FCC CFR47 PART 15 SUBPART C
CERTIFICATION
TEST REPORT

FOR

802.11A/B/G PCMCIA CARDBUS PC CARD

MODEL NUMBER: SL-3040

BRAND NAME: 3COM

FCC ID: O9C-SL3040

REPORT NUMBER: 03U1994-1

ISSUE DATE: JULY 16, 2003

Prepared for
3COM CORPORATION
5500 GREAT AMERICA PARKWAY
SANTA CLARA, CA 95052-8145
USA

Prepared by
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1. TEST RESULT CERTIFICATION

COMPANY NAME: 3COM CORPORATION
5500 GREAT AMERICA PARKWAY
SANTA CLARA, CA 95052-8145, USA

EUT DESCRIPTION: 802.11A/B/G PCMCIA CARDBUS PC CARD

MODEL: SL-3040

DATE TESTED: JUNE 19 – JULY 16, 2003

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.

Note: The 2.4 and 5.8 GHz bands are applicable to this report; another band of operation (5.2 GHz) is documented in a separate report.

Approved & Released For CCS By:

MIKE HECKROTTE
CHIEF ENGINEER
COMPLIANCE CERTIFICATION SERVICES

Tested By:

VIEN TRAN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

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

The EUT has an output power of 25.51 dBm (356 mW) and an antenna gain of -2 dBi in the 2400 - 2483.5 MHz band.

The EUT has an output power of 25.40 dBm (347 mW) and an antenna gain of -1 dBi in the 5750 - 5825 MHz band.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4/1992, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

4. FACILITIES AND ACCREDITATION

4.1. FACILITIES AND EQUIPMENT

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

4.2. TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	ELA 117
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	ELA-171
Taiwan	BSMI	CNS 13438	SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	IC2324 A,B,C, and F

5. CALIBRATION AND UNCERTAINTY

5.1. MEASURING INSTRUMENT CALIBRATION

The measurement instruments utilized to perform the tests documented in this report have been calibrated in accordance with the manufacturer's recommendations, and are traceable to national standards.

5.2. MEASUREMENT UNCERTAINTY

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

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**	**8564E**	**3943A01643**	**7/22/2003**
Preamplifier, 1 ~ 26 GHz	**Miteq**	**NSP10023988**	**646456**	**4/24/2004**
Antenna, Horn 1 ~ 18 GHz	**EMCO**	**3115**	**6717**	**2/4/2004**
Bilog Antenna	**AR**	**LPB-25201A**	**1185**	**3/6/2004**
EMI Receiver	**HP**	**8542A**	**3942A00280**	**11/20/2003**
RF Filter Section	**HP**	**85420E**	**3705A00256**	**11/20/2003**
EMI Test Receiver	**R & S**	**ESHS 20**	**827129/006**	**4/17/2004**
LISN, 10 kHz ~ 30 MHz	**FCC**	**50/250-25-2**	**114**	**9/6/2003**
Line Filter	**Lindgren**	**LMF-3489**	**497**	**NCR**
LISN, 10 kHz ~ 30 MHz	**Solar**	**8012-50-R-24-BNC**	**837990**	**9/6/2003**
PSA Spectrum Analyser	**Agilent**	**E4446A**	**42070220**	**1/13/2004**
EPM-Peak Power Meter	**Agilent**	**E4416A**	**GB41291160**	**8/9/2003**

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID
LAPTOP	DELL	LATITUDE PPX	N/A	DoC
ADAPTOR	DELL	PA-2	N/A	DoC

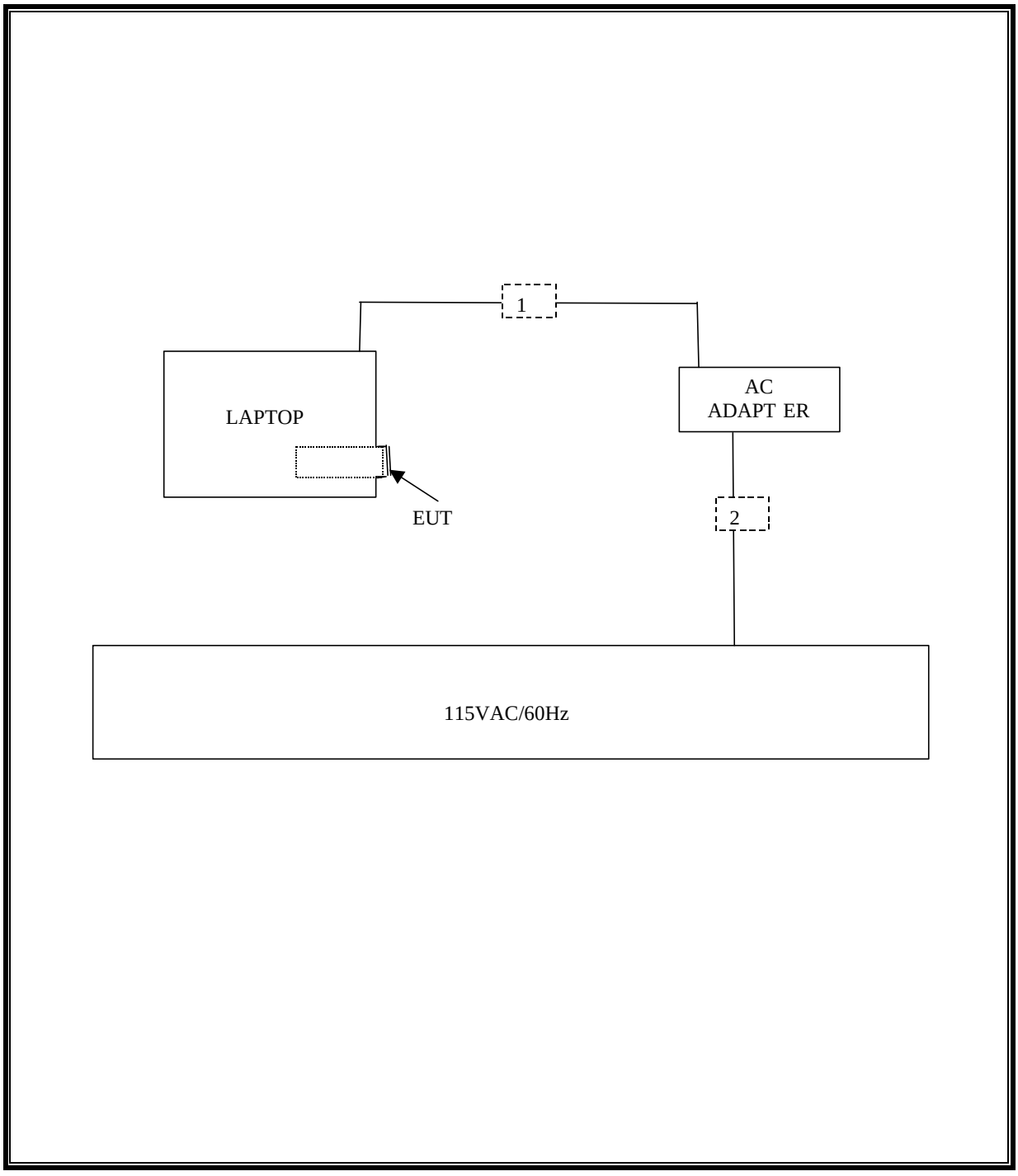
I/O CABLES

Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	**DC**	**1**	**DC**	**Unshielded**	**2m**	**Ferrite on DC Cable**
2	**AC**	**1**	**US 115V**	**Un-shielded**	**2m**	**No**

TEST SETUP

The EUT was installed in the laptop via an extender card and operated by a test program.

SETUP DIAGRAM



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.

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	12080	500	11580
Middle	2437	12000	500	11500
High	2462	12500	500	12000

802.11g Normal Mode

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

802.11g Turbo Mode

Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Margin (kHz)
Middle	2437	32580	500	32080

5.8 GHz BAND RESULTS

No non-compliance noted:

802.11a Normal Mode

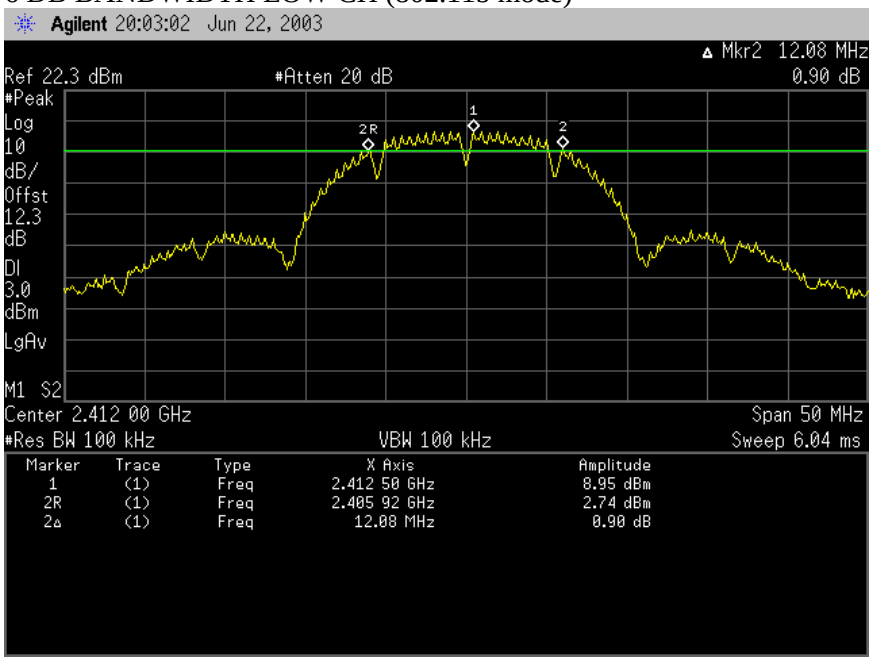
Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Margin (kHz)
Low	5745	16500	500	16000
Middle	5785	16500	500	16000
High	5825	16500	500	16000

802.11a Turbo Mode

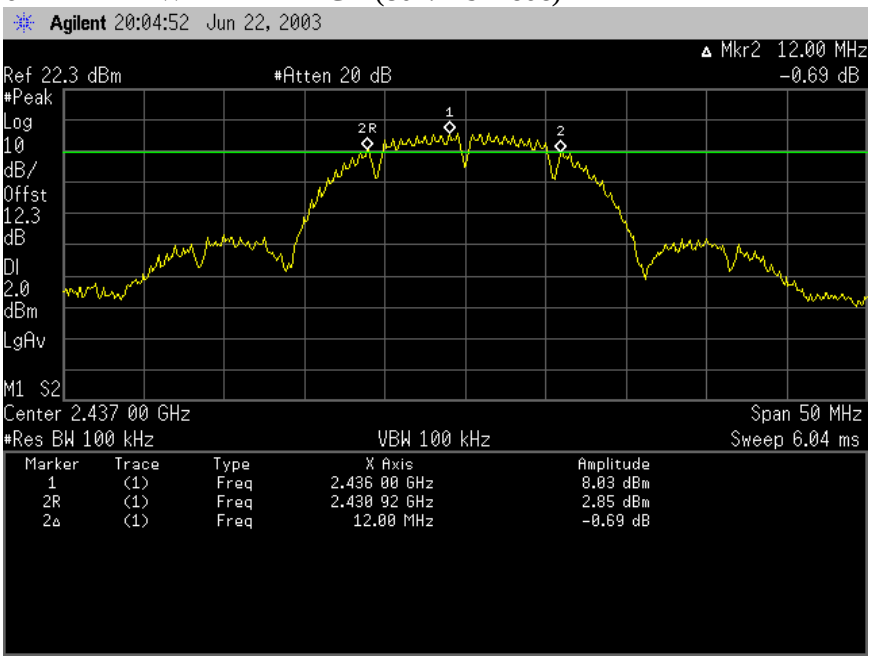
Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Margin (kHz)
Low	5760	32670	500	32170
High	5800	32750	500	32250

6 DB BANDWIDTH (802.11b MODE)

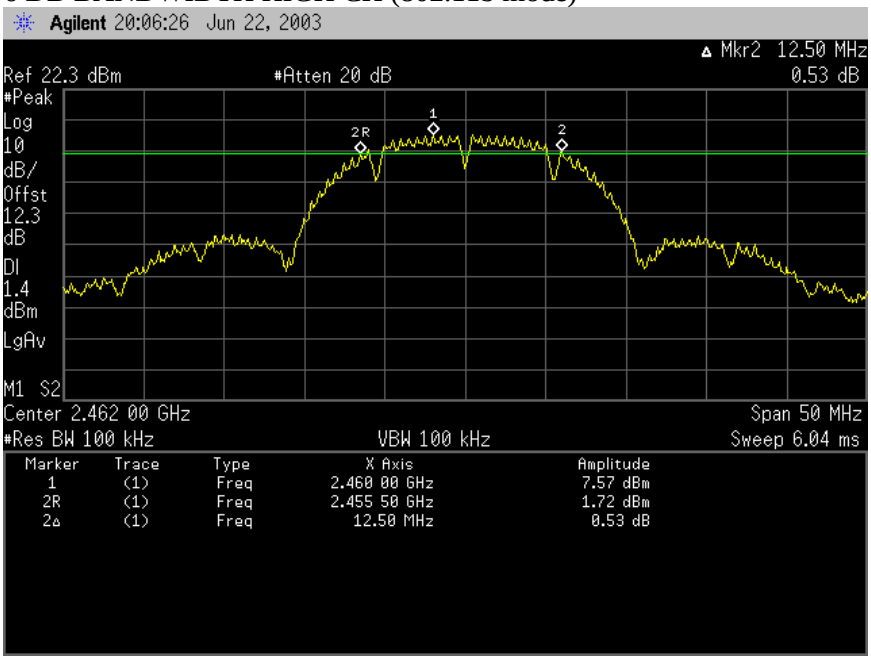
6 DB BANDWIDTH LOW CH (802.11b mode)



6 DB BANDWIDTH MID CH (802.11b mode)

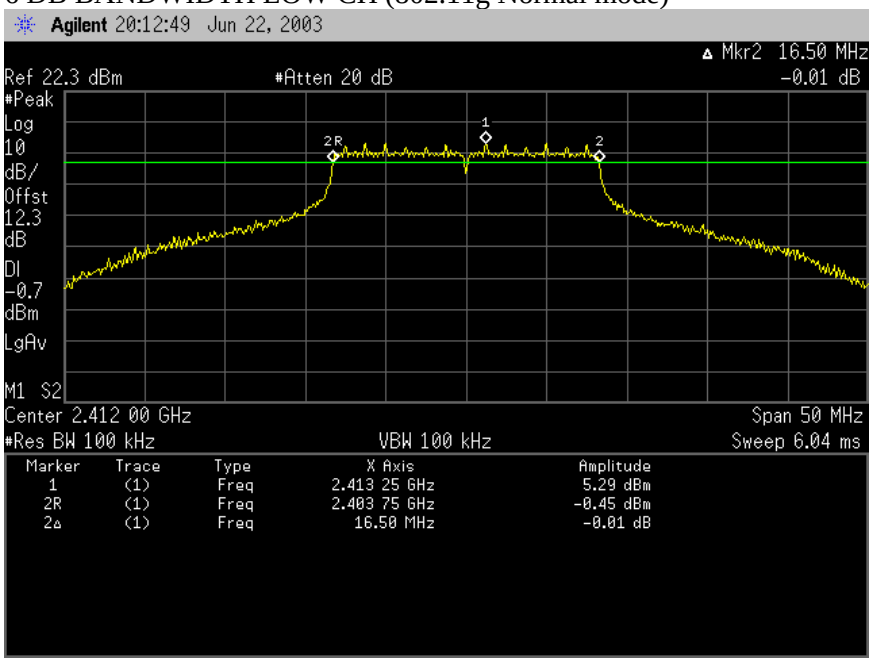


6 DB BANDWIDTH HIGH CH (802.11b mode)

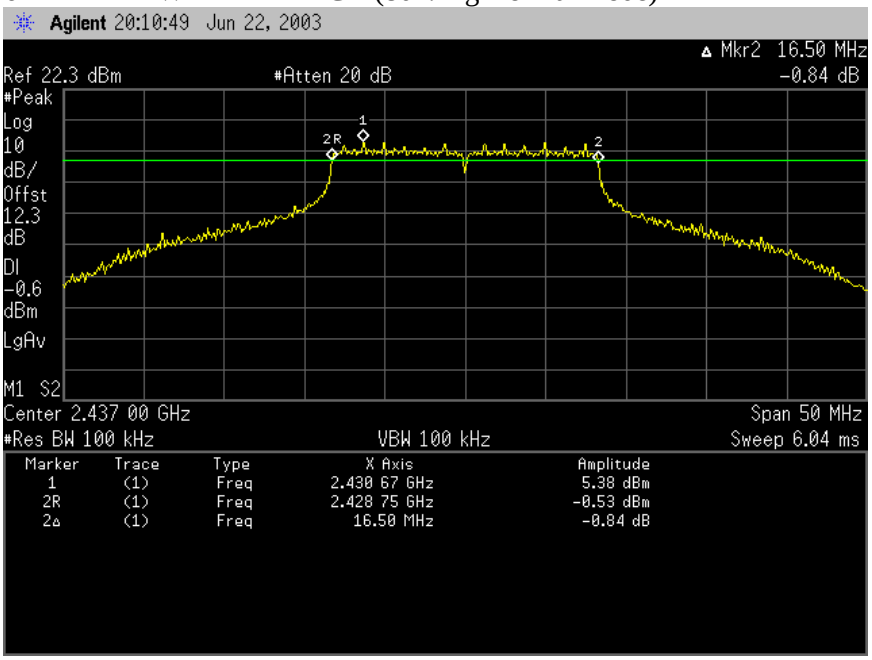


6 DB BANDWIDTH (802.11g NORMAL MODE)

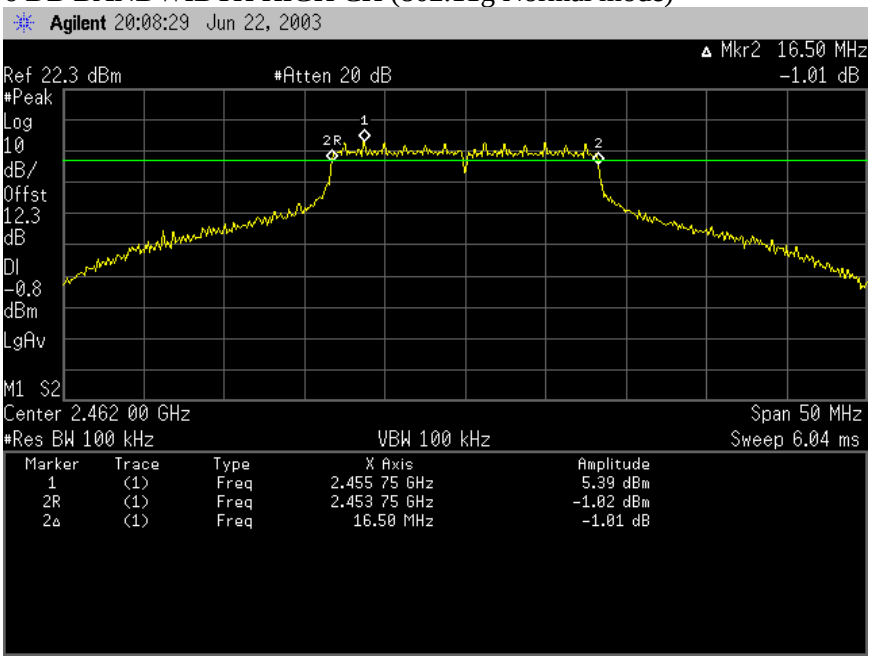
6 DB BANDWIDTH LOW CH (802.11g Normal mode)



6 DB BANDWIDTH MID CH (802.11g Normal mode)

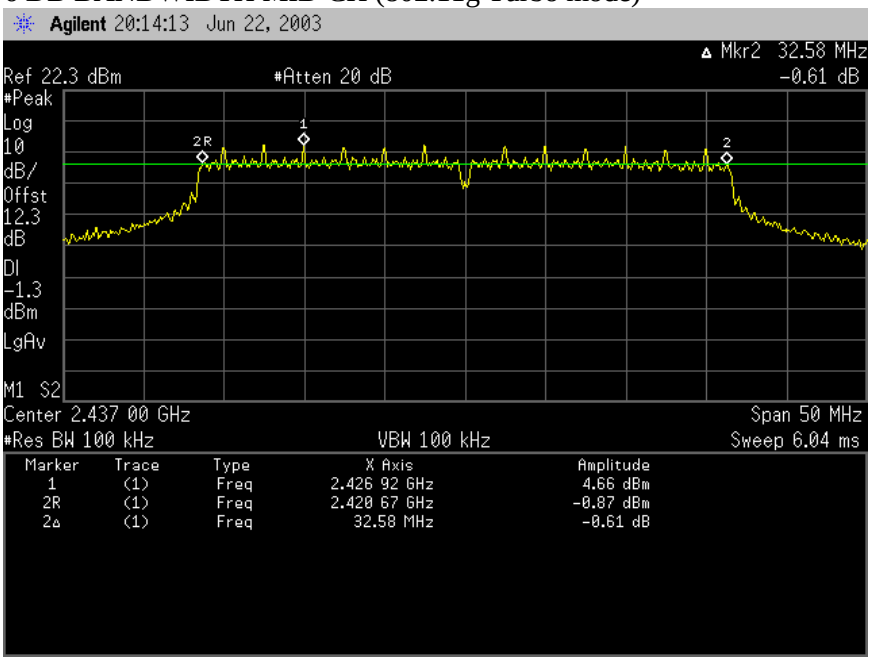


6 DB BANDWIDTH HIGH CH (802.11g Normal mode)



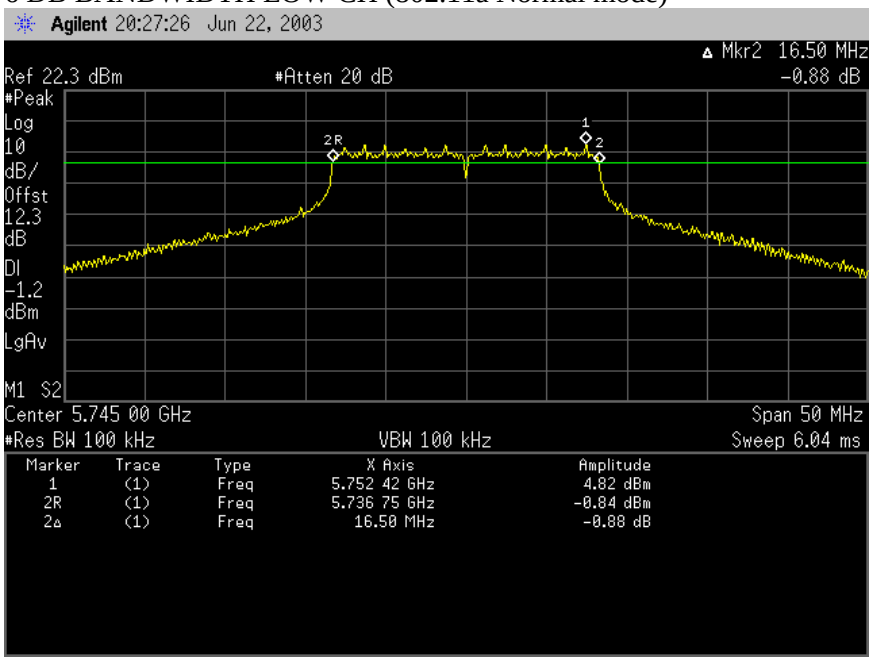
6 DB BANDWIDTH (802.11g TURBO MODE)

6 DB BANDWIDTH MID CH (802.11g Turbo mode)

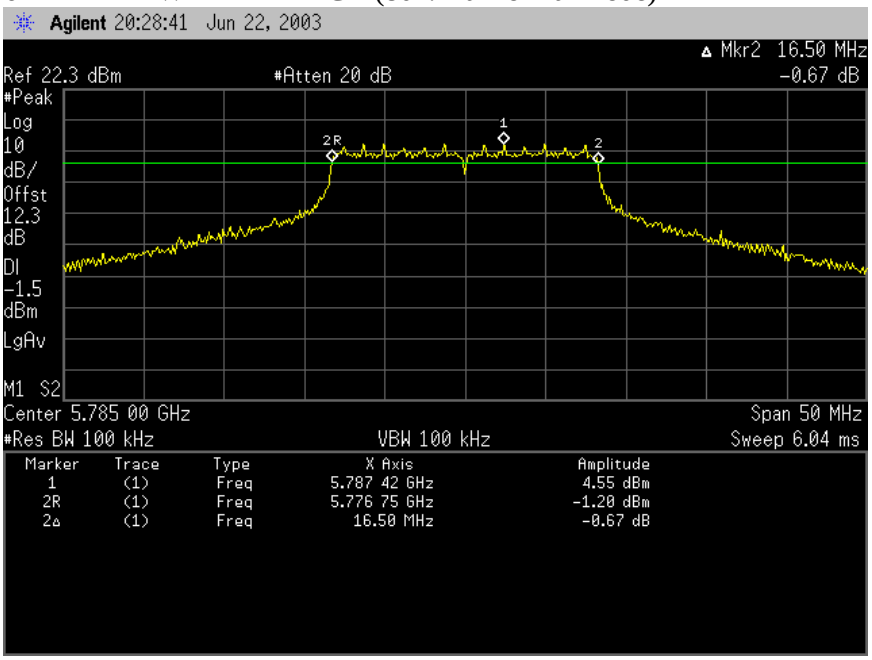


6 DB BANDWIDTH (802.11a MODE)

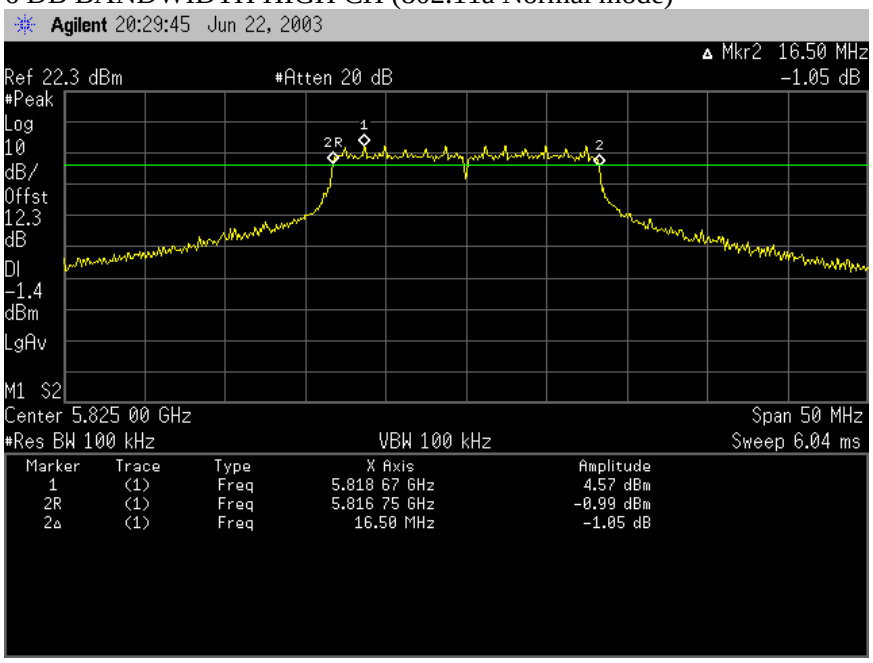
6 DB BANDWIDTH LOW CH (802.11a Normal mode)



