# FCC 47 CFR PART 15 SUBPART C

# TEST REPORT

## For

## 802.11b/g /n USB Adapter

**Trade Name / Model:**
**LanReady / WUB1900RM,**
**LanReady / AWM1910PM,**
**LanReady / AWS1902FM,**
**LanReady / AWS1905FM,**
**LanReady / AWS1908FM,**
**LanReady / AWS1910FM,**
**AirLink101 / AWLL5077,**
**AirLink101 / AWLL5055,**
**AirLink101 / AWLL5058,**
**Cerio / UW-200N-Mini,**
**Cerio / UW-210N-P,**
**Cerio / UW-202N-O,**
**Wavecore / WV-100N,**
**Wavecore / WV-1210NP,**
**Wavecore / WV-1002NF,**
**Ambeon / WL150A-USB,**
**BLUESTORK / BS-WN-USB/NANO,**
**Popcorn Hour / WN-150,**
**Pheenet / WLU-805N,**
**Pheenet / WLU-803N**

*Issued to*

**LanReady Technologies Inc.**
**3F, No.116, Sinhu 2nd Rd., Neihu District,**
**Taipei City 114, Taiwan (R.O.C.)**

*Issued by*

**Compliance Certification Services Inc.**
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Testing Laboratory
1309

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# 1. TEST RESULT CERTIFICATION

**Applicant:** LanReady Technologies Inc.
3F, No.116, Sinhu 2nd Rd., Neihu District,
Taipei City 114, Taiwan (R.O.C.)

**Equipment Under Test:** 802.11b/g /n USB Adapter

**Trade Name / Model:** LanReady / WUB1900RM,
LanReady / AWM1910PM,
LanReady / AWS1902FM,
LanReady / AWS1905FM,
LanReady / AWS1908FM,
LanReady / AWS1910FM,
AirLink101 / AWLL5077,
AirLink101 / AWLL5055,
AirLink101 / AWLL5058,
Cerio / UW-200N-Mini,
Cerio / UW-210N-P,
Cerio / UW-202N-O,
Wavecore / WV-100N,
Wavecore / WV-1210NP,
Wavecore / WV-1002NF,
Ambeon / WL150A-USB,
BLUESTORK / BS-WN-USB/NANO,
Popcorn Hour / WN-150,
Pheenet / WLU-805N,
Pheenet / WLU-803N

**Date of Test:** September 26 ~ November 30, 2009

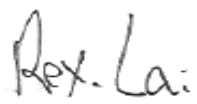
| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULT** |
| FCC 47 CFR Part 15 Subpart C | No non-compliance noted |

**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.

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

*Approved by:*



Rex Lai
Section Manager
Compliance Certification Services Inc.

*Reviewed by:*

Gina Lo
Section Manager
Compliance Certification Services Inc.

# 2. EUT DESCRIPTION

| | |
|---|---|
| **Product** | 802.11b/g /n USB Adapter |
| **Trade Name / Model** | LanReady / WUB1900RM,<br>LanReady / AWM1910PM,<br>LanReady / AWS1902FM,<br>LanReady / AWS1905FM,<br>LanReady / AWS1908FM,<br>LanReady / AWS1910FM,<br>AirLink101 / AWLL5077,<br>AirLink101 / AWLL5055,<br>AirLink101 / AWLL5058,<br>Cerio / UW-200N-Mini,<br>Cerio / UW-210N-P,<br>Cerio / UW-202N-O,<br>Wavecore / WV-100N,<br>Wavecore / WV-1210NP,<br>Wavecore / WV-1002NF,<br>Ambeon / WL150A-USB,<br>BLUESTORK / BS-WN-USB/NANO,<br>Popcorn Hour / WN-150,<br>Pheenet / WLU-805N,<br>Pheenet / WLU-803N |
| **Model Discrepancy** | |

| Trade Name | Model Number | Difference |
|---|---|---|
| LanReady | WUB1900RM | USB Dongle / Chip 0.5dBi |
| LanReady | AWM1910PM | PCBA+Patch / Patch 10dBi |
| LanReady | AWS1902FM | PCBA+Omni / Omni 1.6dBi |
| LanReady | AWS1905FM | PCBA+Omni / Omni 5dBi |
| LanReady | AWS1908FM | PCBA+Omni / Omni 8dBi |
| LanReady | AWS1910FM | PCBA+Omni / Omni 10dBi |
| AirLink101 | AWLL5077 | USB Dongle / Chip 0.5dBi |
| AirLink101 | AWLL5055 | PCBA+Patch / Patch 10dBi |
| AirLink101 | AWLL5058 | PCBA+Omni / Omni 1.6dBi |
| Cerio | UW-200N-Mini | USB Dongle / Chip 0.5dBi |
| Cerio | UW-210N-P | PCBA+Patch / Patch 10dBi |
| Cerio | UW-202N-O | PCBA+Omni / Omni 1.6dBi |
| Wavecore | WV-100N | USB Dongle / Chip 0.5dBi |
| Wavecore | WV-1210NP | PCBA+Patch / Patch 10dBi |
| Wavecore | WV-1002NF | PCBA+Omni / Omni 1.6dBi |
| Ambeon | WL150A-USB | USB Dongle / Chip 0.5dBi |
| BLUESTORK | BS-WN-USB/NANO | USB Dongle / Chip 0.5dBi |
| Popcorn Hour | WN-150 | USB Dongle / Chip 0.5dBi |
| Pheenet | WLU-805N | PCBA+Patch / Patch 10dBi |
| Pheenet | WLU-803N | PCBA+Omni / Omni 1.6dBi |

| | |
|---|---|
| **Power Supply** | Powered from host device. |
| **Frequency Range** | 2412 ~ 2462 MHz |

| | |
|---|---|
| **Transmit Power** | **For Omni Antenna / Gain: 10 dBi**<br>IEEE 802.11b mode: 13.57 dBm<br>IEEE 802.11g mode: 18.36 dBm<br>draft 802.11n Standard-20 MHz Channel mode: 17.55 dBm<br>draft 802.11n Wide-40 MHz Channel mode: 16.41 dBm<br>**For Patch Antenna / Gain: 10 dBi**<br>IEEE 802.11b mode: 14.26 dBm<br>IEEE 802.11g mode: 19.39 dBm<br>draft 802.11n Standard-20 MHz Channel mode: 18.81 dBm<br>draft 802.11n Wide-40 MHz Channel mode: 17.76 dBm<br>**For Chip Antenna / Gain: 0.5 dBi**<br>IEEE 802.11b mode: 14.75 dBm<br>IEEE 802.11g mode: 18.36 dBm<br>draft 802.11n Standard-20 MHz Channel mode: 17.39 dBm<br>draft 802.11n Wide-40 MHz Channel mode: 16.70 dBm |
| **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. Omni Antenna / Gain: 1.6dBi<br>2. Omni Antenna / Gain: 5dBi<br>3. Omni Antenna / Gain: 8dBi<br>4. Omni Antenna / Gain: 10dBi<br>5. Patch Antenna / Gain: 10dBi<br>6. Chip Antenna / Gain: 0.5dBi |

***Remark:***

1. *The sample selected for test was production product and was provided by manufacturer.*
2. *This submittal(s) (test report) is intended for FCC ID: **SCD030014** 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 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.247.

## 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.

## 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 (model: WUB1900RM) had been tested under operating condition.

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

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.

**IEEE 802.11b mode:**
Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate and cyclic delay diversity were chosen for full testing.

**IEEE 802.11g mode:**
Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate and cyclic delay diversity were chosen for full testing.

**draft 802.11n Standard-20 MHz Channel mode:**
Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6.5Mbps data rate were chosen for full testing.

**draft 802.11n Wide-40 MHz Channel mode:**
Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with 13.5Mbps data rate were chosen for full testing.

# 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 | Agilent | E4446A | MY43360131 | 02/23/2010 |

| 3M Semi Anechoic Chamber | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Due** |
| Spectrum Analyzer | Agilent | E4446A | US42510252 | 09/09/2010 |
| Test Receiver | Rohde&Schwarz | ESCI | 100064 | 11/29/2010 |
| Switch Controller | TRC | Switch Controller | SC94050010 | 05/02/2010 |
| 4 Port Switch | TRC | 4 Port Switch | SC94050020 | 05/02/2010 |
| Loop Antenna | EMCO | 6502 | 8905/2356 | 05/29/2010 |
| Horn-Antenna | TRC | HA-0502 | 06 | 06/03/2010 |
| Horn-Antenna | TRC | HA-0801 | 04 | 06/17/2010 |
| Horn-Antenna | TRC | HA-1201A | 01 | 08/09/2010 |
| Horn-Antenna | TRC | HA-1301A | 01 | 08/10/2010 |
| Bilog- Antenna | Sunol Sciences | JB3 | A030205 | 03/28/2010 |
| Turn Table | Max-Full | MFT-120S | T120S940302 | N.C.R. |
| Antenna Tower | Max-Full | MFA-430 | A440940302 | N.C.R. |
| Controller | Max-Full | MF-CM886 | CC-C-1F-13 | N.C.R. |
| Site NSA | CCS | N/A | FCC MRA: TW1039<br>IC: 2324G-1 / -2 | 10/17/2010<br>11/04/2010 |
| Test S/W | LABVIEW (V 6.1) | | | |

| Powerline Conducted Emissions Test Site | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Due** |
| EMI TEST RECEIVER 9kHz-30MHz | ROHDE & SCHWARZ | ESHS30 | 828144/003 | 11/18/2010 |
| TWO-LINE V-NETWORK 9kHz-30MHz | SCHAFFNER | NNB41 | 03/10013 | 06/10/2010 |
| LISN 10kHz-100MHz | EMCO | 3825/2 | 9106-1809 | 04/08/2010 |
| Test S/W | LABVIEW (V 6.1) | | | |

## 4.3 MEASUREMENT UNCERTAINTY

| PARAMETER | UNCERTAINTY |
|---|---|
| Powerline Conducted Emission | +/- 2.81 |
| 3M Semi Anechoic Chamber / 30MHz ~ 1GHz | +/-3.7046 |
| 3M Semi Anechoic Chamber / Above 1GHz | +/-3.0958 |

***Remark**: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.*

# 5. FACILITIES AND ACCREDITATIONS

## 5.1 FACILITIES

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

☒ No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

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 TABLE OF ACCREDITATIONS AND LISTINGS

| Country | Agency | Scope of Accreditation | Logo |
|---|---|---|---|
| USA | FCC | 3M Semi Anechoic Chamber (FCC MRA: TW1309) to perform FCC Part 15/18 measurements | FCC MRA: TW1309 |
| Taiwan | TAF | LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310<br>IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12,2,<br>ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328,<br>ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893,<br>ETSI EN 301 489-1/3/7/17<br>FCC OET Bulletin 65 + Supplement C,<br>EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385,<br>EN 50392, IEC 62209, CNS 14958-1, CNS 14959<br>FCC Method –47 CFR Part 15 Subpart B<br>IEC / EN 61000-3-2, IEC / EN 61000-3-3,<br>IEC / EN 61000-4-2/3/4/5/6/8/11 | TAF Testing Laboratory 1309 |
| Canada | Industry Canada | 3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform | Canada<br>IC 2324G-1<br>IC 2324G-2 |

** No part of this report may be used to claim or imply product endorsement by A2LA 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. | LCD Monitor | Samsung | 710V | GS17H9NXA05864E | FCC DoC | VGA Cable: Shielded, 1.8m with two cores | AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core |
| 2. | Notebook PC | DELL | PP19L | GK102 A00 | QDS-BRCM1021 | N/A | AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core |
| 3. | Notebook PC | IBM | 1951-I3V(T60) | L3B2188 | FCC DoC | LAN Cable: Unshielded, 10m Line Cable: Unshielded, 10m | AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core |
| 4. | USB Mouse | DELL | MO56UO | 408031121 | FCC DoC | Shielded, 1.8m | N/A |
| 5. | USB 2.0 External HDD | TeraSyS | F12-U | A0100214-43b0012 | FCC DoC | Shielded, 1.8m | N/A |
| 6. | Wireless Pre-N Router (Remote) | BELKIN | F5D8230-4 | N/A | SA3-AGNO901APO100 | 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.*

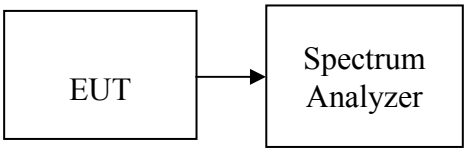
# 7. FCC PART 15.247 REQUIREMENTS

## 7.1 6DB BANDWIDTH

## LIMIT

According to §15.247(a)(2), 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

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100 kHz, VBW = RBW, Span = 50 MHz, Sweep = auto.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

## TEST RESULTS

*No non-compliance noted*

## Test Data

### For Omni Antenna

**Test mode: IEEE 802.11b mode**

| Channel | Frequency (MHz) | Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2412 | 10.08 | >500 | PASS |
| Mid | 2437 | 9.08 | | PASS |
| High | 2462 | 9.75 | | PASS |

**Test mode: IEEE 802.11g mode**

| Channel | Frequency (MHz) | Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2412 | 16.50 | >500 | PASS |
| Mid | 2437 | 16.50 | | PASS |
| High | 2462 | 16.50 | | PASS |

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

| Channel | Frequency (MHz) | Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2412 | 17.83 | >500 | PASS |
| Mid | 2437 | 17.83 | | PASS |
| High | 2462 | 17.83 | | PASS |

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

| Channel | Frequency (MHz) | Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2422 | 36.50 | >500 | PASS |
| Mid | 2437 | 36.50 | | PASS |
| High | 2452 | 36.50 | | PASS |

## For Patch Antenna

### Test mode: IEEE 802.11b mode

| Channel | Frequency (MHz) | Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2412 | 9.58 | >500 | PASS |
| Mid | 2437 | 9.83 | | PASS |
| High | 2462 | 10.08 | | PASS |

### Test mode: IEEE 802.11g mode

| Channel | Frequency (MHz) | Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2412 | 16.50 | >500 | PASS |
| Mid | 2437 | 16.50 | | PASS |
| High | 2462 | 16.50 | | PASS |

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

| Channel | Frequency (MHz) | Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2412 | 17.83 | >500 | PASS |
| Mid | 2437 | 17.67 | | PASS |
| High | 2462 | 17.83 | | PASS |

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

| Channel | Frequency (MHz) | Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2422 | 36.40 | >500 | PASS |
| Mid | 2437 | 36.52 | | PASS |
| High | 2452 | 36.63 | | PASS |

## For Chip Antenna

### Test mode: IEEE 802.11b mode

| Channel | Frequency (MHz) | Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2412 | 10.08 | >500 | PASS |
| Mid | 2437 | 10.08 | | PASS |
| High | 2462 | 9.67 | | PASS |

### Test mode: IEEE 802.11g mode

| Channel | Frequency (MHz) | Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2412 | 16.58 | >500 | PASS |
| Mid | 2437 | 16.58 | | PASS |
| High | 2462 | 16.58 | | PASS |

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

| Channel | Frequency (MHz) | Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2412 | 17.83 | >500 | PASS |
| Mid | 2437 | 17.75 | | PASS |
| High | 2462 | 17.75 | | PASS |

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

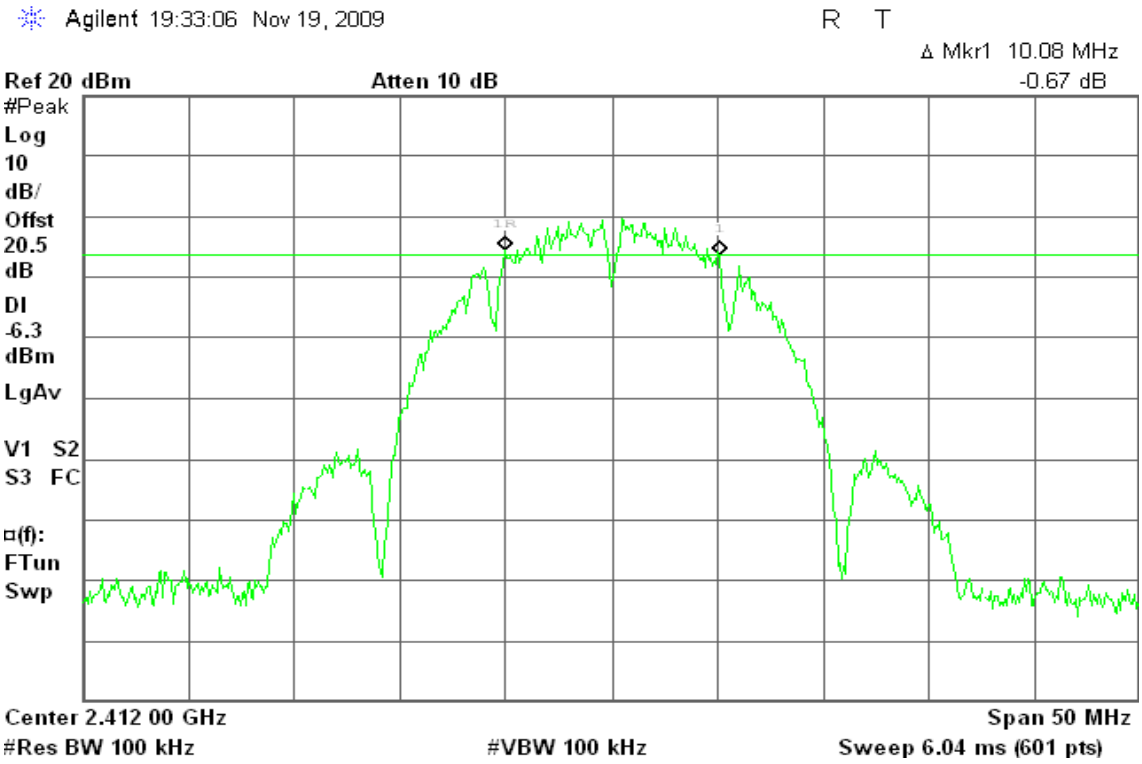
| Channel | Frequency (MHz) | Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2422 | 36.33 | >500 | PASS |
| Mid | 2437 | 36.33 | | PASS |
| High | 2452 | 36.42 | | PASS |

## Test Plot

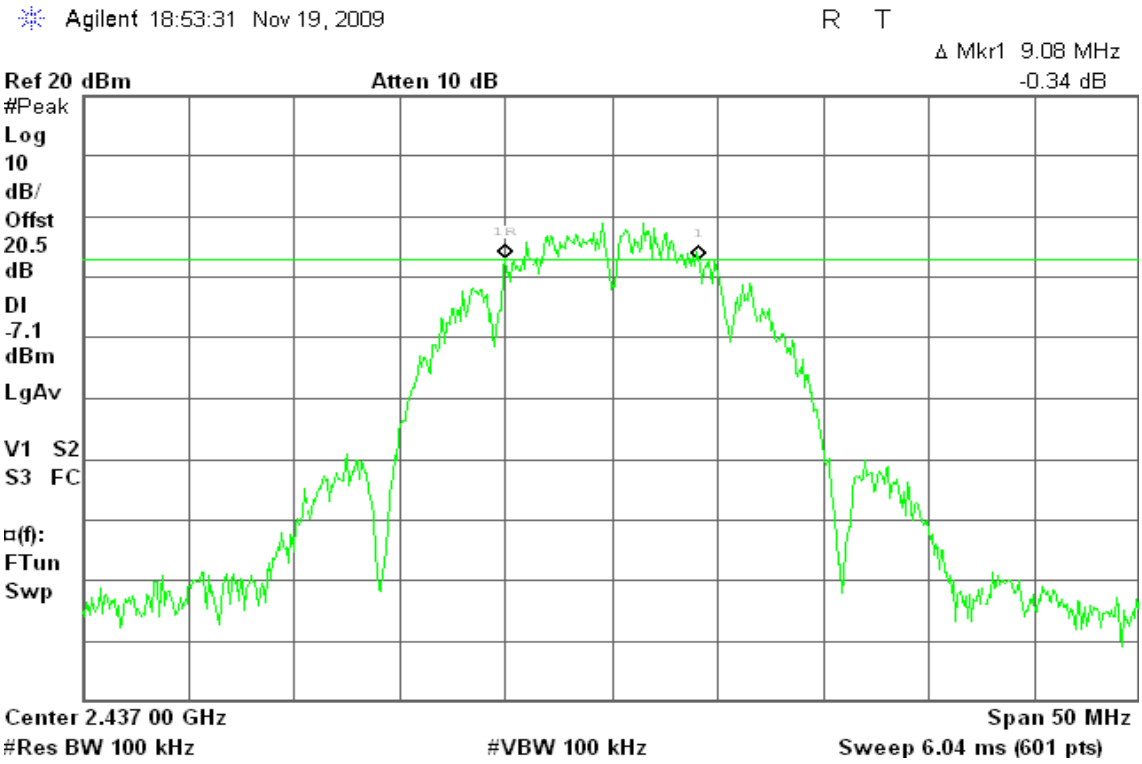
### For Omni Antenna

### IEEE 802.11b mode

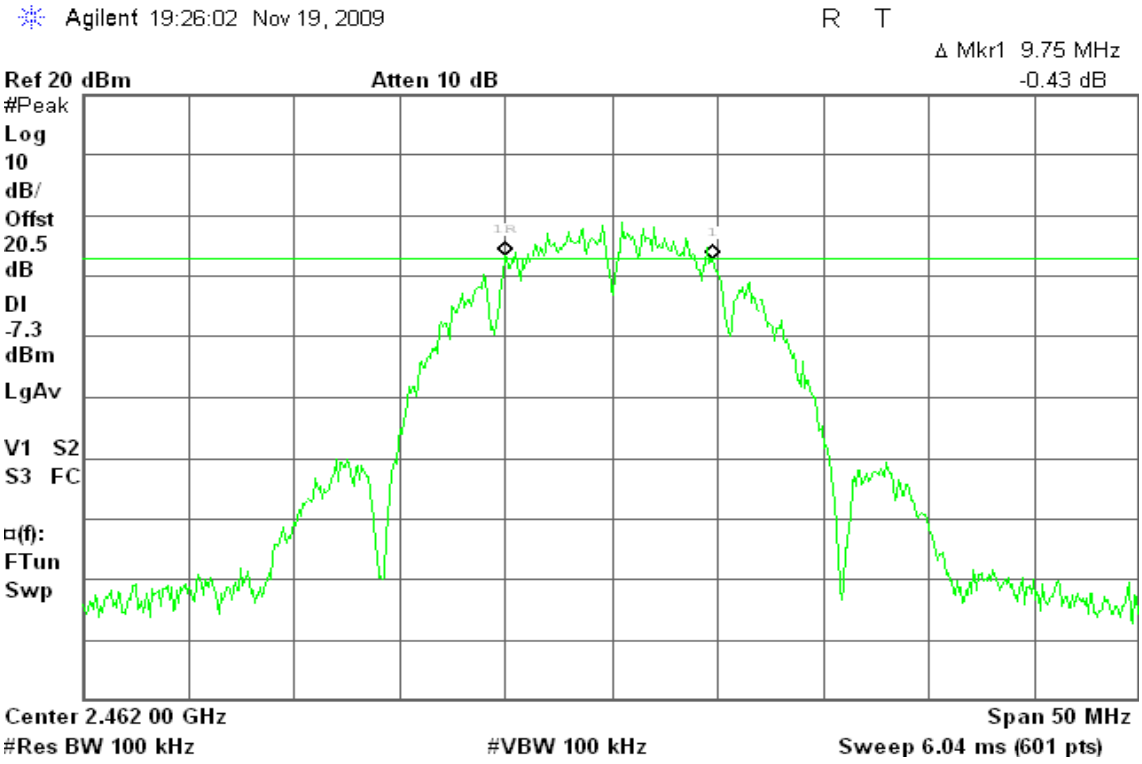
### 6dB Bandwidth (CH Low)




### 6dB Bandwidth (CH Mid)

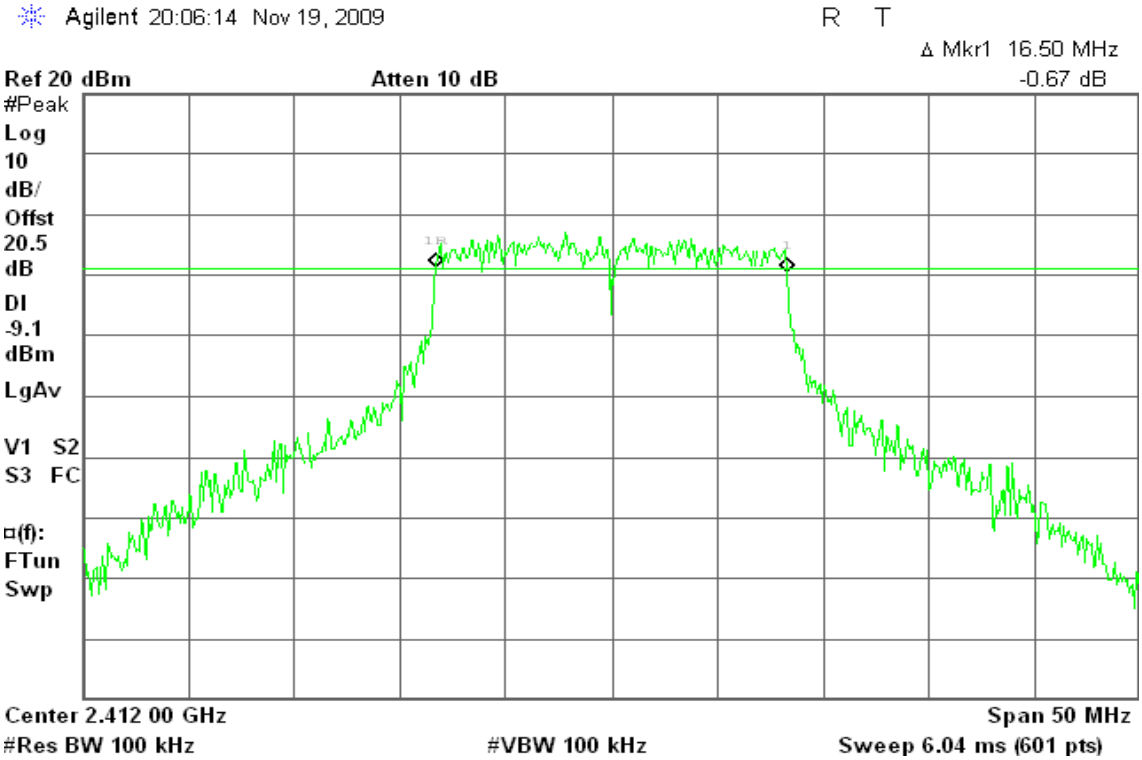


## 6dB Bandwidth (CH High)

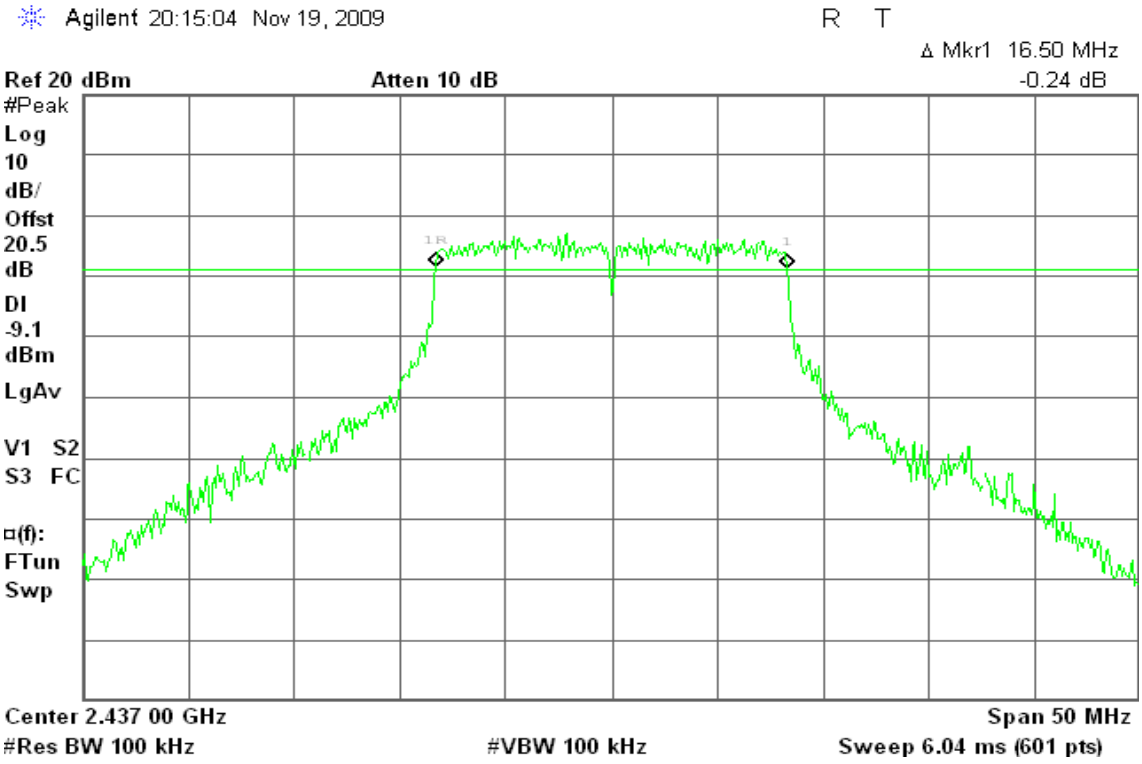



## IEEE 802.11g mode

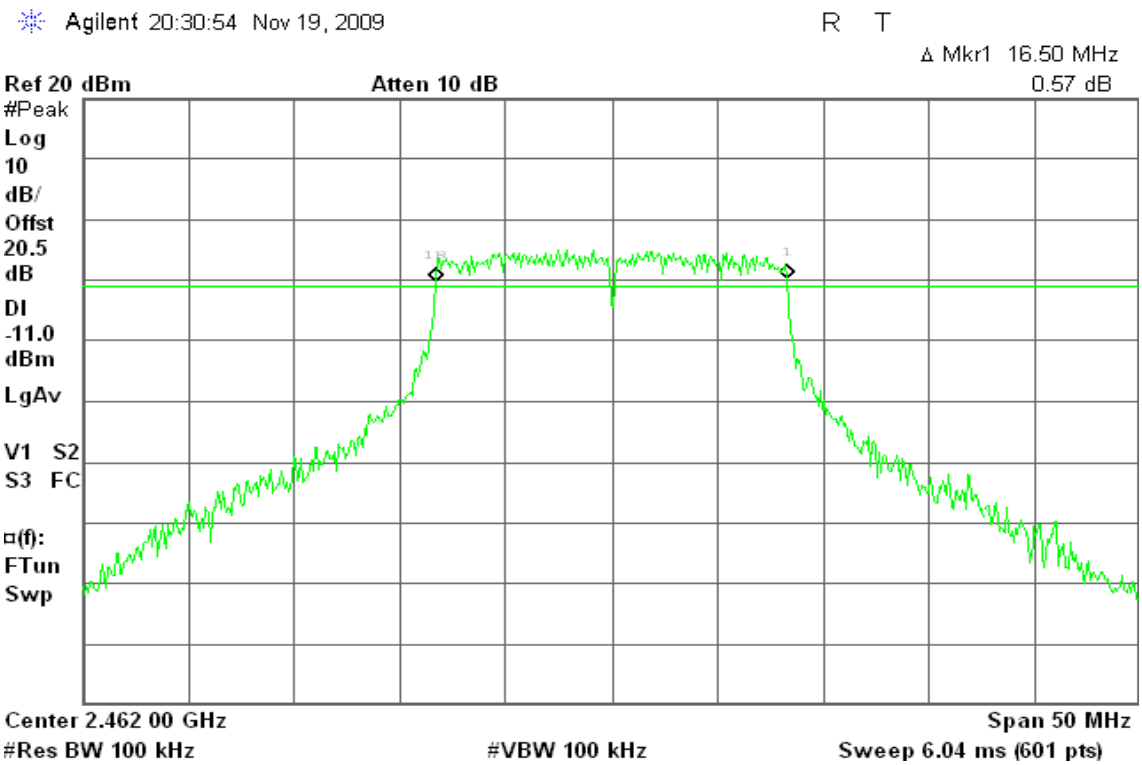
## 6dB Bandwidth (CH Low)



## 6dB Bandwidth (CH Mid)

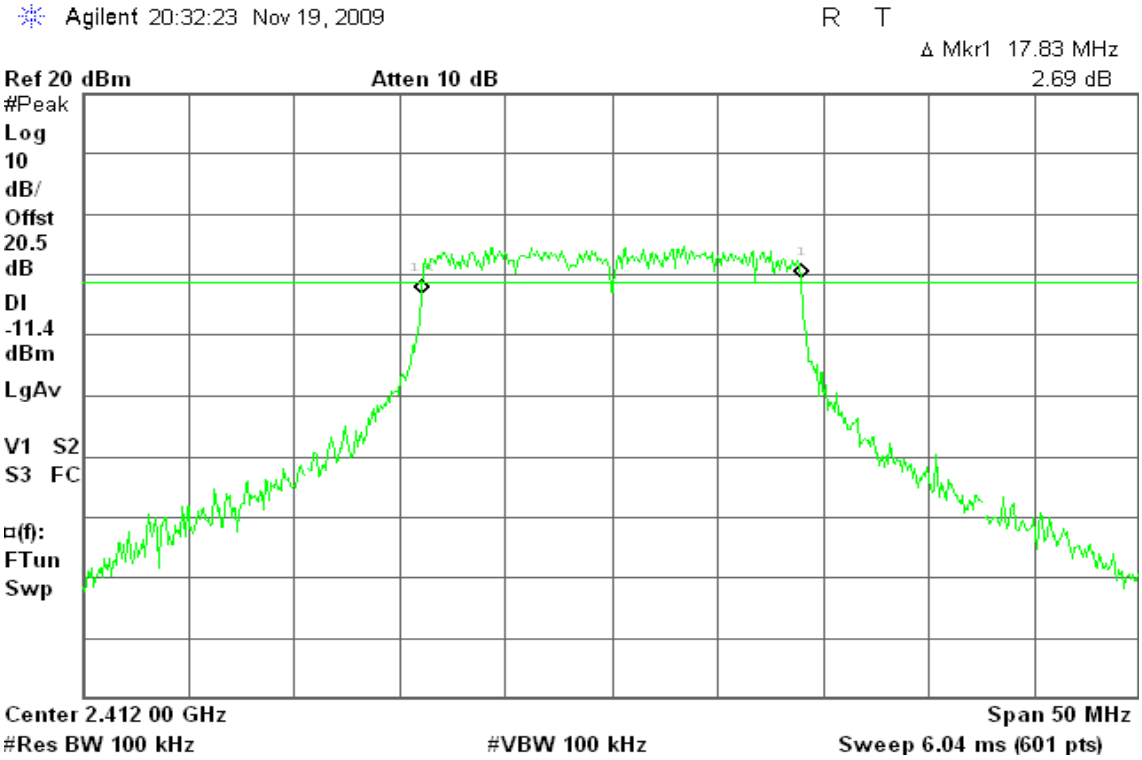



## 6dB Bandwidth (CH High)

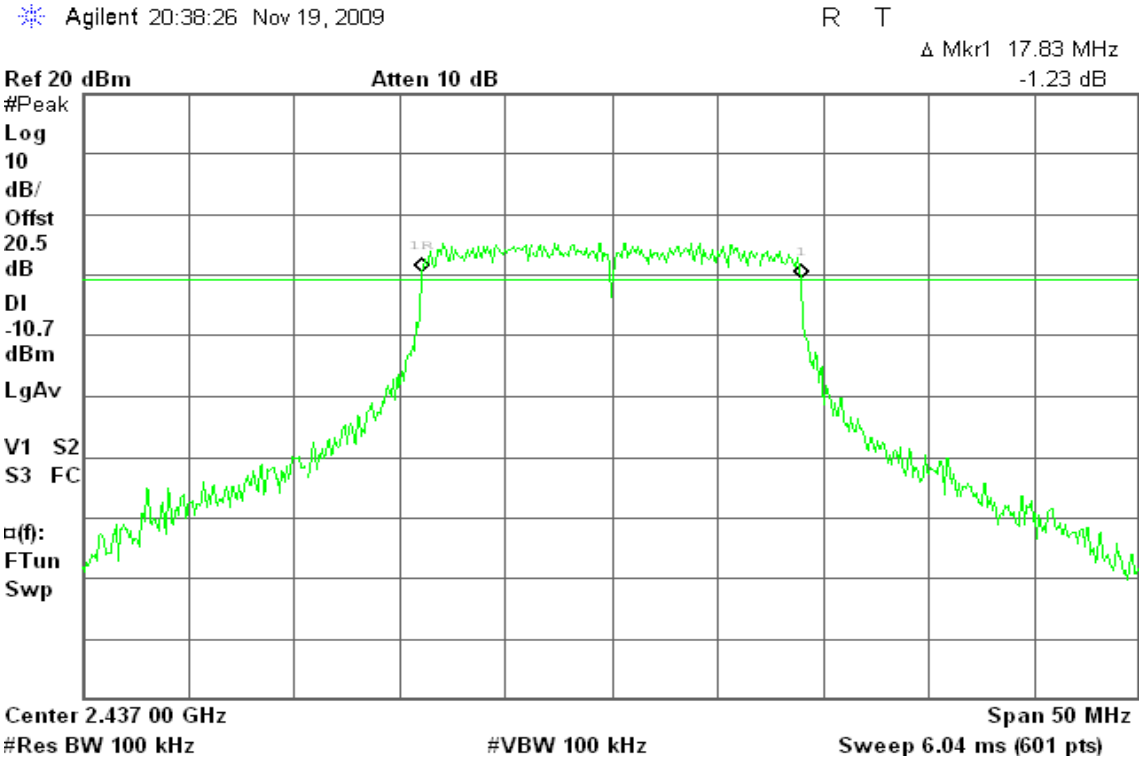


## draft 802.11n Standard-20 MHz Channel mode

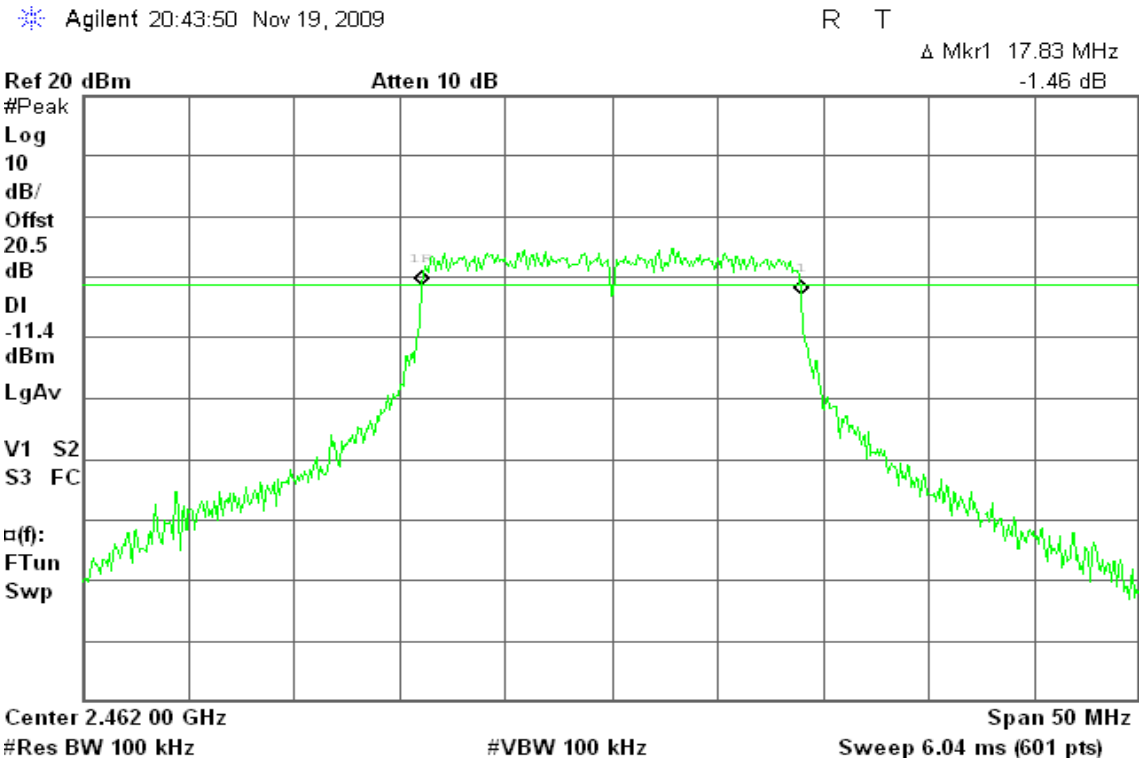
### 6dB Bandwidth (CH Low)




### 6dB Bandwidth (CH Mid)

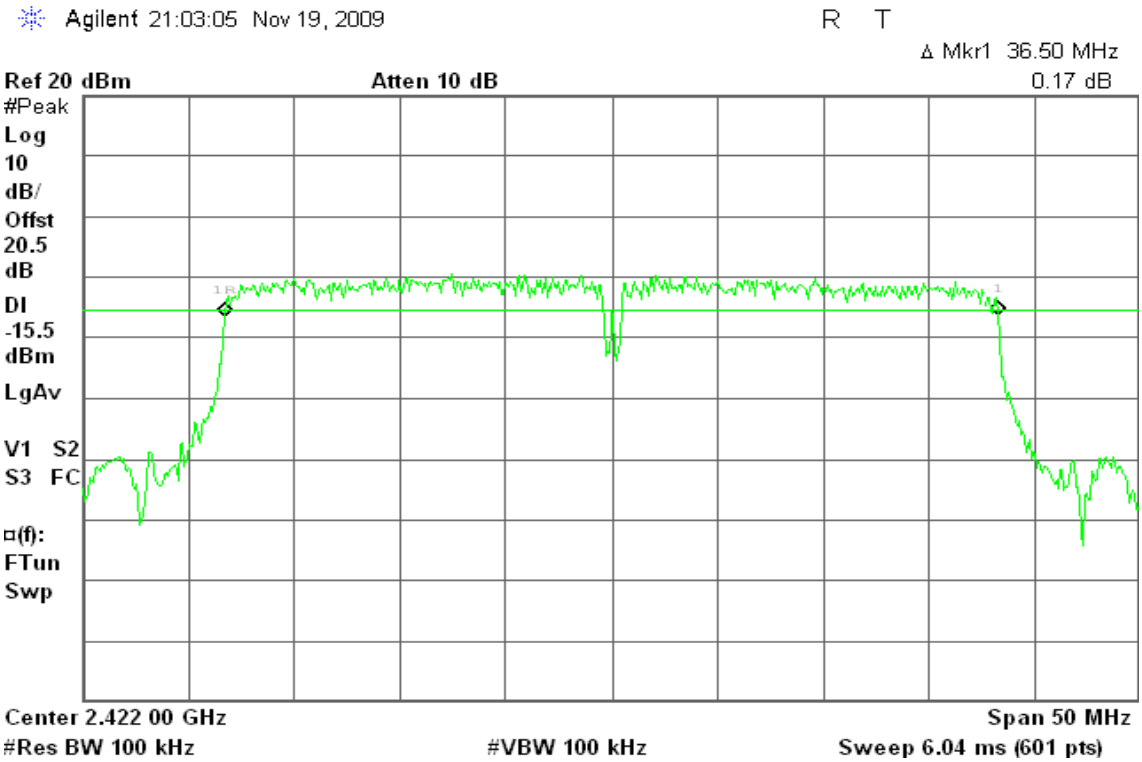


## 6dB Bandwidth (CH High)

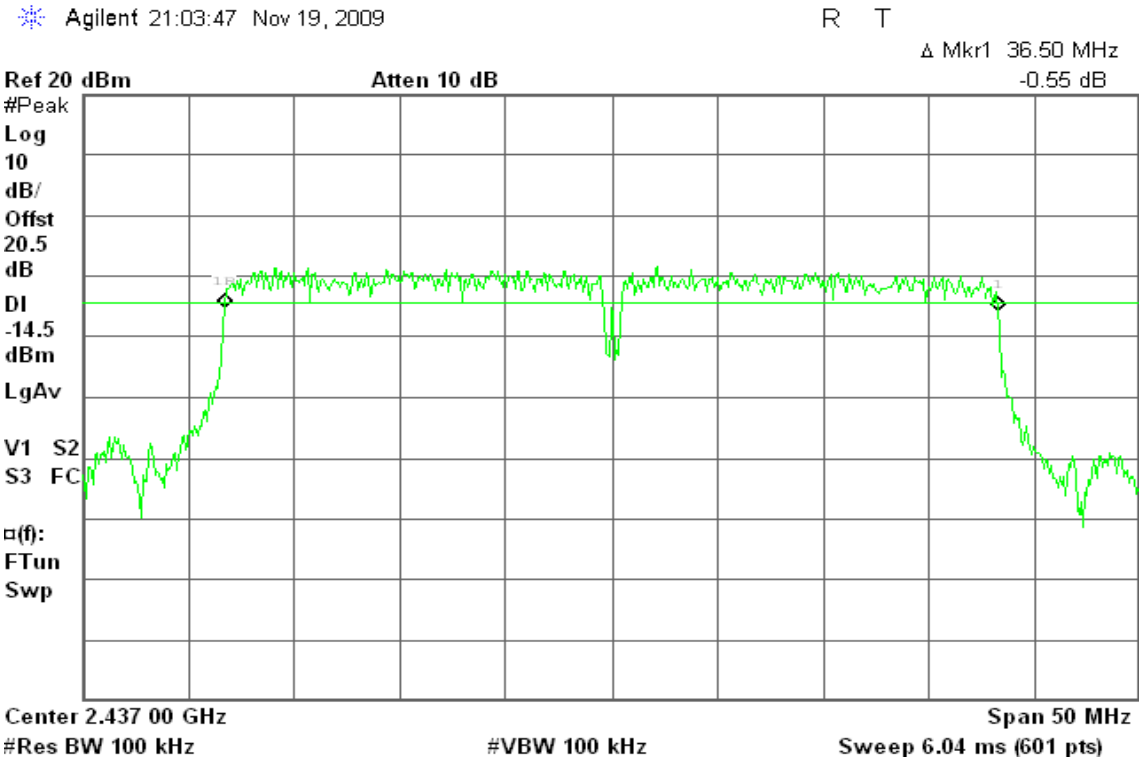



## draft 802.11n Wide-40 MHz Channel mode

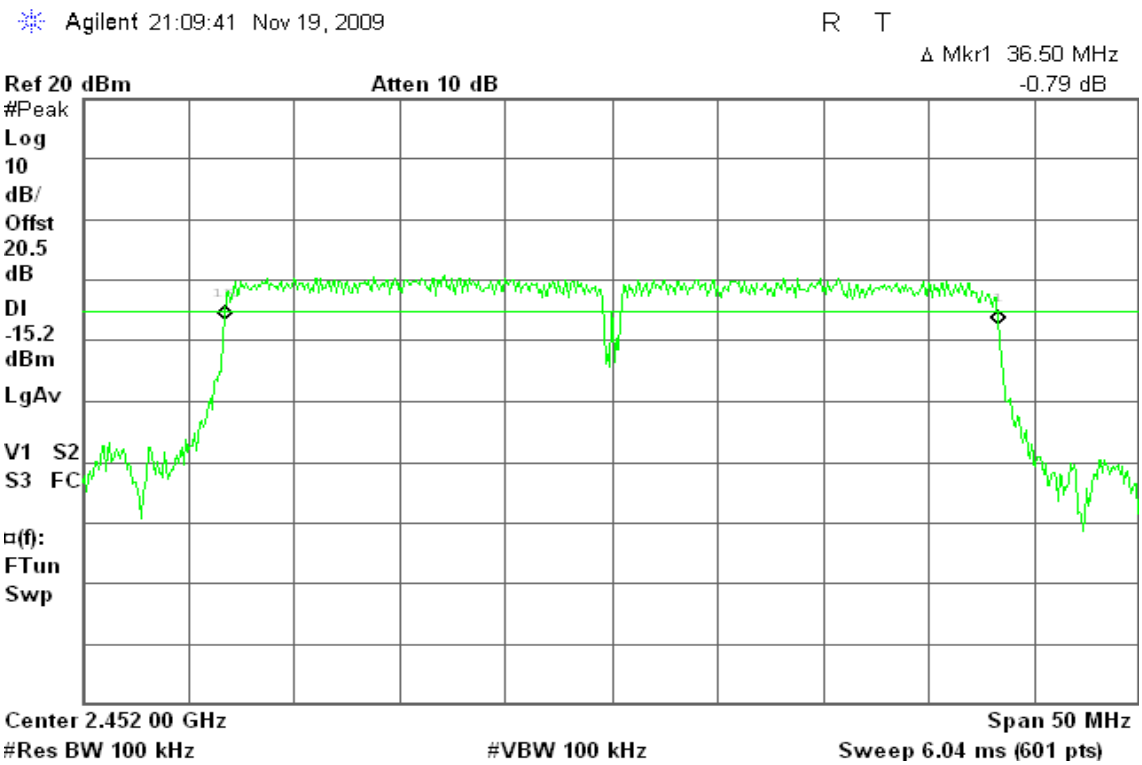
## 6dB Bandwidth (CH Low)



## 6dB Bandwidth (CH Mid)



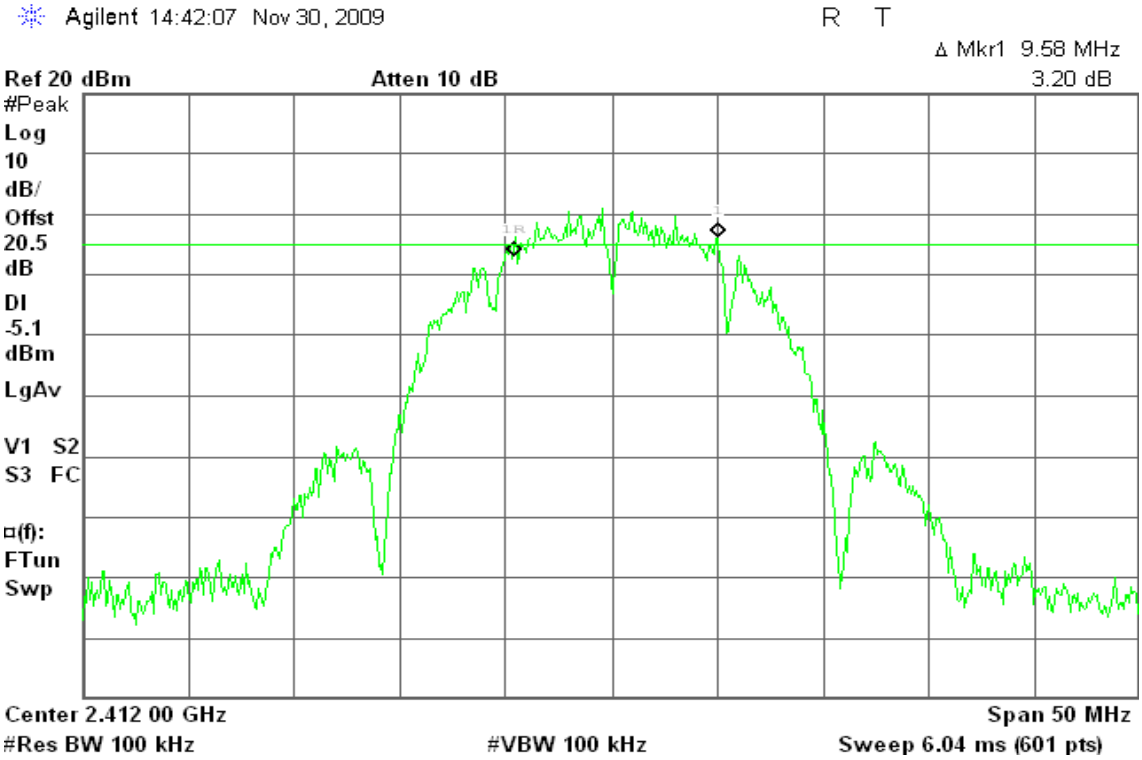

## 6dB Bandwidth (CH High)



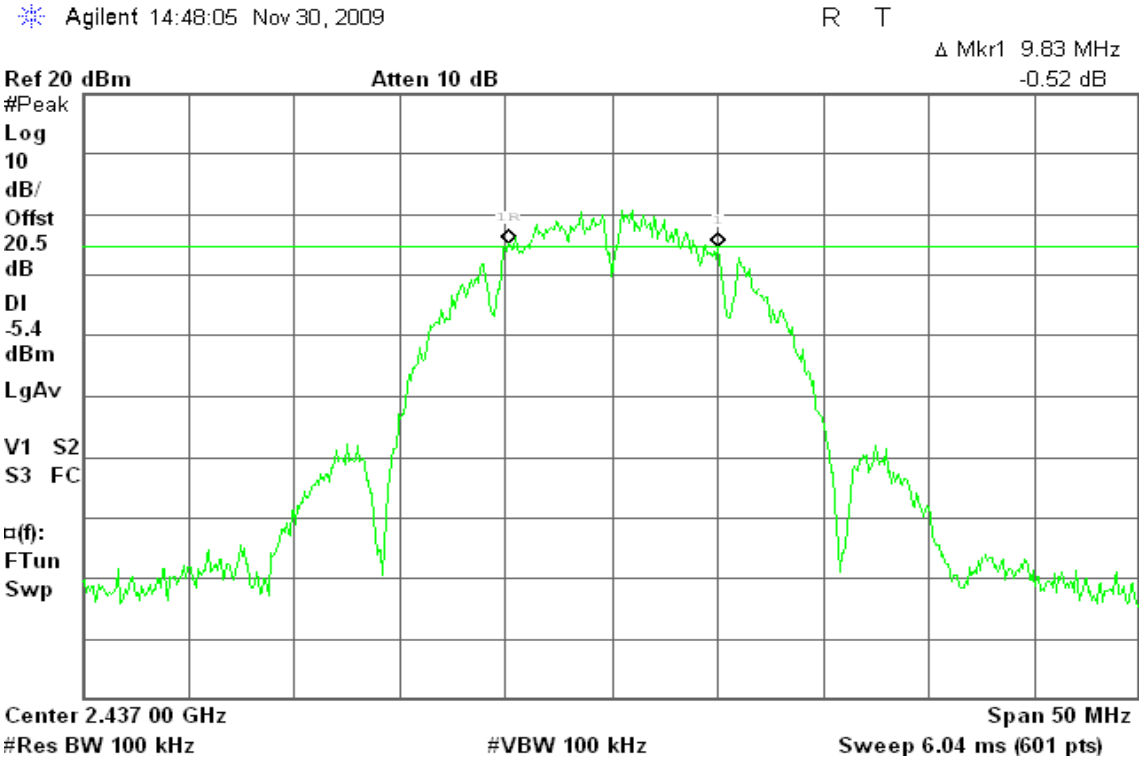
## For Patch Antenna

## IEEE 802.11b mode

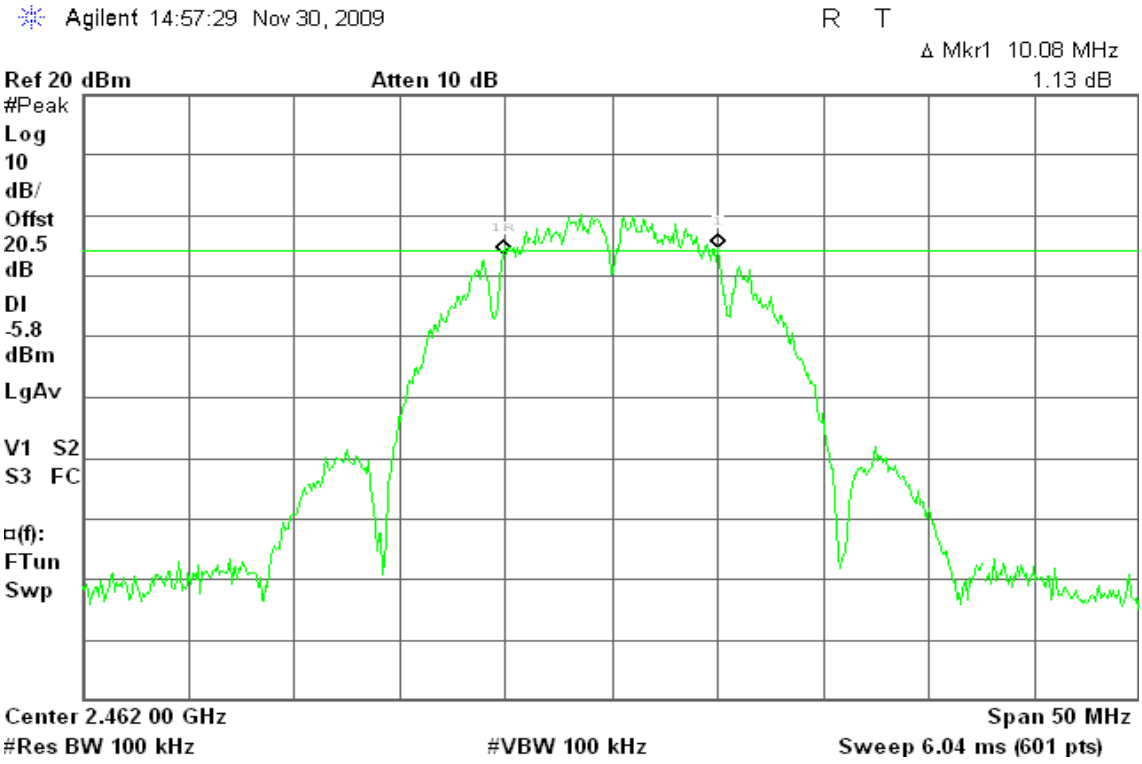
### 6dB Bandwidth (CH Low)




### 6dB Bandwidth (CH Mid)

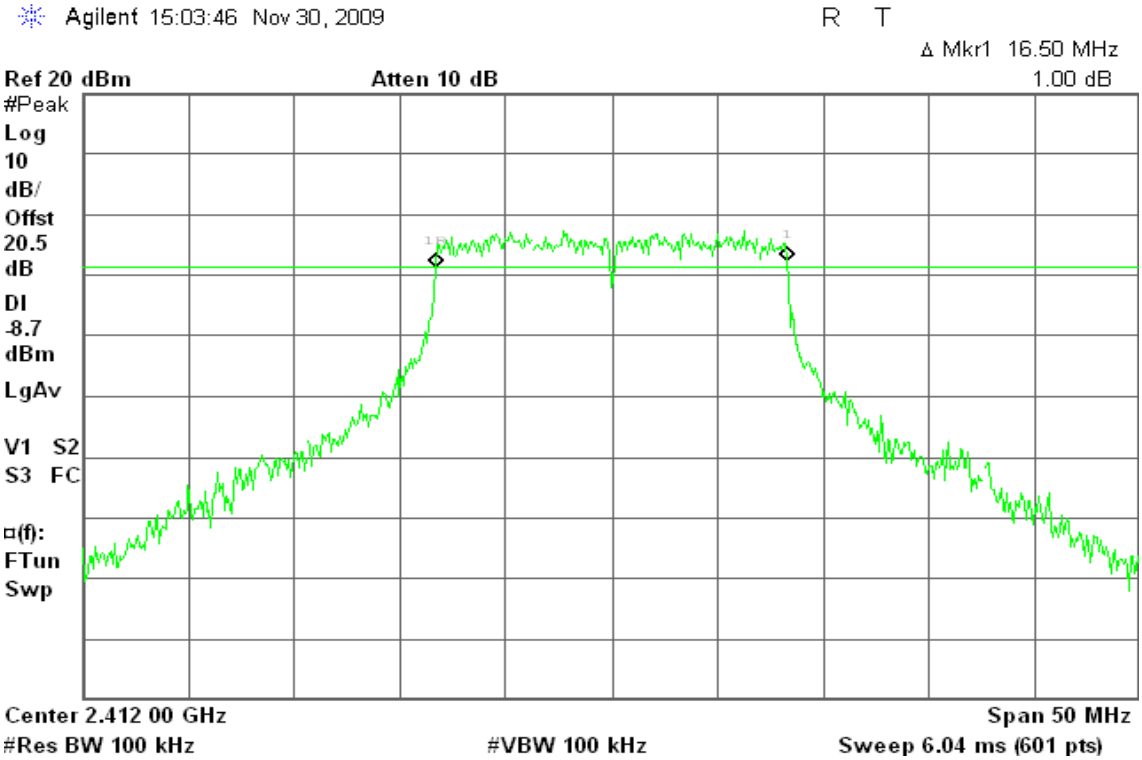


## 6dB Bandwidth (CH High)

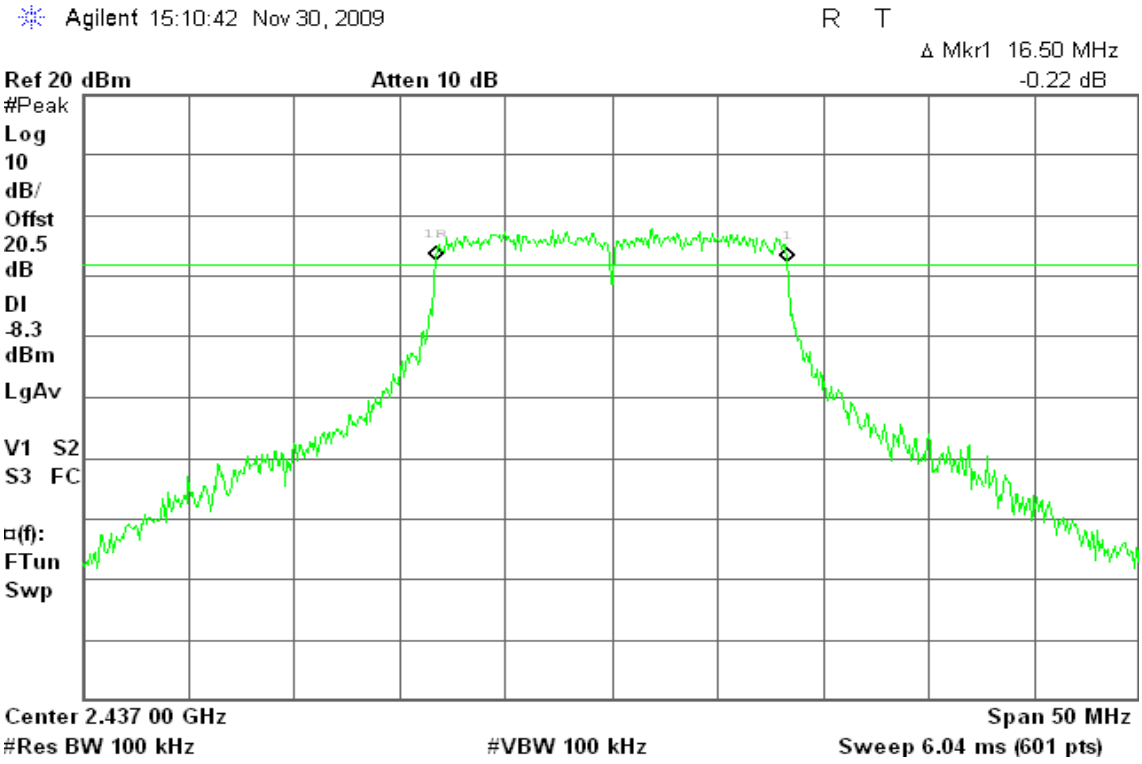



## IEEE 802.11g mode

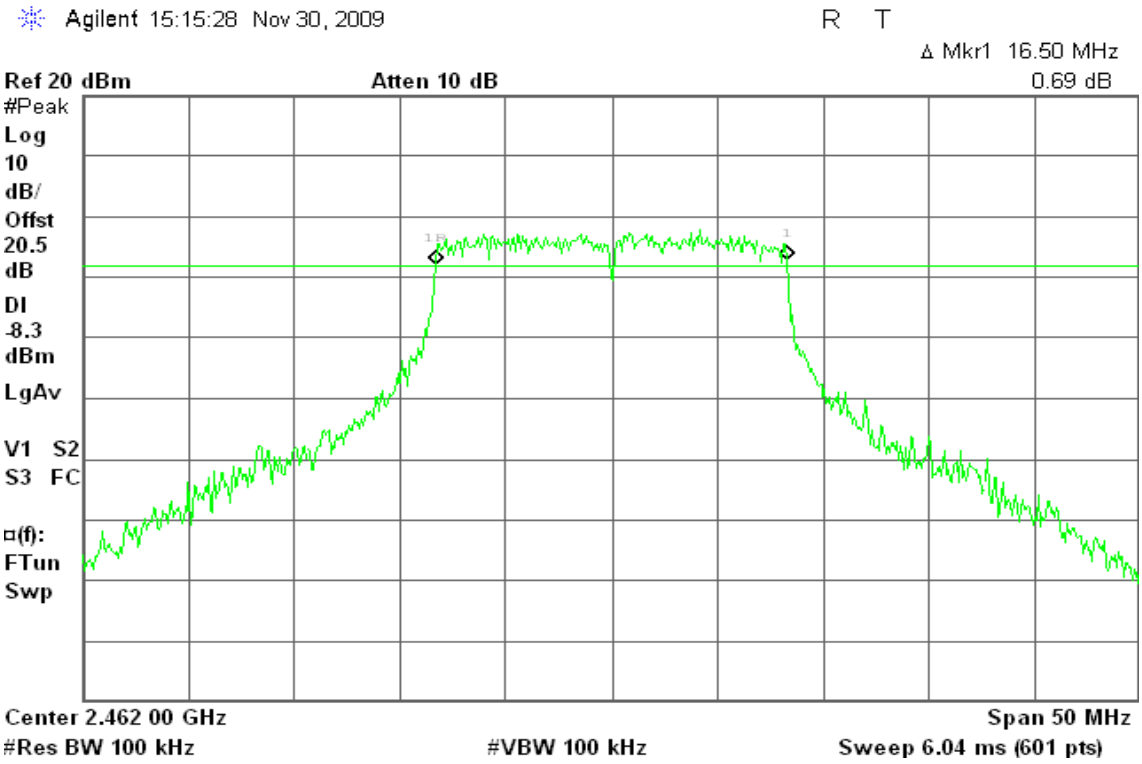
## 6dB Bandwidth (CH Low)



## 6dB Bandwidth (CH Mid)

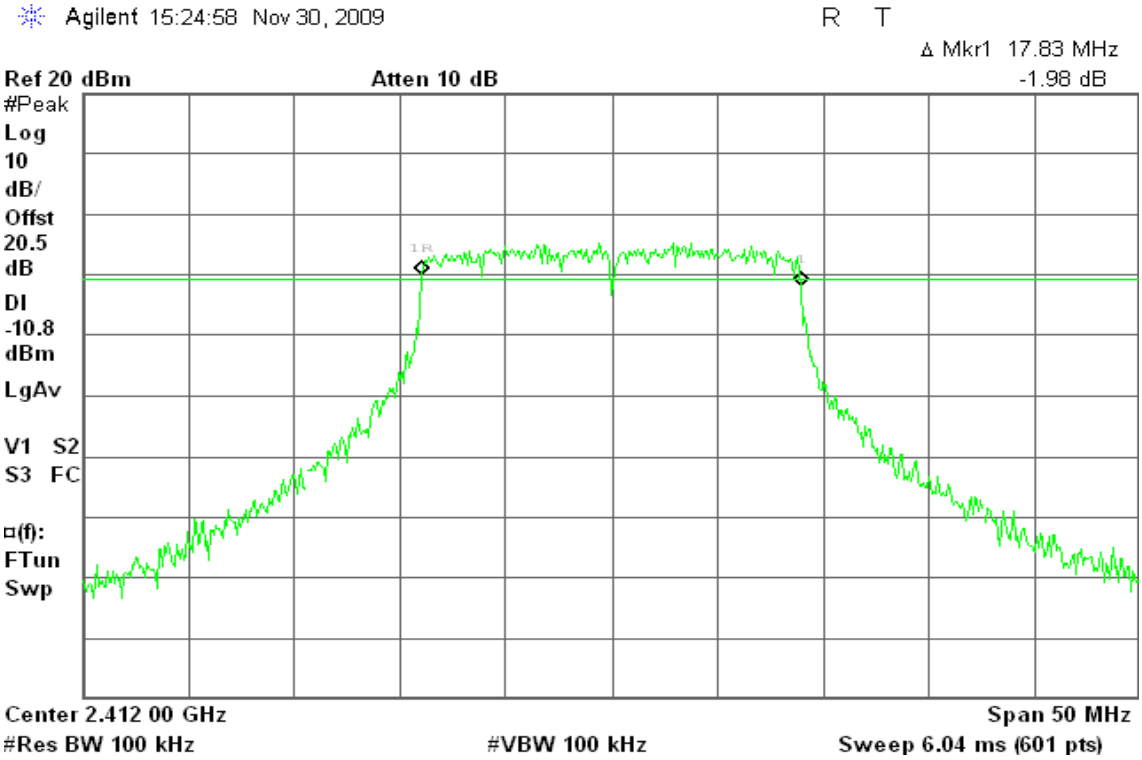



## 6dB Bandwidth (CH High)

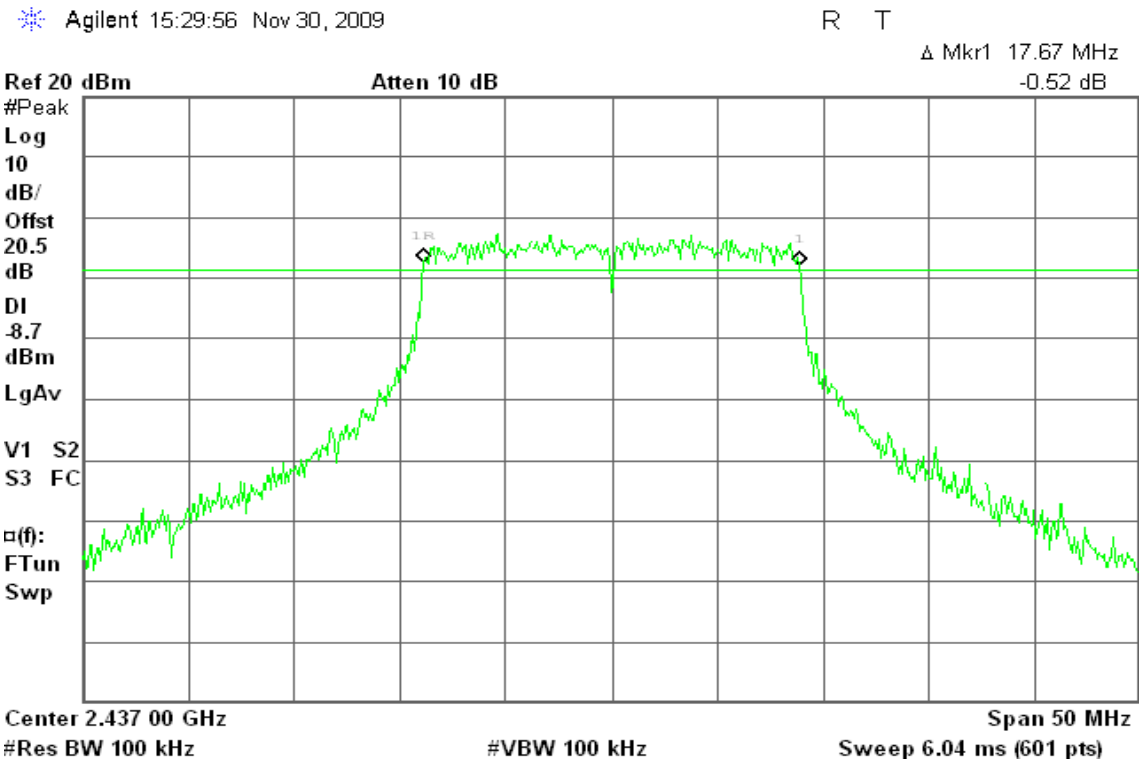


## draft 802.11n Standard-20 MHz Channel mode

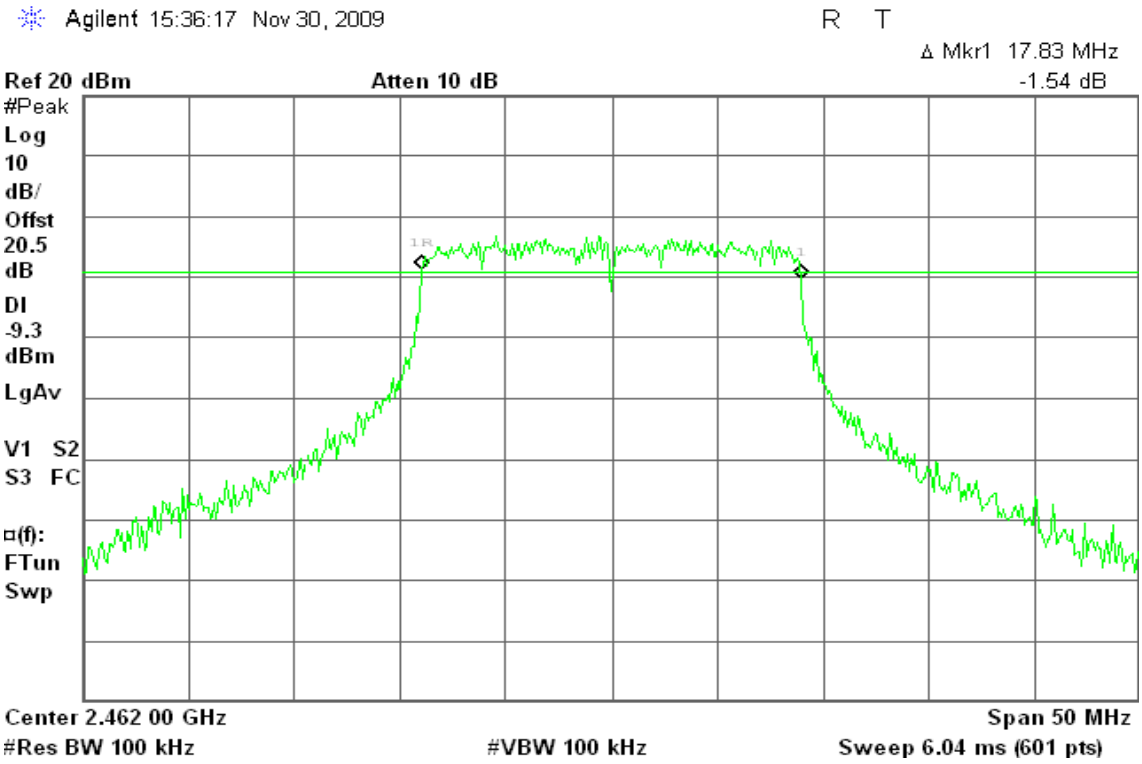
### 6dB Bandwidth (CH Low)




### 6dB Bandwidth (CH Mid)

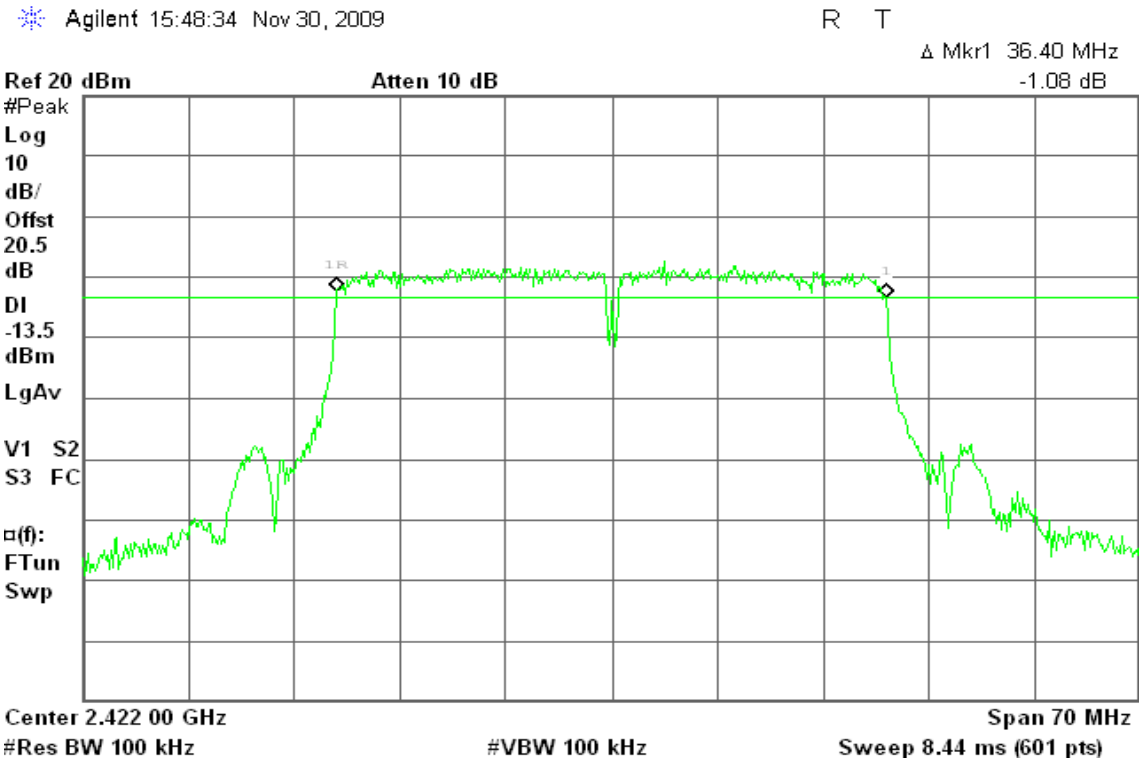


## 6dB Bandwidth (CH High)

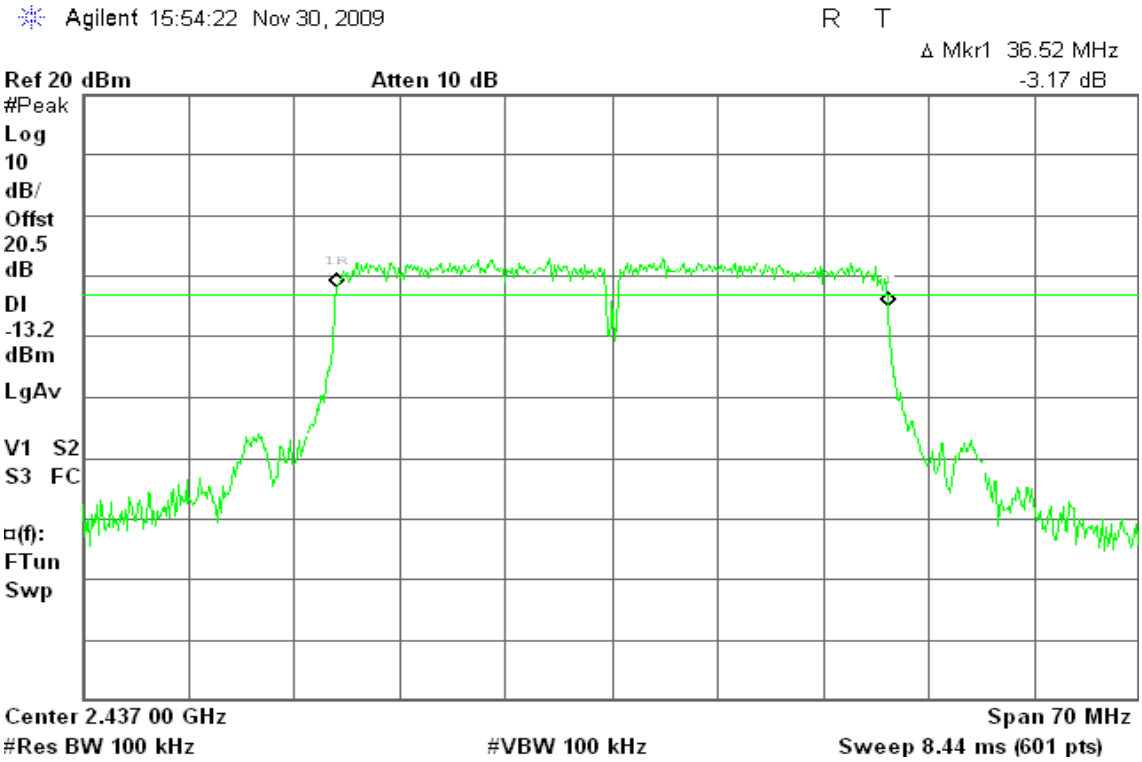



## draft 802.11n Wide-40 MHz Channel mode

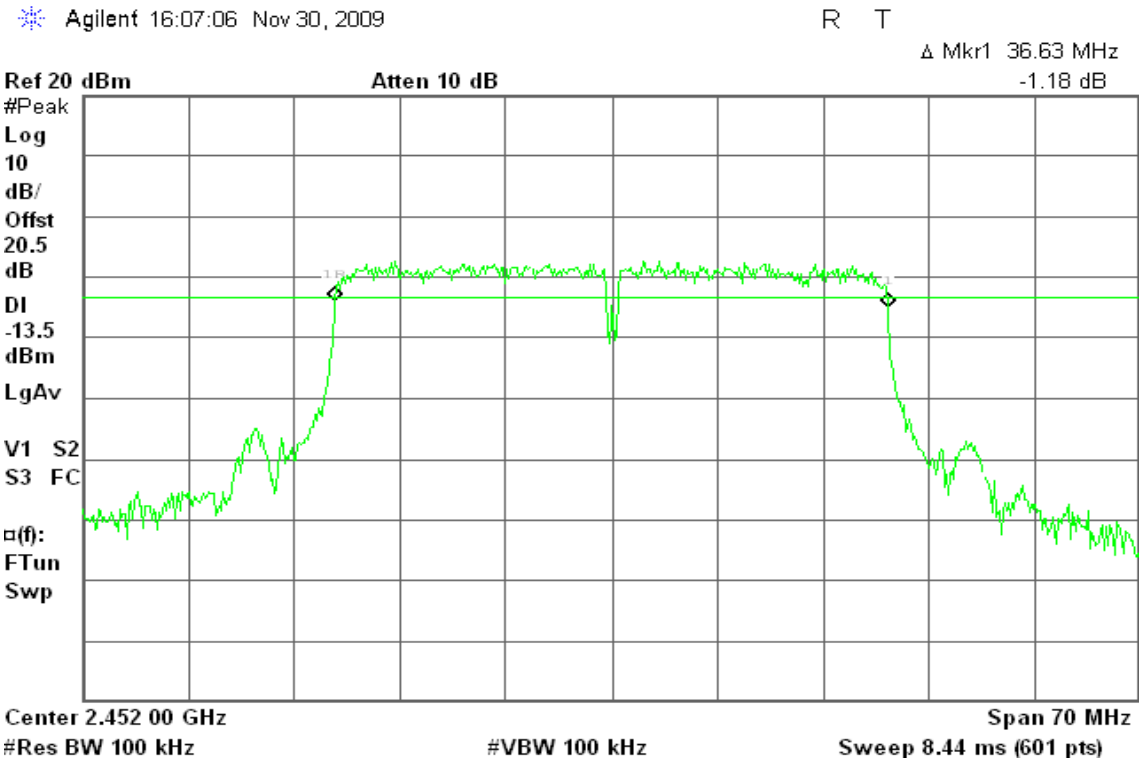
## 6dB Bandwidth (CH Low)



