



FCC CFR47 PART 15 SUBPART C CERTIFICATION

TEST REPORT

FOR

802.11 b/g Mini PCI Transceiver

MODEL NUMBER: PA3373U-1MPC

FCC ID: CJ6UPA3373WL

REPORT NUMBER: 04U2471-1

ISSUE DATE: APRIL 27, 2004

Prepared for TOSHIBA CORPORATION DIGITAL MEDIA NETWORK COMPANY 2-9 SUEHIRO-CHO, OME TOKYO, 198-8710, JAPAN

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



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1. TEST RESULT CERTIFICATION

COMPANY NAME: TOSHIBA CORPORATION DIGITAL MEDIA NETWORK COMPANY 2-9 SUEHIRO-CHO, OME TOKYO, 198-8710, JAPAN

EUT DESCRIPTION: 802.11 b/g Mini PCI transceiver

MODEL: PA3373U-1MPC

DATE TESTED: FEBRUARY 24 – MARCH 19, 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:

Tested By:

M.H

MIKE HECKROTTE ENGINEERING MANAGER COMPLIANCE CERTIFICATION SERVICES

YAN ZHENG EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The EUT is an 802.11b/g transceiver Mini PCI card installed in a Toshiba PortegeM200 Tablet, including co-location with the Toshiba PA3232U-1BTM Bluetooth radio card.

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

Frequency Band Mode		Output Power	Output Power
(MHz)		(dBm)	(mW)
2412 - 2462	802.11b	20.62	115.35
2412 - 2462	802.11g	24.49	281.19
2437	802.11g Turbo	24.64	291.07

The radio utilizes two film antennas for diversity (main and auxiliary), Hitachi model HTL017 with maximum gain of 4.24 dBi in the 2.4 GHz band.

The radio alternately utilizes three other film antenna models: Hitachi model HTL004, Hitachi model HTL008 and Tyco model TIAN001 antennas. These all have lower gain in the 2.4GHz band compared to the HTL017.

Two HTL017 antennas were utilized during final compliance tests.

The Bluetooth radio card has a modular approval, FCC ID: CJ6UPA3232BT. The Bluetooth radio utilizes a film antenna with a maximum gain of 1.22 dBi.

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



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

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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%.

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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	
PreAmplifier 1-26GHz	MITEQ	NSP2600-SP	924341	4/25/2004	
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	H₽	8542E	3942A00286	11/20/2004	
RF Filter Section	H₽	85420E	3705A00256	11/20/2004	
Antenna, Bicon/Log, 30 ~ 2000 MHz	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	

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6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST					
Description	Manufacturer	Model	Serial Number	FCC ID	
LAPTOP	TOSHIBA	PPM20U-AAAA8	Z3044588JU	DOC	
AC ADAPTER	TOSHIBA	ADP-60RHA	G71C0002S110	DOC	

I/O CABLES

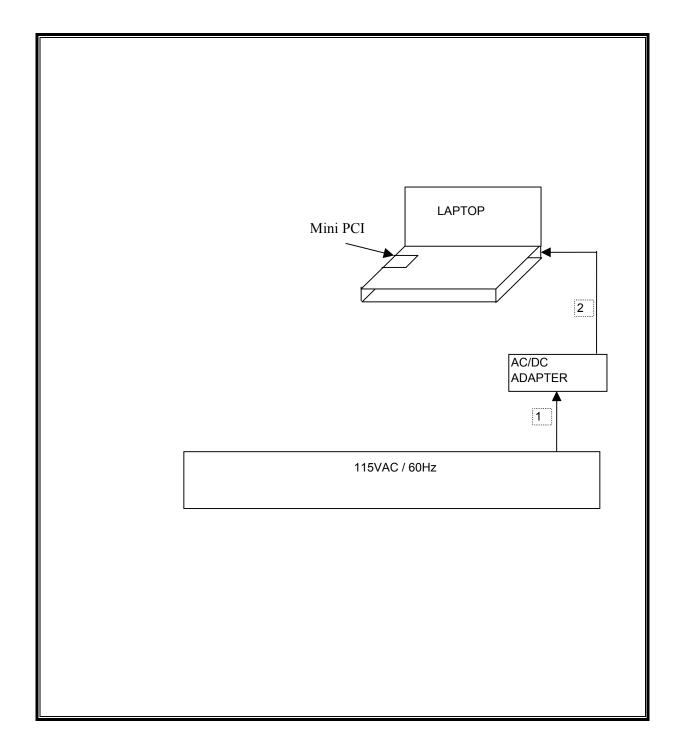
	I/O CABLE LIST						
Cable	Port	# of	Connector	Cable	Cable	Remarks	
No.		Identical	Туре	Туре	Length		
		Ports					
1	AC	2	US115	UNSHIELDED	2m	NO	
2	DC	1	DC	UNSHIELDED	2m	NO	

TEST SETUP

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

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SETUP DIAGRAM FOR TESTS



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7. APPLICABLE LIMITS AND TEST RESULTS

7.1. 6 dB BANDWIDTH

<u>LIMIT</u>

§15.247 (a) (2) For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled.

2.4 GHz BAND RESULTS

No non-compliance noted:

802.11b Mode

Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Margin (kHz)
Low	2412	12167	500	11667
Middle	2437	12000	500	11500
High	2462	12083	500	11583

802.11g Normal Mode

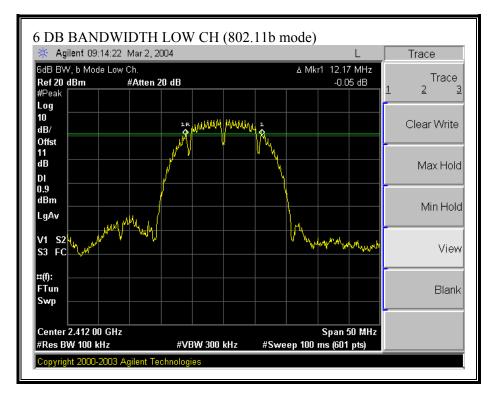
Channel	Frequency	6 dB Bandwidth	Minimum Limit	Margin
	(MHz)	(kHz)	(kHz)	(kHz)
Low	2412	16500	500	16000
Middle	2437	16417	500	15917
High	2462	16417	500	15917

802.11g Turbo Mode

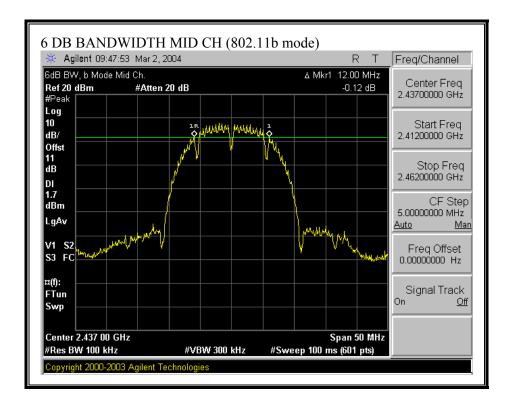
Channel	Frequency	6 dB Bandwidth	Minimum Limit	Margin
	(MHz)	(kHz)	(kHz)	(kHz)
Middle	2437	31500	500	31000

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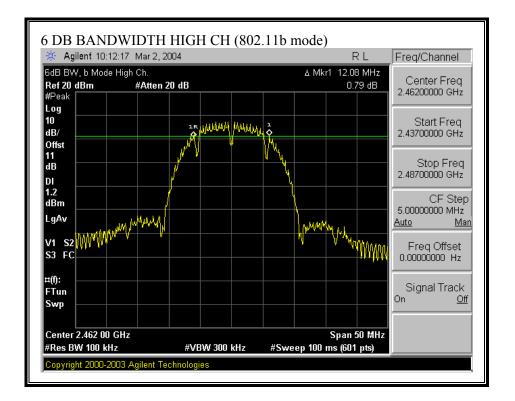
6 DB BANDWIDTH (802.11b MODE)



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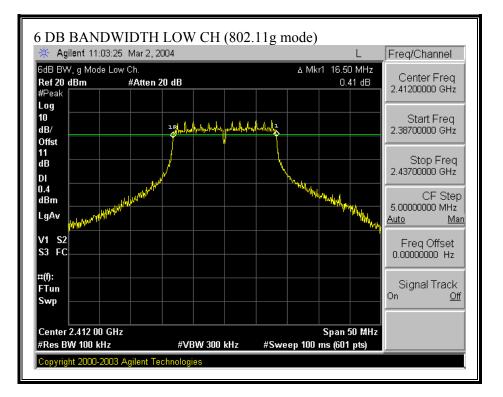


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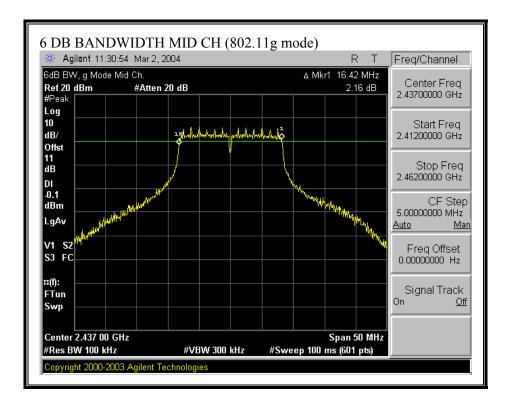


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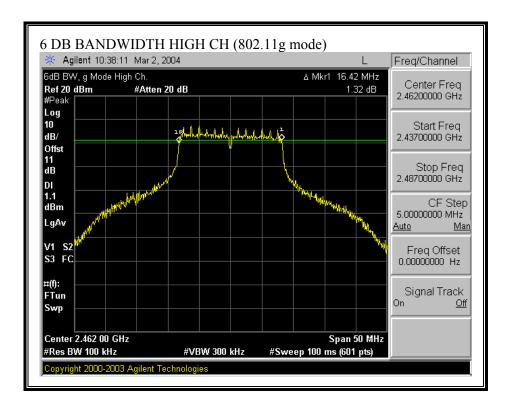
6 DB BANDWIDTH (802.11g MODE)



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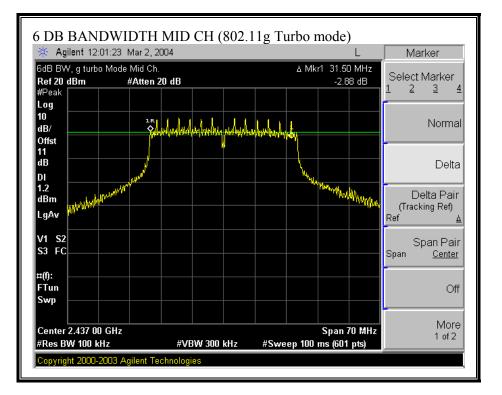


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6 DB BANDWIDTH (802.11g TURBO MODE)



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7.2. 99% **BANDWIDTH**

<u>LIMIT</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

2.4 GHz BAND RESULTS

No non-compliance noted:

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	15.64
Middle	2437	15.82
High	2462	15.37

802.11g Normal Mode

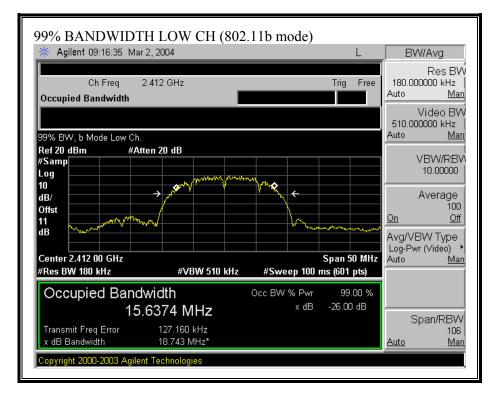
Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	16.57
Middle	2437	16.43
High	2462	16.59

802.11g Turbo Mode

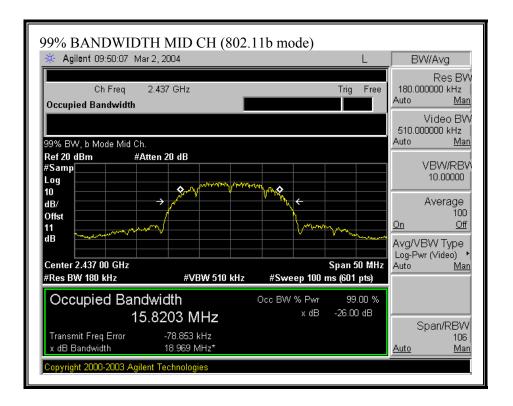
Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Middle	2437	32.77

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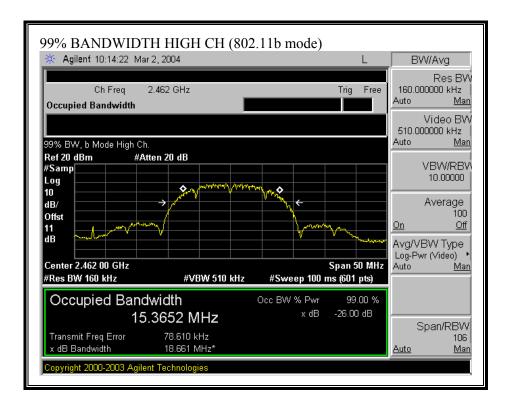
99% BANDWIDTH (802.11b MODE)



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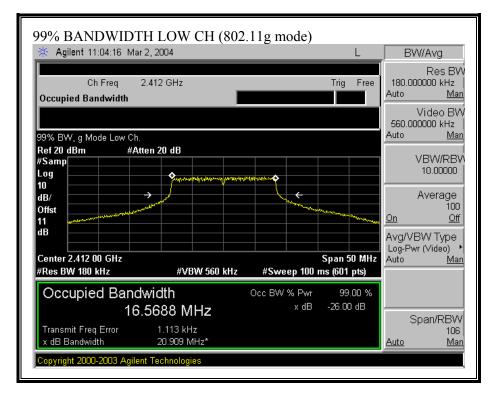


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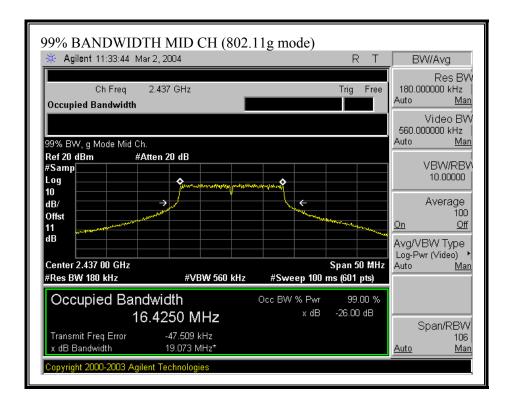


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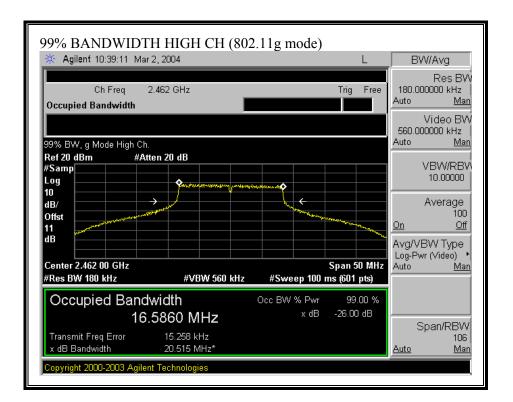
99% BANDWIDTH (802.11g MODE)



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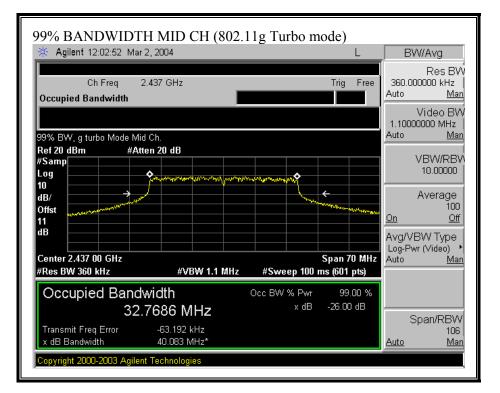


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99% BANDWIDTH (802.11g TURBO MODE)



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7.3. PEAK OUTPUT POWER

PEAK POWER LIMIT

§15.247 (b) The maximum peak output power of the intentional radiator shall not exceed the following:

15.247 (b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz , and 5725-5850 MHz bands: 1 watt.

