FCC CFR47 PART 15 SUBPART C

CLASS II PERMISSIVE CHANGE
TEST REPORT

FOR

WIRELESS ROUTER

MODEL NUMBER: WGT624v2

FCC ID: PY3WGR614V3

REPORT NUMBER: 03U2493-1

ISSUE DATE: FEBRUARY 25, 2004

Prepared for
NETGEAR INC.
4500 GREAT AMERICA PARKWAY
SANTA CLARA
CA 95054, USA

Prepared by
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1. TEST RESULT CERTIFICATION

COMPANY NAME: NETGEAR INC.
4500 GREAT AMERICA PARKWAY
SANTA CLARA, CA 95054, USA

EUT DESCRIPTION: WIRELESS ROUTER

MODEL: WGT624v2

DATE TESTED: FEBRUARY 06, 2004 TO FEBRUARY 09, 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:

MIKE HECKROTTE
CHIEF ENGINEER
COMPLIANCE CERTIFICATION SERVICES

Tested By:

VIEN TRAN
EMC TECHNICIAN
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

2.1. DESCRIPTION OF CHANGES

The EUT is an 802.11b/g wireless router. The changes consist of:

1. a die change on the CPU/MAC/BB processor chip
2. A lower core operating voltage (1.8 VDC new versus 1.3 VDC old) for the CPU/MAC/BB processor chip
3. A higher I/O supply operating voltage (3.3 VDC new versus 2.5 VDC old) for the CPU/MAC/BB processor chip
4. Resistor value changes to provide the correct new DC operating and supply voltages

There are no changes to the transmitter operating frequencies, power levels or antennas.

2.2. TEST PROTOCOL

Spot testing to compare the performance of the new baseband chip is performed with the transmitter set to the middle channel for all tests, except as follows: The transmitter is set to the low, middle and high channels for conducted spurious tests. The transmitter is set to the low and high channels for low and high radiated restricted band tests, respectively.

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.

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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.

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%.

5.3. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Name of Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Due Date**
Spectrum Analyzer	**HP**	**E4446A**	**US42510266**	**7/23/2004**
Peak Power Meter	**Agilent**	**E4416A**	**GB41291160**	**11/7/2004**
Oscilloscope, 100MHz 4Ch.	**HP**	**54601A**	**3106A00123**	**11/6/2004**
Signal Generator, 2 ~ 40 GHz	**R & S**	**SMP04**	**DE 34210**	**5/25/2005**
Temperature / Humidity Chamber	**Thermotron**	**SE 600-10-10**	**29800**	**4/26/2004**
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**
EMI Test Receiver	**R & S**	**ESHS 20**	**827129/006**	**7/17/2004**
Antenna, Horn 1 ~ 18 GHz	**EMCO**	**3115**	**6717**	**2/4/2004**
Preamplifier, 1 ~ 26 GHz	**Miteq**	**NSP10023988**	**646456**	**4/25/2004**
EMI Receiver, 9 kHz ~ 2.9 GHz	**HP**	**8542E**	**3942A00286**	**11/20/2004**
RF Filter Section	**HP**	**85420E**	**3705A00256**	**11/20/2004**
Antenna, Bicon/Log, 25 ~ 2000 MHz	**ARA**	**LPB-2520/A**	**1185**	**3/6/2004**

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Number	Serial Number	FCC ID
Laptop	Dell	PP02X	N/A	E2K24CLNS
AC/DC Power Adapter	Netgear	JAD-12800E	PWR-10004-03	DoC
AC/DC Power Adapter	Netgear	DV-1280-3	PWR-100-27-01	DoC

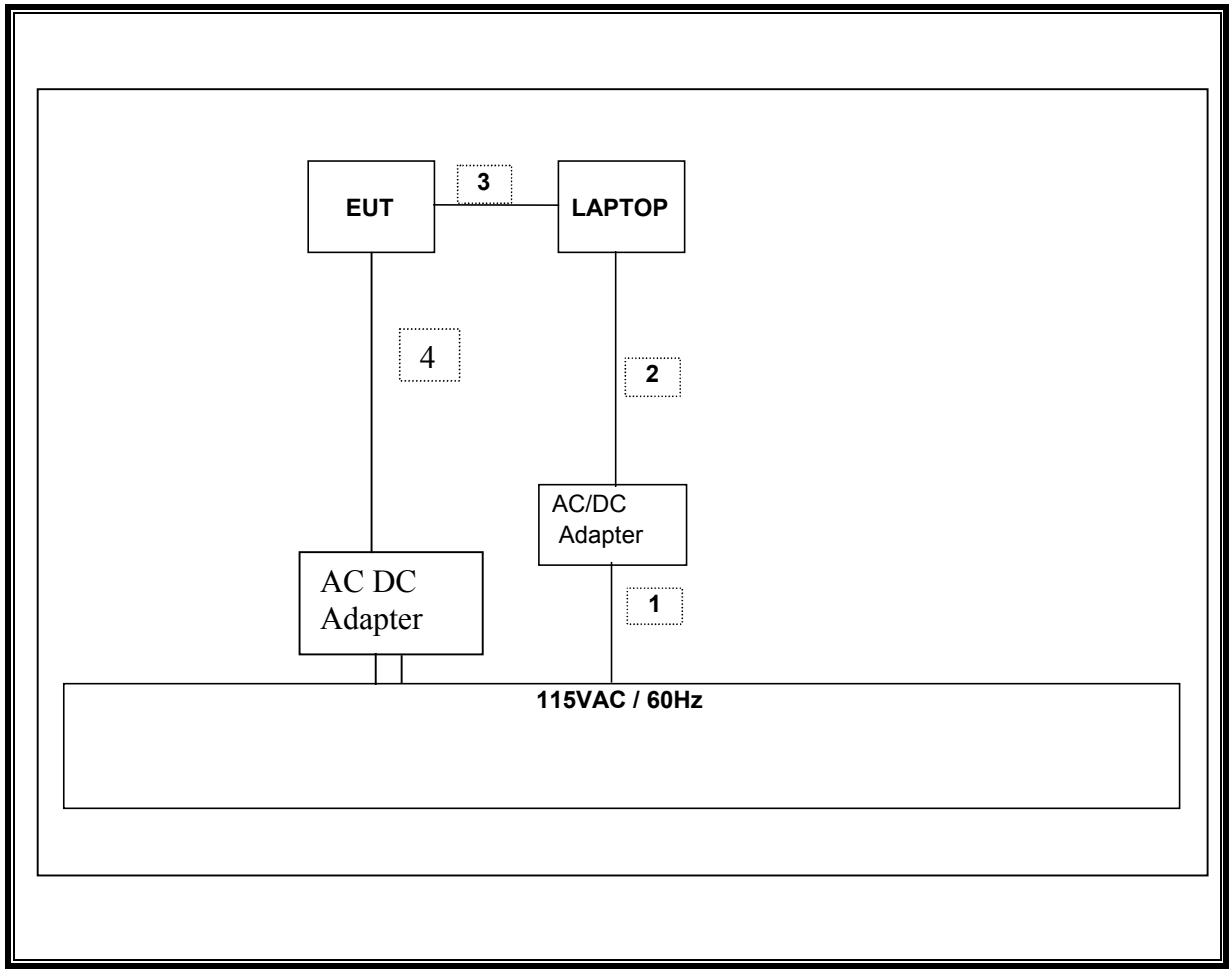
I/O CABLES

Cable No	I/O Port	# of I/O Port	Connector Type	Type of Cable	Cable Length	Data Traffic	Bundled	Remark
1	AC	1	US115VAC	Un-shielded	1m	No	No	N/A
2	DC	1	DC	Un-shielded	1m	No	No	N/A
3	Ethernet	1	RJ45	Un-shielded	3m	Yes	Yes	N/A
4	DC	1	DC	Un-shielded	1m	No	No	Integrated with Adapter

TEST SETUP

The EUT was controlled by the laptop via Ethernet cable.

SETUP DIAGRAM FOR TESTS



SETUP FOR DIGITAL DEVICE TESTS

SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Number	Serial Number	FCC ID
Laptop	Dell	PP02X	N/A	E2K24CLNS
AC/DC Power Adapter	Netgear	JAD-12800E	PWR-10004-03	Doc
AC/DC Power Adapter	Netgear	DV-1280-3	PWR-100-27-01	DOC
MODEM	ACEEX	1414	9013537	IFAXDM1414
PRINTER	HP	2225C	2541S41679	BS46XU2225C
Mouse	Microsoft	Intelemouse	63618-OEM-6345201	DoC

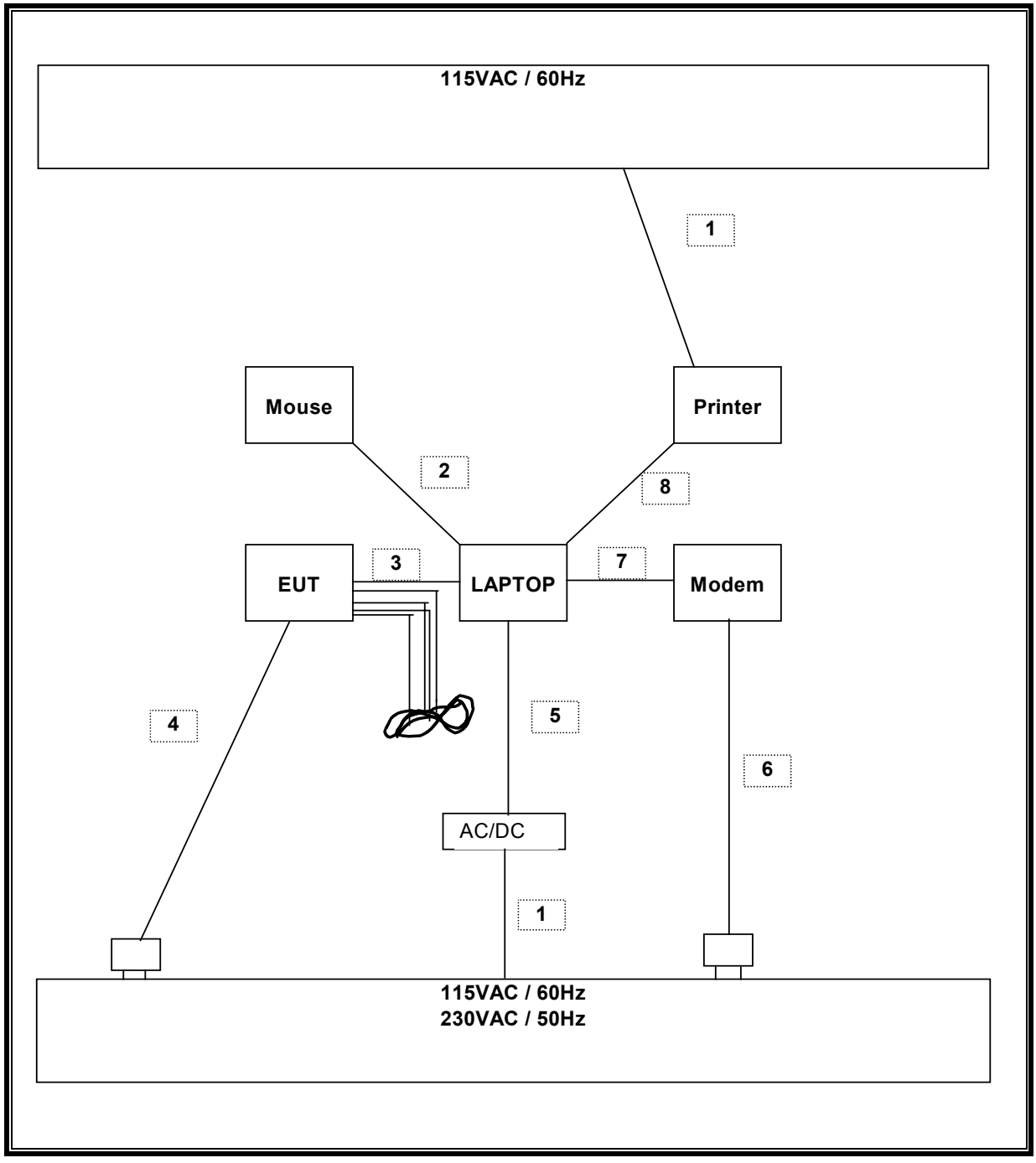
I/O CABLES

Cable No	I/O Port	# of I/O Port	Connector Type	Type of Cable	Cable Length	Data Traffic	Bundled	Remark
1	AC	1	230V	Un-shielded	1m	No	No	N/A
2	PS2	1	PS2	Un-shielded	2m	No	No	N/A
3	Ethernet	5	RJ45	Un-shielded	3m	Yes	Yes	N/A
4	DC	1	DC	Un-shielded	1m	No	No	Integrated with Adapter
5	DC	1	DC	Un-shielded	2m	No	No	N/A
6	DC	1	DC	Un-shielded	1m	No	No	Integrated with Adapter
7	Serial	1	DB9	Shielded	1m	Yes	No	N/A
8	Parallel	1	DB25	Shielded	2m	Yes	Yes	N/A

TEST SETUP

The EUT was controlled by the laptop via Ethernet cable.

SETUP DIAGRAM FOR DIGITAL DEVICE TESTS



7. APPLICABLE LIMITS AND TEST RESULTS

7.1. 6 dB BANDWIDTH

LIMIT

§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.

The transmitter is set to the middle channel.

