



**FCC CFR47 PART 15 SUBPART C
CERTIFICATION
TEST REPORT**

FOR

802.11B/G 2x2 MIMO CARDBUS CARD

MODEL NUMBER: AGN1022PC-01

FCC ID: SA3-AGN1022PC0100

REPORT NUMBER: 05U3491-1

ISSUE DATE: JULY 5, 2005

Prepared for
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Revision History

| <u>Rev.</u> | <u>Issue Date</u> | <u>Revisions</u> | <u>Revised By</u> |
|-------------|-----------------------|------------------|-------------------|
| A | | Initial Issue | YZ |

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: AIRGO NETWORKS, INC.
900 ARASTRADERO ROAD
PALO ALTO, CA 94304, USA

EUT DESCRIPTION: 802.11b/g 2x2 MIMO Cardbus Card

MODEL: AGN1022PC-01

SERIAL NUMBER: 8676

DATE TESTED: June 24, 2005 ~ June 30, 2005

| 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: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. 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. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

Tested By:



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EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

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EMC ENGINEER
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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

3. 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>.

4. CALIBRATION AND UNCERTAINTY

4.1. 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.

4.2. 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. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11b/g transceiver MIMO Cardbus Card.

The radio module is manufactured by Airgo Networks, Inc.

5.2. MAXIMUM OUTPUT POWER

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

2400 to 2483.5 MHz Authorized Band

| Frequency Range (MHz) | Mode | Output Power (dBm) | Output Power (mW) |
|-----------------------|--------------------|--------------------|-------------------|
| 2412 - 2462 | 802.11b, Dual Mode | 26.04 | 401.79 |
| 2412 - 2462 | 802.11g, Dual Mode | 26.87 | 486.41 |

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes two printed circuit board antennas for diversity, each with a maximum gain of 2.2 dBi.

5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was MfgDemoTest v18.00.

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power. The highest measured output power was at 2412 MHz, g mode.

The worst-case data rate for this channel is determined to be 6 Mb/s, based on previous experience with 2.4 GHz WLAN product design architectures.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

| PERIPHERAL SUPPORT EQUIPMENT LIST | | | | |
|-----------------------------------|--------------|----------------|---------------|--------|
| Description | Manufacturer | Model | Serial Number | FCC ID |
| AC/DC Adapter | Sony | PCGA-AC19V1 | 9/27/2263 | N/A |
| Laptop PC | Sony | Vaio, PCG-5312 | 3303321 | DoC |

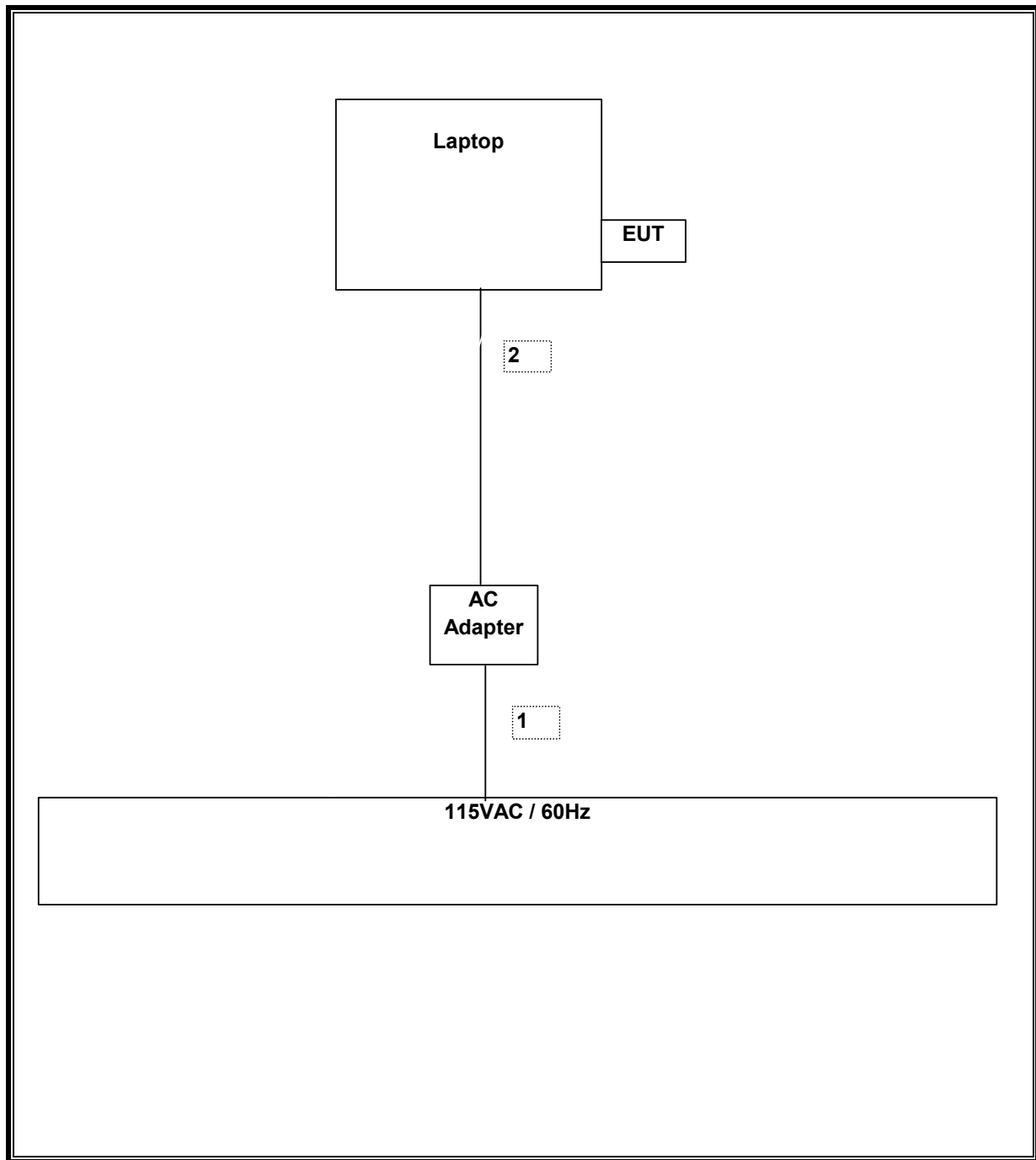
I/O CABLES

| I/O CABLE LIST | | | | | | |
|----------------|------|----------------------|----------------|------------|--------------|---------|
| Cable No. | Port | # of Identical Ports | Connector Type | Cable Type | Cable Length | Remarks |
| 1 | AC | 1 | AC | Unshielded | 0.5 m | |
| 2 | DC | 1 | DC | Unshielded | 1.5 m | |

TEST SETUP

The EUT is installed in a host laptop computer directly during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

| TEST EQUIPMENT LIST | | | | |
|------------------------------------|----------------|------------------|---------------|-----------|
| Description | Manufacturer | Model | Serial Number | Cal Due |
| Spectrum Analyzer 3 Hz ~ 44 GHz | Agilent | E4446A | US42510266 | 8/25/2005 |
| EMI Test Receiver | R & S | ESIB40 | 100192 | 5/9/2006 |
| EMI Test Receiver | R & S | ESHS 20 | 827129/006 | 6/3/2006 |
| EMI Receiver, 9 kHz ~ 2.9 GHz | HP | 8542E | 3942A00286 | 3/29/2006 |
| RF Filter Section | HP | 85420E | 3705A00256 | 3/29/2006 |
| Antenna, Bilog 30MHz ~ 2Ghz | Sunol Sciences | JB1 | A121003 | 3/3/2006 |
| Antenna, Horn 1 ~ 18 GHz | ETS | 3117 | 29301 | 4/22/2006 |
| Preamplifier, 1 ~ 26.5 GHz | HP | 8449B | 3008A00369 | 8/17/2005 |
| LISN, 10 kHz ~ 30 MHz | FCC | LISN-50/250-25-2 | 2023 | 8/30/2005 |
| Site A Line Stabilizer/Conditioner | Tripplite | LC-1800a | A005181 | CNR |
| Peak Power Meter | Agilent | E4416A | GB41291160 | 2/9/2006 |
| Peak / Average Power Sensor | Agilent | E9327A | US40440755 | 2/10/2006 |
| 1.5 GHz High Pass Filter | Micro-Tronics | HPM13193 | 2 | CNR |
| 2.4-2.5 GHz Reject Filter | Micro-Tronics | BRM56702 | 2 | CNR |

7. LIMITS AND RESULTS

7.1. CHANNEL TESTS FOR THE 2400 TO 2483.5 MHz BAND

7.1.1. 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 300 kHz. The sweep time is coupled.

RESULTS

No non-compliance noted:

802.11b Dual Mode, Chain 1

| Channel | Frequency (MHz) | 6 dB Bandwidth (kHz) | Minimum Limit (kHz) | Margin (kHz) |
|---------|-----------------|----------------------|---------------------|--------------|
| Low | 2412 | 10,080 | 500 | 9580 |
| Middle | 2437 | 11,250 | 500 | 10750 |
| High | 2462 | 10,670 | 500 | 10170 |

802.11b Dual Mode, Chain 2

| Channel | Frequency (MHz) | 6 dB Bandwidth (kHz) | Minimum Limit (kHz) | Margin (kHz) |
|---------|-----------------|----------------------|---------------------|--------------|
| Low | 2412 | 10,670 | 500 | 10170 |
| Middle | 2437 | 10,000 | 500 | 9500 |
| High | 2462 | 10,250 | 500 | 9750 |

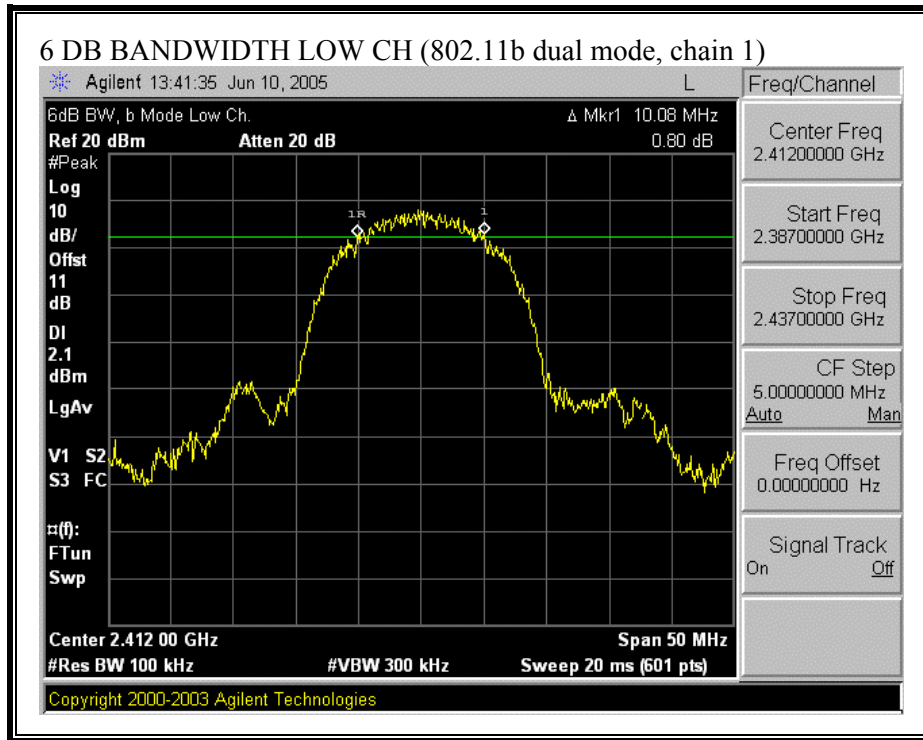
802.11g Dual Mode, Chain 1

| Channel | Frequency (MHz) | 6 dB Bandwidth (kHz) | Minimum Limit (kHz) | Margin (kHz) |
|---------|-----------------|----------------------|---------------------|--------------|
| Low | 2412 | 15,170 | 500 | 14670 |
| Middle | 2437 | 15,170 | 500 | 14670 |
| High | 2462 | 15,170 | 500 | 14670 |

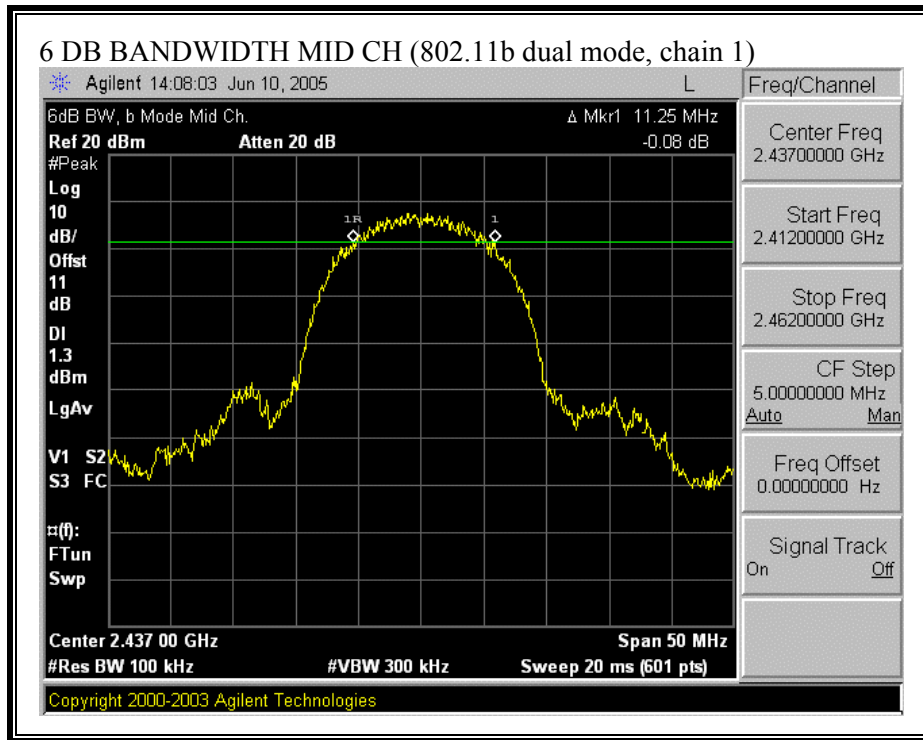
802.11g Dual Mode, Chain 2

| Channel | Frequency (MHz) | 6 dB Bandwidth (kHz) | Minimum Limit (kHz) | Margin (kHz) |
|---------|-----------------|----------------------|---------------------|--------------|
| Low | 2412 | 15,170 | 500 | 14670 |
| Middle | 2437 | 15,250 | 500 | 14750 |
| High | 2462 | 15,170 | 500 | 14670 |

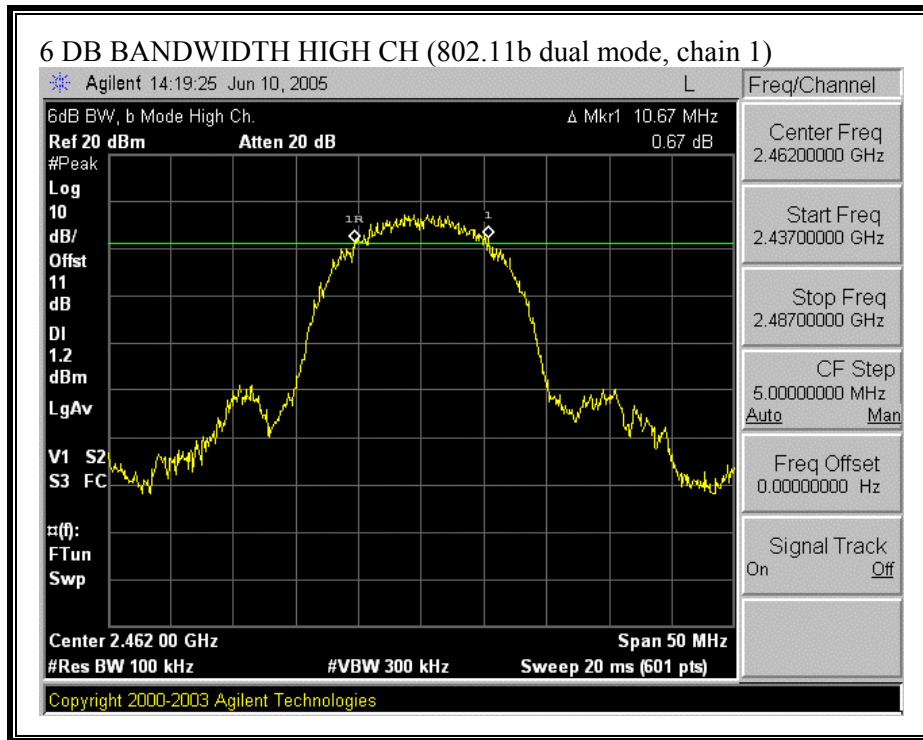
6 DB BANDWIDTH (802.11b DUAL MODE, CHAIN 1)



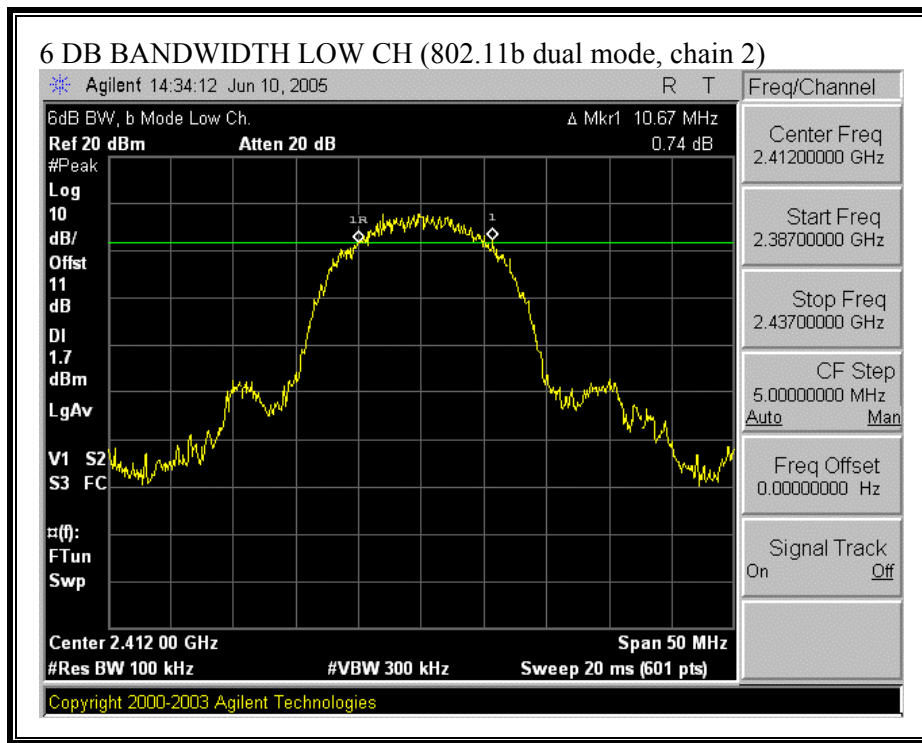
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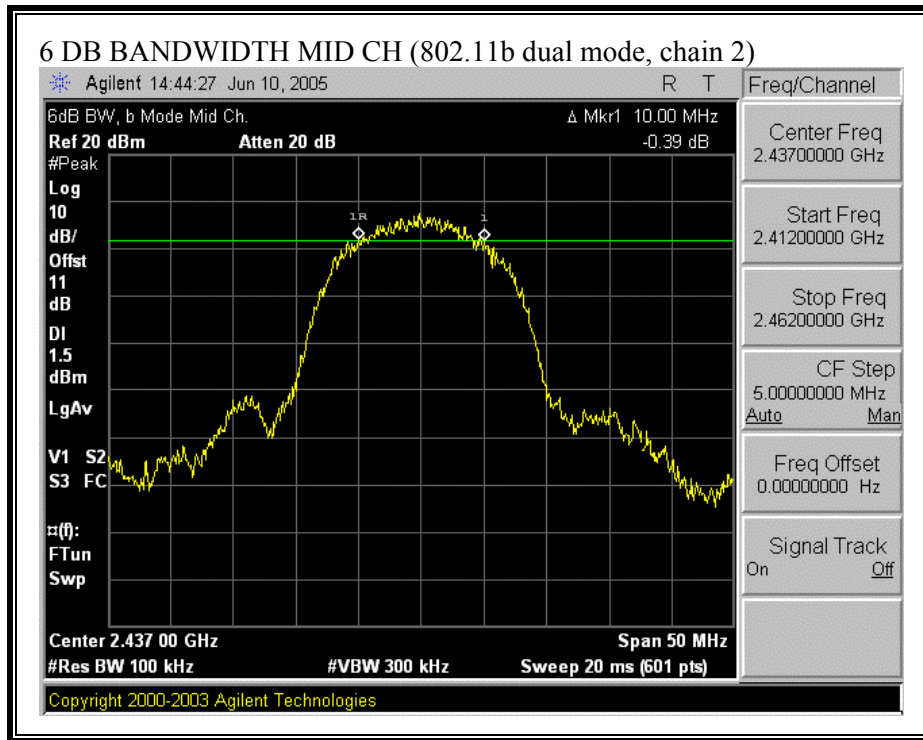
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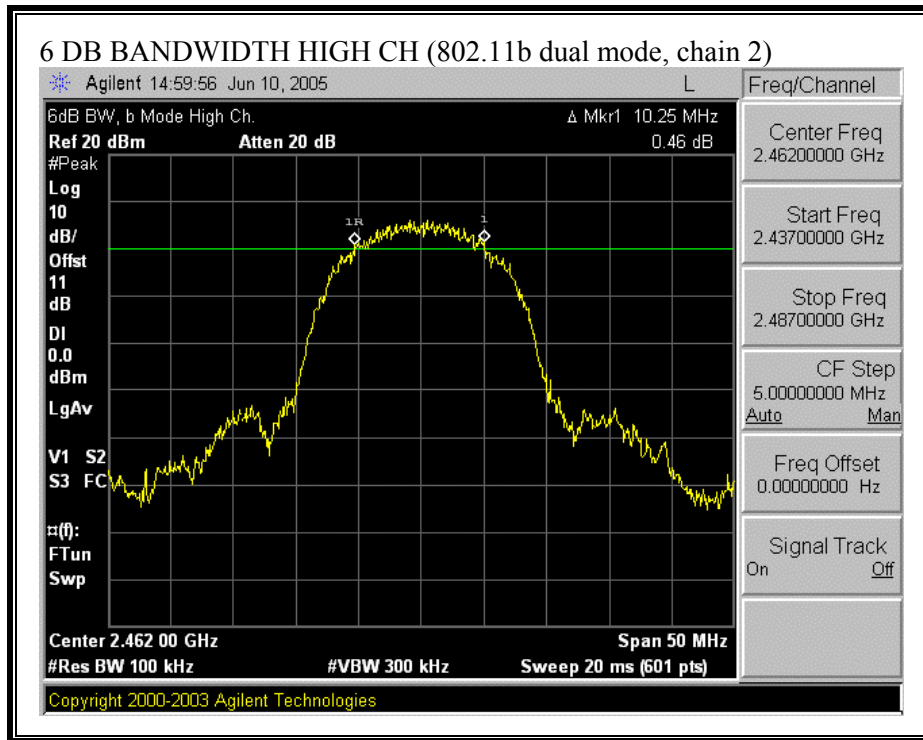
6 DB BANDWIDTH (802.11b DUAL MODE, CHAIN 2)



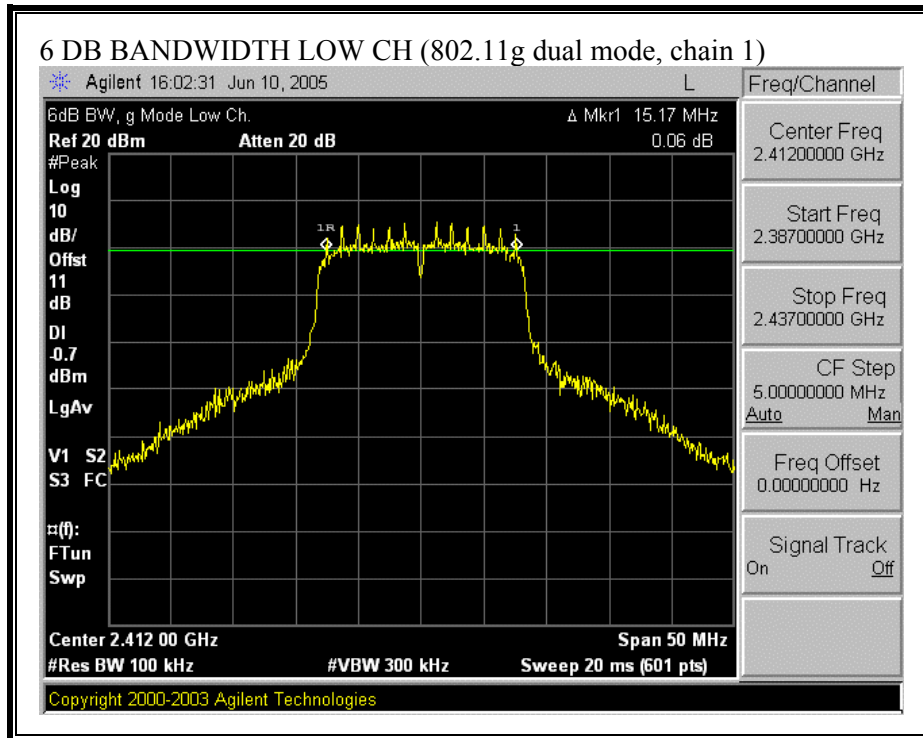
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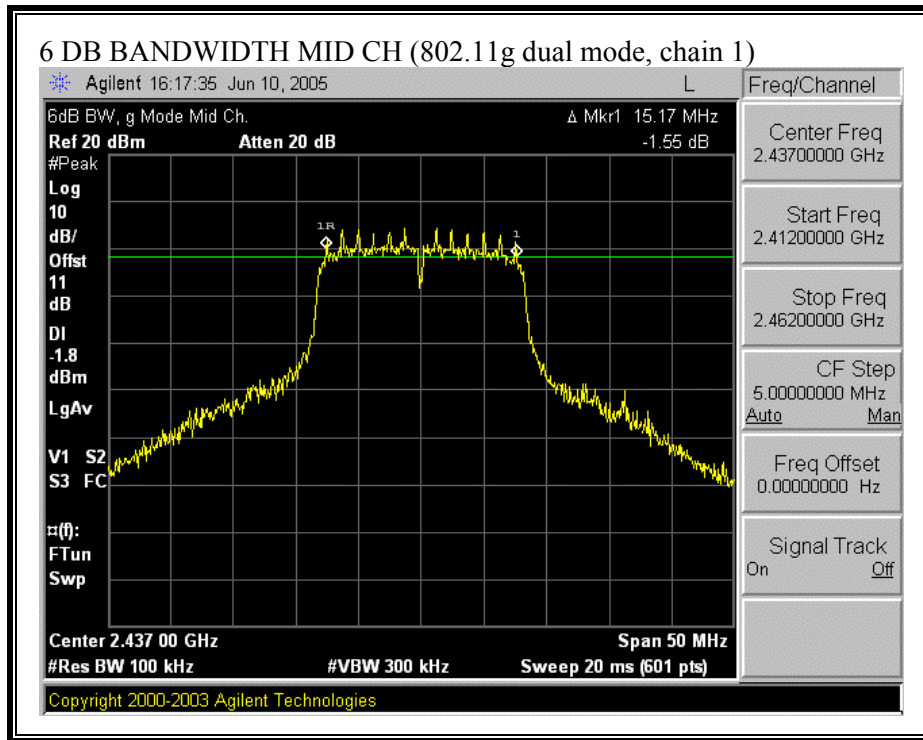
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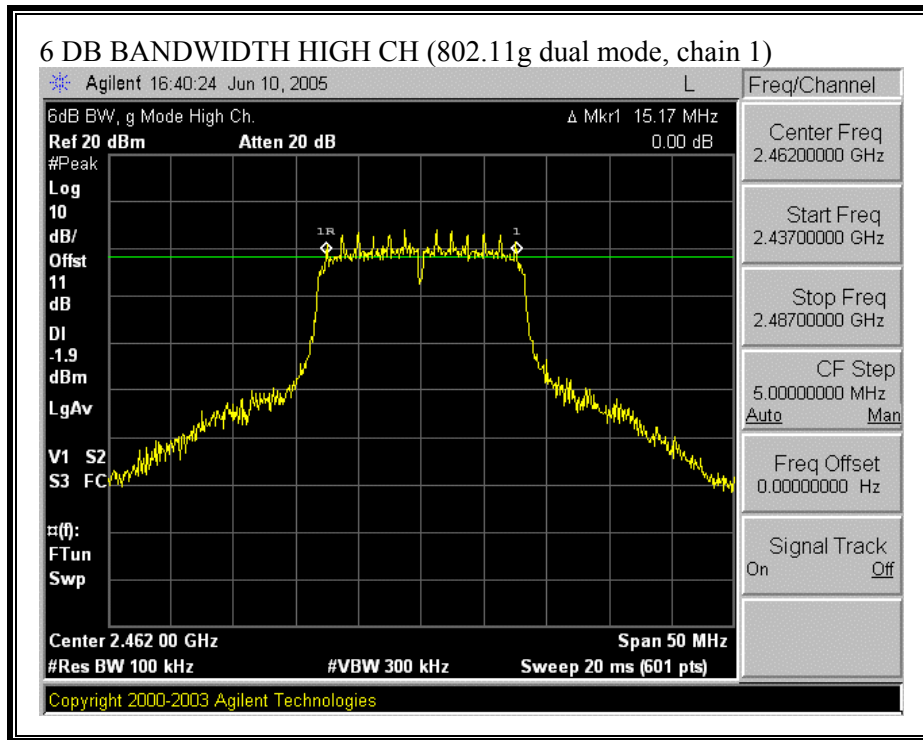
6 DB BANDWIDTH (802.11g DUAL MODE, CHAIN 1)



