



**FCC 47 CFR PART 15 SUBPART E**

**CERTIFICATION TEST REPORT**

**FOR**

**802.11b/g/n/a/ac WLAN + Bluetooth PCI-E NGFF 2230 Card**

**MODEL NUMBER: BCM94350ZAE**

**FCC ID: QDS-BRCM1087**

**REPORT NUMBER: 15U20280- E57 Revision B**

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Revision History

| Rev. | Issue Date | Revisions                                                                      | Revised By  |
|------|------------|--------------------------------------------------------------------------------|-------------|
| --   | 6/30/15    | Initial Issue                                                                  | H. Mustapha |
| A    | 7/02/15    | Added Colocation section<br>Updated Maximum Output Power Table for 5.6GHz band | H. Mustapha |
| B    | 7/09/15    | Updated the Antenna Description (Sec 5.3)                                      | H. Mustapha |

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** BROADCOM CORPORATION  
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SUNNYVALE, CA 94086, U.S.A.

**EUT DESCRIPTION:** 802.11b/g/n/a/ac WLAN + Bluetooth PCI-E NGFF 2230 Card

**MODEL:** BCM94350ZAE

**SERIAL NUMBER:** Radiated: P215, SN: 404  
Conducted: P15, SN: 398

**DATE TESTED:** MAY 1, 2015 – JUNE 16, 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:

Tested By:

*Huda Mustapha*



---

HUDA MUSTAPHA  
PROJECT LEAD  
UL Verification Services Inc.

---

Jeffery Wu  
EMC ENGINEER  
UL Verification Services Inc.



---

FRANK IBRAHIM  
PROGRAM MANAGER  
UL Verification Services Inc.

## 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 06-96, FCC KDB 789033 D01 v01 and 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.

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 47173 Benicia Street                          | 47266 Benicia Street               |
|-----------------------------------------------|------------------------------------|
| <input checked="" type="checkbox"/> Chamber A | <input type="checkbox"/> Chamber D |
| <input checked="" type="checkbox"/> Chamber B | <input type="checkbox"/> Chamber E |
| <input type="checkbox"/> Chamber C            | <input type="checkbox"/> Chamber F |
|                                               | <input type="checkbox"/> Chamber G |
|                                               | <input type="checkbox"/> Chamber H |

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through H are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-8, respectively.

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:

$$\begin{aligned}\text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m}\end{aligned}$$

### 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 | $\pm 3.52$ dB |
| Radiated Disturbance, 30 to 1000 MHz  | $\pm 4.94$ dB |
| Radiated Disturbance, 1 to 6 GHz      | $\pm 3.86$ dB |
| Radiated Disturbance, 6 to 18 GHz     | $\pm 4.23$ dB |
| Radiated Disturbance, 18 to 26 GHz    | $\pm 5.30$ dB |
| Radiated Disturbance, 26 to 40 GHz    | $\pm 5.23$ dB |

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is an 802.11b/g/n/a/ac WLAN + Bluetooth PCI-E NGFF2230 Card

The radio module is manufactured by Broadcom.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

#### 5.2 GHz BAND

| Frequency Range (MHz)    | Mode                | Power, Chain 0 (dBm) | Power, Chain 1 (dBm) | Output Power (dBm) | Output Power (mW) |
|--------------------------|---------------------|----------------------|----------------------|--------------------|-------------------|
| <b>5.2 GHz band, 1TX</b> |                     |                      |                      |                    |                   |
| 5180 - 5240              | 802.11a Legacy      | 19.00                | N/A                  | 19.00              | 79.43             |
| 5180 - 5240              | 802.11n HT20        | 20.30                | N/A                  | 20.30              | 107.15            |
| 5190 - 5230              | 802.11n HT40        | 17.72                | N/A                  | 17.72              | 59.16             |
| 5210                     | 802.11ac VHT80      | 17.42                | N/A                  | 17.42              | 55.22             |
| <b>5.2 GHz band, 2TX</b> |                     |                      |                      |                    |                   |
| 5180 - 5240              | 802.11n HT20 CDD    | 19.35                | 18.50                | 21.96              | 156.89            |
| 5180 - 5240              | 802.11n HT20 STBC   | 19.35                | 18.54                | 21.97              | 157.55            |
| 5180 - 5240              | 802.11n HT20 TxBF   | 19.35                | 18.50                | 21.96              | 156.89            |
| 5190 - 5230              | 802.11n HT40 CDD    | 19.30                | 18.65                | 22.00              | 158.40            |
| 5190 - 5230              | 802.11n HT40 TxBF   | 19.30                | 18.65                | 22.00              | 158.40            |
| 5210                     | 802.11ac VHT80 CDD  | 16.53                | 15.90                | 19.24              | 83.88             |
| 5210                     | 802.11ac VHT80 TxBF | 15.02                | 14.32                | 17.69              | 58.81             |

#### 5.3GHz BAND

| Frequency Range (MHz)    | Mode                | Power, Chain 0 (dBm) | Power, Chain 1 (dBm) | Output Power (dBm) | Output Power (mW) |
|--------------------------|---------------------|----------------------|----------------------|--------------------|-------------------|
| <b>5.3 GHz band, 1TX</b> |                     |                      |                      |                    |                   |
| 5260 - 5320              | 802.11a Legacy      | 19.83                | N/A                  | 19.83              | 96.16             |
| 5260 - 5320              | 802.11n HT20        | 19.39                | N/A                  | 19.39              | 86.90             |
| 5270 - 5310              | 802.11n HT40        | 17.21                | N/A                  | 17.21              | 52.60             |
| 5290                     | 802.11ac VHT80      | 17.35                | N/A                  | 17.35              | 54.33             |
| <b>5.3 GHz band, 2TX</b> |                     |                      |                      |                    |                   |
| 5260 - 5320              | 802.11n HT20        | 19.10                | 18.65                | 21.89              | 154.57            |
| 5260 - 5320              | 802.11n HT20 STBC   | 19.15                | 18.65                | 21.92              | 155.51            |
| 5260 - 5320              | 802.11n HT20 TxBF   | 19.10                | 18.65                | 21.89              | 154.57            |
| 5270 - 5310              | 802.11n HT40 CDD    | 19.60                | 19.10                | 22.37              | 172.48            |
| 5270 - 5310              | 802.11n HT40 TxBF   | 19.60                | 19.10                | 22.37              | 172.48            |
| 5290                     | 802.11ac VHT80 CDD  | 15.16                | 15.36                | 18.27              | 67.17             |
| 5290                     | 802.11ac VHT80 TxBF | 15.26                | 15.02                | 18.15              | 65.34             |

## 5.6 GHz BAND

| Frequency Range (MHz)    | Mode                | Power, Chain 0 (dBm) | Power, Chain 1 (dBm) | Output Power (dBm) | Output Power (mW) |
|--------------------------|---------------------|----------------------|----------------------|--------------------|-------------------|
| <b>5.6 GHz band, 1TX</b> |                     |                      |                      |                    |                   |
| 5500-5700                | 802.11a Legacy      | 20.11                | N/A                  | 20.11              | 102.57            |
| 5500-5700                | 802.11n HT20        | 19.55                | N/A                  | 19.55              | 90.16             |
| 5510-5670                | 802.11n HT40        | 18.05                | N/A                  | 18.05              | 63.83             |
| 5530                     | 802.11ac VHT80      | 17.00                | N/A                  | 17.00              | 50.12             |
| <b>5.6 GHz band, 2TX</b> |                     |                      |                      |                    |                   |
| 5500-5700                | 802.11n HT20 CDD    | 19.45                | 19.00                | 22.24              | 167.54            |
| 5500-5700                | 802.11n HT20 STBC   | 19.45                | 19.10                | 22.29              | 169.39            |
| 5500-5700                | 802.11n HT20 TxBF   | 17.95                | 17.50                | 20.74              | 118.61            |
| 5510-5670                | 802.11n HT40 CDD    | 19.25                | 19.10                | 22.19              | 165.42            |
| 5510-5670                | 802.11n HT40 TxBF   | 17.70                | 17.70                | 20.71              | 117.77            |
| 5530-5610                | 802.11ac VHT80 CDD  | 19.01                | 18.70                | 21.87              | 153.75            |
| 5530-5610                | 802.11ac VHT80 TxBF | 17.20                | 17.30                | 20.26              | 106.18            |

## STRADDLE CHANNELS

| Frequency Range (MHz)                                              | Mode                | Power, Chain 0 (dBm) | Power, Chain 1 (dBm) | Output Power (dBm) | Output Power (mW) |
|--------------------------------------------------------------------|---------------------|----------------------|----------------------|--------------------|-------------------|
| <b>5.6 GHz band, 2TX (Channels overlapping UNII-2C and UNII-3)</b> |                     |                      |                      |                    |                   |
| 5720 (Whole signal)                                                | 802.11n HT20 CDD    | 19.40                | 18.80                | 22.12              | 162.95            |
| 5720 (Whole signal)                                                | 802.11n HT20 STBC   | 19.35                | 19.15                | 22.26              | 168.32            |
| 5720 (Whole signal)                                                | 802.11n HT20 TxBF   | 19.40                | 18.80                | 22.12              | 162.95            |
| 5710 (Whole signal)                                                | 802.11n HT40 CDD    | 19.10                | 18.50                | 21.82              | 152.08            |
| 5710 (Whole signal)                                                | 802.11n HT40 TxBF   | 19.10                | 18.50                | 21.82              | 152.08            |
| 5690 (Whole signal)                                                | 802.11ac VHT80 CDD  | 19.10                | 18.80                | 21.96              | 157.14            |
| 5690 (Whole signal)                                                | 802.11ac VHT80 TxBF | 19.10                | 18.80                | 21.96              | 157.14            |

## 5.8 GHz BAND

| Frequency Range (MHz)    | Mode                | Power, Chain 0 (dBm) | Power, Chain 1 (dBm) | Output Power (dBm) | Output Power (mW) |
|--------------------------|---------------------|----------------------|----------------------|--------------------|-------------------|
| <b>5.8 GHz band, 1TX</b> |                     |                      |                      |                    |                   |
| 5745-5825                | 802.11a Legacy      | 20.52                | N/A                  | 20.52              | 112.72            |
| 5745-5825                | 802.11n HT20        | 19.92                | N/A                  | 19.92              | 98.17             |
| 5755-5795                | 802.11n HT40        | 19.55                | N/A                  | 19.55              | 90.16             |
| 5775                     | 802.11ac VHT80      | 17.13                | N/A                  | 17.13              | 51.64             |
| <b>5.8 GHz band, 2TX</b> |                     |                      |                      |                    |                   |
| 5745-5825                | 802.11n HT20 CDD    | 18.80                | 19.00                | 21.91              | 155.29            |
| 5745-5825                | 802.11n HT20 TxBF   | 20.22                | 20.20                | 23.22              | 209.91            |
| 5755-5795                | 802.11n HT40 CDD    | 19.10                | 19.05                | 22.09              | 161.64            |
| 5755-5795                | 802.11n HT40 TxBF   | 18.91                | 18.56                | 21.75              | 149.58            |
| 5775                     | 802.11ac VHT80 CDD  | 15.72                | 15.35                | 18.55              | 71.60             |
| 5775                     | 802.11ac VHT80 TxBF | 14.60                | 14.40                | 17.51              | 56.38             |

**List of test reduction and modes covering other modes:**

| Antenna Port Testing |                             |                        |
|----------------------|-----------------------------|------------------------|
| Band                 | Mode                        | Covered by             |
| 5 GHz bands          | 802.11a Legacy 1TX          | 802.11n HT20 CDD 2TX   |
| 5 GHz bands          | 802.11a CDD 2TX             | 802.11n HT20 CDD 2TX   |
| 5 GHz bands          | 802.11n HT20 SDM/STBC 2TX   | 802.11n HT20 CDD 2TX   |
| 5 GHz bands          | 802.11n HT40 1TX            | 802.11n HT40 CDD 2TX   |
| 5 GHz bands          | 802.11n HT40 SDM/STBC 2TX   | 802.11n HT40 CDD 2TX   |
| 5 GHz bands          | 802.11ac VHT80 1TX          | 802.11ac VHT80 CDD 2TX |
| 5 GHz bands          | 802.11ac VHT80 SDM/STBC 2TX | 802.11ac VHT80 CDD 2TX |

| Radiated Testing |                                |                                    |
|------------------|--------------------------------|------------------------------------|
| Band             | Mode                           | Covered by                         |
| 5 GHz bands      | 802.11a Legacy 1TX (Harmonics) | 802.11n HT20 CDD 2TX (Harmonics)   |
| 5 GHz bands      | 802.11a CDD 2TX                | 802.11n HT20 CDD 2TX               |
| 5 GHz bands      | 802.11n HT20 SDM/STBC 2TX      | 802.11n HT20 CDD 2TX               |
| 5 GHz bands      | 802.11n HT40 1TX (Harmonics)   | 802.11n HT40 CDD 2TX (Harmonics)   |
| 5 GHz bands      | 802.11ac VHT80 1TX (Harmonics) | 802.11ac VHT80 CDD 2TX (Harmonics) |
| 5 GHz bands      | 802.11ac VHT80 SDM/STBC 2TX    | 802.11ac VHT80 CDD 2TX             |

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The EUT utilizes the following antennas:

| Antenna Manufacturer | Antenna Type             | Model    | Peak Gain (2400-2483.5 MHz) | Peak gain (5150-5250MHz) @5180MHz | Peak gain (5250-5350MHz) @5320MHz | Peak gain (5470-5725MHz) @5580 | Peak gain (5725-5850MHz) @5745MHz |
|----------------------|--------------------------|----------|-----------------------------|-----------------------------------|-----------------------------------|--------------------------------|-----------------------------------|
| Ethertronics         | 802.11bgn WLAN Antenna   | 1000802  | 3.6                         | N/A                               | N/A                               | N/A                            | N/A                               |
| Ethertronics         | 802.11 5GHz WLAN Antenna | 1000615a | N/A                         | 3.3                               | 4.0                               | 6.0                            | 4.7                               |

### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Broadcom, rev. 7.35 RC180.50 and Broadcom, rev. 7.35.RC180.83 (used for HT20/HT40 Radiated BE Testing)

The EUT driver software installed during testing was Broadcom, rev. 7.35.180.50 and Broadcom, rev. 7.35.180.83 (used for HT20/HT40 Radiated BE Testing)

The test utility software used during testing was Broadcom MTool, rev. 2.0.2.5.



## **5.5. WORST-CASE CONFIGURATION AND MODE**

The EUT was tested as an external module installed in a test jig board connected to a host Laptop PC.

The EUT can only be setup in desktop orientation; therefore, all radiated testing was performed with the EUT in desktop orientation.

Radiated emission below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

For 5GHz, band edge preliminary investigation showed that antenna port J0, horizontal polarization was worst case for CDD and SISO modes, therefore only horizontal polarization was tested for these modes.

Worst-case data rates as provided by the client were:

802.11a mode: 6 Mbps

802.11n HT20 mode: MCS0

802.11n HT40 mode: MCS0

802.11AC VHT80 mode: MCS0

Radiated emissions for EUT with antenna was performed and passed; therefore, antenna port spurious was not performed.

For TxBF mode conducted testing, the bandwidth and duty cycle data were shared with CDD mode; the TxBF mode radiated portion has its own duty cycle.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| Support Equipment List |              |                |               |
|------------------------|--------------|----------------|---------------|
| Description            | Manufacturer | Model          | Serial Number |
| Laptop                 | Lenovo       | Lenovo G560    | CB08584349    |
| AC / DC Adapter        | Lenovo       | PA-1650-56LC   | N/A           |
| Laptop                 | DELL         | Latitude E6400 | 7WCBYH1       |
| AC / DC Adapter        | DELL         | DA90PM111      | N/A           |
| Laptop                 | DELL         | Latitude D430  | C6W8RG1       |
| AC / DC Adapter        | DELL         | DA65NS0-00     | N/A           |
| Access Point           | Broadcom     | BCM94709R_1    | 1716862       |
| AC / DC Adapter        | Condor       | HK-H1-A12      | N/A           |
| PCle. Card             | Broadcom     | N/A            | N/A           |

### I/O CABLES

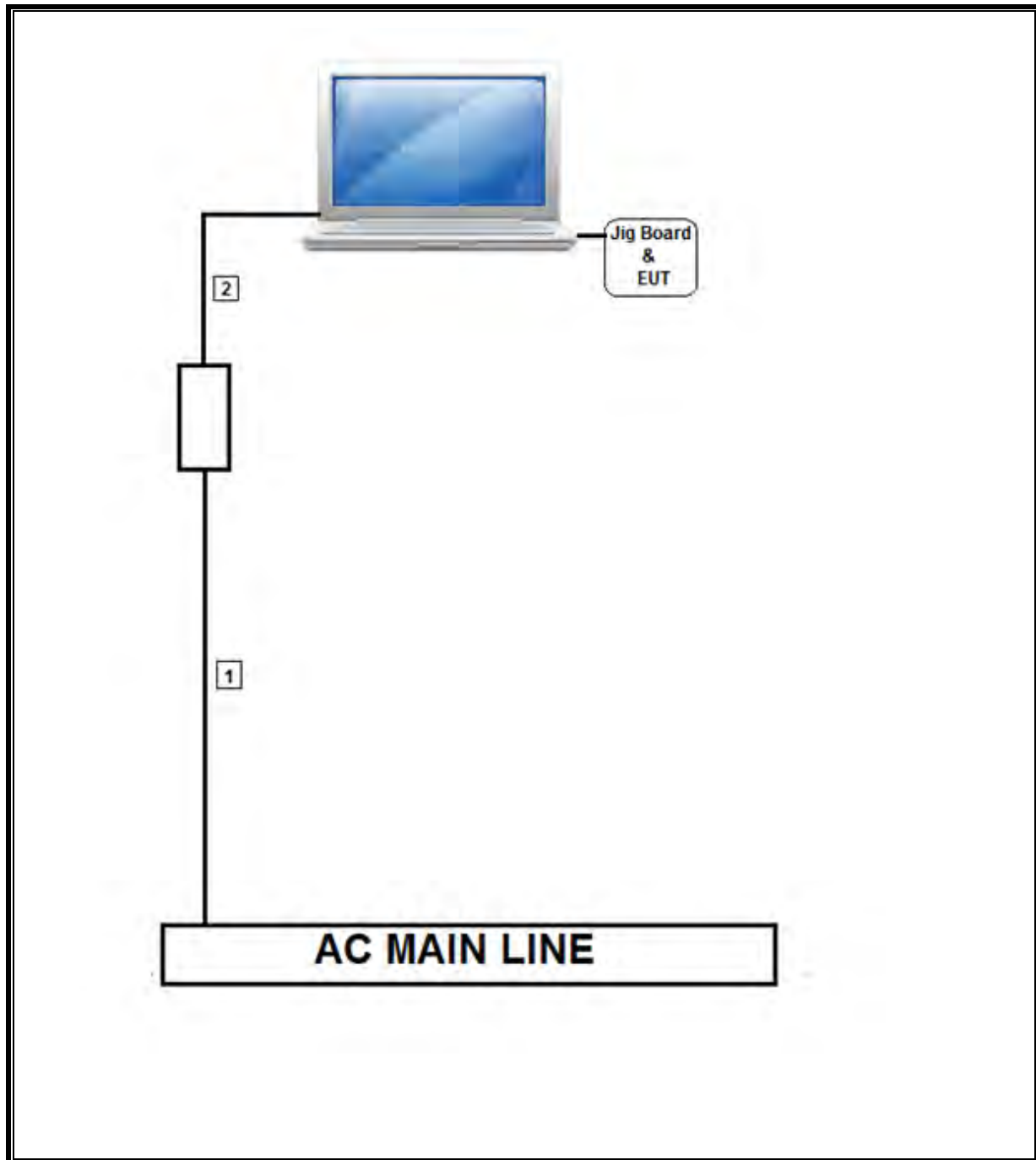
| I/O Cable List |      |                      |                |            |                  |                       |
|----------------|------|----------------------|----------------|------------|------------------|-----------------------|
| Cable No       | Port | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks               |
| 1              | AC   | 1                    | US115V         | Unshielded | 1                |                       |
| 2              | DC   | 1                    | VDC            | Unshielded | 1.5              | Ferrite on laptop end |

### TEST SETUP

The EUT was connected to a host laptop via PCIE card. Test software exercised the EUT.

Broadcom reference Access Point (Model: BCM94709R\_1) was used for TxBF measurement, and the connection was established with iperf packet transmit.

**SETUP DIAGRAM FOR TESTS**



## 6. TEST AND MEASUREMENT EQUIPMENT

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

| Test Equipment List            |                 |               |                       |          |          |
|--------------------------------|-----------------|---------------|-----------------------|----------|----------|
| Description                    | Manufacturer    | Model         | T No.                 | Cal Date | Cal Due  |
| Radiated Software              | UL              | UL EMC        | Ver 9.5, June 6, 2015 |          |          |
| Conducted Software             | UL              | UL EMC        | Ver 9.5, May 17 2012  |          |          |
| Bilog Antenna 30-1000MHz       | Sunol           | JB1           | 130                   | 09/10/14 | 09/10/15 |
| Horn Antenna 1-18GHz           | ETS             | 3117          | 136                   | 01/15/15 | 01/15/16 |
| Horn Antenna 1-18GHz           | ETS             | 3117          | 345                   | 03/03/15 | 03/03/16 |
| Horn Antenna 18-26GHz          | ARA             | SWH-28        | 98                    | 12/17/14 | 12/17/15 |
| Horn Antenna 26.5- 40GHz       | ARA             | MWH-2640/B    | 90                    | 07/15/14 | 07/15/15 |
| Preamplifier 10kHz-1000MHz     | Sonoma          | 310           | 300                   | 11/01/14 | 11/01/15 |
| Preamplifier 1-8GHz            | Miteq           | AMF-4D-010008 | 782                   | 11/18/14 | 11/18/15 |
| Preamplifier 1-18GHz           | Miteq           | AFS42-0010180 | 492                   | 08/09/14 | 08/09/15 |
| Preamplifier 1-26.5GHz         | Agilent         | 8449B         | 404                   | 04/13/15 | 04/13/16 |
| Amplifier, 26-40GHz            | Miteq           | NSP4000-SP2   | 88                    | 04/07/15 | 04/07/16 |
| Spectrum Analyzer 3kHz - 44GHz | Agilent         | N9030A        | 908                   | 09/05/14 | 09/05/15 |
| Spectrum Analyzer 3kHz - 44GHz | Agilent         | N9030A        | 907                   | 05/15/15 | 05/15/16 |
| Spectrum Analyzer 9kHz - 40GHz | HP              | 8564E         | 106                   | 08/06/14 | 08/06/15 |
| Coaxial Switchbox              | Agilent         | SP6T          | 927                   | 09/15/14 | 09/15/15 |
| 3GHz HPF                       | Micro-Tronics   | HPM17543      | 487                   | 01/31/15 | 01/31/16 |
| EMI Test Receiver              | Rohde & Schwarz | ECSI 7        | 212                   | 08/04/14 | 08/04/15 |
| Spectrum Analyzer 3Hz to 44GHz | Agilent         | E4440A        | 123                   | 10/28/14 | 10/28/15 |
| Power Meter                    | Agilent         | N1911A        | 377                   | 06/30/14 | 06/30/15 |
| LISN for Conducted Emission    | FCC             | 50/250-25-2   | 24                    | 01/16/15 | 01/16/16 |
| Power Sensor                   | Agilent         | E9323A        | 400                   | 05/05/15 | 05/05/16 |

## 7. MEASUREMENT METHODS

On Time and Duty Cycle: KDB 789033 D02 v01, Section B

26 dB Emission BW: KDB 789033 D02 v01, Section C

99% Occupied BW: KDB 789033 D02 v01, Section D

Conducted Output Power: KDB 789033 D02 v01, Section E.3.b (Method PM-G), and KDB 662911 D01 v02r01.

Power Spectral Density: KDB 789033 D02 v01, Section F, and KDB 662911 D01 v02r01.

Unwanted emissions in restricted bands: KDB 789033 D02 v01, Sections G.2, G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v01, Sections G.2, G.3, G.4, and G.5

AC Power Line Conducted Emissions: ANSI C63.10-2009, Section 6.2.

## 8. ANTENNA PORT TEST RESULTS

### 8.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only.

#### ON TIME AND DUTY CYCLE RESULTS

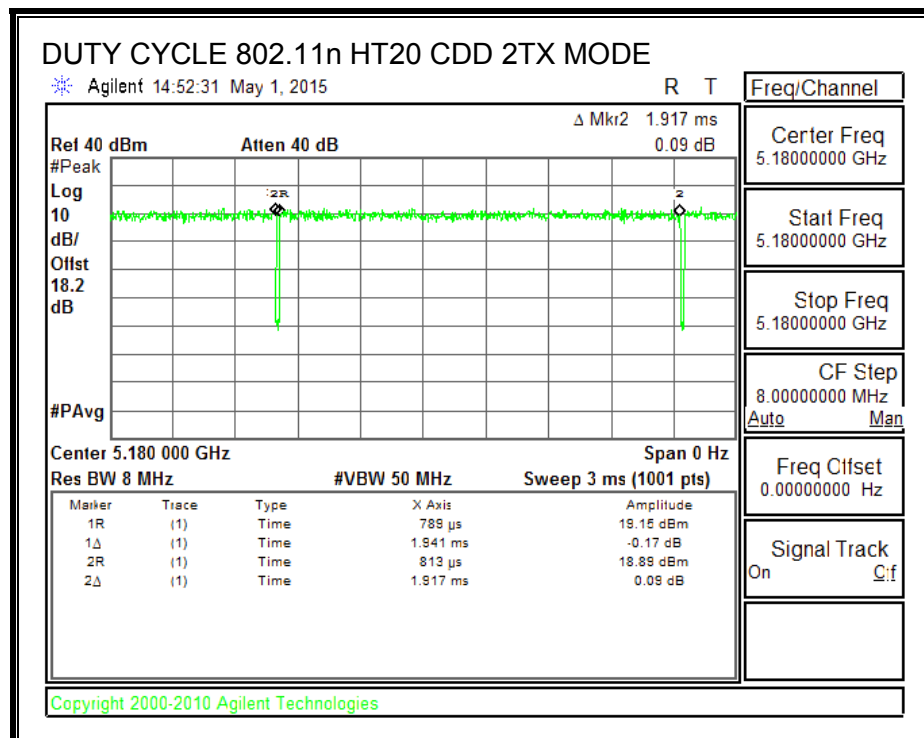
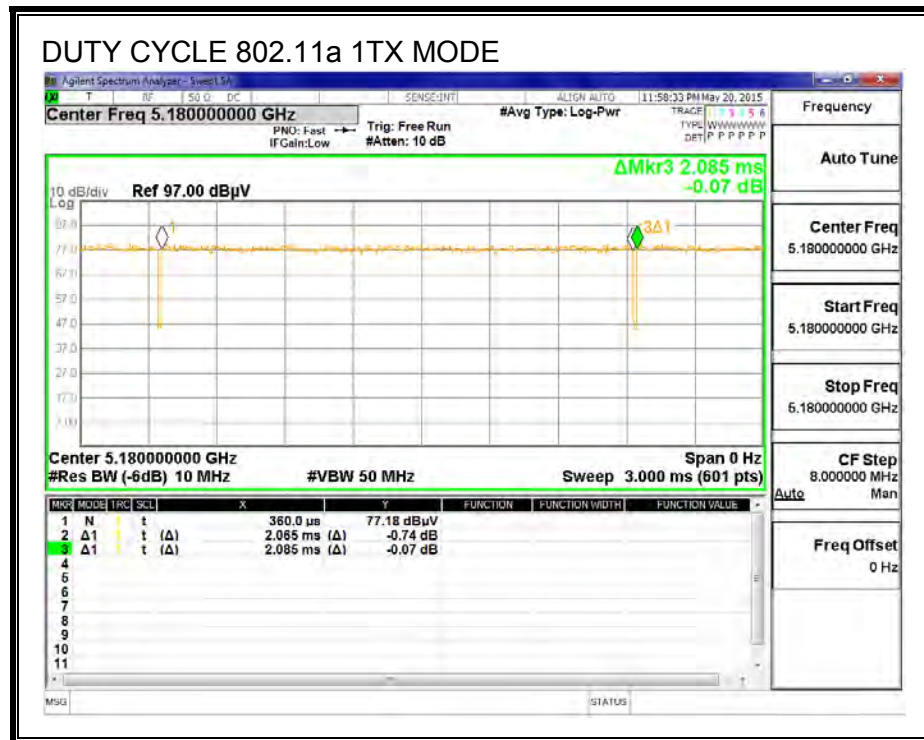
| Mode                   | ON Time<br>B<br>(msec) | Period<br>(msec) | Duty Cycle<br>x<br>(linear) | Duty<br>Cycle<br>(%) | Duty Cycle<br>Correction Factor<br>(dB) | 1/B<br>Minimum VBW<br>(kHz) |
|------------------------|------------------------|------------------|-----------------------------|----------------------|-----------------------------------------|-----------------------------|
| <b>5GHz Band</b>       |                        |                  |                             |                      |                                         |                             |
| 802.11a 1TX            | 2.065                  | 2.085            | 0.990                       | 99.04%               | 0.00                                    | 0.010                       |
| 802.11n HT20 CDD 2TX   | 1.917                  | 1.941            | 0.988                       | 98.76%               | 0.00                                    | 0.010                       |
| 802.11n HT20 STBC 2TX  | 1.917                  | 1.941            | 0.988                       | 98.76%               | 0.00                                    | 0.010                       |
| 802.11n HT20 BF 2TX    | 27.235                 | 28.520           | 0.955                       | 95.49%               | 0.20                                    | 0.037                       |
| 802.11n HT40 CDD 2TX   | 0.9420                 | 0.9620           | 0.979                       | 97.92%               | 0.09                                    | 1.062                       |
| 802.11n HT40 STBC 2TX  | 0.9500                 | 0.9720           | 0.977                       | 97.74%               | 0.10                                    | 1.053                       |
| 802.11n HT40 TxBF 2TX  | 28.150                 | 29.180           | 0.965                       | 96.47%               | 0.16                                    | 0.036                       |
| 802.11ac VHT80 CDD 2TX | 0.4590                 | 0.4790           | 0.958                       | 95.82%               | 0.19                                    | 2.179                       |
| 802.11ac VHT80 BF 2TX  | 24.1850                | 27.2700          | 0.887                       | 88.69%               | 0.52                                    | 0.041                       |

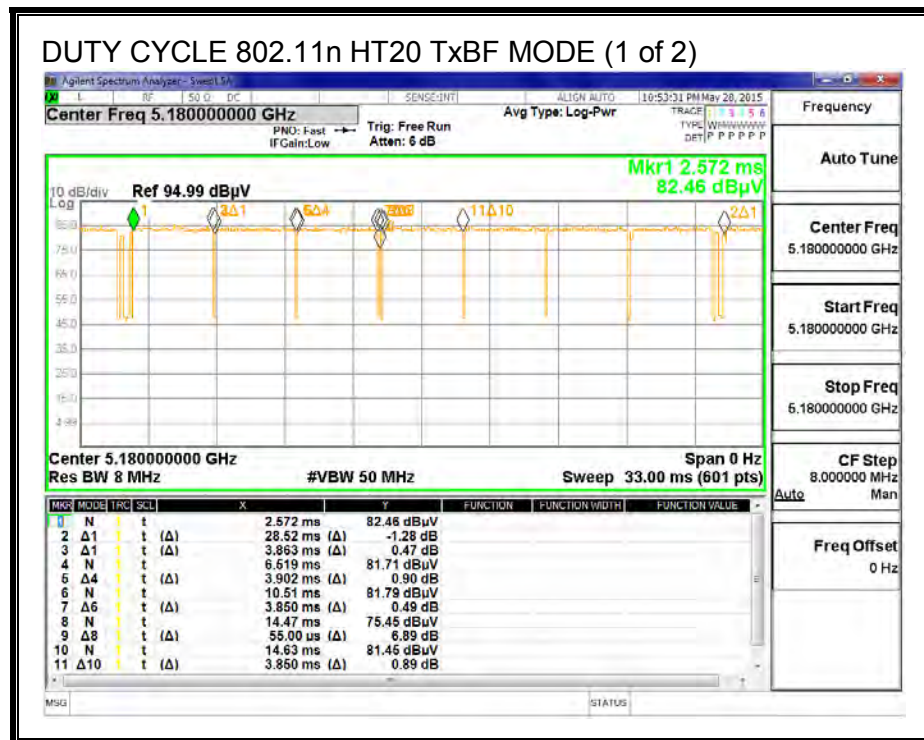
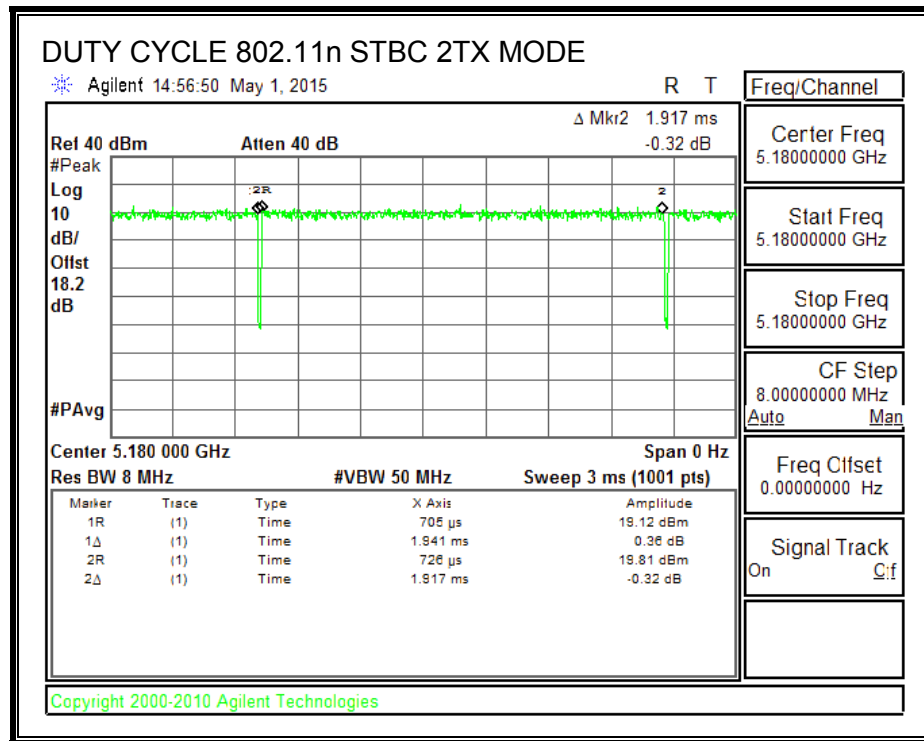
#### Note:

The duty cycle correction factors of CDD modes were used for antenna port beam-forming testing; however, the duty cycle correction factors of beam-forming modes were used for radiated emission of beam-forming modes.

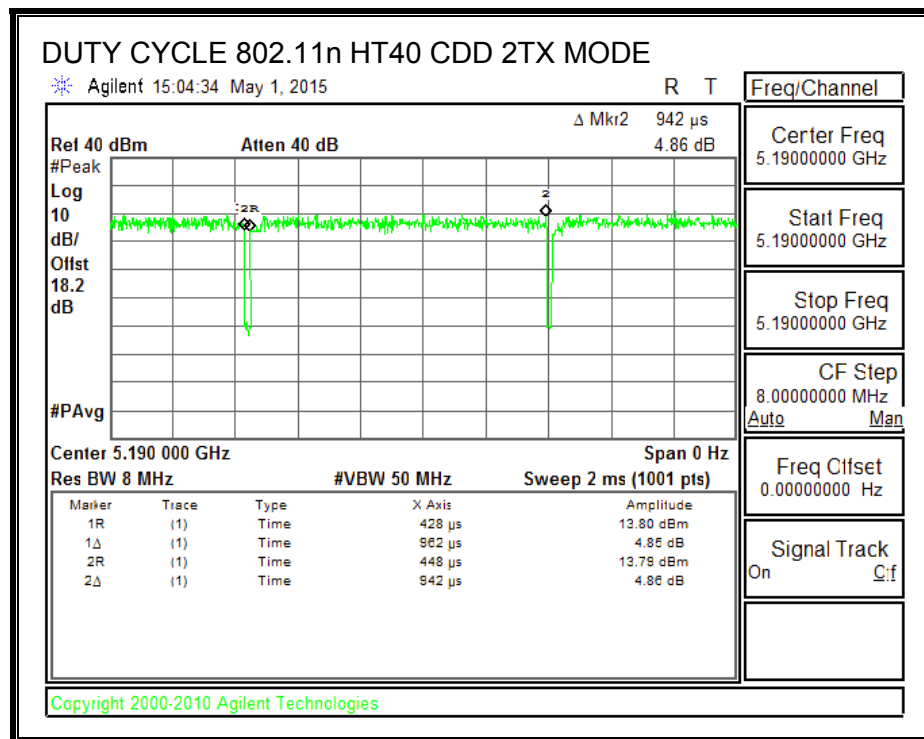
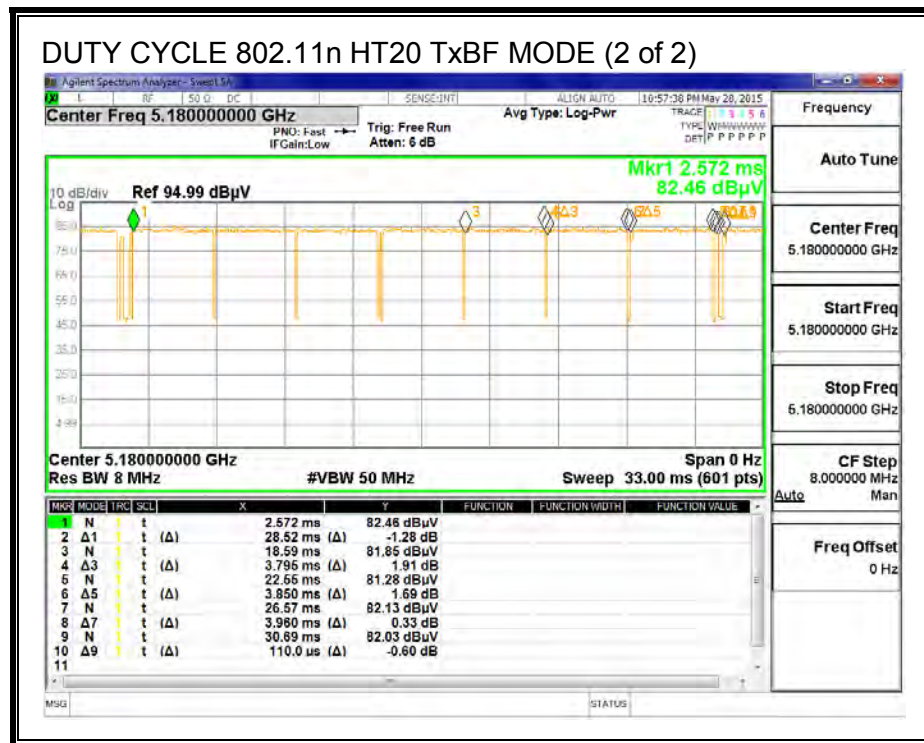
## 8.2. DUTY CYCLE PLOTS

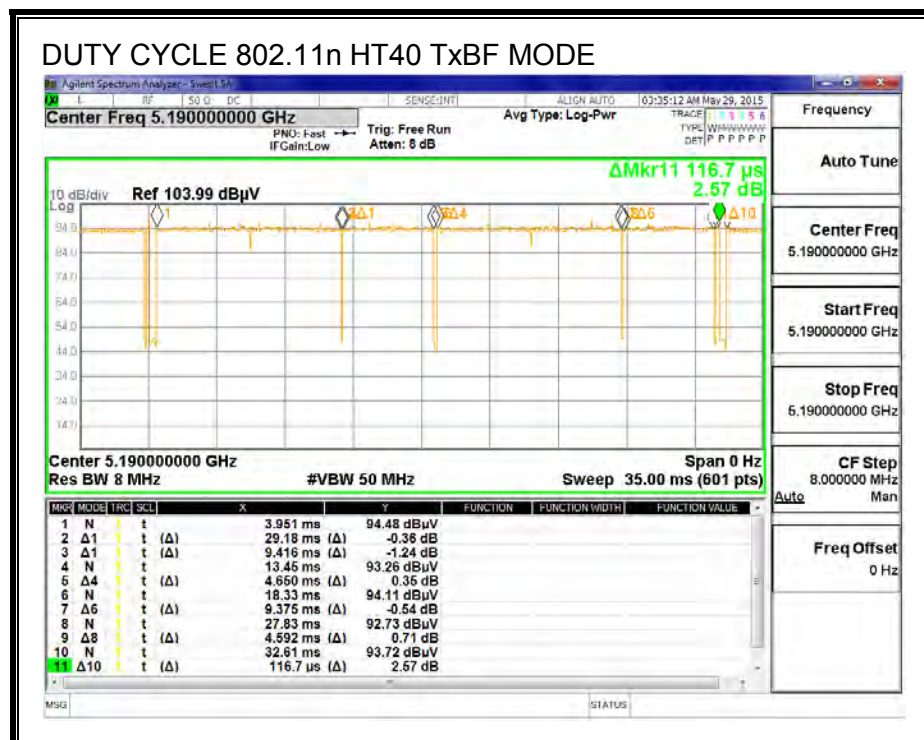
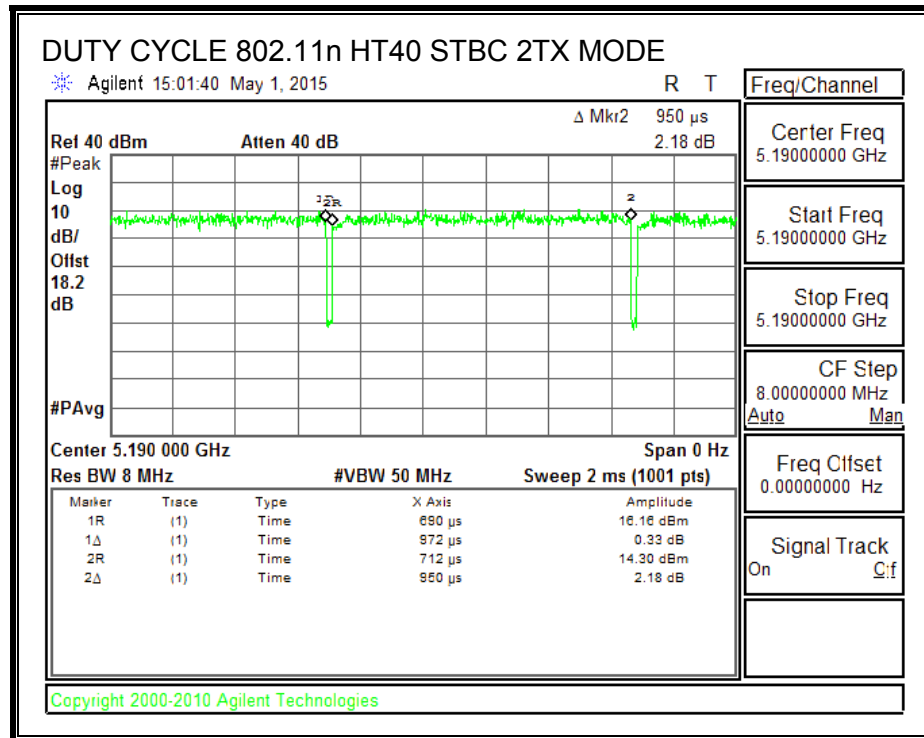
### 5 GHz BANDS

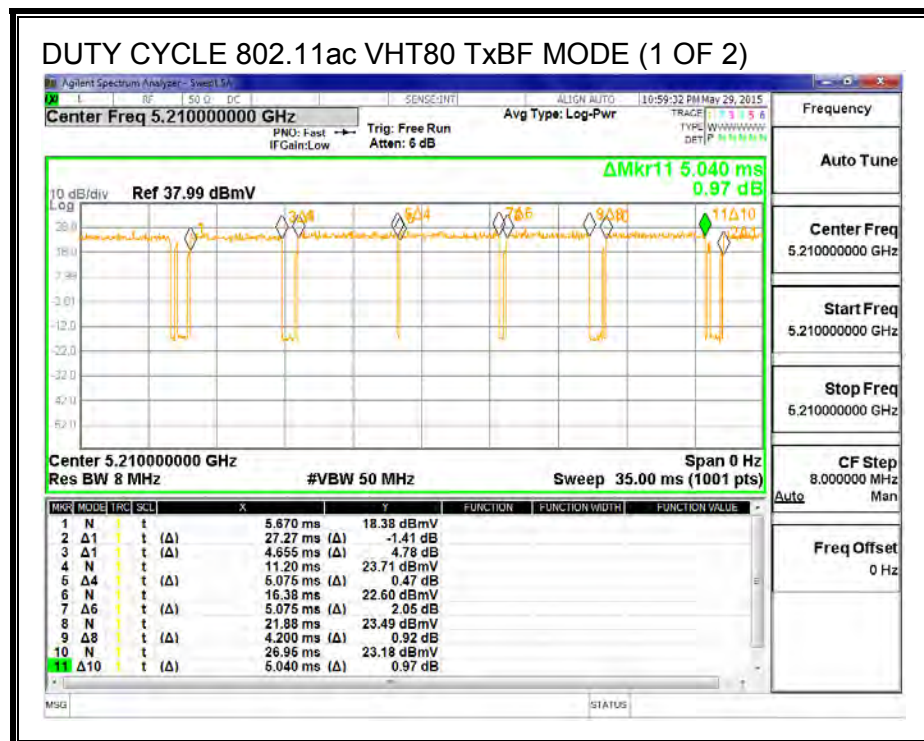
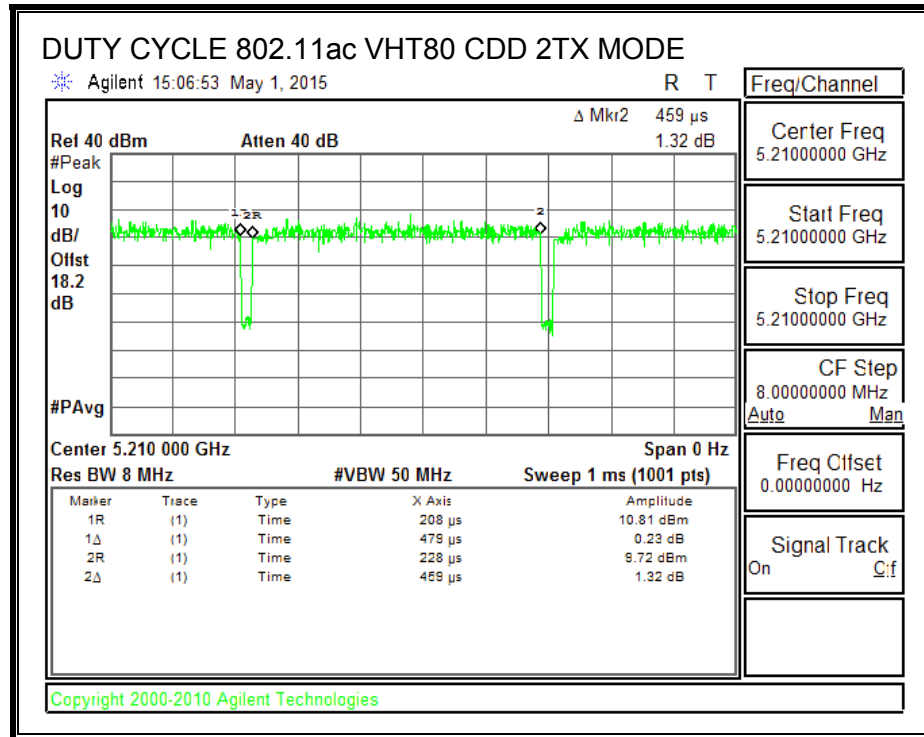


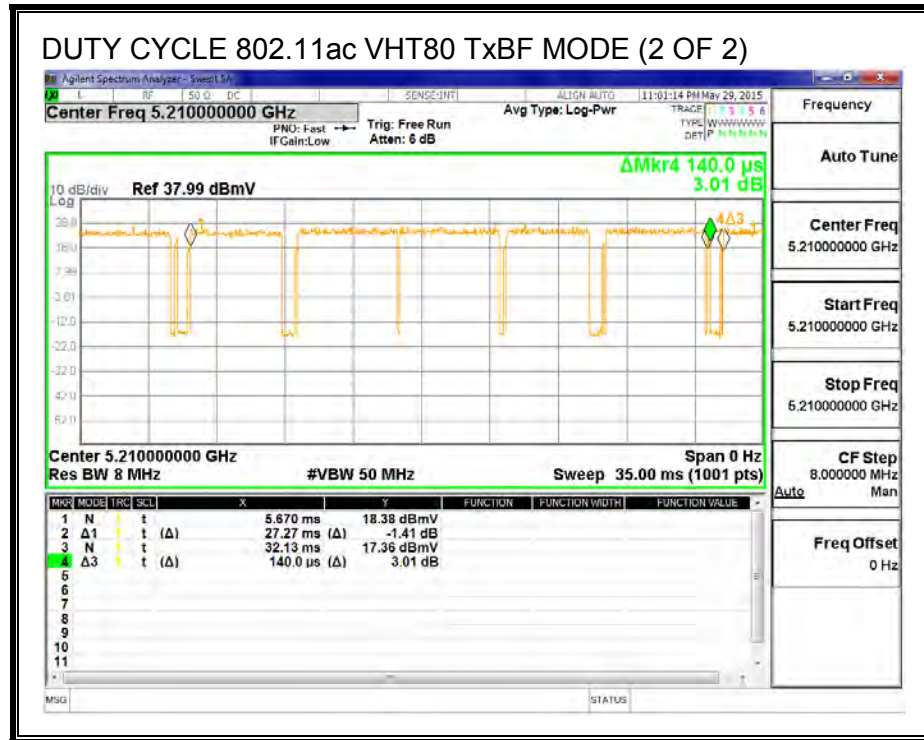












### **8.3. 802.11a LEGACY 1TX MODE IN THE 5.2 GHz BAND**

#### **8.3.1. OUTPUT 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 colocated 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**

This is SISO mode, AG is the highest (worst-case) = 3.3 dBi

## **RESULTS**

### **Antenna Gain and Limits**

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Power<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-------------------------|
| Low     | 5180               | 3.30                                      | 24.00                   |

### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5180               | 19.00                             | 19.00                             | 24.00                   | -5.00                   |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## **8.4. 802.11n HT20 SISO MODE IN THE 5.2 GHz BAND**

### **8.4.1. OUTPUT 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.

### **DIRECTIONAL ANTENNA GAIN**

This is SISO mode, AG is the highest (worst-case) = 3.3 dBi

### **RESULTS**

#### **Antenna Gain and Limits**

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Power<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-------------------------|
| Low     | 5180               | 3.30                                      | 24.00                   |

#### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5180               | 20.30                             | 20.30                             | 24.00                   | -3.70                   |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.



## 8.5. 802.11n HT20 CDD 2Tx MODE IN THE 5.2 GHz BAND

### 8.5.1. 26 dB BANDWIDTH

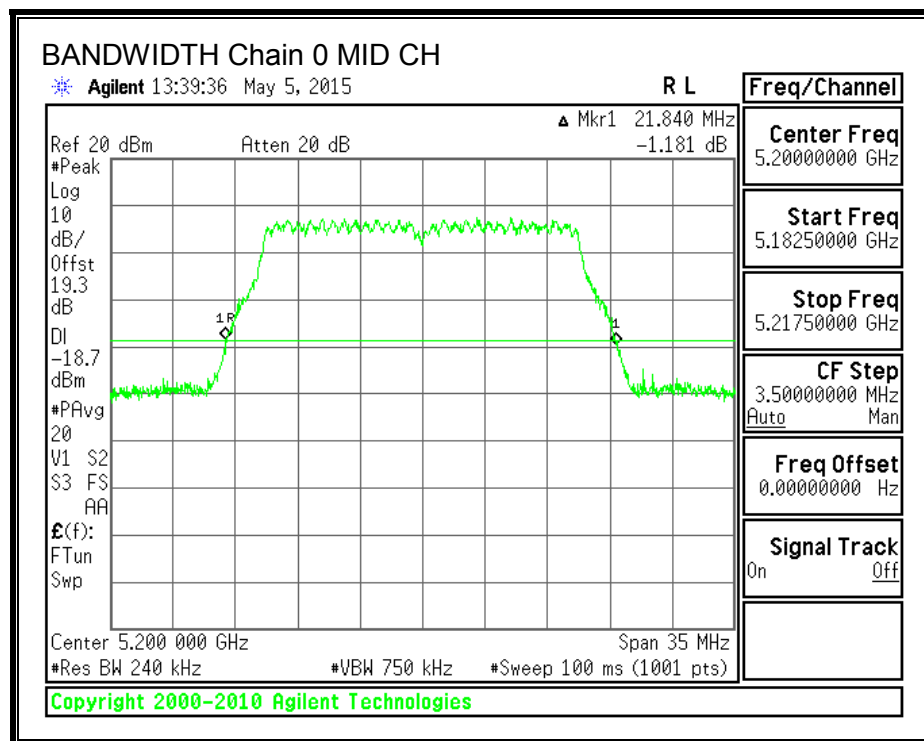
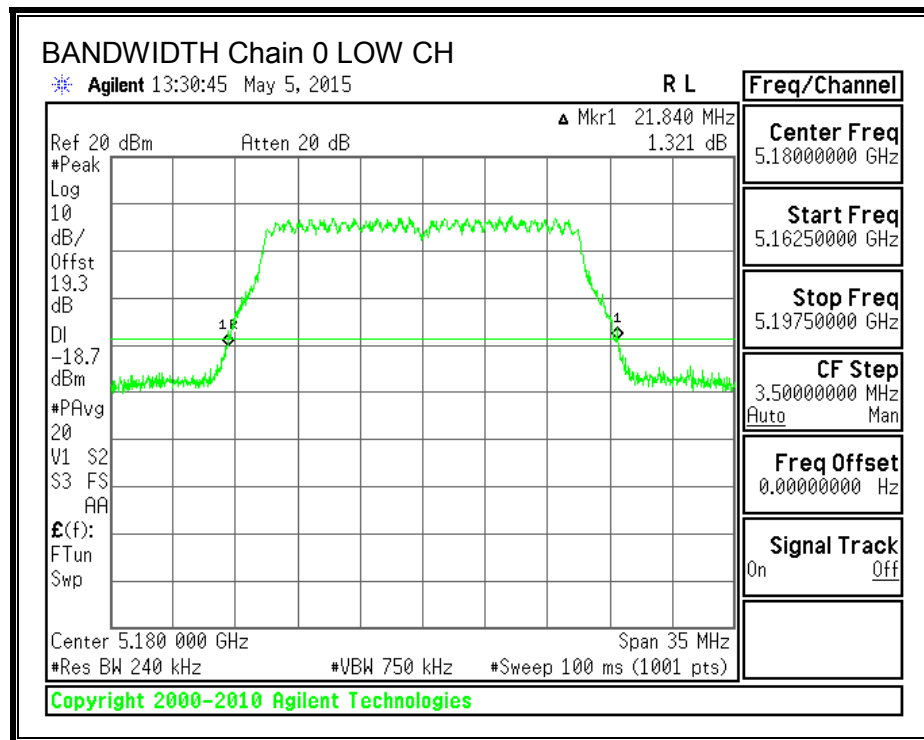
#### LIMITS

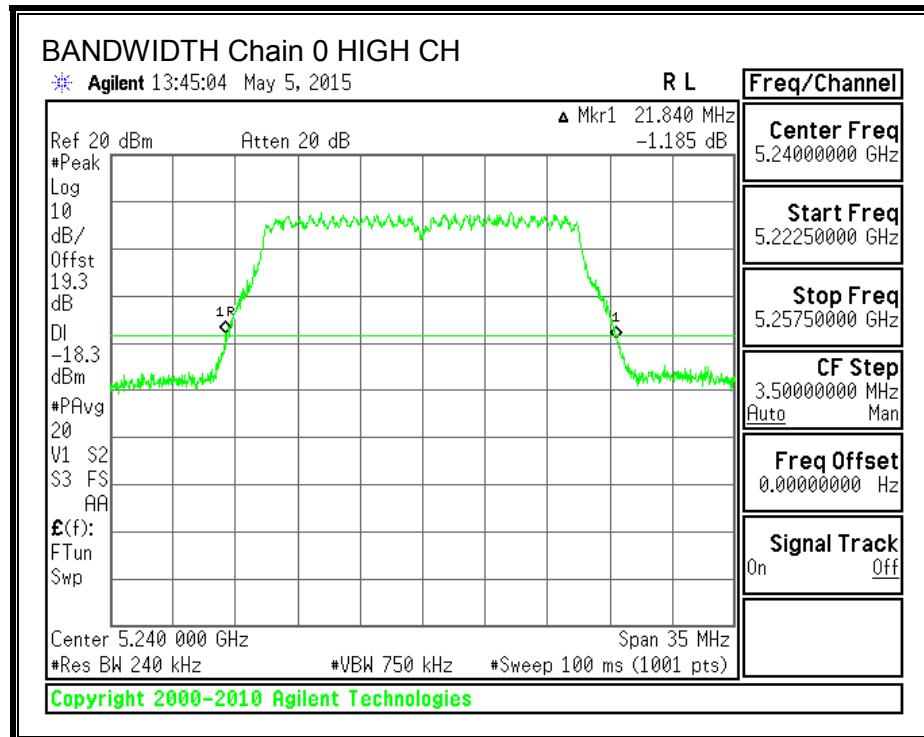
None; for reporting purposes only.

#### RESULTS

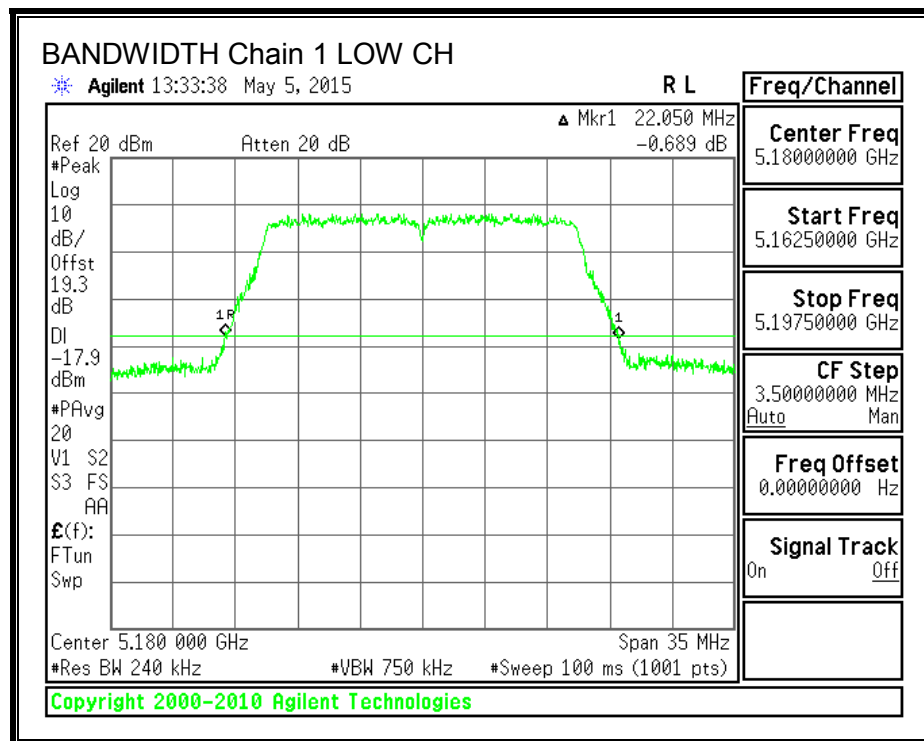
| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) | 26 dB BW<br>Chain 1<br>(MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low     | 5180               | 21.840                       | 22.050                       |
| Mid     | 5200               | 21.840                       | 22.085                       |
| High    | 5240               | 21.840                       | 21.910                       |

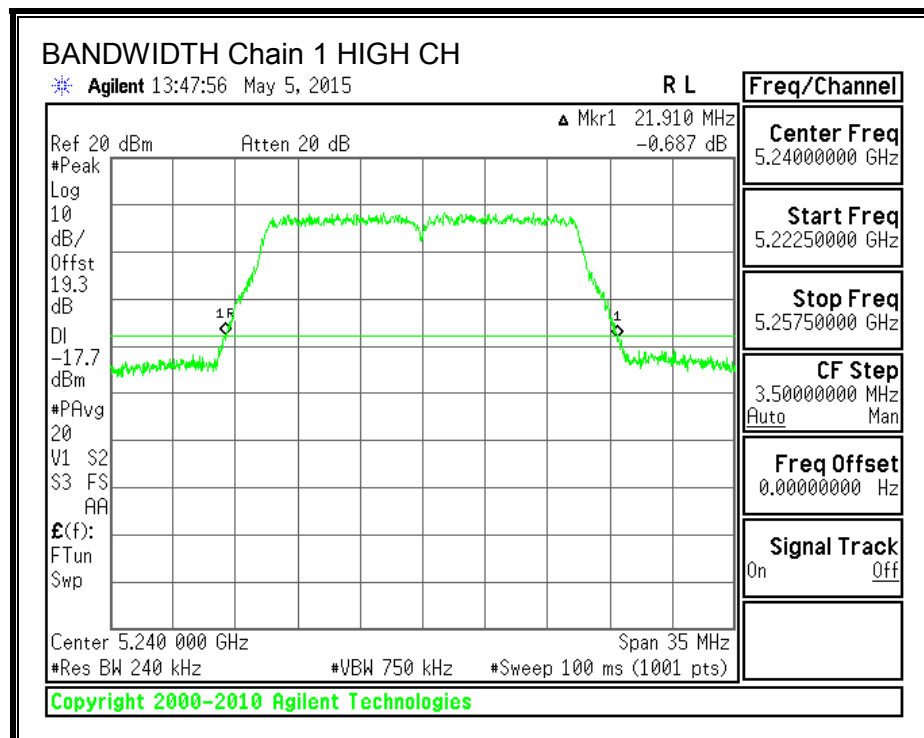
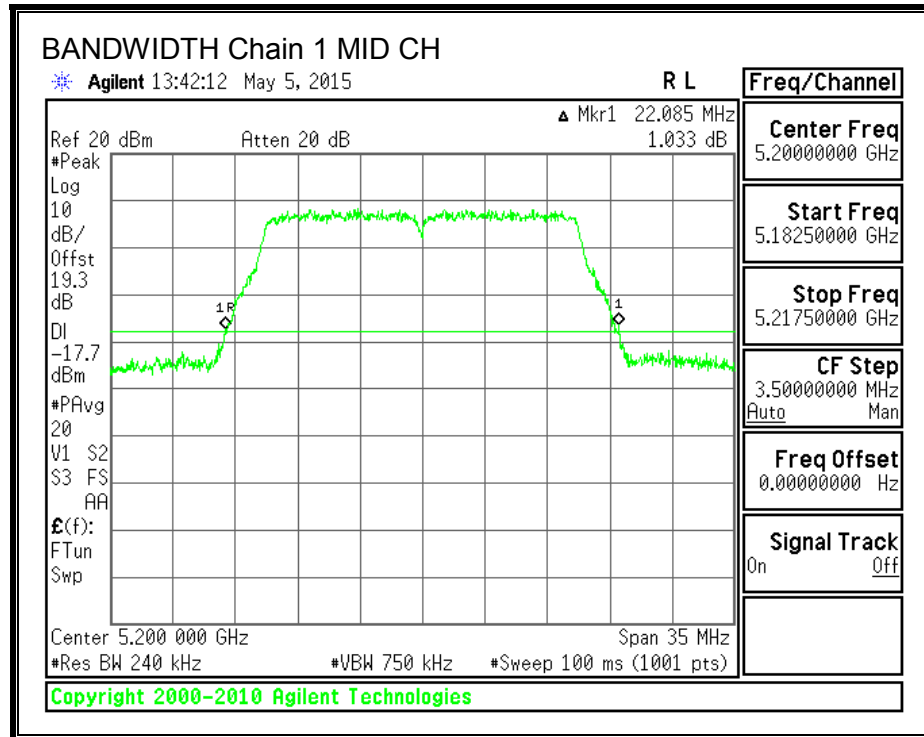
**26 dB BANDWIDTH, Chain 0**





**26 dB BANDWIDTH, Chain 1**





### 8.5.2. 99% BANDWIDTH

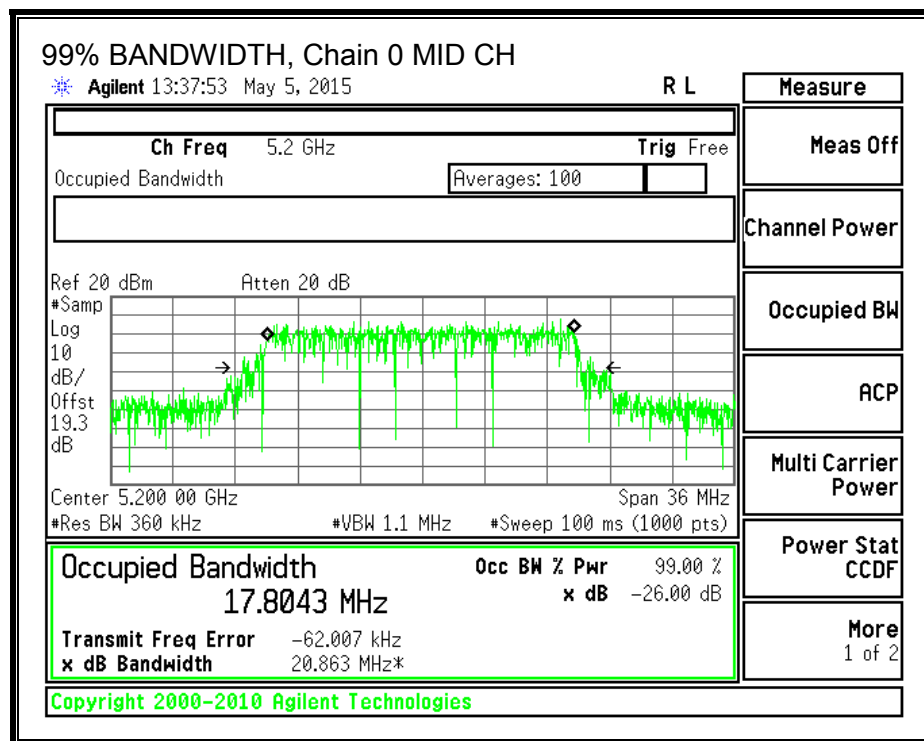
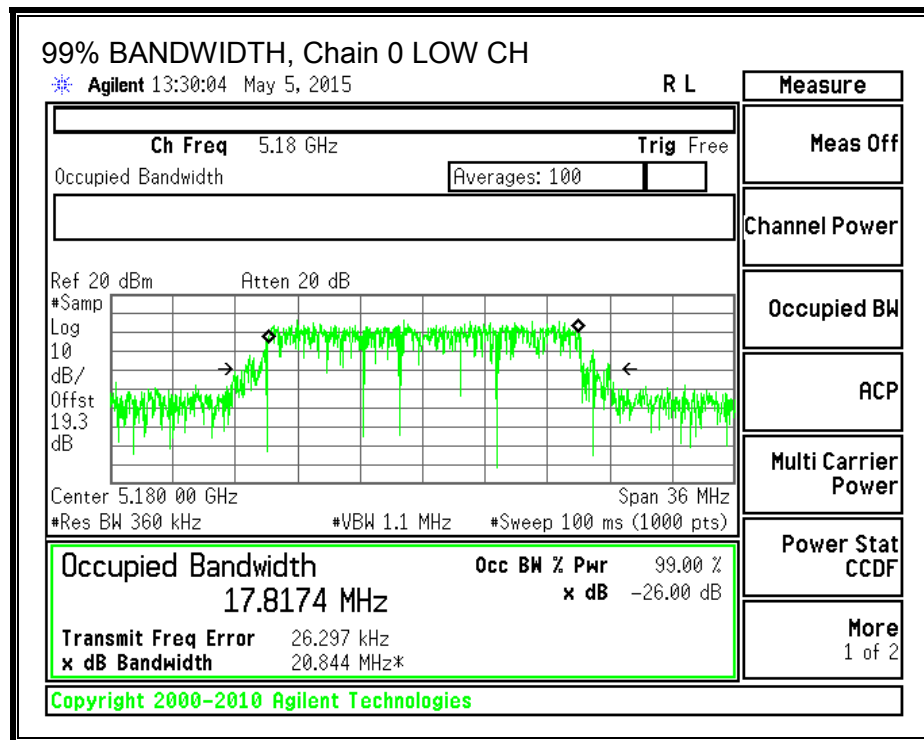
#### LIMITS

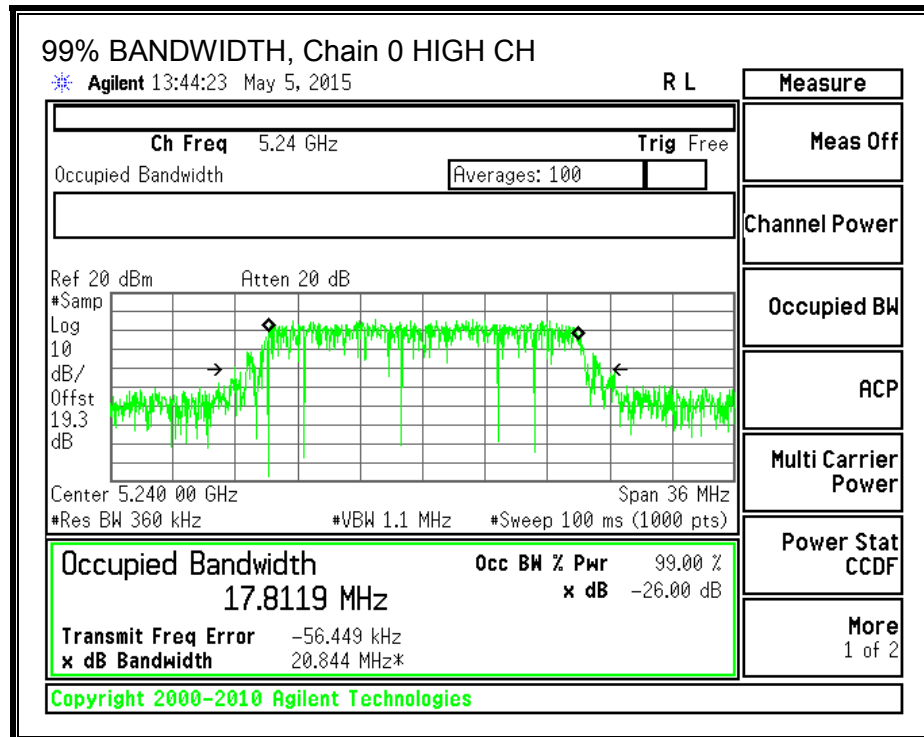
None; for reporting purposes only.