6 DB BANDWIDTH MID CH (802.11a Normal mode)

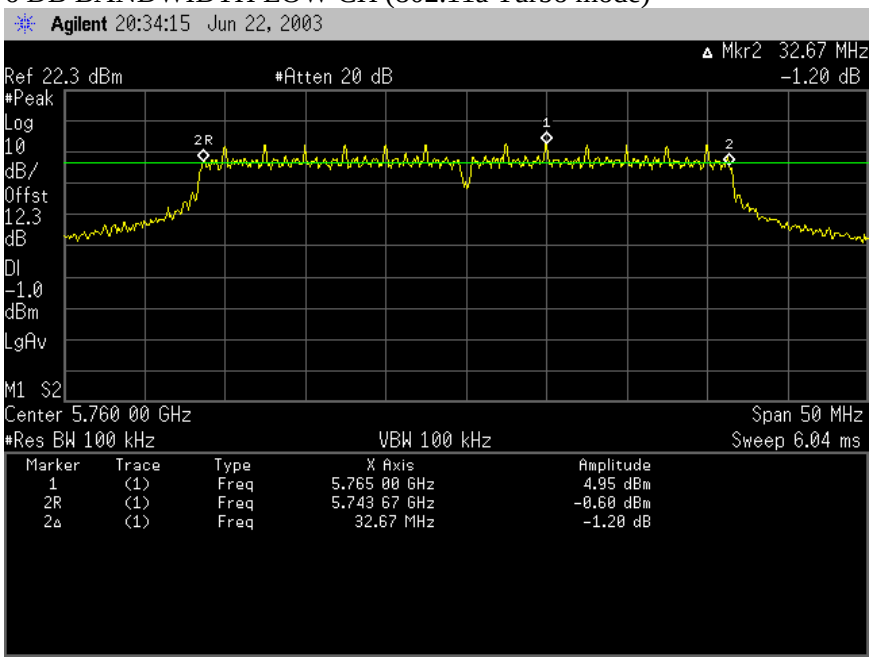


6 DB BANDWIDTH HIGH CH (802.11a Normal mode)

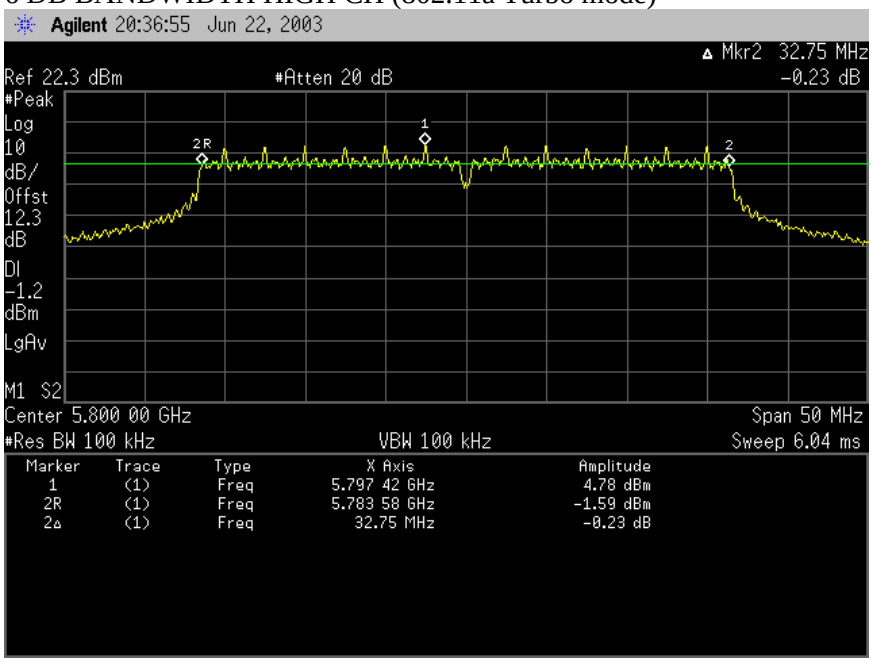


6 DB BANDWIDTH (802.11a TURBO MODE)

6 DB BANDWIDTH LOW CH (802.11a Turbo mode)



6 DB BANDWIDTH HIGH CH (802.11a 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.

2.4 GHz BAND RESULTS

No non-compliance noted:

802.11b Mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.0184
Middle	2437	15.9274
High	2462	16.0853

802.11g Normal Mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.1506
Middle	2437	17.0363
High	2462	17.0672

802.11g Turbo Mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Middle	2437	33.6313

5.8 GHz BAND RESULTS

No non-compliance noted:

802.11a Normal Mode

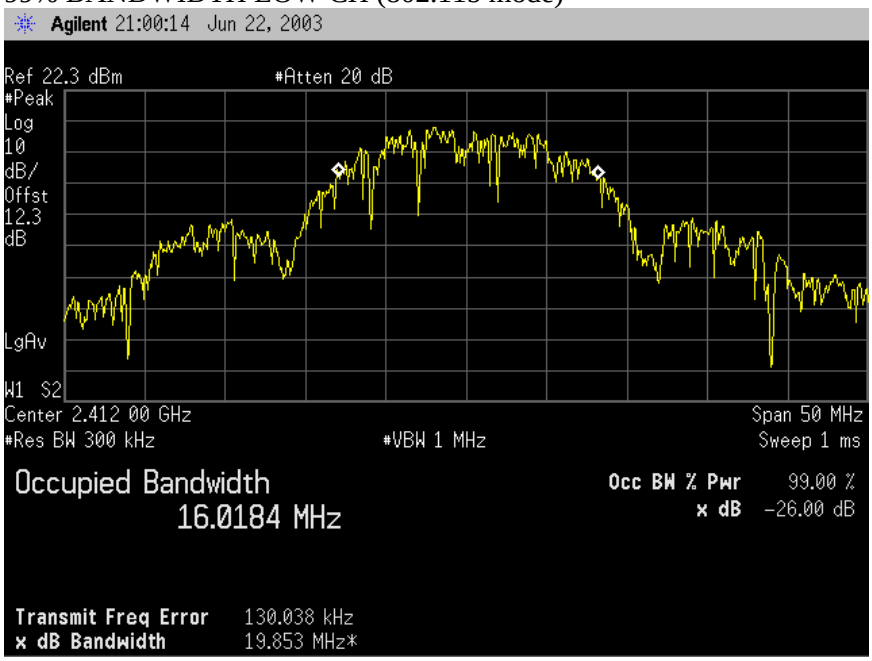
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	16.8101
Middle	5785	16.6627
High	5825	16.9266

802.11a Turbo Mode

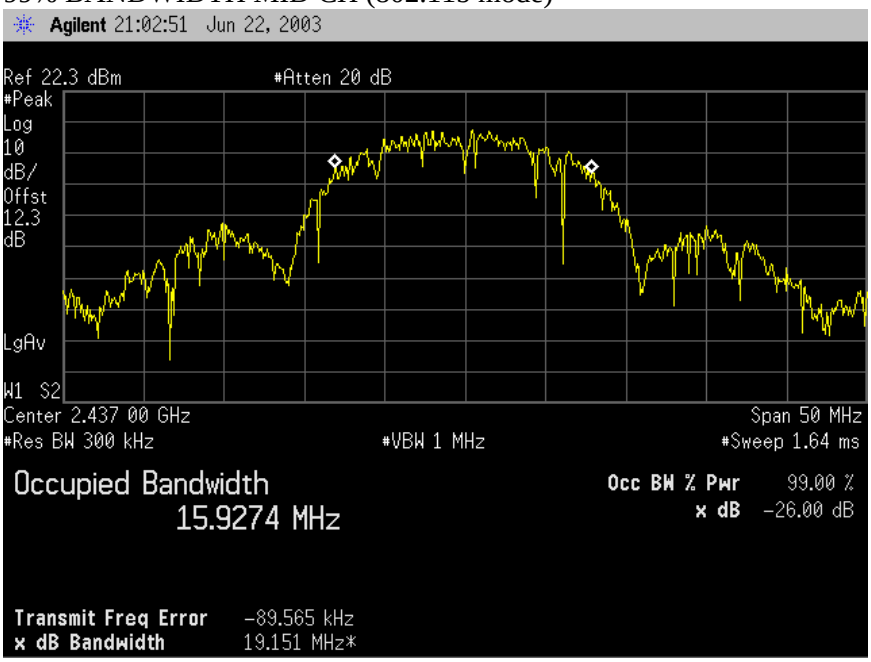
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5760	33.6571
High	5800	33.8818

99% BANDWIDTH (802.11b MODE)

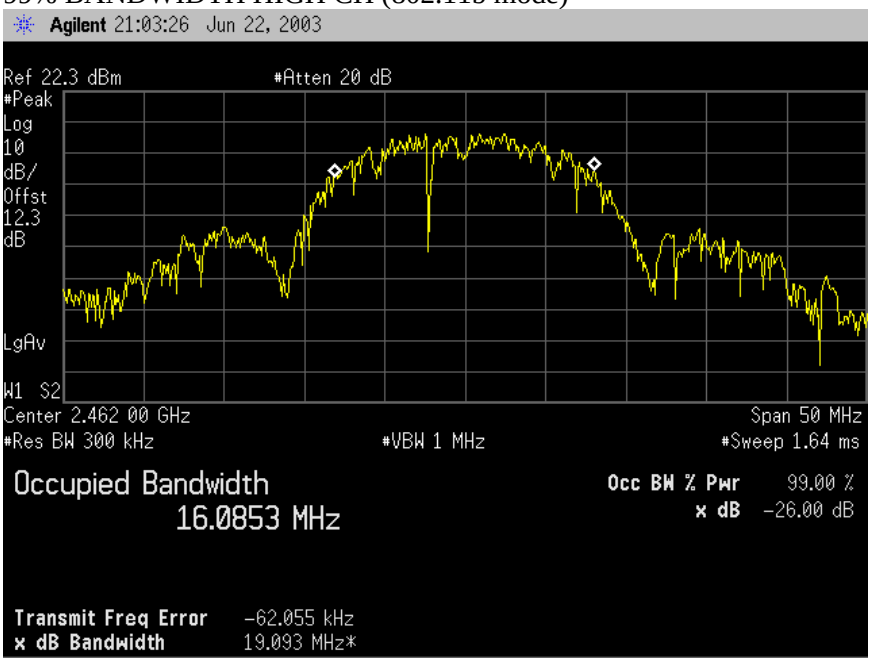
99% BANDWIDTH LOW CH (802.11b mode)



99% BANDWIDTH MID CH (802.11b mode)

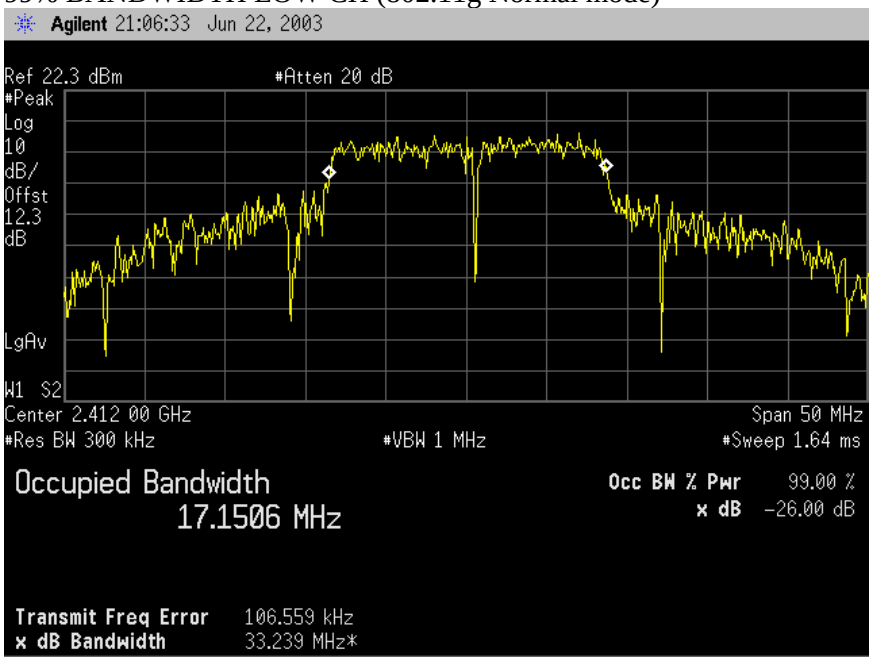


99% BANDWIDTH HIGH CH (802.11b mode)

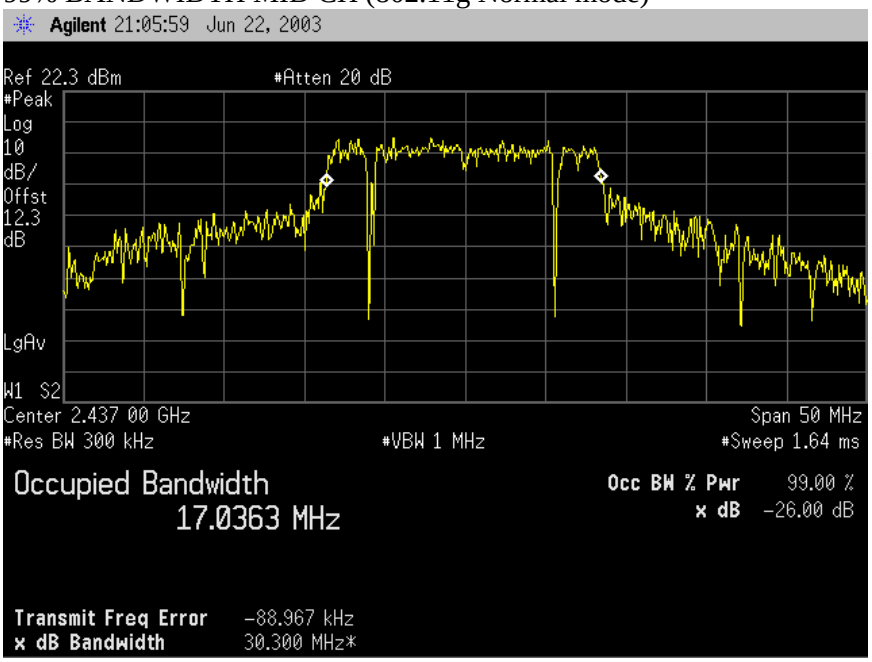


99% BANDWIDTH (802.11g NORMAL MODE)

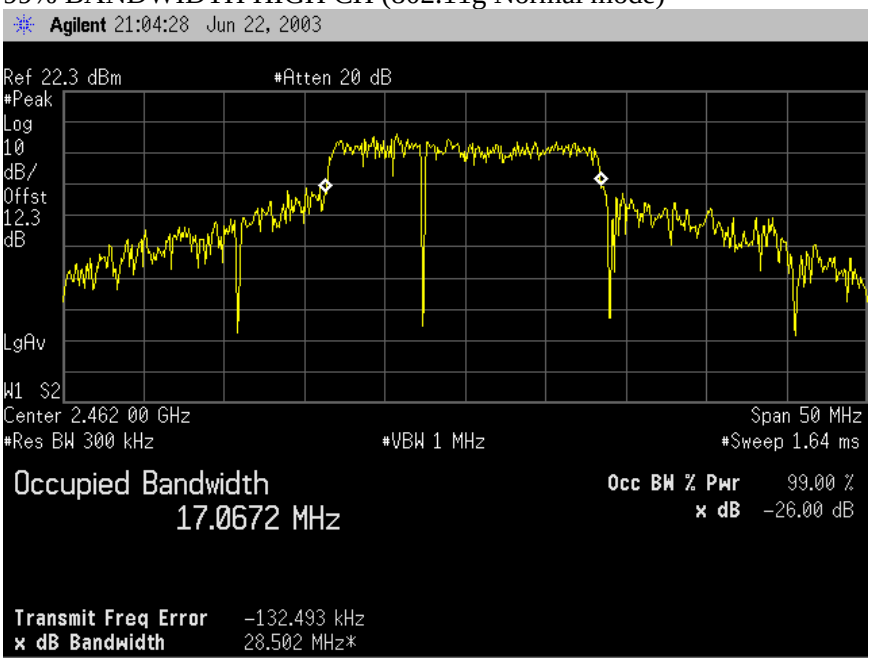
99% BANDWIDTH LOW CH (802.11g Normal mode)



99% BANDWIDTH MID CH (802.11g Normal mode)

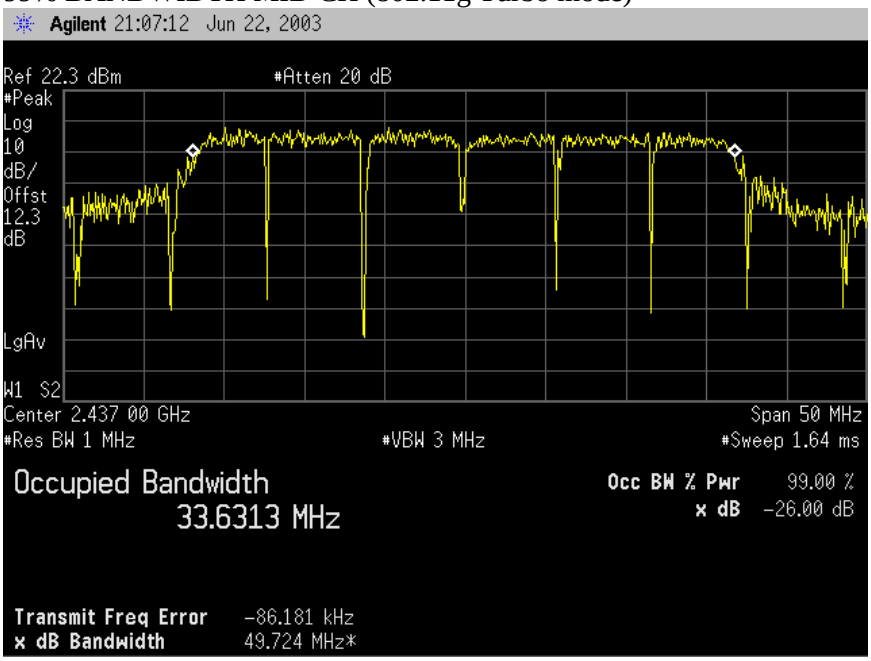


99% BANDWIDTH HIGH CH (802.11g Normal mode)



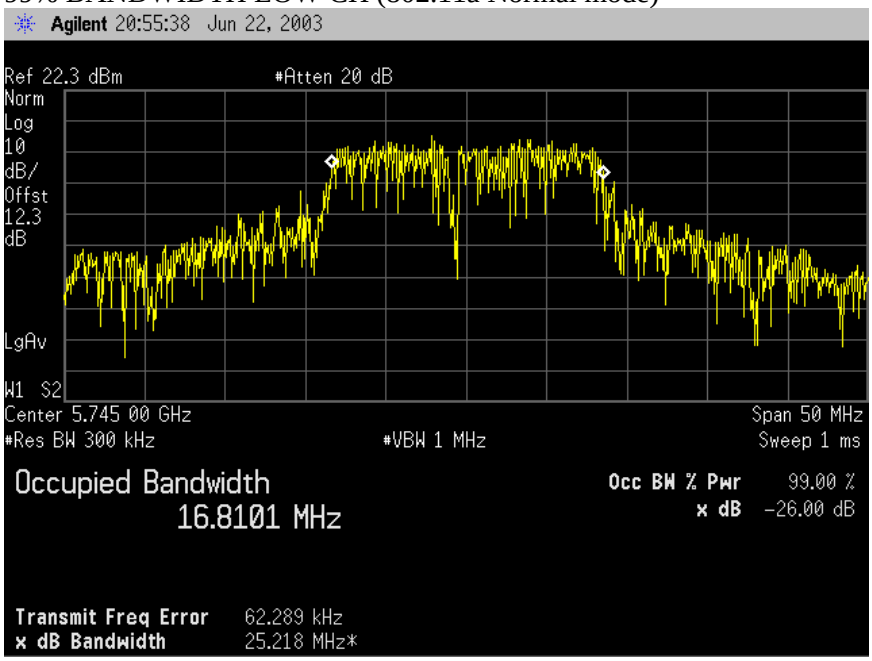
99% BANDWIDTH (802.11g TURBO MODE)

99% BANDWIDTH MID CH (802.11g Turbo mode)

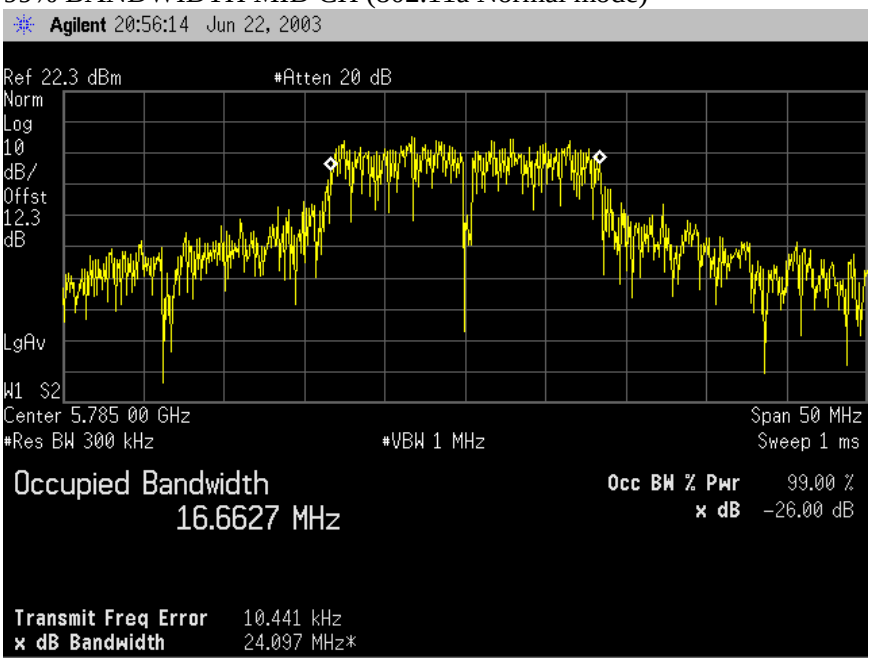


99% BANDWIDTH (802.11a MODE)

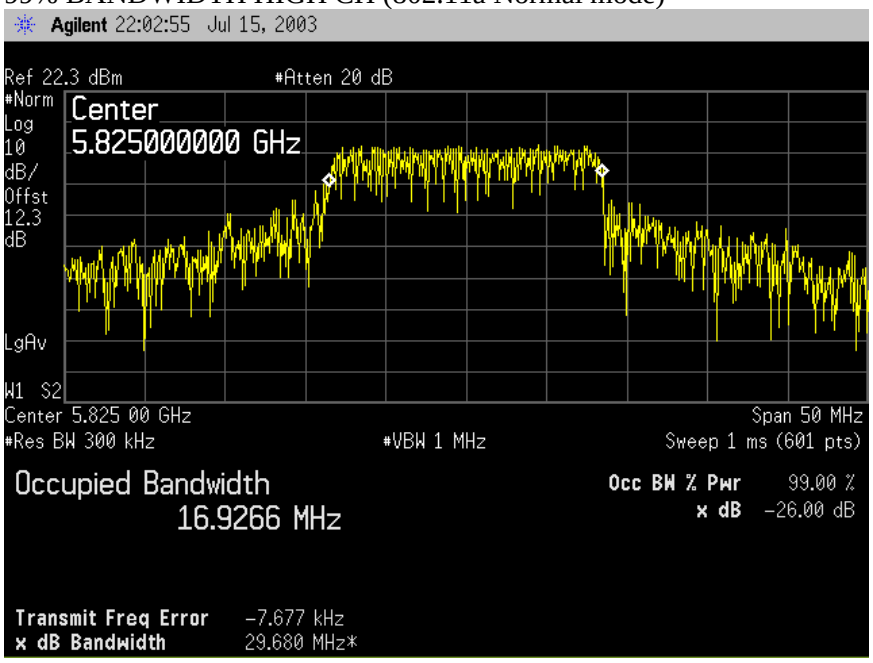
99% BANDWIDTH LOW CH (802.11a Normal mode)