RESULTS

No non-compliance noted:

802.11b Mode

Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Margin (kHz)
Middle	2437	12750	500	12250

802.11g Mode

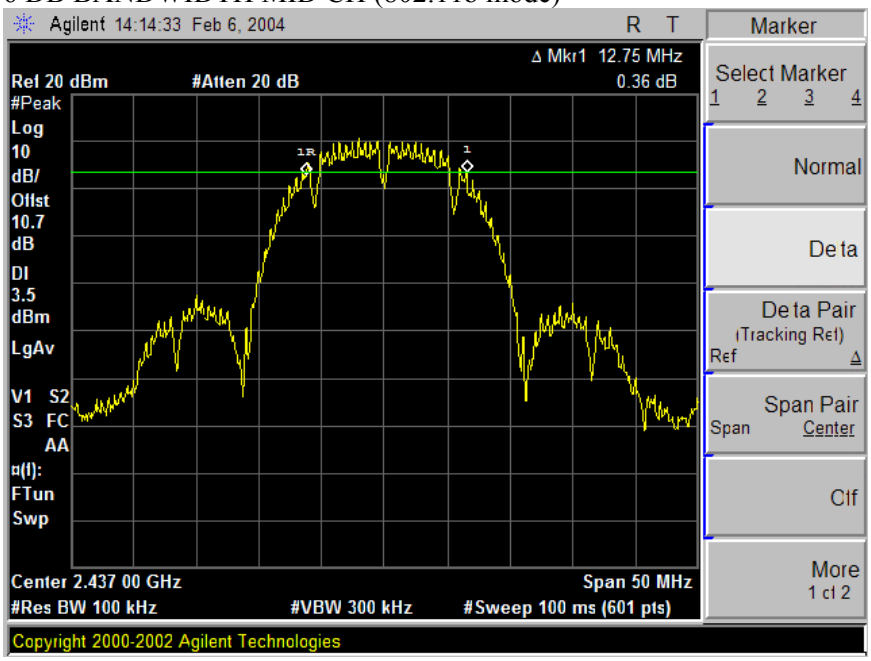
Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Margin (kHz)
Middle	2437	16420	500	15920

802.11g Turbo Mode

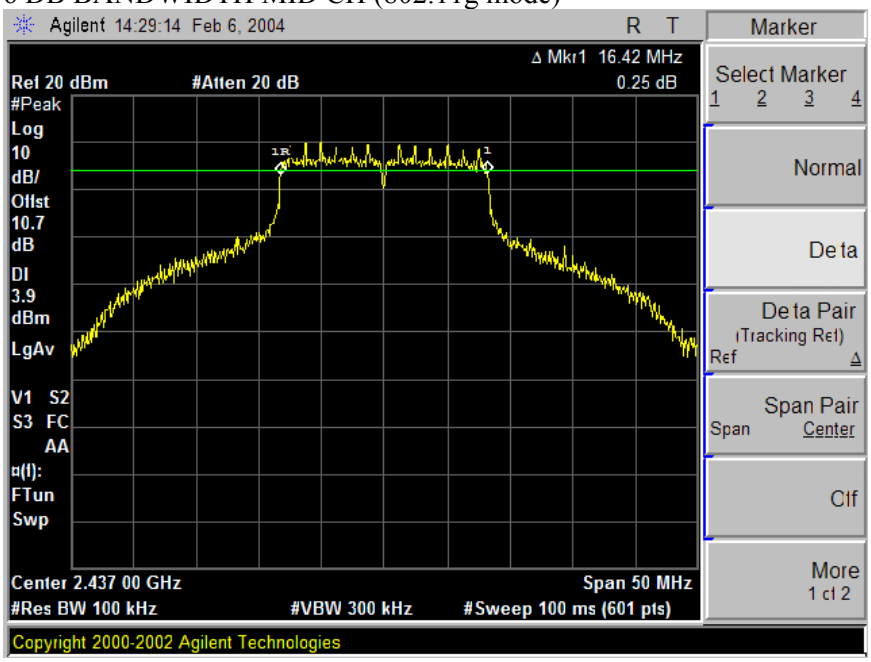
Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Margin (kHz)
Middle	2437	31500	500	31000

6 DB BANDWIDTH (802.11b MODE)

6 DB BANDWIDTH MID CH (802.11b mode)

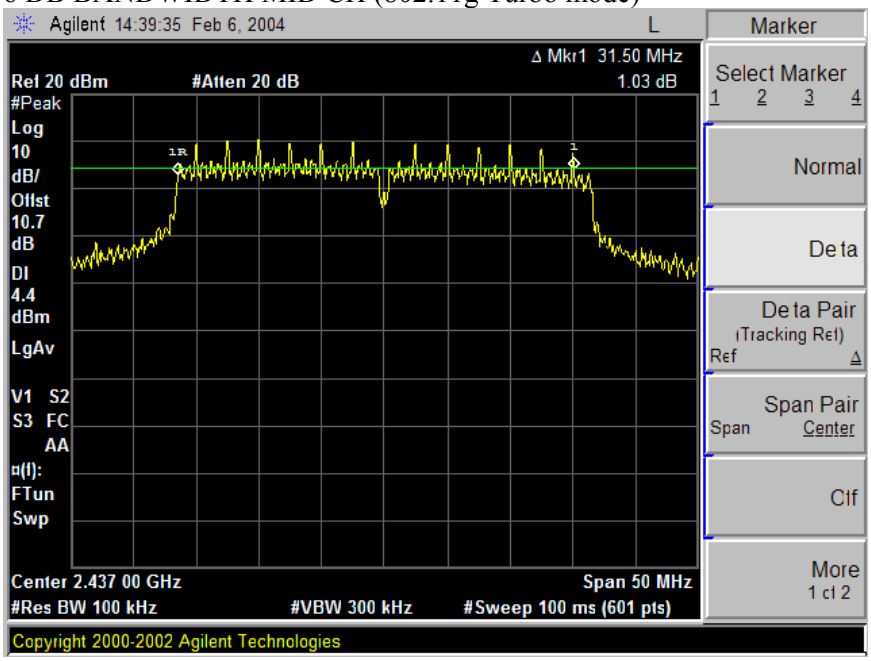


6 DB BANDWIDTH MID CH (802.11g mode)



6 DB BANDWIDTH (802.11g TURBO MODE)

6 DB BANDWIDTH MID CH (802.11g Turbo mode)



7.2. 99% BANDWIDTH

LIMIT

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.

The transmitter is set to the middle channel.

RESULTS

No non-compliance noted:

802.11b Mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Middle	2437	15.8685

802.11g Mode

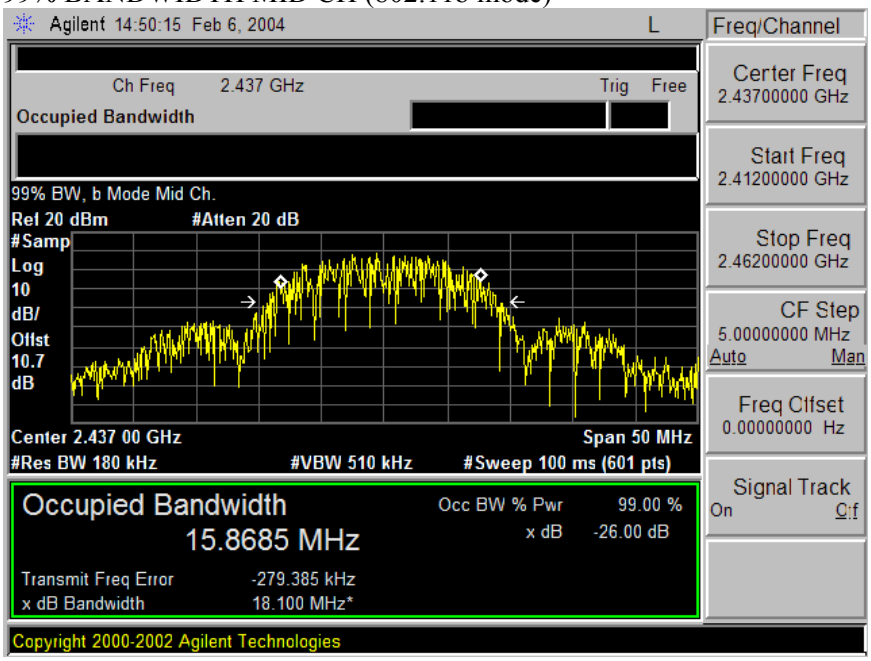
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Middle	2437	16.866

802.11g Turbo Mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Middle	2437	33.09

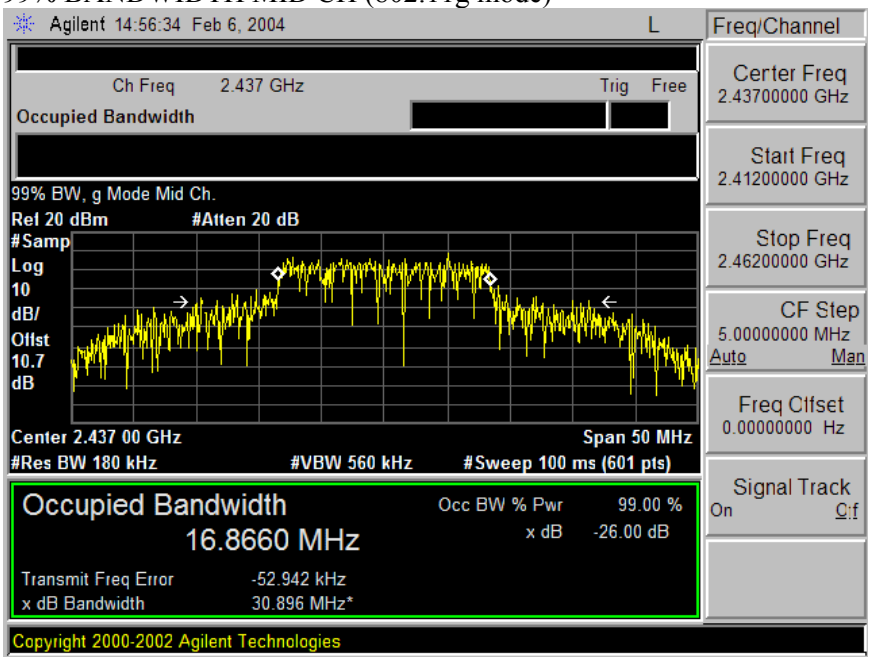
99% BANDWIDTH (802.11b MODE)

99% BANDWIDTH MID CH (802.11b mode)



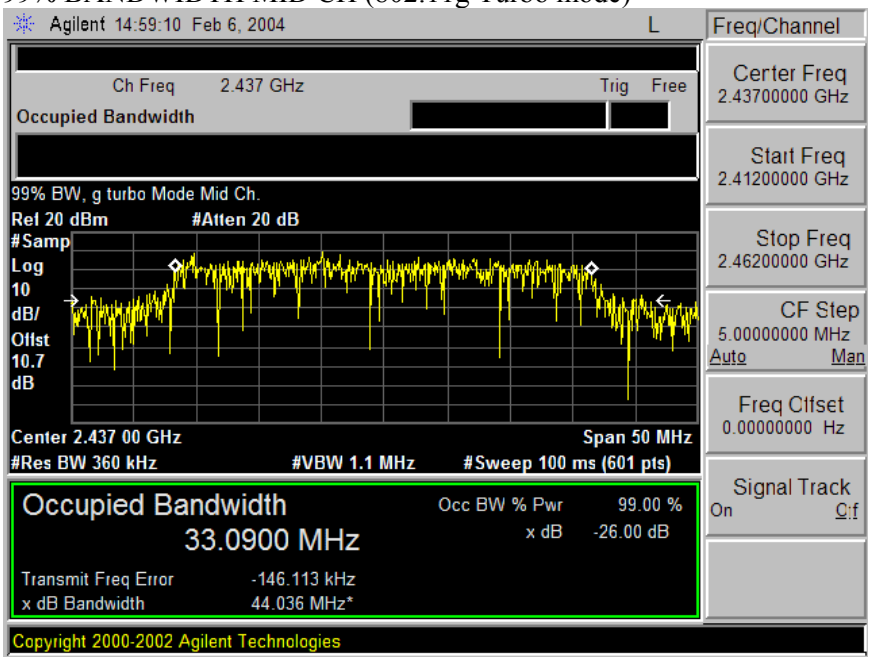
99% BANDWIDTH (802.11g MODE)

99% BANDWIDTH MID CH (802.11g mode)



99% BANDWIDTH (802.11g TURBO MODE)

99% BANDWIDTH MID CH (802.11g Turbo mode)



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 1.8 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.

The transmitter is set to the middle channel.

RESULTS

No non-compliance noted:

802.11b Mode

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	23.05	30	-6.95

802.11g Mode

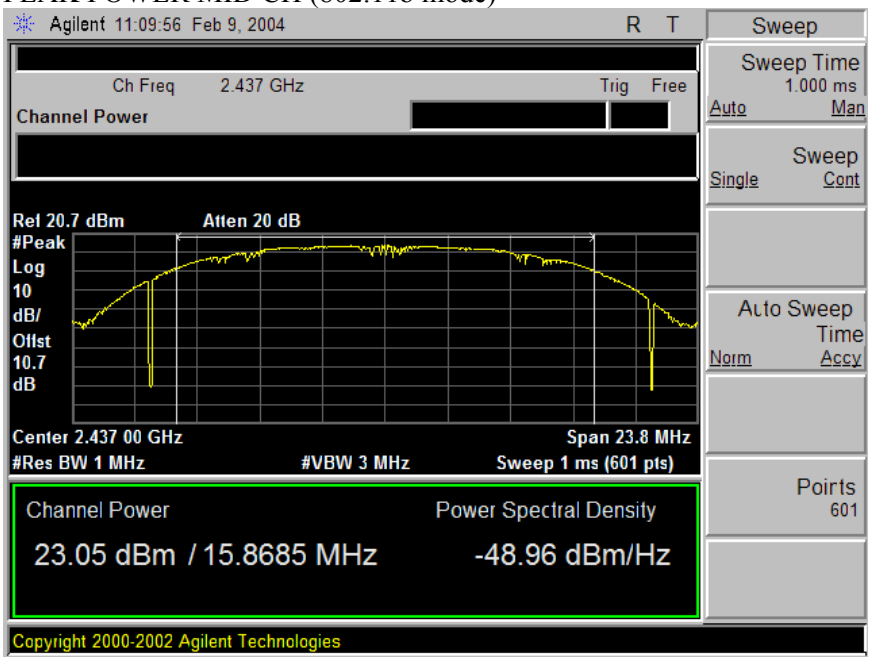
Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	24.02	30	-5.98

802.11g Turbo Mode

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	23.98	30	-6.02

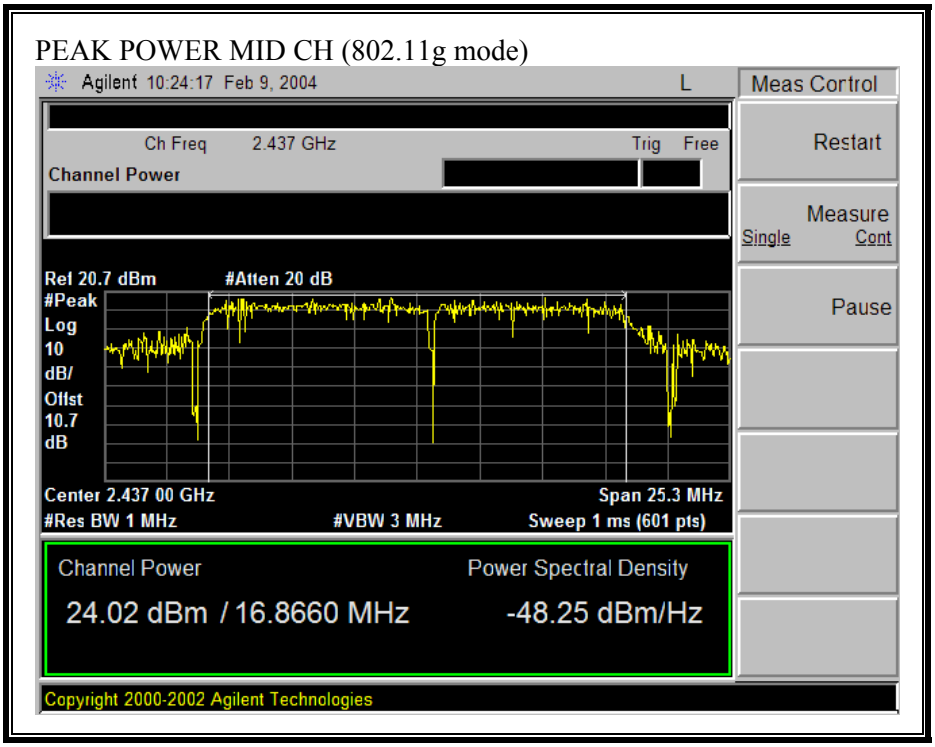
OUTPUT POWER (802.11b MODE)

PEAK POWER MID CH (802.11b mode)