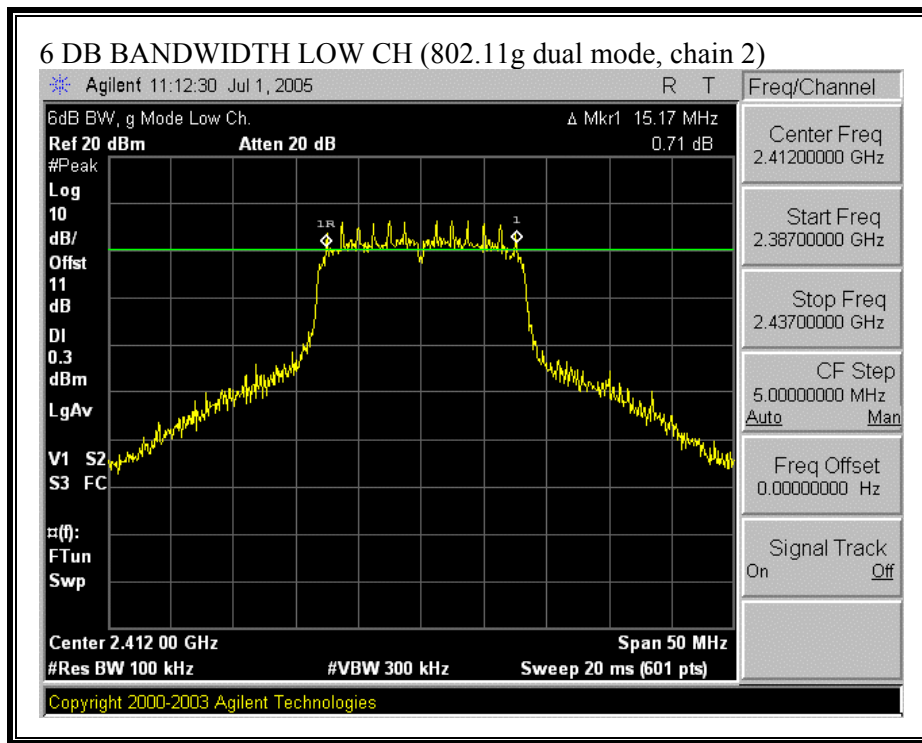
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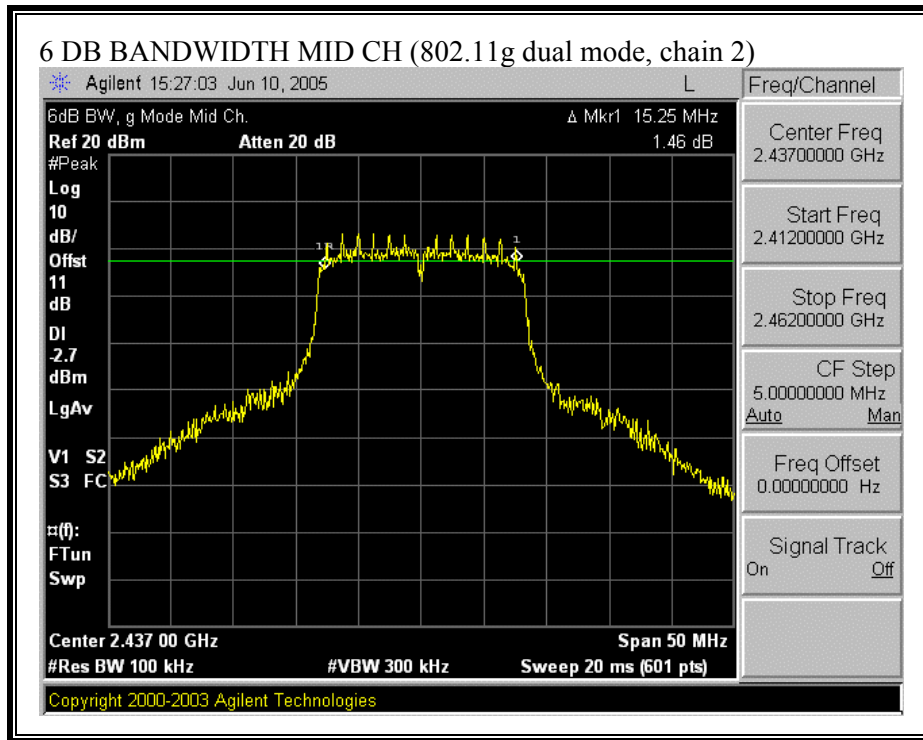
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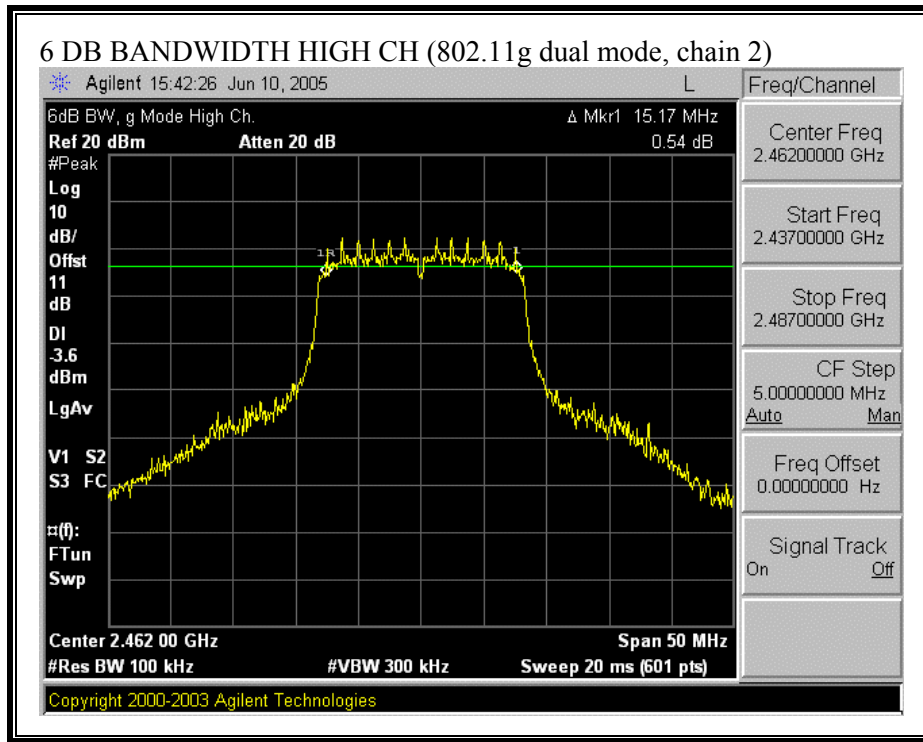
6 DB BANDWIDTH (802.11g DUAL MODE, CHAIN 2)



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7.1.2. 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.

RESULTS

No non-compliance noted:

802.11b Dual Mode, Chain 1

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low | 2412 | 14.754 |
| Middle | 2437 | 14.7767 |
| High | 2462 | 14.7854 |

802.11b Dual Mode, Chain 2

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low | 2412 | 14.8231 |
| Middle | 2437 | 14.7605 |
| High | 2462 | 14.7418 |

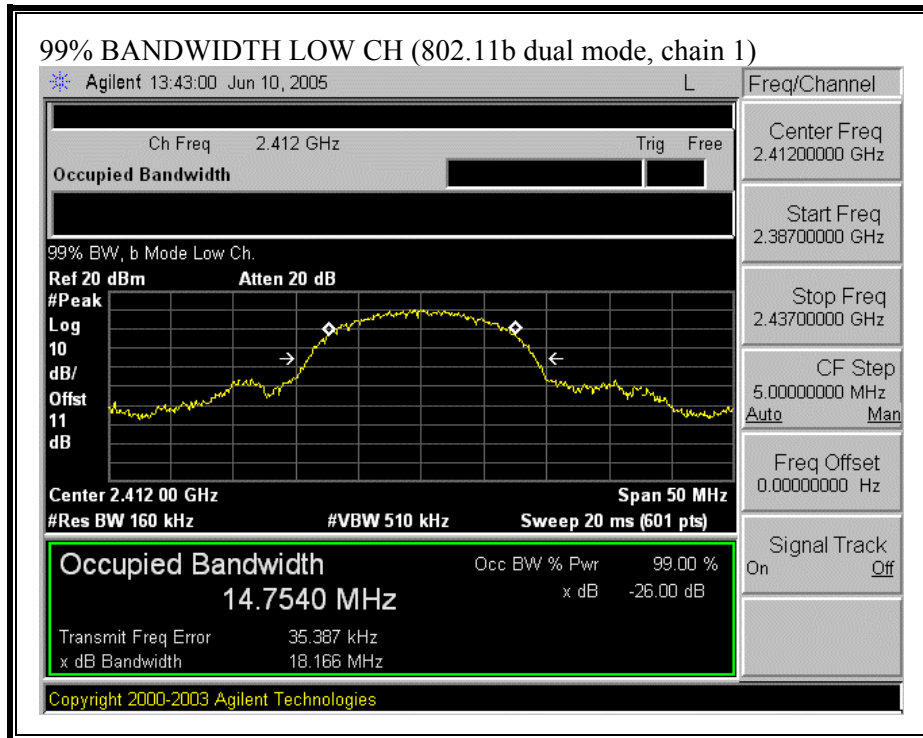
802.11g Dual Mode, Chain 1

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low | 2412 | 16.1763 |
| Middle | 2437 | 16.1779 |
| High | 2462 | 16.1793 |

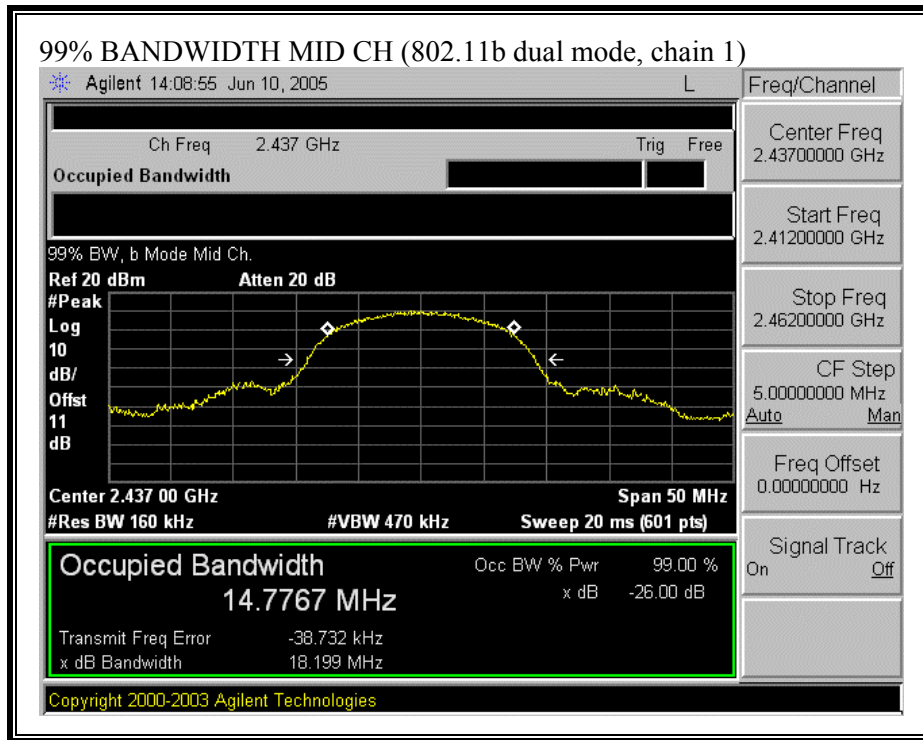
802.11g Dual Mode, Chain 2

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low | 2412 | 16.1847 |
| Middle | 2437 | 16.1791 |
| High | 2462 | 16.1823 |

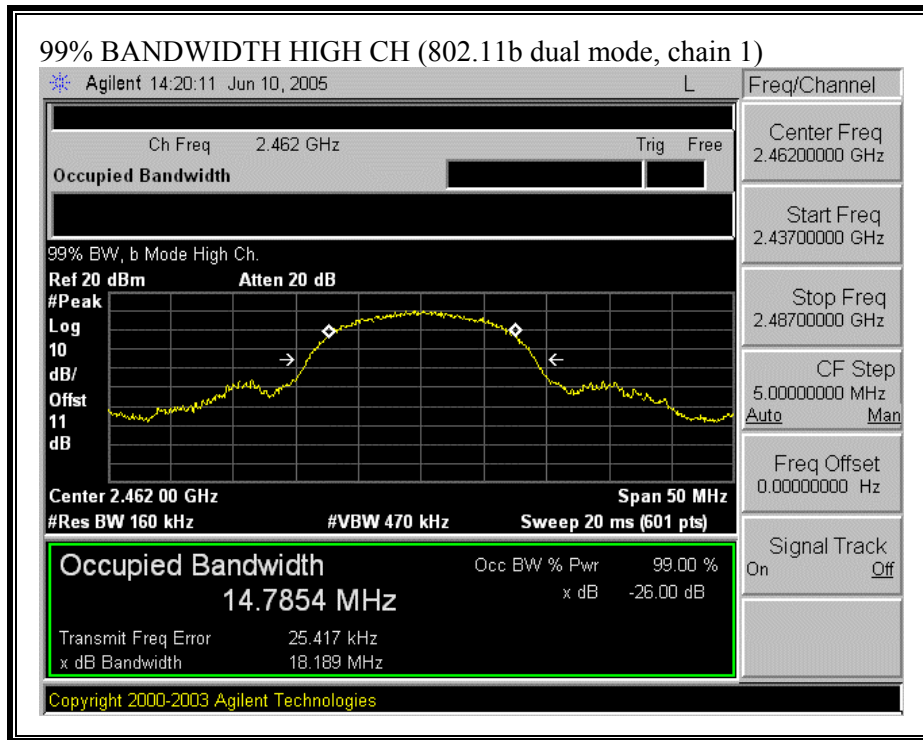
99% BANDWIDTH (802.11b DUAL MODE, CHAIN 1)



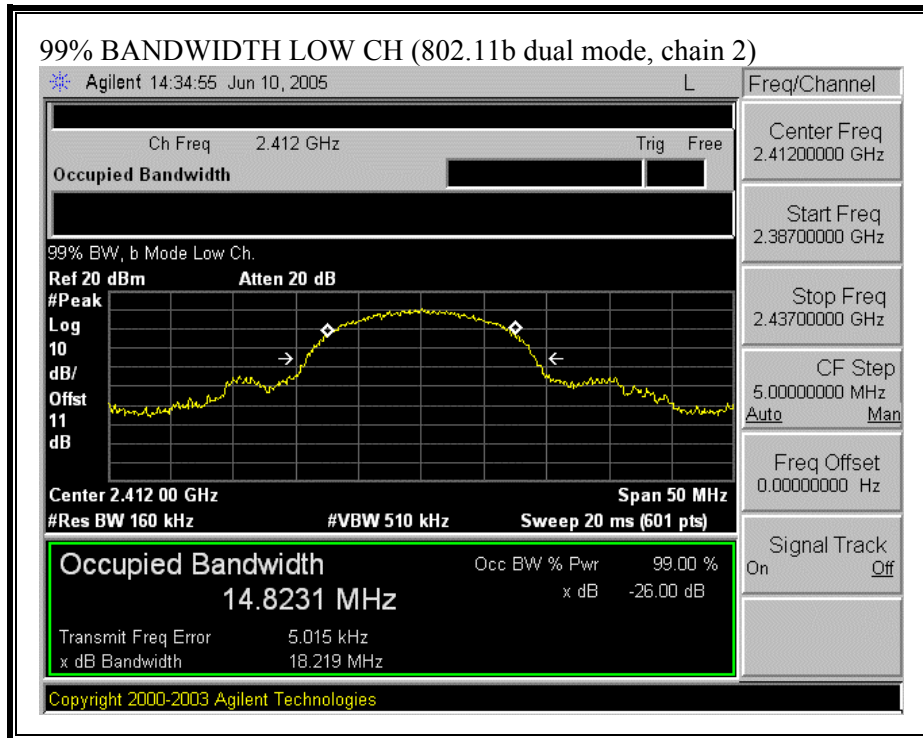
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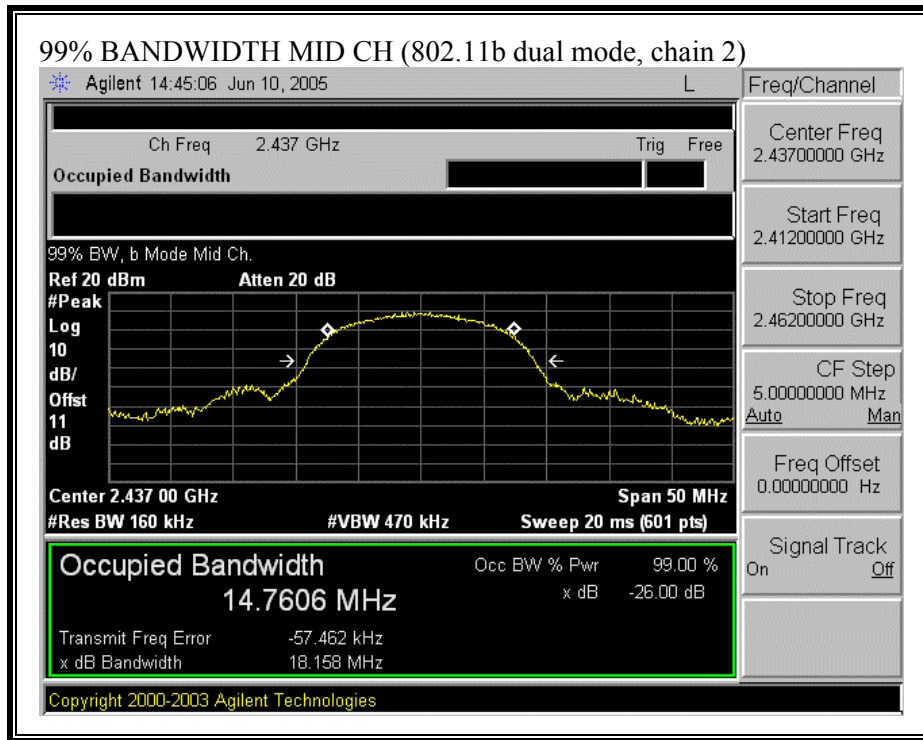
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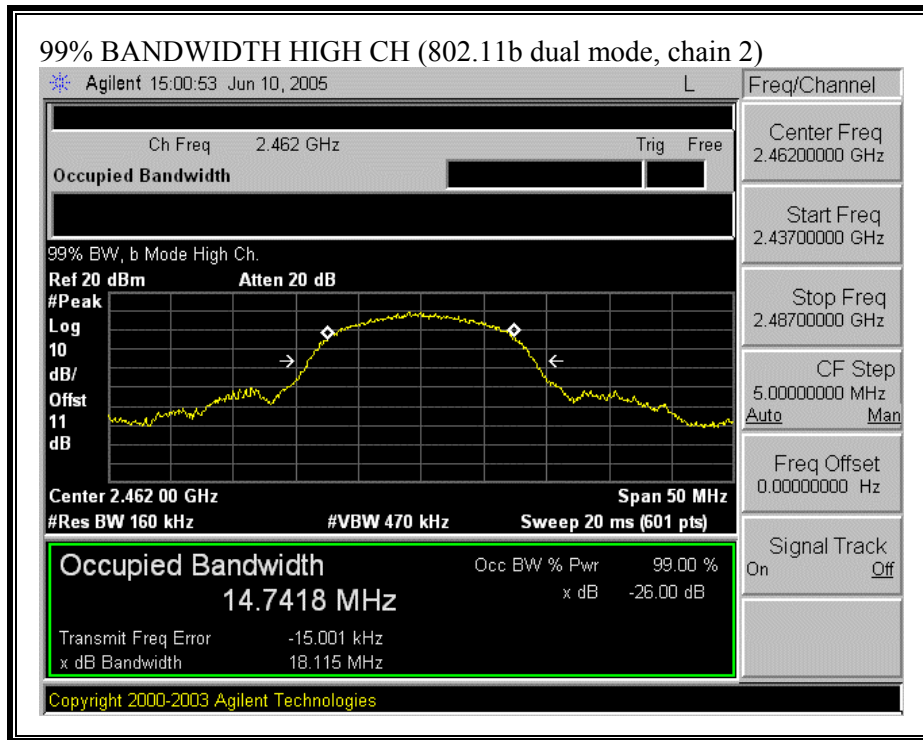
99% BANDWIDTH (802.11b DUAL MODE, CHAIN 2)



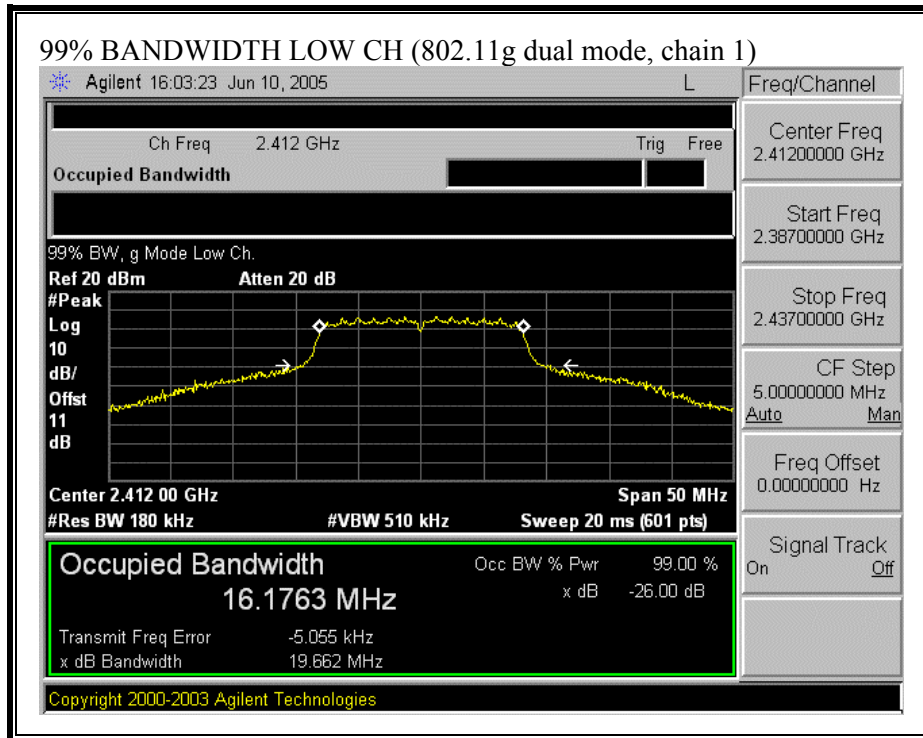
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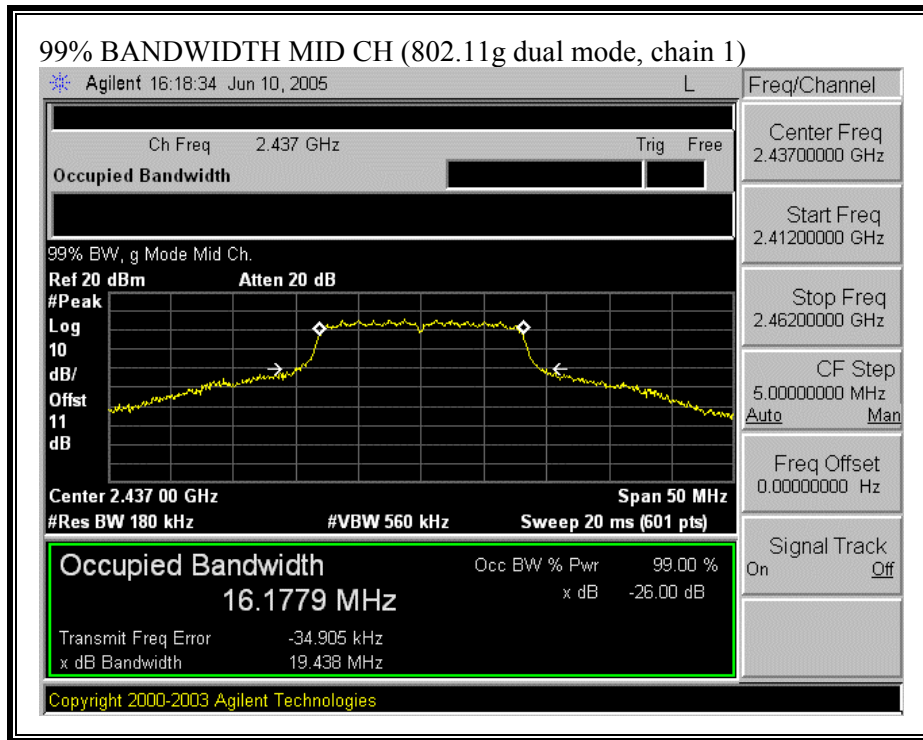
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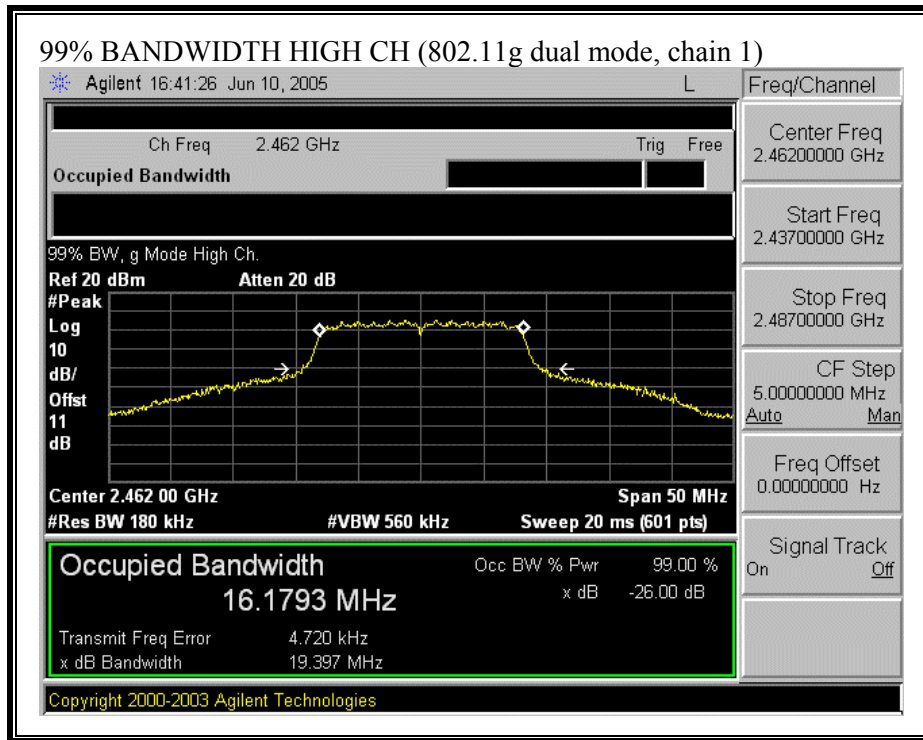
99% BANDWIDTH (802.11g DUAL MODE, CHAIN 1)



