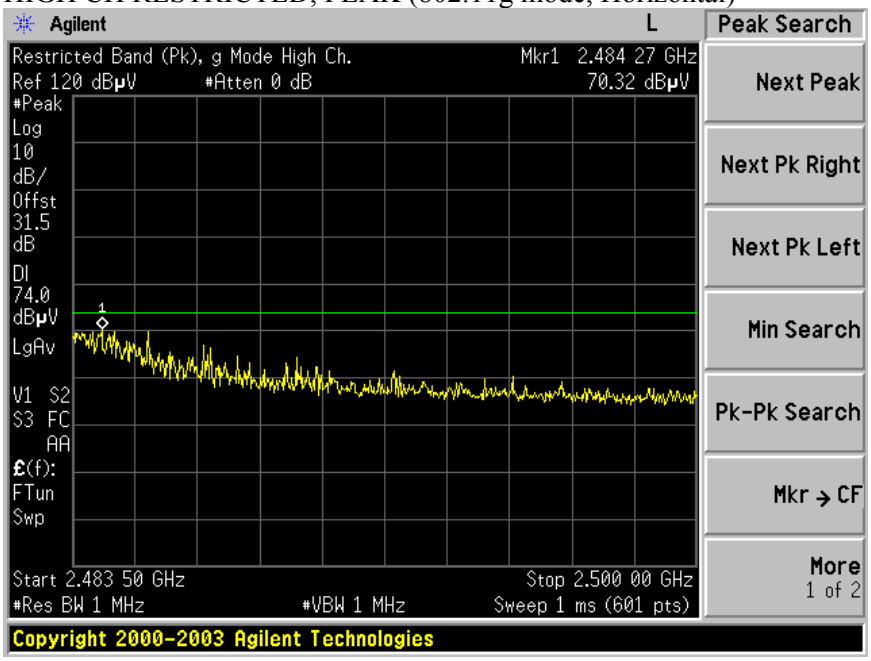
LOW CH RESTRICTED, AVG (802.11g mode, Vertical)



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

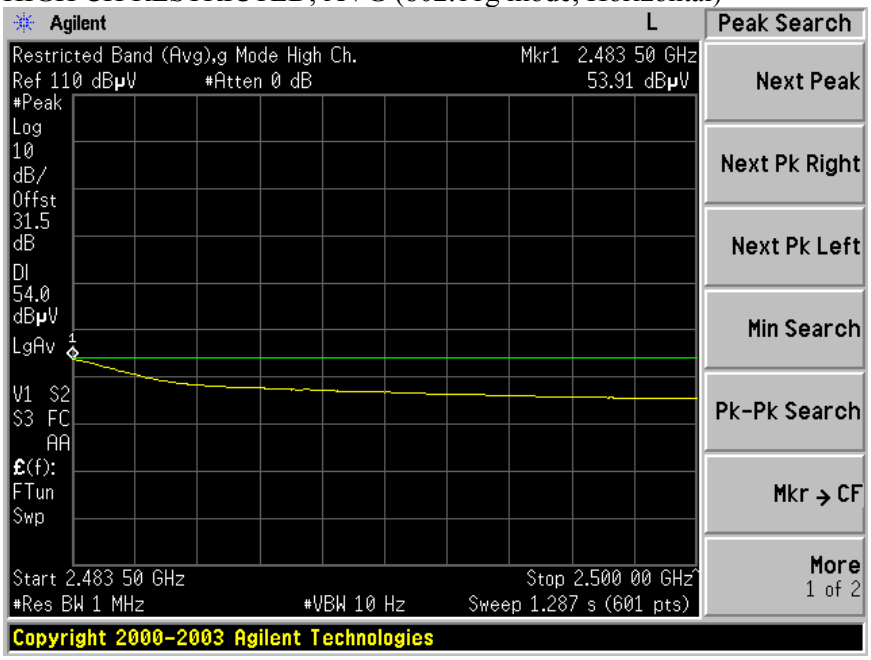
RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)