## 6dB Bandwidth (CH Mid)



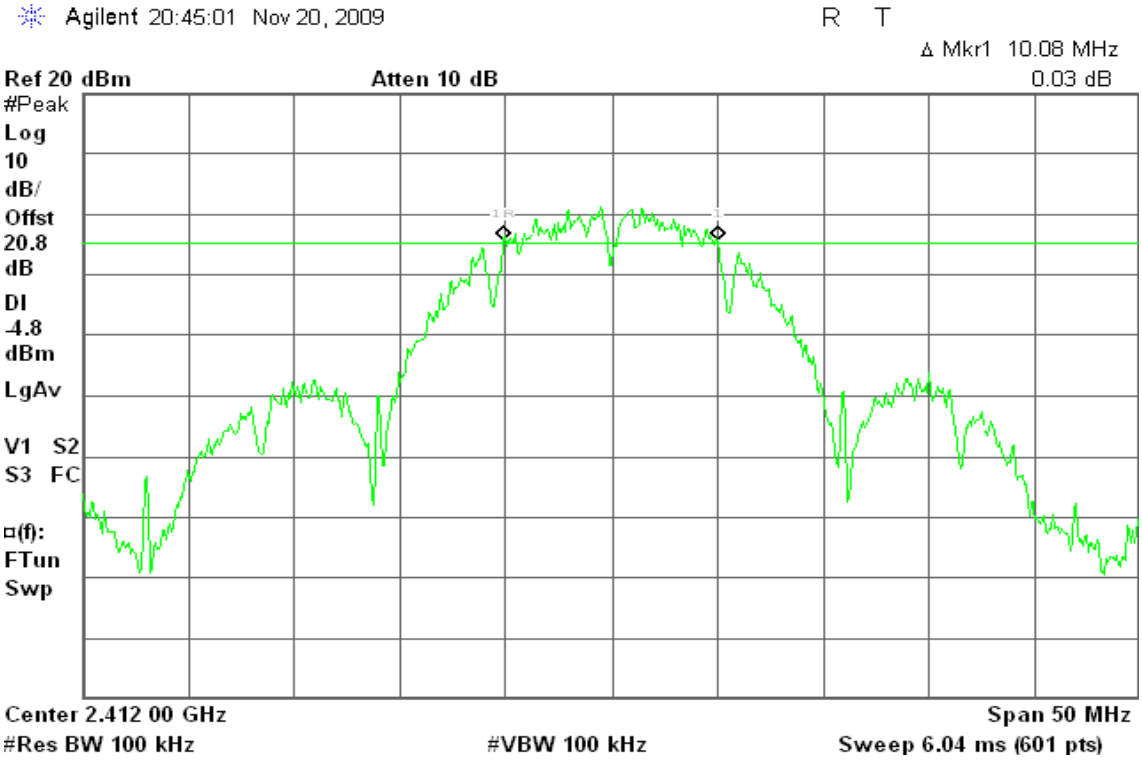

## 6dB Bandwidth (CH High)



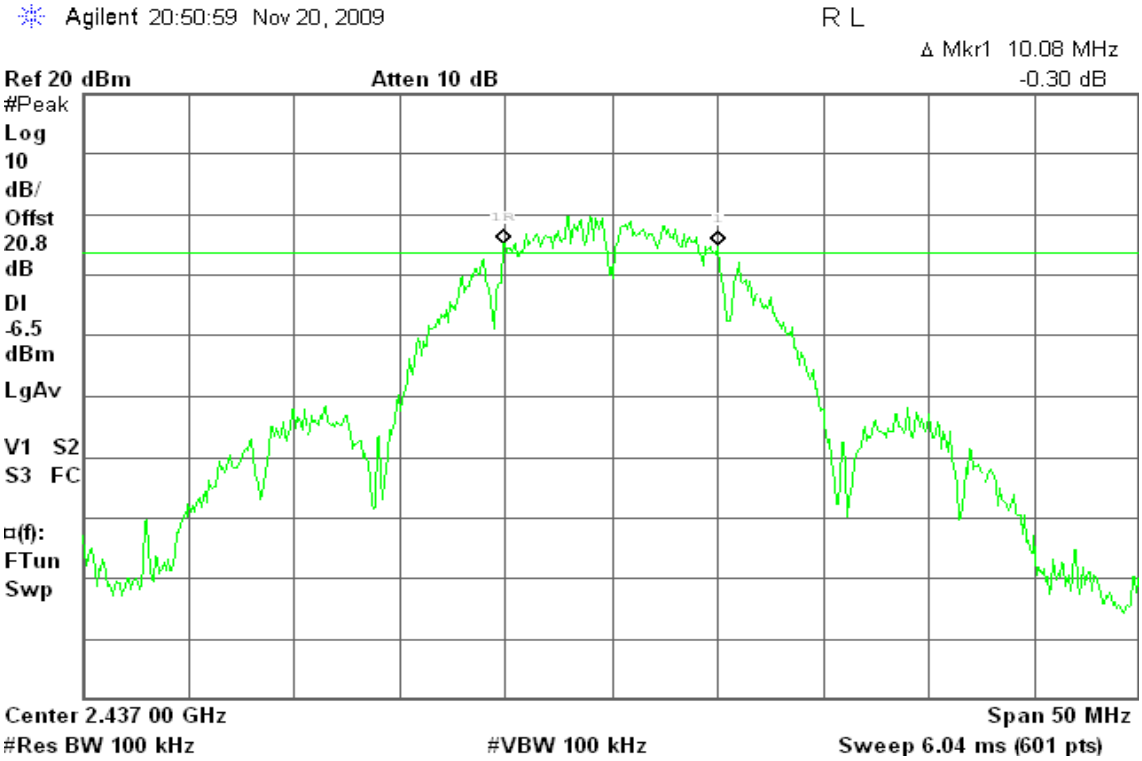
## For Chip Antenna

## IEEE 802.11b mode

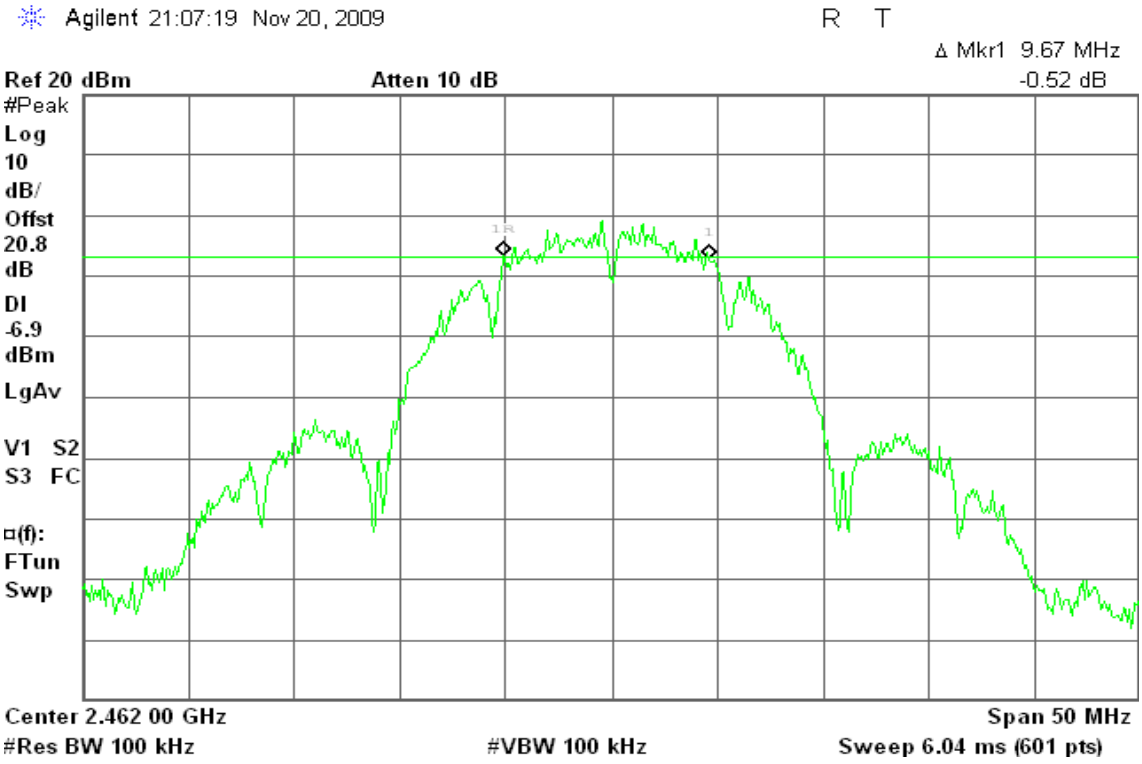
### 6dB Bandwidth (CH Low)




### 6dB Bandwidth (CH Mid)

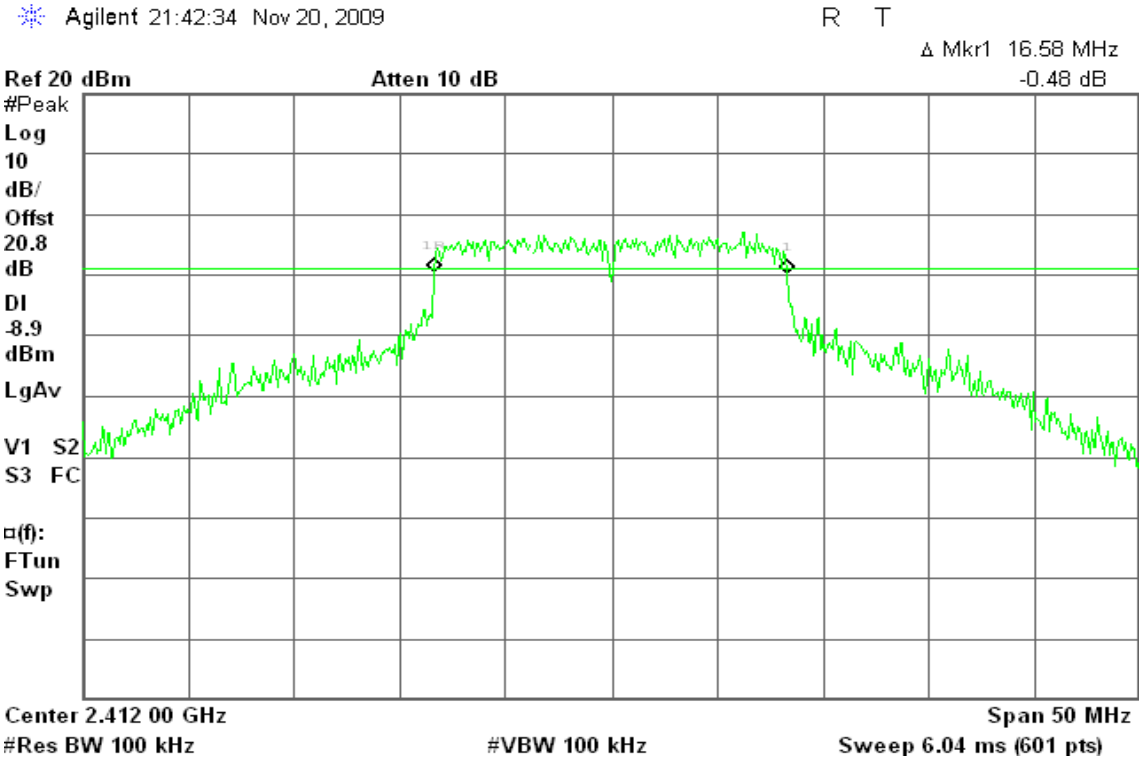


## 6dB Bandwidth (CH High)

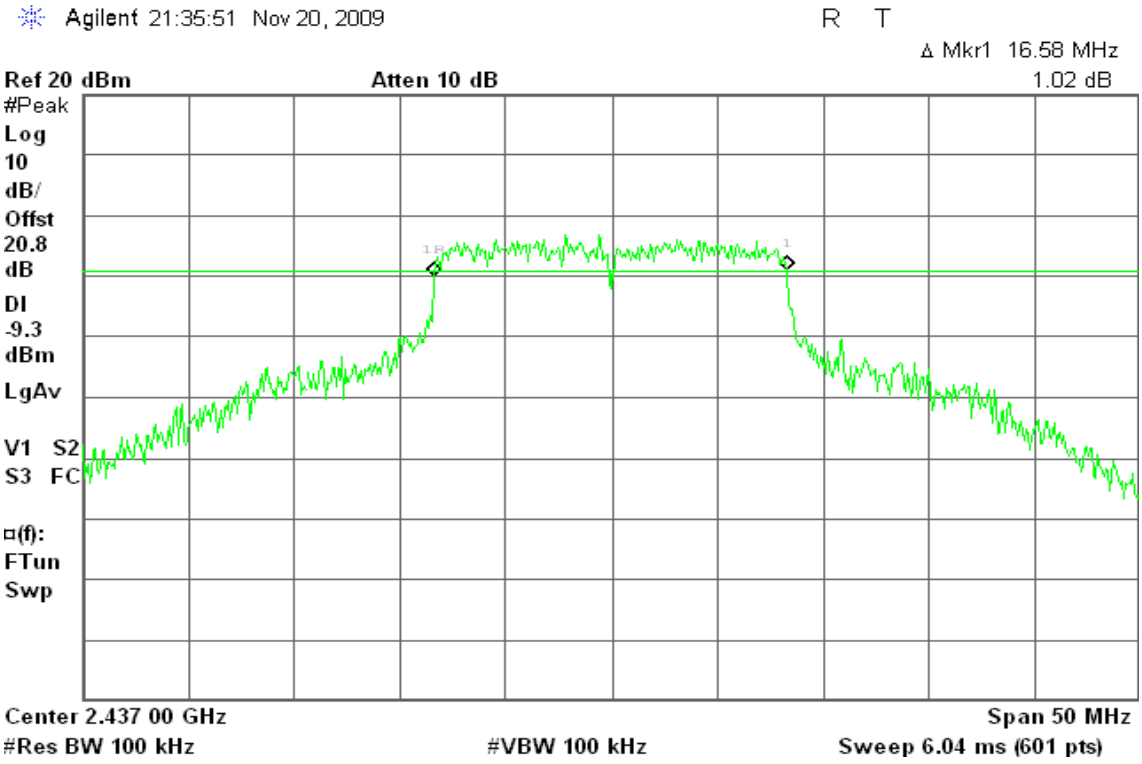



## IEEE 802.11g mode

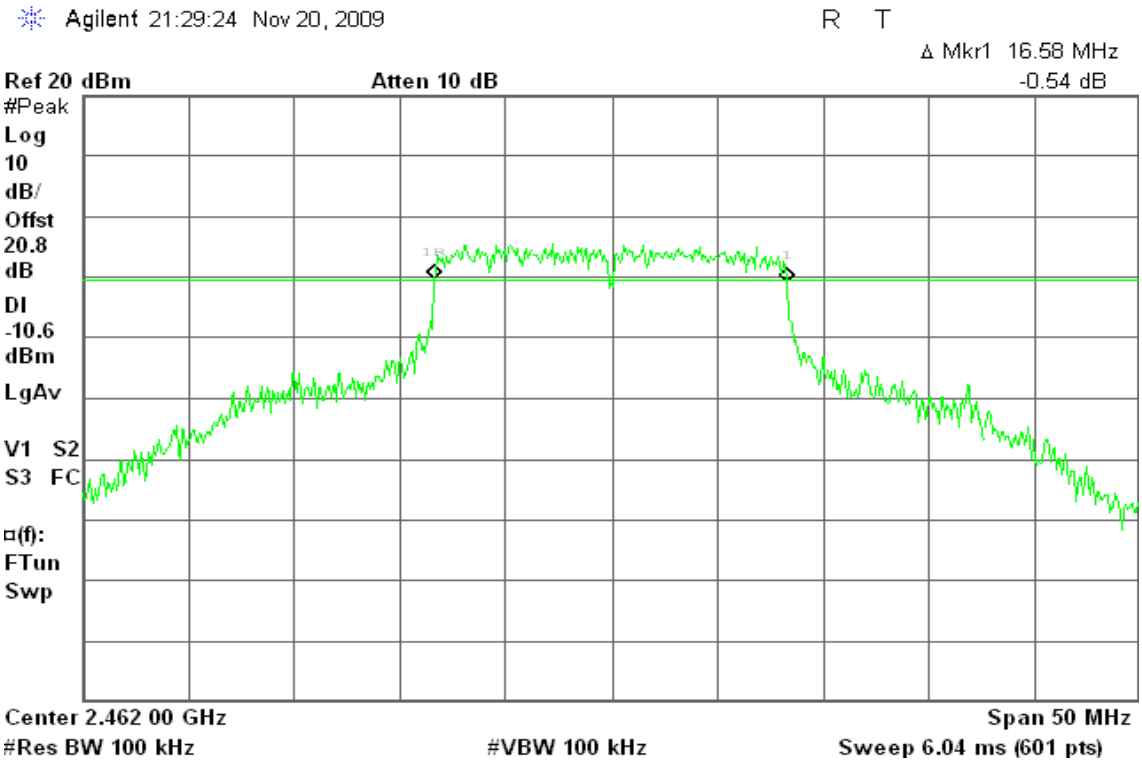
## 6dB Bandwidth (CH Low)



## 6dB Bandwidth (CH Mid)

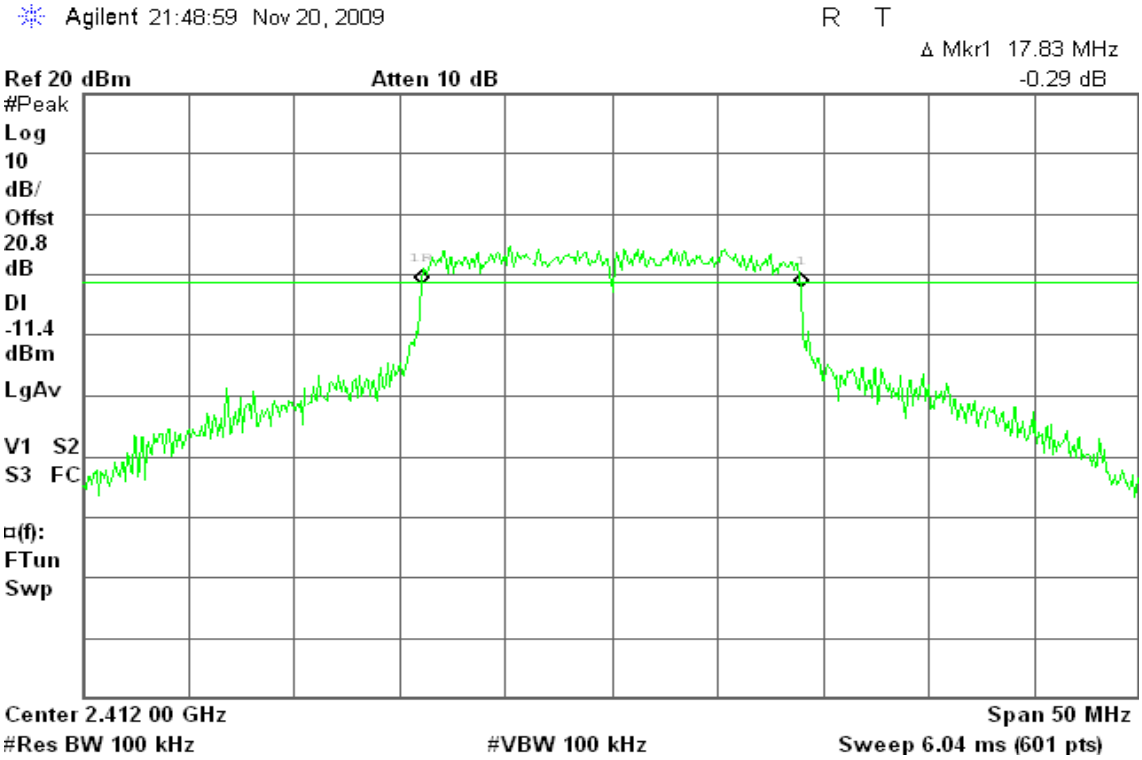



## 6dB Bandwidth (CH High)

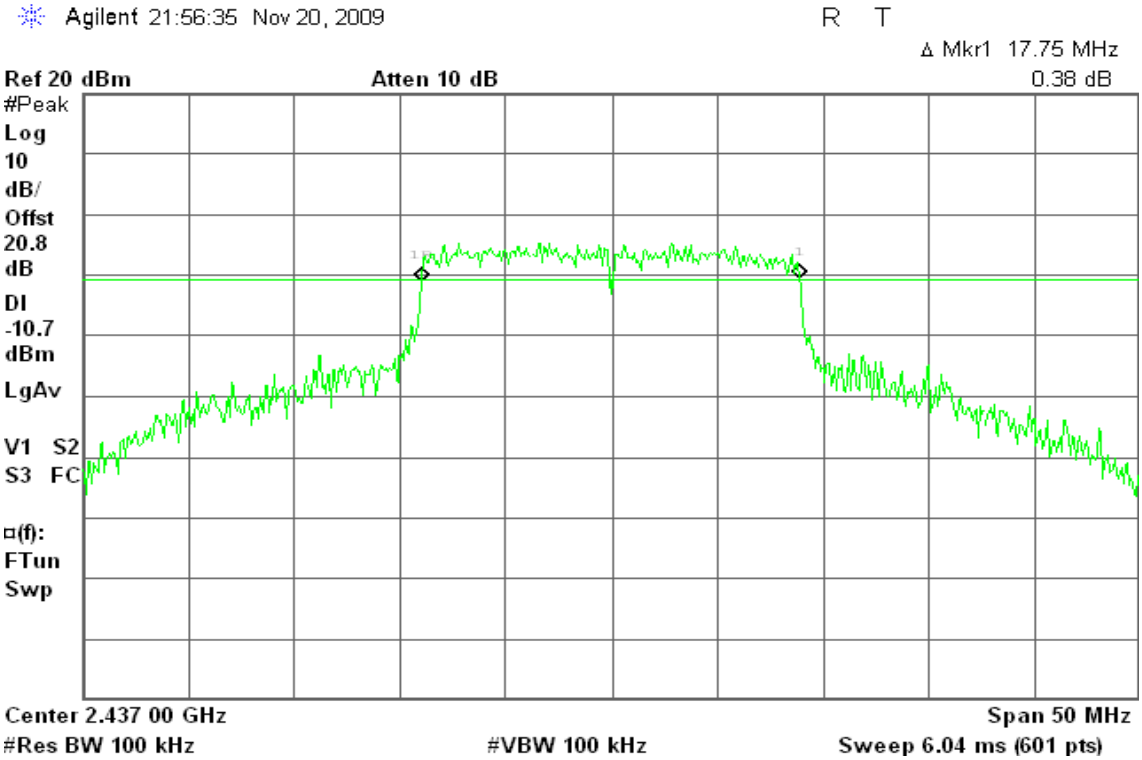


## draft 802.11n Standard-20 MHz Channel mode

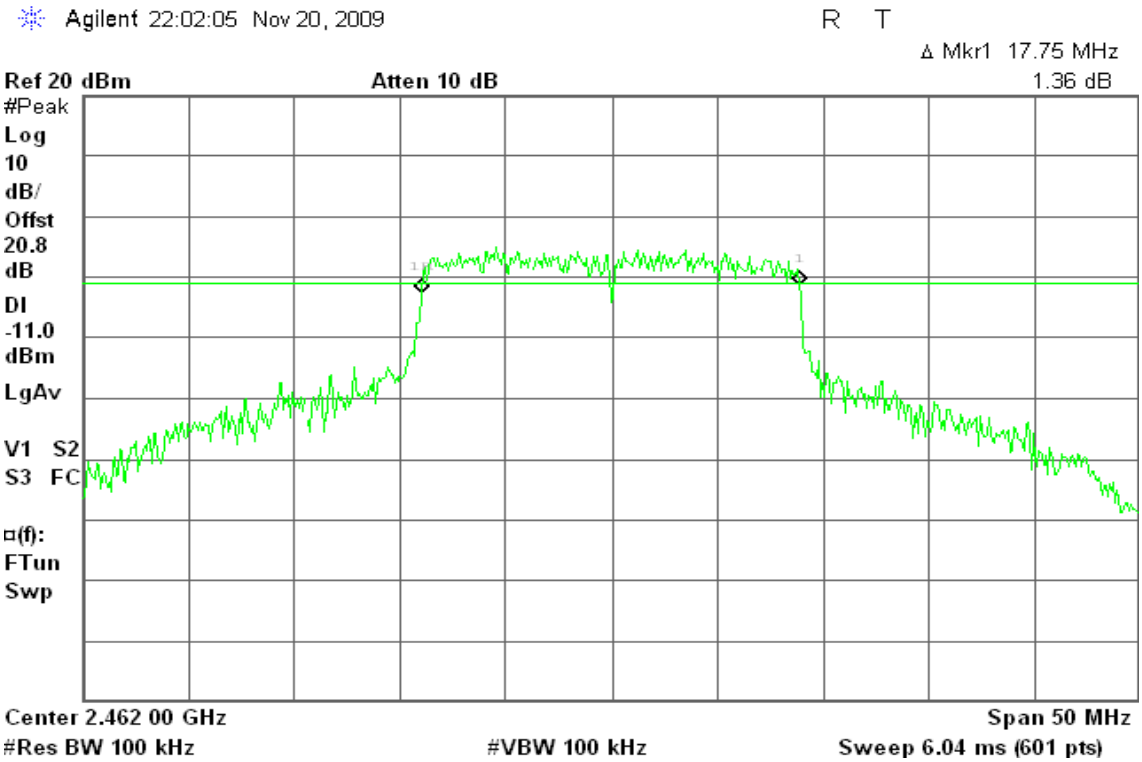
### 6dB Bandwidth (CH Low)




### 6dB Bandwidth (CH Mid)

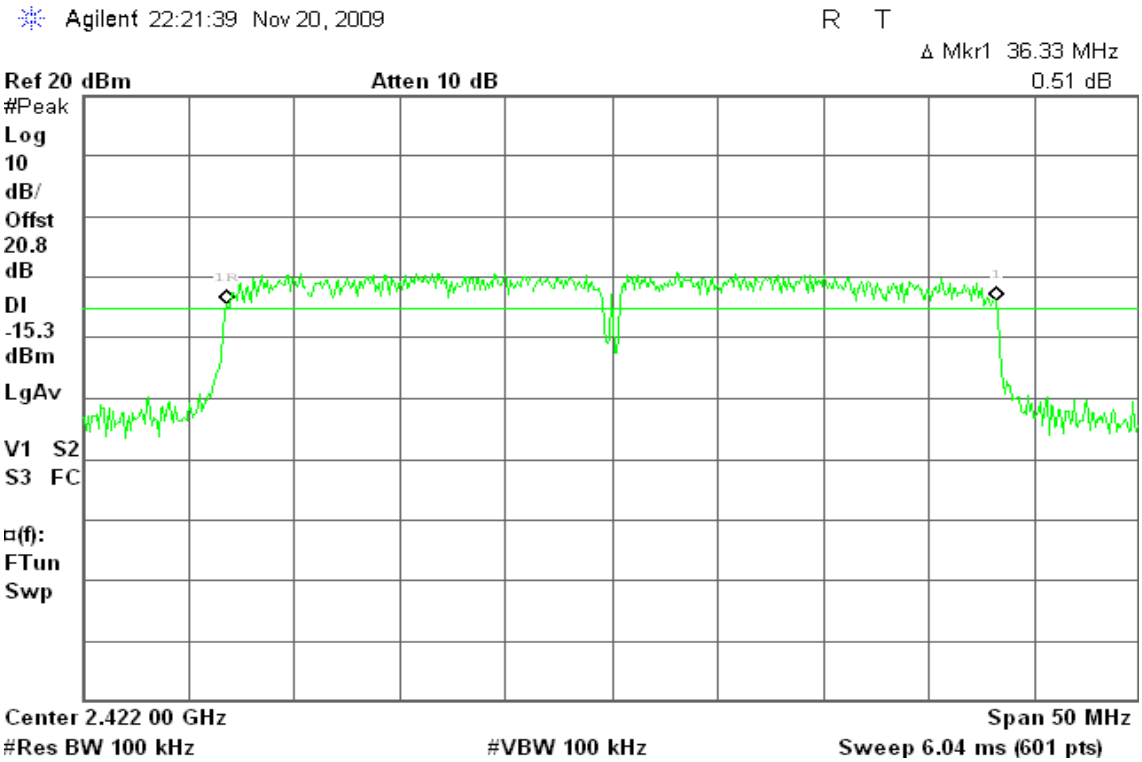


## 6dB Bandwidth (CH High)

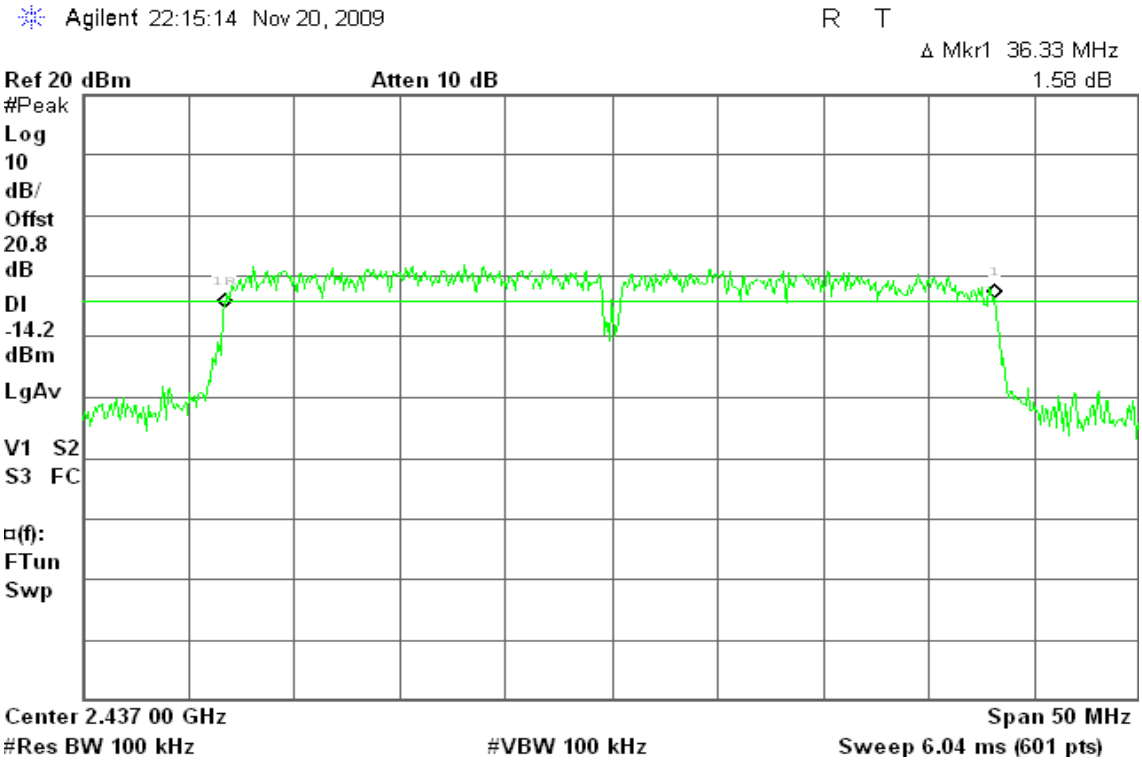



## draft 802.11n Wide-40 MHz Channel mode

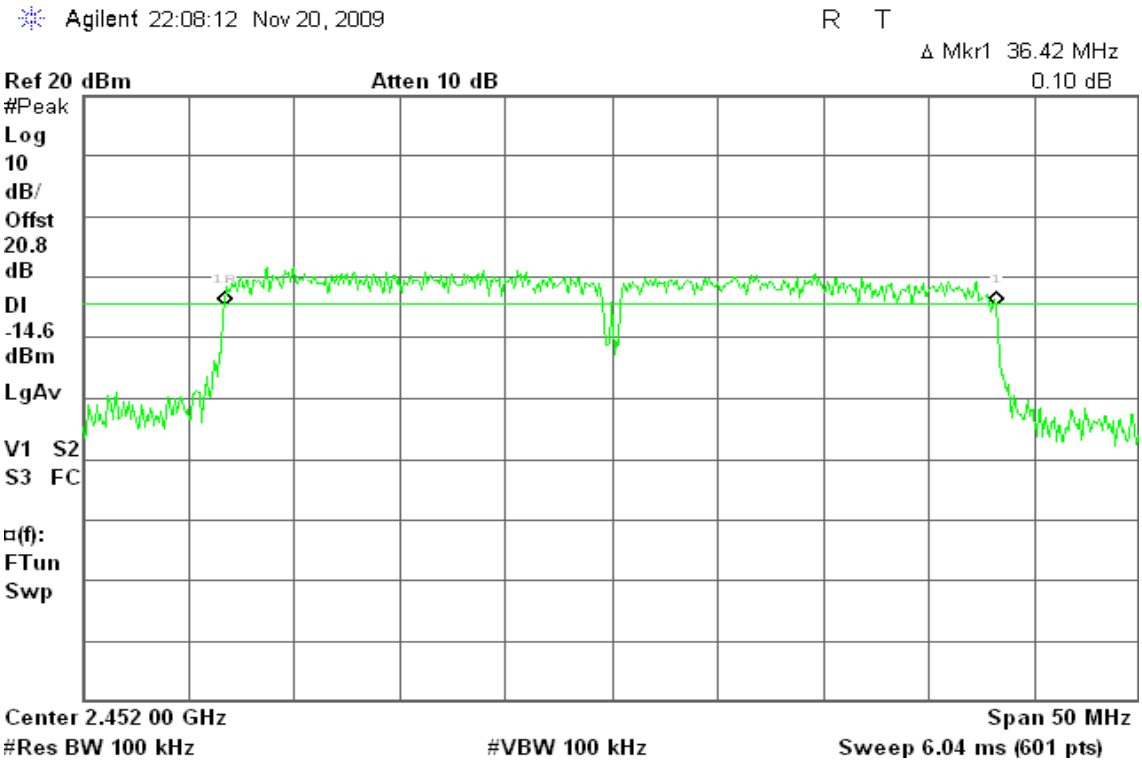
## 6dB Bandwidth (CH Low)



## 6dB Bandwidth (CH Mid)




## 6dB Bandwidth (CH High)



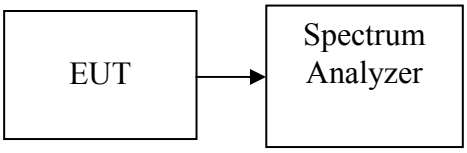
## 7.2 PEAK POWER

## LIMIT

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

1. According to §15.247(b)(3), 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. Peak power is measured using the spectrum analyzer's internal channel power integration function.
2. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

## TEST RESULTS

*No non-compliance noted*

## Test Data

### For Omni Antenna

### Test mode: IEEE 802.11b

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|
| Low | 2412 | 13.57 | 0.02275 | 0.398 | PASS |
| Mid | 2437 | 12.93 | 0.01963 | | PASS |
| High | 2462 | 12.19 | 0.01656 | | PASS |

### Test mode: IEEE 802.11g

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|
| Low | 2412 | 18.36 | 0.06855 | 0.398 | PASS |
| Mid | 2437 | 18.16 | 0.06546 | | PASS |
| High | 2462 | 17.43 | 0.05534 | | PASS |

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

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|
| Low | 2412 | 17.20 | 0.05248 | 0.398 | PASS |
| Mid | 2437 | 17.55 | 0.05689 | | PASS |
| High | 2462 | 17.14 | 0.05176 | | PASS |

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

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|
| Low | 2422 | 15.74 | 0.03750 | 0.398 | PASS |
| Mid | 2437 | 16.41 | 0.04375 | | PASS |
| High | 2452 | 15.99 | 0.03972 | | PASS |

***Remark**: The maximum antenna gain is 10dBi; therefore the reduction due to antenna gain is 4dB, so the limit is 26dBm*

## For Patch Antenna

### Test mode: IEEE 802.11b

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|
| Low | 2412 | 14.15 | 0.0260 | 0.398 | PASS |
| Mid | 2437 | 14.26 | 0.0267 | | PASS |
| High | 2462 | 13.57 | 0.0228 | | PASS |

### Test mode: IEEE 802.11g

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|
| Low | 2412 | 19.30 | 0.0851 | 0.398 | PASS |
| Mid | 2437 | 19.39 | 0.0869 | | PASS |
| High | 2462 | 19.14 | 0.0820 | | PASS |

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

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|
| Low | 2412 | 17.30 | 0.0537 | 0.398 | PASS |
| Mid | 2437 | 18.81 | 0.0760 | | PASS |
| High | 2462 | 18.31 | 0.0678 | | PASS |

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

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|
| Low | 2422 | 16.41 | 0.0438 | 0.398 | PASS |
| Mid | 2437 | 17.76 | 0.0597 | | PASS |
| High | 2452 | 17.63 | 0.0579 | | PASS |

***Remark***: *The maximum antenna gain is 10dBi; therefore the reduction due to antenna gain is 4dB, so the limit is 26dBm*

## For Chip Antenna

### Test mode: IEEE 802.11b

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|
| Low | 2412 | 14.75 | 0.02985 | 1.00 | PASS |
| Mid | 2437 | 14.04 | 0.02535 | | PASS |
| High | 2462 | 12.83 | 0.01919 | | PASS |

### Test mode: IEEE 802.11g

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|
| Low | 2412 | 18.36 | 0.06855 | 1.00 | PASS |
| Mid | 2437 | 18.08 | 0.06427 | | PASS |
| High | 2462 | 17.08 | 0.05105 | | PASS |

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

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|
| Low | 2412 | 16.73 | 0.04710 | 1.00 | PASS |
| Mid | 2437 | 17.39 | 0.05483 | | PASS |
| High | 2462 | 16.53 | 0.04498 | | PASS |

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

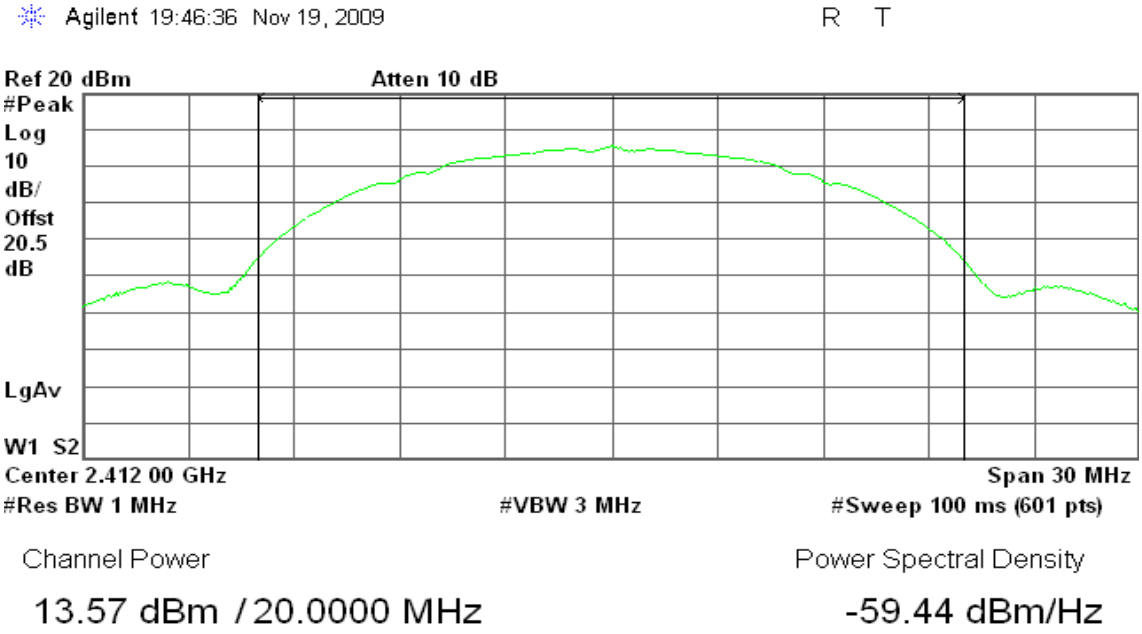
| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|
| Low | 2422 | 15.96 | 0.03945 | 1.00 | PASS |
| Mid | 2437 | 16.70 | 0.04677 | | PASS |
| High | 2452 | 16.05 | 0.04027 | | PASS |

## Test Plot

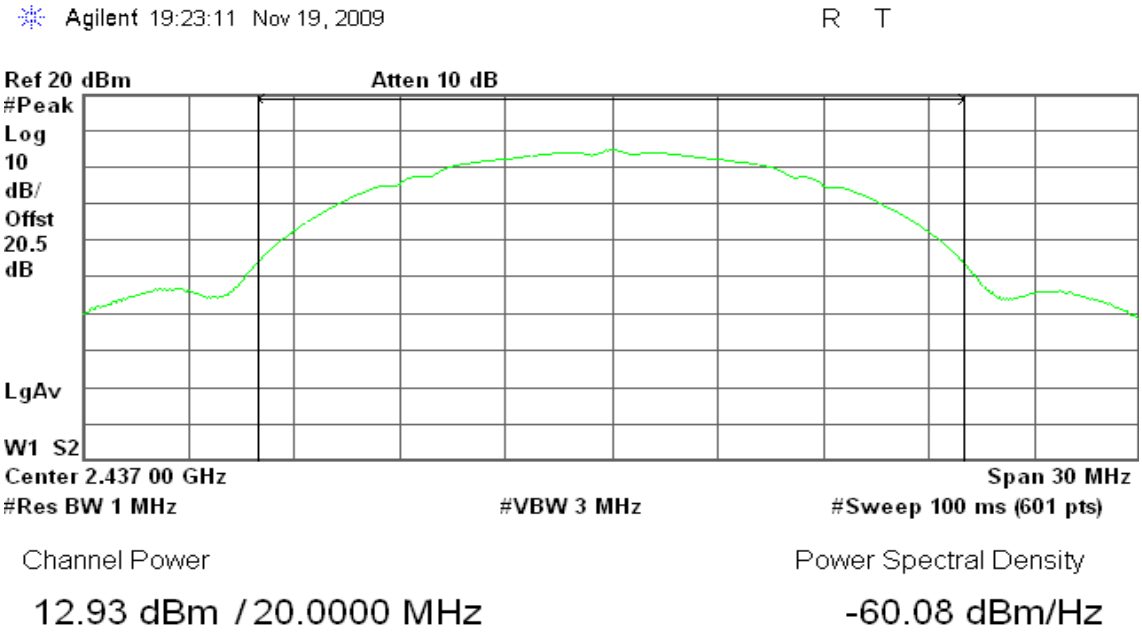
**For Omni Antenna**

**IEEE 802.11b mode**

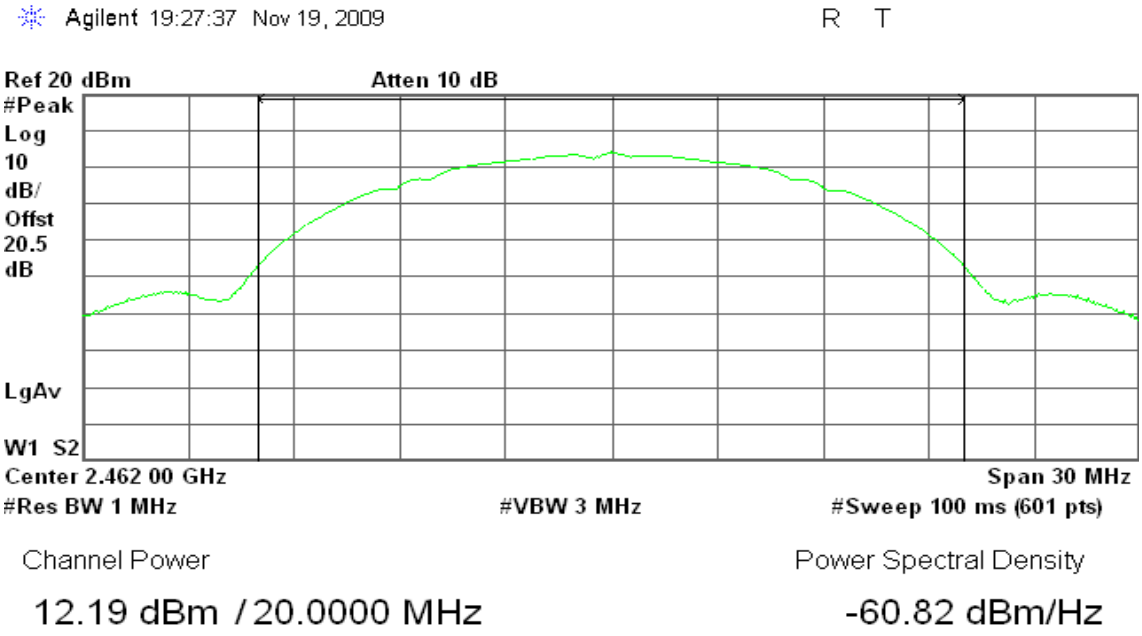
**Peak Power (CH Low)**




**Peak Power (CH Mid)**

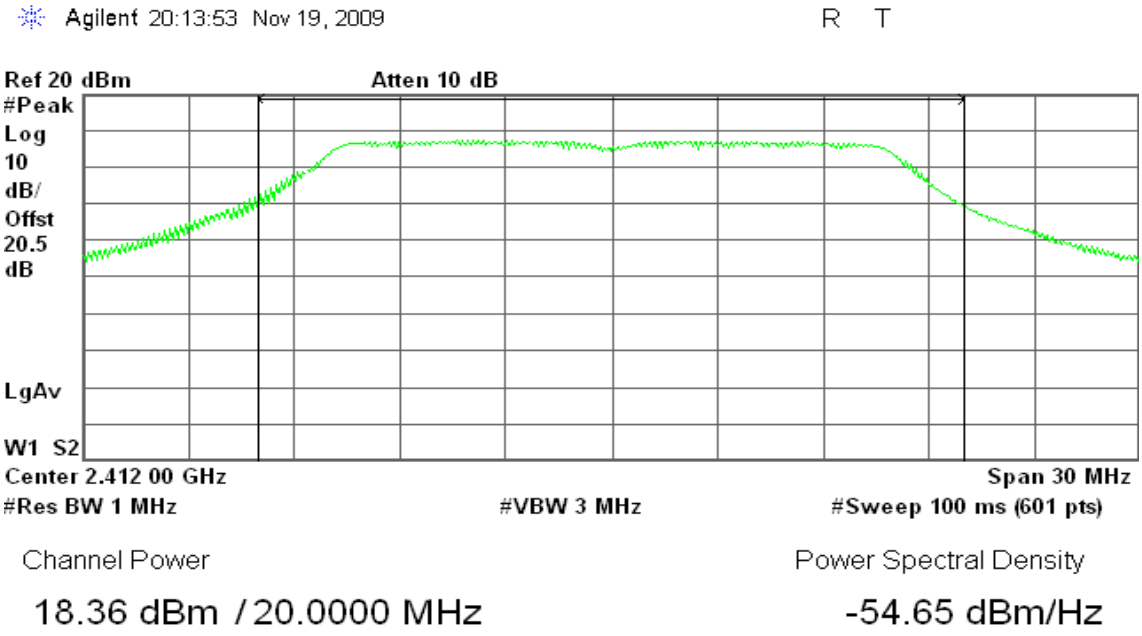


## Peak Power (CH High)

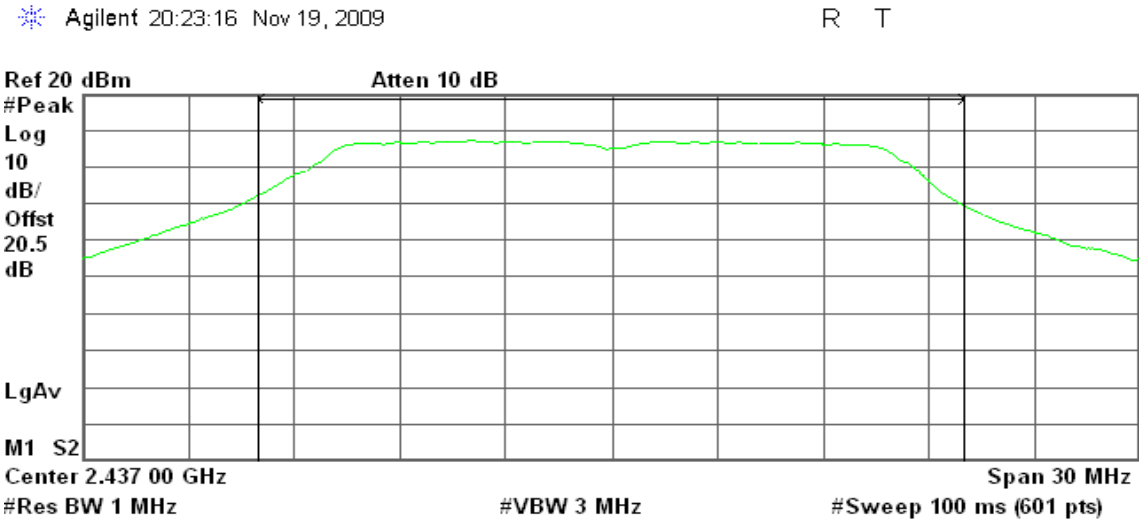



## IEEE 802.11g mode

## Peak Power (CH Low)



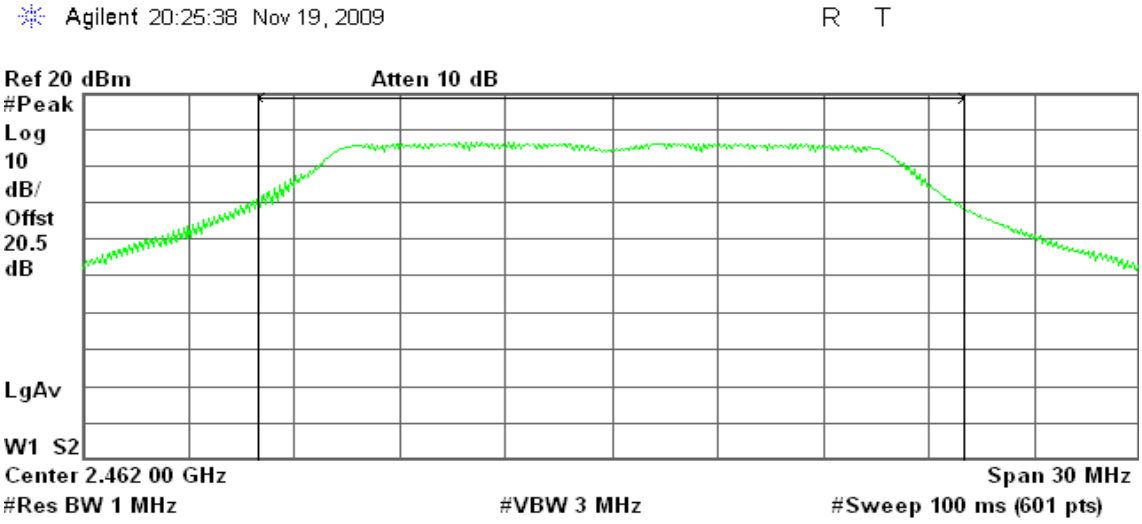
## Peak Power (CH Mid)




Channel Power
18.16 dBm / 20.0000 MHz

Power Spectral Density
-54.85 dBm/Hz

## Peak Power (CH High)

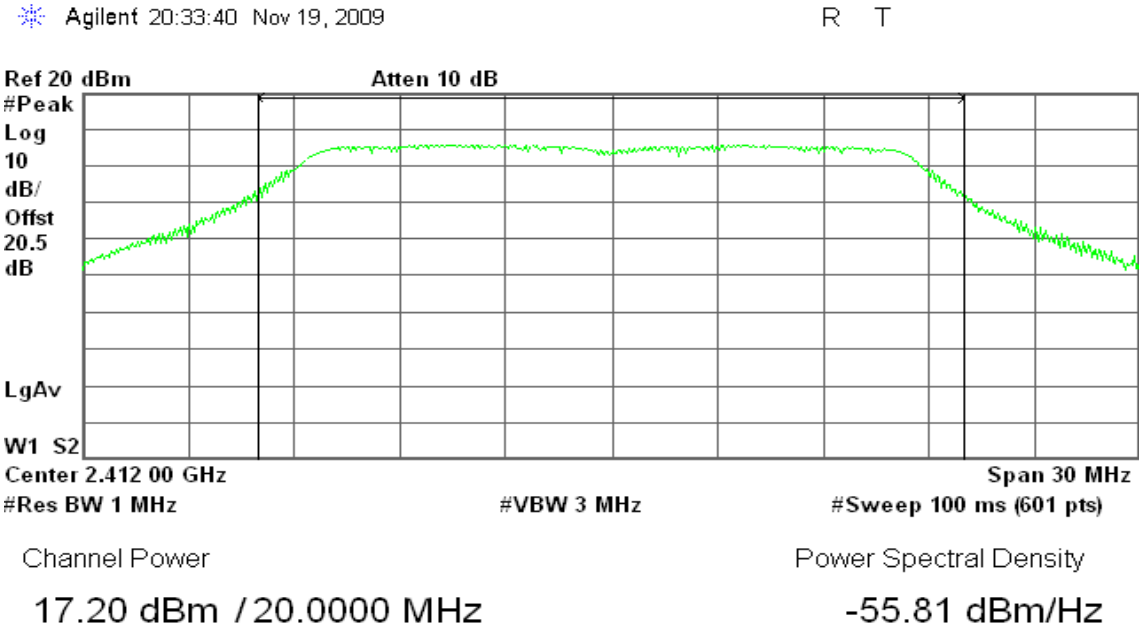



Channel Power
17.43 dBm / 20.0000 MHz

Power Spectral Density
-55.58 dBm/Hz

## draft 802.11n Standard-20 MHz Channel mode

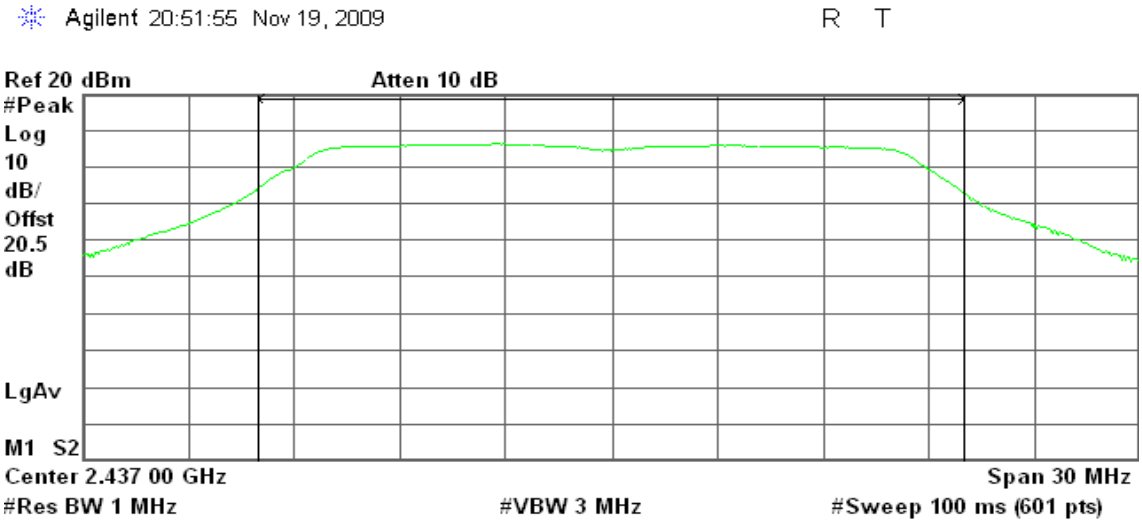
### Peak Power (CH Low)




Channel Power
17.20 dBm / 20.0000 MHz

Power Spectral Density
-55.81 dBm/Hz

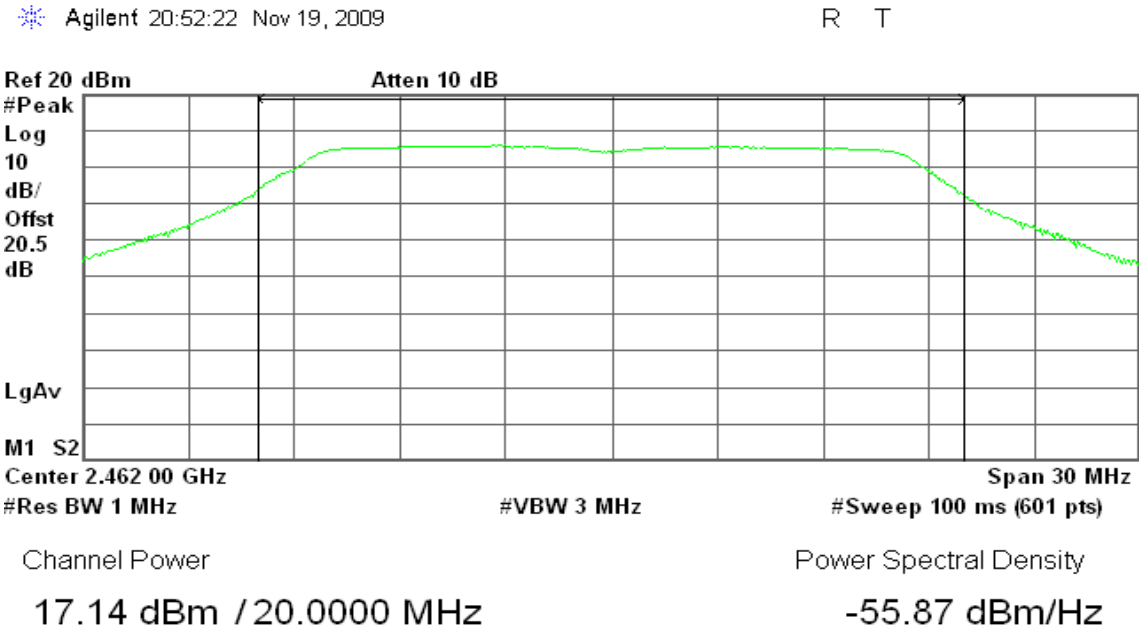
### Peak Power (CH Mid)




Channel Power
17.55 dBm / 20.0000 MHz

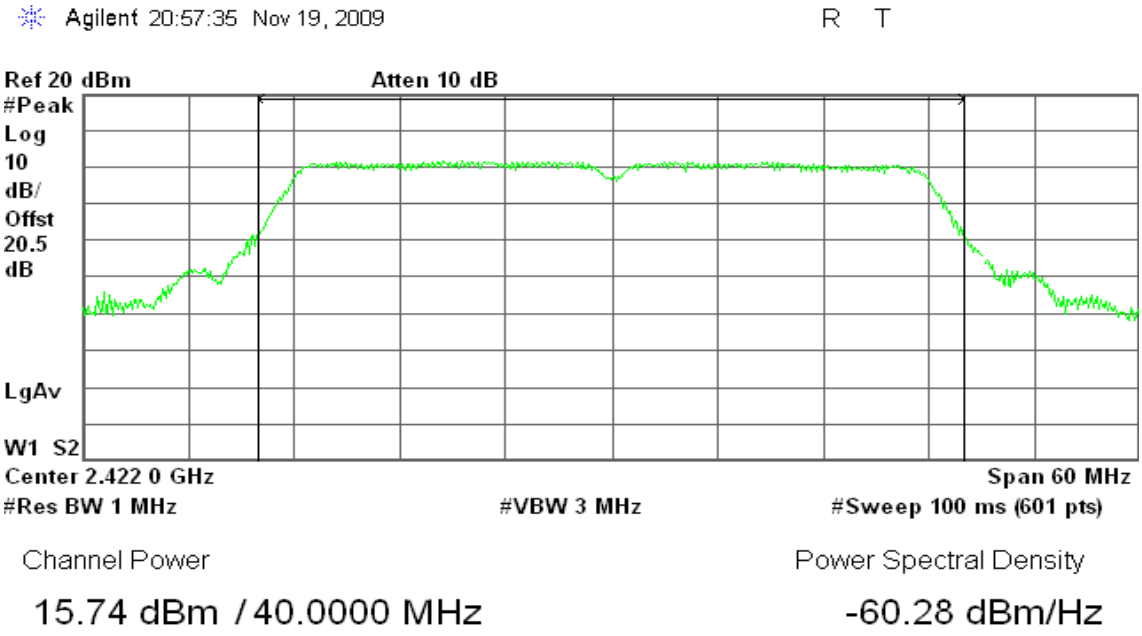
Power Spectral Density
-55.46 dBm/Hz

**Peak Power (CH High)**

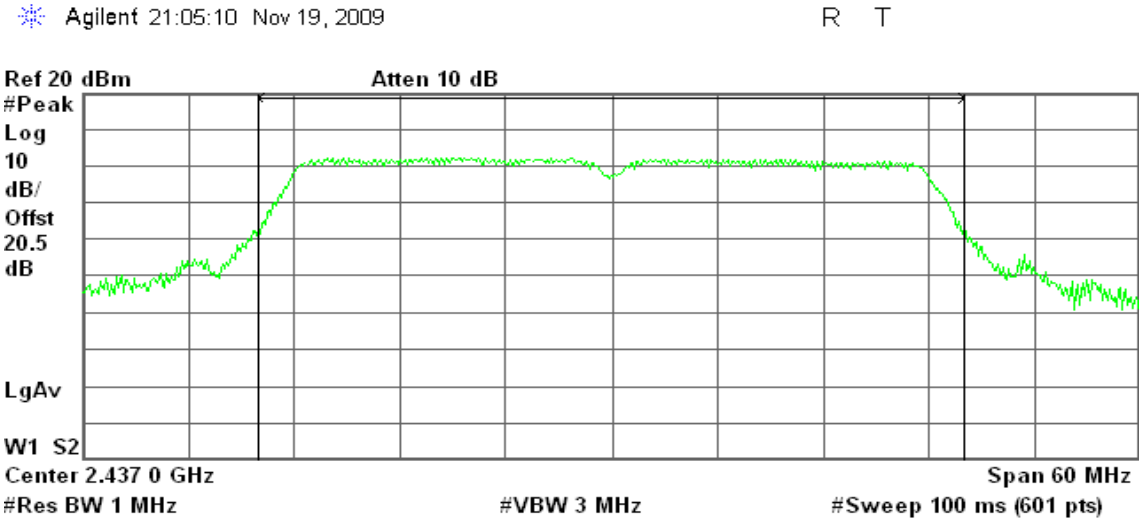



**draft 802.11n Wide-40 MHz Channel mode**

**Peak Power (CH Low)**



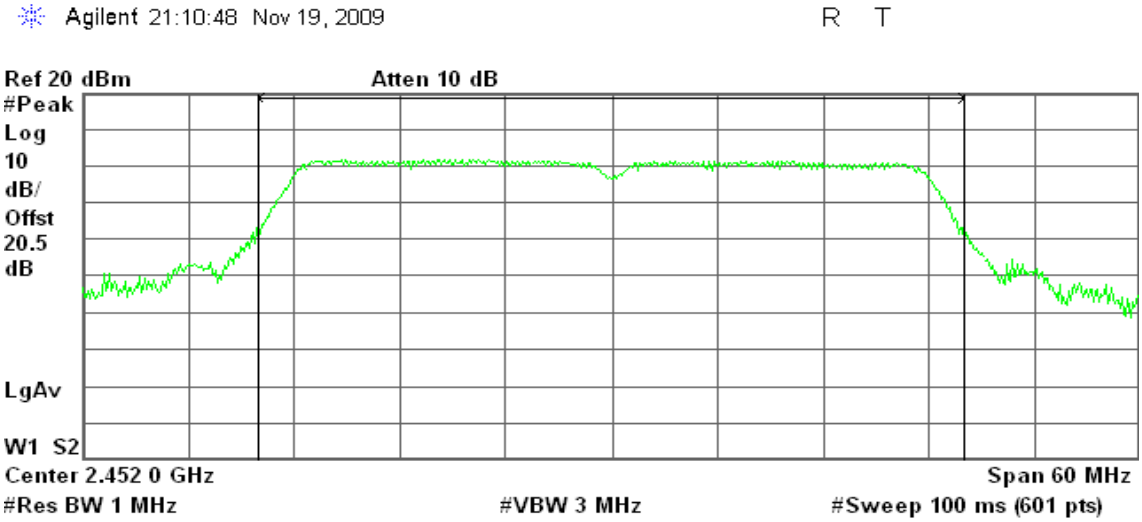
## Peak Power (CH Mid)




Channel Power
16.41 dBm / 40.0000 MHz

Power Spectral Density
-59.61 dBm/Hz

## Peak Power (CH High)



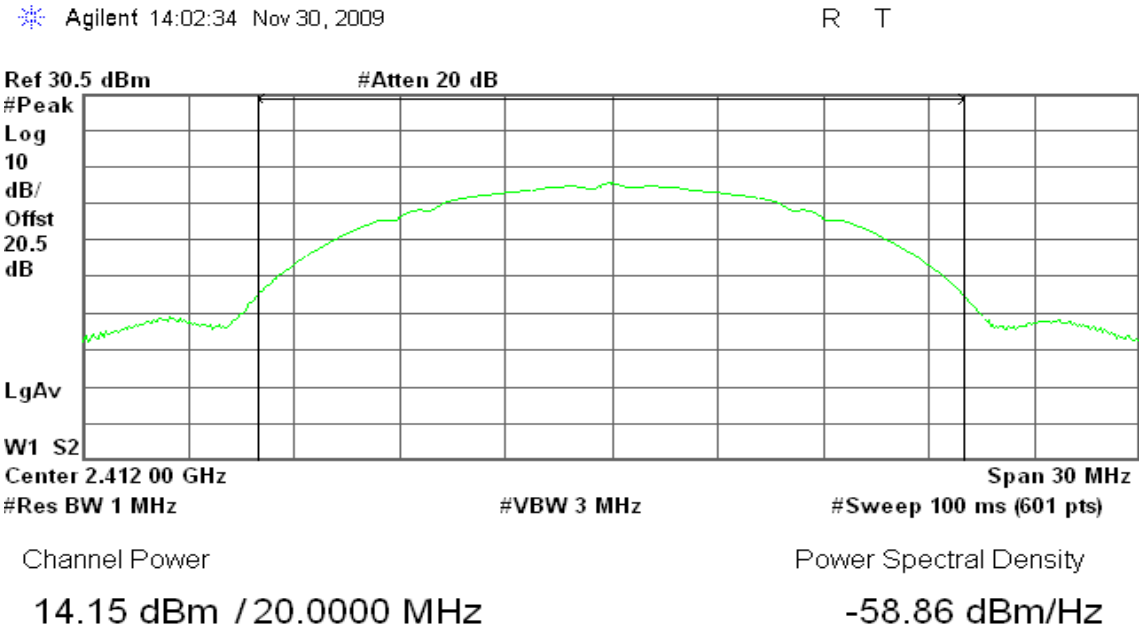

Channel Power
15.99 dBm / 40.0000 MHz

Power Spectral Density
-60.03 dBm/Hz

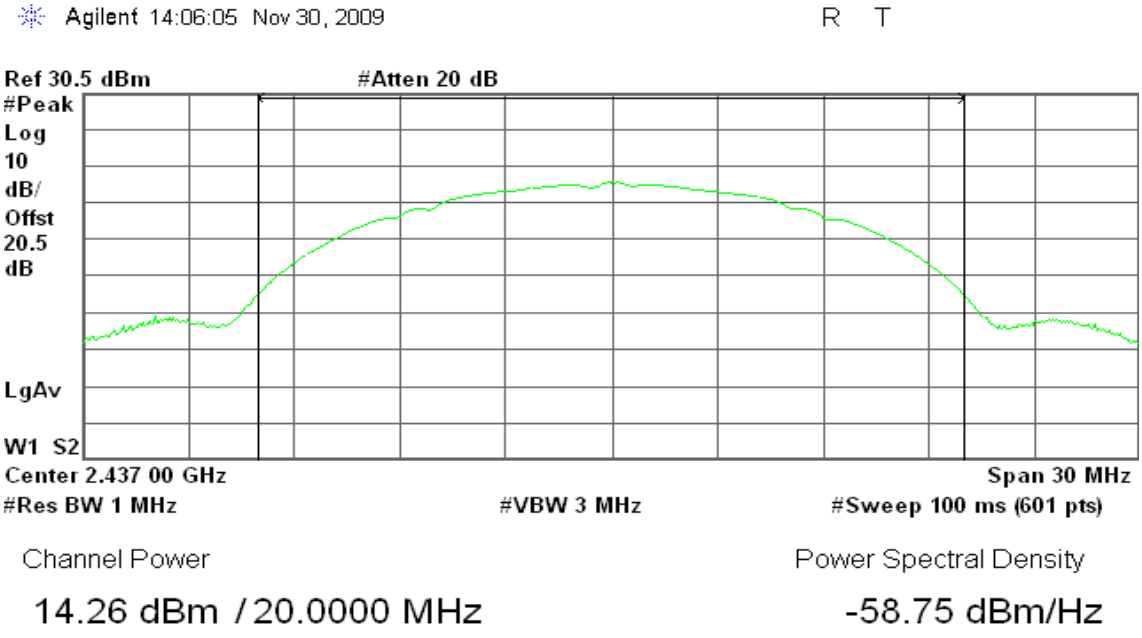
**For Patch Antenna**

**IEEE 802.11b mode**

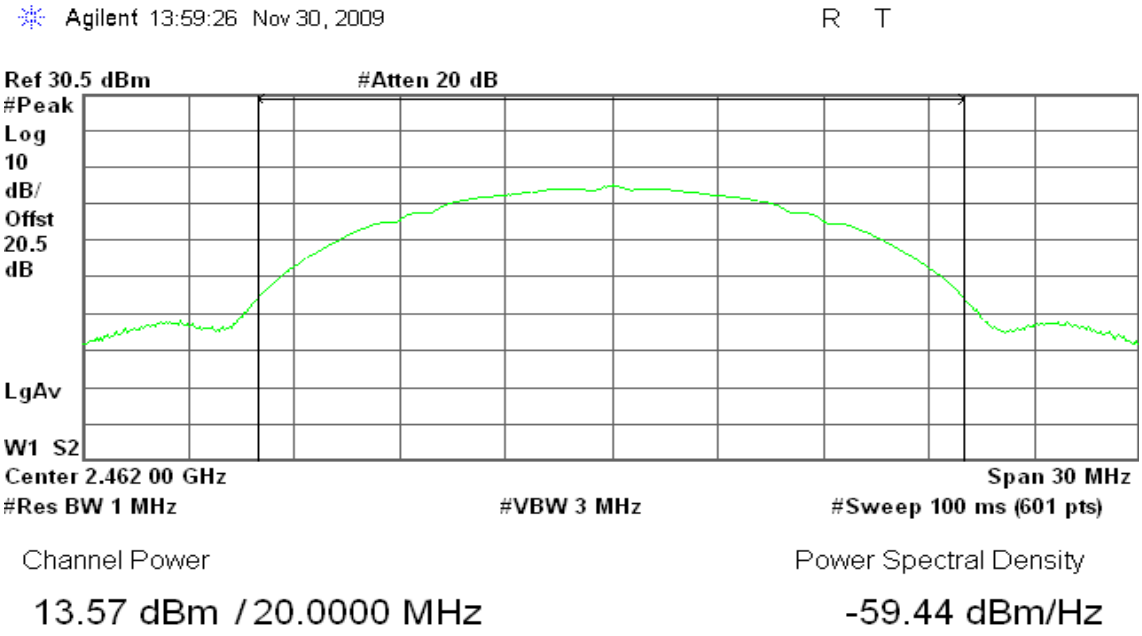
**Peak Power (CH Low)**




**Peak Power (CH Mid)**

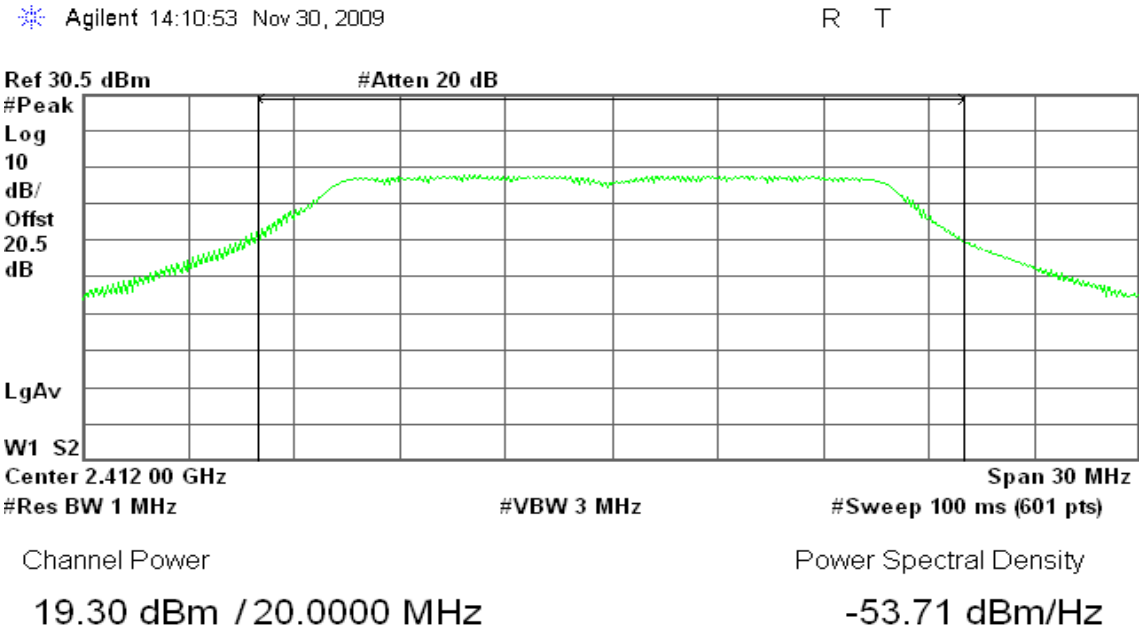


**Peak Power (CH High)**

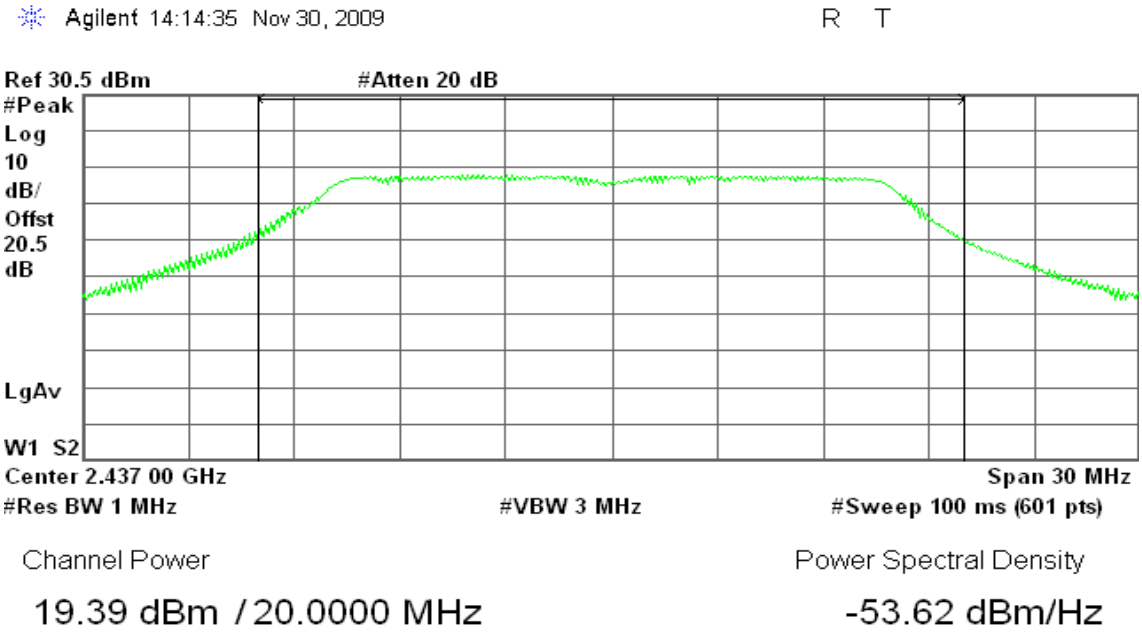



**IEEE 802.11g mode**

**Peak Power (CH Low)**



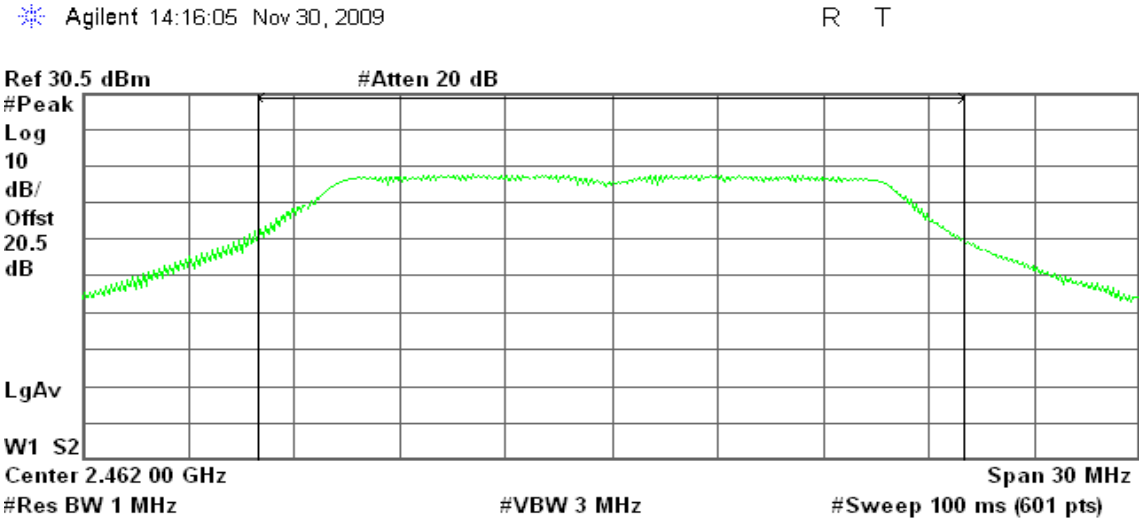
## Peak Power (CH Mid)