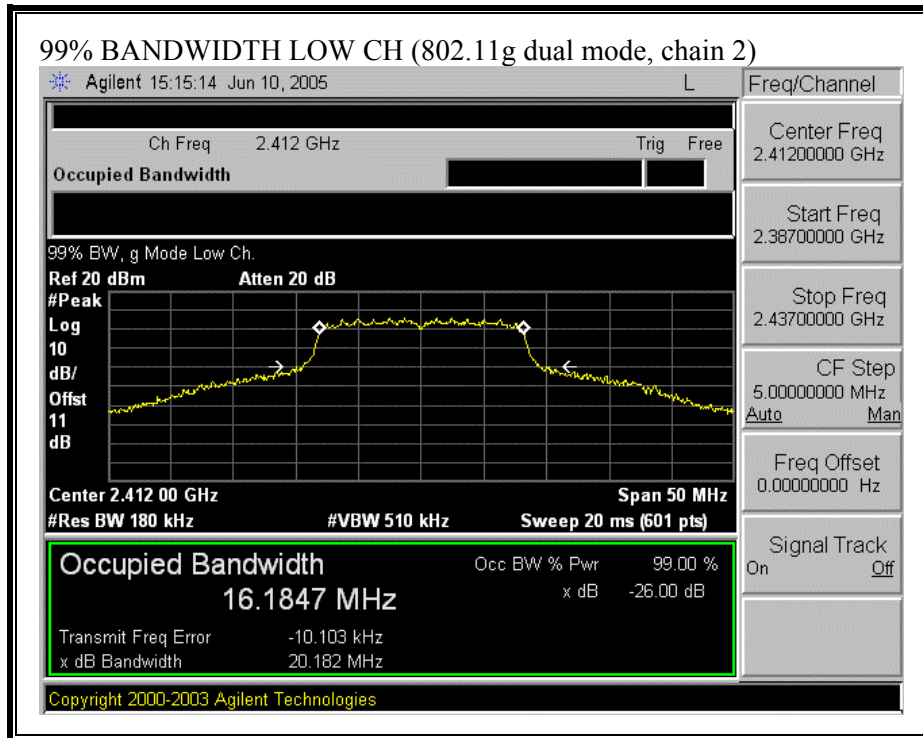
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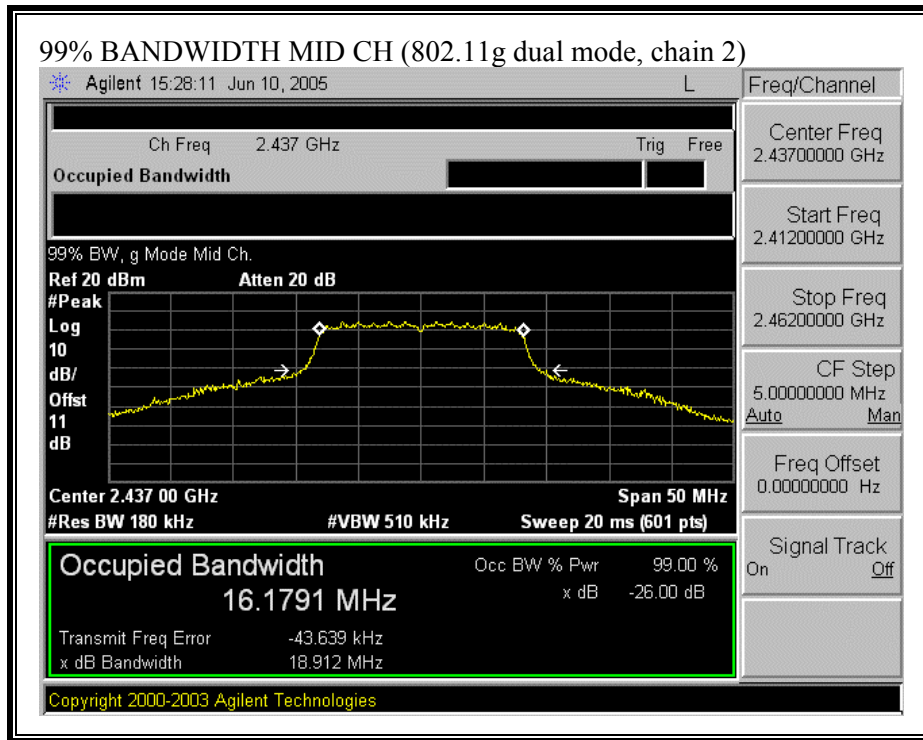
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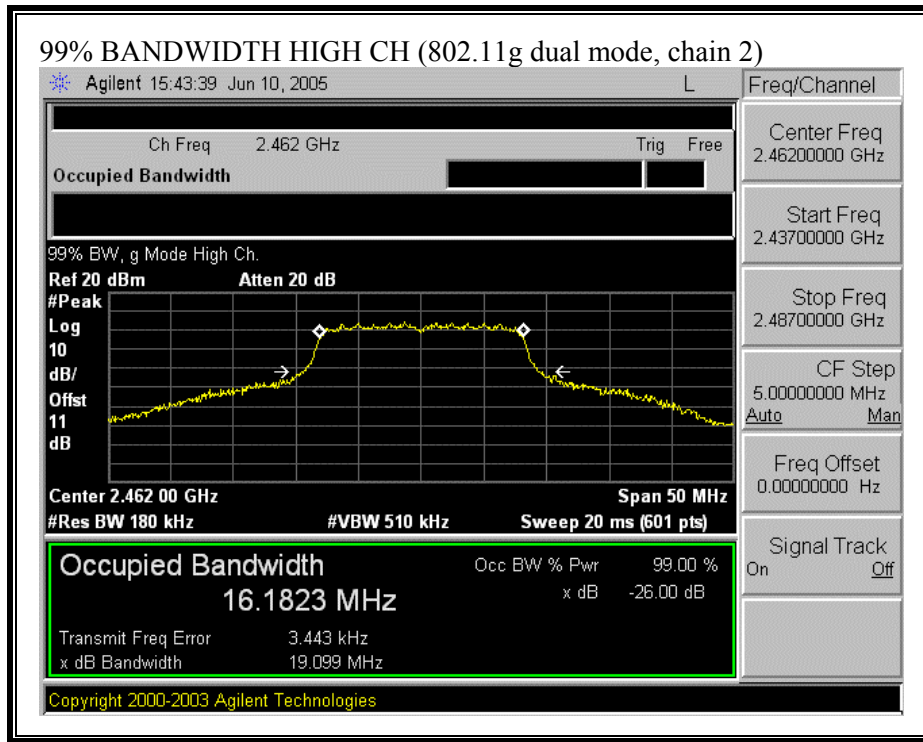
99% BANDWIDTH (802.11g DUAL MODE, CHAIN 2)



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7.1.3. 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)(4) (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.

§15.247 (b) (4) (i) Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

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.

RESULTS

The maximum antenna gain is 3 dBi for other than fixed, point-to-point operations, therefore the limit is 30 dBm.

No non-compliance noted:

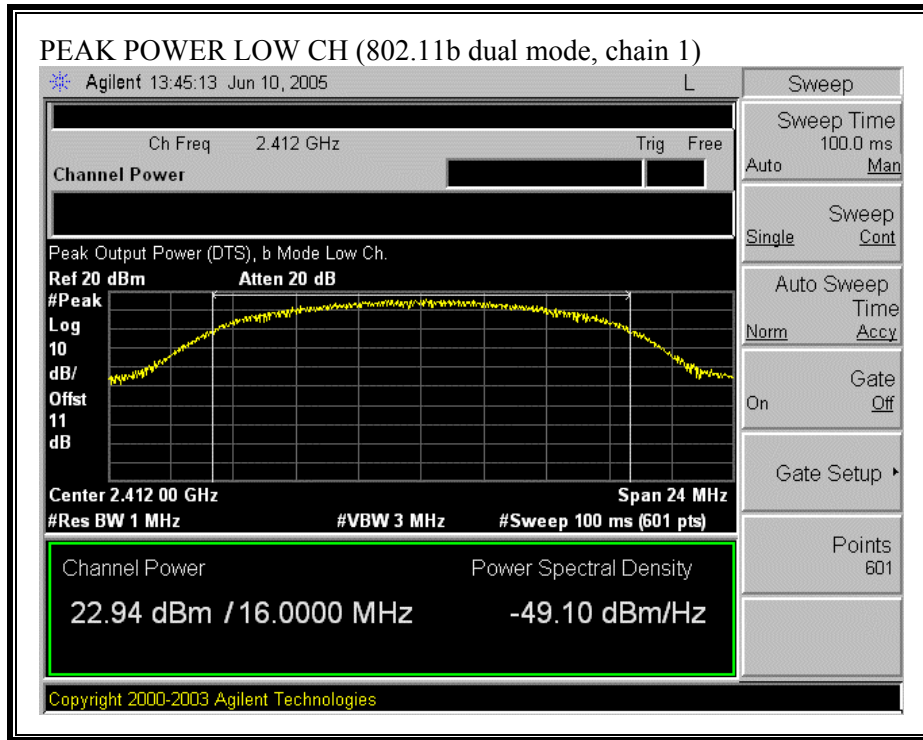
802.11b Dual Mode

| Frequency (MHz) | Peak Power Chain 1 (dBm) | Peak Power Chain 2 (dBm) | Peak Power Total (dBm) | Limit (dBm) | Margin (dB) |
|--------------------|--------------------------------|--------------------------------|------------------------------|----------------|----------------|
| 2412 | 22.9 | 23.1 | 26.04 | 30 | -3.96 |
| 2437 | 23.1 | 22.4 | 25.76 | 30 | -4.24 |
| 2462 | 22.8 | 21.8 | 25.32 | 30 | -4.68 |

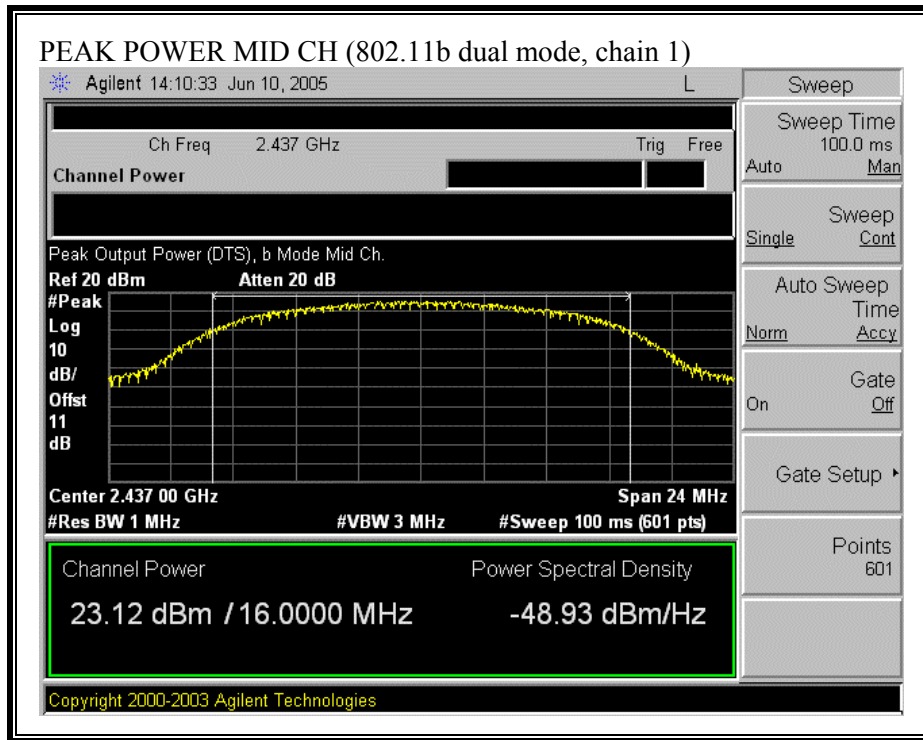
802.11g Dual Mode

| Frequency (MHz) | Peak Power Chain 1 (dBm) | Peak Power Chain 2 (dBm) | Peak Power Total (dBm) | Limit (dBm) | Margin (dB) |
|--------------------|--------------------------------|--------------------------------|------------------------------|----------------|----------------|
| 2412 | 24.2 | 23.5 | 26.87 | 30 | -3.13 |
| 2437 | 23.5 | 22.6 | 26.06 | 30 | -3.94 |
| 2462 | 23.3 | 21.9 | 25.67 | 30 | -4.33 |

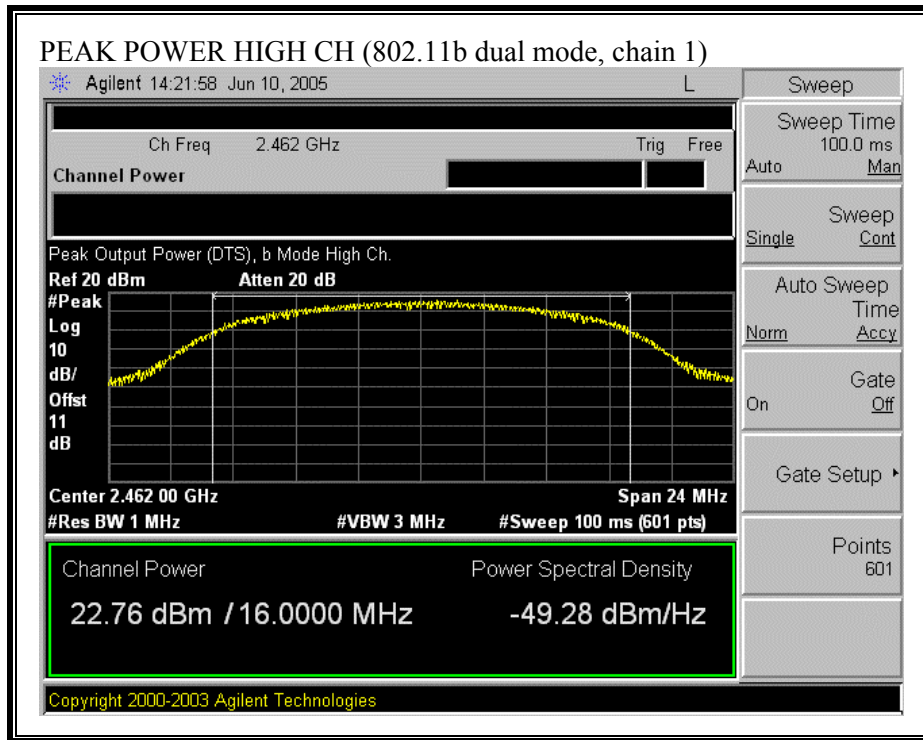
OUTPUT POWER (802.11b DUAL MODE, CHAIN 1)



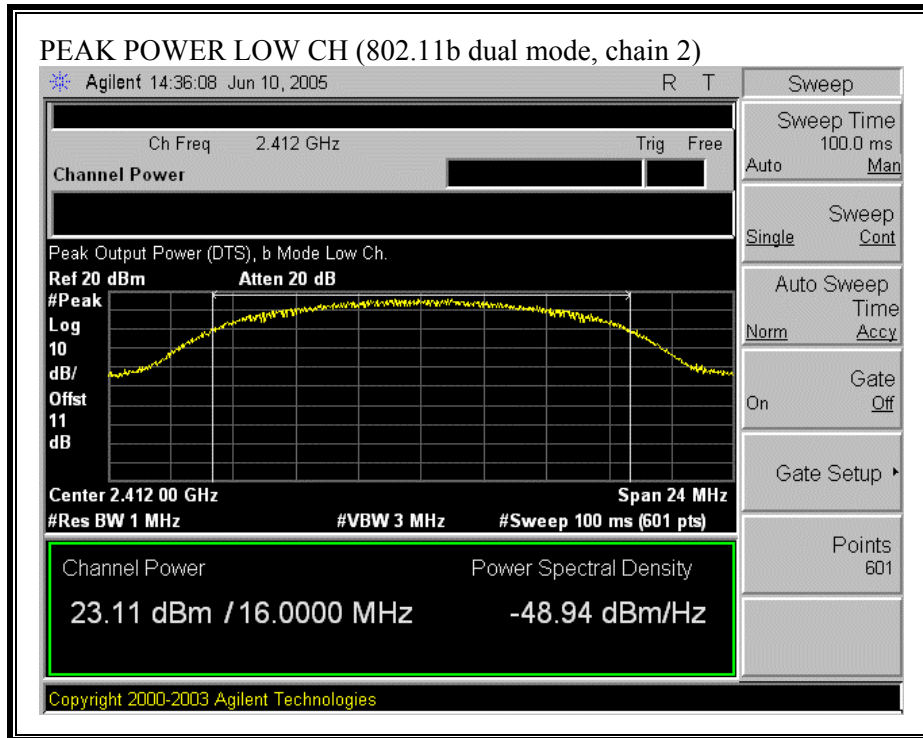
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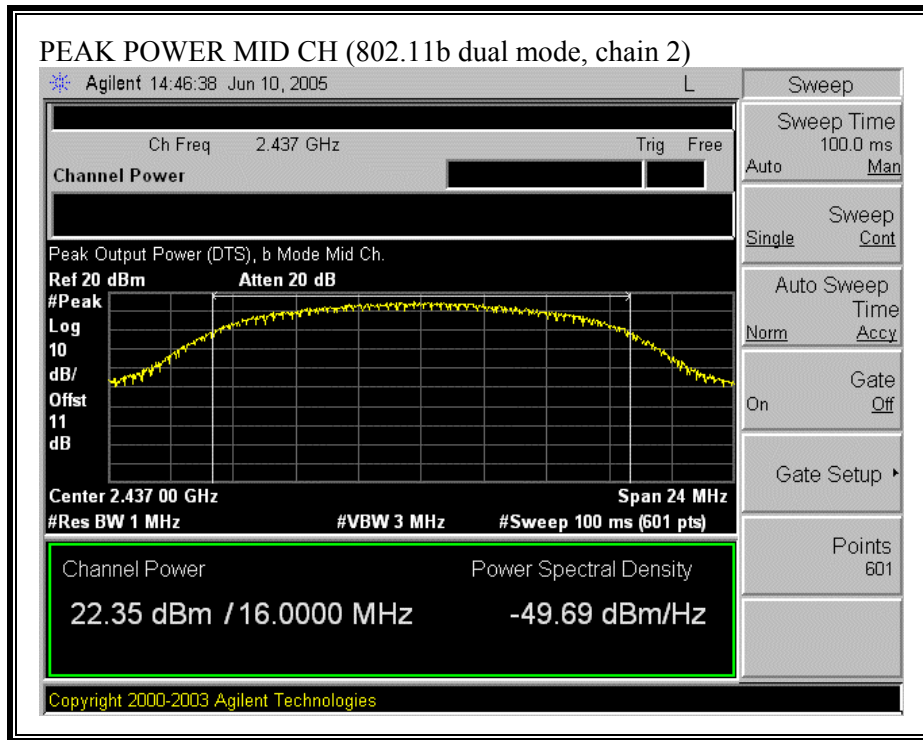
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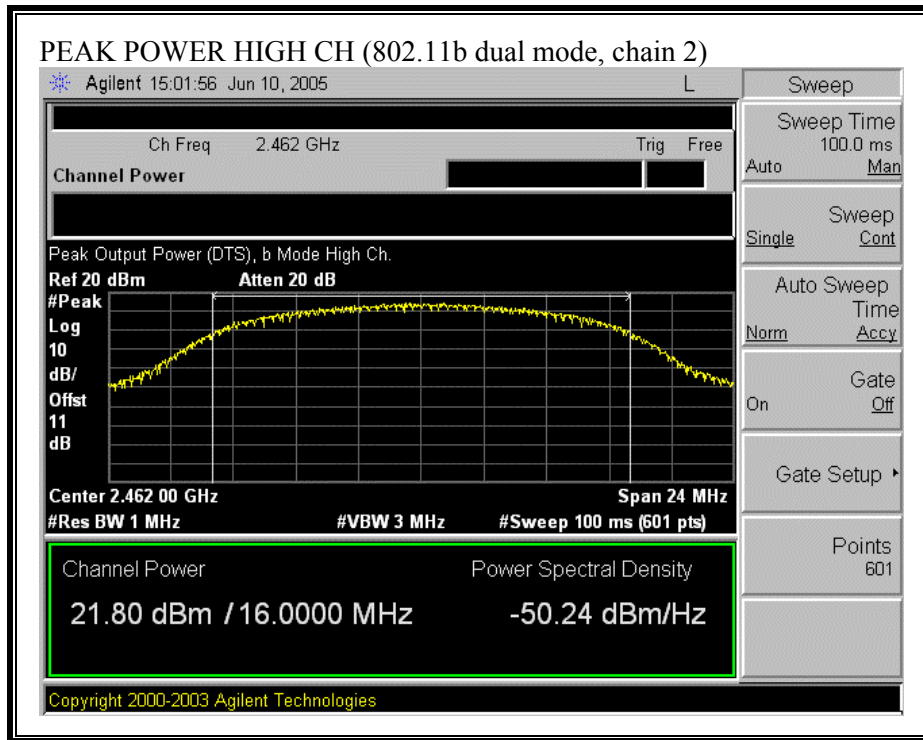
OUTPUT POWER (802.11b DUAL MODE, CHAIN 2)



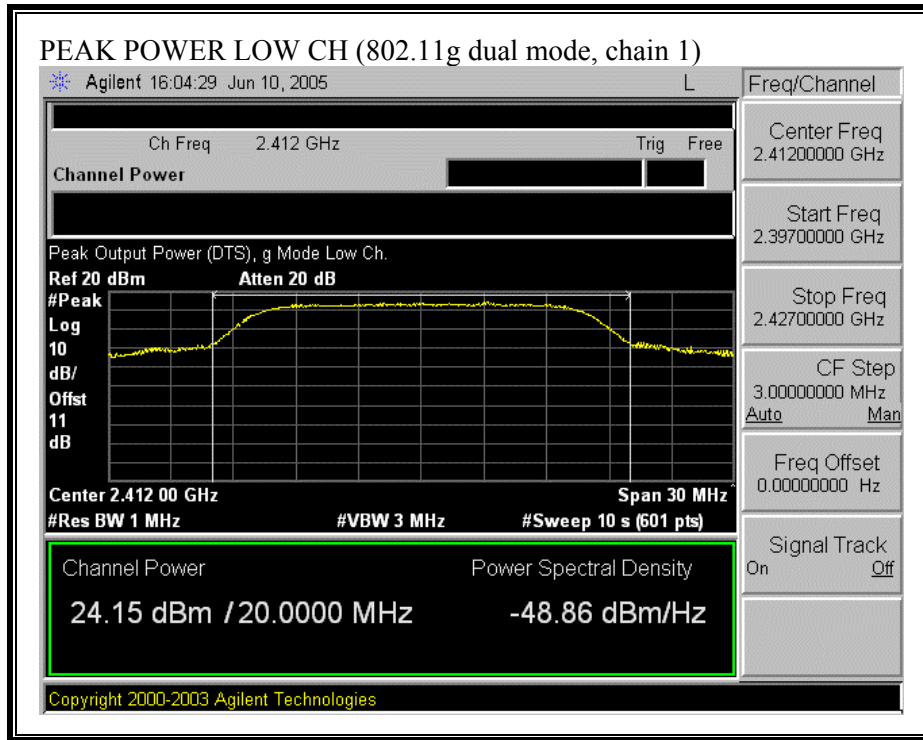
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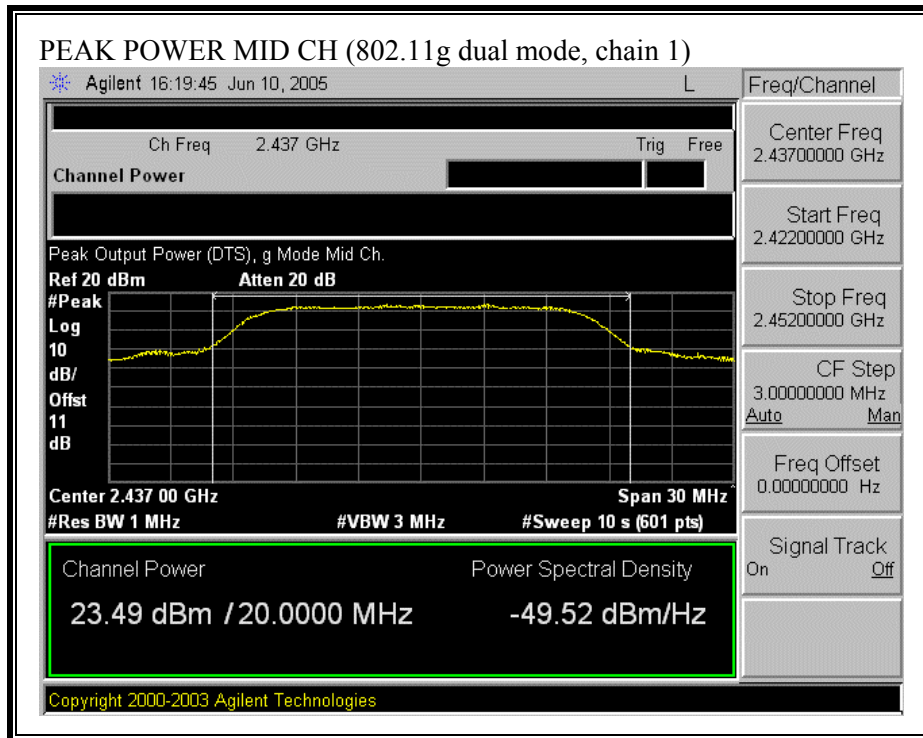
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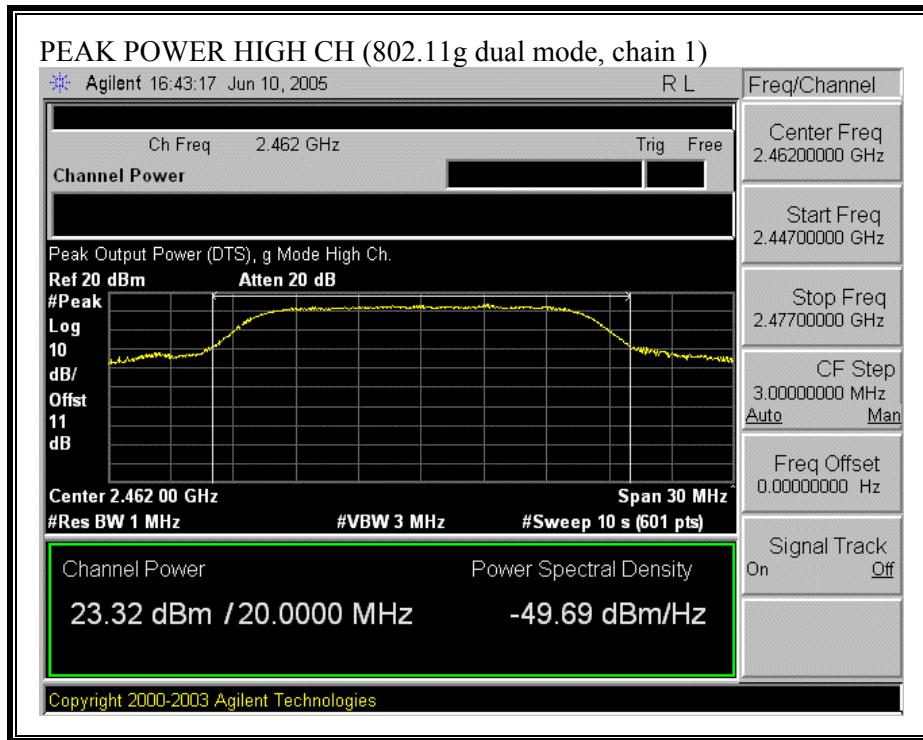
OUTPUT POWER (802.11g DUAL MODE, CHAIN 1)



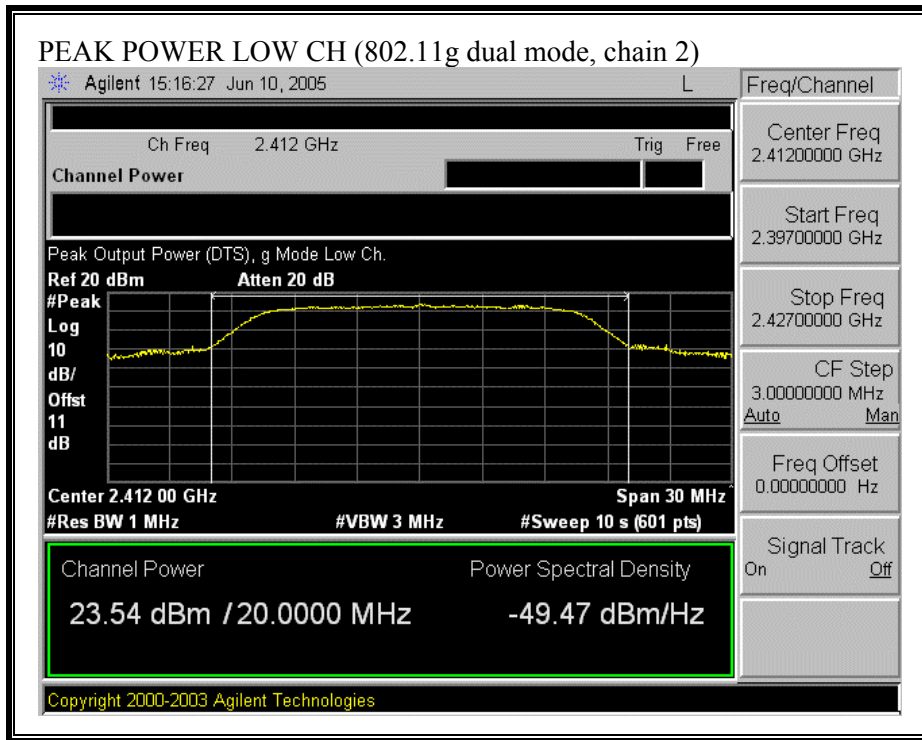
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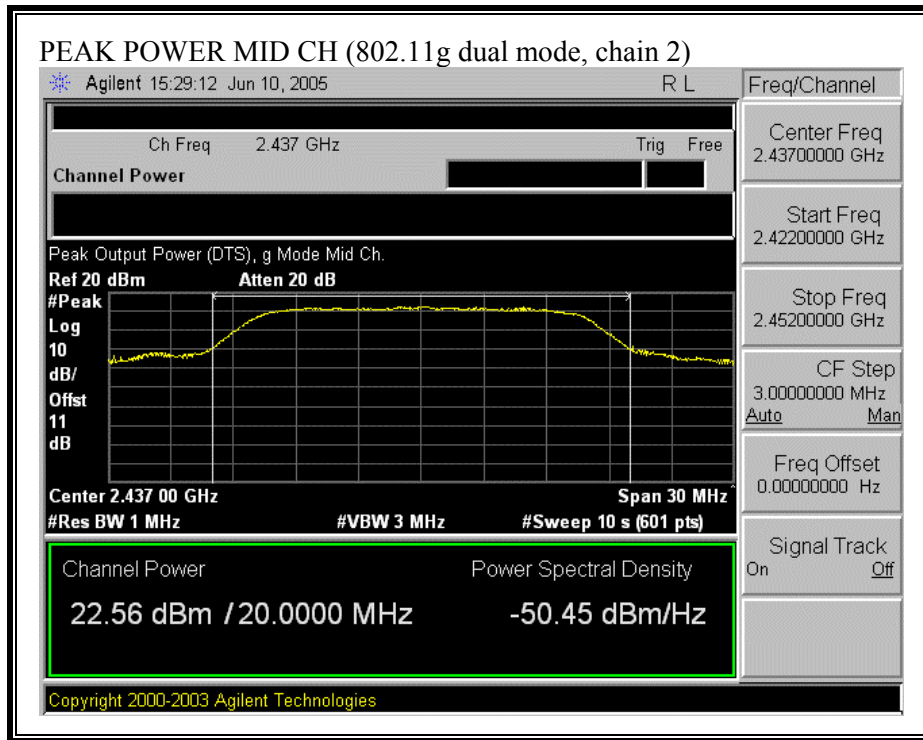
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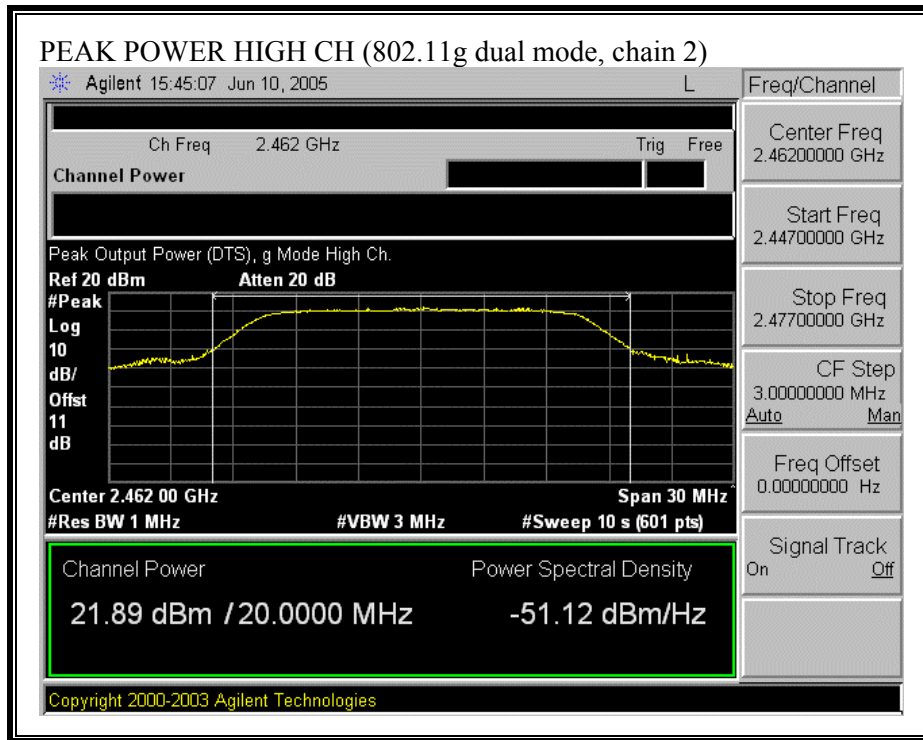
OUTPUT POWER (802.11g DUAL MODE, CHAIN 2)



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7.1.4. 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 11 dB (including 10 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

802.11b Dual Mode

| Frequency (MHz) | Average Power Chain 1 (dBm) | Average Power Chain 2 (dBm) | Average Power Total (dBm) |
|--------------------|-----------------------------------|-----------------------------------|---------------------------------|
| 2412 | 20.6 | 19.9 | 23.26 |
| 2437 | 20.0 | 18.8 | 22.45 |
| 2462 | 19.7 | 17.2 | 21.64 |

802.11g Dual Mode

| Frequency (MHz) | Average Power Chain 1 (dBm) | Average Power Chain 2 (dBm) | Average Power Total (dBm) |
|--------------------|-----------------------------------|-----------------------------------|---------------------------------|
| 2412 | 17.1 | 16.6 | 19.86 |
| 2437 | 15.1 | 14.3 | 17.73 |
| 2462 | 14.8 | 13.5 | 17.21 |

7.1.5. 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 > 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.