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



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

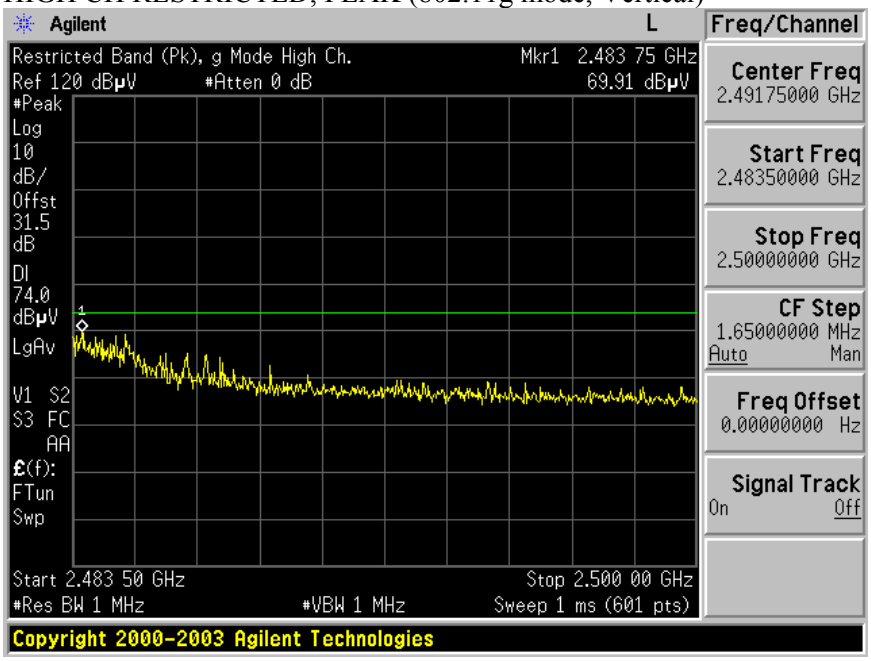
HIGH CH RESTRICTED, AVG (802.11g mode, Horizontal)



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

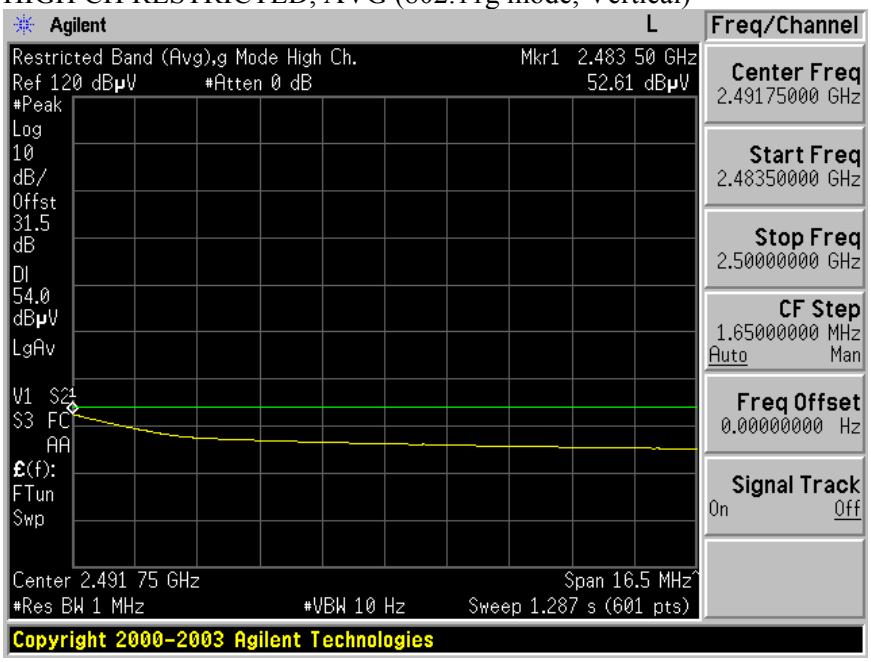
RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)

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



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

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



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

HARMONICS AND SPURIOUS EMISSIONS (g MODE)