#### RESULTS

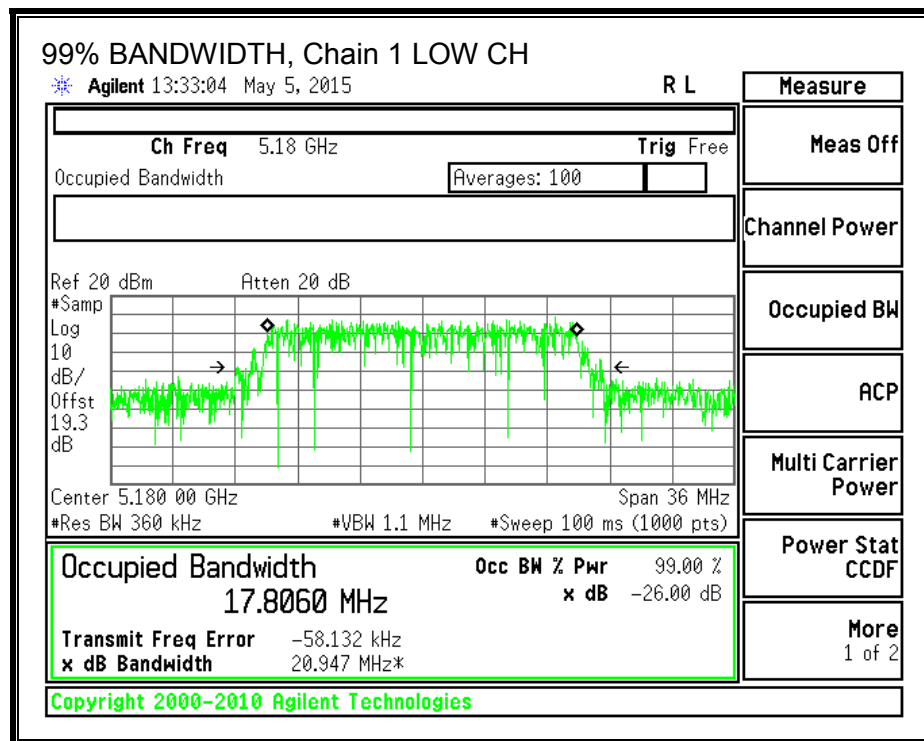
| Channel | Frequency<br>(MHz) | 99% BW<br>Chain 0<br>(MHz) | 99% BW<br>Chain 1<br>(MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low     | 5180               | 17.8174                    | 17.8060                    |
| Mid     | 5200               | 17.8043                    | 17.8213                    |
| High    | 5240               | 17.8119                    | 17.8233                    |

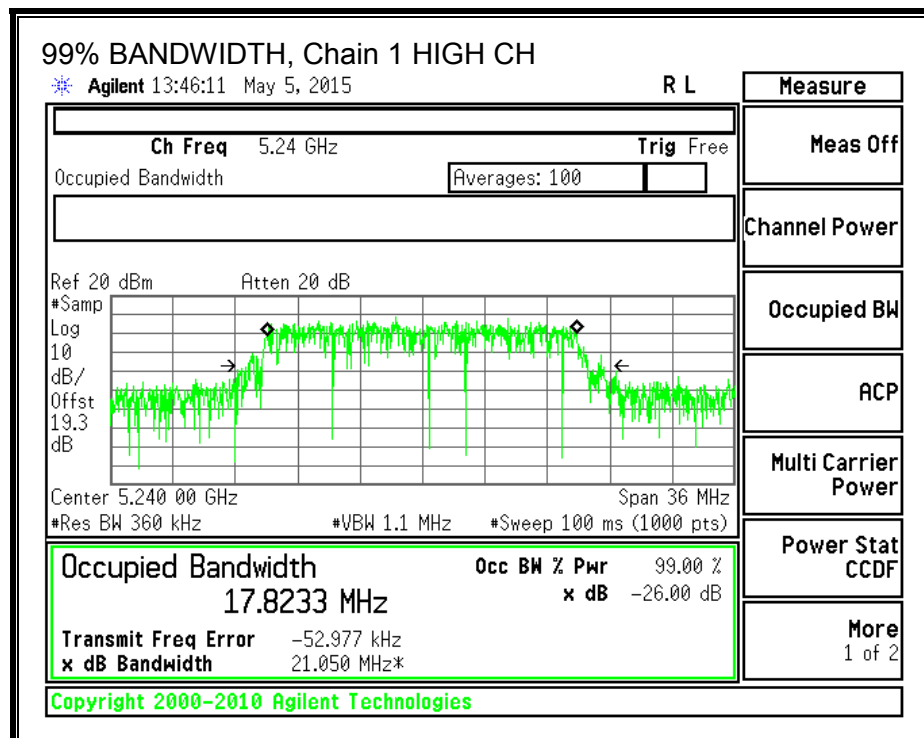
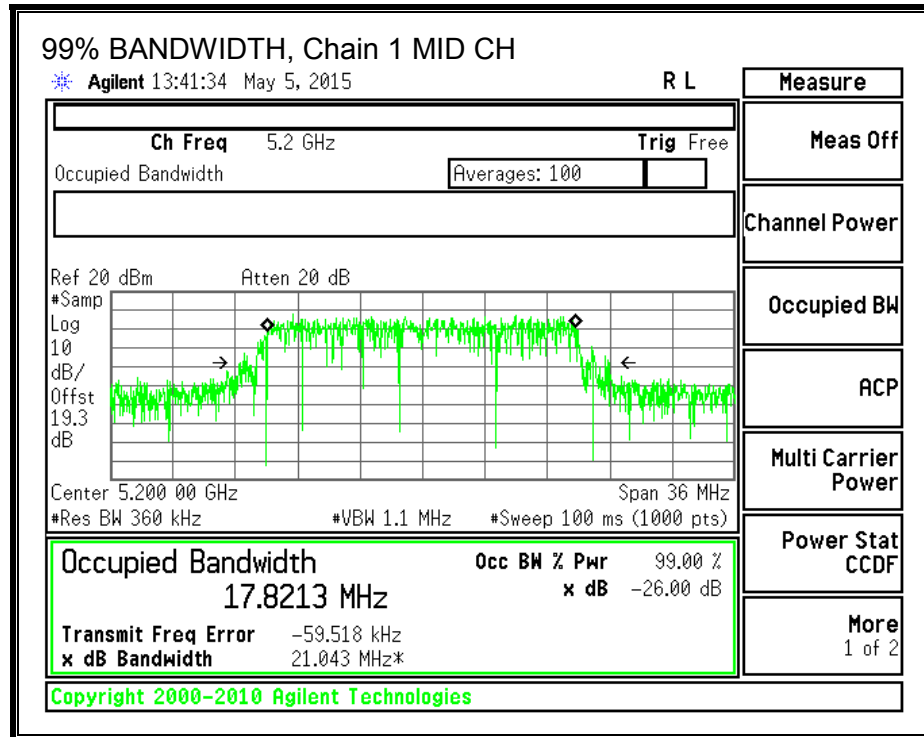
**99% BANDWIDTH, Chain 0**





**99% BANDWIDTH, Chain 1**







### 8.5.3. 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 colocated 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 power, the TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| <b>Chain 0<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Chain 1<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Uncorrelated Chains<br/>Directional<br/>Gain<br/>(dBi)</b> |
|-----------------------------------------------|-----------------------------------------------|---------------------------------------------------------------|
| 3.30                                          | 3.30                                          | 3.30                                                          |

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

| <b>Chain 0<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Chain 1<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Correlated Chains<br/>Directional<br/>Gain<br/>(dBi)</b> |
|-----------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|
| 3.30                                          | 3.30                                          | 6.31                                                        |

## RESULTS

### Antenna Gain and Limits

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5180               | 3.30                                      | 6.31                                    | 24.00                   | 10.69                 |
| Mid     | 5200               | 3.30                                      | 6.31                                    | 24.00                   | 10.69                 |
| High    | 5240               | 3.30                                      | 6.31                                    | 24.00                   | 10.69                 |

|                    |      |                                 |
|--------------------|------|---------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of PSD |
|--------------------|------|---------------------------------|

### Output Power Results

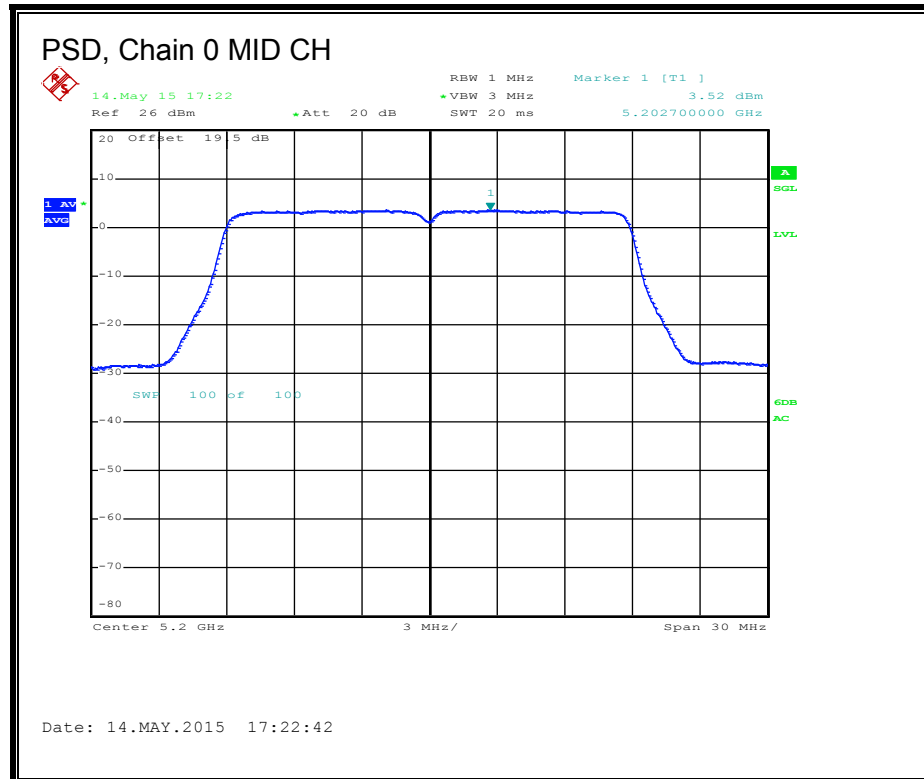
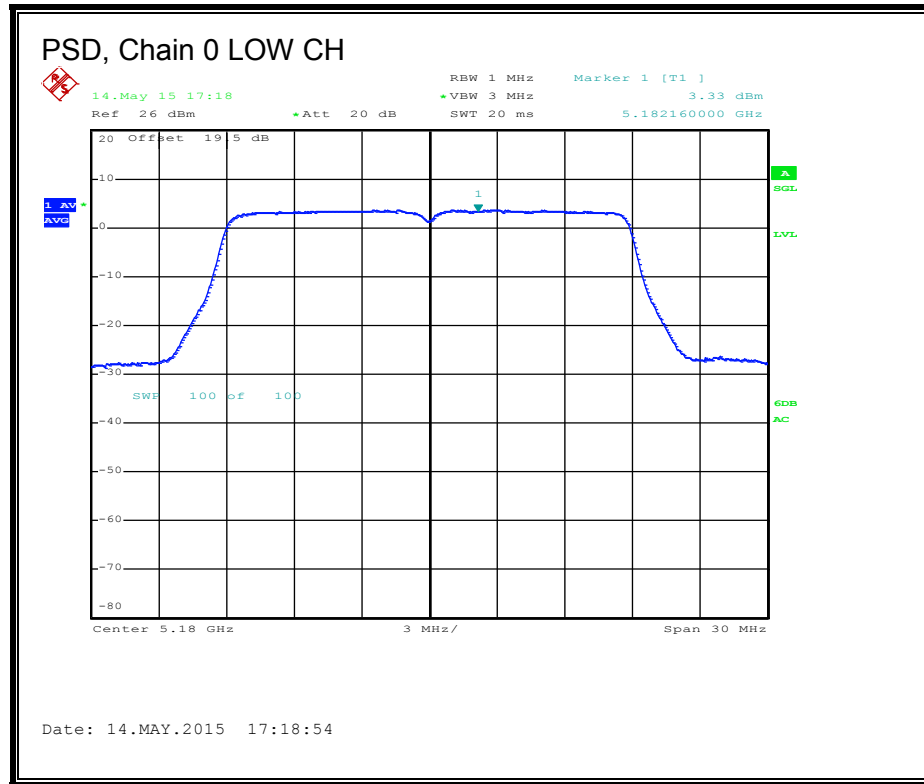
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5180               | 18.76                             | 18.04                             | 21.43                             | 24.00                   | -2.57                   |
| Mid     | 5200               | 19.20                             | 18.50                             | 21.87                             | 24.00                   | -2.13                   |
| High    | 5240               | 19.35                             | 18.50                             | 21.96                             | 24.00                   | -2.04                   |

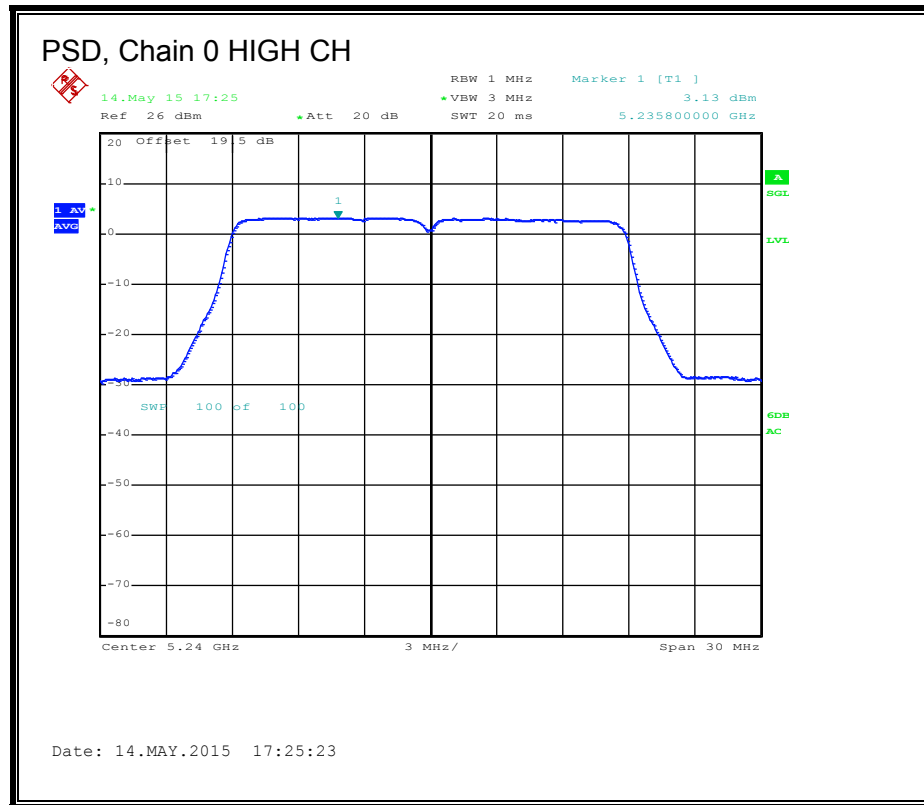
### PSD Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5180               | 3.33                            | 2.89                            | 6.13                            | 10.69                 | -4.56                 |
| Mid     | 5200               | 3.52                            | 2.95                            | 6.25                            | 10.69                 | -4.44                 |
| High    | 5240               | 3.13                            | 2.34                            | 5.76                            | 10.69                 | -4.93                 |

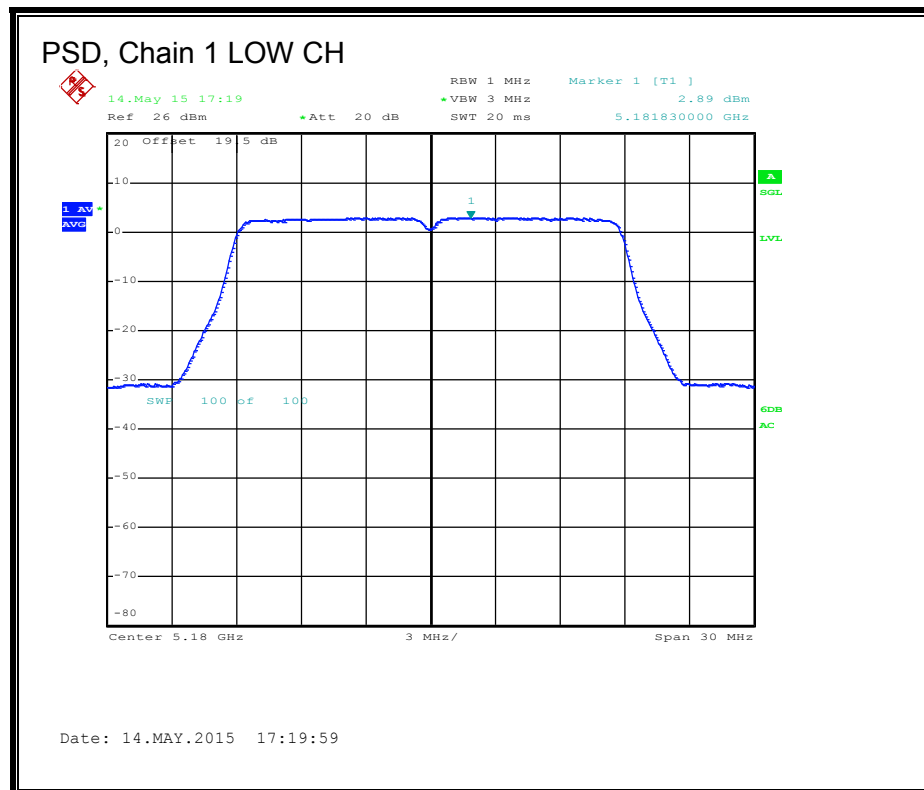
**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

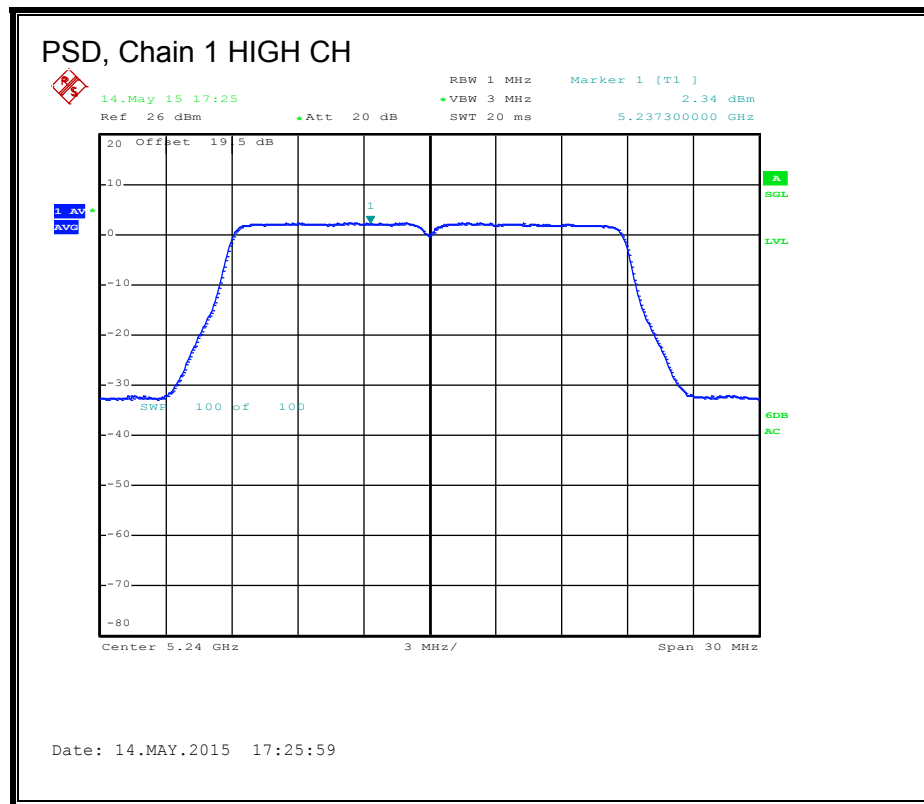
**PSD, Chain 0**





**PSD, Chain 1**





## 8.6. 802.11n HT20 STBC 2Tx MODE IN THE 5.2 GHz BAND

### 8.6.1. 26 dB BANDWIDTH

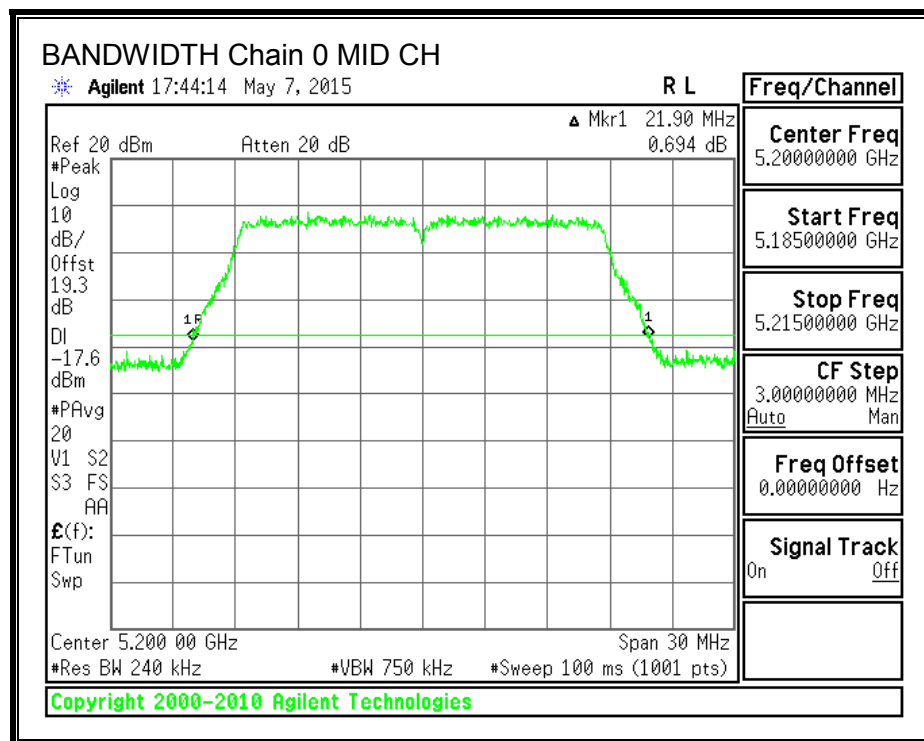
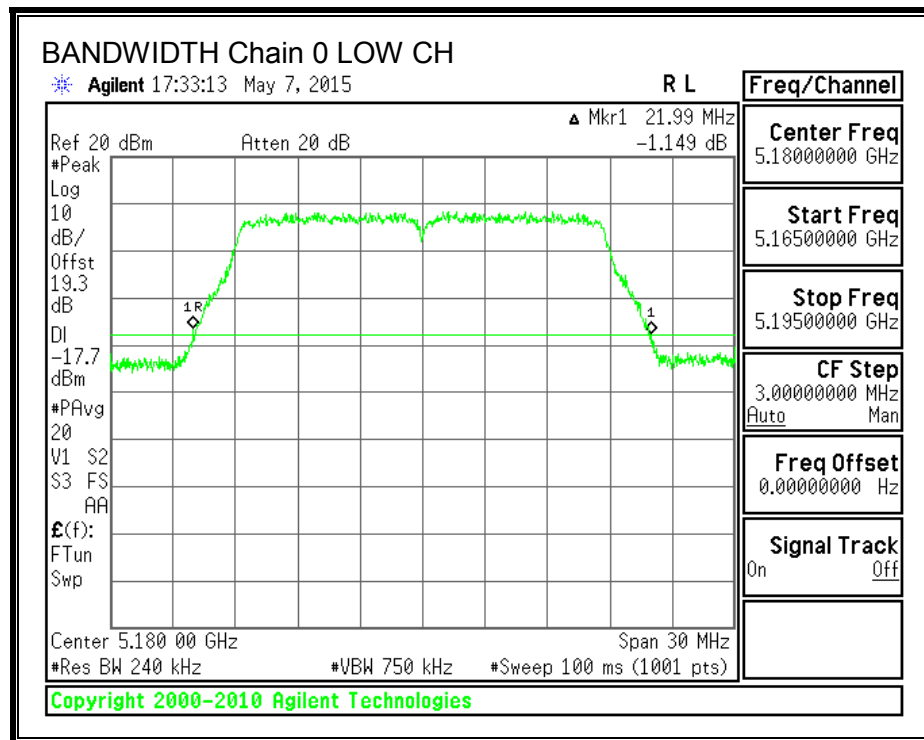
#### LIMITS

None; for reporting purposes only.

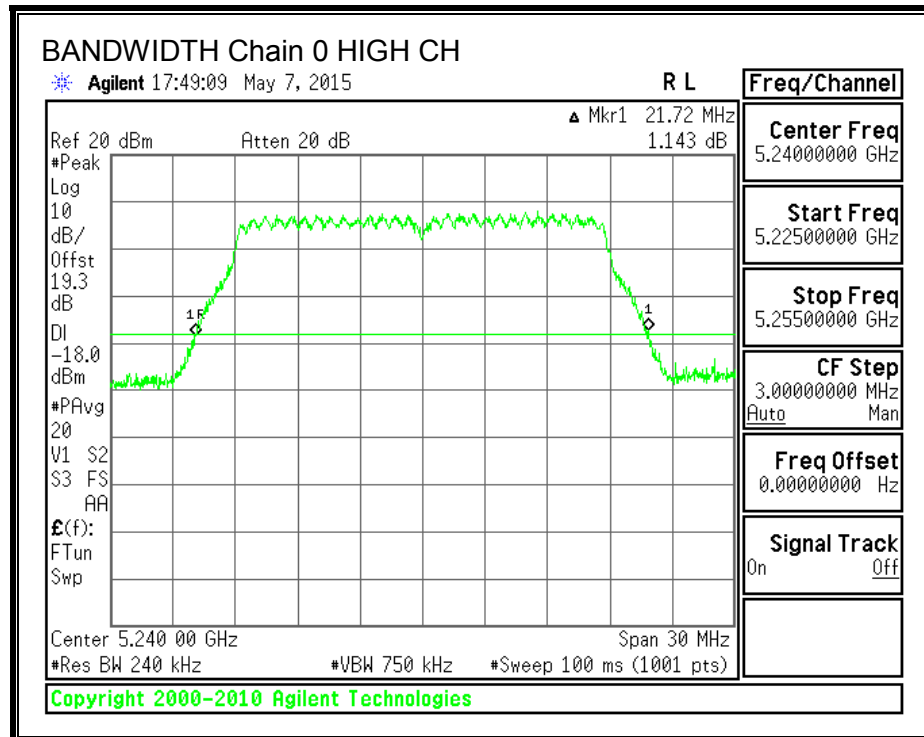
#### RESULTS

| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) | 26 dB BW<br>Chain 1<br>(MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low     | 5180               | 21.990                       | 21.900                       |
| Mid     | 5200               | 21.900                       | 21.810                       |
| High    | 5240               | 21.720                       | 21.840                       |

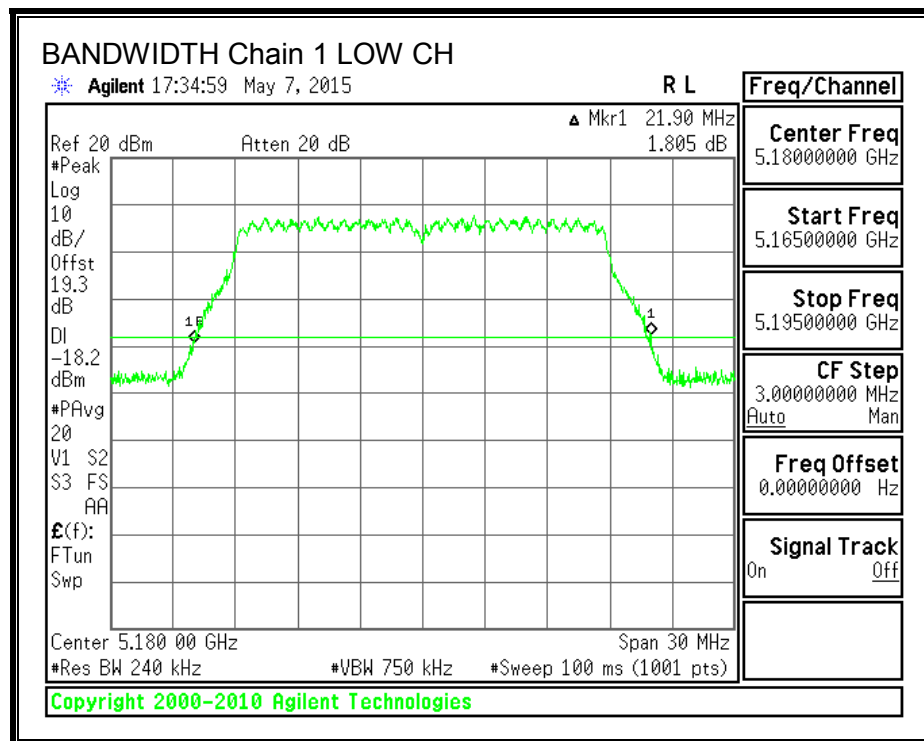
**26 dB BANDWIDTH, Chain 0**

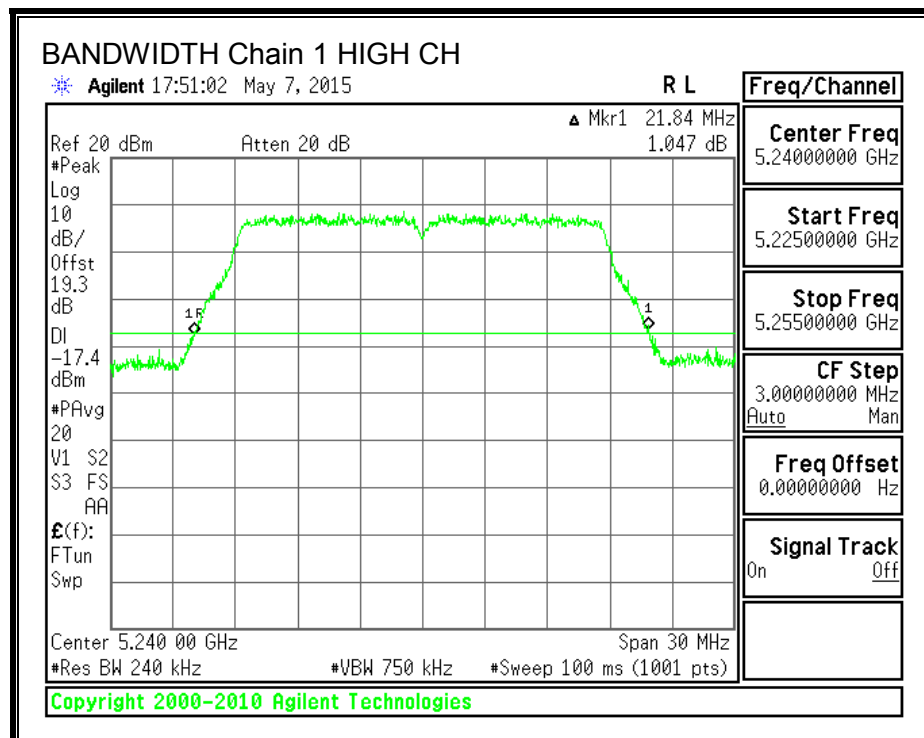
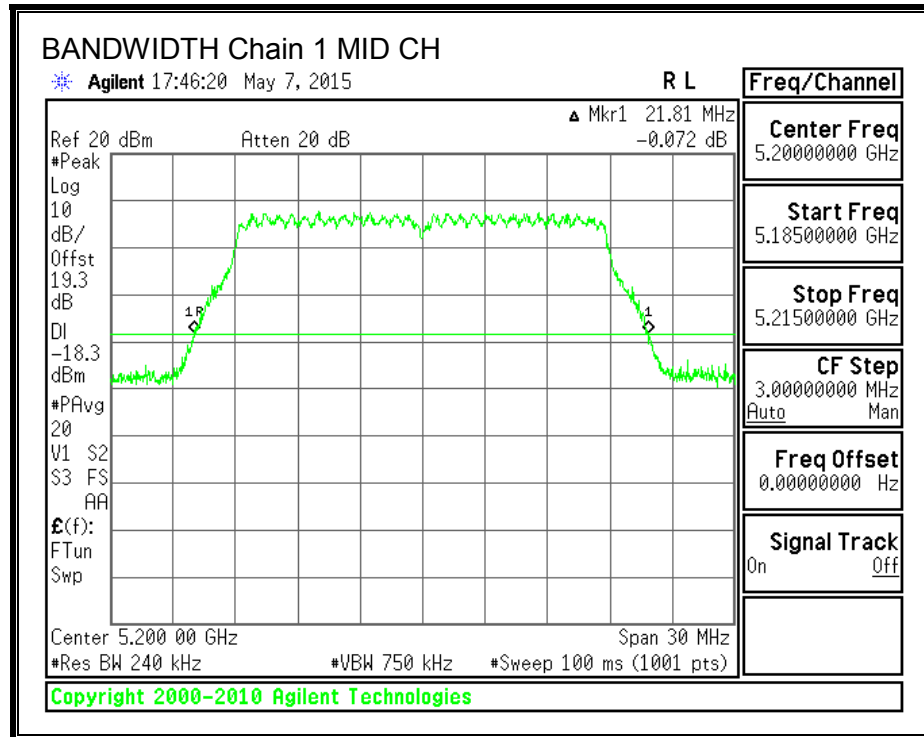






**26 dB BANDWIDTH, Chain 1**





## 8.6.2. 99% BANDWIDTH

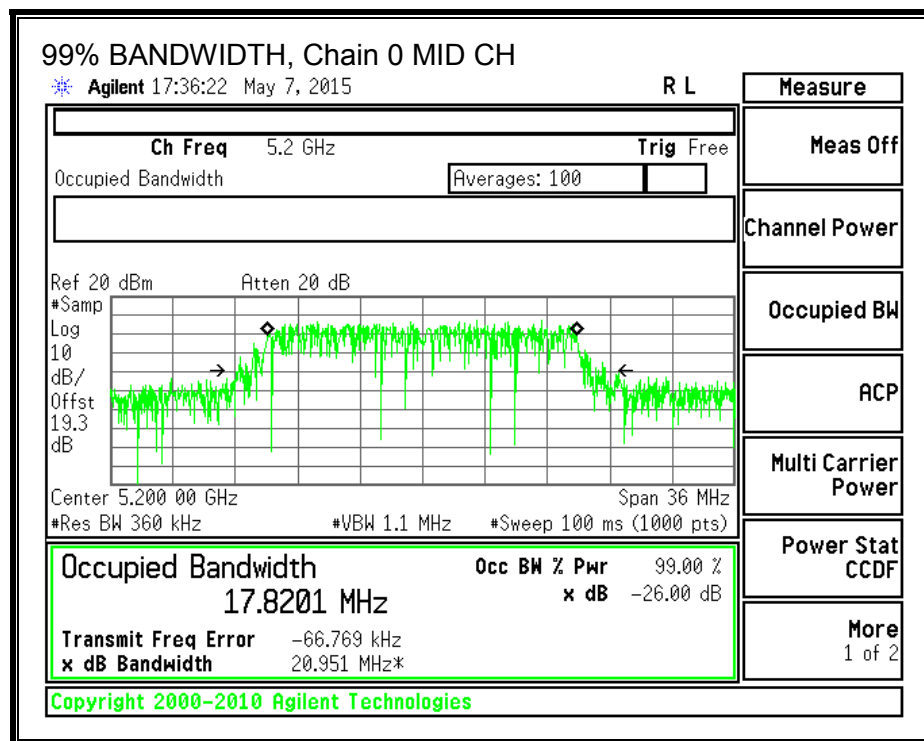
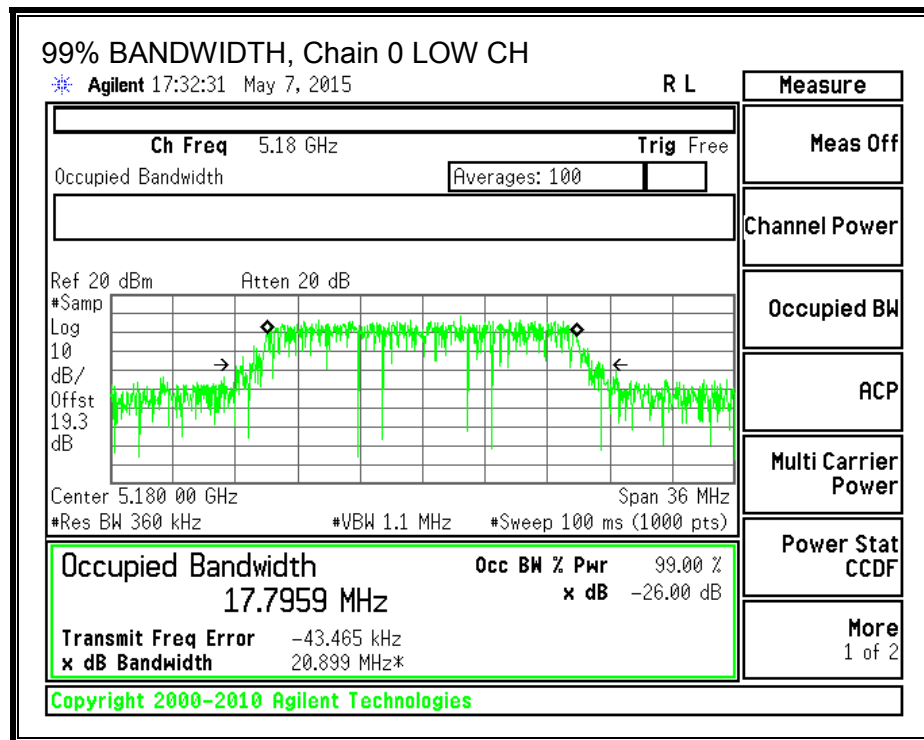
### LIMITS

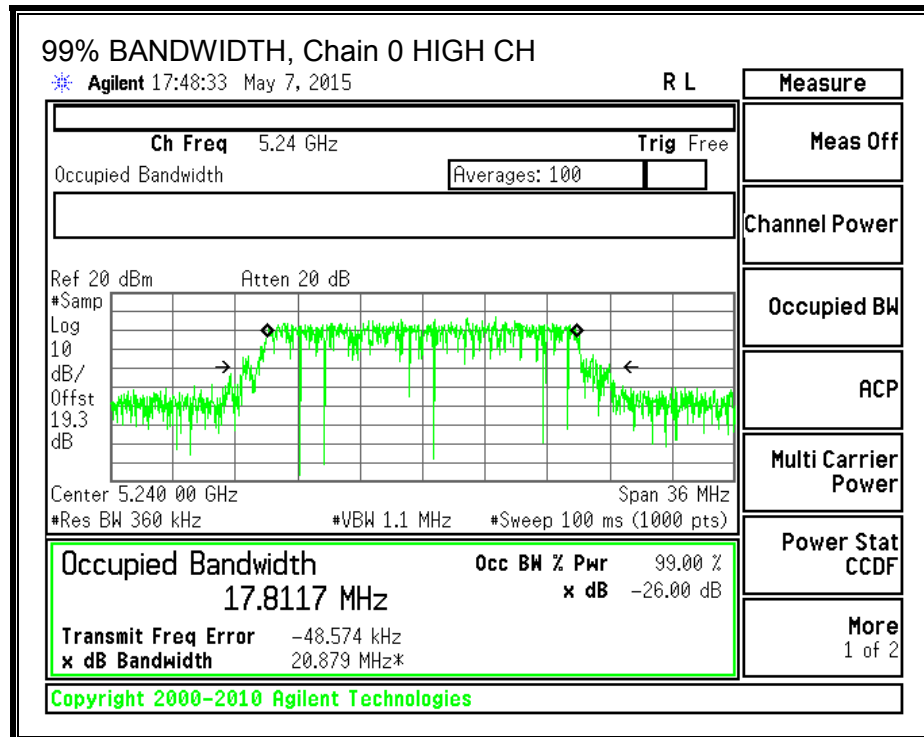
None; for reporting purposes only.

### RESULTS

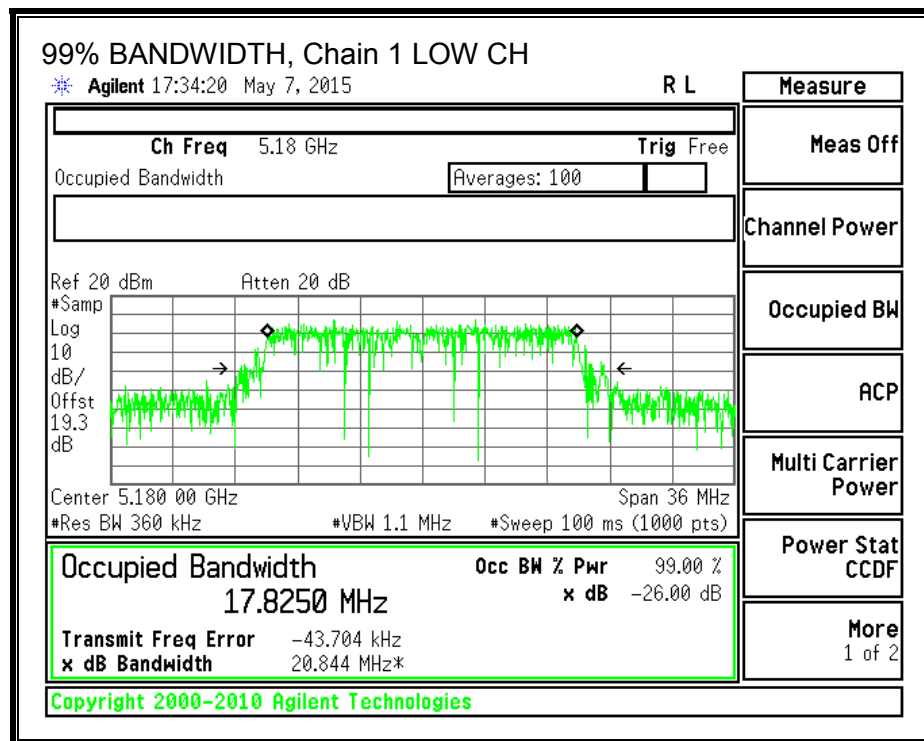
| Channel | Frequency<br>(MHz) | 99% BW<br>Chain 0<br>(MHz) | 99% BW<br>Chain 1<br>(MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low     | 5180               | 17.7959                    | 17.8250                    |
| Mid     | 5200               | 17.8201                    | 17.8169                    |
| High    | 5240               | 17.8117                    | 17.8394                    |

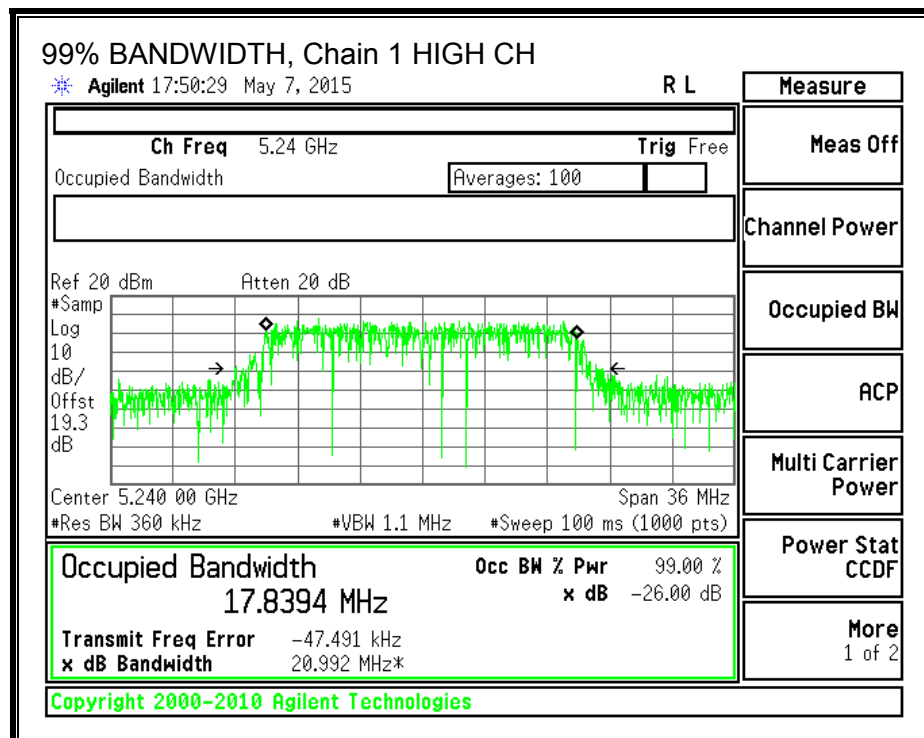
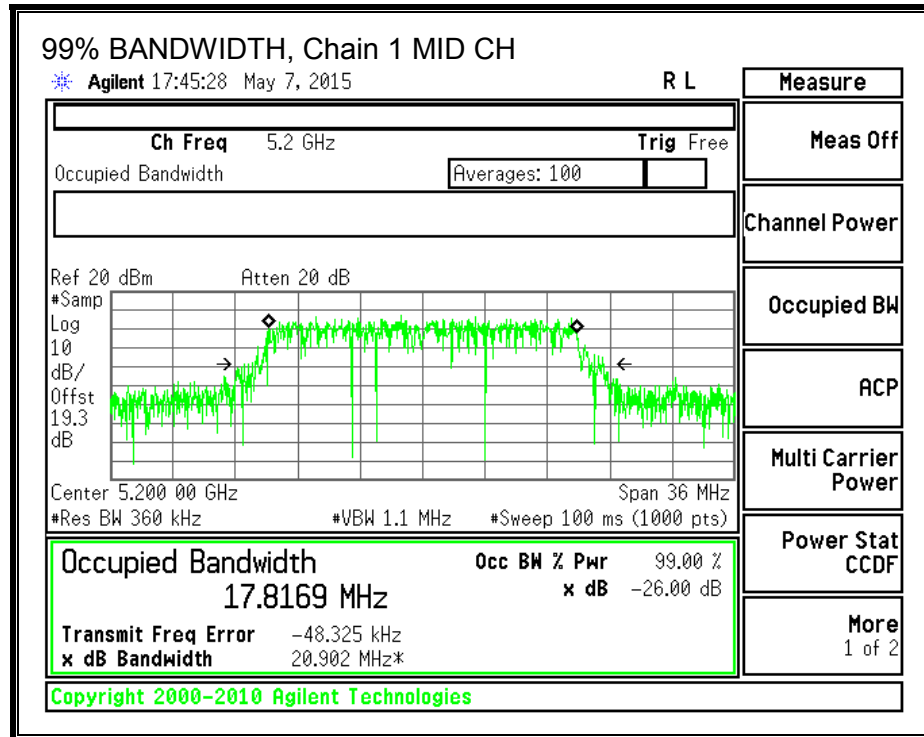
**99% BANDWIDTH, Chain 0**





**99% BANDWIDTH, Chain 1**





### 8.6.3. 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**

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

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Uncorrelated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|-----------------------------------------------------|
| 3.30                                | 3.30                                | 3.30                                                |



## RESULTS

### Antenna Gain and Limits

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5180               | 3.30                                      | 3.30                                    | 24.00                   | 11.00                 |
| Mid     | 5200               | 3.30                                      | 3.30                                    | 24.00                   | 11.00                 |
| High    | 5240               | 3.30                                      | 3.30                                    | 24.00                   | 11.00                 |

|                    |      |                                 |
|--------------------|------|---------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of PSD |
|--------------------|------|---------------------------------|

### Output Power Results

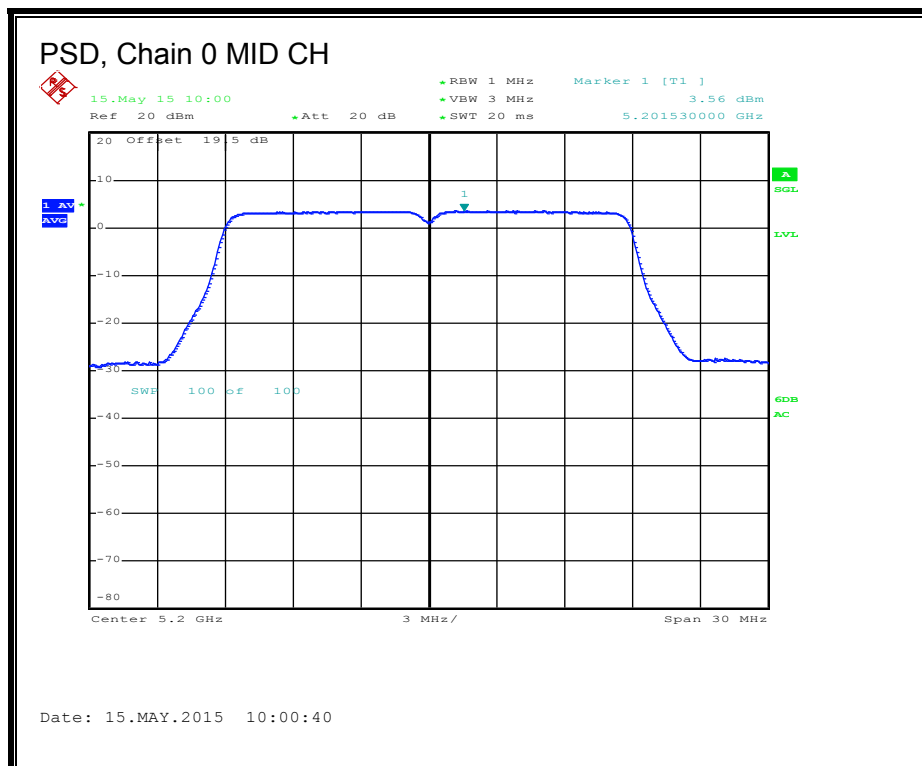
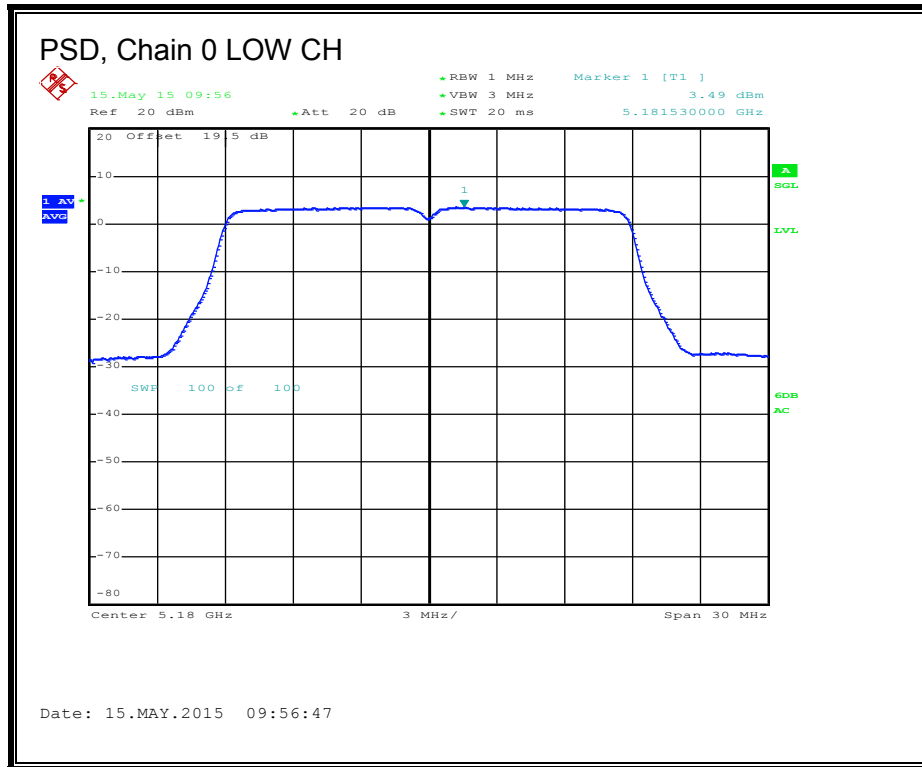
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5180               | 18.76                             | 18.04                             | 21.43                             | 24.00                   | -2.57                   |
| Mid     | 5200               | 19.15                             | 18.35                             | 21.78                             | 24.00                   | -2.22                   |
| High    | 5240               | 19.35                             | 18.54                             | 21.97                             | 24.00                   | -2.03                   |

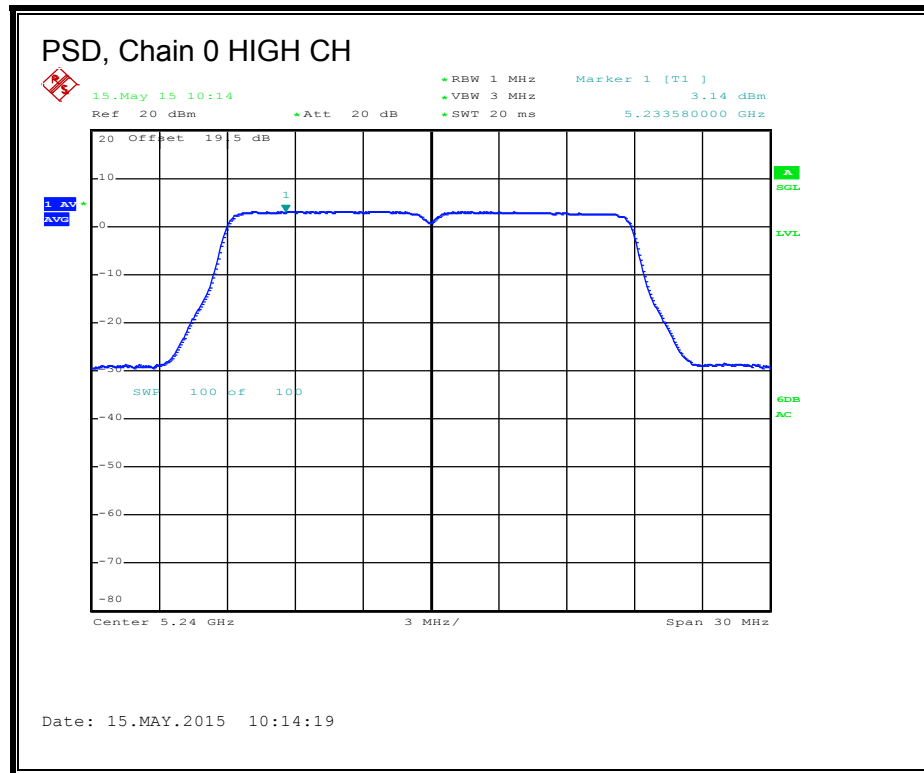
### PSD Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5180               | 3.49                            | 2.69                            | 6.12                            | 11.00                 | -4.88                 |
| Mid     | 5200               | 3.56                            | 2.78                            | 6.20                            | 11.00                 | -4.80                 |
| High    | 5240               | 3.14                            | 2.22                            | 5.71                            | 11.00                 | -5.29                 |

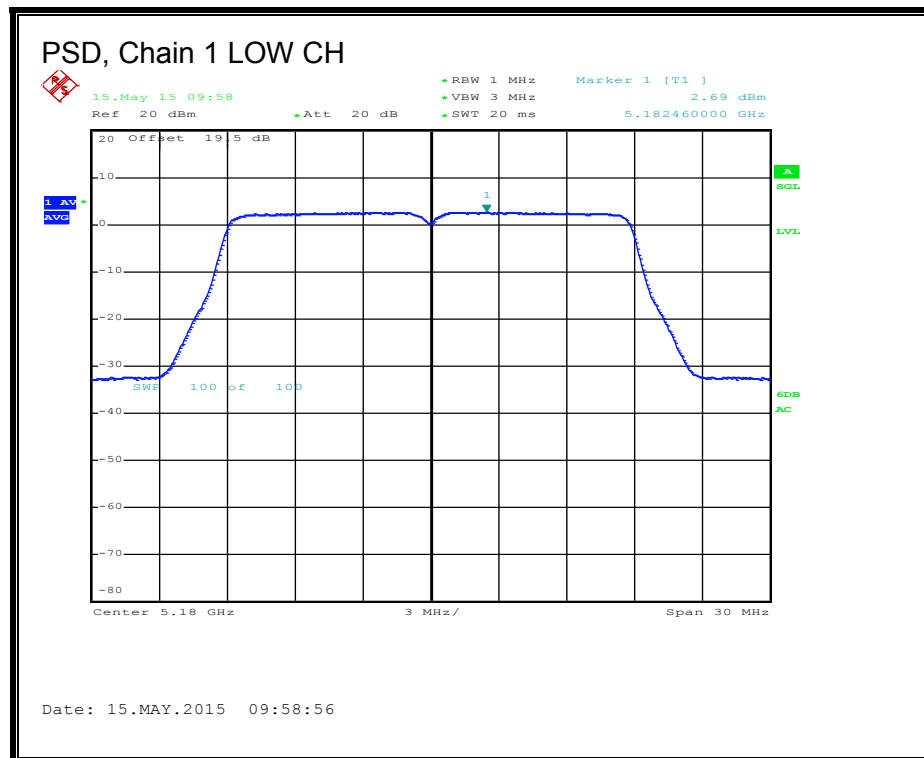
**Note:** the power readings above are measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

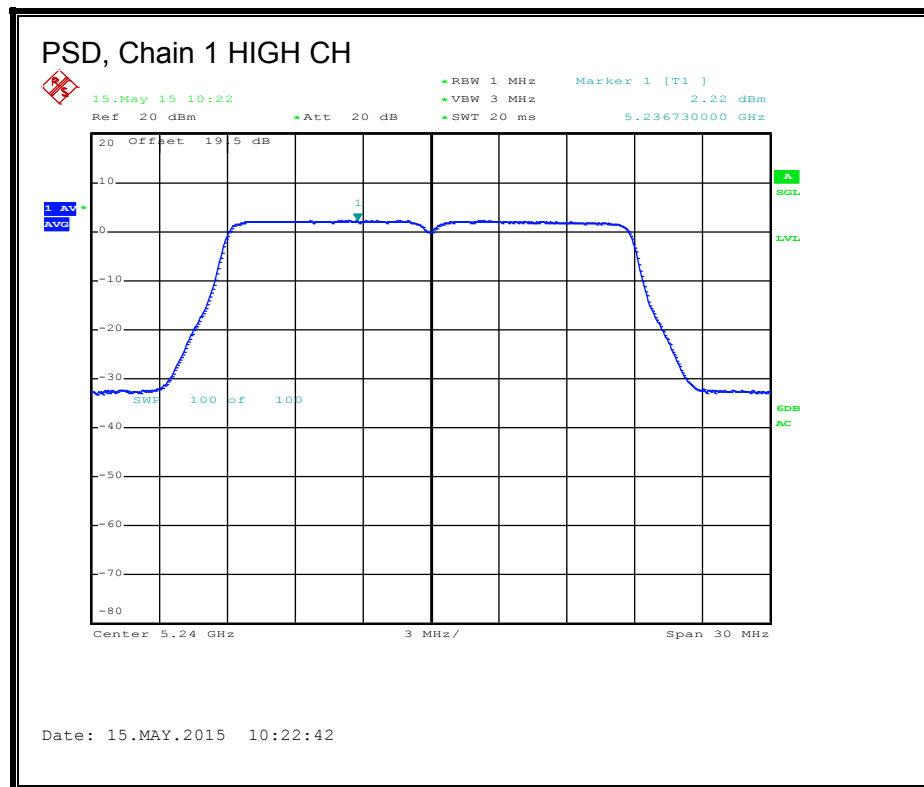
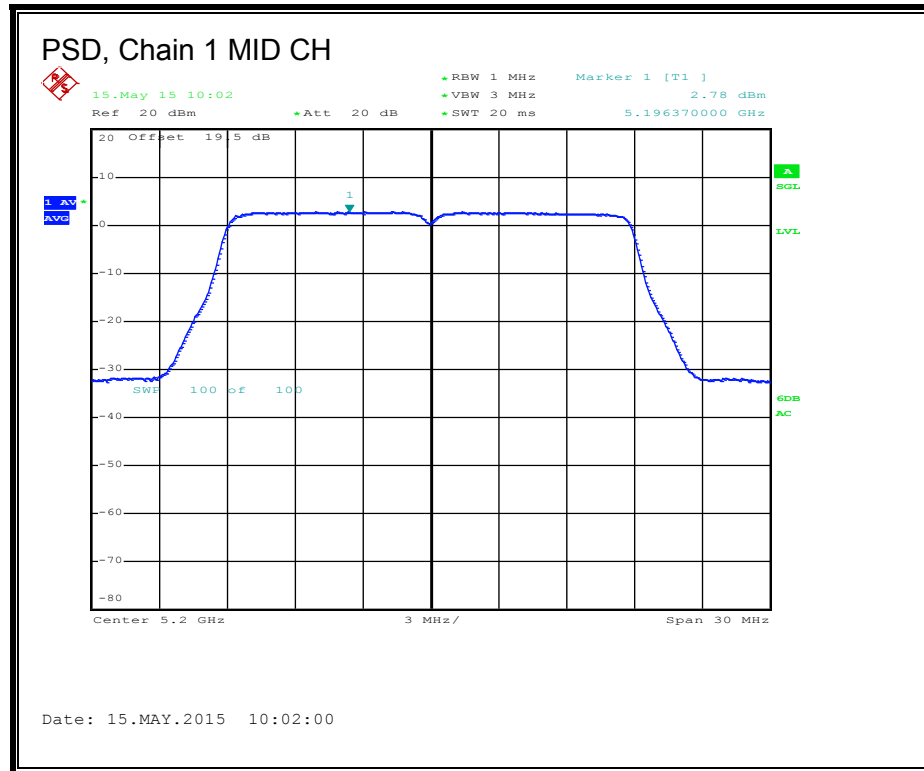
**PSD, Chain 0**





**PSD, Chain 1**





## **8.7. 802.11n HT20 Tx BF 2Tx MODE IN THE 5.2 GHz BAND**

### **8.7.1. 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**

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

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Correlated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|---------------------------------------------------|
| 3.30                                | 3.30                                | 6.31                                              |

## RESULTS

### Antenna Gain and Limits

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5180               | 6.31                                      | 6.31                                    | 23.69                   | 10.69                 |
| Mid     | 5200               | 6.31                                      | 6.31                                    | 23.69                   | 10.69                 |
| High    | 5240               | 6.31                                      | 6.31                                    | 23.69                   | 10.69                 |

|                    |      |                                 |
|--------------------|------|---------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of PSD |
|--------------------|------|---------------------------------|

### Output Power Results

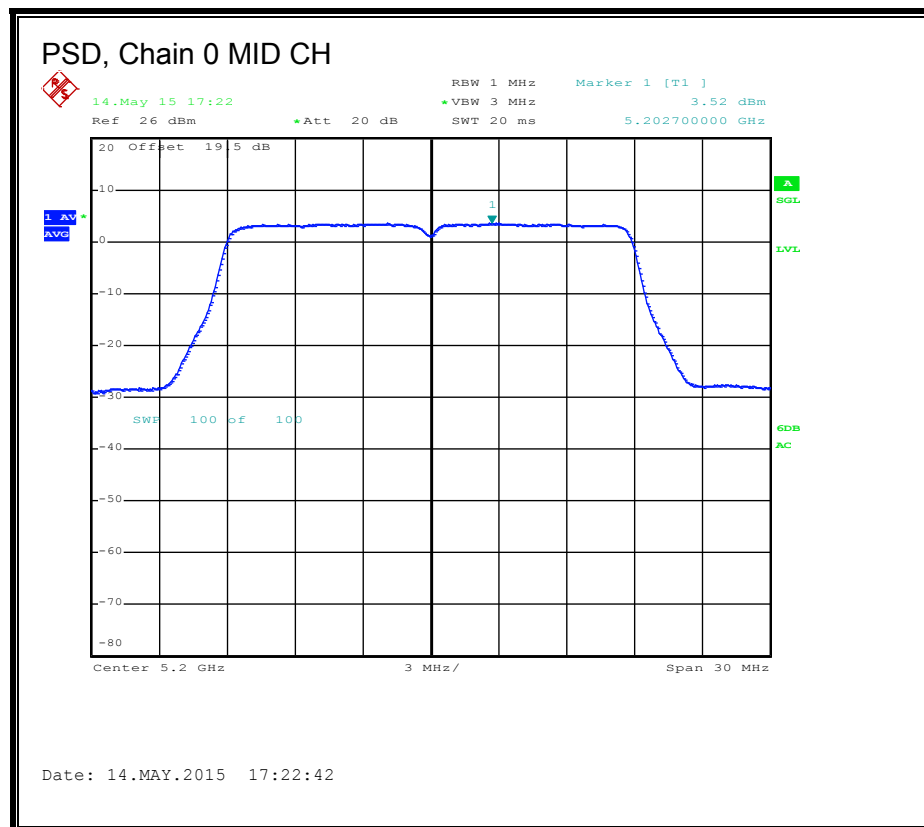
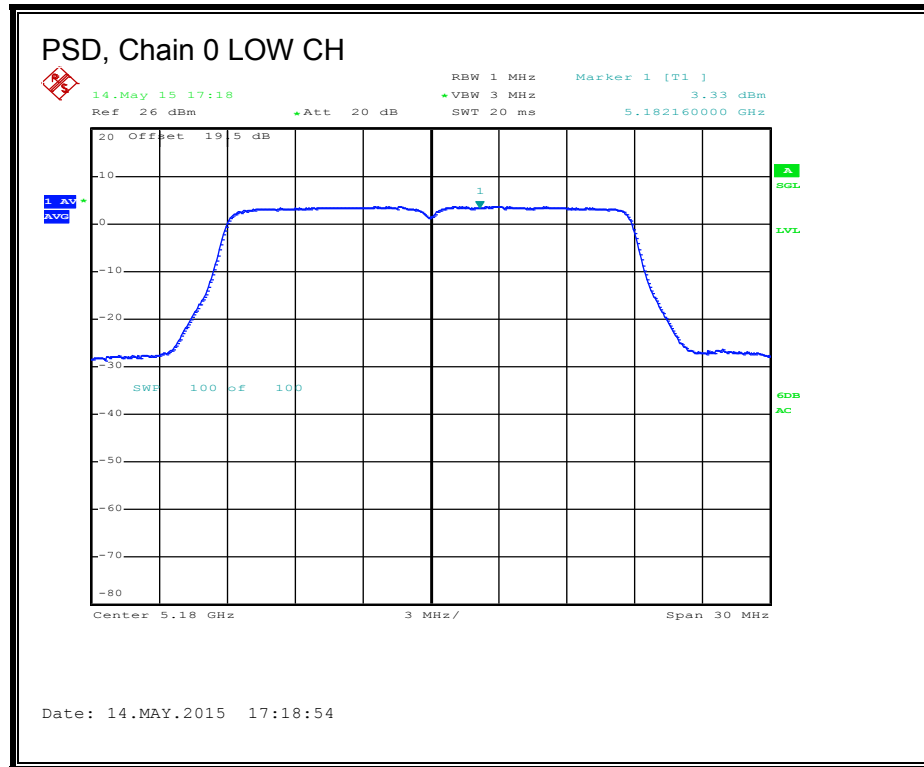
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5180               | 18.11                             | 17.32                             | 20.74                             | 23.69                   | -2.95                   |
| Mid     | 5200               | 19.20                             | 18.50                             | 21.87                             | 23.69                   | -1.82                   |
| High    | 5240               | 19.35                             | 18.50                             | 21.96                             | 23.69                   | -1.73                   |

### PSD Results

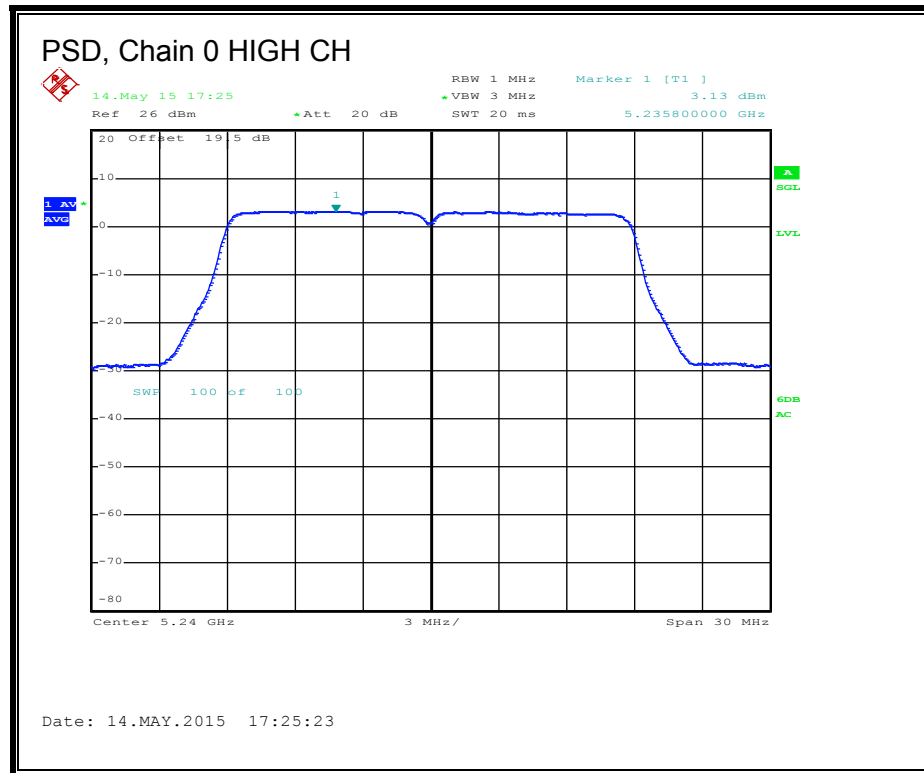
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5180               | 3.33                            | 2.89                            | 6.13                            | 10.69                 | -4.56                 |
| Mid     | 5200               | 3.52                            | 2.95                            | 6.25                            | 10.69                 | -4.44                 |
| High    | 5240               | 3.13                            | 2.34                            | 5.76                            | 10.69                 | -4.93                 |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

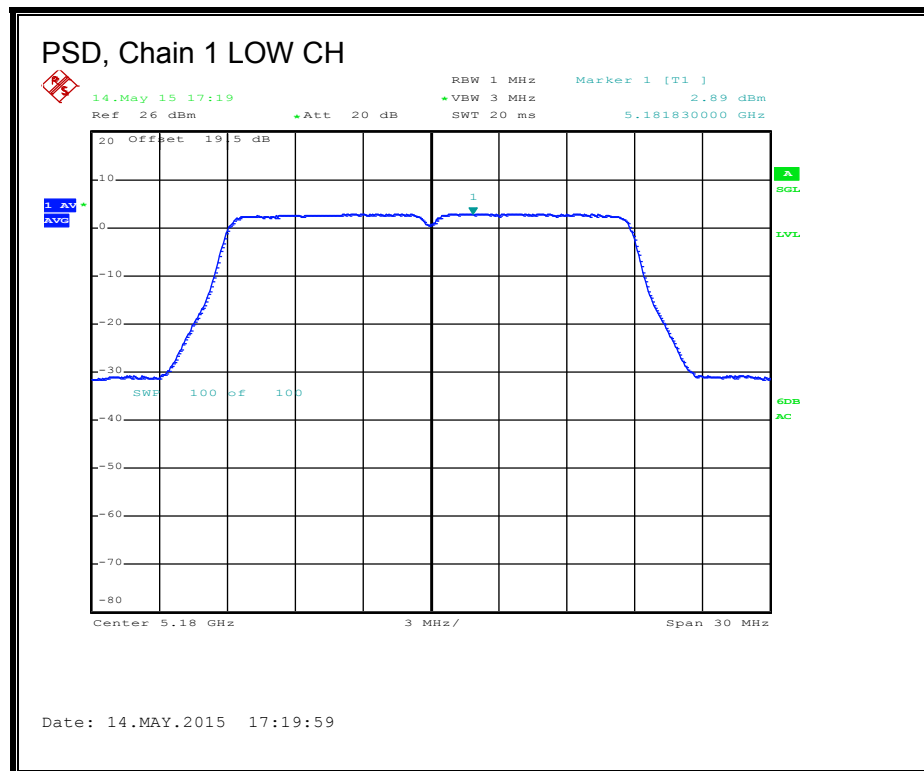
**PSD, Chain 0**

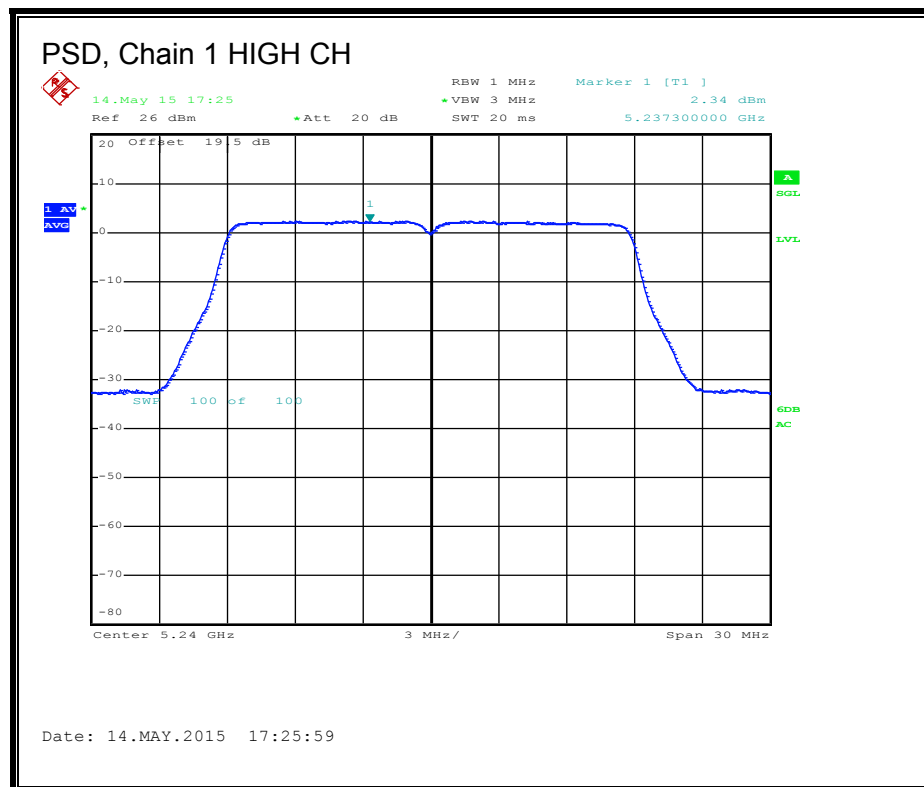
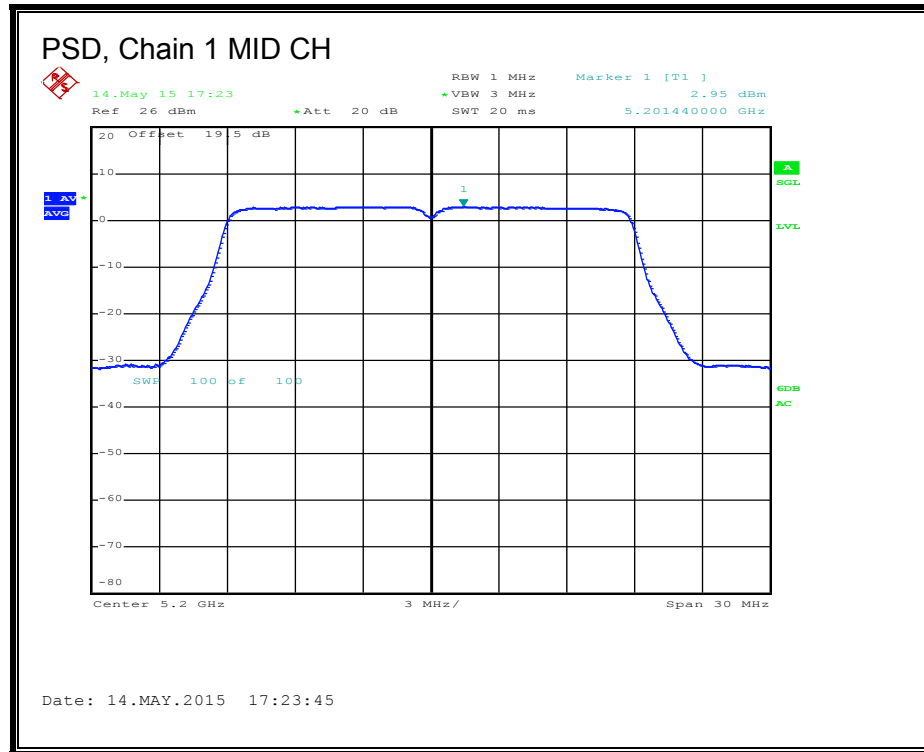






**PSD, Chain 1**





## **8.8. 802.11n HT40 1Tx MODE IN THE 5.2 GHz BAND**

### **8.8.1. OUTPUT 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.

## **DIRECTIONAL ANTENNA GAIN**

This is SISO mode, AG is the highest (worst-case) = 3.3 dBi

## **RESULTS**

### **Antenna Gain and Limits**

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Power<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-------------------------|
| Low     | 5190               | 3.30                                      | 24.00                   |

### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5190               | 17.72                             | 17.72                             | 24.00                   | -6.28                   |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## 8.9. 802.11n HT40 CDD 2Tx MODE IN THE 5.2 GHz BAND

### 8.9.1. 26 dB BANDWIDTH

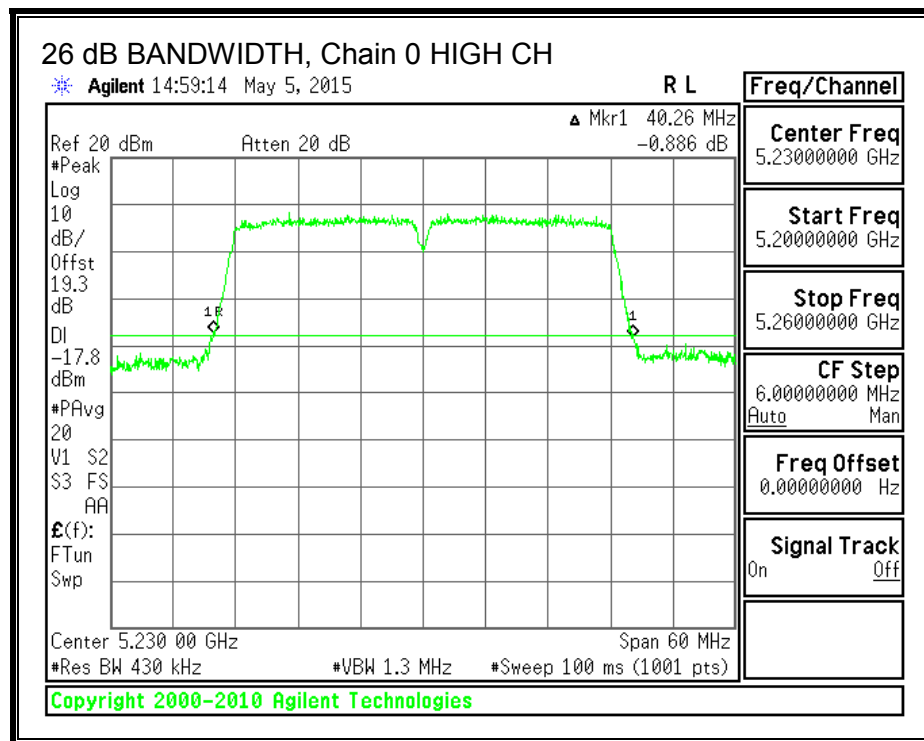
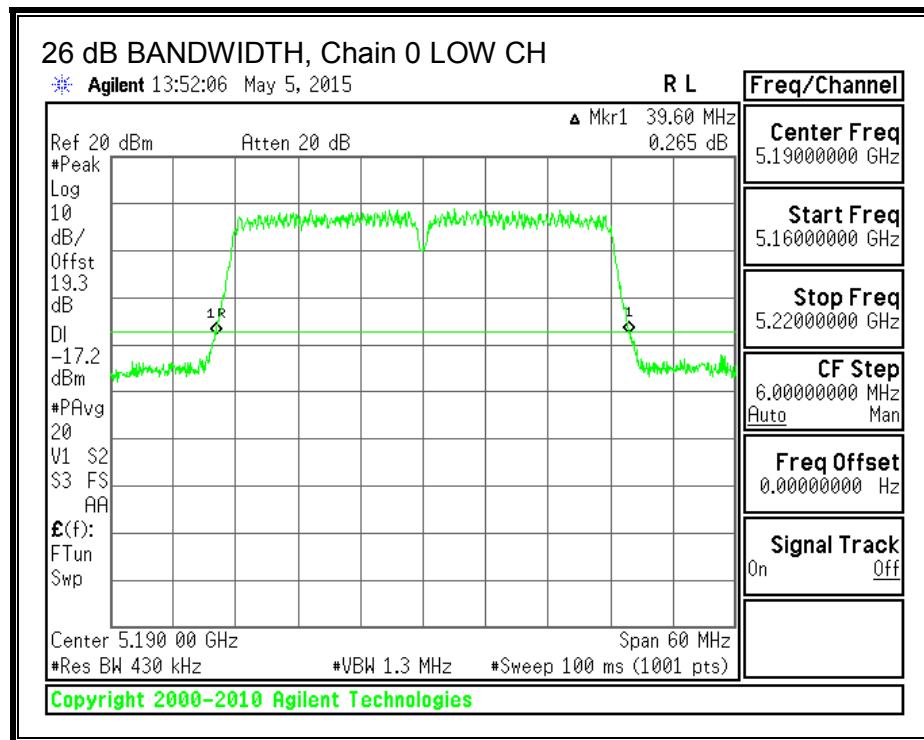
#### LIMITS

None; for reporting purposes only.

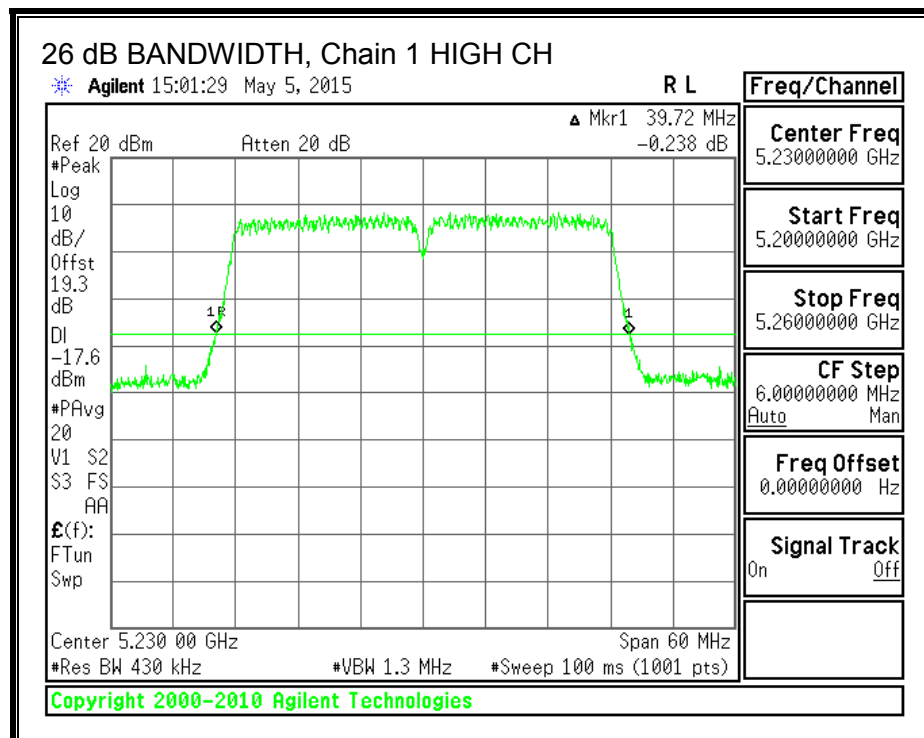
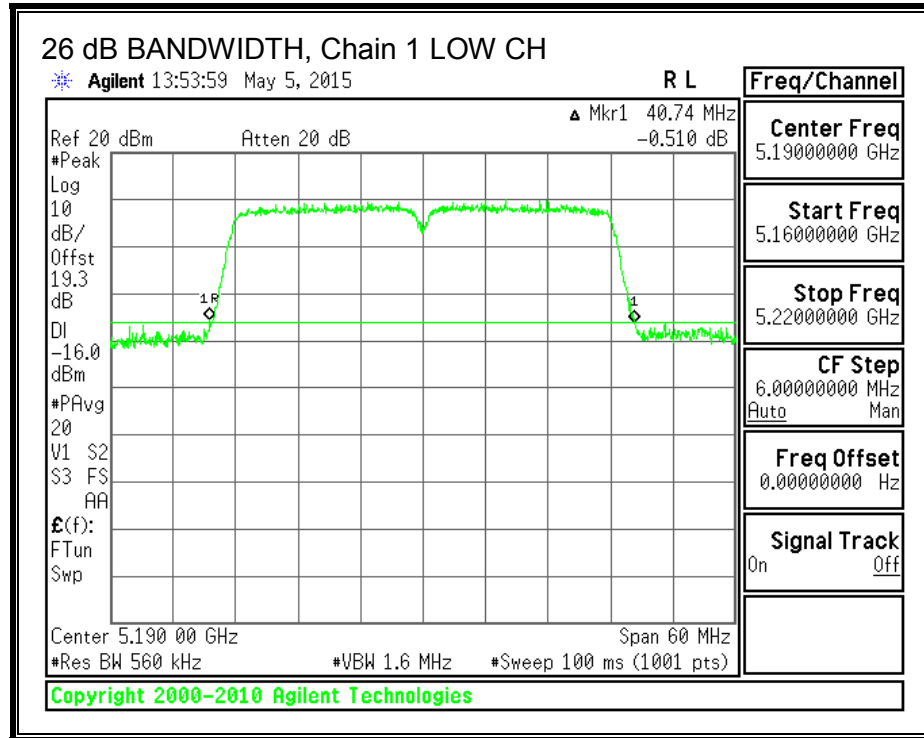
#### RESULTS

| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) | 26 dB BW<br>Chain 1<br>(MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low     | 5190               | 39.600                       | 40.740                       |
| High    | 5230               | 40.260                       | 39.720                       |

**26 dB BANDWIDTH, Chain 0**



**26 dB BANDWIDTH, Chain 1**



## 8.9.2. 99% BANDWIDTH

### LIMITS

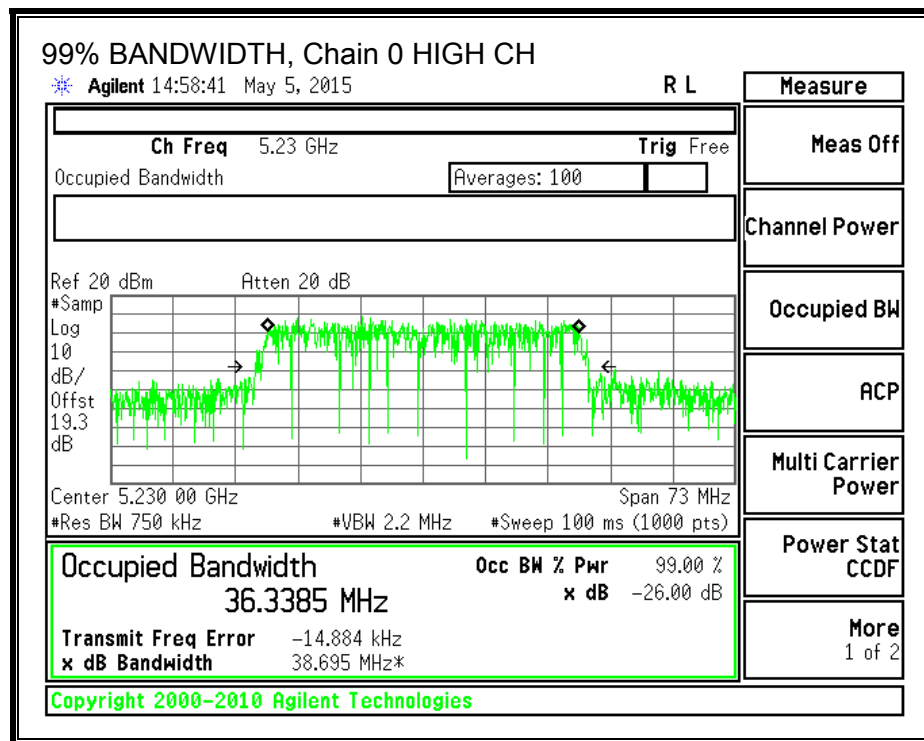
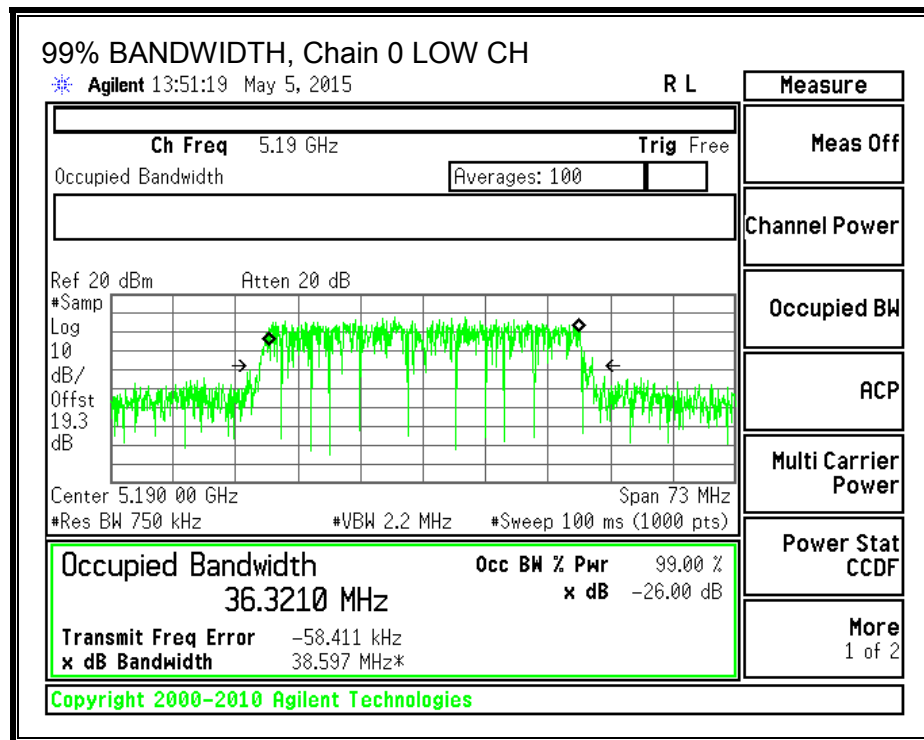
None; for reporting purposes only.