RESULTS

No non-compliance noted:

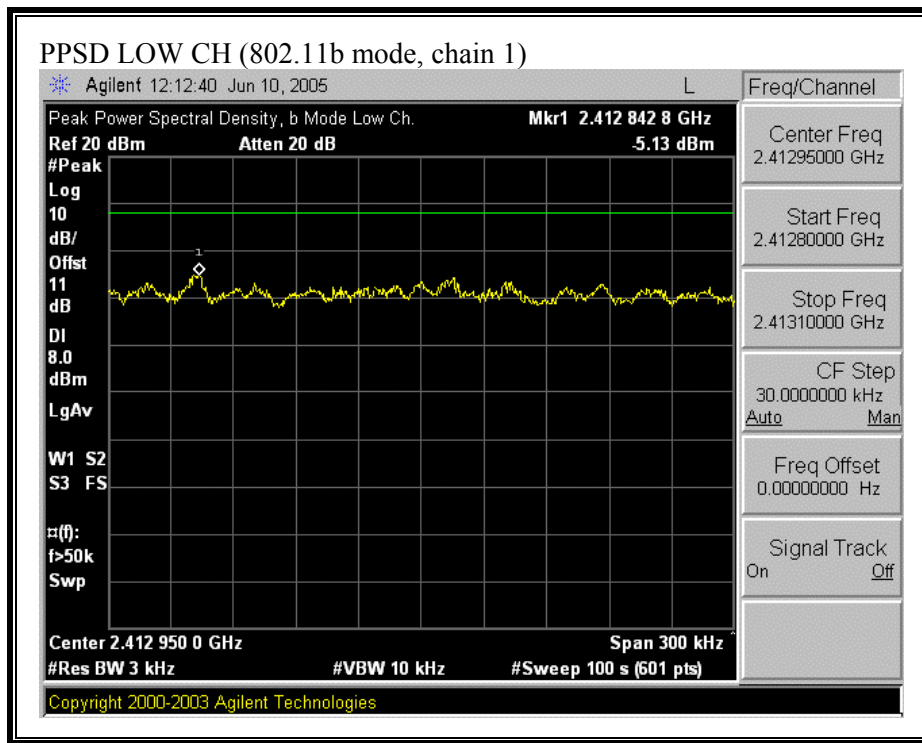
802.11b Dual Mode

| Channel | Frequency (MHz) | PPSD Chain 1 (dBm) | PPSD Chain 2 (dBm) | PPSD Total (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|--------------------------|--------------------------|------------------------|----------------|----------------|
| Low | 2412 | -5.13 | -5.67 | -2.38 | 8 | -10.38 |
| Middle | 2437 | -4.99 | -5.83 | -2.38 | 8 | -10.38 |
| High | 2462 | -7.00 | -8.85 | -4.82 | 8 | -12.82 |

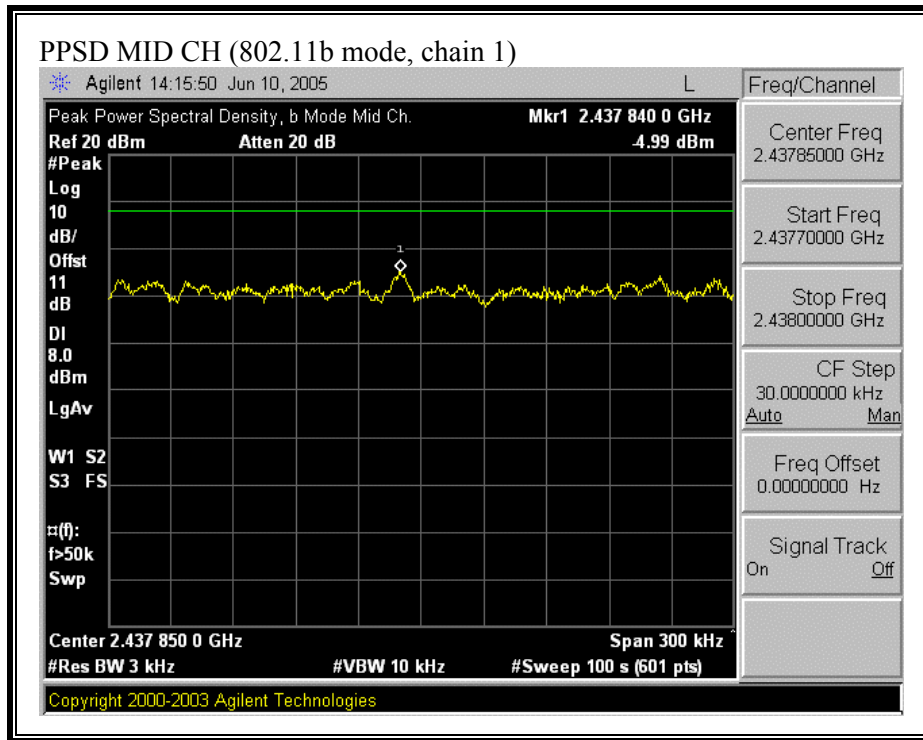
802.11g Dual Mode

| Channel | Frequency (MHz) | PPSD Chain 1 (dBm) | PPSD Chain 2 (dBm) | PPSD Total (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|--------------------------|--------------------------|------------------------|----------------|----------------|
| Low | 2412 | -10.11 | -9.48 | -6.77 | 8 | -14.77 |
| Middle | 2437 | -9.46 | -9.09 | -6.26 | 8 | -14.26 |
| High | 2462 | -11.50 | -11.10 | -8.29 | 8 | -16.29 |

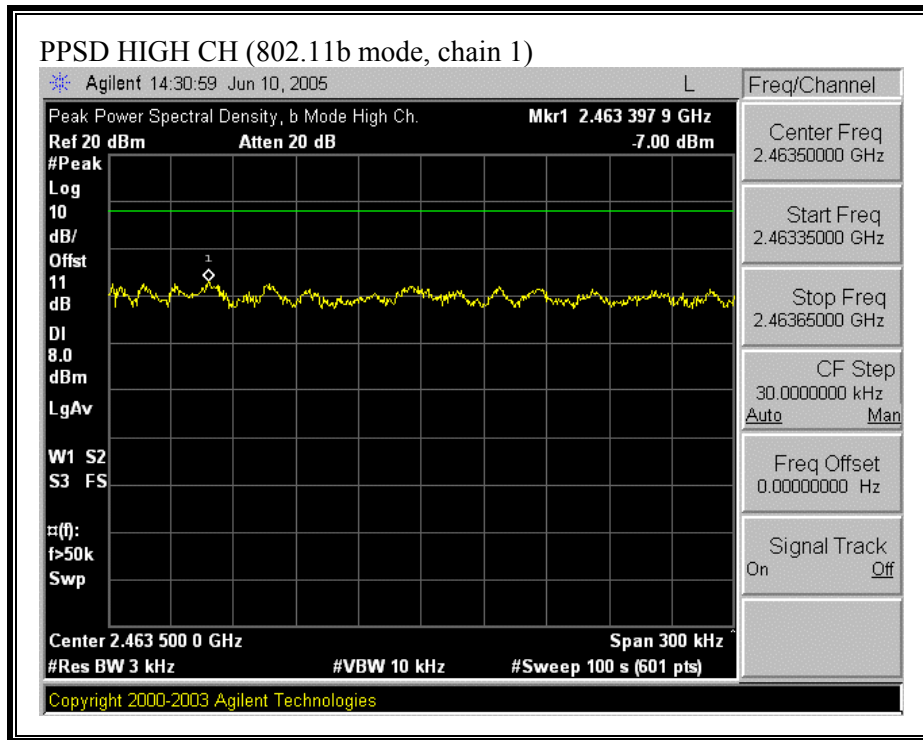
PEAK POWER SPECTRAL DENSITY (802.11b MODE, CHAIN 1)



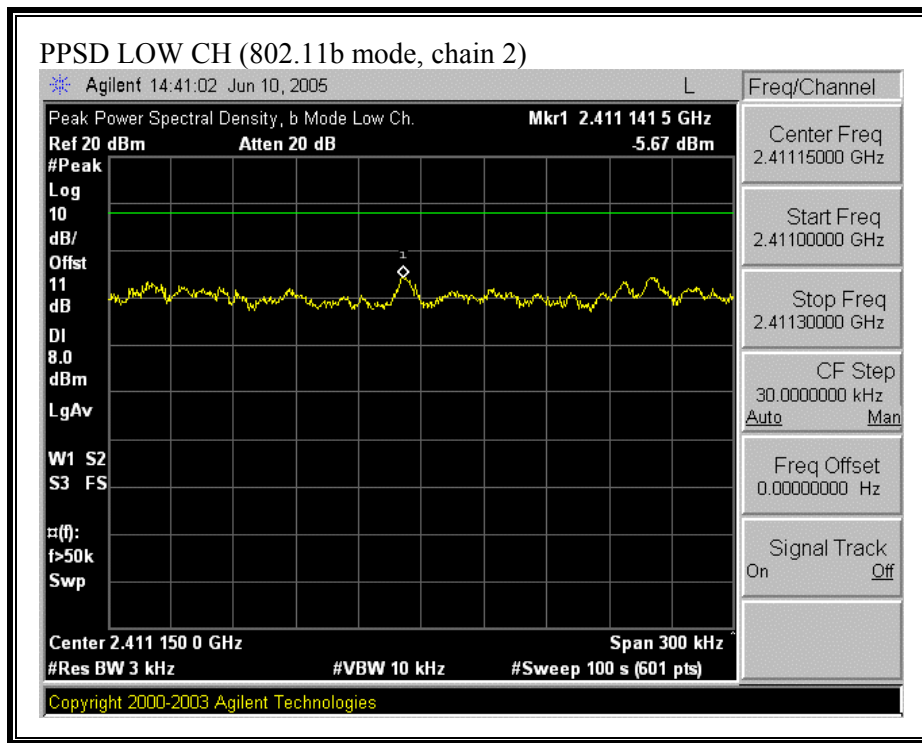
:



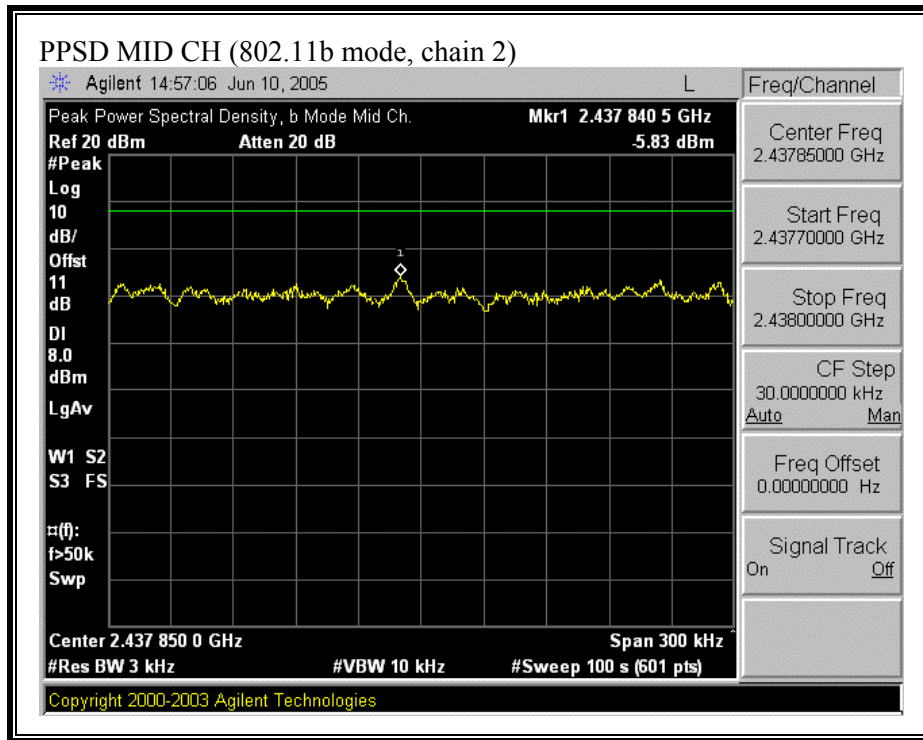
:



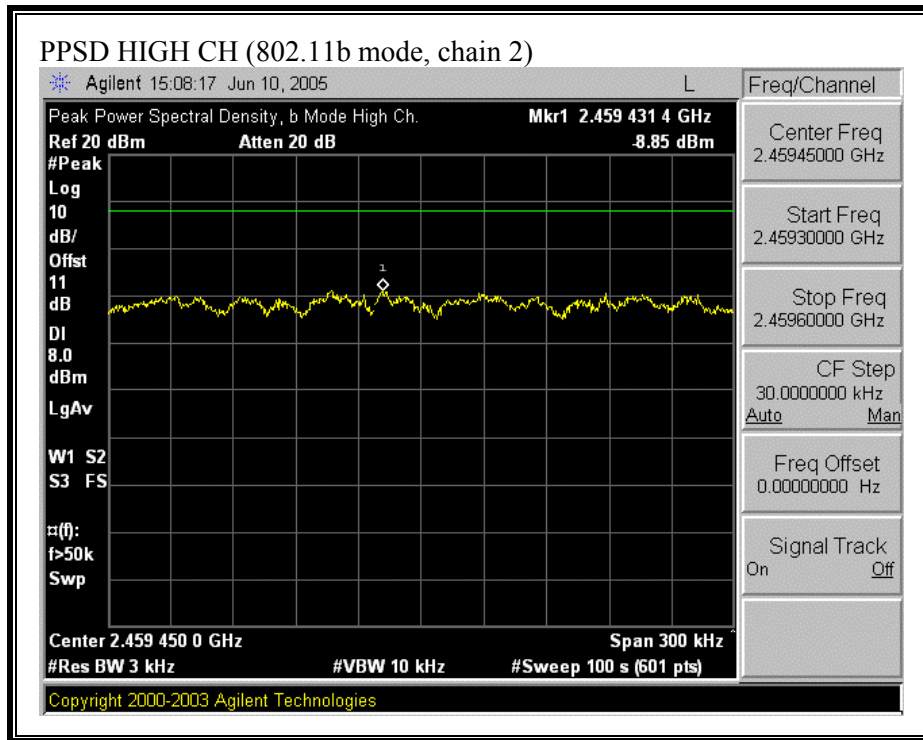
PEAK POWER SPECTRAL DENSITY (802.11b MODE, CHAIN 2)



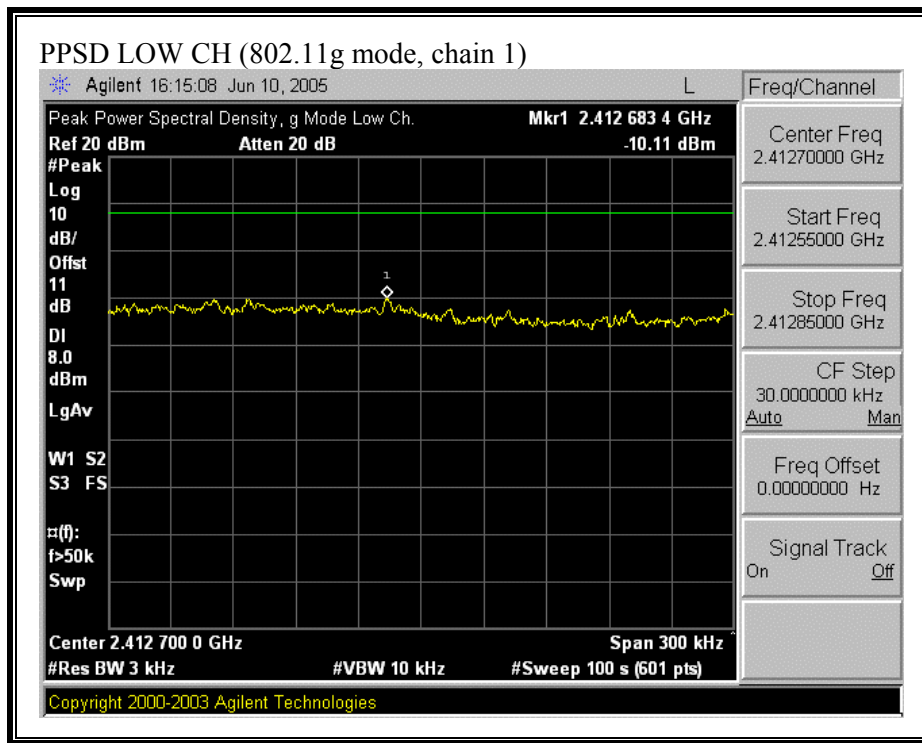
:



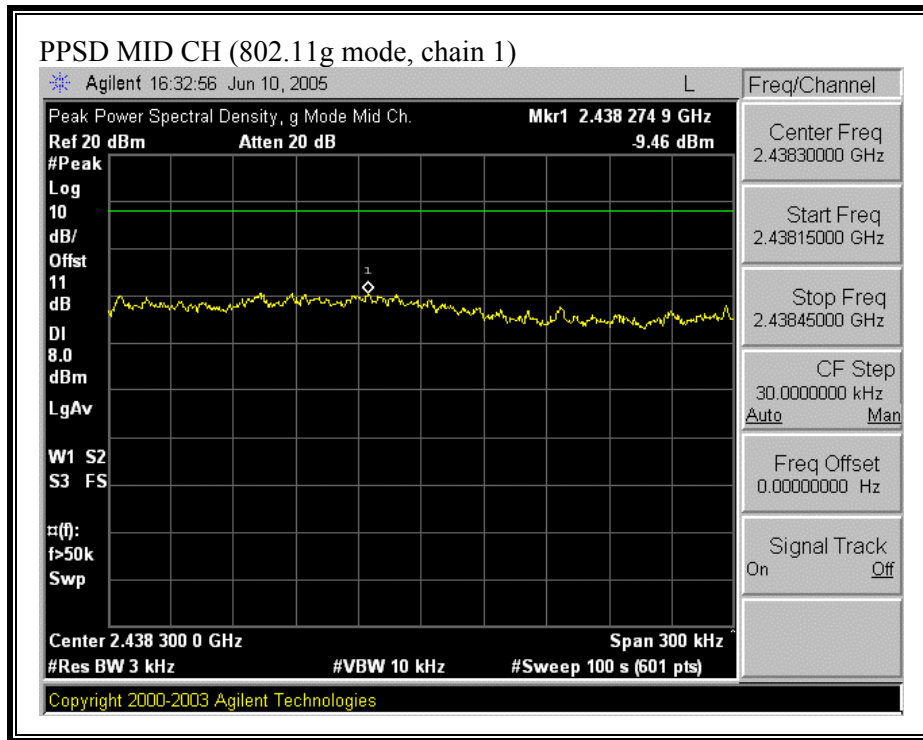
:



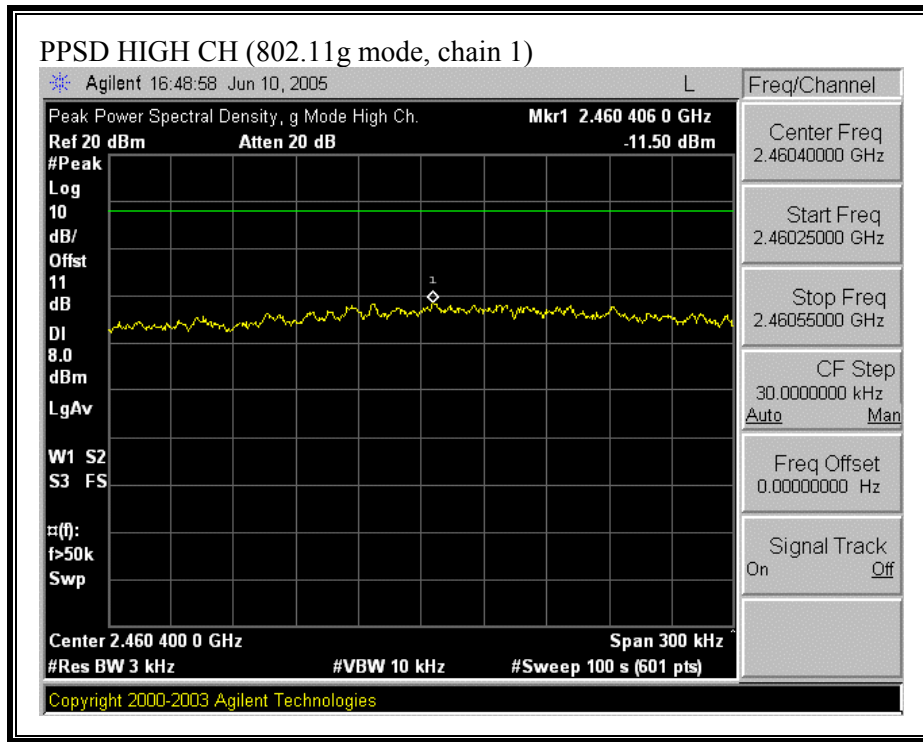
PEAK POWER SPECTRAL DENSITY (802.11g MODE, CHAIN 1)



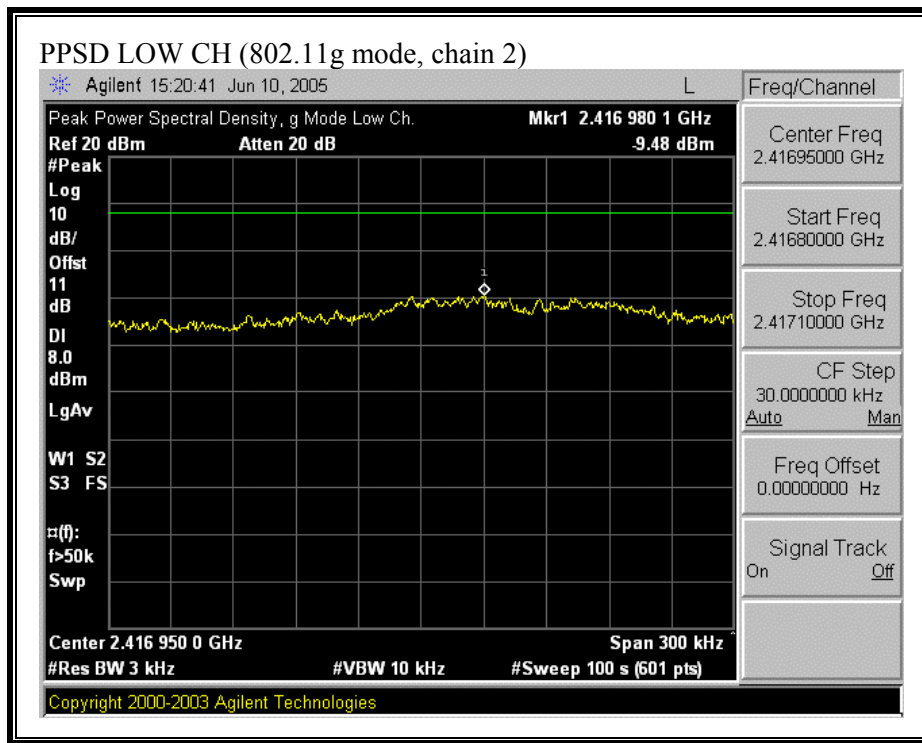
:



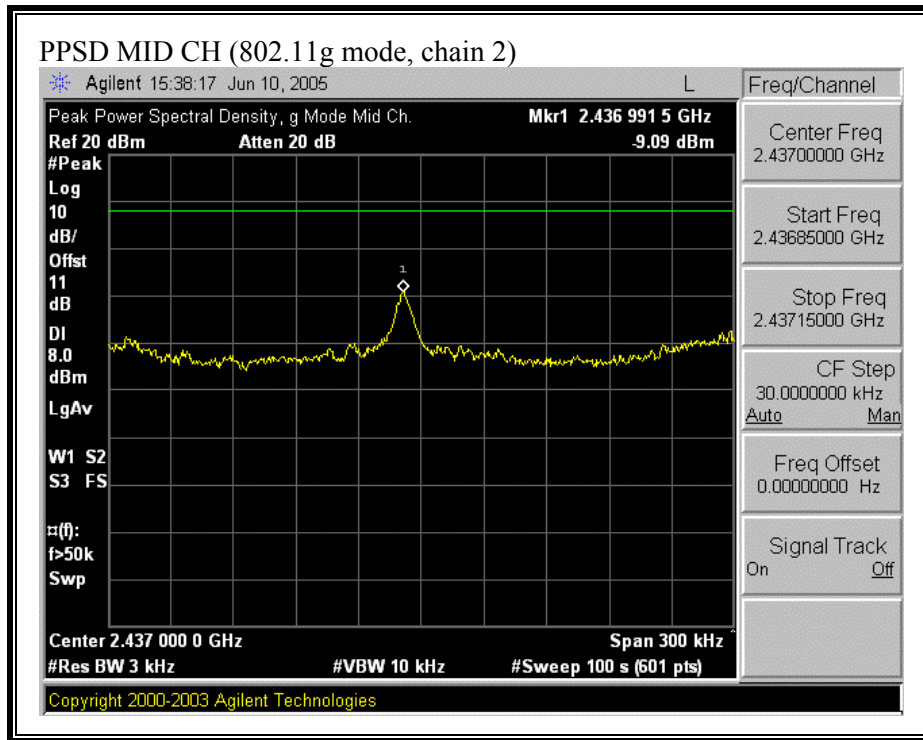
:



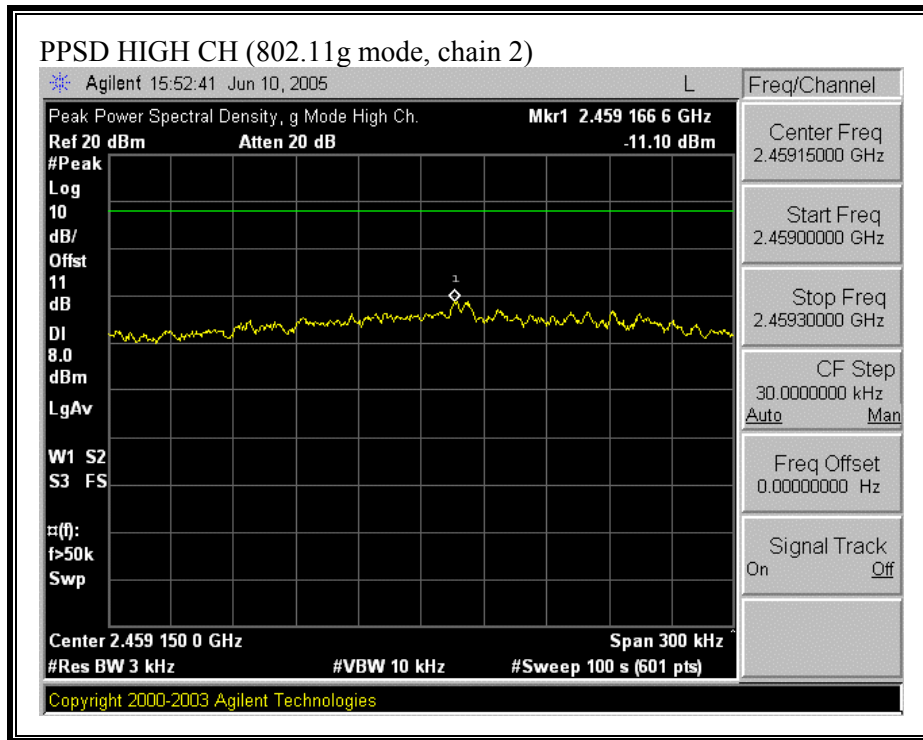
PEAK POWER SPECTRAL DENSITY (802.11g MODE, CHAIN 2)



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7.1.6. 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)).