\$15.247 (b) (4) Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is 4.24 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer and the analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth.

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2.4 GHZ BAND RESULTS

No non-compliance noted:

802.11b Mode

Channel	Frequency	Peak Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	20.25	30	-9.75
Middle	2437	20.62	30	-9.38
High	2462	20.12	30	-9.88

802.11g Normal Mode

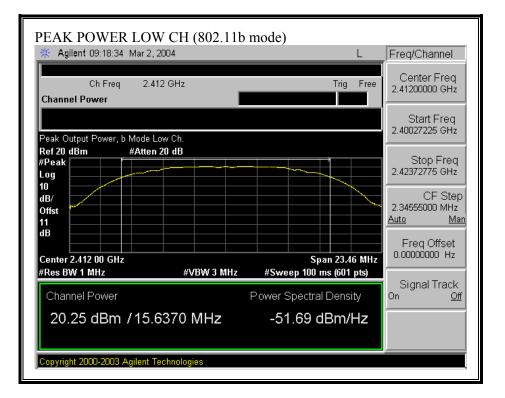
Channel	Frequency	Peak Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	19.35	30	-10.65
Middle	2437	24.49	30	-5.51
High	2462	19.11	30	-10.89

802.11g Turbo Mode

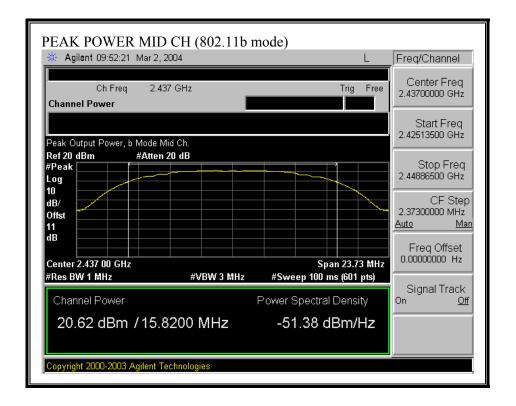
Channel	Frequency	Peak Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Middle	2437	24.64	30	-5.36

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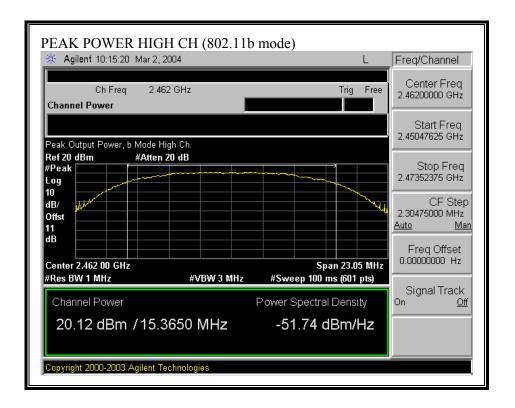
OUTPUT POWER (802.11b MODE)



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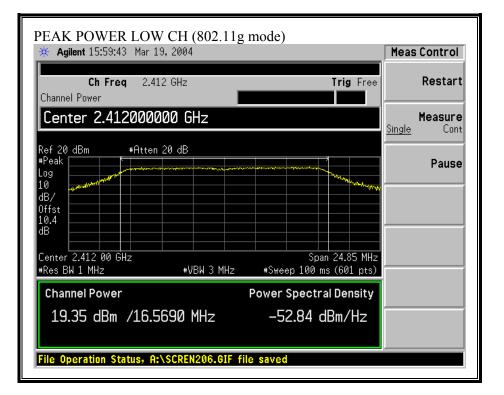


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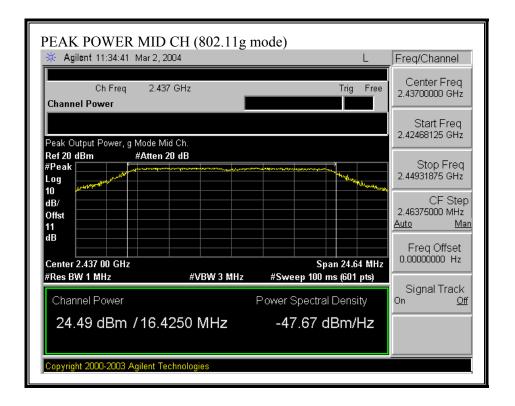


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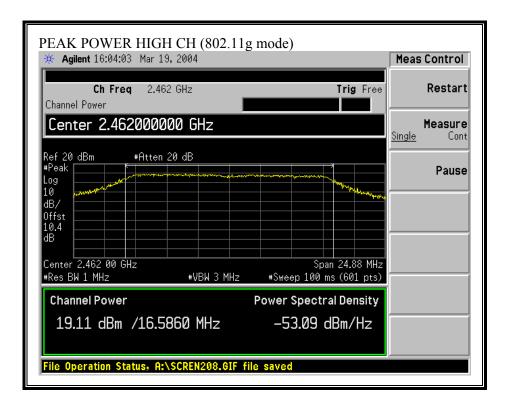
OUTPUT POWER (802.11g MODE)



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OUTPUT POWER (802.11g TURBO MODE)

PEAK POWER (802.1	l 1g Turbo mo	ode)	
🔆 Agilent 12:03:41 Mar 2, 20	04	RT	Freq/Channel
Ch Freq 2.437 Channel Power	GHz	Trig Free	Center Freq 2.43700000 GHz
Peak Output Power, g turbo Moo	le Mid Ch.		Start Freq 2.41242325 GHz
Ref 20 dBm #Atten 2 #Peak Log 10		and the second designed and the se	Stop Freq 2.46157675 GHz
dB/			CF Step 4.91535000 MHz <u>Auto Man</u>
dB Center 2.437 00 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 49.15 MHz #Sweep 100 ms (601 pts)	Freq Offset 0.00000000 Hz
Channel Power	4 0 D 44 2 101112	Power Spectral Density	Signal Track On <u>Off</u>
24.64 dBm / 32.76	690 MHz	-50.51 dBm/Hz	
Copyright 2000-2003 Agilent Tec	hnologies		

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7.4. AVERAGE POWER

AVERAGE POWER LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

2.4 GHZ BAND RESULTS

No non-compliance noted:

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

802.11b Mode

Channel	Frequency	Average Power
	(MHz)	(dBm)
Low	2412	18.90
Middle	2437	19.30
High	2462	18.70

802.11g Mode

Channel	Frequency	Average Power
	(MHz)	(dBm)
Low	2412	16.30
Middle	2437	18.90
High	2462	16.20

802.11g Turbo Mode

Channel	Frequency	Average Power
	(MHz)	(dBm)
Middle	2437	18.60

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7.5. PEAK POWER SPECTRAL DENSITY

<u>LIMIT</u>

§15.247 (d) For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer, the maximum level in a 3 kHz bandwidth is measured with the spectrum analyzer using RBW = 3 kHz and VBW > 3 kHz, sweep time = span / 3 kHz, and video averaging is turned off. The PPSD is the highest level found across the emission in any 3 kHz band.

2.4 GHz BAND RESULTS

No non-compliance noted:

802.11b Mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-6.37	8	-14.37
Middle	2437	-4.75	8	-12.75
High	2462	-6.58	8	-14.58

802.11g Normal Mode

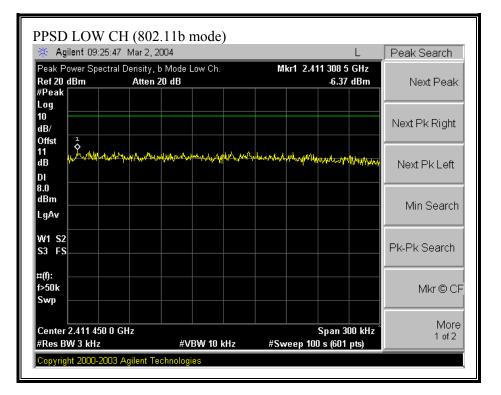
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-12.88	8	-20.88
Middle	2437	-6.54	8	-14.54
High	2462	-11.49	8	-19.49

802.11g Turbo Mode

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Middle	2437	-8.48	8	-16.48

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PEAK POWER SPECTRAL DENSITY (802.11b MODE)



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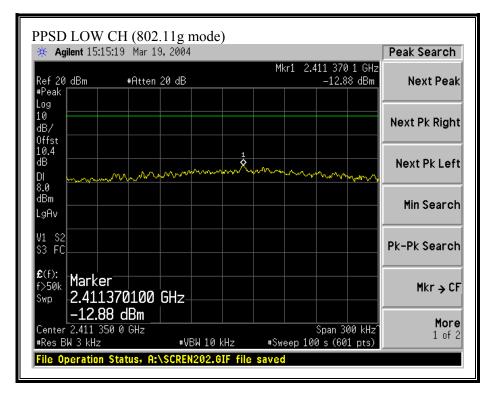
🔆 Agilent 09:55:	39 Mar 2, 2004	R T Free	q/Channel
Ref 20 dBm #Peak	al Density, b Mode Mid Ch. Atten 20 dB		enter Freq 610000 GHz
Log 10 dB/ Offst			Start Freq 595000 GHz
Y Y	B. Materia and a second s	n og The hand and the Alderic of the first North March 1	Stop Freq 625000 GHz
8.0 dBm LgAv		30.0 Auto	CF Step 0000000 kHz <u>Mar</u>
W1 S2 S3 FS			ireq Offset 0000000 Hz
¤(f): f>50k Swp		Si On	ignal Track <u>Off</u>
Center 2.436 100 0 #Res BW 3 kHz	GHz #VBW 10 kHz	Span 300 kHz #Sweep 100 s (601 pts)	

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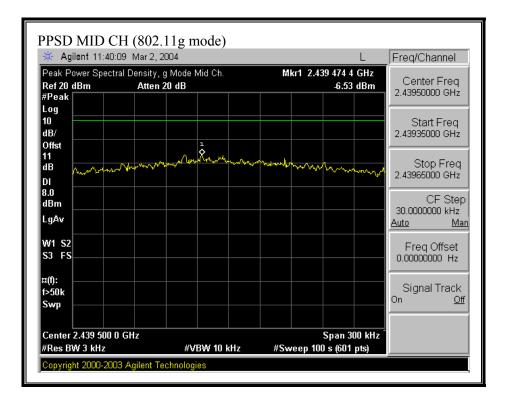
🔆 Agilent 10:1	9:12 Mar 2, 2004			L	Freq/Channel
Ref 20 dBm #Peak	ctral Density, b Mode H Atten 20 dB	ligh Ch.	Mkr1 2.462	329 0 GHz -6.58 dBm	Center Freq 2.46270000 GHz
Log 10 dB/ Offst					Start Freq 2.46255000 GHz
11 dB DI	any where a strate and a second	wayyuyudullaallayyyu	en mandalana ana ana ana ana ana ana ana ana an	w far and the second	Stop Freq 2.46285000 GHz
8.0 dBm LgAv					CF Step 30.0000000 kHz Auto Man
W1 S2 S3 FS					Freq Offset 0.00000000 Hz
¤(f): f>50k Swp					Signal Track On <u>Off</u>
Center 2.462 70 #Res BW 3 kHz		3W 10 kHz		an 300 kHz ^ (601 pts)	

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PEAK POWER SPECTRAL DENSITY (802.11g MODE)



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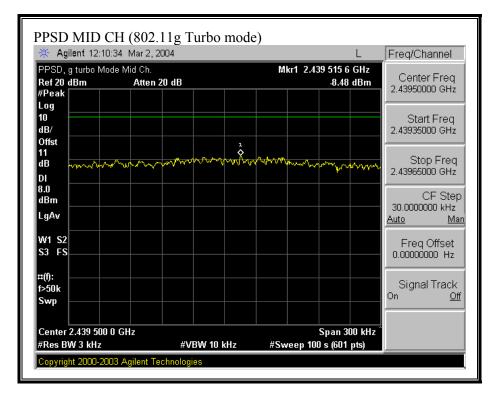


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🔆 Agilent 15:2	20:10 Mar 19, 2004		Peak Search
Ref 20 dBm #Peak	#Atten 20 dB	Mkr1 2.460 744 5 Gł –11.49 dBi	
Log 10 dB/ Offst			Next Pk Right
10.4 dB DI	m m m	mmymmm	Next Pk Left
8.0 dBm LgAv			Min Search
V1 S2 S3 FC			Pk-Pk Search
	1744500 GHz		Mkr → CF
-11.4 Center 2.460 7 #Res BW 3 kHz		Span 300 kH 	

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PEAK POWER SPECTRAL DENSITY (802.11g TURBO MODE)



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7.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

§15.247 (c) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in§15.205(a), must also comply with the radiated emission limits specified in §15.205(a).

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

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

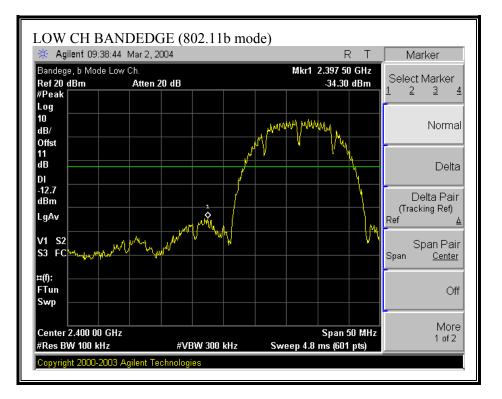
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 5.8 GHz band.

