**FCC CFR47 PART 15 SUBPART E**

# CERTIFICATION TEST REPORT
# CLASS II PERMISSIVE CHANGE

**FOR**

**3x3 MIMO BASE STATION**

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*Prepared for*
**APPLE INC.**
**1 INIFINITE LOOP**
**CUPERTINO, CA 95014**
**U.S.A.**

*Prepared by*
**UL VERIFICATION SERVICES INC.**
**47173 BENICIA STREET**
**FREMONT, CA 94538, U.S.A.**
**TEL: (510) 771-1000**
**FAX: (510) 661-0888**

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UL VERIFICAITON SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** APPLE INC.
1 INIFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

**EUT DESCRIPTION:** 3x3 MIMO BASE STATION

**MODEL:** A1470

**SERIAL NUMBER:** C86K500PFGCP and C86K5029FGCP (RF);

**DATE TESTED:** DECEMBER 10, 2012 to MARCH 22, 2013 and
APRIL 04 to 25, 2013

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULTS** |
| CFR 47 Part 15 Subpart E | Pass |

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Verification Services Inc. By:

FRANK IBRAHIM
WiSE PROGRAM MANAGER
UL Verification Services Inc.

Tested By:

TOM CHEN
EMC ENGINEER
UL Verification Services Inc.


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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 14-30, FCC KDB 662911 D01 v02r01, FCC KDB 905462 D02 v01r02/D03 v01r01/D06 v01, FCC KDB 789033 D02 v01, FCC KDB 644545 D03 v01 ANSI C63.10-2009.

# 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

## 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

## 4.3. MEASUREMENT UNCERTAINTY

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

| PARAMETER | UNCERTAINTY |
|---|---|
| Conducted Disturbance, 0.15 to 30 MHz | 3.52 dB |
| Radiated Disturbance, 30 to 1000 MHz | 4.94 dB |

Uncertainty figures are valid to a confidence level of 95%.


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# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

The EUT is a 3x3 802.11a/g/n/ac MIMO base station. The EUT also supports Transmit beam forming on 11n and 11ac modes.

## 5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

Upgrade 5.2/5.3/5.6GHz band to new rule per KDB 789033 D02 v01.

We have reviewed the original test report for UNII-1, UNII-2A and UNII-2C bands and are hereby attesting that all current technical requirements are still met and all applicable test procedures remain the same. Therefore, the original report is still applicable and no additional testing is done.

We updated the following on this report:

- Updated report to latest KDB 789033 D02 v01.
- 5.2G output power table limit/PPSD limit.
- Removed IC related information.
- Removed Peak Excursion.


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## 5.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

| 5150-5250 MHz Authorized Frequency Band | | | | | | |
|---|---|---|---|---|---|---|
| Frequency Range (MHz) | Mode | Avg Power, Chain 0 (dBm) | Avg Power, Chain 1 (dBm) | Avg Power, Chain 2 (dBm) | Total Avg power (dBm) | Total Avg power (mW) |
| 5180-5240 | 802.11a Legacy 1TX | N/A | 14.1 | N/A | 14.10 | 25.70 |
| 5180-5240 | 802.11n HT20 CDD 2TX | 10.26 | 10.00 | N/A | 13.14 | 20.61 |
| 5180-5240 | 802.11n HT20 BF 2TX | 10.26 | 10.00 | N/A | 13.14 | 20.61 |
| 5180-5240 | 802.11n HT20 STBC 2TX | 11.20 | 11.10 | N/A | 14.16 | 26.06 |
| 5180-5240 | 802.11n HT20 CDD 3TX | 7.15 | 7.31 | 7.66 | 12.15 | 16.41 |
| 5180-5240 | 802.11n HT20 BF 3TX | 7.15 | 7.31 | 7.66 | 12.15 | 16.41 |
| 5180-5240 | 802.11n HT20 STBC 3TX | 9.40 | 9.10 | 8.96 | 13.93 | 24.72 |
| 5190-5230 | 802.11n HT40 1TX | N/A | 16.5 | N/A | 16.50 | 44.67 |
| 5190-5230 | 802.11n HT40 CDD 2TX | 12.70 | 12.80 | N/A | 15.76 | 37.67 |
| 5190-5230 | 802.11n HT40 BF 2TX | 12.70 | 12.80 | N/A | 15.76 | 37.67 |
| 5190-5230 | 802.11n HT40 STBC 2TX | 13.70 | 13.80 | N/A | 16.76 | 47.42 |
| 5190-5230 | 802.11n HT40 CDD 3TX | 9.80 | 9.50 | 9.60 | 14.41 | 27.61 |
| 5190-5230 | 802.11n HT40 BF 3TX | 9.80 | 9.50 | 9.60 | 14.41 | 27.61 |
| 5190-5230 | 802.11n HT40 STBC 3TX | 11.73 | 11.55 | 11.50 | 16.37 | 43.35 |
| 5210 | 802.11ac VHT80 1TX | N/A | 13.00 | N/A | 13.00 | 19.95 |
| 5210 | 802.11ac VHT80 CDD 2TX | 12.50 | 12.60 | N/A | 15.56 | 35.97 |
| 5210 | 802.11ac VHT80 BF 2TX | 12.50 | 12.60 | N/A | 15.56 | 35.97 |
| 5210 | 802.11ac VHT80 STBC 2TX | 12.70 | 12.40 | N/A | 15.56 | 35.97 |
| 5210 | 802.11ac VHT80 CDD 3TX | 11.90 | 12.10 | 11.95 | 16.76 | 47.42 |
| 5210 | 802.11ac VHT80 BF 3TX | 10.00 | 10.30 | 10.10 | 14.91 | 30.97 |
| 5210 | 802.11ac VHT80 STBC 3TX | 11.90 | 11.98 | 12.10 | 16.77 | 47.53 |

**Note:**

802.11n HT20 BF 3TX was tested for BE and Harmonics, and this covers 802.11n HT20 BF 2TX, 802.11n AC20 BF 2TX, and 802.11n AC20 BF 3TX.

802.11ac VHT20 SISO is leveraged from HT20 SISO.
802.11ac VHT20 2TX CDD is leveraged from HT20 2TX CDD.
802.11ac VHT20 2TX STBC is leveraged from HT20 2TX STBC.
802.11ac VHT20 3TX CDD is leveraged from HT20 3TX CDD.
802.11ac VHT20 3TX STBC is leveraged from HT20 3TX STBC.

802.11ac VHT40 SISO is leveraged from HT40 SISO.
802.11ac VHT40 2TX CDD is leveraged from HT40 2TX CDD.
802.11ac VHT40 2TX STBC is leveraged from HT40 2TX STBC.
802.11ac VHT40 3TX CDD is leveraged from HT40 3TX CDD.
802.11ac VHT40 3TX STBC is leveraged from HT40 3TX STBC.


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| 5250-5325 MHz Authorized Frequency Band | | | | | | |
|---|---|---|---|---|---|---|
| Frequency Range (MHz) | Mode | Avg Power, Chain 0 (dBm) | Avg Power, Chain 1 (dBm) | Avg Power, Chain 2 (dBm) | Total Avg power (dBm) | Total Avg power (mW) |
| 5260-5320 | 802.11a Legacy 1TX | N/A | 20.5 | N/A | 20.50 | 112.20 |
| 5260-5320 | 802.11n HT20 CDD 2TX | 16.50 | 16.60 | N/A | 19.56 | 90.36 |
| 5260-5320 | 802.11n HT20 BF 2TX | 16.50 | 16.60 | N/A | 19.56 | 90.36 |
| 5260-5320 | 802.11n HT20 STBC 2TX | 18.10 | 18.00 | N/A | 21.06 | 127.64 |
| 5260-5320 | 802.11n HT20 CDD 3TX | 13.60 | 13.80 | 13.50 | 18.41 | 69.34 |
| 5260-5320 | 802.11n HT20 BF 3TX | 13.60 | 13.80 | 13.50 | 18.41 | 69.34 |
| 5260-5320 | 802.11n HT20 STBC 3TX | 16.10 | 16.30 | 16.20 | 20.97 | 125.03 |
| 5270-5310 | 802.11n HT40 1TX | N/A | 17.5 | N/A | 17.50 | 56.23 |
| 5270-5310 | 802.11n HT40 CDD 2TX | 17.30 | 17.30 | N/A | 20.31 | 107.40 |
| 5270-5310 | 802.11n HT40 BF 2TX | 17.30 | 17.30 | N/A | 20.31 | 107.40 |
| 5270-5310 | 802.11n HT40 STBC 2TX | 17.30 | 17.20 | N/A | 20.26 | 106.17 |
| 5270-5310 | 802.11n HT40 CDD 3TX | 16.00 | 16.30 | 16.10 | 20.91 | 123.31 |
| 5270-5310 | 802.11n HT40 BF 3TX | 16.00 | 16.30 | 16.10 | 20.91 | 123.31 |
| 5270-5310 | 802.11n HT40 STBC 3TX | 16.00 | 16.30 | 16.10 | 20.91 | 123.31 |
| 5290 | 802.11ac VHT80 1TX | N/A | 13.50 | N/A | 13.50 | 22.39 |
| 5290 | 802.11ac VHT80 CDD 2TX | 13.10 | 13.00 | N/A | 16.06 | 40.36 |
| 5290 | 802.11ac VHT80 BF 2TX | 13.10 | 13.00 | N/A | 16.06 | 40.36 |
| 5290 | 802.11ac VHT80 STBC 2TX | 13.10 | 13.00 | N/A | 16.06 | 40.36 |
| 5290 | 802.11ac VHT80 CDD 3TX | 12.12 | 12.00 | 12.00 | 16.81 | 47.97 |
| 5290 | 802.11ac VHT80 BF 3TX | 12.12 | 12.00 | 12.00 | 16.81 | 47.97 |
| 5290 | 802.11ac VHT80 STBC 3TX | 12.12 | 12.00 | 12.00 | 16.81 | 47.97 |

**Note:**

802.11n HT20 BF 3TX was tested for BE and Harmonics, and this covers 802.11n HT20 BF 2TX, 802.11n AC20 BF 2TX, and 802.11n AC20 BF 3TX

802.11ac VHT20 SISO is leveraged from HT20 SISO.
802.11ac VHT20 2TX CDD is leveraged from HT20 2TX CDD.
802.11ac VHT20 2TX STBC is leveraged from HT20 2TX STBC.
802.11ac VHT20 3TX CDD is leveraged from HT20 3TX CDD.
802.11ac VHT20 3TX STBC is leveraged from HT20 3TX STBC.

802.11ac VHT40 SISO is leveraged from HT40 SISO.
802.11ac VHT40 2TX CDD is leveraged from HT40 2TX CDD.
802.11ac VHT40 2TX STBC is leveraged from HT40 2TX STBC.
802.11ac VHT40 3TX CDD is leveraged from HT40 3TX CDD.
802.11ac VHT40 3TX STBC is leveraged from HT40 3TX STBC.


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| 5500-5700 MHz Authorized Frequency Band | | | | | | |
|---|---|---|---|---|---|---|
| Frequency Range (MHz) | Mode | Avg Power, Chain 0 (dBm) | Avg Power, Chain 1 (dBm) | Avg Power, Chain 2 (dBm) | Total Avg power (dBm) | Total Avg power (mW) |
| 5500-5700 | 802.11a Legacy 1TX | N/A | 20.50 | N/A | 20.50 | 112.20 |
| 5500-5700 | 802.11n HT20 CDD 2TX | 16.70 | 16.60 | N/A | 19.66 | 92.47 |
| 5500-5700 | 802.11n HT20 BF 2TX | 16.70 | 16.60 | N/A | 19.66 | 92.47 |
| 5500-5700 | 802.11n HT20 STBC 2TX | 18.20 | 18.10 | N/A | 21.16 | 130.62 |
| 5500-5700 | 802.11n HT20 CDD 3TX | 13.50 | 13.75 | 13.60 | 18.39 | 69.02 |
| 5500-5700 | 802.11n HT20 BF 3TX | 13.50 | 13.75 | 13.60 | 18.39 | 69.02 |
| 5500-5700 | 802.11n HT20 STBC 3TX | 16.00 | 16.30 | 16.20 | 20.94 | 124.17 |
| 5510-5670 | 802.11n HT40 1TX | N/A | 19.50 | N/A | 19.50 | 89.13 |
| 5510-5670 | 802.11n HT40 CDD 2TX | 18.20 | 18.10 | N/A | 21.16 | 130.62 |
| 5510-5670 | 802.11n HT40 BF 2TX | 18.20 | 18.10 | N/A | 21.16 | 130.62 |
| 5510-5670 | 802.11n HT40 STBC 2TX | 18.10 | 18.00 | N/A | 21.06 | 127.64 |
| 5510-5670 | 802.11n HT40 CDD 3TX | 16.00 | 16.25 | 16.10 | 20.89 | 122.74 |
| 5510-5670 | 802.11n HT40 BF 3TX | 16.00 | 16.25 | 16.10 | 20.89 | 122.74 |
| 5510-5670 | 802.11n HT40 STBC 3TX | 16.00 | 16.30 | 16.10 | 20.91 | 123.31 |
| 5530 | 802.11ac VHT80 1TX | N/A | 13.00 | N/A | 13.00 | 19.95 |
| 5530 | 802.11ac VHT80 CDD 2TX | 12.59 | 12.79 | N/A | 15.61 | 36.39 |
| 5530 | 802.11ac VHT80 BF 2TX | 12.59 | 12.79 | N/A | 15.61 | 36.39 |
| 5530 | 802.11ac VHT80 STBC 2TX | 12.59 | 12.79 | N/A | 15.61 | 36.39 |
| 5530 | 802.11ac VHT80 STBC 3TX | 12.09 | 12.29 | 12.19 | 16.87 | 48.64 |
| 5530 | 802.11ac VHT80 CDD 3TX | 12.09 | 12.29 | 12.19 | 16.87 | 48.64 |
| 5530 | 802.11ac VHT80BF 3TX | 12.09 | 12.29 | 12.19 | 16.87 | 48.64 |

**Note:**

"802.11n HT20 BF 3TX was tested for Harmonics, and this covers 802.11n HT20 BF 2TX, 802.11n AC20 BF 2TX, and 802.11n AC20 BF 3TX".

"802.11n HT20 BF 3TX was tested for BE, and this covers 802.11n AC20 BF 3TX".

"802.11n HT20 BF 3TX was tested for BE, and this covers 802.11n AC20 BF 2TX".

802.11ac VHT20 SISO is leveraged from HT20 SISO.
802.11ac VHT20 2TX CDD is leveraged from HT20 2TX CDD.
802.11ac VHT20 2TX STBC is leveraged from HT20 2TX STBC.
802.11ac VHT20 3TX CDD is leveraged from HT20 3TX CDD.
802.11ac VHT20 3TX STBC is leveraged from HT20 3TX STBC.

802.11ac VHT40 SISO is leveraged from HT40 SISO.
802.11ac VHT40 2TX CDD is leveraged from HT40 2TX CDD.
802.11ac VHT40 2TX STBC is leveraged from HT40 2TX STBC.
802.11ac VHT40 3TX CDD is leveraged from HT40 3TX CDD.
802.11ac VHT40 3TX STBC is leveraged from HT40 3TX STBC.


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| Frequency Range (MHz) | Mode | Avg Power, Chain 0 (dBm) | Avg Power, Chain 1 (dBm) | Avg Power, Chain 2 (dBm) | Total Avg power (dBm) | Total Avg power (mW) |
|---|---|---|---|---|---|---|
| **5.6 GHz band, 1TX (Channels overlapping UNII and DTS bands)** | | | | | | |
| 5720 (UNII portion) | 802.11a 1TX | N/A | 20.29 | N/A | 20.29 | 106.91 |
| 5720 (DTS portion) | 802.11a 1TX | N/A | 14.58 | N/A | 14.58 | 28.71 |
| 5720 (Whole signal) | 802.11a 1TX | N/A | 21.32 | N/A | 21.32 | 135.61 |
| 5710 (UNII portion) | 802.11n HT40 1TX | N/A | 23.12 | N/A | 23.12 | 205.12 |
| 5710 (DTS portion) | 802.11n HT40 1TX | N/A | 12.56 | N/A | 12.56 | 18.03 |
| 5710 (Whole signal) | 802.11n HT40 1TX | N/A | 23.49 | N/A | 23.49 | 223.15 |
| 5690 (UNII portion) | 802.11ac VHT80 1TX | N/A | 23.87 | N/A | 23.87 | 243.78 |
| 5690 (DTS portion) | 802.11ac VHT80 1TX | N/A | 8.48 | N/A | 8.48 | 7.05 |
| 5690 (Whole signal) | 802.11ac VHT80 1TX | N/A | 23.99 | N/A | 23.99 | 250.83 |
| **5.6 GHz band, 2TX (Channels overlapping UNII and DTS bands)** | | | | | | |
| 5720 (UNII portion) | 802.11n HT20 CDD 2TX | 16.15 | 16.23 | N/A | 19.20 | 83.19 |
| 5720 (DTS portion) | 802.11n HT20 CDD 2TX | 10.26 | 10.30 | N/A | 13.29 | 21.33 |
| 5720 (Whole signal) | 802.11n HT20 CDD 2TX | 17.15 | 17.22 | N/A | 20.19 | 104.52 |
| 5720 (UNII portion) | 802.11n HT20 STBC 2TX | 18.09 | 18.27 | N/A | 21.19 | 131.56 |
| 5720 (DTS portion) | 802.11n HT20 STBC 2TX | 10.96 | 11.12 | N/A | 14.05 | 25.42 |
| 5720 (Whole signal) | 802.11n HT20 STBC 2TX | 18.86 | 19.04 | N/A | 21.96 | 156.98 |
| 5710 (UNII portion) | 802.11n HT40 CDD 2TX | 19.35 | 19.15 | N/A | 22.26 | 168.32 |
| 5710 (DTS portion) | 802.11n HT40 CDD 2TX | 8.46 | 9.40 | N/A | 11.97 | 15.72 |
| 5710 (Whole signal) | 802.11n HT40 CDD 2TX | 19.69 | 19.59 | N/A | 22.65 | 184.05 |
| 5710 (UNII portion) | 802.11n HT40 BF 2TX | 19.35 | 19.15 | N/A | 22.26 | 168.32 |
| 5710 (DTS portion) | 802.11n HT40 BF 2TX | 8.46 | 9.40 | N/A | 11.97 | 15.72 |
| 5710 (Whole signal) | 802.11n HT40 BF 2TX | 19.69 | 19.59 | N/A | 22.65 | 184.05 |
| 5710 (UNII portion) | 802.11n HT40 STBC 2TX | 20.36 | 20.68 | N/A | 23.53 | 225.59 |
| 5710 (DTS portion) | 802.11n HT40 STBC 2TX | 9.64 | 10.41 | N/A | 13.05 | 20.19 |
| 5710 (Whole signal) | 802.11n HT40 STBC 2TX | 20.71 | 21.07 | N/A | 23.91 | 245.79 |
| 5690 (UNII portion) | 802.11ac VHT80 CDD 2TX | 20.91 | 20.60 | N/A | 23.77 | 238.13 |
| 5690 (DTS portion) | 802.11ac VHT80 CDD 2TX | 3.79 | 6.02 | N/A | 8.06 | 6.39 |
| 5690 (Whole signal) | 802.11ac VHT80 CDD 2TX | 20.99 | 20.75 | N/A | 23.88 | 244.52 |
| 5690 (UNII portion) | 802.11ac VHT80 BF 2TX | 19.44 | 19.47 | N/A | 22.47 | 176.41 |
| 5690 (DTS portion) | 802.11ac VHT80 BF 2TX | 5.91 | 6.00 | N/A | 8.97 | 7.88 |
| 5690 (Whole signal) | 802.11ac VHT80 BF 2TX | 19.63 | 19.66 | N/A | 22.66 | 184.29 |
| 5690 (UNII portion) | 802.11ac VHT80 STBC 2TX | 20.91 | 20.60 | N/A | 23.77 | 238.13 |
| 5690 (DTS portion) | 802.11ac VHT80 STBC 2TX | 3.79 | 6.02 | N/A | 8.06 | 6.39 |
| 5690 (Whole signal) | 802.11ac VHT80 STBC 2TX | 20.99 | 20.75 | N/A | 23.88 | 244.52 |
| **5.6 GHz band, 3TX (Channels overlapping UNII and DTS bands)** | | | | | | |
| 5720 (UNII portion) | 802.11n HT20 CDD 3TX | 13.86 | 13.74 | 13.54 | 18.49 | 70.58 |
| 5720 (DTS portion) | 802.11n HT20 CDD 3TX | 7.86 | 7.71 | 7.95 | 12.61 | 18.25 |
| 5720 (Whole signal) | 802.11n HT20 CDD 3TX | 14.83 | 14.71 | 14.60 | 19.49 | 88.82 |
| 5720 (UNII portion) | 802.11n HT20 STBC 3TX | 16.57 | 15.95 | 16.30 | 21.05 | 127.41 |
| 5720 (DTS portion) | 802.11n HT20 STBC 3TX | 9.45 | 8.85 | 9.14 | 13.92 | 24.69 |
| 5720 (Whole signal) | 802.11n HT20 STBC 3TX | 17.34 | 16.72 | 17.06 | 21.82 | 152.09 |
| 5710 (UNII portion) | 802.11n HT40 CDD 3TX | 15.82 | 16.63 | 15.92 | 20.91 | 123.30 |
| 5710 (DTS portion) | 802.11n HT40 CDD 3TX | 5.86 | 5.89 | 6.25 | 10.77 | 11.95 |
| 5710 (Whole signal) | 802.11n HT40 CDD 3TX | 16.24 | 16.98 | 16.36 | 21.31 | 135.26 |
| 5710 (UNII portion) | 802.11n HT40 BF 3TX | 15.82 | 16.63 | 15.92 | 20.91 | 123.30 |
| 5710 (DTS portion) | 802.11n HT40 BF 3TX | 5.86 | 5.89 | 6.25 | 10.77 | 11.95 |
| 5710 (Whole signal) | 802.11n HT40 BF 3TX | 16.24 | 16.98 | 16.36 | 21.31 | 135.26 |
| 5710 (UNII portion) | 802.11n HT40 STBC 3TX | 18.66 | 18.66 | 18.56 | 23.40 | 218.68 |
| 5710 (DTS portion) | 802.11n HT40 STBC 3TX | 8.50 | 7.94 | 8.33 | 13.03 | 20.11 |
| 5710 (Whole signal) | 802.11n HT40 STBC 3TX | 19.06 | 19.01 | 18.95 | 23.78 | 238.79 |
| 5690 (UNII portion) | 802.11ac VHT80 CDD 3TX | 18.58 | 18.72 | 18.73 | 23.45 | 221.23 |
| 5690 (DTS portion) | 802.11ac VHT80 CDD 3TX | 4.85 | 4.04 | 4.31 | 9.18 | 8.29 |
| 5690 (Whole signal) | 802.11ac VHT80 CDD 3TX | 18.76 | 18.87 | 18.88 | 23.61 | 229.52 |
| 5690 (UNII portion) | 802.11ac VHT80 BF 3TX | 16.47 | 16.30 | 16.22 | 21.10 | 128.90 |
| 5690 (DTS portion) | 802.11ac VHT80 BF 3TX | 4.85 | 4.04 | 4.31 | 9.18 | 8.29 |
| 5690 (Whole signal) | 802.11ac VHT80 BF 3TX | 16.76 | 16.55 | 16.49 | 21.37 | 137.19 |
| 5690 (UNII portion) | 802.11ac VHT80 STBC 3TX | 18.58 | 18.72 | 18.73 | 23.45 | 221.23 |
| 5690 (DTS portion) | 802.11ac VHT80 STBC 3TX | 4.85 | 4.04 | 4.31 | 9.18 | 8.29 |
| 5690 (Whole signal) | 802.11ac VHT80 STBC 3TX | 18.76 | 18.87 | 18.88 | 23.61 | 229.52 |


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## 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

| Band (GHz) | Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|---|---|
| 2.4 | 3.00 | 3.00 | 3.10 | 3.03 |
| 5.2 | 3.20 | 1.40 | 2.20 | 2.33 |
| 5.3 | 3.40 | 1.60 | 2.30 | 2.50 |
| 5.6 | 3.00 | 1.70 | 3.80 | 2.92 |
| 5.8 | 2.70 | 1.90 | 4.40 | 3.13 |

| Band (GHz) | Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|---|---|
| 2.4 | 3.00 | 3.00 | 3.10 | 7.80 |
| 5.2 | 3.20 | 1.40 | 2.20 | 7.07 |
| 5.3 | 3.40 | 1.60 | 2.30 | 7.24 |
| 5.6 | 3.00 | 1.70 | 3.80 | 7.65 |
| 5.8 | 2.70 | 1.90 | 4.40 | 7.83 |

## 5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 6.10.56.166.


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## 5.6. WORST-CASE CONFIGURATION AND MODE

FCC ID: BCGA1470 is eletrically identical to FCC ID: BCGA1521 except harddrive. Test data in this report was generated using FCC ID: BCGA1521 since RF characteristic for FCC ID: BCGA1521 are representative of FCC ID: BCGA1470.

The fundamental emission of the EUT was investigated in three orthogonal orientations; X,Y and Z. It was determined that Y orientation is worst-case; therefore, all final radiated emissions testing was performed with the EUT in Y orientation
The EUT was a 3x3 MIMO Base Station connected to a host Laptop PC.

Worst-Case data rates, as provided by the client, were as follows:

For 5 GHz Bands:
802.11a: 6 Mb/s.
802.11n 20MHz, CDD and STBC: MCS0.
802.11n 40MHz, CDD and STBC: MCS0.
802.11n 80MHz, CDD and STBC: MCS0.

Worst-case mode and channel used for 30-1000 MHz radiated and power line conducted emissions was the mode and channel with the highest output power.

For the modes where a second LOW channel and a second HIGH channel were tested for output power, all other test items at the second LOW and second HIGH channels were performed with the higher power level between LOW and second LOW channels, and between HIGH and second HIGH channels, as worst-case scenario.

For all modes with single chain, chain 1 was selected per the software provided by the client. Based on the client a preliminary investigation was performed on the three chains and chain 1 was found to be worst-case.

Peak Excursion testing was performed for each modulation in the 5.2 GHz band to show compliance with the applicable limits.

Nss (number of spatial streams) used for all the testing on 2Tx & 3Tx modes was 1 as worst-case scenario.


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## 5.7. DESCRIPTION OF TEST SETUP

**SUPPORT EQUIPMENT**

| Support Equipment List | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Serial Number** | **FCC ID** |
| Laptop PC | Apple | MacBook M42A | PT358811 | DoC |
| Direct Plug-In AC-DC Adapter | Apple | PA-1850 | N/A | N/A |
| Mouse | HP | MOE2UO | CNP10300BB | DoC |

**I/O CABLES**

| I/O Cable List | | | | | | |
|---|---|---|---|---|---|---|
| **Cable No** | **Port** | **# of identical ports** | **Connector Type** | **Cable Type** | **Cable Length (m)** | **Remarks** |
| 1 | AC | 1 | 2P | Non-shielded | 1.8 | |
| 2 | Ethernet | 1 | Ethernet | Non-shielded | 3 | |
| 3 | DC | 1 | DC | Non-shielded | 1.75 | |
| 4 | USB | 1 | USB | Non-shielded | 0.6 | |

**TEST SETUP**

The EUT is powered by AC source only during test. Test software exercised the radio card.


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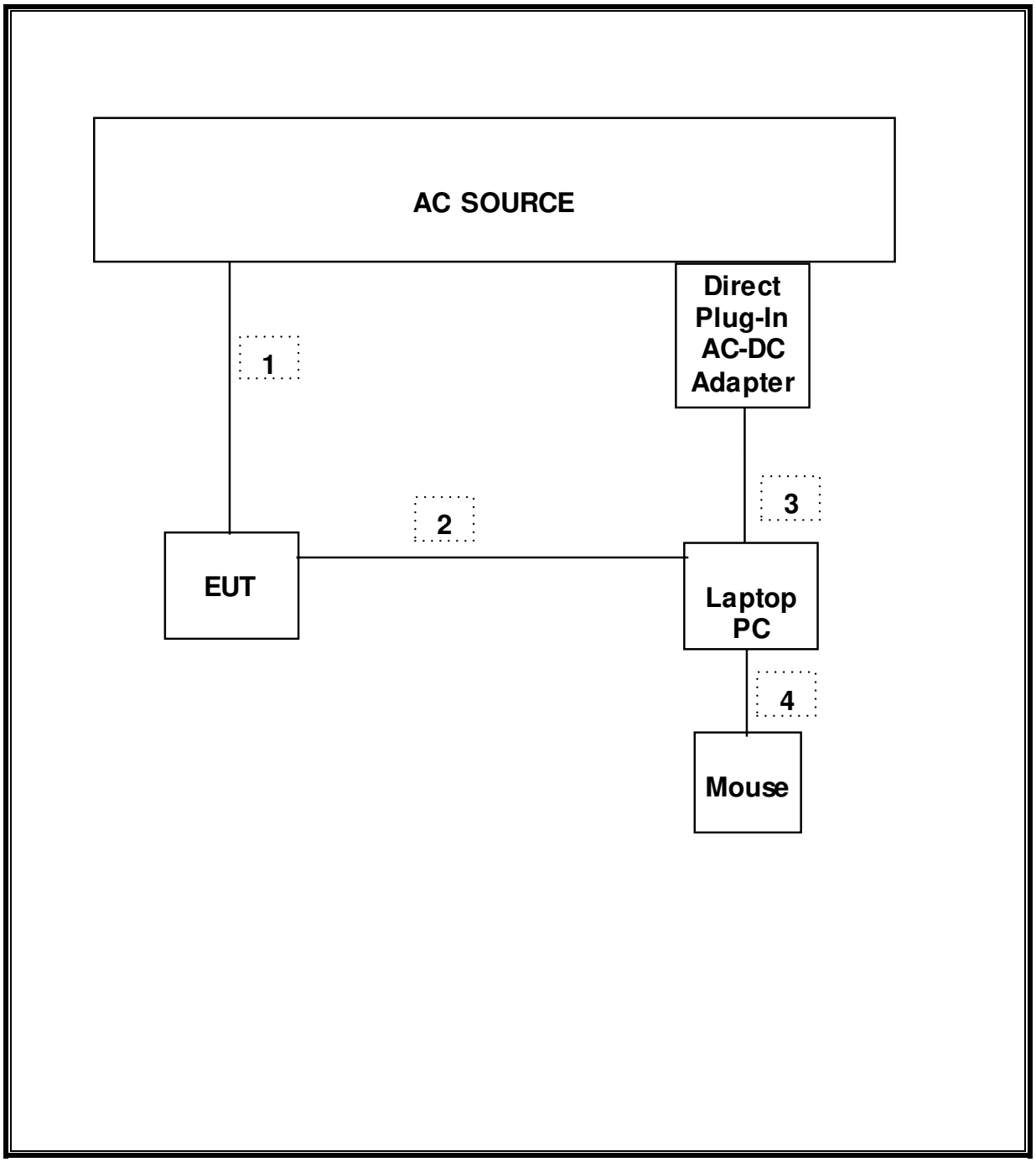
**SETUP DIAGRAM FOR TESTS**





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# 6. TEST AND MEASUREMENT EQUIPMENT

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

| Test Equipment List | | | | | |
|---|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Asset** | **Cal Date** | **Cal Due** |
| Spectrum Analyzer, 26.5 GHz | Agilent / HP | E4440A | C01179 | 02/16/12 | 02/26/14 |
| Spectrum Analyzer, 44 GHz | Agilent / HP | E4446A | C01012 | 10/21/12 | 10/21/13 |
| EMI Test Receiver, 9 kHz-7 GHz | R & S | ESCI 7 | 1000741 | 08/08/12 | 08/08/13 |
| EMI Test Receiver, 9 kHz-7 GHz | R & S | ESCI 7 | N/A | 08/21/12 | 08/21/13 |
| EMI Test Receiver, 30 MHz | R & S | ESHS 20 | N02396 | 08/08/12 | 08/08/13 |
| Antenna, Horn, 18 GHz | EMCO | 3115 | C00945 | 11/12/12 | 11/12/13 |
| Antenna, Horn, 26.5 GHz | ARA | MWH-1826/B | C00980 | 11/14/12 | 11/14/13 |
| Antenna, Horn, 40 GHz | ARA | MWH-2640/B | C00981 | 06/14/11 | 06/14/13 |
| Antenna, Bilog, 30MHz-1 GHz | Sunol Sciences | JB1 | N/A | 02/07/12 | 03/06/14 |
| Preamplifier, 26.5 GHz | Agilent / HP | 8449B | C00749 | 10/19/12 | 10/19/13 |
| Preamplifier, 26.5 GHz | Agilent / HP | 8449B | C01052 | 10/22/12 | 10/22/13 |
| Preamplifier, 40 GHz | Miteq | NSP4000-SP2 | C00990 | 08/02/11 | 08/02/13 |
| Preamplifier, 1300 MHz | Agilent / HP | 8447D | C00885 | 12/20/11 | 12/30/13 |
| P-Series single channel Power Meter | Agilent / HP | N1911A | N/A | 07/27/12 | 07/27/13 |
| Peak / Average Power Sensor | Agilent / HP | E9323A | N/A | 07/26/12 | 07/26/13 |
| LISN, 30 MHz | FCC | 50/250-25-2 | C00626 | 12/13/11 | 01/13/14 |


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# 7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

**LIMITS**

None; for reporting purposes only.

**PROCEDURE**

KDB 789033 Zero-Span Spectrum Analyzer Method.

## 7.1. ON TIME AND DUTY CYCLE RESULTS

| Mode | ON Time B (msec) | Period (msec) | Duty Cycle x (linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/B Minimum VBW (kHz) |
|---|---|---|---|---|---|---|
| 802.11a 20 MHz | 2.055 | 2.090 | 0.983 | 98.3% | 0.00 | 0.010 |
| 802.11n HT20 CDD | 1.915 | 1.940 | 0.987 | 98.7% | 0.00 | 0.010 |
| 802.11n HT20 STBC | 1.925 | 1.945 | 0.990 | 99.0% | 0.00 | 0.010 |
| 802.11n HT40 SISO | 0.9424 | 0.9601 | 0.982 | 98.2% | 0.00 | 0.010 |
| 802.11n HT40 CDD | 0.9449 | 0.9627 | 0.982 | 98.2% | 0.00 | 0.010 |
| 802.11n HT40 STBC | 0.9520 | 0.9707 | 0.981 | 98.1% | 0.00 | 0.010 |
| 802.11ac VHT80 SISO | 0.6000 | 0.6133 | 0.978 | 97.8% | 0.10 | 1.667 |
| 802.11ac VHT80 CDD | 0.5953 | 0.6080 | 0.979 | 97.9% | 0.09 | 1.680 |
| 802.11ac VHT80 STBC | 0.5979 | 0.6105 | 0.979 | 97.9% | 0.09 | 1.673 |

## 7.2. MEASUREMENT METHOD FOR POWER AND PPSD

For output power measurement, KDB 789033 Method PM as described in section C) f) was used.

For PSD measurement, KDB 789033 Method SA-1 was used when Duty Cycle is greater than or equal to 98%.
For PSD measurement, KDB 789033 Method SA-2 was used when Duty Cycle is less than 98%.

## 7.3. MEASUREMENT METHOD FOR AVG SPURIOUS EMISSION ABOVE 1 GHz

KDB 789033 Method VB with Power RMS Averaging is used.


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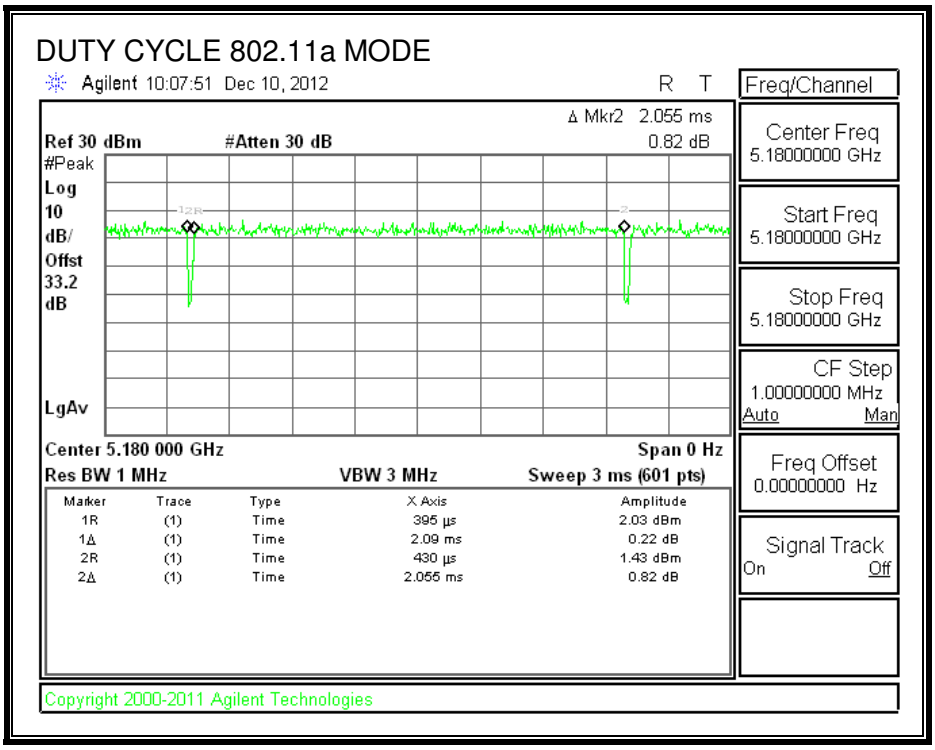
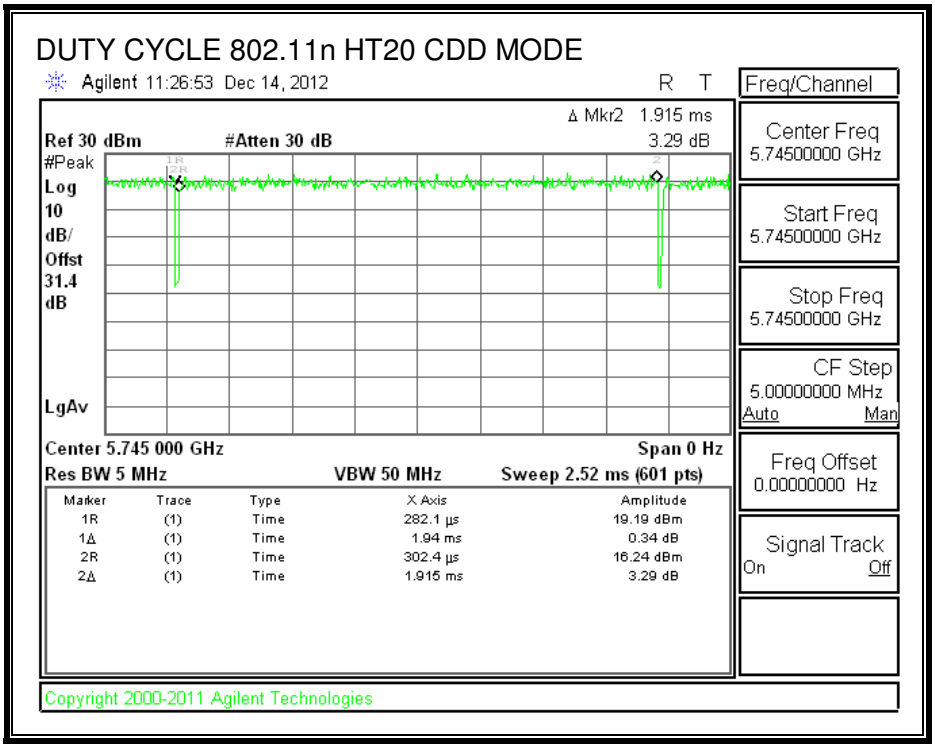
## 7.4. DUTY CYCLE PLOTS





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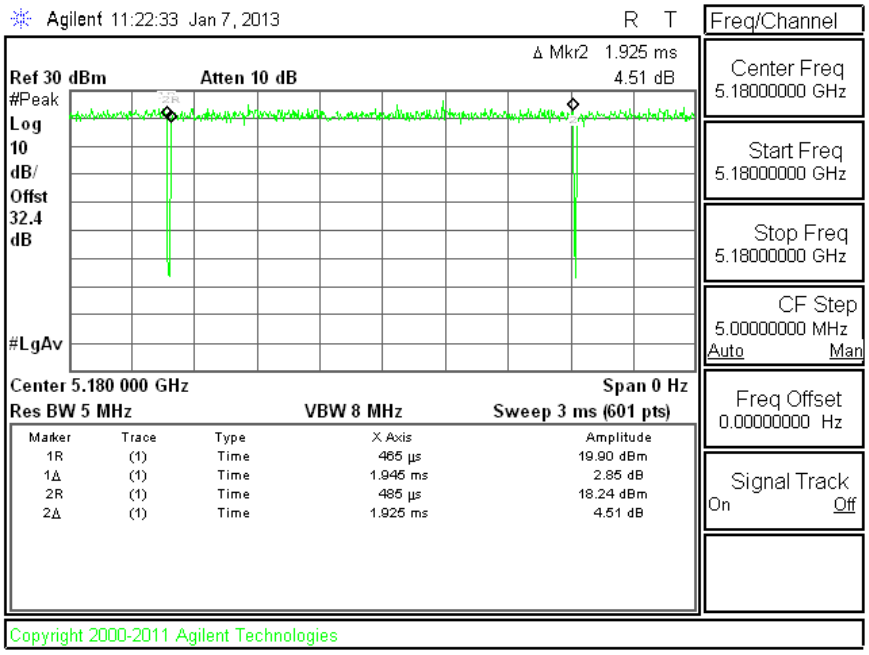
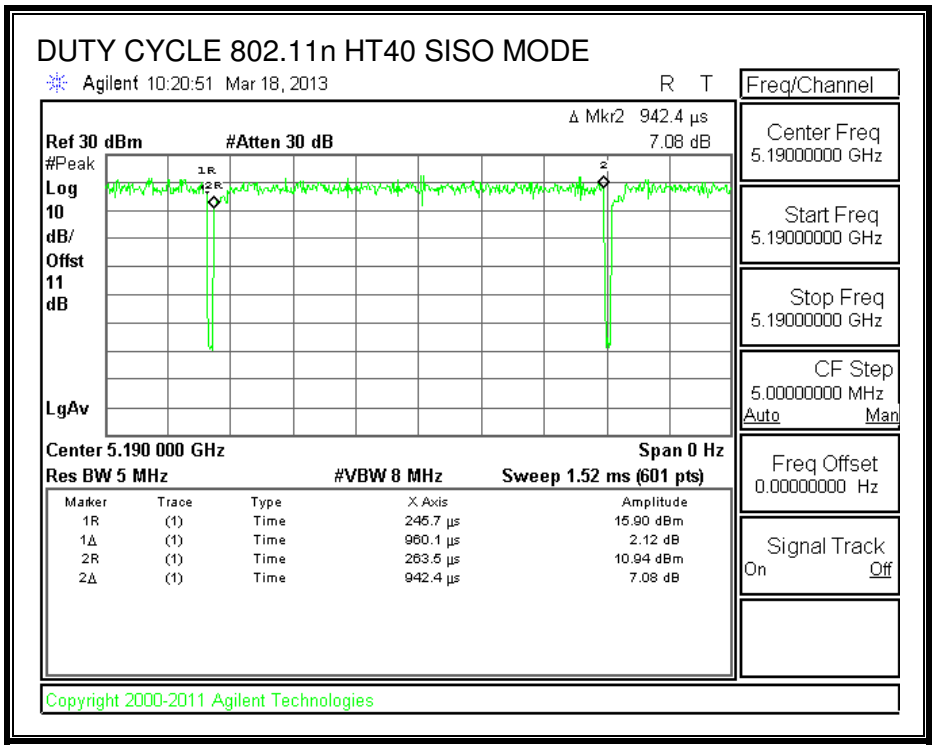
DUTY CYCLE 802.11n HT20 STBC MODE




DUTY CYCLE 802.11n HT40 SISO MODE





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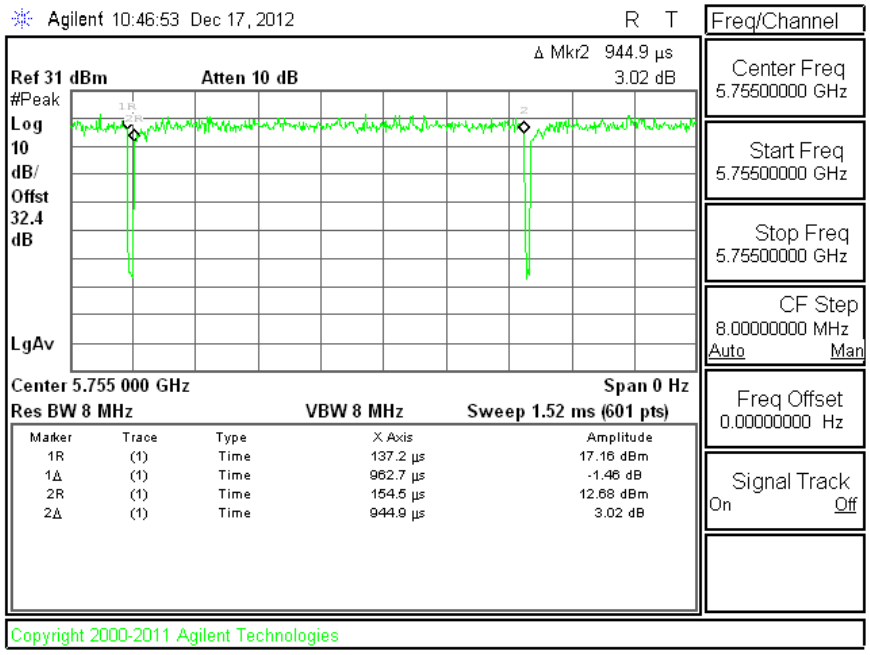
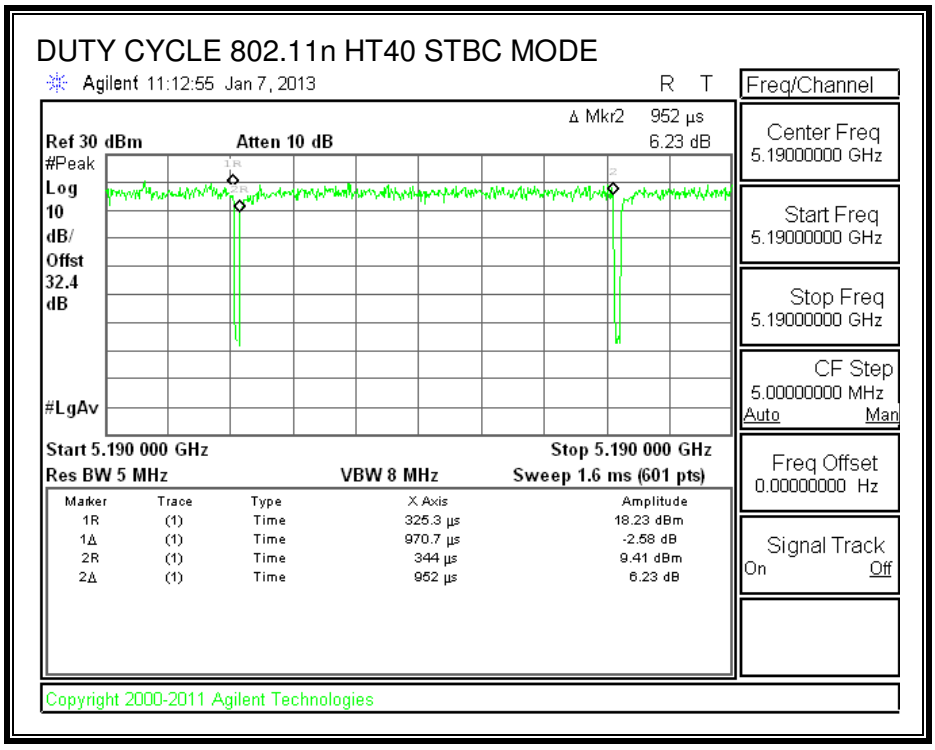
DUTY CYCLE 802.11n HT40 CDD MODE




DUTY CYCLE 802.11n HT40 STBC MODE





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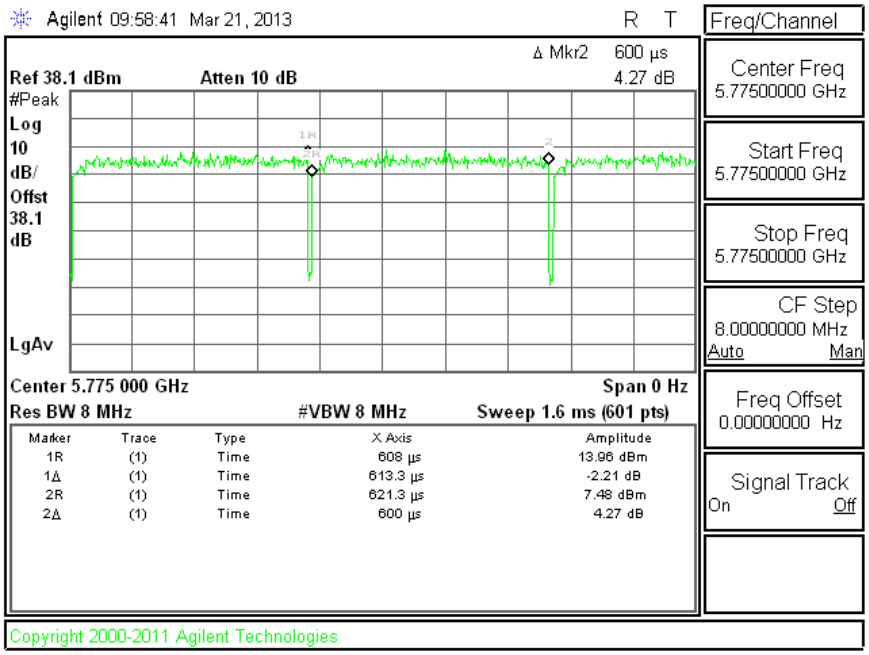
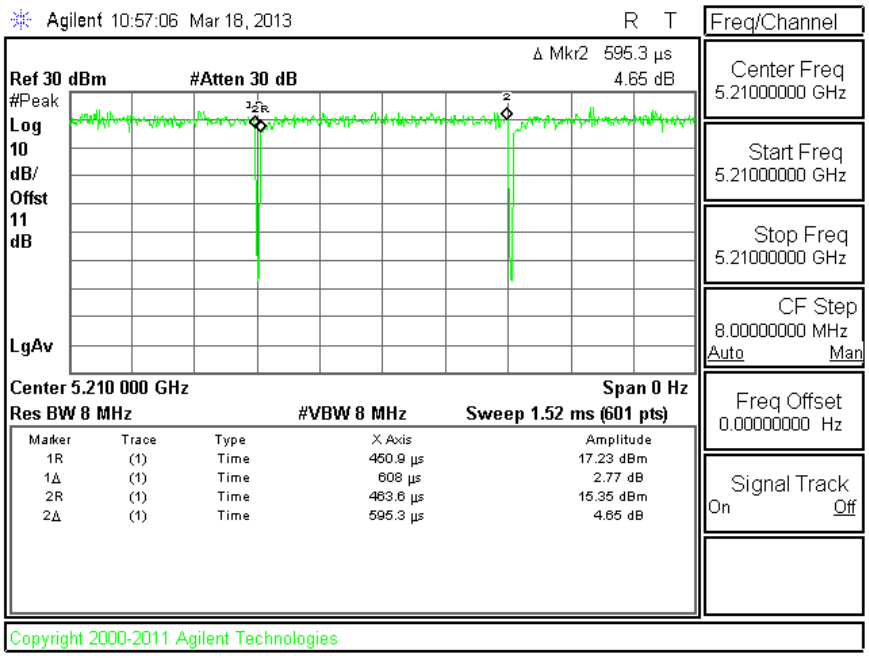
DUTY CYCLE 802.11ac VHT80 SISO MODE




DUTY CYCLE 802.11ac VHT80 CDD MODE





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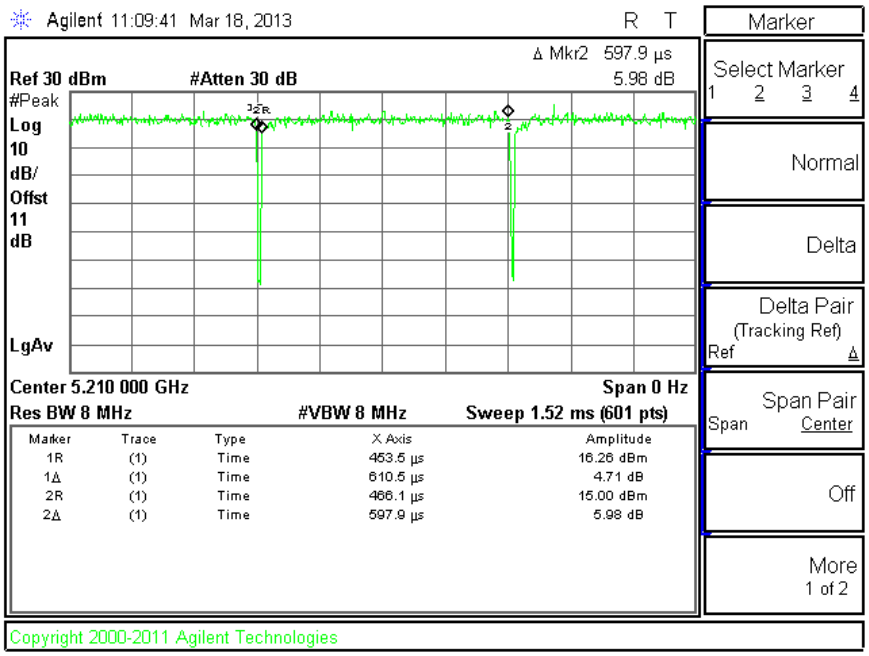
DUTY CYCLE 802.11ac VHT80 STBC MODE





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# 8. ANTENNA PORT TEST RESULTS

## 8.1. 802.11a Legacy 1TX MODE IN THE 5.2 GHz BAND

### 8.1.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB Bandwidth (MHz) |
|---|---|---|
| Low | 5180 | 20.33 |
| Mid | 5200 | 20.33 |
| High | 5240 | 20.33 |


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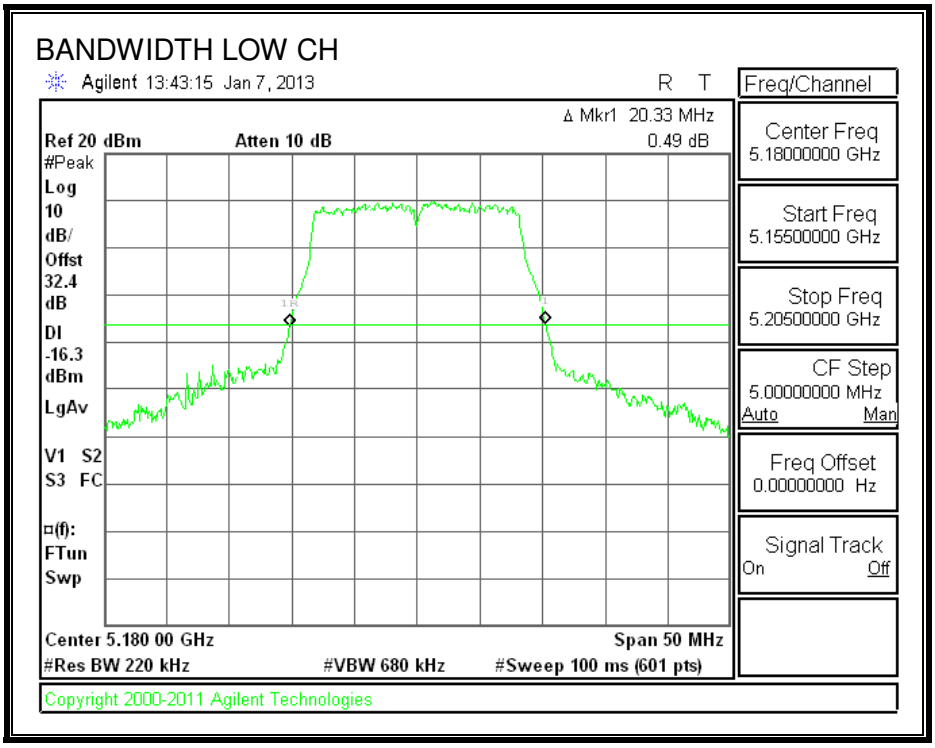
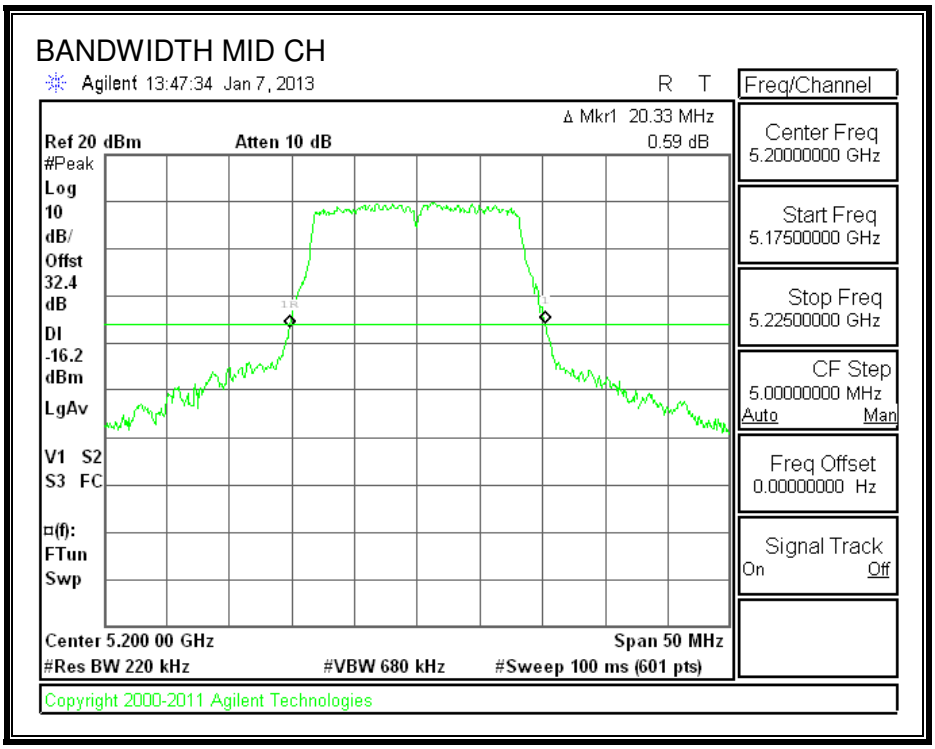
**26 dB BANDWIDTH**





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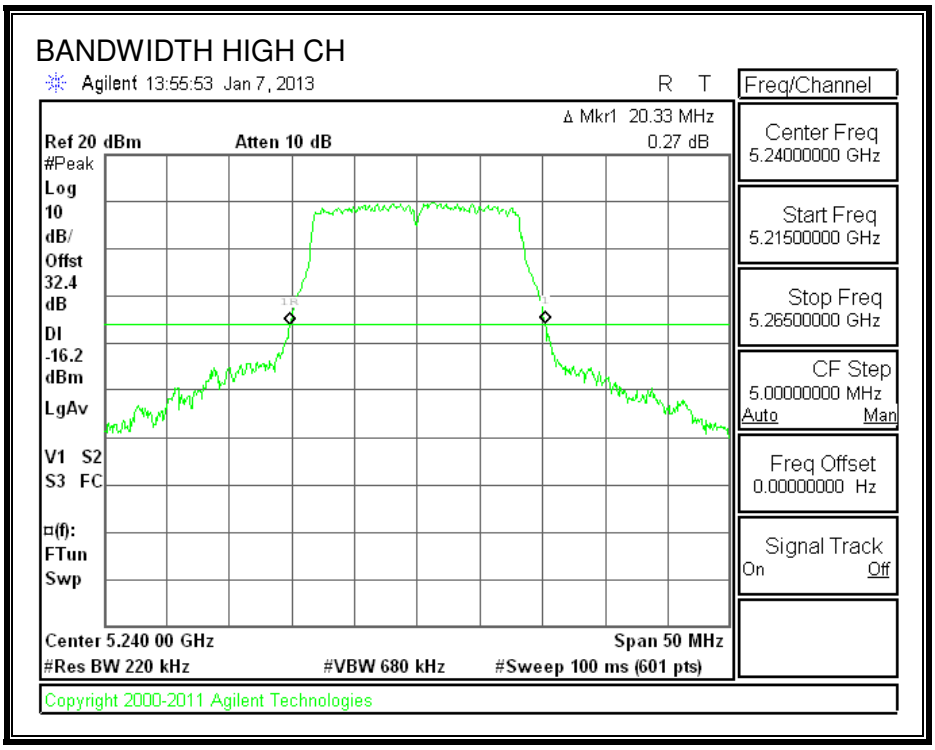
BANDWIDTH HIGH CH





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### 8.1.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5180 | 16.5050 |
| Mid | 5200 | 16.4885 |
| High | 5240 | 16.4770 |


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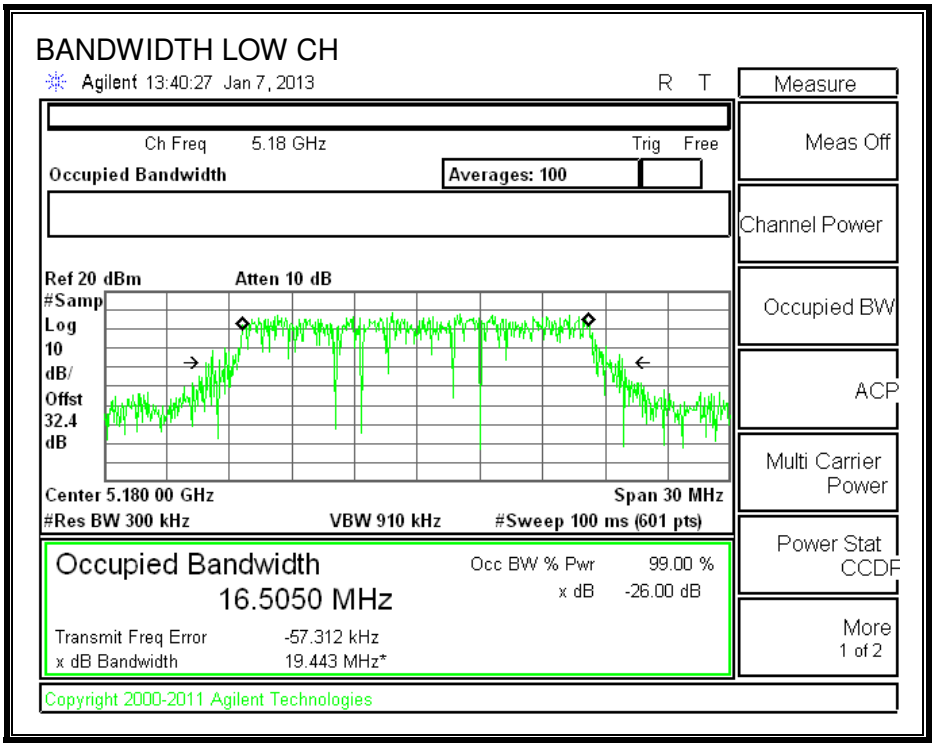
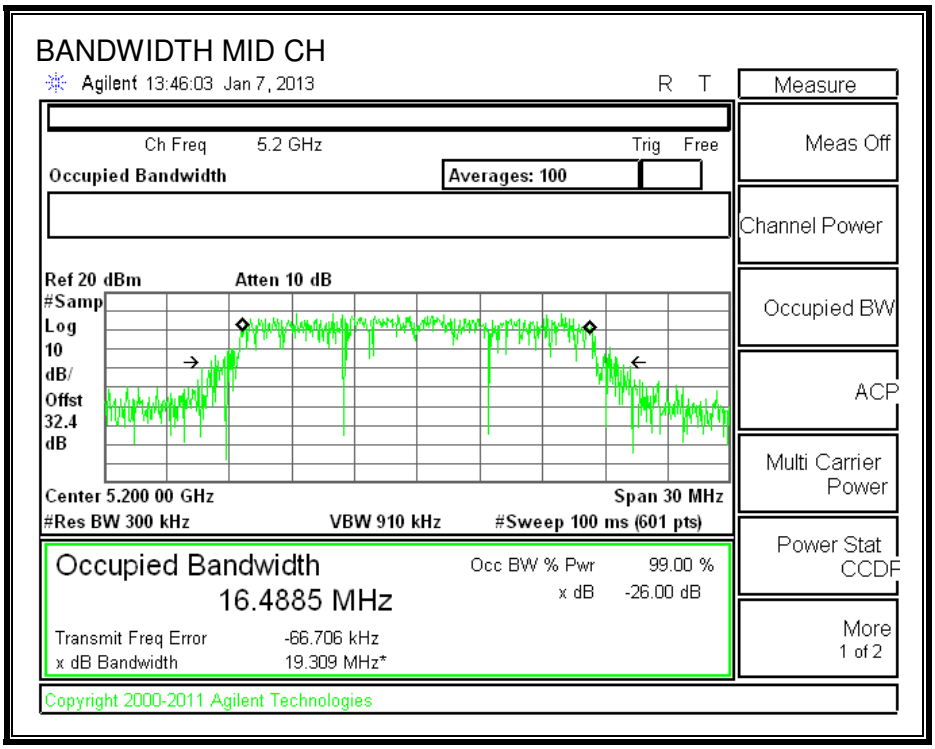
**99% BANDWIDTH**





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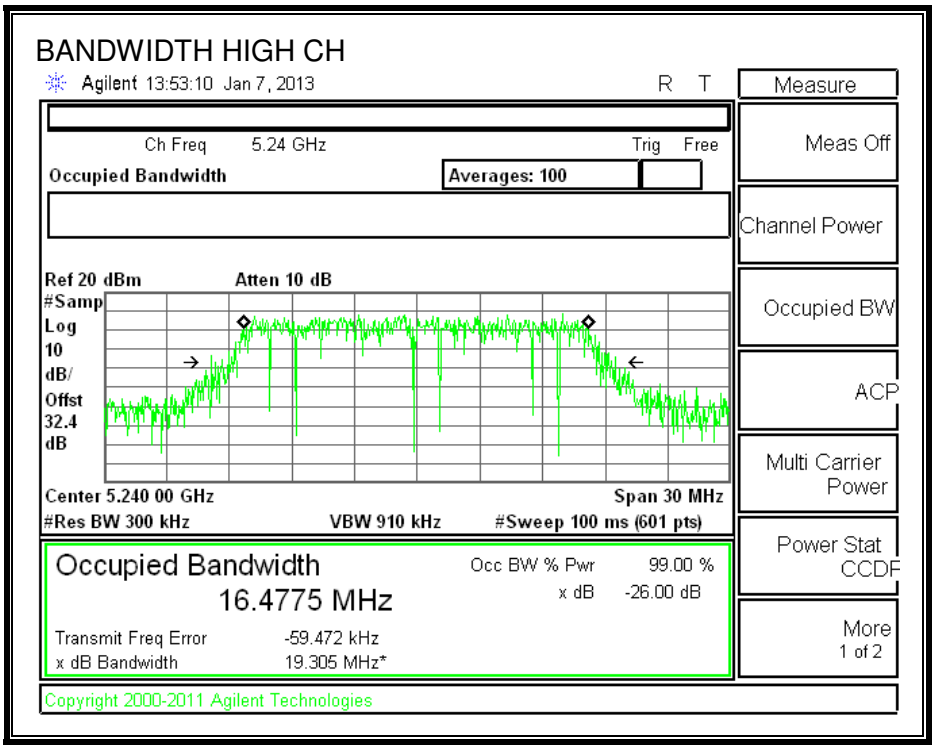



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### 8.1.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.


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**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Directio Gain (dBi) |
|---|---|---|
| Low | 5180 | 3.20 |
| Mid | 5200 | 3.20 |
| High | 5240 | 3.20 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | FCC PSD Limit (dBm) |
|---|---|---|---|
| Low | 5180 | 30.00 | 17.00 |
| Mid | 5200 | 30.00 | 17.00 |
| High | 5240 | 30.00 | 17.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5180 | 14.00 | 14.00 | 30.00 | -16.00 |
| Mid | 5200 | 14.10 | 14.10 | 30.00 | -15.90 |
| High | 5240 | 14.00 | 14.00 | 30.00 | -16.00 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5180 | 3.68 | 3.68 | 17.00 | -13.32 |
| Mid | 5200 | 3.58 | 3.58 | 17.00 | -13.42 |
| High | 5240 | 3.57 | 3.57 | 17.00 | -13.43 |


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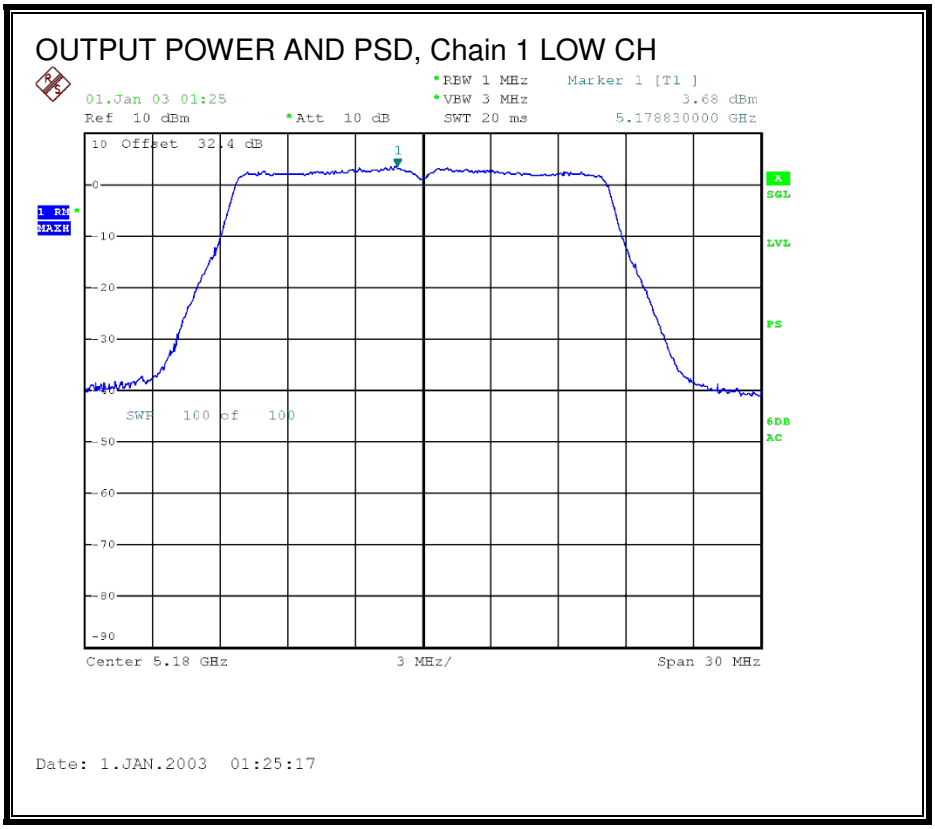
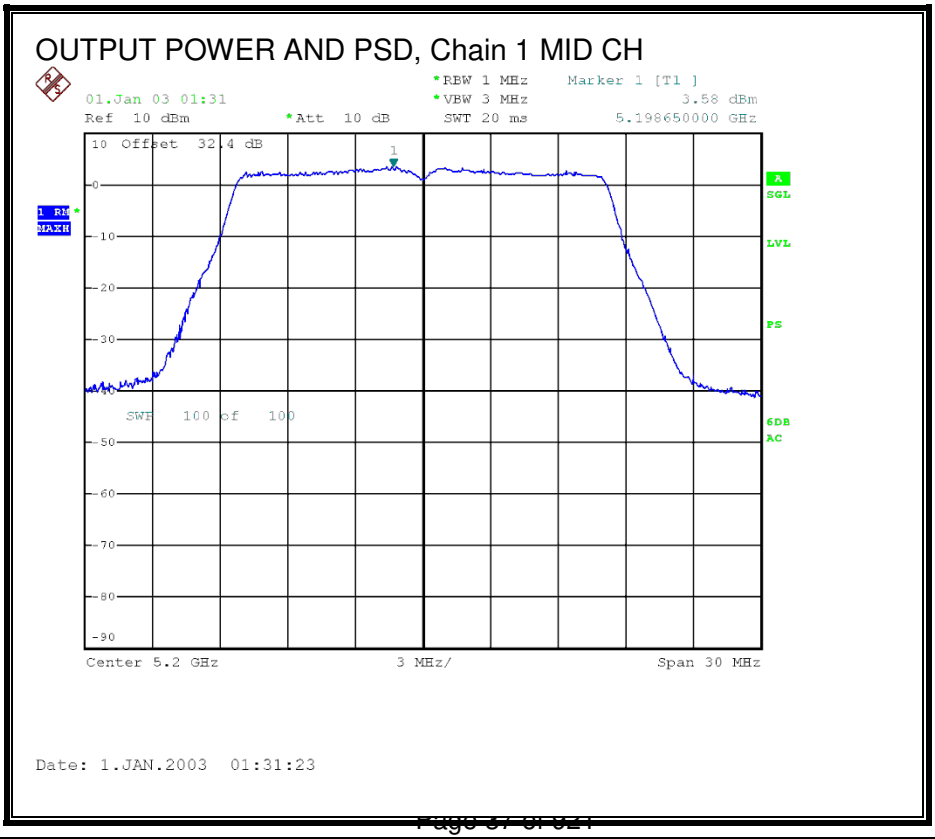
**OUTPUT POWER AND PSD, Chain 1**







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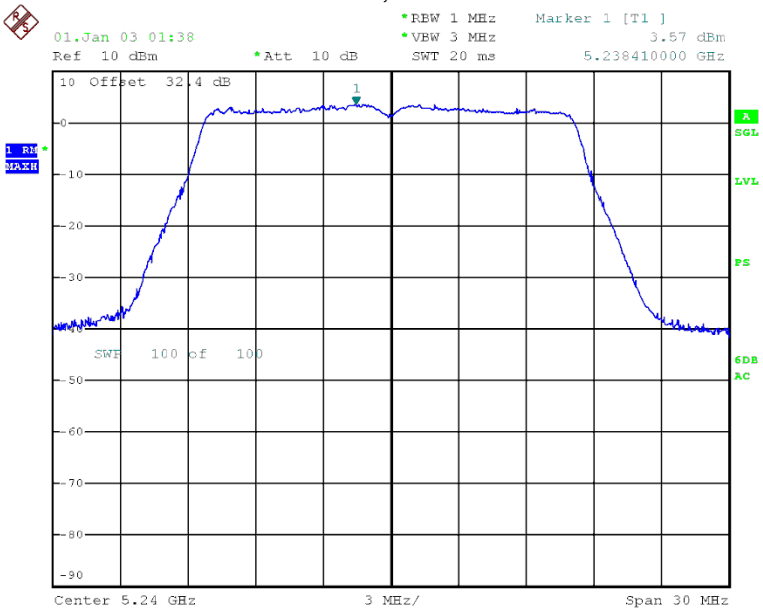
OUTPUT POWER AND PSD, Chain 1 HIGH CH

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## 8.2. 802.11n HT20 CDD 2TX MODE IN THE 5.2 GHz BAND

### 8.2.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5180 | 20.67 | 20.50 |
| Mid | 5200 | 20.67 | 20.42 |
| High | 5240 | 20.75 | 20.42 |


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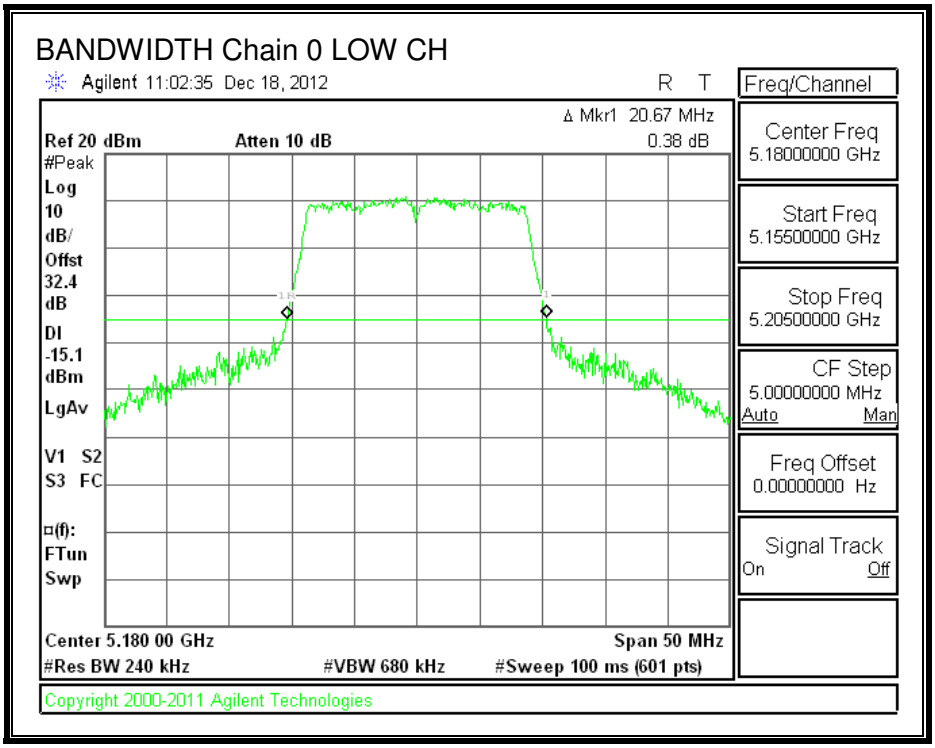
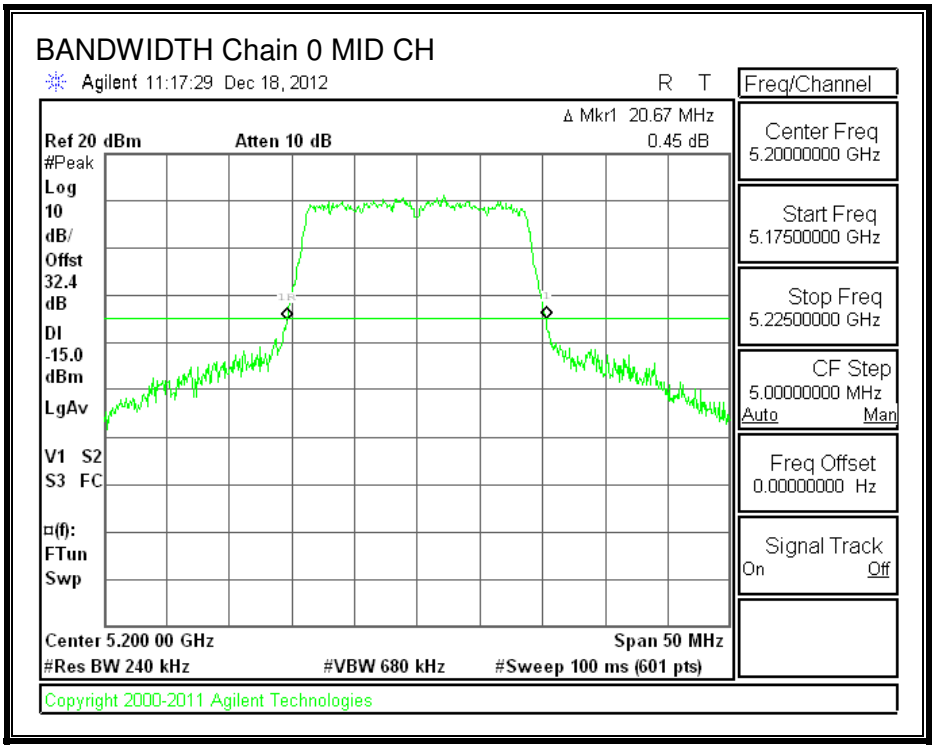
**26 dB BANDWIDTH, Chain 0**





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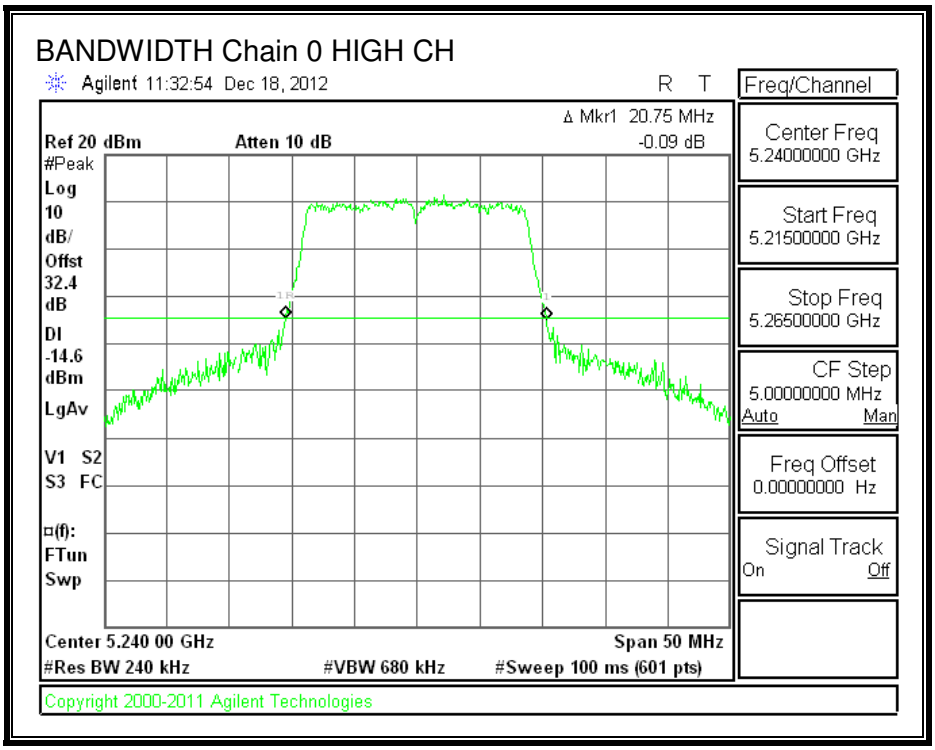
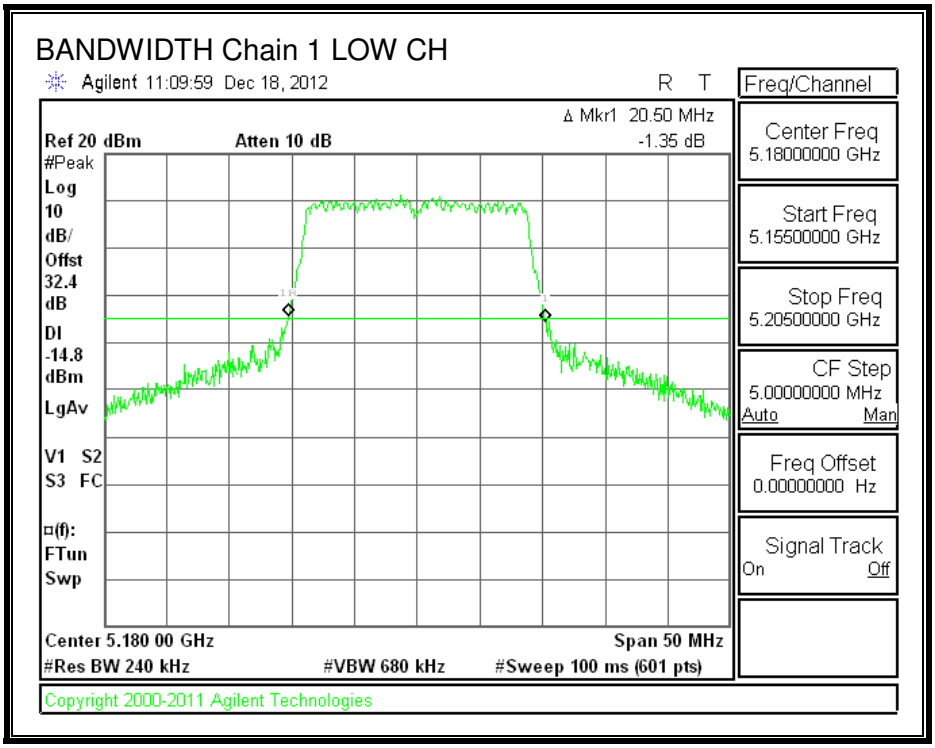



**26 dB BANDWIDTH, Chain 1**





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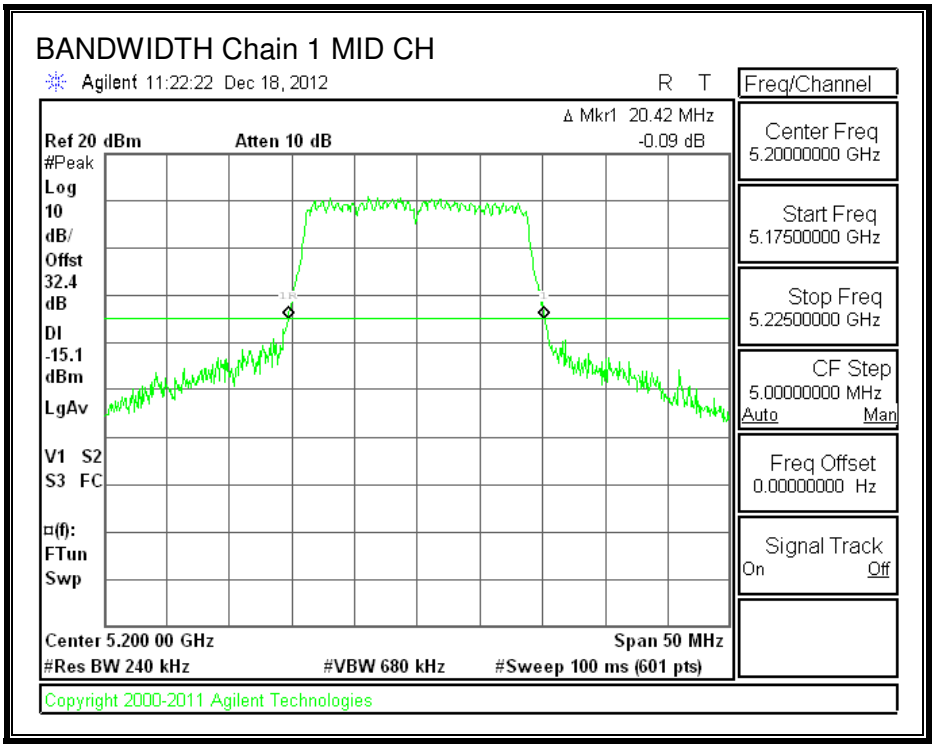
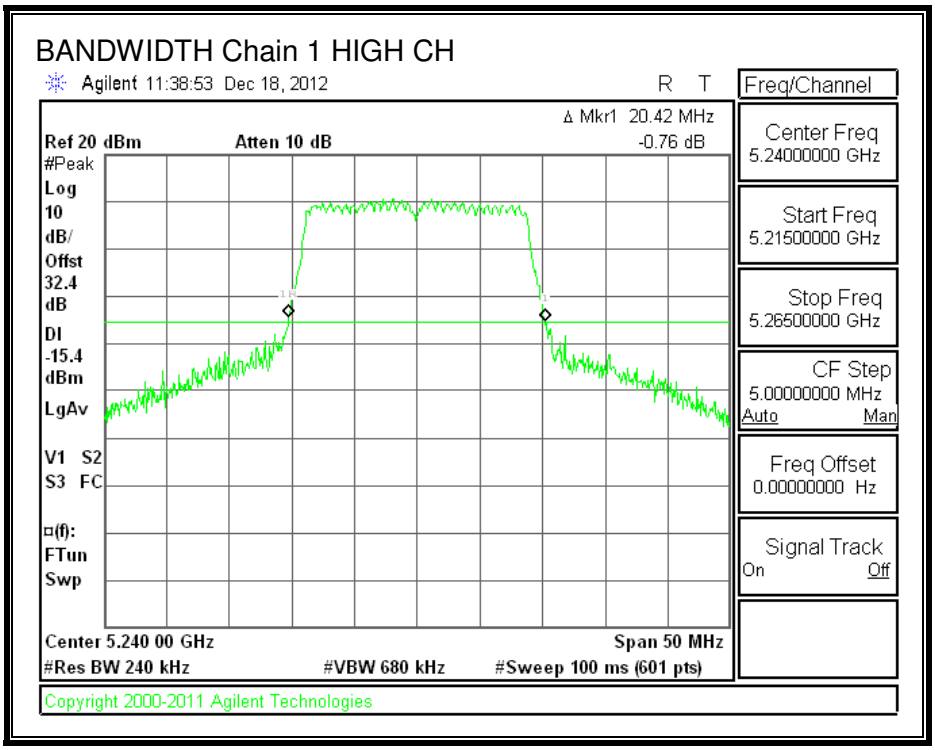
BANDWIDTH Chain 1 MID CH




BANDWIDTH Chain 1 HIGH CH





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### 8.2.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5180 | 17.7217 | 17.7031 |
| Mid | 5200 | 17.7120 | 17.7066 |
| High | 5240 | 17.7045 | 17.6986 |


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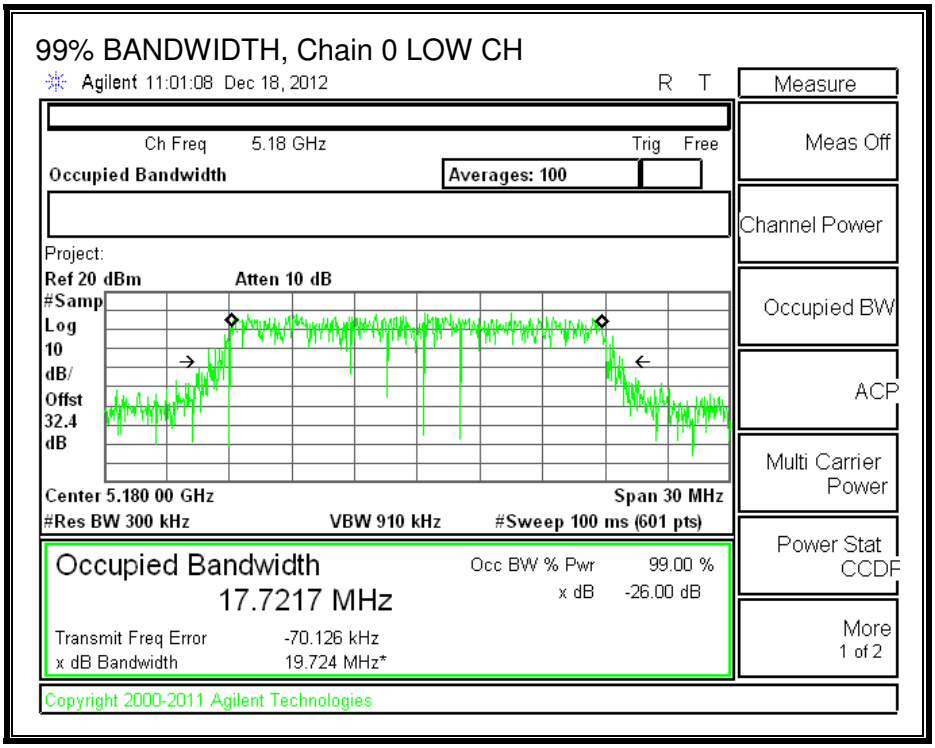
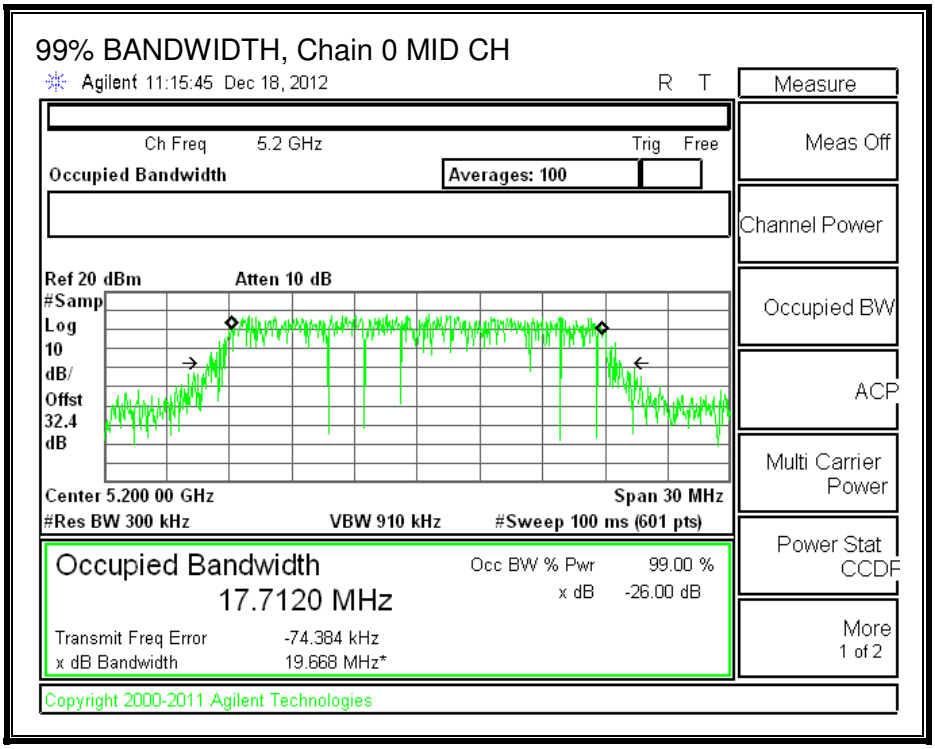
**99% BANDWIDTH, Chain 0**





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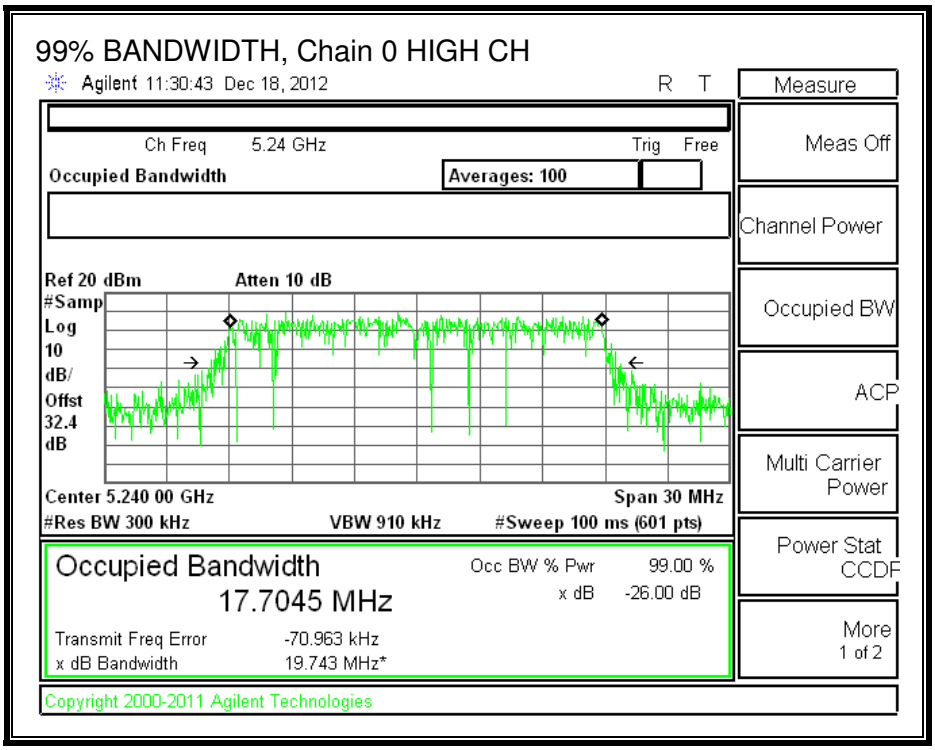
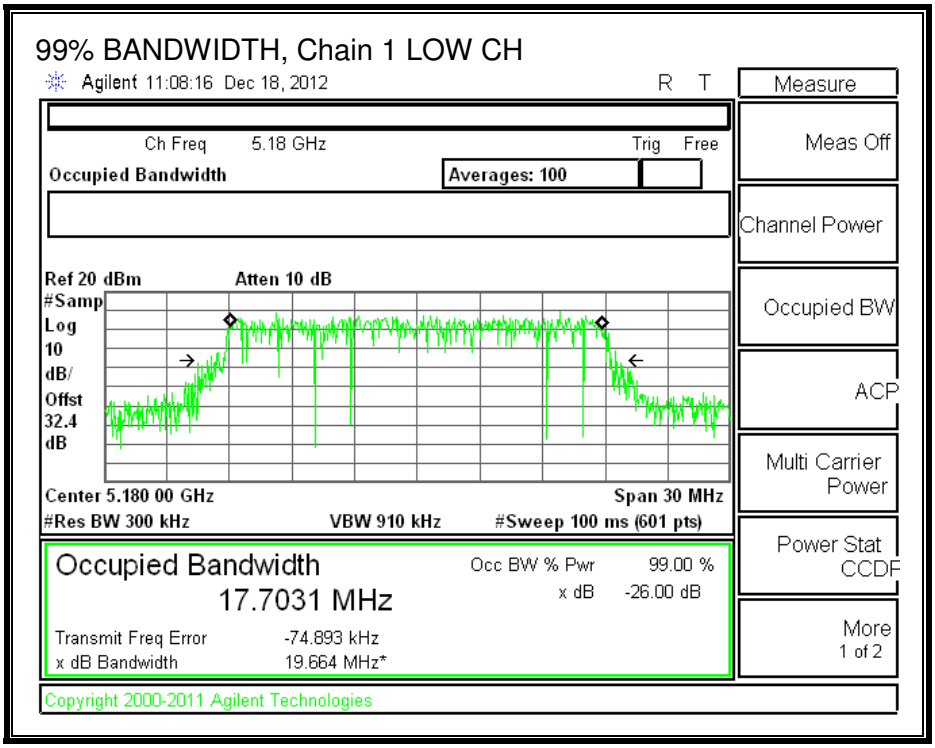



**99% BANDWIDTH, Chain 1**





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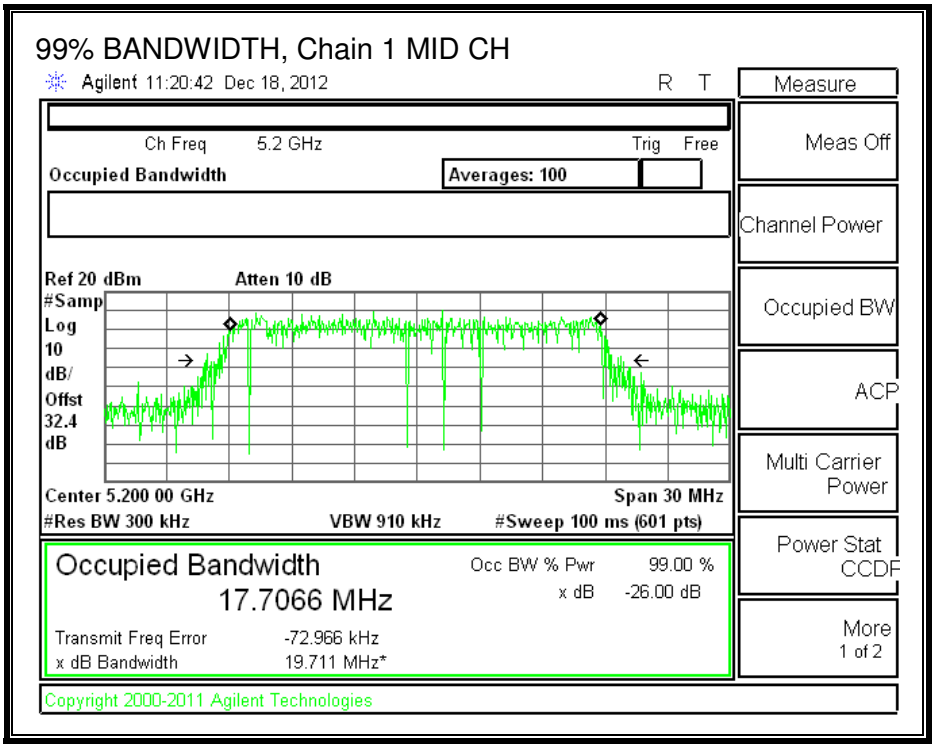


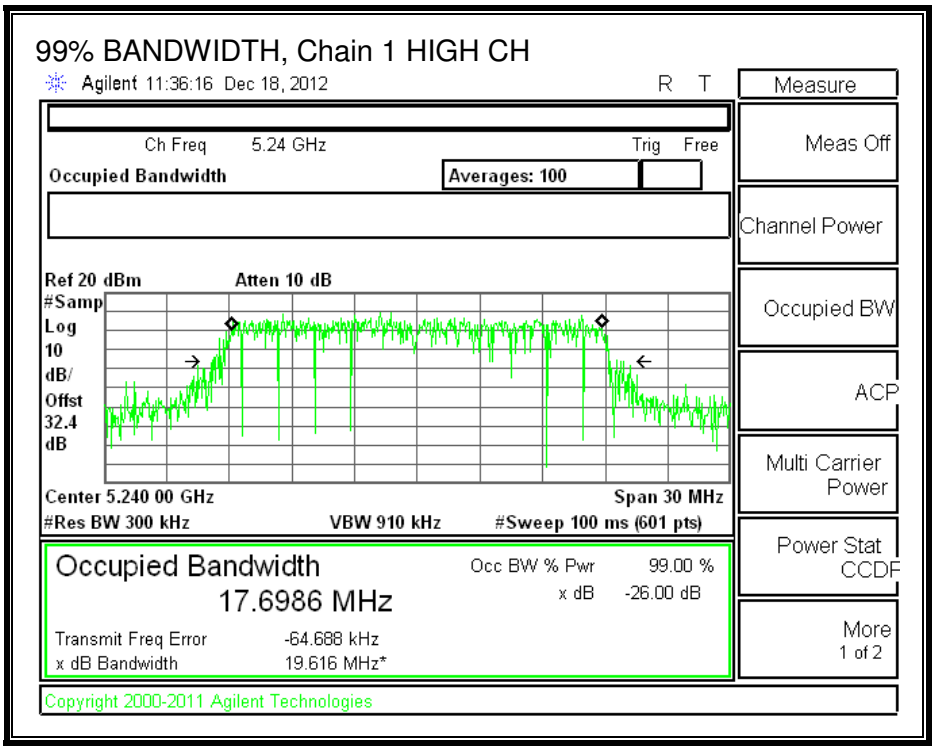



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### 8.2.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

For output power, the two chains are considered uncorrelated and the antenna gain is unequal among the chains. The directional gain is:


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| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|
| 3.20 | 2.20 | 2.73 |

For PSD, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|
| 3.20 | 2.20 | 5.72 |


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**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Correlat Directio Gain (dBi) | Uncorre Directio Gain (dBi) |
|---|---|---|---|
| Low | 5180 | 5.72 | 2.73 |
| Mid | 5200 | 5.72 | 2.73 |
| High | 5240 | 5.72 | 2.73 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | FCC PSD Limit (dBm) |
|---|---|---|---|
| Low | 5180 | 30.00 | 17.00 |
| Mid | 5200 | 30.00 | 17.00 |
| High | 5240 | 30.00 | 17.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5180 | 10.10 | 10.00 | 13.06 | 30.00 | -16.94 |
| Mid | 5200 | 10.10 | 9.90 | 13.01 | 30.00 | -16.99 |
| High | 5240 | 10.26 | 10.00 | 13.14 | 30.00 | -16.86 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5180 | 0.681 | 0.242 | 3.48 | 17.00 | -13.52 |
| Mid | 5200 | 0.600 | 0.191 | 3.41 | 17.00 | -13.59 |
| High | 5240 | 0.595 | 0.255 | 3.44 | 17.00 | -13.56 |


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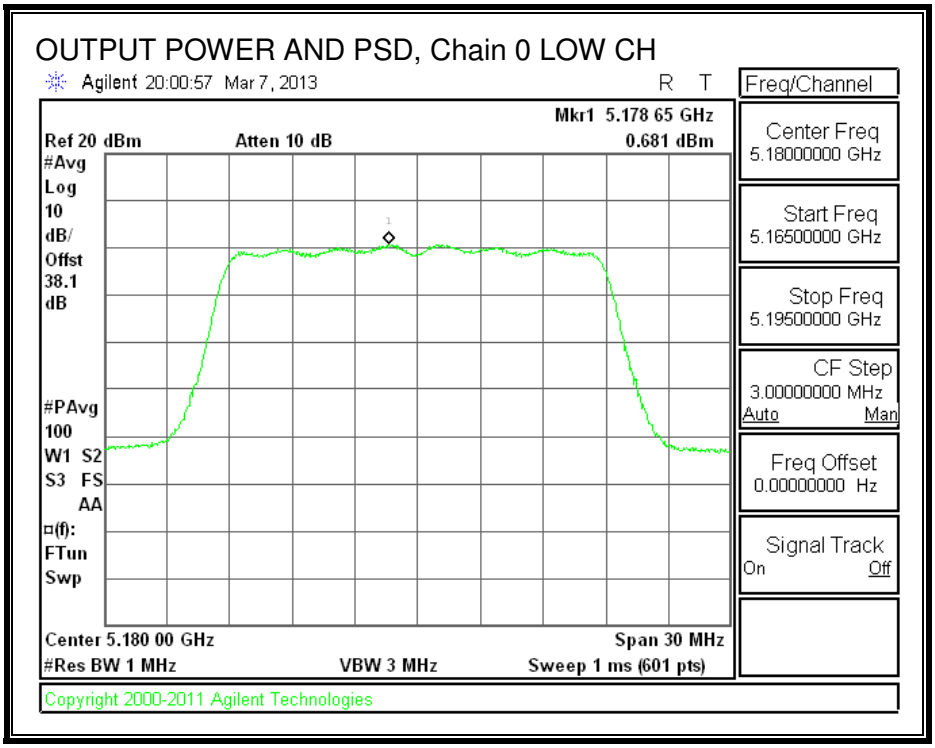
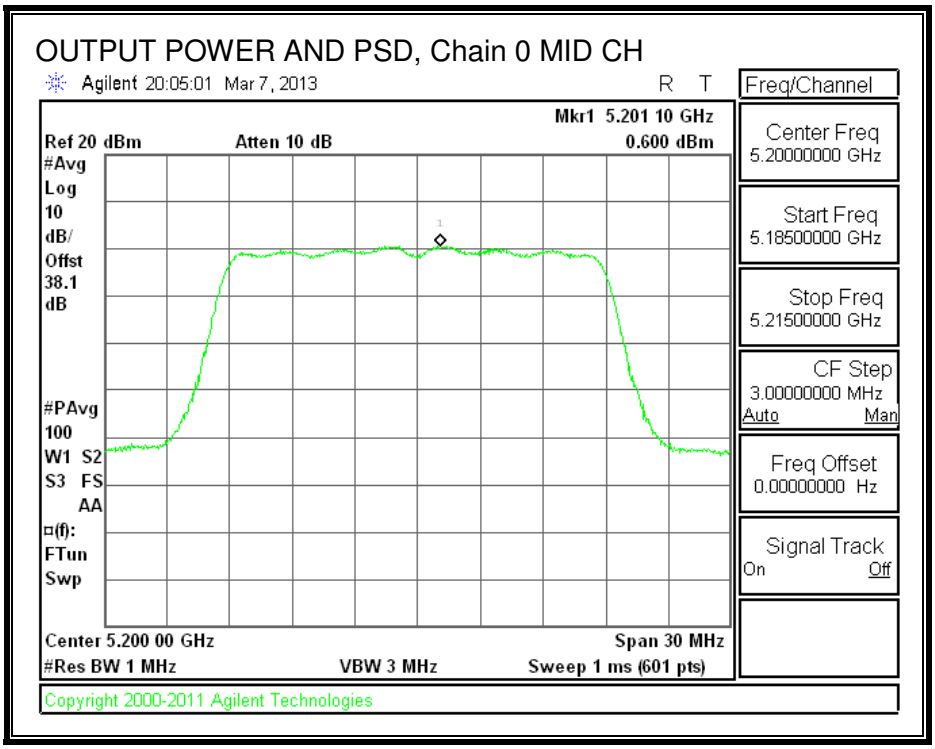
**OUTPUT POWER AND PSD, Chain 0**





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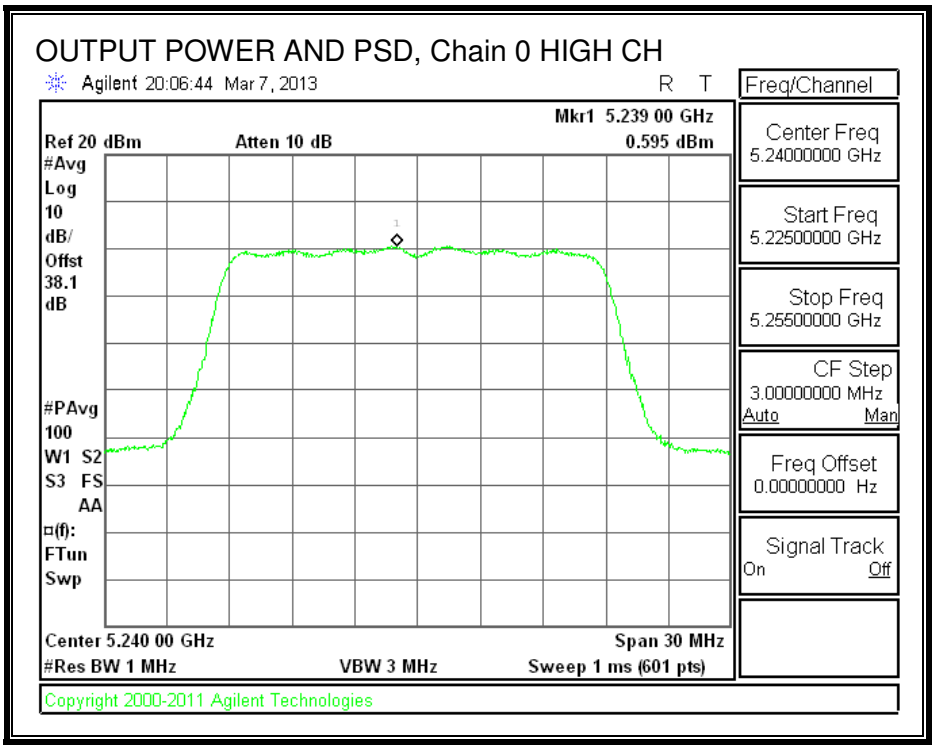
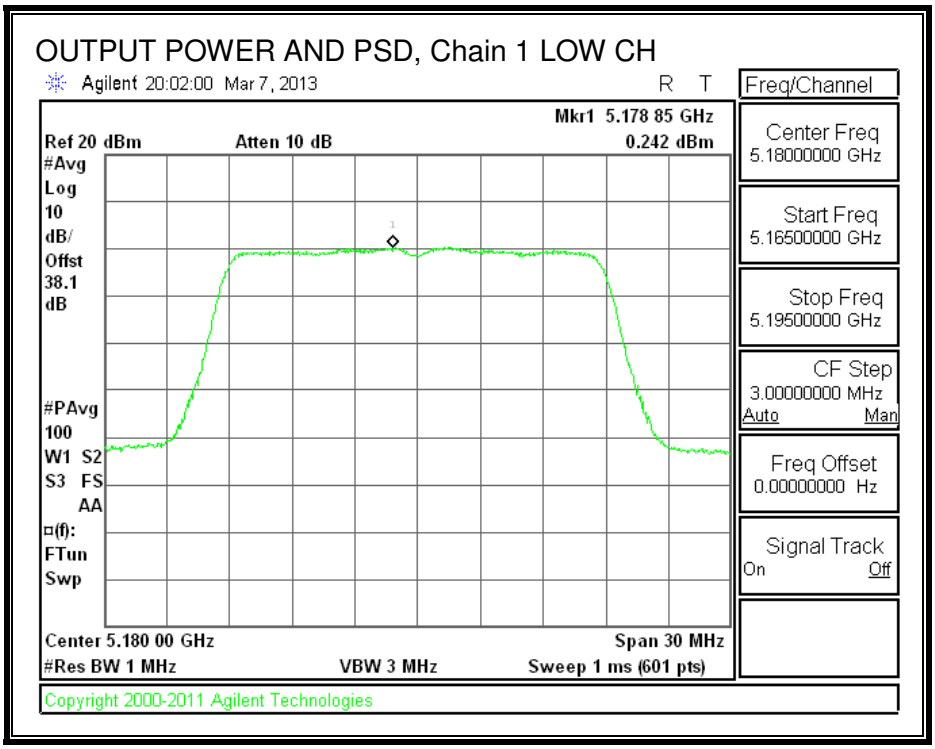



**OUTPUT POWER AND PSD, Chain 1**





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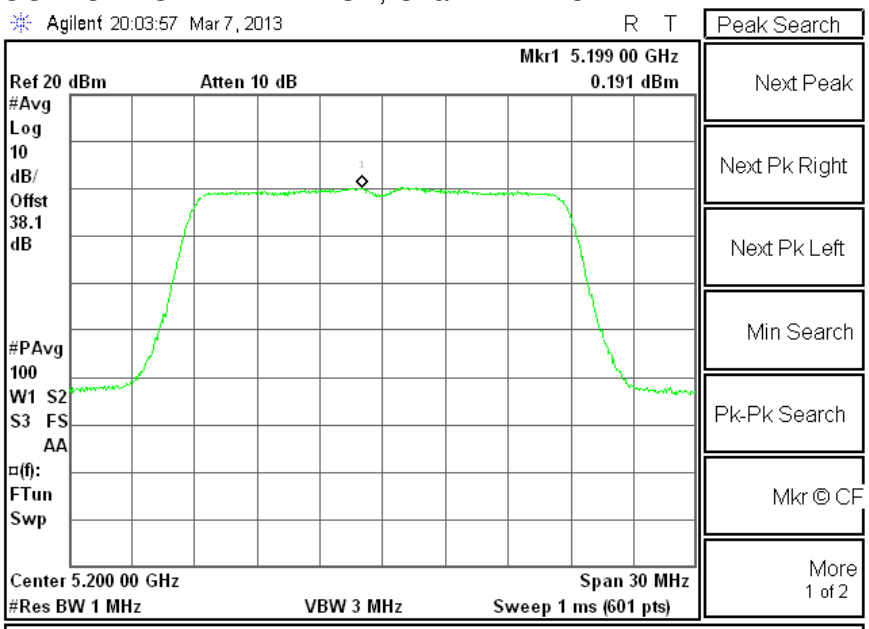
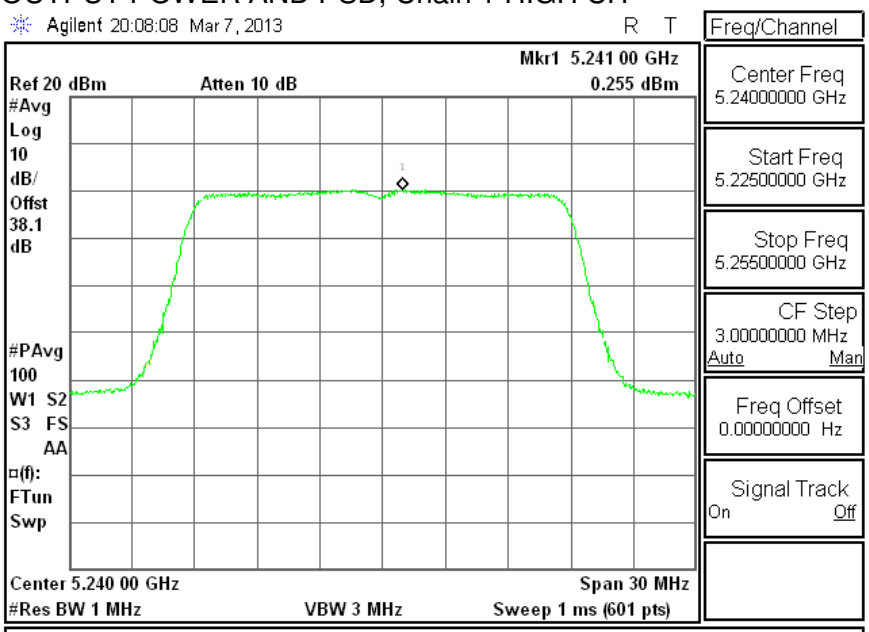
OUTPUT POWER AND PSD, Chain 1 MID CH




OUTPUT POWER AND PSD, Chain 1 HIGH CH





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## 8.3. 802.11n HT20 BF 2TX MODE IN THE 5.2 GHz BAND

Covered by testing HT20 CDD 2TX mode, the power per chain used for HT20 CDD 2TX mode is the same power per chain that will be used for HT20 BF 2TX mode. However, since BF is correlated and CDD is uncorrelated for output power, the section below for output power using correlated AG for this BF mode shows it is still compliant.