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
g Mode, 2412MHz															
4.824	9.8	50.7	35.3	33.4	3.0	-35.3	0.0	1.0	52.7	37.2	74.0	54.0	-21.3	-16.8	V
4.824	9.8	47.0	35.0	33.4	3.0	-35.3	0.0	1.0	49.0	37.0	74.0	54.0	-25.0	-17.0	H
7.236	9.8	53.5	38.9	35.7	3.9	-34.6	0.0	1.0	59.4	44.8	74.0	54.0	-14.6	-9.2	V
7.236	9.8	49.7	35.9	35.7	3.9	-34.6	0.0	1.0	55.6	41.8	74.0	54.0	-18.4	-12.2	H
g Mode, 2437MHz															
4.874	9.8	46.8	33.7	33.4	3.0	-35.3	0.0	1.0	48.9	35.7	74.0	54.0	-25.1	-18.3	V
4.874	9.8	47.0	35.1	33.4	3.0	-35.3	0.0	1.0	49.1	37.2	74.0	54.0	-24.9	-16.8	H
7.311	9.8	58.2	42.4	35.8	3.9	-34.6	0.0	1.0	64.3	48.5	74.0	54.0	-9.7	-5.5	V
7.311	9.8	55.1	41.4	35.8	3.9	-34.6	0.0	1.0	61.3	47.5	74.0	54.0	-12.7	-6.5	H
g Mode, 2462MHz															
4.924	9.8	46.3	34.4	33.5	3.0	-35.3	0.0	1.0	48.4	36.5	74.0	54.0	-25.6	-17.5	V
4.924	9.8	53.1	41.0	33.5	3.0	-35.3	0.0	1.0	55.2	43.2	74.0	54.0	-18.8	-10.8	H
7.386	9.8	56.3	43.0	36.0	3.9	-34.5	0.0	1.0	62.7	49.3	74.0	54.0	-11.3	-4.7	V
7.386	9.8	54.0	40.3	36.0	3.9	-34.5	0.0	1.0	60.3	46.6	74.0	54.0	-13.7	-7.4	H

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		

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

HARMONICS AND SPURIOUS EMISSIONS (g TURBO MODE)

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
g Turbo Mode, 2437MHz															
4.874	9.8	43.3	31.6	33.4	3.0	-35.3	0.0	1.0	45.4	33.7	74.0	54.0	-28.6	-20.3	V
4.874	9.8	46.8	34.2	33.4	3.0	-35.3	0.0	1.0	48.9	36.3	74.0	54.0	-25.1	-17.7	H
7.311	9.8	52.8	39.9	35.8	3.9	-34.6	0.0	1.0	58.9	46.1	74.0	54.0	-15.1	-7.9	V
7.311	9.8	48.3	35.7	35.8	3.9	-34.6	0.0	1.0	54.4	41.8	74.0	54.0	-19.6	-12.2	H

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		

COMPLIANCE CERTIFICATION SERVICES DOCUMENT NO: CCSUP4031A
561F MONTEREY ROAD, MORGAN HILL, CA 95037 USA TEL: (408) 463-0885 FAX: (408) 463-0888
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

HARMONICS AND SPURIOUS EMISSIONS (a MODE)

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
a Mode, 5745MHz															
11.490	9.8	58.6	47.0	38.8	4.9	-41.5	0.0	1.0	61.7	50.1	74.0	54.0	-12.3	-3.9	V
11.490	9.8	52.7	42.6	38.8	4.9	-41.5	0.0	1.0	55.7	45.7	74.0	54.0	-18.3	-8.3	H
17.235	9.8	57.8	45.9	41.5	6.1	-46.1	0.0	1.0	60.3	48.4	74.0	54.0	-13.7	-5.6	V
17.235	9.8	59.3	48.7	41.5	6.1	-46.1	0.0	1.0	61.8	51.2	74.0	54.0	-12.2	-2.8	H
a Mode, 5785MHz															
11.570	9.8	64.2	49.7	38.8	4.9	-41.6	0.0	1.0	67.3	52.8	74.0	54.0	-6.7	-1.2	V
11.570	9.8	58.7	47.1	38.8	4.9	-41.6	0.0	1.0	61.8	50.1	74.0	54.0	-12.2	-3.9	H
17.355	9.8	61.7	48.8	42.2	6.2	-46.0	0.0	1.0	65.0	52.1	74.0	54.0	-9.0	-1.9	V
17.355	9.8	60.6	48.2	42.2	6.2	-46.0	0.0	1.0	63.9	51.5	74.0	54.0	-10.1	-2.5	H
a Mode, 5825MHz															
11.650	9.8	64.6	50.2	38.9	4.9	-41.7	0.0	1.0	67.6	53.2	74.0	54.0	-6.4	-0.8	V
11.650	9.8	63.8	50.3	38.9	4.9	-41.7	0.0	1.0	66.8	53.4	74.0	54.0	-7.2	-0.6	H
17.475	9.8	57.9	45.5	43.0	6.2	-46.0	0.0	1.0	62.0	49.6	74.0	54.0	-12.0	-4.4	V
17.475	9.8	58.6	47.0	43.0	6.2	-46.0	0.0	1.0	62.7	51.1	74.0	54.0	-11.3	-2.9	H