99% BANDWIDTH MID CH (802.11a Normal mode)

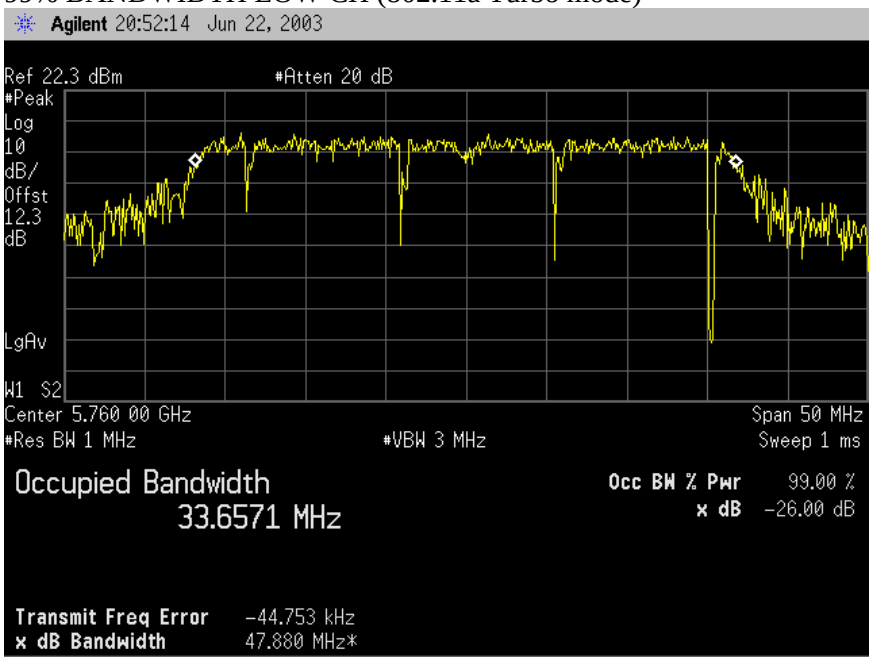


99% BANDWIDTH HIGH CH (802.11a Normal mode)

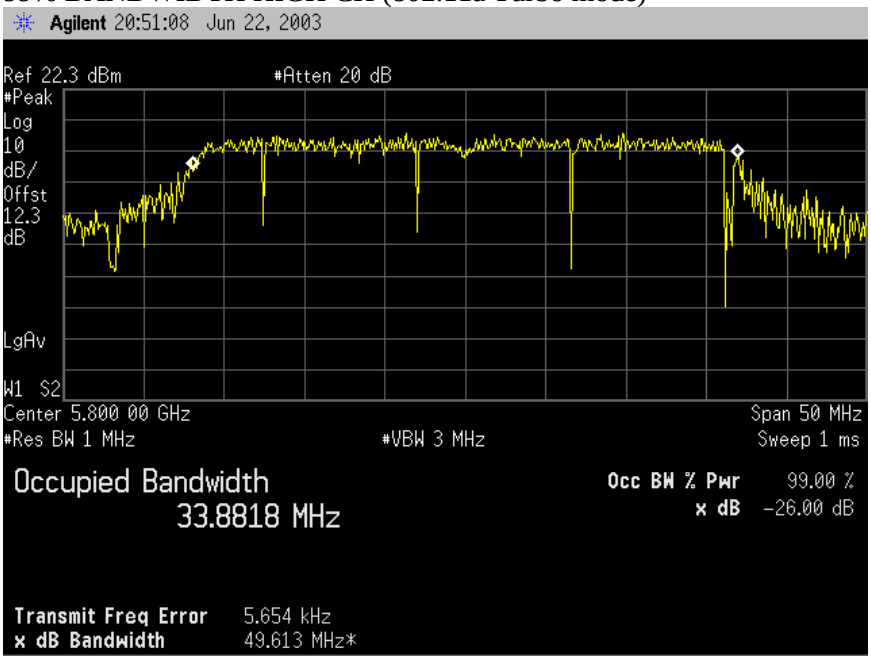


99% BANDWIDTH (802.11a TURBO MODE)

99% BANDWIDTH LOW CH (802.11a Turbo mode)



99% BANDWIDTH HIGH CH (802.11a 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 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.

2.4 GHZ BAND RESULTS

No non-compliance noted:

802.11b Mode

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	22.44	30	-7.56
Middle	2437	21.91	30	-8.09
High	2462	21.91	30	-8.09

802.11g Normal Mode

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	25.51	30	-4.49
Middle	2437	25.35	30	-4.65
High	2462	25.11	30	-4.89

802.11g Turbo Mode

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	24.38	30	-5.62

5.8 GHZ BAND RESULTS

No non-compliance noted:

802.11a Normal Mode

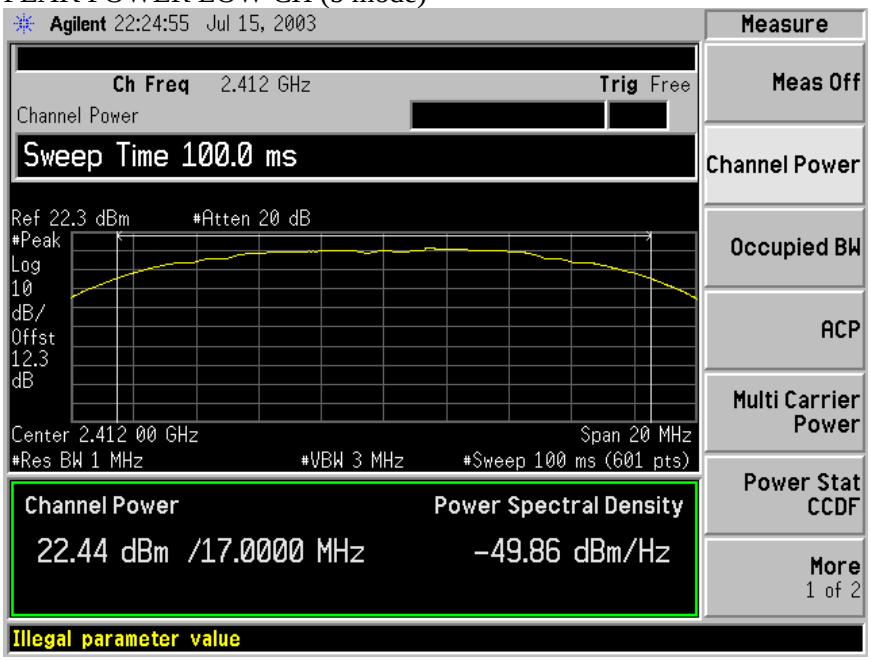
Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	25.25	30	-4.75
Middle	575	25.18	30	-4.82
High	5825	25.40	30	-4.60

802.11a Turbo Mode

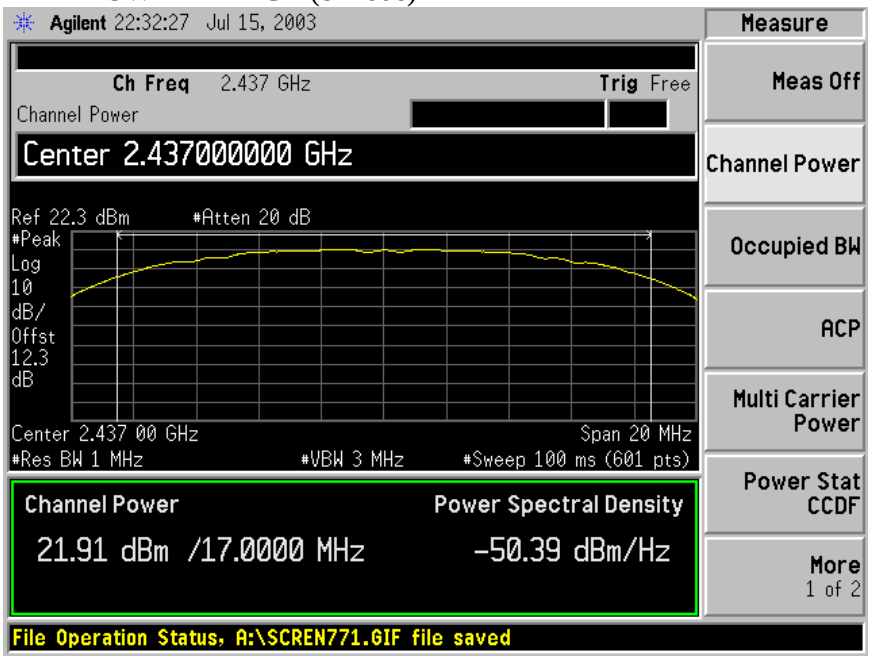
Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	5760	24.14	30	-5.86
High	5800	24.08	30	-5.92

OUTPUT POWER (802.11b MODE)

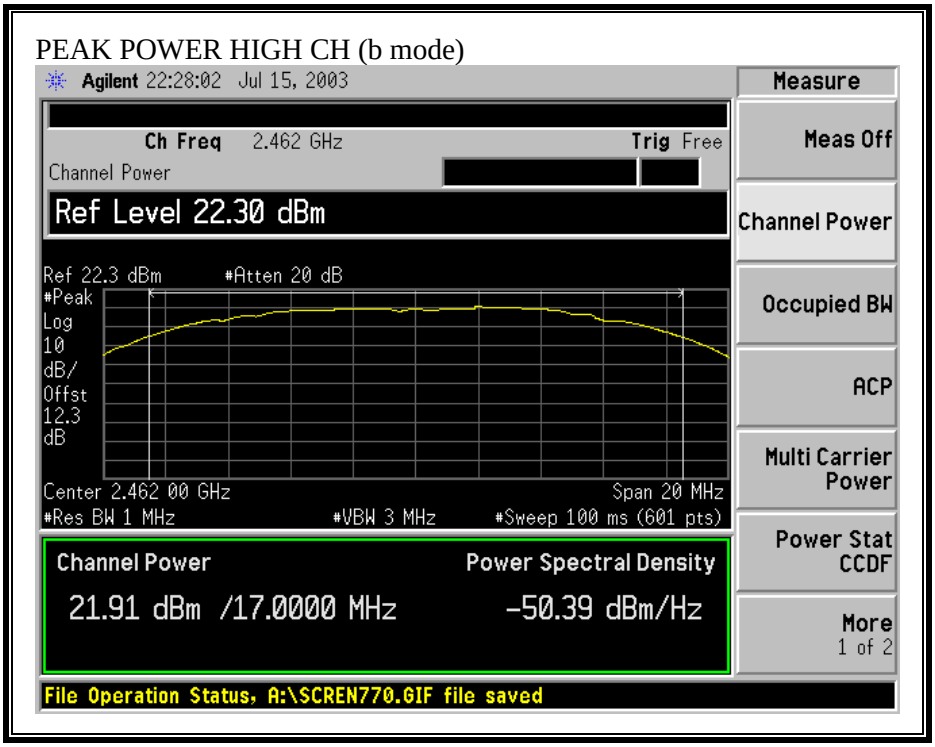
PEAK POWER LOW CH (b mode)



PEAK POWER MID CH (b mode)

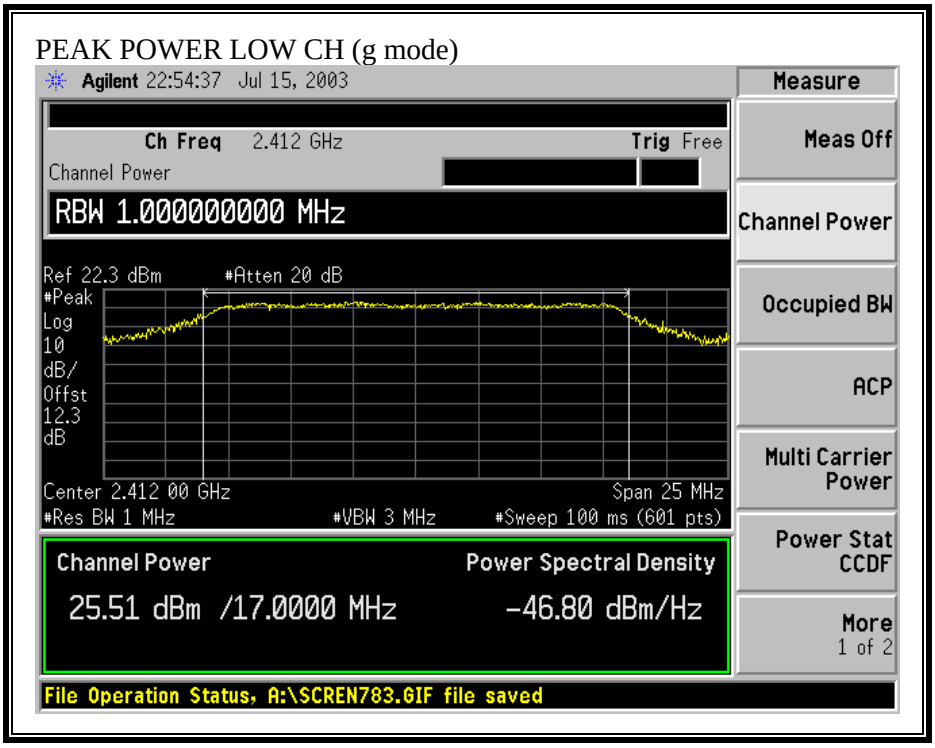


PEAK POWER HIGH CH (b mode)

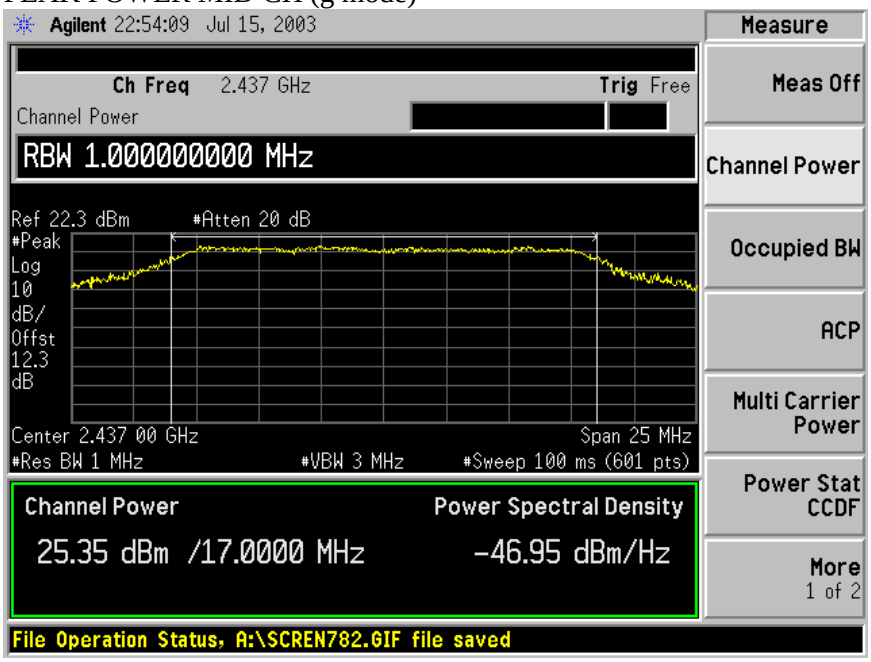


OUTPUT POWER (802.11g NORMAL MODE)

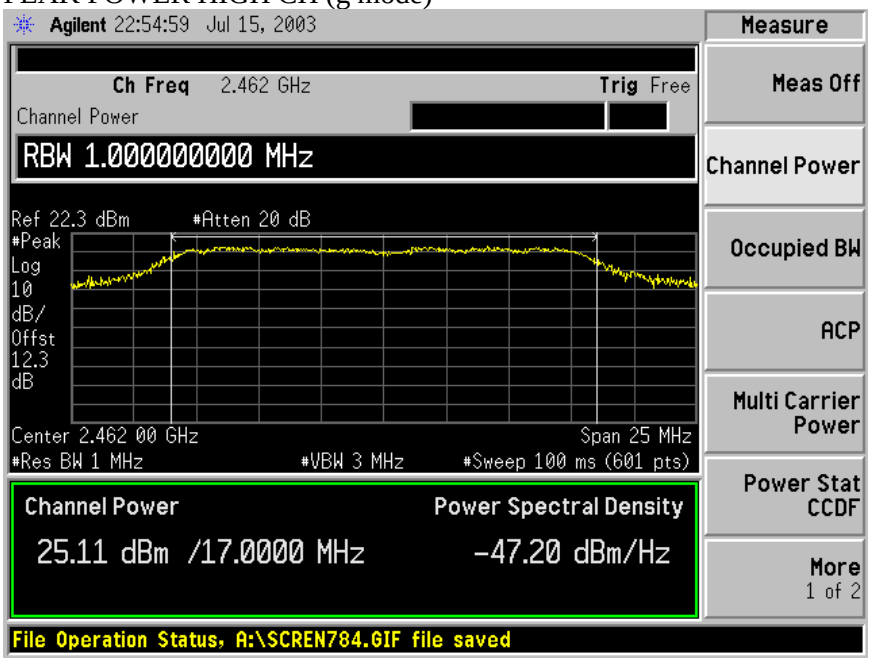
PEAK POWER LOW CH (g mode)



PEAK POWER MID CH (g mode)

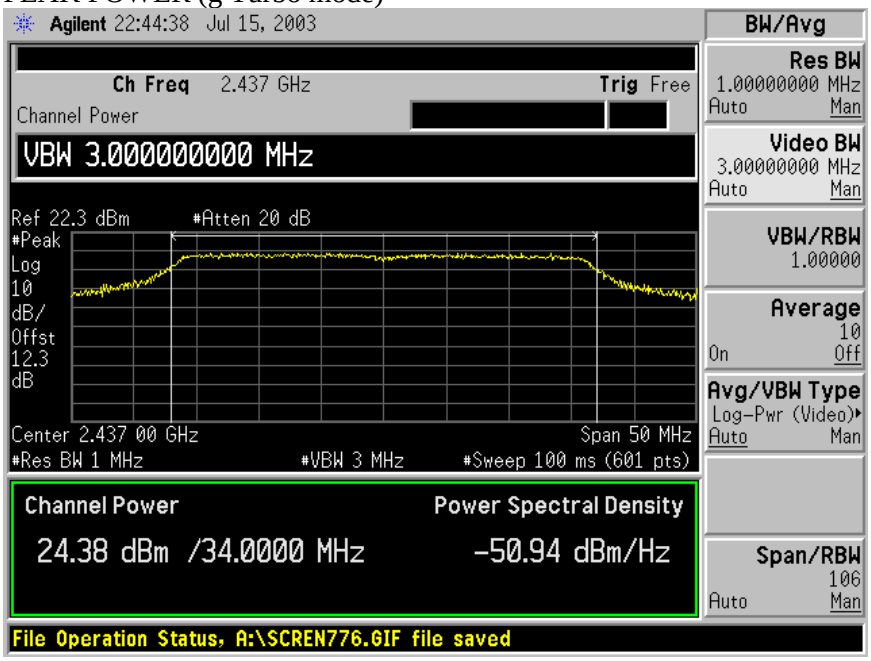


PEAK POWER HIGH CH (g mode)



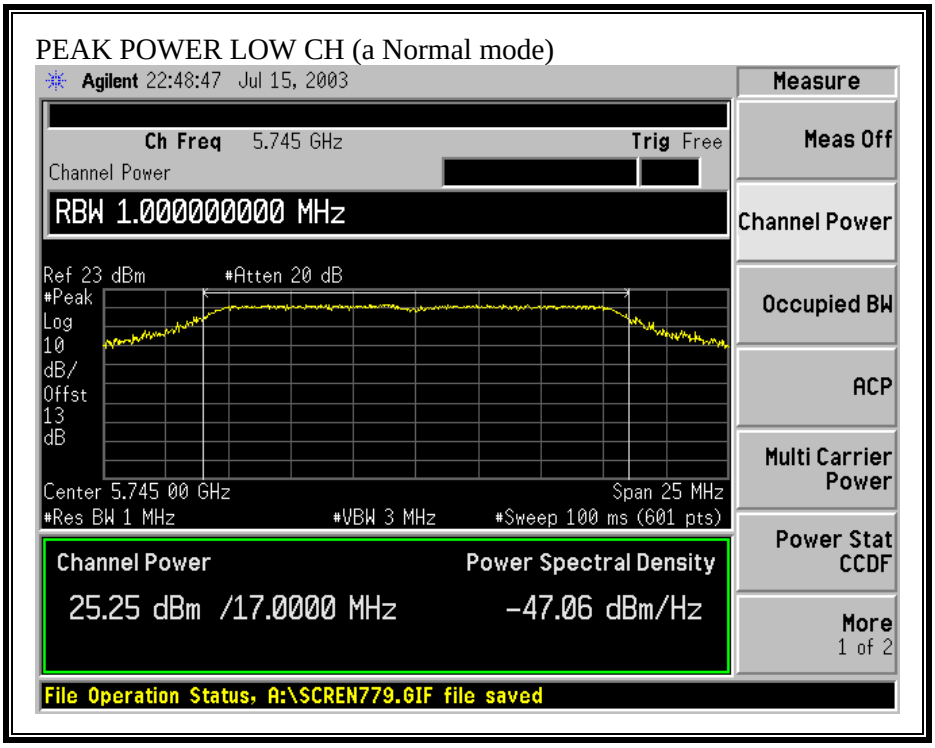
OUTPUT POWER (802.11g TURBO MODE)

PEAK POWER (g Turbo mode)

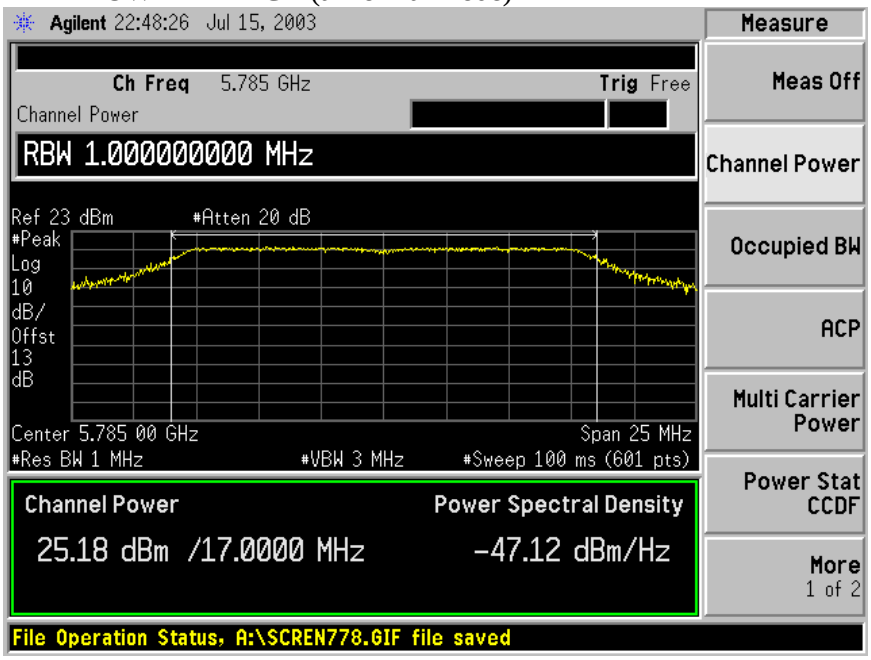


OUTPUT POWER (802.11a NORMAL MODE)

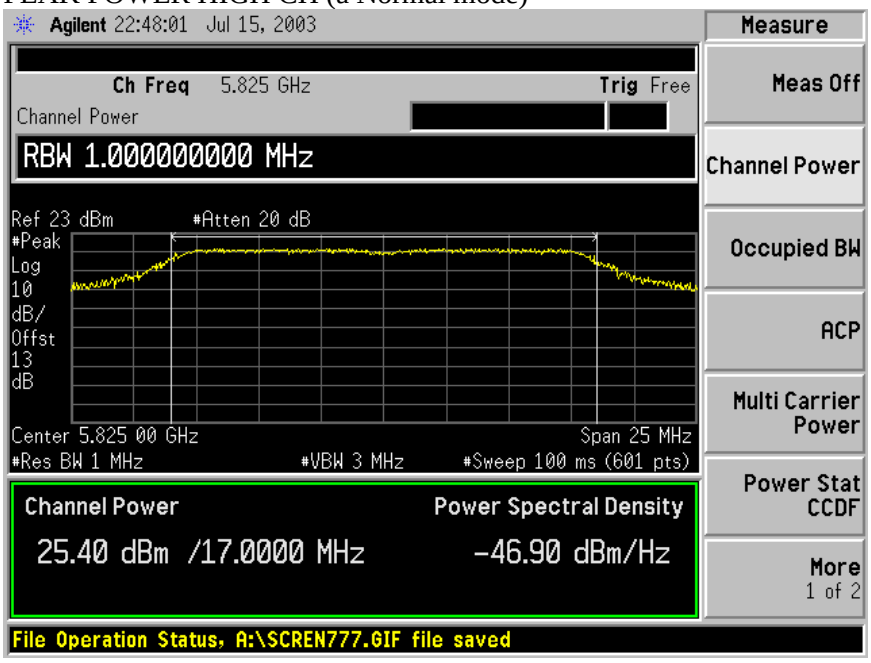
PEAK POWER LOW CH (a Normal mode)



PEAK POWER MID CH (a Normal mode)

