# FCC 47 CFR PART 15 SUBPART C & INDUSTRY CANADA RSS-210

# TEST REPORT

**For**

## 802.11n 2x2 PCIe Minicard transceiver

## Model: AR5B93

## Trade Name: Atheros

*Issued to*

**Atheros Communications, Inc.**
**5480 Great America Parkway Santa Clara CA 95054**

*Issued by*

**Compliance Certification Services Inc.**
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# 1. TEST RESULT CERTIFICATION

| | |
|---|---|
| **Applicant:** | Atheros Communications, Inc.<br>5480 Great America Parkway Santa Clara CA 95054 |
| **Equipment Under Test:** | 802.11n 2x2 PCIe Minicard transceiver |
| **Trade Name:** | Atheros |
| **Model:** | AR5B93 |
| **Date of Test:** | December 03 ~ 22, 2008 |

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULT** |
| FCC 47 CFR Part 15 Subpart C<br>&<br>INDUSTRY CANADA RSS-210 | No non-compliance noted |

## We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2003 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247 and Industry Canada RSS-210.

The test results of this report relate only to the tested sample EUT identified in this report.

*Approved by:*

Jason Chang
Team Leader
Compliance Certification Services Inc.

*Reviewed by:*

Alan Fan
Team Leader
Compliance Certification Services Inc.

# 2. EUT DESCRIPTION

| | |
|---|---|
| **Product** | 802.11n 2x2 PCIe Minicard transceiver |
| **Trade Name** | Atheros |
| **Model Number** | AR5B93 |
| **Model Discrepancy** | N/A |
| **Power Supply** | Powered by host device |
| **Frequency Range** | IEEE 802.11b: 2412 ~ 2462 MHz<br>IEEE 802.11g: 2412 ~ 2462 MHz<br>draft 802.11n Standard-20 MHz: 2412 ~ 2462 MHz<br>draft 802.11n Wide -40 MHz: 2422 ~ 2452 MHz |
| **Transmit Power** | IEEE 802.11b: 19.158 dBm ( 82.389 mW )<br>IEEE 802.11g: 25.31 dBm ( 339.625 mW )<br>draft 802.11n Standard-20 MHz: 24.95 dBm ( 312.608 mW )<br>draft 802.11n Wide -40 MHz: 25.85 dBm ( 384.592 mW ) |
| **Modulation Technique** | IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mpbs)<br>IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54 Mpbs)<br>draft 802.11n Standard-20 MHz Channel mode: OFDM (6.5, 7.2, 13, 14.4, 14.44, 19.5, 21.7, 26, 28.89, 28.9, 39, 43.3, 43.33 52, 57.78, 57.8, 58.5, 65.0, 72.2, 78, 86.67, 104, 115.56, 117, 130, 144.44 Mbps)<br>draft 802.11n Wide-40 MHz Channel mode: OFDM (13.5, 15, 27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150, 162, 180, 216, 240, 243, 270, 300 Mbps) |
| **Number of Channels** | IEEE 802.11b/g mode: 11 Channels<br>draft 802.11n Standard-20 MHz Channel mode: 11 Channels<br>draft 802.11n Wide-40 MHz Channel mode: 7 Channels |
| **Antenna Specification** | 1. PIFA Antenna / Gain: 3.62 dBi<br>2. Dipole Antenna / Gain: 3.2 dBi |

***Remark:***

1. *The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*
2. *This submittal(s) (test report) is intended for FCC ID: **PPD-AR5B93** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*

# 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 Part 15, RSS-GEN Issue 2, and RSS-210 Issue 7.

## 3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

## 3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

The tests documented in this report were performed in accordance with IC RSS-210, IC RSS-Gen, IC RSS-102, and ANSI C63.4.

## 3.3 GENERAL TEST PROCEDURES

**Conducted Emissions**

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

**Radiated Emissions**

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.

## 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(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 - | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.52525 | 2655 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 156.7 - 156.9 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 162.0125 - 167.17 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 167.72 - 173.2 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 240 - 285 | 3600 - 4400 | ([2]) |
| 13.36 - 13.41 | 322 - 335.4 | | |

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

[2] Above 38.6

(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.

## 3.5 DESCRIPTION OF TEST MODES

The EUT is an 802.11n 2x2 PCIe Minicard transceiver.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

All final tests in the 802.11b mode were made at 1 Mb/s.

All final tests in the 802.11g mode were made at 6 Mb/s.

All final tests in the 802.11n HT20 mode were made at 6.5Mbps.

All final tests in the 802.11n HT40 mode were made at 13.5Mbps

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

# 4. INSTRUMENT CALIBRATION

## 4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

## 4.2 MEASUREMENT EQUIPMENT USED

**Equipment Used for Emissions Measurement**

***Remark:*** *Each piece of equipment is scheduled for calibration once a year.*

| Conducted Emissions Test Site | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Due** |
| SPECTRUM ANALYZER | R & S | FSEK30 | 835253/002 | 10/25/2009 |
| SPECTRUM ANALYZER | AGILENT | E4446A | MY43360132 | 06/24/2009 |

| 3M Semi Anechoic Chamber | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Due** |
| SPECTRUM ANALYZER | AGILENT | E4446A | MY46180323 | 05/21/2009 |
| EMI TEST RECEIVER | R & S | ESCI | 100211 | 10/16/2009 |
| BILOG ANTENNA | SCHWARZBECK | VNLB | 9168 | 09/18/2009 |
| HORN ANTENNA | ETS LINDGREN | 3117 | 00078732 | 05/13/2009 |
| PRE-AMPLIFIER | EM | EM30265 | 07032612 | 05/22/2009 |
| Band Reject FILTER | Micro-Tronics | BRM50702-01 | 021 | N.C.R. |
| RF COAXIAL CABLE | HUBERSUHNER | SUCOFLEX 104PEA | SN31350 | 07/21/2009 |
| Test S/W | LABVIEW (V 6.1) | | | |

***Remark:*** *1. The measurement uncertainty is less than +/- 3.2dB (30MHz ~ 1GHz), +/- 3.2dB (Above 1GHz) which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.*
*2. N.C.R = No Calibration Request.*

| Powerline Conducted Emissions Test Site | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Due** |
| L.I.S.N | SCHWARZBECK | NSLK 8127 | 8127-465 | 08/14/2009 |
| L.I.S.N | SCHWARZBECK | NSLK 8127 | 8127-473 | 10/13/2009 |
| TEST RECEIVER | R & S | ESHS30 | 838550/003 | 01/23/2009 |
| PULSE LIMIT | R & S | ESH3-Z2 | 100117 | 09/24/2009 |
| N TYPE COAXIAL CABLE | BELDEN | 8268 M17/164 | 003 | 09/14/2009 |

***Remark:*** *The measurement uncertainty is less than +/- 2.1dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.*

# 5. FACILITIES AND ACCREDITATIONS

## 5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☒ Rm.258, Bldg.17, NO.195 , Sec. 4, Chung Hsing Rd., Chu-Tung Chen. Hsin-Chu, Taiwan 310 R.O.C.

☒ NO. 989-1 Wen Shan Rd., Shang Shan Village, Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

## 5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

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

## 5.3 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by Taiwan Accreditation Foundation for the specific scope of accreditation under Lab Code: 0240 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by TAF or any agency of the Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: 90585 and 90584).

## 5.4 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 | 90585, 90584 |
| Japan | VCCI | 3/10 meter Open Area Test Sites to perform conducted/radiated measurements | R-1229/1189<br>C-1250/1294 |
| Taiwan | TAF | FCC Method-47 CFR Part 15 Subpart C,D,E CISPR 11, FCC METHOD-47 CFR Part 18, EN 55011, CNS 13803, CISPR 13, CNS 13439, FCC Method-47 CFR Part 15 Subpart B, CISPR 14-1, EN 55014-1, CNS 13783-1, EN 55015, CNS 14115, CISPR 22, EN 55022, VCCI CNS 13438, EN 61000-4-2/3/4/5/6/8/11 | Testing Laboratory<br>0240 |
| Taiwan | BSMI | CNS 13803, CNS 13438, CNS 13439, CNS 13783-1, CNS 14115 | SL2-IS-E-0002<br>SL2-IN-E-0002<br>SL2-A1-E-0002<br>SL2-R1-E-0002<br>SL2-R2-E-0002<br>SL2-L1-E-0002 |
| Canada | Industry Canada | RSS-GEN Issue 2 | IC 4417-1, IC-4417-2 |

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

# 6. SETUP OF EQUIPMENT UNDER TEST

## 6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

## 6.2 SUPPORT EQUIPMENT

| No | Equipment | Brand | Model | Series No. | FCC ID | Data Cable | Power Cord |
|---|---|---|---|---|---|---|---|
| 1. | Notebook PC | IBM | 2672 (X31) | 9985H9M | WLAN: ANO20030400LEG Bluetooth: ANO20020100MTN | N/A | AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core |
| 2. | Test kit | N/A | N/A | N/A | N/A | N/A | N/A |
| 3. | Super a/g 108Mbps Wireless Lan Router (Remote) | PLANEX | BLW-04SAG | 40DDA0421 | SJ9-BLW54SAG | N/A | Unshielded, 1.8m |

***Remark:***

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

# 7. APPLICABLE RULES FOR INDUSTRY CANADA RSS-210

## RSS-210 §2 General Certification Requirements and Specifications

### RSS-210 §2.1 Frequency Stability

When the carrier frequency stability is not specified, it need not be tested, provided that the carrier frequency is chosen such that the fundamental modulation products (meaning the nominal bandwidth) lie totally within the bands listed in Tables 2, 3, 4 and 5 and do not fall into any restricted band listed in Table 1. Due account shall be taken of carrier frequency drift as a result of aging, temperature, humidity, and supply voltage variations when using frequencies near the band edges.

### RSS-210 §2.2 Restricted Bands and Unwanted Emission Frequencies

Restricted bands, identified in Table 1, are designated primarily for safety-of-life services (distress calling and certain aeronautical bands), certain satellite downlinks, radio astronomy, and some government uses. Except where otherwise indicated, the following restrictions apply:
(a) Fundamental components of modulation of LPDs shall not fall within the restricted bands of Table 1.
(b) Unwanted emissions falling into restricted bands of Table 1 shall meet Tables 2 and 3 limits. It should also be noted that unwanted emissions falling in non-restricted bands do not need to be suppressed to a level lower than the Table 2 and 3 limits.
(c) Unwanted emissions not falling within restricted frequency bands may also use the limits specified in the applicable annex.

### RSS-210 §2.3 Licence-exempt Receivers

Category I licence-exempt receivers are required to have their spurious emissions comply with Section 7.2.3 of RSS-Gen.

### RSS-210 §2.6 General Field Strength Limits

Table 2 and 3 list the permissible levels of unwanted emissions of transmitters and receivers. However, transmitters with field strengths that do not exceed the limits in these tables may also operate in these frequency bands, other than the restricted bands of Table 1 and the TV bands (i.e. unwanted emissions of transmitters and receivers are permitted to fall into Table 1 and TV frequencies but intentional emissions are prohibited). See the note of Table 2 for further details.

## RSS-210 §2.7 Tables

### RSS-210 Table 1: Restricted Frequency Bands (Note)

| MHz | MHz | MHz | MHz | GHz |
|---|---|---|---|---|
| 0.090-0.110 | 8.37625-8.38675 | -- | 1718.8-1722.2 | 9.0-9.2 |
| -- | 8.41425-8.41475 | 156.52475-156.52525 | 2200-2300 | 9.3-9.5 |
| 2.1735-2.1905 | 12.29-12.293 | 156.7-156.9 | 2310-2390 | 10.6-12.7 |
| 3.020-3.026 | 12.51975-12.52025 | -- | -- | 13.25-13.4 |
| 4.125-4.128 | 12.57675-12.57725 | -- | 2655-2900 | 14.47-14.5 |
| 4.17725-4.17775 | 13.36-13.41 | 240-285 | 3260-3267 | 15.35-16.2 |
| 4.20725-4.20775 | 16.42-16.423 | 322-335.4 | 3332-3339 | 17.7-21.4 |
| 5.677-5.683 | 16.69475-16.69525 | 399.9-410 | 3345.8-3358 | 22.01-23.12 |
| 6.215-6.218 | 16.80425-16.80475 | 608-614 | 3500-4400 | 23.6-24.0 |
| 6.26775-6.26825 | 25.5-25.67 | 960-1427 | 4500-5150 | 31.2-31.8 |
| 6.31175-6.31225 | 37.5-38.25 | 1435-1626.5 | 5350-5460 | 36.43-36.5 |
| 8.291-8.294 | 73-74.6; 74.8-75.2 | 1645.5-1646.5 | 7250-7750 | Above 38.6 |
| 8.362-8.366 | 108-138 | 1660-1710 | 8025-8500 | |

***Note:*** *Certain frequency bands listed in Table 2 and above 38.6 GHz are designated for low-power licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in this Standard as well as RSS-310.*

### RSS-210 Table 2: General Field Strength Limits for Transmitters and Receivers at Frequencies Above 30 MHz (Note)

| Frequency (MHz) | Field Strength microvolts/m at 3 metres (watts, e.i.r.p.) | |
|---|---|---|
| | Transmitters | Receivers |
| 30-88 | 100 (3 nW) | 100 (3 nW) |
| 88-216 | 150 (6.8 nW) | 150 (6.8 nW) |
| 216-960 | 200 (12 nW) | 200 (12 nW) |
| Above 960 | 500 (75 nW) | 500 (75 nW) |

***Note:*** *Transmitting devices are not permitted in Table 1 bands or in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz, and 614-806 MHz). Prohibition of operation in TV bands does not apply to momentary devices, or to medical telemetry devices in the band 174-216 MHz, and to perimeter protection systems in the bands 54-72 and 76-88 MHz. The perimeter protection devices are to meet Table 3 field strengths limits.*

**RSS-210 Table 3: General Field Strength Limits for Transmitters at Frequencies Below 30 MHz (Transmit)**

| Frequency (fundamental or spurious) | Field Strength (microvolts/m) | Magnetic H-Field (microamperes/m) | Measurement Distance (metres) |
|---|---|---|---|
| 9-490 kHz | 2,400/F (F in kHz) | 2,400/377F (F in Hz) | 300 |
| 490-1.705 kHz | 24,000/F (F in kHz) | 24,000/377F (F in kHz) | 30 |
| 1.705-30 MHz | 30 | N/A | 30 |

***Note:*** *The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing an average detector.*

**RSS-210 §Annex 8: Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands**

This section applies to systems that employ frequency hopping (FH) and digital modulation technology in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands. Systems in these bands may employ frequency hopping, digital modulation and or a combination (hybrid) of both techniques.

A frequency hopping system that synchronizes with another or several other systems (to avoid frequency collision among them) via off-air sensing or via connecting cables is not hopping randomly and therefore is not in compliance with RSS-210.

**RSS-210 §A8.2 Digital Modulation Systems**

These include systems employing digital modulation techniques resulting in spectral characteristics similar to direct sequence systems. The following applies to all three bands.

**RSS-210 §A8.4 Transmitter Output Power and e.i.r.p. Requirements**

(4) For systems employing digital modulation techniques operating in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands, the maximum peak conducted power shall not exceed 1 W. Except as provided in Section A8.4(5), the e.i.r.p. shall not exceed 4 W.
As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power (see RSS-Gen)
(5) Point-to-point systems in the bands 2400-2483.5 MHz and 5725-5850 MHz are permitted to have an e.i.r.p. higher than 4 W, provided that the higher e.i.r.p. is achieved by employing higher gain directional antennas and not higher transmitter output powers. Point-to-multipoint systems, omni-directional applications and multiple co-located transmitters transmitting the same information are prohibited from exceeding 4 W e.i.r.p. However, remote stations of point-to-multipoint systems shall be allowed to operate at greater than 4 W e.i.r.p, under the same conditions as for point-to- point systems.
**Note:** "Fixed, point-to-point operation", excludes point-to-multipoint systems, omnidirectional applications and multiple co-located transmitters transmitting the same information.

**RSS-210 §A8.5 Out-of-band Emissions**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required.

**RSS-Gen §2 General Information**

Unless otherwise indicated, radiocommunications equipment is subject to licensing pursuant to subsection 4(1) of the *Radiocommunication Act.*

**RSS-Gen §2.1.2 Category II Equipment**

Category II equipment comprises radio devices where a standard has been prescribed but for which a TAC is not required, that is, equipment certification by Industry Canada or a Certification Body (CB) is not required (certification exempt), pursuant to subsection 4(3) of the *Radiocommunication Act*. The manufacturer or importer shall nevertheless ensure that the standards are complied with. A test report shall be available on request and the device shall be properly labelled.

**RSS-Gen §2.2 Receivers**

Radiocommunication receivers are defined as Category I equipment or Category II equipment by the characteristics outlined below.

**RSS-Gen §2.2.1 Category I Equipment Receivers**

A receiver is classified as Category I equipment if it meets one of the following conditions:
(a) is a stand-alone receiver that is tunable to any frequency in the band 30-960 MHz;
(b) is a receiver that is associated with Category I transmitters; or
(c) is a scanner receiver.

Except for scanner receivers, which have their own RSSs, Category I receivers shall comply with the limits for receiver spurious emissions set out in Section 6 of this RSS-Gen, and shall be certified under the RSS applicable to the transmitter type with which the receiver is associated or designed to operate (NOT under RSS-Gen).

**RSS-Gen §2.2.2 Category II Equipment Receivers**

A receiver is classified as Category II equipment if it is not meeting the conditions of Section 2.2.1.

**RSS-Gen §2.2.3 Licence-exempt Receivers**

Paging receivers, “receive-only” earth stations operating with satellites approved by Industry Canada, and stand-alone receivers which are exempted from licensing, can be classified as either Category I or Category II. These receivers shall comply with the requirements of RSS-210 or RSS-310, respectively.

**RSS-Gen §2.3 Licence-exempt Low-power Radiocommunication Devices (LPDs)**

Licence-exempt low-power radiocommunication devices are devices which have intentional and unwanted emissions of very low signal levels such that they can co-exist with licensed radio services. LPDs are required to operate on a **"no-interference no-protection"** basis (i.e. they may not cause radio interference and cannot claim protection from interference). The requirements for LPDs are generally described in Section 7.

**RSS-Gen §5.5 Exposure of Humans to RF Fields**

Before equipment certification is granted, the applicable requirements of RSS-102 shall be met.

**RSS-Gen §6 Receiver Spurious Emission Standard**

The following receiver spurious emission limits shall be complied with:
(a) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table 1.

**RSS-Gen Table 1 - Spurious Emission Limits for Receivers**

| Frequency (MHz) | Field Strength microvolts/m at 3 metres |
|---|---|
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above 960 | 500 |

(b) If a conducted measurement is made, no spurious output signals appearing at the antenna terminals shall exceed 2 nanowatts per any 4 kHz spurious frequency in the band 30-1000 MHz, or 5 nanowatts above 1 GHz.

**RSS-Gen §7.1.4 Transmitter Antenna**

A transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.
When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

**RSS-Gen §7.2.2 Transmitter and Receiver AC Power Lines Conducted Emission Limits**

Except when the requirements applicable to a given device state otherwise, for any licence-exempt radiocommunication device equipped to operate from the public utility AC power supply, either directly or indirectly, the radio frequency voltage that is conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in Table 2. The tighter limit applies at the frequency range boundaries.

**RSS-Gen Table 2 – AC Power Lines Conducted Emission Limits**

| Frequency Range (MHz) | Conducted limit (dBµV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 to 0.5 | 66 to 56* | 56 to 46* |
| 0.5 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

**Decreases with the logarithm of the frequency*

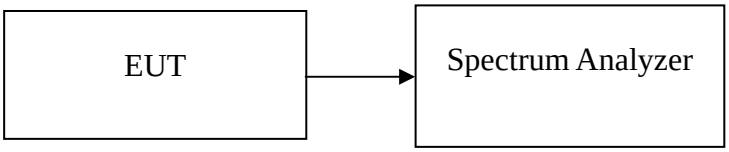
# 8. FCC PART 15.247 REQUIREMENTS & RSS-210 REQUIREMENTS

## 8.1 99% BANDWIDTH

**LIMIT**

None; for reporting purposes only.

**TEST CONFIGURATION**




**TEST PROCEDURE**

1. The spectrum shall be set as follows :
   Span : The minimum span to fully display the emission and approximately 20dB below peak level.
   RBW : The set to 1% to 3% of the approximate emission width.
2. Compute the combined power of all signal responses contained in the trace by covering all the data points.
3. For 99% occupied BW, place the markers at the frequency at which 0.5% of the power lies to the right of the right marker and 0.5% of the power lies to the left of the left marker.
4. The 99% BW is the bandwidth between the right and left markers.

## TEST DATA

**Test mode: IEEE 802.11b mode**

| Channel | Channel Frequency (MHz) | 99% Occupied power bandwidth (MHz) | |
|---|---|---|---|
| | | Chain 0 | Chain 1 |
| Low | 2412 | 15.599 | 15.816 |
| Middle | 2437 | 15.800 | 15.785 |
| High | 2462 | 15.743 | 15.899 |

***Remark:***

*1. At finial test to get the worst-case emission at 1 Mbps.*
*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: IEEE 802.11g mode**

| Channel | Channel Frequency (MHz) | 99% Occupied power bandwidth (MHz) | |
|---|---|---|---|
| | | Chain 0 | Chain 1 |
| Low | 2412 | 16.651 | 16.466 |
| Middle | 2437 | 16.606 | 16.454 |
| High | 2462 | 16.619 | 16.556 |

***Remark:***

*1. At finial test to get the worst-case emission at 6 Mbps.*
*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: draft 802.11n Standard-20 MHz Channel mode**

| Channel | Channel Frequency (MHz) | 99% Occupied power bandwidth (MHz) | |
|---|---|---|---|
| | | Chain 0 | Chain 1 |
| Low | 2412 | 17.734 | 17.839 |
| Middle | 2437 | 17.763 | 17.827 |
| High | 2462 | 17.758 | 17.796 |

***Remark:***

*1. At finial test to get the worst-case emission at 6.5 Mbps.*

*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: draft 802.11n Standard-40 MHz Channel mode**

| Channel | Channel Frequency (MHz) | 99% Occupied power bandwidth (MHz) | |
|---|---|---|---|
| | | Chain 0 | Chain 1 |
| Low | 2422 | 36.305 | 36.400 |
| Middle | 2437 | 36.405 | 36.319 |
| High | 2452 | 36.415 | 36.302 |

***Remark:***

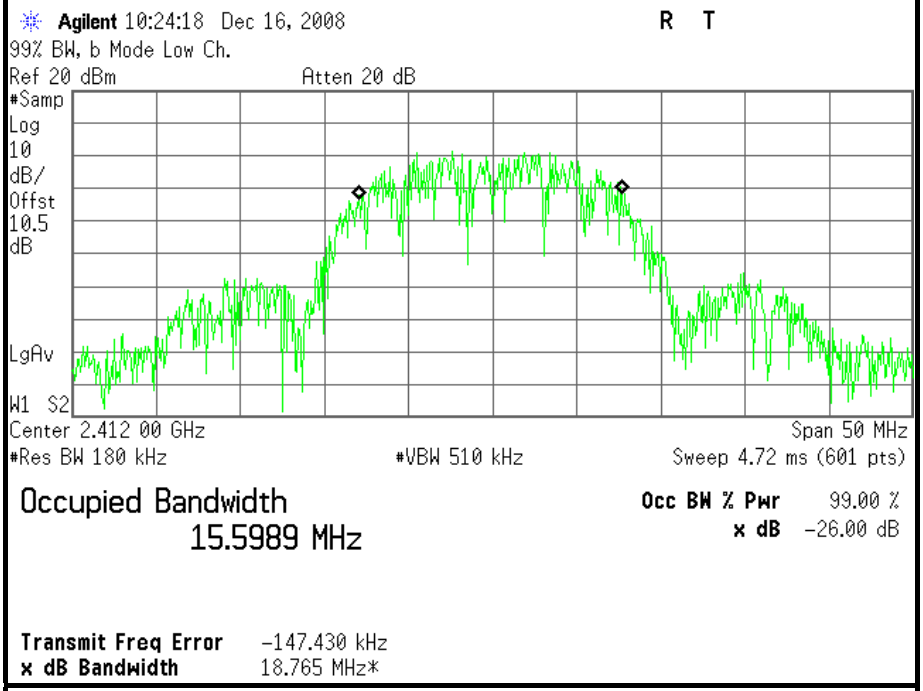
*1. At finial test to get the worst-case emission at 13.5 Mbps.*

*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

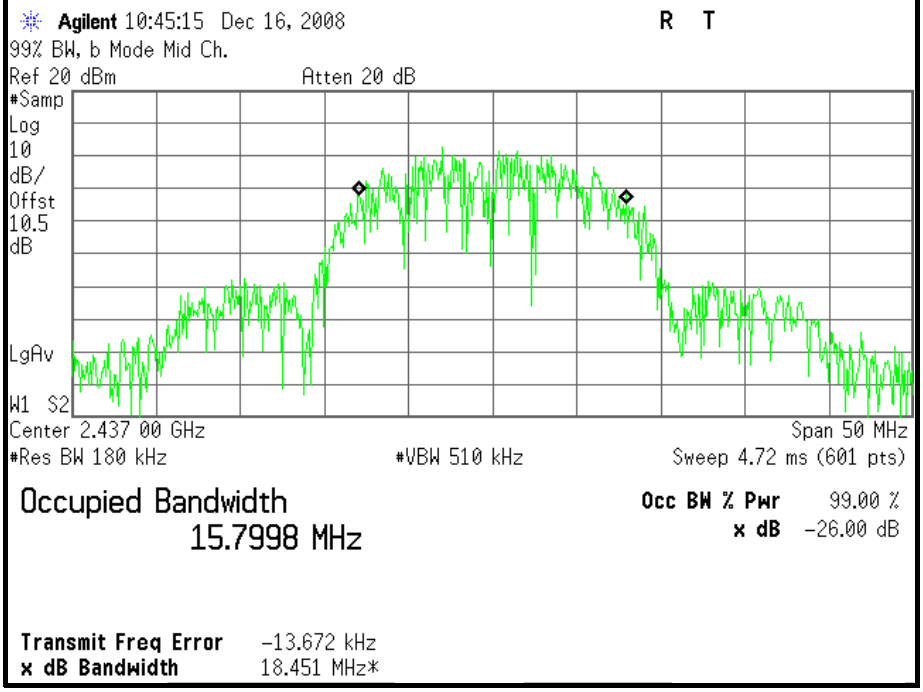
## TEST PLOT

### 99% BANDWIDTH ( IEEE 802.11b mode)

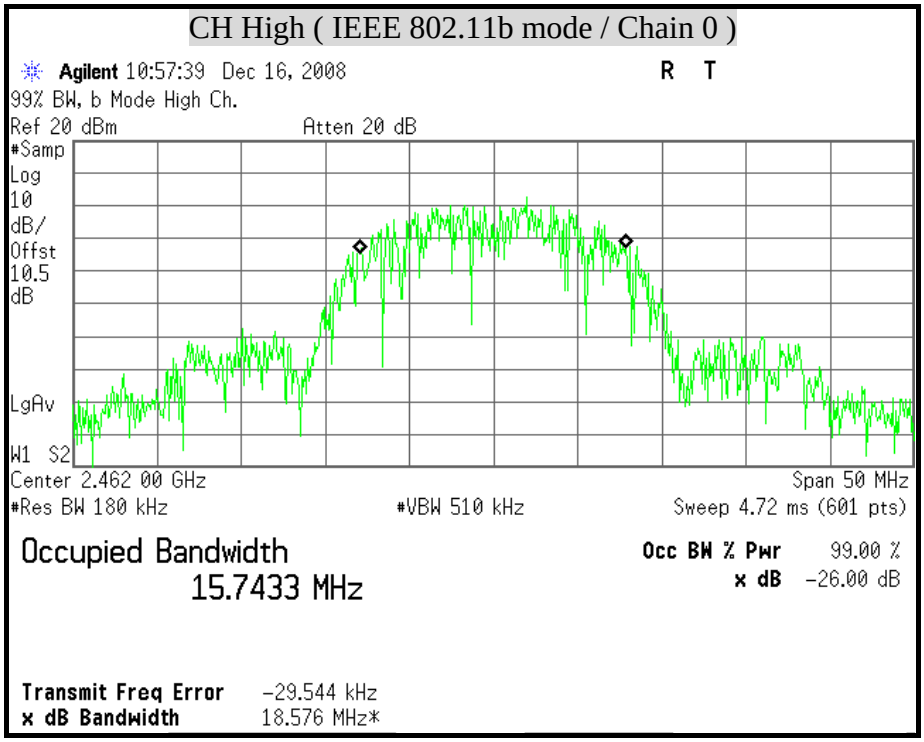
CH Low ( IEEE 802.11b mode / Chain 0 )



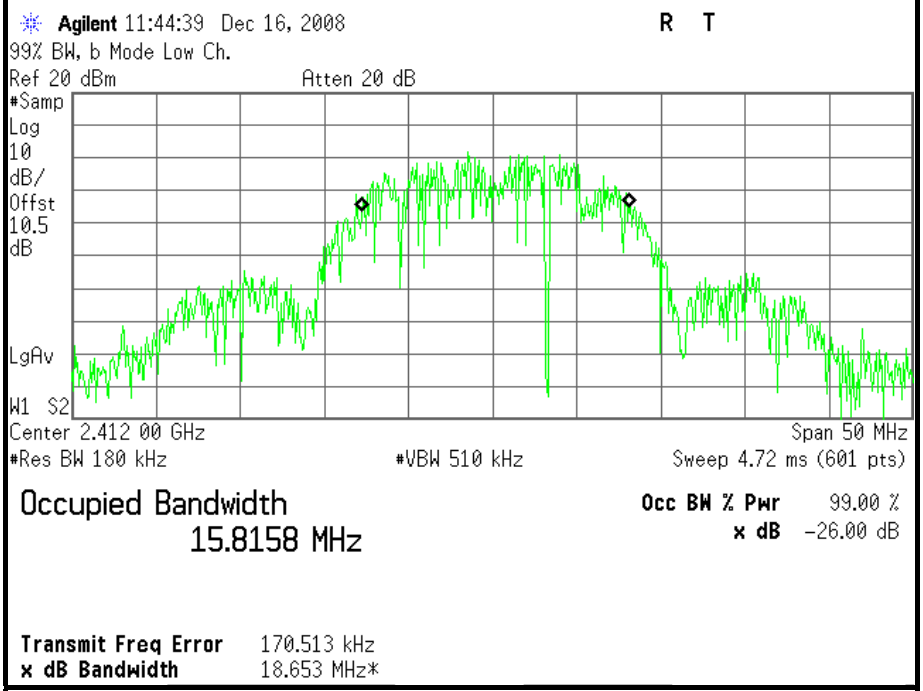

CH Middle ( IEEE 802.11b mode / Chain 0 )



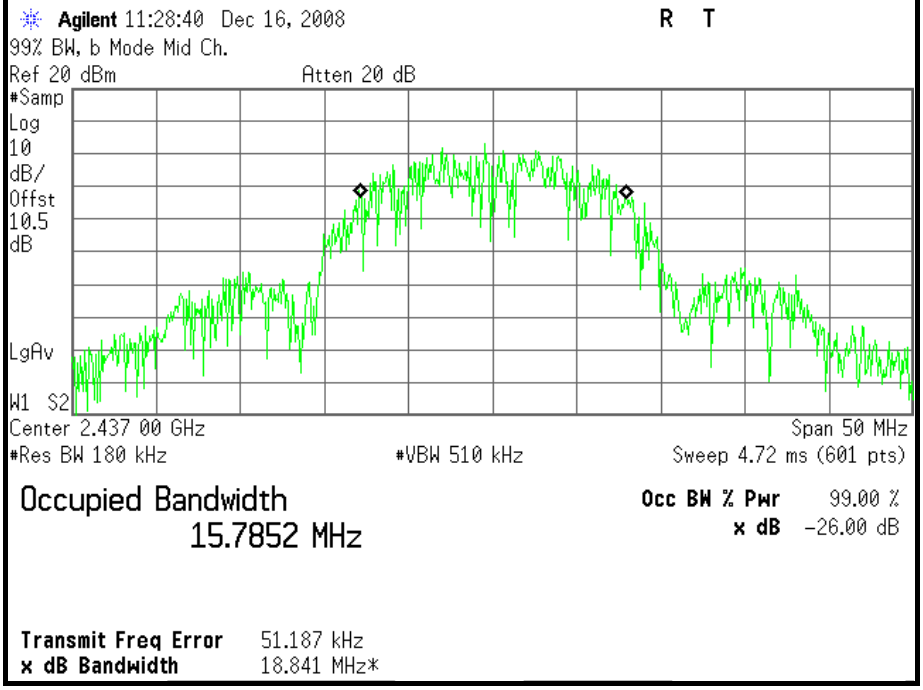
CH High ( IEEE 802.11b mode / Chain 0 )



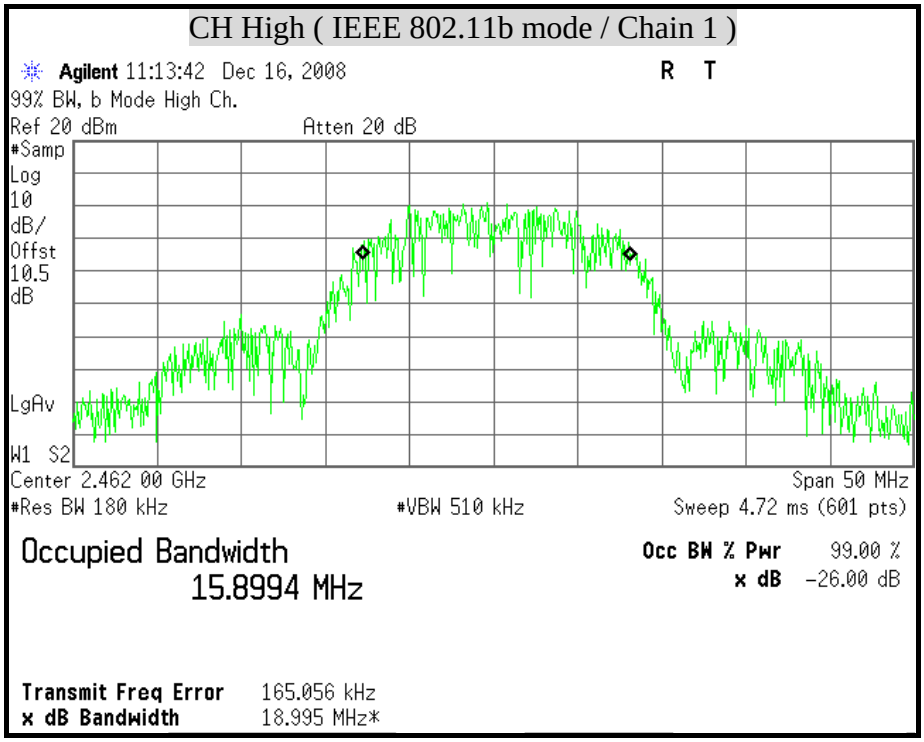
CH Low ( IEEE 802.11b mode / Chain 1 )




CH Middle ( IEEE 802.11b mode / Chain 1 )

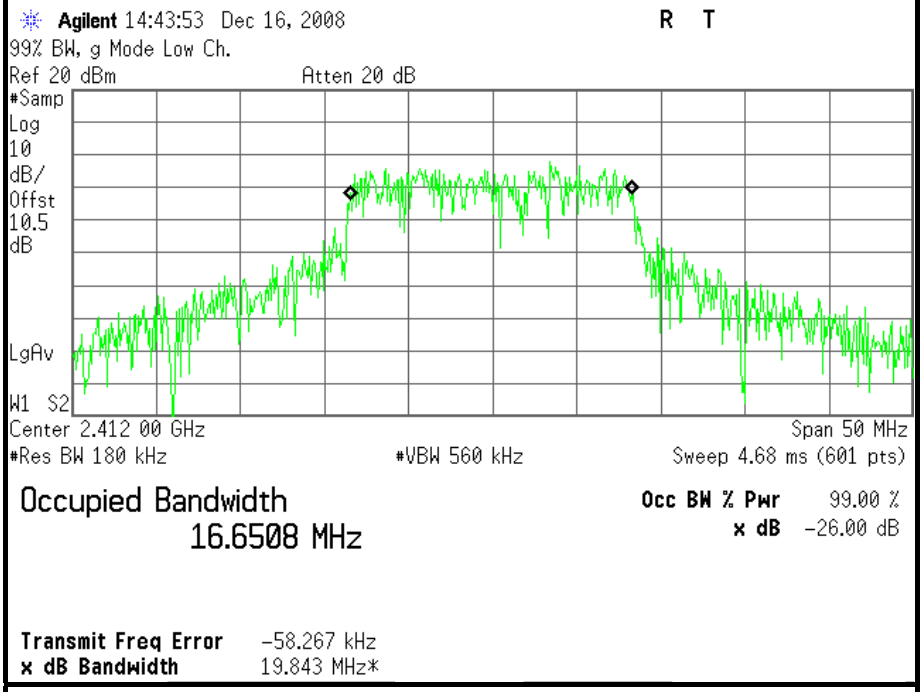


CH High ( IEEE 802.11b mode / Chain 1 )

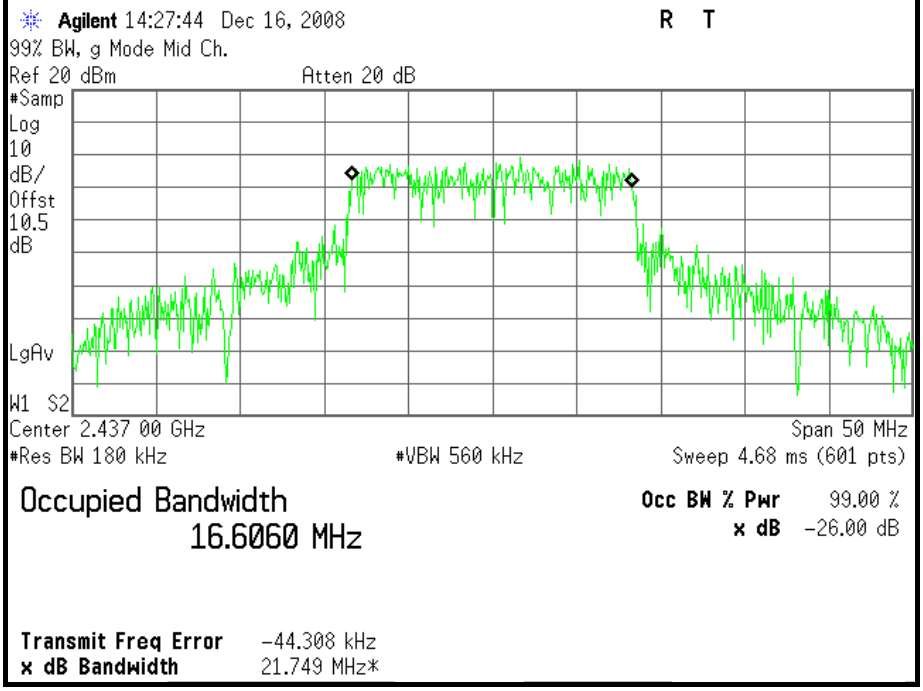


## 99% BANDWIDTH ( IEEE 802.11g mode)

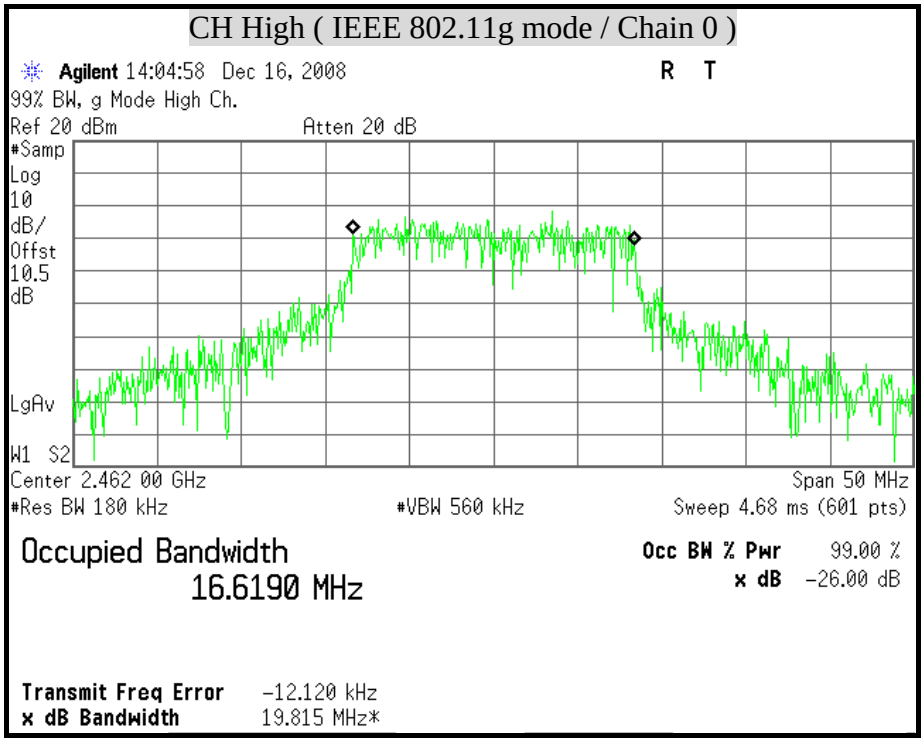
CH Low ( IEEE 802.11g mode / Chain 0 )



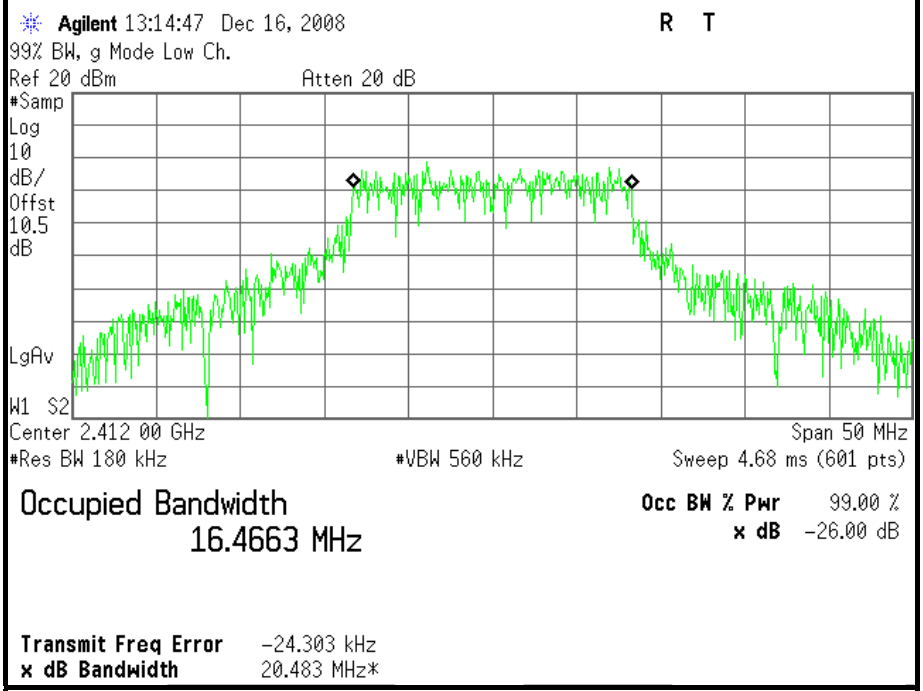

CH Middle ( IEEE 802.11g mode / Chain 0 )



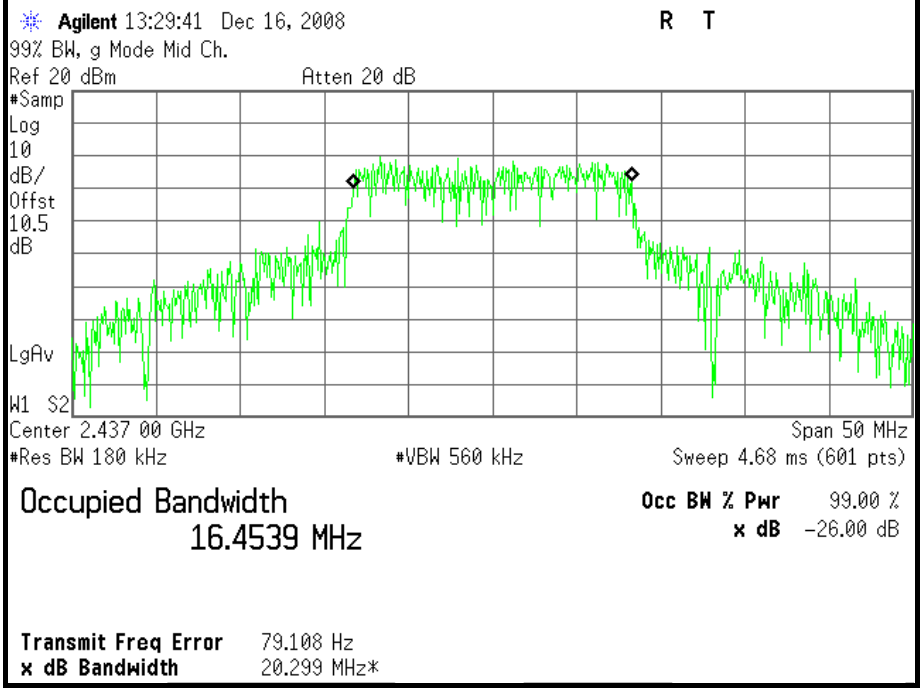
CH High ( IEEE 802.11g mode / Chain 0 )



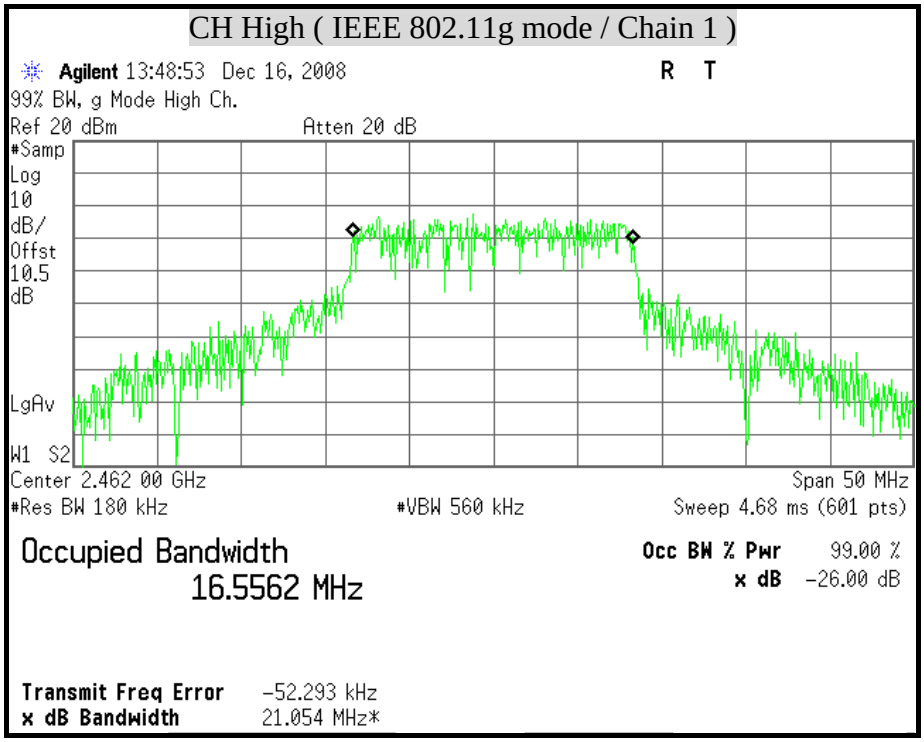
CH Low ( IEEE 802.11g mode / Chain 1 )




CH Middle ( IEEE 802.11g mode / Chain 1 )

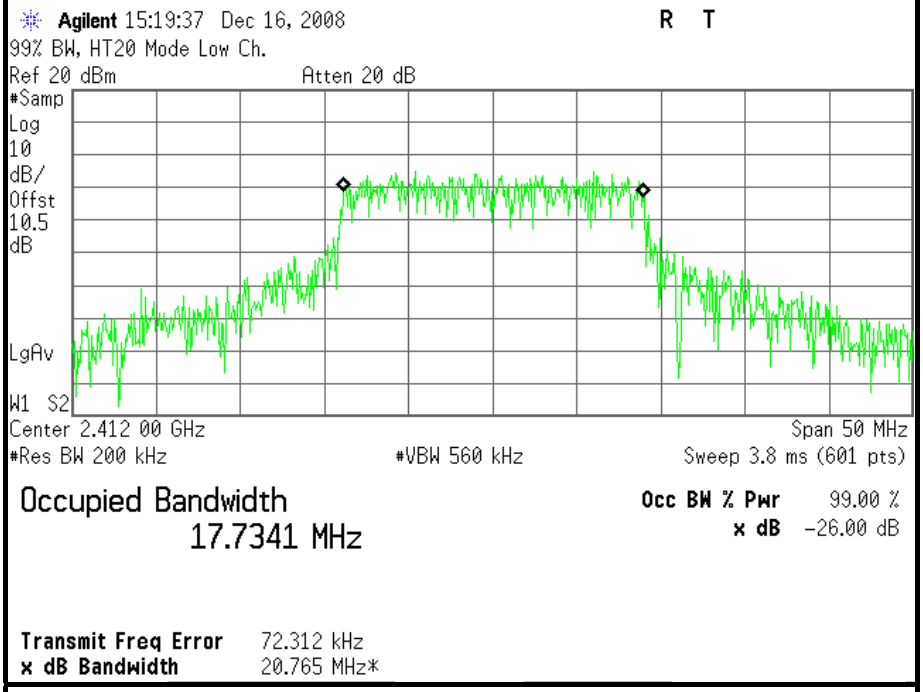


CH High ( IEEE 802.11g mode / Chain 1 )

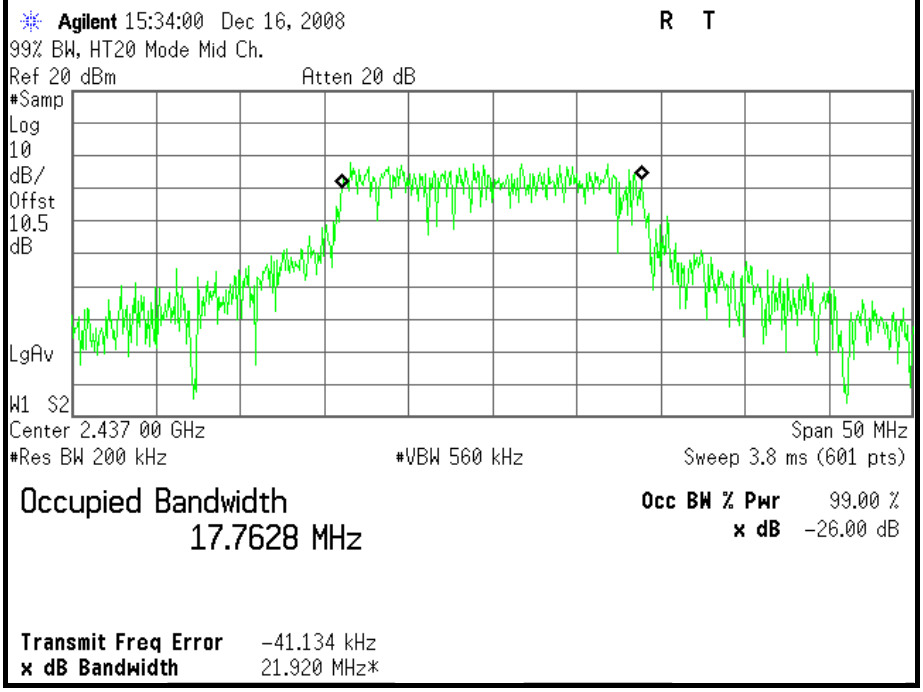


## 99% BANDWIDTH ( draft 802.11n Standard-20 MHz Channel mode )

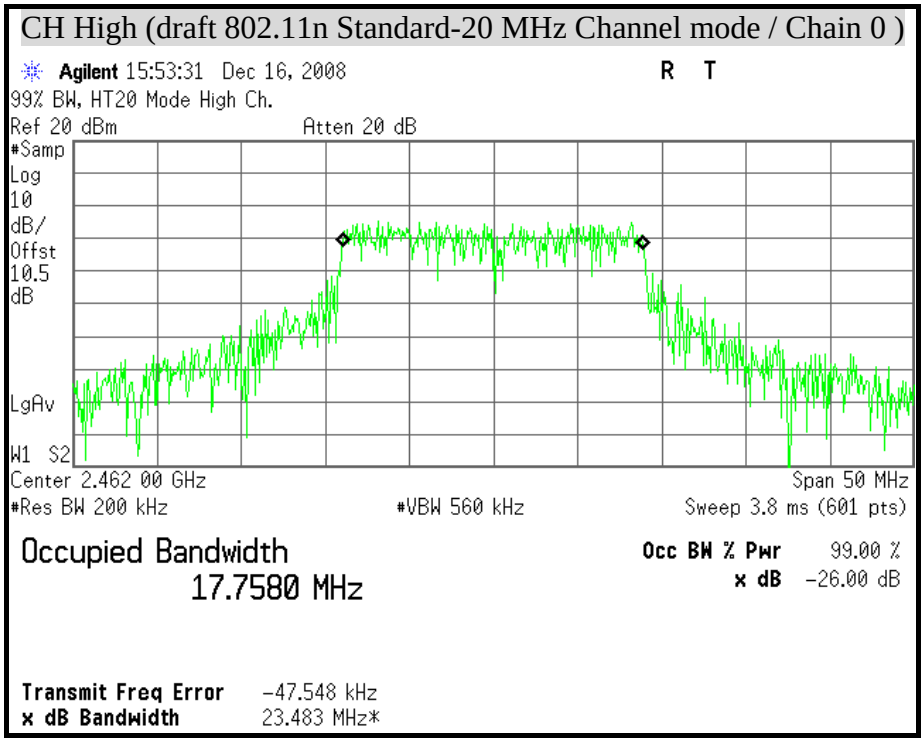
CH Low ( draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



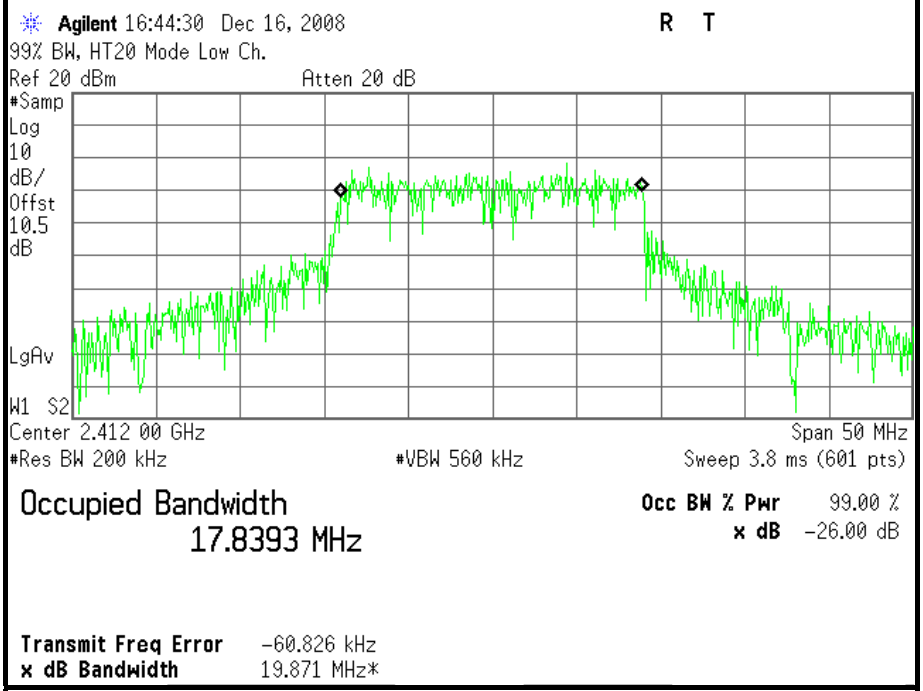

CH Middle (draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



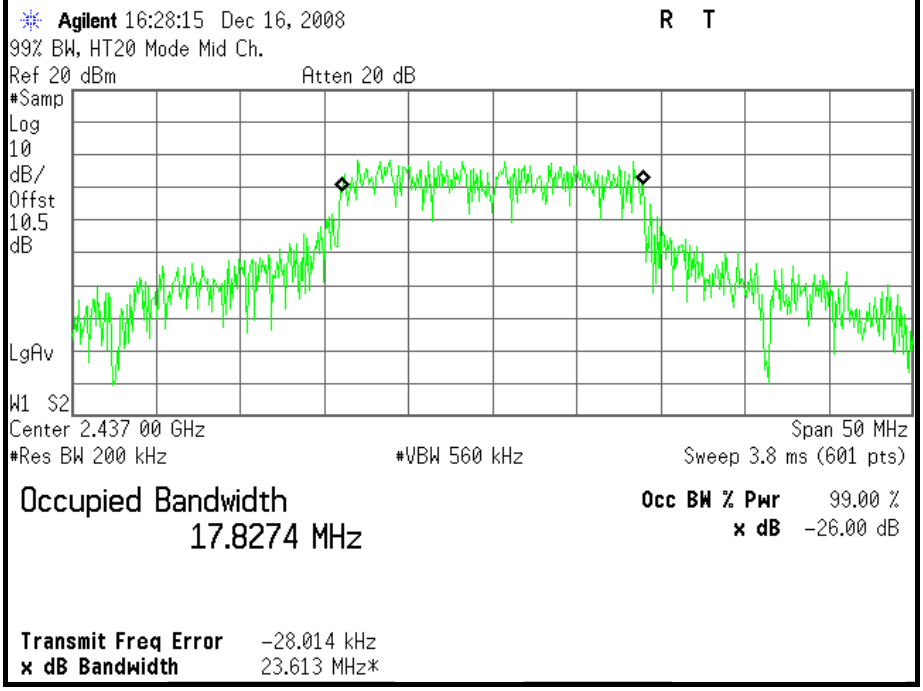
CH High (draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



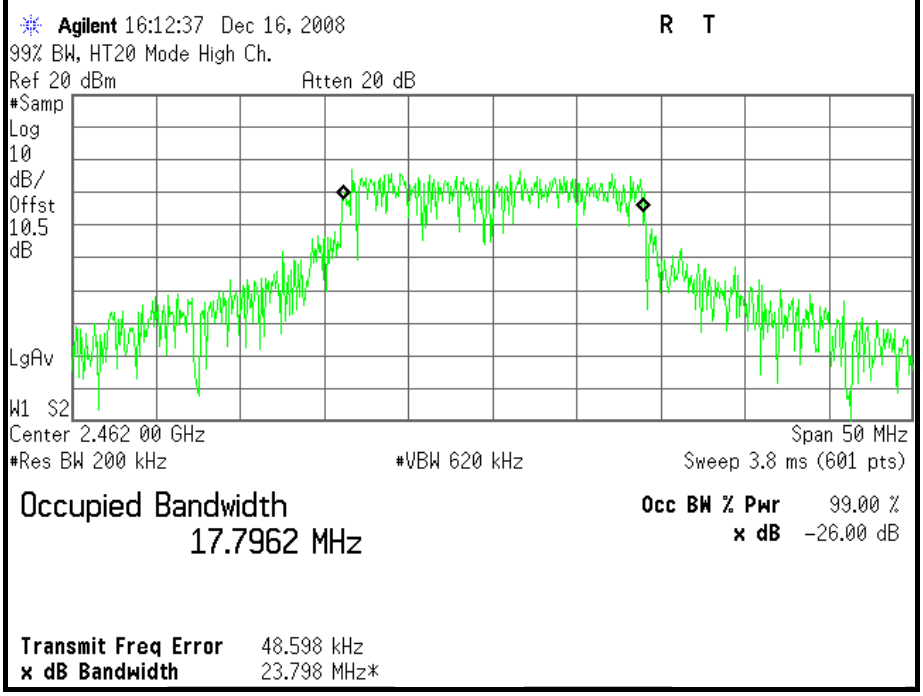
CH Low (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )




CH Middle (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )

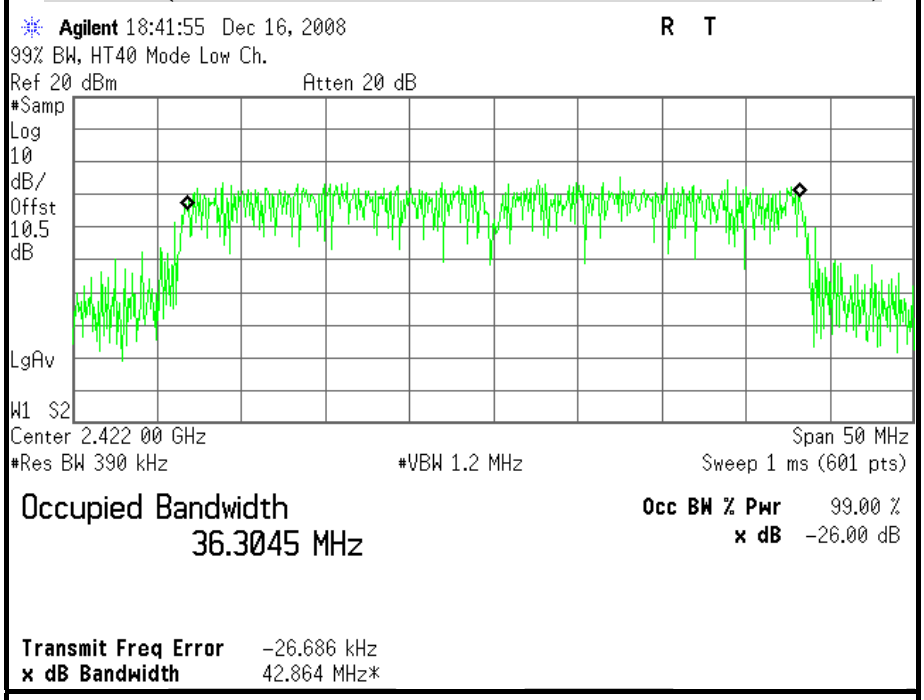


CH High (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )

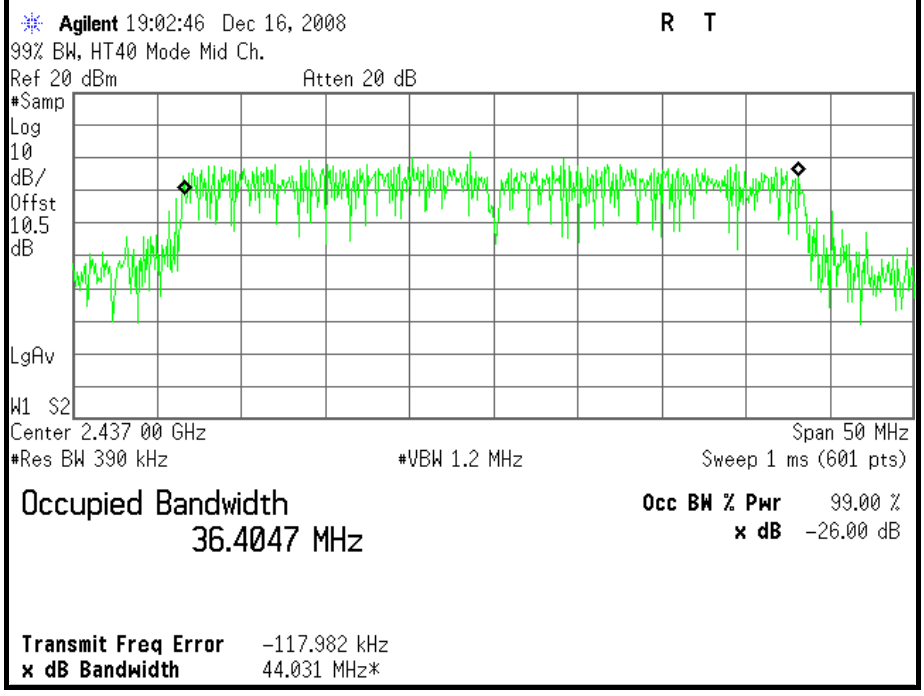


## 99% BANDWIDTH ( draft 802.11n Wide-40 MHz Channel mode )

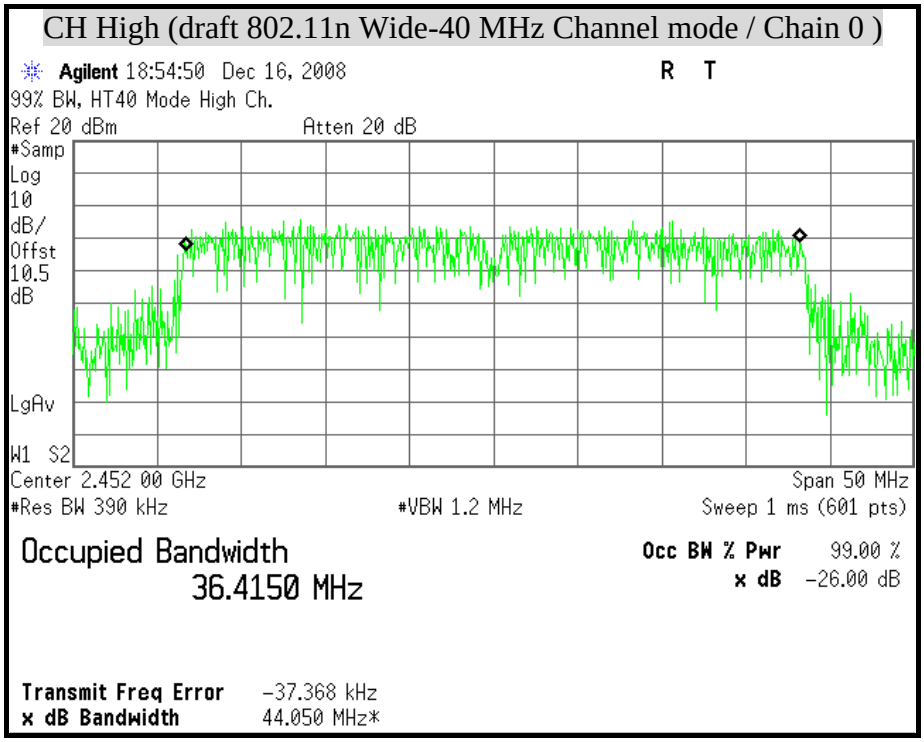
CH Low ( draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



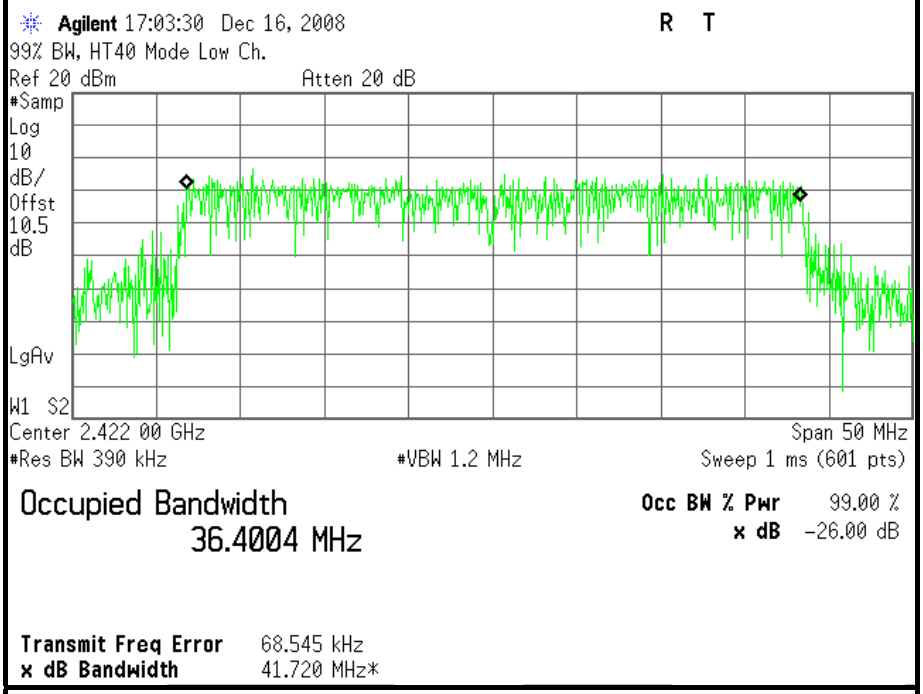

CH Middle (draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



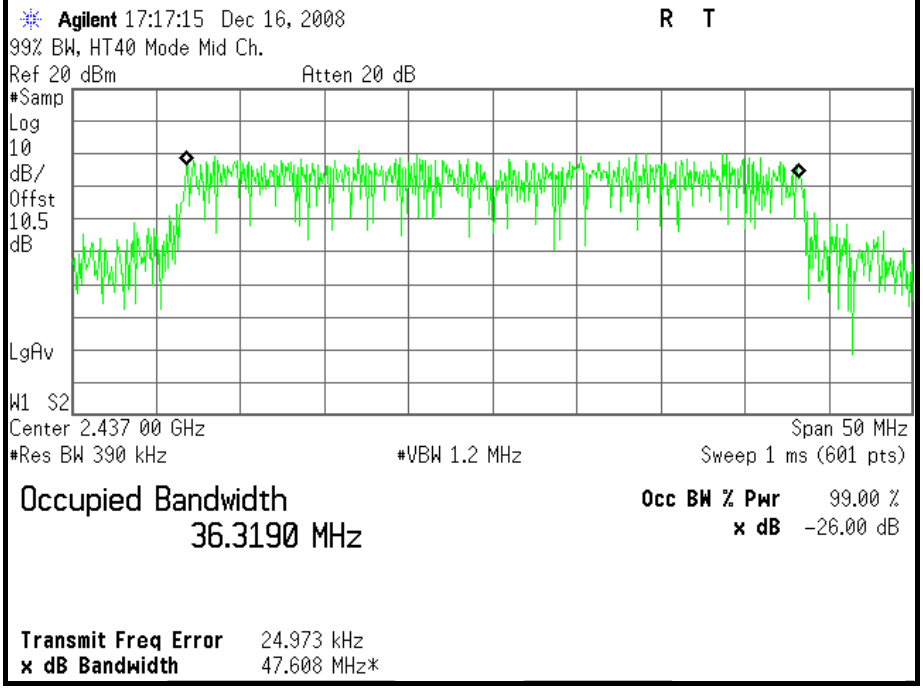
CH High (draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



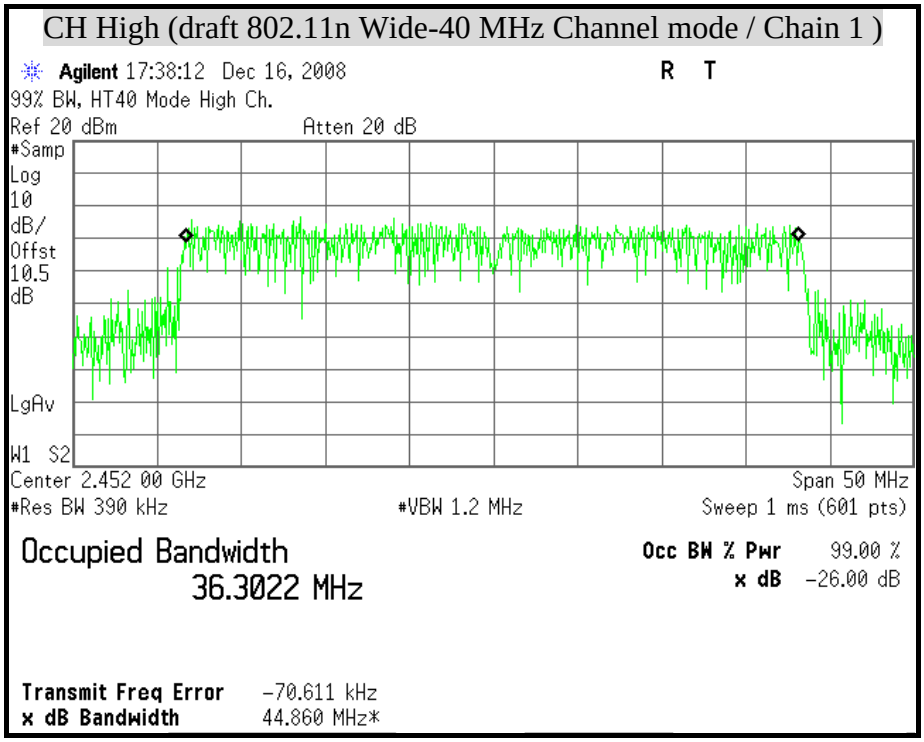
CH Low (draft 802.11n Wide-40 MHz Channel mode / Chain 1 )




CH Middle (draft 802.11n Wide-40 MHz Channel mode / Chain 1 )



CH High (draft 802.11n Wide-40 MHz Channel mode / Chain 1 )

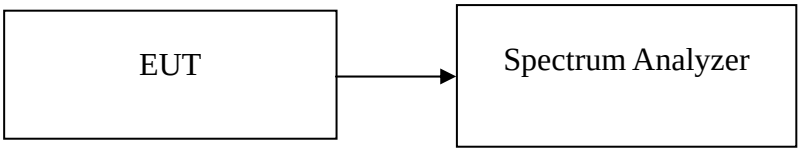


## 8.2 6DB BANDWIDTH

**LIMIT**

According to §15.247(a)(2) & RSS-210 §A8.2(1), systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

**TEST CONFIGURATION**




**TEST PROCEDURE**

The transmitter output was connected to a spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

**TEST RESULTS**

*No non-compliance noted*

## TEST DATA

**Test mode: IEEE 802.11b mode**

| Channel | Channel Frequency (MHz) | 6dB Bandwidth (kHz) | | Minimum Limit (kHz) | Result |
|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | |
| Low | 2412 | 10083.333 | 13000.000 | 500 | PASS |
| Middle | 2437 | 12083.333 | 12166.667 | 500 | PASS |
| High | 2462 | 11166.667 | 10166.667 | 500 | PASS |

***Remark:***

*1. At finial test to get the worst-case emission at 1 Mbps.*
*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: IEEE 802.11g mode**

| Channel | Channel Frequency (MHz) | 6dB Bandwidth (kHz) | | Minimum Limit (kHz) | Result |
|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | |
| Low | 2412 | 16500.000 | 16333.333 | 500 | PASS |
| Middle | 2437 | 16416.667 | 16500.000 | 500 | PASS |
| High | 2462 | 16583.333 | 16500.000 | 500 | PASS |

***Remark:***

*1. At finial test to get the worst-case emission at 6 Mbps.*
*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: draft 802.11n Standard-20 MHz Channel mode**

| Channel | Channel Frequency (MHz) | 6dB Bandwidth (kHz) | | Minimum Limit (kHz) | Result |
|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | |
| Low | 2412 | 17833.333 | 17833.333 | 500 | PASS |
| Middle | 2437 | 17500.000 | 17833.333 | 500 | PASS |
| High | 2462 | 17750.000 | 17666.667 | 500 | PASS |