Channel Power
19.39 dBm / 20.0000 MHz

Power Spectral Density
-53.62 dBm/Hz

## Peak Power (CH High)

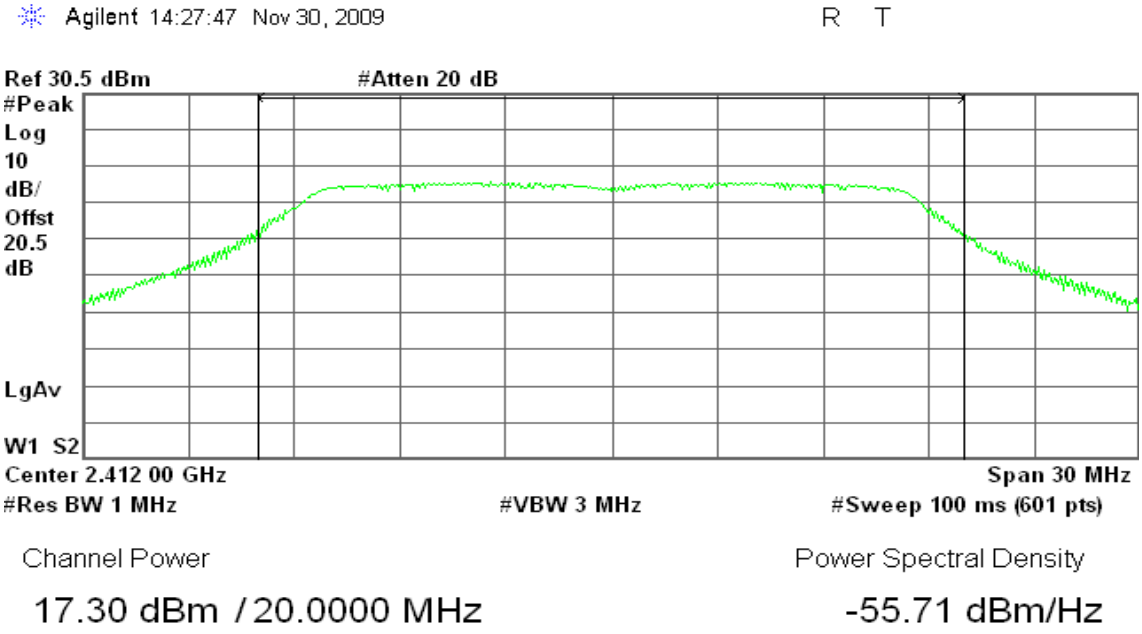



Channel Power
19.14 dBm / 20.0000 MHz

Power Spectral Density
-53.87 dBm/Hz

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

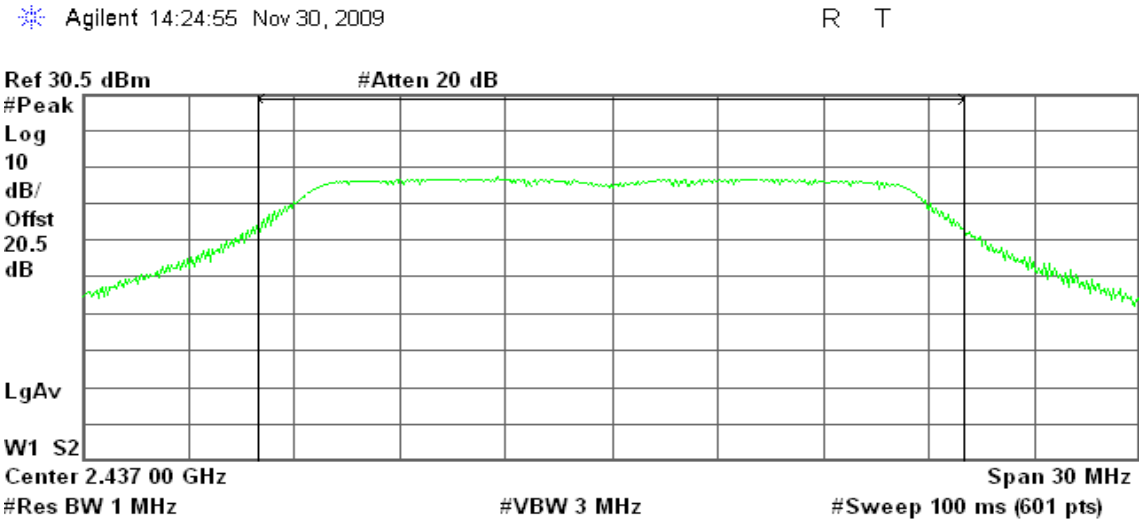
**Peak Power (CH Low)**




Channel Power
17.30 dBm / 20.0000 MHz

Power Spectral Density
-55.71 dBm/Hz

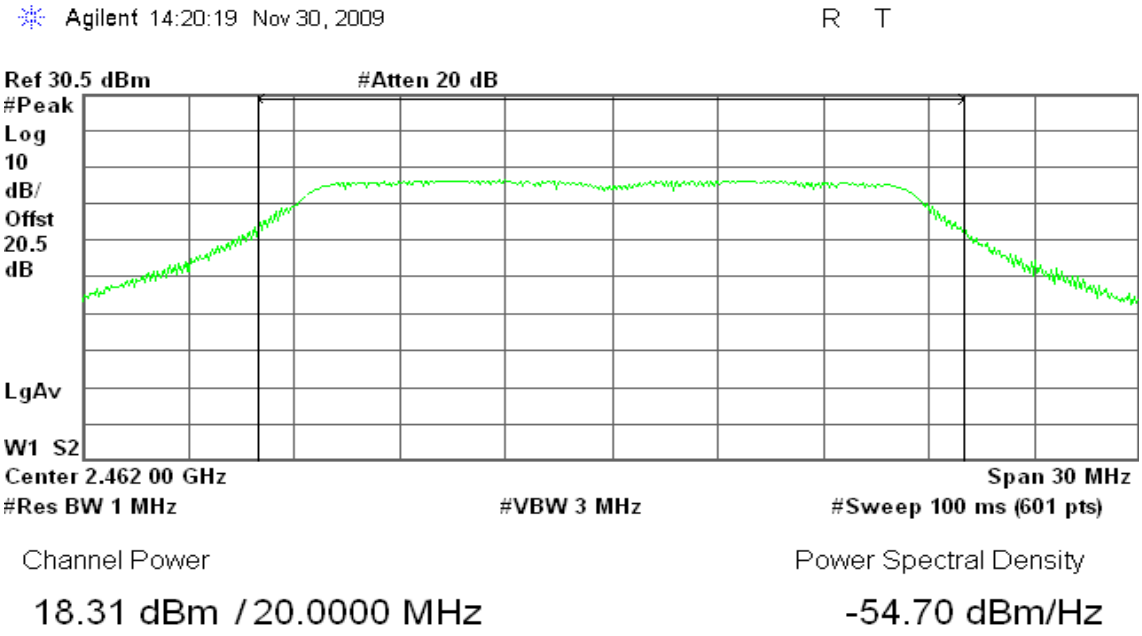
**Peak Power (CH Mid)**




Channel Power
18.81 dBm / 20.0000 MHz

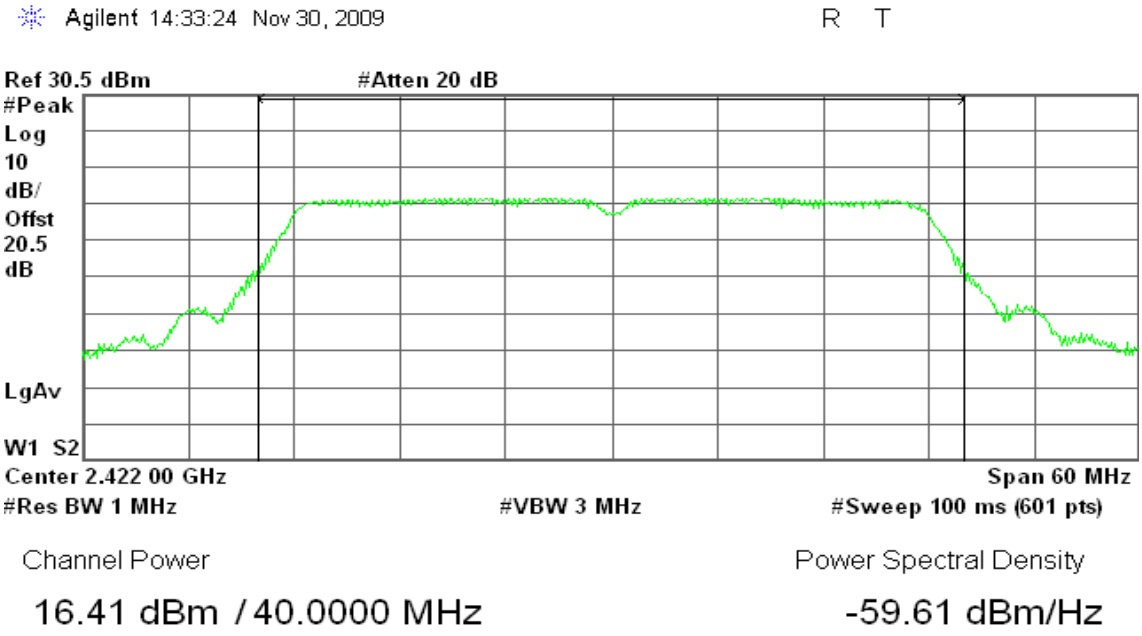
Power Spectral Density
-54.20 dBm/Hz

**Peak Power (CH High)**

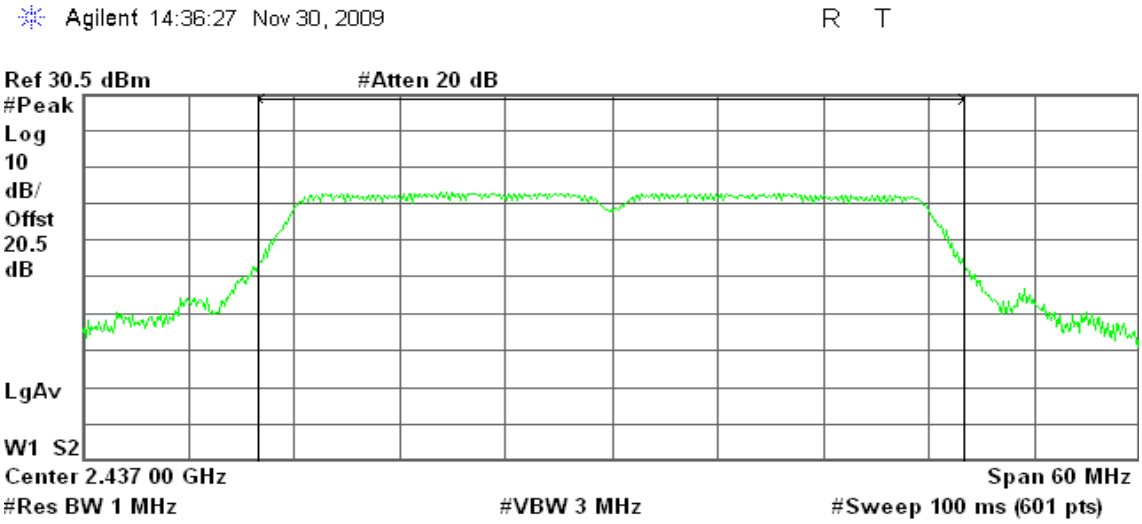



**draft 802.11n Wide-40 MHz Channel mode**

**Peak Power (CH Low)**



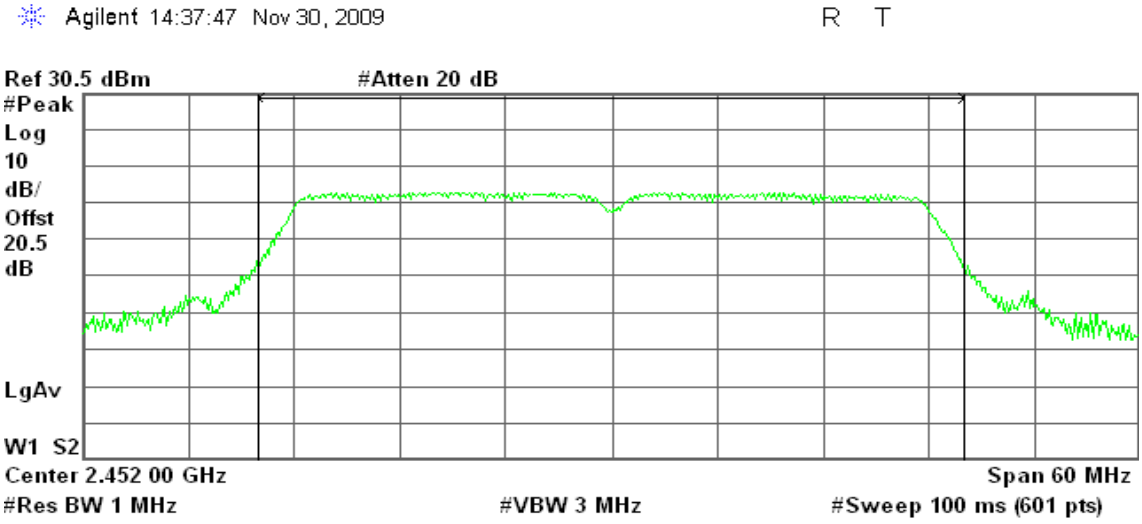
## Peak Power (CH Mid)




Channel Power
17.76 dBm / 40.0000 MHz

Power Spectral Density
-58.26 dBm/Hz

## Peak Power (CH High)



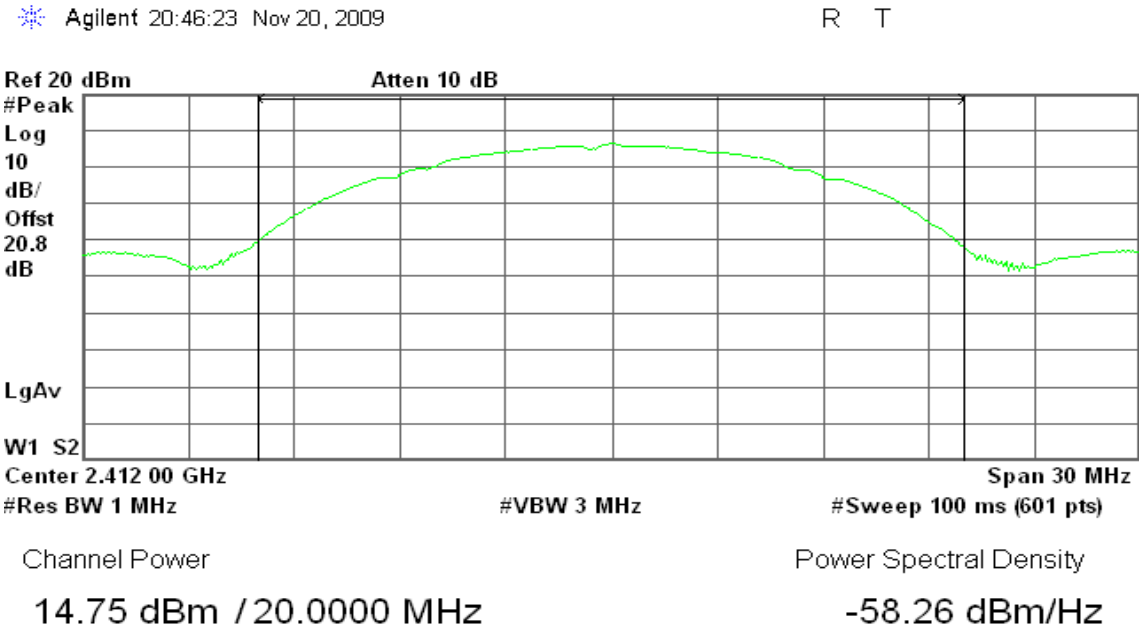

Channel Power
17.63 dBm / 40.0000 MHz

Power Spectral Density
-58.40 dBm/Hz

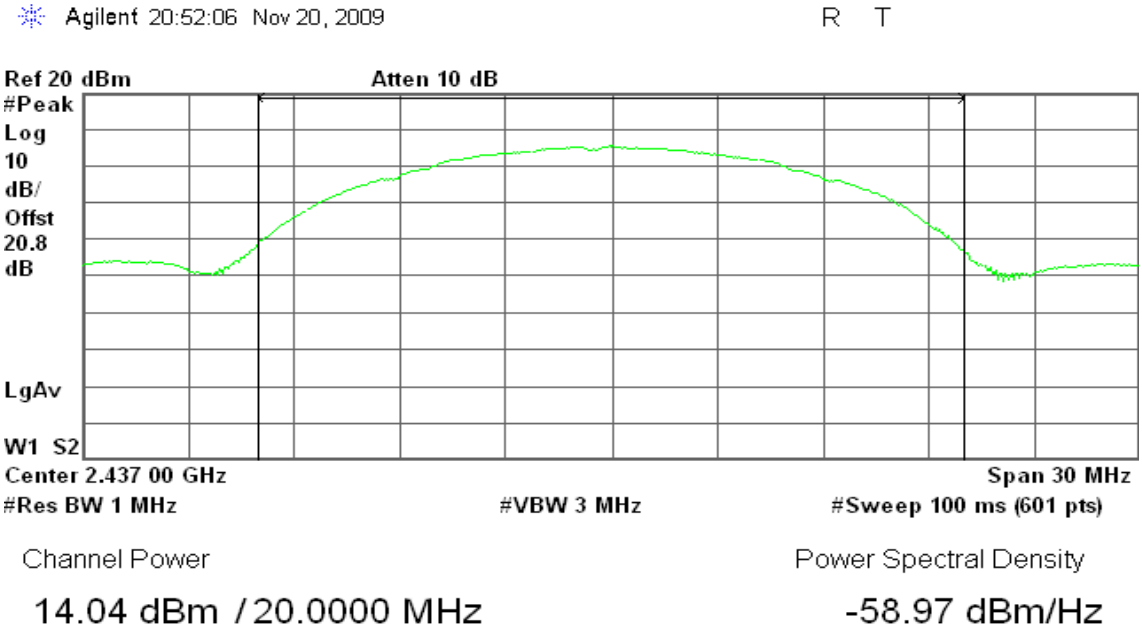
**For Chip Antenna**

**IEEE 802.11b mode**

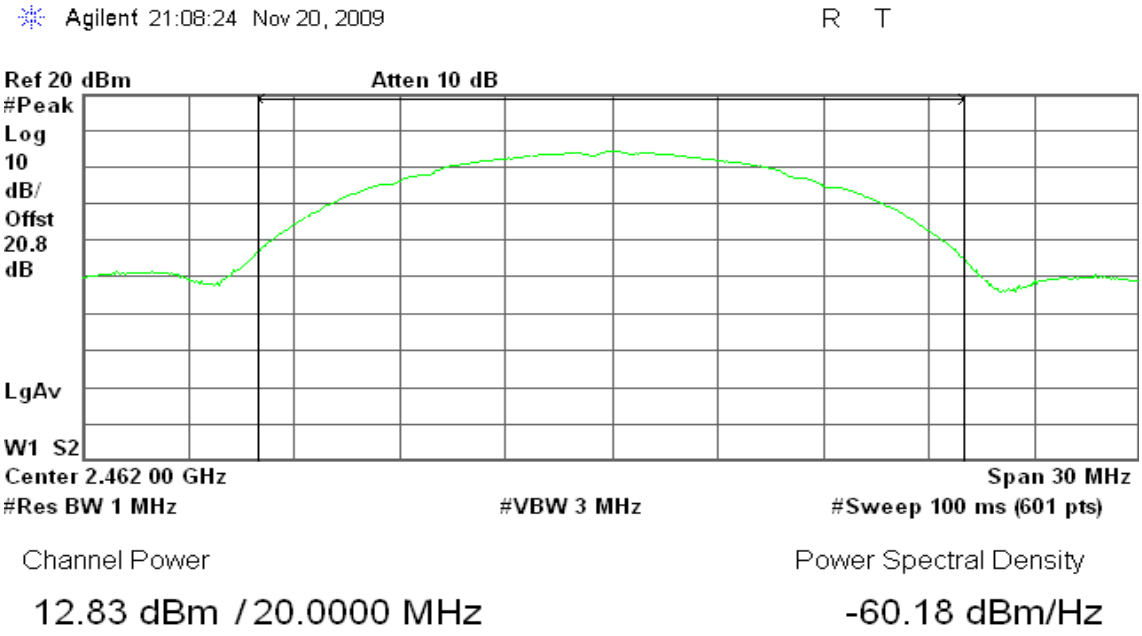
**Peak Power (CH Low)**




**Peak Power (CH Mid)**

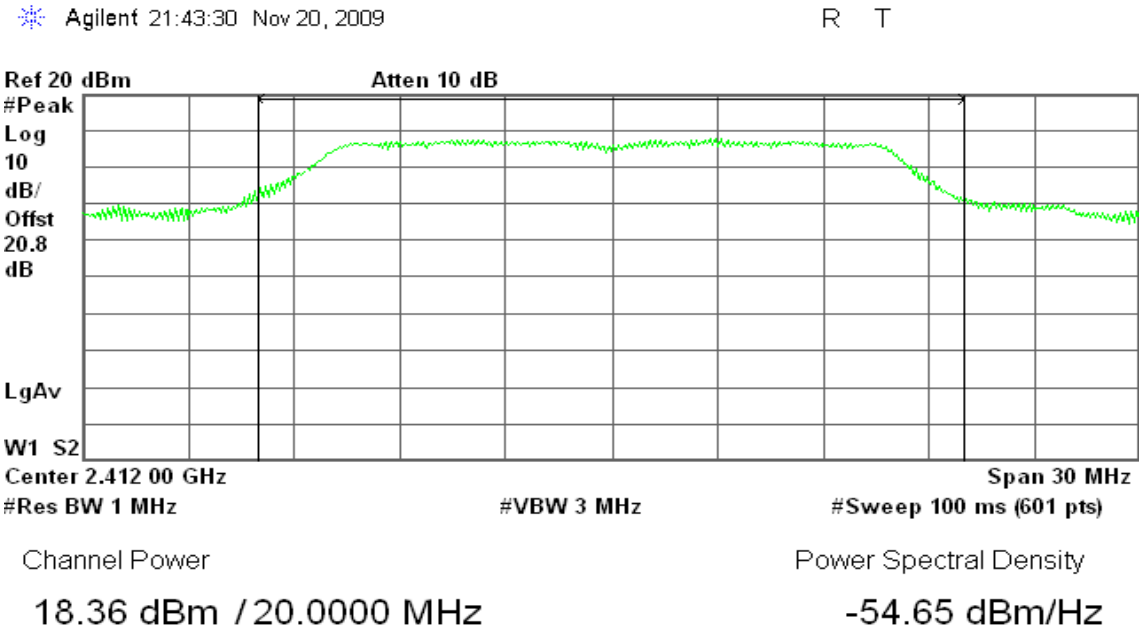


**Peak Power (CH High)**

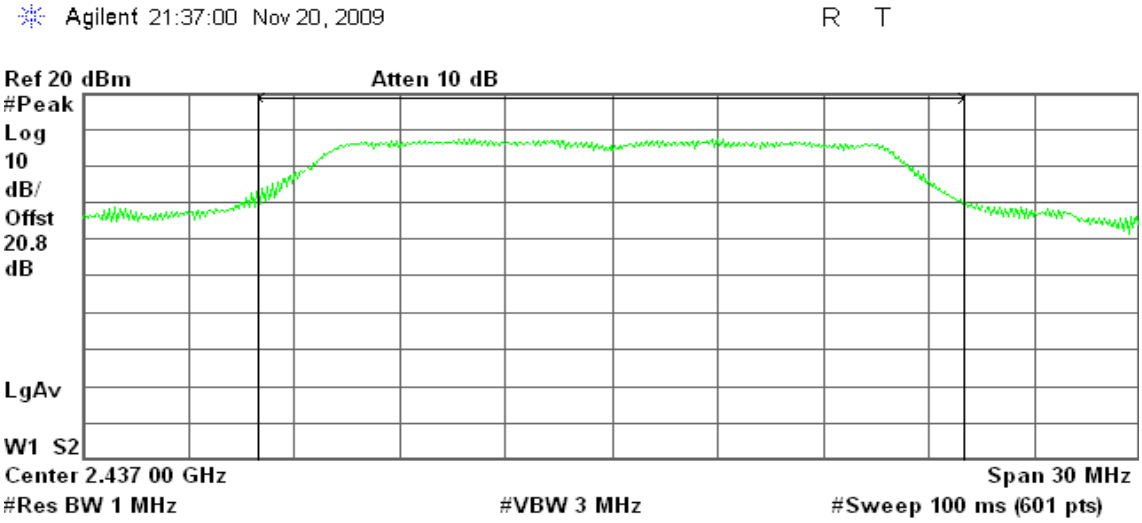



**IEEE 802.11g mode**

**Peak Power (CH Low)**



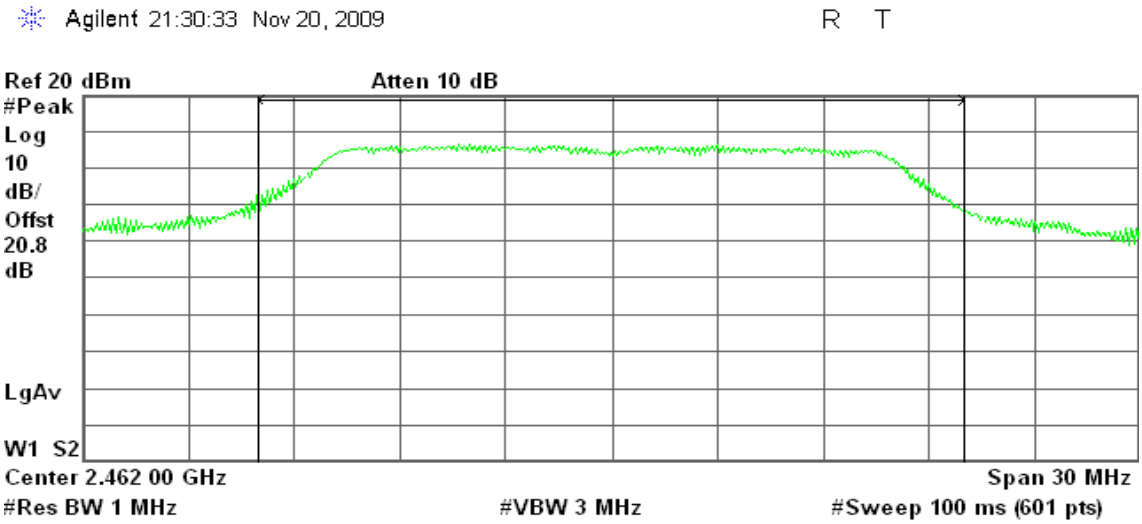
## Peak Power (CH Mid)




Channel Power
18.08 dBm / 20.0000 MHz

Power Spectral Density
-54.93 dBm/Hz

## Peak Power (CH High)

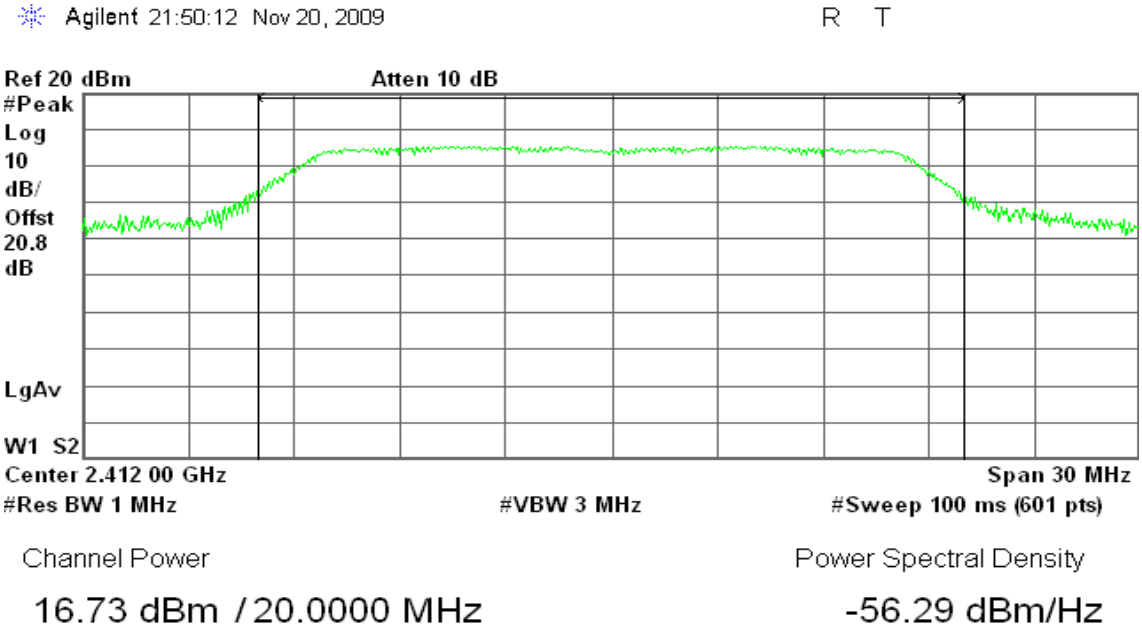



Channel Power
17.08 dBm / 20.0000 MHz

Power Spectral Density
-55.93 dBm/Hz

## draft 802.11n Standard-20 MHz Channel mode

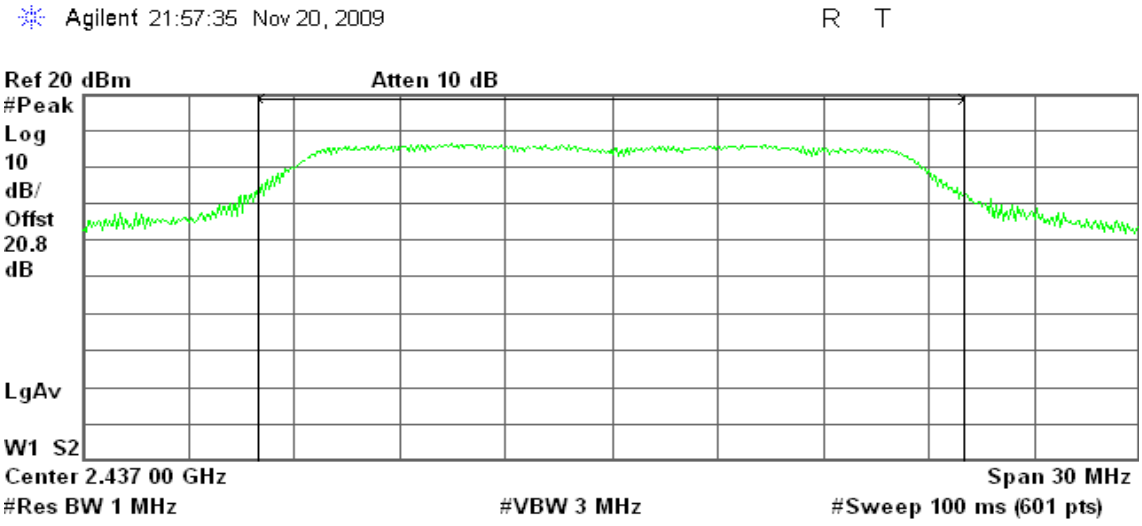
### Peak Power (CH Low)




Channel Power
16.73 dBm / 20.0000 MHz

Power Spectral Density
-56.29 dBm/Hz

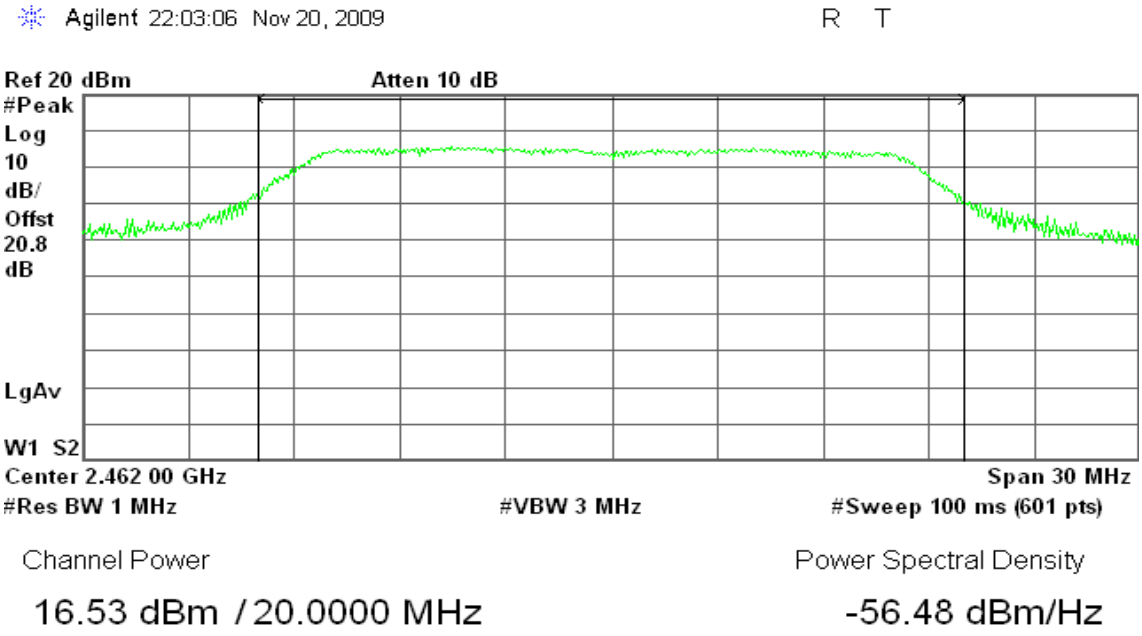
### Peak Power (CH Mid)




Channel Power
17.39 dBm / 20.0000 MHz

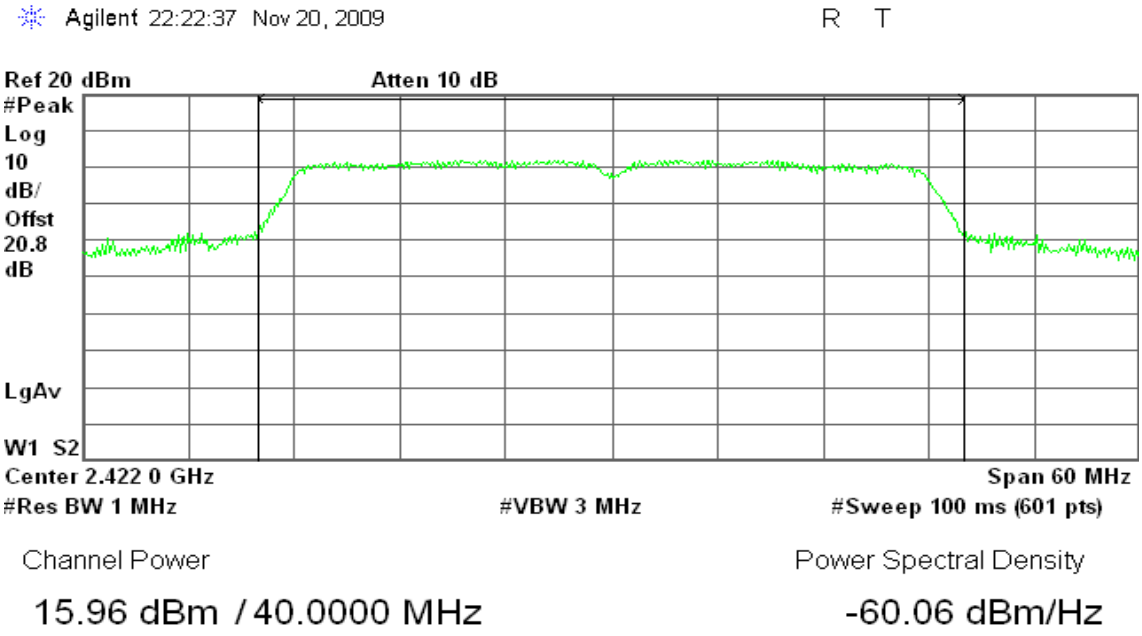
Power Spectral Density
-55.62 dBm/Hz

**Peak Power (CH High)**

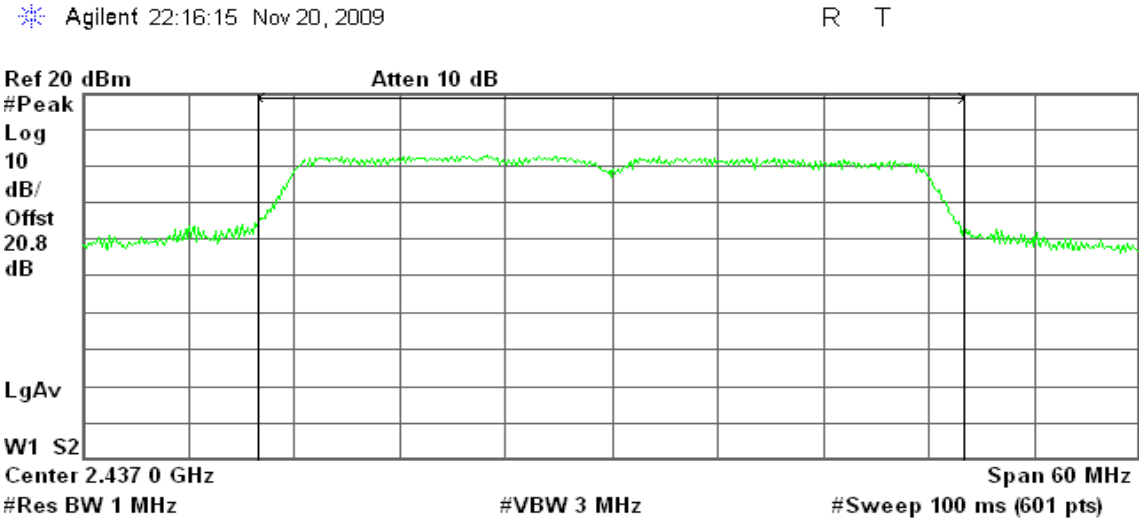



**draft 802.11n Wide-40 MHz Channel mode**

**Peak Power (CH Low)**



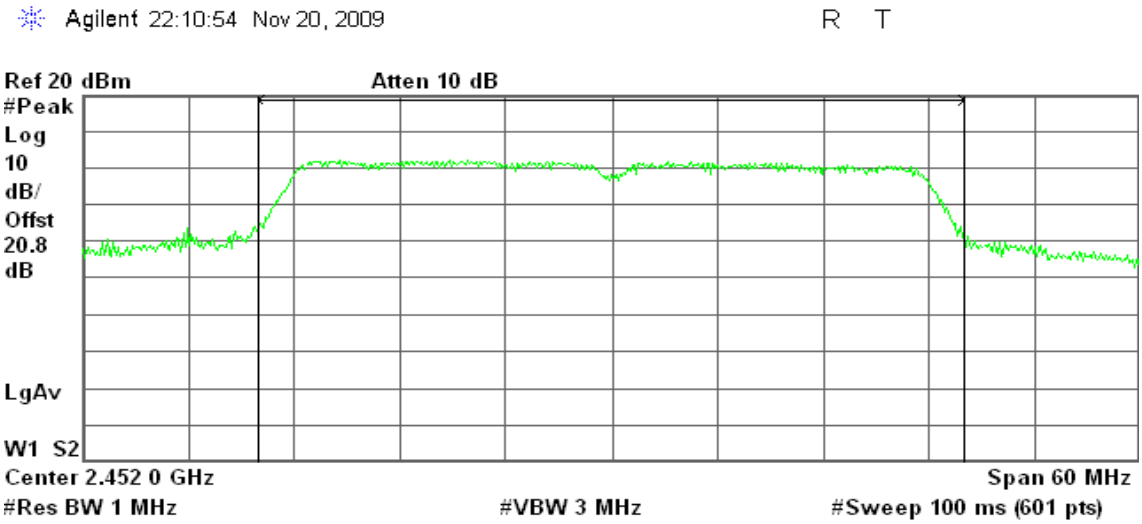
## Peak Power (CH Mid)




Channel Power
16.70 dBm / 40.0000 MHz

Power Spectral Density
-59.32 dBm/Hz

## Peak Power (CH High)




Channel Power
16.05 dBm / 40.0000 MHz

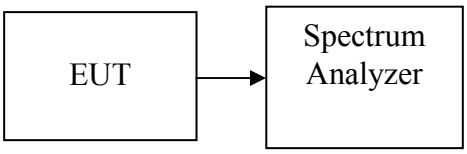
Power Spectral Density
-59.97 dBm/Hz

## 7.3 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

### For Omni Antenna

### Test mode: IEEE 802.11b

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2412 | 10.24 |
| Mid | 2437 | 9.82 |
| High | 2462 | 9.03 |

### Test mode: IEEE 802.11g

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2412 | 11.21 |
| Mid | 2437 | 11.09 |
| High | 2462 | 9.67 |

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

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2412 | 9.80 |
| Mid | 2437 | 10.98 |
| High | 2462 | 9.12 |

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

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2422 | 8.67 |
| Mid | 2437 | 9.25 |
| High | 2452 | 8.67 |

## For Patch Antenna

### Test mode: IEEE 802.11b

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2412 | 11.02 |
| Mid | 2437 | 11.33 |
| High | 2462 | 10.41 |

### Test mode: IEEE 802.11g

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2412 | 12.10 |
| Mid | 2437 | 12.34 |
| High | 2462 | 11.73 |

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

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2412 | 9.86 |
| Mid | 2437 | 11.58 |
| High | 2462 | 10.84 |

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

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2422 | 8.99 |
| Mid | 2437 | 10.99 |
| High | 2452 | 10.38 |

## For Chip Antenna

### Test mode: IEEE 802.11b

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2412 | 11.41 |
| Mid | 2437 | 10.74 |
| High | 2462 | 9.45 |

### Test mode: IEEE 802.11g

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2412 | 11.25 |
| Mid | 2437 | 10.64 |
| High | 2462 | 10.05 |

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

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2412 | 9.56 |
| Mid | 2437 | 10.16 |
| High | 2462 | 9.42 |

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

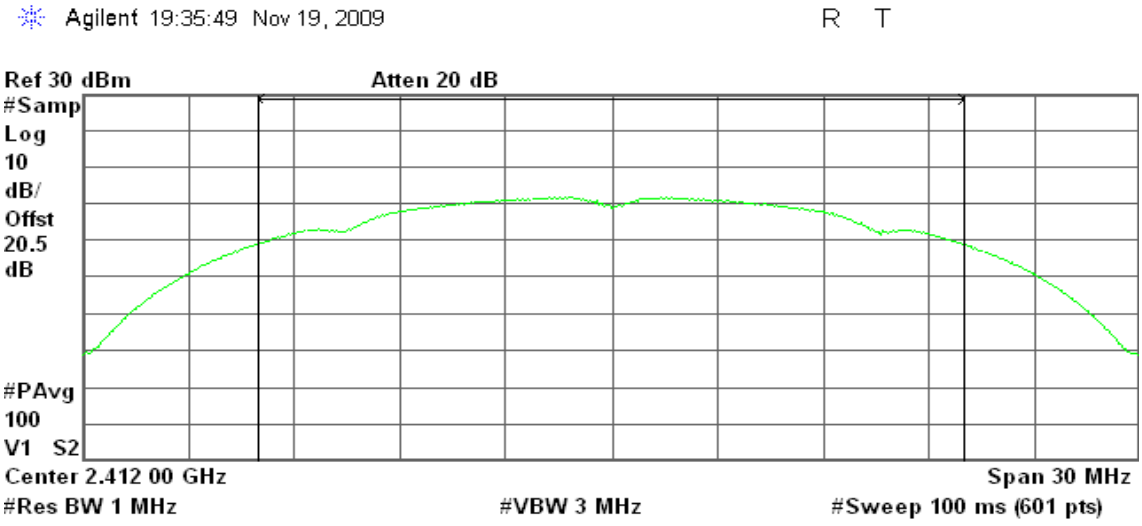
| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2422 | 8.66 |
| Mid | 2437 | 9.81 |
| High | 2452 | 8.84 |

## Test Plot

**For Omni Antenna**

**IEEE 802.11b mode**

**Average Power (CH Low)**



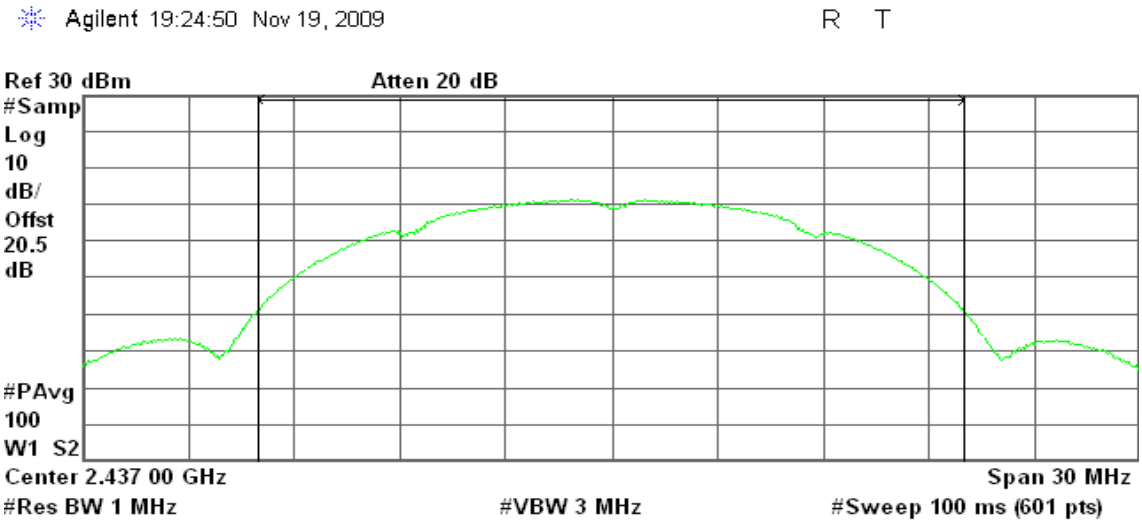

Channel Power

10.24 dBm / 20.0000 MHz

Power Spectral Density

-62.77 dBm/Hz

**Average Power (CH Mid)**



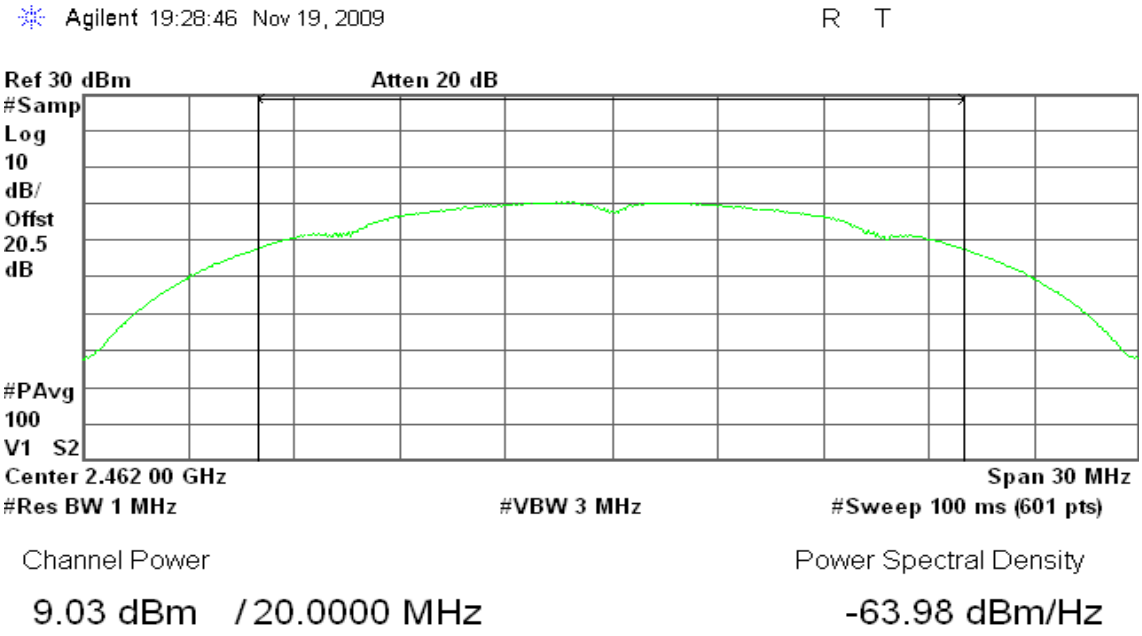

Channel Power

9.82 dBm / 20.0000 MHz

Power Spectral Density

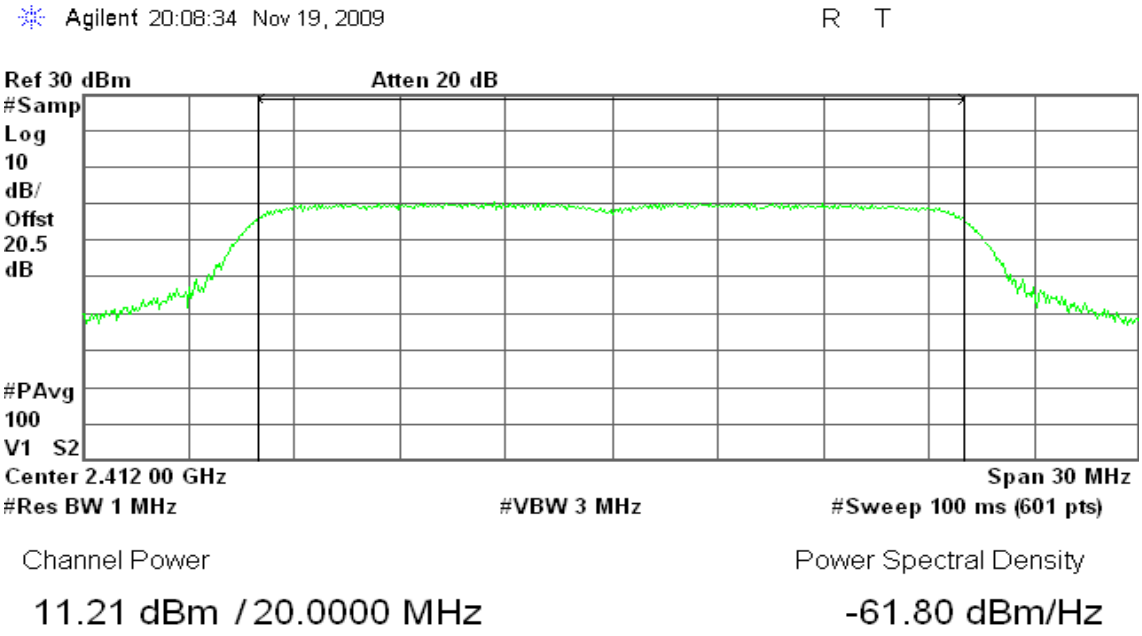
-63.19 dBm/Hz

### Average Power (CH High)

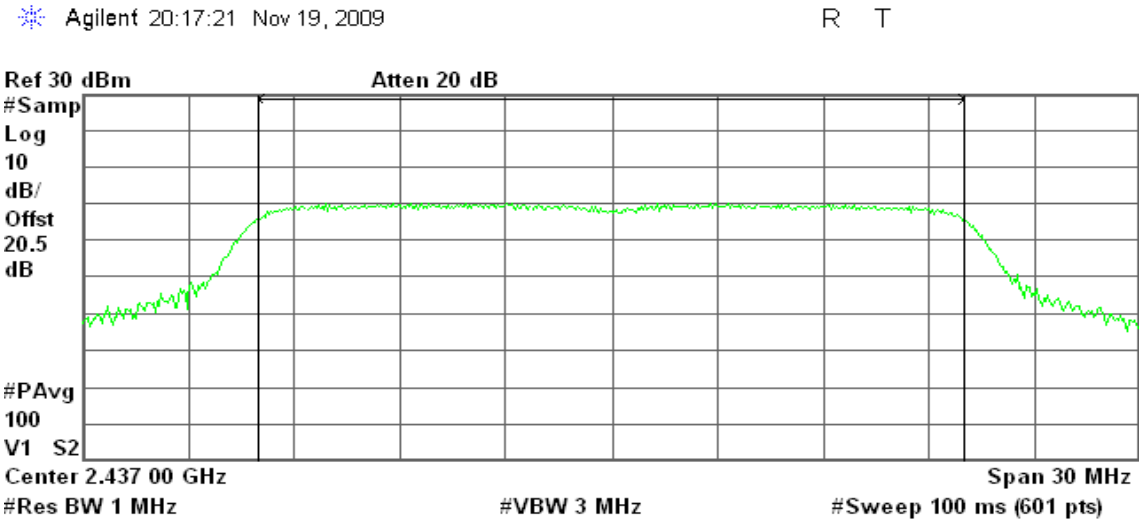



### IEEE 802.11g mode

### Average Power (CH Low)



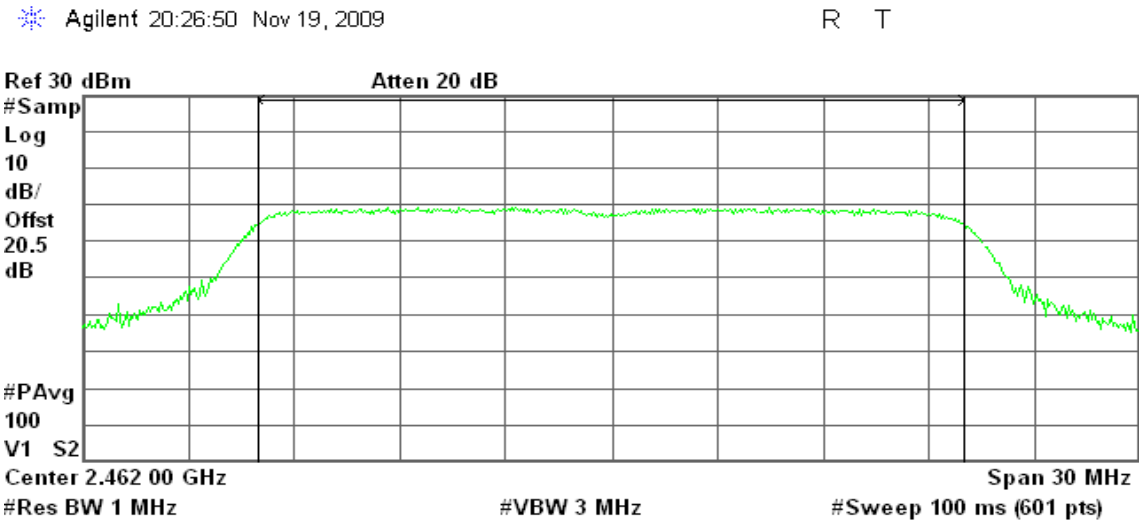
## Average Power (CH Mid)




Channel Power
11.09 dBm / 20.0000 MHz

Power Spectral Density
-61.92 dBm/Hz

## Average Power (CH High)

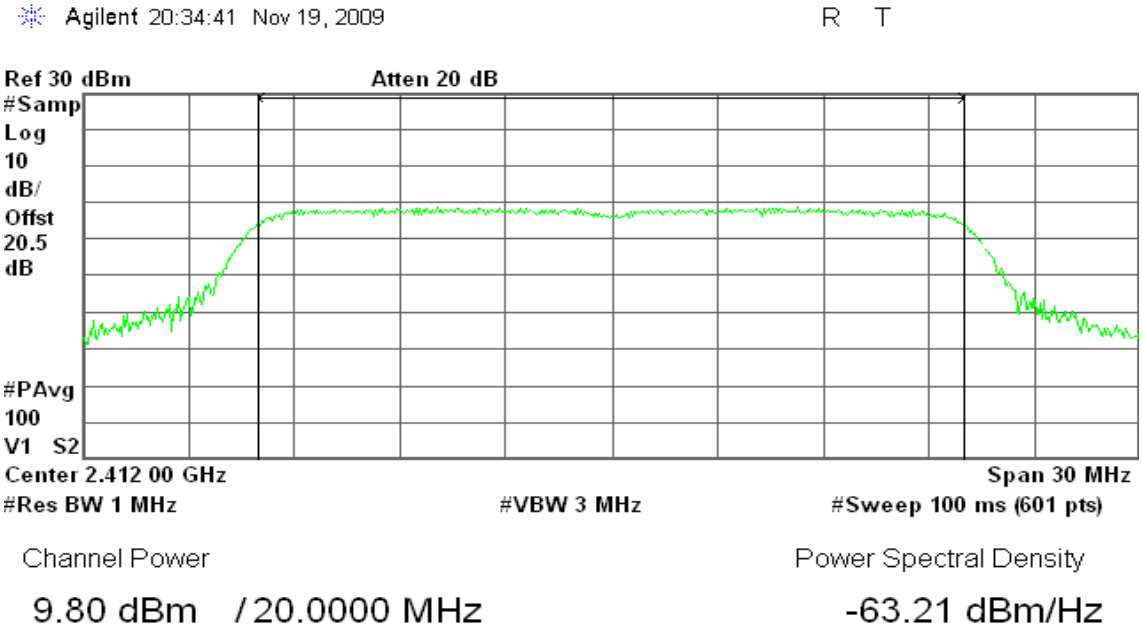



Channel Power
9.67 dBm / 20.0000 MHz

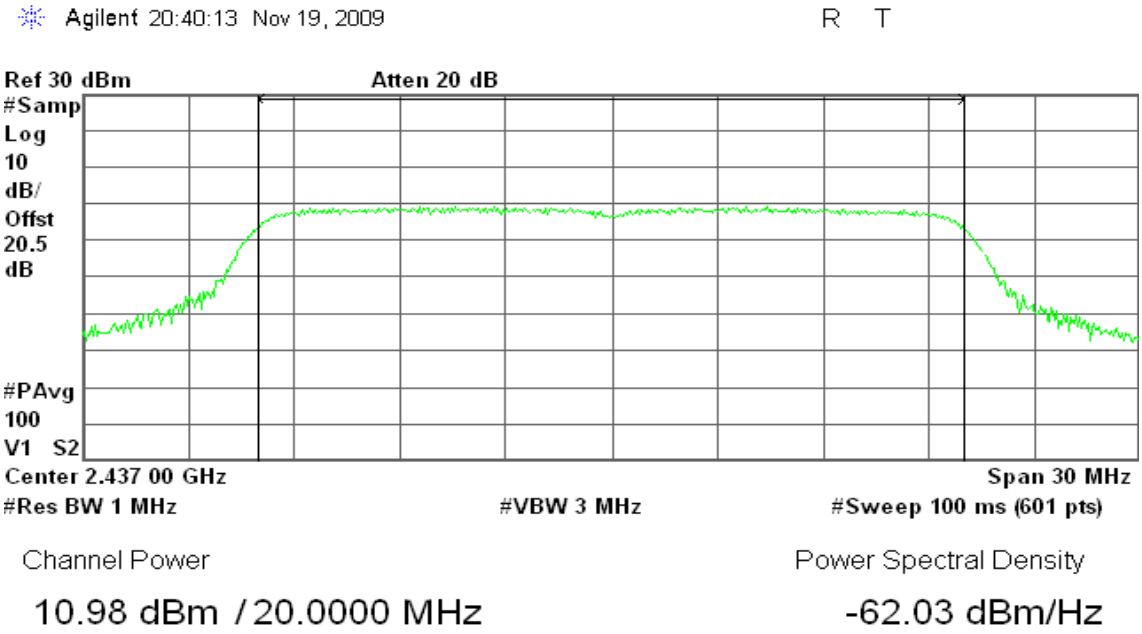
Power Spectral Density
-63.34 dBm/Hz

## draft 802.11n Standard-20 MHz Channel mode

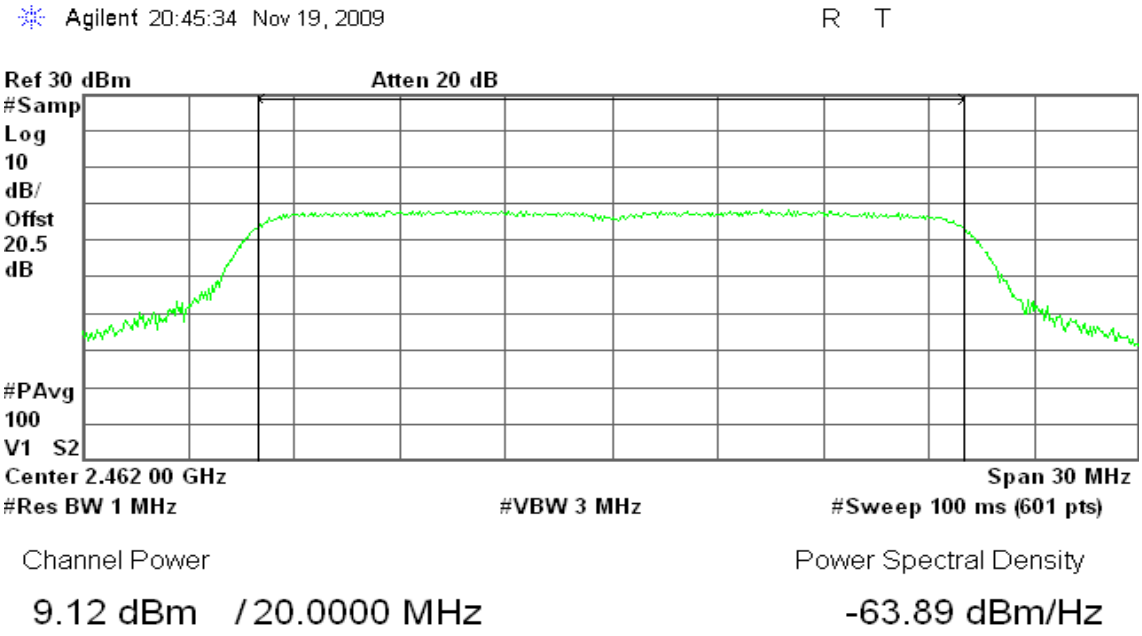
### Average Power (CH Low)




### Average Power (CH Mid)

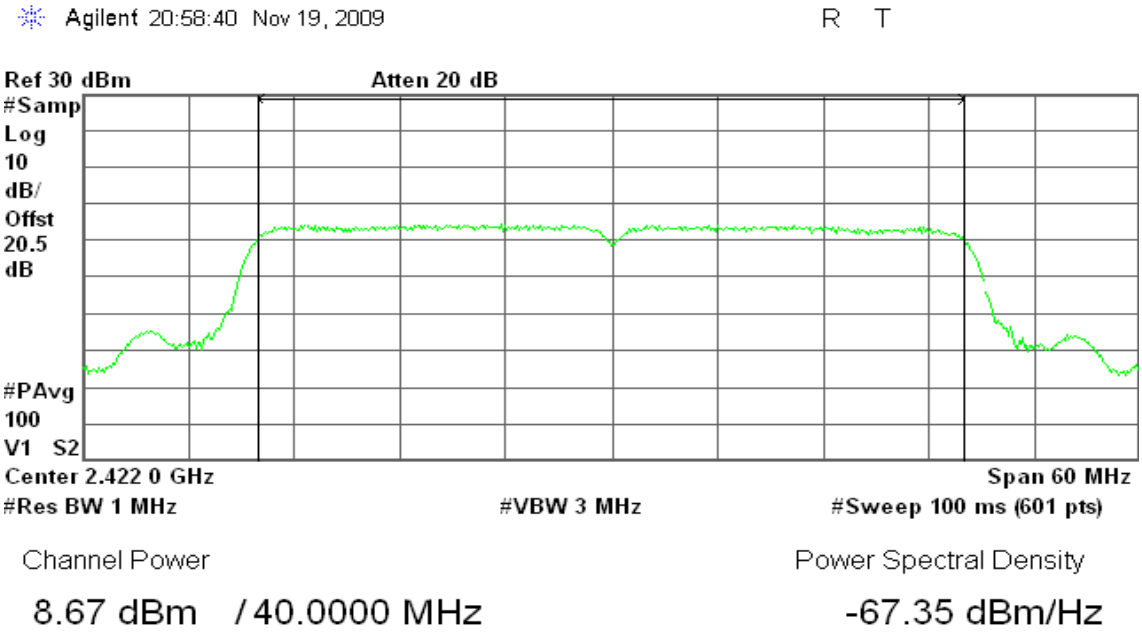


## Average Power (CH High)

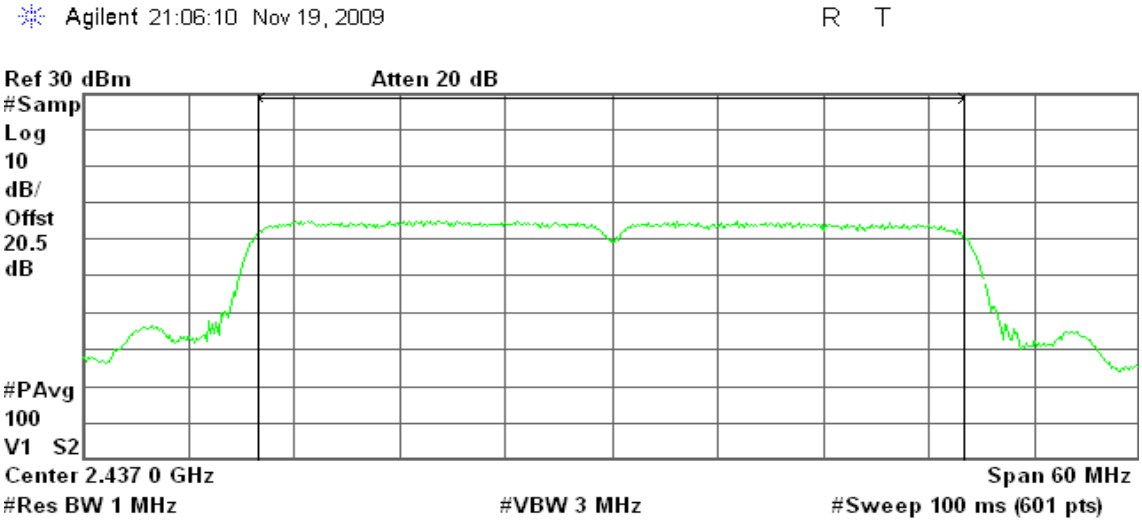



## draft 802.11n Wide-40 MHz Channel mode

## Average Power (CH Low)



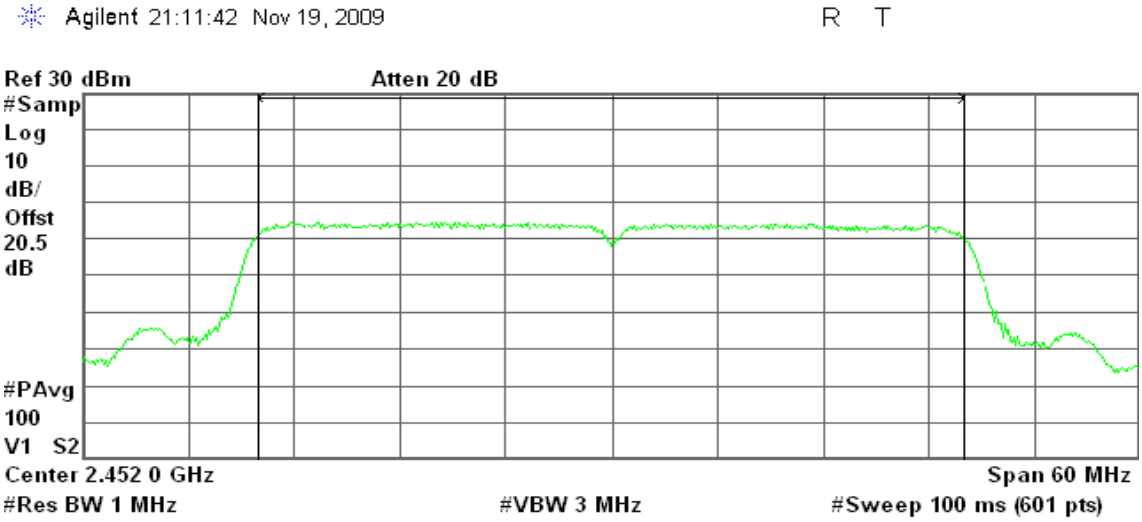
## Average Power (CH Mid)




Channel Power
9.25 dBm / 40.0000 MHz

Power Spectral Density
-66.77 dBm/Hz

## Average Power (CH High)



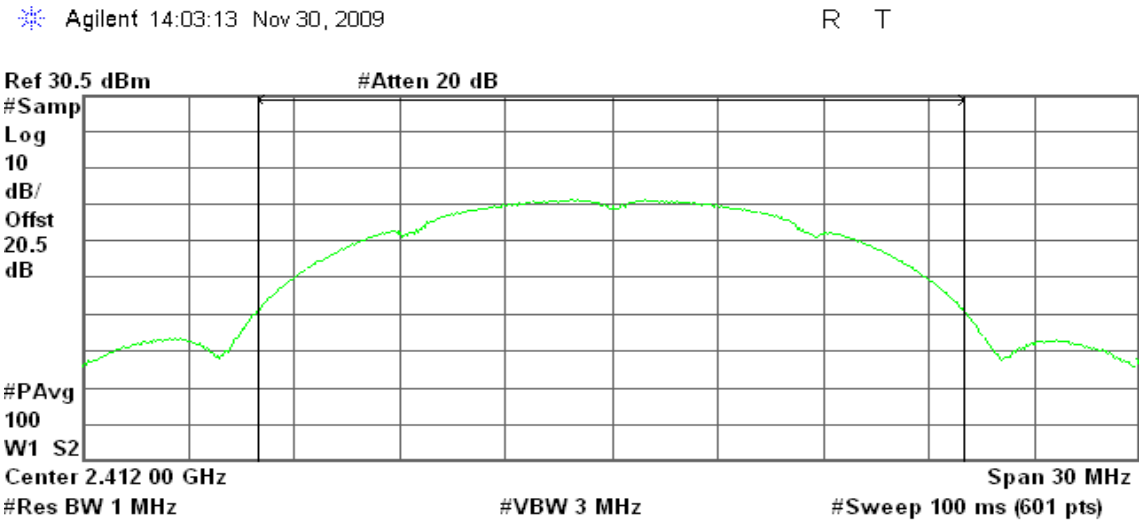

Channel Power
8.67 dBm / 40.0000 MHz

Power Spectral Density
-67.35 dBm/Hz

**For Patch Antenna**

**IEEE 802.11b mode**

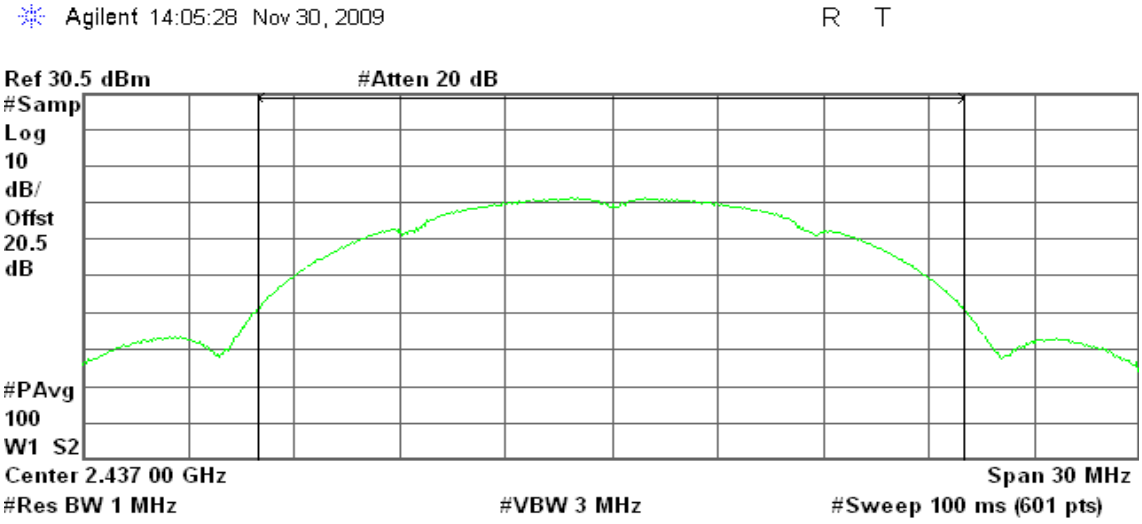
**Average Power (CH Low)**




Channel Power
11.02 dBm / 20.0000 MHz

Power Spectral Density
-61.99 dBm/Hz

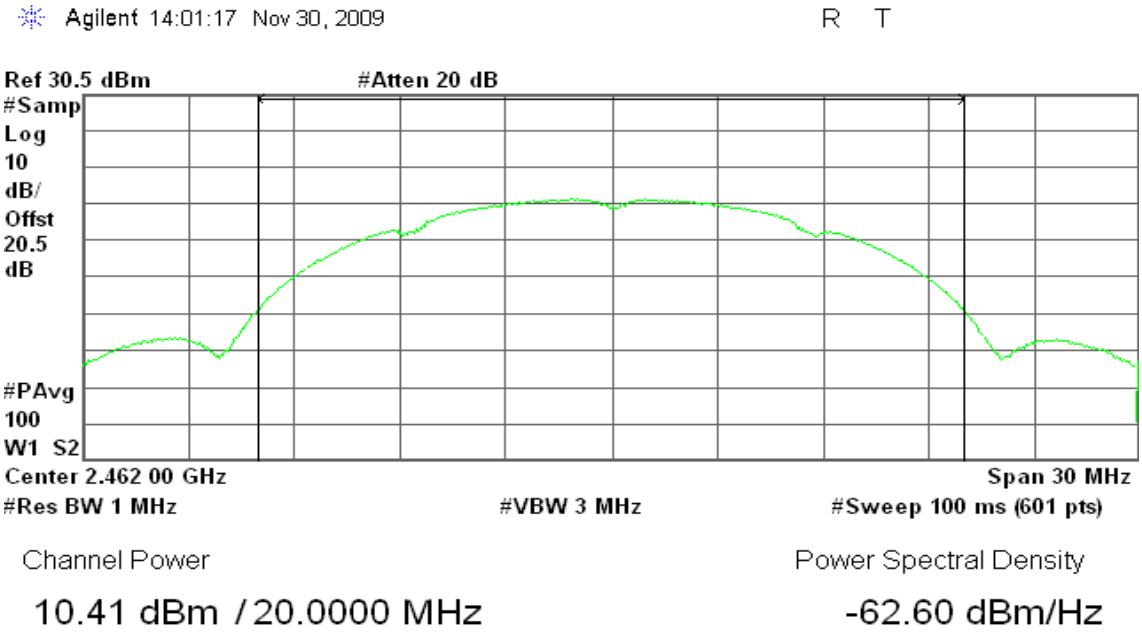
**Average Power (CH Mid)**




Channel Power
11.33 dBm / 20.0000 MHz

Power Spectral Density
-61.68 dBm/Hz

## Average Power (CH High)

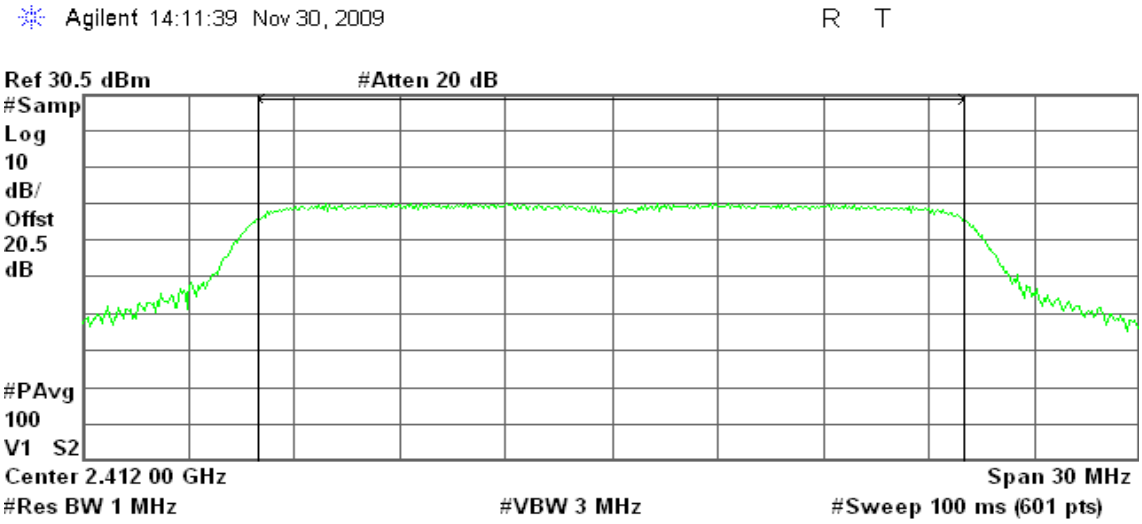



Channel Power
10.41 dBm / 20.0000 MHz

Power Spectral Density
-62.60 dBm/Hz

## IEEE 802.11g mode

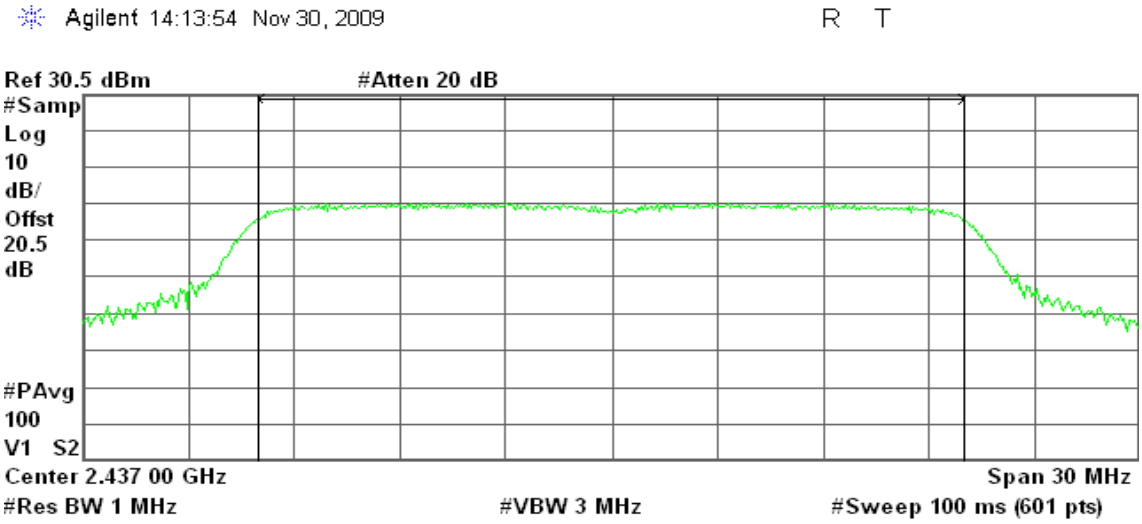
## Average Power (CH Low)




Channel Power
12.10 dBm / 20.0000 MHz

Power Spectral Density
-60.91 dBm/Hz

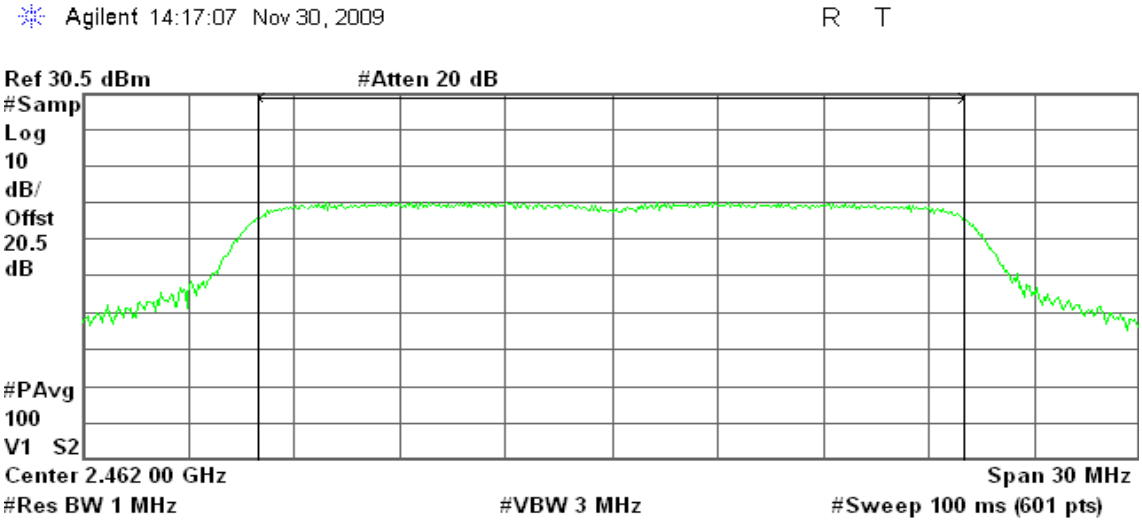
## Average Power (CH Mid)




Channel Power
12.34 dBm / 20.0000 MHz

Power Spectral Density
-60.67 dBm/Hz

## Average Power (CH High)

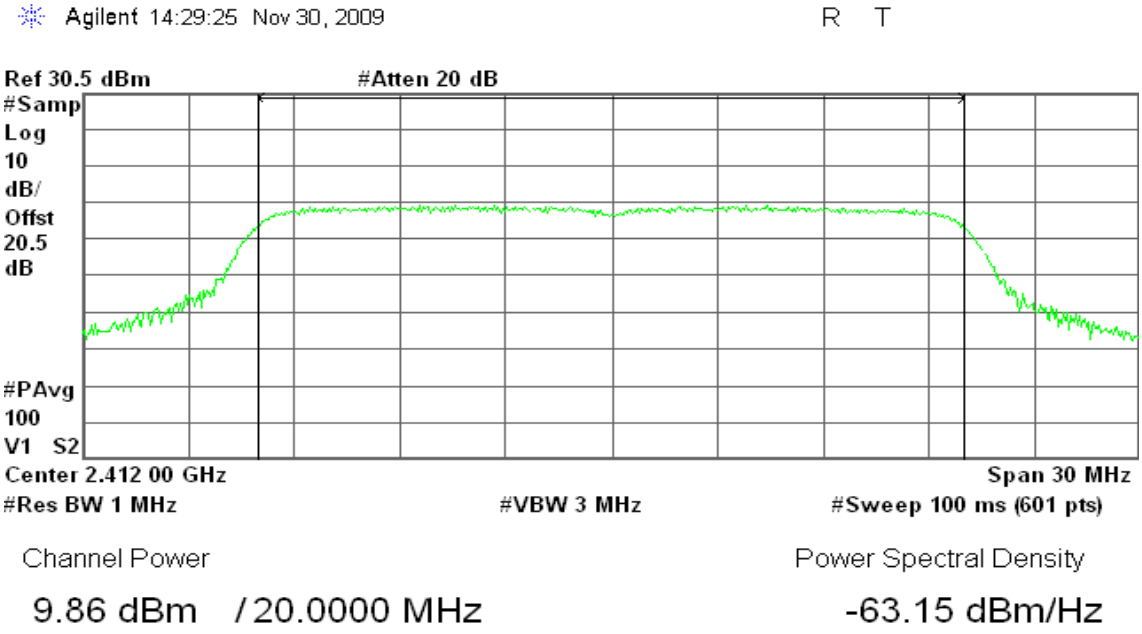



Channel Power
11.73 dBm / 20.0000 MHz

Power Spectral Density
-61.28 dBm/Hz

## draft 802.11n Standard-20 MHz Channel mode

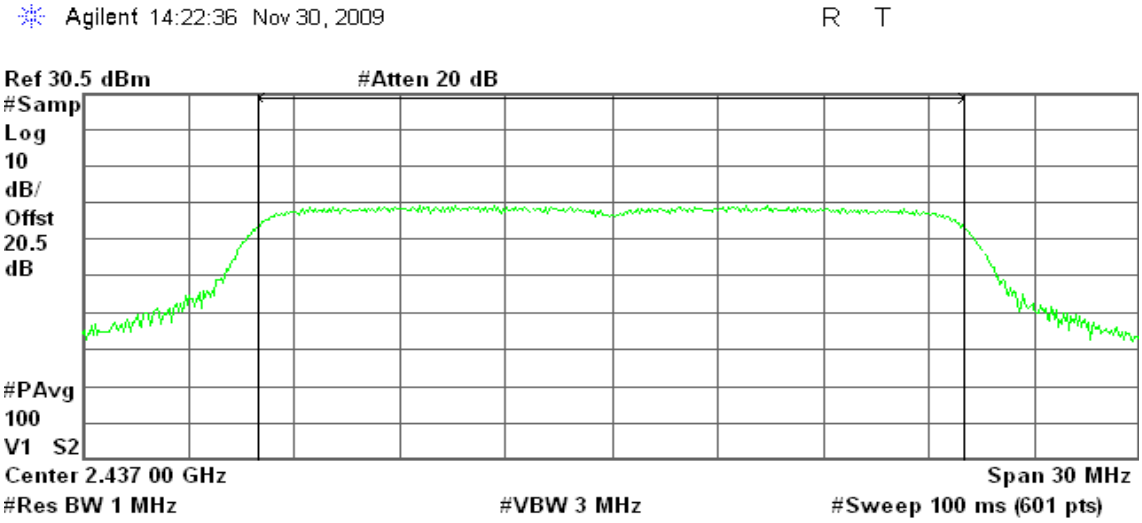
### Average Power (CH Low)