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		

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

HARMONICS AND SPURIOUS EMISSIONS (a TURBO MODE)

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
a turbo Mode, 5760MHz															
11.520	9.8	57.5	44.5	38.8	4.9	-41.5	0.0	1.0	60.6	47.6	74.0	54.0	-13.4	-6.4	V
11.520	9.8	54.0	42.0	38.8	4.9	-41.5	0.0	1.0	57.1	45.1	74.0	54.0	-16.9	-8.9	H
17.280	9.8	59.4	47.0	41.8	6.1	-46.1	0.0	1.0	62.2	49.8	74.0	54.0	-11.8	-4.2	V
17.280	9.8	58.5	47.0	41.8	6.1	-46.1	0.0	1.0	61.3	49.8	74.0	54.0	-12.7	-4.2	H
a turbo Mode, 5805MHz															
11.610	9.8	60.0	47.8	38.9	4.9	-41.6	0.0	1.0	63.1	50.9	74.0	54.0	-10.9	-3.1	V
11.610	9.8	58.3	46.9	38.9	4.9	-41.6	0.0	1.0	61.4	49.9	74.0	54.0	-12.6	-4.1	H
17.415	9.8	57.5	45.3	42.6	6.2	-46.0	0.0	1.0	61.2	49.0	74.0	54.0	-12.8	-5.0	V
17.415	9.8	61.3	49.0	42.6	6.2	-46.0	0.0	1.0	65.0	52.7	74.0	54.0	-9.0	-1.3	H

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		

COMPLIANCE CERTIFICATION SERVICES DOCUMENT NO: CCSUP4031A
561F MONTEREY ROAD, MORGAN HILL, CA 95037 USA TEL: (408) 463-0885 FAX: (408) 463-0888
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

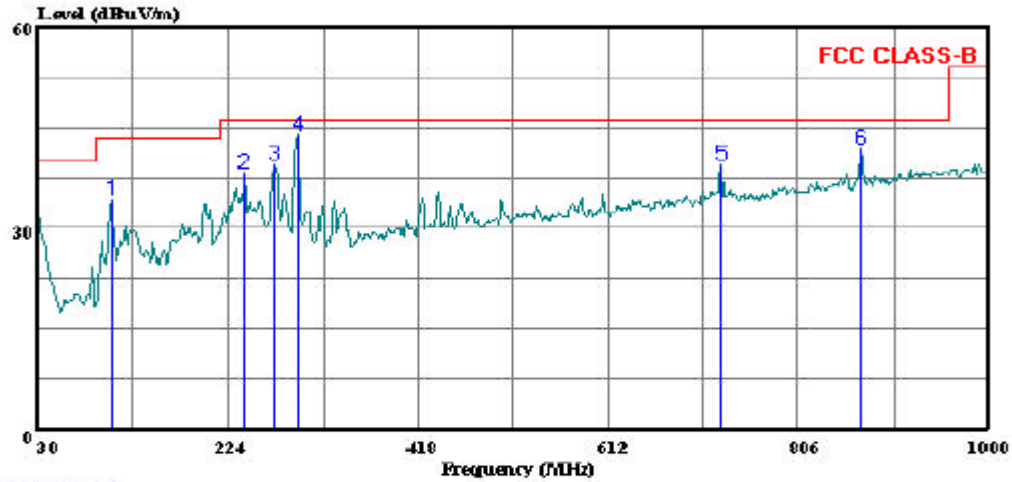
7.1.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