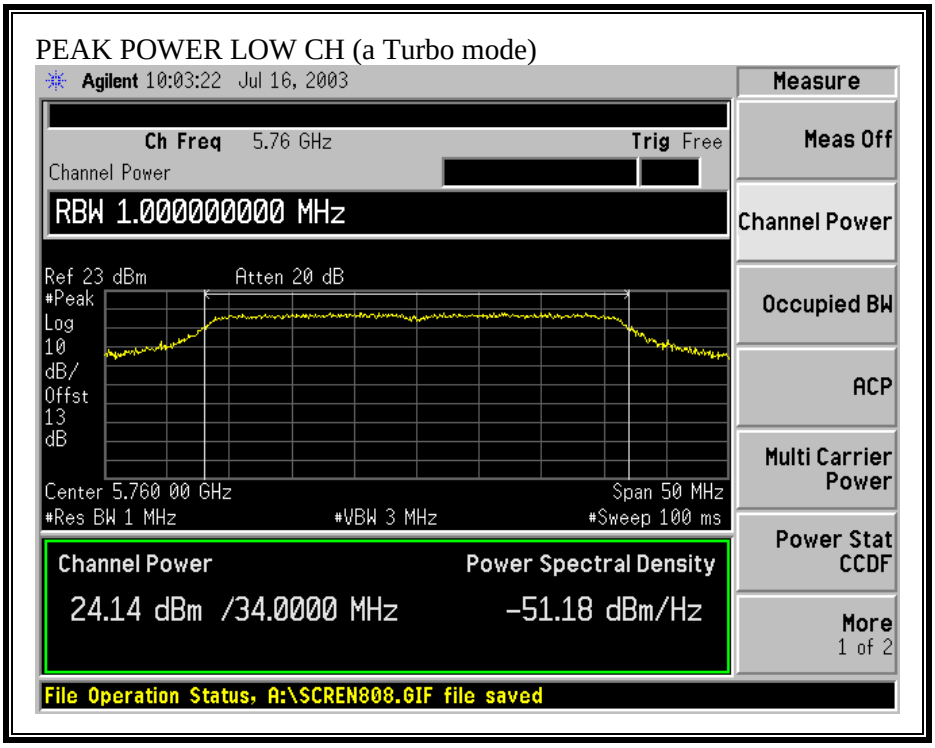


PEAK POWER HIGH CH (a Normal mode)

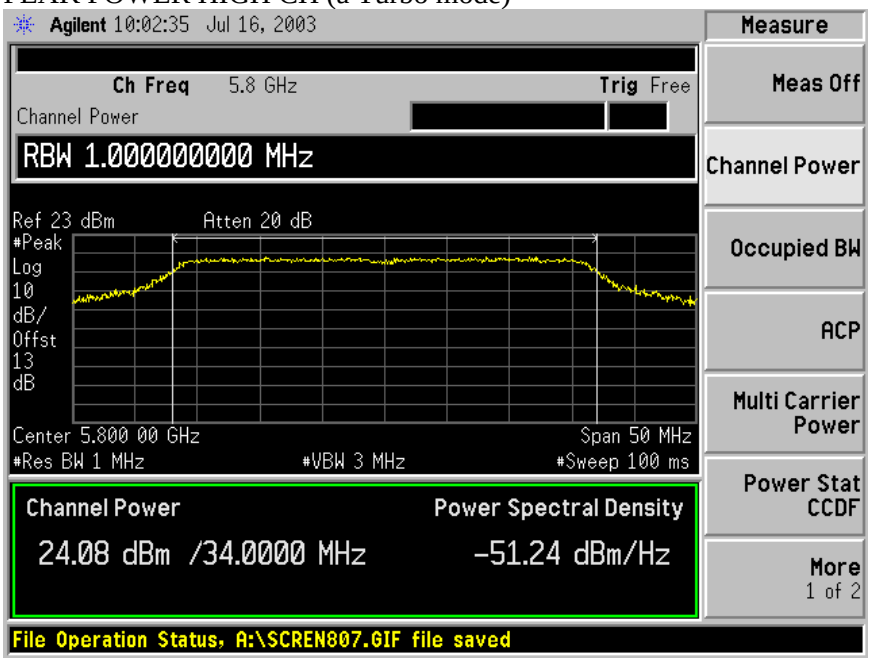


OUTPUT POWER (802.11a TURBO MODE)

PEAK POWER LOW CH (a Turbo mode)



PEAK POWER HIGH CH (a Turbo mode)



7.4. AVERAGE POWER

AVERAGE POWER LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter is set to simultaneously read peak power and average power.

2.4 GHZ BAND RESULTS

No non-compliance noted:

The cable assembly insertion loss of 12.3 dB (including 10 dB pad and 2.3 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	19.34
Middle	2437	19.03
High	2462	18.79

802.11g Normal Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	2412	18.21
Middle	2437	17.97
High	2462	17.86

802.11g Turbo Mode

Channel	Frequency (MHz)	Average Power (dBm)
Middle	2437	18.06

5.8 GHZ BAND RESULTS

No non-compliance noted:

The cable assembly insertion loss of 13 dB (including 10 dB pad and 3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

802.11a Normal Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	5745	17.22
Middle	5785	17.06
High	5825	16.83

802.11a Turbo Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	5760	16.75
High	5800	16.87

7.5. 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 >= 3KHz, 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	-5.23	8	-13.23
Middle	2437	-5.49	8	-13.49
High	2462	-6.35	8	-14.35

802.11g Normal Mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-9.09	8	-17.09
Middle	2437	-9.84	8	-17.84
High	2462	-9.71	8	-17.71

802.11g Turbo Mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	-12.71	8	-20.71

5.8 GHz BAND RESULTS

No non-compliance noted:

802.11a Normal Mode

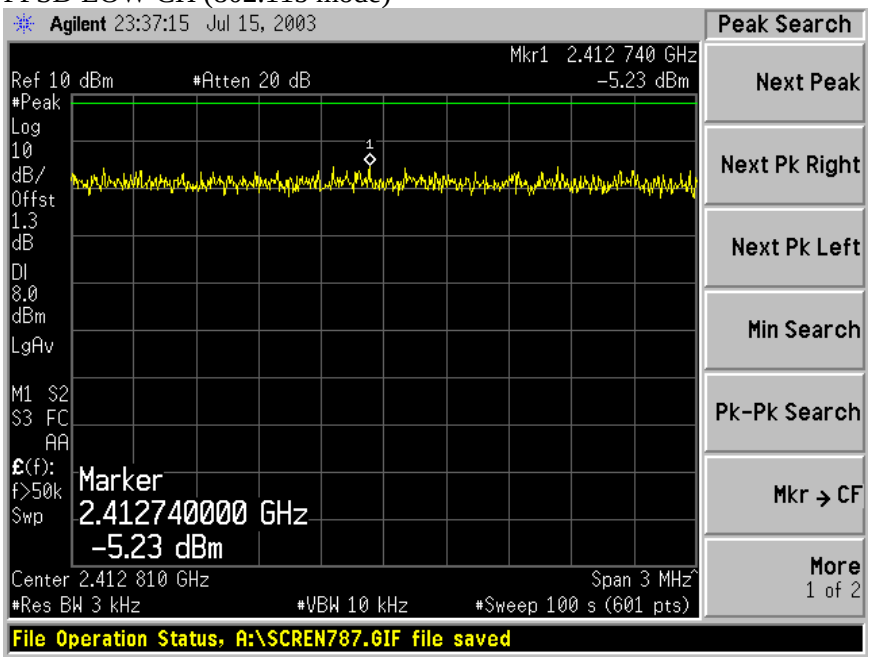
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-9.41	8	-17.41
Middle	5785	-9.20	8	-17.20
High	5825	-9.02	8	-17.02

802.11a Turbo Mode

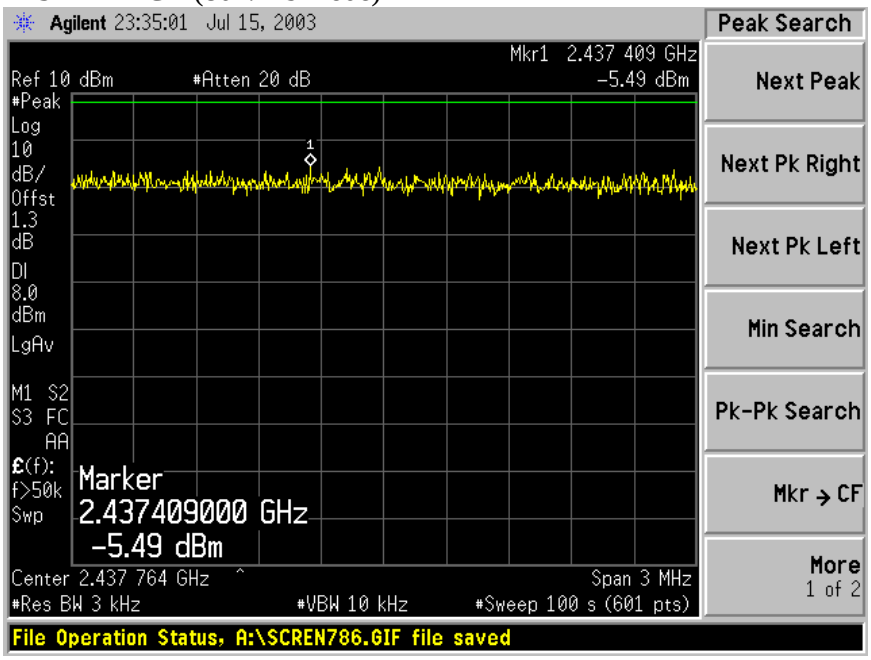
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5760	-10.75	8	-18.75
High	5800	-10.63	8	-18.63

PEAK POWER SPECTRAL DENSITY (802.11b MODE)

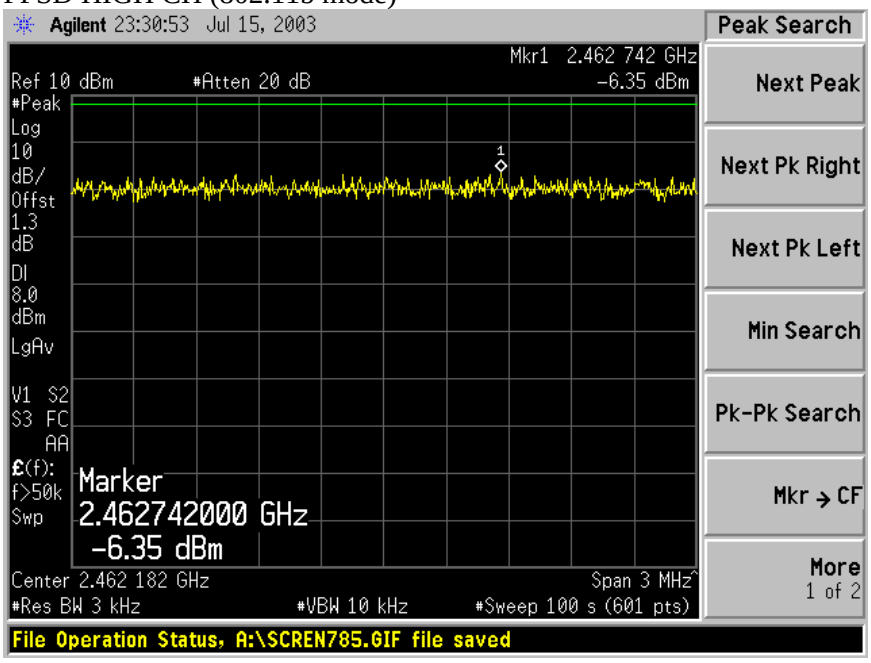
PPSD LOW CH (802.11b mode)



PPSD MID CH (802.11b mode)

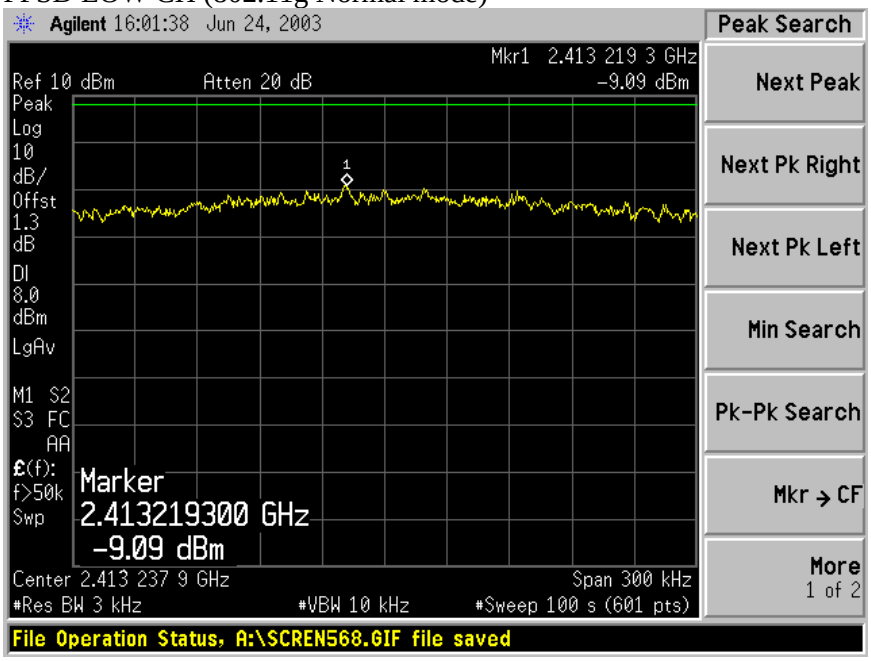


PPSD HIGH CH (802.11b mode)

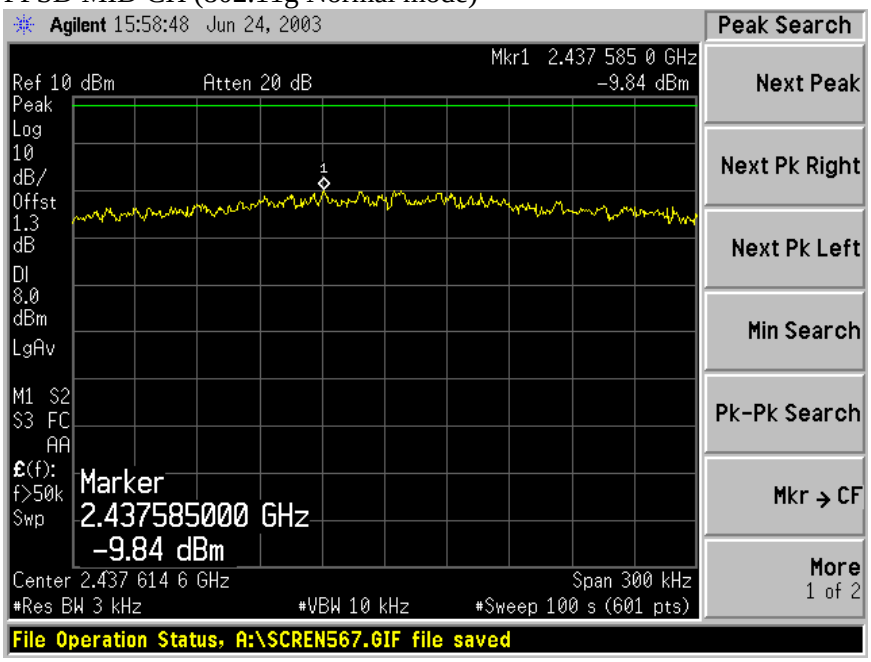


PEAK POWER SPECTRAL DENSITY (802.11g NORMAL MODE)

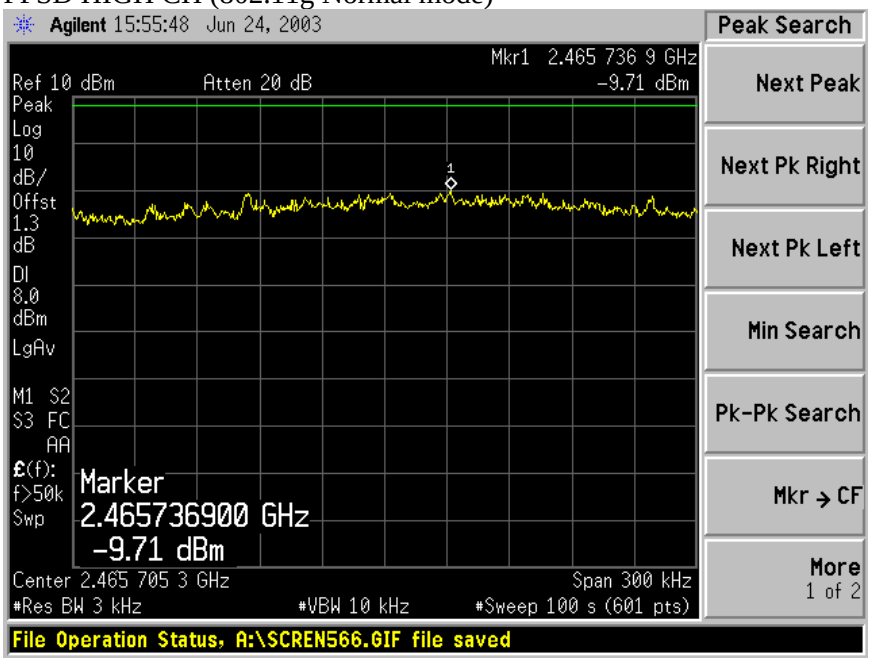
PPSD LOW CH (802.11g Normal mode)



PPSD MID CH (802.11g Normal mode)

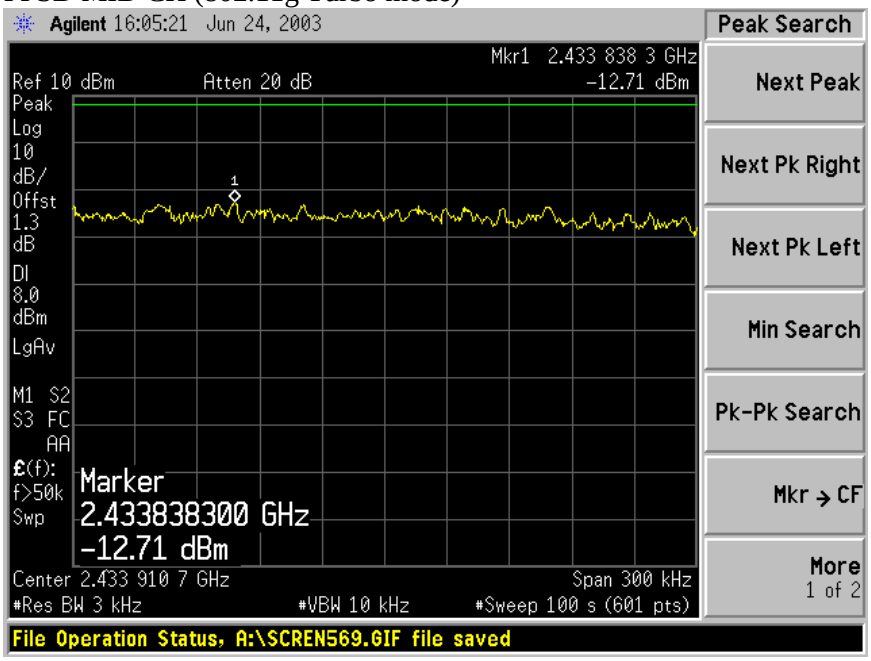


PPSD HIGH CH (802.11g Normal mode)



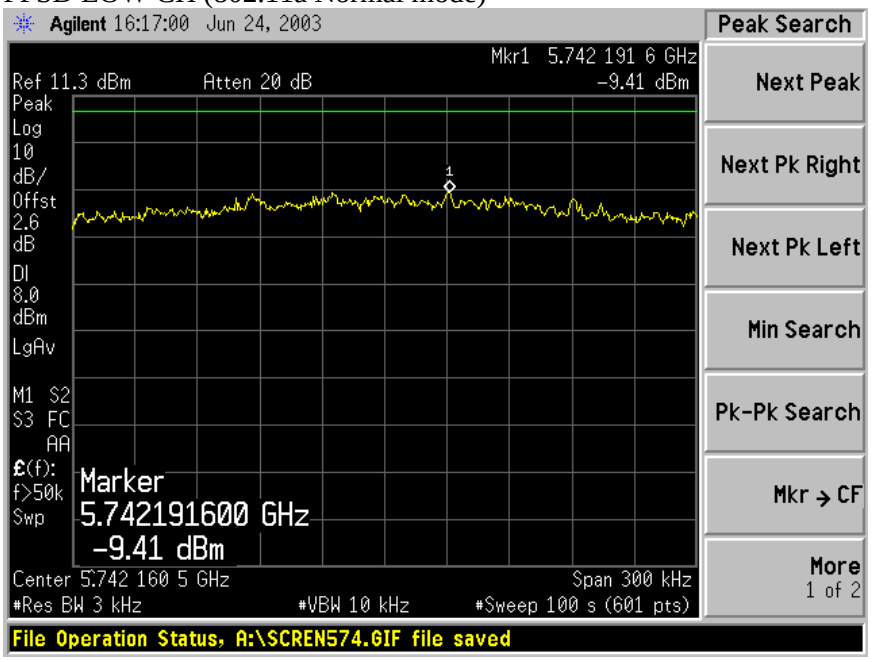
PEAK POWER SPECTRAL DENSITY (802.11g TURBO MODE)

PPSD MID CH (802.11g Turbo mode)

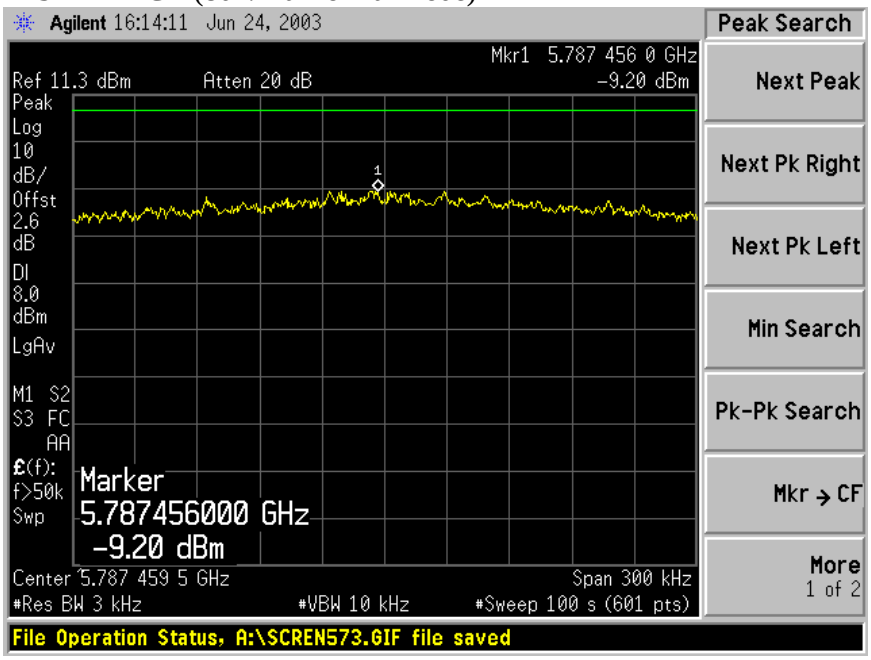


PEAK POWER SPECTRAL DENSITY (802.11a NORMAL MODE)

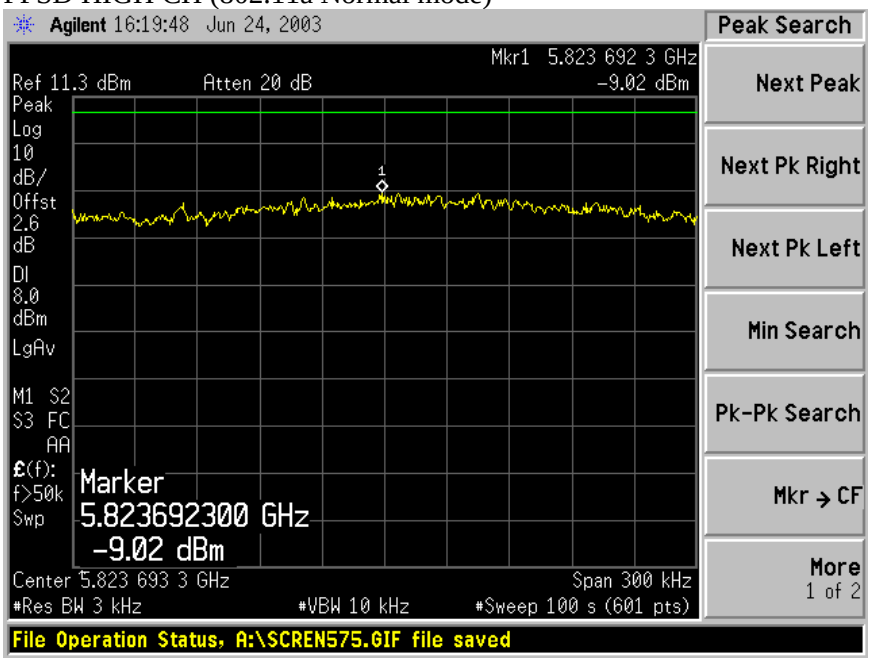
PPSD LOW CH (802.11a Normal mode)



PPSD MID CH (802.11a Normal mode)

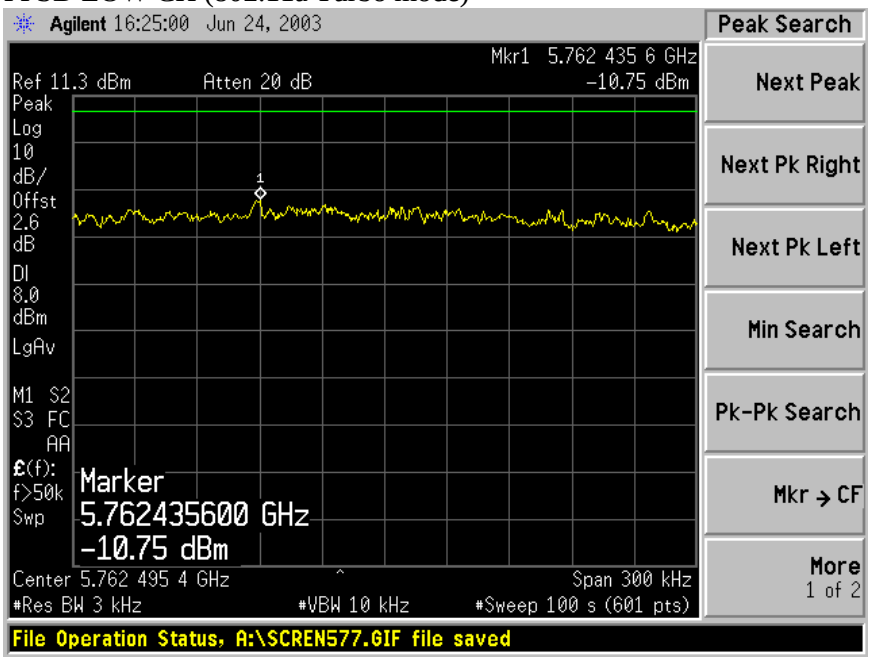


PPSD HIGH CH (802.11a Normal mode)

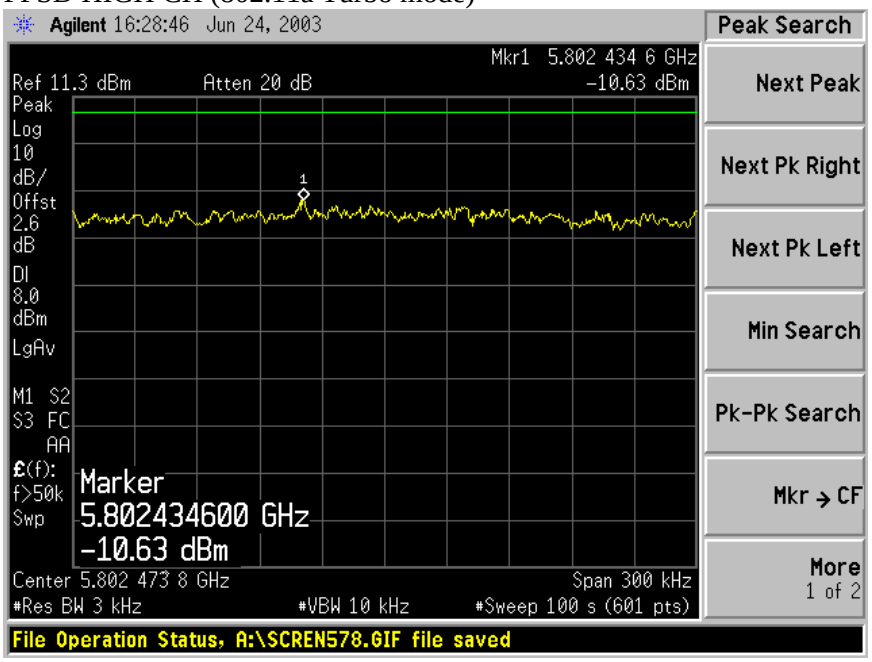


PEAK POWER SPECTRAL DENSITY (802.11a TURBO MODE)

PPSD LOW CH (802.11a Turbo mode)



PPSD HIGH CH (802.11a Turbo mode)



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 §15.209(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 in the 2.4 GHz band.