### 8.3.1. OUTPUT AVERAGE POWER

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

For output power, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|
| 3.20 | 2.20 | 5.72 |

**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Correlat Directio Gain (dBi) |
|---|---|---|
| Low | 5180 | 5.72 |
| Mid | 5200 | 5.72 |
| High | 5240 | 5.72 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) |
|---|---|---|
| Low | 5180 | 30.00 |
| Mid | 5200 | 30.00 |
| High | 5240 | 30.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5180 | 10.10 | 10.00 | 13.06 | 30.00 | -16.94 |
| Mid | 5200 | 10.10 | 9.90 | 13.01 | 30.00 | -16.99 |
| High | 5240 | 10.26 | 10.00 | 13.14 | 30.00 | -16.86 |


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## 8.4. 802.11n HT20 STBC 2TX MODE IN THE 5.2 GHz BAND

### 8.4.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5180 | 20.67 | 20.58 |
| Mid | 5200 | 20.83 | 20.58 |
| High | 5240 | 20.75 | 20.50 |


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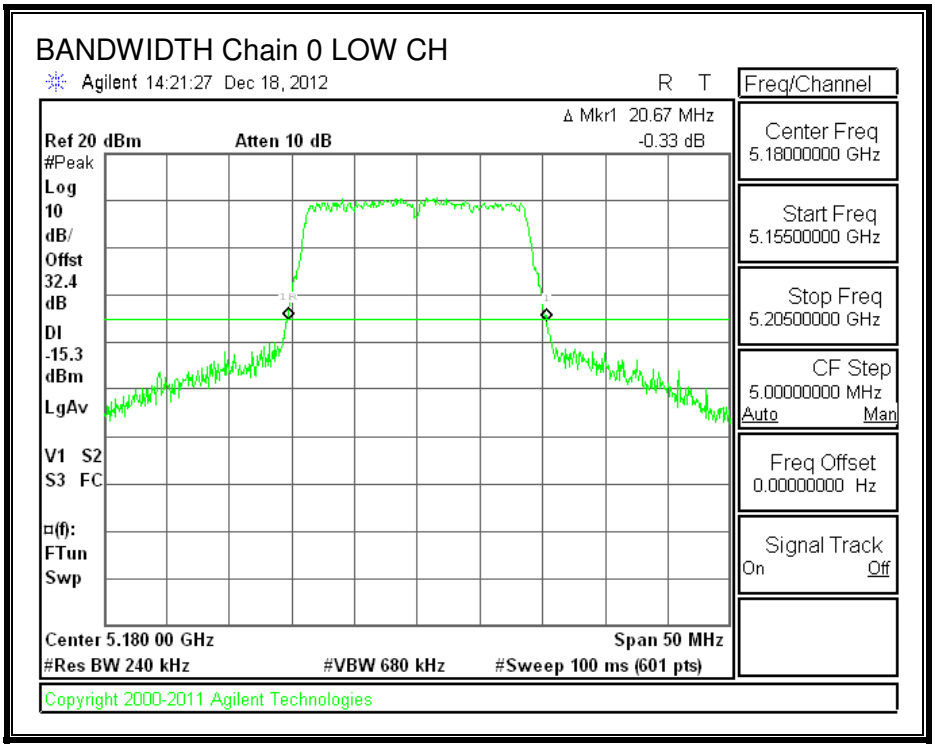
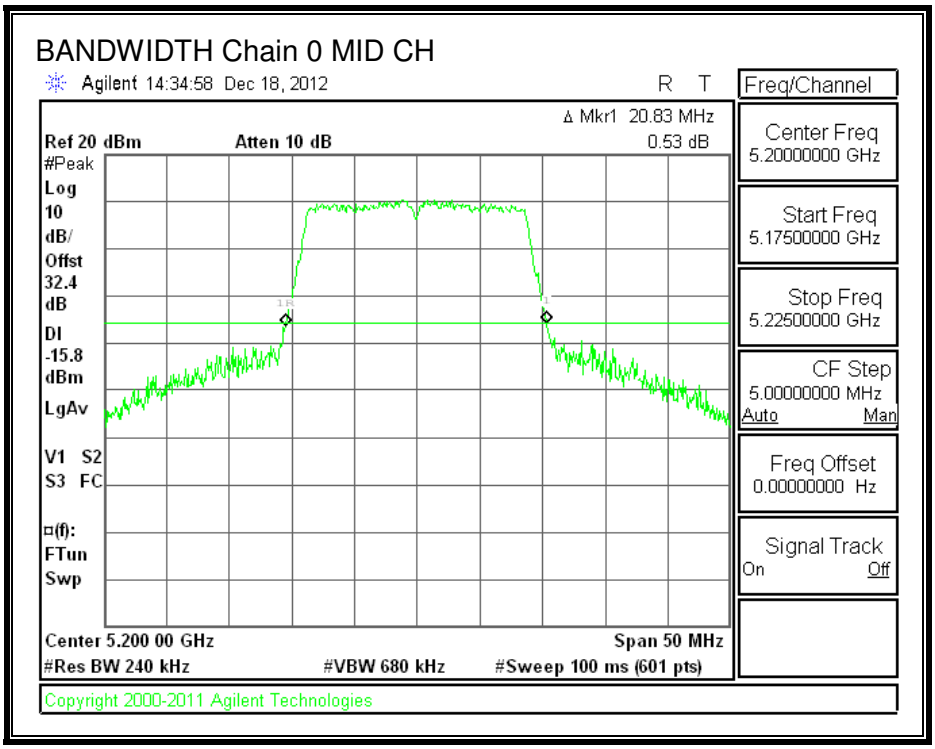
**26 dB BANDWIDTH, Chain 0**





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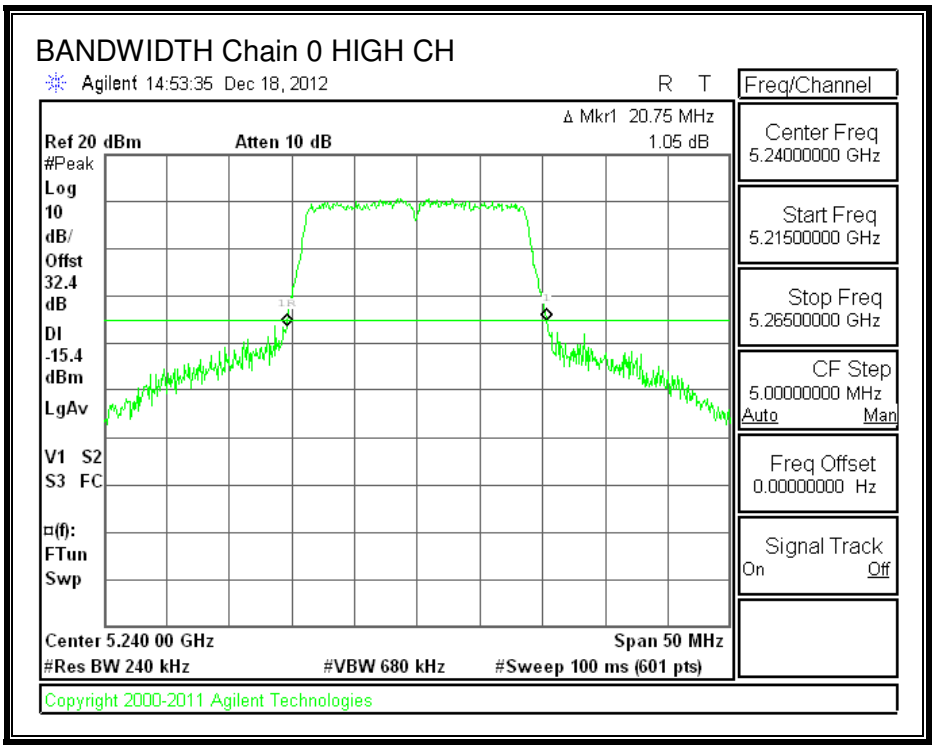
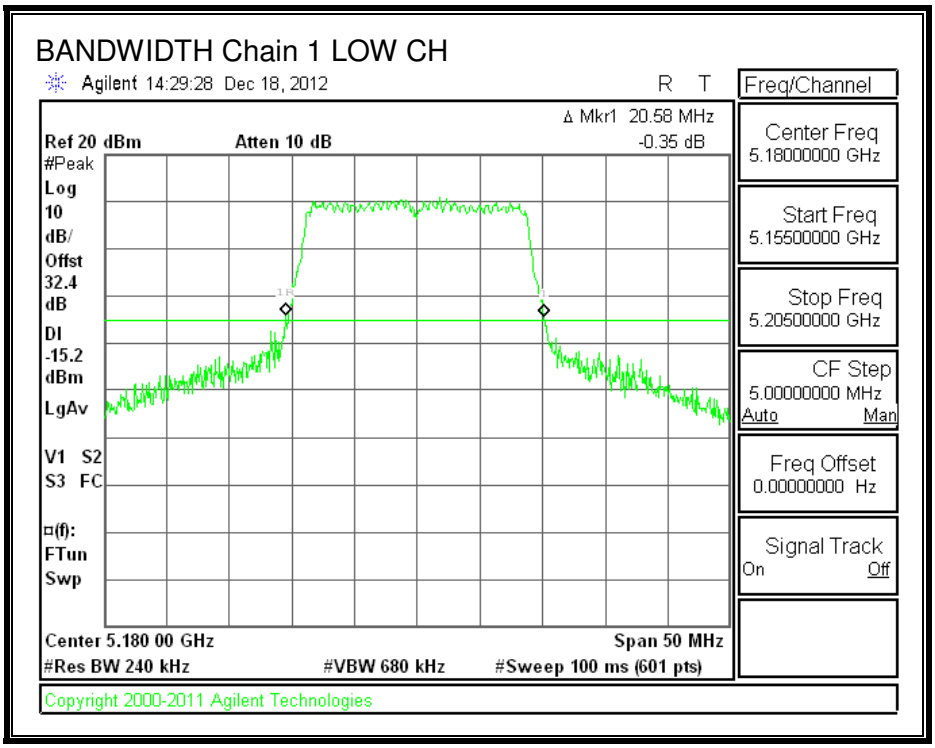



**26 dB BANDWIDTH, Chain 1**





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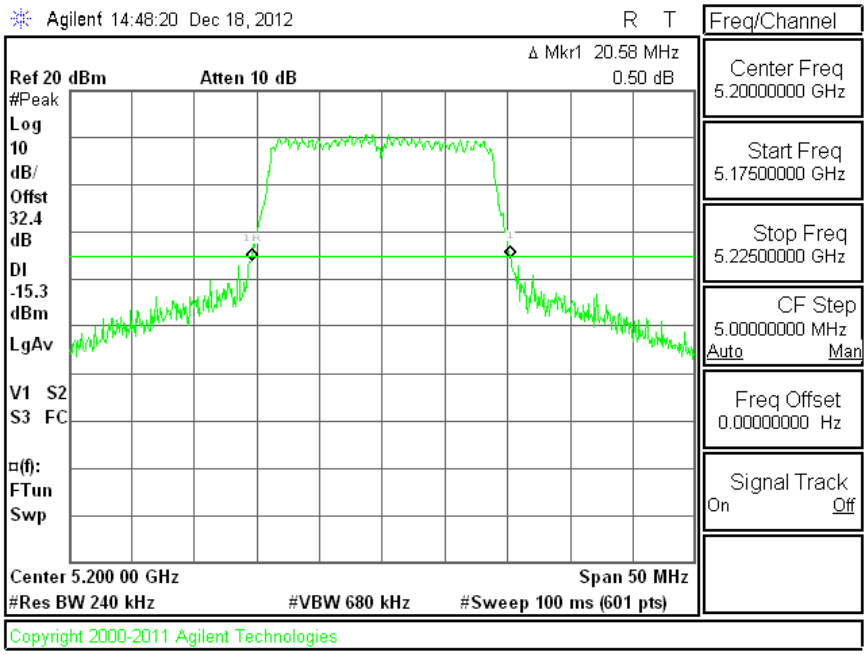
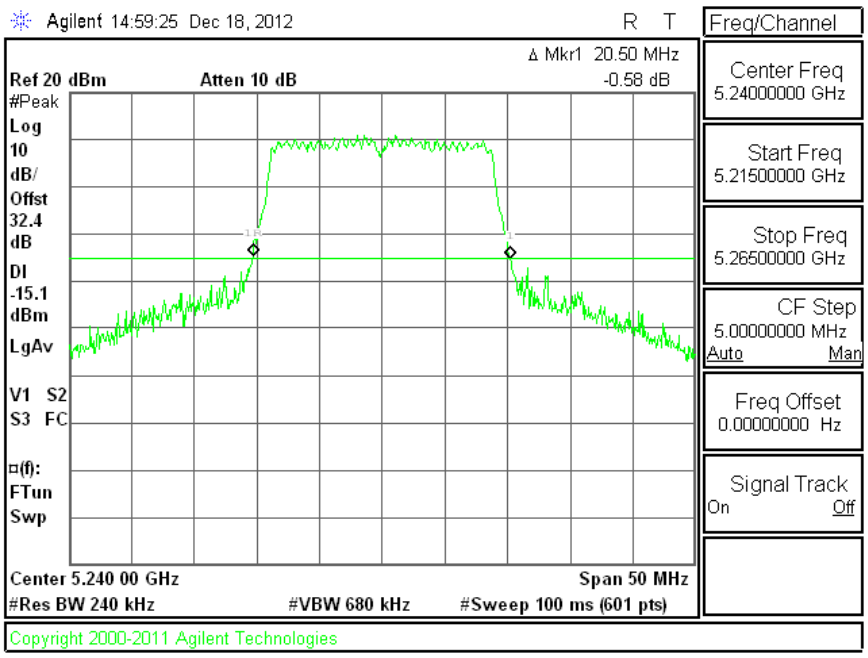
BANDWIDTH Chain 1 MID CH




BANDWIDTH Chain 1 HIGH CH





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### 8.4.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5180 | 17.6779 | 17.6947 |
| Mid | 5200 | 17.6852 | 17.6885 |
| High | 5240 | 17.6850 | 17.6906 |


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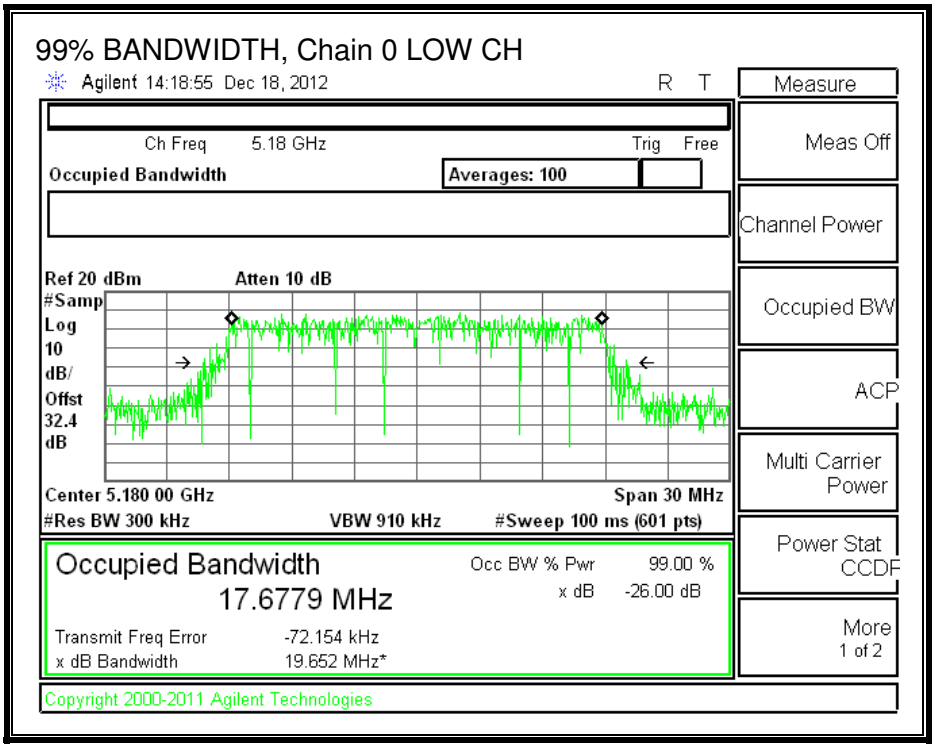
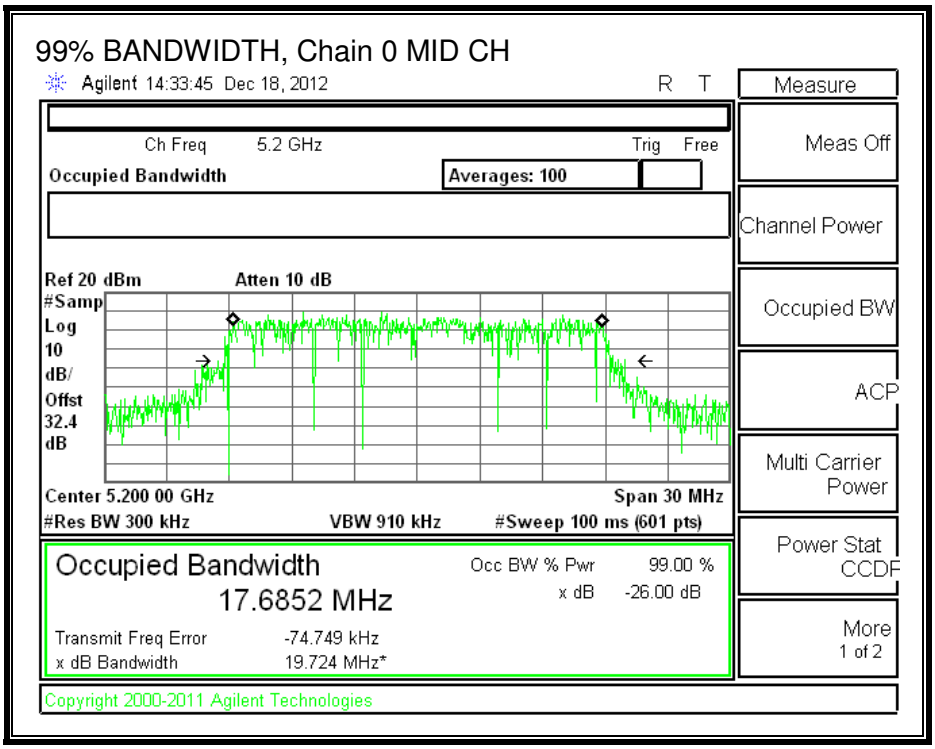
**99% BANDWIDTH, Chain 0**





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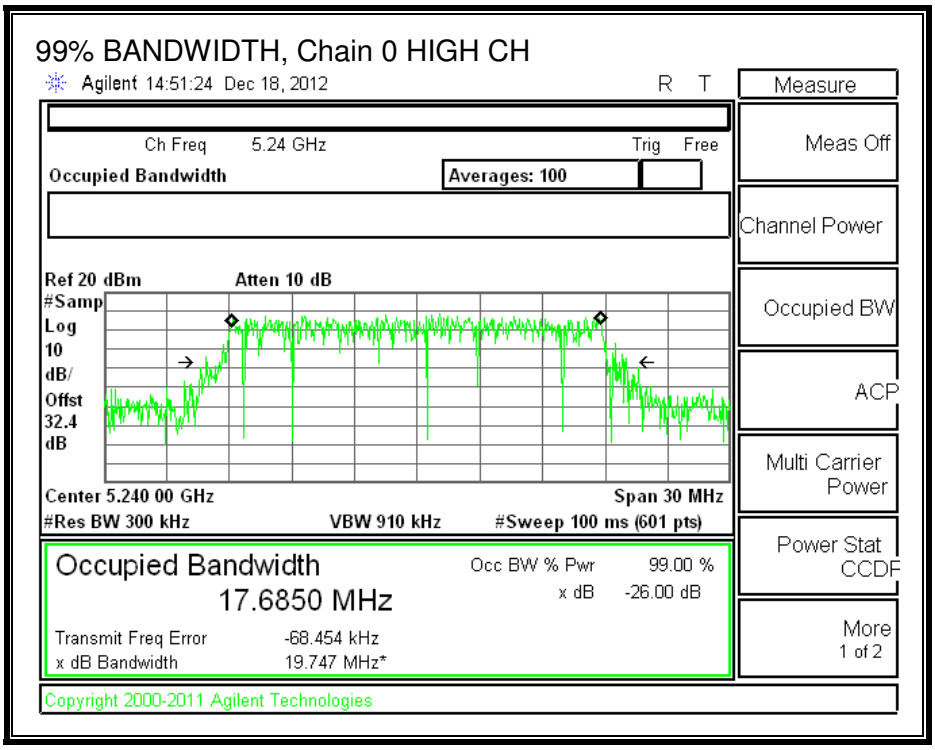
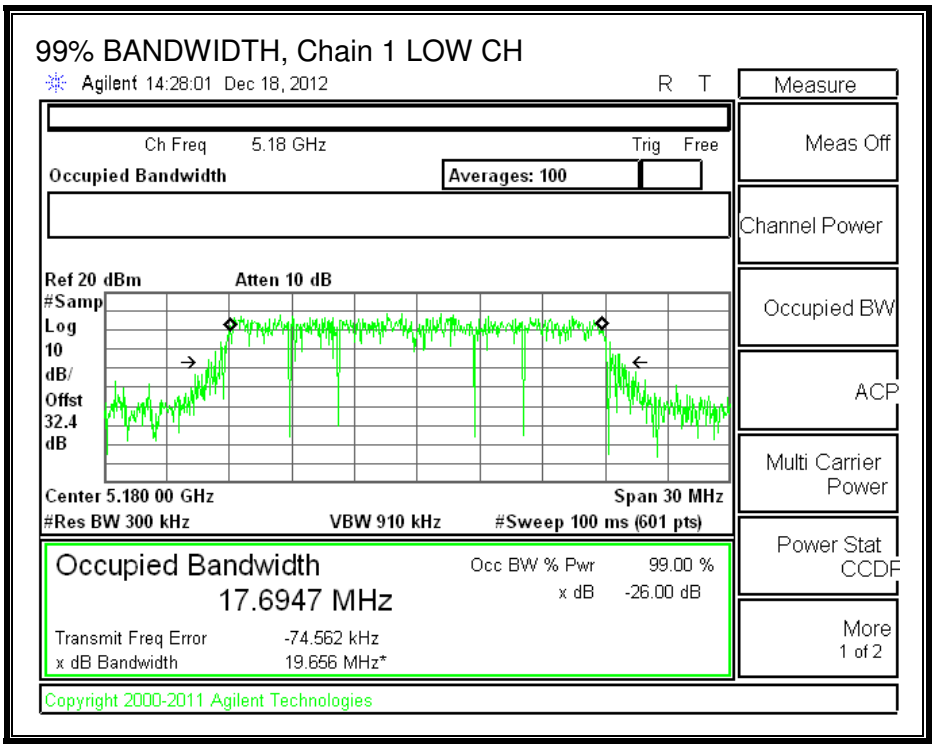



**99% BANDWIDTH, Chain 1**





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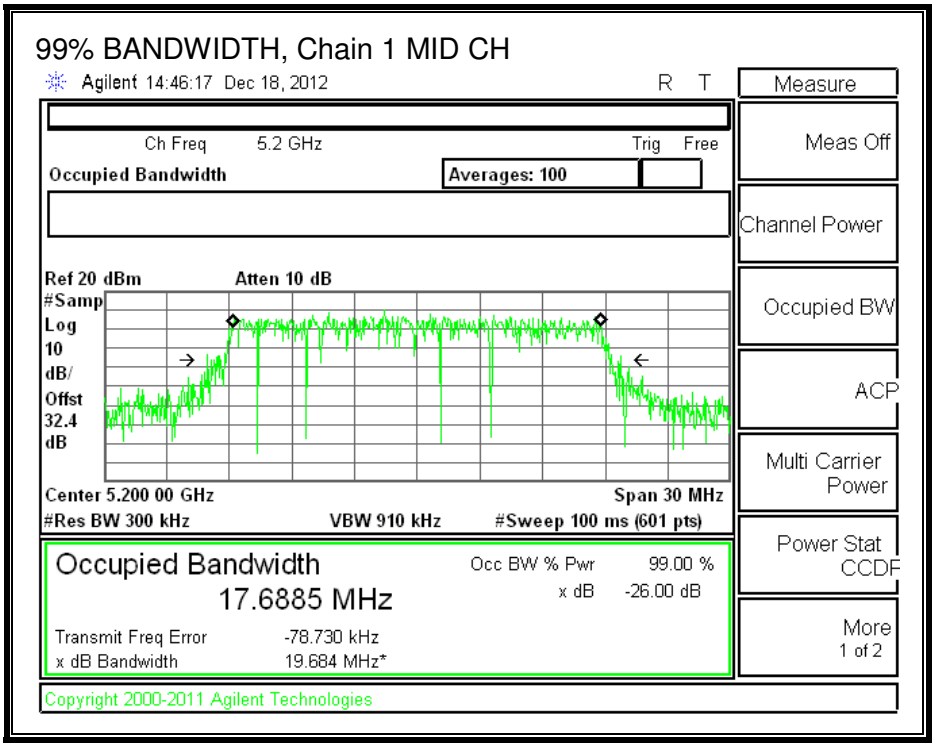


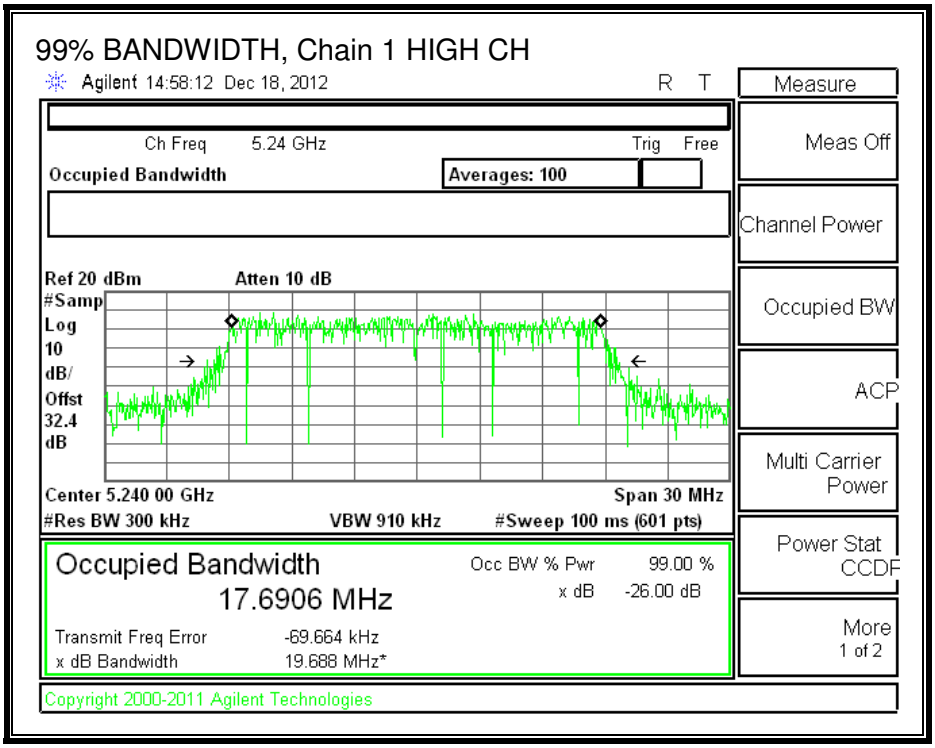



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### 8.4.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|
| 3.20 | 2.20 | 2.73 |


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**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Directio Gain (dBi) |
|---|---|---|
| Low | 5180 | 2.73 |
| Mid | 5200 | 2.73 |
| High | 5240 | 2.73 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | FCC PSD Limit (dBm) |
|---|---|---|---|
| Low | 5180 | 30.00 | 17.00 |
| Mid | 5200 | 30.00 | 17.00 |
| High | 5240 | 30.00 | 17.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5180 | 11.10 | 11.20 | 14.16 | 30.00 | -15.84 |
| Mid | 5200 | 11.21 | 10.98 | 14.11 | 30.00 | -15.89 |
| High | 5240 | 11.20 | 11.10 | 14.16 | 30.00 | -15.84 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5180 | 0.72 | 1.16 | 3.96 | 17.00 | -13.04 |
| Mid | 5200 | 0.70 | 1.12 | 3.93 | 17.00 | -13.07 |
| High | 5240 | 0.77 | 0.67 | 3.73 | 17.00 | -13.27 |


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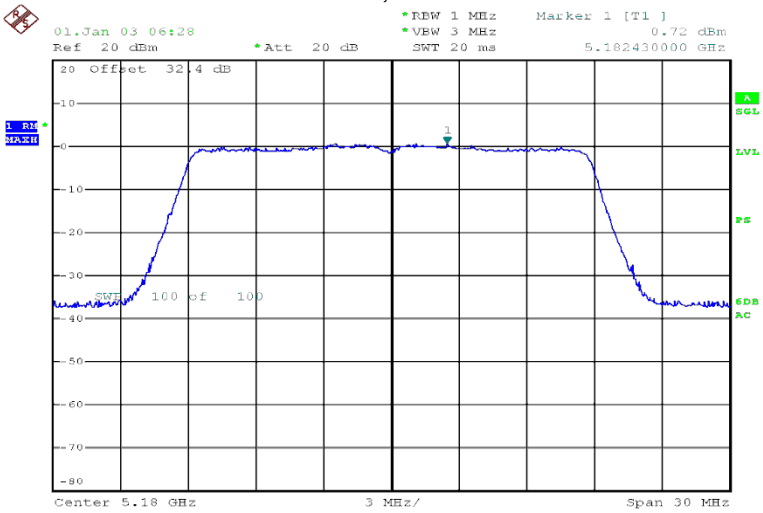
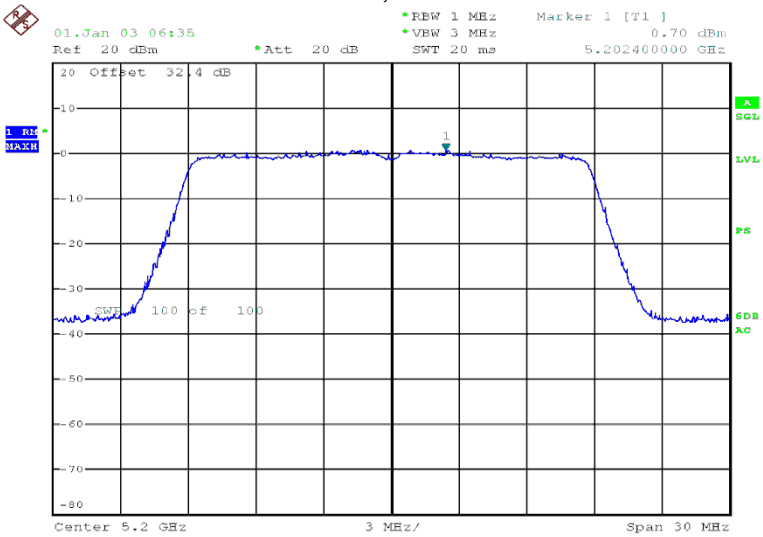
**OUTPUT POWER AND PSD, Chain 0**

OUTPUT POWER AND PSD, Chain 0 LOW CH




Date: 1.JAN.2003 06:28:26

OUTPUT POWER AND PSD, Chain 0 MID CH




Date: 1.JAN.2003 06:35:26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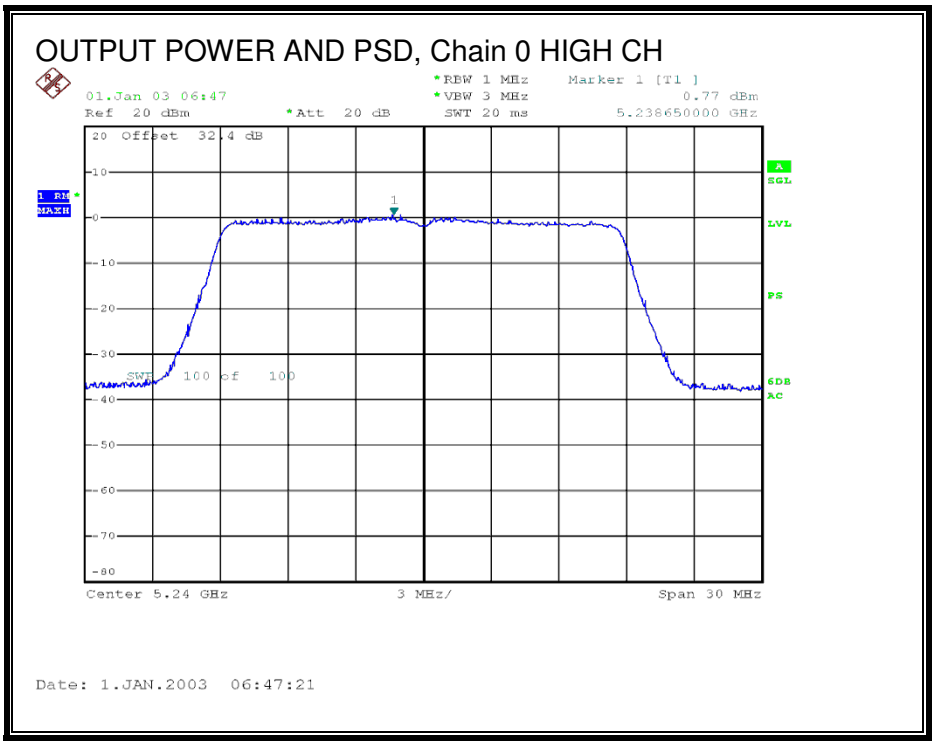
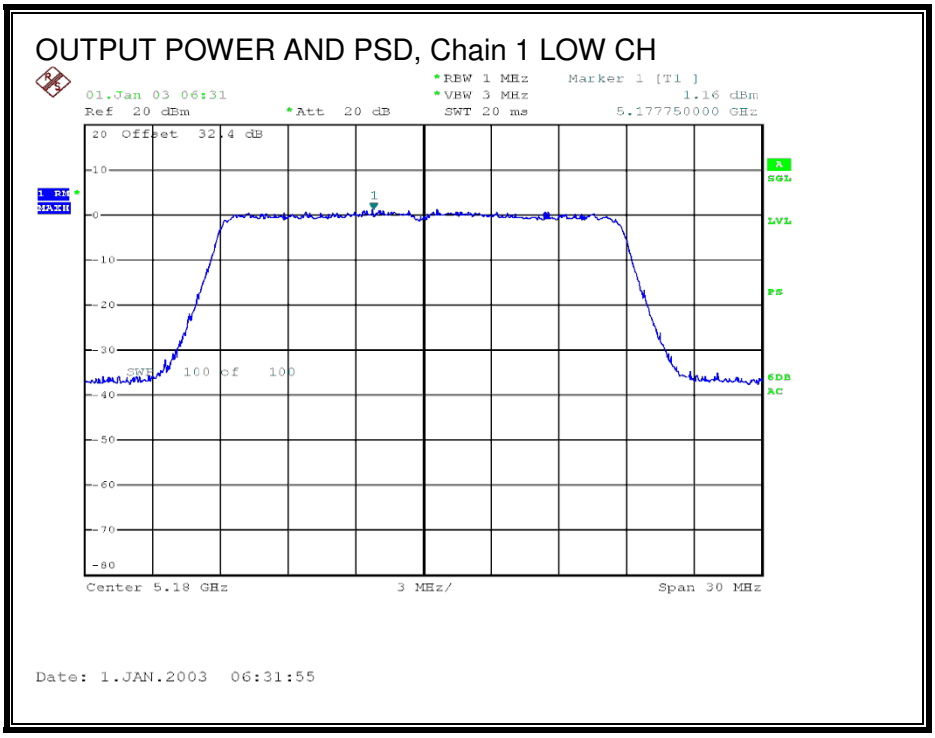



**OUTPUT POWER AND PSD, Chain 1**





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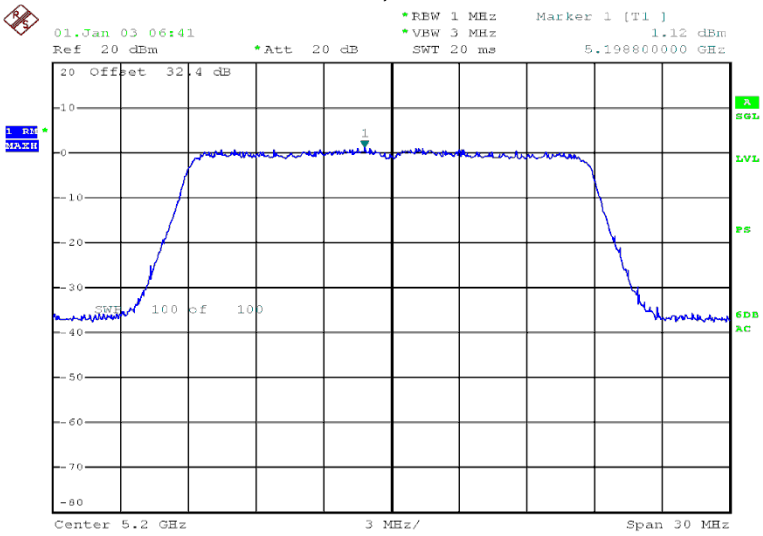
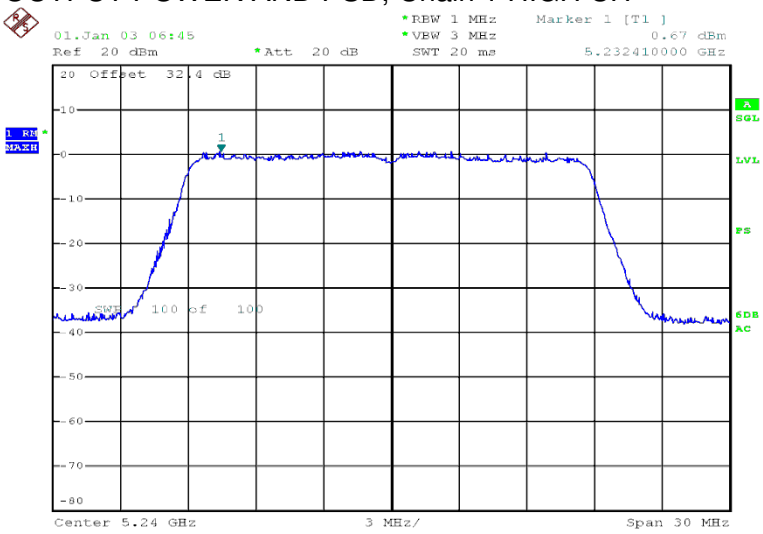
OUTPUT POWER AND PSD, Chain 1 MID CH




Date: 1.JAN.2003 06:41:55

OUTPUT POWER AND PSD, Chain 1 HIGH CH




Date: 1.JAN.2003 06:45:10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## 8.5. 802.11n HT20 CDD 3TX MODE IN THE 5.2 GHz BAND

### 8.5.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) | 26 dB BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5180 | 20.75 | 20.42 | 20.67 |
| Mid | 5200 | 20.67 | 20.50 | 20.67 |
| High | 5240 | 20.67 | 20.50 | 20.92 |


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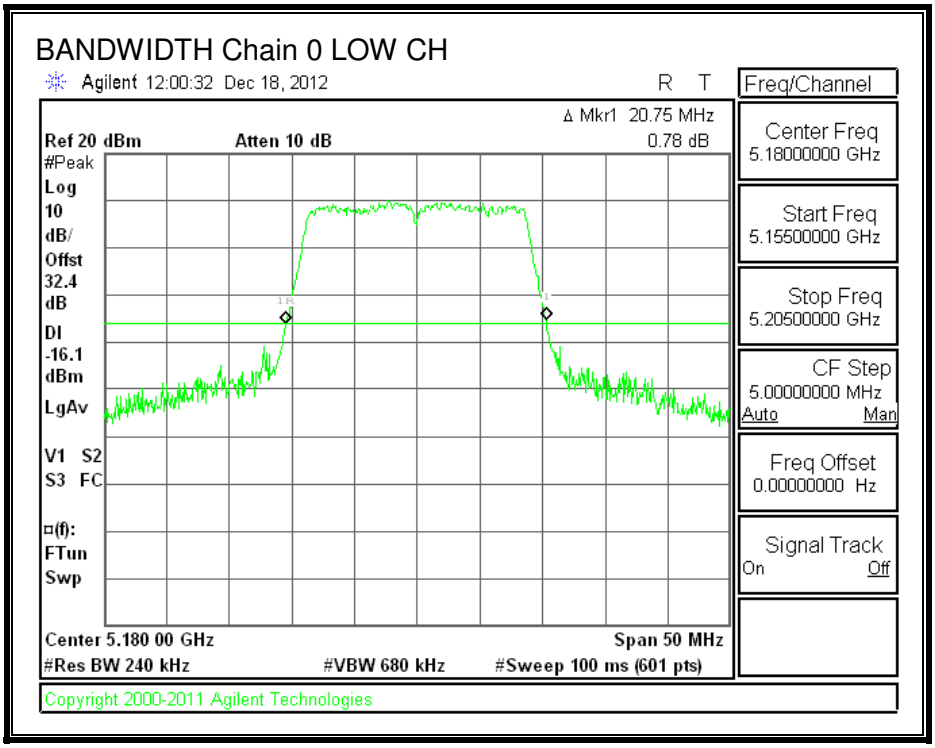
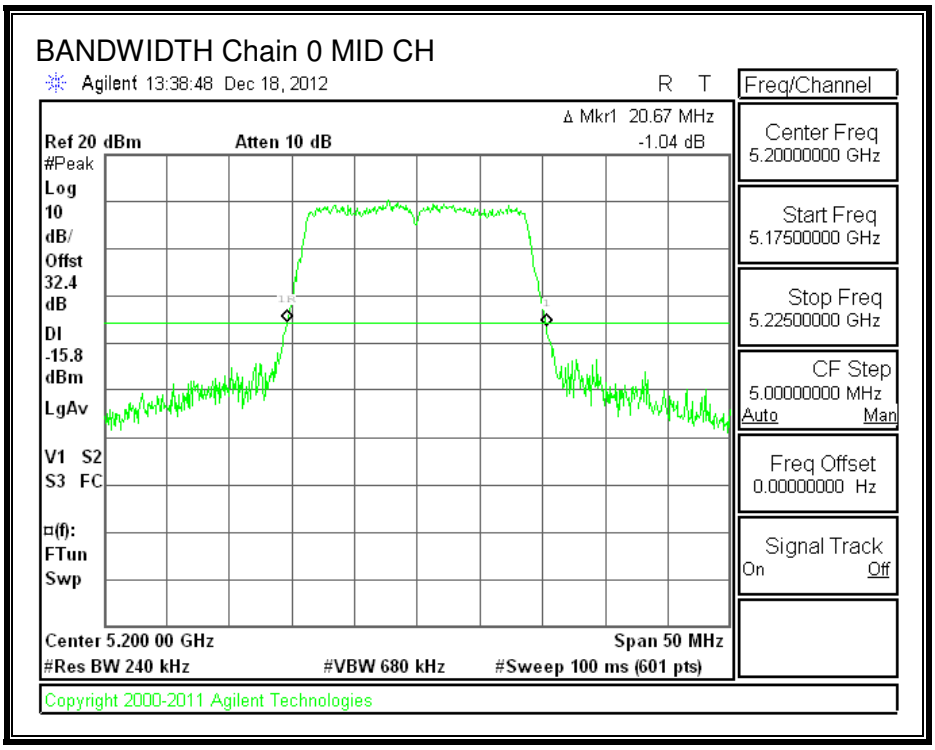
**26 dB BANDWIDTH, Chain 0**





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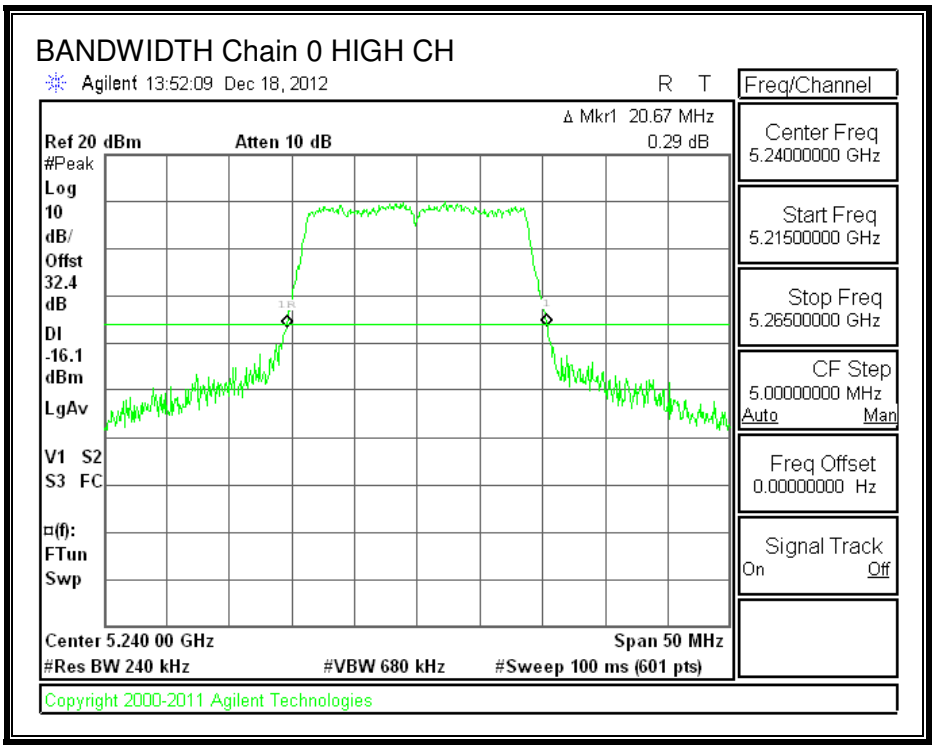
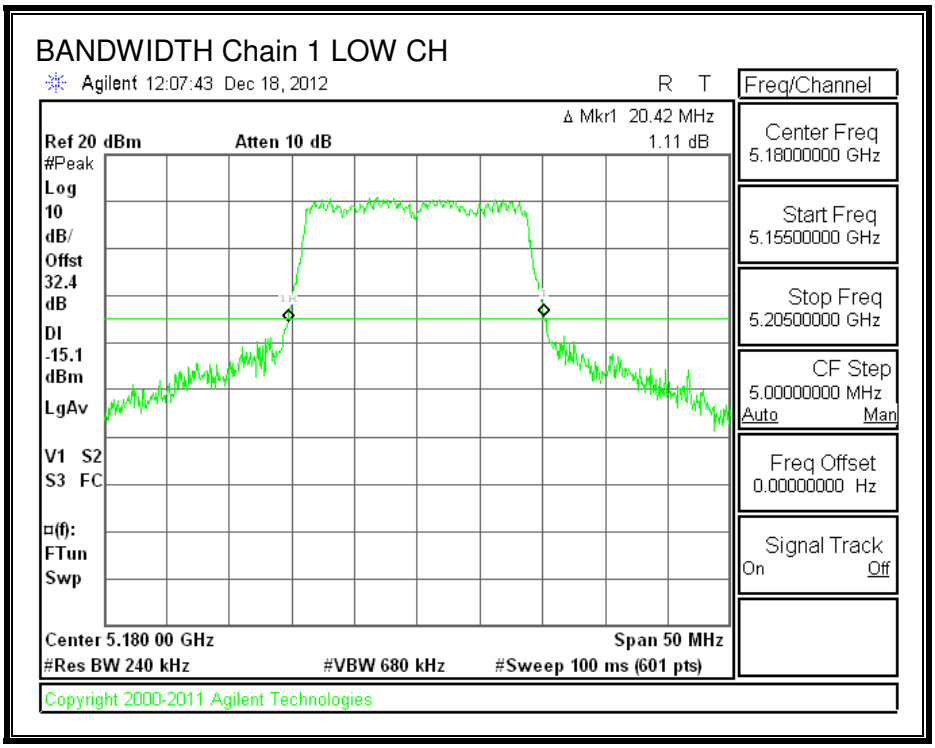



**26 dB BANDWIDTH, Chain 1**





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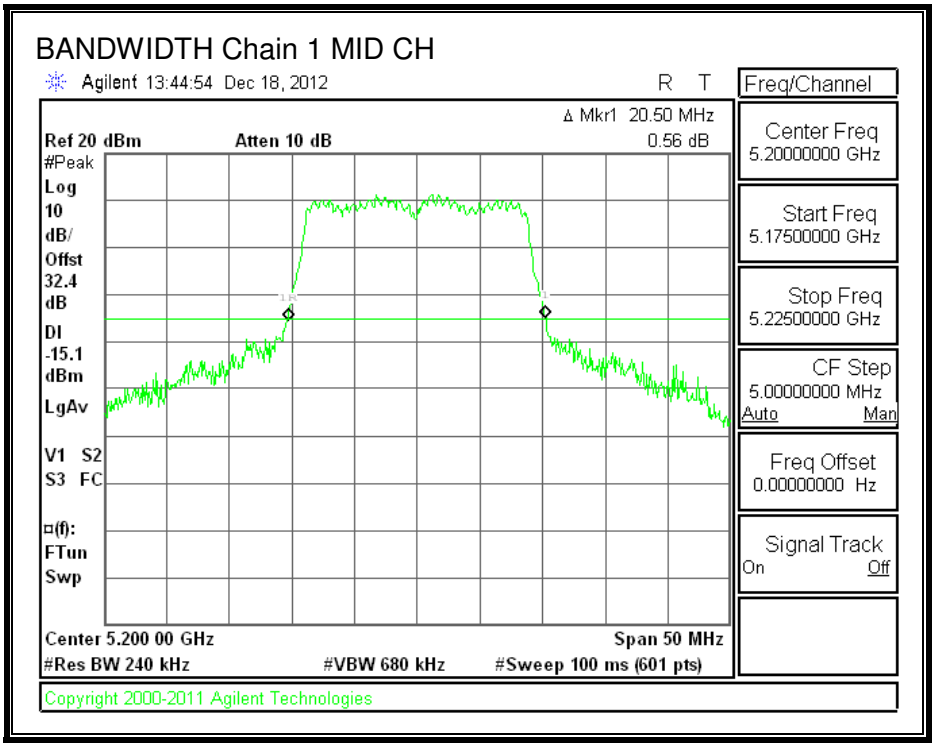


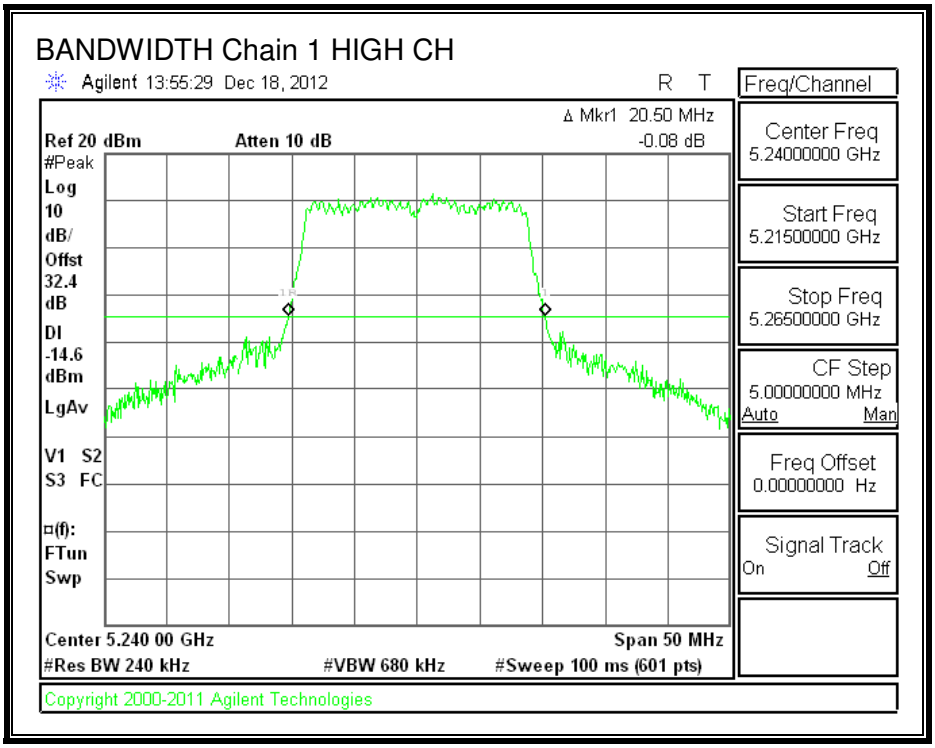



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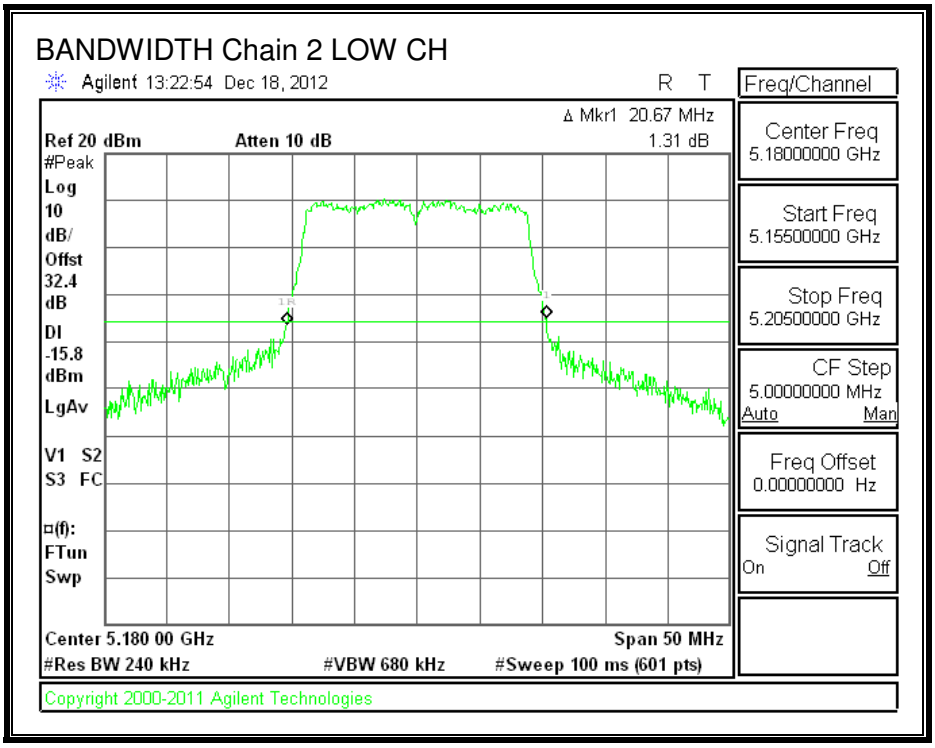
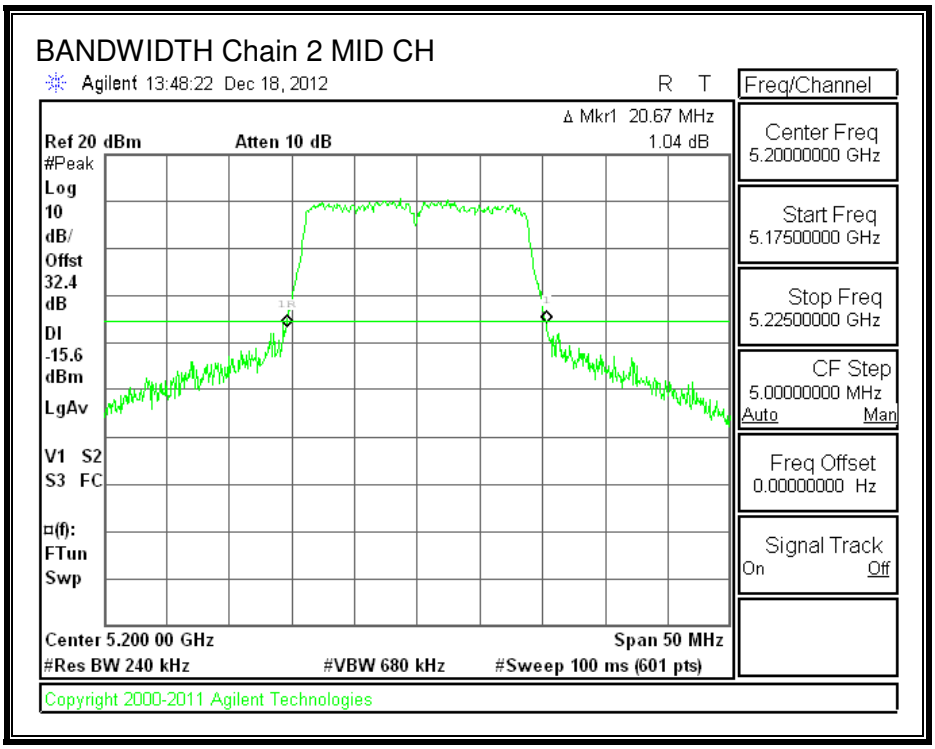
**26 dB BANDWIDTH, Chain 2**





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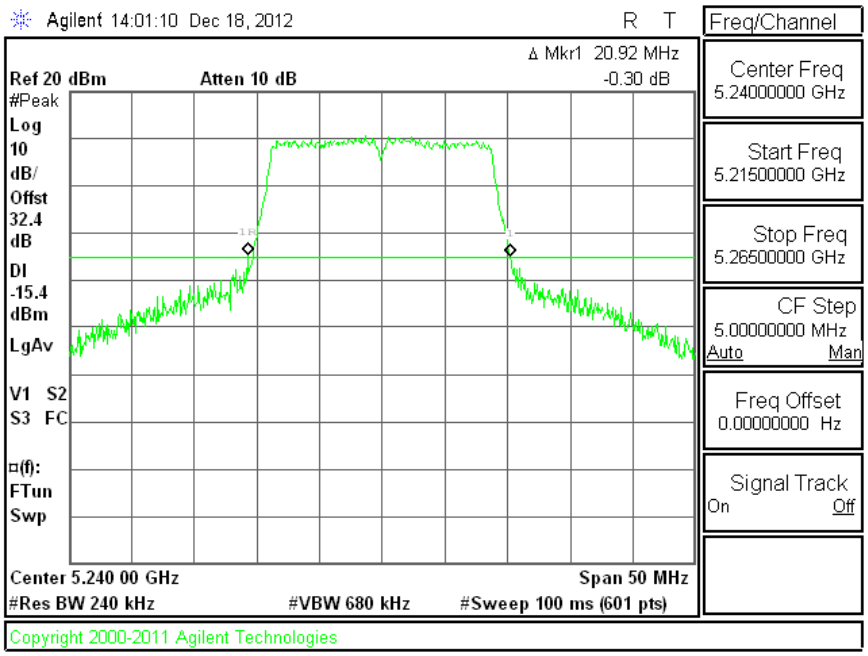
BANDWIDTH Chain 2 HIGH CH





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### 8.5.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) | 99% BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5180 | 17.6757 | 17.6767 | 17.6812 |
| Mid | 5200 | 17.6877 | 17.6801 | 17.6888 |
| High | 5240 | 17.6989 | 17.6850 | 17.6956 |


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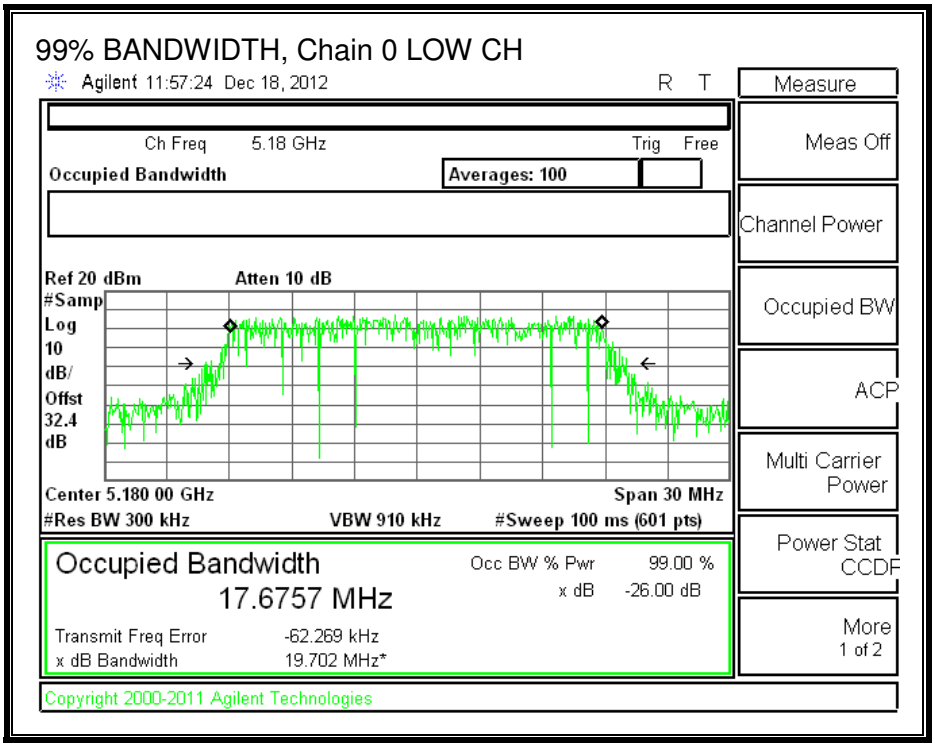
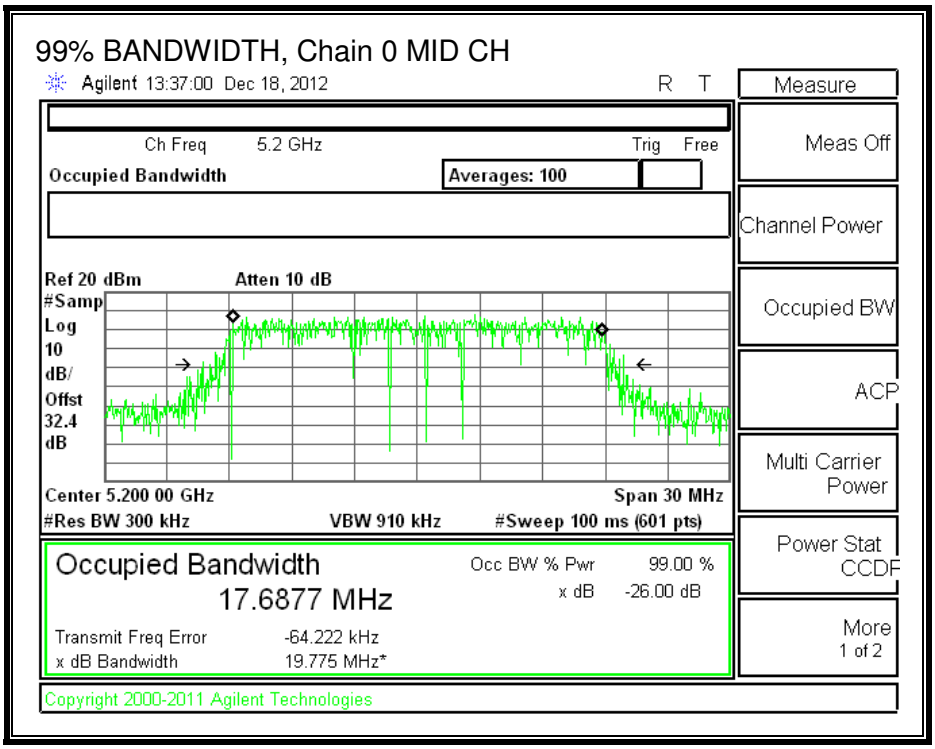
**99% BANDWIDTH, Chain 0**





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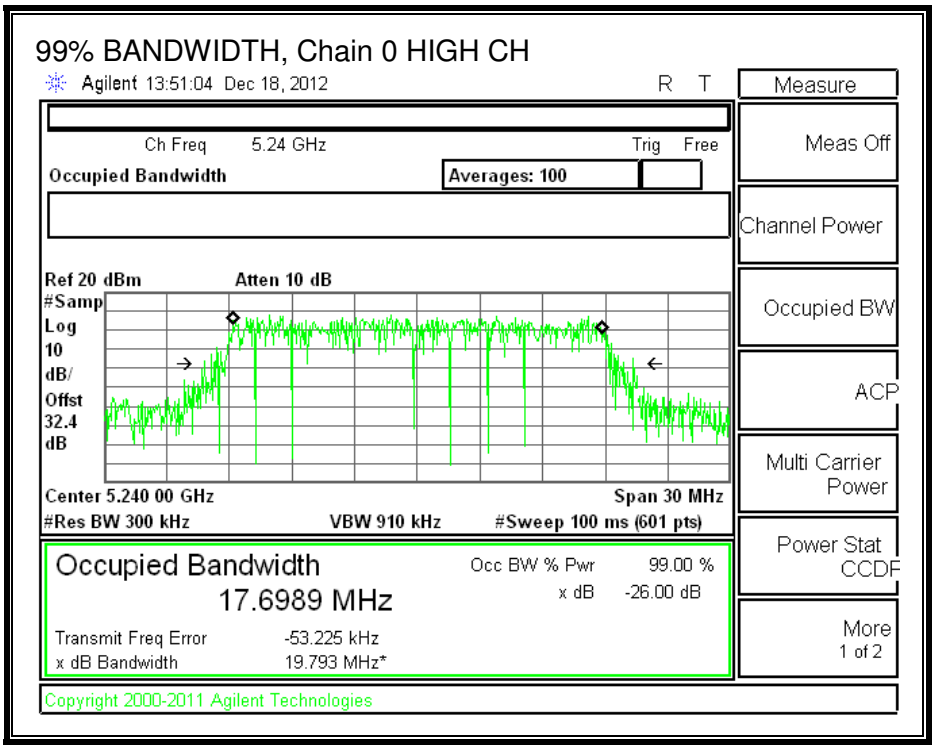
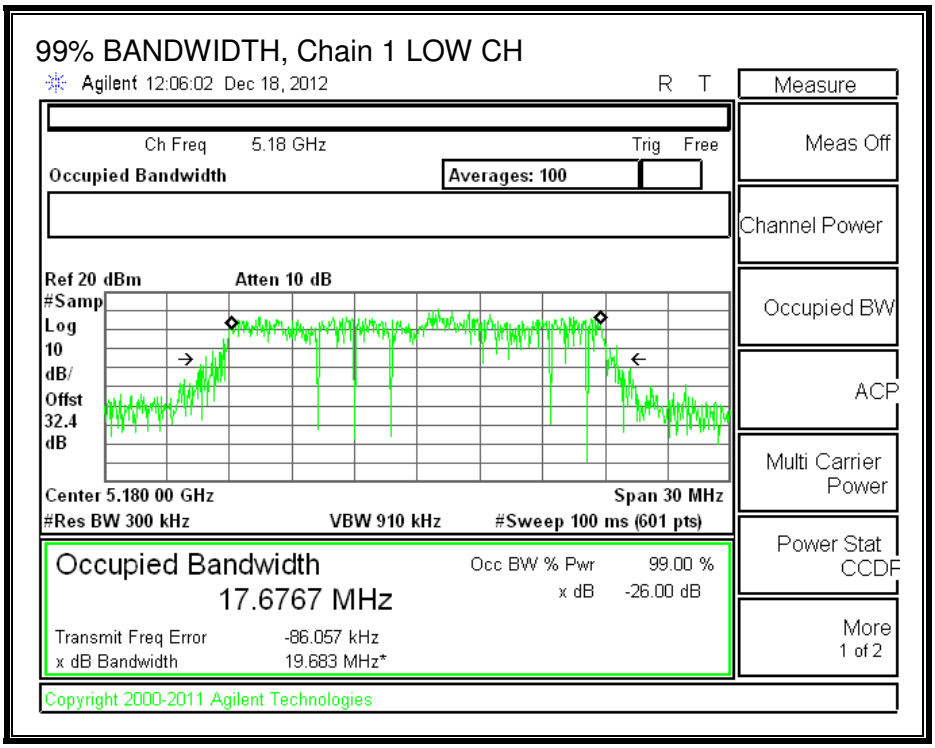



**99% BANDWIDTH, Chain 1**





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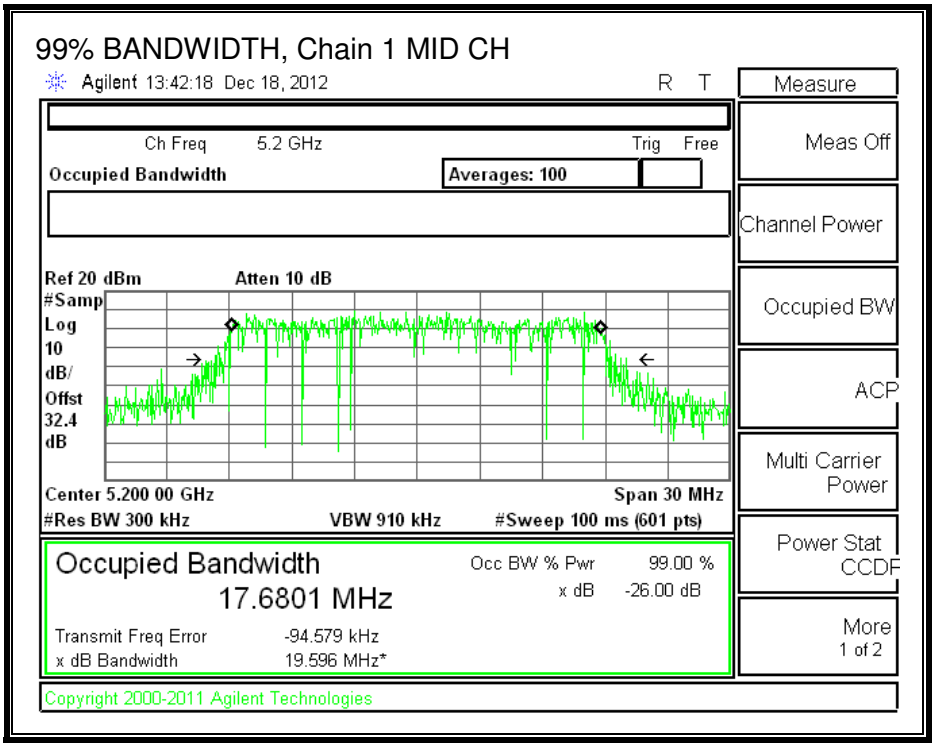


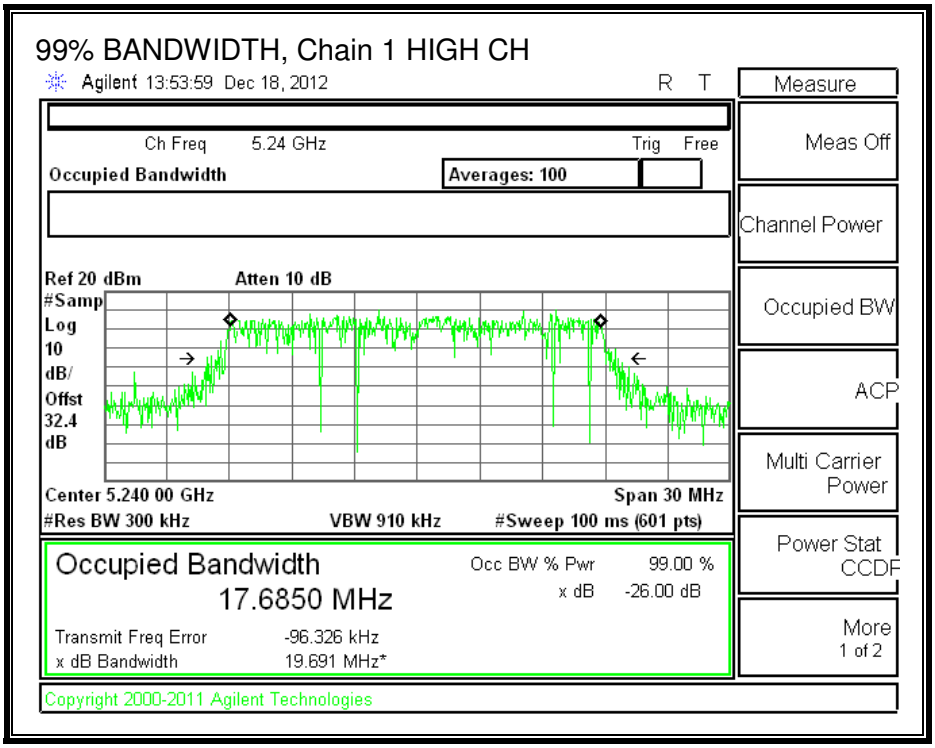



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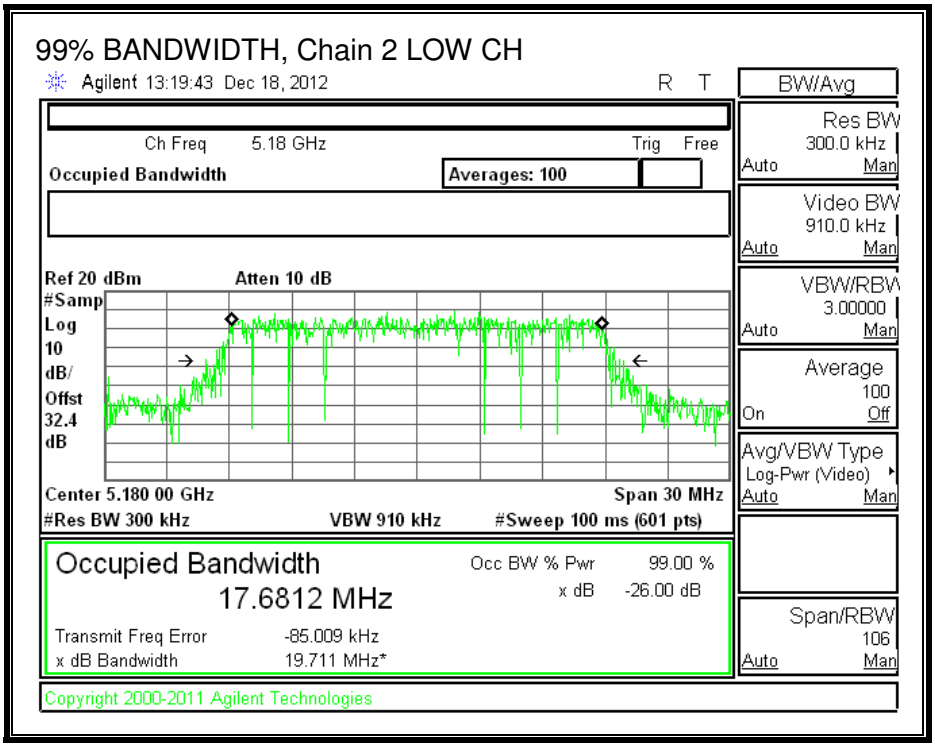
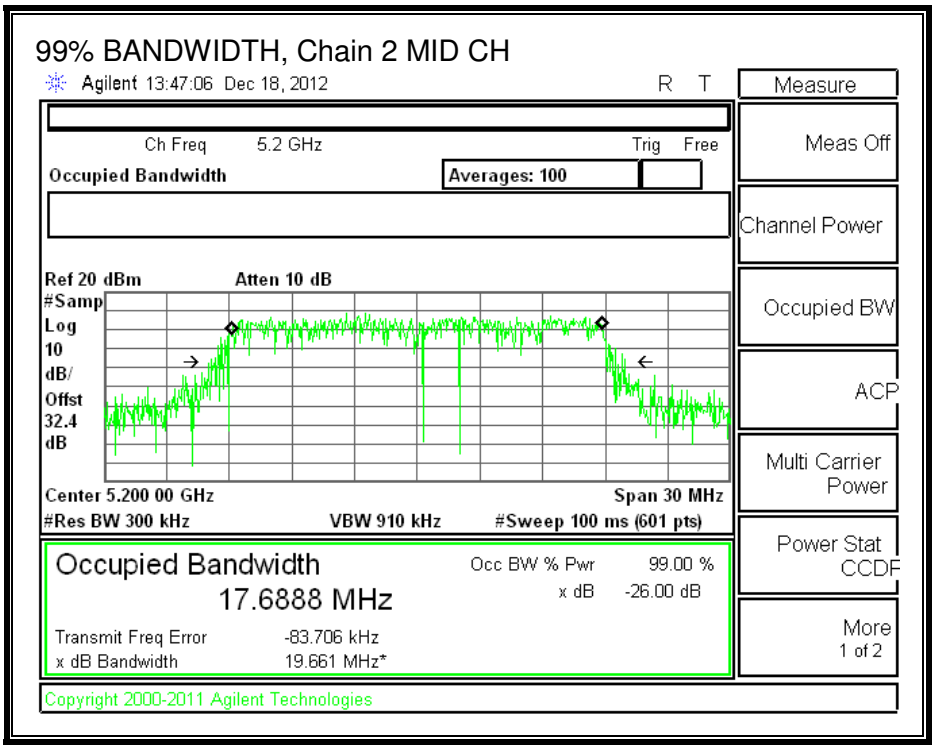
**99% BANDWIDTH, Chain 2**





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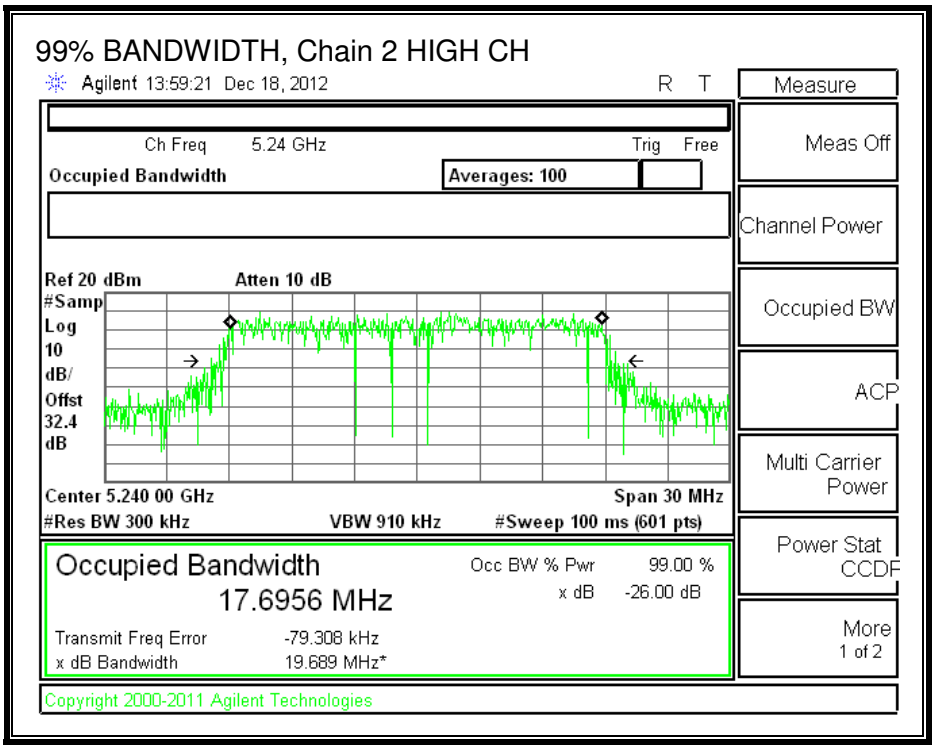



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### 8.5.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated for output power and the antenna gain is unequal among the chains. The directional gain is:


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| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.20 | 1.40 | 2.20 | 2.33 |

The TX chains are correlated for PSD and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.20 | 1.40 | 2.20 | 7.07 |


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**RESULTS**

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Correlat Directional Gain (dBi) | Uncorre Directional Gain (dBi) |
|---|---|---|---|
| Low | 5180 | 7.07 | 2.33 |
| Mid | 5200 | 7.07 | 2.33 |
| High | 5240 | 7.07 | 2.33 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | FCC PSD Limit (dBm) |
|---|---|---|---|
| Low | 5180 | 30.00 | 15.93 |
| Mid | 5200 | 30.00 | 15.93 |
| High | 5240 | 30.00 | 15.93 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5180 | 7.10 | 7.10 | 7.40 | 11.97 | 30.00 | -18.03 |
| Mid | 5200 | 7.06 | 7.30 | 7.42 | 12.03 | 30.00 | -17.97 |
| High | 5240 | 7.15 | 7.31 | 7.66 | 12.15 | 30.00 | -17.85 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Chain 2 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5180 | -2.455 | -2.215 | -1.661 | 2.67 | 15.93 | -13.26 |
| Mid | 5200 | -2.512 | -2.098 | -2.077 | 2.55 | 15.93 | -13.38 |
| High | 5240 | -2.465 | -1.885 | -1.989 | 2.67 | 15.93 | -13.26 |


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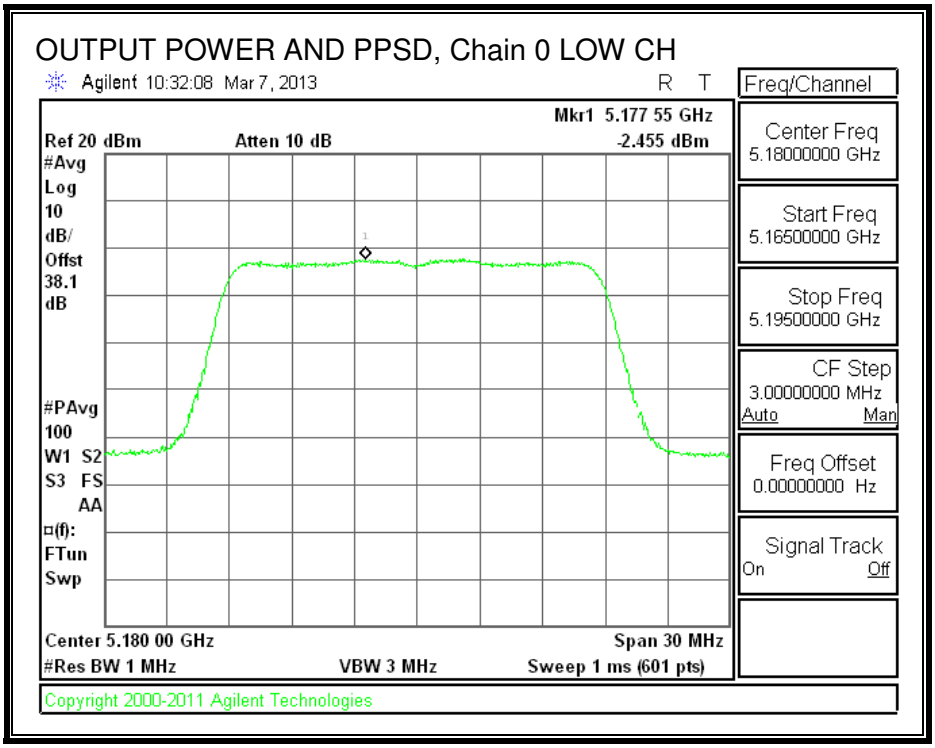
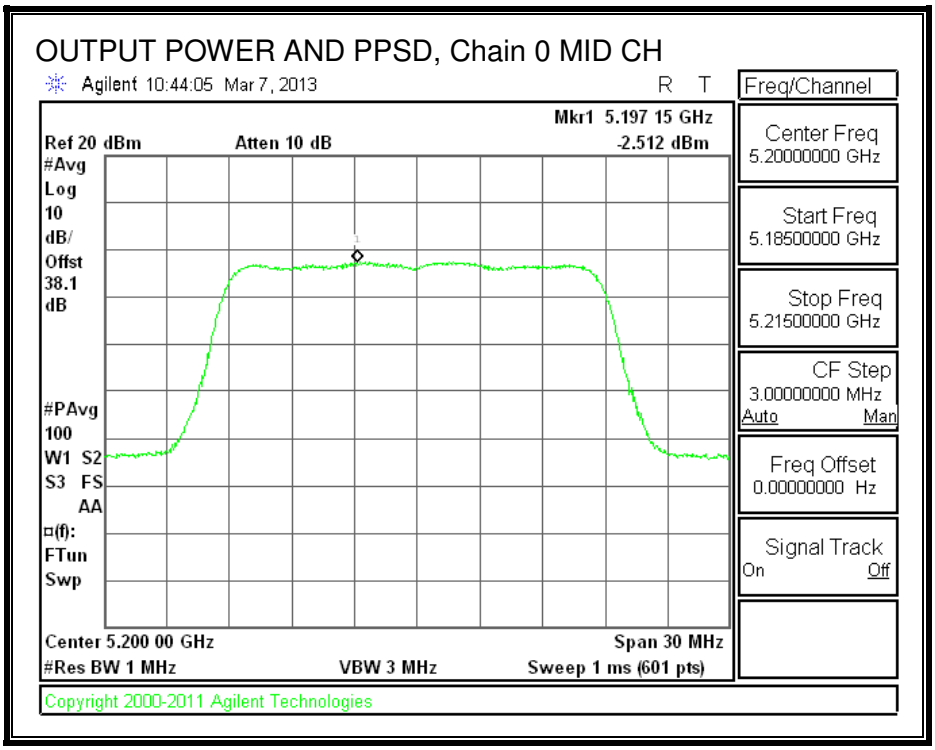
**OUTPUT POWER AND PPSD, Chain 0**





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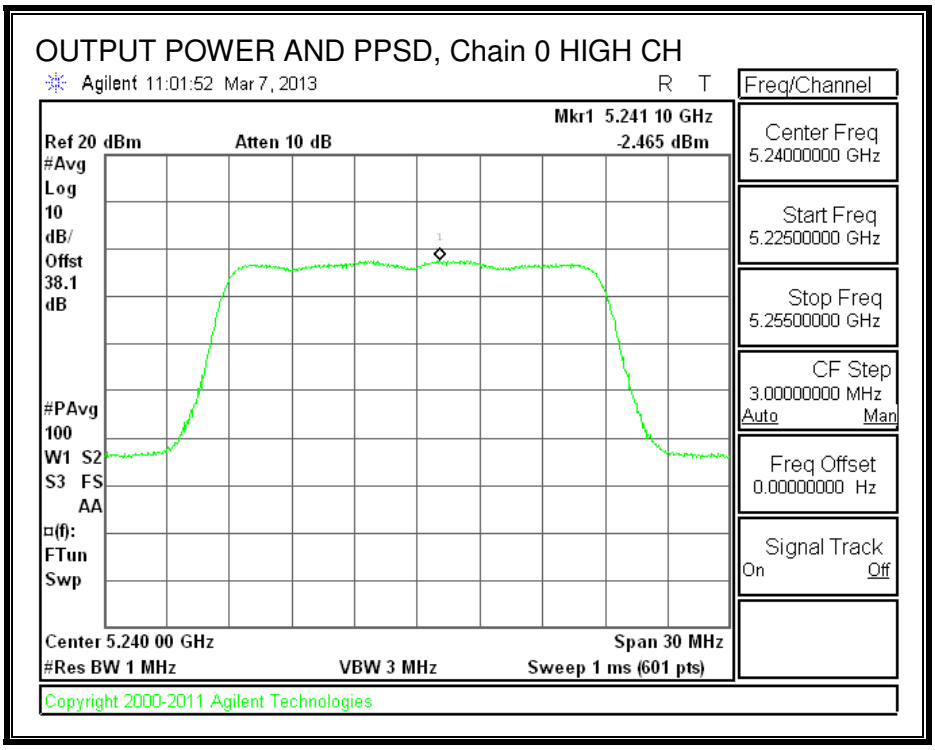
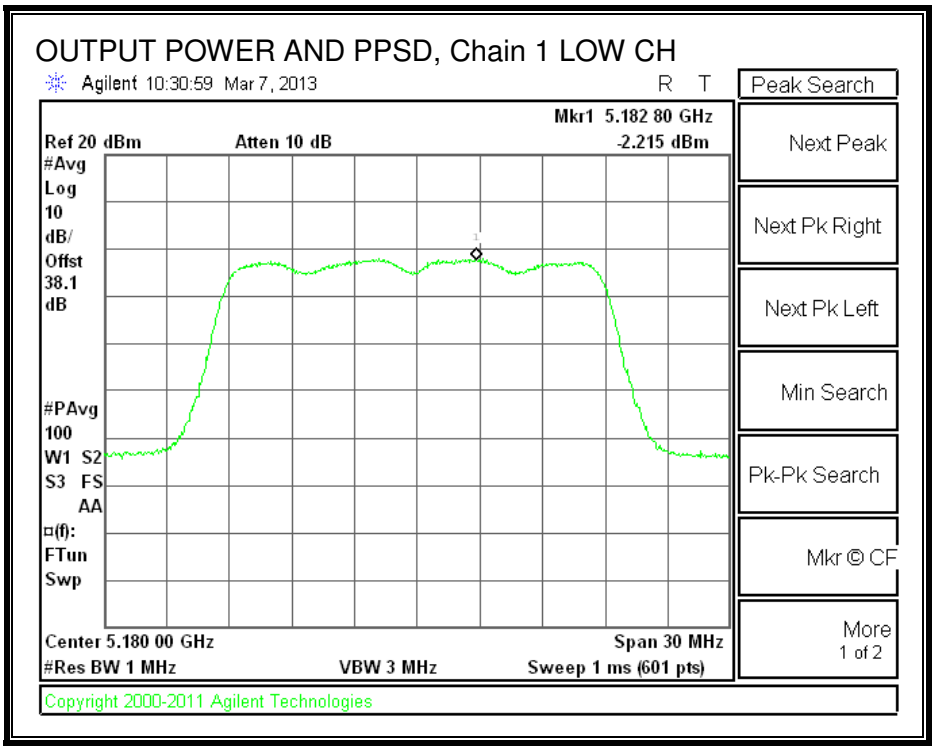



**OUTPUT POWER AND PPSD, Chain 1**





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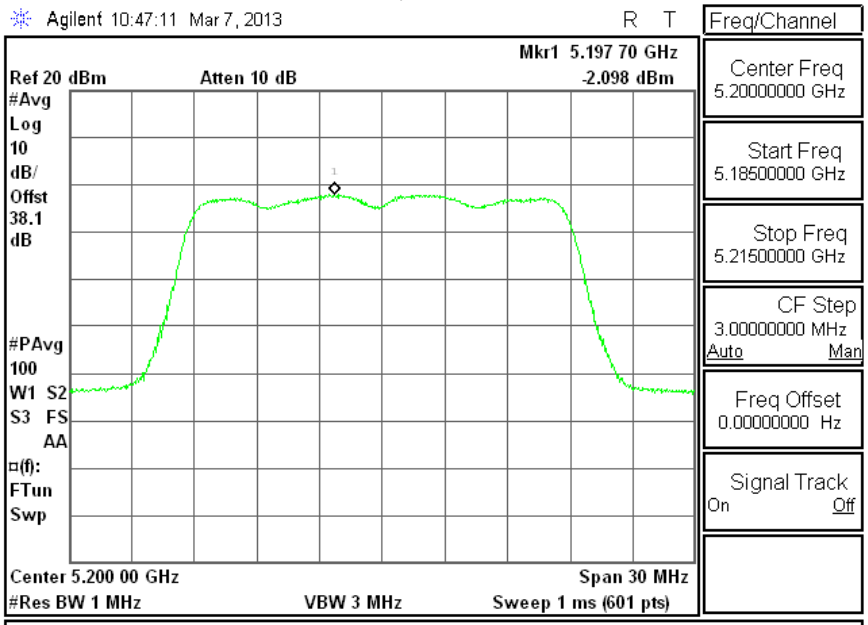
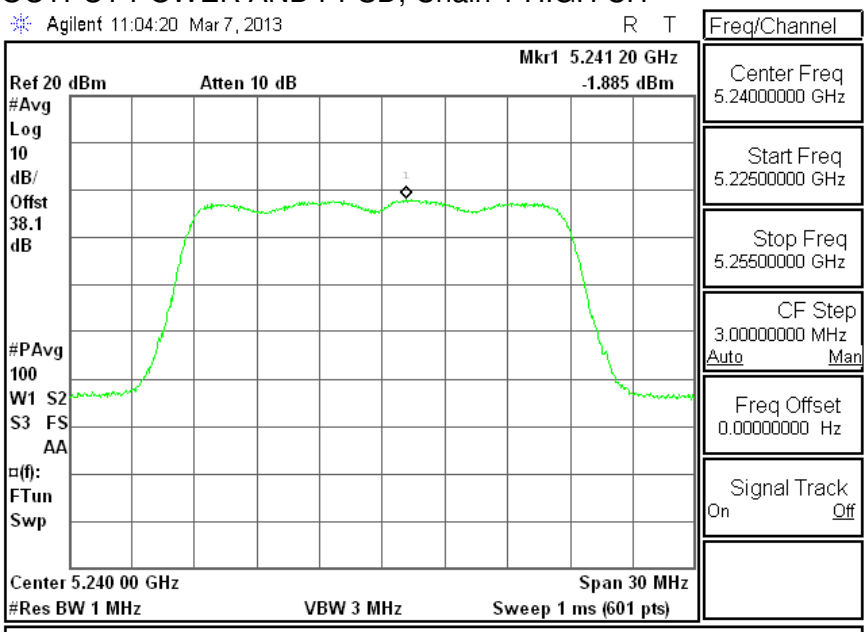
OUTPUT POWER AND PPSD, Chain 1 MID CH




OUTPUT POWER AND PPSD, Chain 1 HIGH CH





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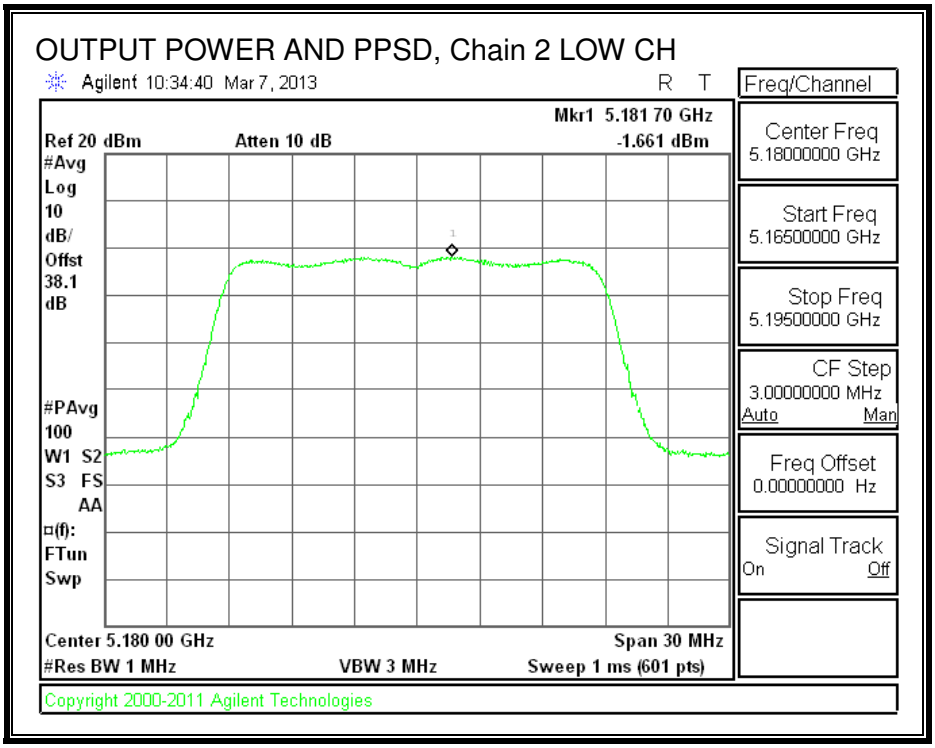
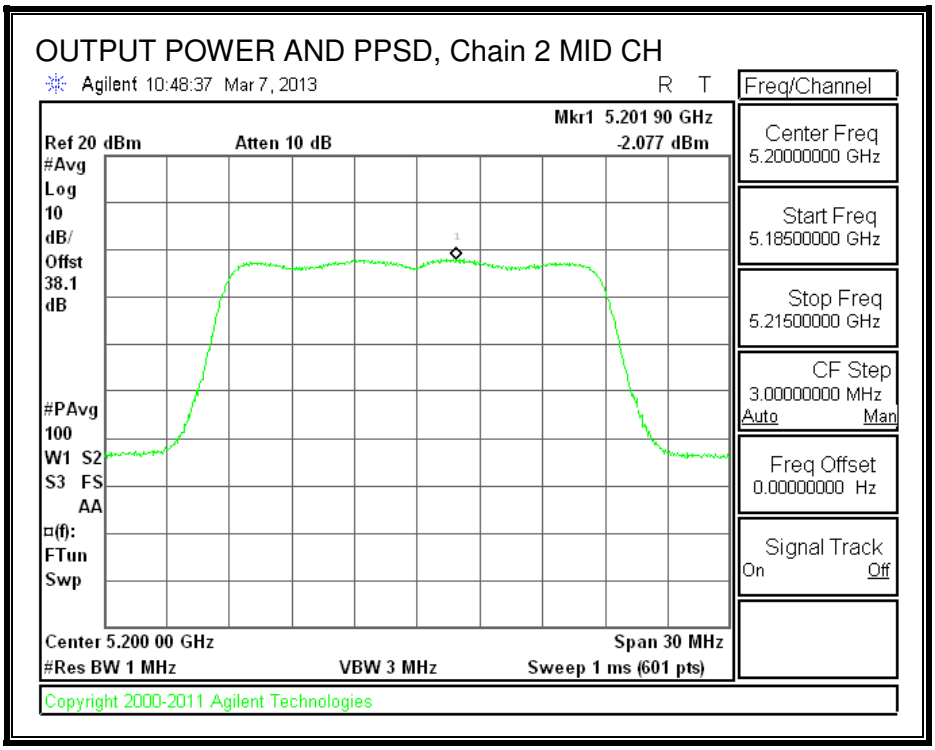
**OUTPUT POWER AND PPSD, Chain 2**





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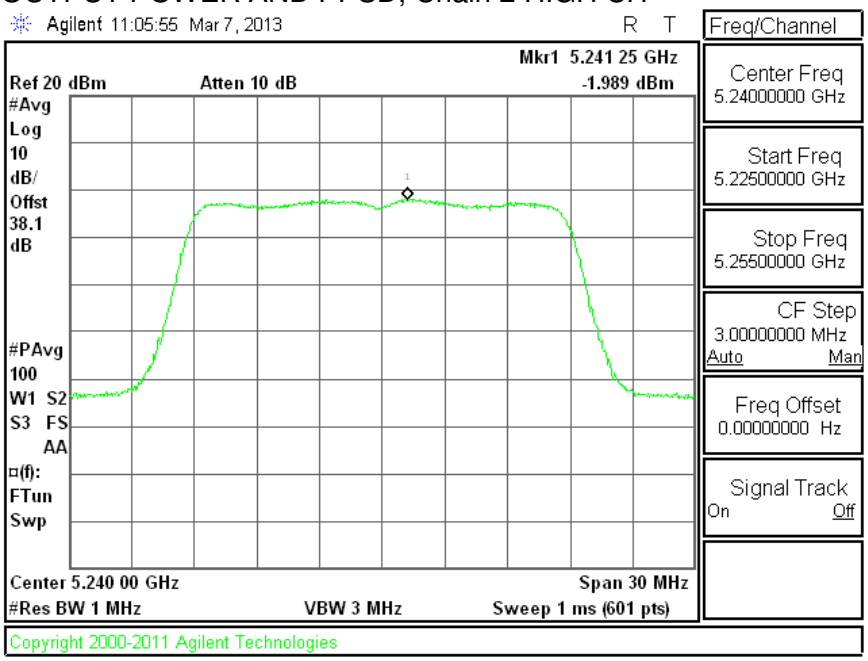
OUTPUT POWER AND PPSD, Chain 2 HIGH CH





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## 8.6. 802.11n HT20 BF 3TX MODE IN THE 5.2 GHz BAND

Covered by testing HT20 CDD 3TX mode, the power per chain used for HT20 CDD 3TX mode is the same power per chain that will be used for HT20 BF 3TX mode. However, since BF is correlated and CDD is uncorrelated for output power, the section below for output power using correlated AG for this BF mode shows it is still compliant.