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

HORIZONTAL PLOT

561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 8 File#: atheros_04u2852.EMI
Date: 08-04-2004 Time: 21:53:14



(Audix ATC)
Trace: 7 Ref Trace:

Condition: FCC CLASS-B 3m SUNOL BILOG 12/22/04 HORIZONTAL
Test Operator: : Chin Pang
Project #: : 04U2852
Company: : Atheros
EUT: : 802,11a/b/g Mini-PCI Transceiver
Model No: : AR5BMB-00044 (Class II Change)
Configuration: : EUT Only
: MODEM)
Target of Test: : FCC Class B
Mode of Operation: TX (at Worse Case)

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

HORIZONTAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	104.690	Peak	22.18	12.11	34.29	43.50	-9.21
2	240.490	Peak	24.34	13.73	38.07	46.00	-7.93
3	271.530	Peak	24.35	15.15	39.50	46.00	-6.50
4	295.780	Peak	28.14	15.84	43.98	46.00	-2.03
5	727.430	Peak	15.31	24.22	39.53	46.00	-6.47
6	870.990	Peak	16.11	25.61	41.72	46.00	-4.28

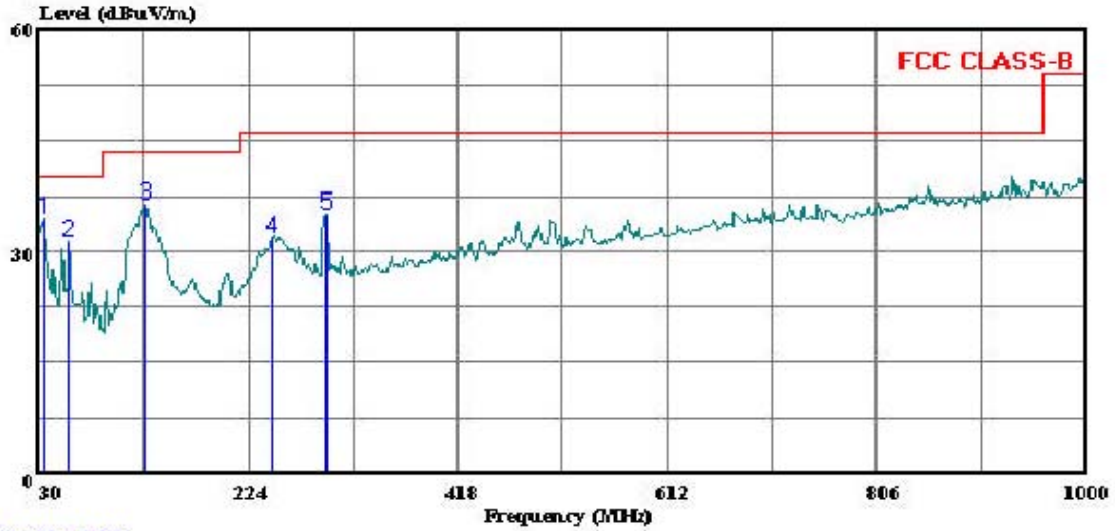
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

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

VERTICAL PLOT

561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 6 File#: atheros_04u2852.EMI
Date: 08-04-2004 Time: 21:50:10



(Audix ATC)
Trace: 5 Ref Trace:

Condition: FCC CLASS-B 3m SUNOL BILOG 12/22/04 VERTICAL
Test Operator: : Chin Pang
Project #: : 04U2852
Company: : Atheros
EUT: : 802,11a/b/g Mini-PCI Transceiver
Model No: : AR5BMB-00044 (Class II Change)
Configuration: : EUT Only
: MODEM)
Target of Test: : FCC Class B
Mode of Operation: TX (at Worse Case)