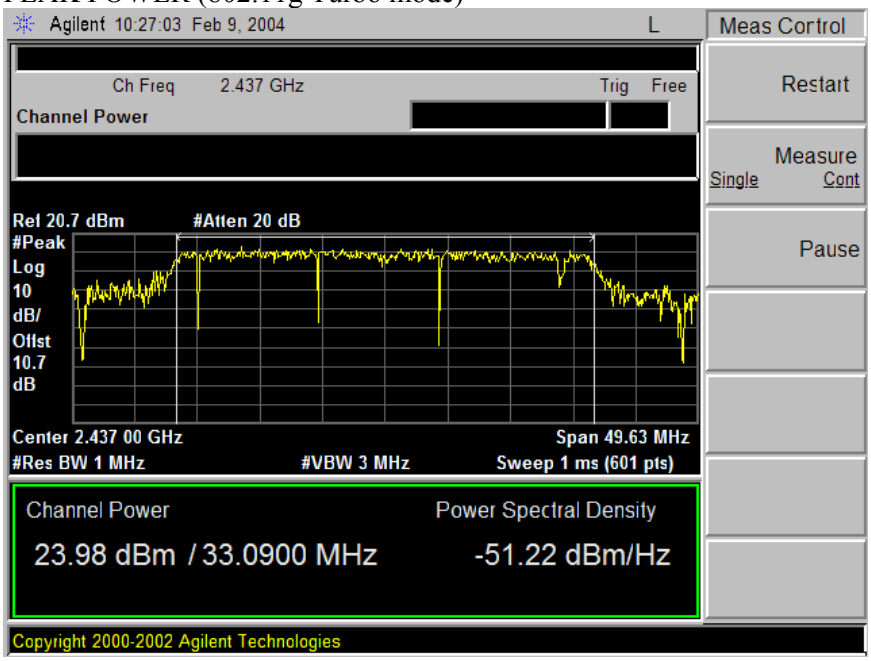
OUTPUT POWER (802.11g MODE)

PEAK POWER MID CH (802.11g mode)



OUTPUT POWER (802.11g TURBO MODE)

PEAK POWER (802.11g Turbo mode)



7.4. MAXIMUM PERMISSIBLE EXPOSURE

LIMITS

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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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

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

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

f = frequency in MHz
* = Plane-wave equivalent power density
NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

CALCULATIONS

Given

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

and

$S = E \wedge 2 / 3770$

where

E = Field Strength in Volts/meter
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power Density in milliwatts/square centimeter

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

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

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

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

yields

$d = 100 * \sqrt{((30 * (P / 1000) * G) / (3770 * S))}$
$d = 0.282 * \sqrt{(P * G / S)}$

where

d = distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power Density in mW/cm^2

Substituting the logarithmic form of power and gain using:

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

yields

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

where

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

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

LIMITS

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

RESULTS

No non-compliance noted:

Frequency (MHz)	Mode	Power Density Limit (mW/cm^2)	Output Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)
2437	802.11b	1.0	23.05	1.80	4.93
2437	802.11g	1.0	24.02	1.80	5.51
2437	802.11g Turbo	1.0	23.98	1.80	5.49

The transmitter is set to the middle channel.

NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.

7.5. AVERAGE POWER

AVERAGE POWER LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

No non-compliance noted:

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and .7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

802.11b Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	2412	20.40
Middle	2437	20.50
High	2462	20.50

802.11g Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	2412	16.70
Middle	2437	20.00
High	2462	16.00

802.11g Turbo Mode

Channel	Frequency (MHz)	Average Power (dBm)
Middle	2437	20.30

7.6. PEAK POWER SPECTRAL DENSITY

LIMIT

§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.

The transmiter is set to the middle channel.

RESULTS

No non-compliance noted:

802.11b Mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	-3.71	8	-11.71

802.11g Mode

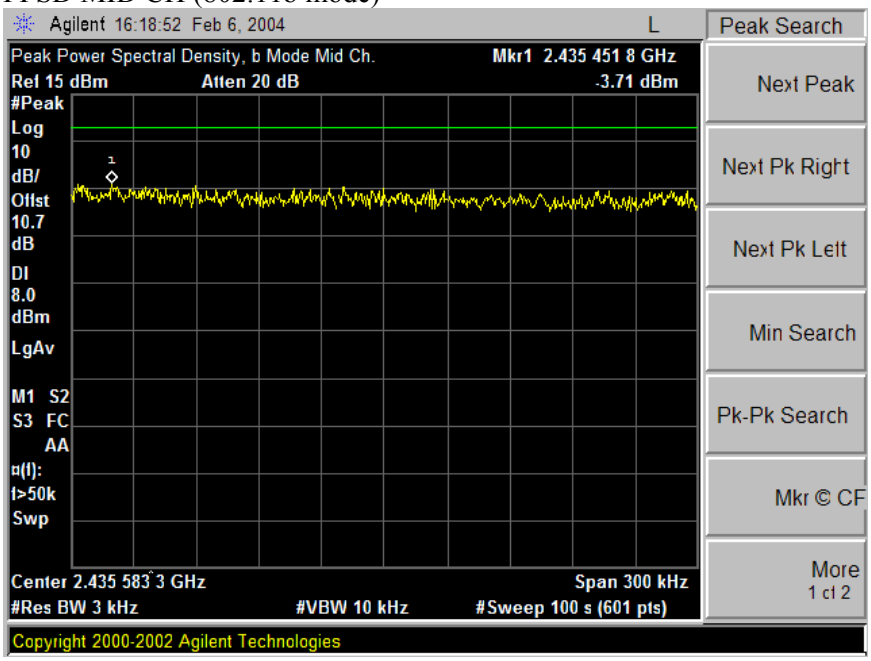
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	-3.31	8	-11.31

802.11g Turbo Mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	-5.37	8	-13.37

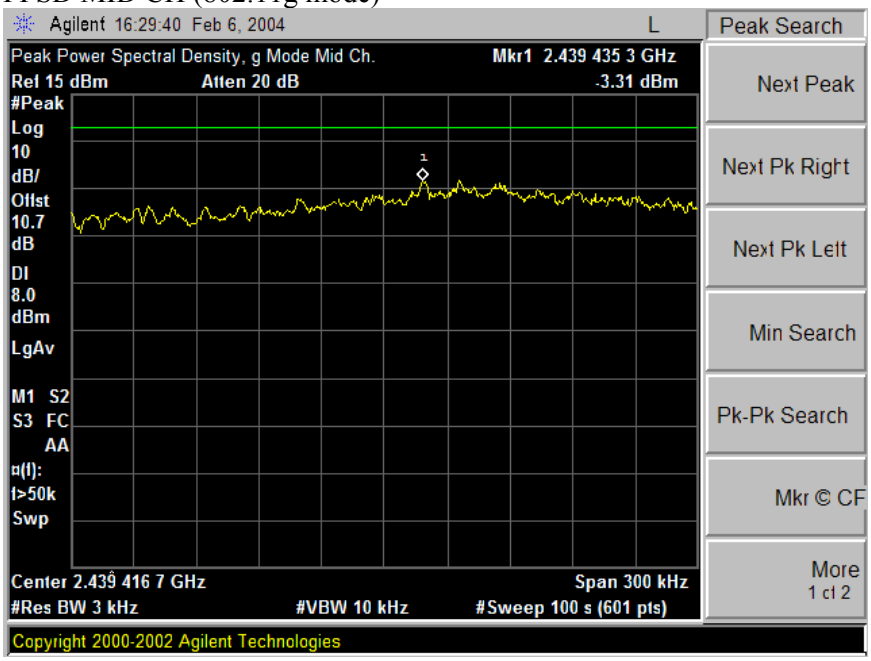
PEAK POWER SPECTRAL DENSITY (802.11b MODE)

PPSD MID CH (802.11b mode)



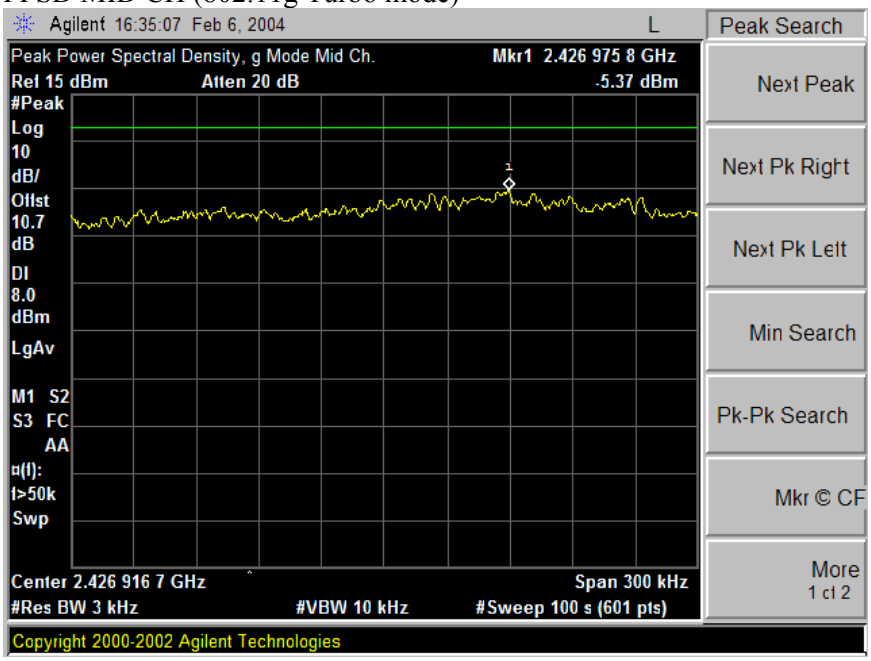
PEAK POWER SPECTRAL DENSITY (802.11g MODE)

PPSD MID CH (802.11g mode)



PEAK POWER SPECTRAL DENSITY (802.11g TURBO MODE)

PPSD MID CH (802.11g Turbo mode)



7.7. 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 §15.209(a) (see §15.205(c)).

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.

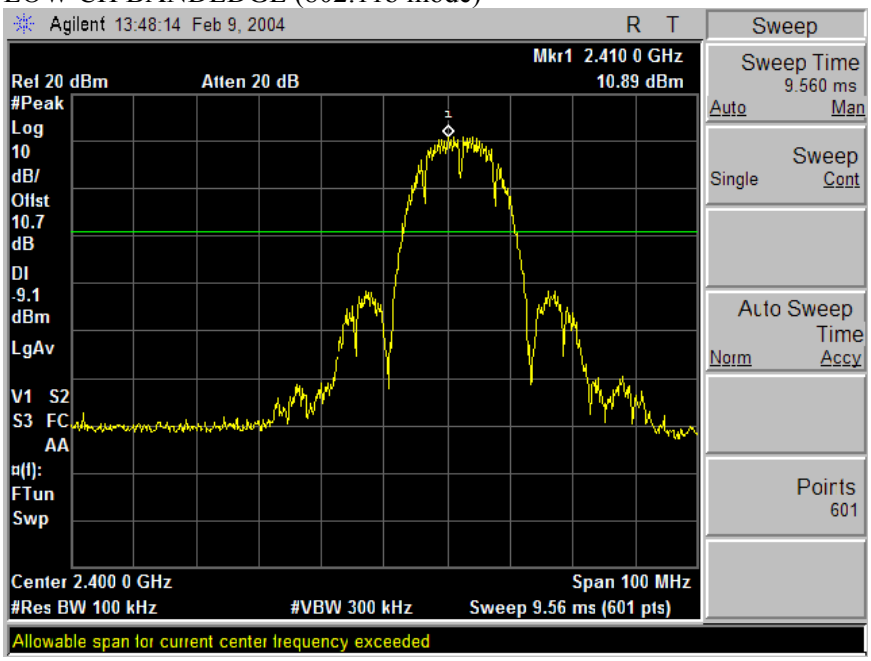
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

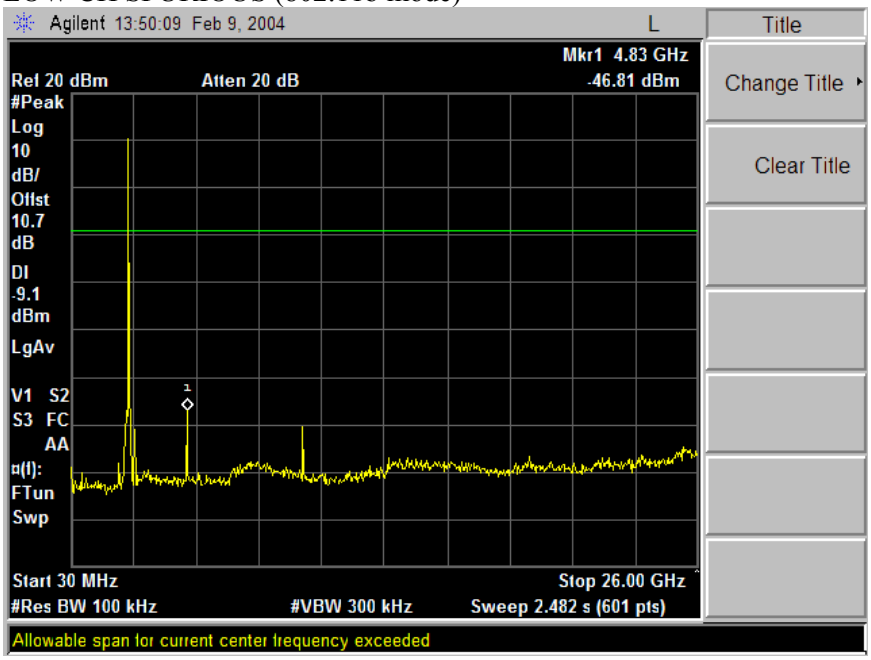
No non-compliance noted:

SPURIOUS EMISSIONS, LOW CHANNEL (802.11b MODE)

LOW CH BANDEDGE (802.11b mode)

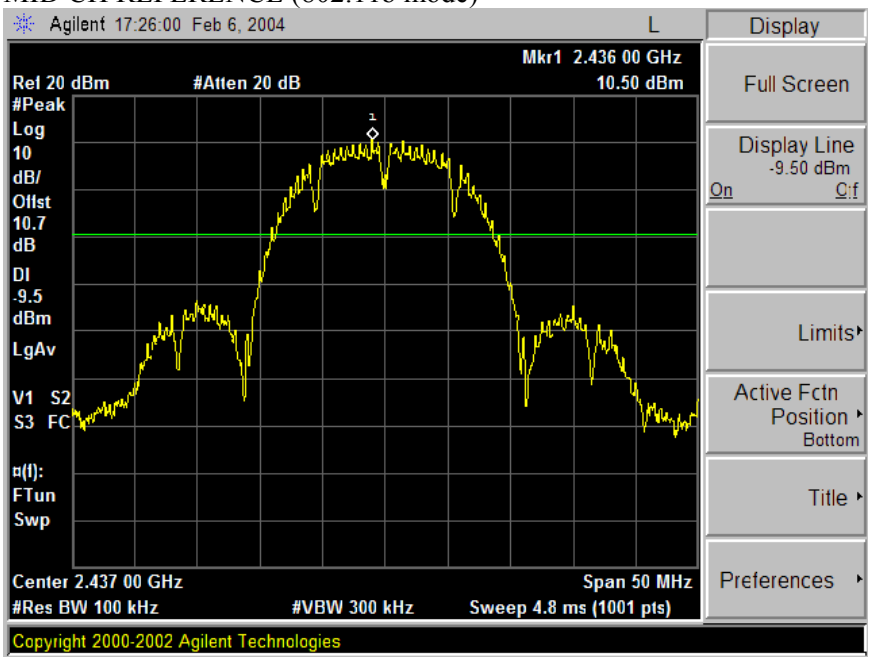


LOW CH SPURIOUS (802.11b mode)