RESULTS

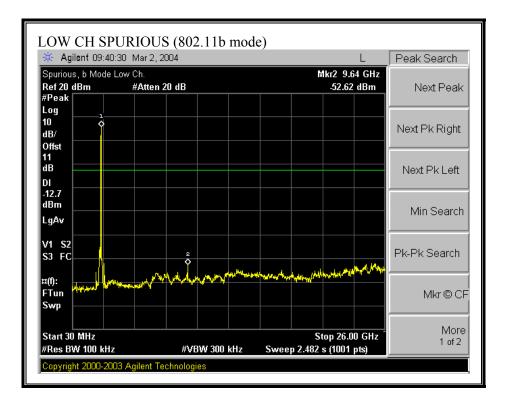
No non-compliance noted:

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SPURIOUS EMISSIONS, LOW CHANNEL (802.11b MODE)

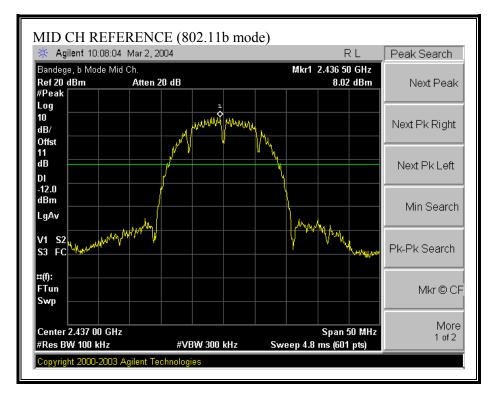


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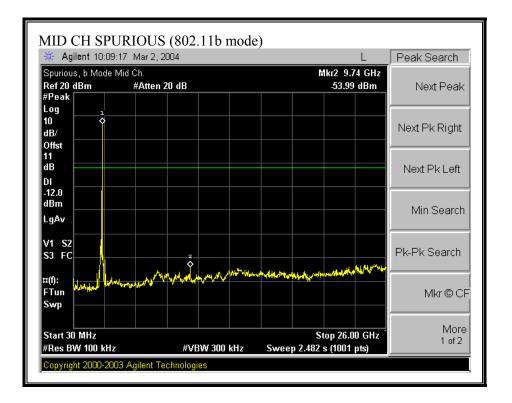


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SPURIOUS EMISSIONS, MID CHANNEL (802.11b MODE)

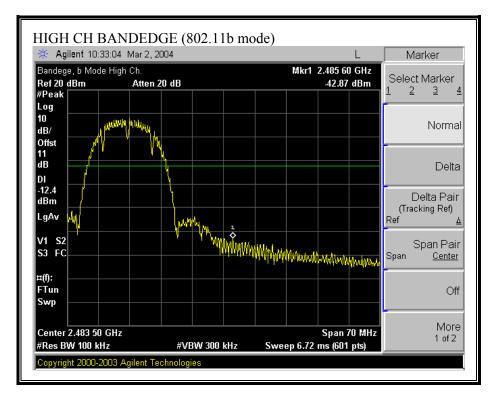


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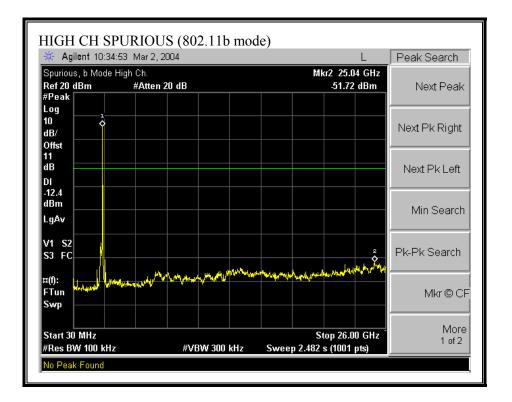


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SPURIOUS EMISSIONS, HIGH CHANNEL (802.11b MODE)

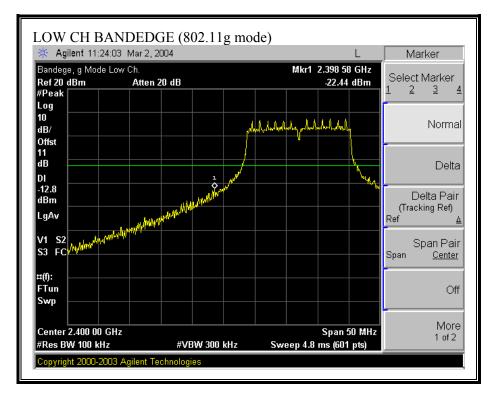


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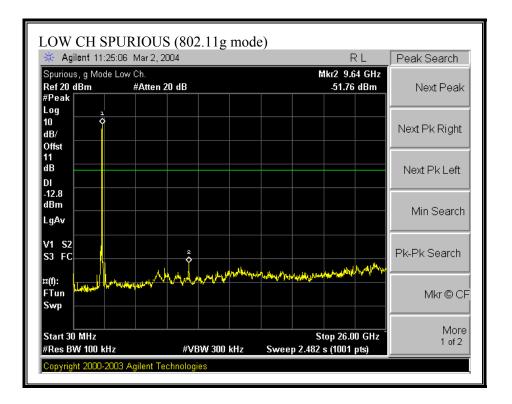


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SPURIOUS EMISSIONS, LOW CHANNEL (802.11g MODE)

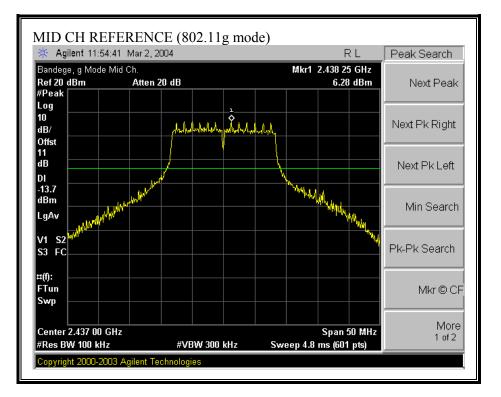


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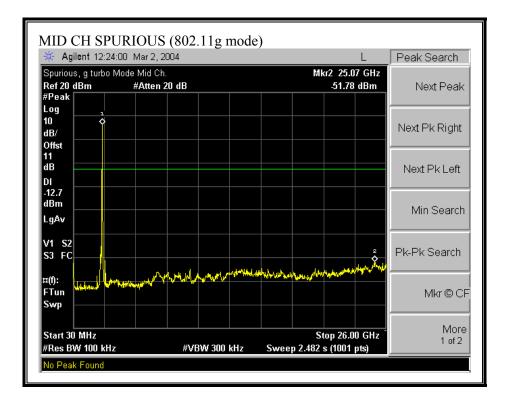


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SPURIOUS EMISSIONS, MID CHANNEL (802.11g MODE)

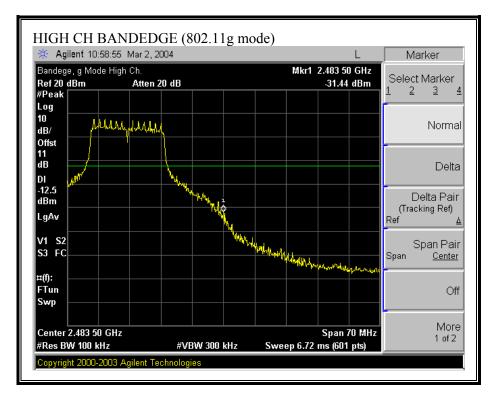


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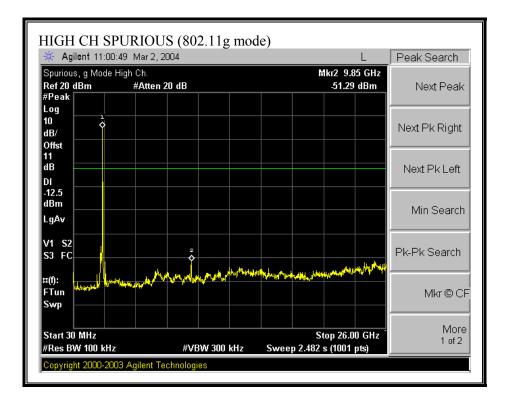


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SPURIOUS EMISSIONS, HIGH CHANNEL (802.11g MODE)

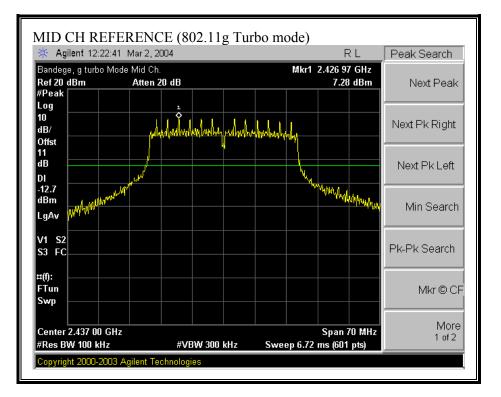


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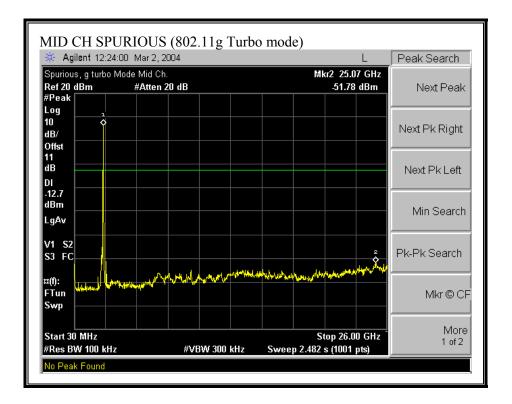


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SPURIOUS EMISSIONS, MID CHANNEL (802.11g TURBO MODE)



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7.7. RADIATED EMISSIONS

7.7.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

LIMITS

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

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

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

² Above 38.6

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

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

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

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

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

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TEST PROCEDURE

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

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

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, 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.

The worst-case operating point for radiated emissions tests below 1 GHz is determined by the mode and channel that operates at the highest peak output power level.

The correction factor to convert the received voltage (dBuV) to field strength (dBuV/m) is entered as a reference level offset in the spectrum analyzer to allow for direct reading of field strength.

RESULTS

For radiated emissions tests below 1 GHz the EUT is set to the 802.11g Turbo mode at 2437 MHz, at an average power setting of 18.6 dBm, peak power level of 24.64 dBm.

No non-compliance noted:

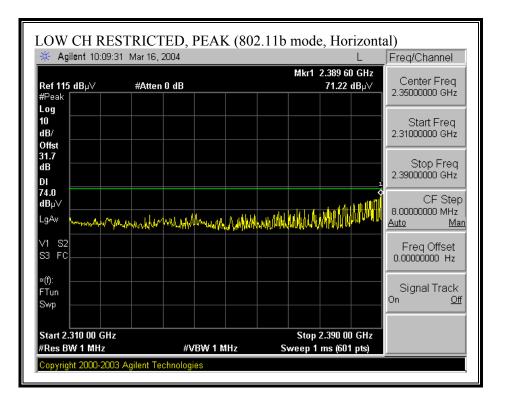
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7.7.2. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHZ (LAPTOP CONFIGURATION)

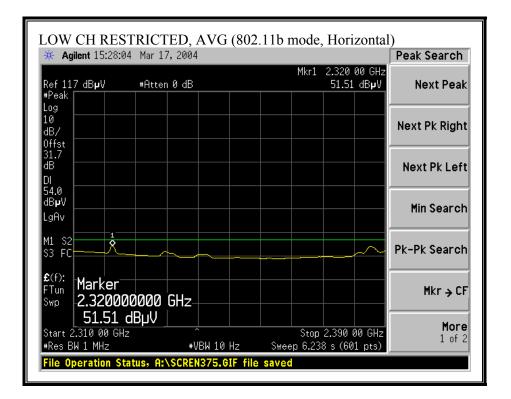
CORRECTION FACTOR FOR RESTRICTED BANDEDGE MEASUREMENTS

The reference level offset is equal to the test antenna gain + the test cable loss (29.4 dBi + 2.3 dBm = 31.7)

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

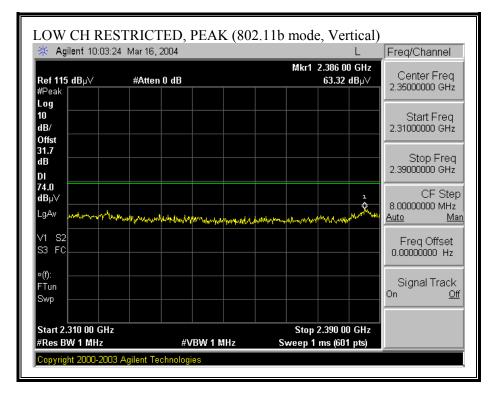


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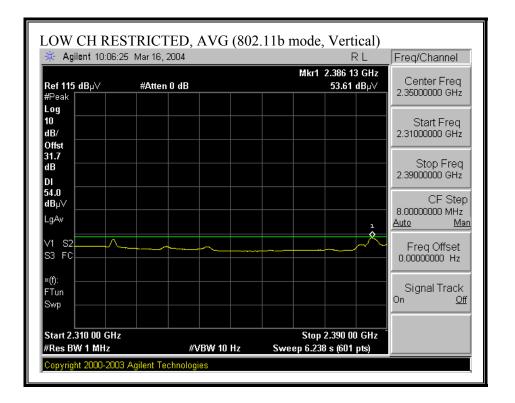


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RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)



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CORRECTION FACTOR FOR RESTRICTED BANDEDGE MEASUREMENTS

The reference level offset is equal to the test antenna gain + the test cable loss (29.4 dBi + 2.4 dBm = 31.8)

RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

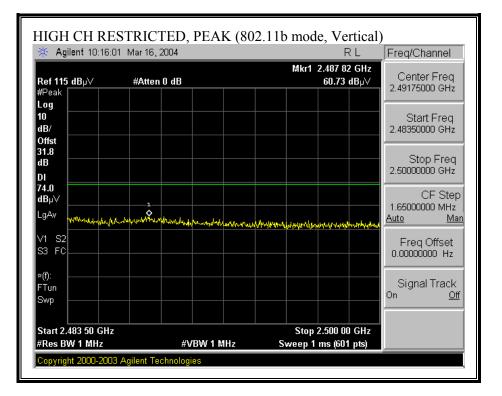
Agilent 10:12:5	68 Mar 16, 2004		L	Freq/Channel
ef 115 dBµ∨ ^P eak	#Atten 0 dB	Mkr1 2.484 61.6	46 GHz 0 dBµ∨	Center Freq 2.49175000 GHz
0g 8/				Start Freq 2.48350000 GHz
.8				Stop Fred 2.5000000 GHz
.0 3μV <u>1</u> ιΑν γγγγ _ν γγγγγγγγγγγγγγγγγγγγγγγγγγγγγγγ	Here the the the state of the s	and on the production of the second of the	Mangerighe	CF Ste 1.6500000 MH: <u>Auto M</u>
S2 } FC				Freq Offset 0.00000000 Hz
): Tun vp				Signal Tracl On <u>C</u>
art 2.483 50 GHz Res BW 1 MHz	#VBW 1 I	Stop 2.500 AHz Sweep 1 ms (6		

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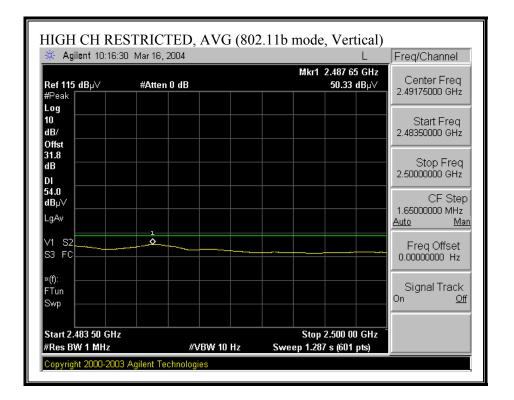
🔆 Agilent 10:13:	21 Mar 16, 2004	RT	Freq/Channel
Ref 115 dBµ∨ #Peak	#Atten 0 dB	Mkr1 2.483 50 GHz 50.62 dBµ∨	Center Freq 2.49175000 GHz
Log 10 dB/ Offst			Start Freq 2.48350000 GHz
31.8 dB DI			Stop Freq 2.5000000 GHz
54.0 dBµ∨ LgAv			CF Step 1.6500000 MHz <u>Auto Man</u>
V1 S2 S3 FC			Freq Offset 0.00000000 Hz
*(f): FTun Swp			Signal Track On <u>Off</u>
Start 2.483 50 GHz #Res BW 1 MHz	#VBW 10 H	Stop 2.500 00 GHz z Sweep 1.287 s (601 pts)	•

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RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



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HARMONICS AND SPURIOUS EMISSIONS (b MODE)