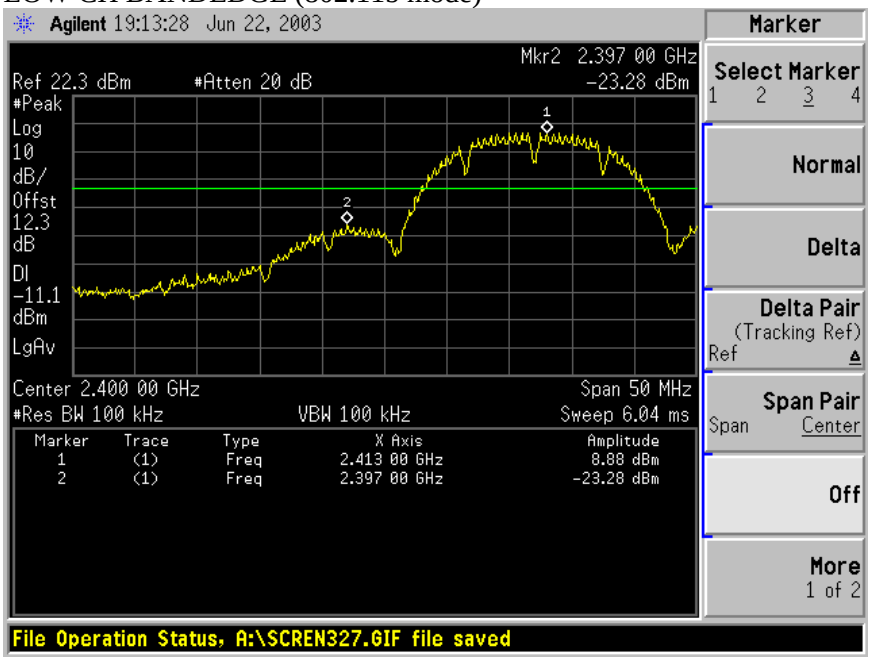
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 5.8 GHz band.

RESULTS

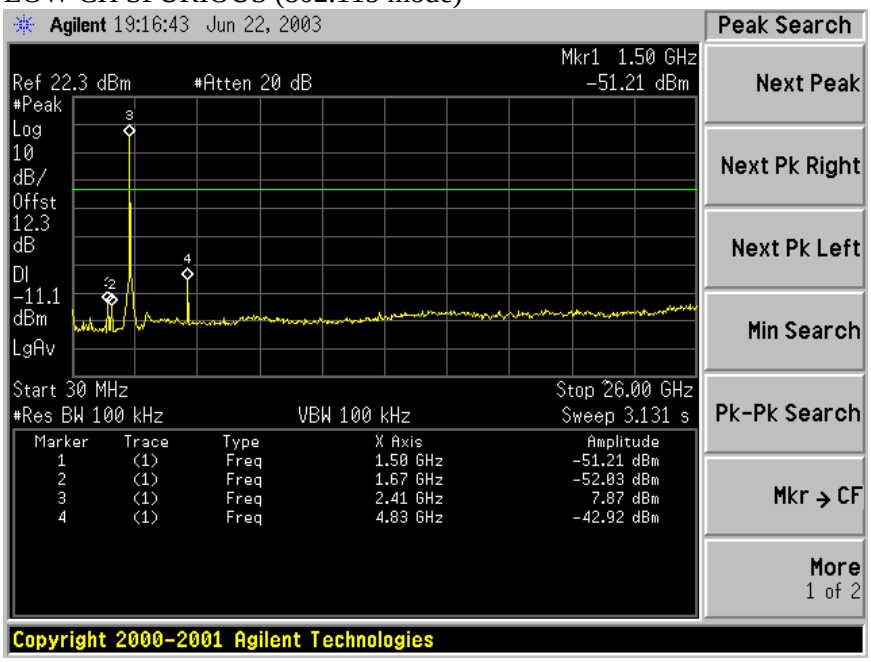
No non-compliance noted:

SPURIOUS EMISSIONS, LOW CHANNEL (802.11b MODE)

LOW CH BANDEDGE (802.11b mode)

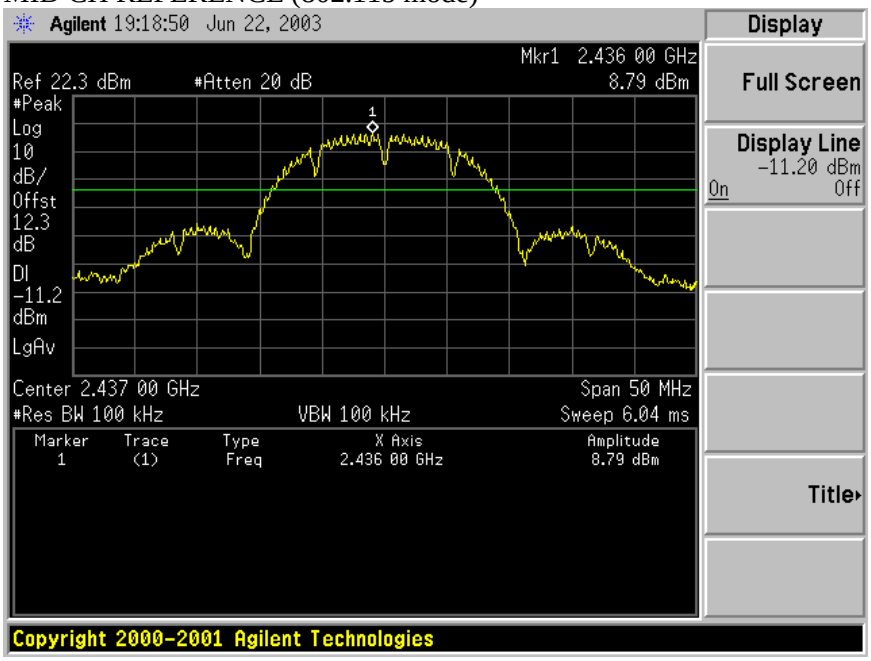


LOW CH SPURIOUS (802.11b mode)

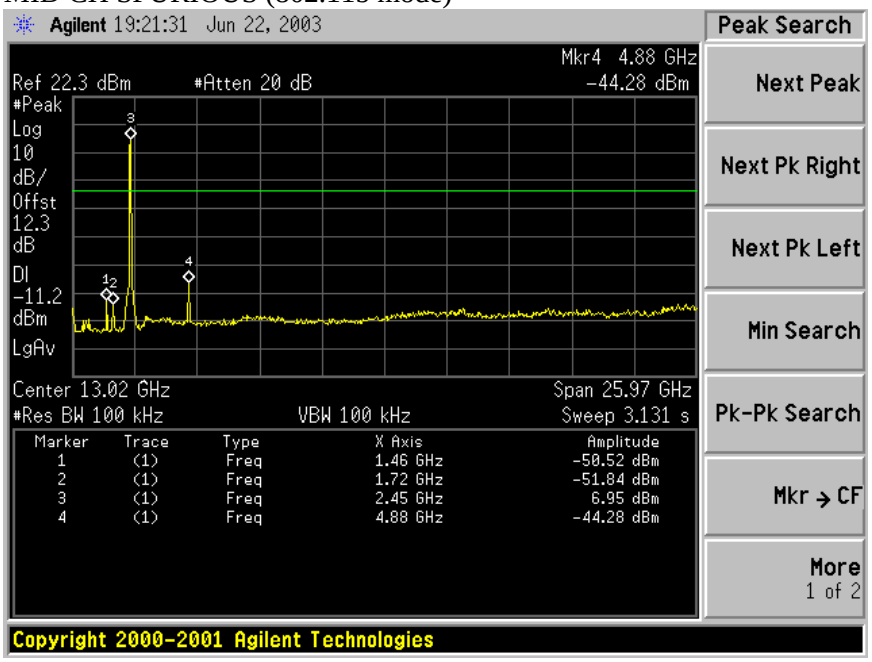


SPURIOUS EMISSIONS, MID CHANNEL (802.11b MODE)

MID CH REFERENCE (802.11b mode)



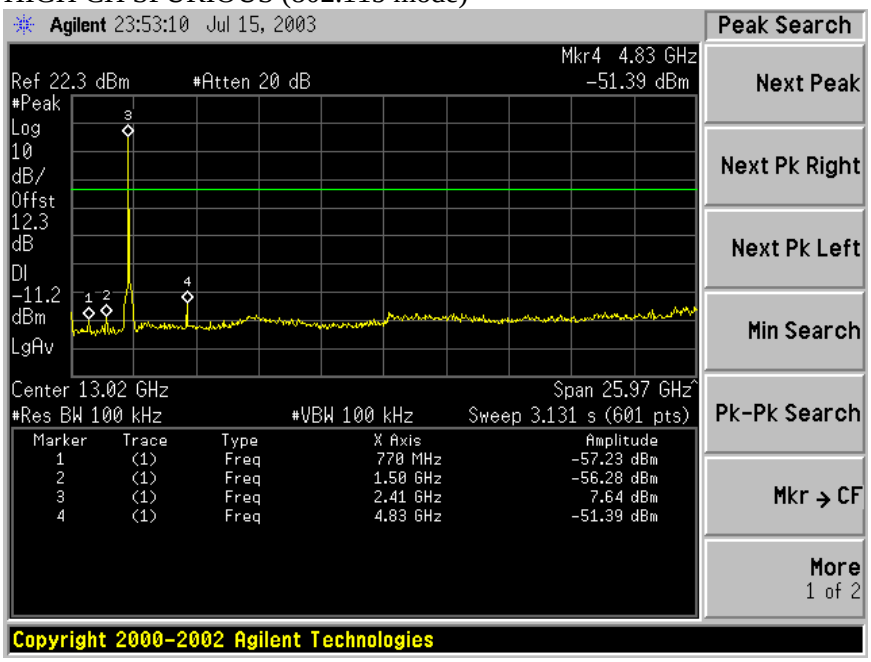
MID CH SPURIOUS (802.11b mode)



SPURIOUS EMISSIONS, HIGH CHANNEL (802.11b MODE)

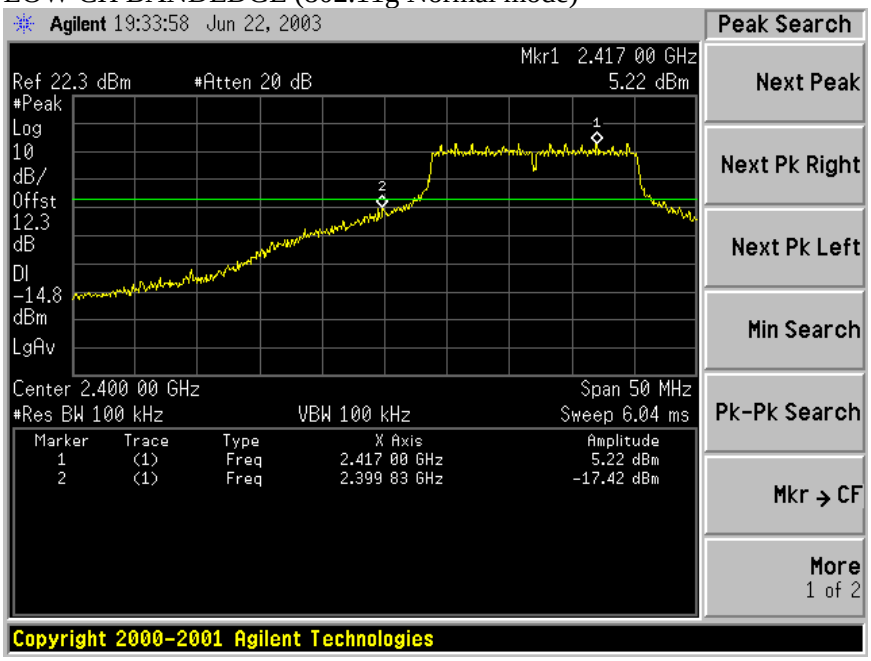
HIGH CH BANDEDGE (802.11b mode)

HIGH CH SPURIOUS (802.11b mode)

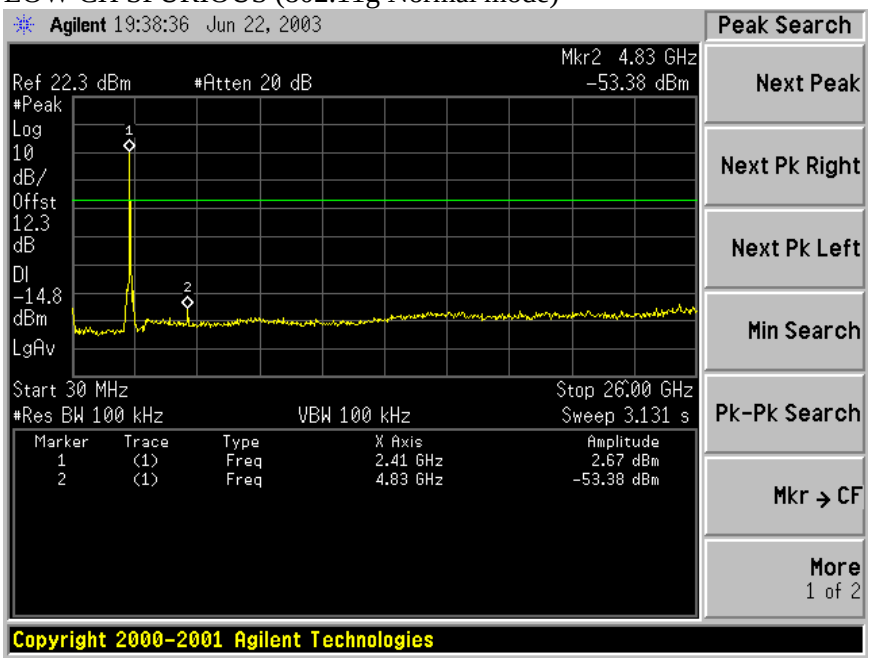


SPURIOUS EMISSIONS, LOW CHANNEL (802.11g NORMAL MODE)

LOW CH BANDEDGE (802.11g Normal mode)

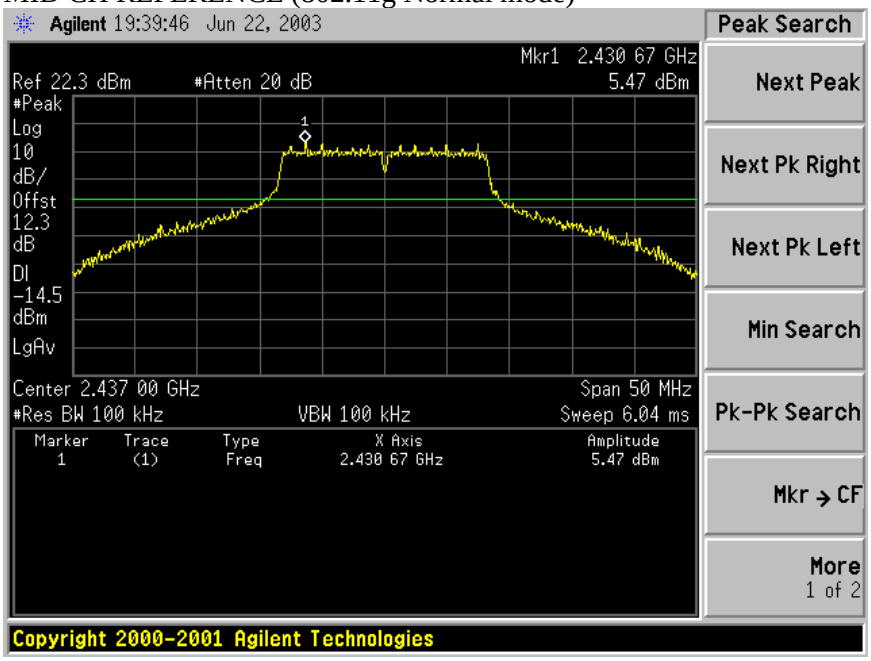


LOW CH SPURIOUS (802.11g Normal mode)

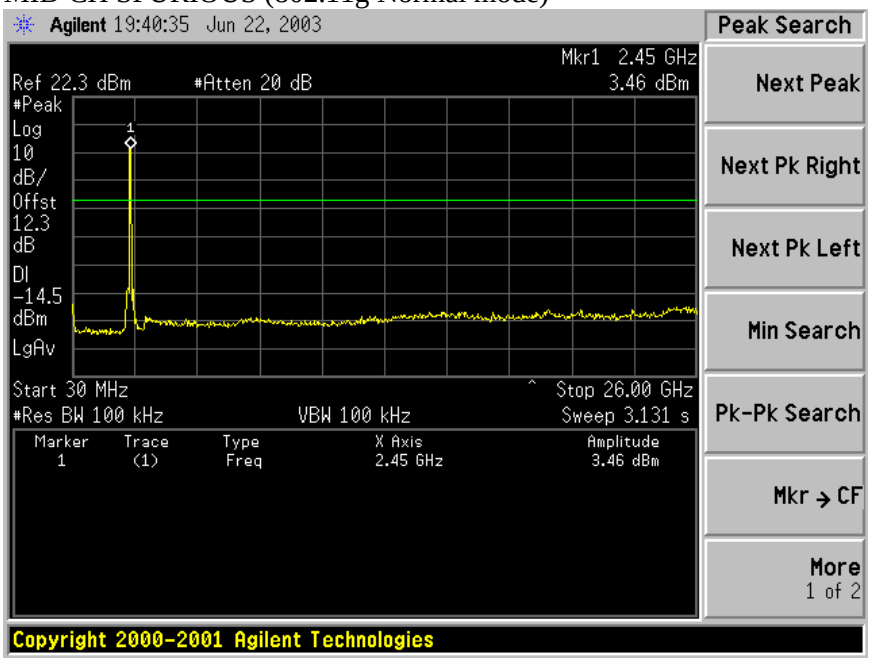


SPURIOUS EMISSIONS, MID CHANNEL (802.11g NORMAL MODE)

MID CH REFERENCE (802.11g Normal mode)

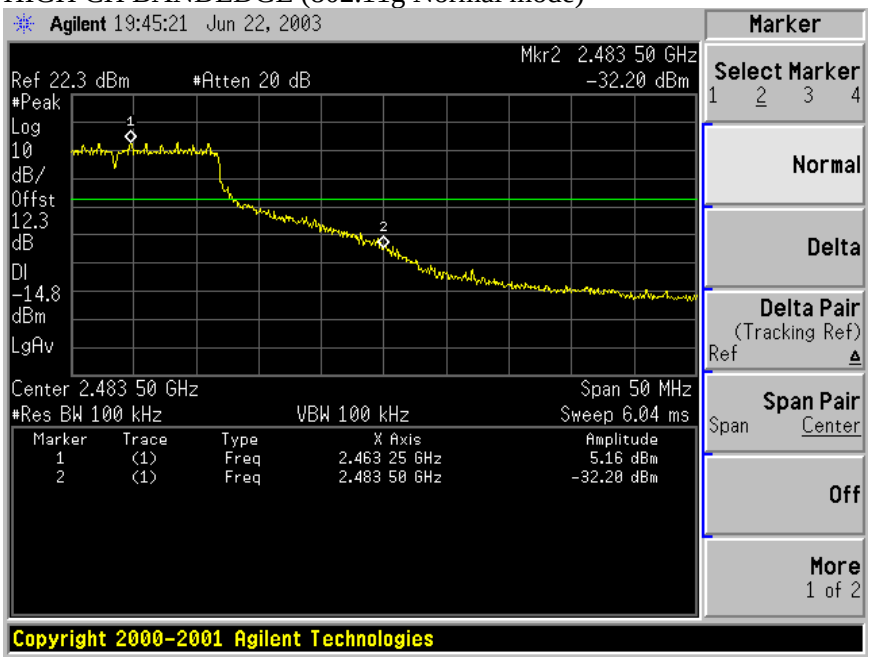


MID CH SPURIOUS (802.11g Normal mode)

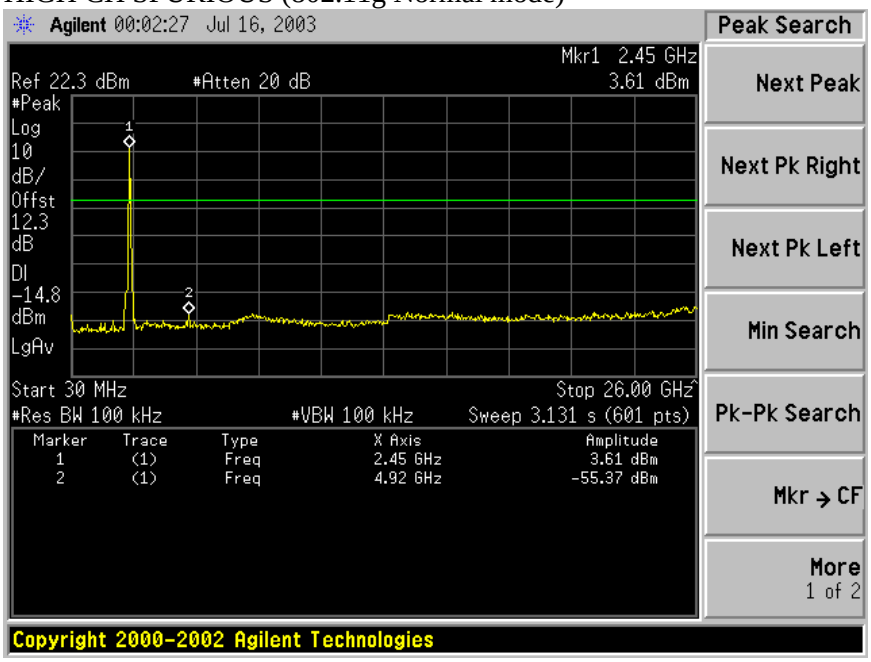


SPURIOUS EMISSIONS, HIGH CHANNEL (802.11g NORMAL MODE)

HIGH CH BANDEDGE (802.11g Normal mode)