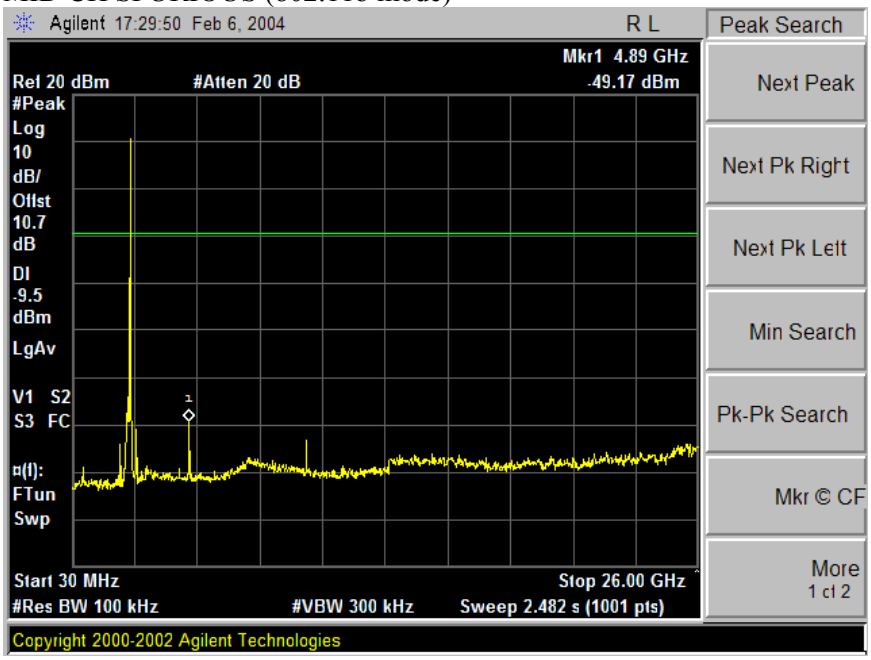


SPURIOUS EMISSIONS, MID CHANNEL (802.11b MODE)

MID CH REFERENCE (802.11b mode)

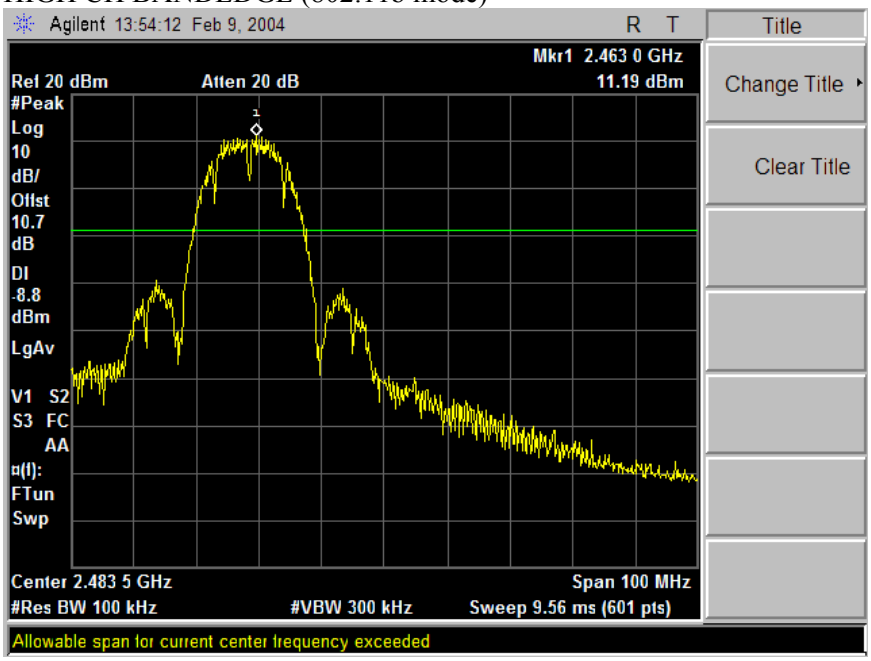


MID CH SPURIOUS (802.11b mode)

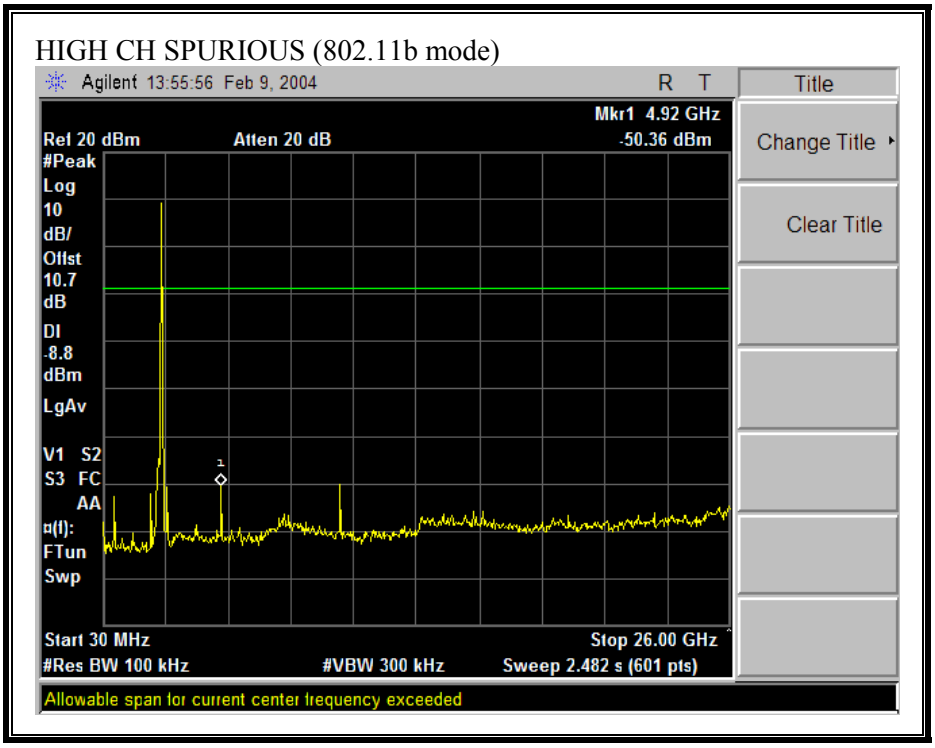


SPURIOUS EMISSIONS, HIGH CHANNEL (802.11b MODE)

HIGH CH BANDEDGE (802.11b mode)

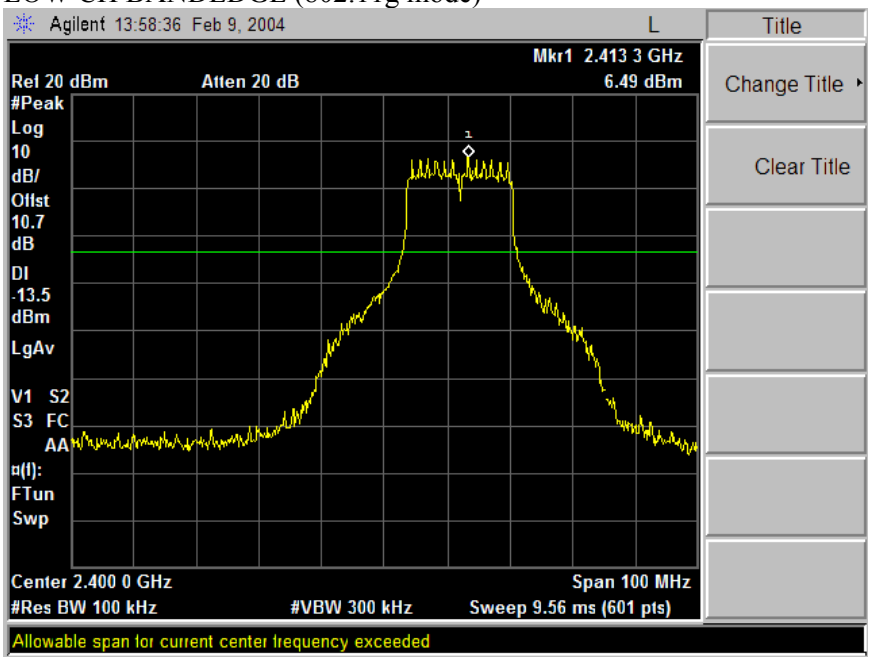


HIGH CH SPURIOUS (802.11b mode)

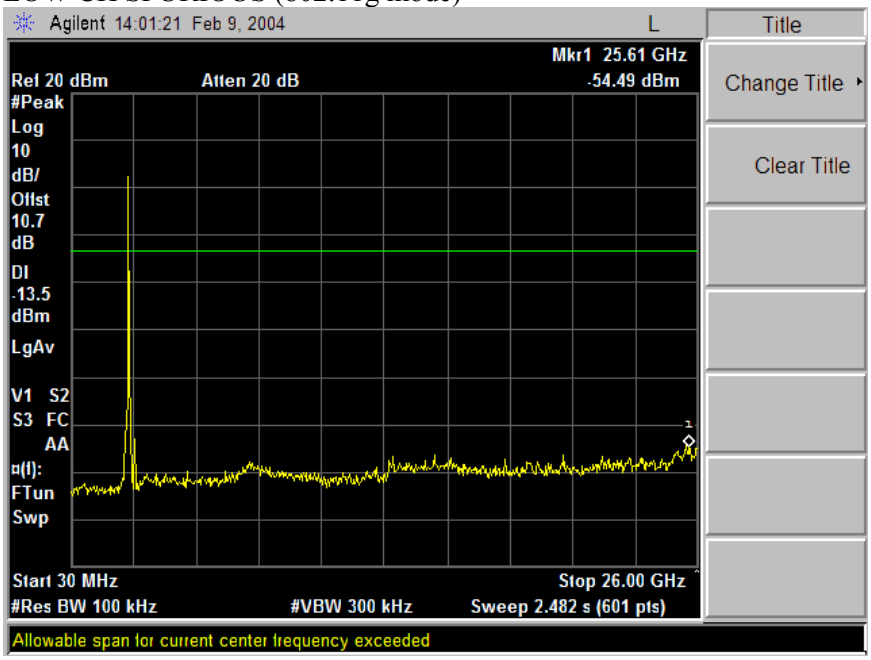


SPURIOUS EMISSIONS, LOW CHANNEL (802.11g MODE)

LOW CH BANDEDGE (802.11g mode)

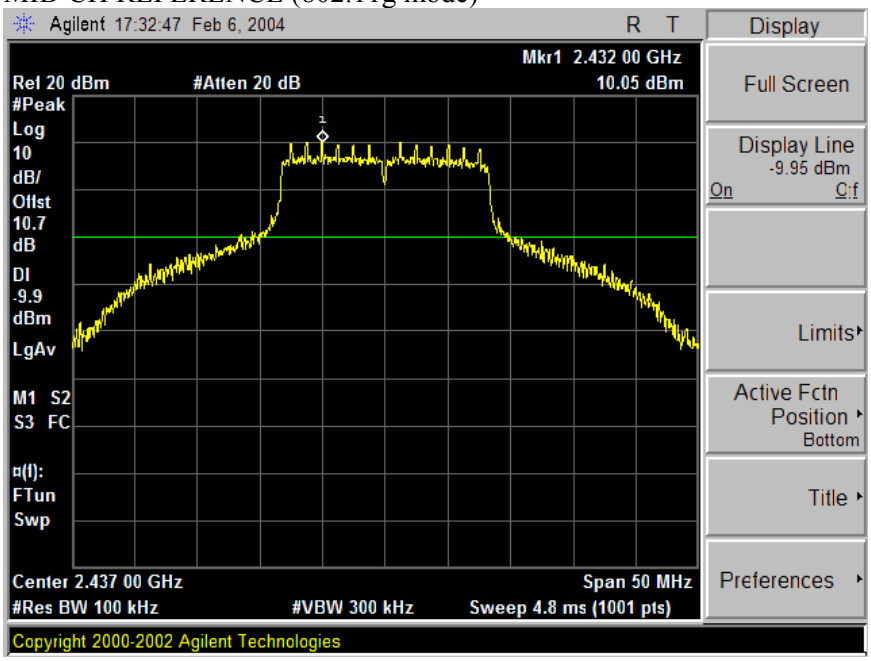


LOW CH SPURIOUS (802.11g mode)

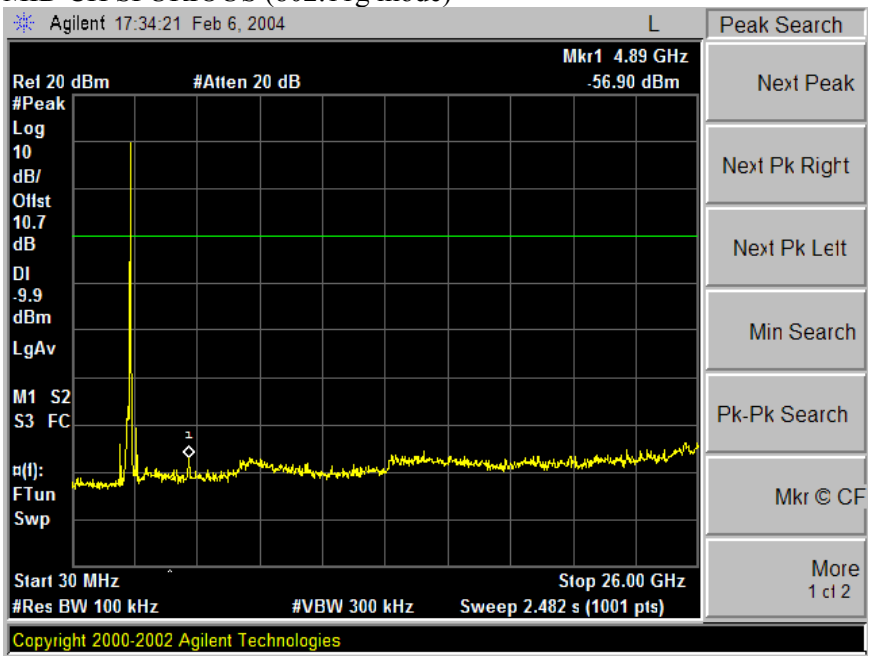


SPURIOUS EMISSIONS, MID CHANNEL (802.11g MODE)

MID CH REFERENCE (802.11g mode)