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### 8.6.1. OUTPUT AVERAGE POWER

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

The TX chains are correlated for output power and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.20 | 1.40 | 2.20 | 7.07 |

**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Correlat Directional Gain (dBi) |
|---|---|---|
| Low | 5180 | 7.07 |
| Mid | 5200 | 7.07 |
| High | 5240 | 7.07 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) |
|---|---|---|
| Low | 5180 | 28.93 |
| Mid | 5200 | 28.93 |
| High | 5240 | 28.93 |

| Duty Cycle CF (dB) | 0.00 | |
|---|---|---|

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5180 | 7.10 | 7.10 | 7.40 | 11.97 | 28.93 | -16.96 |
| Mid | 5200 | 7.06 | 7.30 | 7.42 | 12.03 | 28.93 | -16.90 |
| High | 5240 | 7.15 | 7.31 | 7.66 | 12.15 | 28.93 | -16.78 |


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## 8.7. 802.11n HT20 STBC 3TX MODE IN THE 5.2 GHz BAND

### 8.7.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) | 26 dB BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5180 | 20.42 | 20.58 | 20.33 |
| Mid | 5200 | 20.50 | 20.67 | 20.42 |
| High | 5240 | 20.42 | 21.00 | 20.42 |


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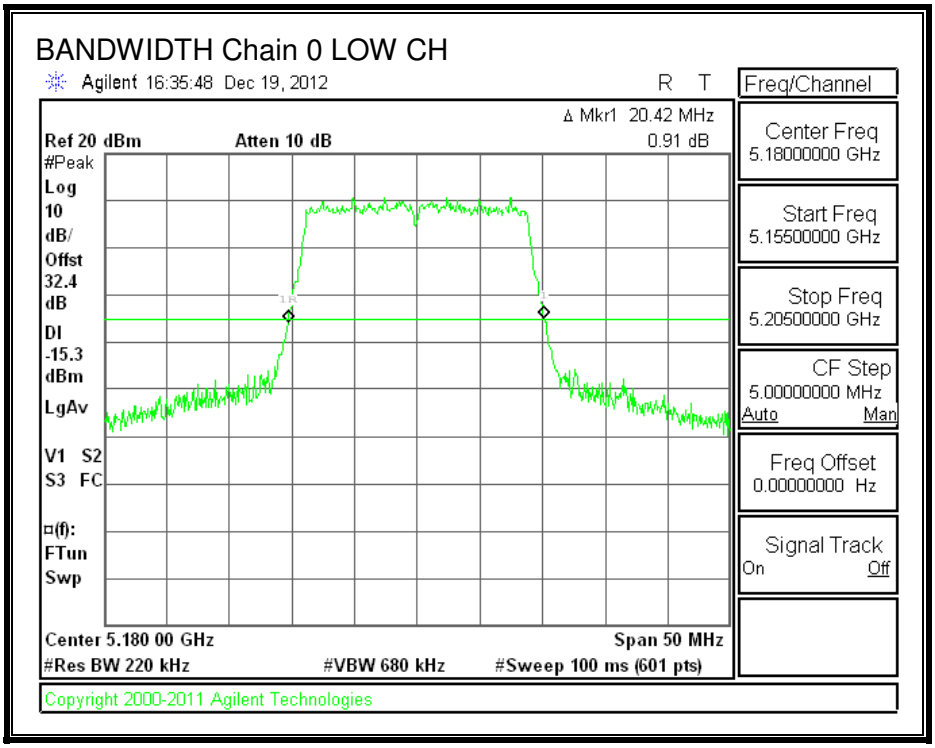
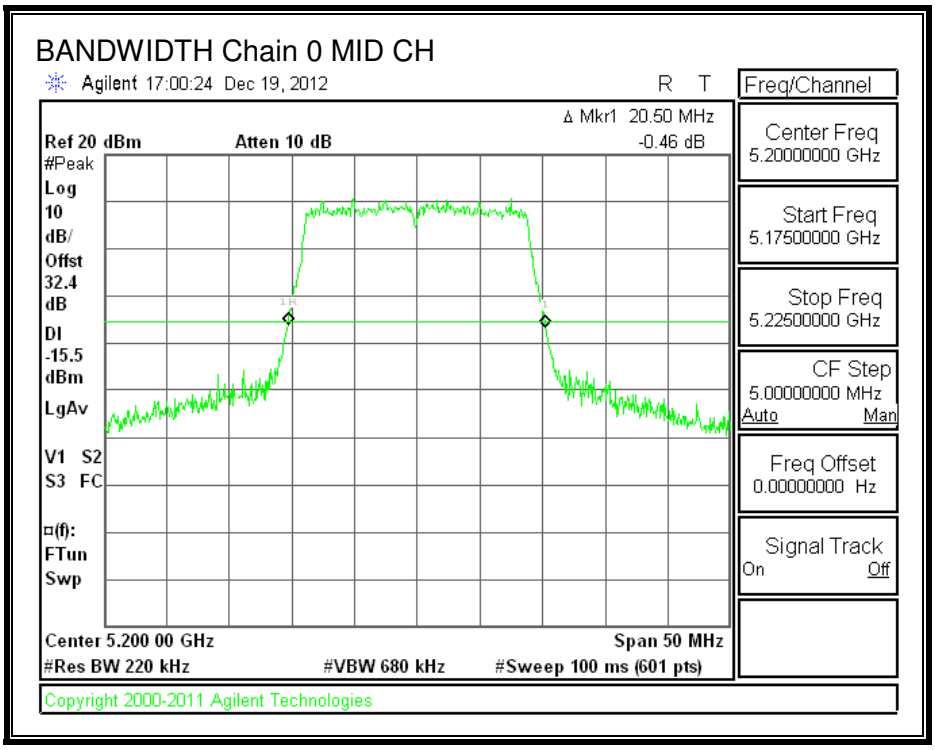
**26 dB BANDWIDTH, Chain 0**





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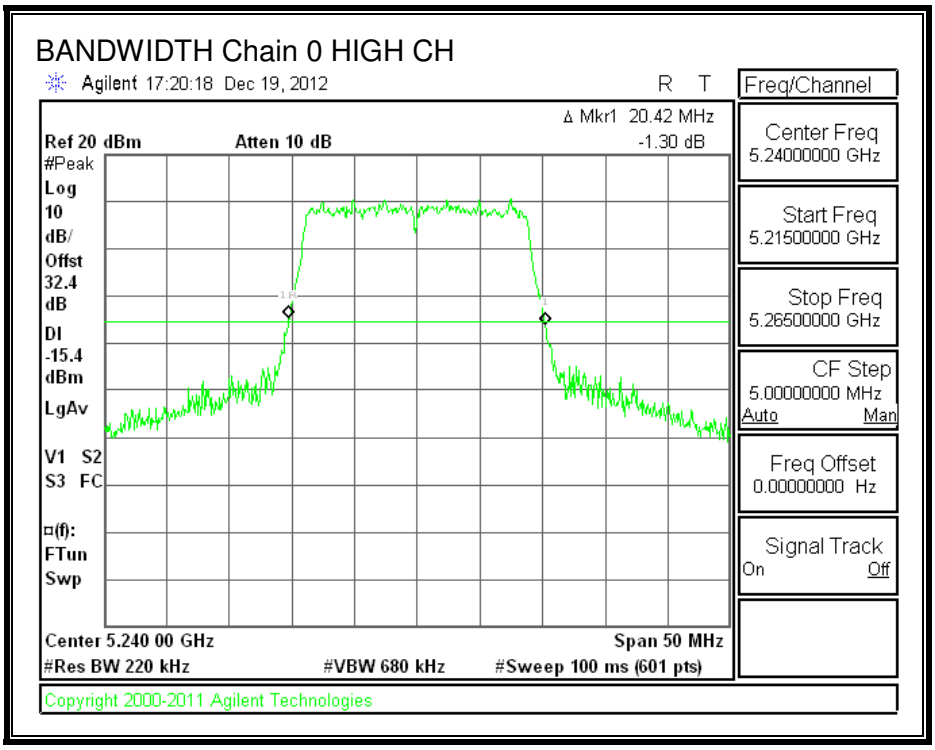
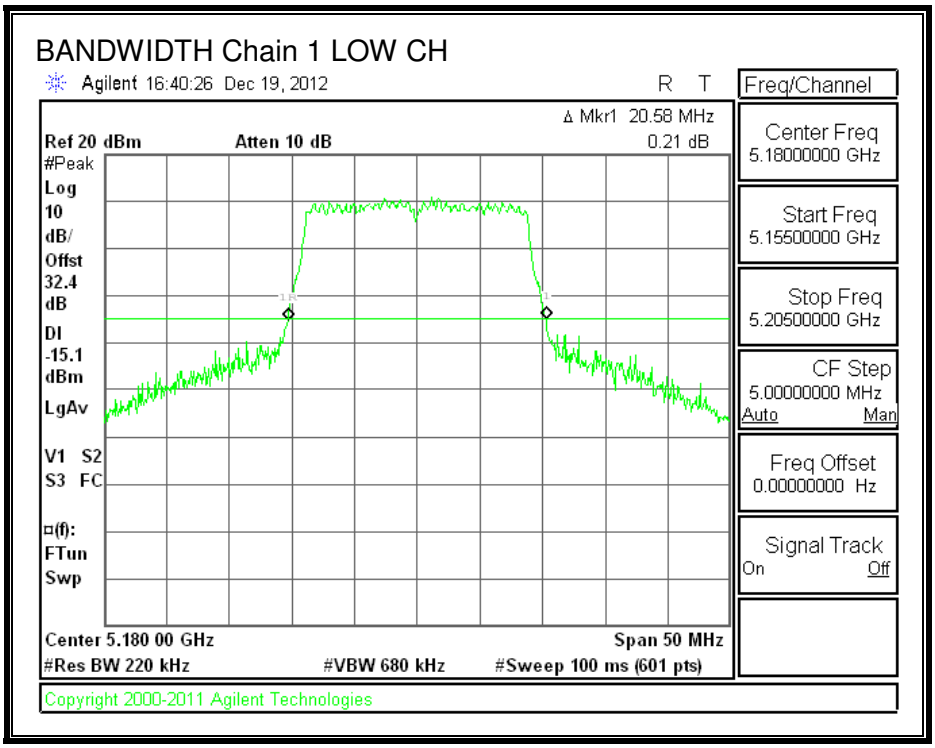



**26 dB BANDWIDTH, Chain 1**





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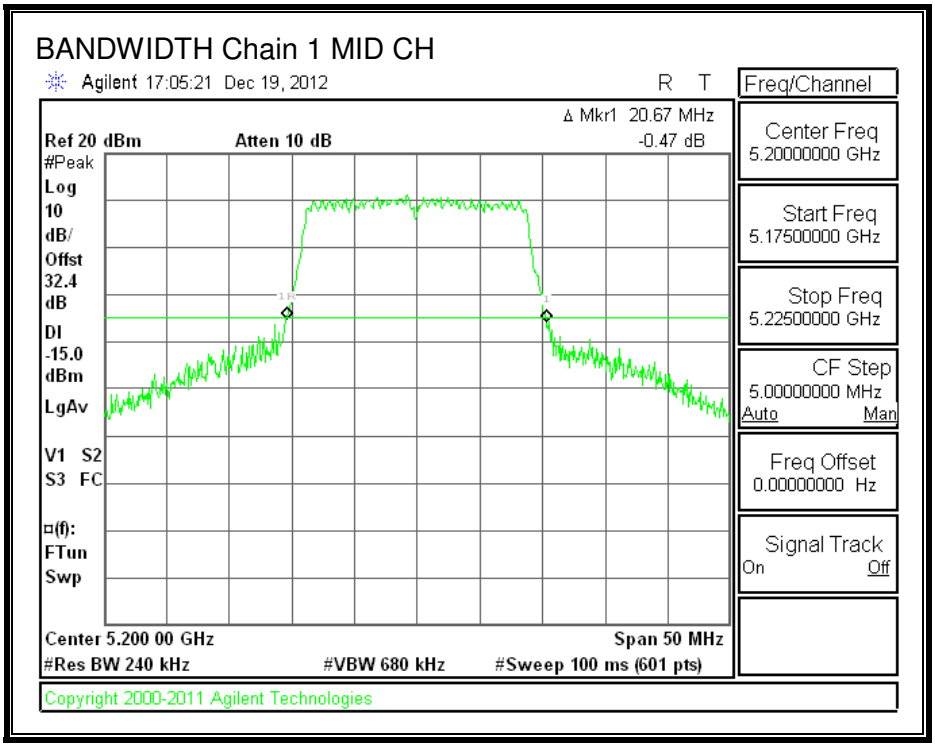


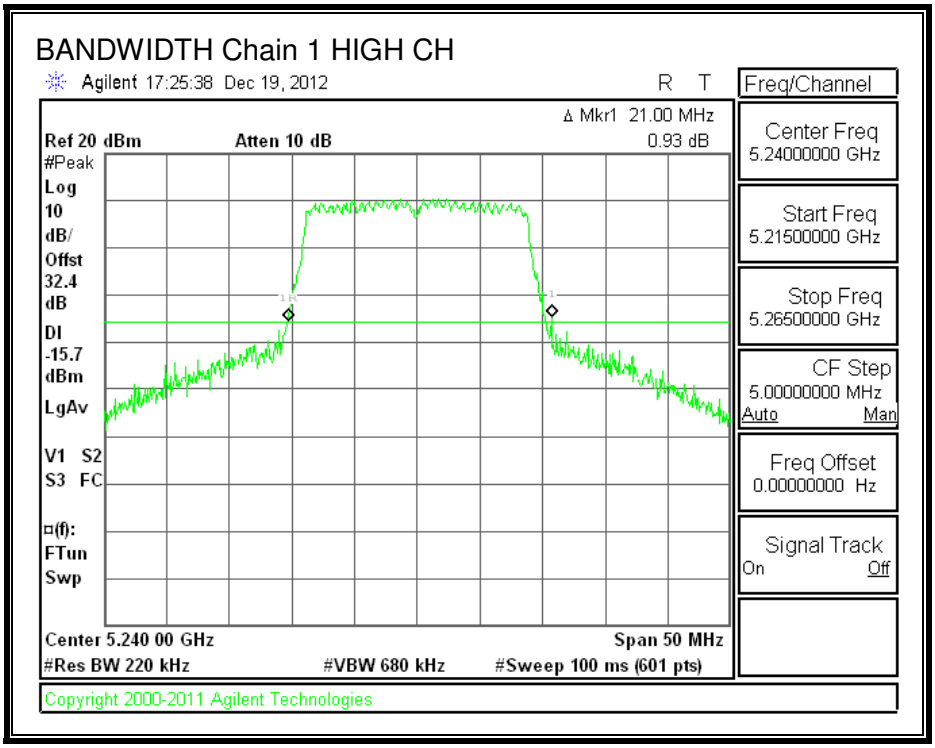



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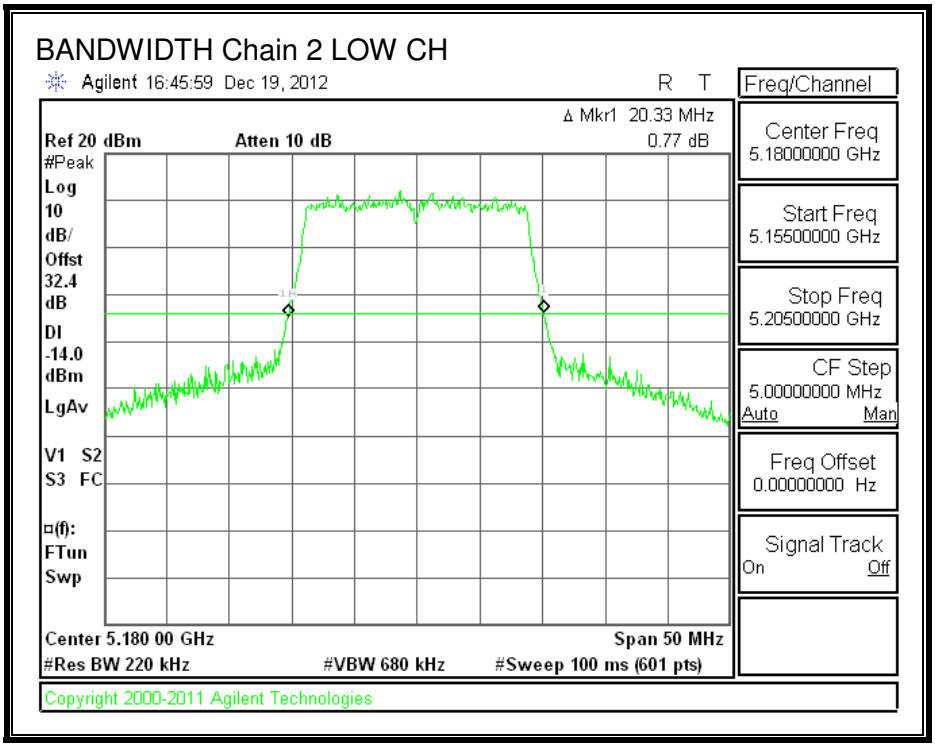
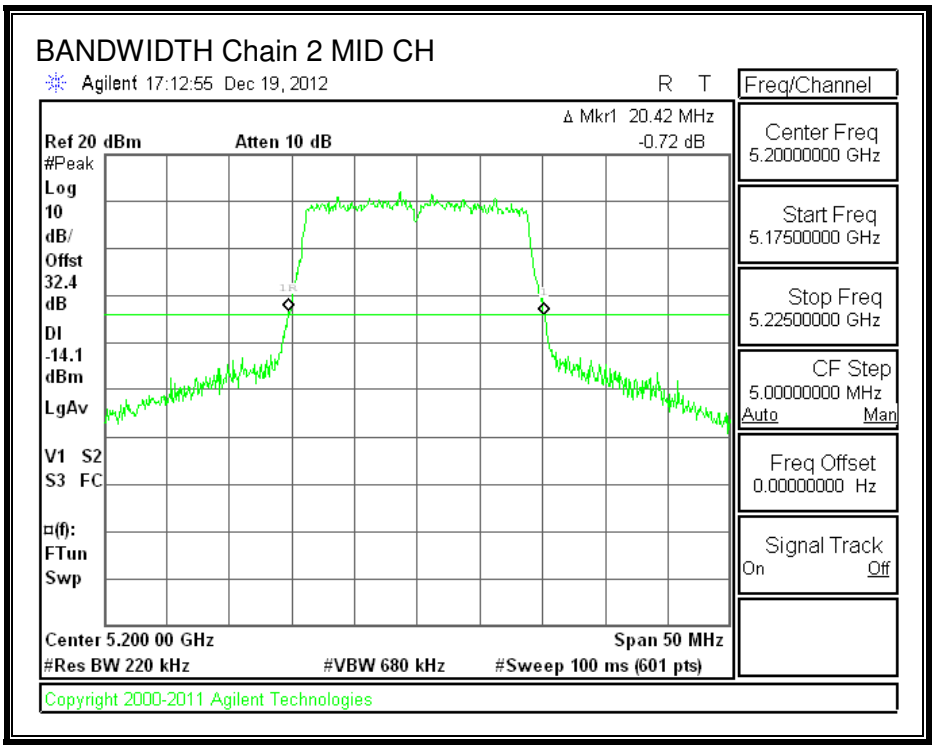
**26 dB BANDWIDTH, Chain 2**





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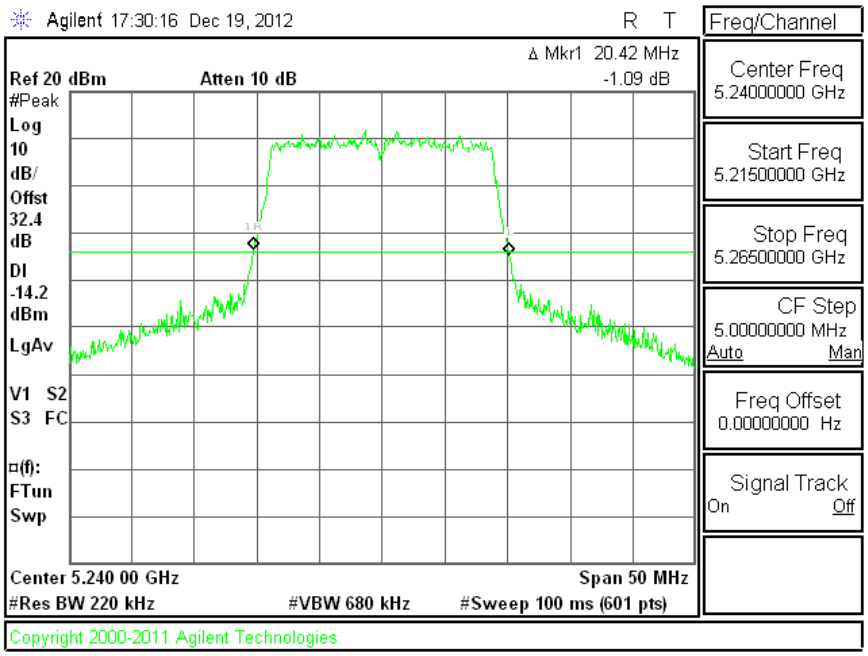
BANDWIDTH Chain 2 HIGH CH





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### 8.7.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) | 99% BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5180 | 17.6610 | 17.6940 | 17.6556 |
| Mid | 5200 | 17.6762 | 17.6872 | 17.6725 |
| High | 5240 | 17.6759 | 17.6865 | 17.6673 |


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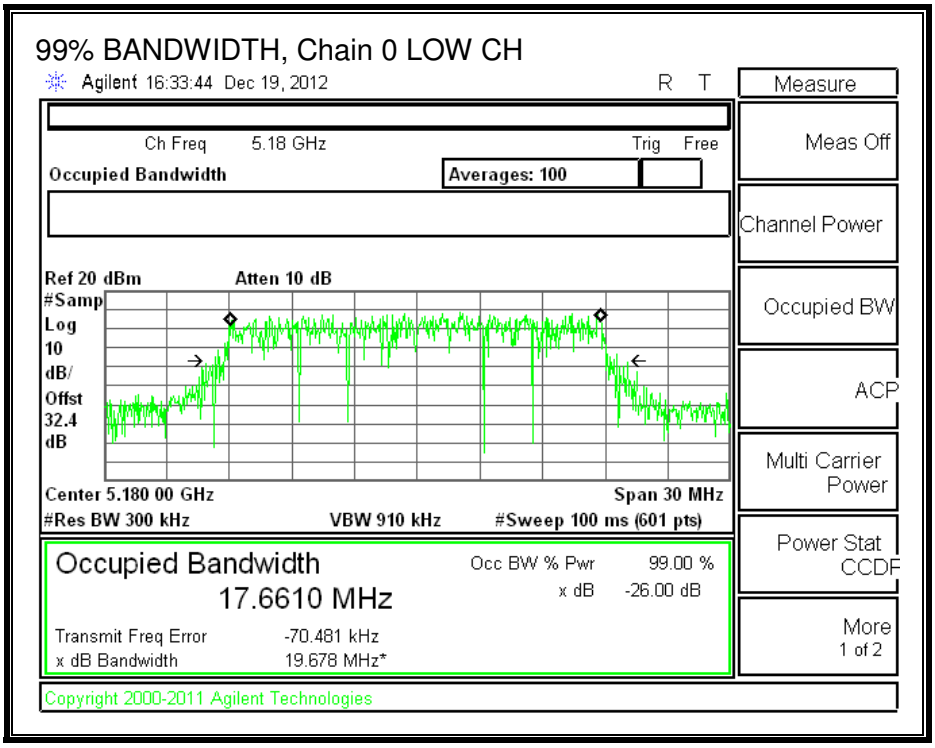
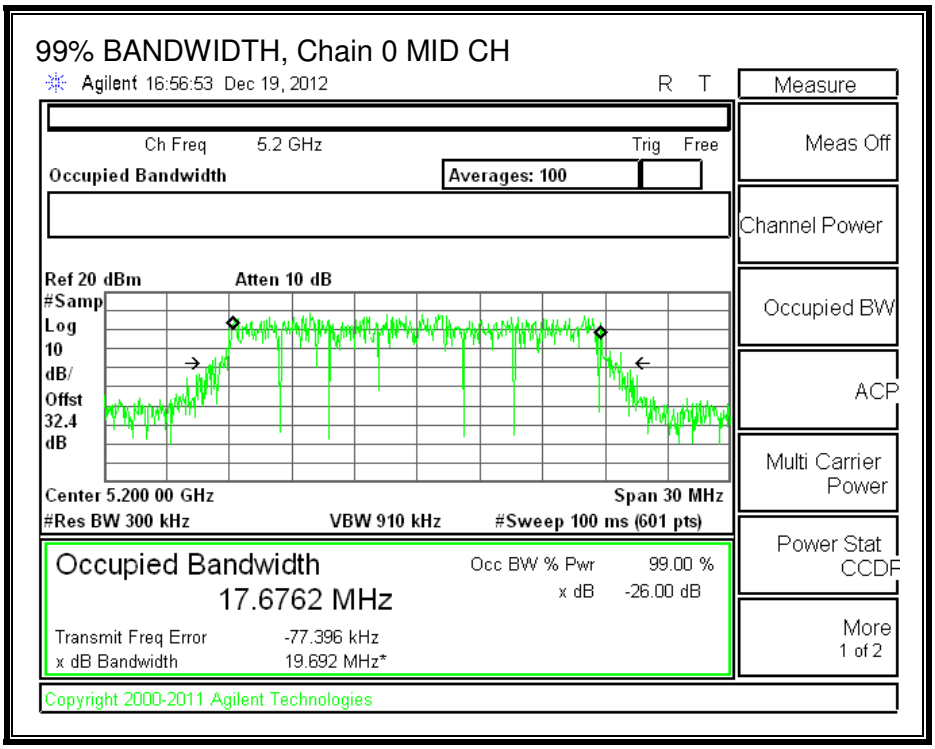
**99% BANDWIDTH, Chain 0**





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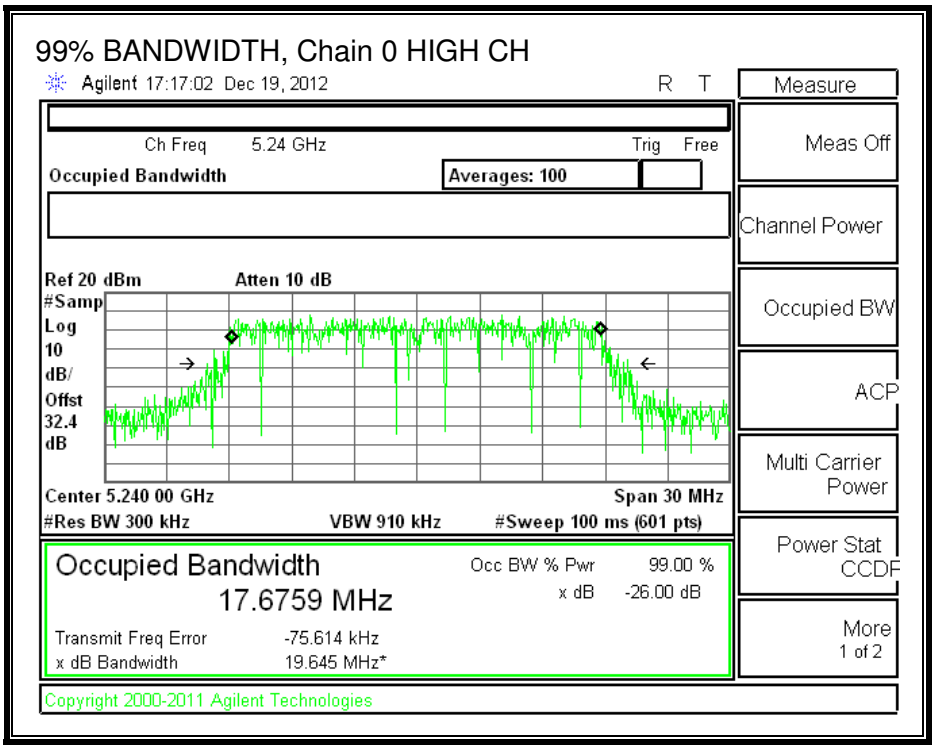
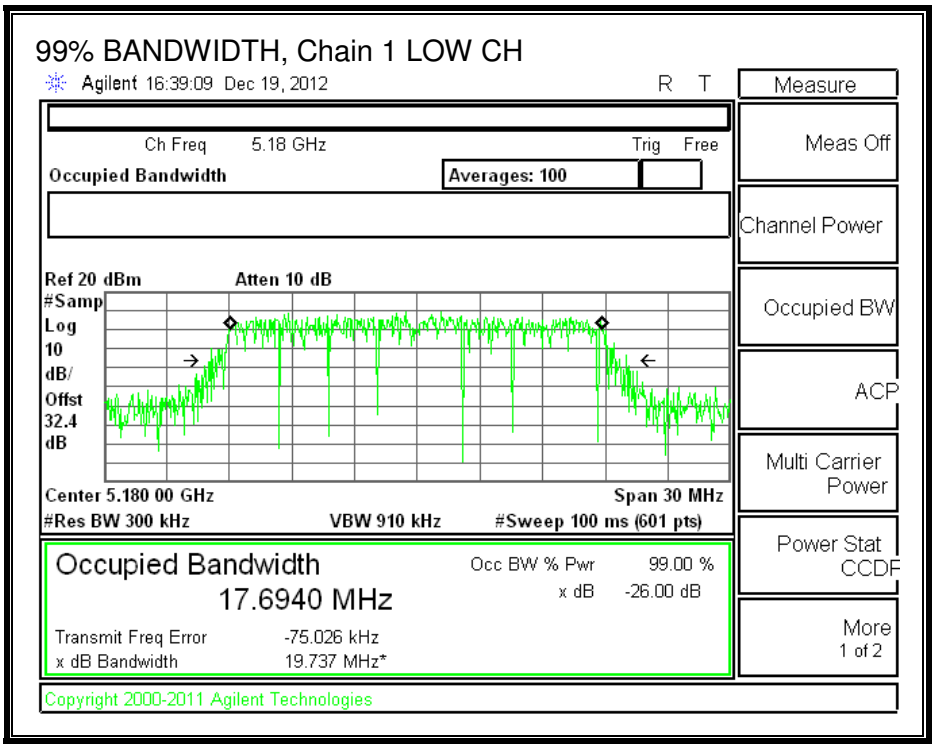



**99% BANDWIDTH, Chain 1**





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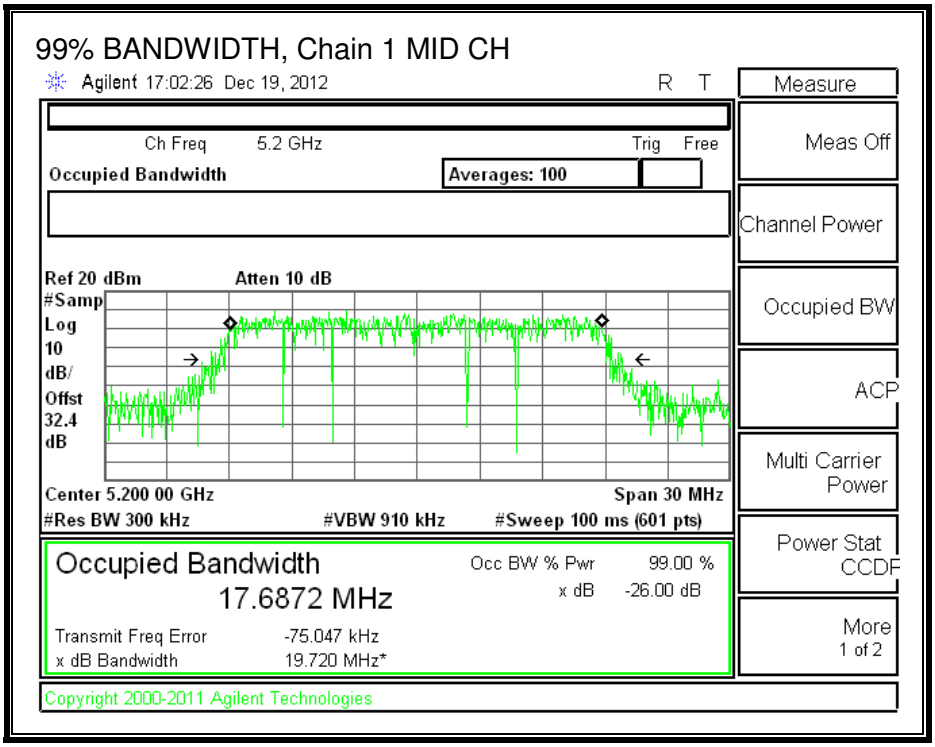


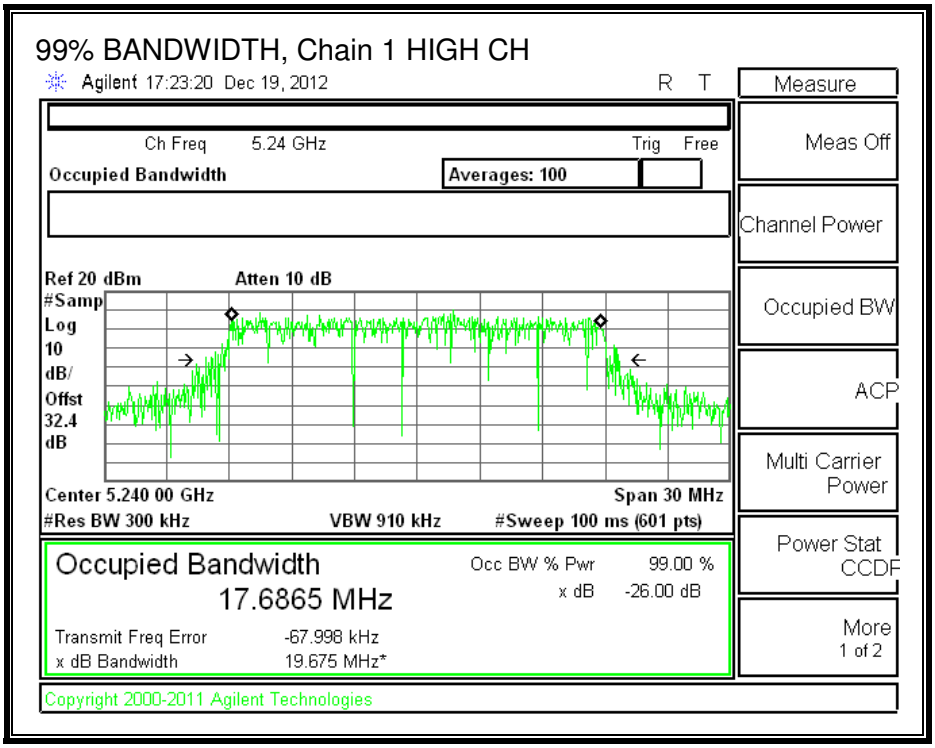



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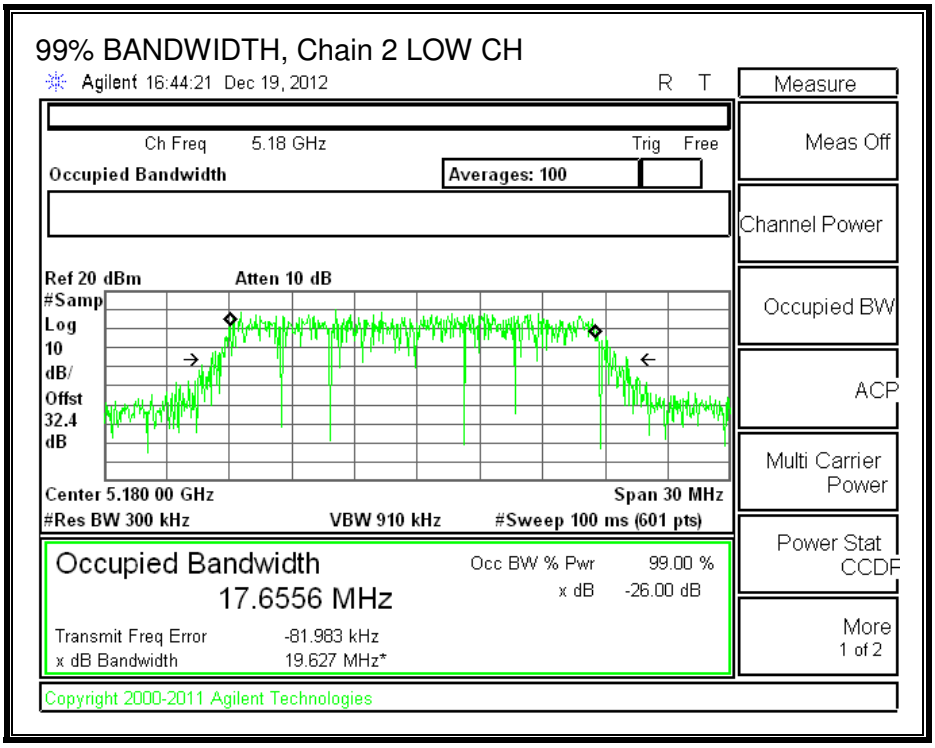
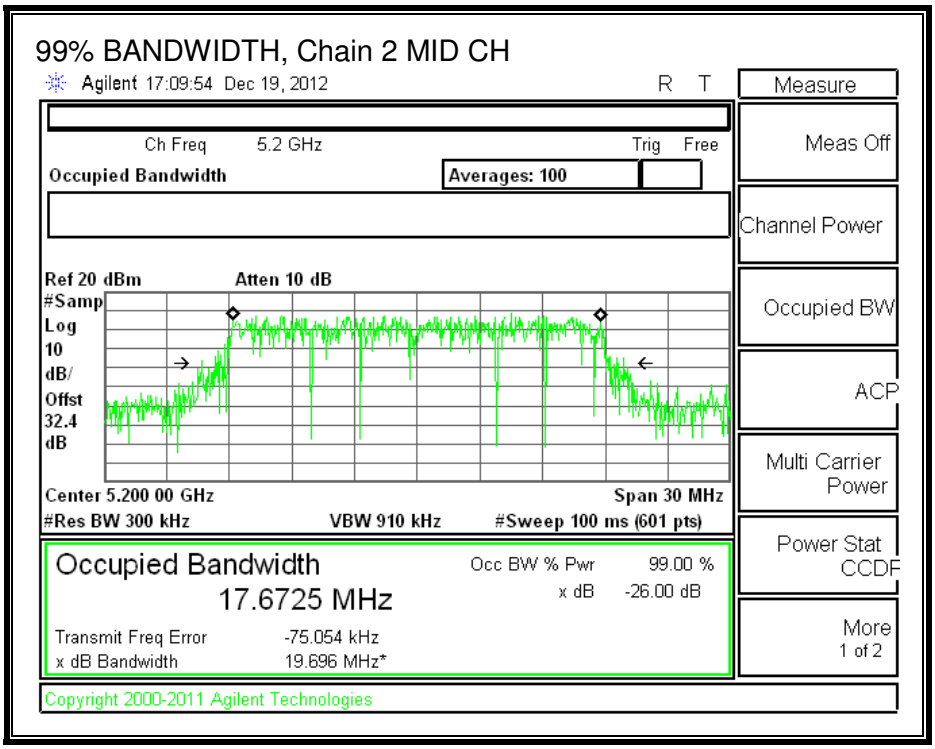
**99% BANDWIDTH, Chain 2**





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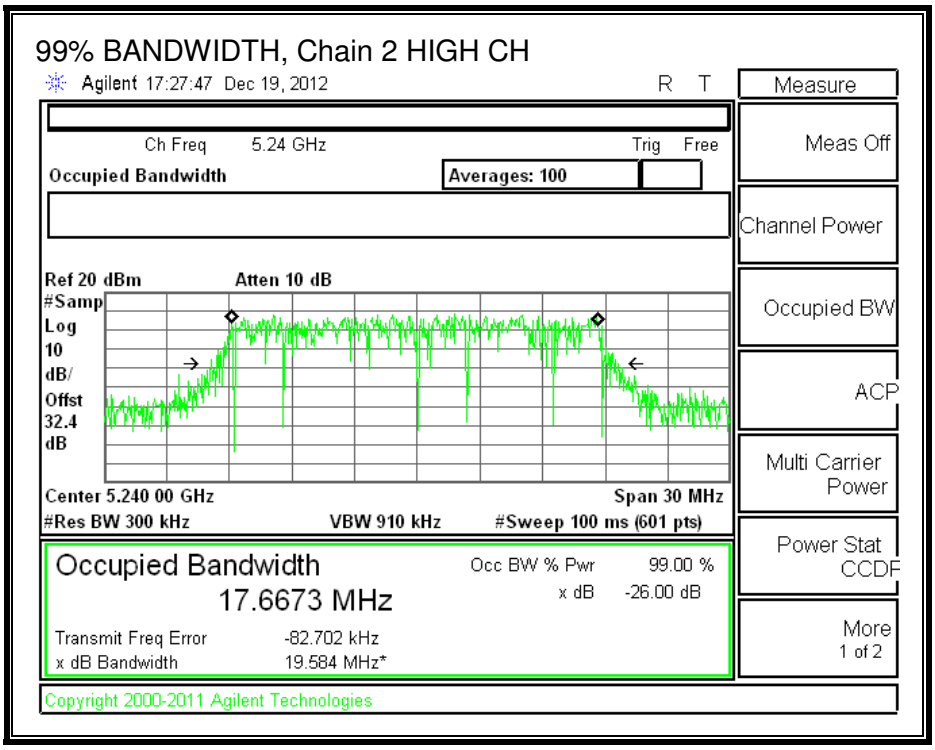



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### 8.7.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.20 | 1.40 | 2.20 | 2.33 |


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**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Directio Gain (dBi) |
|---|---|---|
| Low | 5180 | 2.33 |
| Mid | 5200 | 2.33 |
| High | 5240 | 2.33 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | FCC PSD Limit (dBm) |
|---|---|---|---|
| Low | 5180 | 30.00 | 17.00 |
| Mid | 5200 | 30.00 | 17.00 |
| High | 5240 | 30.00 | 17.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5180 | 9.00 | 8.95 | 8.96 | 13.74 | 30.00 | -16.26 |
| Mid | 5200 | 8.90 | 8.95 | 8.86 | 13.67 | 30.00 | -16.33 |
| High | 5240 | 9.40 | 9.10 | 8.96 | 13.93 | 30.00 | -16.07 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Chain 2 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5180 | -1.02 | -0.95 | -0.92 | 3.81 | 17.00 | -13.19 |
| Mid | 5200 | -1.05 | -0.93 | -0.95 | 3.79 | 17.00 | -13.21 |
| High | 5240 | -0.68 | -1.24 | -1.35 | 3.69 | 17.00 | -13.31 |


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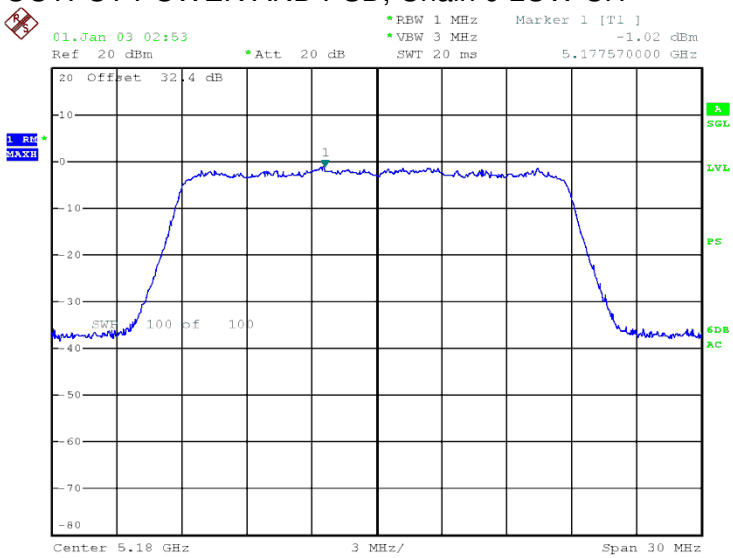
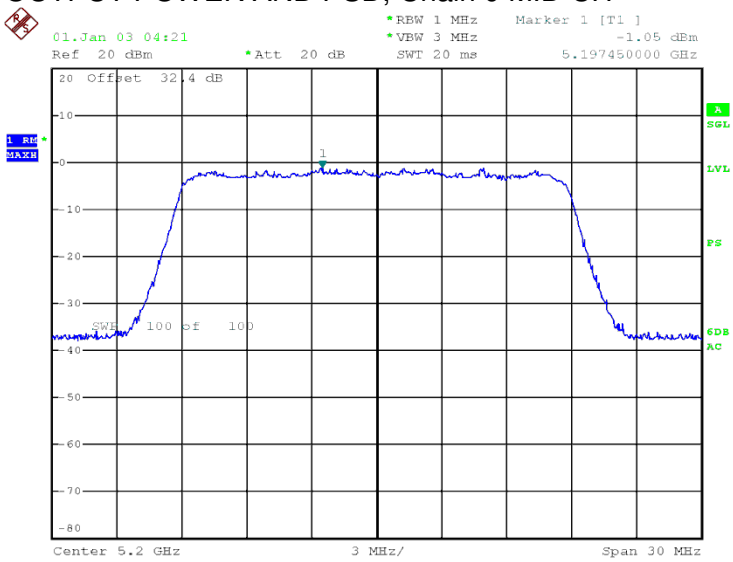
**OUTPUT POWER AND PSD, Chain 0**

OUTPUT POWER AND PSD, Chain 0 LOW CH




Date: 1.JAN.2003 02:53:07

OUTPUT POWER AND PSD, Chain 0 MID CH




Date: 1.JAN.2003 04:21:12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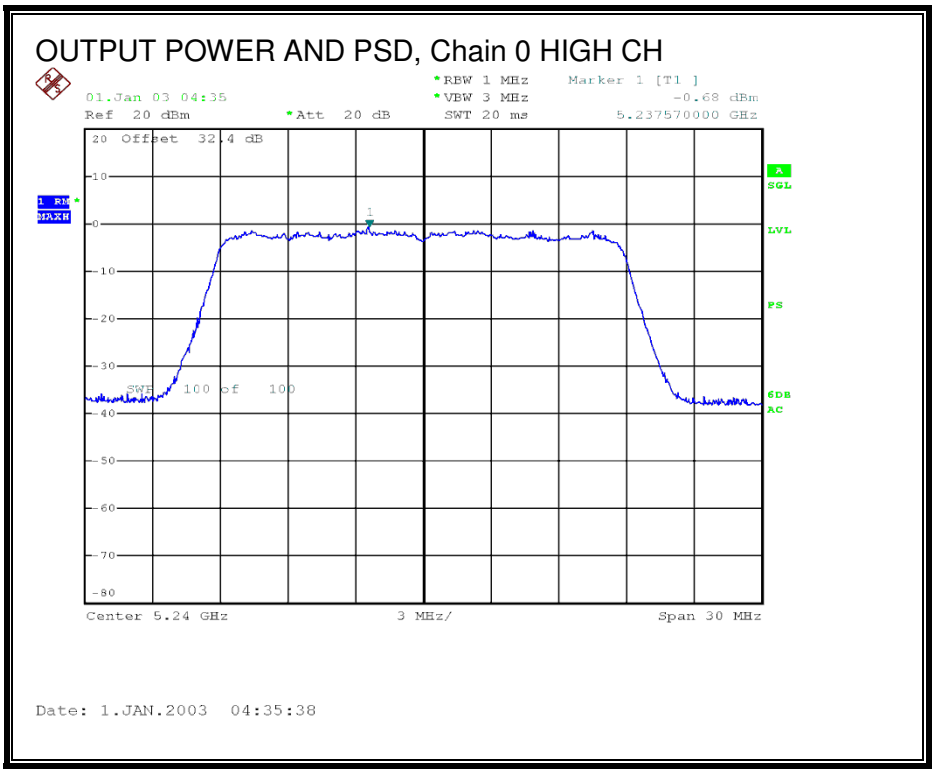
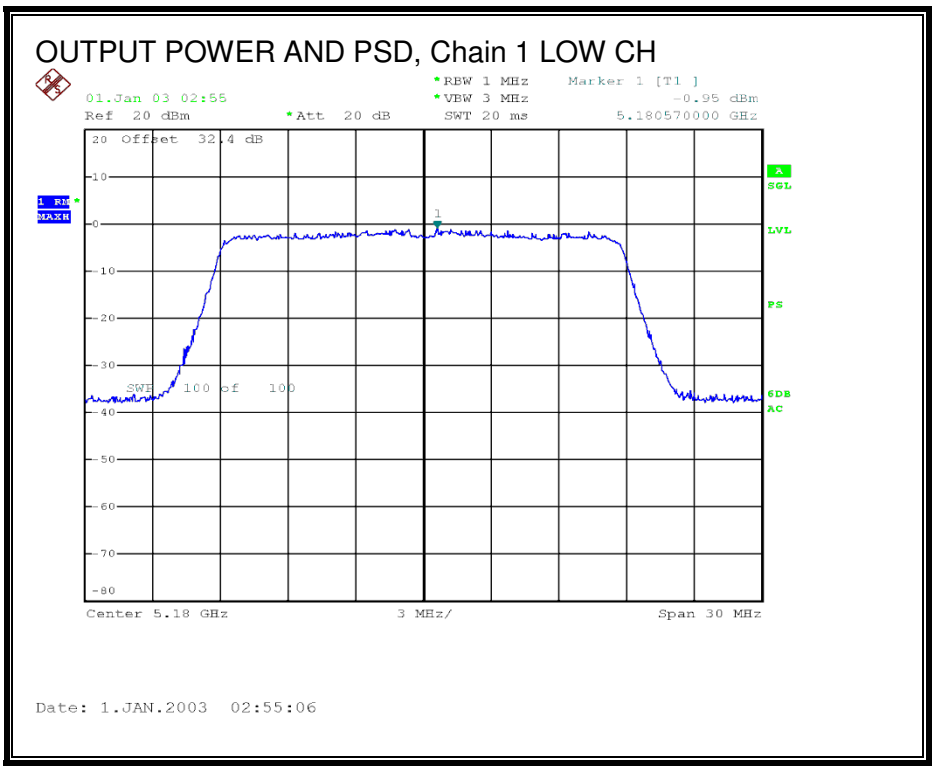



**OUTPUT POWER AND PSD, Chain 1**





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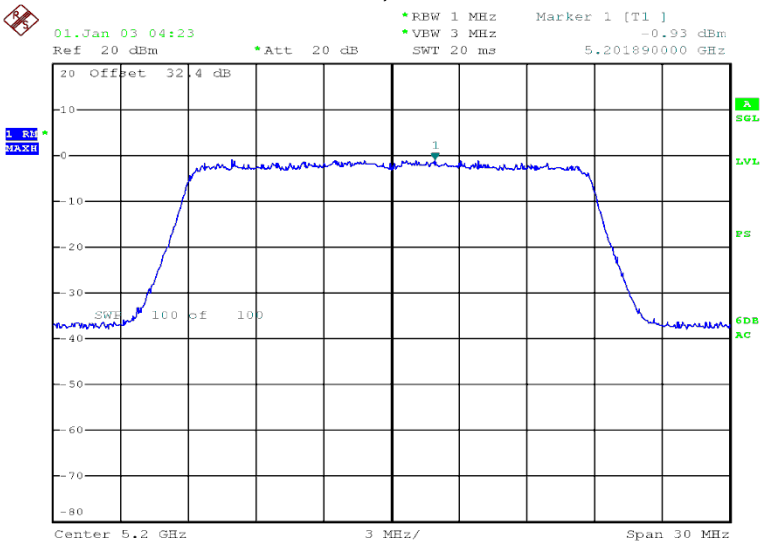
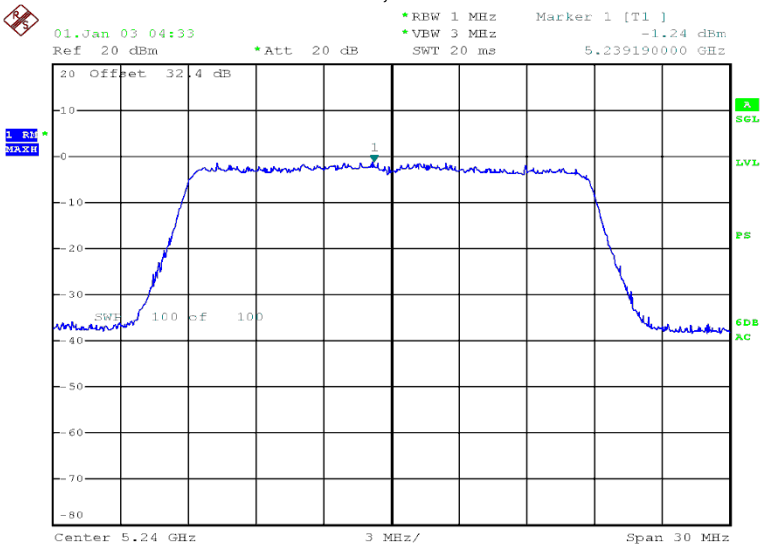
OUTPUT POWER AND PSD, Chain 1 MID CH




Date: 1.JAN.2003 04:23:40

OUTPUT POWER AND PSD, Chain 1 HIGH CH




Date: 1.JAN.2003 04:33:58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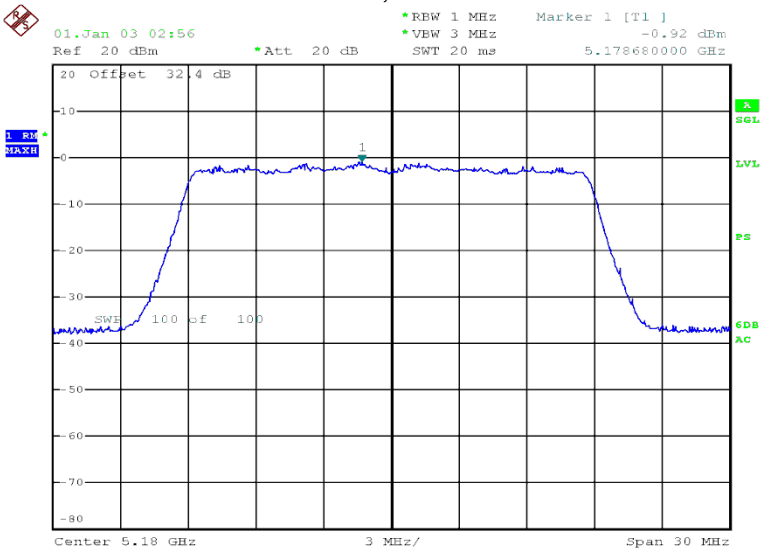
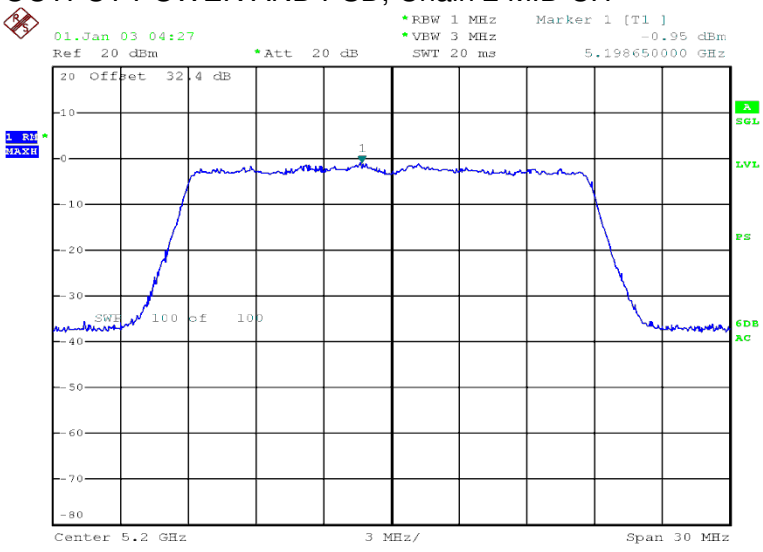
**OUTPUT POWER AND PSD, Chain 2**

OUTPUT POWER AND PSD, Chain 2 LOW CH




Date: 1.JAN.2003 02:56:50

OUTPUT POWER AND PSD, Chain 2 MID CH




Date: 1.JAN.2003 04:27:06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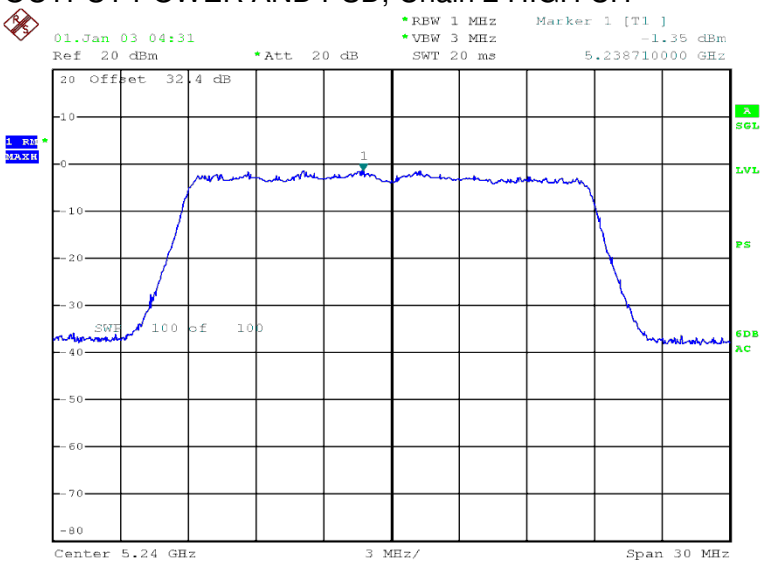
OUTPUT POWER AND PSD, Chain 2 HIGH CH




Date: 1.JAN.2003 04:31:45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## 8.8. 802.11n HT40 1TX MODE IN THE 5.2 GHz BAND

### 8.8.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB Bandwidth (MHz) |
|---|---|---|
| Low | 5190 | 40.17 |
| High | 5230 | 40.00 |


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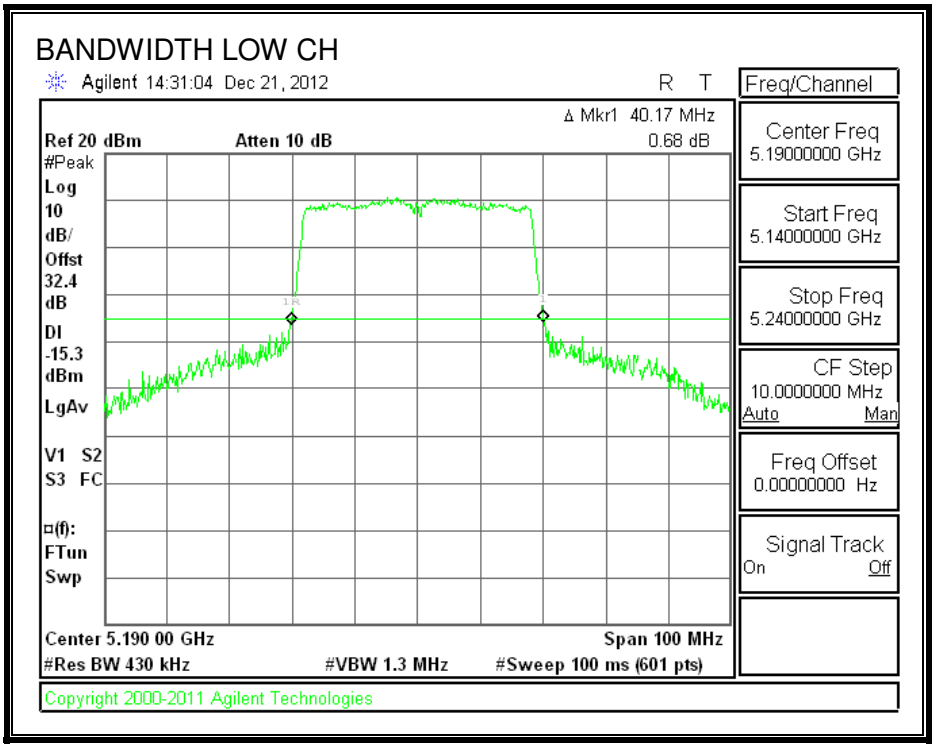
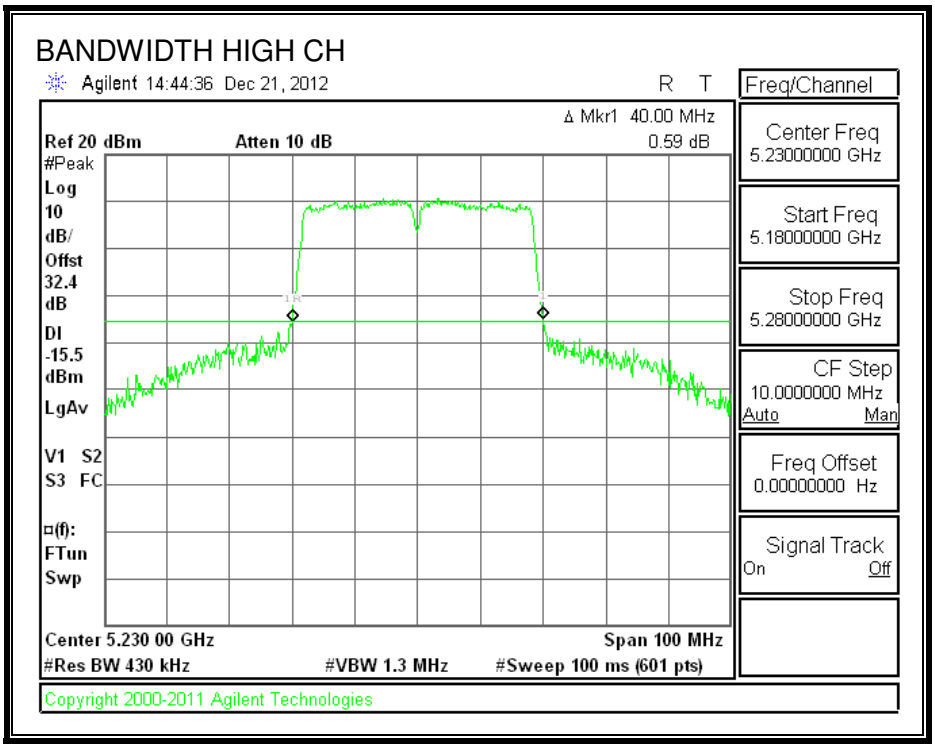
**26 dB BANDWIDTH**





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### 8.8.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5190 | 36.1980 |
| High | 5230 | 36.1971 |


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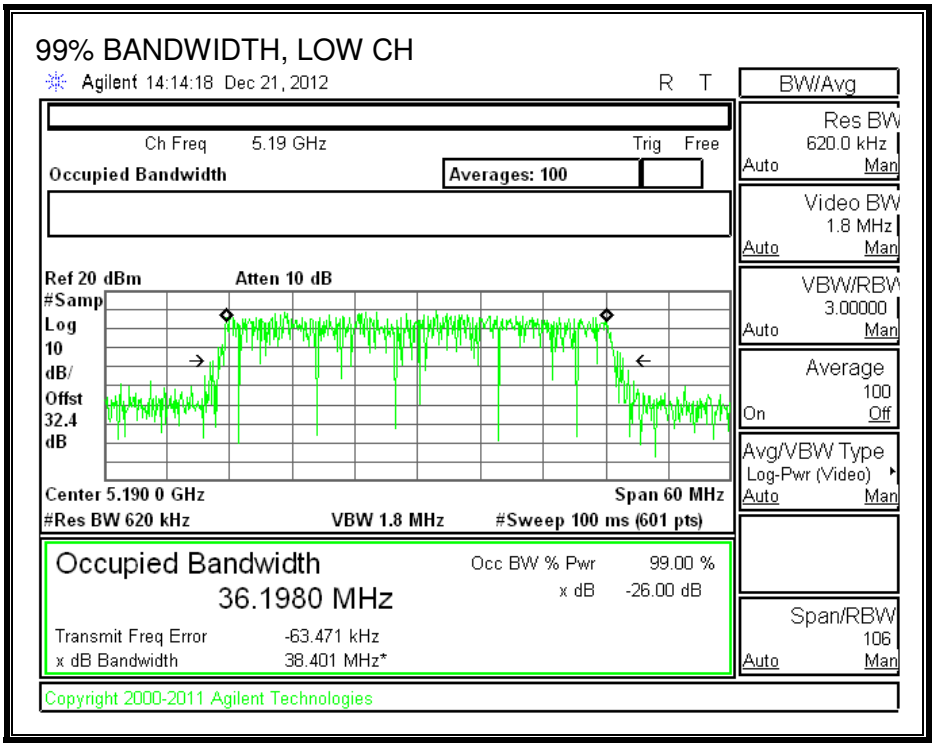
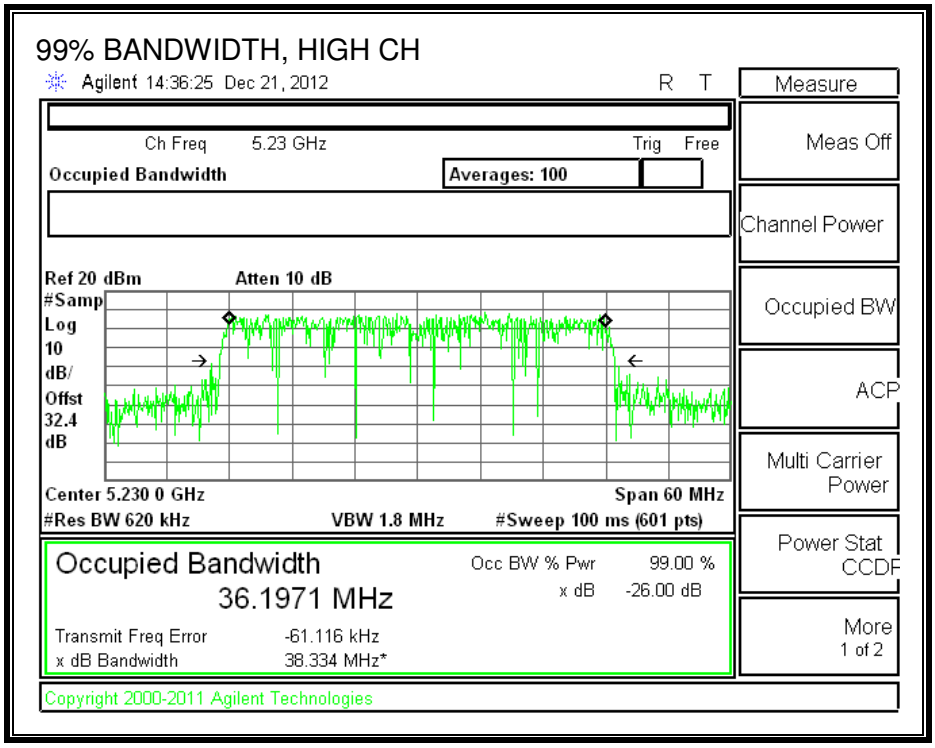
**99% BANDWIDTH**





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### 8.8.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.


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**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Directio Gain (dBi) |
|---|---|---|
| Low | 5190 | 3.20 |
| High | 5230 | 3.20 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | FCC PSD Limit (dBm) |
|---|---|---|---|
| Low | 5190 | 30.00 | 17.00 |
| High | 5230 | 30.00 | 17.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5190 | 15.00 | 15.00 | 30.00 | -15.00 |
| High | 5230 | 16.50 | 16.50 | 30.00 | -13.50 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5190 | 3.71 | 3.71 | 17.00 | -13.29 |
| High | 5230 | 3.56 | 3.56 | 17.00 | -13.44 |


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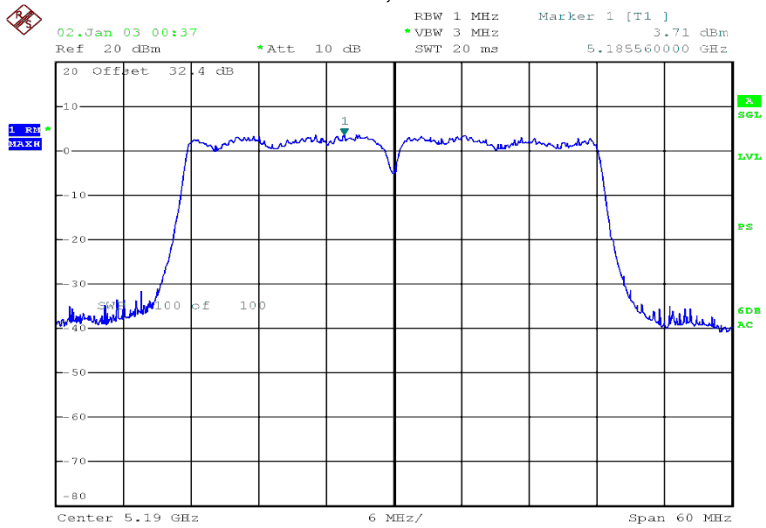
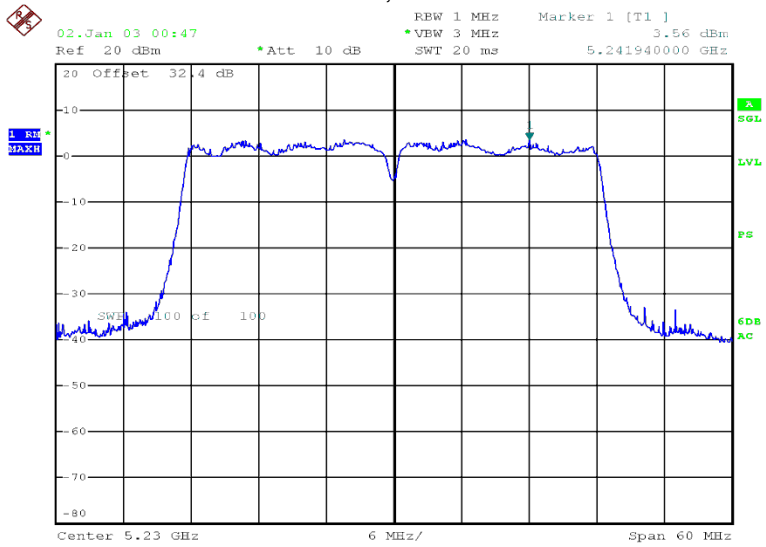
**OUTPUT POWER AND PSD, Chain 1**

OUTPUT POWER AND PSD, Chain 0 LOW CH




Date: 2.JAN.2003 00:37:08

OUTPUT POWER AND PSD, Chain 0 HIGH CH




Date: 2.JAN.2003 00:47:35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## 8.9. 802.11n HT40 CDD 2TX MODE IN THE 5.2 GHz BAND

### 8.9.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5190 | 39.83 | 39.67 |
| High | 5230 | 39.83 | 39.50 |


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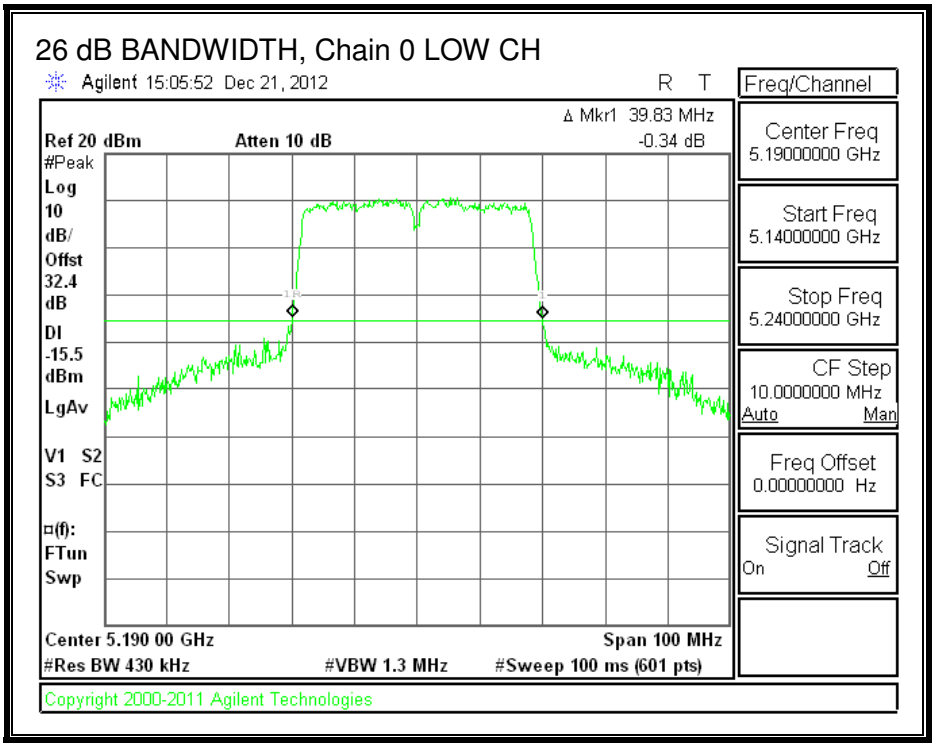
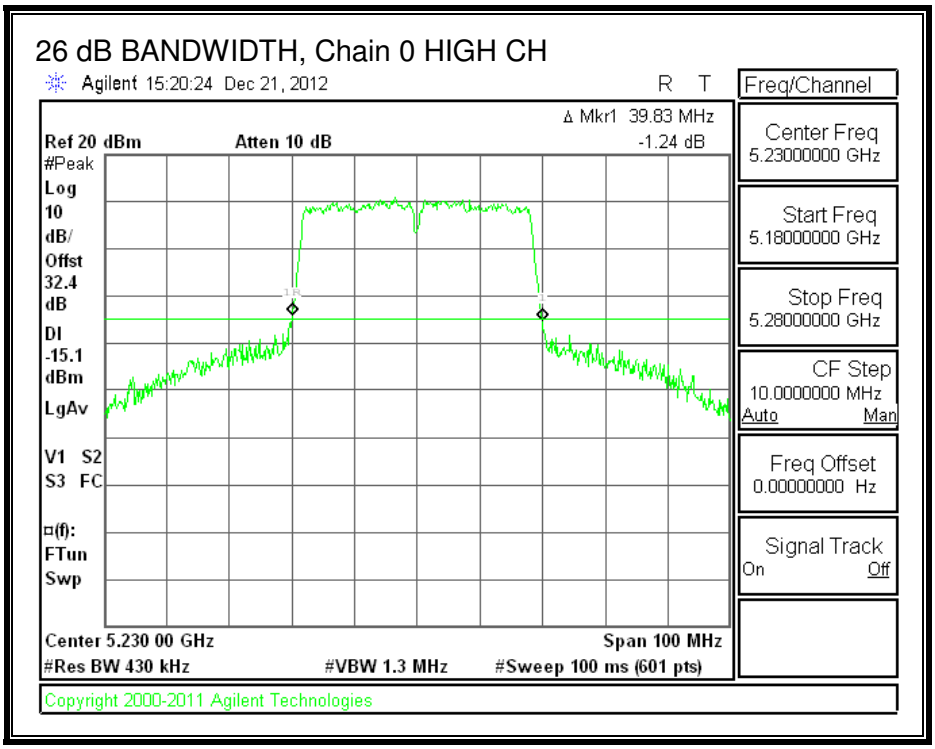
**26 dB BANDWIDTH, Chain 0**





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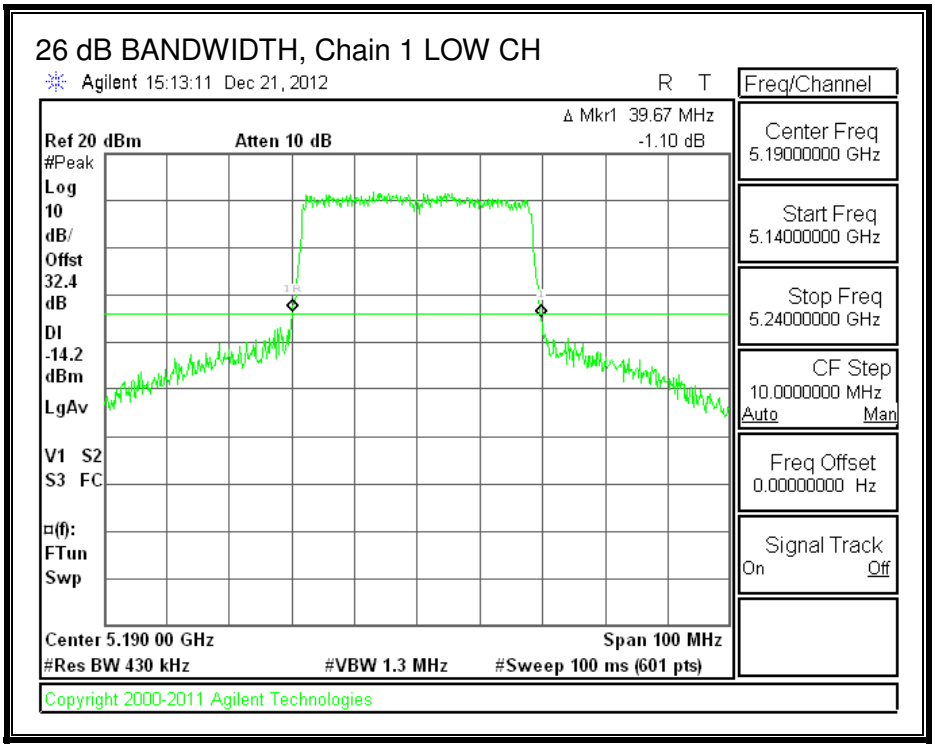
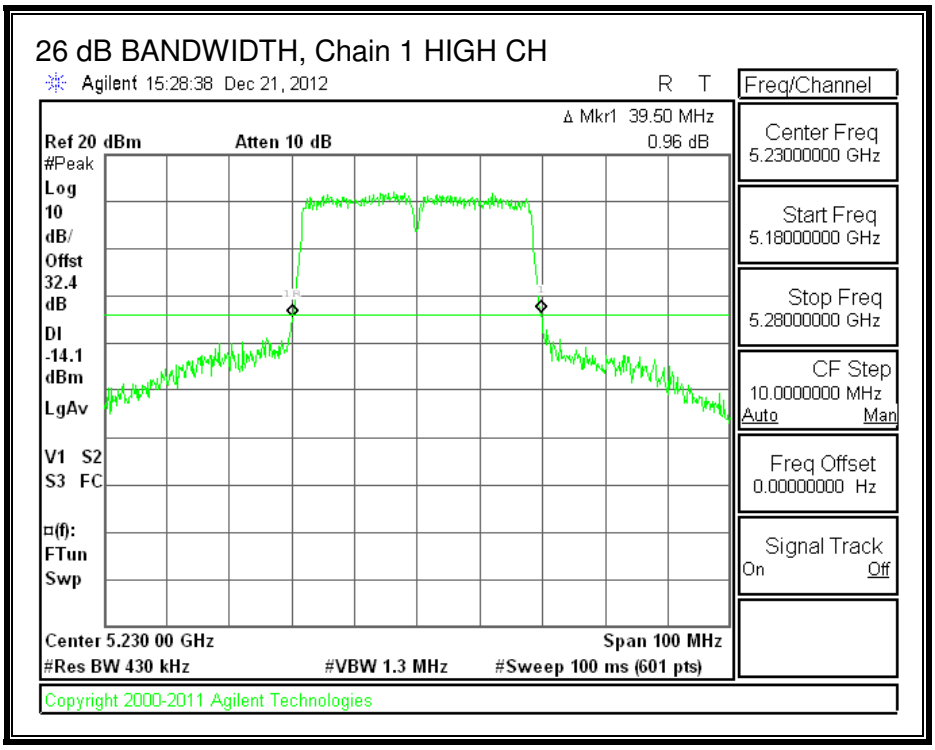
**26 dB BANDWIDTH, Chain 1**





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### 8.9.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5190 | 36.1932 | 36.1838 |
| High | 5230 | 36.2235 | 36.2197 |


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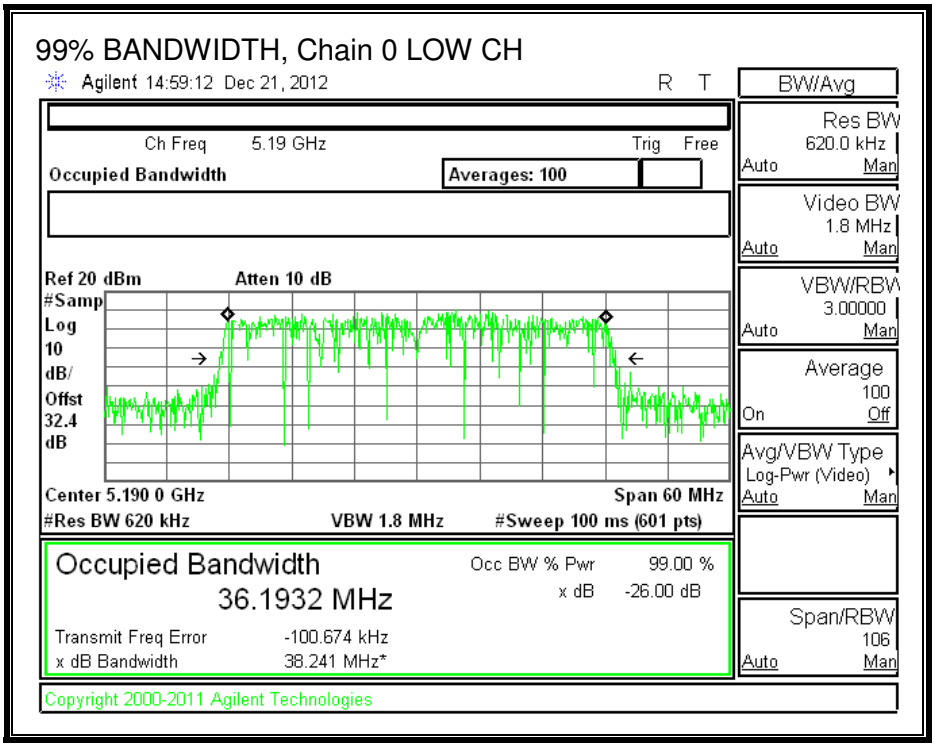
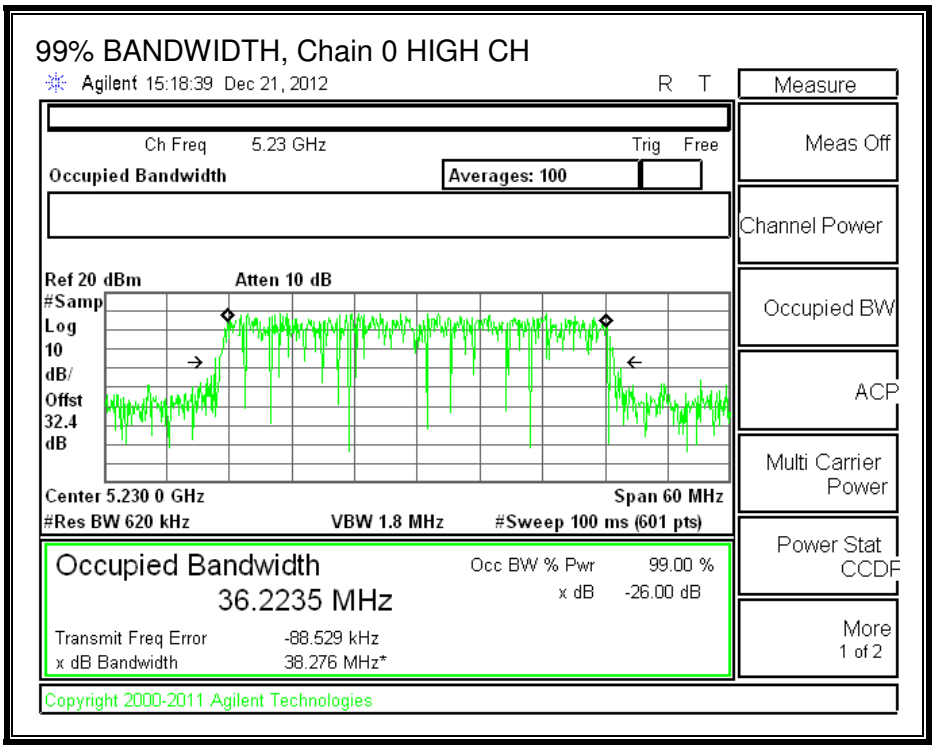
**99% BANDWIDTH, Chain 0**





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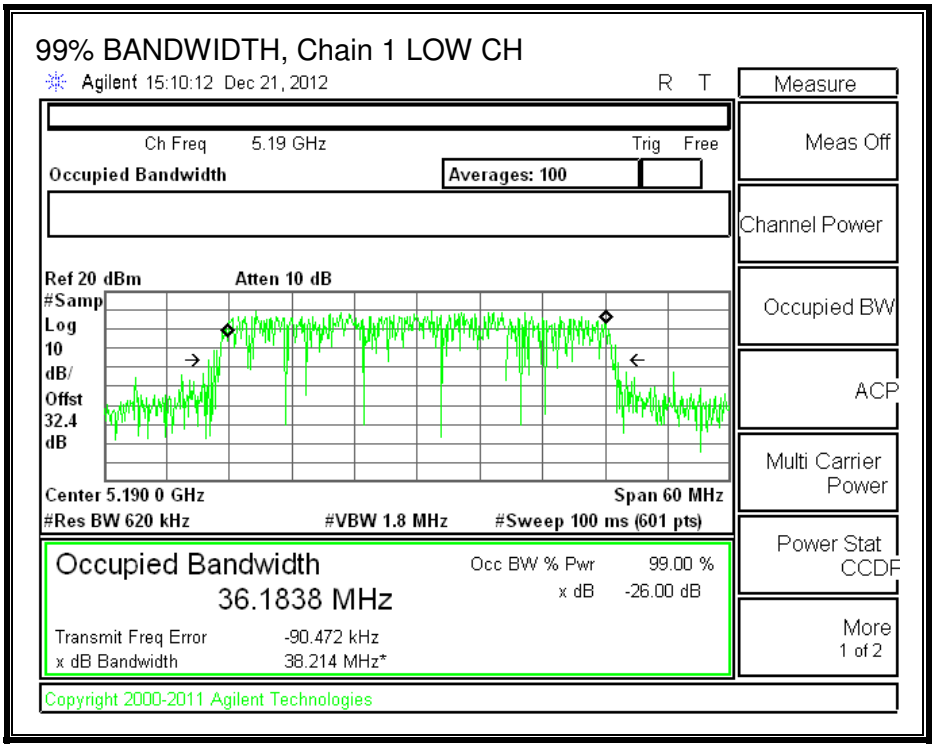
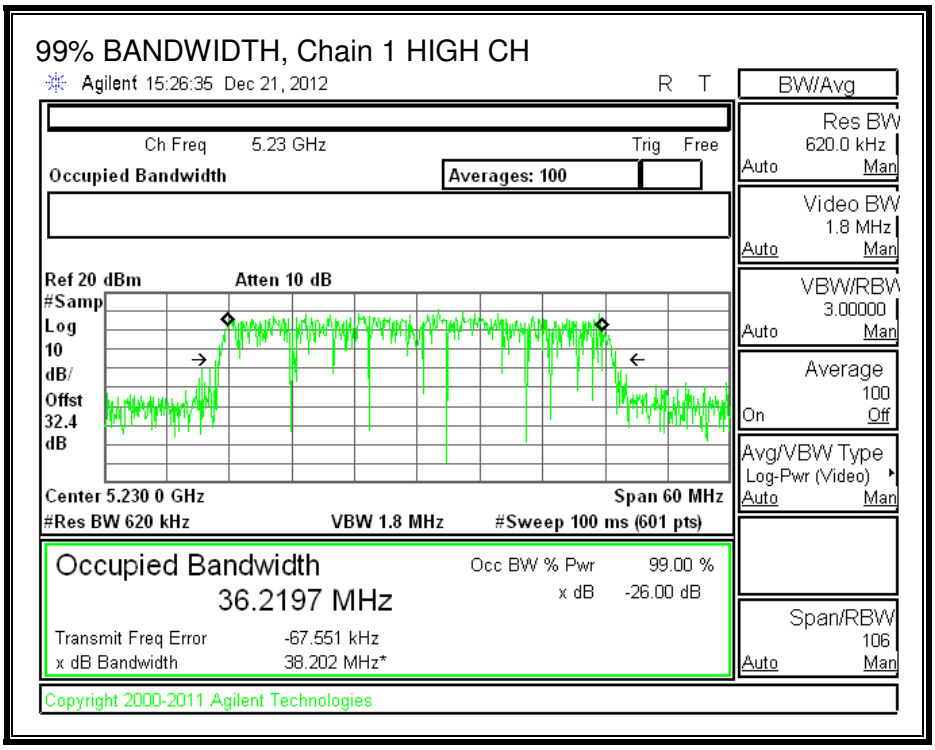
**99% BANDWIDTH, Chain 1**





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### 8.9.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

For output power, the two chains are considered uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|
| 3.20 | 2.20 | 2.73 |

For PSD, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|
| 3.20 | 2.20 | 5.72 |


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**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Correlat Directio Gain (dBi) | Correlat Directio Gain (dBi) |
|---|---|---|---|
| Low | 5190 | 5.72 | 2.73 |
| High | 5230 | 5.72 | 2.73 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | FCC PSD Limit (dBm) |
|---|---|---|---|
| Low | 5190 | 30.00 | 17.00 |
| High | 5230 | 30.00 | 17.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5190 | 12.80 | 12.50 | 15.66 | 30.00 | -14.34 |
| High | 5230 | 12.70 | 12.80 | 15.76 | 30.00 | -14.24 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5190 | 0.601 | 0.682 | 3.65 | 17.00 | -13.35 |
| High | 5230 | 0.227 | 0.019 | 3.13 | 17.00 | -13.87 |


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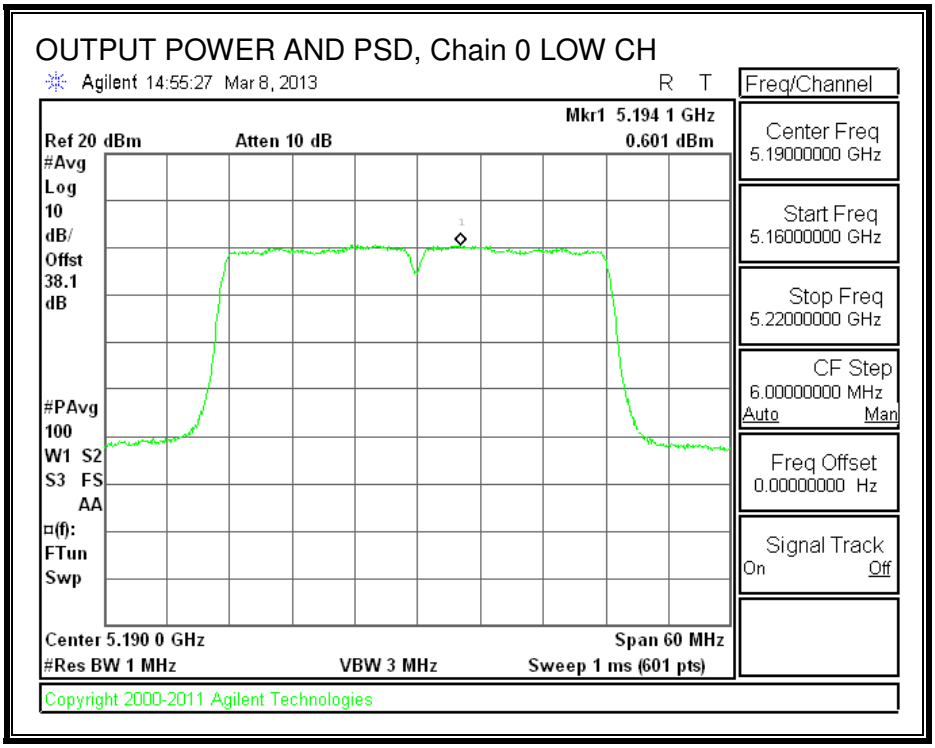
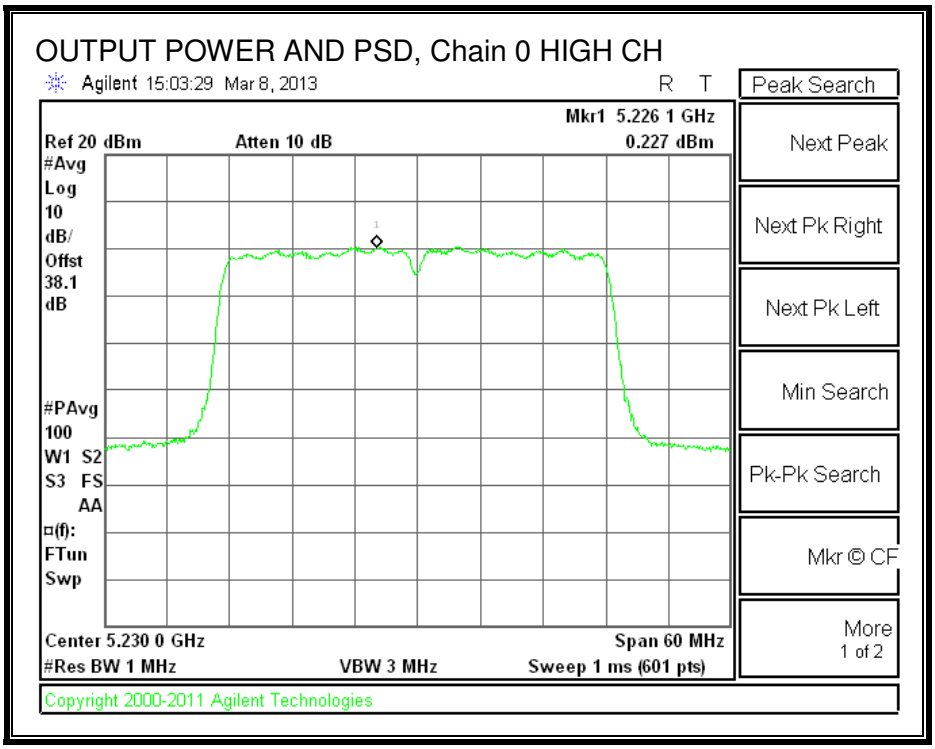
**OUTPUT POWER AND PSD, Chain 0**





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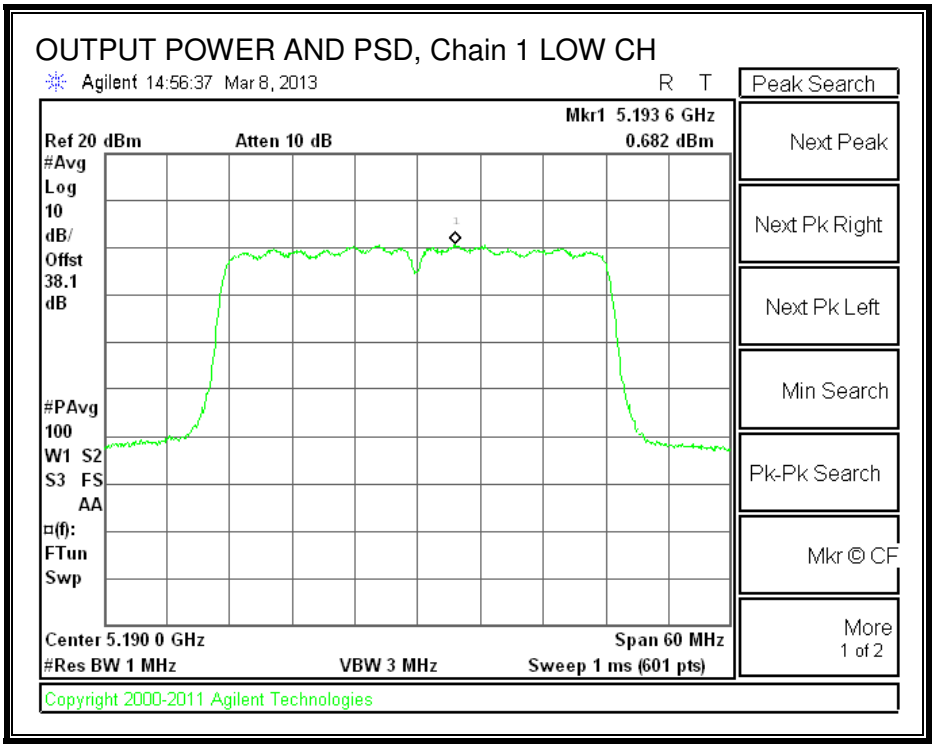
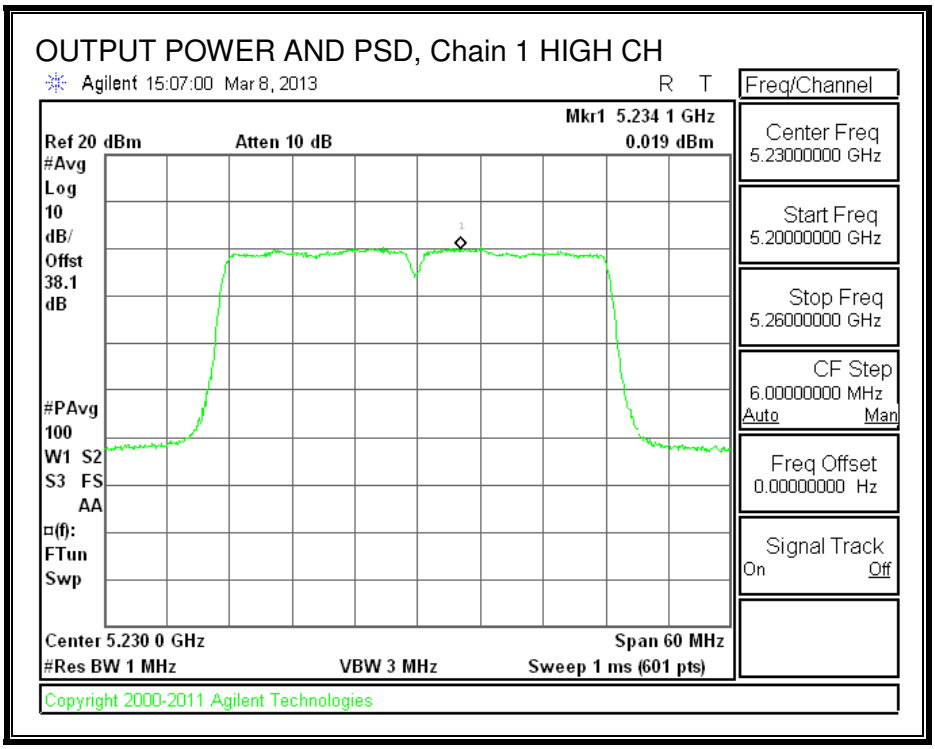
**OUTPUT POWER AND PSD, Chain 1**





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## 8.10. 802.11n HT40 BF 2TX MODE IN THE 5.2 GHz BAND

Covered by testing HT40 CDD 2TX mode, the power per chain used for HT40 CDD 2TX mode is the same power per chain that will be used for HT40 BF 2TX mode. However, since BF is correlated and CDD is uncorrelated for output power, the section below for output power using correlated AG for this BF mode shows it is still compliant.

### 8.10.1. OUTPUT AVERAGE POWER

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

For output power, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|
| 3.20 | 2.20 | 5.72 |

**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Correlat Directio Gain (dBi) |
|---|---|---|
| Low | 5190 | 5.72 |
| High | 5230 | 5.72 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) |
|---|---|---|
| Low | 5190 | 30.00 |
| High | 5230 | 30.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5190 | 12.80 | 12.50 | 15.66 | 30.00 | -14.34 |
| High | 5230 | 12.70 | 12.80 | 15.76 | 30.00 | -14.24 |


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## 8.11. 802.11n HT40 STBC 2TX MODE IN THE 5.2 GHz BAND

### 8.11.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5190 | 40.17 | 39.50 |
| High | 5230 | 40.67 | 39.50 |


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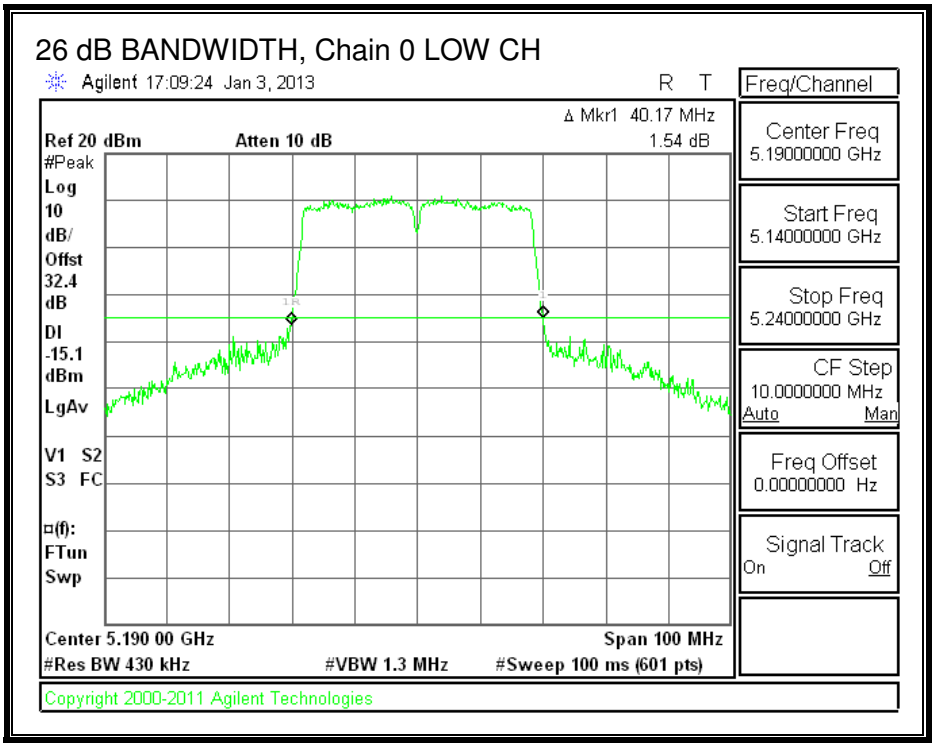
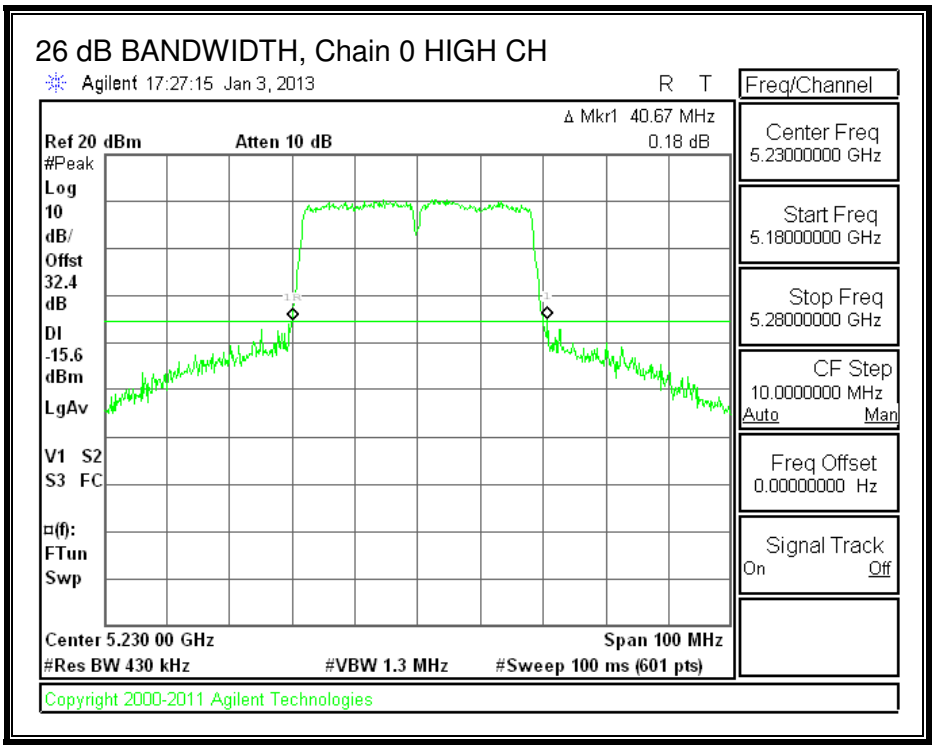
**26 dB BANDWIDTH, Chain 0**





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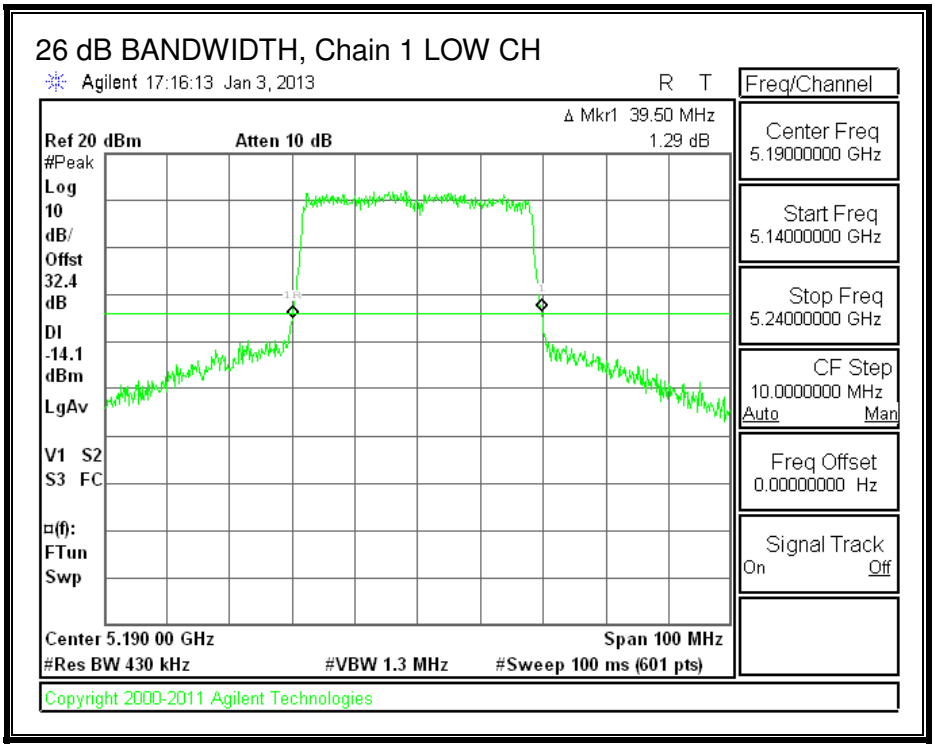
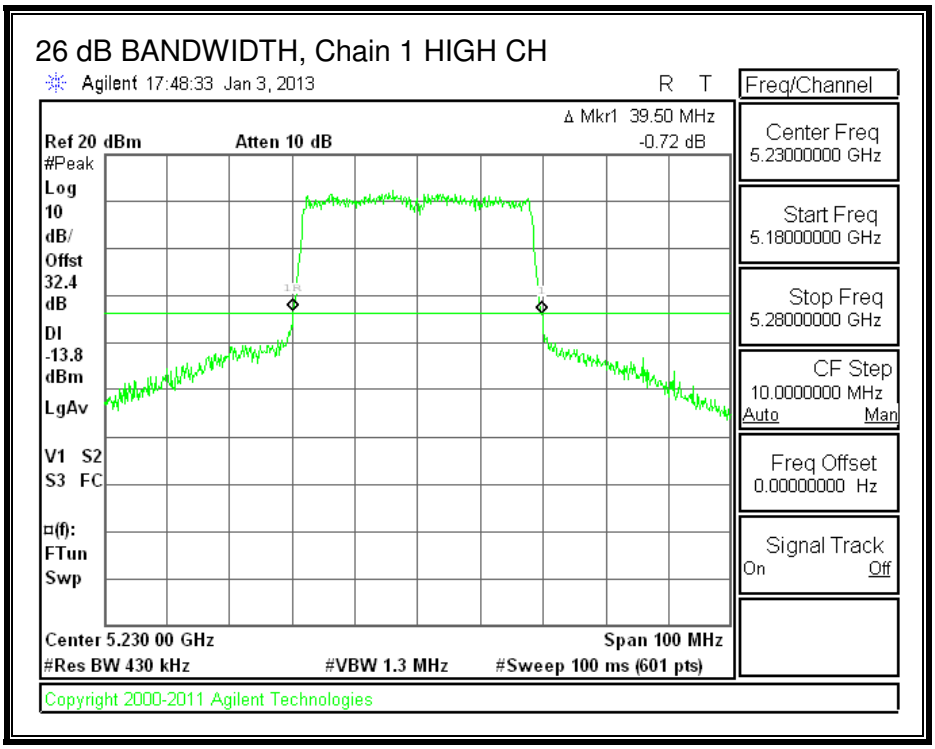
**26 dB BANDWIDTH, Chain 1**





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### 8.11.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5190 | 36.2054 | 36.1982 |
| High | 5230 | 36.1918 | 36.2227 |


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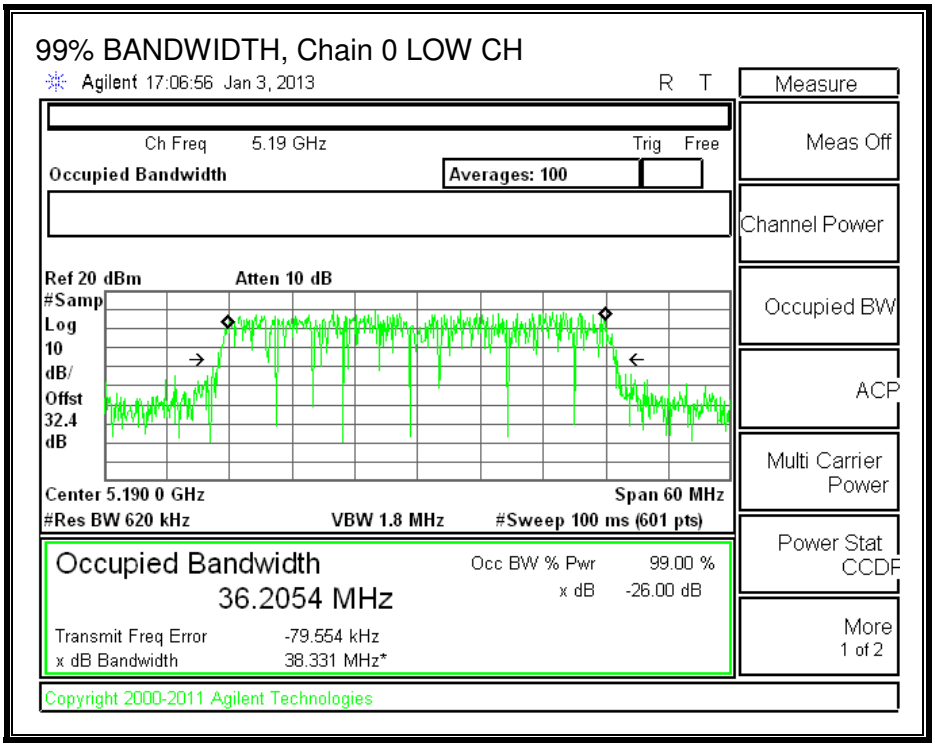
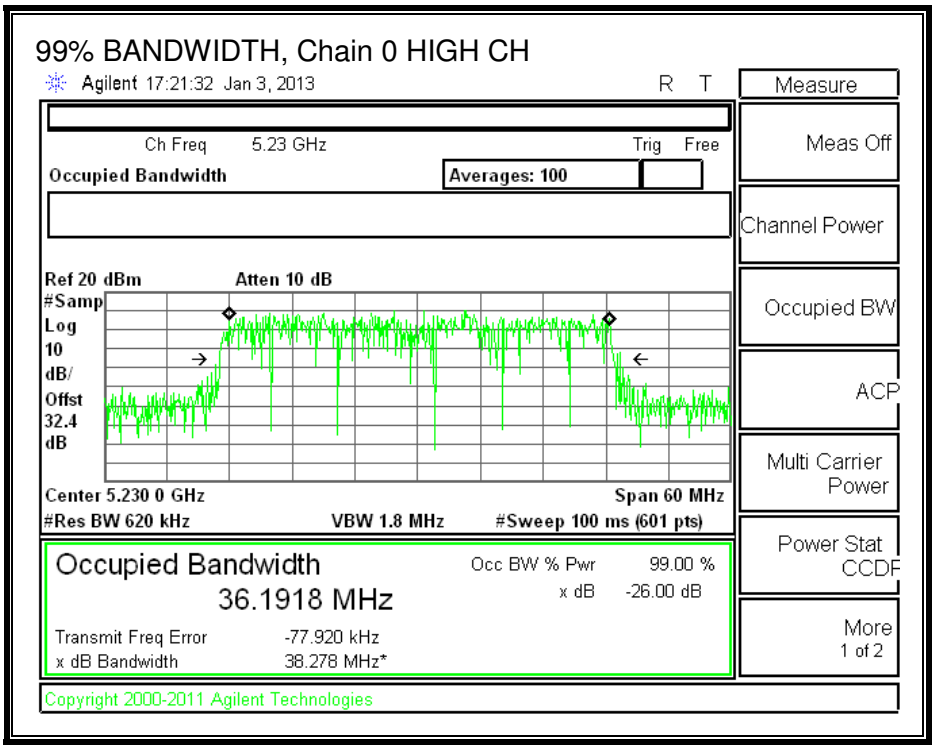
**99% BANDWIDTH, Chain 0**





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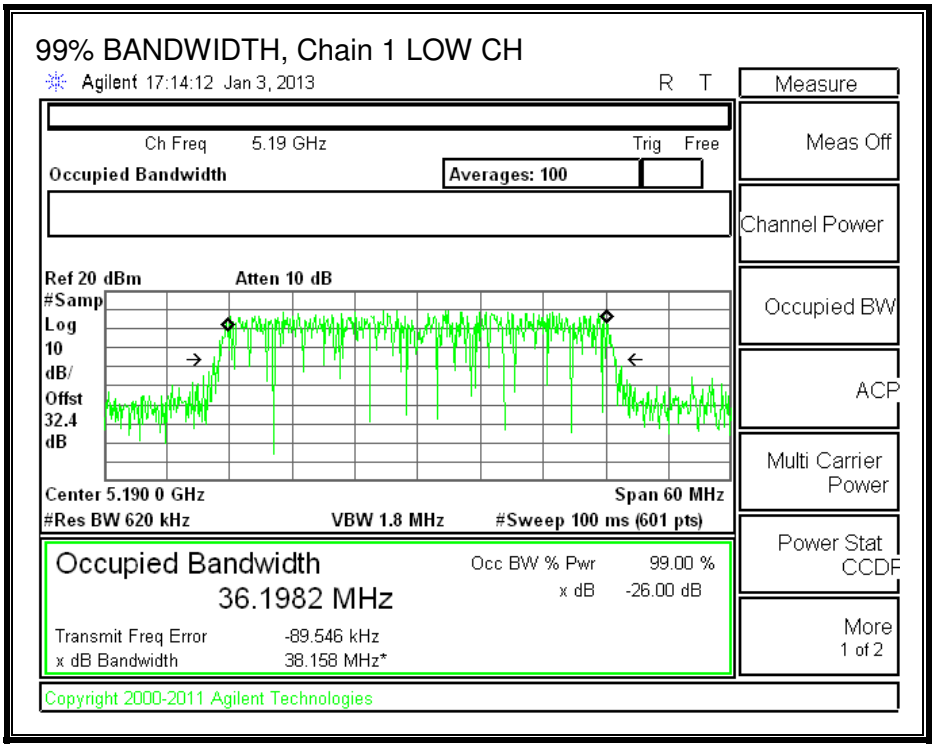
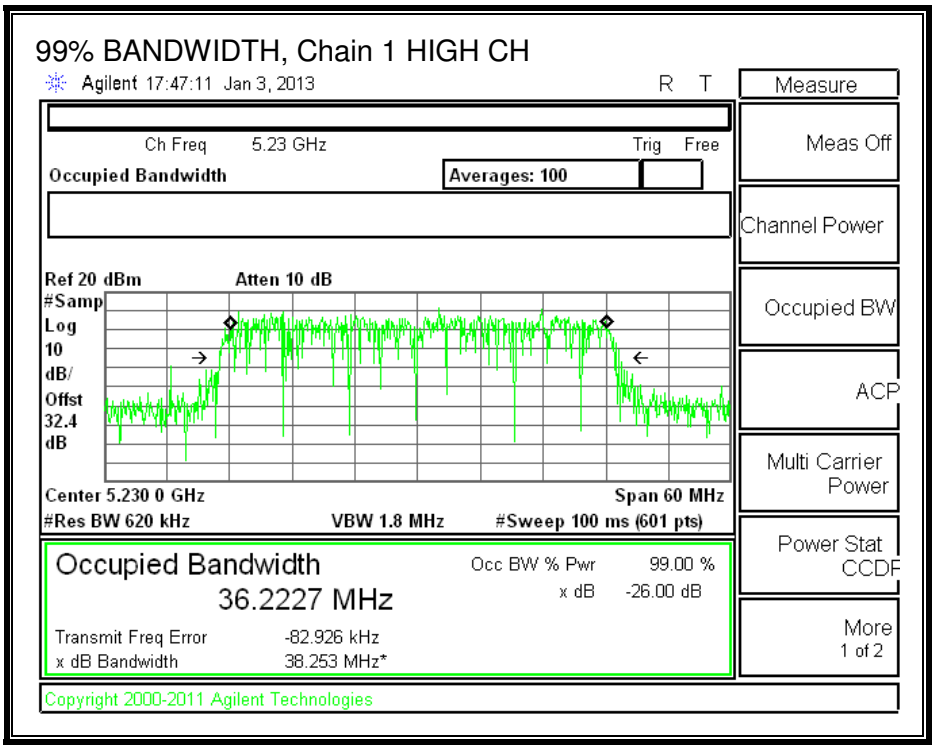
**99% BANDWIDTH, Chain 1**





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### 8.11.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|
| 3.20 | 2.20 | 2.73 |


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**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Directio Gain (dBi) |
|---|---|---|
| Low | 5190 | 2.73 |
| High | 5230 | 2.73 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | FCC PSD Limit (dBm) |
|---|---|---|---|
| Low | 5190 | 30.00 | 17.00 |
| High | 5230 | 30.00 | 17.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5190 | 13.70 | 13.80 | 16.76 | 30.00 | -13.24 |
| High | 5230 | 13.60 | 13.70 | 16.66 | 30.00 | -13.34 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5190 | -1.08 | -0.21 | 2.39 | 17.00 | -14.61 |
| High | 5230 | -0.97 | -0.07 | 2.51 | 17.00 | -14.49 |


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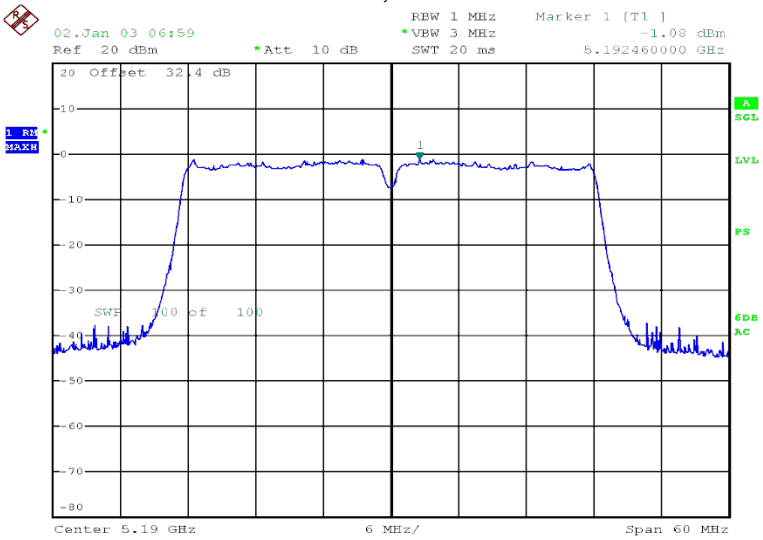
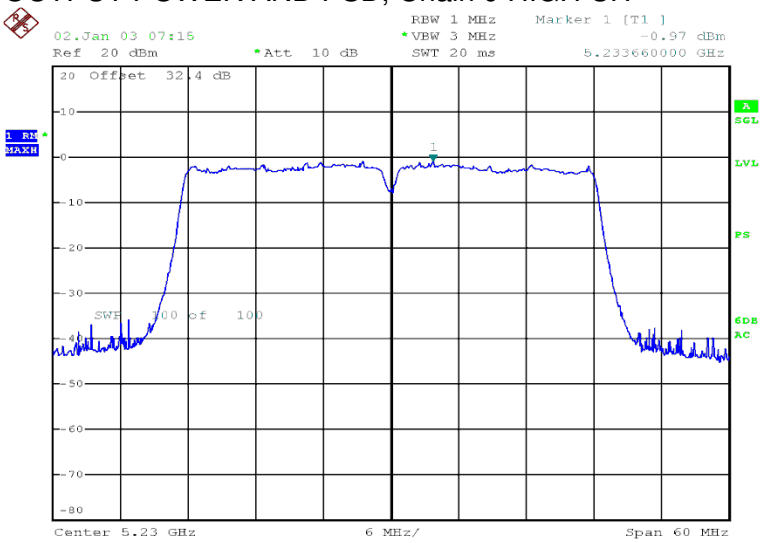
**OUTPUT POWER AND PSD, Chain 0**

OUTPUT POWER AND PSD, Chain 0 LOW CH




Date: 2.JAN.2003 06:59:55

OUTPUT POWER AND PSD, Chain 0 HIGH CH




Date: 2.JAN.2003 07:15:14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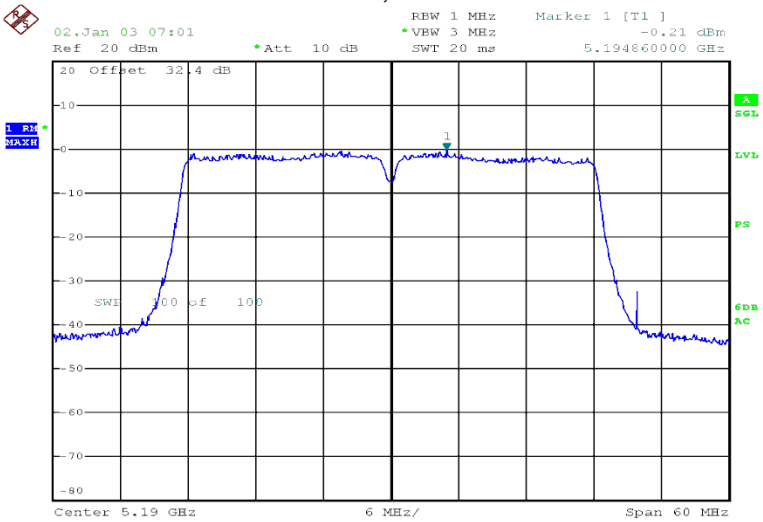
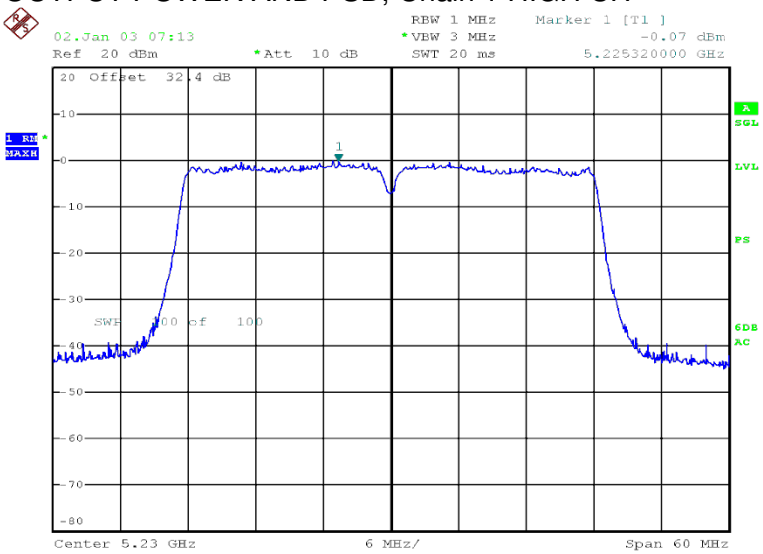
**OUTPUT POWER AND PSD, Chain 1**

OUTPUT POWER AND PSD, Chain 1 LOW CH




Date: 2.JAN.2003 07:01:20

OUTPUT POWER AND PSD, Chain 1 HIGH CH




Date: 2.JAN.2003 07:13:59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## 8.12. 802.11n HT40 CDD 3TX MODE IN THE 5.2 GHz BAND

### 8.12.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) | 26 dB BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5190 | 40.17 | 39.50 | 39.50 |
| High | 5230 | 39.83 | 39.50 | 39.50 |