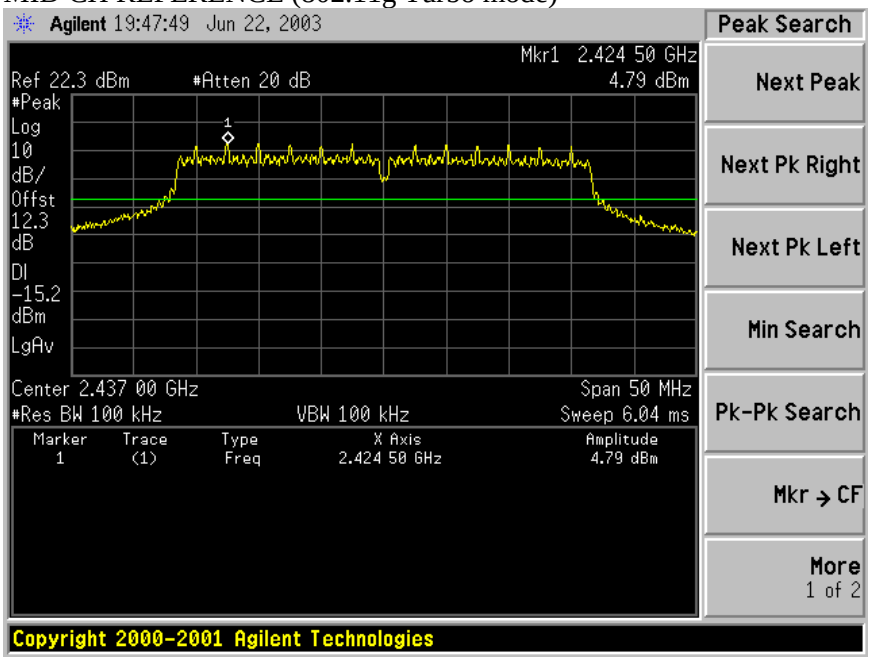


HIGH CH SPURIOUS (802.11g Normal mode)

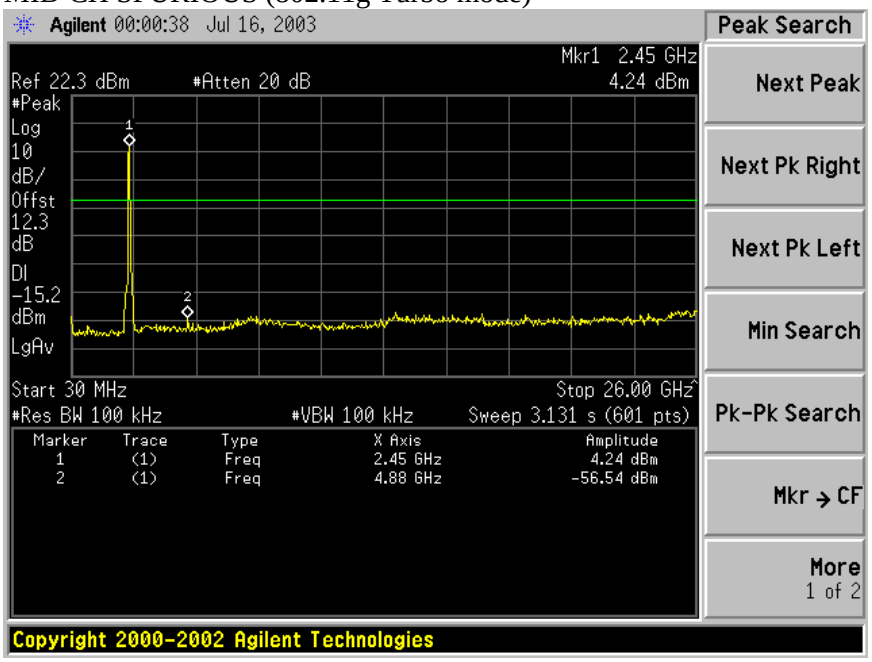


SPURIOUS EMISSIONS, MID CHANNEL (802.11g TURBO MODE)

MID CH REFERENCE (802.11g Turbo mode)

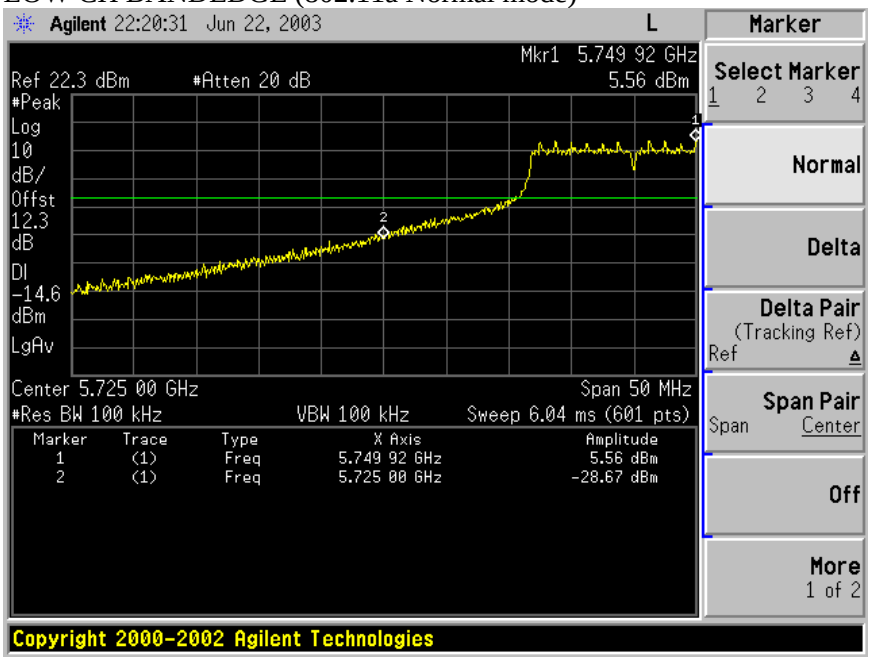


MID CH SPURIOUS (802.11g Turbo mode)

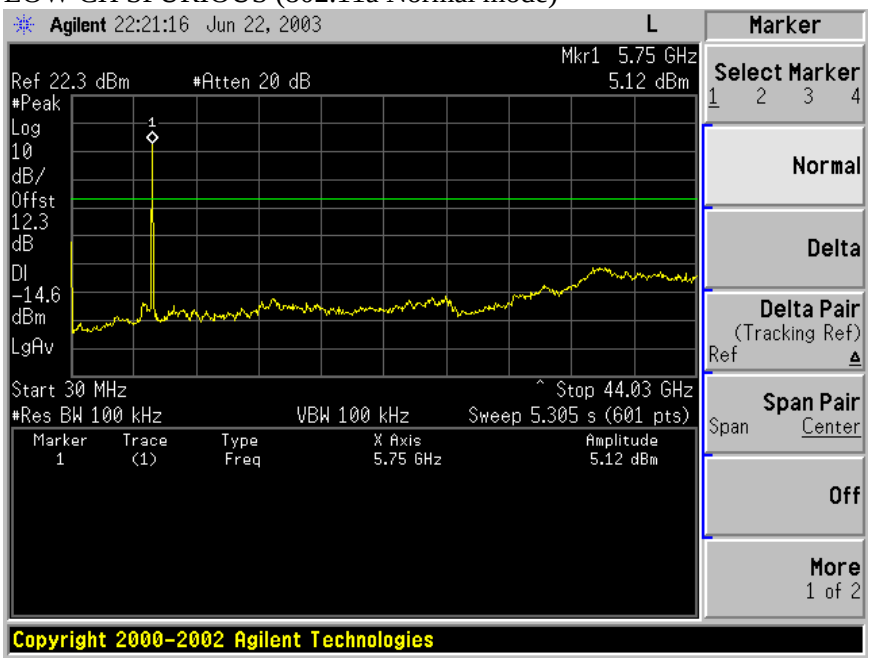


SPURIOUS EMISSIONS, LOW CHANNEL (802.11a NORMAL MODE)

LOW CH BANDEDGE (802.11a Normal mode)

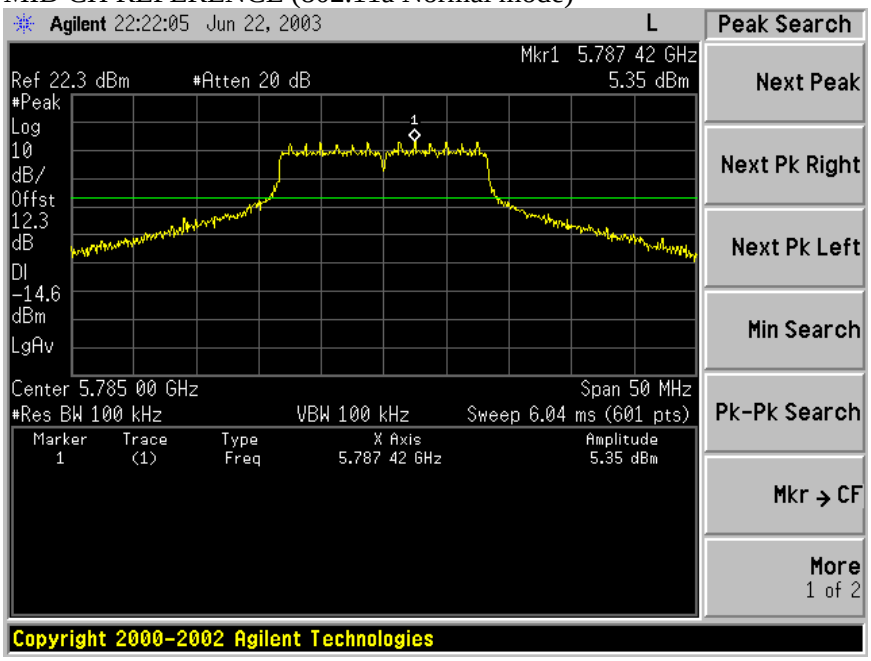


LOW CH SPURIOUS (802.11a Normal mode)

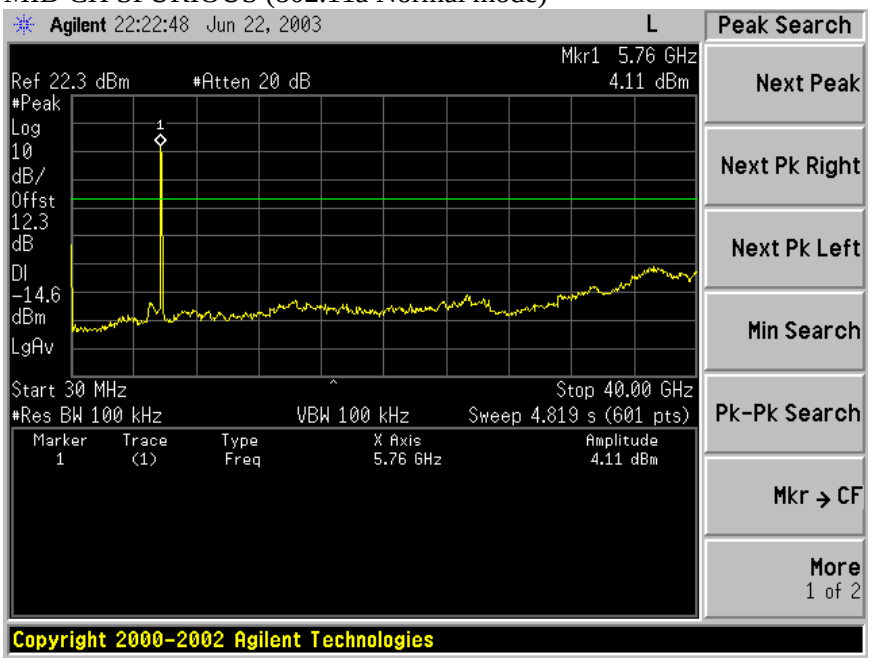


SPURIOUS EMISSIONS, MID CHANNEL (802.11a NORMAL MODE)

MID CH REFERENCE (802.11a Normal mode)



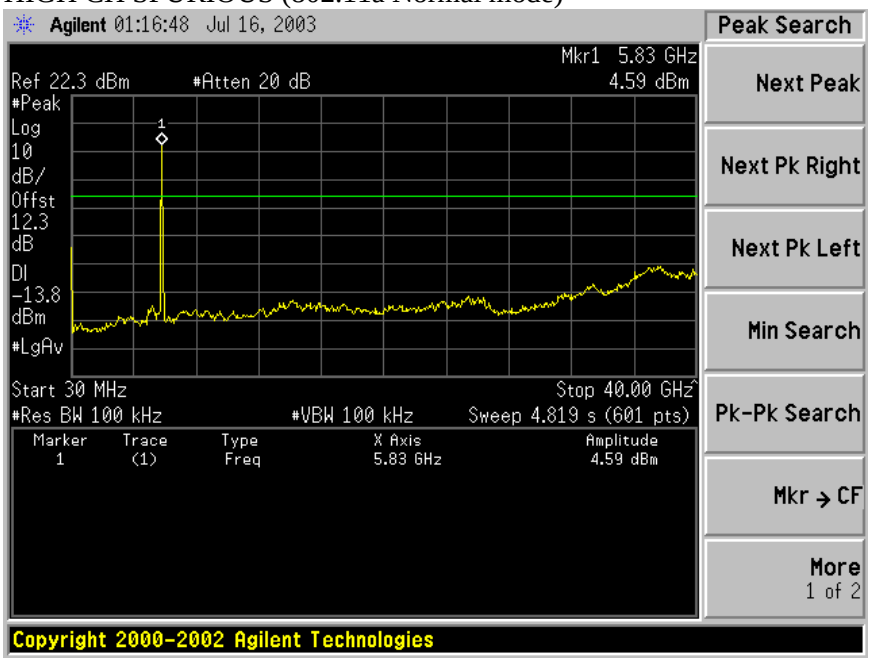
MID CH SPURIOUS (802.11a Normal mode)



SPURIOUS EMISSIONS, HIGH CHANNEL (802.11a NORMAL MODE)

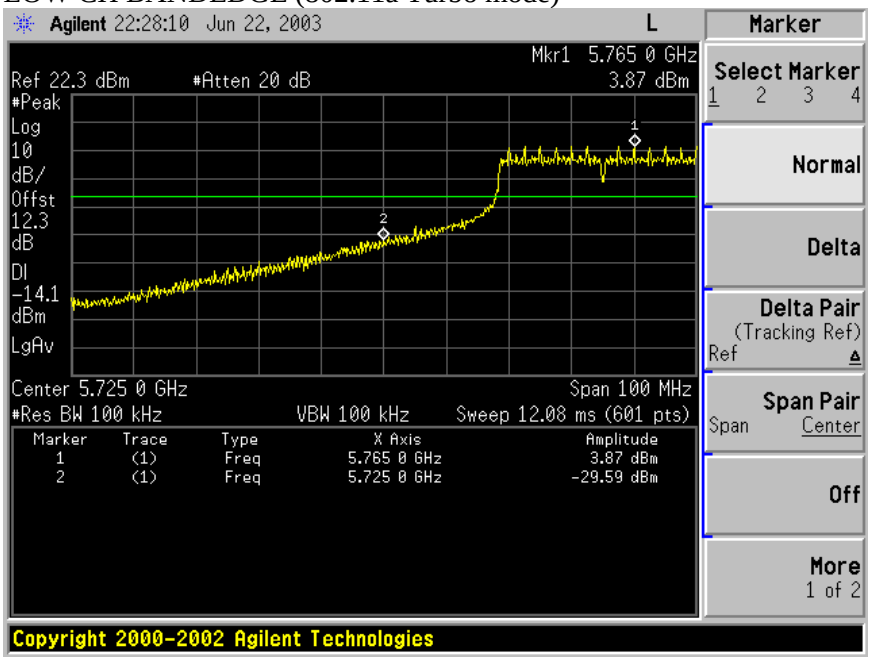
HIGH CH BANDEDGE (802.11a Normal mode)

HIGH CH SPURIOUS (802.11a Normal mode)

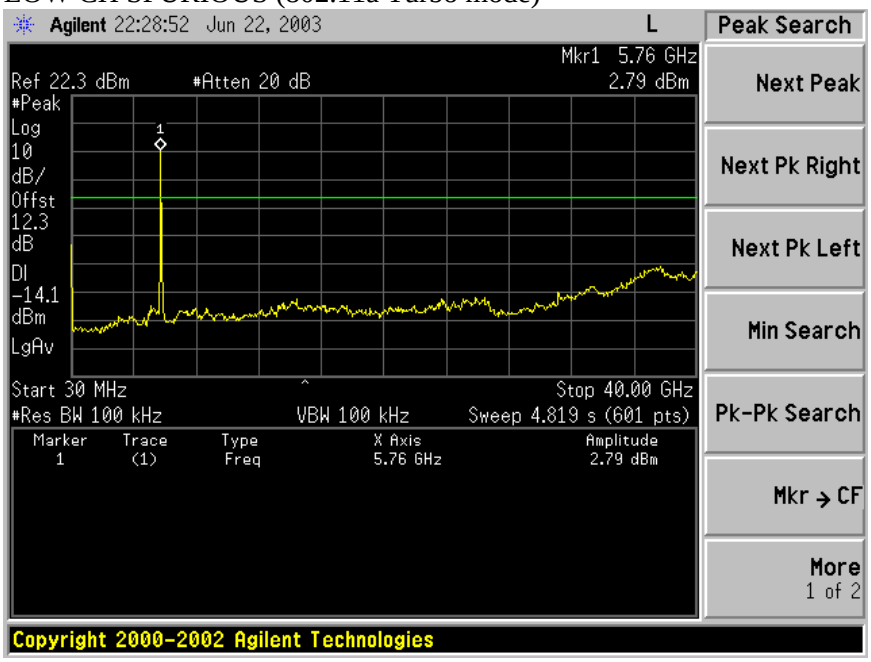


SPURIOUS EMISSIONS, LOW CHANNEL (802.11a TURBO MODE)

LOW CH BANDEDGE (802.11a Turbo mode)

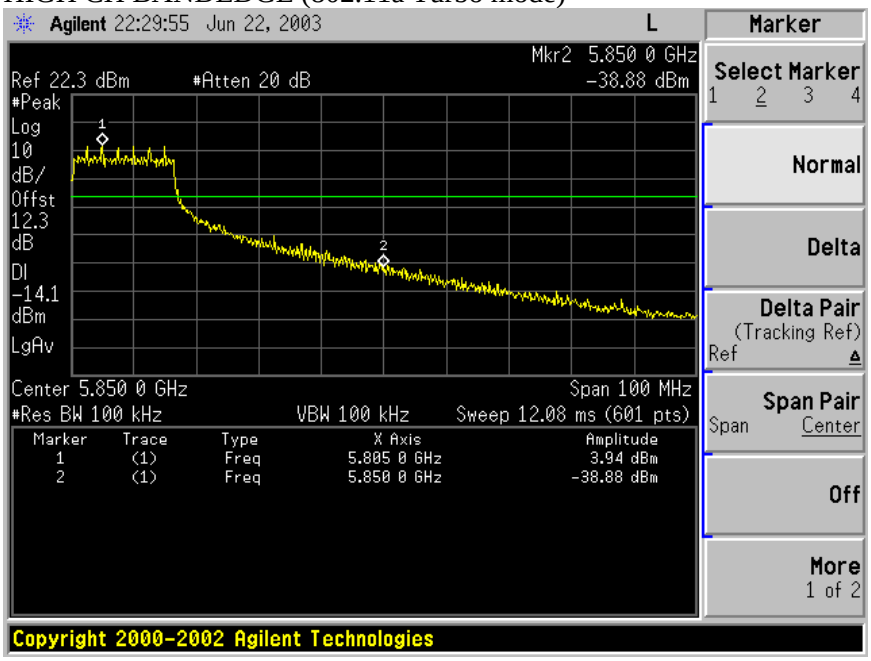


LOW CH SPURIOUS (802.11a Turbo mode)

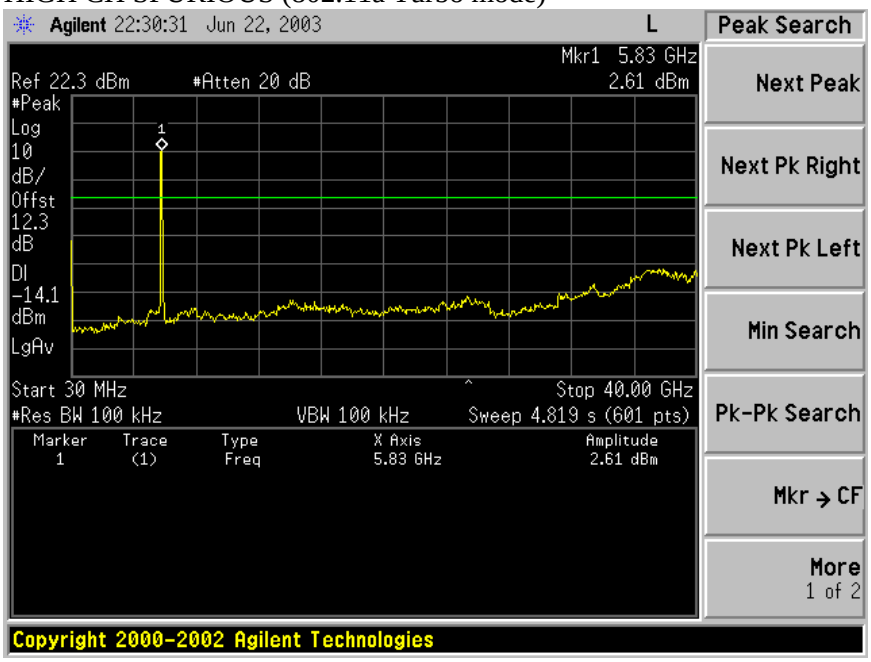


SPURIOUS EMISSIONS, HIGH CHANNEL (802.11a TURBO MODE)

HIGH CH BANDEDGE (802.11a Turbo mode)



HIGH CH SPURIOUS (802.11a Turbo mode)



7.7. RADIATED 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 of the 2.4 GHz band.

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

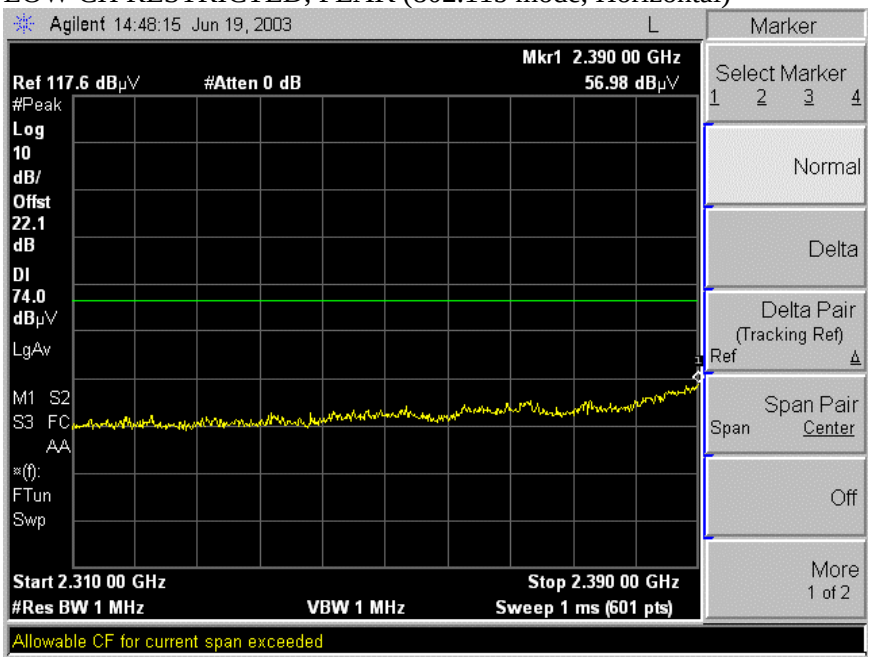
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

RESULTS

No non-compliance noted:

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

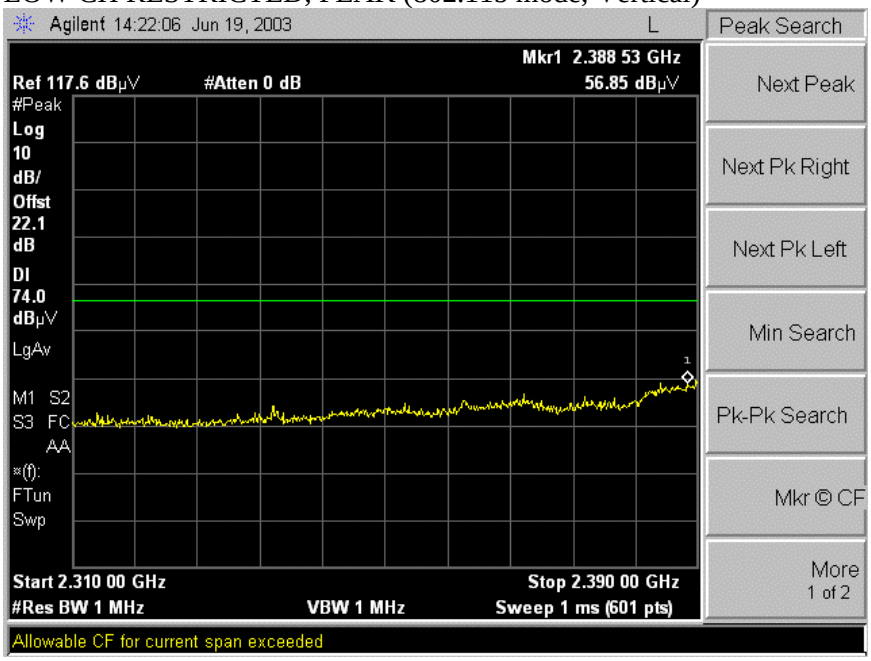
LOW CH RESTRICTED, PEAK (802.11b mode, Horizontal)