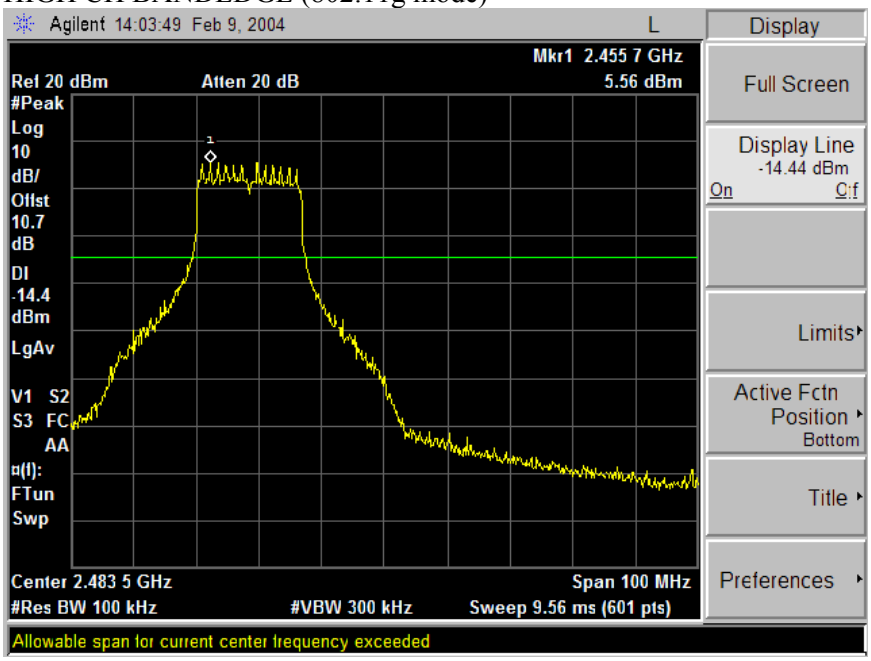


MID CH SPURIOUS (802.11g mode)

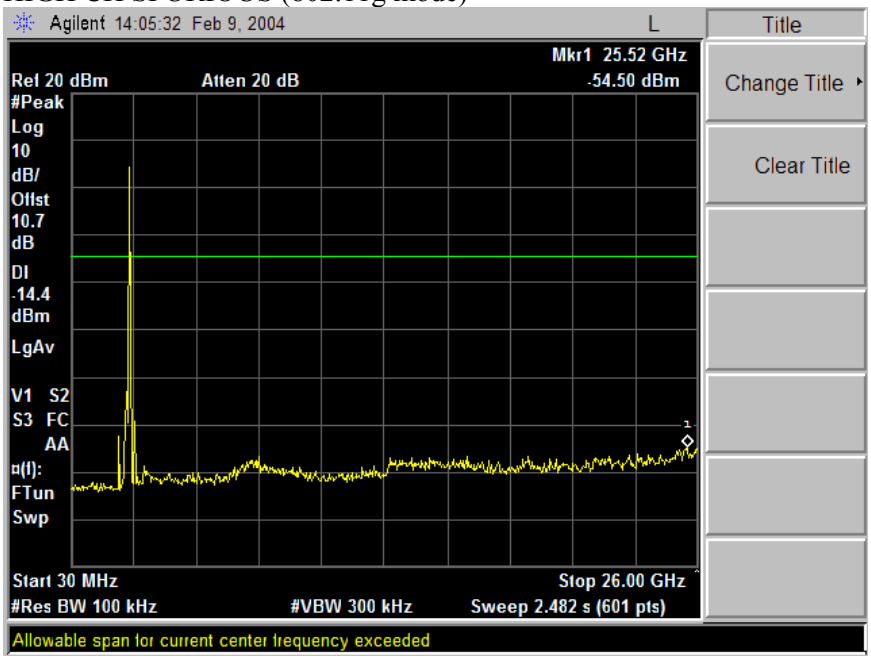


SPURIOUS EMISSIONS, HIGH CHANNEL (802.11g MODE)

HIGH CH BANDEDGE (802.11g mode)

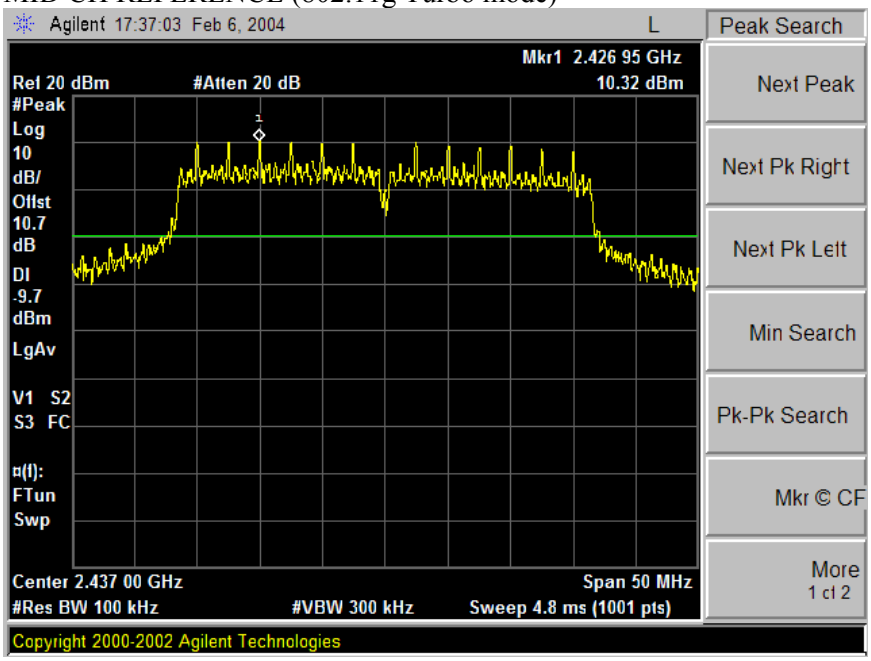


HIGH CH SPURIOUS (802.11g mode)

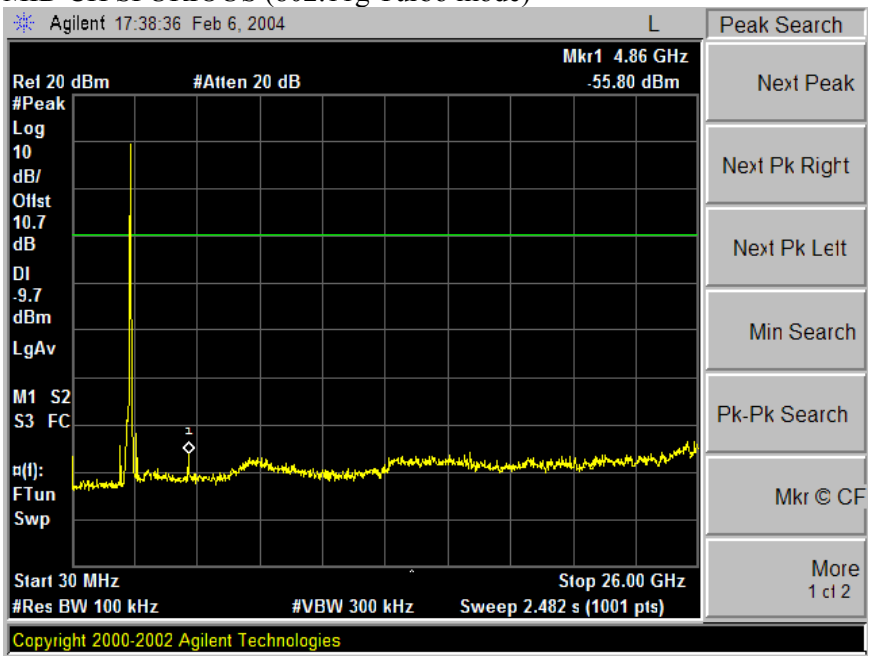


SPURIOUS EMISSIONS, MID CHANNEL (802.11g TURBO MODE)

MID CH REFERENCE (802.11g Turbo mode)



MID CH SPURIOUS (802.11g Turbo mode)



7.8. RADIATED EMISSIONS

7.8.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

LIMITS

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

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

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

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

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

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

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

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

TEST PROCEDURE

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

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

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

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

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.

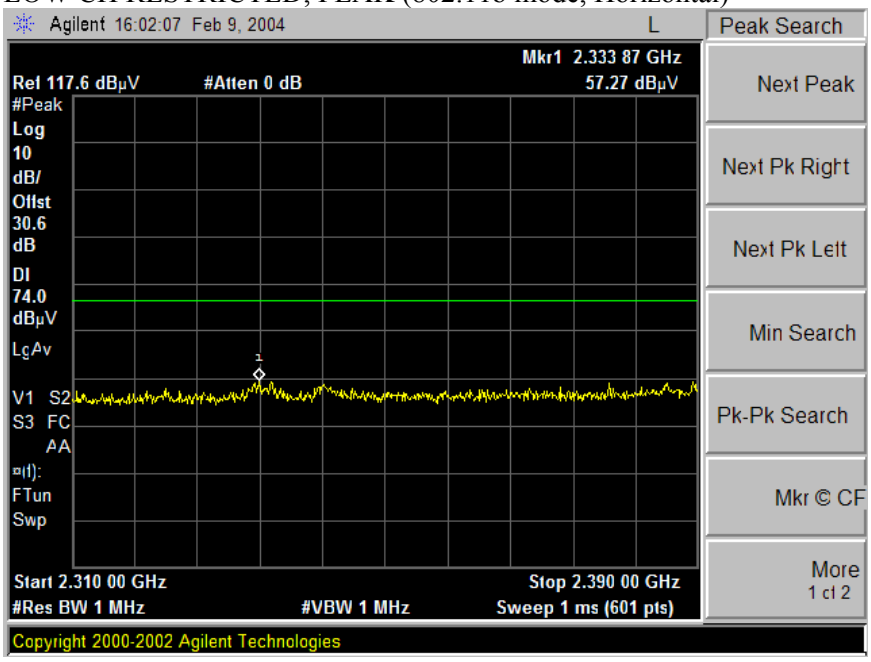
RESULTS

No non-compliance noted:

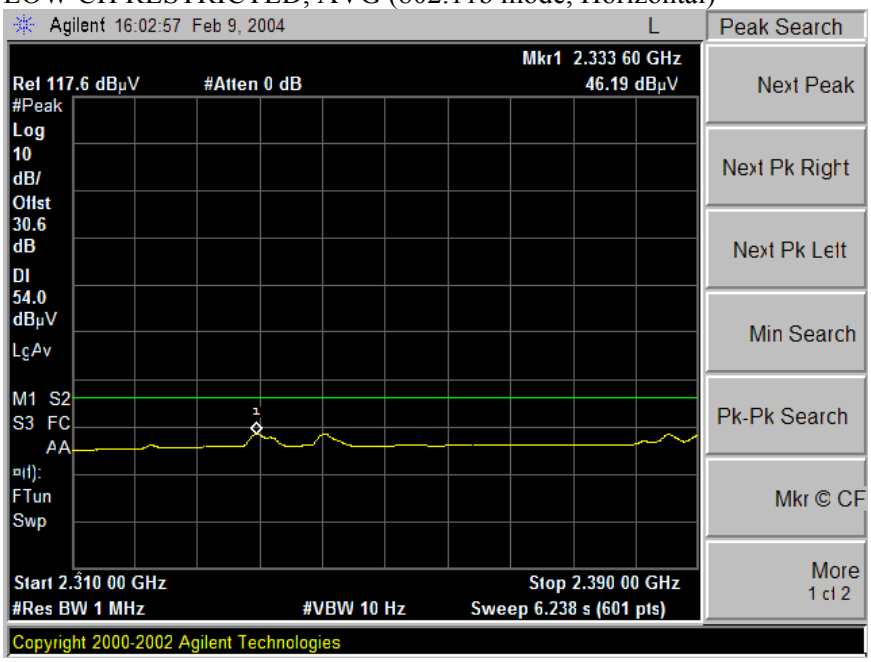
7.8.2. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHZ

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

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

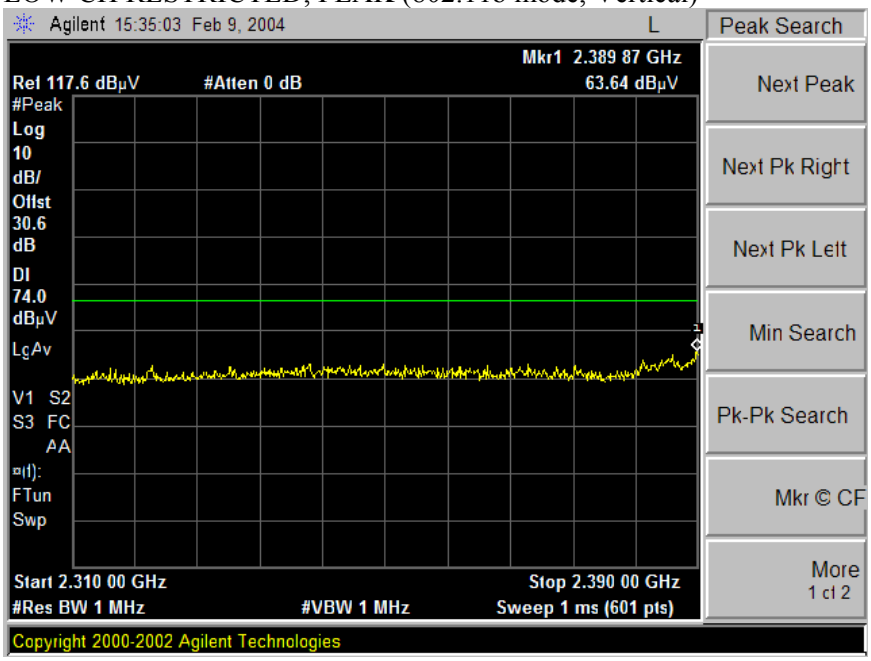


LOW CH RESTRICTED, AVG (802.11b mode, Horizontal)

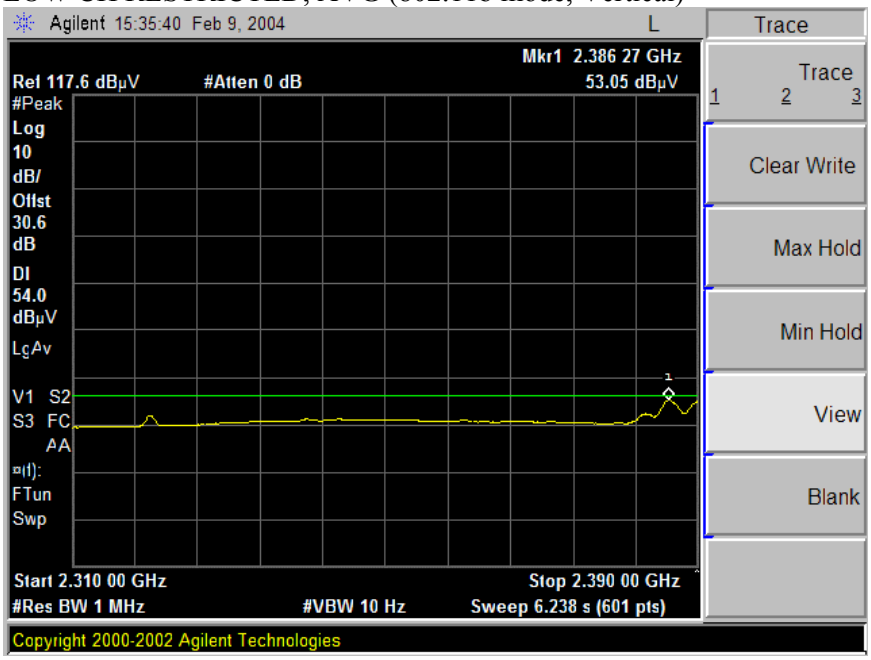


RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

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

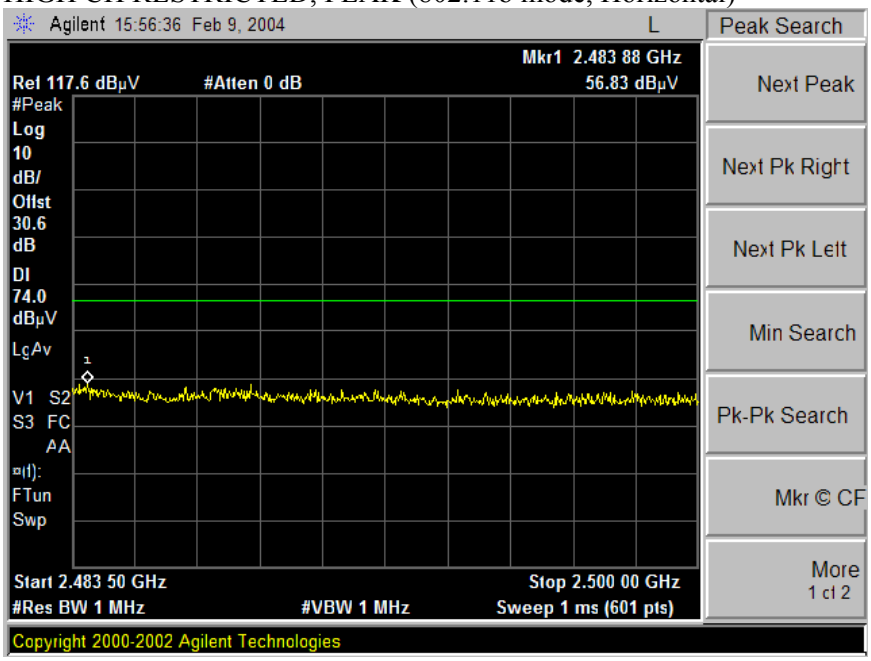


LOW CH RESTRICTED, AVG (802.11b mode, Vertical)