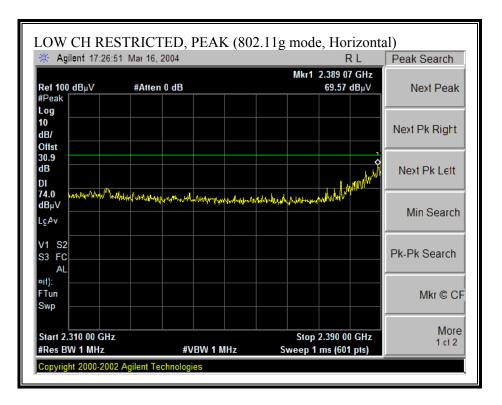
UT M	iy: escrip.: ⁄N: rget:	FCC	et w/MB43 ins ion, 802.11b m/												
	uipmen														
EMCO Horn 1-18GHz Spectrum Analyzer						Pre-amj	olifer 1	-26GHz	Pre-am	plifer 26-40	GHz		Horn > 18G	Hz	
T73; S	5/N: 6717	@3m 🗸	Agilent	E4446A .	Analyze	r 🗸	T86 Mit	eq 924	341 🗸			•	T87; AR	A 18-26GHz; S/N:	1049
Hi Frequency Cables			□ (4~6 ft) □ (12 ft)				Limit FCC 15.205			Peak Measurement 1 MHz Resolution Band 1MHz Video Bandwidth			dwidth 1 MHz Resolution Bandwidth		
f	Dist		Read Avg.	AF	CL	Amp	D Corr	HPF	Peak	Avg			1	Avg Mar	Notes
GHz 11b 2412	feet	dBuV	dBuV	dB/m	dB	dB	dB		dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
4.824	9.8	58.7	54.8	33.4	3.0	-45.6	0.0	1.0	50.4	46.5	74.0	54.0	-23.6	-7.5	v
4.824	9.8	51.4	42.3	33.4	3.0	-45.6	0.0	1.0	43.1	34.0	74.0	54.0	-30.9	-20.0	H
4.472	9.8	56.9	50.4	40.6	5.6	-47.7	0.0	1.0	56.4	49.9	74.0	54.0	-17.6	-4.1	V
4.472 1b 2437	9.8 channel	53.2	44.1	40.6	5.6	-47.7	0.0	1.0	52.7	43.6	74.0	54.0	-21.3	-10.4	H
4.874	9.8	57.1	54.4	33.4	3.0	-45.6	0.0	1.0	48.9	46.2	74.0	54.0	-25.1	-7.8	V
4.874	9.8	50.7	41.3	33.4	3.0	-45.6	0.0	1.0	42.5	33.1	74.0	54.0	-31.5	-20.9	н
7.311	9.8	62.4	58.0	35.8	3.7	-46.6	0.0	1.0	56.3	51.9	74.0	54.0	-17.7	-2.1	V
7.311	9.8	55.4	46.2	35.8	3.7	-46.6	0.0	1.0	49.3	40.1	74.0	54.0	- 24. 7	-13.9	H
116 2462		60 7	53.0	22 -	2.0	45.7	0.0	10		44.7	74.0	54.0	10.5	0.2	v
4.924 4.924	9.8 9.8	63.7 50.8	52.9 41.1	33.5 33.5	3.0 3.0	-45.7 -45.7	0.0 0.0	1.0 1.0	55.5 42.6	44.7 32.9	74.0 74.0	54.0 54.0	-18.5 -31.4	-9.3 -21.1	U H
1.924 7.386	9.8	59.3	41.1 53.8	33.5	3.0	-45.7 -46.5	0.0	1.0	42.0 53.4	47.9	74.0	54.0 54.0	-31.4	-21.1	V H
7.386	9.8	54.1	42.8	36.0	3.7	-46.5	0.0	1.0	48.2	36.9	74.0	54.0	-25.8	-17.1	H
		Measurem Distance to Analyzer R Antenna Fa Cable Loss	eading actor	y		Amp D Corr Avg Peak HPF	Average	Correc Field S d Peak	ct to 3 mete Strength @ c Field Stre	3 m		Pk Lim Avg Mar	Peak Fiel Margin vs	Field Strength Li d Strength Limit s. Average Limit s. Peak Limit	

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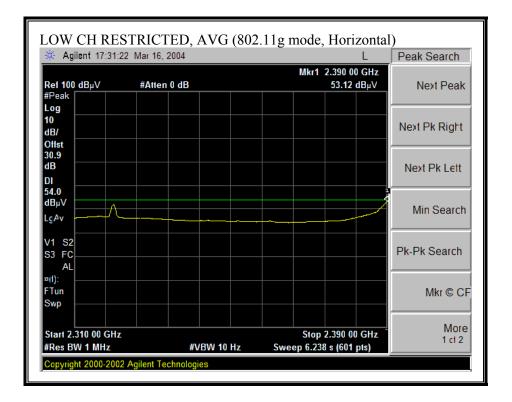
CORRECTION FACTOR FOR RESTRICTED BANDEDGE MEASUREMENTS

The reference level offset is equal to the test antenna gain + the test cable loss (29.4 dBi + 1.5 dBm = 30.9)

RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)

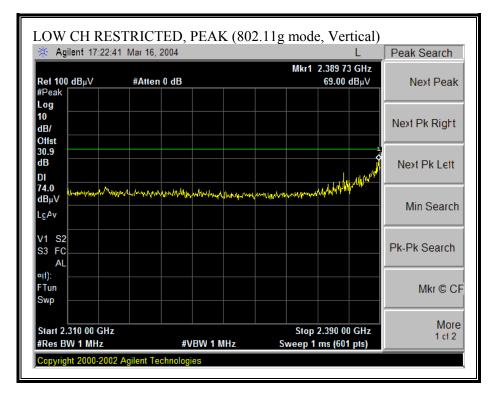


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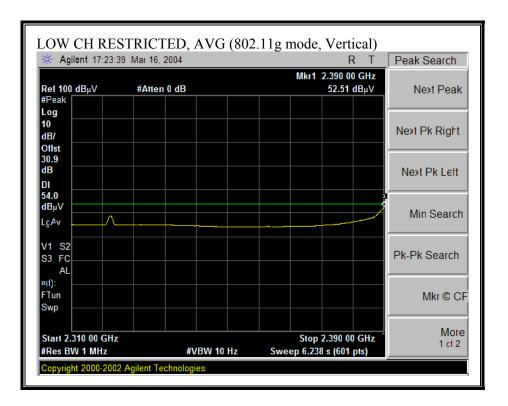


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RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)

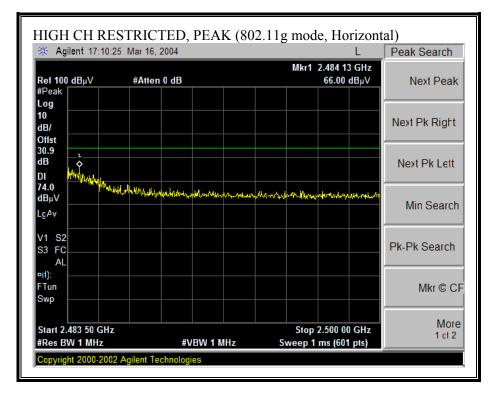


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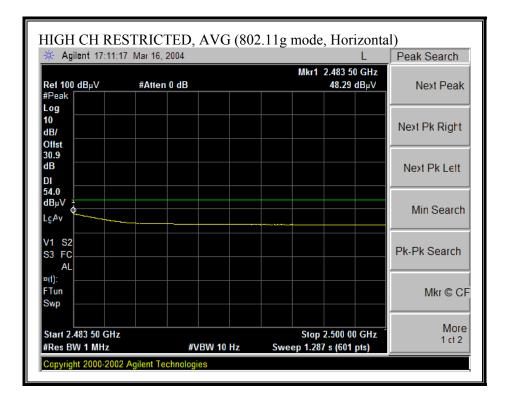


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RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)

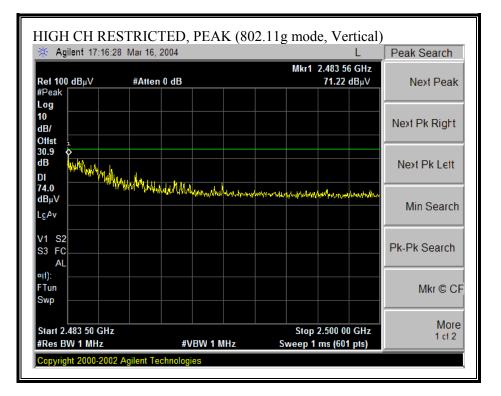


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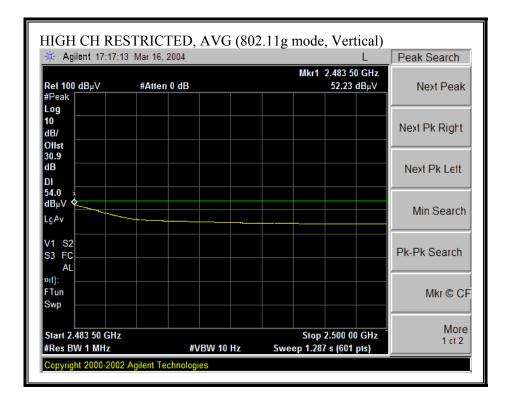


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RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)



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HARMONICS AND SPURIOUS EMISSIONS (g MODE)

0 crip.: 1 crip.: 1 (: (et: F	C I I I	TCC .aptop posit	et w/MB43 ins ion, 802.11b mo												
0	Horn 1	-18GHz	Spec	trum An	alyzer		Pre-am	plifer 1	-26GHz	Pre-am	plifer 26-40	GHz		Horn >18	GHz
8; S/N	N: 6717	@3m 🗸	Agilent I	24446A A	Analyze	r 🗸	T86 Mit	teq 924:	341 🗸			-	T87; AR.4	A 18-26GHz; S/	N:1049
						FCC 15	Limit .205	•	Peak Measurements: 1 MHz Resolution Bandwi 1 MHz Video Bandwidth			width			
	Dist	Read Pk	Read Avg.	AF		Amp	D Corr	HPF	Peak	Avg			Pk Mar	Avg Mar	Notes
<u> </u>	feet hannel	dBuV	dBuV	dB/m	dB	dB	dB		dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
412 cr 4	hannel 9.8	52.1	45.3	33.4	3.0	-45.6	0.0	1.0	43.8	37.0	74.0	54.0	-30.2	-17.0	V
4	9.8	50.2	41.2	33.4	3.0	-45.6	0.0	1.0	41.9	32.9	74.0	54.0	-32.1	-21.1	Н
2437 cł 1	hannel 9.8	58.3	46.2	35.8	3.7	-46.6	0.0	1.0	52.2	40.1	74.0	54.0	-21.8	-13.9	v
L	9.8	54.8	42.5	35.8	3.7	-46.6	0.0	1.0	48.7	36.4	74.0	54.0	-25.3	-17.6	Н
2462 cł 6	hannel 9.8	60.2	48.5	36.0	3.7	-46.5	0.0	1.0	54.3	42.6	74.0	54.0	-19.7	-11.4	v
6	9.8	56.3	44.5	36.0	3.7	-46.5	0.0	1.0	50.4	38.6	74.0	54.0	-13.7	-11.4 -15.4	, H
F A	Dist Read AF	Measureme Distance to Analyzer R Antenna Fa Cable Loss	eading actor	/		Avg	Average	Correc Field S d Peak	et to 3 mete strength @ c Field Stre	3 m		Pk Lim Avg Mar	Peak Field Margin vs	ield Strength I 1 Strength Lim . Average Lim . Peak Limit	it

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HARMONICS AND SPURIOUS EMISSIONS (g TURBO MODE)

est En oject ompan UT De UT M/	gr: #: y: scrip.:	David Garcia 04U2471 Toshiba	Services, M et w/MB43 ins	-	Hill Op	oen Field	l Site								
est Ta Iode O	rget:		ion, 802.11b mo	ode											
EMC	O Horn	1-18GHz		trum An	· ·	r	Pre-am T86 Mit	-	-26GHz	Pre-am	plifer 26-40		T87; AR/	Horn > 1 A 18-26GHz; S	
- Hi Free	Hz feet dBuV dBuV dB/m turbo 2437 channel							Limit FCC 15.205			1 MHz Reso	asurements: olution Bandwidth o Bandwidth		<u>Average Measurements:</u> 1 MHz Resolution Bandwidth 10Hz Video Bandwidth	
f GHz	feet	dBuV	-		CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	-	Pk Mar dB	Avg Mar dB	Notes
lg turbo 311 311			47.2 42.1	35.8 35.8	3.7 3.7	-46.6 -46.6	0.0 0.0	1.0 1.0	48.7 45.6	41.1 36.0	74.0 74.0	54.0 54.0	-25.3 -28.4	-12.9 -18.0	V H
	AF CL	Analyzer R Antenna Fa Cable Loss	actor				-	d Peak	itrength @ Field Stre					. Average Lii . Peak Limit	

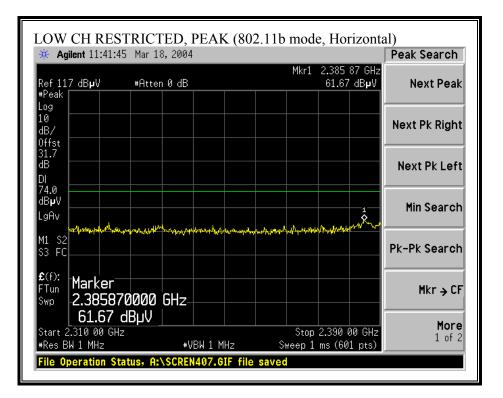
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7.7.3. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHZ (PORTABLE CONFIGURATION)

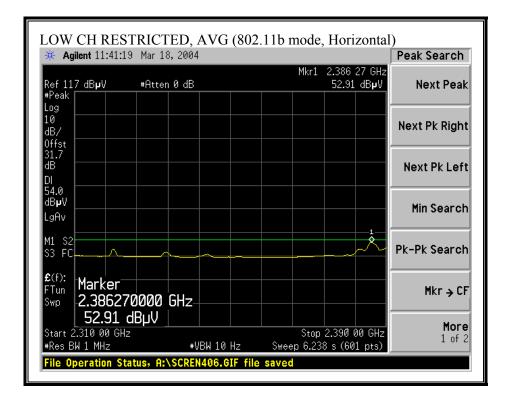
CORRECTION FACTOR FOR RESTRICTED BANDEDGE MEASUREMENTS

The reference level offset is equal to the test antenna gain + the test cable loss (29.4 dBi + 2.3 dBm = 31.7)

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

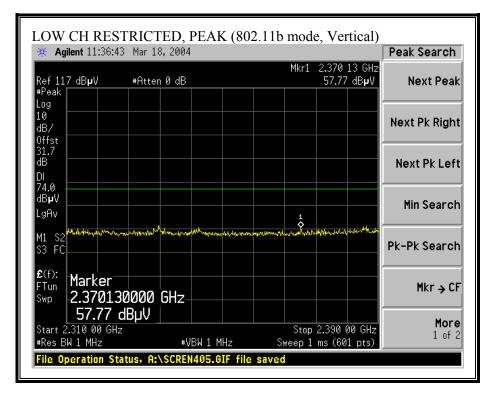


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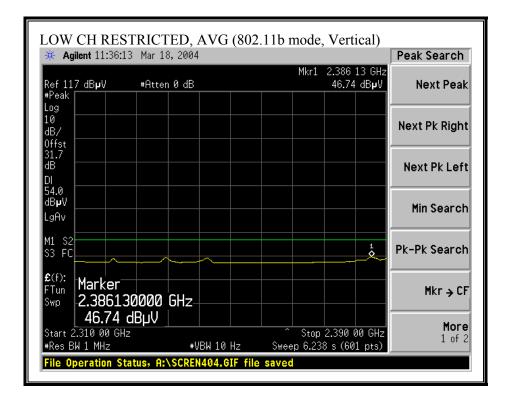


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RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

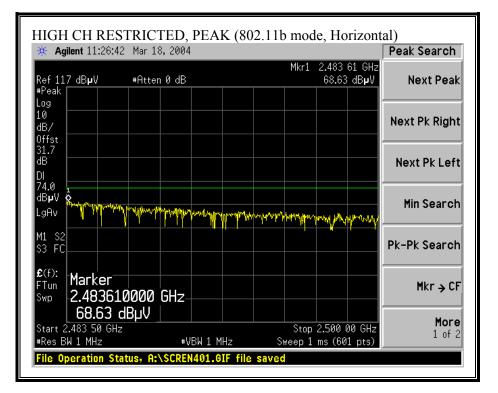


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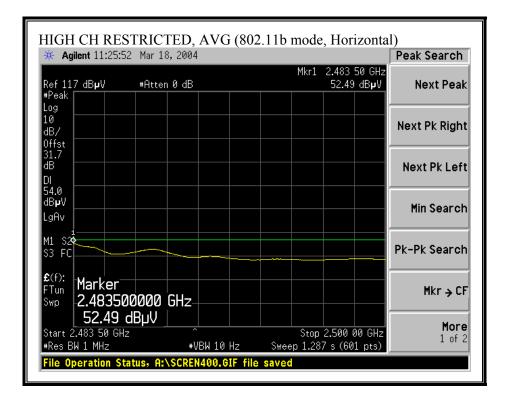