Channel Power
9.86 dBm / 20.0000 MHz

Power Spectral Density
-63.15 dBm/Hz

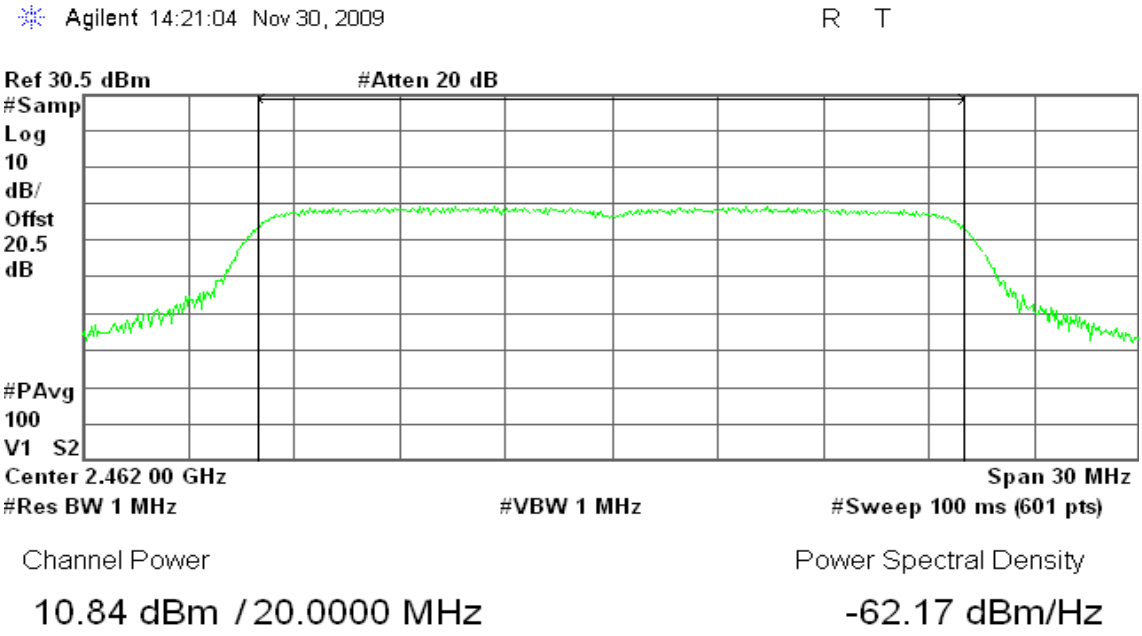
### Average Power (CH Mid)




Channel Power
11.58 dBm / 20.0000 MHz

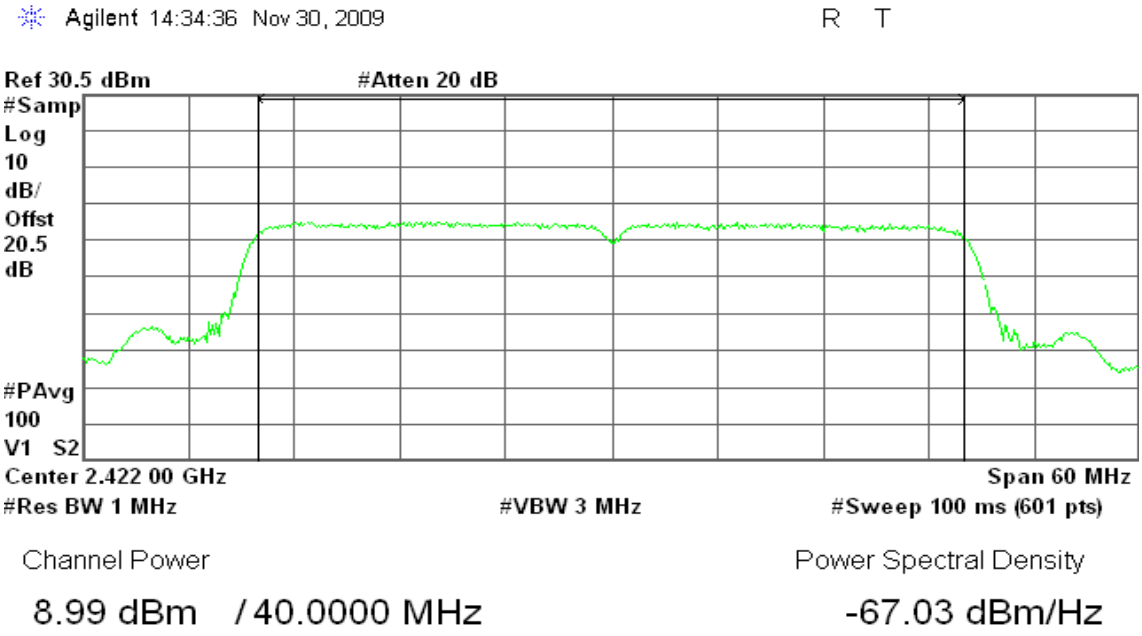
Power Spectral Density
-61.43 dBm/Hz

## Average Power (CH High)

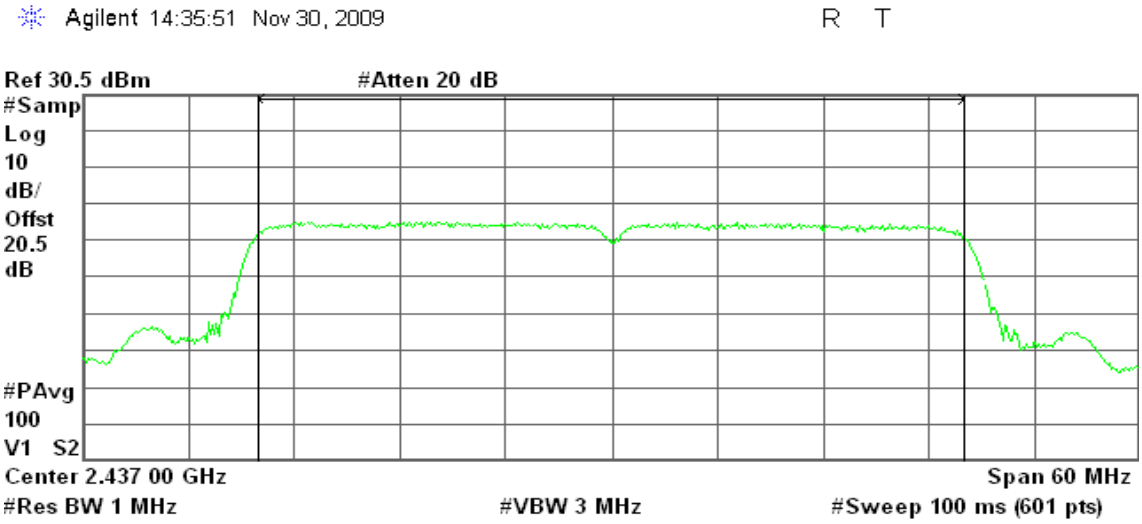



## draft 802.11n Wide-40 MHz Channel mode

## Average Power (CH Low)



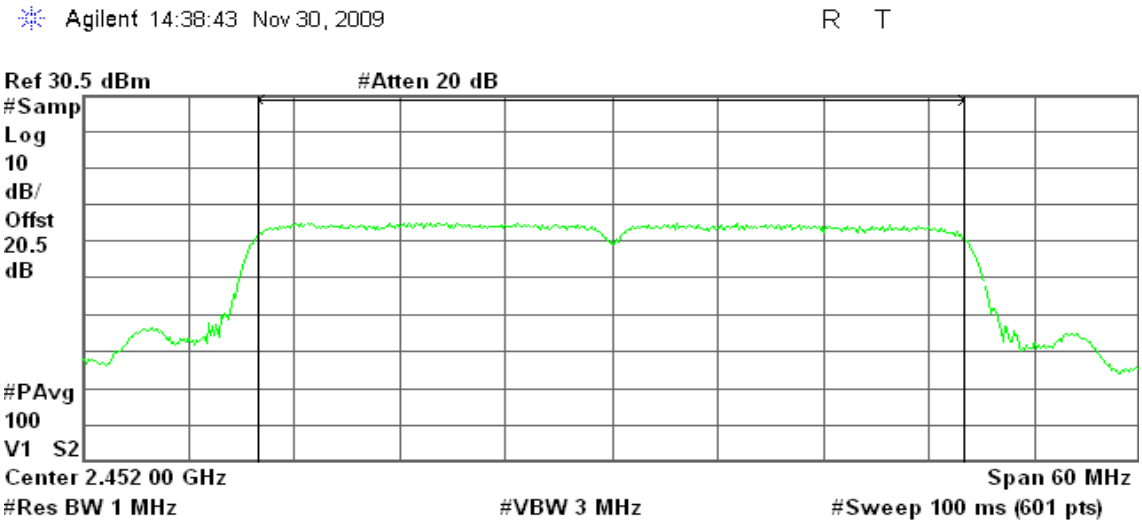
## Average Power (CH Mid)




Channel Power
10.99 dBm / 40.0000 MHz

Power Spectral Density
-65.03 dBm/Hz

## Average Power (CH High)



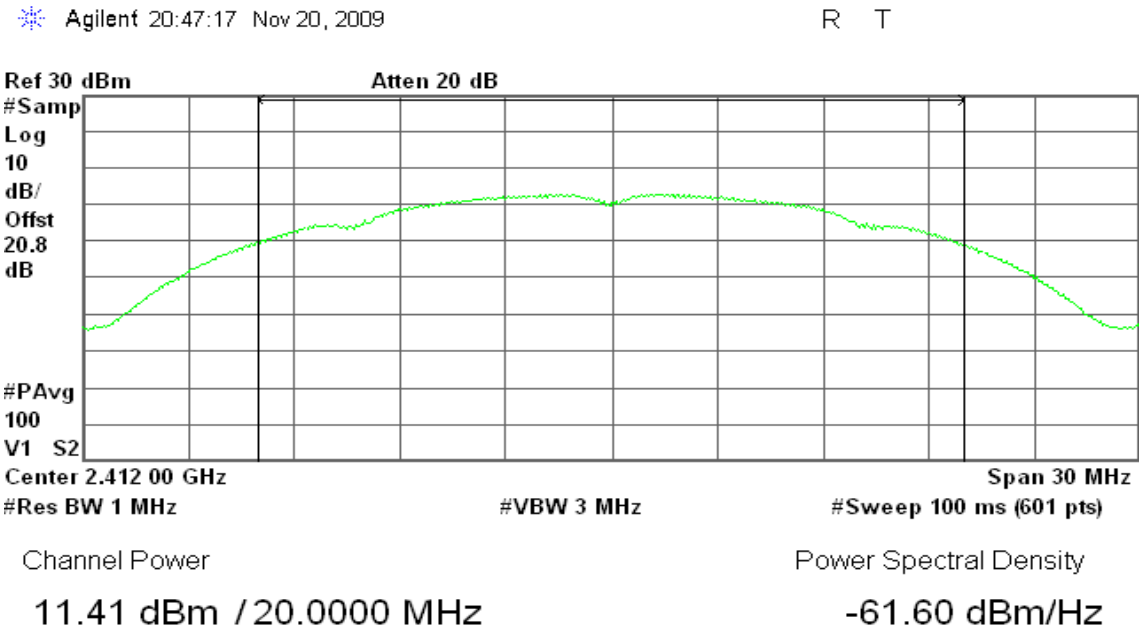

Channel Power
10.38 dBm / 40.0000 MHz

Power Spectral Density
-65.64 dBm/Hz

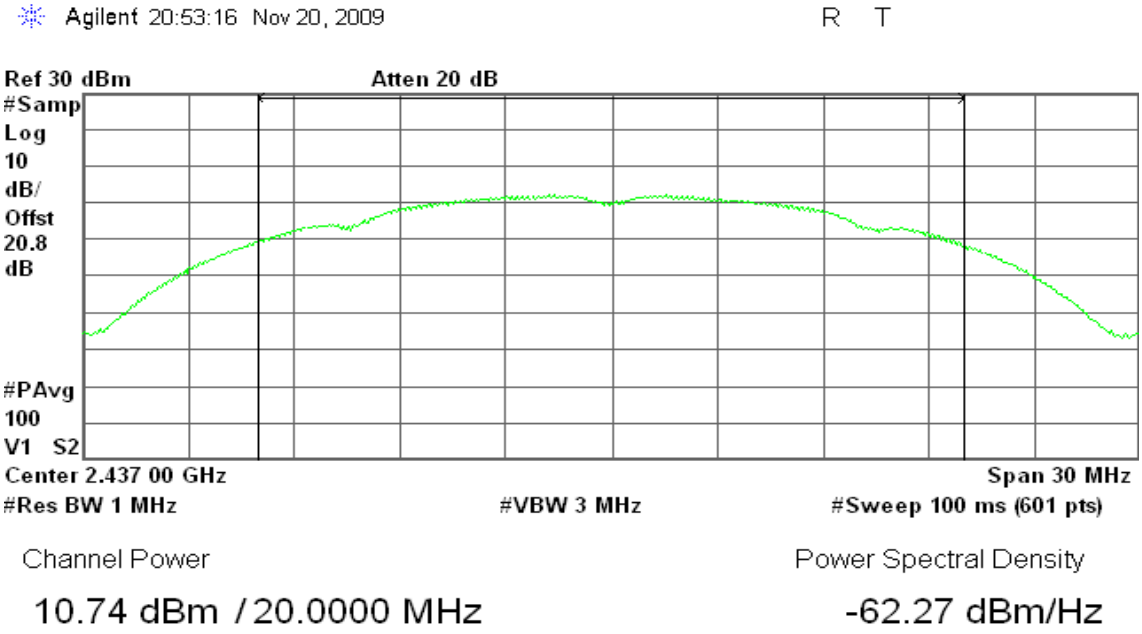
**For Chip Antenna**

**IEEE 802.11b mode**

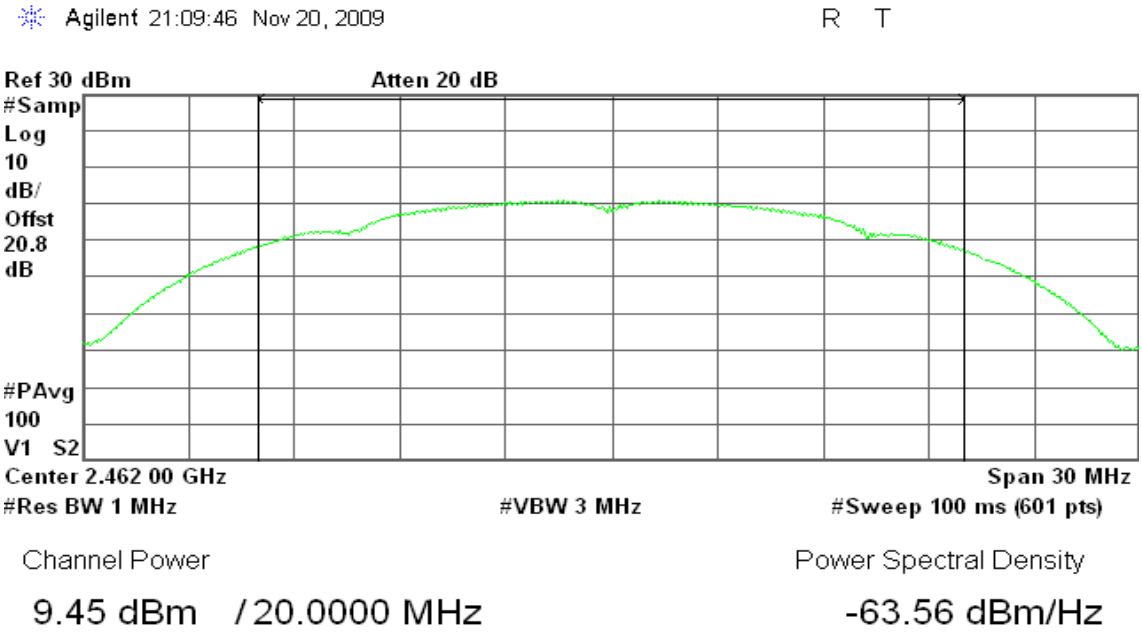
**Average Power (CH Low)**




**Average Power (CH Mid)**

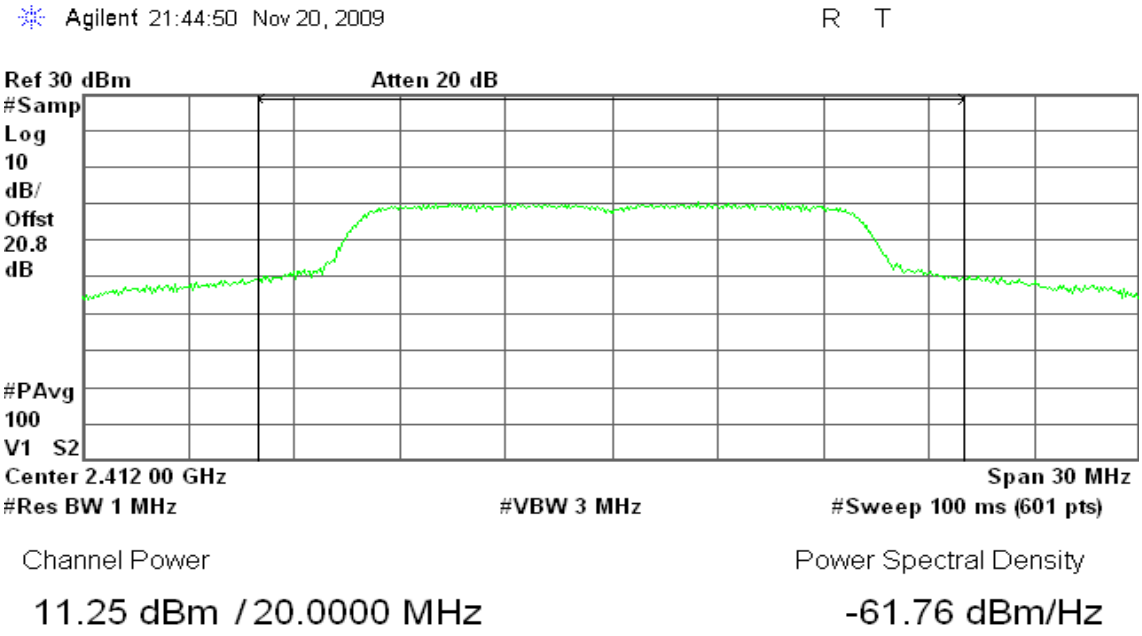


### Average Power (CH High)

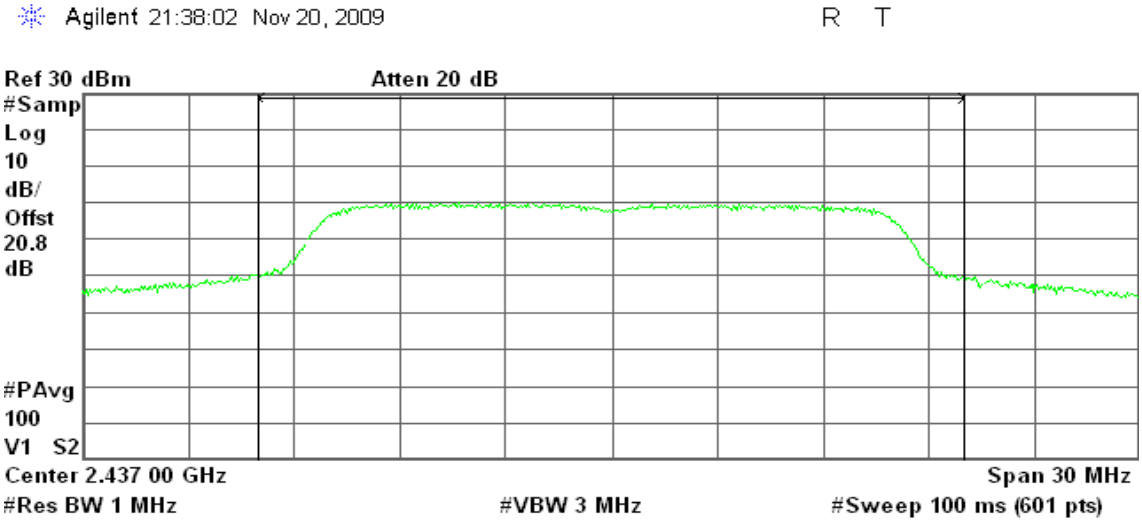



### IEEE 802.11g mode

### Average Power (CH Low)



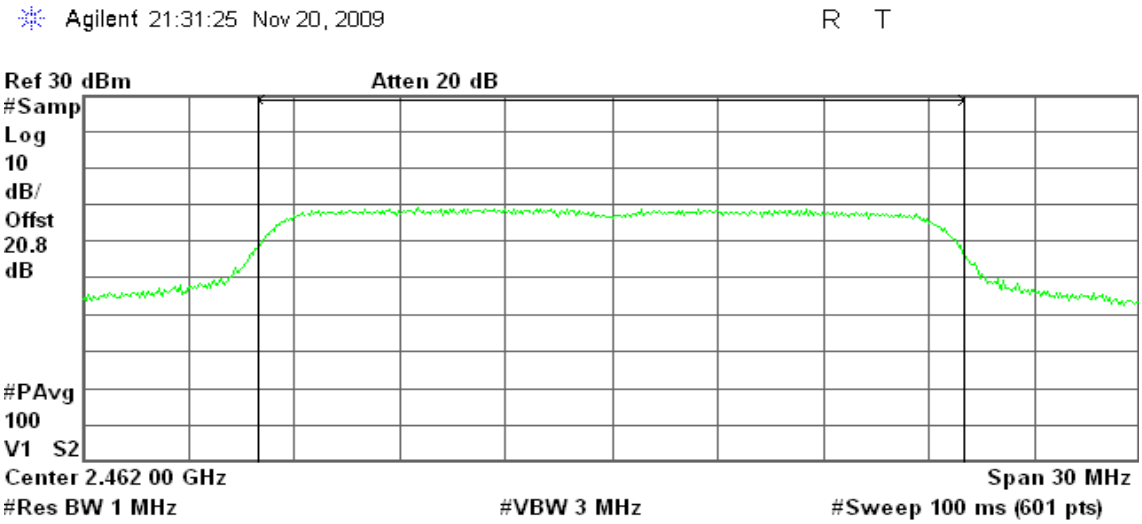
## Average Power (CH Mid)




Channel Power
10.64 dBm / 20.0000 MHz

Power Spectral Density
-62.37 dBm/Hz

## Average Power (CH High)

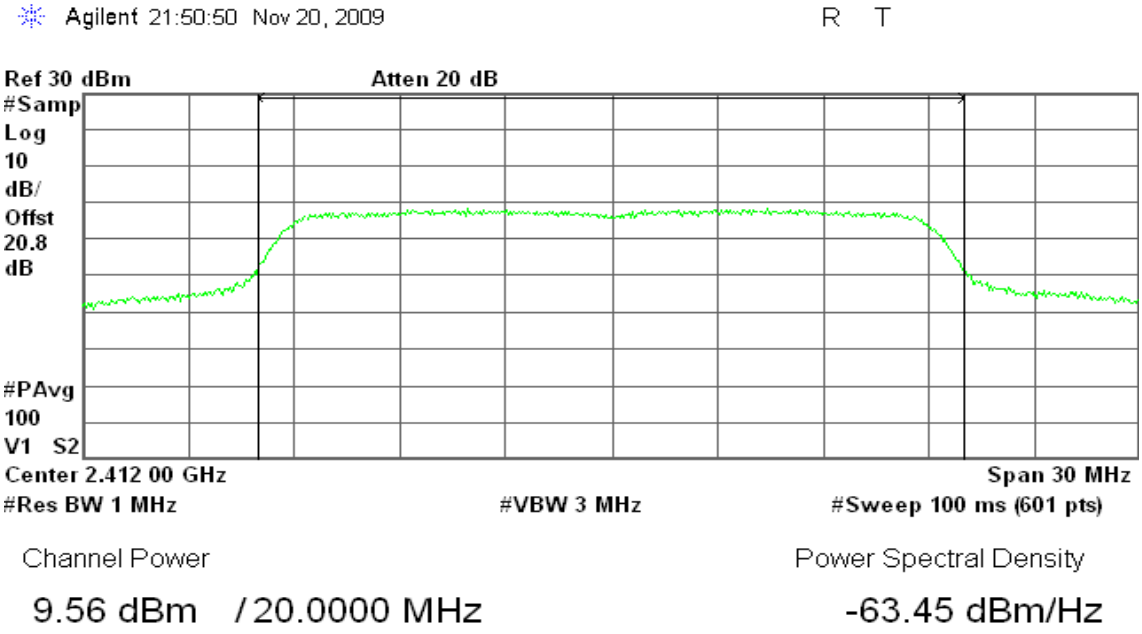



Channel Power
10.05 dBm / 20.0000 MHz

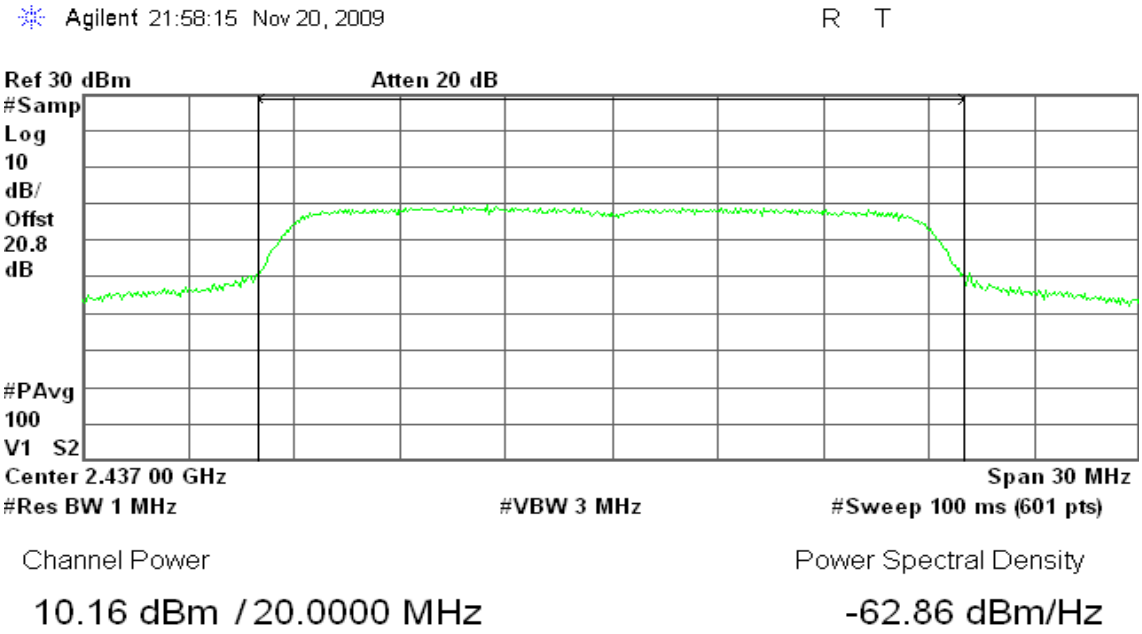
Power Spectral Density
-62.96 dBm/Hz

## draft 802.11n Standard-20 MHz Channel mode

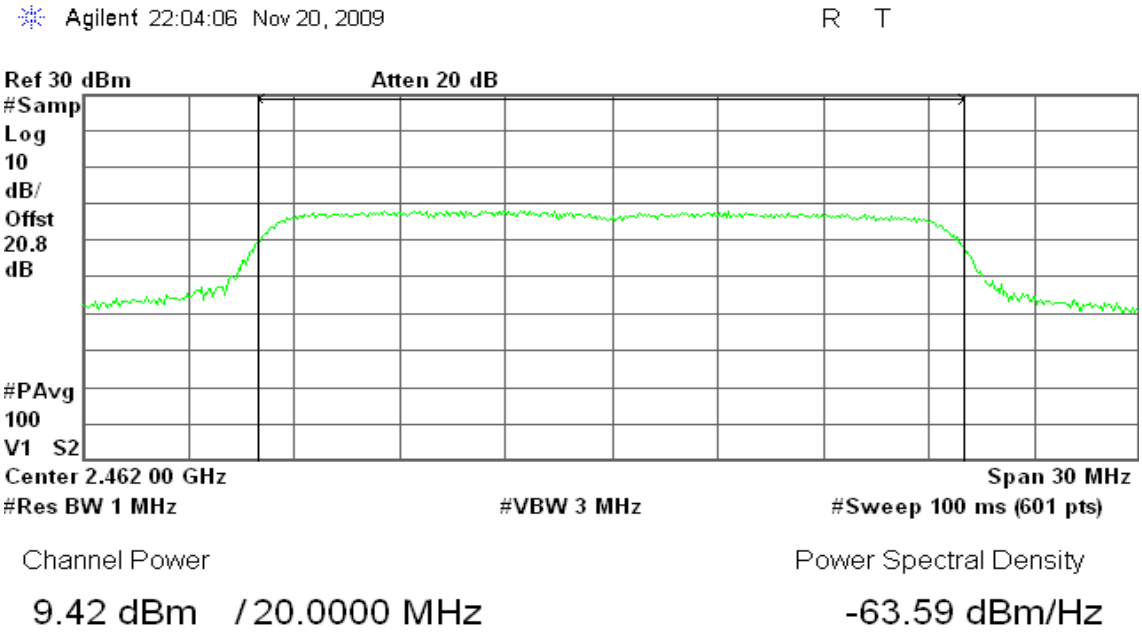
### Average Power (CH Low)




### Average Power (CH Mid)

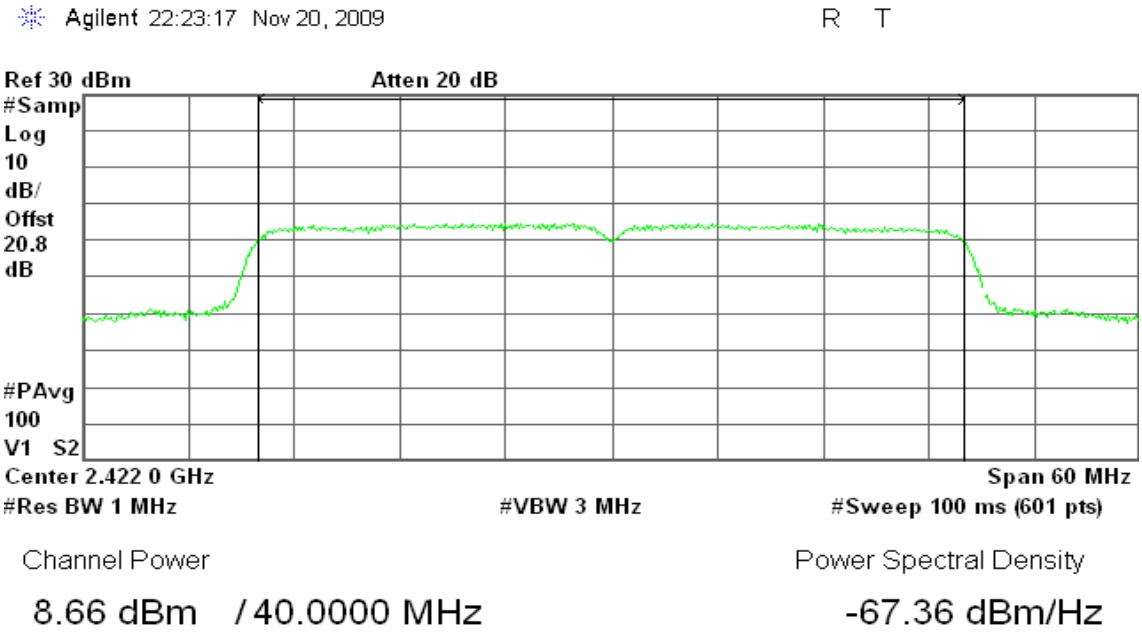


## Average Power (CH High)

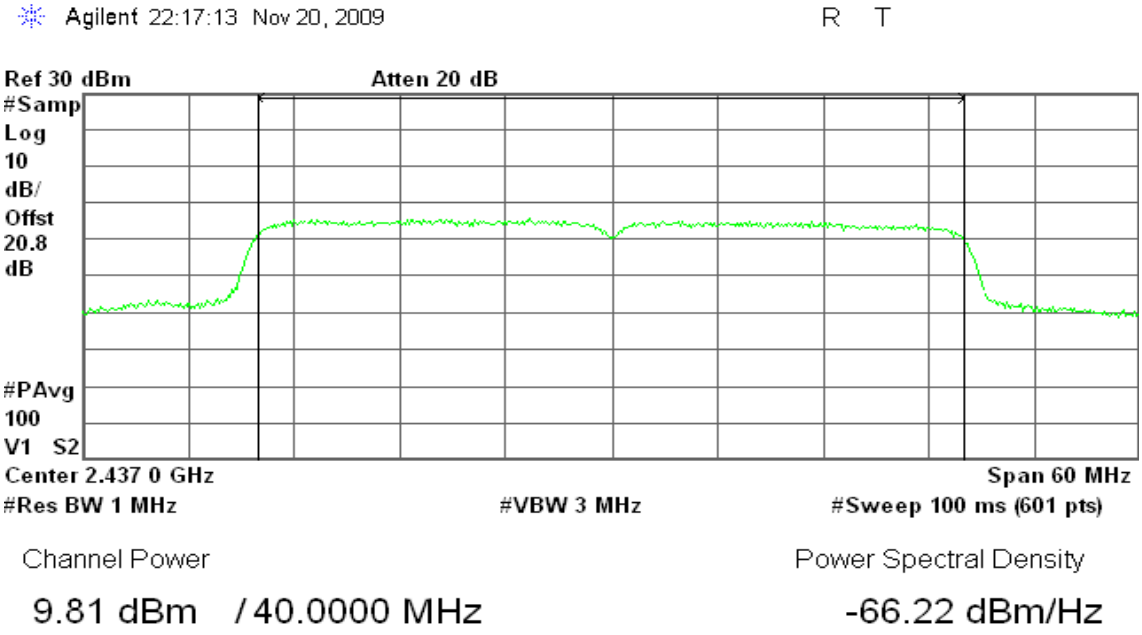



## draft 802.11n Wide-40 MHz Channel mode

## Average Power (CH Low)



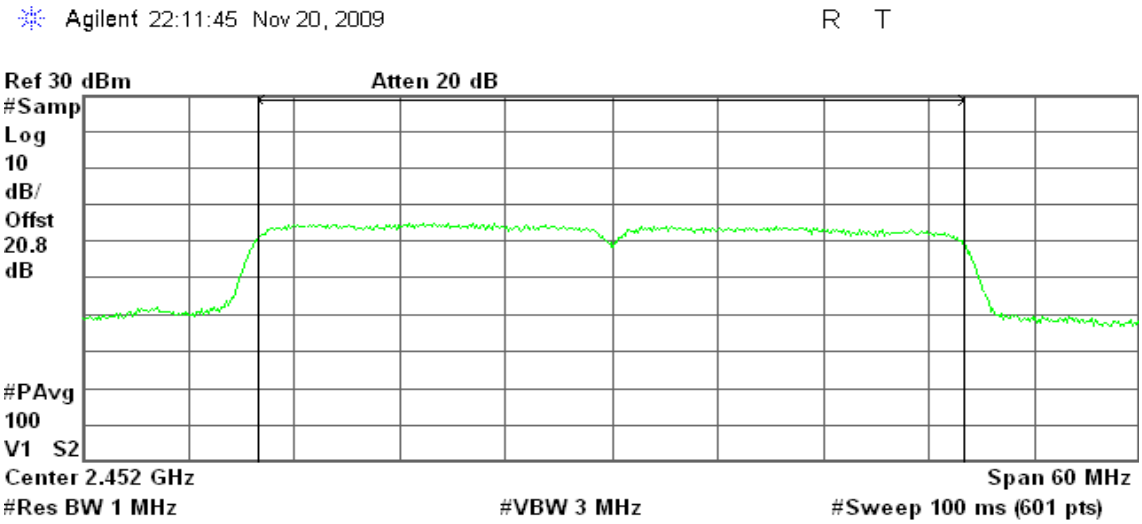
## Average Power (CH Mid)




Channel Power
9.81 dBm /40.0000 MHz

Power Spectral Density
-66.22 dBm/Hz

## Average Power (CH High)




Channel Power
8.84 dBm /40.0000 MHz

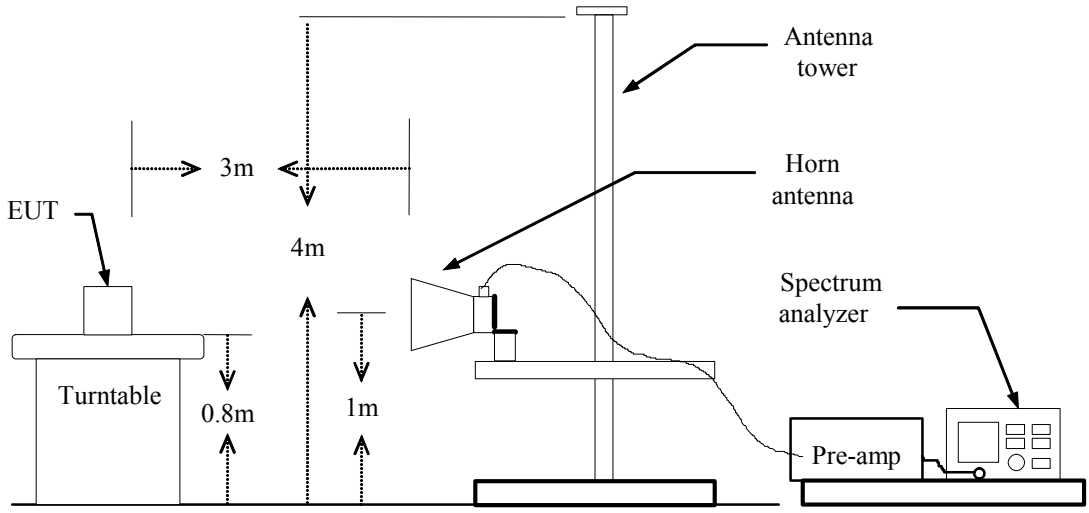
Power Spectral Density
-77.18 dBm/Hz

## 7.4 BAND EDGES MEASUREMENT

## LIMIT

According to §15.247(d), 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.

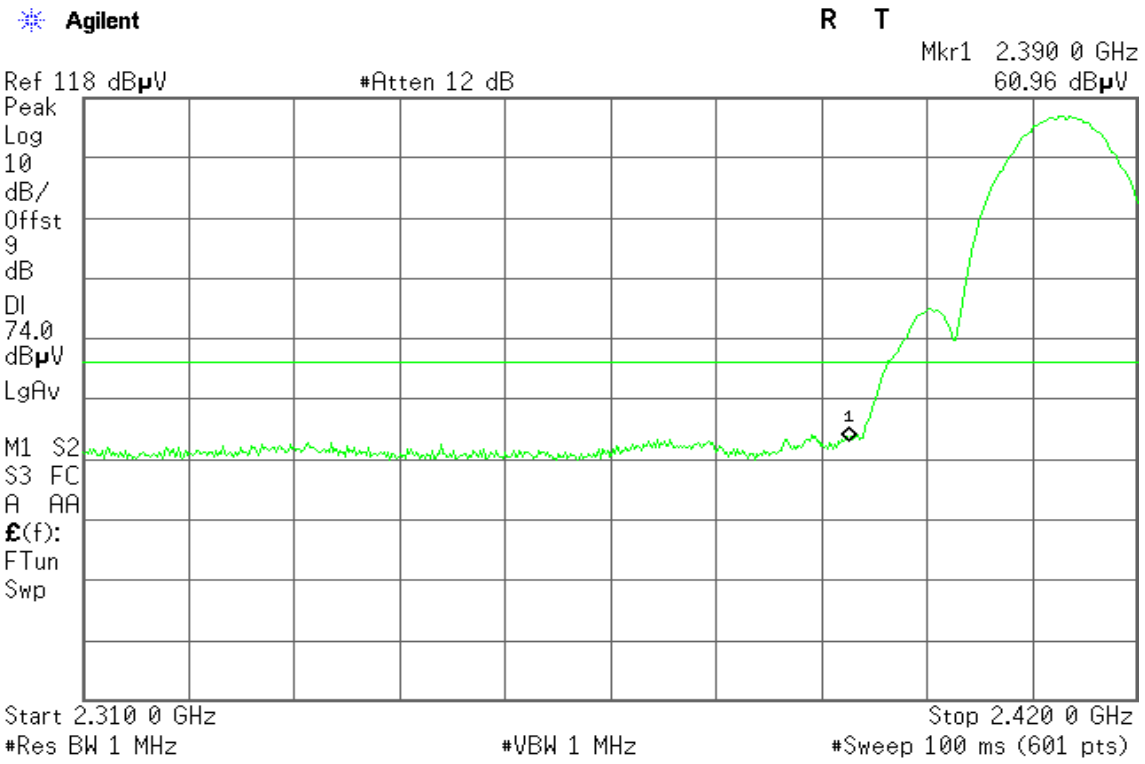
## TEST RESULTS

Refer to attach spectrum analyzer data chart.

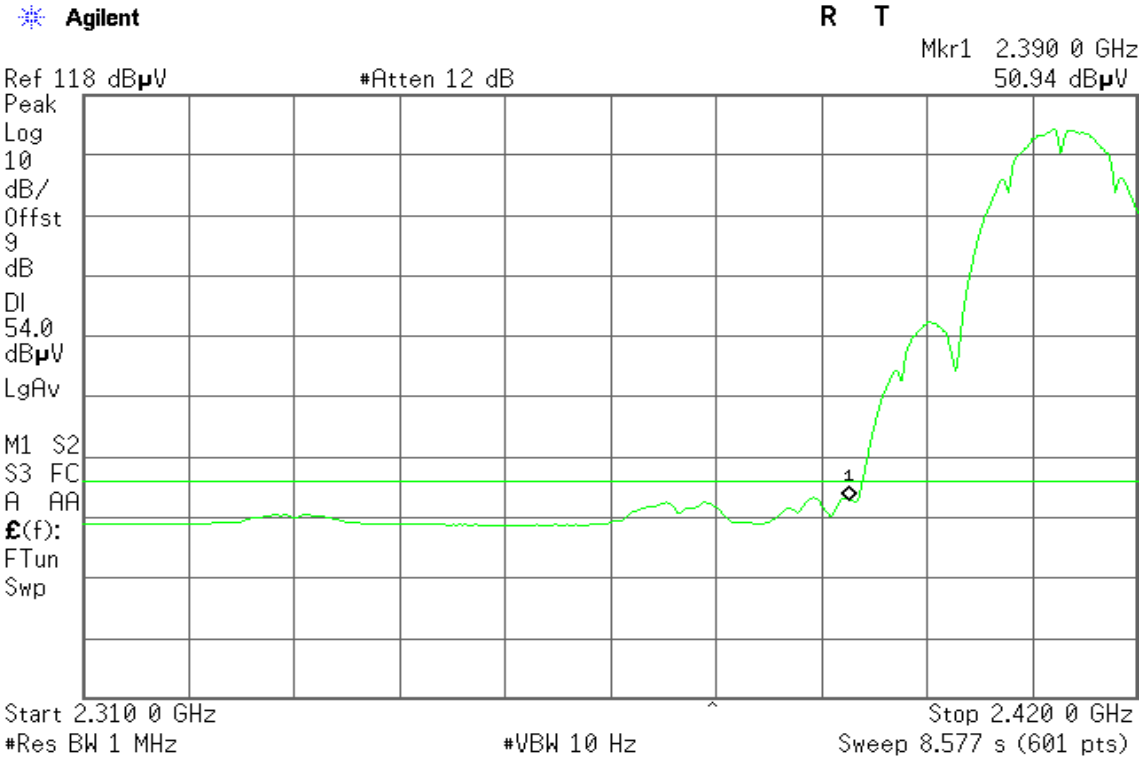
**For Omni Antenna**

**Band Edges (IEEE 802.11b mode / CH Low)**

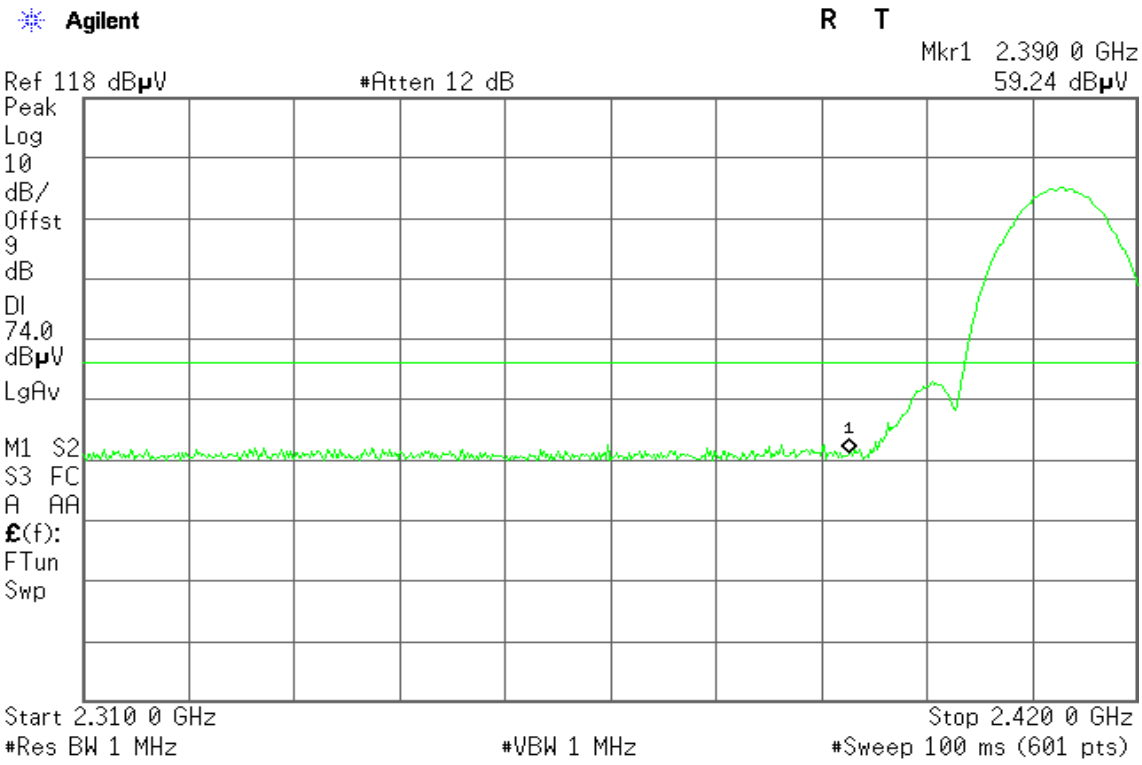
**Detector mode: Peak** **Polarity: Vertical**



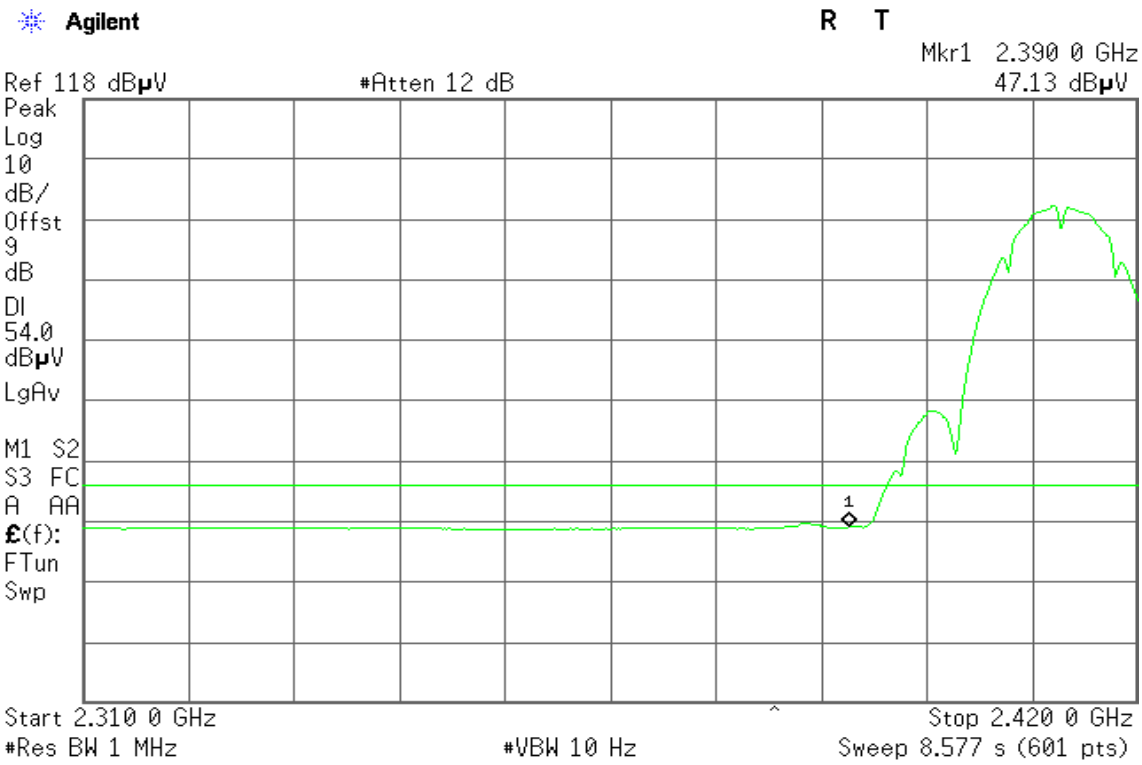

**Detector mode: Average** **Polarity: Vertical**



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

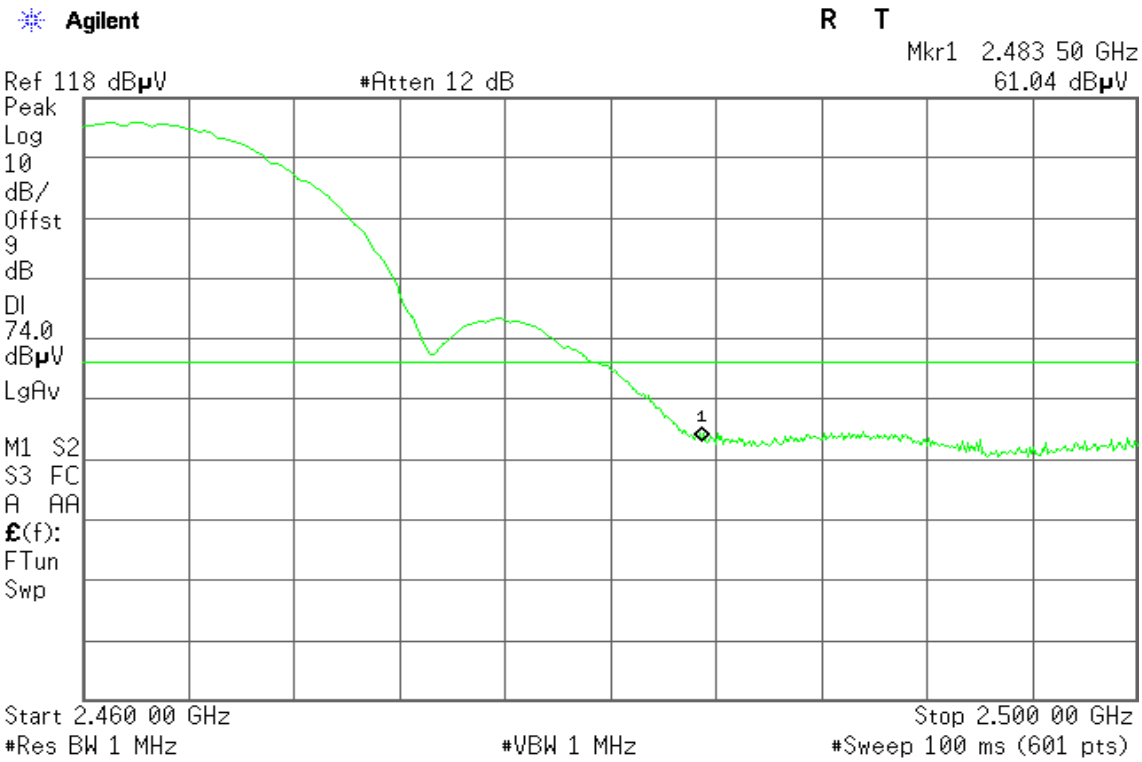



**Detector mode: Average** **Polarity: Horizontal**

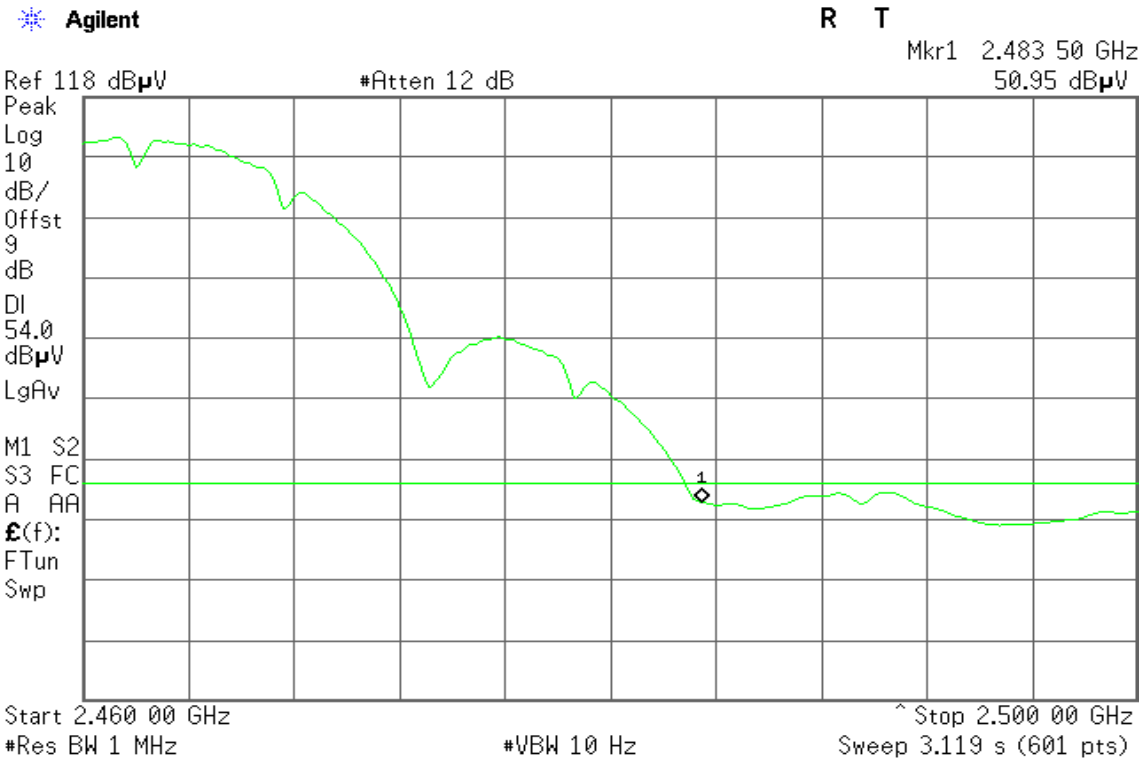


## Band Edges (IEEE 802.11b mode / CH High)

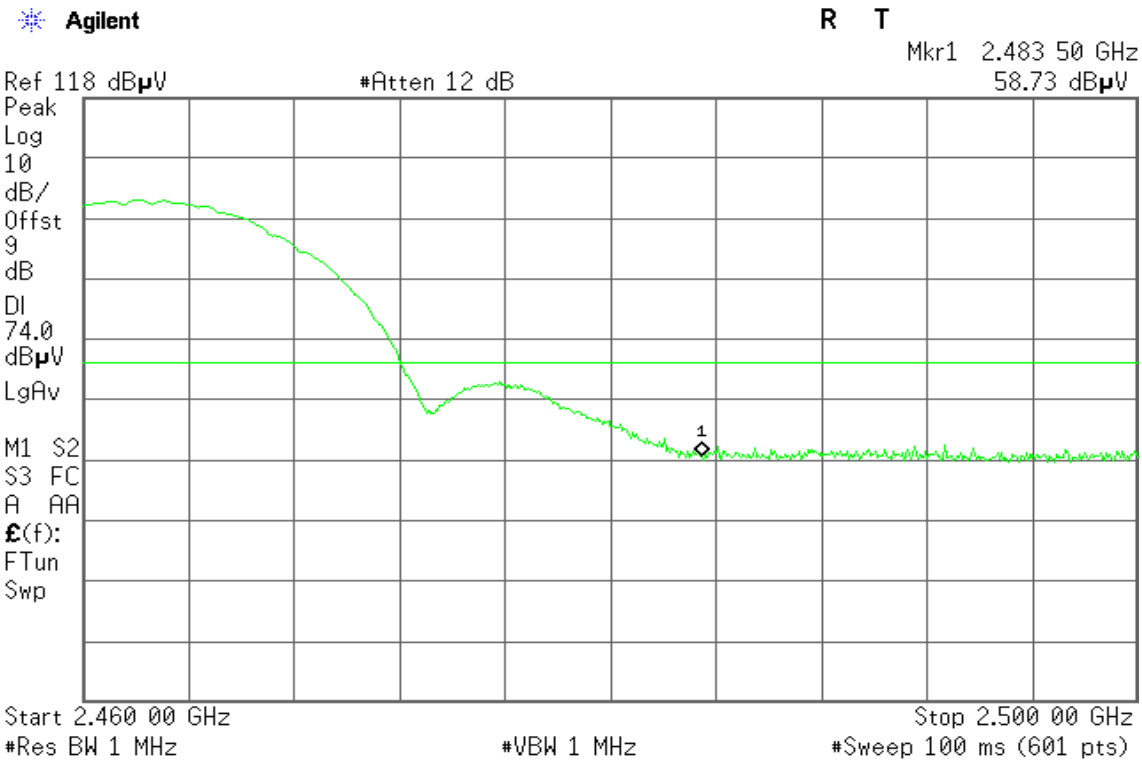
### Detector mode: Peak Polarity: Vertical



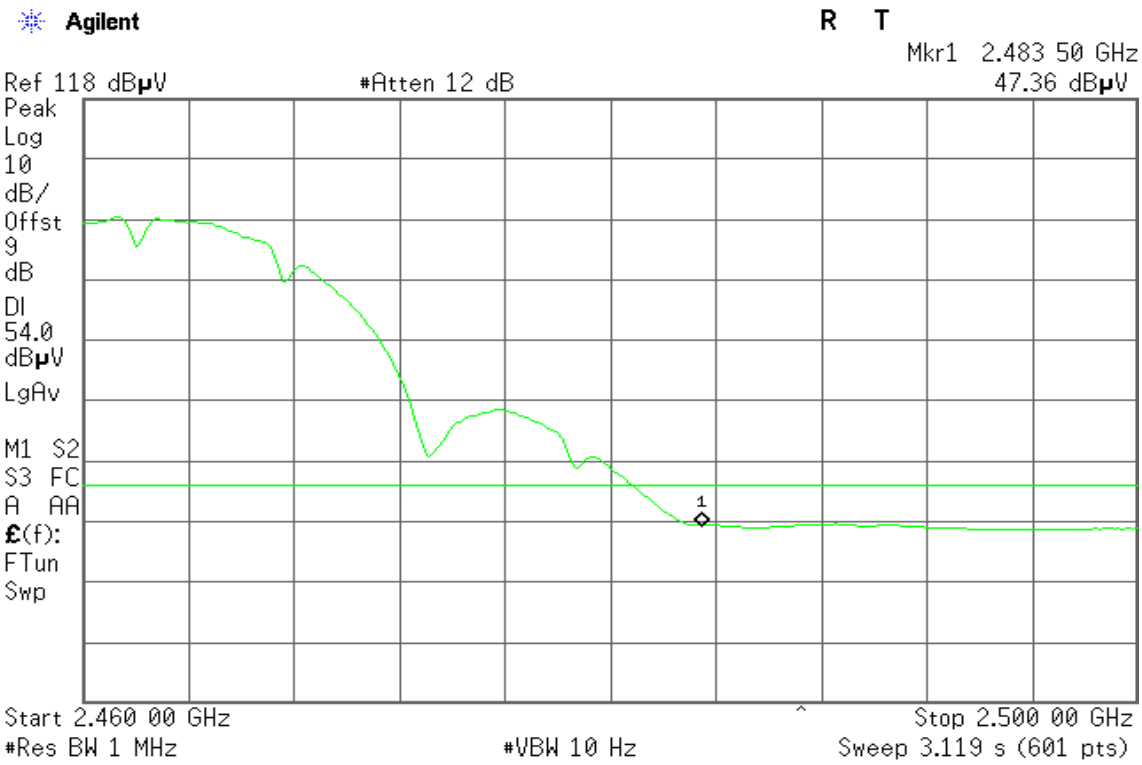

### Detector mode: Average Polarity: Vertical



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

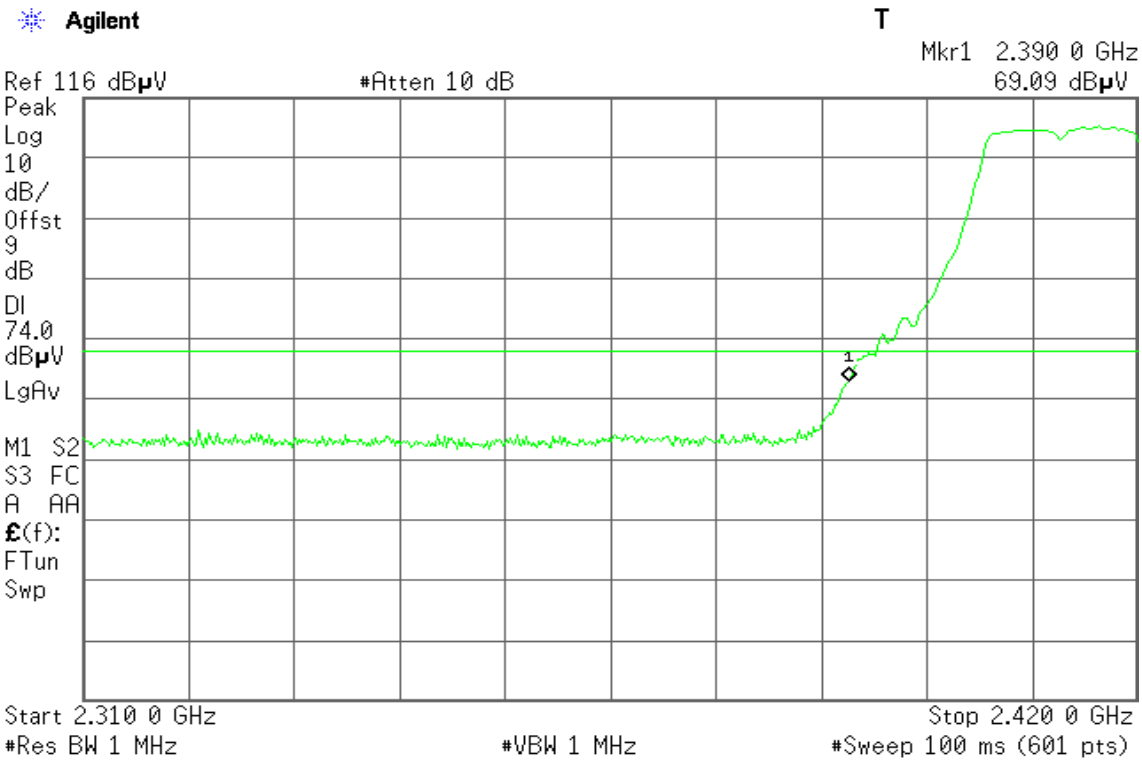



**Detector mode: Average** **Polarity: Horizontal**

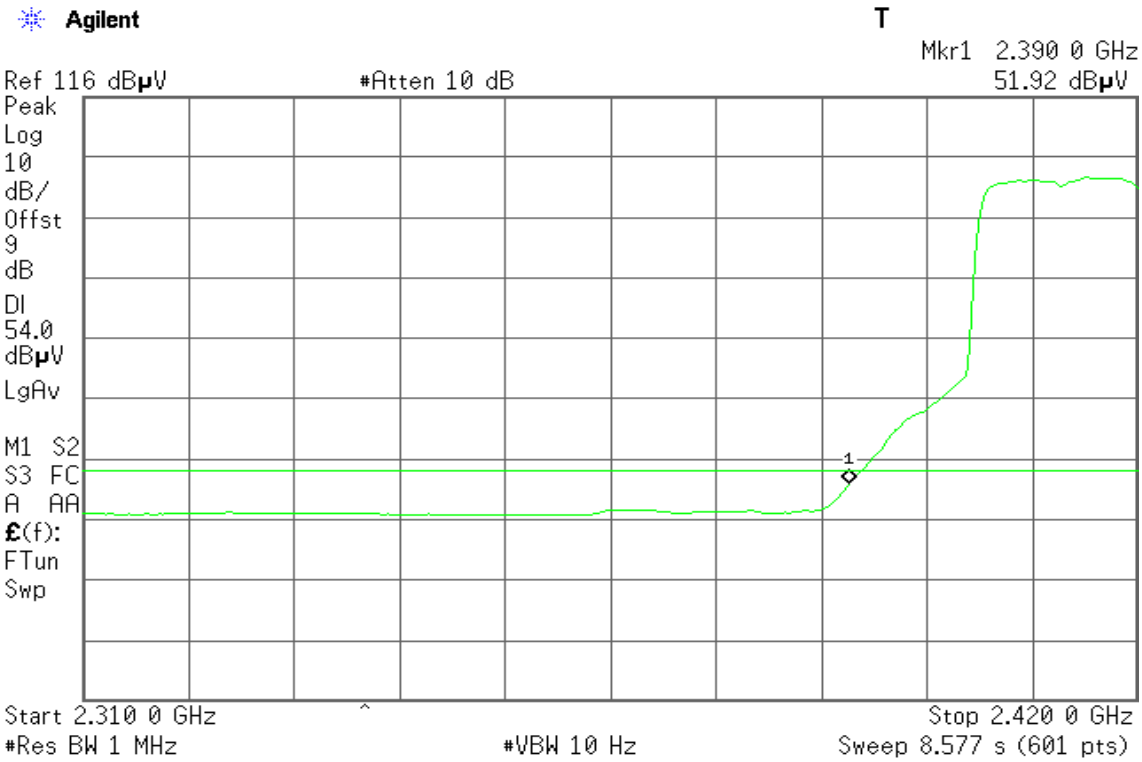


## Band Edges (IEEE 802.11g mode / CH Low)

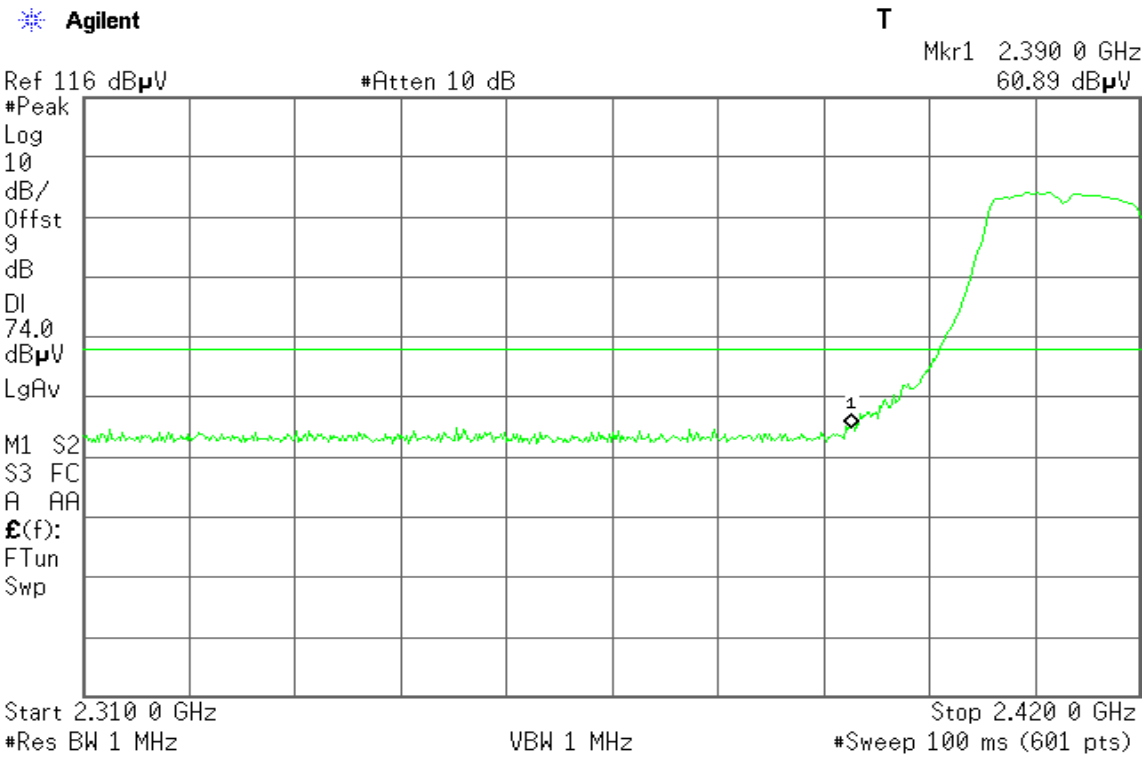
### Detector mode: Peak Polarity: Vertical



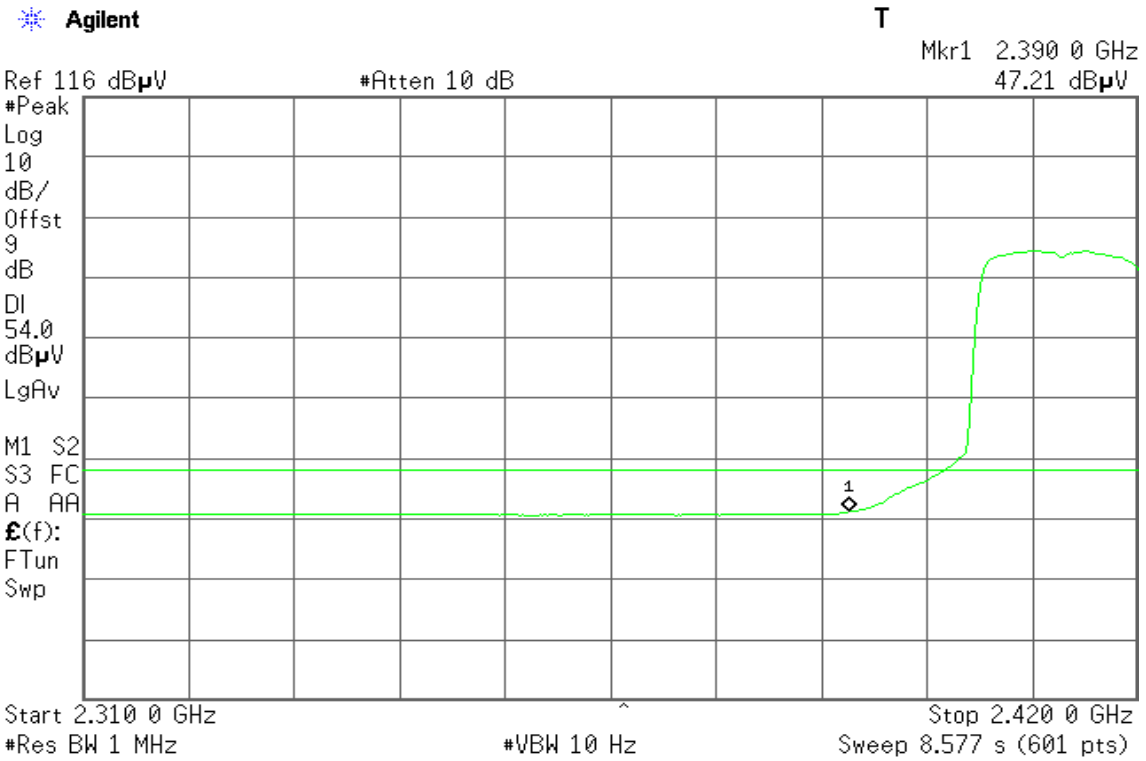

### Detector mode: Average Polarity: Vertical



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

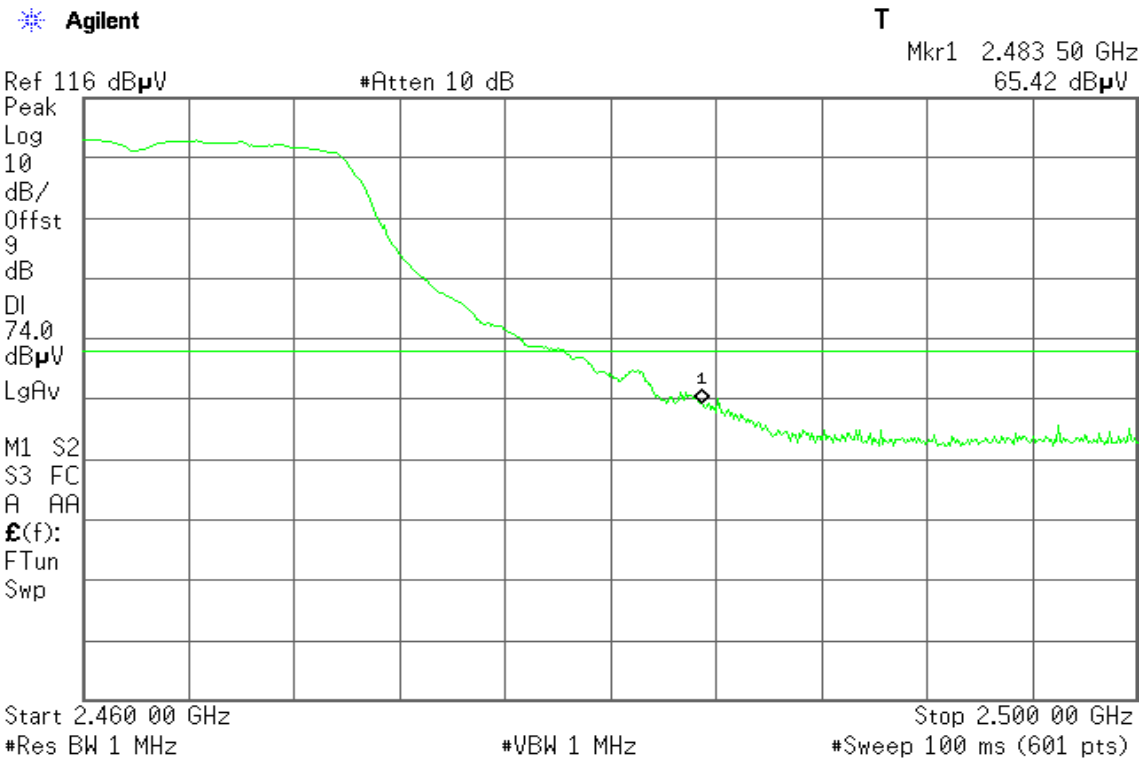



**Detector mode: Average** **Polarity: Horizontal**

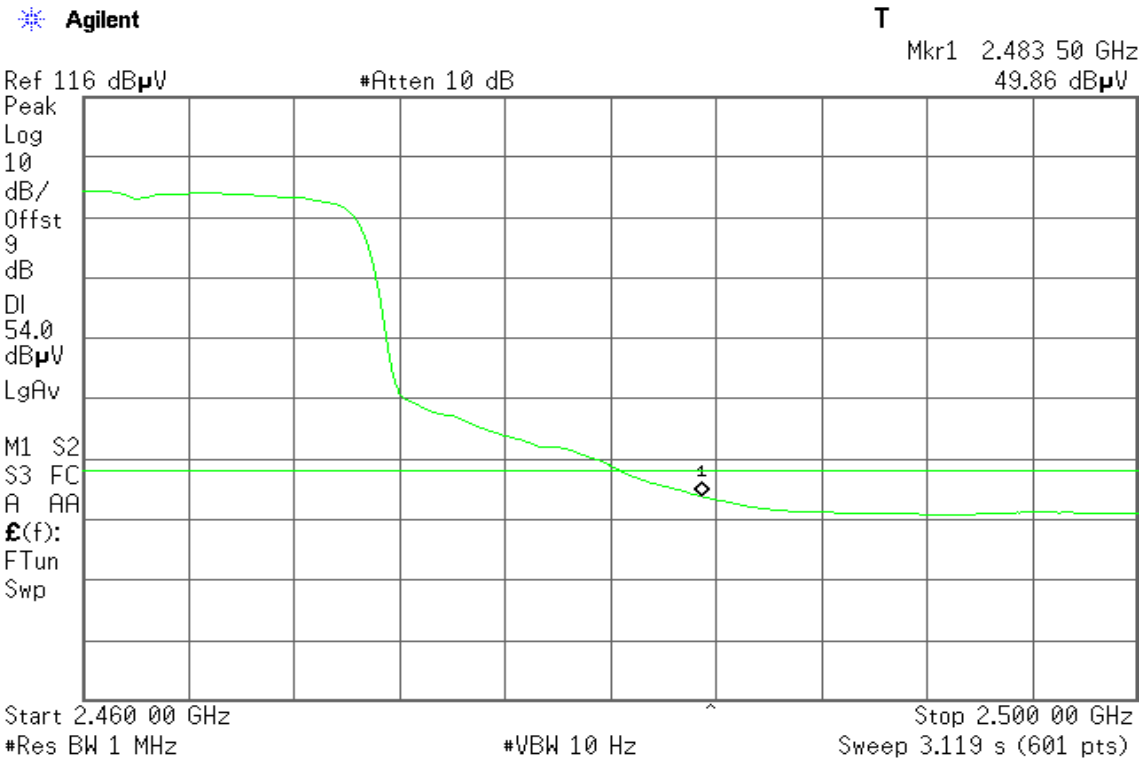


## Band Edges (IEEE 802.11g mode / CH High)

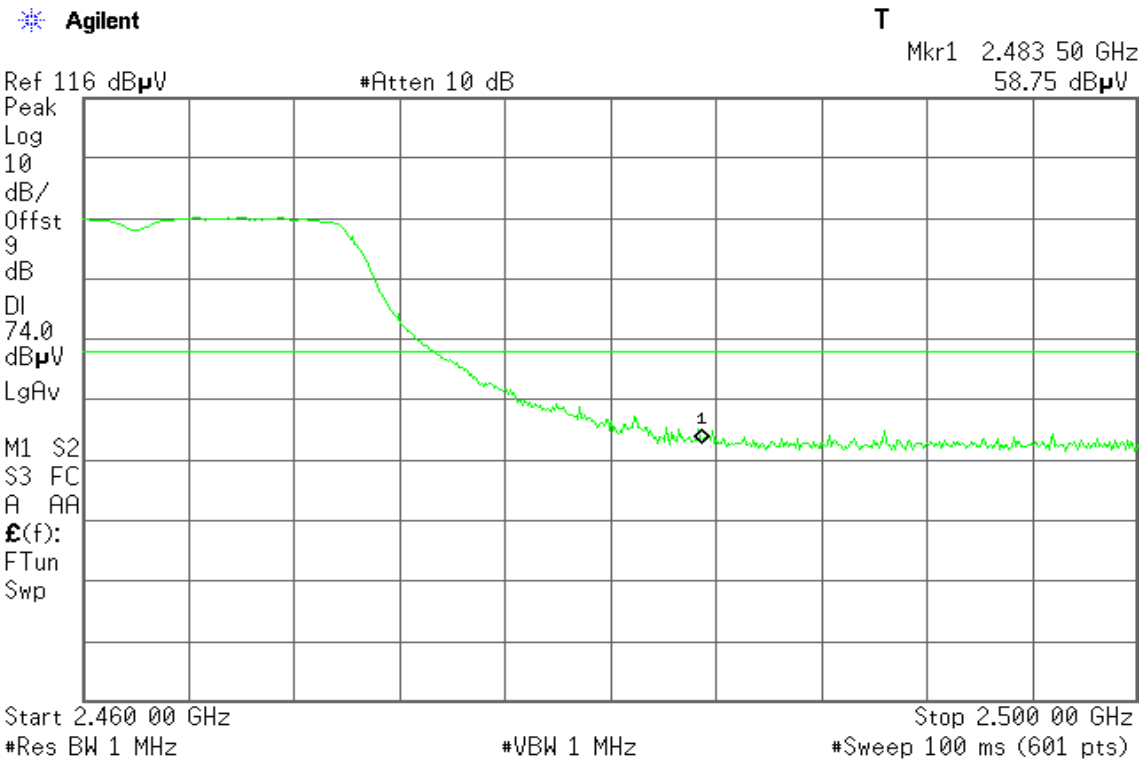
### Detector mode: Peak Polarity: Vertical