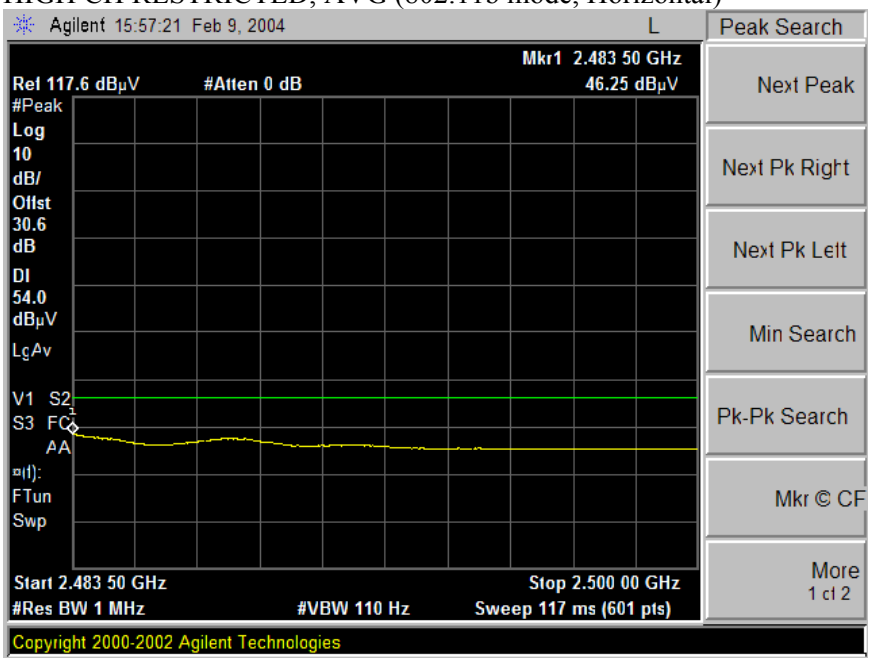


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

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

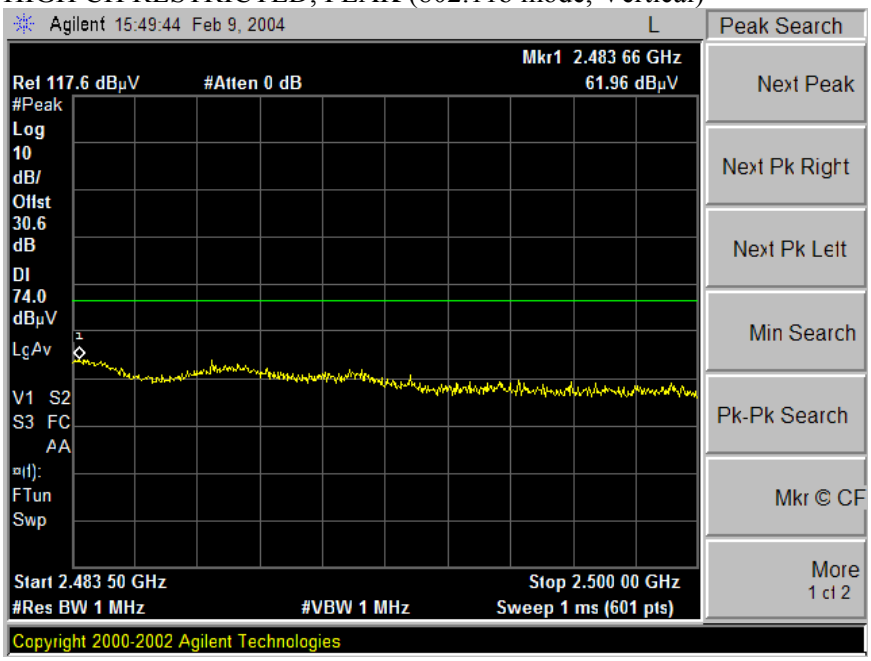


HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)

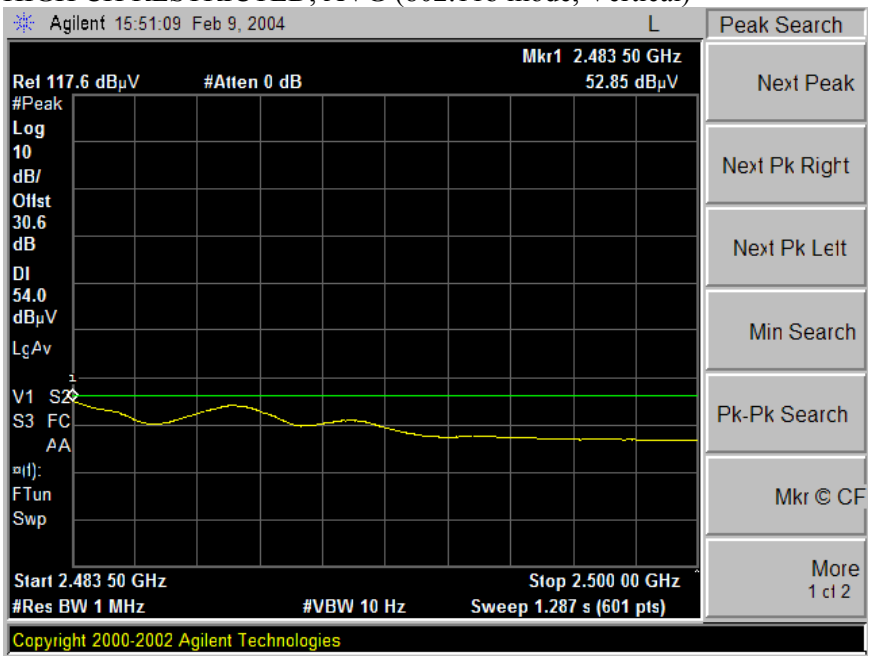


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

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



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



HARMONICS AND SPURIOUS EMISSIONS (b MODE)

02/09/04 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2493
Company: NETGEAR
EUT Descrip.: 108Mbps WIRELESS FIREWALL ROUTER
EUT M/N: WGT624
Test Target: FCC 15.247_CLASS II PERMISSIVE CHANGE
Mode Oper: TX_ b MODE MID CHANNEL

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T63 Miteq 646456	Agilent E4446A Analyzer		FCC 15.209

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

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

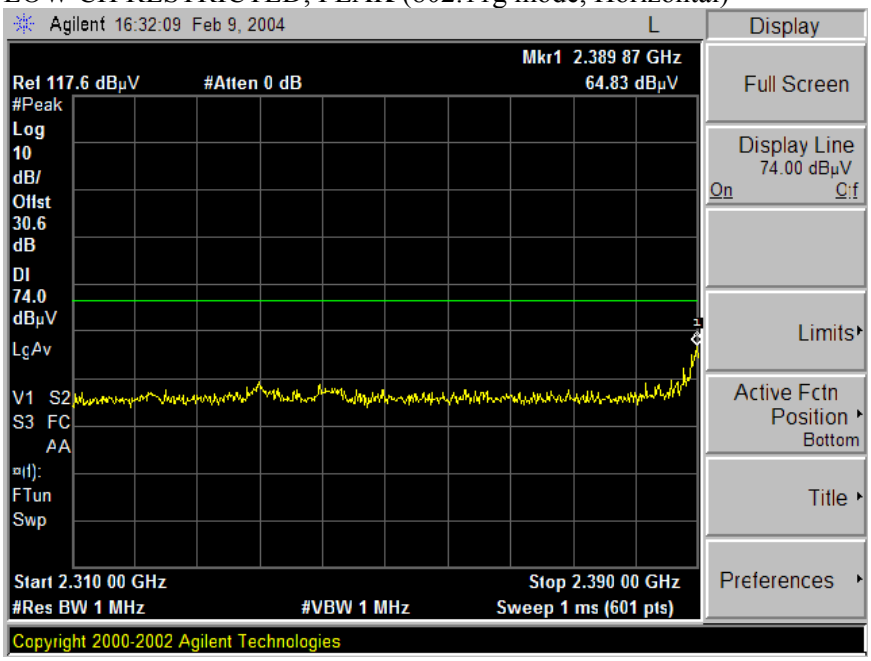
Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
b_MID CH															
4.874	9.8	51.4	43.6	33.4	2.8	-35.3	0.0	1.0	53.2	45.4	74.0	54.0	-20.8	-8.6	V
7.311	9.8	48.0	34.0	35.8	3.6	-34.6	0.0	1.0	53.8	39.8	74.0	54.0	-20.2	-14.2	V
4.874	9.8	47.6	38.7	33.4	2.8	-35.3	0.0	1.0	49.4	40.5	74.0	54.0	-24.6	-13.5	H
7.311	9.8	44.9	33.5	35.8	3.6	-34.6	0.0	1.0	50.7	39.3	74.0	54.0	-23.3	-14.7	H
No spurious emisisons above the system noise floor were detected															

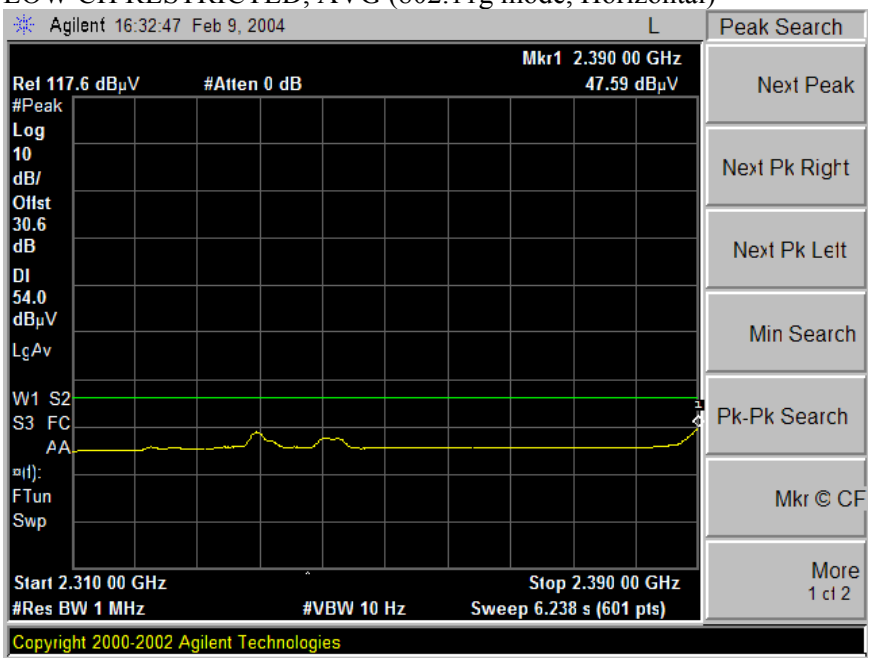
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)

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

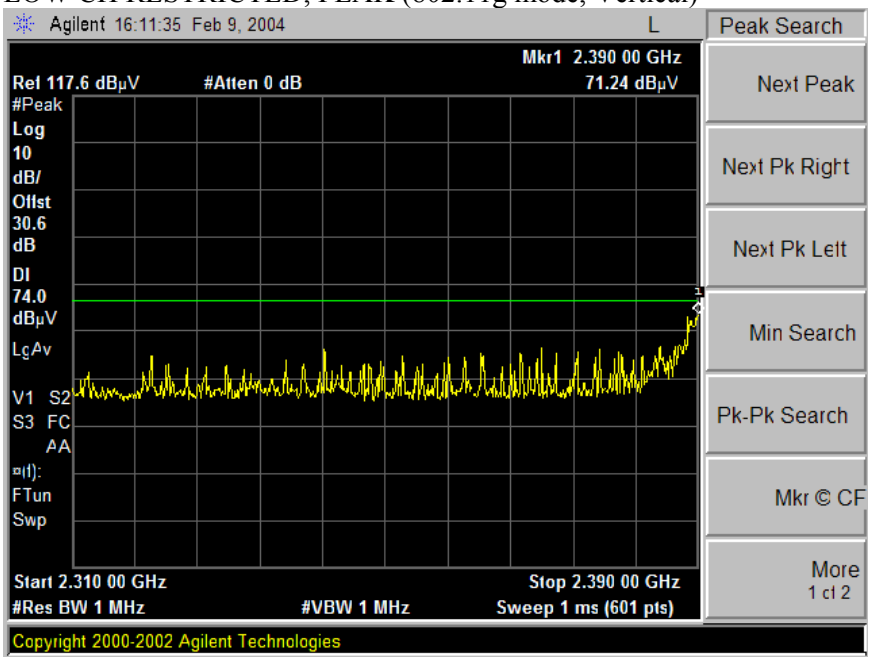


LOW CH RESTRICTED, AVG (802.11g mode, Horizontal)