### RESULTS

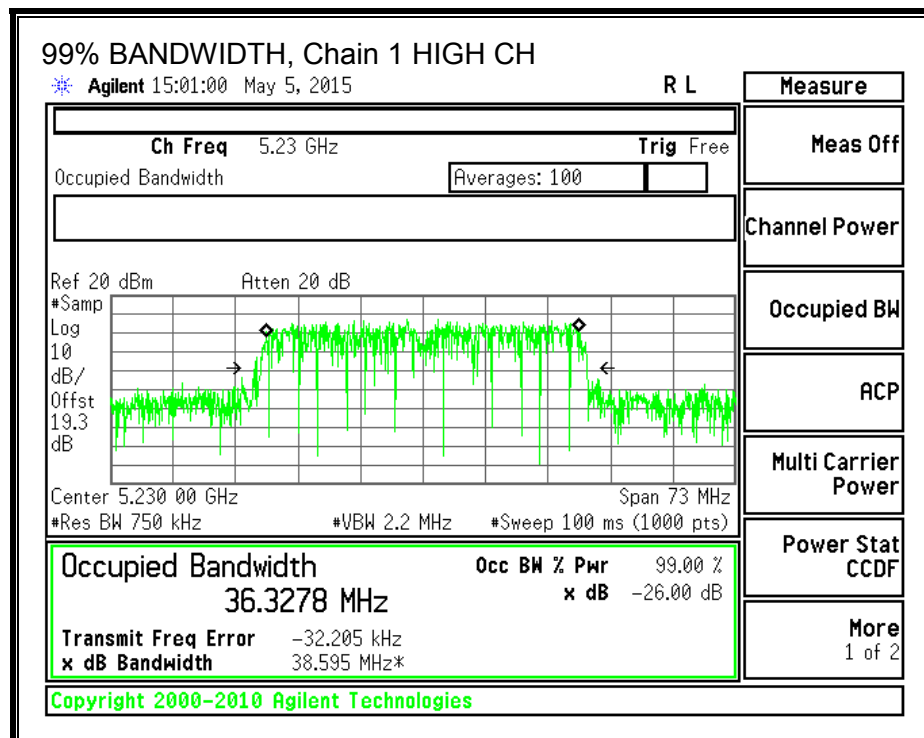
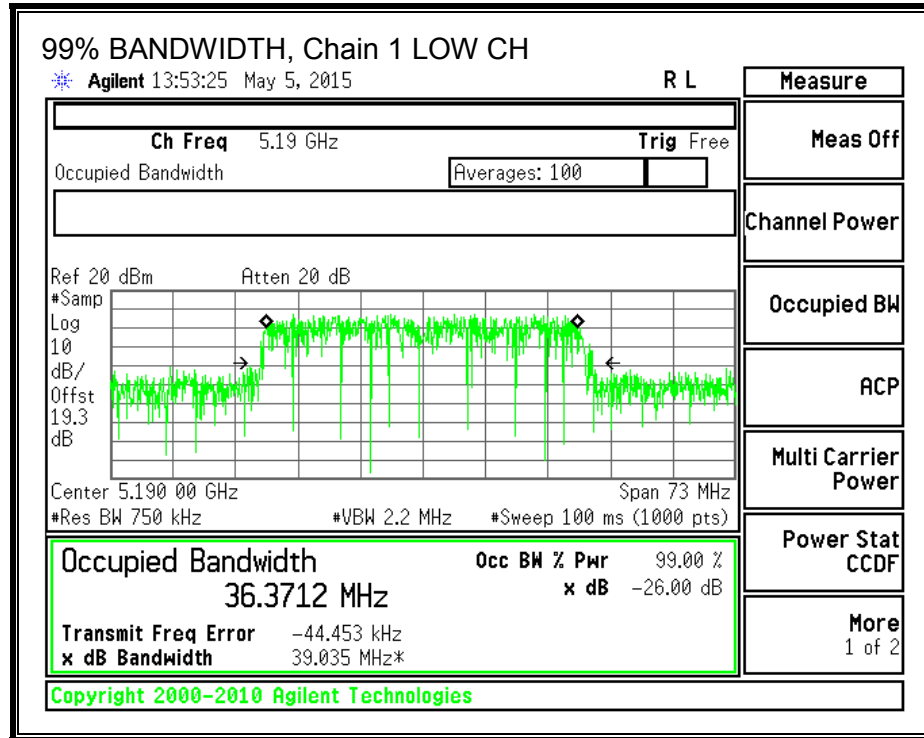
| Channel | Frequency<br>(MHz) | 99% BW<br>Chain 0<br>(MHz) | 99% BW<br>Chain 1<br>(MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low     | 5190               | 36.3210                    | 36.3712                    |
| High    | 5230               | 36.3385                    | 36.3278                    |



**99% BANDWIDTH, Chain 0**



**99% BANDWIDTH, Chain 1**



### 8.9.3. 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**

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

| <b>Chain 0<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Chain 1<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Uncorrelated Chains<br/>Directional<br/>Gain<br/>(dBi)</b> |
|-----------------------------------------------|-----------------------------------------------|---------------------------------------------------------------|
| 3.30                                          | 3.30                                          | 3.30                                                          |

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

| <b>Chain 0<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Chain 1<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Correlated Chains<br/>Directional<br/>Gain<br/>(dBi)</b> |
|-----------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|
| 3.30                                          | 3.30                                          | 6.31                                                        |

## RESULTS

### Antenna Gain and Limits

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5190               | 3.30                                      | 6.31                                    | 24.00                   | 10.69                 |
| High    | 5230               | 3.30                                      | 6.31                                    | 24.00                   | 10.69                 |

|                    |      |                                 |
|--------------------|------|---------------------------------|
| Duty Cycle CF (dB) | 0.09 | Included in Calculations of PSD |
|--------------------|------|---------------------------------|

### Output Power Results

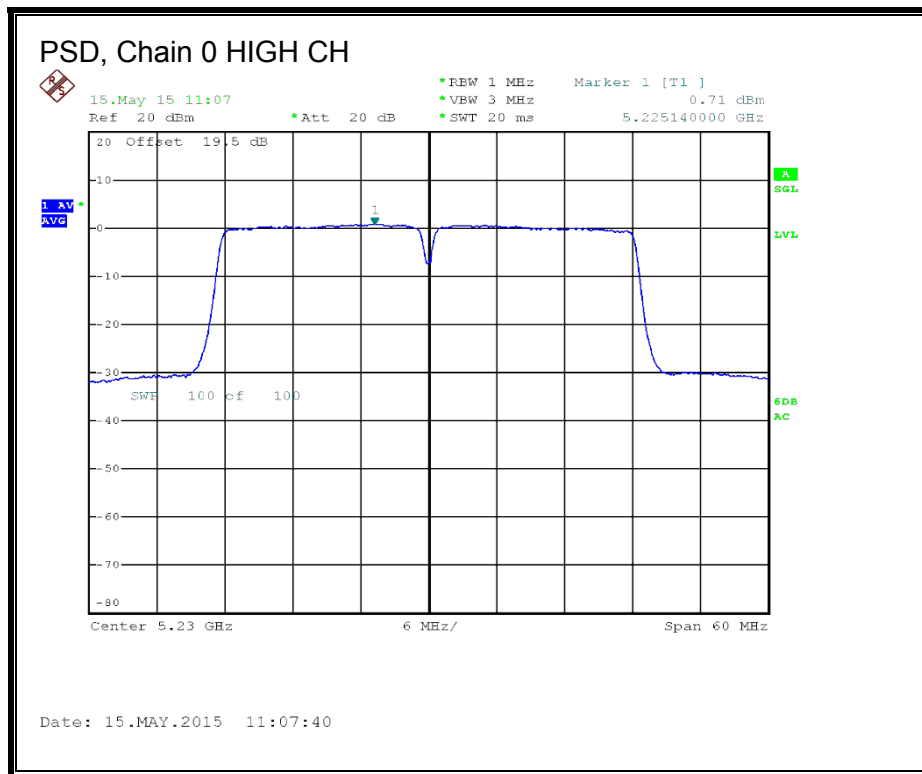
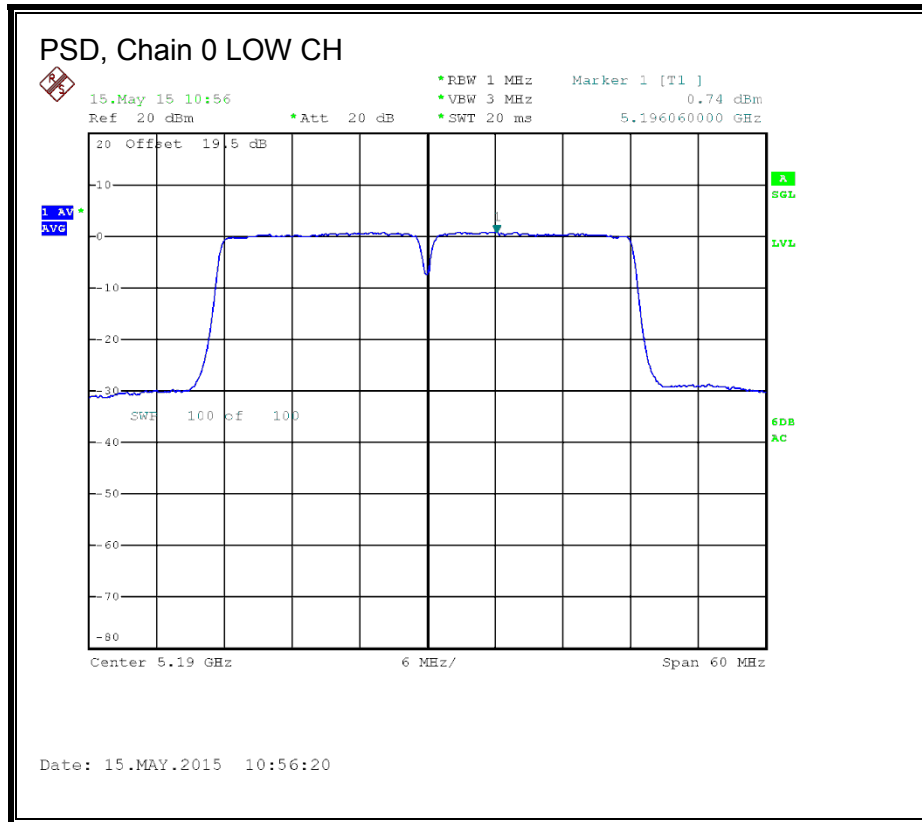
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5190               | 16.12                             | 15.66                             | 18.91                             | 24.00                   | -5.09                   |
| High    | 5230               | 19.30                             | 18.65                             | 22.00                             | 24.00                   | -2.00                   |

### PSD Results

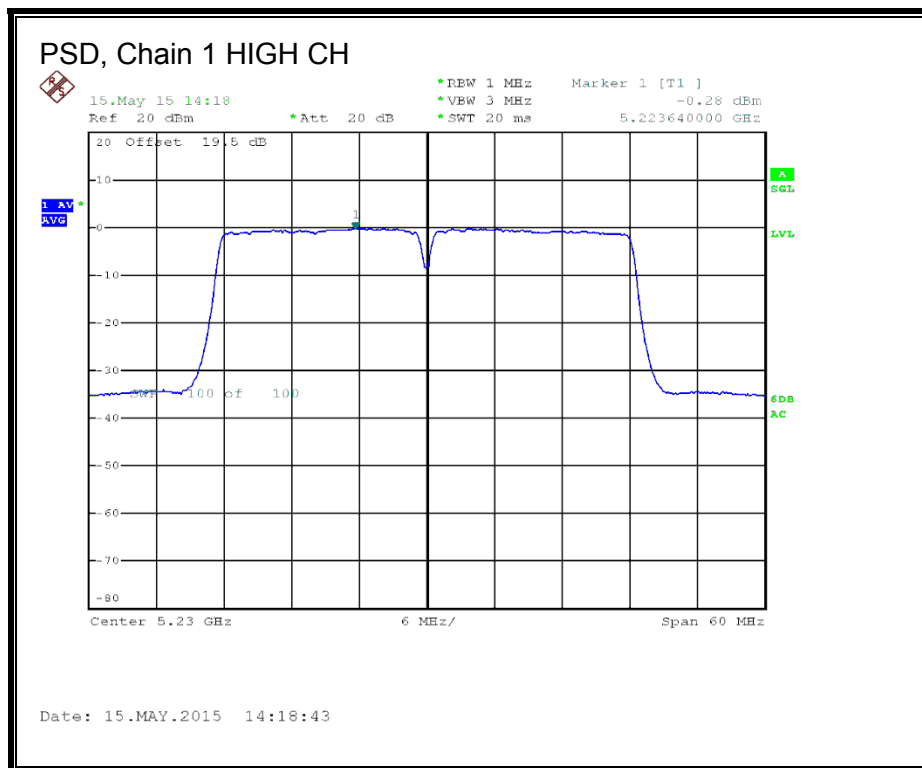
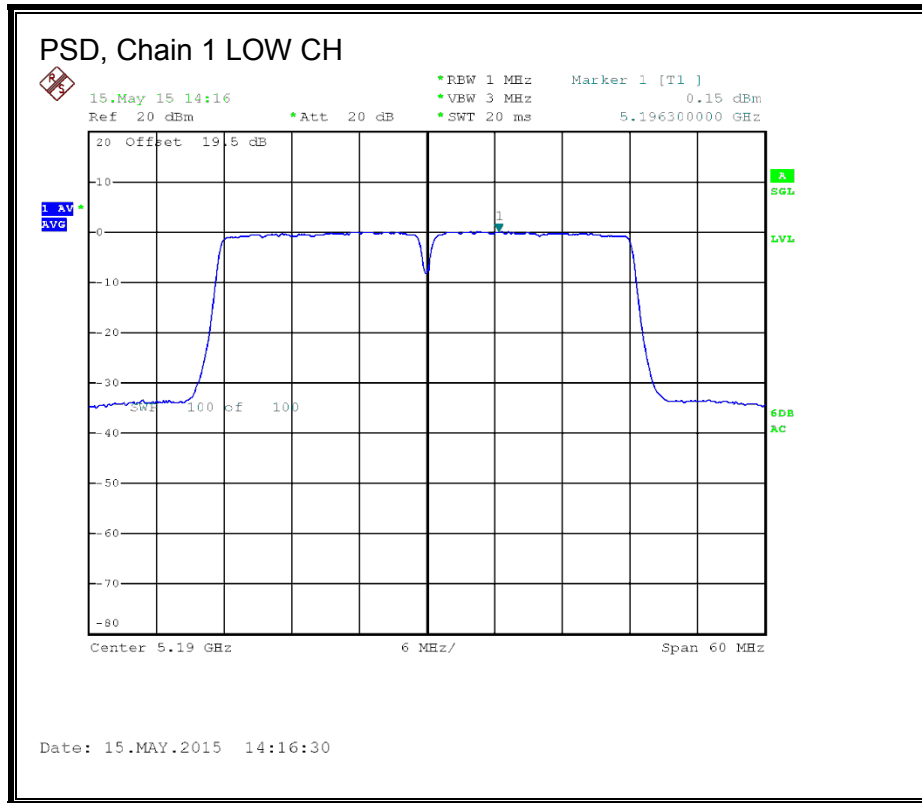
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5190               | 0.74                            | 0.15                            | 3.56                            | 10.69                 | -7.13                 |
| High    | 5230               | 0.71                            | -0.28                           | 3.34                            | 10.69                 | -7.35                 |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

**PSD, Chain 0**



**PSD, Chain 1**



## **8.10. 802.11n HT40 TxBF 2Tx MODE IN THE 5.2 GHz BAND**

### **8.10.1. 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**

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

| <b>Chain 0<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Chain 1<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Correlated Chains<br/>Directional<br/>Gain<br/>(dBi)</b> |
|-----------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|
| 3.30                                          | 3.30                                          | 6.31                                                        |

## RESULTS

### Antenna Gain and Limits

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5190               | 6.31                                      | 6.31                                    | 23.69                   | 10.69                 |
| High    | 5230               | 6.31                                      | 6.31                                    | 23.69                   | 10.69                 |

|                    |      |                                 |
|--------------------|------|---------------------------------|
| Duty Cycle CF (dB) | 0.09 | Included in Calculations of PSD |
|--------------------|------|---------------------------------|

### Output Power Results

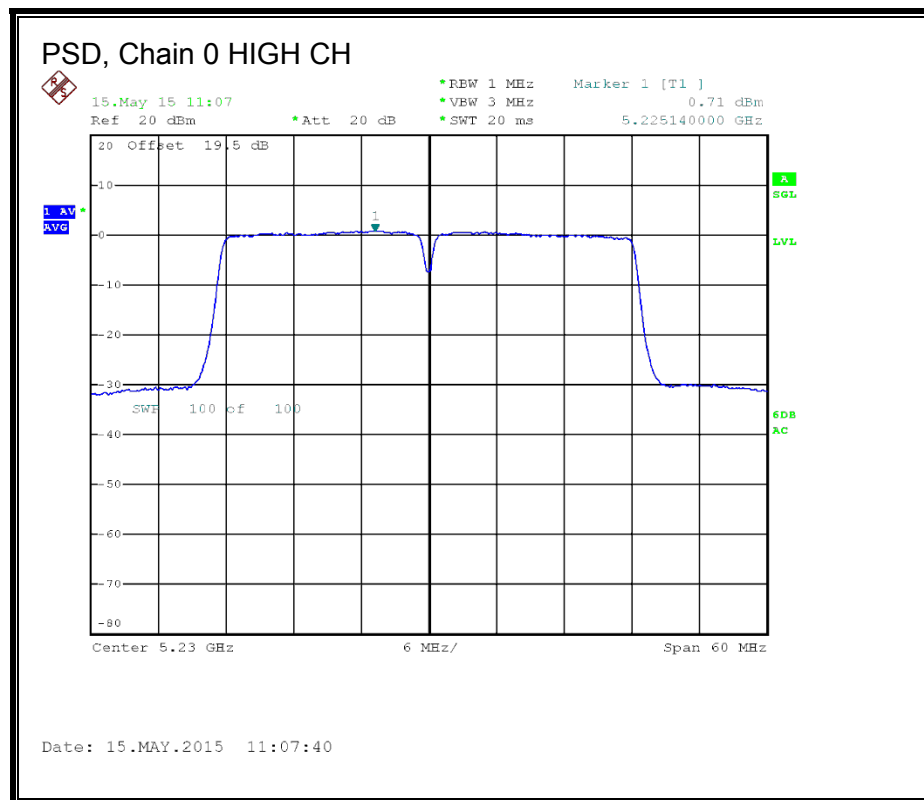
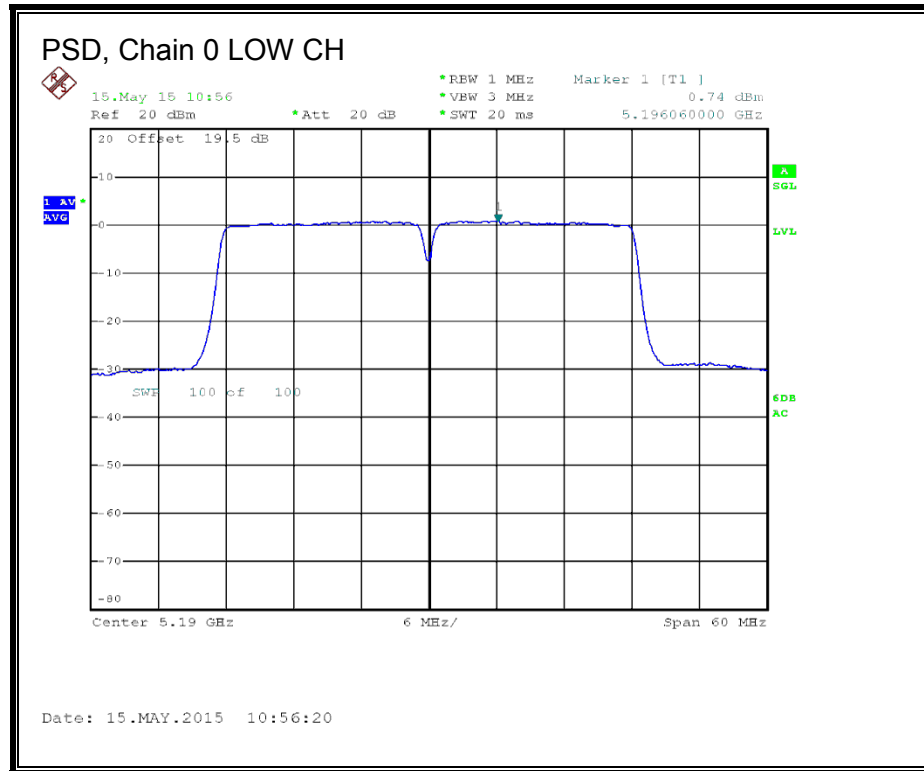
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5190               | 15.70                             | 15.10                             | 18.42                             | 23.69                   | -5.27                   |
| High    | 5230               | 19.30                             | 18.65                             | 22.00                             | 23.69                   | -1.69                   |

### PSD Results

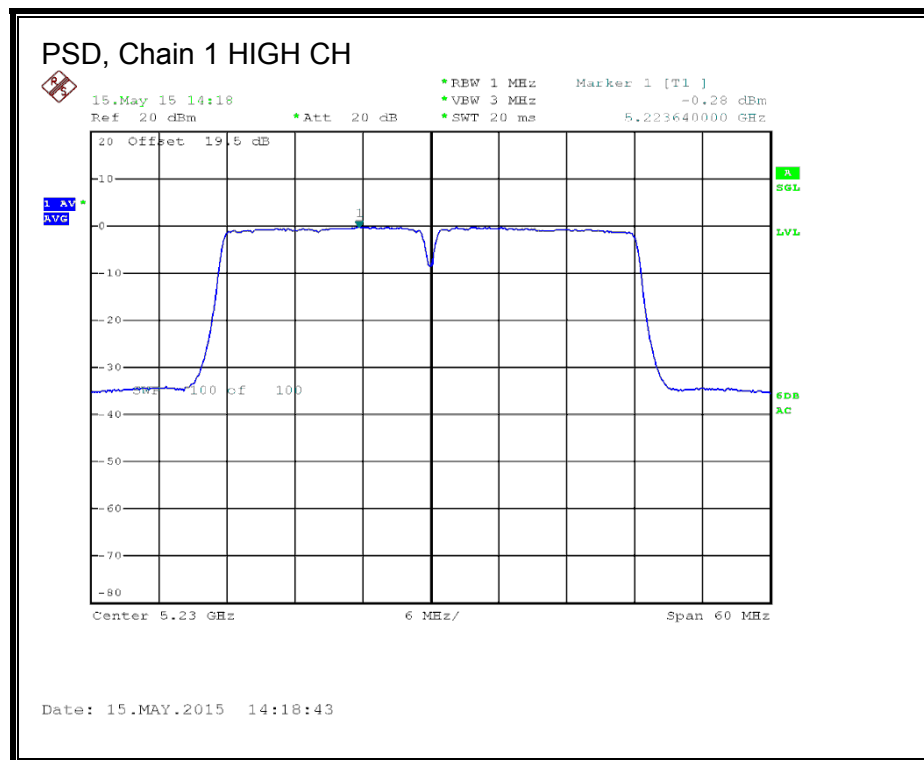
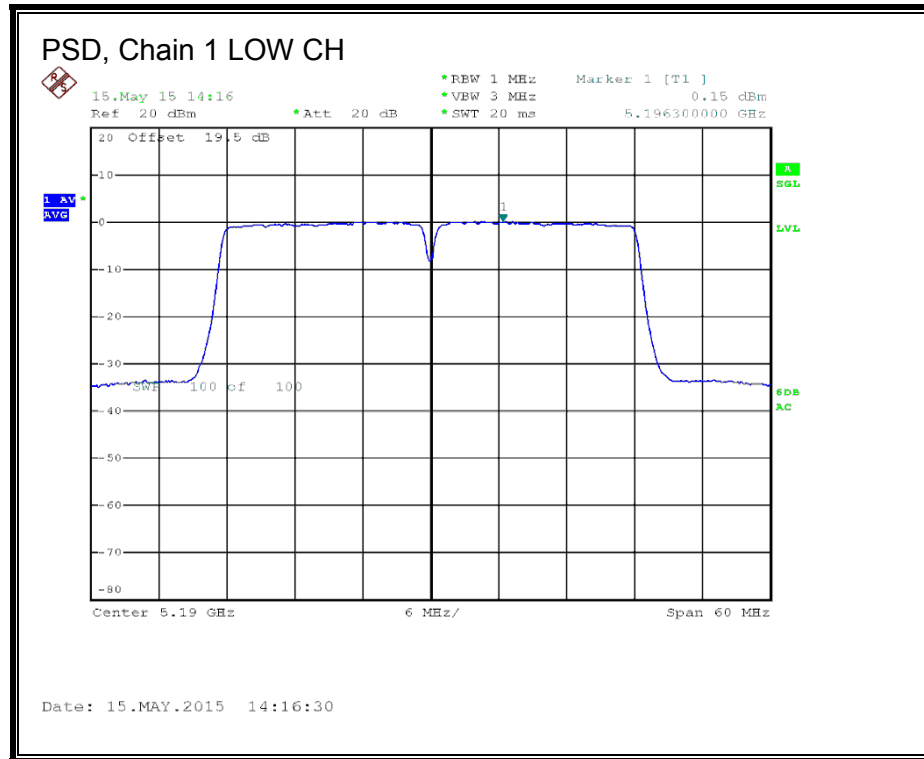
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5190               | 0.74                            | 0.15                            | 3.56                            | 10.69                 | -7.13                 |
| High    | 5230               | 0.71                            | -0.28                           | 3.34                            | 10.69                 | -7.35                 |

**Note:** the power readings above are measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

**PSD, Chain 0**



**PSD, Chain 1**



## **8.11. 802.11ac VHT80 1Tx MODE IN THE 5.2 GHz BAND**

### **8.11.1. OUTPUT 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.

### **DIRECTIONAL ANTENNA GAIN**

This is SISO mode, AG is the highest (worst-case) = 3.3 dBi

### **RESULTS**

#### **Antenna Gain and Limits**

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Power<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-------------------------|
| Mid     | 5210               | 3.30                                      | 24.00                   |

#### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Mid     | 5210               | 17.42                             | 17.42                             | 24.00                   | -6.58                   |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## 8.12. 802.11ac VHT80 CDD 2Tx MODE IN THE 5.2 GHz BAND

### 8.12.1. 26 dB BANDWIDTH

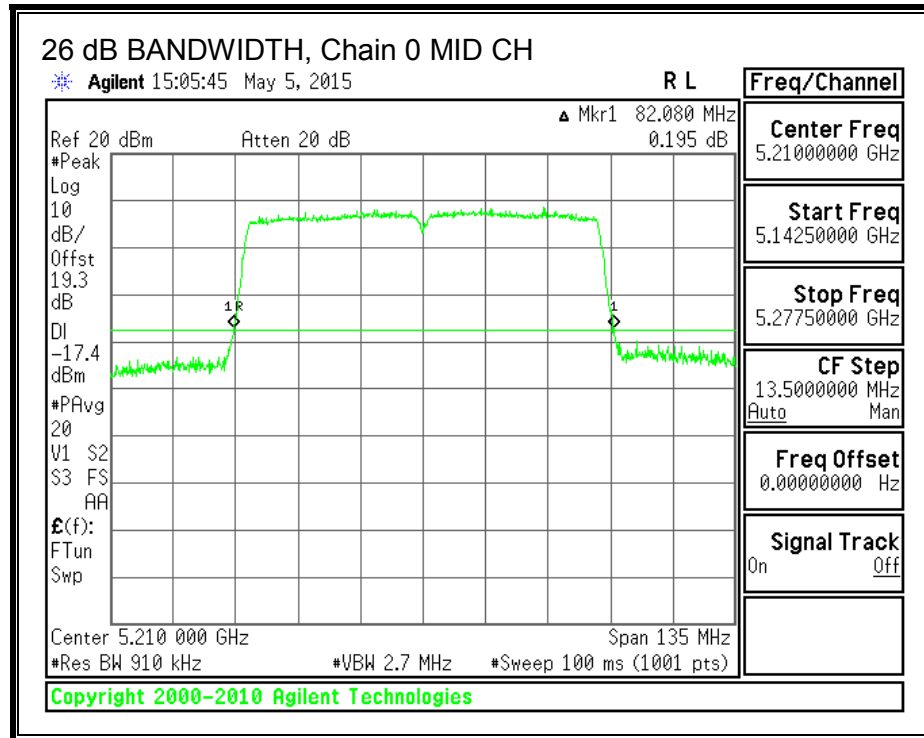
#### LIMITS

None; for reporting purposes only.

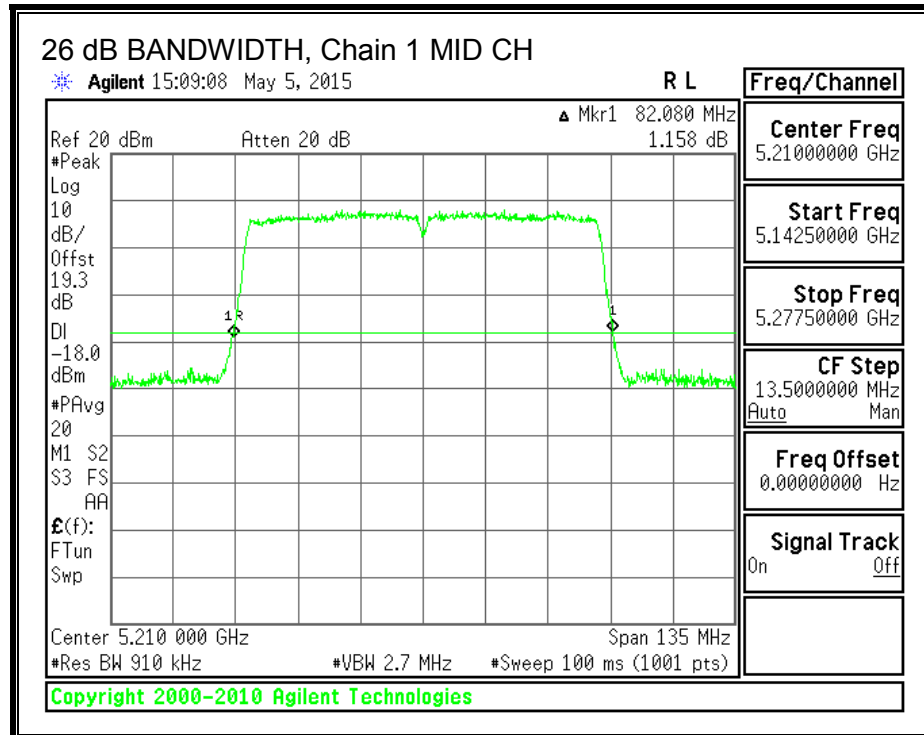
#### RESULTS

| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) | 26 dB BW<br>Chain 1<br>(MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Mid     | 5210               | 82.08                        | 82.08                        |

**26 dB BANDWIDTH, Chain 0**



**26 dB BANDWIDTH, Chain 1**





## 8.12.2. 99% BANDWIDTH

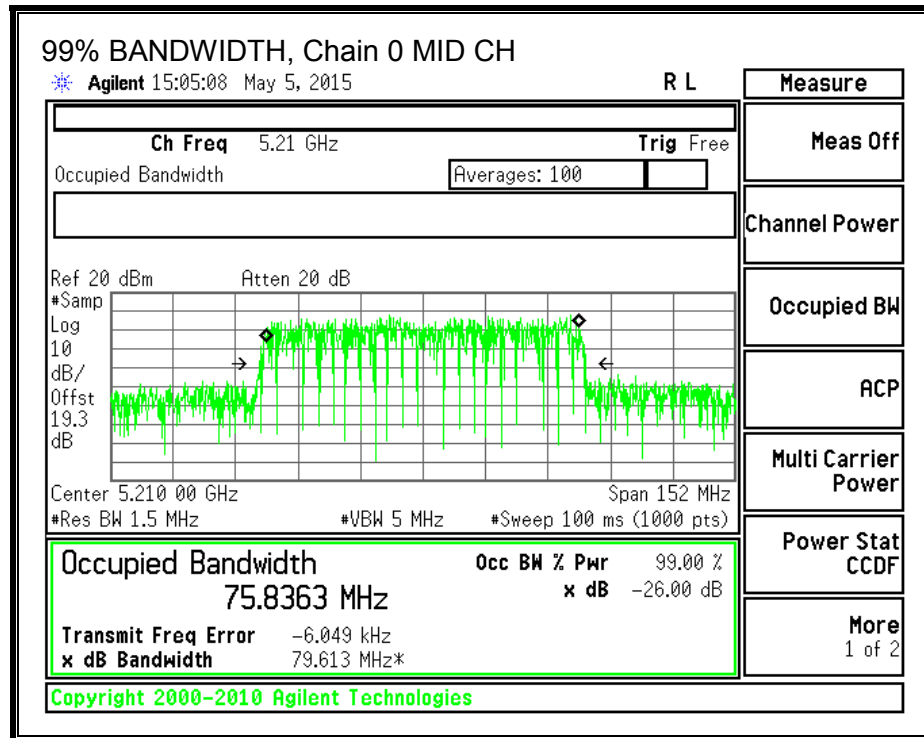
### LIMITS

None; for reporting purposes only.

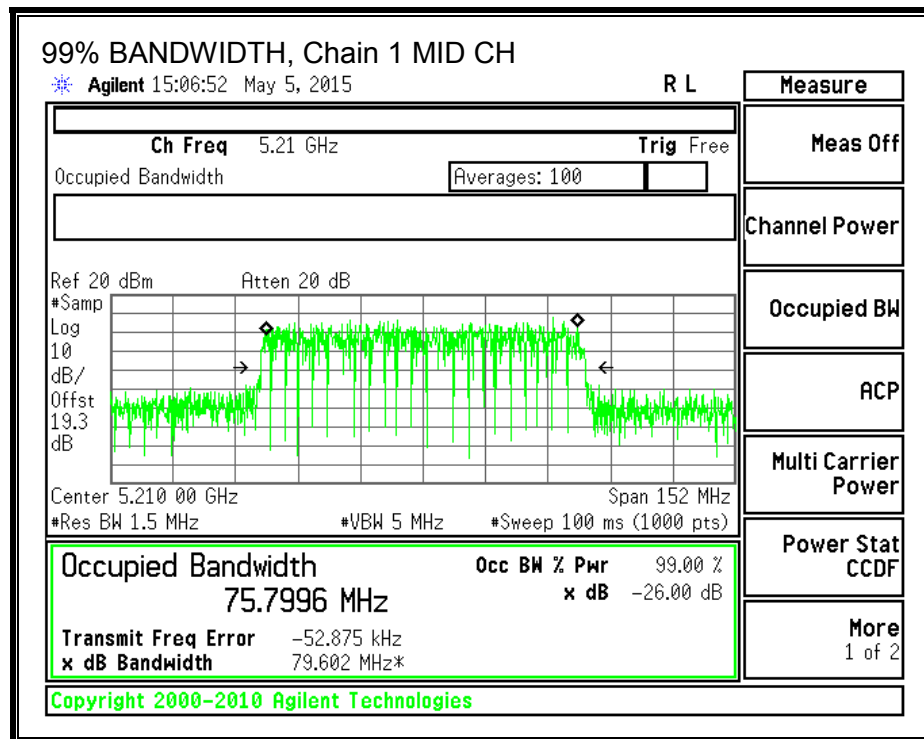
### RESULTS

| Channel | Frequency<br>(MHz) | 99% BW<br>Chain 0<br>(MHz) | 99% BW<br>Chain 1<br>(MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Mid     | 5210               | 75.8363                    | 75.7996                    |

**99% BANDWIDTH, Chain 0**



**99% BANDWIDTH, Chain 1**



### 8.12.3. 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 colocated 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 power, the TX chains are uncorrelated and the antenna gain is unequal among the chains.  
The directional gain is:

| <b>Chain 0<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Chain 1<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Uncorrelated Chains<br/>Directional<br/>Gain<br/>(dBi)</b> |
|-----------------------------------------------|-----------------------------------------------|---------------------------------------------------------------|
| 3.30                                          | 3.30                                          | 3.30                                                          |

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

| <b>Chain 0<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Chain 1<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Correlated Chains<br/>Directional<br/>Gain<br/>(dBi)</b> |
|-----------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|
| 3.30                                          | 3.30                                          | 6.31                                                        |

## RESULTS

### Antenna Gain and Limits

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBi) | PSD<br>Limit<br>(dBi) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Mid     | 5210               | 3.30                                      | 6.31                                    | 24.00                   | 10.69                 |

|                    |      |                                 |
|--------------------|------|---------------------------------|
| Duty Cycle CF (dB) | 0.19 | Included in Calculations of PSD |
|--------------------|------|---------------------------------|

### Output Power Results

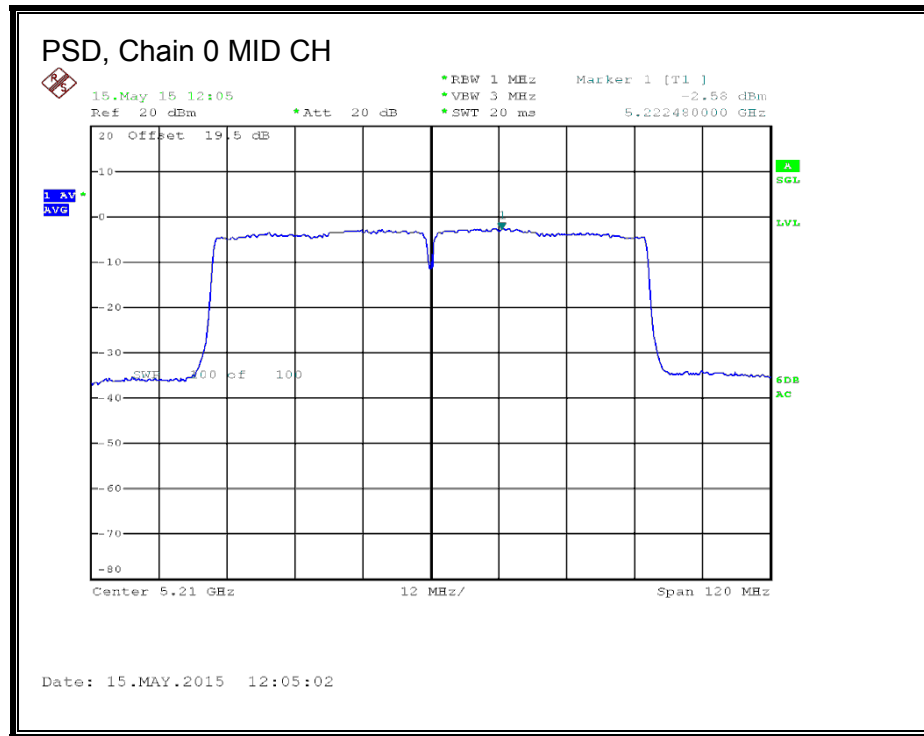
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Mid     | 5210               | 16.53                             | 15.90                             | 19.24                             | 24.00                   | -4.76                   |

### PSD Results

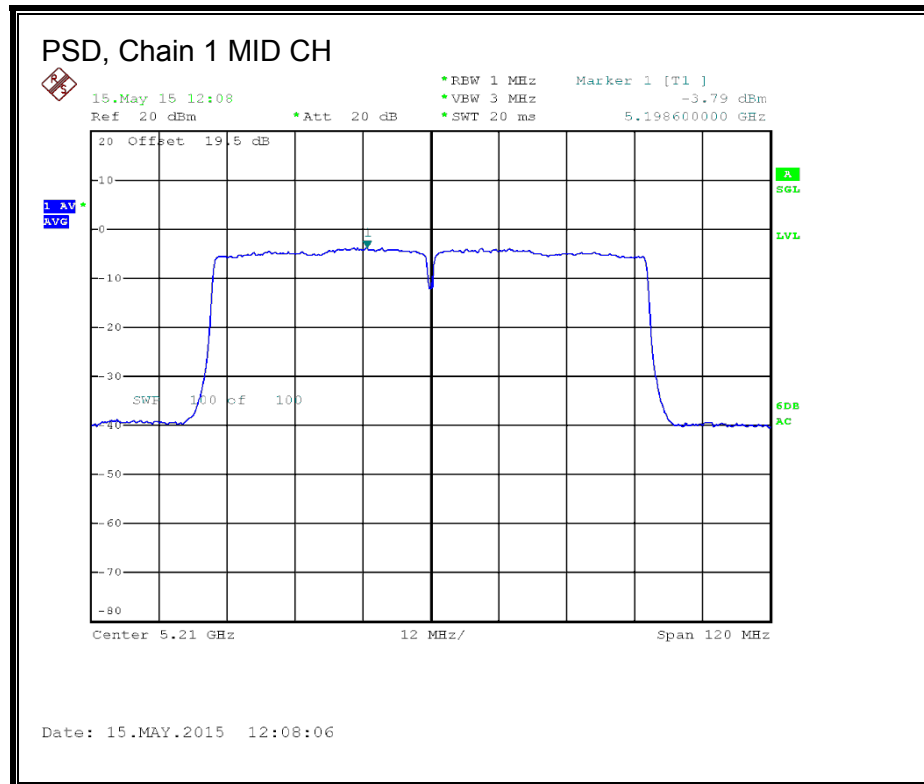
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Mid     | 5210               | -2.58                           | -3.79                           | 0.06                            | 10.69                 | -10.63                |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

**PSD, Chain 0**



**PSD, Chain 1**



## **8.13. 802.11ac VHT80 TxBF 2Tx MODE IN THE 5.2 GHz BAND**

### **8.13.1. 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**

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

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Correlated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|---------------------------------------------------|
| 3.30                                | 3.30                                | 6.31                                              |



## RESULTS

### Antenna Gain and Limits

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBi) | PSD<br>Limit<br>(dBi) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Mid     | 5210               | 6.31                                      | 6.31                                    | 23.69                   | 10.69                 |

|                    |      |                                 |
|--------------------|------|---------------------------------|
| Duty Cycle CF (dB) | 0.19 | Included in Calculations of PSD |
|--------------------|------|---------------------------------|

### Output Power Results

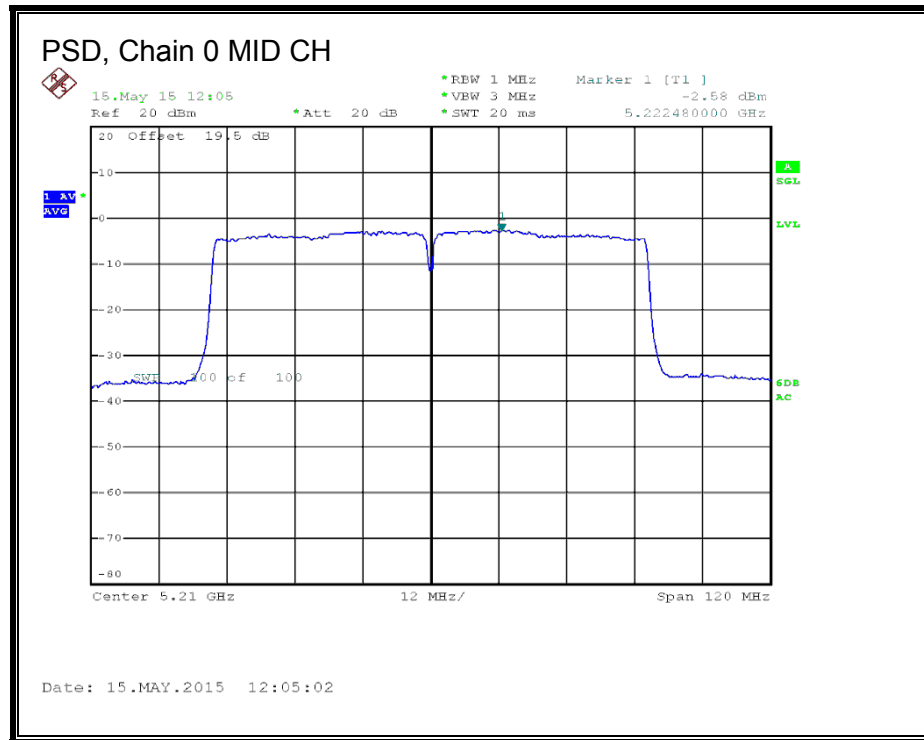
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Mid     | 5210               | 15.02                             | 14.32                             | 17.69                             | 23.69                   | -6.00                   |

### PSD Results

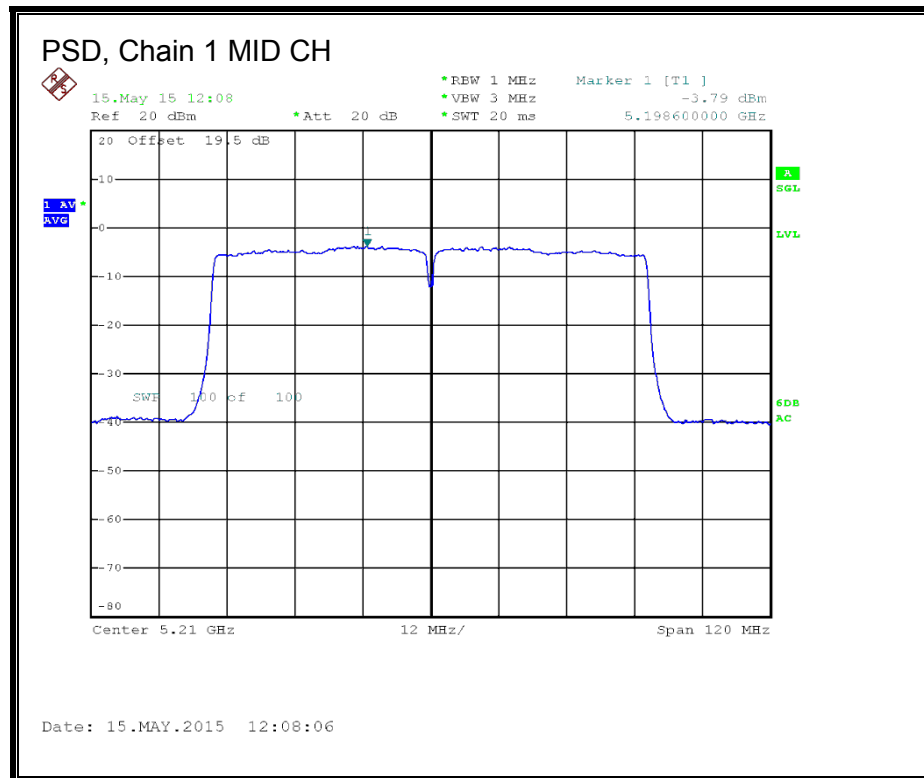
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Mid     | 5210               | -2.58                           | -3.79                           | 0.06                            | 10.69                 | -10.63                |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

**PSD, Chain 0**



**PSD, Chain 1**



## 8.14. 802.11a LEGACY 1TX MODE IN THE 5.3 GHz BAND

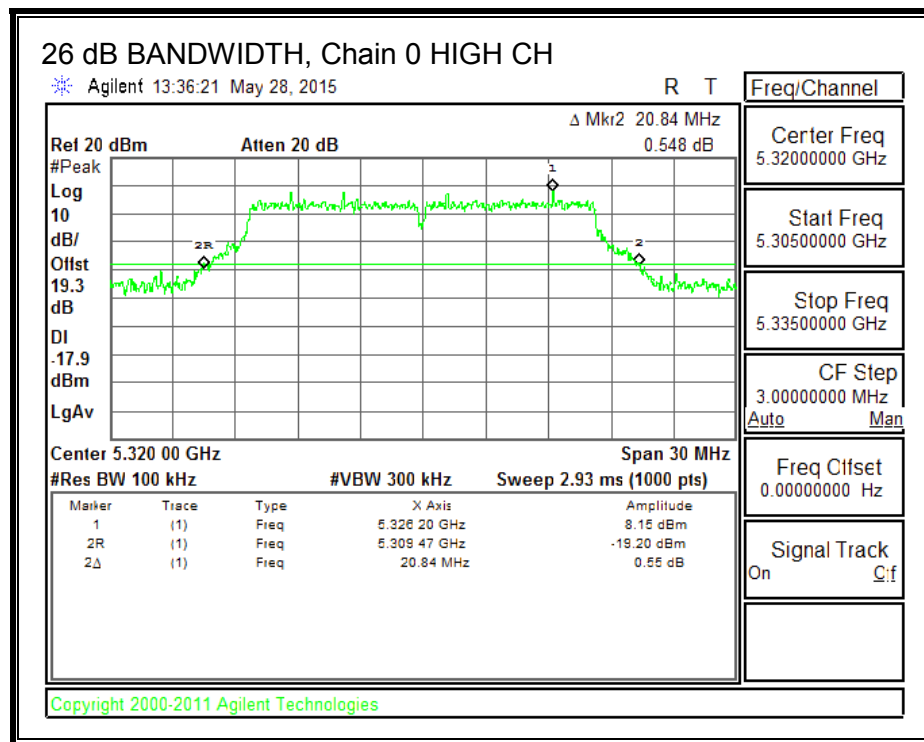
### 8.14.1. 26 dB BANDWIDTH

#### LIMITS

None; for reporting purposes only.

#### RESULTS

| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) |
|---------|--------------------|------------------------------|
| High    | 5320               | 20.840                       |



## **8.14.2. OUTPUT 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  $11 \text{ dBm} + 10 \log B$ , 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**

This is SISO mode, AG is the highest (worst-case) = 4.0 dBi.

## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>(dBi) | Power<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|------------------------------|-------------------------|
| High    | 5320               | 20.84                       | 4.00                         | 24.00                   |

### Output Power Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| High    | 5320               | 19.83                             | 19.83                             | 24.00                   | -4.17                   |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## 8.15. 802.11n HT20 SISO MODE IN THE 5.3 GHz BAND

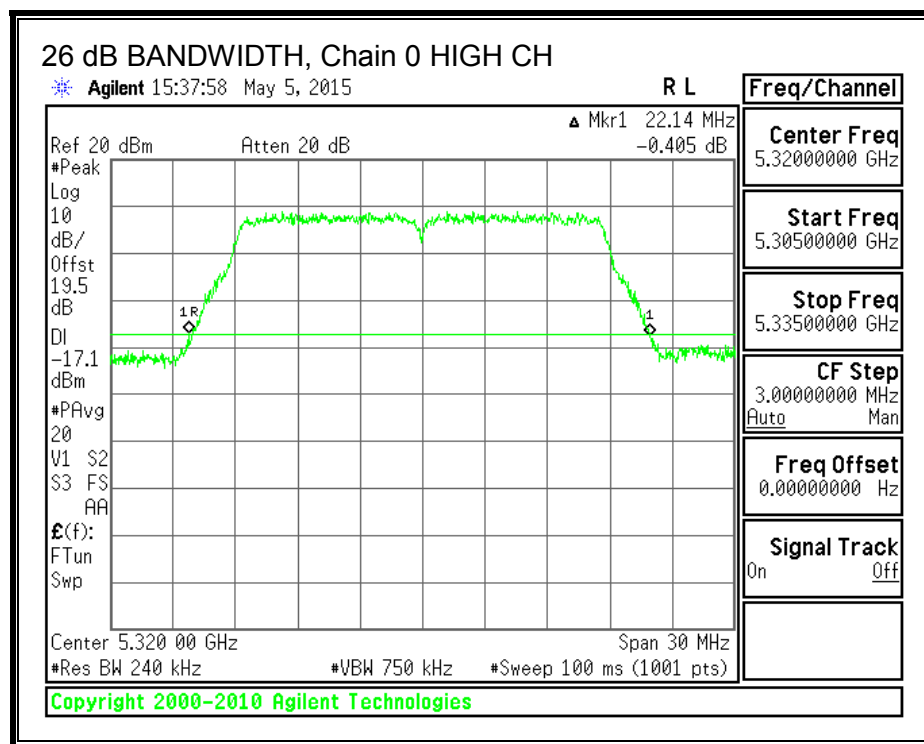
### 8.15.1. 26 dB BANDWIDTH

#### LIMITS

None; for reporting purposes only.

#### RESULTS

| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) |
|---------|--------------------|------------------------------|
| High    | 5320               | 22.14                        |



## **8.15.2. OUTPUT 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  $11 \text{ dBm} + 10 \log B$ , 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**

This is SISO mode, AG is the highest (worst-case) = 4.0 dBi.

## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>(dBi) | Power<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|------------------------------|-------------------------|
| High    | 5320               | 22.14                       | 4.00                         | 24.00                   |

### Output Power Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| High    | 5320               | 19.39                             | 19.39                             | 24.00                   | -4.61                   |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.



## **8.16. 802.11n HT20 CDD 2Tx MODE IN THE 5.3 GHz BAND**

### **8.16.1. 26 dB BANDWIDTH**

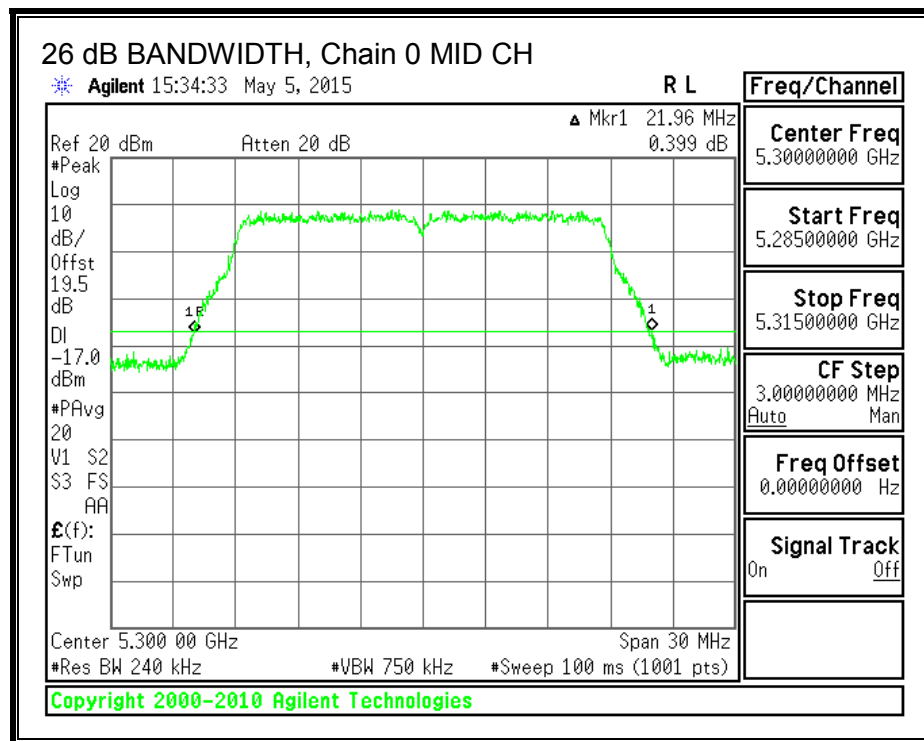
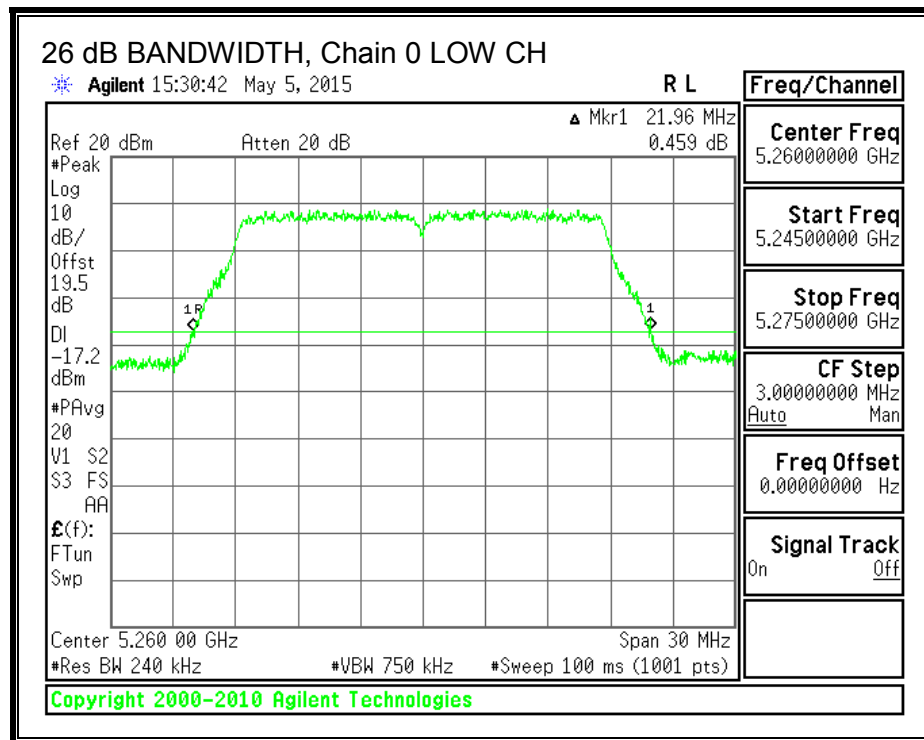
#### **LIMITS**

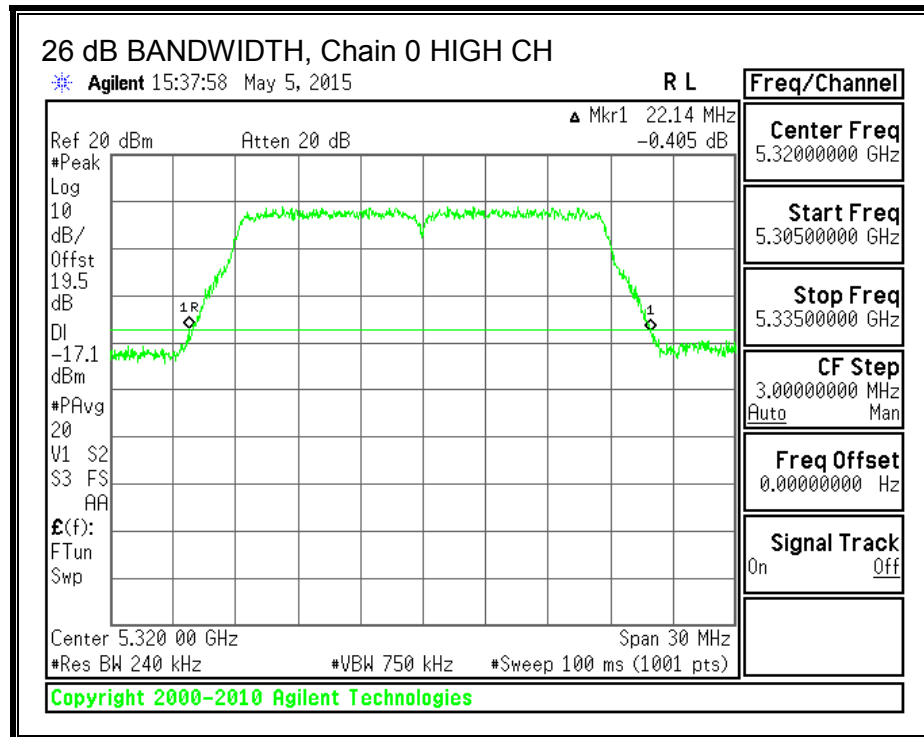
None; for reporting purposes only.

#### **RESULTS**

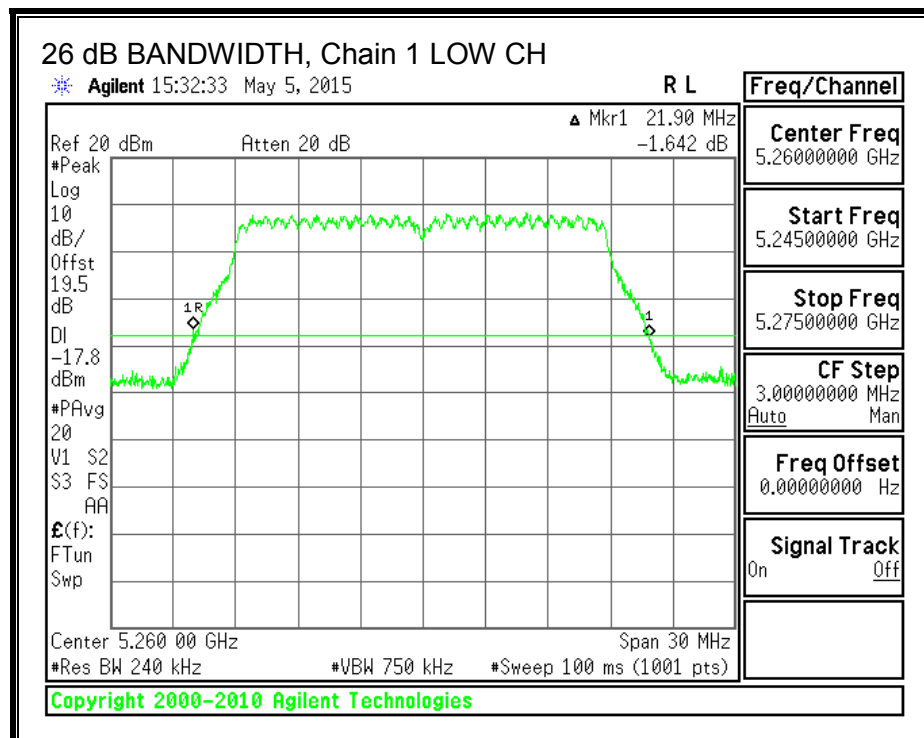
| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) | 26 dB BW<br>Chain 1<br>(MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low     | 5260               | 21.960                       | 21.900                       |
| Mid     | 5300               | 21.960                       | 21.810                       |
| High    | 5320               | 22.140                       | 21.720                       |

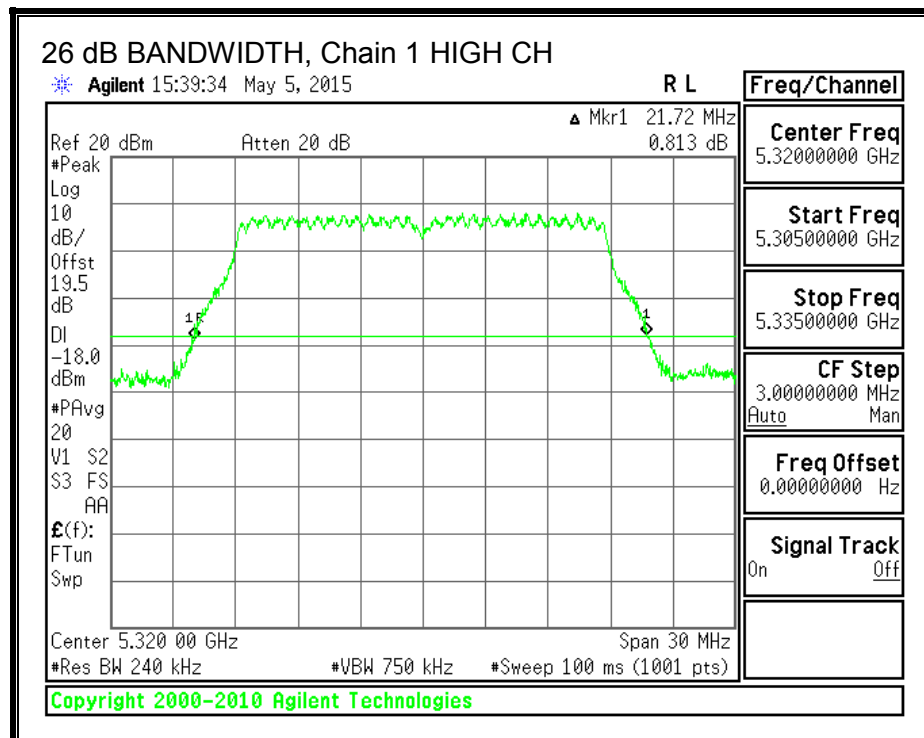
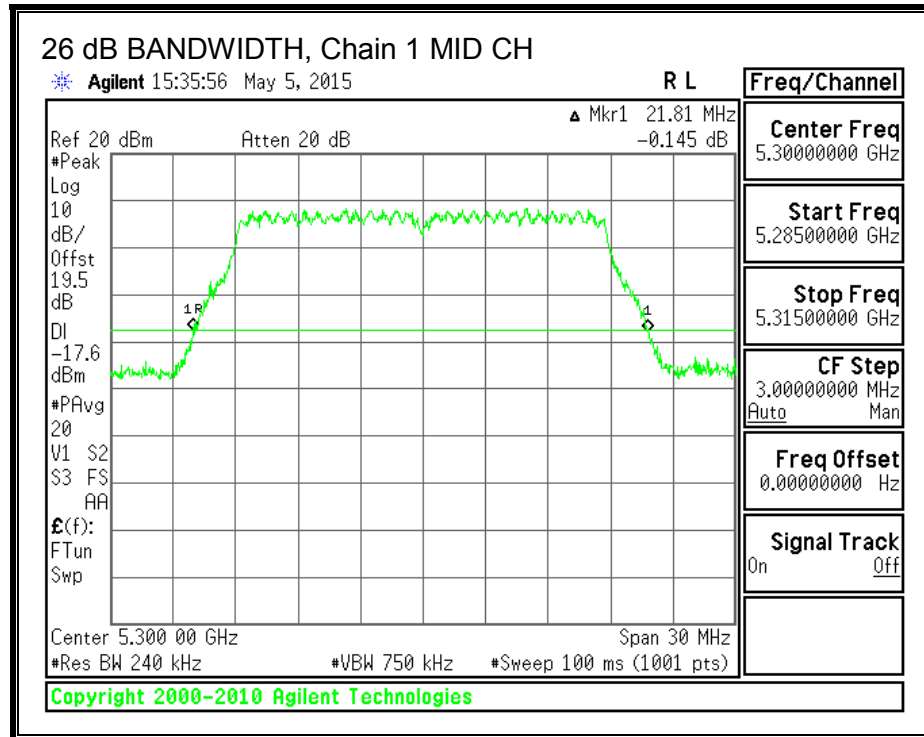
**26 dB BANDWIDTH, Chain 0**





**26 dB BANDWIDTH, Chain 1**





## 8.16.2. 99% BANDWIDTH

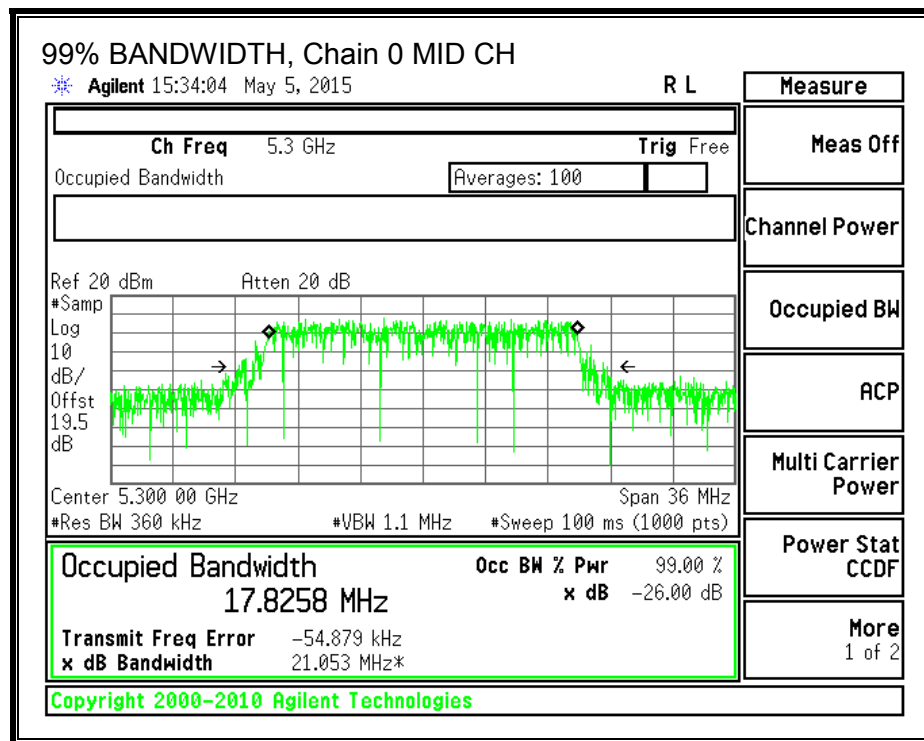
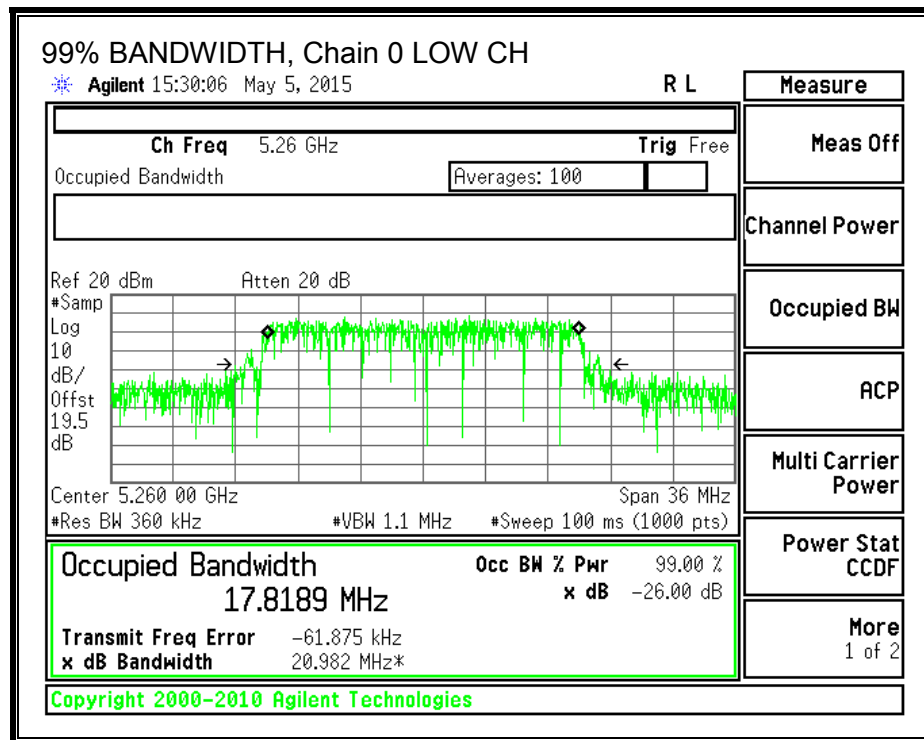
### LIMITS

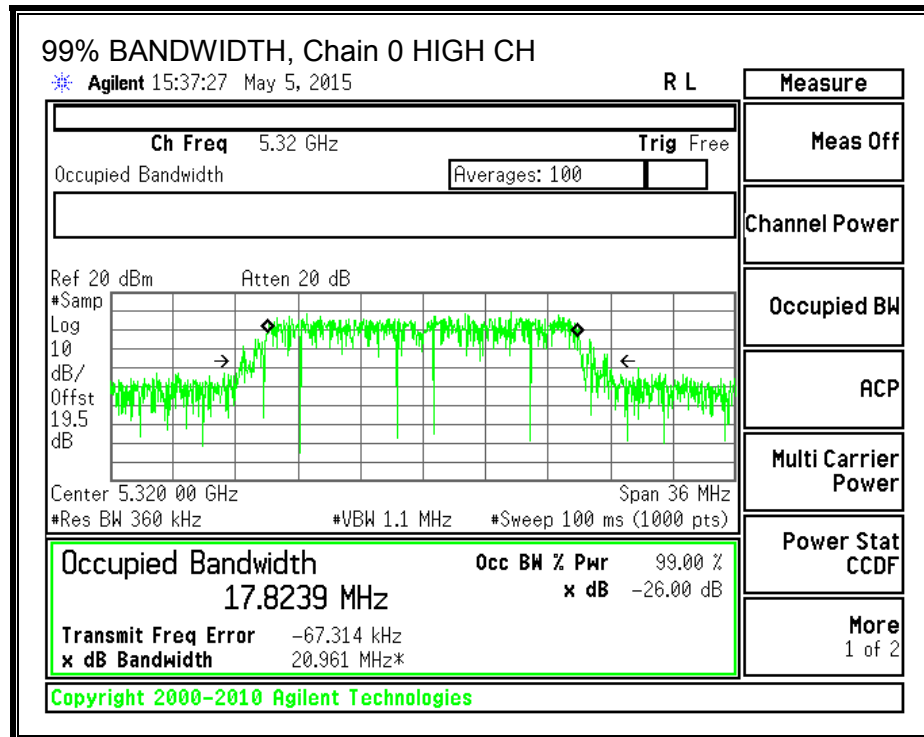
None; for reporting purposes only.