***Remark:***

*1. At finial test to get the worst-case emission at 6.5 Mbps.*

*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: draft 802.11n Wide-40 MHz Channel mode**

| Channel | Channel Frequency (MHz) | 6dB Bandwidth (kHz) | | Minimum Limit (kHz) | Result |
|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | |
| Low | 2422 | 36333.333 | 36416.667 | 500 | PASS |
| Middle | 2437 | 36166.667 | 36416.667 | 500 | PASS |
| High | 2452 | 36333.333 | 36333.333 | 500 | PASS |

***Remark:***

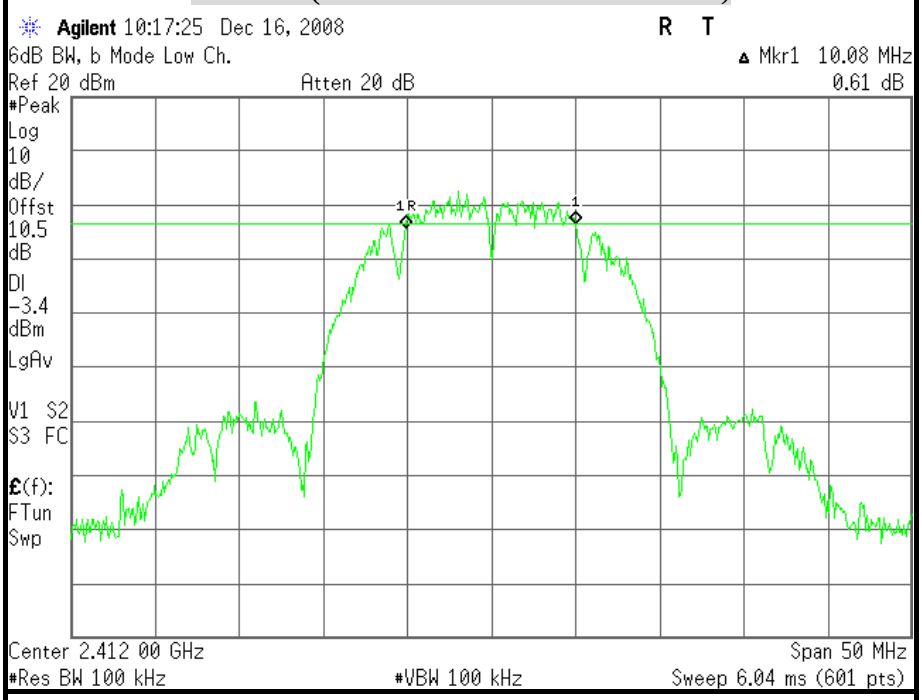
*1. At finial test to get the worst-case emission at 13.5 Mbps.*

*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

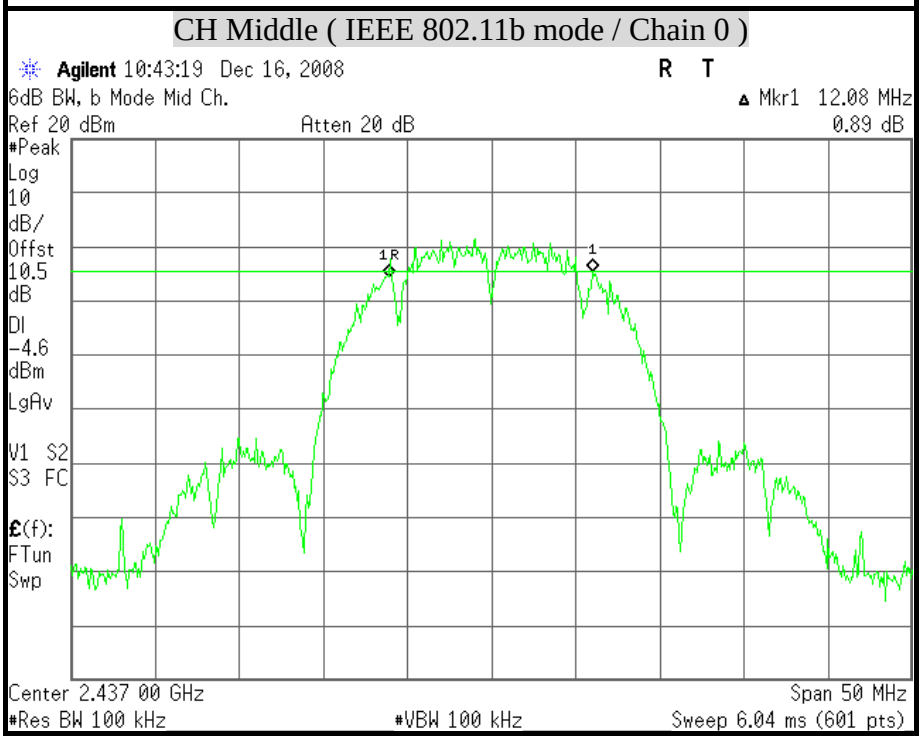
## TEST PLOT

### 6dB BANDWIDTH ( IEEE 802.11b mode)

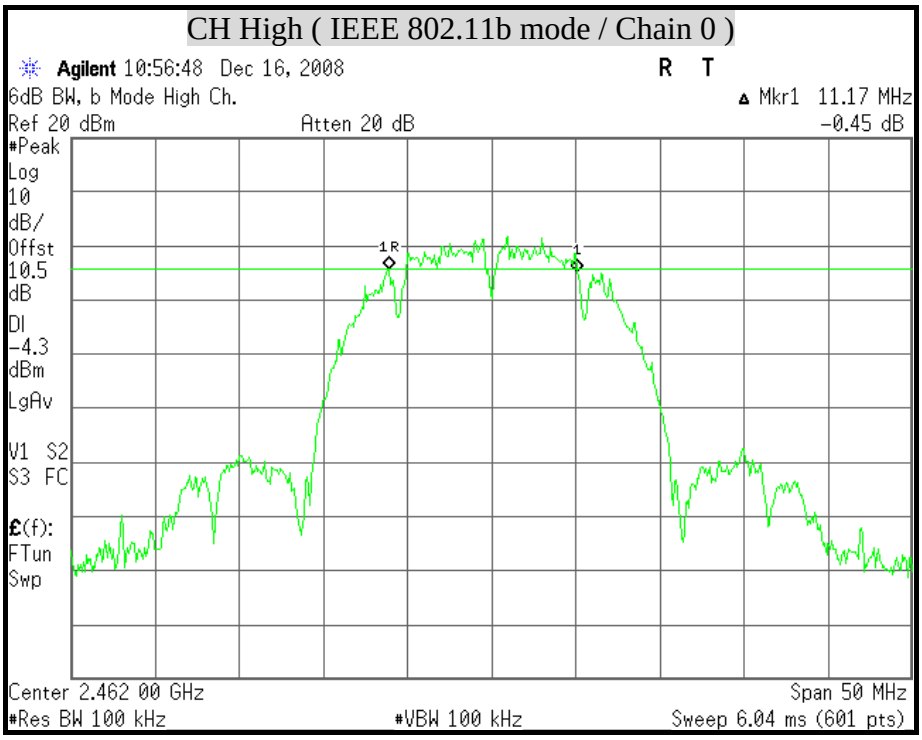
CH Low ( IEEE 802.11b mode / Chain 0 )



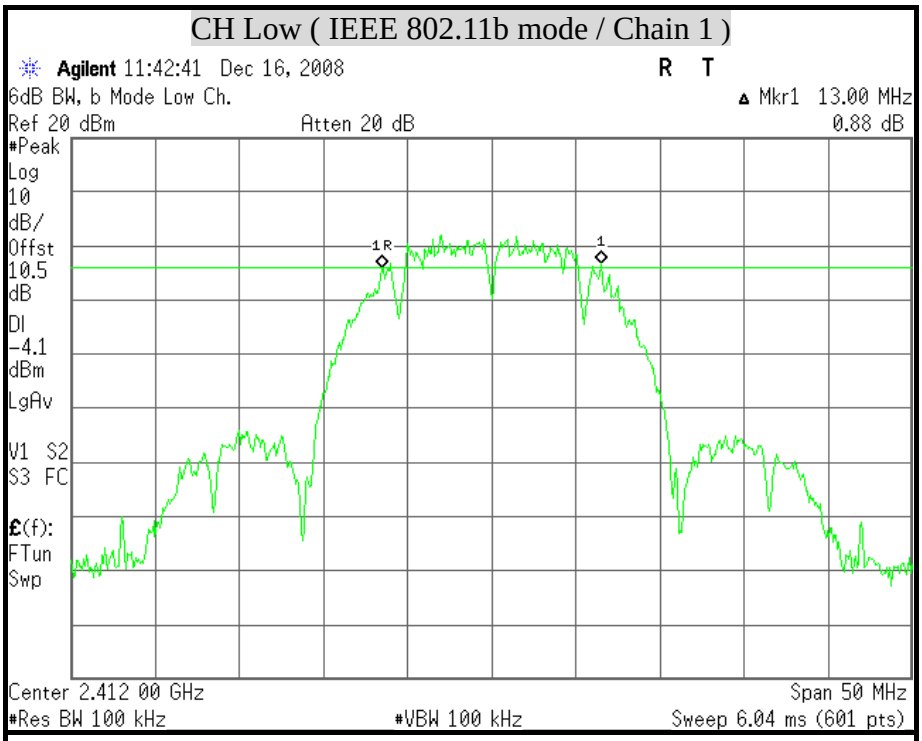

CH Middle ( IEEE 802.11b mode / Chain 0 )



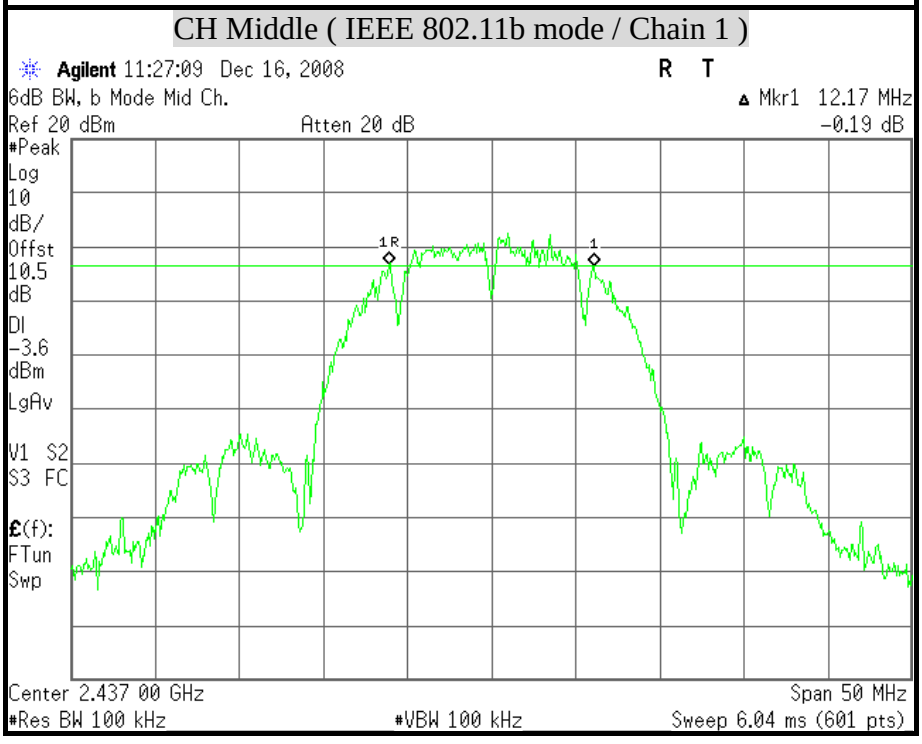
CH High ( IEEE 802.11b mode / Chain 0 )



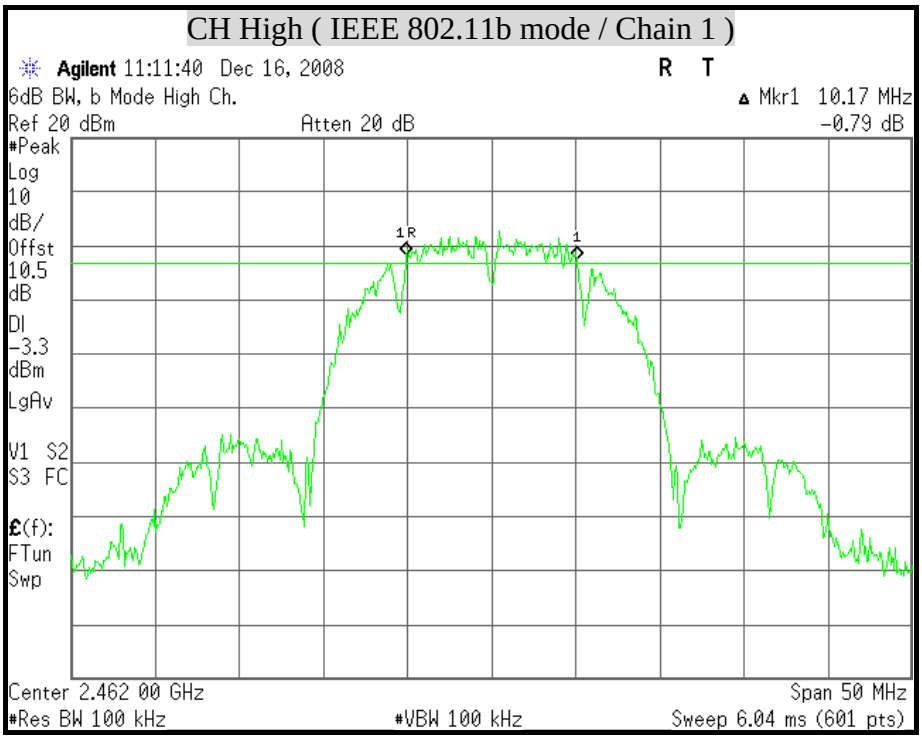
CH Low ( IEEE 802.11b mode / Chain 1 )




CH Middle ( IEEE 802.11b mode / Chain 1 )

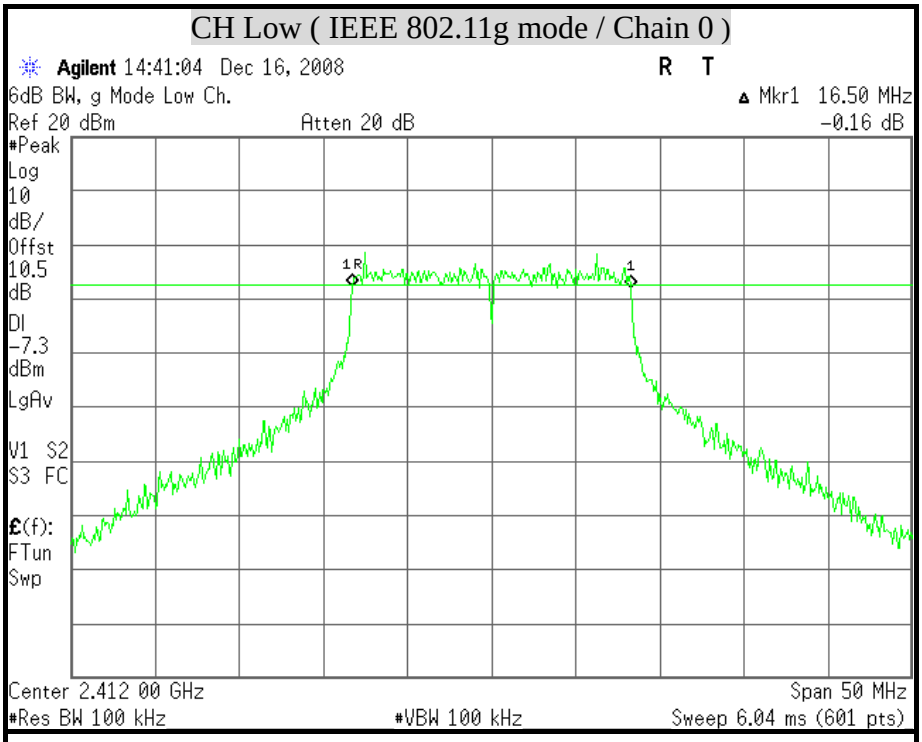


CH High ( IEEE 802.11b mode / Chain 1 )

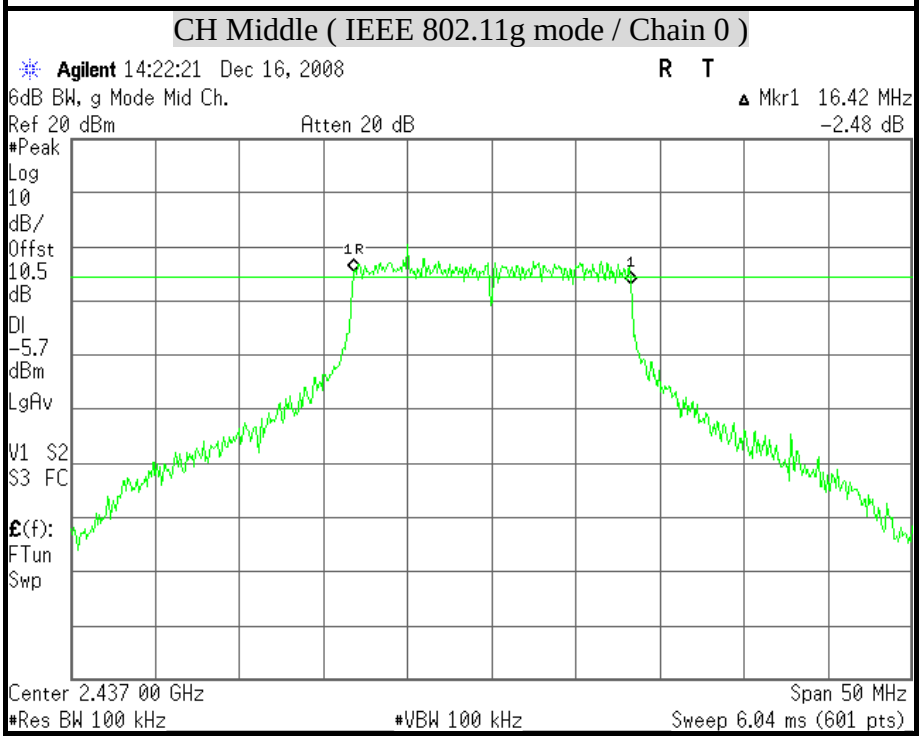


## 6dB BANDWIDTH ( IEEE 802.11g mode)

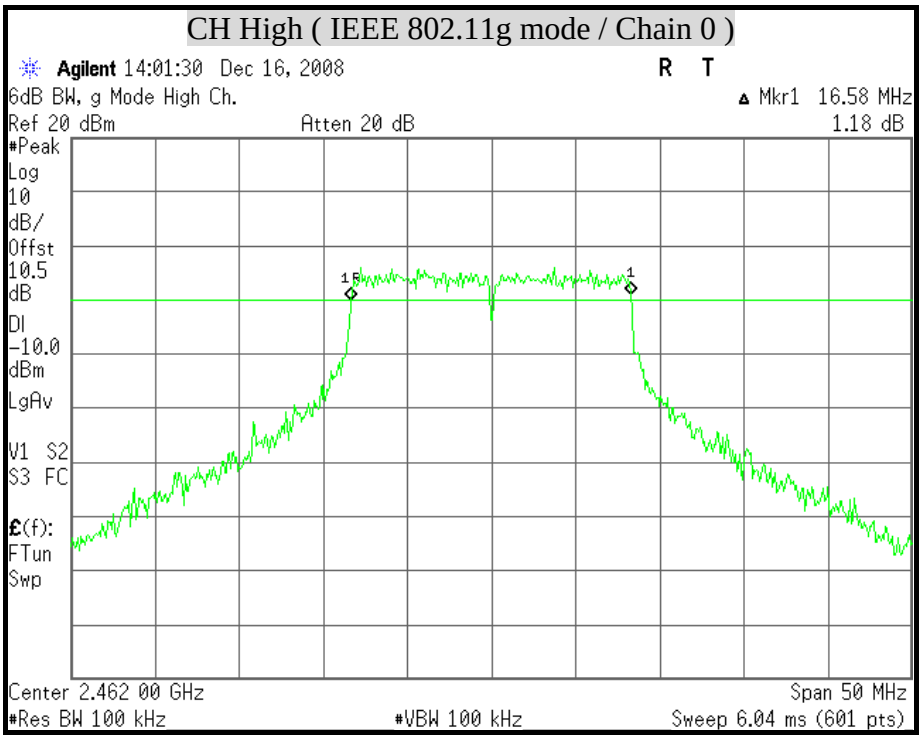
CH Low ( IEEE 802.11g mode / Chain 0 )



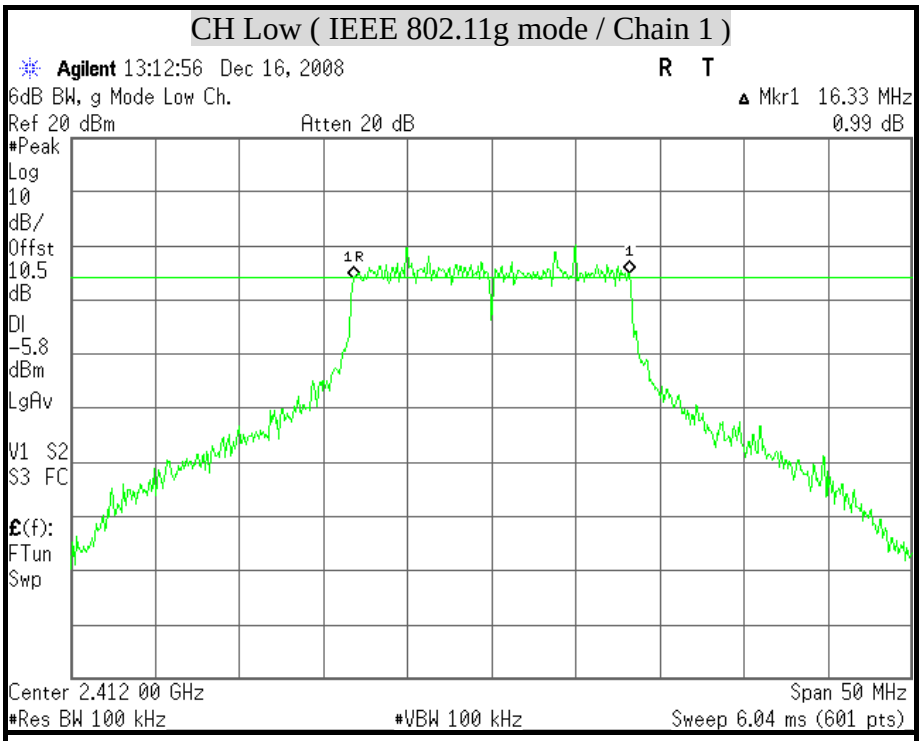

CH Middle ( IEEE 802.11g mode / Chain 0 )



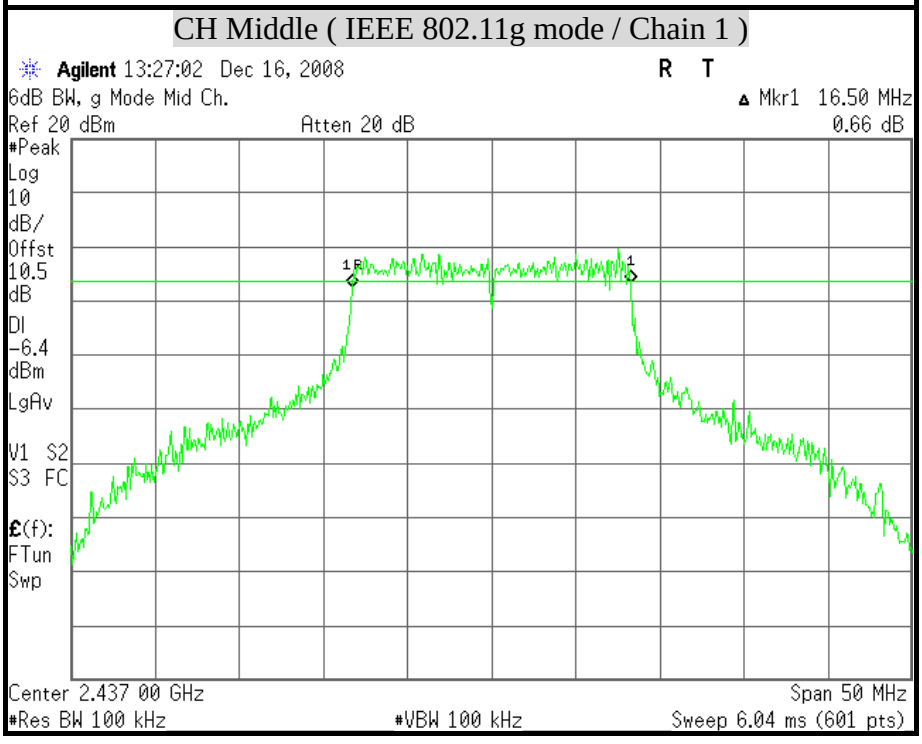
CH High ( IEEE 802.11g mode / Chain 0 )



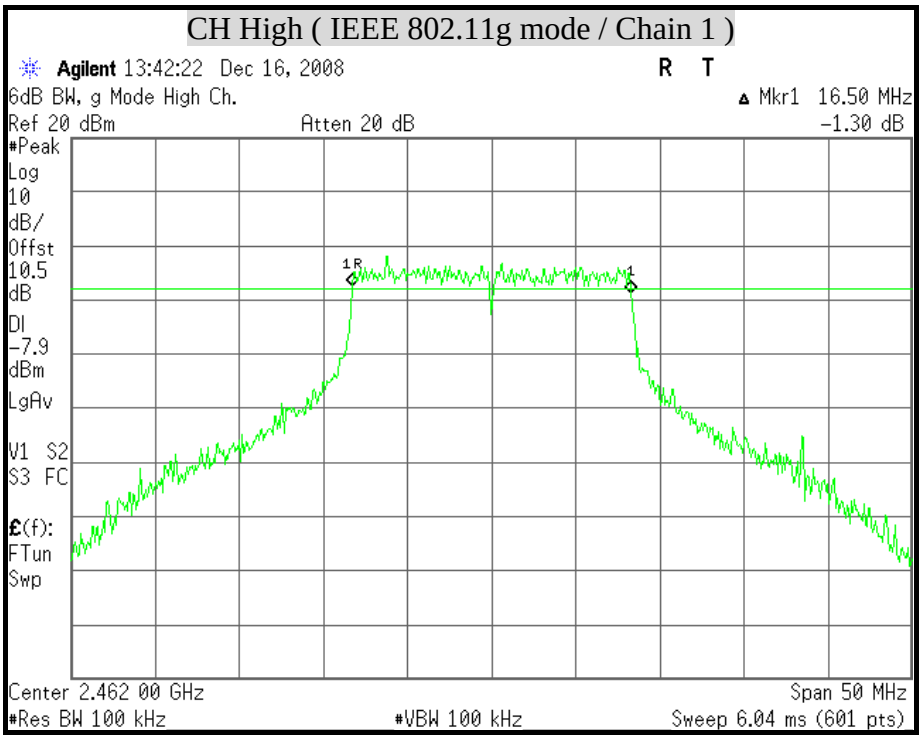
CH Low ( IEEE 802.11g mode / Chain 1 )




CH Middle ( IEEE 802.11g mode / Chain 1 )

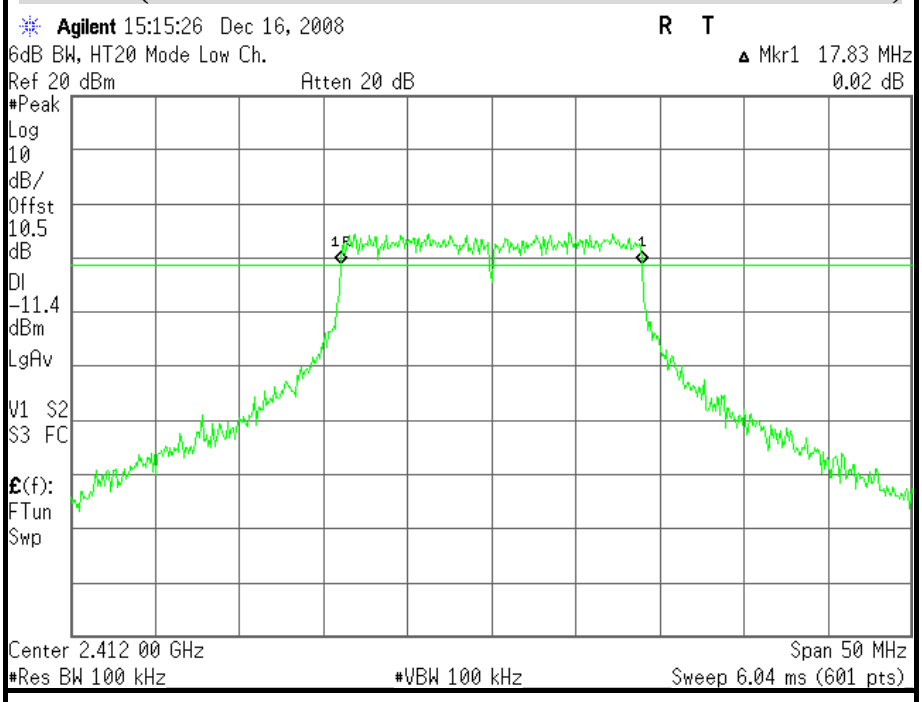


CH High ( IEEE 802.11g mode / Chain 1 )

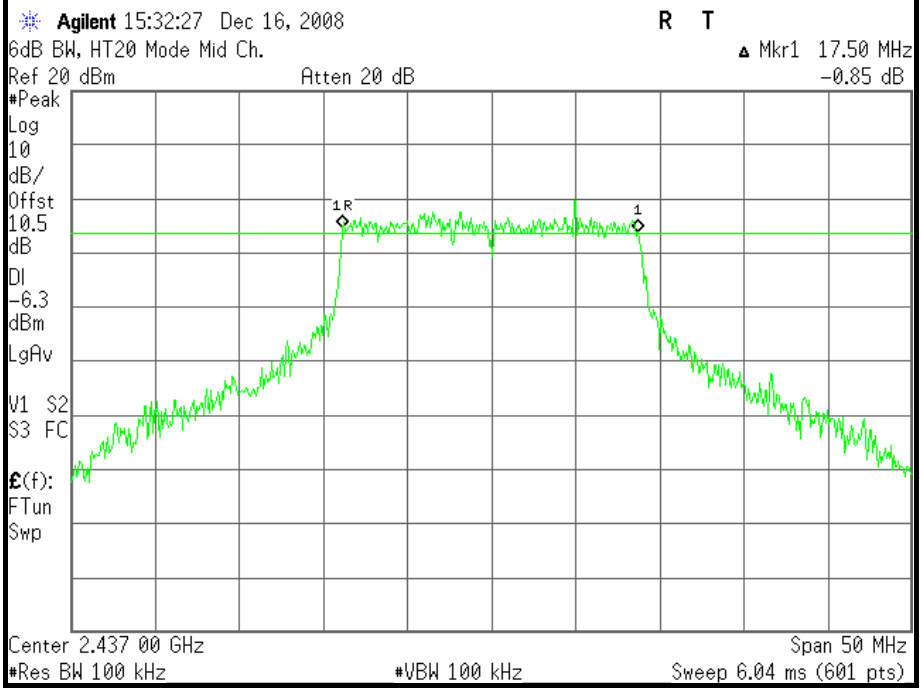


## 6dB BANDWIDTH ( draft 802.11n Standard-20 MHz Channel mode )

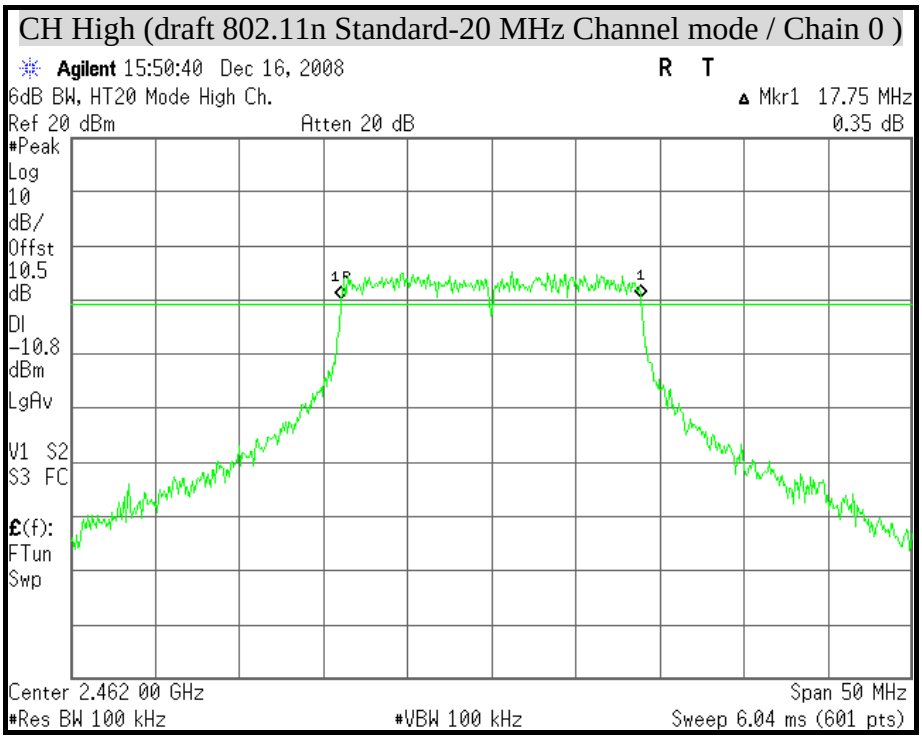
CH Low ( draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



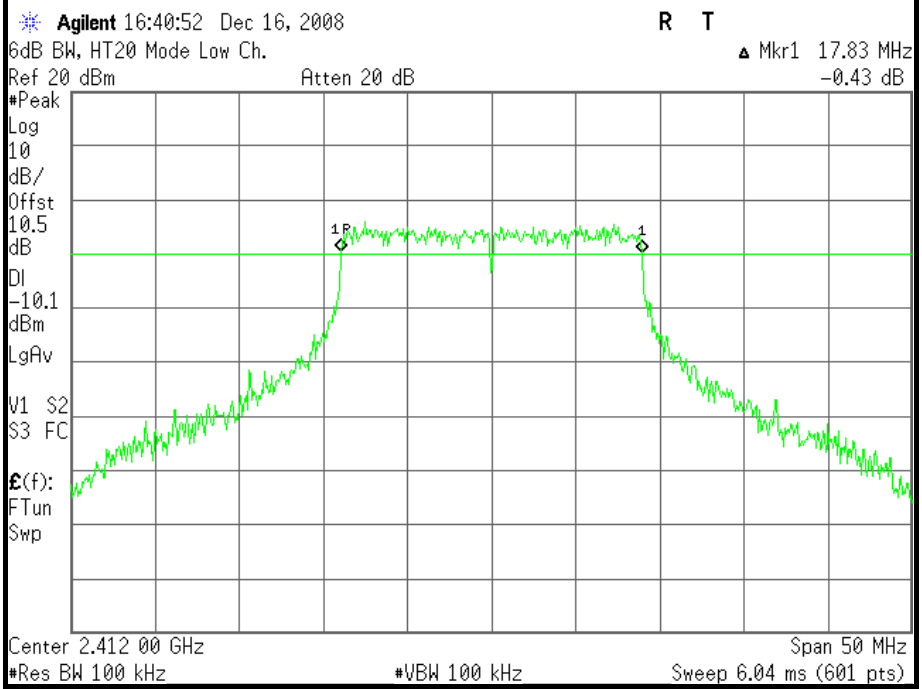

CH Middle (draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



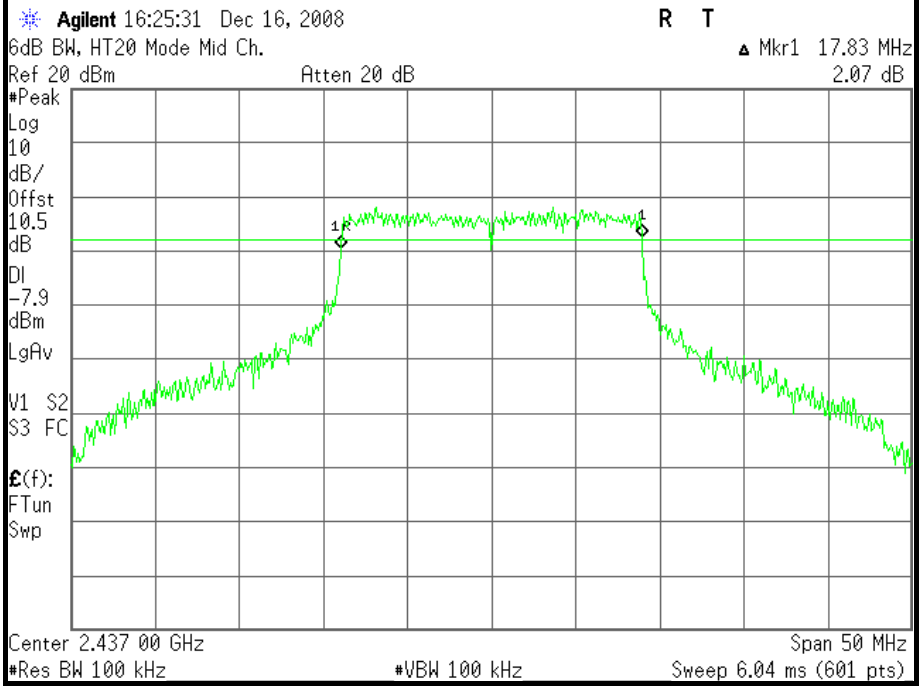
CH High (draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



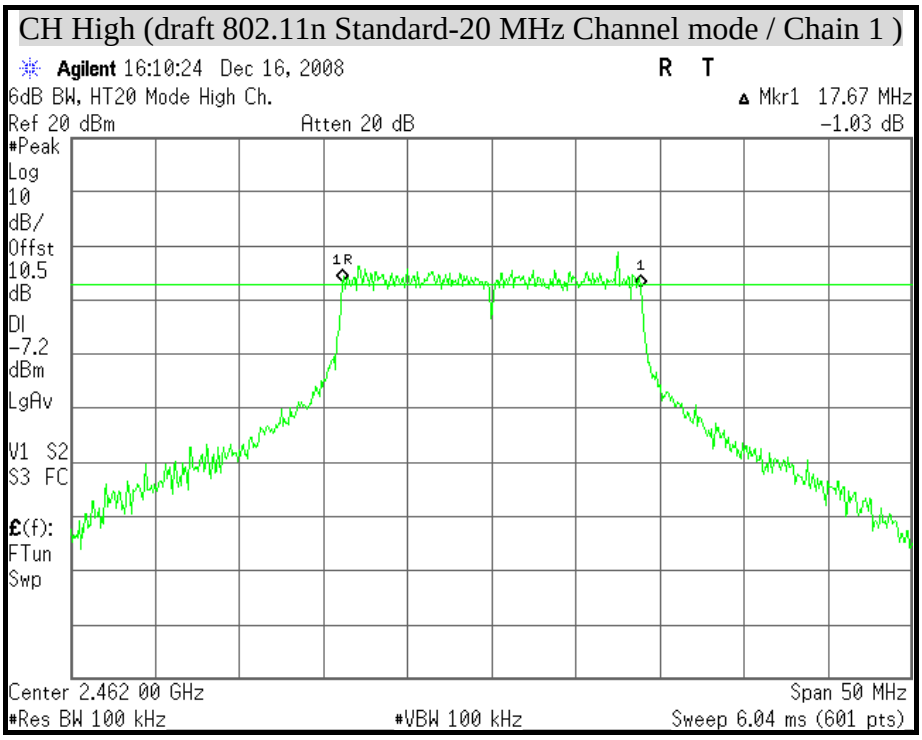
CH Low (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )




CH Middle (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )

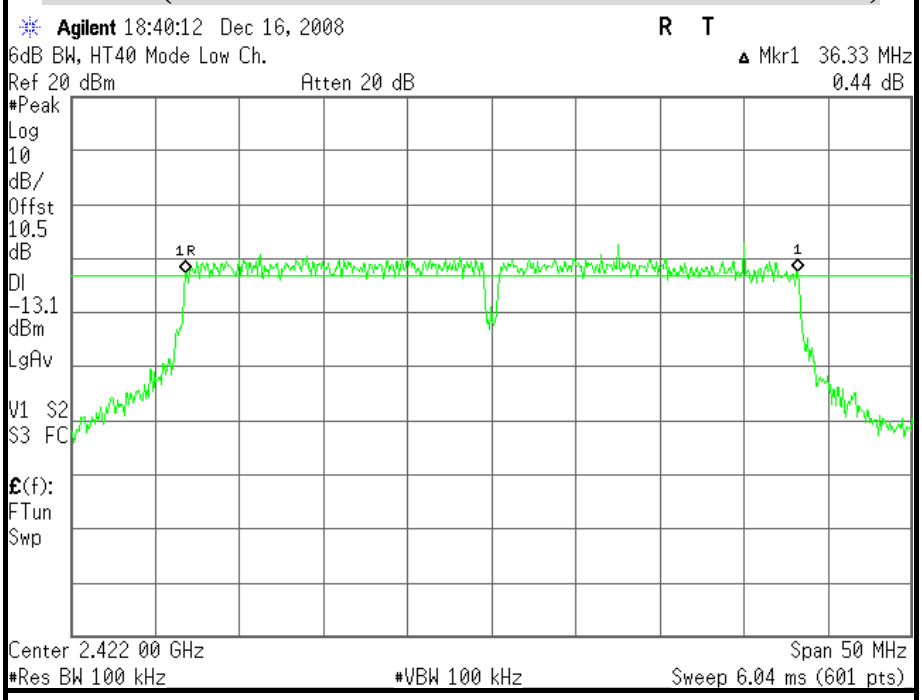


CH High (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )

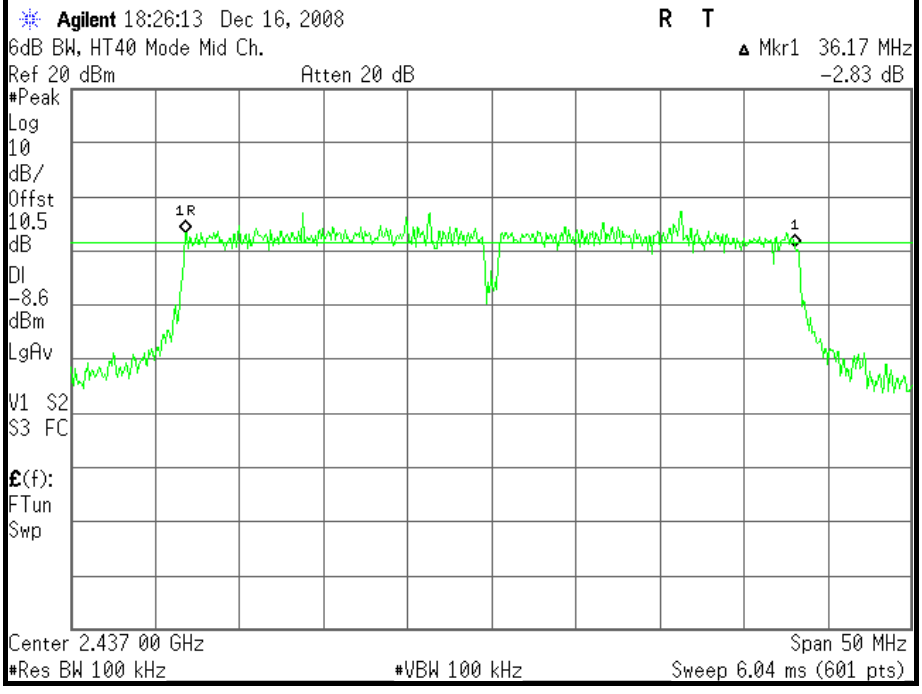


## 6dB BANDWIDTH ( draft 802.11n Wide-40 MHz Channel mode )

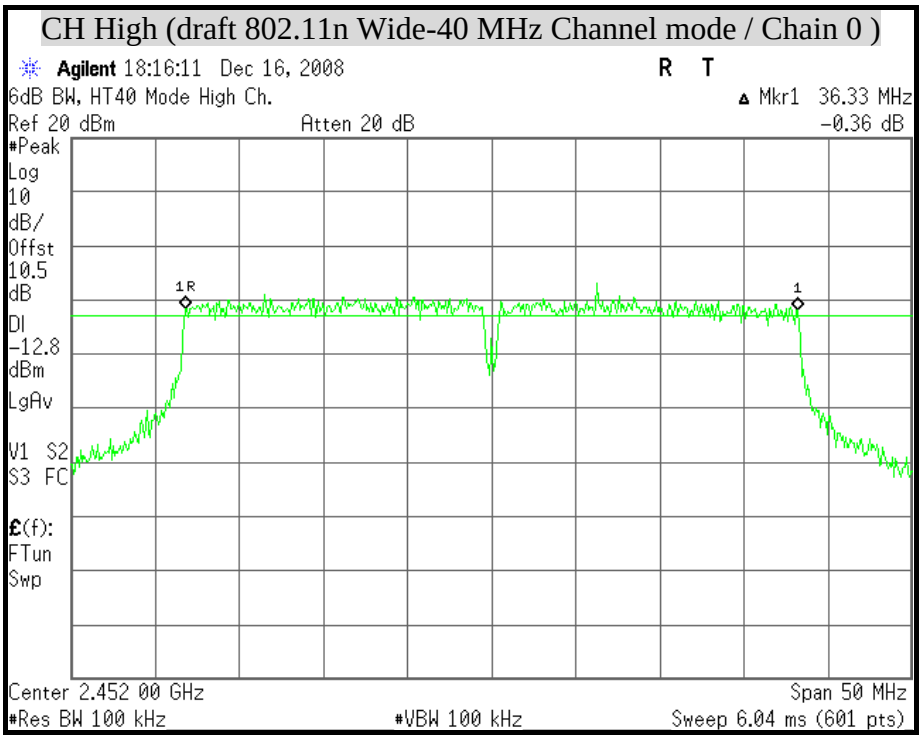
CH Low ( draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



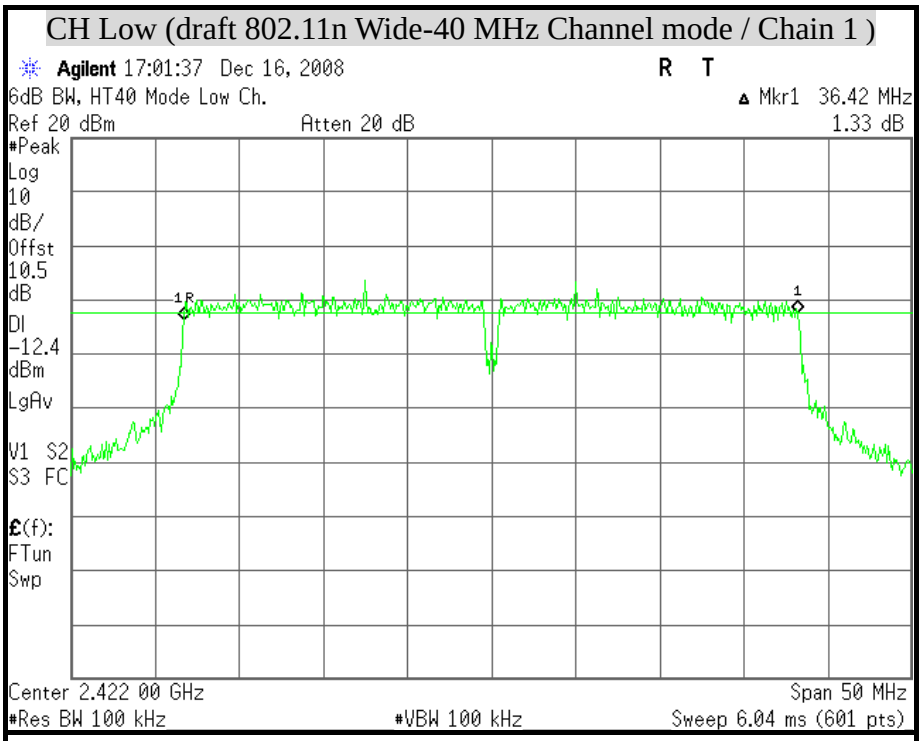

CH Middle (draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



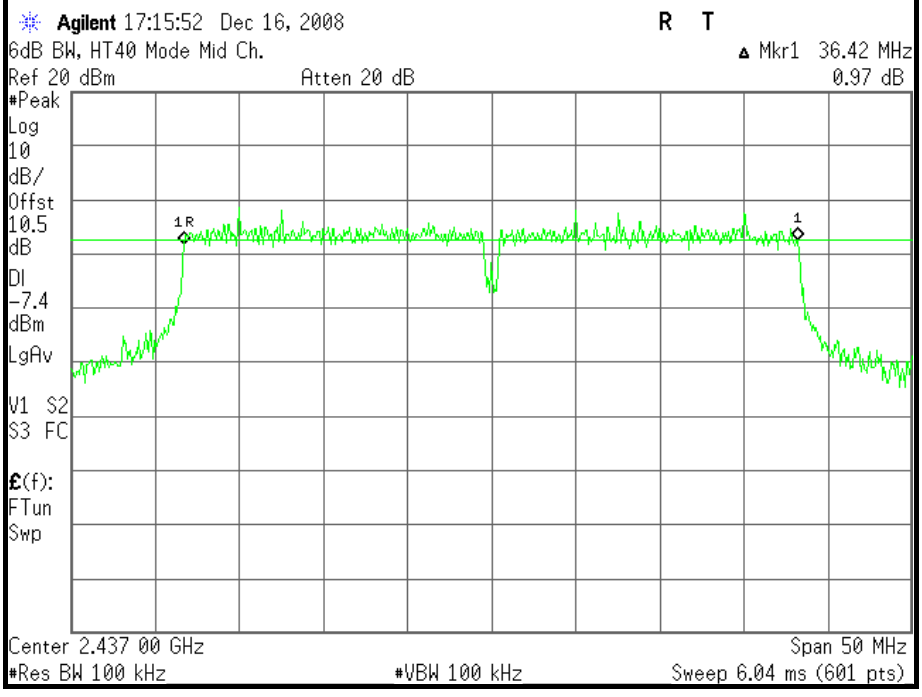
CH High (draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



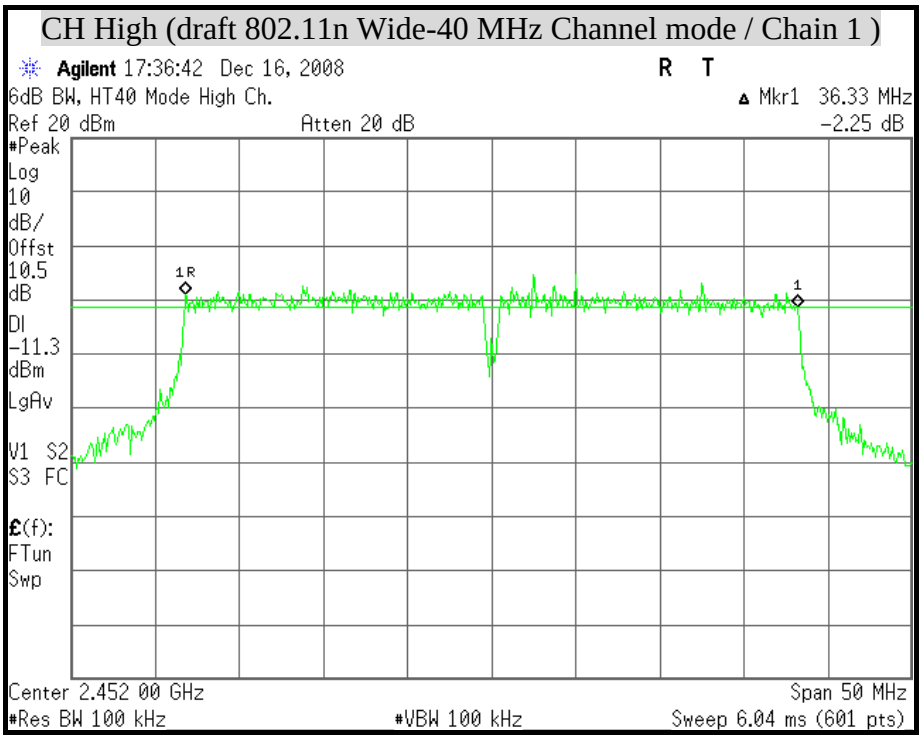
CH Low (draft 802.11n Wide-40 MHz Channel mode / Chain 1 )




CH Middle (draft 802.11n Wide-40 MHz Channel mode / Chain 1 )



CH High (draft 802.11n Wide-40 MHz Channel mode / Chain 1 )



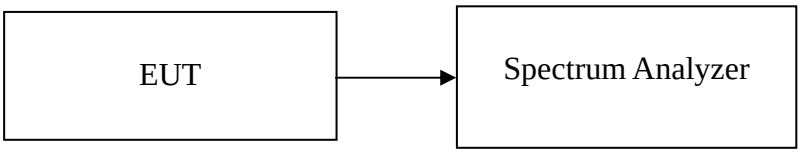
## 8.3 PEAK POWER

**LIMIT**

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(b)(3) & RSS-210 §A8.4(4), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**TEST CONFIGURATION**




**TEST PROCEDURE**

1. The spectrum shall be set as follows :
   Span : 1.5 times channel integration bandwidth.
   RBW : 1MHz
   VBW : 3MHz
   Detector : Peak
   Sweep : Single trace
2. Compute the combined power of all signal responses contained in the trace by covering all the data points.
3. For 99% occupied BW, place the markers at the frequency at which 0.5% of the power lies to the right of the right marker and 0.5% of the power lies to the left of the left marker.
4. The peak output power is the channel power integrated over 99% bandwidth.

**TEST RESULTS**

*No non-compliance noted*

## TEST DATA

Total peak power calculation formula:
10 log (10^ (Chain 0 Power / 10) + 10^ (Chain1 Power / 10)

The maximum antenna gain is 3.62 dBi, therefore the limit is 30 dBm.
In the legacy mode, the effective antenna gain is 3.62 + 10 × Log (2) = 6.63 dBi.

**Test mode: IEEE 802.11b mode**

| Channel | Channel Frequency (MHz) | Peak Power (dBm) | | Peak Power (W) | | Peak Power Total (dBm) | Peak Power Total (W) | Peak Power Limit (W) | Result |
|---|---|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 0 | Chain 1 | | | | |
| Low | 2412 | 15.99 | 16.28 | 0.040 | 0.042 | 19.148 | 0.082 | 0.865 | PASS |
| Middle | 2437 | 15.87 | 16.41 | 0.039 | 0.044 | 19.159 | 0.082 | 0.865 | PASS |
| High | 2462 | 15.75 | 16.37 | 0.038 | 0.043 | 19.081 | 0.08 | 0.865 | PASS |

***Remark:***

*1. At finial test to get the worst-case emission at 1 Mbps.*
*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: IEEE 802.11g mode**

| Channel | Channel Frequency (MHz) | Peak Power (dBm) | | Peak Power (W) | | Peak Power Total (dBm) | Peak Power Total (W) | Peak Power Limit (W) | Result |
|---|---|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 0 | Chain 1 | | | | |
| Low | 2412 | 18.63 | 20.01 | 0.073 | 0.100 | 22.38 | 0.173 | 0.865 | PASS |
| Middle | 2437 | 22.20 | 22.40 | 0.166 | 0.174 | 25.31 | 0.340 | 0.865 | PASS |
| High | 2462 | 18.31 | 19.74 | 0.068 | 0.094 | 22.09 | 0.162 | 0.865 | PASS |

***Remark:***

*1. At finial test to get the worst-case emission at 6 Mbps.*
*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: draft 802.11n Standard-20 MHz Channel mode**

| Channel | Channel Frequency (MHz) | Peak Power (dBm) | | Peak Power (W) | | Peak Power Total (dBm) | Peak Power Total (W) | Peak Power Limit (W) | Result |
|---|---|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 0 | Chain 1 | | | | |
| Low | 2412 | 17.60 | 18.58 | 0.060 | 0.070 | 21.13 | 0.13 | 0.865 | PASS |
| Middle | 2437 | 22.13 | 21.75 | 0.163 | 0.150 | 24.95 | 0.31 | 0.865 | PASS |
| High | 2462 | 17.89 | 18.63 | 0.060 | 0.070 | 21.29 | 0.13 | 0.865 | PASS |

***Remark:***

*1. At finial test to get the worst-case emission at 6.5 Mbps.*

*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: draft 802.11n Wide-40 MHz Channel mode**

| Channel | Channel Frequency (MHz) | Peak Power (dBm) | | Peak Power (W) | | Peak Power Total (dBm) | Peak Power Total (W) | Peak Power Limit (W) | Result |
|---|---|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 0 | Chain 1 | | | | |
| Low | 2422 | 16.45 | 17.34 | 0.040 | 0.050 | 19.93 | 0.10 | 0.865 | PASS |
| Middle | 2437 | 22.74 | 22.93 | 0.188 | 0.196 | 25.85 | 0.39 | 0.865 | PASS |
| High | 2452 | 16.86 | 18.05 | 0.050 | 0.060 | 20.51 | 0.11 | 0.865 | PASS |

***Remark:***

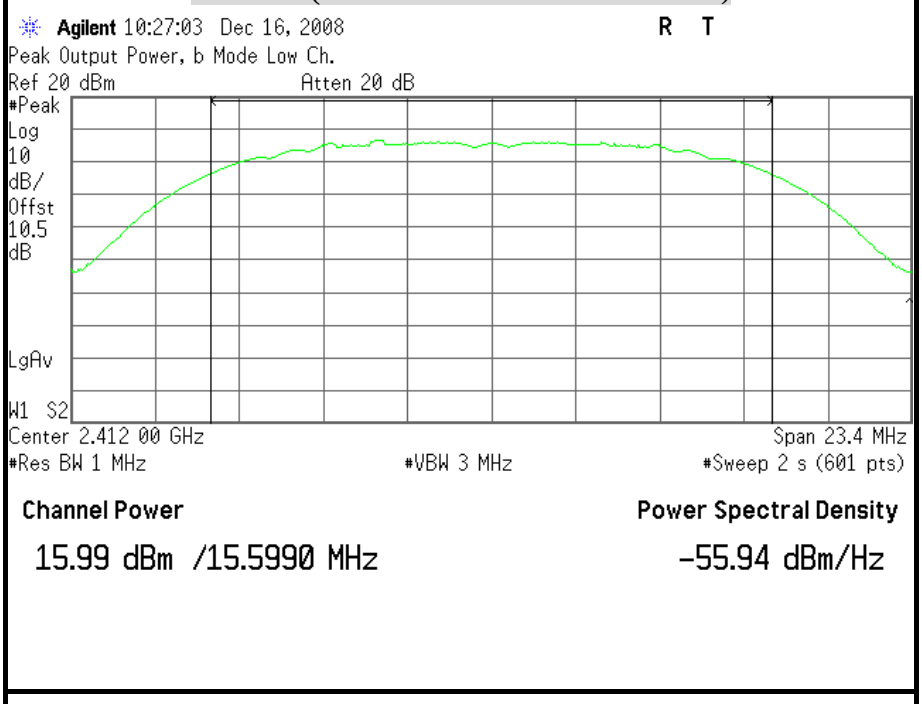
*1. At finial test to get the worst-case emission at 13.5 Mbps.*

*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

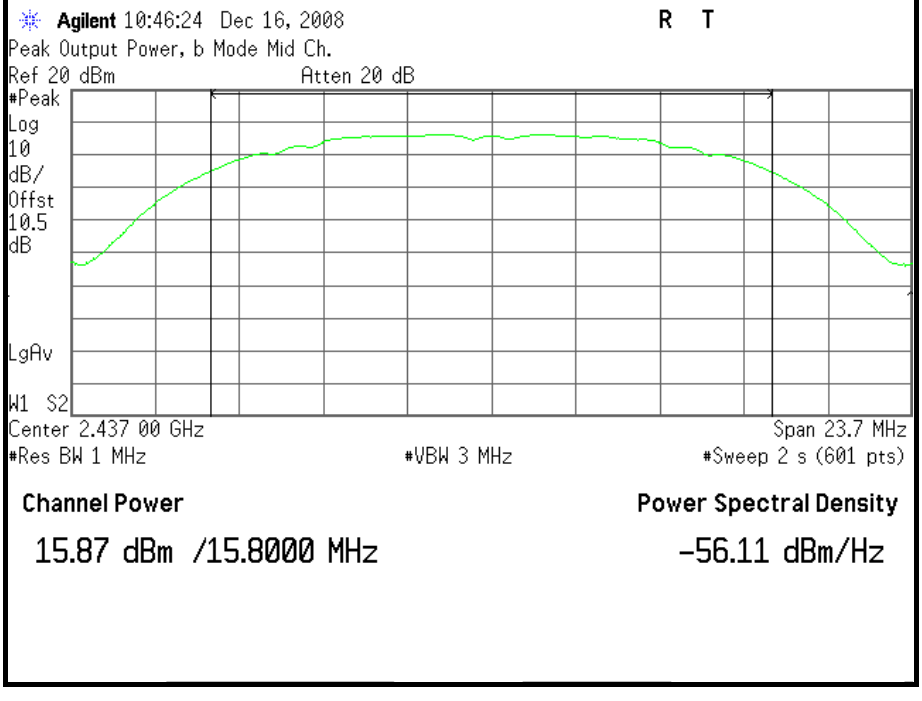
## TEST PLOT

### PEAK POWER ( IEEE 802.11b mode)

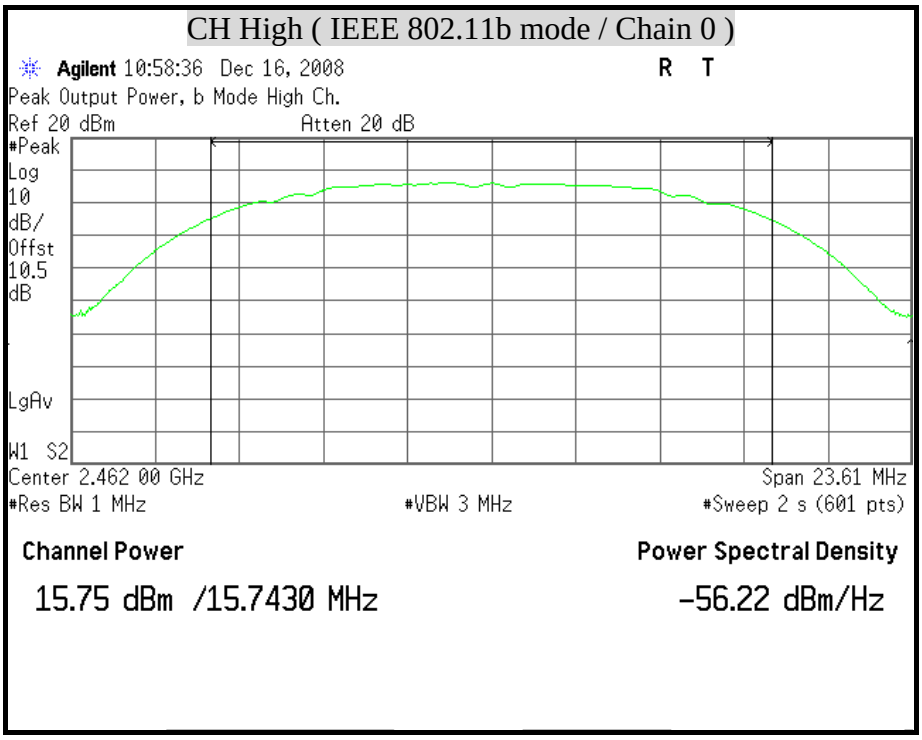
CH Low ( IEEE 802.11b mode / Chain 0 )



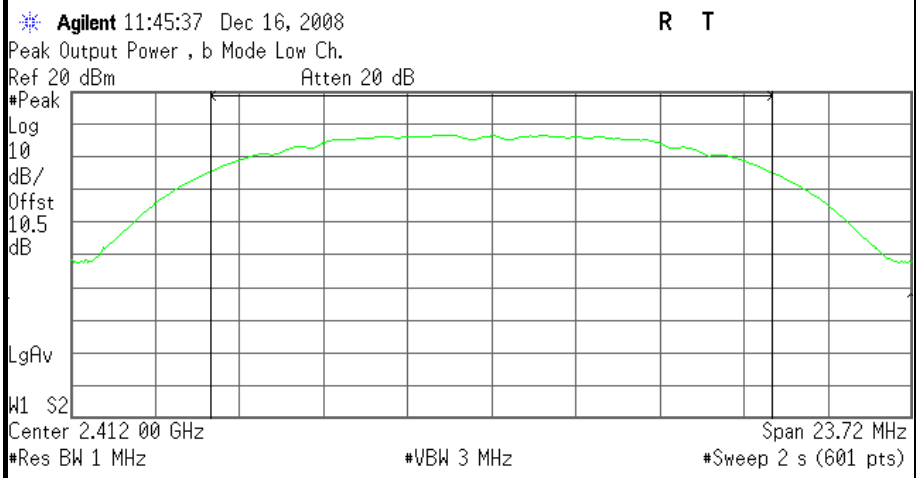

CH Middle ( IEEE 802.11b mode / Chain 0 )



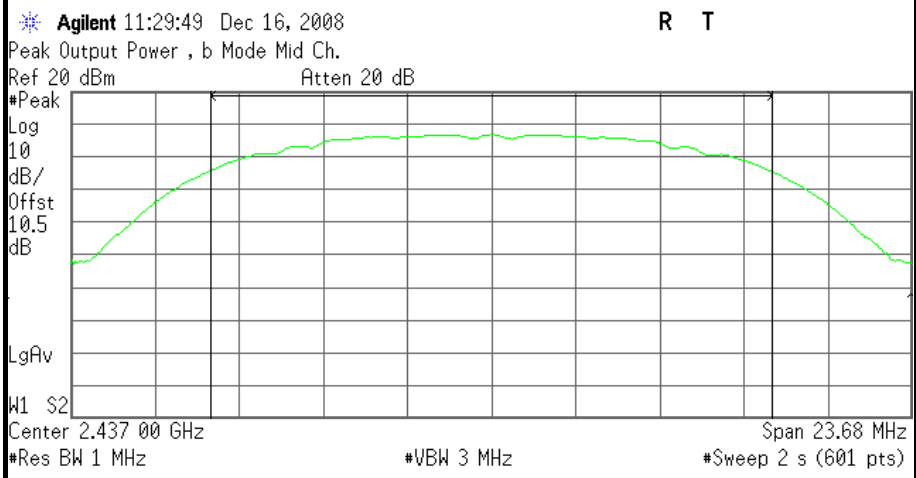
CH High ( IEEE 802.11b mode / Chain 0 )



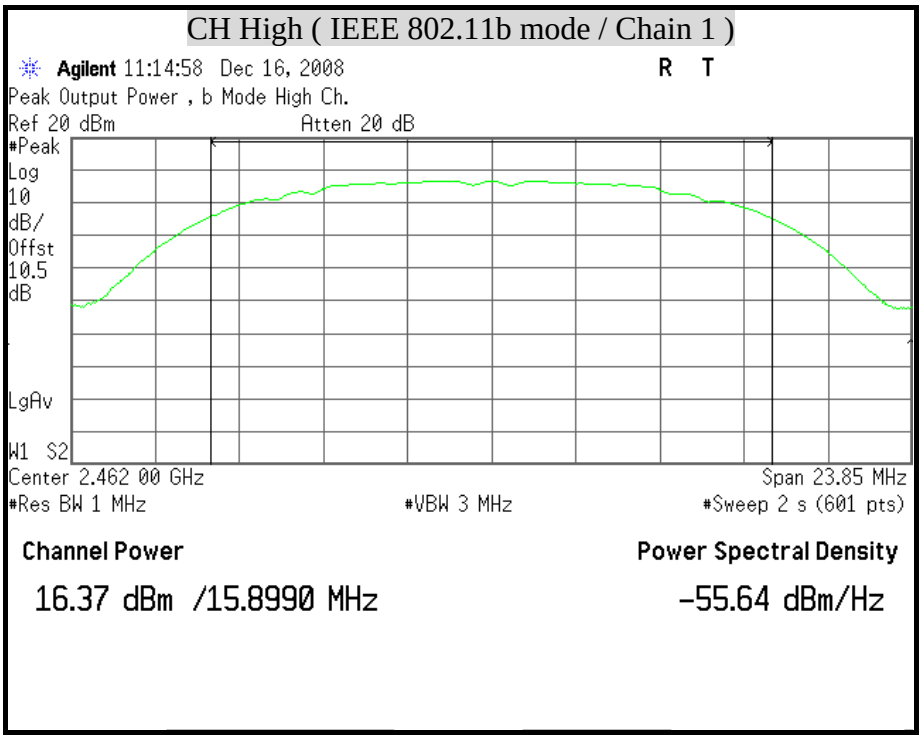
CH Low ( IEEE 802.11b mode / Chain 1 )




CH Middle ( IEEE 802.11b mode / Chain 1 )

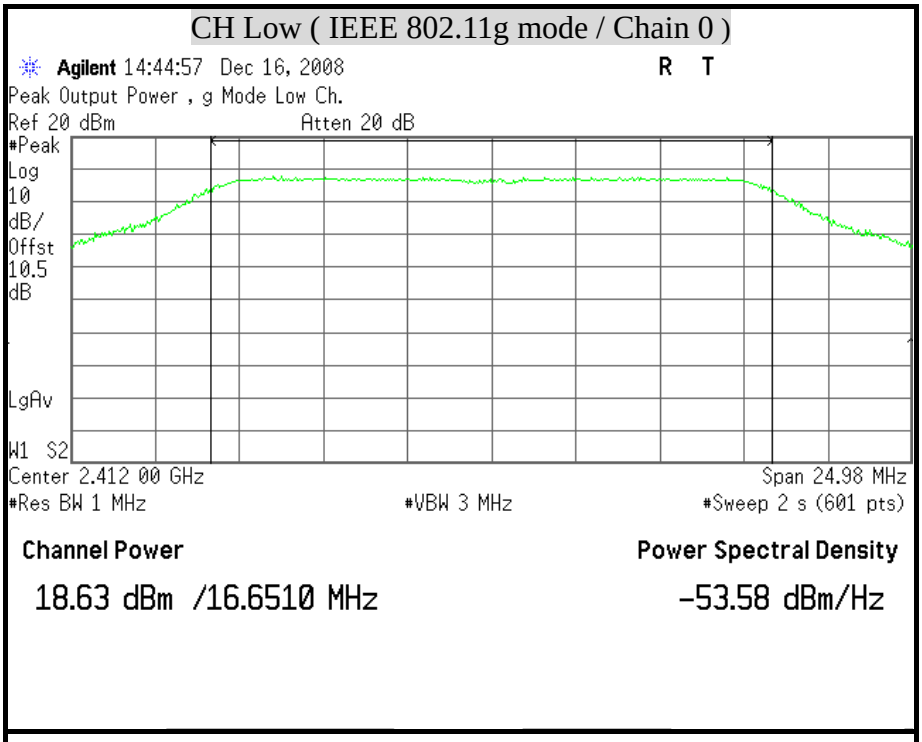


CH High ( IEEE 802.11b mode / Chain 1 )

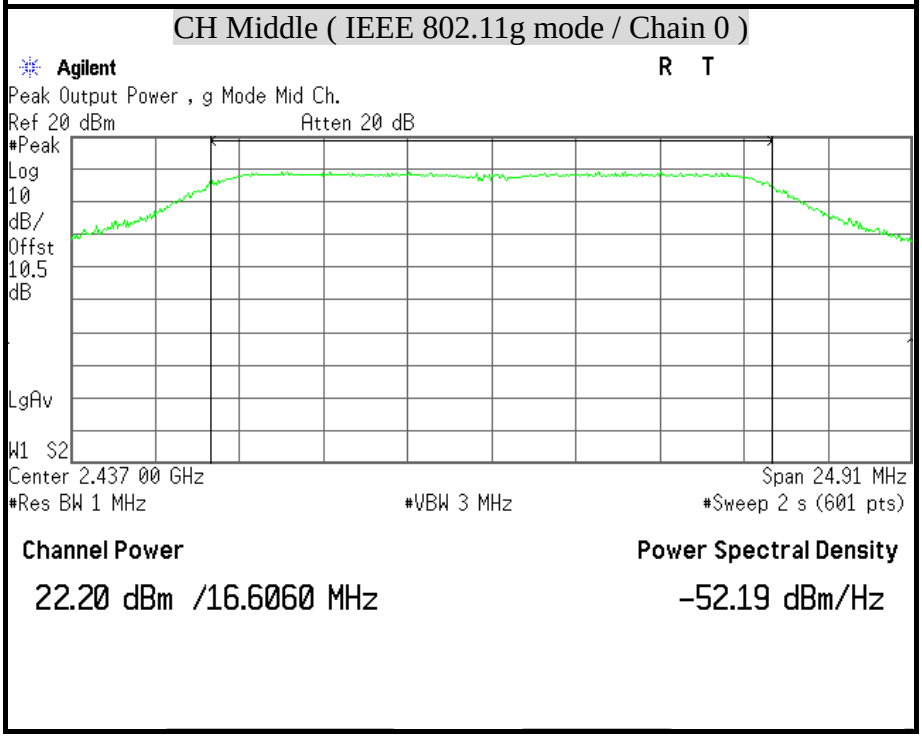


## PEAK POWER ( IEEE 802.11g mode)

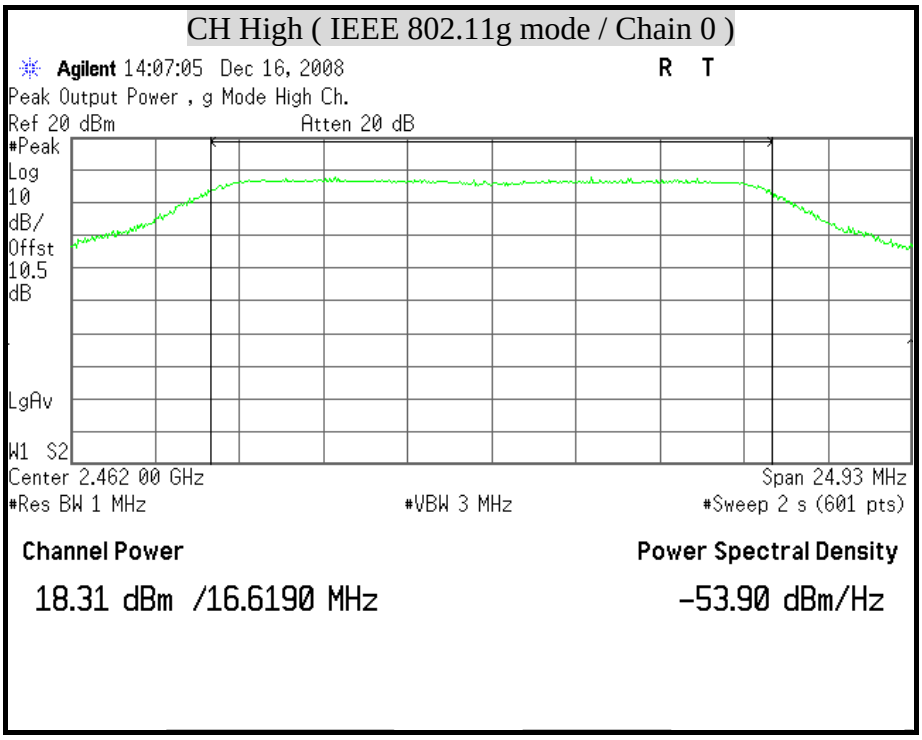
CH Low ( IEEE 802.11g mode / Chain 0 )