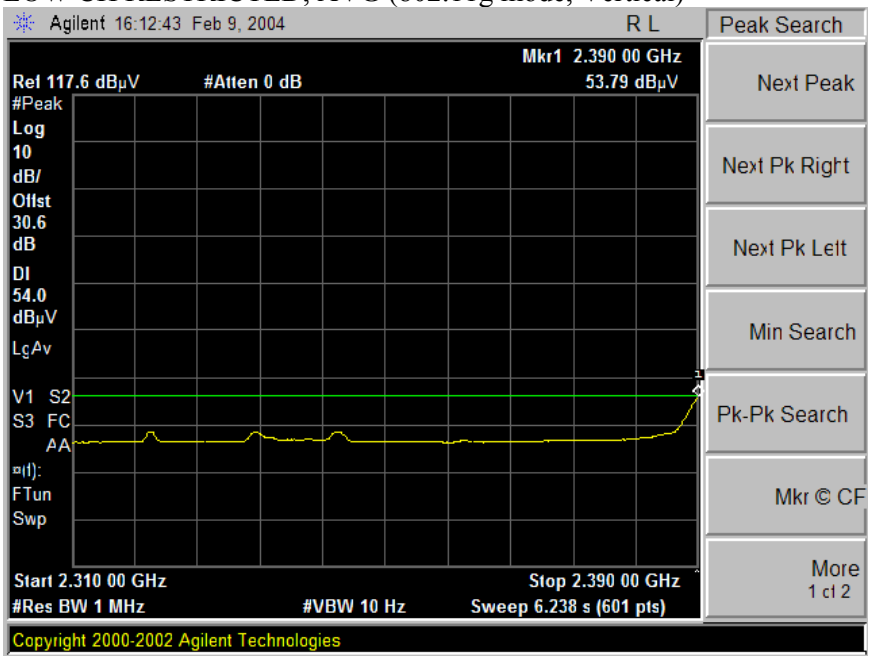


RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)

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

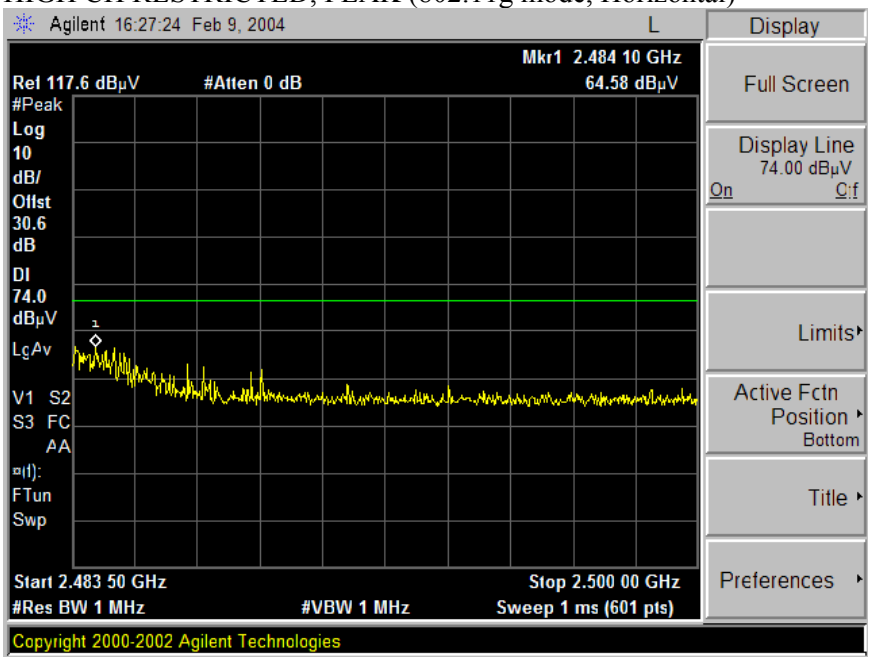


LOW CH RESTRICTED, AVG (802.11g mode, Vertical)

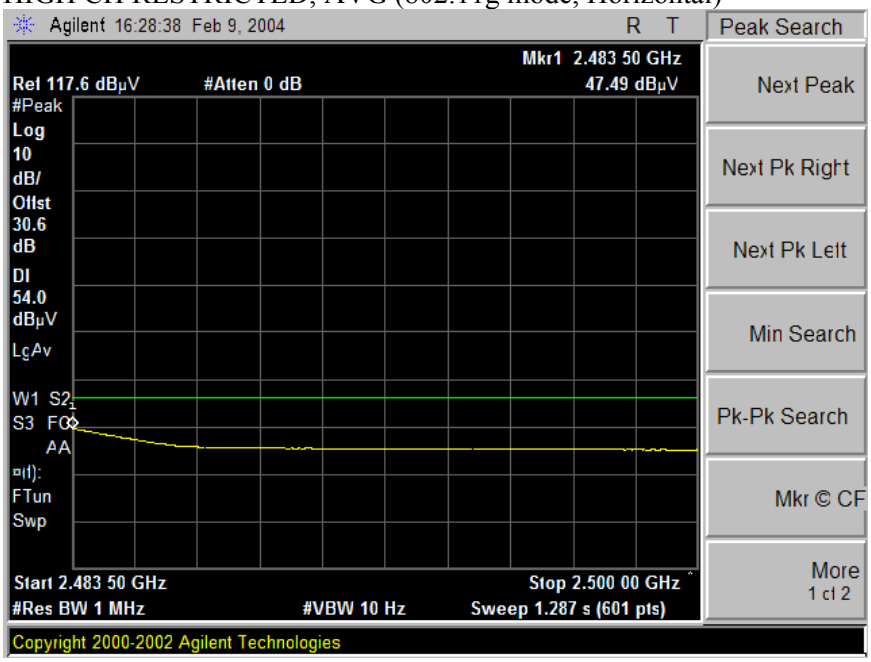


RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)

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

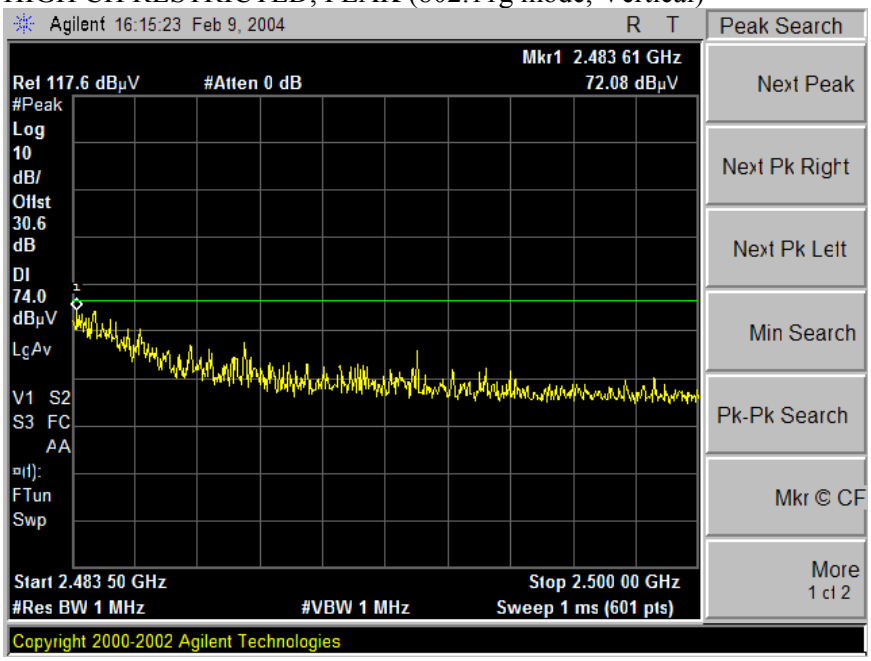


HIGH CH RESTRICTED, AVG (802.11g mode, Horizontal)

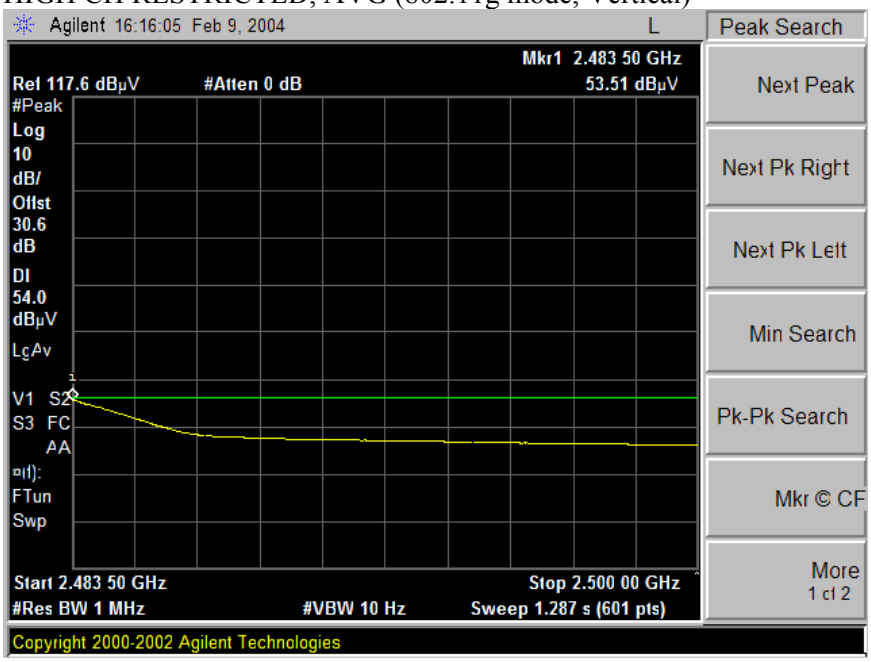


RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)

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



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



HARMONICS AND SPURIOUS EMISSIONS (g MODE)

02/09/04 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2493
Company: NETGEAR
EUT Descrip.: 108Mbps WIRELESS FIREWALL ROUTER
EUT M/N: WGT624
Test Target: FCC 15.247_CLASS II PERMISSIVE CHANGE
Mode Oper: TX _ g MODE MID CHANNEL

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T63 Miteq 646456	Agilent E4446A Analyzer		FCC 15.209

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

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
g_MID CH															
4.874	9.8	45.3	33.5	33.4	2.8	-35.3	0.0	1.0	47.1	35.3	74.0	54.0	-26.9	-18.7	V
7.311	9.8	43.0	33.0	35.8	3.6	-34.6	0.0	1.0	48.8	38.8	74.0	54.0	-25.2	-15.2	V
4.874	9.8	44.0	32.0	33.4	2.8	-35.3	0.0	1.0	45.8	33.8	74.0	54.0	-28.2	-20.2	H
7.311	9.8	43.0	33.0	35.8	3.6	-34.6	0.0	1.0	48.8	38.8	74.0	54.0	-25.2	-15.2	H
No spurious emisisons above the system noise floor were detected															

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		

HARMONICS AND SPURIOUS EMISSIONS (g TURBO MODE)

02/09/04 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 04U2493
Company: NETGEAR
EUT Descrip.: 108Mbps WIRELESS FIREWALL ROUTER
EUT M/N: WGT624
Test Target: FCC 15.247_CLASS II PERMISSIVE CHANGE
Mode Oper: TX_g TURBO MODE MID CHANNEL

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T63 Miteq 646456	Agilent E4446A Analyzer		FCC 15.209

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

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
g TURBO MID CH															
4.874	9.8	46.4	34.2	33.4	2.8	-35.3	0.0	1.0	48.2	36.0	74.0	54.0	-25.8	-18.0	V
7.311	9.8	44.5	32.7	35.8	3.6	-34.6	0.0	1.0	50.3	38.5	74.0	54.0	-23.7	-15.5	V
4.874	9.8	44.4	33.2	33.4	2.8	-35.3	0.0	1.0	46.2	35.0	74.0	54.0	-27.8	-19.0	H
7.311	9.8	52.9	32.0	35.8	3.6	-34.6	0.0	1.0	58.7	37.8	74.0	54.0	-15.3	-16.2	H
No spurious emisisons above the system noise floor were detected															

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		

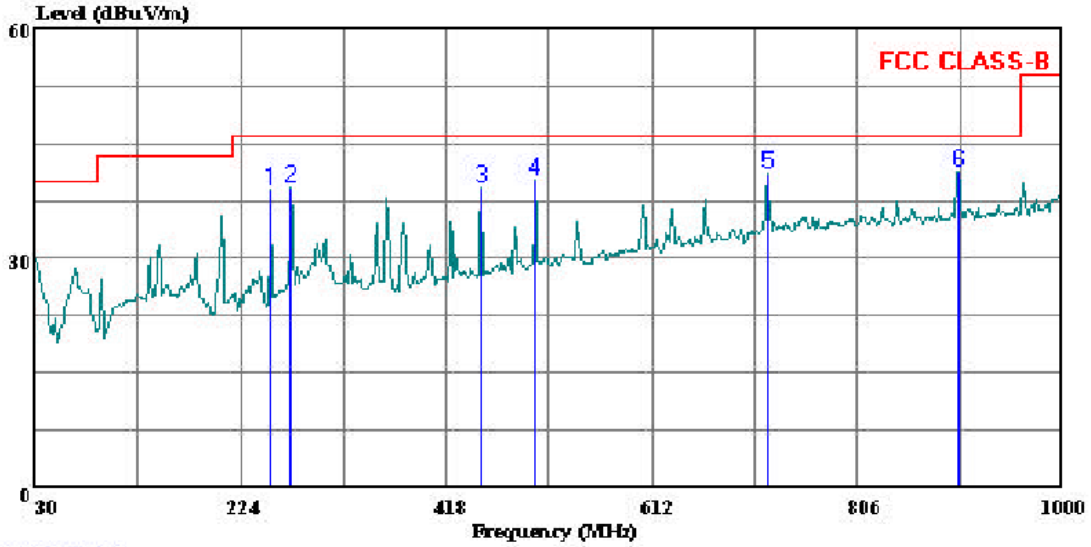
7.8.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

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

HORIZONTAL PLOT

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

Data#: 9 File#: Netgear.emi Date: 02-12-2004 Time: 17:49:25



(Audix ATC)

Trace: 8 Ref Trace:

Condition: FCC CLASS-B SUNOL BILOG 12/22/04 HORIZONTAL
Test Eng: : VIEN TRAN
Project #: : 04U2493
Company: : NETGEAR
EUT: : 108Mbps WIRELESS FIREWALL ROUTER
Model No: : WGT624
Configuration: : EUT AND PERIPHERALS
Target of Test: : FCC CLASS B
Mode of Operation: TX Worst case

HORIZONTAL DATA

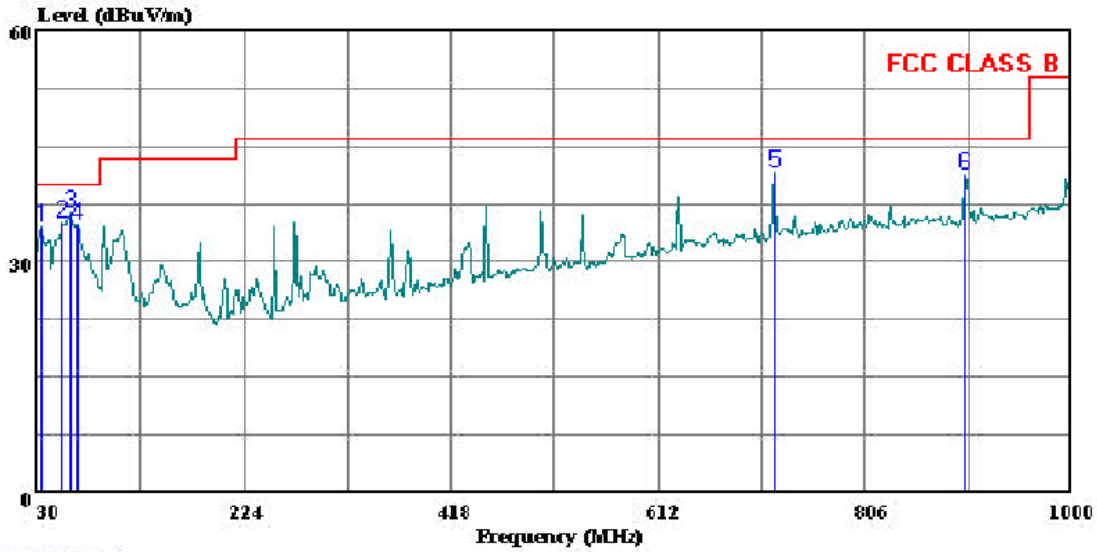
	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	252.130	Peak	24.83	14.14	38.97	46.00	-7.03
2	271.530	Peak	24.03	15.15	39.18	46.00	-6.82
3	450.980	Peak	19.69	19.44	39.13	46.00	-6.87
4	502.390	Peak	19.52	20.65	40.17	46.00	-5.83
5	720.640	Peak	16.78	24.14	40.92	46.00	-5.08
6	902.030	Peak	15.17	26.21	41.38	46.00	-4.62