Conducted power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

TEST PROCEDURE

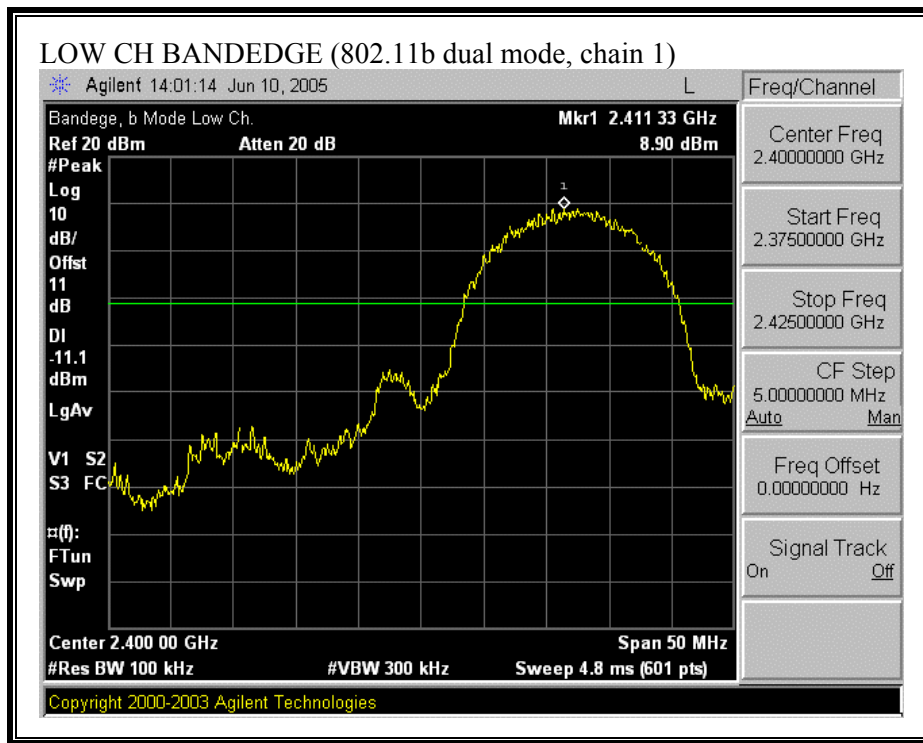
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

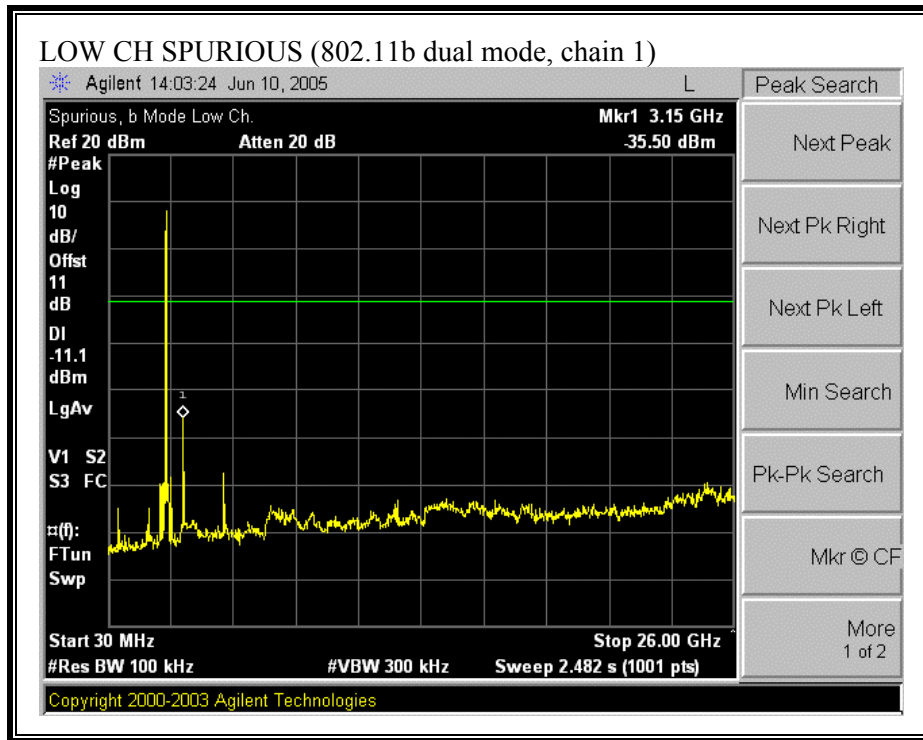
RESULTS

No non-compliance noted:

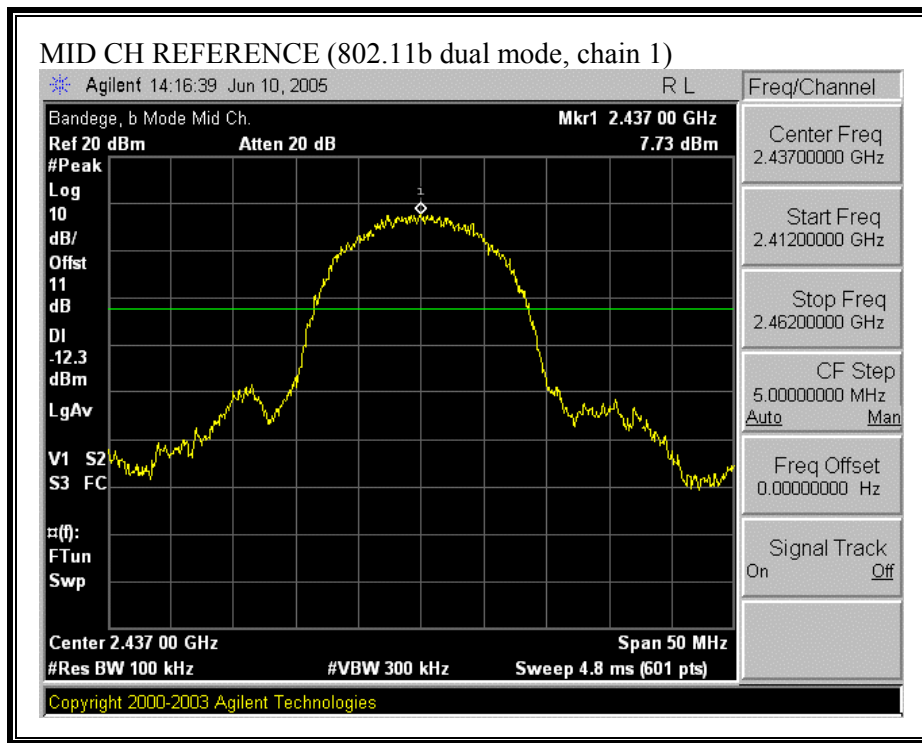
SPURIOUS EMISSIONS, LOW CHANNEL (802.11b DUAL MODE, CHAIN 1)



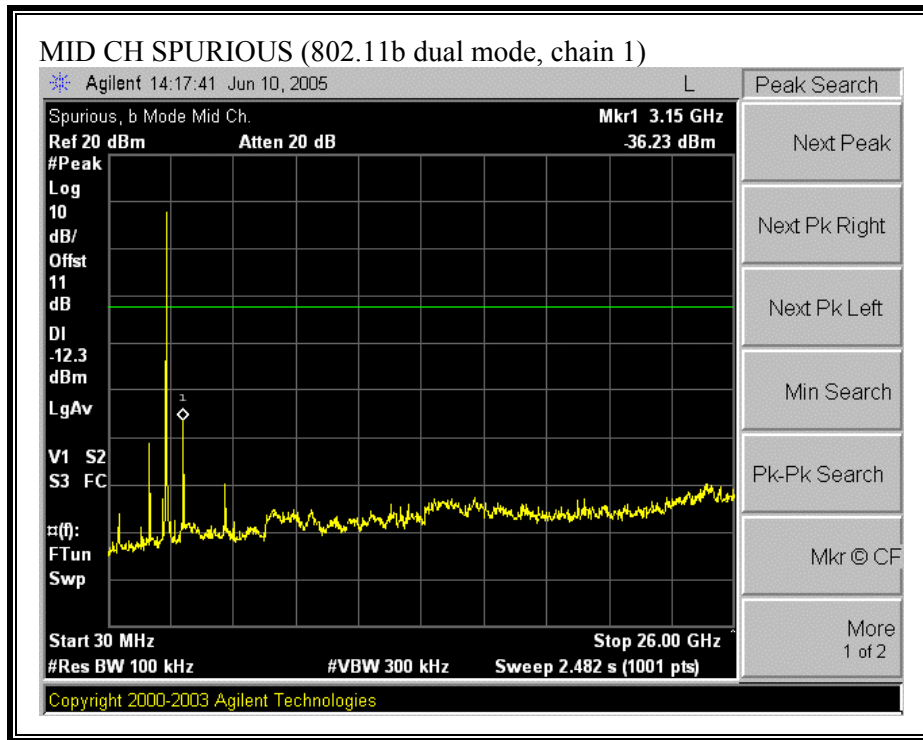
:



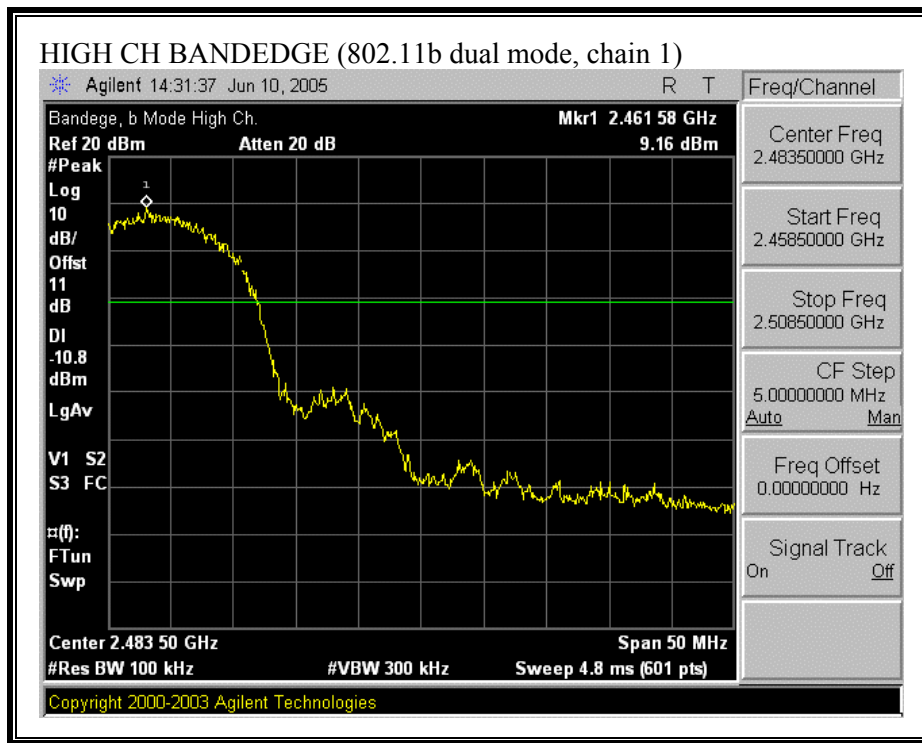
SPURIOUS EMISSIONS, MID CHANNEL (802.11b DUAL MODE, CHAIN 1)



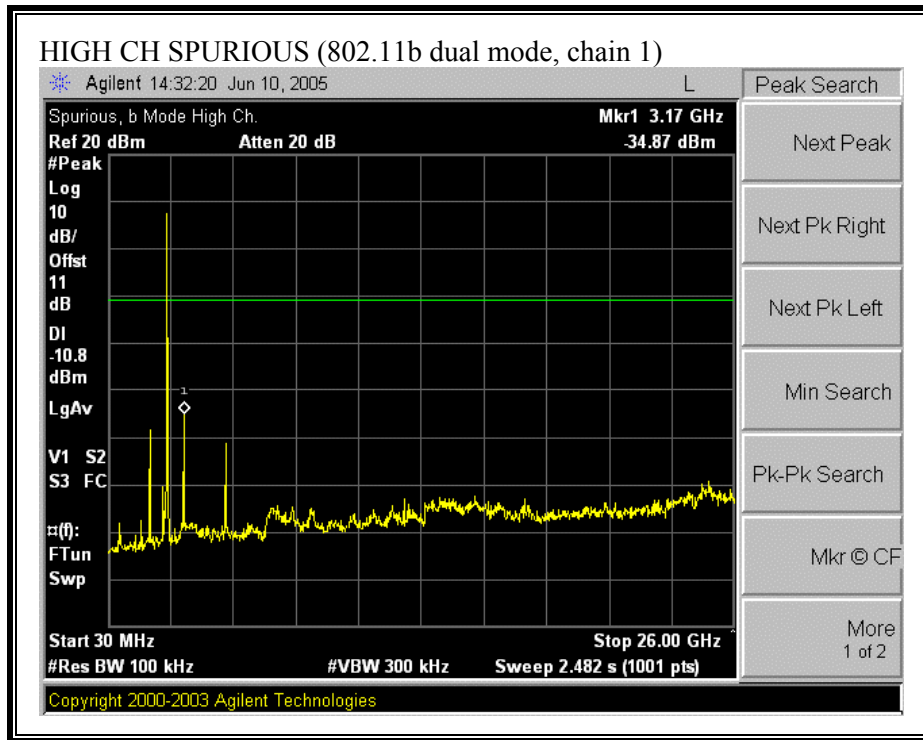
:



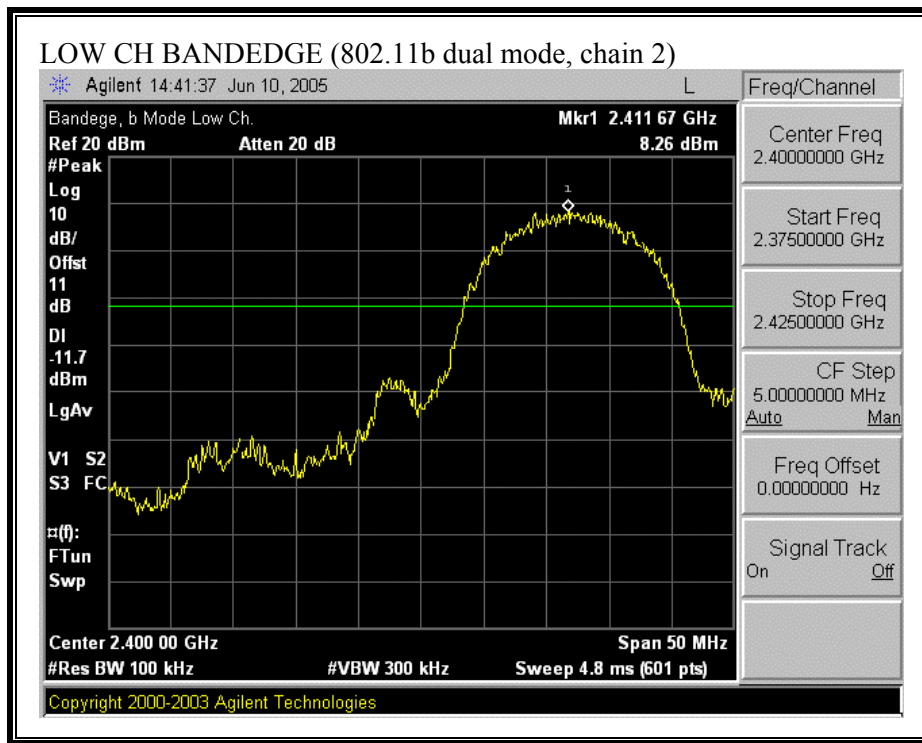
SPURIOUS EMISSIONS, HIGH CHANNEL (802.11b DUAL MODE, CHAIN 1)



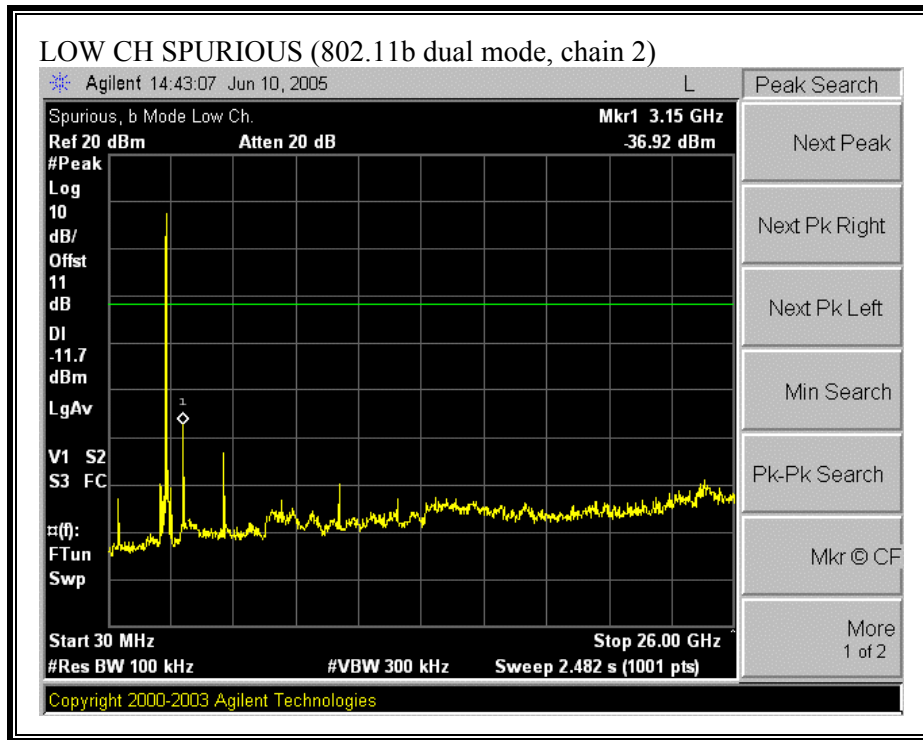
:



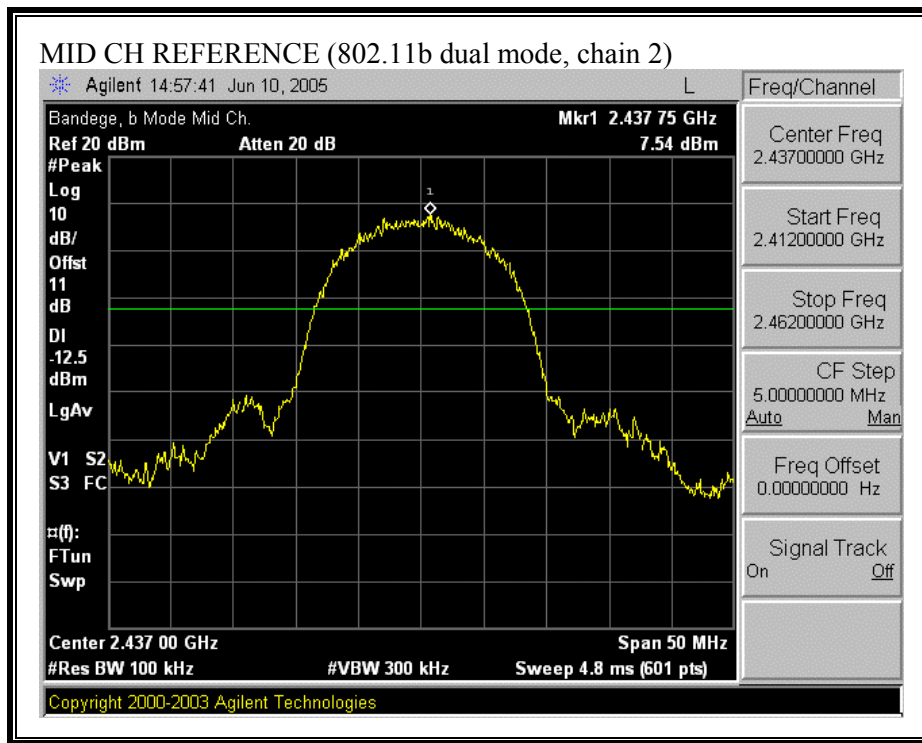
SPURIOUS EMISSIONS, LOW CHANNEL (802.11b DUAL MODE, CHAIN 2)



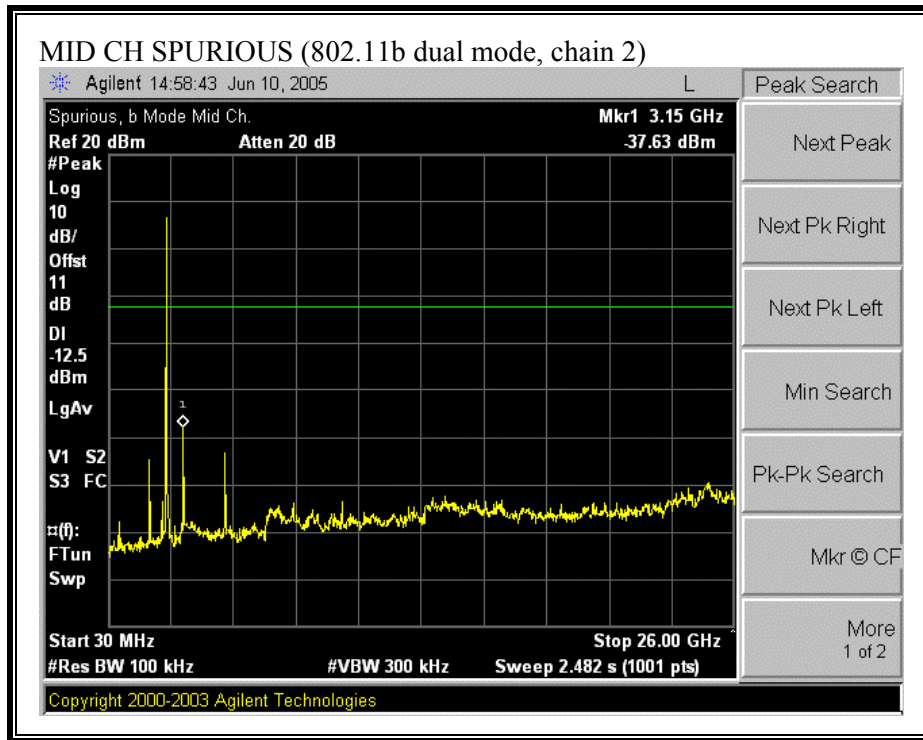
:



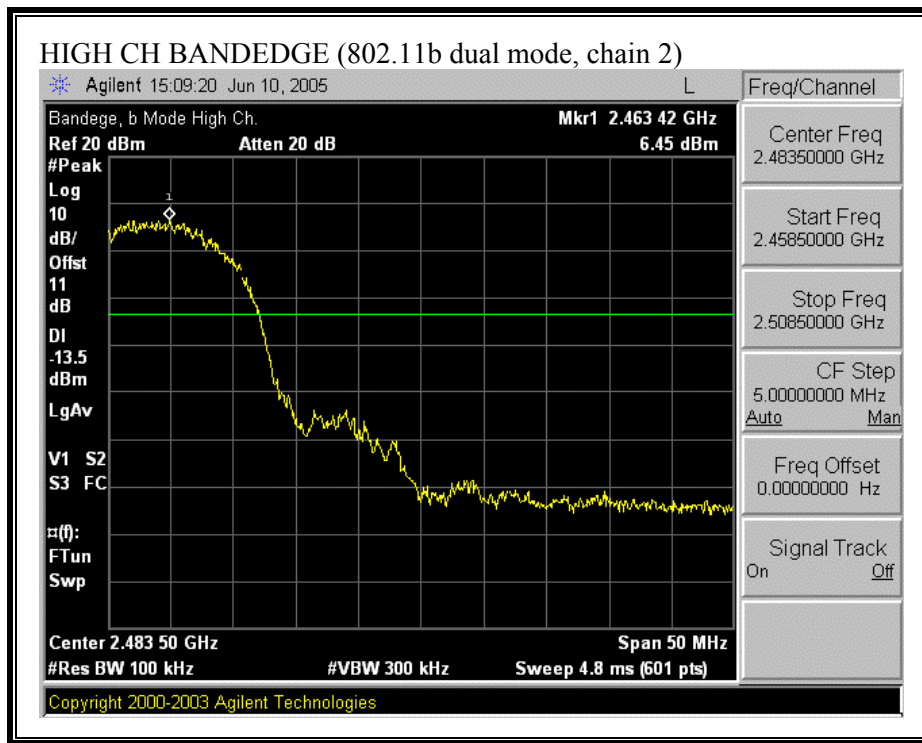
SPURIOUS EMISSIONS, MID CHANNEL (802.11b DUAL MODE, CHAIN 2)



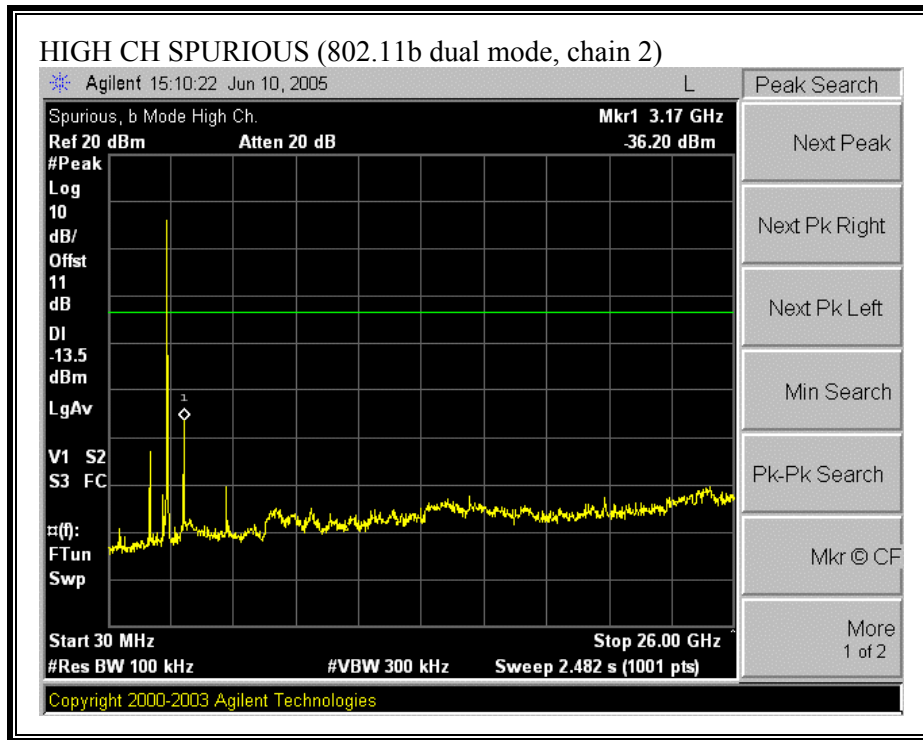
:



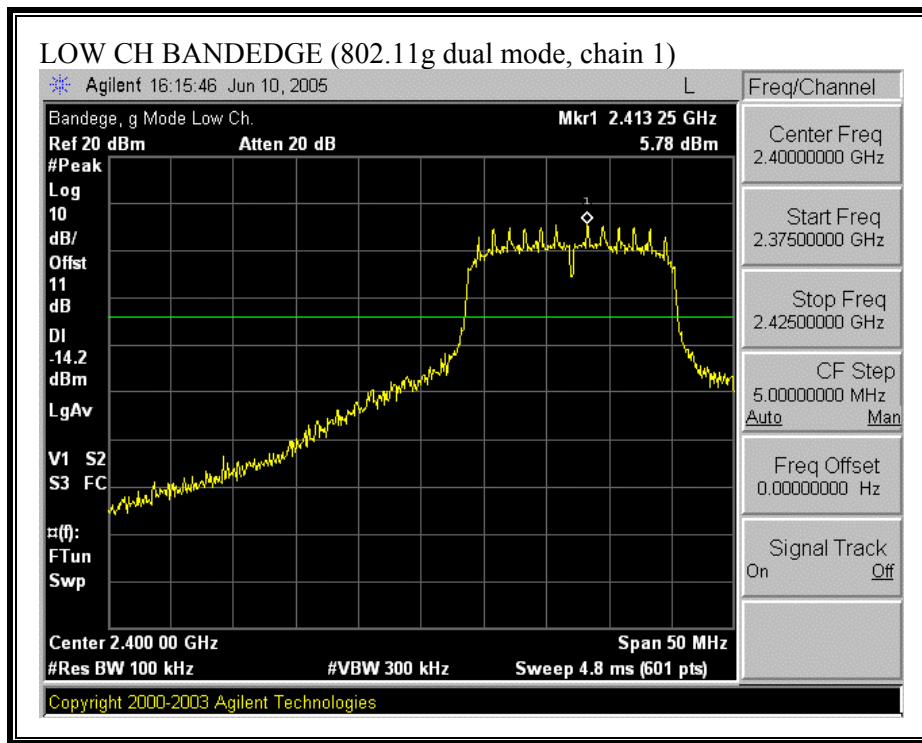
SPURIOUS EMISSIONS, HIGH CHANNEL (802.11b DUAL MODE, CHAIN 2)