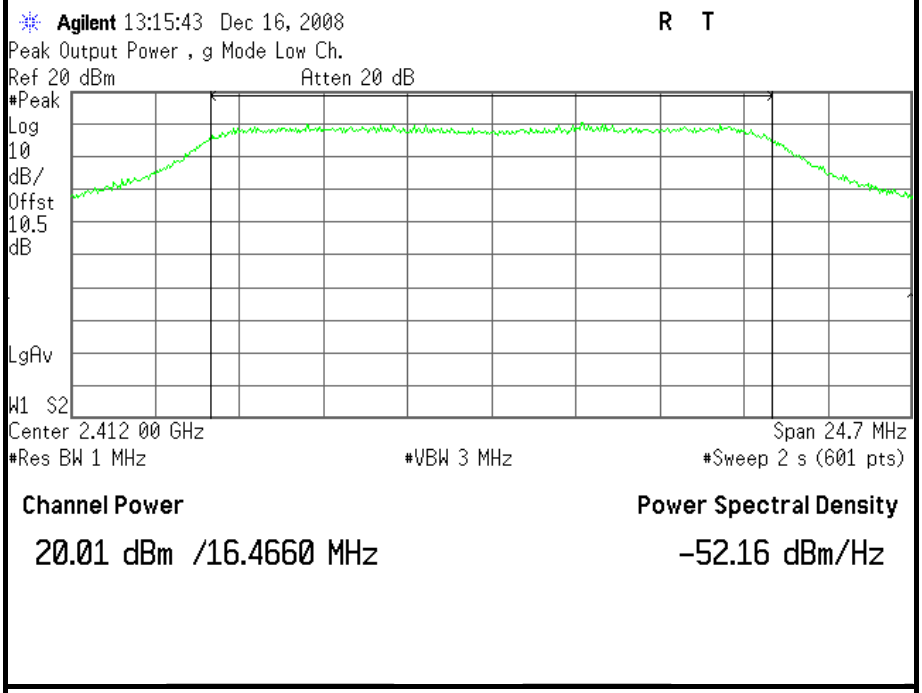

CH Middle ( IEEE 802.11g mode / Chain 0 )



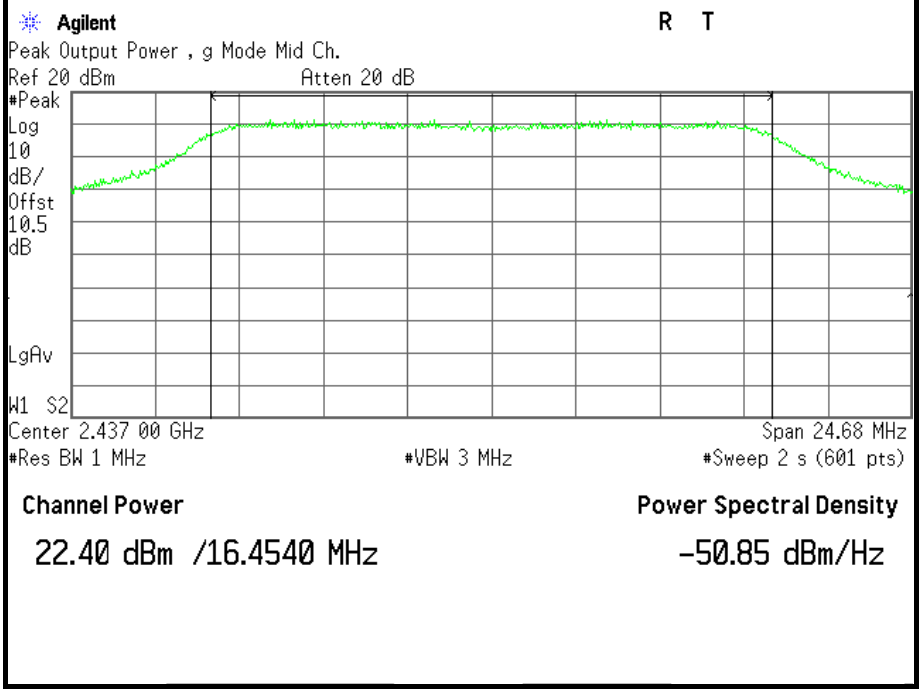
CH High ( IEEE 802.11g mode / Chain 0 )



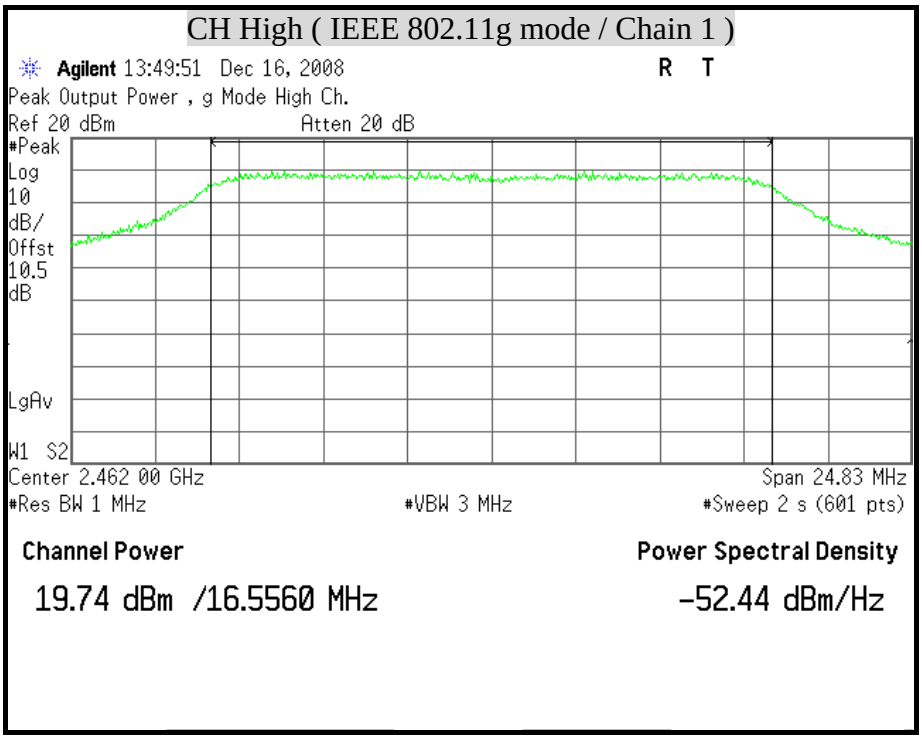
CH Low ( IEEE 802.11g mode / Chain 1 )




CH Middle ( IEEE 802.11g mode / Chain 1 )

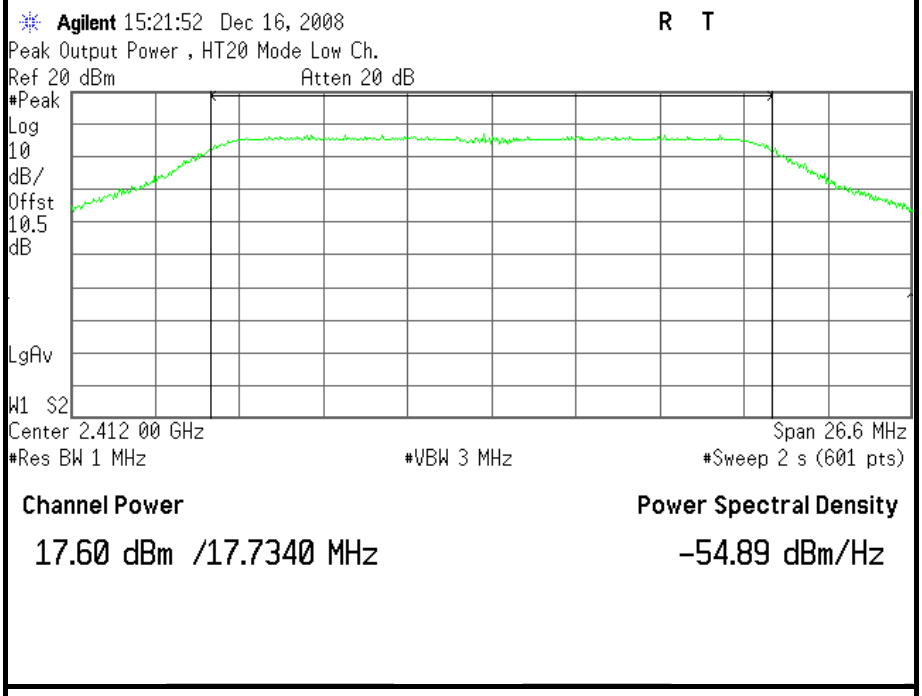


CH High ( IEEE 802.11g mode / Chain 1 )

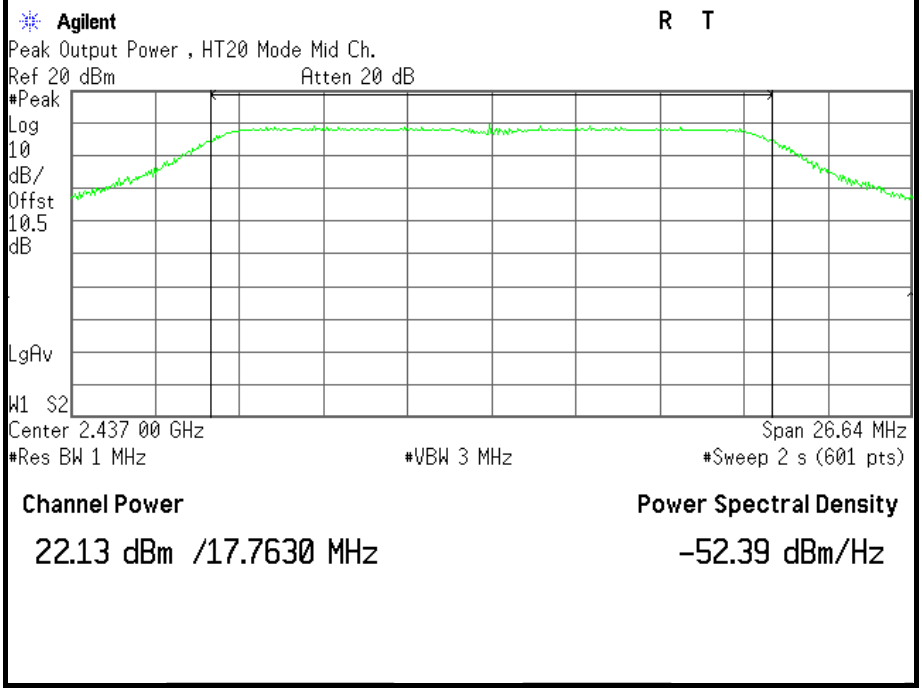


## PEAK POWER ( draft 802.11n Standard-20 MHz Channel mode )

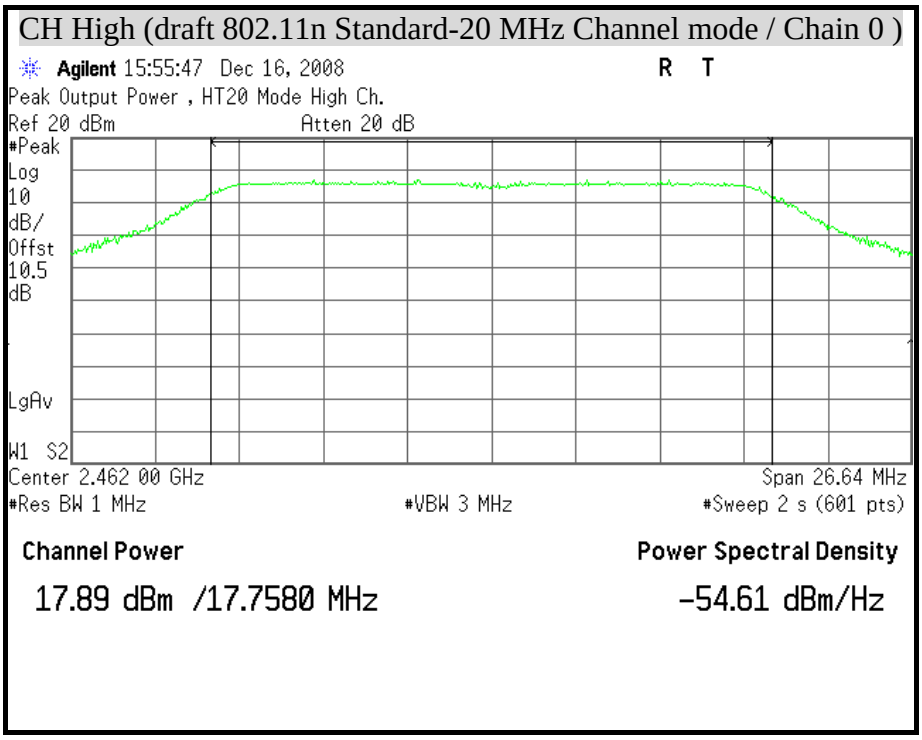
CH Low ( draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



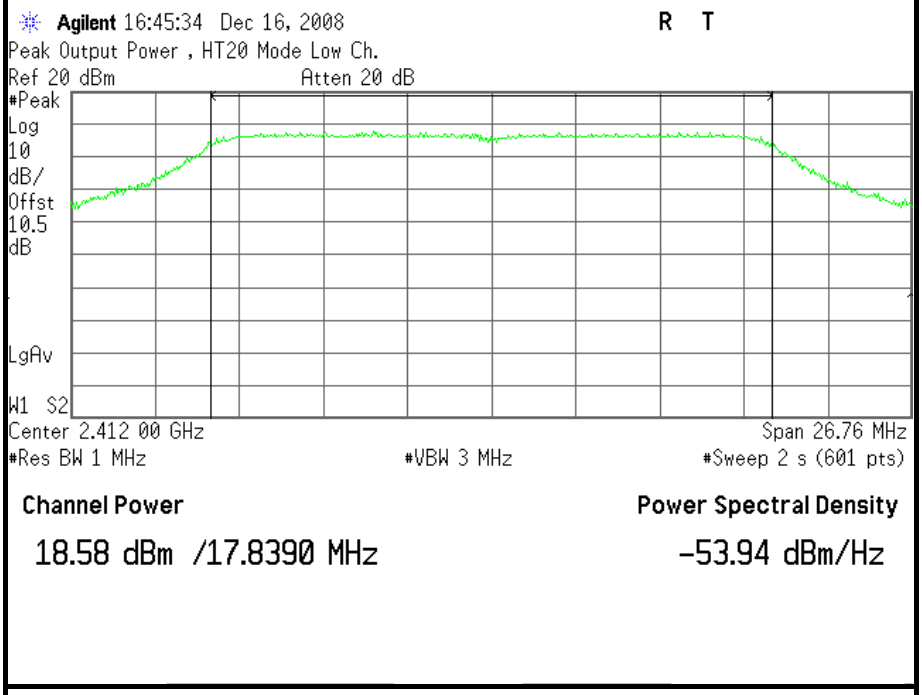

CH Middle (draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



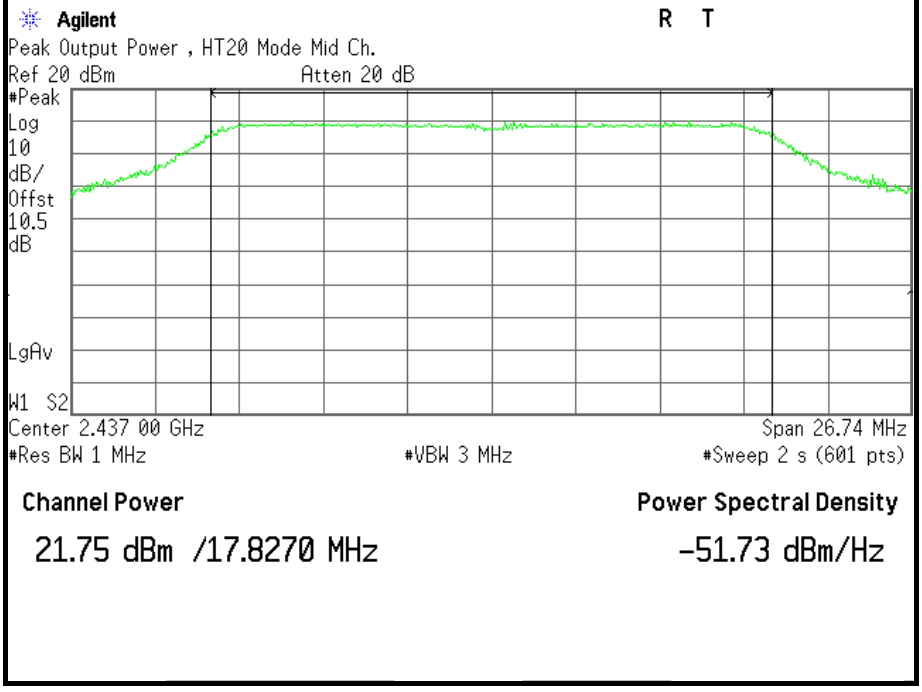
CH High (draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



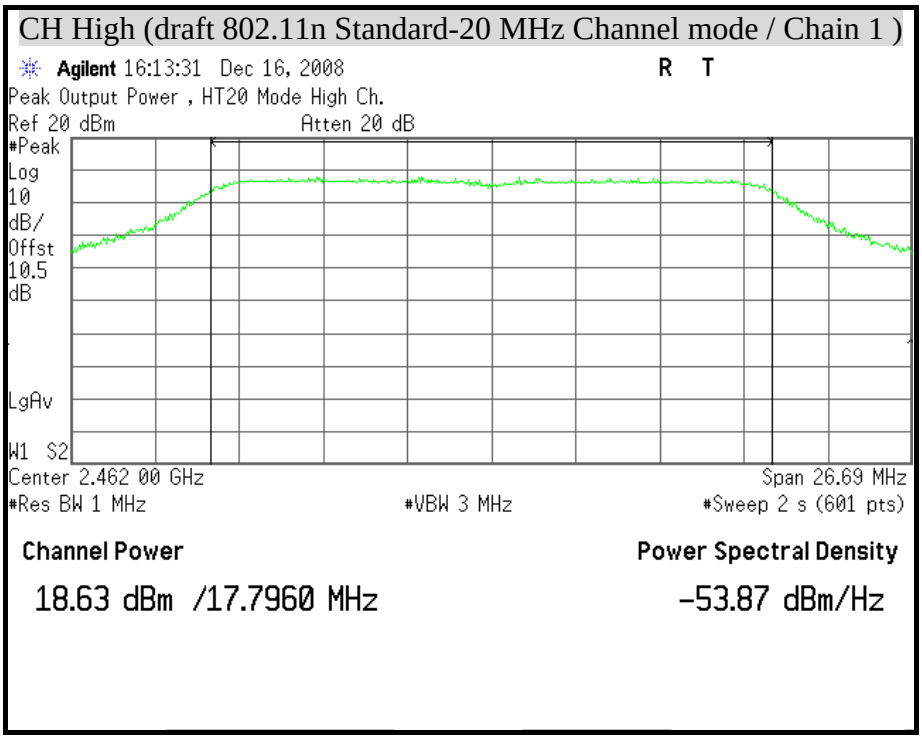
CH Low (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )




CH Middle (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )

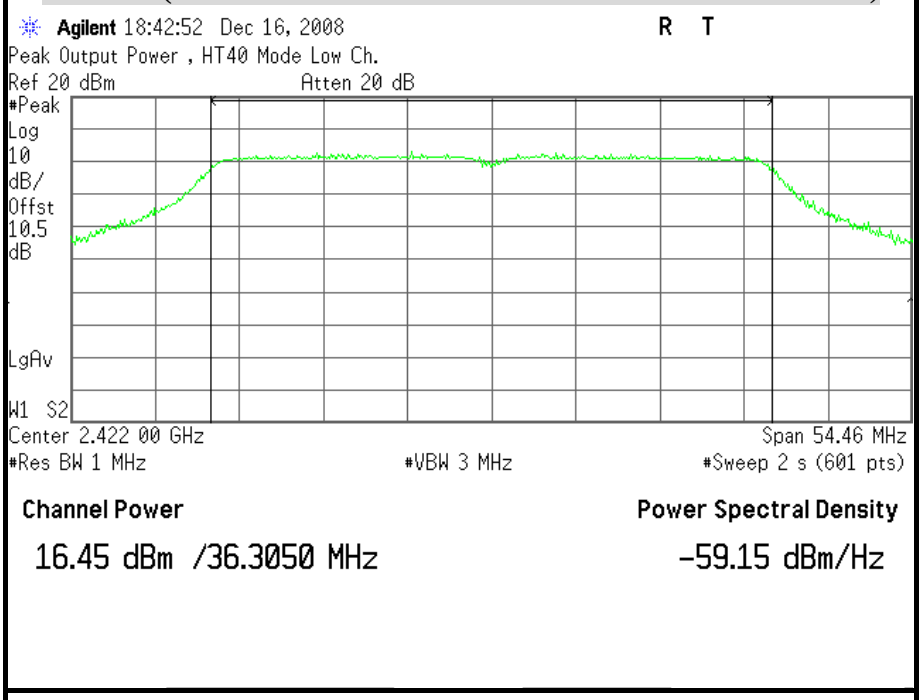


CH High (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )

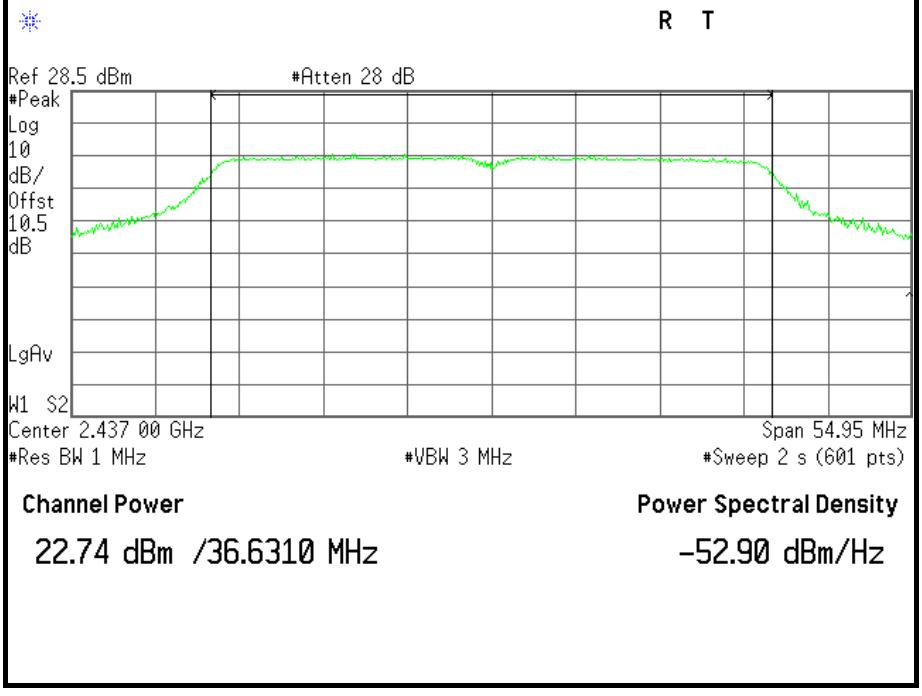


## PEAK POWER ( draft 802.11n Wide-40 MHz Channel mode )

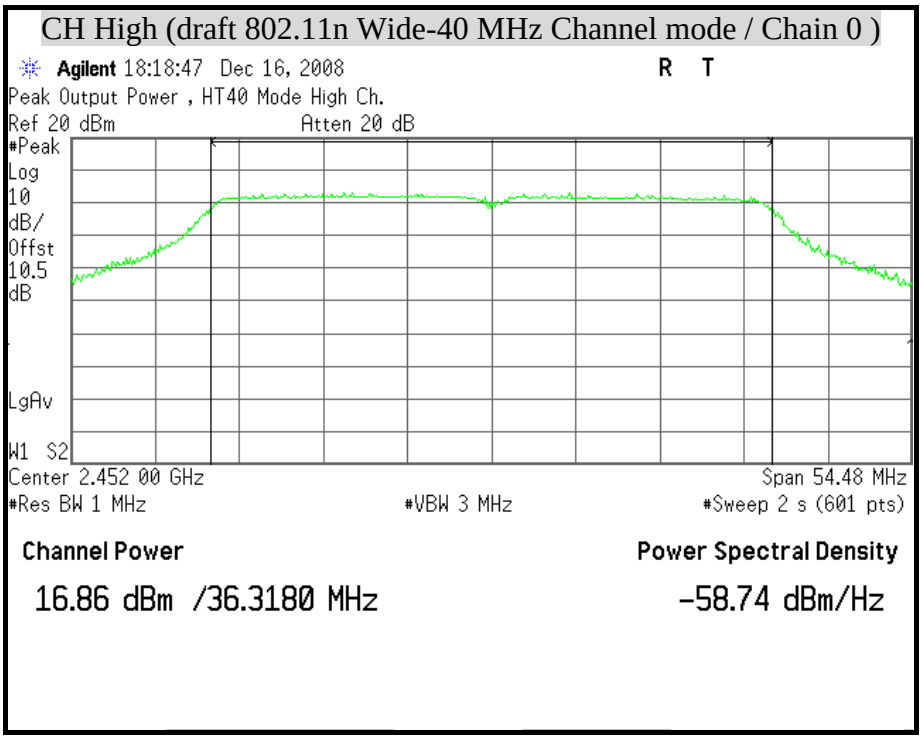
CH Low ( draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



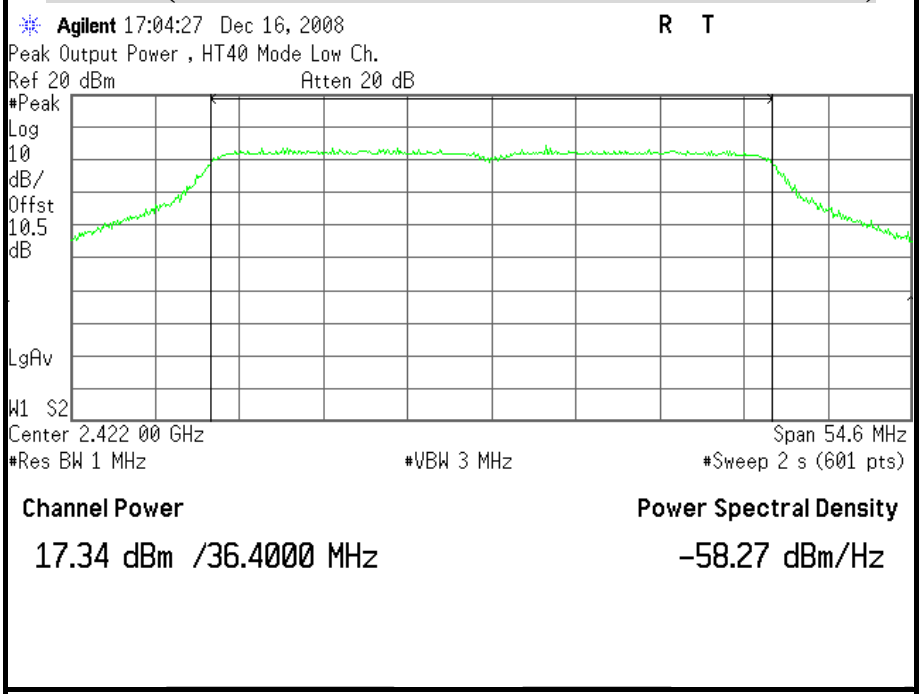

CH Middle (draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



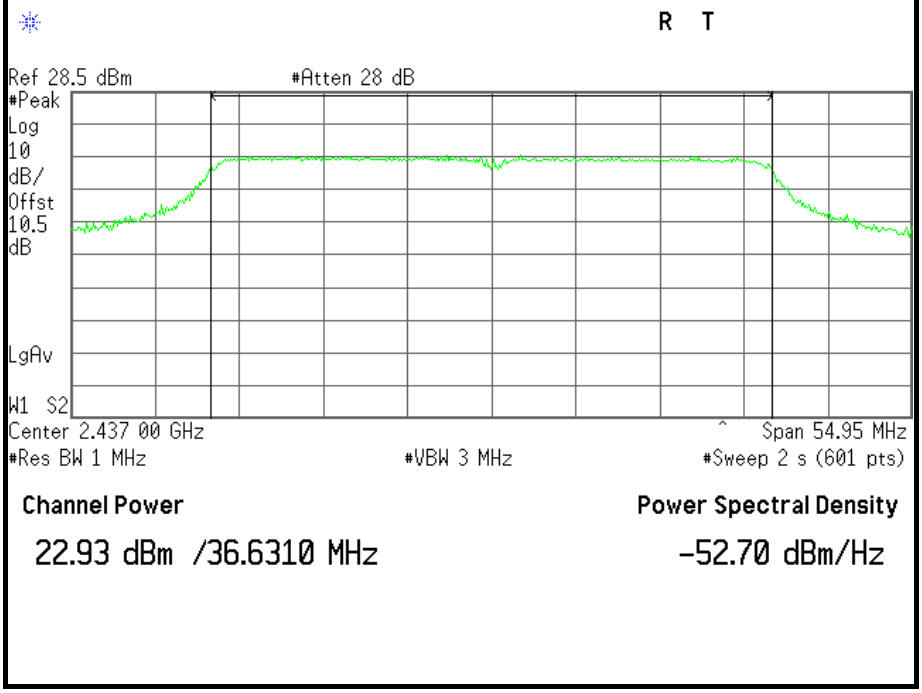
CH High (draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



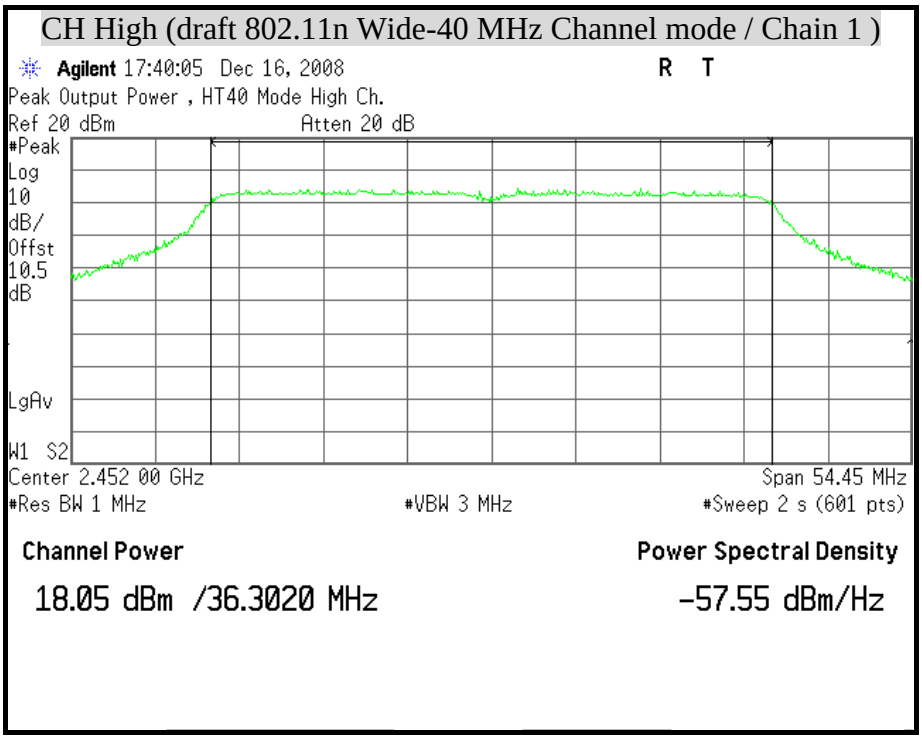
CH Low (draft 802.11n Wide-40 MHz Channel mode / Chain 1 )




CH Middle (draft 802.11n Wide-40 MHz Channel mode / Chain 1 )



CH High (draft 802.11n Wide-40 MHz Channel mode / Chain 1 )

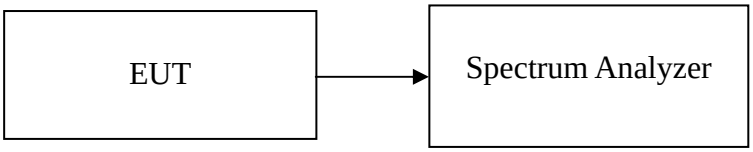


## 8.4 AVERAGE POWER

**LIMIT**

None; for reporting purposes only.

**TEST CONFIGURATION**




**TEST PROCEDURE**

The transmitter output is connected to the Spectrum analyzer. The Spectrum analyzer is set to the average power detection.

**TEST RESULTS**

*No non-compliance noted*

## TEST DATA

Total avg power calculation formula:
10 log (10^ (Chain 0 Power / 10) + 10^ (Chain1 Power / 10)).

**Test mode: IEEE 802.11b mode**

| Channel | Channel Frequency (MHz) | AVG Power (dBm) | | AVG Power (W) | | AVG Power Total (dBm) | AVG Power Total (W) |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 0 | Chain 1 | | |
| Low | 2412 | 14.12 | 13.54 | 0.03 | 0.02 | 16.85 | 0.05 |
| Middle | 2437 | 13.11 | 13.61 | 0.02 | 0.02 | 16.38 | 0.04 |
| High | 2462 | 12.86 | 13.52 | 0.02 | 0.02 | 16.21 | 0.04 |

***Remark:***

*1. At finial test to get the worst-case emission at 1 Mbps.*
*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: IEEE 802.11g mode**

| Channel | Channel Frequency (MHz) | AVG Power (dBm) | | AVG Power (W) | | AVG Power Total (dBm) | AVG Power Total (W) |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 0 | Chain 1 | | |
| Low | 2412 | 11.12 | 11.44 | 0.01 | 0.01 | 14.29 | 0.03 |
| Middle | 2437 | 14.35 | 13.89 | 0.03 | 0.02 | 17.14 | 0.05 |
| High | 2462 | 10.61 | 11.30 | 0.01 | 0.01 | 13.98 | 0.03 |

***Remark:***

*1. At finial test to get the worst-case emission at 6 Mbps.*
*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: draft 802.11n Standard-20 MHz Channel mode**

| Channel | Channel Frequency (MHz) | AVG Power (dBm) | | AVG Power (W) | | AVG Power Total (dBm) | AVG Power Total (W) |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 0 | Chain 1 | | |
| Low | 2412 | 9.66 | 10.51 | 0.01 | 0.01 | 13.12 | 0.02 |
| Middle | 2437 | 14.34 | 13.81 | 0.03 | 0.02 | 17.09 | 0.05 |
| High | 2462 | 9.88 | 10.53 | 0.01 | 0.01 | 13.23 | 0.02 |

***Remark:***

*1. At finial test to get the worst-case emission at 6.5 Mbps.*

*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: draft 802.11n Wide-40 MHz Channel mode**

| Channel | Channel Frequency (MHz) | AVG Power (dBm) | | AVG Power (W) | | AVG Power Total (dBm) | AVG Power Total (W) |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 0 | Chain 1 | | |
| Low | 2422 | 8.36 | 9.17 | 0.01 | 0.01 | 11.79 | 0.02 |
| Middle | 2437 | 14.68 | 14.99 | 0.29 | 0.32 | 17.85 | 0.04 |
| High | 2452 | 8.65 | 9.62 | 0.01 | 0.01 | 12.17 | 0.02 |

***Remark:***

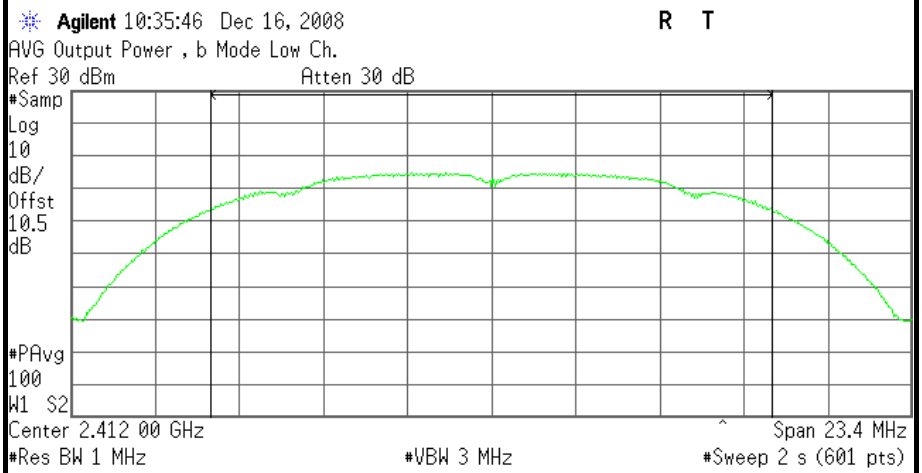
*1. At finial test to get the worst-case emission at 13.5 Mbps.*

*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

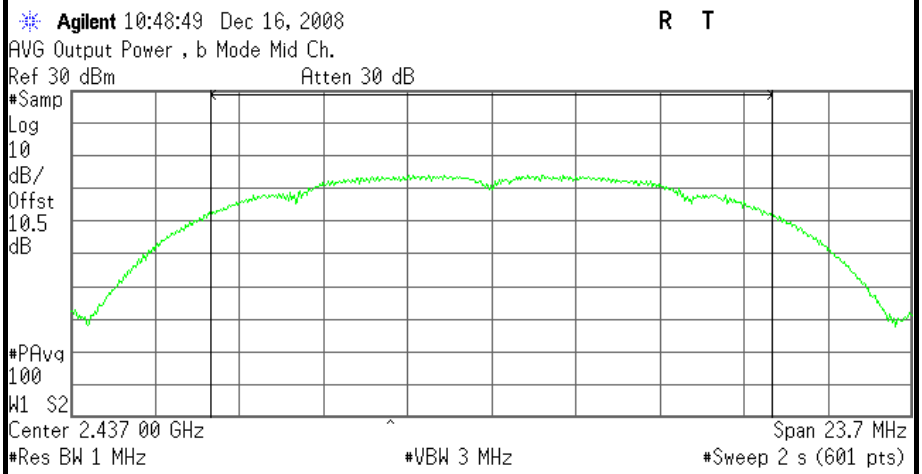
## TEST PLOT

### AVG POWER ( IEEE 802.11b mode)

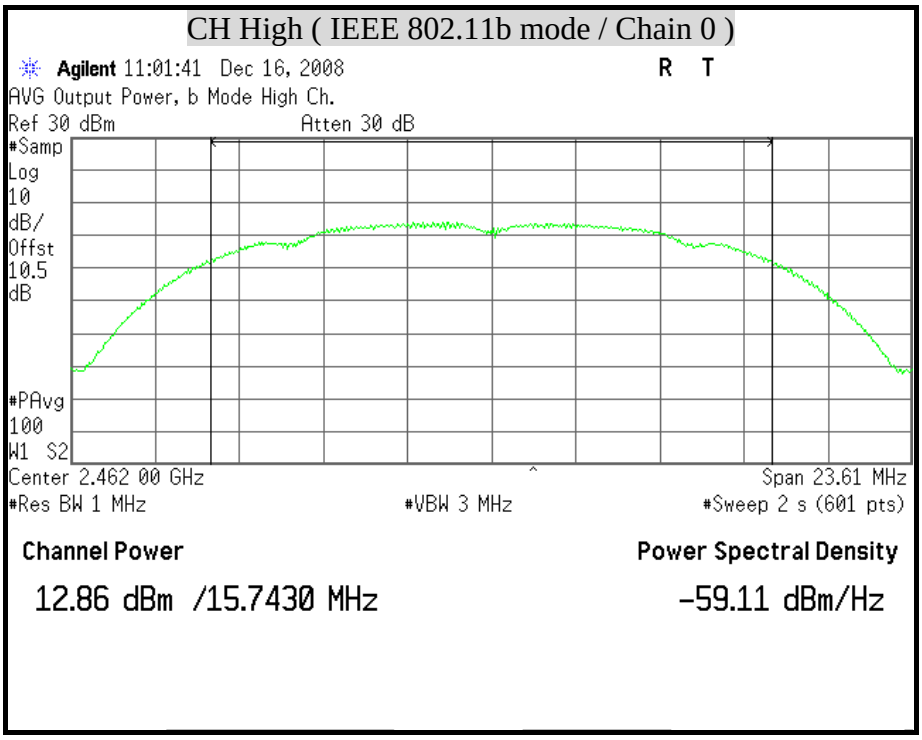
CH Low ( IEEE 802.11b mode / Chain 0 )



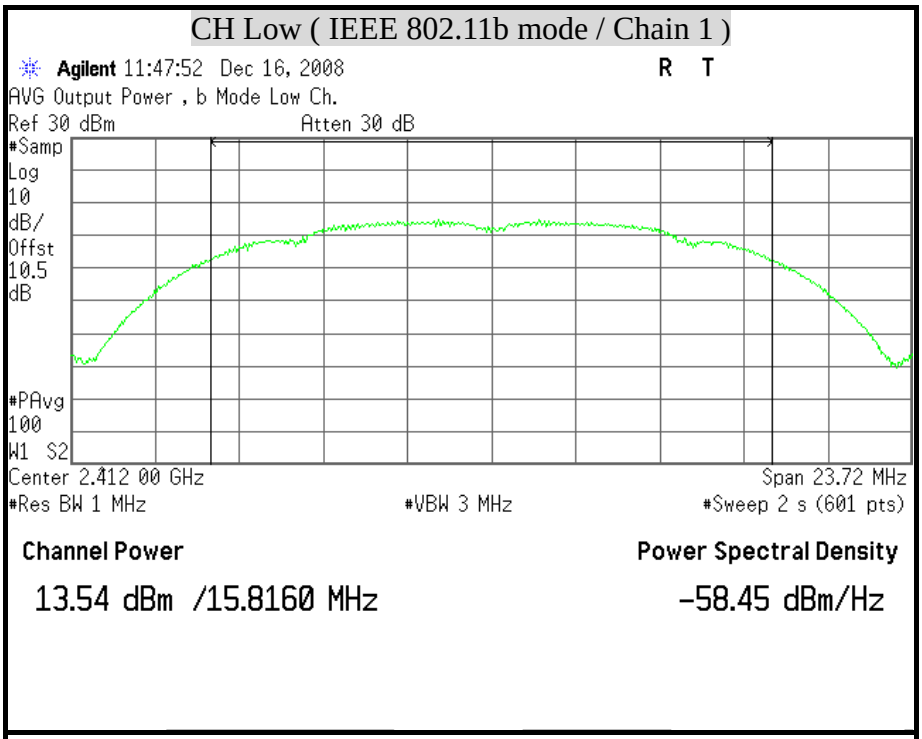

CH Middle ( IEEE 802.11b mode / Chain 0 )



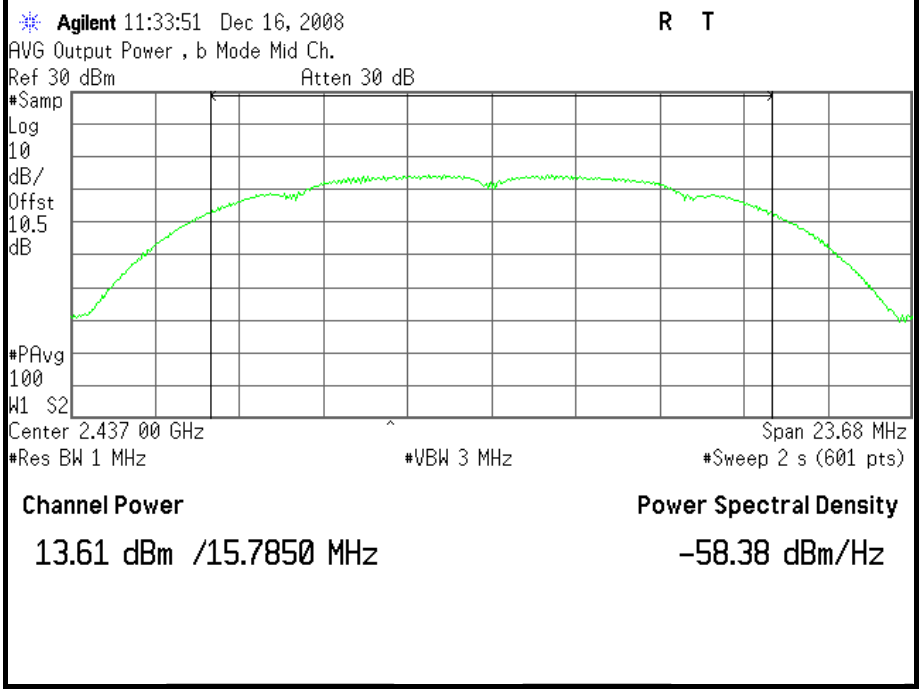
CH High ( IEEE 802.11b mode / Chain 0 )



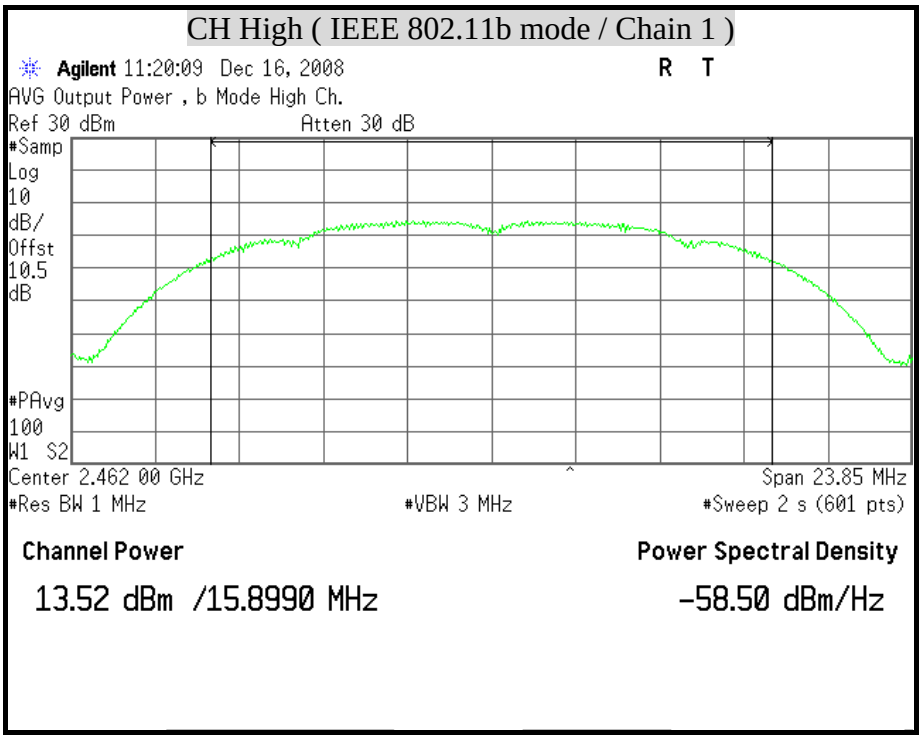
CH Low ( IEEE 802.11b mode / Chain 1 )




CH Middle ( IEEE 802.11b mode / Chain 1 )

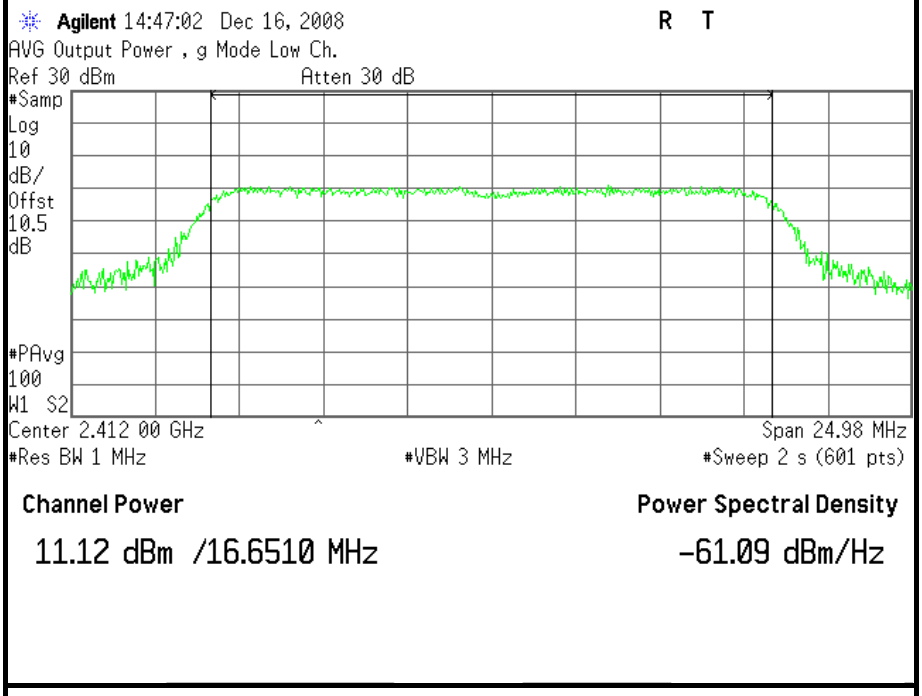


CH High ( IEEE 802.11b mode / Chain 1 )

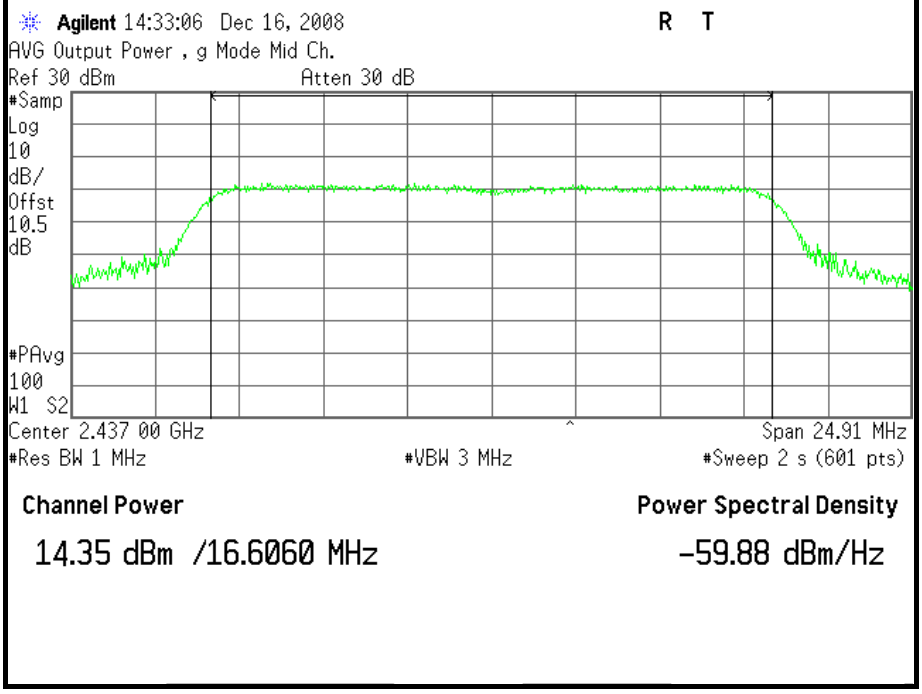


## AVG POWER ( IEEE 802.11g mode)

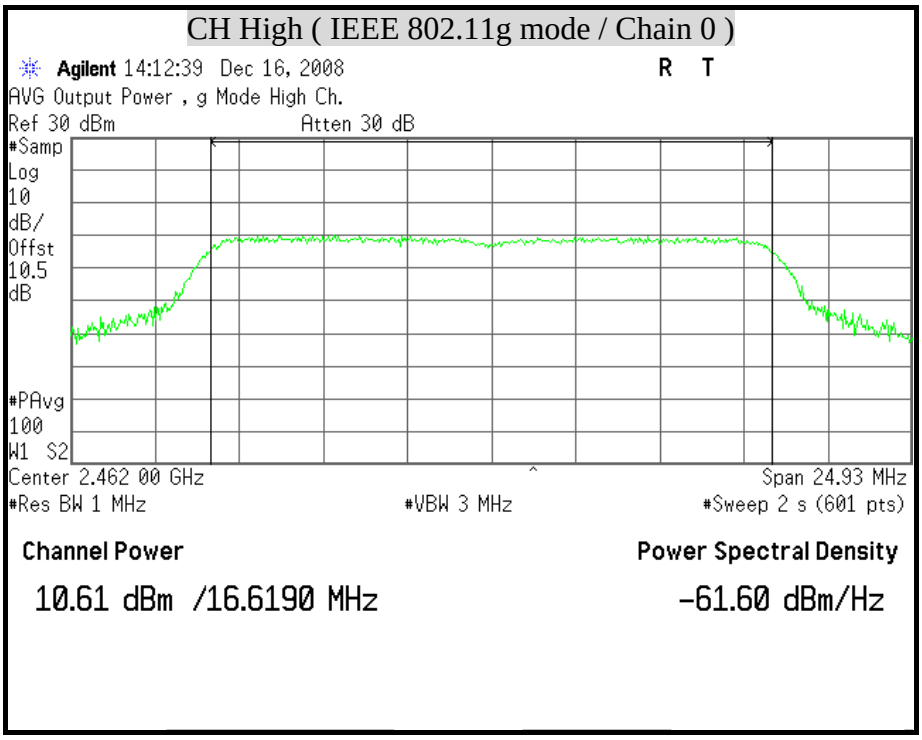
CH Low ( IEEE 802.11g mode / Chain 0 )



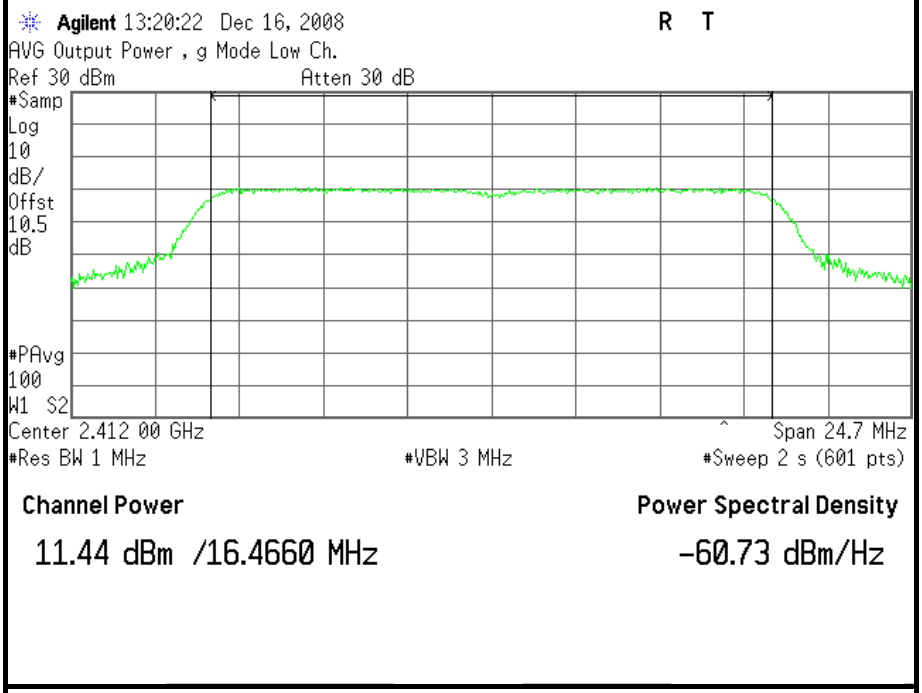

CH Middle ( IEEE 802.11g mode / Chain 0 )



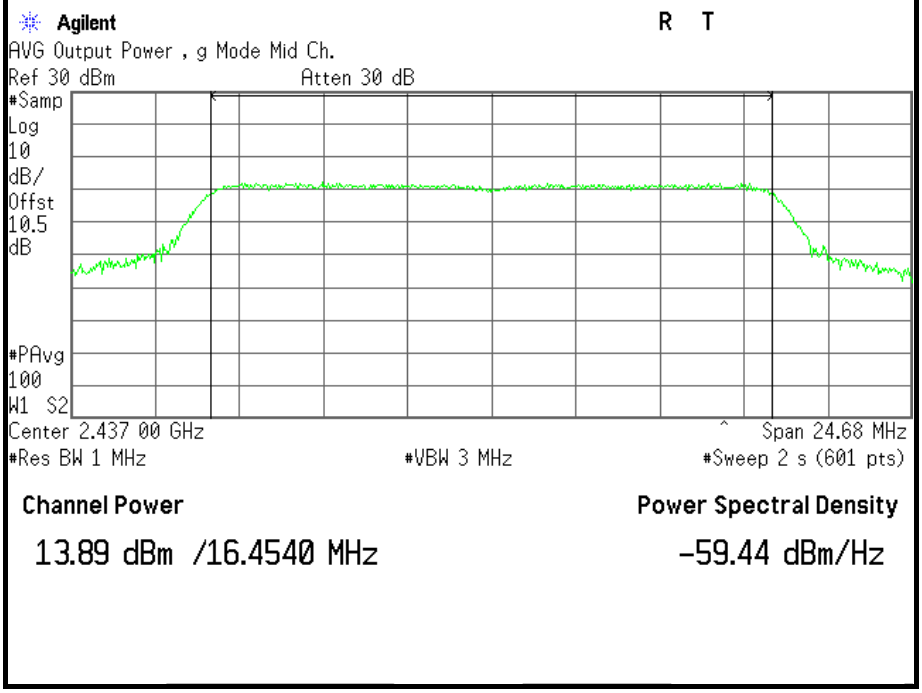
CH High ( IEEE 802.11g mode / Chain 0 )



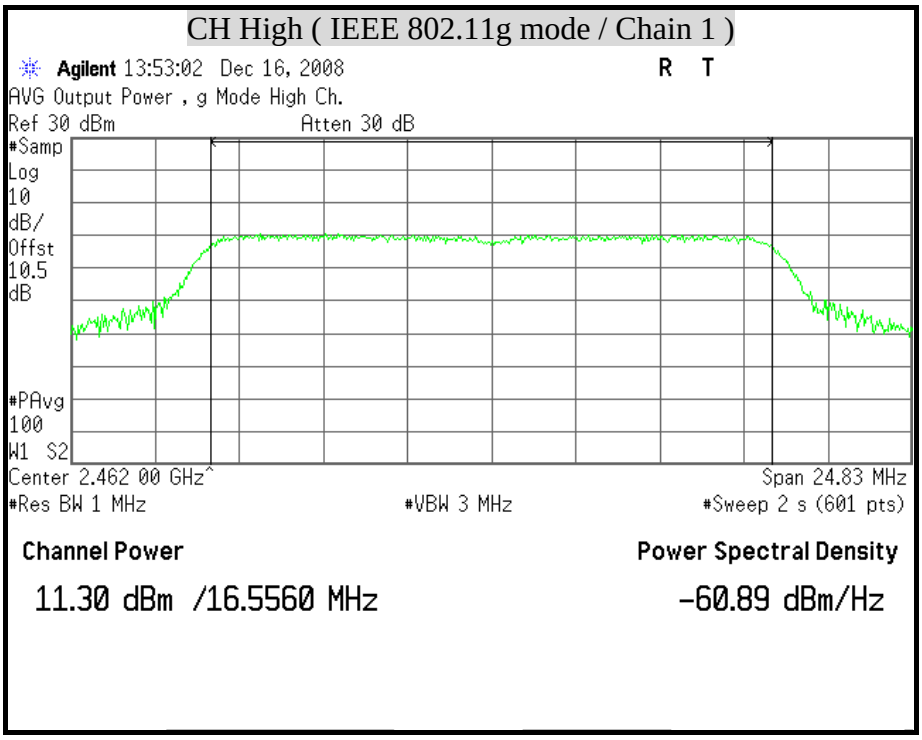
CH Low ( IEEE 802.11g mode / Chain 1 )




CH Middle ( IEEE 802.11g mode / Chain 1 )

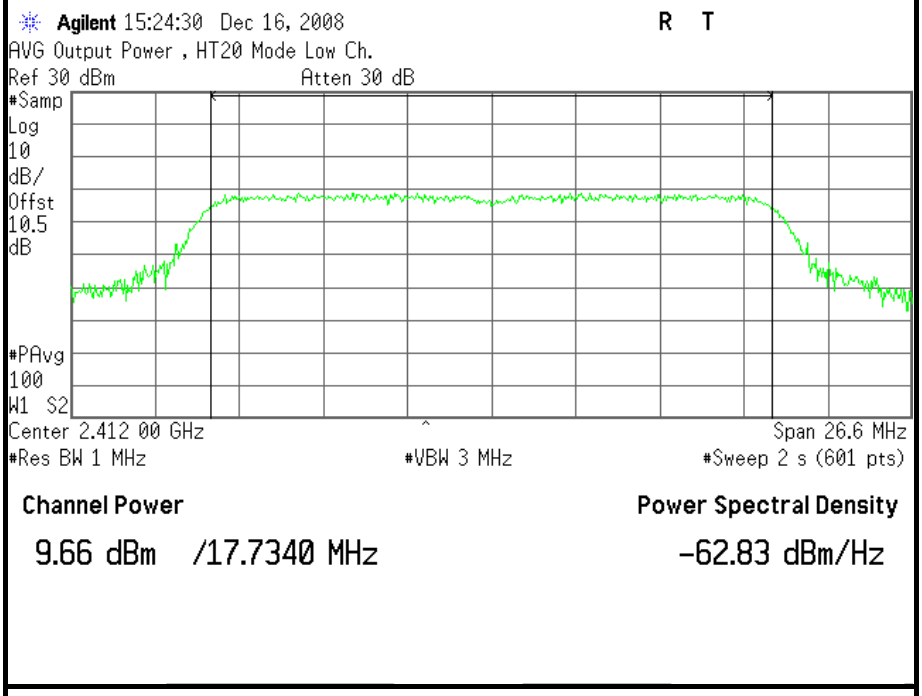


CH High ( IEEE 802.11g mode / Chain 1 )

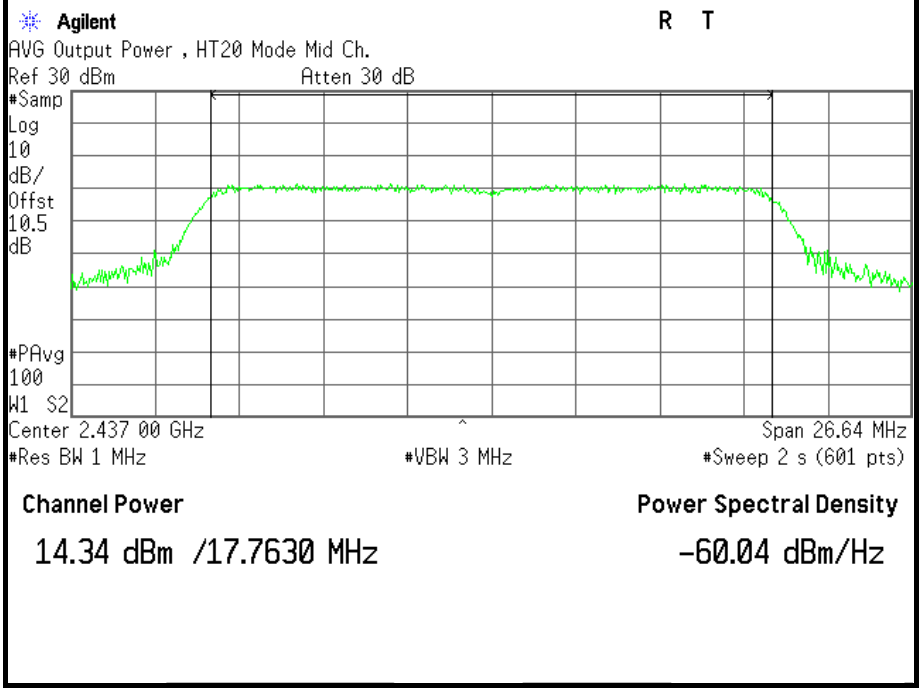


## AVG POWER ( draft 802.11n Standard-20 MHz Channel mode )

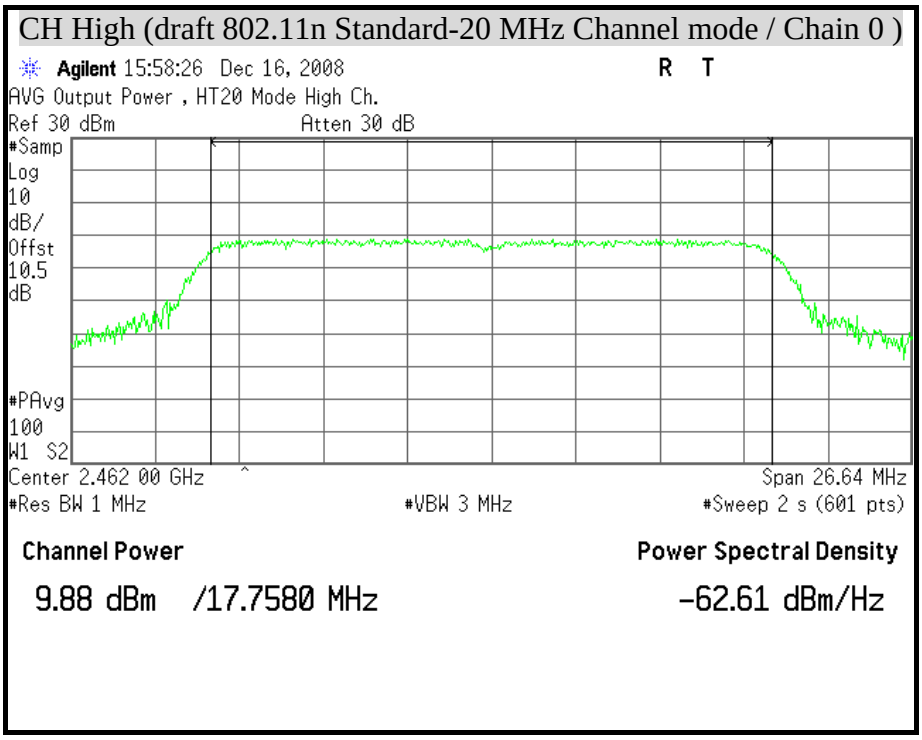
CH Low ( draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



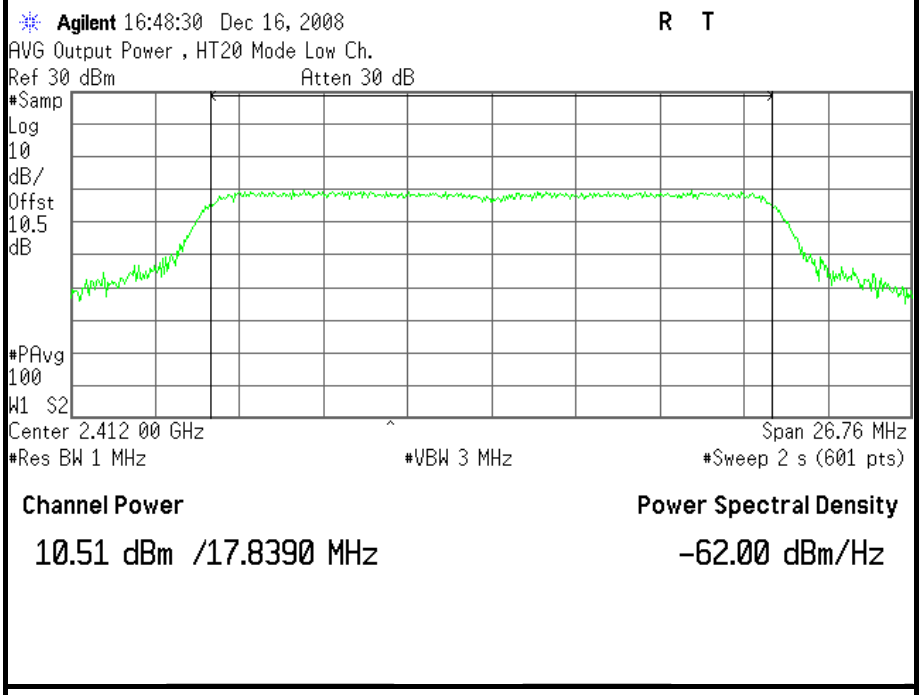

CH Middle (draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



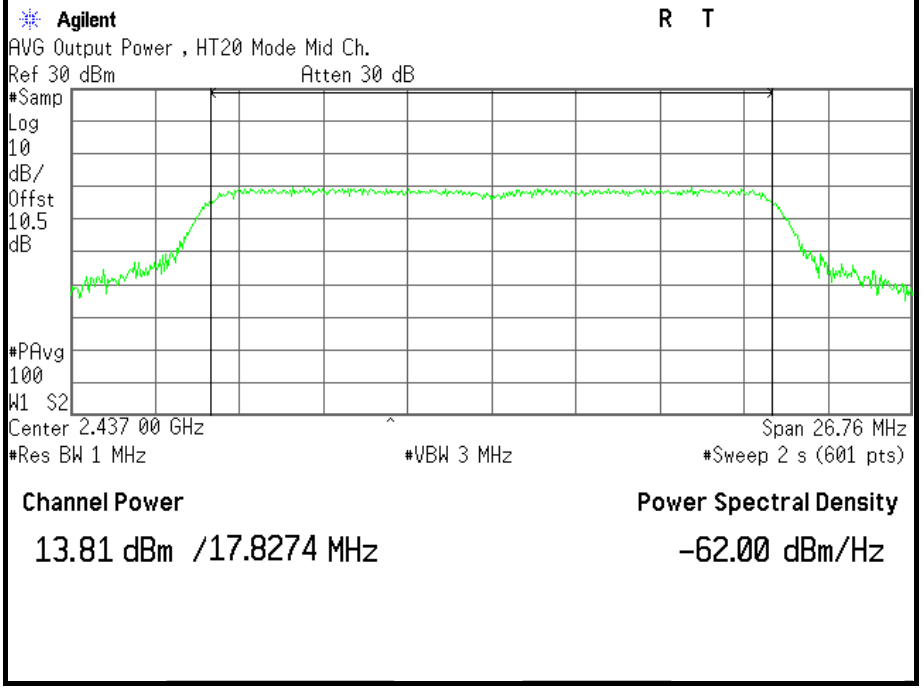
CH High (draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



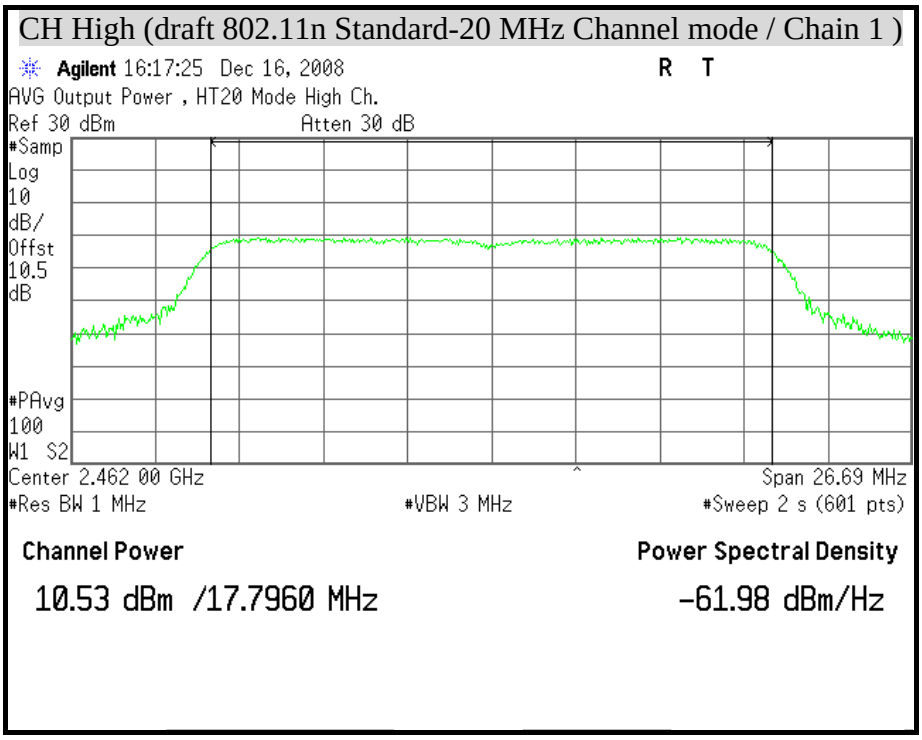
CH Low (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )




CH Middle (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )

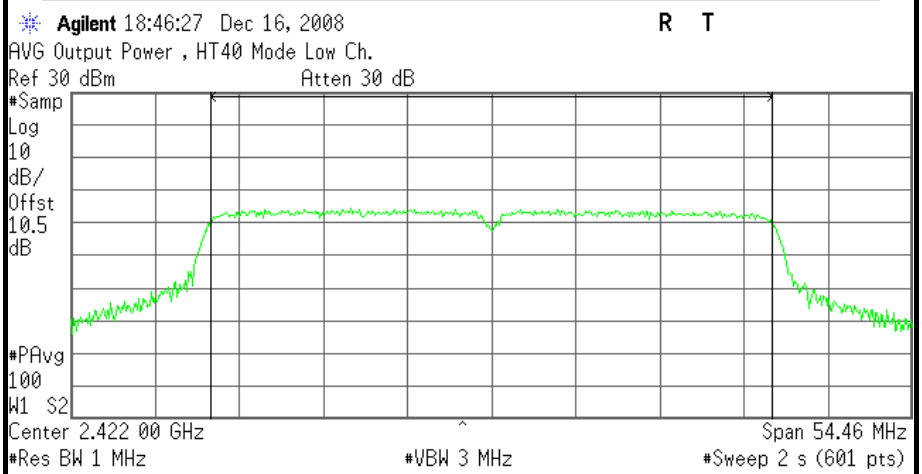


CH High (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )