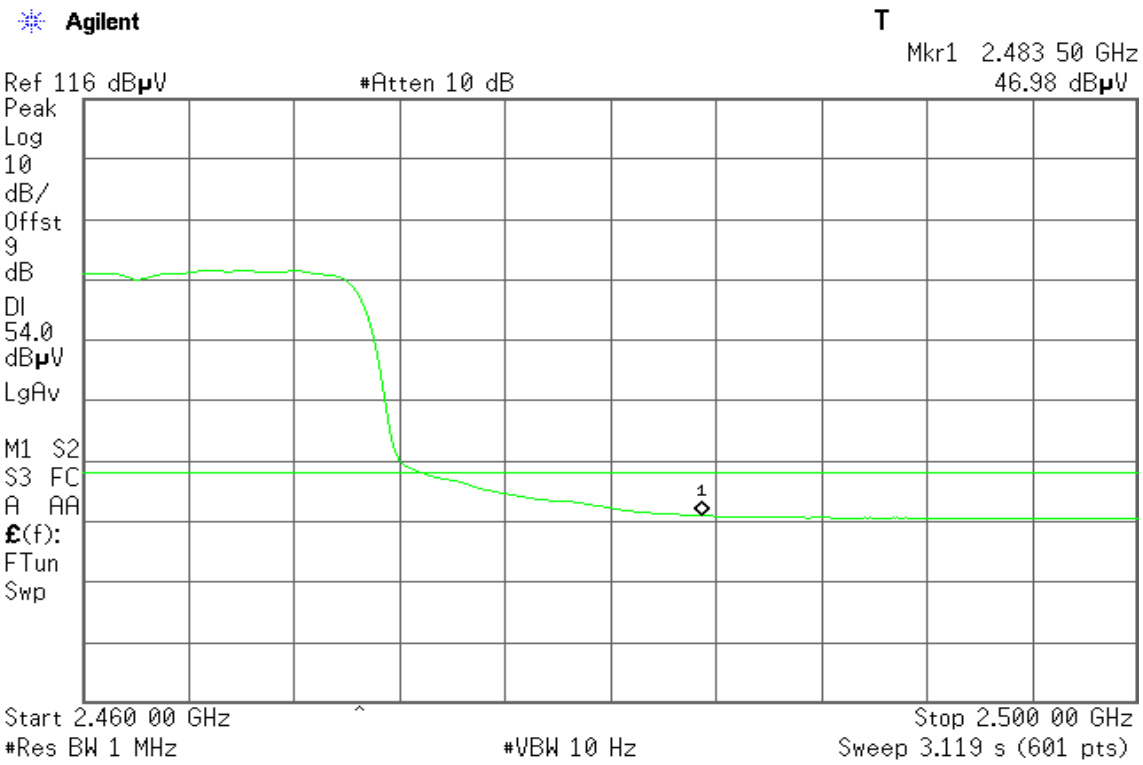

### Detector mode: Average Polarity: Vertical



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

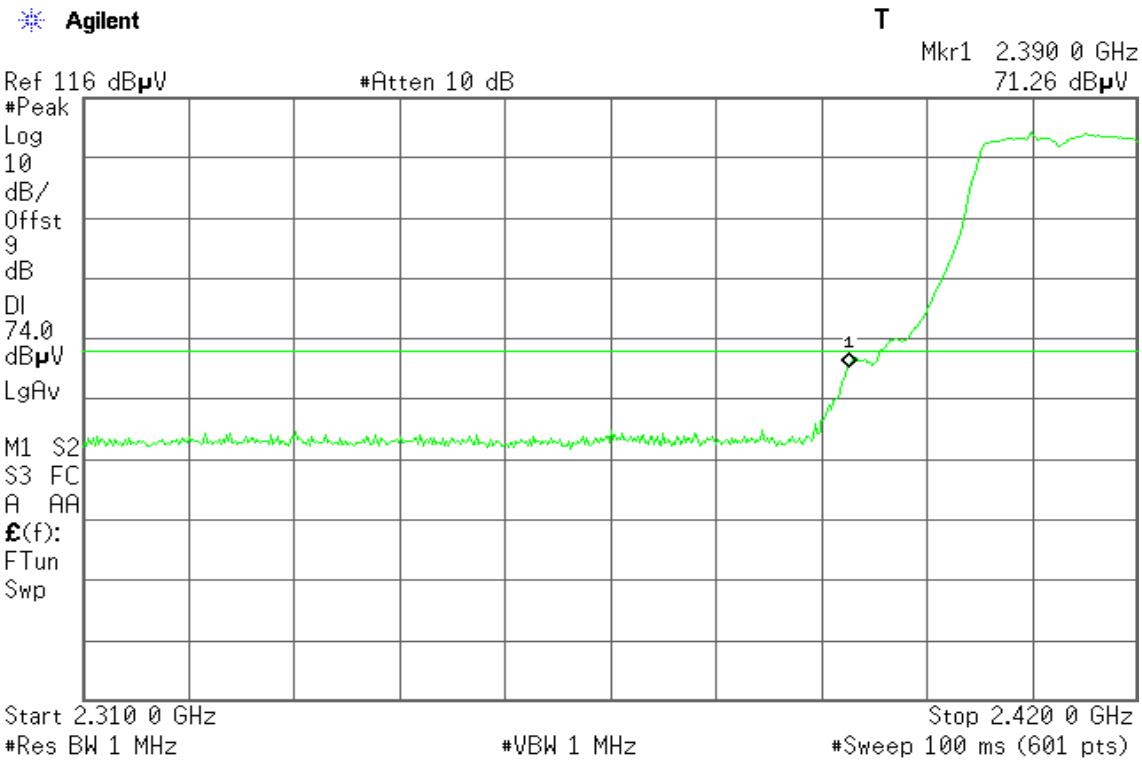



**Detector mode: Average** **Polarity: Horizontal**

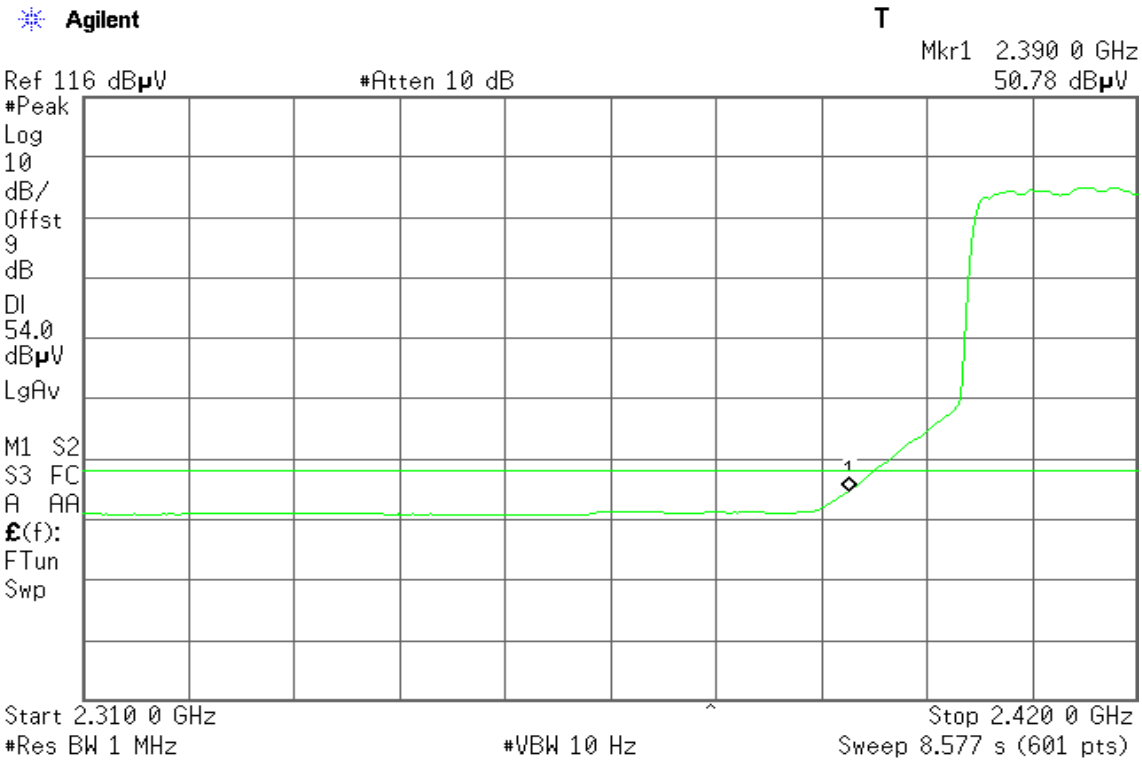


## Band Edges (draft 802.11n Standard-20 MHz Channel mode / CH Low)

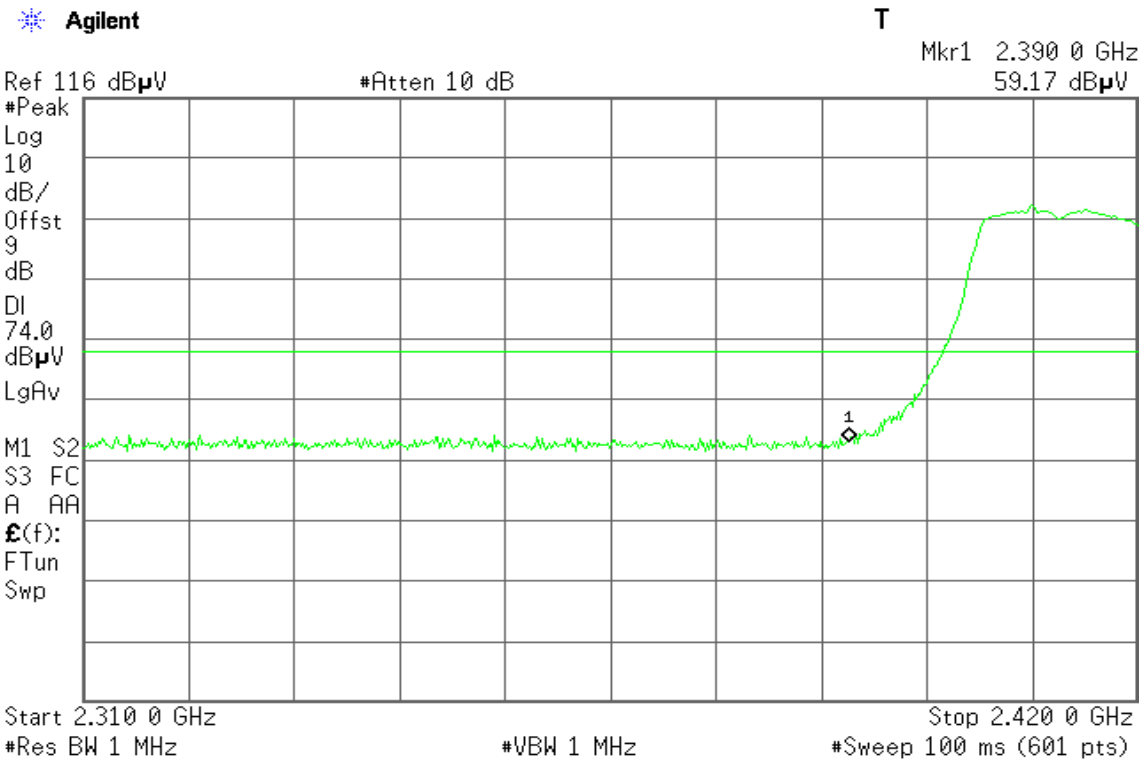
**Detector mode: Peak** **Polarity: Vertical**



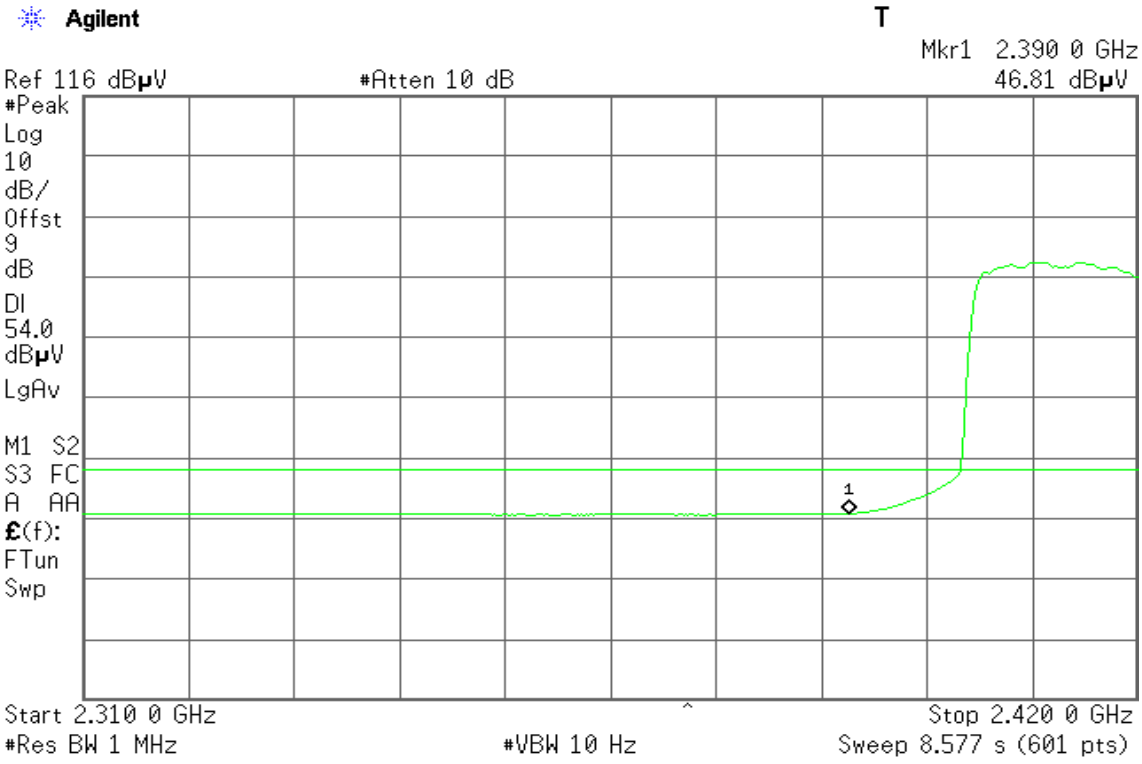

**Detector mode: Average** **Polarity: Vertical**



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

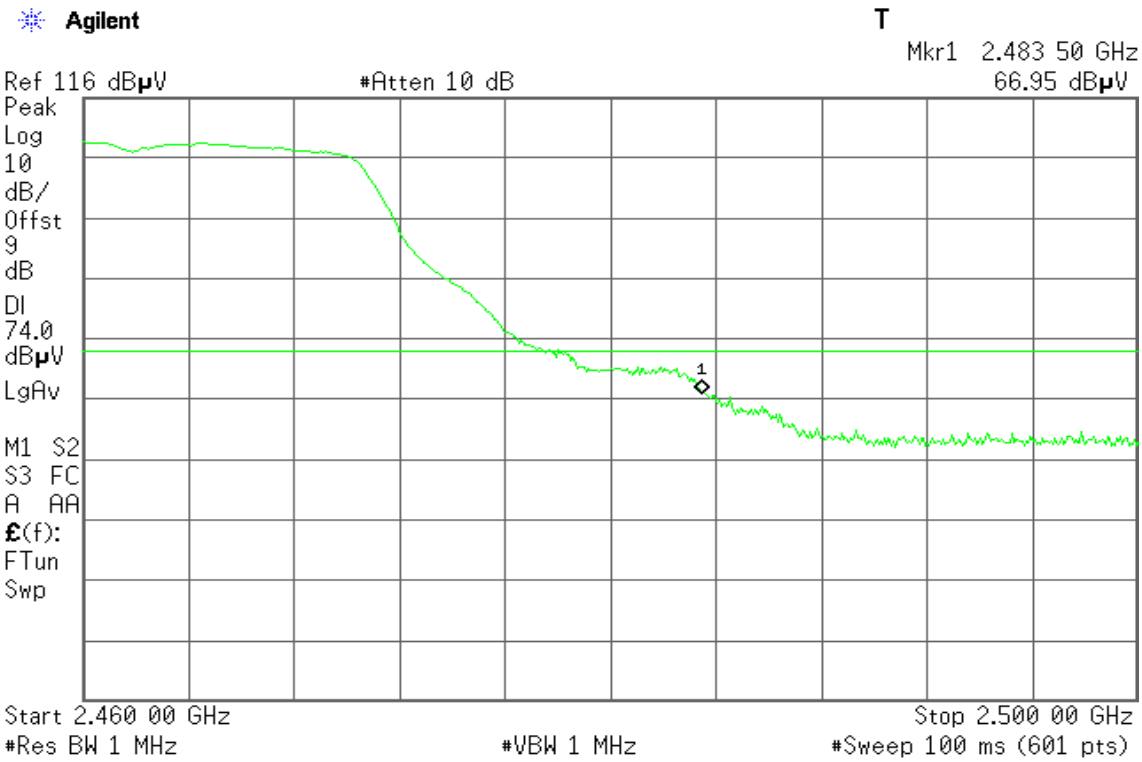



**Detector mode: Average** **Polarity: Horizontal**

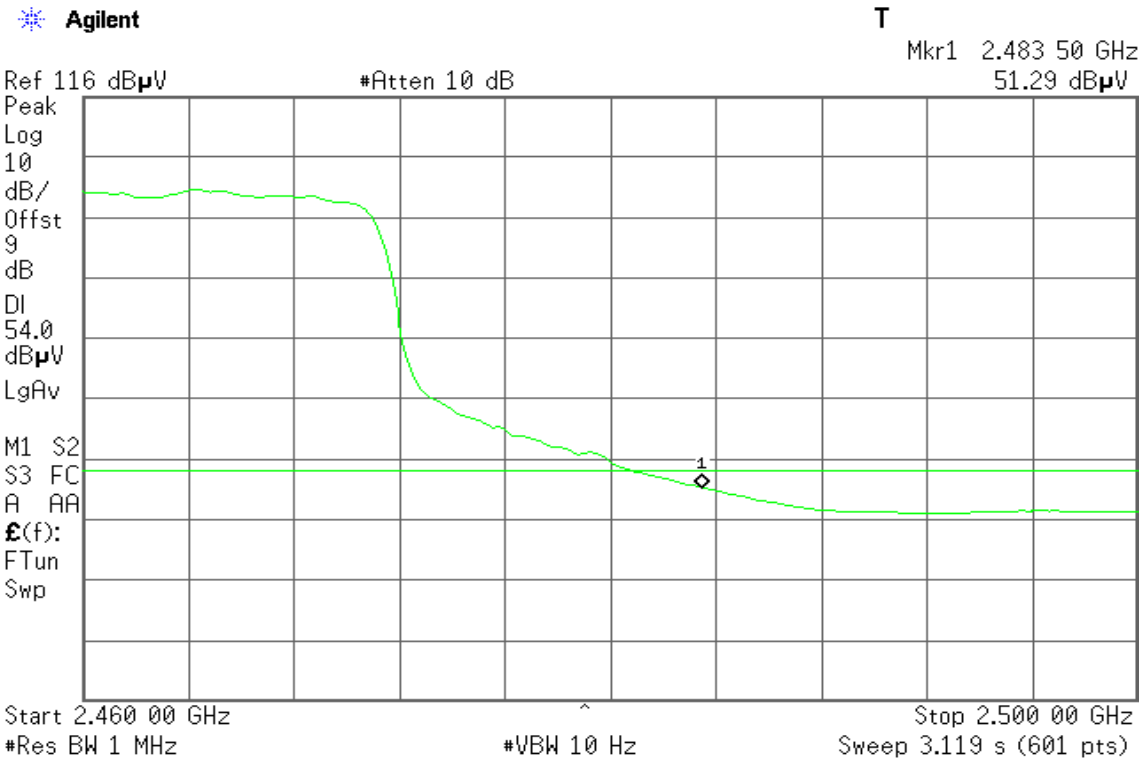


## Band Edges (draft 802.11n Standard-20 MHz Channel mode / CH High)

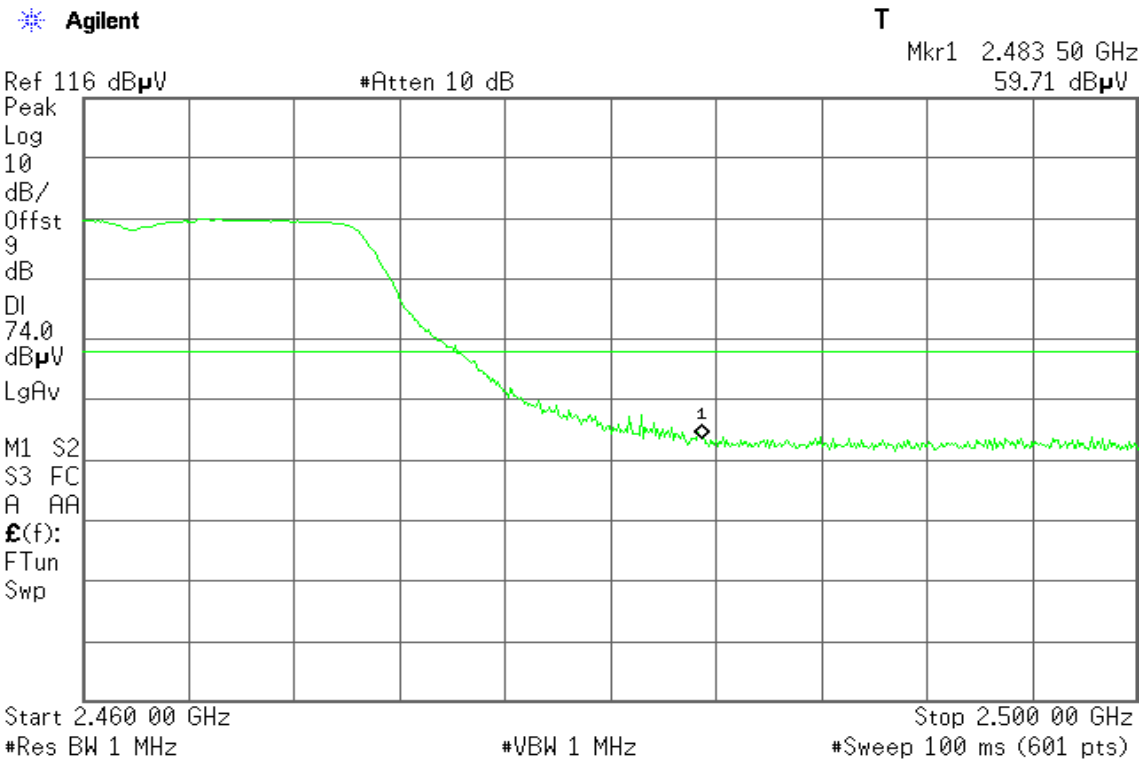
**Detector mode: Peak** **Polarity: Vertical**



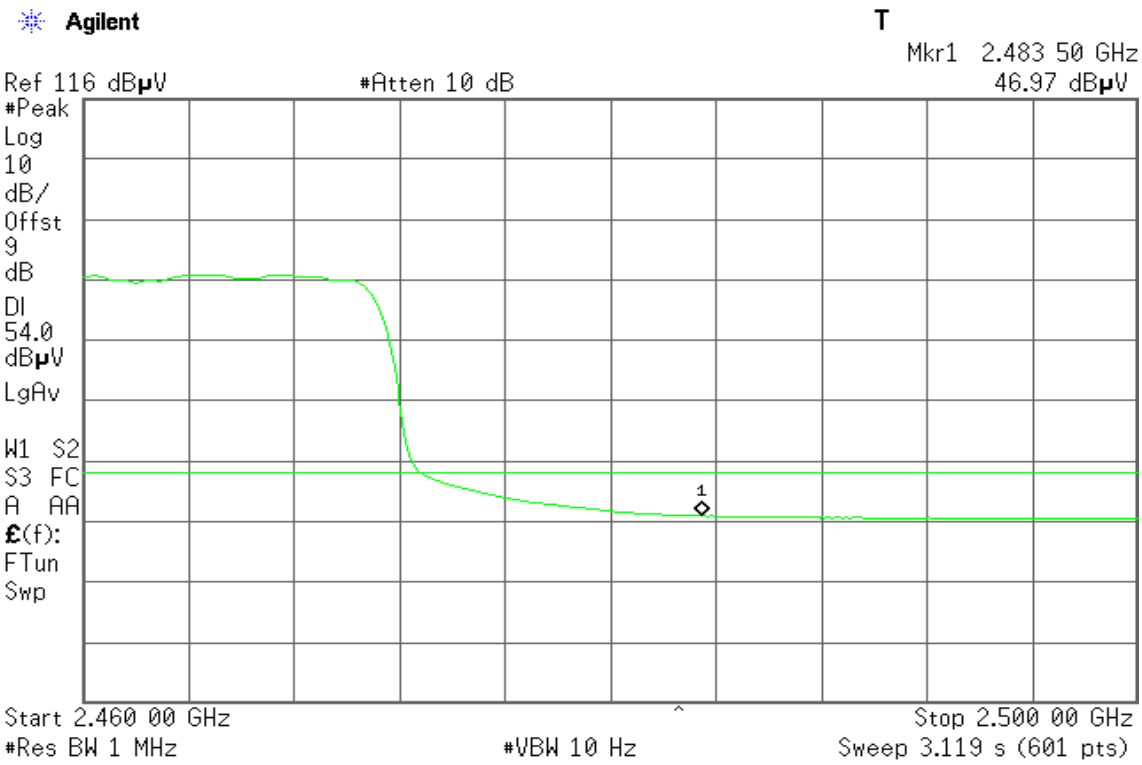

**Detector mode: Average** **Polarity: Vertical**



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

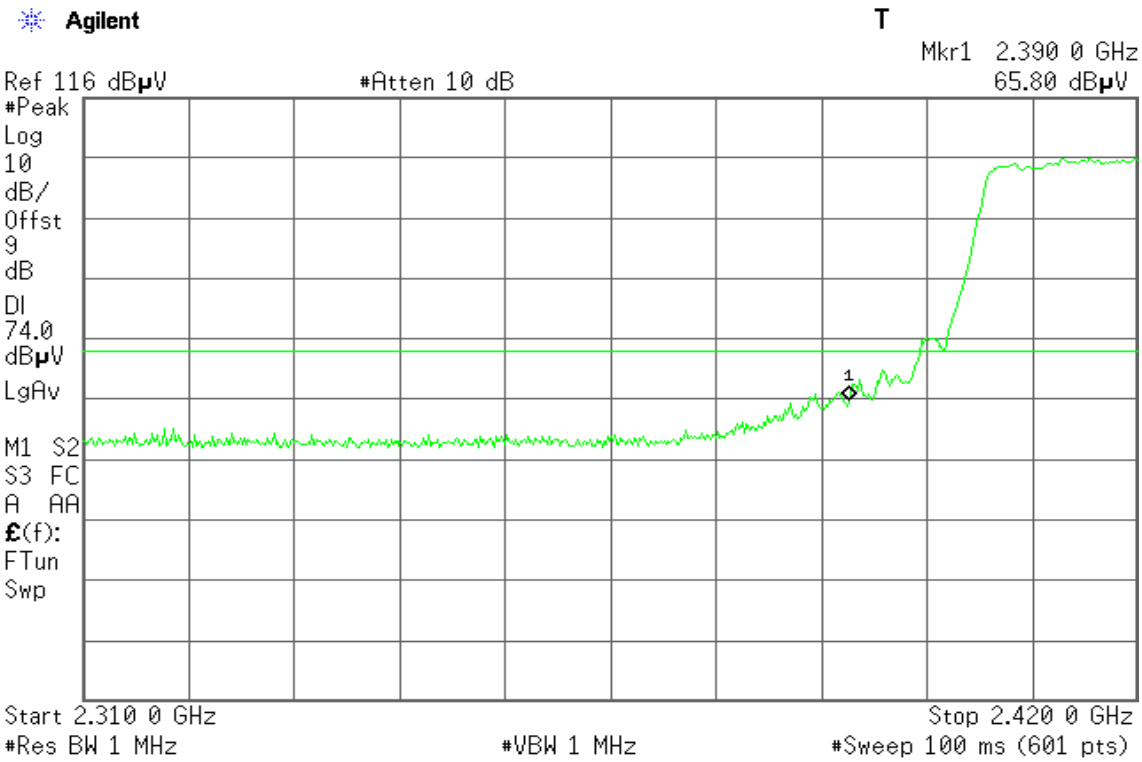



**Detector mode: Average** **Polarity: Horizontal**

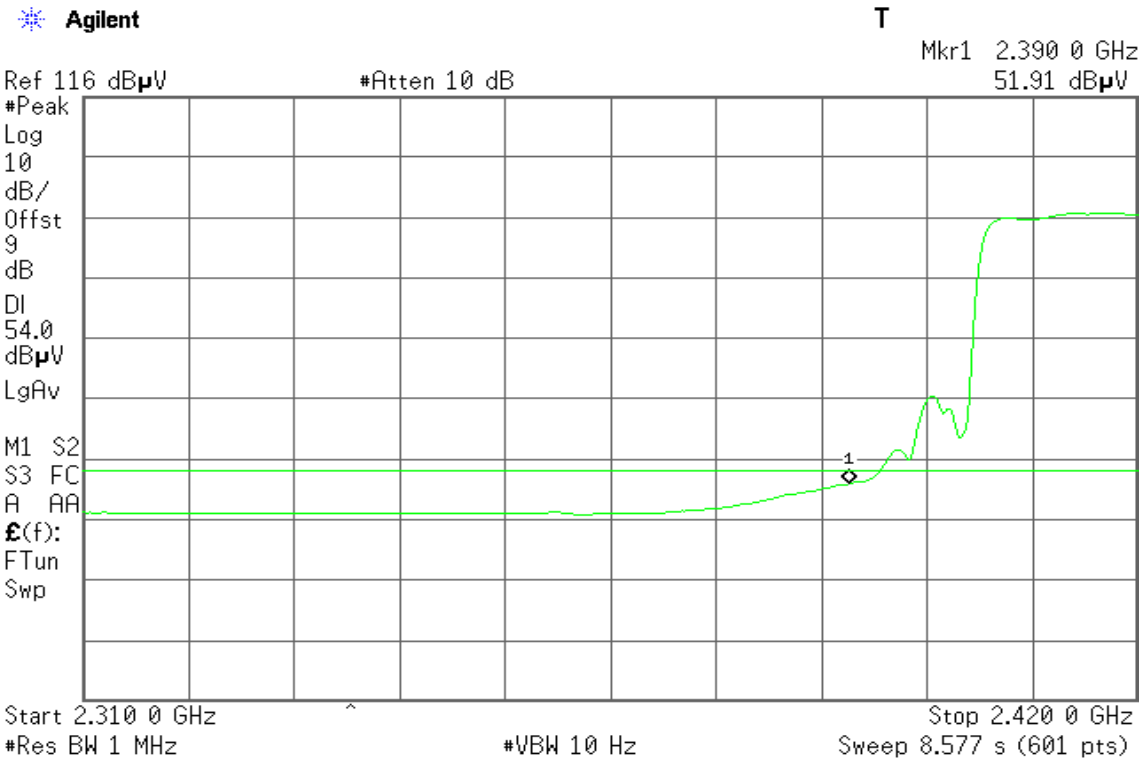


## Band Edges (draft 802.11n Wide-40 MHz Channel mode / CH Low)

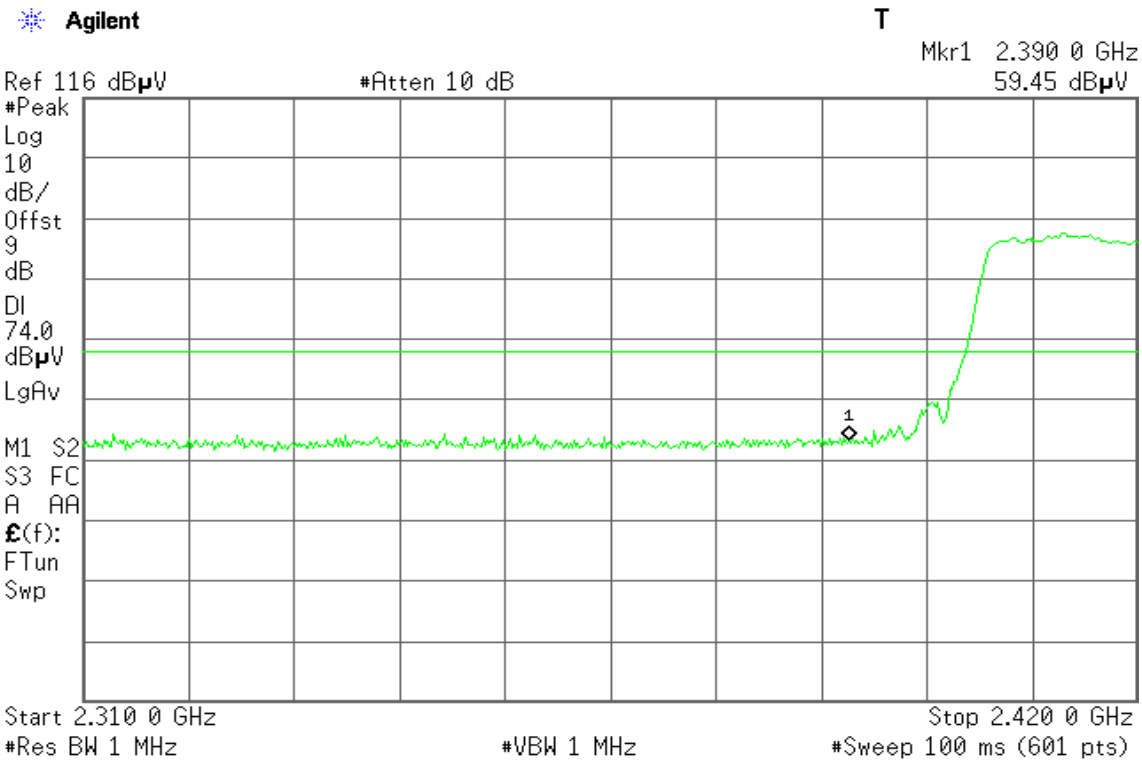
**Detector mode: Peak** **Polarity: Vertical**



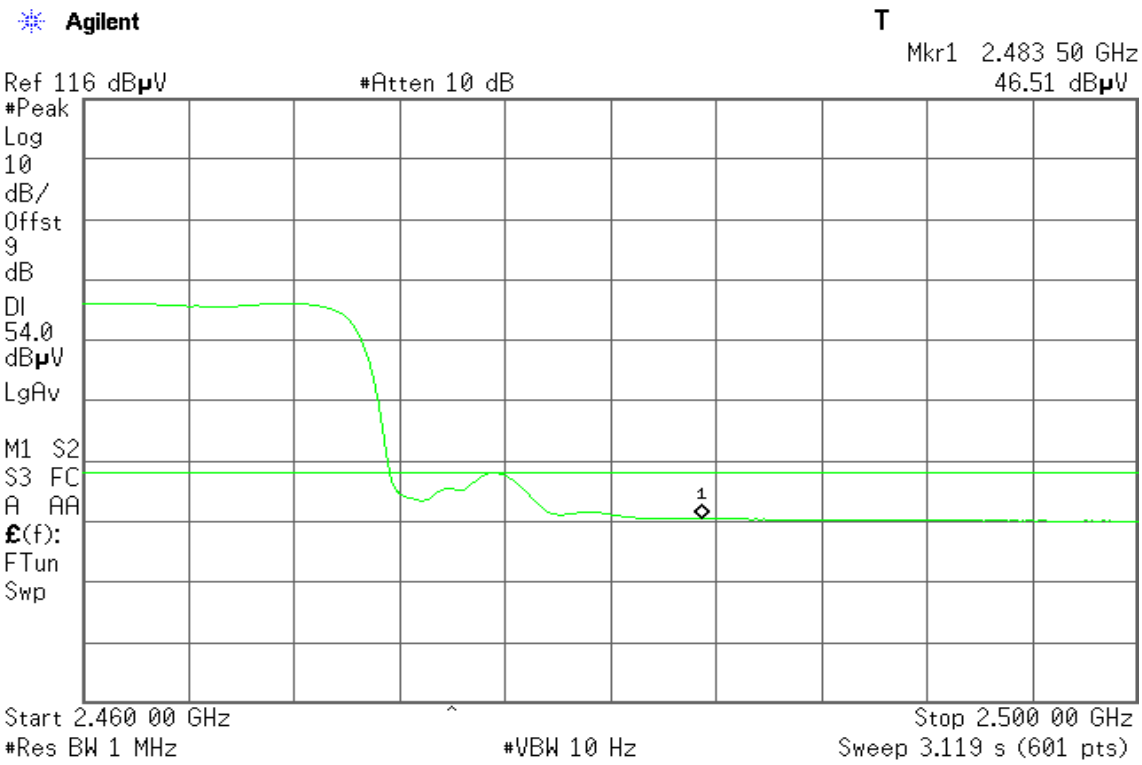

**Detector mode: Average** **Polarity: Vertical**



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

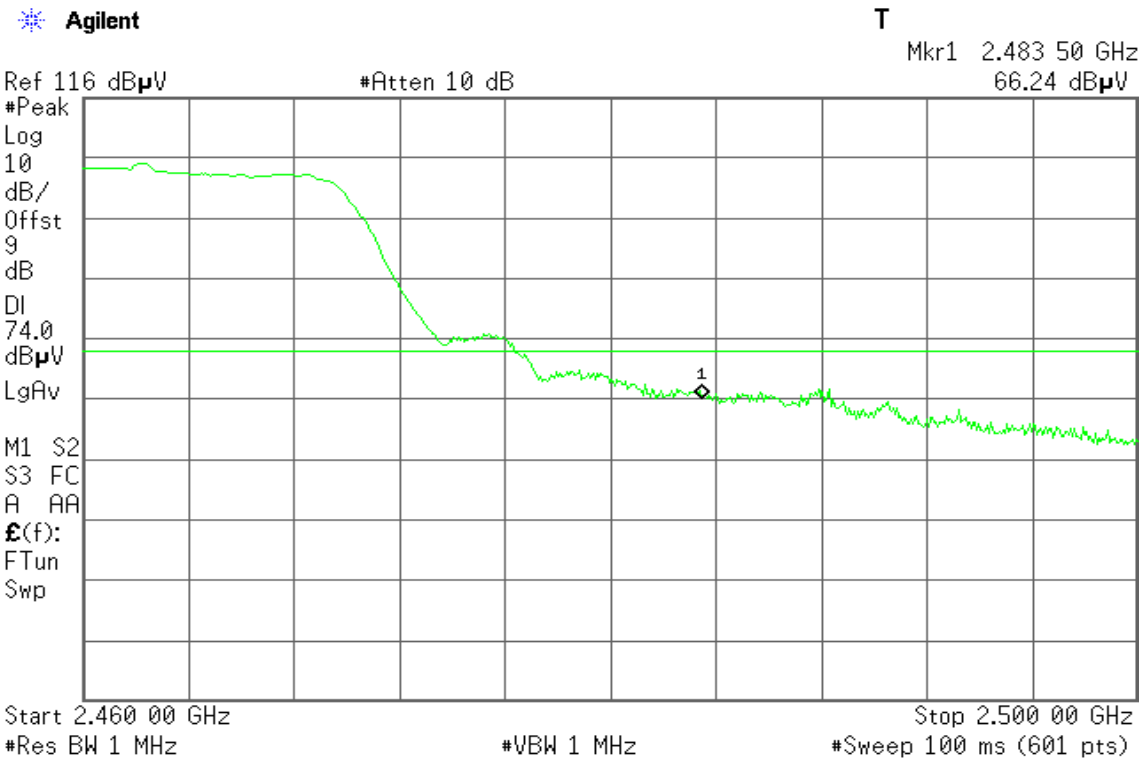



**Detector mode: Average** **Polarity: Horizontal**

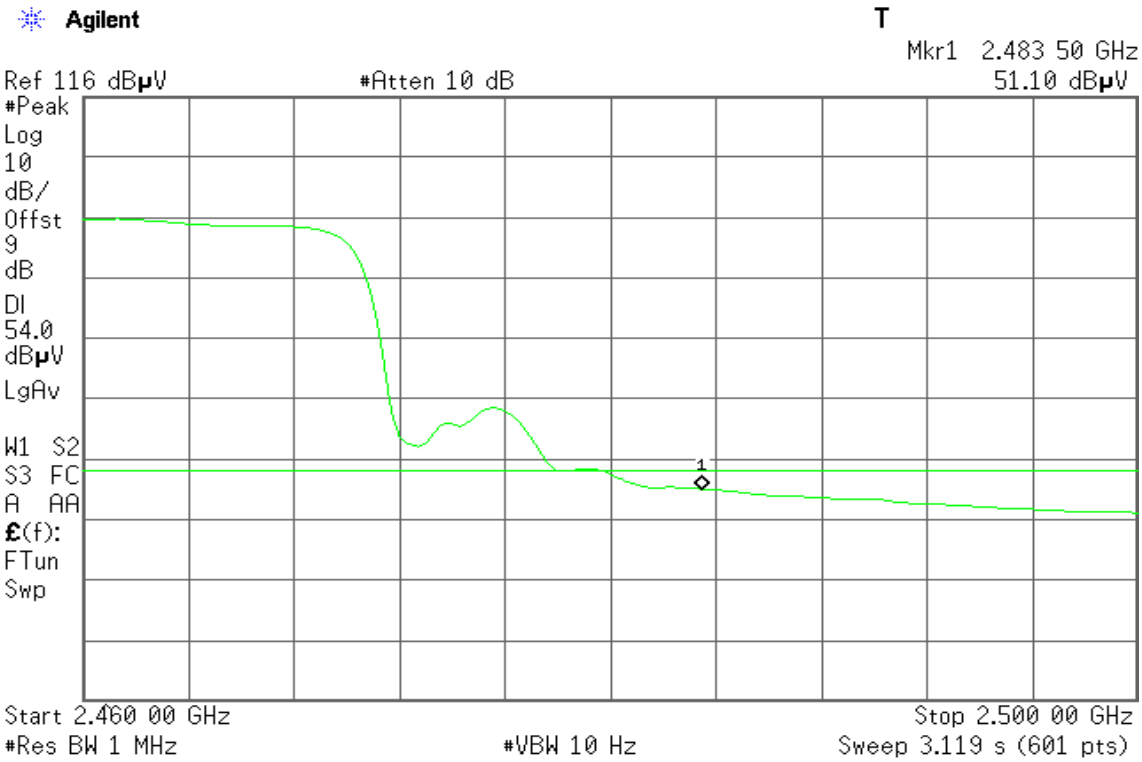


## Band Edges (draft 802.11n Wide-40 MHz Channel mode / CH High)

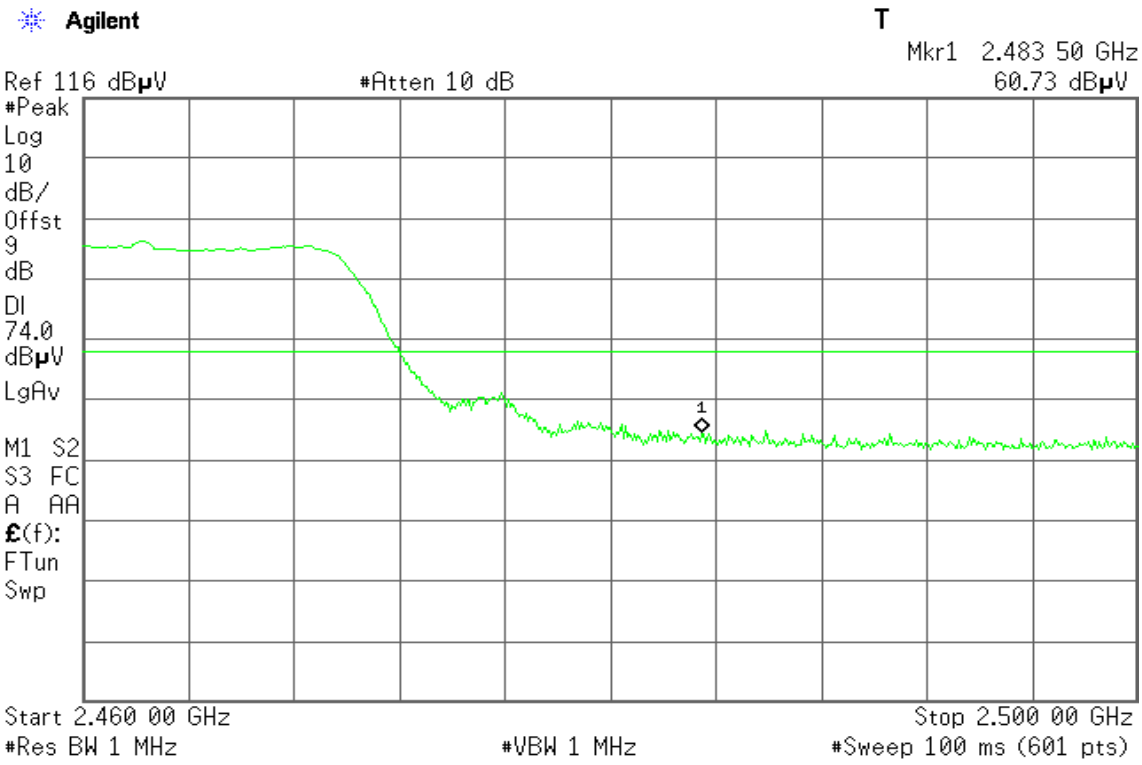
**Detector mode: Peak** **Polarity: Vertical**



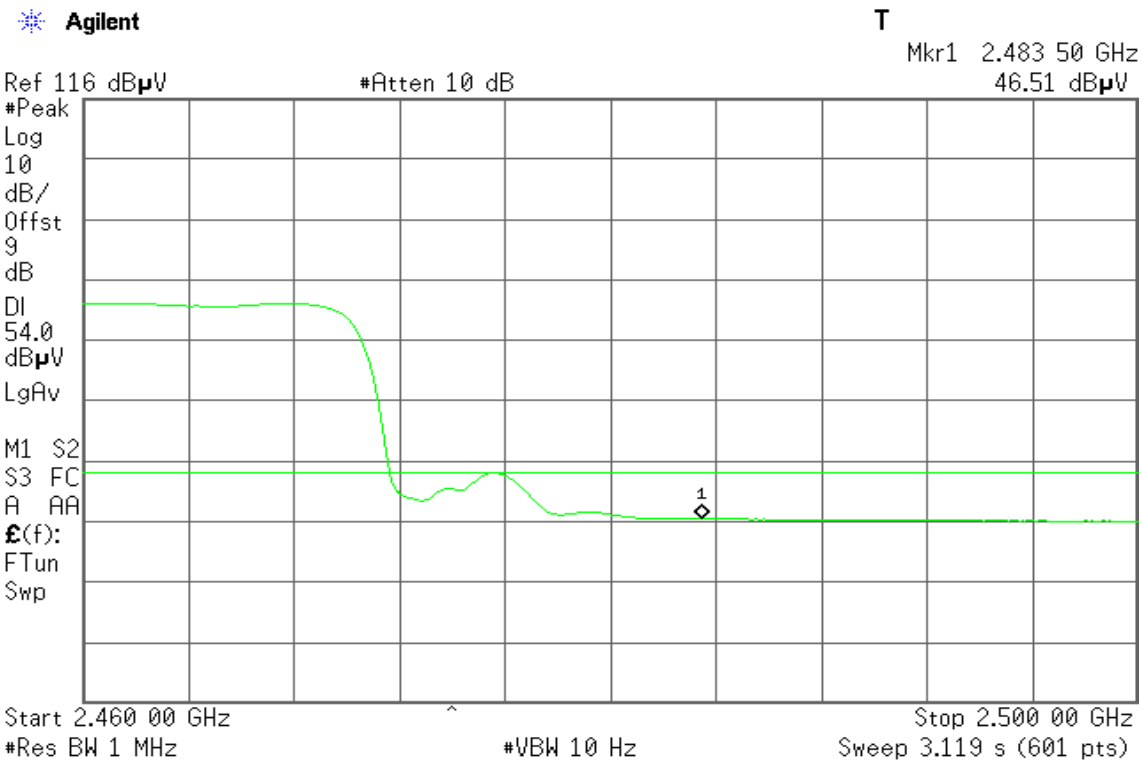

**Detector mode: Average** **Polarity: Vertical**



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



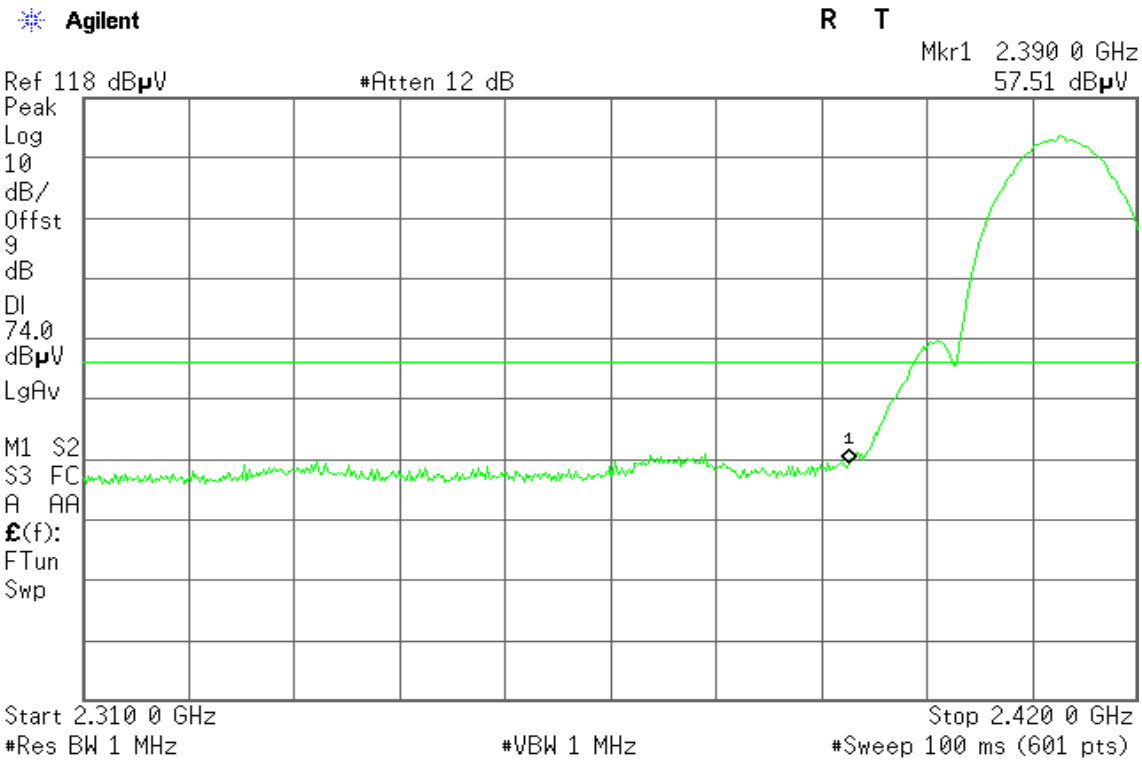

**Detector mode: Average** **Polarity: Horizontal**



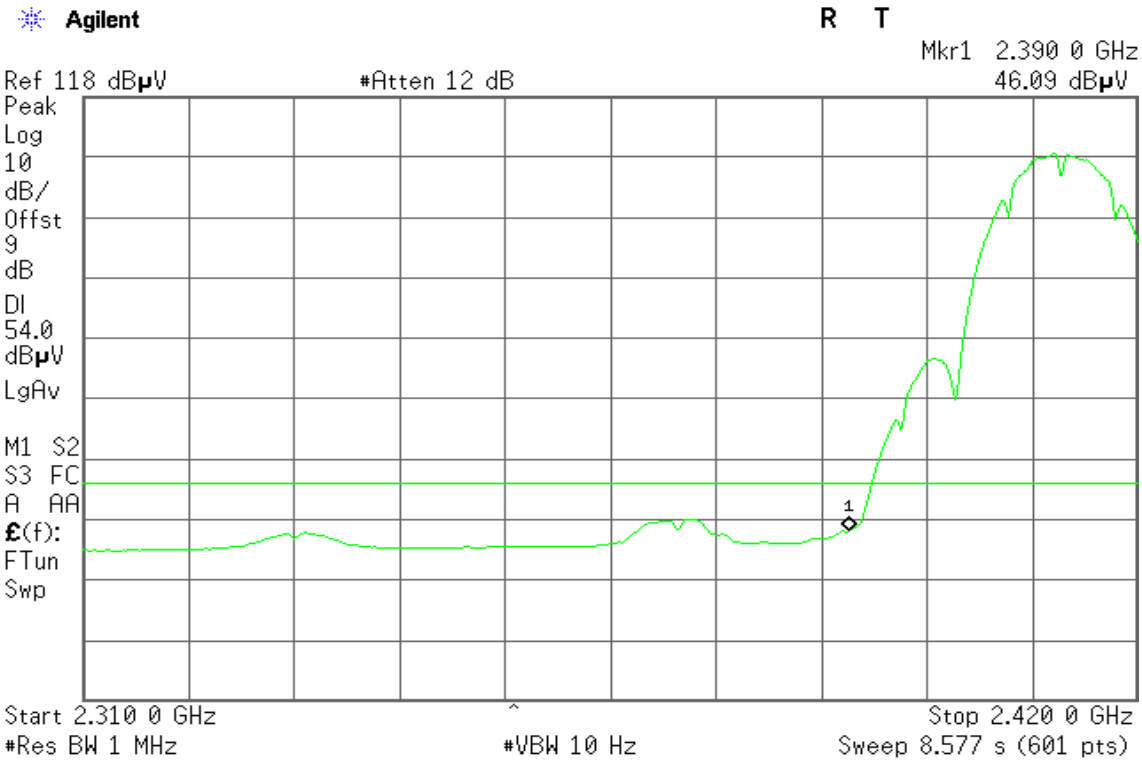
**For Patch Antenna**

**Band Edges (IEEE 802.11b mode / CH Low)**

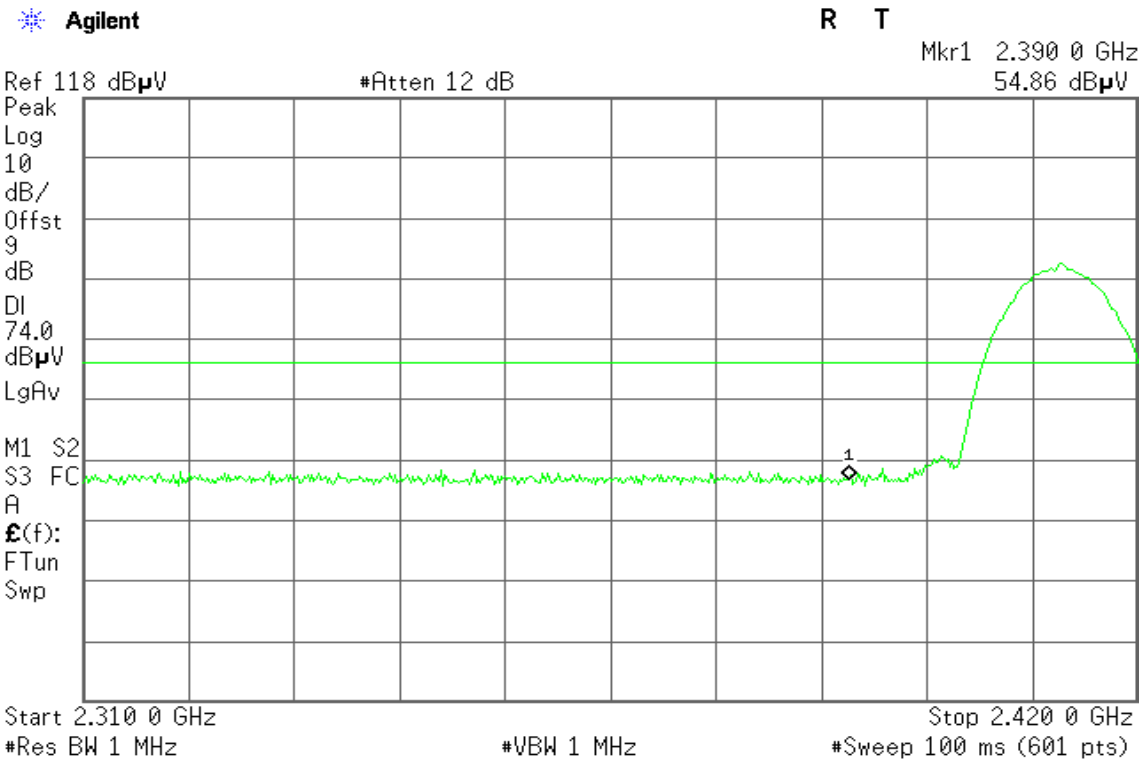
**Detector mode: Peak** **Polarity: Vertical**



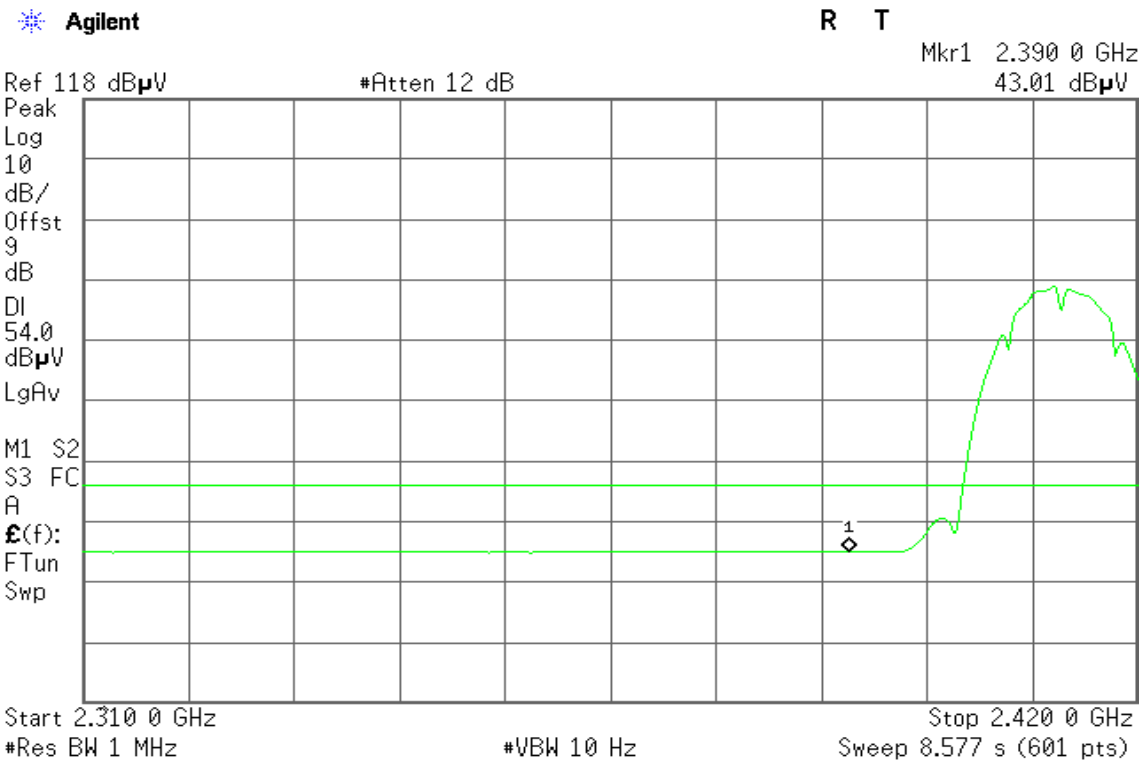

**Detector mode: Average** **Polarity: Vertical**



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

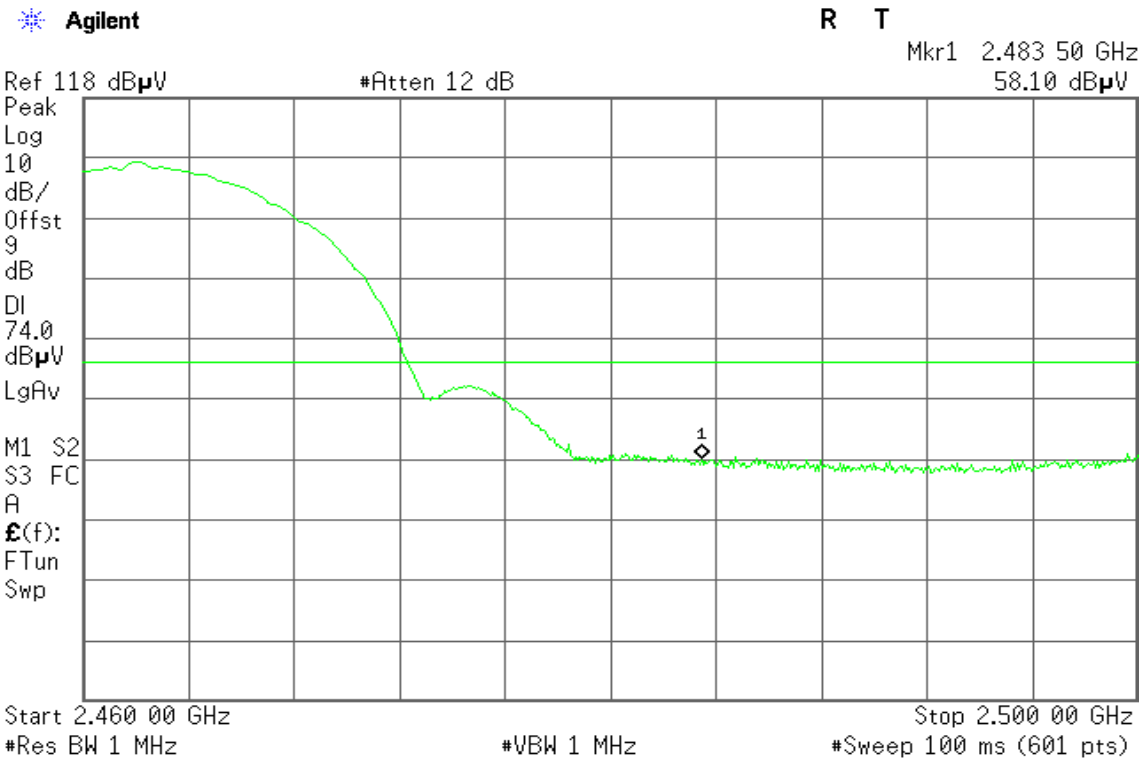



**Detector mode: Average** **Polarity: Horizontal**

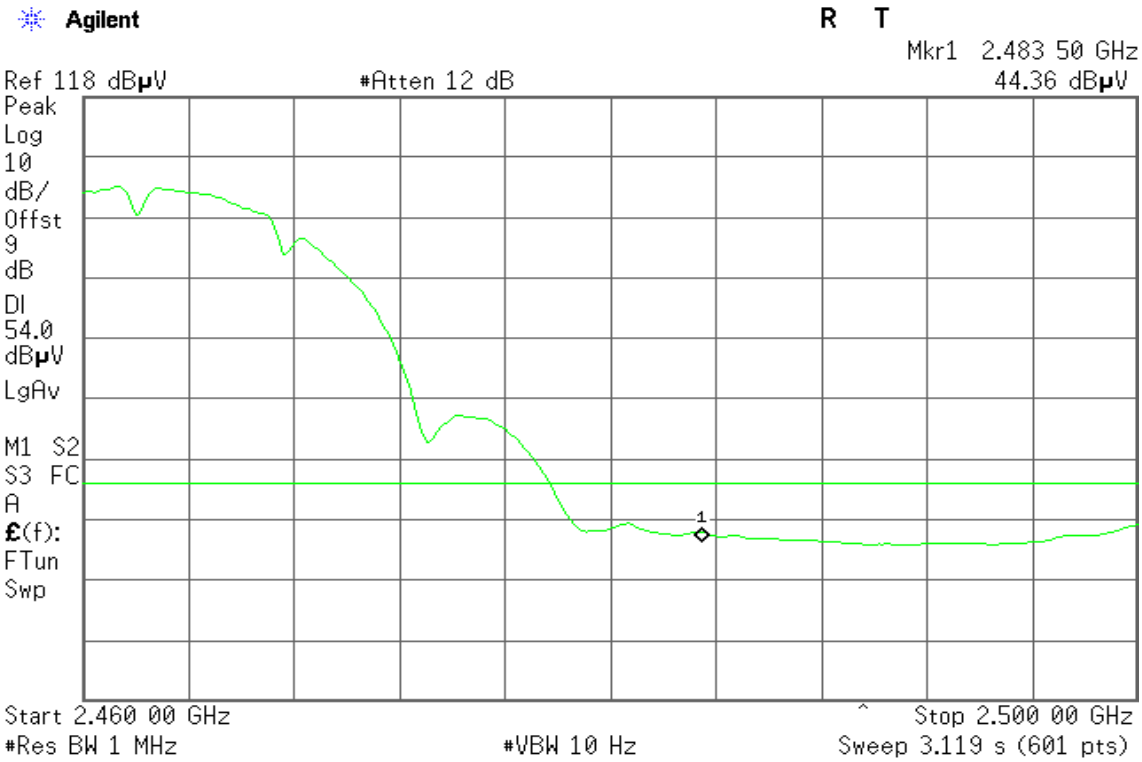


## Band Edges (IEEE 802.11b mode / CH High)

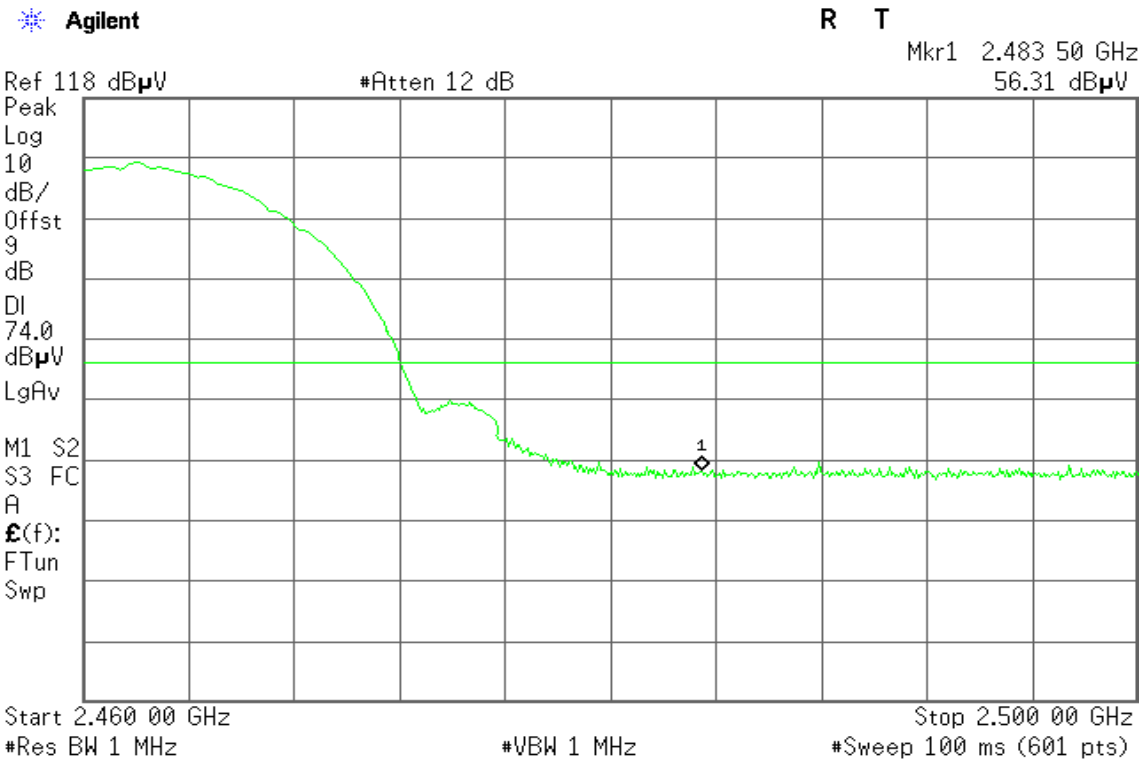
### Detector mode: Peak Polarity: Vertical



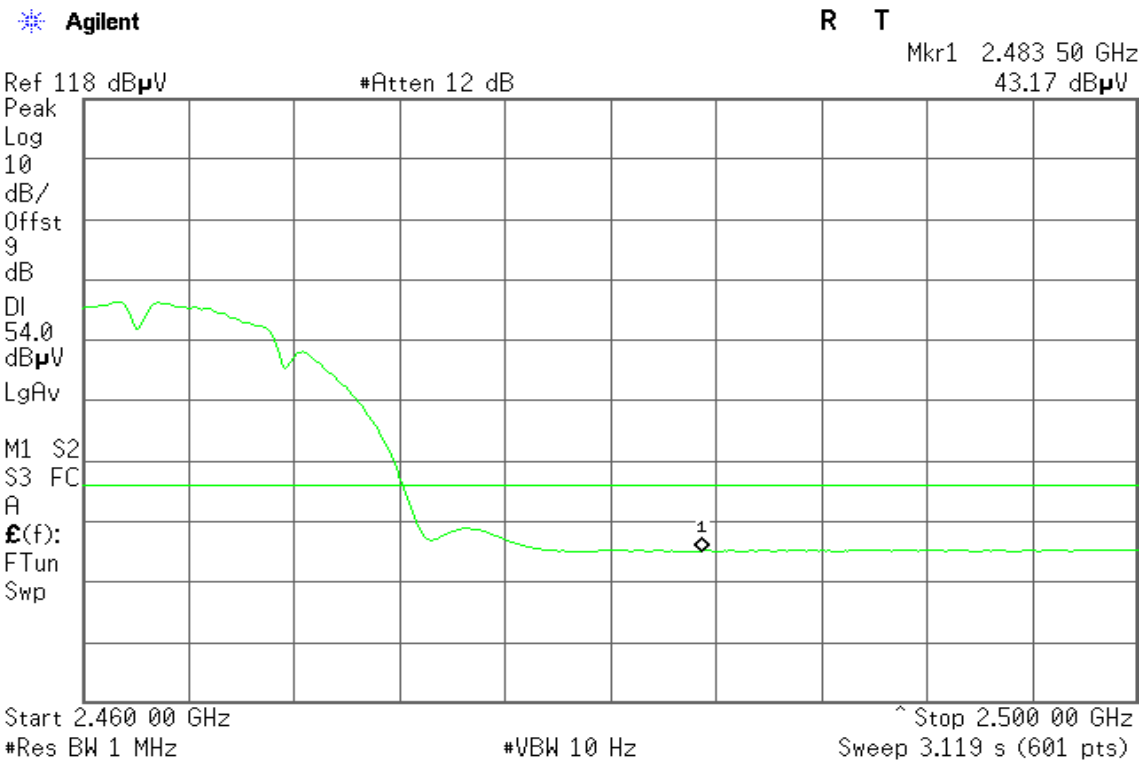

### Detector mode: Average Polarity: Vertical



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

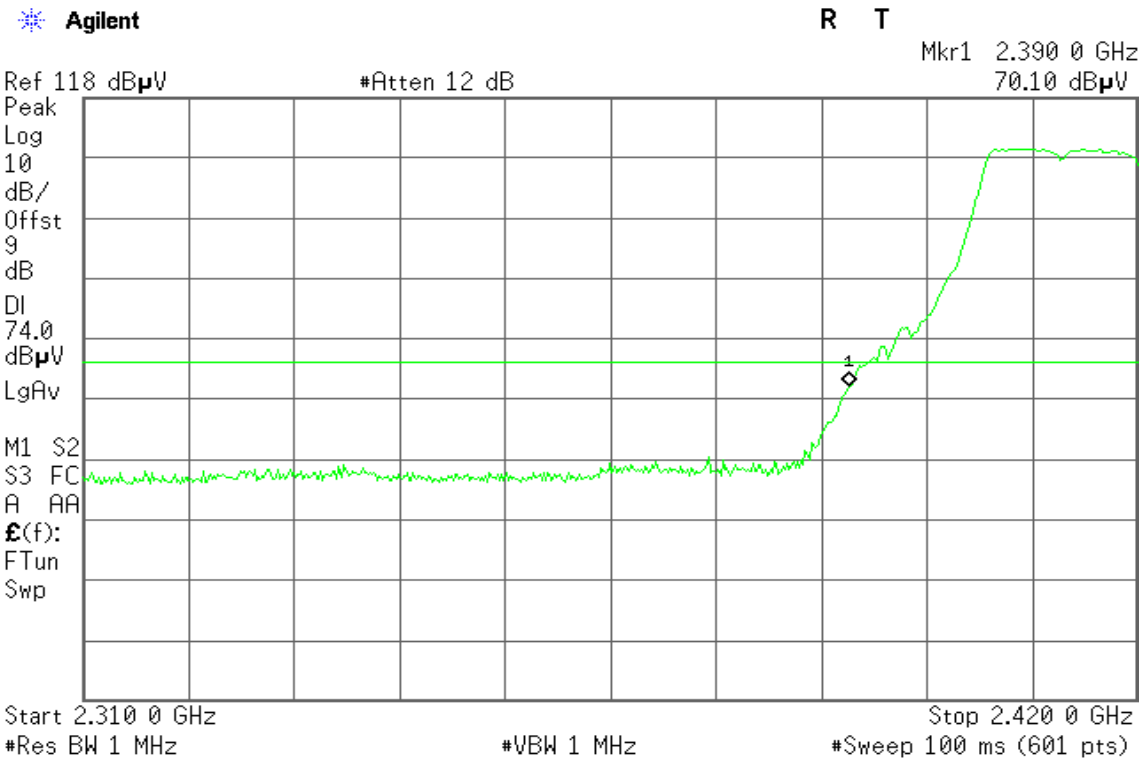



**Detector mode: Average** **Polarity: Horizontal**

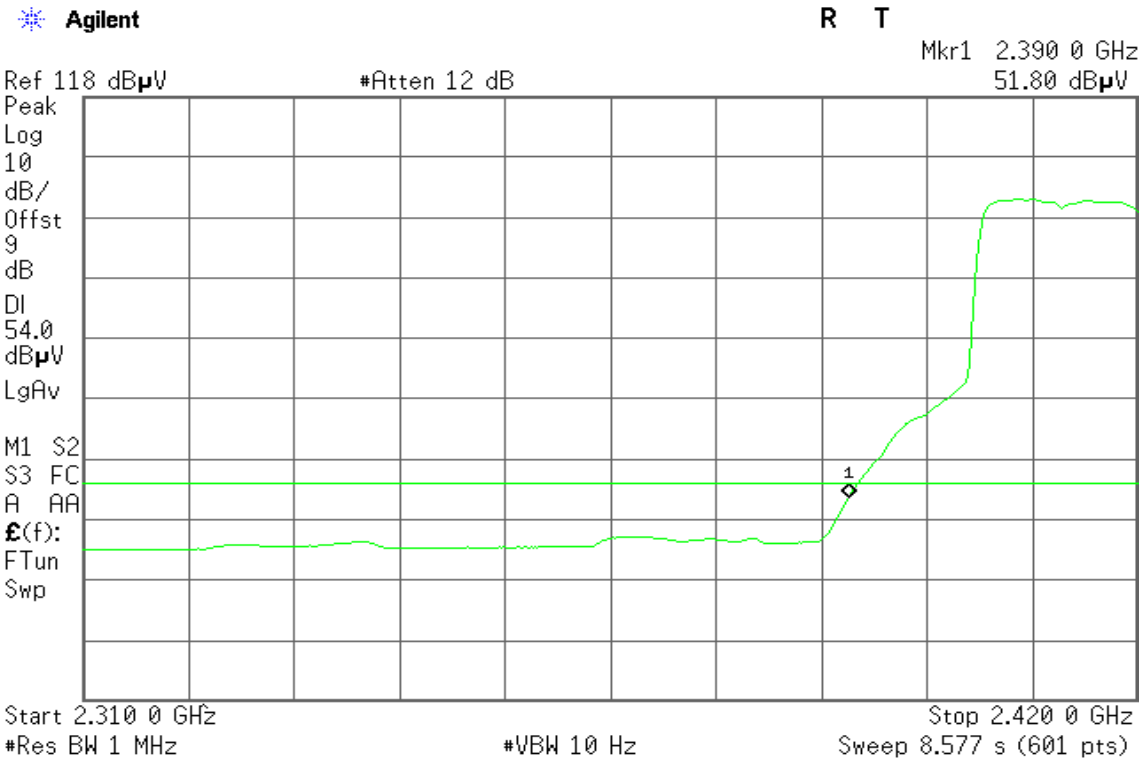


## Band Edges (IEEE 802.11g mode / CH Low)

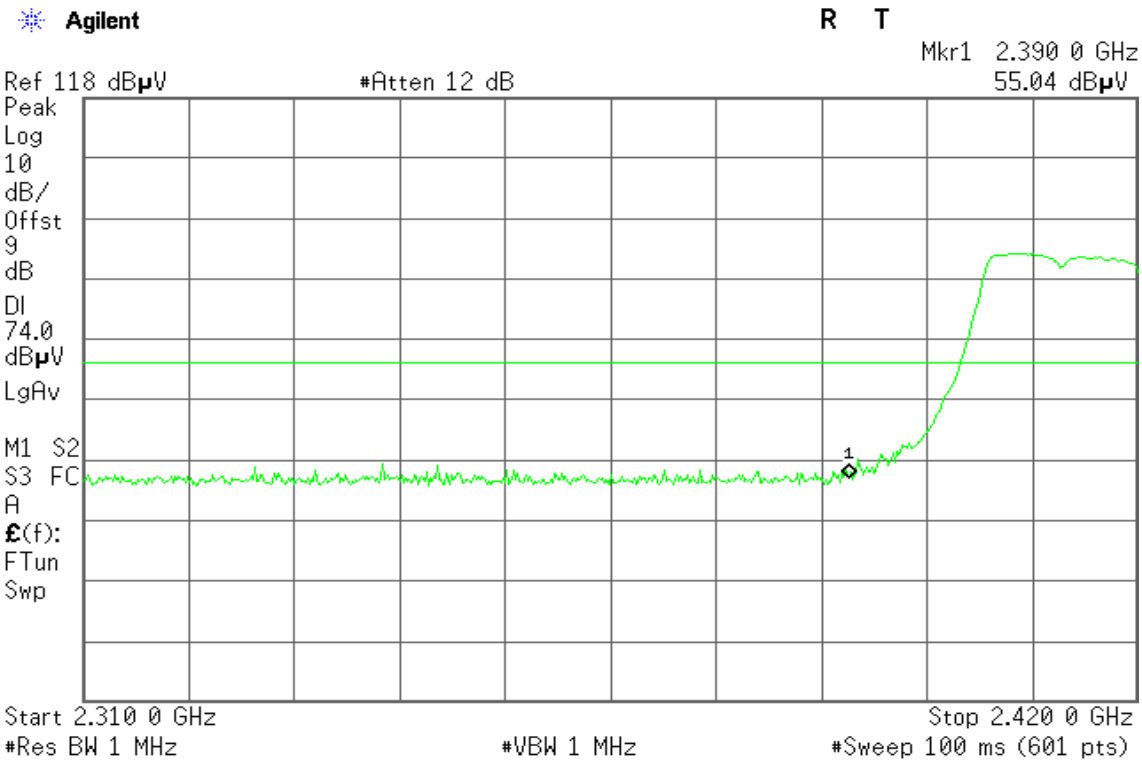
### Detector mode: Peak Polarity: Vertical