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RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

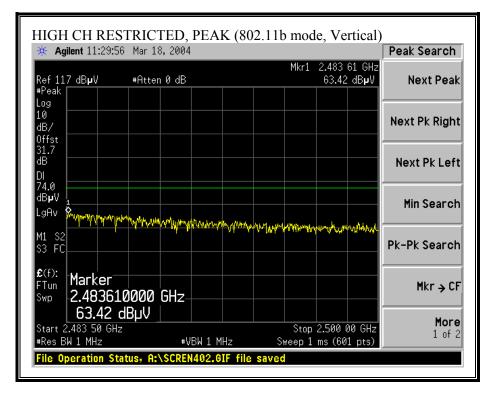


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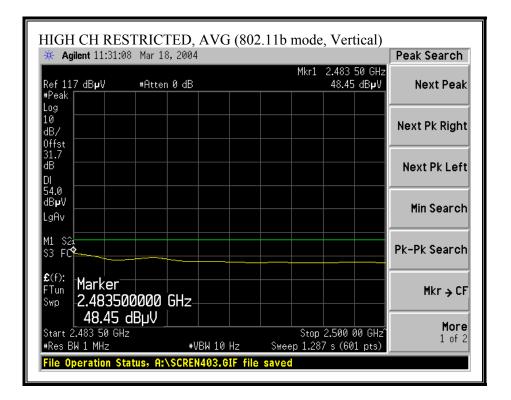


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RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



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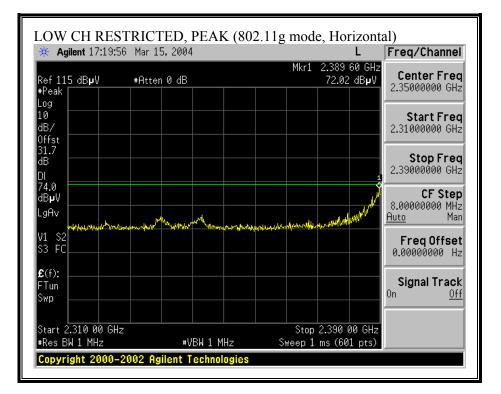
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HARMONICS AND SPURIOUS EMISSIONS (b MODE)

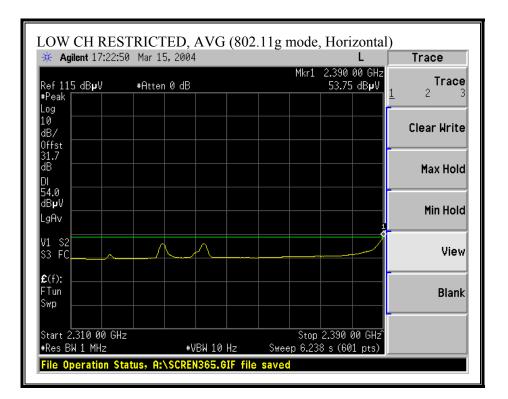
Test Ta Mode C <u>Test Eq</u>	per:	x,y,z axis har worst case a <u>t:</u>													
EMC	O Horn 1	1-18GHz	Spec	trum An	alyzer		Pre-am	nlifer l	-26GHz	Pre-am	plifer 26-40	GHz		Horn > 180	GHz
	5/N: 6717		Agilent I	E4446A /	Analyze	r 🗸	T86 Mi	-					T87; ARA 18-26GHz; S/N:1049		
	GHz feet dBuV dBuV dB/m dB dH					Limit FCC 15.205			Peak Measurements 1 MHz Resolution Bandw 1MHz Video Bandwidth						
		1				Amp	D Corr	HPF	Peak	Avg	Pk Lim	-		Avg Mar	Notes
GHz 11b 2412	<u>.</u>		dBuV	dB/m	dB	dB	dB		dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
.824	9.8	48.3	39.7	33.4	3.0	-45.6	0.0	1.0	40.0	31.4	74.0	54.0	-34.0	-22.6	V
.824	9.8 Channel	50.3	42.4	33.4	3.0	-45.6	0.0	1.0	42.0	34.1	74.0	54.0	-32.0	-19.9	H
16 2437 874	9.8	50.7	40.4	33.4	3.0	-45.6	0.0	1.0	42.5	32.2	74.0	54.0	-31.5	-21.8	v
.874	9.8	50.2	39.5	33.4	3.0	-45.6	0.0	1.0	42.0	31.3	74.0	54.0	-32.0	-22.7	H
.311	9.8	55.6	47.1	35.8	3.7	-46.6	0.0	1.0	49.5	41.0	74.0	54.0	-24.5	-13.0	v
.311	9.8	54.3	43.9	35.8	3.7	-46.6	0.0	1.0	48.2	37.8	74.0	54.0	-25.8	-16.2	H
1b 2462 924	Channel 9.8	49.8	41.6	33.5	3.0	-45.7	0.0	1.0	41.6	33.4	74.0	54.0	-32.4	-20.6	v
.924 .924	9.8	49.8 50.4	41.0	33.5 33.5	3.0	-45.7 -45.7	0.0	1.0	41.0	33.4	74.0	54.0	-32.4 -31.8	-20.0	H
.386	9.8	52.9	42.9	36.0	3.7	-46.5	0.0	1.0	47.0	37.0	74.0	54.0	-27.0	-17.0	v
.386	9.8	51.4	40.6	36.0	3.7	-46.5	0.0	1.0	45.5	34.7	74.0	54.0	-28.5	-19.3	H
		Measurem Distance to Analyzer R Antenna Fa Cable Loss	.eading actor	y		Amp D Corr Avg Peak HPF	Average	Correc Field S d Peak	et to 3 met trength @ : Field Stre	3 m		Pk Lim Avg Mar	Peak Field Margin vs	ield Strength I d Strength Limi . Average Limi . Peak Limit	t

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RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)

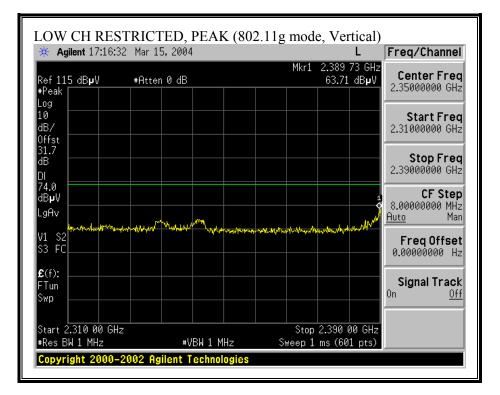


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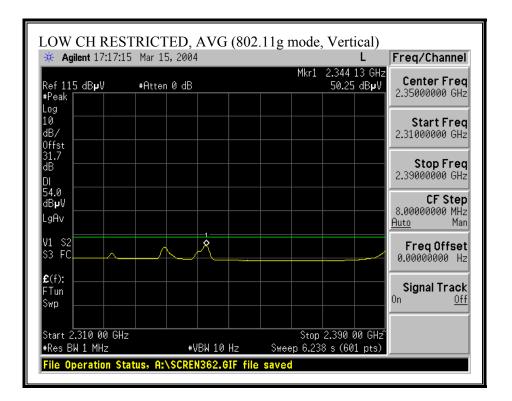


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RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)



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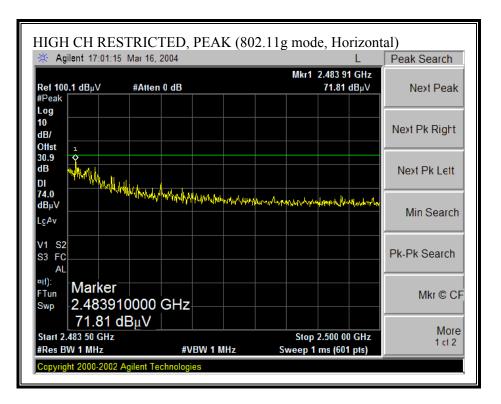


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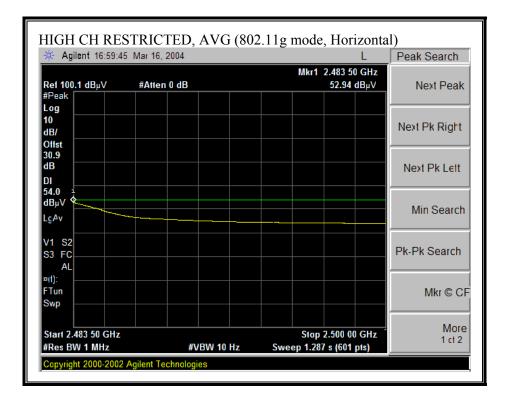
CORRECTION FACTOR FOR RESTRICTED BANDEDGE MEASUREMENTS

The reference level offset is equal to the test antenna gain + the test cable loss (29.4 dBi + 1.5 dBm = 30.9)

RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)



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CORRECTION FACTOR FOR RESTRICTED BANDEDGE MEASUREMENTS

The reference level offset is equal to the test antenna gain + the test cable loss (29.4 dBi + 2.4 dBm = 31.8)

RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)

🖌 Agilent 17:12:00 M	lar 15, 2004					L	Freq/Channe
Peak	Atten Ø dB			Mkr1	2.484 69.65	13 GHz dB µ V	Center Fred 2.49175000 GH
og Ø B/							Start Free 2.48350000 GH
1.8 B							Stop Fred 2.50000000 GH
4.0 BµV gAv 1 \$2	anath dues the	1 11-11-1			1.0		CF Stej 1.65000000 MH <u>Auto</u> Ma
3 FL			**************************************	www.som.org	1999 - 1999 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -	197 4 - 497	Freq Offse 0.00000000 H
(f): Tun wp							Signal Tracl On <u>Of</u>
tart 2.483 50 GHz Res BW 1 MHz	#VE	3W 1 MH		Stop Sweep 1	2.500 (ms (60		

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🔆 Agilent 17:12:43	8 Mar 15, 2004			1	L	Freq/Channel
Ref 115 dB µ V	#Atten 0 dB		Mkr1	2.483 50 50.32 d		Center Freq 2.49175000 GHz
#Peak Log						2.4317,5000,002
10 dB/						Start Freq 2.48350000 GHz
0ffst 31.8 dB DI						Stop Freq 2.50000000 GHz
54.0 dBµV LgAv						CF Step 1.65000000 MHz <u>Auto</u> Man
V1 S2 S3 FC						Freq Offset 0.00000000 Hz
£(f): FTun Swp						Signal Track On <u>Off</u>
Start 2.483 50 GHz #Res BW 1 MHz		0 Hz		2.500 00		

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HARMONICS AND SPURIOUS EMISSIONS (g MODE)

Test Tar Mode O Test Equ	per:	x,y,z axis har worst case a t:													
		L-18GHz	Spec	etrum An	alvzer		Pre-am	nlifen l	26011-	Pue am	plifer 26-40	CHa		Horn >180	GHz
	/N: 6717		Agilent I		-	r 🗸	T86 Mi	-		1 I C-am	piner 20-40	-	T87; ARA 18-26GHz; S/N:1049		
	GHz feet dBuV dBuV dB/m dB dl					Limit FCC 15.205			Peak Measurements 1 MHz Resolution Bandw 1MHz Video Bandwidth				: Average Measurements:		
						Amp	D Corr	HPF	Peak	Avg	Pk Lim	-		Avg Mar	Notes
GHz 11g 2412			dBuV	dB/m	dB	dB	dB		dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
1.824	9.8	48.0	39.2	33.4	3.0	-45.6	0.0	1.0	39.7	30.9	74.0	54.0	-34.3	-23.1	V
1.824 1g 2437	9.8 Channel	49.0	37.2	33.4	3.0	-45.6	0.0	1.0	40.7	28.9	74.0	54.0	-33.3	-25.1	H
1g 2437 .874	9.8	47.4	38.6	33.4	3.0	-45.6	0.0	1.0	39.2	30.4	74.0	54.0	-34.8	-23.6	v
.874	9.8	49.1	38.4	33.4	3.0	-45.6	0.0	1.0	40.9	30.2	74.0	54.0	-33.1	-23.8	H
7.311	9.8	57.2	43.5	35.8	3.7	-46.6	0.0	1.0	51.1	37.4	74.0	54.0	-22.9	-16.6	V
7.311	9.8	52.3	42.0	35.8	3.7	-46.6	0.0	1.0	46.2	35.9	74.0	54.0	-27.8	- 18.1	H
11g 2462 4.924	Channel 9.8	47.5	38.3	33.5	3.0	-45.7	0.0	1.0	39.3	30.1	74.0	54.0	-34.7	-23.9	v
1.924	9.8 9.8	47.5	38.3	33.5 33.5	3.0	-45.7	0.0	1.0	39.3 41.9	30.1	74.0	54.0 54.0	-34.7	-23.9 -23.5	H
7.386	9.8	56.6	42.9	36.0	3.7	-46.5	0.0	1.0	50.7	37.0	74.0	54.0	-23.3	-17.0	V
7.386	9.8	49.6	38.2	36.0	3.7	-46.5	0.0	1.0	43.7	32.3	74.0	54.0	-30.3	-21.7	H
		Measurem Distance to Analyzer R Antenna Fa Cable Loss	.eading actor	y		Amp D Corr Avg Peak HPF	Average	Correc Field S d Peak	t to 3 met trength @ Field Stre	3 m		Pk Lim Avg Mar	Peak Fiel Margin vs	Field Strength I d Strength Limi . Average Limi . Peak Limit	t

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HARMONICS AND SPURIOUS EMISSIONS (g TURBO MODE)

oject #: mpany: T Desc T M/N st Targ ode Ope	Toshi trip.: Mini I : MB43 et: x,y,z a	iba PCI cari	monics												
st Equij			Saca	trum An	ahman		_							Horn >]	1901-
	Horn 1-18Gl				· ·		T86 Mi	-	-26GHz 341 🗸	Pre-an	aplifer 26-40	GHz •	T87; AR.	A 18-26GHz; S	
Hz feet dBuV dBuV dB 2437 turbo Channel			▼ (12 ft)]	FCC 15	Limit 5.205	-		1 MHz Reso	asurement olution Band o Bandwidth	width		<u>Ieasurements:</u> ution Bandwidth Bandwidth	
			-	AF	CL	Amp	D Corr	HPF	Peak	Avg			1	Avg Mar	Notes
		_	dBuV	dB/m	dB	dB	dB		dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
74				33.4	3.0	-45.6	0.0	1.0	39.2	30.3	74.0	54.0	-34.8	-23.7	V
74 11		0.2 8.5	40.8 45.4	33.4 35.8	3.0 3.7	-45.6 -46.6	0.0 0.0	1.0 1.0	42.0 52.4	32.6 39.3	74.0 74.0	54.0 54.0	-32.0 -21.6	-21.4 -14.7	H V
11		3.1	41.9	35.8	3.7	-46.6	0.0	1.0	47.0	35.8	74.0	54.0	-27.0	-18.2	, H
	Dist Dista	nce to	ent Frequency Antenna	/				Correc	ct to 3 met			Pk Lim	Peak Field	Field Strength d Strength Li	imit
E R A	Dist Dista Lead Analy AF Anter	nce to	Antenna leading actor	r		•	Distance Average	Correc Field S ed Peal	Strength @ k Field Stre	3 m		Pk Lim Avg Mar	Peak Field Margin vs		imit imit

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7.7.4. CO-LOCATED TRANSMITTER RADIATED EMISSIONS

SUPPLEMENTAL TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna The dominant transmitter is set to the worst case channel. The spurious emissions performance of the dominant transmitter is investigated as the settings of the non-dominant transmitter are varied. Worst case results are reported.