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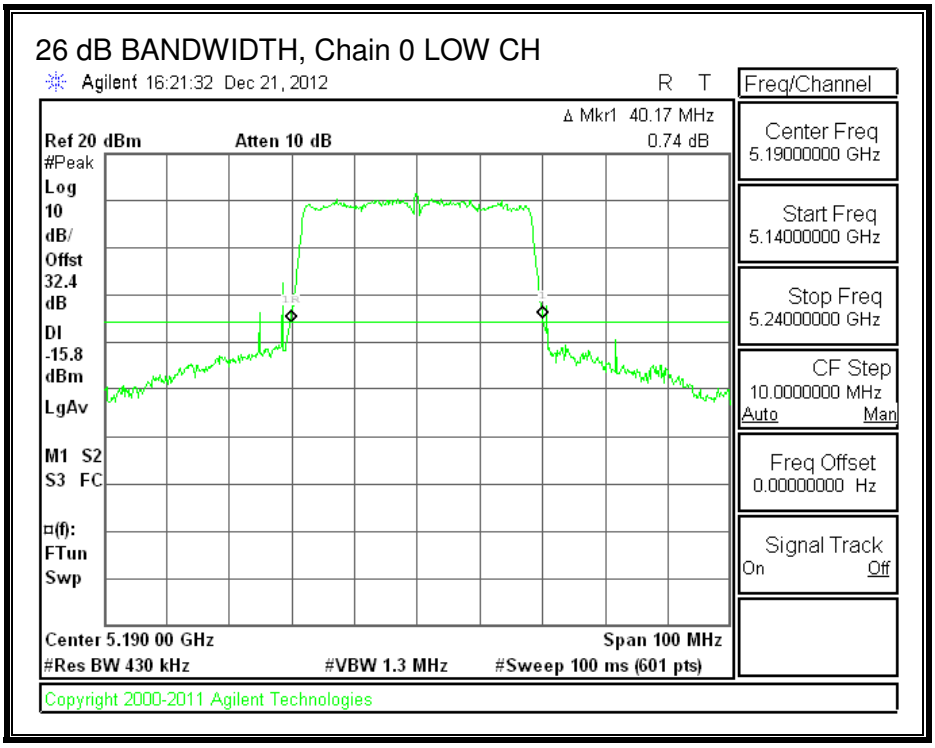
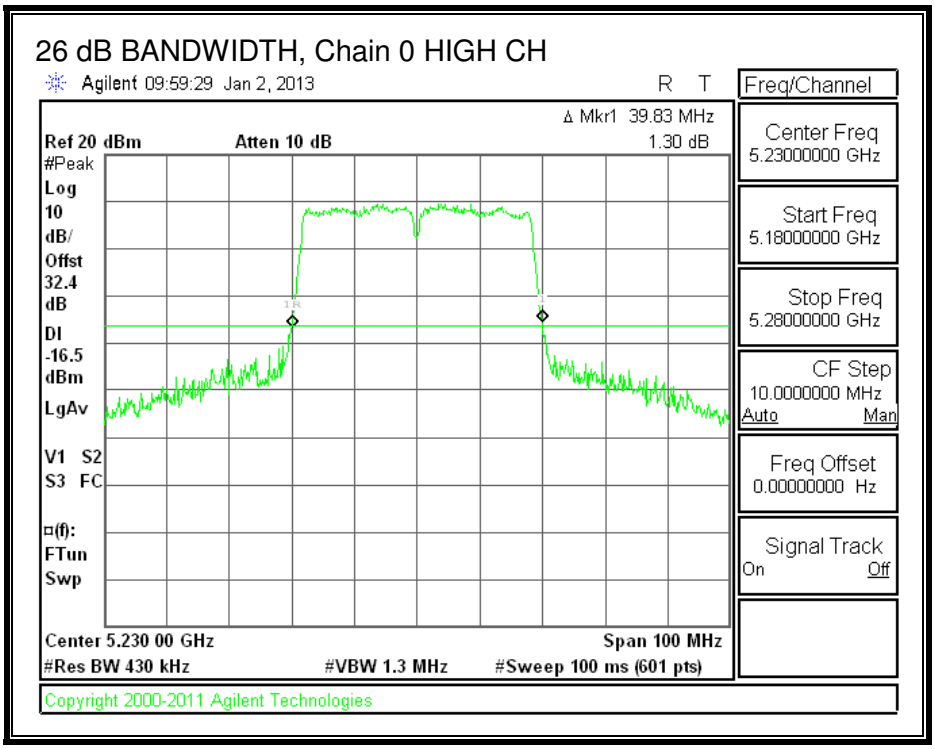
**26 dB BANDWIDTH, Chain 0**





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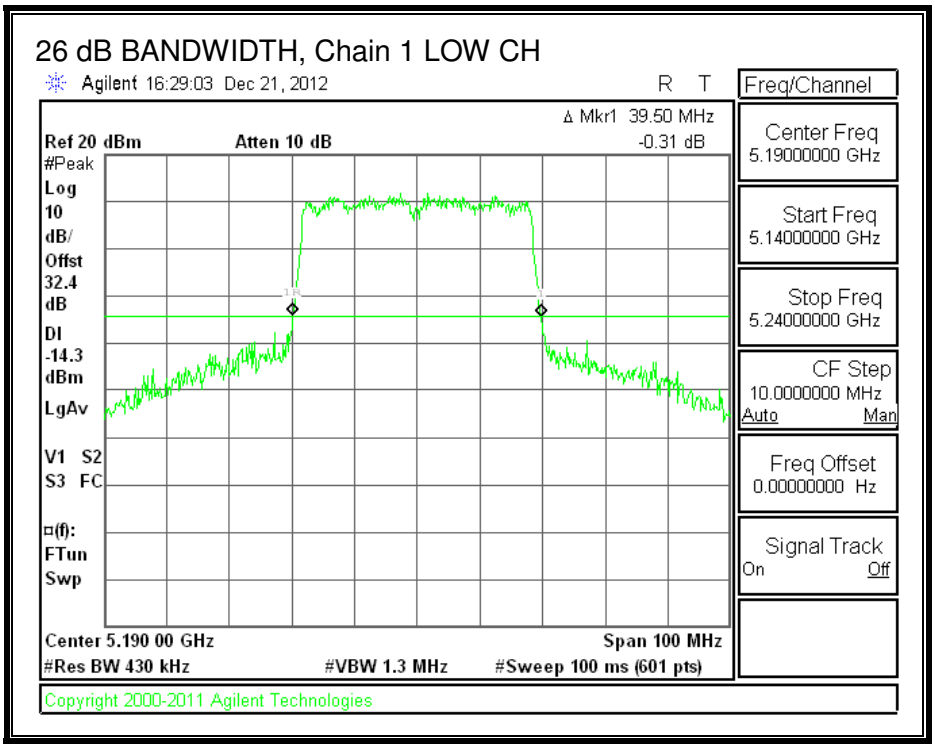
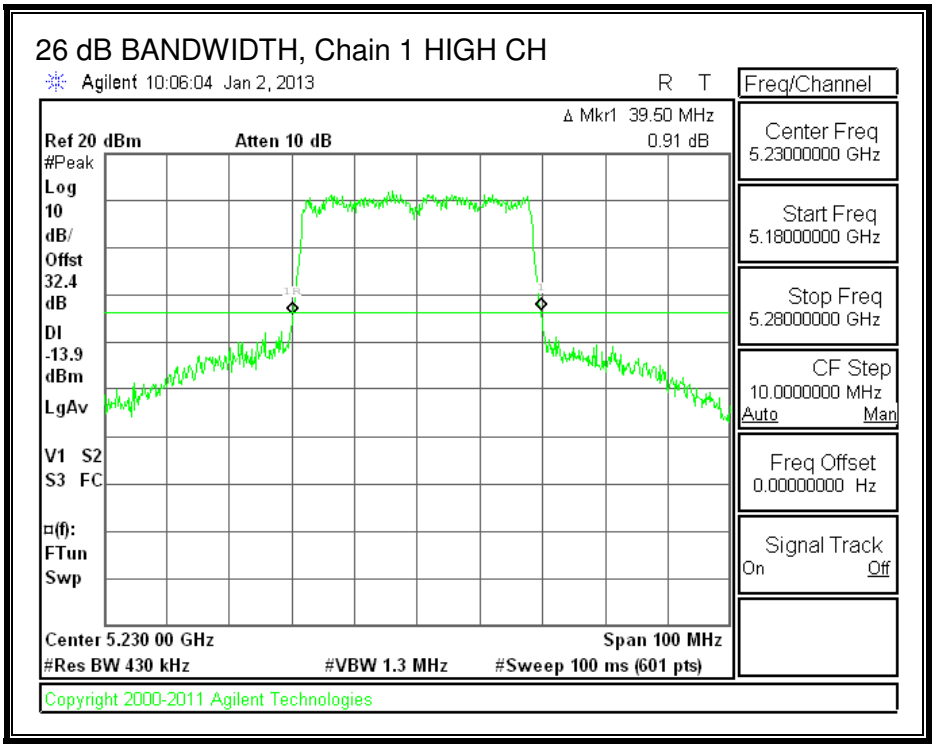
**26 dB BANDWIDTH, Chain 1**





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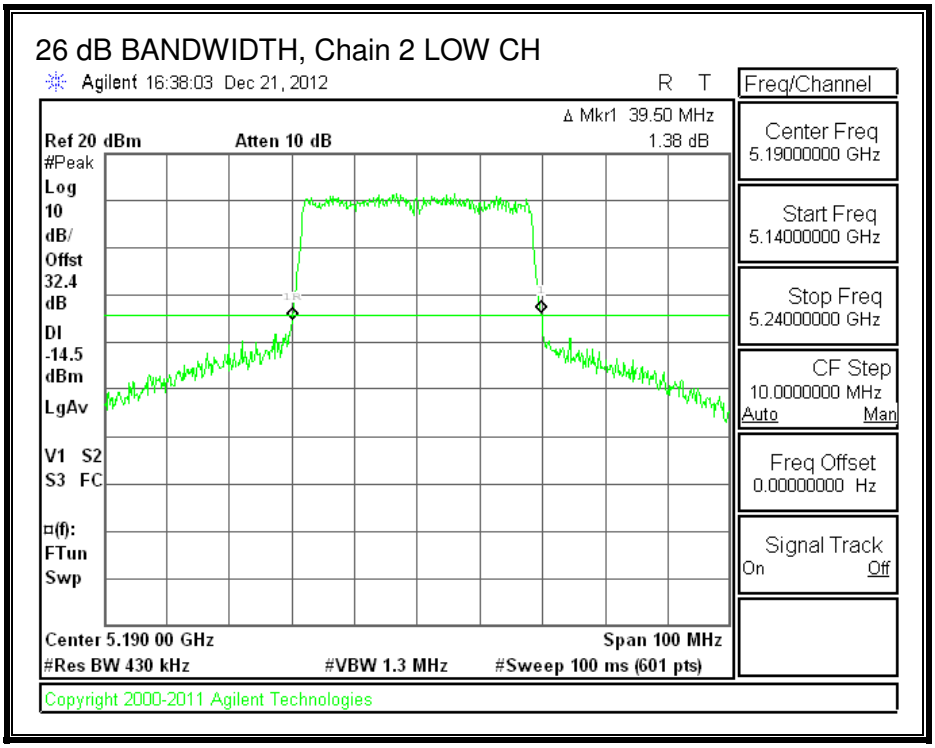
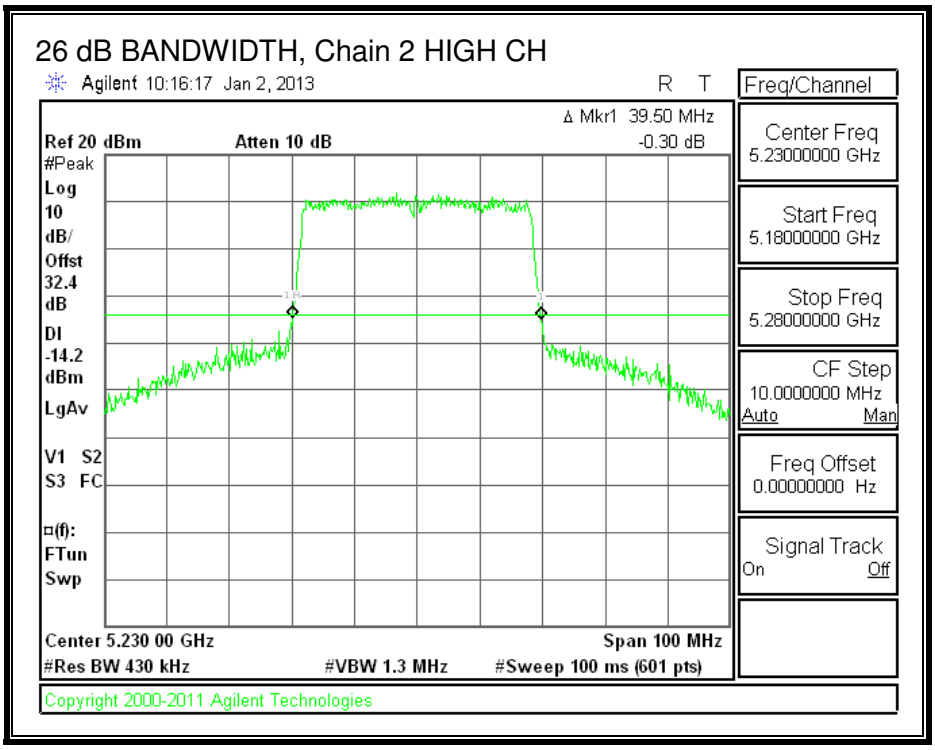
**26 dB BANDWIDTH, Chain 2**





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### 8.12.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) | 99% BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5190 | 36.2176 | 36.2109 | 36.2162 |
| High | 5230 | 36.2417 | 36.2393 | 36.2273 |


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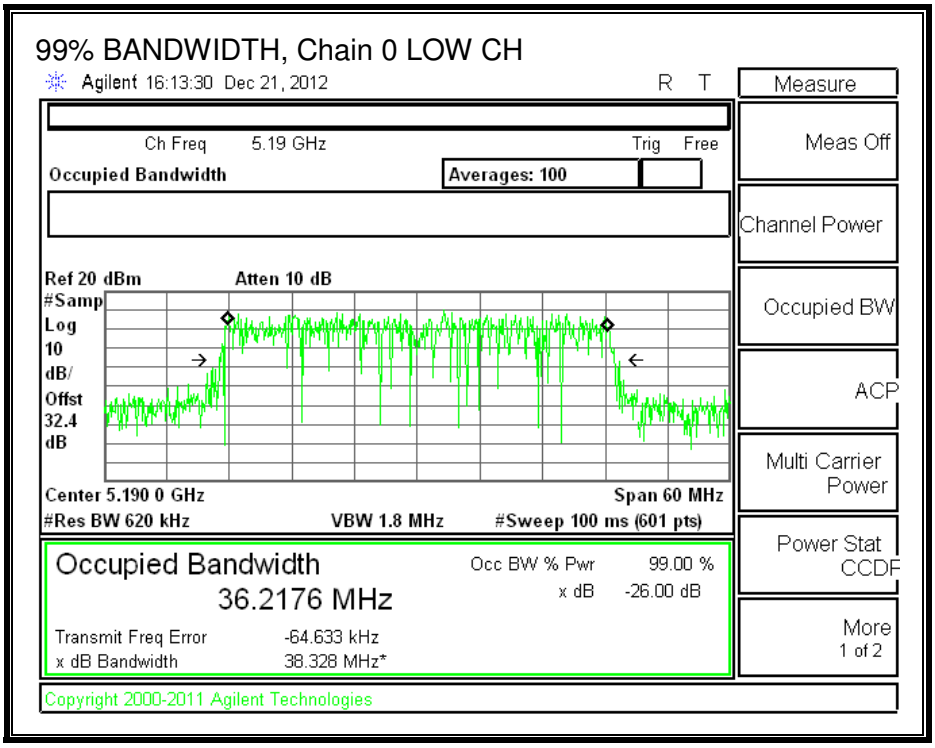
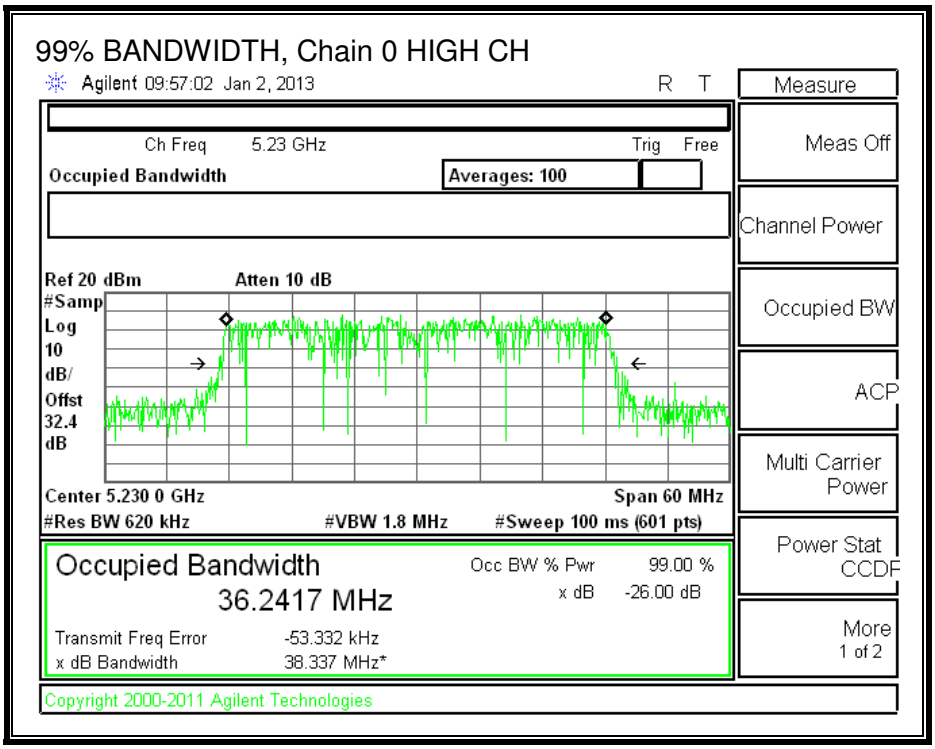
**99% BANDWIDTH, Chain 0**





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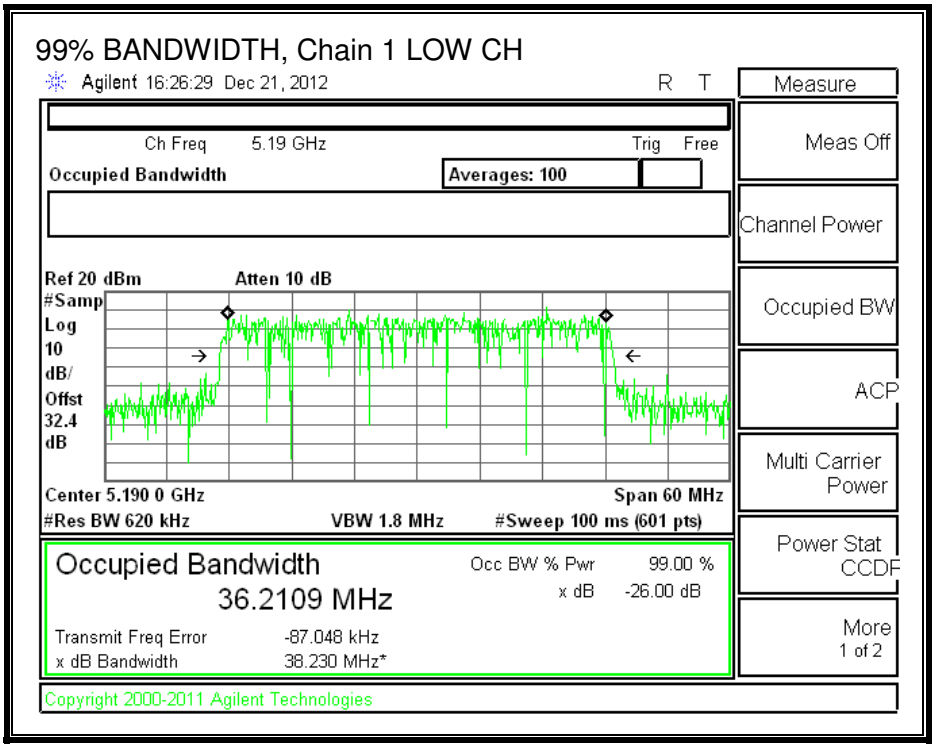
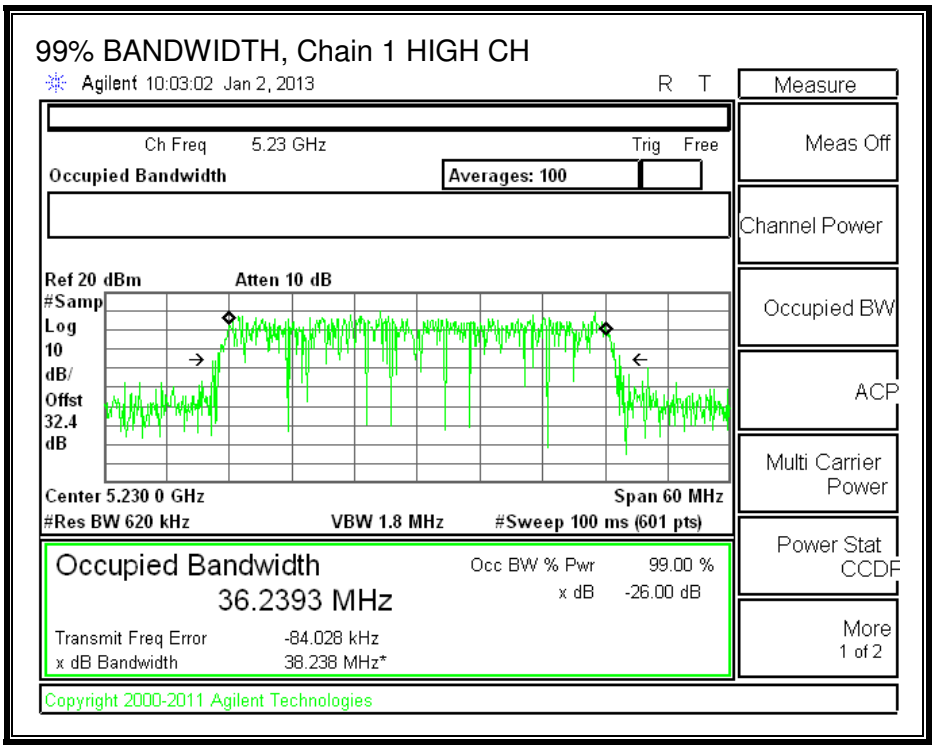
**99% BANDWIDTH, Chain 1**





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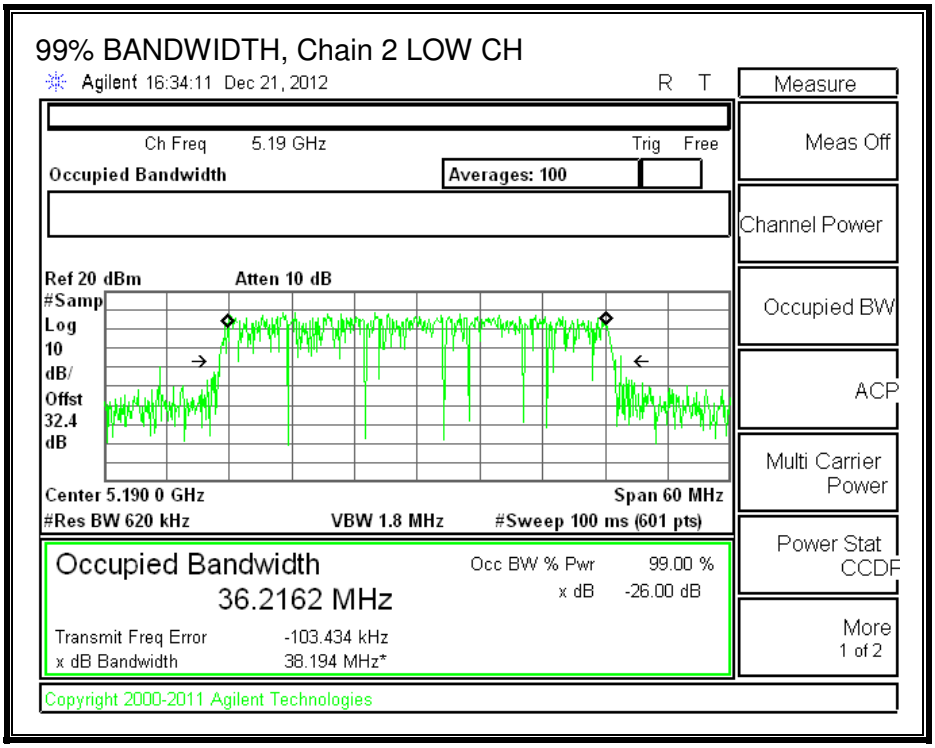
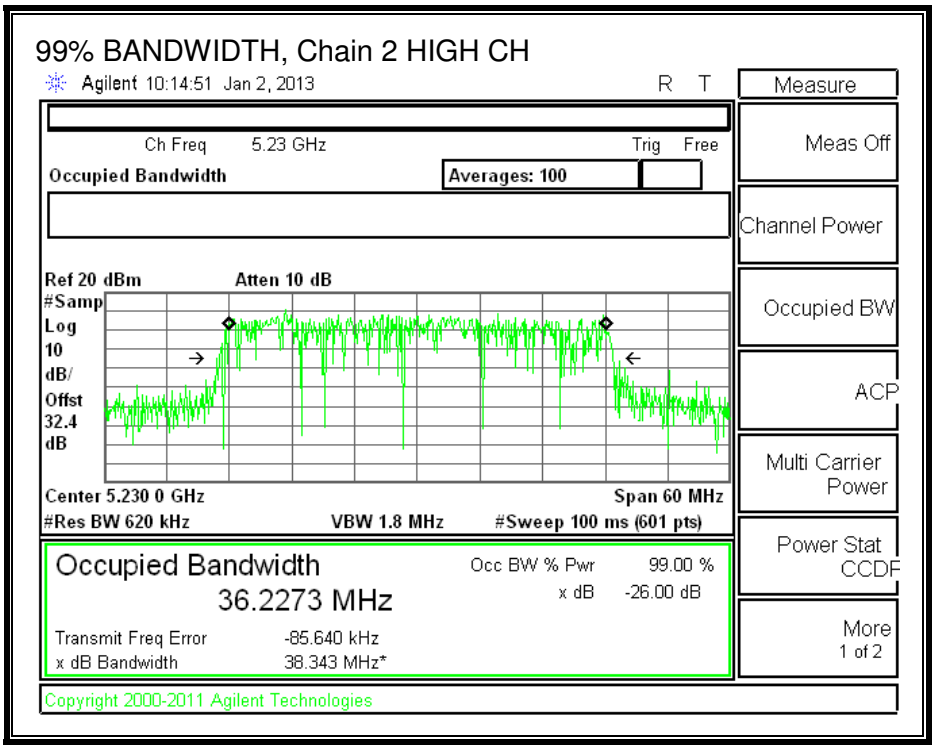
**99% BANDWIDTH, Chain 2**





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### 8.12.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated for output power and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.20 | 1.40 | 2.20 | 2.33 |

The TX chains are correlated for PSD and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.20 | 1.40 | 2.20 | 7.07 |


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**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Correlat Directional Gain (dBi) | Uncorre Directional Gain (dBi) |
|---|---|---|---|
| Low | 5190 | 7.07 | 2.33 |
| High | 5230 | 7.07 | 2.33 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | FCC PSD Limit (dBm) |
|---|---|---|---|
| Low | 5190 | 30.00 | 15.93 |
| High | 5230 | 30.00 | 15.93 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5190 | 9.80 | 9.50 | 9.60 | 14.41 | 30.00 | -15.59 |
| High | 5230 | 9.70 | 9.50 | 9.60 | 14.37 | 30.00 | -15.63 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Chain 2 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5190 | -2.050 | -2.860 | -2.097 | 2.45 | 15.93 | -13.48 |
| High | 5230 | -2.169 | -2.243 | -2.284 | 2.54 | 15.93 | -13.39 |


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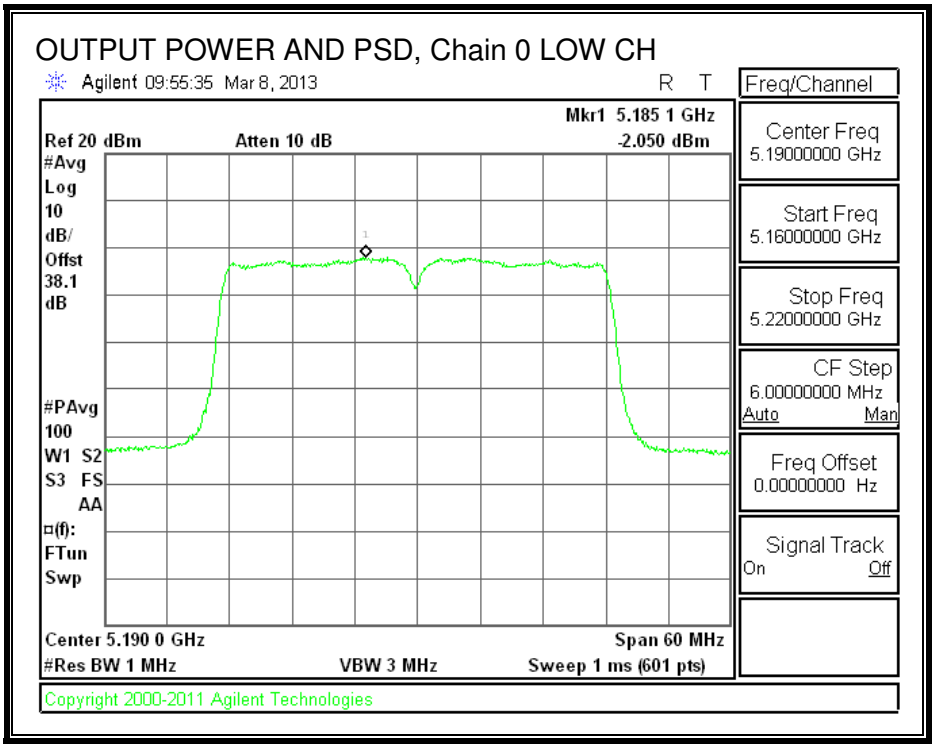
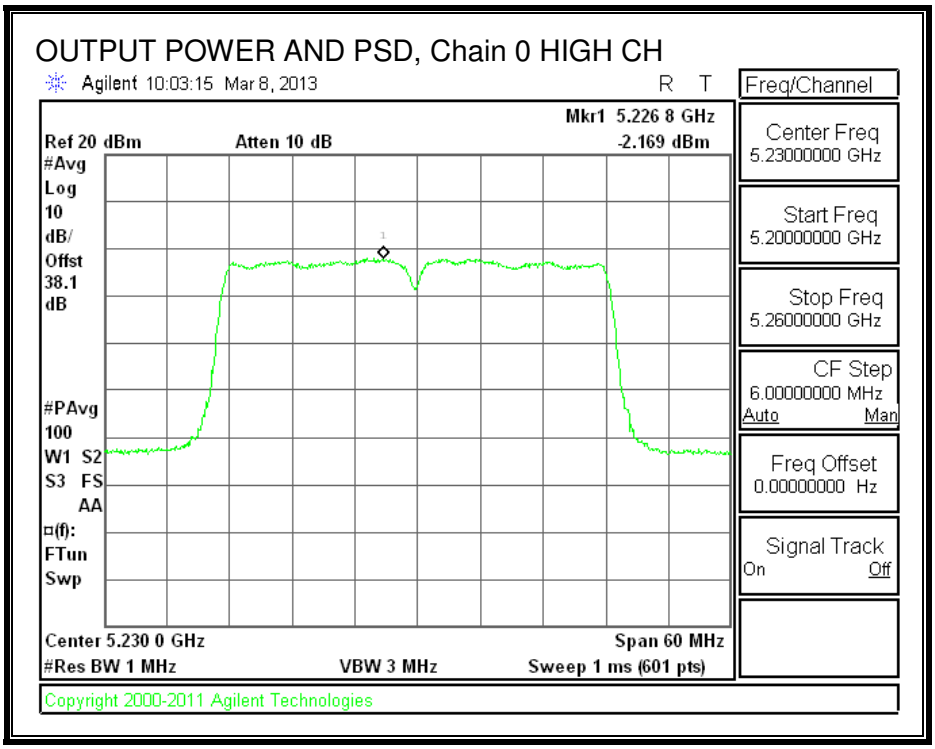
**OUTPUT POWER AND PSD, Chain 0**





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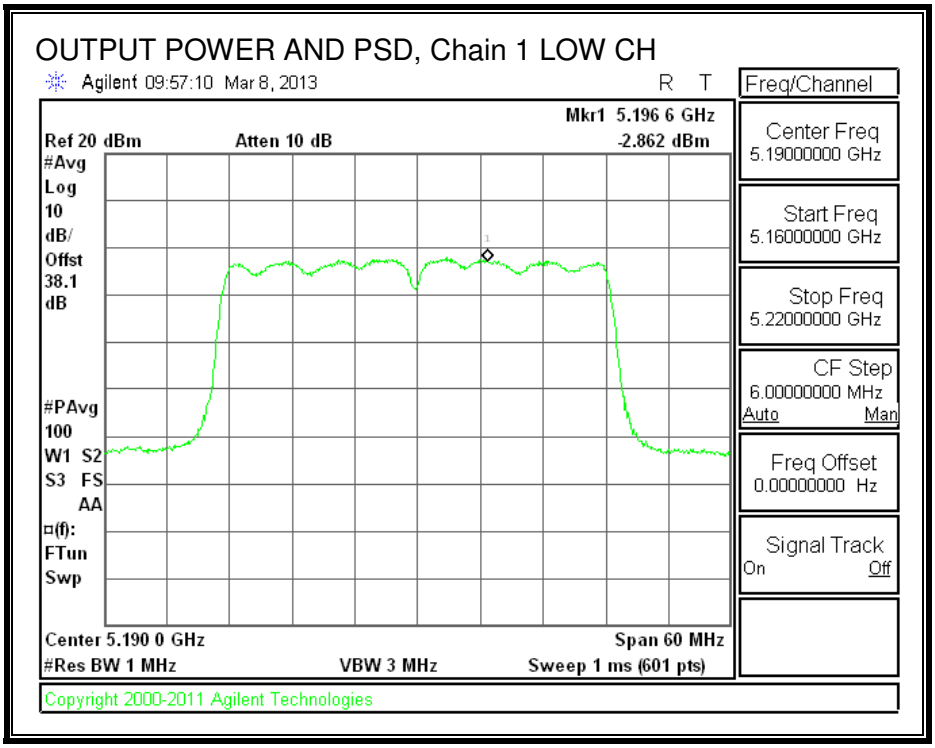
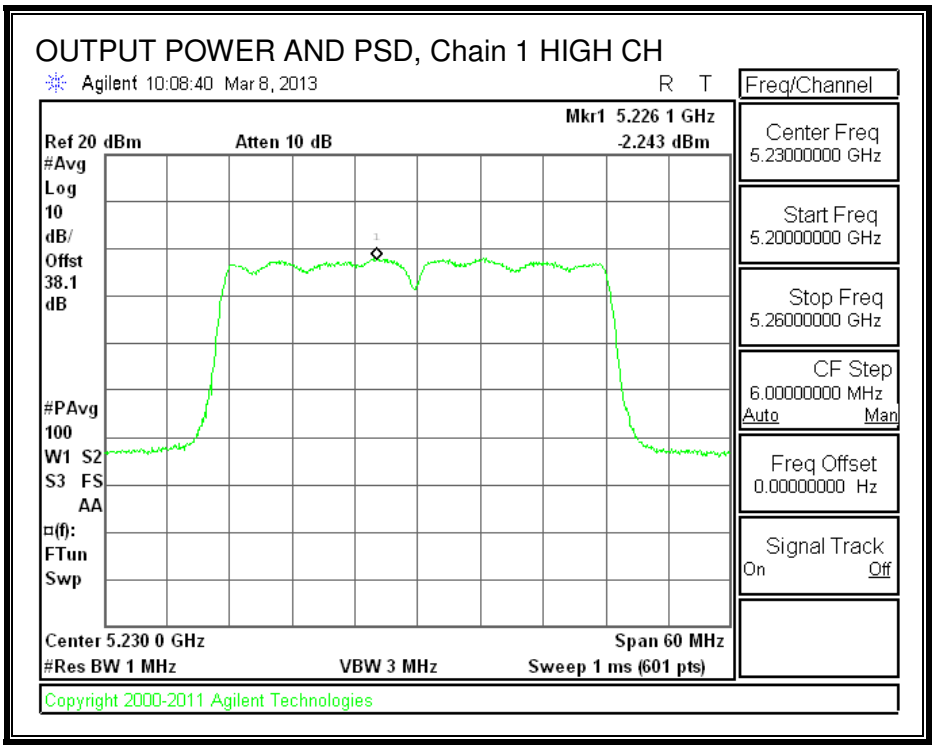
**OUTPUT POWER AND PSD, Chain 1**





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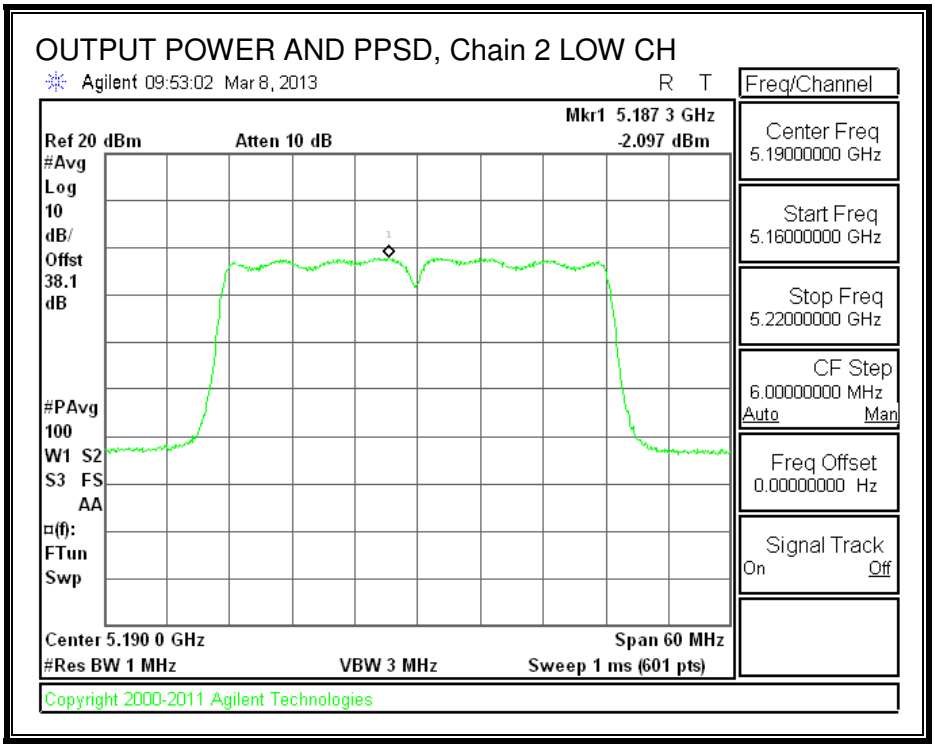
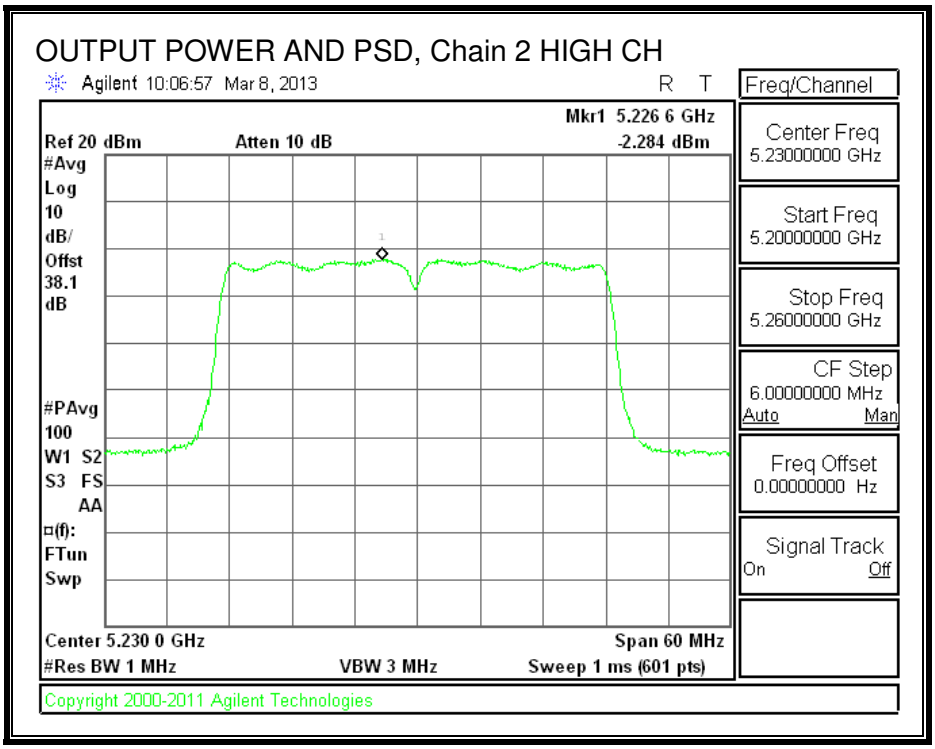
**OUTPUT POWER AND PSD, Chain 2**





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## 8.13. 802.11n HT40 BF 3TX MODE IN THE 5.2 GHz BAND

Covered by testing HT40 CDD 3TX mode, the power per chain used for HT40 CDD 3TX mode is the same power per chain that will be used for HT40 BF 3TX mode. However, since BF is correlated and CDD is uncorrelated for output power, the section below for output power using correlated AG for this BF mode shows it is still compliant.

### 8.13.1. OUTPUT AVERAGE POWER

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

The TX chains are correlated for output power and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.20 | 1.40 | 2.20 | 7.07 |

**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Correlat Directional Gain (dBi) |
|---|---|---|
| Low | 5190 | 7.07 |
| High | 5230 | 7.07 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) |
|---|---|---|
| Low | 5190 | 28.93 |
| High | 5230 | 28.93 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5190 | 9.80 | 9.50 | 9.60 | 14.41 | 28.93 | -14.52 |
| High | 5230 | 9.70 | 9.50 | 9.60 | 14.37 | 28.93 | -14.56 |


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## 8.14. 802.11n HT40 STBC 3TX MODE IN THE 5.2 GHz BAND

### 8.14.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) | 26 dB BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5190 | 39.67 | 39.33 | 39.67 |
| High | 5230 | 39.83 | 39.33 | 39.50 |


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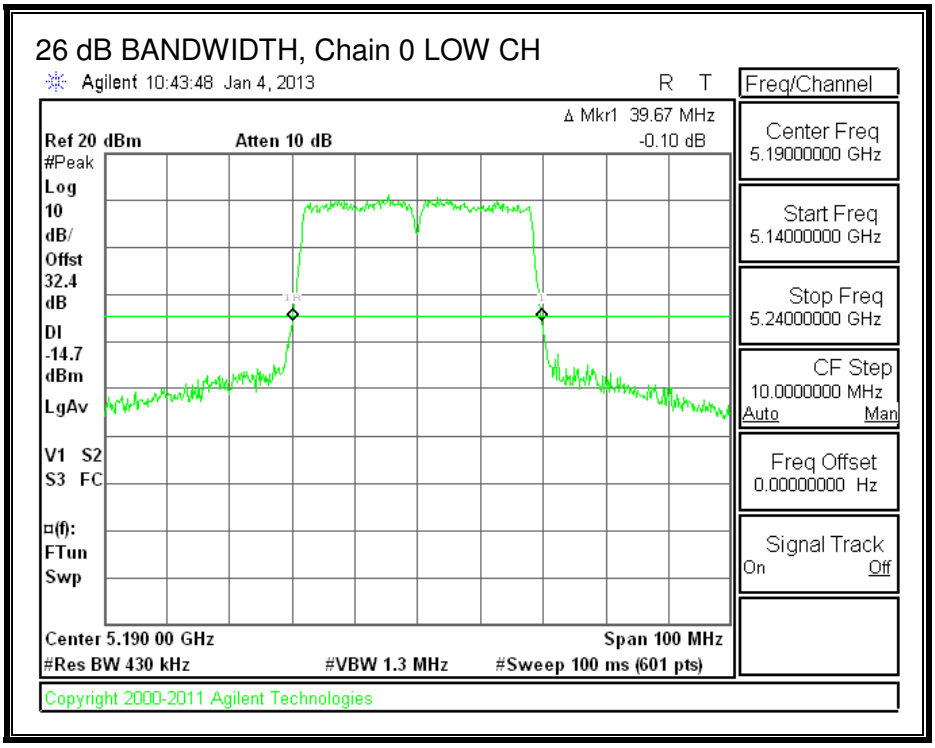
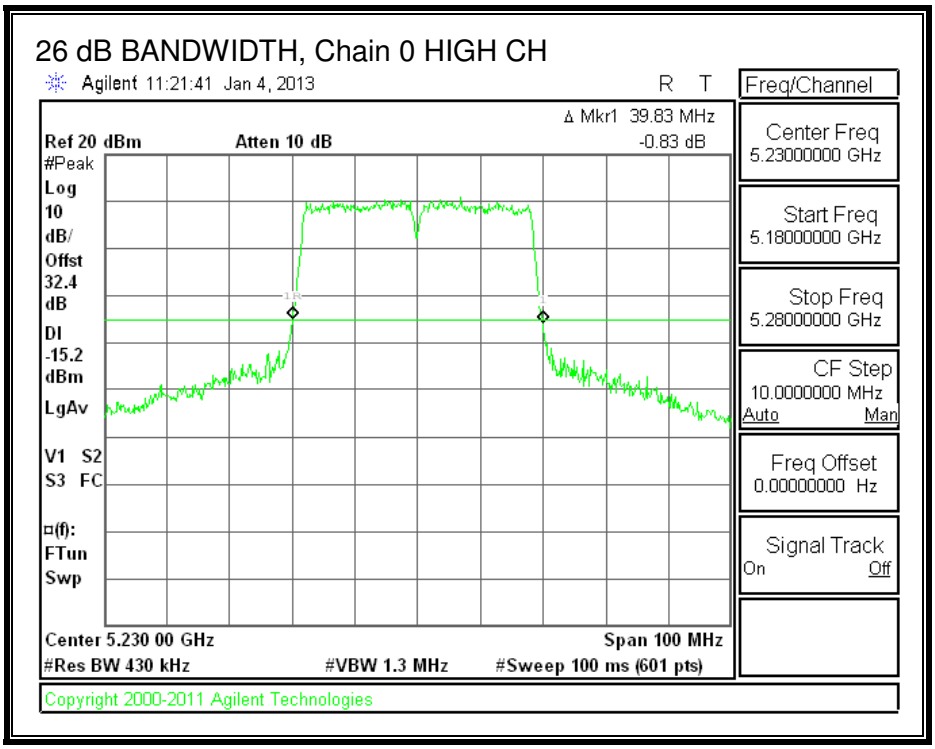
**26 dB BANDWIDTH, Chain 0**





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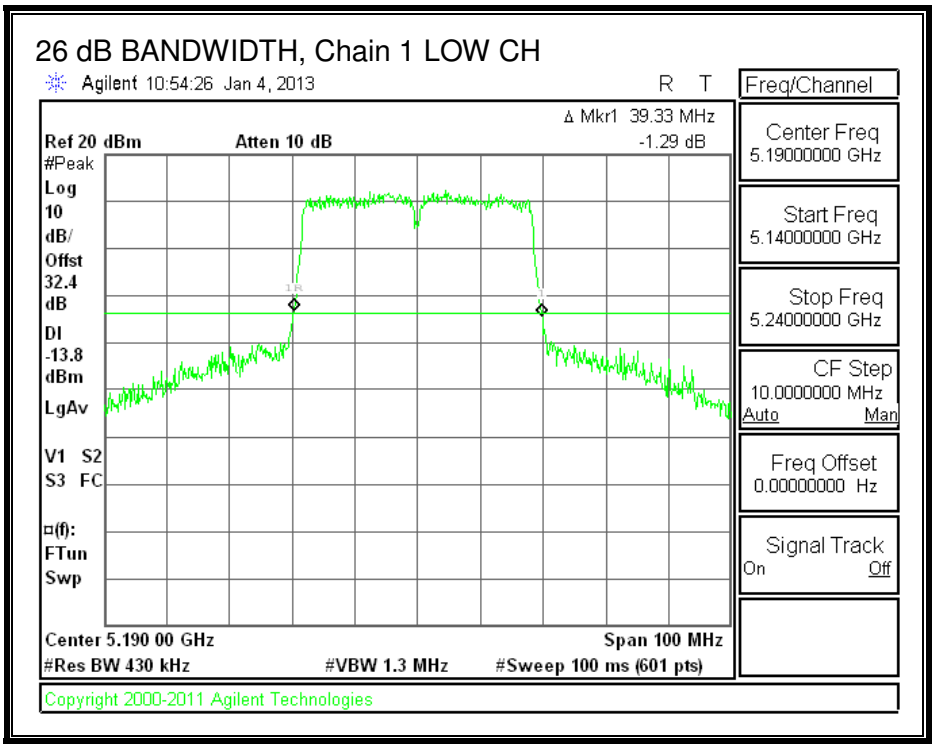
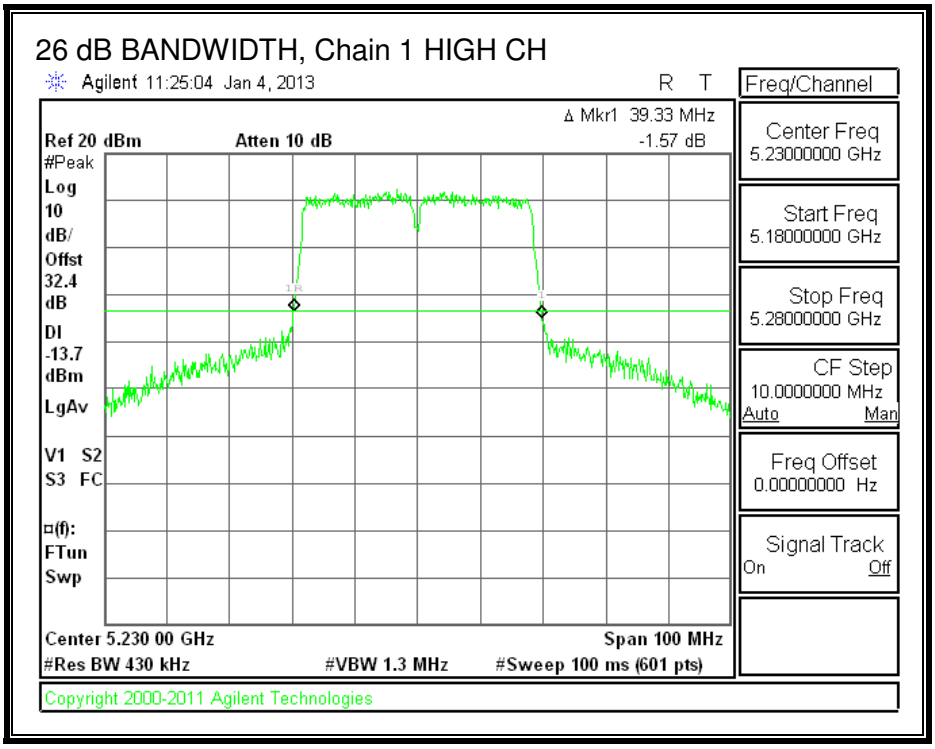
**26 dB BANDWIDTH, Chain 1**





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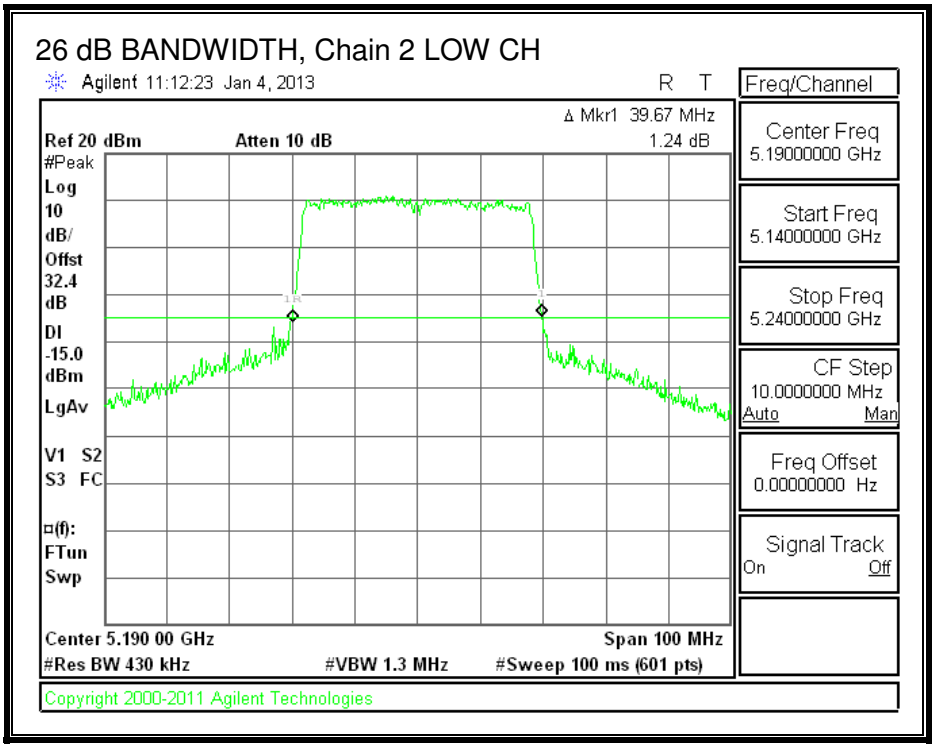
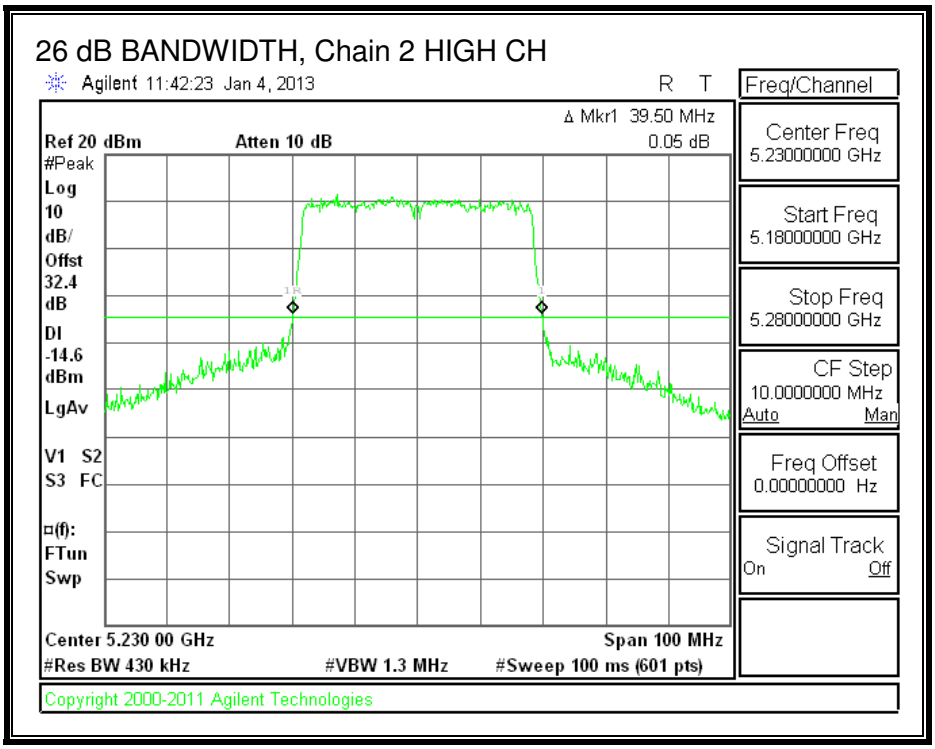
**26 dB BANDWIDTH, Chain 2**





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### 8.14.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) | 99% BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5190 | 36.1860 | 36.1983 | 36.2039 |
| High | 5230 | 36.1916 | 36.1918 | 36.1916 |


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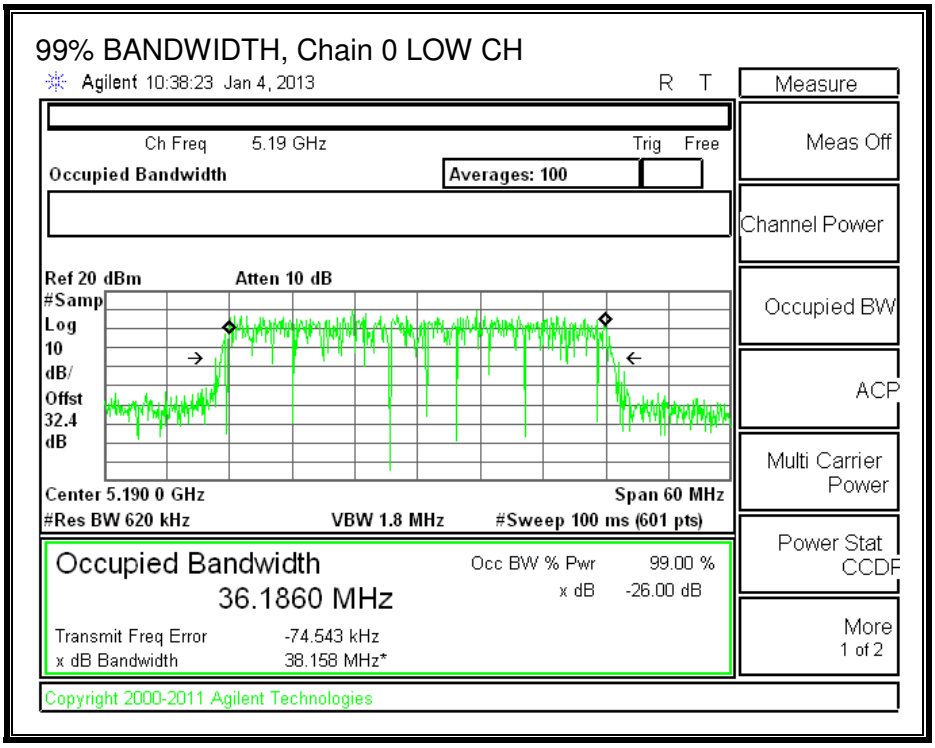
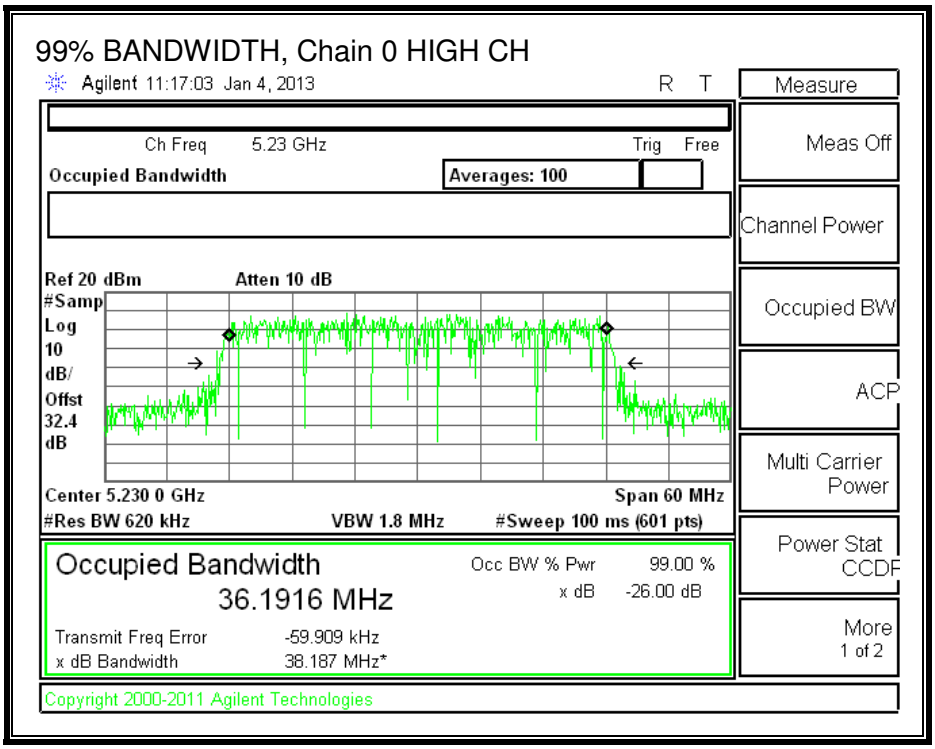
**99% BANDWIDTH, Chain 0**





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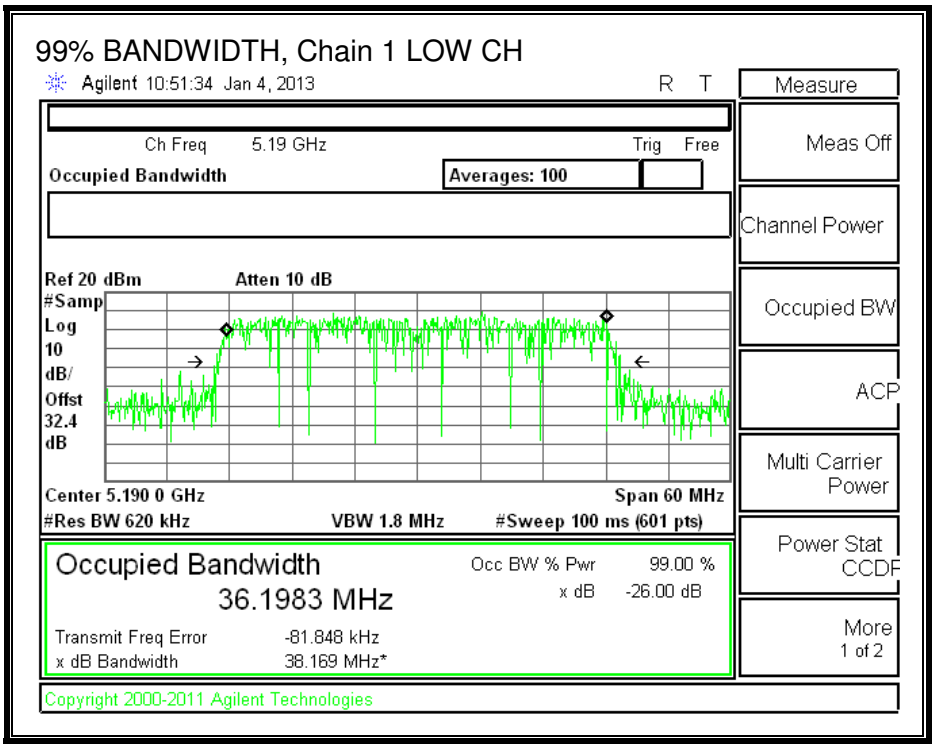
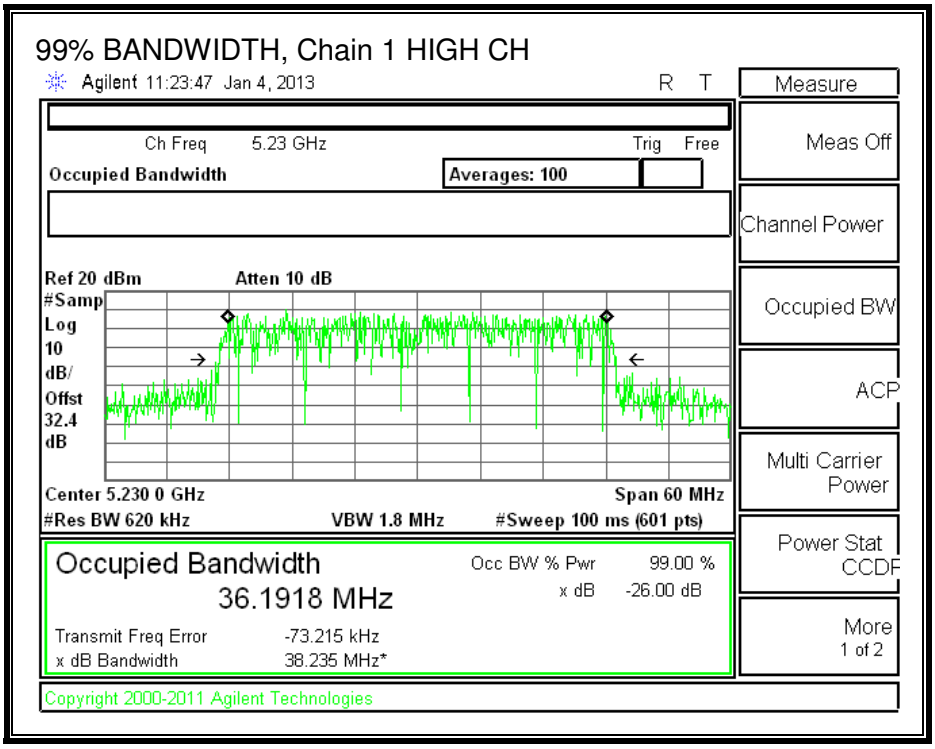
**99% BANDWIDTH, Chain 1**





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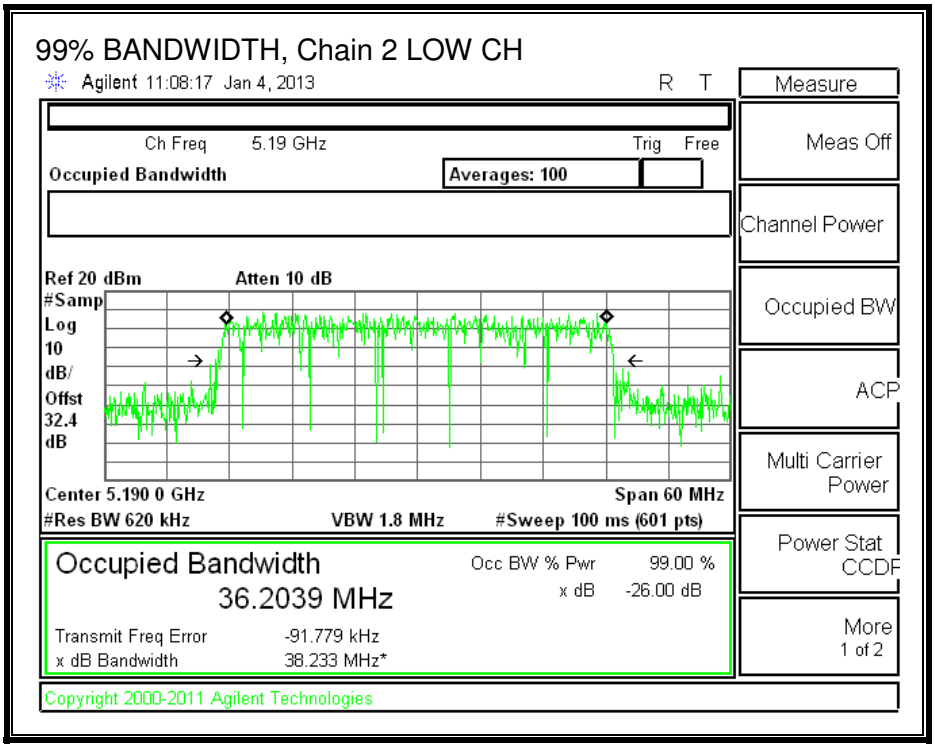
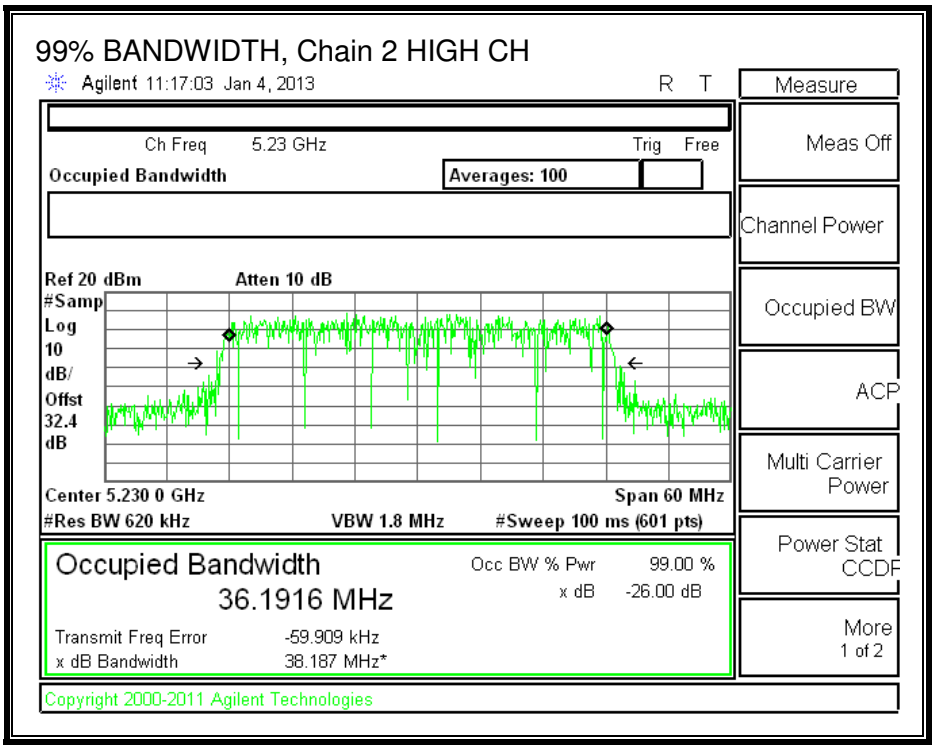
**99% BANDWIDTH, Chain 2**





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### 8.14.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.20 | 1.40 | 2.20 | 2.33 |


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**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Directio Gain (dBi) |
|---|---|---|
| Low | 5190 | 2.33 |
| High | 5230 | 2.33 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | FCC PSD Limit (dBm) |
|---|---|---|---|
| Low | 5190 | 30.00 | 17.00 |
| High | 5230 | 30.00 | 17.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5190 | 11.73 | 11.55 | 11.50 | 16.37 | 30.00 | -13.63 |
| High | 5230 | 11.60 | 11.50 | 11.45 | 16.29 | 30.00 | -13.71 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Chain 2 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5190 | -0.84 | -0.84 | -0.99 | 3.88 | 17.00 | -13.12 |
| High | 5230 | -0.81 | -0.98 | -1.07 | 3.82 | 17.00 | -13.18 |


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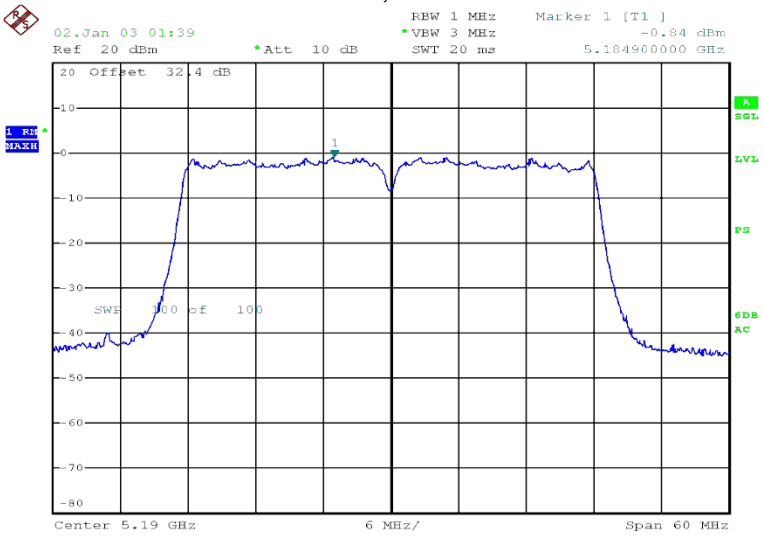
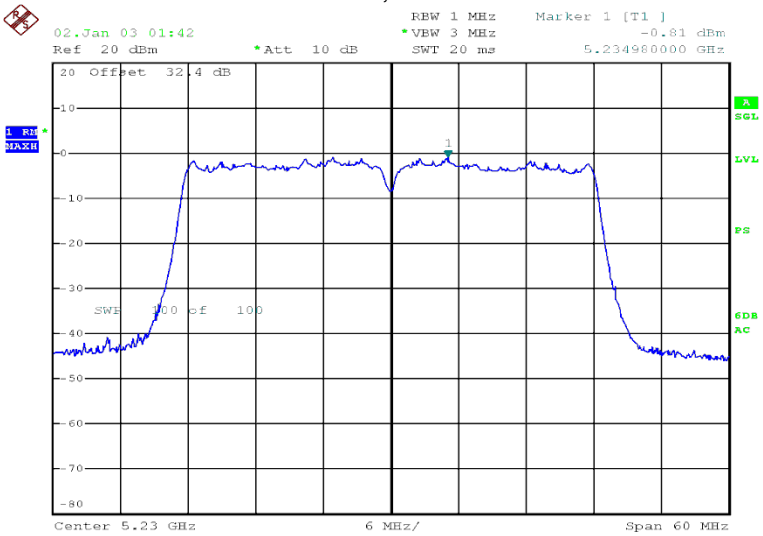
**OUTPUT POWER AND PSD, Chain 0**

OUTPUT POWER AND PSD, Chain 0 LOW CH




Date: 2.JAN.2003 01:39:36

OUTPUT POWER AND PSD, Chain 0 HIGH CH




Date: 2.JAN.2003 01:42:35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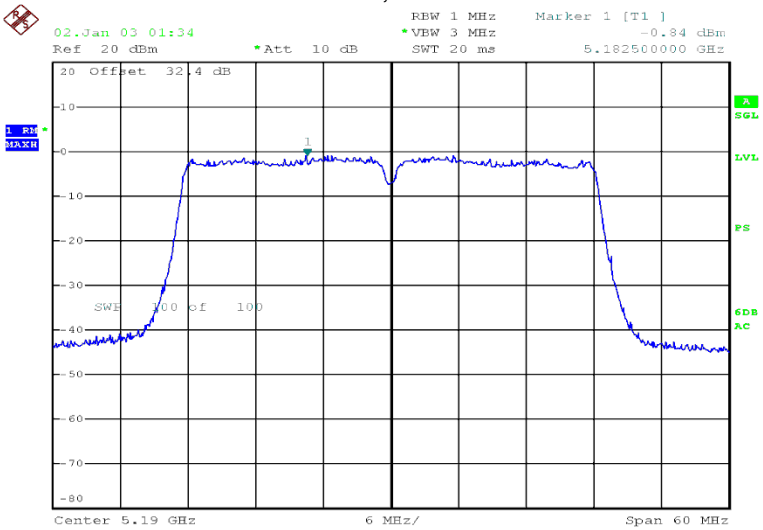
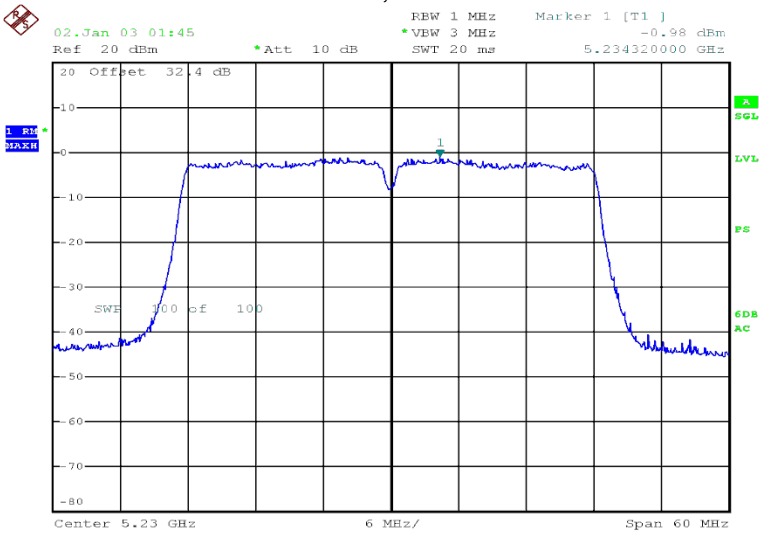
**OUTPUT POWER AND PSD, Chain 1**

OUTPUT POWER AND PSD, Chain 1 LOW CH




Date: 2.JAN.2003 01:34:30

OUTPUT POWER AND PSD, Chain 1 HIGH CH




Date: 2.JAN.2003 01:45:58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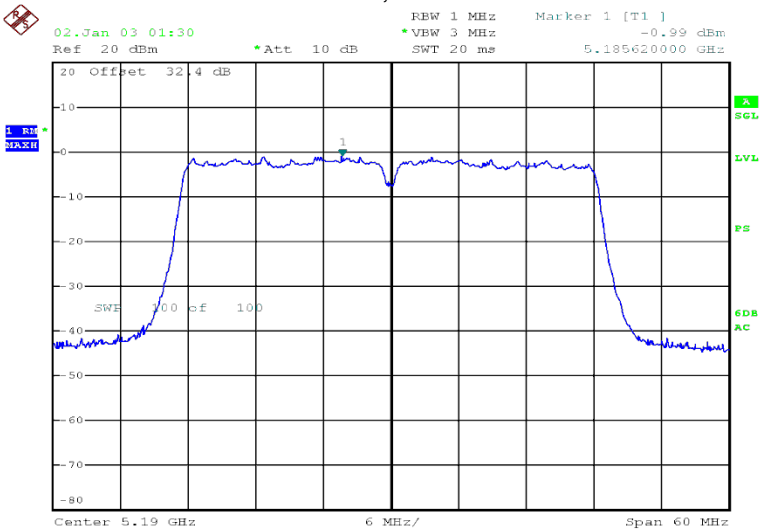
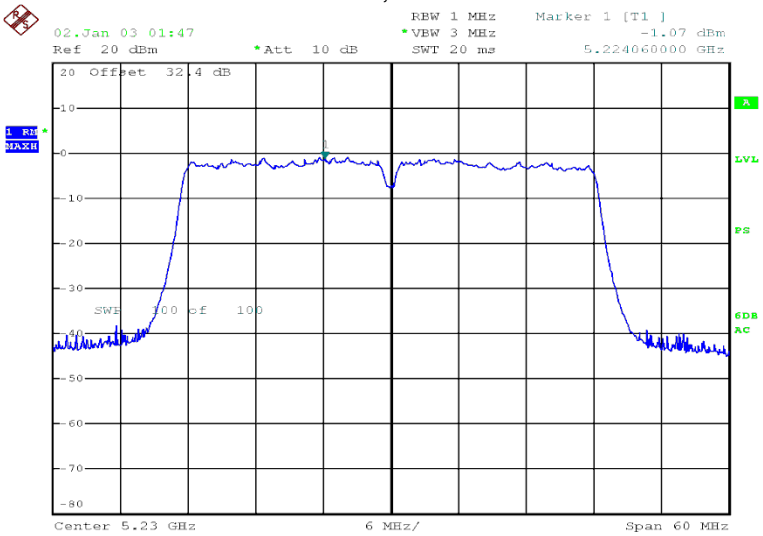
**OUTPUT POWER AND PSD, Chain 2**

OUTPUT POWER AND PSD, Chain 2 LOW CH




Date: 2.JAN.2003 01:30:31

OUTPUT POWER AND PSD, Chain 2 HIGH CH




Date: 2.JAN.2003 01:47:32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## 8.15. 802.11ac VHT80 1TX MODE IN THE 5.2 GHz BAND

### 8.15.1. 26 dB BANDWIDTH

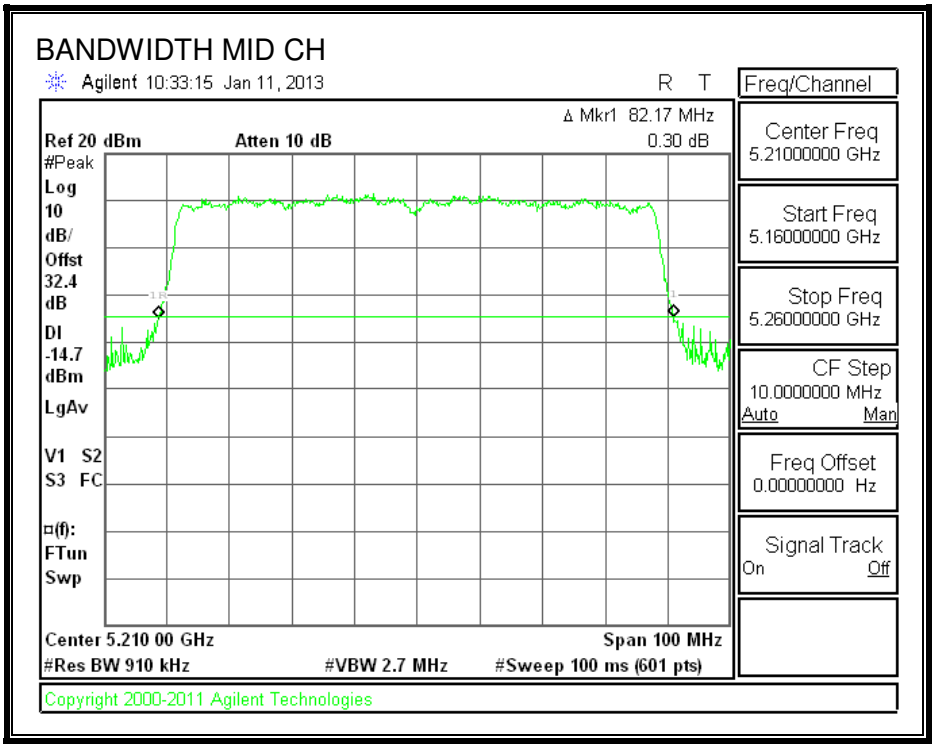
**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB Bandwidth (MHz) |
|---|---|---|
| Mid | 5210 | 82.17 |

**26 dB BANDWIDTH**





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### 8.15.2. 99% BANDWIDTH

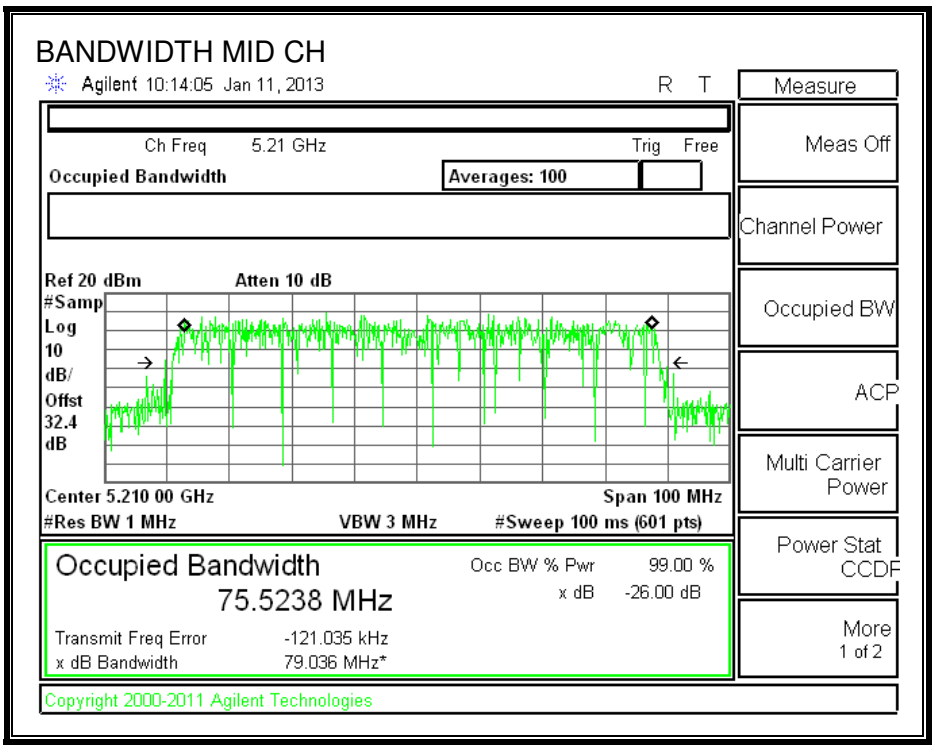
**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Mid | 5210 | 75.5238 |

**99% BANDWIDTH**





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### 8.15.3. OUTPUT POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.


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47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Directio Gain (dBi) |
|---|---|---|
| Mid | 5210 | 3.20 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | FCC PSD Limit (dBm) |
|---|---|---|---|
| Mid | 5210 | 30.00 | 17.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.10 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Mid | 5210 | 13.00 | 13.00 | 30.00 | -17.00 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Mid | 5210 | 0.513 | 0.613 | 17.00 | -16.39 |


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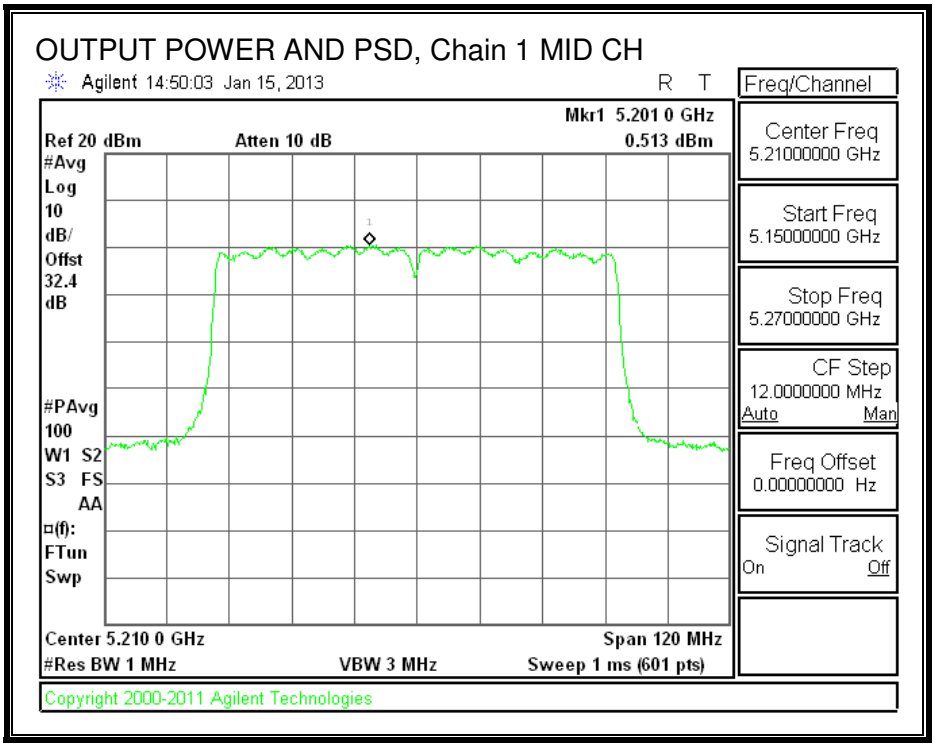
**OUTPUT POWER AND PSD, Chain 1**





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## 8.16. 802.11ac VHT80 CDD 2TX MODE IN THE 5.2 GHz BAND

### 8.16.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---|---|---|---|
| Mid | 5210 | 82.17 | 82.00 |


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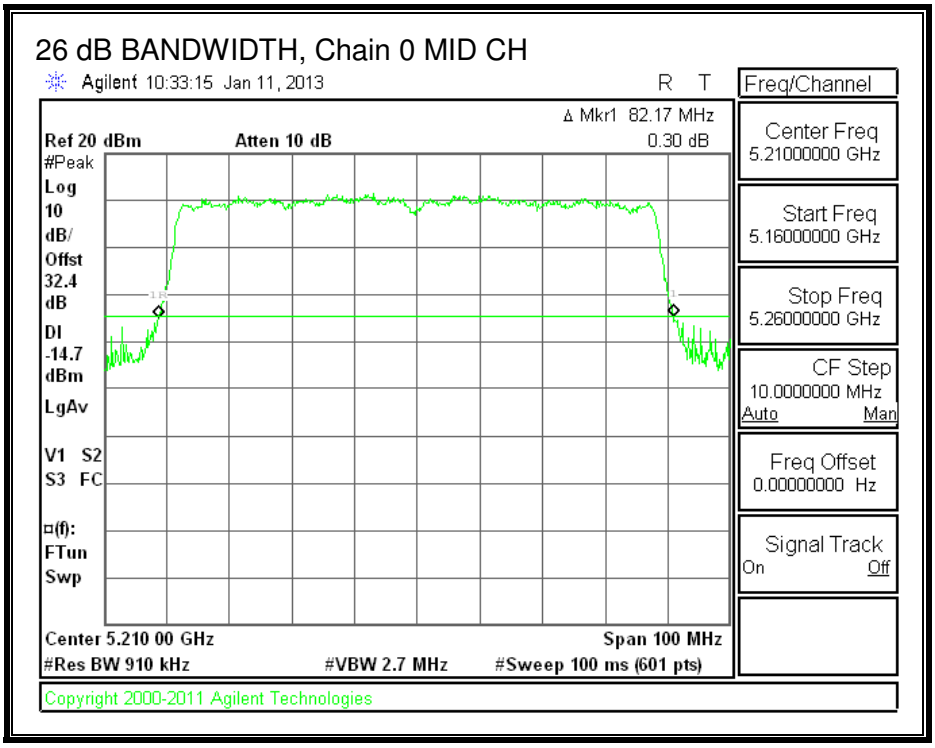
**26 dB BANDWIDTH, Chain 0**





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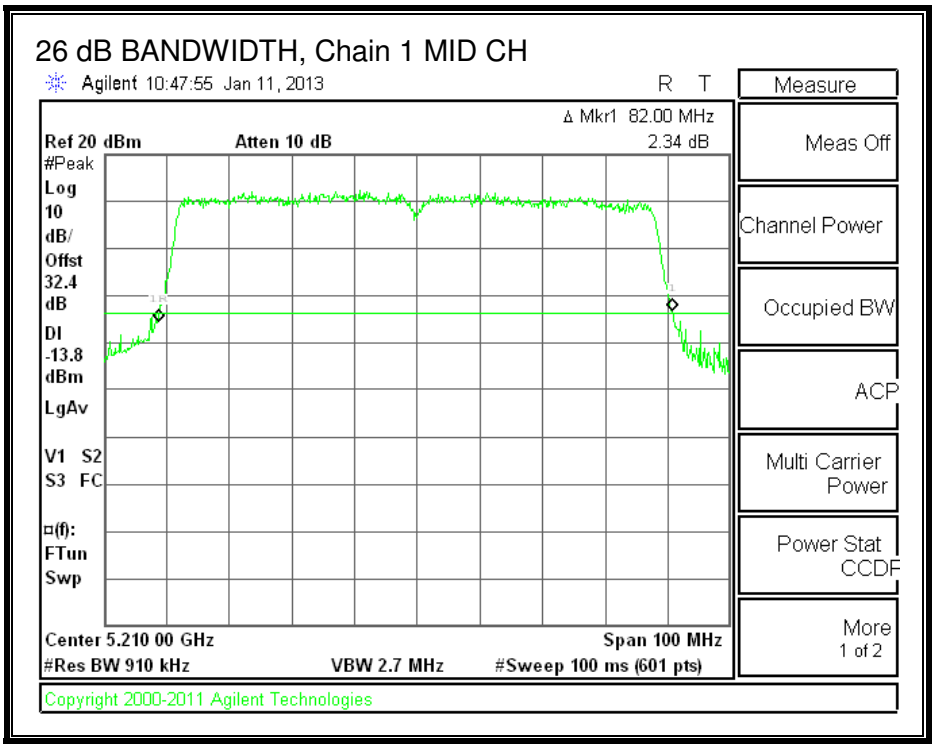
**26 dB BANDWIDTH, Chain 1**





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### 8.16.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---|---|---|---|
| Mid | 5210 | 75.3912 | 75.5115 |


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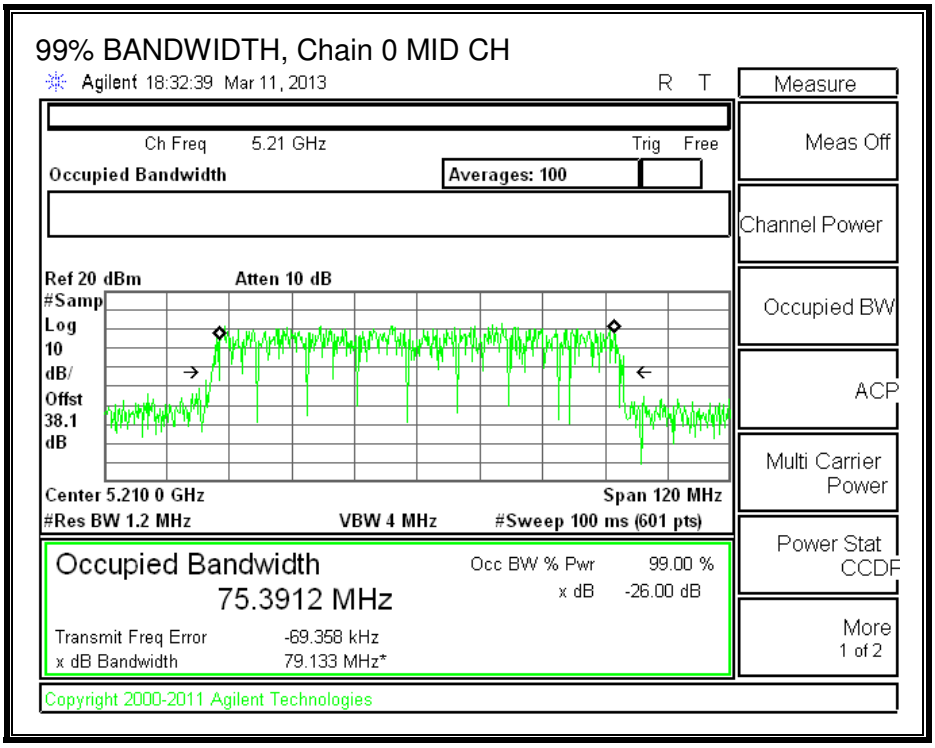
**99% BANDWIDTH, Chain 0**





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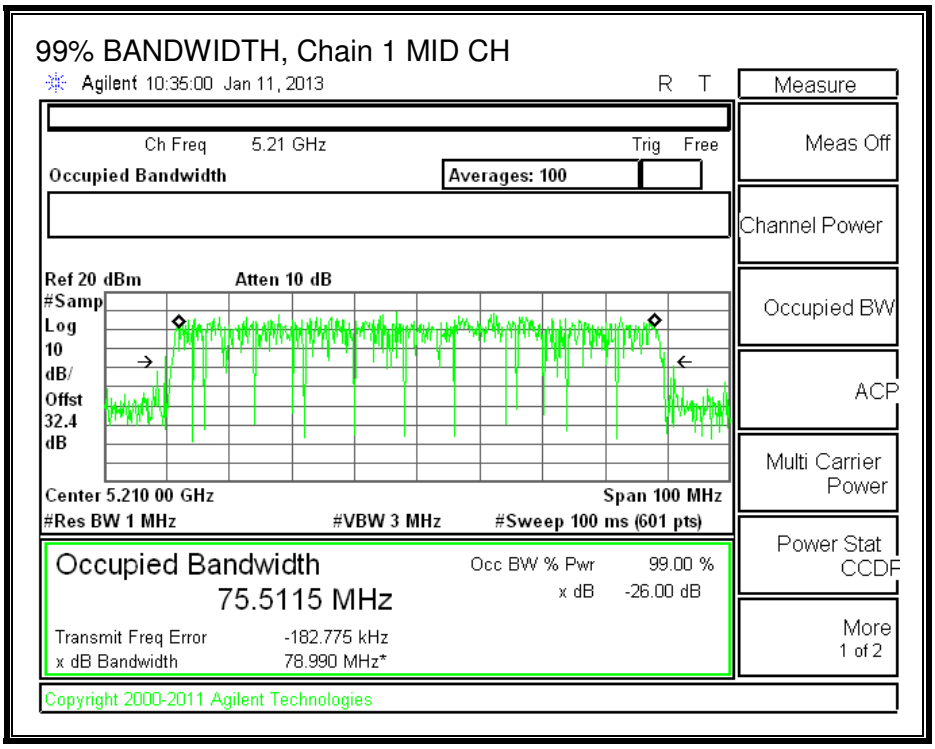
**99% BANDWIDTH, Chain 1**





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### 8.16.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

For output power, the two chains are considered uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|
| 3.20 | 2.20 | 2.73 |

For PSD, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|
| 3.20 | 2.20 | 5.72 |


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**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Correlat Directio Gain (dBi) | Unorrel Directio Gain (dBi) |
|---|---|---|---|
| Mid | 5210 | 5.72 | 2.73 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | FCC PSD Limit (dBm) |
|---|---|---|---|
| Mid | 5210 | 30.00 | 17.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.09 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Mid | 5210 | 12.50 | 12.60 | 15.56 | 30.00 | -14.44 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|
| Mid | 5210 | -3.396 | -3.846 | -0.51 | 17.00 | -17.51 |


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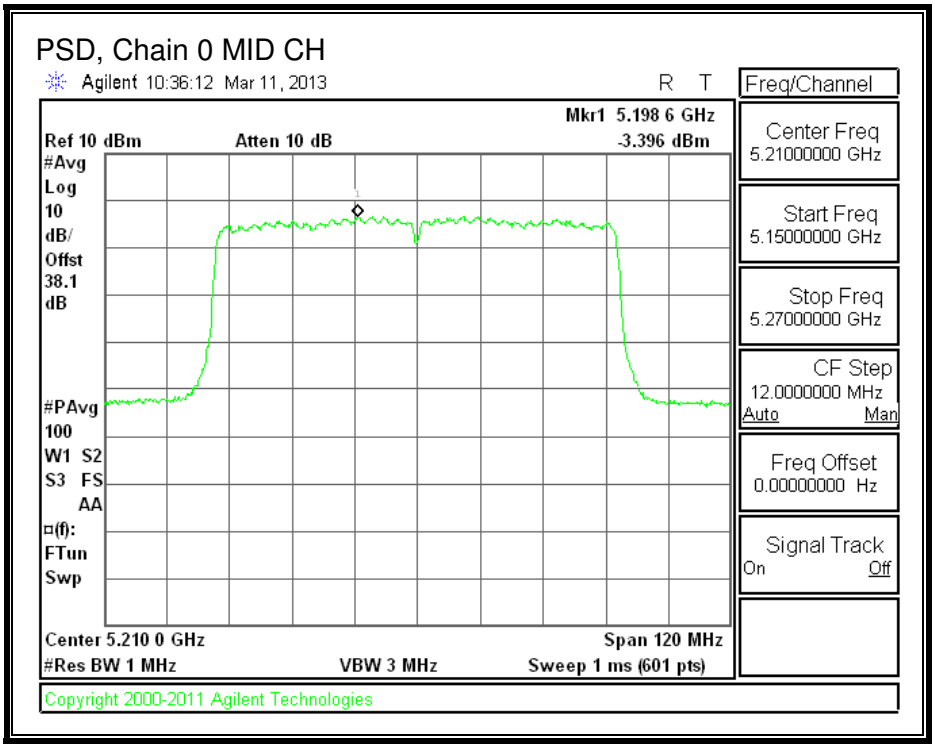
**PSD, Chain 0**





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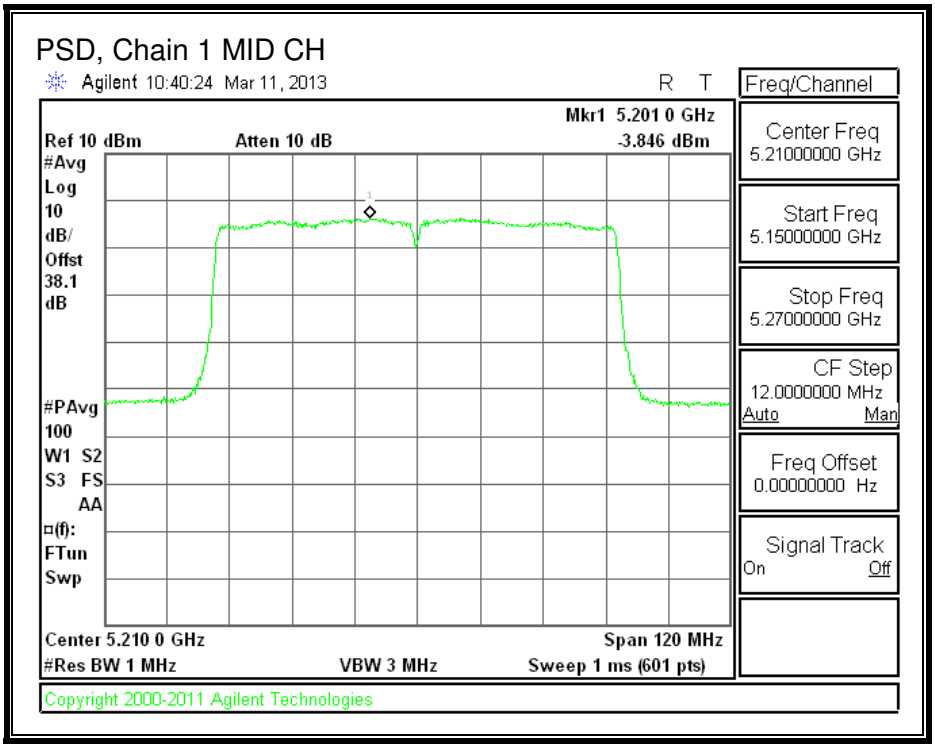
**PSD, Chain 1**





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## 8.17. 802.11ac VHT80 BF 2TX MODE IN THE 5.2 GHz BAND

Covered by testing 11ac VHT80 CDD 2TX mode, the power per chain used for 11ac VHT80 CDD 2TX mode is the same power per chain that will be used for 11ac VHT80 BF 2TX mode. However, since BF is correlated and CDD is uncorrelated for output power, the section below for output power using correlated AG for this BF mode shows it is still compliant.