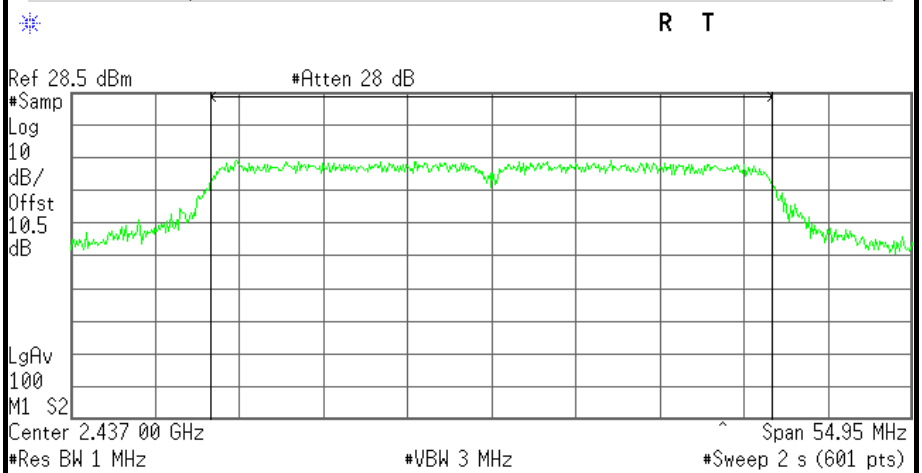


## PEAK POWER ( draft 802.11n Wide-40 MHz Channel mode )

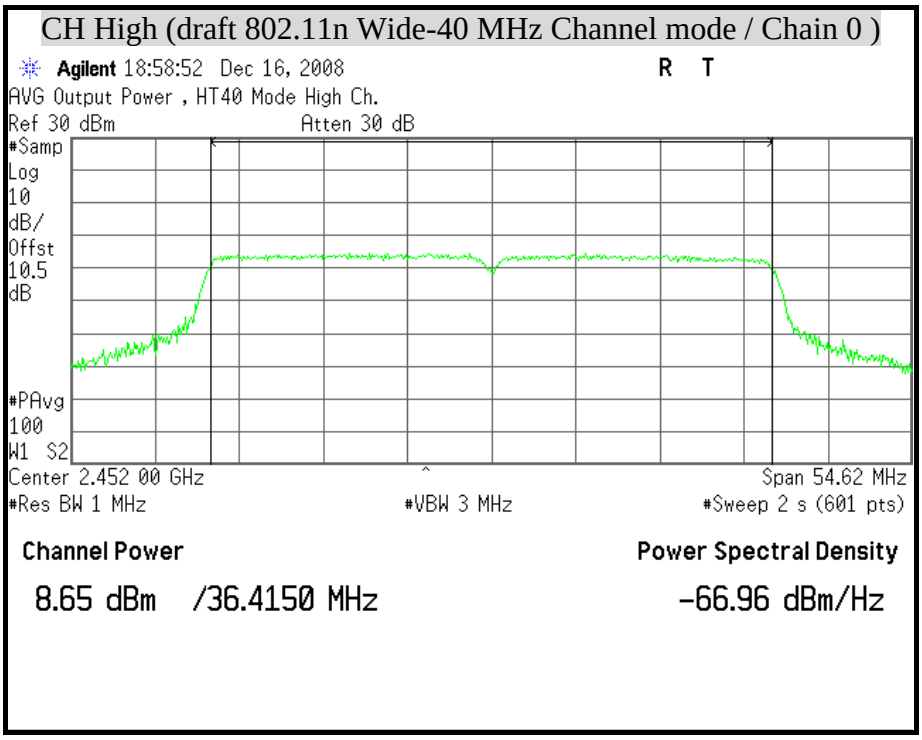
CH Low ( draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



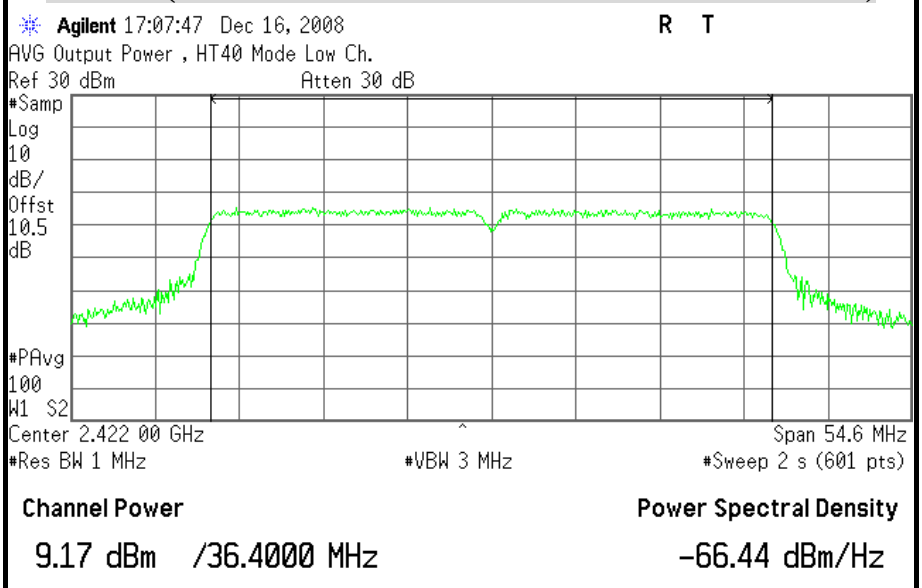

CH Middle (draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



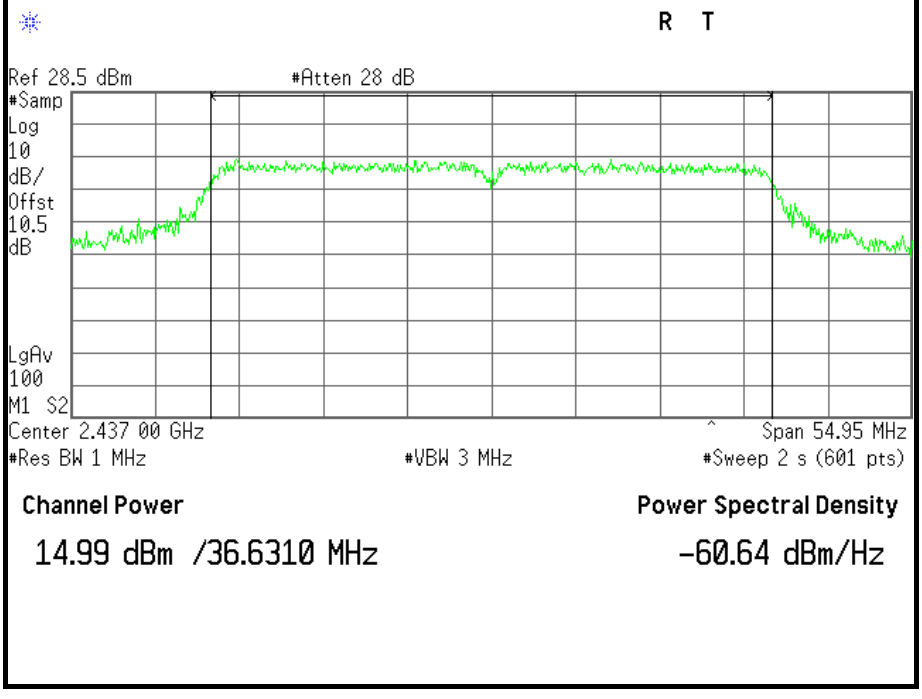
CH High (draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



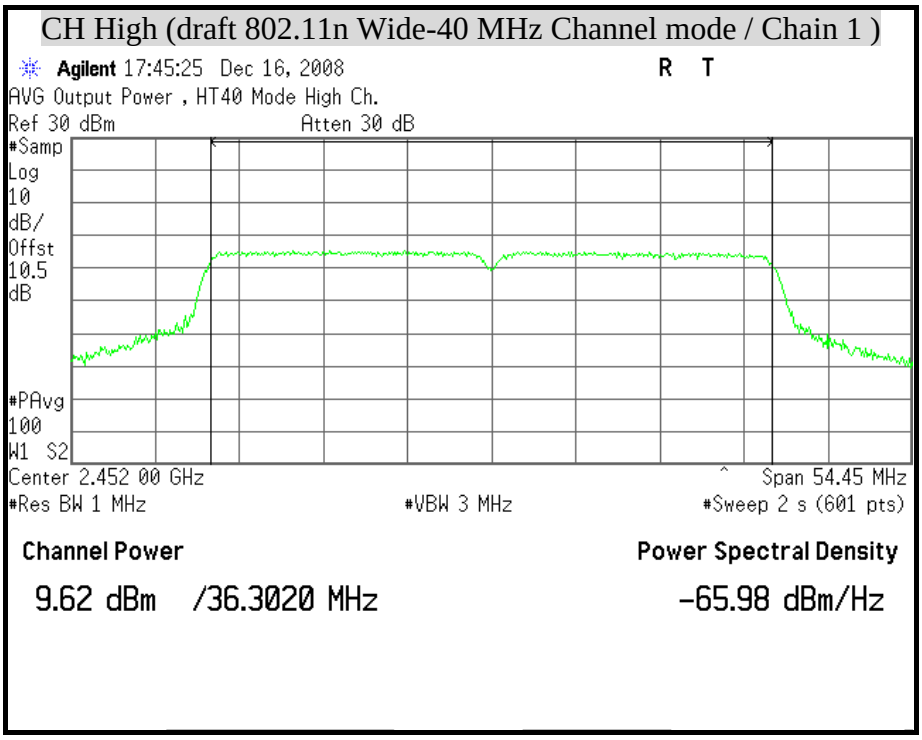
CH Low (draft 802.11n Wide-40 MHz Channel mode / Chain 1 )




CH Middle (draft 802.11n Wide-40 MHz Channel mode / Chain 1 )



CH High (draft 802.11n Wide-40 MHz Channel mode / Chain 1 )

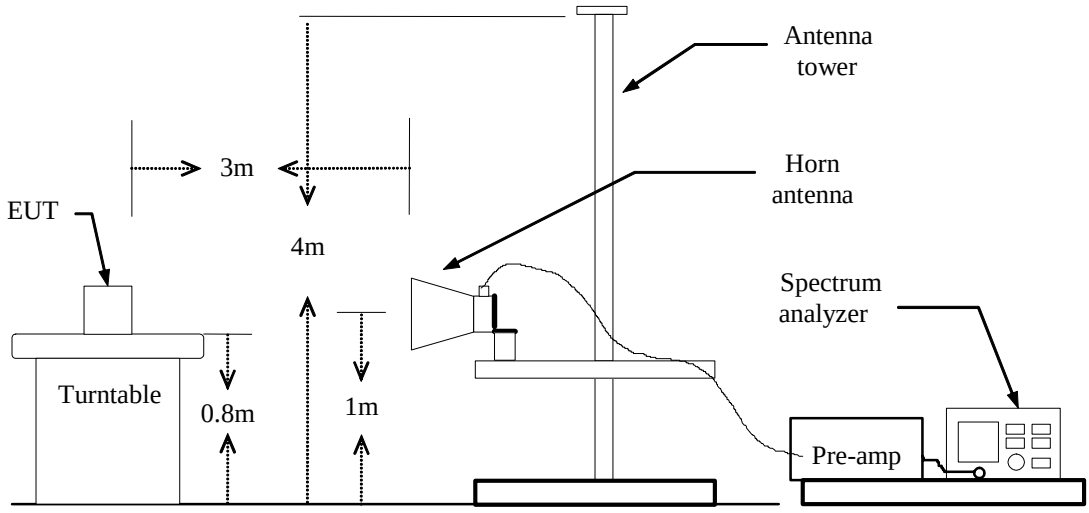


## 8.5 BAND EDGES MEASUREMENT

**LIMIT**

According to §15.247(d) & RSS-210 §A8.5, in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in 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, provided the transmitter demonstrates compliance with the peak conducted power limits. 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 Section 15.205(c)).

**TEST CONFIGURATION**




**TEST PROCEDURE**

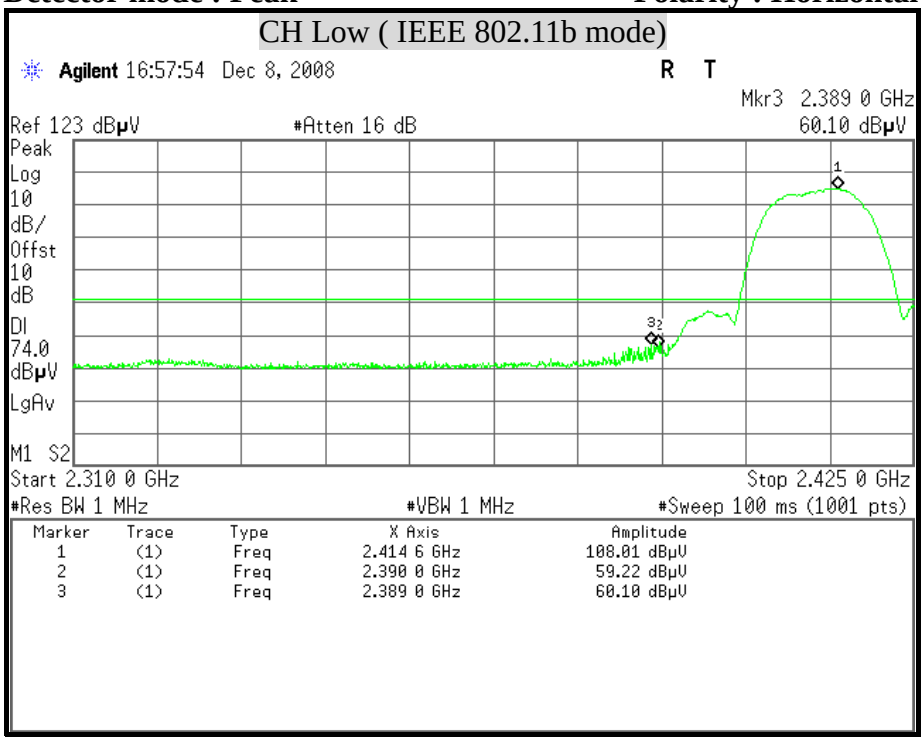
1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

**TEST RESULTS**

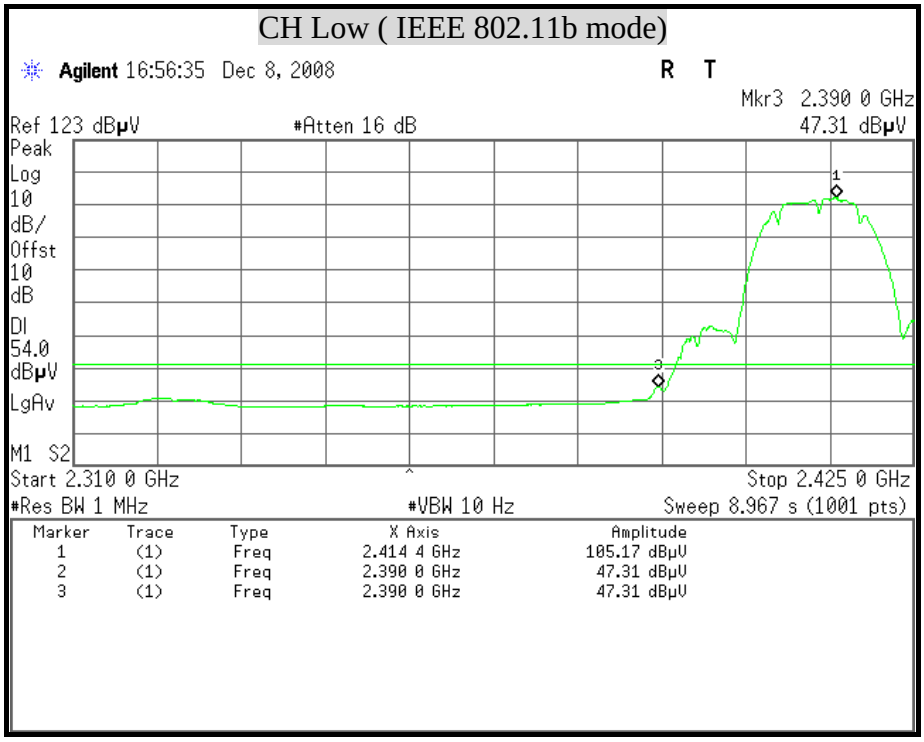
Refer to attach spectrum analyzer data chart.

# PIFA ANTENNA

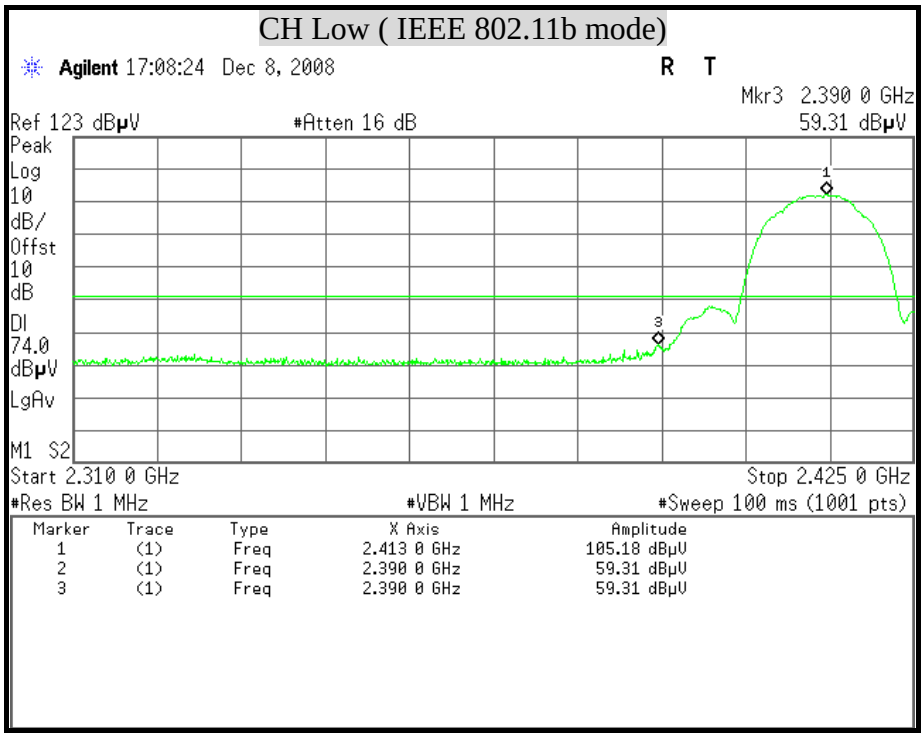
**Detector mode : Peak** **Polarity : Horizontal**



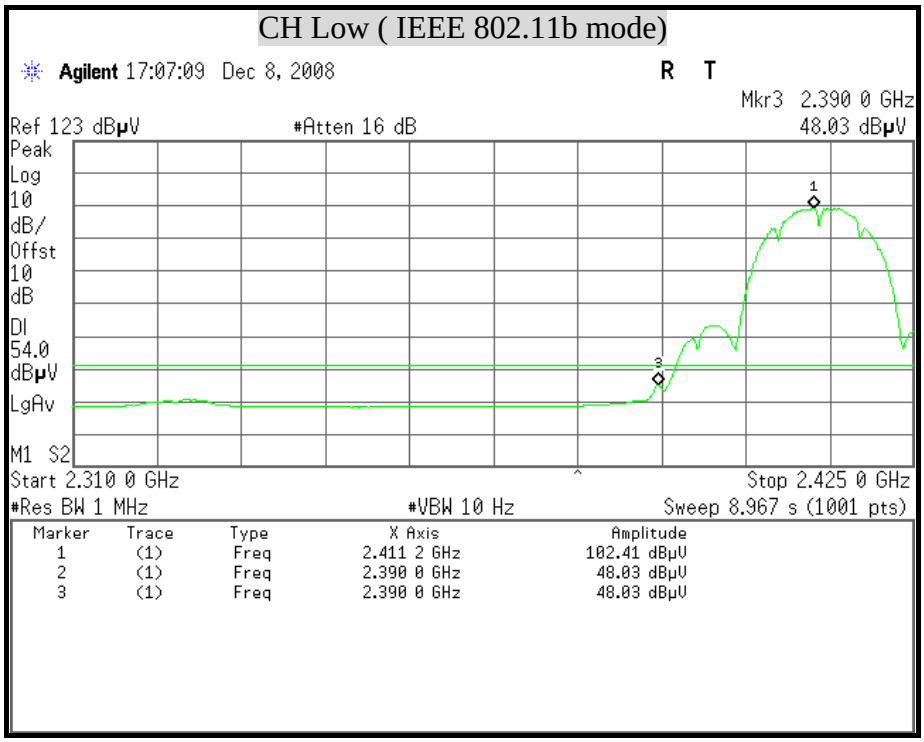

**Detector mode : Average** **Polarity : Horizontal**



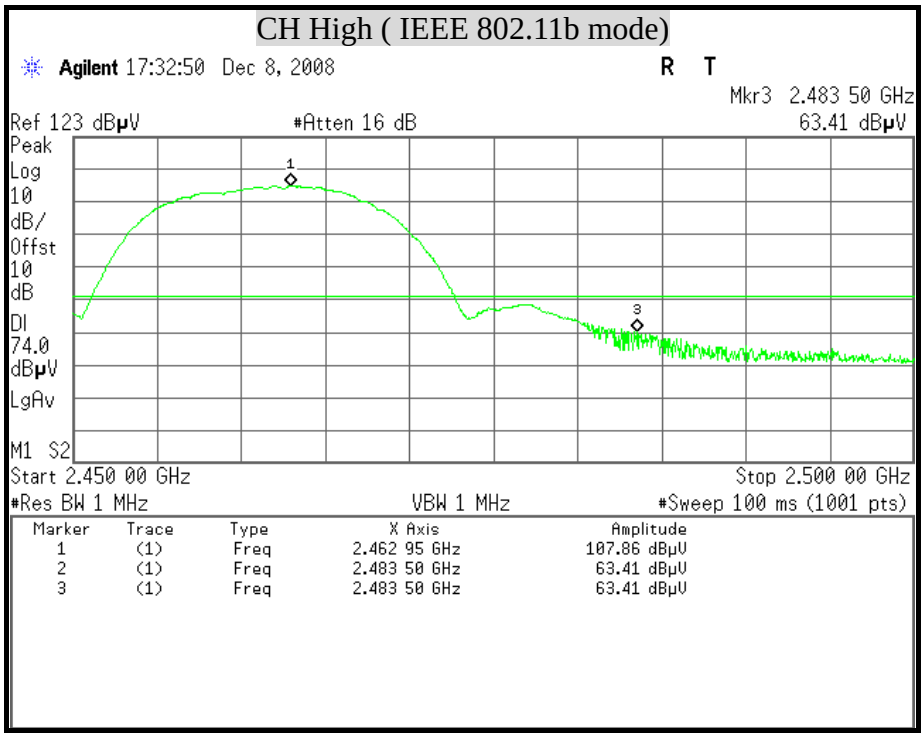
**Detector mode : Peak** **Polarity : Vertical**



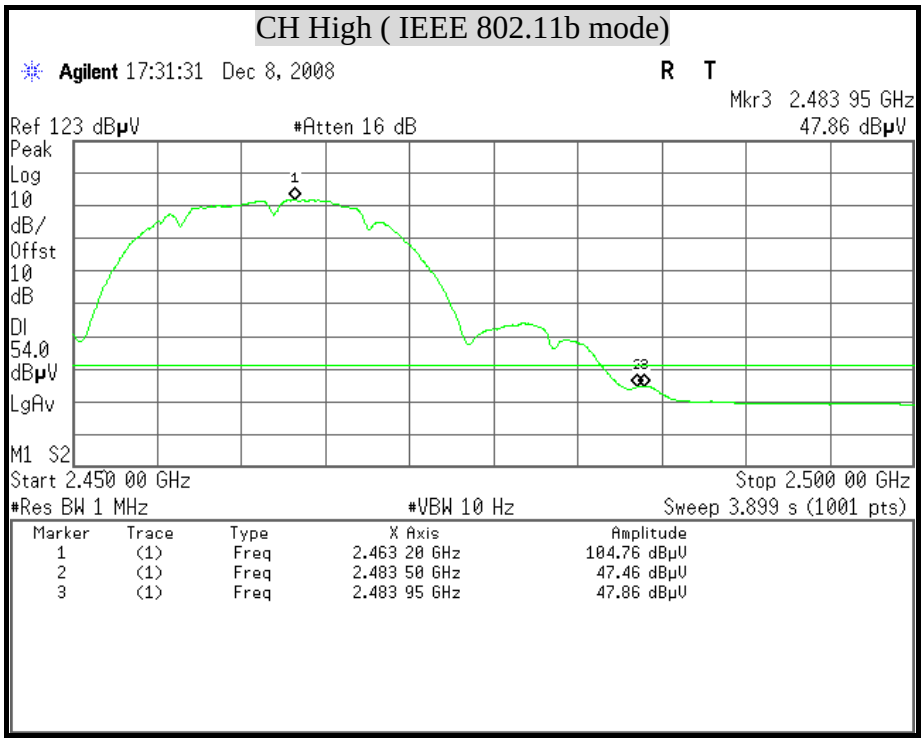

**Detector mode : Average** **Polarity : Vertical**



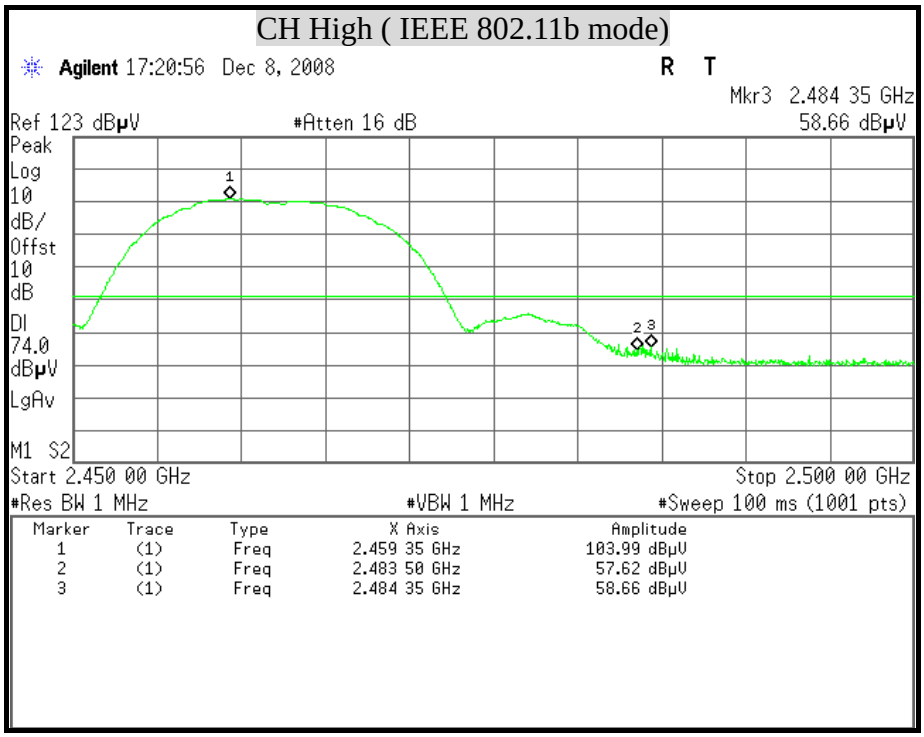
**Detector mode : Peak** **Polarity : Horizontal**



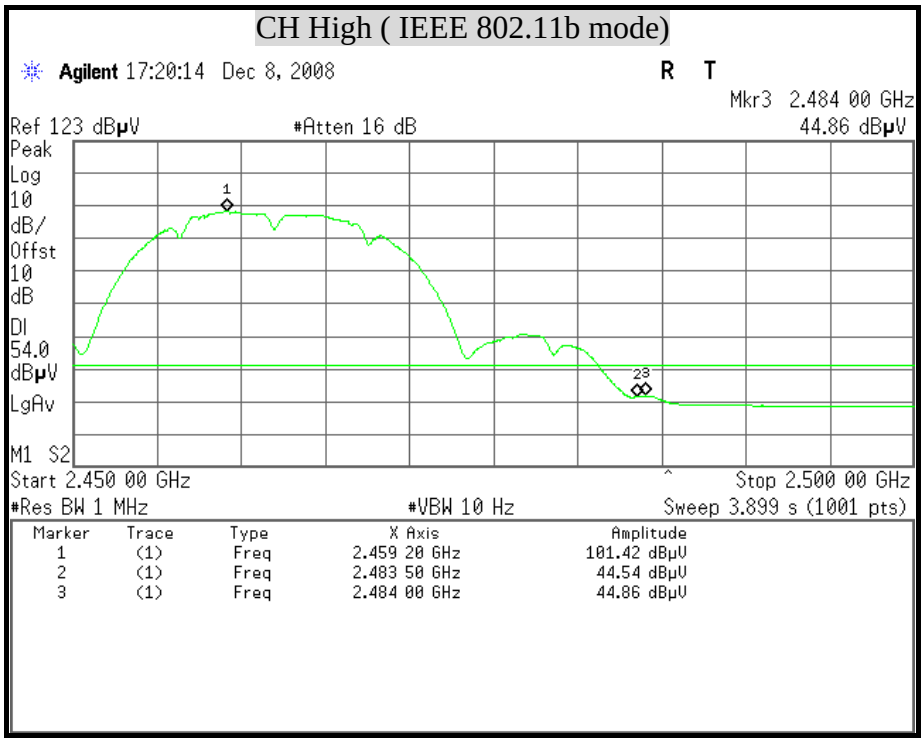

**Detector mode : Average** **Polarity : Horizontal**



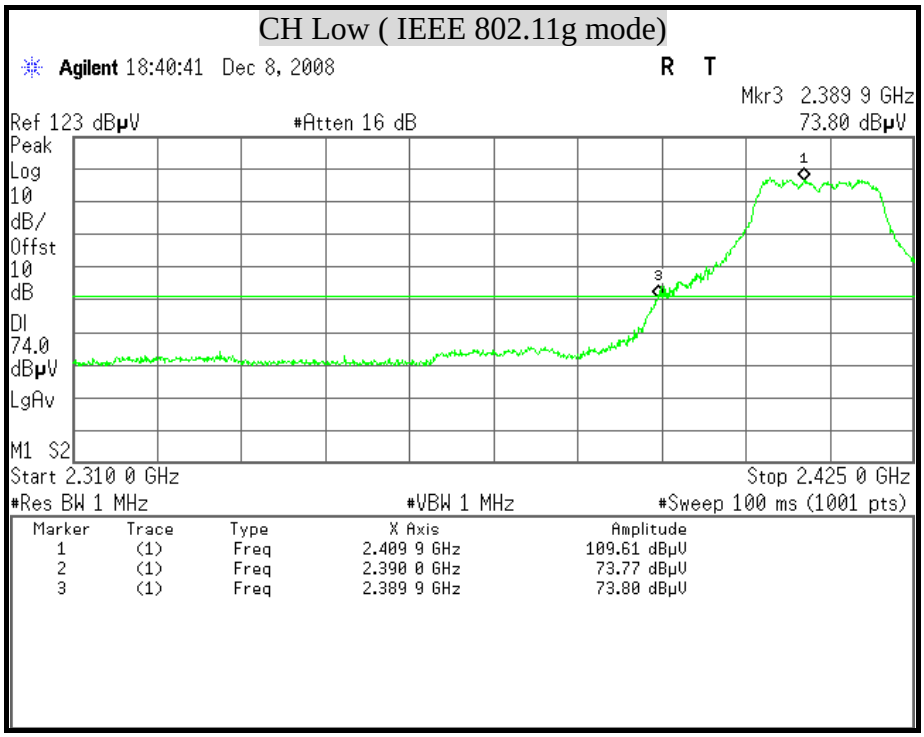
**Detector mode : Peak** **Polarity : Vertical**



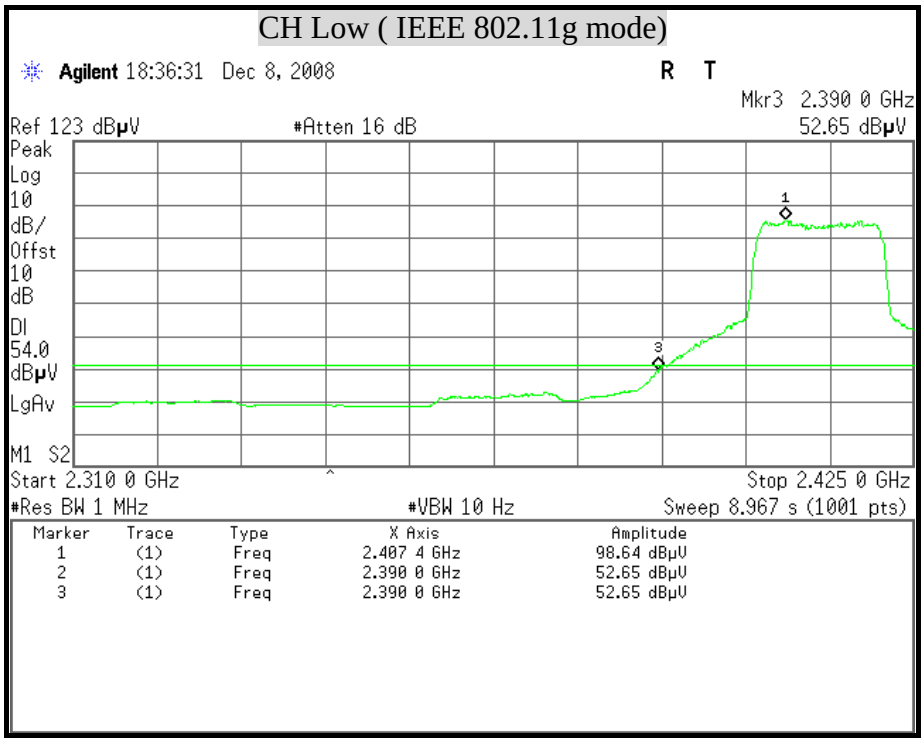

**Detector mode : Average** **Polarity : Vertical**



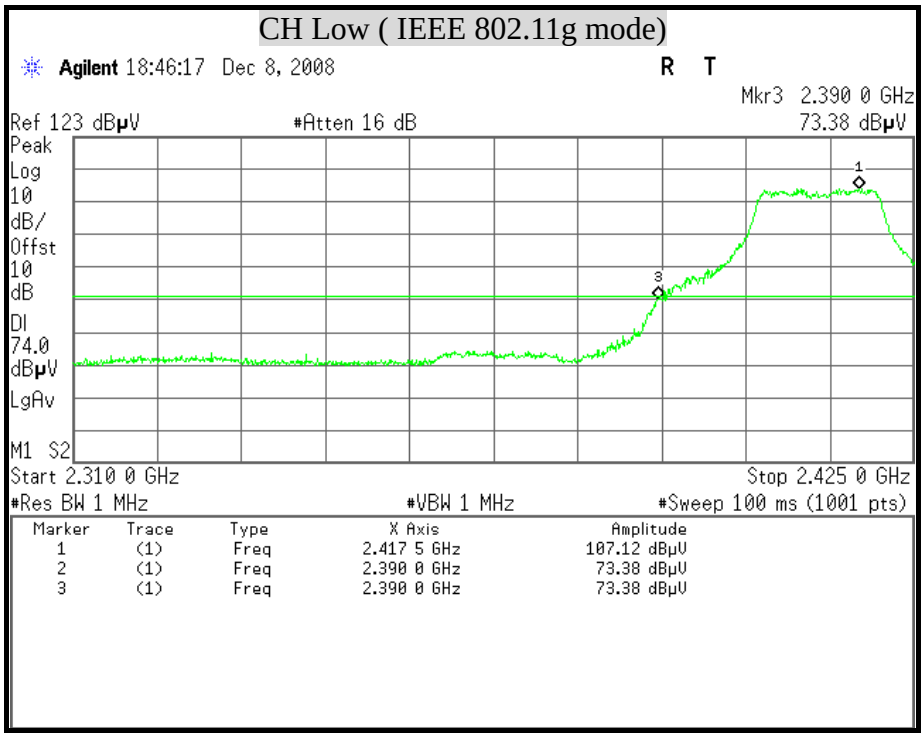
**Detector mode : Peak** **Polarity : Horizontal**



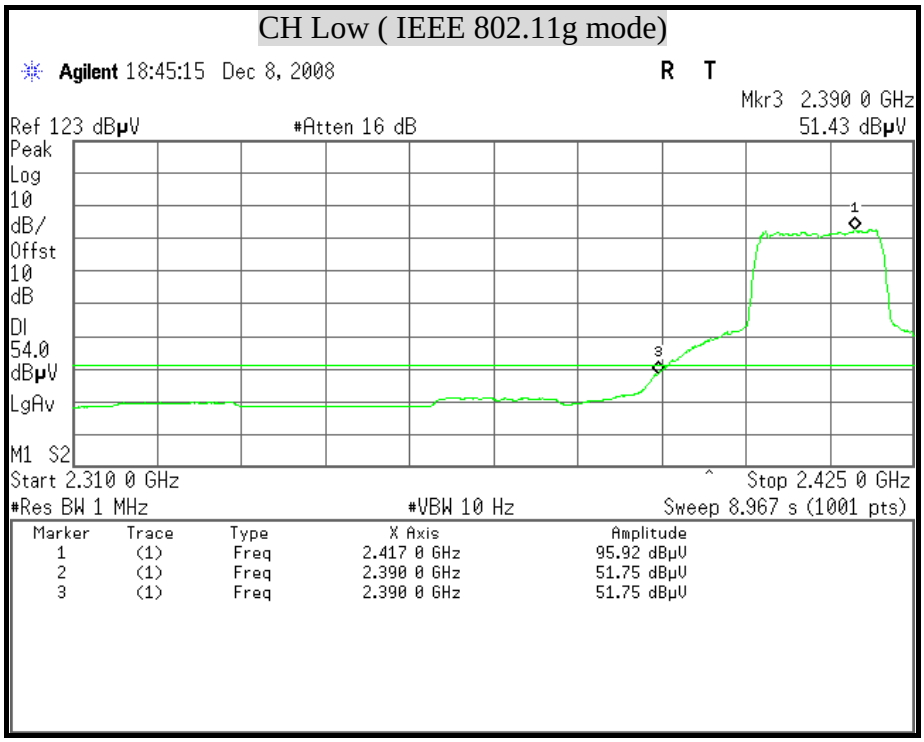

**Detector mode : Average** **Polarity : Horizontal**



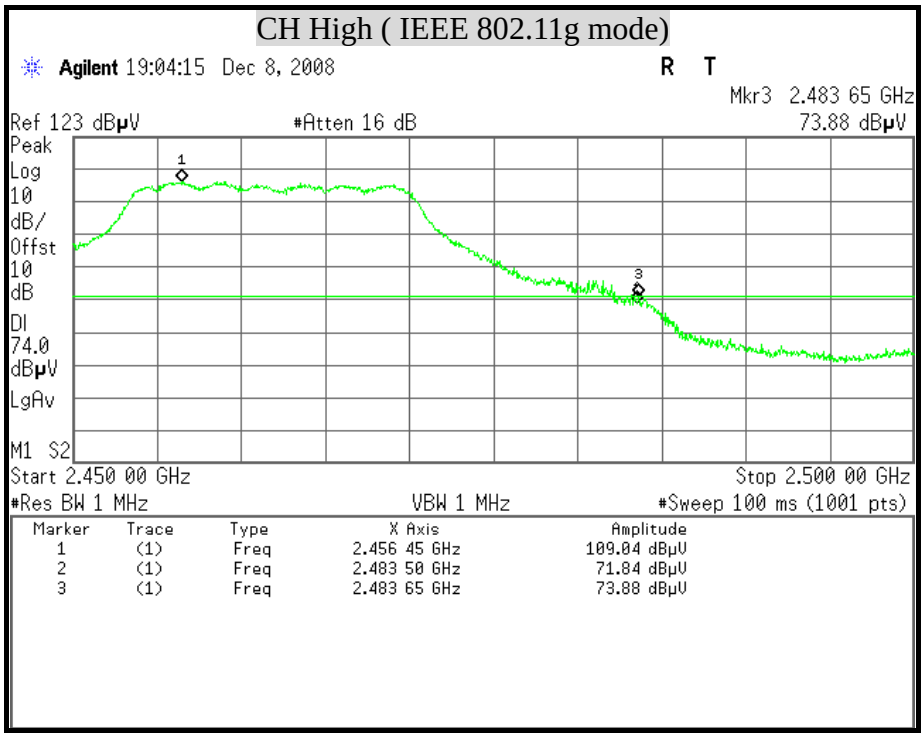
**Detector mode : Peak** **Polarity : Vertical**



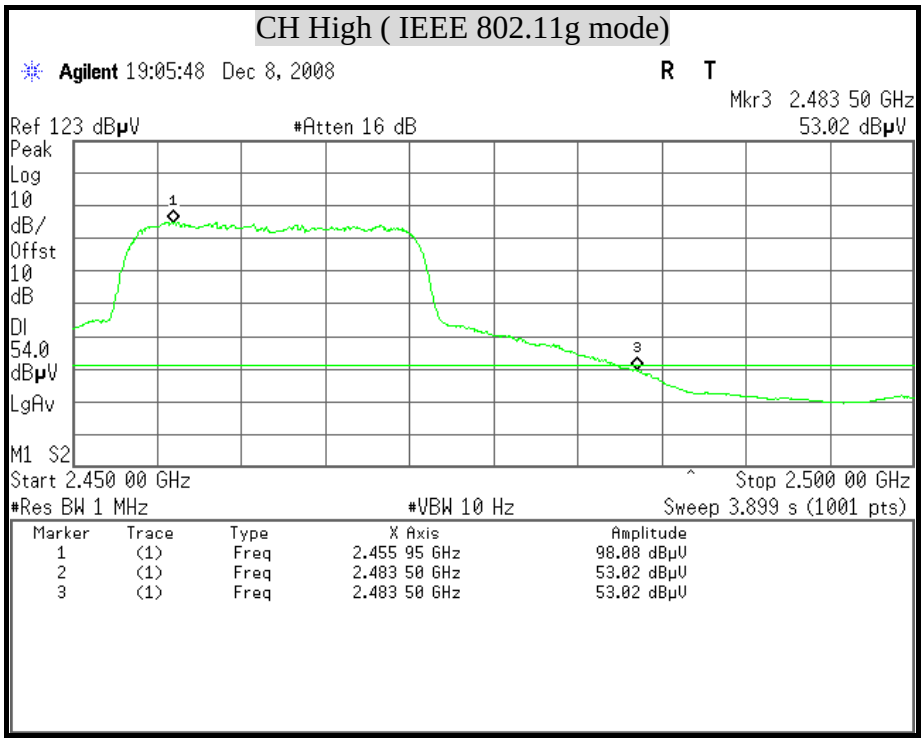

**Detector mode : Average** **Polarity : Vertical**



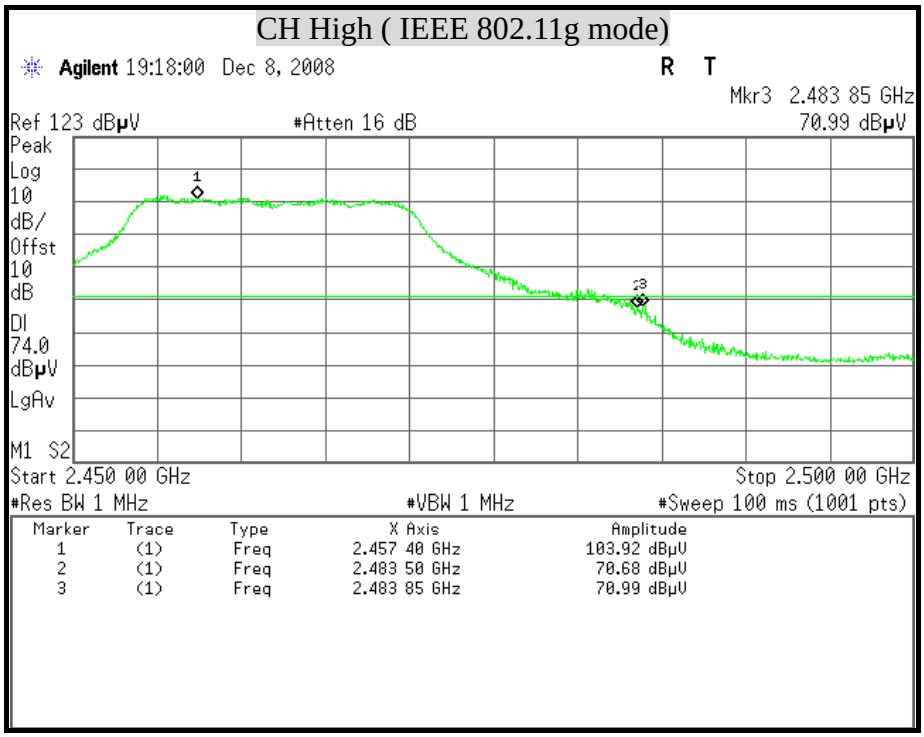
**Detector mode : Peak** **Polarity : Horizontal**



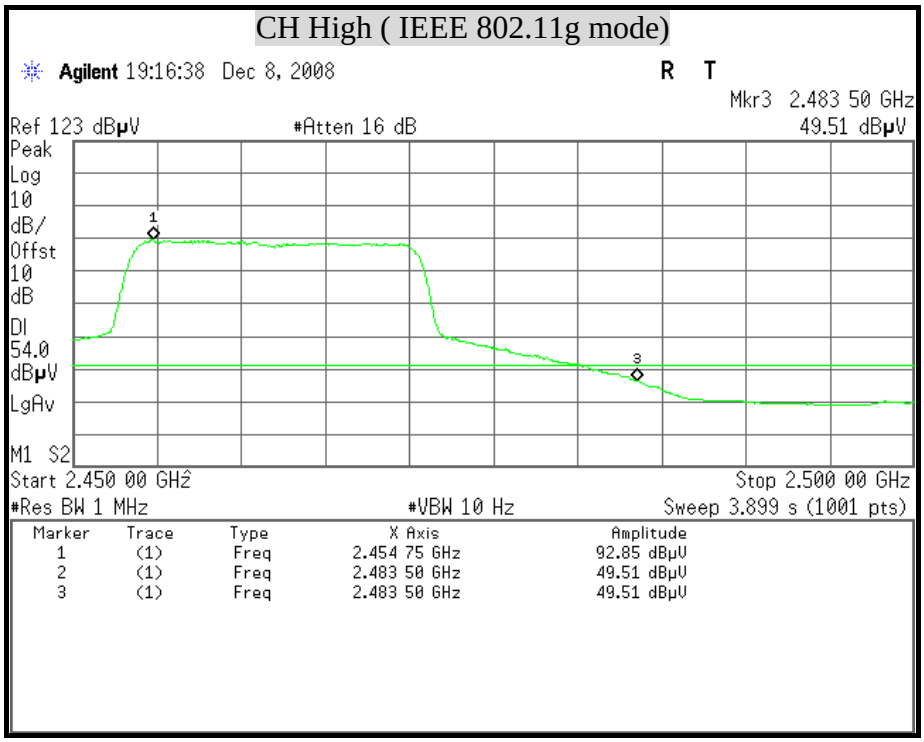

**Detector mode : Average** **Polarity : Horizontal**



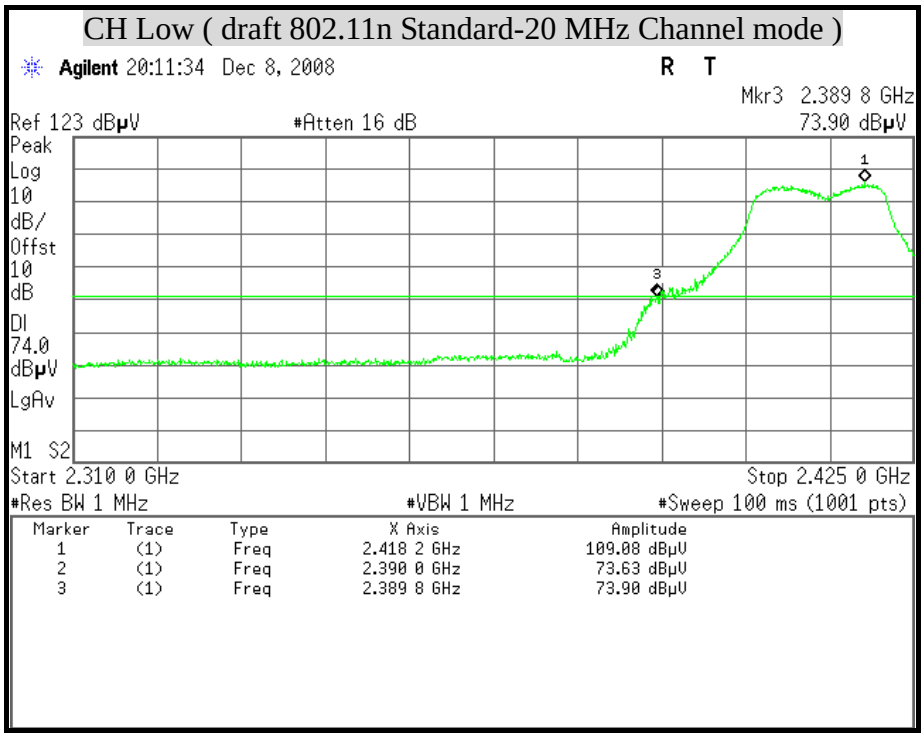
**Detector mode : Peak** **Polarity : Vertical**



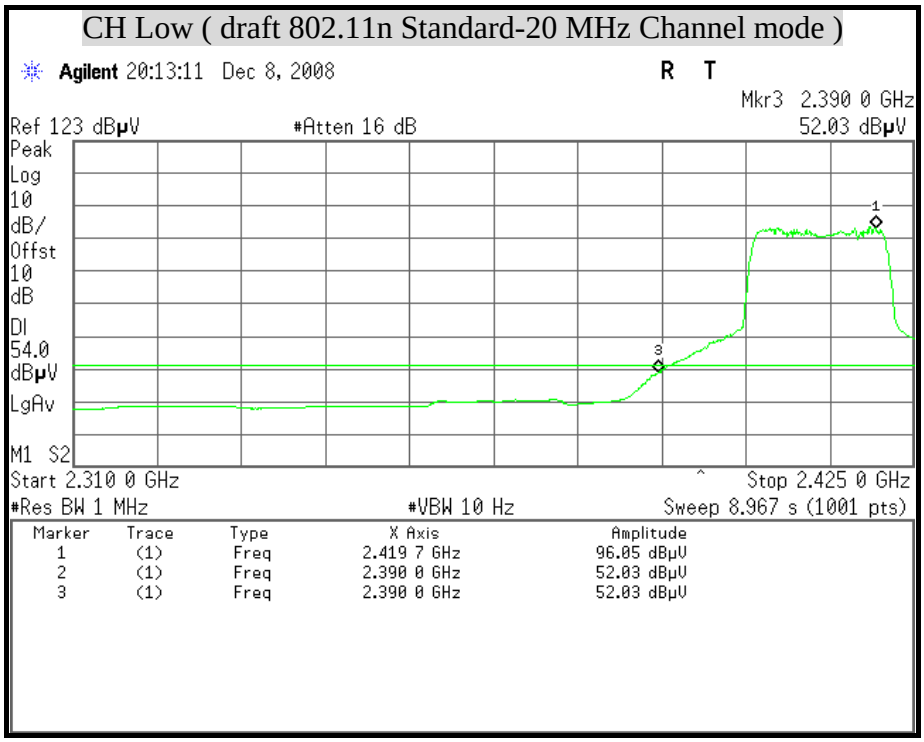

**Detector mode : Average** **Polarity : Vertical**



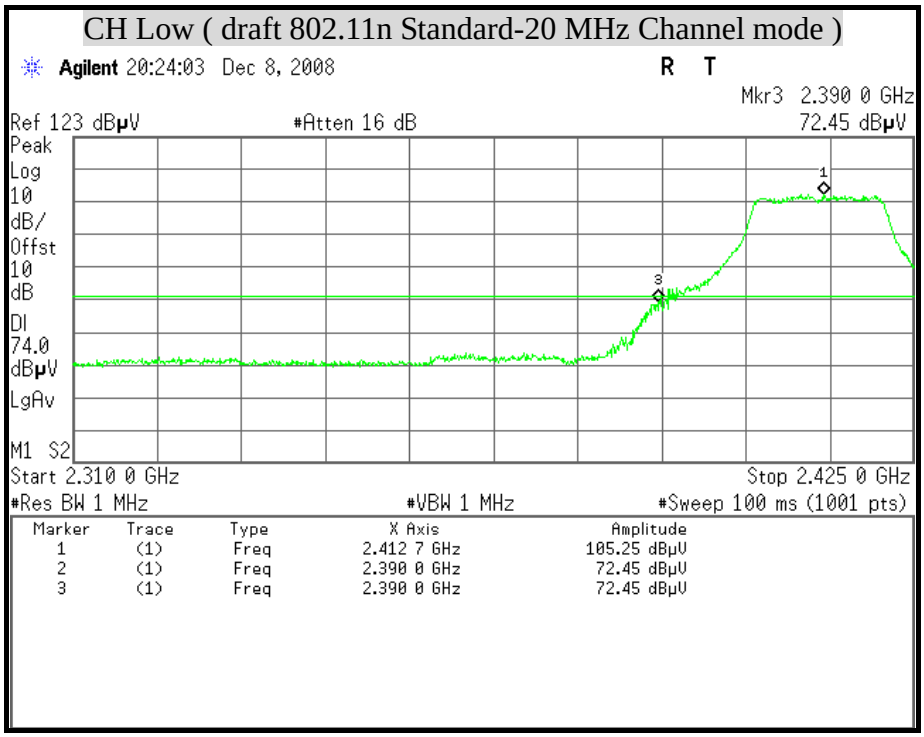
**Detector mode : Peak** **Polarity : Horizontal**



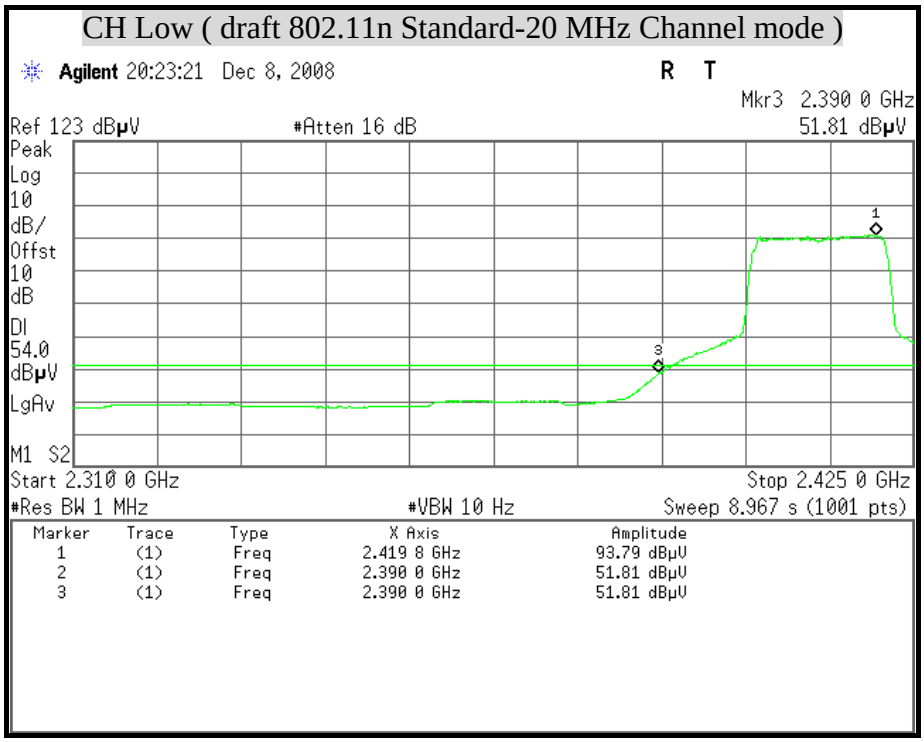

**Detector mode : Average** **Polarity : Horizontal**



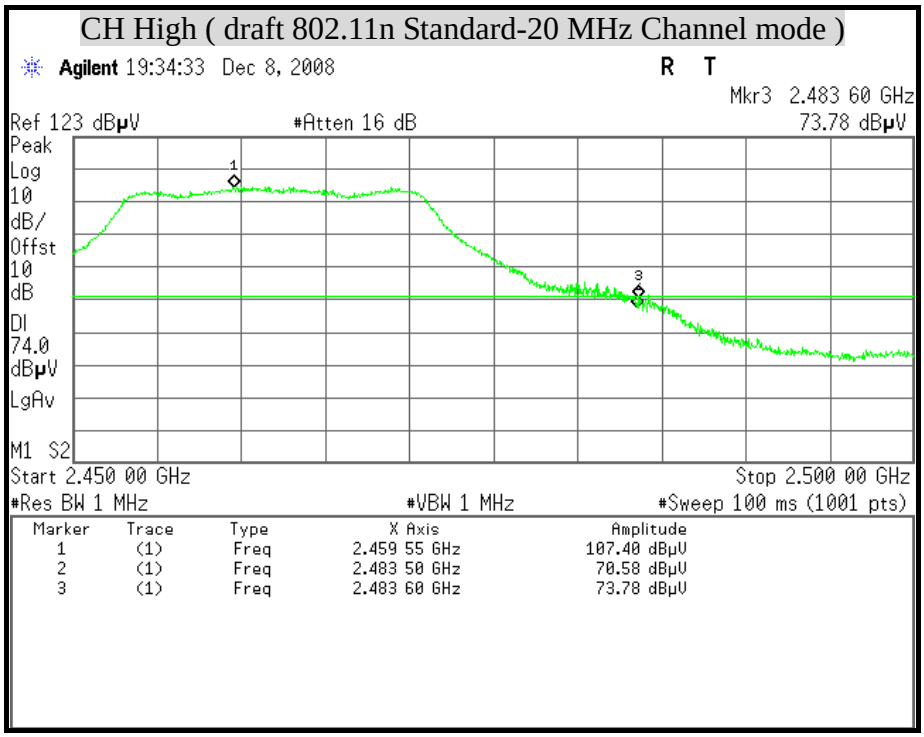
**Detector mode : Peak** **Polarity : Vertical**



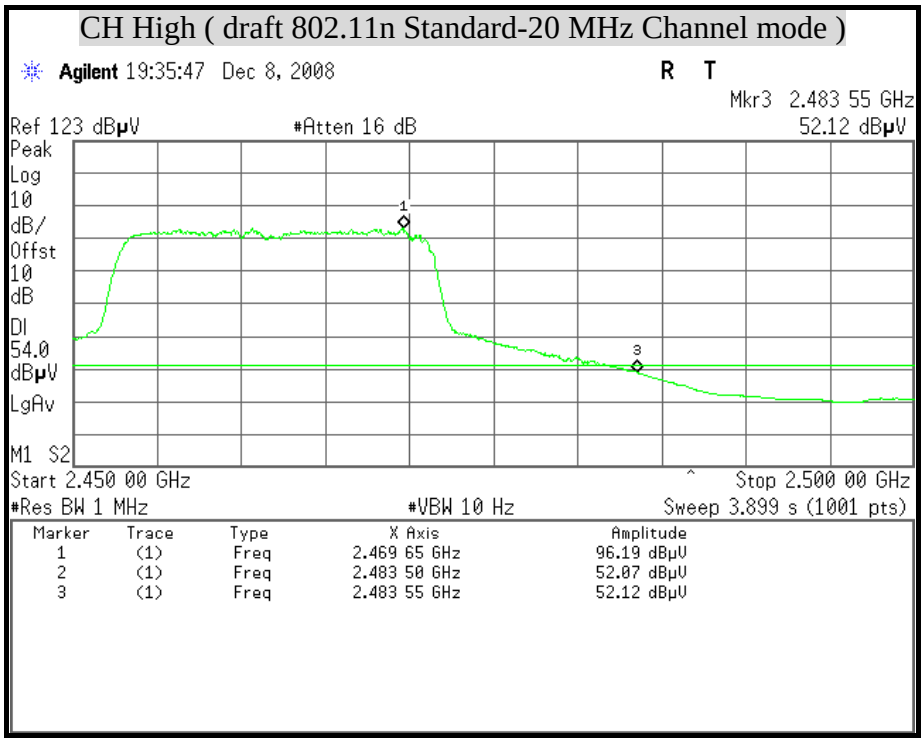

**Detector mode : Average** **Polarity : Vertical**



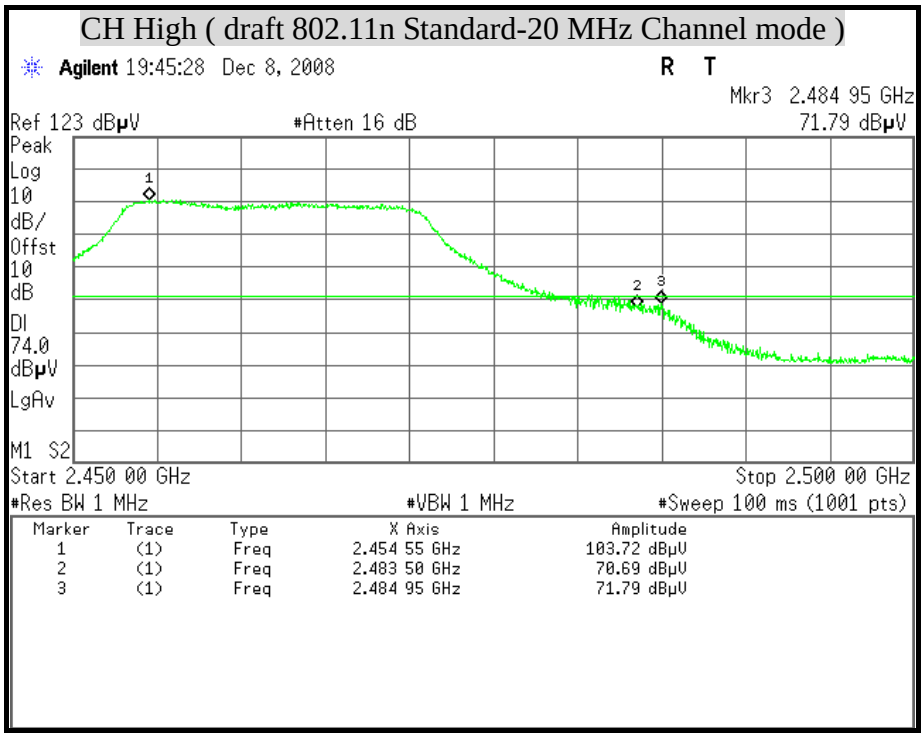
**Detector mode : Peak** **Polarity : Horizontal**



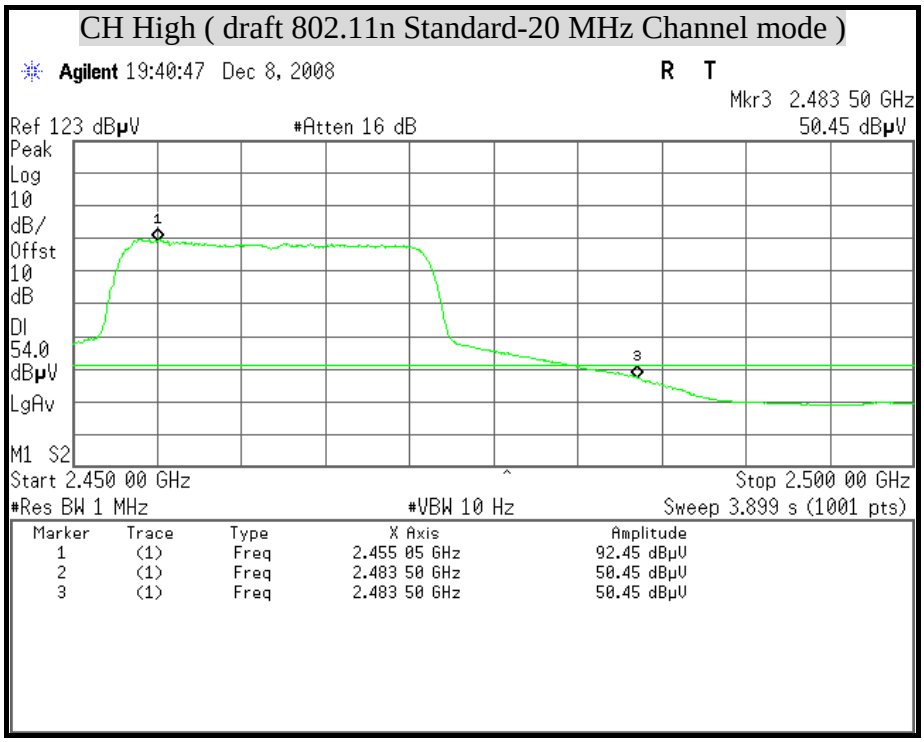

**Detector mode : Average** **Polarity : Horizontal**



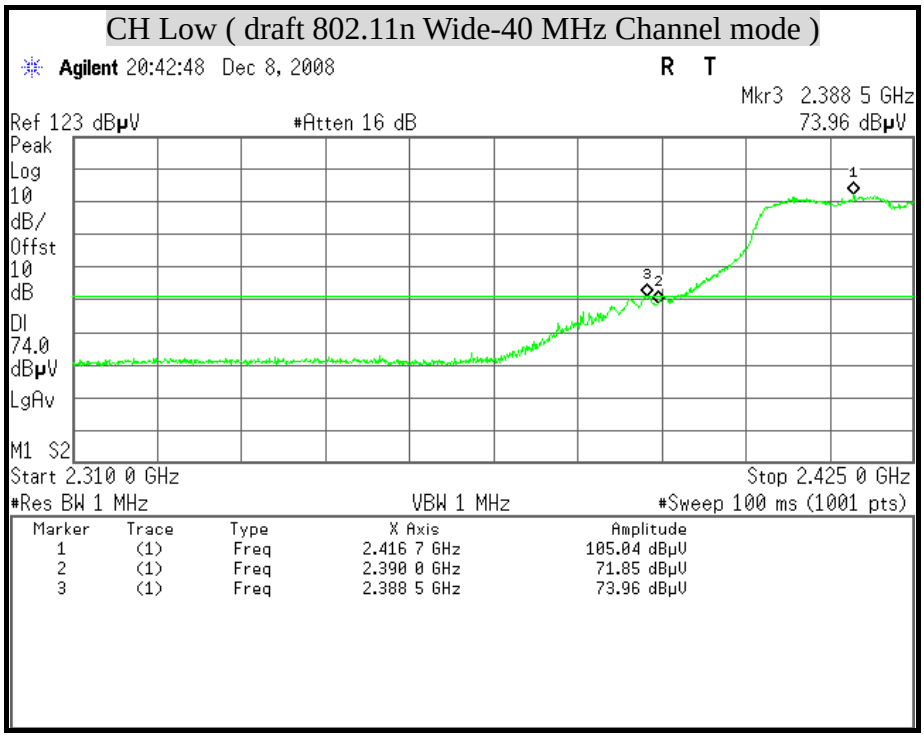
**Detector mode : Peak** **Polarity : Vertical**



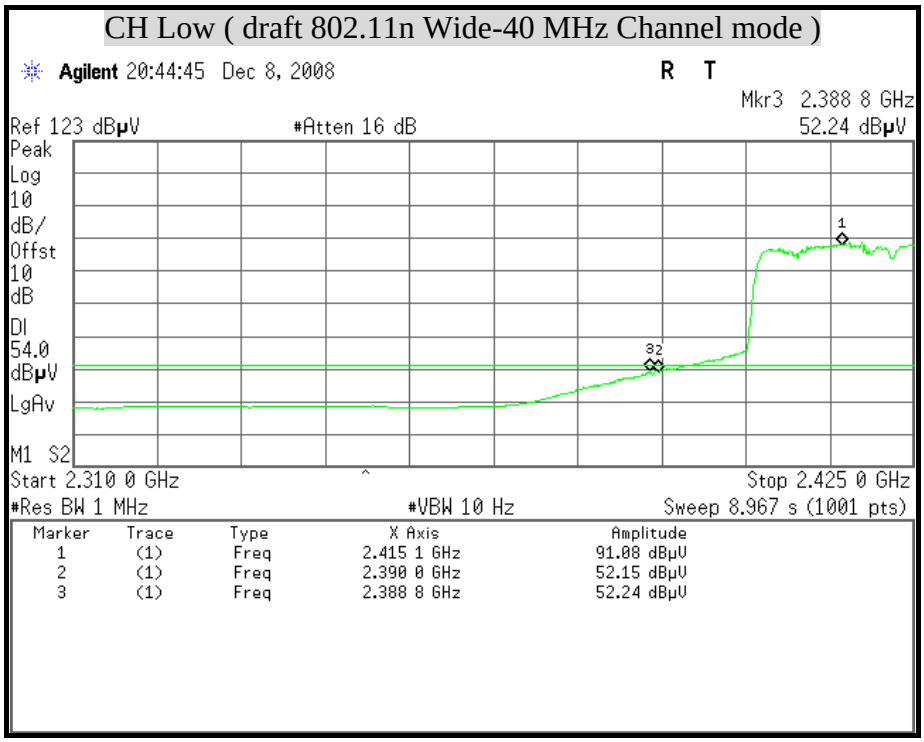

**Detector mode : Average** **Polarity : Vertical**



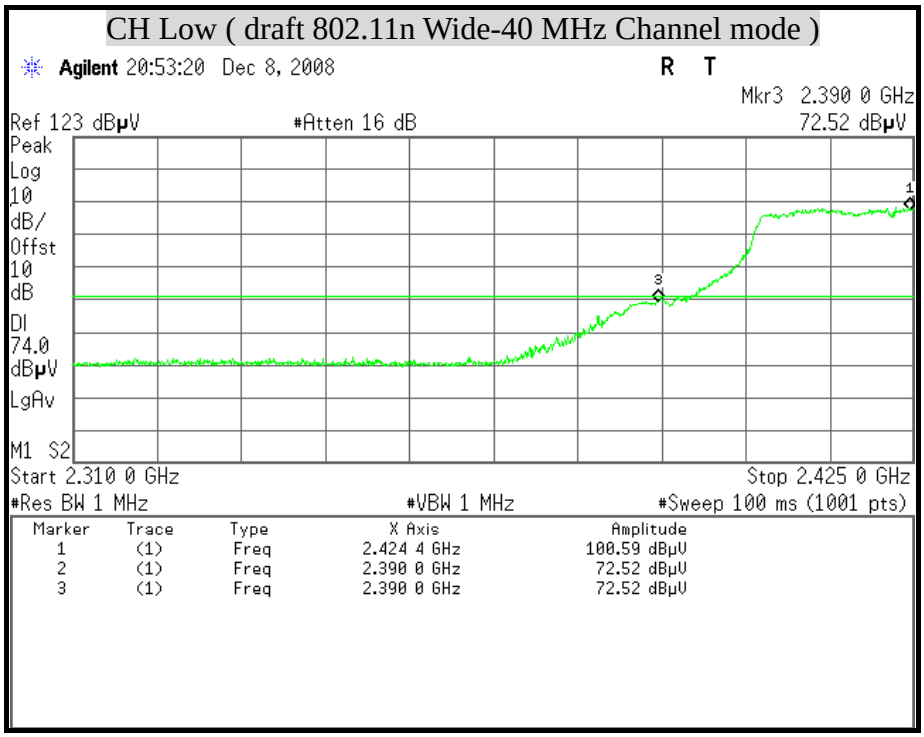
**Detector mode : Peak** **Polarity : Horizontal**



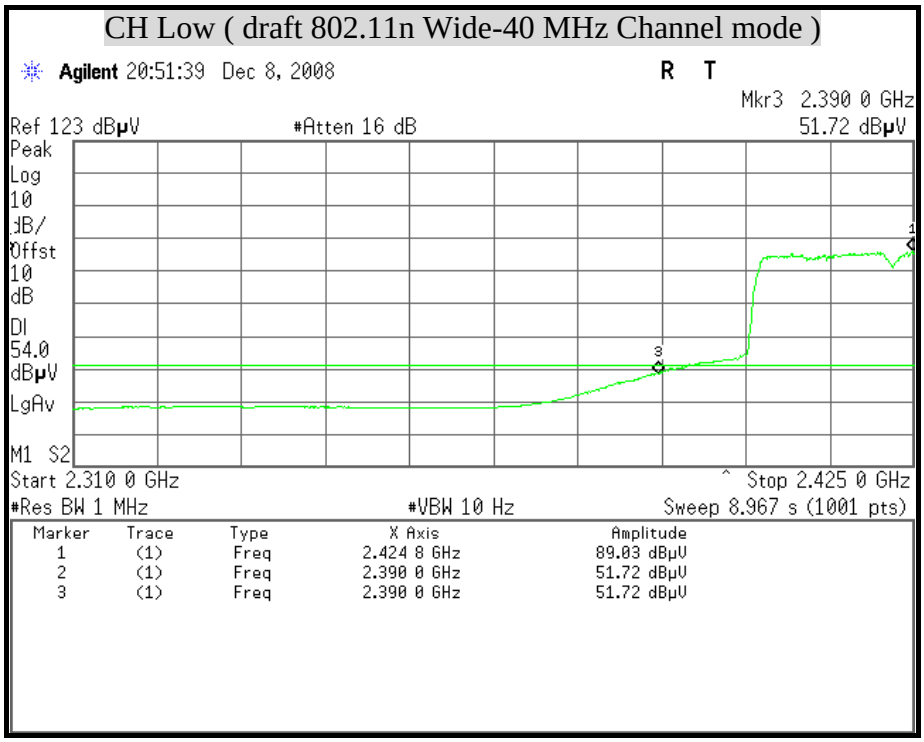

**Detector mode : Average** **Polarity : Horizontal**



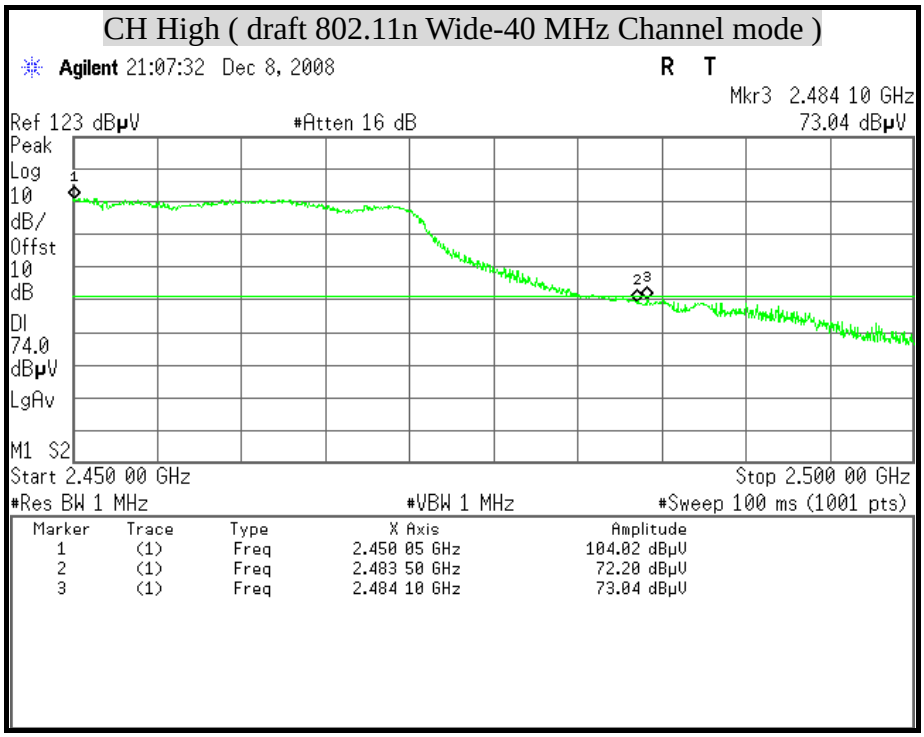
**Detector mode : Peak** **Polarity : Vertical**