### RESULTS

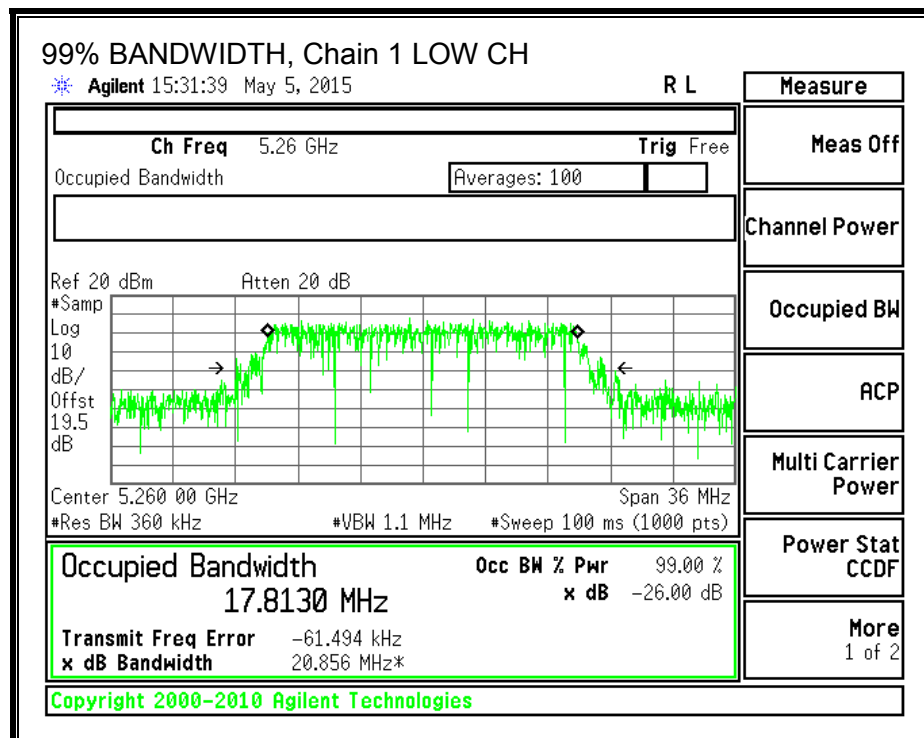
| Channel | Frequency<br>(MHz) | 99% BW<br>Chain 0<br>(MHz) | 99% BW<br>Chain 1<br>(MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low     | 5260               | 17.8189                    | 17.8130                    |
| Mid     | 5300               | 17.8258                    | 17.8279                    |
| High    | 5320               | 17.8239                    | 17.8038                    |

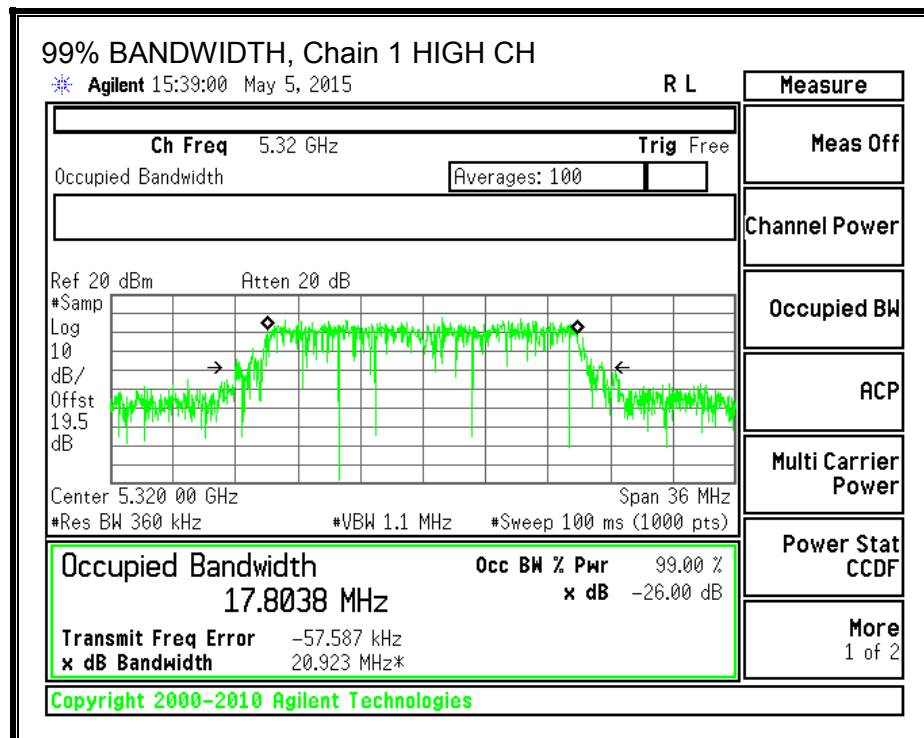
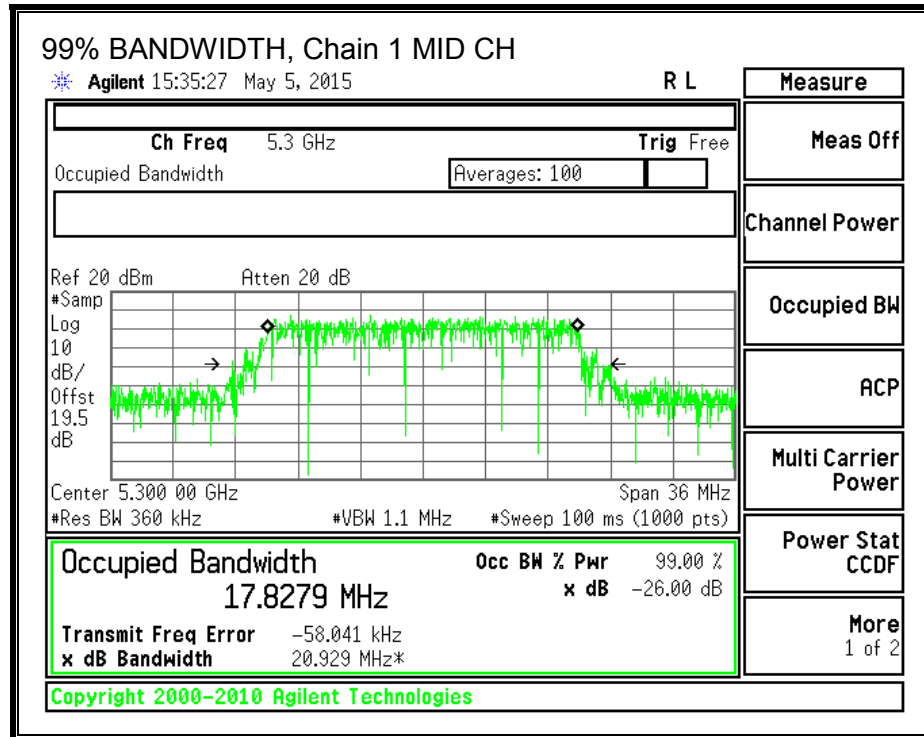
**99% BANDWIDTH, Chain 0**





**99% BANDWIDTH, Chain 1**







### 8.16.3. OUTPUT 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  $11 \text{ dBm} + 10 \log B$ , 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 power, the TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Uncorrelated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|-----------------------------------------------------|
| 4.00                                | 4.00                                | 4.00                                                |

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

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Correlated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|---------------------------------------------------|
| 4.00                                | 4.00                                | 7.01                                              |

## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5260               | 21.90                       | 4.00                                      | 7.01                                    | 24.00                   | 9.99                  |
| Mid     | 5300               | 21.81                       | 4.00                                      | 7.01                                    | 24.00                   | 9.99                  |
| High    | 5320               | 21.72                       | 4.00                                      | 7.01                                    | 24.00                   | 9.99                  |

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

### Output Power Results

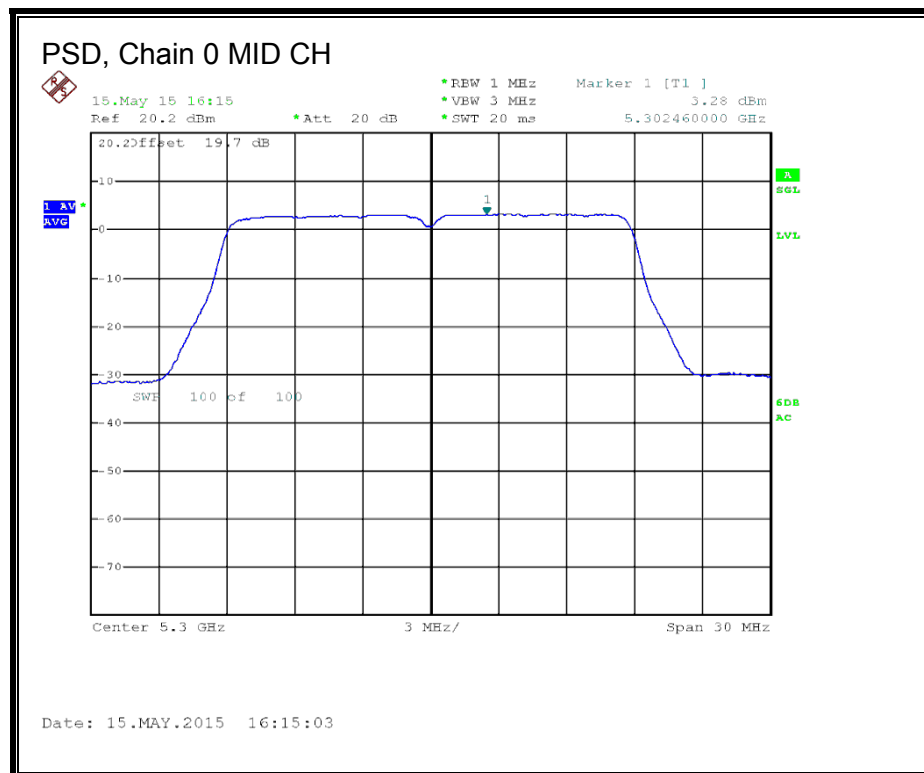
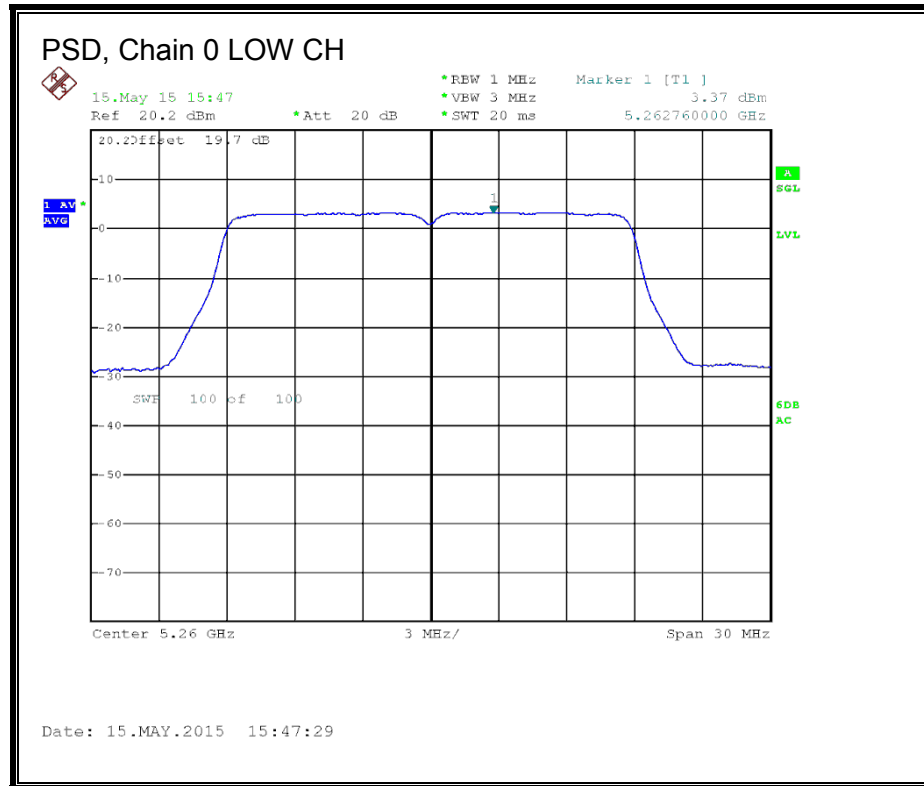
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5260               | 19.10                             | 18.65                             | 21.89                             | 24.00                   | -2.11                   |
| Mid     | 5300               | 19.15                             | 18.55                             | 21.87                             | 24.00                   | -2.13                   |
| High    | 5320               | 18.62                             | 18.13                             | 21.39                             | 24.00                   | -2.61                   |

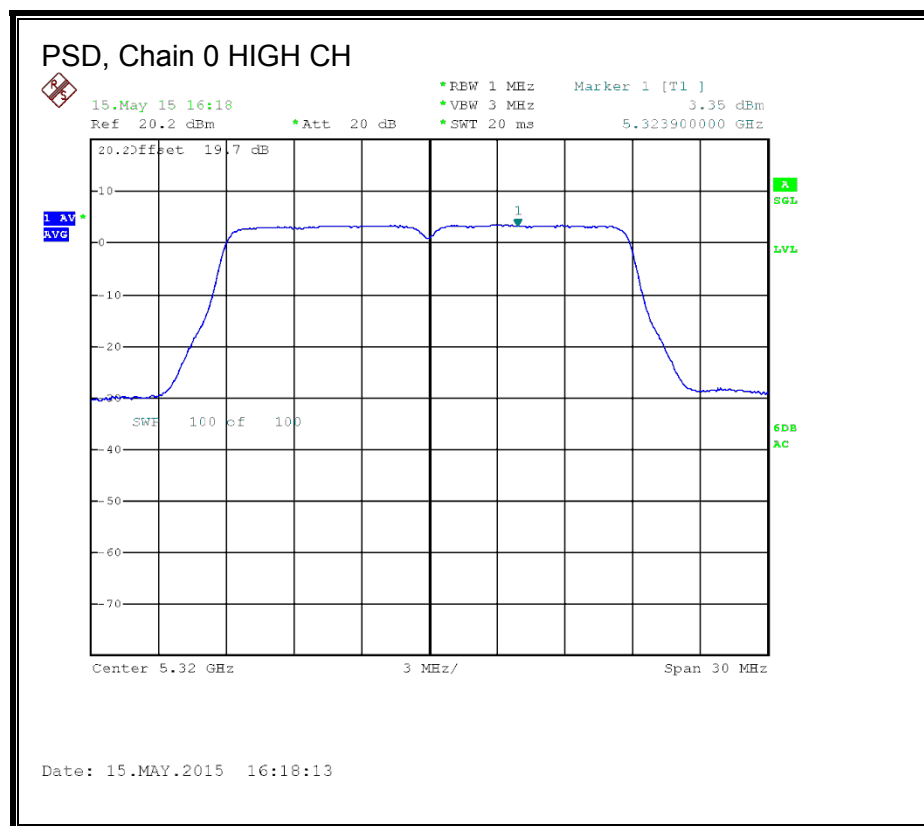
### PPSD Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5260               | 3.37                            | 1.99                            | 5.74                            | 9.99                  | -4.25                 |
| Mid     | 5300               | 3.28                            | 2.38                            | 5.86                            | 9.99                  | -4.13                 |
| High    | 5320               | 3.35                            | 2.64                            | 6.02                            | 9.99                  | -3.97                 |

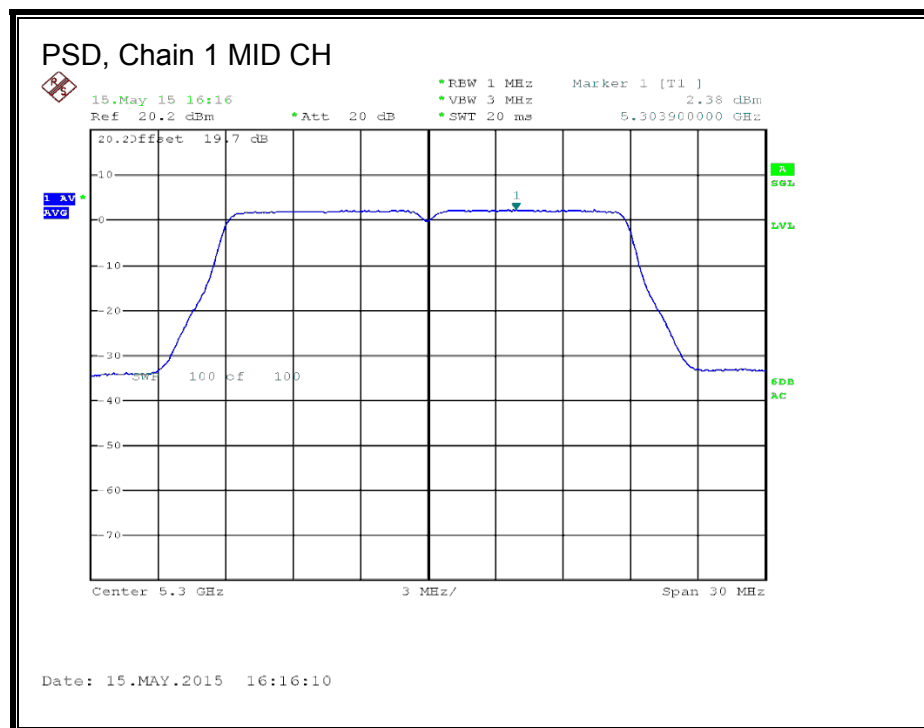
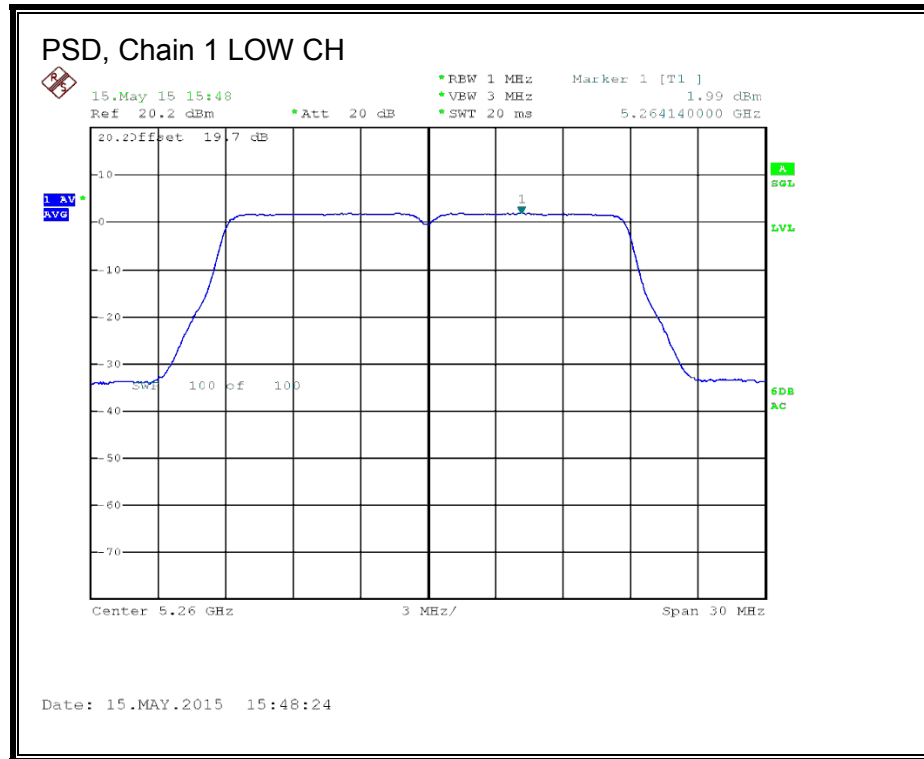
**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

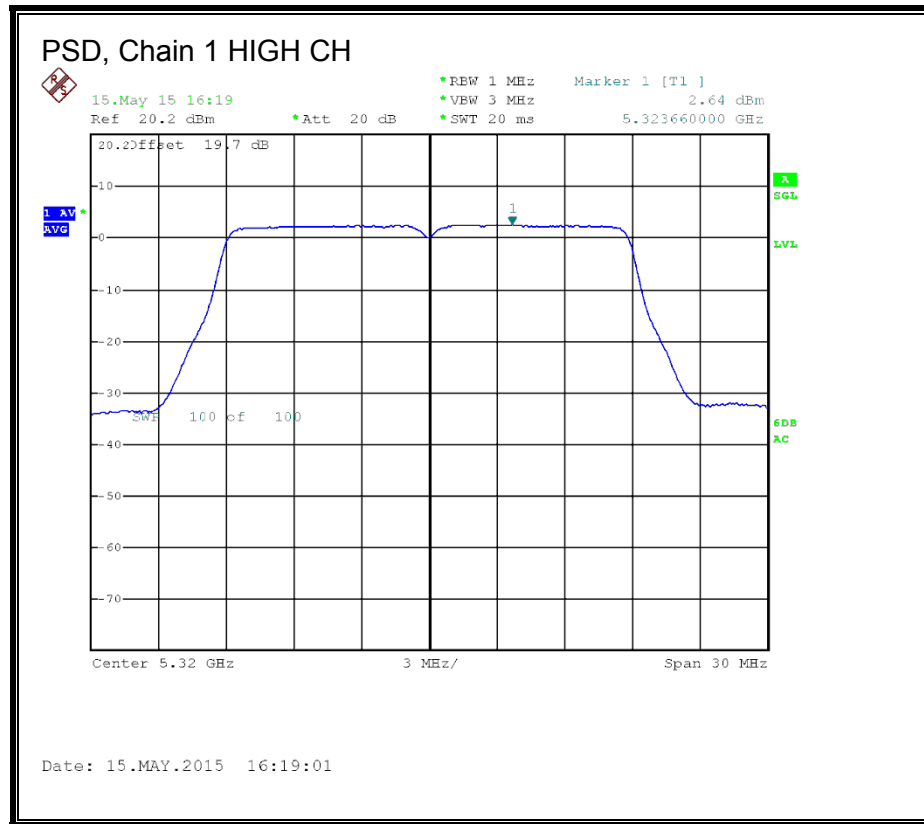
**PSD, Chain 0**





**PSD, Chain 1**





## 8.17. 802.11n HT20 STBC 2Tx MODE IN THE 5.3 GHz BAND

### 8.17.1. 26 dB BANDWIDTH

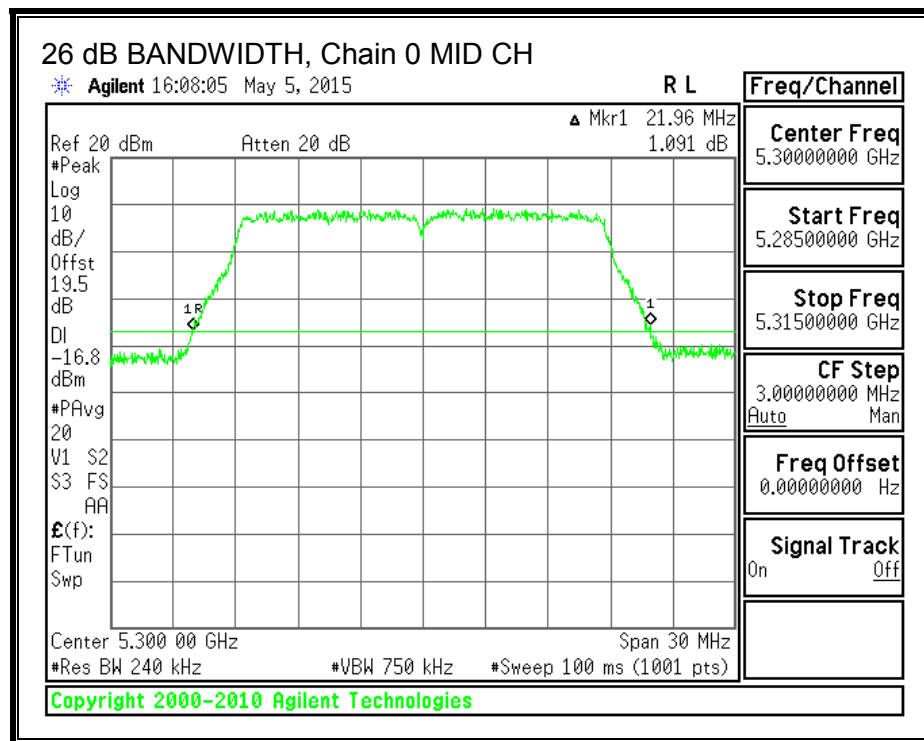
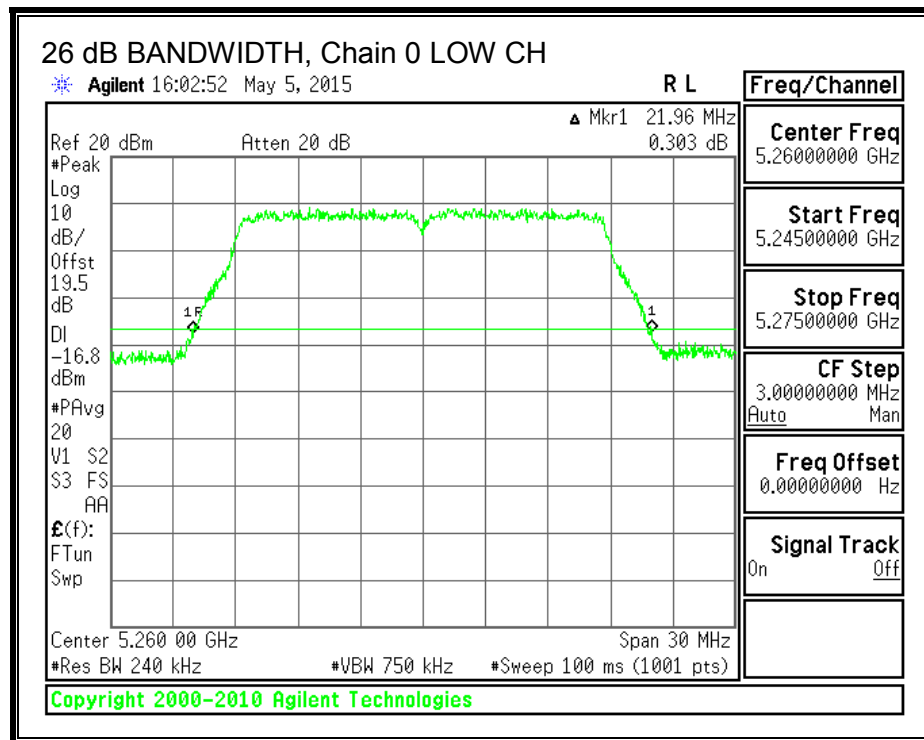
#### LIMITS

None; for reporting purposes only.

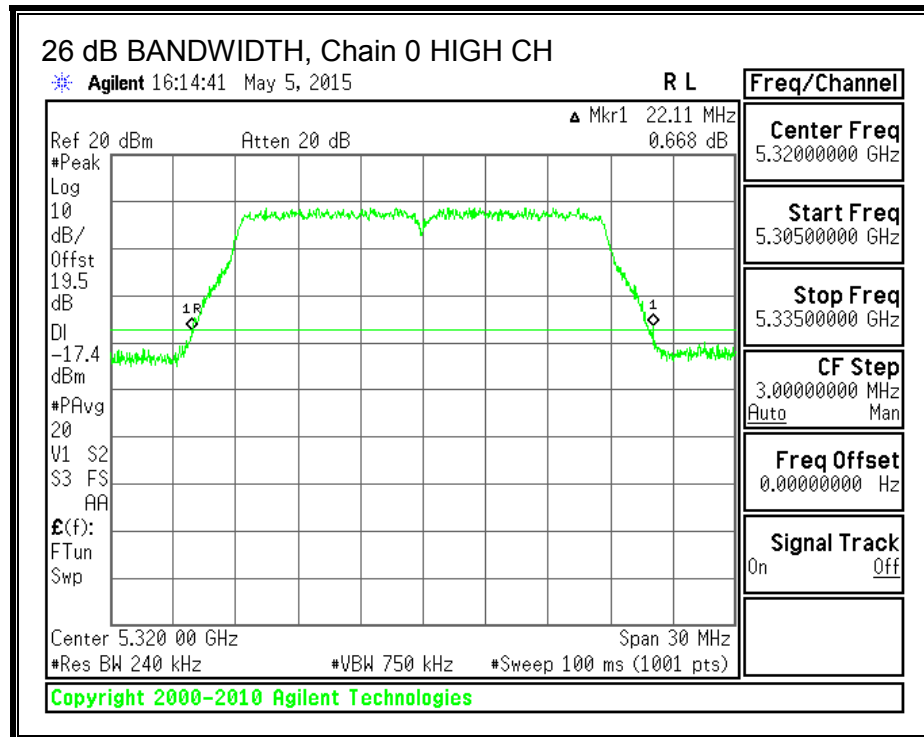
#### RESULTS

| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) | 26 dB BW<br>Chain 1<br>(MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low     | 5260               | 21.960                       | 21.810                       |
| Mid     | 5300               | 21.960                       | 21.930                       |
| High    | 5320               | 22.110                       | 21.900                       |

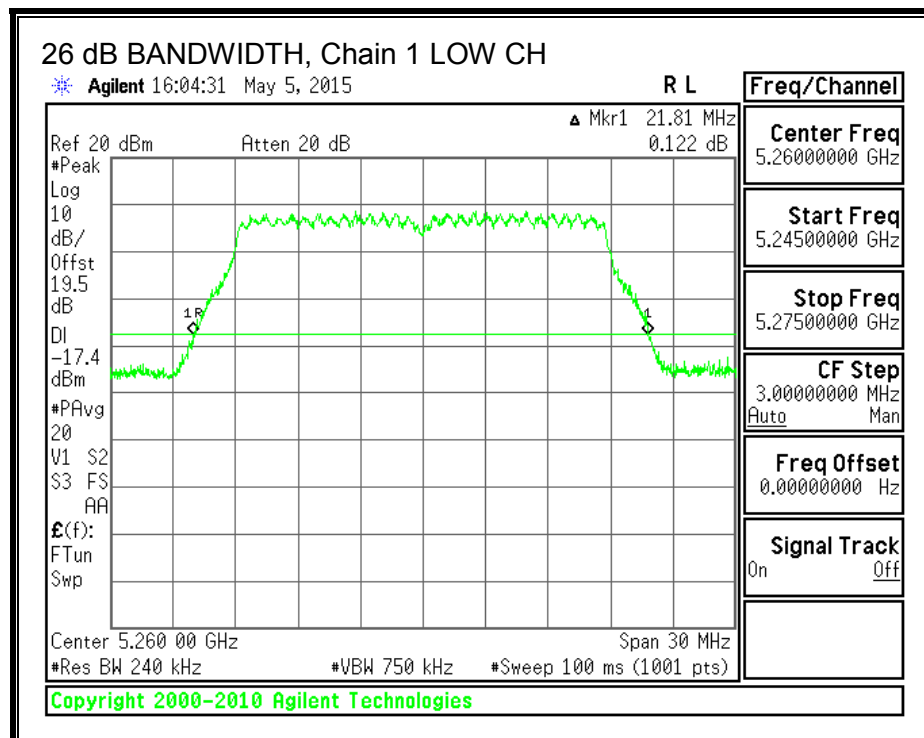
**26 dB BANDWIDTH, Chain 0**

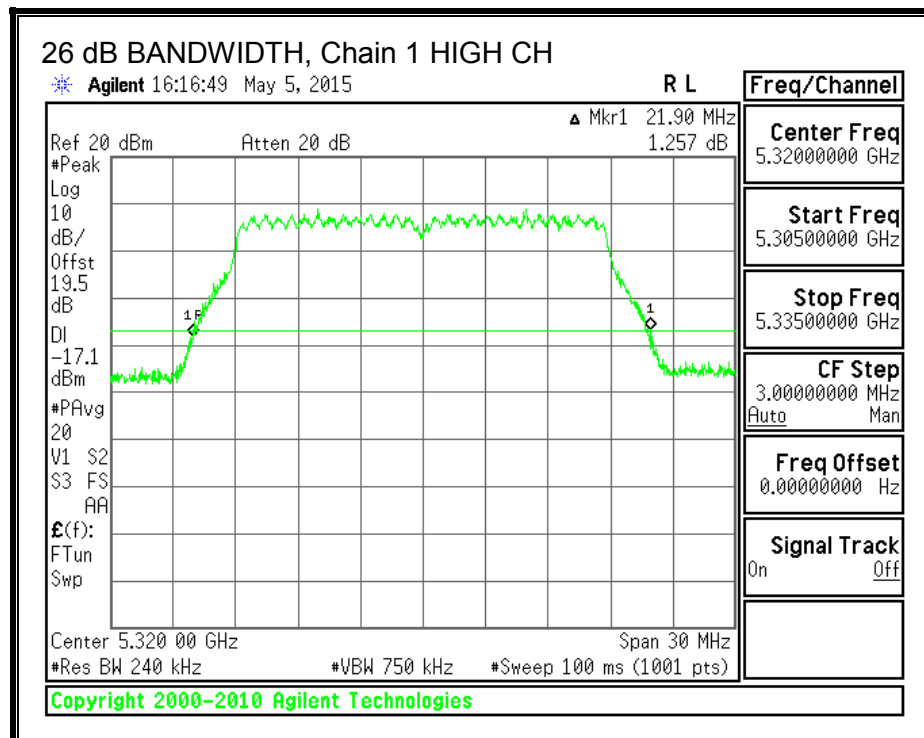
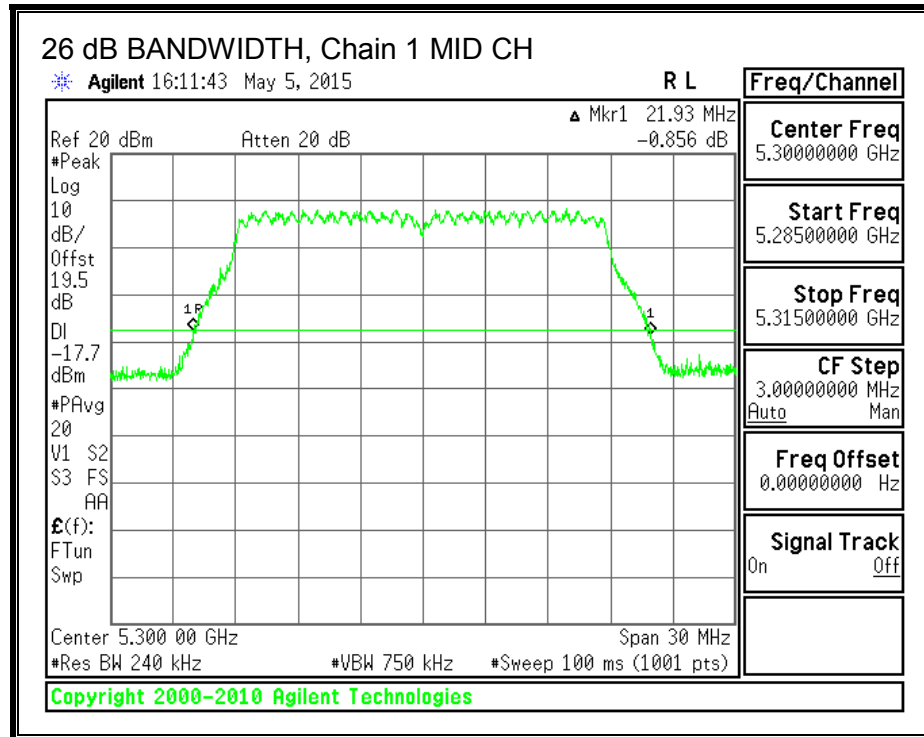






**26 dB BANDWIDTH, Chain 1**





## 8.17.2. 99% BANDWIDTH

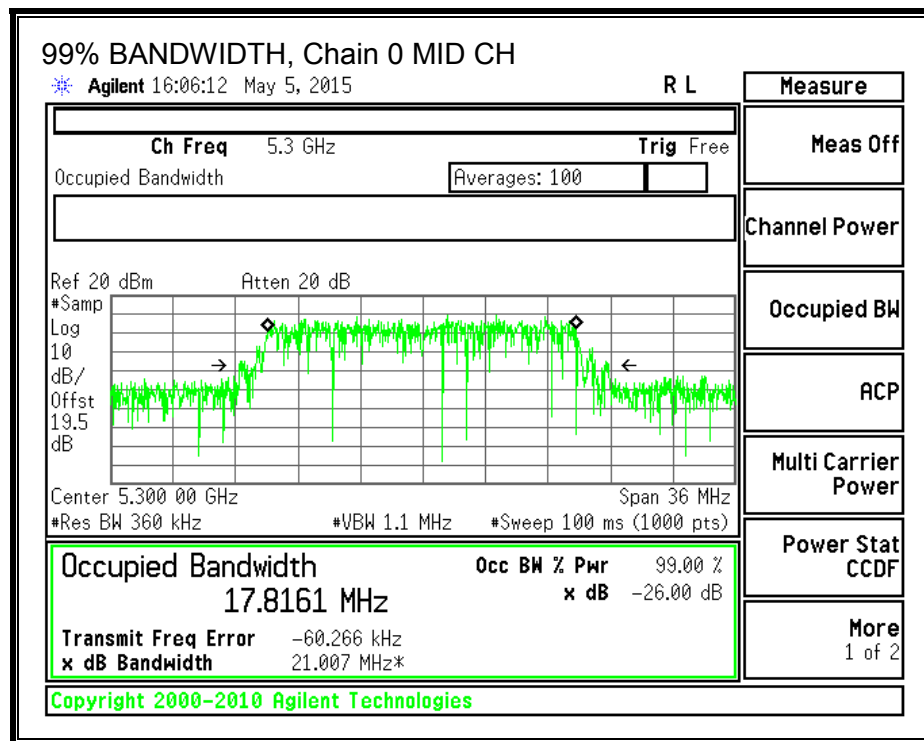
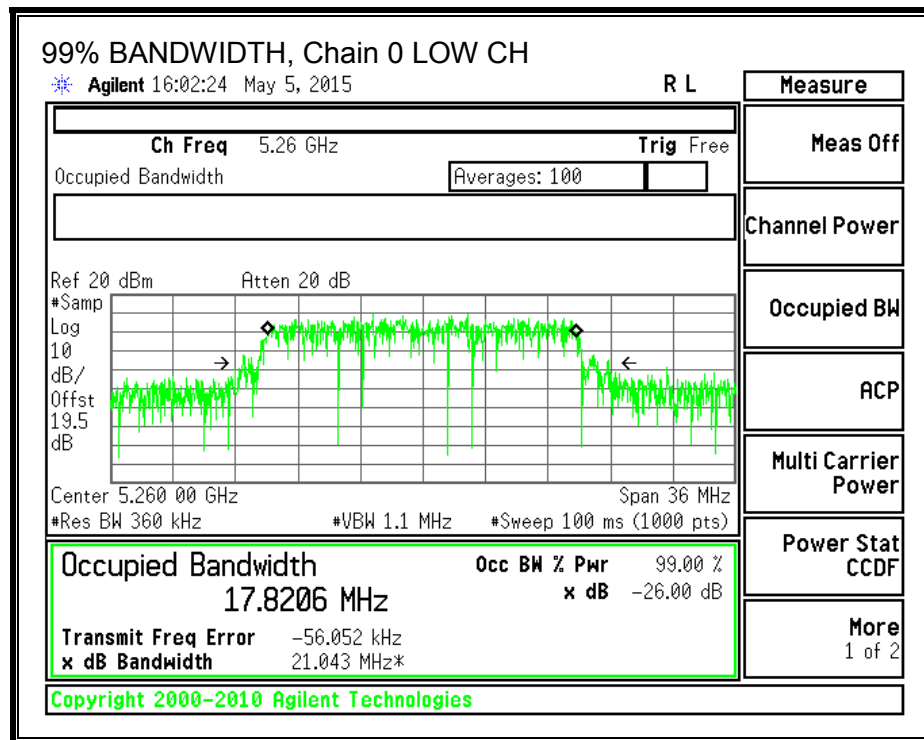
### LIMITS

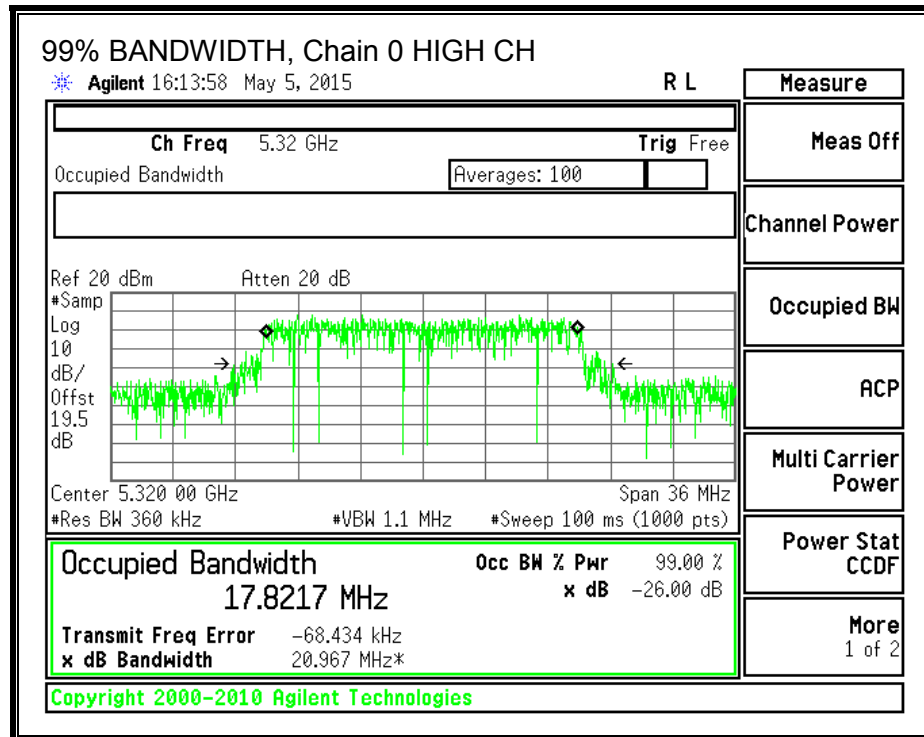
None; for reporting purposes only.

### RESULTS

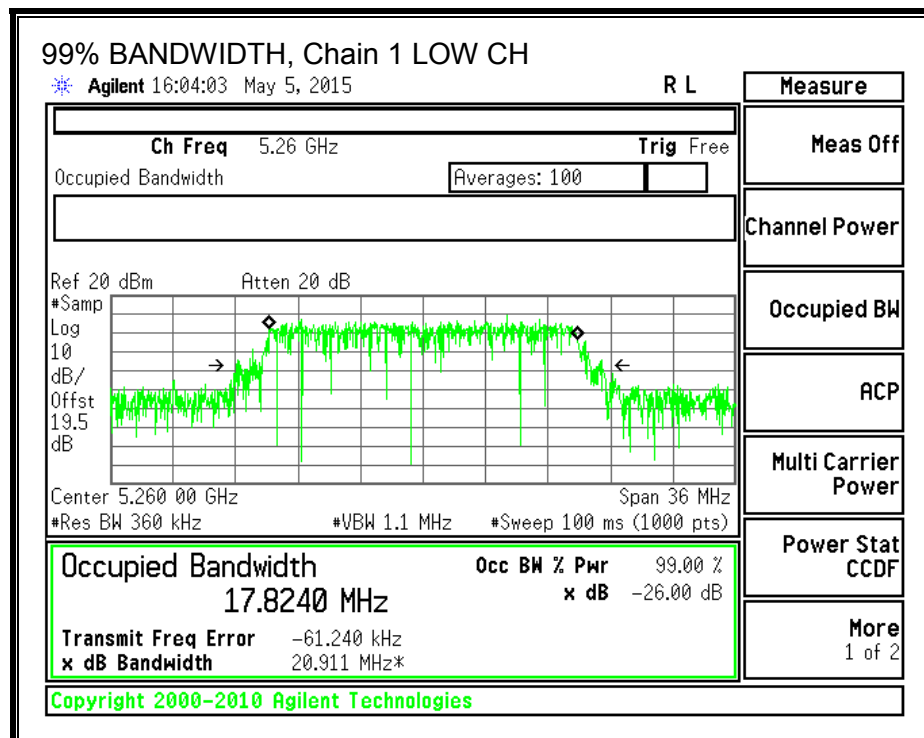
| Channel | Frequency<br>(MHz) | 99% BW<br>Chain 0<br>(MHz) | 99% BW<br>Chain 1<br>(MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low     | 5260               | 17.8206                    | 17.8240                    |
| Mid     | 5300               | 17.8161                    | 17.8057                    |
| High    | 5320               | 17.8217                    | 17.8162                    |

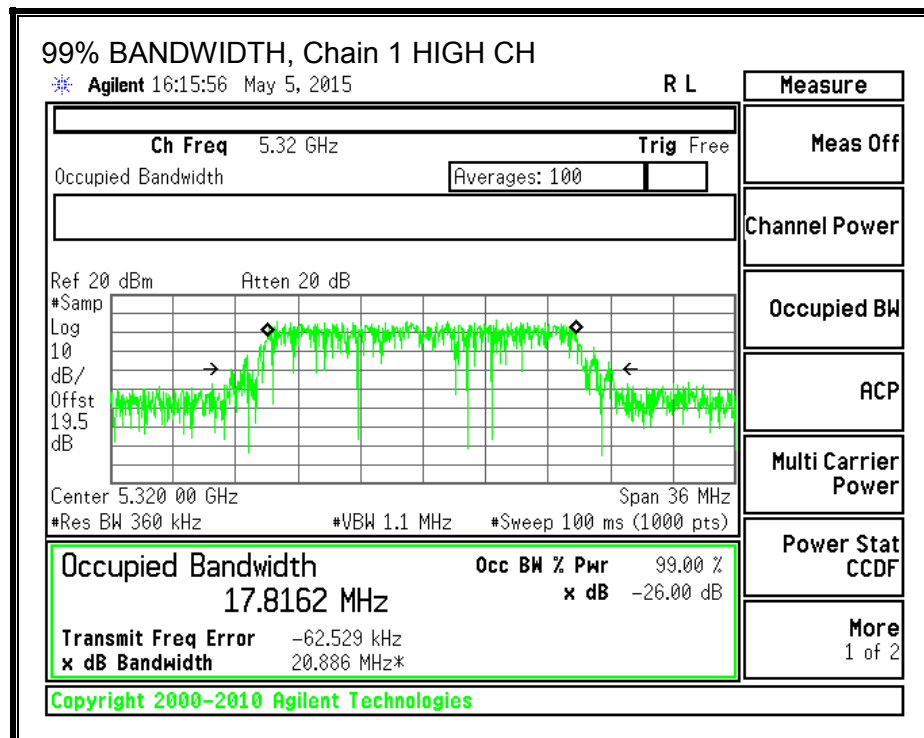
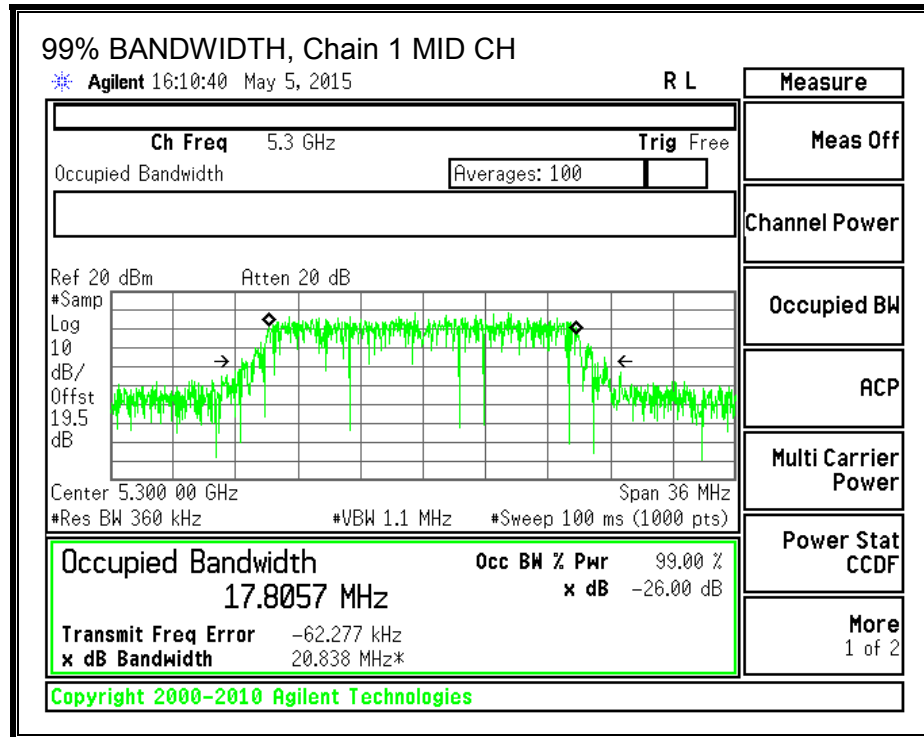
**99% BANDWIDTH, Chain 0**





**99% BANDWIDTH, Chain 1**





### 8.17.3. OUTPUT 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  $11 \text{ dBm} + 10 \log B$ , 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 power and PSD, the TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Uncorrelated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|-----------------------------------------------------|
| 4.00                                | 4.00                                | 4.00                                                |

## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5260               | 21.81                       | 4.00                                      | 4.00                                    | 24.00                   | 11.00                 |
| Mid     | 5300               | 21.81                       | 4.00                                      | 4.00                                    | 24.00                   | 11.00                 |
| High    | 5320               | 21.90                       | 4.00                                      | 4.00                                    | 24.00                   | 11.00                 |

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

### Output Power Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5260               | 19.20                             | 18.55                             | 21.90                             | 24.00                   | -2.10                   |
| Mid     | 5300               | 19.15                             | 18.65                             | 21.92                             | 24.00                   | -2.08                   |
| High    | 5320               | 18.62                             | 18.13                             | 21.39                             | 24.00                   | -2.61                   |

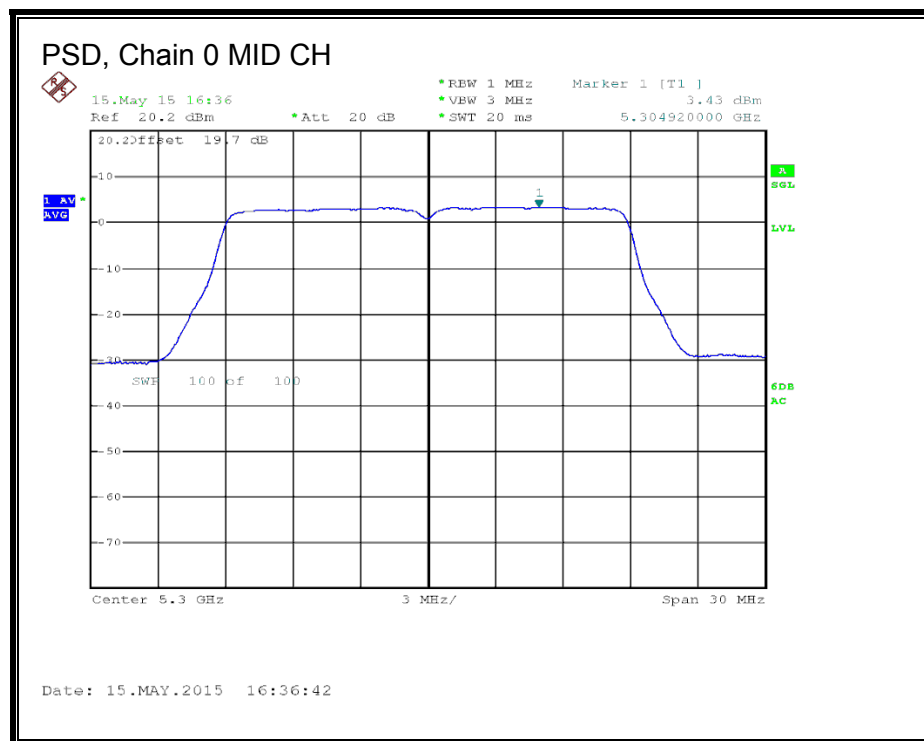
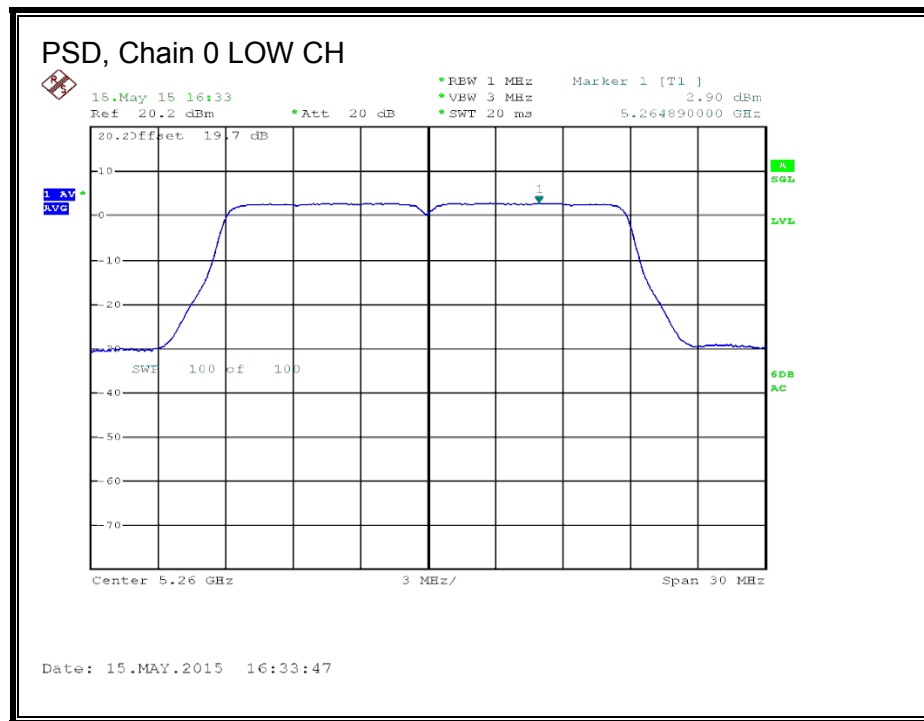
### PPSD Results

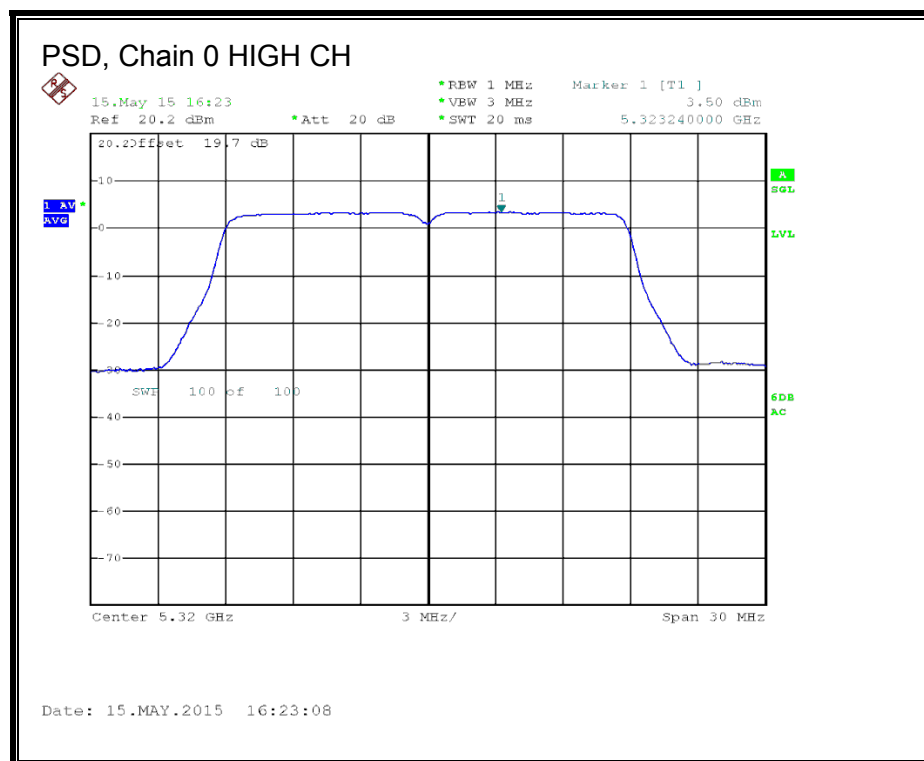
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5260               | 2.90                            | 2.06                            | 5.51                            | 11.00                 | -5.49                 |
| Mid     | 5300               | 3.43                            | 2.27                            | 5.90                            | 11.00                 | -5.10                 |
| High    | 5320               | 3.50                            | 2.59                            | 6.08                            | 11.00                 | -4.92                 |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

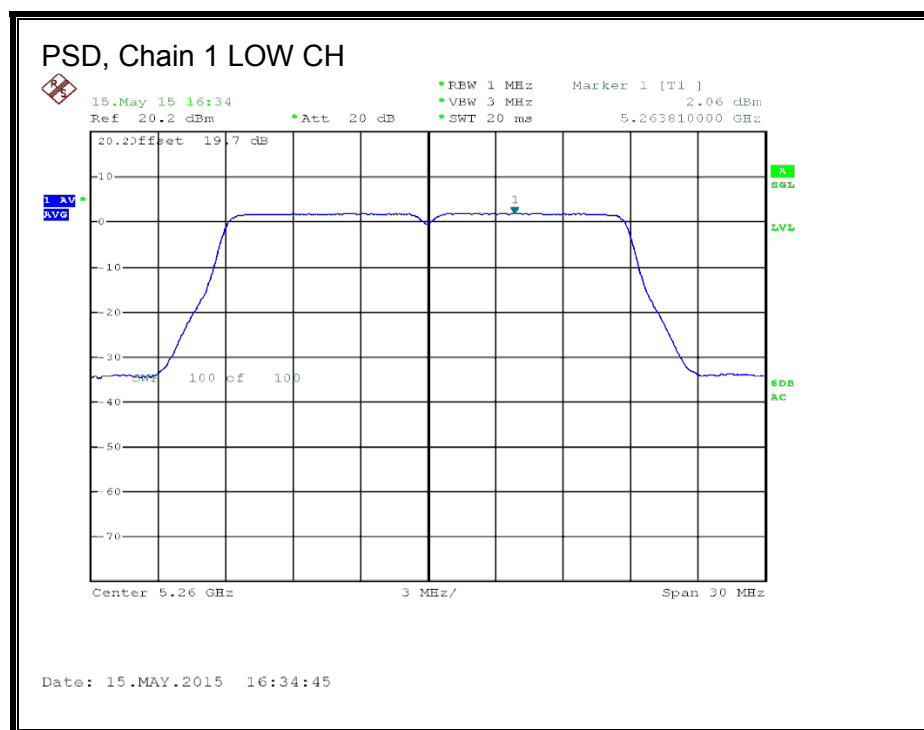


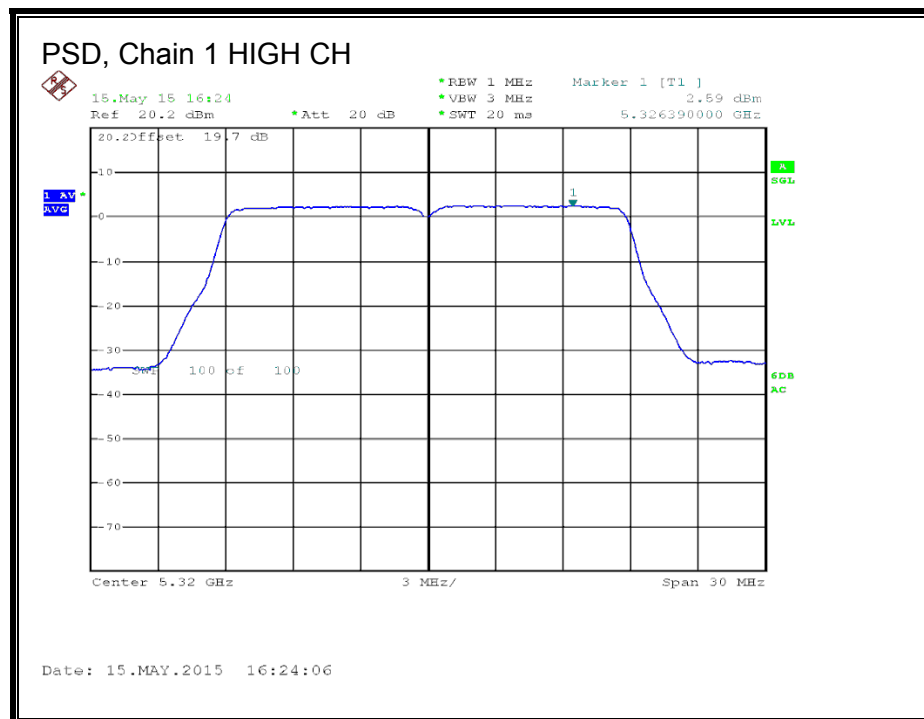
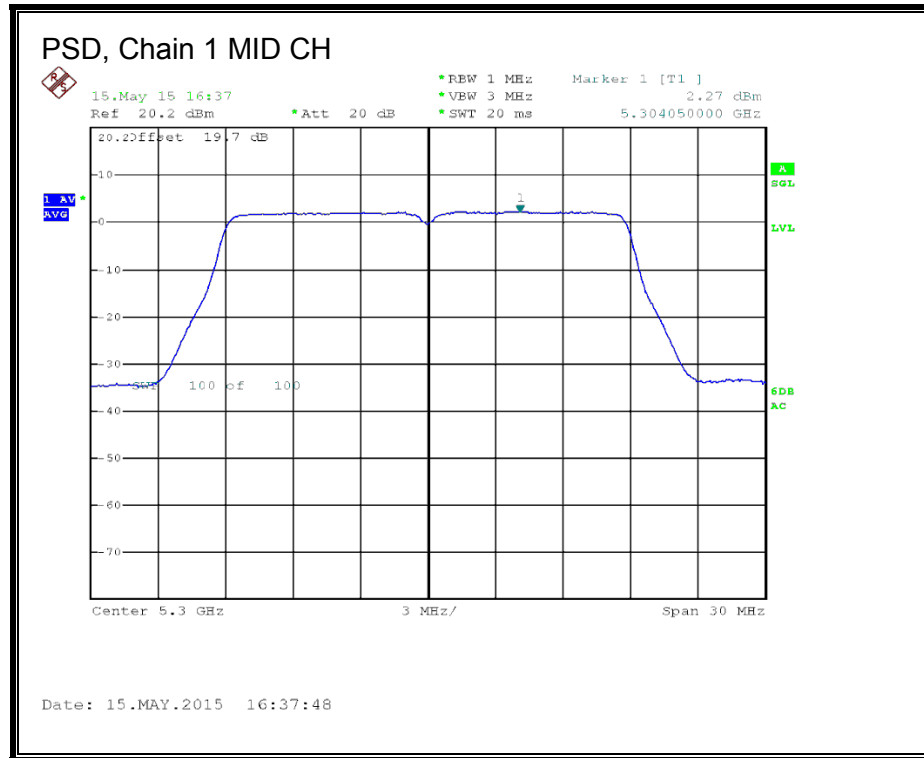
**PSD, Chain 0**





### PSD, Chain 1





## **8.18. 802.11n HT20 TxBF 2Tx MODE IN THE 5.3 GHz BAND**

### **8.18.1. OUTPUT 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 Power and PSD the TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

| <b>Chain 0<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Chain 1<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Correlated Chains<br/>Directional<br/>Gain<br/>(dBi)</b> |
|-----------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|
| 4.00                                          | 4.00                                          | 7.01                                                        |

## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5260               | 21.90                       | 7.01                                      | 7.01                                    | 22.99                   | 9.99                  |
| Mid     | 5300               | 21.81                       | 7.01                                      | 7.01                                    | 22.99                   | 9.99                  |
| High    | 5320               | 21.72                       | 7.01                                      | 7.01                                    | 22.99                   | 9.99                  |

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

### Output Power Results

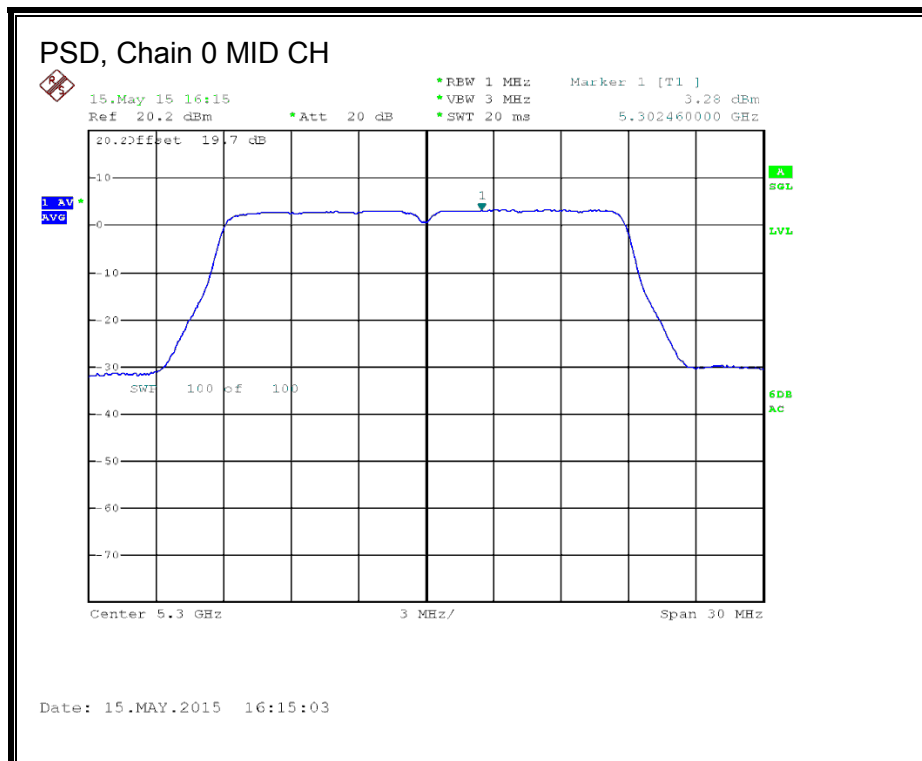
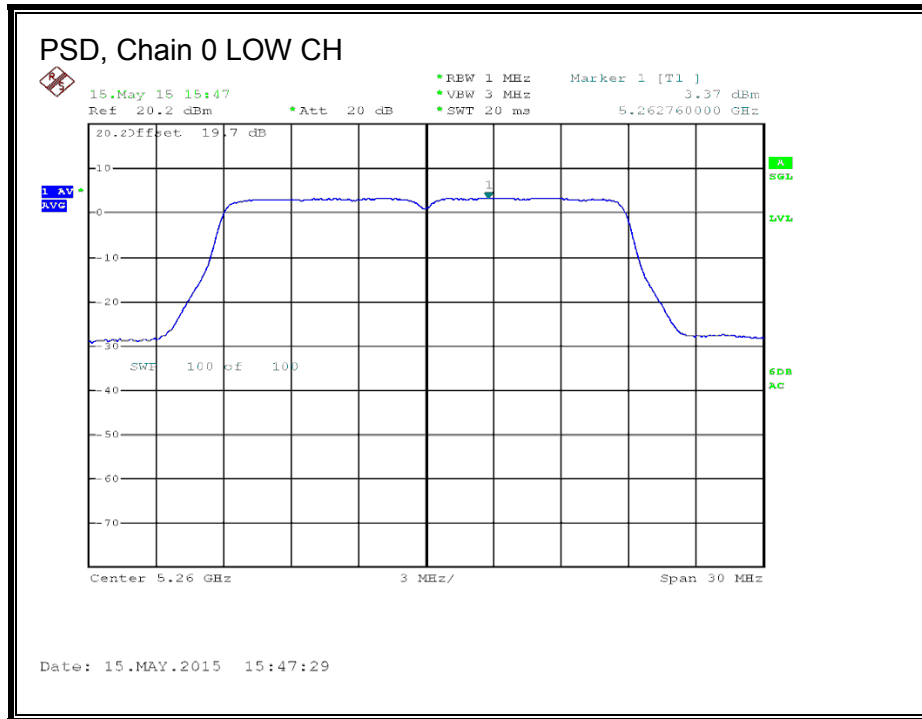
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5260               | 19.10                             | 18.65                             | 21.89                             | 22.99                   | -1.10                   |
| Mid     | 5300               | 19.15                             | 18.55                             | 21.87                             | 22.99                   | -1.12                   |
| High    | 5320               | 17.36                             | 17.01                             | 20.20                             | 22.99                   | -2.79                   |

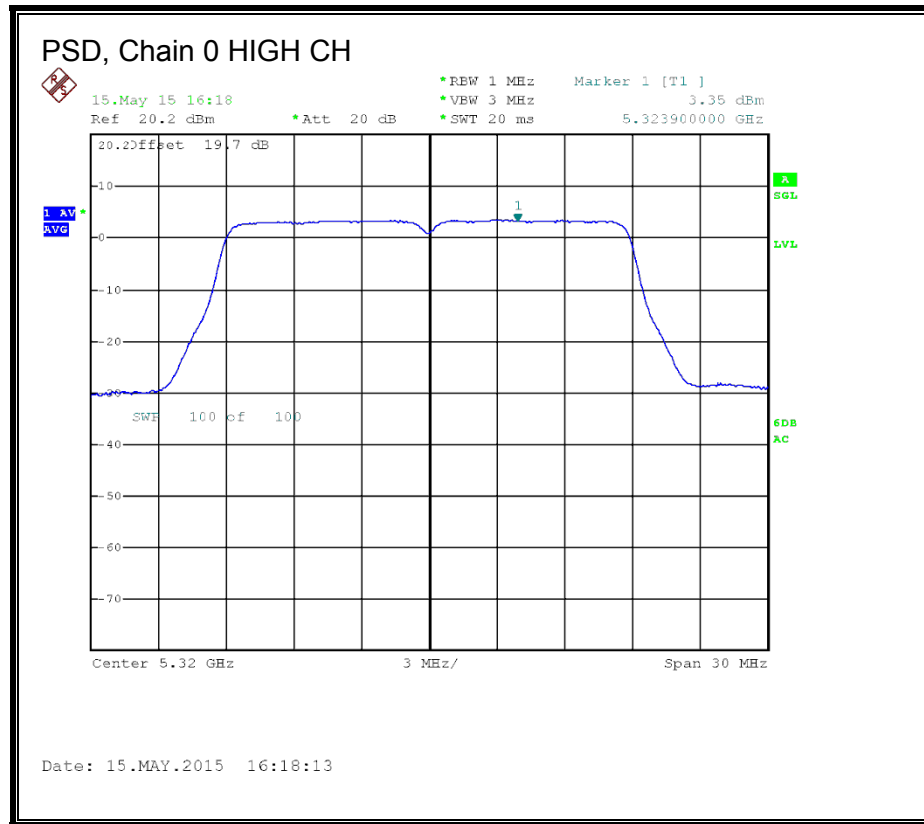
### PSD Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5260               | 3.37                            | 1.99                            | 5.74                            | 9.99                  | -4.25                 |
| Mid     | 5300               | 3.28                            | 2.38                            | 5.86                            | 9.99                  | -4.13                 |
| High    | 5320               | 3.35                            | 2.64                            | 6.02                            | 9.99                  | -3.97                 |

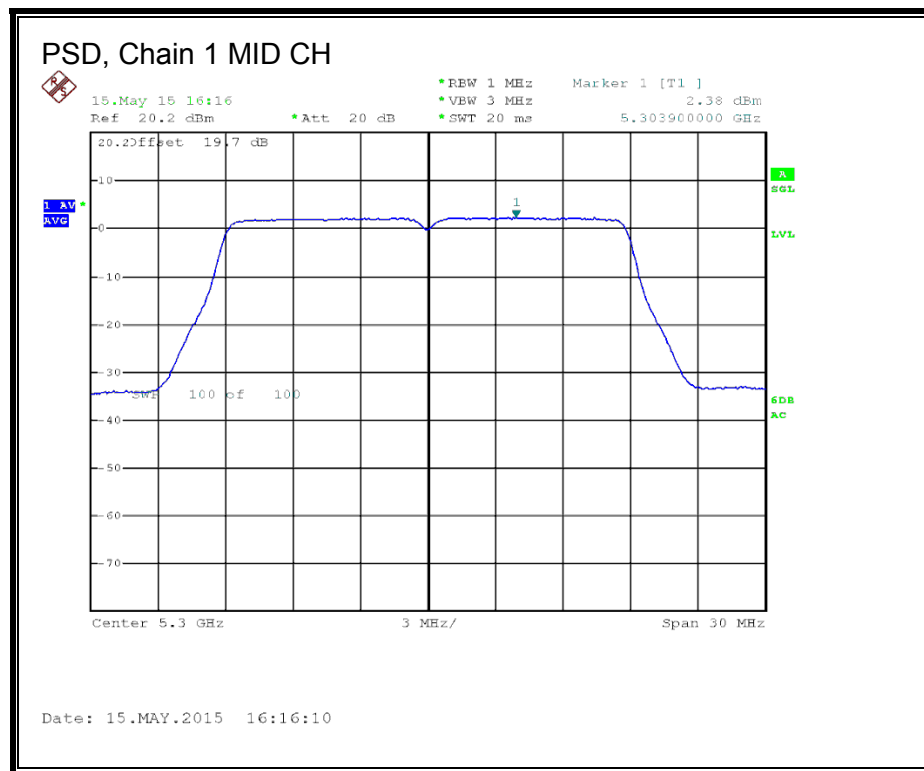
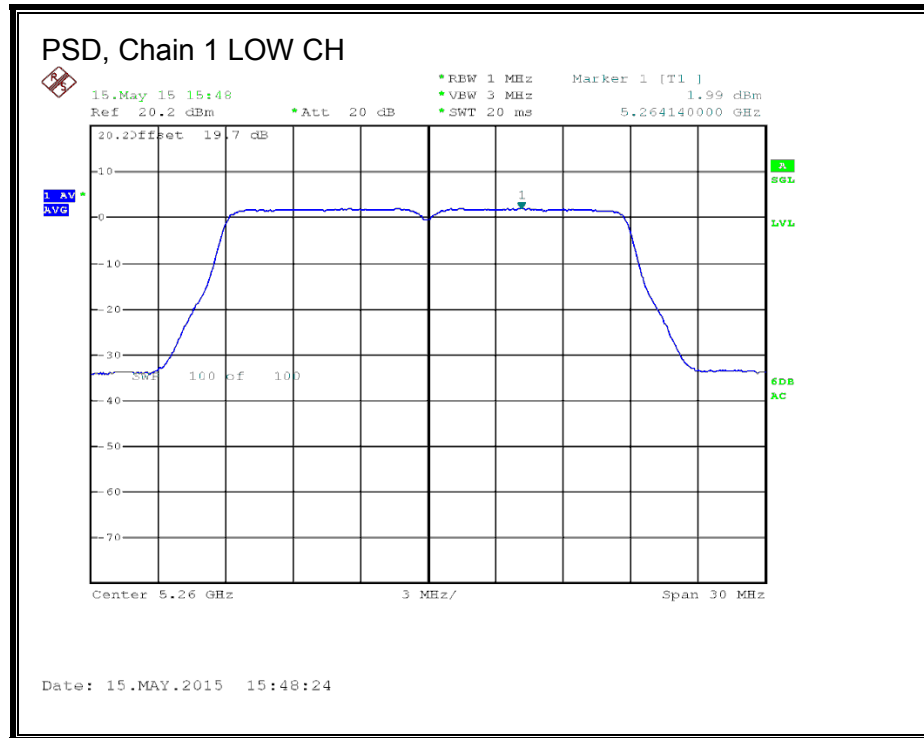
**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

**PSD, Chain 0**

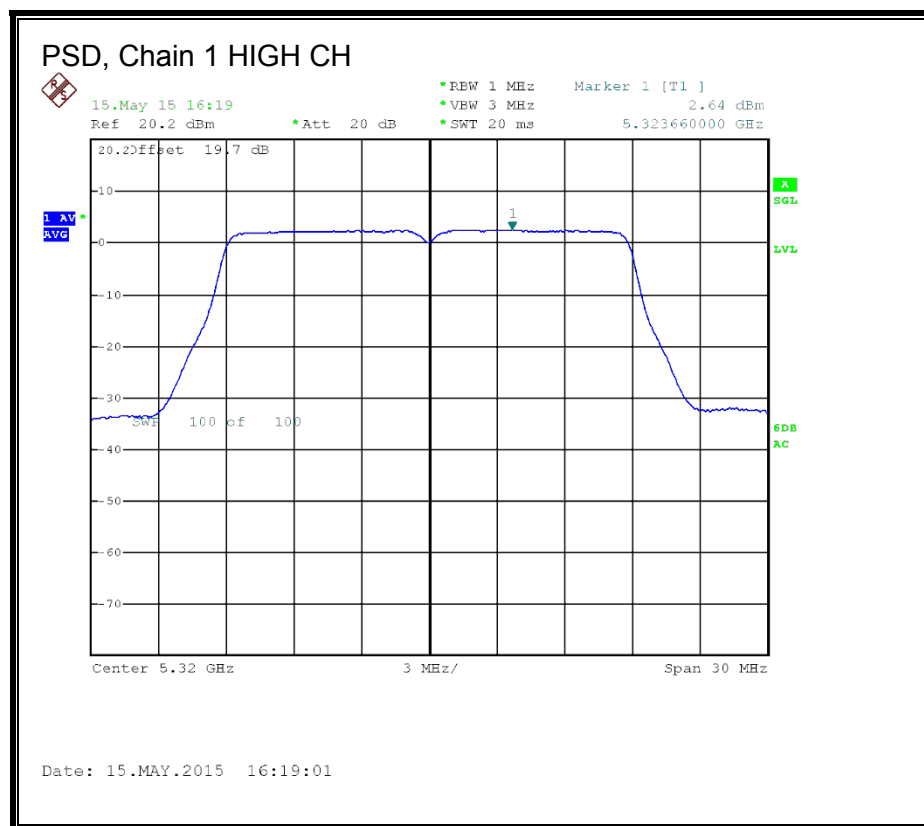




**PSD, Chain 1**







## **8.19. 802.11n HT40 1Tx MODE IN THE 5.3 GHz BAND**

### **8.19.1. OUTPUT 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  $11 \text{ dBm} + 10 \log B$ , 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**

This is SISO mode, AG is the highest (worst-case) = 4.0 dBi.

## **RESULTS**

### **Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|------------------------------|-------------------------|-----------------------|
| High    | 5310               | 40.32                       | 4.00                         | 24.00                   | 11.00                 |

### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| High    | 5310               | 17.21                             | 17.21                             | 24.00                   | -6.79                   |

**Note:** for Chain 0, 26dB & 99% data & plots, see section 11n HT40 CDD 2TX MODE IN THE 5.3 GHz BAND

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## 8.20. 802.11n HT40 CDD 2Tx MODE IN THE 5.3 GHz BAND

### 8.20.1. 26 dB BANDWIDTH

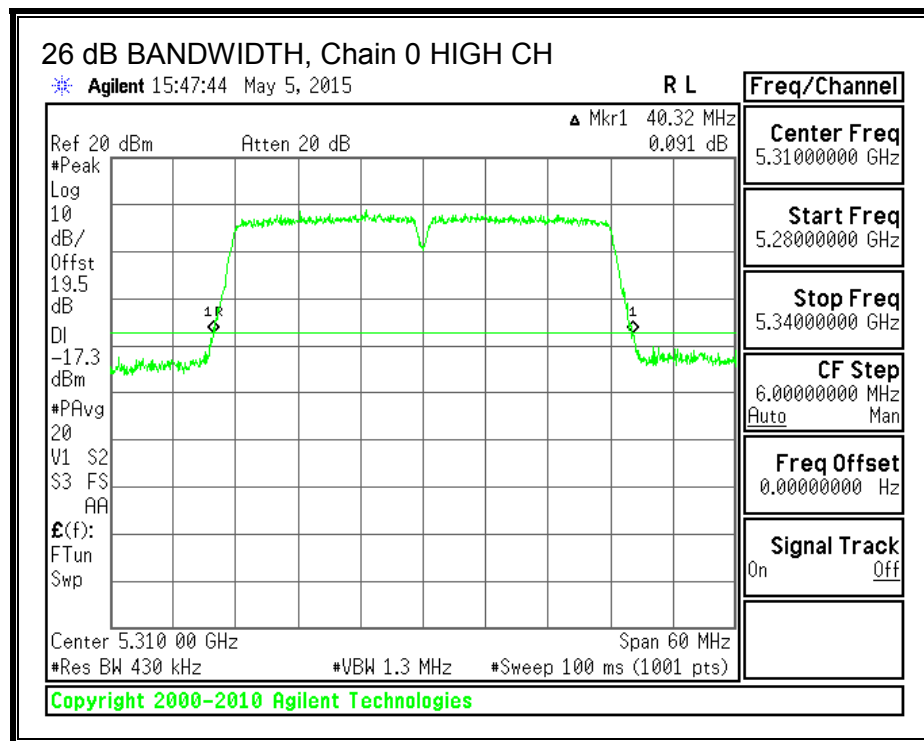
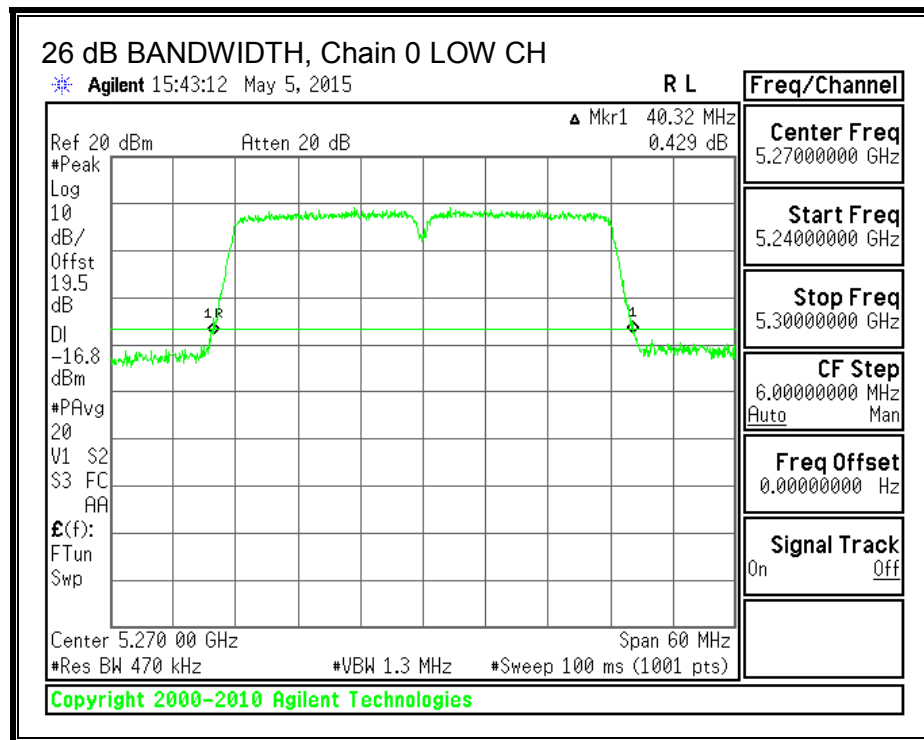
#### LIMITS

None; for reporting purposes only.

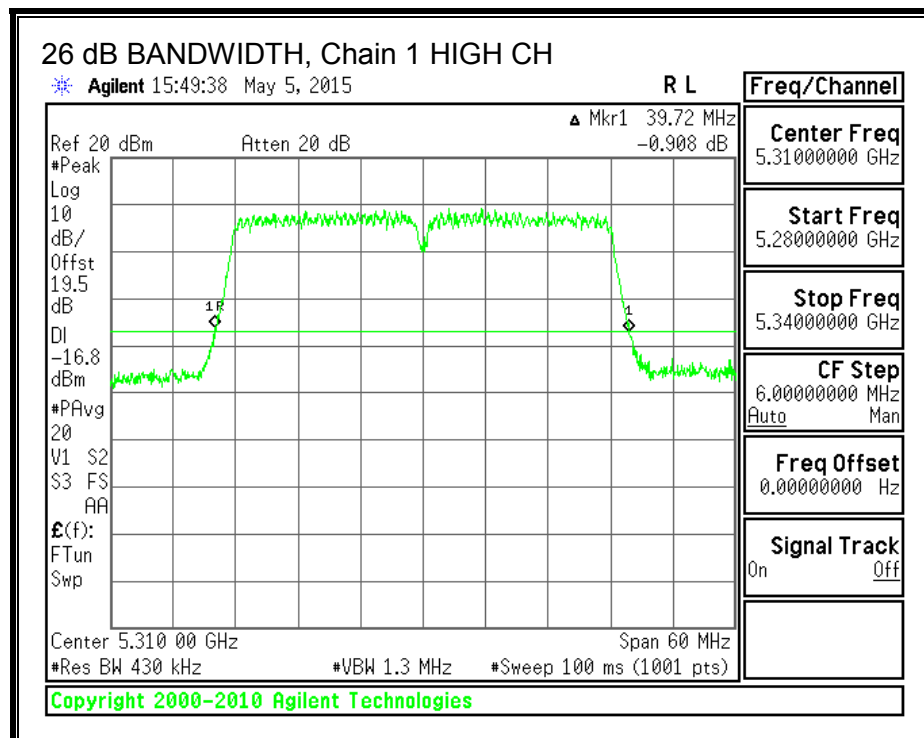
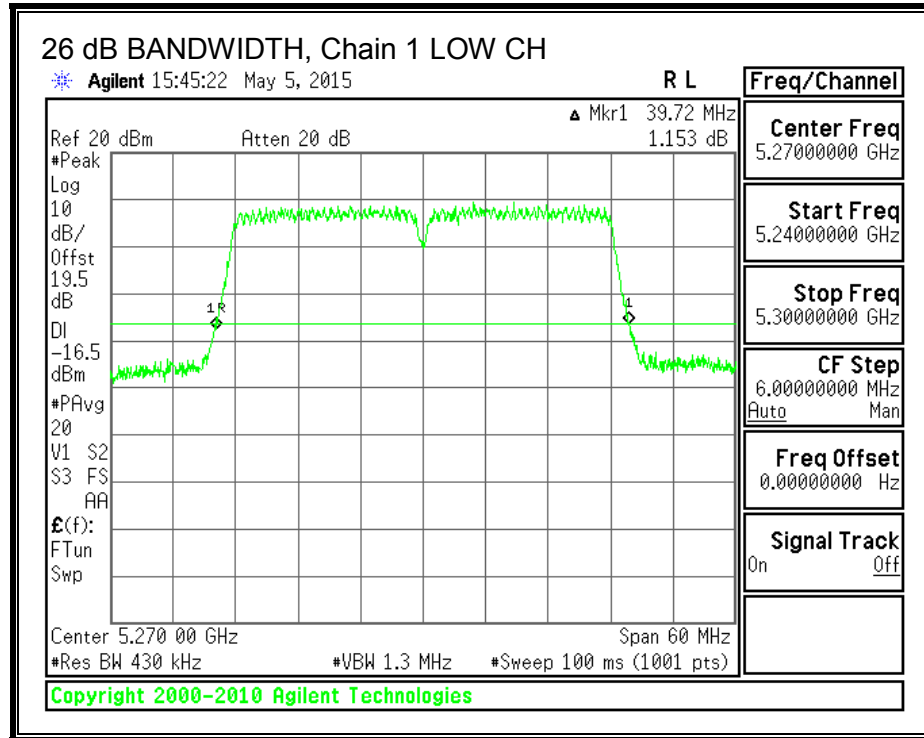
#### RESULTS

| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) | 26 dB BW<br>Chain 1<br>(MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low     | 5270               | 40.32                        | 39.72                        |
| High    | 5310               | 40.32                        | 39.72                        |

**26 dB BANDWIDTH, Chain 0**



**26 dB BANDWIDTH, Chain 1**



## 8.20.2. 99% BANDWIDTH

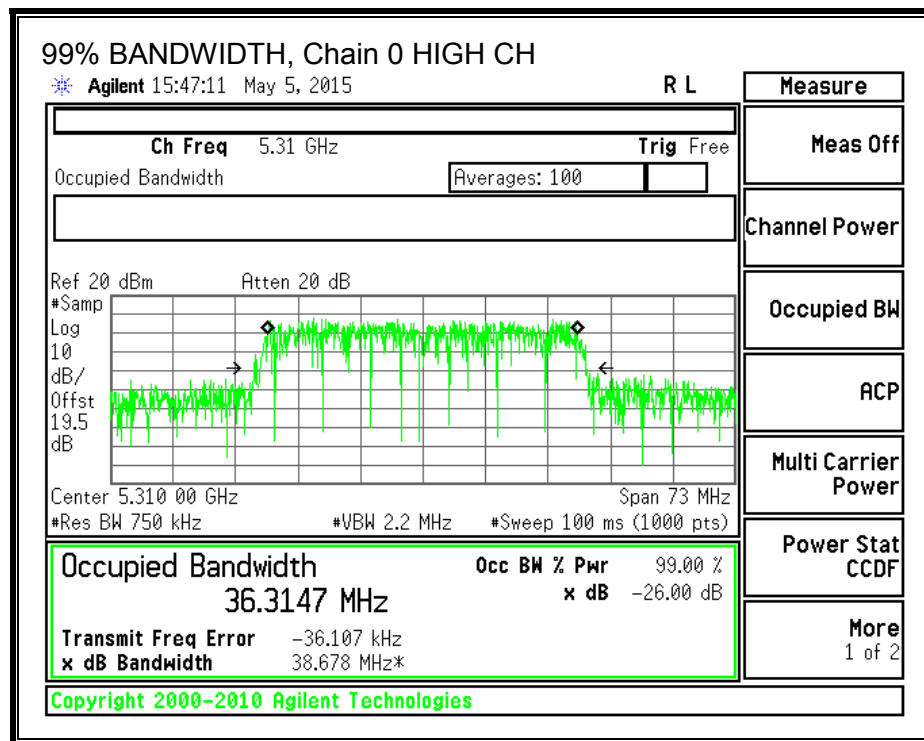
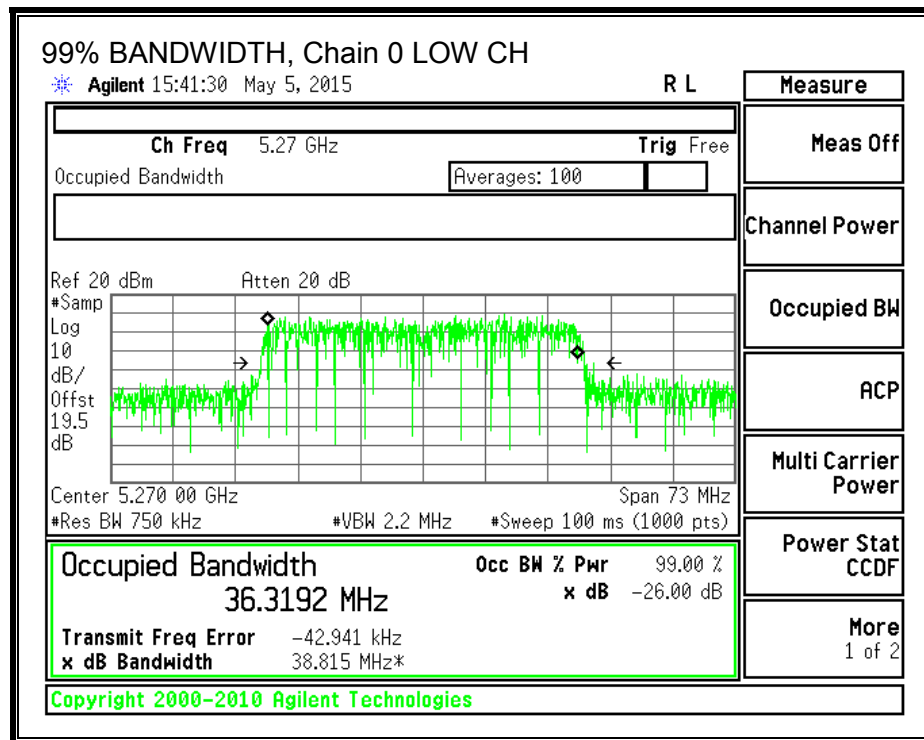
### LIMITS

None; for reporting purposes only.