### 8.17.1. OUTPUT AVERAGE POWER

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

For output power, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|
| 3.20 | 2.20 | 5.72 |

**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Correlat Directio Gain (dBi) |
|---|---|---|
| Mid | 5220 | 5.72 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) |
|---|---|---|
| Mid | 5220 | 30.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.09 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Mid | 5220 | 12.50 | 12.60 | 15.56 | 30.00 | -14.44 |


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## 8.18. 802.11ac VHT80 STBC 2TX MODE IN THE 5.2 GHz BAND

### 8.18.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5210 | 82.17 | 82.00 |


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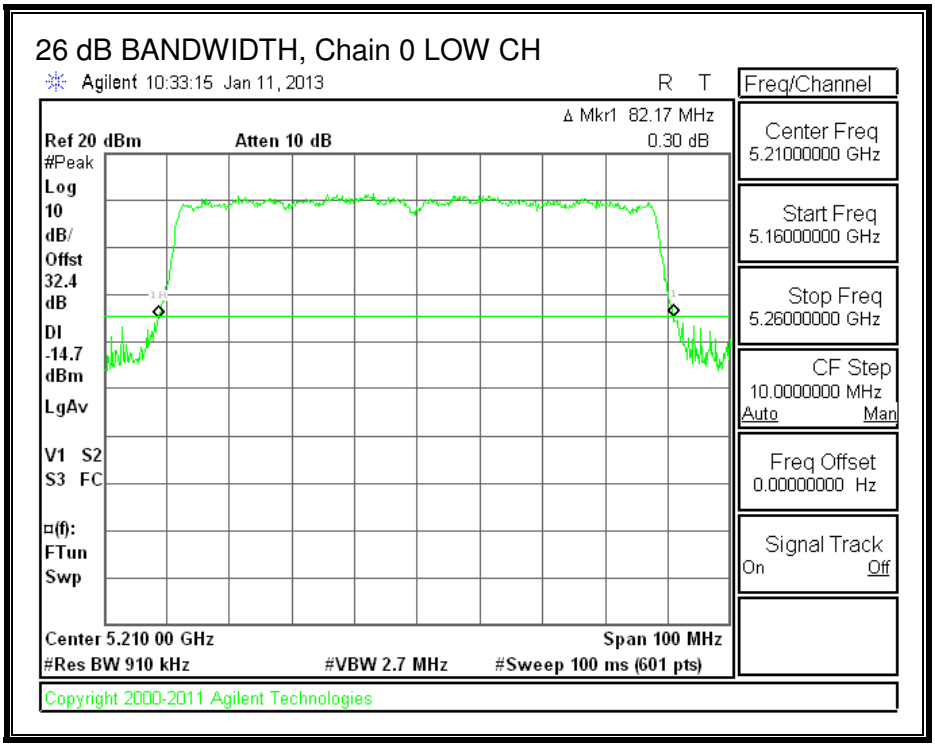
**26 dB BANDWIDTH, Chain 0**





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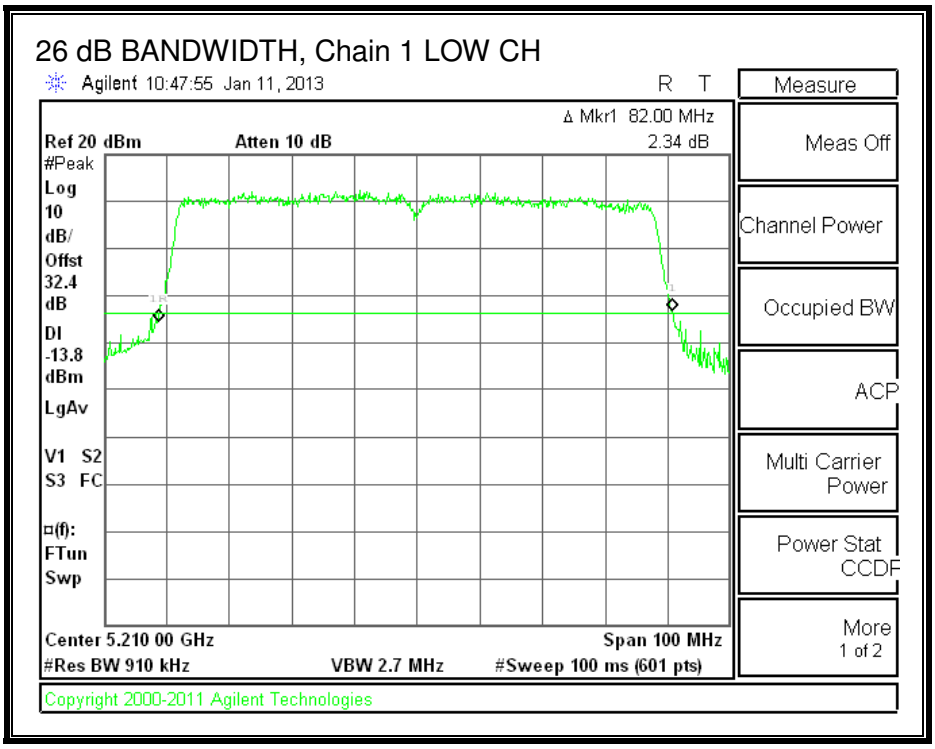
**26 dB BANDWIDTH, Chain 1**





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### 8.18.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---|---|---|---|
| Mid | 5210 | 75.3912 | 75.5115 |


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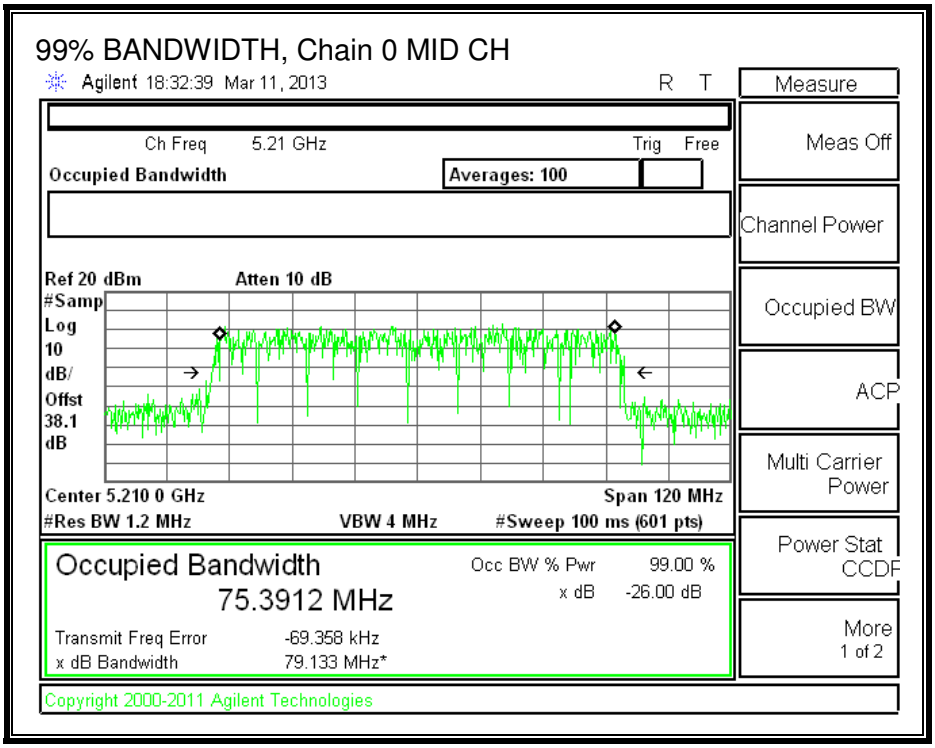
**99% BANDWIDTH, Chain 0**





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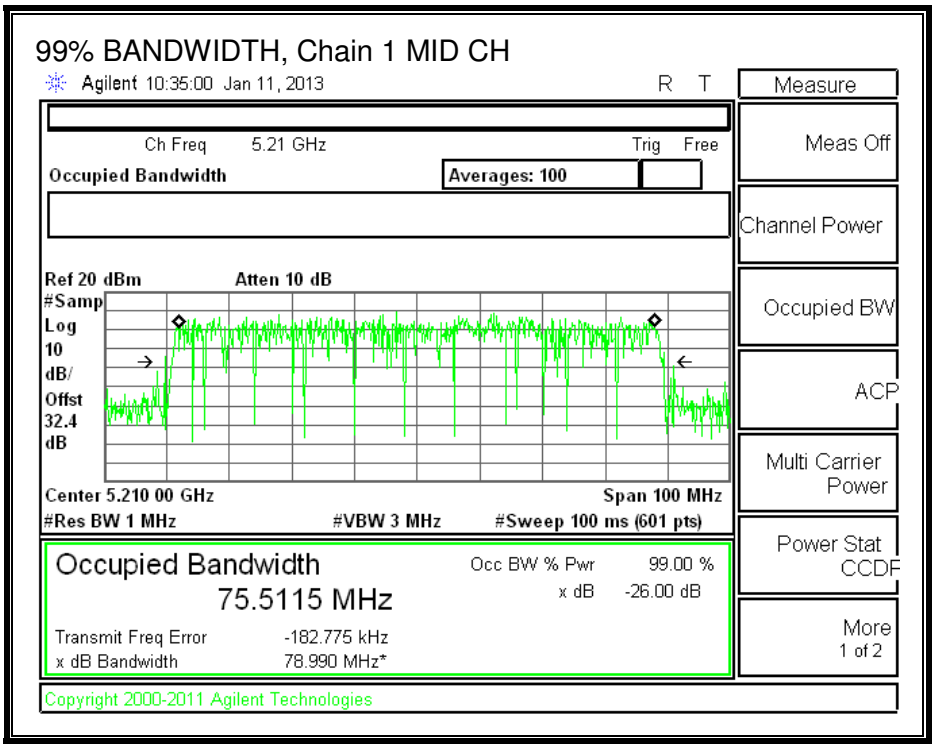
**99% BANDWIDTH, Chain 1**





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### 8.18.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|
| 3.20 | 2.20 | 2.73 |

**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Directio Gain (dBi) |
|---|---|---|
| Low | 5210 | 2.73 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) |
|---|---|---|
| Low | 5210 | 30.00 |

**Gated Output Power Measurement**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5210 | 12.70 | 12.40 | 15.56 | 30.00 | -14.44 |


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**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---|---|---|---|---|
| Low | 5210 | 82.00 | 75.3912 | 2.73 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC EIRP Limit (dBm) | Max IC Power (dBm) | Power Limit (dBm) | FCC PSD Limit (dBm) | IC eirp PSD Limit (dBm) | PSD Limit (dBm) |
|---|---|---|---|---|---|---|---|---|
| Low | 5210 | 17.00 | 23.00 | 20.27 | 17.00 | 4.00 | 10.00 | 4.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.09 | |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5210 | -3.244 | -3.223 | -0.133 | 4.00 | -4.13 |


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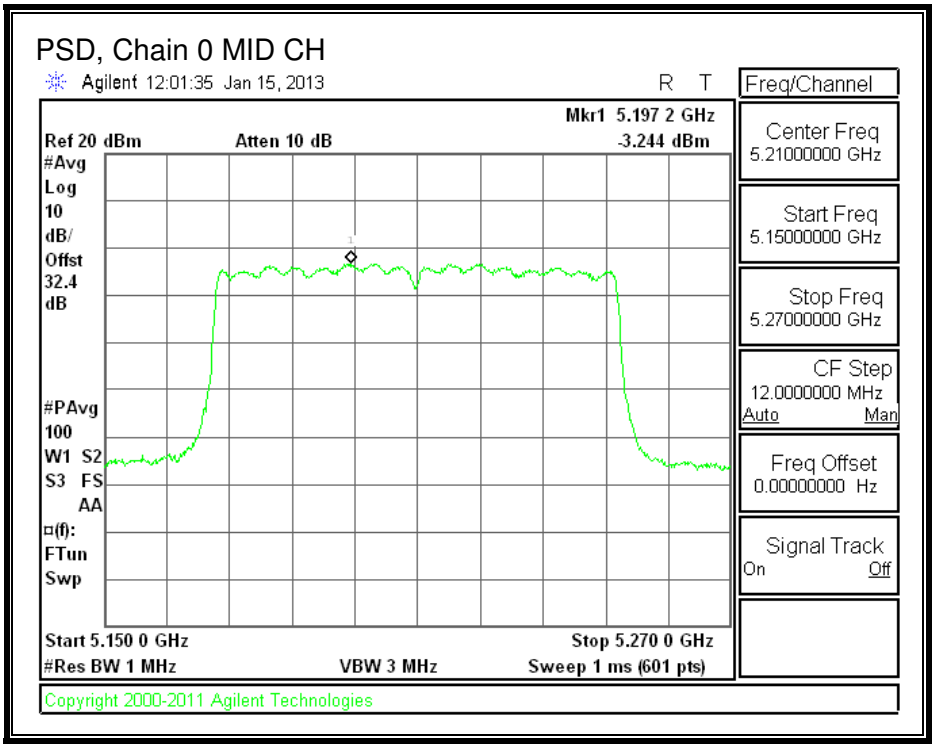
**PSD, Chain 0**





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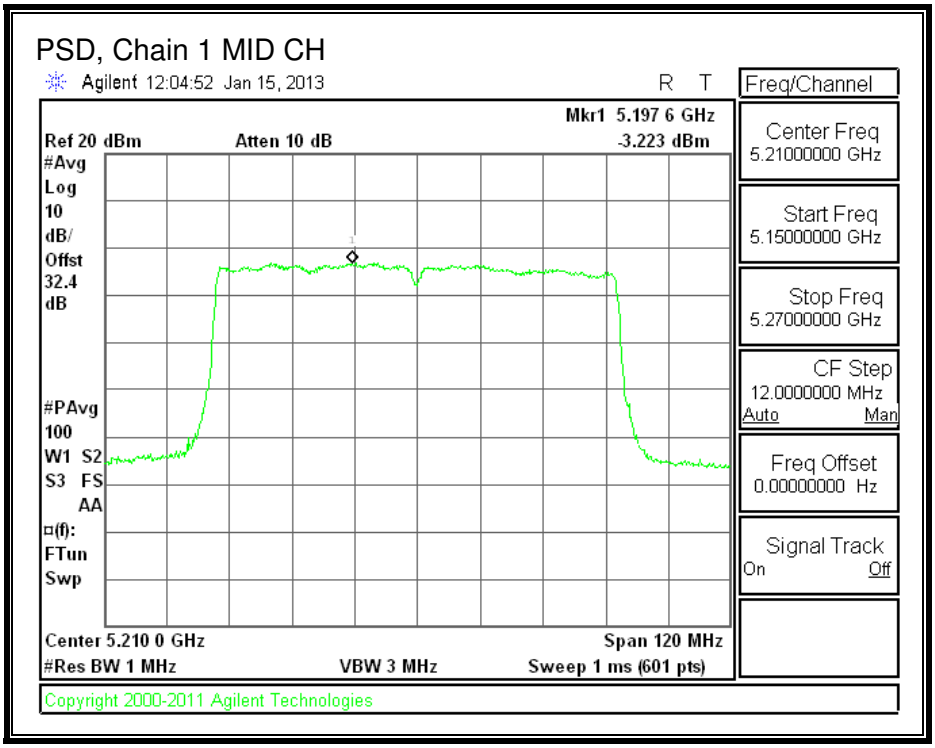
**PSD, Chain 1**





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## 8.19. 802.11ac VHT80 CDD 3TX MODE IN THE 5.2 GHz BAND

### 8.19.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) | 26 dB BW Chain 2 (MHz) |
|---|---|---|---|---|
| Mid | 5210 | 83.00 | 82.40 | 81.40 |


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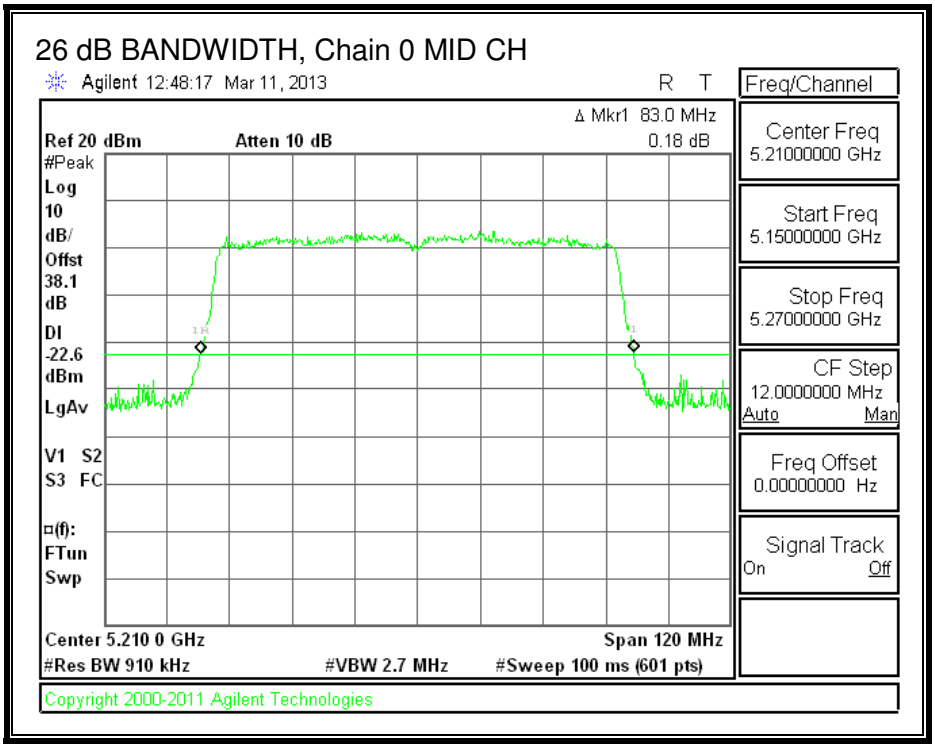
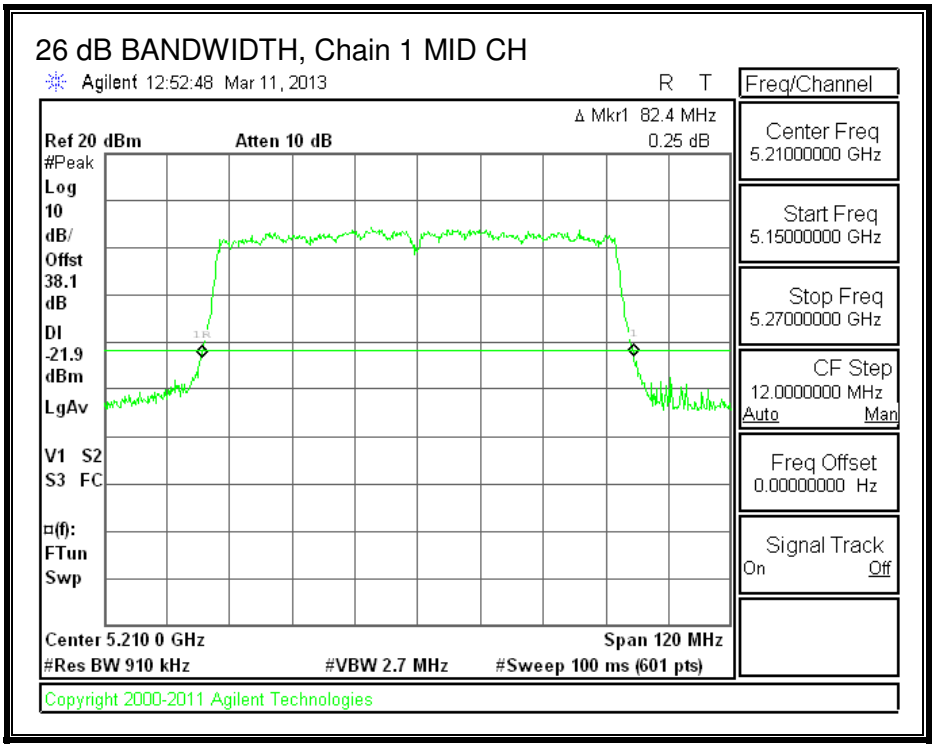
**26 dB BANDWIDTH, Chain 0**




**26 dB BANDWIDTH, Chain 1**





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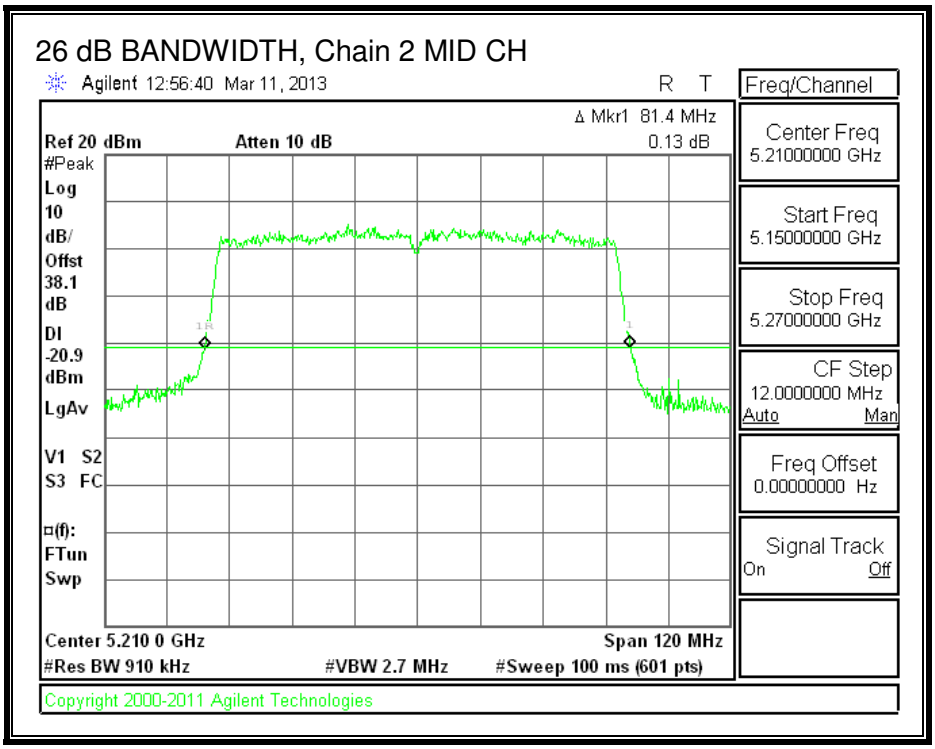
**26 dB BANDWIDTH, Chain 2**





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### 8.19.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) | 99% BW Chain 2 (MHz) |
|---|---|---|---|---|
| Mid | 5210 | 75.6423 | 75.6117 | 75.5864 |


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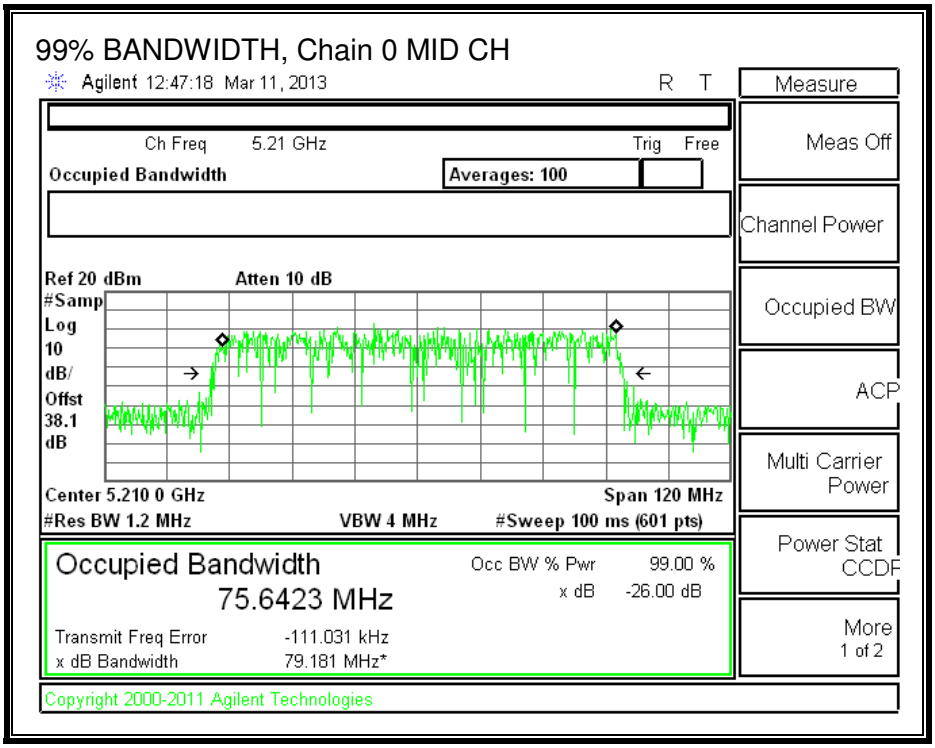
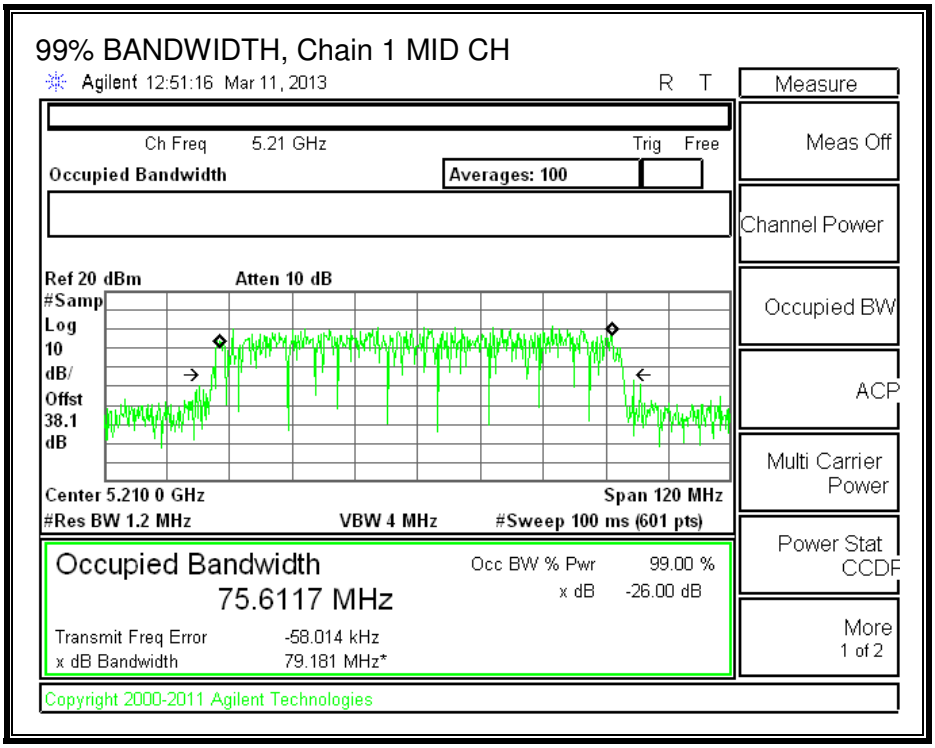
**99% BANDWIDTH, Chain 0**




**99% BANDWIDTH, Chain 1**





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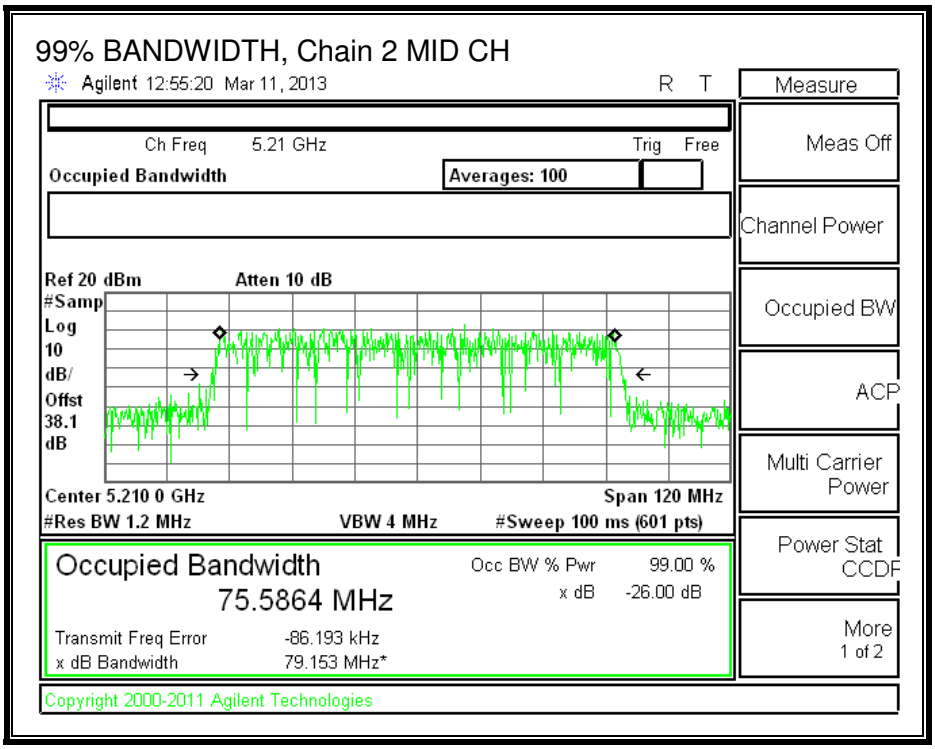
**99% BANDWIDTH, Chain 2**





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### 8.19.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated for output power and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.20 | 1.40 | 2.20 | 2.33 |

The TX chains are correlated for PSD and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.20 | 1.40 | 2.20 | 7.07 |


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**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Correlat Directional Gain (dBi) | Uncorre Directional Gain (dBi) |
|---|---|---|---|
| Mid | 5210 | 7.07 | 2.33 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | FCC PSD Limit (dBm) |
|---|---|---|---|
| Mid | 5210 | 30.00 | 15.93 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.09 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Mid | 5210 | 11.90 | 12.10 | 11.95 | 16.76 | 30.00 | -13.24 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Chain 2 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|---|
| Mid | 5210 | -5.479 | -5.387 | -5.062 | -0.44 | 15.93 | -16.37 |


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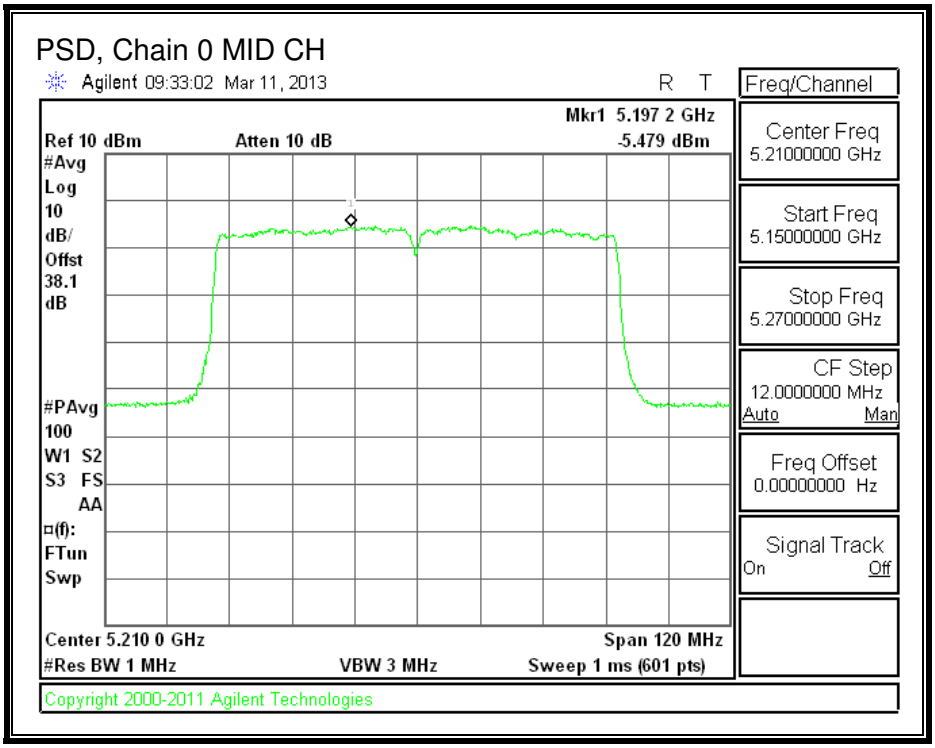
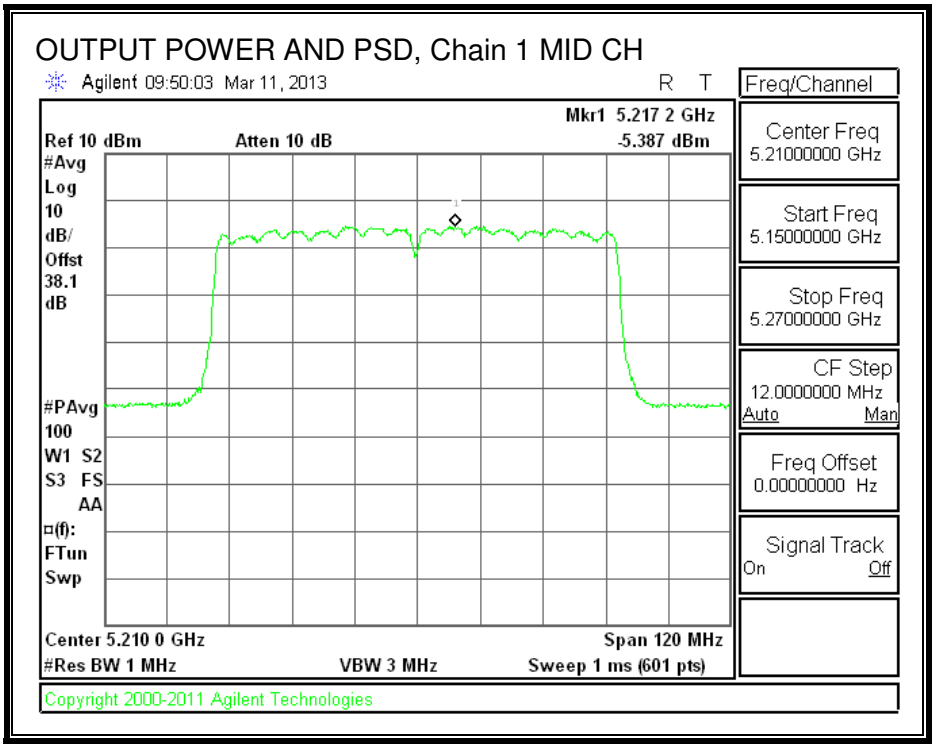
**PSD, Chain 0**




**PSD, Chain 1**





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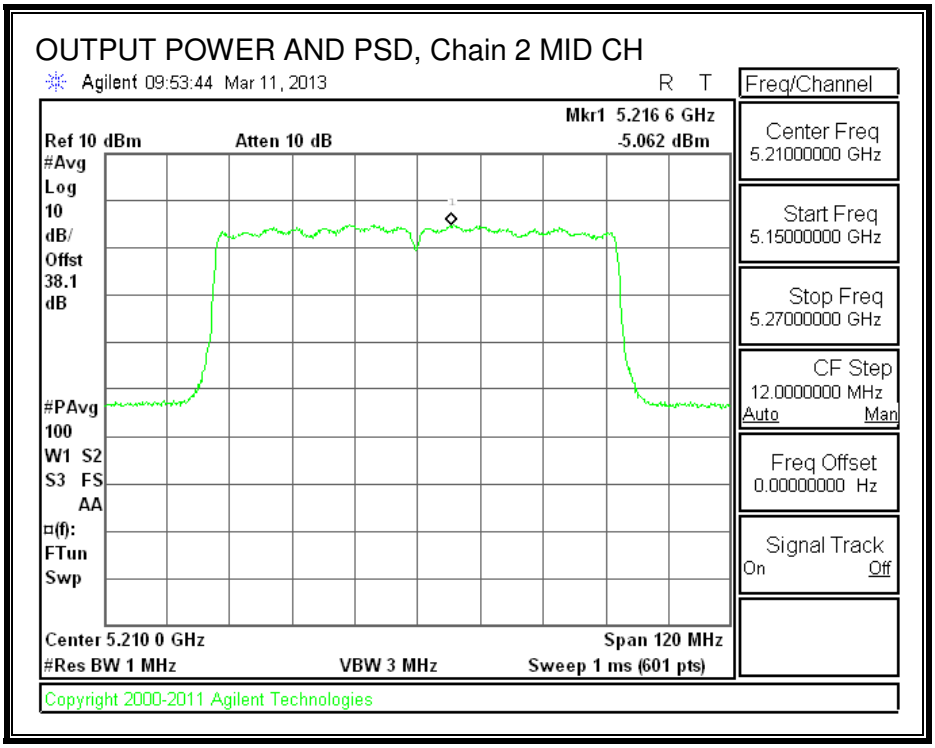
**PSD, Chain 2**





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## 8.20. 802.11ac VHT80 BF 3TX MODE IN THE 5.2 GHz BAND

Covered by testing 11ac VHT80 CDD 3TX mode, the power per chain used for 11ac VHT80 CDD 3TX mode is the same power per chain that will be used for 11ac VHT80 BF 3TX mode. However, since BF is correlated and CDD is uncorrelated for output power, the section below for output power using correlated AG for this BF mode shows it is still compliant.

### 8.20.1. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

The TX chains are correlated for output power and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.20 | 1.40 | 2.20 | 7.07 |

**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Correlat Directional Gain (dBi) |
|---|---|---|
| Mid | 5210 | 7.07 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) |
|---|---|---|
| Mid | 5210 | 28.93 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.09 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Mid | 5210 | 10.00 | 10.30 | 10.10 | 14.91 | 28.93 | -14.02 |


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## 8.21. 802.11ac VHT80 STBC 3TX MODE IN THE 5.2 GHz BAND

### 8.21.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) | 26 dB BW Chain 2 (MHz) |
|---|---|---|---|---|
| Mid | 5210 | 82.67 | 82.17 | 82.00 |


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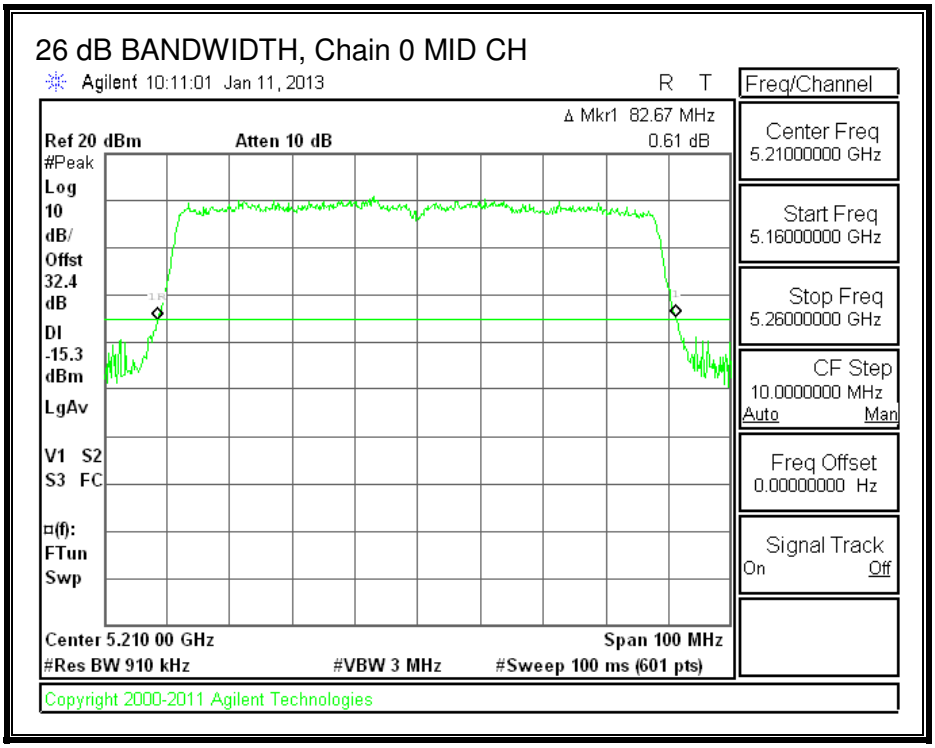
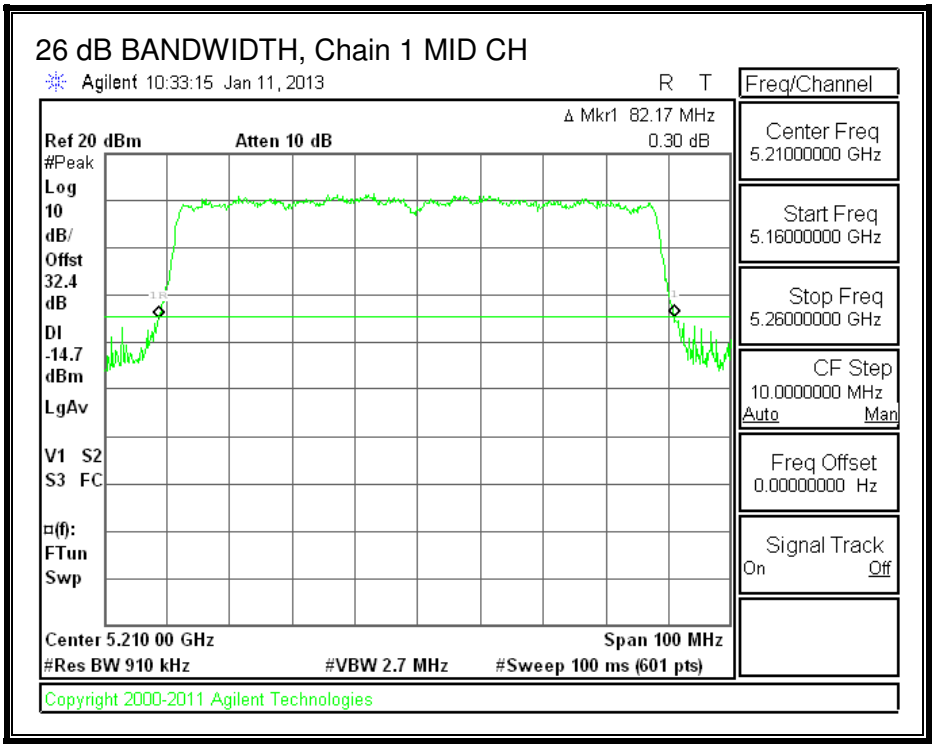
**26 dB BANDWIDTH, Chain 0**




**26 dB BANDWIDTH, Chain 1**





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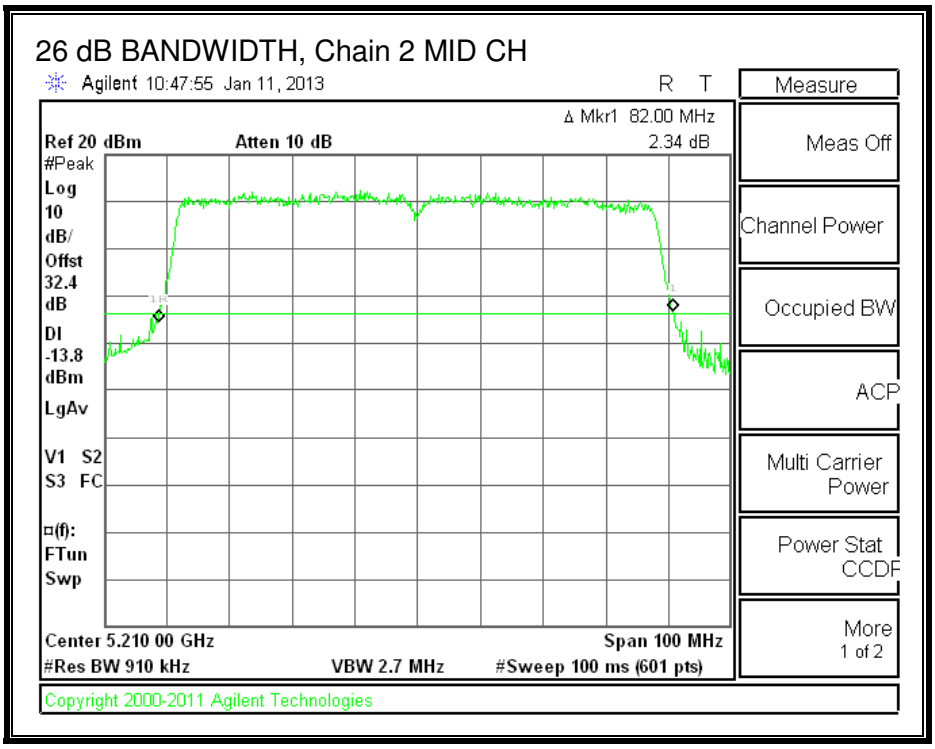
**26 dB BANDWIDTH, Chain 2**





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### 8.21.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) | 99% BW Chain 2 (MHz) |
|---|---|---|---|---|
| Mid | 5210 | 75.5197 | 75.5238 | 75.5115 |


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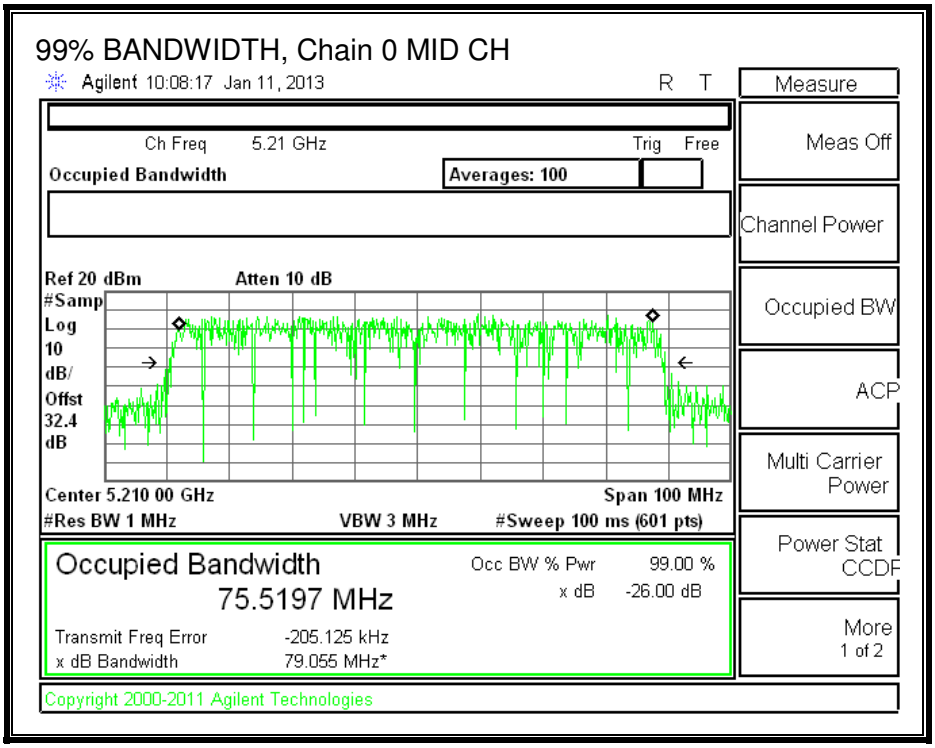
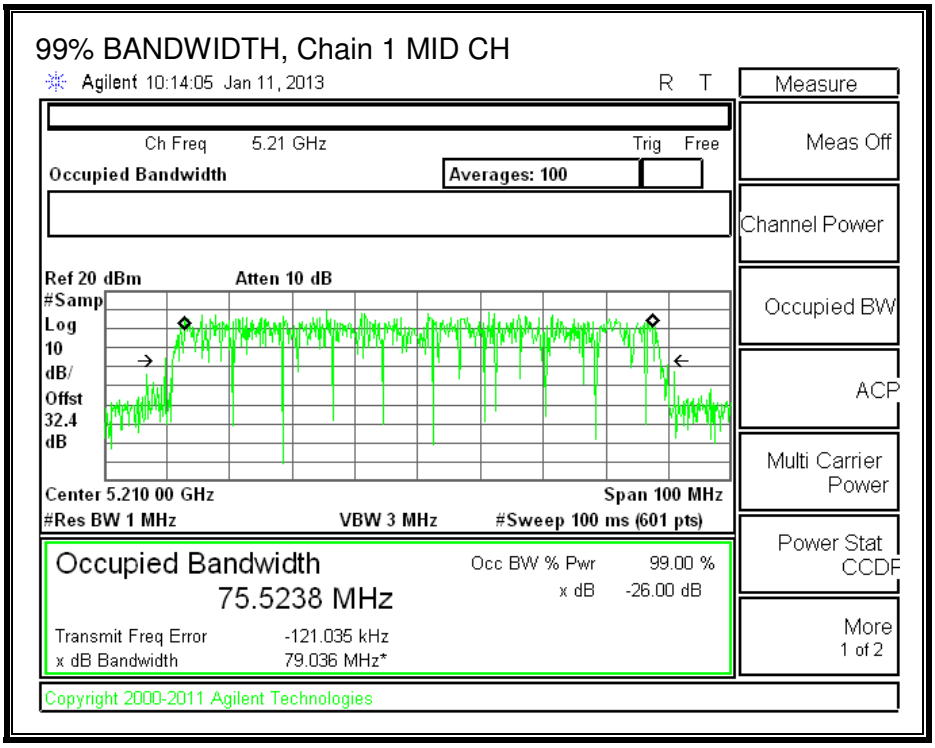
**99% BANDWIDTH, Chain 0**




**99% BANDWIDTH, Chain 1**





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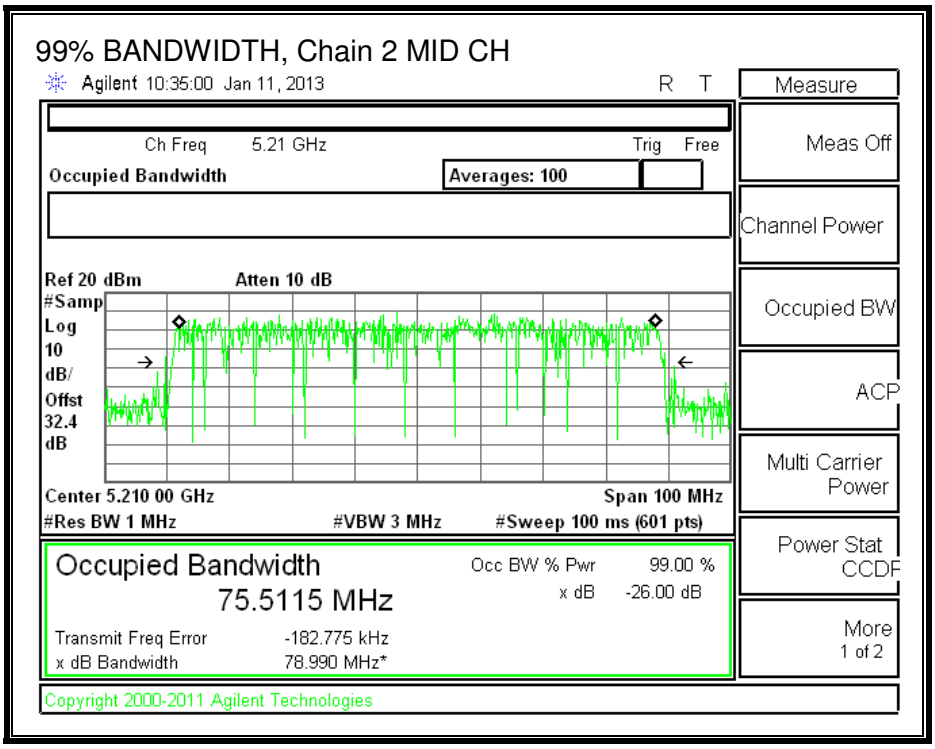
**99% BANDWIDTH, Chain 2**





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### 8.21.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.


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**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.20 | 1.40 | 2.20 | 2.33 |

**RESULTS**

**Antenna Gain**

| Channel | Frequency (MHz) | Directio Gain (dBi) |
|---|---|---|
| Mid | 5210 | 2.33 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) |
|---|---|---|
| Mid | 5210 | 30.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.09 | |

**Gated Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Mid | 5210 | 11.90 | 11.98 | 12.10 | 16.77 | 30.00 | -13.23 |


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**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Directio Gain (dBi) |
|---|---|---|
| Mid | 5210 | 2.33 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | FCC PPSD Limit (dBm) |
|---|---|---|---|
| Mid | 5210 | 30.00 | 17.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.09 | |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Chain 2 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|---|
| Mid | 5210 | -5.635 | -4.183 | -3.917 | 0.35 | 17.00 | -16.65 |


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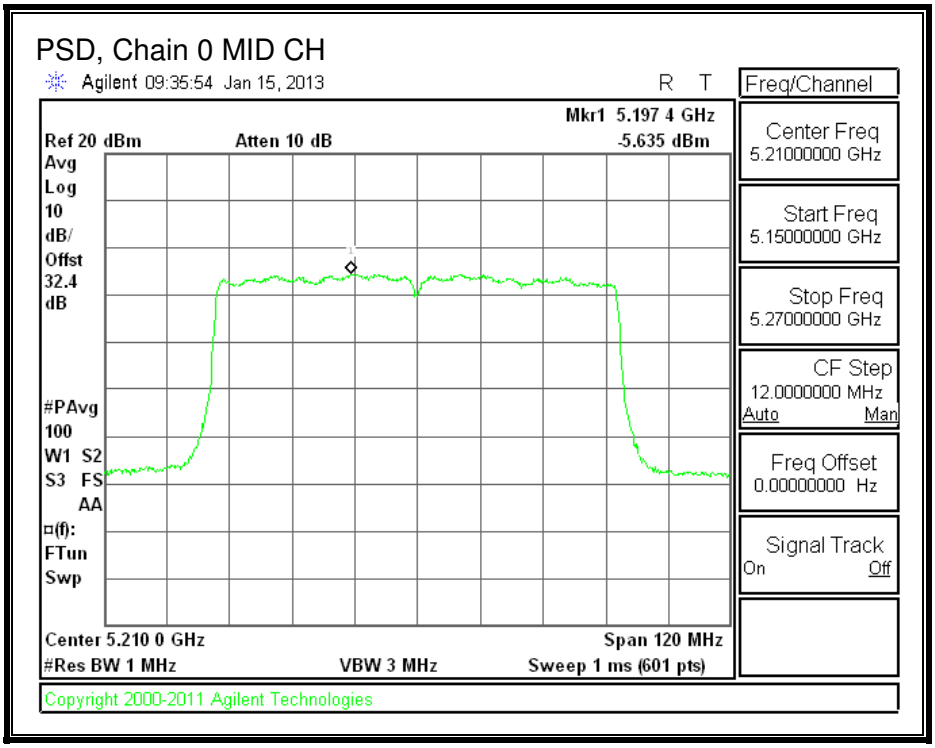
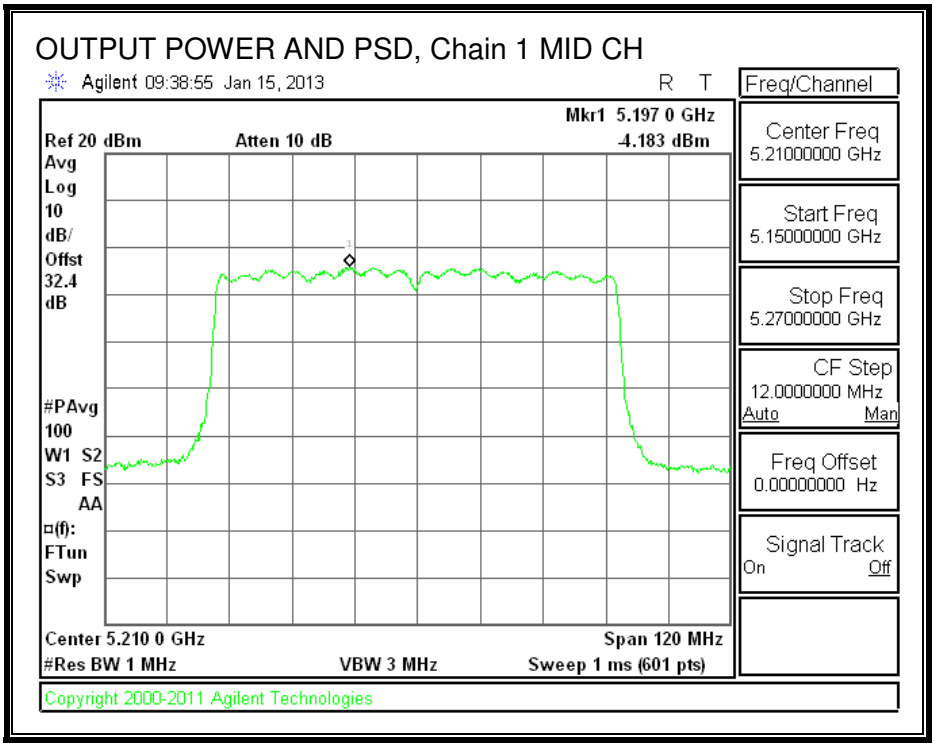
**PSD, Chain 0**




**PSD, Chain 1**





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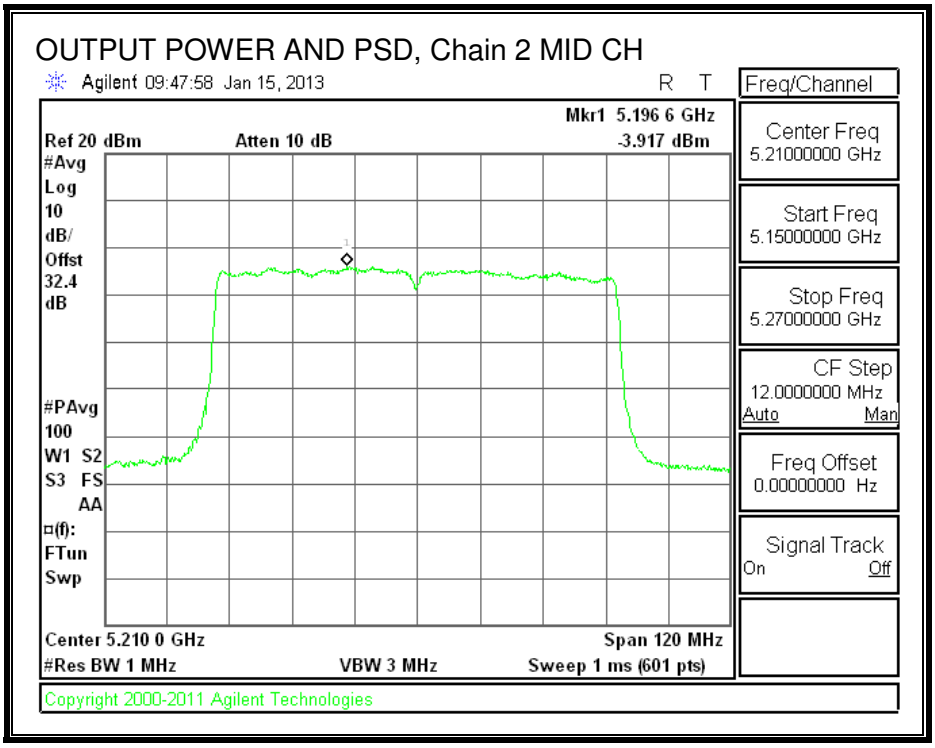
**PSD, Chain 2**





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## 8.22. 802.11a Legacy 1TX MODE IN THE 5.3 GHz BAND

### 8.22.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB Bandwidth (MHz) |
|---|---|---|
| Low | 5260 | 20.33 |
| Mid | 5300 | 20.42 |
| High | 5320 | 20.42 |


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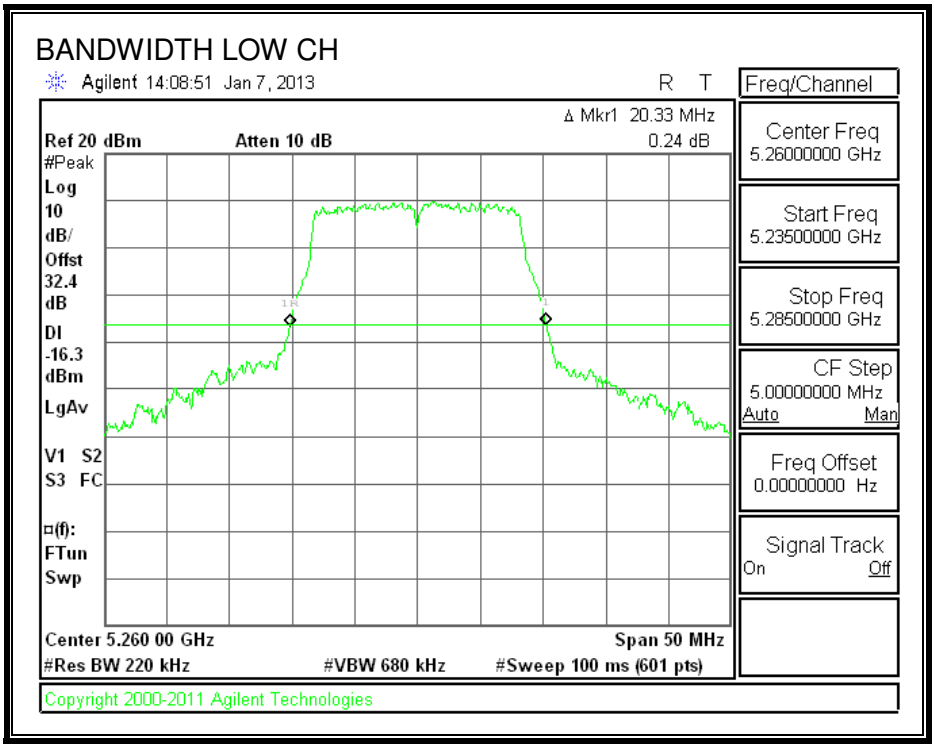
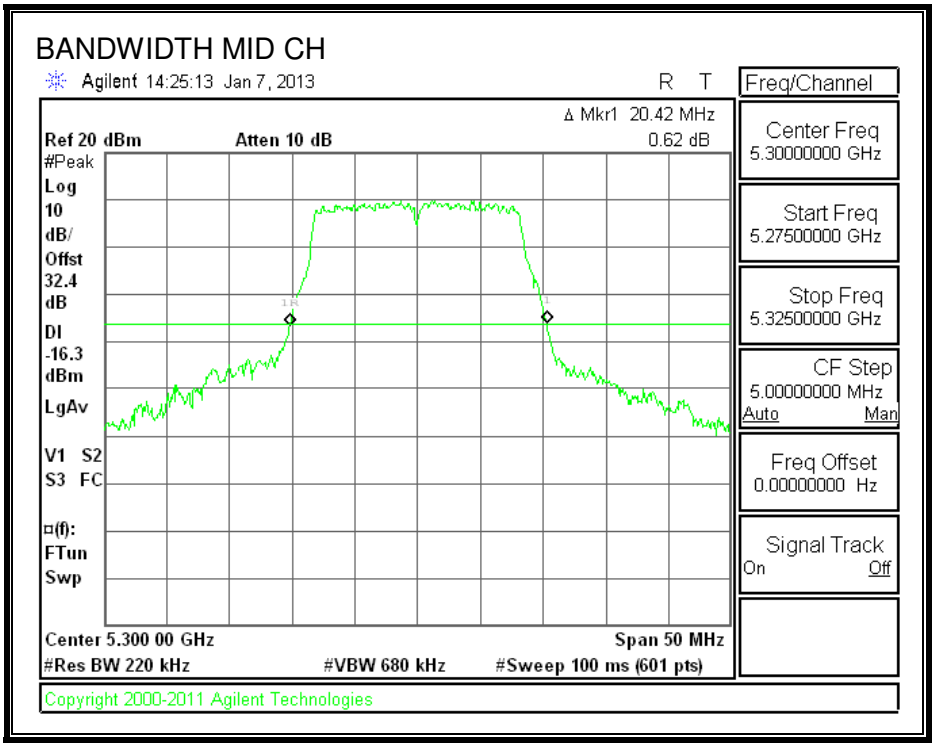
**26 dB BANDWIDTH**





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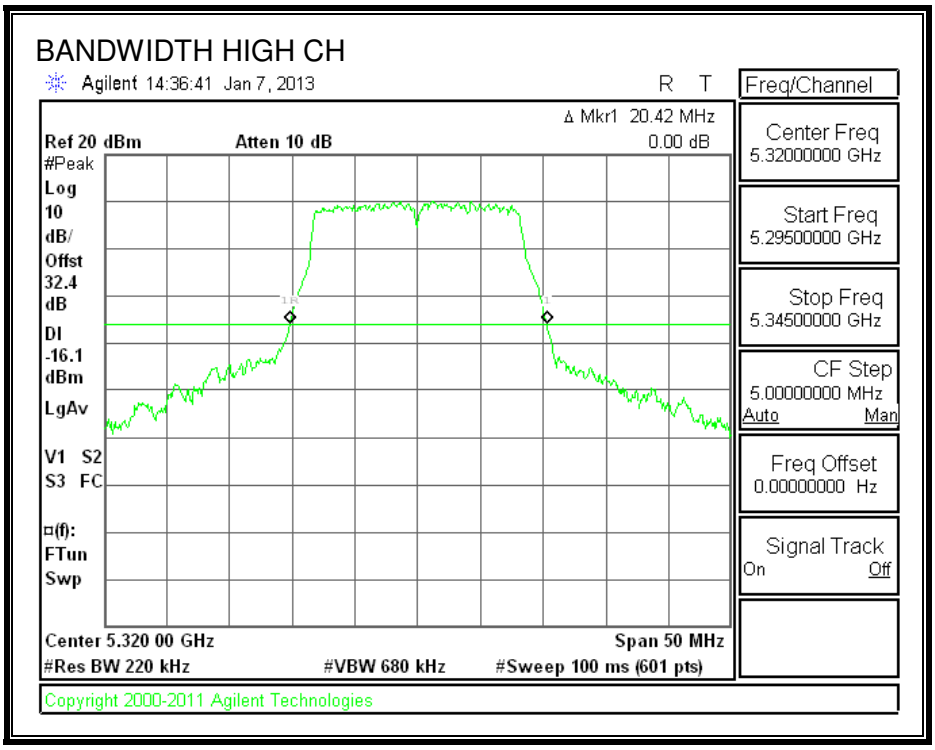
BANDWIDTH HIGH CH





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### 8.22.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5260 | 16.4975 |
| Mid | 5300 | 16.4947 |
| High | 5320 | 16.4911 |


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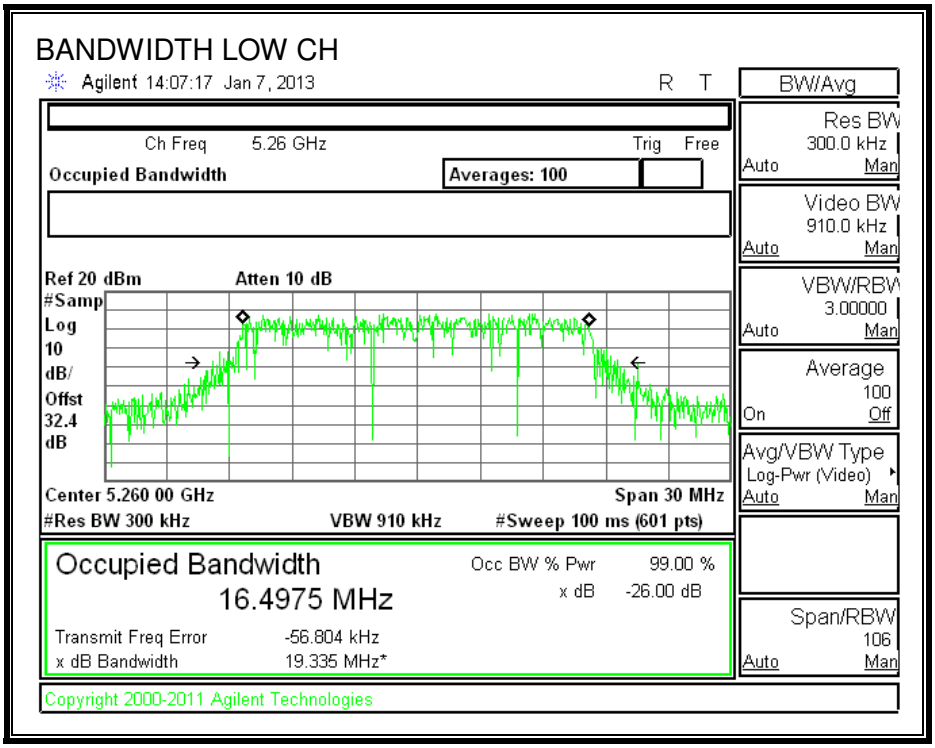
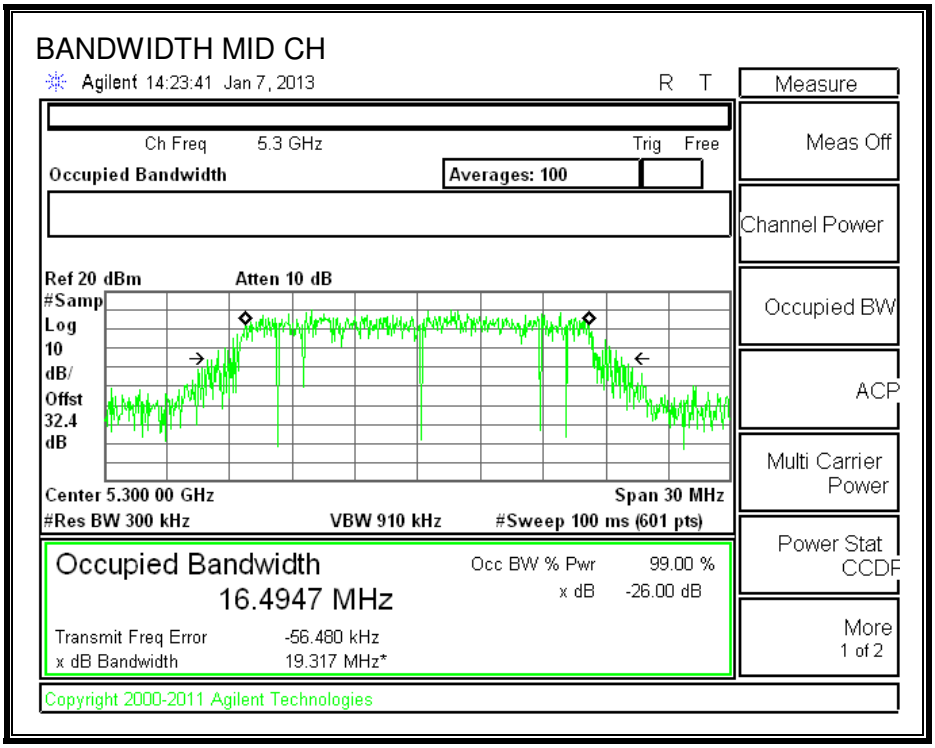
**99% BANDWIDTH**





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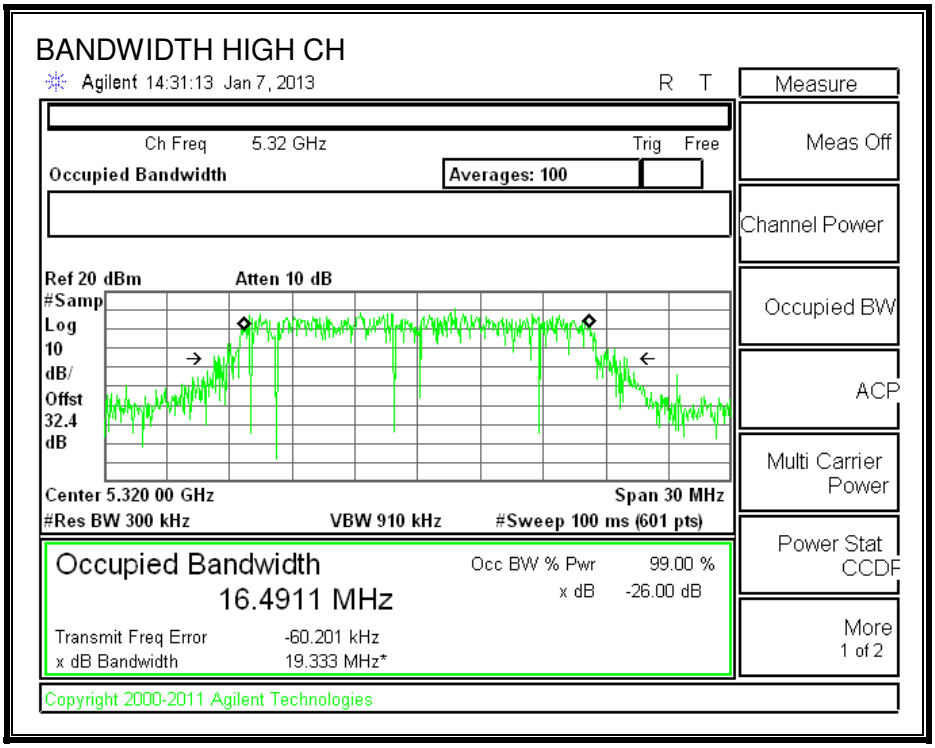
BANDWIDTH HIGH CH





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### 8.22.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.


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**RESULTS**

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---|---|---|---|---|
| Low | 5260 | 20.33 | 16.4975 | 3.40 |
| Mid | 5300 | 20.42 | 16.4947 | 3.40 |
| High | 5320 | 20.42 | 16.4911 | 3.40 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PSD Limit (dBm) | IC PSD Limit (dBm) | PSD Limit (dBm) |
|---|---|---|---|---|---|---|---|---|
| Low | 5260 | 24.00 | 23.17 | 29.17 | 23.17 | 11.00 | 11.00 | 11.00 |
| Mid | 5300 | 24.00 | 23.17 | 29.17 | 23.17 | 11.00 | 11.00 | 11.00 |
| High | 5320 | 24.00 | 23.17 | 29.17 | 23.17 | 11.00 | 11.00 | 11.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5260 | 20.50 | 20.50 | 23.17 | -2.67 |
| Mid | 5300 | 16.00 | 16.00 | 23.17 | -7.17 |
| High | 5320 | 15.50 | 15.50 | 23.17 | -7.67 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5260 | 10.116 | 10.116 | 11.00 | -0.88 |
| Mid | 5300 | 9.937 | 9.937 | 11.00 | -1.06 |
| High | 5320 | 9.685 | 9.685 | 11.00 | -1.32 |


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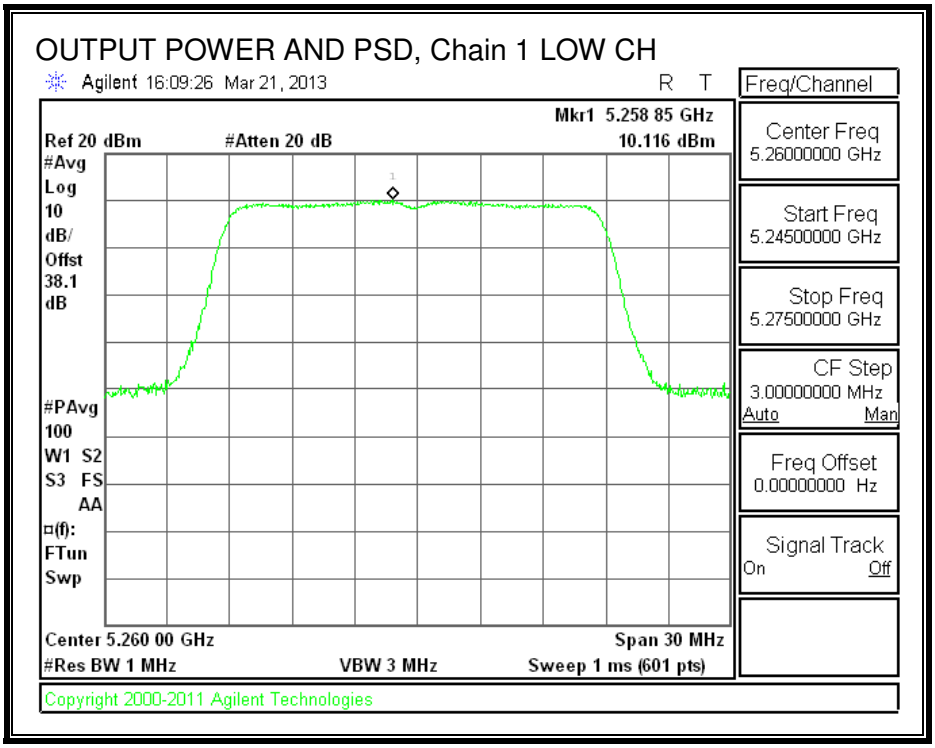
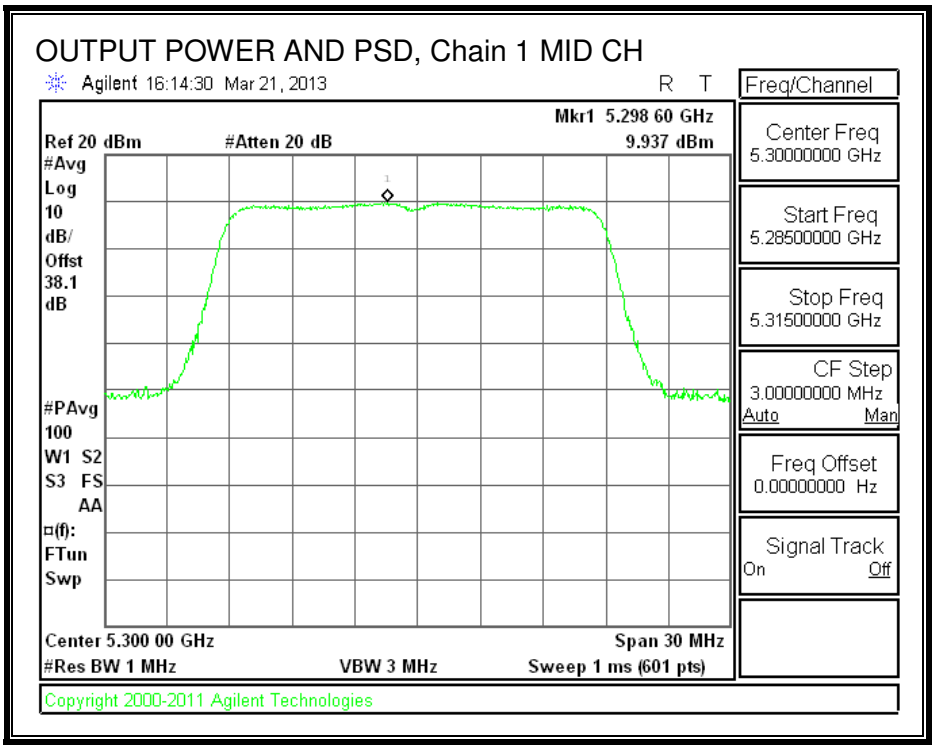
**OUTPUT POWER AND PSD, Chain 1**





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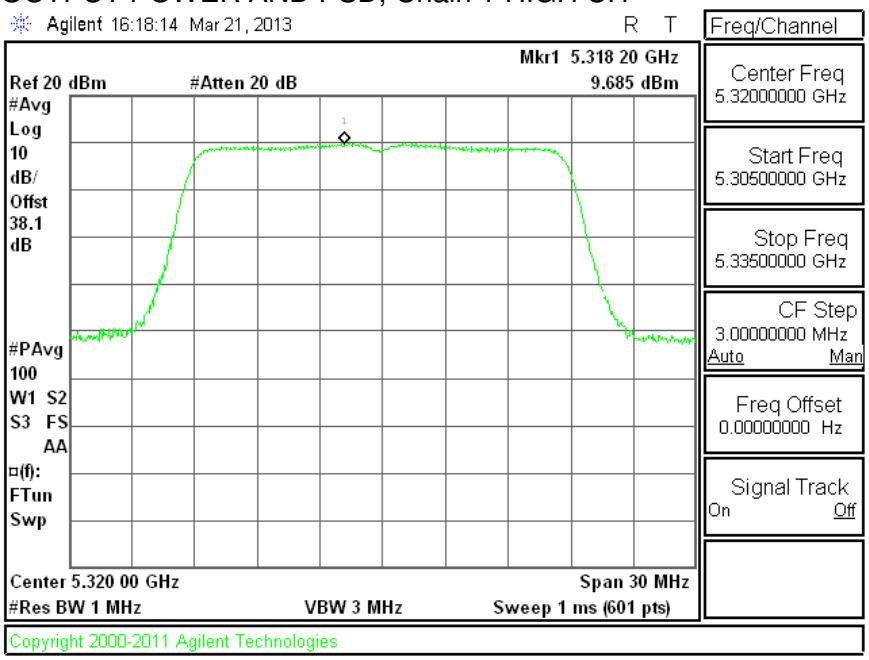
OUTPUT POWER AND PSD, Chain 1 HIGH CH





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### 8.22.4. TPC POWER

**LIMITS**

FCC §15.407 (h) (1)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

**RESULTS**

The maximum EIRP is less than 500 mW; therefore, TPC is not required.


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47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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## 8.23. 802.11n HT20 CDD 2TX MODE IN THE 5.3 GHz BAND

### 8.23.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5260 | 20.83 | 20.58 |
| Mid | 5300 | 20.58 | 20.58 |
| High | 5320 | 20.67 | 20.67 |


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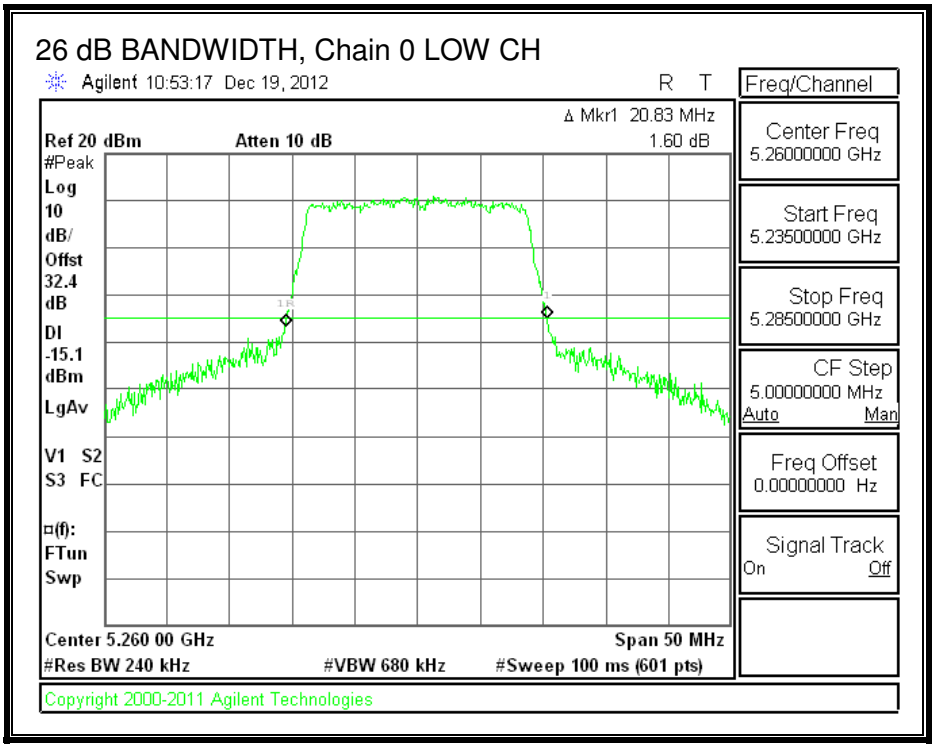
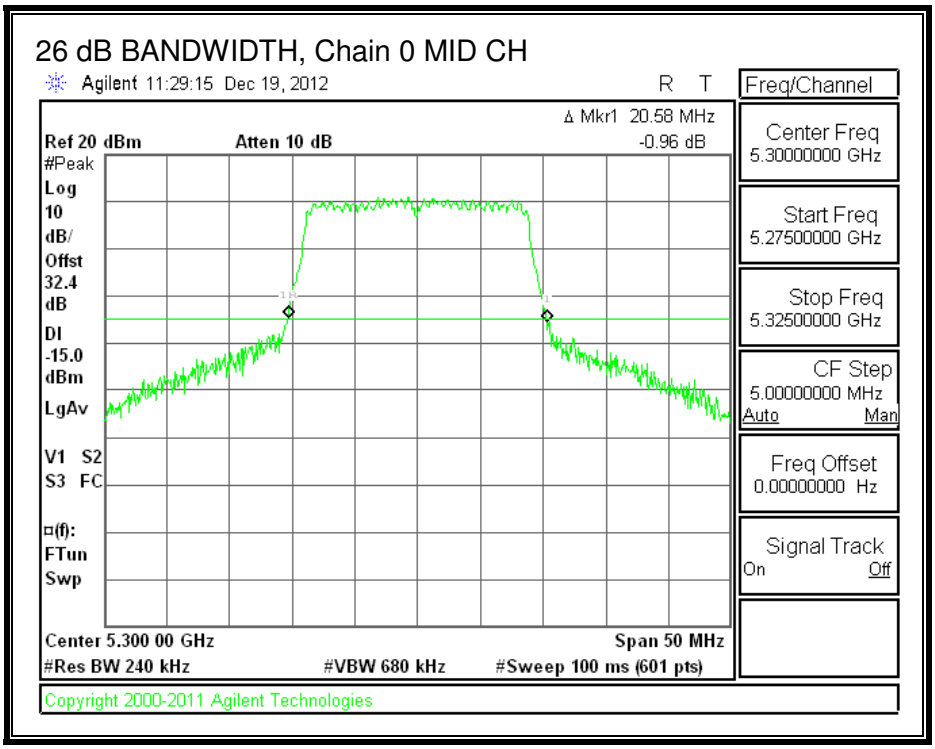
**26 dB BANDWIDTH, Chain 0**





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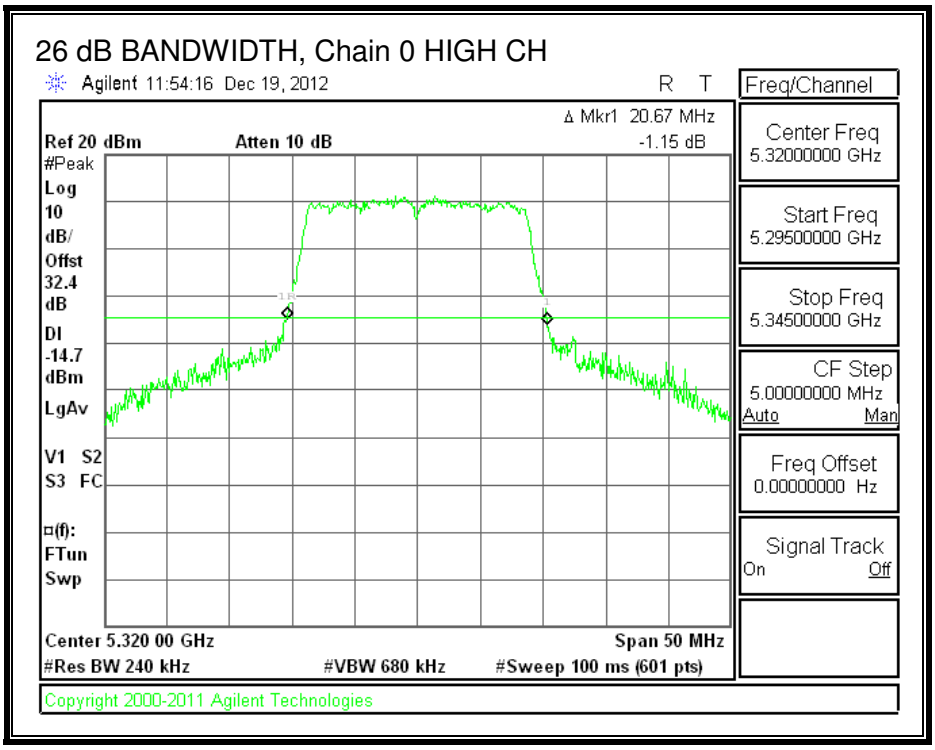
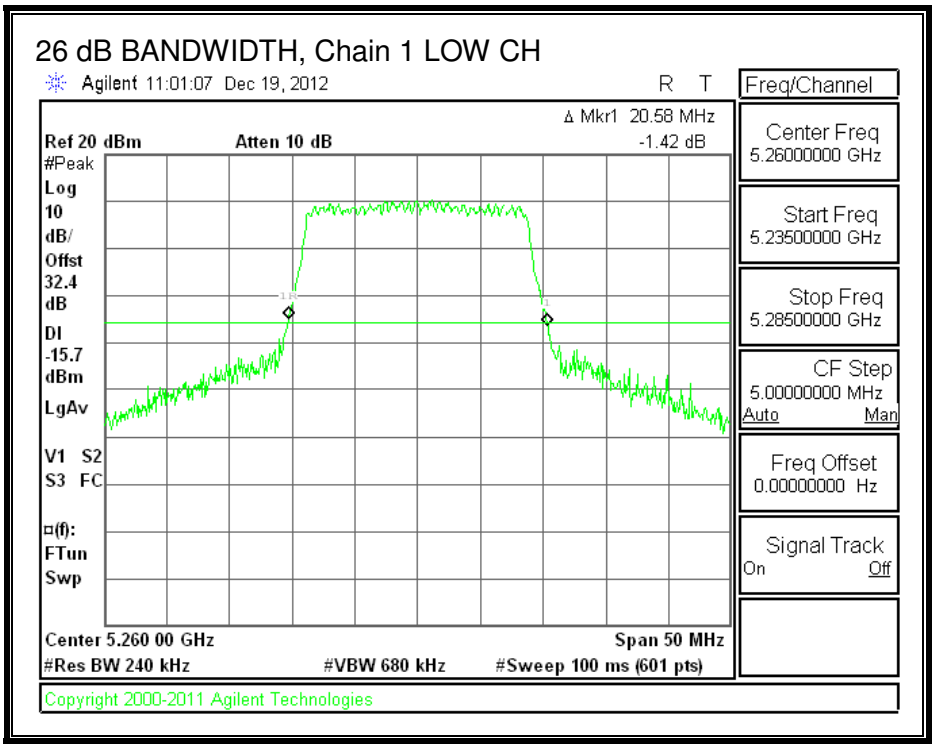



**26 dB BANDWIDTH, Chain 1**





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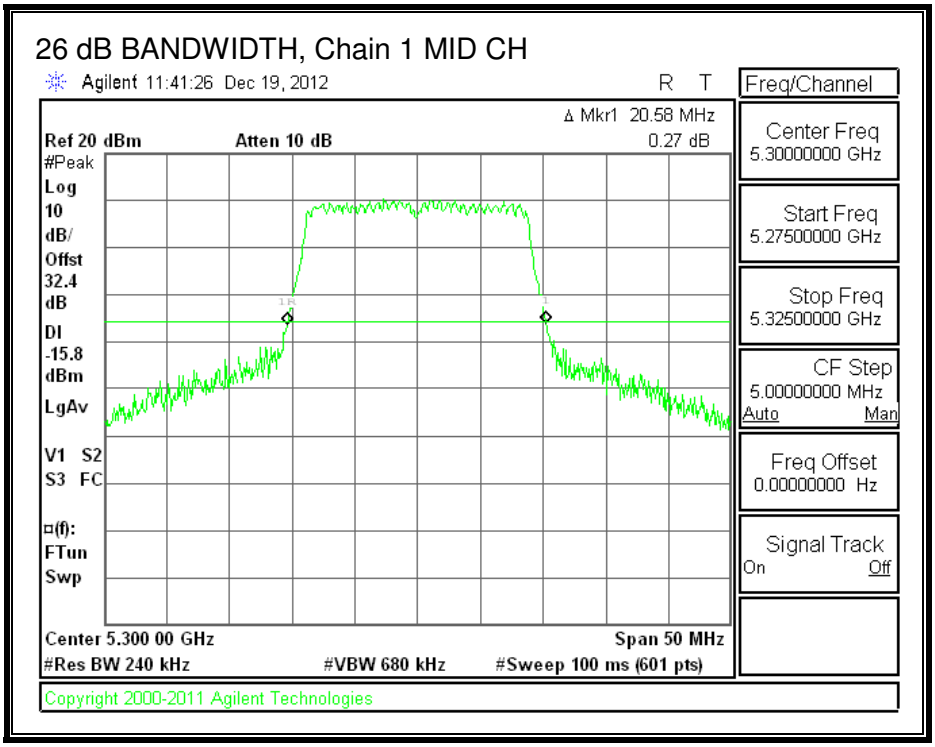


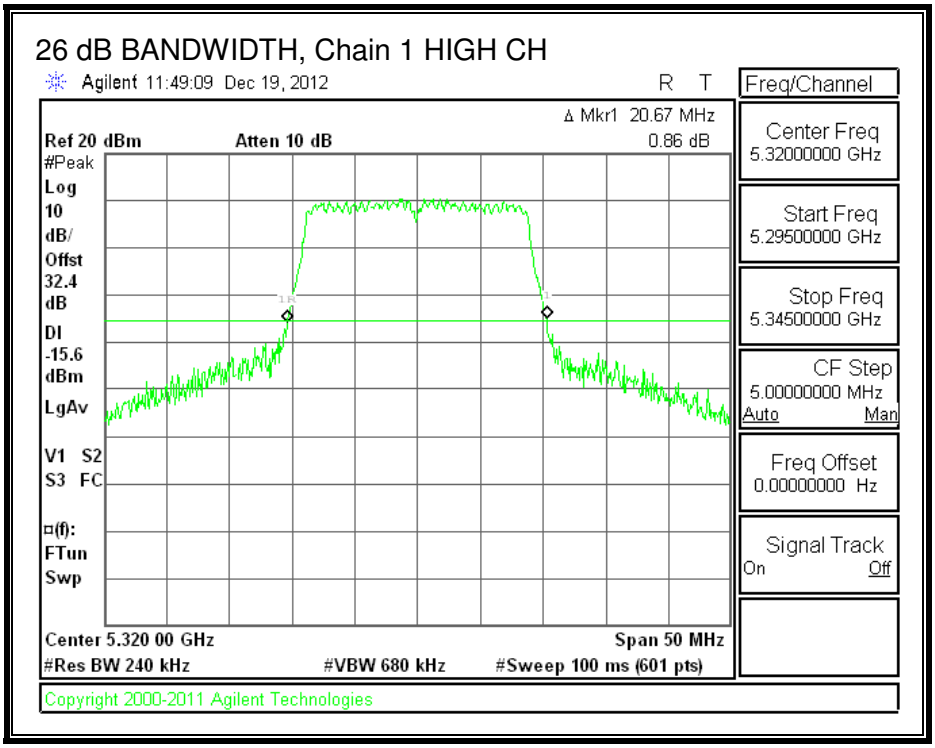



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### 8.23.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5260 | 17.7032 | 17.6849 |
| Mid | 5300 | 17.6792 | 17.6898 |
| High | 5320 | 17.6960 | 17.6968 |


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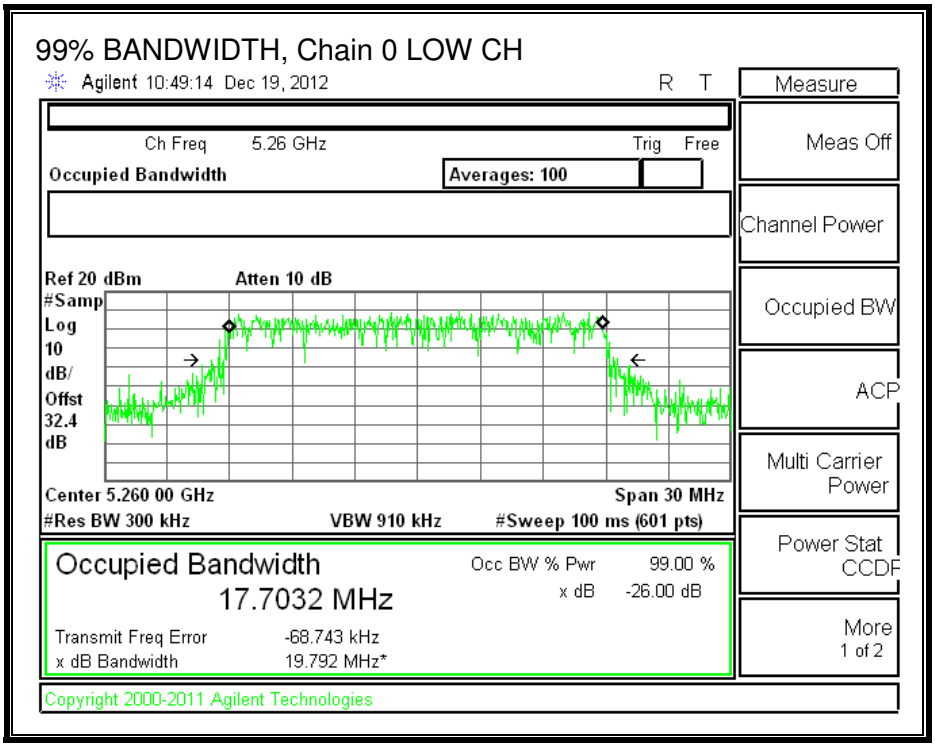
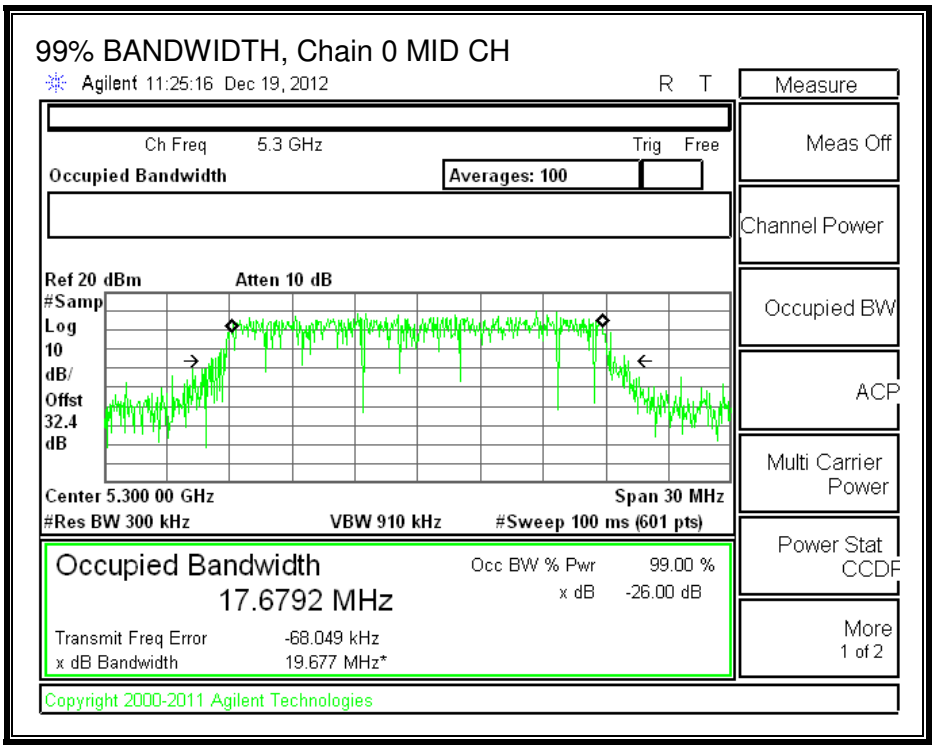
**99% BANDWIDTH, Chain 0**





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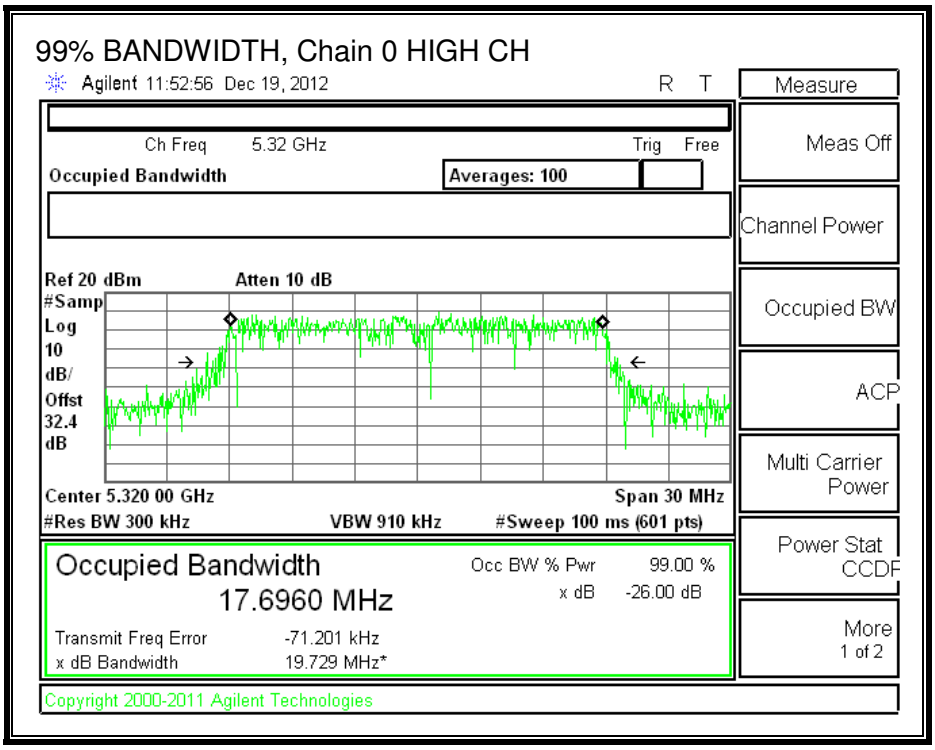
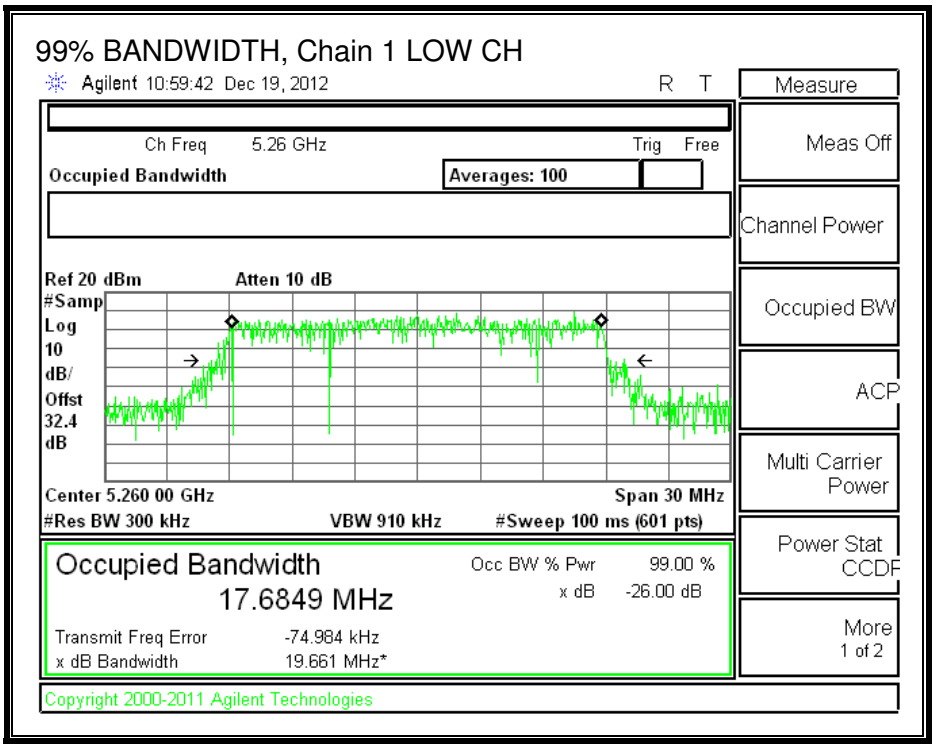



**99% BANDWIDTH, Chain 1**





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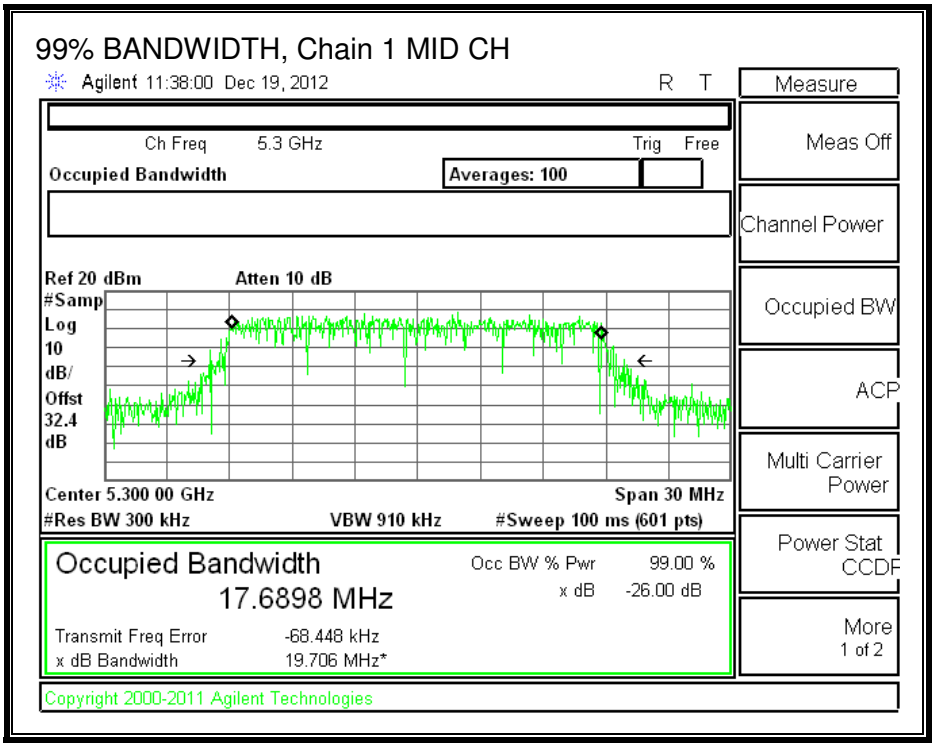


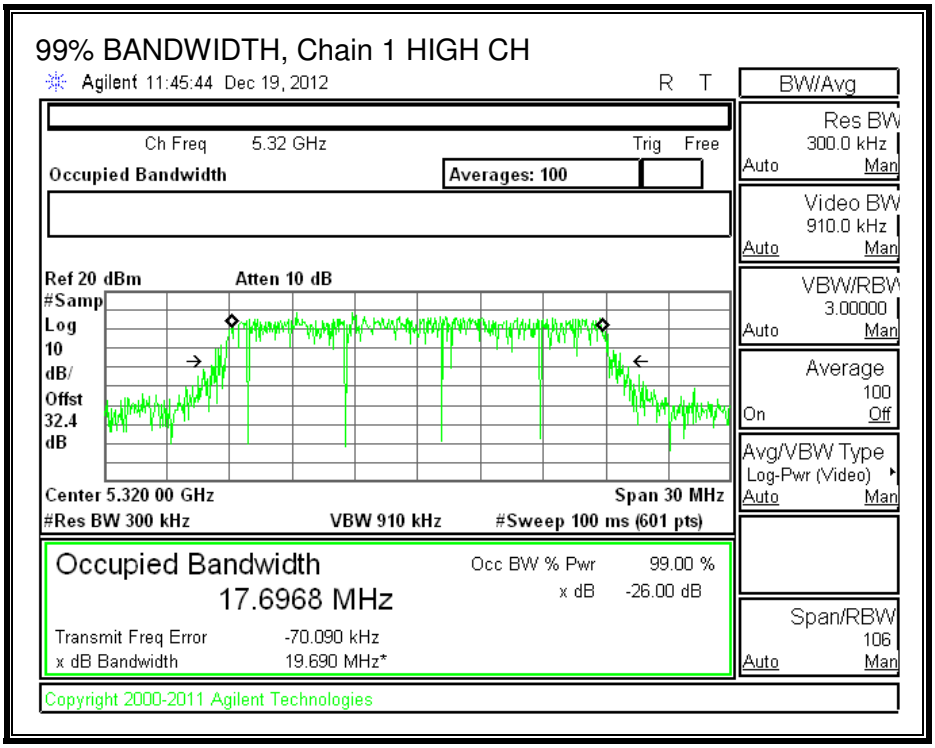



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### 8.23.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

For output power, the two chains are considered uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|
| 3.40 | 2.30 | 2.88 |

For PSD, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|
| 3.40 | 2.30 | 5.88 |


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## RESULTS

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Correlated Directional Gain (dBi) | Uncorrelated Directional Gain (dBi) |
|---|---|---|---|---|---|
| Low | 5260 | 20.58 | 17.6849 | 5.88 | 2.88 |
| Mid | 5300 | 20.58 | 17.6792 | 5.88 | 2.88 |
| High | 5320 | 20.67 | 17.6960 | 5.88 | 2.88 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PSD Limit (dBm) | IC PSD Limit (dBm) | PSD Limit (dBm) |
|---|---|---|---|---|---|---|---|---|
| Low | 5260 | 24.00 | 23.48 | 29.48 | 23.48 | 11.00 | 11.00 | 11.00 |
| Mid | 5300 | 24.00 | 23.47 | 29.47 | 23.47 | 11.00 | 11.00 | 11.00 |
| High | 5320 | 24.00 | 23.48 | 29.48 | 23.48 | 11.00 | 11.00 | 11.00 |

| Duty Cycle CF (dB) | 0.00 |
|---|---|

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5260 | 16.50 | 16.60 | 19.56 | 23.48 | -3.92 |
| Mid | 5300 | 15.20 | 15.00 | 18.11 | 23.47 | -5.36 |
| High | 5320 | 14.70 | 14.40 | 17.56 | 23.48 | -5.92 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5260 | 6.532 | 6.541 | 9.55 | 11.00 | -1.45 |
| Mid | 5300 | 6.469 | 6.640 | 9.57 | 11.00 | -1.43 |
| High | 5320 | 6.656 | 6.696 | 9.69 | 11.00 | -1.31 |


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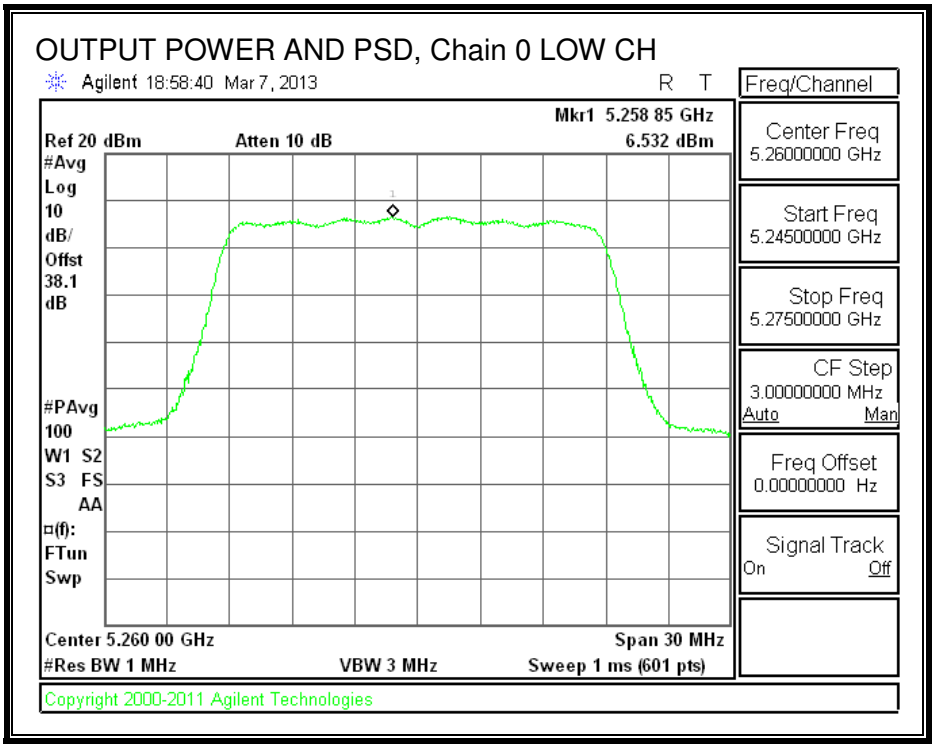
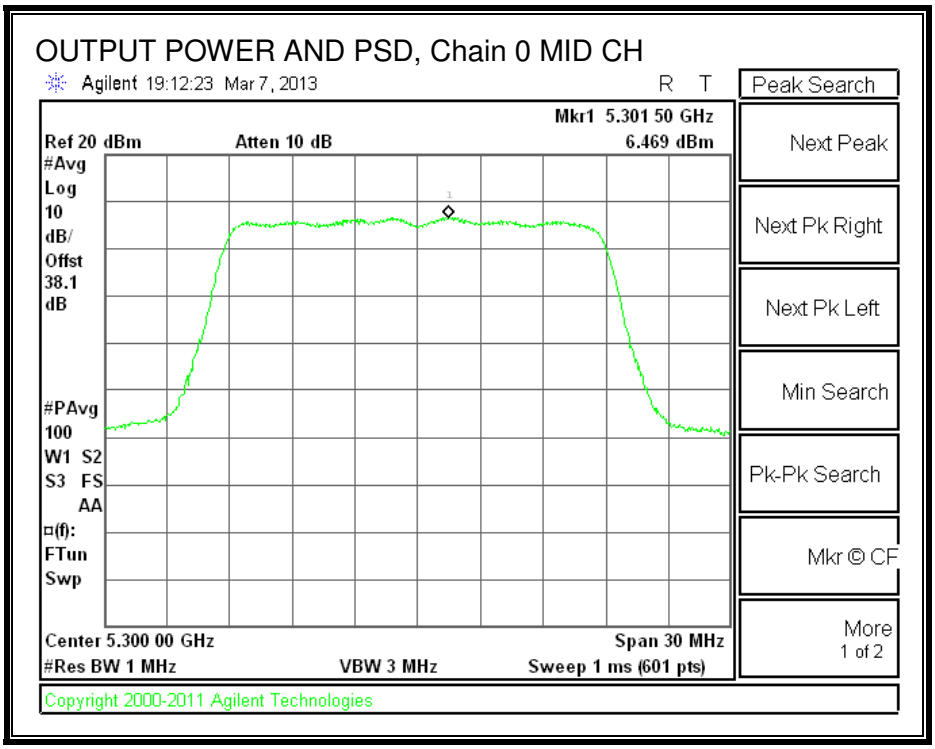
**OUTPUT POWER AND PSD, Chain 0**





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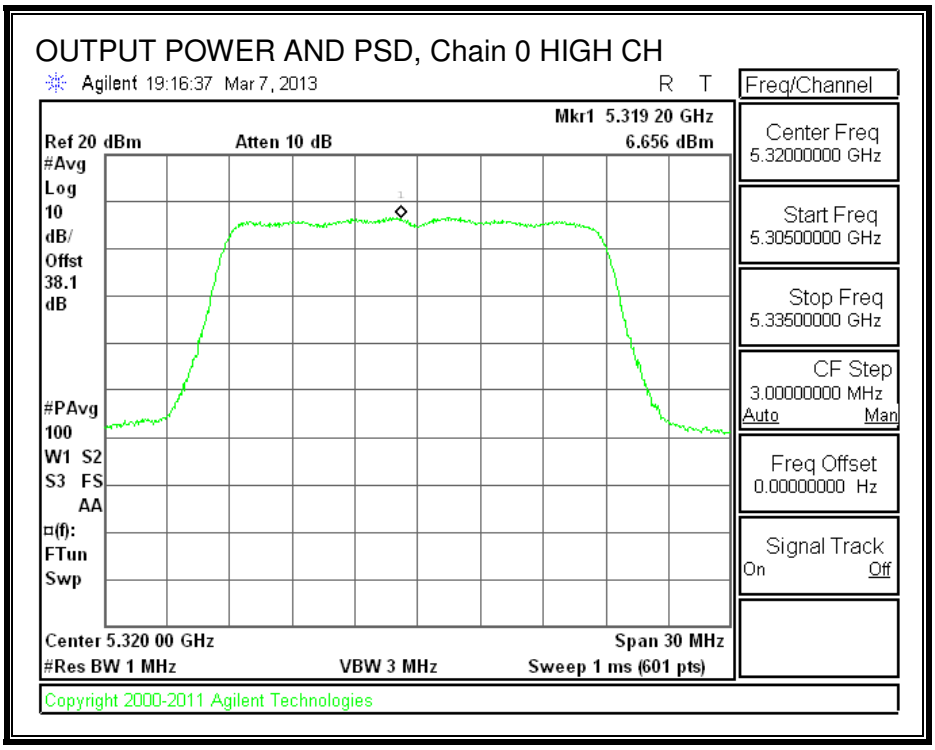
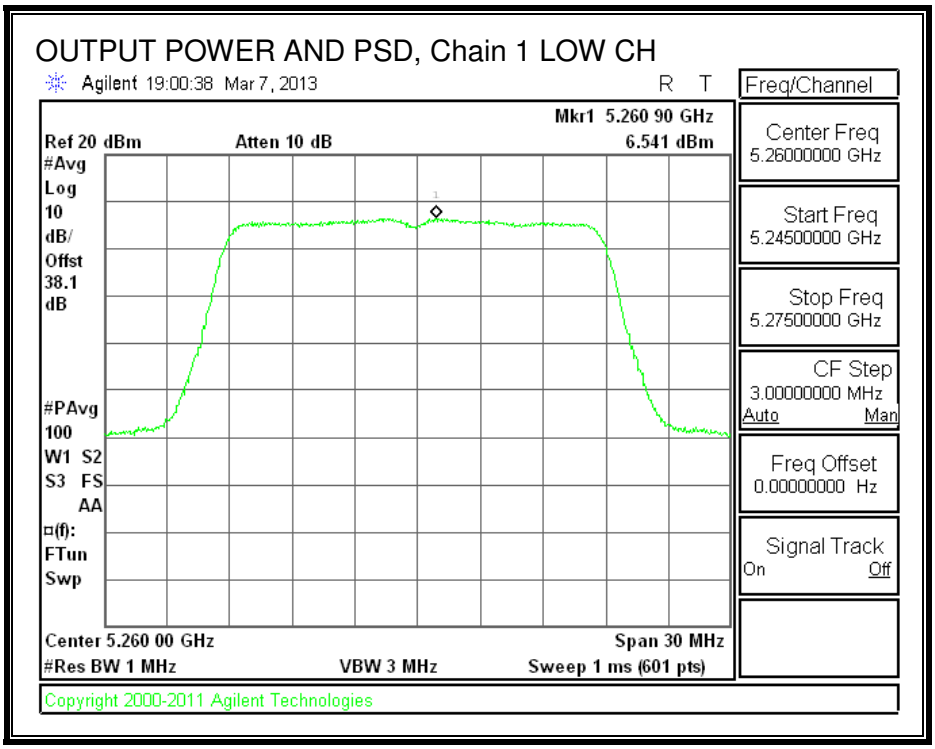



**OUTPUT POWER AND PSD, Chain 1**





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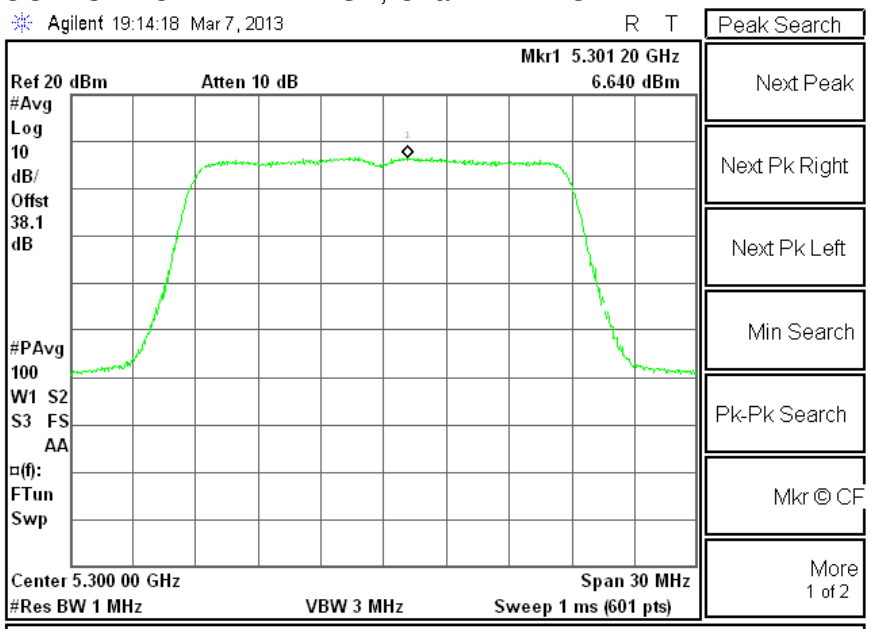
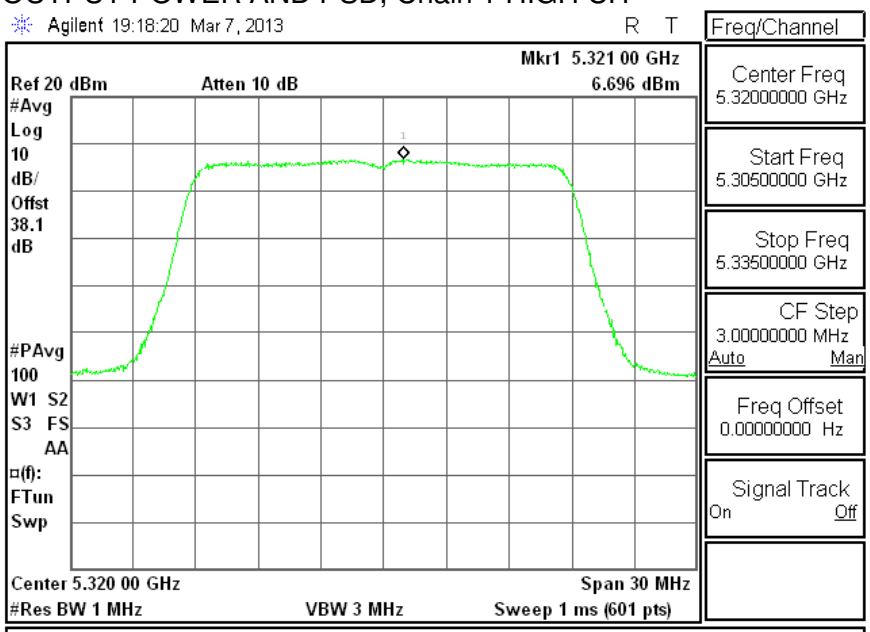
OUTPUT POWER AND PSD, Chain 1 MID CH




OUTPUT POWER AND PSD, Chain 1 HIGH CH





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### 8.23.4. TPC POWER

**LIMITS**

FCC §15.407 (h) (1)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

**RESULTS**

The maximum EIRP is less than 500 mW; therefore, TPC is not required.


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## 8.24. 802.11n HT20 BF 2TX MODE IN THE 5.3 GHz BAND

Covered by testing HT20 CDD 2TX mode, the power per chain used for HT20 CDD 2TX mode is the same power per chain that will be used for HT20 BF 2TX mode. However, since BF is correlated and CDD is uncorrelated for output power, the section below for output power using correlated AG for this BF mode shows it is still compliant.