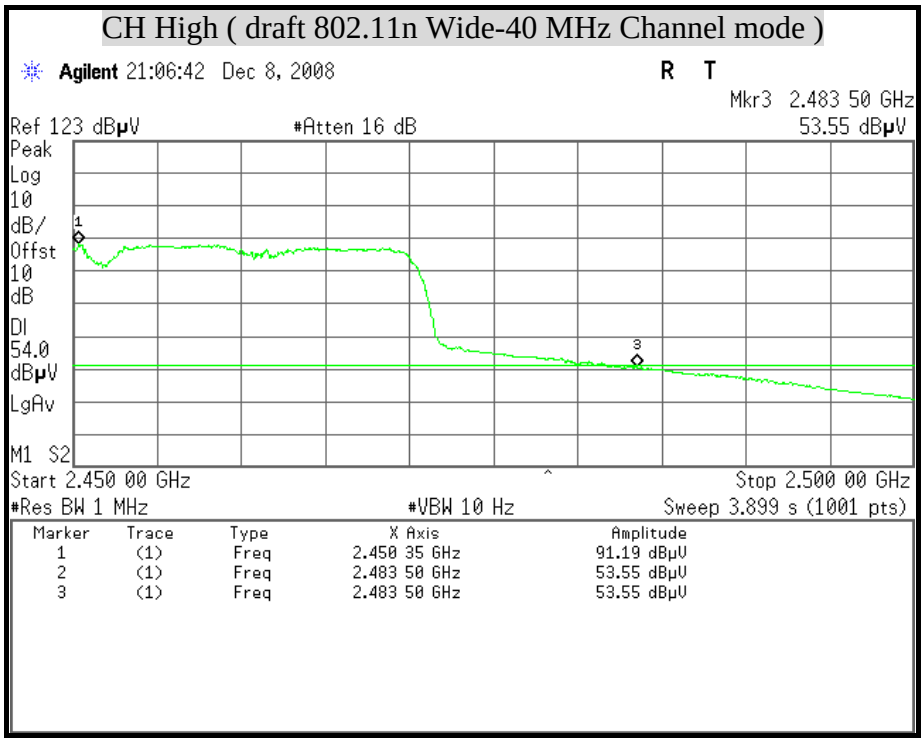

**Detector mode : Average** **Polarity : Vertical**



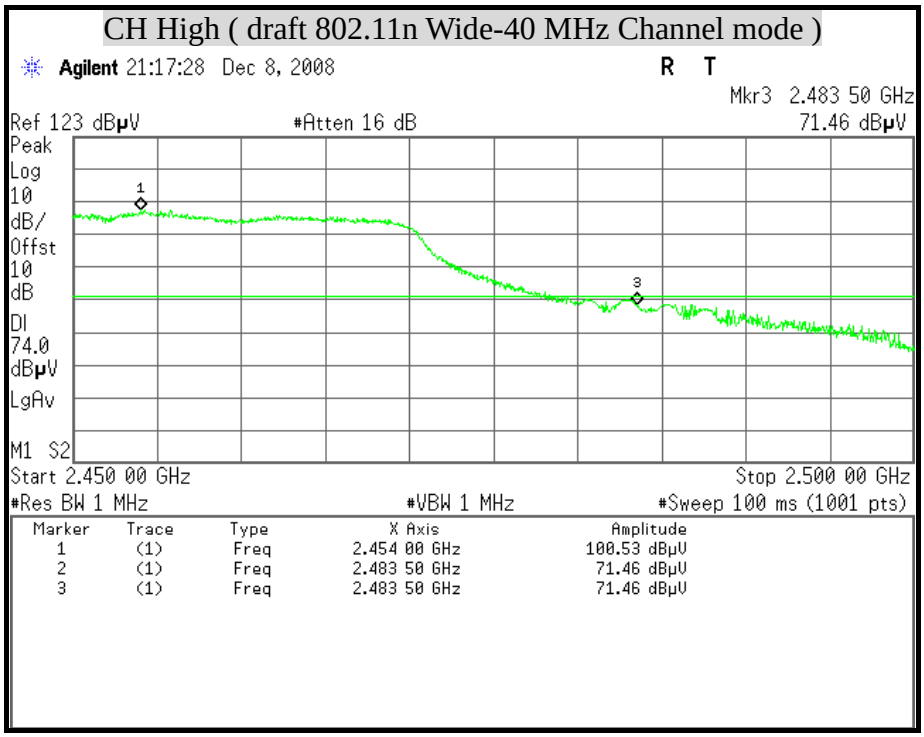
**Detector mode : Peak** **Polarity : Horizontal**



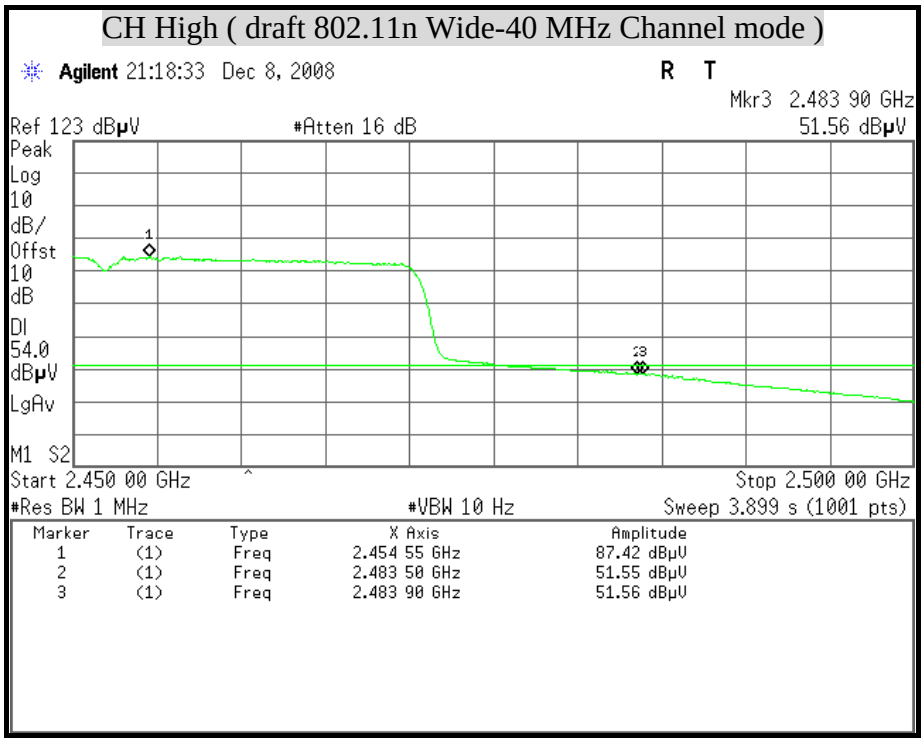

**Detector mode : Average** **Polarity : Horizontal**



**Detector mode : Peak** **Polarity : Vertical**

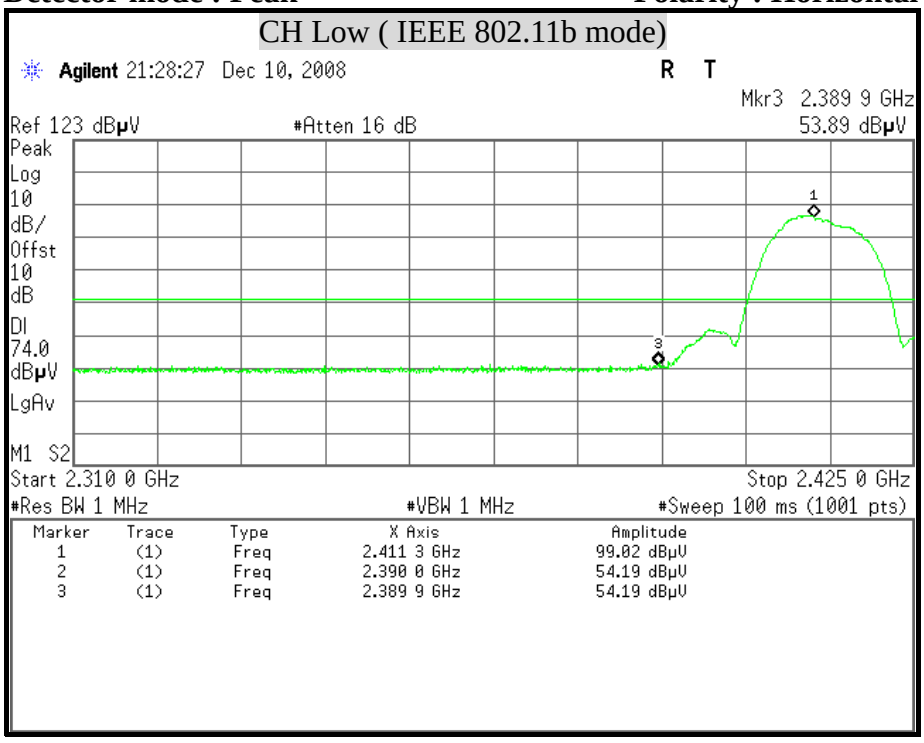



**Detector mode : Average** **Polarity : Vertical**

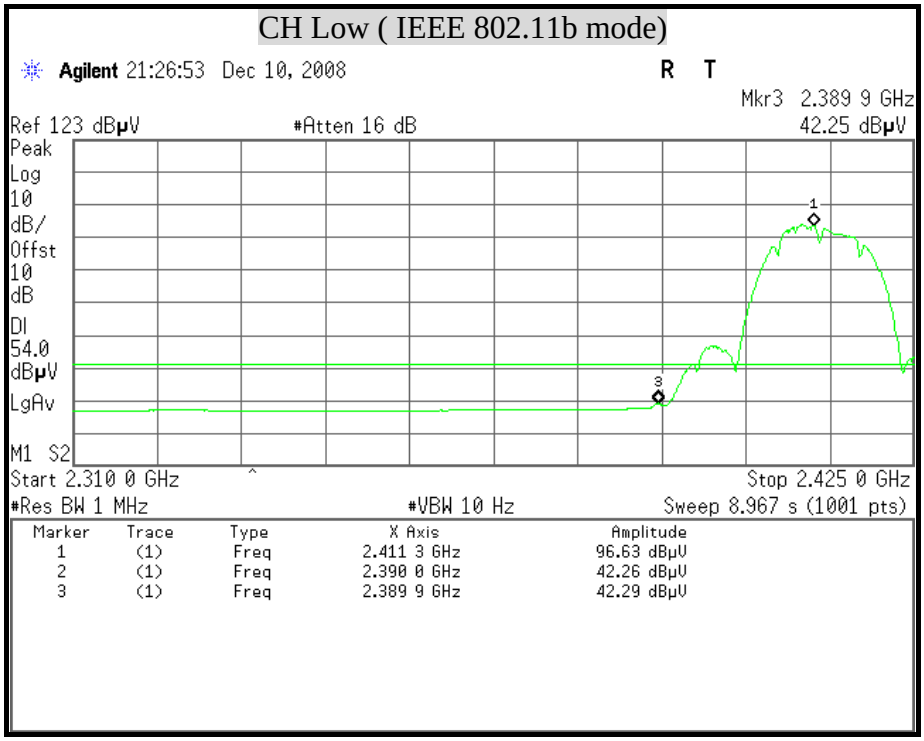


# DIPOLE ANTENNA

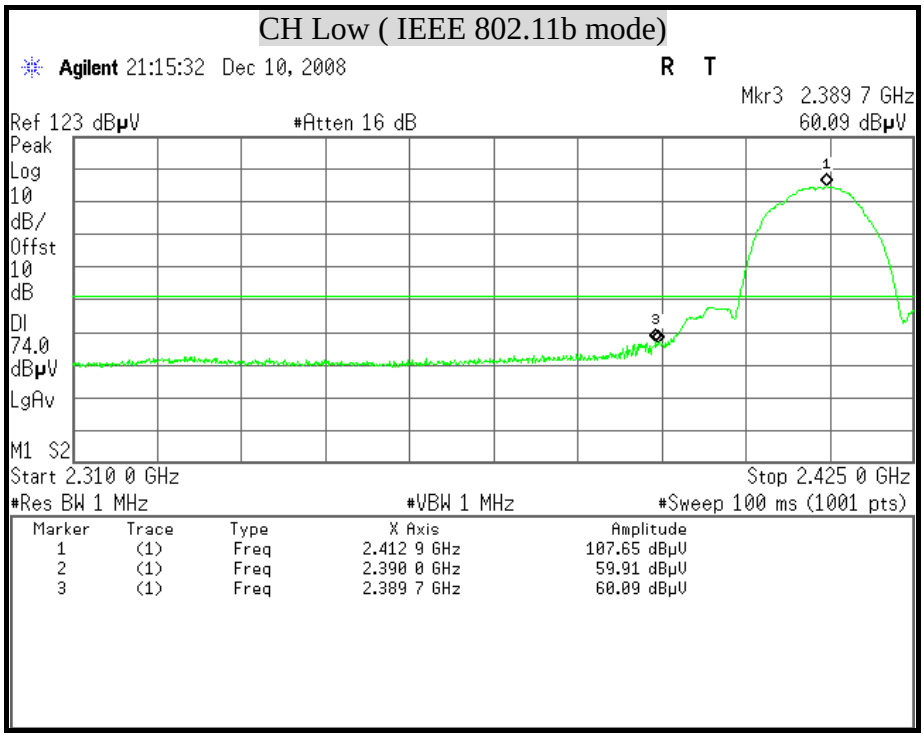
**Detector mode : Peak** **Polarity : Horizontal**



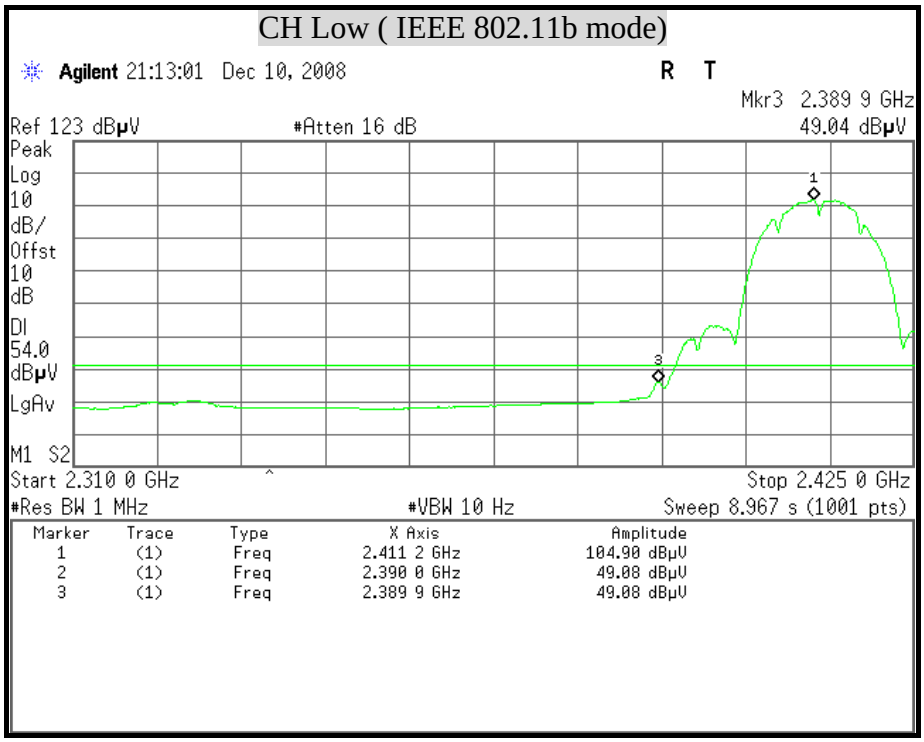

**Detector mode : Average** **Polarity : Horizontal**



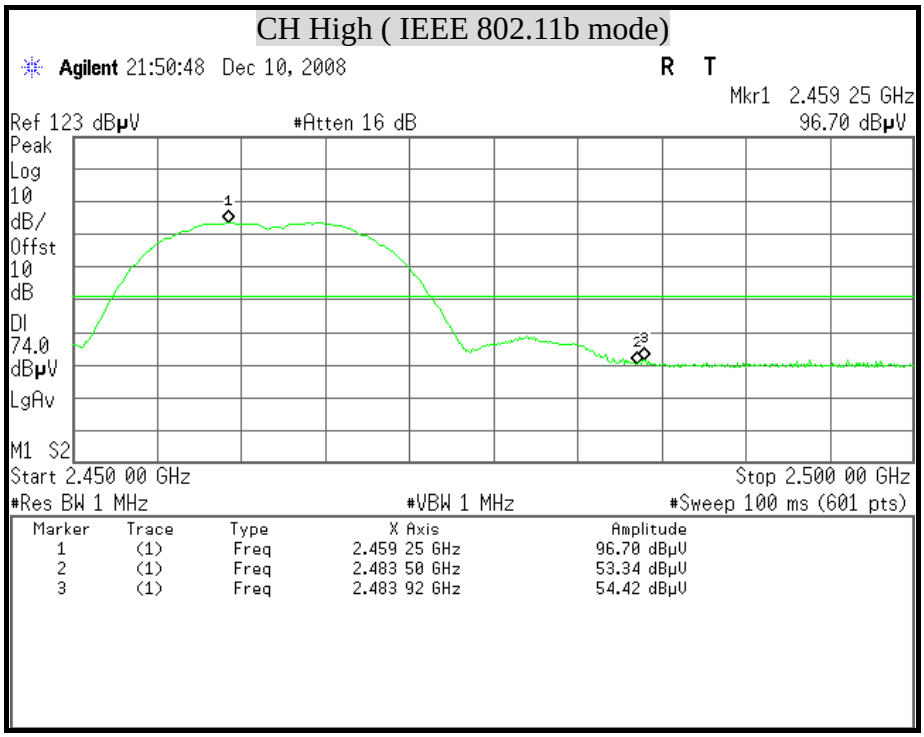
**Detector mode : Peak** **Polarity : Vertical**



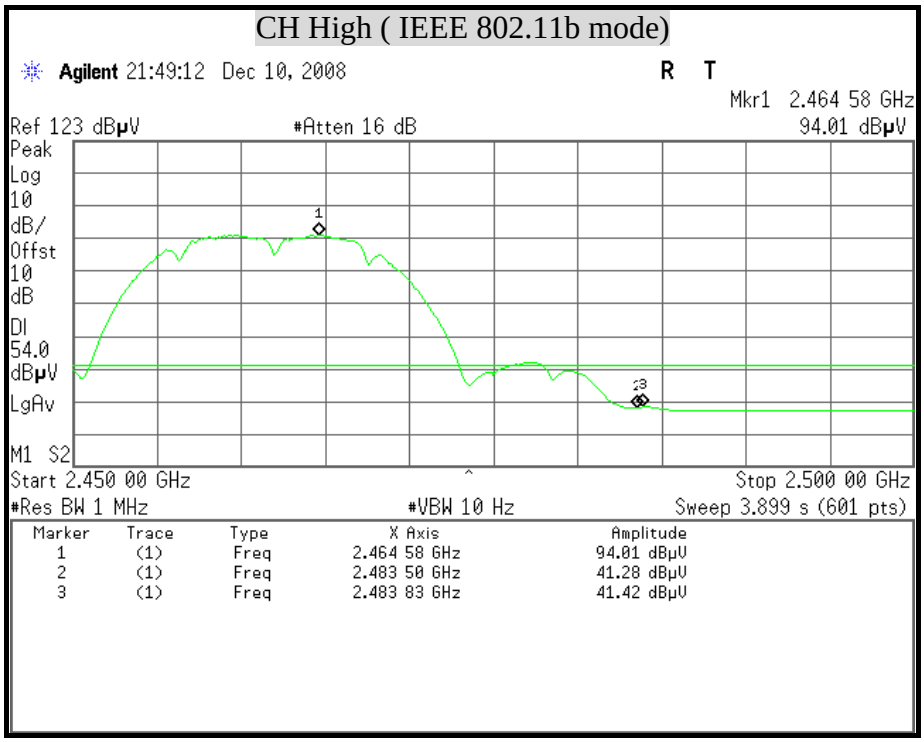

**Detector mode : Average** **Polarity : Vertical**



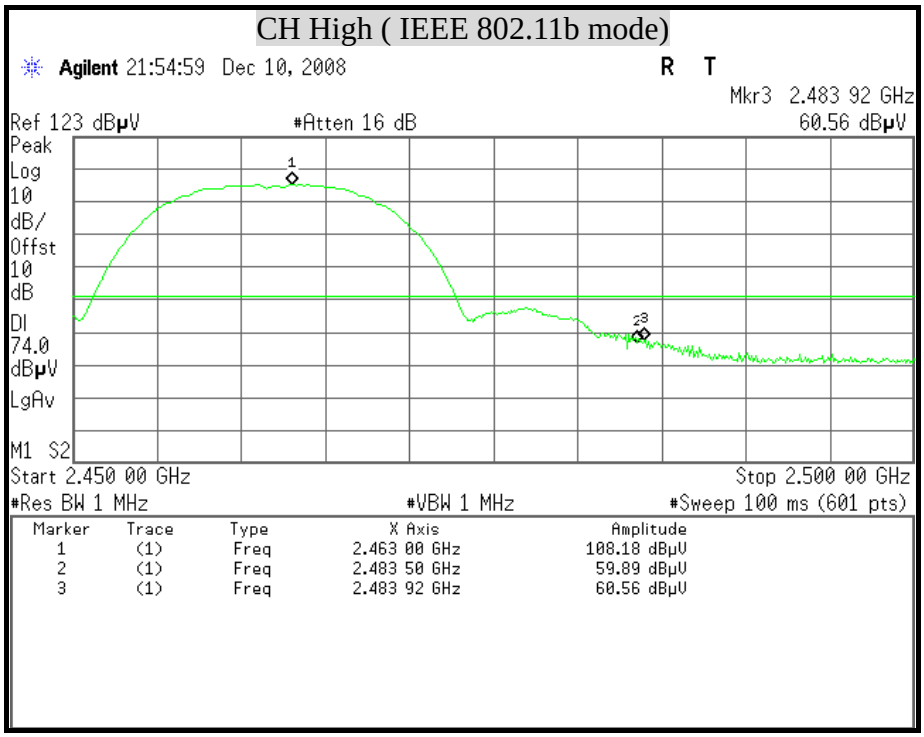
**Detector mode : Peak** **Polarity : Horizontal**



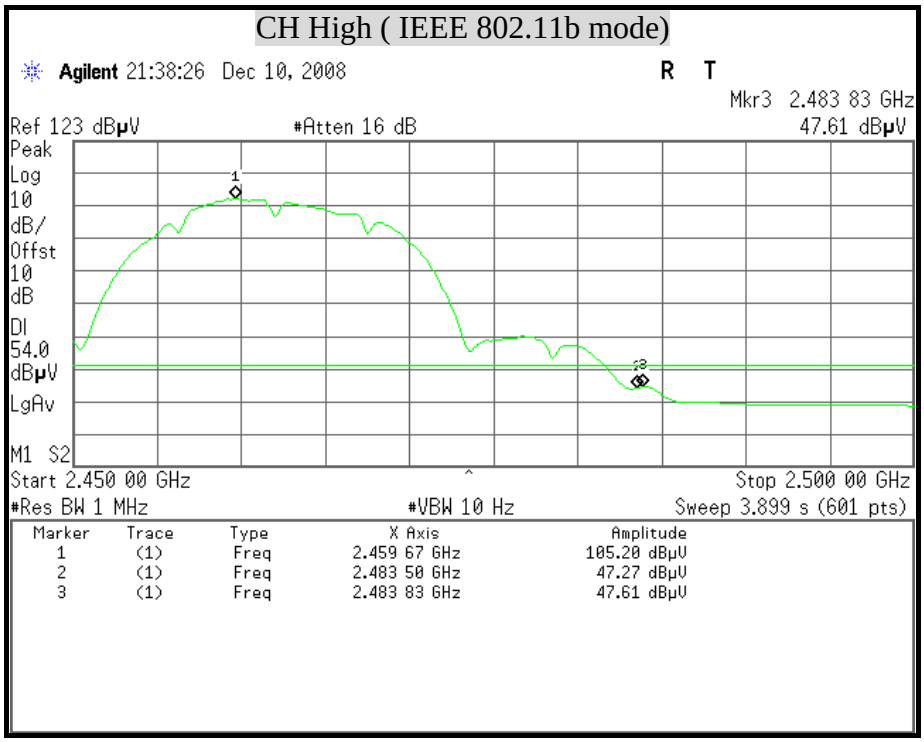

**Detector mode : Average** **Polarity : Horizontal**



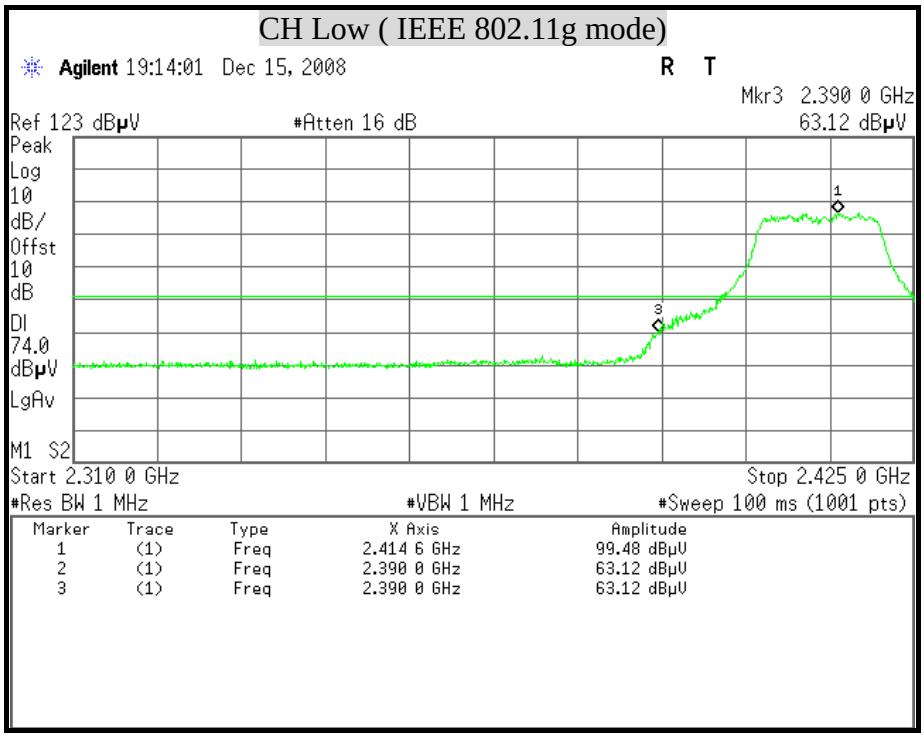
**Detector mode : Peak** **Polarity : Vertical**



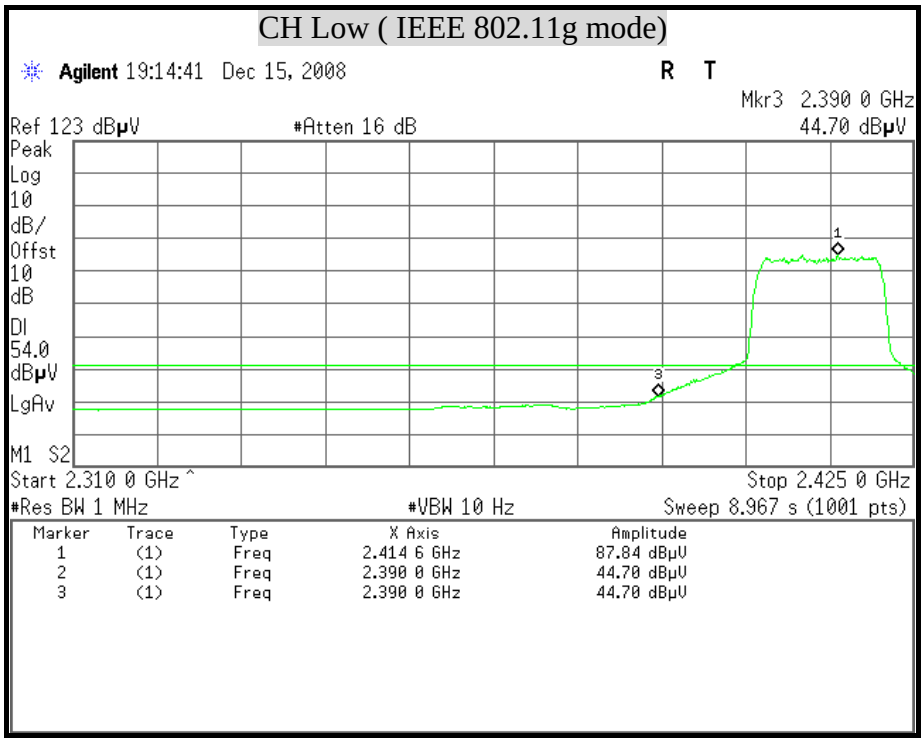

**Detector mode : Average** **Polarity : Vertical**



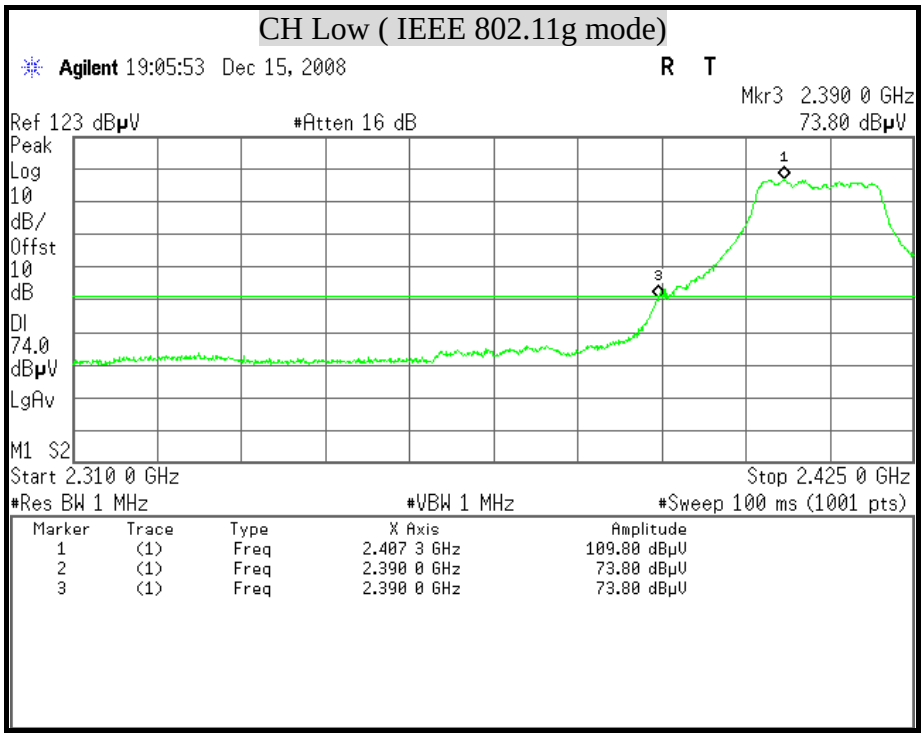
**Detector mode : Peak** **Polarity : Horizontal**



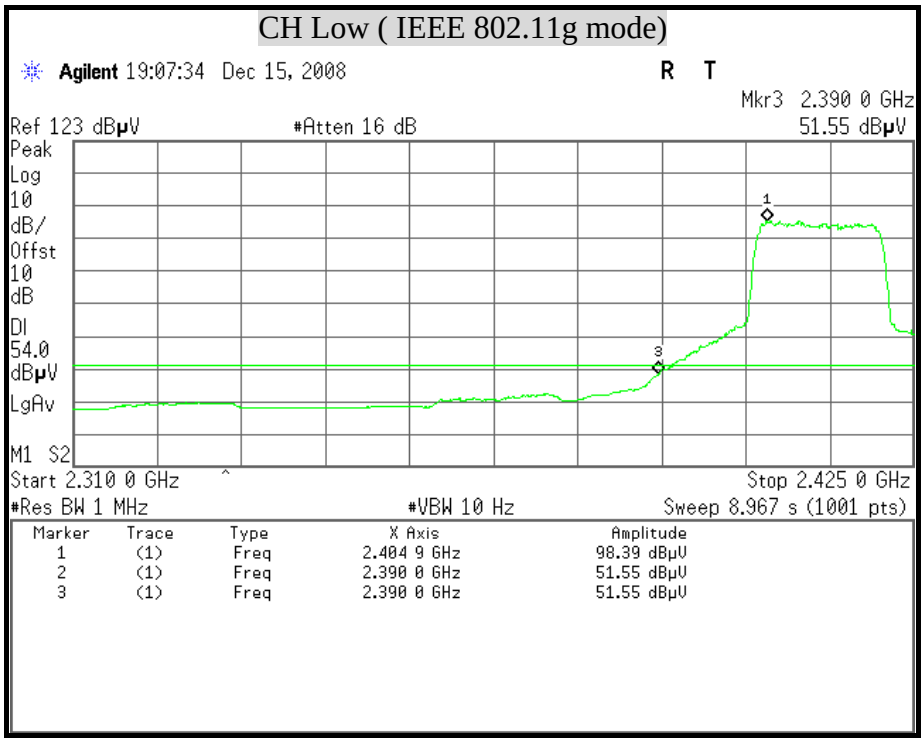

**Detector mode : Average** **Polarity : Horizontal**



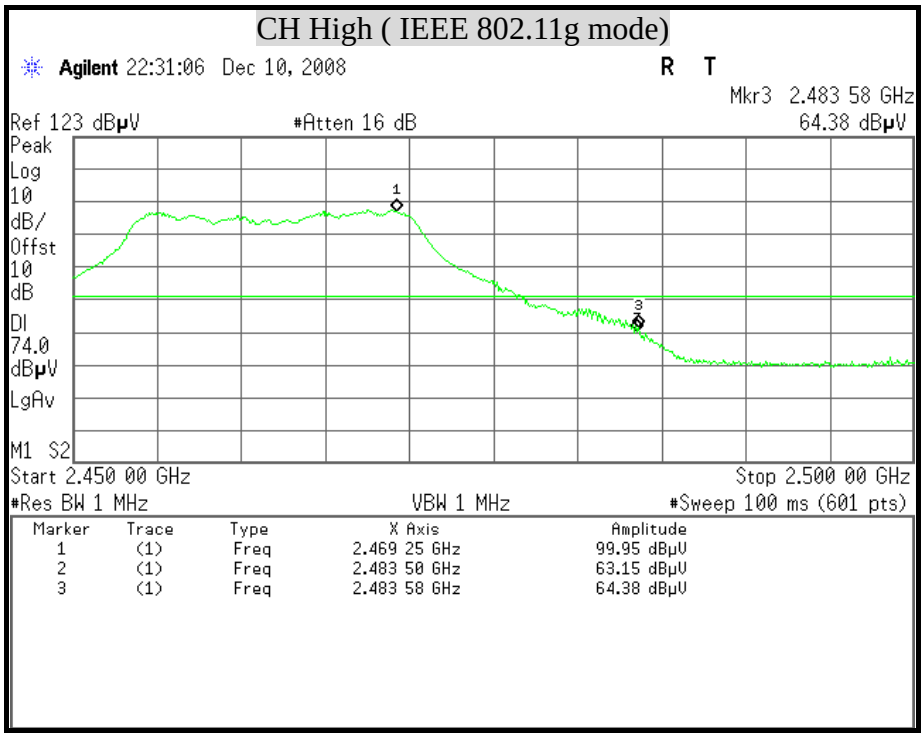
**Detector mode : Peak** **Polarity : Vertical**



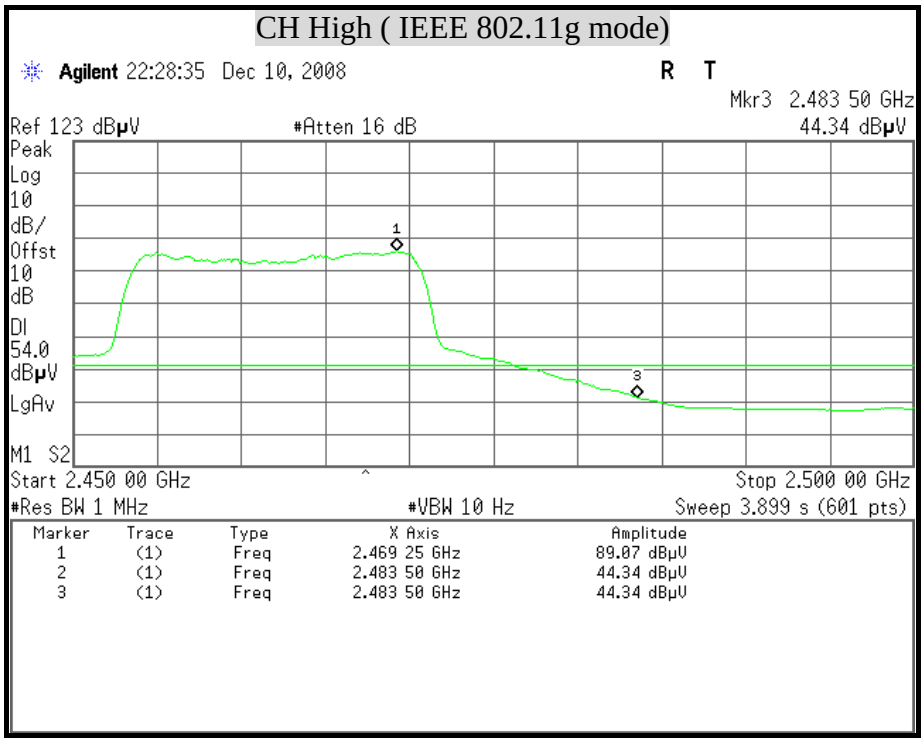

**Detector mode : Average** **Polarity : Vertical**



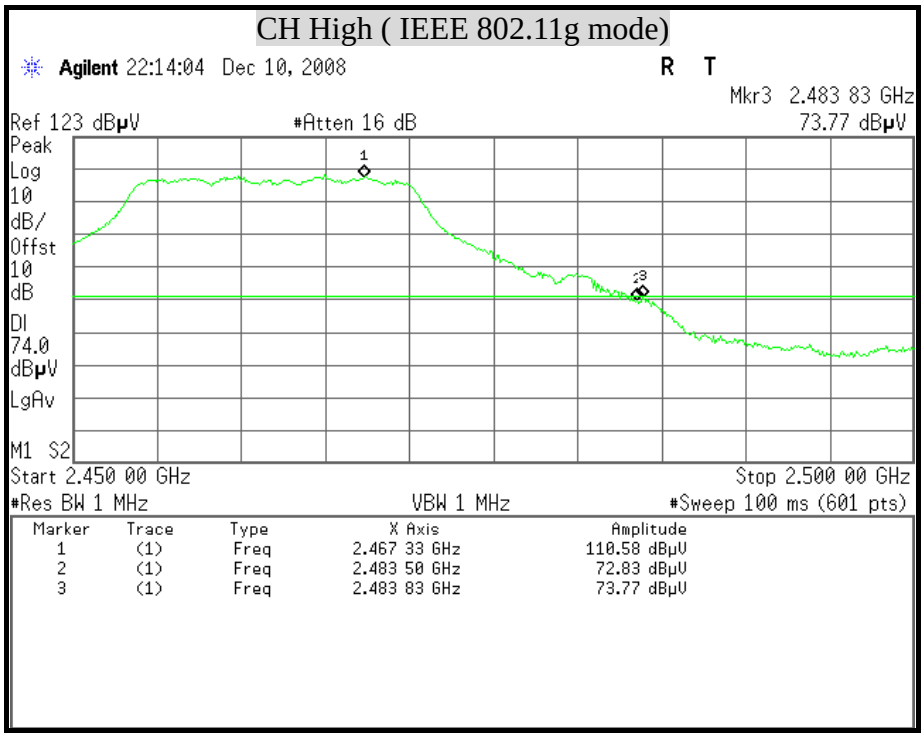
**Detector mode : Peak** **Polarity : Horizontal**



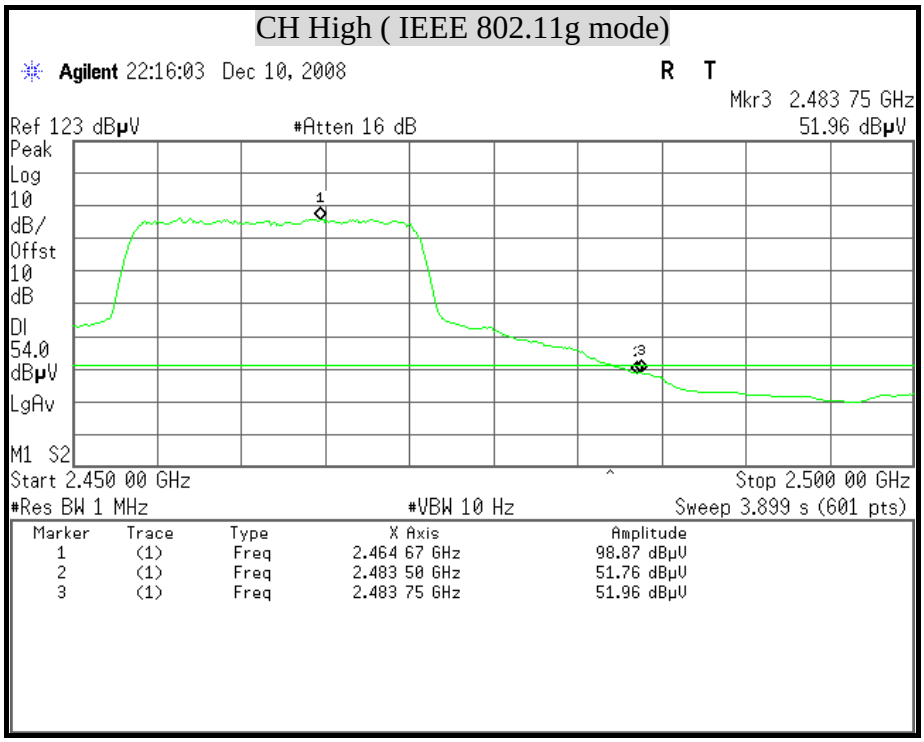

**Detector mode : Average** **Polarity : Horizontal**



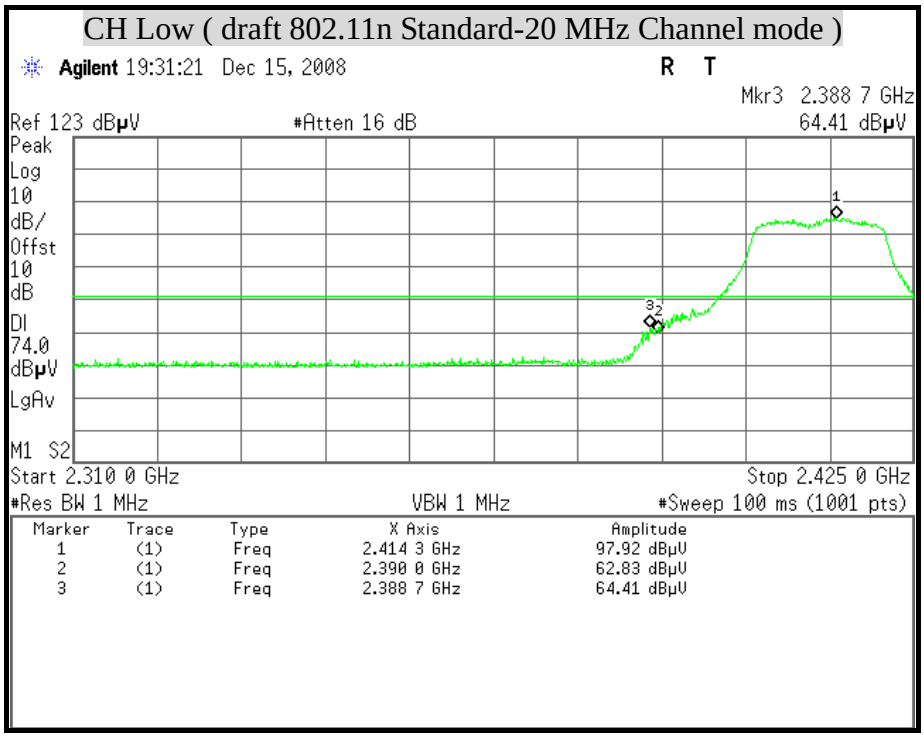
**Detector mode : Peak** **Polarity : Vertical**



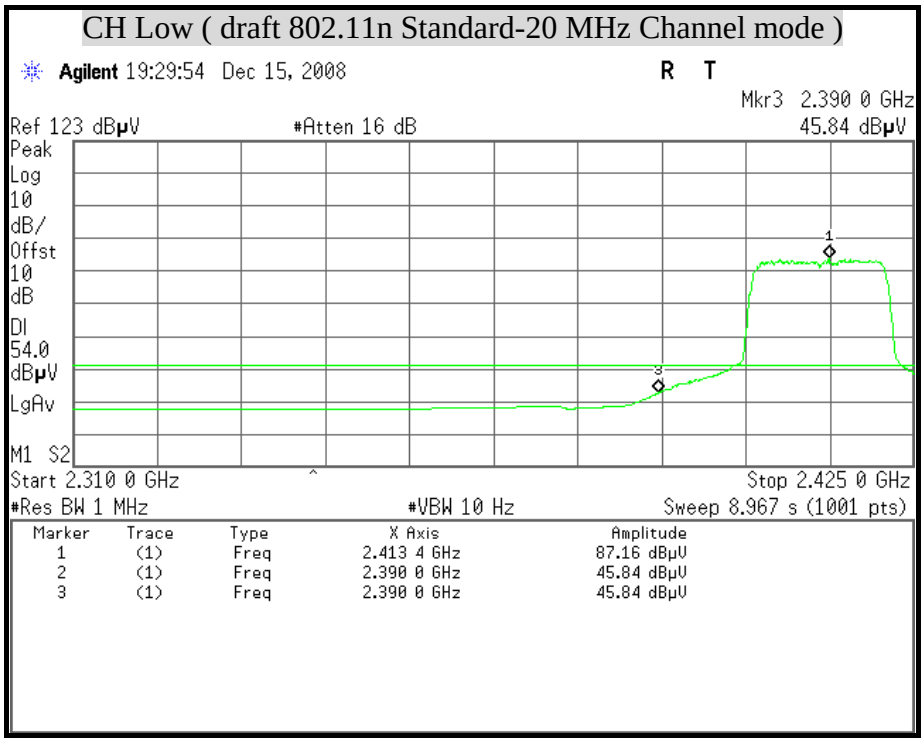

**Detector mode : Average** **Polarity : Vertical**



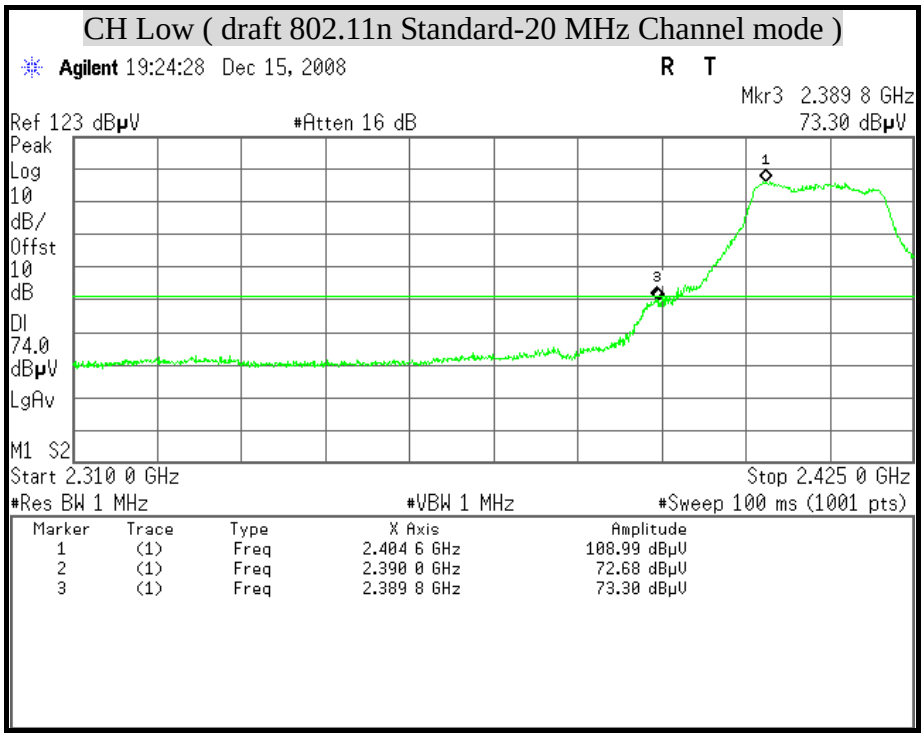
**Detector mode : Peak** **Polarity : Horizontal**



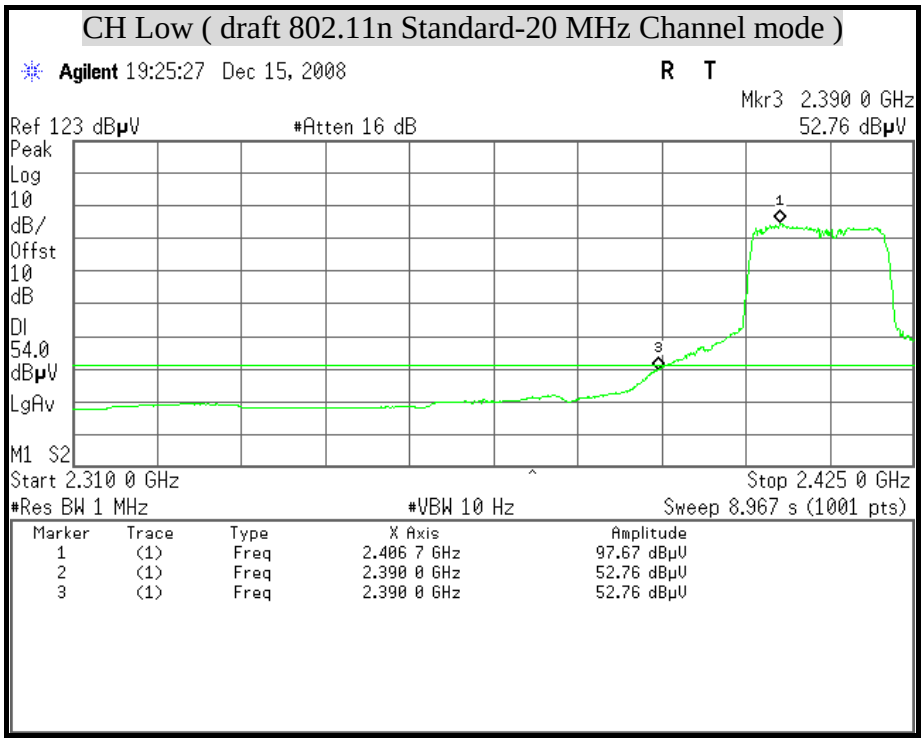

**Detector mode : Average** **Polarity : Horizontal**



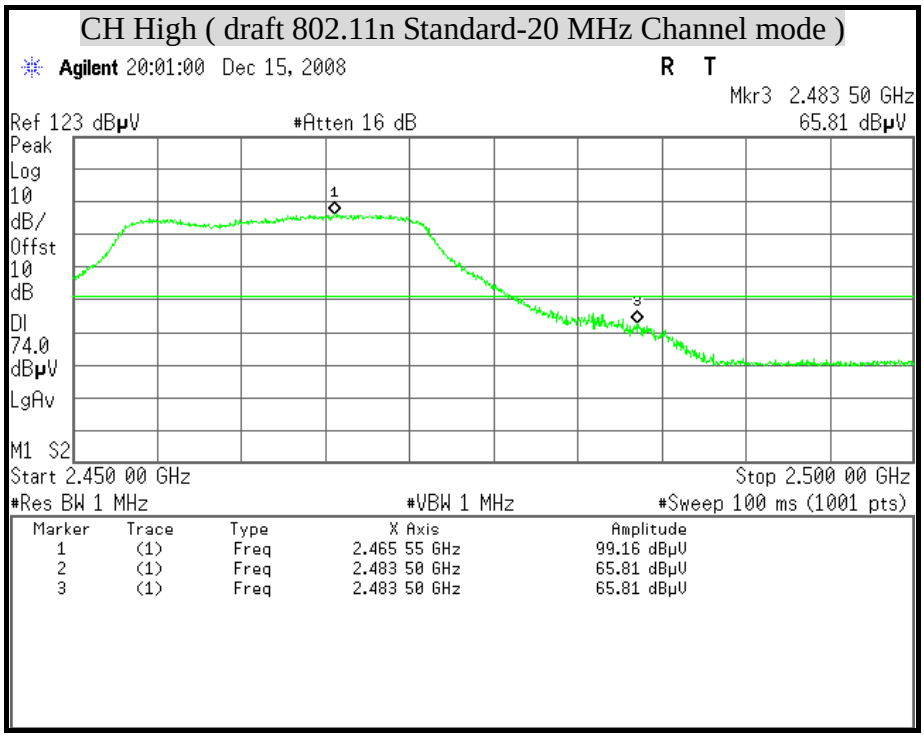
**Detector mode : Peak** **Polarity : Vertical**



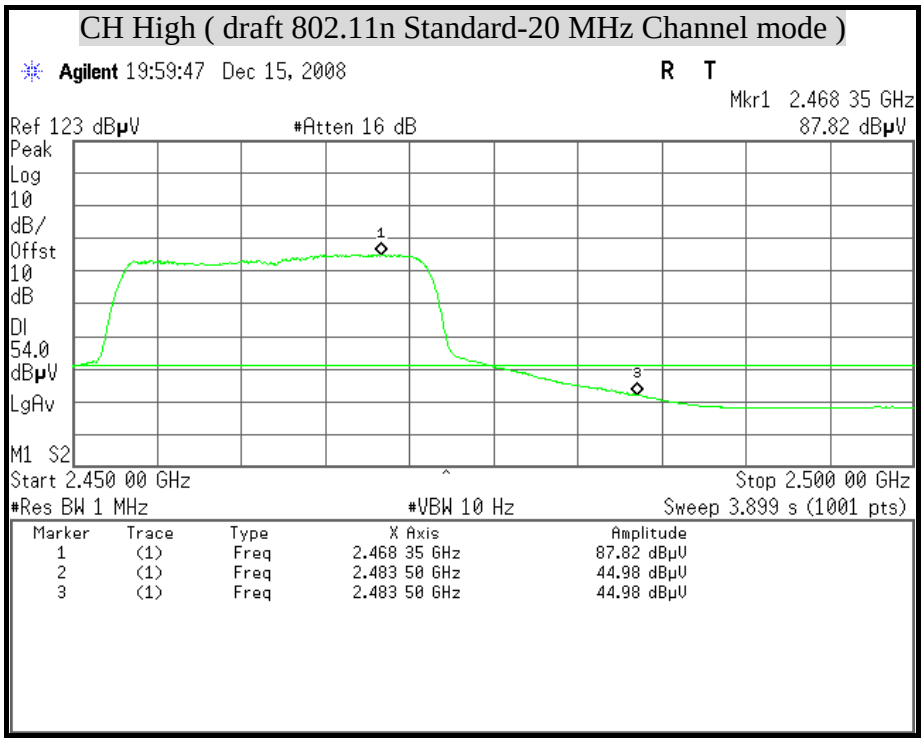

**Detector mode : Average** **Polarity : Vertical**



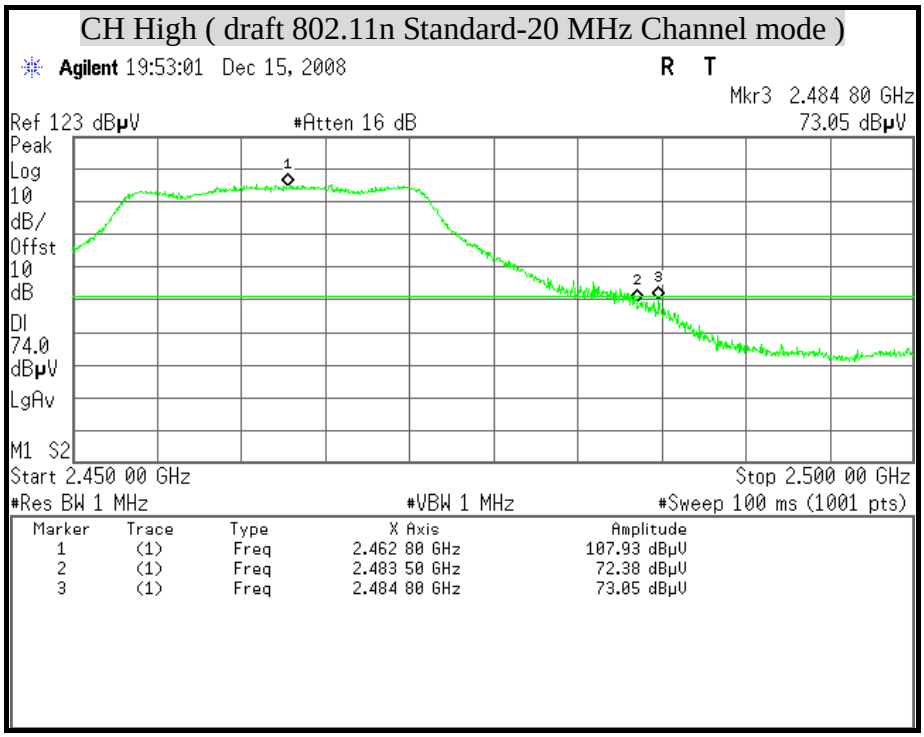
**Detector mode : Peak** **Polarity : Horizontal**



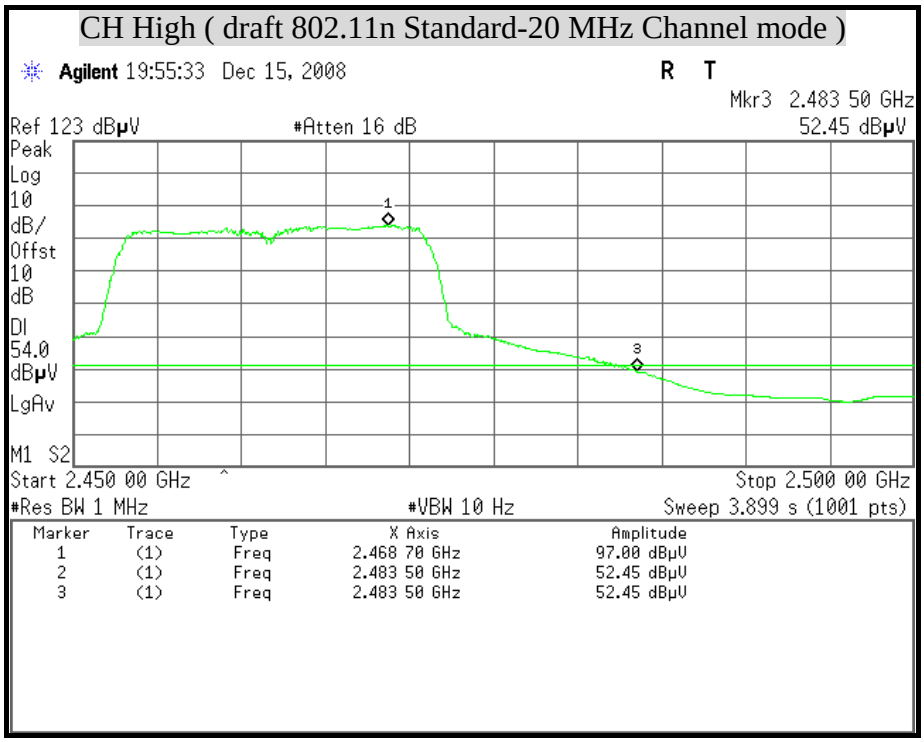

**Detector mode : Average** **Polarity : Horizontal**



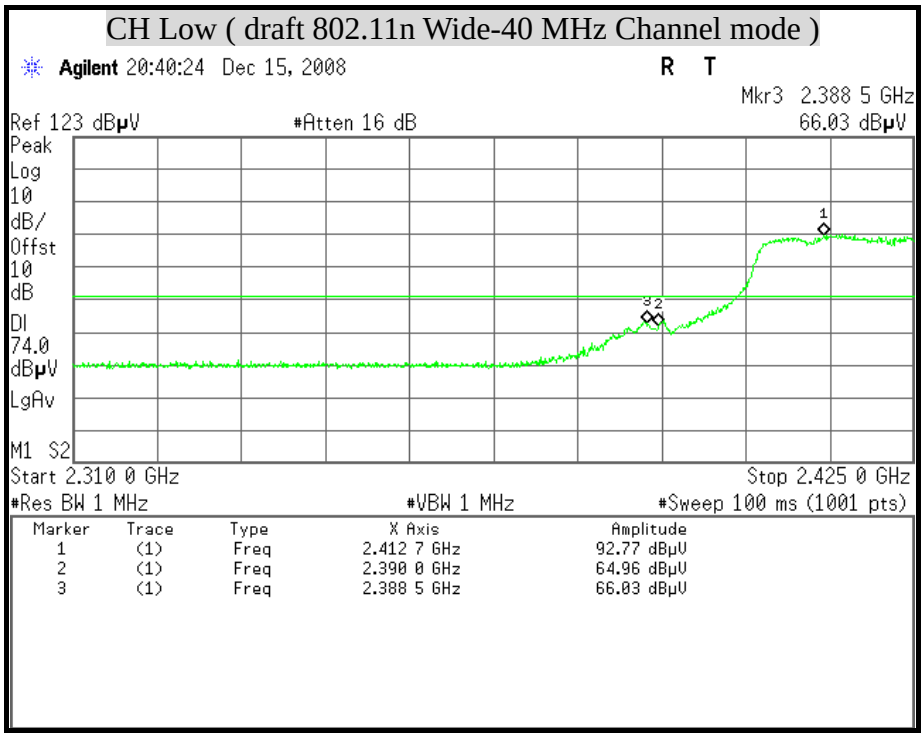
**Detector mode : Peak** **Polarity : Vertical**



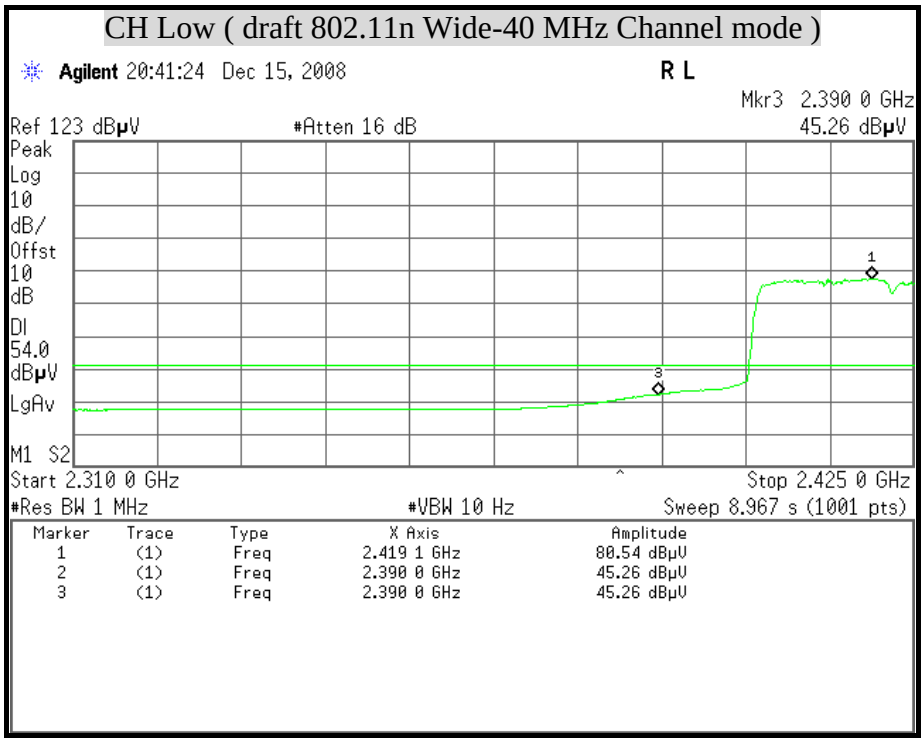

**Detector mode : Average** **Polarity : Vertical**



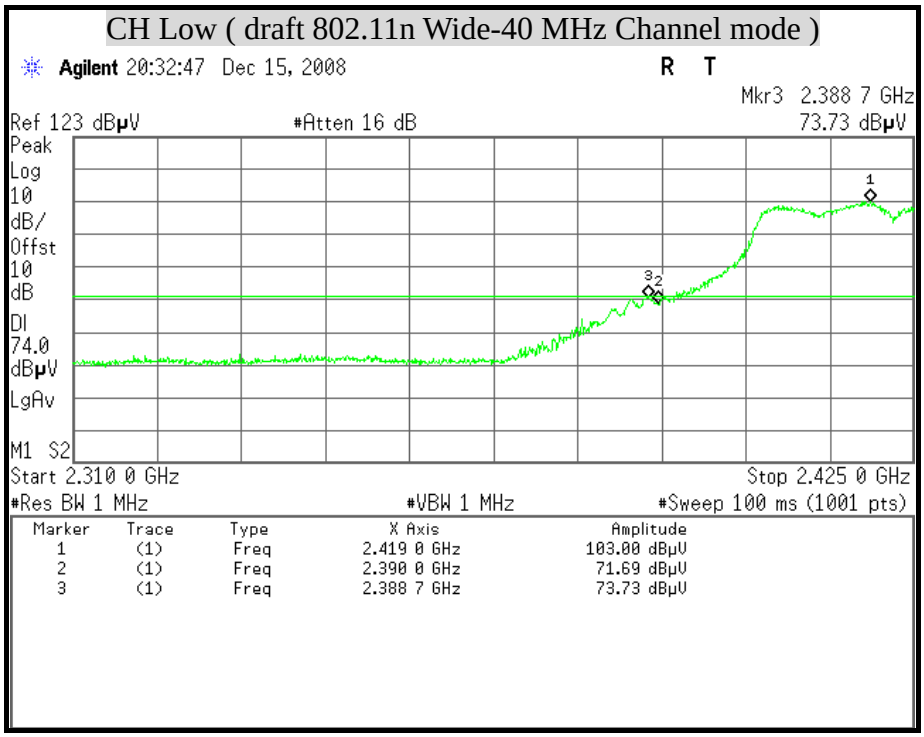
**Detector mode : Peak** **Polarity : Horizontal**



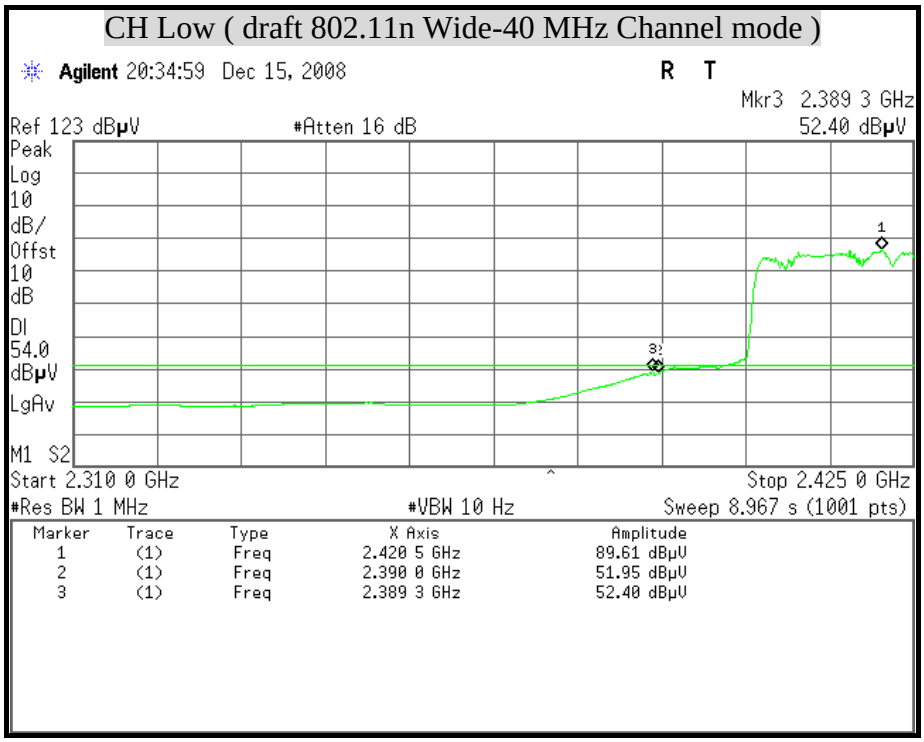

**Detector mode : Average** **Polarity : Horizontal**



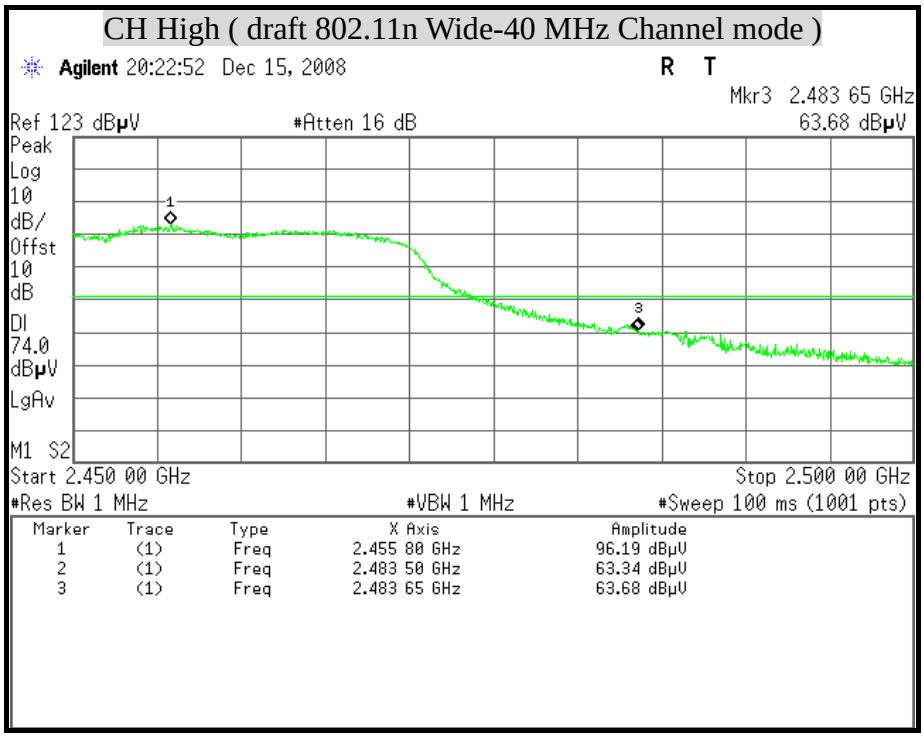
**Detector mode : Peak** **Polarity : Vertical**



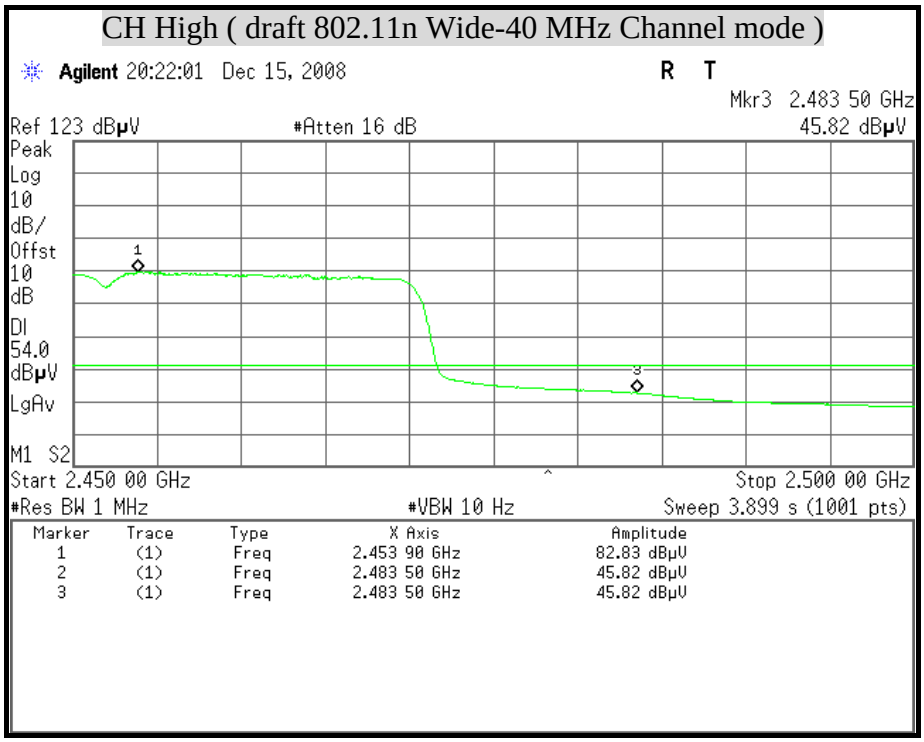

**Detector mode : Average** **Polarity : Vertical**



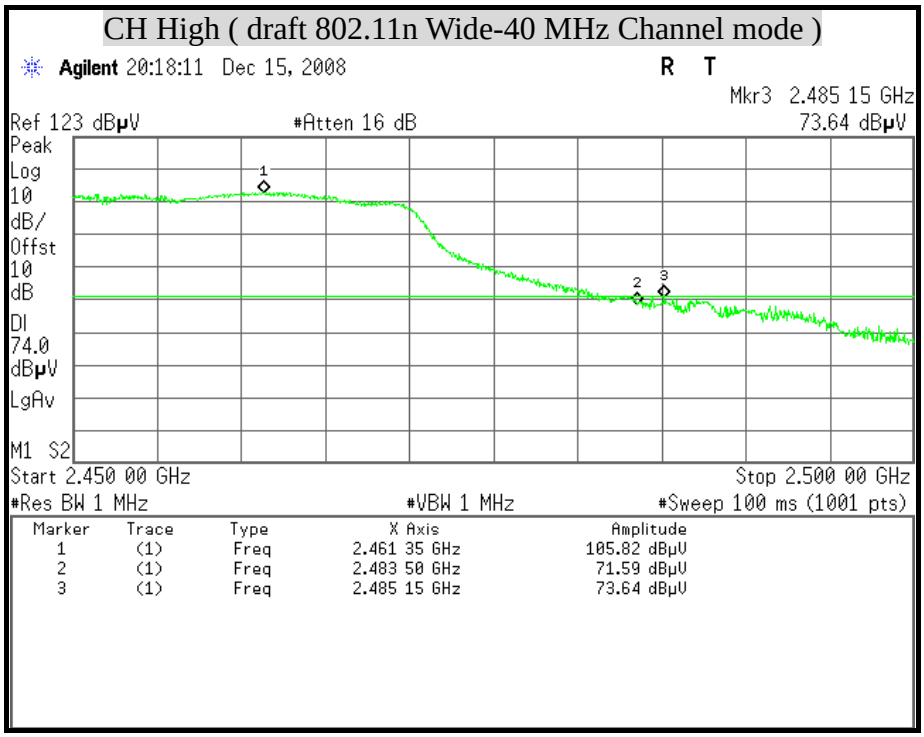
**Detector mode : Peak** **Polarity : Horizontal**



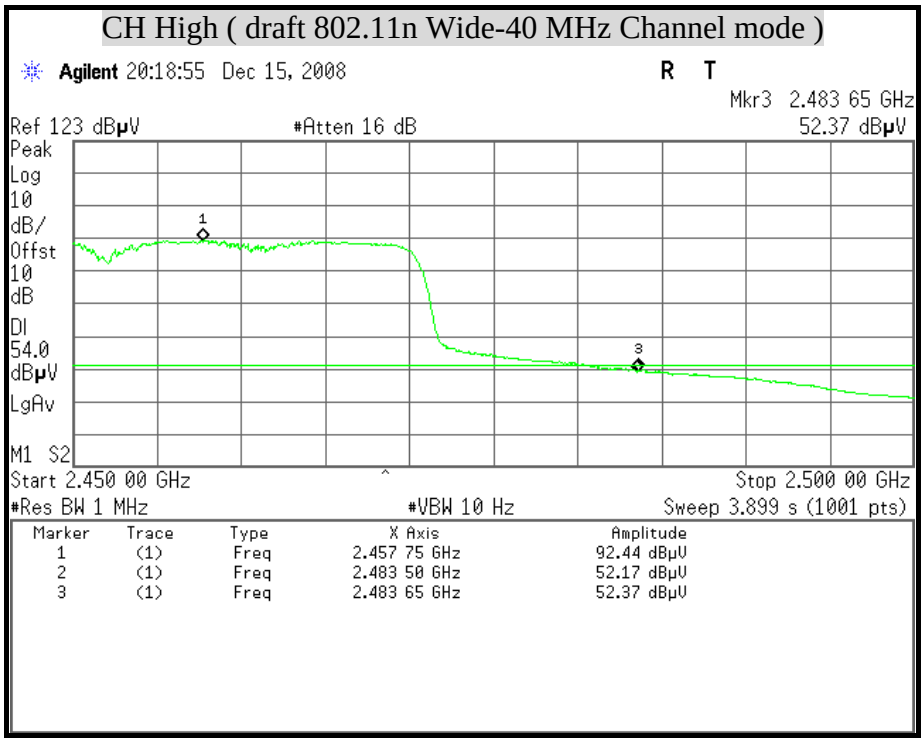

**Detector mode : Average** **Polarity : Horizontal**



**Detector mode : Peak** **Polarity : Vertical**




**Detector mode : Average** **Polarity : Vertical**

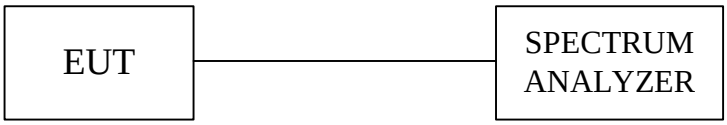


## 8.6 PEAK POWER SPECTRAL DENSITY

**LIMIT**

1. According to §15.247(e) & RSS-210 §A8.2, for digitally modulated systems, the 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.
2. According to §15.247(f) & RSS-210 §A8.3, the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

**TEST SETUP**




Combined mode


**TEST PROCEDURE**

The transmitter output was connected to the spectrum analyzer, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW＝3KHz and VBW≧RBW, set sweep time＝span / 3KHz.