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

VERTICAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	33.880	Peak	13.92	20.70	34.62	40.00	-5.38
2	58.130	Peak	22.65	8.73	31.38	40.00	-8.62
3	128.940	Peak	20.73	15.53	36.26	43.50	-7.24
4	246.310	Peak	18.14	13.90	32.04	46.00	-13.96
5	295.780	Peak	19.14	15.84	34.98	46.00	-11.03

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

7.2. 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:

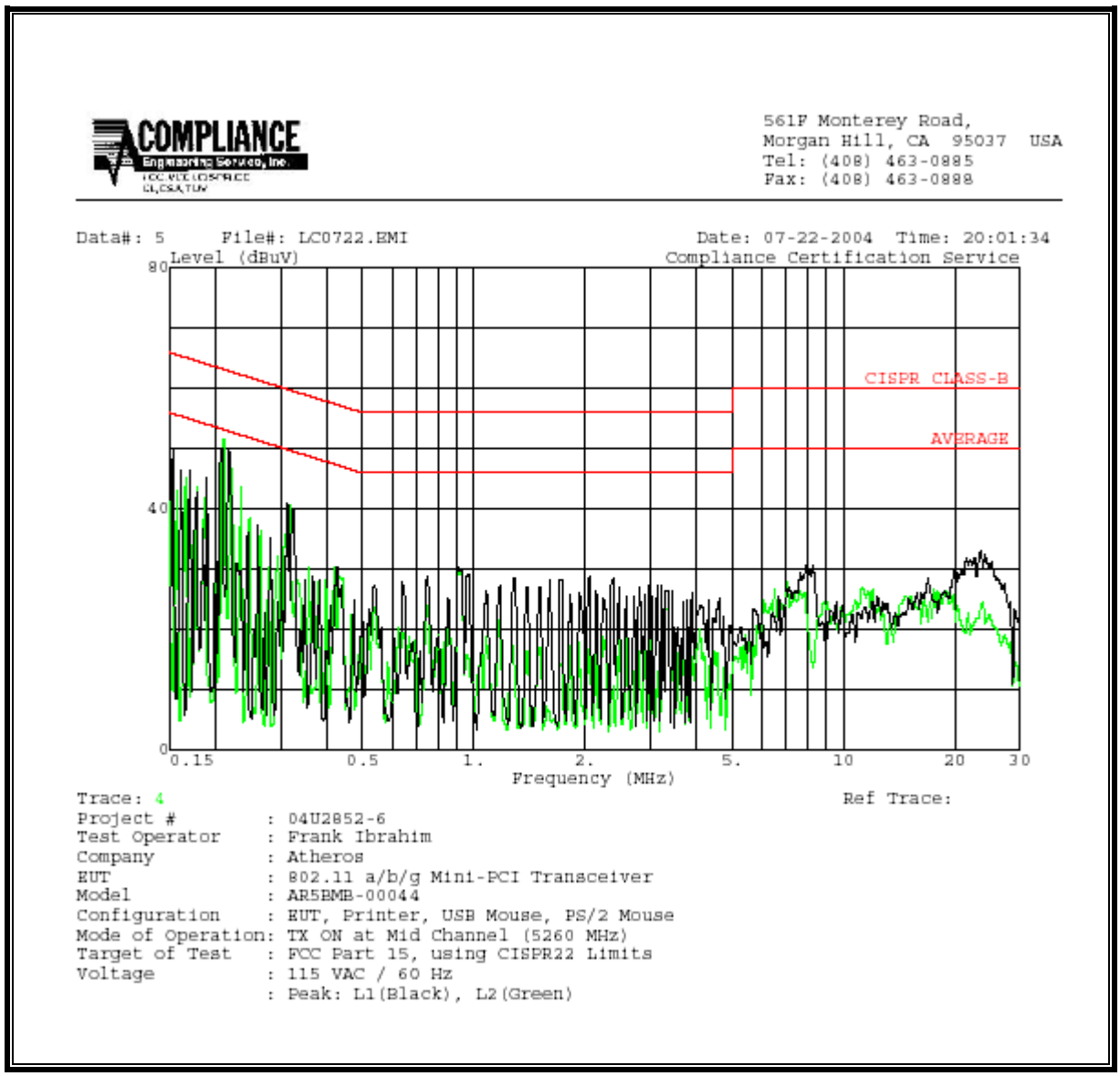
COMPLIANCE CERTIFICATION SERVICES DOCUMENT NO: CCSUP4031A
561F MONTEREY ROAD, MORGAN HILL, CA 95037 USA TEL: (408) 463-0885 FAX: (408) 463-0888
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