### 8.24.1. OUTPUT AVERAGE POWER

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

For output power, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|
| 3.40 | 2.30 | 5.88 |


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**RESULTS**

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Correlated Directional Gain (dBi) |
|---|---|---|---|---|
| Low | 5260 | 20.58 | 17.6849 | 5.88 |
| Mid | 5300 | 20.58 | 17.6792 | 5.88 |
| High | 5320 | 20.67 | 17.6960 | 5.88 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) |
|---|---|---|---|---|---|
| Low | 5260 | 24.00 | 23.48 | 29.48 | 23.48 |
| Mid | 5300 | 24.00 | 23.47 | 29.47 | 23.47 |
| High | 5320 | 24.00 | 23.48 | 29.48 | 23.48 |

| Duty Cycle CF (dB) | 0.00 | |
|---|---|---|

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5260 | 16.50 | 16.60 | 19.56 | 23.48 | -3.92 |
| Mid | 5300 | 15.20 | 15.00 | 18.11 | 23.47 | -5.36 |
| High | 5320 | 14.70 | 14.40 | 17.56 | 23.48 | -5.92 |


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## 8.25. 802.11n HT20 STBC 2TX MODE IN THE 5.3 GHz BAND

### 8.25.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5260 | 20.67 | 20.58 |
| Mid | 5300 | 20.58 | 20.50 |
| High | 5320 | 20.67 | 20.75 |


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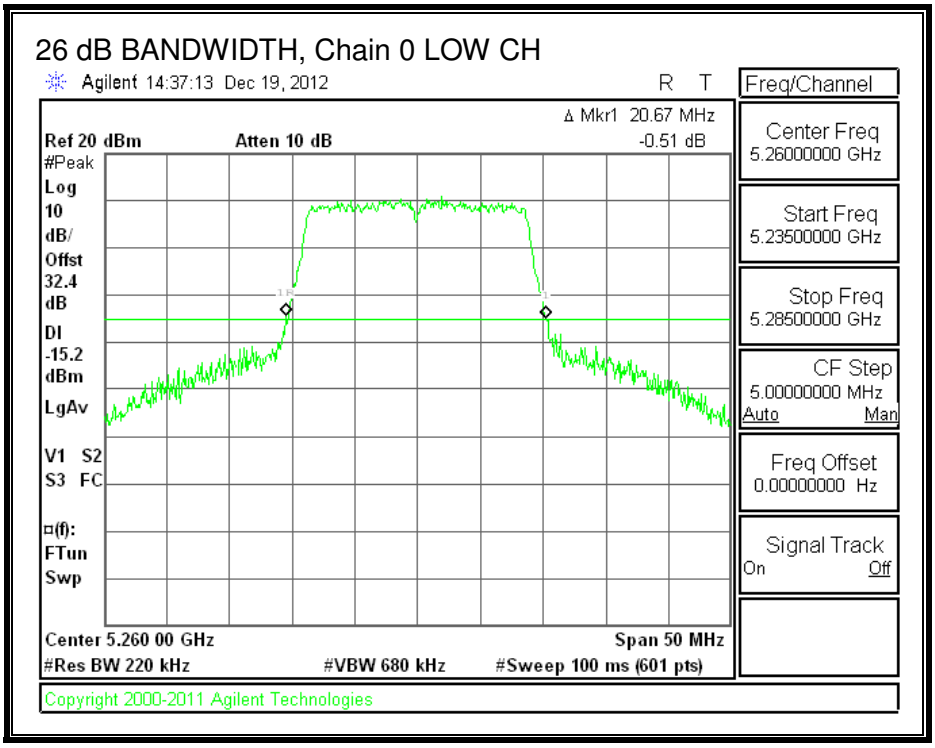
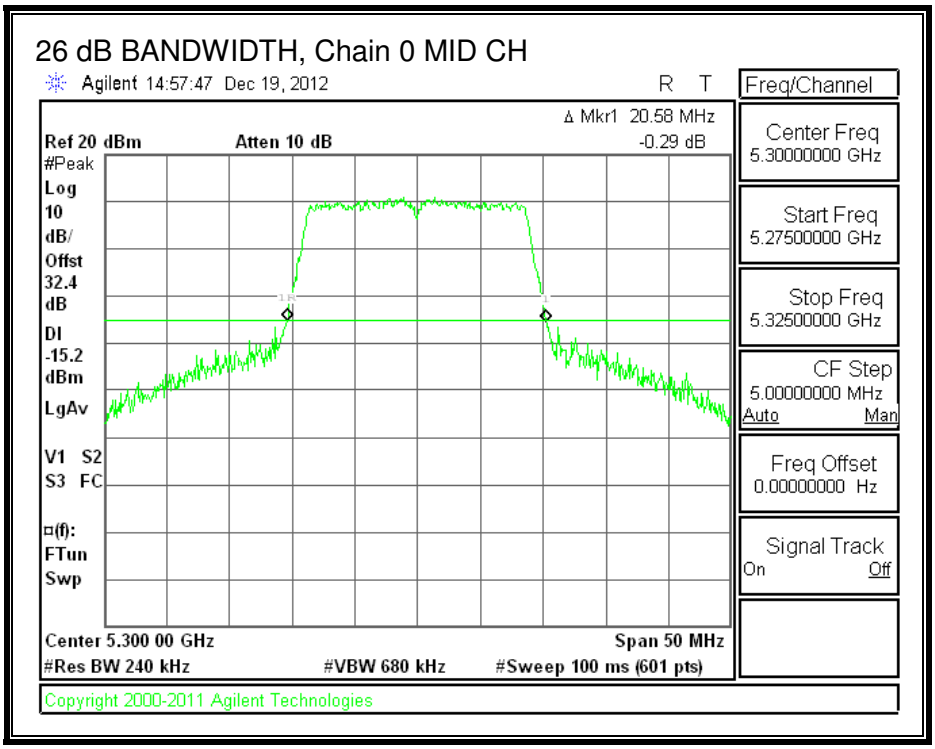
**26 dB BANDWIDTH, Chain 0**





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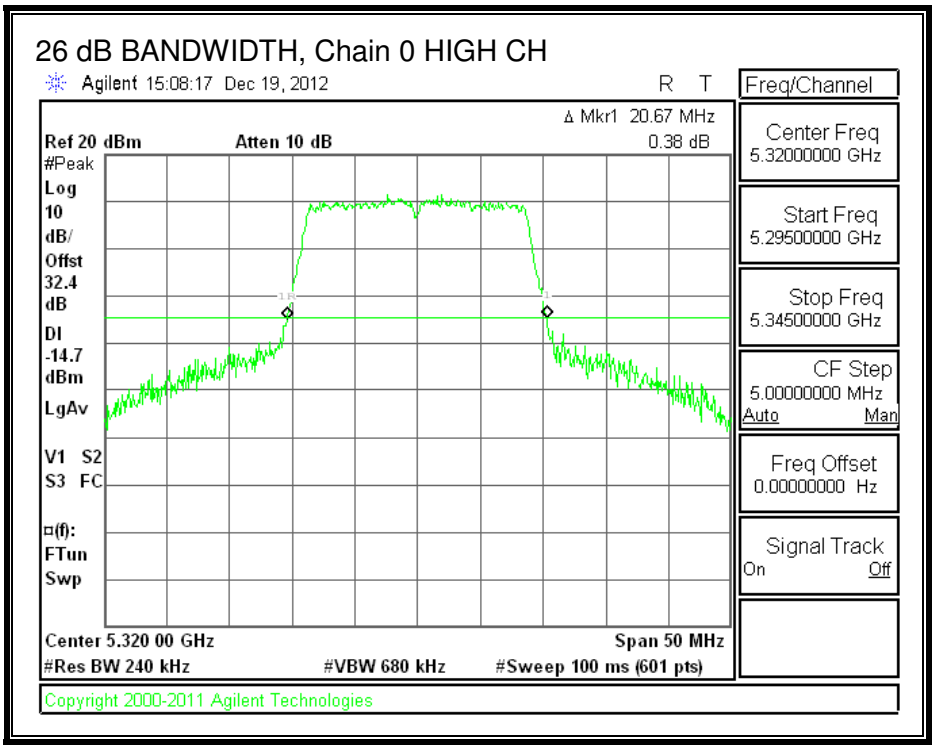
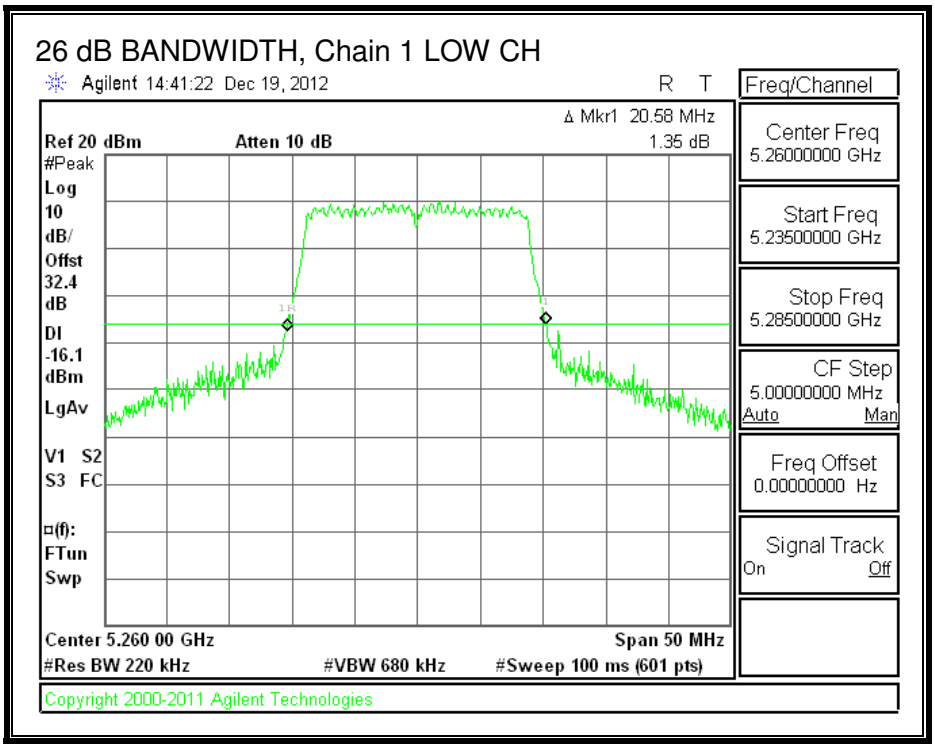



**26 dB BANDWIDTH, Chain 1**





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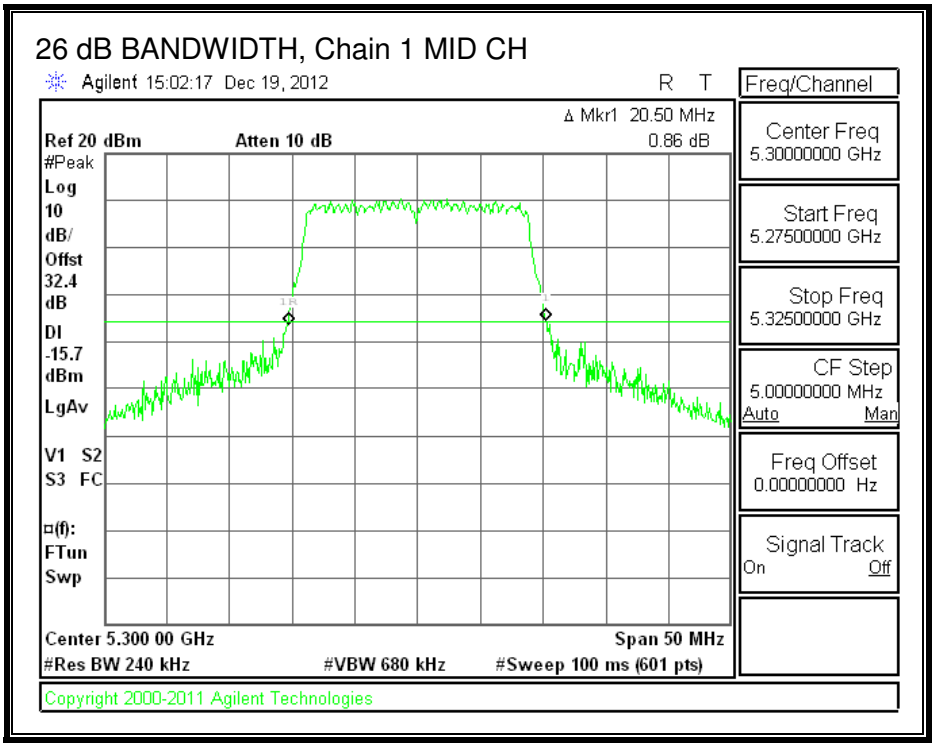


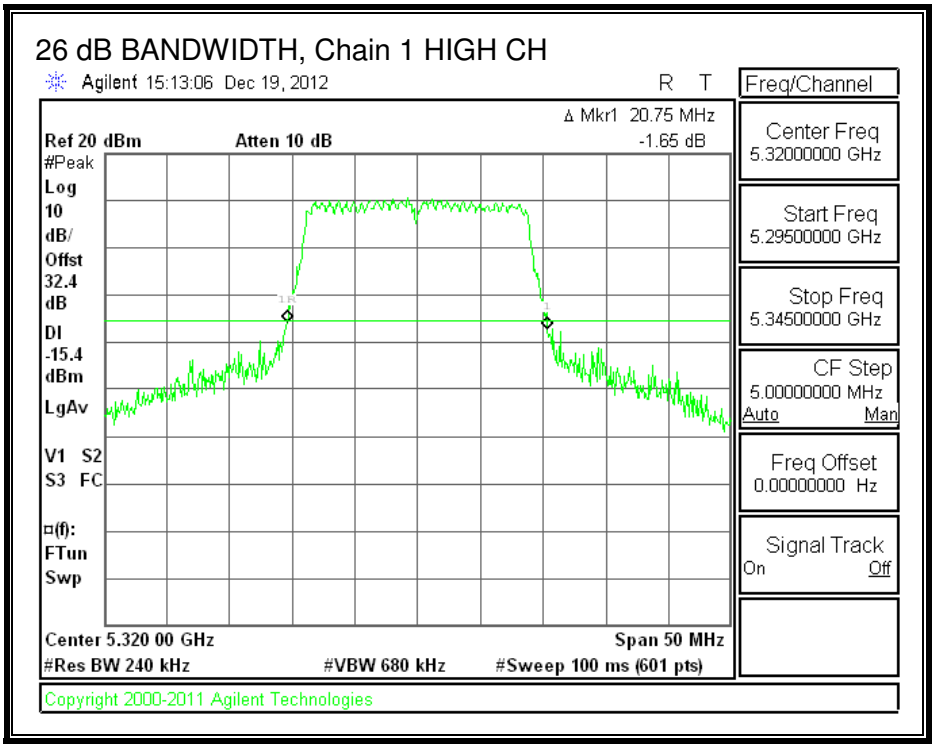



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### 8.25.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5260 | 17.6887 | 17.6836 |
| Mid | 5300 | 17.6887 | 17.6843 |
| High | 5320 | 17.6802 | 17.6734 |


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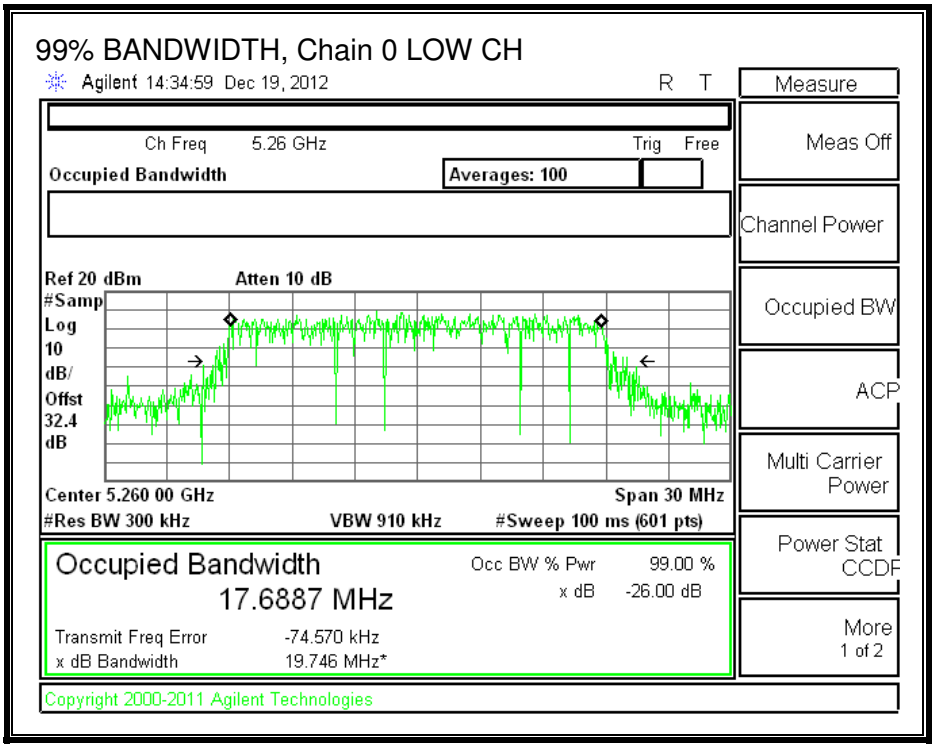
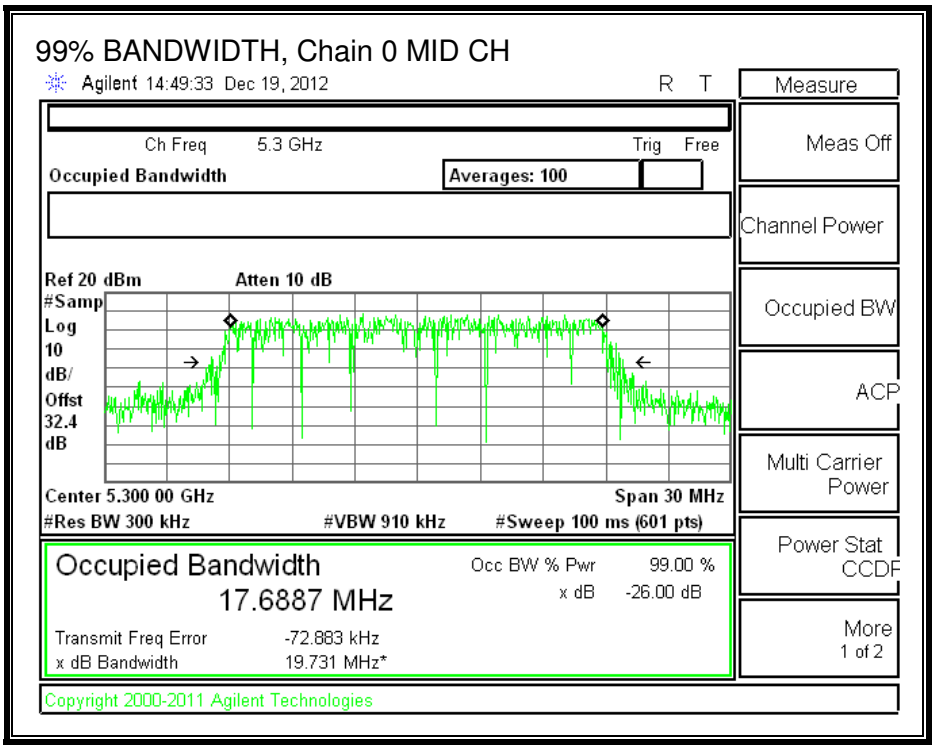
**99% BANDWIDTH, Chain 0**





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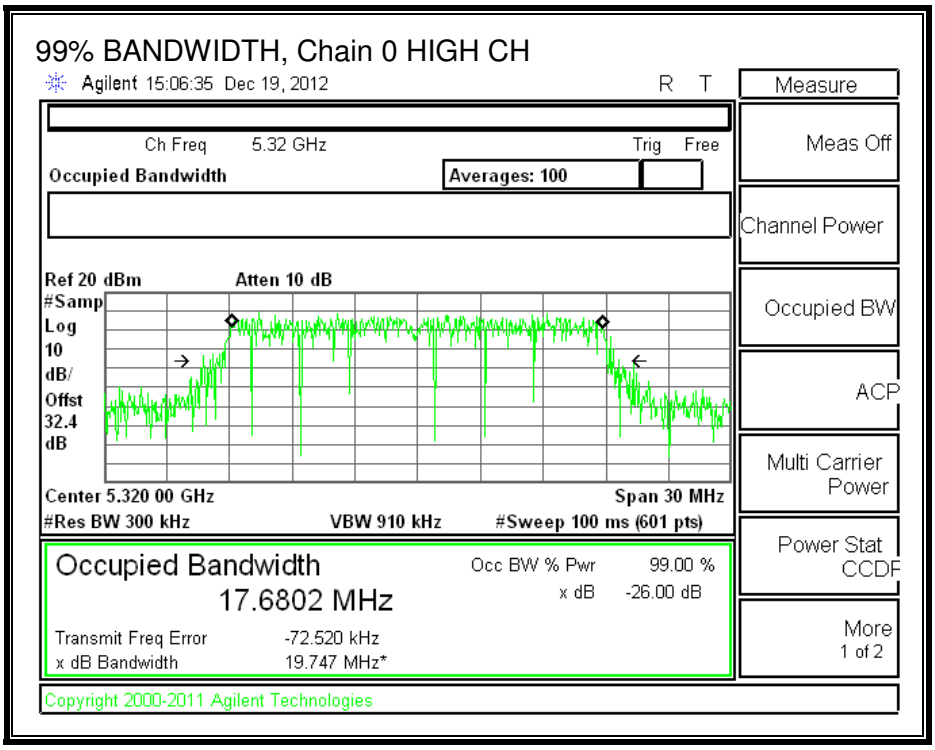
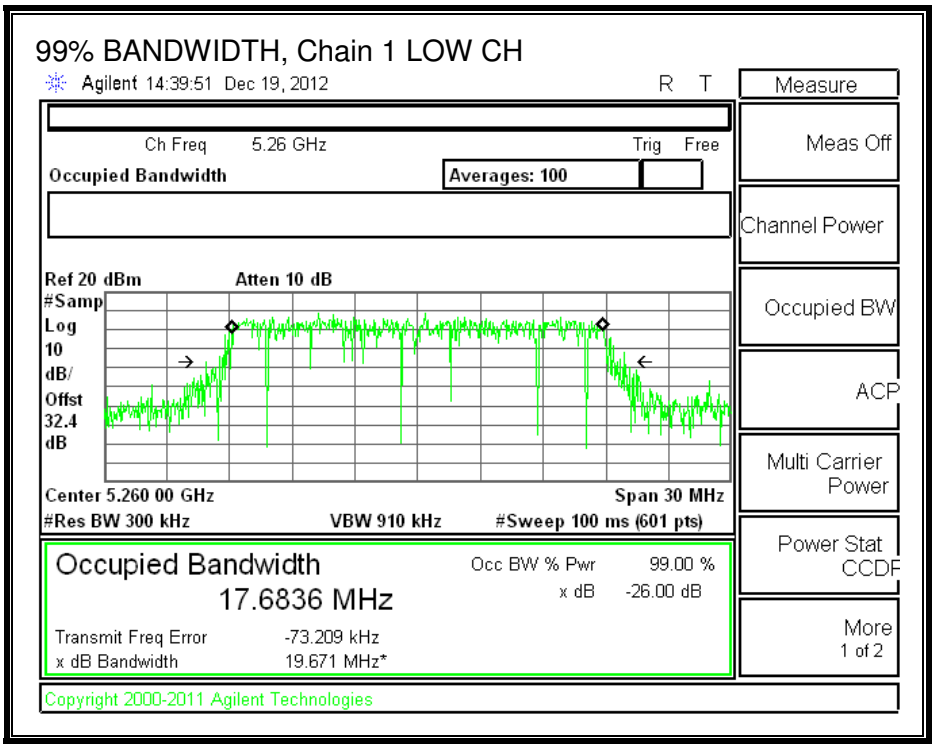



**99% BANDWIDTH, Chain 1**





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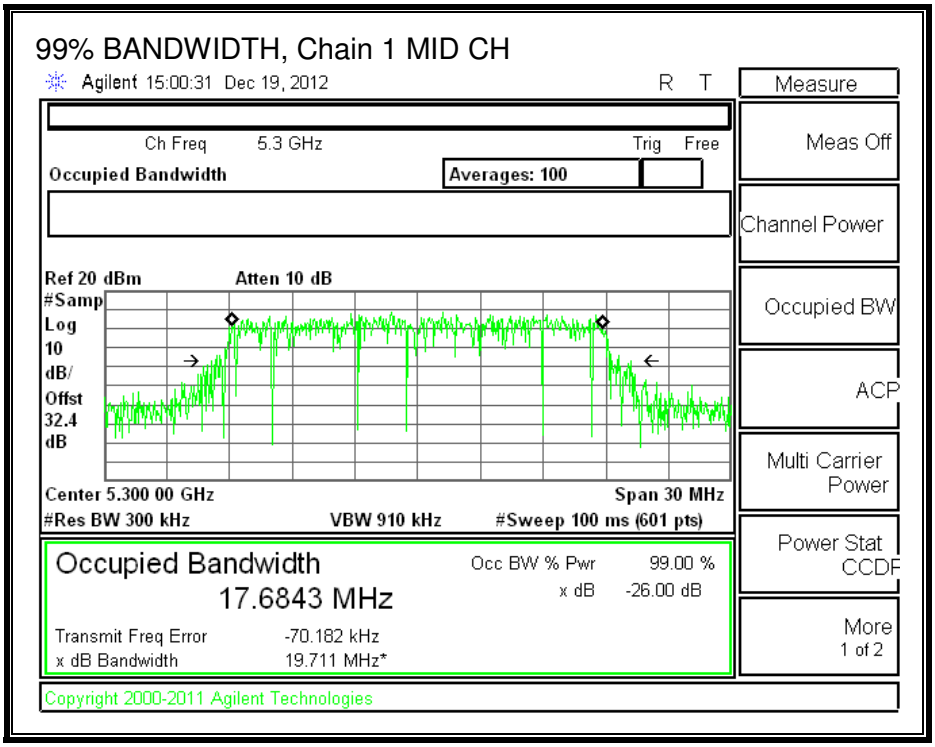


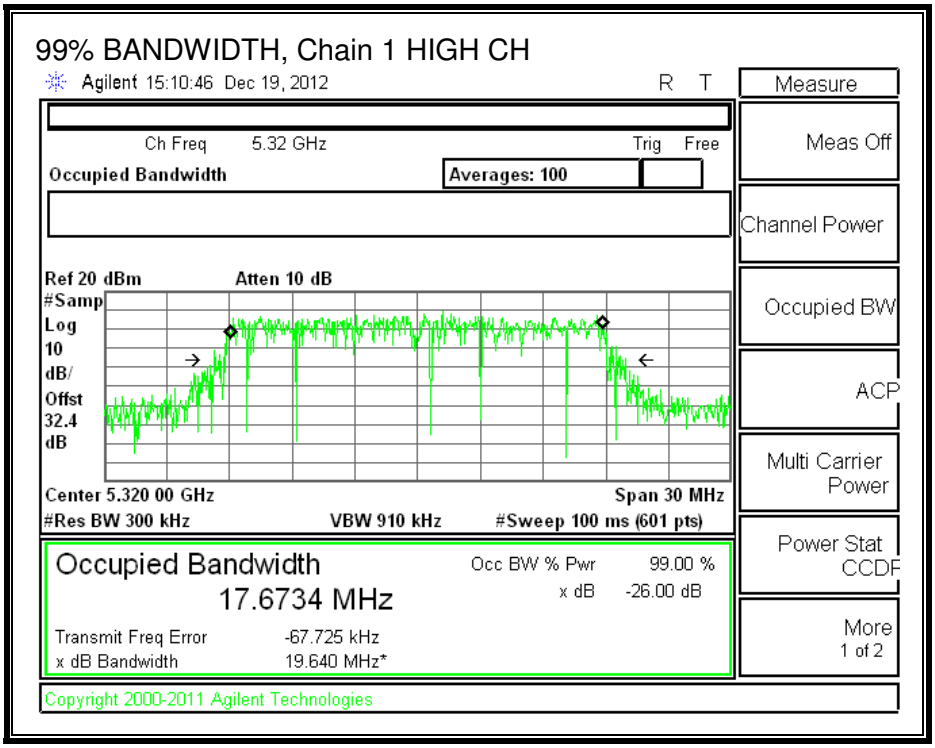



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### 8.25.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|
| 3.40 | 2.30 | 2.88 |


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**RESULTS**

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---|---|---|---|---|
| Low | 5260 | 20.6 | 17.7 | 2.88 |
| Mid | 5300 | 20.5 | 17.7 | 2.88 |
| High | 5320 | 20.7 | 17.7 | 2.88 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PSD Limit (dBm) | IC PSD Limit (dBm) | Limit (dBm) |
|---|---|---|---|---|---|---|---|---|
| Low | 5260 | 24.00 | 23.48 | 29.48 | 23.48 | 11.00 | 11.00 | 11.00 |
| Mid | 5300 | 24.00 | 23.48 | 29.48 | 23.48 | 11.00 | 11.00 | 11.00 |
| High | 5320 | 24.00 | 23.47 | 29.47 | 23.47 | 11.00 | 11.00 | 11.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5260 | 18.10 | 18.00 | 21.06 | 23.48 | -2.42 |
| Mid | 5300 | 15.20 | 15.00 | 18.11 | 23.48 | -5.37 |
| High | 5320 | 14.70 | 14.40 | 17.56 | 23.47 | -5.91 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5260 | 7.12 | 7.50 | 10.32 | 11.00 | -0.68 |
| Mid | 5300 | 7.09 | 7.64 | 10.38 | 11.00 | -0.62 |
| High | 5320 | 7.21 | 7.83 | 10.54 | 11.00 | -0.46 |


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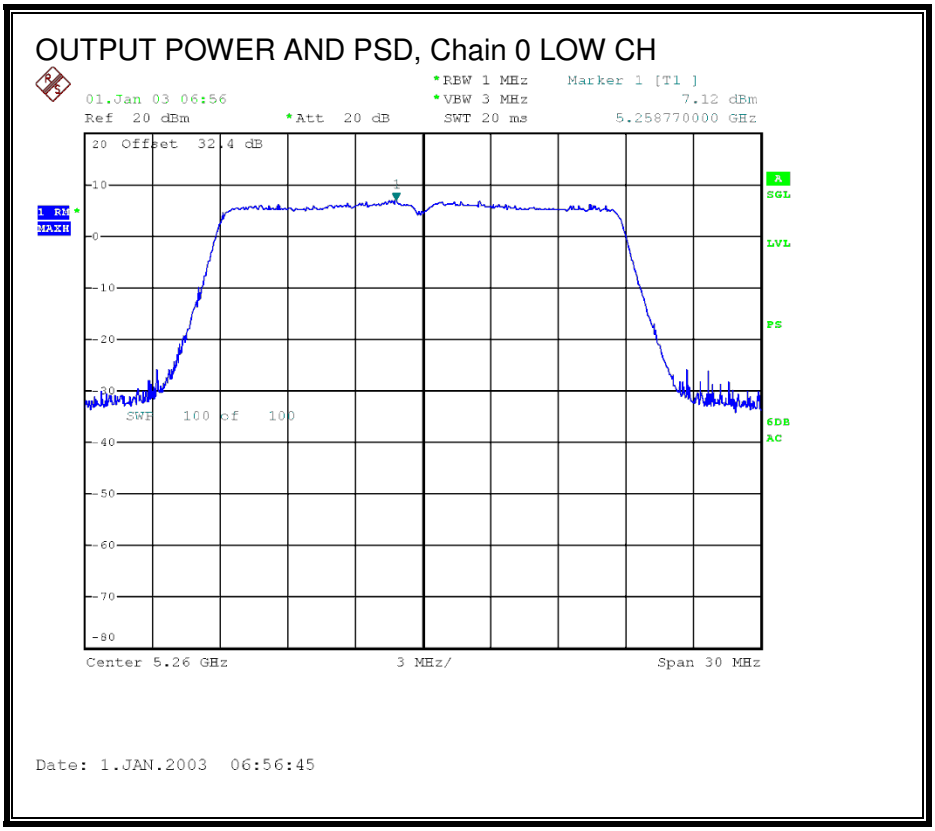
**OUTPUT POWER AND PSD, Chain 0**





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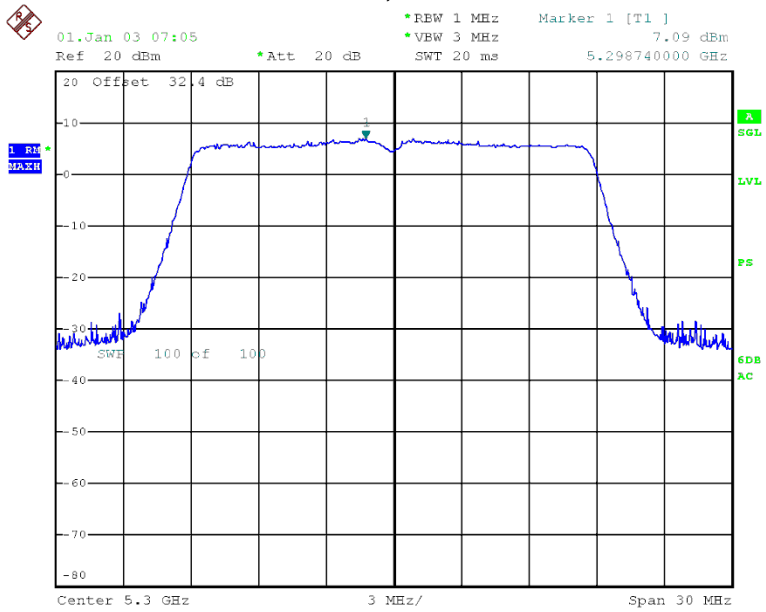
OUTPUT POWER AND PSD, Chain 0 MID CH




Date: 1.JAN.2003 07:05:18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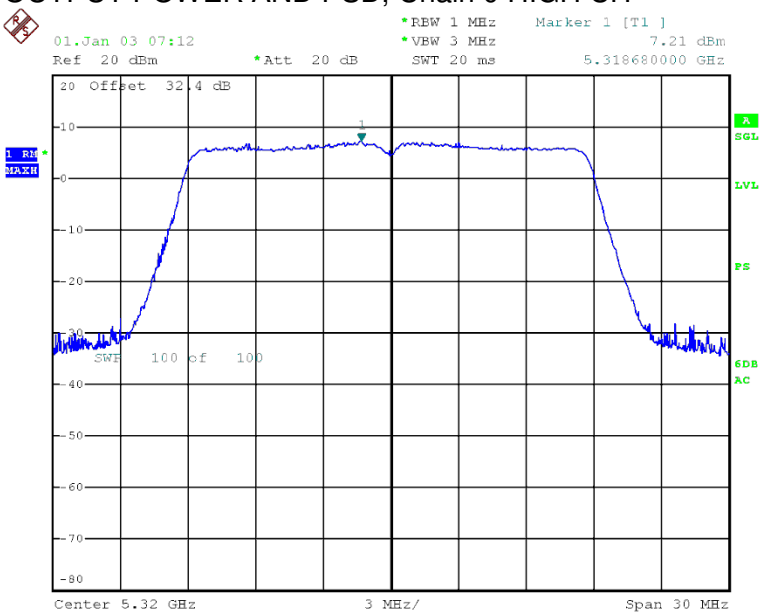
OUTPUT POWER AND PSD, Chain 0 HIGH CH




Date: 1.JAN.2003 07:12:16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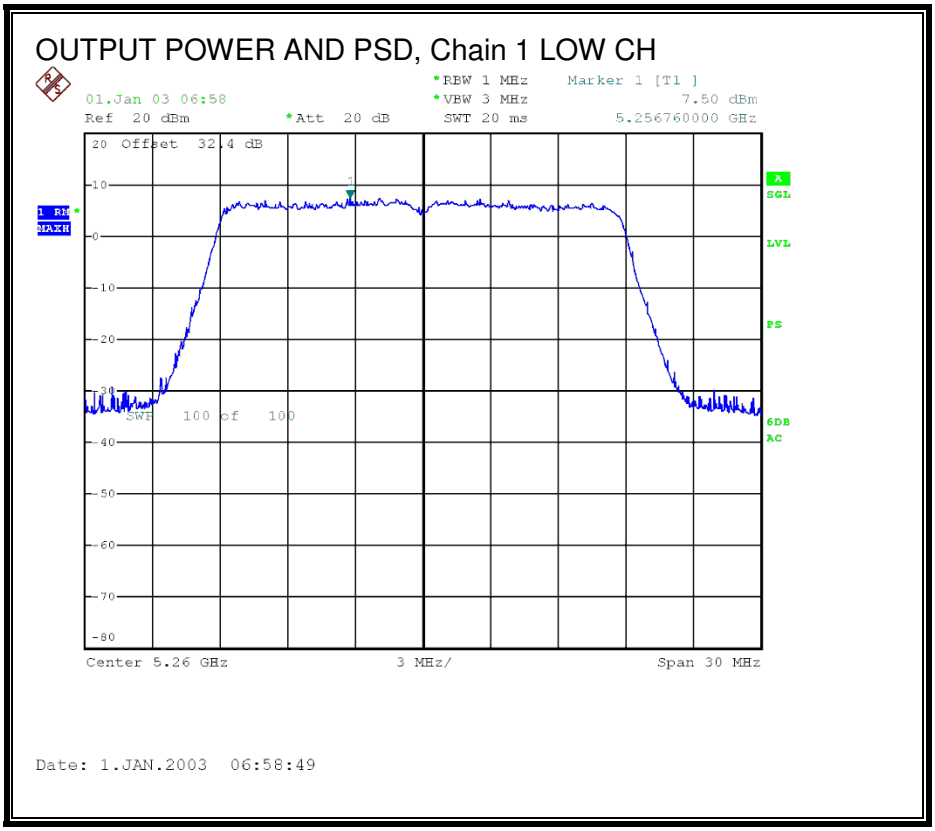
**OUTPUT POWER AND PSD, Chain 1**





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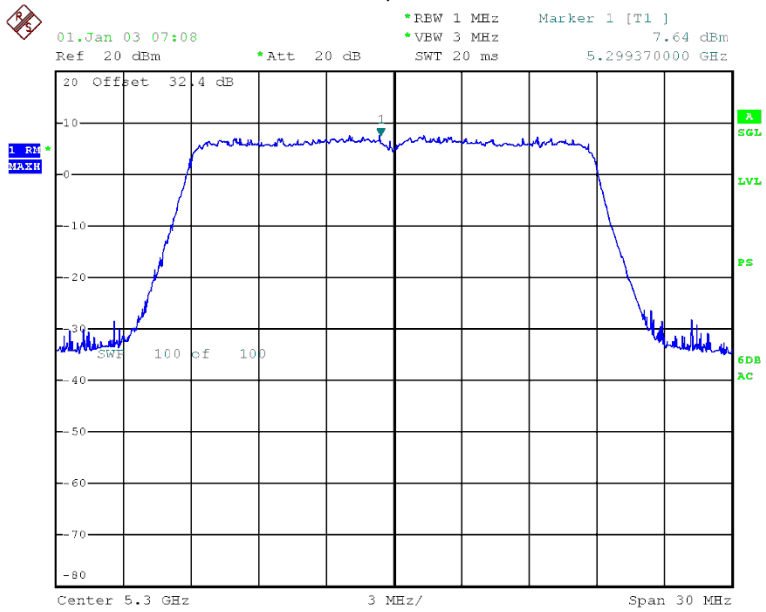
OUTPUT POWER AND PSD, Chain 1 MID CH




Date: 1.JAN.2003 07:08:47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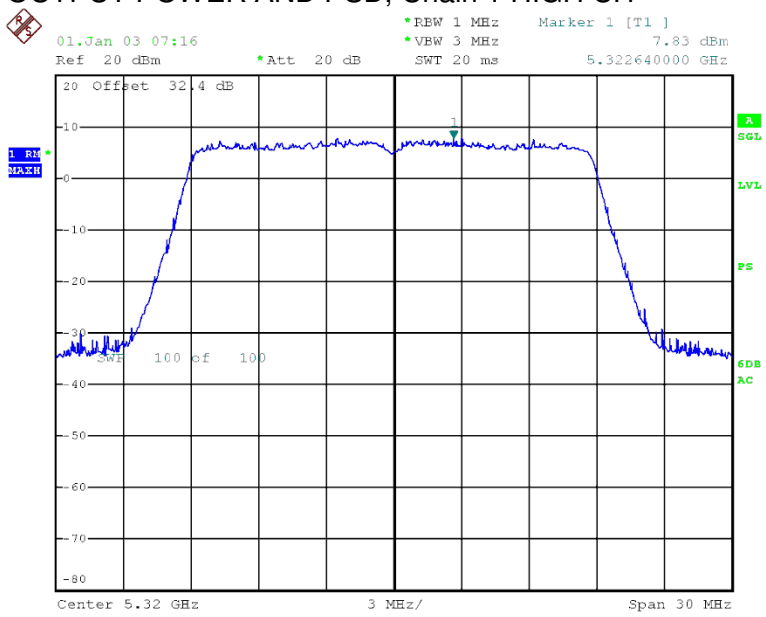
OUTPUT POWER AND PSD, Chain 1 HIGH CH




Date: 1.JAN.2003 07:16:45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### 8.25.4. TPC POWER

**LIMITS**

FCC §15.407 (h) (1)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

**RESULTS**

The maximum EIRP is less than 500 mW; therefore, TPC is not required.


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## 8.26. 802.11n HT20 CDD 3TX MODE IN THE 5.3 GHz BAND

### 8.26.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) | 26 dB BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5260 | 20.67 | 20.67 | 20.58 |
| Mid | 5300 | 20.75 | 20.58 | 20.58 |
| High | 5320 | 20.75 | 20.75 | 20.50 |


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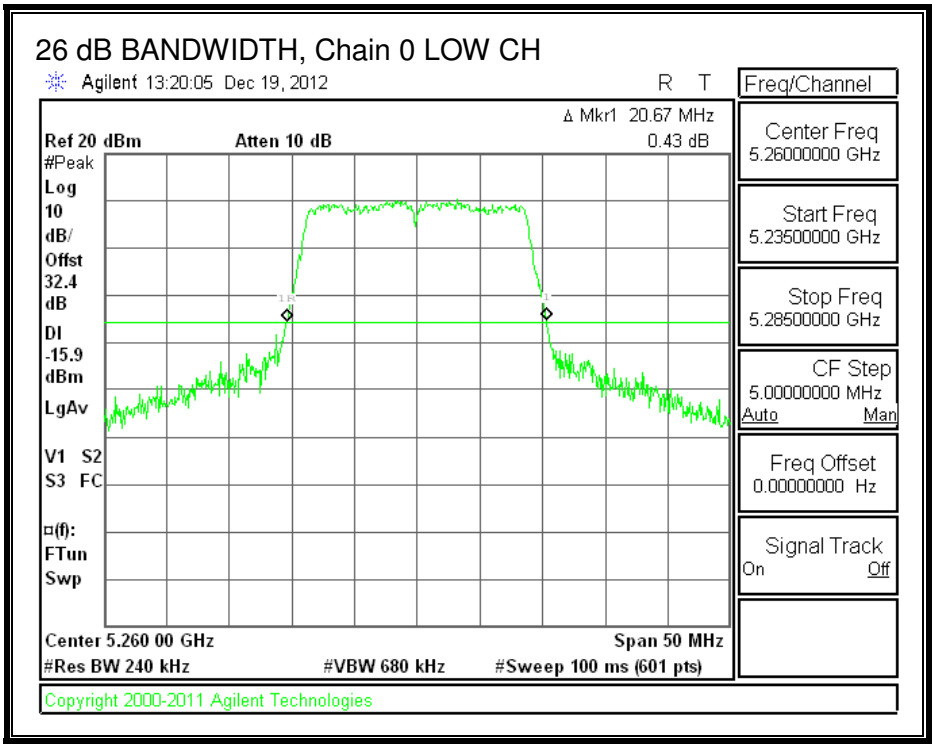
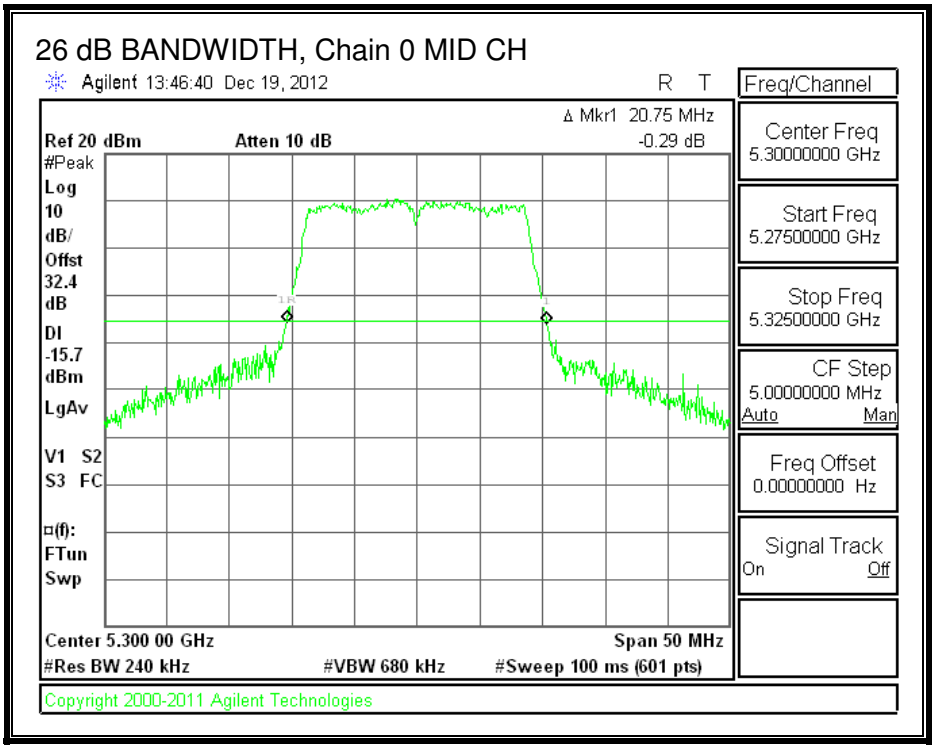
**26 dB BANDWIDTH, Chain 0**





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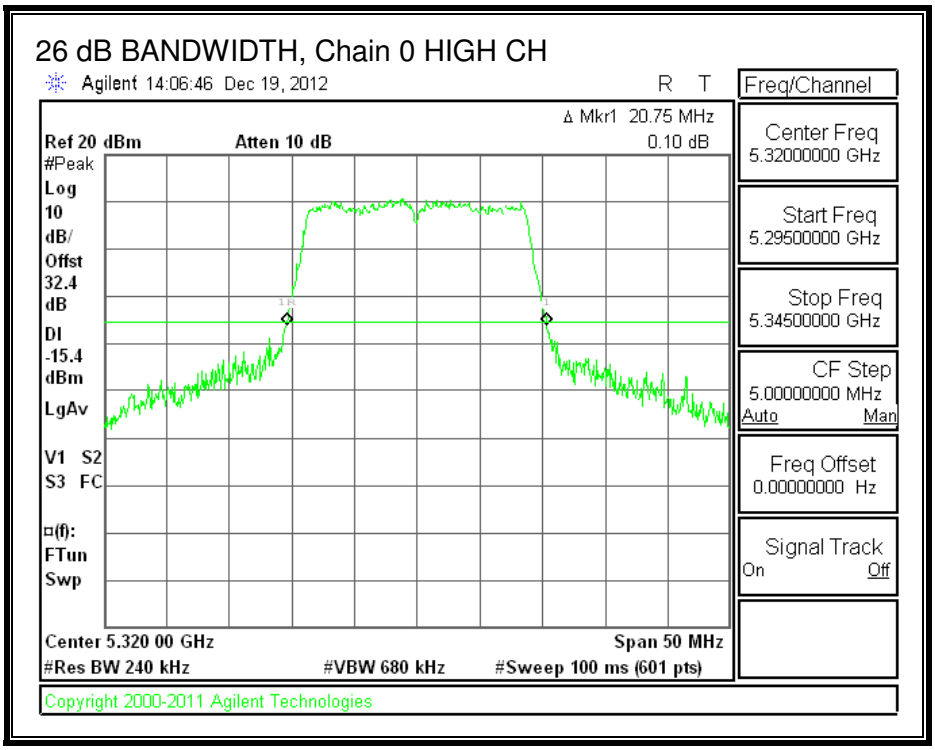
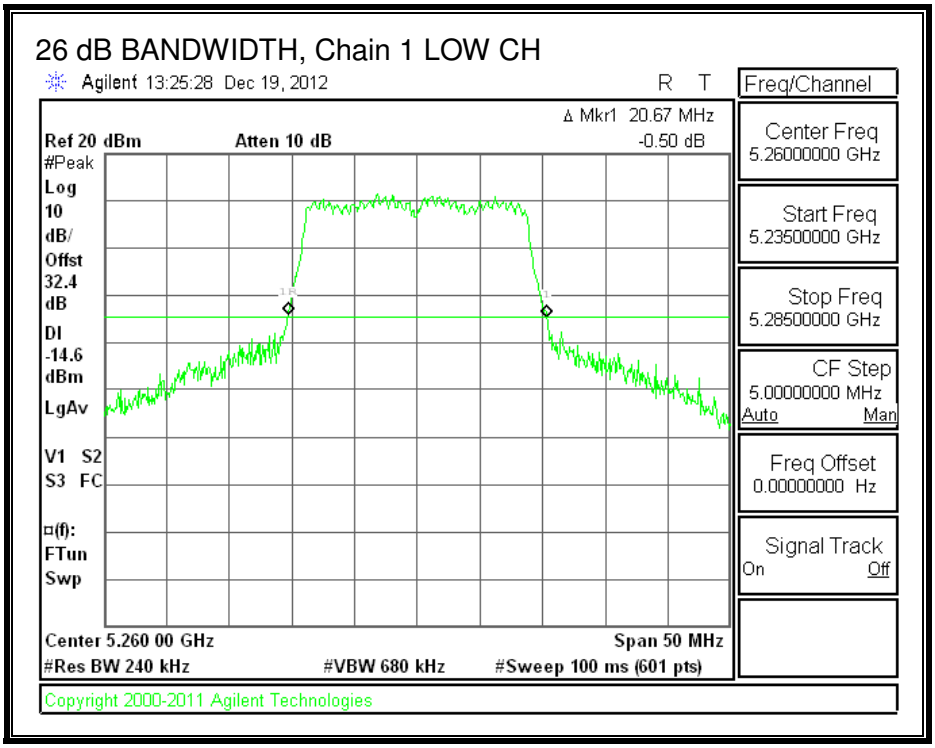



**26 dB BANDWIDTH, Chain 1**





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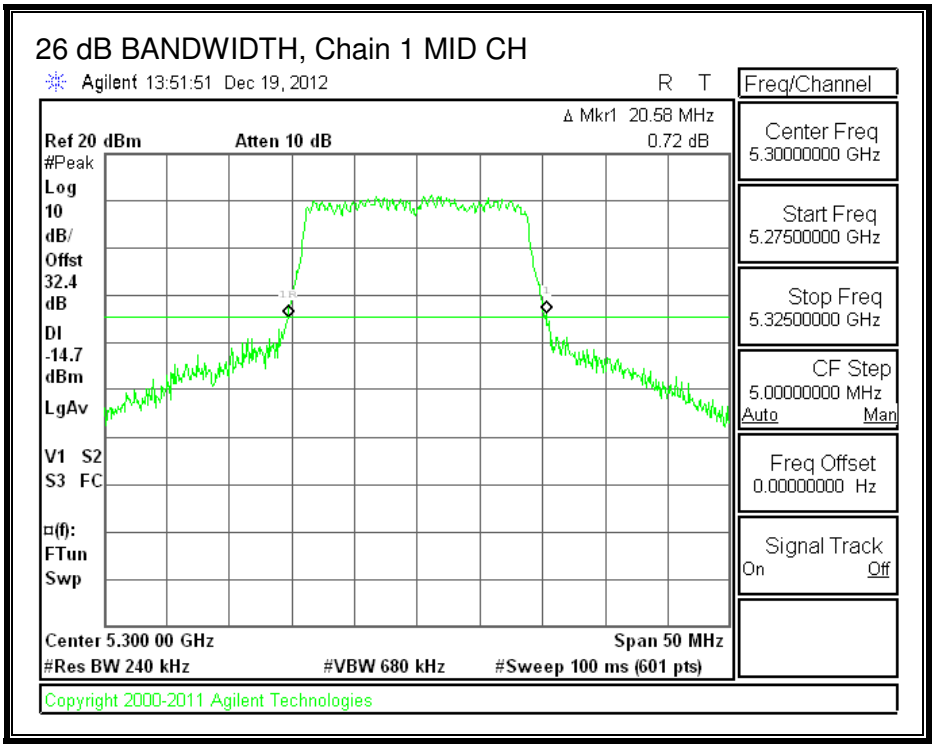


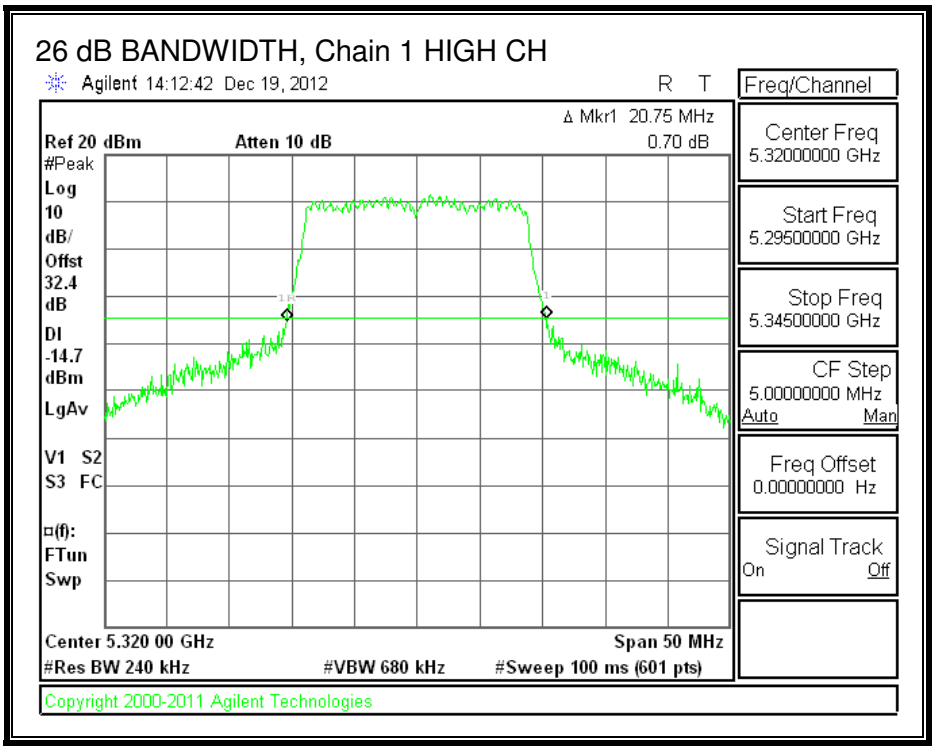



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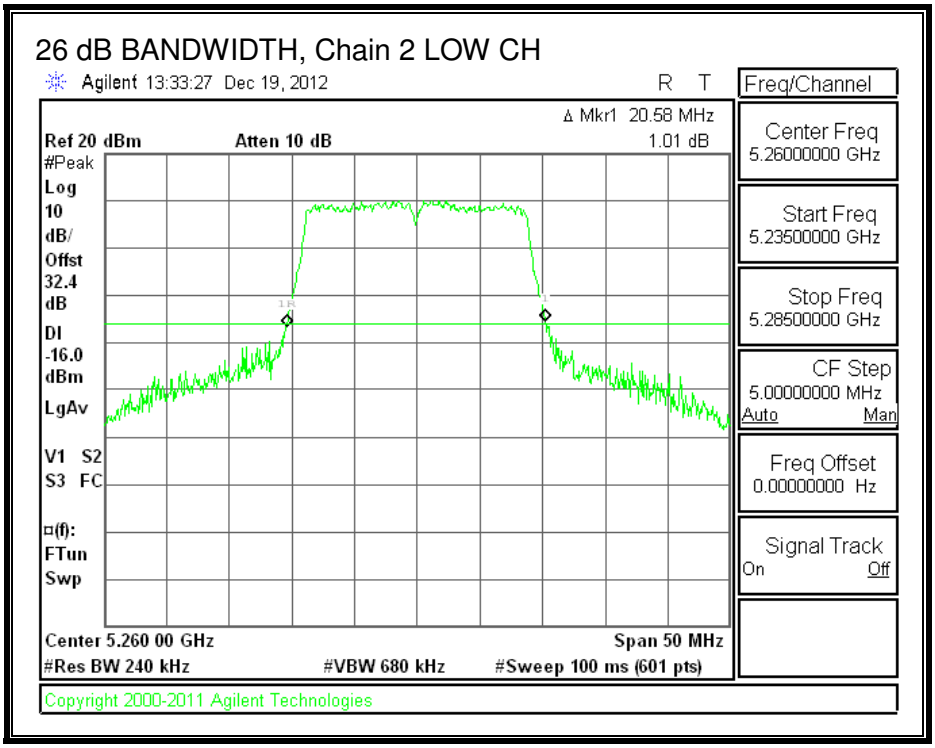
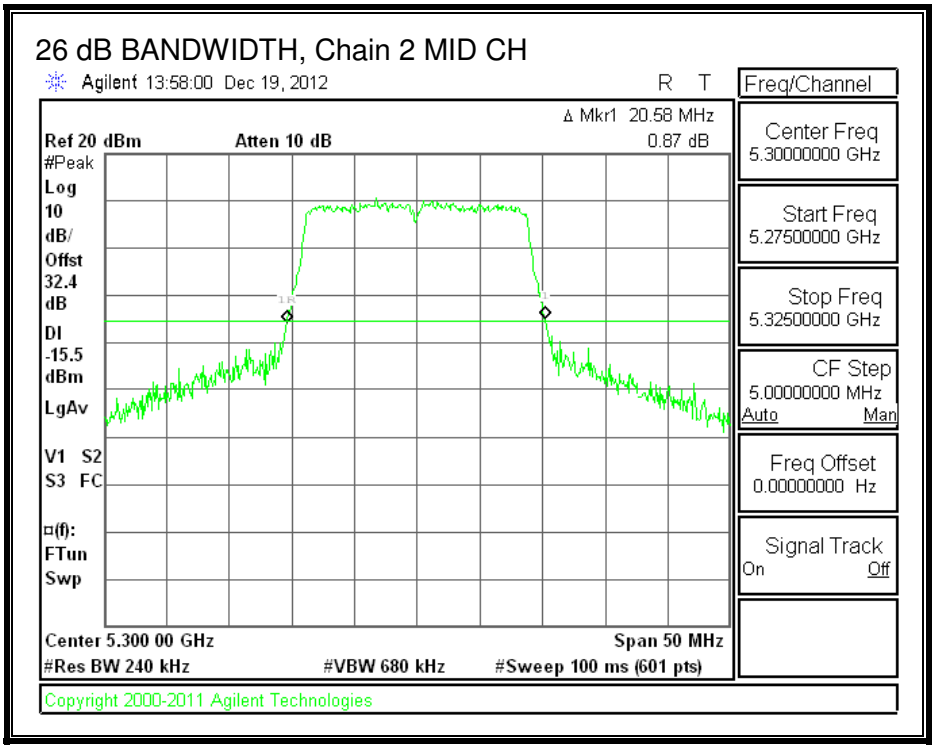
**26 dB BANDWIDTH, Chain 2**





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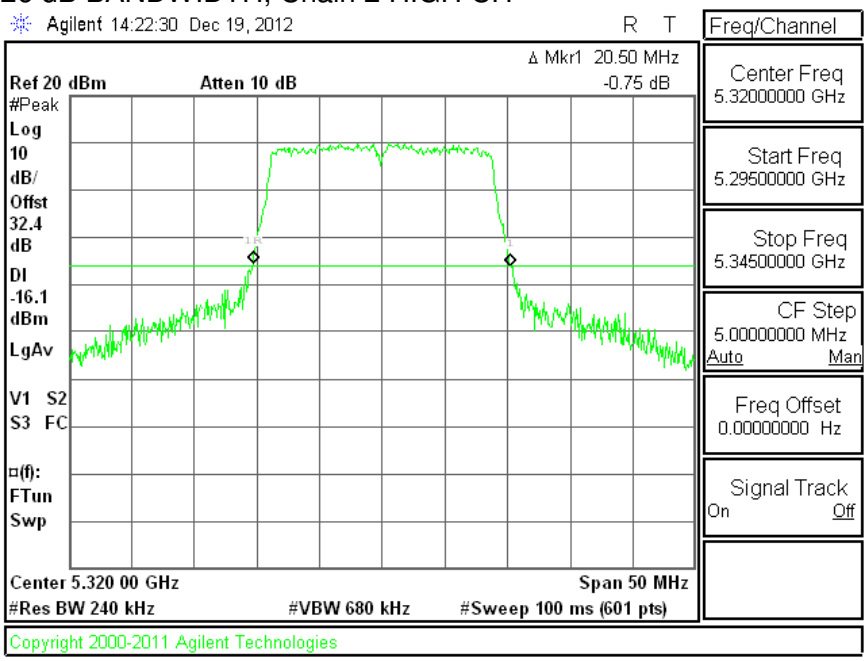
26 dB BANDWIDTH, Chain 2 HIGH CH





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### 8.26.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) | 99% BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5260 | 17.7057 | 17.6853 | 17.6937 |
| Mid | 5300 | 17.7039 | 17.6751 | 17.6908 |
| High | 5320 | 17.7117 | 17.6826 | 17.6386 |


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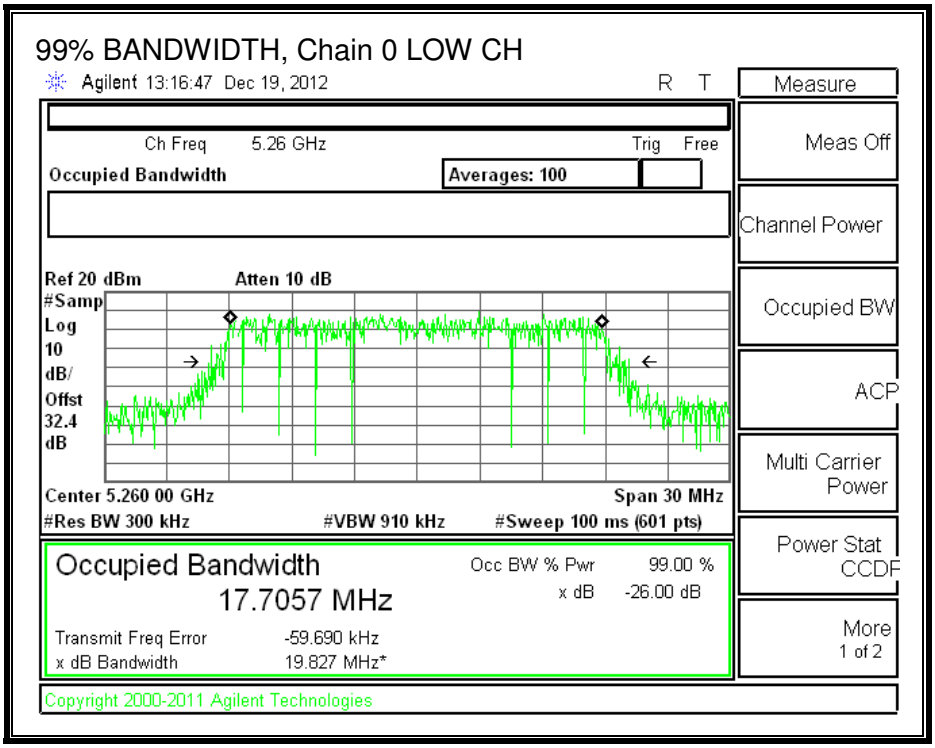
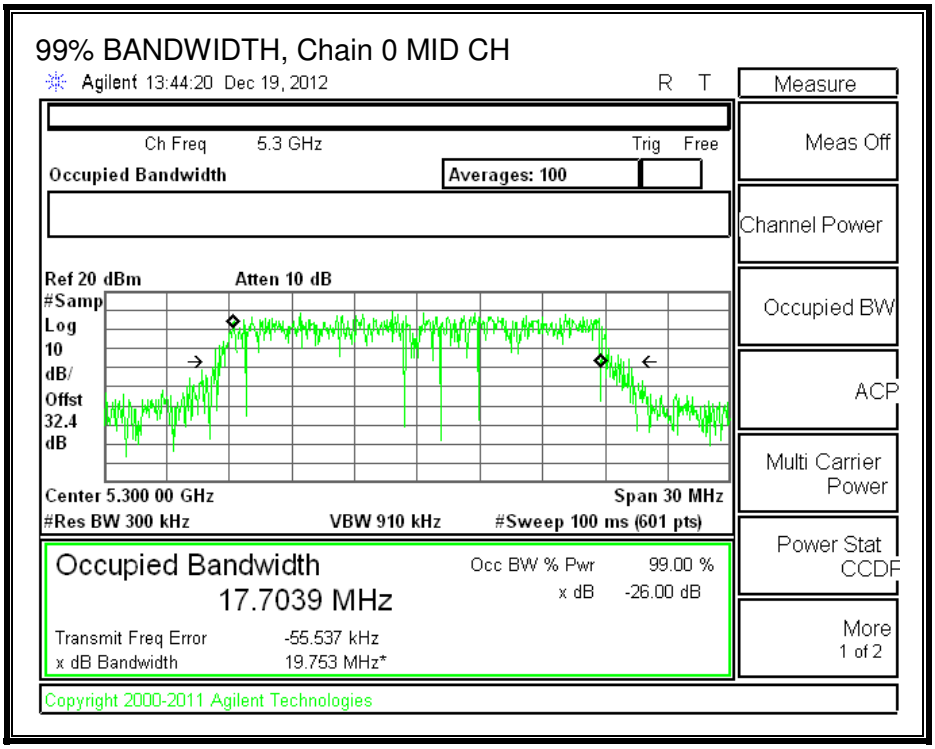
**99% BANDWIDTH, Chain 0**





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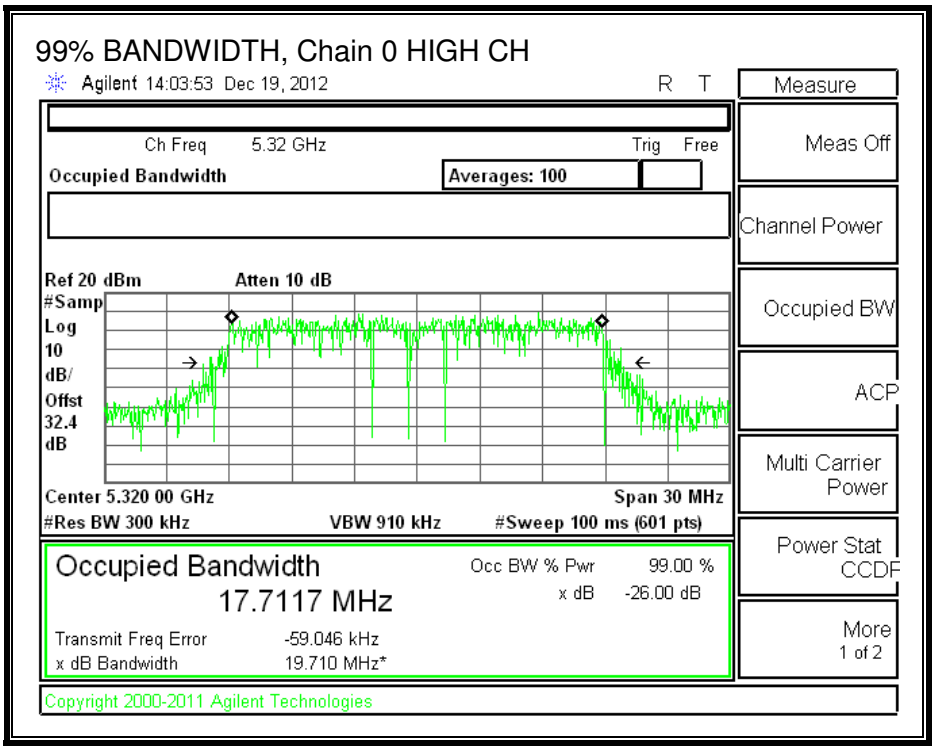
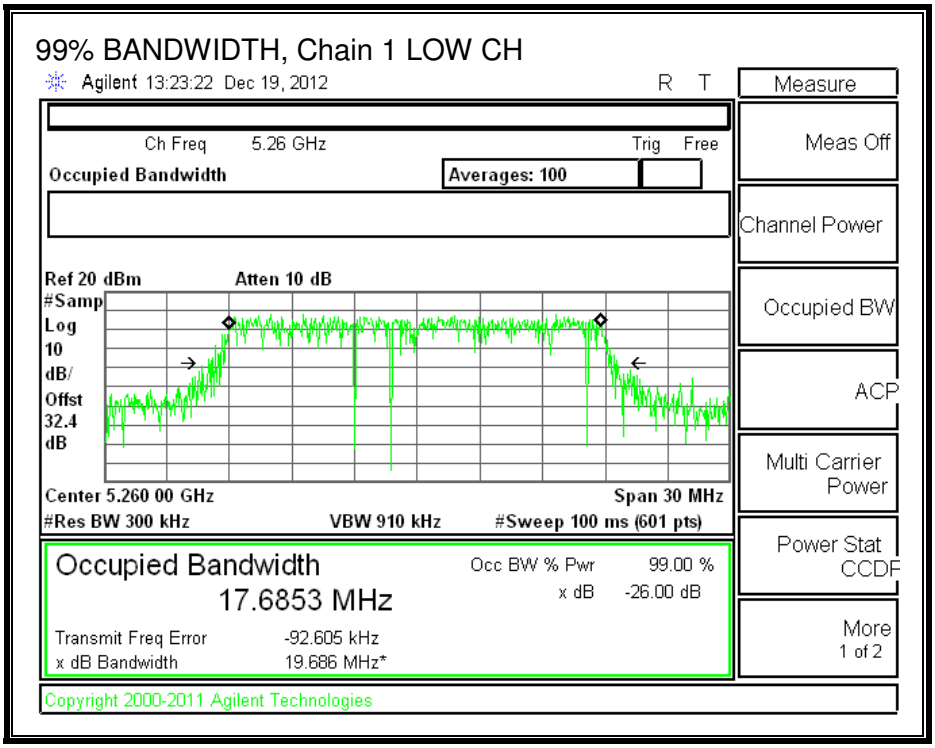



**99% BANDWIDTH, Chain 1**





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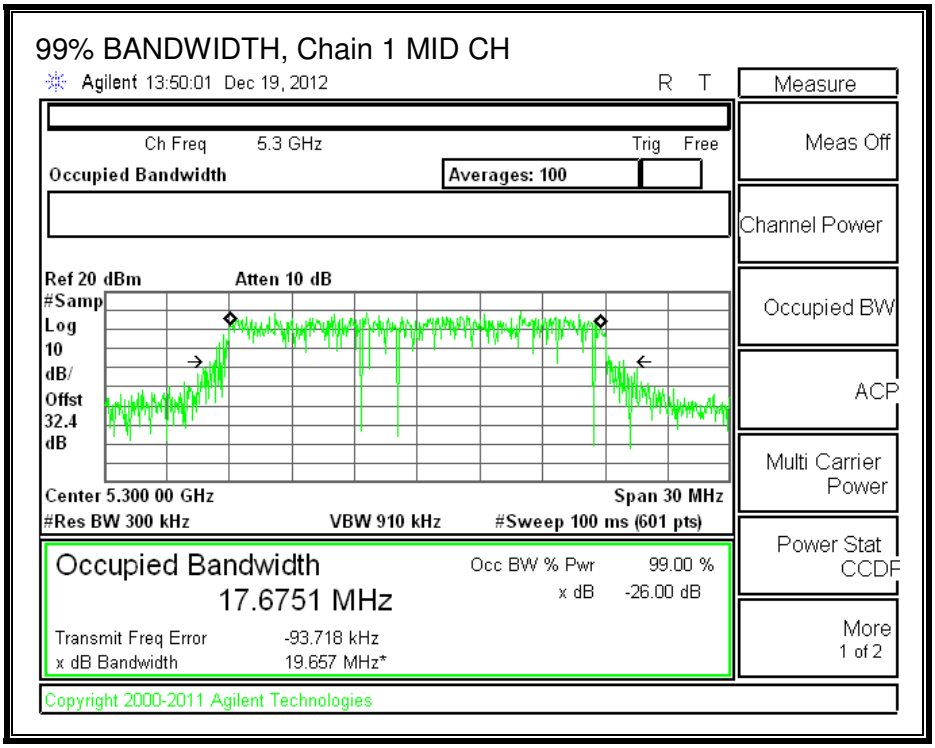


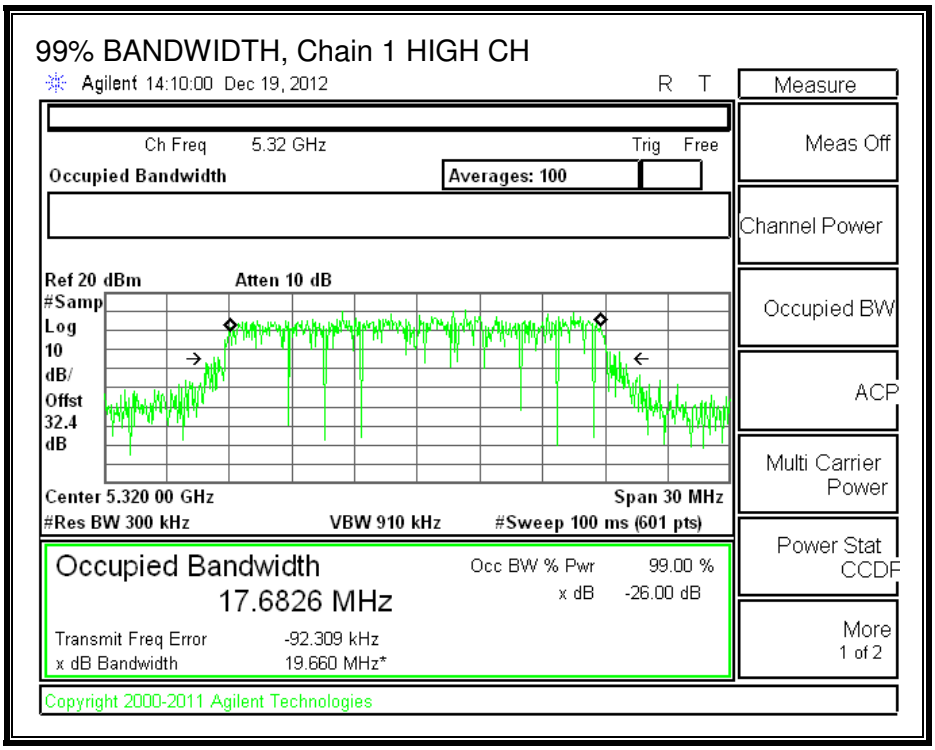



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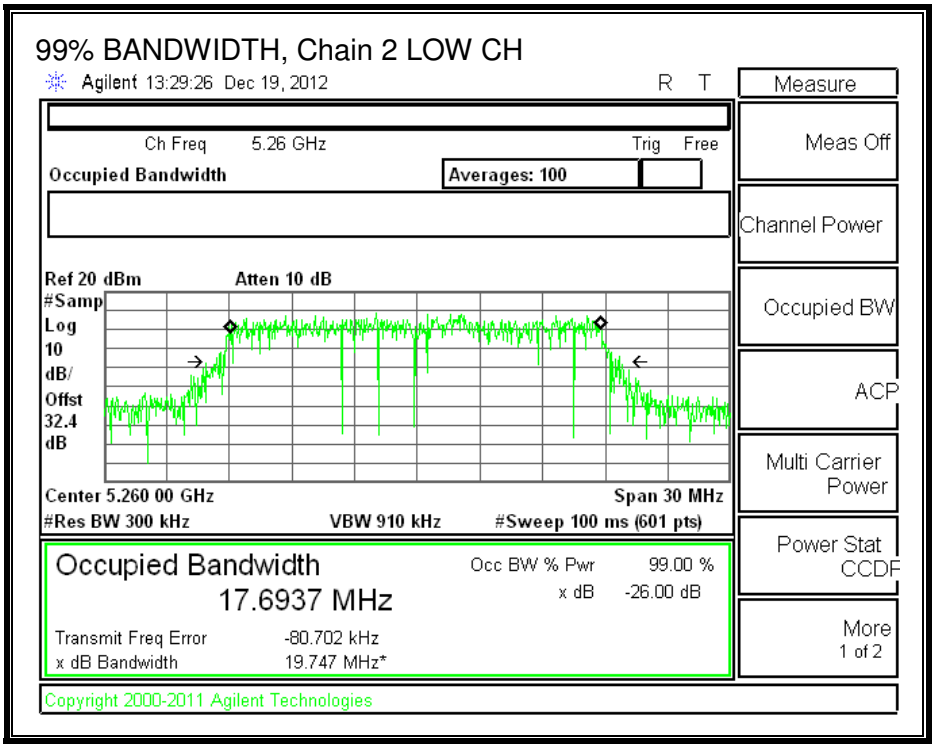
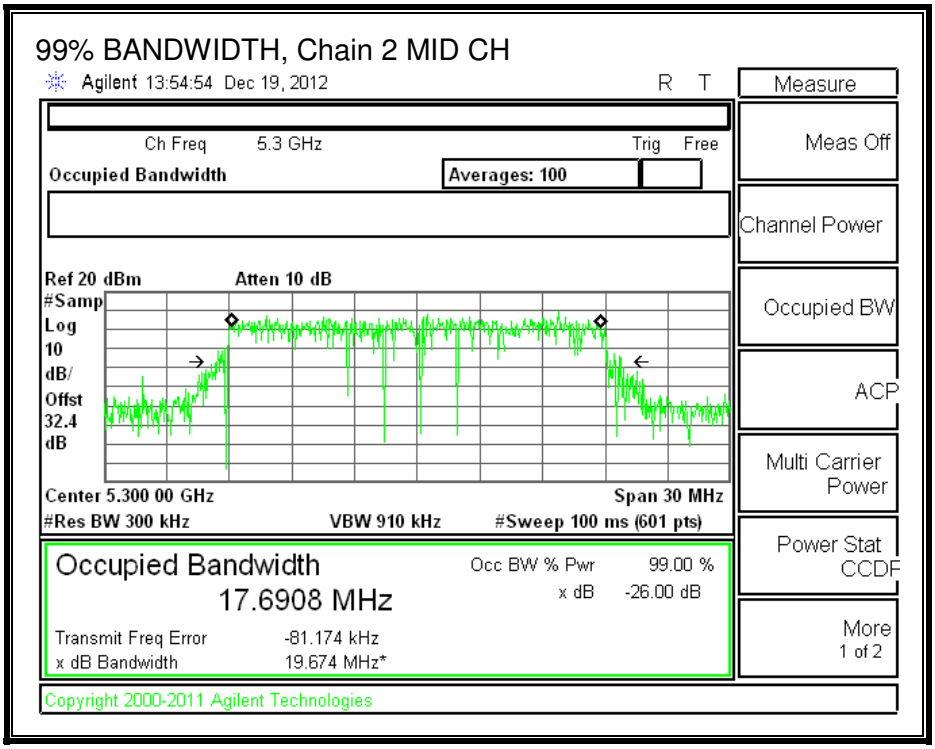
**99% BANDWIDTH, Chain 2**





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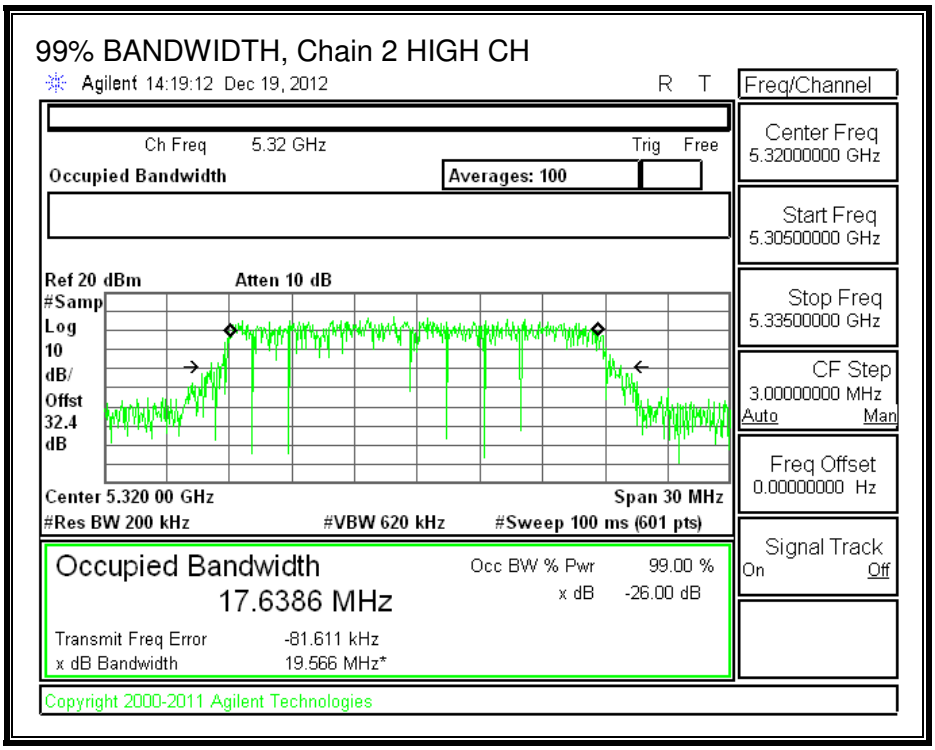



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### 8.26.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated for output power and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.40 | 1.60 | 2.30 | 2.50 |

The TX chains are correlated for PSD and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.40 | 1.60 | 2.30 | 7.24 |


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**RESULTS**

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Correlated Directional Gain (dBi) | Uncorrelated Directional Gain (dBi) |
|---|---|---|---|---|---|
| Low | 5260 | 20.58 | 17.6853 | 7.24 | 2.50 |
| Mid | 5300 | 20.58 | 17.6751 | 7.24 | 2.50 |
| High | 5320 | 20.50 | 17.6386 | 7.24 | 2.50 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PSD Limit (dBm) | IC PSD Limit (dBm) | PSD Limit (dBm) |
|---|---|---|---|---|---|---|---|---|
| Low | 5260 | 24.00 | 23.48 | 29.48 | 23.48 | 9.76 | 11.00 | 9.76 |
| Mid | 5300 | 24.00 | 23.47 | 29.47 | 23.47 | 9.76 | 11.00 | 9.76 |
| High | 5320 | 24.00 | 23.46 | 29.46 | 23.46 | 9.76 | 11.00 | 9.76 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5260 | 13.50 | 13.59 | 13.70 | 18.37 | 23.48 | -5.11 |
| Mid | 5300 | 13.60 | 13.80 | 13.50 | 18.41 | 23.47 | -5.07 |
| High | 5320 | 13.55 | 13.70 | 13.60 | 18.39 | 23.46 | -5.08 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Chain 2 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5260 | 4.842 | 4.507 | 4.754 | 9.47 | 9.76 | -0.29 |
| Mid | 5300 | 4.697 | 4.860 | 4.968 | 9.61 | 9.76 | -0.15 |
| High | 5320 | 4.577 | 4.526 | 4.598 | 9.34 | 9.76 | -0.42 |


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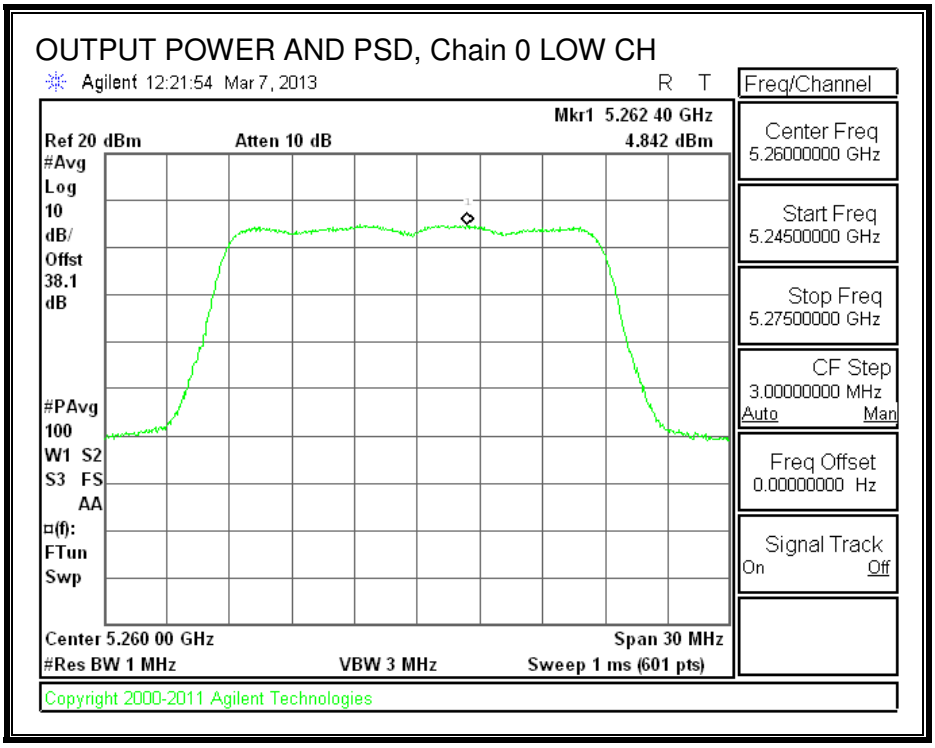
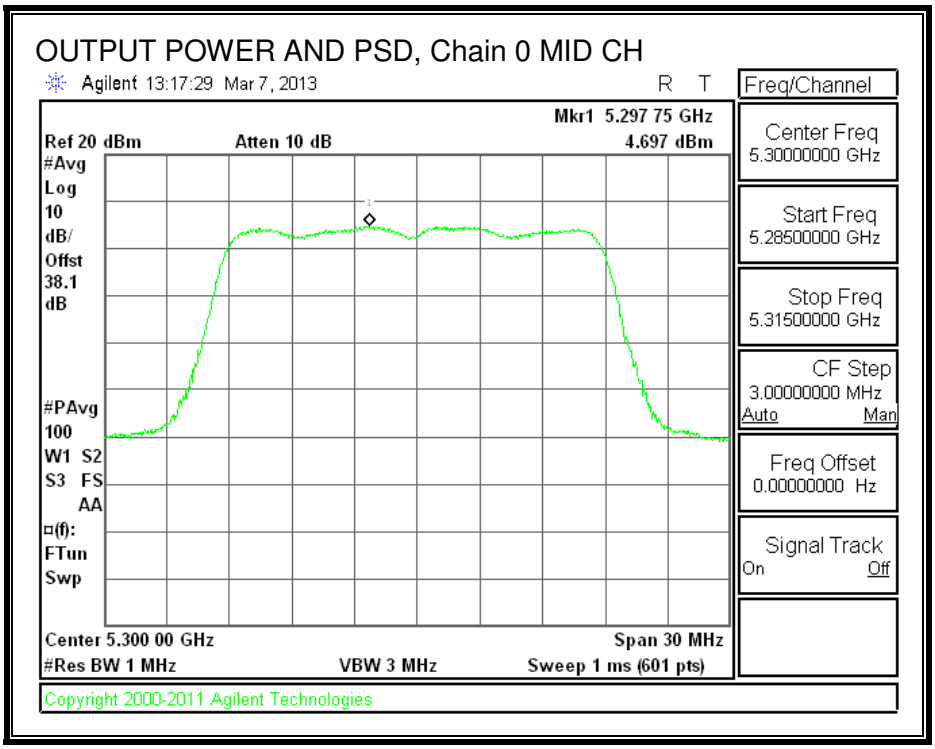
**OUTPUT POWER AND PSD, Chain 0**





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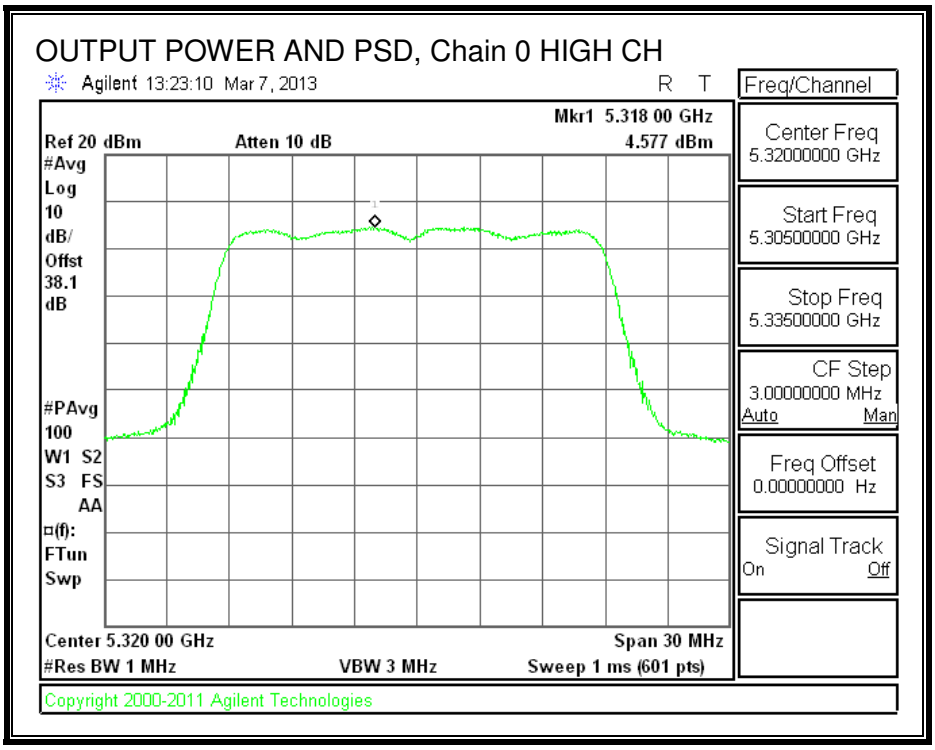
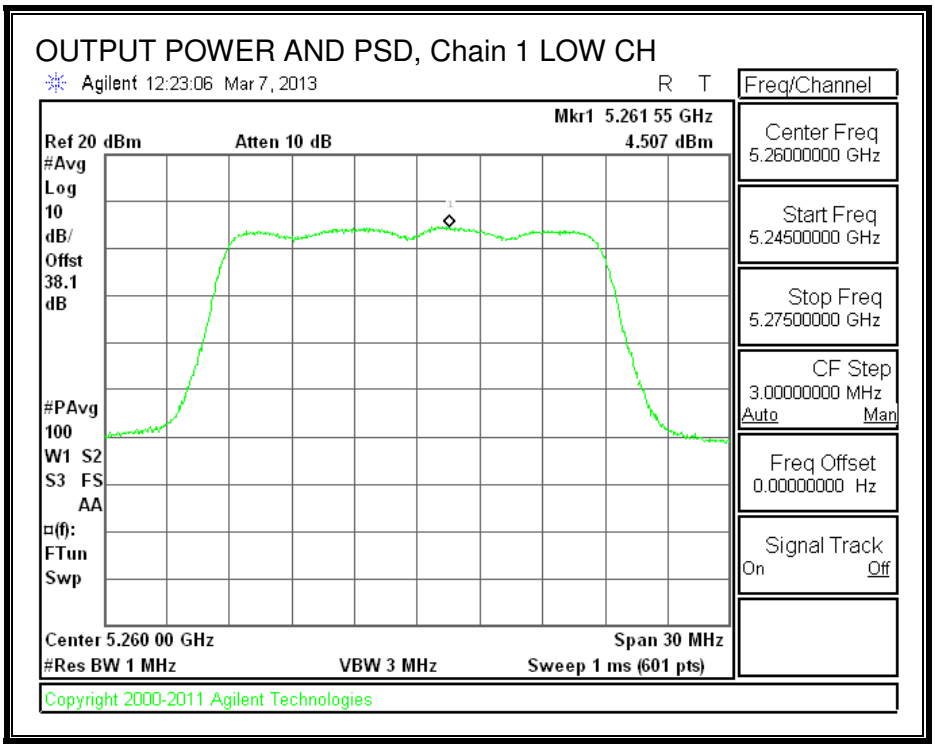



**OUTPUT POWER AND PSD, Chain 1**





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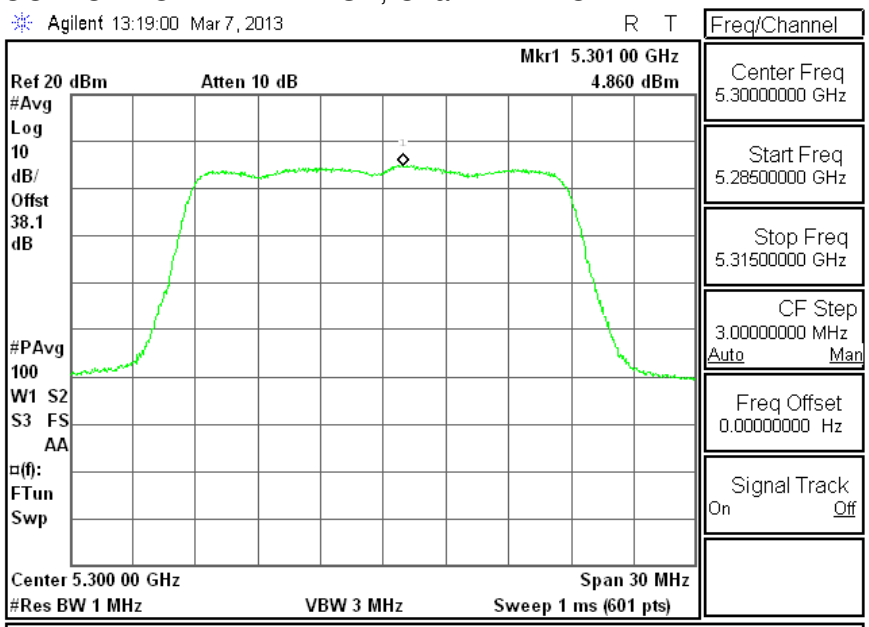
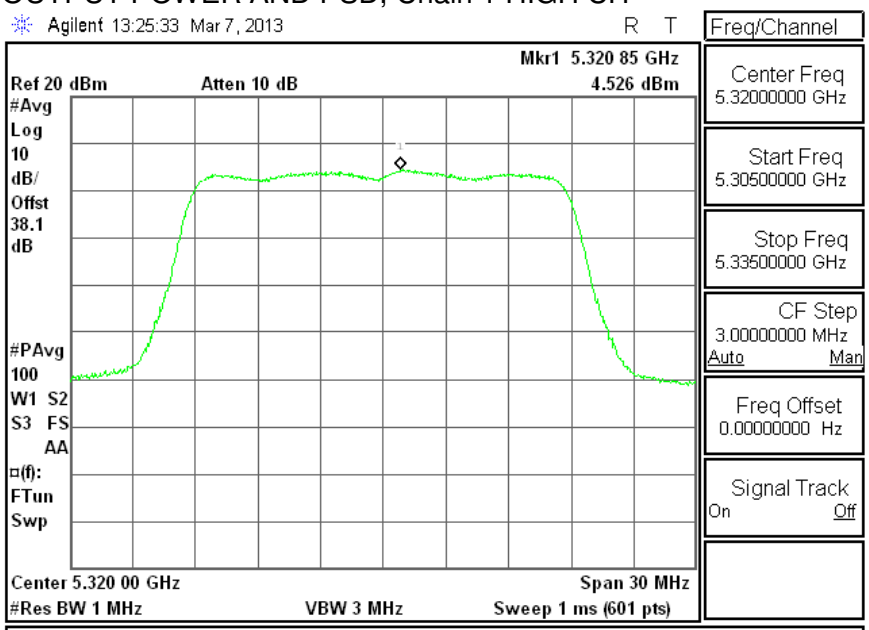
OUTPUT POWER AND PSD, Chain 1 MID CH




OUTPUT POWER AND PSD, Chain 1 HIGH CH





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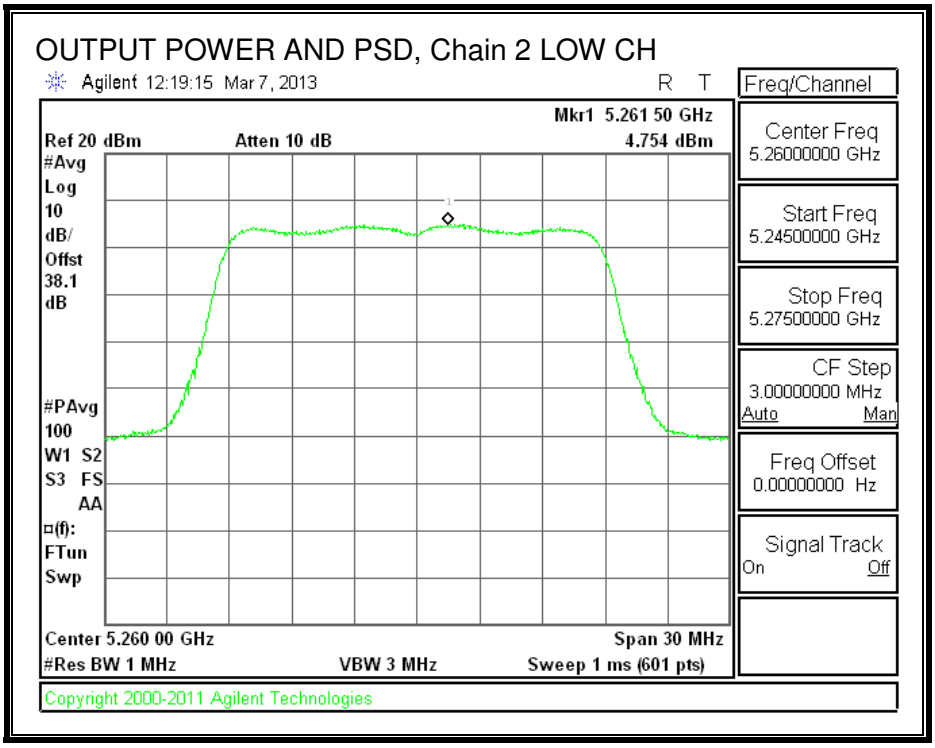
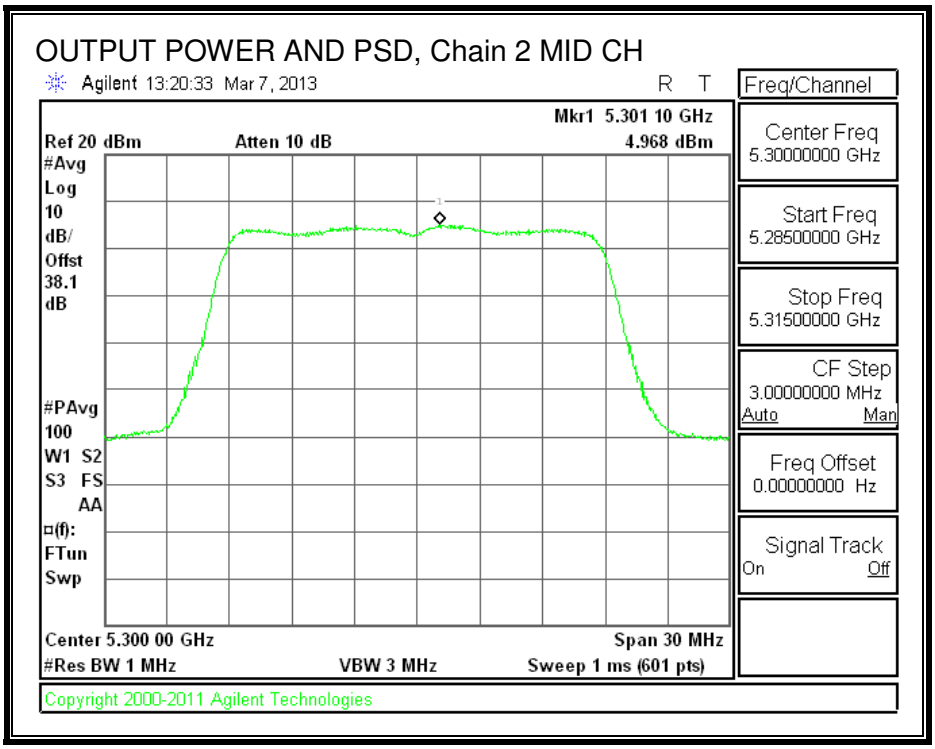
**OUTPUT POWER AND PSD, Chain 2**





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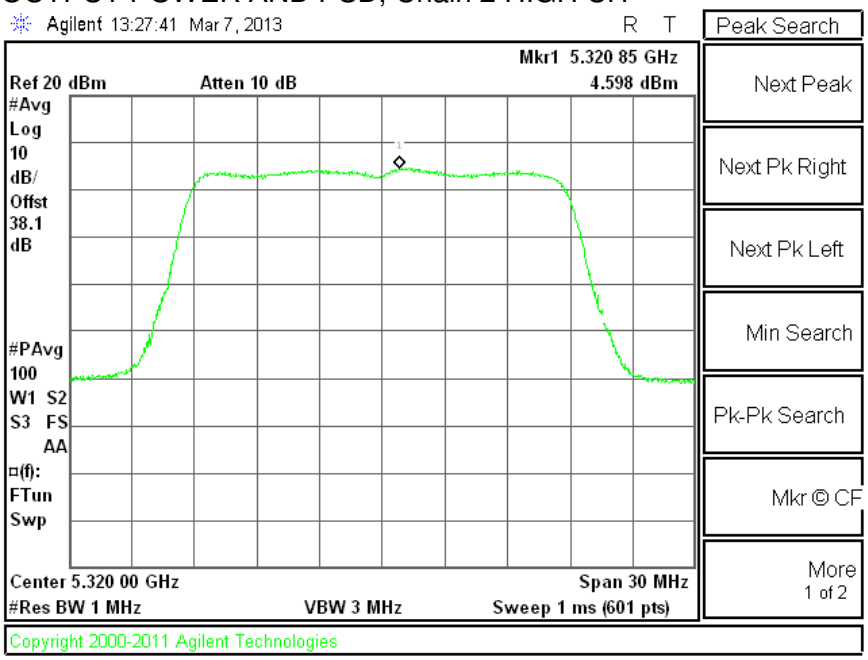
OUTPUT POWER AND PSD, Chain 2 HIGH CH





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### 8.26.4. TPC POWER

**LIMITS**

FCC §15.407 (h) (1)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

**RESULTS**

The maximum EIRP is less than 500 mW; therefore, TPC is not required.


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## 8.27. 802.11n HT20 BF 3TX MODE IN THE 5.3 GHz BAND

Covered by testing HT20 CDD 3TX mode, the power per chain used for HT20 CDD 3TX mode is the same power per chain that will be used for HT20 BF 3TX mode. However, since BF is correlated and CDD is uncorrelated for output power, the section below for output power using correlated AG for this BF mode shows it is still compliant.