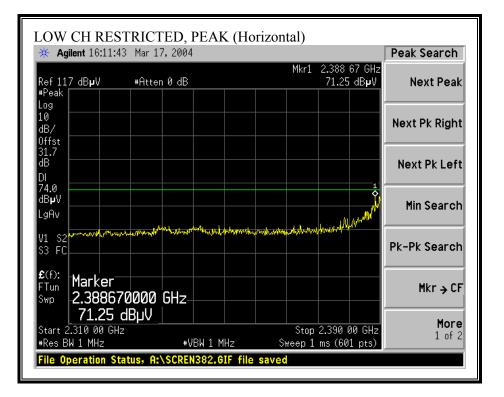
RESULTS

No non-compliance noted:

CORRECTION FACTOR FOR RESTRICTED BANDEDGE MEASUREMENTS

The reference level offset is equal to the test antenna gain + the test cable loss (29.4 dBi + 2.3 dBm = 31.7)

WORST-CASE RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

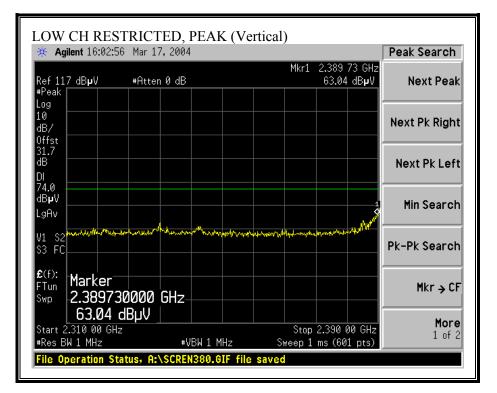


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LOW CH RESTRICT	ED, AVG (Horizont	al)	
🔆 🔆 Agilent 16:12:29 Mar 17	7,2004		Peak Search
Ref 117 dB µ V #Atter #Peak	n Ø dB	Mkr1 2.390 00 GHz 53.75 dB µ V	Next Peak
Log 10 dB/ 0ffst			Next Pk Right
31.7 dB DI			Next Pk Left
54.0 dB µ V LgAv			Min Search
M1 S2 S3 FC	~		Pk-Pk Search
£(f): FTun Swp 2.390000000 53.75 dBuV	GHz		Mkr → CF
Start 2.310 00 GHz #Res BW 1 MHz		Stop 2.390 00 GHz ep 6.238 s (601 pts)	More 1 of 2
File Operation Status, A:	SCREN383.GIF file save		

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WORST-CASE RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

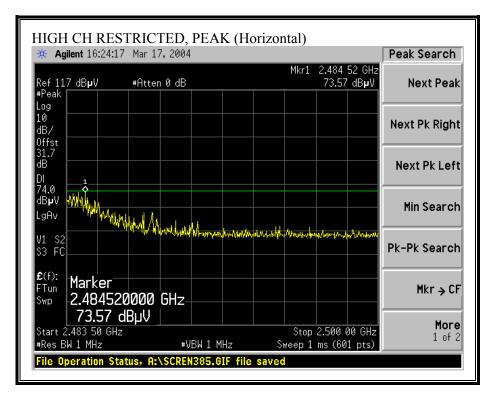


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LOW CH RESTRICT	,		
🔆 🔆 Agilent 16:03:45 Mar 1	7,2004		Peak Search
Ref 117 dBµV #Atter #Peak	n 0 dB	Mkr1 2.390 00 GHz 48.31 dB µ V	Next Peak
Log 10 dB/ 0ffst			Next Pk Right
31.7 dB DI			Next Pk Left
54.0 dBµV LgAv			Min Search
M1 S2 S3 FC			Pk-Pk Search
£(f): FTun Swp 2.390000000 48.31 dBµV	GHz		Mkr → CF
Start 2.310 00 GHz #Res BW 1 MHz		Stop 2.390 00 GHz ep 6.238 s (601 pts)	More 1 of 2
File Operation Status, A:	\SCREN381.GIF file save		

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WORST-CASE RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

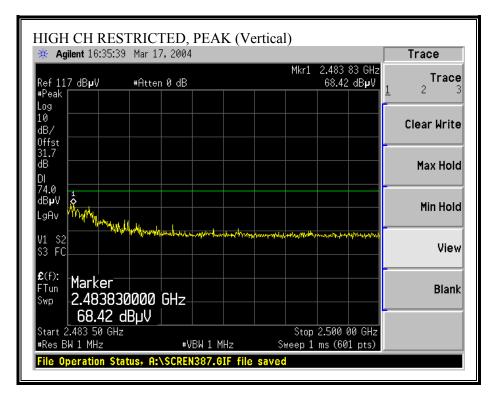


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HIGH CH RESTRIC	TED, AVG (Horizon	tal)	
🔆 🔆 Agilent 16:29:03 Mar 1	7,2004		Peak Search
Ref 117 dB µ V #Atter #Peak	n0dB	Mkr1 2.483 50 GHz 53.88 dB µ V	Next Peak
Log 10 dB/ 0ffst			Next Pk Right
31.7 dB DI			Next Pk Left
54.0 dB µ V LgAv			Min Search
V1 S2 S3 FC			Pk-Pk Search
£(f): FTun Swp 2.483500000 53.88 dBµV	GHz		Mkr → CF
Start 2.483 50 GHz #Res BW 1 MHz	#VBW 10 Hz Swe		More 1 of 2
File Operation Status, A:	\SCREN386.GIF file save		

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WORST-CASE RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



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HIGH CH RESTRIC			
🔆 🔆 Agilent 16:36:13 Mar 1	7,2004		Peak Search
Ref 117 dB µ V #Atter #Peak	n 0 dB	Mkr1 2.483 50 GHz 49.30 dB µ V	Next Peak
Log 10 dB/ 0ffst			Next Pk Right
31.7 dB DI 54.0			Next Pk Left
dBµV			Min Search
M1 S2 S3 FC			Pk-Pk Search
£(f): FTun Swp 2.483500000 49.30 dBµV	GHz		Mkr → CF
Start 2.483 50 GHz #Res BW 1 MHz		Stop 2.500 00 GHz eep 1.287 s (601 pts)	More 1 of 2
File Operation Status, A:	\SCREN388.GIF file save	d	

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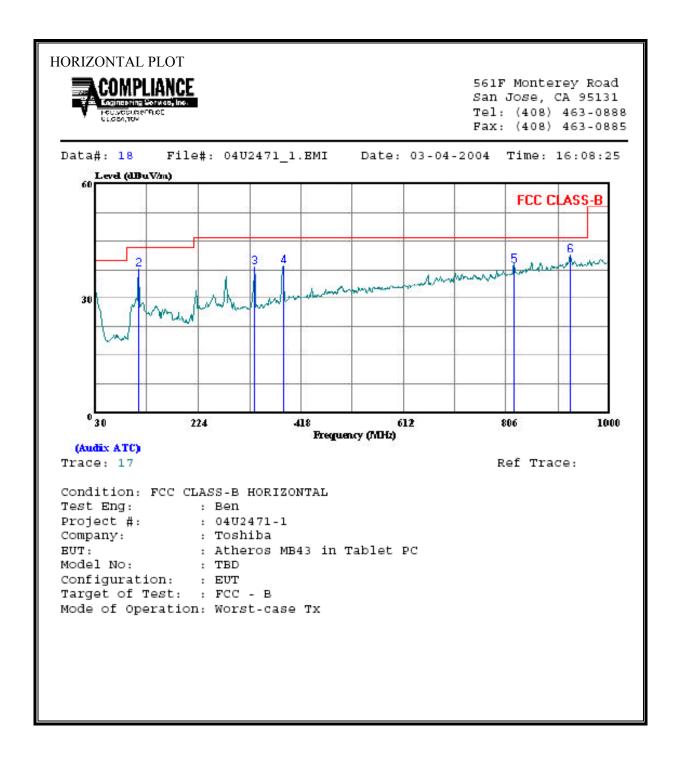
WORST-CASE HARMONICS AND SPURIOUS EMISSIONS

: M et: 1	U2470-1 OSHIBA : MB44 IN I B43 15.247_CO-1 Ix_11g_MO ent:	LOCATION	_HARM		C & SP	UR								
MCO Horn	1-18GHz	Spec	trum An	alyzer		Pre-am	plifer 1-	26GHz	Pre-am	plifer 26-40	GHz		Horn >18	8GHz
[60; S/N: 223	38 @3m 🗸	Agilent l	E4446A /	Analyze	er 🗸	T34 HP					-			
Hi Frequency (, □ (4 ~ 6 ft)	▼ (12 ft)			FCC 15	Limit .209	•	-	1 MHz Reso	asurement Iution Bandw Bandwidth			e <u>asurements:</u> tion Bandwidth ndwidth
f Dist Hz feet	1	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	-	Pk Mar dB	Avg Mar dB	Notes
CH 2462MHZ														
4 9.8 6 9.8	43.0	28.5 32.5	33.2 36.3	2.4 3.1	-34.5 -34.1	0.0 0.0	1.0 1.0	45.0 53.7	30.5 38.9	74.0 74.0	54.0 54.0	-29.0 -20.3	-23.5 -15.1	v v
24 9.8		30.0	33.2	2.4	-34.1	0.0	1.0	44.8	32.0	74.0	54.0	-20.3	-15.1	н
36 9.8		31.6	33.2 36.3	2.4 3.1	-34.5 -34.1	0.0	1.0	44.8 52.1	32.0	74.0	54.0 54.0	-29.2 -21.9	-16.0	H
f Dist Read AF CL		eading actor	y		Amp D Corr Avg Peak HPF	Average	Correc Field S d Peak	t to 3 mete trength @ Field Stre	3 m		Pk Lim Avg Mar	Peak Field Margin vs	Field Strength d Strength Lin Average Lin Peak Limit	nit

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7.7.5. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

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

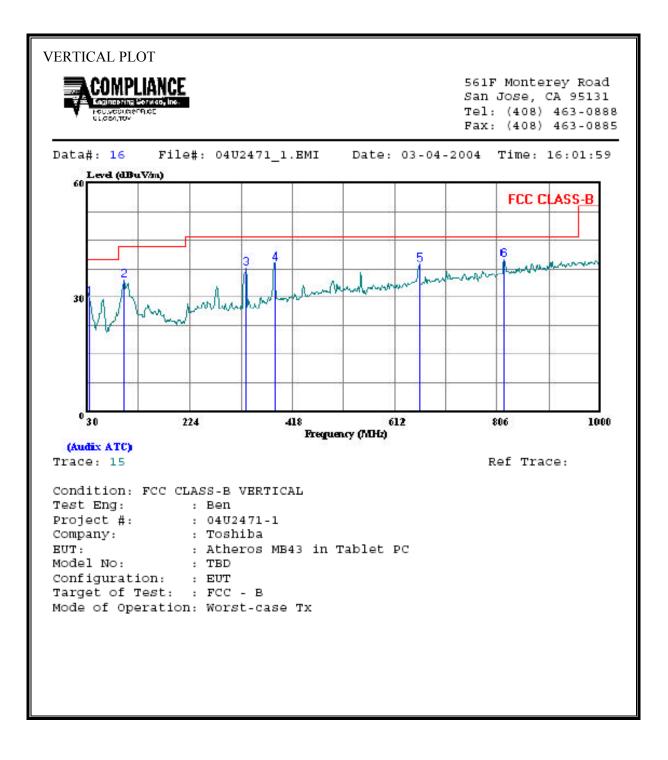


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HORIZ	ZONTAL DATA	L .					
			Read			Limit	Over
	Freq	Remark	Level F	actor	Level	Line	Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
	11112		abav	ab .	abav/m	abav/m	чD
1	30.000	Peak	8.82	22.95	31.77	40.00	-8.23
2	111.480		24.04				
3	329.730		21.77				
4	385.990		20.64				-7.49
5	820.550			25.21		46.00	
6	926.280	Peak	14.54	26.76	41.30	46.00	-4.70

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



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REPORT NO: 04U2471-1 EUT: 802.11 b/g Mini PCI Transceiver

VERT	ICAL DATA						
	Freq	Remark	Read Level F	actor	Level	Limit Line	Over Limit
	MHz		dBu⊽	dB	dBuV/m	dBuV/m	dB
1 2 3 4 5 6	33.880 99.840 329.730 385.990 657.590	Peak Peak Peak Peak	9.19 24.13 21.20 21.20	20.70 10.38 16.44 17.87 23.00	29.89 34.51 37.64 39.07 38.65	40.00 43.50 46.00 46.00 46.00	-10.11 -8.99 -8.36 -6.93 -7.35

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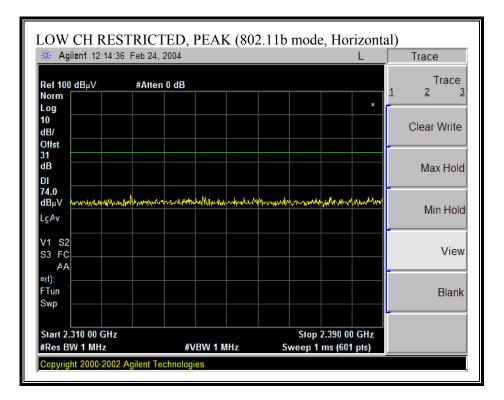
7.8. STAND-ALONE RADIATED EMISSIONS

7.8.1. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHZ

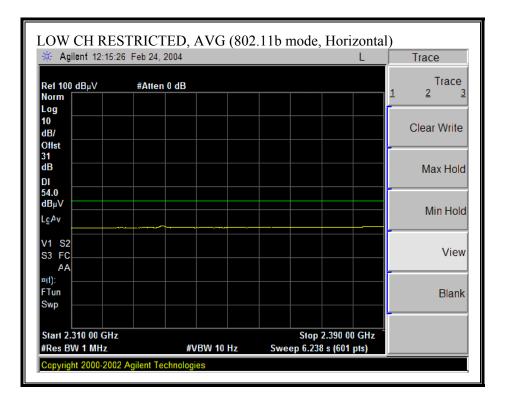
CORRECTION FACTOR FOR RESTRICTED BANDEDGE MEASUREMENTS

The reference level offset is equal to the test antenna gain + the test cable loss (29.4 dBi + 1.6 dBm)

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

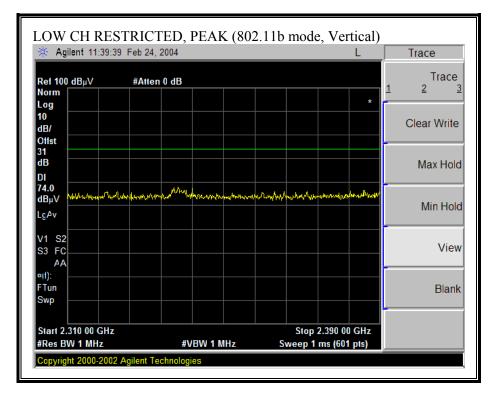


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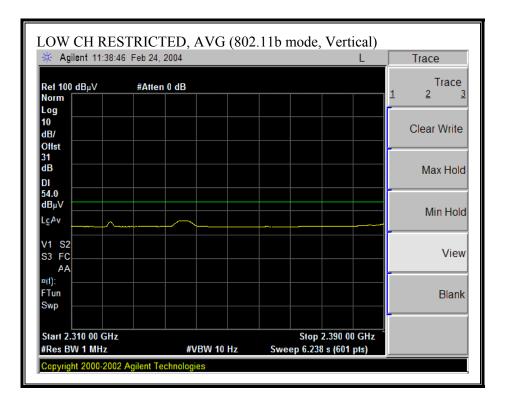


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RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