6 WORST EMISSIONS

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	50.19	--	--	0.00	65.91	55.91	-15.72	-5.72	L1
0.21	50.17	--	--	0.00	64.34	54.34	-14.17	-4.17	L1
0.22	50.10	--	--	0.00	64.11	54.11	-14.01	-4.01	L1
0.16	43.13	--	--	0.00	65.80	55.80	-22.67	-12.67	L2
0.17	45.20	--	--	0.00	65.54	55.54	-20.34	-10.34	L2
0.21	51.60	--	--	0.00	64.26	54.26	-12.66	-2.66	L2
6 Worst Data									

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

LINE 1 AND LINE 2 RESULTS



This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

8. SETUP PHOTOS

RADIATED RF MEASUREMENT SETUP

RADIATED FRONT PHOTO

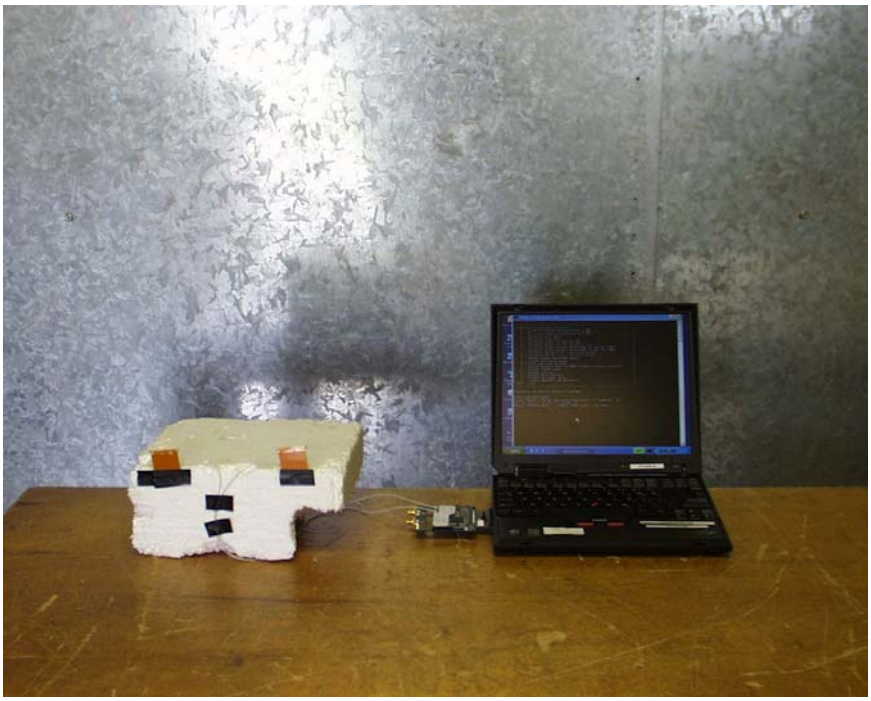
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

RADIATED BACK PHOTO

This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

LINE CONDUCTED FRONT PHOTO



COMPLIANCE CERTIFICATION SERVICES DOCUMENT NO: CCSUP4031A
561F MONTEREY ROAD, MORGAN HILL, CA 95037 USA TEL: (408) 463-0885 FAX: (408) 463-0888
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.

LINE CONDUCTED BACK PHOTO

END OF REPORT

COMPLIANCE CERTIFICATION SERVICES DOCUMENT NO: CCSUP4031A
561F MONTEREY ROAD, MORGAN HILL, CA 95037 USA TEL: (408) 463-0885 FAX: (408) 463-0888
This report shall not be reproduced except in full, without the written approval of CCS. This document may be altered or revised by Compliance Certification Services personnel only, and shall be noted in the revision section of the document.