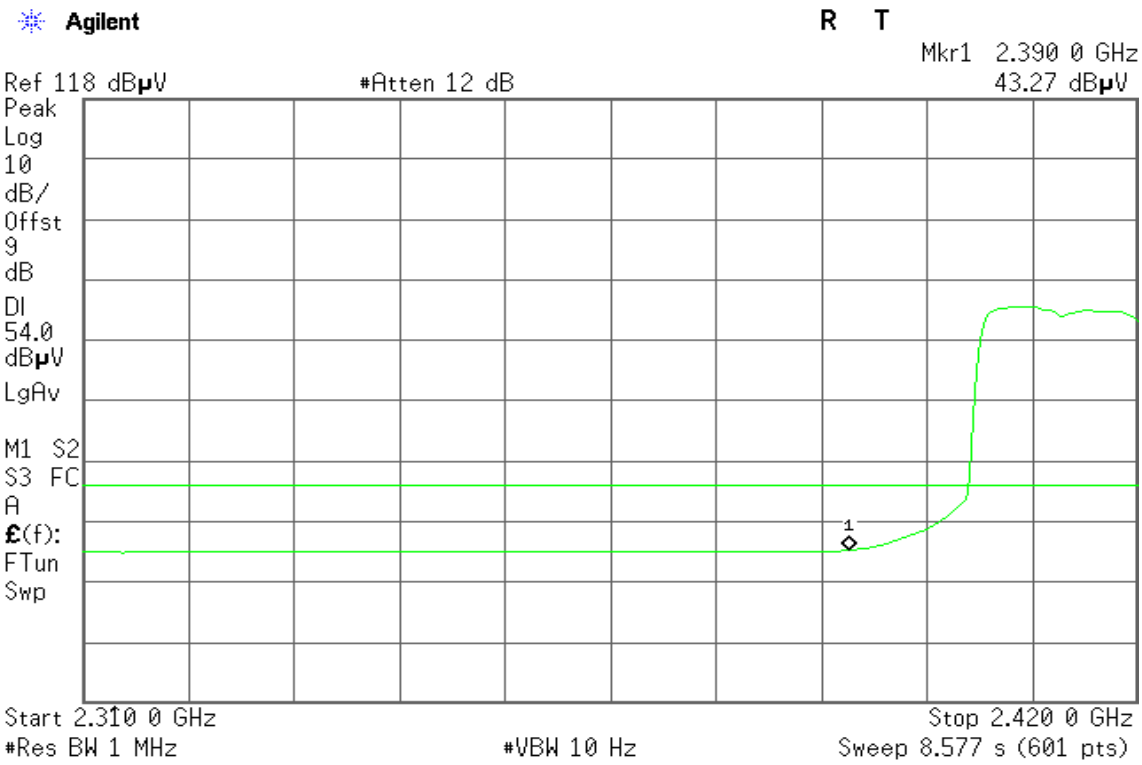

### Detector mode: Average Polarity: Vertical



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

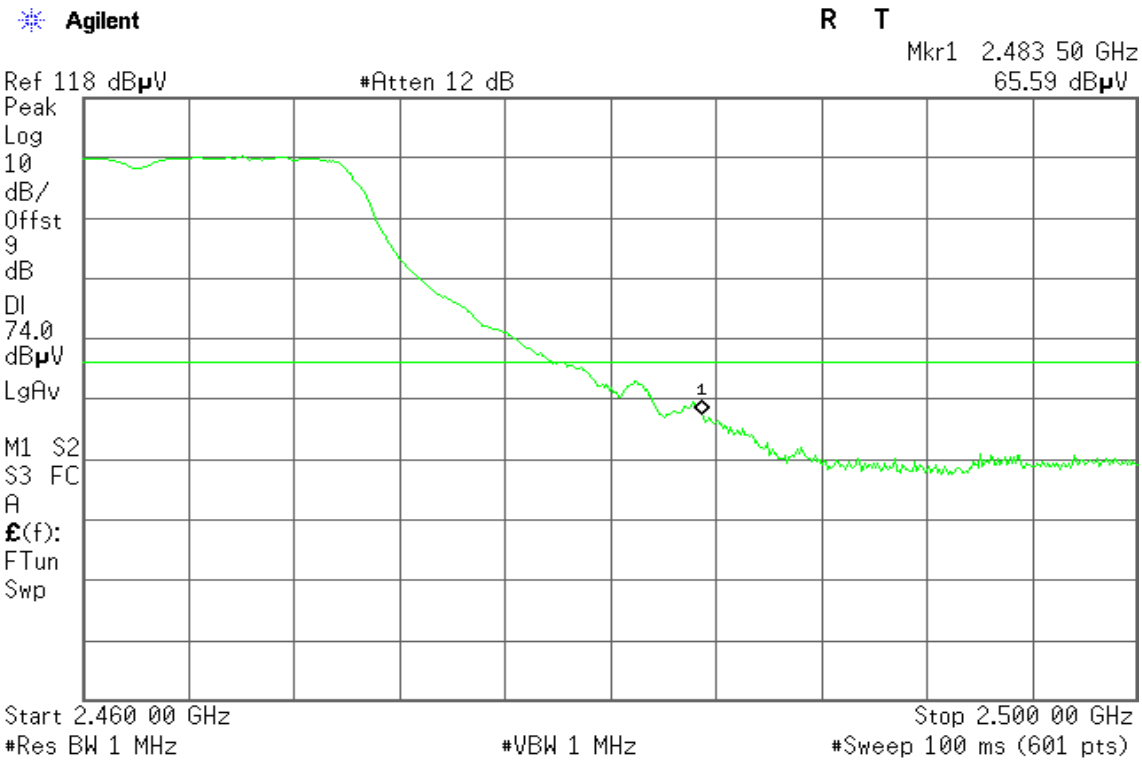



**Detector mode: Average** **Polarity: Horizontal**

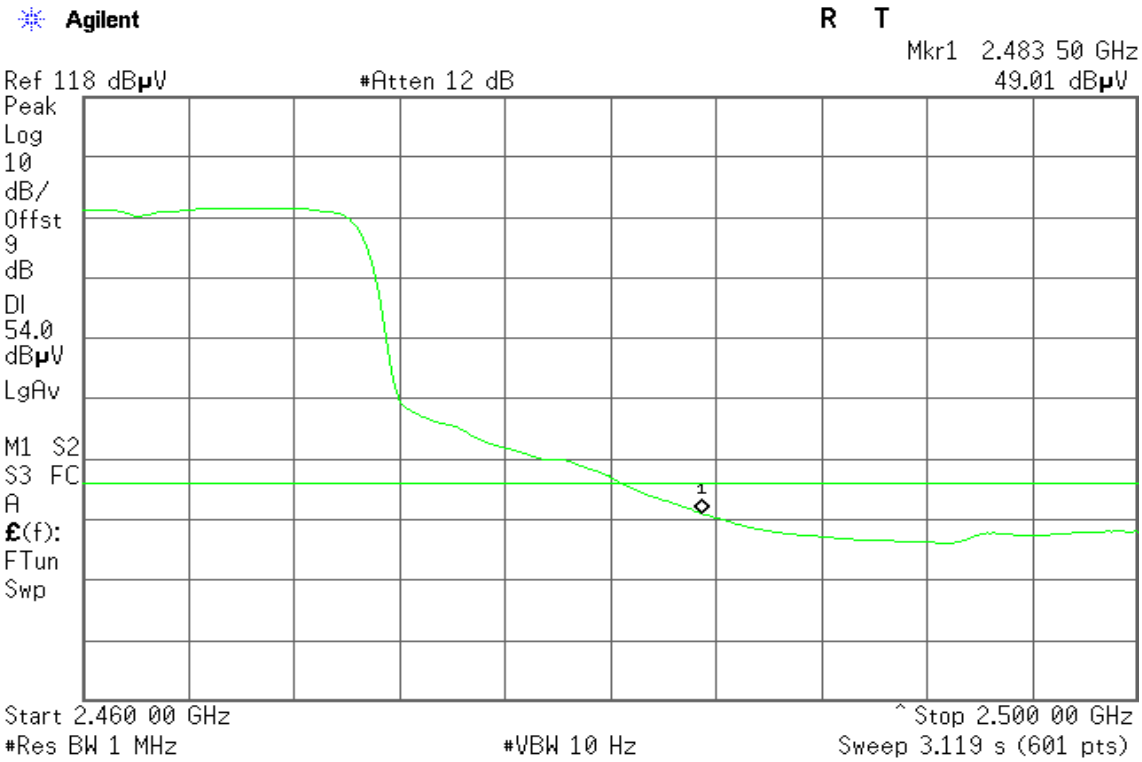


## Band Edges (IEEE 802.11g mode / CH High)

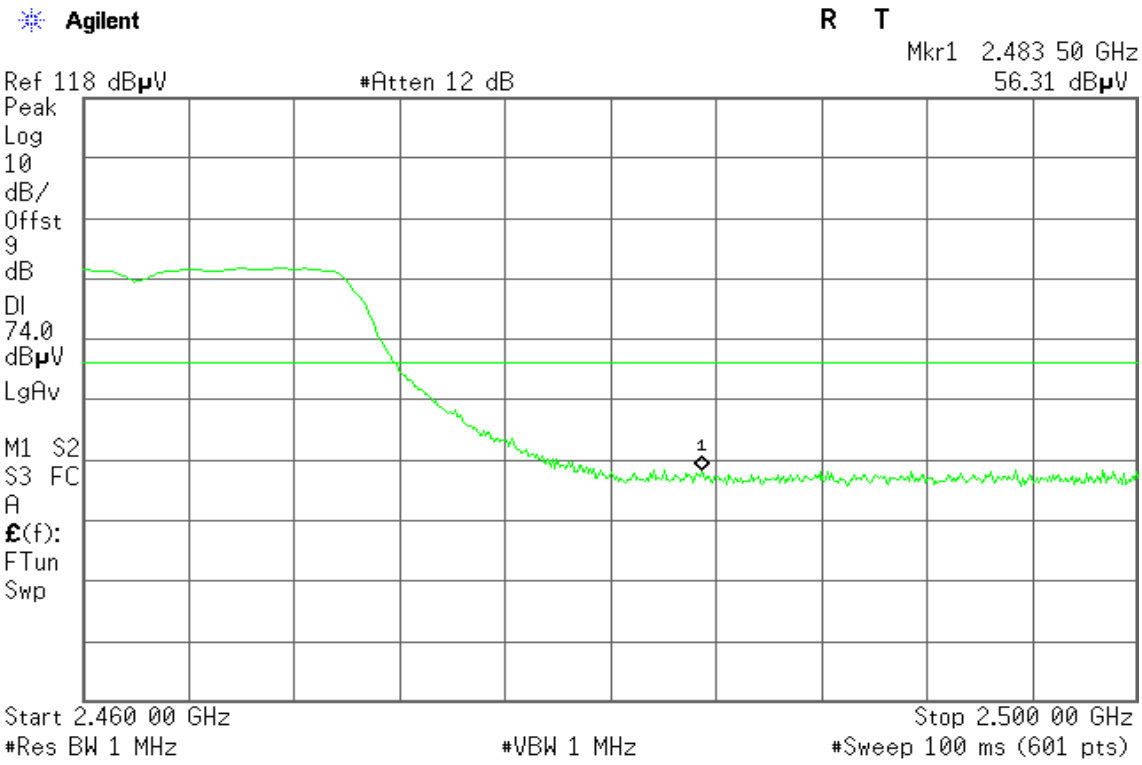
### Detector mode: Peak Polarity: Vertical



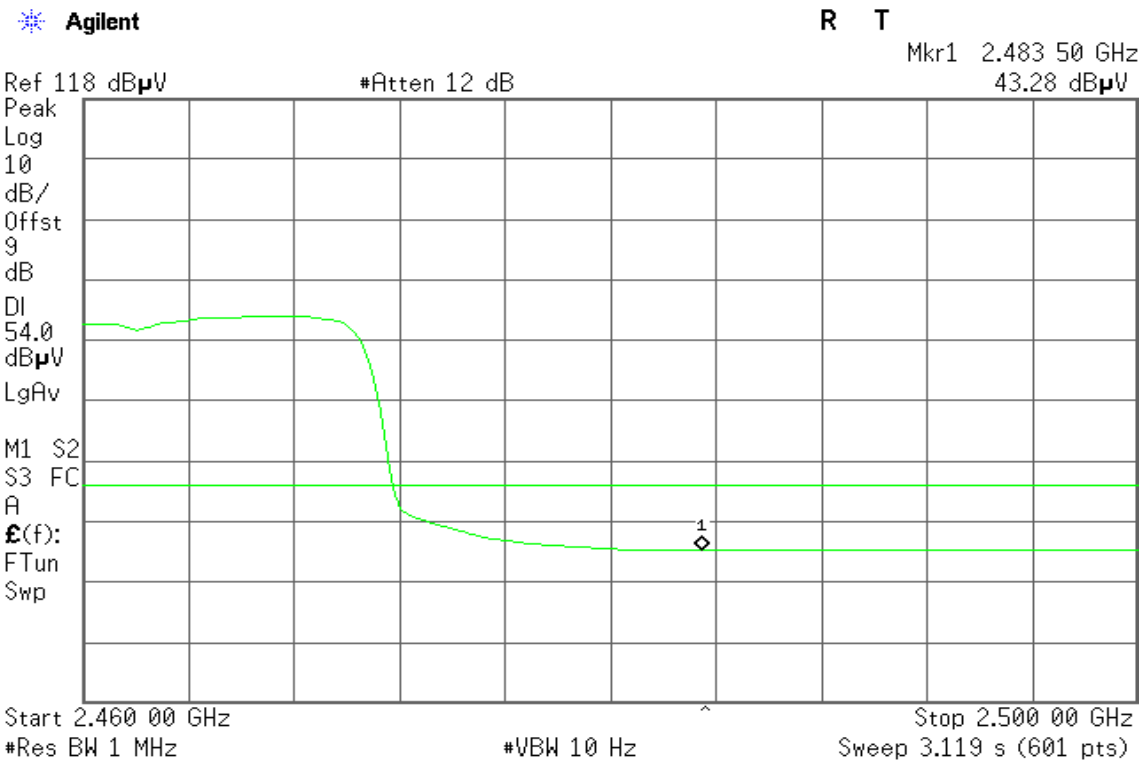

### Detector mode: Average Polarity: Vertical



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

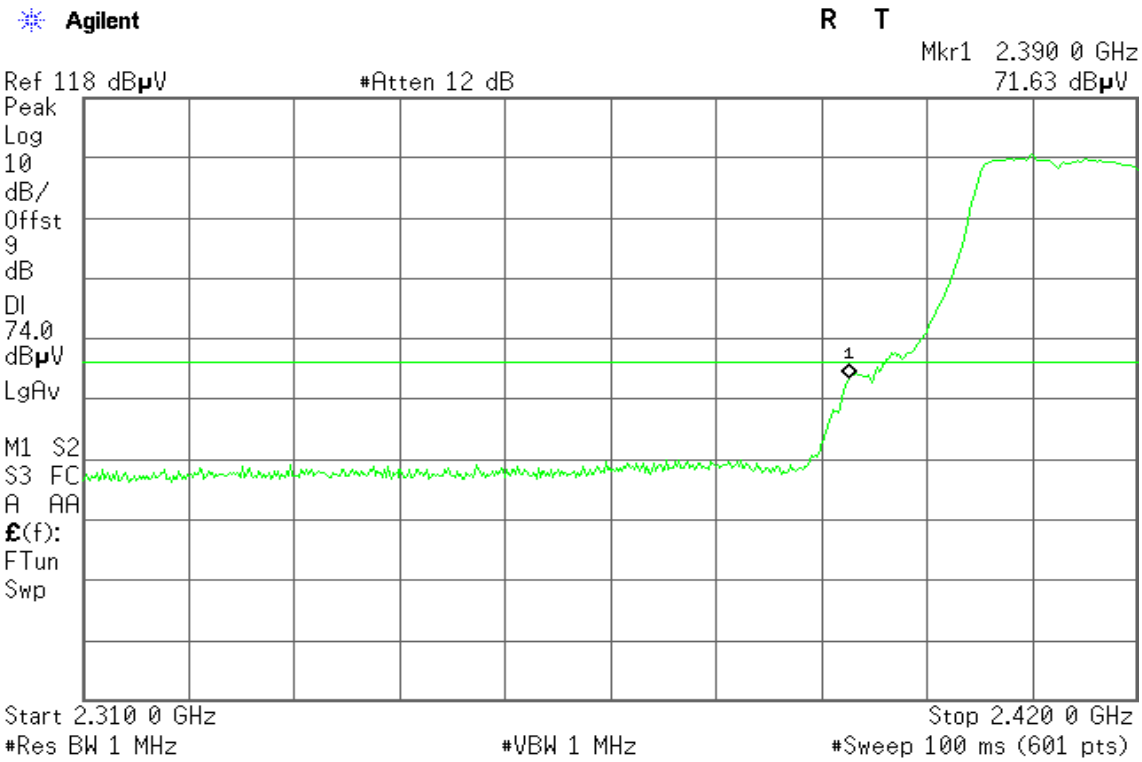



**Detector mode: Average** **Polarity: Horizontal**

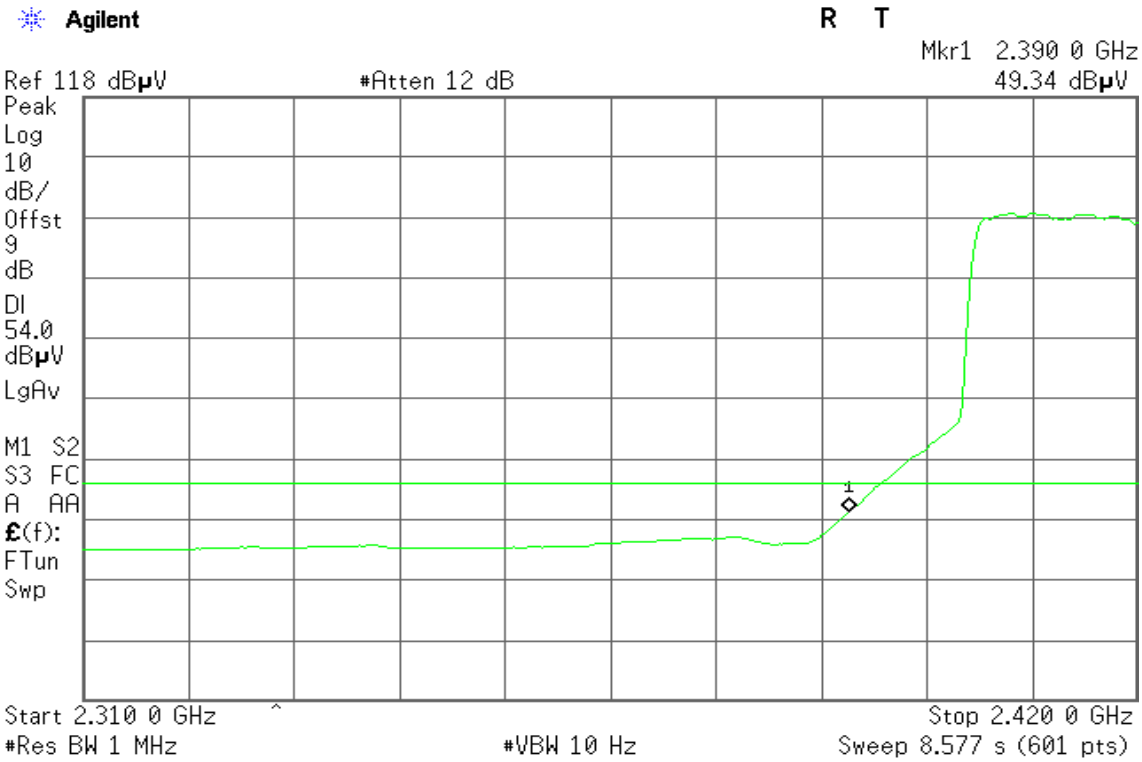


## Band Edges (draft 802.11n Standard-20 MHz Channel mode / CH Low)

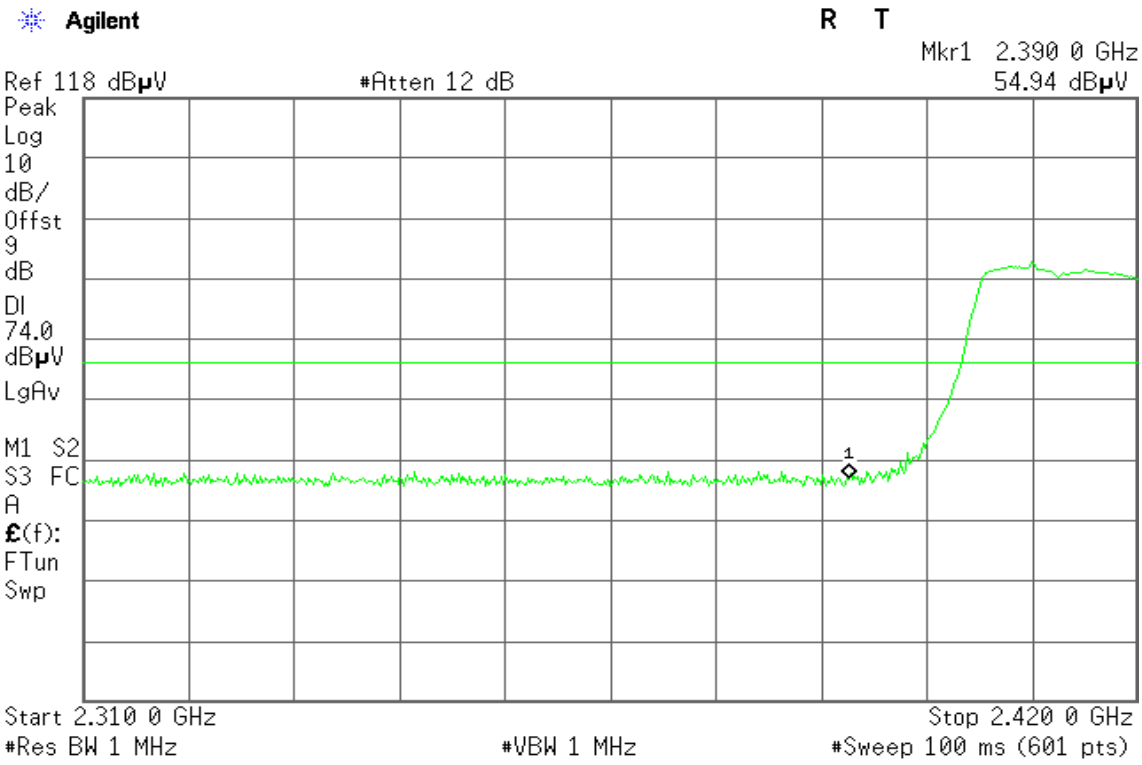
**Detector mode: Peak** **Polarity: Vertical**



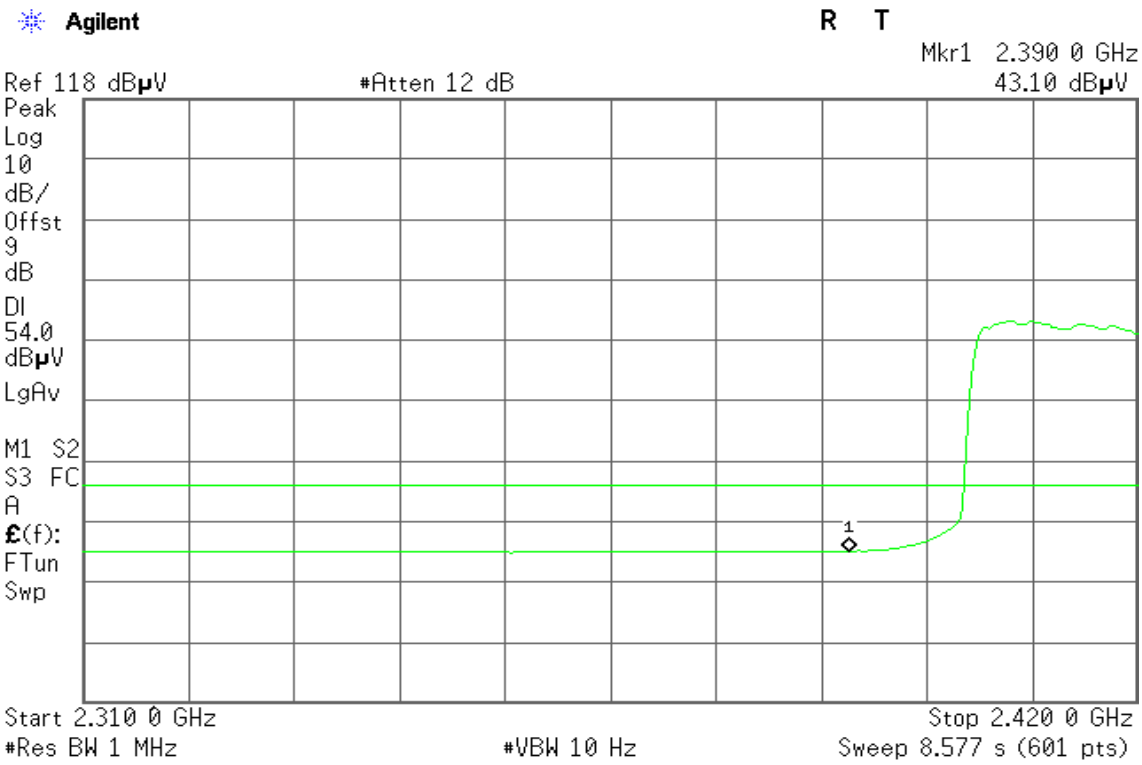

**Detector mode: Average** **Polarity: Vertical**



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

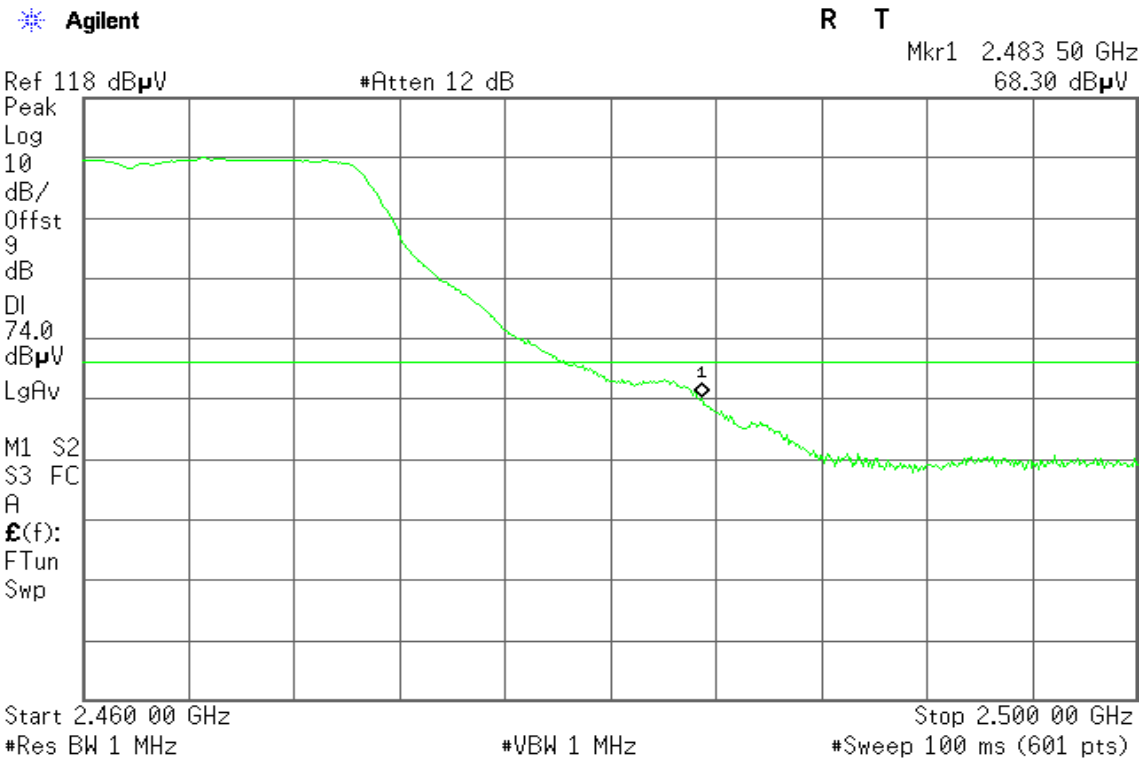



**Detector mode: Average** **Polarity: Horizontal**

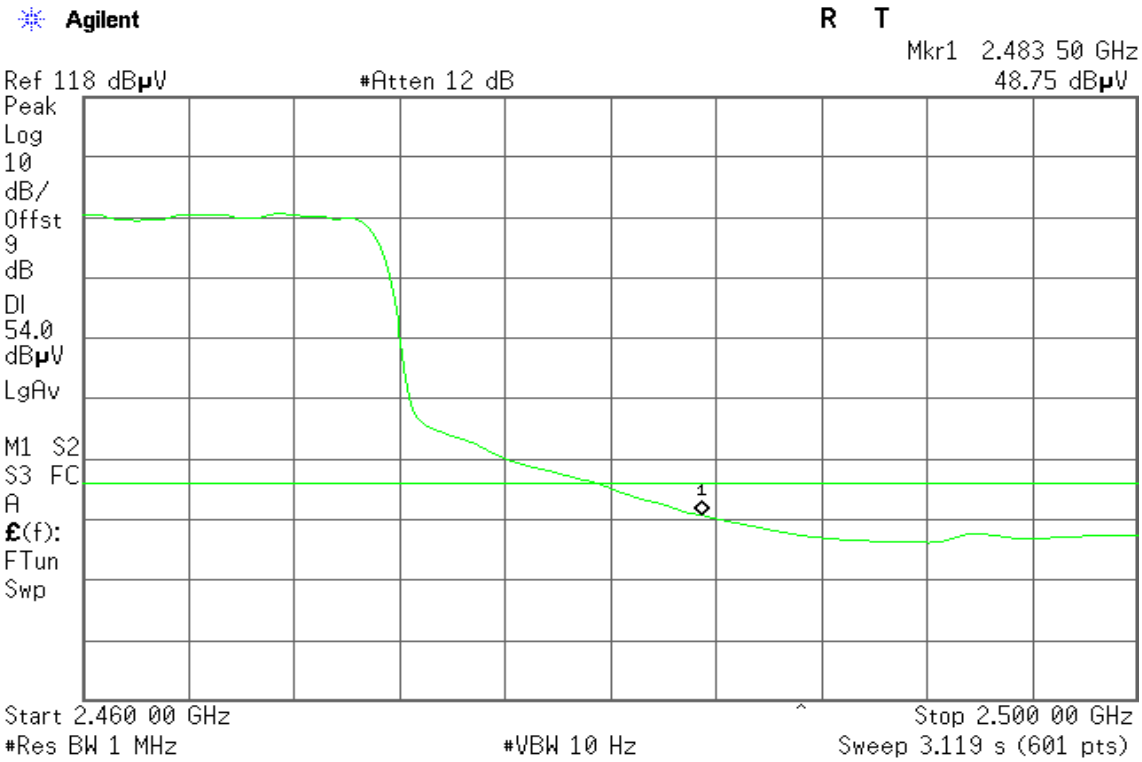


## Band Edges (draft 802.11n Standard-20 MHz Channel mode / CH High)

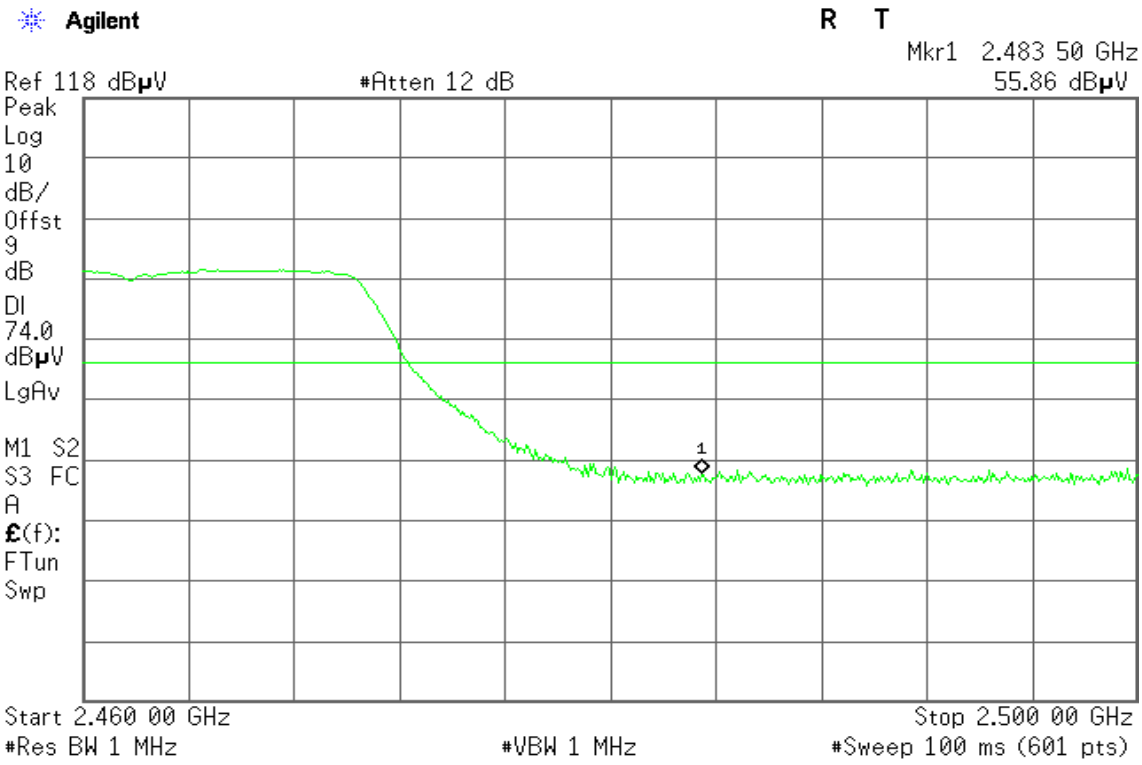
**Detector mode: Peak** **Polarity: Vertical**



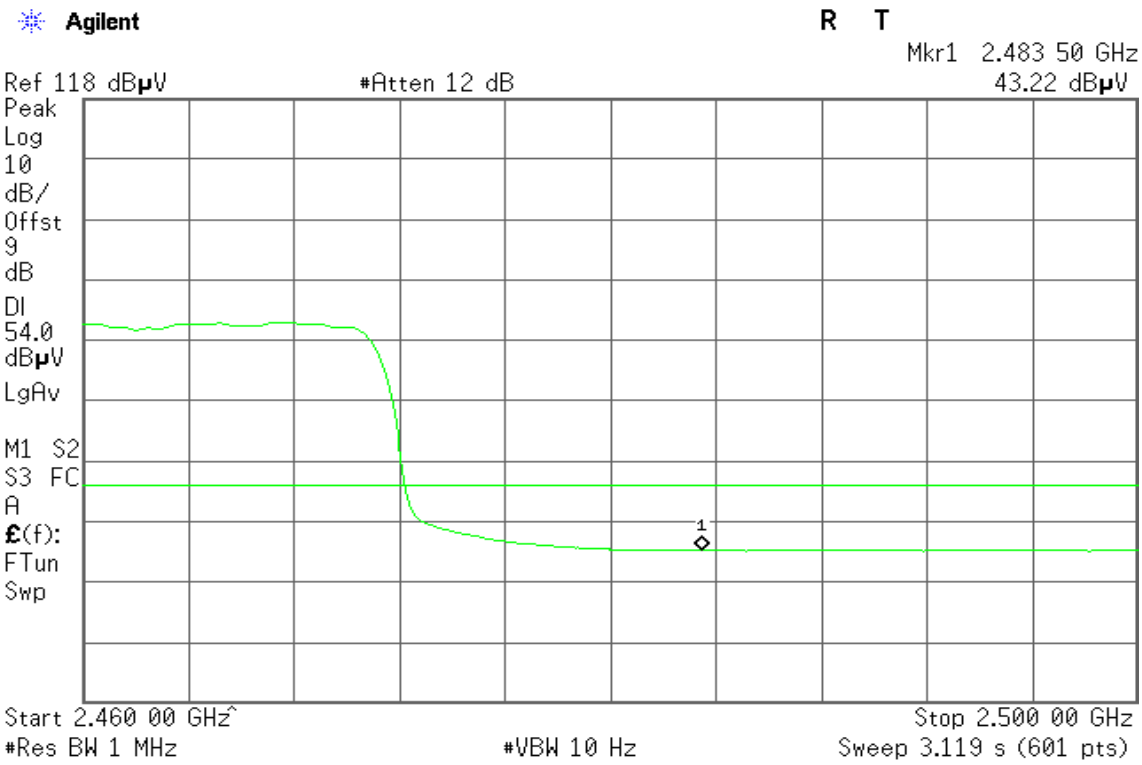

**Detector mode: Average** **Polarity: Vertical**



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

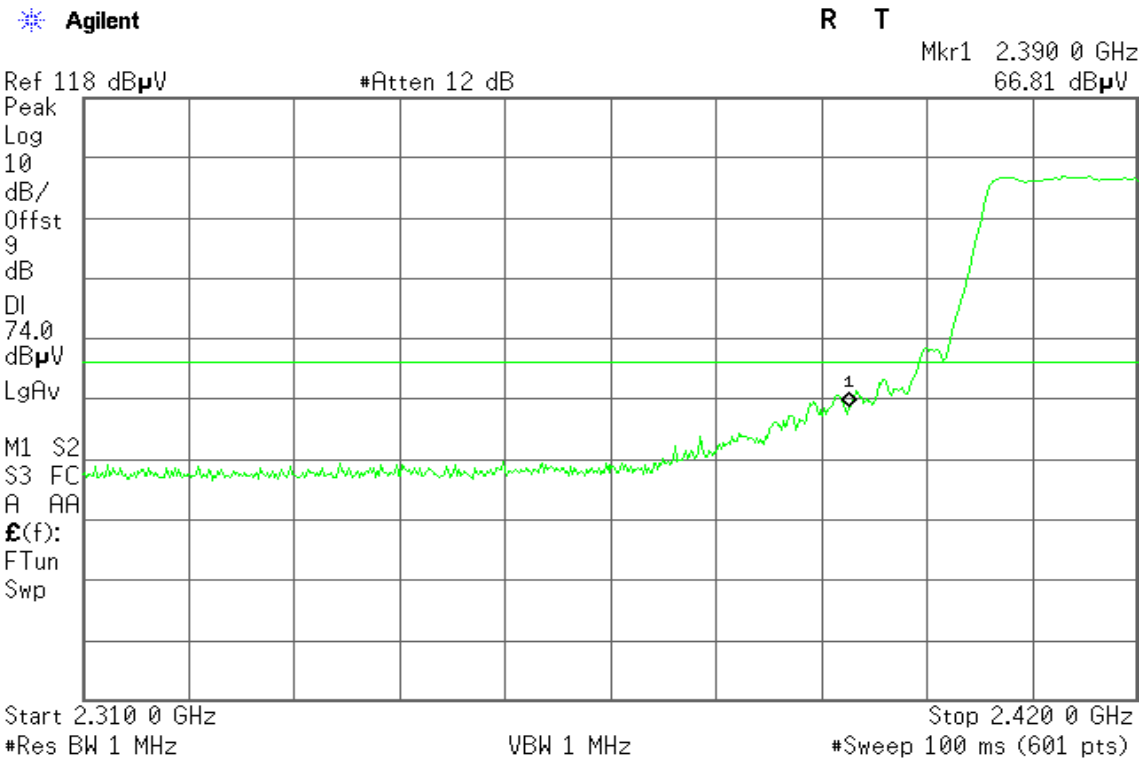



**Detector mode: Average** **Polarity: Horizontal**

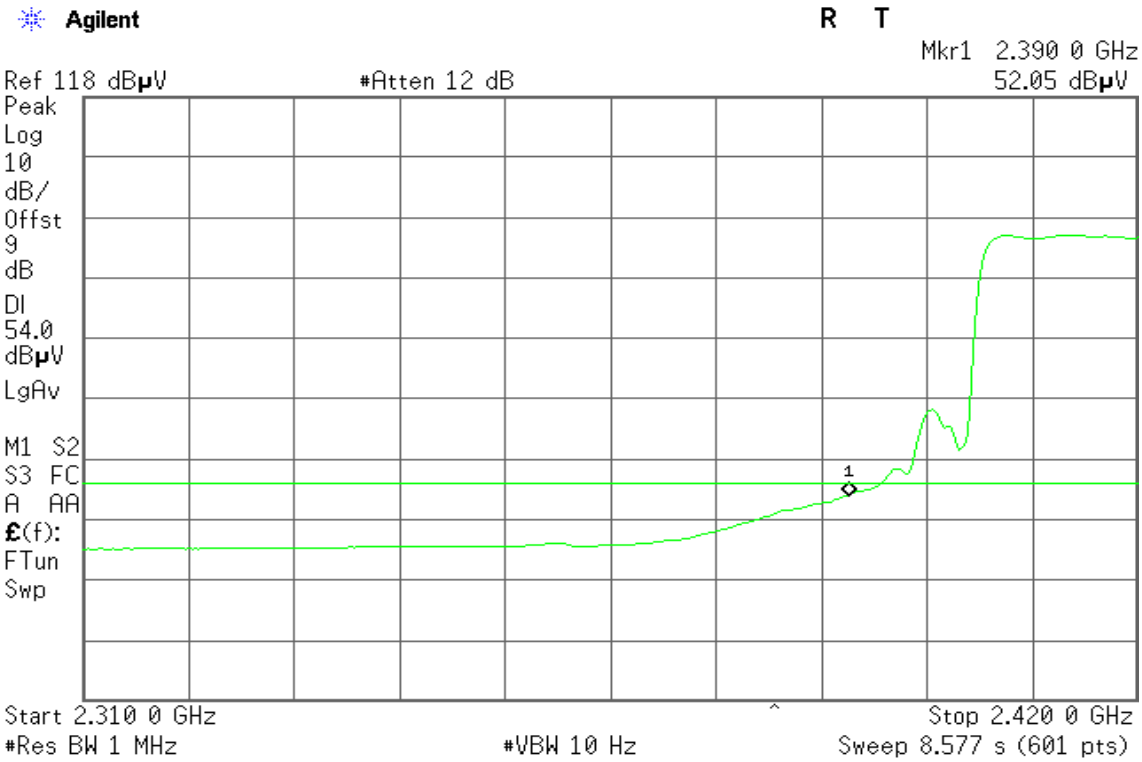


## Band Edges (draft 802.11n Wide-40 MHz Channel mode / CH Low)

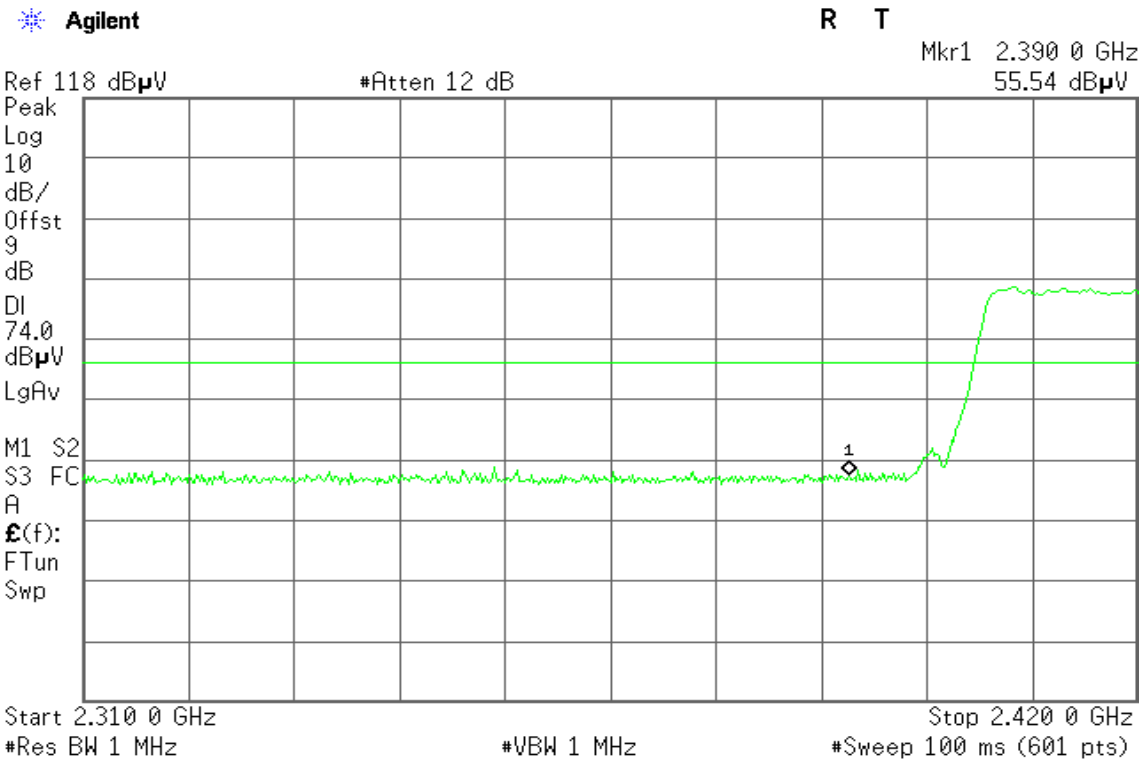
**Detector mode: Peak** **Polarity: Vertical**



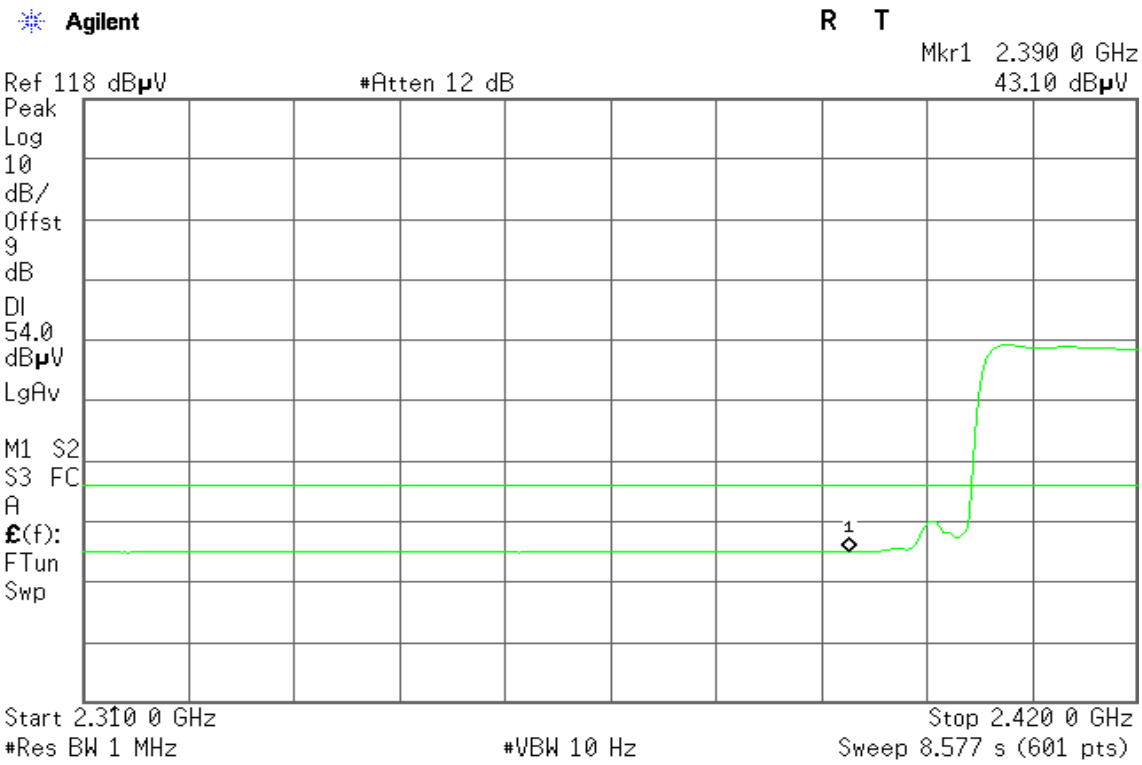

**Detector mode: Average** **Polarity: Vertical**



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

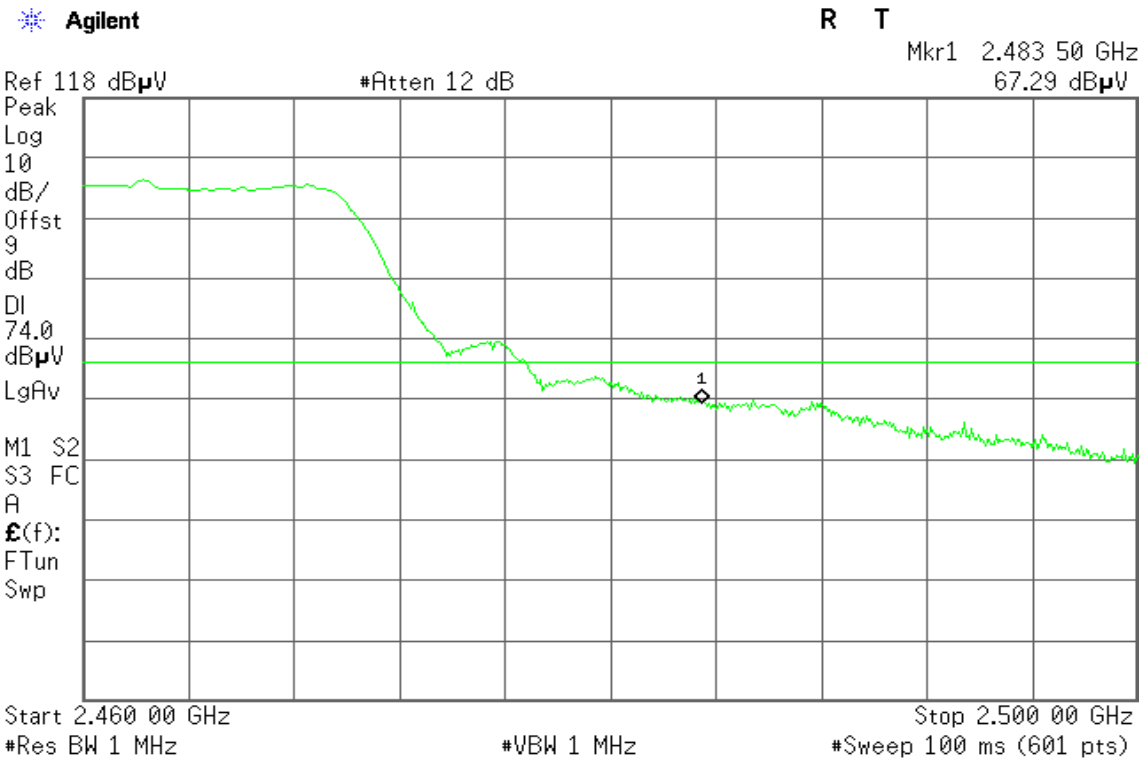



**Detector mode: Average** **Polarity: Horizontal**

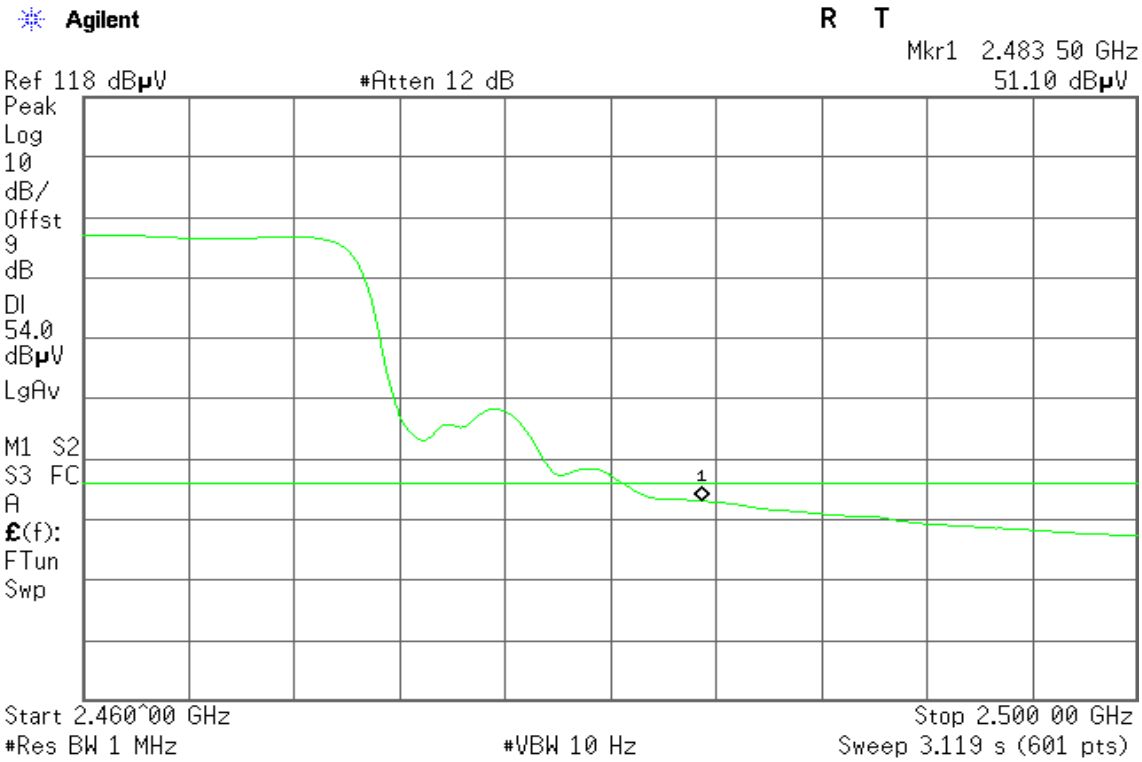


## Band Edges (draft 802.11n Wide-40 MHz Channel mode / CH High)

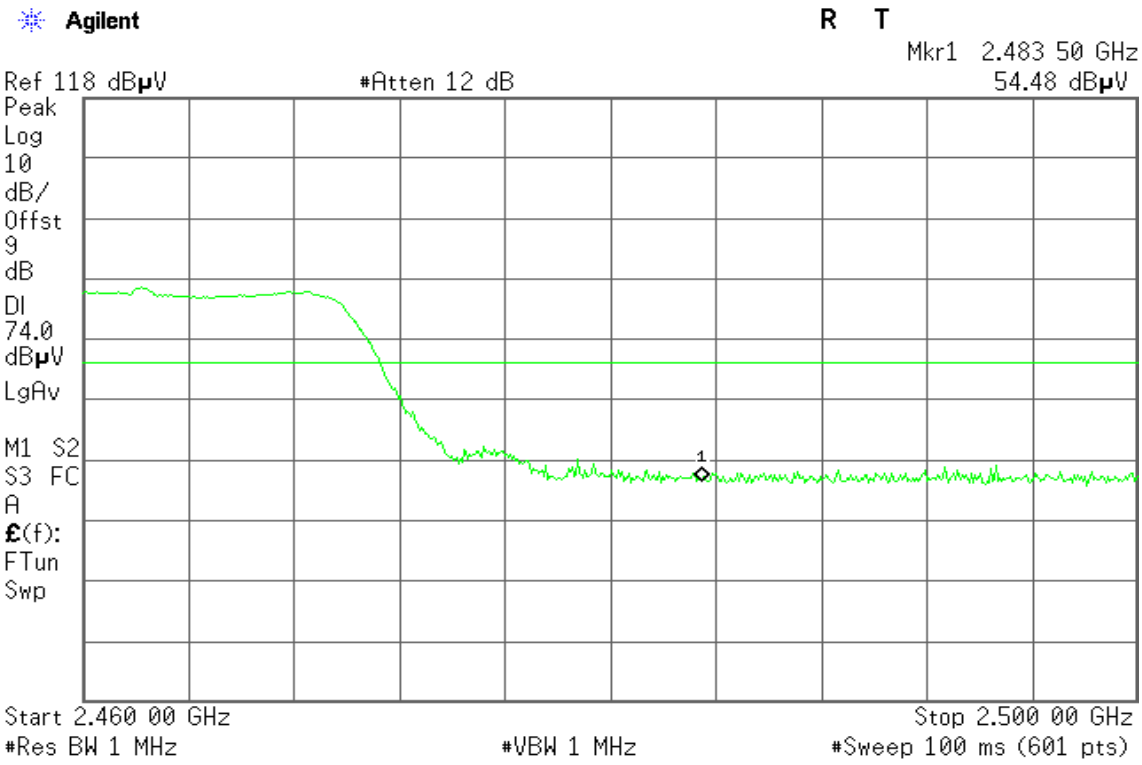
### Detector mode: Peak Polarity: Vertical



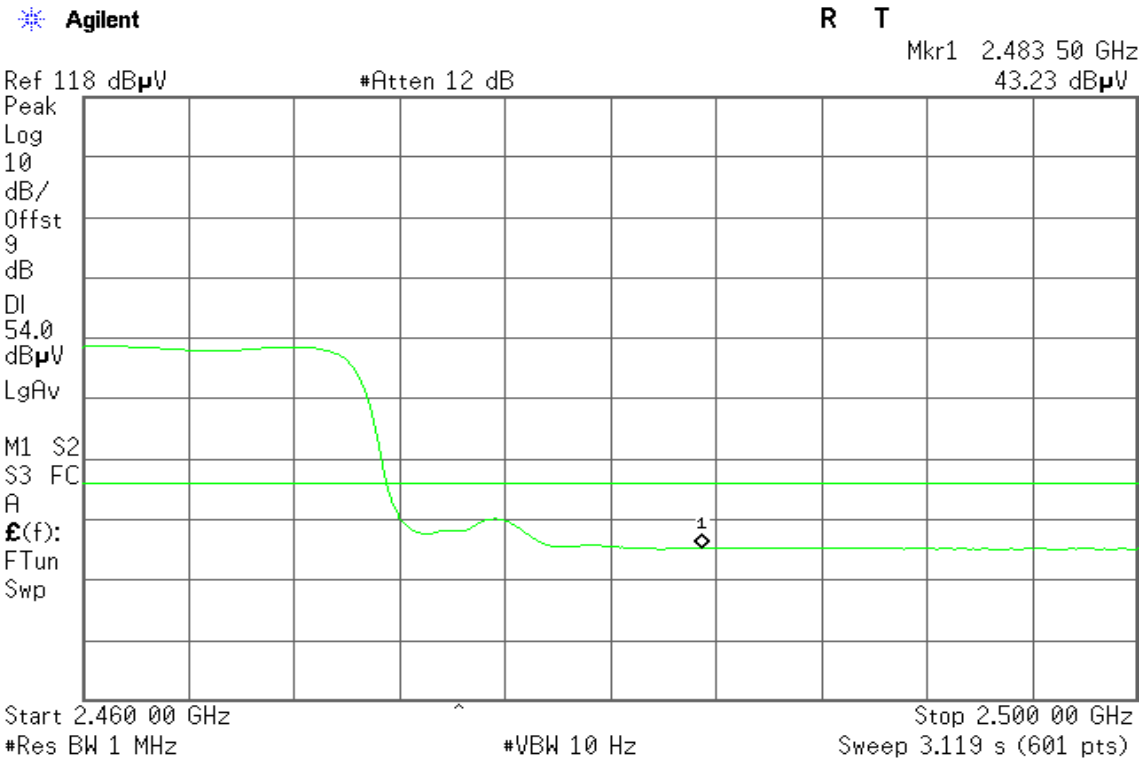

### Detector mode: Average Polarity: Vertical



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



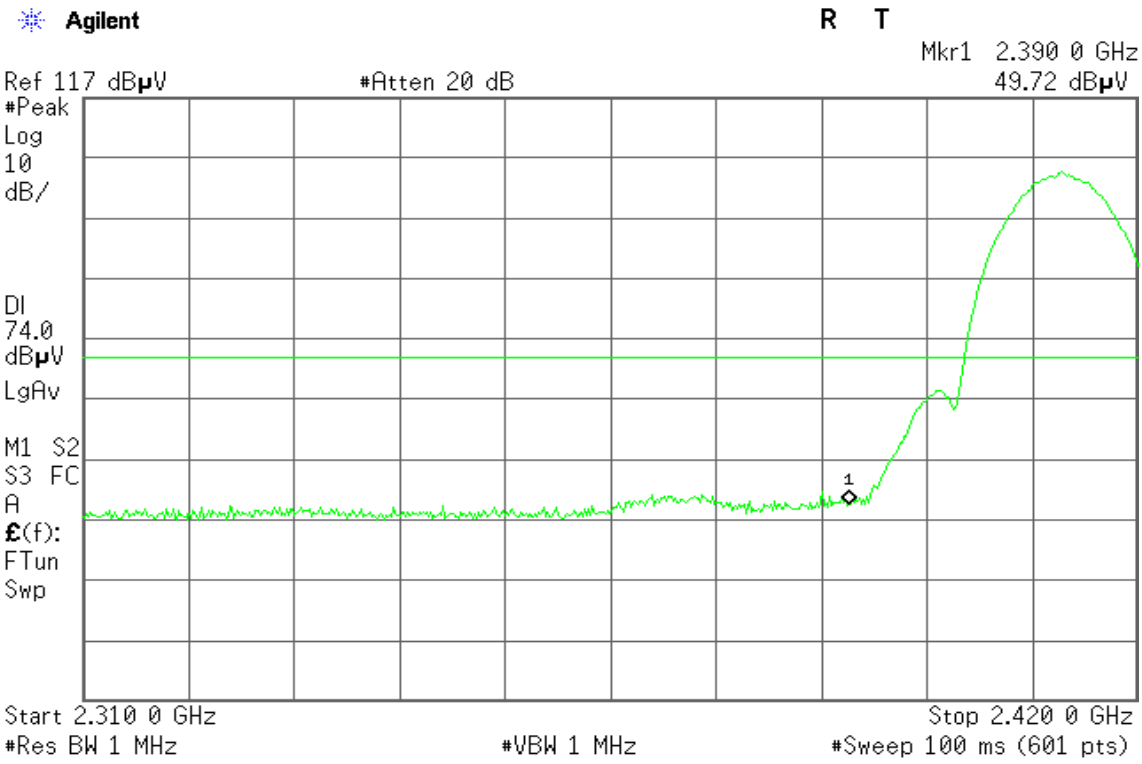

**Detector mode: Average** **Polarity: Horizontal**



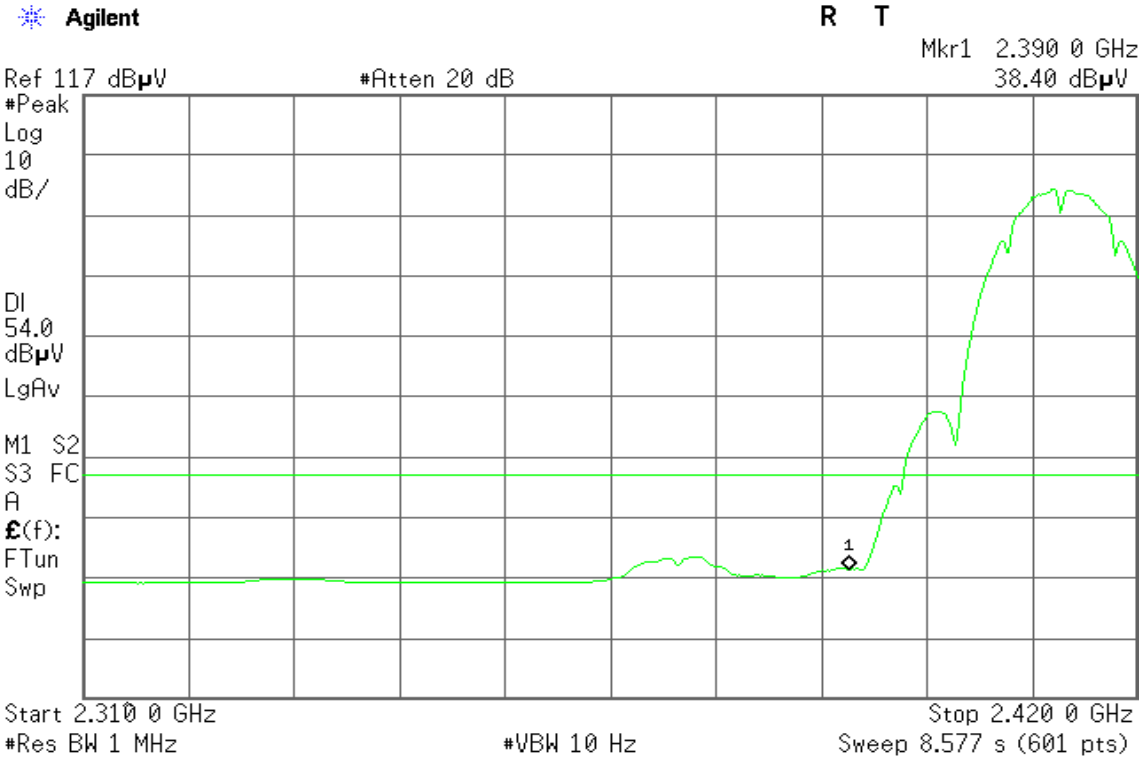
**For Chip Antenna**

**Band Edges (IEEE 802.11b mode / CH Low)**

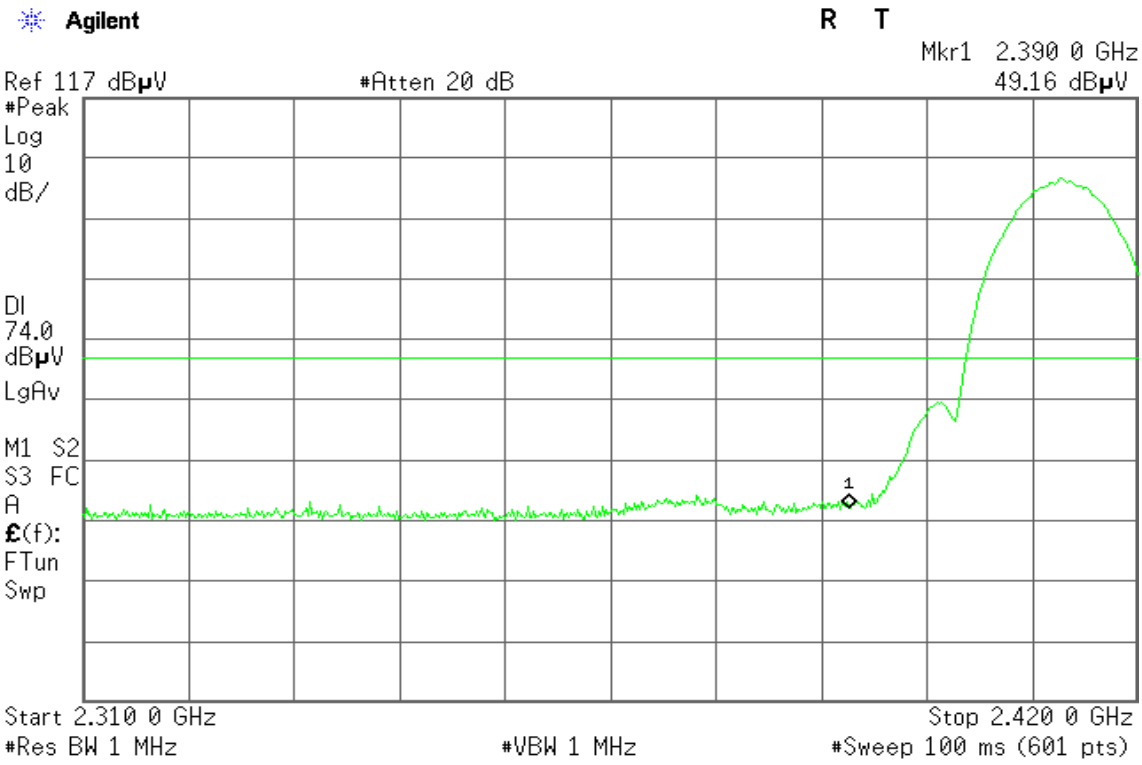
**Detector mode: Peak** **Polarity: Vertical**



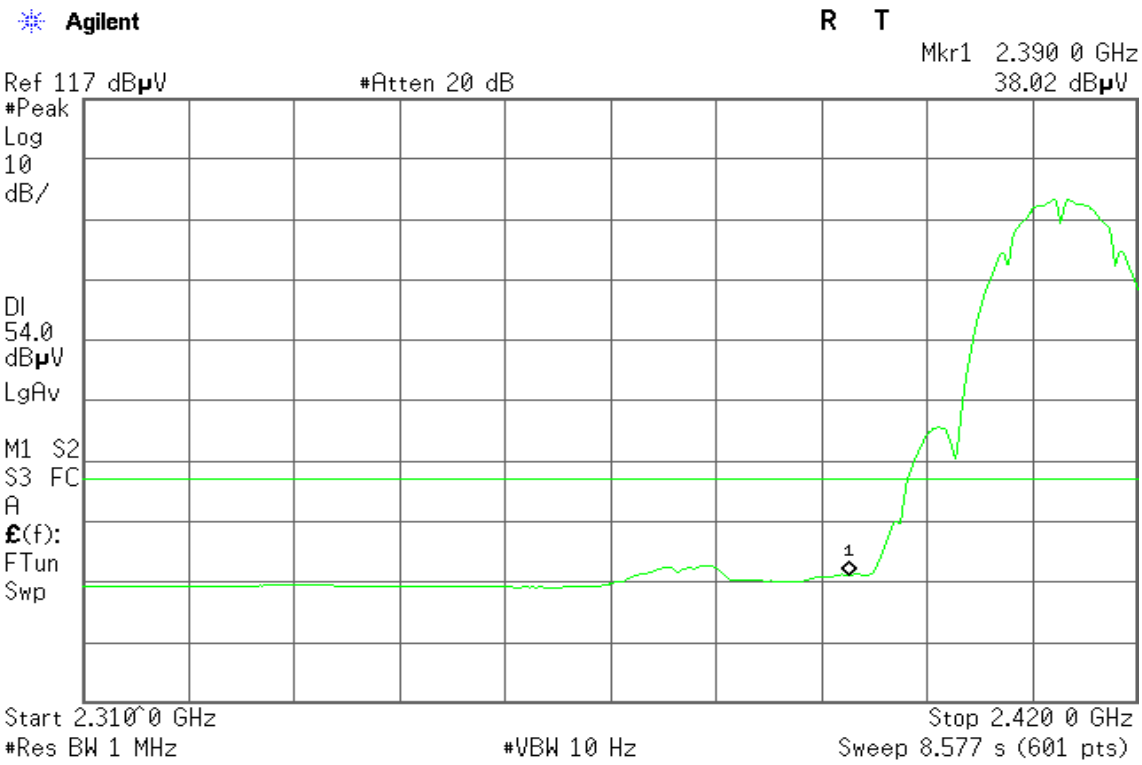

**Detector mode: Average** **Polarity: Vertical**



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

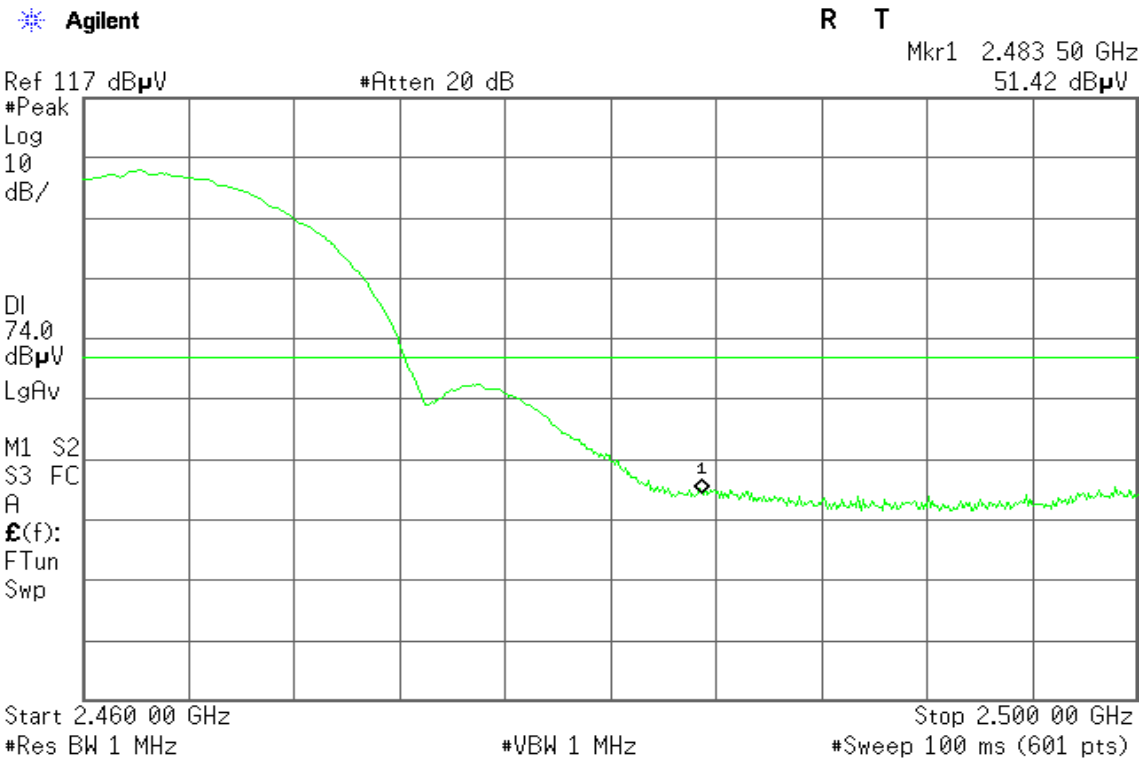



**Detector mode: Average** **Polarity: Horizontal**

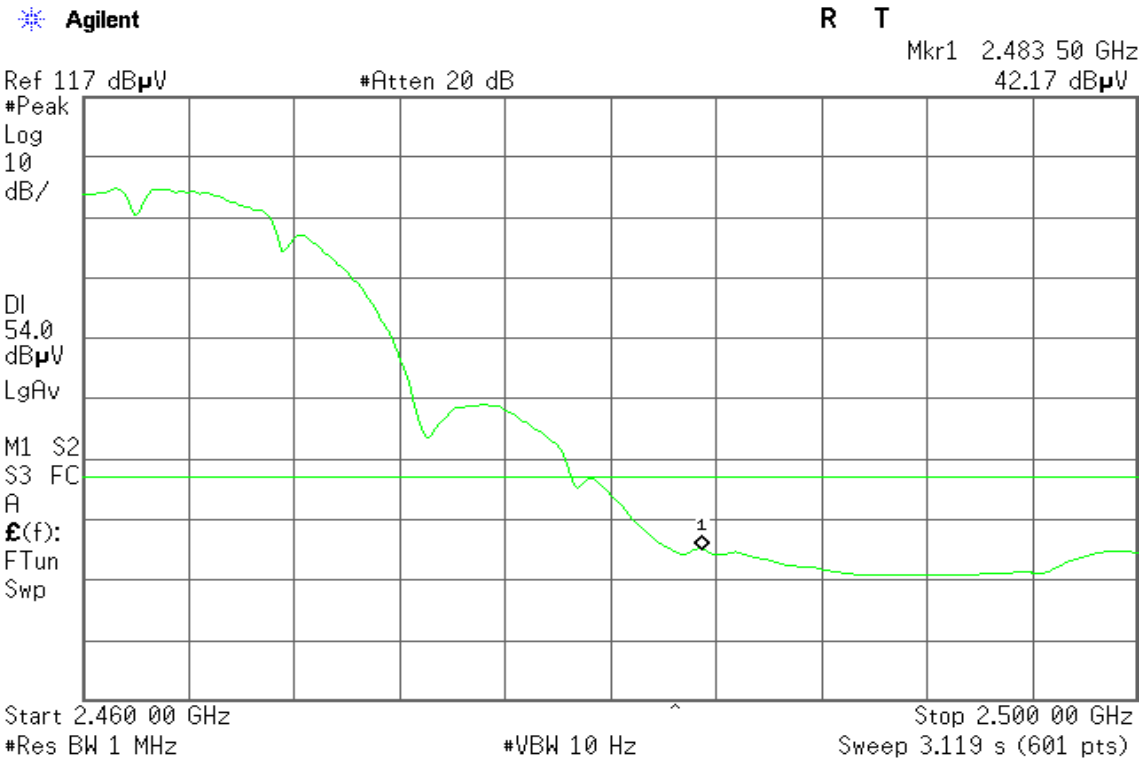


## Band Edges (IEEE 802.11b mode / CH High)

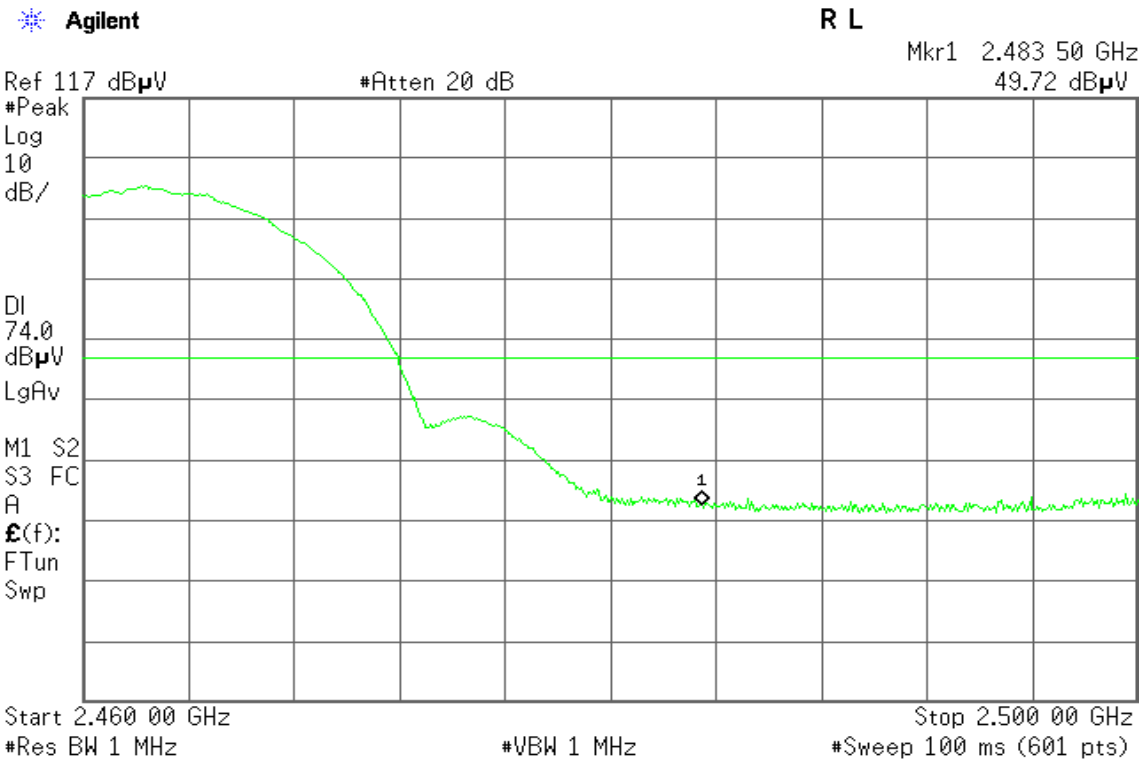
### Detector mode: Peak Polarity: Vertical



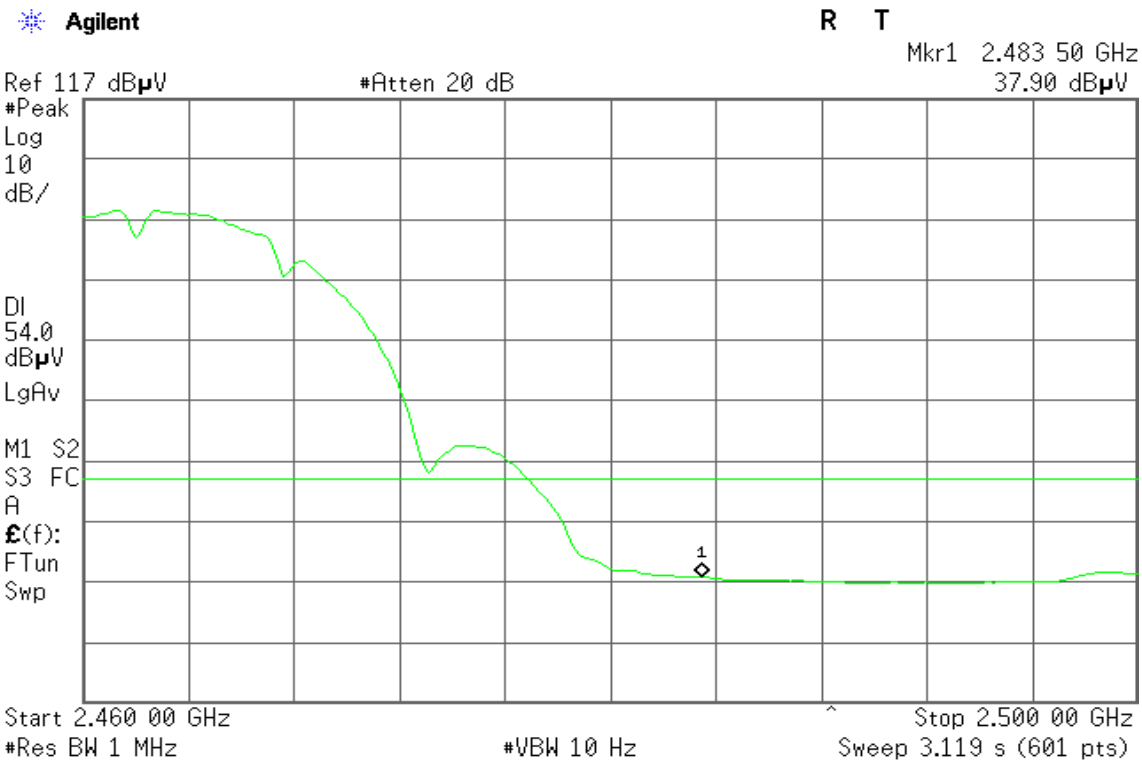

### Detector mode: Average Polarity: Vertical



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

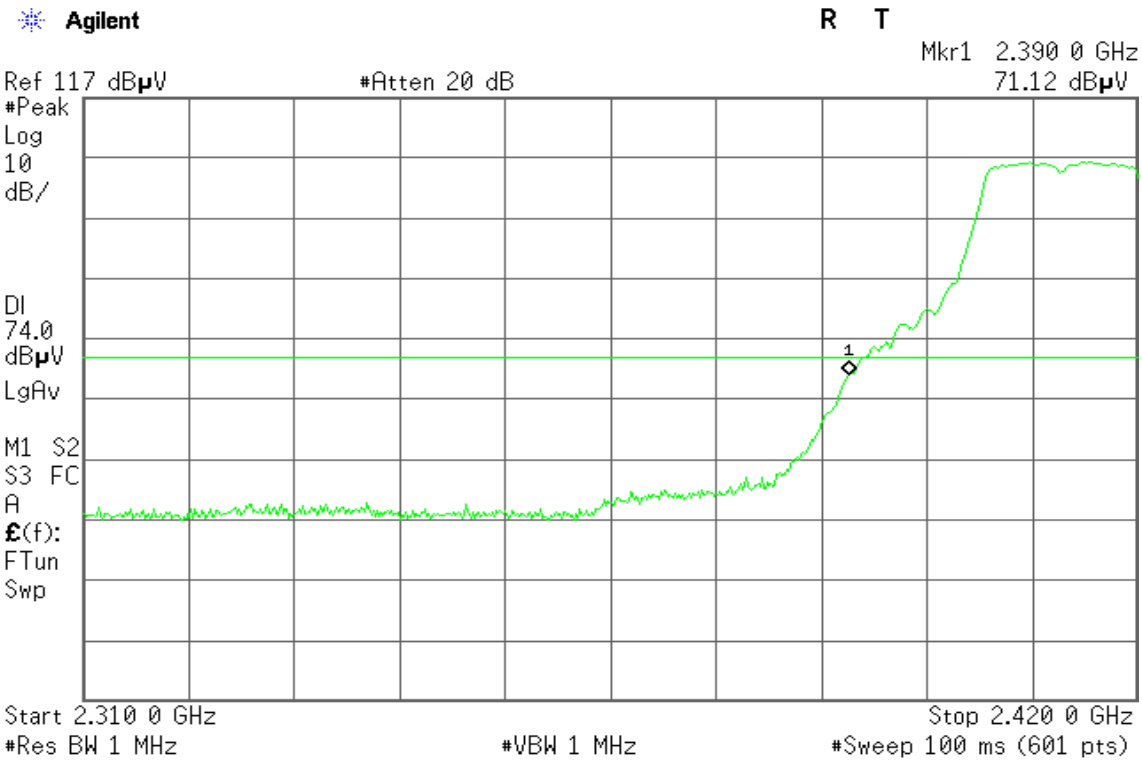



**Detector mode: Average** **Polarity: Horizontal**

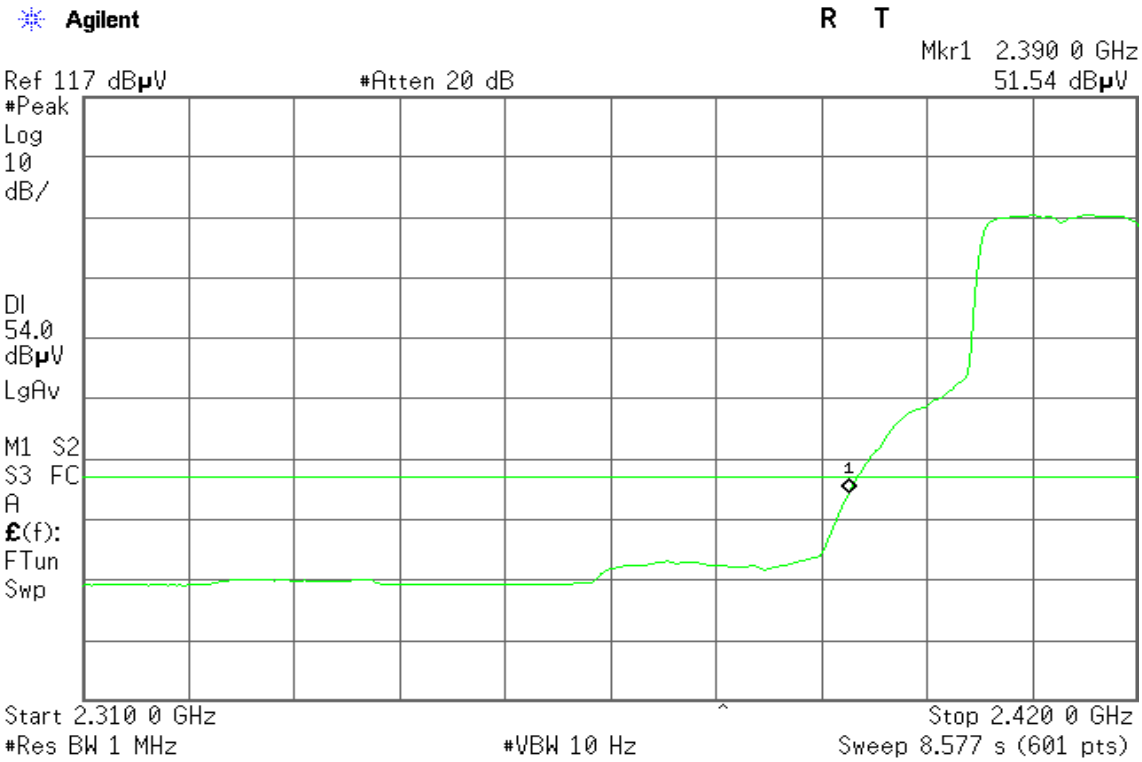


## Band Edges (IEEE 802.11g mode / CH Low)

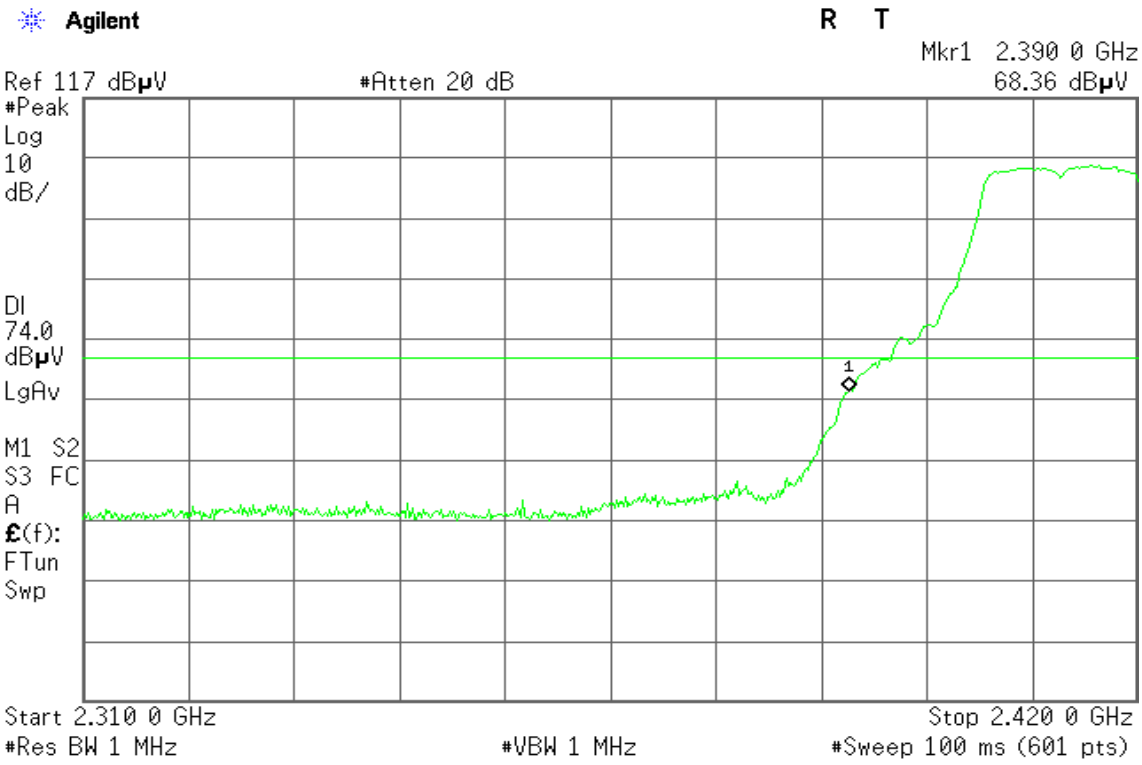
### Detector mode: Peak Polarity: Vertical