The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span / 3KHz for a full response of the mixer in the spectrum analyzer.

**TEST RESULTS**

*No non-compliance noted*

## TEST DATA

Total peak power calculation formula:
10 log (10^ (Chain 0 Power / 10) + 10^ (Chain1 Power / 10)).

**Test mode: IEEE 802.11b mode**

| Channel | Channel Frequency (MHz) | Final RF Power Level in 3KHz BW (dBm) | | PPSD Total (dBm) | Minimum Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | | |
| Low | 2412 | -9.53 | -9.94 | -6.72 | 8 | PASS |
| Middle | 2437 | -10.82 | -9.63 | -7.17 | 8 | PASS |
| High | 2462 | -11.33 | -10.49 | -7.88 | 8 | PASS |

***Remark:***

1. *At finial test to get the worst-case emission at 1 Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: IEEE 802.11b Combined mode**

| Channel | Channel Frequency (MHz) | Final RF Power Level in 3KHz BW (dBm) | Minimum Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2412 | -5.04 | 8 | PASS |
| Middle | 2437 | -3.25 | 8 | PASS |
| High | 2462 | -3.21 | 8 | PASS |

***Remark:***

1. *At finial test to get the worst-case emission at 1 Mbps.*
2. *The cable assembly insertion loss of 14.4 dB was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: IEEE 802.11g mode**

| Channel | Channel Frequency (MHz) | Final RF Power Level in 3KHz BW (dBm) | | PPSD Total (dBm) | Minimum Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | | |
| Low | 2412 | -13.77 | -13.23 | -10.48 | 8 | PASS |
| Middle | 2437 | -12.01 | -11.82 | -8.90 | 8 | PASS |
| High | 2462 | -14.07 | -13.93 | -10.99 | 8 | PASS |

***Remark:***

1. *At finial test to get the worst-case emission at 6 Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: IEEE 802.11g Combined mode**

| Channel | Channel Frequency (MHz) | Final RF Power Level in 3KHz BW (dBm) | Minimum Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2412 | -7.62 | 8 | PASS |
| Middle | 2437 | -6.87 | 8 | PASS |
| High | 2462 | -7.25 | 8 | PASS |

***Remark:***

*1. At finial test to get the worst-case emission at 6 Mbps.*

*2. The cable assembly insertion loss of 14.4 dB was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: draft 802.11n Standard-20 MHz Channel mode**

| Channel | Channel Frequency (MHz) | Final RF Power Level in 3KHz BW (dBm) | | PPSD Total (dBm) | Minimum Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | | |
| Low | 2412 | -15.88 | -14.65 | -12.21 | 8 | PASS |
| Middle | 2437 | -12.96 | -11.80 | -9.33 | 8 | PASS |
| High | 2462 | -14.73 | -14.76 | -11.73 | 8 | PASS |

***Remark:***

*1. At finial test to get the worst-case emission at 6.5 Mbps.*

*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: draft 802.11n Standard-20 MHz Channel Combined mode**

| Channel | Channel Frequency (MHz) | Final RF Power Level in 3KHz BW (dBm) | Minimum Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2412 | -8.58 | 8 | PASS |
| Middle | 2437 | -5.96 | 8 | PASS |
| High | 2462 | -9.41 | 8 | PASS |

***Remark:***

*1. At finial test to get the worst-case emission at 6.5 Mbps.*

*2. The cable assembly insertion loss of 14.4 dB was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: draft 802.11n Wide-40 MHz Channel mode**

| Channel | Channel Frequency (MHz) | Final RF Power Level in 3KHz BW (dBm) | | PPSD Total (dBm) | Minimum Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | | |
| Low | 2422 | -19.86 | -17.97 | -15.80 | 8 | PASS |
| Middle | 2437 | -15.29 | -13.54 | -11.32 | 8 | PASS |
| High | 2452 | -18.09 | -17.92 | -14.99 | 8 | PASS |

***Remark:***

*1. At finial test to get the worst-case emission at 13.5 Mbps.*

*2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

**Test mode: draft 802.11n Wide-40 MHz Channel Combined mode**

| Channel | Channel Frequency (MHz) | Final RF Power Level in 3KHz BW (dBm) | Minimum Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2422 | -11.78 | 8 | PASS |
| Middle | 2437 | -6.99 | 8 | PASS |
| High | 2452 | -13.18 | 8 | PASS |

***Remark:***

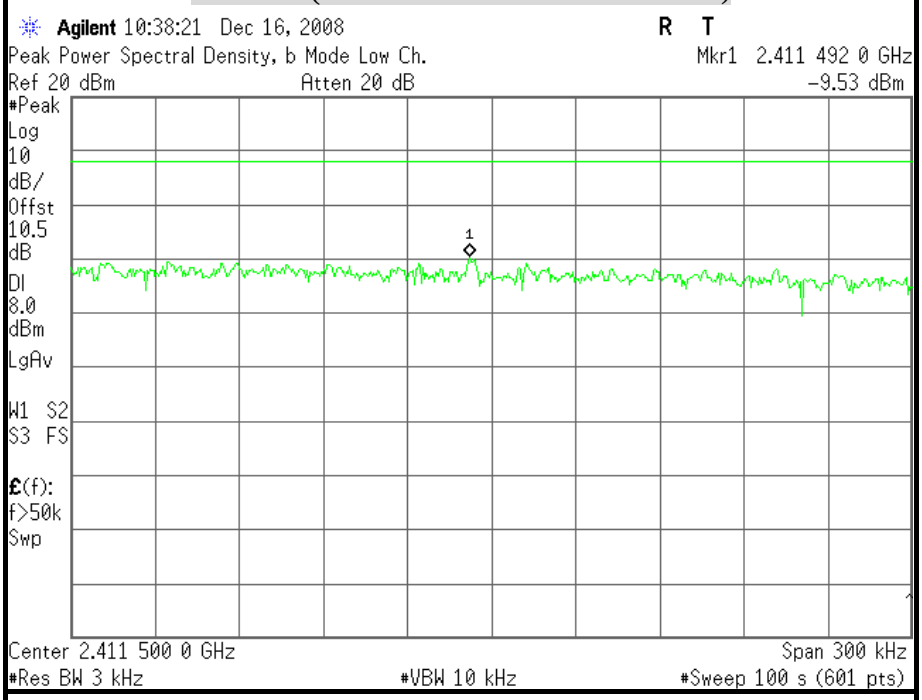
*1. At finial test to get the worst-case emission at 13.5 Mbps.*

*2. The cable assembly insertion loss of 14.4 dB was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

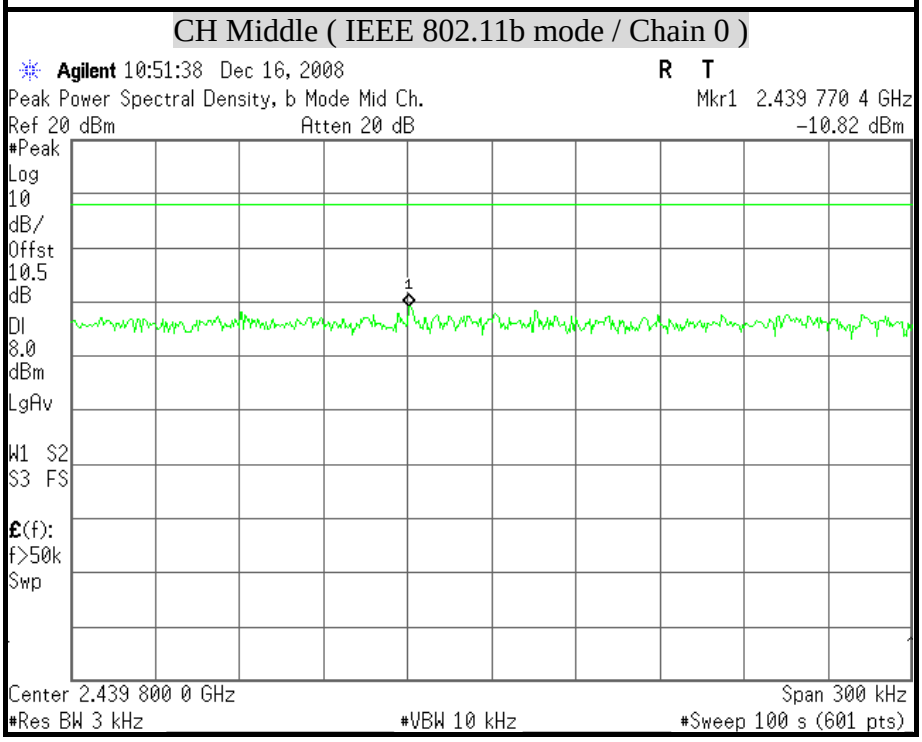
## TEST PLOT

### POWER SPECTRAL DENSITY ( IEEE 802.11b mode)

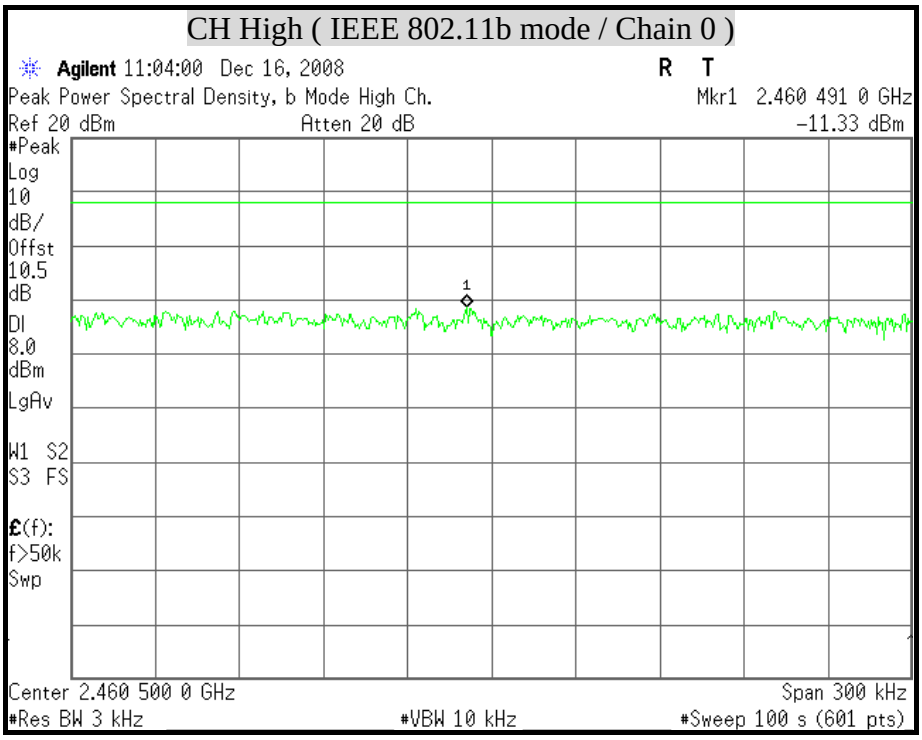
CH Low ( IEEE 802.11b mode / Chain 0 )



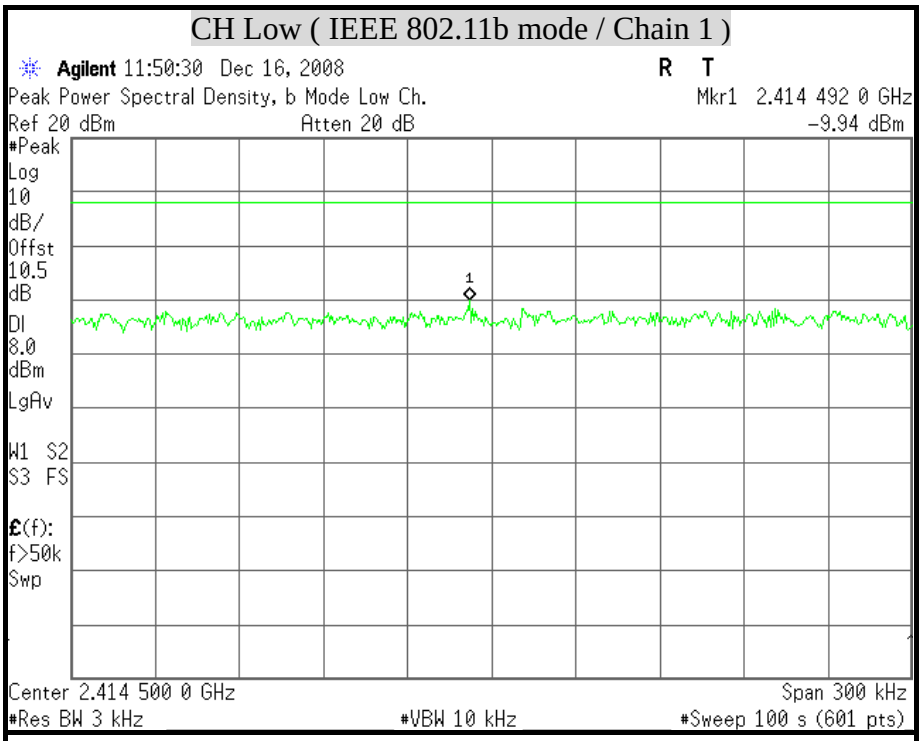

CH Middle ( IEEE 802.11b mode / Chain 0 )



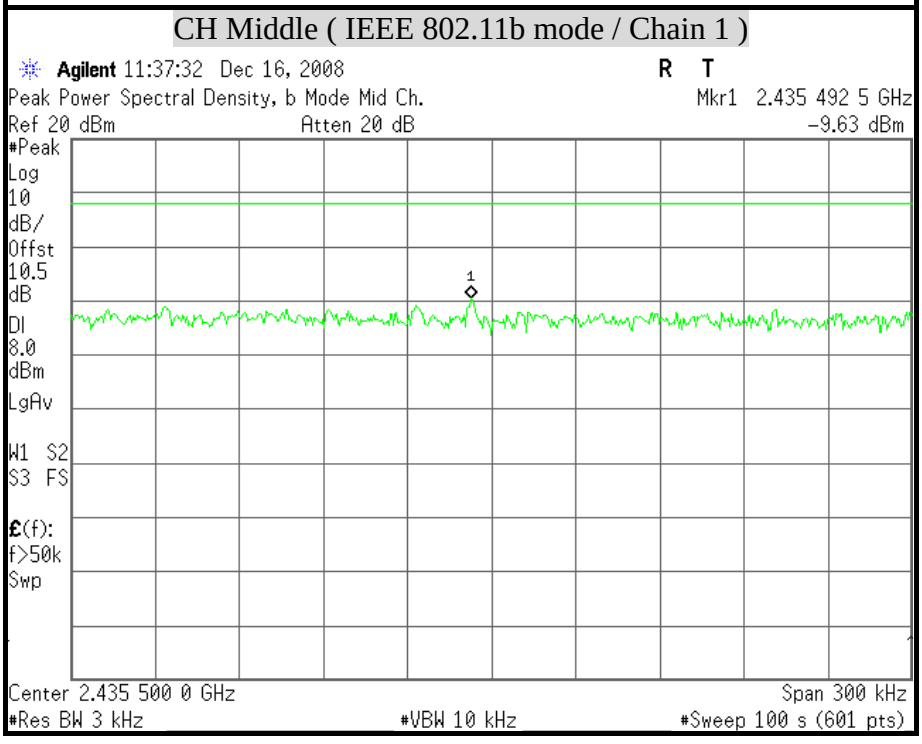
CH High ( IEEE 802.11b mode / Chain 0 )



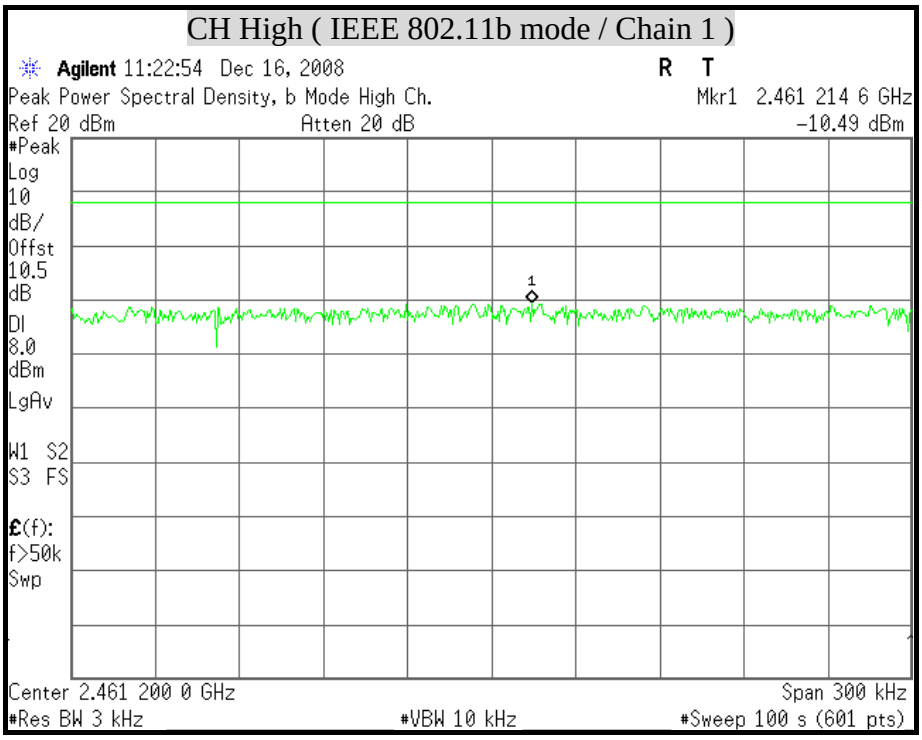
CH Low ( IEEE 802.11b mode / Chain 1 )




CH Middle ( IEEE 802.11b mode / Chain 1 )

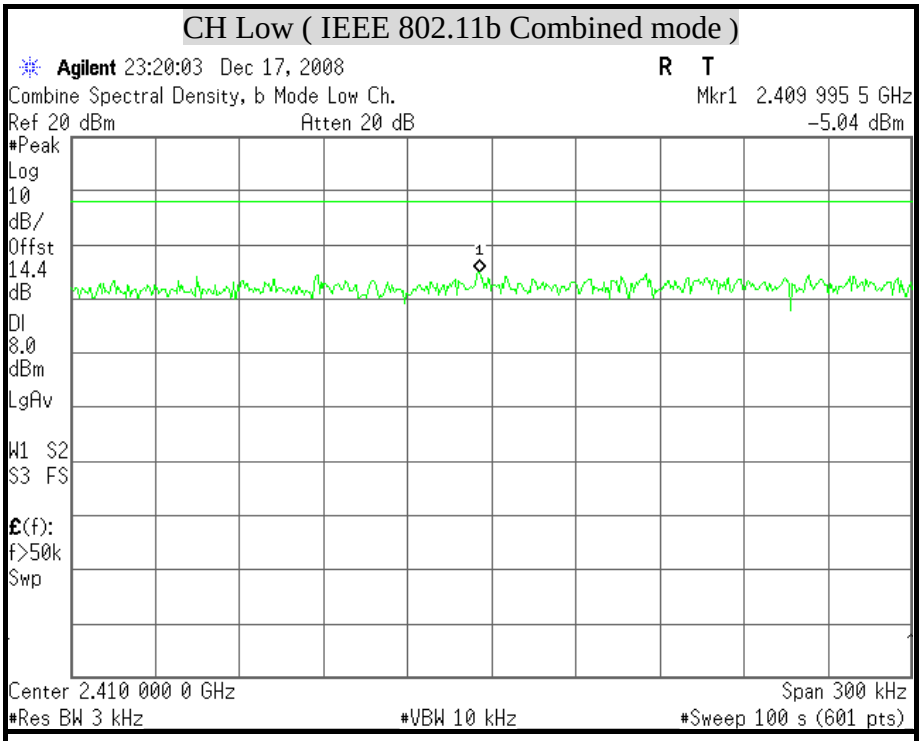


CH High ( IEEE 802.11b mode / Chain 1 )

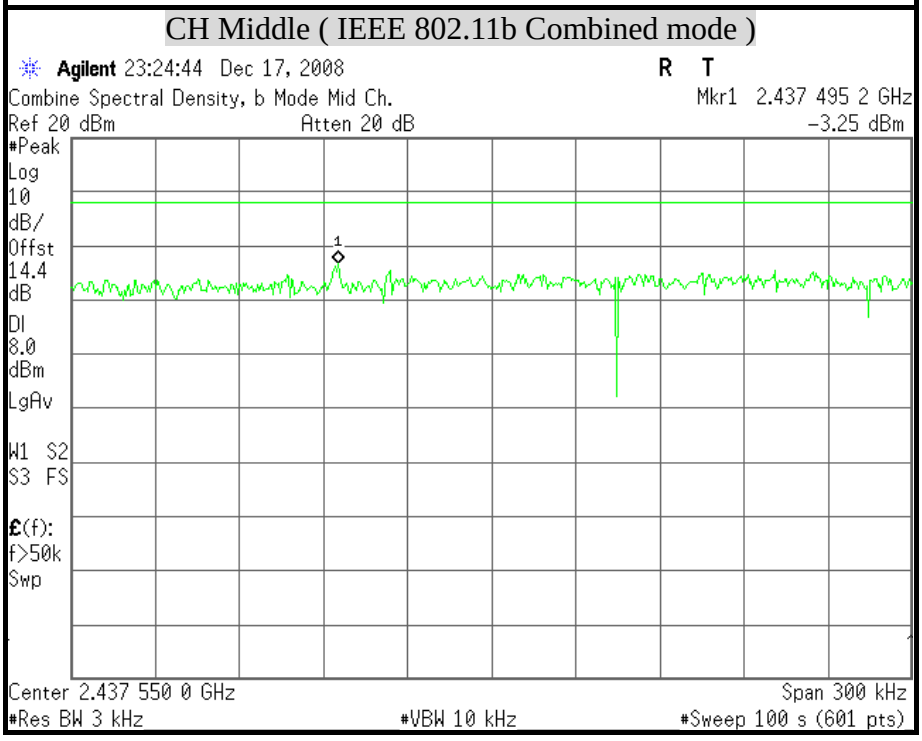


## POWER SPECTRAL DENSITY ( IEEE 802.11b Combined mode )

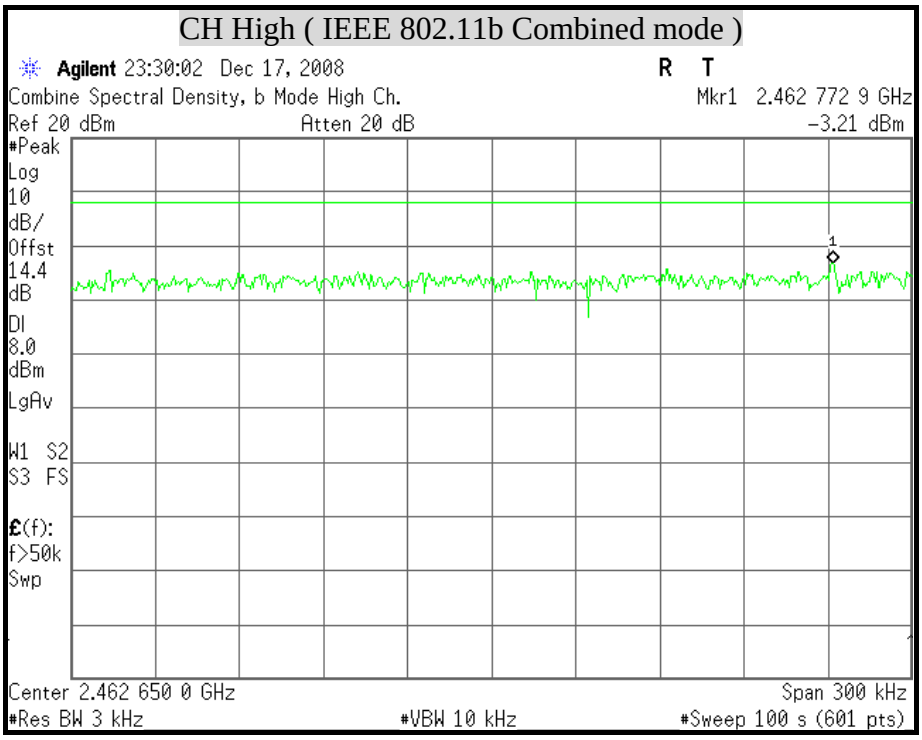
CH Low ( IEEE 802.11b Combined mode )




CH Middle ( IEEE 802.11b Combined mode )

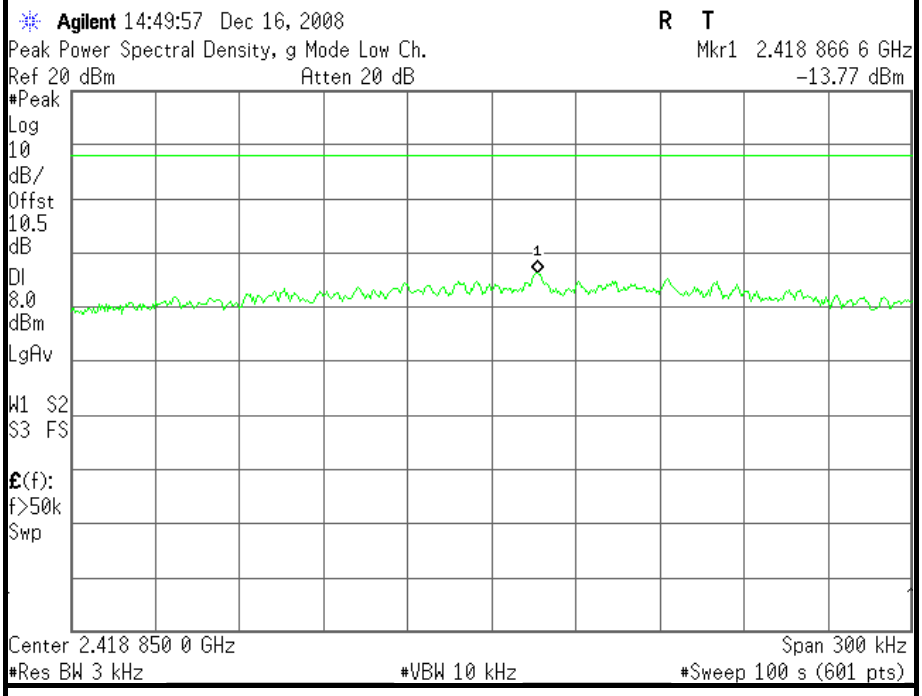


CH High ( IEEE 802.11b Combined mode )

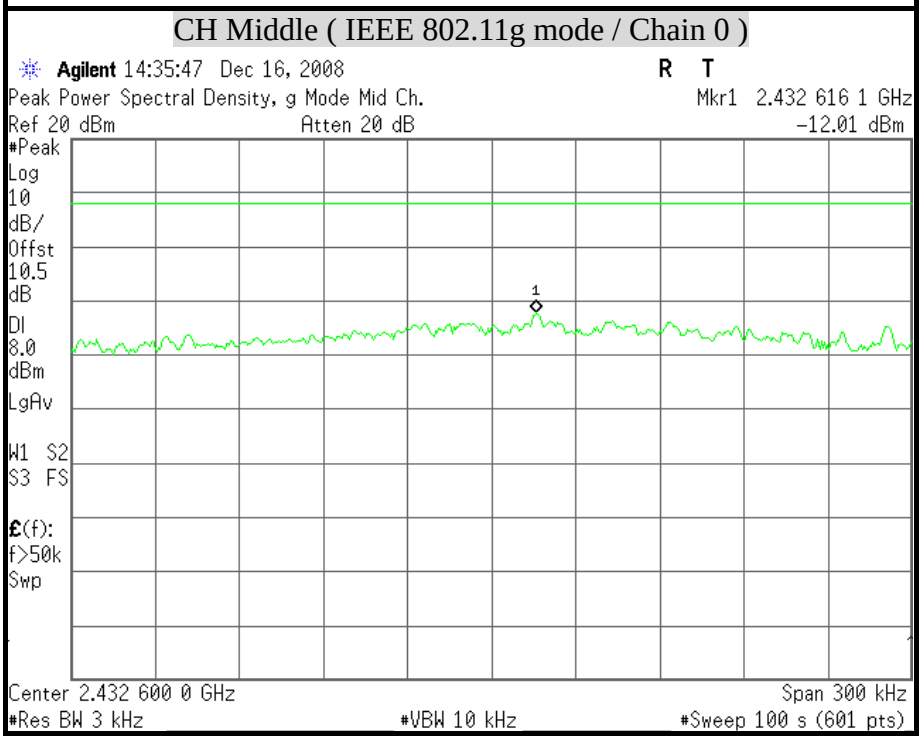


## POWER SPECTRAL DENSITY ( IEEE 802.11g mode)

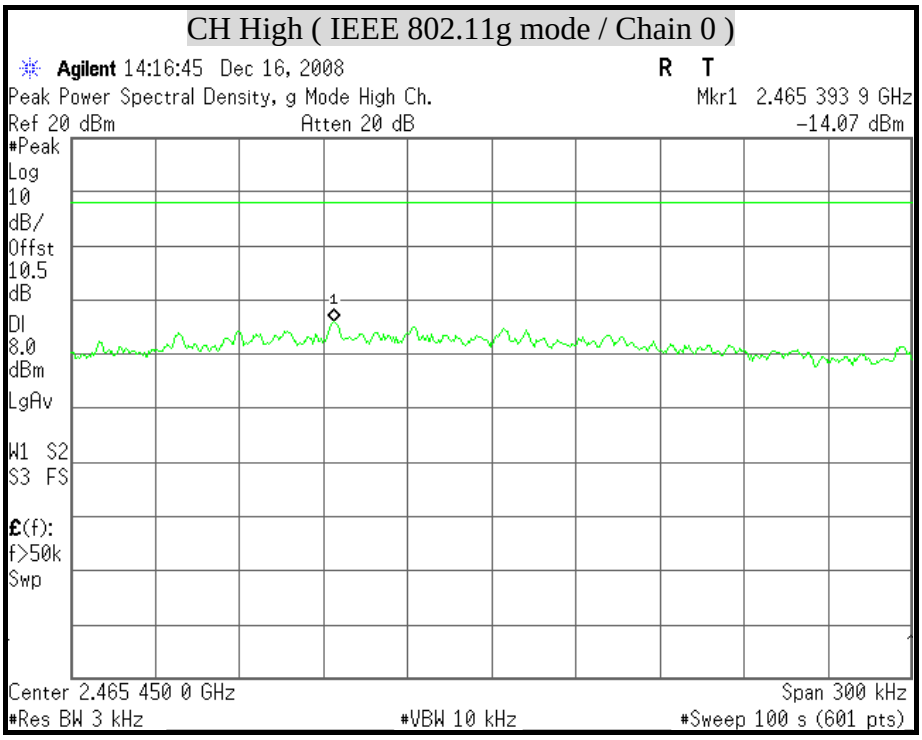
CH Low ( IEEE 802.11g mode / Chain 0 )



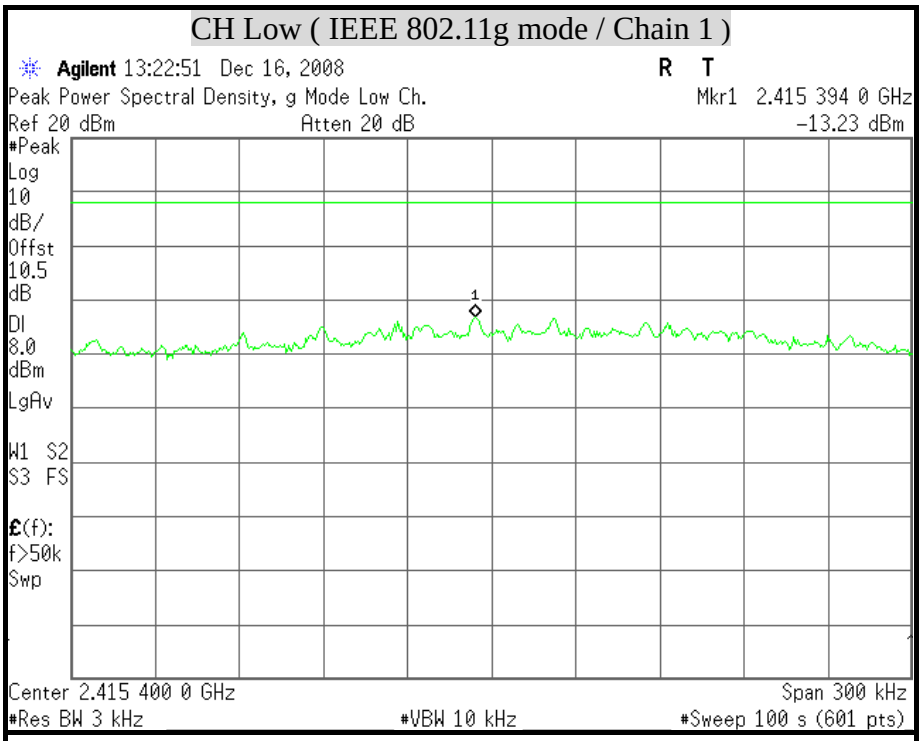

CH Middle ( IEEE 802.11g mode / Chain 0 )



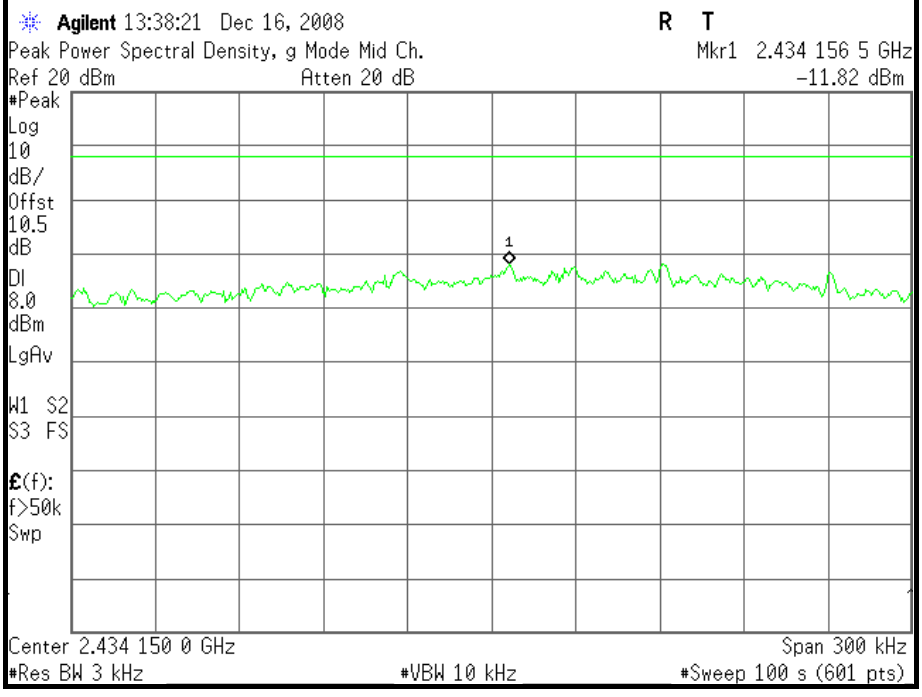
CH High ( IEEE 802.11g mode / Chain 0 )



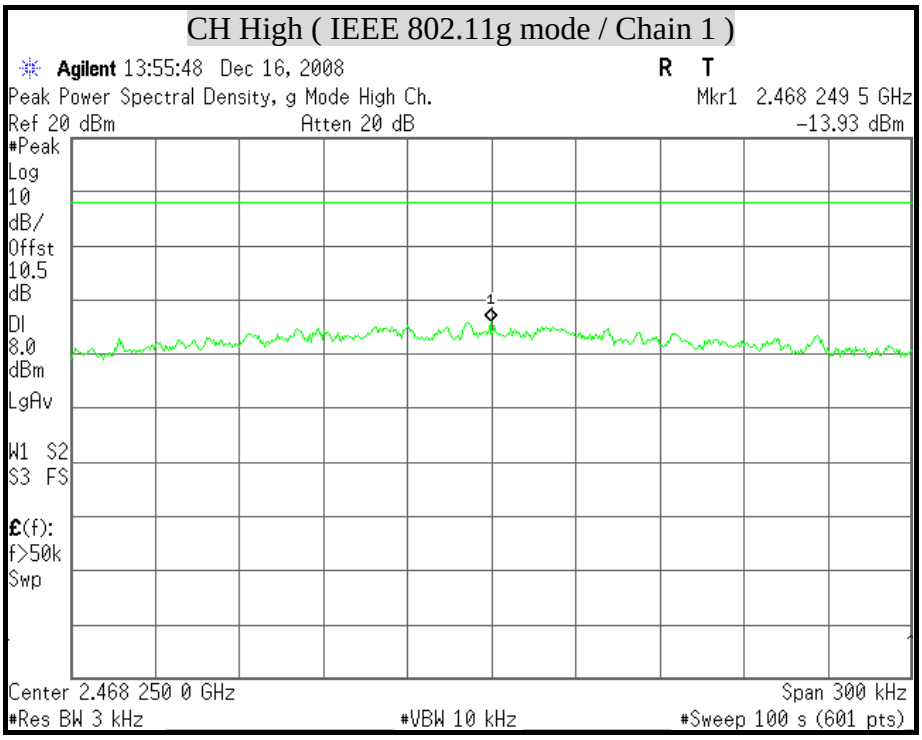
CH Low ( IEEE 802.11g mode / Chain 1 )




CH Middle ( IEEE 802.11g mode / Chain 1 )

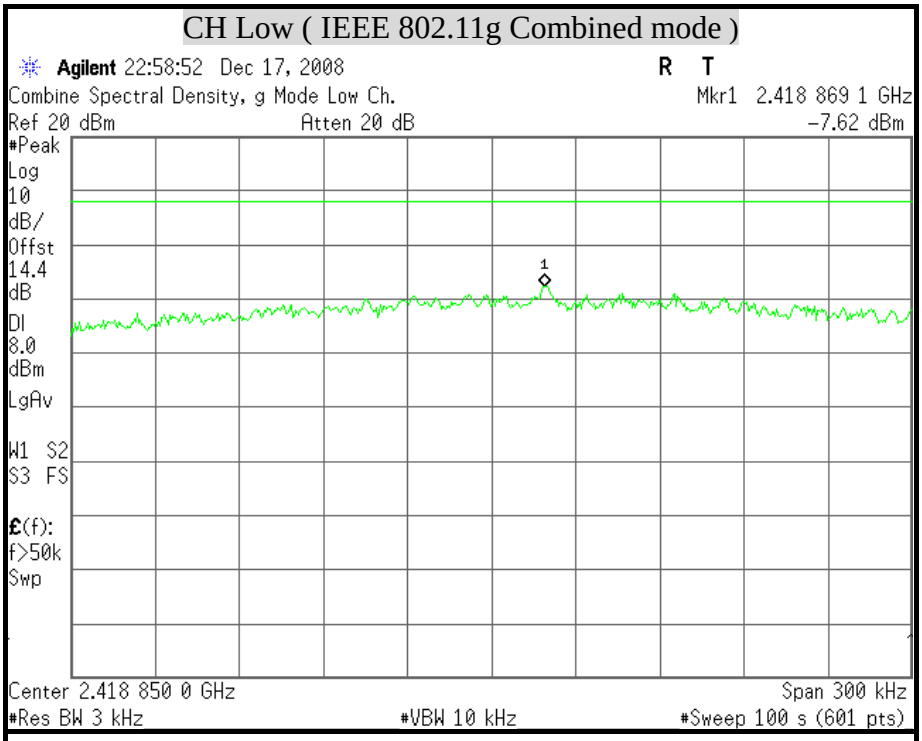


CH High ( IEEE 802.11g mode / Chain 1 )

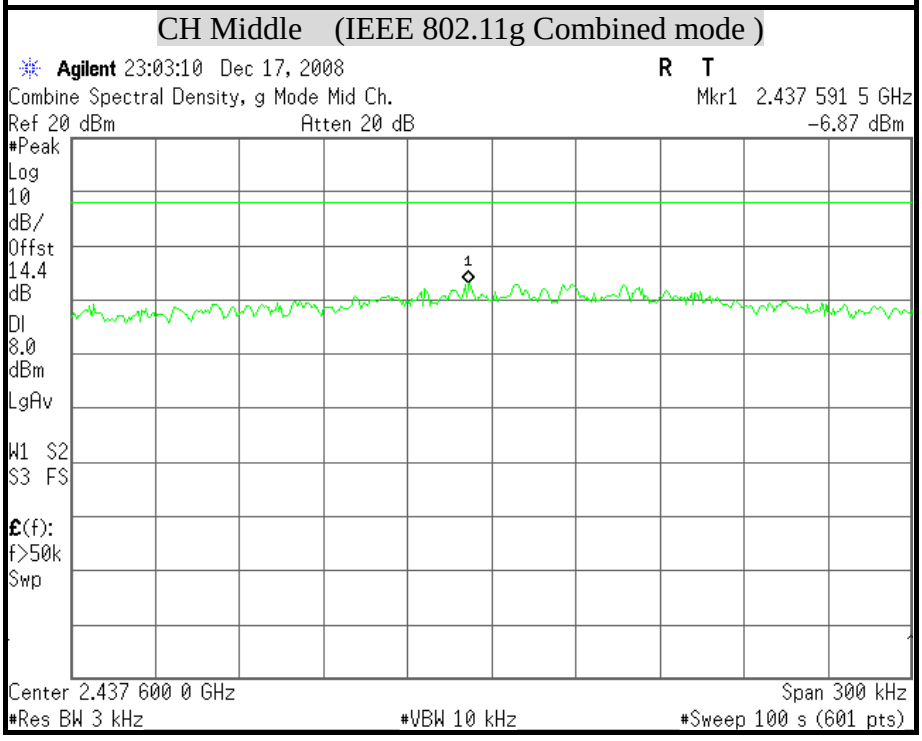


## POWER SPECTRAL DENSITY ( IEEE 802.11g Combined mode )

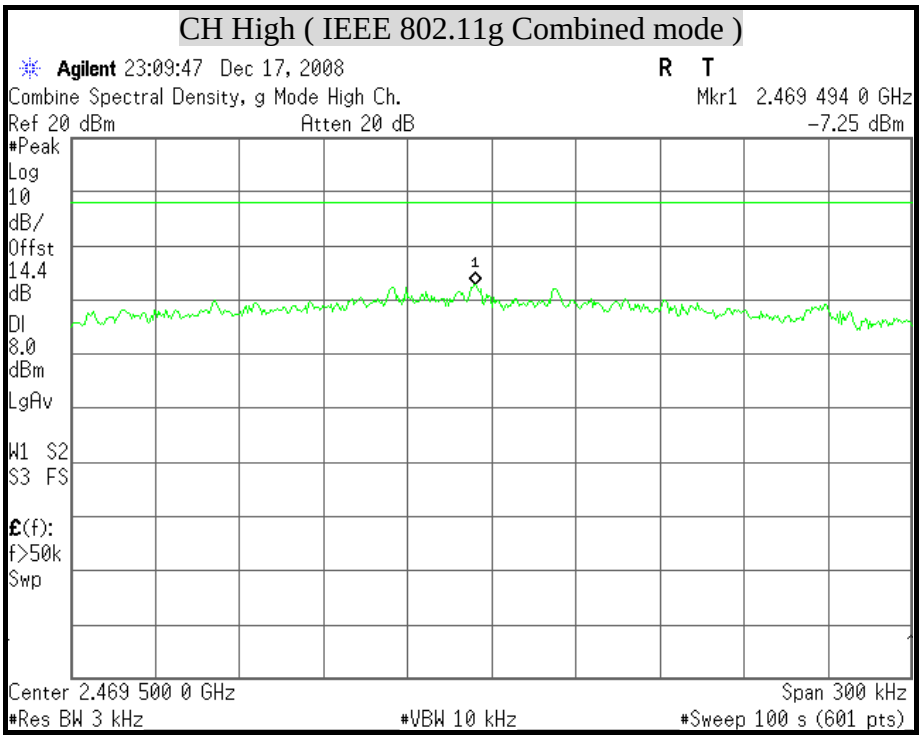
CH Low ( IEEE 802.11g Combined mode )




CH Middle (IEEE 802.11g Combined mode )

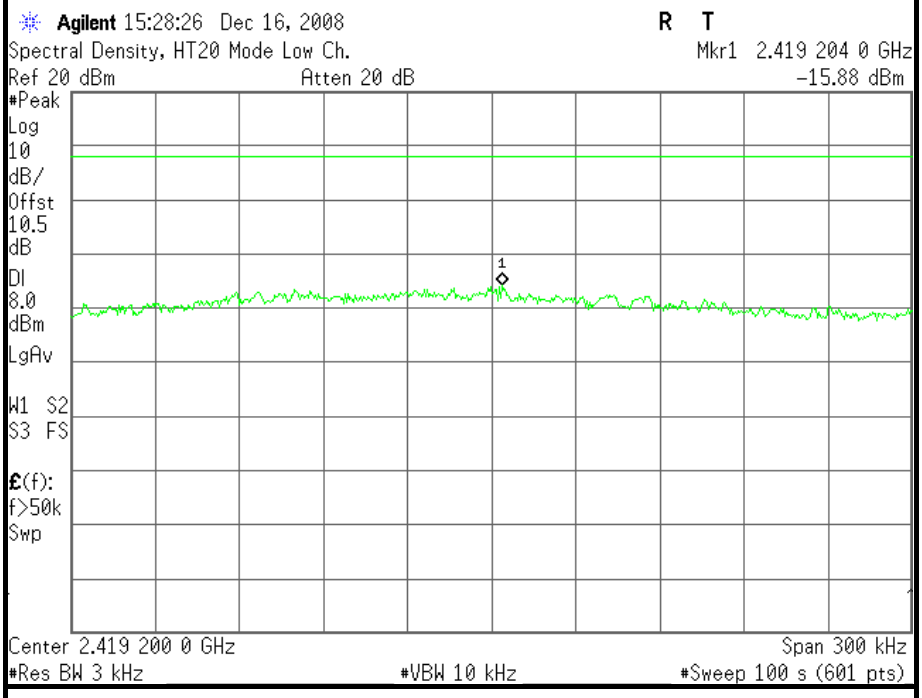


CH High ( IEEE 802.11g Combined mode )

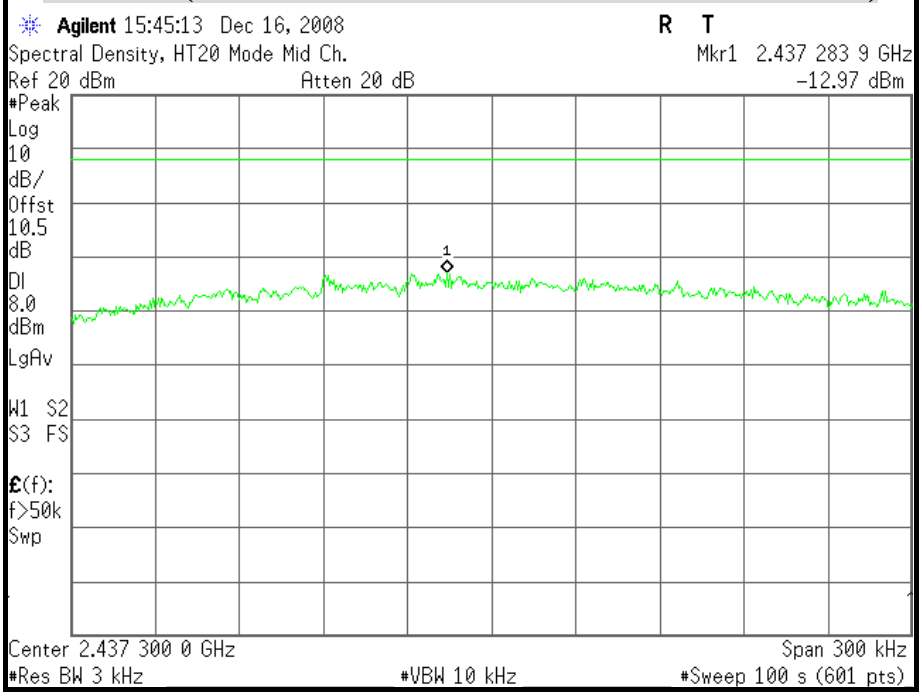


## POWER SPECTRAL DENSITY ( draft 802.11n Standard-20 MHz Channel mode )

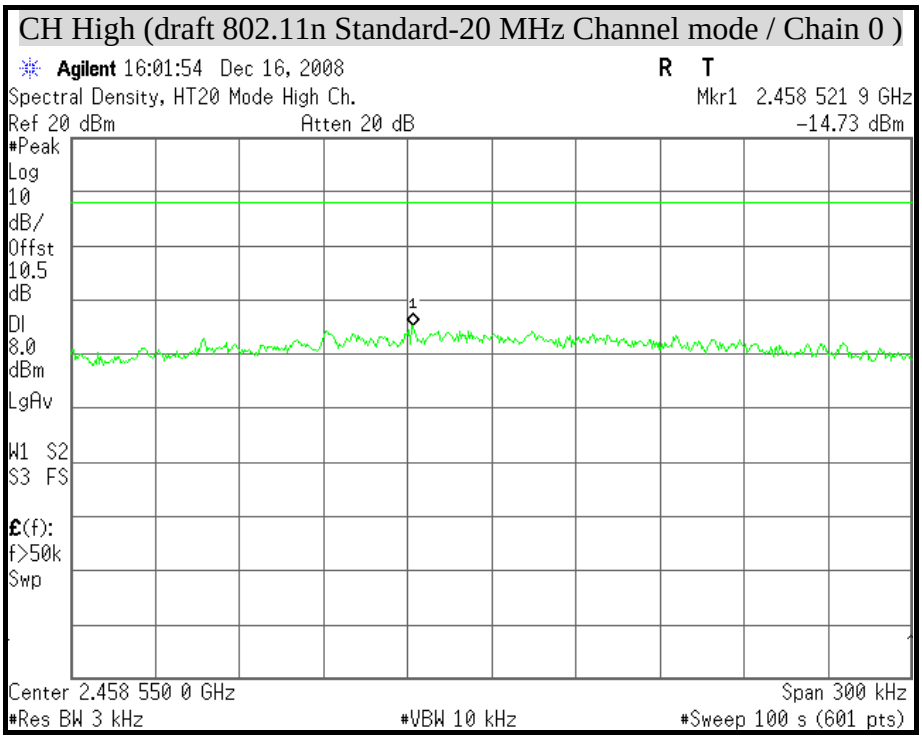
CH Low ( draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



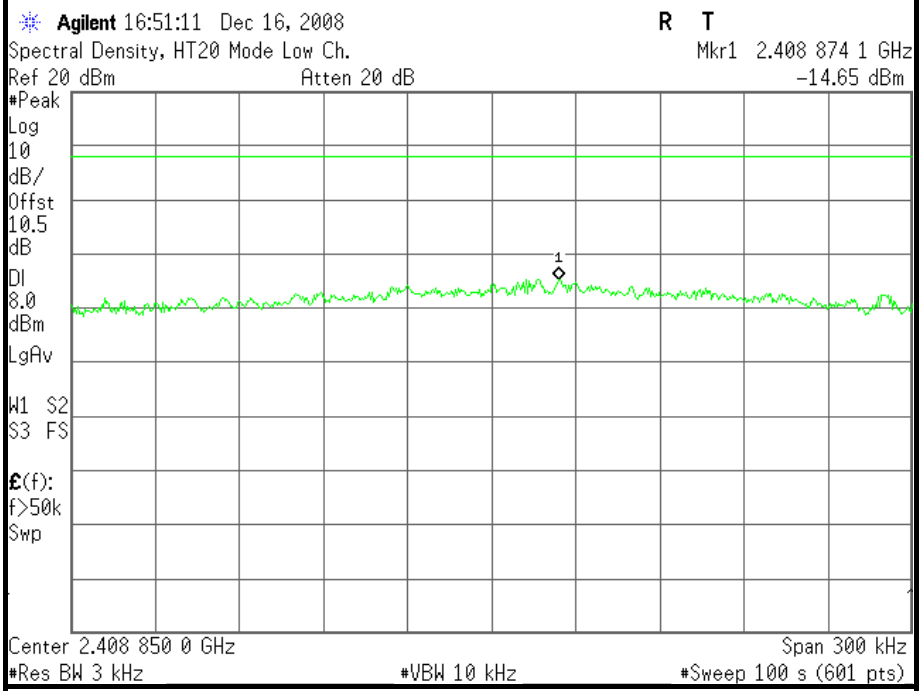

CH Middle (draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



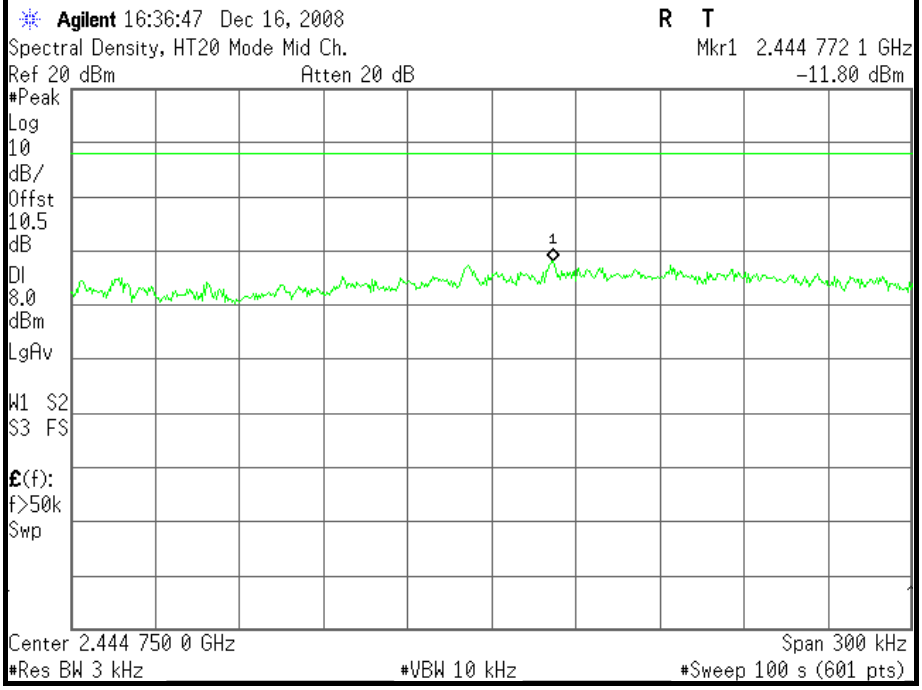
CH High (draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



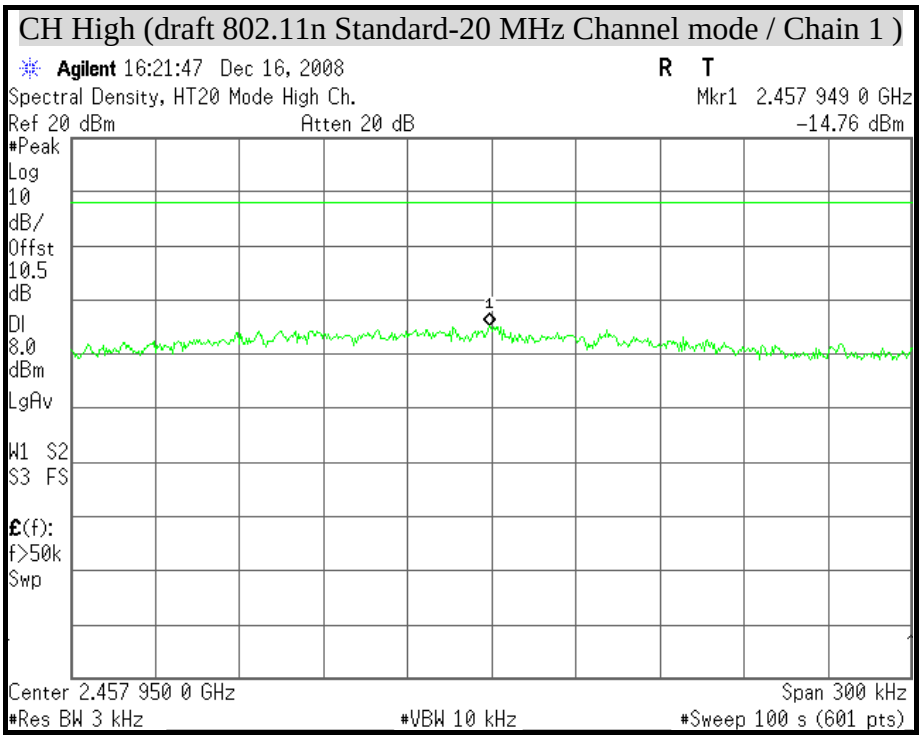
CH Low (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )




CH Middle (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )

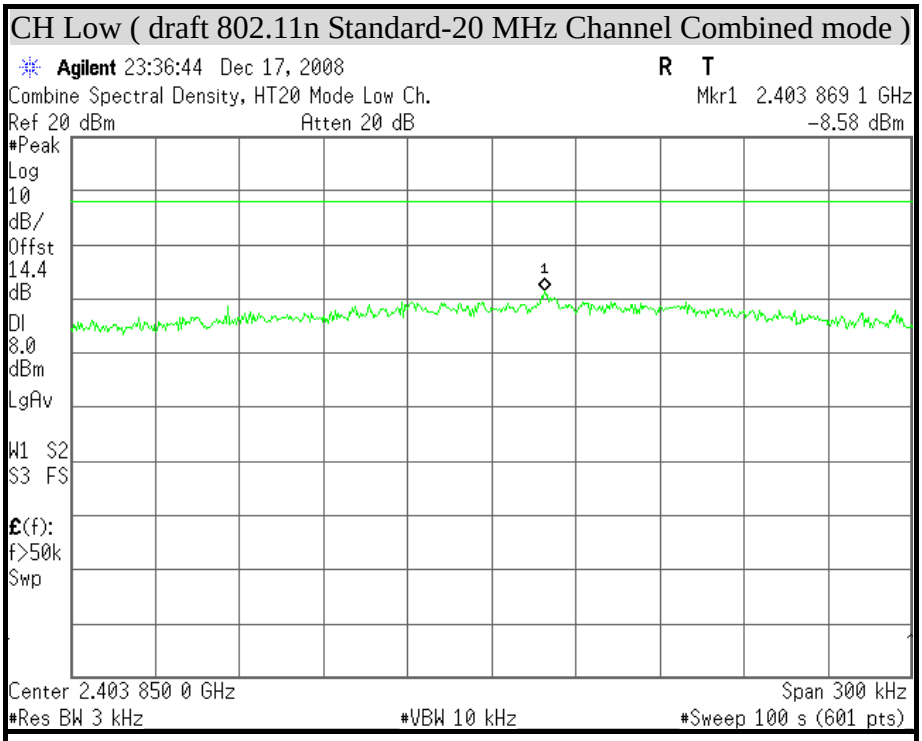


CH High (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )

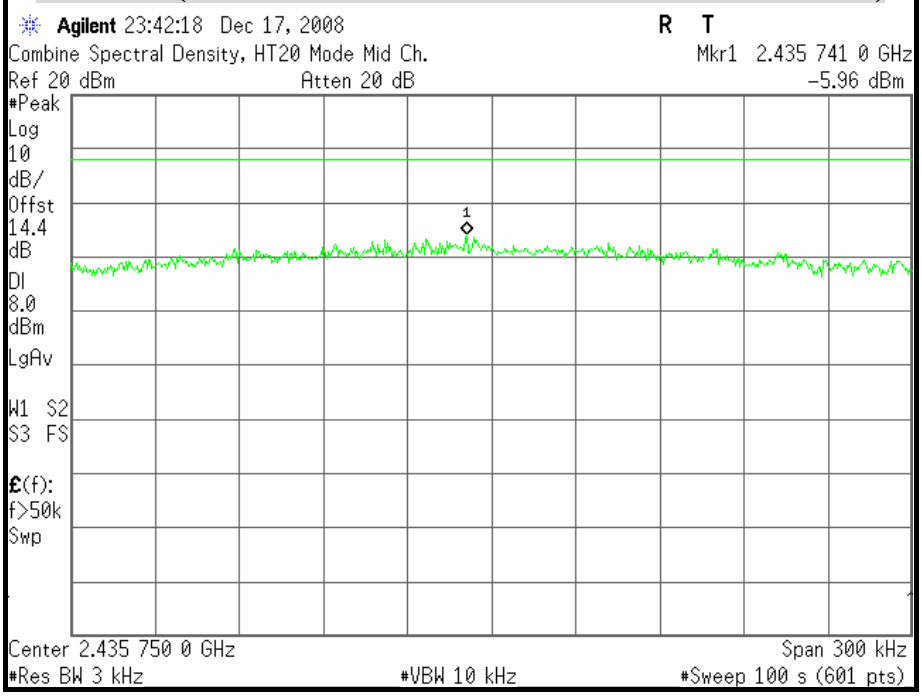


**POWER SPECTRAL DENSITY ( draft 802.11n Standard-20 MHz Channel Combined mode )**

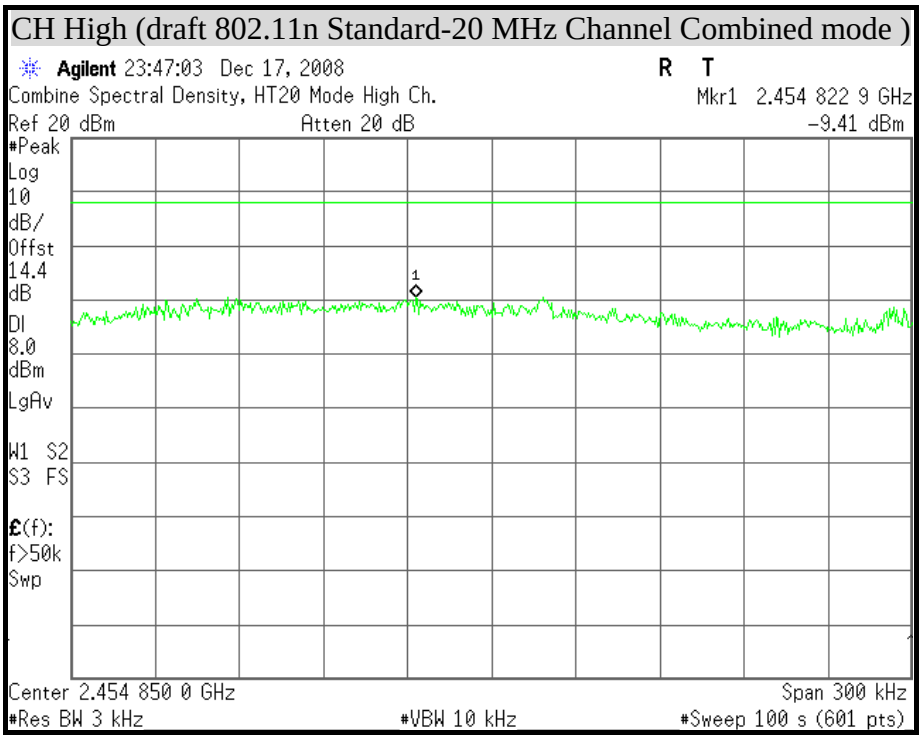
CH Low ( draft 802.11n Standard-20 MHz Channel Combined mode )




CH Middle (draft 802.11n Standard-20 MHz Channel Combined mode )

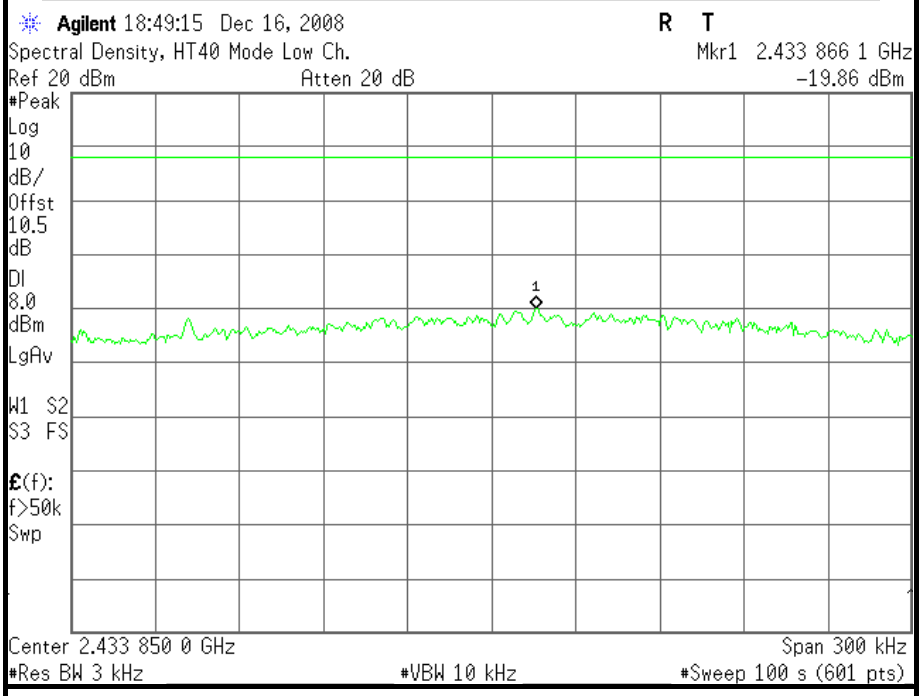


CH High (draft 802.11n Standard-20 MHz Channel Combined mode )

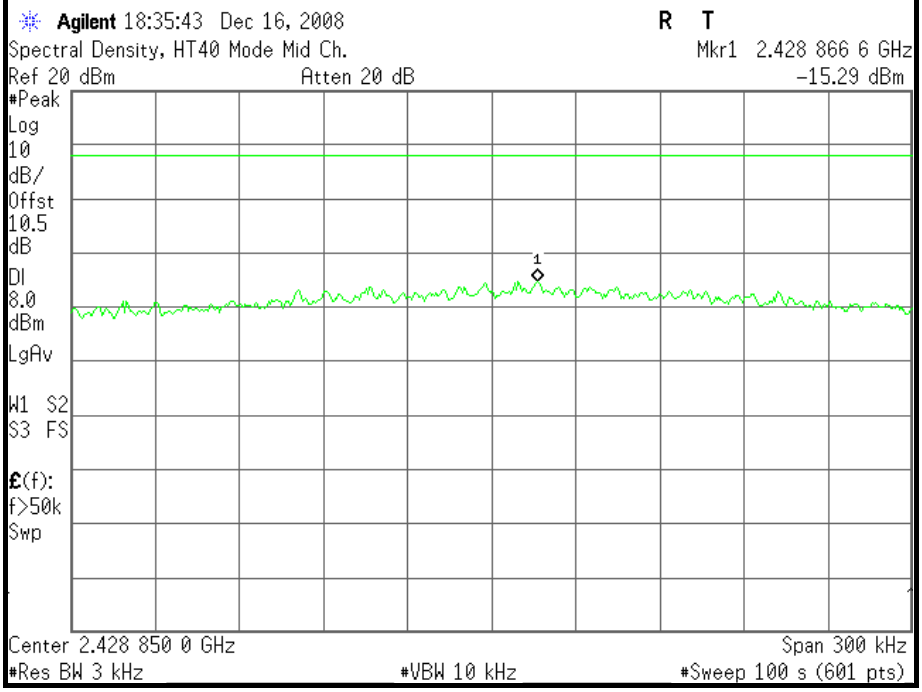


## POWER SPECTRAL DENSITY ( draft 802.11n Wide-40 MHz Channel mode )

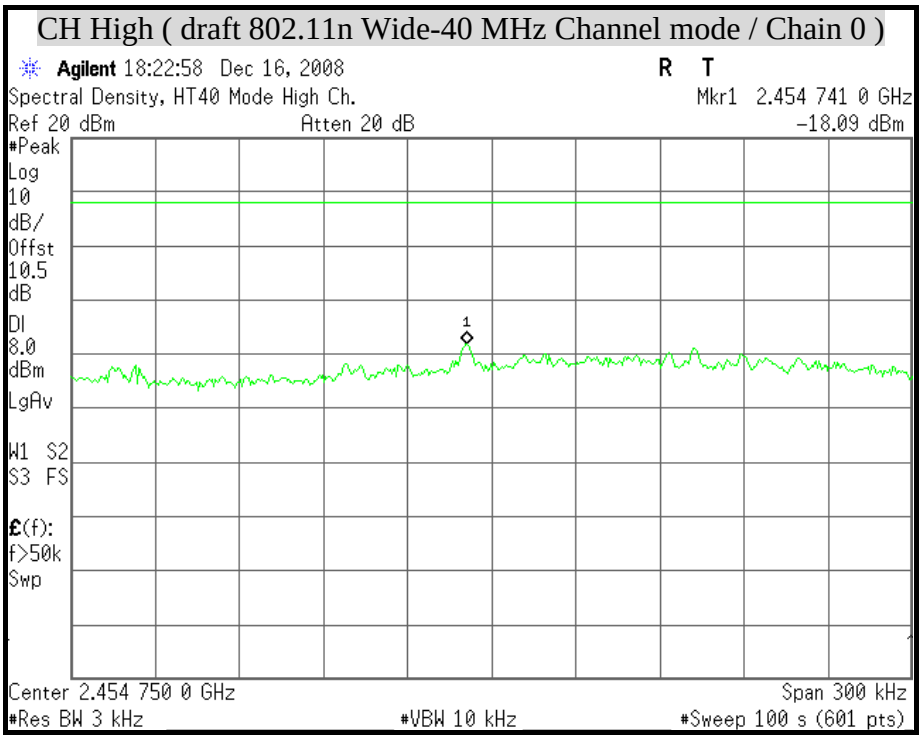
CH Low ( draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