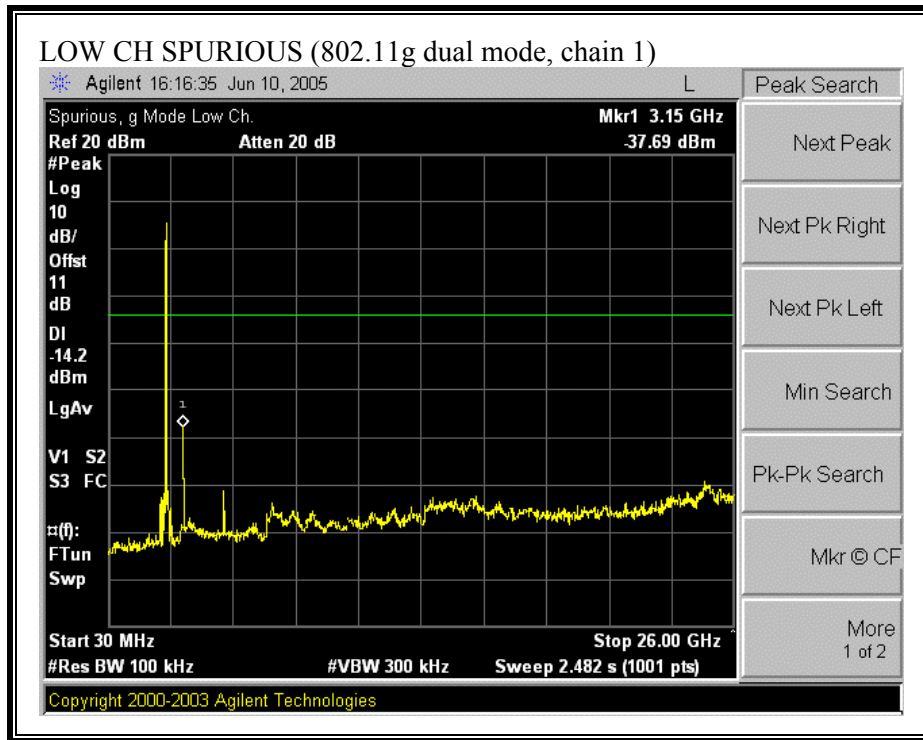
:



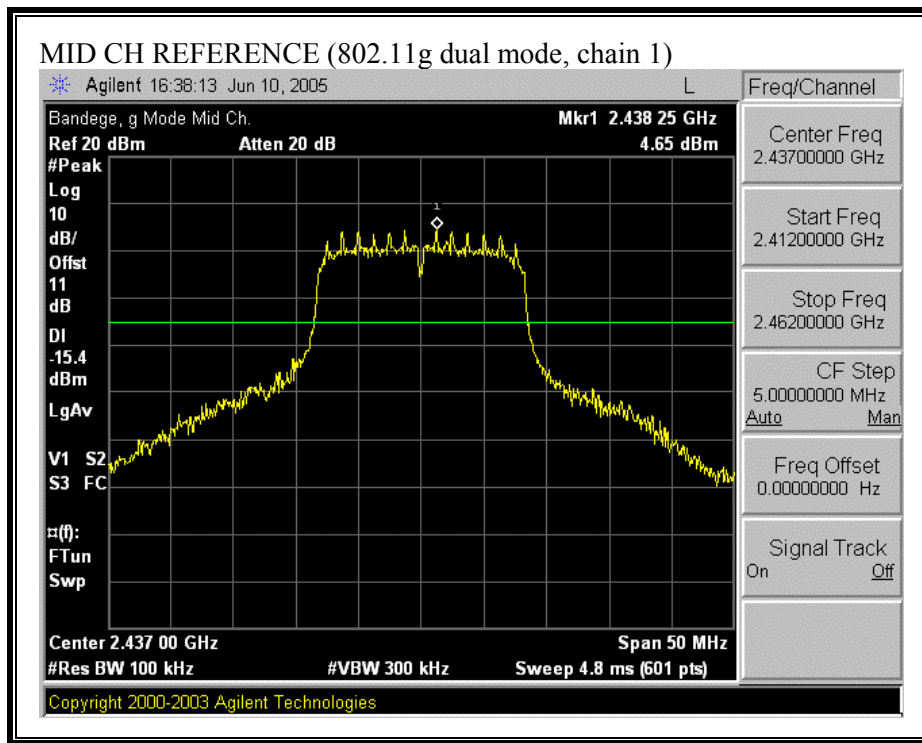
SPURIOUS EMISSIONS, LOW CHANNEL (802.11g DUAL MODE, CHAIN 1)



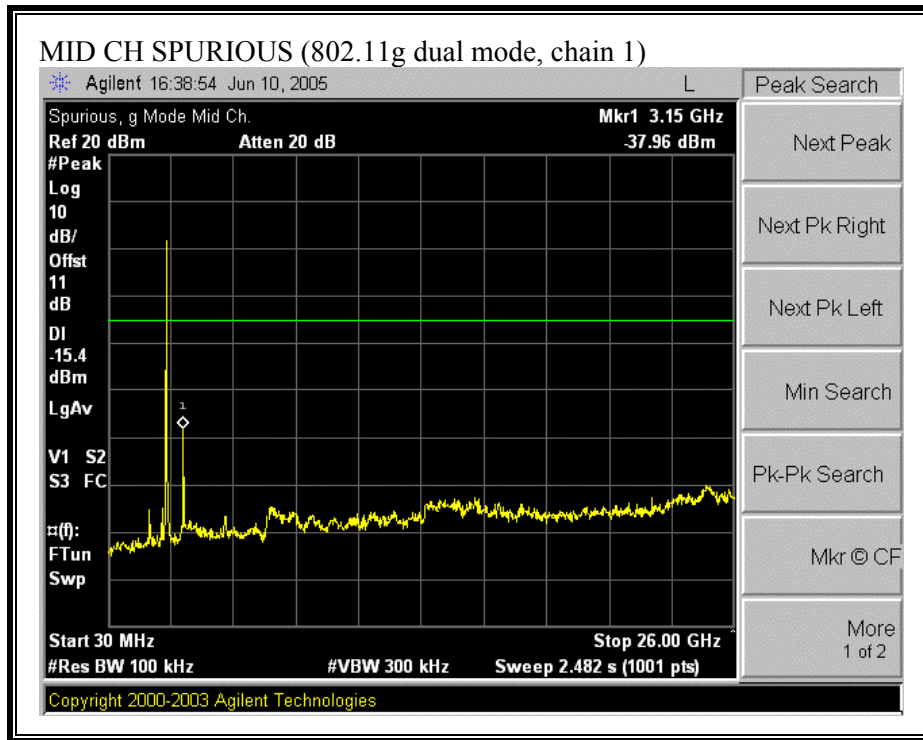
:



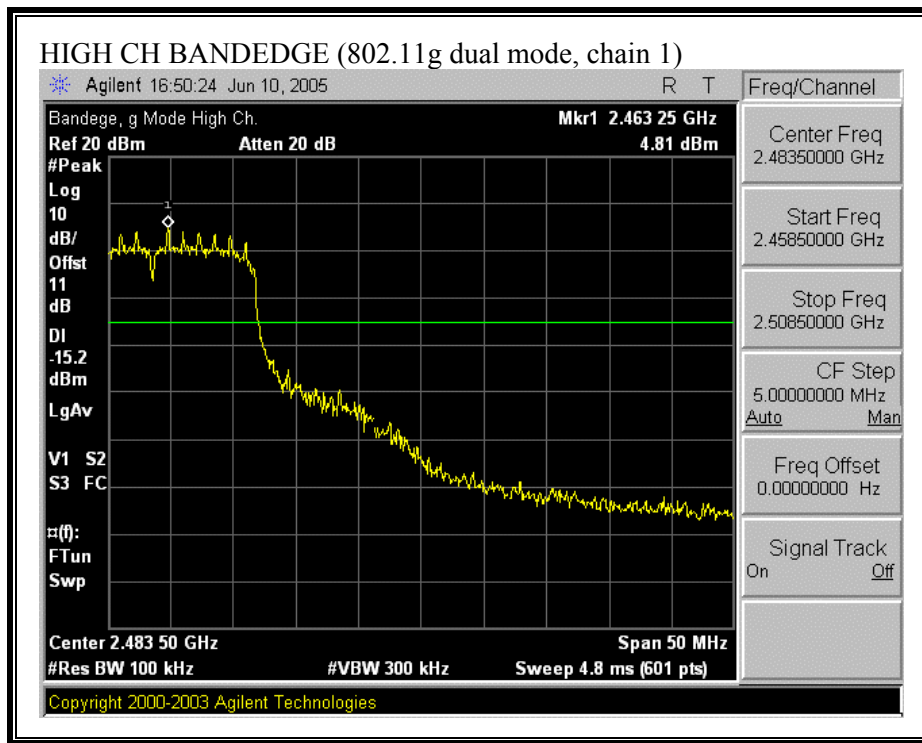
SPURIOUS EMISSIONS, MID CHANNEL (802.11g DUAL MODE, CHAIN 1)



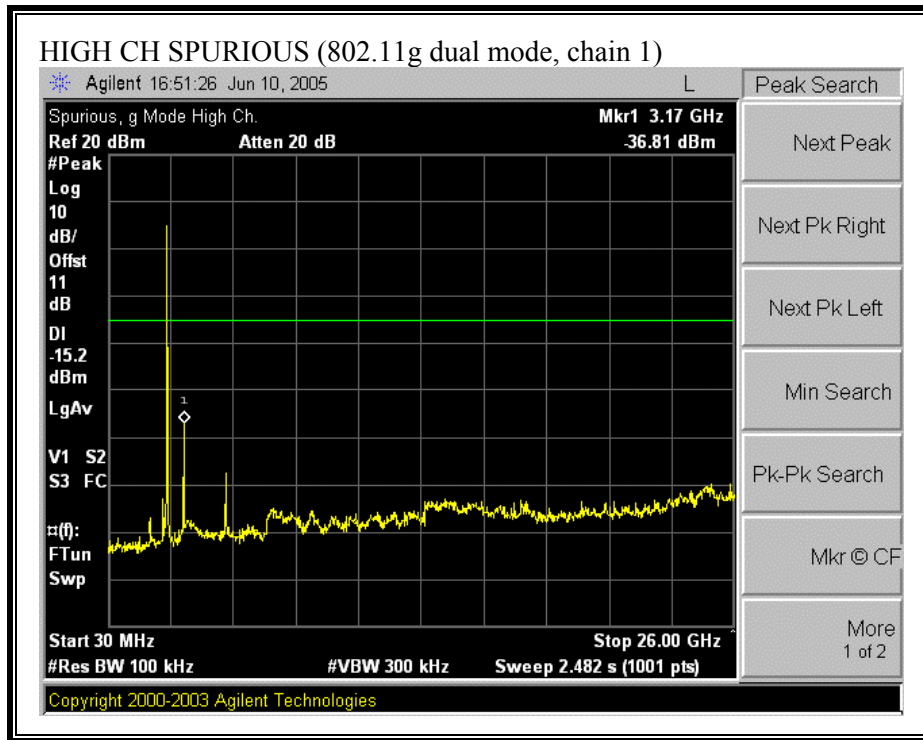
:



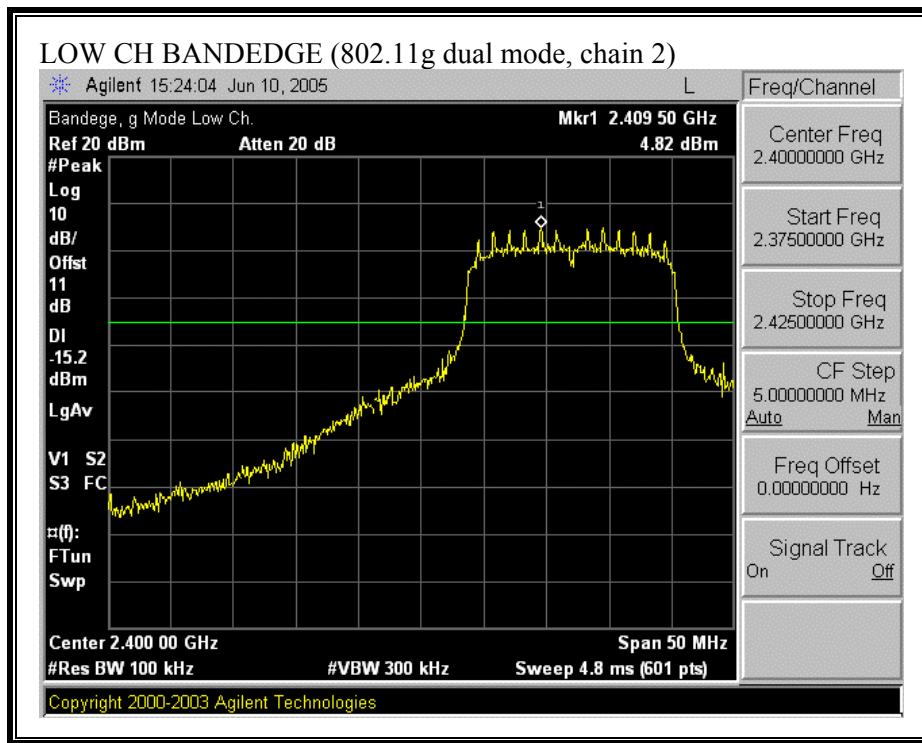
SPURIOUS EMISSIONS, HIGH CHANNEL (802.11g DUAL MODE, CHAIN 1)



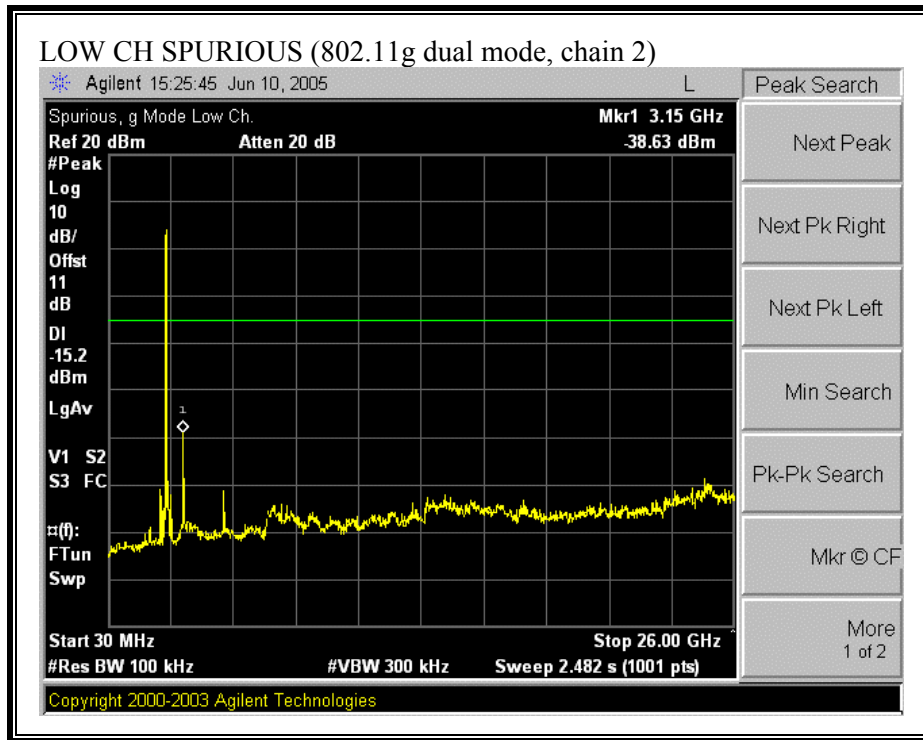
:



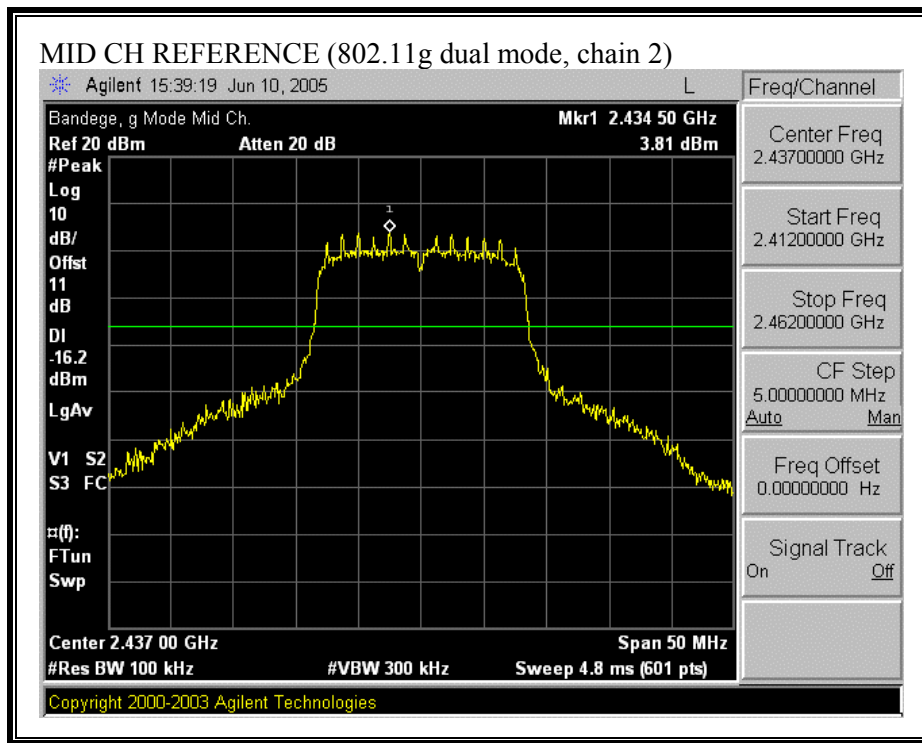
SPURIOUS EMISSIONS, LOW CHANNEL (802.11g DUAL MODE, CHAIN 2)



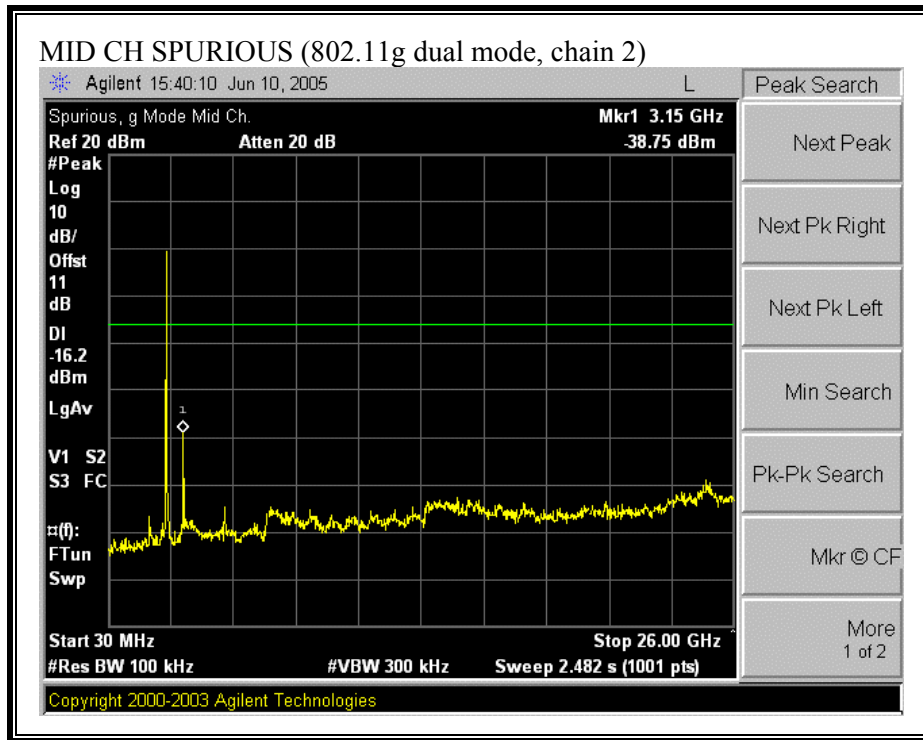
:



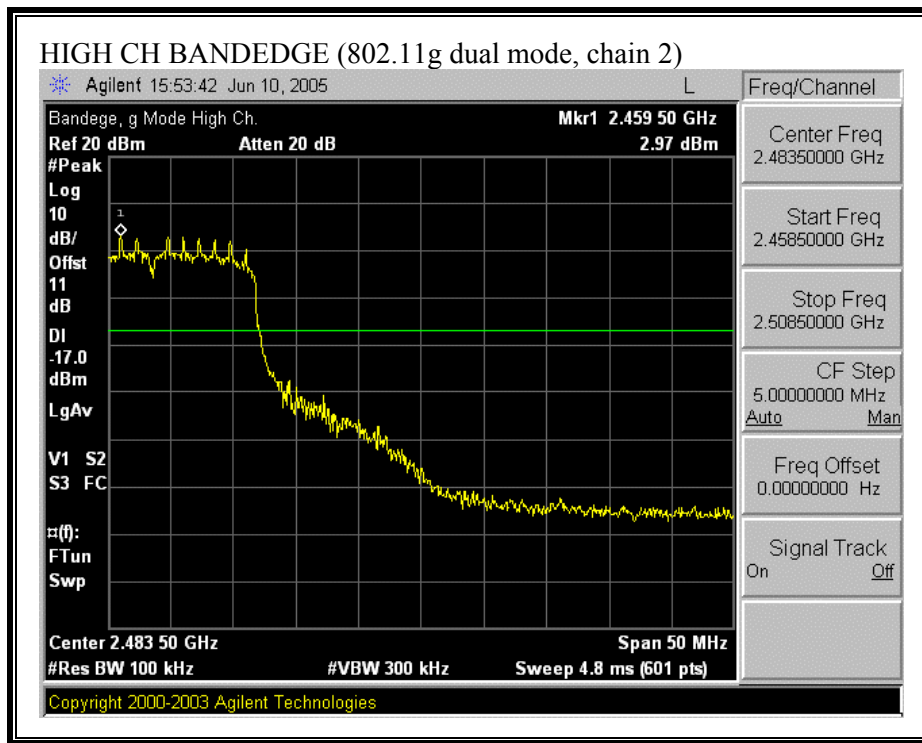
SPURIOUS EMISSIONS, MID CHANNEL (802.11g DUAL MODE, CHAIN 2)



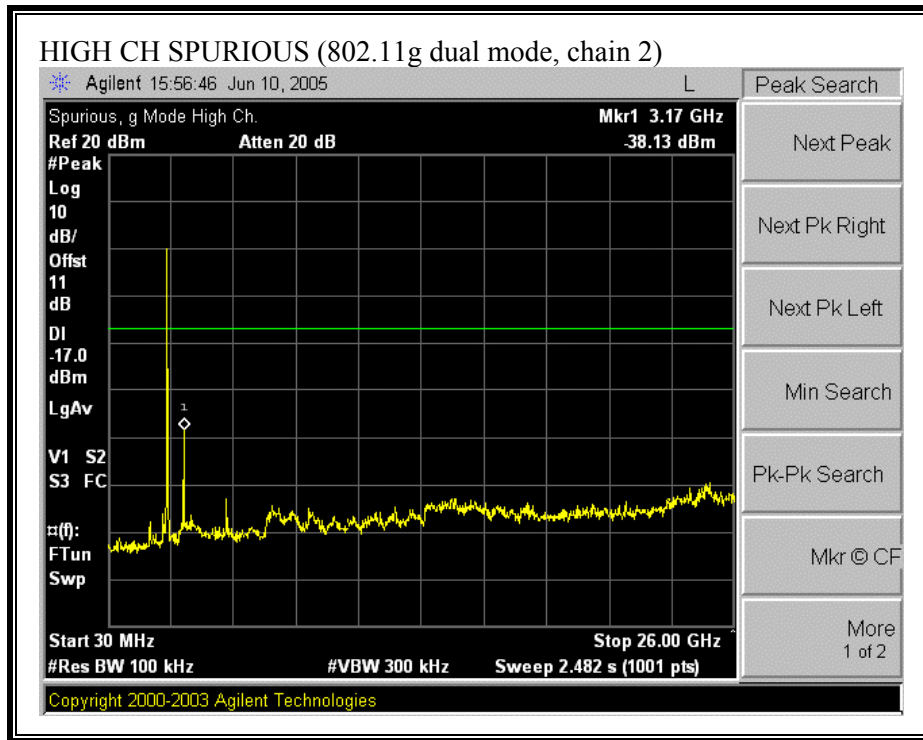
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SPURIOUS EMISSIONS, HIGH CHANNEL (802.11g DUAL MODE, CHAIN 2)



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7.2. RADIATED EMISSIONS

7.2.1. 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.

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TEST PROCEDURE

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

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

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

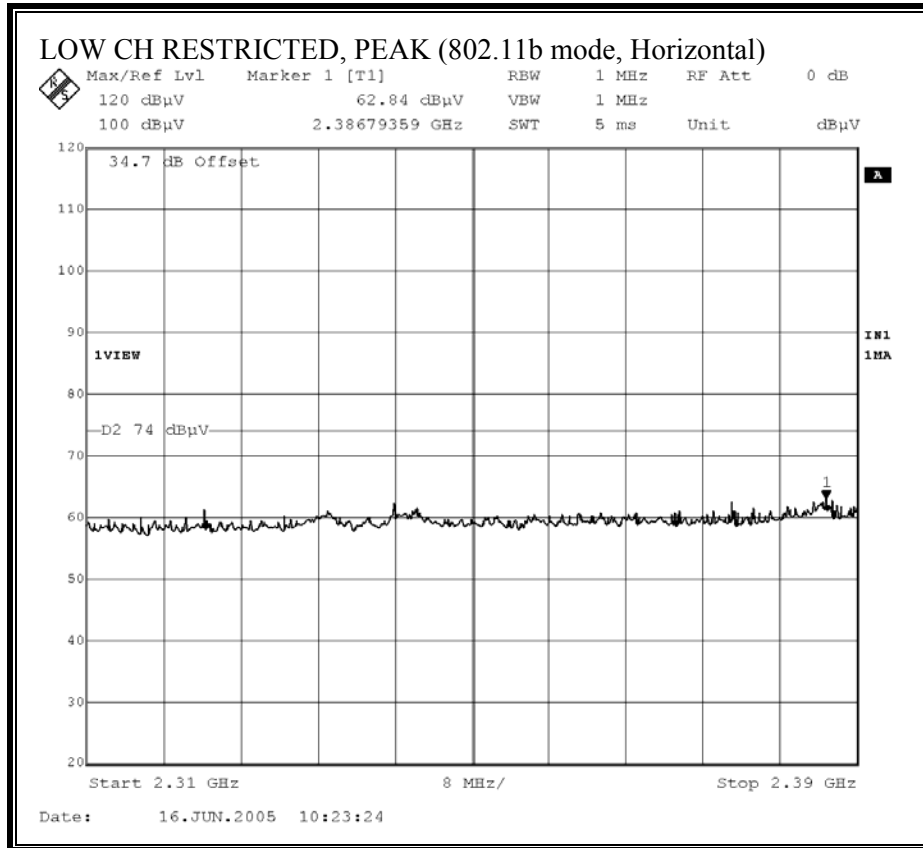
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 5 GHz band.