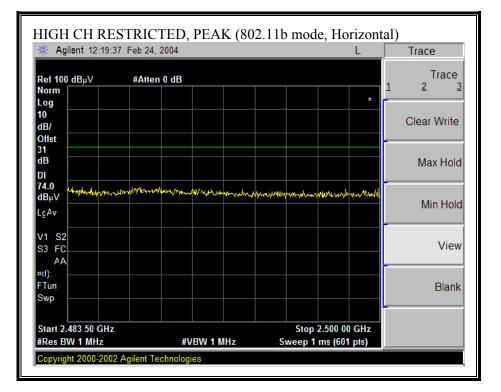


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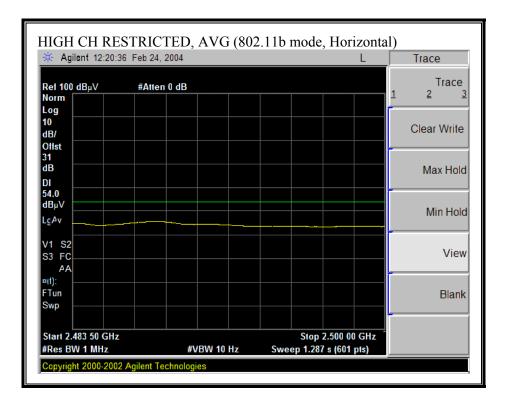


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RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

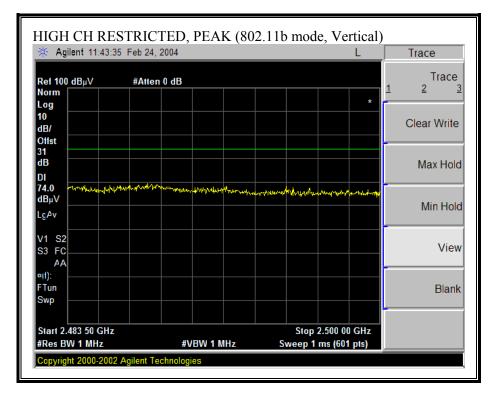


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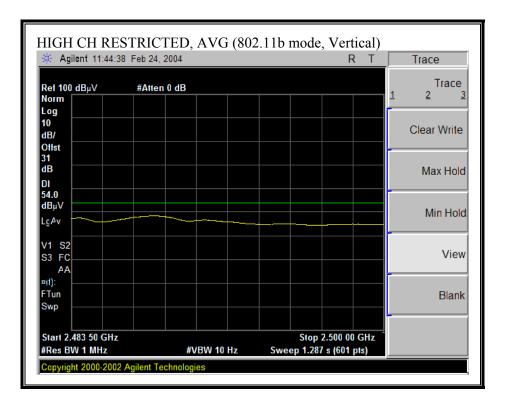


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RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



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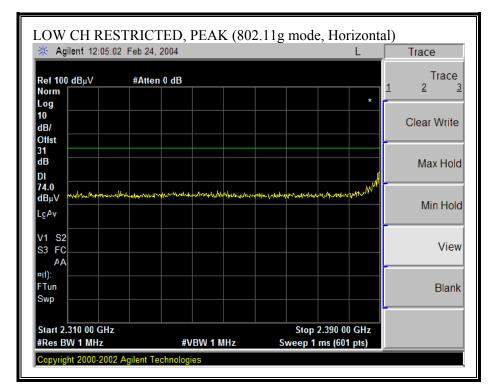
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HARMONICS AND SPURIOUS EMISSIONS (b MODE)

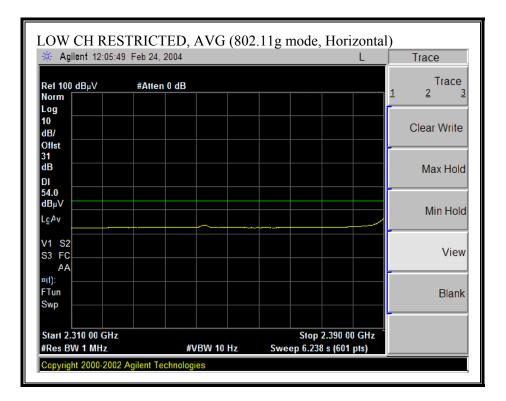
UT De UT M/ est Tar Iode O	N: get:	MB43 ART program	m												
est Equ	iipmen	. <u>t:</u>													
		1-18GHz		etrum An	-		Pre-am	plifer 1	-26GHz	Pre-am	plifer 26-40	GHz		Horn > 18G	Hz
T59; S	/N: 3245	5@3m 🗸	Agilent	E4446A .	Analyze	r 🗸	T63 Mi	teq 646	456 🗸			•			•
Hi Freq	uency Ca ft)		□ (4 ~ 6 ft)	$\boxed{(4 \sim 6 ft)} \boxed{\checkmark} (12 ft)$			FCC 15	Limit	-	Peak Measurem 1 MHz Resolution B 1MHz Video Bandwi		lution Bandy			
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		Pk Mar dB	Avg Mar dB	Notes
1b low								10							77
.824 .648	9.8 9.8	48.6 46.8	39.4 39.1	33.1 37.9	2.9 4.0	-35.3 -33.3	0.0 0.0	1.0 1.0	50.2 56.3	41.0 48.6	74.0 74.0	54.0 54.0	-23.8 -17.7	-13.0 -5.4	V V
lb mid 874	9.8	46.1	36.3	33.1	2.9	-35.3	0.0	1.0	47.7	37.9	74.0	54.0	-26.3	-16.1	V
748	9.8	43.6	34.5	37.8	4.1	-33.4	0.0	1.0	53.1	44.0	74.0	54.0	-20.9	-10.0	v
b high 924	9.8	46.9	37.0	33.1	2.9	-35.3	0.0	1.0	48.6	38.7	74.0	54.0	-25.4	-15.3	V
848	9.8	44.8	34.8	37.7	4.1	-33.4	0.0	1.0	54.2	44.2	74.0	54.0	- 19.8	-9.8	V
lb low 824	9.8	46.7	39.1	33.1	2.9	-35.3	0.0	1.0	48.3	40.7	74.0	54.0	-25.7	-13.3	H
648 lb mid	9.8	44.7	36.4	37.9	4.0	-33.3	0.0	1.0	54.2	45.9	74.0	54.0	-19.8	-8.1	H H
874	9.8	44.2	34.5	33.1	2.9	-35.3	0.0	1.0	45.8	36.1	74.0	54.0	-28.2	-17.9	Н
.748 1b high	9.8	41.0	32.9	37.8	4.1	-33.4	0.0	1.0	50.5	42.4	74.0	54.0	-23.5	-11.6	H H
16 high .924	9.8	43.4	33.5	33.1	2.9	-35.3	0.0	1.0	45.1	35.2	74.0	54.0	-28.9	-18.8	H H
f Measurement Frequency Amp Preamp Gain Avg Lim Ave Dist Distance to Antenna D Corr Distance Correct to 3 meters Pk Lim Pea							Distance Average Calculate	Correc Field S ed Peak	itrength @ Field Stre	3 m		Pk Lim Avg Mar	Peak Fiel Margin vs	Field Strength Li d Strength Limit Average Limit Peak Limit	

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RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)

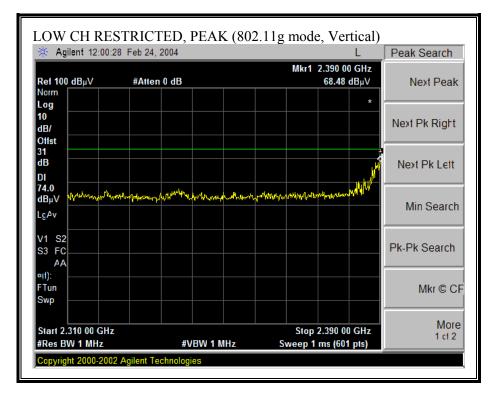


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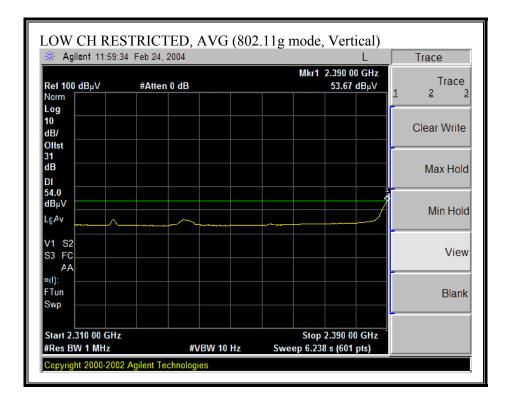


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RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)

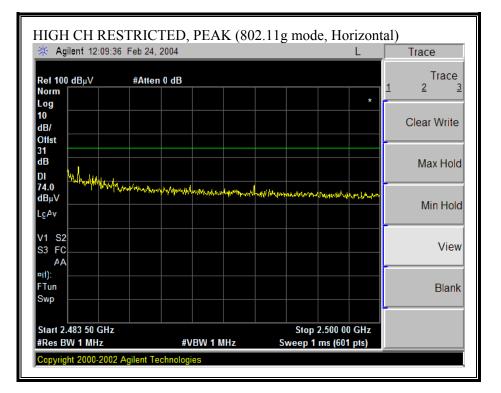


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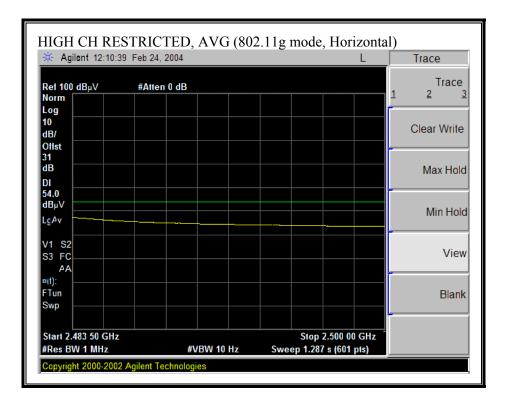


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RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)

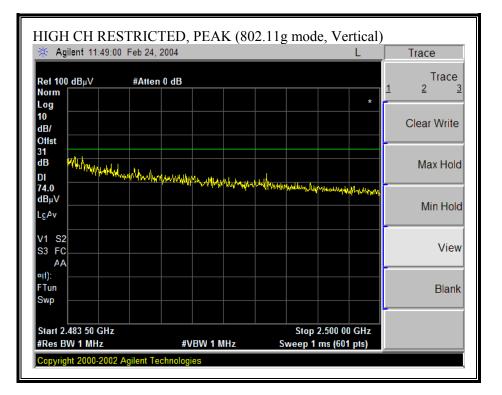


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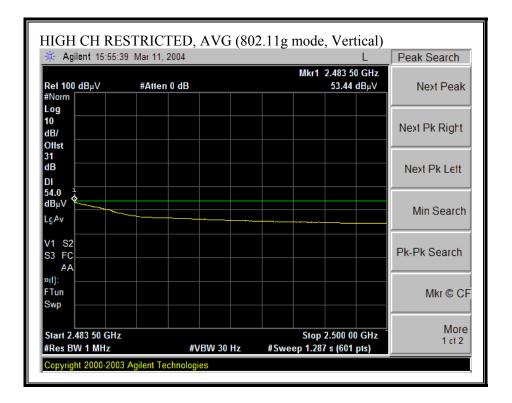


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RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)



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HARMONICS AND SPURIOUS EMISSIONS (g MODE)

UT De UT M/ Cest Tai Iode O	y: ATH scrip.: N: MB rget: 15 per: Tx uipmen	43 5.247 c_11g													
EMC	EMCO Horn 1-18GHz Spectrum Analyzer		Pre-am	plifer 1	-26GHz	Pre-am	plifer 26-40	GHz		Horn >18G	Hz				
T60; S	/N: 2238	@3m 🗸	Agilent	E4446A .	Analyze	er 🗸	T63 Mit	teq 646	456 🗸			-			-
Hi Fred	quency Ca ft)		□ (4 ~ 6 ft)	🔽 (12 ft)			FCC 15	Limit	Ţ	Peak Measurement 1 MHz Resolution Bandw 1MHz Video Bandwidth		width	Average Measurements: 1 MHz Resolution Bandwidth 10Hz Video Bandwidth		
f	Dist		Read Avg.	AF	CL	Amp	D Corr	HPF	Peak	Avg		-		Avg Mar	Notes
GHz OW CH	feet	dBuV	dBuV	dB/m	dB	dB	dB		dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
.824	9.8	48.7	34.6	33.1	2.9	-35.3	0.0	1.0	50.3	36.2	74.0	54.0	-23.7	-17.8	v
326	9.8	45.5	33.2	36.2	3.8	-34.6	0.0	1.0	52.0	39.7	74.0	54.0	- 22.0	-14.3	V
824	9.8	45.3	33.1	33.1	2.9	-35.3	0.0	1.0	46.9	34.7	74.0	54.0	- 27.1	-19.3	H
326	9.8	43.9	32.7	36.2	3.8	-34.6	0.0	1.0	50.4	39.2	74.0	54.0	-23.6	-14.8	H
ID CH														105	
874	9.8	45.6	33.7	33.1	2.9	-35.3	0.0	1.0	47.2	35.3	74.0	54.0	-26.8	-18.7	V
.748 .874	9.8 9.8	35.4 49.6	33.0 37.3	38.5 33.1	5.6 2.9	-33.4 -35.3	0.0 0.0	1.0 1.0	44.9 51.3	42.5 39.0	74.0 74.0	54.0 54.0	-29.1 -22.7	-11.5 -15.0	V H
874 311	9.8 9.8	49.6 45.8	37.3 33.6	33.1 36.2	2.9 3.8	-35.3 -34.6	0.0 0.0	1.0	51.3 52.2	39.0 40.0	74.0 74.0	54.0 54.0	-22.7 -21.8	-15.0 -14.0	H H
I CIT															
II CH .924	9.8	49.2	36.7	33.2	2.9	-35.3	0.0	1.0	50.9	38.4	74.0	54.0	-23.1	-15.6	v
.924	9.8 9.8	49.2	36.7	33.2	3.9	-35.3	0.0	1.0	50.9 51.5	38.4 39.4	74.0	54.0 54.0	-23.1 -22.5	-15.0 -14.6	<u>v</u> v
.380 .924	9.8	44.9	34.9	33.2	2.9	-34.5	0.0	1.0	49.4	39.4	74.0	54.0	-22.5	-14.0	H
386	9.8	44.8	33.0	36.3	3.9	-34.5	0.0	1.0	51.4	39.6	74.0	54.0	-22.6	-14.4	H
	Dist Read AF	Measurem Distance to Analyzer R Antenna Fa Cable Loss	leading actor	у		Avg Peak	Average	Correc Field S d Peak	ct to 3 mete Strength @ c Field Stre	3 m		Pk Lim Avg Mar	Peak Fiel Margin vs	Field Strength Li d Strength Limit 5. Average Limit 5. Peak Limit	

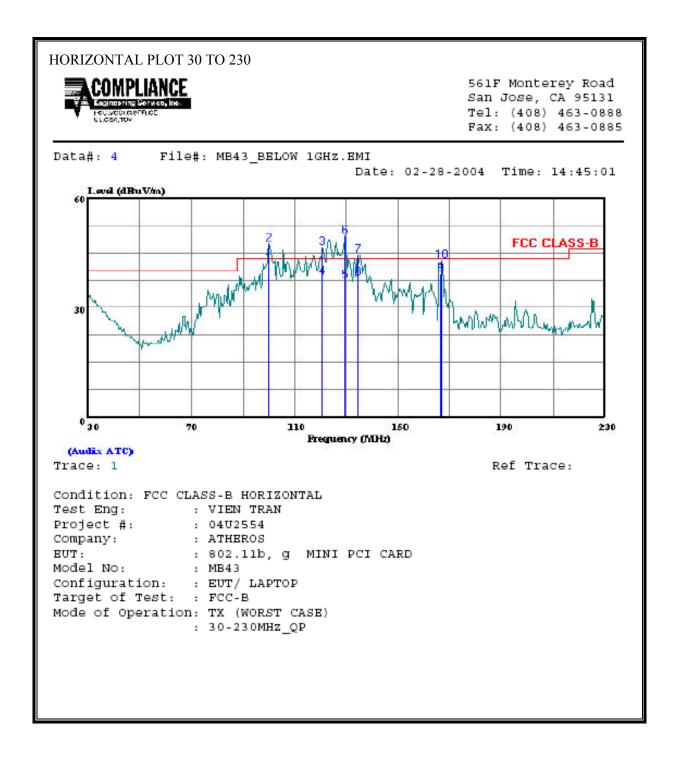
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HARMONICS AND SPURIOUS EMISSIONS (g TURBO MODE)