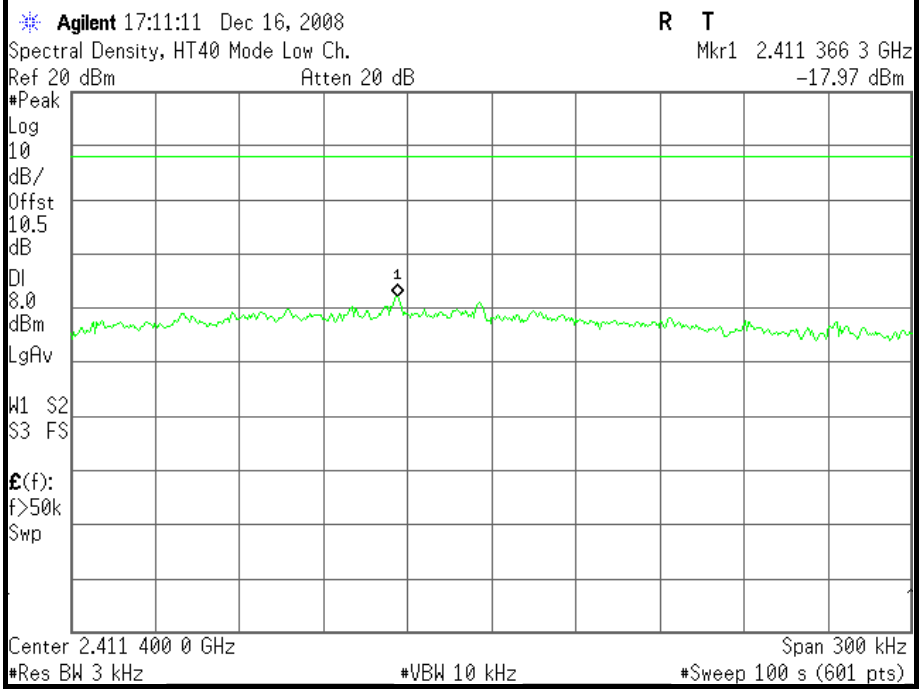

CH Middle ( draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



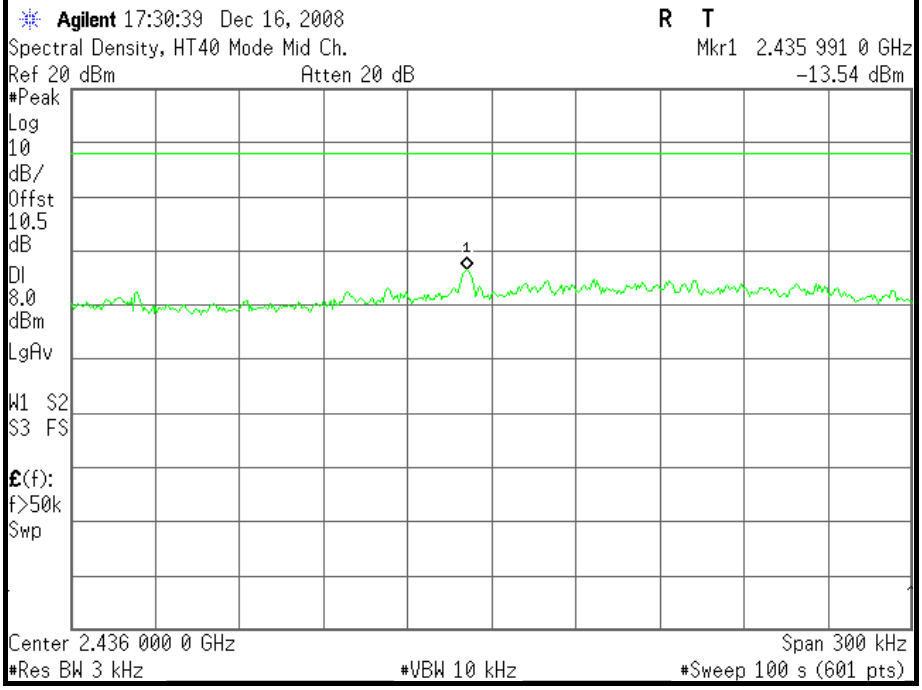
CH High ( draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



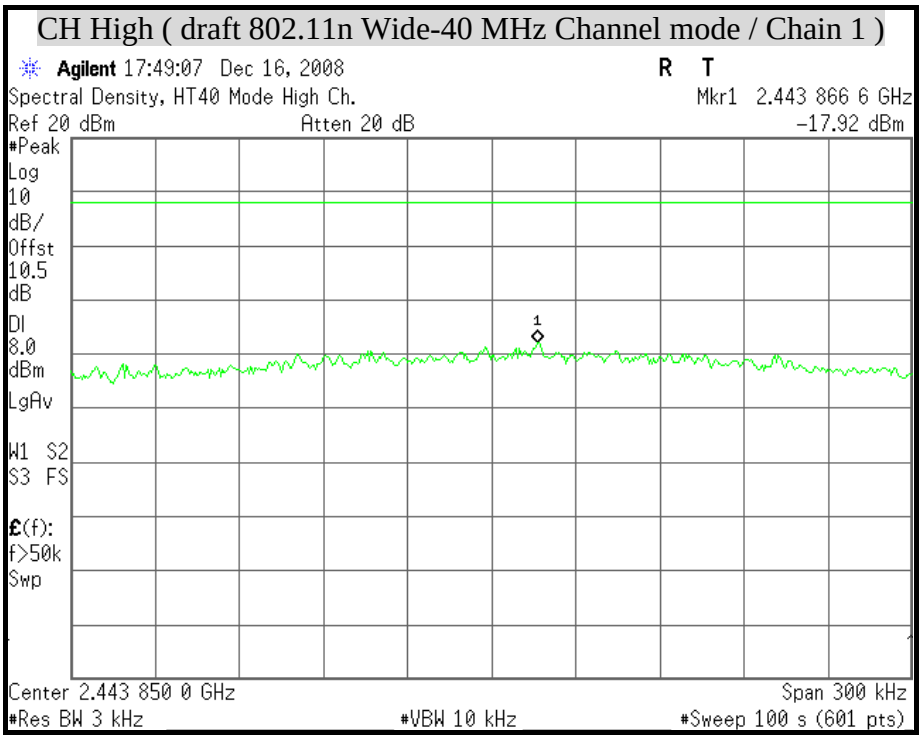
CH Low ( draft 802.11n Wide-40 MHz Channel mode / Chain 1 )




CH Middle ( draft 802.11n Wide-40 MHz Channel mode / Chain 1 )

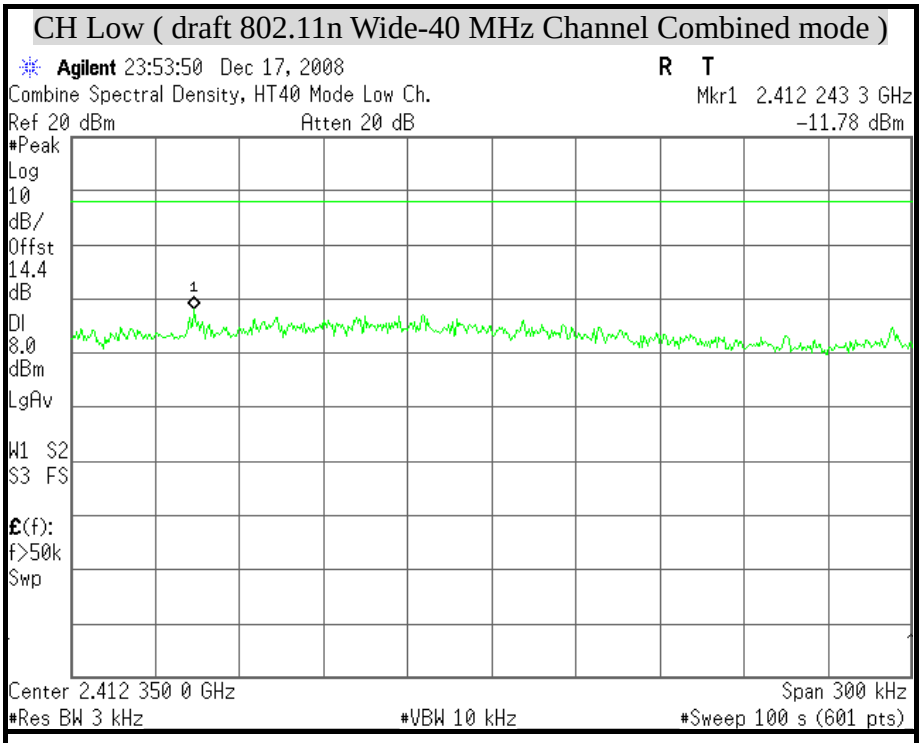


CH High ( draft 802.11n Wide-40 MHz Channel mode / Chain 1 )

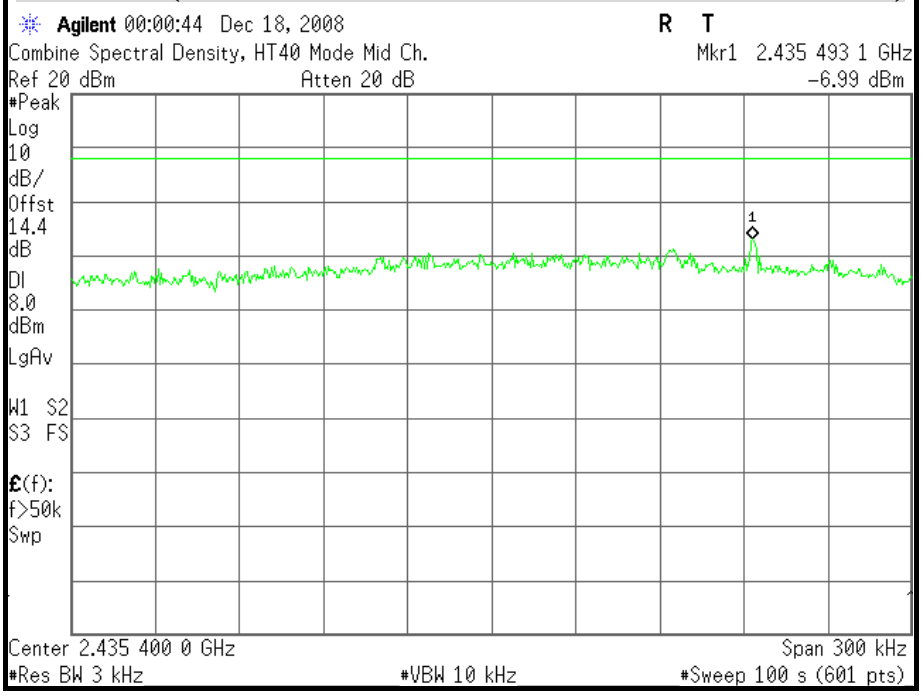


## POWER SPECTRAL DENSITY ( draft 802.11n Wide-40 MHz Channel Combined mode )

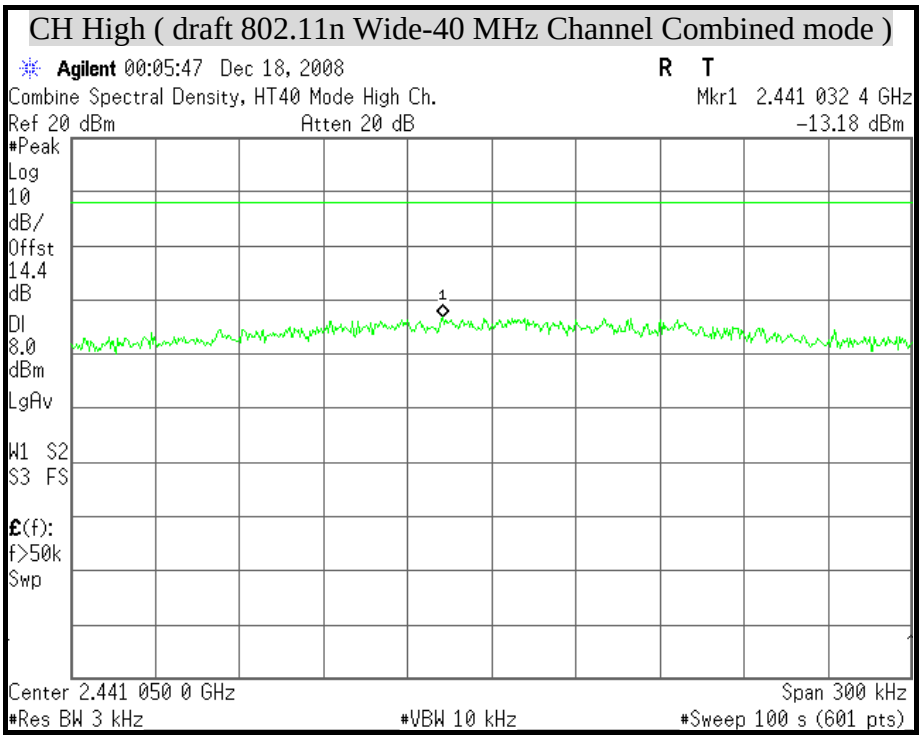
CH Low ( draft 802.11n Wide-40 MHz Channel Combined mode )




CH Middle ( draft 802.11n Wide-40 MHz Channel Combined mode )



CH High ( draft 802.11n Wide-40 MHz Channel Combined mode )



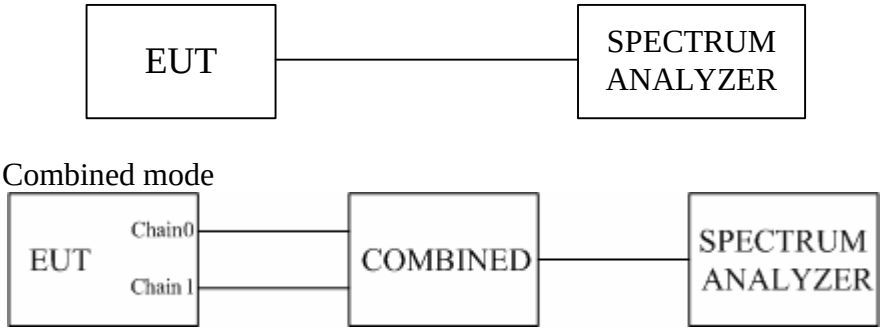
# 8.7 SPURIOUS EMISSIONS

## 8.7.1 Conducted Measurement

**LIMIT**

According to §15.247(d) & RSS-210 §A8.5, in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in 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, provided the transmitter demonstrates compliance with the peak conducted power limits. 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 Section 15.205(c)).

**TEST SETUP**




**TEST PROCEDURE**

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

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

Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

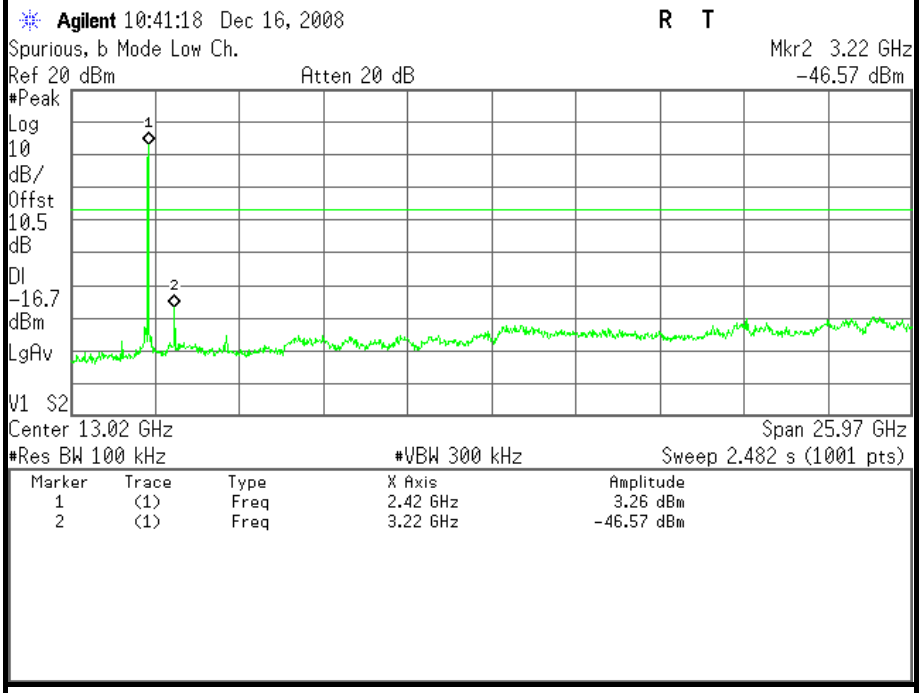
**TEST RESULTS**

*No non-compliance noted*

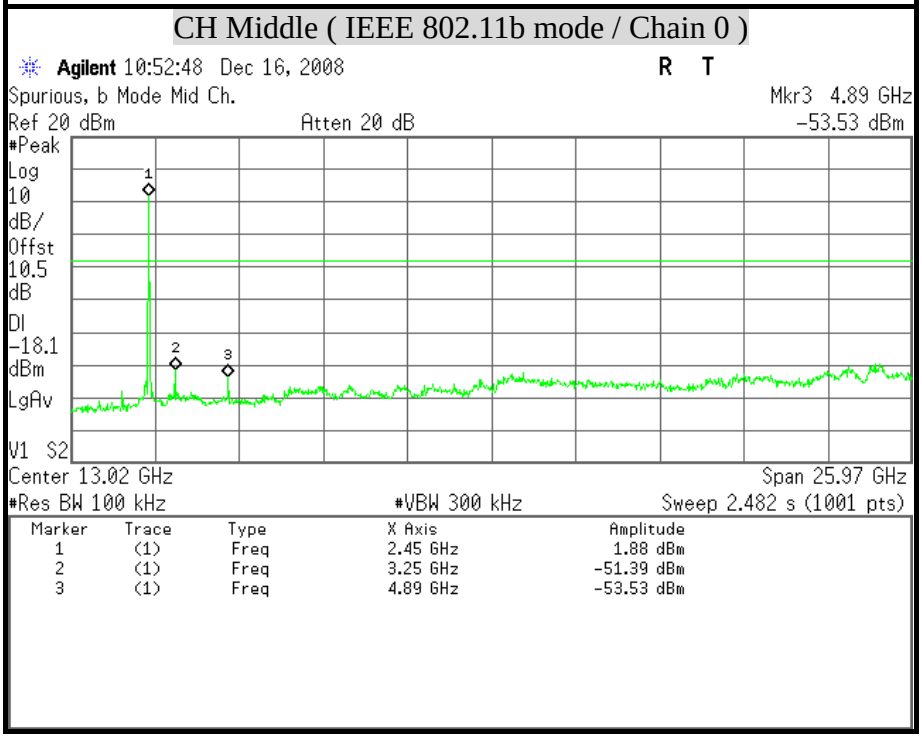
## TEST PLOT

### SPURIOUS EMISSIONS ( IEEE 802.11b mode)

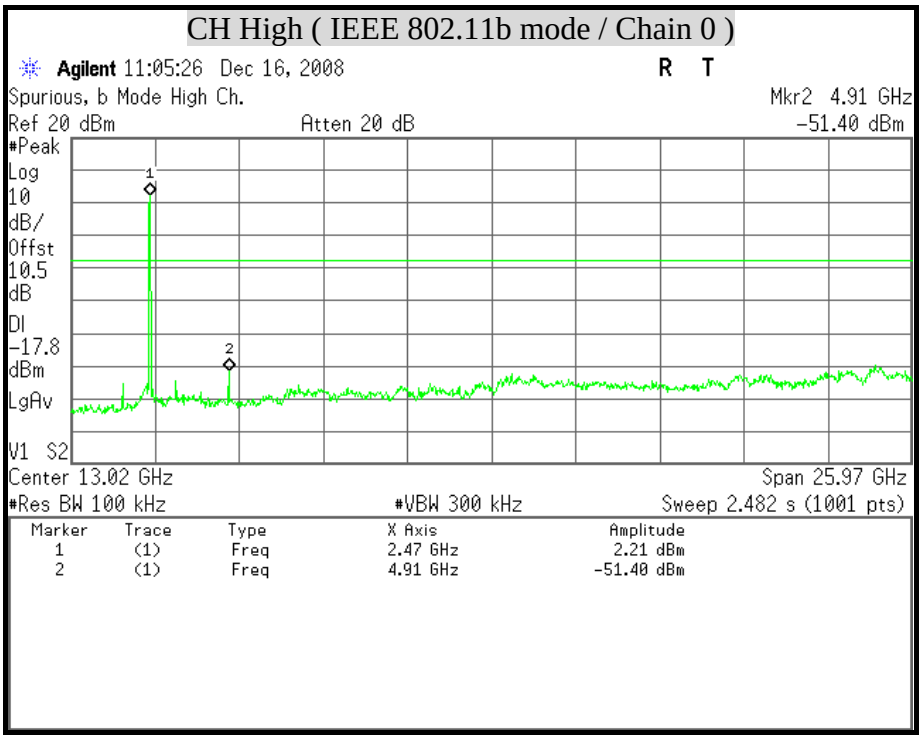
CH Low ( IEEE 802.11b mode / Chain 0 )



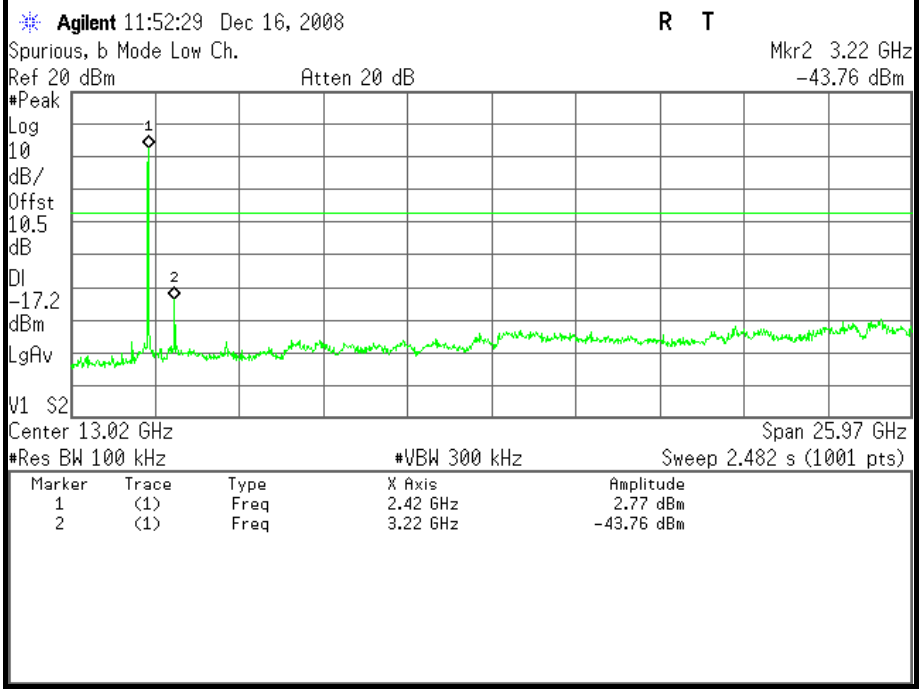

CH Middle ( IEEE 802.11b mode / Chain 0 )



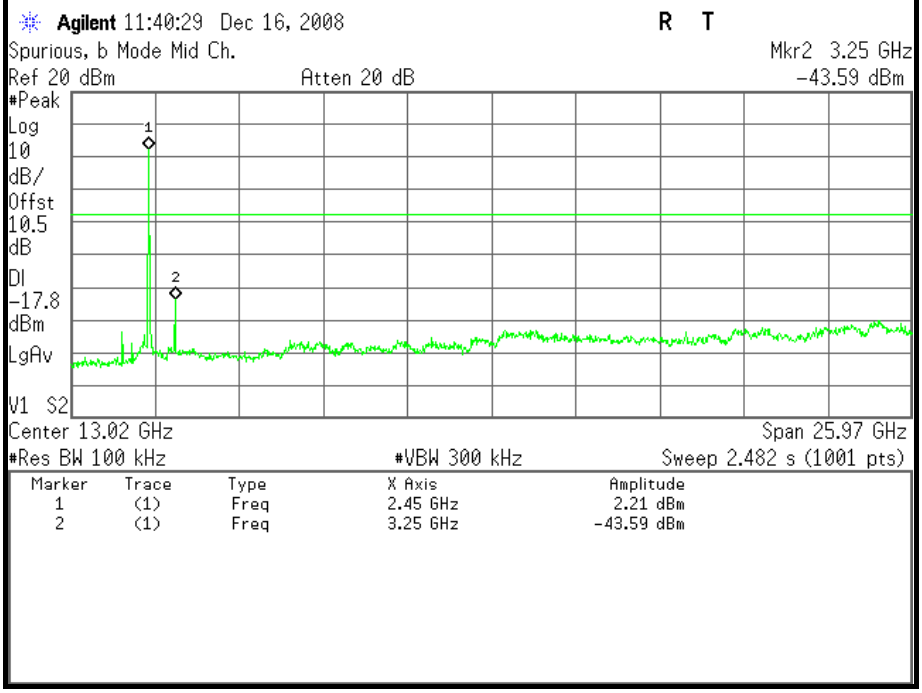
CH High ( IEEE 802.11b mode / Chain 0 )



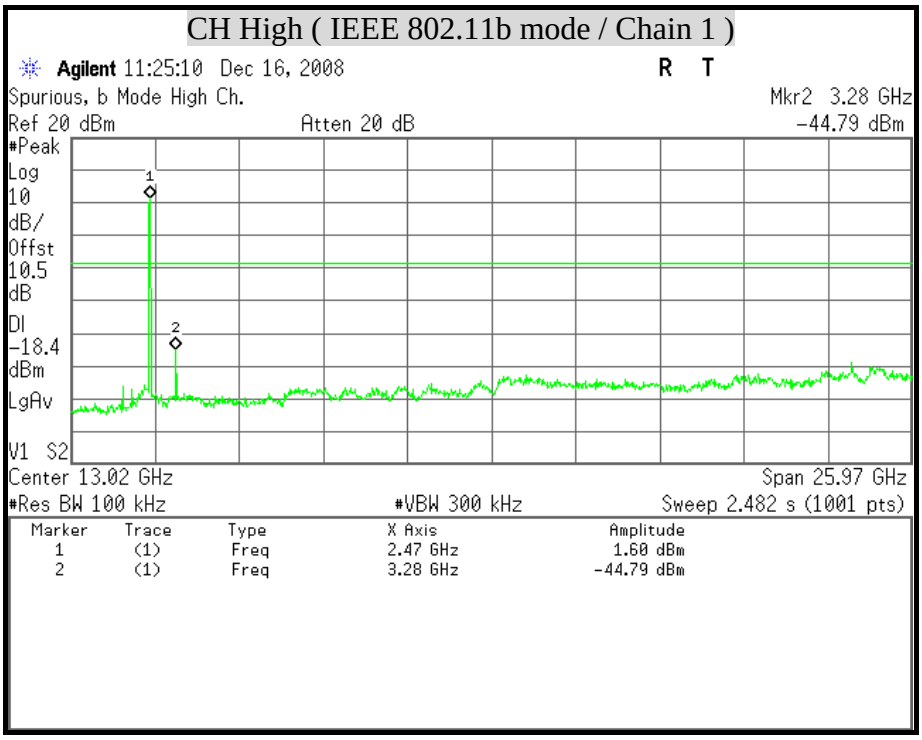
CH Low ( IEEE 802.11b mode / Chain 1 )




CH Middle ( IEEE 802.11b mode / Chain 1 )

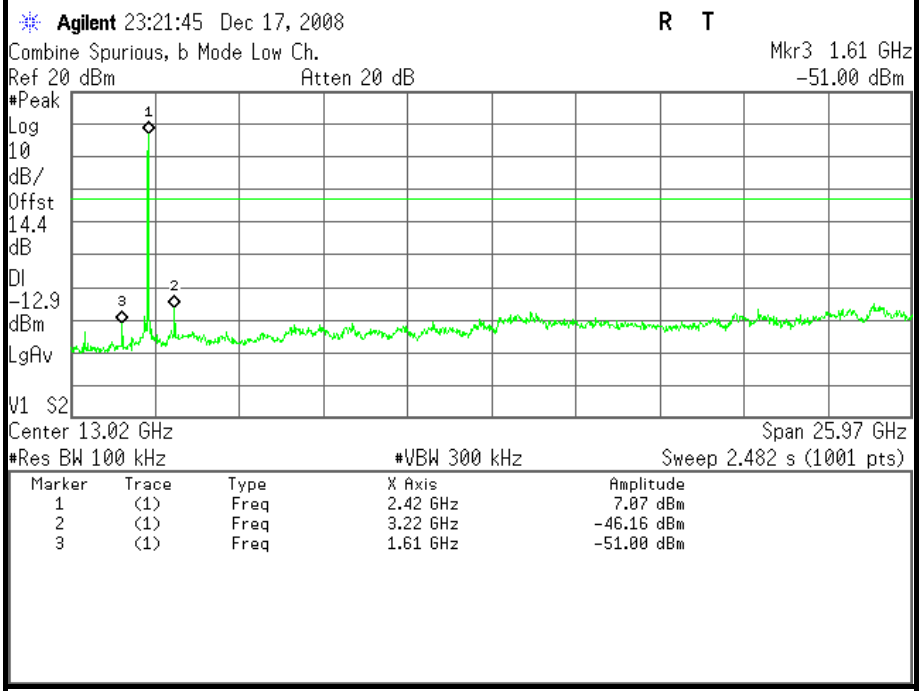


CH High ( IEEE 802.11b mode / Chain 1 )

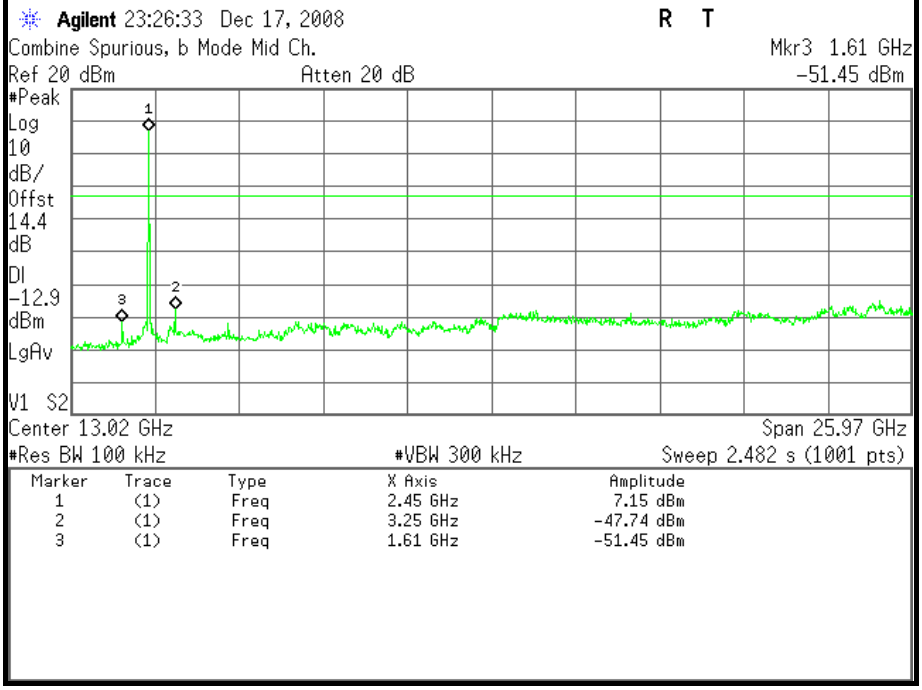


## POWER SPECTRAL DENSITY ( IEEE 802.11b Combined mode )

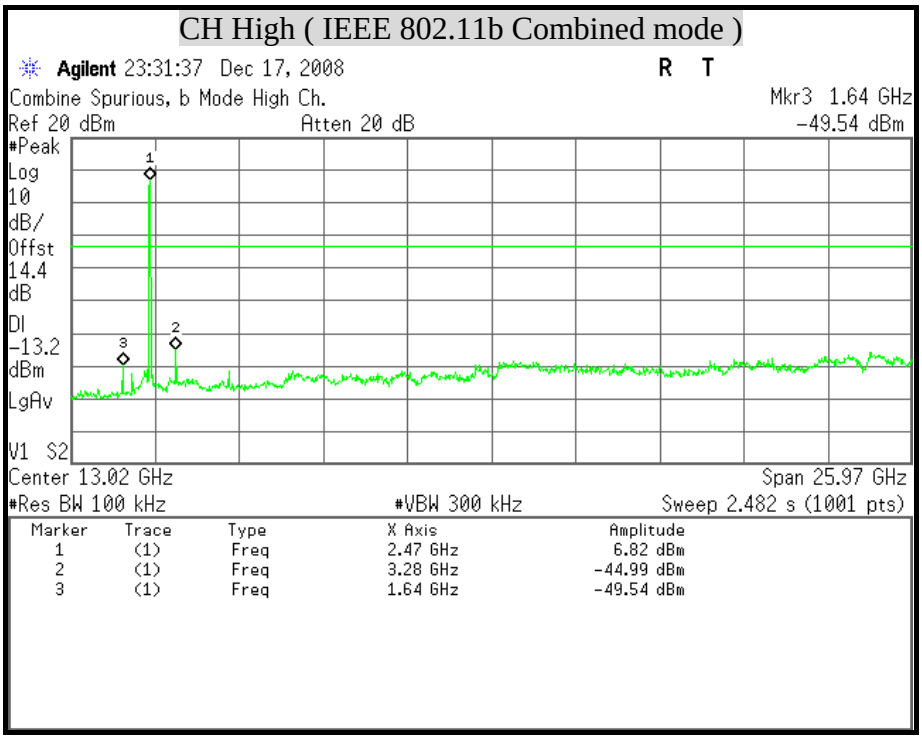
CH Low ( IEEE 802.11b Combined mode )




CH Middle ( IEEE 802.11b Combined mode )

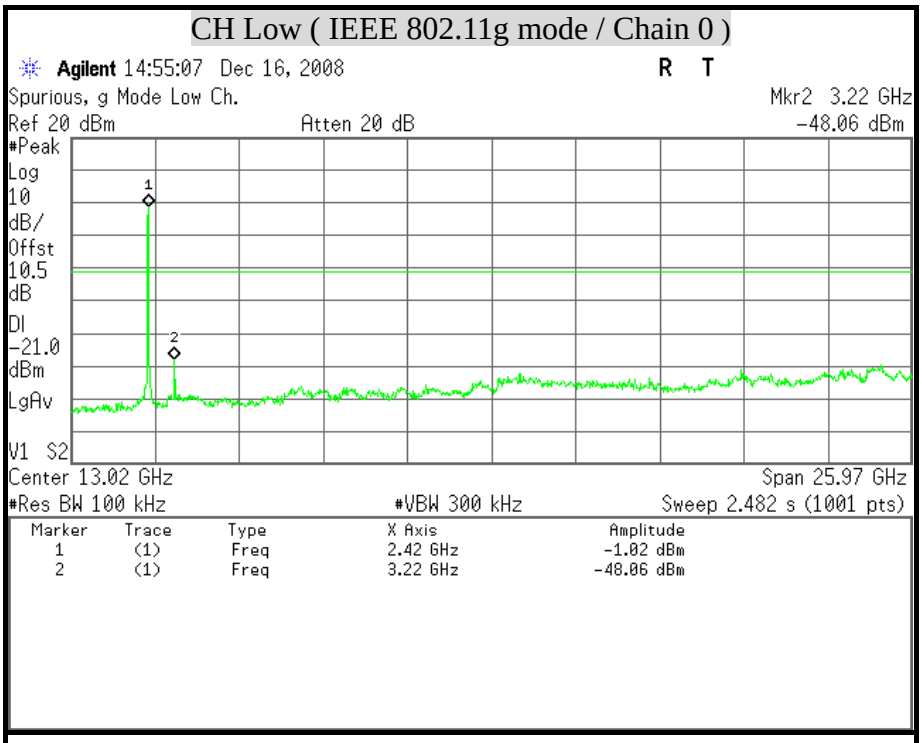


CH High ( IEEE 802.11b Combined mode )

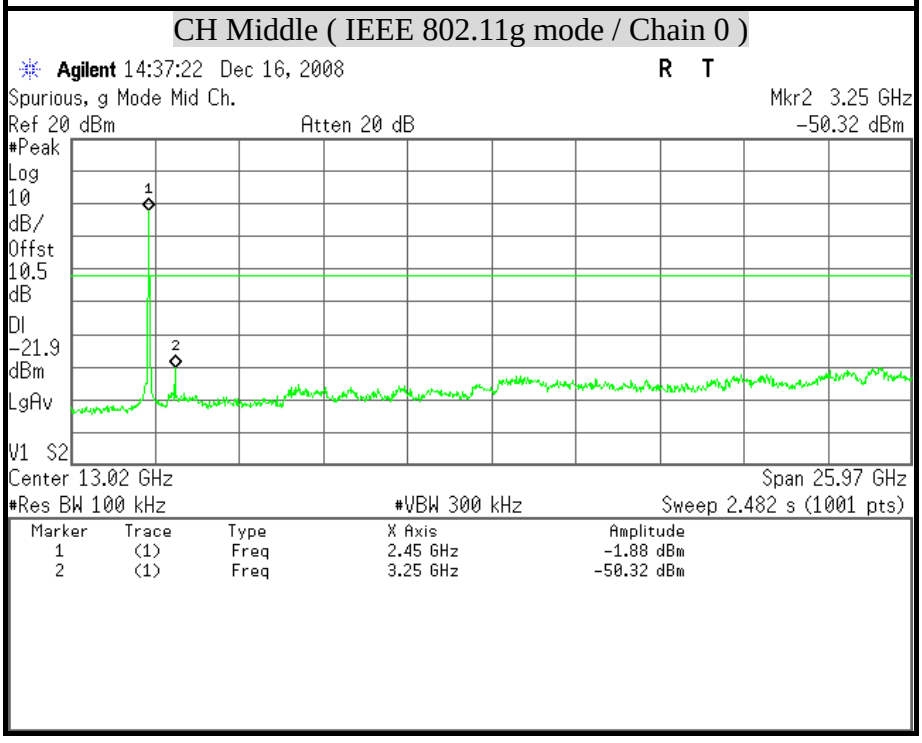


## POWER SPECTRAL DENSITY ( IEEE 802.11g mode)

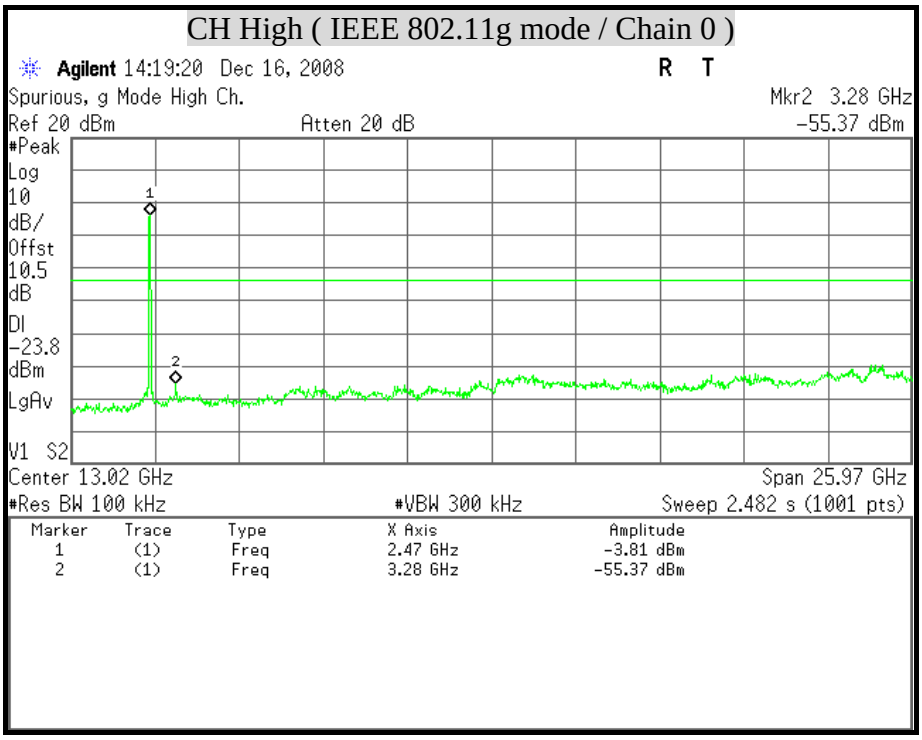
CH Low ( IEEE 802.11g mode / Chain 0 )



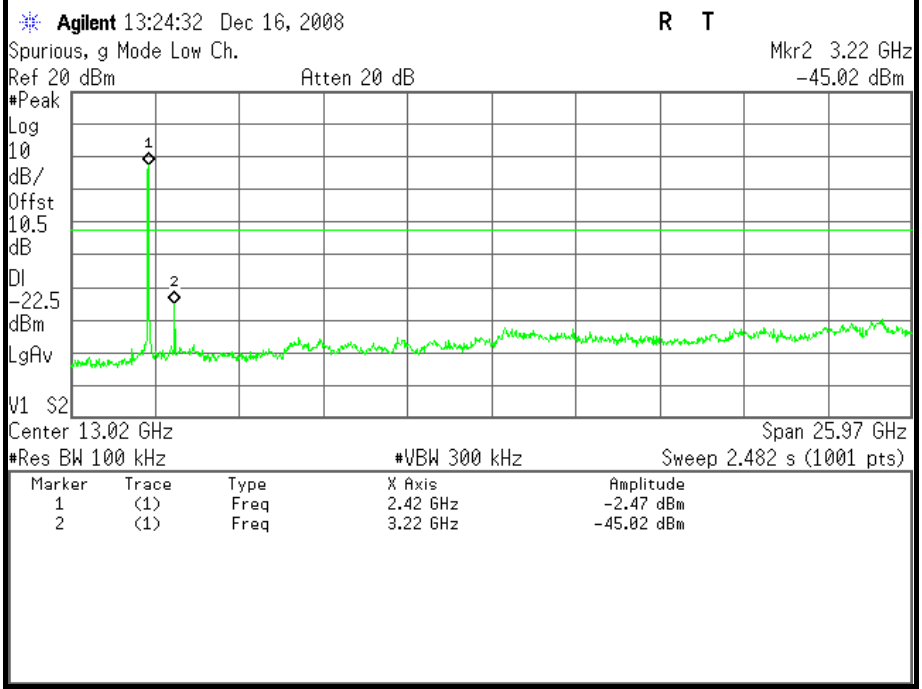

CH Middle ( IEEE 802.11g mode / Chain 0 )



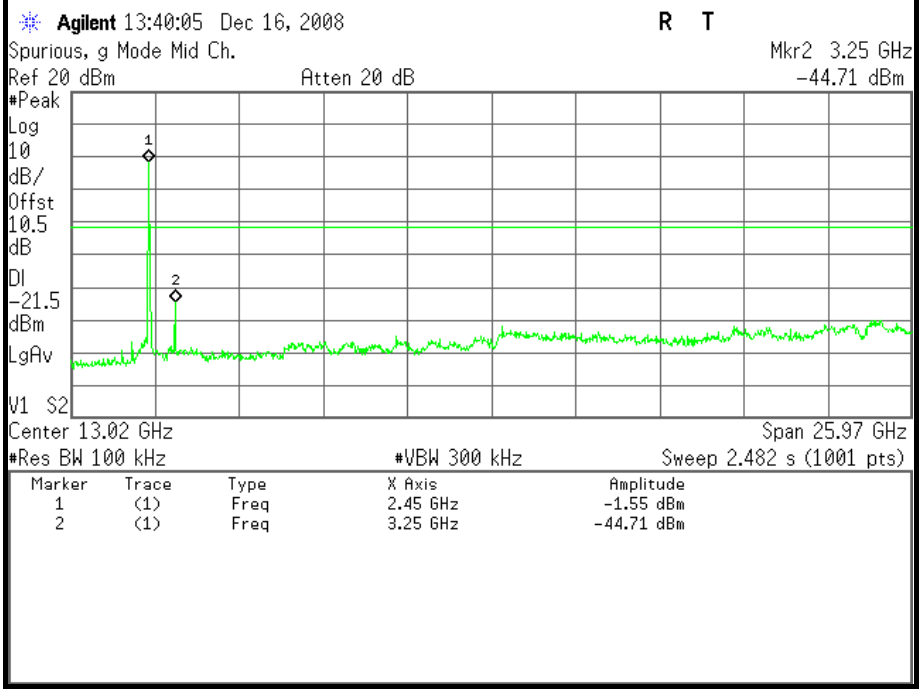
CH High ( IEEE 802.11g mode / Chain 0 )



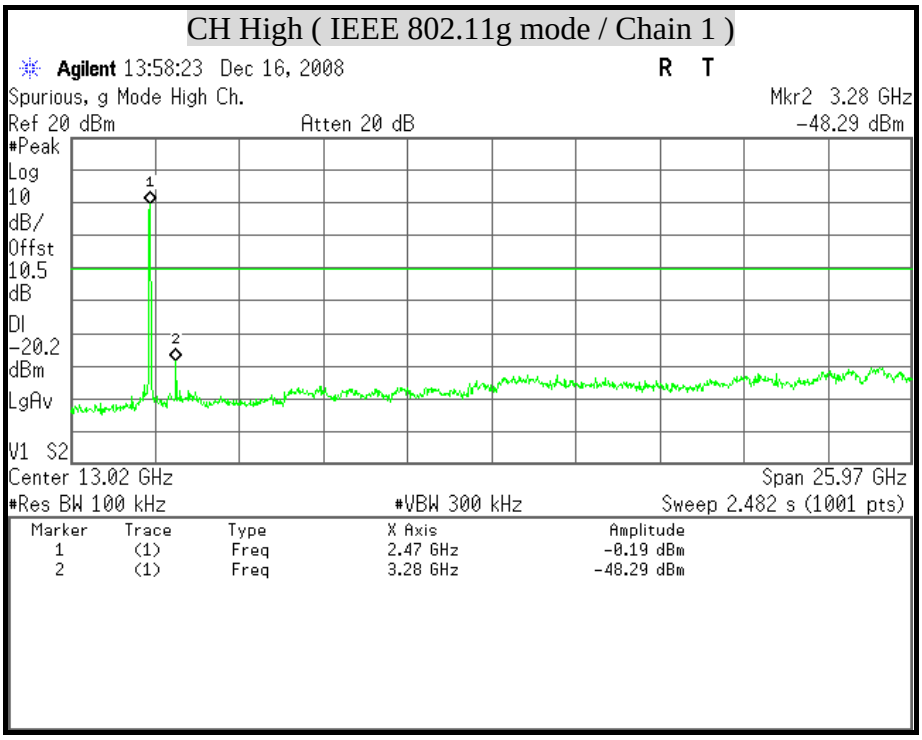
CH Low ( IEEE 802.11g mode / Chain 1 )




CH Middle ( IEEE 802.11g mode / Chain 1 )

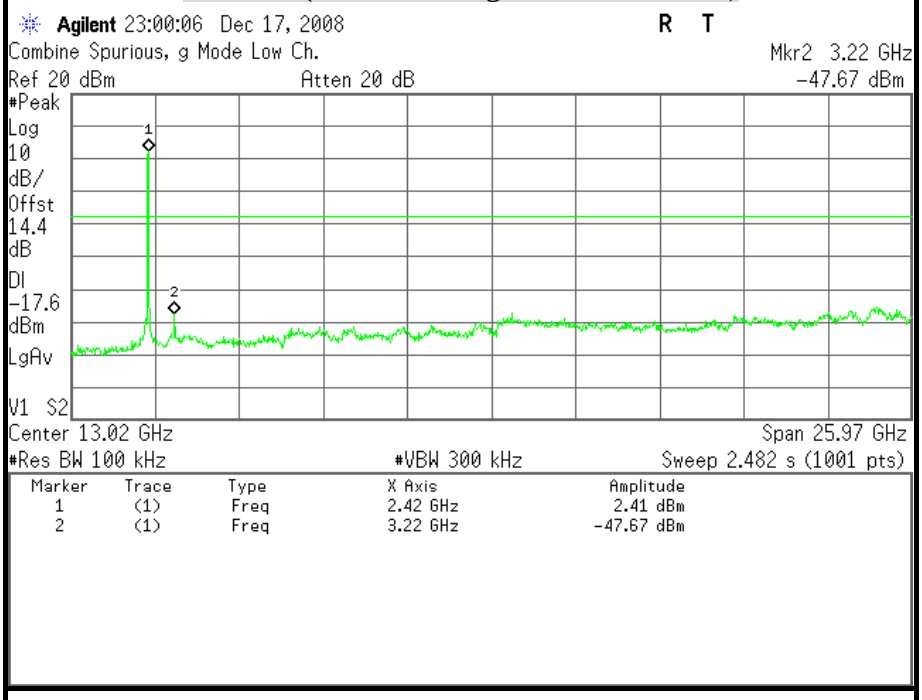


CH High ( IEEE 802.11g mode / Chain 1 )

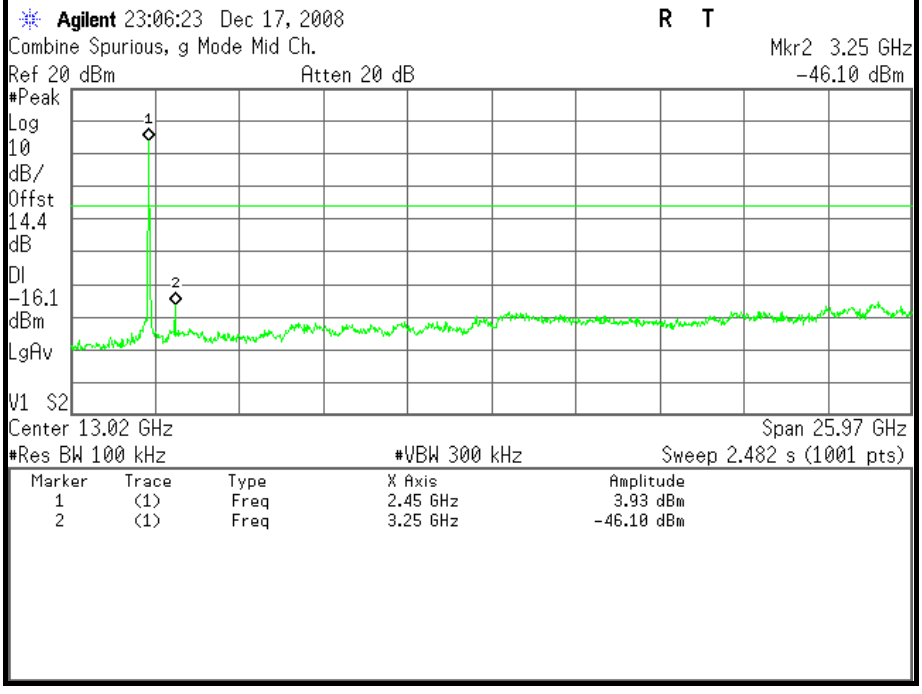


## POWER SPECTRAL DENSITY ( IEEE 802.11g Combined mode )

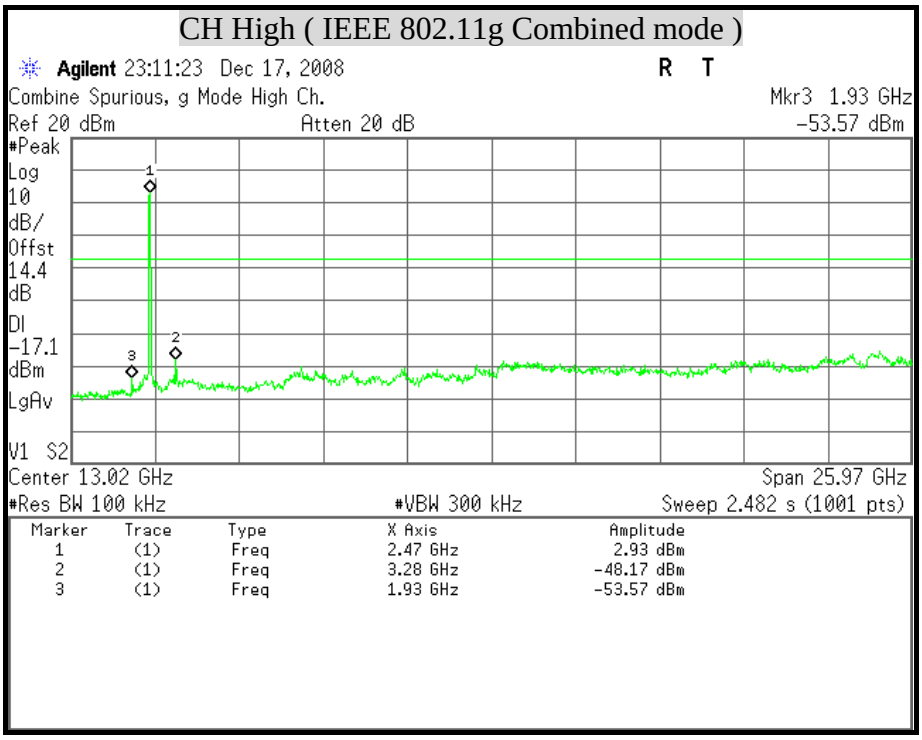
CH Low ( IEEE 802.11g Combined mode )




CH Middle (IEEE 802.11g Combined mode )

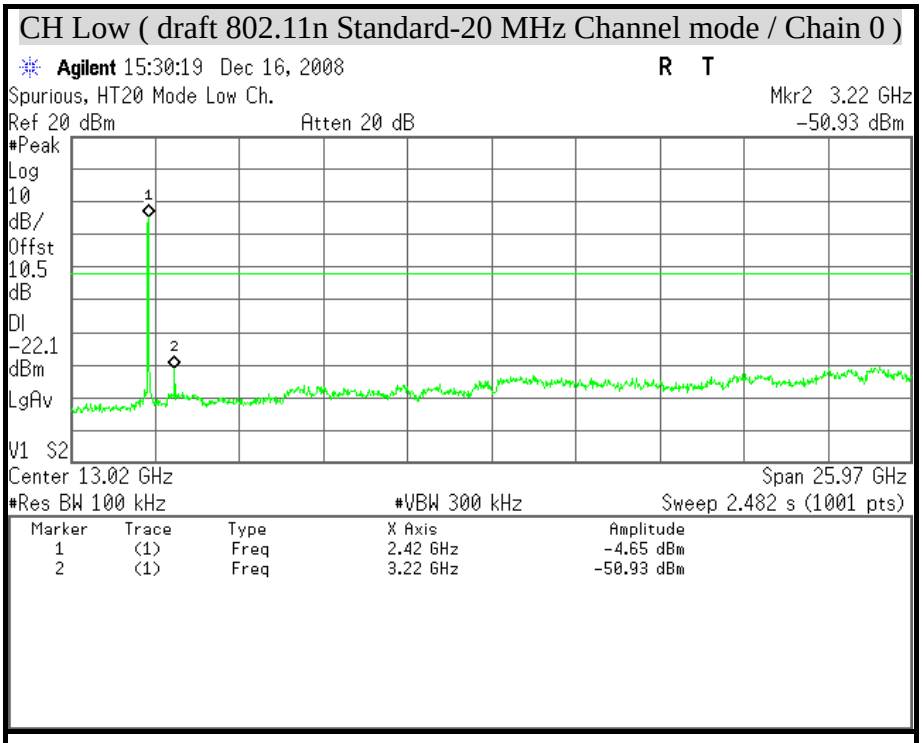


CH High ( IEEE 802.11g Combined mode )

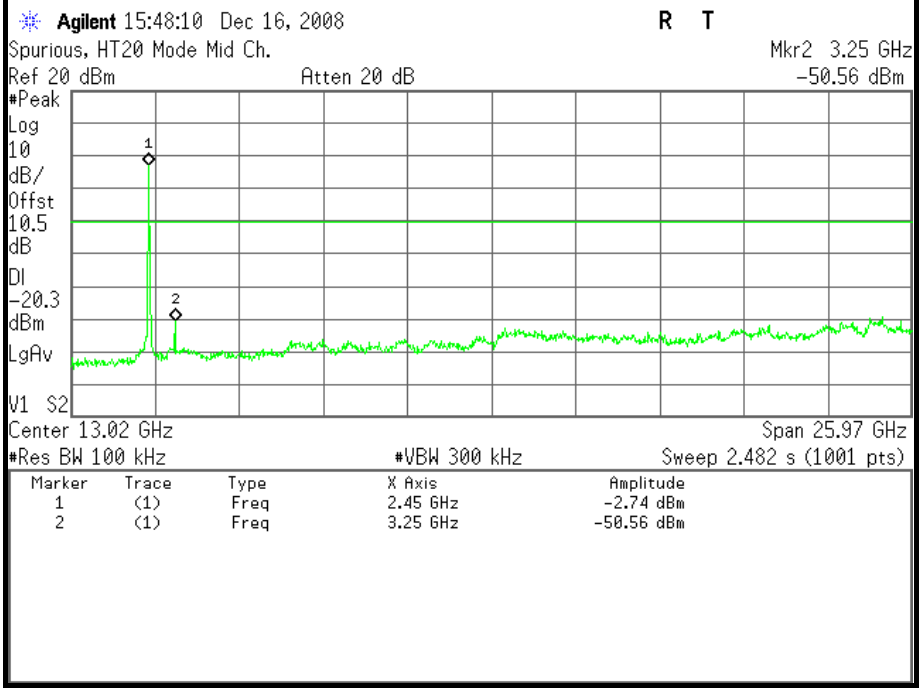


## POWER SPECTRAL DENSITY ( draft 802.11n Standard-20 MHz Channel mode )

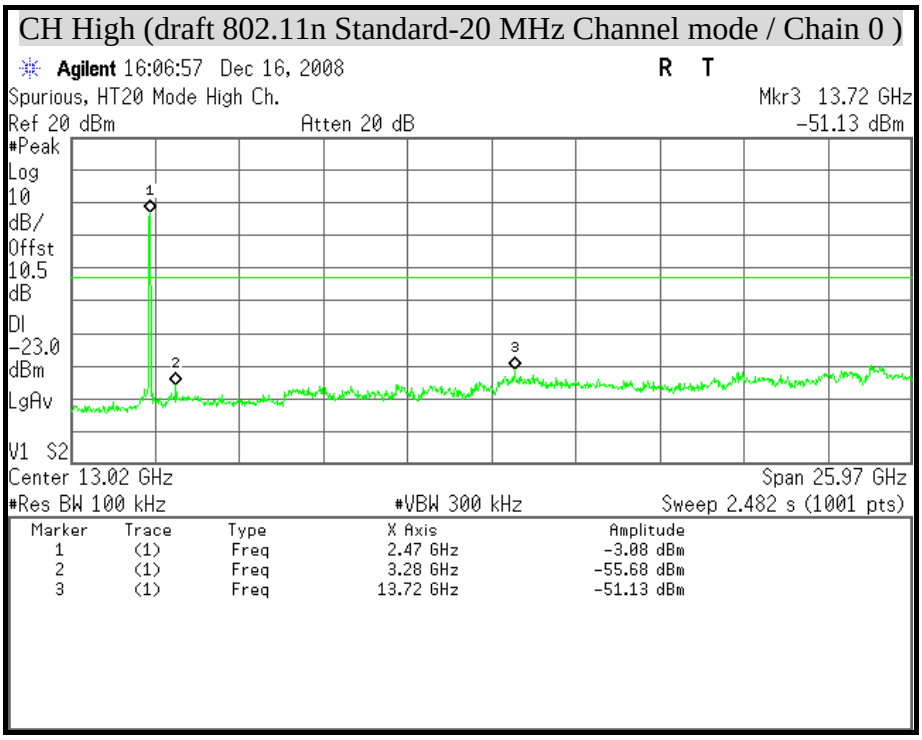
CH Low ( draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



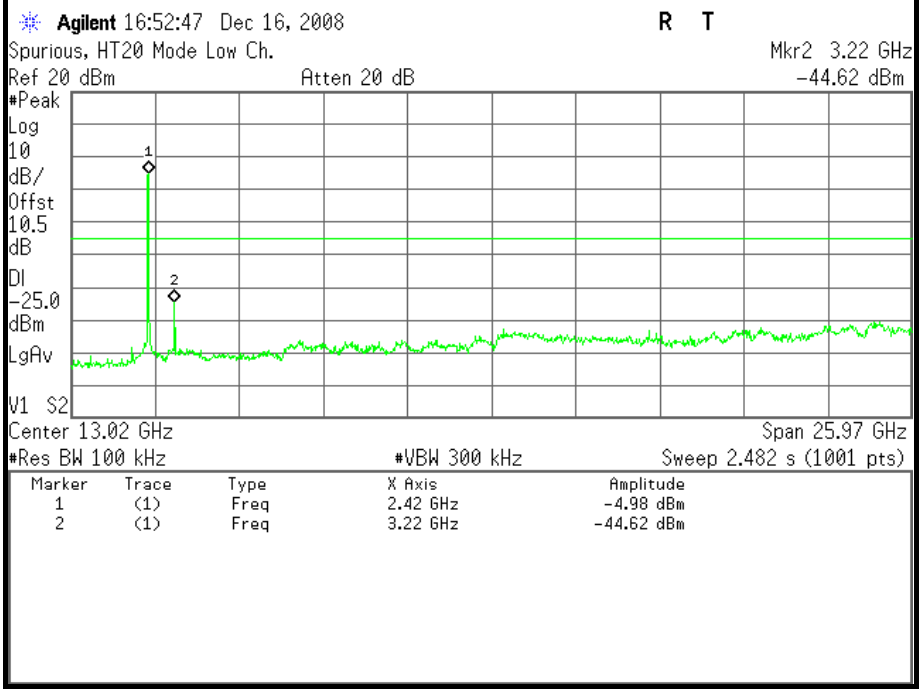

CH Middle (draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



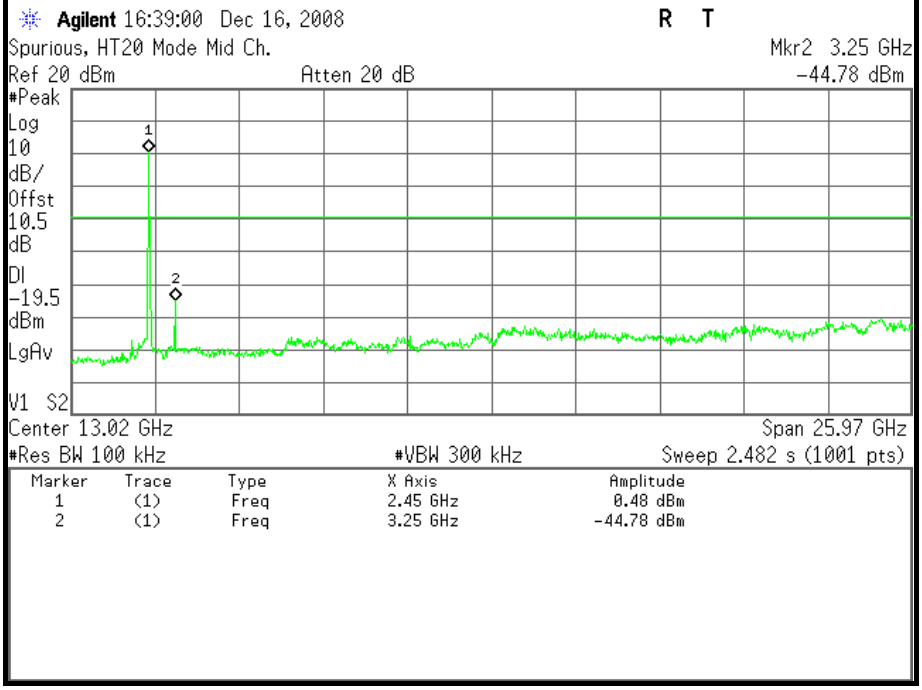
CH High (draft 802.11n Standard-20 MHz Channel mode / Chain 0 )



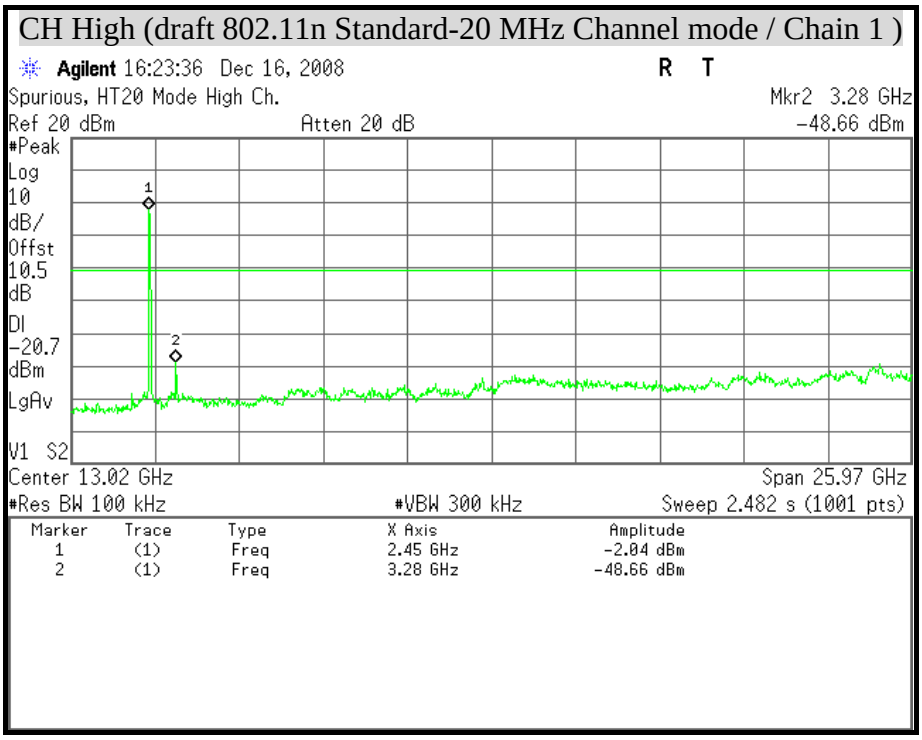
CH Low (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )




CH Middle (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )

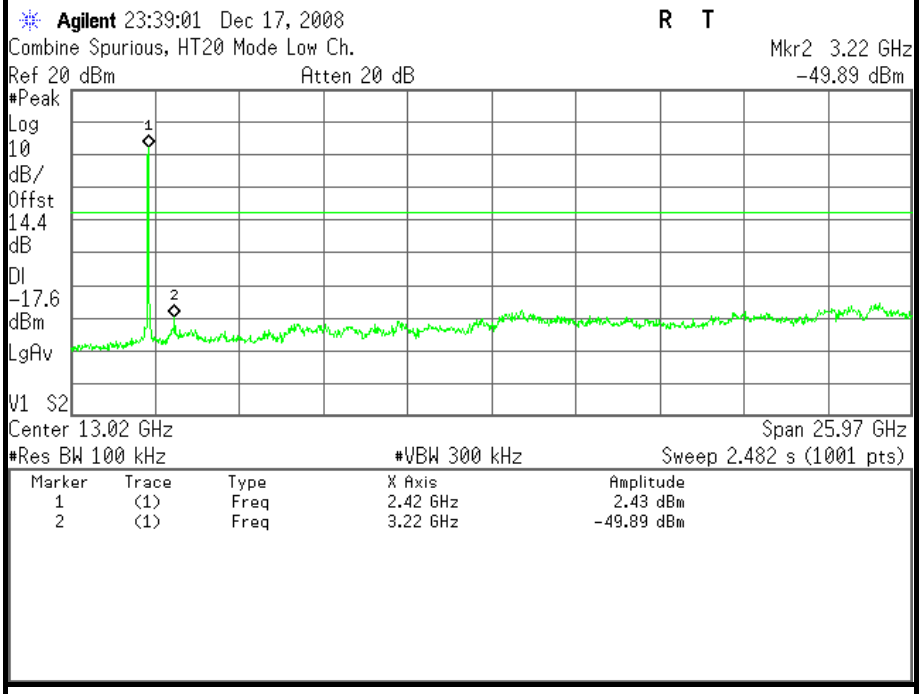


CH High (draft 802.11n Standard-20 MHz Channel mode / Chain 1 )

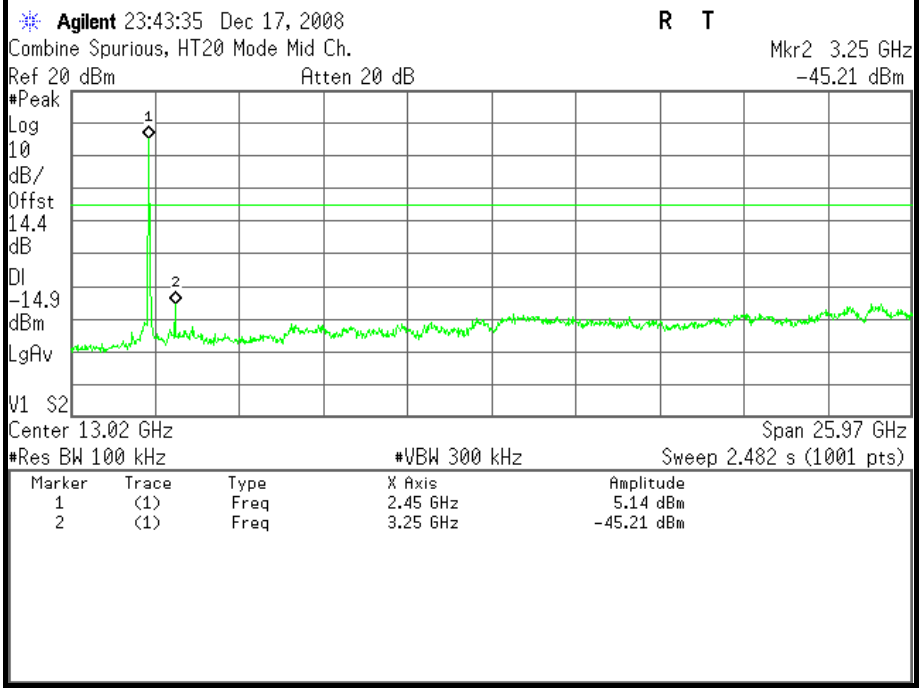


**POWER SPECTRAL DENSITY ( draft 802.11n Standard-20 MHz Channel Combined mode )**

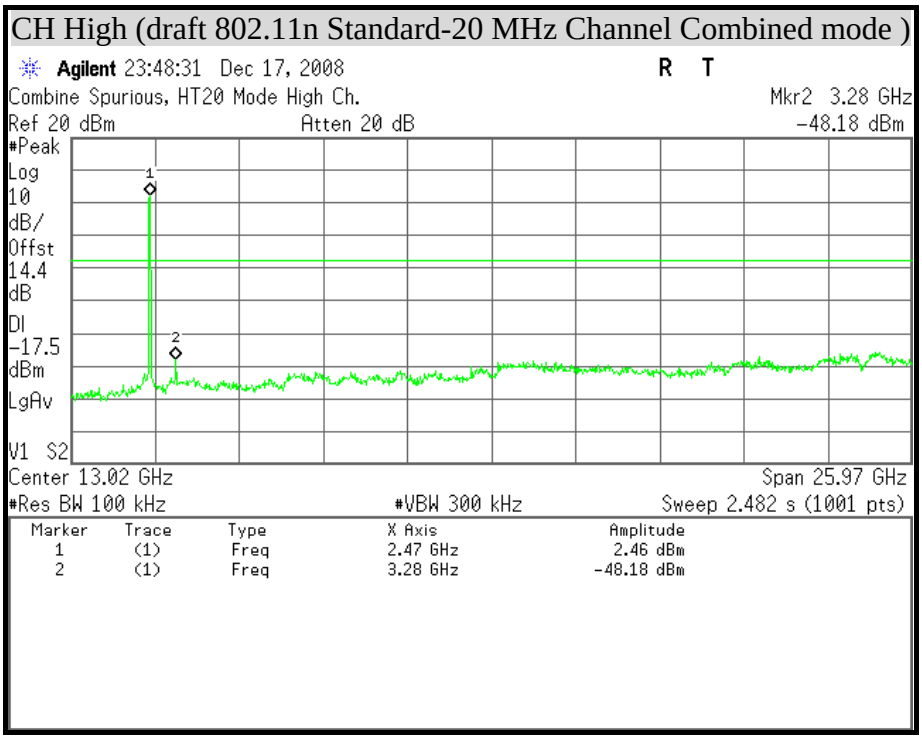
CH Low ( draft 802.11n Standard-20 MHz Channel Combined mode )




CH Middle (draft 802.11n Standard-20 MHz Channel Combined mode )

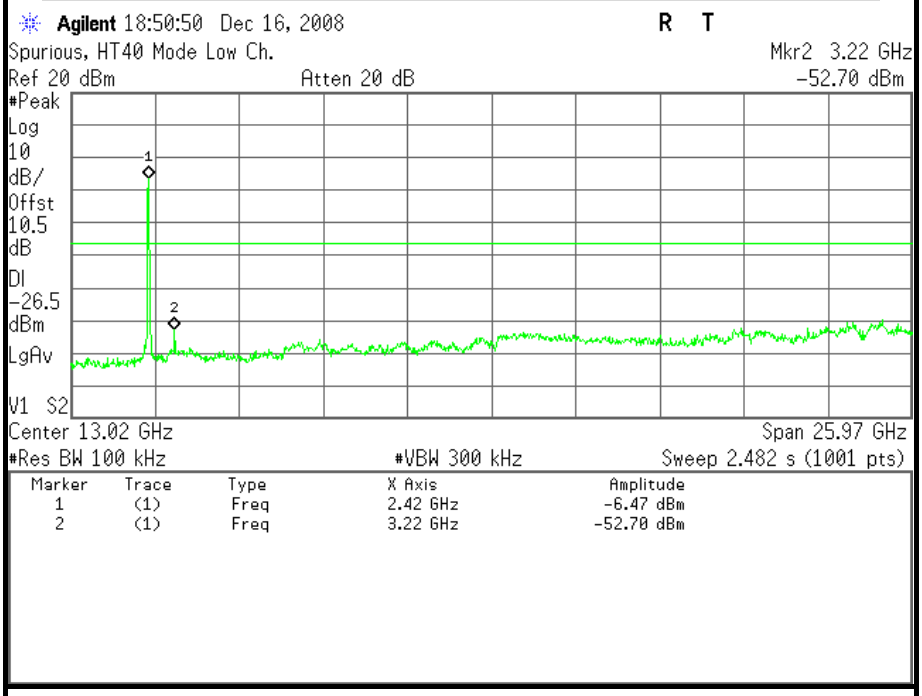


CH High (draft 802.11n Standard-20 MHz Channel Combined mode )