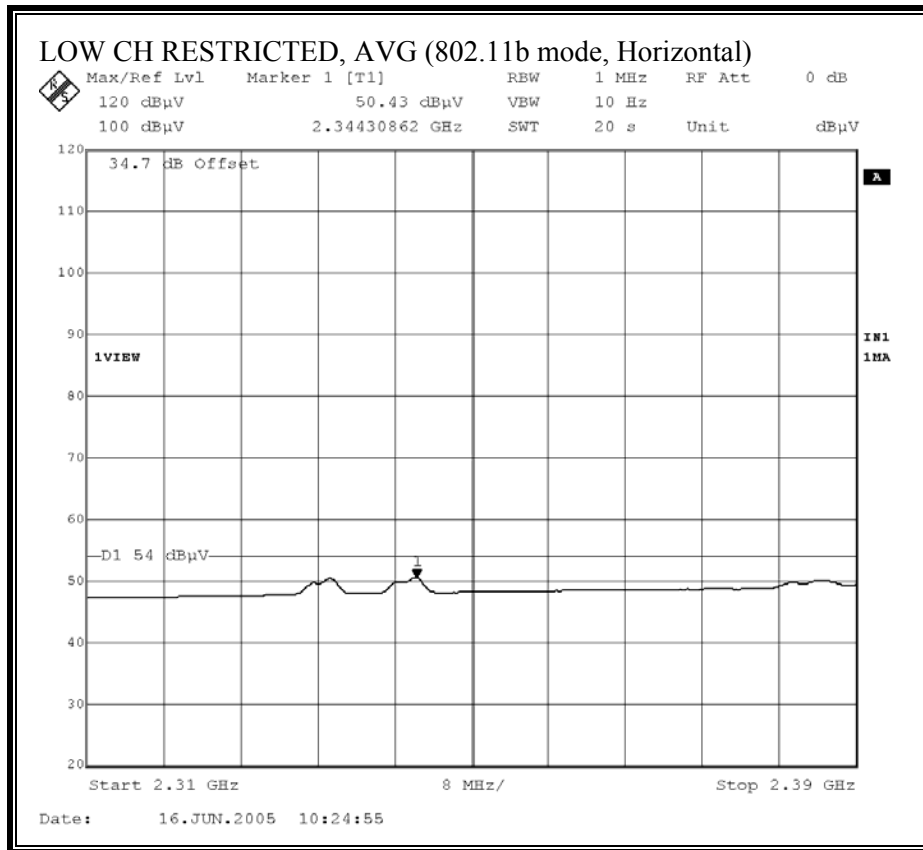
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

7.2.2. TRANSMITTER ABOVE 1 GHz FOR 2400 TO 2483.5 MHz BAND

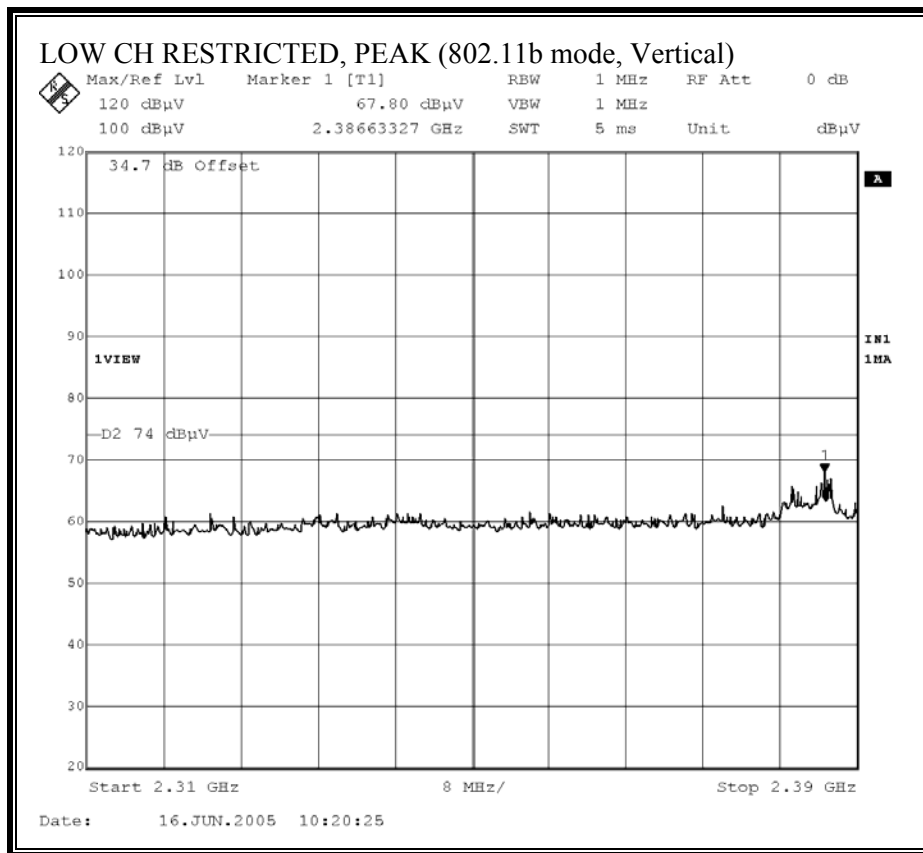
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)



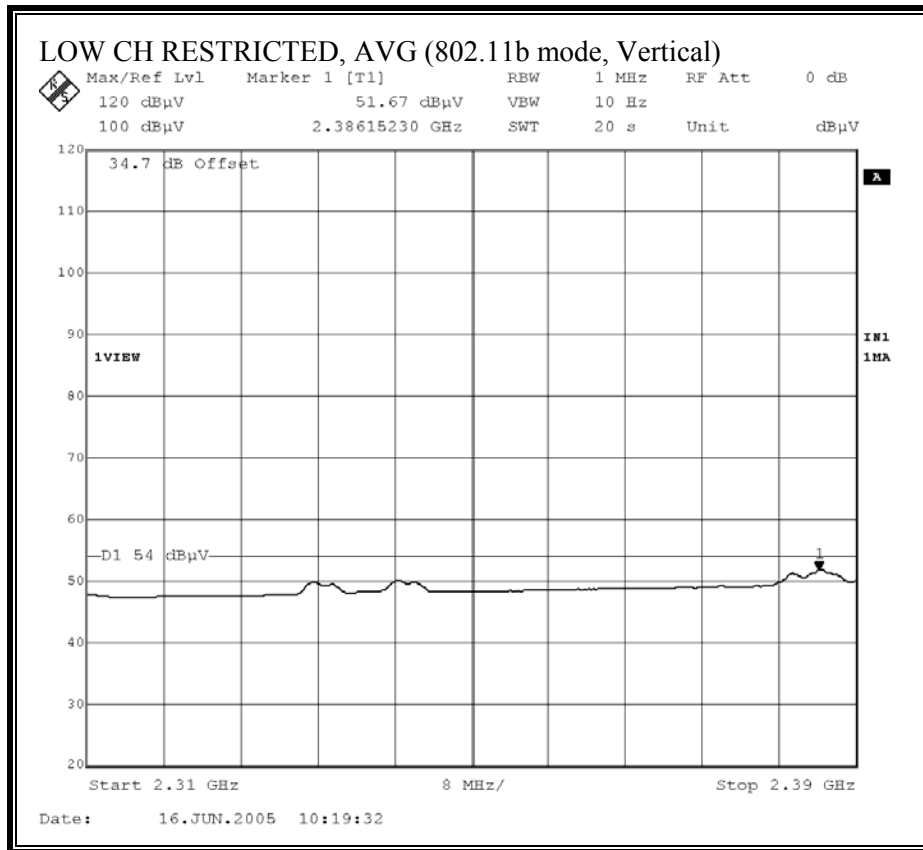
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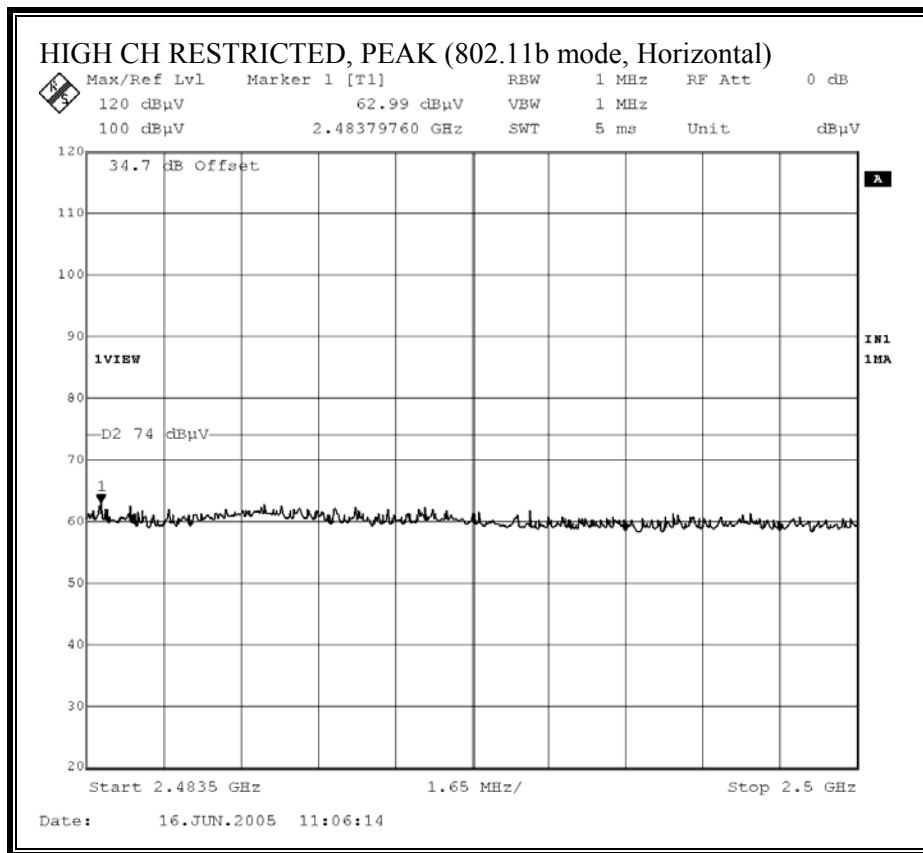
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)



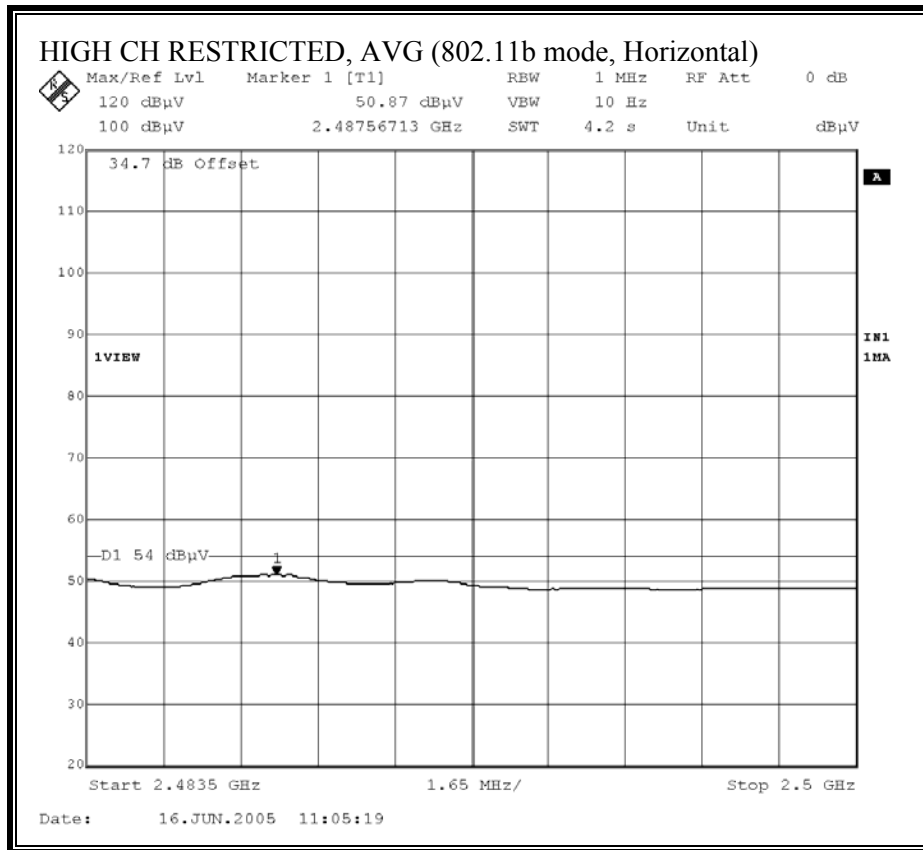
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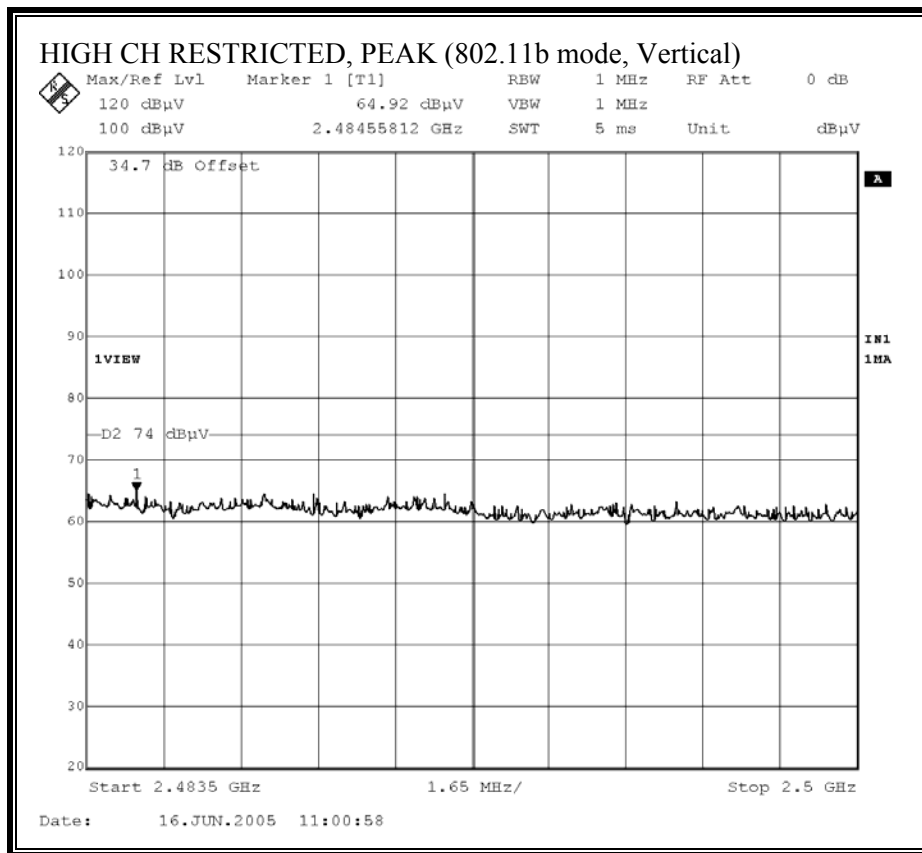
RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)



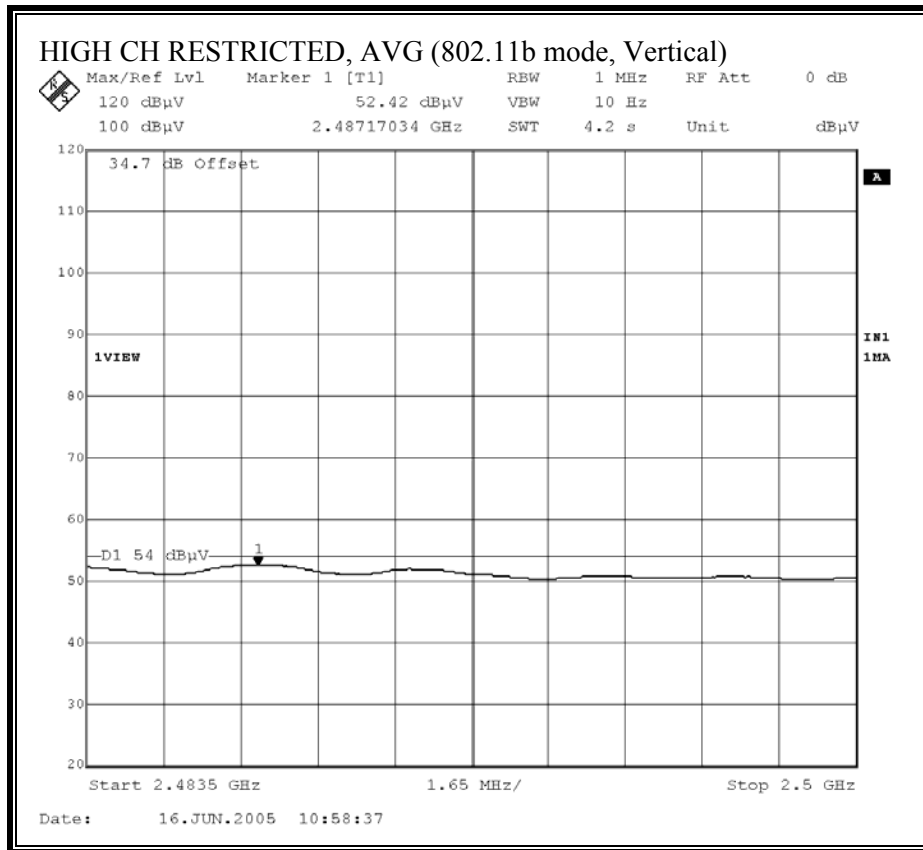
:



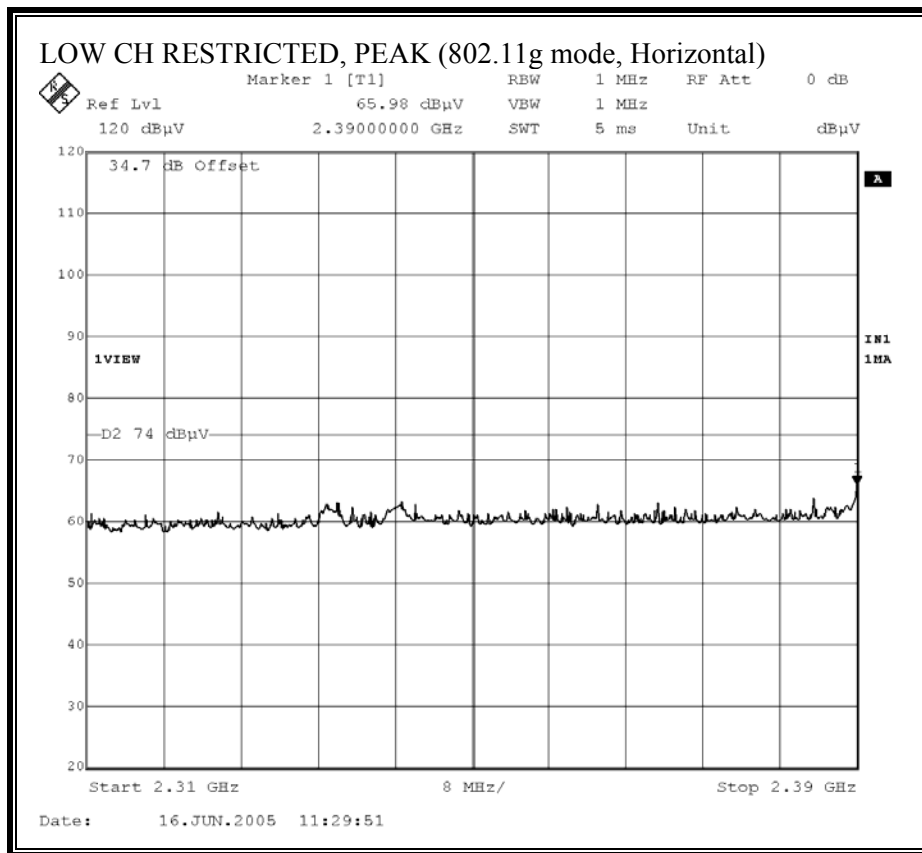
RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



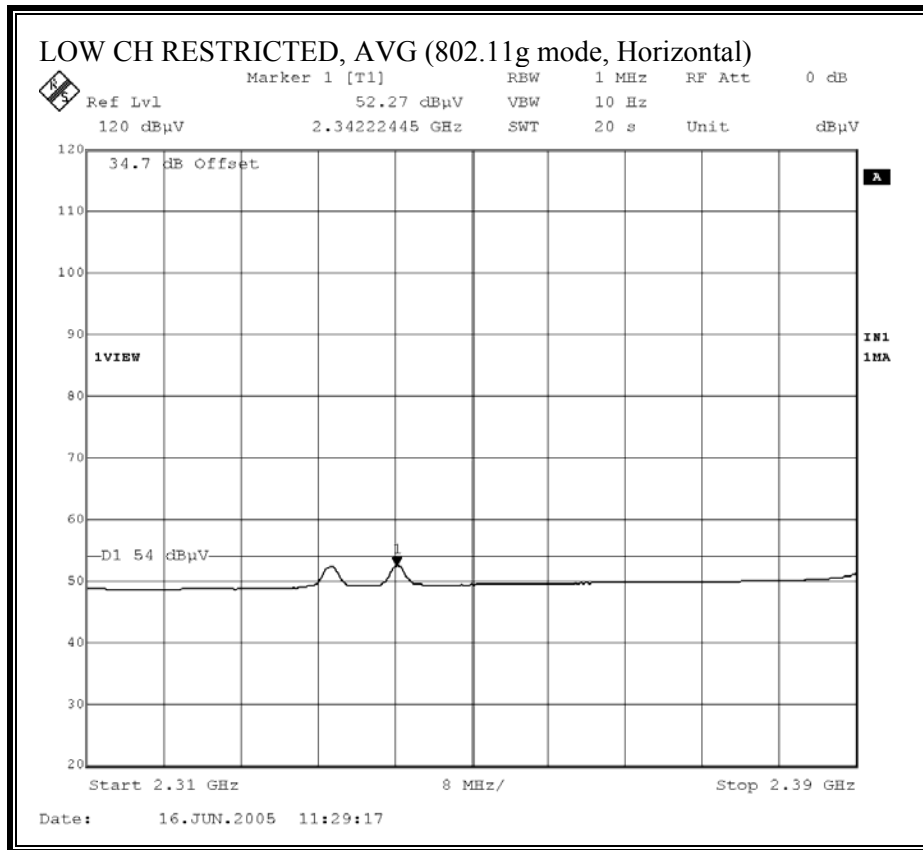
:



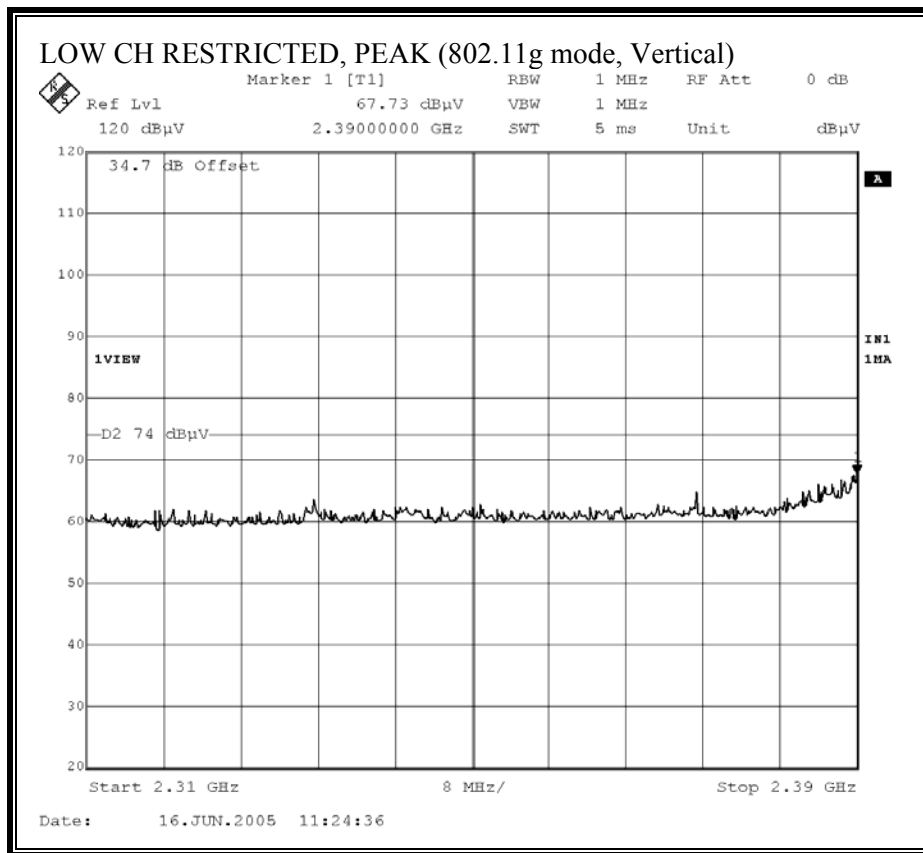
RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)



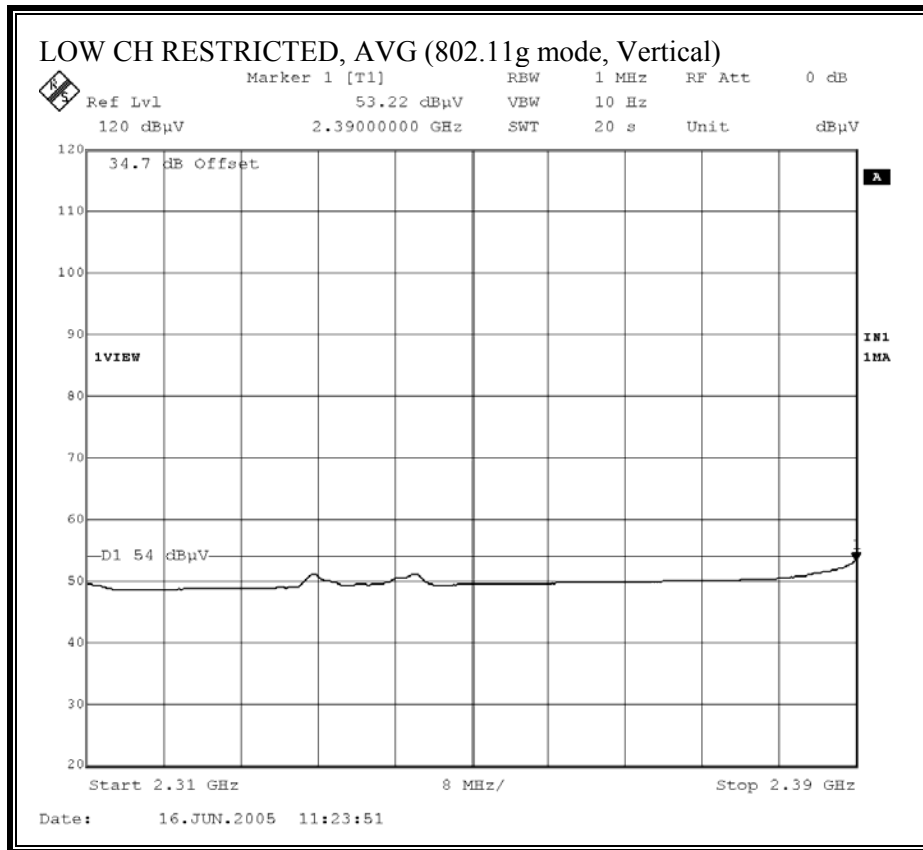
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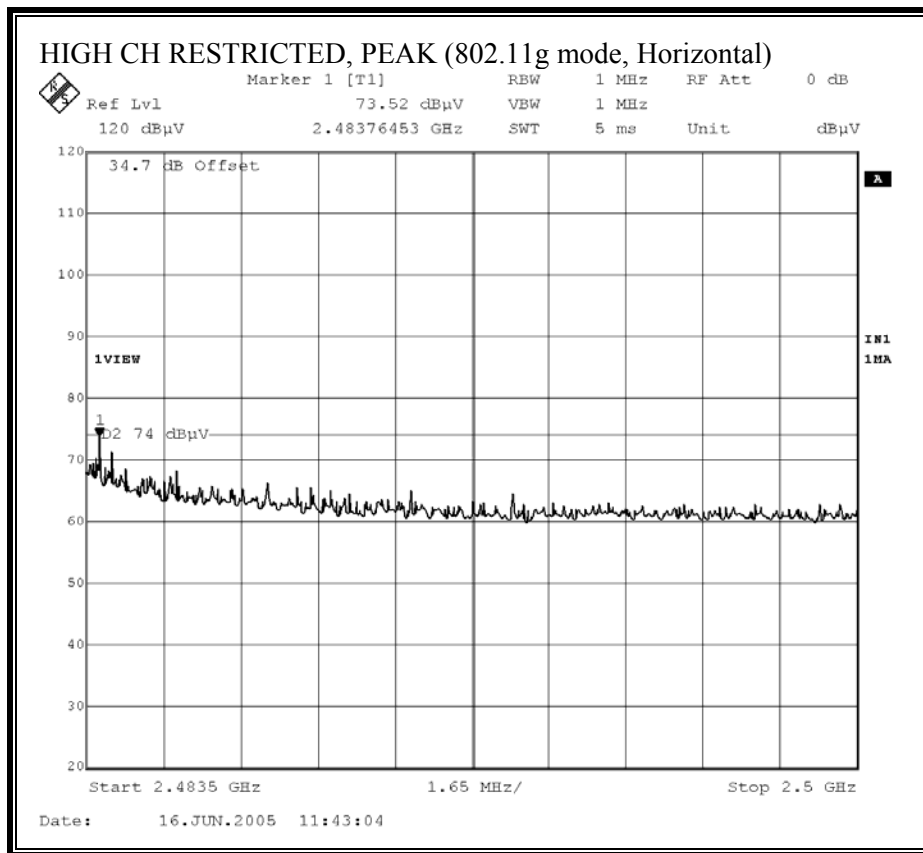
RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)