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7.8.2. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 230 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

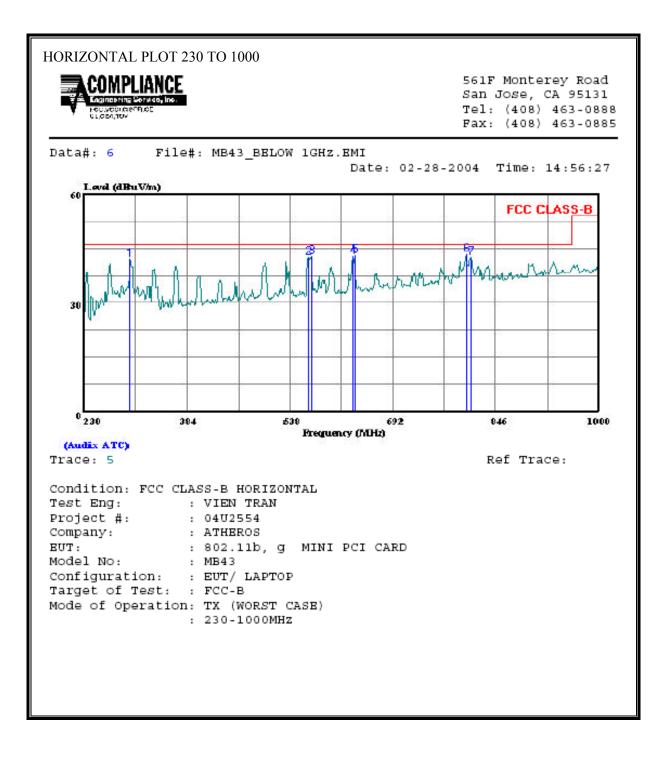


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HORIZONTAL DATA	HORIZONTAL DATA 30 TO 230									
Freq	Remark	Read Level F	actor	Level	Limit Line					
MHz		dBuV	dB d	BuV/m d	dBuV/m	dB				
2 * 99.800 3 * 120.800 4 120.800 5 129.400 6 * 129.400 7 * 134.400 8 134.400 9 166.400	Peak Peak QP QP Peak Peak QP	37.20 31.45 23.50 21.95 34.00 29.09 22.70 25.65	10.41 15.03 15.01 15.55 15.54 15.43 15.43 13.63	47.61 46.48 38.51 37.50 49.54 44.52 38.13 39.28	43.50 43.50 43.50 43.50 43.50 43.50 43.50	4.11 2.98 -5.00 -6.00 6.04 1.02 -5.37 -4.22				

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SPURIOUS EMISSIONS 230 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

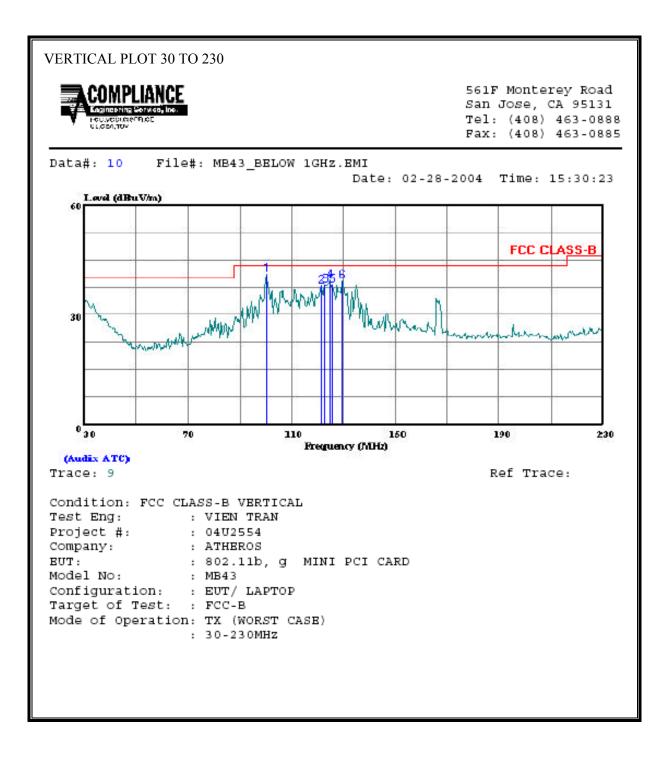


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HORIZONTAL DATA 230 TO 1000									
Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit			
MHz		dBuV	dB	dBuV/m ₀	dBuV/m	dB			
1 298.530 2 566.490 3 570.340 4 631.940 5 635.790 6 801.340 7 809.040	Peak Peak Peak Peak Peak		21.49 21.65 22.41		46.00 46.00 46.00 46.00 46.00	-3.51 -3.03 -3.20 -2.81			

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SPURIOUS EMISSIONS 30 TO 230 MHz (WORST-CASE CONFIGURATION, VERTICAL)

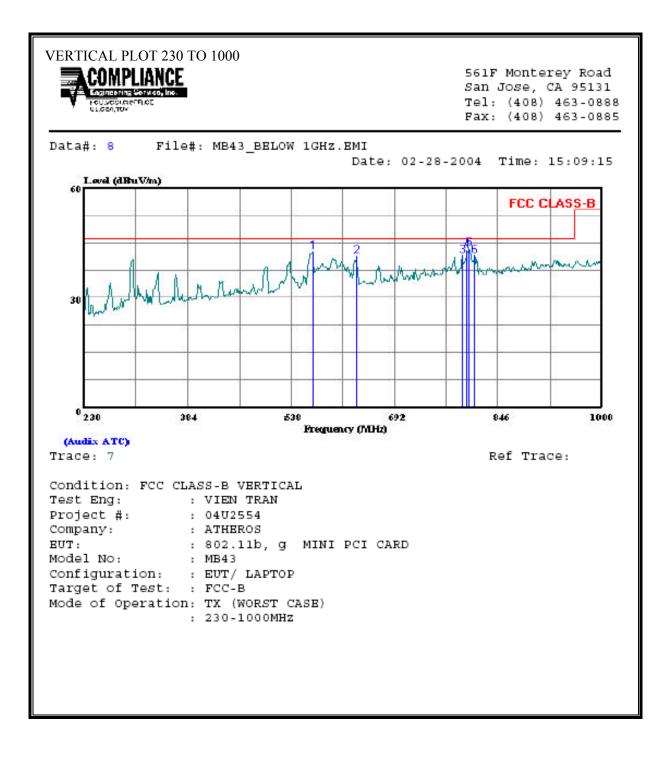


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VERTICAL DATA 30 TO 230									
Freq Remark	Read Limit Over Level Factor Level Line Limit								
MHz									
4 124.400 Peak 5 125.400 Peak	30.50 10.59 41.09 43.50 -2.41 22.88 15.09 37.97 43.50 -5.53 22.86 15.25 38.11 43.50 -5.39 24.00 15.41 39.41 43.50 -4.09 22.74 15.47 38.21 43.50 -5.29 23.81 15.54 39.35 43.50 -4.15								

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SPURIOUS EMISSIONS 230 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)



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REPORT NO: 04U2471-1 EUT: 802.11 b/g Mini PCI Transceiver

VERTICAL DATA 230 TO 1000									
Freq	Remark	Read Level H	actor	Level	Limit Line				
MHz		dBuV	dB	dBuV/m	dBuV/m	dB			
1 570.340 2 635.790 3 791.330 4 799.030 5 802.880 6 810.580	Peak Peak Peak Peak	21.02 18.81 16.57 17.75 18.27	21.65 22.53 24.86 25.01 25.06	42.66 41.34	46.00 46.00 46.00 46.00 46.00	-3.34 -4.66 -4.57 -3.24			

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7.9. POWERLINE CONDUCTED EMISSIONS

<u>LIMIT</u>

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

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

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

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

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

RESULTS

No non-compliance noted:

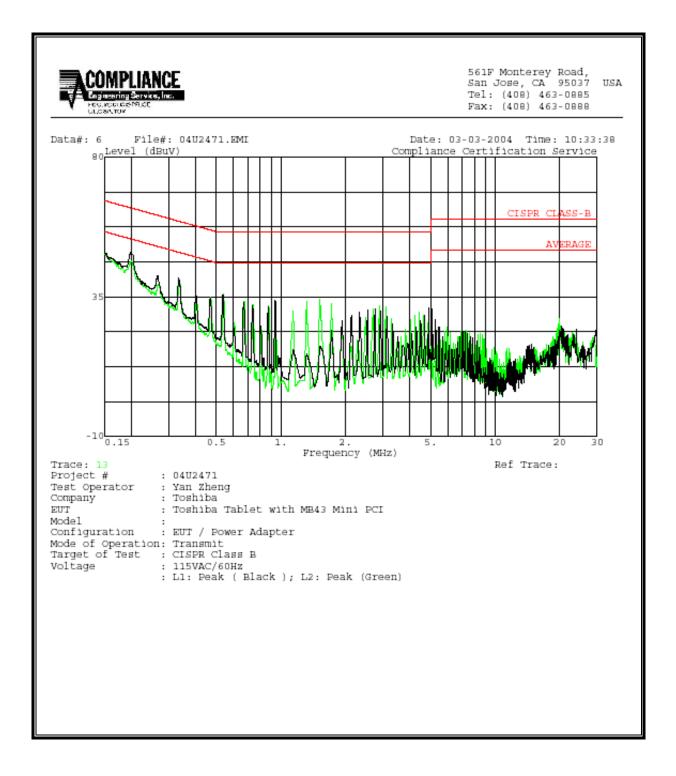
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<u>6 WORST EMISSIONS</u>

			CONDUCTED	EMISSI	ONS DA	ТА			
Freq.		Reading		Closs	Limit	EN_B	Margi	Remark	
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	49.94			0.00	66.00	56.00	-16.06	-6.06	L1
0.27	41.96			0.00	62.69	52.69	-20.73	-10.73	L1
0.33	41.12			0.00	60.86	50.86	-19.74	-9.74	L1
0.15	48.80			0.00	66.00	56.00	-17.20	-7.20	L2
0.20	46.50			0.00	64.57	54.57	-18.07	-8.07	L2
0.34	40.30			0.00	60.57	50.57	-20.27	-10.27	L2
6 Worst Data									

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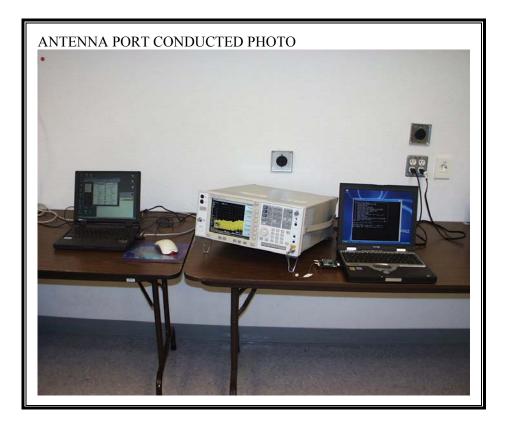
LINE 1 AND LINE 2 RESULTS



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8. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



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RADIATED RF MEASUREMENT SETUP WITH LAPTOP POSITION



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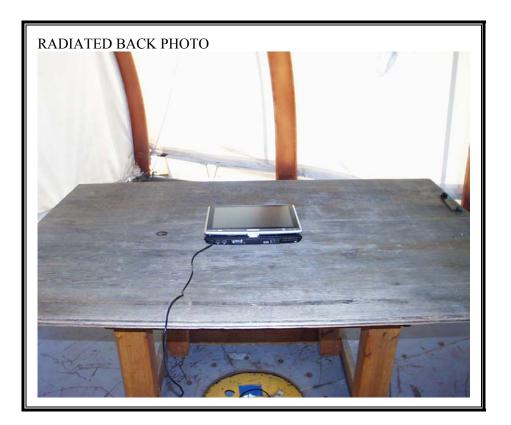


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RADIATED RF MEASUREMENT SETUP WITH PORTABLE, X AXIS POSITION

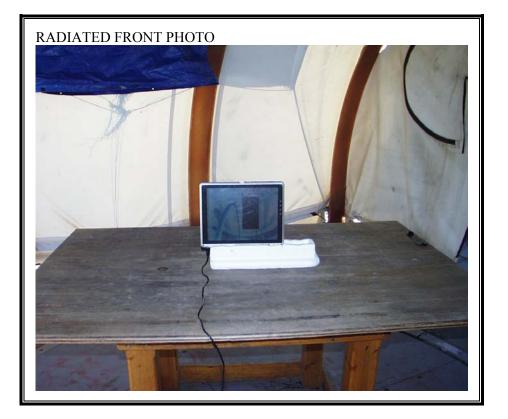


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RADIATED RF MEASUREMENT SETUP WITH PORTABLE, Y AXIS POSITION



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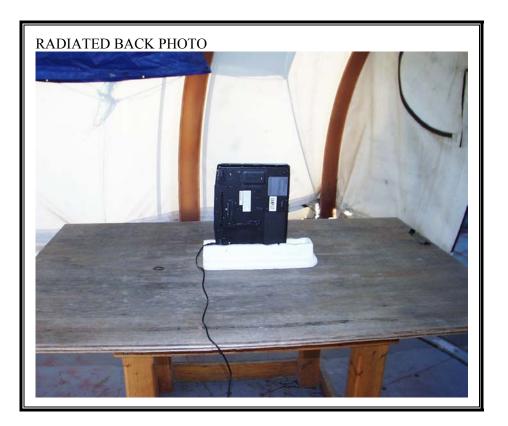


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RADIATED RF MEASUREMENT SETUP WITH PORTABLE, Z AXIS POSITION



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STAND-ALONE RADIATED EMISSINS SETUP

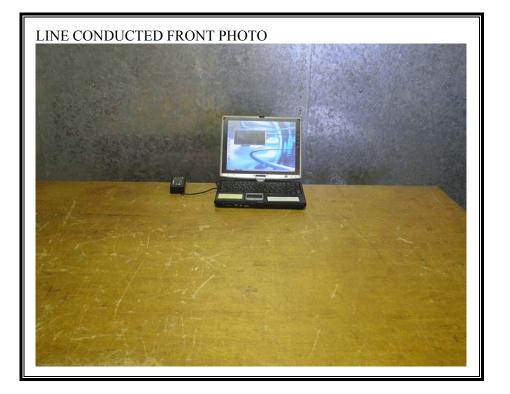


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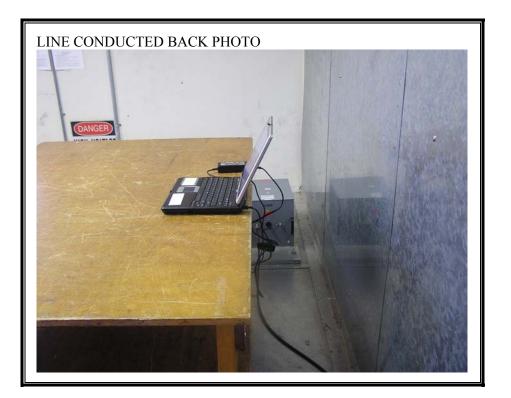


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POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP



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END OF REPORT

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