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

VERTICAL PLOT

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

Data#: 7 File#: Netgear.emi Date: 02-12-2004 Time: 17:43:43



(Audix ATC)

Trace: 6 Ref Trace:

Condition: FCC CLASS B SUNOL BILOG 12/22/04 VERTICAL
Test Eng: : VIEN TRAN
Project #: : 04U2493
Company: : NETGEAR
EUT: : 108Mbps WIRELESS FIREWALL ROUTER
Model No: : WGT624
Configuration: : EUT AND PERIPHERALS
Target of Test: : FCC CLASS B
Mode of Operation: TX Worst case

VERTICAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	33.880	Peak	13.74	20.70	34.44	40.00	-5.56
2	53.280	Peak	25.97	9.01	34.98	40.00	-5.02
3	61.040	Peak	27.39	8.90	36.29	40.00	-3.71
4	67.830	Peak	25.37	9.35	34.72	40.00	-5.28
5	720.640	Peak	17.47	24.14	41.61	46.00	-4.39
6	900.090	Peak	15.20	26.18	41.38	46.00	-4.63

7.9. POWERLINE CONDUCTED EMISSIONS

LIMIT

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

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

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

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

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

RESULTS

No non-compliance noted:

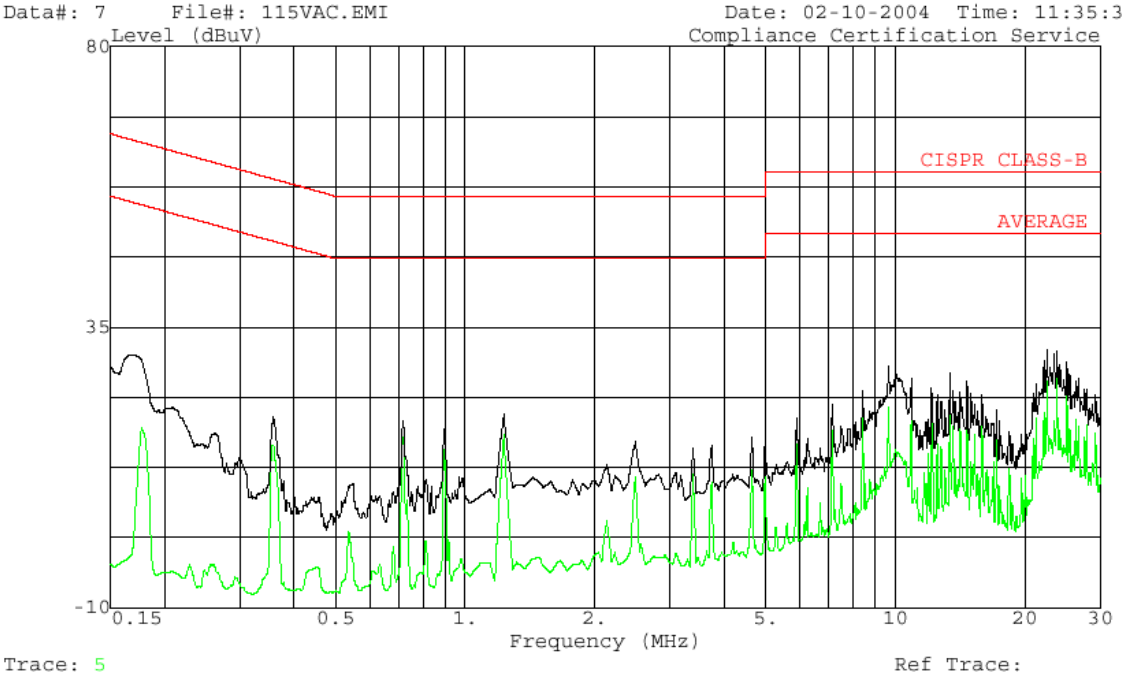
6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.18	30.51	--	18.80	0.00	65.26	55.26	-34.75	-36.46	L1
1.22	22.03	--	17.10	0.00	56.00	46.00	-33.97	-28.90	L1
22.30	31.59	--	27.30	0.00	60.00	50.00	-28.41	-22.70	L1
0.18	29.74	--	14.75	0.00	65.26	55.26	-35.52	-40.51	L2
9.23	24.10	--	18.96	0.00	60.00	50.00	-35.90	-31.04	L2
28.60	29.62	--	24.00	0.00	60.00	50.00	-30.38	-26.00	L2
6 Worst Data									

LINE 1 RESULTS

COMPLIANCE Engineering Service, Inc.
FCC, VCCI, CISPR, CE
UL, CSA, TUV

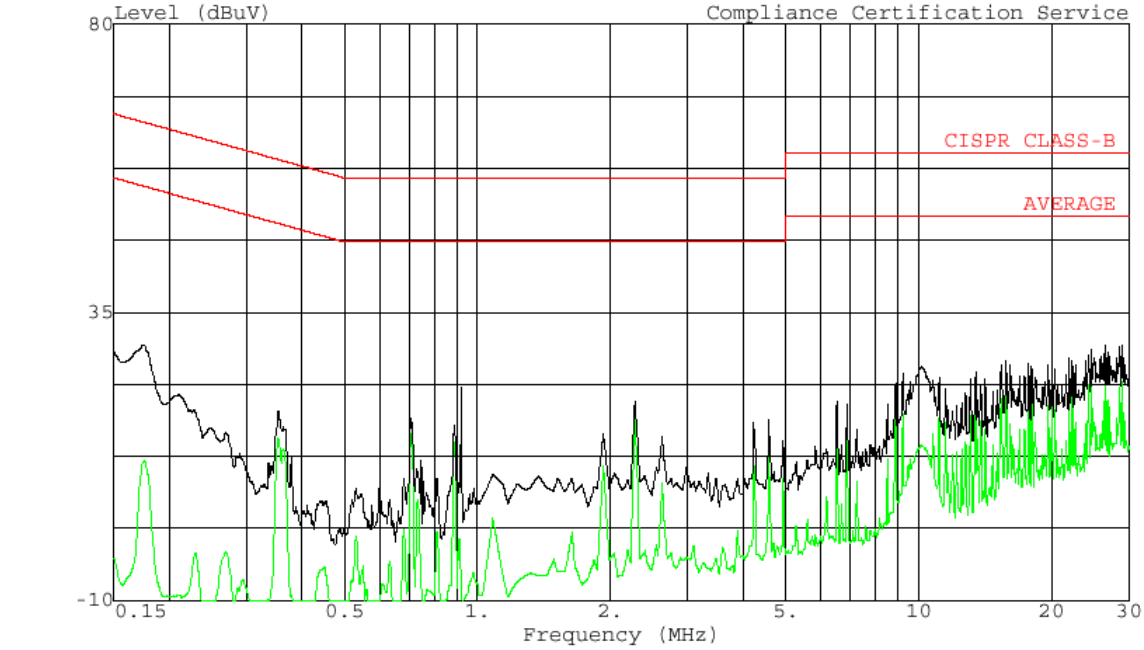
561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888



Trace: 5 Ref Trace:
Project # : 0U2493_L1_115VAC
Test Operator : VIEN TRAN
Company : NETGEAR
EUT : 108Mbps WIRELESS FIREWALL ROUTER
Model : WGT624
Configuration : EUT and Peripheral
Mode of Operation: Tx Worst Case
Target of Test : CISPR CLASS B
Voltage : 115VAC, 60Hz
: L1: Peak (BLACK), Avg (GREEN)

LINE 2 RESULTS

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



Trace: 12 Ref Trace:
Project # : 0U2493_L2_115VAC
Test Operator : VIEN TRAN
Company : NETGEAR
EUT : 108Mbps WIRELESS FIREWALL ROUTER
Model : WGT624
Configuration : EUT and Peripheral
Mode of Operation: Tx Worst Case
Target of Test : CISPR CLASS B
Voltage : 115VAC, 60Hz
: L2: Peak (BLACK), Average(GREEN)

8. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED PHOTO

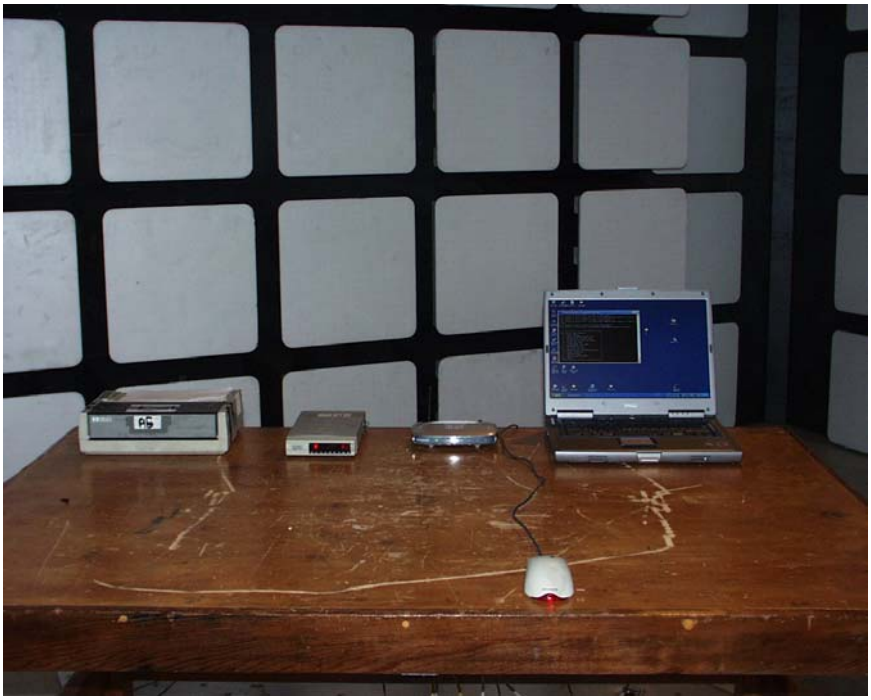
RADIATED RF MEASUREMENT SETUP

RADIATED FRONT PHOTO

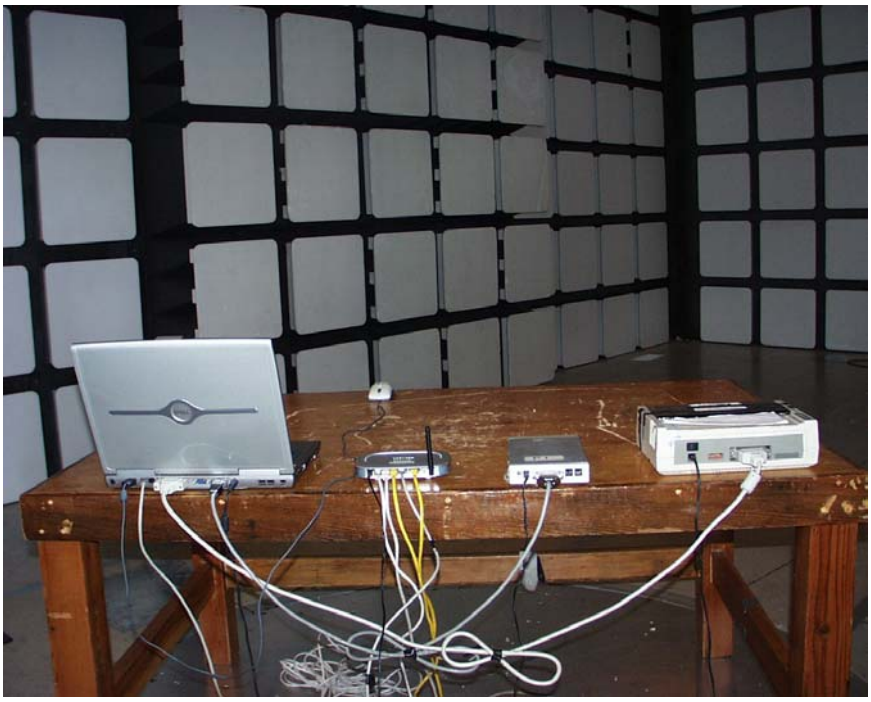
RADIATED BACK PHOTO

DIGITAL DEVICE RADIATED EMISSIONS SETUP

DIGITAL DEVICE FRONT PHOTO

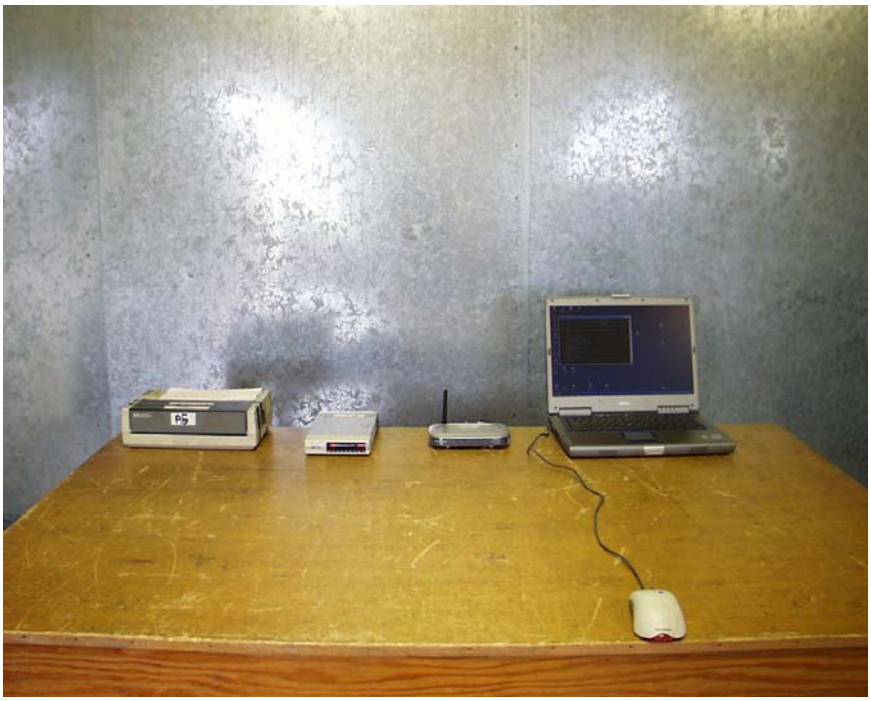


DIGITAL DEVICE BACK PHOTO



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

LINE CONDUCTED FRONT PHOTO



LINE CONDUCTED BACK PHOTO

END OF REPORT