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

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

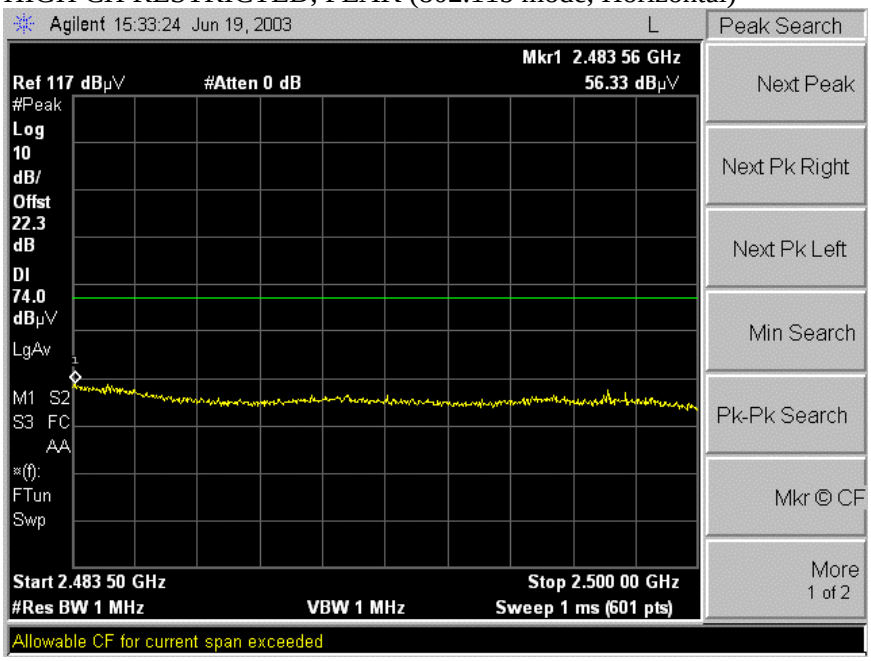
LOW CH RESTRICTED, PEAK (802.11b mode, Vertical)



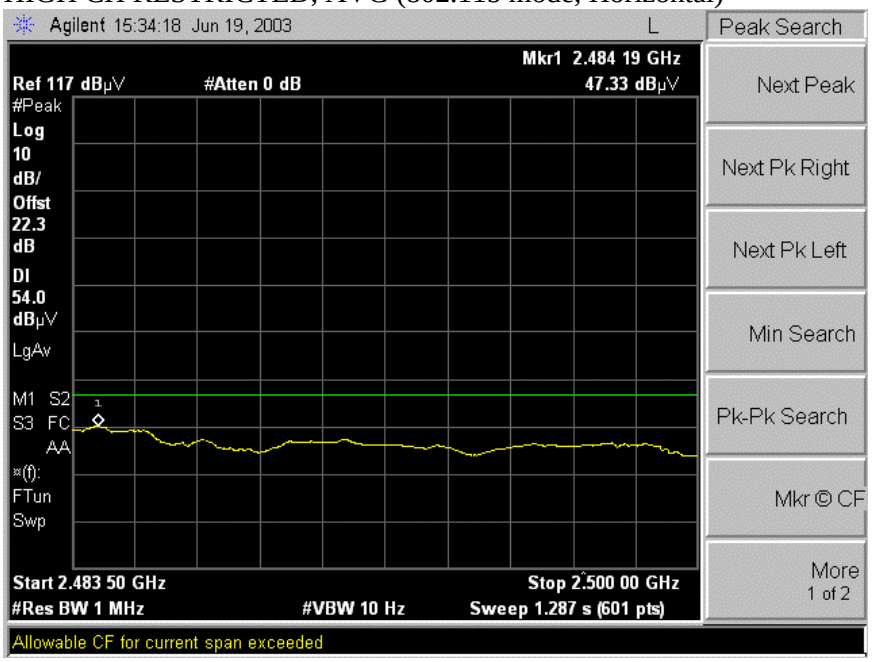
LOW CH RESTRICTED, AVG (802.11b mode, Vertical)

RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

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

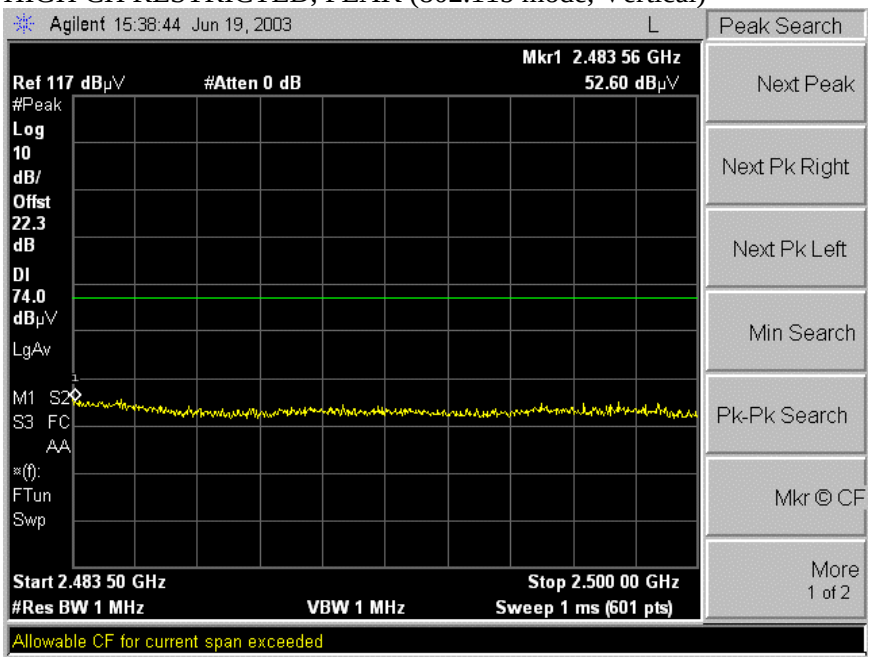


HIGH CH RESTRICTED, AVG (802.11b mode, Horizontal)

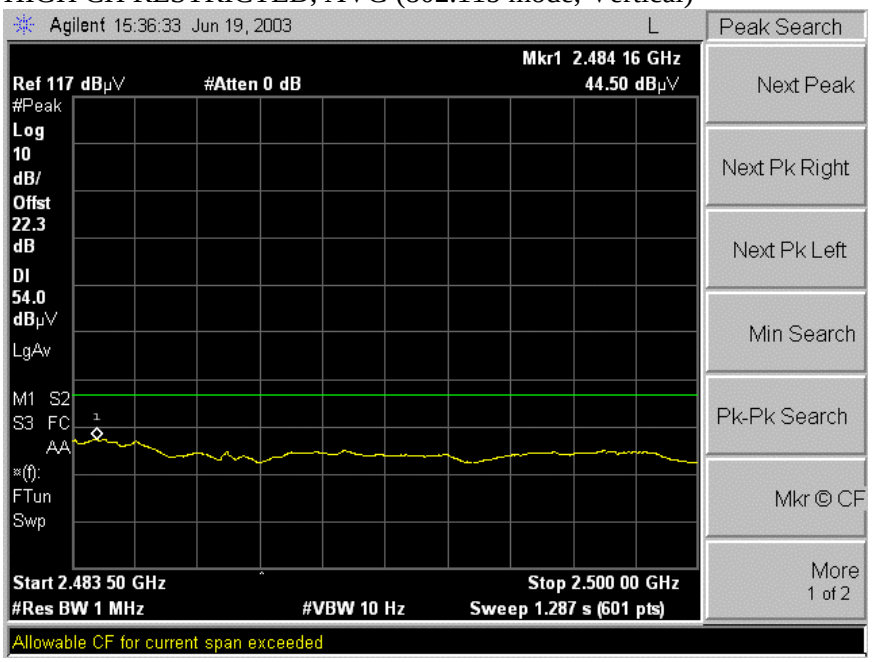


RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

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

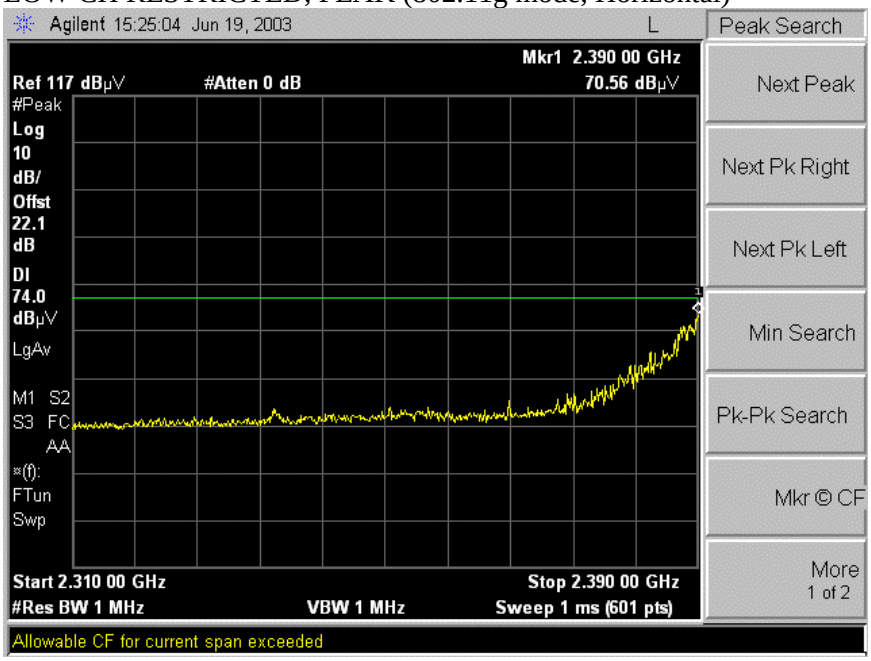


HIGH CH RESTRICTED, AVG (802.11b mode, Vertical)

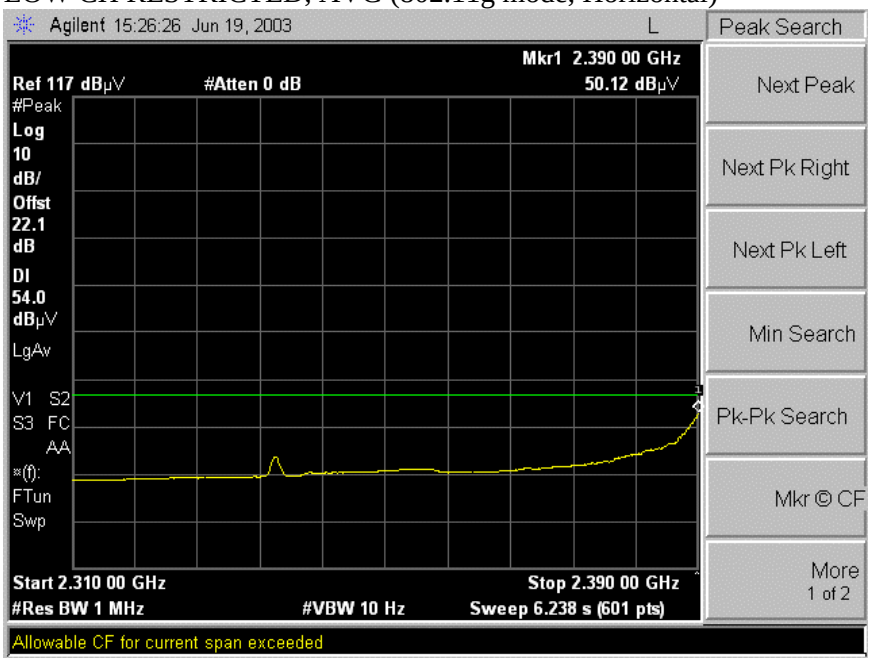


RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)

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

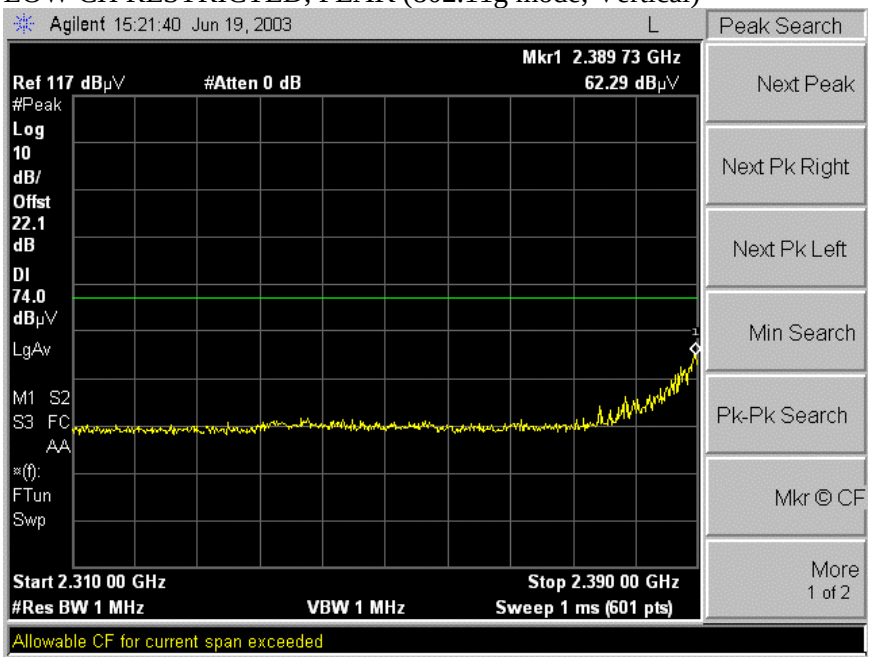


LOW CH RESTRICTED, AVG (802.11g mode, Horizontal)

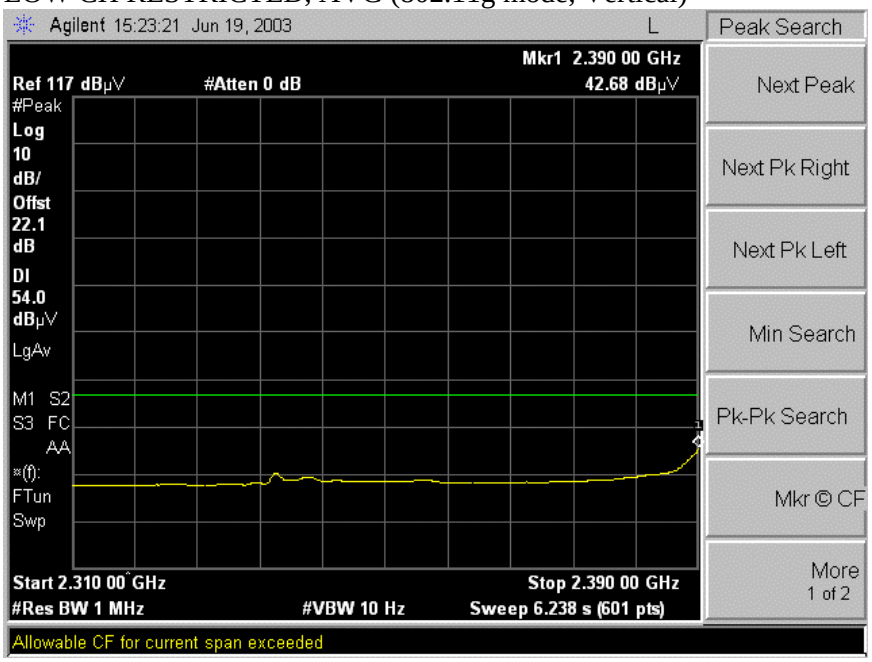


RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)

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

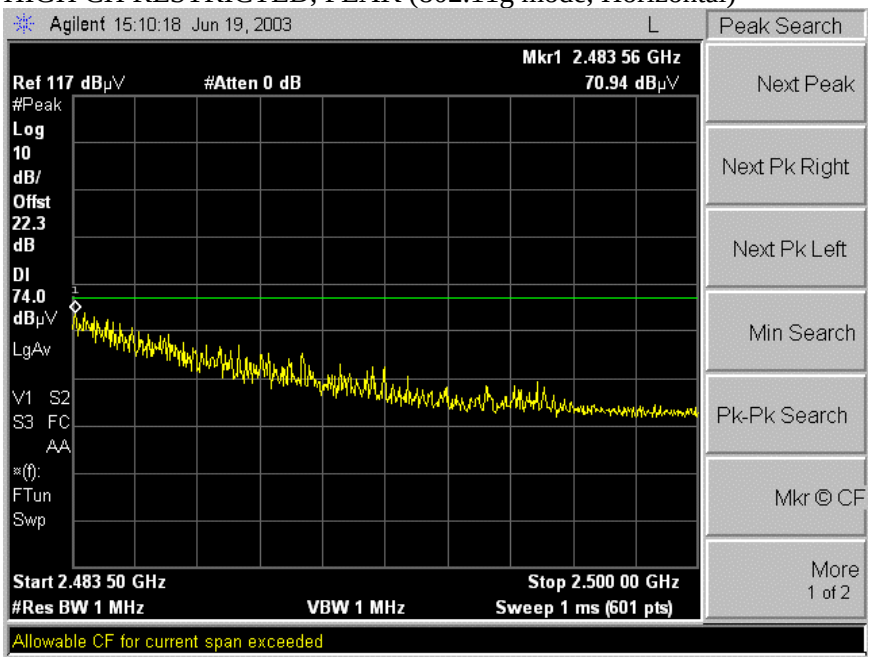


LOW CH RESTRICTED, AVG (802.11g mode, Vertical)

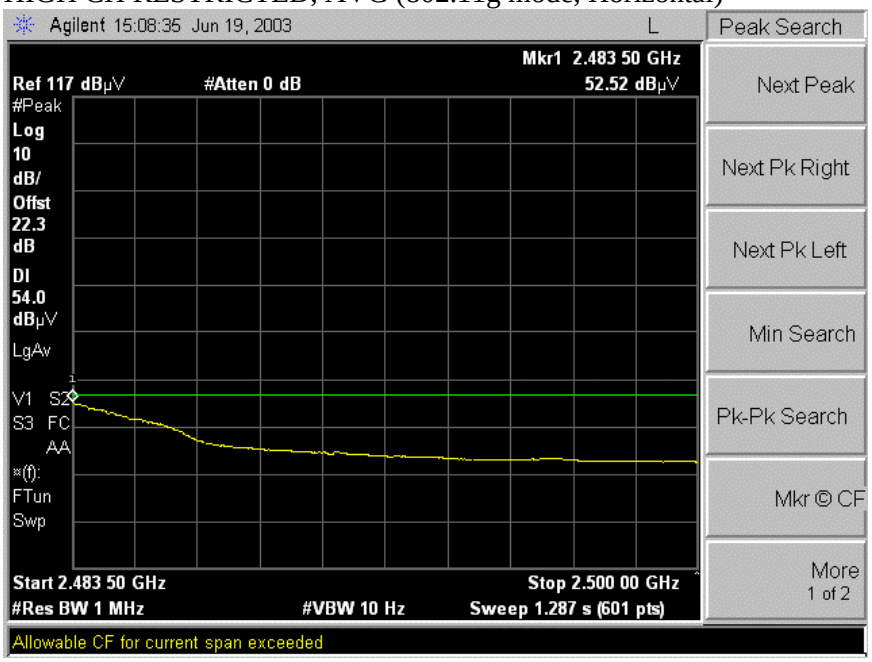


RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)

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

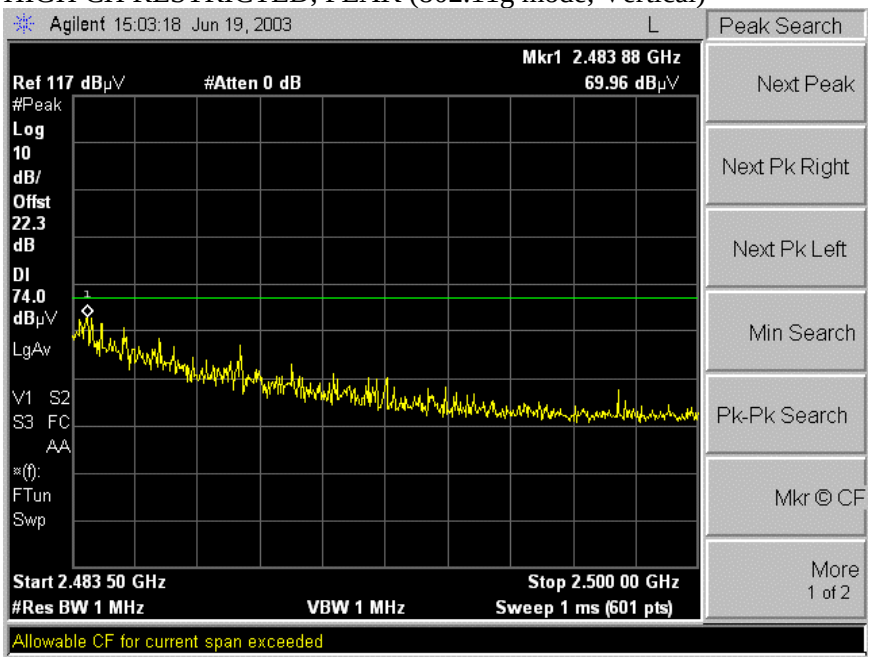


HIGH CH RESTRICTED, AVG (802.11g mode, Horizontal)

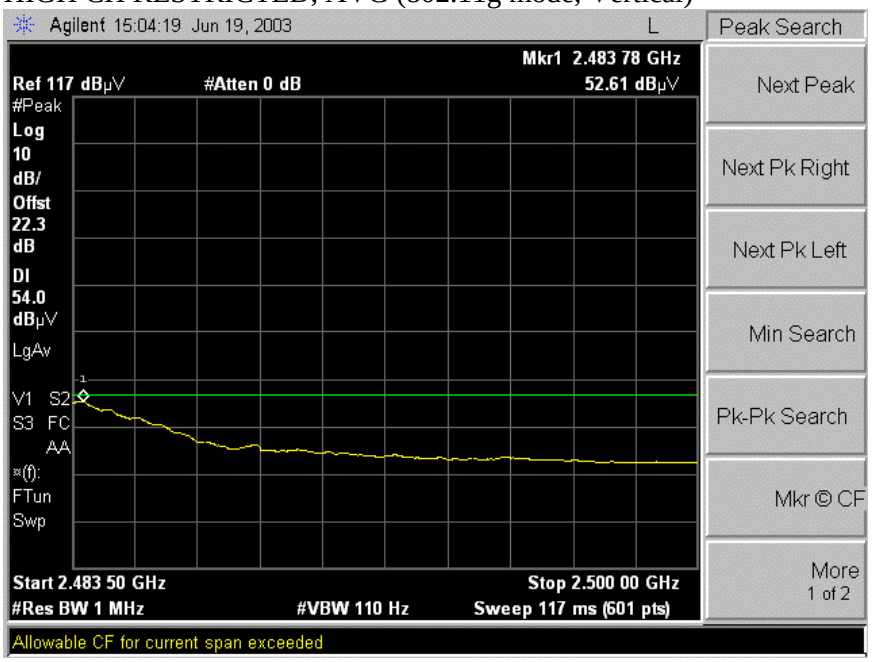


RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)

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

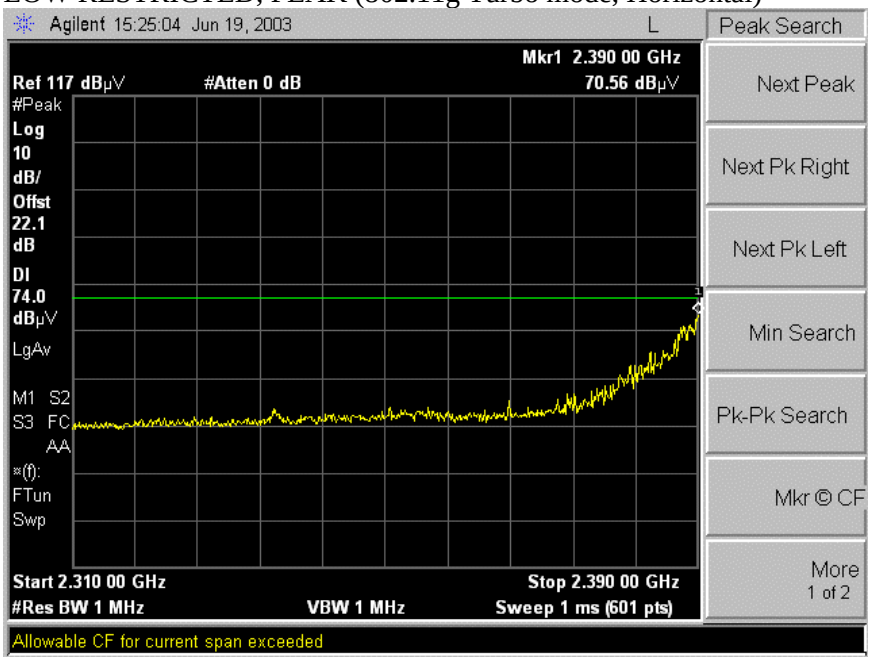


HIGH CH RESTRICTED, AVG (802.11g mode, Vertical)

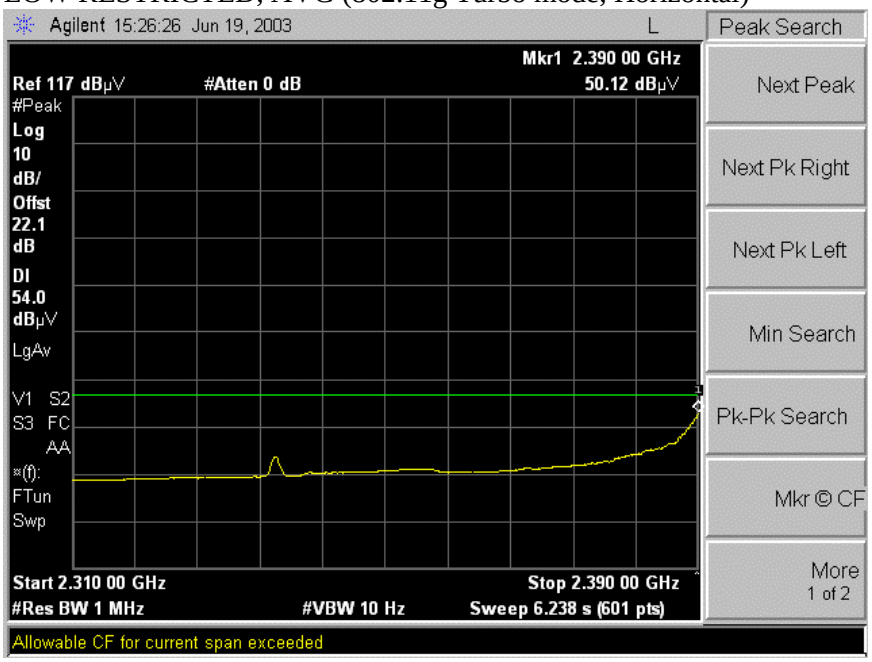


LOW RESTRICTED BANDEDGE (g TURBO MODE, HORIZONTAL)