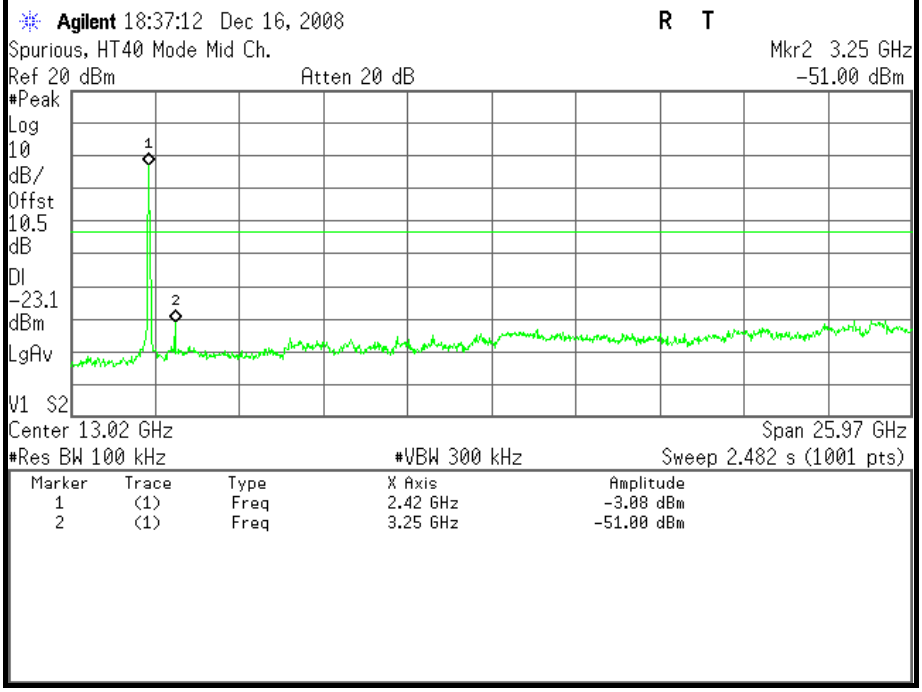


## POWER SPECTRAL DENSITY ( draft 802.11n Wide-40 MHz Channel mode )

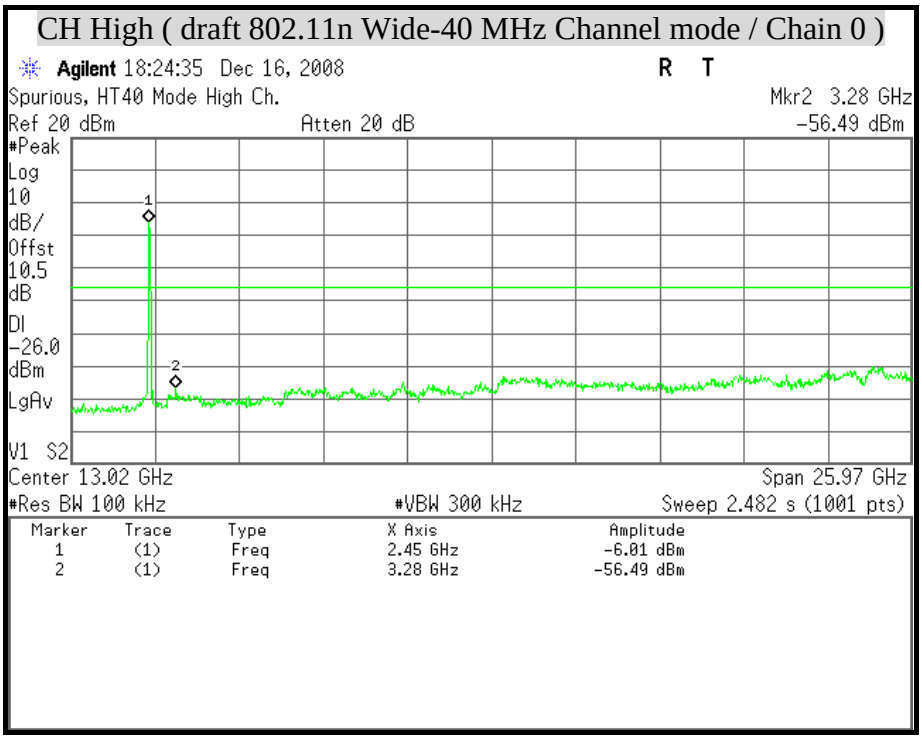
CH Low ( draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



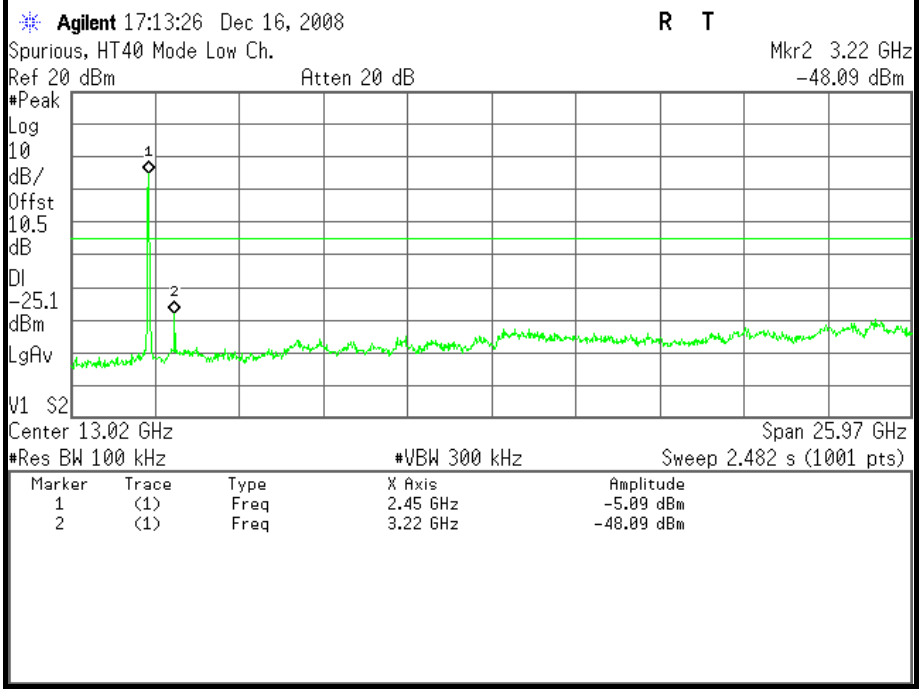

CH Middle ( draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



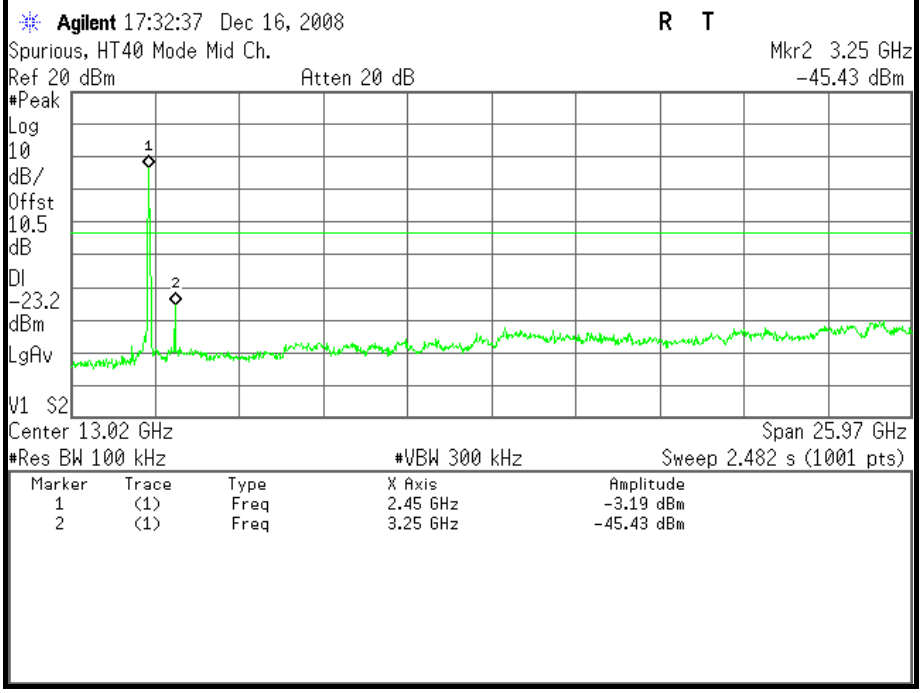
CH High ( draft 802.11n Wide-40 MHz Channel mode / Chain 0 )



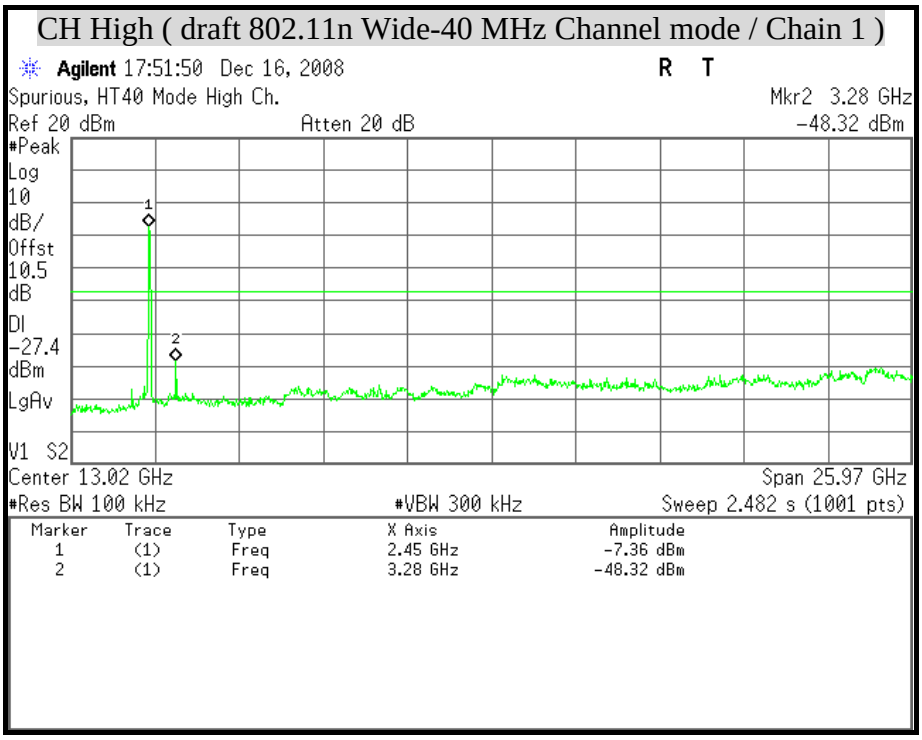
CH Low ( draft 802.11n Wide-40 MHz Channel mode / Chain 1 )




CH Middle ( draft 802.11n Wide-40 MHz Channel mode / Chain 1 )

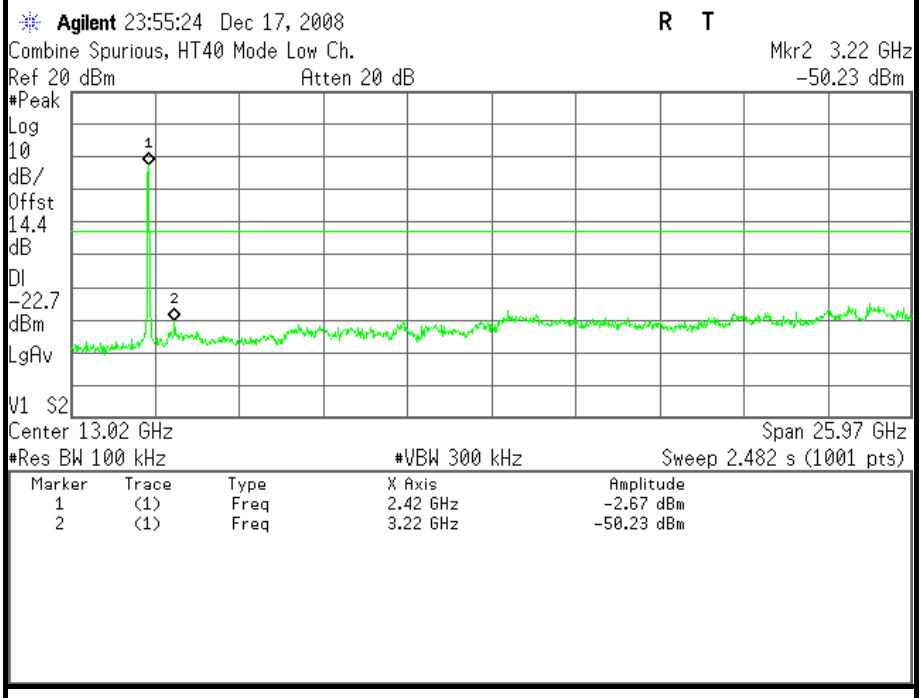


CH High ( draft 802.11n Wide-40 MHz Channel mode / Chain 1 )

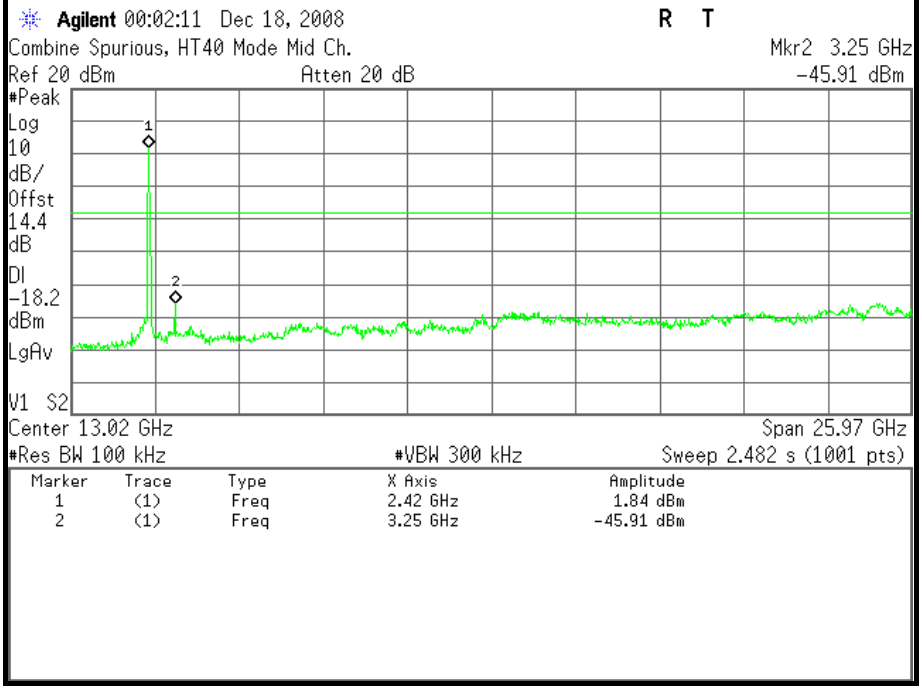


## POWER SPECTRAL DENSITY ( draft 802.11n Wide-40 MHz Channel Combined mode )

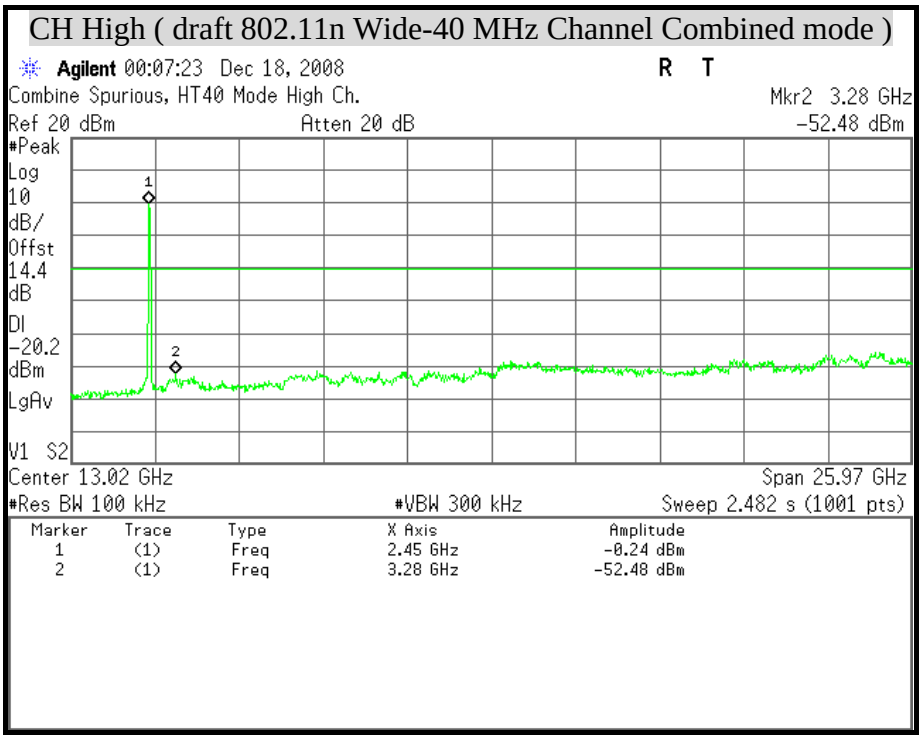
CH Low ( draft 802.11n Wide-40 MHz Channel Combined mode )




CH Middle ( draft 802.11n Wide-40 MHz Channel Combined mode )



CH High ( draft 802.11n Wide-40 MHz Channel Combined mode )



## 8.8 RADIATED EMISSIONS

## LIMIT

1. According to §15.205, 209(a) & RSS-210 Clause 2.6 (Transmitter) and IC RSS-GEN Clause 6 (Receiver), 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 (µV/m) | Measurement Distance (m) |
|---|---|---|
| 30-88 | 100* | 3 |
| 88-216 | 150* | 3 |
| 216-960 | 200* | 3 |
| Above 960 | 500 | 3 |

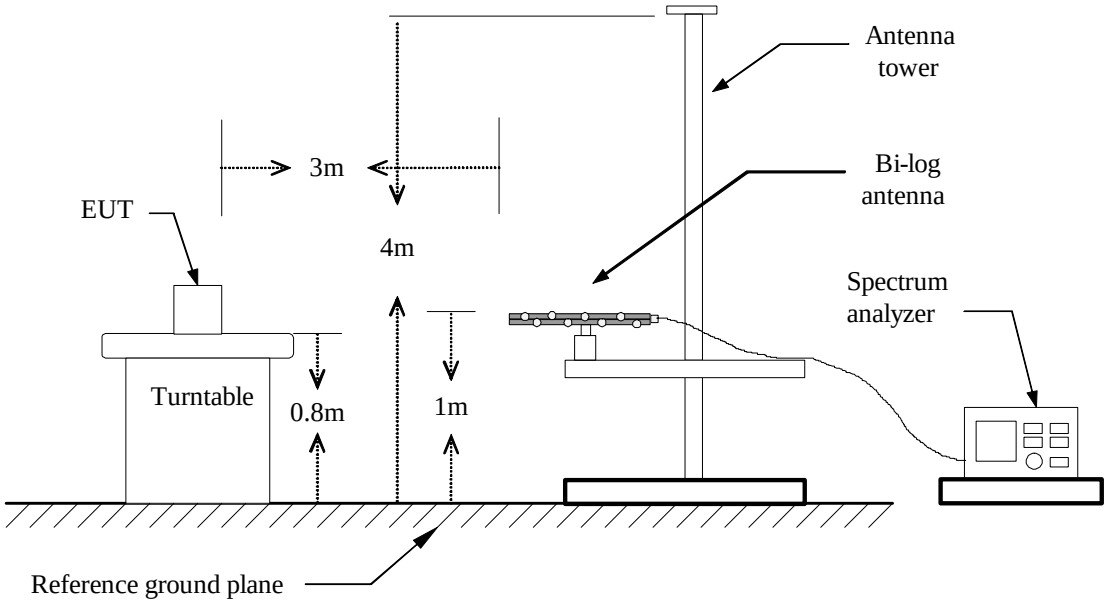
***Remark:*** *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections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

2. In the emission table above, the tighter limit applies at the band edges.

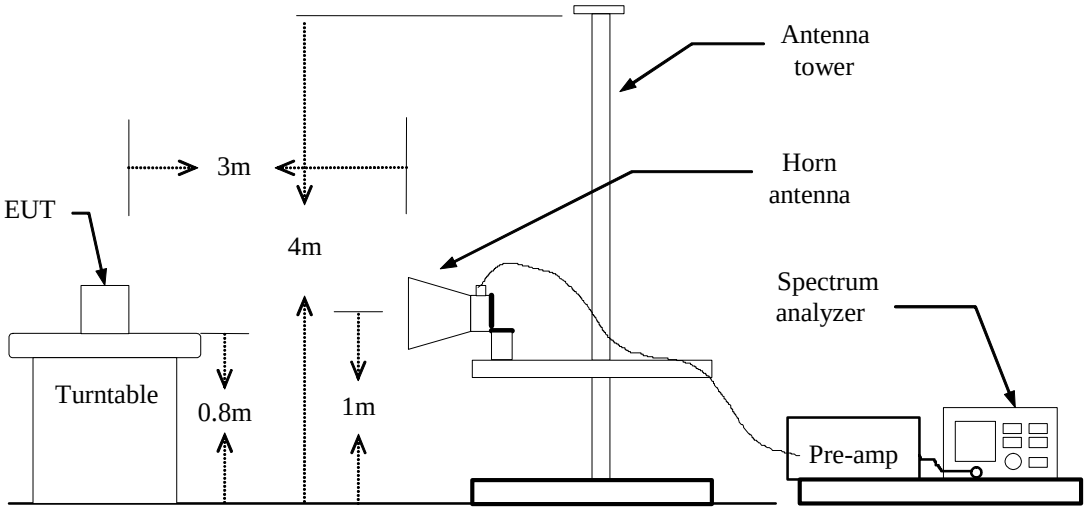
| Frequency (MHz) | Field Strength (µV/m at 3-meter) | Field Strength (dBµV/m at 3-meter) |
|---|---|---|
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |

## Test Configuration

### Below 1 GHz




### Above 1 GHz



## TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

   Below 1GHz:

   RBW=100kHz / VBW=300kHz / Sweep=AUTO

   Above 1GHz:

   (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

   (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

**Below 1GHz**

**Operation Mode:** Normal Link **Test Date:** December 19, 2008

**Temperature:** 22.3°C **Tested by:** Rueyyan Lin

**Humidity:** 53% RH **Polarity:** Hor. / Ver.

| Horizontal | | | | | | |
|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading (dBμV) | Correction Factor (dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark |
| 88.20 | 67.96 | -36.34 | 31.61 | 43.50 | -11.89 | Peak |
| 99.84 | 78.60 | -36.22 | 42.38 | 43.50 | -1.12 | QP |
| 254.07 | 62.81 | -30.07 | 32.74 | 46.00 | -13.26 | Peak |
| 298.69 | 62.45 | -28.00 | 34.45 | 46.00 | -11.55 | Peak |
| 398.60 | 50.80 | -26.96 | 23.84 | 46.00 | -22.16 | Peak |
| 666.32 | 53.98 | -22.40 | 31.58 | 46.00 | -14.42 | Peak |
| 999.03 | 61.65 | -18.25 | 43.40 | 54.00 | -10.60 | Peak |

| Vertical | | | | | | |
|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading (dBμV) | Correction Factor (dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark |
| 99.84 | 71.99 | -36.22 | 35.77 | 43.50 | -7.73 | Peak |
| 175.50 | 62.17 | -31.80 | 30.37 | 43.50 | -13.13 | Peak |
| 254.07 | 57.78 | -30.07 | 27.71 | 46.00 | -18.29 | Peak |
| 298.69 | 53.94 | -28.00 | 25.94 | 46.00 | -20.06 | Peak |
| 497.54 | 47.68 | -25.21 | 22.48 | 46.00 | -23.52 | Peak |
| 665.35 | 51.19 | -22.42 | 28.77 | 46.00 | -17.23 | Peak |
| 999.03 | 63.76 | -18.25 | 45.51 | 54.00 | -8.49 | Peak |

***Remark:***

1. *Measuring frequencies from 30 MHz to the 1GHz.*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.*
3. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Margin (dB) = Result (dBuV/m) – Limit (dBuV/m).*

# PIFA ANTENNA

## Above 1 GHz

**Operation Mode:** TX / IEEE 802.11b / CH Low **Test Date:** December 09, 2008

**Temperature:** 19.3°C **Tested by:** Gundam Lin

**Humidity:** 61 % RH **Polarity:** Hor. / Ver.

| Horizontal | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1334.00 | 64.86 | --- | -13.94 | 50.92 | --- | 74.00 | 54.00 | -3.08 | Peak |
| 2410.00 | 116.96 | 114.12 | -8.95 | 108.01 | 105.17 | --- | --- | --- | Carrier |
| 3217.50 | 65.63 | 63.97 | -7.79 | 57.84 | 56.18 | 88.01 | 85.17 | -30.17 | 20dBc Peak Fundamental |
| 4822.50 | 57.76 | 53.75 | -4.56 | 53.20 | 49.19 | 74.00 | 54.00 | -0.80 | Peak |
| 11805.00 | 48.06 | 36.56 | 6.40 | 54.46 | 42.96 | 74.00 | 54.00 | -11.04 | AVG |
| 16087.50 | 46.10 | 34.22 | 11.78 | 57.87 | 46.00 | 74.00 | 54.00 | -8.00 | AVG |

| Vertical | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1000.00 | 80.32 | 58.61 | -14.73 | 65.59 | 43.88 | 74.00 | 54.00 | -10.12 | AVG |
| 1328.00 | 71.15 | 53.78 | -13.95 | 57.20 | 39.83 | 74.00 | 54.00 | -14.17 | AVG |
| 2414.00 | 114.25 | --- | -8.94 | 105.31 | --- | --- | --- | --- | Carrier |
| 2490.00 | 68.79 | 55.47 | -8.86 | 59.93 | 46.61 | 74.00 | 54.00 | -7.39 | AVG |
| 3217.50 | 63.72 | 61.67 | -7.79 | 55.93 | 53.88 | 74.00 | 54.00 | -0.12 | AVG |
| 4822.50 | 60.37 | 58.02 | -4.56 | 55.81 | 53.46 | 74.00 | 54.00 | -0.54 | AVG |
| 11220.00 | 47.24 | --- | 4.64 | 51.88 | --- | 74.00 | 54.00 | -2.12 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

**Operation Mode:** TX / IEEE 802.11b / CH Mid **Test Date:** December 09, 2008

**Temperature:** 19.3°C **Tested by:** Gundam Lin

**Humidity:** 61 % RH **Polarity:** Hor. / Ver.

| Horizontal | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1000.00 | 65.48 | --- | -14.73 | 50.75 | --- | 74.00 | 54.00 | -3.25 | Peak |
| 1330.00 | 64.91 | --- | -13.95 | 50.96 | --- | 74.00 | 54.00 | -3.04 | Peak |
| 2436.00 | 117.88 | --- | -8.92 | 108.96 | --- | --- | --- | --- | Carrier |
| 3247.50 | 63.11 | 61.17 | -7.75 | 55.36 | 53.42 | 74.00 | 54.00 | -0.58 | AVG |
| 4875.00 | 57.62 | 52.35 | -4.42 | 53.20 | 47.93 | 74.00 | 54.00 | -0.80 | Peak |
| 6457.50 | 51.30 | --- | -2.23 | 49.07 | --- | 74.00 | 54.00 | -4.93 | Peak |
| 9337.50 | 48.88 | --- | 2.20 | 51.08 | --- | 74.00 | 54.00 | -2.92 | Peak |

| Vertical | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1000.00 | 80.52 | 58.50 | -14.73 | 65.79 | 43.77 | 74.00 | 54.00 | -10.23 | AVG |
| 1328.00 | 72.05 | 55.23 | -13.95 | 58.10 | 41.28 | 74.00 | 54.00 | -12.72 | AVG |
| 2434.00 | 114.60 | 112.39 | -8.92 | 105.68 | 103.47 | --- | --- | --- | Carrier |
| 2498.00 | 67.23 | 54.36 | -8.85 | 58.38 | 45.51 | 74.00 | 54.00 | -8.49 | AVG |
| 3247.50 | 65.82 | 64.51 | -7.75 | 58.07 | 56.76 | 85.68 | 83.47 | -27.61 | 20dBc Peak Fundamental |
| 4875.00 | 59.92 | 57.05 | -4.42 | 55.50 | 52.63 | 74.00 | 54.00 | -1.37 | AVG |
| 11355.00 | 47.13 | --- | 5.18 | 52.32 | --- | 74.00 | 54.00 | -1.68 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

**Operation Mode:** TX / IEEE 802.11b / CH High **Test Date:** December 09, 2008

**Temperature:** 19.3°C **Tested by:** Gundam Lin

**Humidity:** 61 % RH **Polarity:** Hor. / Ver.

| Horizontal | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1000.00 | 70.92 | 53.62 | -14.73 | 56.19 | 38.89 | 74.00 | 54.00 | -15.11 | AVG |
| 1330.00 | 68.25 | 53.55 | -13.95 | 54.30 | 39.60 | 74.00 | 54.00 | -14.40 | AVG |
| 2464.00 | 114.12 | 111.45 | -8.89 | 105.23 | 102.56 | --- | --- | --- | Carrier |
| 3285.00 | 61.23 | 59.00 | -7.69 | 53.54 | 51.31 | 74.00 | 54.00 | -0.46 | Peak |
| 4927.50 | 57.40 | 53.39 | -4.29 | 53.11 | 49.10 | 74.00 | 54.00 | -0.89 | Peak |
| 11662.50 | 48.22 | 35.61 | 6.11 | 54.33 | 41.72 | 74.00 | 54.00 | -12.28 | AVG |

| Vertical | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1000.00 | 80.01 | 57.96 | -14.73 | 65.28 | 43.23 | 74.00 | 54.00 | -10.77 | AVG |
| 1330.00 | 72.31 | 54.69 | -13.95 | 58.36 | 40.74 | 74.00 | 54.00 | -13.26 | AVG |
| 1664.00 | 68.72 | 52.65 | -12.19 | 56.53 | 40.46 | 74.00 | 54.00 | -13.54 | AVG |
| 2462.00 | 114.42 | 111.21 | -8.89 | 105.53 | 102.32 | --- | --- | --- | Carrier |
| 3285.00 | 64.22 | 62.65 | -7.69 | 56.53 | 54.96 | 85.53 | 82.32 | -29.00 | 20dBc Peak Fundamental |
| 4927.50 | 60.58 | 57.78 | -4.29 | 56.29 | 53.49 | 74.00 | 54.00 | -0.51 | AVG |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

**Operation Mode:** TX / IEEE 802.11g / CH Low **Test Date:** December 09, 2008

**Temperature:** 19.3°C **Tested by:** Gundam Lin

**Humidity:** 61 % RH **Polarity:** Hor. / Ver.

**Horizontal**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1332.00 | 64.93 | --- | -13.94 | 50.99 | --- | 74.00 | 54.00 | -3.01 | Peak |
| 2418.00 | 115.56 | 112.11 | -8.94 | 106.62 | 103.17 | --- | --- | --- | Carrier |
| 3217.50 | 67.18 | 65.86 | -7.79 | 59.39 | 58.07 | 86.62 | 83.17 | -27.23 | 20dBc Peak Fundamental |
| 4815.00 | 53.32 | --- | -4.58 | 48.74 | --- | 74.00 | 54.00 | -5.26 | Peak |
| 9720.00 | 48.76 | --- | 2.62 | 51.38 | --- | 74.00 | 54.00 | -2.62 | Peak |

**Vertical**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1000.00 | 79.86 | 57.63 | -14.73 | 65.13 | 42.90 | 74.00 | 54.00 | -11.10 | AVG |
| 1328.00 | 70.81 | 54.97 | -13.95 | 56.86 | 41.02 | 74.00 | 54.00 | -12.98 | AVG |
| 2418.00 | 114.98 | 111.55 | -8.94 | 106.04 | 102.61 | --- | --- | --- | Carrier |
| 2498.00 | 66.71 | 54.82 | -8.85 | 57.86 | 45.97 | 74.00 | 54.00 | -8.03 | AVG |
| 3217.50 | 65.18 | 63.65 | -7.79 | 57.39 | 55.86 | 86.04 | 82.61 | -28.65 | 20dBc Peak Fundamental |
| 4830.00 | 55.15 | --- | -4.54 | 50.61 | --- | 74.00 | 54.00 | -3.39 | Peak |
| 7237.50 | 51.05 | --- | -0.89 | 50.16 | --- | 74.00 | 54.00 | -3.84 | Peak |
| 11107.50 | 48.41 | --- | 4.18 | 52.60 | --- | 74.00 | 54.00 | -1.40 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

**Operation Mode:** TX / IEEE 802.11g / CH Mid **Test Date:** December 09, 2008

**Temperature:** 19.3°C **Tested by:** Gundam Lin

**Humidity:** 61 % RH **Polarity:** Hor. / Ver.

| Horizontal | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1332.00 | 64.96 | --- | -13.94 | 51.02 | --- | 74.00 | 54.00 | -2.98 | Peak |
| 3255.00 | 62.62 | 59.73 | -7.74 | 54.88 | 51.99 | 74.00 | 54.00 | -2.01 | AVG |
| 4875.00 | 62.67 | 48.14 | -4.42 | 58.25 | 43.72 | 74.00 | 54.00 | -10.28 | AVG |
| 7755.00 | 50.01 | --- | -0.14 | 49.87 | --- | 74.00 | 54.00 | -4.13 | Peak |

| Vertical | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1000.00 | 80.28 | 58.76 | -14.73 | 65.55 | 44.03 | 74.00 | 54.00 | -9.97 | AVG |
| 1332.00 | 71.36 | 55.18 | -13.94 | 57.42 | 41.24 | 74.00 | 54.00 | -12.76 | AVG |
| 1950.00 | 66.22 | 52.21 | -9.82 | 56.40 | 42.39 | 74.00 | 54.00 | -11.61 | AVG |
| 2394.00 | 66.52 | 54.78 | -8.97 | 57.55 | 45.81 | 74.00 | 54.00 | -8.19 | AVG |
| 2430.00 | 115.23 | 112.74 | -8.93 | 106.30 | 103.81 | --- | --- | --- | Carrier |
| 2496.00 | 67.81 | 54.86 | -8.85 | 58.96 | 46.01 | 74.00 | 54.00 | -7.99 | AVG |
| 3255.00 | 60.84 | 57.18 | -7.74 | 53.10 | 49.44 | 74.00 | 54.00 | -0.90 | Peak |
| 4875.00 | 61.07 | 46.71 | -4.42 | 56.65 | 42.29 | 74.00 | 54.00 | -11.71 | AVG |
| 7305.00 | 59.24 | 42.97 | -0.84 | 58.40 | 42.13 | 74.00 | 54.00 | -11.87 | AVG |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

**Operation Mode:** TX / IEEE 802.11g / CH High **Test Date:** December 09, 2008

**Temperature:** 19.3°C **Tested by:** Gundam Lin

**Humidity:** 61 % RH **Polarity:** Hor. / Ver.

| Horizontal | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1000.00 | 70.22 | 54.67 | -14.73 | 55.49 | 39.94 | 74.00 | 54.00 | -14.06 | AVG |
| 1332.00 | 65.17 | --- | -13.94 | 51.22 | --- | 74.00 | 54.00 | -2.78 | Peak |
| 3142.50 | 52.92 | --- | -7.90 | 45.02 | --- | 74.00 | 54.00 | -8.98 | Peak |
| 3285.00 | 61.81 | 59.59 | -7.69 | 54.12 | 51.90 | 74.00 | 54.00 | -2.10 | AVG |
| 4920.00 | 52.33 | --- | -4.31 | 48.02 | --- | 74.00 | 54.00 | -5.98 | Peak |
| 7500.00 | 50.36 | --- | -0.70 | 49.66 | --- | 74.00 | 54.00 | -4.34 | Peak |

| Vertical | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1000.00 | 80.12 | 58.46 | -14.73 | 65.39 | 43.73 | 74.00 | 54.00 | -10.27 | AVG |
| 1332.00 | 72.23 | 55.52 | -13.94 | 58.29 | 41.58 | 74.00 | 54.00 | -12.42 | AVG |
| 1662.00 | 71.29 | 54.73 | -12.21 | 59.08 | 42.52 | 74.00 | 54.00 | -11.48 | AVG |
| 3285.00 | 63.59 | 61.55 | -7.69 | 55.90 | 53.86 | 74.00 | 54.00 | -0.14 | AVG |
| 4912.50 | 53.71 | --- | -4.33 | 49.38 | --- | 74.00 | 54.00 | -4.62 | Peak |
| 5032.50 | 53.25 | --- | -4.05 | 49.20 | --- | 74.00 | 54.00 | -4.80 | Peak |
| 7395.00 | 52.13 | --- | -0.78 | 51.35 | --- | 74.00 | 54.00 | -2.65 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / draft 802.11n Standard-20 MHz Channel mode / CH Low | **Test Date:** | December 09, 2008 |
| **Temperature:** | 19.3°C | **Tested by:** | Gundam Lin |
| **Humidity:** | 61 % RH | **Polarity:** | Hor. / Ver. |

| **Horizontal** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1330.00 | 70.89 | 54.63 | -13.95 | 56.94 | 40.68 | 74.00 | 54.00 | -13.32 | AVG |
| 2418.00 | 116.44 | 113.68 | -8.94 | 107.50 | 104.74 | --- | --- | --- | Carrier |
| 3217.50 | 67.20 | 65.77 | -7.79 | 59.41 | 57.98 | 87.50 | 84.74 | -28.09 | 20dBc Peak Fundamental |
| 4815.00 | 52.54 | --- | -4.58 | 47.96 | --- | 74.00 | 54.00 | -6.04 | Peak |
| 6570.00 | 51.08 | --- | -2.03 | 49.05 | --- | 74.00 | 54.00 | -4.95 | Peak |
| 16965.00 | 47.27 | 34.23 | 11.93 | 59.20 | 46.16 | 74.00 | 54.00 | -7.84 | AVG |

| **Vertical** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1000.00 | 80.12 | 57.89 | -14.73 | 65.39 | 43.16 | 74.00 | 54.00 | -10.84 | AVG |
| 1330.00 | 70.70 | 55.30 | -13.95 | 56.75 | 41.35 | 74.00 | 54.00 | -12.65 | AVG |
| 2420.00 | 115.71 | 112.56 | -8.94 | 106.77 | 103.62 | --- | --- | --- | Carrier |
| 3217.50 | 65.29 | 63.53 | -7.79 | 57.50 | 55.74 | 86.77 | 83.62 | -29.27 | 20dBc Peak Fundamental |
| 4822.50 | 55.37 | --- | -4.56 | 50.82 | --- | 74.00 | 54.00 | -3.18 | Peak |
| 6030.00 | 51.56 | --- | -2.69 | 48.86 | --- | 74.00 | 54.00 | -5.14 | Peak |
| 9232.50 | 49.14 | --- | 2.14 | 51.27 | --- | 74.00 | 54.00 | -2.73 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / draft 802.11n Standard-20 MHz Channel mode / CH Mid | **Test Date:** | December 09, 2008 |
| **Temperature:** | 19.3°C | **Tested by:** | Gundam Lin |
| **Humidity:** | 61 % RH | **Polarity:** | Hor. / Ver. |

**Horizontal**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1332.00 | 65.63 | --- | -13.94 | 51.69 | --- | 74.00 | 54.00 | -2.31 | Peak |
| 3255.00 | 61.58 | 58.49 | -7.74 | 53.84 | 50.75 | 74.00 | 54.00 | -0.16 | Peak |
| 4875.00 | 62.24 | 46.99 | -4.42 | 57.82 | 42.57 | 74.00 | 54.00 | -11.43 | AVG |

**Vertical**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1000.00 | 80.31 | 58.12 | -14.73 | 65.58 | 43.39 | 74.00 | 54.00 | -10.61 | AVG |
| 1330.00 | 70.60 | 54.67 | -13.95 | 56.65 | 40.72 | 74.00 | 54.00 | -13.28 | AVG |
| 2436.00 | 115.80 | 112.31 | -8.92 | 106.88 | -103.39 | --- | --- | --- | Carrier |
| 3255.00 | 60.59 | 56.88 | -7.74 | 52.85 | 49.14 | 74.00 | 54.00 | -1.15 | Peak |
| 4875.00 | 61.87 | 46.81 | -4.42 | 57.45 | 42.39 | 74.00 | 54.00 | -11.61 | AVG |
| 7305.00 | 58.77 | 42.47 | -0.84 | 57.93 | 41.63 | 74.00 | 54.00 | -12.37 | AVG |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / draft 802.11n Standard-20 MHz Channel mode / CH High | **Test Date:** | December 09, 2008 |
| **Temperature:** | 19.3°C | **Tested by:** | Gundam Lin |
| **Humidity:** | 61 % RH | **Polarity:** | Hor. / Ver. |

**Horizontal**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1000.00 | 71.38 | 56.82 | -14.73 | 56.65 | 42.09 | 74.00 | 54.00 | -11.91 | AVG |
| 1332.00 | 70.57 | 55.02 | -13.94 | 56.63 | 41.08 | 74.00 | 54.00 | -12.92 | AVG |
| 2462.00 | 114.83 | --- | -8.89 | 105.94 | --- | 74.00 | 54.00 | 51.94 | *Peak |
| 3285.00 | 61.23 | 58.82 | -7.69 | 53.54 | 51.13 | 74.00 | 54.00 | -0.46 | Peak |
| 4920.00 | 52.93 | --- | -4.31 | 48.62 | --- | 74.00 | 54.00 | -5.38 | Peak |
| 11647.50 | 48.33 | 36.21 | 6.08 | 54.41 | 42.29 | 74.00 | 54.00 | -11.71 | AVG |

**Vertical**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1000.00 | 80.03 | 58.31 | -14.73 | 65.30 | 43.58 | 74.00 | 54.00 | -10.42 | AVG |
| 1330.00 | 71.49 | 55.75 | -13.95 | 57.54 | 41.80 | 74.00 | 54.00 | -12.20 | AVG |
| 1662.00 | 69.12 | 54.87 | -12.21 | 56.91 | 42.66 | 74.00 | 54.00 | -11.34 | AVG |
| 2460.00 | 114.88 | 111.34 | -8.89 | 105.99 | 102.45 | --- | --- | --- | Carrier |
| 3285.00 | 64.29 | 62.40 | -7.69 | 56.60 | 54.71 | 85.99 | 82.45 | -29.39 | 20dBc Peak Fundamental |
| 4920.00 | 55.73 | --- | -4.31 | 51.42 | --- | 74.00 | 54.00 | -2.58 | Peak |
| 7380.00 | 51.25 | --- | -0.79 | 50.46 | --- | 74.00 | 54.00 | -3.54 | Peak |
| 10380.00 | 49.43 | --- | 3.27 | 52.70 | --- | 74.00 | 54.00 | -1.30 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / draft 802.11n Wide-40 MHz Channel mode / CH Low | **Test Date:** | December 09, 2008 |
| **Temperature:** | 19.3°C | **Tested by:** | Gundam Lin |
| **Humidity:** | 61 % RH | **Polarity:** | Hor. / Ver. |

**Horizontal**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1332.00 | 65.81 | --- | -13.94 | 51.87 | --- | 74.00 | 54.00 | -2.13 | Peak |
| 2432.00 | 114.47 | 111.21 | -8.92 | 105.54 | 102.29 | --- | --- | --- | Carrier |
| 3232.50 | 67.08 | 65.12 | -7.77 | 59.31 | 57.35 | 85.54 | 82.29 | -26.23 | 20dBc Peak Fundamental |
| 4845.00 | 52.38 | --- | -4.50 | 47.88 | --- | 74.00 | 54.00 | -6.12 | Peak |
| 5572.50 | 52.09 | --- | -3.21 | 48.88 | --- | 74.00 | 54.00 | -5.12 | Peak |

**Vertical**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1000.00 | 80.45 | 57.73 | -14.73 | 65.72 | 43.00 | 74.00 | 54.00 | -11.00 | AVG |
| 1332.00 | 71.00 | 55.49 | -13.94 | 57.06 | 41.55 | 74.00 | 54.00 | -12.45 | AVG |
| 1666.00 | 69.17 | 54.57 | -12.17 | 57.00 | 42.40 | 74.00 | 54.00 | -11.60 | AVG |
| 2426.00 | 113.33 | 110.83 | -8.93 | 104.39 | 101.90 | --- | --- | --- | Carrier |
| 3232.50 | 64.99 | 63.65 | -7.77 | 57.22 | 55.88 | 84.39 | 81.90 | -27.17 | 20dBc Peak Fundamental |
| 4845.00 | 54.26 | --- | -4.50 | 49.76 | --- | 74.00 | 54.00 | -4.24 | Peak |
| 5782.50 | 52.08 | --- | -2.97 | 49.11 | --- | 74.00 | 54.00 | -4.89 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / draft 802.11n Wide-40 MHz Channel mode / CH Mid | **Test Date:** | December 09, 2008 |
| **Temperature:** | 19.3°C | **Tested by:** | Gundam Lin |
| **Humidity:** | 61 % RH | **Polarity:** | Hor. / Ver. |

**Horizontal**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1000.00 | 70.87 | 56.47 | -14.73 | 56.14 | 41.74 | 74.00 | 54.00 | -12.26 | AVG |
| 1328.00 | 65.08 | --- | -13.95 | 51.12 | --- | 74.00 | 54.00 | -2.88 | Peak |
| 2342.00 | 66.96 | 53.37 | -9.03 | 57.93 | 44.34 | 74.00 | 54.00 | -9.66 | AVG |
| 3255.00 | 62.21 | 58.67 | -7.74 | 54.47 | 50.93 | 74.00 | 54.00 | -3.07 | AVG |
| 4875.00 | 60.69 | 45.97 | -4.42 | 56.27 | 41.55 | 74.00 | 54.00 | -12.45 | AVG |

**Vertical**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1000.00 | 80.31 | 58.38 | -14.73 | 65.58 | 43.65 | 74.00 | 54.00 | -10.35 | AVG |
| 1328.00 | 70.90 | 55.86 | -13.95 | 56.95 | 41.91 | 74.00 | 54.00 | -12.09 | AVG |
| 2426.00 | 113.86 | 110.26 | -8.93 | 104.92 | 101.33 | --- | --- | --- | Carrier |
| 3255.00 | 62.94 | 59.54 | -7.74 | 55.20 | 51.80 | 74.00 | 54.00 | -2.20 | AVG |
| 4875.00 | 59.88 | 45.75 | -4.42 | 55.46 | 41.33 | 74.00 | 54.00 | -12.67 | AVG |
| 7305.00 | 58.41 | 43.21 | -0.84 | 57.57 | 42.37 | 74.00 | 54.00 | -11.63 | AVG |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / draft 802.11n Wide-40 MHz Channel mode / CH High | **Test Date:** | December 09, 2008 |
| **Temperature:** | 19.3°C | **Tested by:** | Gundam Lin |
| **Humidity:** | 61 % RH | **Polarity:** | Hor. / Ver. |

**Horizontal**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1000.00 | 66.26 | --- | -14.73 | 51.53 | --- | 74.00 | 54.00 | -2.47 | Peak |
| 1332.00 | 65.33 | --- | -13.94 | 51.38 | --- | 74.00 | 54.00 | -2.62 | Peak |
| 3270.00 | 61.82 | 59.00 | -7.71 | 54.11 | 51.29 | 74.00 | 54.00 | -2.71 | AVG |
| 6907.50 | 50.06 | --- | -1.27 | 48.80 | --- | 74.00 | 54.00 | -5.20 | Peak |

**Vertical**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1000.00 | 79.88 | 57.26 | -14.73 | 65.15 | 42.53 | 74.00 | 54.00 | -11.47 | AVG |
| 1332.00 | 71.23 | 55.52 | -13.94 | 57.29 | 41.58 | 74.00 | 54.00 | -12.42 | AVG |
| 2464.00 | 112.50 | 109.45 | -8.89 | 103.61 | 100.65 | --- | --- | --- | Carrier |
| 3270.00 | 65.21 | 63.66 | -7.71 | 57.50 | 55.95 | 83.61 | 80.65 | -26.11 | 20dBc Peak Fundamental |
| 4905.00 | 54.19 | --- | -4.35 | 49.84 | --- | 74.00 | 54.00 | -4.16 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

# DIPOLE ANTENNA

**Operation Mode:** TX / IEEE 802.11b / CH Low **Test Date:** December 16, 2008

**Temperature:** 23°C **Tested by:** Rueyyan Lin

**Humidity:** 52 % RH **Polarity:** Hor. / Ver.

| Horizontal | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1216.00 | 70.12 | 58.78 | -14.22 | 55.90 | 44.56 | 74.00 | 54.00 | -9.44 | AVG |
| 3210.00 | 54.11 | --- | -7.80 | 46.31 | --- | 74.00 | 54.00 | -7.69 | Peak |
| 4830.00 | 54.57 | --- | -4.54 | 50.03 | --- | 74.00 | 54.00 | -3.97 | Peak |

| Vertical | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1242.00 | 64.93 | --- | -14.16 | 50.77 | --- | 74.00 | 54.00 | -3.23 | Peak |
| 3215.00 | 63.34 | 61.09 | -7.79 | 55.55 | 53.30 | 74.00 | 54.00 | -0.70 | AVG |
| 4825.00 | 62.29 | 58.09 | -4.55 | 57.74 | 53.54 | 74.00 | 54.00 | -0.46 | AVG |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

**Operation Mode:** TX / IEEE 802.11b / CH Mid **Test Date:** December 16, 2008

**Temperature:** 23°C **Tested by:** Rueyyan Lin

**Humidity:** 52 % RH **Polarity:** Hor. / Ver.

| Horizontal | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1206.00 | 70.35 | 58.21 | -14.24 | 56.11 | 43.97 | 74.00 | 54.00 | -10.03 | AVG |
| 2436.00 | 106.61 | --- | -8.92 | 97.69 | --- | --- | --- | --- | Carrier |
| 3255.00 | 55.12 | --- | -7.74 | 47.38 | --- | 74.00 | 54.00 | -6.62 | Peak |
| 4875.00 | 54.53 | --- | -4.42 | 50.10 | --- | 74.00 | 54.00 | -3.90 | Peak |
| 10050.00 | 49.13 | --- | 3.06 | 52.18 | --- | 74.00 | 54.00 | -1.82 | Peak |

| Vertical | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1254.00 | 66.18 | --- | -14.13 | 52.05 | --- | 74.00 | 54.00 | -1.95 | Peak |
| 3255.00 | 62.92 | 60.27 | -7.74 | 55.18 | 52.53 | 74.00 | 54.00 | -1.47 | AVG |
| 4875.00 | 59.82 | 57.16 | -4.42 | 55.40 | 52.74 | 74.00 | 54.00 | -1.26 | AVG |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

**Operation Mode:** TX / IEEE 802.11b / CH High **Test Date:** December 16, 2008

**Temperature:** 23°C **Tested by:** Rueyyan Lin

**Humidity:** 52 % RH **Polarity:** Hor. / Ver.

| Horizontal | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1216.00 | 70.46 | 58.38 | -14.22 | 56.24 | 44.16 | 74.00 | 54.00 | -9.84 | AVG |
| 3285.00 | 54.95 | --- | -7.69 | 47.25 | --- | 74.00 | 54.00 | -6.75 | Peak |
| 4920.00 | 53.77 | --- | -4.31 | 49.46 | --- | 74.00 | 54.00 | -4.54 | Peak |
| 9420.00 | 48.78 | --- | 2.25 | 51.03 | --- | 74.00 | 54.00 | -2.97 | Peak |

| Vertical | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1244.00 | 66.02 | --- | -14.15 | 51.87 | --- | 74.00 | 54.00 | -2.13 | Peak |
| 3285.00 | 61.85 | 60.14 | -7.69 | 54.16 | 52.45 | 74.00 | 54.00 | -1.55 | AVG |
| 4920.00 | 61.59 | 58.13 | -4.31 | 57.28 | 53.82 | 74.00 | 54.00 | -0.18 | AVG |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

**Operation Mode:** TX / IEEE 802.11g / CH Low **Test Date:** December 16, 2008

**Temperature:** 23°C **Tested by:** Rueyyan Lin

**Humidity:** 52 % RH **Polarity:** Hor. / Ver.

| Horizontal | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1216.00 | 70.12 | 58.98 | -14.22 | 55.9 | 44.76 | 74.00 | 54.00 | -9.24 | AVG |
| 3210.00 | 52.96 | --- | -7.80 | 45.15 | --- | 74.00 | 54.00 | -8.85 | Peak |
| 4935.00 | 50.49 | --- | -4.27 | 46.22 | --- | 74.00 | 54.00 | -7.78 | Peak |

| Vertical | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1398.00 | 68.00 | --- | -13.79 | 54.22 | --- | 74.00 | 54.00 | 0.22 | *Peak |
| 3210.00 | 62.58 | 60.98 | -7.80 | 54.78 | 53.18 | 74.00 | 54.00 | -0.82 | AVG |
| 4995.00 | 51.99 | --- | -4.12 | 47.87 | --- | 74.00 | 54.00 | -6.13 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

**Operation Mode:** TX / IEEE 802.11g / CH Mid **Test Date:** December 16, 2008

**Temperature:** 23°C **Tested by:** Rueyyan Lin

**Humidity:** 52 % RH **Polarity:** Hor. / Ver.

| Horizontal | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1212.00 | 71.24 | 60.14 | -14.23 | 57.01 | 45.91 | 74.00 | 54.00 | -8.09 | AVG |
| 3255.00 | 54.44 | --- | -7.74 | 46.70 | --- | 74.00 | 54.00 | -7.30 | Peak |
| 4875.00 | 53.84 | --- | -4.42 | 49.42 | --- | 74.00 | 54.00 | -4.58 | Peak |

| Vertical | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1244.00 | 66.36 | --- | -14.15 | 52.20 | --- | 74.00 | 54.00 | -1.80 | Peak |
| 1918.00 | 62.87 | --- | -10.09 | 52.78 | --- | 74.00 | 54.00 | -1.22 | Peak |
| 3255.00 | 63.79 | 61.50 | -7.74 | 56.05 | 53.76 | 74.00 | 54.00 | -0.24 | AVG |
| 4860.00 | 62.03 | 45.41 | -4.46 | 57.57 | 40.95 | 74.00 | 54.00 | -13.05 | AVG |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

**Operation Mode:** TX / IEEE 802.11g / CH High **Test Date:** December 16, 2008

**Temperature:** 23°C **Tested by:** Rueyyan Lin

**Humidity:** 52 % RH **Polarity:** Hor. / Ver.

| Horizontal | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1222.00 | 70.32 | 57.86 | -14.20 | 56.12 | 43.66 | 74.00 | 54.00 | -10.34 | AVG |
| 3285.00 | 53.03 | --- | -7.69 | 45.34 | --- | 74.00 | 54.00 | -8.66 | Peak |
| 4995.00 | 52.00 | --- | -4.12 | 47.89 | --- | 74.00 | 54.00 | -6.11 | Peak |

| Vertical | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1208.00 | 65.74 | --- | -14.24 | 51.50 | --- | 74.00 | 54.00 | -2.50 | Peak |
| 3285.00 | 60.57 | 59.89 | -7.69 | 52.88 | 52.20 | 74.00 | 54.00 | -1.12 | Peak |
| 4920.00 | 58.58 | 41.94 | -4.31 | 54.27 | 37.63 | 74.00 | 54.00 | -16.37 | AVG |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / draft 802.11n Standard-20 MHz Channel mode / CH Low | **Test Date:** | December 16, 2008 |
| **Temperature:** | 23°C | **Tested by:** | Rueyyan Lin |
| **Humidity:** | 52 % RH | **Polarity:** | Hor. / Ver. |

| **Horizontal** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1190.00 | 68.25 | --- | -14.28 | 53.96 | --- | 74.00 | 54.00 | -0.04 | Peak |
| 3210.00 | 53.09 | --- | -7.80 | 45.28 | --- | 74.00 | 54.00 | -8.72 | Peak |

| **Vertical** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1240.00 | 65.66 | --- | -14.16 | 51.50 | --- | 74.00 | 54.00 | -2.50 | Peak |
| 3210.00 | 62.35 | 61.24 | -7.80 | 54.55 | 53.44 | 74.00 | 54.00 | -0.56 | AVG |
| 4830.00 | 52.59 | --- | -4.54 | 48.05 | --- | 74.00 | 54.00 | -5.95 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / draft 802.11n Standard-20 MHz Channel mode / CH Mid | **Test Date:** | December 16, 2008 |
| **Temperature:** | 23°C | **Tested by:** | Rueyyan Lin |
| **Humidity:** | 52 % RH | **Polarity:** | Hor. / Ver. |

| **Horizontal** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1214.00 | 70.31 | 58.62 | -14.22 | 56.09 | 44.40 | 74.00 | 54.00 | -9.60 | AVG |
| 3255.00 | 56.16 | --- | -7.74 | 48.43 | --- | 74.00 | 54.00 | -5.57 | Peak |

| **Vertical** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1250.00 | 65.46 | --- | -14.14 | 51.32 | --- | 74.00 | 54.00 | -2.68 | Peak |
| 3255.00 | 63.54 | 61.24 | -7.74 | 55.80 | 53.50 | 74.00 | 54.00 | -0.50 | AVG |
| 4875.00 | 59.43 | 44.72 | -4.42 | 55.01 | 40.30 | 74.00 | 54.00 | -13.70 | AVG |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / draft 802.11n Standard-20 MHz Channel mode / CH High | **Test Date:** | December 16, 2008 |
| **Temperature:** | 23°C | **Tested by:** | Rueyyan Lin |
| **Humidity:** | 52 % RH | **Polarity:** | Hor. / Ver. |

| **Horizontal** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1212.00 | 70.39 | 58.25 | -14.23 | 56.16 | 44.02 | 74.00 | 54.00 | -9.98 | AVG |
| 3285.00 | 53.03 | --- | -7.69 | 45.34 | --- | 74.00 | 54.00 | -8.66 | Peak |
| 4920.00 | 50.97 | --- | -4.31 | 46.66 | --- | 74.00 | 54.00 | -7.34 | Peak |

| **Vertical** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
| 1332.00 | 66.83 | --- | -13.94 | 52.89 | --- | 74.00 | 54.00 | -1.11 | Peak |
| 3285.00 | 63.52 | 61.13 | -7.69 | 55.83 | 53.44 | 74.00 | 54.00 | -0.56 | AVG |
| 4920.00 | 53.69 | --- | -4.31 | 49.38 | --- | 74.00 | 54.00 | -4.62 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / draft 802.11n Wide-40 MHz Channel mode / CH Low | **Test Date:** | December 16, 2008 |
| **Temperature:** | 23°C | **Tested by:** | Rueyyan Lin |
| **Humidity:** | 52 % RH | **Polarity:** | Hor. / Ver. |

**Horizontal**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1214.00 | 70.28 | 58.15 | -14.22 | 56.06 | 43.93 | 74.00 | 54.00 | -10.07 | AVG |
| 4950.00 | 51.54 | --- | -4.23 | 47.31 | --- | 74.00 | 54.00 | -6.69 | Peak |

**Vertical**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1268.00 | 65.64 | --- | -14.10 | 51.55 | --- | 74.00 | 54.00 | -2.45 | Peak |
| 3225.00 | 57.06 | --- | -7.78 | 49.28 | --- | 74.00 | 54.00 | -4.72 | Peak |
| 4995.00 | 51.96 | --- | -4.12 | 47.85 | --- | 74.00 | 54.00 | -6.15 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / draft 802.11n Wide-40 MHz Channel mode / CH Mid | **Test Date:** | December 16, 2008 |
| **Temperature:** | 23°C | **Tested by:** | Rueyyan Lin |
| **Humidity:** | 52 % RH | **Polarity:** | Hor. / Ver. |

**Horizontal**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1212.00 | 70.37 | 58.42 | -14.23 | 56.14 | 44.19 | 74.00 | 54.00 | -9.81 | AVG |
| 3255.00 | 53.70 | --- | -7.74 | 45.97 | --- | 74.00 | 54.00 | -8.03 | Peak |
| 4950.00 | 51.08 | --- | -4.23 | 46.84 | --- | 74.00 | 54.00 | -7.16 | Peak |

**Vertical**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1240.00 | 66.37 | --- | -14.16 | 52.21 | --- | 74.00 | 54.00 | -1.79 | Peak |
| 3255.00 | 63.73 | 60.24 | -7.74 | 55.99 | 52.50 | 74.00 | 54.00 | -1.50 | AVG |
| 4890.00 | 60.21 | 45.09 | -4.39 | 55.82 | 40.70 | 74.00 | 54.00 | -13.30 | AVG |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / draft 802.11n Wide-40 MHz Channel mode / CH High | **Test Date:** | December 16, 2008 |
| **Temperature:** | 23°C | **Tested by:** | Rueyyan Lin |
| **Humidity:** | 52 % RH | **Polarity:** | Hor. / Ver. |

**Horizontal**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1208.00 | 70.62 | 58.14 | -14.24 | 56.38 | 43.90 | 74.00 | 54.00 | -10.10 | AVG |
| 2460.00 | 106.02 | --- | -8.89 | 97.12 | --- | --- | --- | --- | Carrier |
| 5025.00 | 50.83 | --- | -4.06 | 46.77 | --- | 74.00 | 54.00 | -7.23 | Peak |

**Vertical**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1250.00 | 65.50 | --- | -14.14 | 51.36 | --- | 74.00 | 54.00 | -2.64 | Peak |
| 3270.00 | 57.24 | --- | -7.71 | 49.53 | --- | 74.00 | 54.00 | -4.47 | Peak |
| 4980.00 | 50.63 | --- | -4.15 | 46.48 | --- | 74.00 | 54.00 | -7.52 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

**Operation Mode:** RX / IEEE 802.11g / CH Mid **Test Date:** December 09, 2008

**Temperature:** 19.3°C **Tested by:** Gundam

**Humidity:** 61 % RH **Polarity:** Hor. / Ver.

**Horizontal**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1000.00 | 58.01 | --- | -14.73 | 43.28 | --- | 74.00 | 54.00 | -10.72 | Peak |
| 1391.00 | 56.00 | --- | -13.80 | 42.19 | --- | 74.00 | 54.00 | -11.81 | Peak |
| 2496.00 | 55.79 | --- | -8.85 | 46.94 | --- | 74.00 | 54.00 | -7.06 | Peak |
| 5658.00 | 51.60 | --- | -3.11 | 48.49 | --- | 74.00 | 54.00 | -5.51 | Peak |

**Vertical**

| Frequency (MHz) | Reading-PK (dBµV) | Reading-AV (dBµV) | Correction Factor (dB/m) | Result-PK (dBµV/m) | Result-AV (dBµV/m) | Limit-PK (dBµV/m) | Limit-AV (dBµV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1000.00 | 61.84 | --- | -14.73 | 47.11 | --- | 74.00 | 54.00 | -6.89 | Peak |
| 1331.50 | 58.41 | --- | -13.95 | 44.46 | --- | 74.00 | 54.00 | -9.54 | Peak |
| 2487.50 | 59.25 | --- | -8.86 | 50.39 | --- | 74.00 | 54.00 | -3.61 | Peak |
| 10868.50 | 49.15 | --- | 3.65 | 52.80 | --- | 74.00 | 54.00 | -1.20 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

## 8.9 POWERLINE CONDUCTED EMISSIONS

**LIMIT**

According to §15.207(a) & RSS-Gen §7.2.2, 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 Range (MHz) | Limits (dBµV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56* | 56 to 46* |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

** Decreases with the logarithm of the frequency.*

**TEST CONFIGURATION**

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

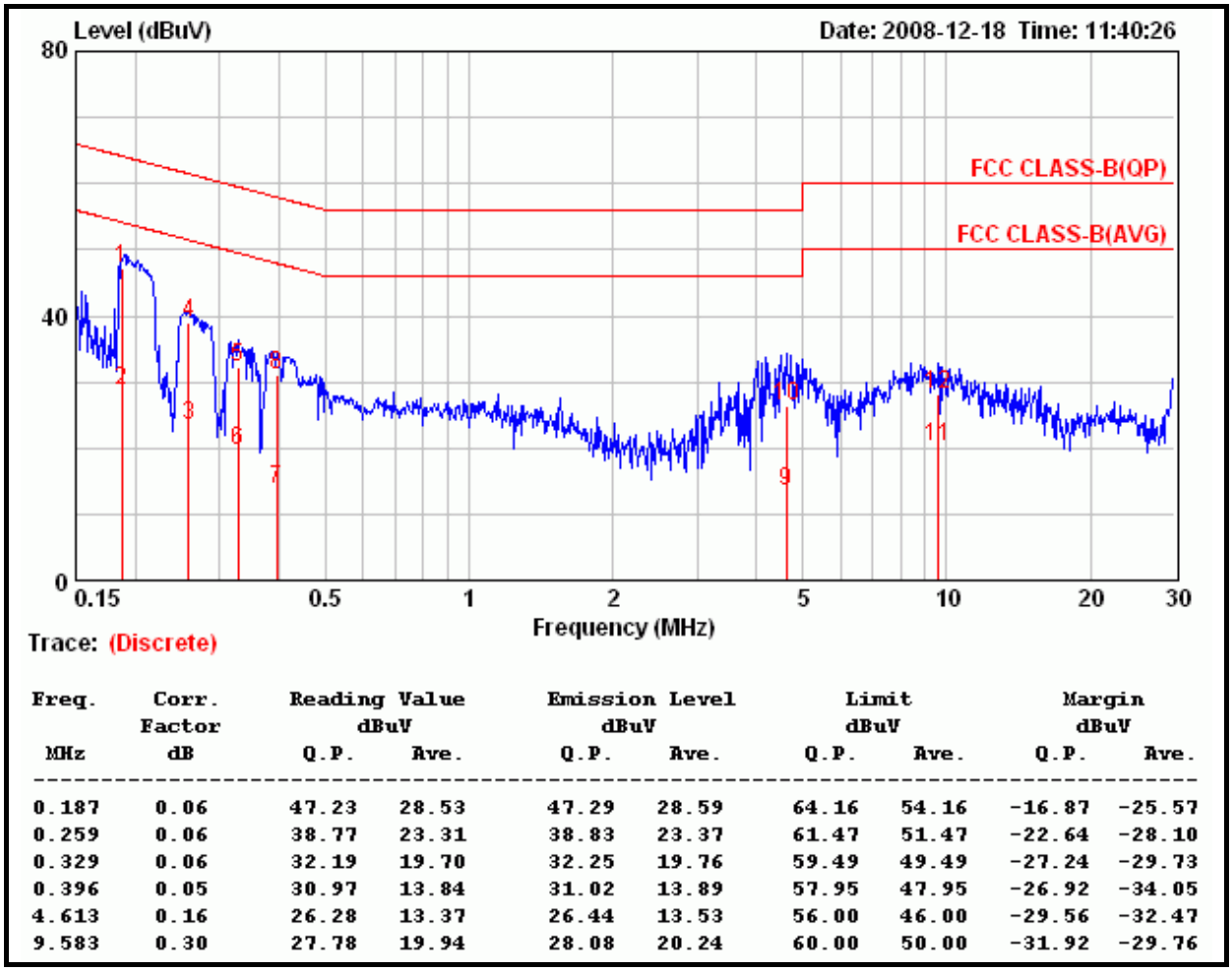
**TEST PROCEDURE**

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

## TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

| | | | |
|---|---|---|---|
| **Operation Mode:** | Normal Link | **Line:** | LINE |
| **Temperature:** | 22°C | **Test Date:** | December 18, 2008 |
| **Humidity:** | 45% RH | **Tested by:** | Rueyyan Lin |

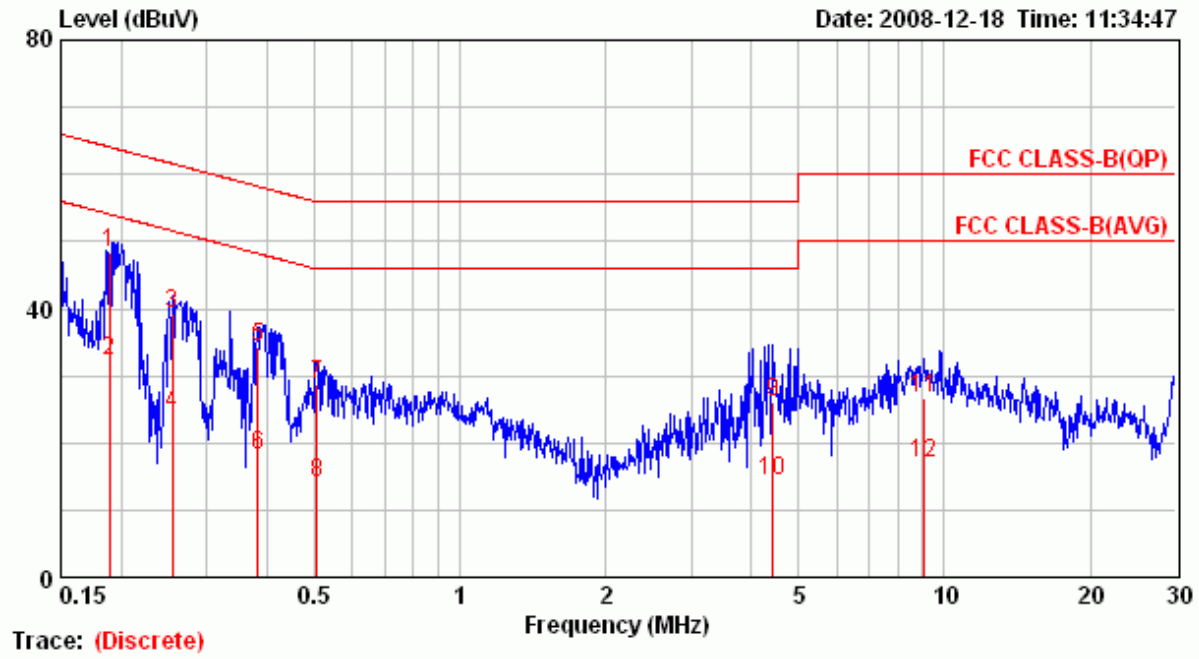



| Freq. MHz | Corr. Factor dB | Reading Value dBuV Q.P. | Reading Value dBuV Ave. | Emission Level dBuV Q.P. | Emission Level dBuV Ave. | Limit dBuV Q.P. | Limit dBuV Ave. | Margin dBuV Q.P. | Margin dBuV Ave. |
|---|---|---|---|---|---|---|---|---|---|
| 0.187 | 0.06 | 47.23 | 28.53 | 47.29 | 28.59 | 64.16 | 54.16 | -16.87 | -25.57 |
| 0.259 | 0.06 | 38.77 | 23.31 | 38.83 | 23.37 | 61.47 | 51.47 | -22.64 | -28.10 |
| 0.329 | 0.06 | 32.19 | 19.70 | 32.25 | 19.76 | 59.49 | 49.49 | -27.24 | -29.73 |
| 0.396 | 0.05 | 30.97 | 13.84 | 31.02 | 13.89 | 57.95 | 47.95 | -26.92 | -34.05 |
| 4.613 | 0.16 | 26.28 | 13.37 | 26.44 | 13.53 | 56.00 | 46.00 | -29.56 | -32.47 |
| 9.583 | 0.30 | 27.78 | 19.94 | 28.08 | 20.24 | 60.00 | 50.00 | -31.92 | -29.76 |

**Remark:**

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value

| | | | |
|---|---|---|---|
| **Operation Mode:** | Normal Link | **Line:** | NEUTRAL |
| **Temperature:** | 22°C | **Test Date:** | December 18, 2008 |
| **Humidity:** | 45% RH | **Tested by:** | Rueyyan Lin |




| Freq. | Corr. Factor | Reading Value dBuV | | Emission Level dBuV | | Limit dBuV | | Margin dBuV | |
|---|---|---|---|---|---|---|---|---|---|
| MHz | dB | Q.P. | Ave. | Q.P. | Ave. | Q.P. | Ave. | Q.P. | Ave. |
| 0.189 | 0.06 | 48.27 | 32.22 | 48.33 | 32.28 | 64.07 | 54.07 | -15.74 | -21.79 |
| 0.255 | 0.06 | 39.35 | 24.41 | 39.41 | 24.47 | 61.58 | 51.58 | -22.18 | -27.12 |
| 0.383 | 0.05 | 34.16 | 18.25 | 34.21 | 18.30 | 58.22 | 48.22 | -24.00 | -29.91 |
| 0.507 | 0.05 | 28.52 | 13.92 | 28.57 | 13.97 | 56.00 | 46.00 | -27.43 | -32.03 |
| 4.433 | 0.16 | 25.89 | 14.08 | 26.05 | 14.24 | 56.00 | 46.00 | -29.95 | -31.76 |
| 9.099 | 0.28 | 26.24 | 16.69 | 26.52 | 16.97 | 60.00 | 50.00 | -33.48 | -33.03 |

**Remark:**

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value

# APPENDIX I
# RADIO FREQUENCY EXPOSURE

## LIMIT

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

**EUT Specification**

| | |
|---|---|
| **EUT** | 802.11n 2x2 PCIe Minicard transceiver |
| **Frequency band (Operating)** | ☒ WLAN: 2.412GHz ~ 2.462GHz<br>☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz<br>☐ WLAN: 5.745GHz ~ 5.825GHz<br>☐ Others |
| **Device category** | ☐ Portable (<20cm separation)<br>☒ Mobile (>20cm separation)<br>☐ Others |
| **Exposure classification** | ☐ Occupational/Controlled exposure (S = 5mW/cm$^2$)<br>☒ General Population/Uncontrolled exposure (S=1mW/cm$^2$) |
| **Antenna diversity** | ☐ Single antenna<br>☒ Multiple antennas<br>☐ Tx diversity<br>☐ Rx diversity<br>☒ Tx/Rx diversity |
| **Max. output power** | IEEE 802.11b: 19.158 dBm ( 82.389 mW )<br>IEEE 802.11g: 25.31 dBm ( 339.625 mW )<br>draft 802.11n Standard-20 MHz: 24.95 dBm ( 312.608 mW )<br>draft 802.11n Wide -40 MHz: 25.85 dBm ( 384.592 mW ) |
| **Antenna gain (Max)** | 1. PIFA Antenna / Gain: 3.62 dBi (Numeric gain: 2.30)<br>2. Dipole Antenna / Gain: 3.2 dBi (Numeric gain: 2.09) |
| **Evaluation applied** | ☒ MPE Evaluation*<br>☐ SAR Evaluation<br>☐ N/A |

***Remark:***

1. *The maximum output power is 25.85dBm (235.749 mW) at 2437MHz (with 3.62 numeric antenna gain.)*
2. *DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.*
3. *For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is 1.0 mW/cm2 even if the calculation indicates that the power density would be larger.*

## TEST RESULTS

*No non-compliance noted.*

**Calculation**

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$

*Where* *E = Field strength in Volts / meter*
*P = Power in Watts*
*G = Numeric antenna gain*
*d = Distance in meters*
*S = Power density in milliwatts / square centimeter*

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

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

*P (mW) = P (W) / 1000 and*

*d (cm) = d(m) / 100*

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$ ***Equation 1***

*Where* *d = Distance in cm*
*P = Power in mW*
*G = Numeric antenna gain*
*S = Power density in mW / cm$^2$*

**Maximum Permissible Exposure**

Substituting the MPE safe distance using d = 20 cm into Equation 1:

Yields

$$S = 0.000199 \times P \times G$$

*Where* *P = Power in mW*
*G = Numeric antenna gain*
*S = Power density in mW / cm$^2$*

**IEEE 802.11b mode:**

EUT output power = 82.389 mW

Numeric Antenna gain = 3.62

*→ Power density = 0.037716 mW / $cm^2$*

**IEEE 802.11g mode:**

EUT output power = 339.625 mW

Numeric Antenna gain = 3.62

*→ Power density = 0.155499 mW / $cm^2$*

**draft 802.11n Standard-20 MHz Channel mode:**

EUT output power = 312.608 mW

Numeric Antenna gain = 3.62

*→ Power density = 0.143130 mW / $cm^2$*

**draft 802.11n Wide-40 MHz Channel mode:**

EUT output power = 384.592 mW

Numeric Antenna gain = 3.62

*→ Power density = 0.176088 mW / $cm^2$*

*(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/$cm^2$ even if the calculation indicates that the power density would be larger.)*