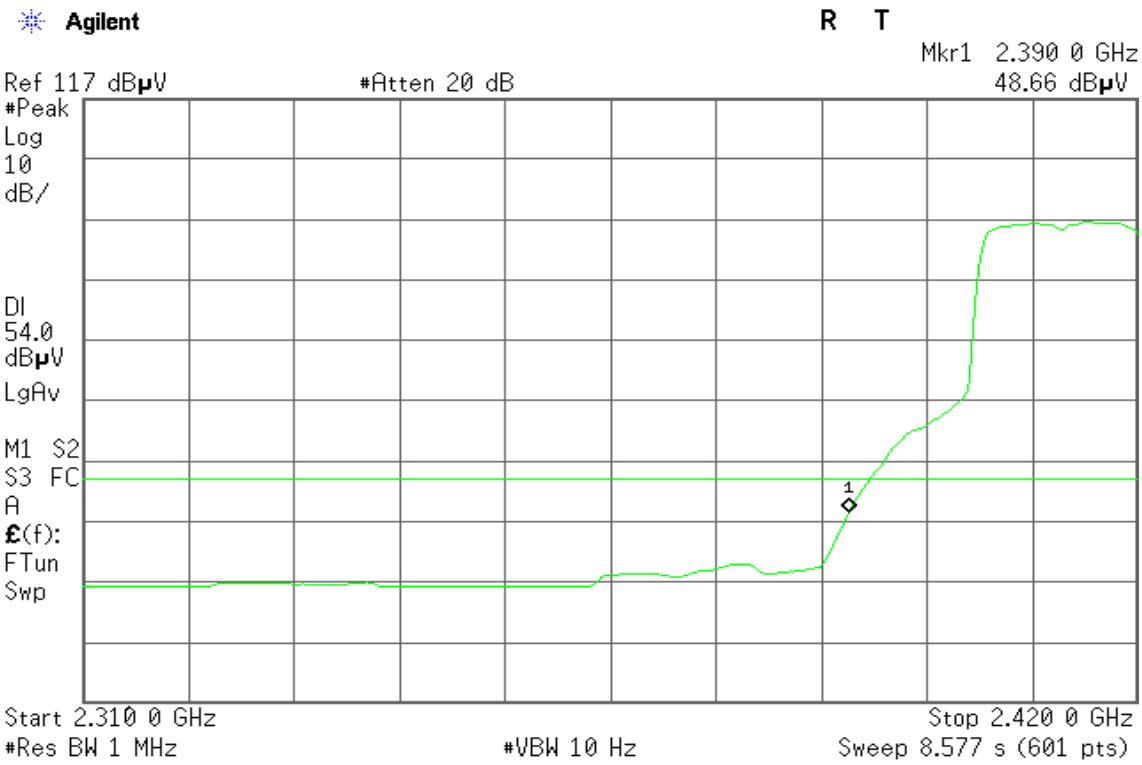

### Detector mode: Average Polarity: Vertical



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

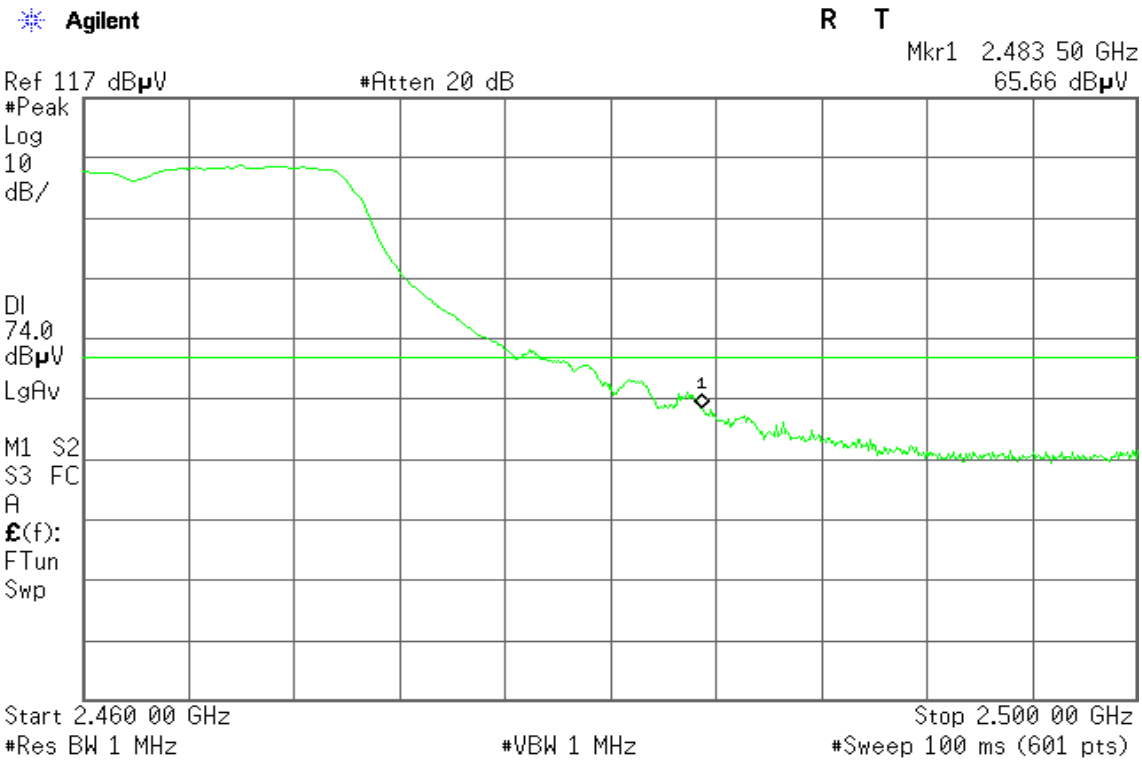



**Detector mode: Average** **Polarity: Horizontal**

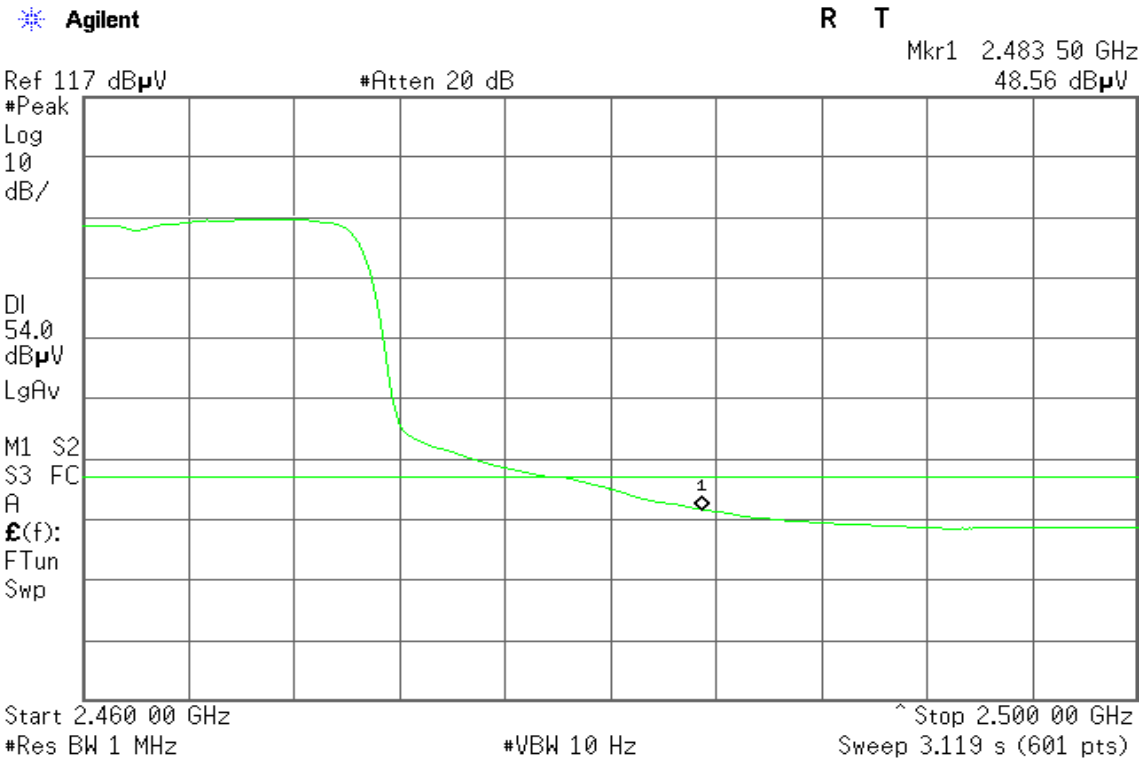


## Band Edges (IEEE 802.11g mode / CH High)

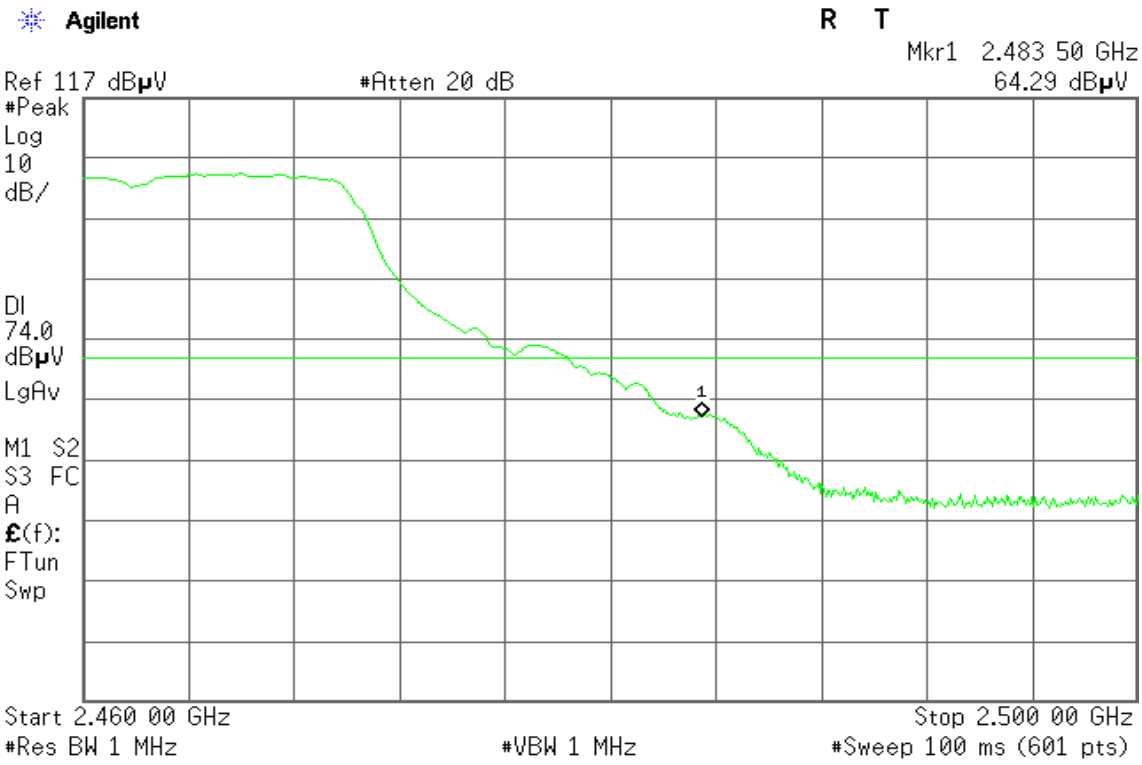
**Detector mode: Peak** **Polarity: Vertical**



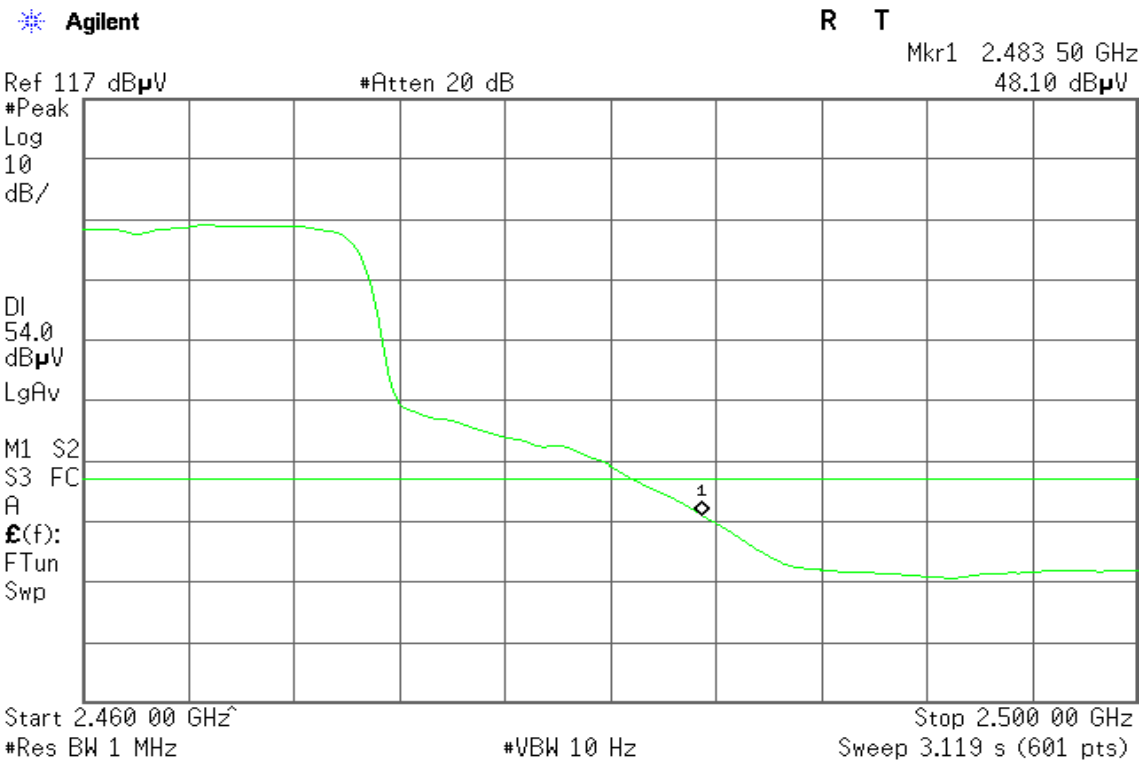

**Detector mode: Average** **Polarity: Vertical**



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

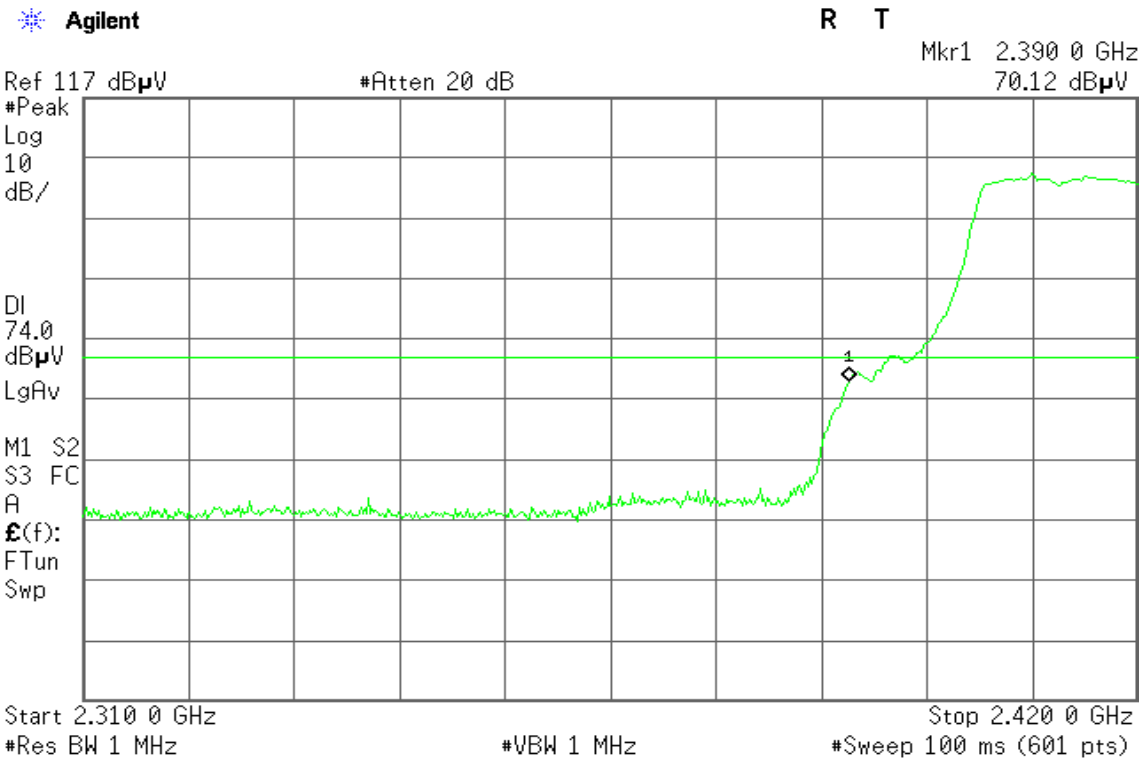



**Detector mode: Average** **Polarity: Horizontal**

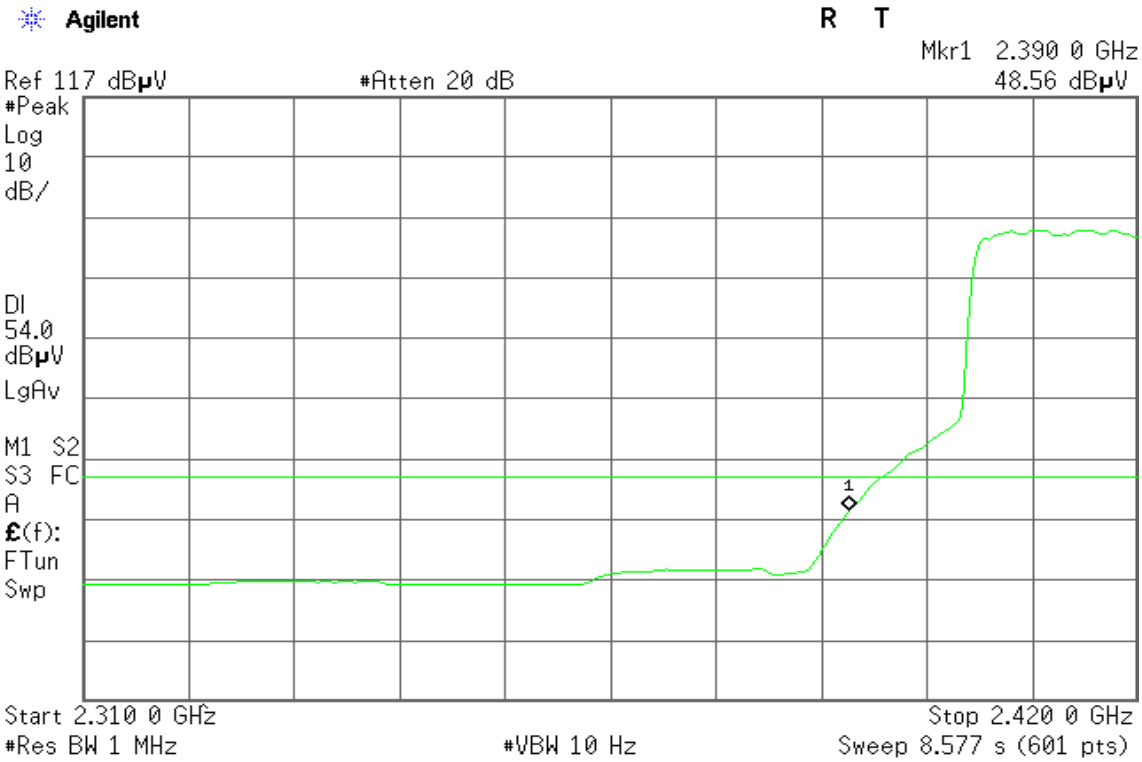


## Band Edges (draft 802.11n Standard-20 MHz Channel mode / CH Low)

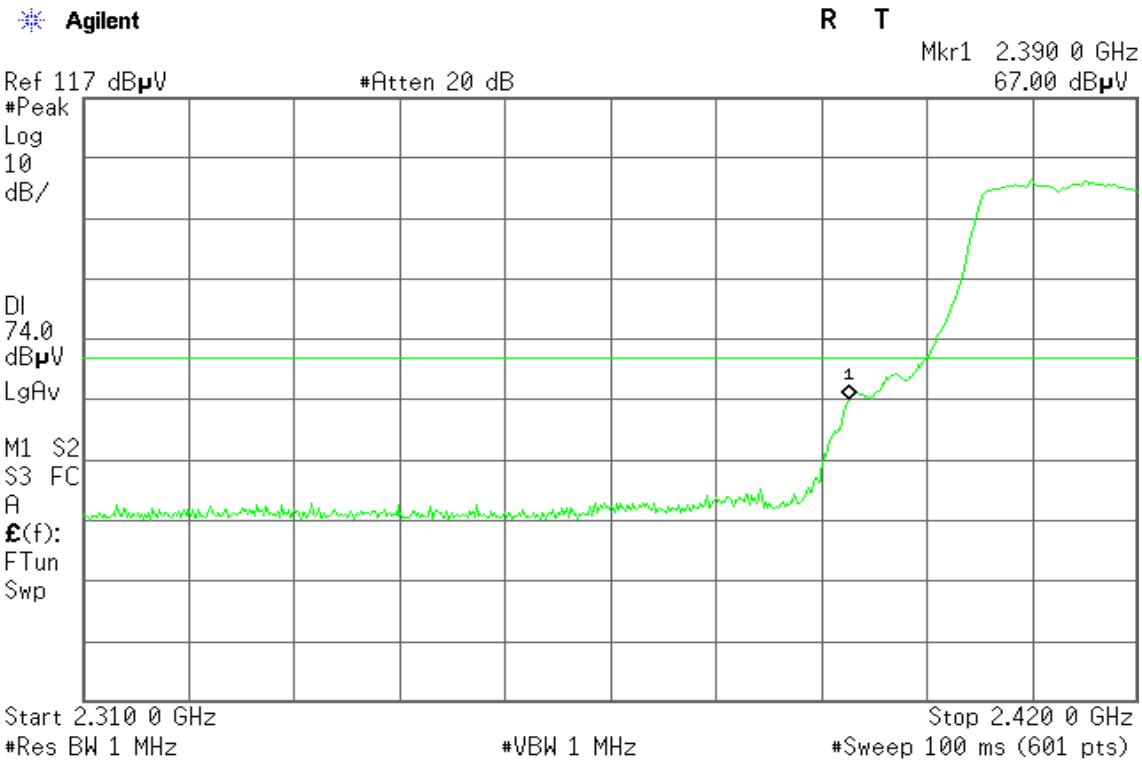
**Detector mode: Peak** **Polarity: Vertical**



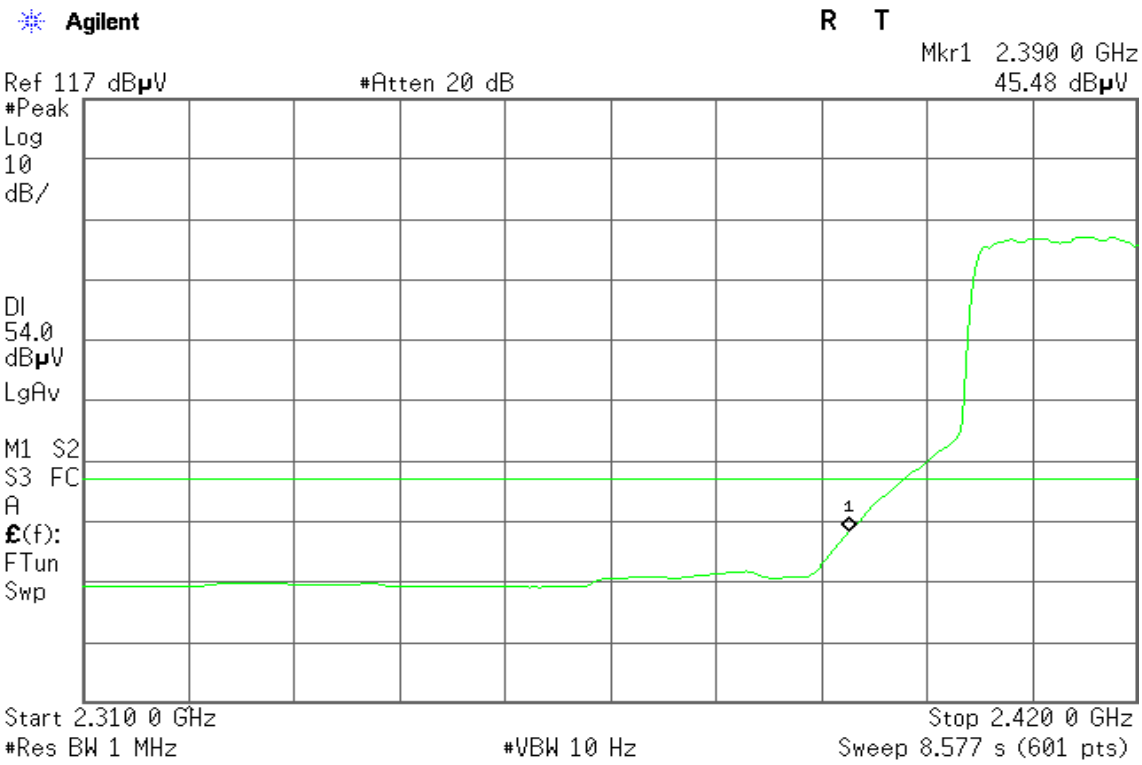

**Detector mode: Average** **Polarity: Vertical**



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

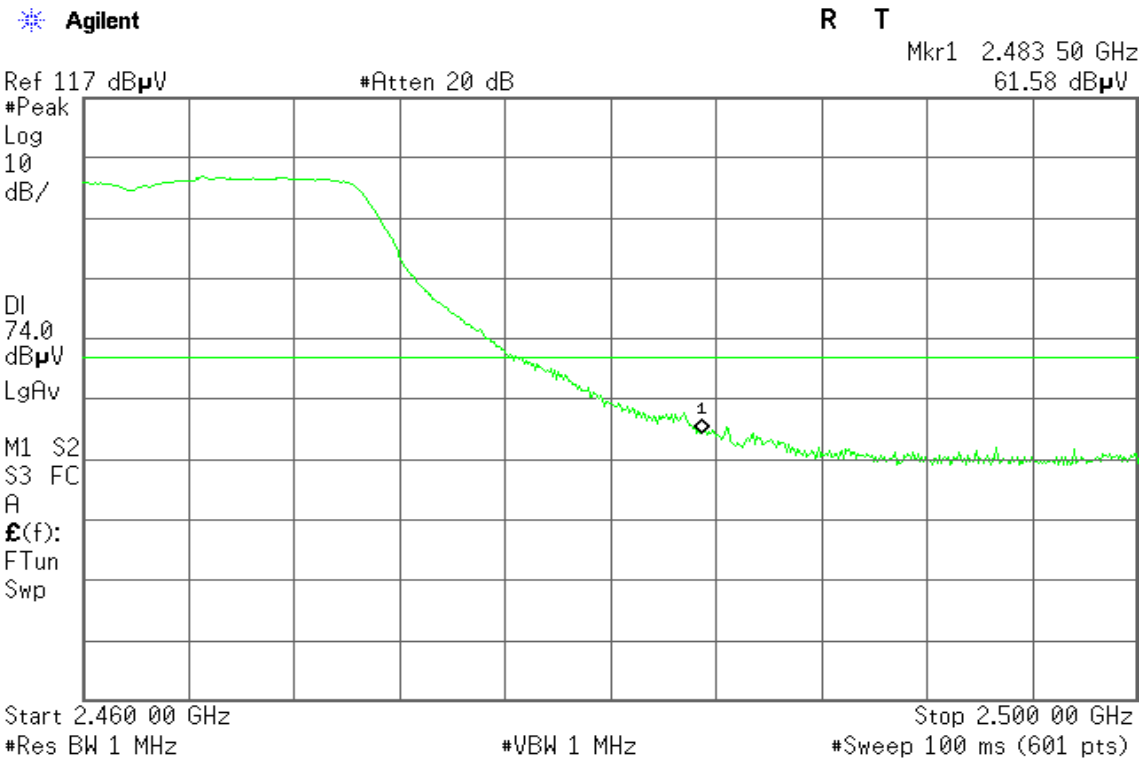



**Detector mode: Average** **Polarity: Horizontal**

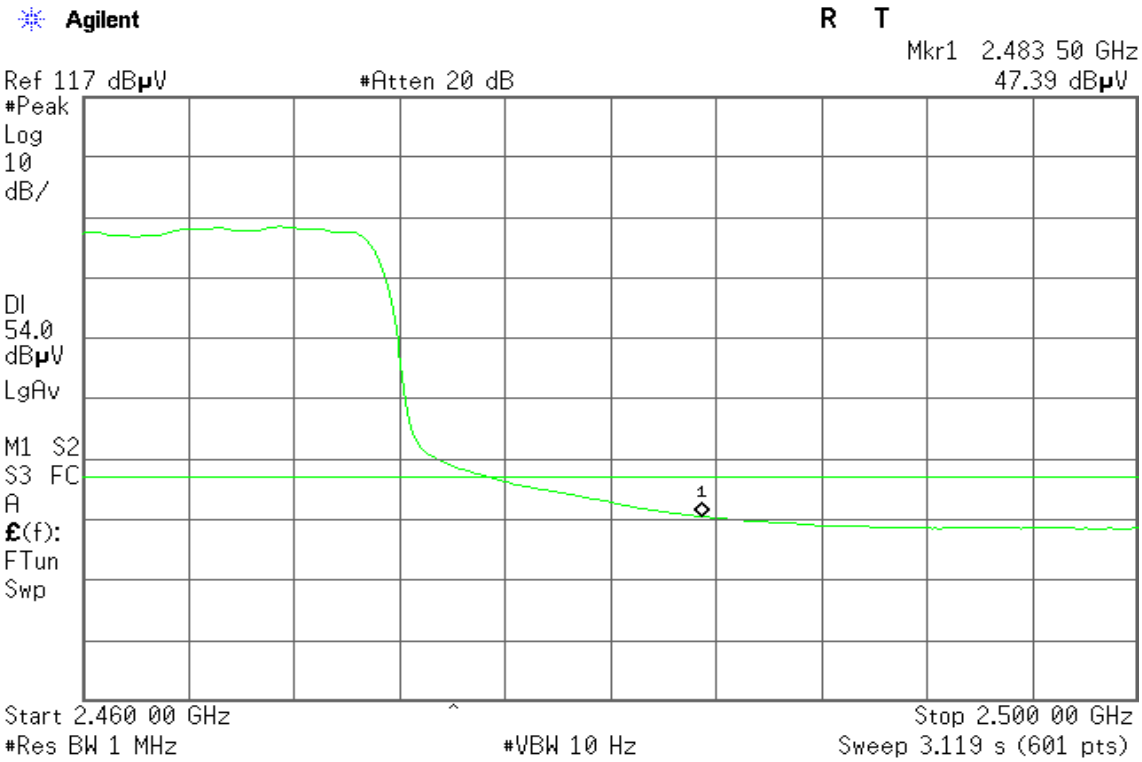


## Band Edges (draft 802.11n Standard-20 MHz Channel mode / CH High)

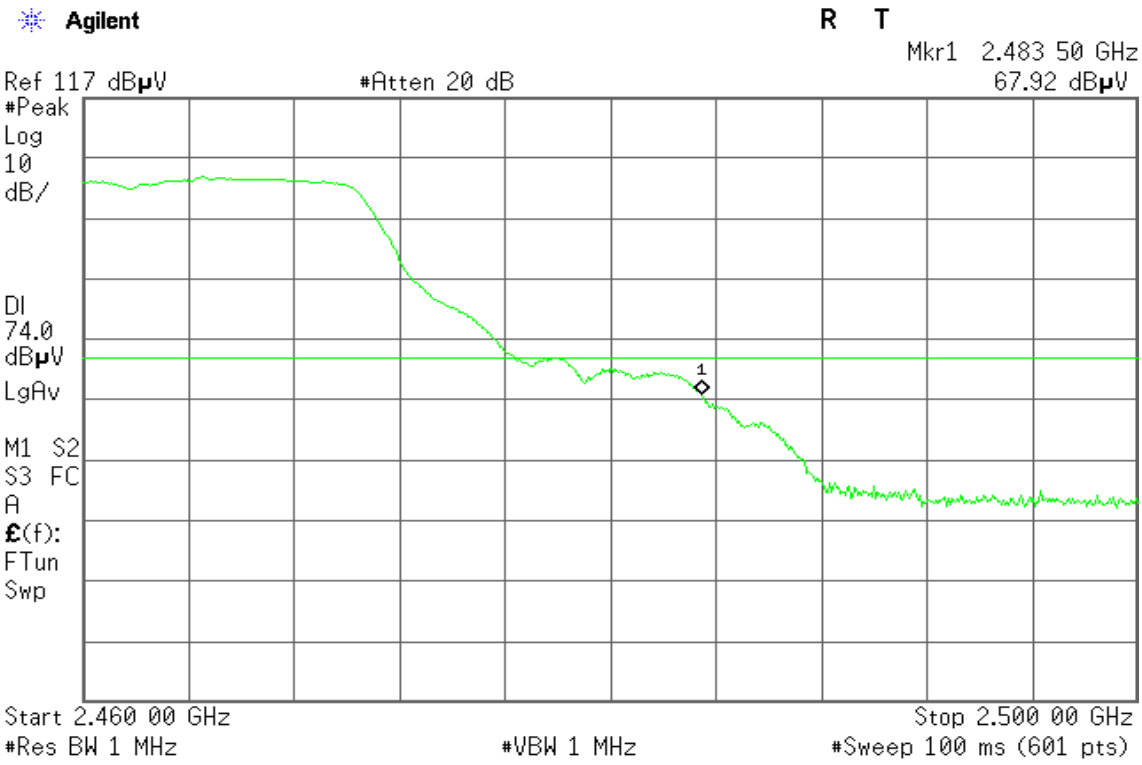
**Detector mode: Peak** **Polarity: Vertical**



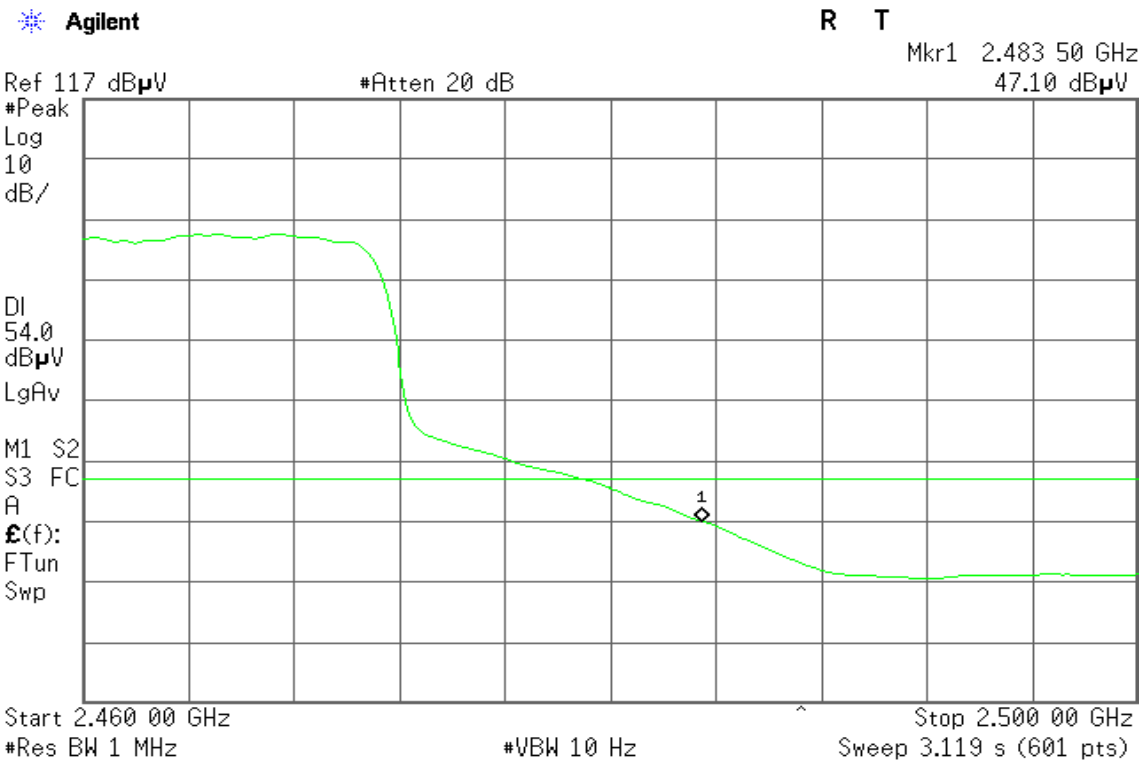

**Detector mode: Average** **Polarity: Vertical**



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

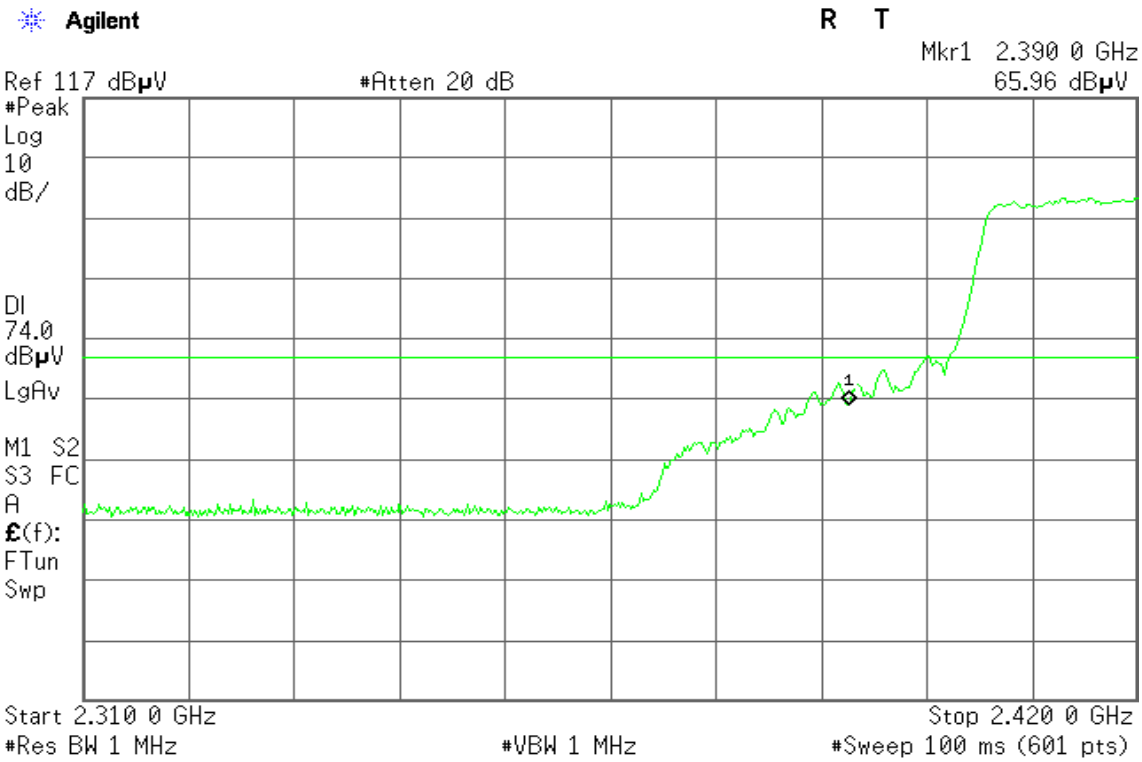



**Detector mode: Average** **Polarity: Horizontal**

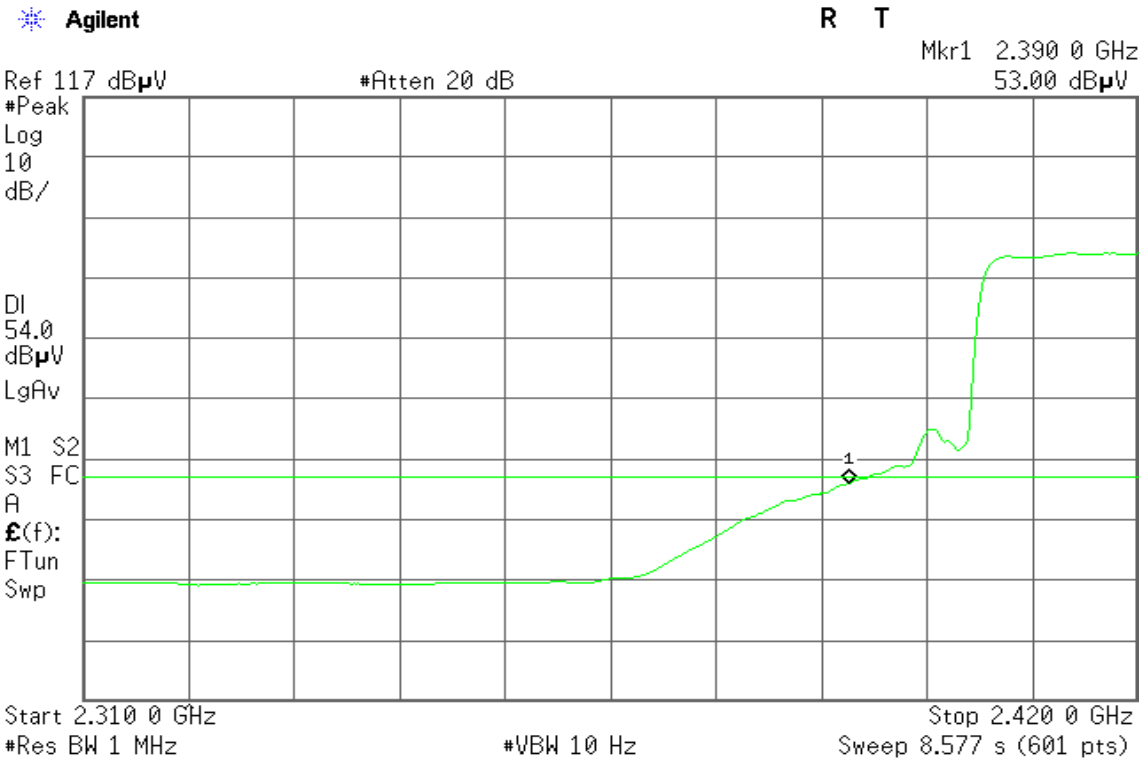


## Band Edges (draft 802.11n Wide-40 MHz Channel mode / CH Low)

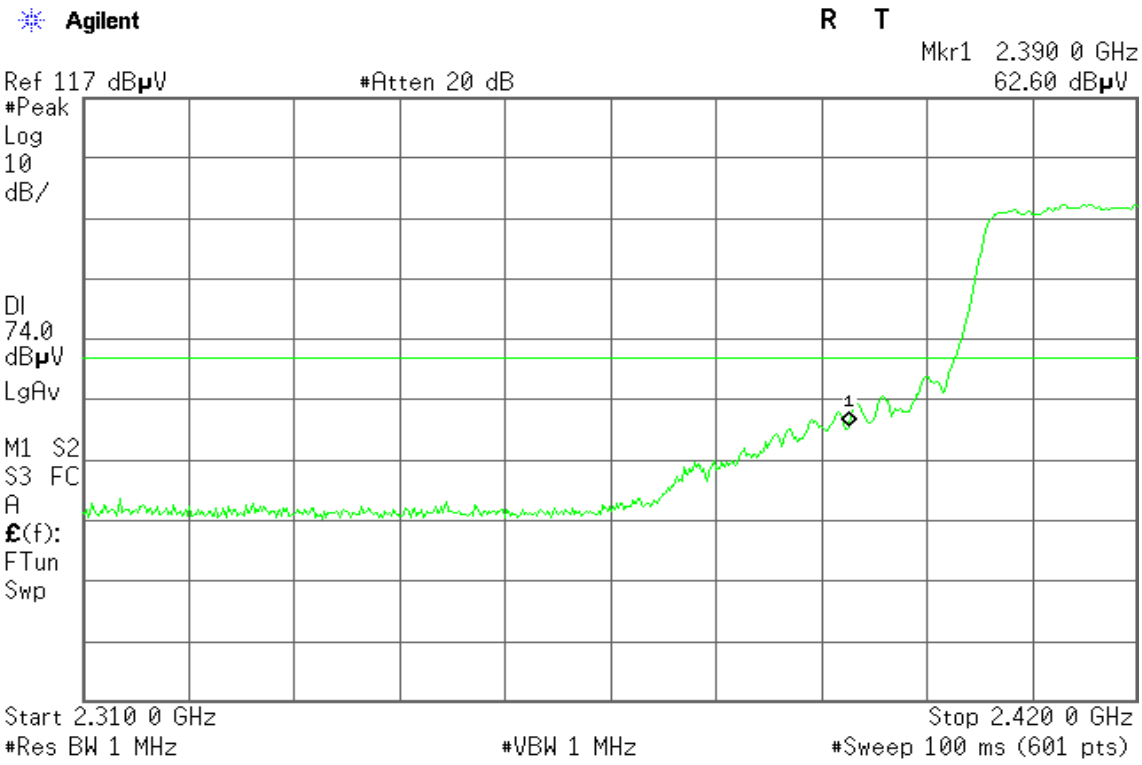
**Detector mode: Peak** **Polarity: Vertical**



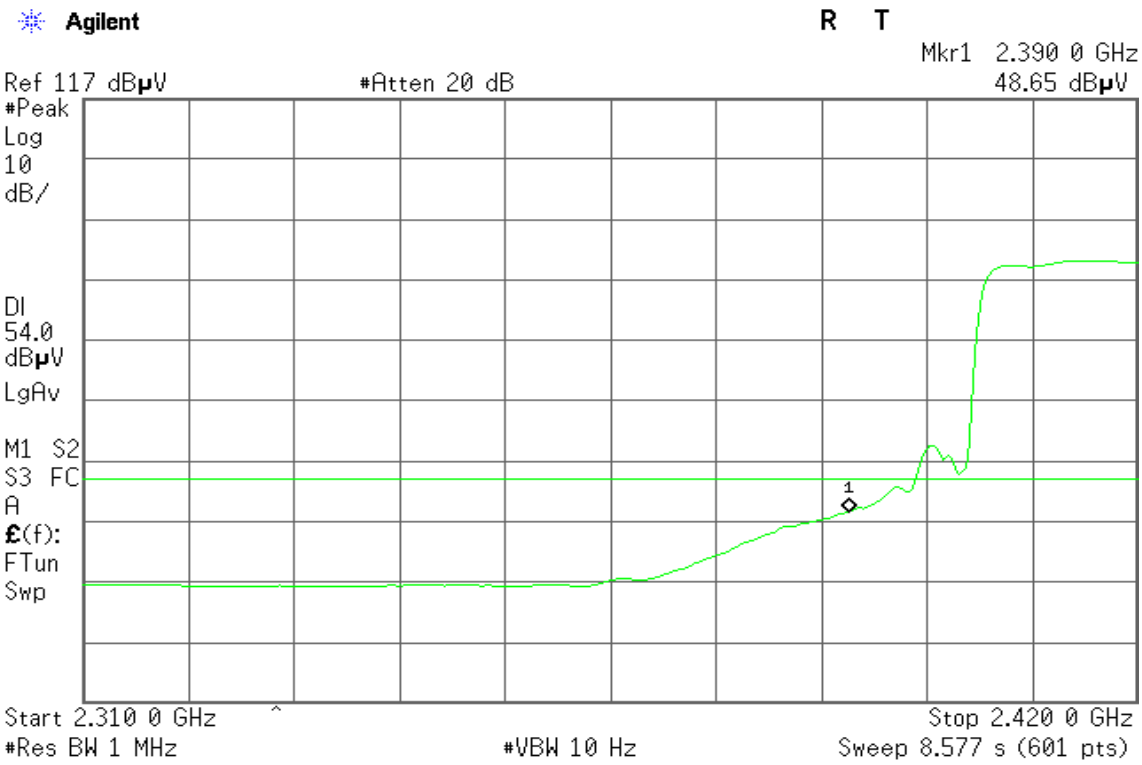

**Detector mode: Average** **Polarity: Vertical**



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

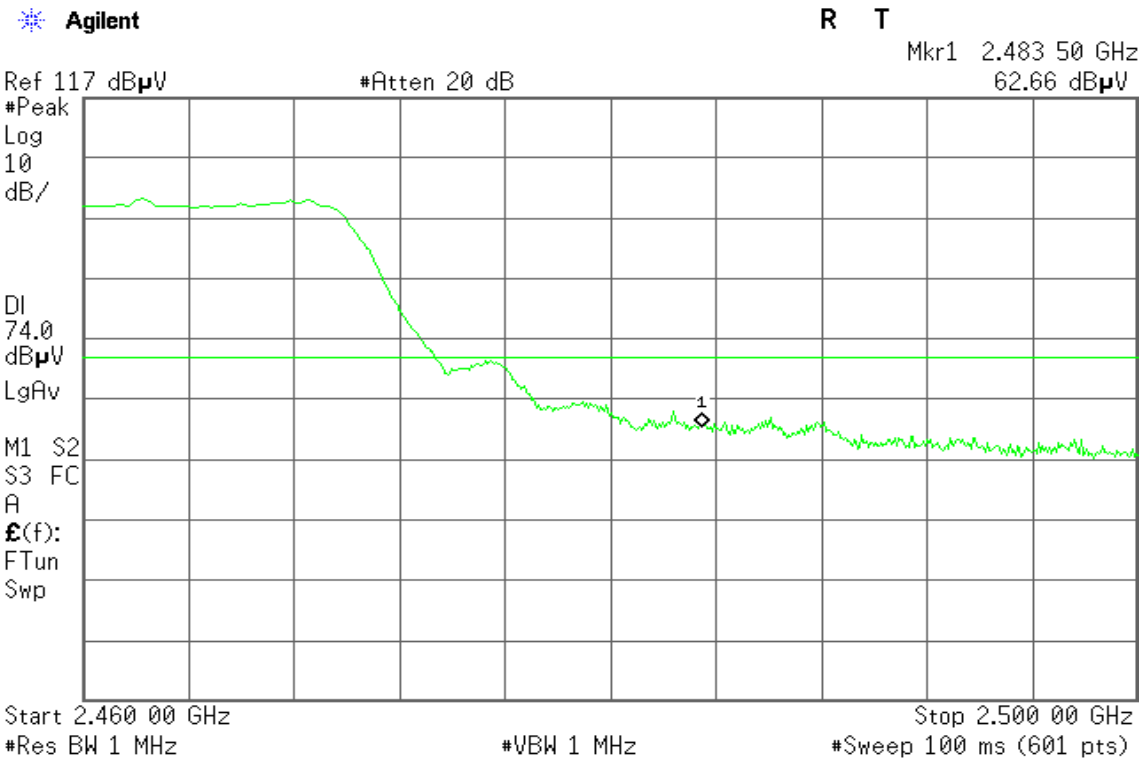



**Detector mode: Average** **Polarity: Horizontal**

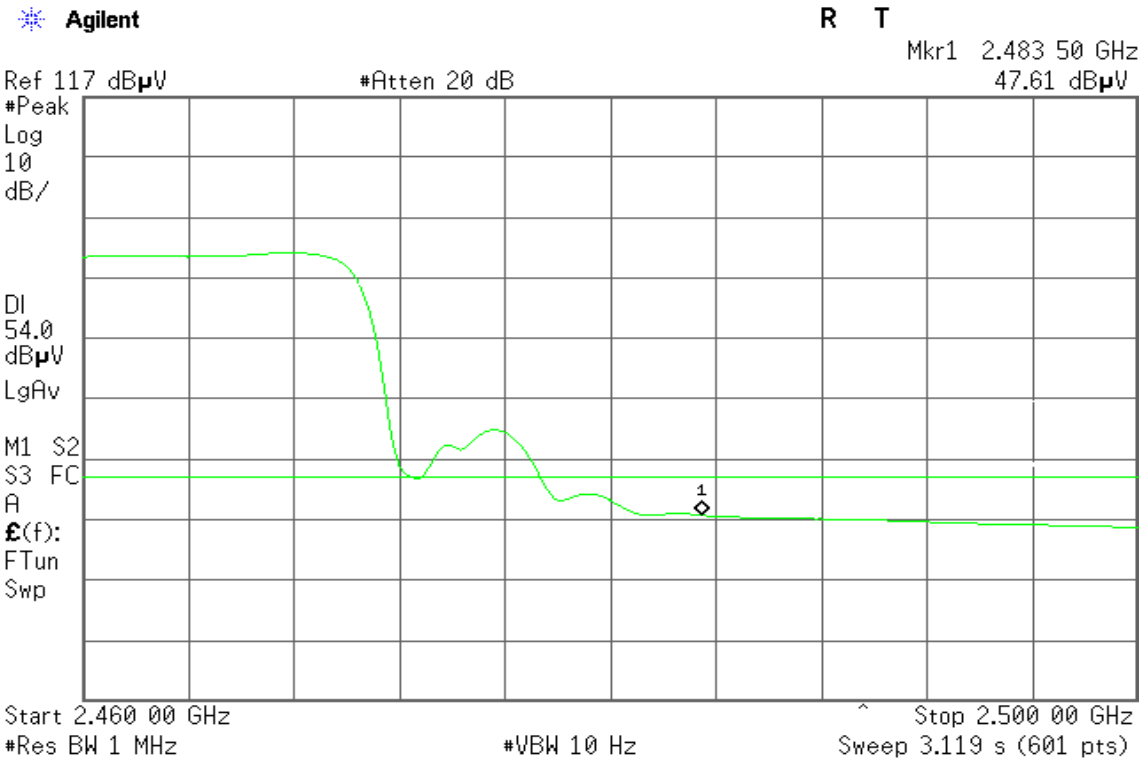


## Band Edges (draft 802.11n Wide-40 MHz Channel mode / CH High)

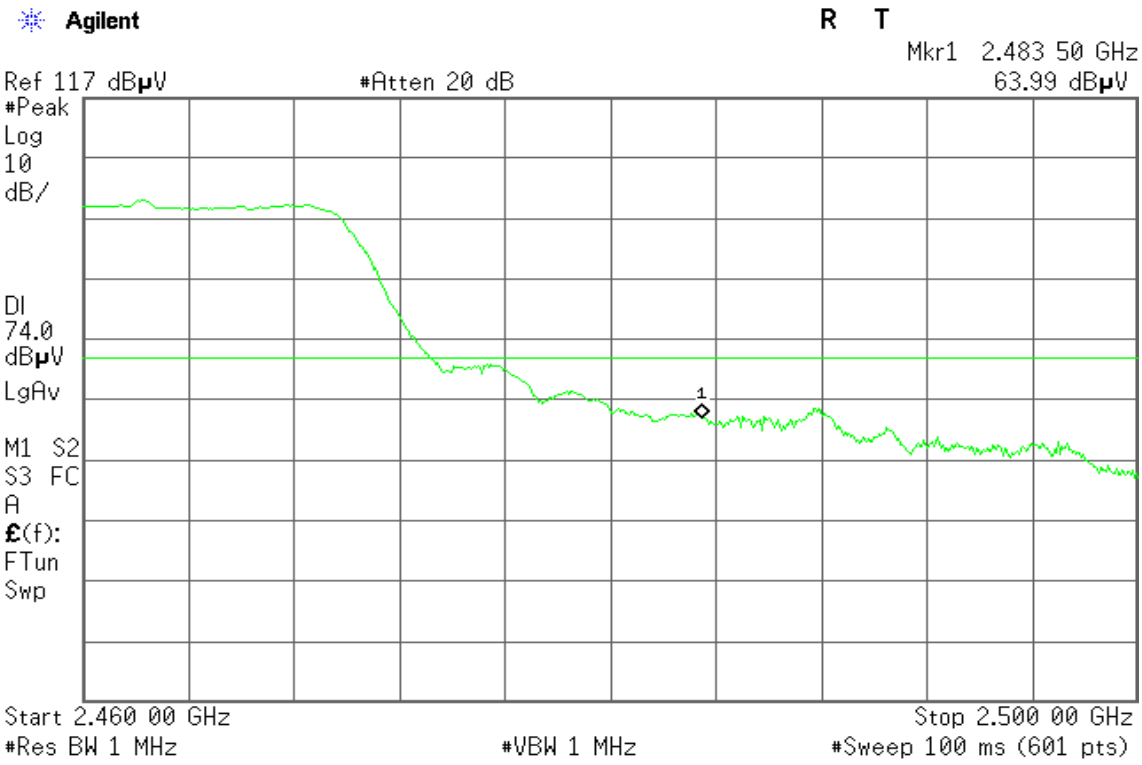
**Detector mode: Peak** **Polarity: Vertical**



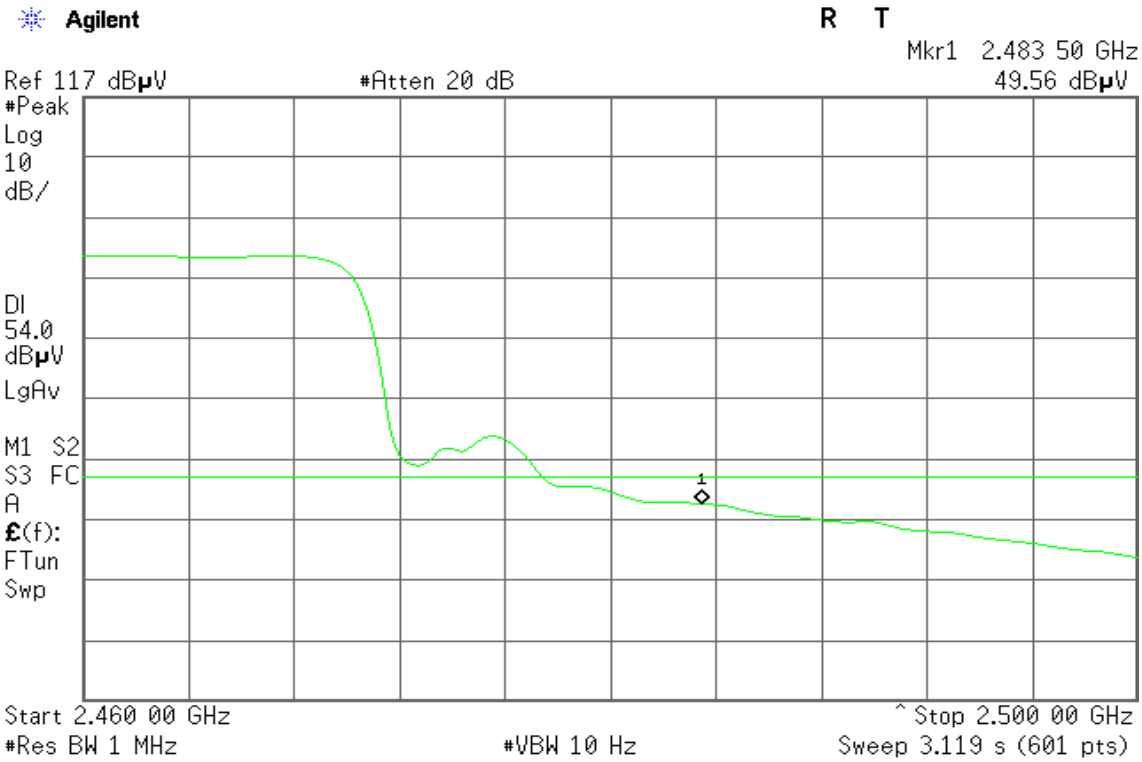

**Detector mode: Average** **Polarity: Vertical**



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




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

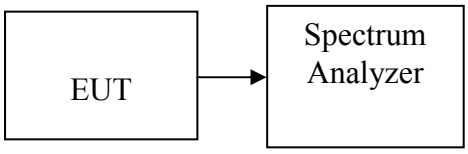


## 7.5 PEAK POWER SPECTRAL DENSITY

## LIMIT

1. According to §15.247(e), 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), 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 Configuration**




## TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
   Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3 kHz, VBW = 10 kHz, Span = 300 kHz, Sweep time = 100 s
3. Record the max reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

## TEST RESULTS

*No non-compliance noted*

## Test Data

### For Omni Antenna

### Test mode: IEEE 802.11b

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2412 | -16.99 | 4 | PASS |
| Mid | 2437 | -17.62 | | PASS |
| High | 2462 | -18.13 | | PASS |

### Test mode: IEEE 802.11g

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2412 | -18.12 | 4 | PASS |
| Mid | 2437 | -18.44 | | PASS |
| High | 2462 | -18.61 | | PASS |

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

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2412 | -17.23 | 4 | PASS |
| Mid | 2437 | -17.88 | | PASS |
| High | 2462 | -18.38 | | PASS |

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

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2422 | -17.23 | 4 | PASS |
| Mid | 2437 | -17.77 | | PASS |
| High | 2452 | -18.18 | | PASS |

***Remark**: The maximum antenna gain is 10dBi; therefore the reduction due to antenna gain is 4dB, so the limit is 4dBm*

## For Patch Antenna

### Test mode: IEEE 802.11b

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2412 | -16.15 | 4 | PASS |
| Mid | 2437 | -16.33 | | PASS |
| High | 2462 | -17.00 | | PASS |

### Test mode: IEEE 802.11g

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2412 | -17.61 | 4 | PASS |
| Mid | 2437 | -16.92 | | PASS |
| High | 2462 | -17.30 | | PASS |

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

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2412 | -16.25 | 4 | PASS |
| Mid | 2437 | -16.95 | | PASS |
| High | 2462 | -17.25 | | PASS |

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

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2422 | -16.41 | 4 | PASS |
| Mid | 2437 | -16.68 | | PASS |
| High | 2452 | -16.85 | | PASS |

***Remark**: The maximum antenna gain is 10dBi; therefore the reduction due to antenna gain is 4dB, so the limit is 4dBm*

## For Chip Antenna

### Test mode: IEEE 802.11b

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2412 | -11.30 | 8.00 | PASS |
| Mid | 2437 | -13.14 | | PASS |
| High | 2462 | -15.71 | | PASS |

### Test mode: IEEE 802.11g

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2412 | -15.34 | 8.00 | PASS |
| Mid | 2437 | -16.20 | | PASS |
| High | 2462 | -16.36 | | PASS |

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

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2412 | -14.81 | 8.00 | PASS |
| Mid | 2437 | -15.78 | | PASS |
| High | 2462 | -16.48 | | PASS |

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

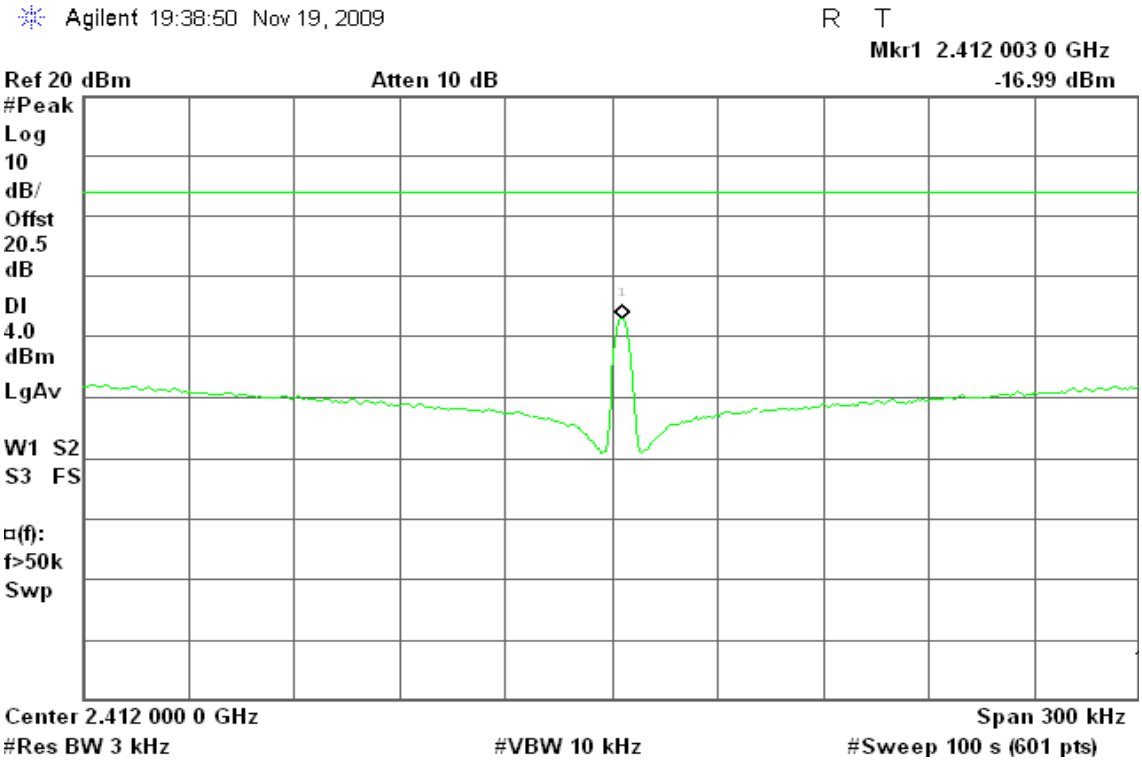
| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2422 | -14.68 | 8.00 | PASS |
| Mid | 2437 | -15.59 | | PASS |
| High | 2452 | -16.33 | | PASS |

## Test Plot

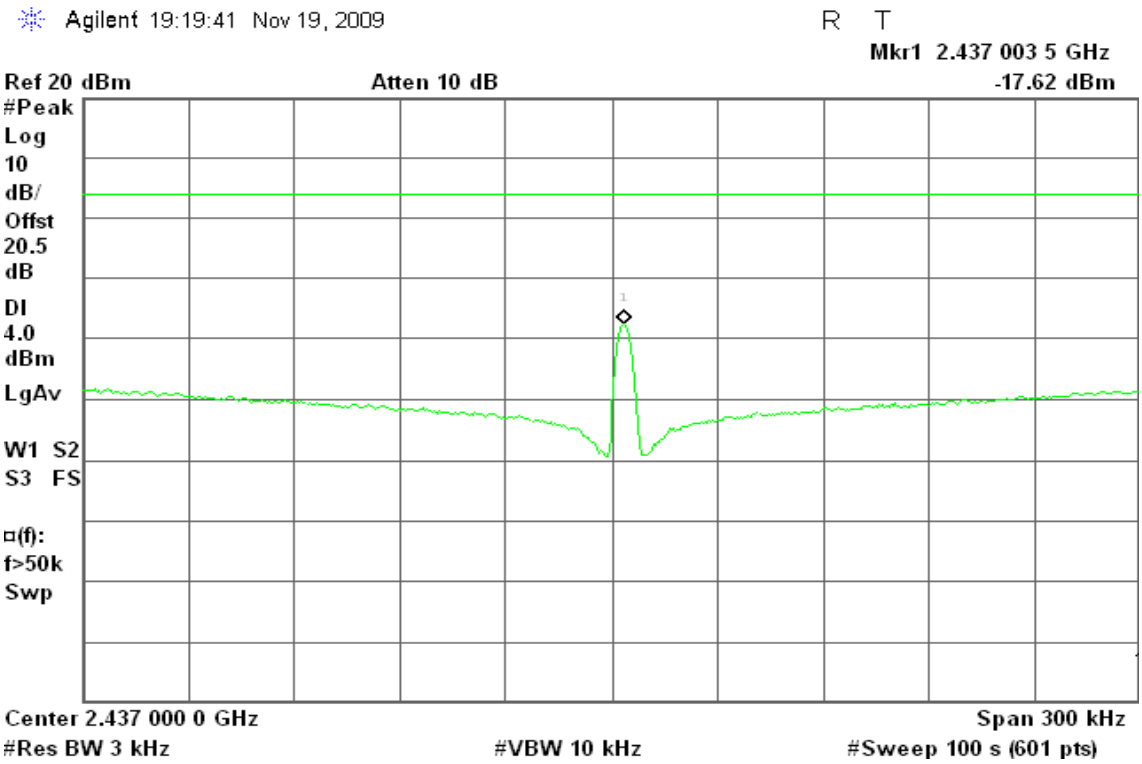
### For Omni Antenna

### IEEE 802.11b mode

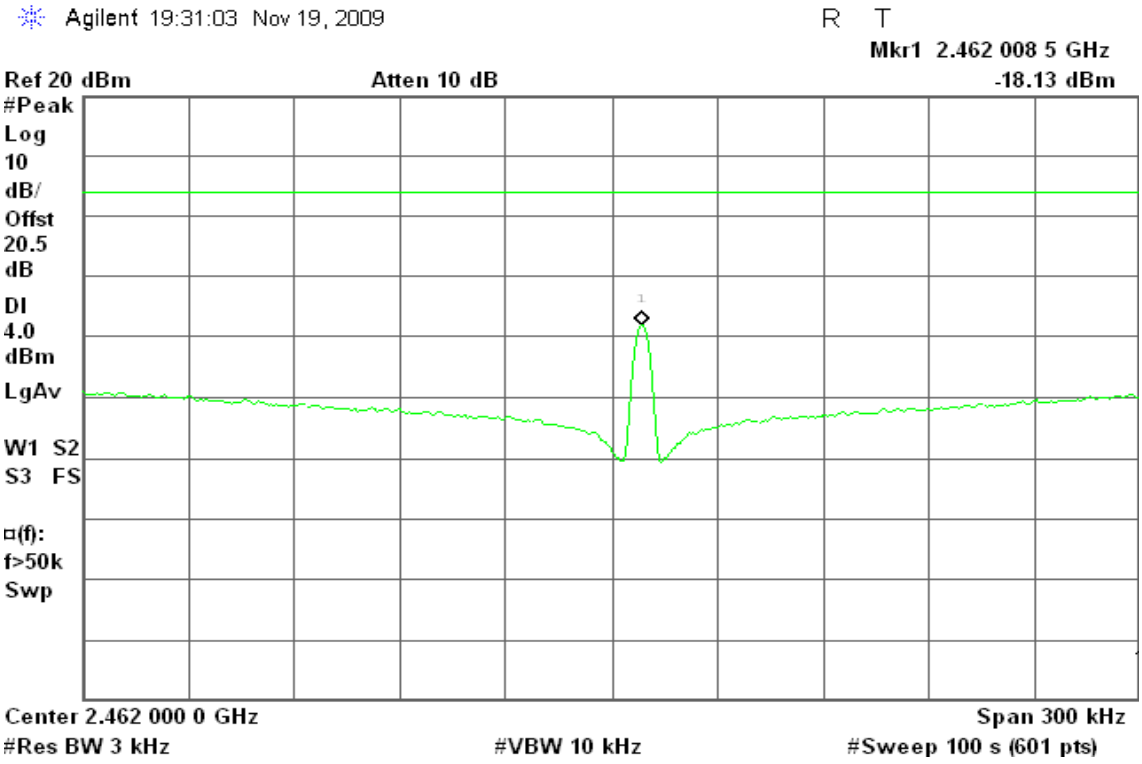
### PPSD (CH Low)




### PPSD (CH Mid)

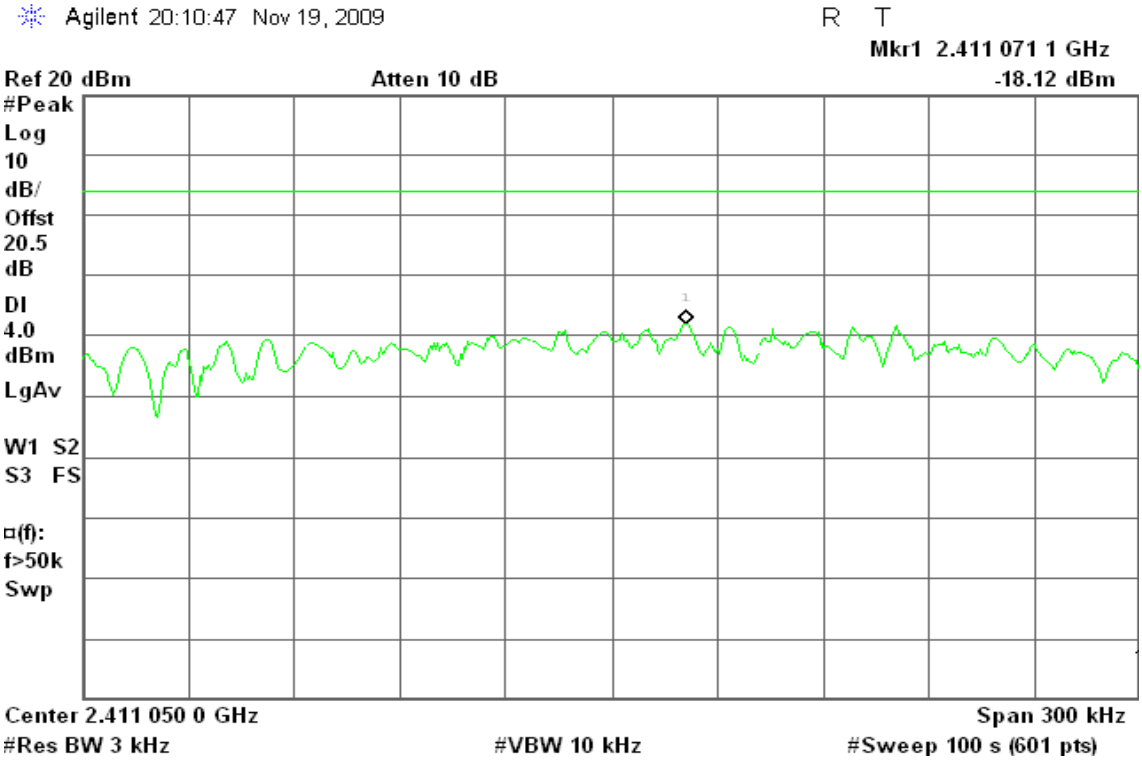


## PPSD (CH High)

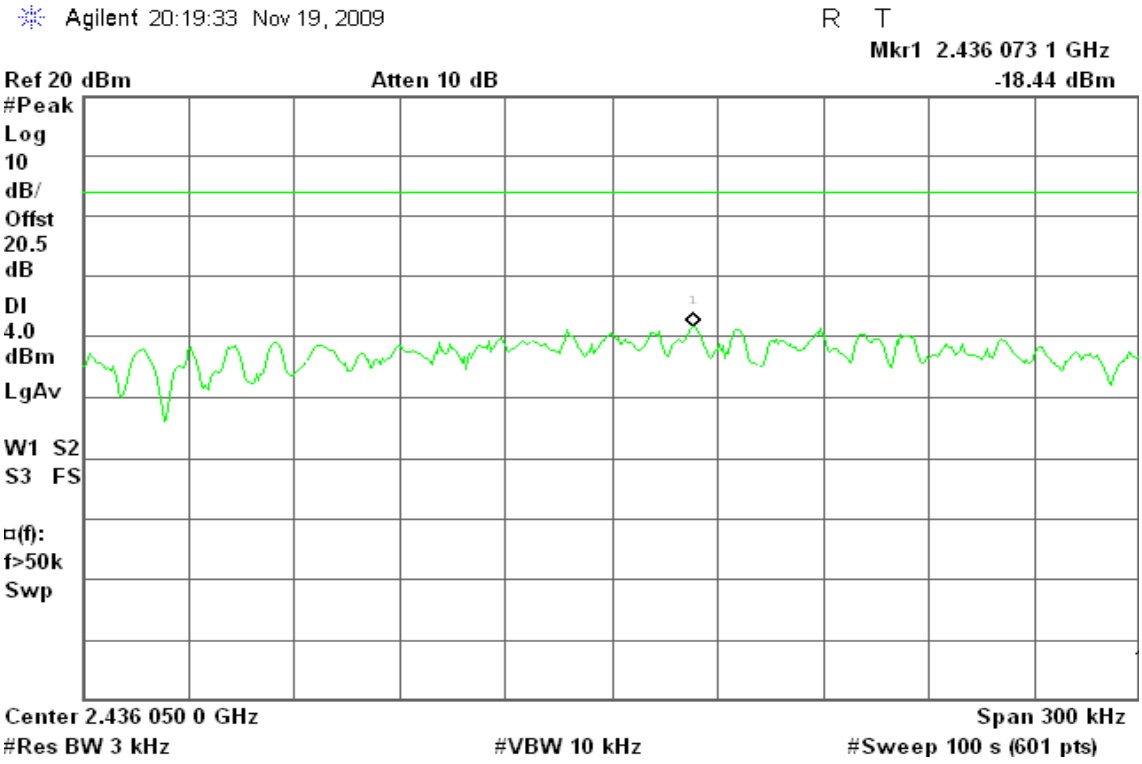



## IEEE 802.11g mode

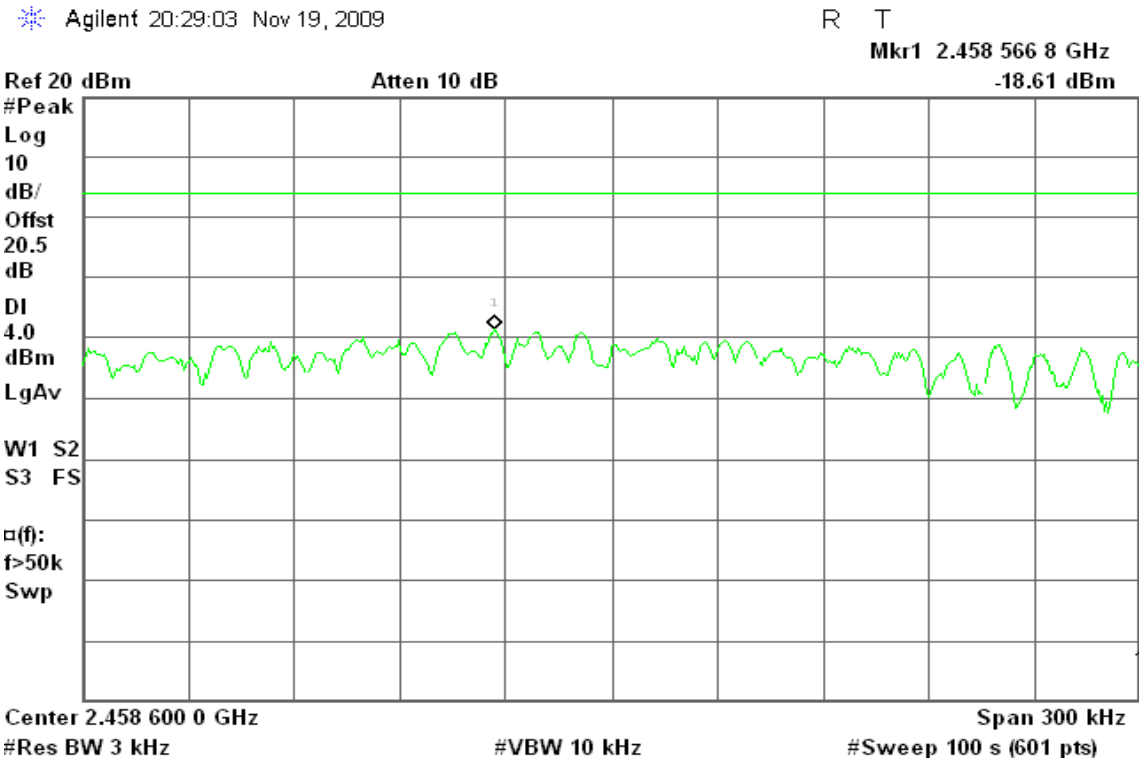
## PPSD (CH Low)