### RESULTS

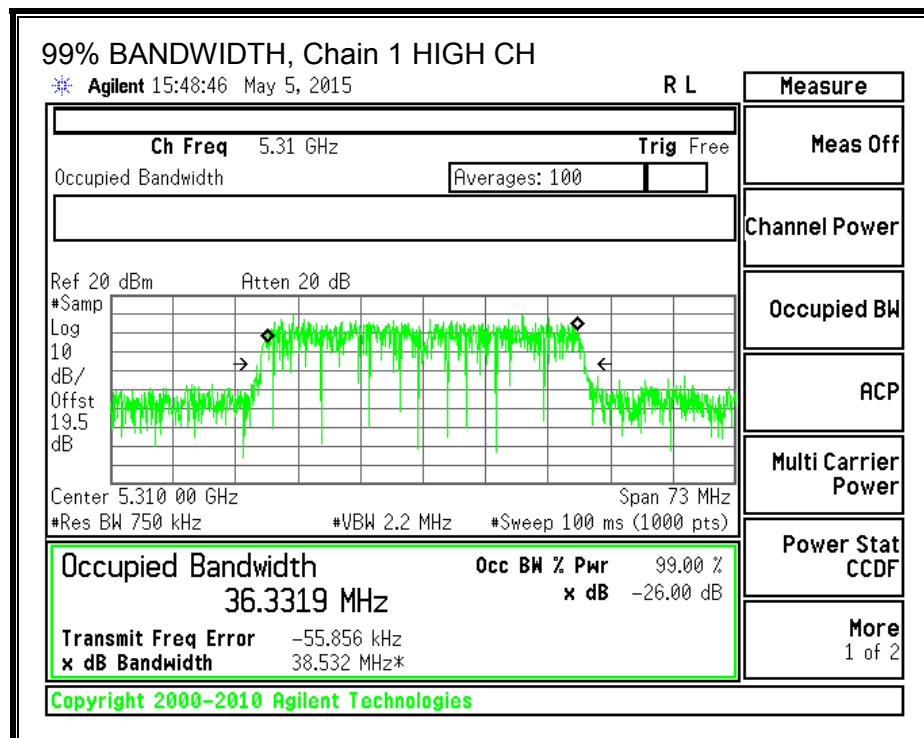
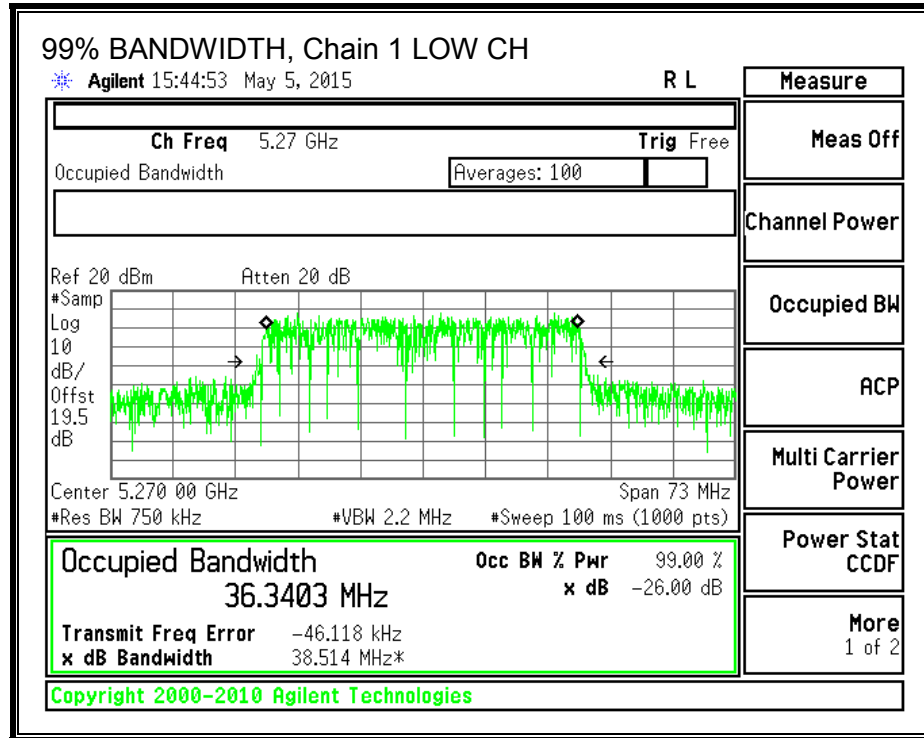
| Channel | Frequency<br>(MHz) | 99% BW<br>Chain 0<br>(MHz) | 99% BW<br>Chain 1<br>(MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low     | 5270               | 36.3192                    | 36.3403                    |
| High    | 5310               | 36.3147                    | 36.3319                    |

**99% BANDWIDTH, Chain 0**





**99% BANDWIDTH, Chain 1**



### 8.20.3. OUTPUT 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  $11 \text{ dBm} + 10 \log B$ , 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 power, the TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Uncorrelated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|-----------------------------------------------------|
| 4.00                                | 4.00                                | 4.00                                                |

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

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Correlated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|---------------------------------------------------|
| 4.00                                | 4.00                                | 7.01                                              |

## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5270               | 39.72                       | 4.00                                      | 7.01                                    | 24.00                   | 9.99                  |
| High    | 5310               | 39.72                       | 4.00                                      | 7.01                                    | 24.00                   | 9.99                  |

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.09 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

### Output Power Results

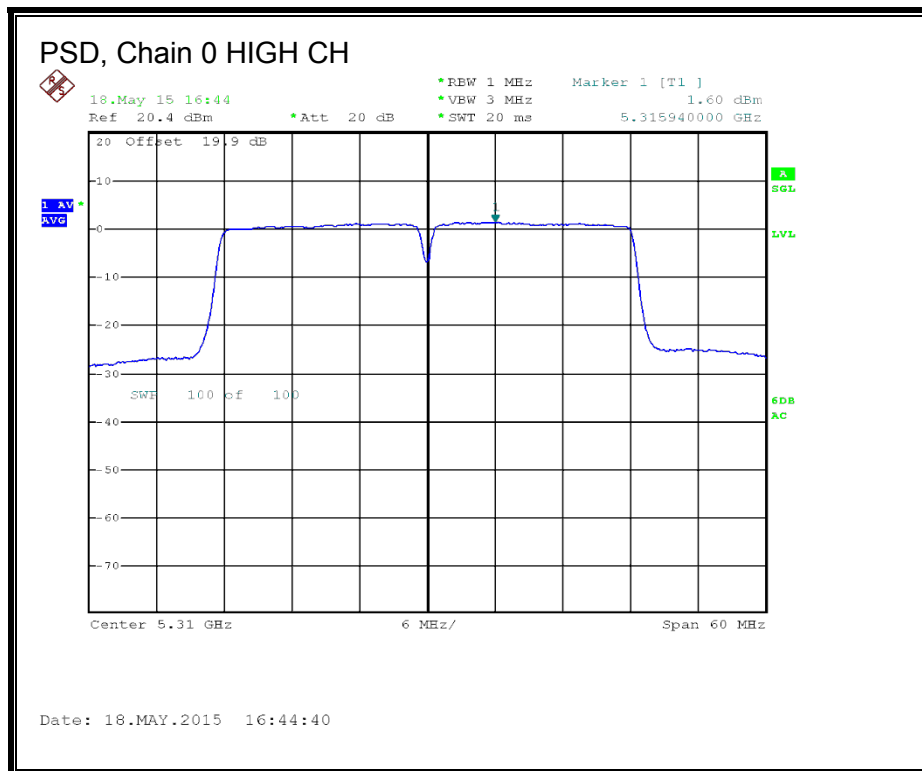
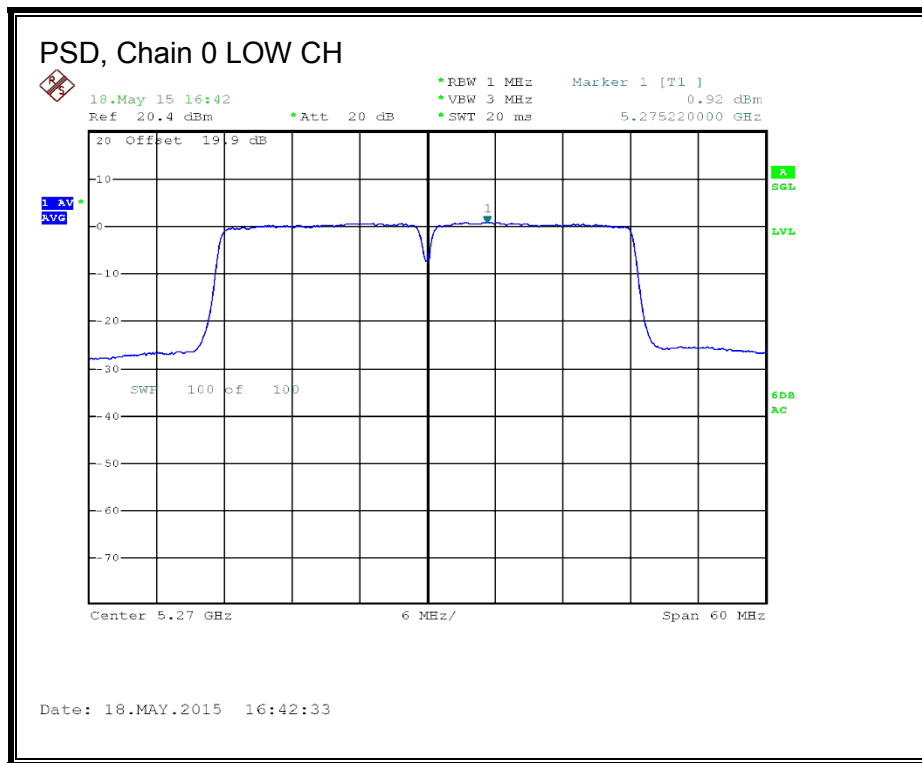
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5270               | 19.60                             | 19.10                             | 22.37                             | 24.00                   | -1.63                   |
| High    | 5310               | 16.18                             | 15.87                             | 19.13                             | 24.00                   | -4.87                   |

### PSD Results

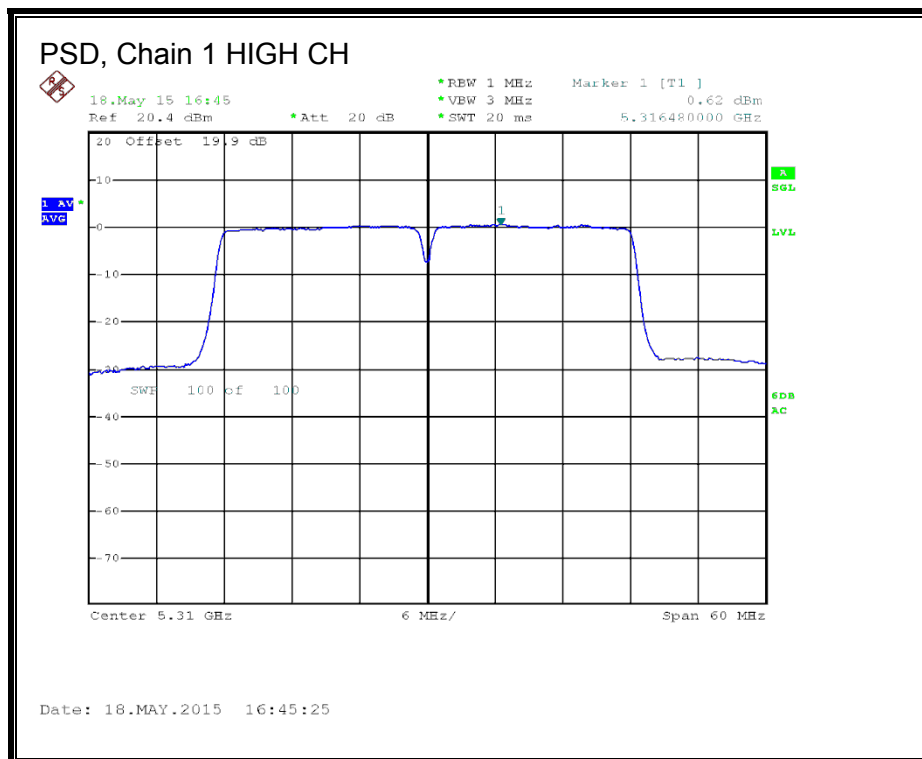
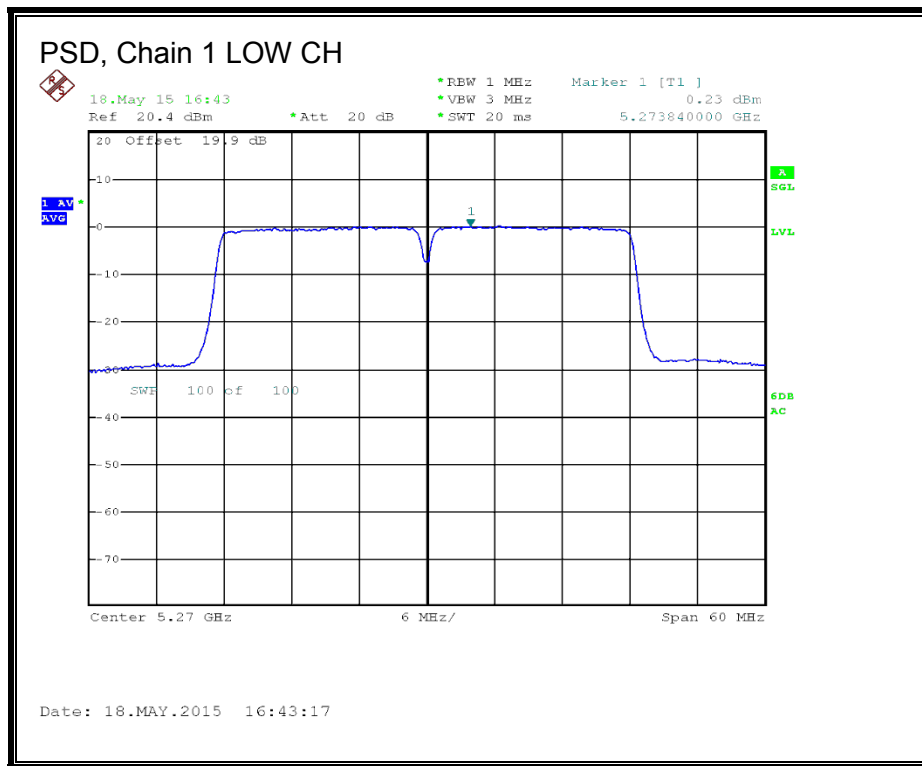
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5270               | 0.92                            | 0.23                            | 3.69                            | 9.99                  | -6.30                 |
| High    | 5310               | 1.60                            | 0.62                            | 4.24                            | 9.99                  | -5.75                 |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

**PSD, Chain 0**



**PSD, Chain 1**



## **8.21. 802.11n HT40 TxBF 2Tx MODE IN THE 5.3 GHz BAND**

### **8.21.1. OUTPUT 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 Power and PSD the TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

| <b>Chain 0<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Chain 1<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Correlated Chains<br/>Directional<br/>Gain<br/>(dBi)</b> |
|-----------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|
| 4.00                                          | 4.00                                          | 7.01                                                        |

## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5270               | 39.72                       | 7.01                                      | 7.01                                    | 22.99                   | 9.99                  |
| High    | 5310               | 39.72                       | 7.01                                      | 7.01                                    | 22.99                   | 9.99                  |

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.09 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

### Output Power Results

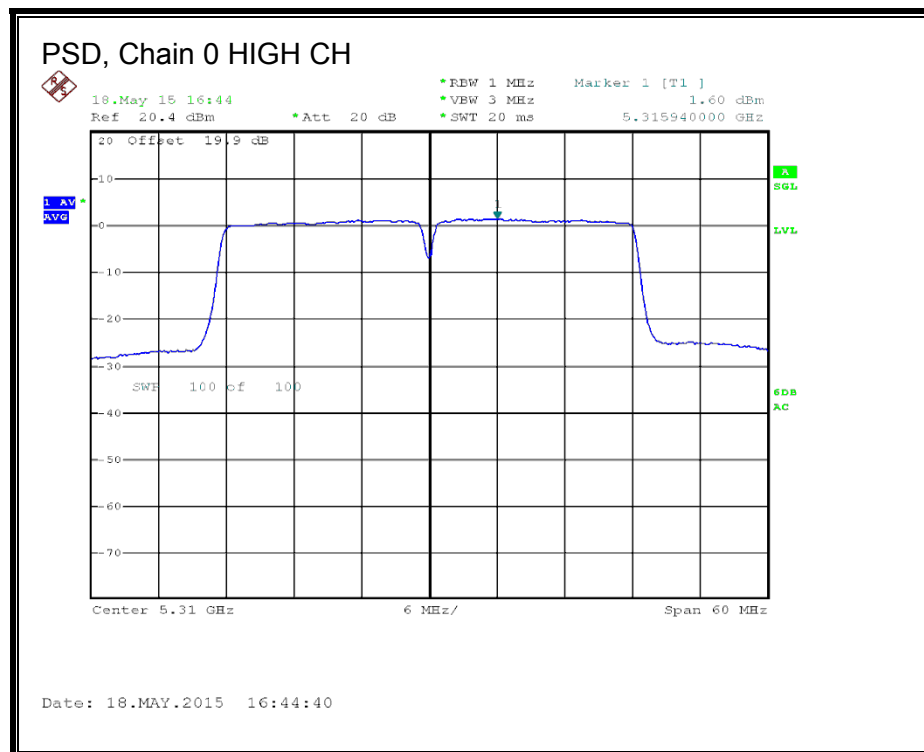
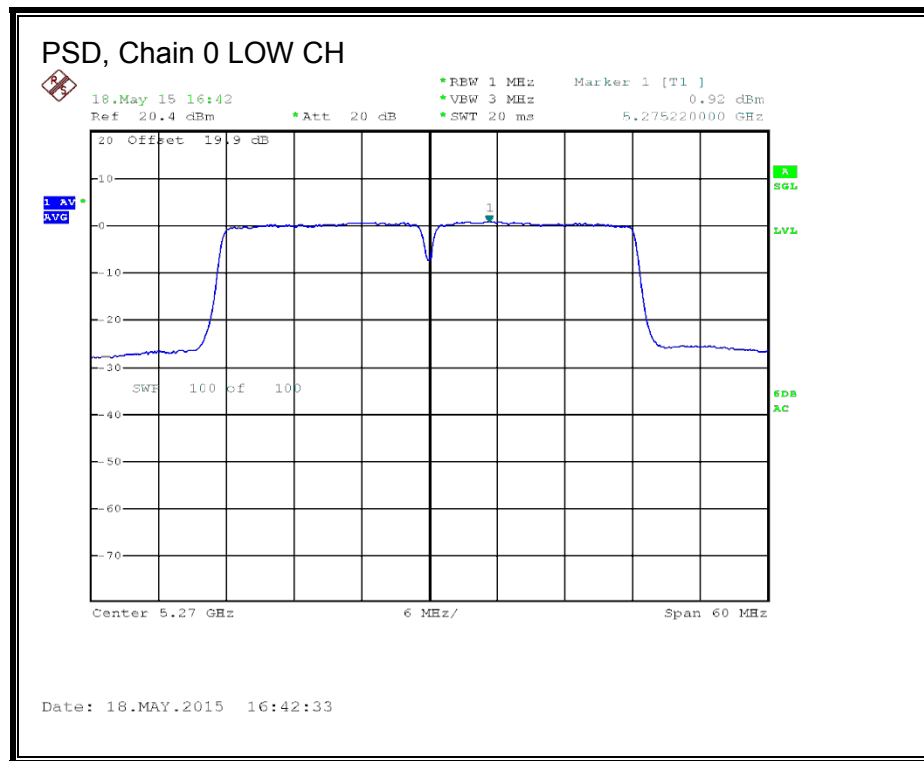
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5270               | 19.60                             | 19.10                             | 22.37                             | 22.99                   | -0.62                   |
| High    | 5310               | 15.61                             | 15.41                             | 18.61                             | 22.99                   | -4.38                   |

### PSD Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5270               | 0.92                            | 0.23                            | 3.69                            | 9.99                  | -6.30                 |
| High    | 5310               | 1.60                            | 0.62                            | 4.24                            | 9.99                  | -5.75                 |

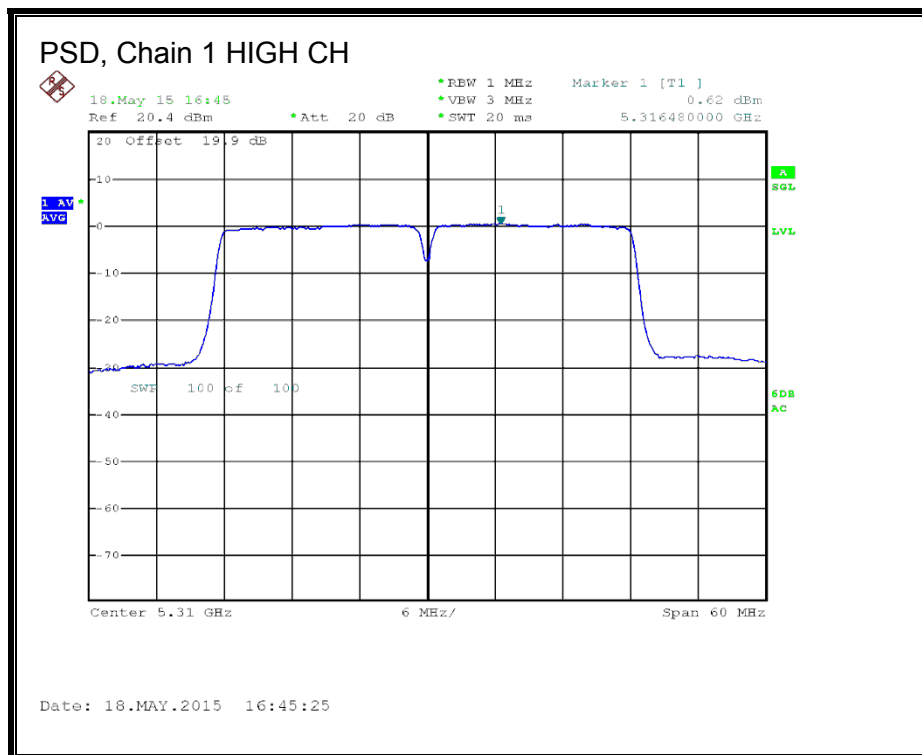
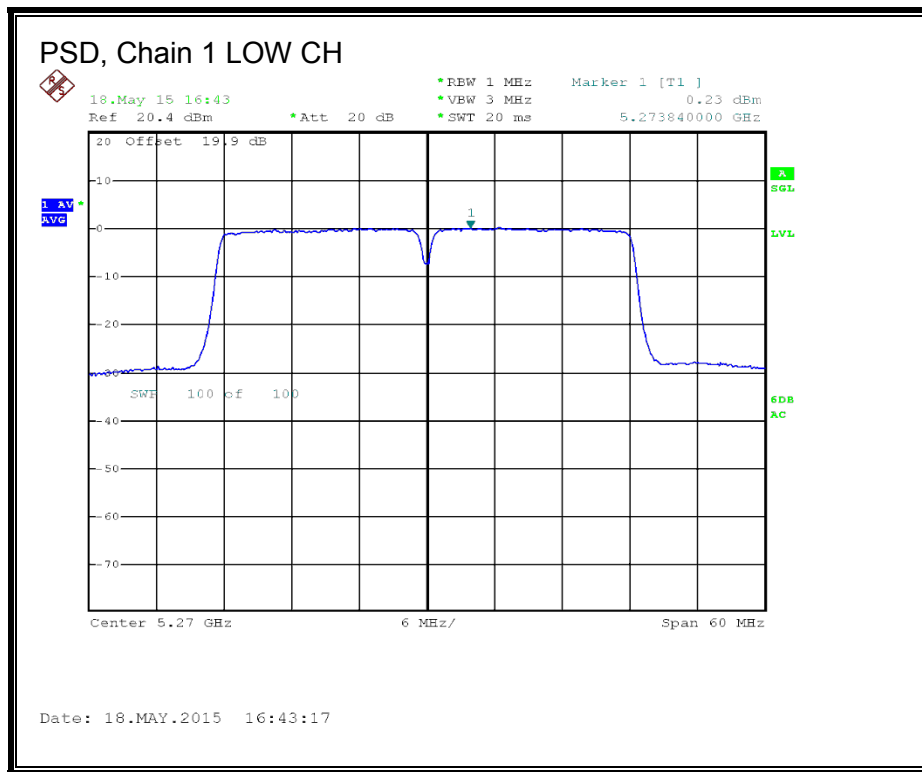
**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

**PSD, Chain 0**





**PSD, Chain 1**



## **8.22. 802.11ac VHT80 1Tx MODE IN THE 5.3 GHz BAND**

### **8.22.1. OUTPUT 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  $11 \text{ dBm} + 10 \log B$ , 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**

This is SISO mode, AG is the highest (worst-case) = 4 dBi.

## **RESULTS**

### **Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>(dBi) | Power<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|------------------------------|-------------------------|
| Mid     | 5290               | 82.11                       | 4.00                         | 24.00                   |

### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Mid     | 5290               | 17.35                             | 17.35                             | 24.00                   | -6.65                   |

**Note:** for Chain 0, 26dB & 99% data & plots, see section 11ac VHT80 CDD 2TX MODE IN THE 5.3 GHz BAND

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## **8.23. 802.11ac VHT80 CDD 2Tx MODE IN THE 5.3 GHz BAND**

### **8.23.1. 26 dB BANDWIDTH**

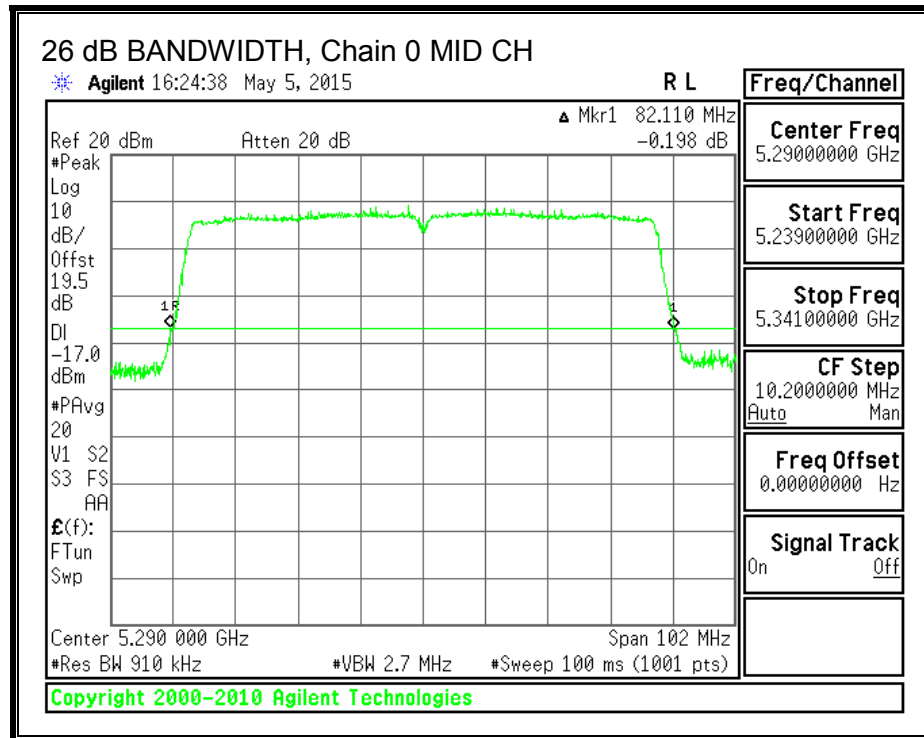
#### **LIMITS**

None; for reporting purposes only.

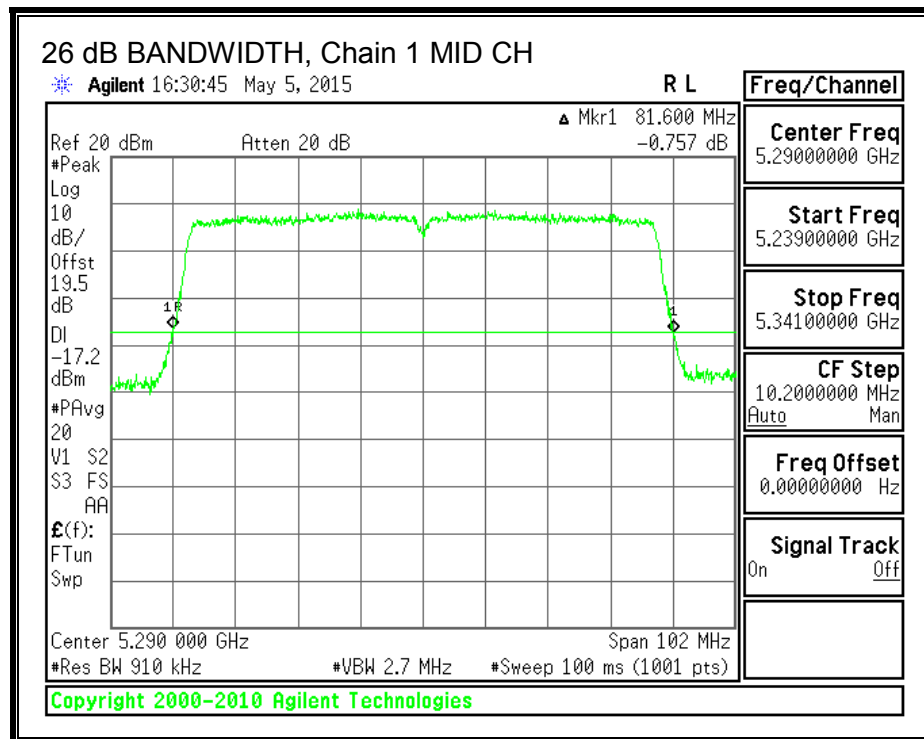
#### **RESULTS**

| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) | 26 dB BW<br>Chain 1<br>(MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Mid     | 5290               | 82.110                       | 81.600                       |

**26 dB BANDWIDTH, Chain 0**



**26 dB BANDWIDTH, Chain 1**



## 8.23.2. 99% BANDWIDTH

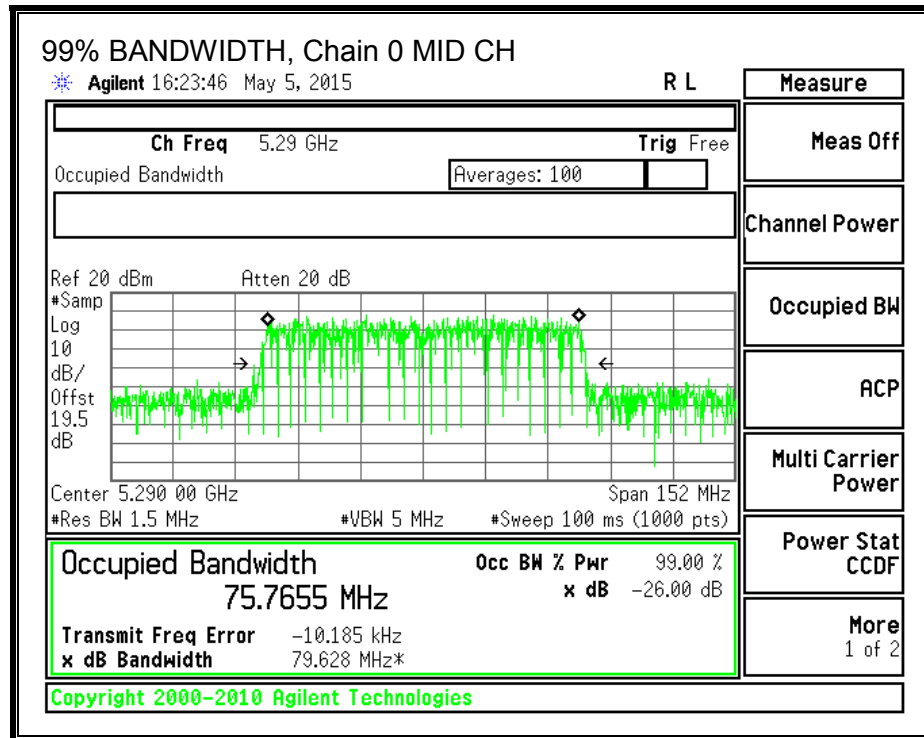
### LIMITS

None; for reporting purposes only.

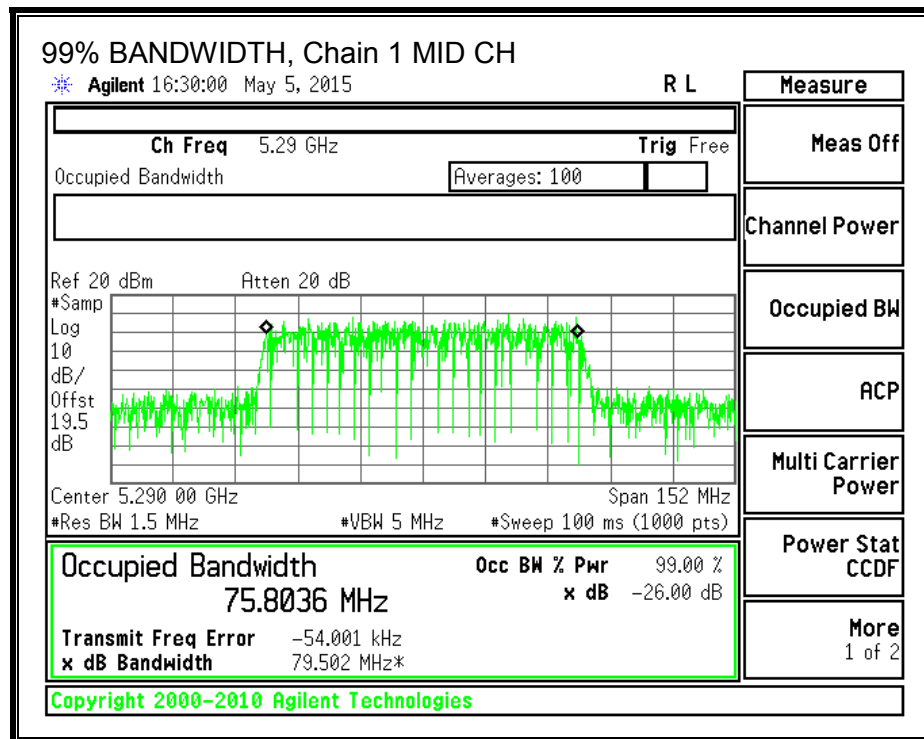
### RESULTS

| Channel | Frequency<br>(MHz) | 99% BW<br>Chain 0<br>(MHz) | 99% BW<br>Chain 1<br>(MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Mid     | 5290               | 75.7655                    | 75.8036                    |

**99% BANDWIDTH, Chain 0**



**99% BANDWIDTH, Chain 1**



### 8.23.3. OUTPUT 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  $11 \text{ dBm} + 10 \log B$ , 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 power, the TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Uncorrelated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|-----------------------------------------------------|
| 4.00                                | 4.00                                | 4.00                                                |

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

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Correlated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|---------------------------------------------------|
| 4.00                                | 4.00                                | 7.01                                              |



## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Mid     | 5290               | 81.60                       | 4.00                                      | 7.01                                    | 24.00                   | 9.99                  |

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.19 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

### Output Power Results

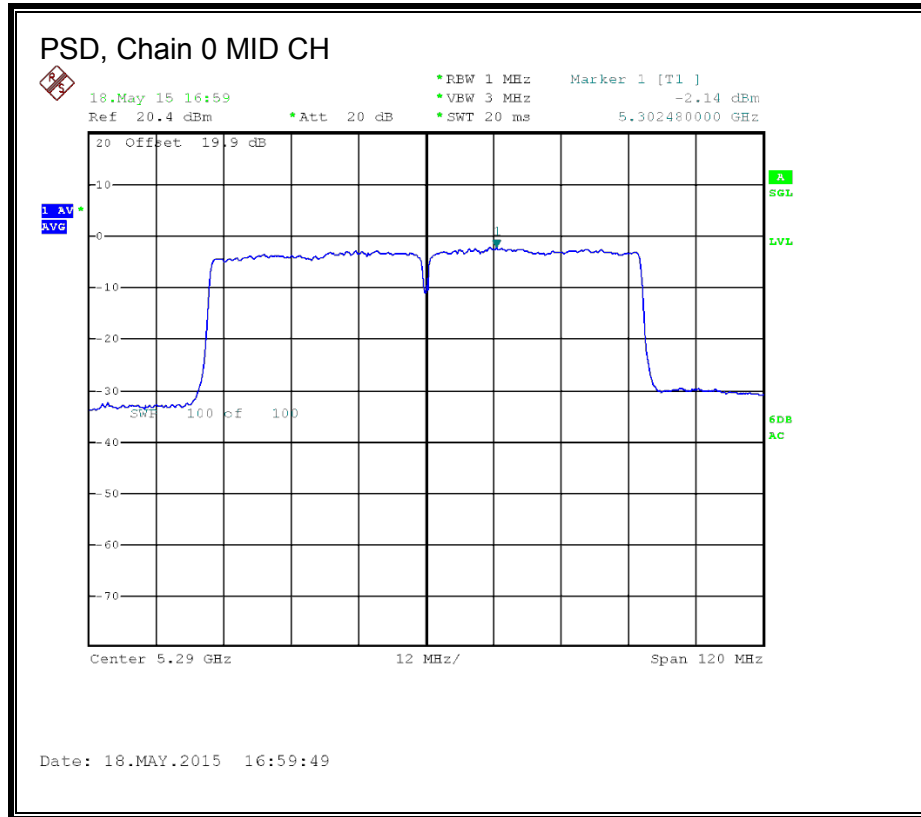
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Mid     | 5290               | 15.16                             | 15.36                             | 18.27                             | 24.00                   | -5.73                   |

### PSD Results

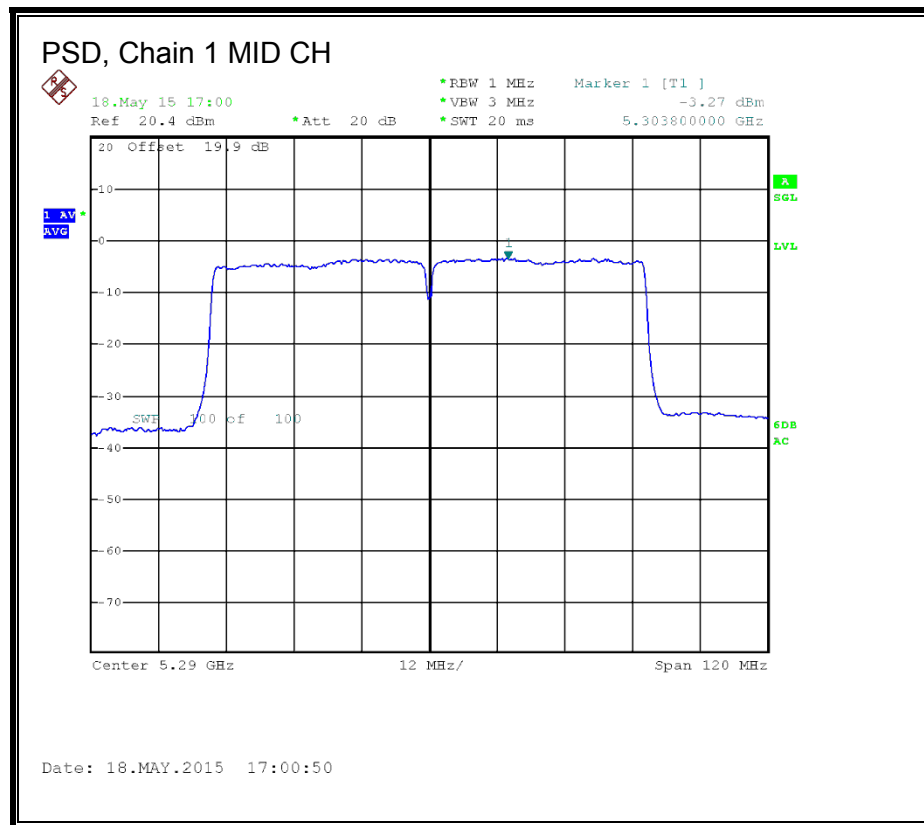
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Mid     | 5290               | -2.14                           | -3.27                           | 0.53                            | 9.99                  | -9.46                 |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

**PSD, Chain 0**



**PSD, Chain 1**



## **8.24. 802.11ac VHT80 TxBF 2Tx MODE IN THE 5.3 GHz BAND**

### **8.24.1. OUTPUT 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  $11 \text{ dBm} + 10 \log B$ , 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 Power and PSD the TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

| <b>Chain 0<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Chain 1<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Correlated Chains<br/>Directional<br/>Gain<br/>(dBi)</b> |
|-----------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|
| 4.00                                          | 4.00                                          | 7.01                                                        |

## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Mid     | 5290               | 81.60                       | 7.01                                      | 7.01                                    | 22.99                   | 9.99                  |

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.19 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

### Output Power Results

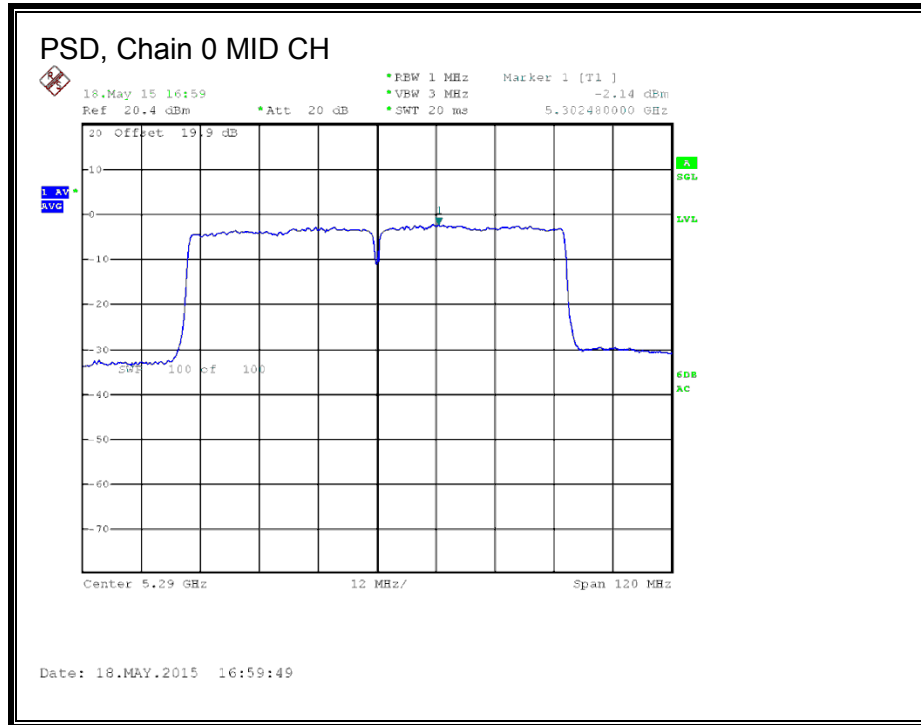
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Mid     | 5290               | 15.26                             | 15.02                             | 18.15                             | 22.99                   | -4.84                   |

### PSD Results

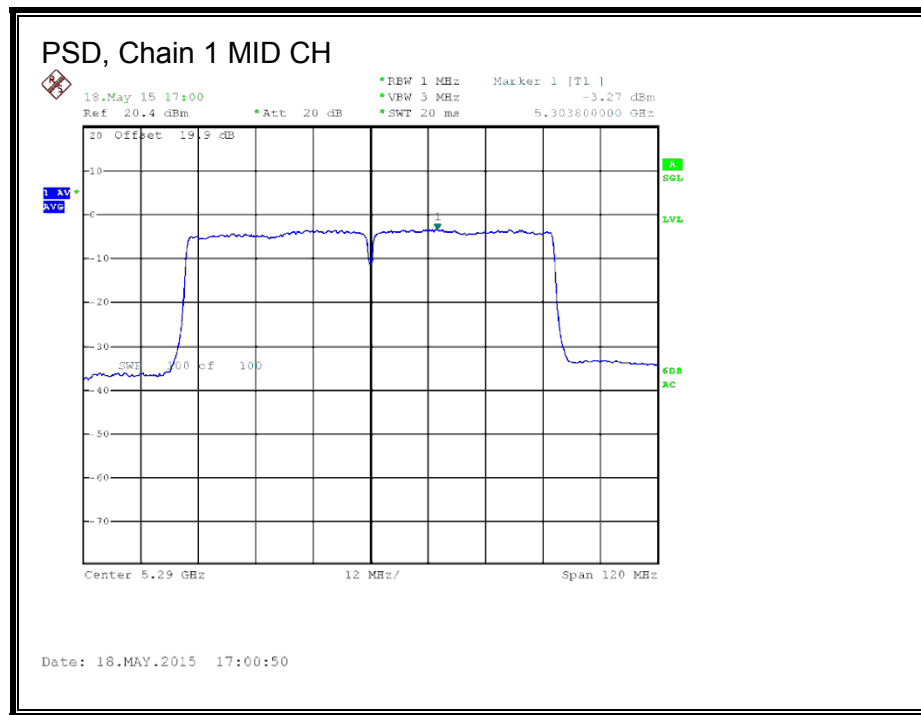
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Mid     | 5290               | -2.14                           | -3.27                           | 0.53                            | 9.99                  | -9.46                 |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

**PSD, Chain 0**



**PSD, Chain 1**



## 8.25. 802.11a LEGACY MODE IN THE 5.6 GHz BAND

### 8.25.1. 26 dB BANDWIDTH

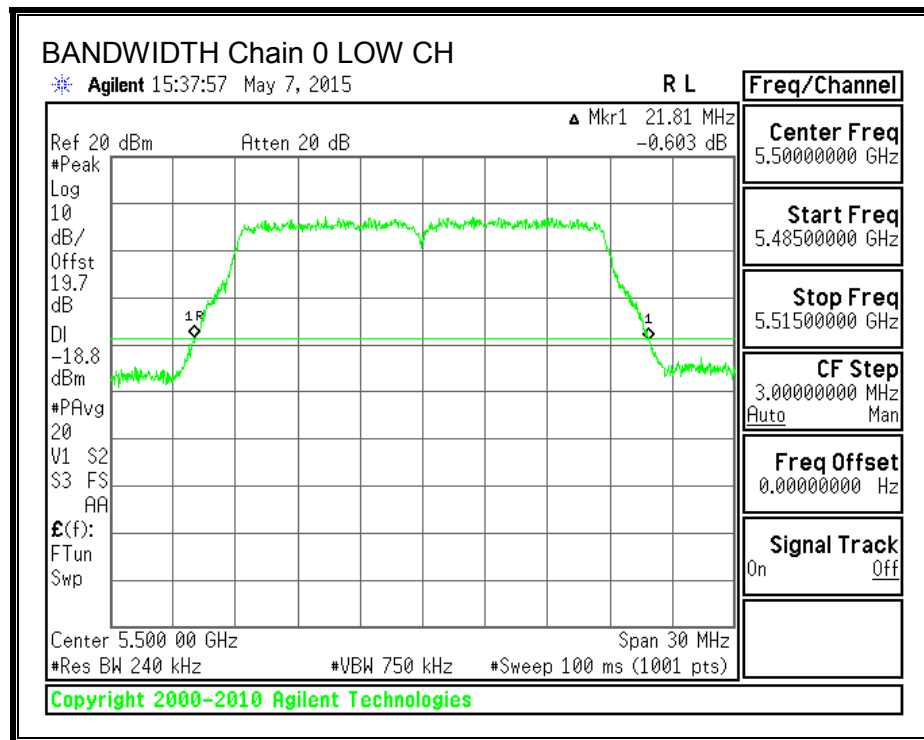
#### LIMITS

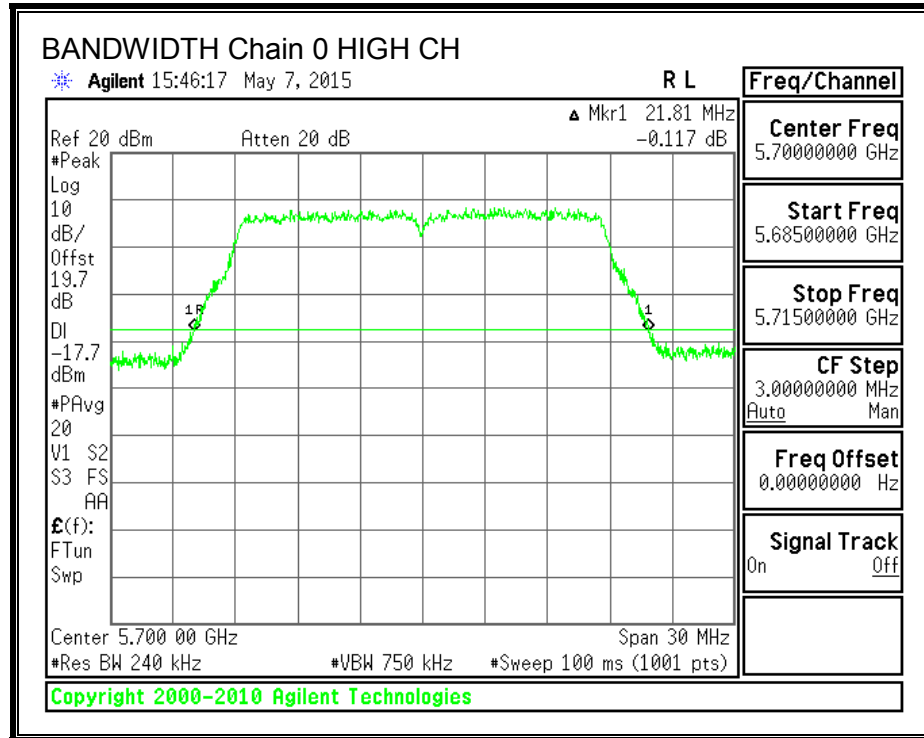
None; for reporting purposes only.

#### RESULTS

| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) |
|---------|--------------------|------------------------------|
| Low     | 5500               | 21.81                        |
| High    | 5700               | 21.81                        |

#### 26 dB BANDWIDTH, Chain 0







## **8.25.2. OUTPUT POWER**

### **LIMITS**

FCC §15.407 (a) (2)

For the band 5.47–5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , 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**

This is SISO mode, AG is the highest (worst-case) = 6 dBi

## **RESULTS**

### **Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|------------------------------|-------------------------|-----------------------|
| Low     | 5500               | 21.81                       | 6.00                         | 24.00                   | 11.00                 |
| High    | 5700               | 21.81                       | 6.00                         | 24.00                   | 11.00                 |

### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5500               | 20.11                             | 20.11                             | 24.00                   | -3.89                   |
| High    | 5700               | 17.39                             | 17.39                             | 24.00                   | -6.61                   |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## 8.26. 802.11n HT20 SISO MODE IN THE 5.6 GHz BAND

### 8.26.1. 26 dB BANDWIDTH

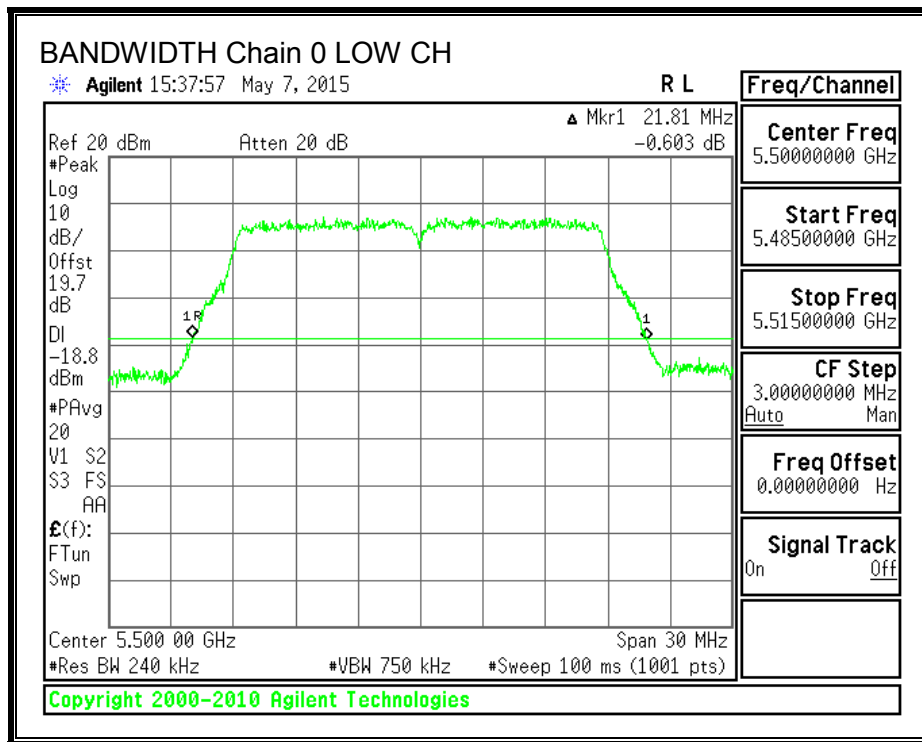
#### LIMITS

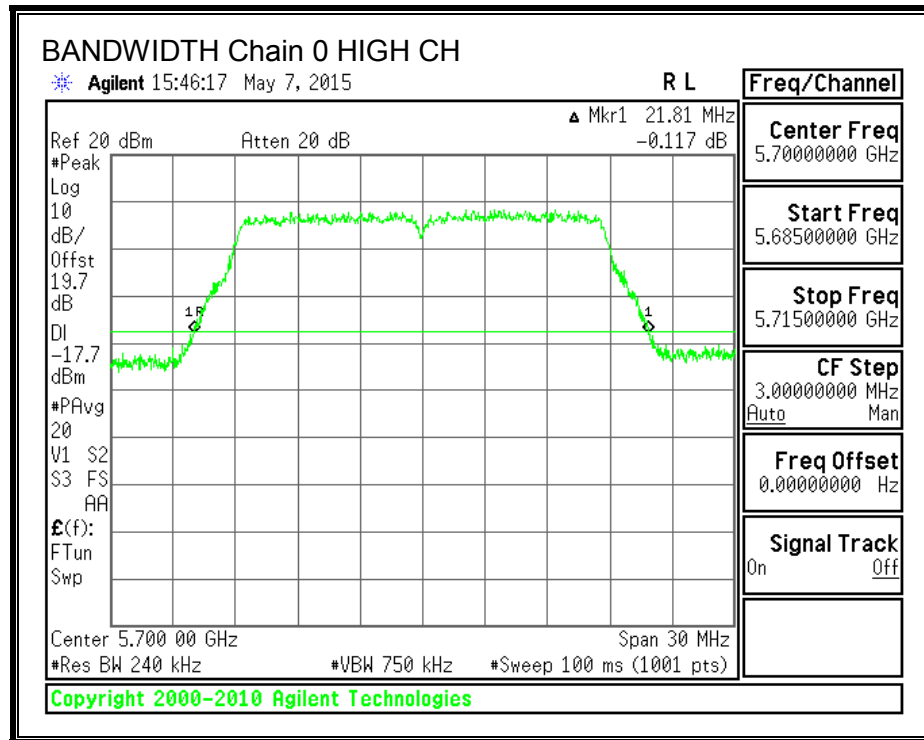
None; for reporting purposes only.

#### RESULTS

| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) |
|---------|--------------------|------------------------------|
| Low     | 5500               | 21.81                        |
| High    | 5700               | 21.81                        |

#### 26 dB BANDWIDTH, Chain 0





## **8.26.2. OUTPUT POWER**

### **LIMITS**

FCC §15.407 (a) (2)

For the band 5.47–5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , 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**

This is SISO mode, AG is the highest (worst-case) = 6 dBi

## **RESULTS**

### **Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|------------------------------|-------------------------|-----------------------|
| Low     | 5500               | 21.81                       | 6.00                         | 24.00                   | 11.00                 |
| High    | 5700               | 21.81                       | 6.00                         | 24.00                   | 11.00                 |

### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5500               | 19.55                             | 19.55                             | 24.00                   | -4.45                   |
| High    | 5700               | 17.12                             | 17.12                             | 24.00                   | -6.88                   |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## 8.27. 802.11n HT20 CDD 2Tx MODE IN THE 5.6 GHz BAND

### 8.27.1. 26 dB BANDWIDTH

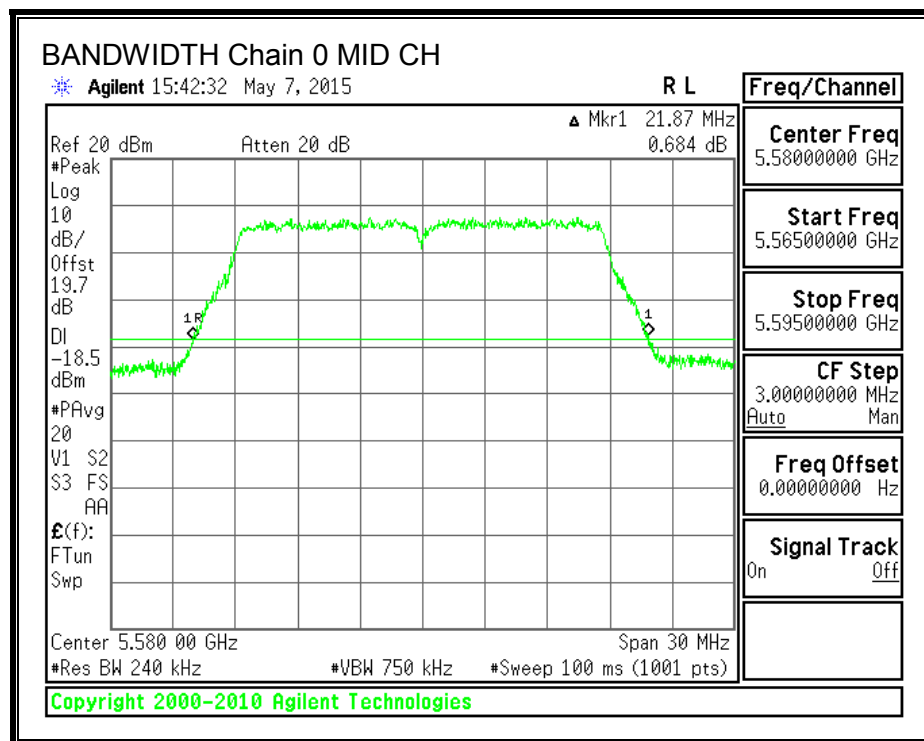
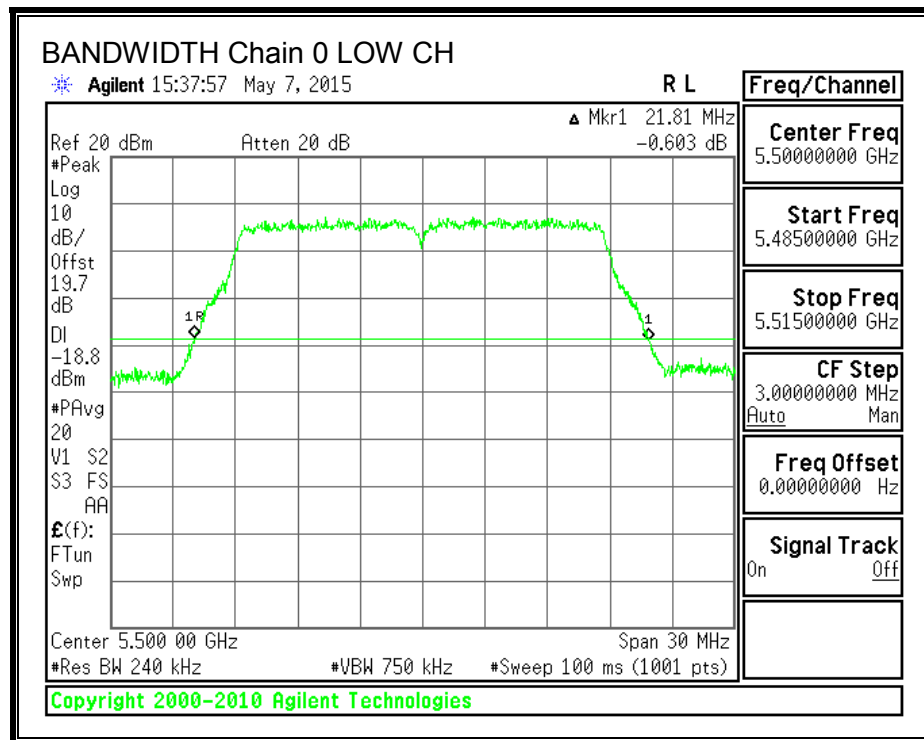
#### LIMITS

None; for reporting purposes only.

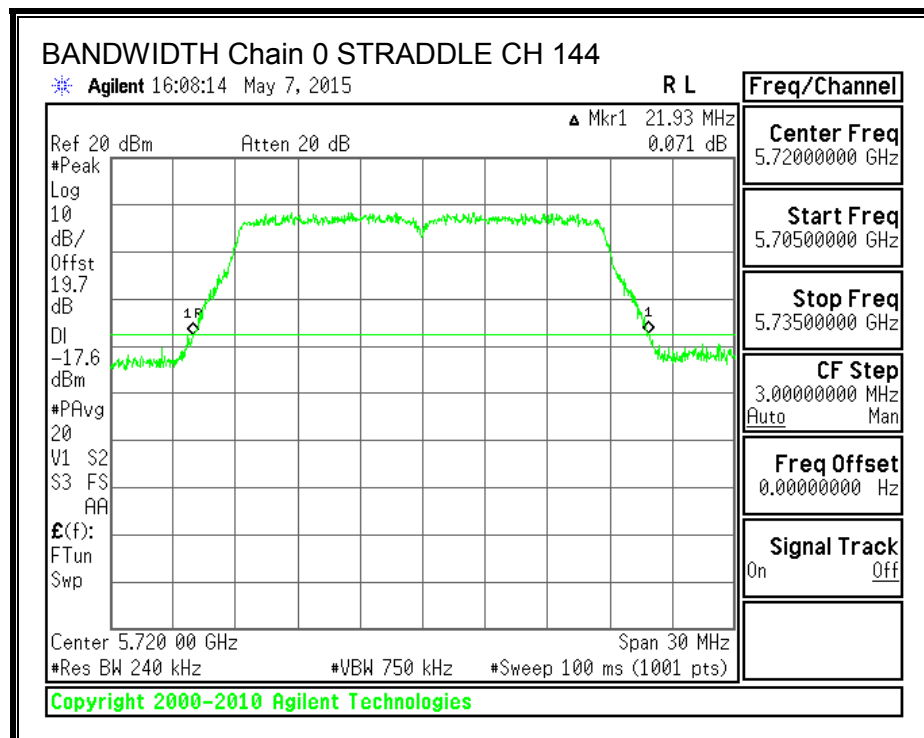
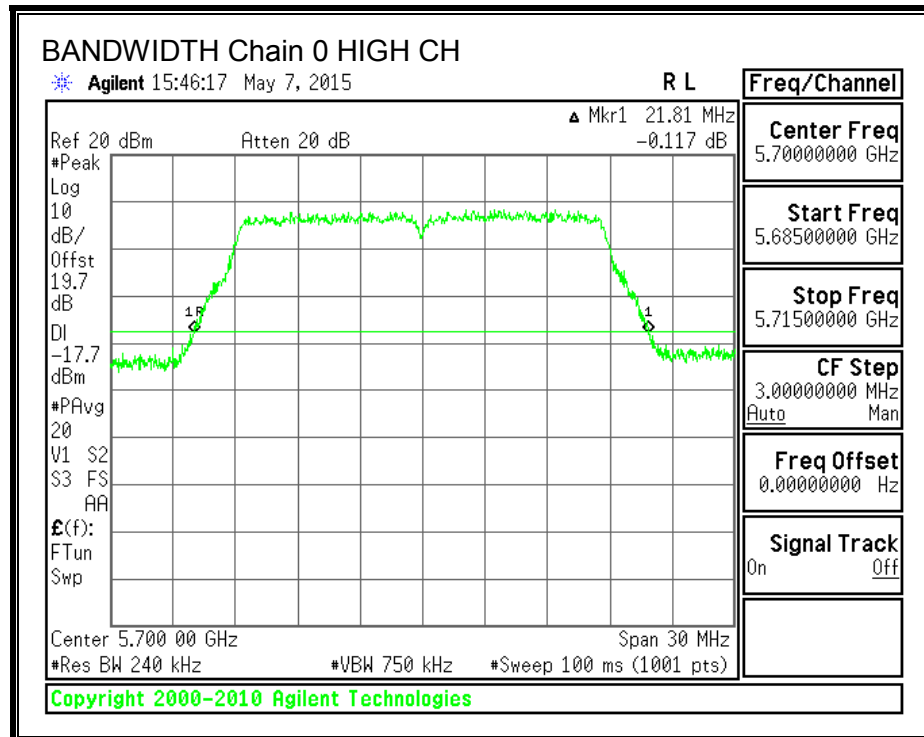
#### RESULTS

| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) | 26 dB BW<br>Chain 1<br>(MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low     | 5500               | 21.81                        | 21.81                        |
| Mid     | 5580               | 21.87                        | 21.75                        |
| High    | 5700               | 21.81                        | 21.90                        |
| 144     | 5720               | 21.93                        | 21.78                        |

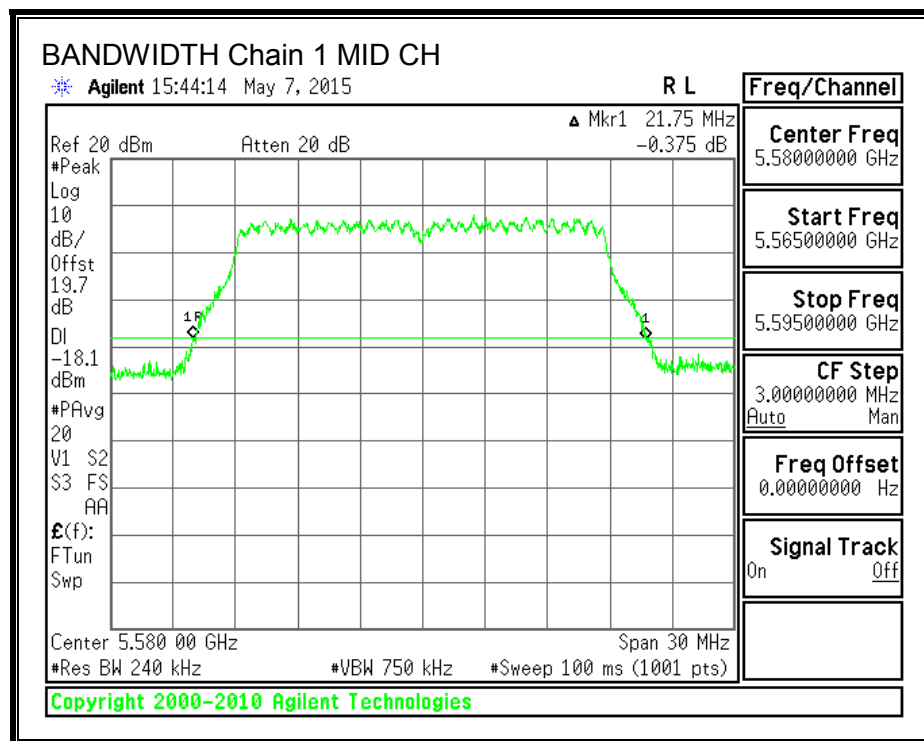
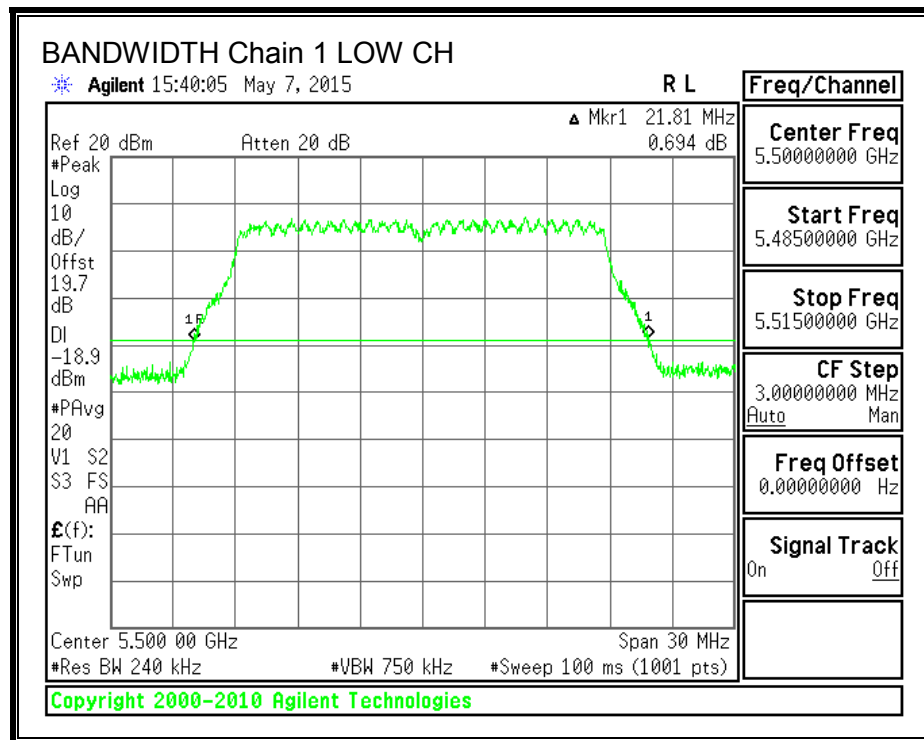
**26 dB BANDWIDTH, Chain 0**

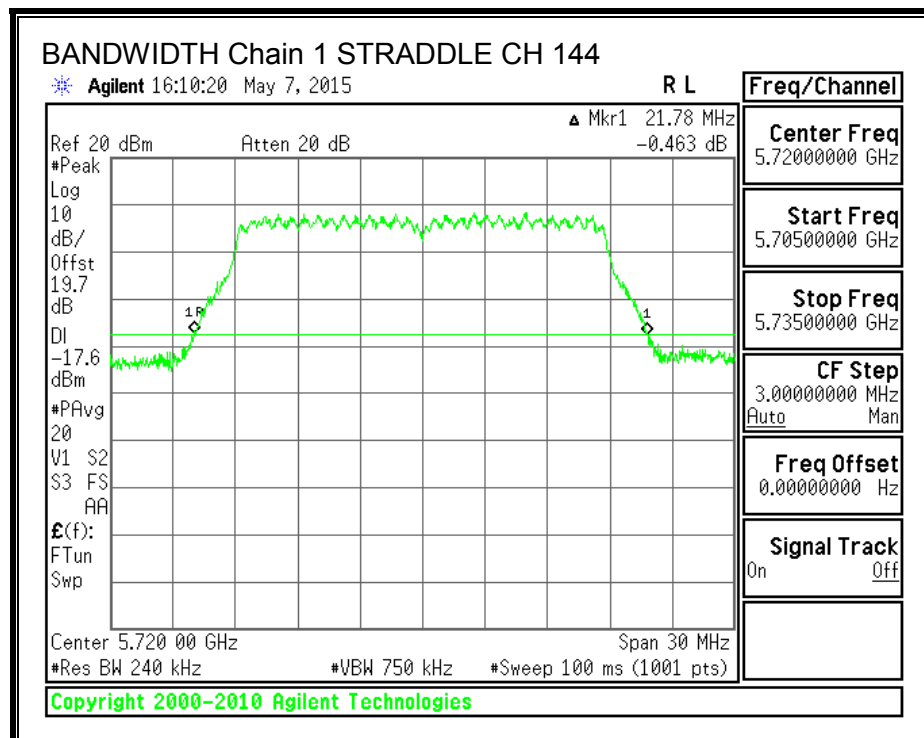
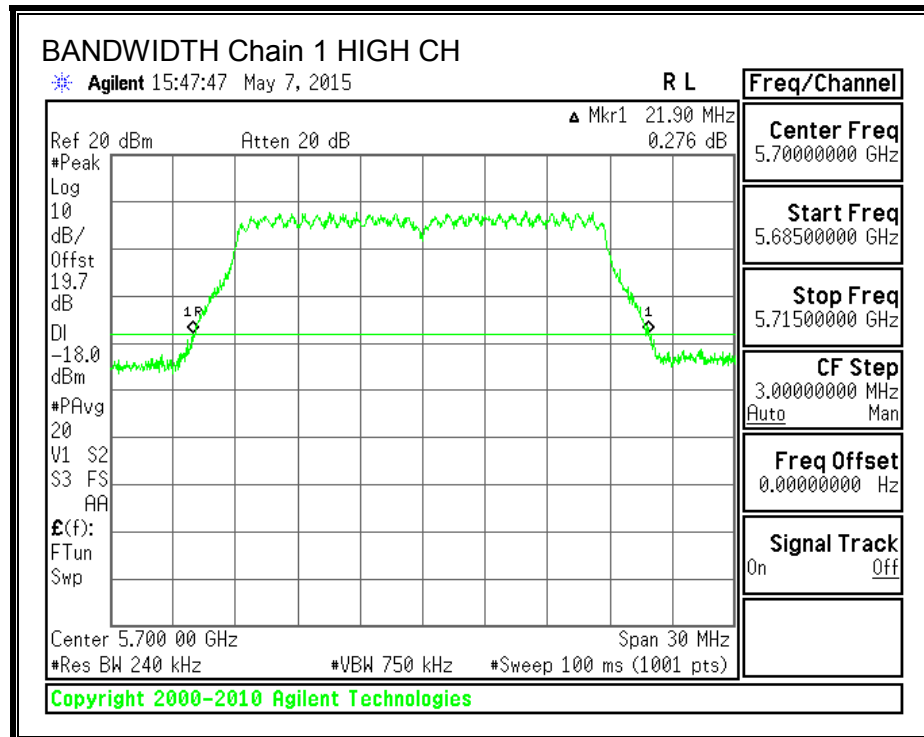






**26 dB BANDWIDTH, Chain 1**





## 8.27.2. 99% BANDWIDTH

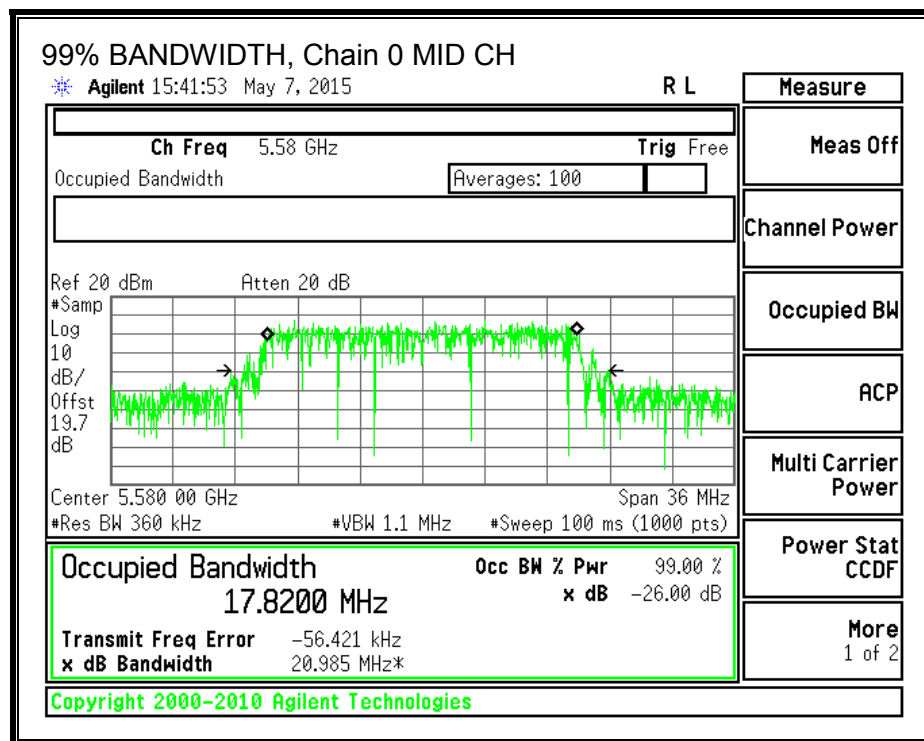
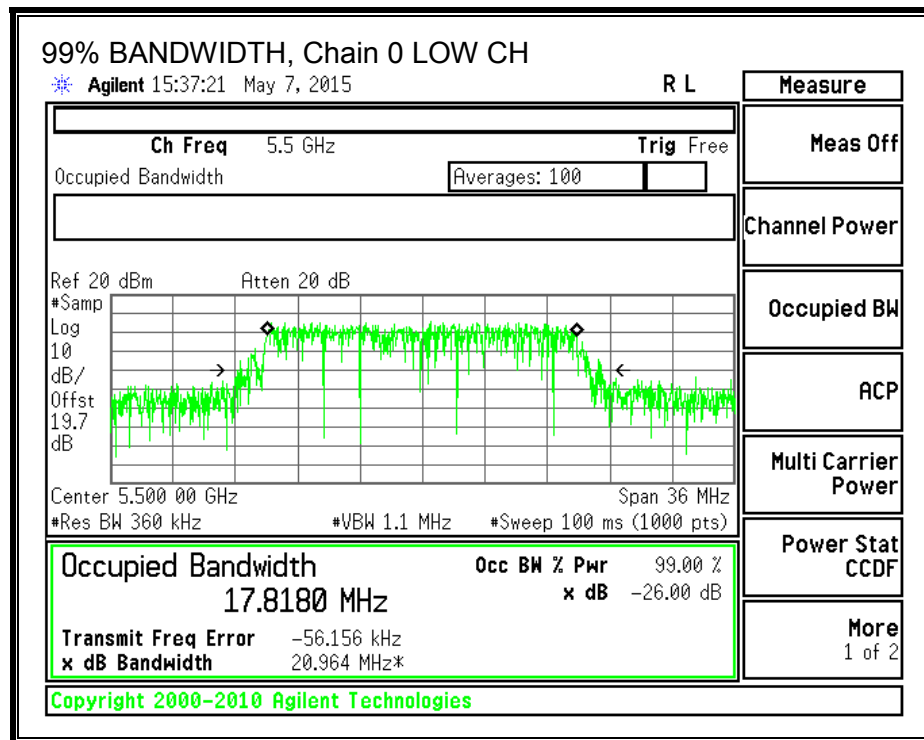
### LIMITS

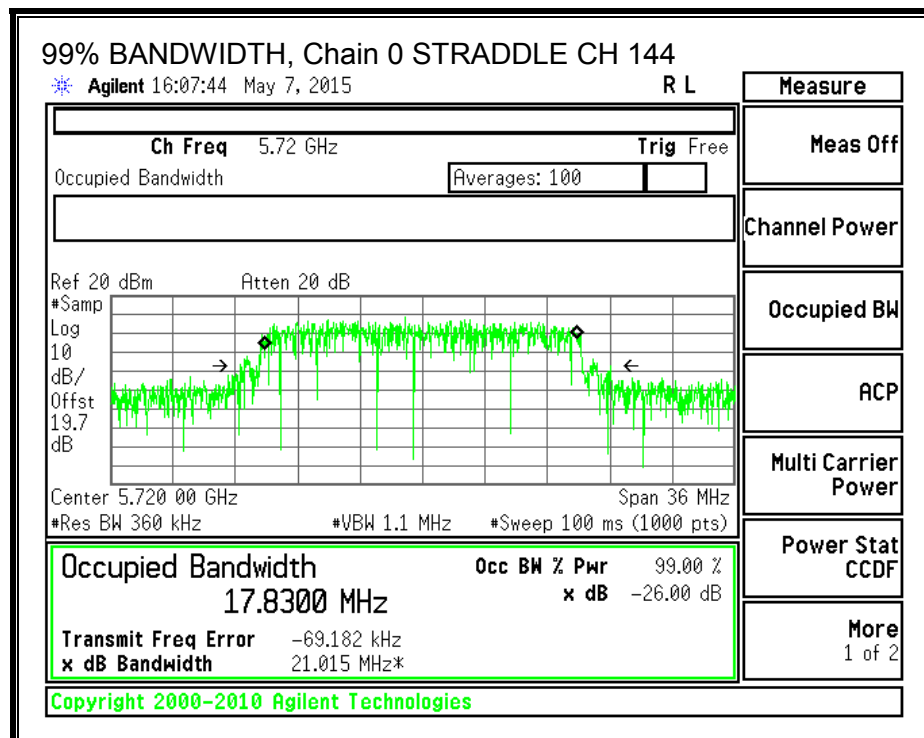
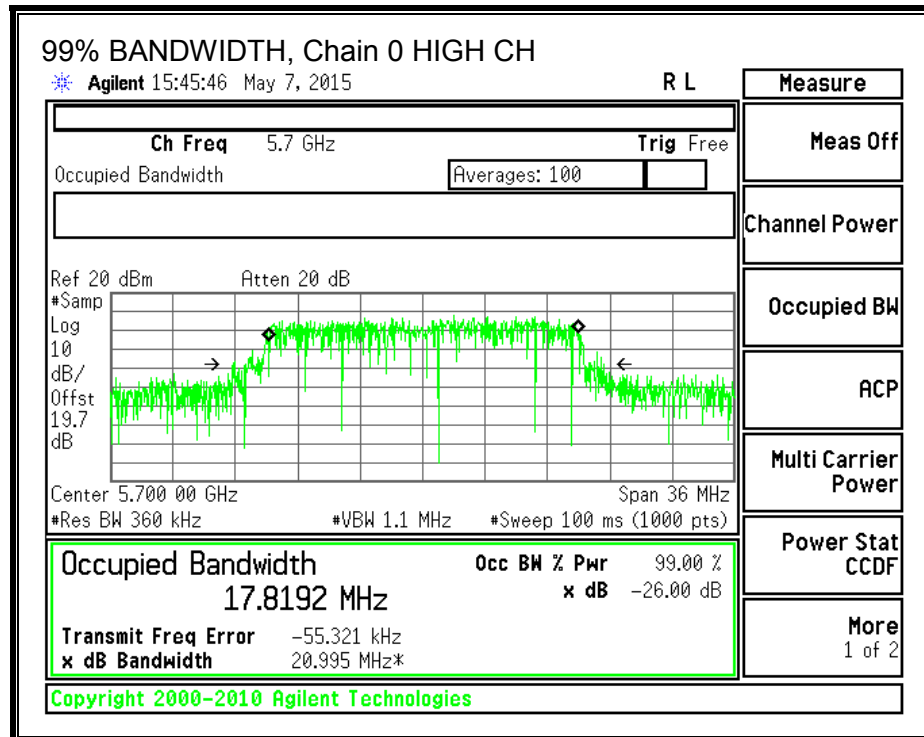
None; for reporting purposes only.