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

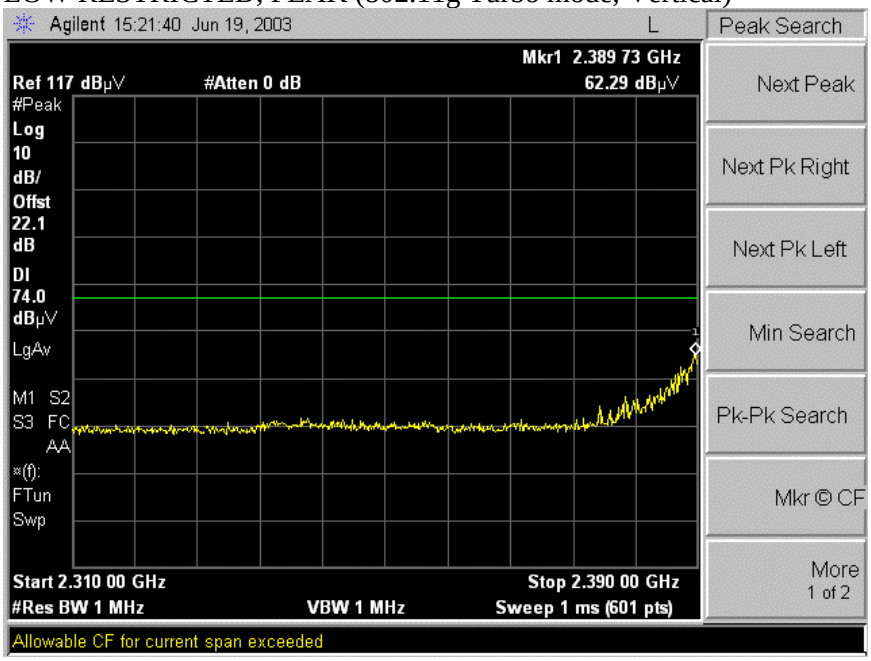


LOW RESTRICTED, AVG (802.11g Turbo mode, Horizontal)

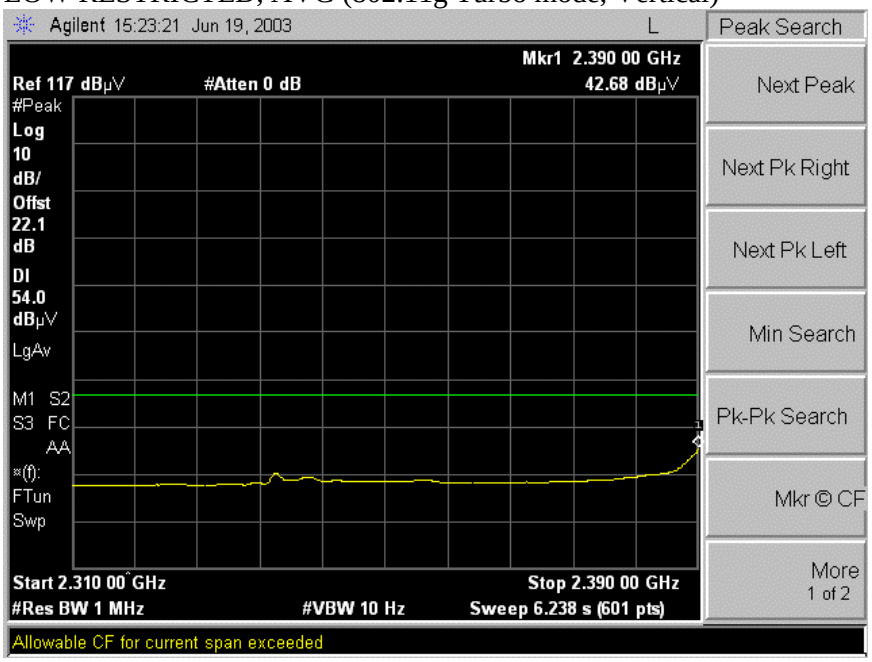


LOW RESTRICTED BANDEDGE (g TURBO MODE, VERTICAL)

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

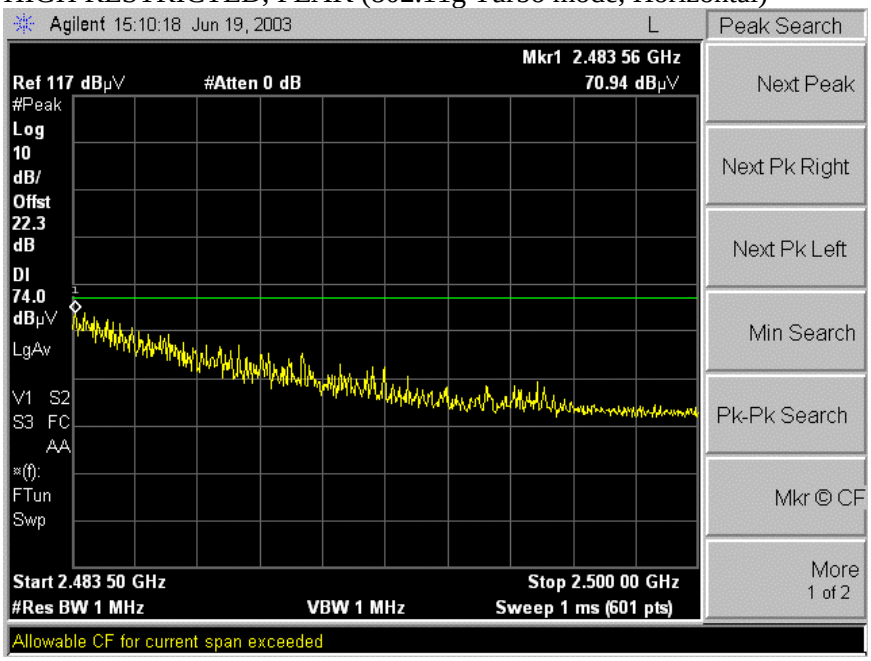


LOW RESTRICTED, AVG (802.11g Turbo mode, Vertical)

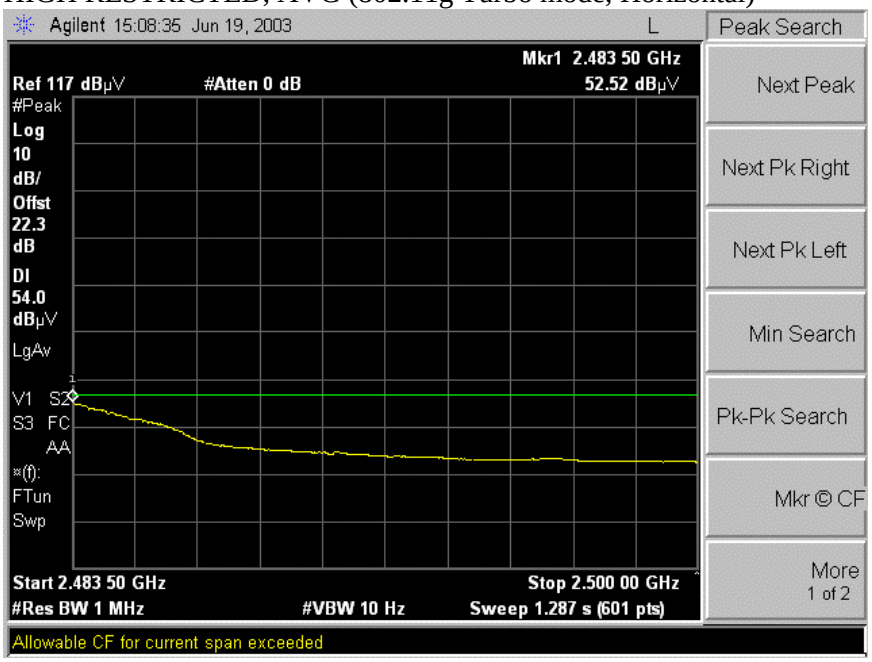


HIGH RESTRICTED BANDEDGE (g TURBO MODE, HORIZONTAL)

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

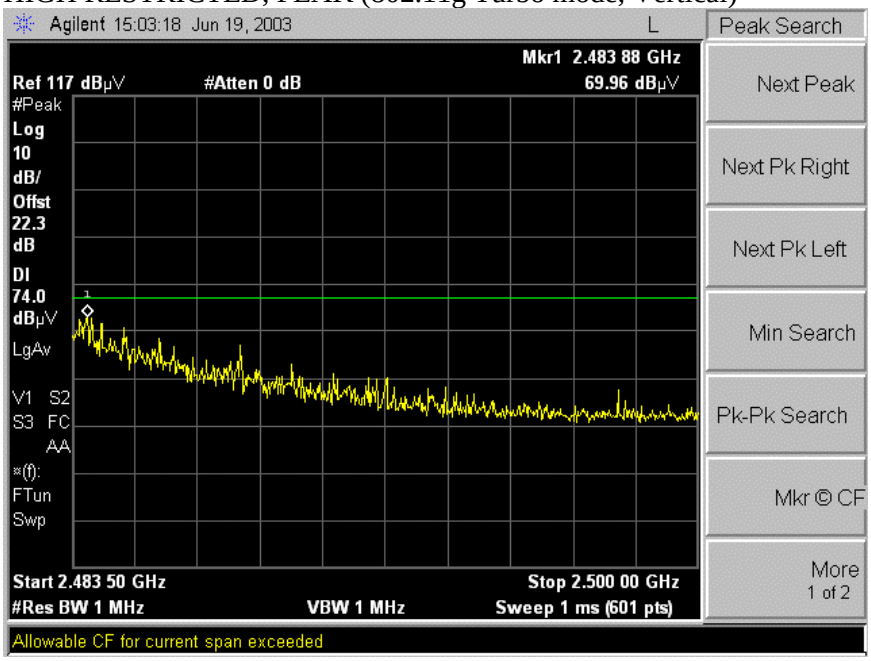


HIGH RESTRICTED, AVG (802.11g Turbo mode, Horizontal)

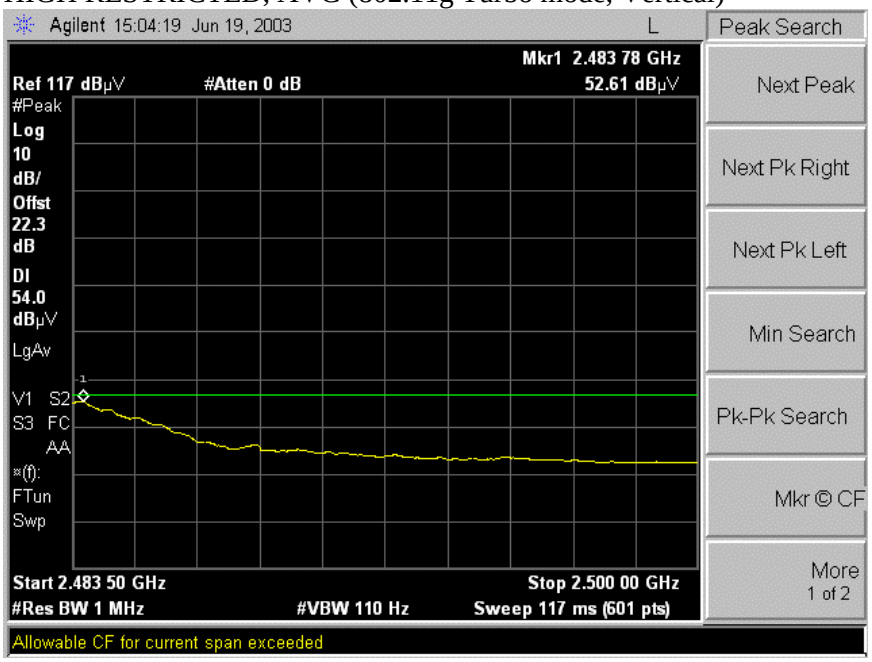


RESTRICTED BANDEDGE (g TURBO MODE, VERTICAL)

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



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



HARMONICS AND SPURIOUS EMISSIONS (2.4 GHZ BAND)

06/25/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Thanh Nguyen
Project #: 03U1944
Company: 3COM Corporation
EUT Descrip.: 802.11a/b/g PCMCIA CardBus PC Card
EUT M/N: SL-3040 (FCC ID 09C-SL3040)
Test Target: FCC 15.247, IC RSS 210
Mode Oper: Tx at 2.4GHZ b Mode

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T60; S/N: 2238 @3m	T63 Miteq 646456	Agilent E4446A Analyzer	T87-T88 ARA 18-40GHz & Mixer > 40GHz

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 mode Low Channel 2.412GHZ															
Harmonics and Spurious Emissions.															
4.824	9.8	38.4	30.5	33.1	3.1	-35.3	0.0	1.0	40.3	32.4	74.0	54.0	-33.7	-21.6	Noise Floor
No more Harmonics and Spurious Emissions after 2nd harmonic.															
b Mode MID Channel 2.437GHz															
Harmonics and Spurious Emissions.															
4.874	9.8	38.7	30.8	33.1	3.2	-35.3	0.0	1.0	40.7	32.8	74.0	54.0	-33.3	-21.2	Noise Floor
No more Harmonics and Spurious Emissions after 2nd harmonic.															
b Mode High Channel 2.462GHz															
Harmonics and Spurious Emissions.															
4.924	9.8	39.4	30.2	33.2	3.2	-35.3	0.0	1.0	41.5	32.2	74.0	54.0	-32.5	-21.8	Noise Floor
No more Harmonics and Spurious Emissions after 2nd harmonic.															
No noise signal was detected at g Normal and Turbo Mode all Channels.															

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 (5.8 GHZ BAND)

06/25/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Thanh Nguyen
Project #: 03U1944
Company: 3COM Corporation
EUT Descrip.: 802.11a/b/g PCMCIA CardBus PC Card
EUT M/N: SL-3040 (FCC ID 09C-SL3040)
Test Target: FCC 15.247, IC RSS 210
Mode Oper: Tx

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T60; S/N: 2238 @3m	T63 Miteq 646456	Agilent E4446A Analyzer	T87-T88 ARA 18-40GHz & Mixer > 40GHz

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

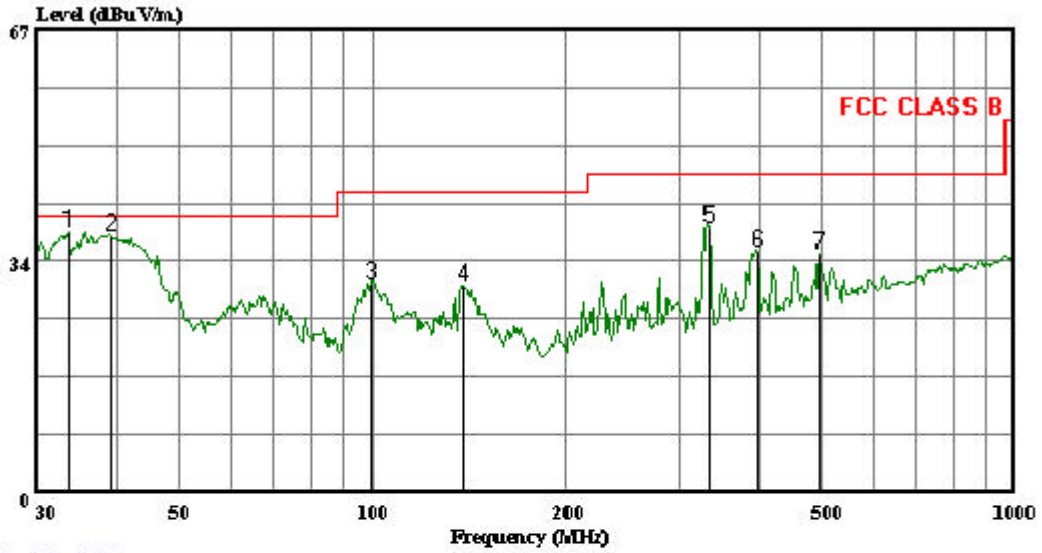
f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
Normal Low Channel 5.745GHZ															
Harmonics and Spurious Emissions.															
11.490	9.8	38.4	30.5	38.7	5.4	-34.2	0.0	1.0	49.3	41.4	74.0	54.0	-24.7	-12.6	Noise Floor
No more Harmonics and Spurious Emissions after 2nd harmonic.															
Normal MID Channel 5.785GHZ															
Harmonics and Spurious Emissions.															
11.570	9.8	38.7	30.8	38.8	5.5	-34.3	0.0	1.0	49.6	41.7	74.0	54.0	-24.4	-12.3	Noise Floor
No more Harmonics and Spurious Emissions after 2nd harmonic.															
Normal High Channel 5.825GHz.															
Harmonics and Spurious Emissions.															
11.650	9.8	39.4	30.2	38.9	5.5	-34.4	0.0	1.0	50.4	41.1	74.0	54.0	-23.6	-12.9	Noise Floor
No more Harmonics and Spurious Emissions after 2nd harmonic.															
No noise signal was detected at Turbo Mode all Channels.															

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		

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

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

Data#: 6 File#: 3COM5m.EMI Date: 06-28-2003 Time: 18:42:13



(Audix ATC)

Trace: 5 Ref Trace:

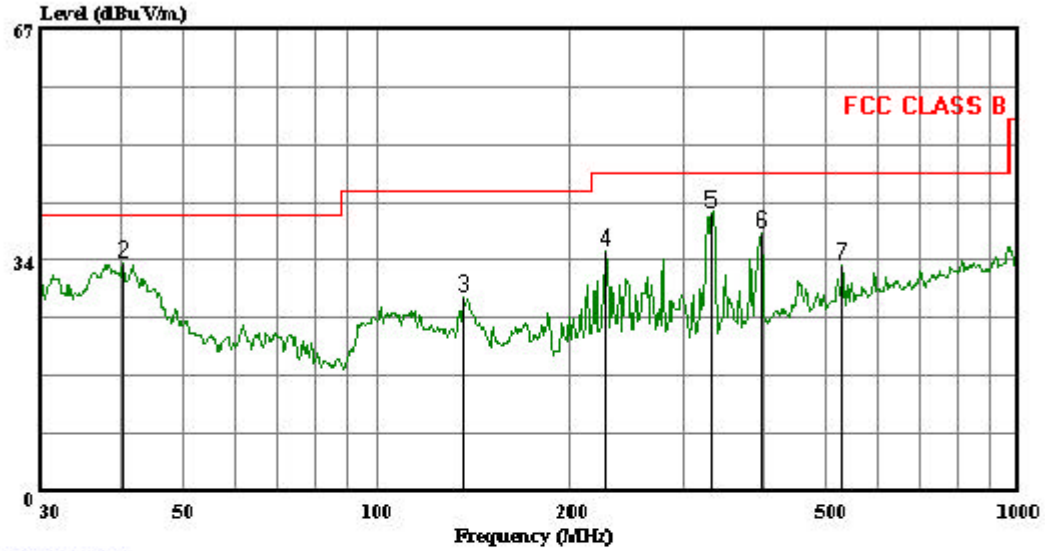
Condition: FCC CLASS B 3m CHAMBER 030306 1185 VERTICAL
Company : 3COM Corporation
EUT Description : 802.11a/b/g + gturbo PCMCIA Card.
Model Number : SL-3040 (FCC ID O9C-SL3040)
Test Configurtion: EUT plug in DELL Laptop
Test Target : FCC Class B
Mode of Operation: Norst case
Project No : 03U1994
Tester : Thanh Nguyen

Page: 1

	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	33.562	20.07	16.93	0.60	0.00	37.60	40.00	-2.40	Peak
2	39.024	20.07	16.56	0.60	0.00	37.24	40.00	-2.76	Peak
3	99.180	20.58	8.76	0.96	0.00	30.29	43.50	-13.21	Peak
4	138.387	19.73	9.02	1.11	0.00	29.86	43.50	-13.64	Peak
5	333.687	23.63	12.93	1.86	0.00	38.42	46.00	-7.58	Peak
6	397.633	18.33	14.36	2.01	0.00	34.70	46.00	-11.30	Peak
7	494.199	15.76	16.40	2.31	0.00	34.47	46.00	-11.53	Peak

COMPLIANCE Engineering Services, Inc.
561F Monterey Road
Morgan Hill, CA 95037, U.S.A.
Tel: (408) 463-0885
Fax:(408) 463-0888

Data#: 8 File#: 3COM5m.EMI Date: 06-28-2003 Time: 18:47:26



(Audix ATC)

Trace: 7 Ref Trace:

Condition: FCC CLASS B 3m CHAMBER 030306 1185 HORIZONTAL
Company : 3COM Corporation
EUT Description : 802.11a/b/g + gturbo PCMCIA Card.
Model Number : SL-3040 (FCC ID O9C-SL3040)
Test Configurtion: EUT plug in DELL Laptop
Test Target : FCC Class B
Mode of Operation: Worst case
Project No : 03U1994
Tester : Thanh Nguyen

Page: 1

	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	30.000	15.62	16.99	0.55	0.00	33.16	40.00	-6.84	Peak
2	40.276	15.89	16.45	0.62	0.00	32.96	40.00	-7.04	Peak
3	136.460	17.99	9.18	1.11	0.00	28.28	43.50	-15.22	Peak
4	226.894	22.72	10.55	1.47	0.00	34.74	46.00	-11.26	Peak
5	331.355	25.63	12.85	1.83	0.00	40.31	46.00	-5.69	Peak
6	397.633	21.01	14.36	2.01	0.00	37.38	46.00	-8.62	Peak
7	530.101	13.48	16.91	2.40	0.00	32.79	46.00	-13.21	Peak

7.8. 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:

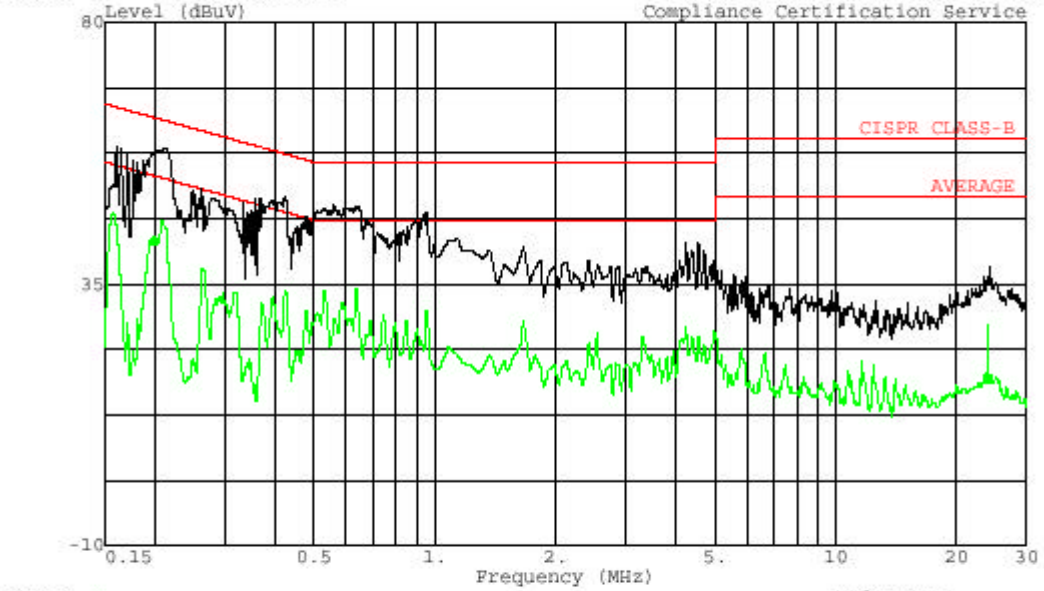
6 WORST EMISSIONS

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
0.21	58.30	--	45.92	0.00	64.17	54.17	-5.87	-8.25	L1
0.65	47.98	--	34.34	0.00	56.00	46.00	-8.02	-11.66	L1
4.22	42.22	--	27.56	0.00	56.00	46.00	-13.78	-18.44	L1
0.21	57.92	--	45.62	0.00	64.23	54.23	-6.31	-8.61	L2
4.22	47.18	--	32.08	0.00	56.00	46.00	-8.82	-13.92	L2
0.95	46.78	--	35.00	0.00	56.00	46.00	-9.22	-11.00	L2
6 Worst Data									

LINE 1 (LINE) RESULTS

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



Trace: 5 Ref Trace:
Project # : 03U1994
Test Engineer : Thanh Nguyen
Company : 3COM Corporation
EUT : 802.11a/b/g +g Turbo PCMCIA Card.
Model : SL-3040 (FCC ID: 09C-SL3040
Configuration : EUT Plug in DELL Laptop M/N PPX
: Latitude CPiR Series.
Target of Test: FCC Class B
: L1 , PEAK (Black), AVE (Green)
: 115VAC, 60Hz

LINE 2 (NEUTRAL) RESULTS

8. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED PHOTO

RADIATED RF MEASUREMENT SETUP

RADIATED FRONT PHOTO

RADIATED BACK PHOTO

POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

LINE CONDUCTED FRONT PHOTO

LINE CONDUCTED BACK PHOTO

END OF REPORT