## PPSD (CH Mid)

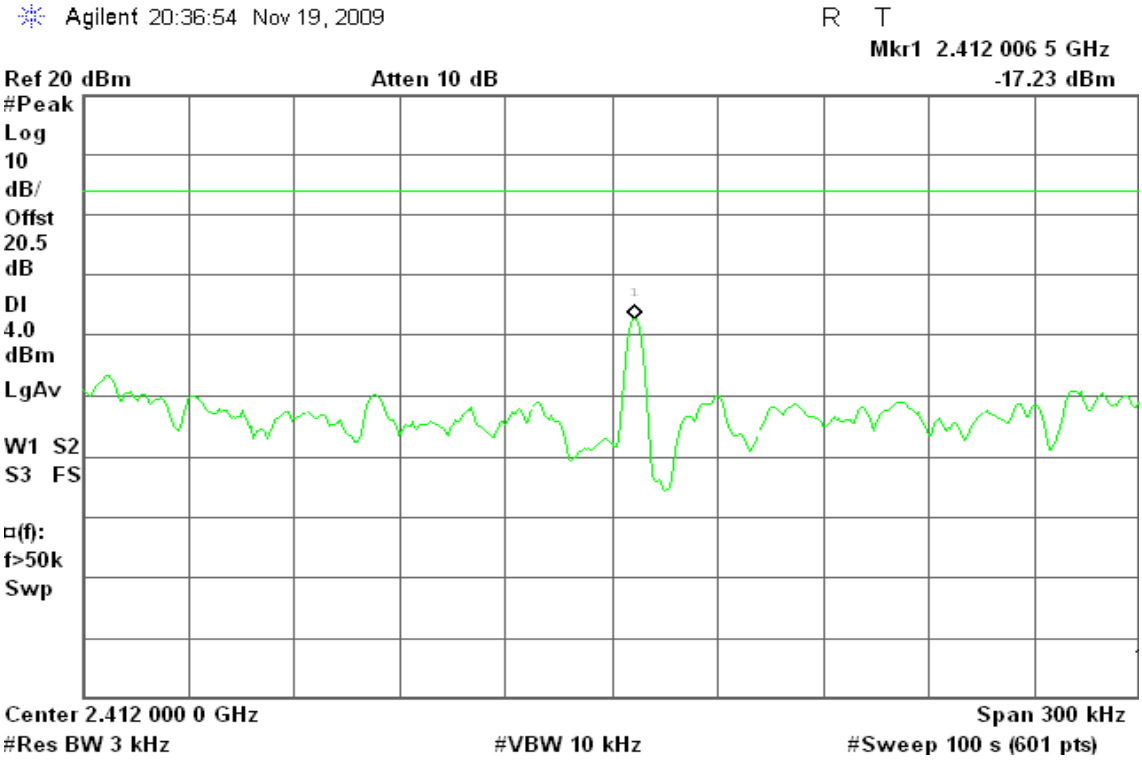



## PPSD (CH High)

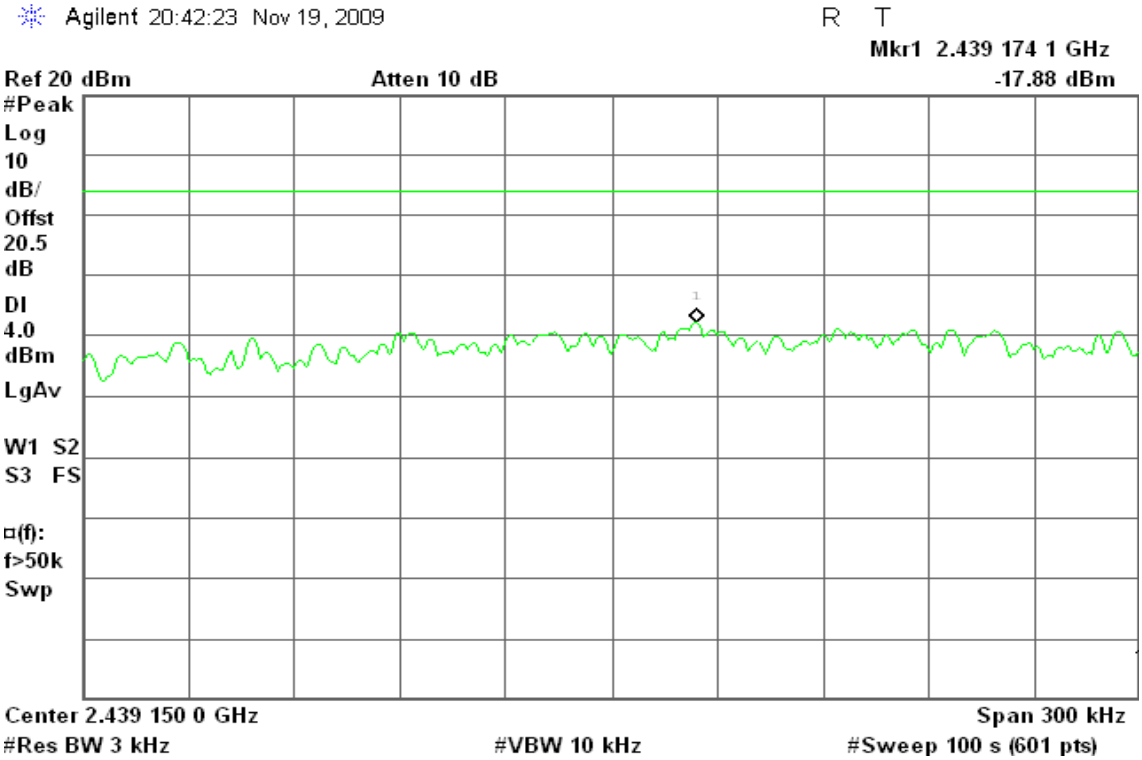


## draft 802.11n Standard-20 MHz Channel mode

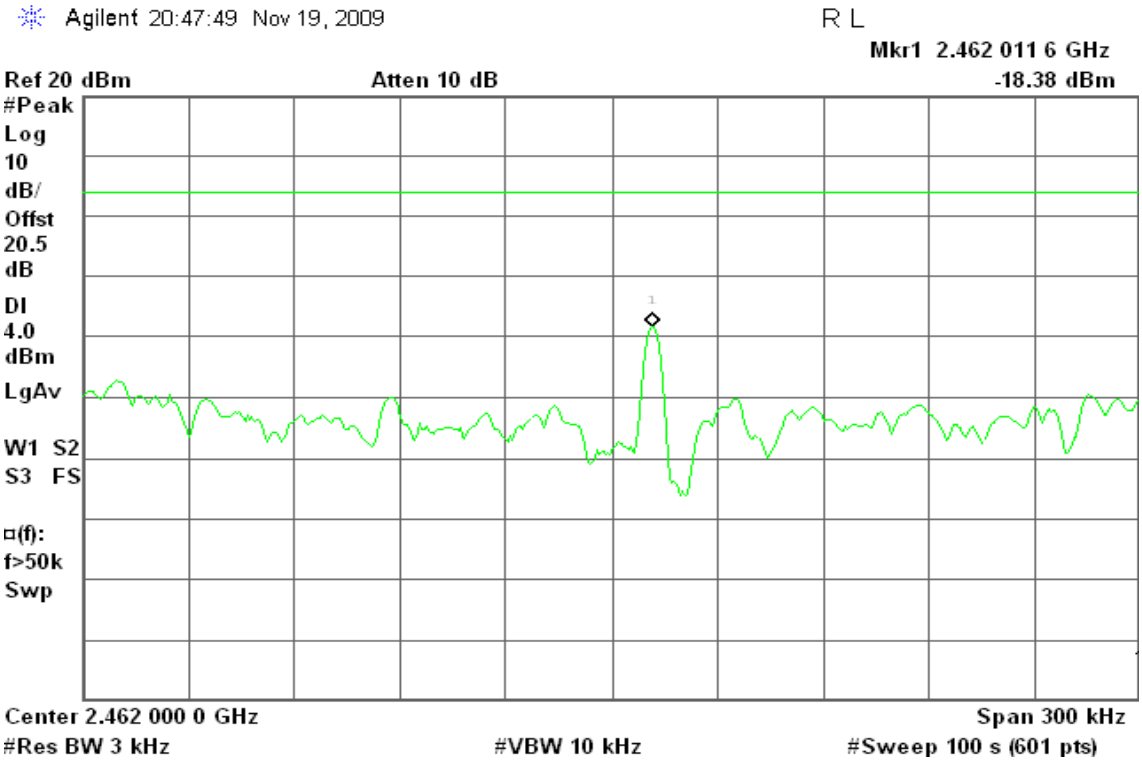
### PPSD (CH Low)




### PPSD (CH Mid)

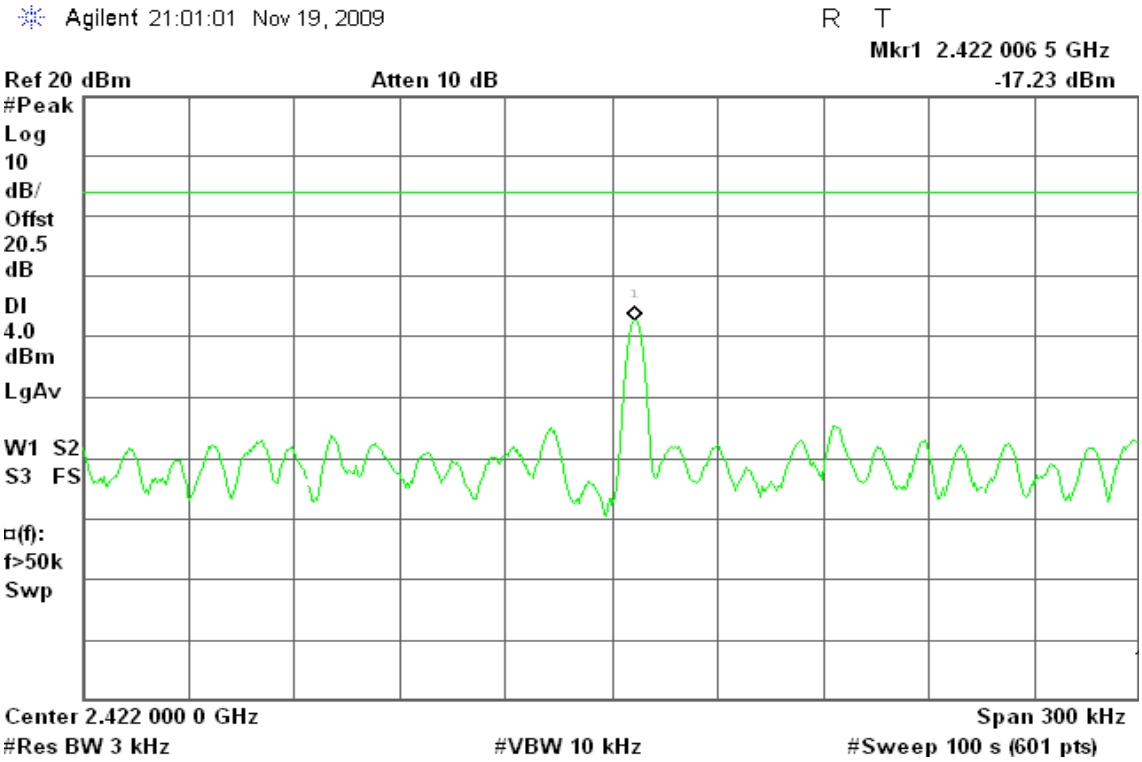


## PPSD (CH High)

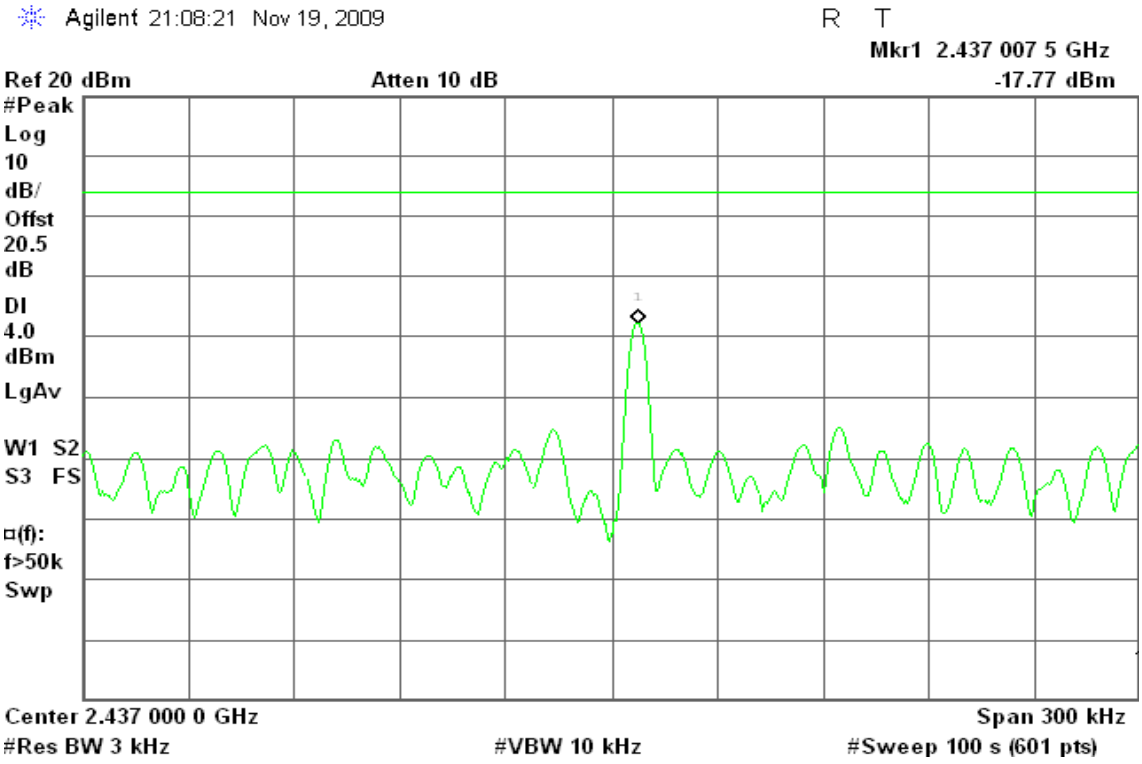



## draft 802.11n Wide-40 MHz Channel mode

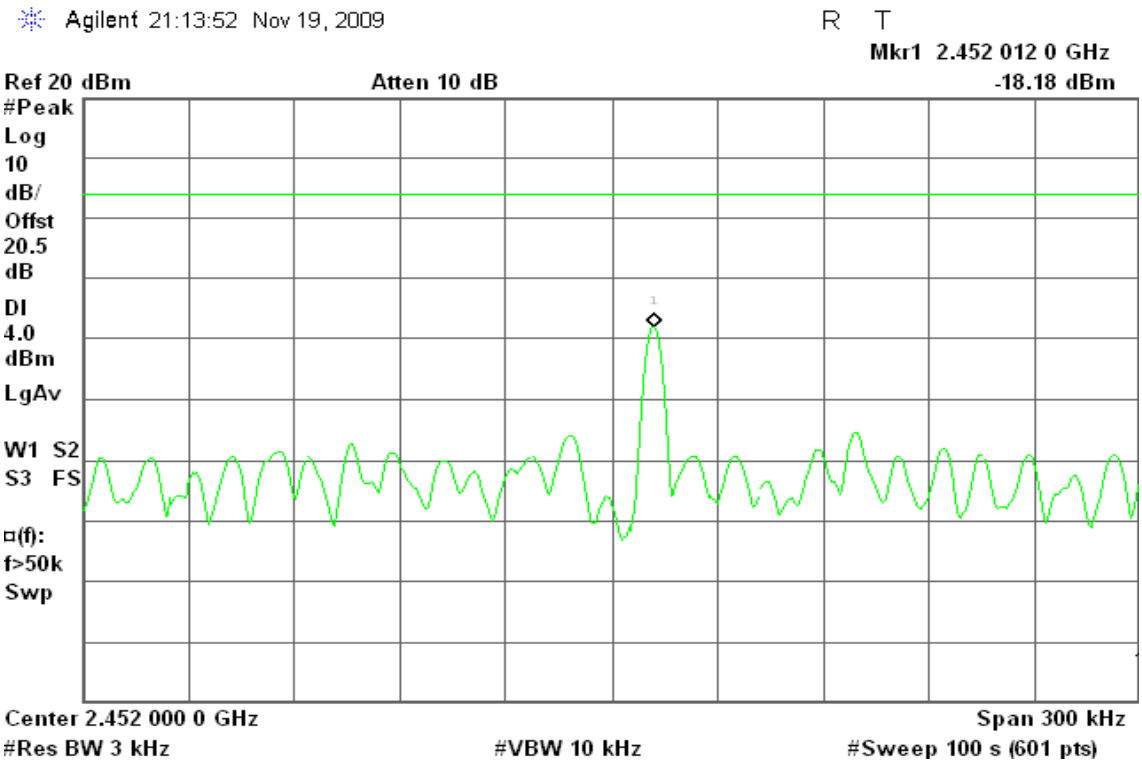
## PPSD (CH Low)



## PPSD (CH Mid)



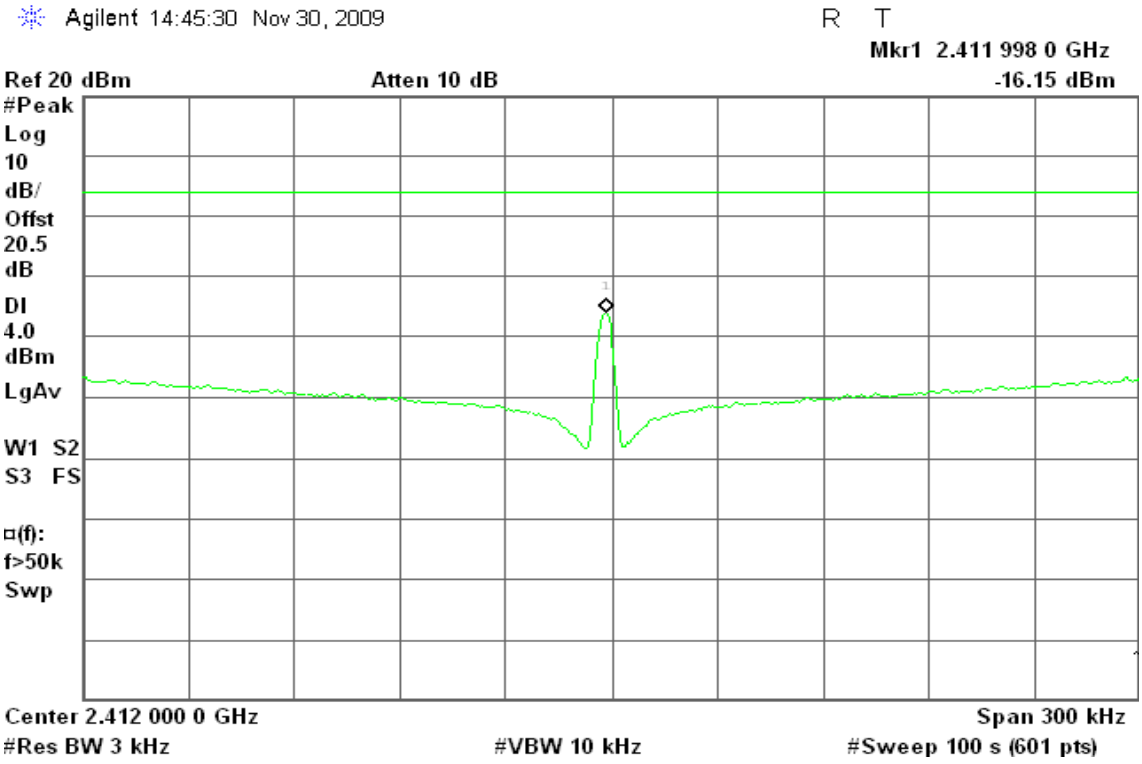

## PPSD (CH High)



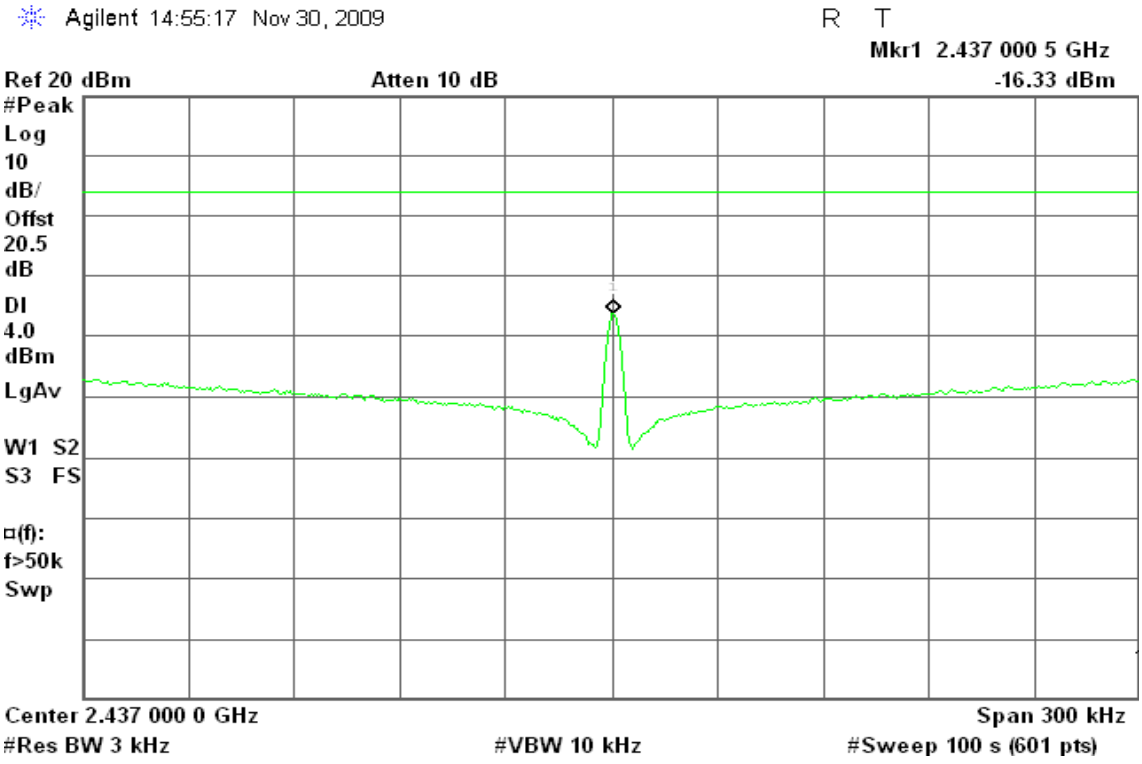
## For Patch Antenna

## IEEE 802.11b mode

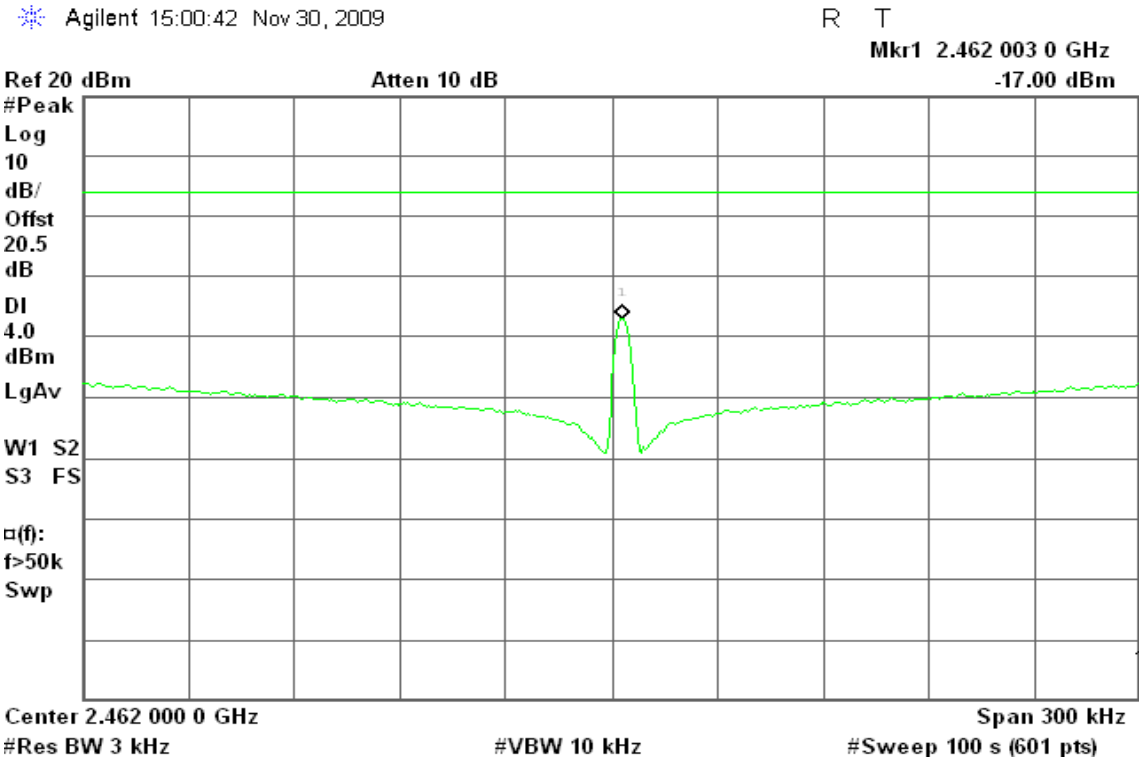
## PPSD (CH Low)




## PPSD (CH Mid)

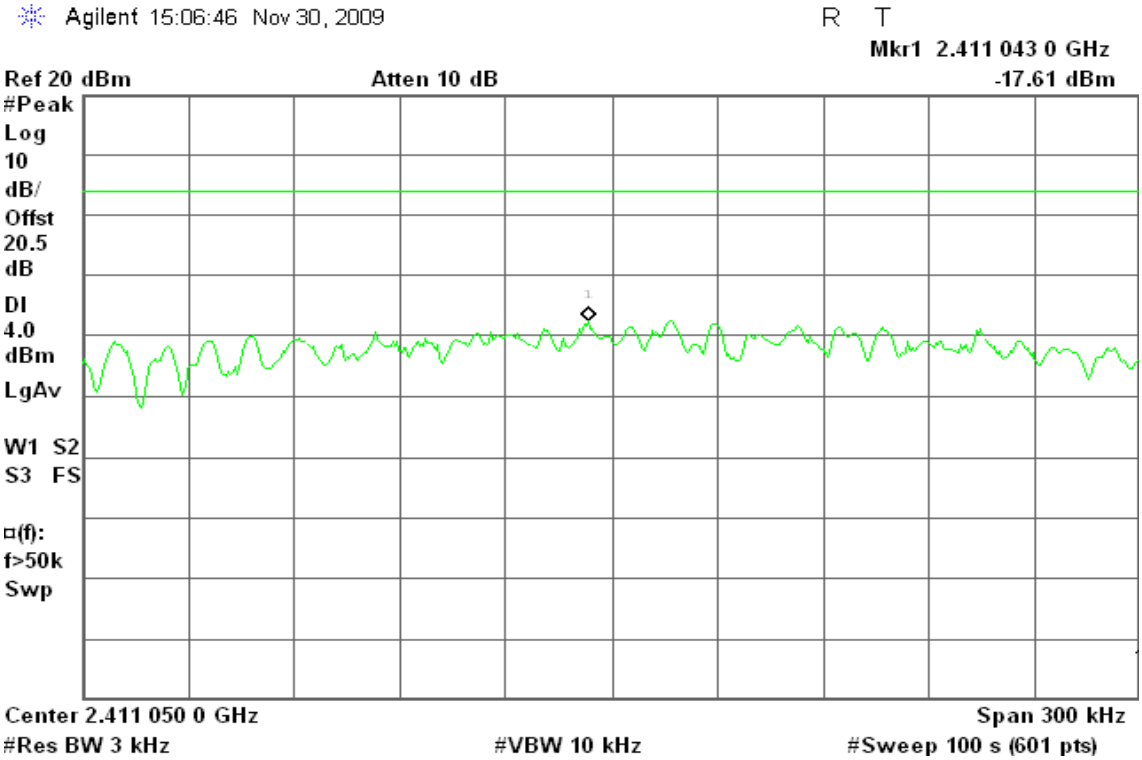


## PPSD (CH High)

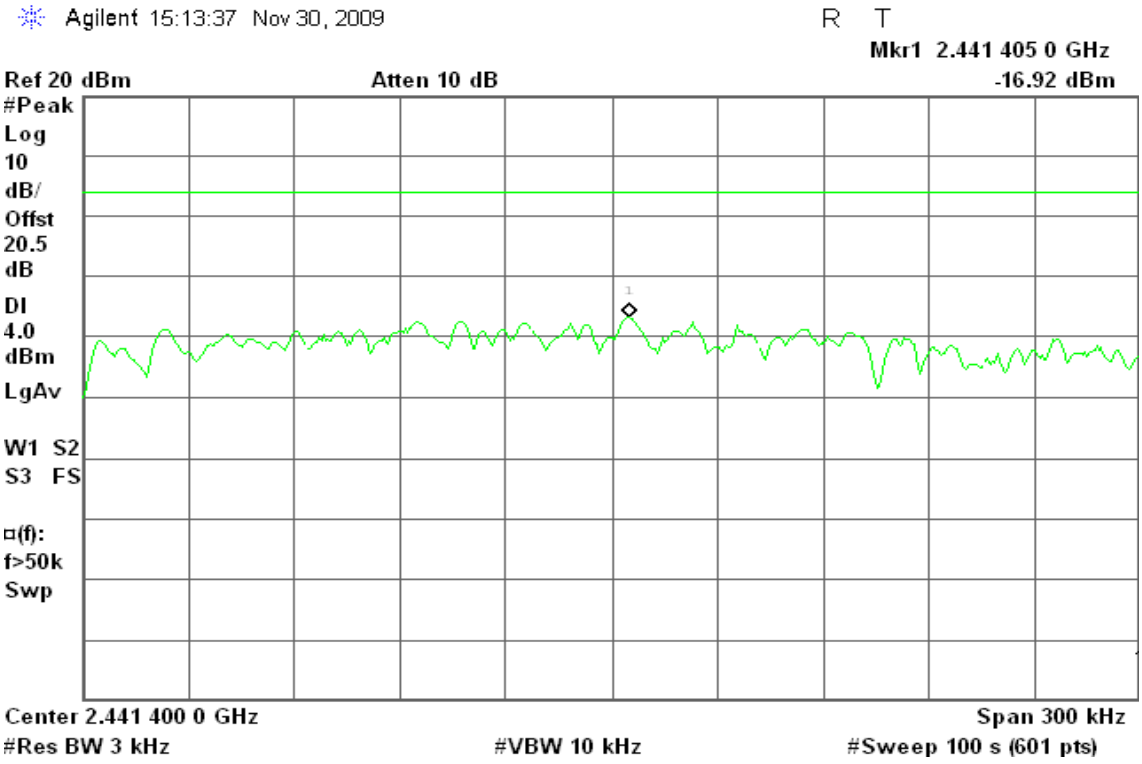



## IEEE 802.11g mode

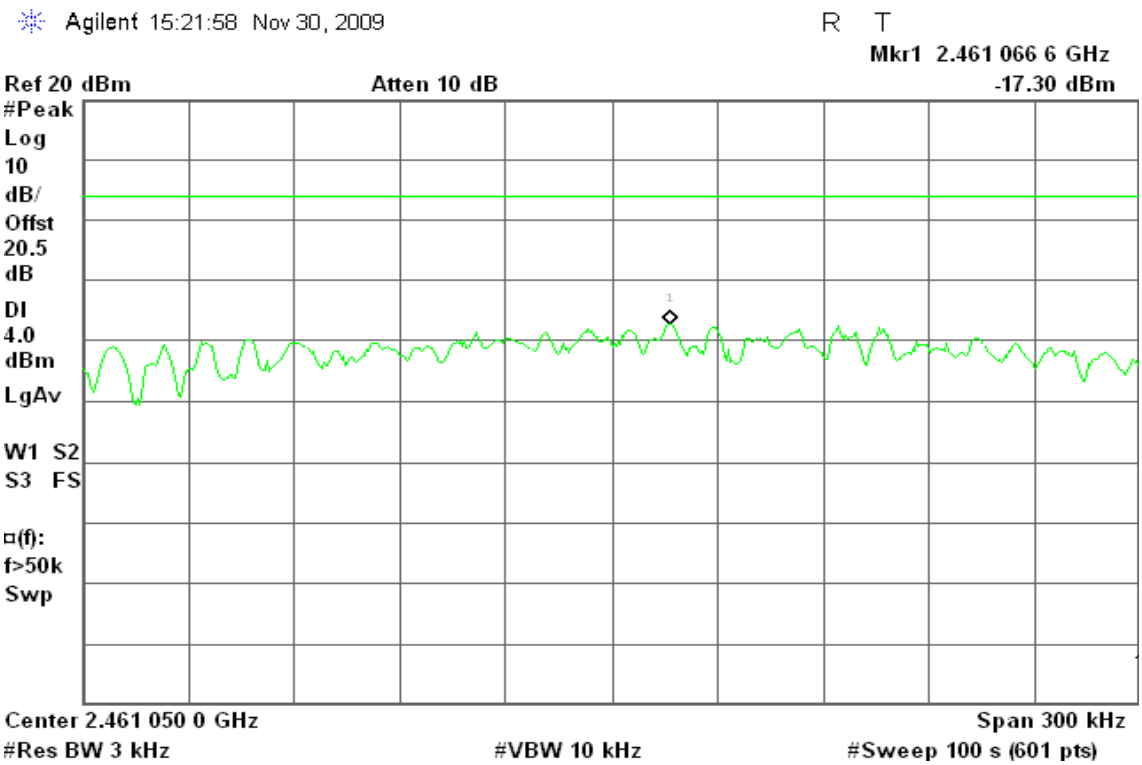
## PPSD (CH Low)



## PPSD (CH Mid)

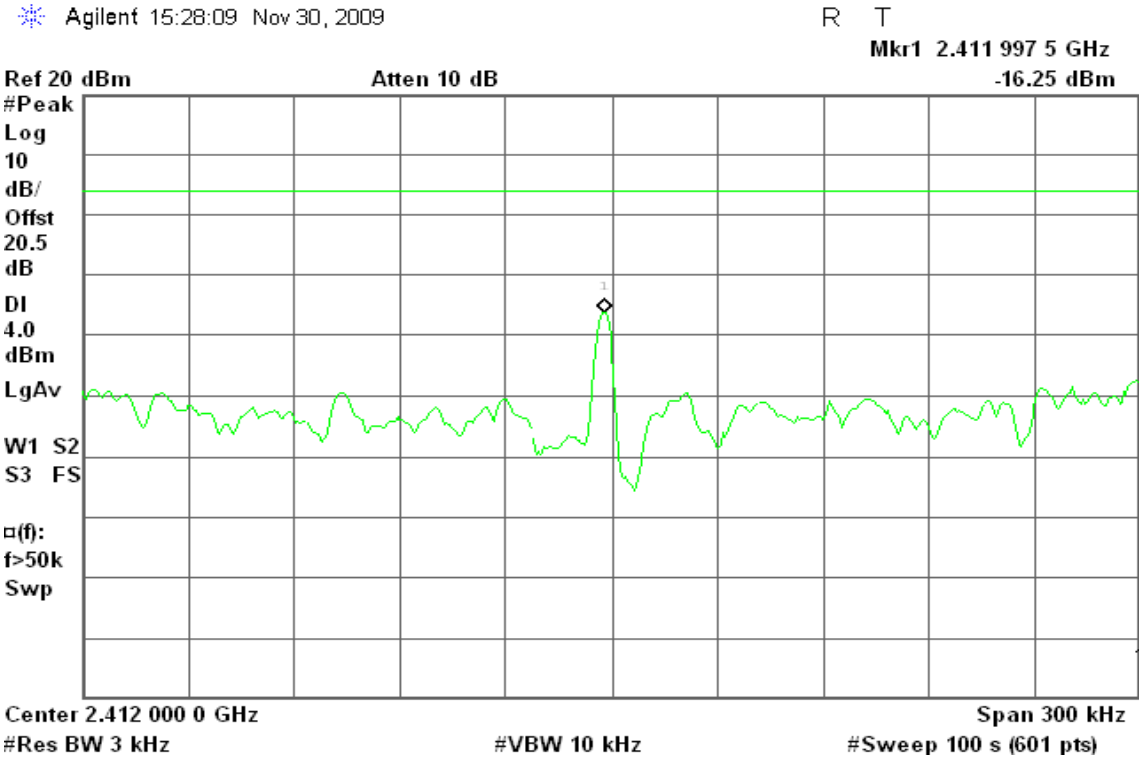



## PPSD (CH High)

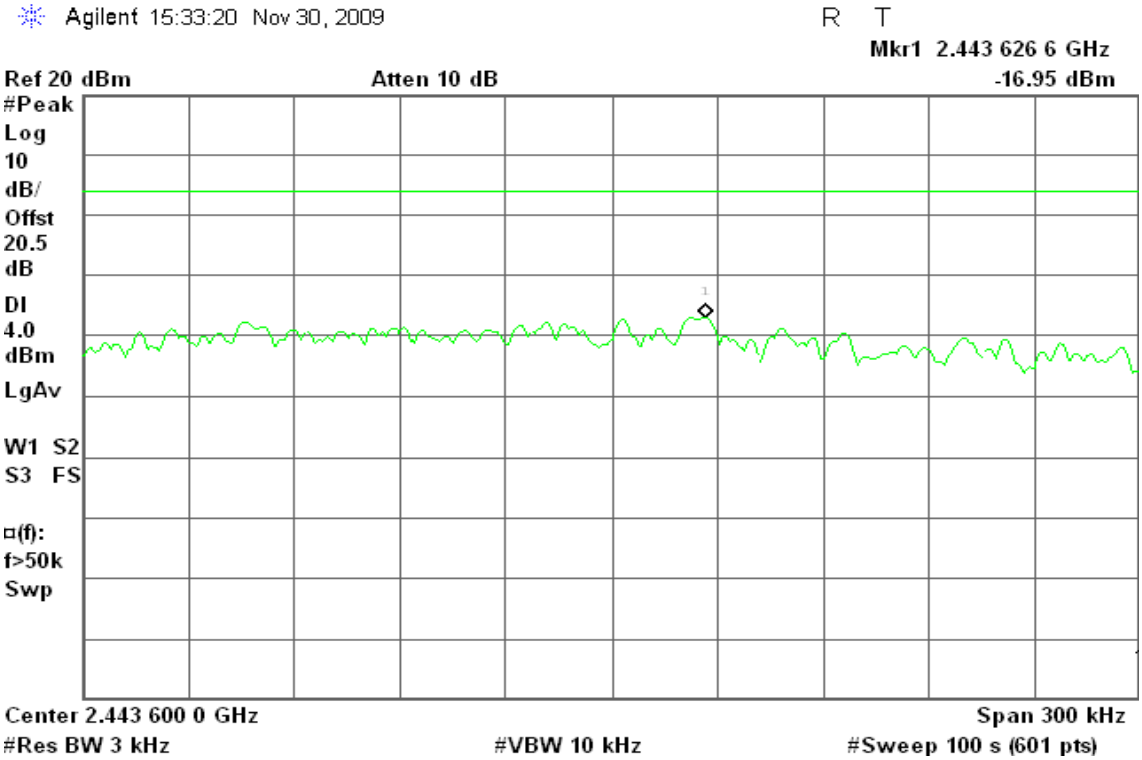


## draft 802.11n Standard-20 MHz Channel mode

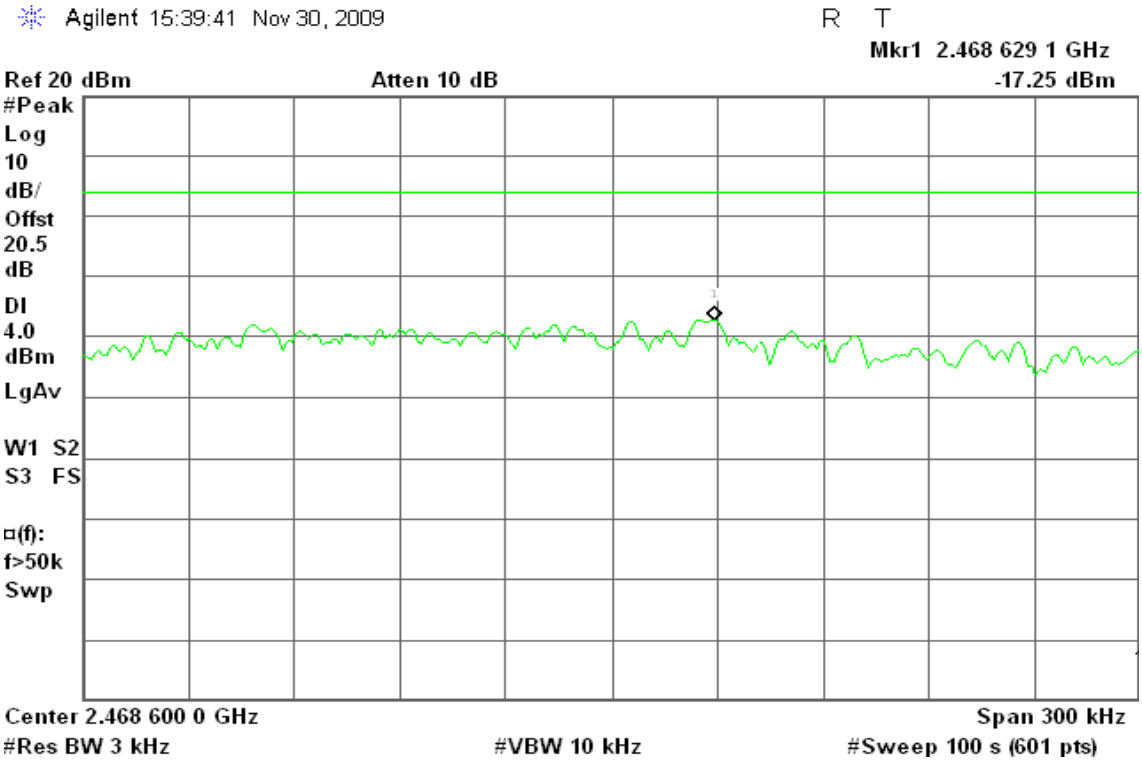
### PPSD (CH Low)




### PPSD (CH Mid)

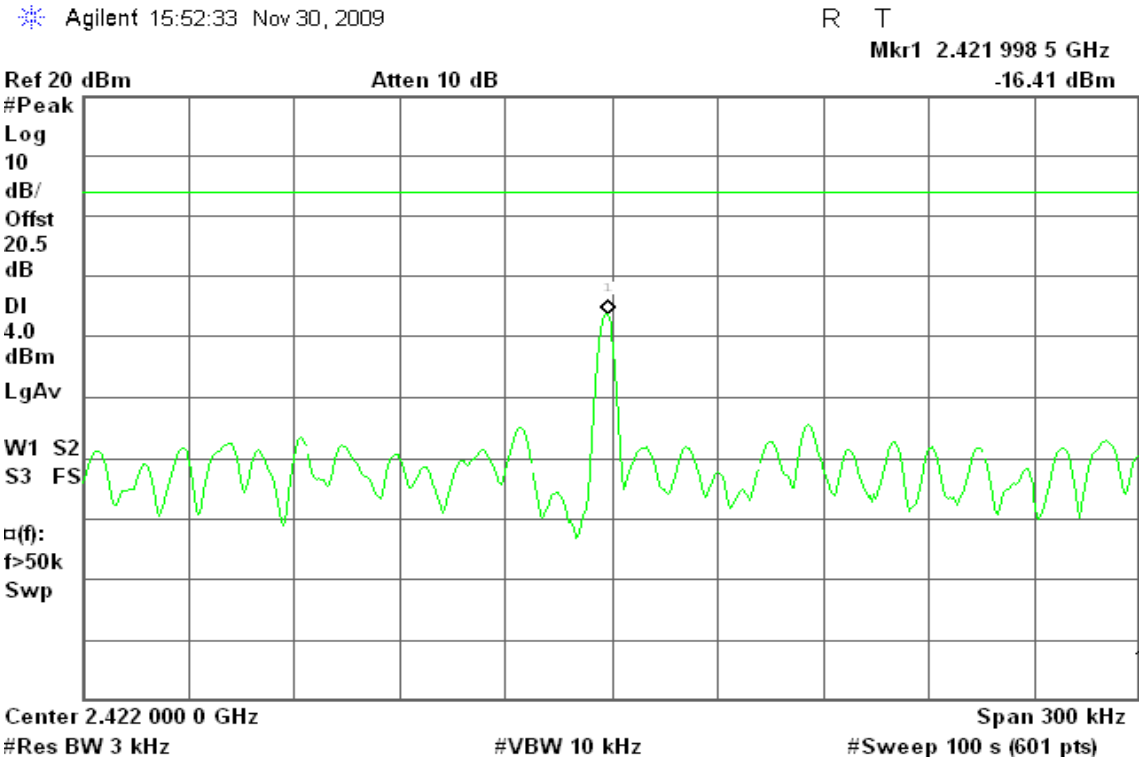


## PPSD (CH High)

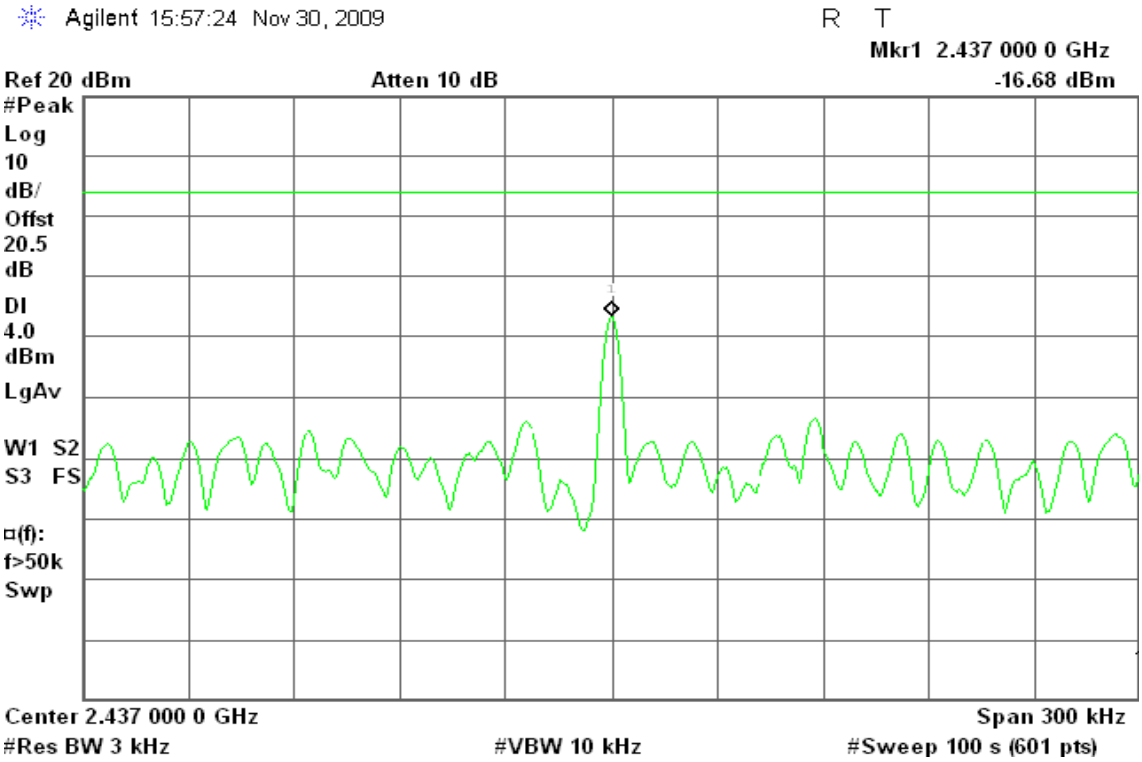



## draft 802.11n Wide-40 MHz Channel mode

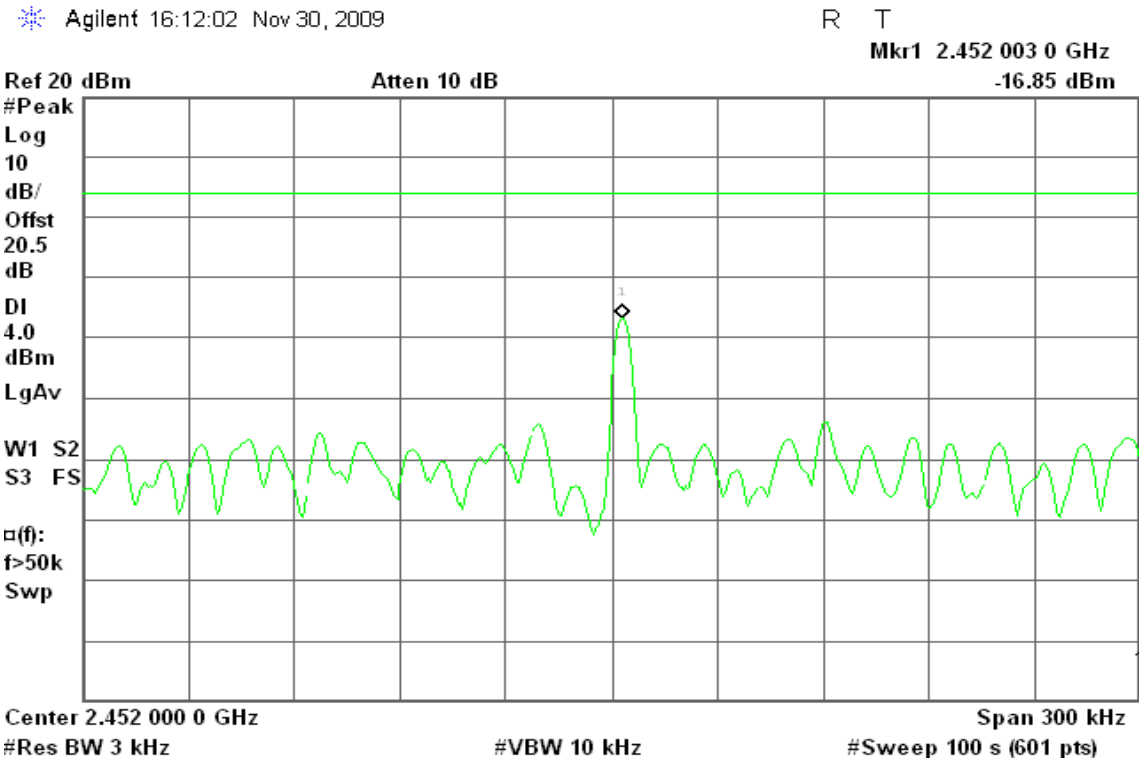
## PPSD (CH Low)



## PPSD (CH Mid)



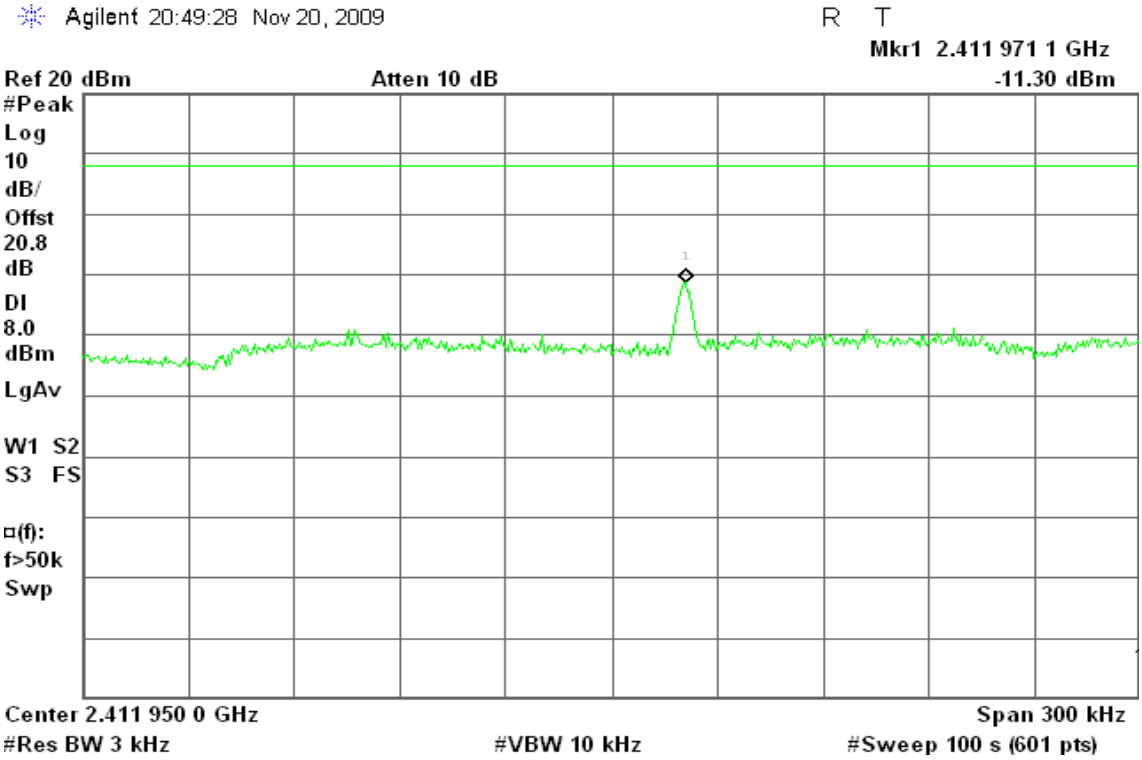

## PPSD (CH High)



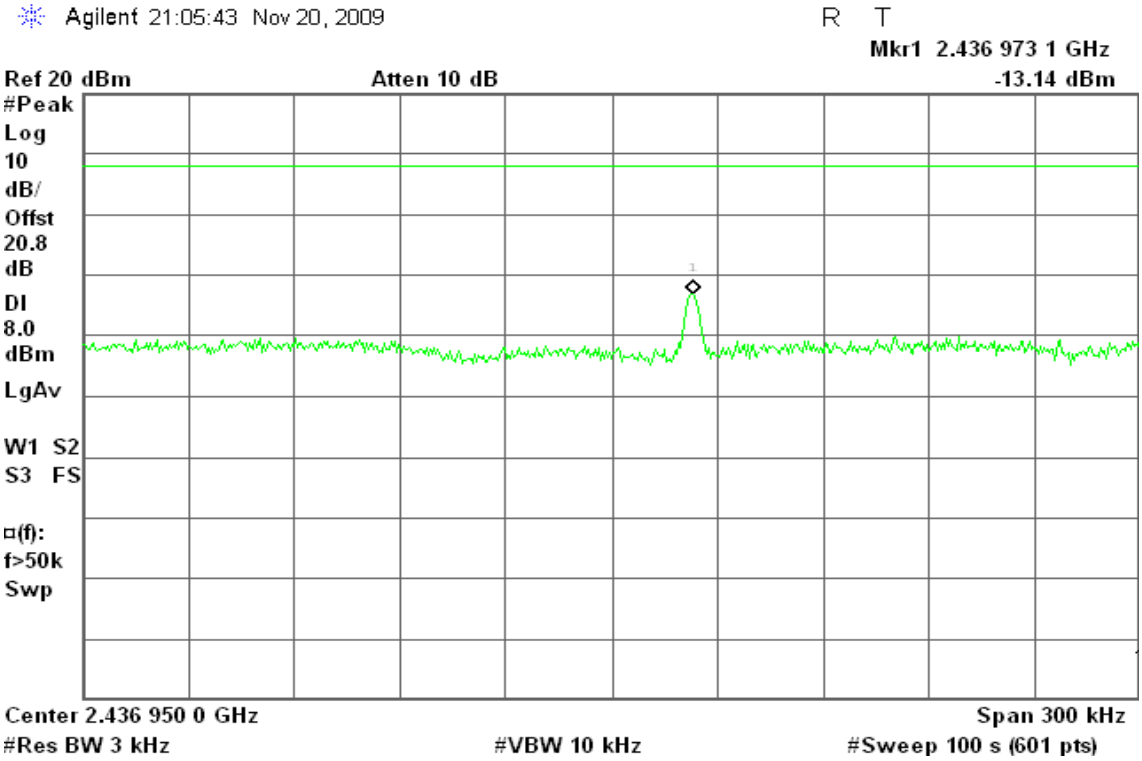
## For Chip Antenna

## IEEE 802.11b mode

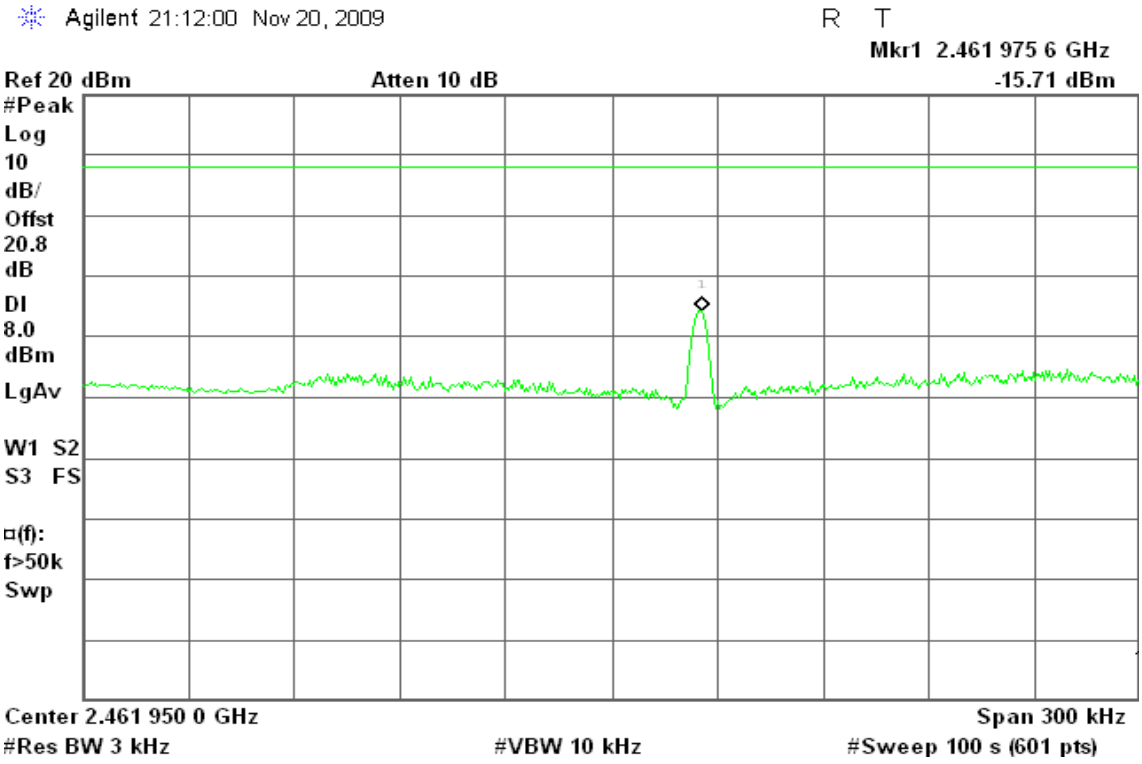
## PPSD (CH Low)




## PPSD (CH Mid)

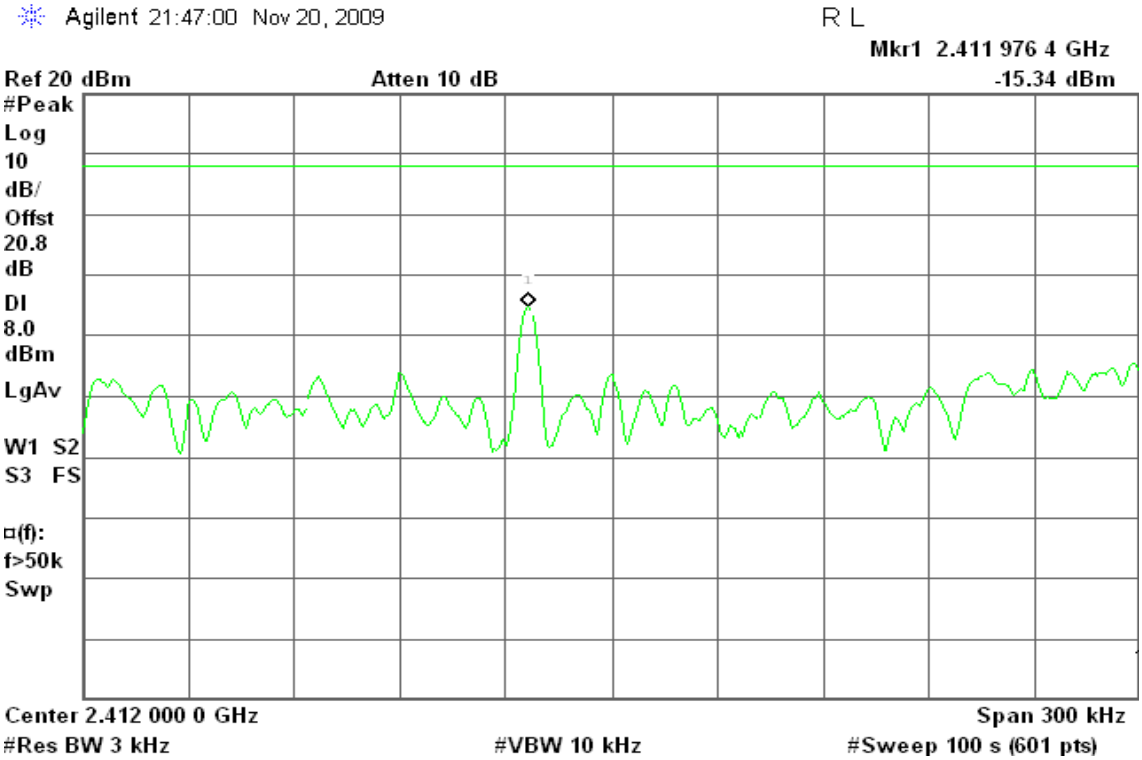


## PPSD (CH High)

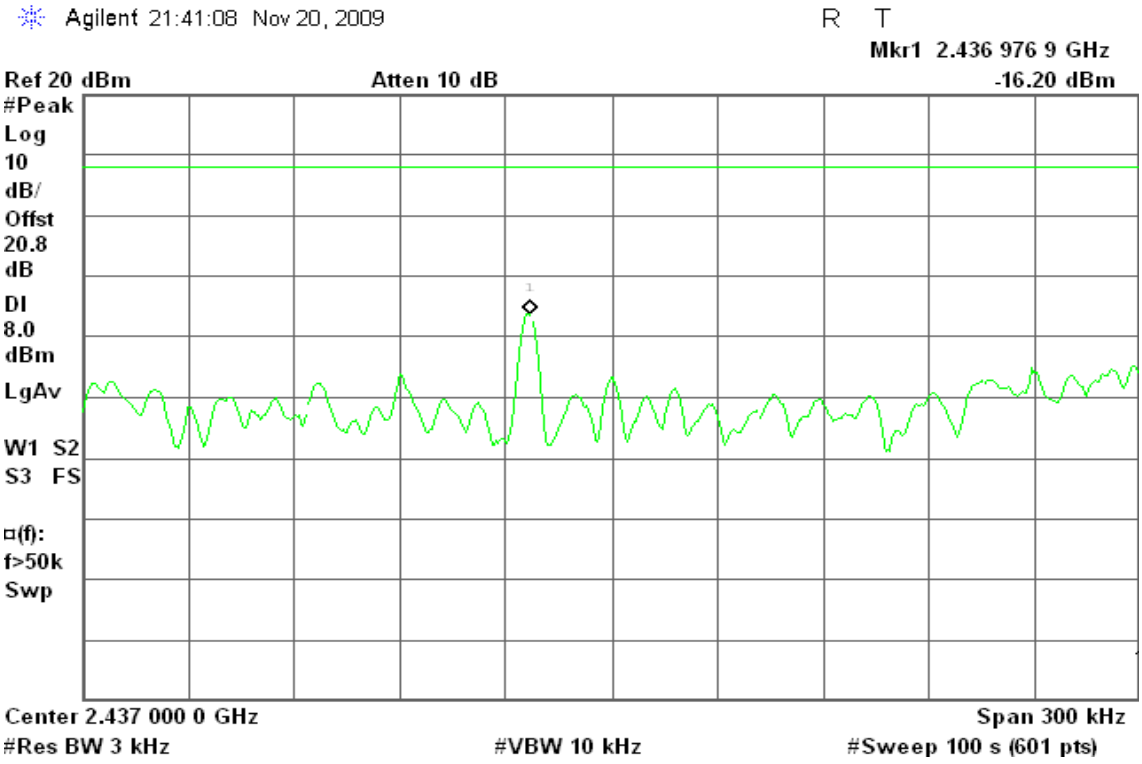



## IEEE 802.11g mode

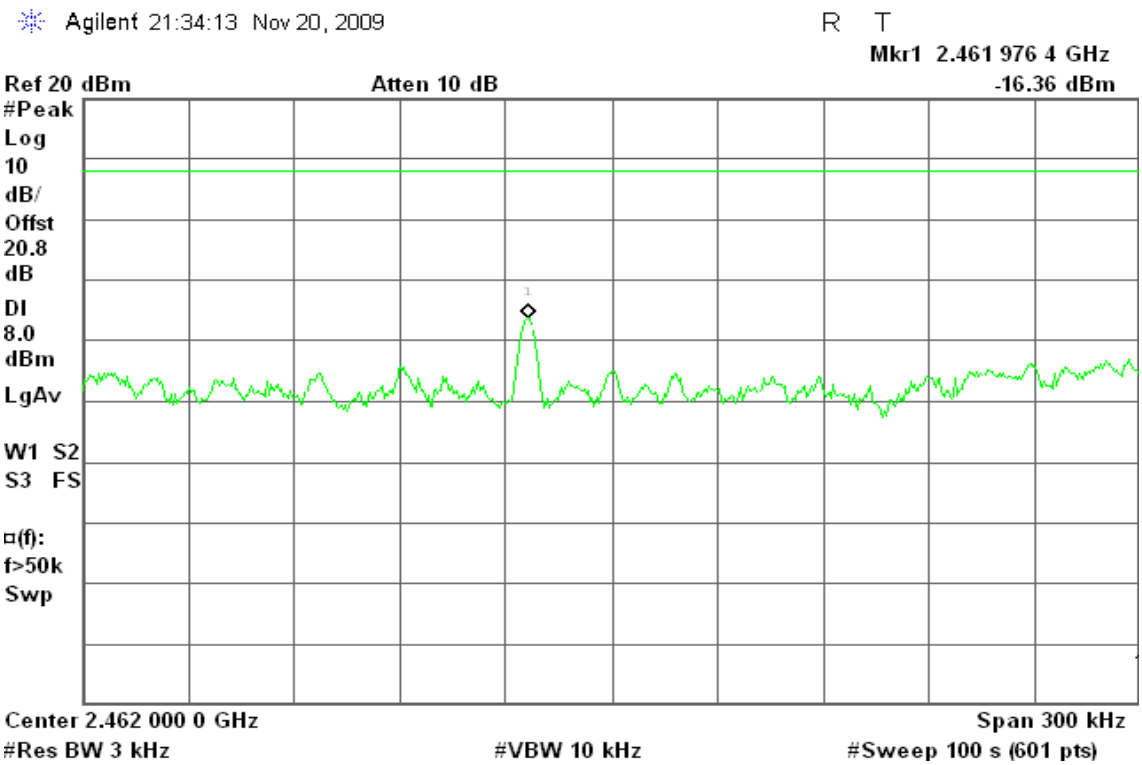
## PPSD (CH Low)



## PPSD (CH Mid)

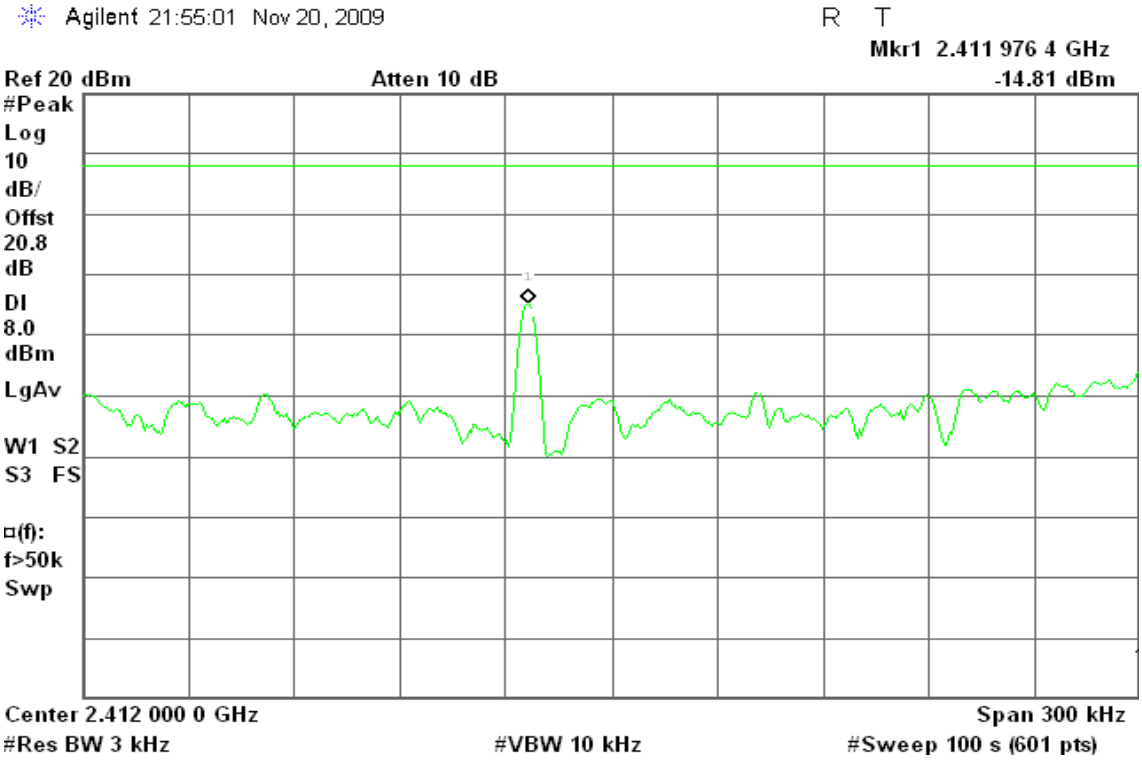



## PPSD (CH High)

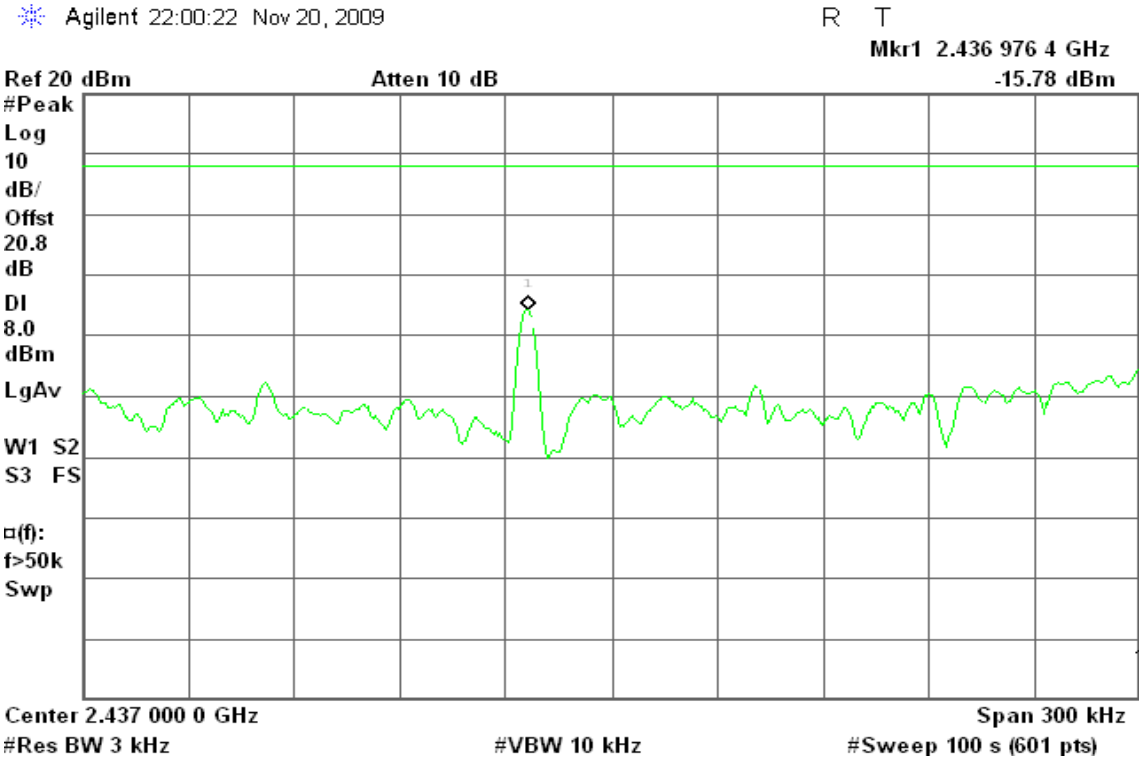


## draft 802.11n Standard-20 MHz Channel mode

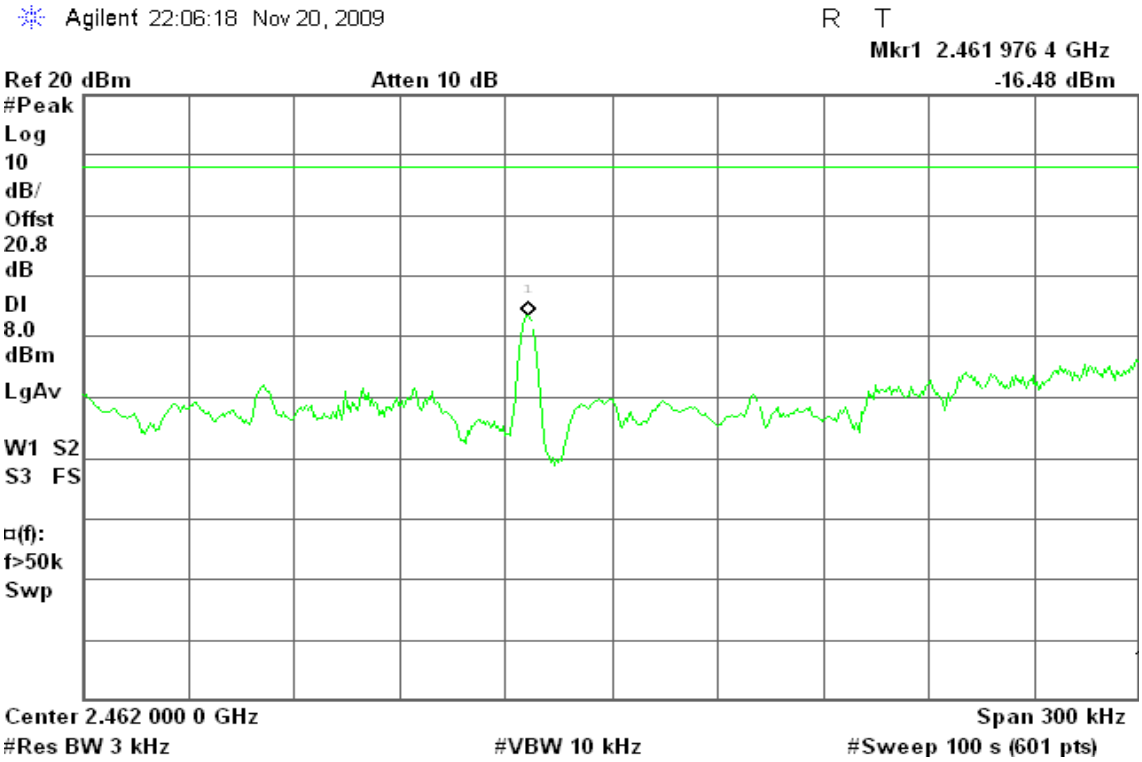
### PPSD (CH Low)




### PPSD (CH Mid)

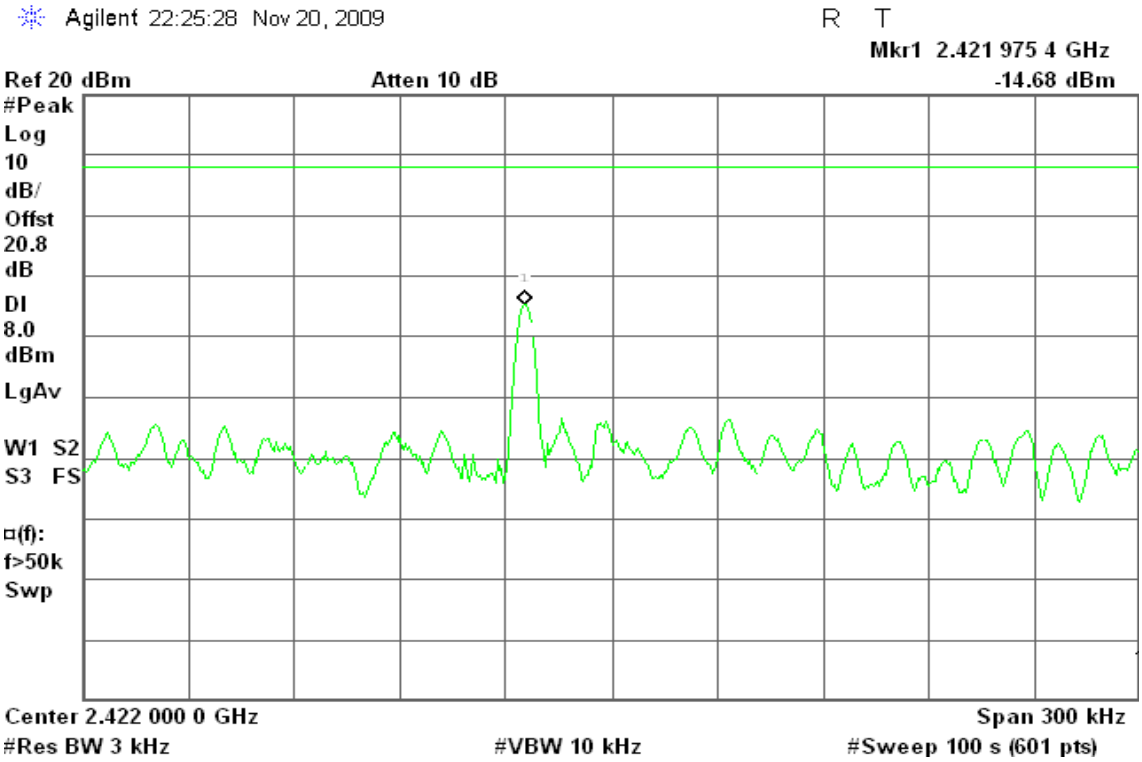


## PPSD (CH High)

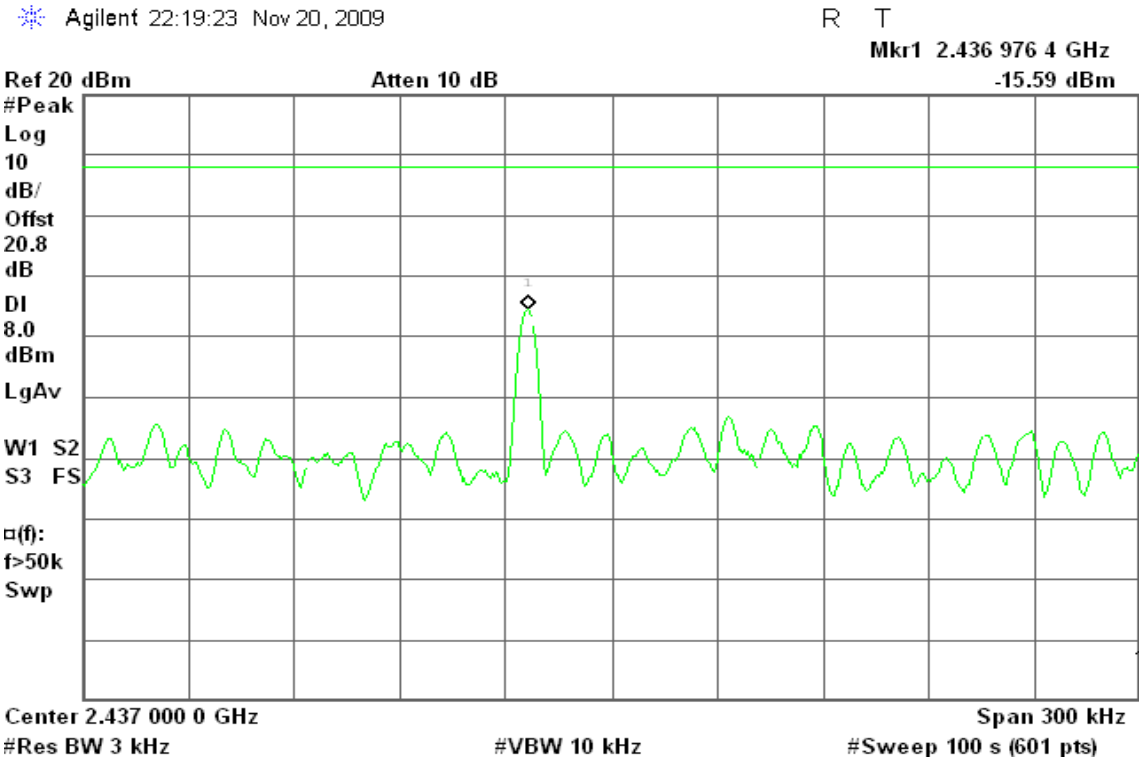



## draft 802.11n Wide-40 MHz Channel mode

## PPSD (CH Low)



## PPSD (CH Mid)




## PPSD (CH High)