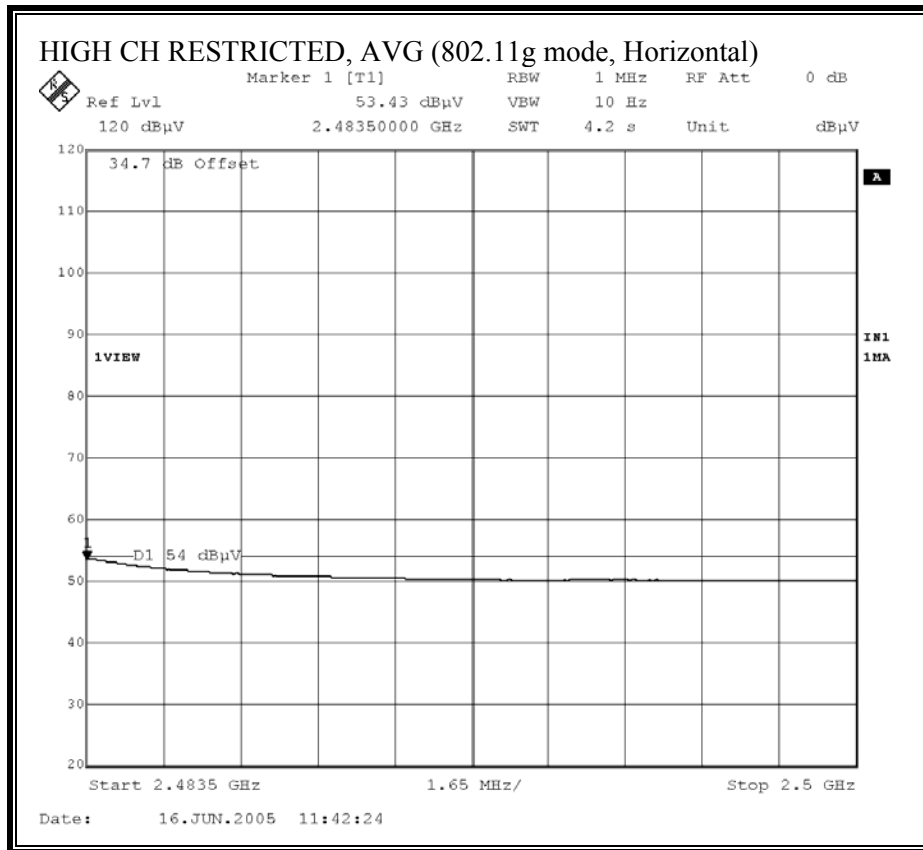
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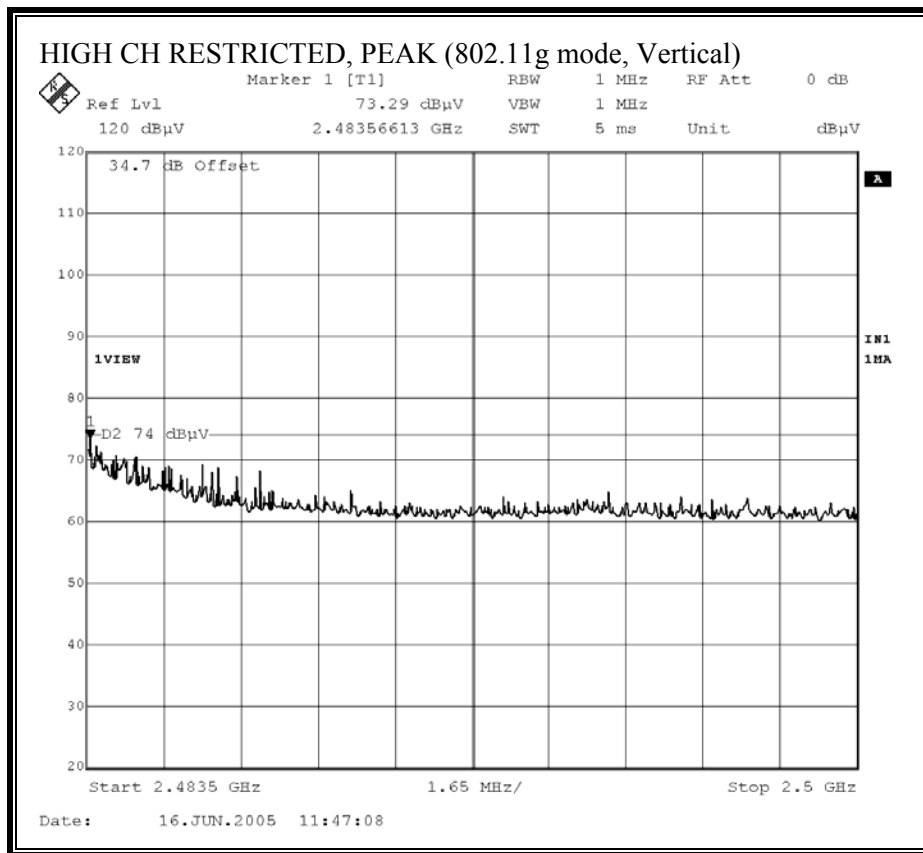
RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)



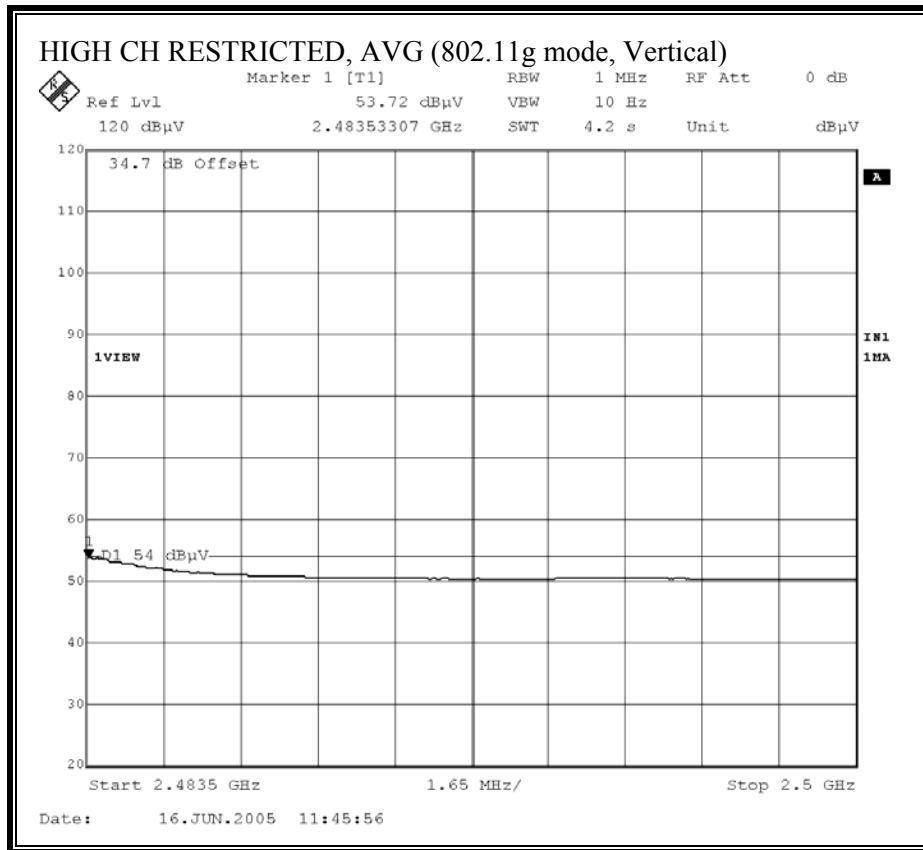
:



RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)

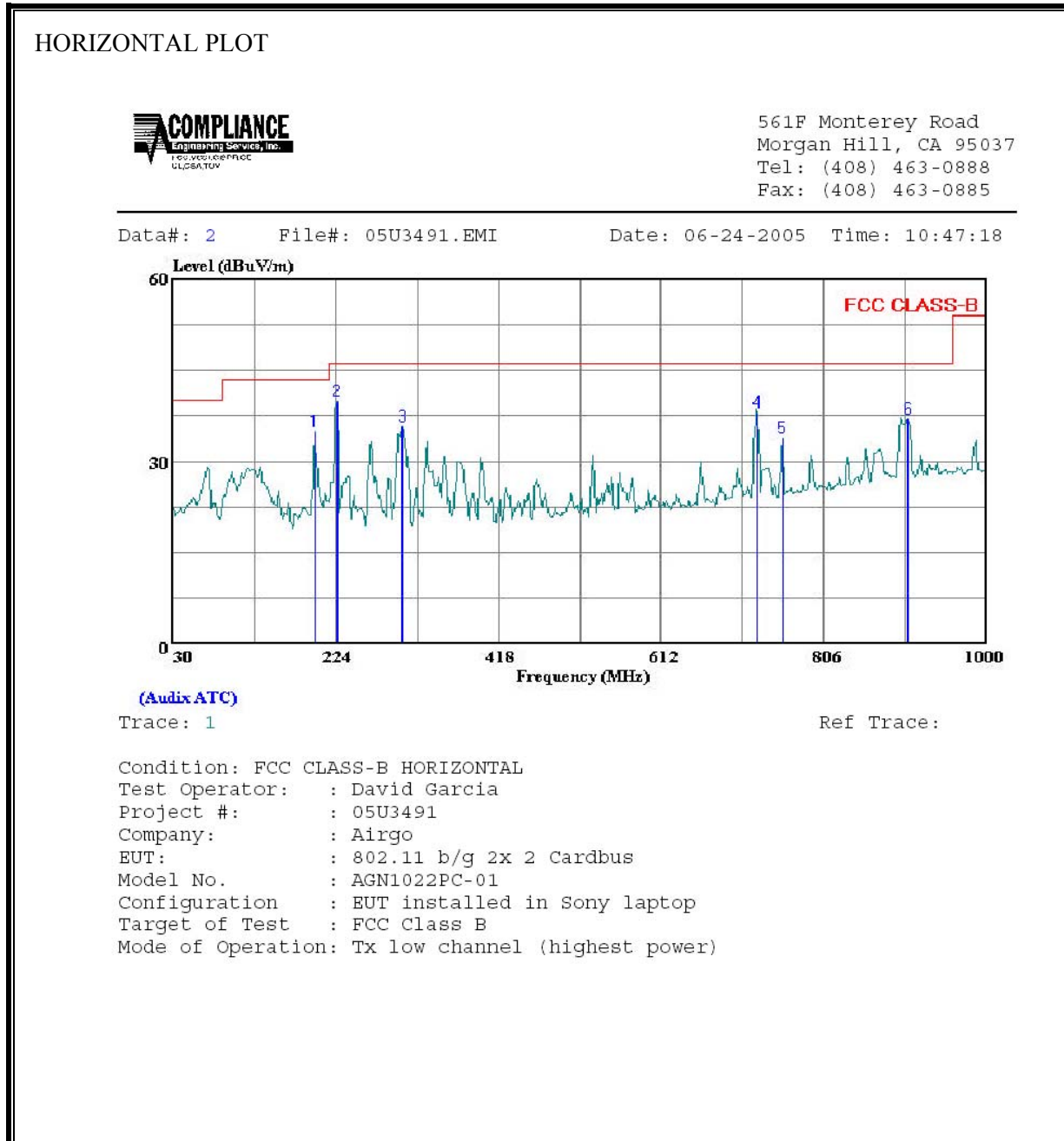


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7.2.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

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

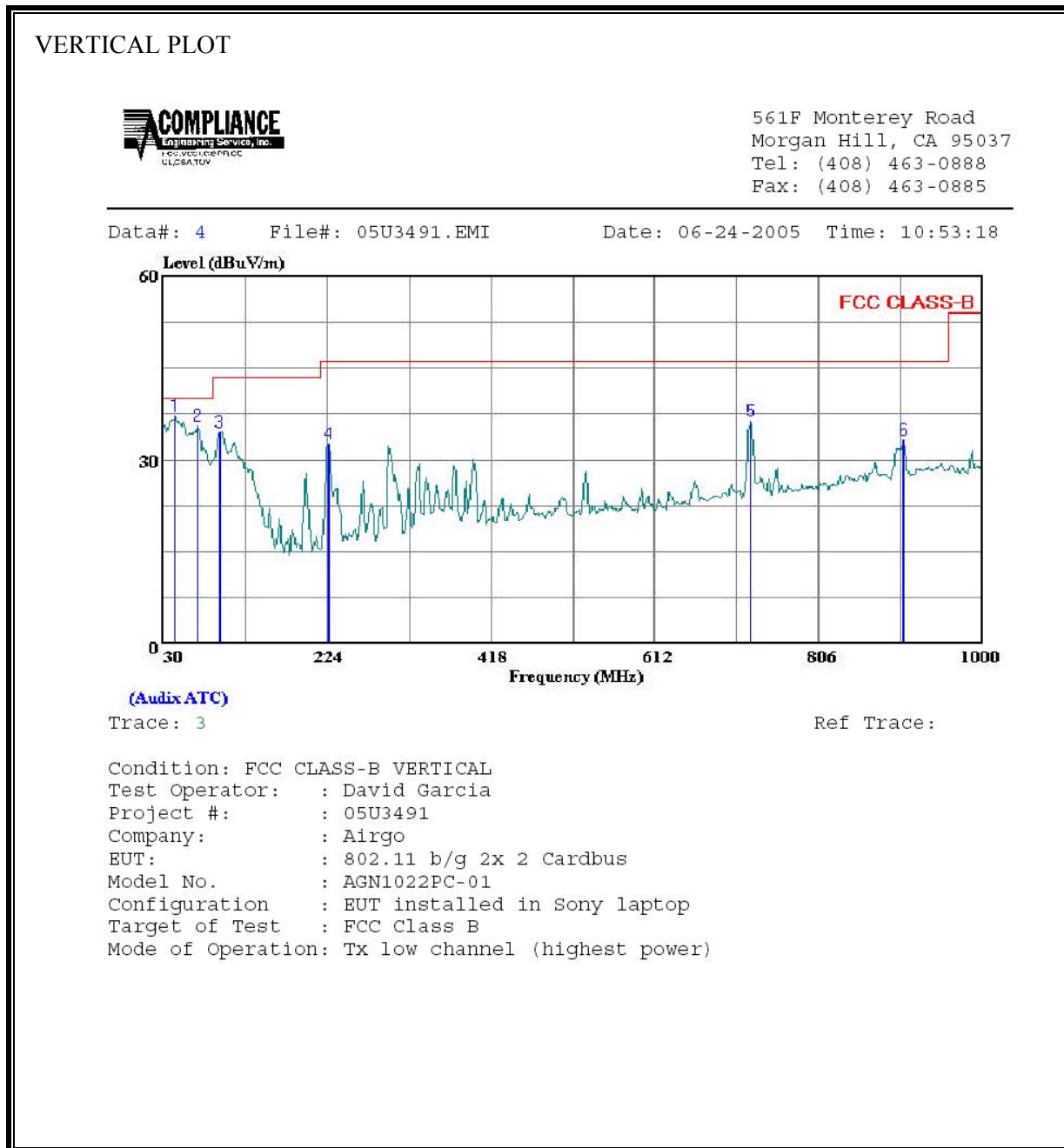


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HORIZONTAL DATA

| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark |
|---|---------|------------|--------|--------|------------|------------|--------|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | |
| 1 | 198.780 | 20.48 | 14.37 | 34.85 | 43.50 | -8.65 | Peak |
| 2 | 225.940 | 26.90 | 12.91 | 39.81 | 46.00 | -6.19 | Peak |
| 3 | 303.540 | 20.04 | 15.75 | 35.79 | 46.00 | -10.21 | Peak |
| 4 | 726.460 | 14.54 | 23.53 | 38.06 | 46.00 | -7.94 | Peak |
| 5 | 756.530 | 9.87 | 23.93 | 33.80 | 46.00 | -12.20 | Peak |
| 6 | 906.880 | 10.91 | 26.01 | 36.92 | 46.00 | -9.08 | Peak |

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



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VERTICAL DATA

| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark |
|---|---------|------------|--------|--------|------------|------------|--------|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | |
| 1 | 43.580 | 24.16 | 13.02 | 37.18 | 40.00 | -2.82 | Peak |
| 2 | 70.740 | 26.21 | 9.34 | 35.55 | 40.00 | -4.45 | Peak |
| 3 | 96.930 | 23.93 | 10.58 | 34.51 | 43.50 | -8.99 | Peak |
| 4 | 225.940 | 19.65 | 12.91 | 32.56 | 46.00 | -13.44 | Peak |
| 5 | 725.490 | 12.84 | 23.53 | 36.37 | 46.00 | -9.63 | Peak |
| 6 | 906.880 | 7.30 | 26.01 | 33.31 | 46.00 | -12.70 | Peak |

7.3. POWERLINE CONDUCTED EMISSIONS

LIMIT

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

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

| Frequency of Emission (MHz) | Conducted 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.

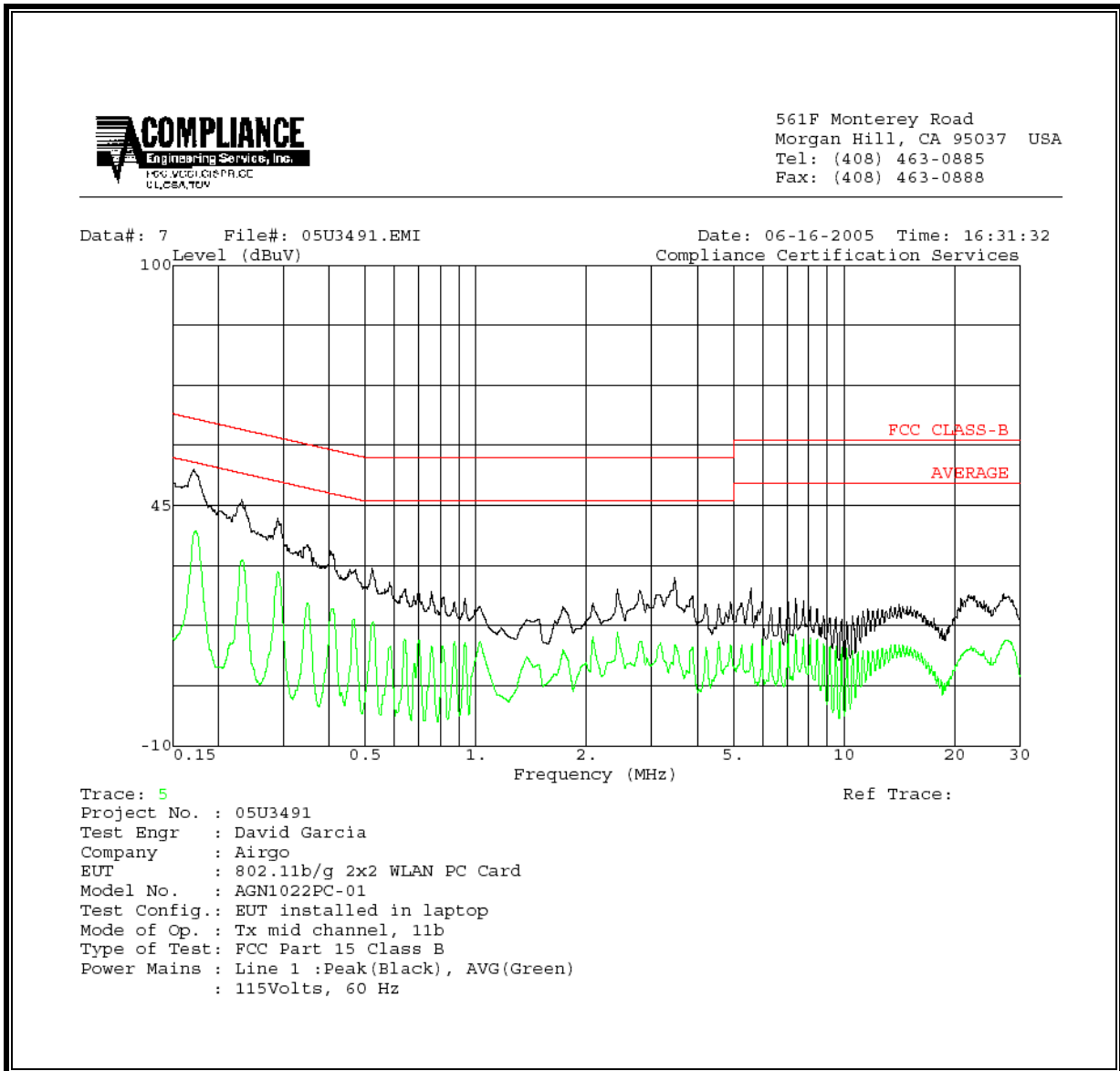
RESULTS

No non-compliance noted:

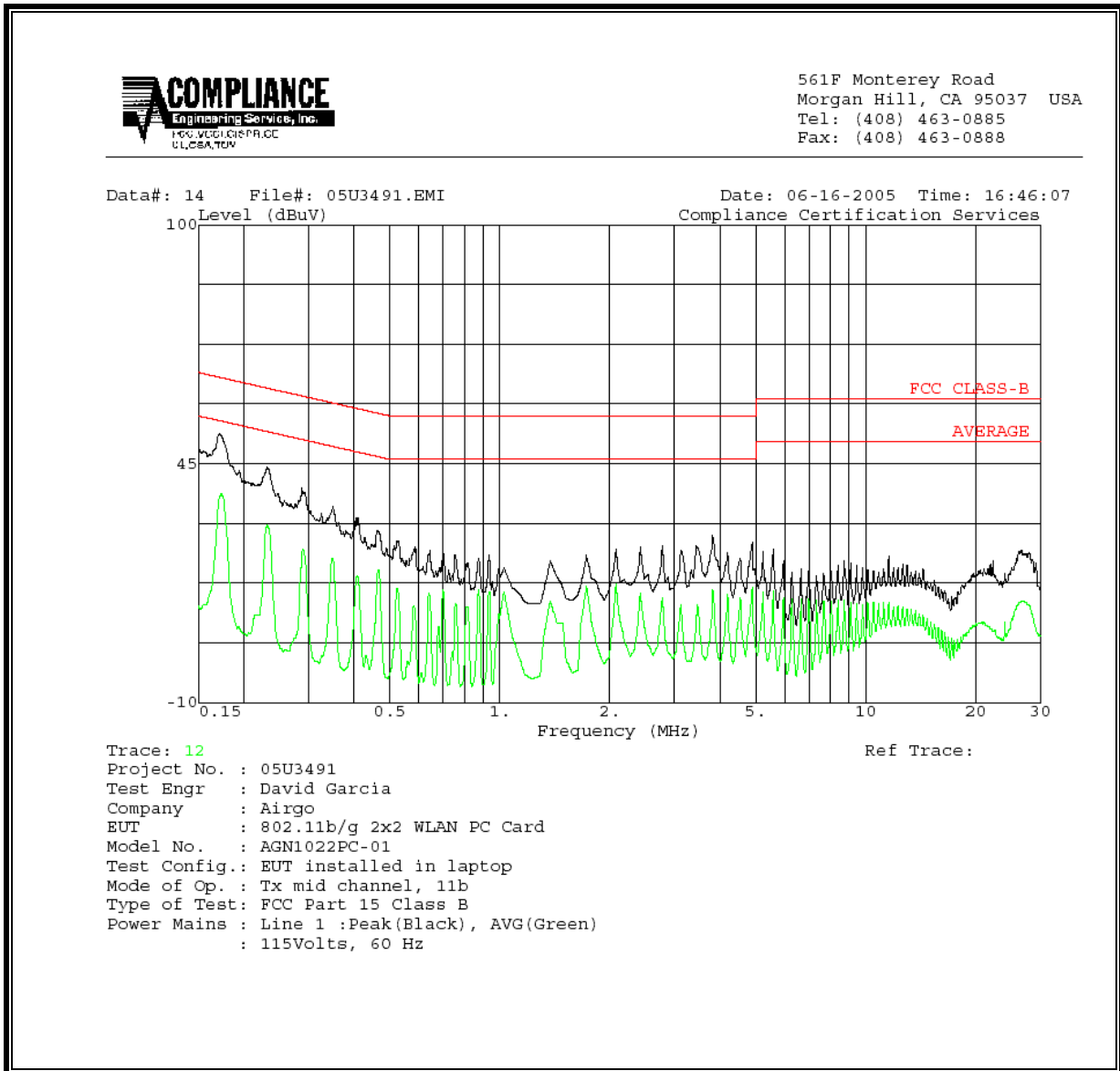
6 WORST EMISSIONS

| CONDUCTED EMISSIONS DATA (115VAC 60Hz) | | | | | | | | | |
|--|-----------|-----------|-----------|-------|-------|-------|---------|---------|---------|
| Freq. | Reading | | | Closs | Limit | FCC B | Margin | | Remark |
| (MHz) | PK (dBUV) | QP (dBUV) | AV (dBUV) | (dB) | QP | AV | QP (dB) | AV (dB) | L1 / L2 |
| 0.17 | 53.20 | -- | -- | 0.00 | 64.91 | 54.91 | -11.71 | -1.71 | L1 |
| 3.47 | 28.52 | -- | -- | 0.00 | 56.00 | 46.00 | -27.48 | -17.48 | L1 |
| 5.59 | 26.12 | -- | -- | 0.00 | 60.00 | 50.00 | -33.88 | -23.88 | L1 |
| 0.17 | 51.86 | -- | -- | 0.00 | 64.91 | 54.91 | -13.05 | -3.05 | L2 |
| 3.82 | 28.52 | -- | -- | 0.00 | 56.00 | 46.00 | -27.48 | -17.48 | L2 |
| 4.90 | 26.98 | -- | -- | 0.00 | 56.00 | 46.00 | -29.02 | -19.02 | L2 |
| 6 Worst Data | | | | | | | | | |

LINE 1 RESULTS

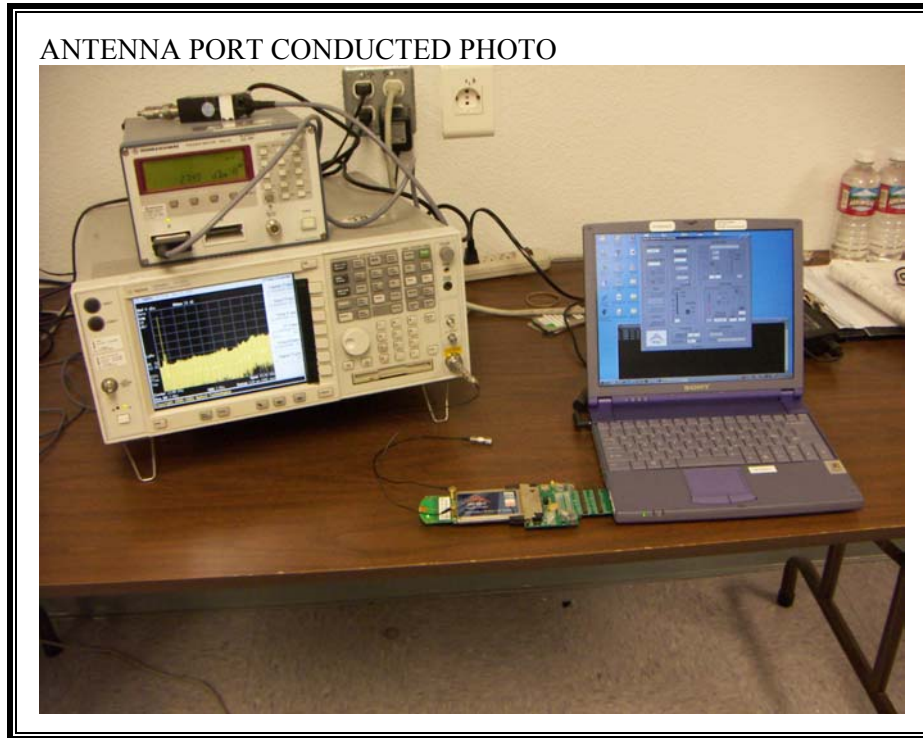


LINE 2 RESULTS



8. SETUP PHOTOS

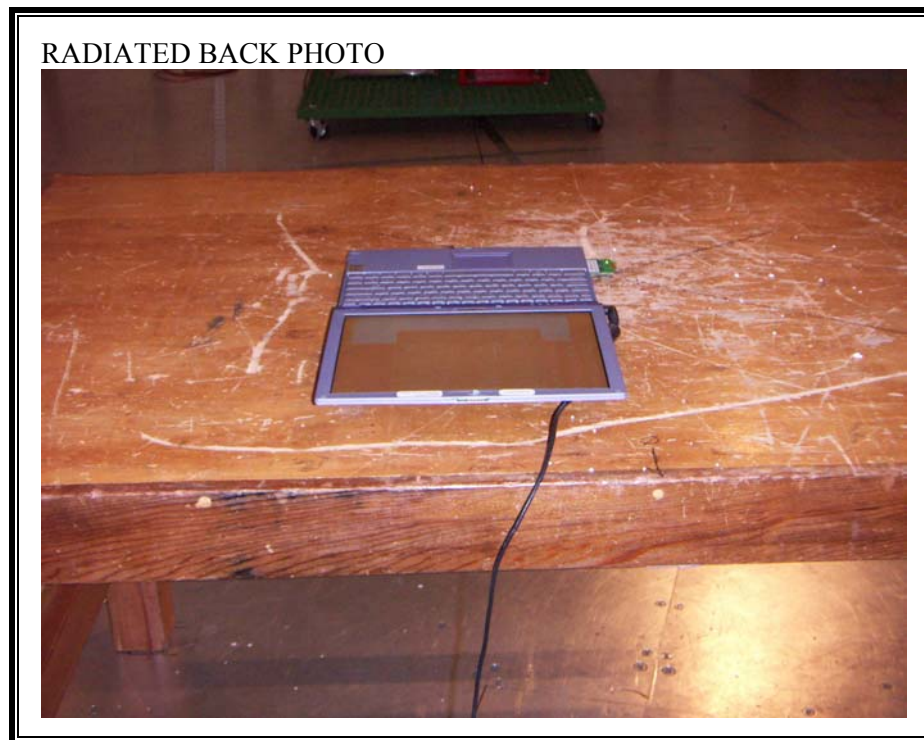
ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



RADIATED RF MEASUREMENT SETUP



:



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP



:



END OF REPORT