### RESULTS

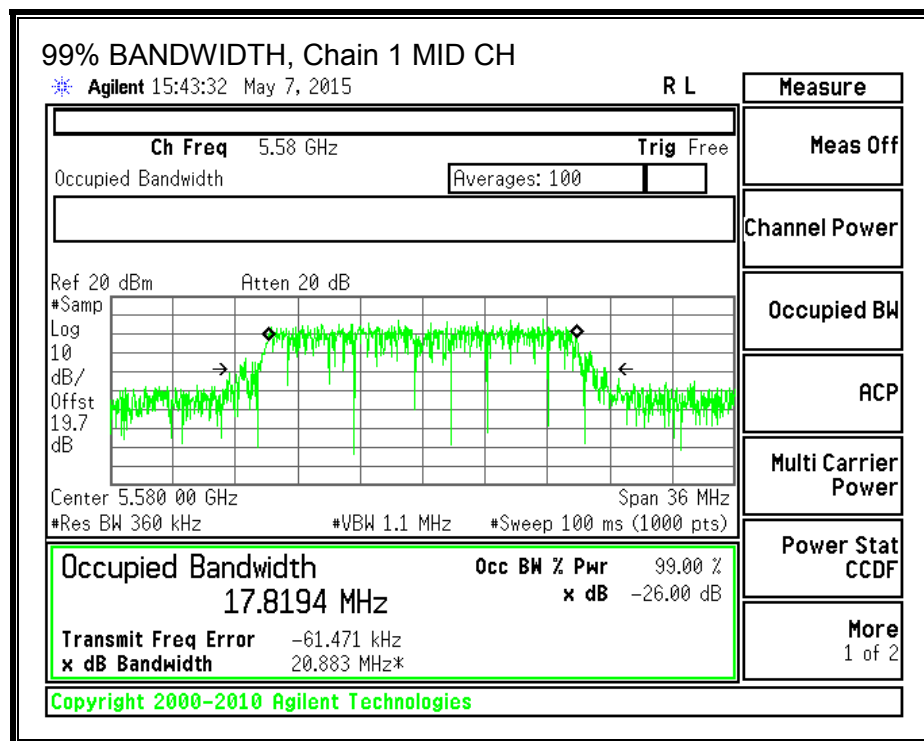
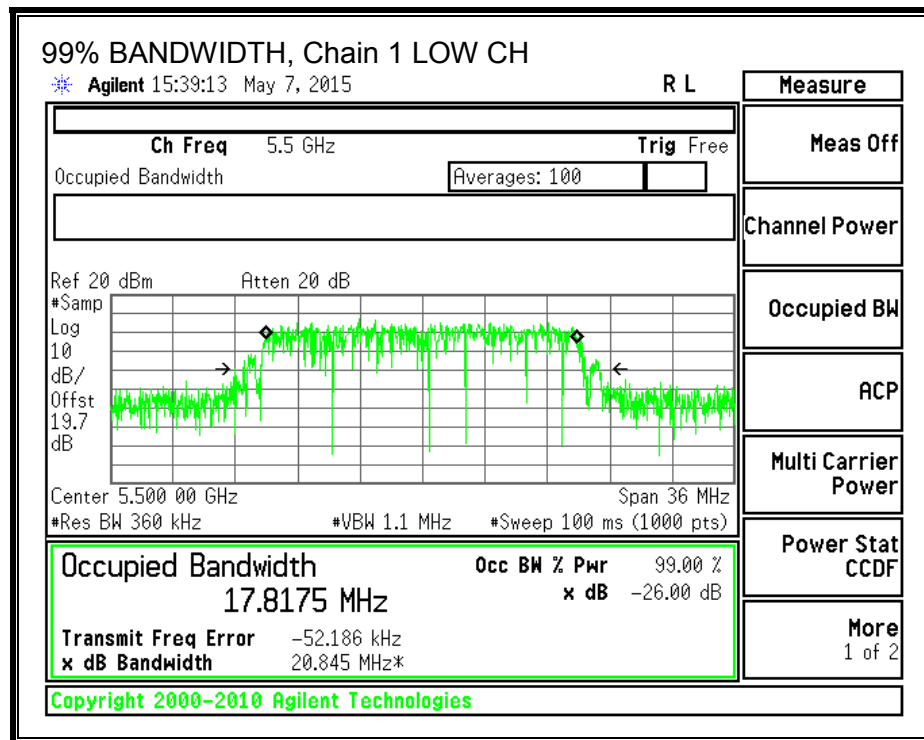
| Channel | Frequency<br>(MHz) | 99% BW<br>Chain 0<br>(MHz) | 99% BW<br>Chain 1<br>(MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low     | 5500               | 17.8180                    | 17.8175                    |
| Mid     | 5580               | 17.8200                    | 17.8194                    |
| High    | 5700               | 17.8192                    | 17.8031                    |
| 144     | 5720               | 17.8300                    | 17.8176                    |

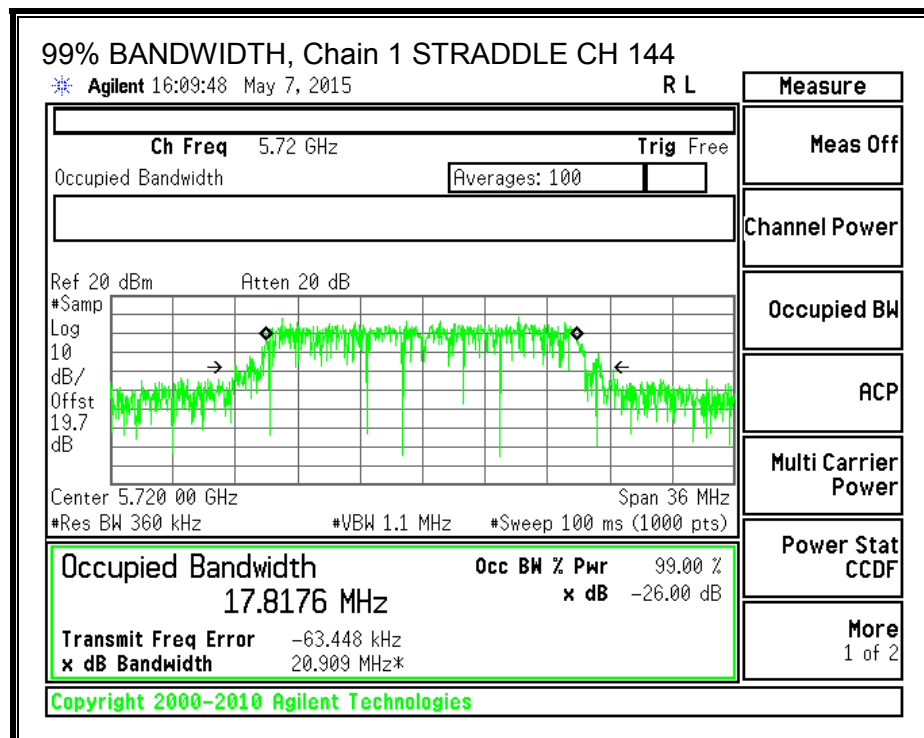
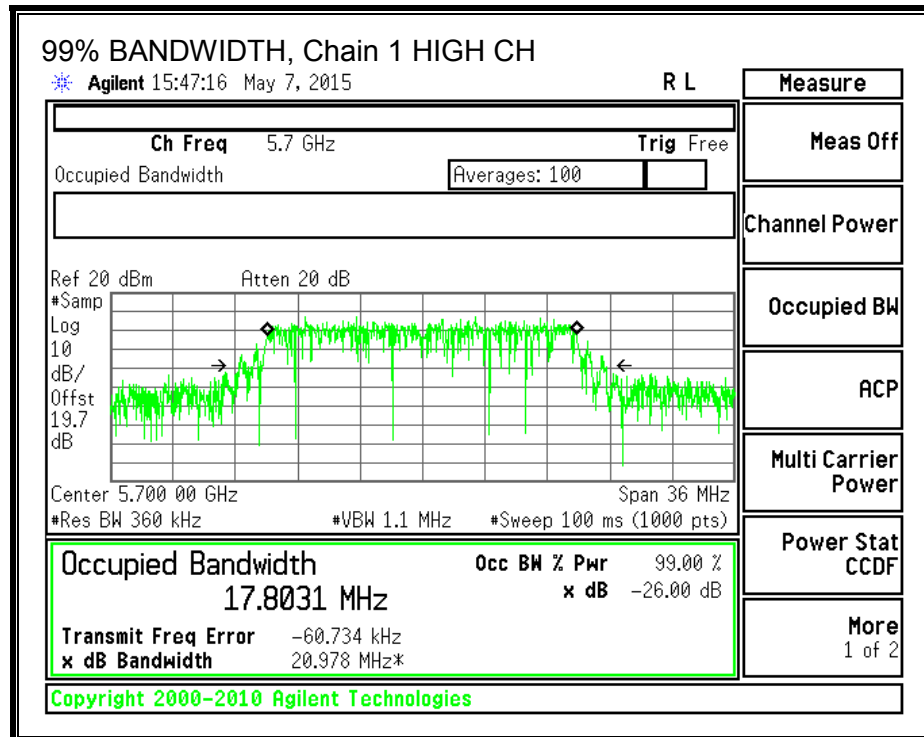
**99% BANDWIDTH, Chain 0**





**99% BANDWIDTH, Chain 1**







### 8.27.3. OUTPUT POWER AND PSD

#### LIMITS

FCC §15.407 (a) (2)

For the band 5.47–5.725 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 power, the TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Uncorrelated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|-----------------------------------------------------|
| 6.00                                | 6.00                                | 6.00                                                |

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

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Correlated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|---------------------------------------------------|
| 6.00                                | 6.00                                | 9.01                                              |

## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5500               | 21.81                       | 6.00                                      | 9.01                                    | 24.00                   | 7.99                  |
| Mid     | 5580               | 21.75                       | 6.00                                      | 9.01                                    | 24.00                   | 7.99                  |
| High    | 5700               | 21.81                       | 6.00                                      | 9.01                                    | 24.00                   | 7.99                  |

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

### Output Power Results

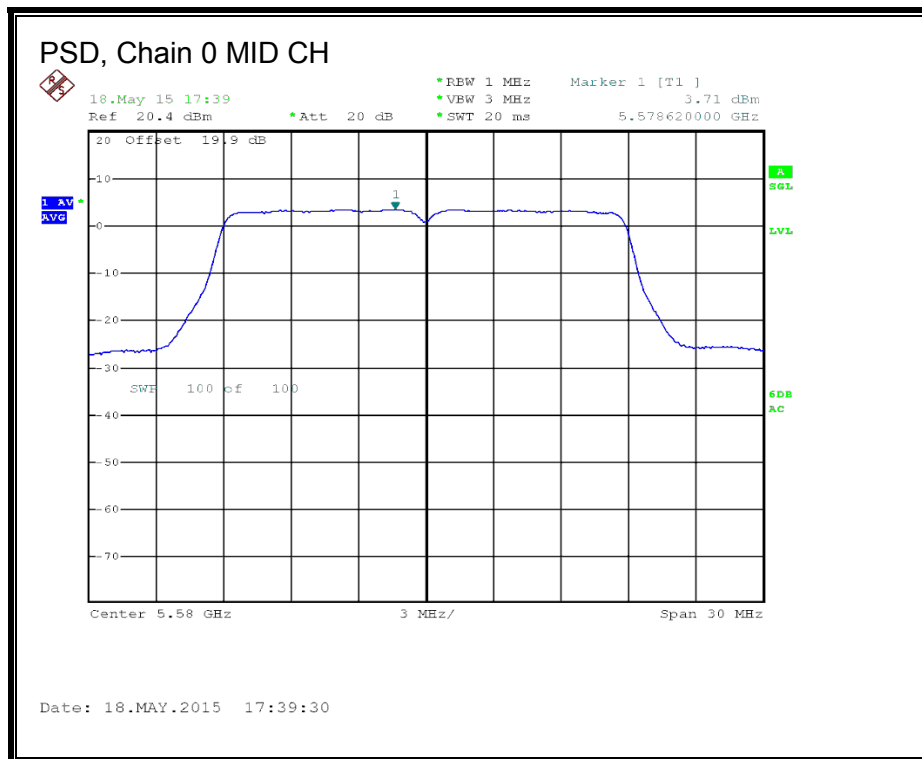
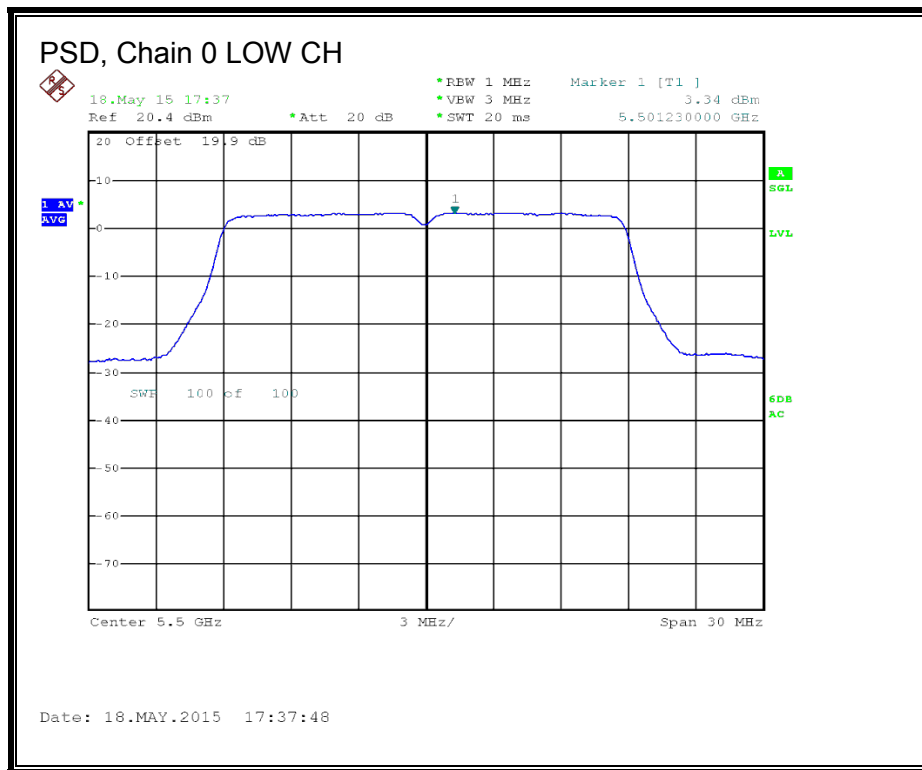
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5500               | 17.67                             | 17.65                             | 20.67                             | 24.00                   | -3.33                   |
| Mid     | 5580               | 19.45                             | 19.00                             | 22.24                             | 24.00                   | -1.76                   |
| High    | 5700               | 16.32                             | 15.87                             | 19.11                             | 24.00                   | -4.89                   |

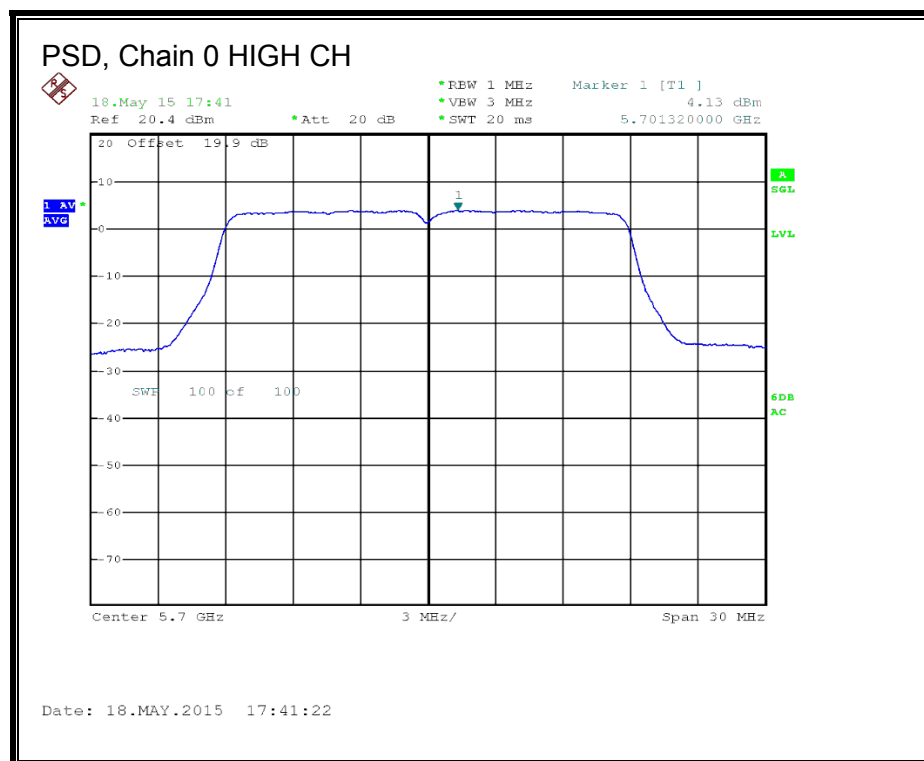
### PSD Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5500               | 3.34                            | 3.02                            | 6.19                            | 7.99                  | -1.80                 |
| Mid     | 5580               | 3.71                            | 3.20                            | 6.47                            | 7.99                  | -1.52                 |
| High    | 5700               | 4.13                            | 3.60                            | 6.88                            | 7.99                  | -1.11                 |

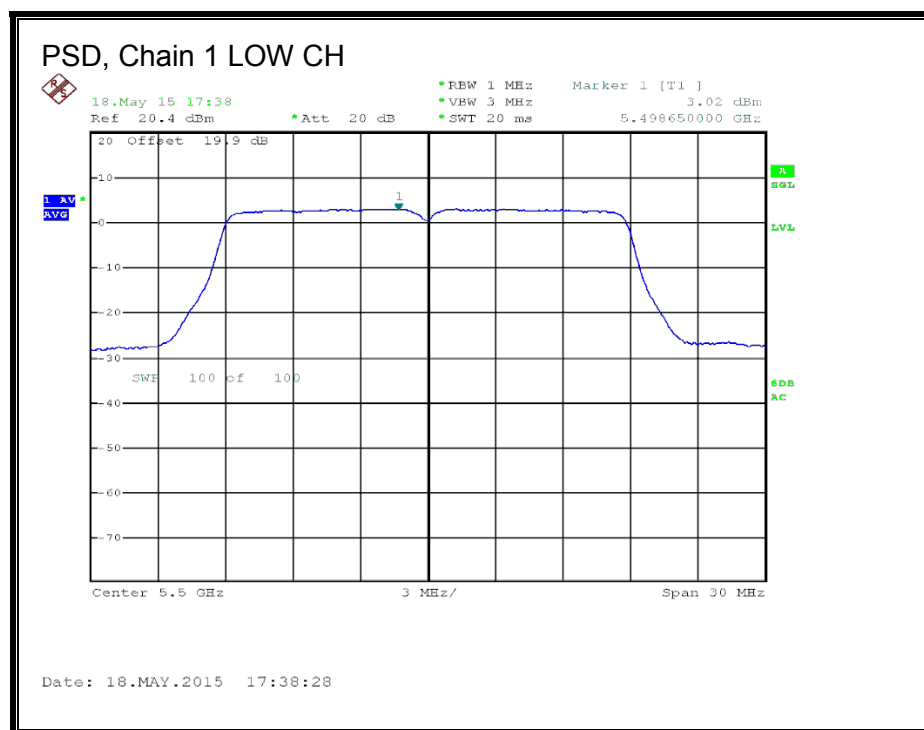
**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

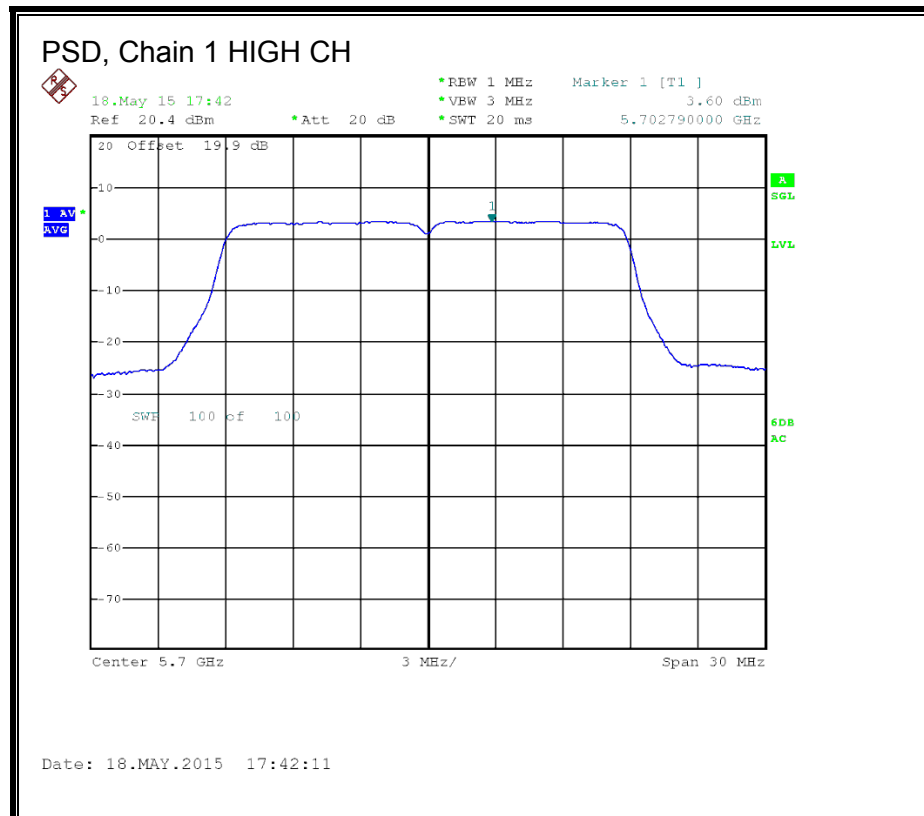
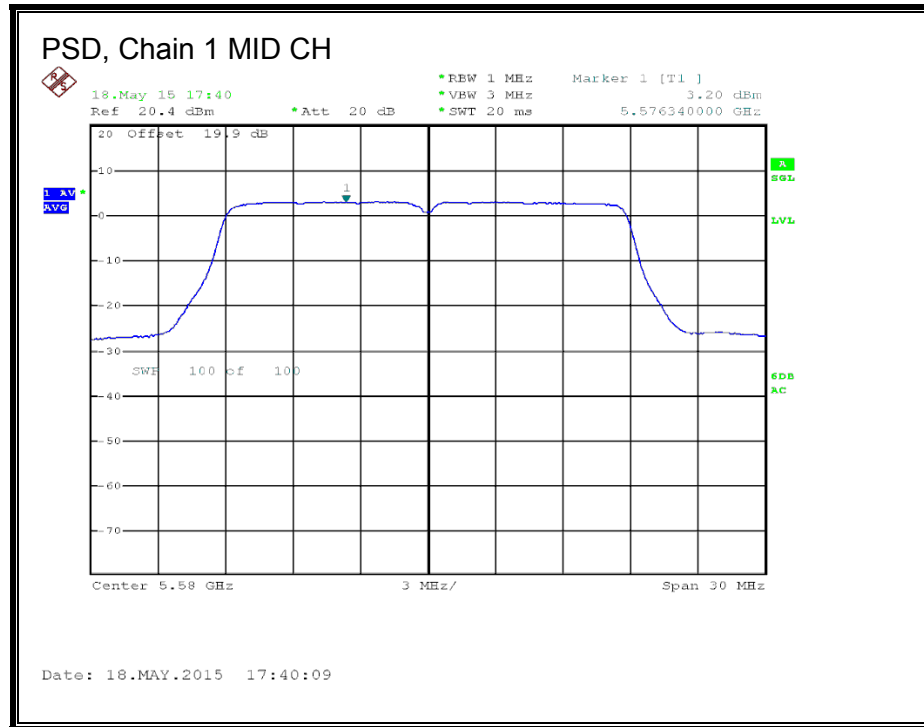
**PSD, Chain 0**





### PSD, Chain 1





## **STRADDLE CHANNEL 144 RESULTS**

### **UNII-2C BAND**

#### **Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| 144     | 5720               | 15.89                       | 6.00                                      | 9.01                                    | 23.01                   | 7.99                  |

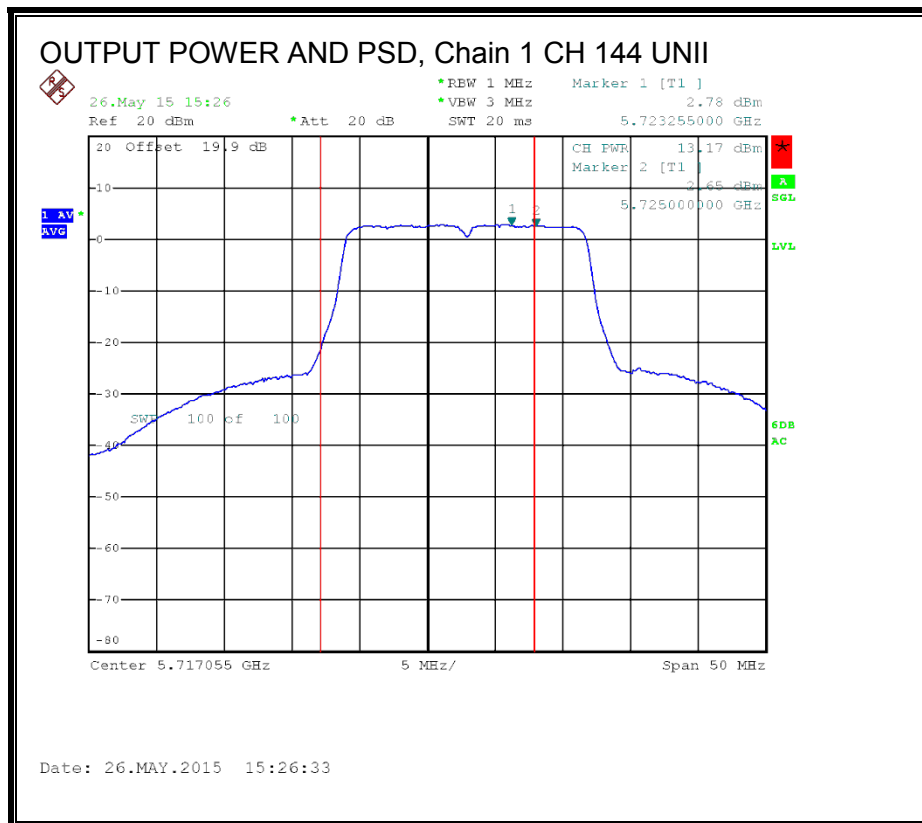
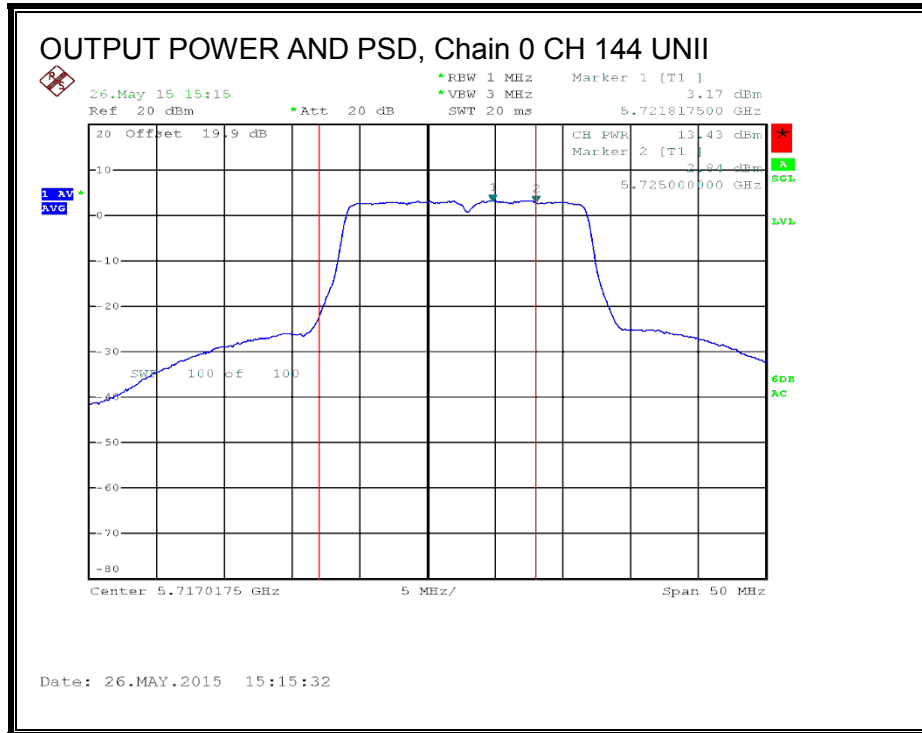
|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

#### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| 144     | 5720               | 13.43                             | 13.17                             | 16.31                             | 23.01                   | -6.70                   |

#### **PSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| 144     | 5720               | 3.17                            | 2.78                            | 5.99                            | 7.99                  | -2.00                 |



**UNII-3 BAND**

**Antenna Gain and Limit**

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| 144     | 5720               | 4.70                                      | 7.71                                    | 30.00                   | 28.29                 |

|                    |      |                                                |
|--------------------|------|------------------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd Power & PSD |
|--------------------|------|------------------------------------------------|

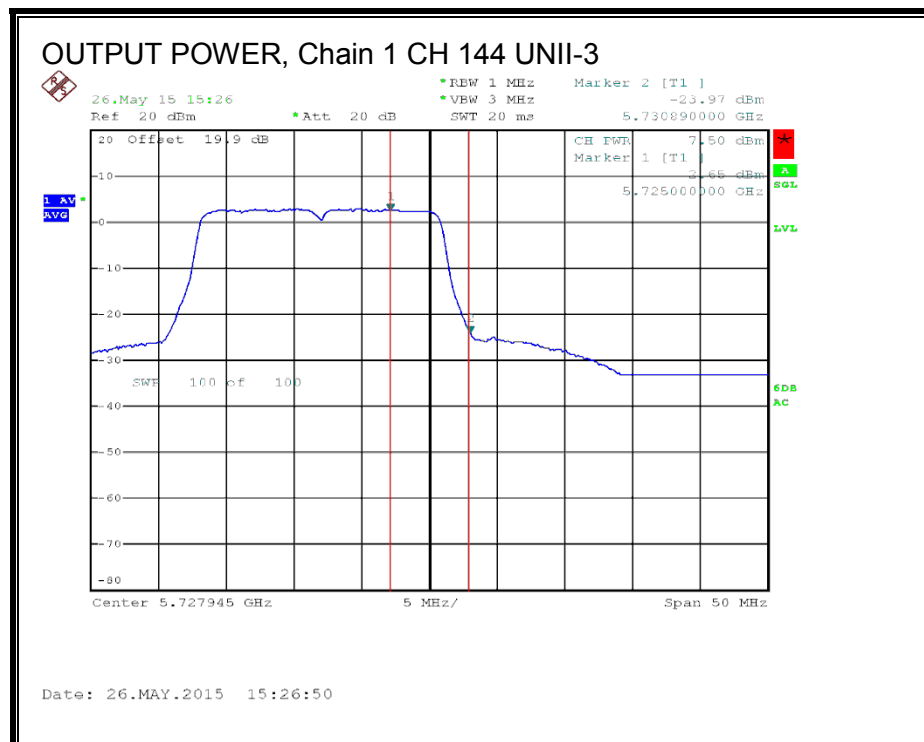
**Output Power Results**

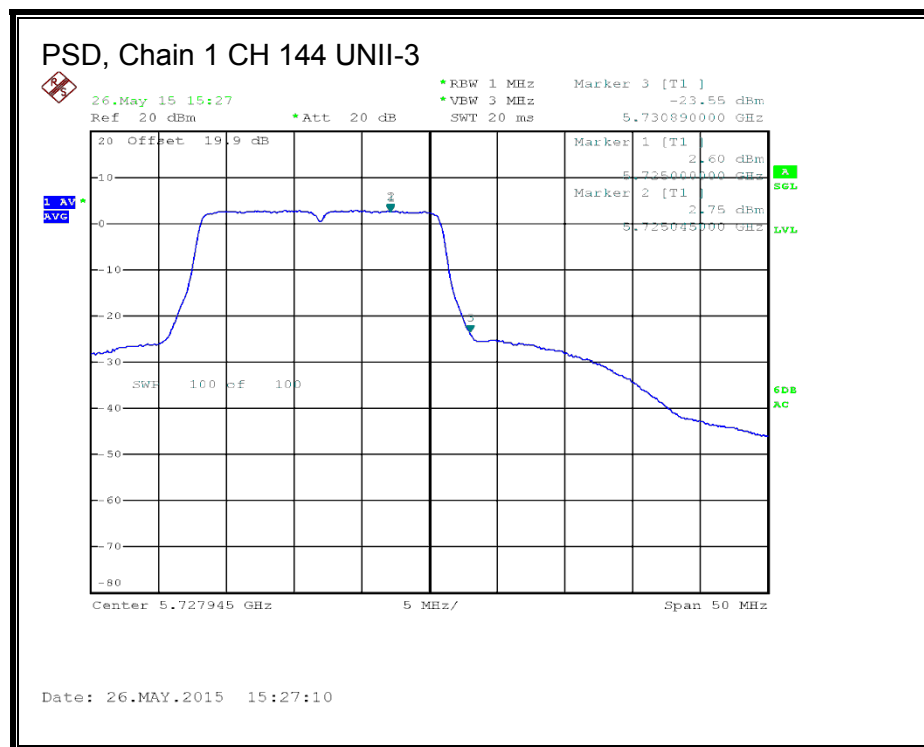
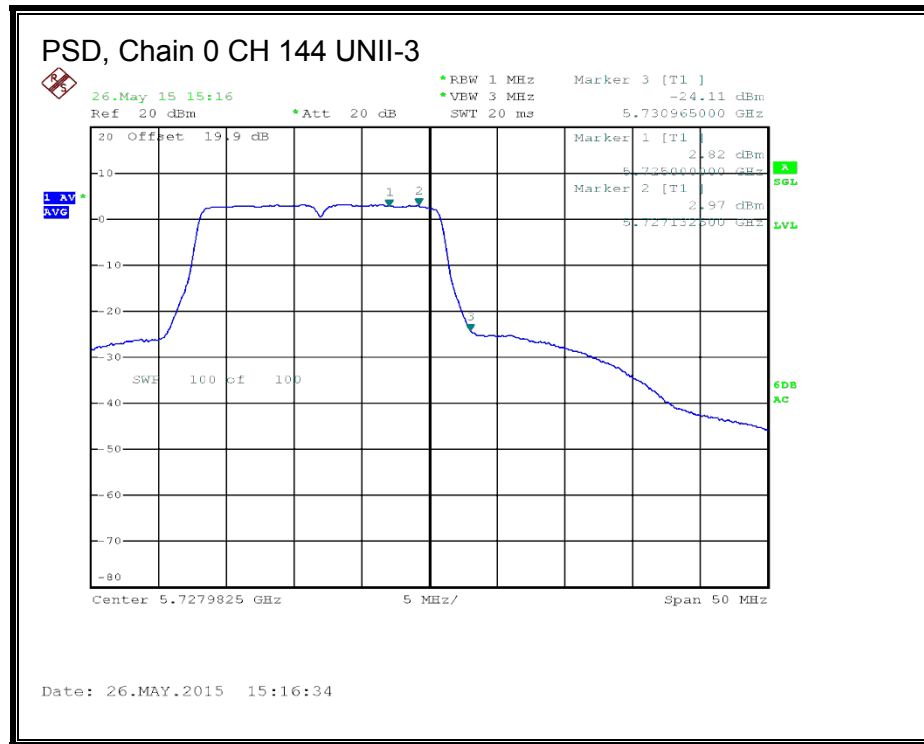
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| 144     | 5720               | 7.85                              | 7.50                              | 10.69                             | 30.00                   | -19.31                  |

**PSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| 144     | 5720               | 2.97                            | 2.75                            | 5.87                            | 28.29                 | -22.42                |







## 8.27.4. AVERAGE OUTPUT POWER (WHOLE FUNDAMENTAL)

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

### RESULTS

#### Output Power Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| 144     | 5720               | 19.40                             | 18.80                             | 22.12                             |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## **8.28. 802.11n HT20 STBC 2Tx MODE IN THE 5.6 GHz BAND**

### **8.28.1. 26 dB BANDWIDTH**

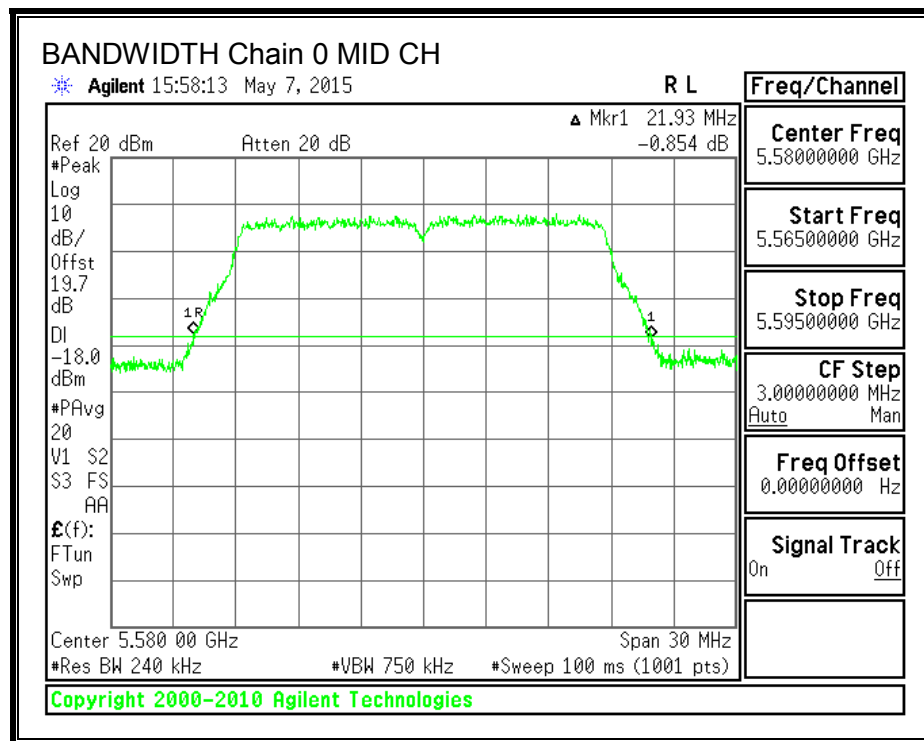
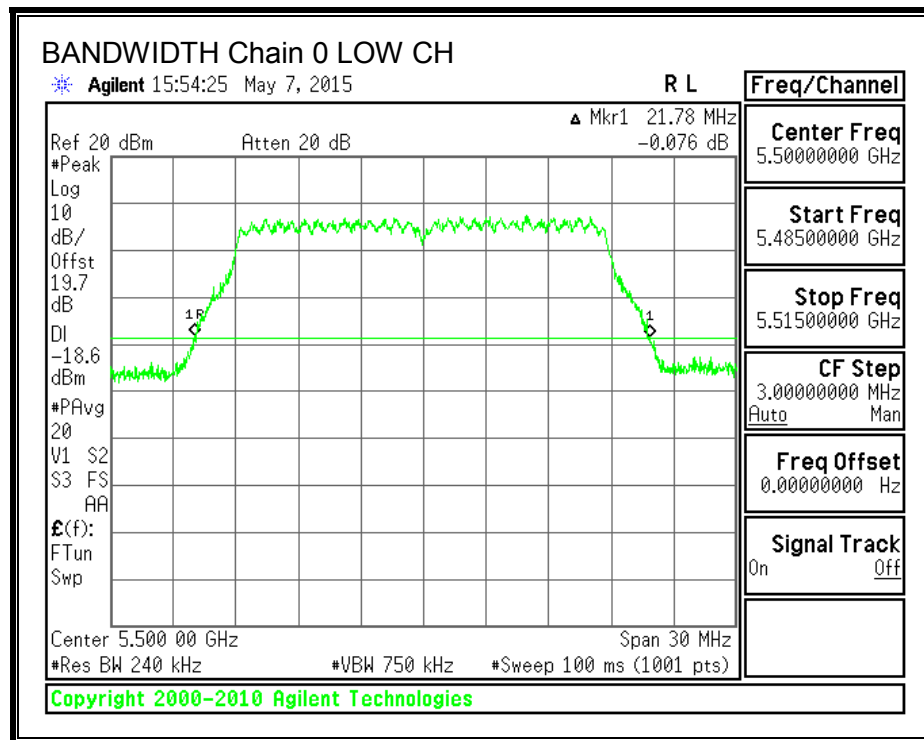
#### **LIMITS**

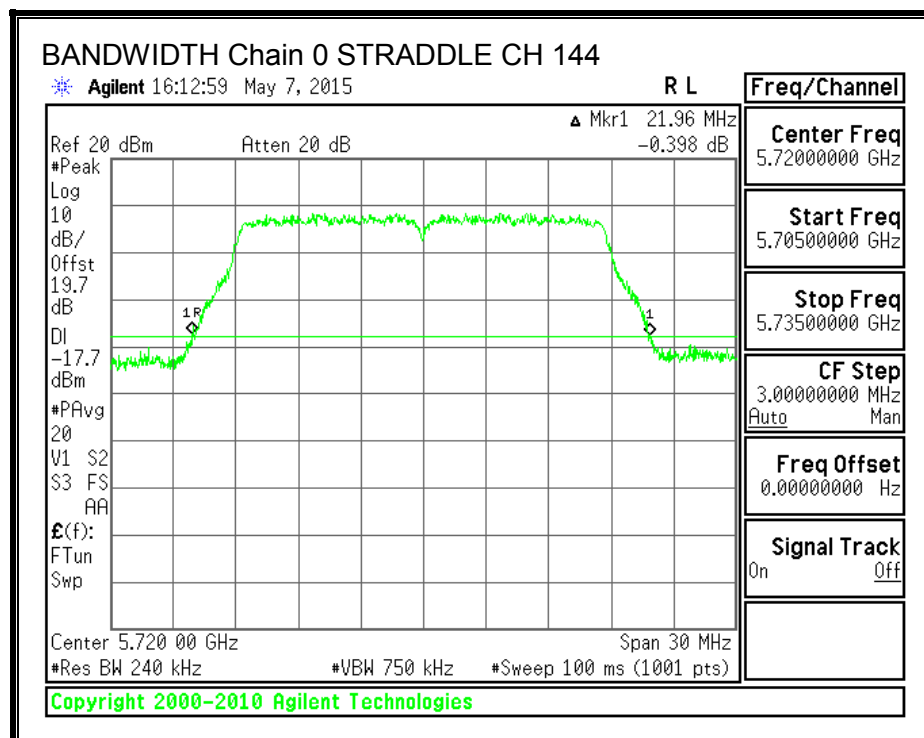
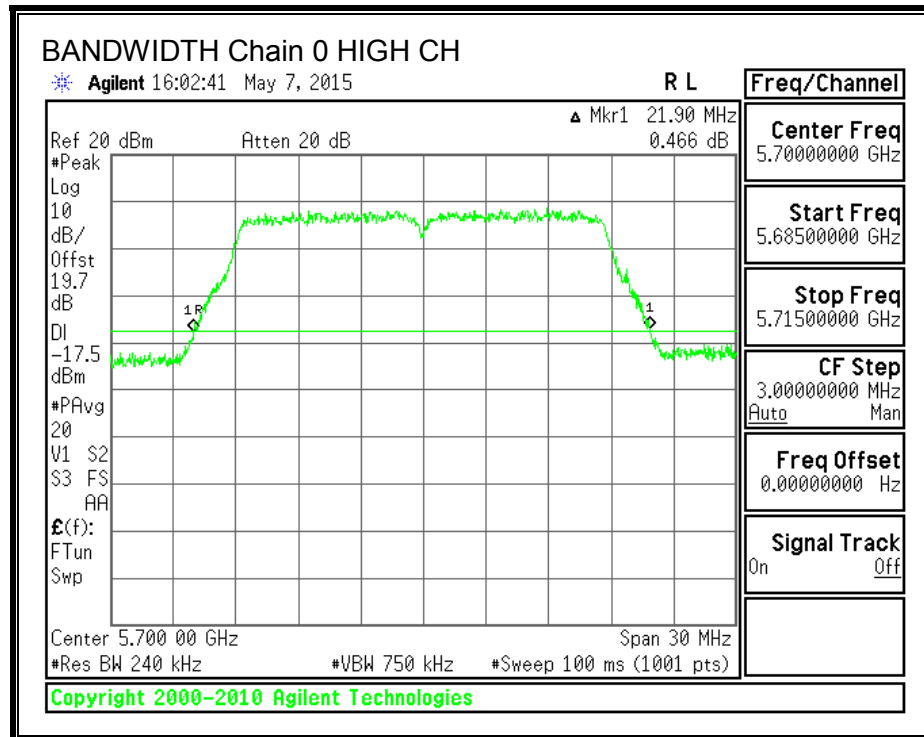
None; for reporting purposes only.

#### **RESULTS**

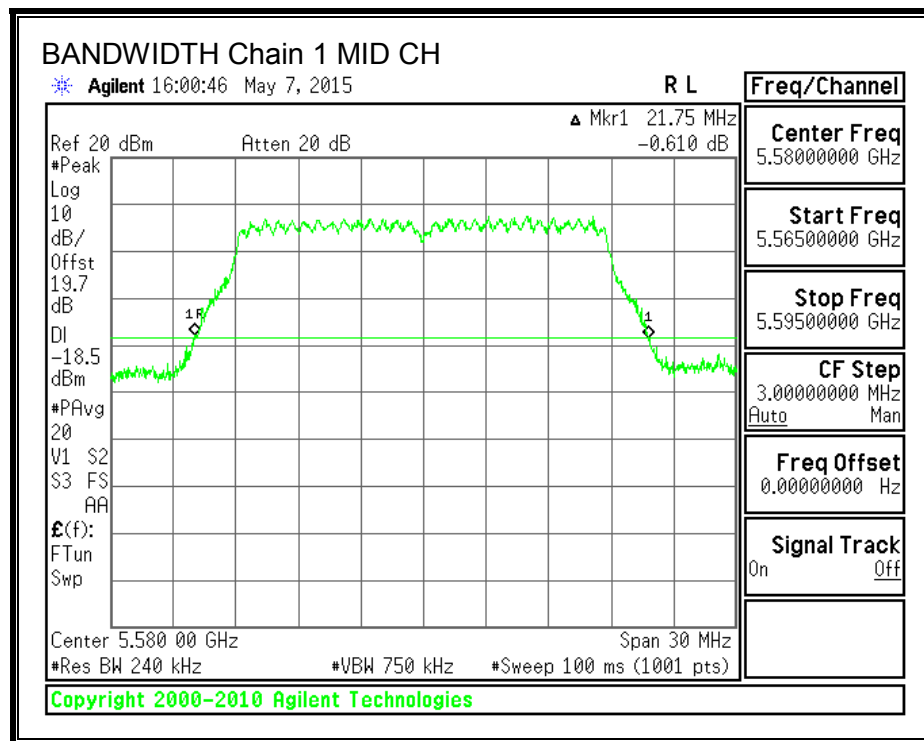
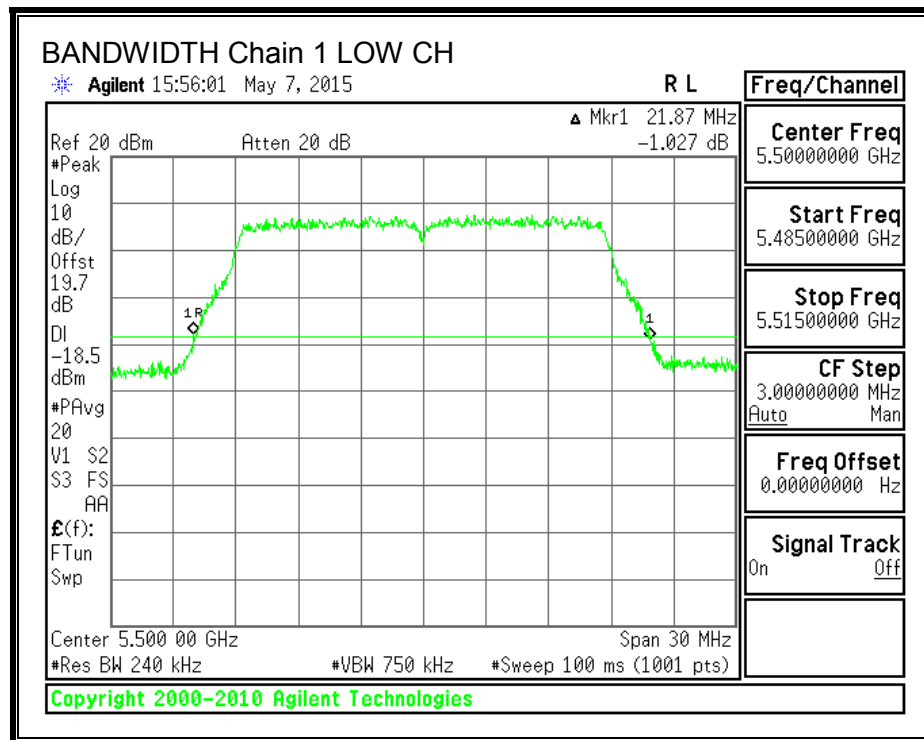
| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) | 26 dB BW<br>Chain 1<br>(MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low     | 5500               | 21.78                        | 21.78                        |
| Mid     | 5580               | 21.93                        | 21.75                        |
| High    | 5700               | 21.90                        | 21.87                        |
| 144     | 5720               | 21.96                        | 21.84                        |

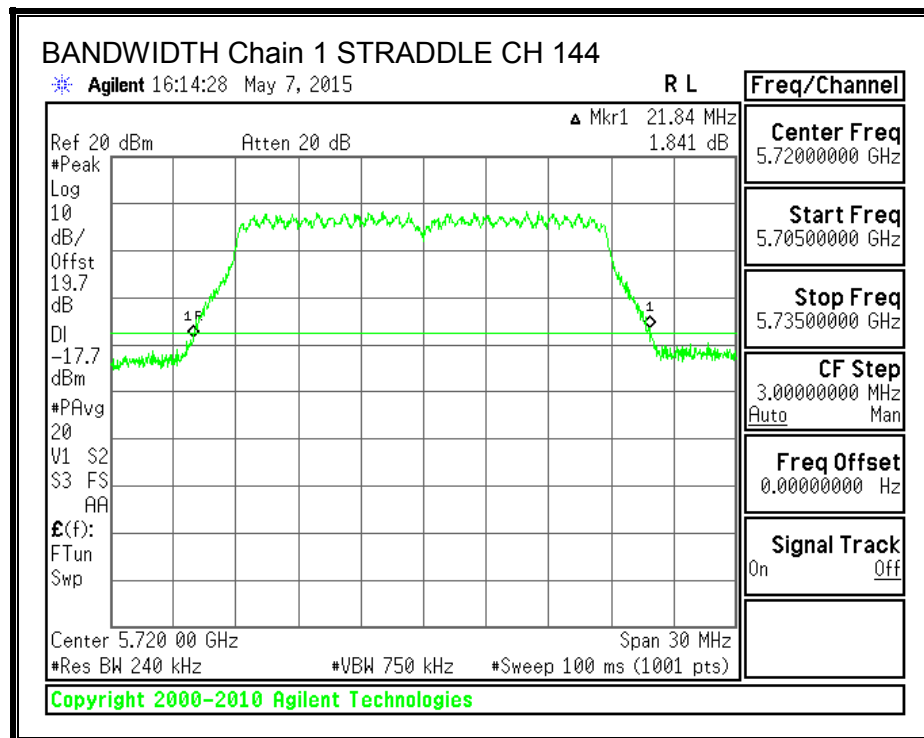
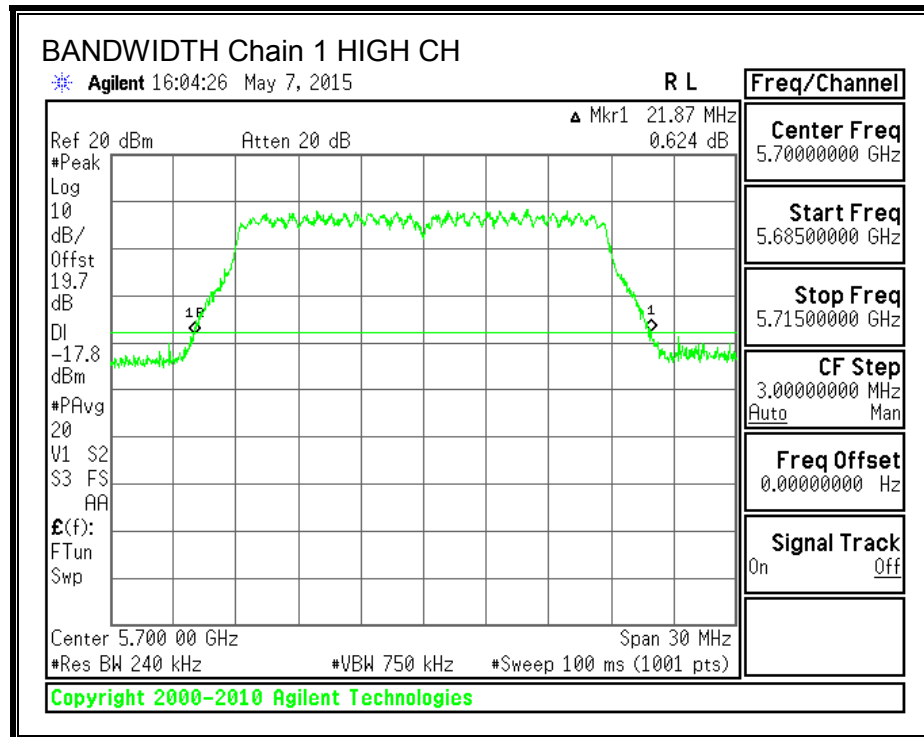
**26 dB BANDWIDTH, Chain 0**





**26 dB BANDWIDTH, Chain 1**







## 8.28.2. 99% BANDWIDTH

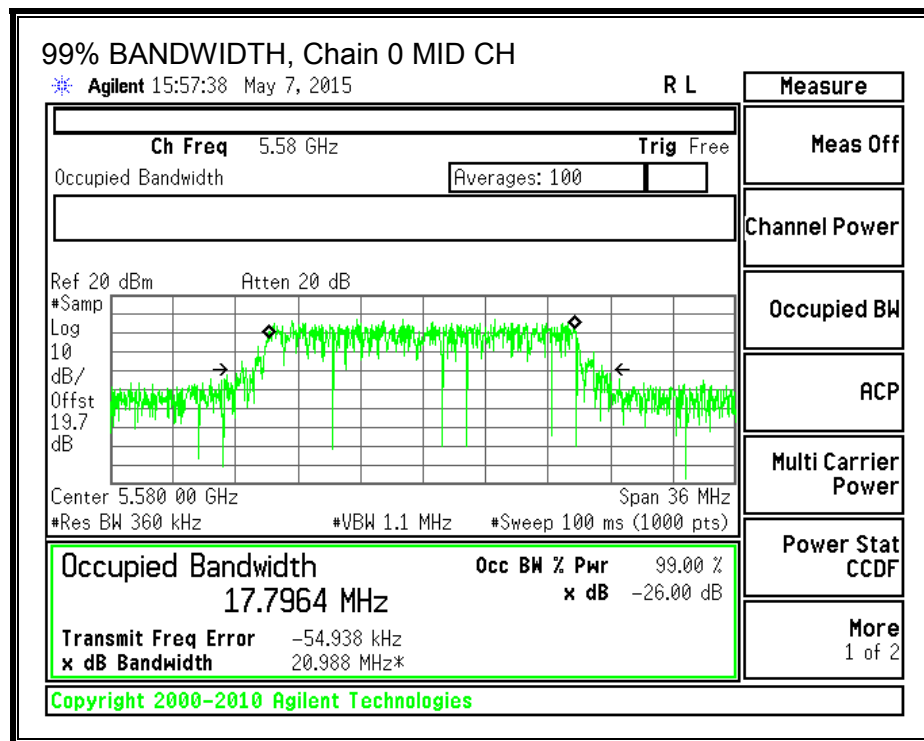
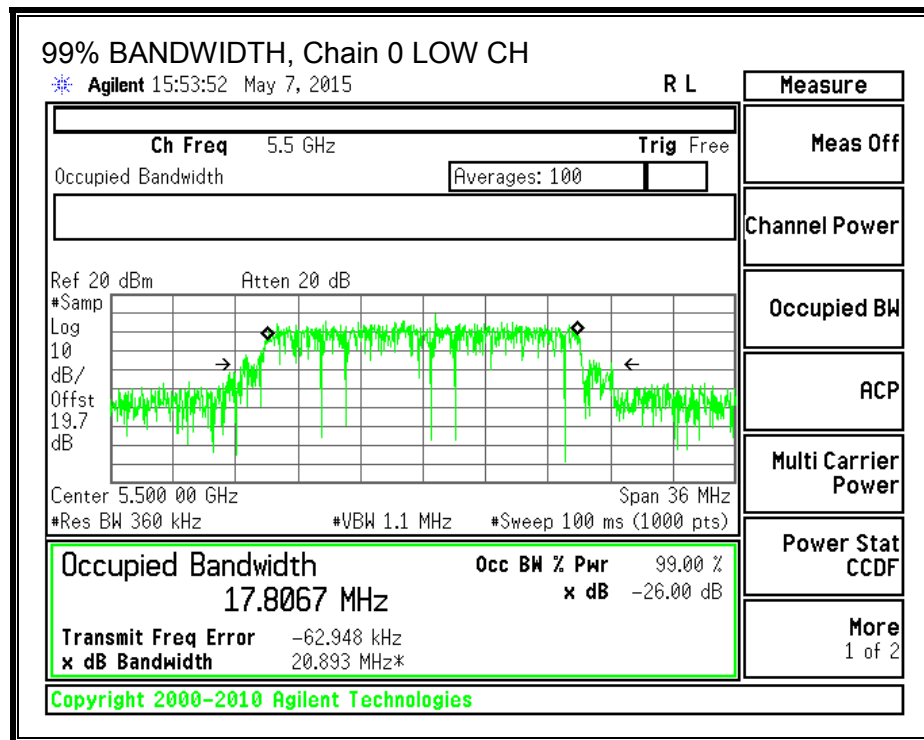
### LIMITS

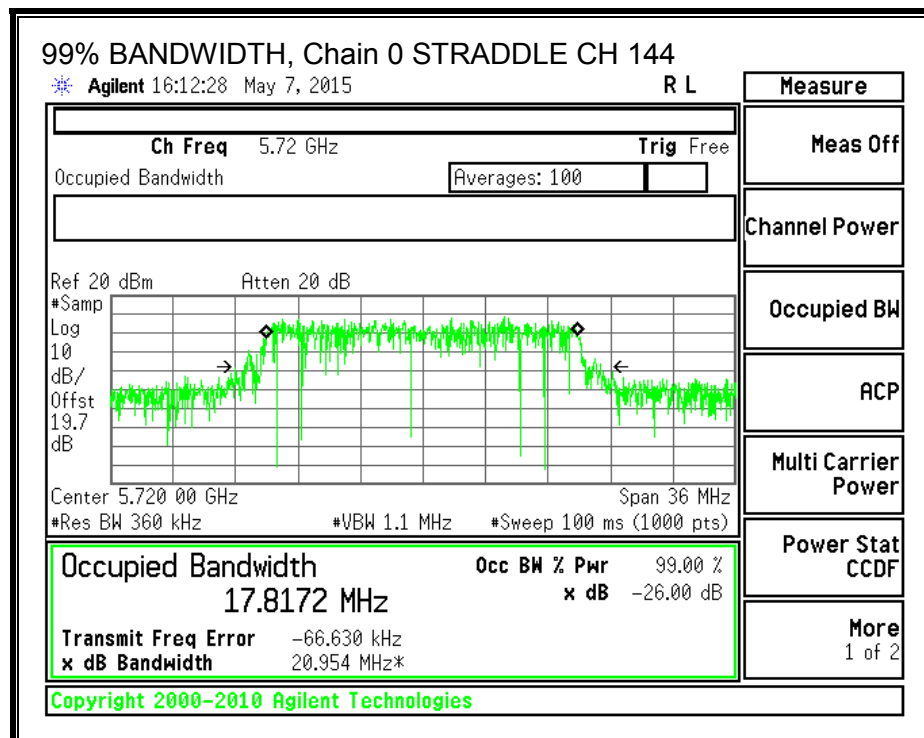
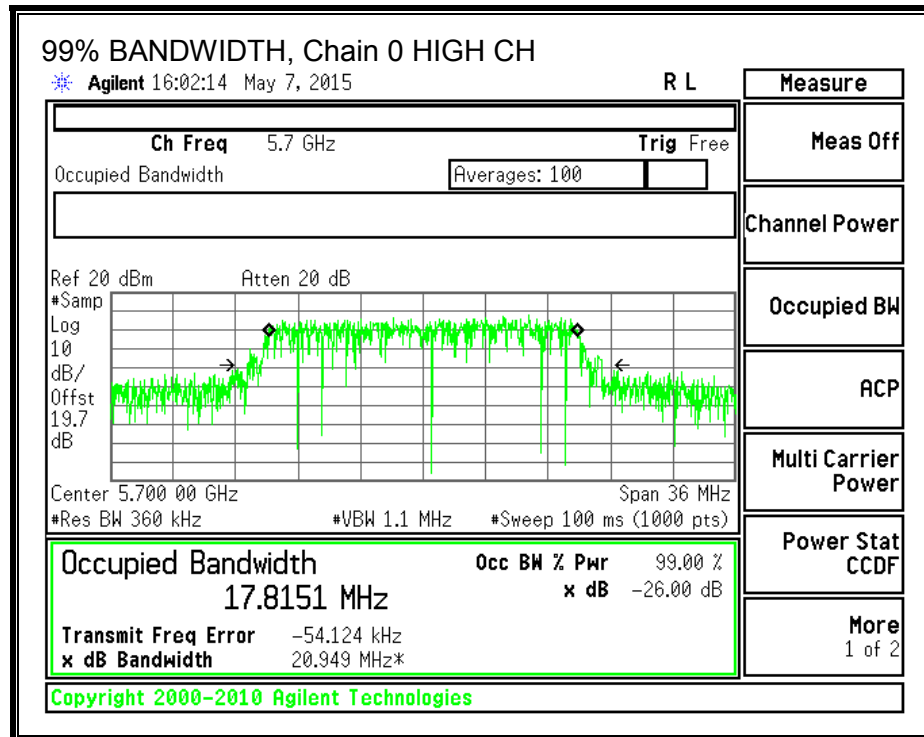
None; for reporting purposes only.

### RESULTS

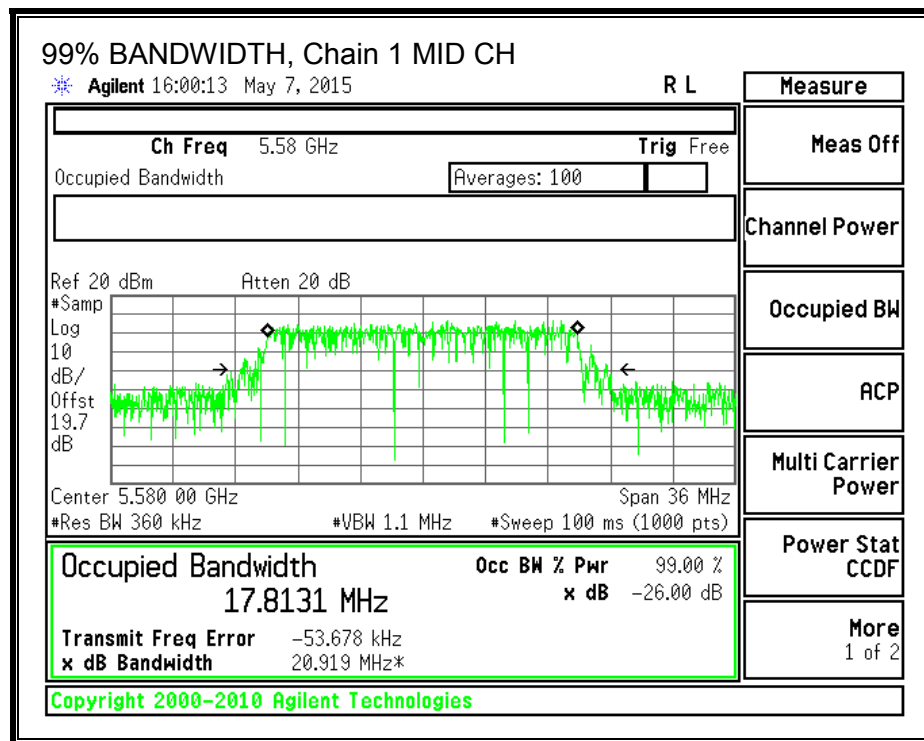
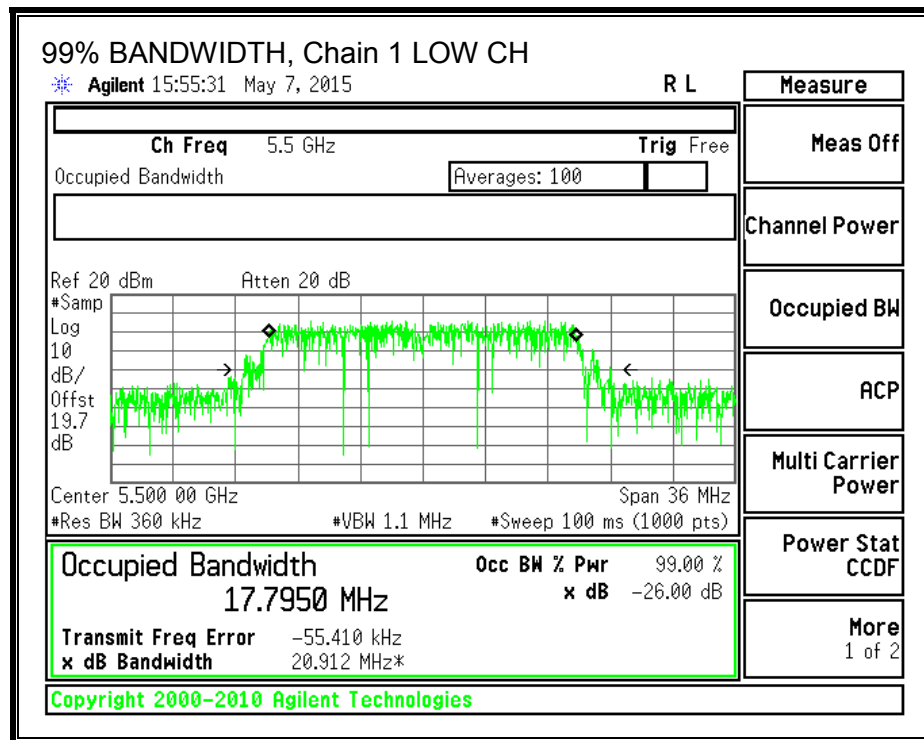
| Channel | Frequency<br>(MHz) | 99% BW<br>Chain 0<br>(MHz) | 99% BW<br>Chain 1<br>(MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low     | 5500               | 17.8067                    | 17.7950                    |
| Mid     | 5580               | 17.7964                    | 17.8131                    |
| High    | 5700               | 17.8151                    | 17.8209                    |
| 144     | 5720               | 17.8172                    | 17.8339                    |

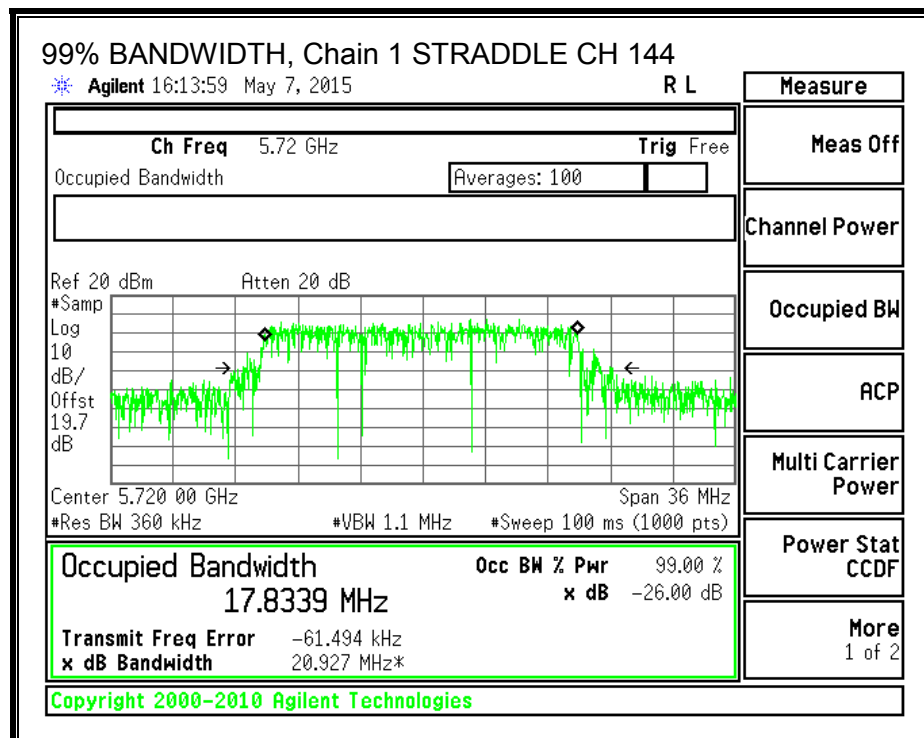
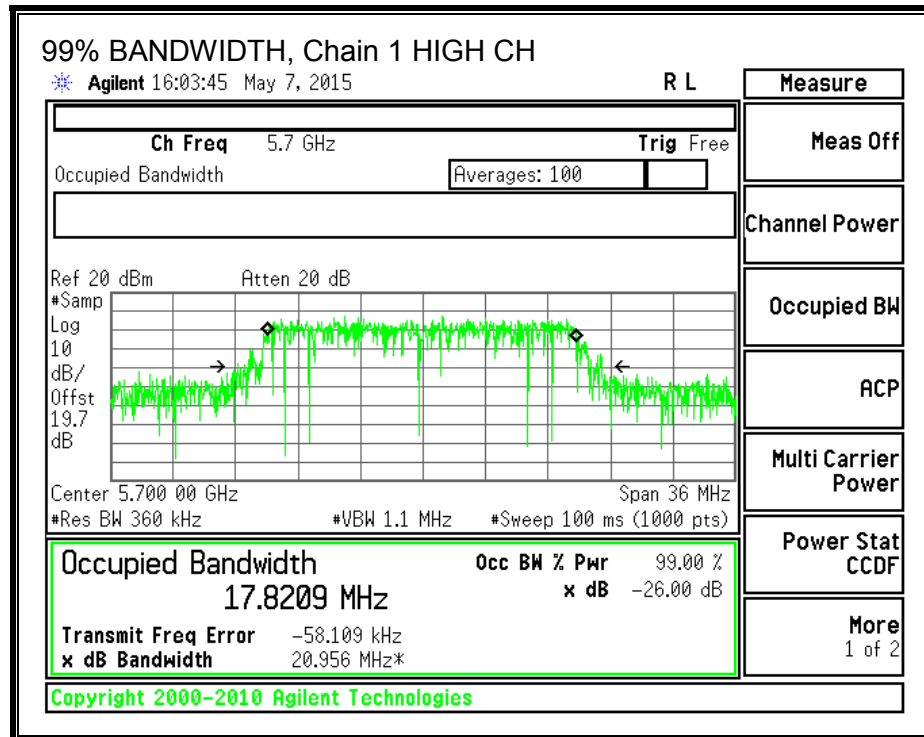
**99% BANDWIDTH, Chain 0**





**99% BANDWIDTH, Chain 1**





### 8.28.3. OUTPUT POWER AND PSD

#### LIMITS

FCC §15.407 (a) (2)

For the band 5.47–5.725 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 power and PSD, the TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Uncorrelated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|-----------------------------------------------------|
| 6.00                                | 6.00                                | 6.00                                                |

## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5500               | 21.78                       | 6.00                                      | 6.00                                    | 24.00                   | 11.00                 |
| Mid     | 5580               | 21.75                       | 6.00                                      | 6.00                                    | 24.00                   | 11.00                 |
| High    | 5700               | 21.87                       | 6.00                                      | 6.00                                    | 24.00                   | 11.00                 |

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

### Output Power Results

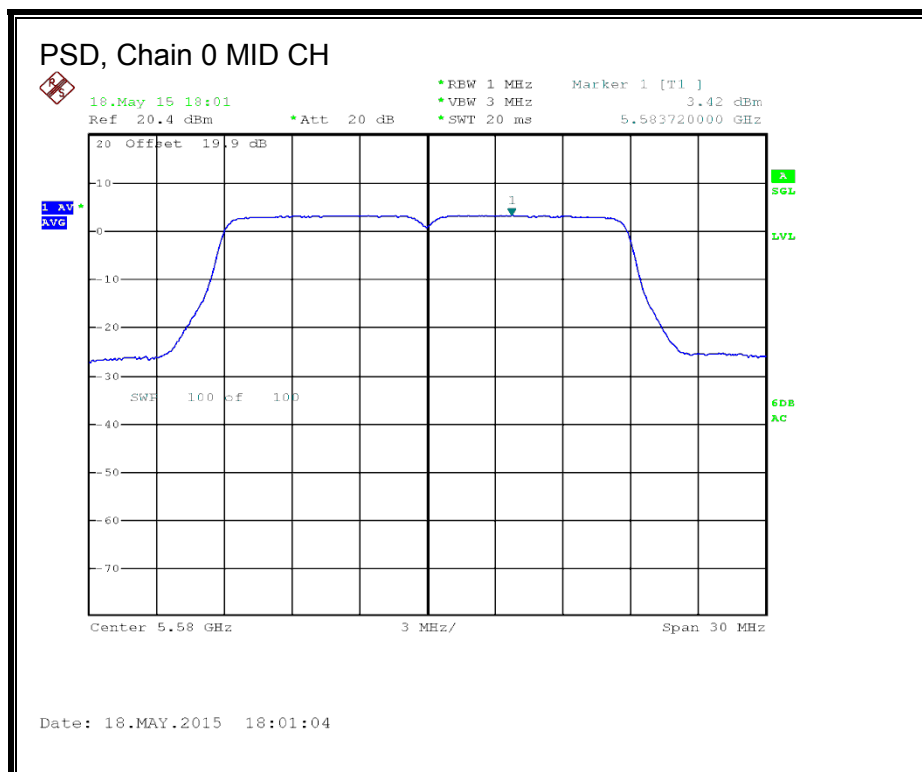
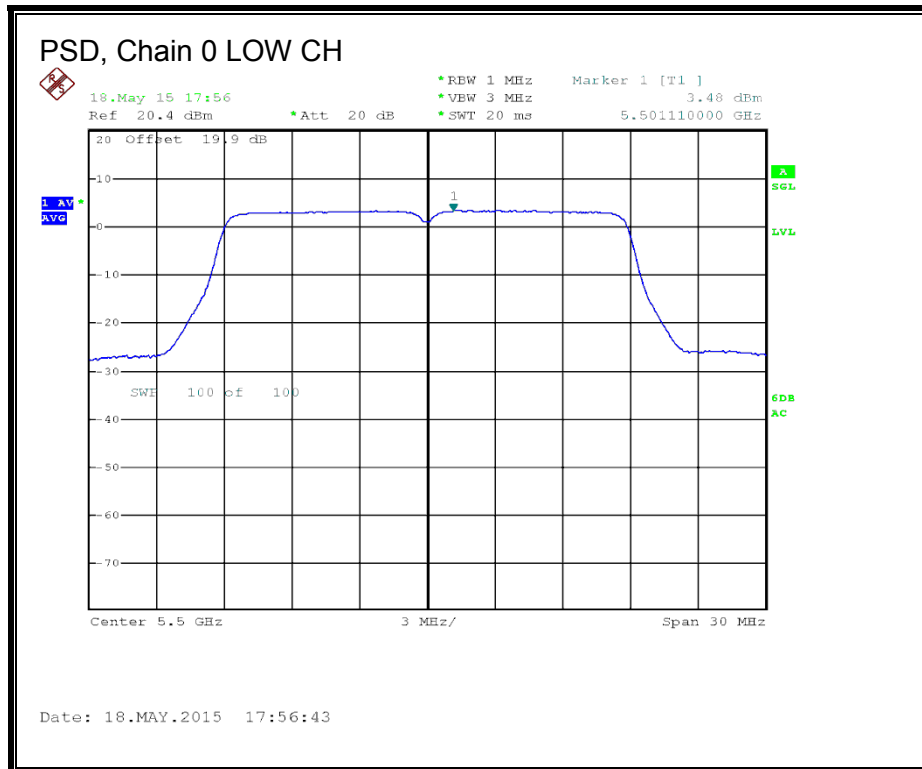
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5500               | 17.67                             | 17.65                             | 20.67                             | 24.00                   | -3.33                   |
| Mid     | 5580               | 19.45                             | 19.10                             | 22.29                             | 24.00                   | -1.71                   |
| High    | 5700               | 16.32                             | 15.87                             | 19.11                             | 24.00                   | -4.89                   |

### PSD Results

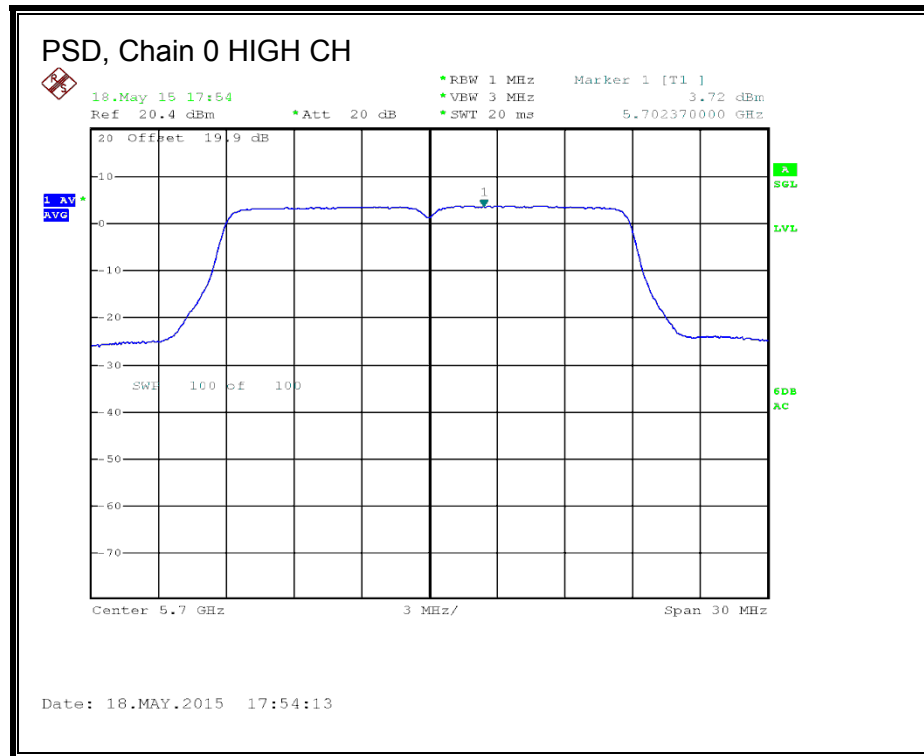
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5500               | 3.48                            | 3.15                            | 6.33                            | 11.00                 | -4.67                 |
| Mid     | 5580               | 3.42                            | 3.00                            | 6.23                            | 11.00                 | -4.77                 |
| High    | 5700               | 3.72                            | 3.37                            | 6.56                            | 11.00                 | -4.44                 |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