### 8.27.1. OUTPUT AVERAGE POWER

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

The TX chains are correlated for output power and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.40 | 1.60 | 2.30 | 7.24 |


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**RESULTS**

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Correlated Directional Gain (dBi) |
|---|---|---|---|---|
| Low | 5260 | 20.58 | 17.6853 | 7.24 |
| Mid | 5300 | 20.58 | 17.6751 | 7.24 |
| High | 5320 | 20.50 | 17.6386 | 7.24 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) |
|---|---|---|---|---|---|
| Low | 5260 | 22.76 | 23.48 | 29.48 | 22.76 |
| Mid | 5300 | 22.76 | 23.47 | 29.47 | 22.76 |
| High | 5320 | 22.76 | 23.46 | 29.46 | 22.76 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5260 | 13.50 | 13.59 | 13.70 | 18.37 | 22.76 | -4.39 |
| Mid | 5300 | 13.60 | 13.80 | 13.50 | 18.41 | 22.76 | -4.35 |
| High | 5320 | 13.55 | 13.70 | 13.60 | 18.39 | 22.76 | -4.37 |


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## 8.28. 802.11n HT20 STBC 3TX MODE IN THE 5.3 GHz BAND

### 8.28.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) | 26 dB BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5260 | 20.42 | 20.75 | 20.42 |
| Mid | 5300 | 20.33 | 20.67 | 20.42 |
| High | 5320 | 20.50 | 20.58 | 20.42 |


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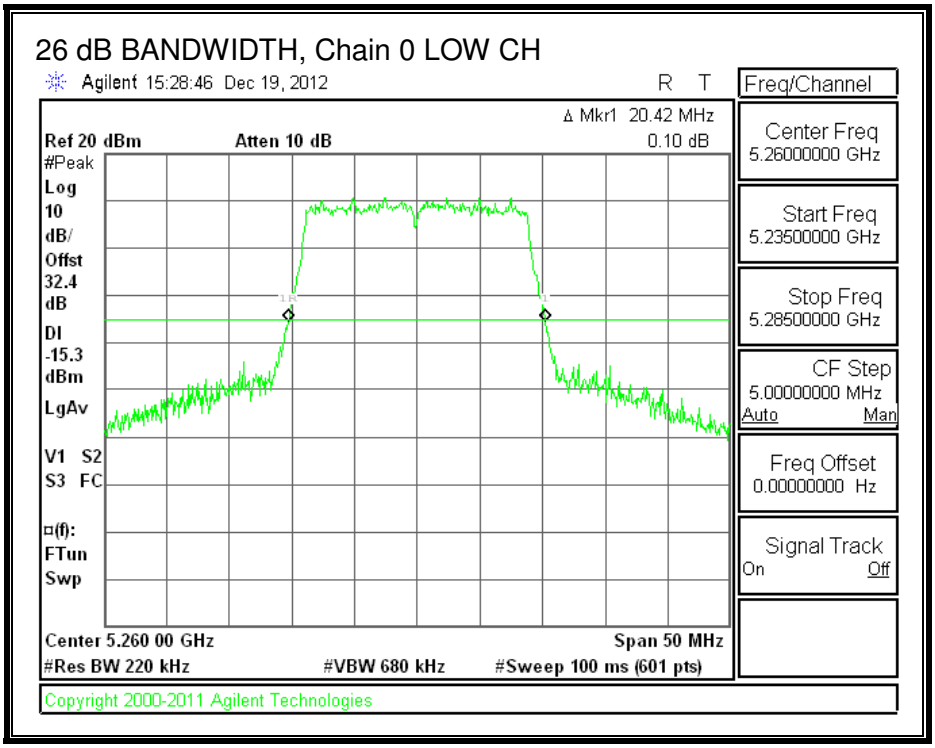
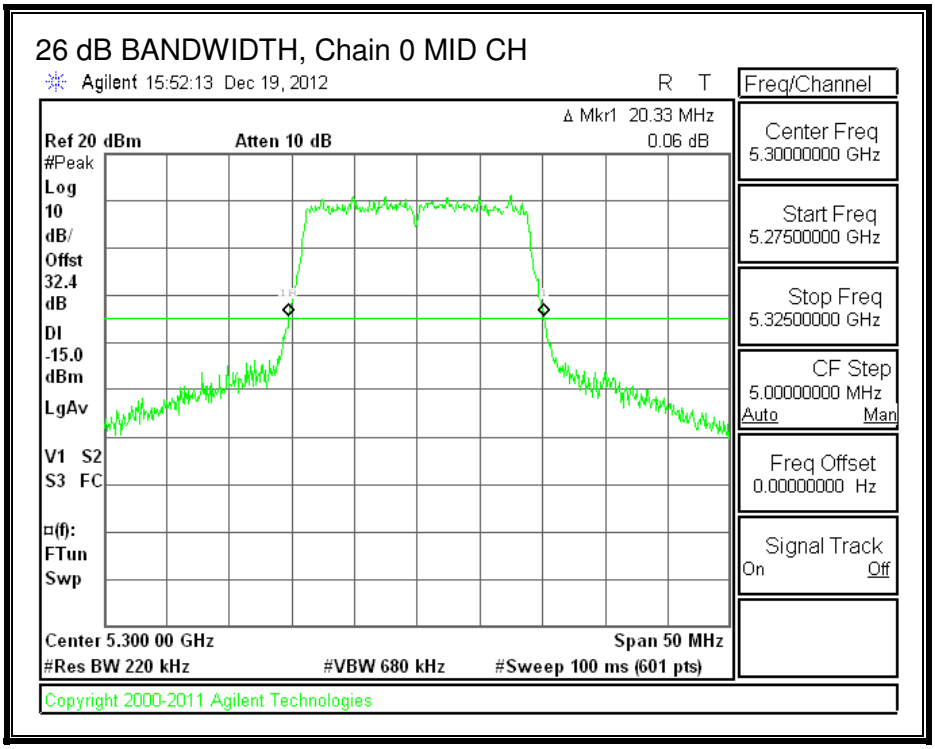
**26 dB BANDWIDTH, Chain 0**





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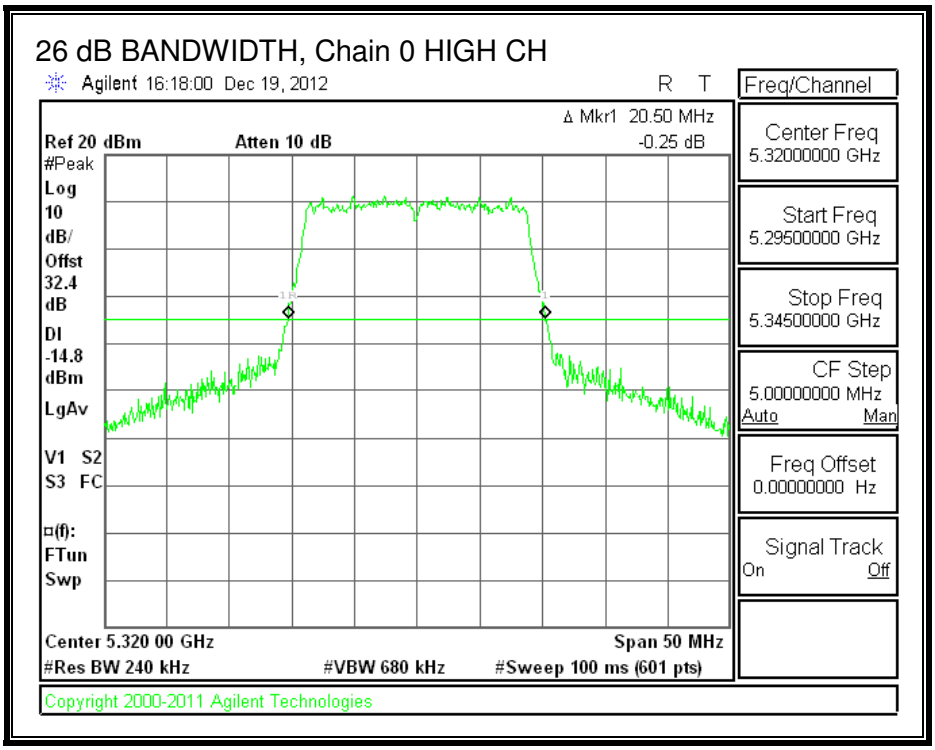
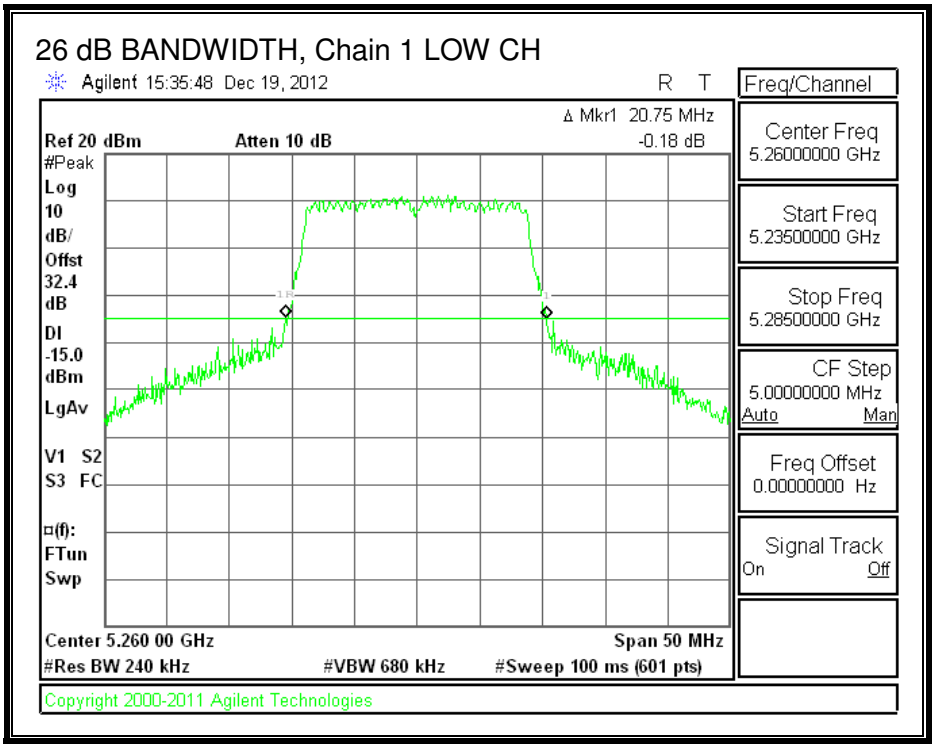



**26 dB BANDWIDTH, Chain 1**





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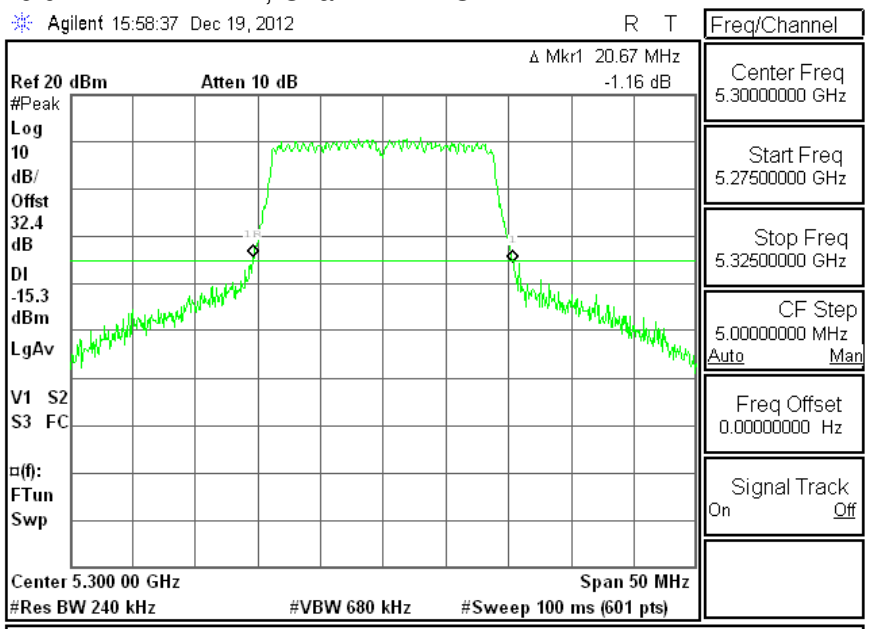
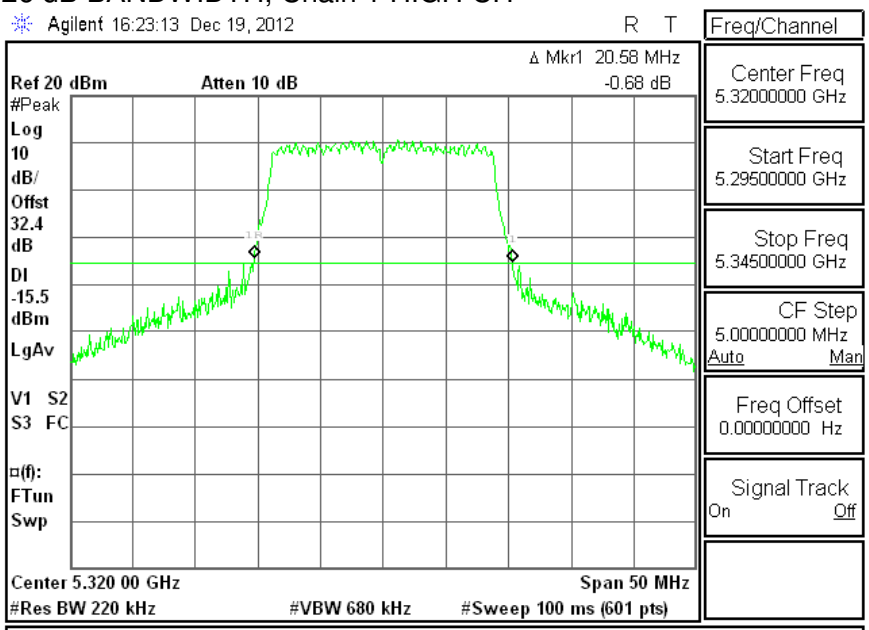
26 dB BANDWIDTH, Chain 1 MID CH




26 dB BANDWIDTH, Chain 1 HIGH CH





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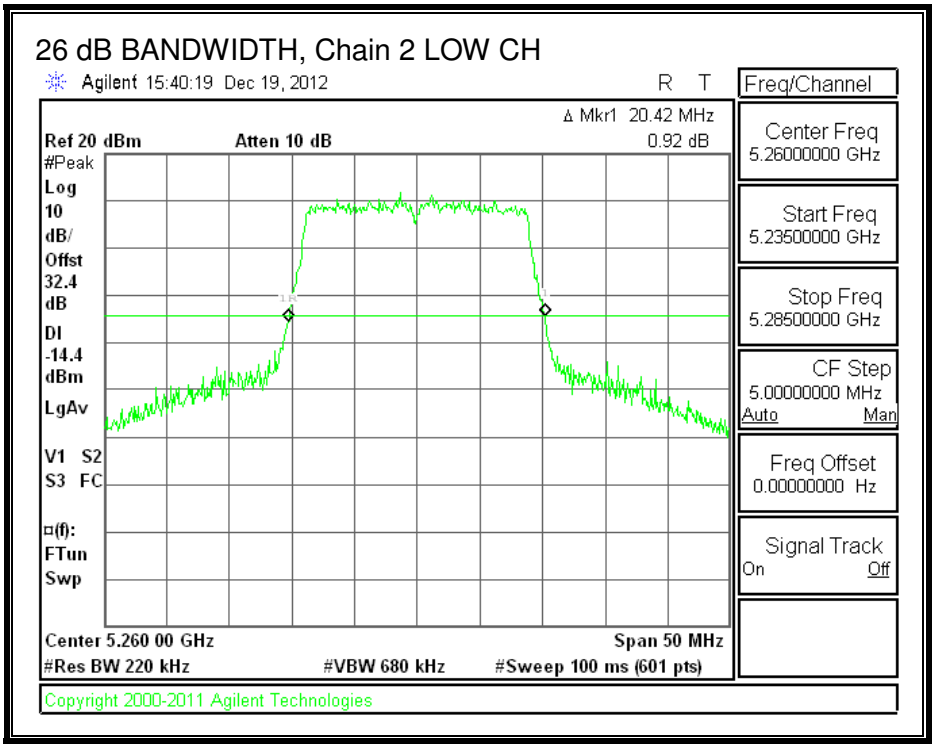
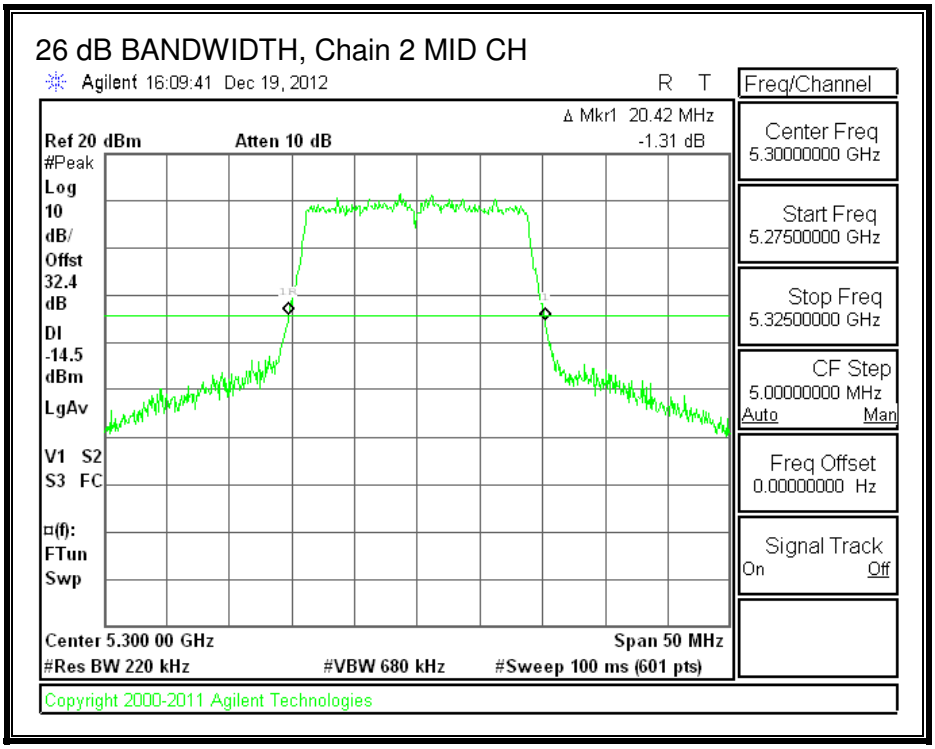
**26 dB BANDWIDTH, Chain 2**





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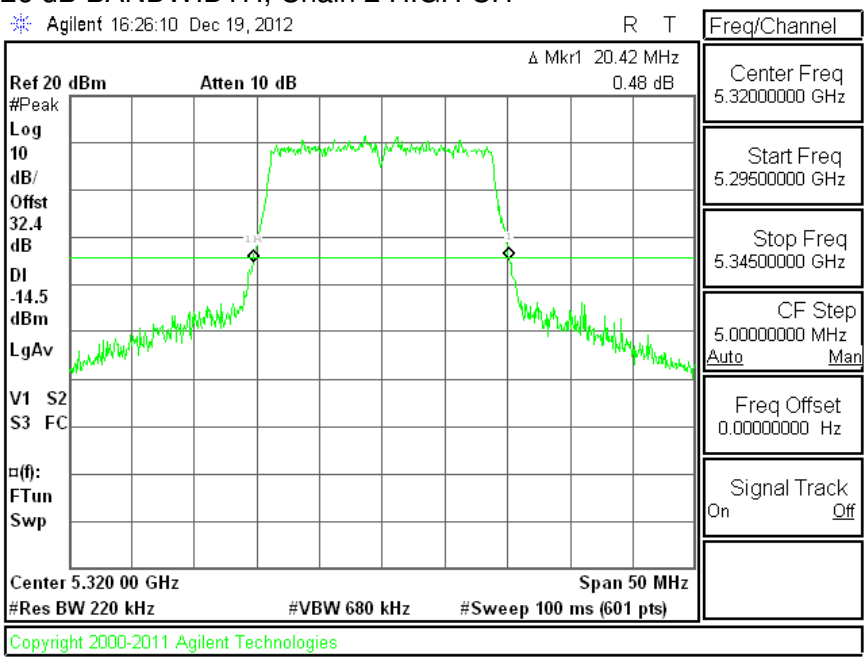
26 dB BANDWIDTH, Chain 2 HIGH CH





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### 8.28.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) | 99% BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5260 | 17.6595 | 17.6882 | 17.6534 |
| Mid | 5300 | 17.6595 | 17.6871 | 17.6422 |
| High | 5320 | 17.6759 | 17.6868 | 17.6698 |


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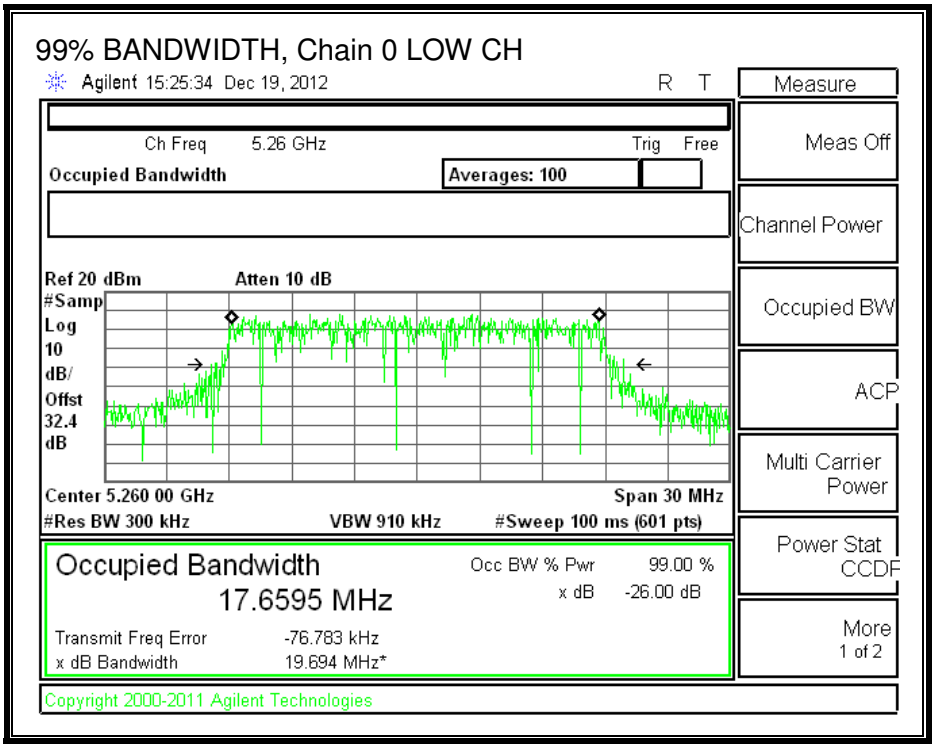
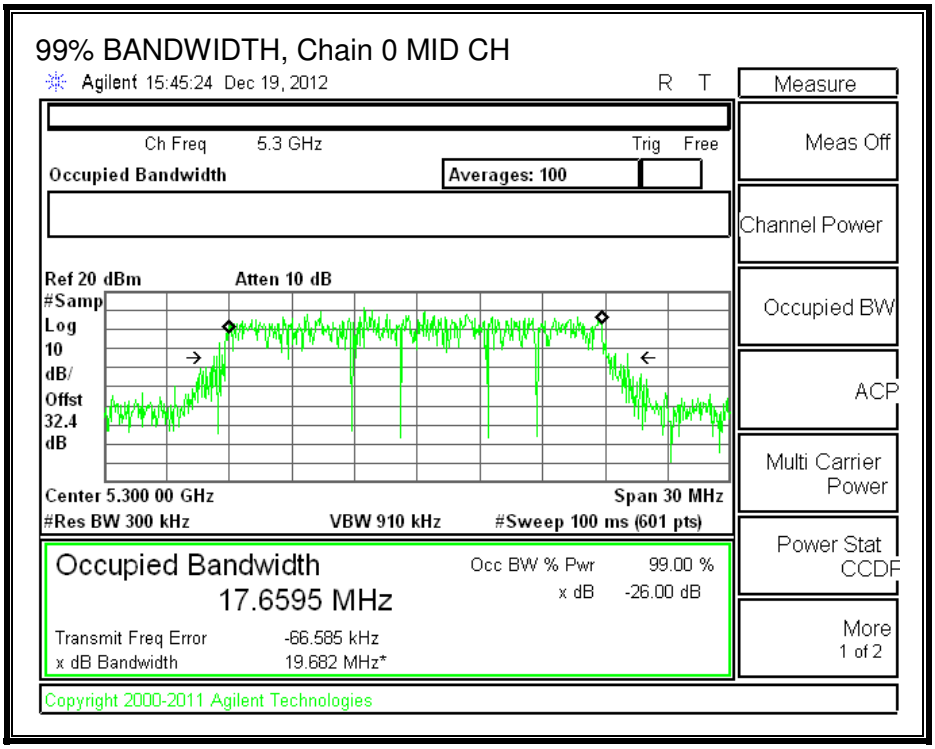
**99% BANDWIDTH, Chain 0**





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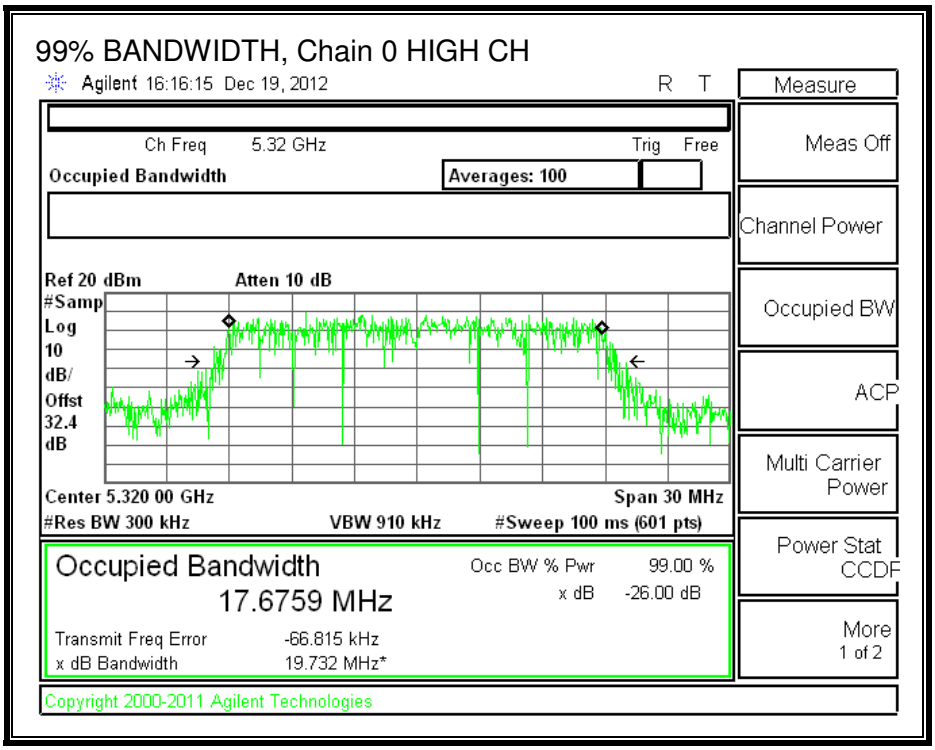
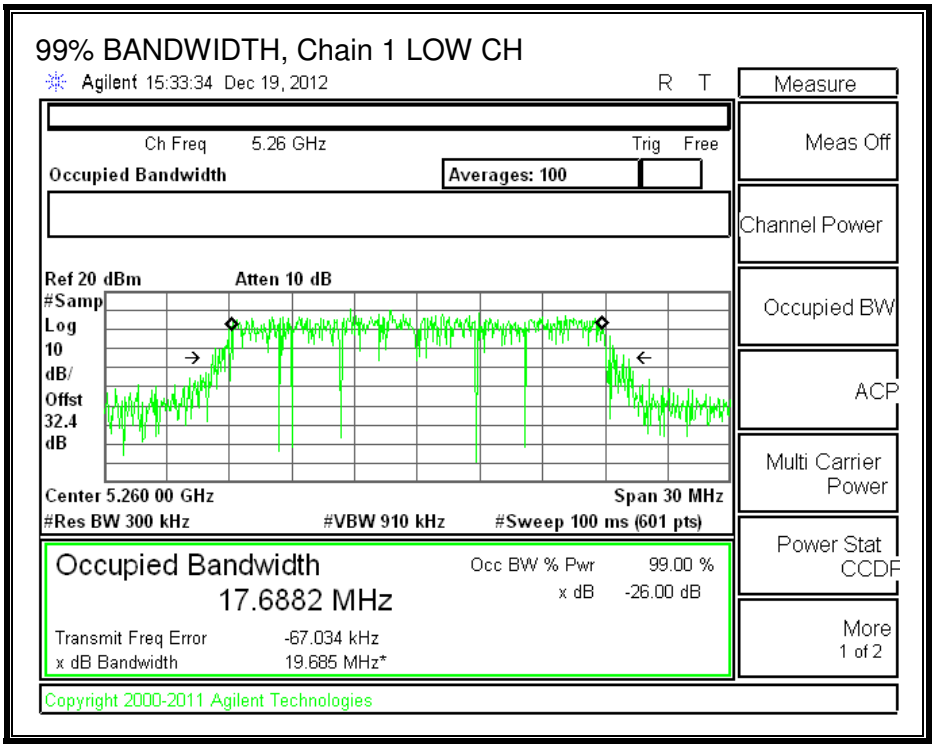



**99% BANDWIDTH, Chain 1**





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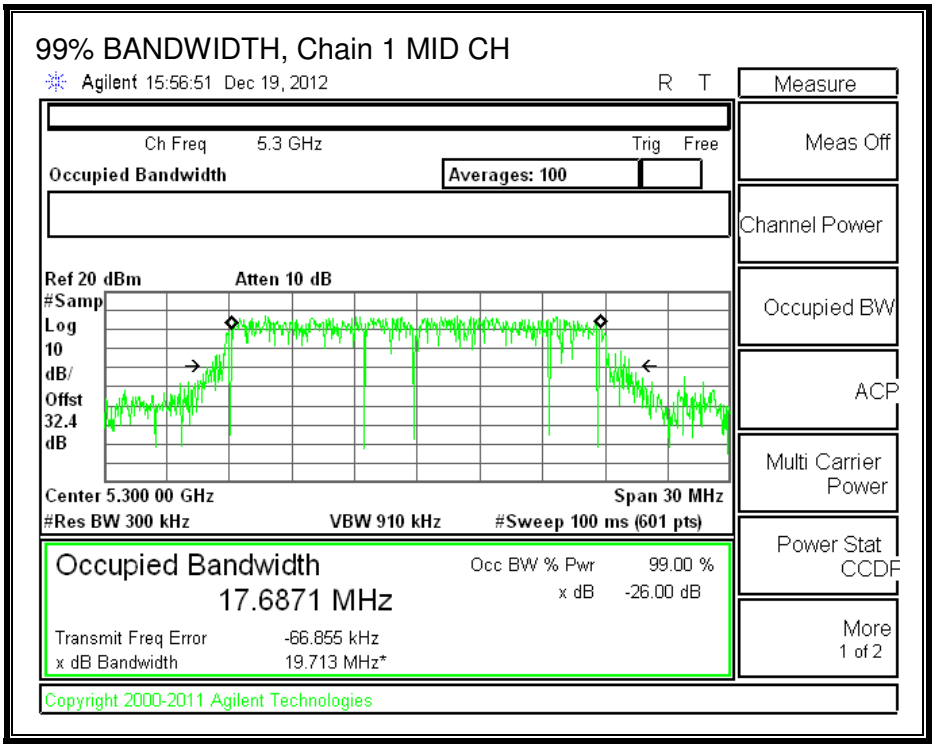


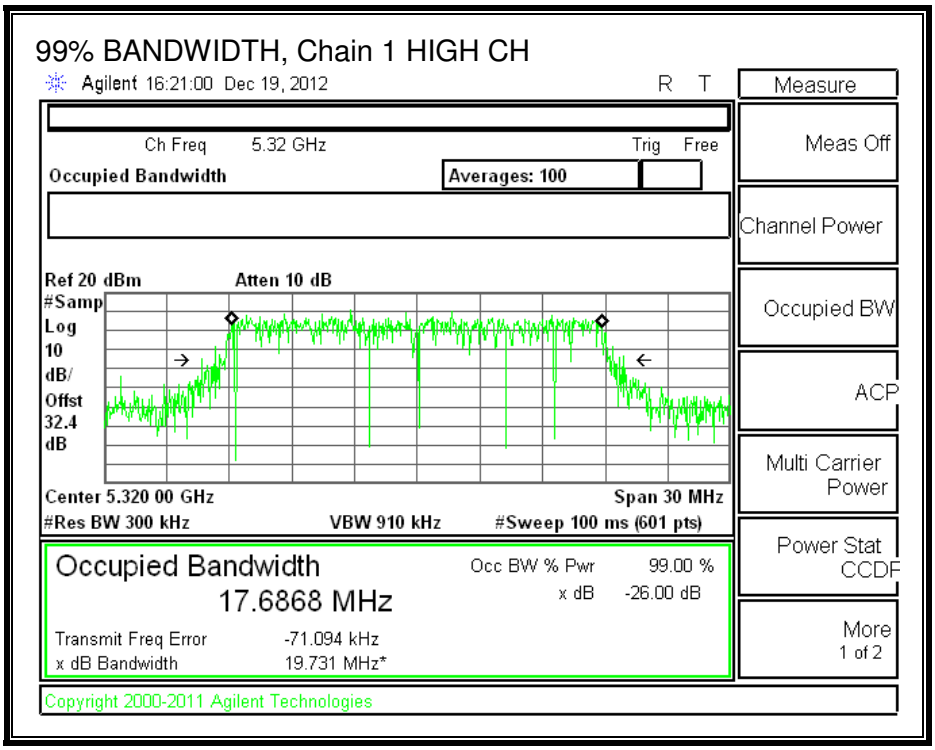



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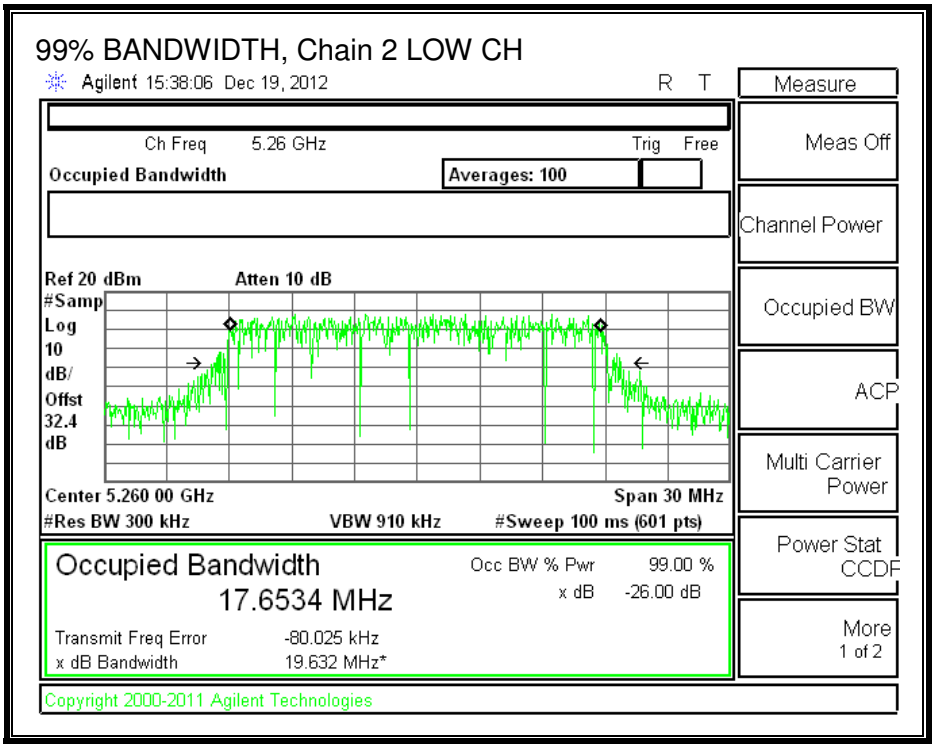
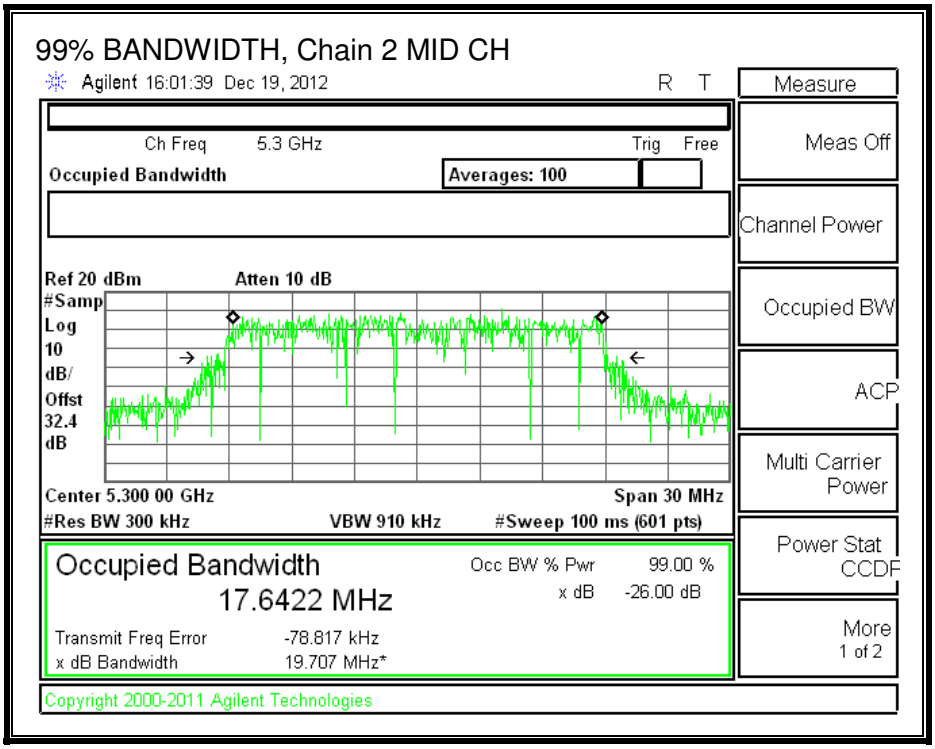
**99% BANDWIDTH, Chain 2**





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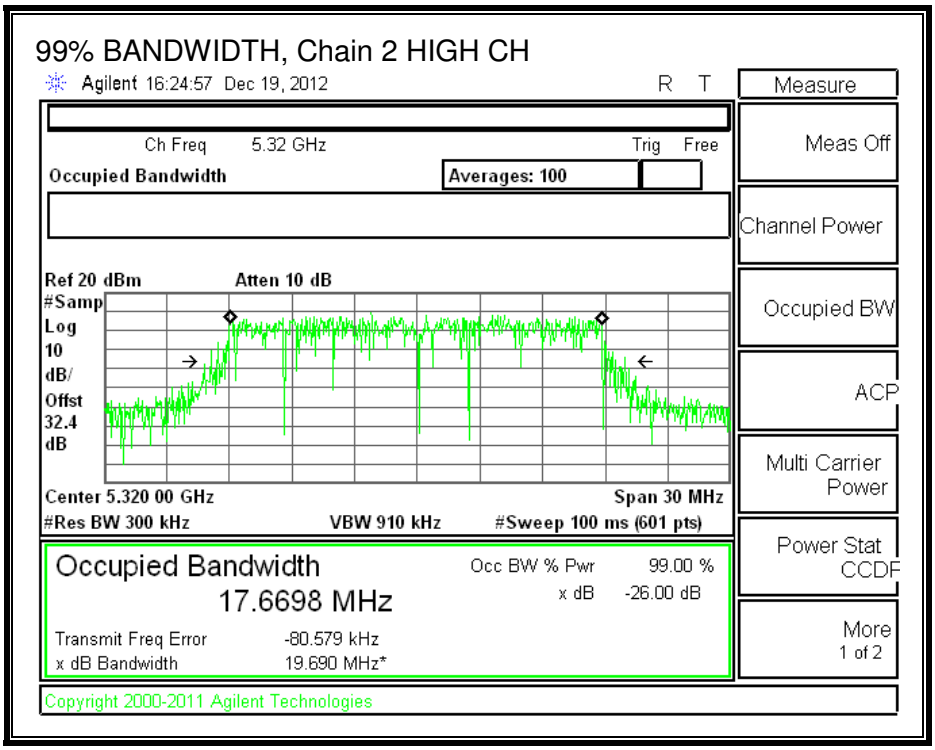



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### 8.28.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.40 | 1.60 | 2.30 | 2.50 |


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**RESULTS**

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---|---|---|---|---|
| Low | 5260 | 20.42 | 17.6534 | 2.50 |
| Mid | 5300 | 20.33 | 17.6422 | 2.50 |
| High | 5320 | 20.42 | 17.6689 | 2.50 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PPSD Limit (dBm) | IC PSD Limit (dBm) | PSD Limit (dBm) |
|---|---|---|---|---|---|---|---|---|
| Low | 5260 | 24.00 | 23.47 | 29.47 | 23.47 | 11.00 | 11.00 | 11.00 |
| Mid | 5300 | 24.00 | 23.47 | 29.47 | 23.47 | 11.00 | 11.00 | 11.00 |
| High | 5320 | 24.00 | 23.47 | 29.47 | 23.47 | 11.00 | 11.00 | 11.00 |

| Duty Cycle CF (dB) | 0.00 | |
|---|---|---|

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5260 | 16.10 | 16.30 | 16.20 | 20.97 | 23.47 | -2.50 |
| Mid | 5300 | 14.50 | 14.80 | 14.60 | 19.41 | 23.47 | -4.06 |
| High | 5320 | 14.00 | 14.25 | 14.10 | 18.89 | 23.47 | -4.58 |

**PPSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Chain 2 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5260 | 6.04 | 6.25 | 5.76 | 10.79 | 11.00 | -0.21 |
| Mid | 5300 | 5.73 | 6.36 | 6.03 | 10.82 | 11.00 | -0.18 |
| High | 5320 | 6.05 | 6.50 | 5.78 | 10.89 | 11.00 | -0.11 |


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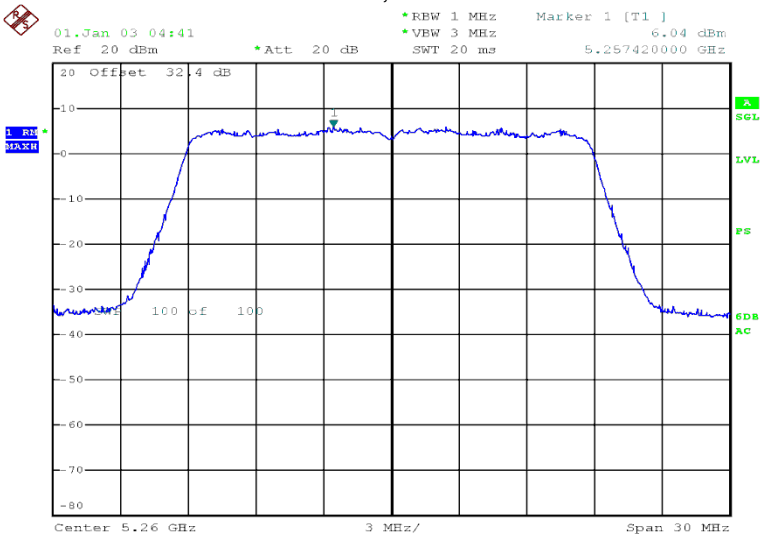
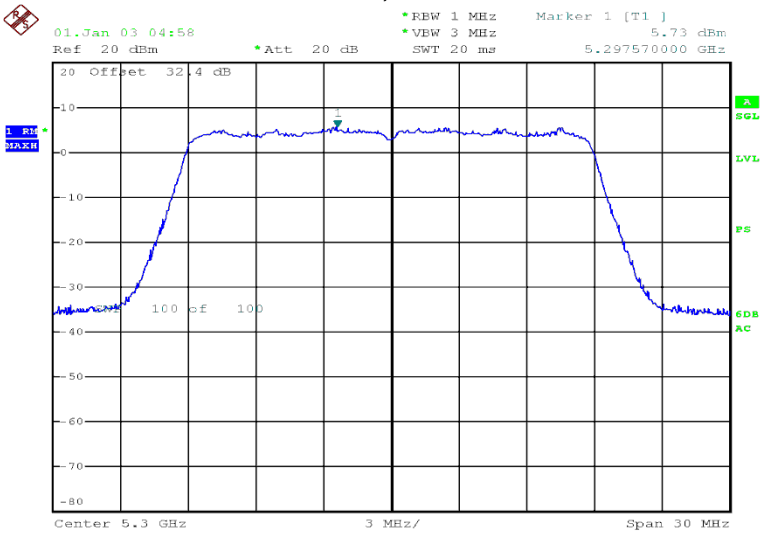
**OUTPUT POWER AND PSD, Chain 0**

OUTPUT POWER AND PSD, Chain 0 LOW CH




Date: 1.JAN.2003 04:41:56

OUTPUT POWER AND PSD, Chain 0 MID CH




Date: 1.JAN.2003 04:58:01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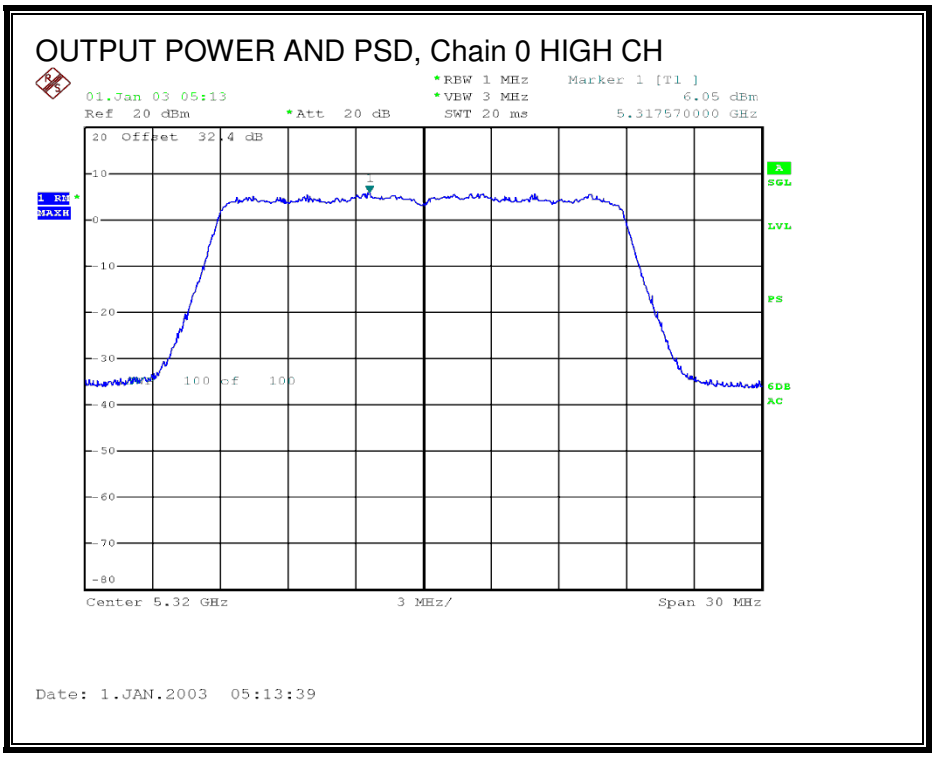
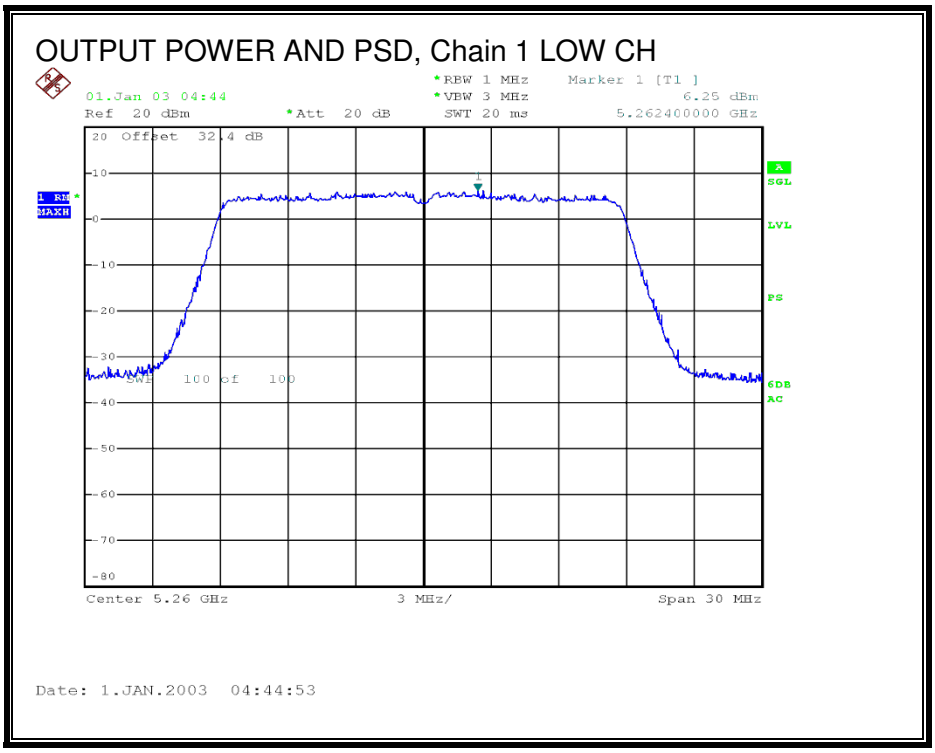



**OUTPUT POWER AND PSD, Chain 1**





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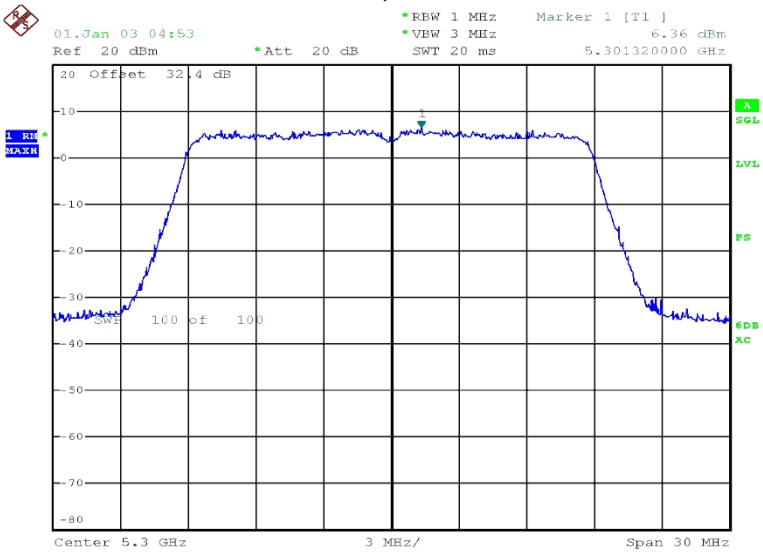
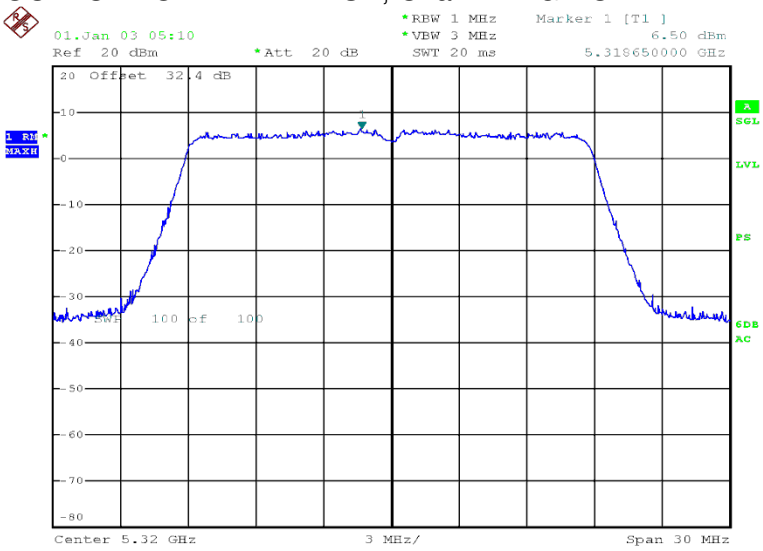
OUTPUT POWER AND PSD, Chain 1 MID CH




Date: 1.JAN.2003 04:53:56

OUTPUT POWER AND PSD, Chain 1 HIGH CH




Date: 1.JAN.2003 05:10:06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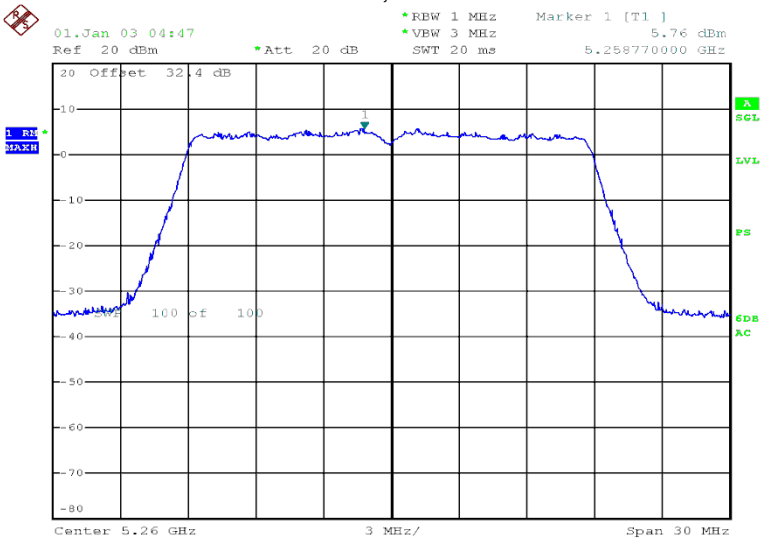
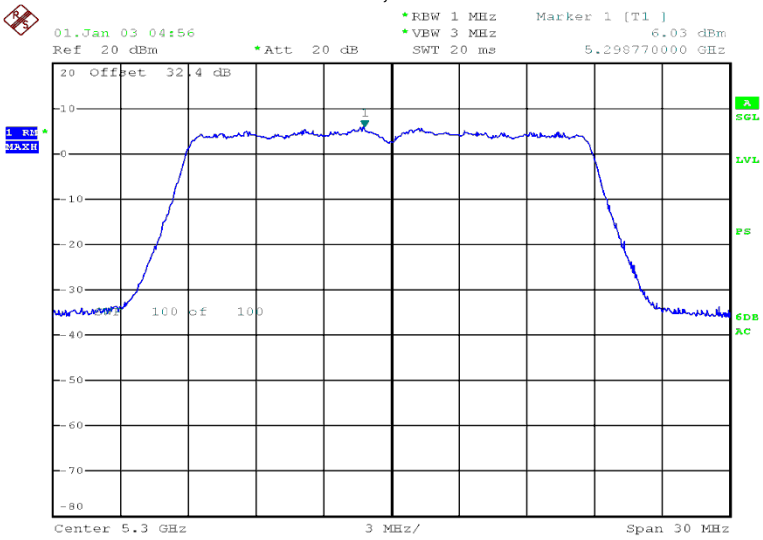
**OUTPUT POWER AND PSD, Chain 2**

OUTPUT POWER AND PSD, Chain 2 LOW CH




Date: 1.JAN.2003 04:47:19

OUTPUT POWER AND PSD, Chain 2 MID CH




Date: 1.JAN.2003 04:56:03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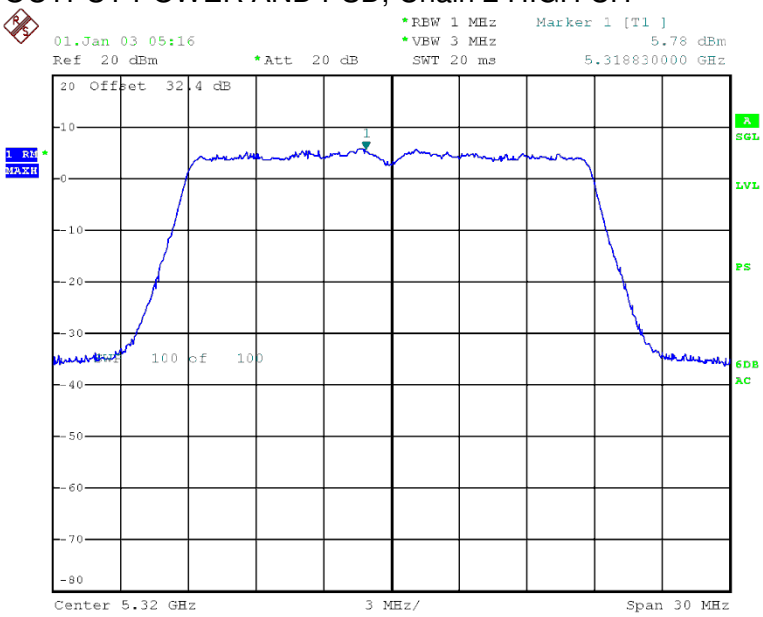
OUTPUT POWER AND PSD, Chain 2 HIGH CH




Date: 1.JAN.2003 05:16:56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### 8.28.4. TPC POWER

**LIMITS**

FCC §15.407 (h) (1)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

**RESULTS**

The maximum EIRP is less than 500 mW; therefore, TPC is not required.


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## 8.29. 802.11n HT40 1TX MODE IN THE 5.3 GHz BAND

### 8.29.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB Bandwidth (MHz) |
|---|---|---|
| Low | 5270 | 39.83 |
| High | 5310 | 40.33 |


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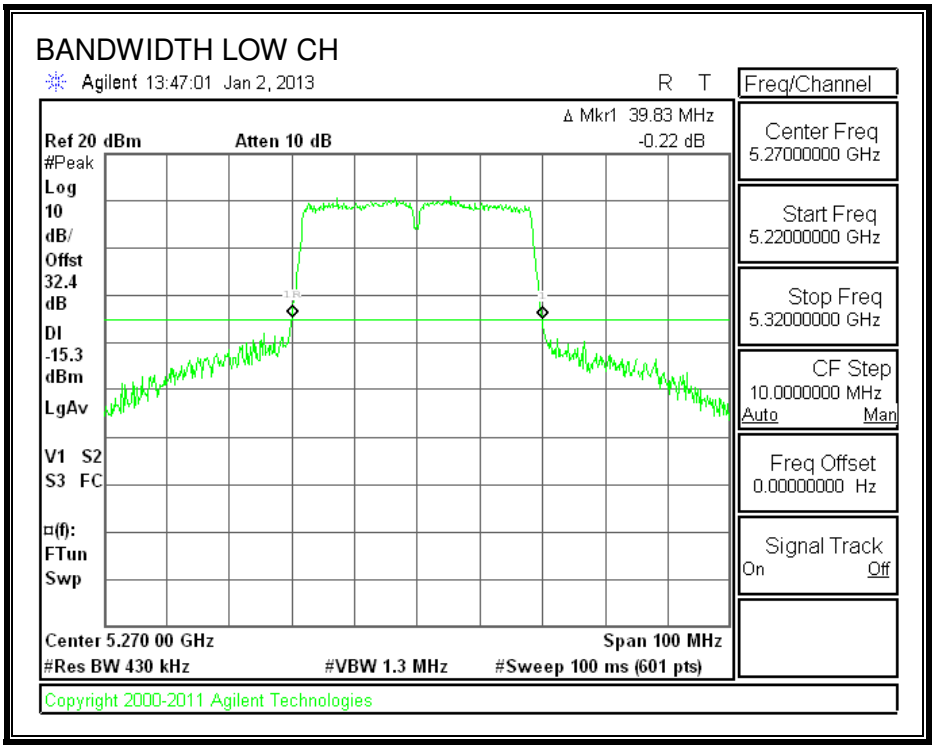
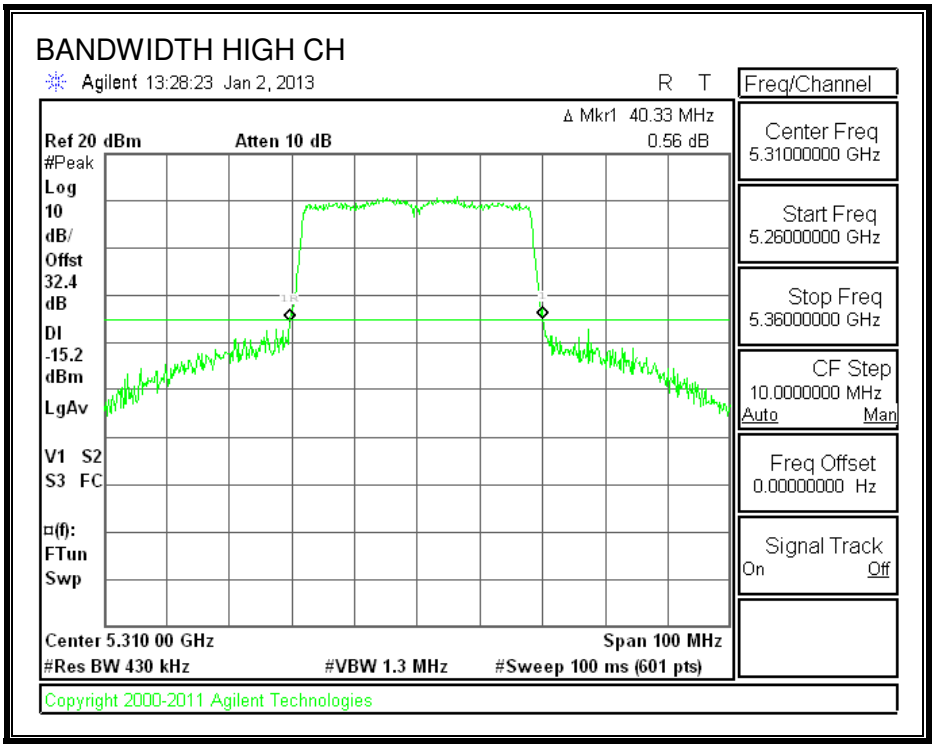
**26 dB BANDWIDTH**





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### 8.29.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5270 | 36.2322 |
| High | 5310 | 36.1961 |


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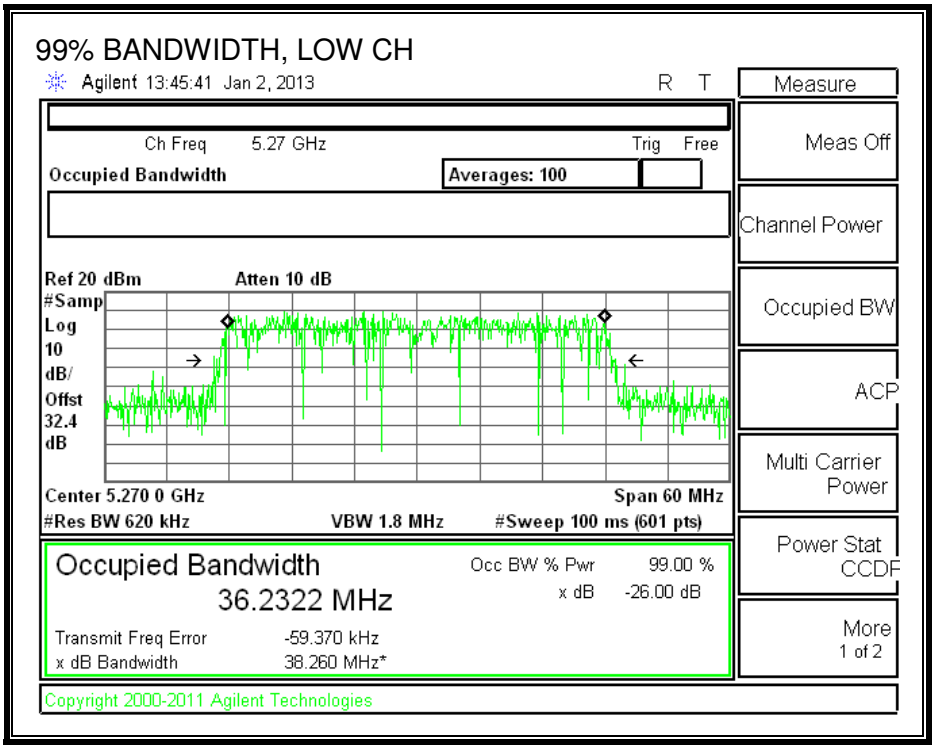
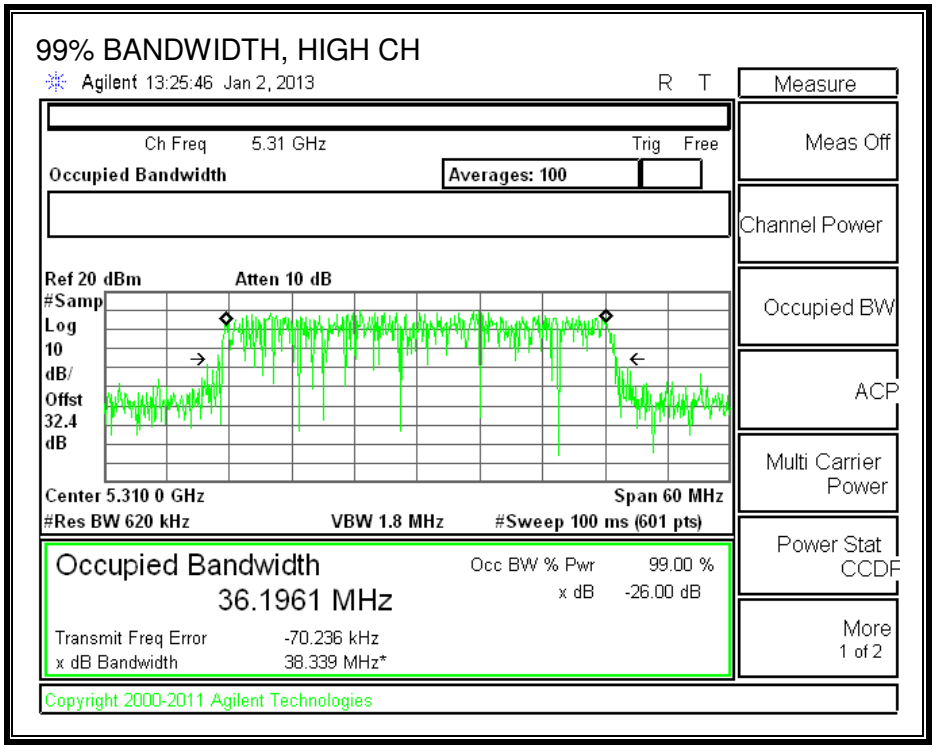
**99% BANDWIDTH**





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### 8.29.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.


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**RESULTS**

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---|---|---|---|---|
| Low | 5270 | 39.83 | 36.2322 | 3.40 |
| High | 5310 | 40.33 | 36.1961 | 3.40 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PSD Limit (dBm) | IC PSD Limit (dBm) | PSD Limit (dBm) |
|---|---|---|---|---|---|---|---|---|
| Low | 5270 | 24.00 | 24.00 | 30.00 | 24.00 | 11.00 | 11.00 | 11.00 |
| High | 5310 | 24.00 | 24.00 | 30.00 | 24.00 | 11.00 | 11.00 | 11.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5270 | 17.50 | 17.50 | 24.00 | -6.50 |
| High | 5310 | 16.00 | 16.00 | 24.00 | -8.00 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5270 | 5.88 | 5.88 | 11.00 | -5.12 |
| High | 5310 | 5.69 | 5.69 | 11.00 | -5.31 |


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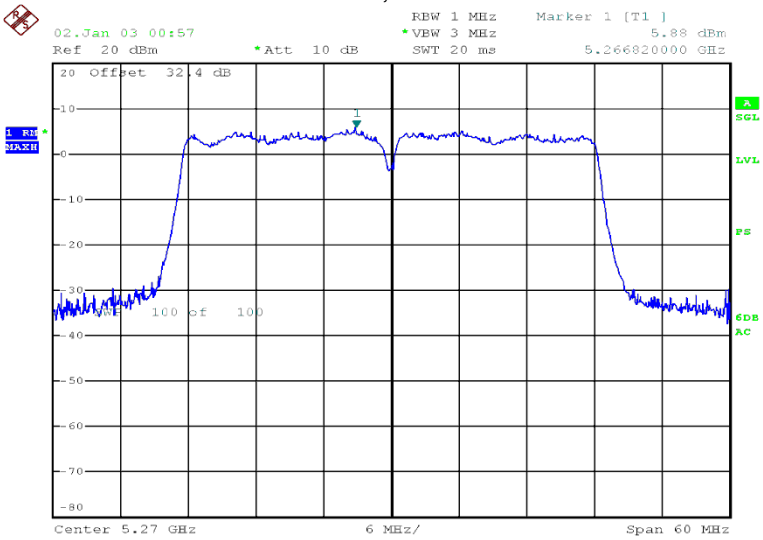
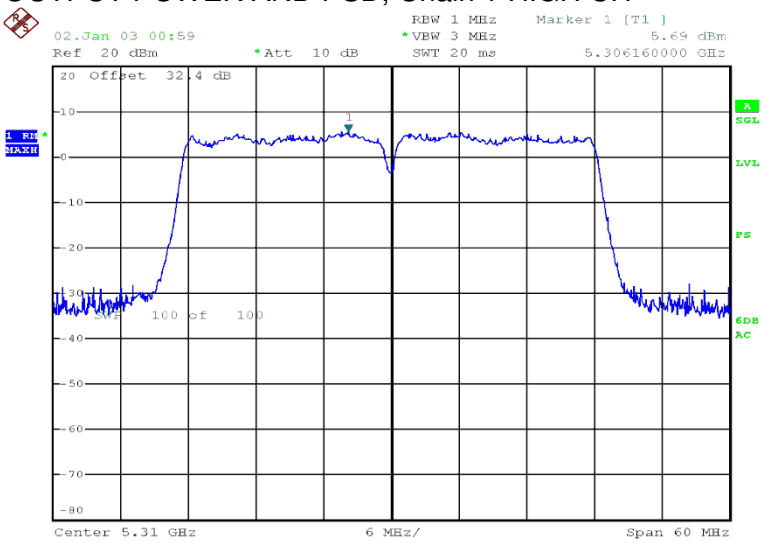
**OUTPUT POWER AND PSD, Chain 1**

OUTPUT POWER AND PSD, Chain 1 LOW CH




Date: 2.JAN.2003 00:57:43

OUTPUT POWER AND PSD, Chain 1 HIGH CH




Date: 2.JAN.2003 00:59:39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### 8.29.4. TPC POWER

**LIMITS**

FCC §15.407 (h) (1)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

**RESULTS**

The maximum EIRP is less than 500 mW; therefore, TPC is not required.


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## 8.30. 802.11n HT40 CDD 2TX MODE IN THE 5.3 GHz BAND

### 8.30.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5270 | 39.83 | 39.50 |
| High | 5310 | 39.50 | 39.50 |


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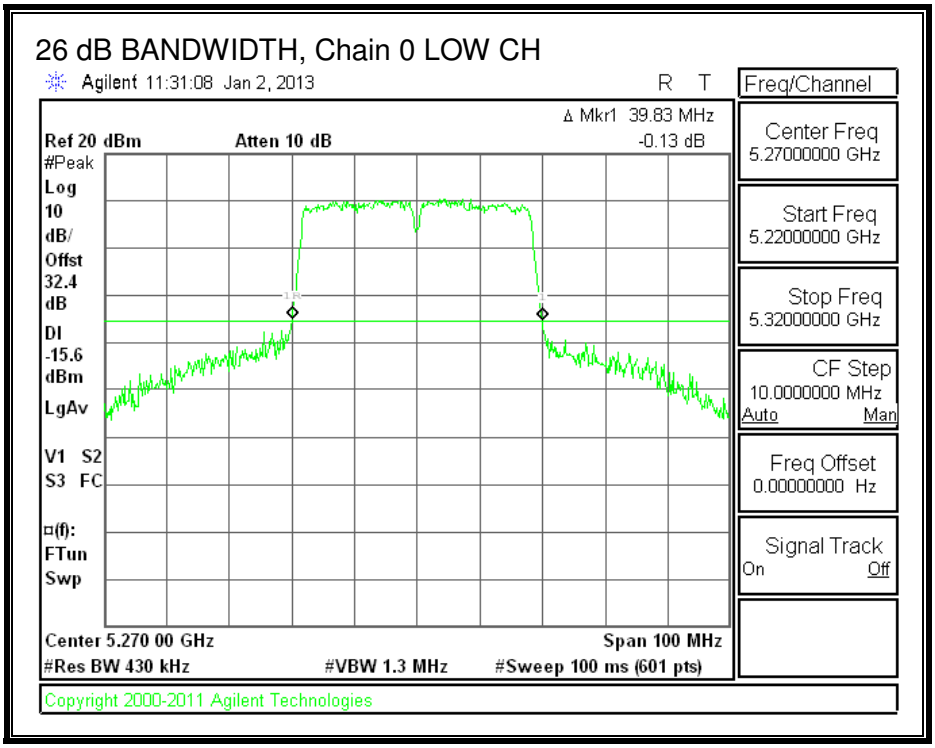
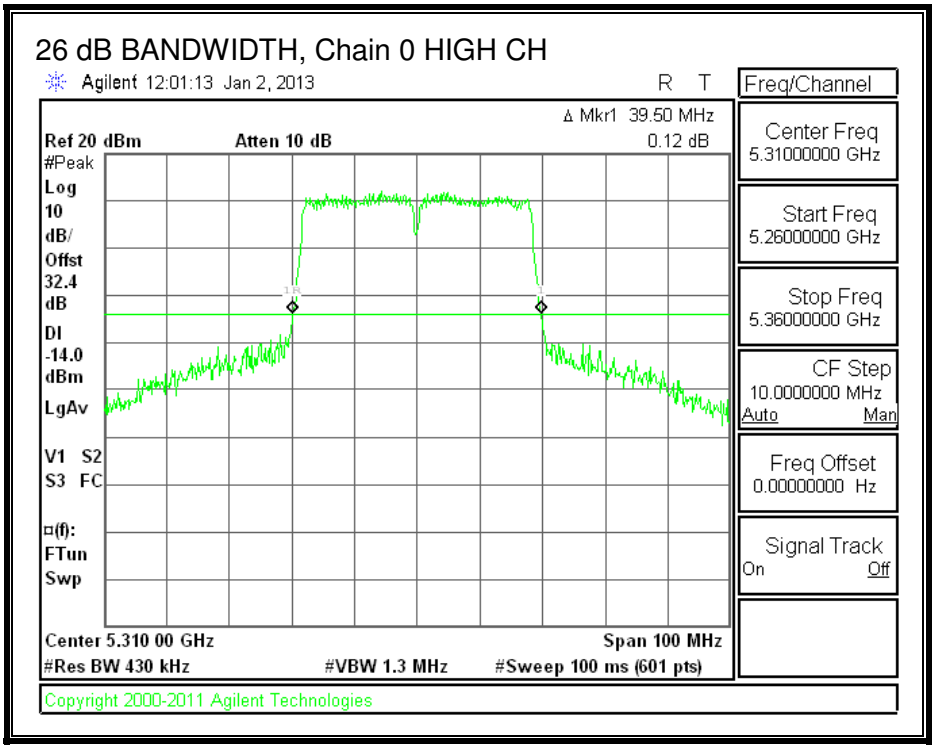
**26 dB BANDWIDTH, Chain 0**





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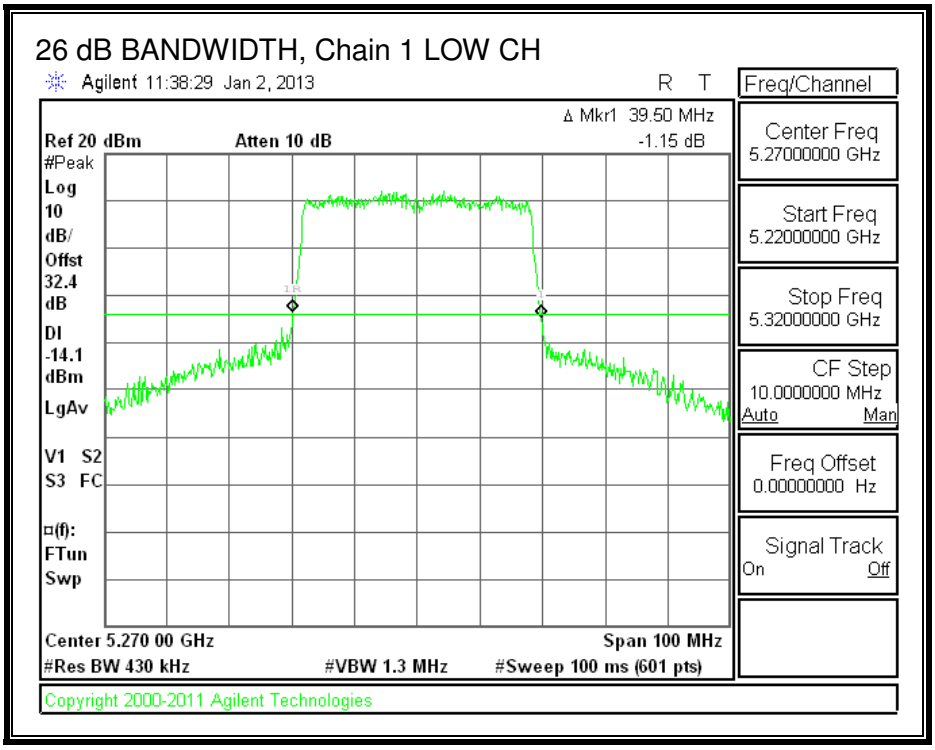
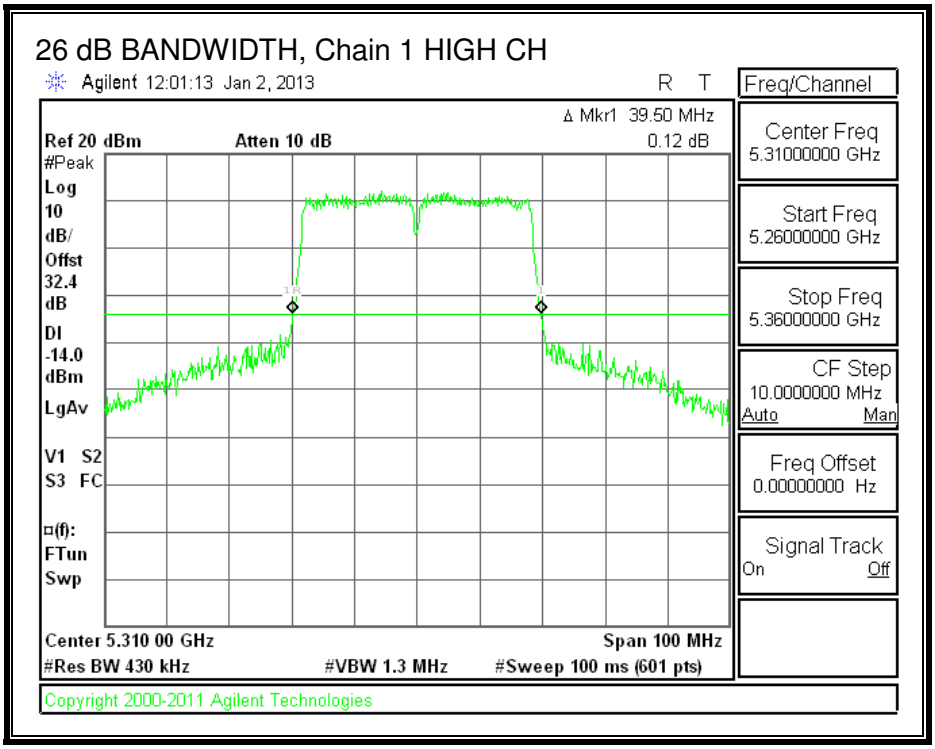
**26 dB BANDWIDTH, Chain 1**





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### 8.30.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5270 | 36.1901 | 36.1602 |
| High | 5310 | 36.2376 | 36.2241 |


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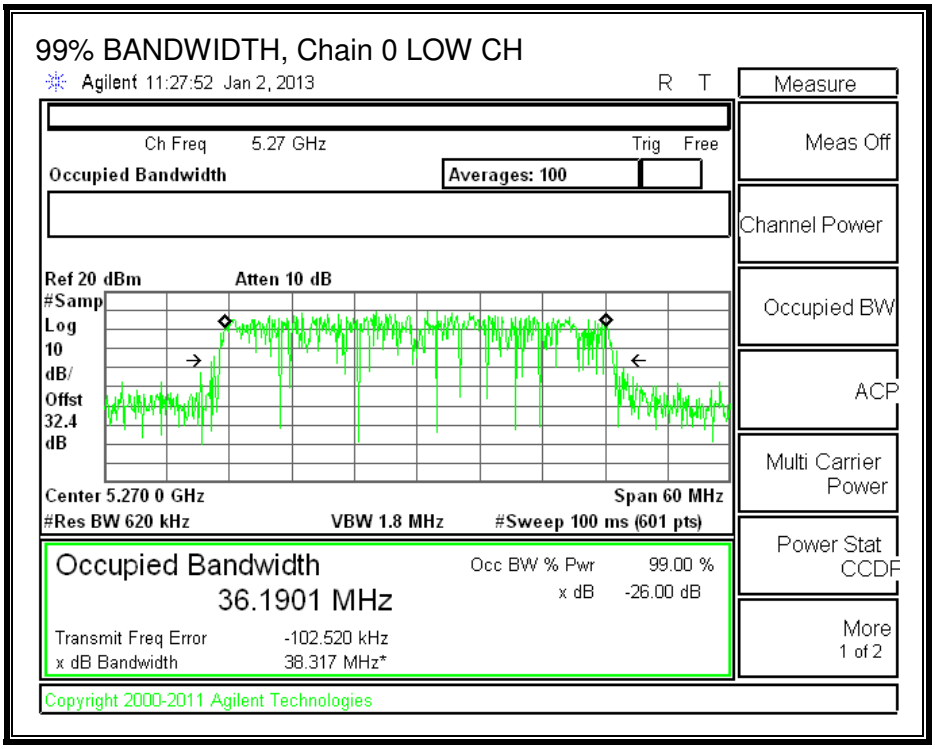
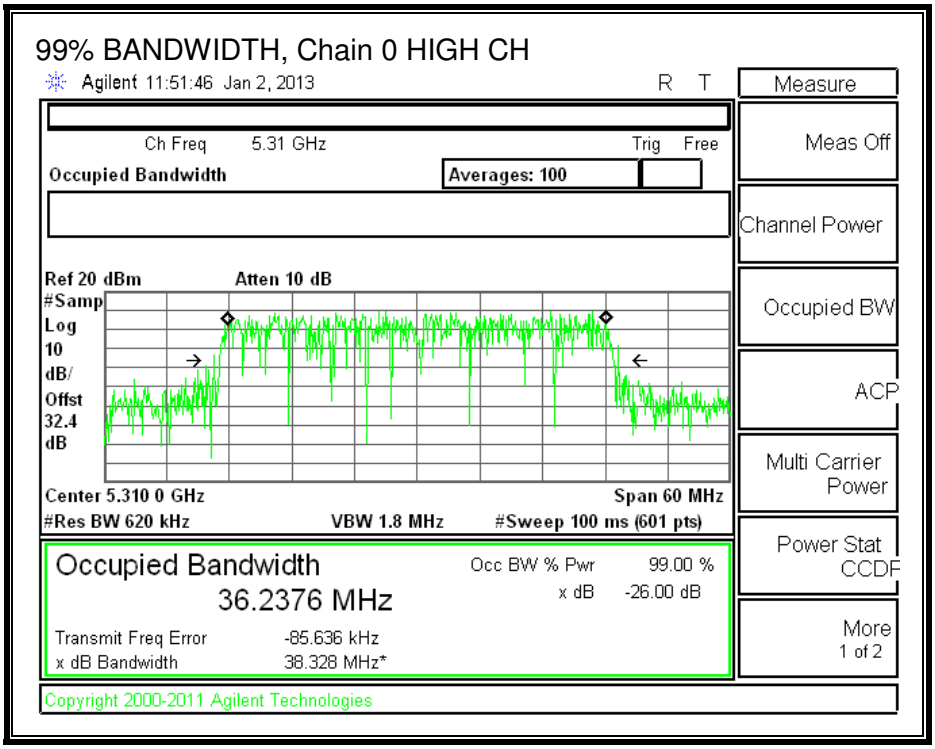
**99% BANDWIDTH, Chain 0**





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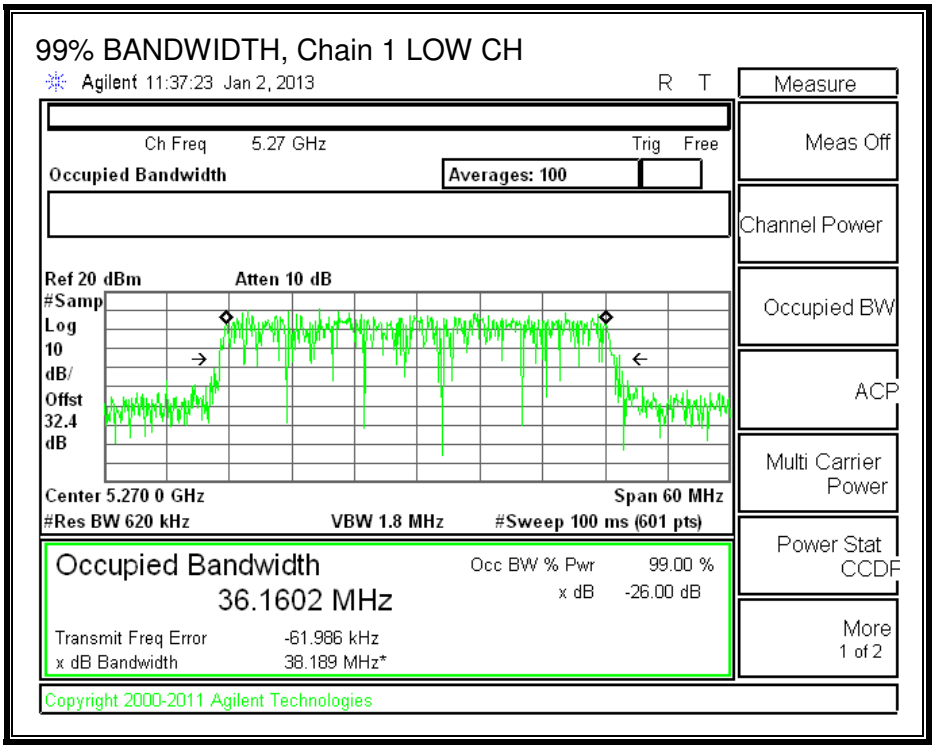
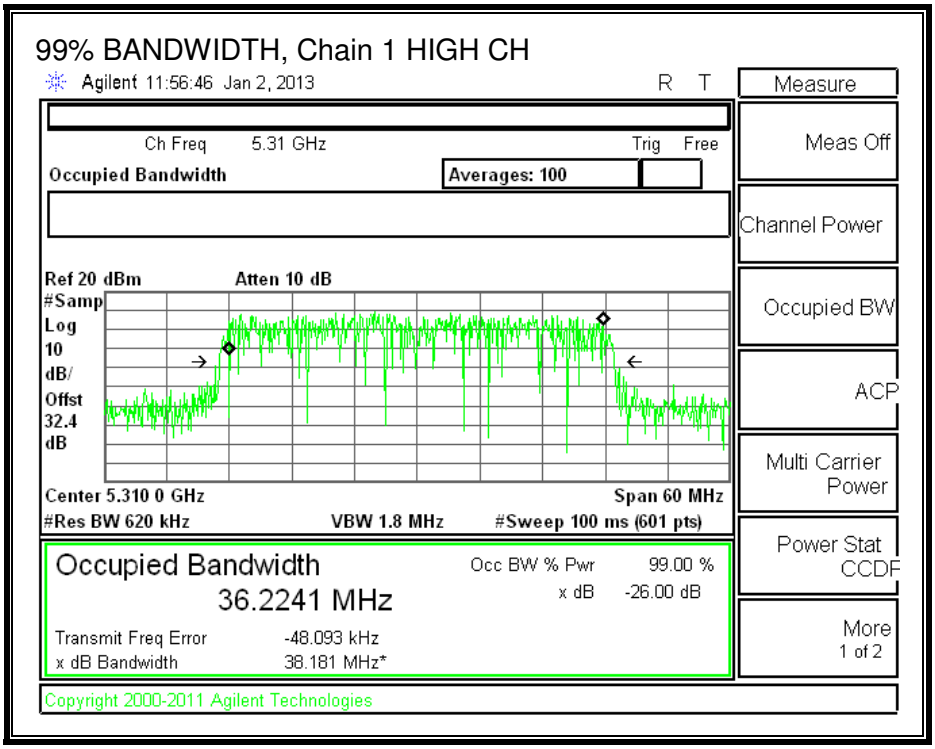
**99% BANDWIDTH, Chain 1**





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### 8.30.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

For output power, the two chains are considered uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|
| 3.40 | 2.30 | 2.88 |

For PSD, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|
| 3.40 | 2.30 | 5.88 |


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## RESULTS

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Correlated Directional Gain (dBi) | Uncorrelated Directional Gain (dBi) |
|---|---|---|---|---|---|
| Low | 5270 | 39.50 | 36.1602 | 5.88 | 2.88 |
| High | 5310 | 39.50 | 36.2241 | 5.88 | 2.88 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PSD Limit (dBm) | IC PSD Limit (dBm) | PSD Limit (dBm) |
|---|---|---|---|---|---|---|---|---|
| Low | 5270 | 24.00 | 24.00 | 30.00 | 24.00 | 11.00 | 11.00 | 11.00 |
| High | 5310 | 24.00 | 24.00 | 30.00 | 24.00 | 11.00 | 11.00 | 11.00 |

| Duty Cycle CF (dB) | 0.00 | |
|---|---|---|

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5270 | 17.30 | 17.30 | 20.31 | 24.00 | -3.69 |
| High | 5310 | 15.65 | 15.50 | 18.59 | 24.00 | -5.41 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5270 | 3.404 | 3.488 | 6.46 | 11.00 | -4.54 |
| High | 5310 | 3.308 | 3.561 | 6.45 | 11.00 | -4.55 |


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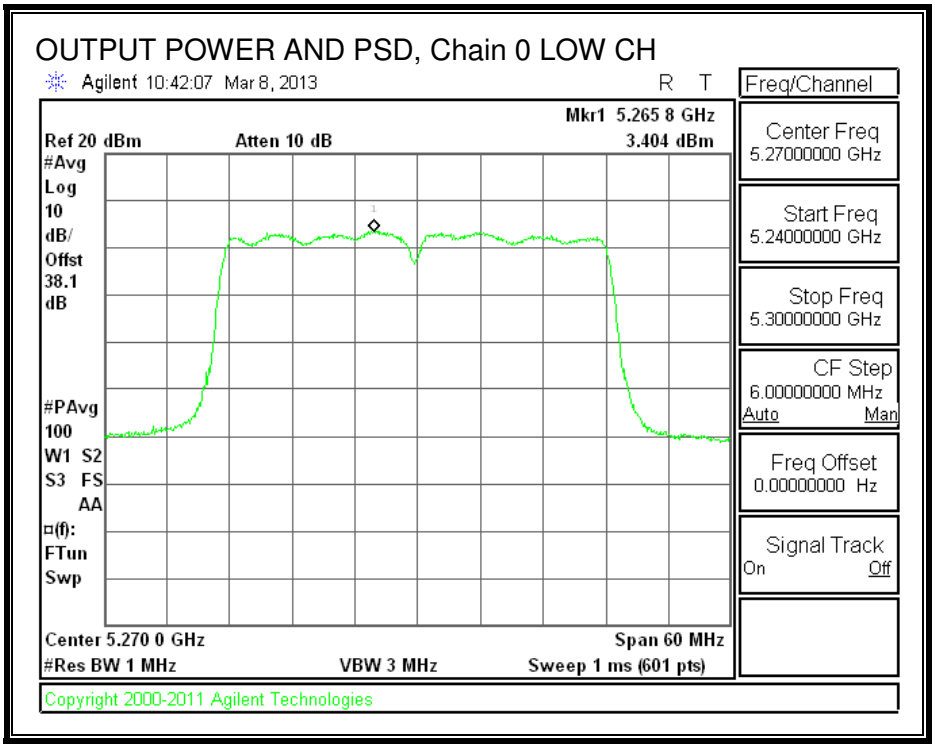
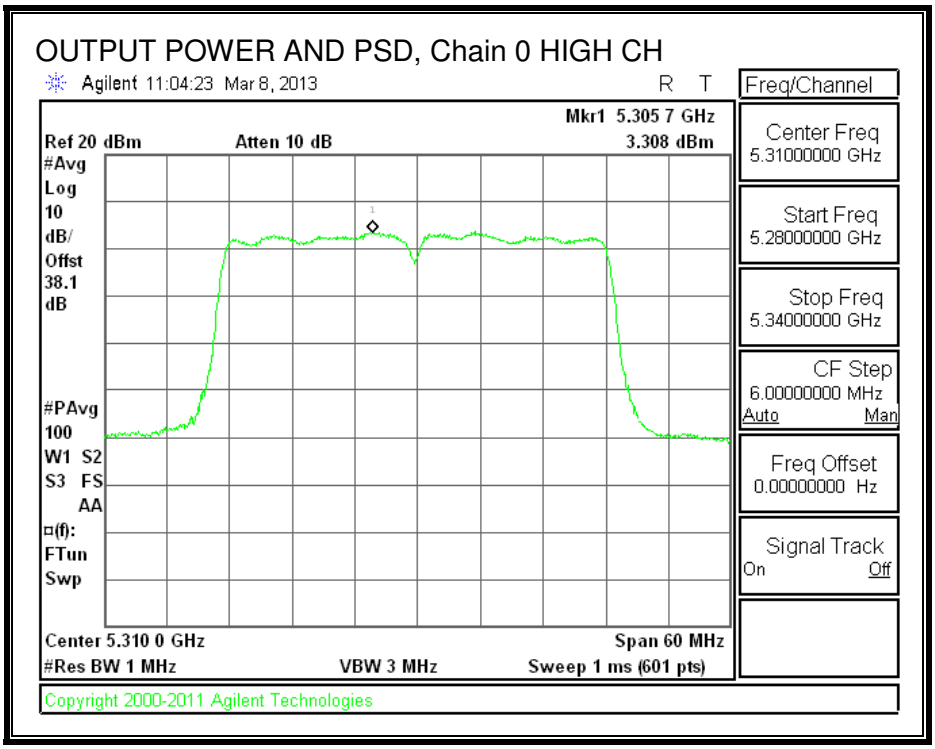
**OUTPUT POWER AND PSD, Chain 0**





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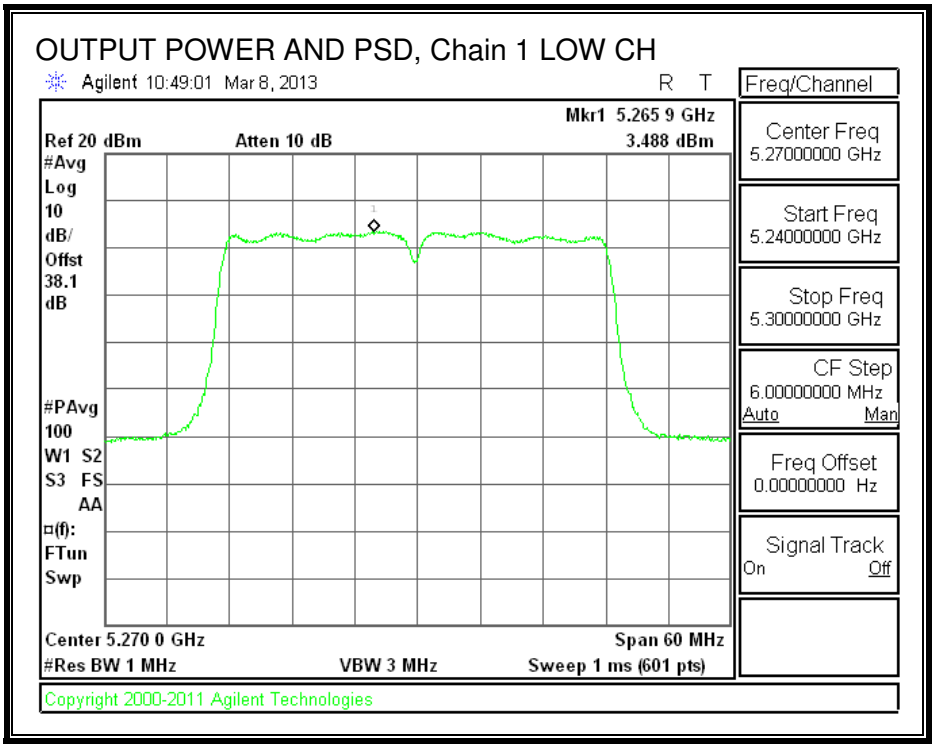
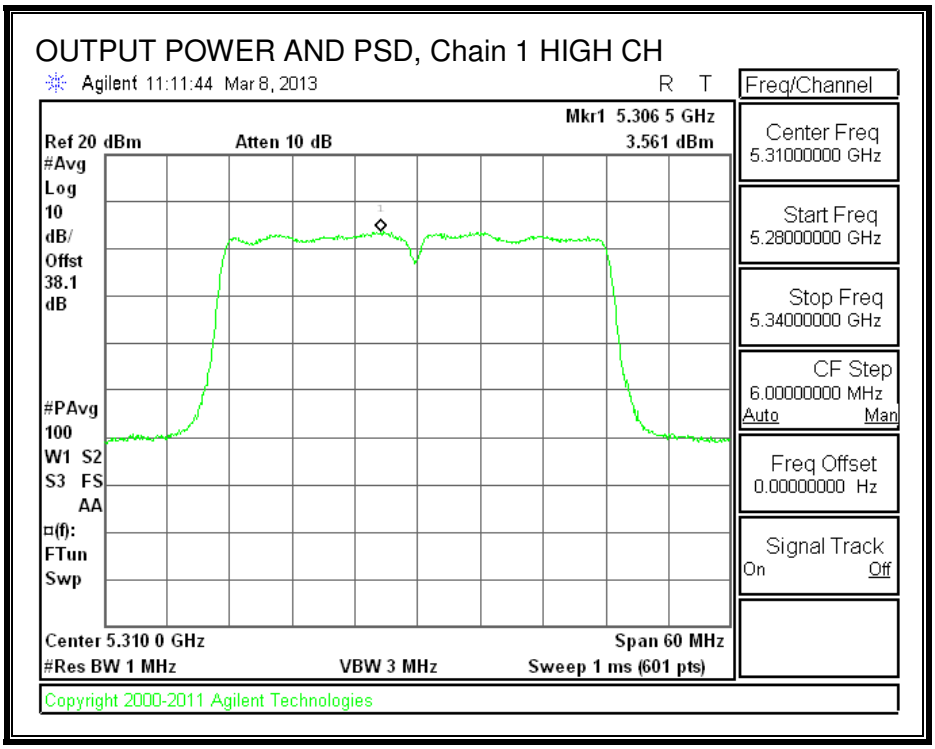
**OUTPUT POWER AND PSD, Chain 1**





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### 8.30.4. TPC POWER

**LIMITS**

FCC §15.407 (h) (1)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

**RESULTS**

The maximum EIRP is less than 500 mW; therefore, TPC is not required.


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47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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## 8.31. 802.11n HT40 BF 2TX MODE IN THE 5.3 GHz BAND

Covered by testing HT40 CDD 2TX mode, the power per chain used for HT40 CDD 2TX mode is the same power per chain that will be used for HT40 BF 2TX mode. However, since BF is correlated and CDD is uncorrelated for output power, the section below for output power using correlated AG for this BF mode shows it is still compliant.

### 8.31.1. OUTPUT AVERAGE POWER

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

For output power, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|
| 3.40 | 2.30 | 5.88 |


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**RESULTS**

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Correlated Directional Gain (dBi) |
|---|---|---|---|---|
| Low | 5270 | 39.50 | 36.1602 | 5.88 |
| High | 5310 | 39.50 | 36.2241 | 5.88 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) |
|---|---|---|---|---|---|
| Low | 5270 | 24.00 | 24.00 | 30.00 | 24.00 |
| High | 5310 | 24.00 | 24.00 | 30.00 | 24.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5270 | 17.30 | 17.30 | 20.31 | 24.00 | -3.69 |
| High | 5310 | 15.65 | 15.50 | 18.59 | 24.00 | -5.41 |


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## 8.32. 802.11n HT40 STBC 2TX MODE IN THE 5.3 GHz BAND

### 8.32.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5270 | 40.17 | 39.33 |
| High | 5310 | 39.83 | 39.50 |


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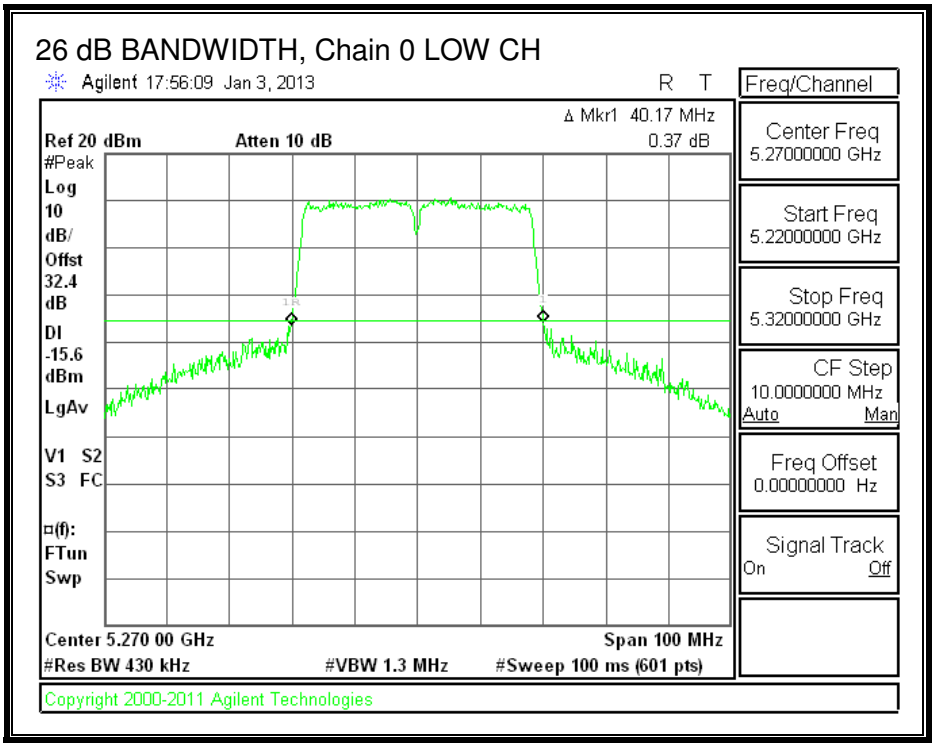
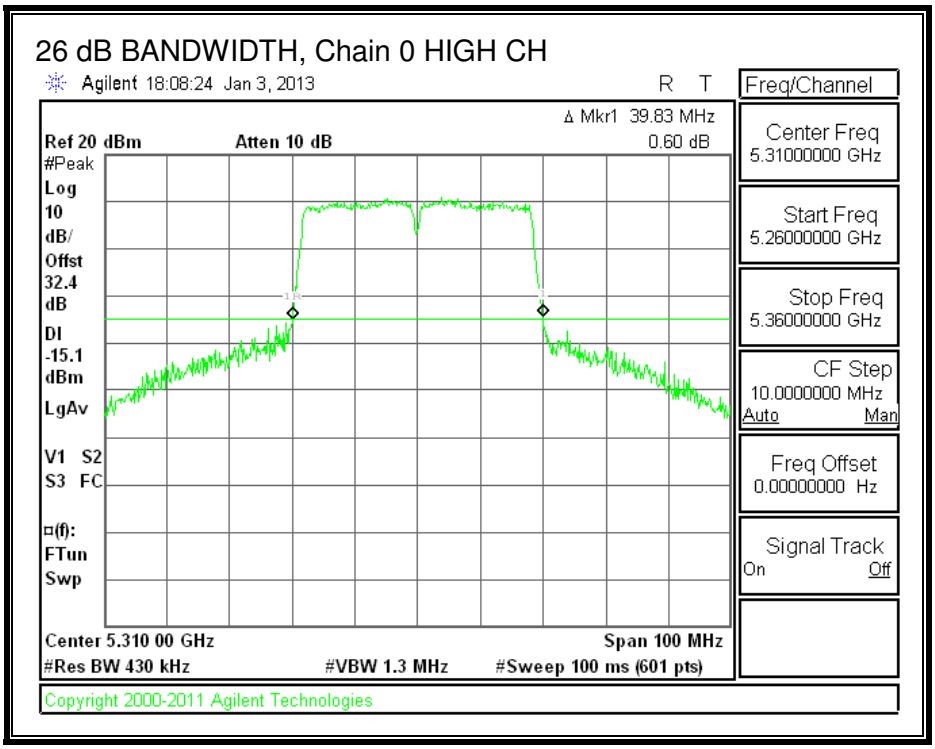
**26 dB BANDWIDTH, Chain 0**





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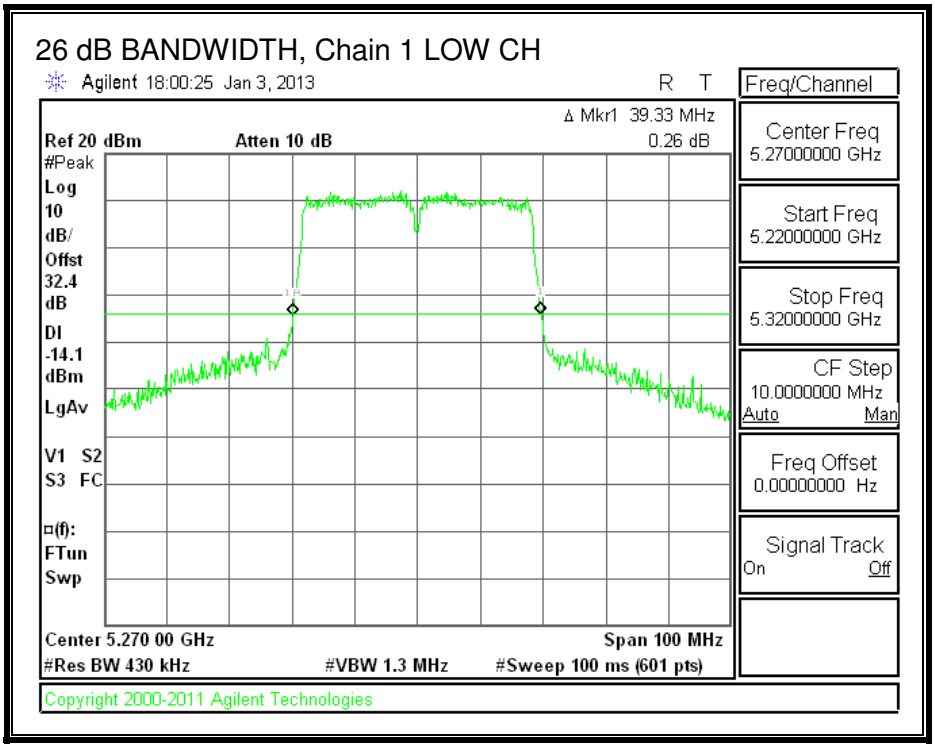
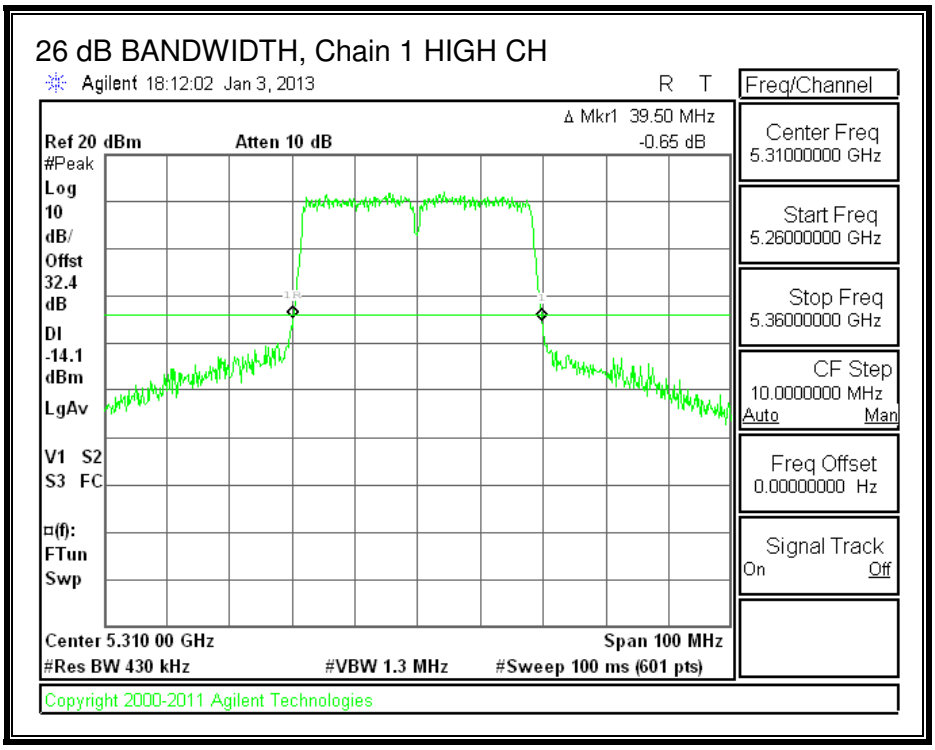
**26 dB BANDWIDTH, Chain 1**





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### 8.32.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---|---|---|---|
| Low | 5270 | 36.2107 | 36.2281 |
| High | 5310 | 36.2314 | 36.1758 |


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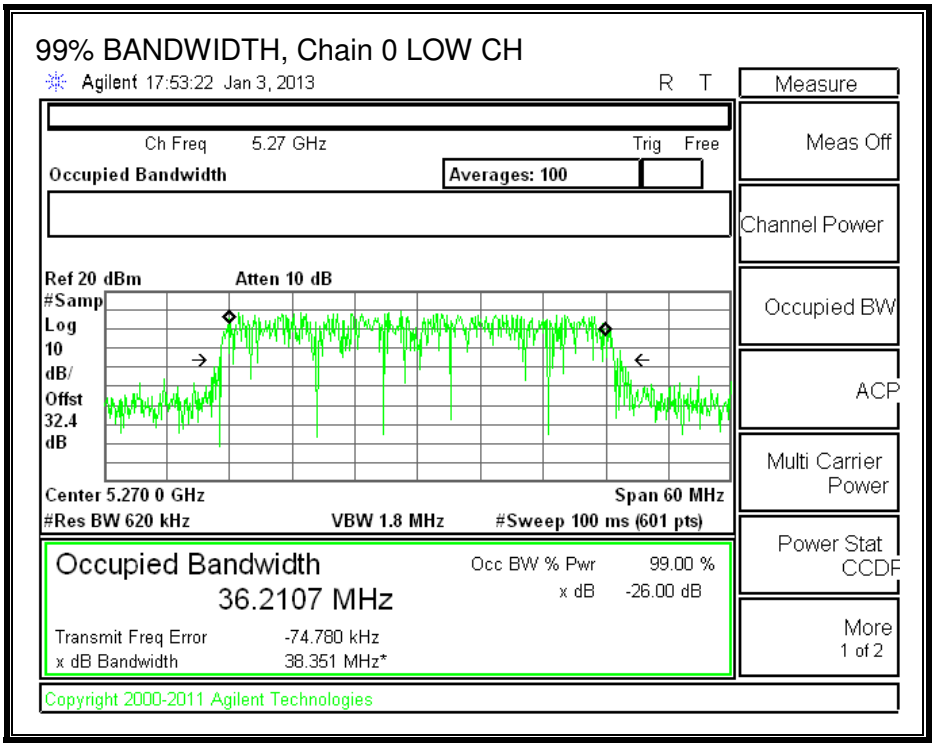
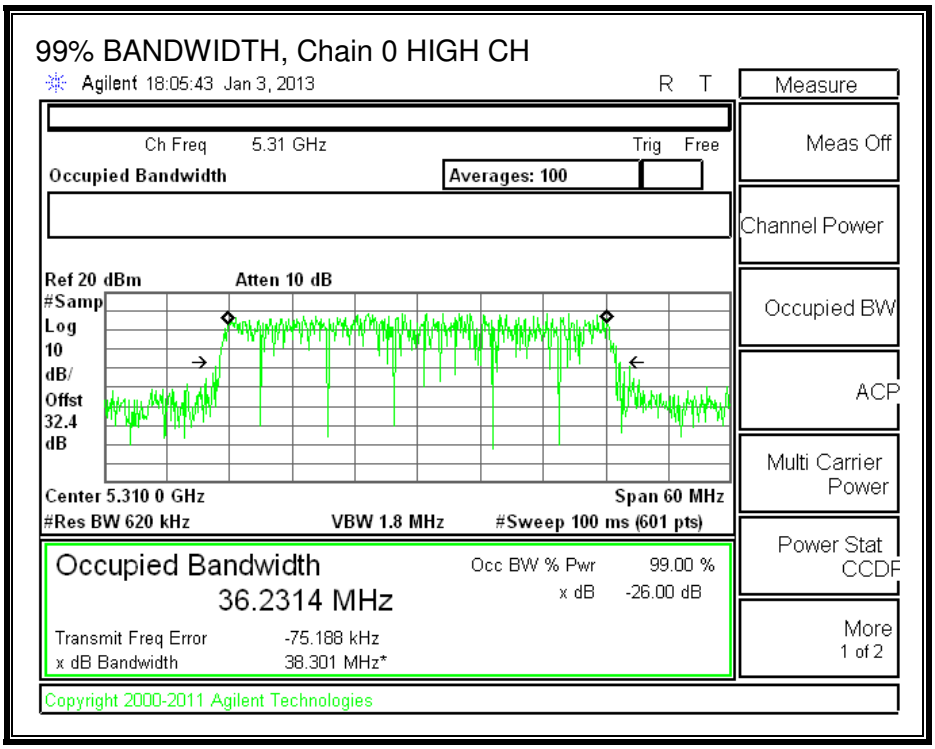
**99% BANDWIDTH, Chain 0**





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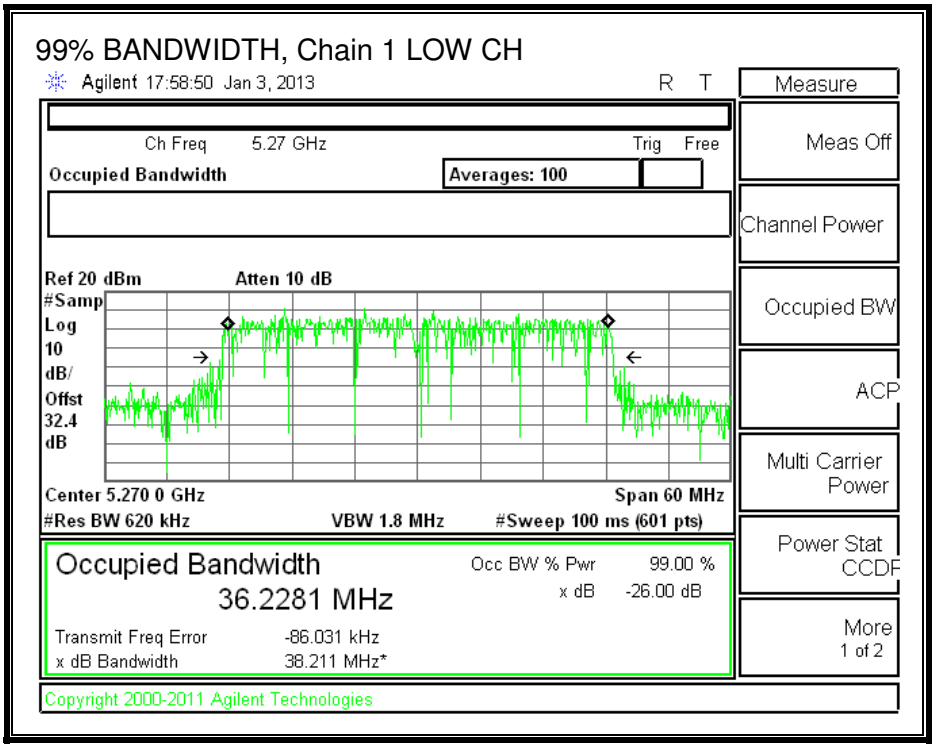
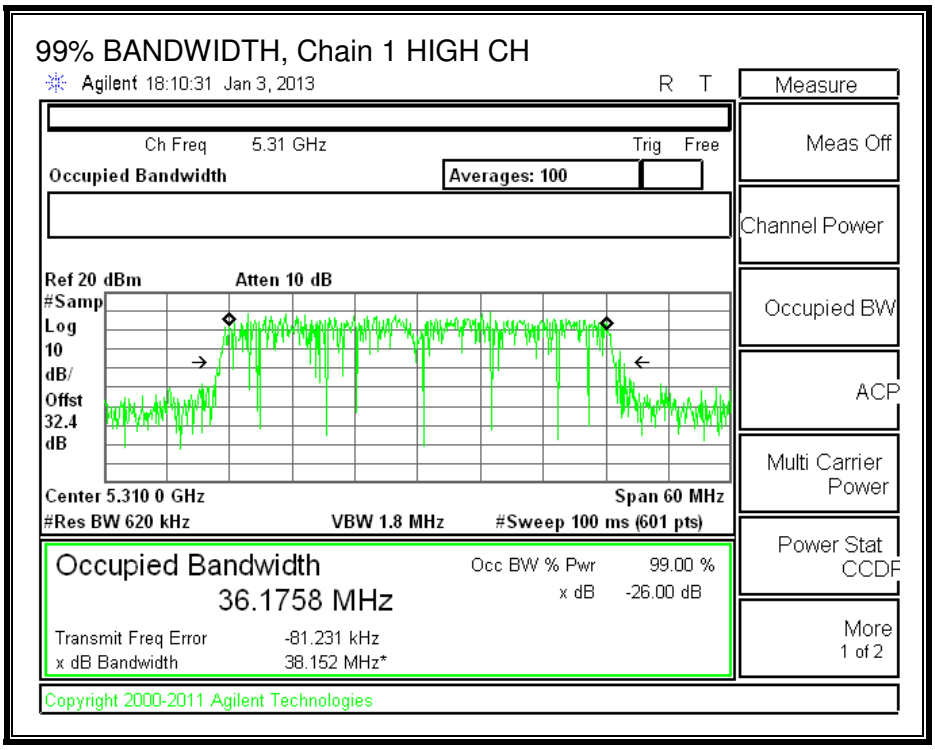
**99% BANDWIDTH, Chain 1**





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### 8.32.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|
| 3.40 | 2.30 | 2.88 |


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## RESULTS

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---|---|---|---|---|
| Low | 5270 | 39.33 | 36.2107 | 2.88 |
| High | 5310 | 39.50 | 36.1758 | 2.88 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PSD Limit (dBm) | IC PSD Limit (dBm) | PSD Limit (dBm) |
|---|---|---|---|---|---|---|---|---|
| Low | 5270 | 24.00 | 24.00 | 30.00 | 24.00 | 11.00 | 11.00 | 11.00 |
| High | 5310 | 24.00 | 24.00 | 30.00 | 24.00 | 11.00 | 11.00 | 11.00 |

| Duty Cycle CF (dB) | 0.00 | |
|---|---|---|

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5270 | 17.30 | 17.20 | 20.26 | 24.00 | -3.74 |
| High | 5310 | 15.65 | 15.50 | 18.59 | 24.00 | -5.41 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5270 | 4.60 | 5.28 | 7.96 | 11.00 | -3.04 |
| High | 5310 | 5.28 | 5.28 | 8.29 | 11.00 | -2.71 |


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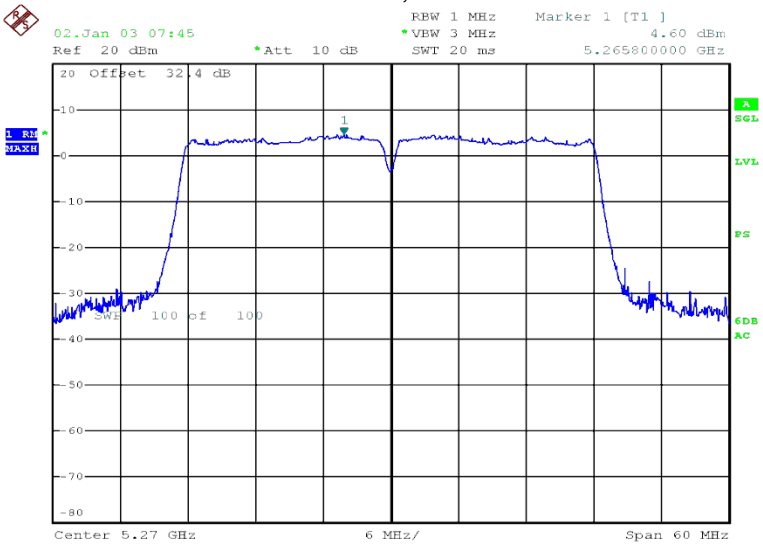
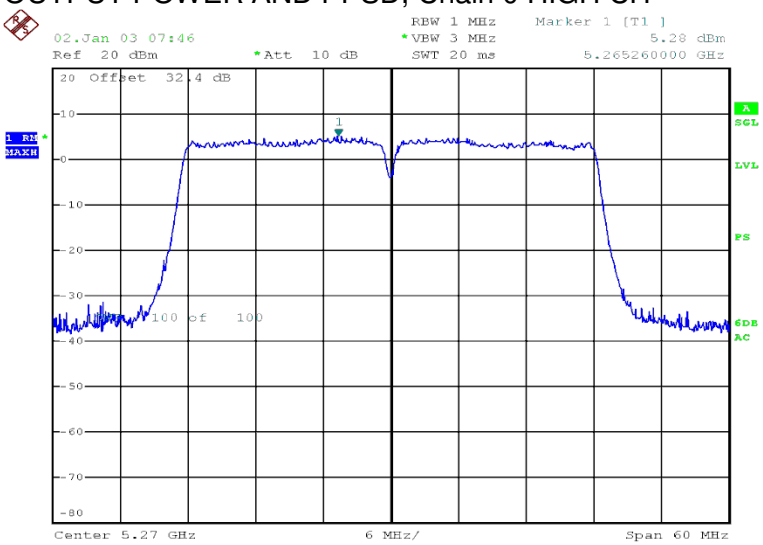
**OUTPUT POWER AND PPSD, Chain 0**

OUTPUT POWER AND PPSD, Chain 0 LOW CH




Date: 2.JAN.2003 07:45:14

OUTPUT POWER AND PPSD, Chain 0 HIGH CH




Date: 2.JAN.2003 07:46:19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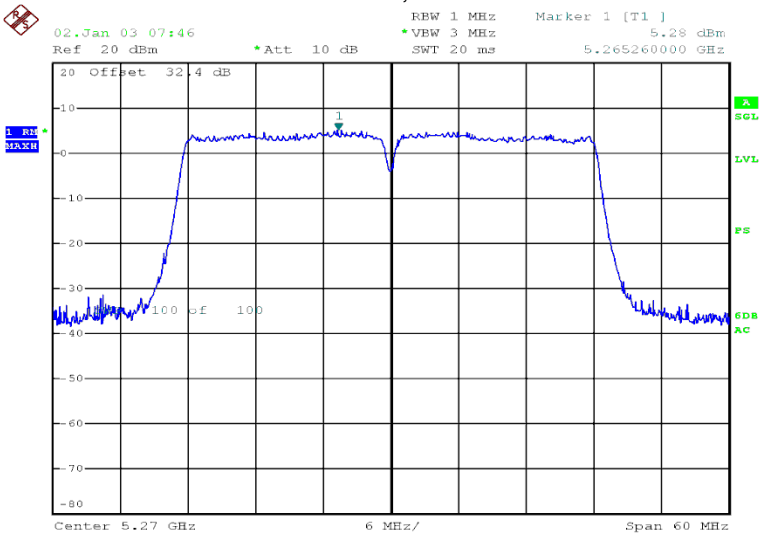
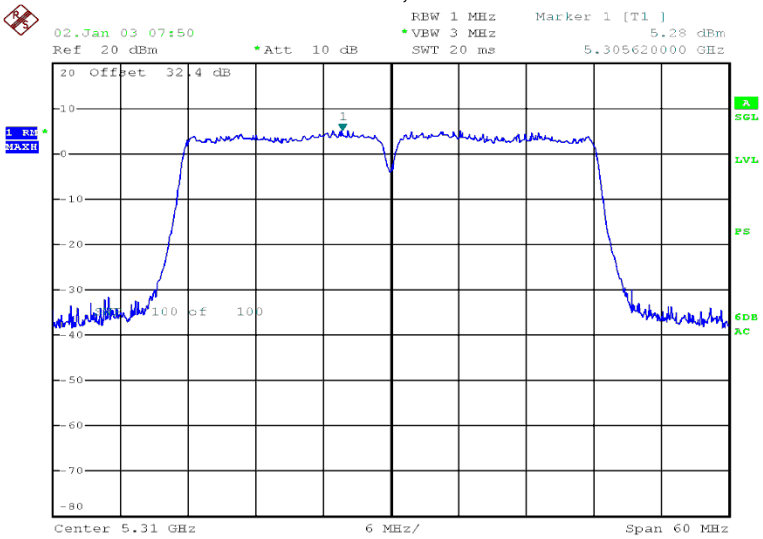
**OUTPUT POWER AND PPSD, Chain 1**

OUTPUT POWER AND PPSD, Chain 1 LOW CH




Date: 2.JAN.2003 07:46:19

OUTPUT POWER AND PPSD, Chain 1 HIGH CH




Date: 2.JAN.2003 07:50:40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### 8.32.4. TPC POWER

**LIMITS**

FCC §15.407 (h) (1)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

**RESULTS**

The maximum EIRP is less than 500 mW; therefore, TPC is not required.