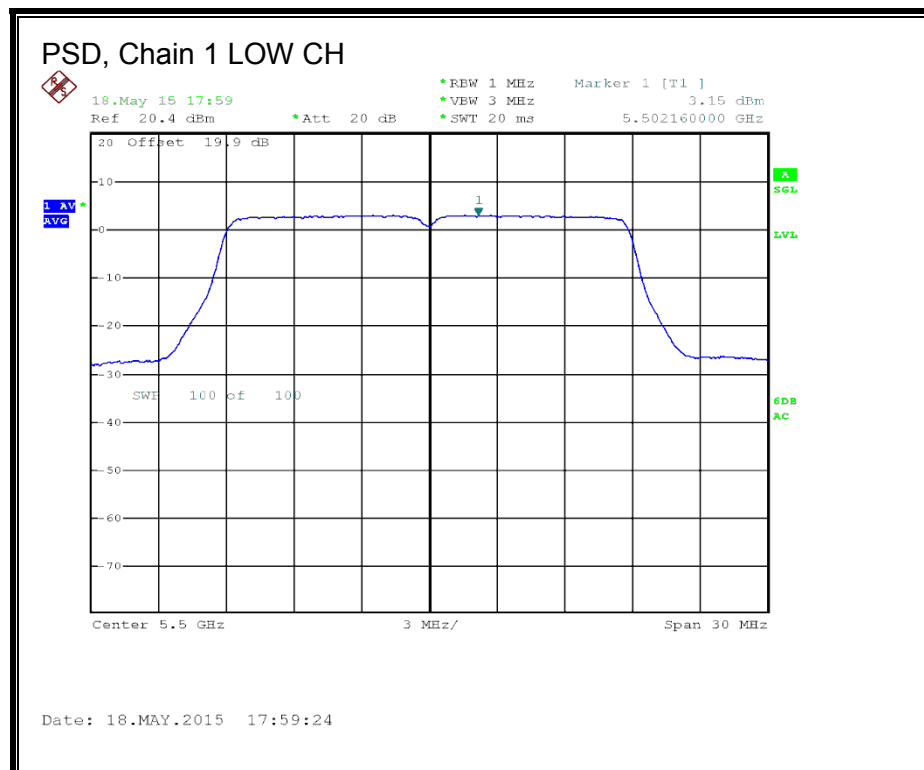
**PSD, Chain 0**

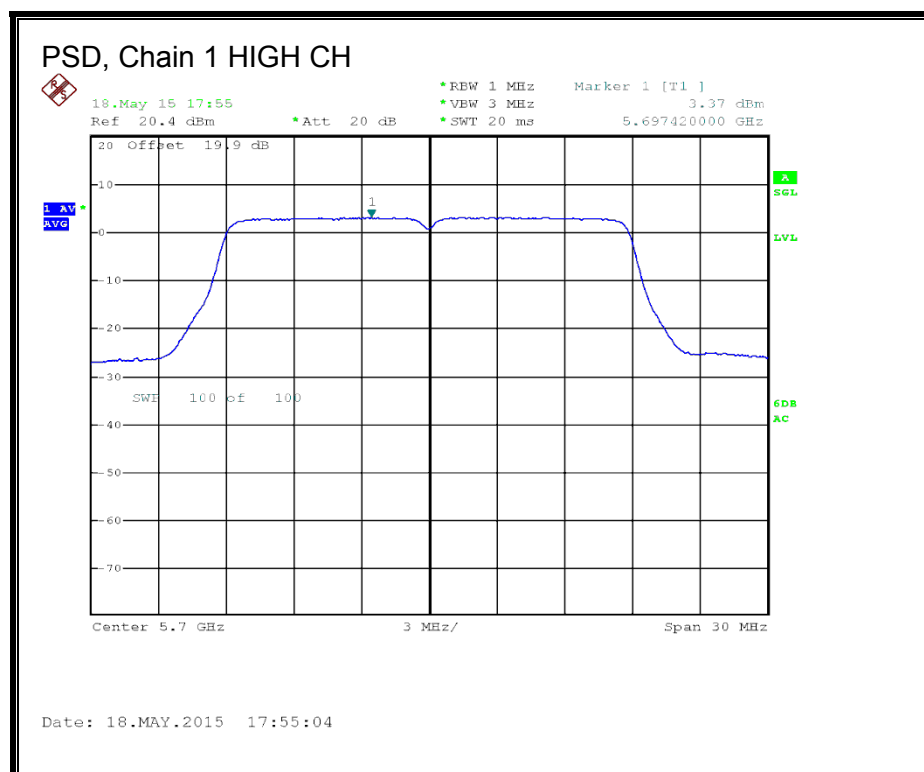
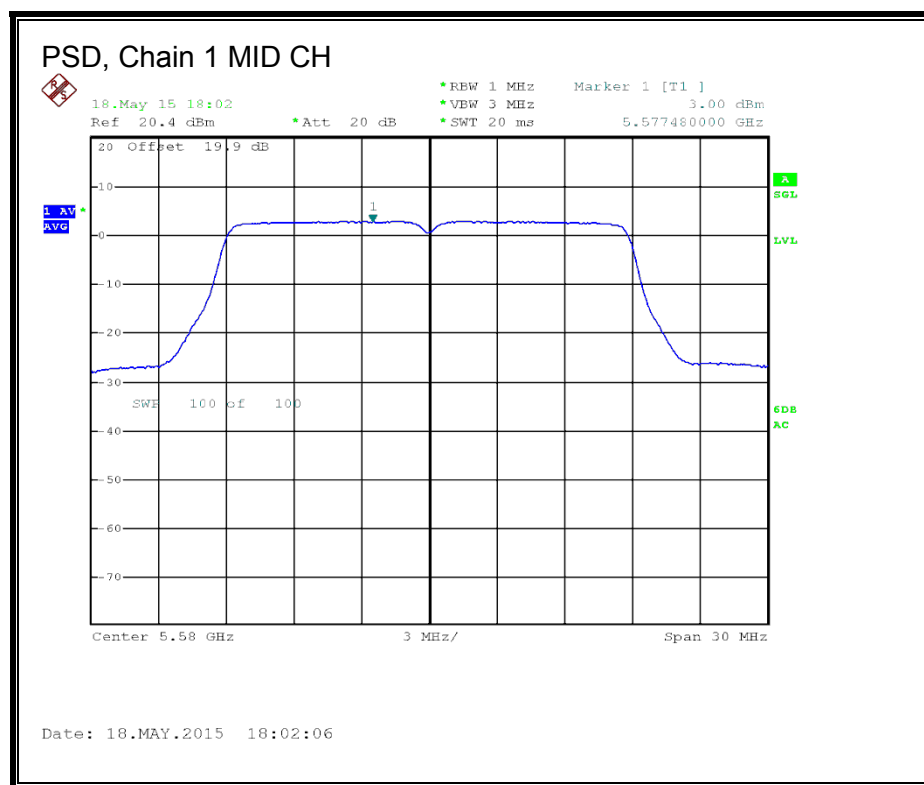






**PSD, Chain 1**





## **STRADDLE CHANNEL 144 RESULTS**

### **UNII-2C BAND**

#### **Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| 144     | 5720               | 15.94                       | 6.00                                      | 6.00                                    | 23.02                   | 11.00                 |

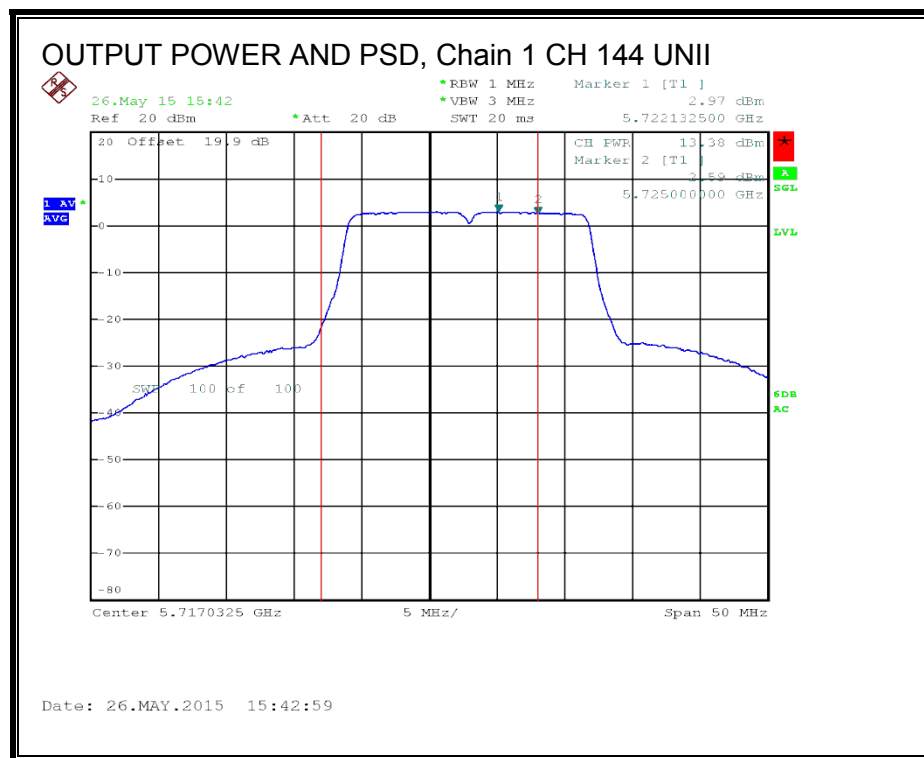
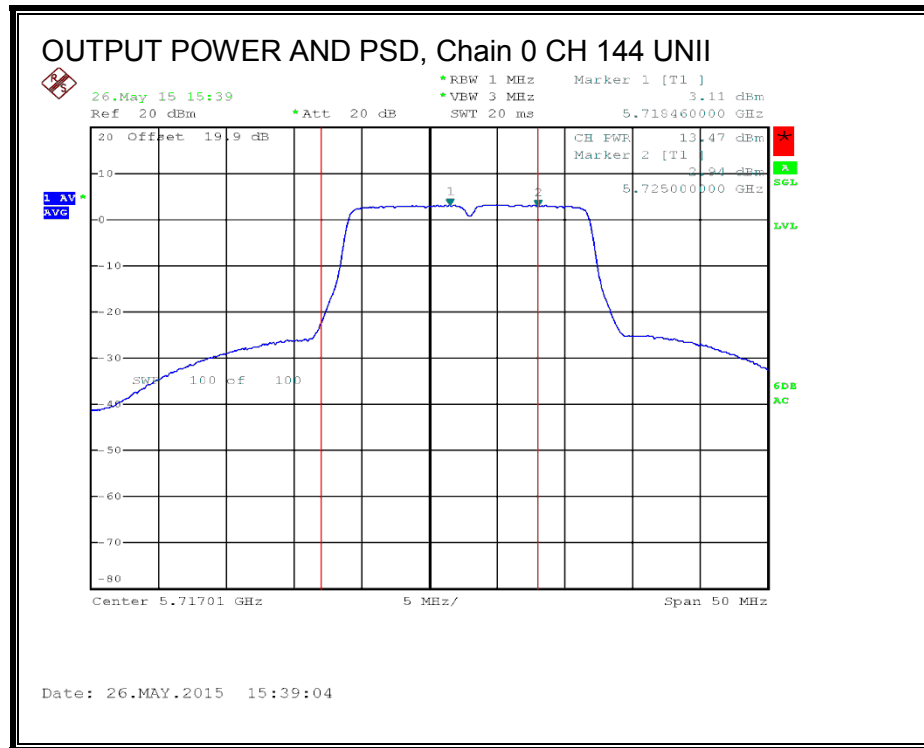
|                    |      |                                                |
|--------------------|------|------------------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd Power & PSD |
|--------------------|------|------------------------------------------------|

#### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| 144     | 5720               | 13.47                             | 13.38                             | 16.44                             | 23.02                   | -6.59                   |

#### **PSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| 144     | 5720               | 3.11                            | 2.97                            | 6.05                            | 11.00                 | -4.95                 |



**UNII-3 BAND**

**Antenna Gain and Limit**

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| 144     | 5720               | 4.70                                      | 4.70                                    | 30.00                   | 30.00                 |

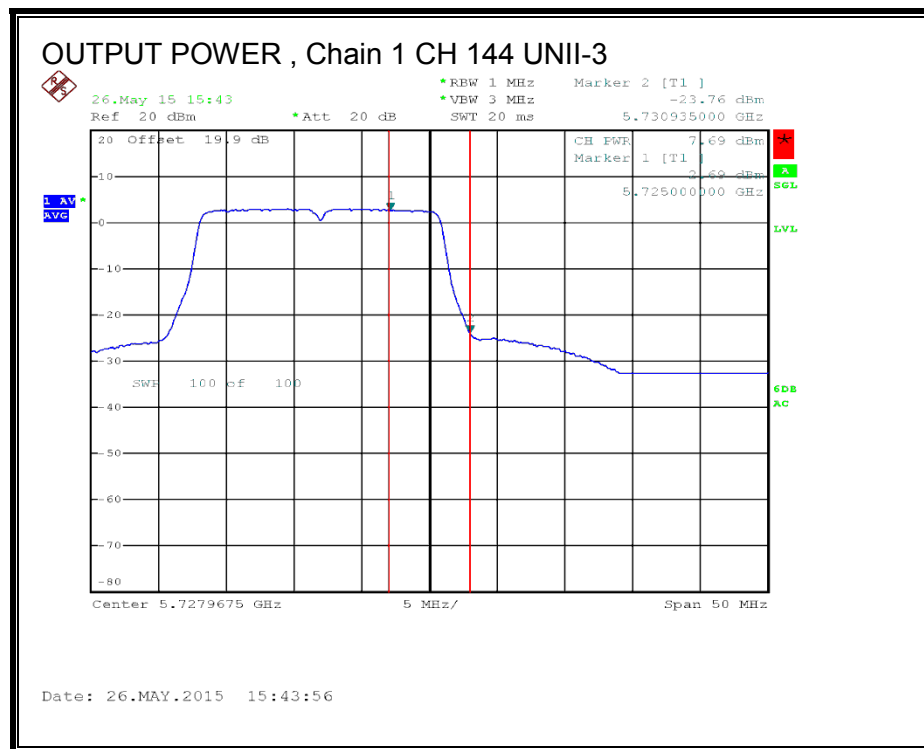
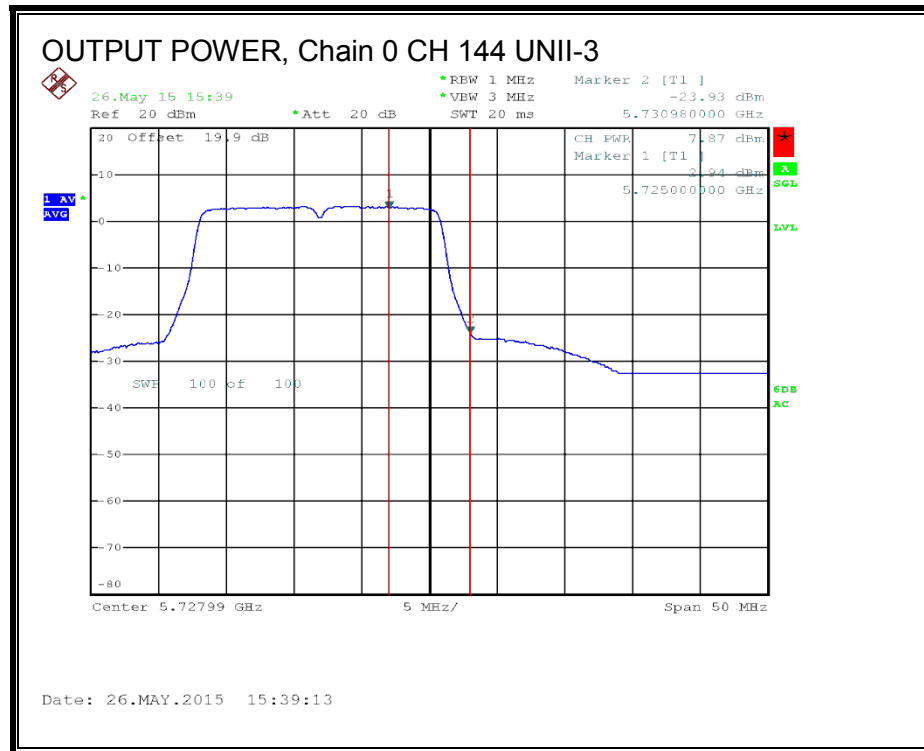
|                    |      |                                                |
|--------------------|------|------------------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd Power & PSD |
|--------------------|------|------------------------------------------------|

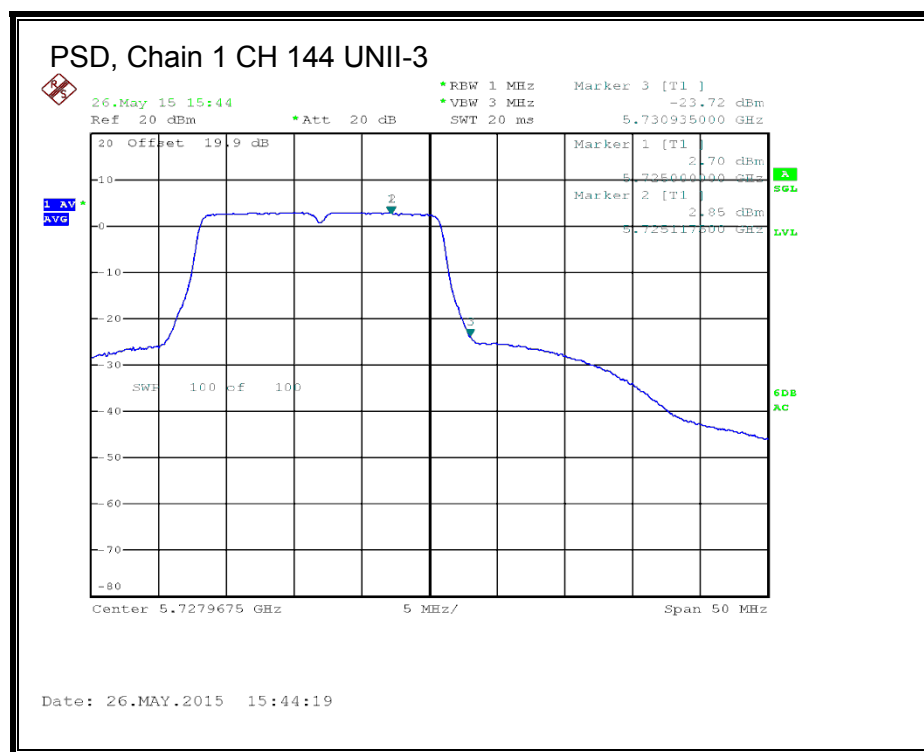
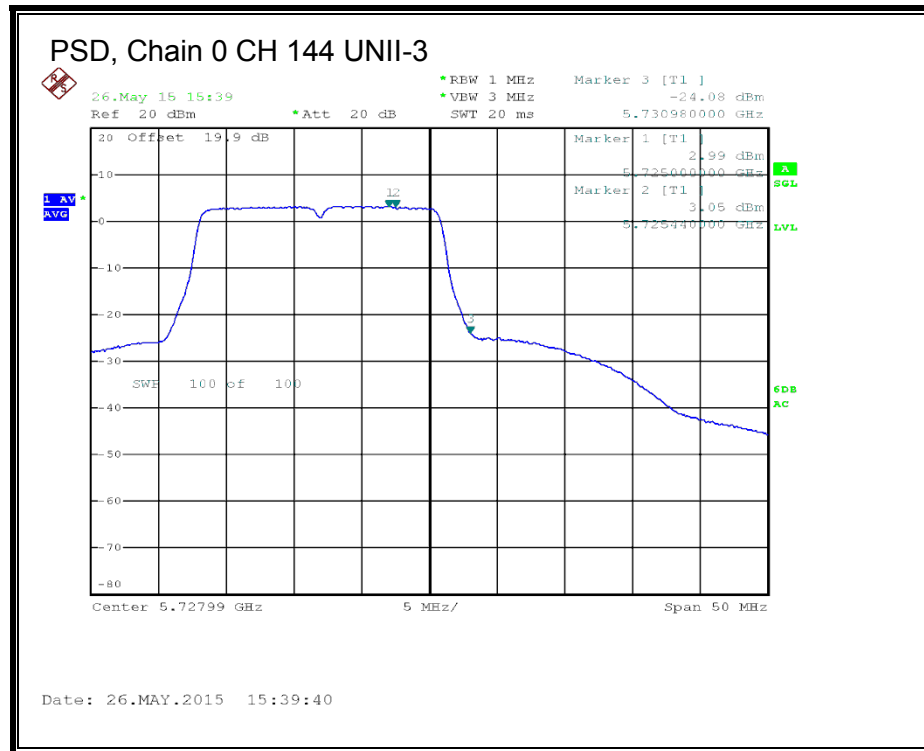
**Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| 144     | 5720               | 7.87                              | 7.69                              | 10.79                             | 30.00                   | -19.21                  |

**PSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| 144     | 5720               | 3.05                            | 2.85                            | 5.96                            | 30.00                 | -24.04                |





#### 8.28.4. AVERAGE OUTPUT POWER (WHOLE FUNDAMENTAL)

##### LIMITS

None; for reporting purposes only.

##### TEST PROCEDURE

The transmitter output is connected to a power meter.

##### RESULTS

###### Output Power Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| 144     | 5720               | 19.35                             | 19.15                             | 22.26                             |



## **8.29. 802.11n HT20 TxBF 2Tx MODE IN THE 5.6 GHz BAND**

### **8.29.1. OUTPUT POWER AND PSD**

#### **LIMITS**

FCC §15.407 (a) (2)

For the band 5.47–5.725 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 Power and PSD the TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

| <b>Chain 0<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Chain 1<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Correlated Chains<br/>Directional<br/>Gain<br/>(dBi)</b> |
|-----------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|
| 6.00                                          | 6.00                                          | 9.01                                                        |

## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5500               | 21.81                       | 9.01                                      | 9.01                                    | 20.99                   | 7.99                  |
| Mid     | 5580               | 21.75                       | 9.01                                      | 9.01                                    | 20.99                   | 7.99                  |
| High    | 5700               | 21.81                       | 9.01                                      | 9.01                                    | 20.99                   | 7.99                  |

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

### Output Power Results

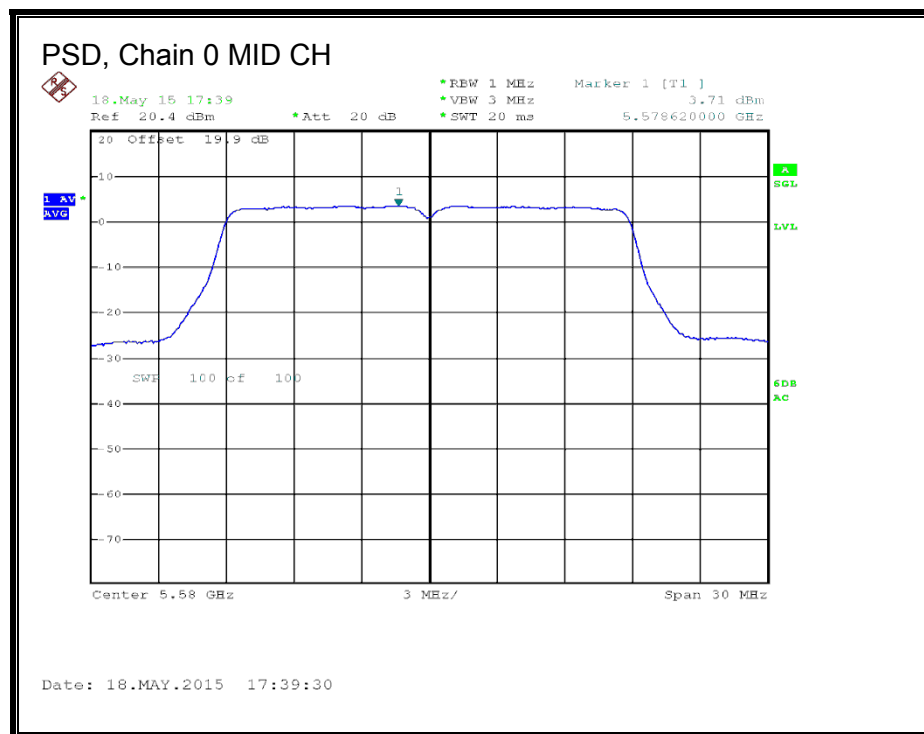
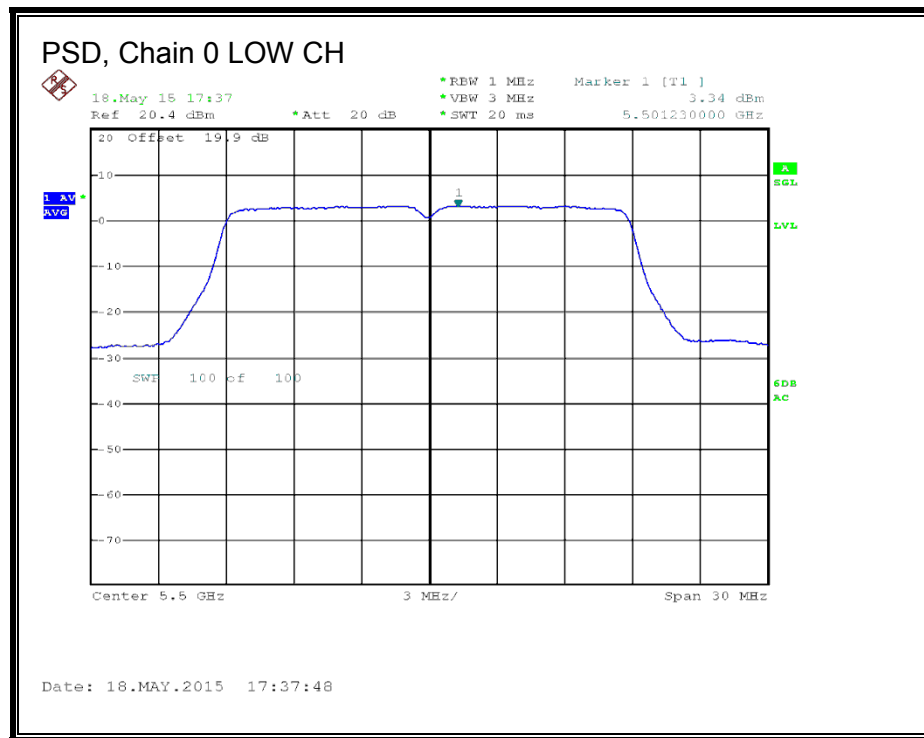
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5500               | 17.23                             | 17.12                             | 20.19                             | 20.99                   | -0.80                   |
| Mid     | 5580               | 17.95                             | 17.50                             | 20.74                             | 20.99                   | -0.25                   |
| High    | 5700               | 15.81                             | 15.55                             | 18.69                             | 20.99                   | -2.30                   |

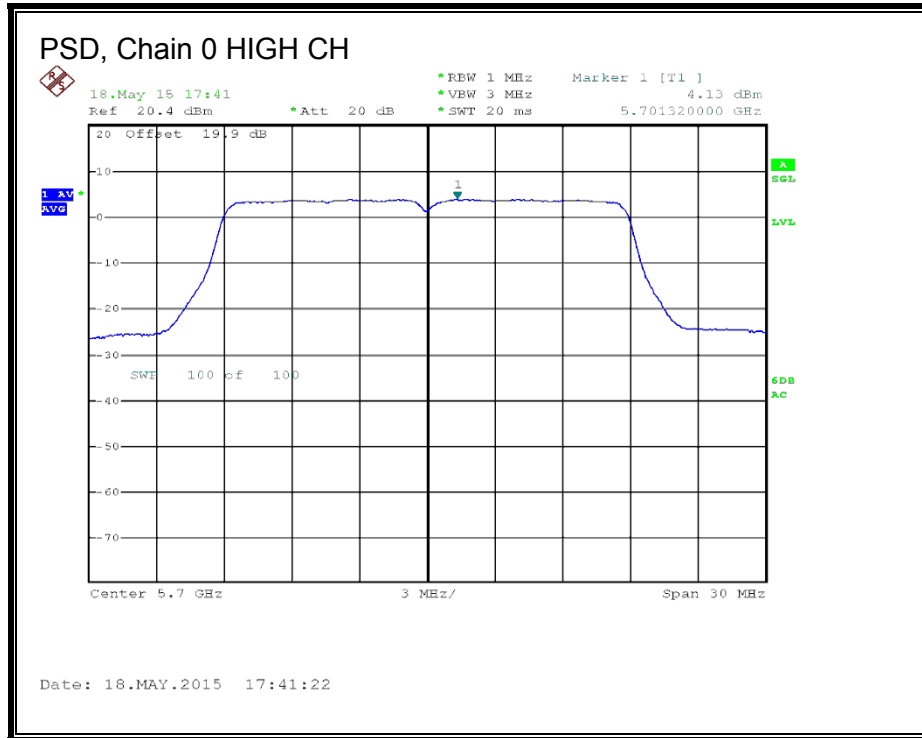
### PSD Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5500               | 3.34                            | 3.02                            | 6.19                            | 7.99                  | -1.80                 |
| Mid     | 5580               | 3.71                            | 3.20                            | 6.47                            | 7.99                  | -1.52                 |
| High    | 5700               | 4.13                            | 3.60                            | 6.88                            | 7.99                  | -1.11                 |

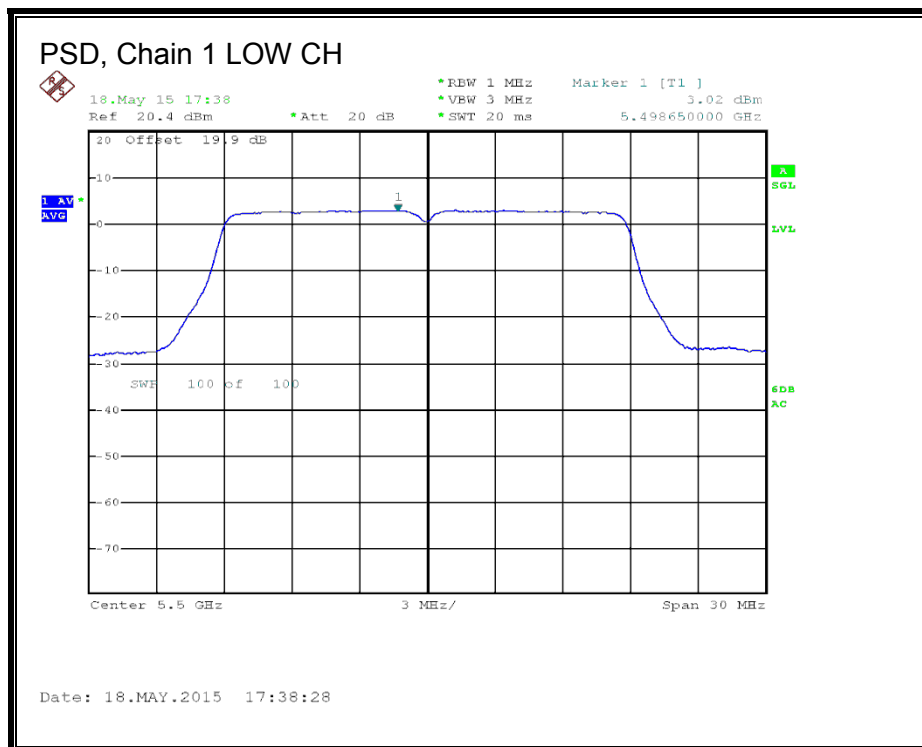
**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

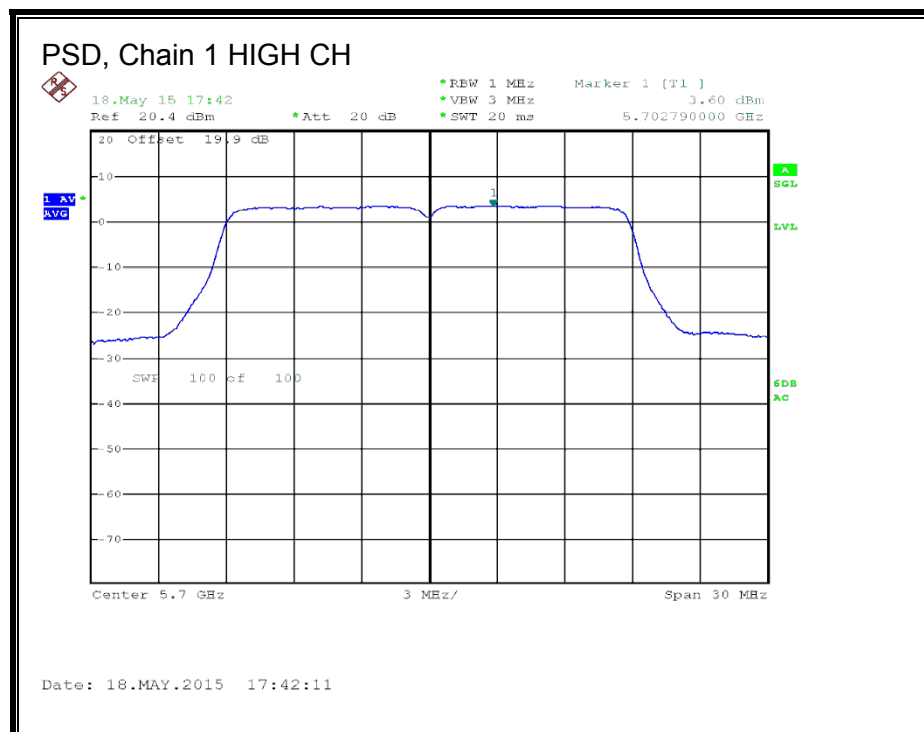
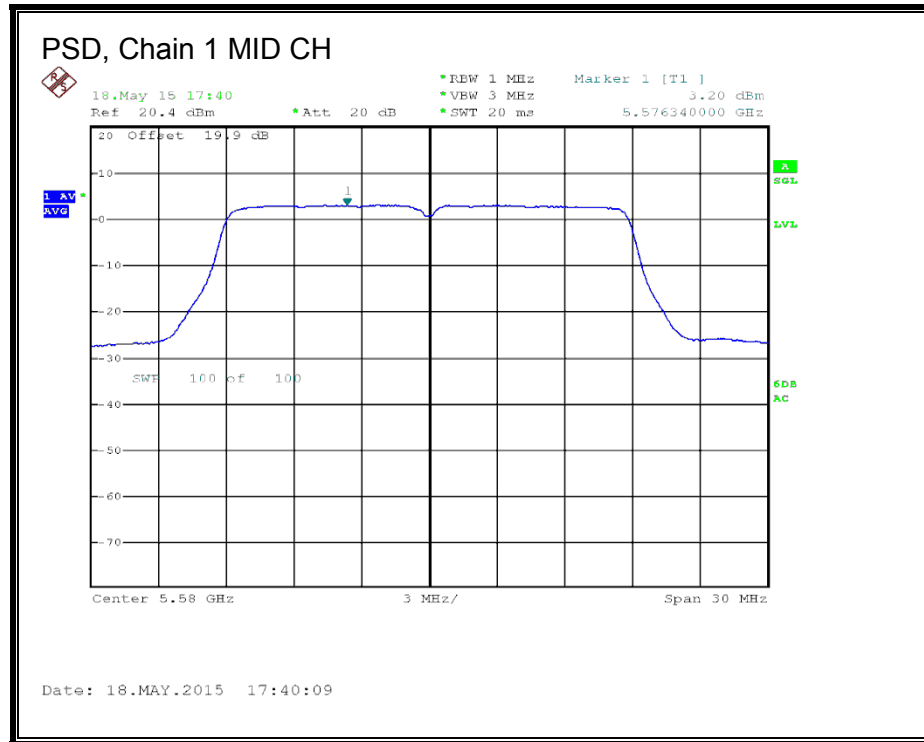
**PSD, Chain 0**





**PSD, Chain 1**





## **STRADDLE CHANNEL 144 RESULTS**

### **UNII-2C BAND**

#### **Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| 144     | 5720               | 15.89                       | 9.01                                      | 9.01                                    | 20.00                   | 7.99                  |

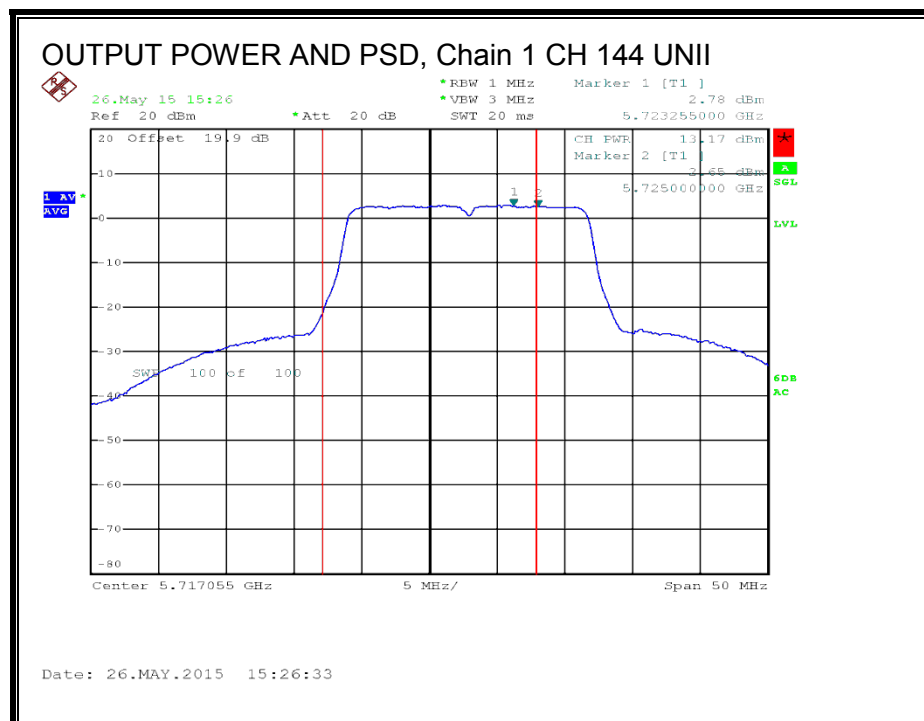
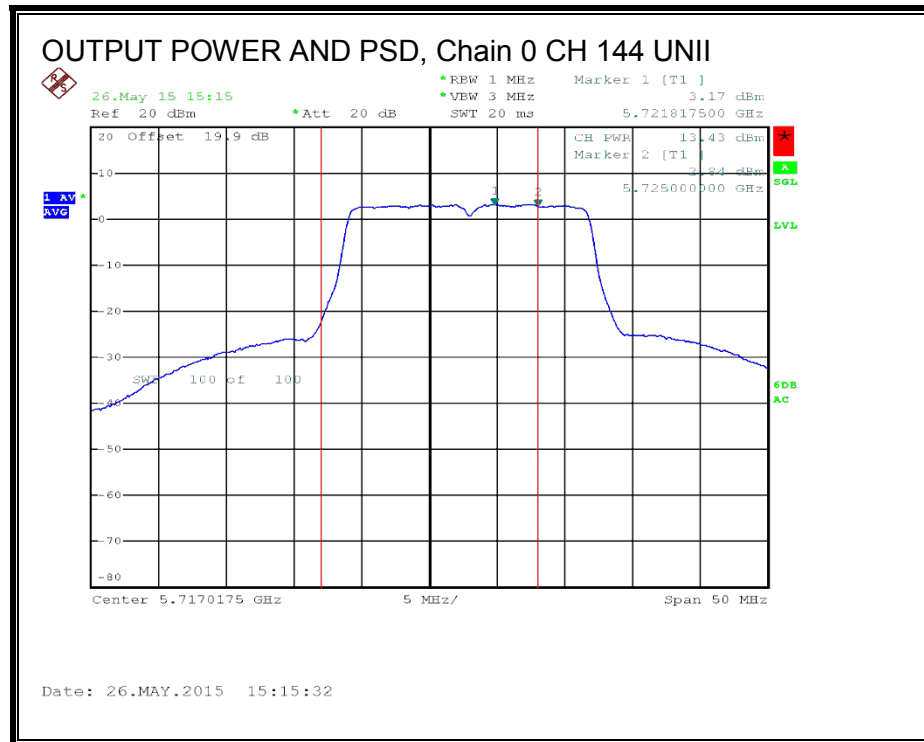
|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

#### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| 144     | 5720               | 13.43                             | 13.17                             | 16.31                             | 20.00                   | -3.69                   |

#### **PSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| 144     | 5720               | 3.17                            | 2.78                            | 5.99                            | 7.99                  | -2.00                 |



**UNII-3 BAND**

**Antenna Gain and Limit**

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| 144     | 5720               | 7.71                                      | 7.71                                    | 28.29                   | 28.29                 |

|                    |      |                                                |
|--------------------|------|------------------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd Power & PSD |
|--------------------|------|------------------------------------------------|

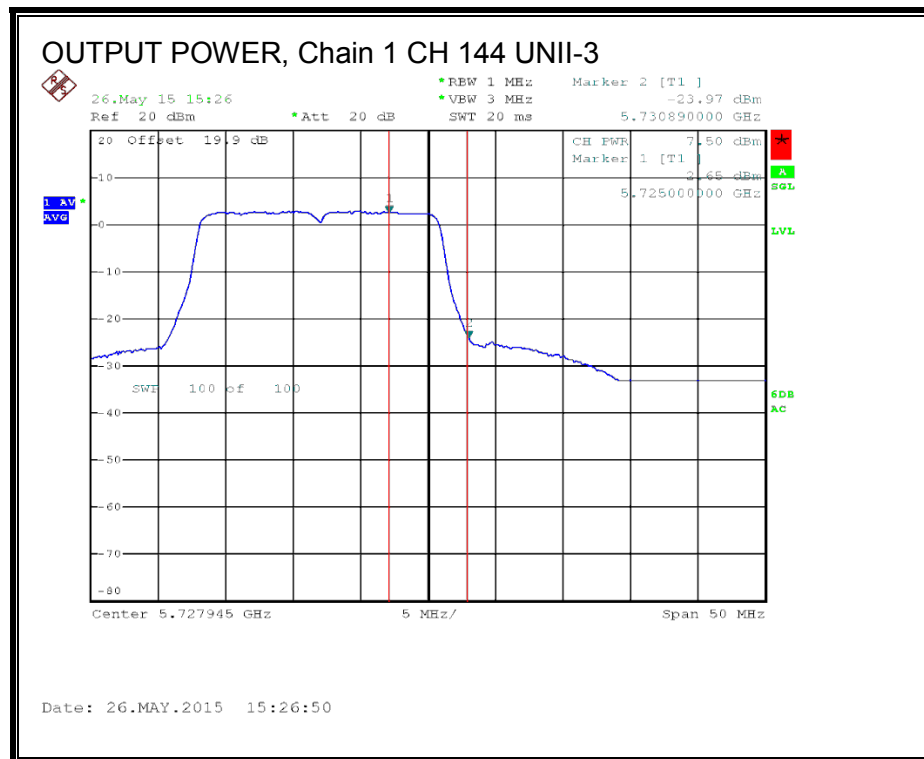
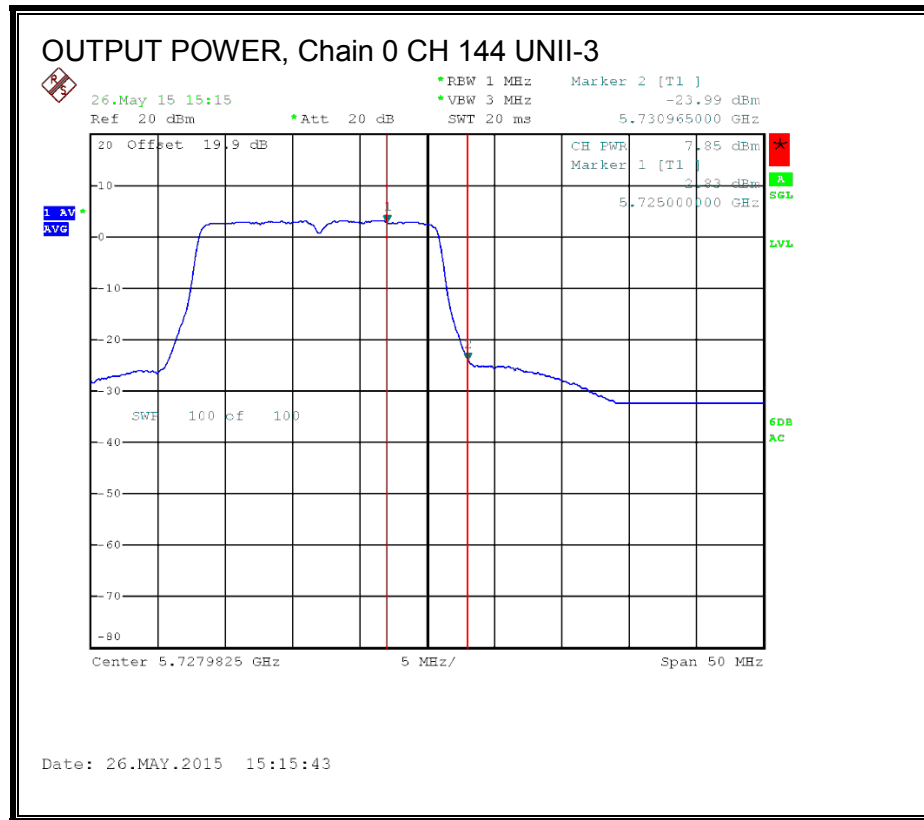
**Output Power Results**

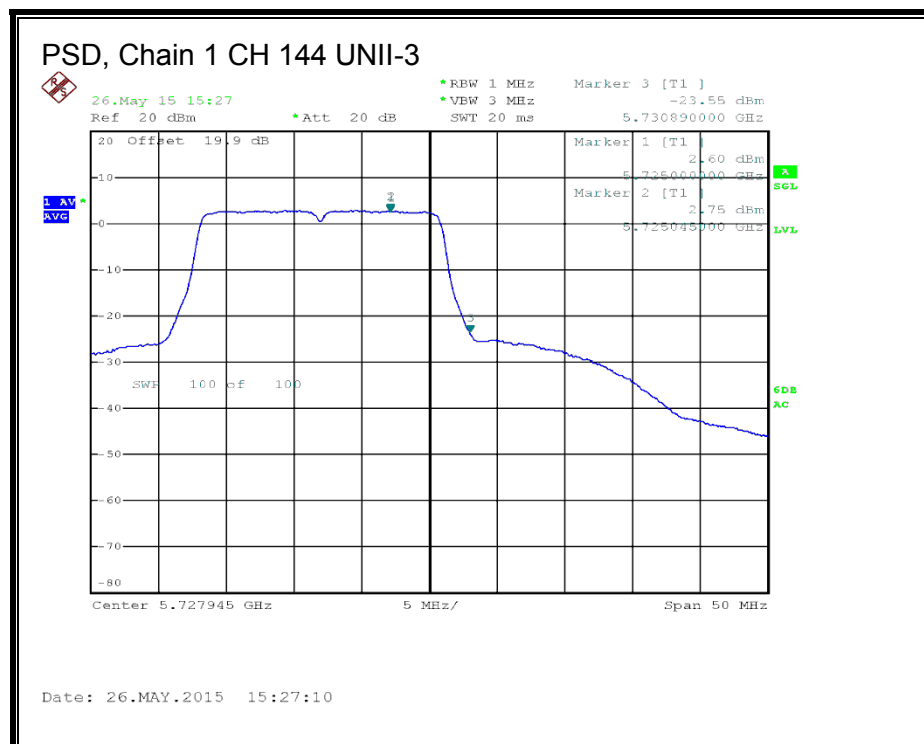
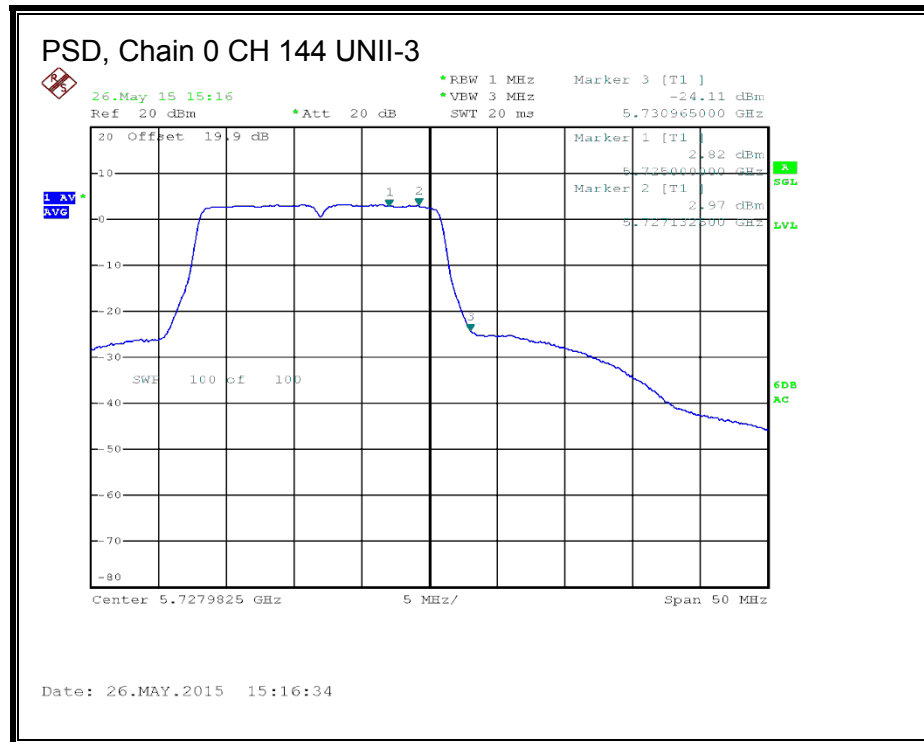
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| 144     | 5720               | 7.85                              | 7.50                              | 10.69                             | 28.29                   | -17.60                  |

**PSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| 144     | 5720               | 2.97                            | 2.75                            | 5.87                            | 28.29                 | -22.42                |







## 8.29.2. AVERAGE OUTPUT POWER (WHOLE FUNDAMENTAL)

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

### RESULTS

#### Output Power Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| 144     | 5720               | 19.40                             | 18.80                             | 22.12                             |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## **8.30. 802.11n HT40 1Tx MODE IN THE 5.6 GHz BAND**

### **8.30.1. OUTPUT POWER**

#### **LIMITS**

FCC §15.407 (a) (2)

For the band 5.47–5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , 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**

This is SISO mode, AG is the highest (worst-case) = 6 dBi

## **RESULTS**

### **Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>(dBi) | Power<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|------------------------------|-------------------------|
| Low     | 5510               | 40.32                       | 6.00                         | 24.00                   |
| High    | 5670               | 40.20                       | 6.00                         | 24.00                   |

### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5510               | 17.61                             | 17.61                             | 24.00                   | -6.39                   |
| High    | 5670               | 18.05                             | 18.05                             | 24.00                   | -5.95                   |

**Note:** for Chain 0, 26dB data & plots, see section 11n HT40 CDD 2TX MODE IN THE 5.6 GHz BAND.

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## 8.31. 802.11n HT40 CDD 2Tx MODE IN THE 5.6 GHz BAND

### 8.31.1. 26 dB BANDWIDTH

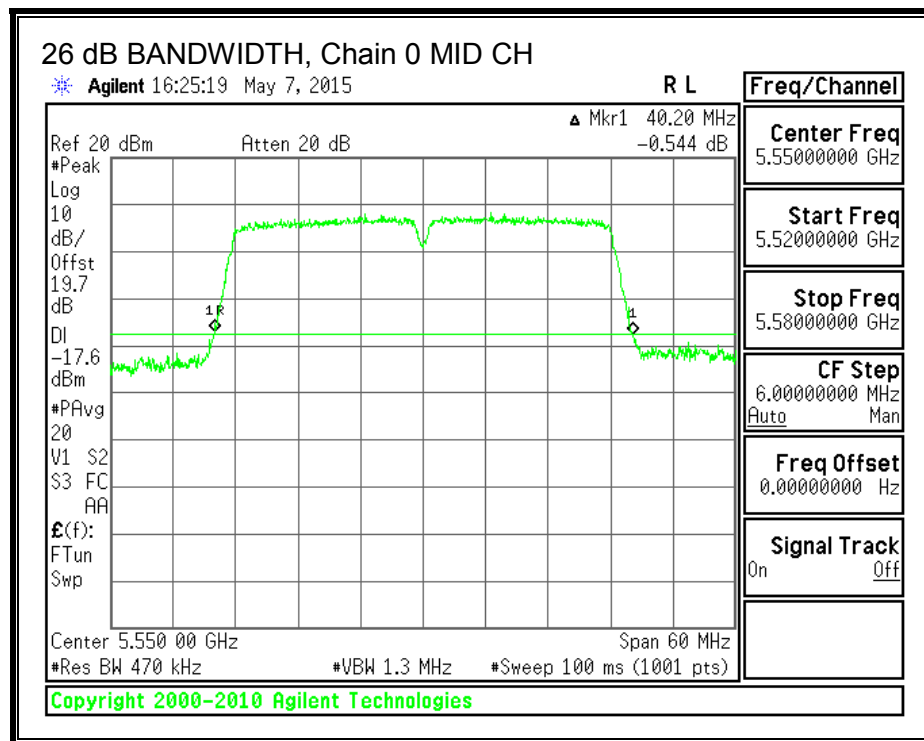
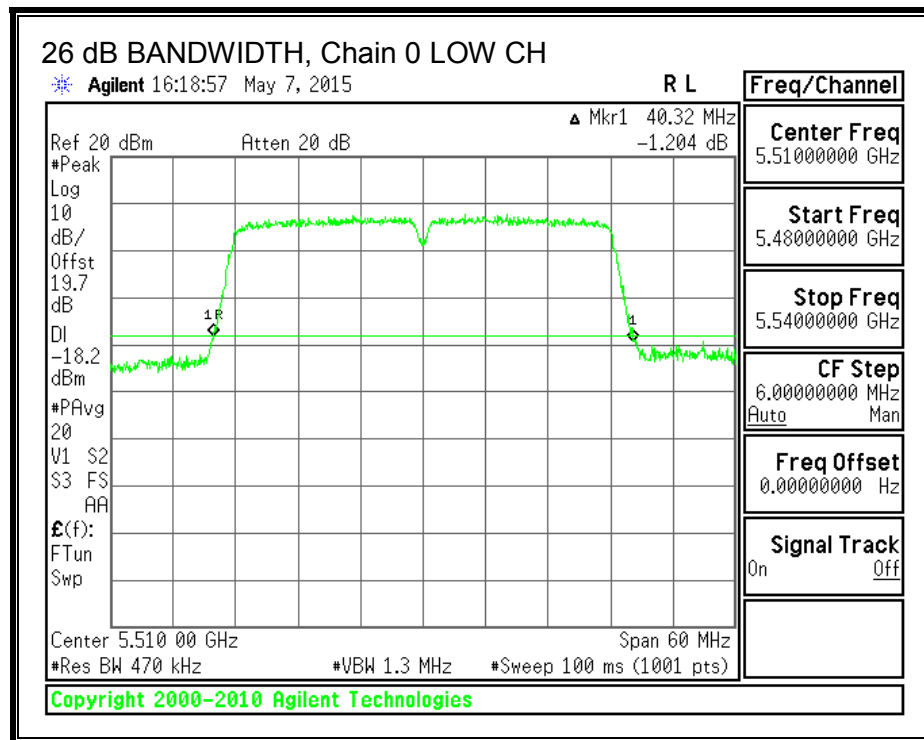
#### LIMITS

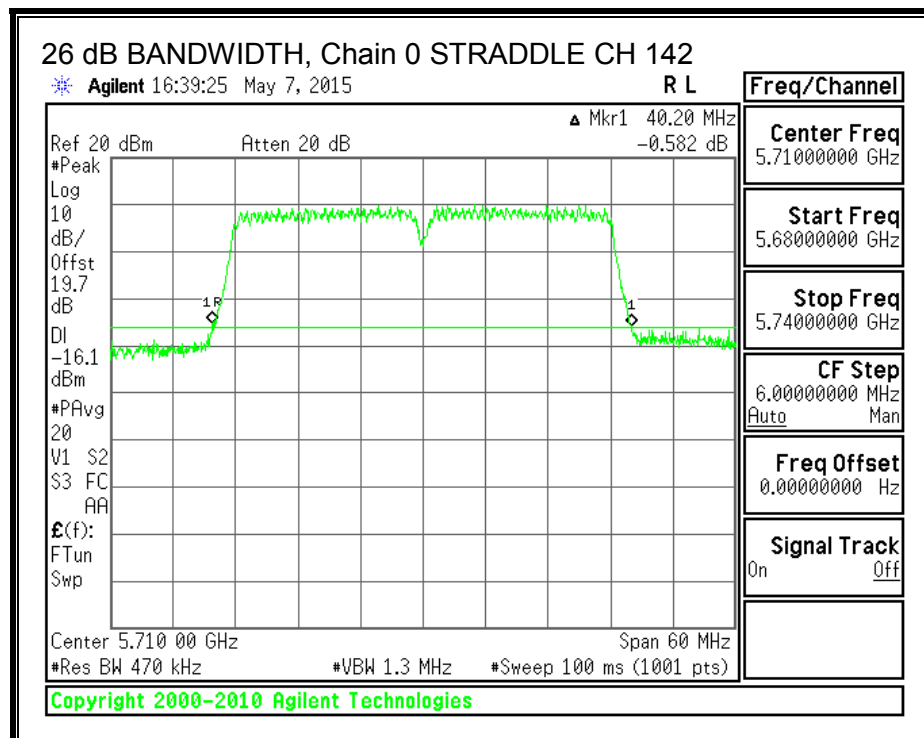
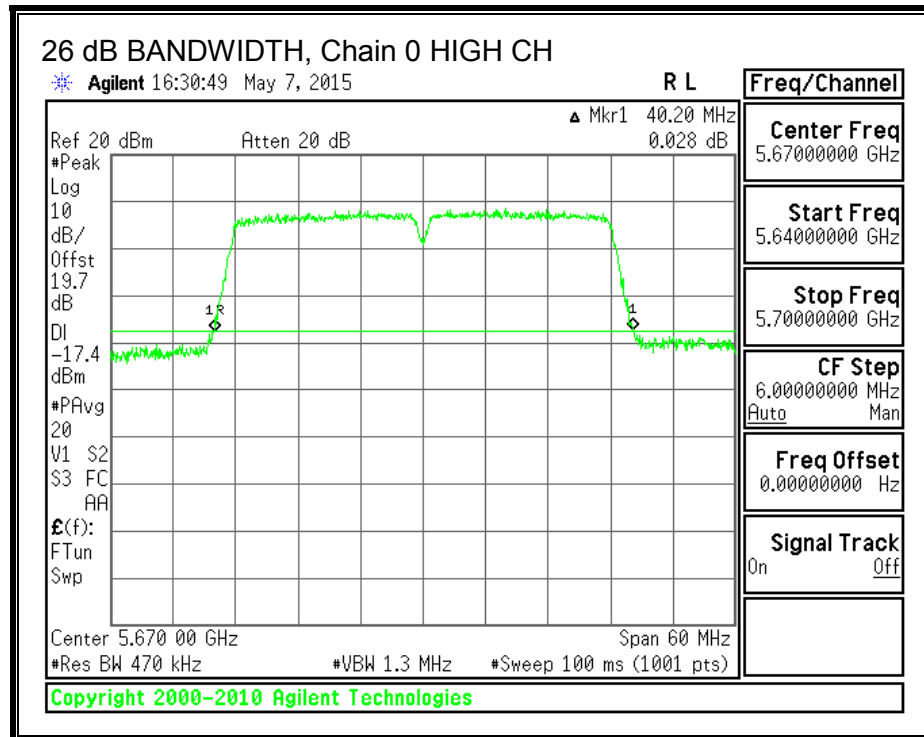
None; for reporting purposes only.

#### RESULTS

| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) | 26 dB BW<br>Chain 1<br>(MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low     | 5510               | 40.32                        | 40.02                        |
| Mid     | 5550               | 40.20                        | 39.90                        |
| High    | 5670               | 40.20                        | 40.44                        |
| 142     | 5710               | 40.20                        | 40.50                        |

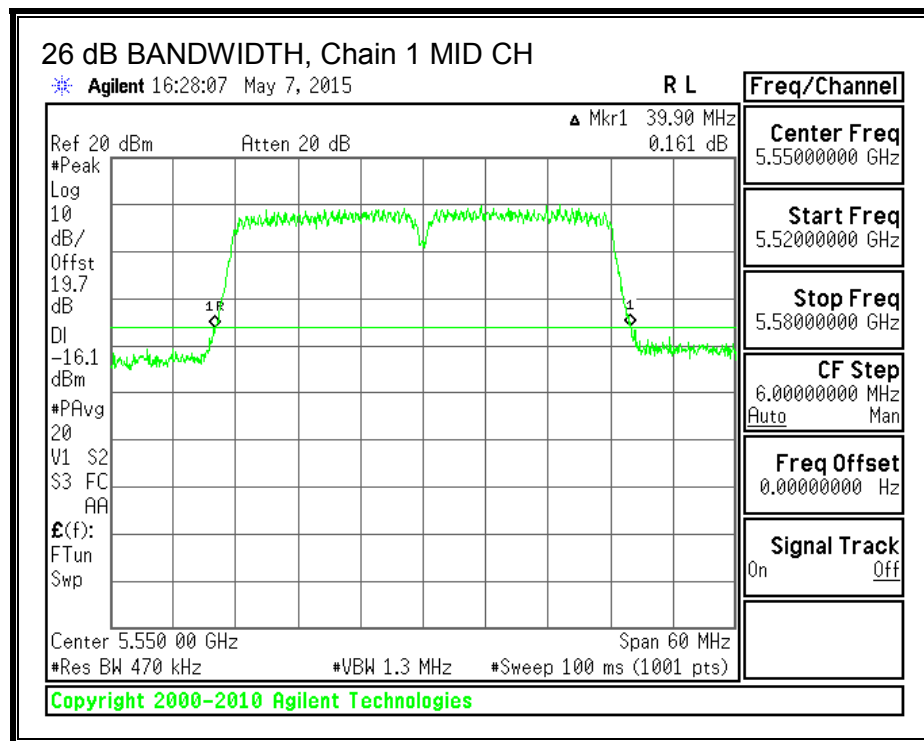
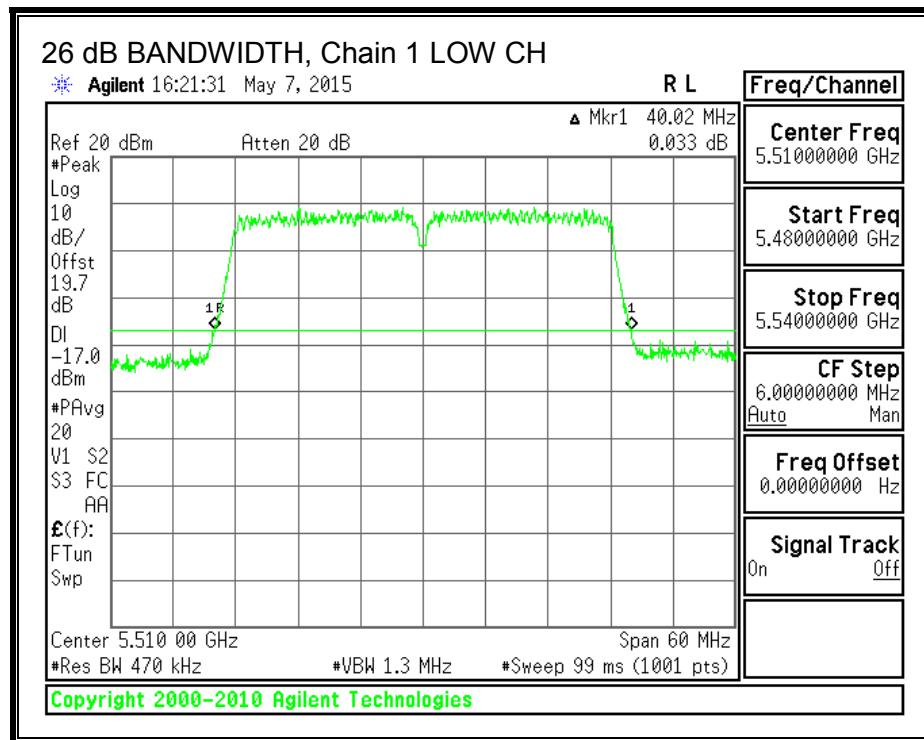
**26 dB BANDWIDTH, Chain 0**

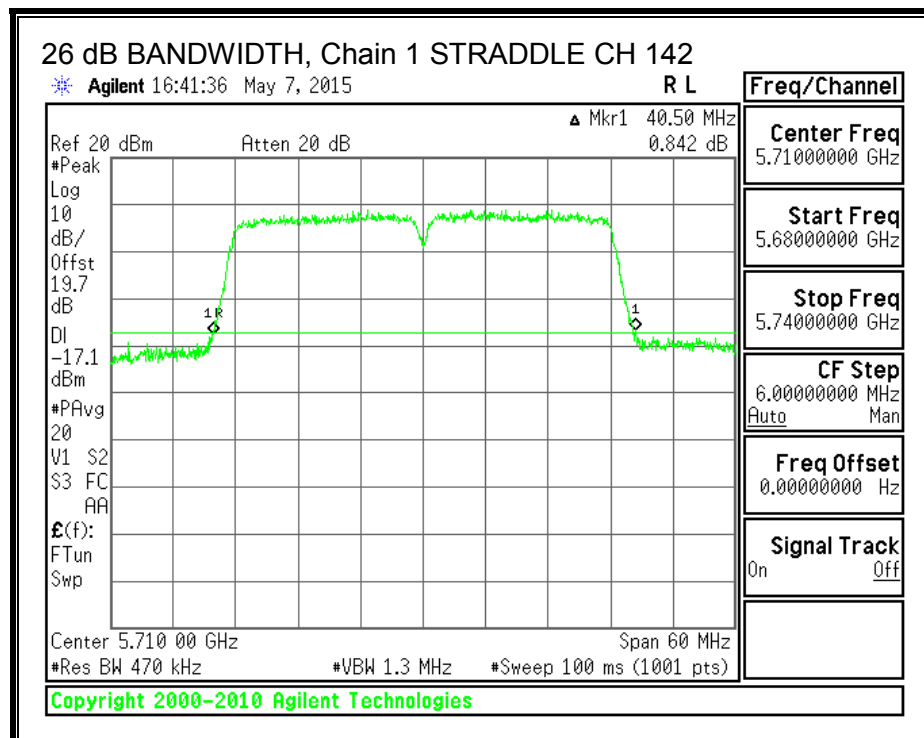
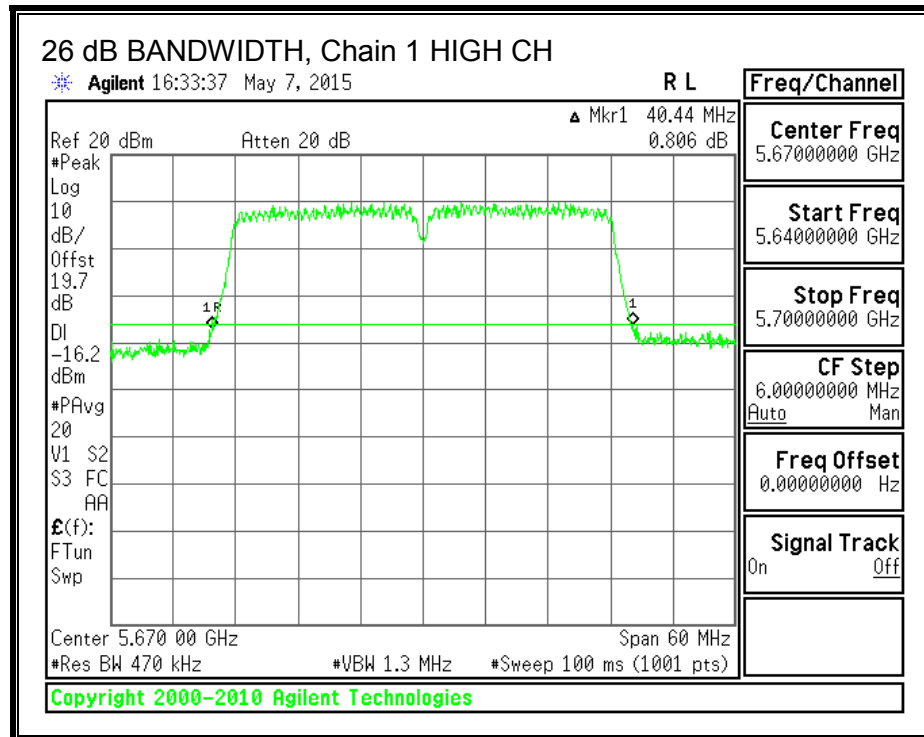






**26 dB BANDWIDTH, Chain 1**





## 8.31.2. 99% BANDWIDTH

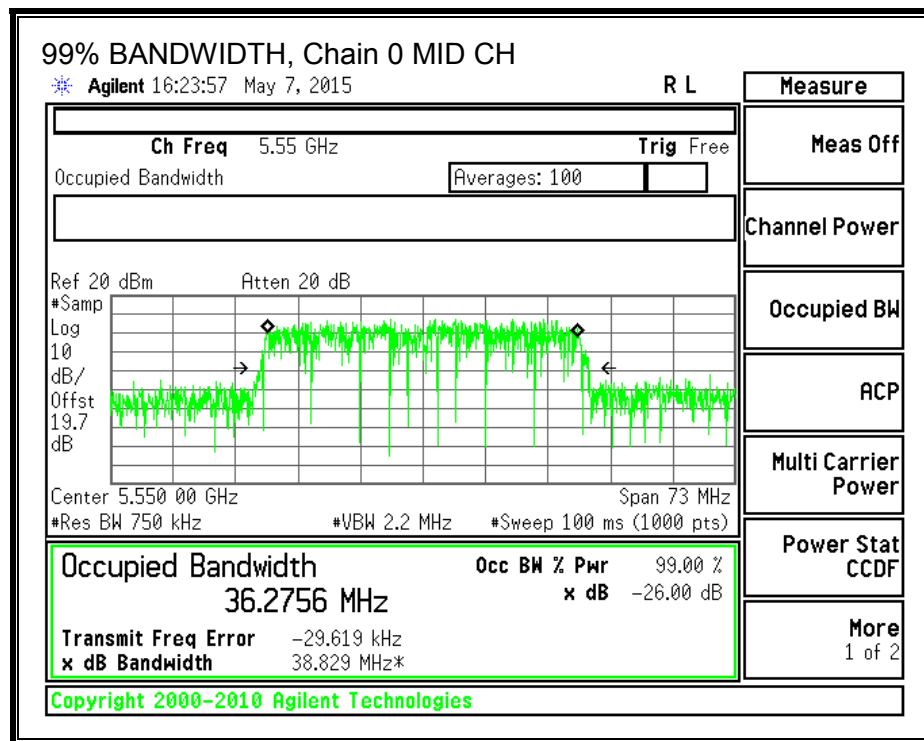
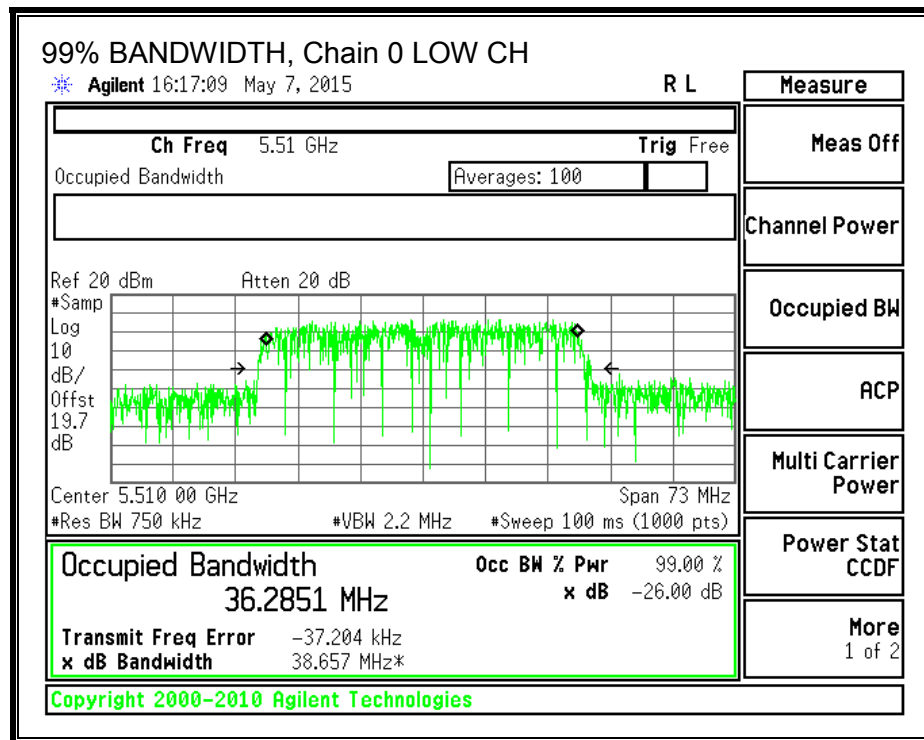
### LIMITS

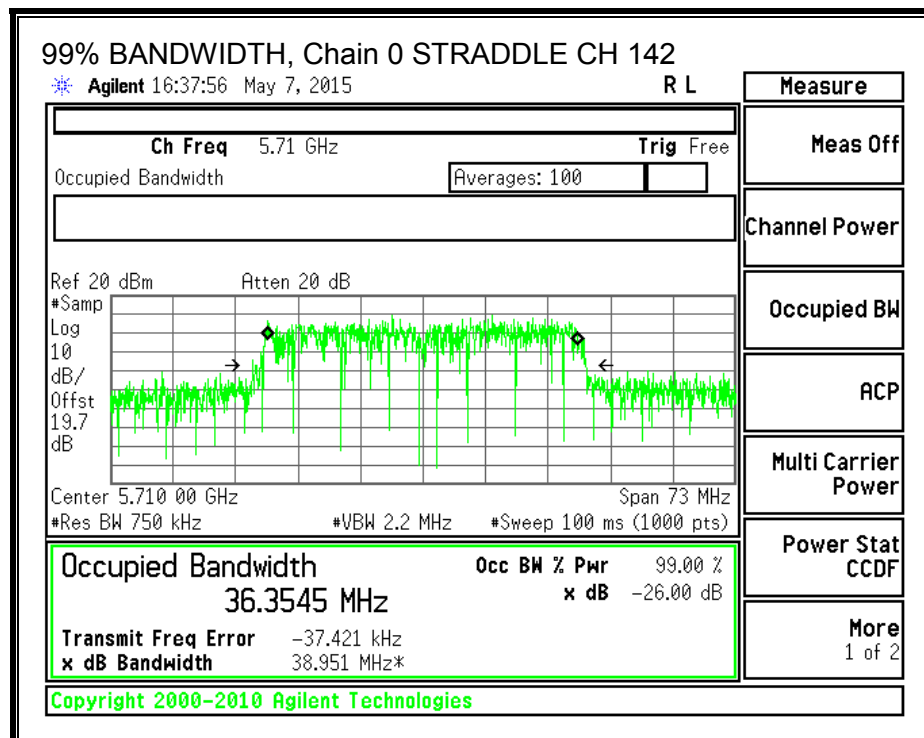
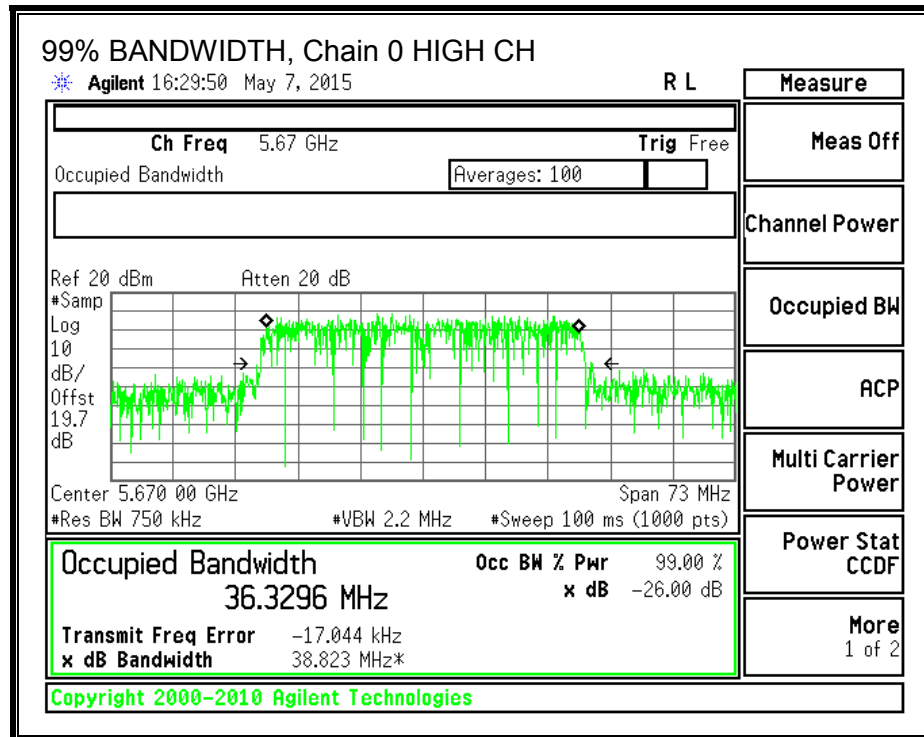
None; for reporting purposes only.