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47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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## 8.33. 802.11n HT40 CDD 3TX MODE IN THE 5.3 GHz BAND

### 8.33.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) | 26 dB BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5270 | 39.83 | 39.50 | 39.50 |
| High | 5310 | 40.00 | 39.50 | 39.50 |


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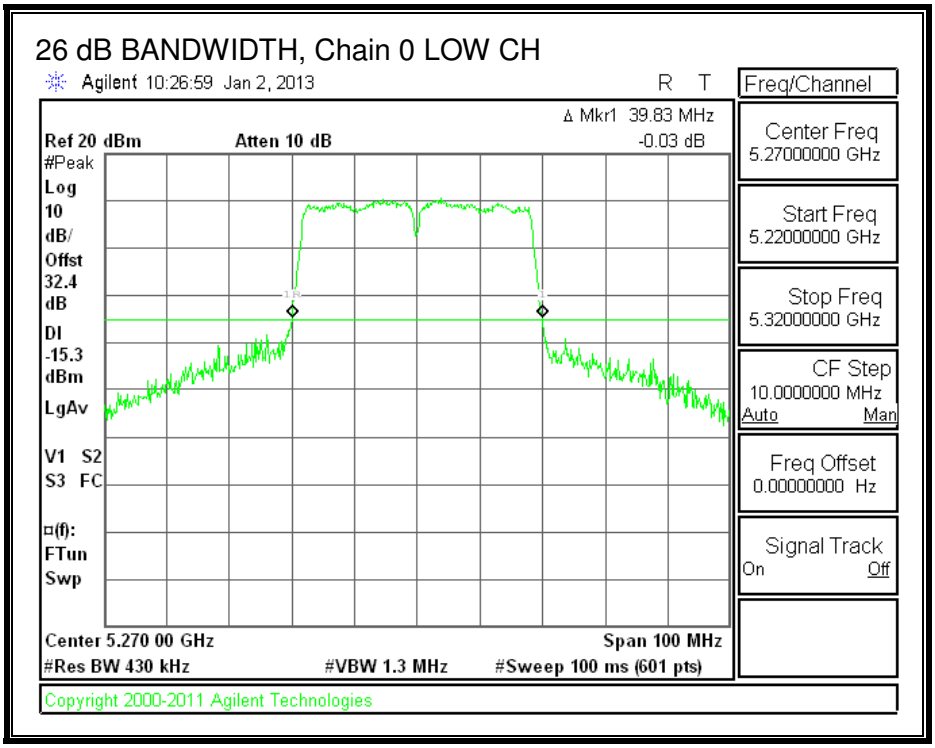
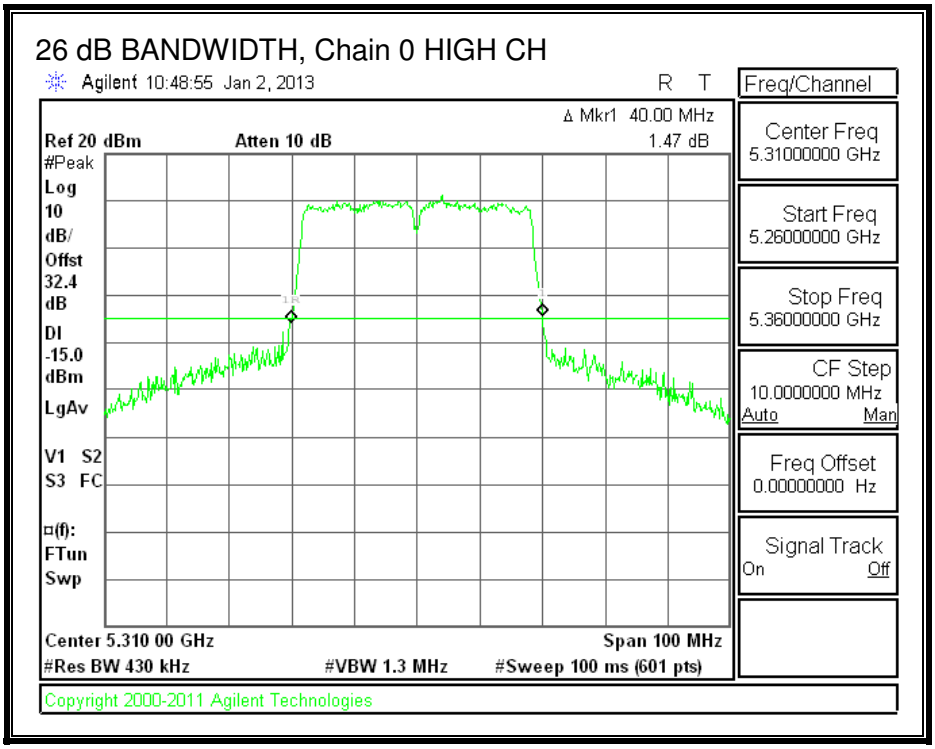
**26 dB BANDWIDTH, Chain 0**





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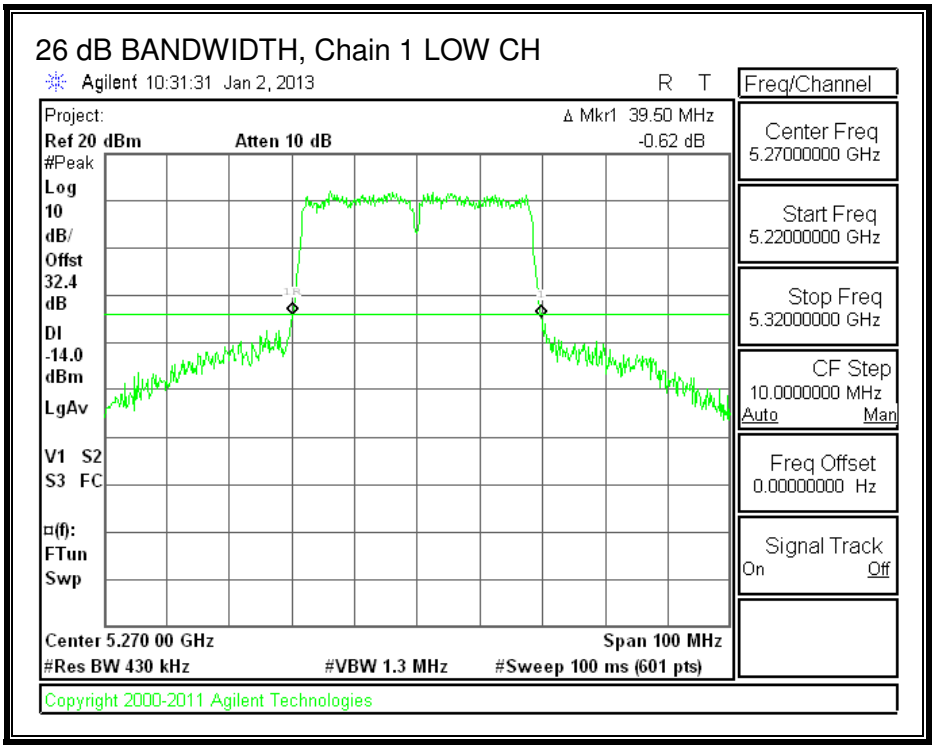
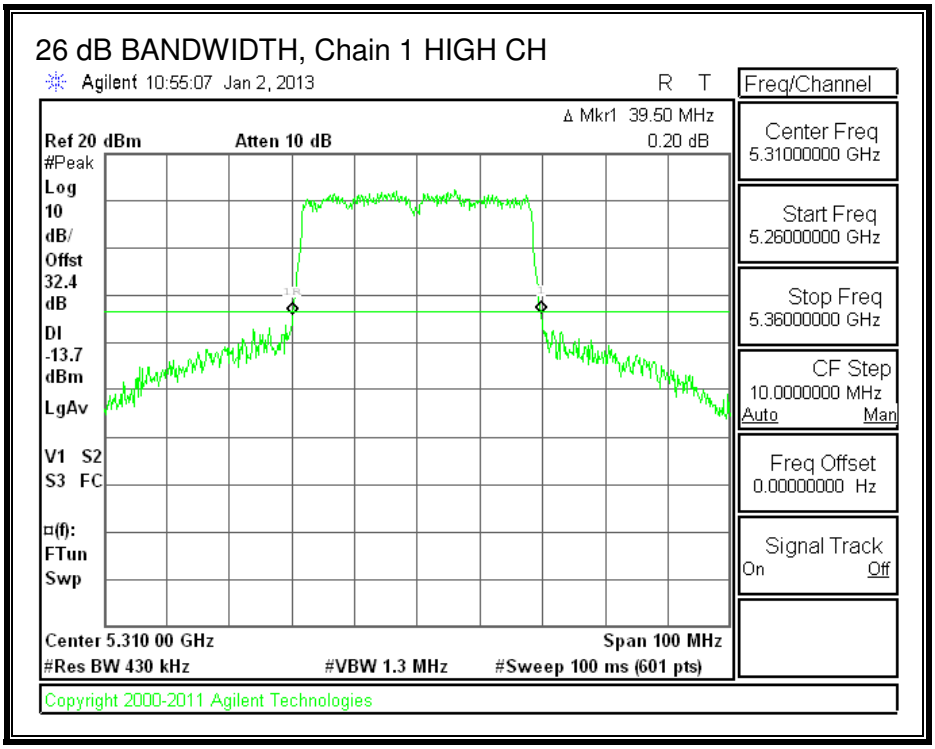
**26 dB BANDWIDTH, Chain 1**





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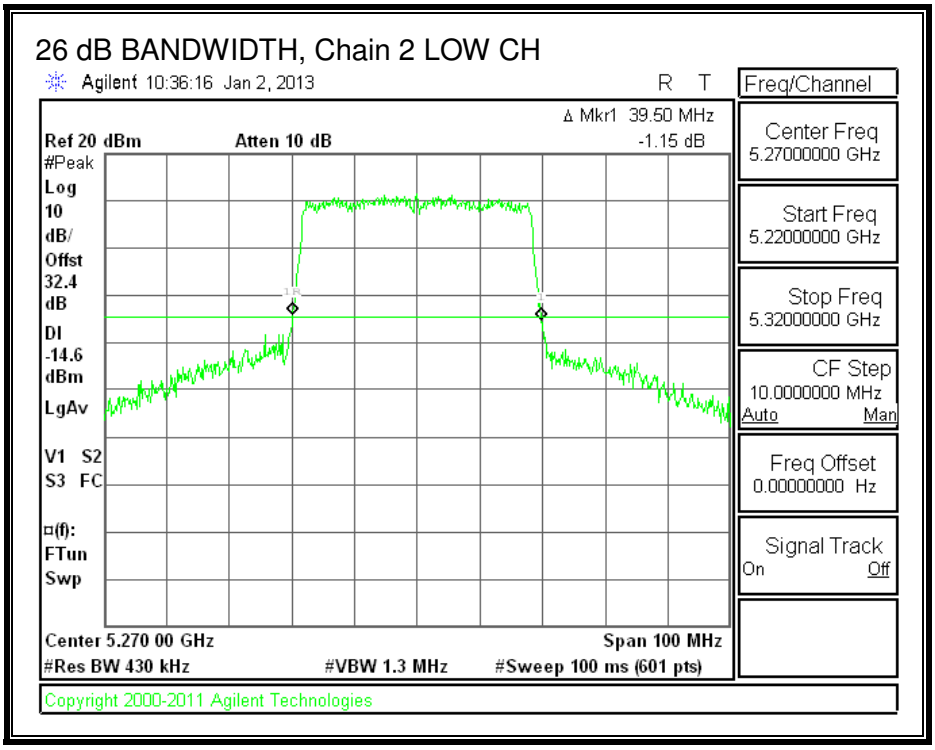
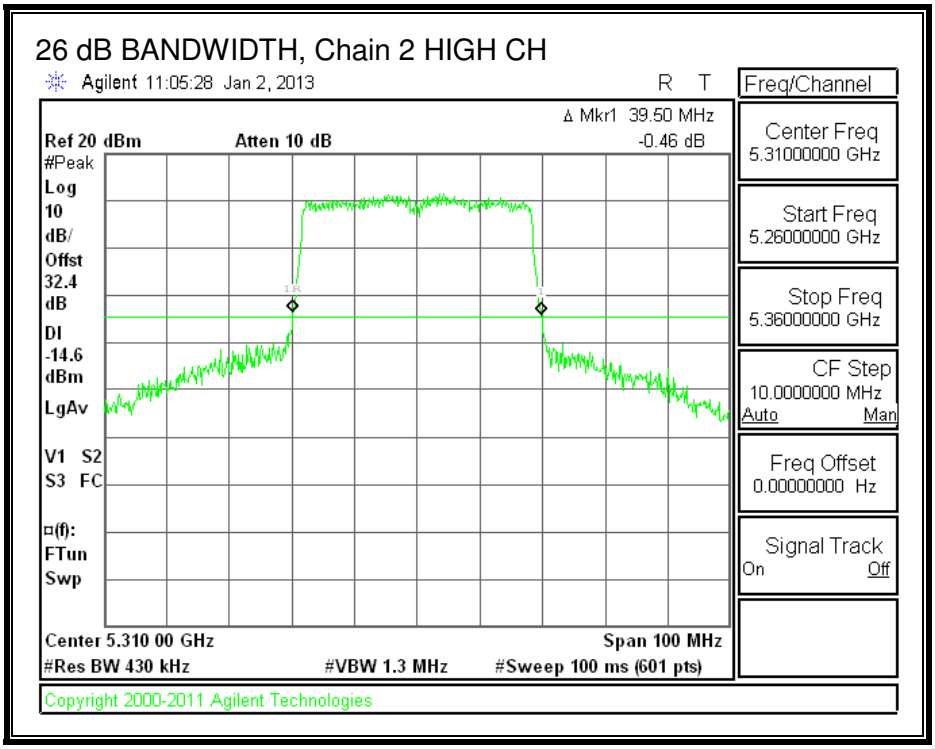
**26 dB BANDWIDTH, Chain 2**





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### 8.33.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) | 99% BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5270 | 36.2446 | 36.1981 | 36.2265 |
| High | 5310 | 36.2032 | 36.2128 | 36.2170 |


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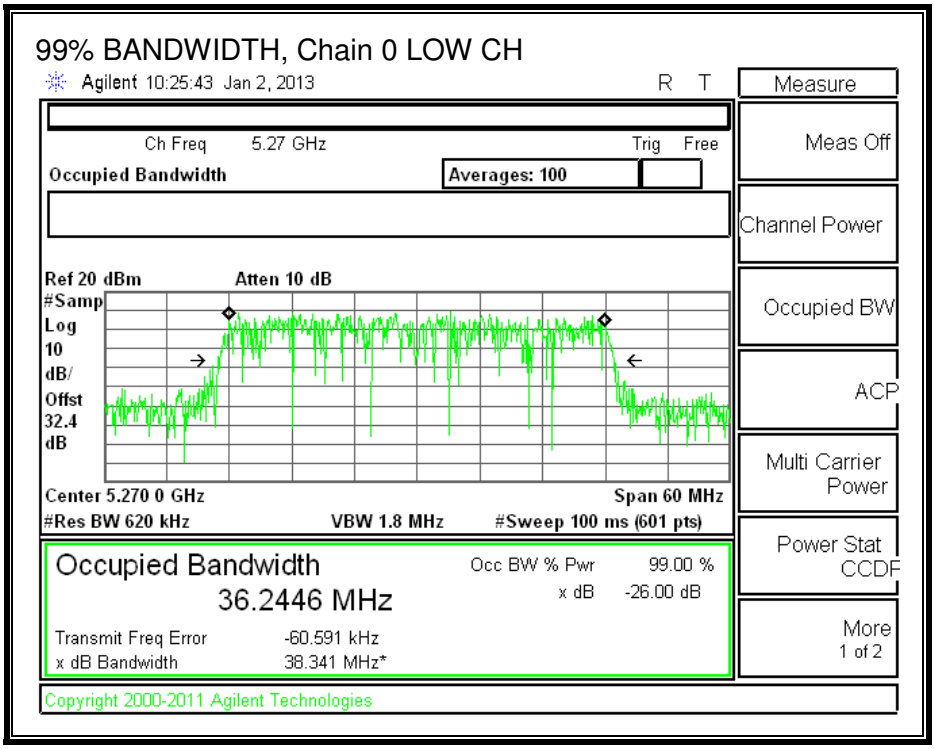
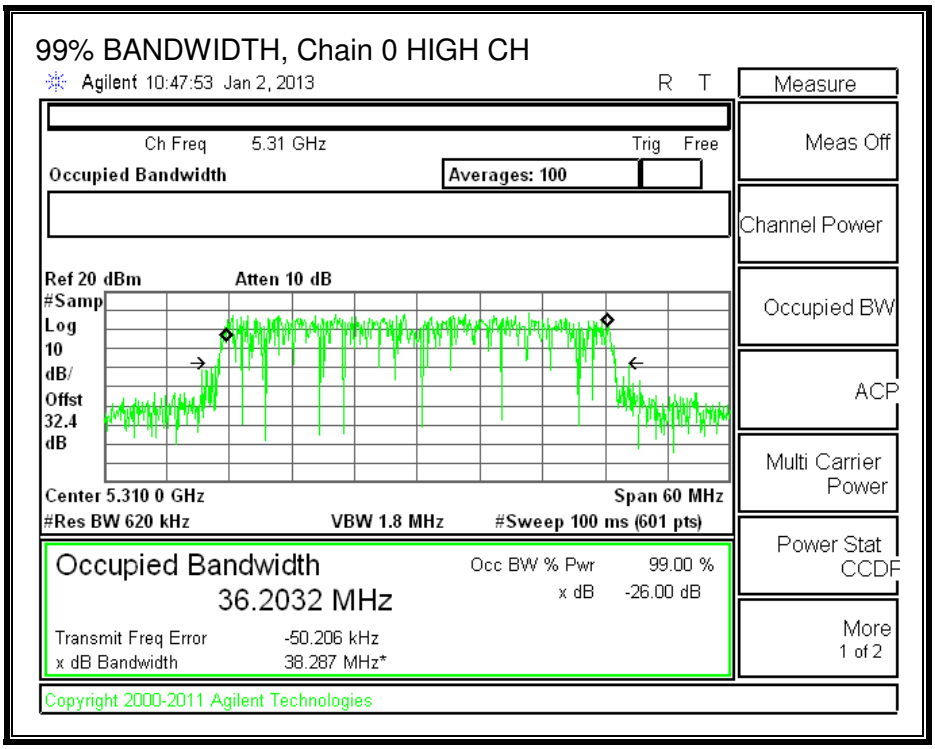
**99% BANDWIDTH, Chain 0**





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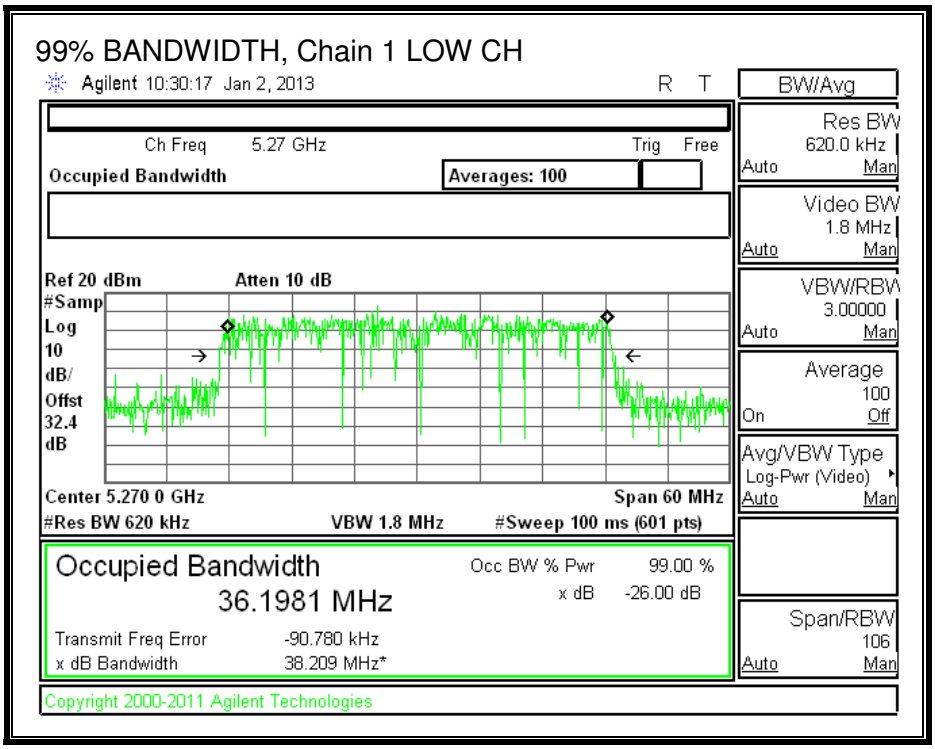
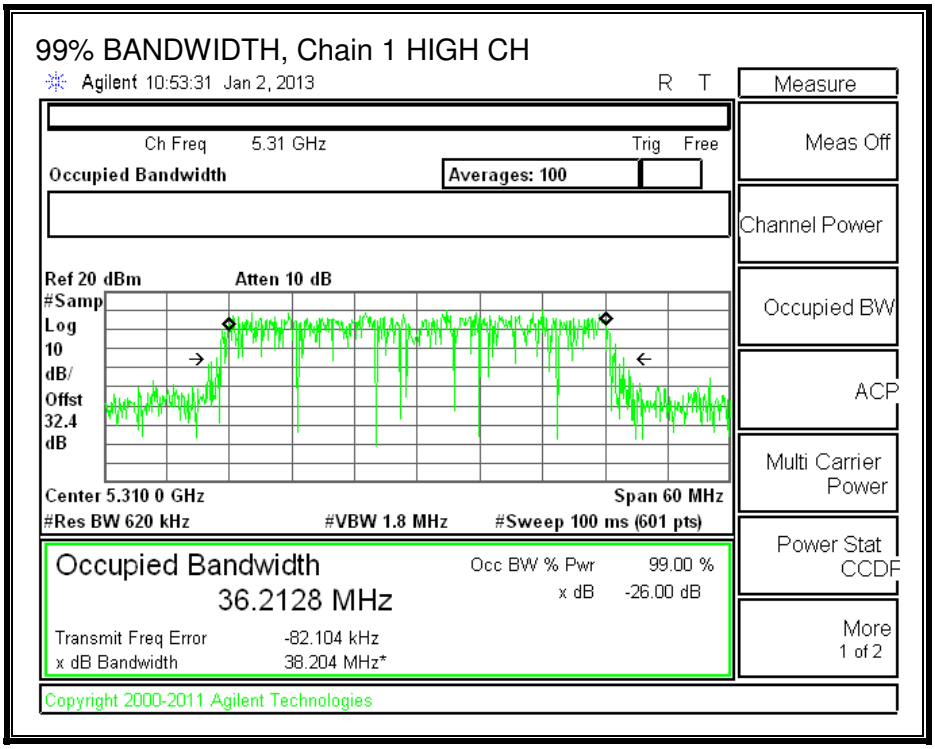
**99% BANDWIDTH, Chain 1**





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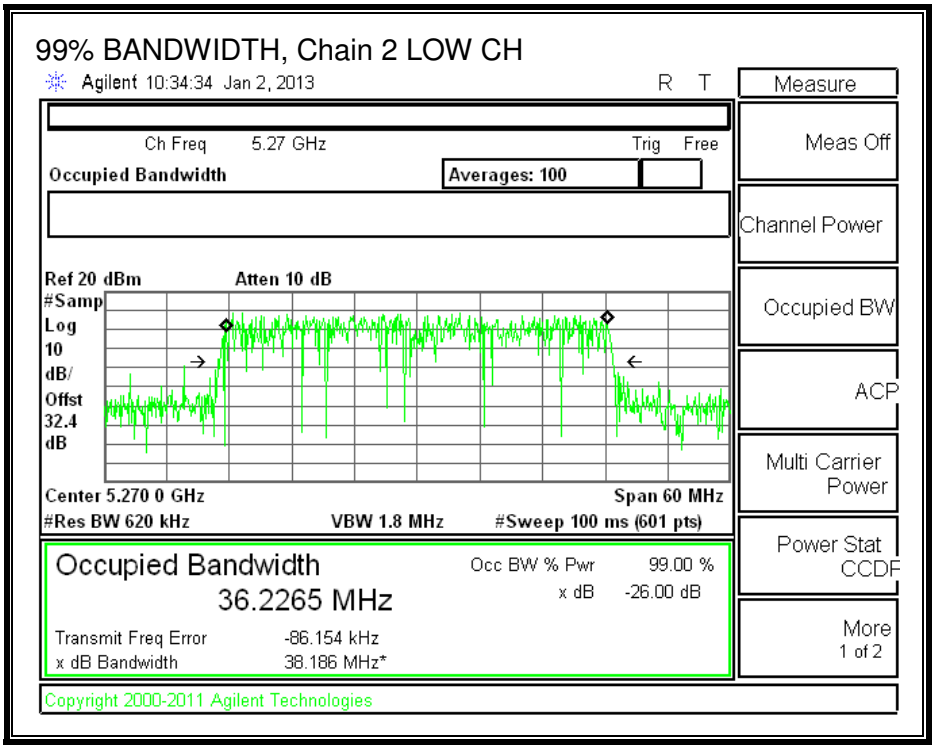
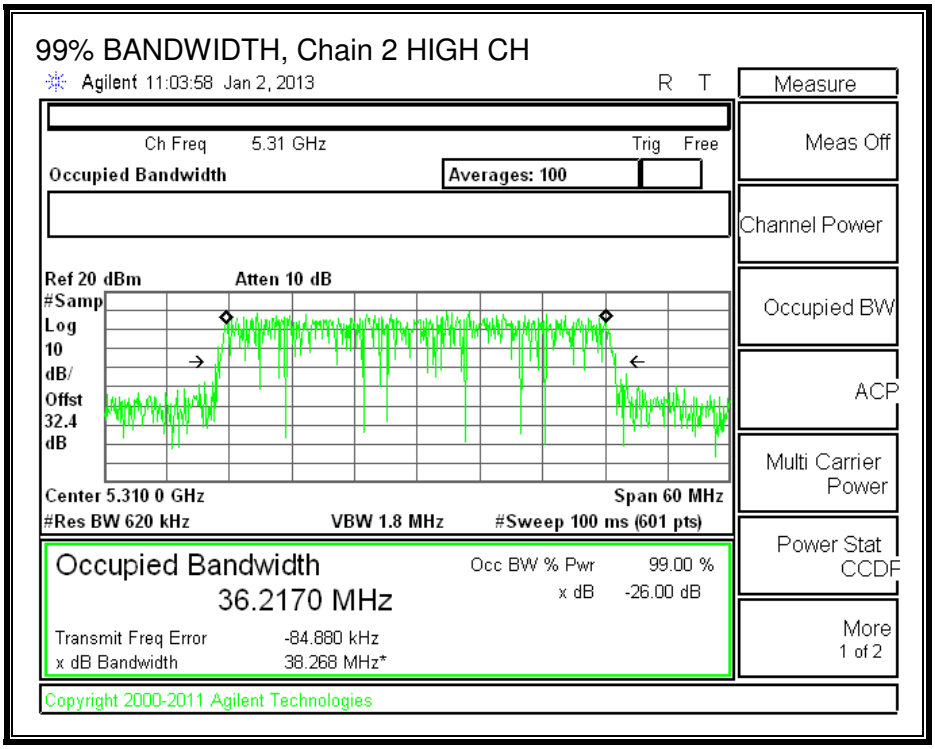
**99% BANDWIDTH, Chain 2**





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### 8.33.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated for output power and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.40 | 1.60 | 2.30 | 2.50 |

The TX chains are correlated for PSD and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.40 | 1.60 | 2.30 | 7.24 |


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**RESULTS**

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Correlated Directional Gain (dBi) | Uncorrelated Directional Gain (dBi) |
|---|---|---|---|---|---|
| Low | 5270 | 39.50 | 36.1981 | 7.24 | 2.50 |
| High | 5310 | 39.50 | 36.2032 | 7.24 | 2.50 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PSD Limit (dBm) | IC PSD Limit (dBm) | PSD Limit (dBm) |
|---|---|---|---|---|---|---|---|---|
| Low | 5270 | 24.00 | 24.00 | 30.00 | 24.00 | 9.76 | 11.00 | 9.76 |
| High | 5310 | 24.00 | 24.00 | 30.00 | 24.00 | 9.76 | 11.00 | 9.76 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5270 | 16.00 | 16.30 | 16.10 | 20.91 | 24.00 | -3.09 |
| High | 5310 | 14.50 | 14.65 | 14.60 | 19.35 | 24.00 | -4.65 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Chain 2 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5270 | 3.181 | 3.404 | 3.488 | 8.13 | 9.76 | -1.63 |
| High | 5310 | 4.019 | 3.308 | 3.561 | 8.41 | 9.76 | -1.35 |


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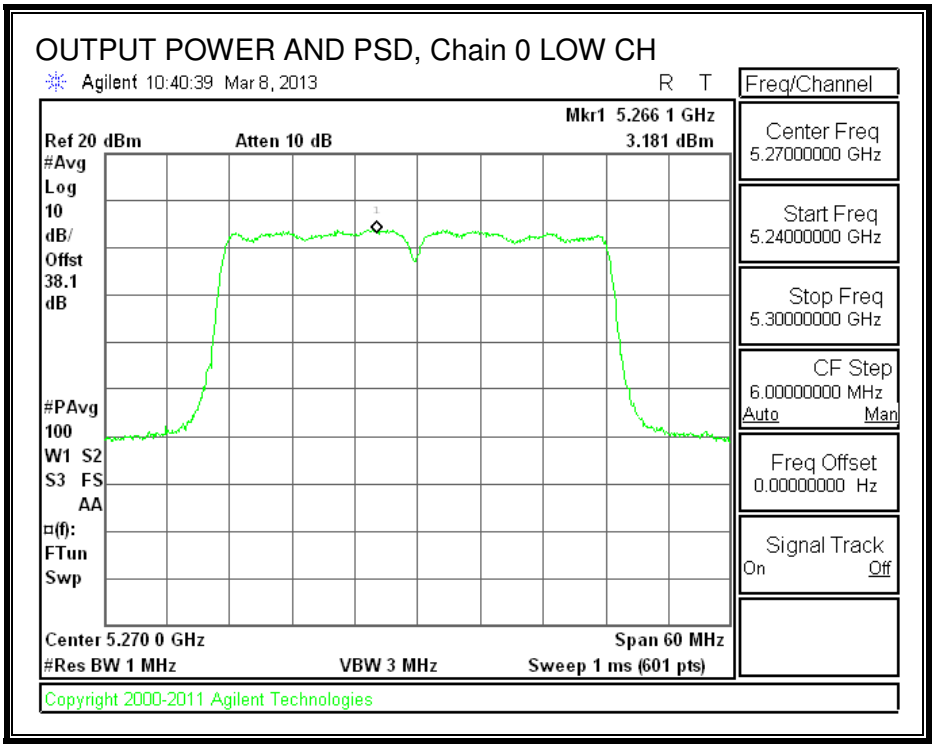
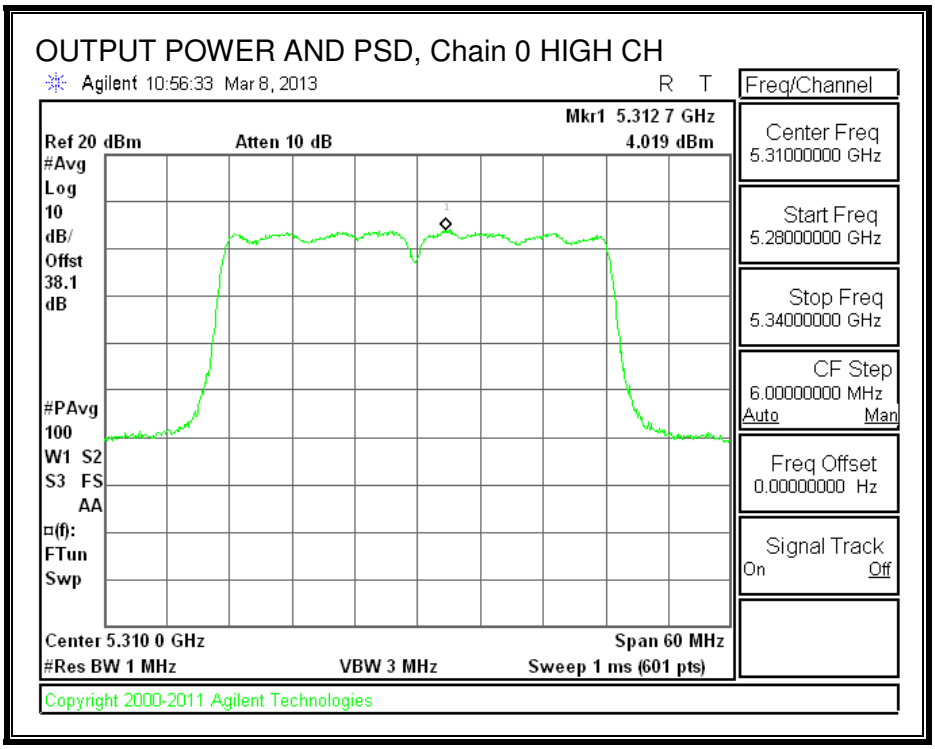
**OUTPUT POWER AND PSD, Chain 0**





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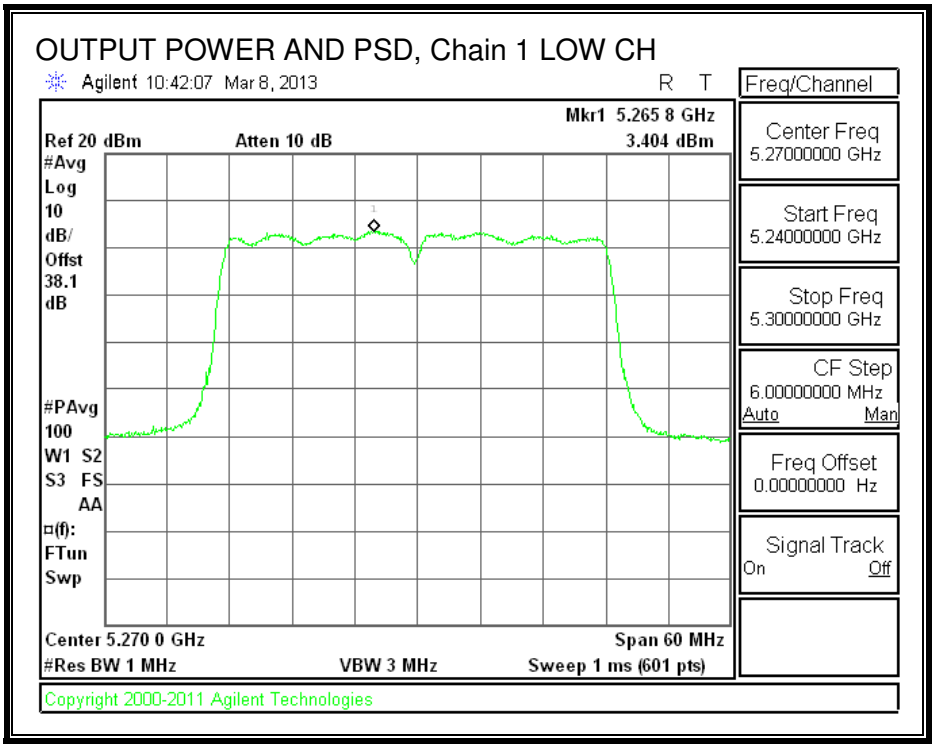
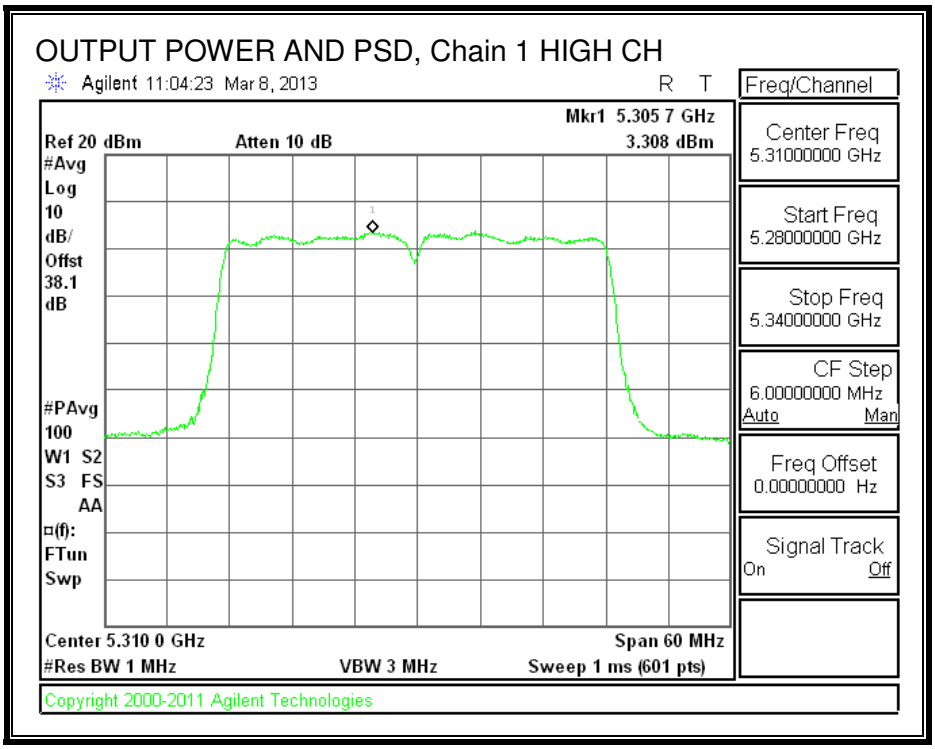
**OUTPUT POWER AND PSD, Chain 1**





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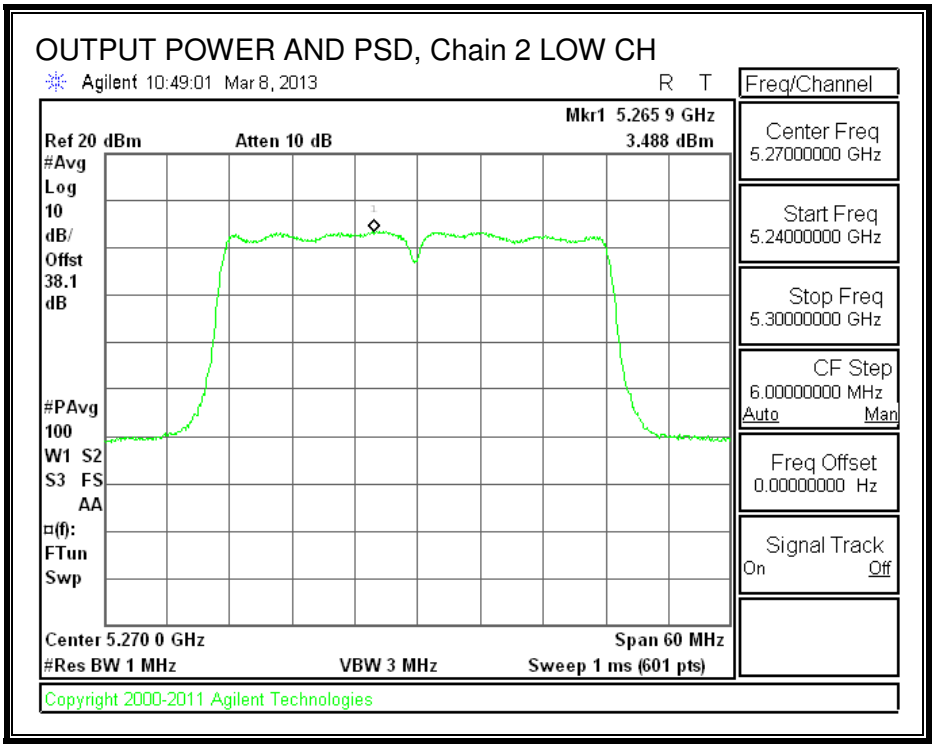
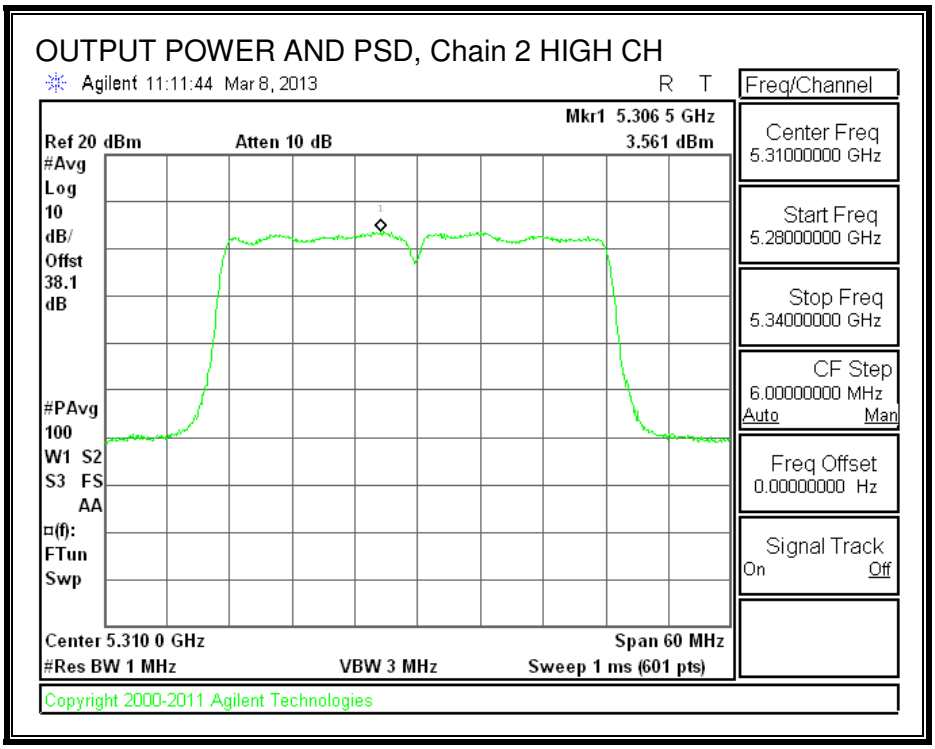
**OUTPUT POWER AND PSD, Chain 2**





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### 8.33.4. TPC POWER

**LIMITS**

FCC §15.407 (h) (1)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

**RESULTS**

The maximum EIRP is less than 500 mW; therefore, TPC is not required.


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## 8.34. 802.11n HT40 BF 3TX MODE IN THE 5.3 GHz BAND

Covered by testing HT40 CDD 3TX mode, the power per chain used for HT40 CDD 3TX mode is the same power per chain that will be used for HT40 BF 3TX mode. However, since BF is correlated and CDD is uncorrelated for output power, the section below for output power using correlated AG for this BF mode shows it is still compliant.

### 8.34.1. OUTPUT AVERAGE POWER

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

The TX chains are correlated for output power and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.40 | 1.60 | 2.30 | 7.24 |


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**RESULTS**

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Correlated Directional Gain (dBi) |
|---|---|---|---|---|
| Low | 5270 | 39.50 | 36.1981 | 7.24 |
| High | 5310 | 39.50 | 36.2032 | 7.24 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) |
|---|---|---|---|---|---|
| Low | 5270 | 22.76 | 24.00 | 30.00 | 22.76 |
| High | 5310 | 22.76 | 24.00 | 30.00 | 22.76 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5270 | 16.00 | 16.30 | 16.10 | 20.91 | 22.76 | -1.85 |
| High | 5310 | 14.50 | 14.80 | 14.60 | 19.41 | 22.76 | -3.35 |


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## 8.35. 802.11n HT40 STBC 3TX MODE IN THE 5.3 GHz BAND

### 8.35.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) | 26 dB BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5270 | 39.50 | 39.17 | 39.67 |
| High | 5310 | 39.83 | 39.33 | 39.67 |


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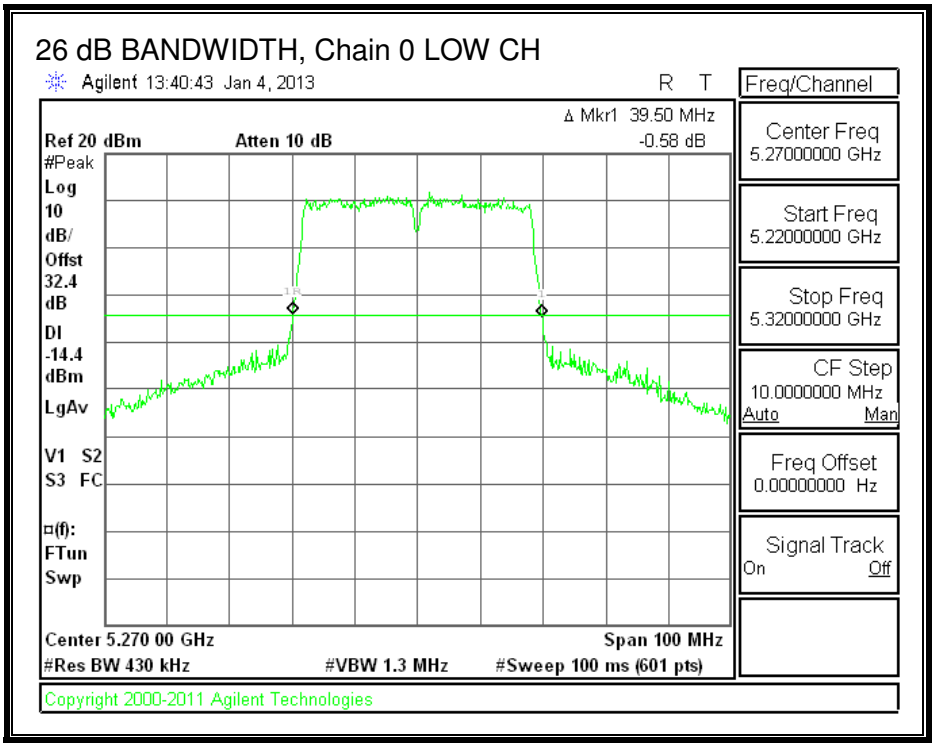
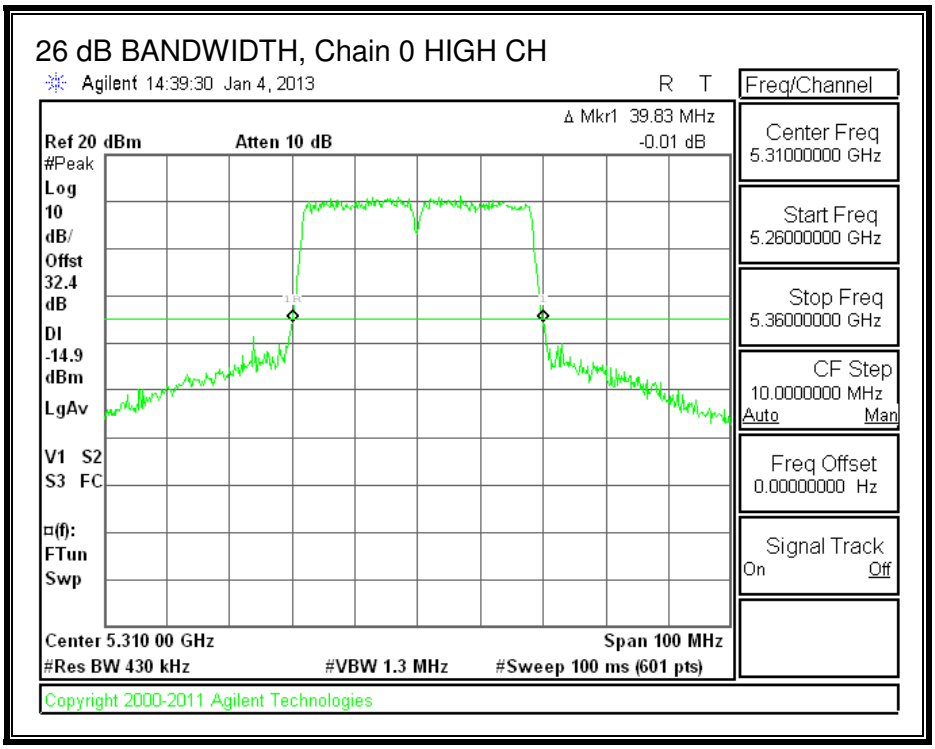
**26 dB BANDWIDTH, Chain 0**





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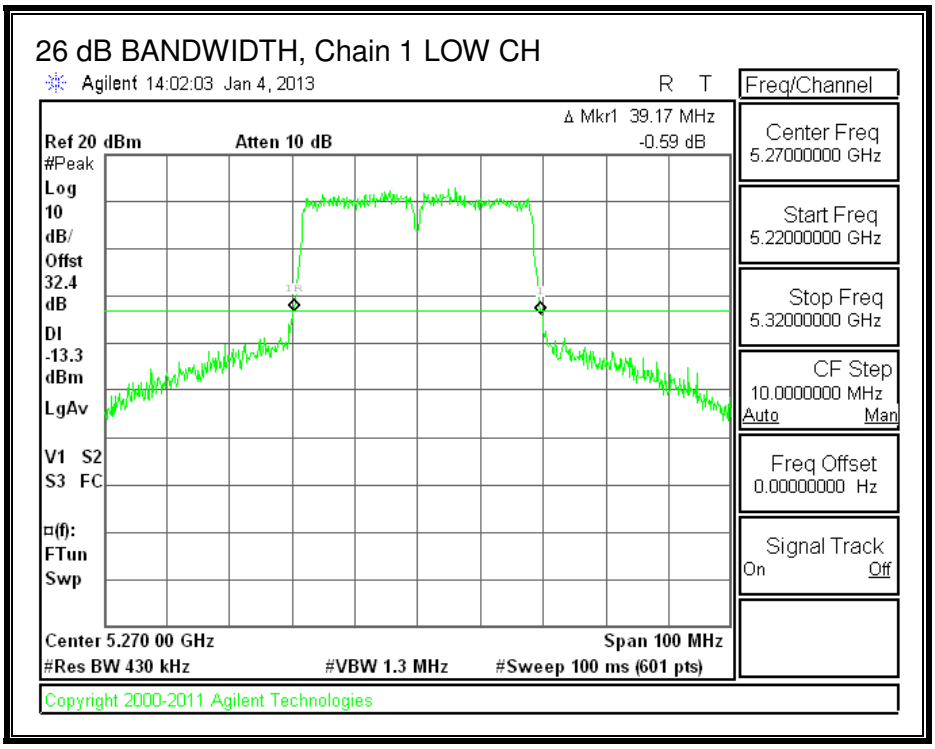
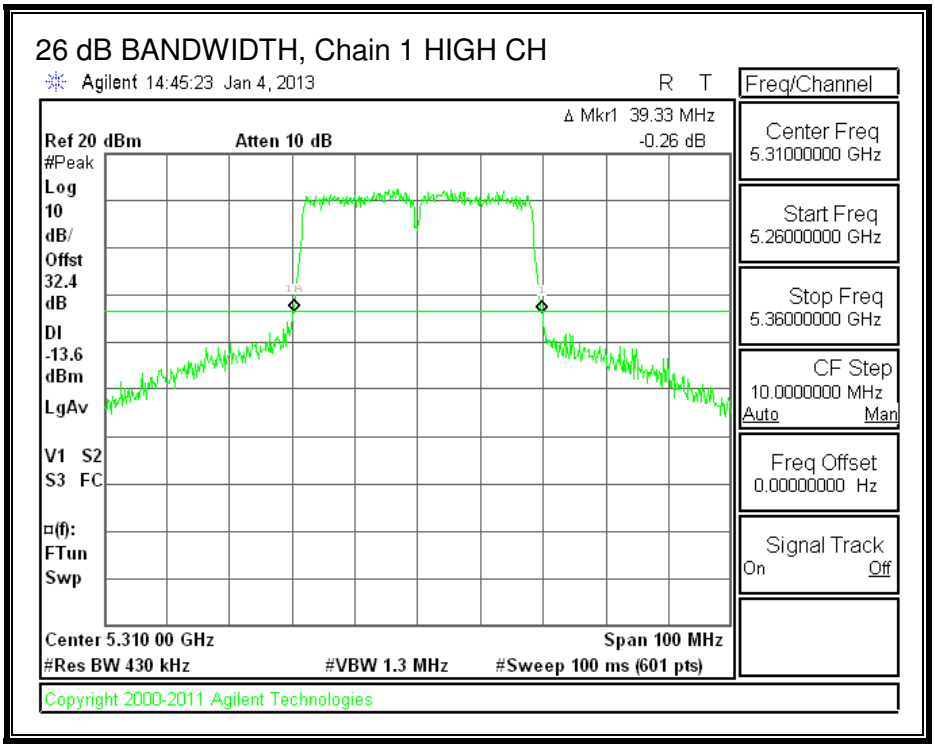
**26 dB BANDWIDTH, Chain 1**





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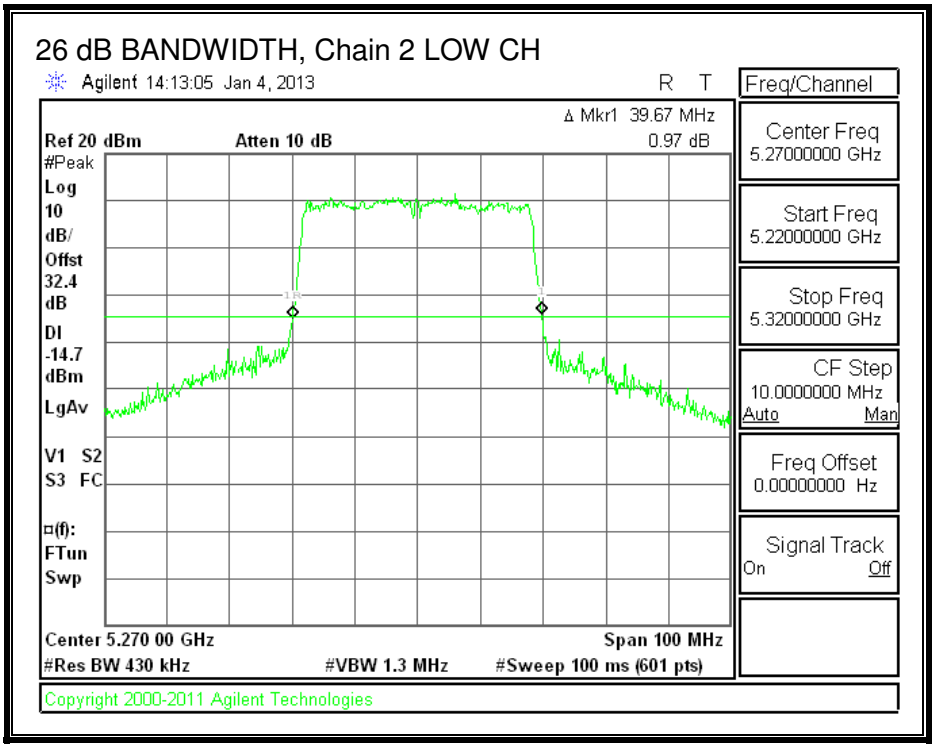
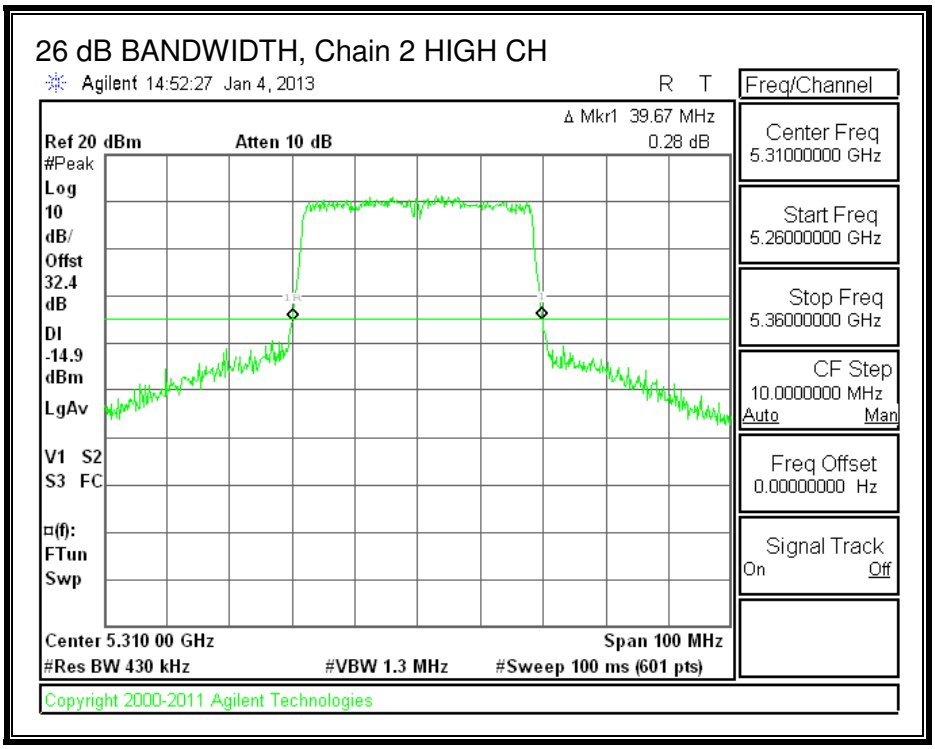
**26 dB BANDWIDTH, Chain 2**





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### 8.35.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) | 99% BW Chain 2 (MHz) |
|---|---|---|---|---|
| Low | 5270 | 36.1714 | 36.1775 | 36.1869 |
| High | 5310 | 36.1744 | 36.2118 | 36.1699 |


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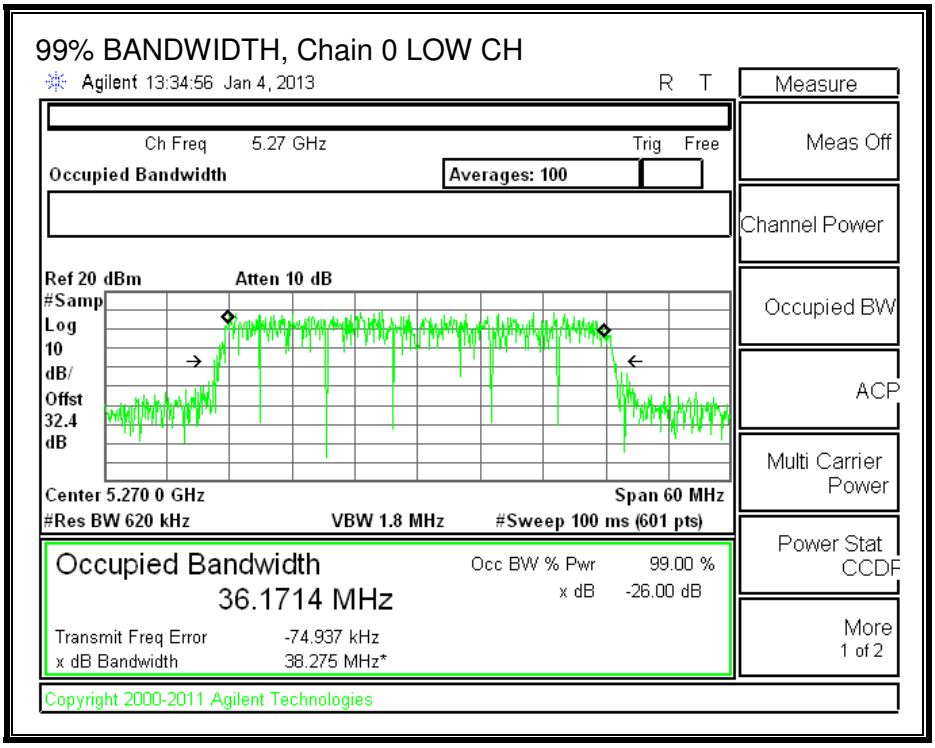
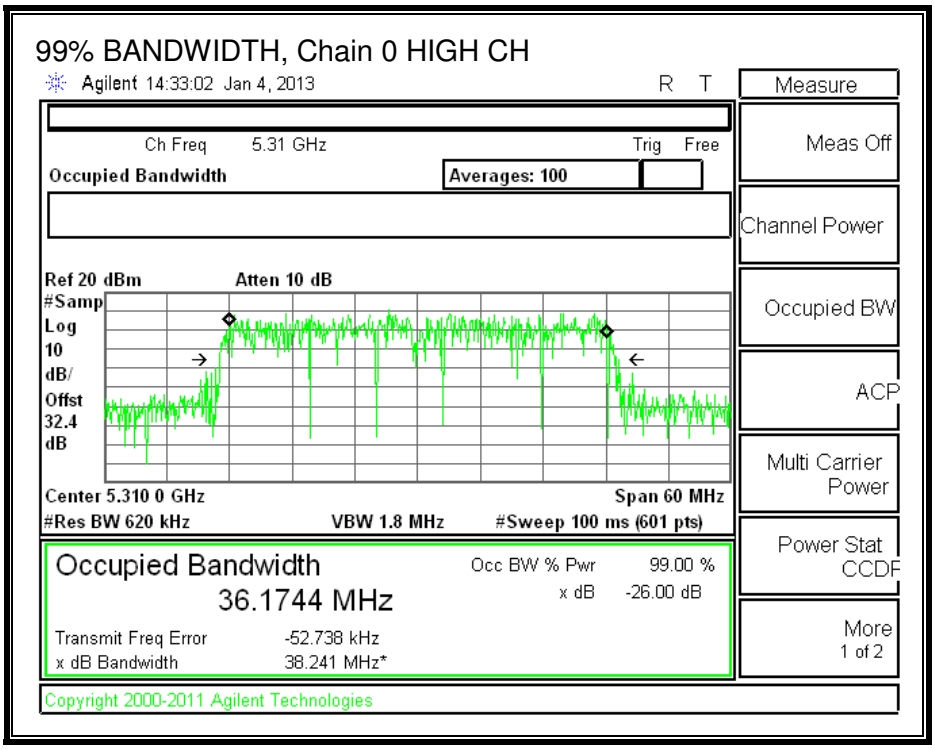
**99% BANDWIDTH, Chain 0**





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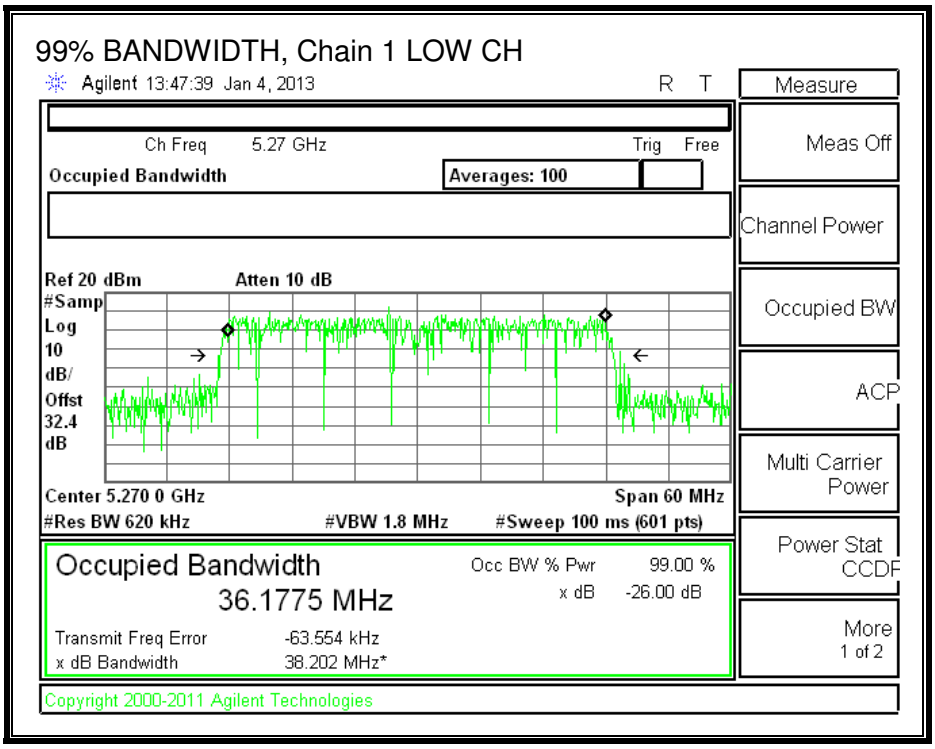
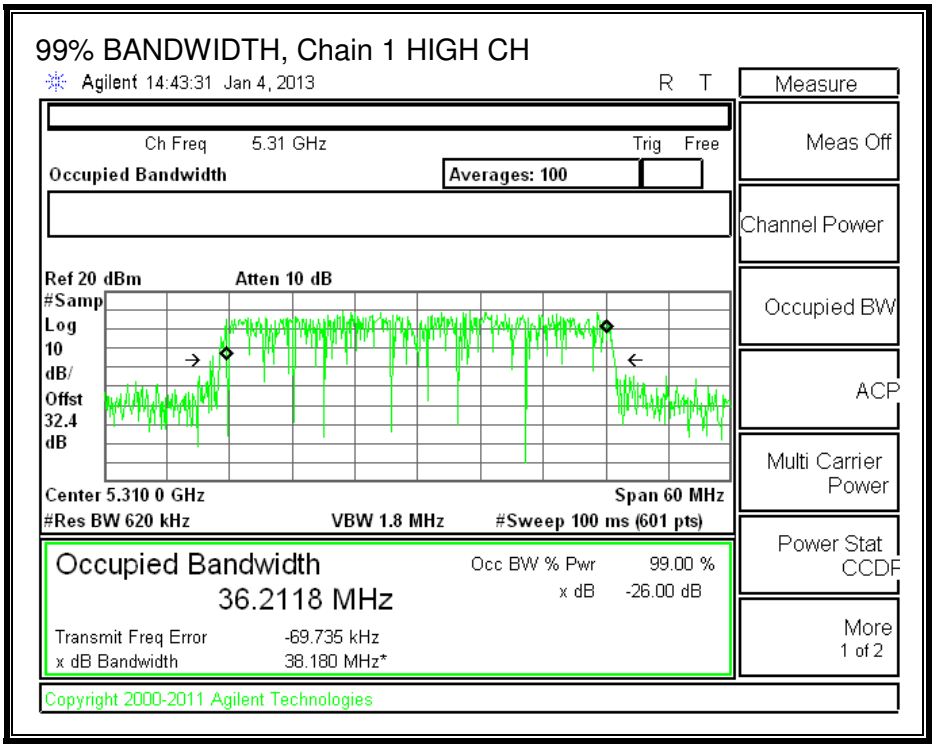
**99% BANDWIDTH, Chain 1**





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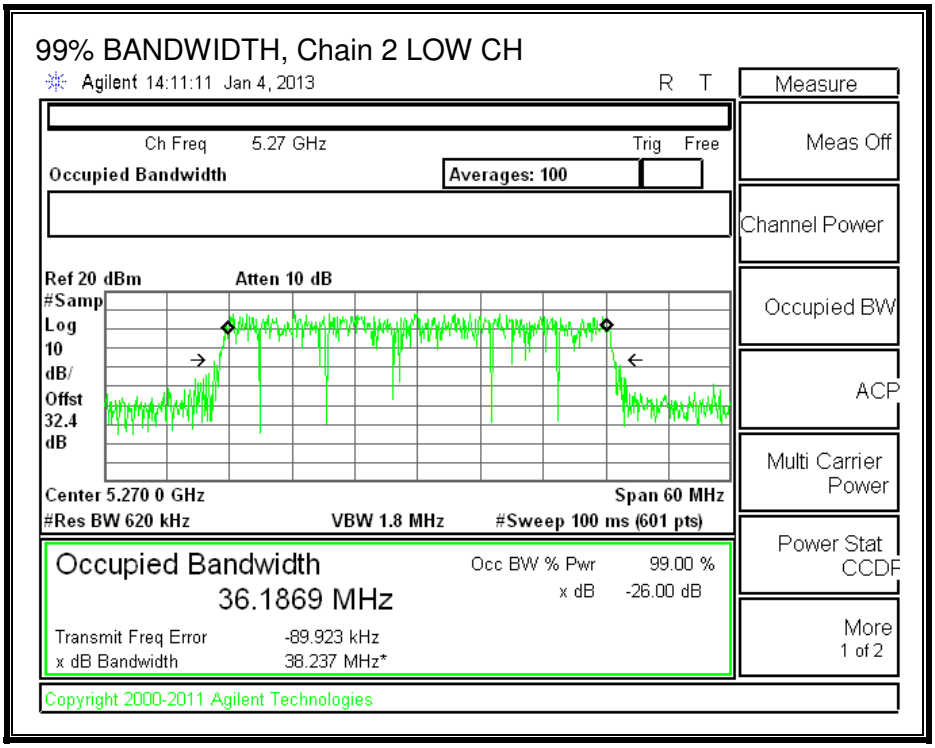
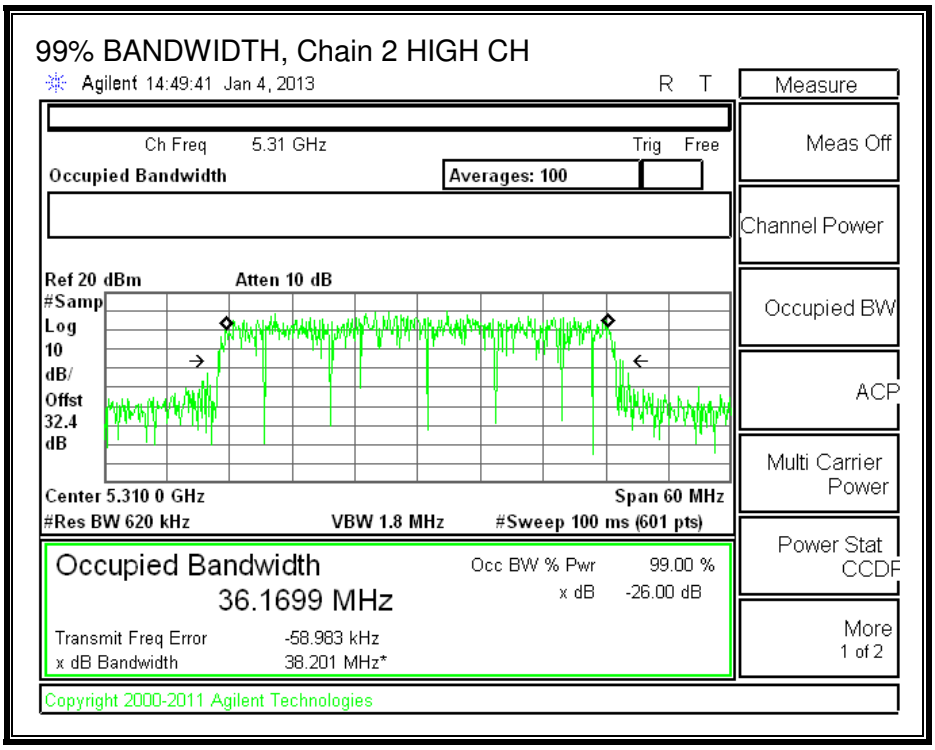
**99% BANDWIDTH, Chain 2**





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### 8.35.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Chain 2 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|---|
| 3.40 | 1.60 | 2.30 | 2.50 |


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**RESULTS**

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---|---|---|---|---|
| Low | 5270 | 39.17 | 36.1714 | 2.50 |
| High | 5310 | 39.33 | 36.1699 | 2.50 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PSD Limit (dBm) | IC PSD Limit (dBm) | PSD Limit (dBm) |
|---|---|---|---|---|---|---|---|---|
| Low | 5270 | 24.00 | 24.00 | 30.00 | 24.00 | 11.00 | 11.00 | 11.00 |
| High | 5310 | 24.00 | 24.00 | 30.00 | 24.00 | 11.00 | 11.00 | 11.00 |

| Duty Cycle CF (dB) | 0.00 | |
|---|---|---|

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Chain 2 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5270 | 16.00 | 16.30 | 16.10 | 20.91 | 24.00 | -3.09 |
| High | 5310 | 14.50 | 14.80 | 14.65 | 19.42 | 24.00 | -4.58 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Chain 2 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5270 | 4.78 | 4.75 | 4.65 | 9.50 | 11.00 | -1.50 |
| High | 5310 | 4.99 | 4.66 | 4.16 | 9.39 | 11.00 | -1.61 |


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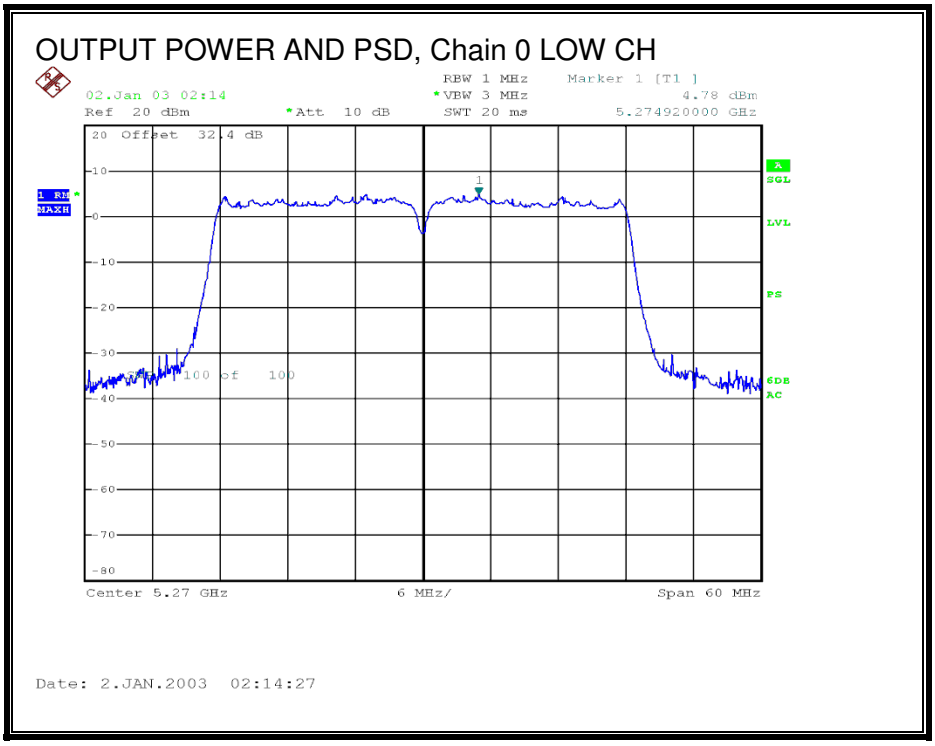
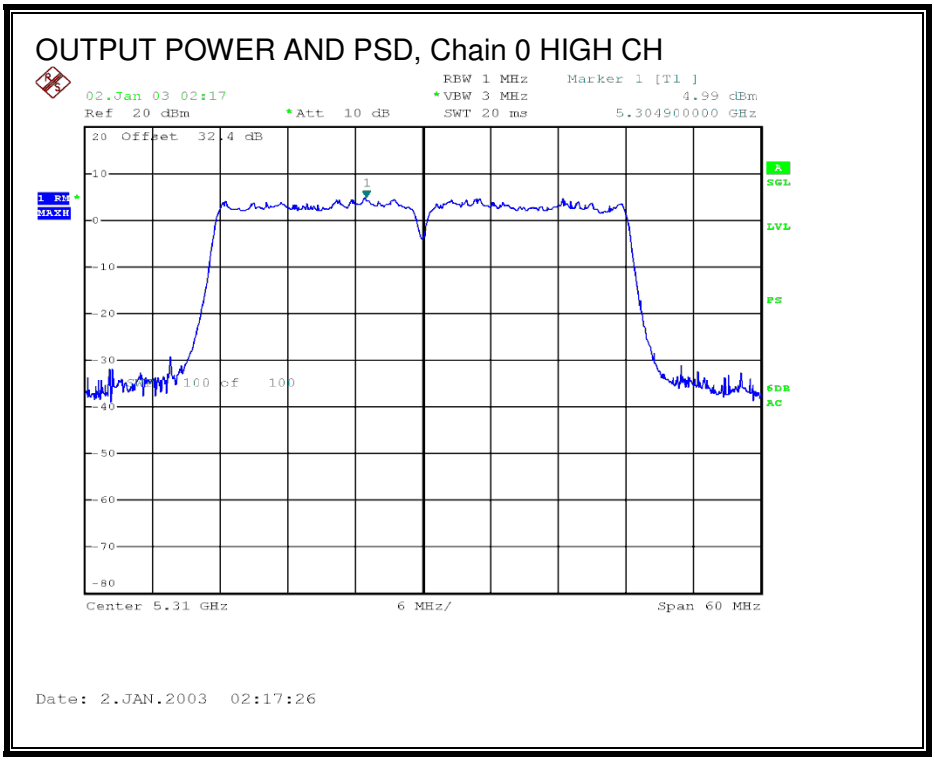
**OUTPUT POWER AND PSD, Chain 0**





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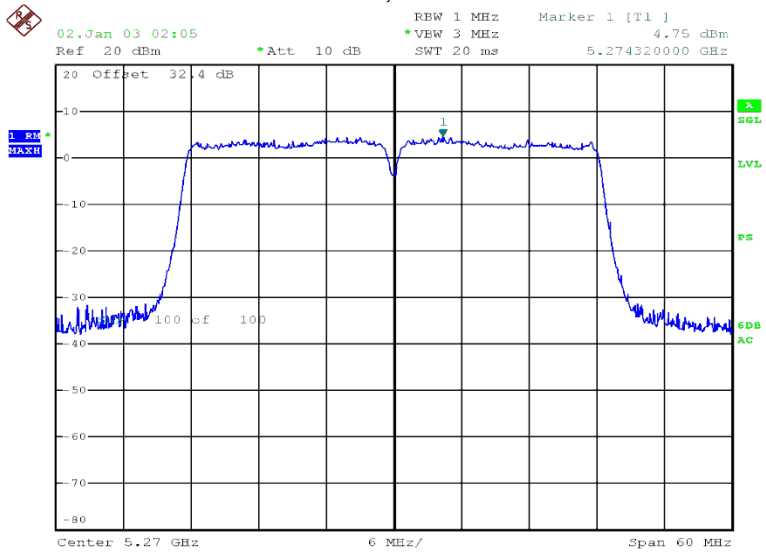
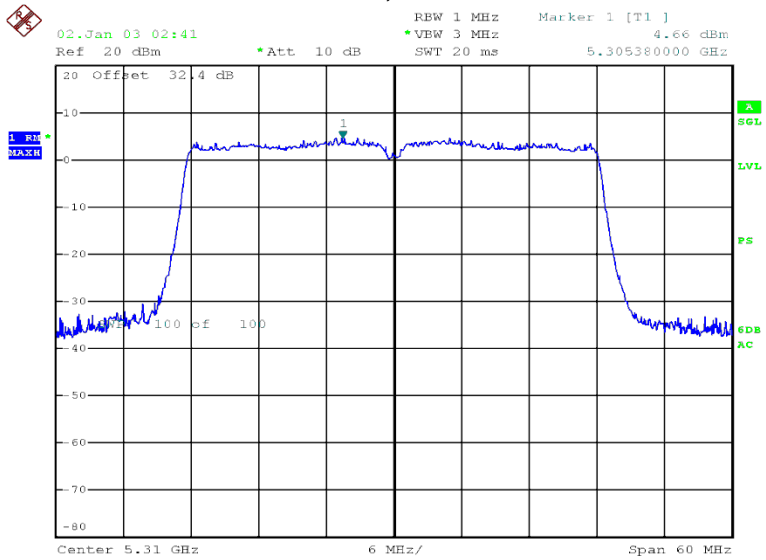
**OUTPUT POWER AND PSD, Chain 1**

OUTPUT POWER AND PSD, Chain 1 LOW CH




Date: 2.JAN.2003 02:05:31

OUTPUT POWER AND PSD, Chain 1 HIGH CH




Date: 2.JAN.2003 02:41:33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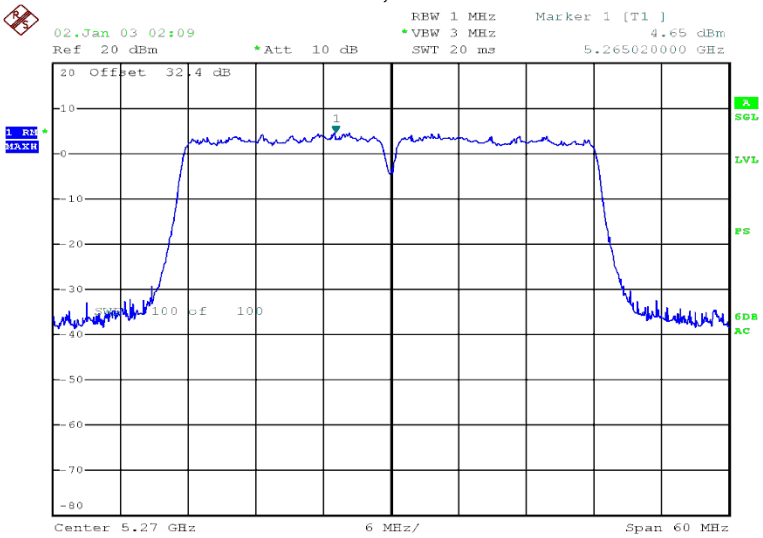
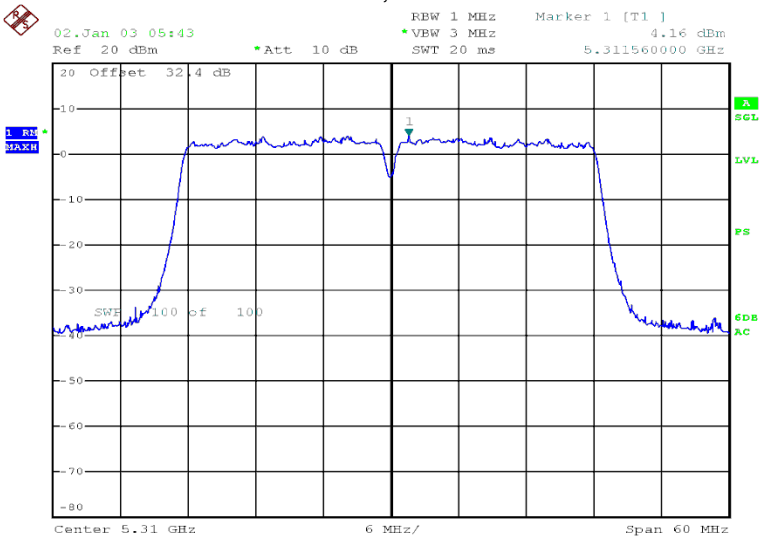
**OUTPUT POWER AND PSD, Chain 2**

OUTPUT POWER AND PSD, Chain 2 LOW CH




Date: 2.JAN.2003 02:09:21

OUTPUT POWER AND PSD, Chain 2 HIGH CH




Date: 2.JAN.2003 05:43:59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### 8.35.4. TPC POWER

**LIMITS**

FCC §15.407 (h) (1)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

**RESULTS**

The maximum EIRP is less than 500 mW; therefore, TPC is not required.


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## 8.36. 802.11ac VHT80 1X MODE IN THE 5.3 GHz BAND

### 8.36.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB Bandwidth (MHz) |
|---|---|---|
| Mid | 5290 | 82.33 |


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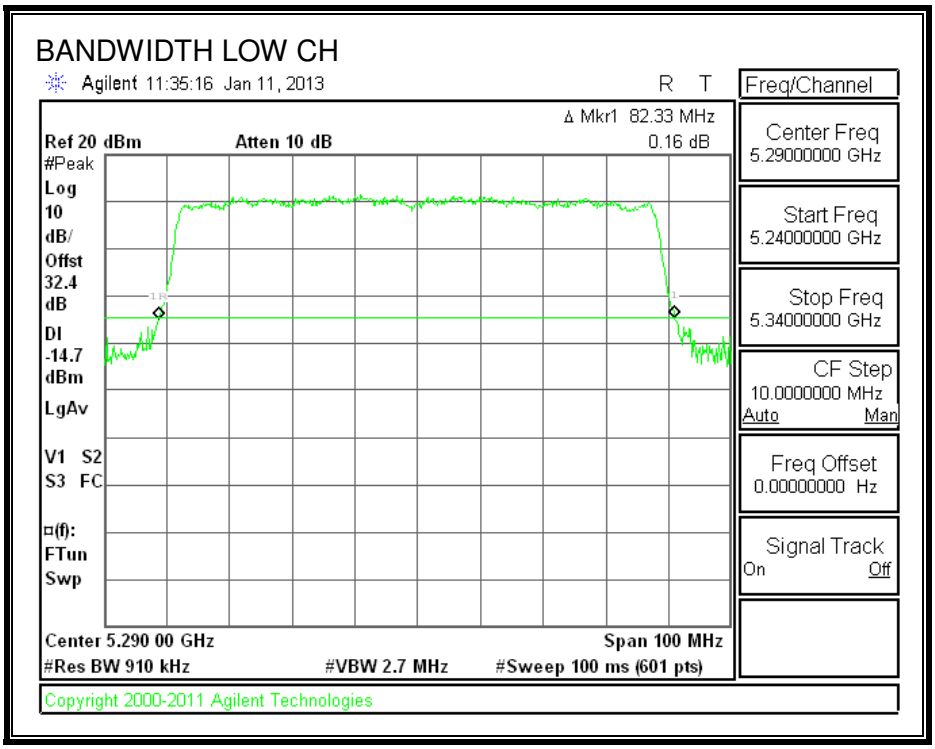
**26 dB BANDWIDTH**





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### 8.36.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Mid | 5290 | 75.5201 |


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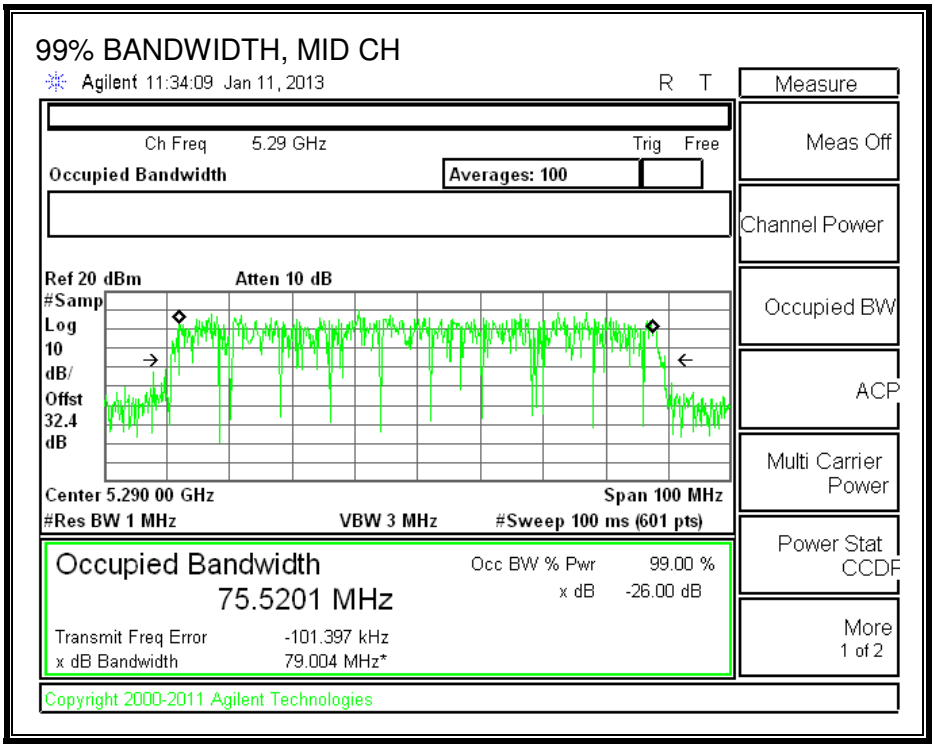
**99% BANDWIDTH**





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### 8.36.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.


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## RESULTS

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---|---|---|---|---|
| Mid | 5290 | 82.33 | 75.5201 | 3.40 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PSD Limit (dBm) | IC PSD Limit (dBm) | PSD Limit (dBm) |
|---|---|---|---|---|---|---|---|---|
| Mid | 5290 | 24.00 | 24.00 | 30.00 | 24.00 | 11.00 | 11.00 | 11.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.10 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Mid | 5290 | 13.50 | 13.50 | 24.00 | -10.50 |

**PSD Results**

| Channel | Frequency (MHz) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Mid | 5290 | -3.386 | -3.286 | 11.00 | -14.29 |


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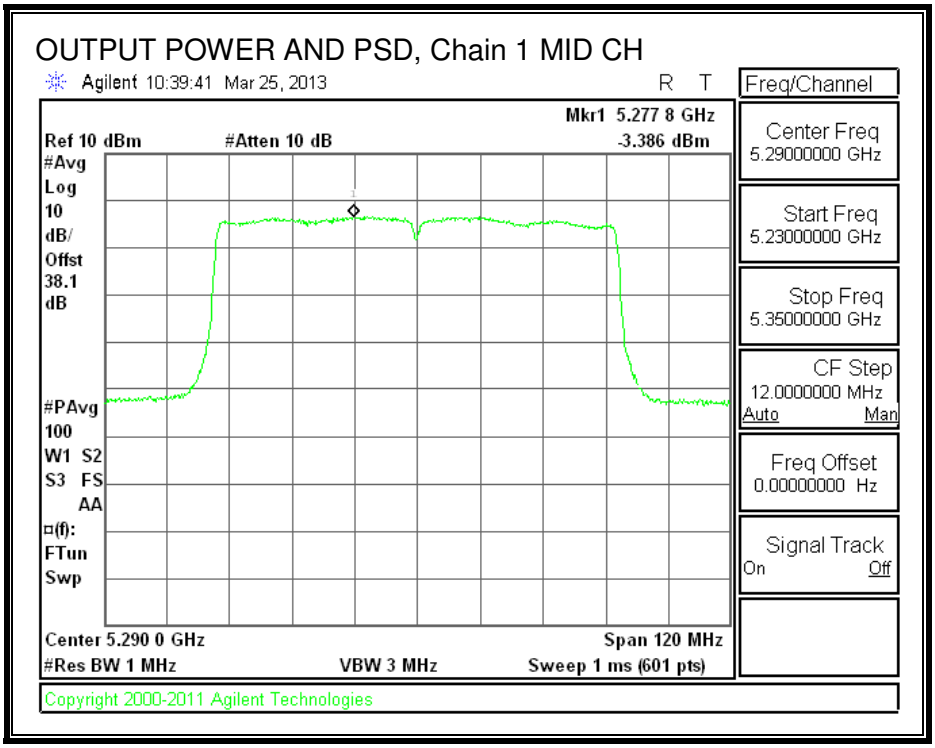
**OUTPUT POWER AND PSD, Chain 1**





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### 8.36.4. TPC POWER

**LIMITS**

FCC §15.407 (h) (1)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

**RESULTS**

The maximum EIRP is less than 500 mW; therefore, TPC is not required.


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## 8.37. 802.11ac VHT80 CDD 2TX MODE IN THE 5.3 GHz BAND

### 8.37.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---|---|---|---|
| Mid | 5290 | 82.80 | 82.80 |


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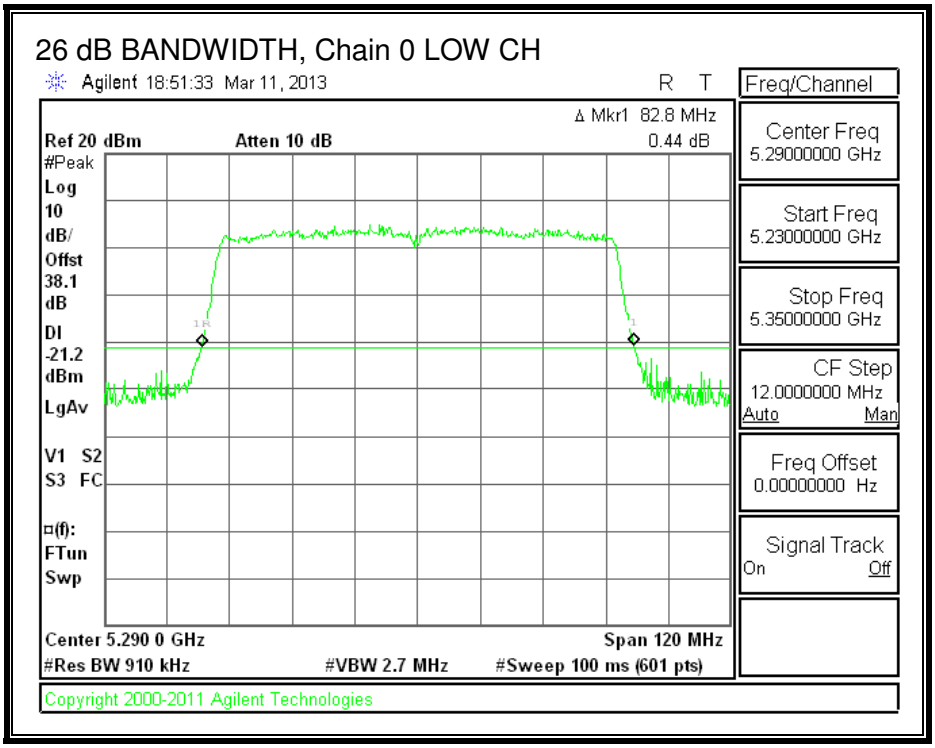
**26 dB BANDWIDTH, Chain 0**





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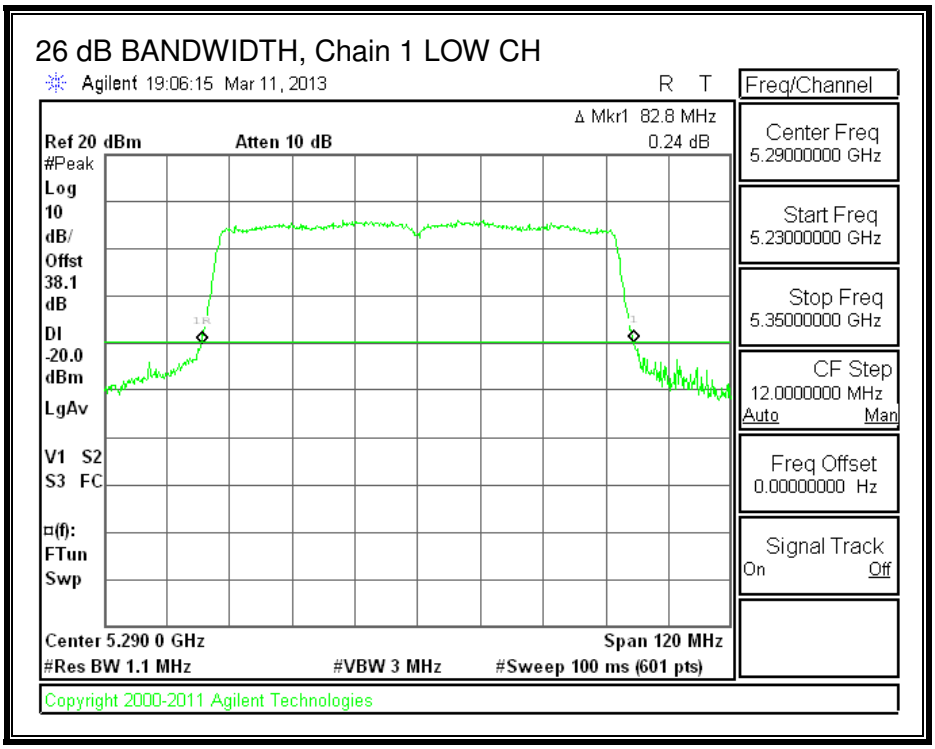
**26 dB BANDWIDTH, Chain 1**





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### 8.37.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---|---|---|---|
| Mid | 5290 | 70.5030 | 75.5521 |


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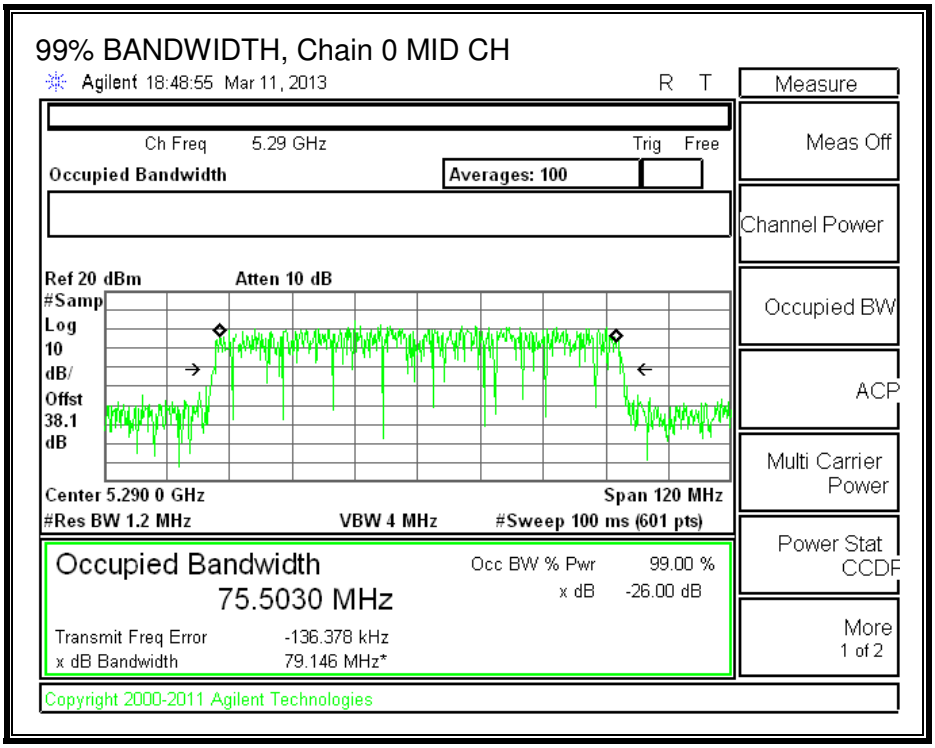
**99% BANDWIDTH, Chain 0**





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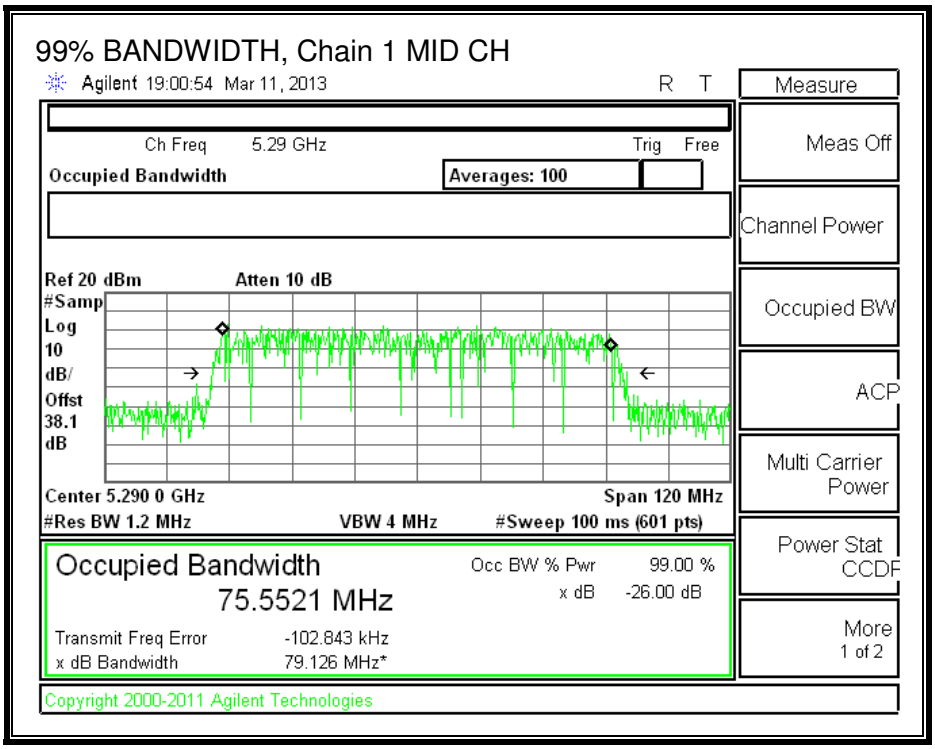
**99% BANDWIDTH, Chain 1**





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### 8.37.3. OUTPUT AVERAGE POWER AND PSD

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

For output power, the two chains are considered uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|
| 3.40 | 2.30 | 2.88 |

For PSD, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|
| 3.40 | 2.30 | 5.88 |


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## RESULTS

### Bandwidth and Antenna Gain

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Correlated Directional Gain (dBi) | Uncorrelated Directional Gain (dBi) |
|---|---|---|---|---|---|
| Mid | 5290 | 82.80 | 70.5030 | 5.88 | 2.88 |

### Limits

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PSD Limit (dBm) | IC PSD Limit (dBm) | PSD Limit (dBm) |
|---|---|---|---|---|---|---|---|---|
| Mid | 5290 | 24.00 | 24.00 | 30.00 | 24.00 | 11.00 | 11.00 | 11.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.09 | |

### Output Power Results

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Mid | 5290 | 13.10 | 13.00 | 16.06 | 24.00 | -7.94 |

### PSD Results

| Channel | Frequency (MHz) | Chain 0 Meas PSD (dBm) | Chain 1 Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|---|
| Mid | 5290 | -3.431 | -4.073 | -0.64 | 11.00 | -11.64 |


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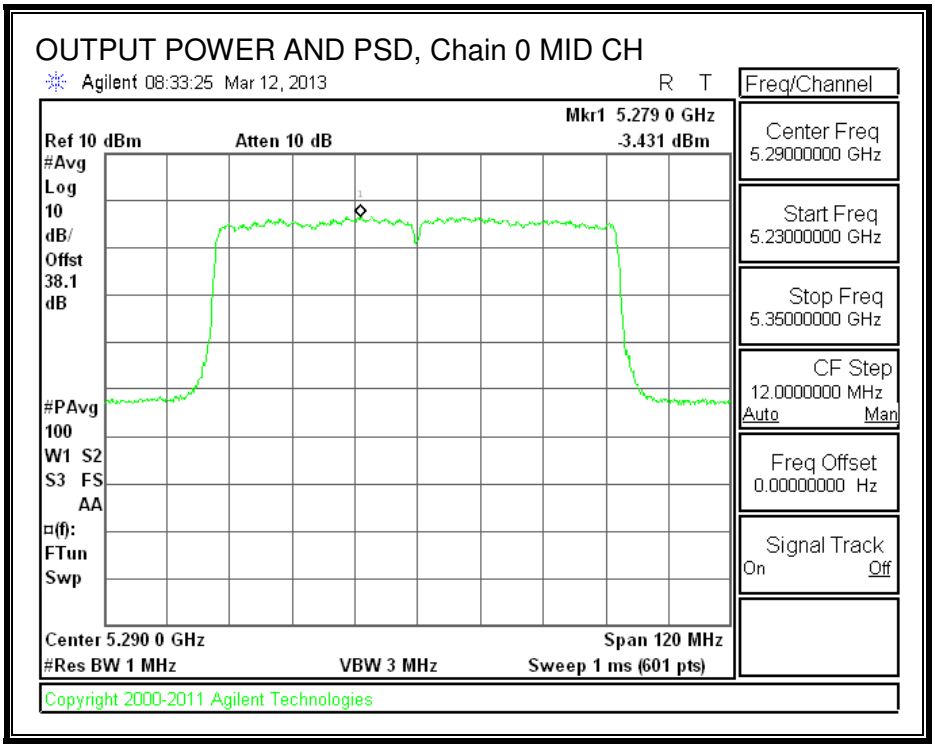
**OUTPUT POWER AND PSD, Chain 0**





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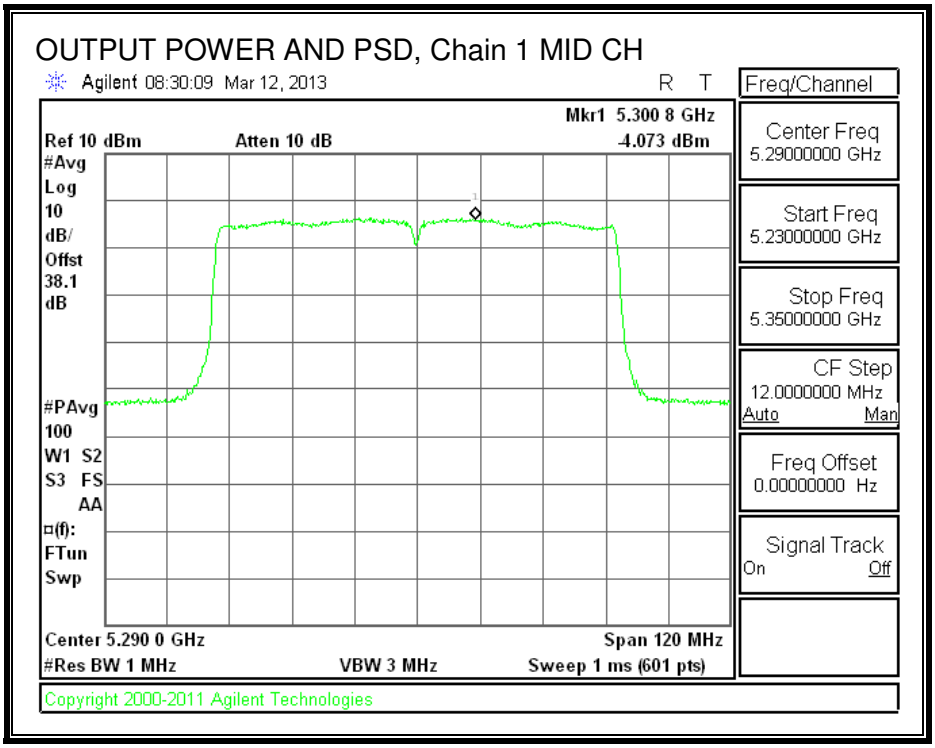
**OUTPUT POWER AND PSD, Chain 1**





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### 8.37.4. TPC POWER

**LIMITS**

FCC §15.407 (h) (1)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

**RESULTS**

The maximum EIRP is less than 500 mW; therefore, TPC is not required.


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## 8.38. 802.11ac VHT80 BF 2TX MODE IN THE 5.3 GHz BAND

Covered by testing 11ac VHT80 CDD 2TX mode, the power per chain used for 11ac VHT80 CDD 2TX mode is the same power per chain that will be used for 11ac VHT80 BF 2TX mode. However, since BF is correlated and CDD is uncorrelated for output power, the section below for output power using correlated AG for this BF mode shows it is still compliant.

### 8.38.1. OUTPUT AVERAGE POWER

**LIMITS**

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**DIRECTIONAL ANTENNA GAIN**

For output power, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|
| 3.40 | 2.30 | 5.88 |


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**RESULTS**

**Bandwidth and Antenna Gain**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Correlated Directional Gain (dBi) |
|---|---|---|---|---|
| Mid | 5290 | 82.80 | 70.5030 | 5.88 |

**Limits**

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) |
|---|---|---|---|---|---|
| Mid | 5290 | 24.00 | 24.00 | 30.00 | 24.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.09 | |

**Output Power Results**

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|---|
| Mid | 5290 | 13.10 | 13.00 | 16.06 | 24.00 | -7.94 |


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## 8.39. 802.11ac VHT80 2TX STBC MODE IN THE 5.3 GHz BAND

Covered by testing 11ac VHT80 CDD 2TX mode, the power per chain used for 11ac VHT80 CDD 2TX mode is the same power per chain that will be used for 11ac VHT80 STBC 2TX mode.


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## 8.40. 802.11n HT80 CDD 3TX MODE IN THE 5.3 GHz BAND

### 8.40.1. 26 dB BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) | 26 dB BW Chain 2 (MHz) |
|---|---|---|---|---|
| Mid | 5290 | 82.83 | 82.33 | 82.00 |


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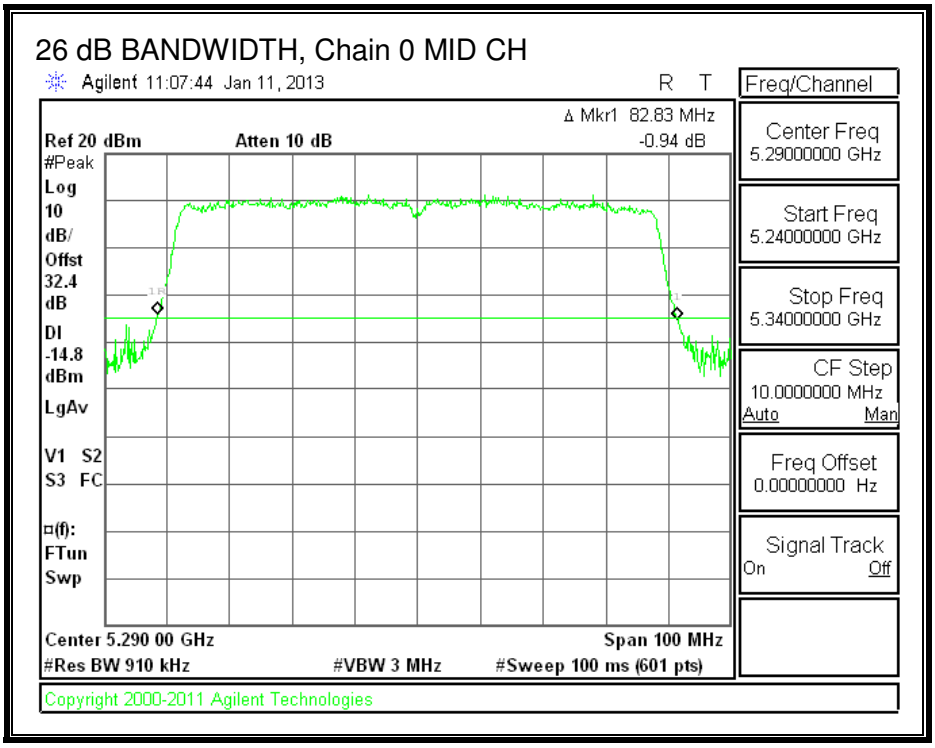
**26 dB BANDWIDTH, Chain 0**





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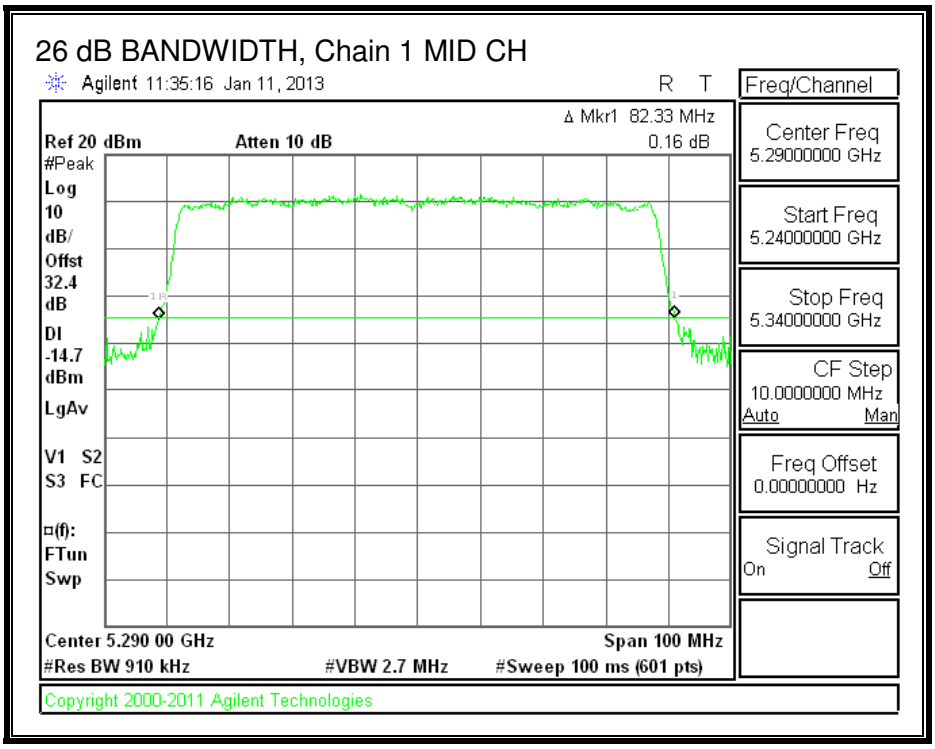
**26 dB BANDWIDTH, Chain 1**





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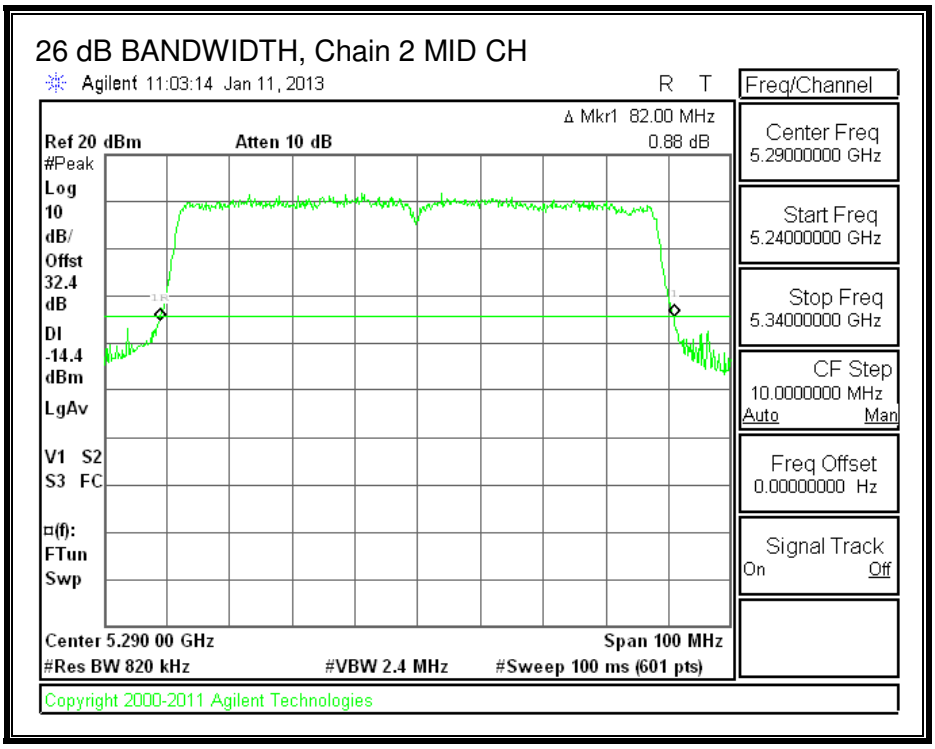
**26 dB BANDWIDTH, Chain 2**





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### 8.40.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) | 99% BW Chain 2 (MHz) |
|---|---|---|---|---|
| Mid | 5290 | 75.5456 | 75.5201 | 75.5049 |


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