### RESULTS

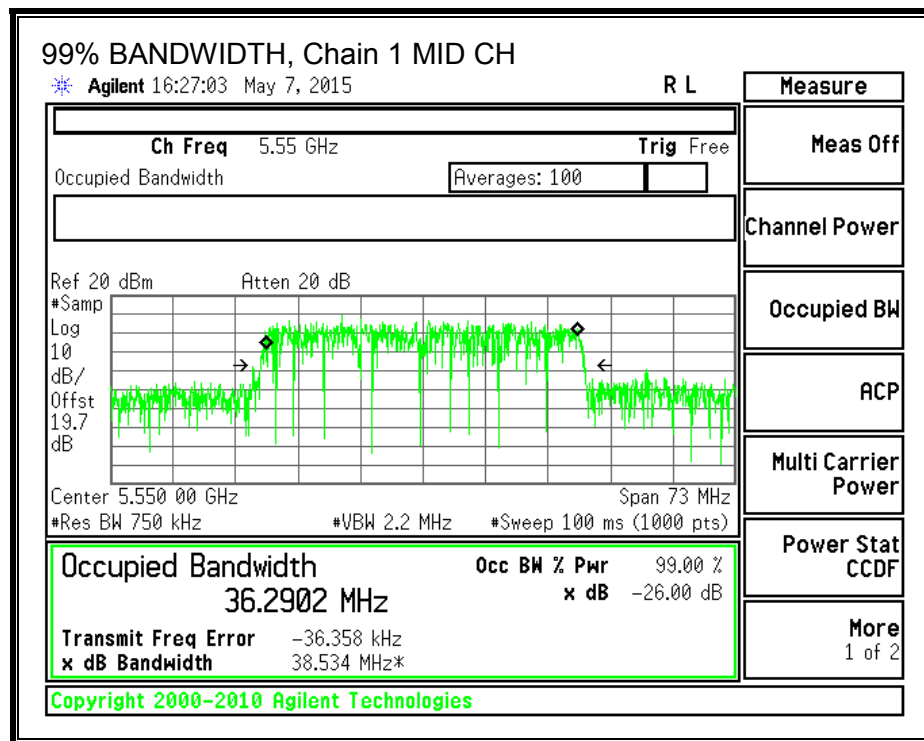
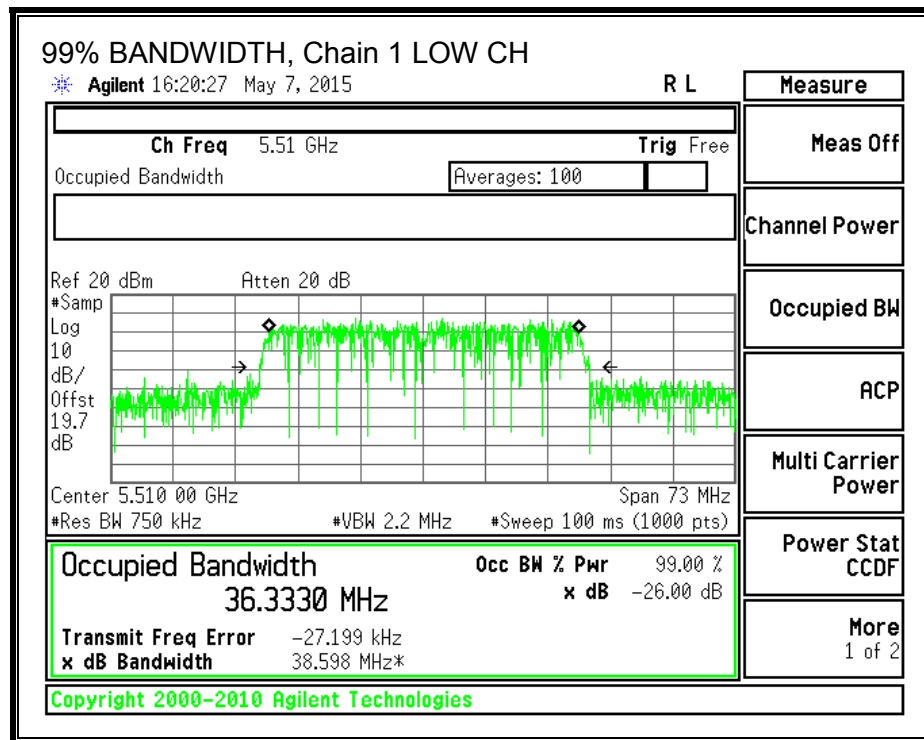
| Channel | Frequency<br>(MHz) | 99% BW<br>Chain 0<br>(MHz) | 99% BW<br>Chain 1<br>(MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low     | 5510               | 36.2851                    | 36.3330                    |
| Mid     | 5550               | 36.2756                    | 36.2902                    |
| High    | 5670               | 36.3296                    | 36.3444                    |
| 142     | 5710               | 36.3545                    | 36.3346                    |

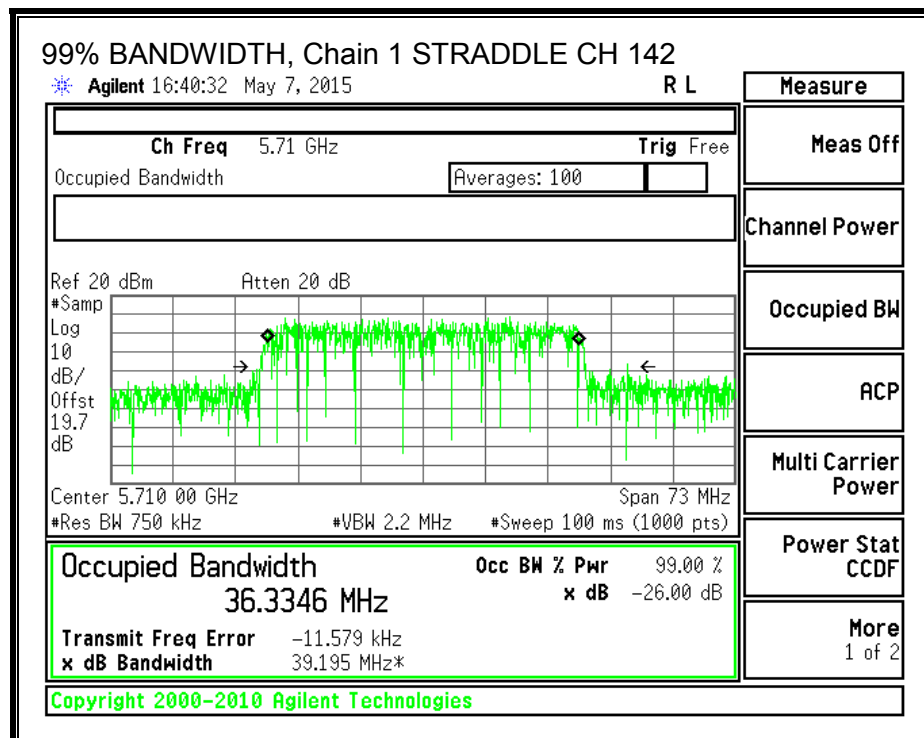
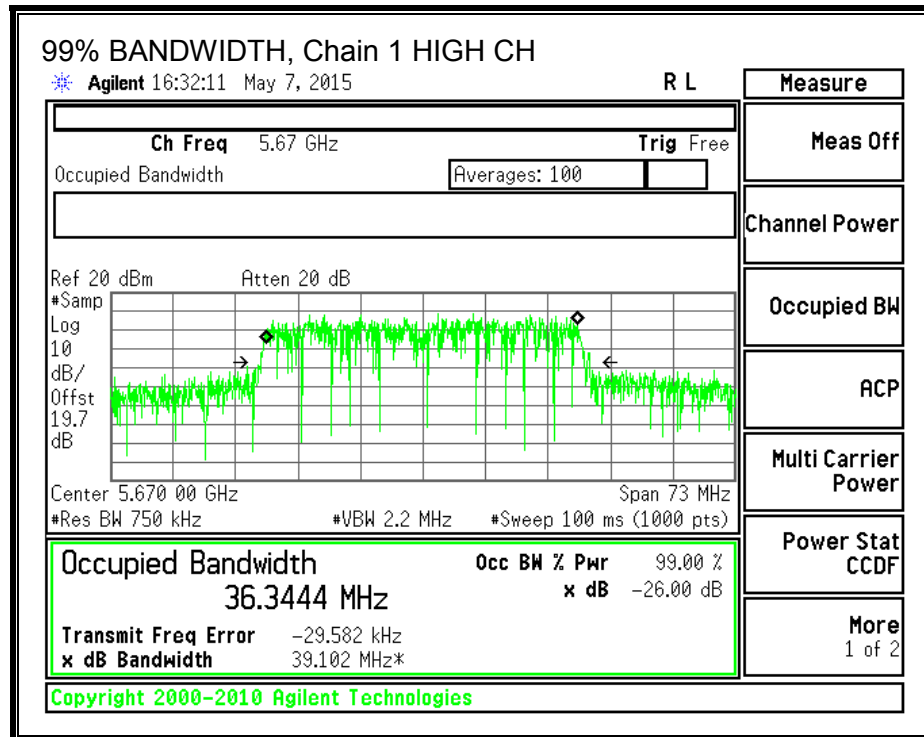
**99% BANDWIDTH, Chain 0**





**99% BANDWIDTH, Chain 1**





### 8.31.3. OUTPUT POWER AND PSD

#### LIMITS

FCC §15.407 (a) (2)

For the band 5.47–5.725 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<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Uncorrelated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|-----------------------------------------------------|
| 6.00                                | 6.00                                | 6.00                                                |

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

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Correlated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|---------------------------------------------------|
| 6.00                                | 6.00                                | 9.01                                              |



## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5510               | 40.02                       | 6.00                                      | 9.01                                    | 24.00                   | 7.99                  |
| Mid     | 5550               | 39.90                       | 6.00                                      | 9.01                                    | 24.00                   | 7.99                  |
| High    | 5670               | 40.20                       | 6.00                                      | 9.01                                    | 24.00                   | 7.99                  |

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.09 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

### Output Power Results

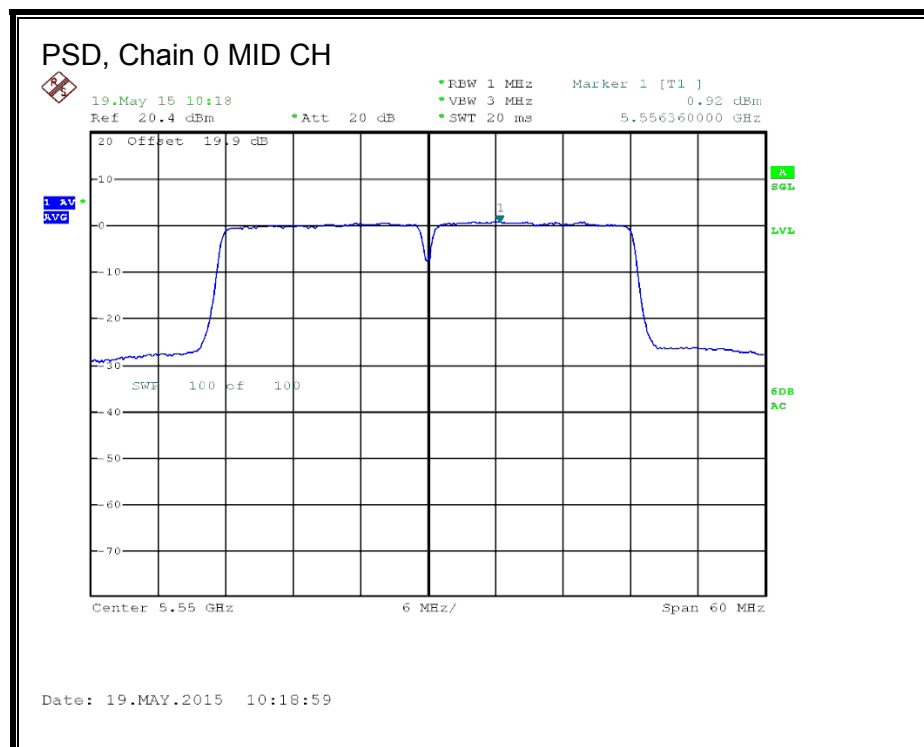
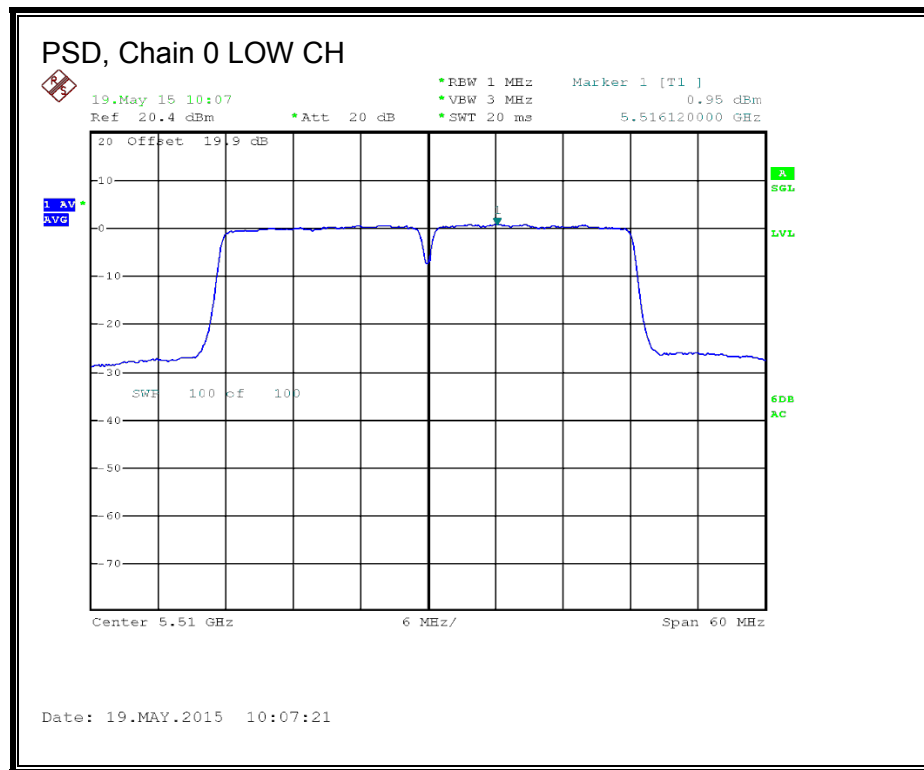
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5510               | 16.06                             | 16.22                             | 19.15                             | 24.00                   | -4.85                   |
| Mid     | 5550               | 19.25                             | 19.10                             | 22.19                             | 24.00                   | -1.81                   |
| High    | 5670               | 17.82                             | 17.10                             | 20.49                             | 24.00                   | -3.51                   |

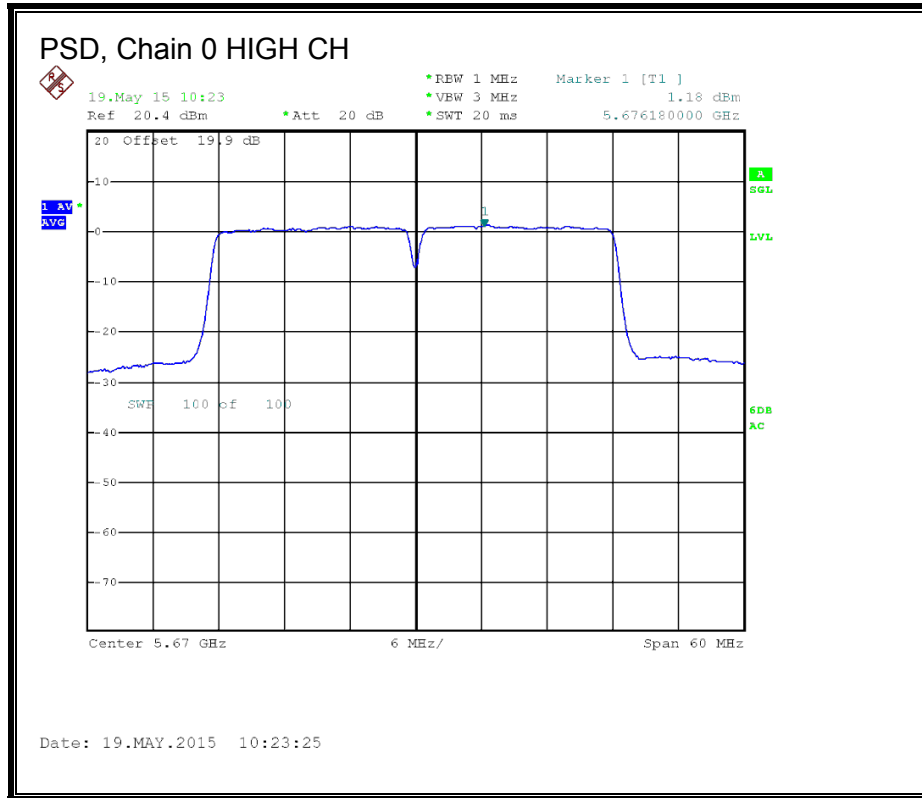
### PSD Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5510               | 0.95                            | 0.52                            | 3.84                            | 7.99                  | -4.15                 |
| Mid     | 5550               | 0.92                            | 0.81                            | 3.97                            | 7.99                  | -4.02                 |
| High    | 5670               | 1.18                            | 1.14                            | 4.26                            | 7.99                  | -3.73                 |

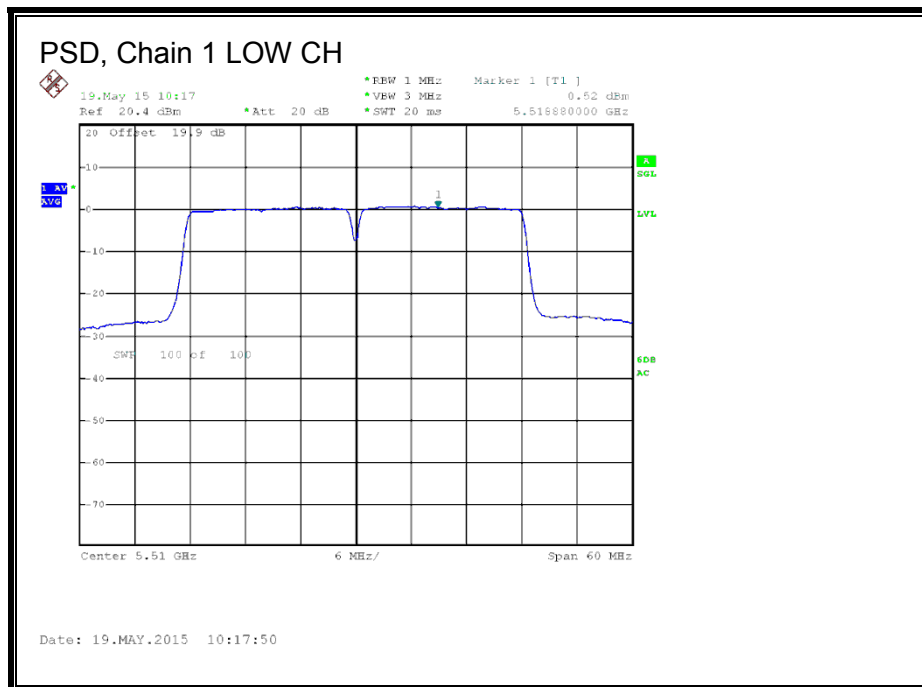
**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

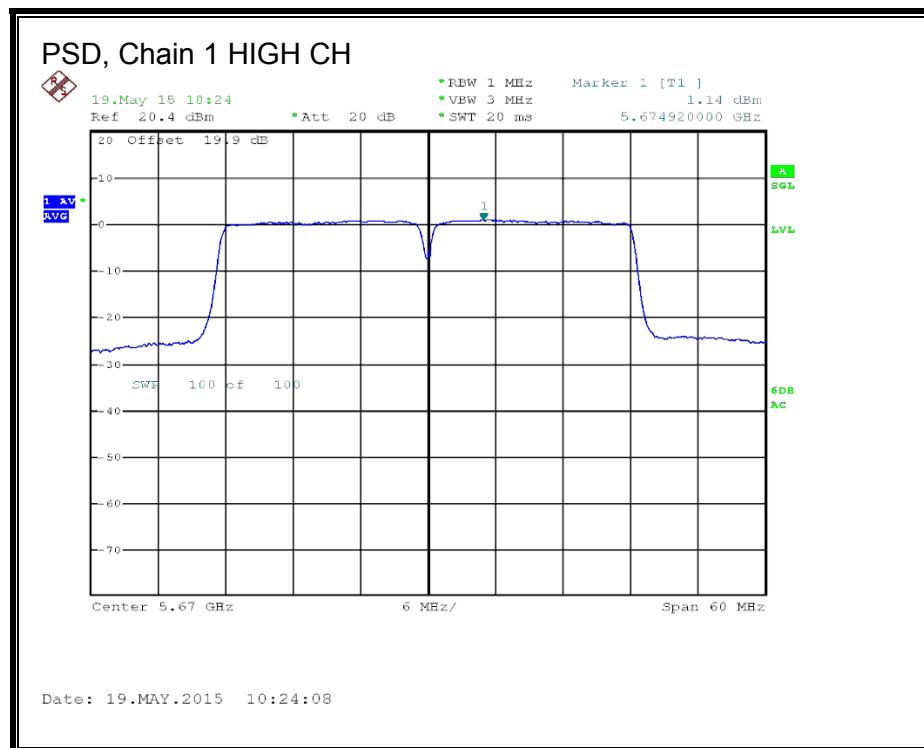
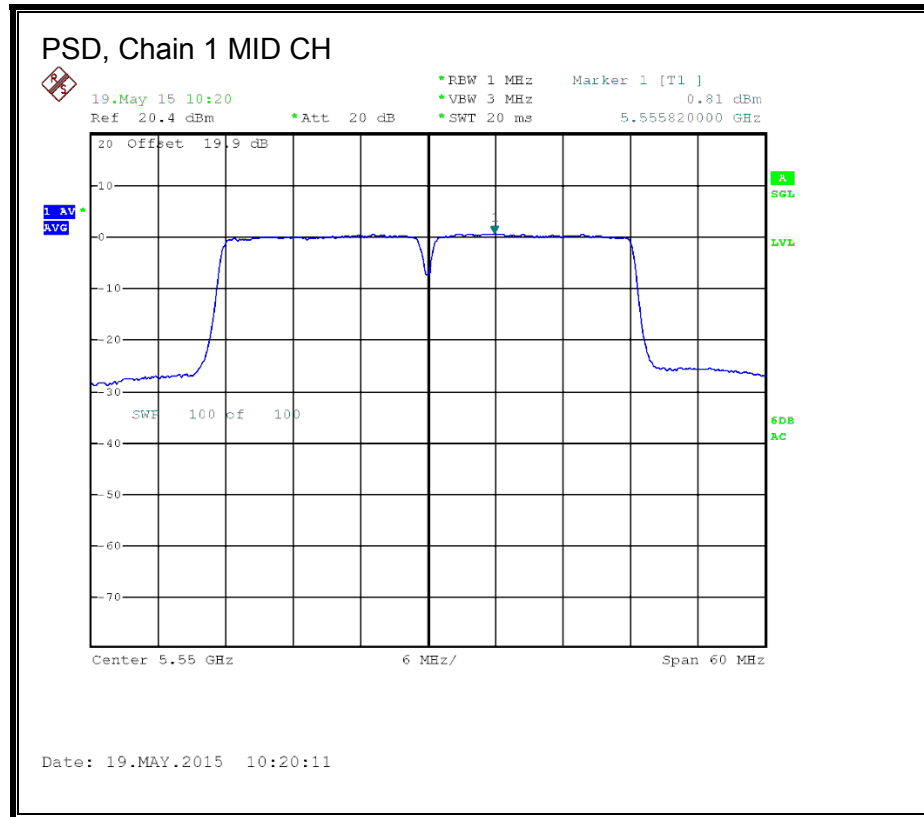
**PSD, Chain 0**





**PSD, Chain 1**





## **STRADDLE CHANNEL 142 RESULTS**

### **UNII-2C BAND**

#### **Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| 142     | 5710               | 35.10                       | 6.00                                      | 9.01                                    | 24.00                   | 7.99                  |

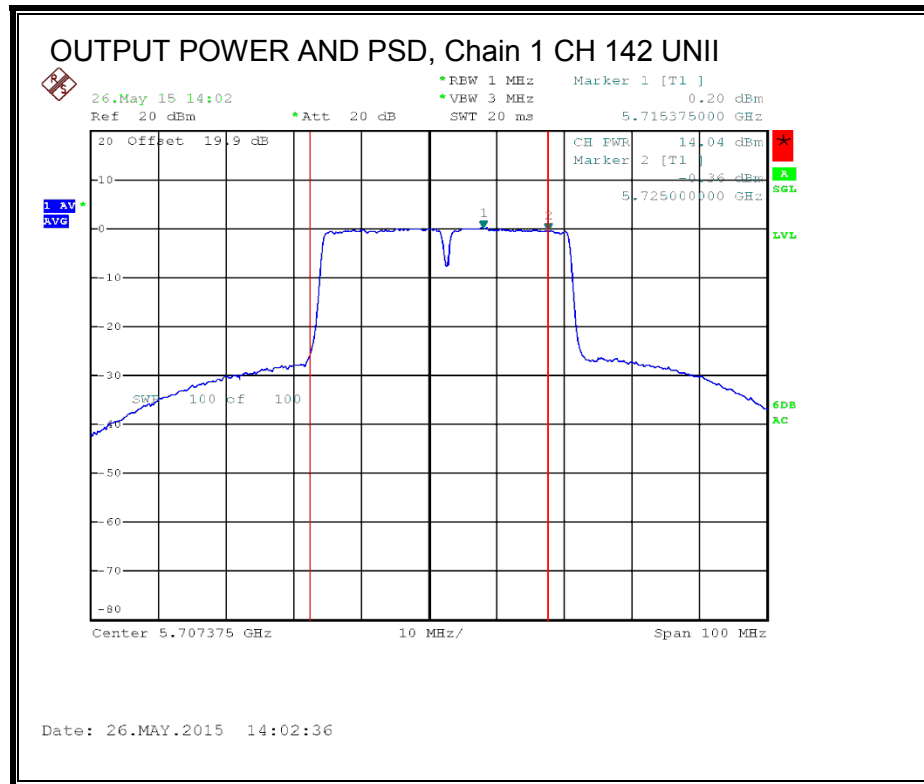
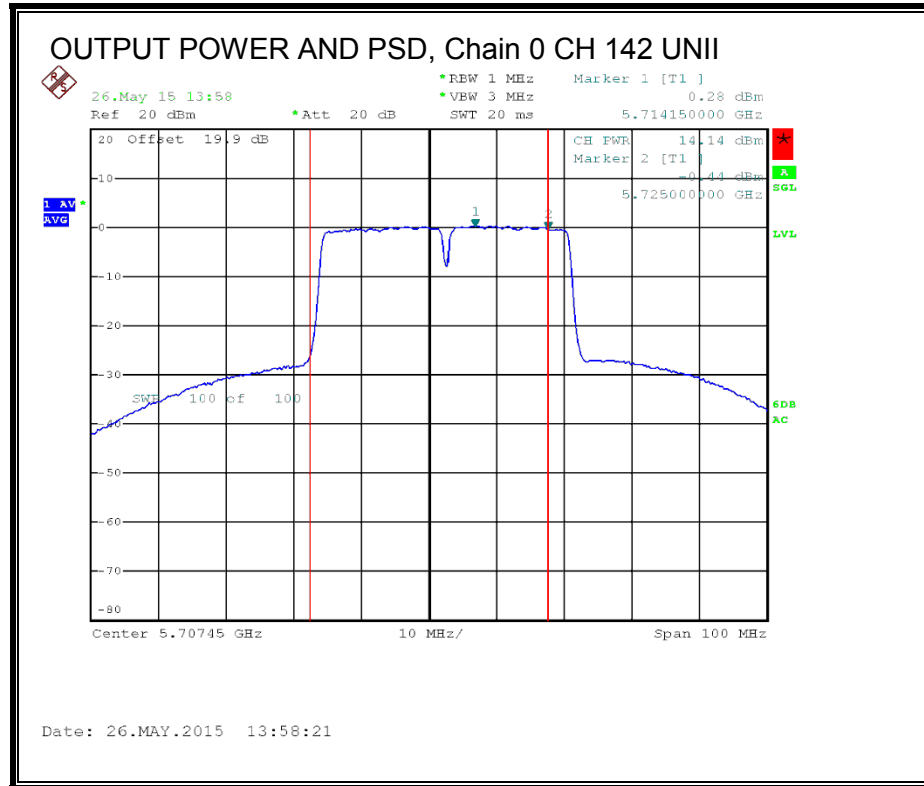
|                           |      |                                                           |
|---------------------------|------|-----------------------------------------------------------|
| <b>Duty Cycle CF (dB)</b> | 0.09 | <b>Included in Calculations of Corr'd Power &amp; PSD</b> |
|---------------------------|------|-----------------------------------------------------------|

#### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| 142     | 5710               | 14.14                             | 14.04                             | 17.19                             | 24.00                   | -6.81                   |

#### **PSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| 142     | 5710               | 0.28                            | 0.20                            | 3.34                            | 7.99                  | -4.65                 |



**UNII-3 BAND**

**Antenna Gain and Limit**

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| 142     | 5710               | 4.70                                      | 7.71                                    | 30.00                   | 28.29                 |

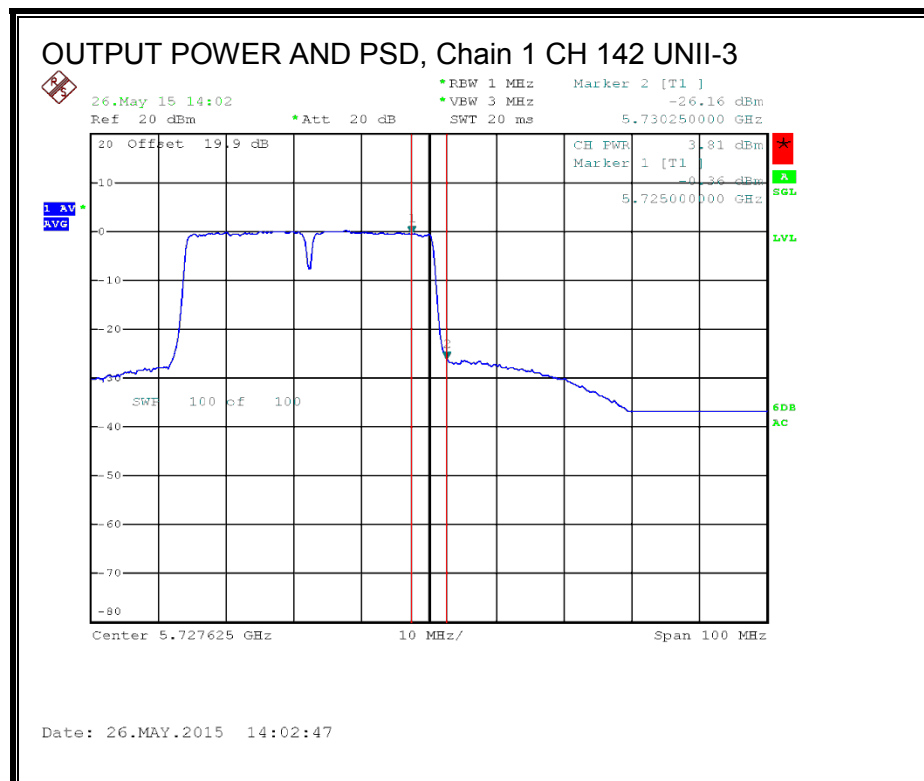
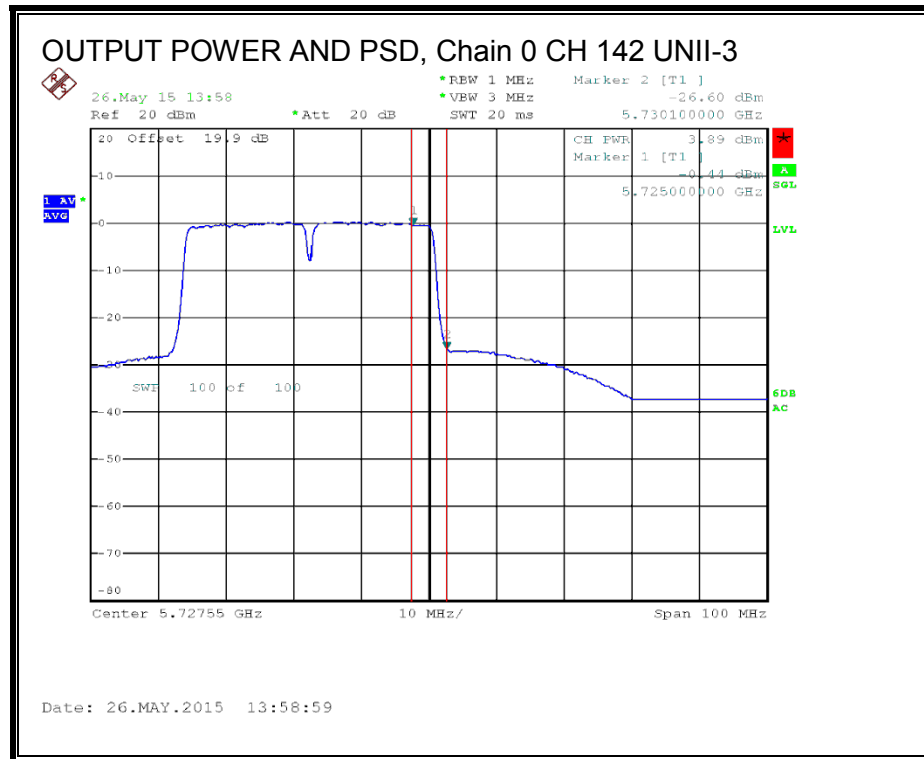
|                    |      |                                                |
|--------------------|------|------------------------------------------------|
| Duty Cycle CF (dB) | 0.09 | Included in Calculations of Corr'd Power & PSD |
|--------------------|------|------------------------------------------------|

**Output Power Results**

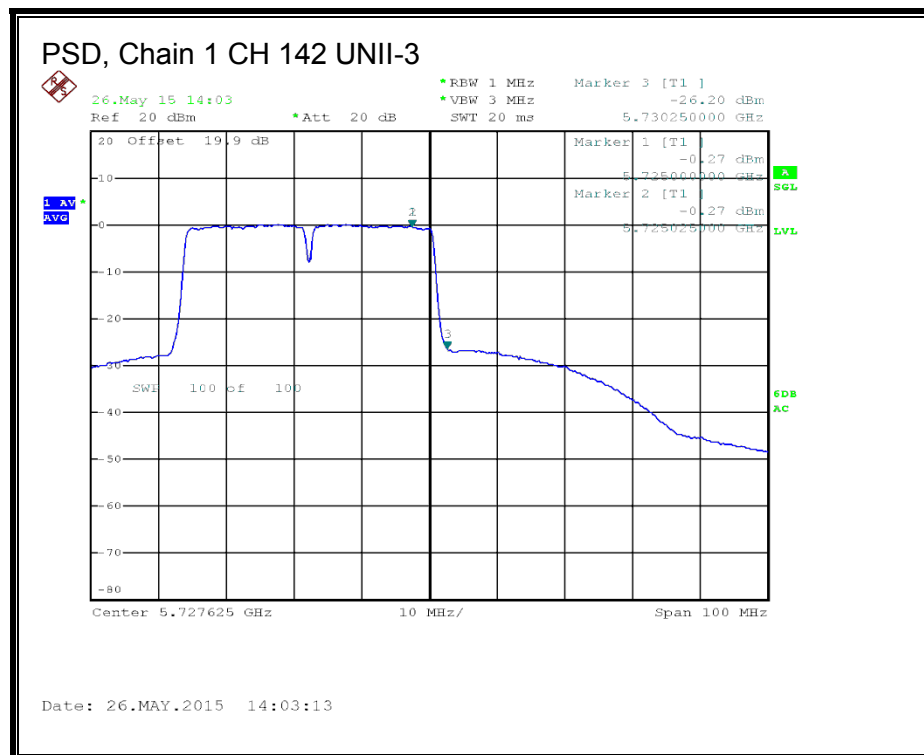
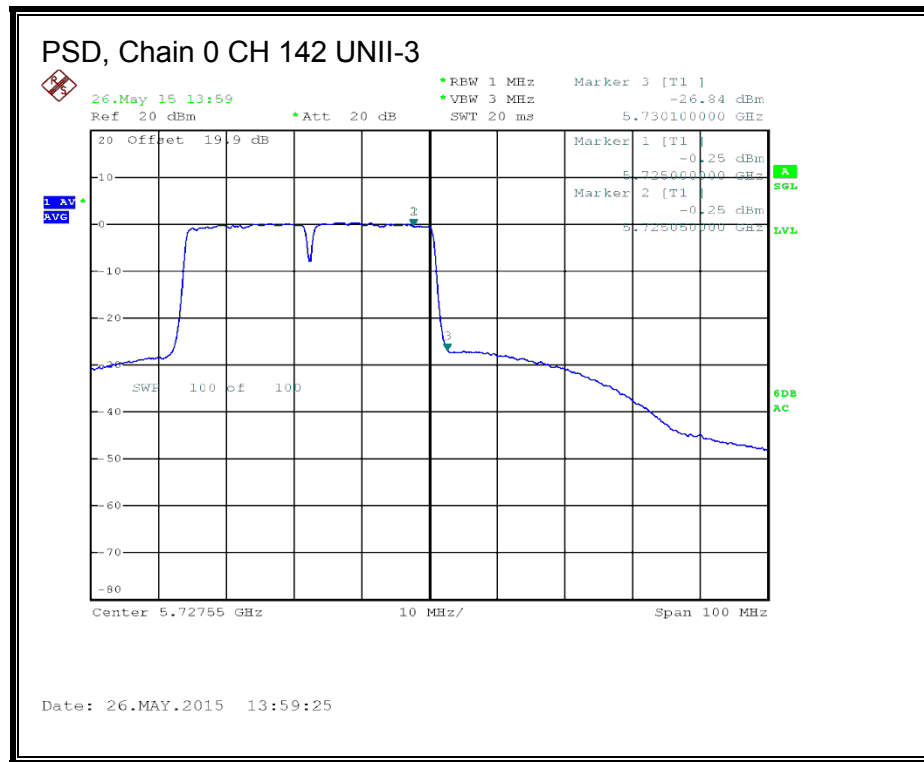
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| 142     | 5710               | 3.89                              | 3.81                              | 6.95                              | 30.00                   | -23.05                  |

**PSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| 142     | 5710               | -0.25                           | -0.27                           | 2.84                            | 28.29                 | -25.45                |







#### 8.31.4. AVERAGE OUTPUT POWER (WHOLE FUNDAMENTAL)

##### LIMITS

None; for reporting purposes only.

##### TEST PROCEDURE

The transmitter output is connected to a power meter.

##### RESULTS

###### Output Power Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| 142     | 5710               | 19.10                             | 18.50                             | 21.82                             |

**Note:** the power readings above are measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## **8.32. 802.11n HT40 TxBF 2Tx MODE IN THE 5.6 GHz BAND**

### **8.32.1. OUTPUT POWER AND PSD**

#### **LIMITS**

FCC §15.407 (a) (2)

For the band 5.47–5.725 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 Power and PSD the TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

| <b>Chain 0<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Chain 1<br/>Antenna<br/>Gain<br/>(dBi)</b> | <b>Correlated Chains<br/>Directional<br/>Gain<br/>(dBi)</b> |
|-----------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|
| 6.00                                          | 6.00                                          | 9.01                                                        |

## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5510               | 40.02                       | 9.01                                      | 9.01                                    | 20.99                   | 7.99                  |
| Mid     | 5550               | 39.90                       | 9.01                                      | 9.01                                    | 20.99                   | 7.99                  |
| High    | 5670               | 40.20                       | 9.01                                      | 9.01                                    | 20.99                   | 7.99                  |

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.09 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

### Output Power Results

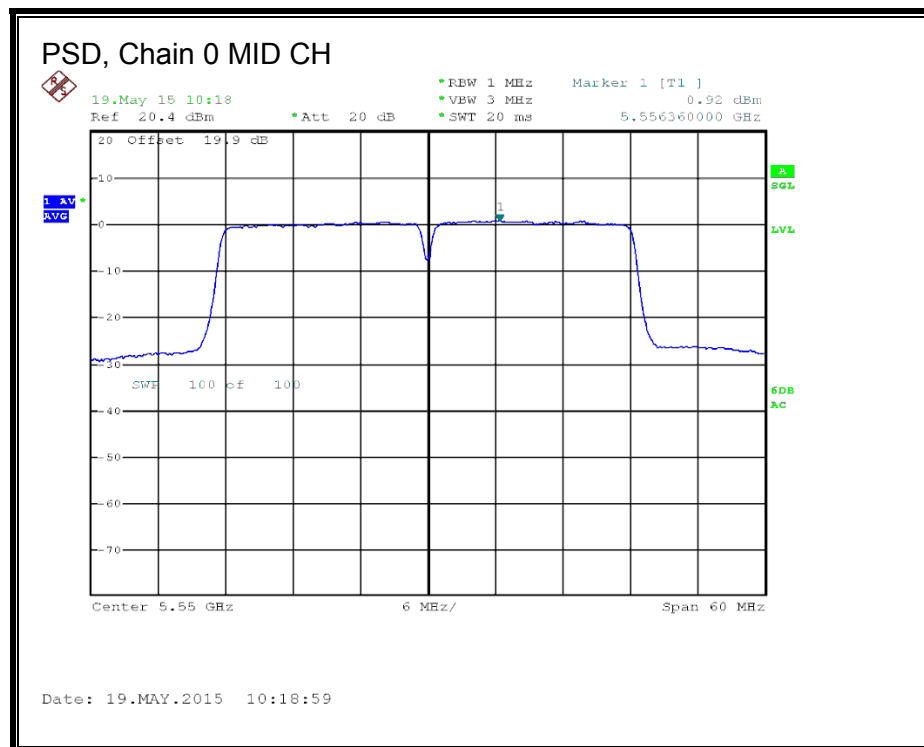
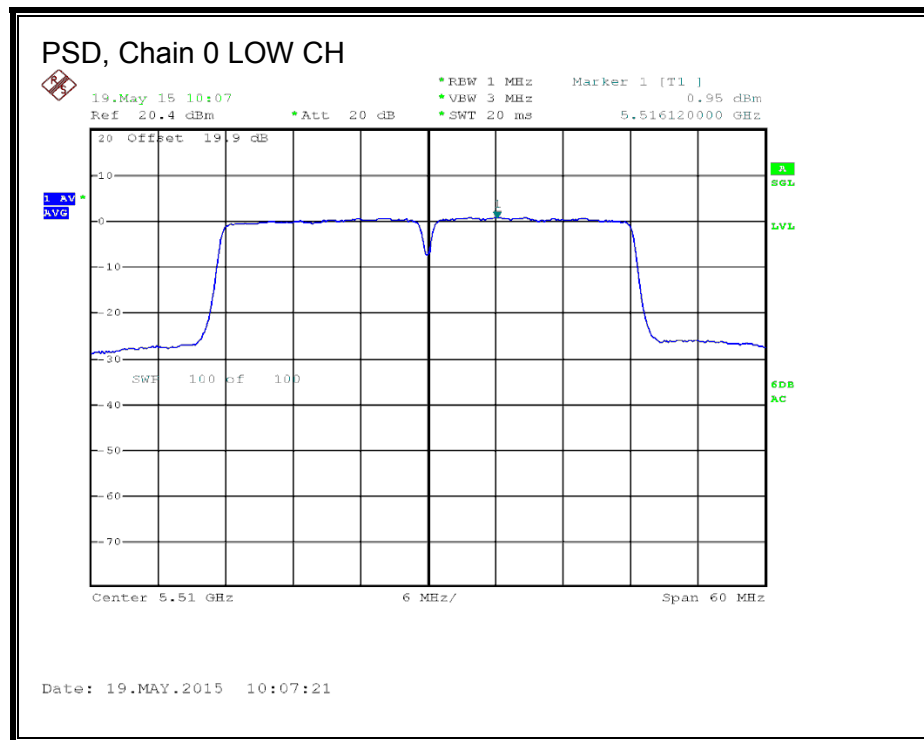
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5510               | 15.82                             | 15.96                             | 18.90                             | 20.99                   | -2.09                   |
| Mid     | 5550               | 17.75                             | 17.60                             | 20.69                             | 20.99                   | -0.30                   |
| High    | 5670               | 17.70                             | 17.70                             | 20.71                             | 20.99                   | -0.28                   |

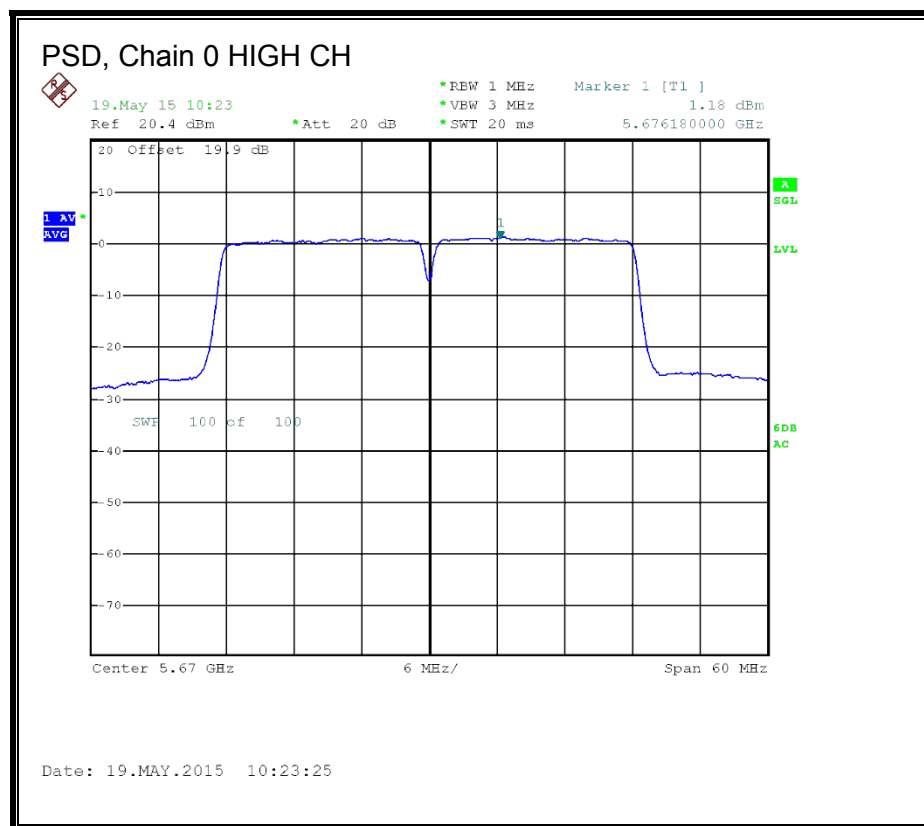
### PSD Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5510               | 0.95                            | 0.52                            | 3.84                            | 7.99                  | -4.15                 |
| Mid     | 5550               | 0.92                            | 0.81                            | 3.97                            | 7.99                  | -4.02                 |
| High    | 5670               | 1.18                            | 1.14                            | 4.26                            | 7.99                  | -3.73                 |

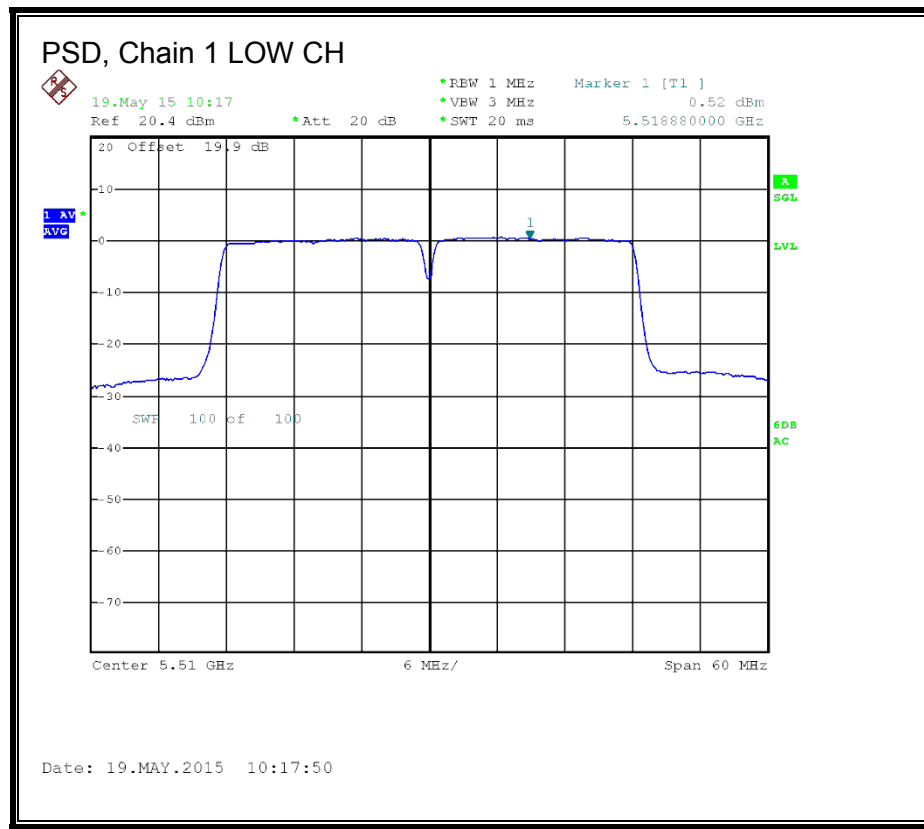
**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

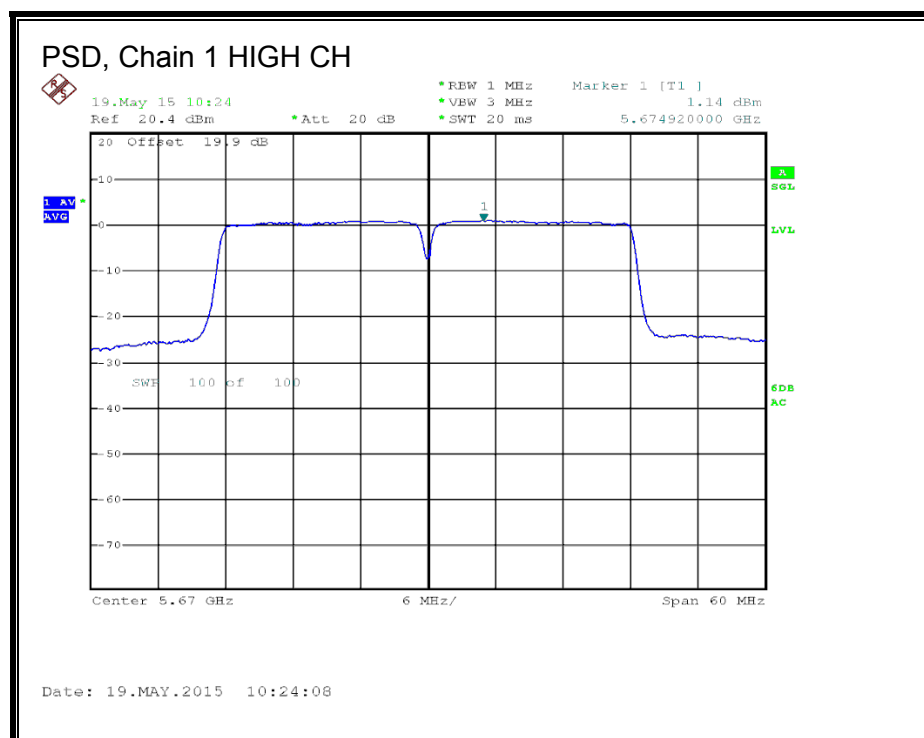
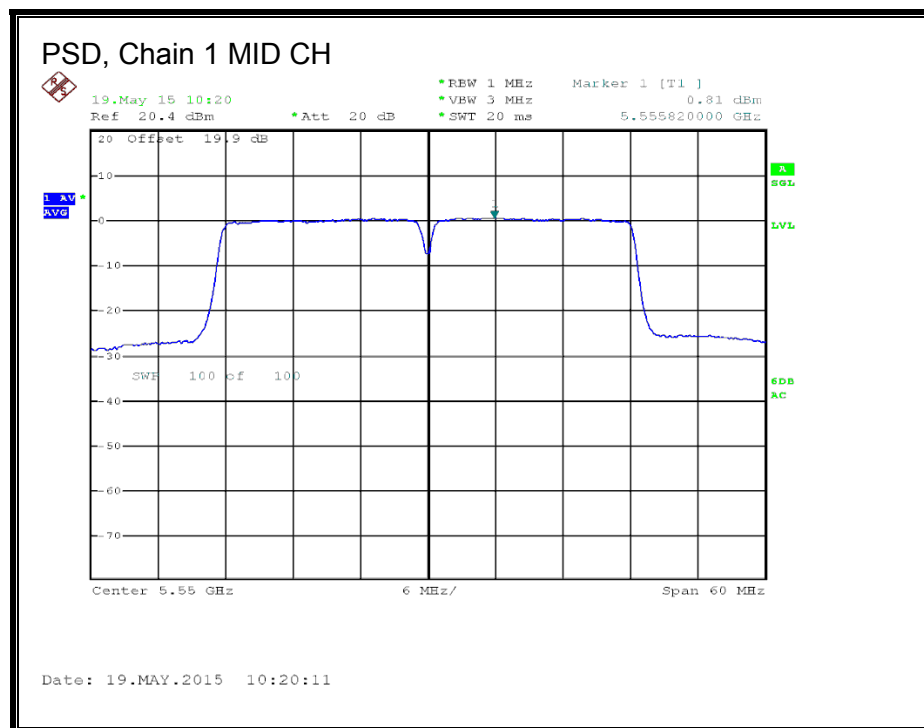
**PSD, Chain 0**





**PSD, Chain 1**







## **STRADDLE CHANNEL 142 RESULTS**

### **UNII-2C BAND**

#### **Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| 142     | 5710               | 35.10                       | 9.01                                      | 9.01                                    | 20.99                   | 7.99                  |

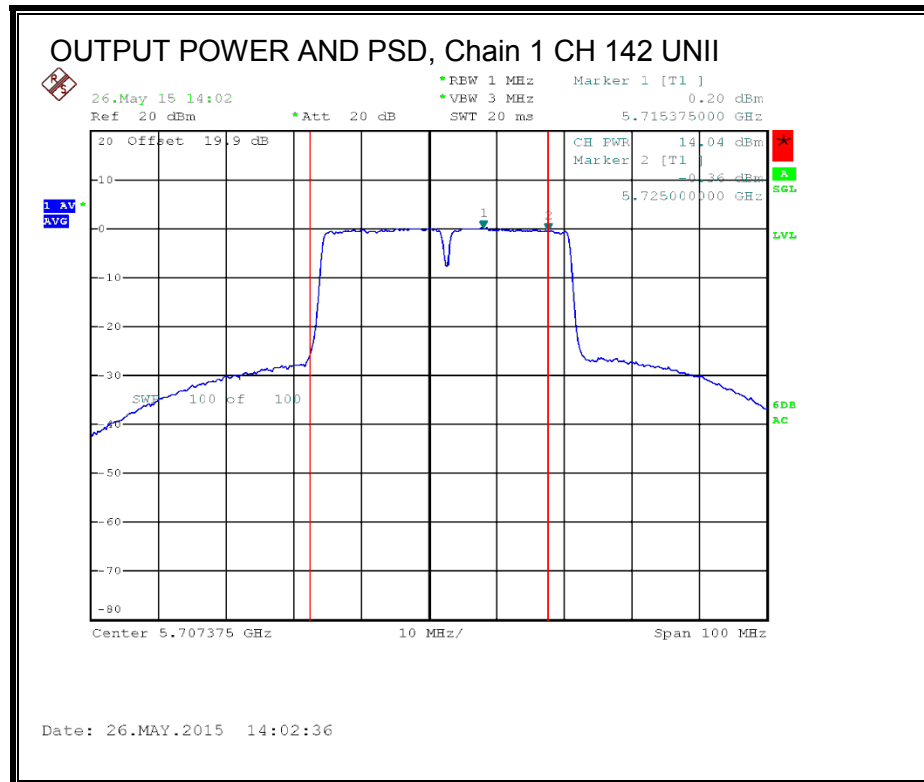
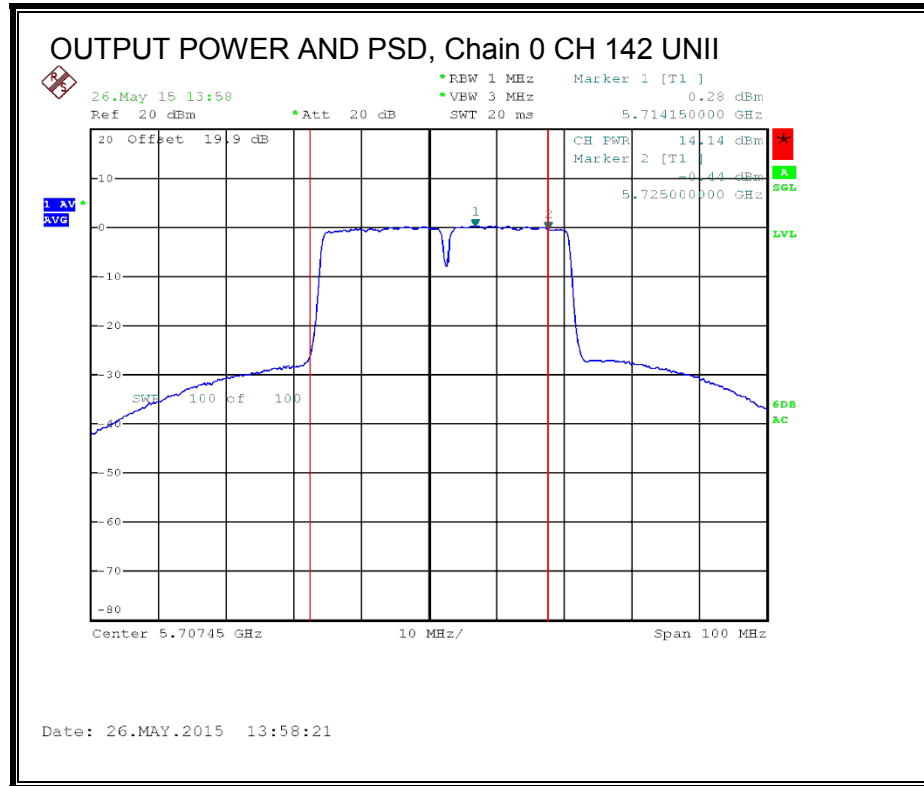
|                           |      |                                                           |
|---------------------------|------|-----------------------------------------------------------|
| <b>Duty Cycle CF (dB)</b> | 0.09 | <b>Included in Calculations of Corr'd Power &amp; PSD</b> |
|---------------------------|------|-----------------------------------------------------------|

#### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| 142     | 5710               | 14.14                             | 14.04                             | 17.19                             | 20.99                   | -3.80                   |

#### **PSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| 142     | 5710               | 0.28                            | 0.20                            | 3.34                            | 7.99                  | -4.65                 |



**UNII-3 BAND**

**Antenna Gain and Limit**

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| 142     | 5710               | 7.71                                      | 7.71                                    | 28.29                   | 28.29                 |

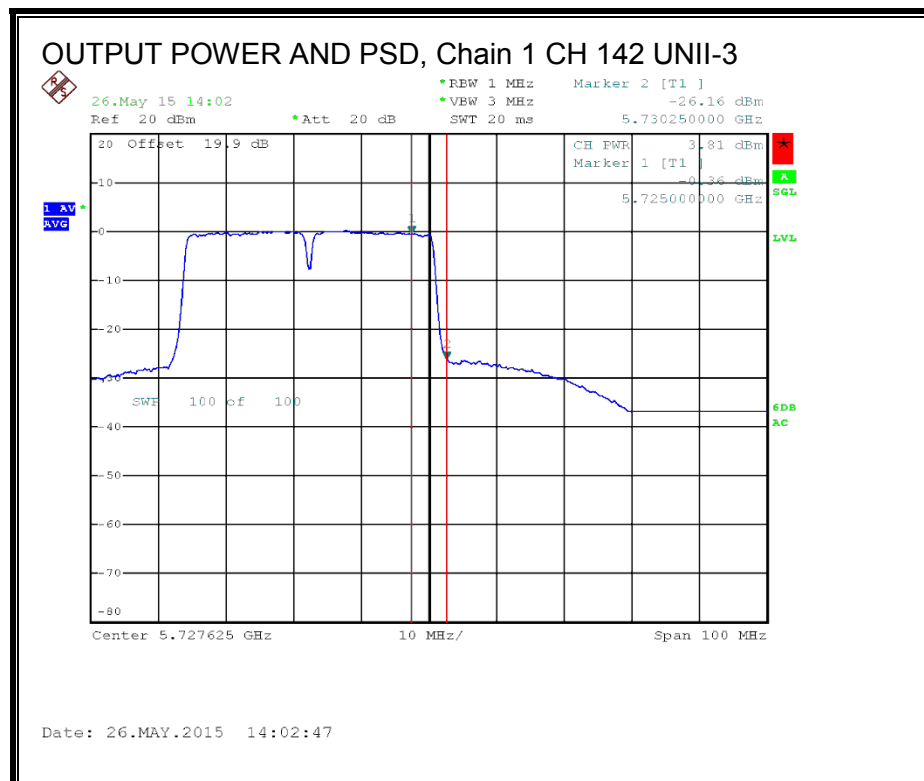
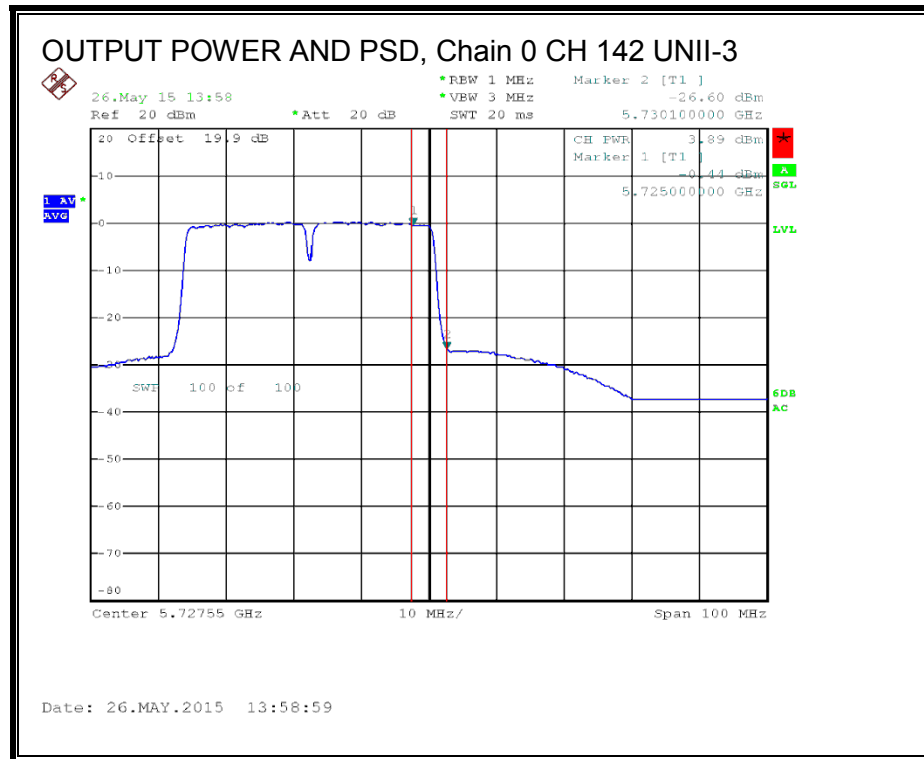
|                    |      |                                                |
|--------------------|------|------------------------------------------------|
| Duty Cycle CF (dB) | 0.09 | Included in Calculations of Corr'd Power & PSD |
|--------------------|------|------------------------------------------------|

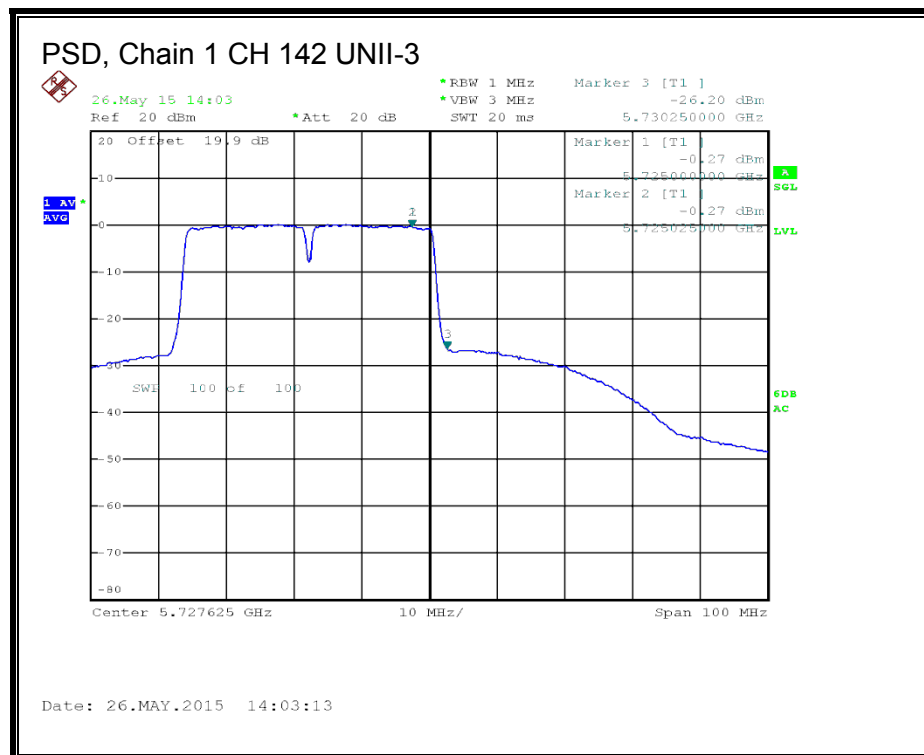
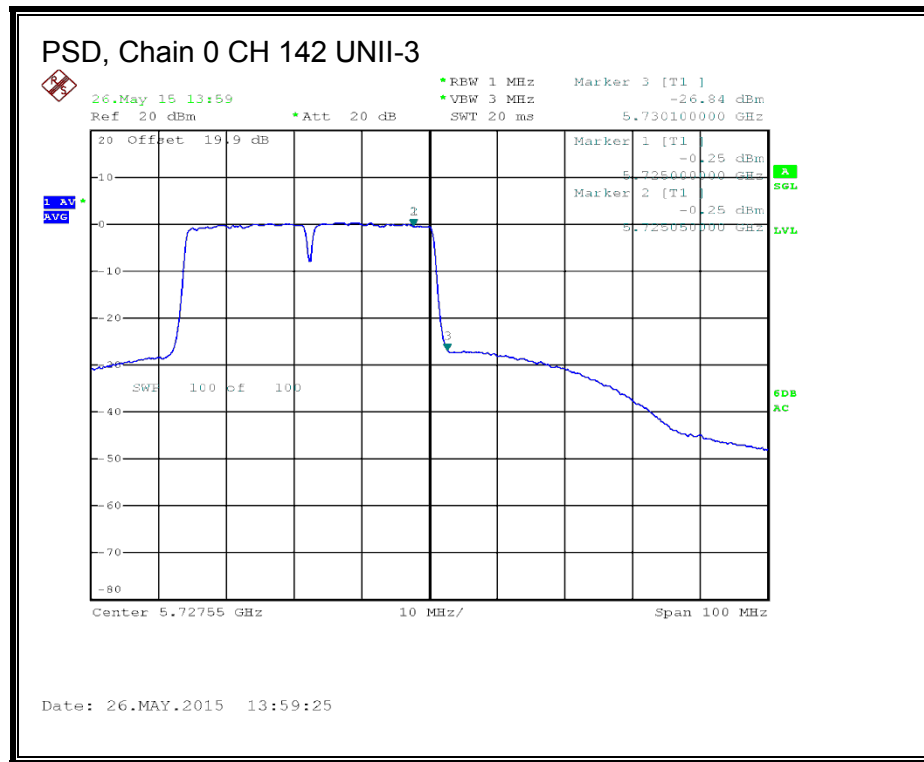
**Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| 142     | 5710               | 3.89                              | 3.81                              | 6.95                              | 28.29                   | -21.34                  |

**PSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| 142     | 5710               | -0.25                           | -0.27                           | 2.84                            | 28.29                 | -25.45                |





## 8.32.2. AVERAGE OUTPUT POWER (WHOLE FUNDAMENTAL)

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

### RESULTS

#### Output Power Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| 142     | 5710               | 19.10                             | 18.50                             | 21.82                             |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

### **8.33. 802.11ac VHT80 1Tx MODE IN THE 5.6 GHz BAND**

#### **8.33.1. OUTPUT POWER**

##### **LIMITS**

FCC §15.407 (a) (2)

For the band 5.47–5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , 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**

This is SISO mode, AG is the highest (worst-case) = 6 dBi

## **RESULTS**

### **Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|------------------------------|-------------------------|-----------------------|
| Low     | 5530               | 81.70                       | 6.00                         | 24.00                   | 11.00                 |

### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5530               | 17.00                             | 17.00                             | 24.00                   | -7.00                   |

**Note:** for Chain 0, 26dB data & plots, see section 11ac HT80 CDD 2TX MODE IN THE 5.6 GHz BAND.

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.



### 8.34. 802.11ac VHT80 CDD 2Tx MODE IN THE 5.6 GHz BAND

#### 8.34.1. 26 dB BANDWIDTH

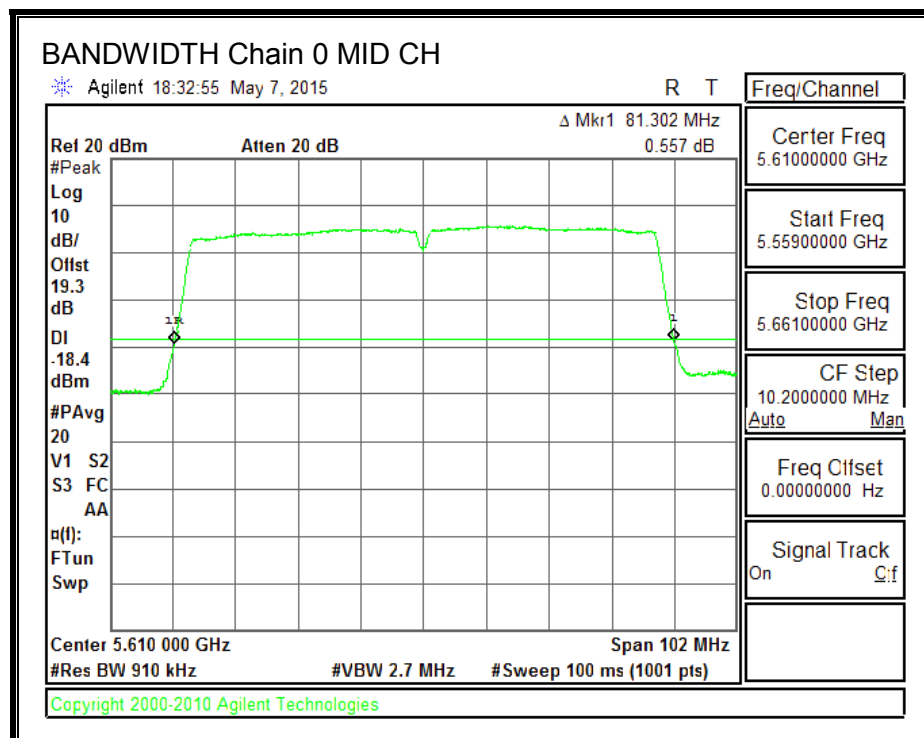
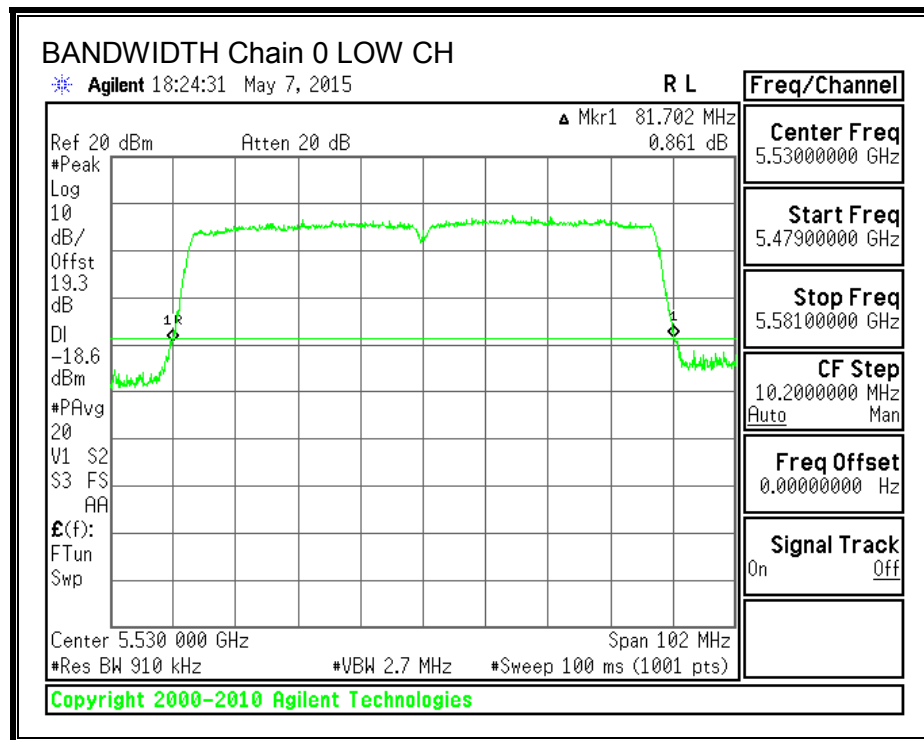
##### LIMITS

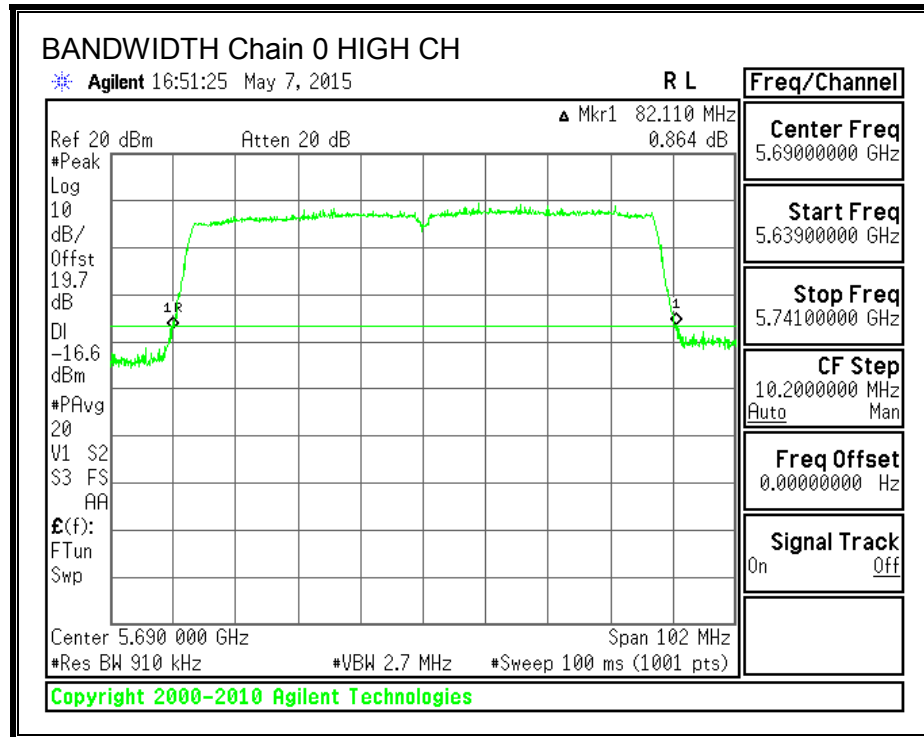
None; for reporting purposes only.

##### RESULTS

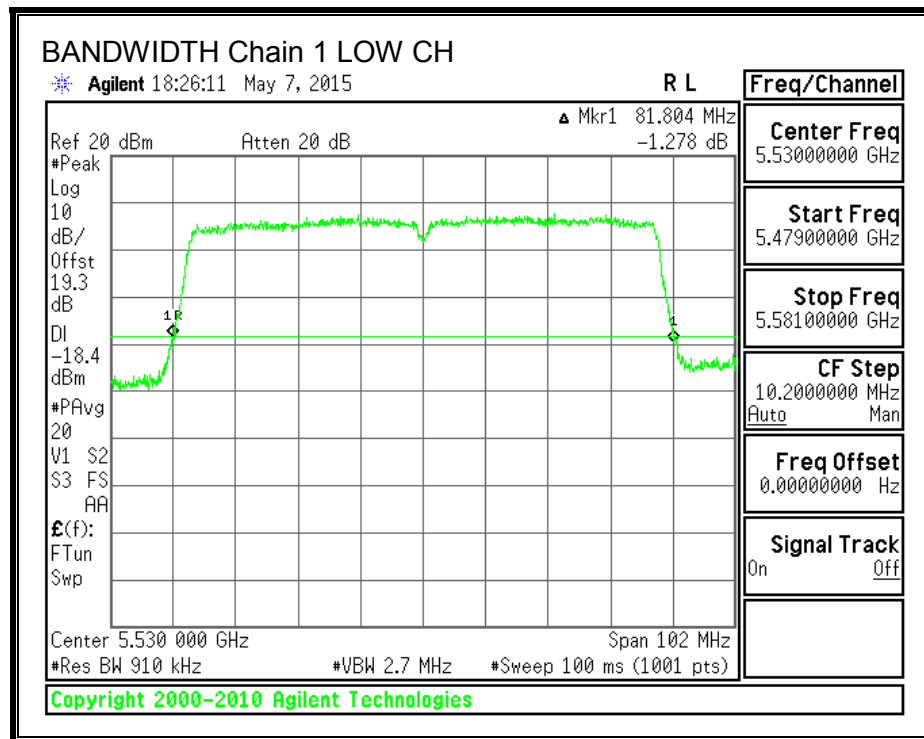
| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) | 26 dB BW<br>Chain 1<br>(MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low     | 5530               | 81.702                       | 81.804                       |
| Mid     | 5610               | 81.302                       | 81.200                       |
| High    | 5690               | 82.110                       | 81.600                       |

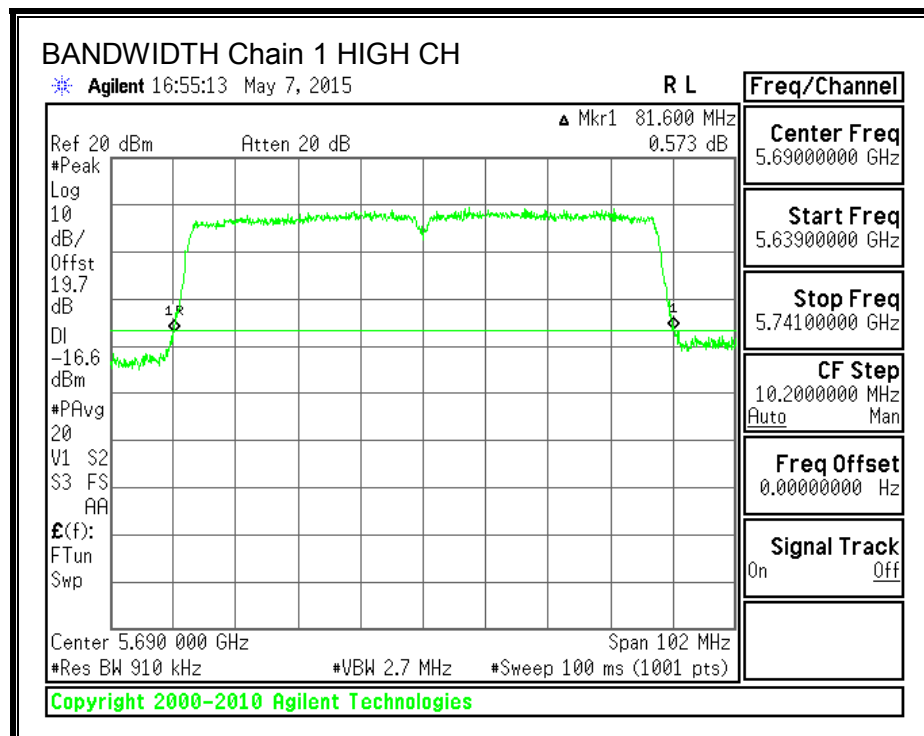
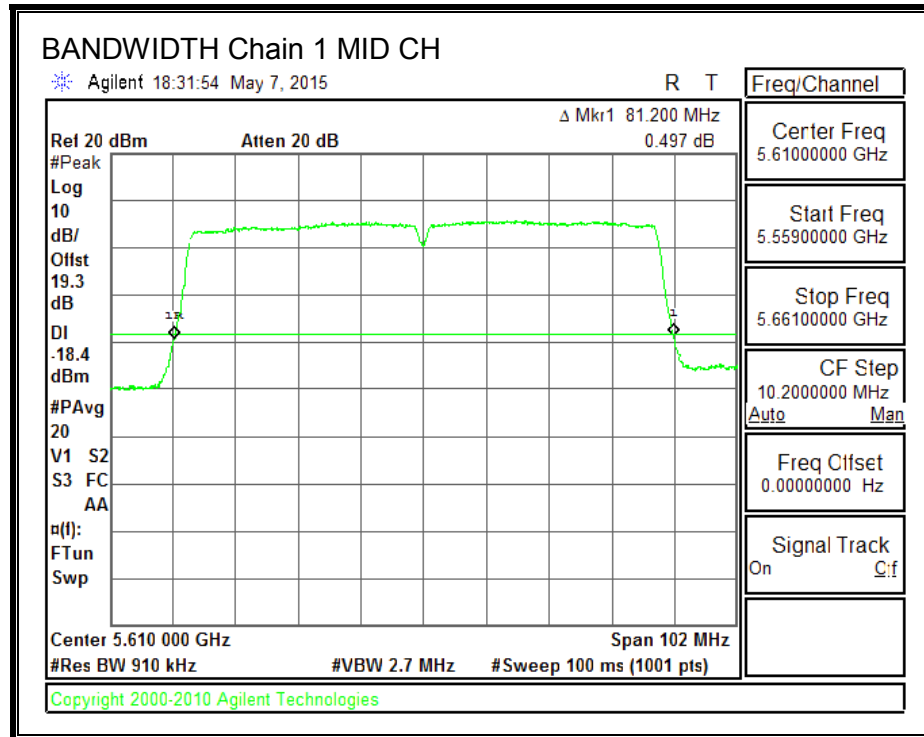
**26 dB BANDWIDTH, Chain 0**





**26 dB BANDWIDTH, Chain 1**





## 8.34.2. 99% BANDWIDTH

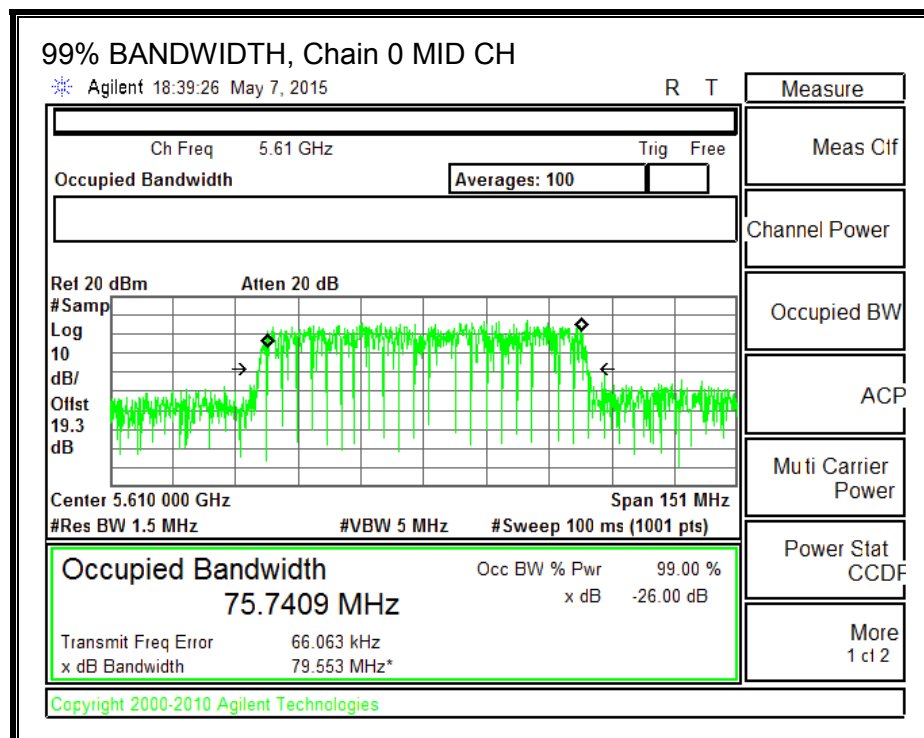
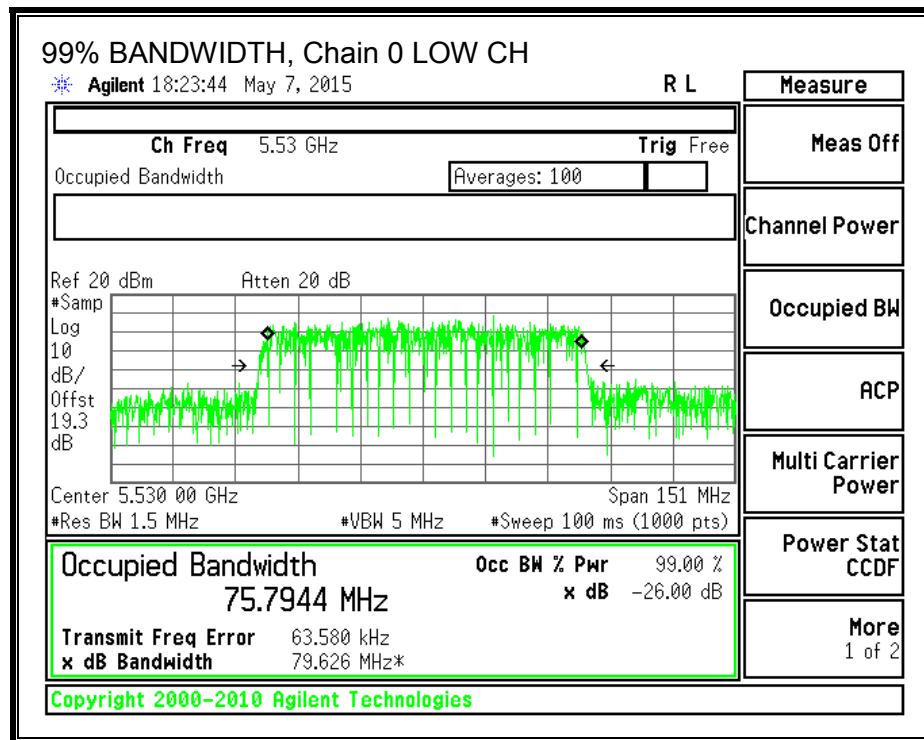
### LIMITS

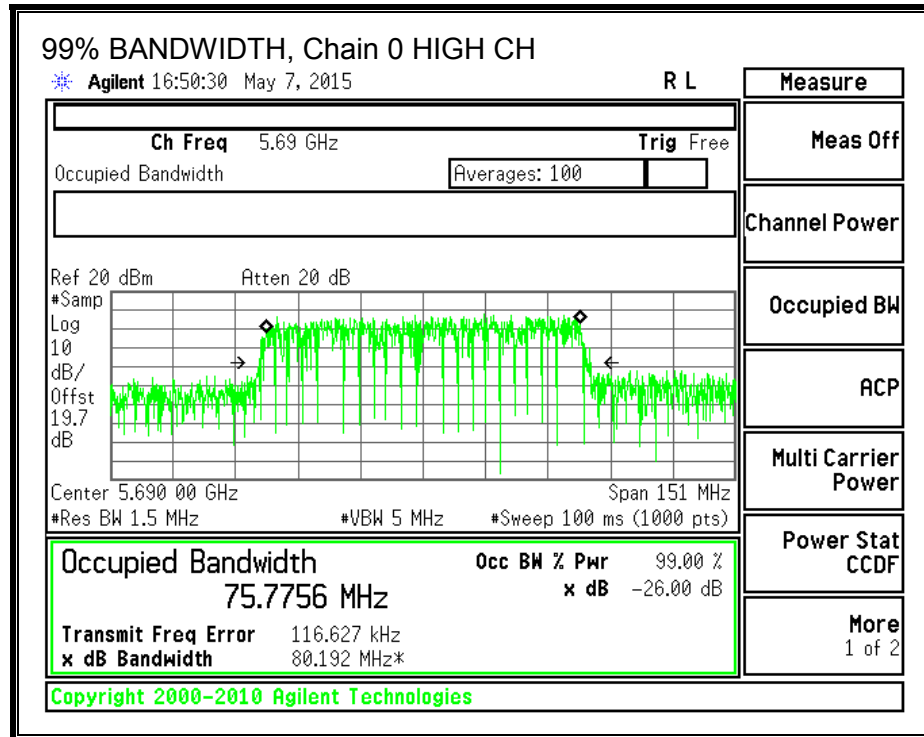
None; for reporting purposes only.

### RESULTS

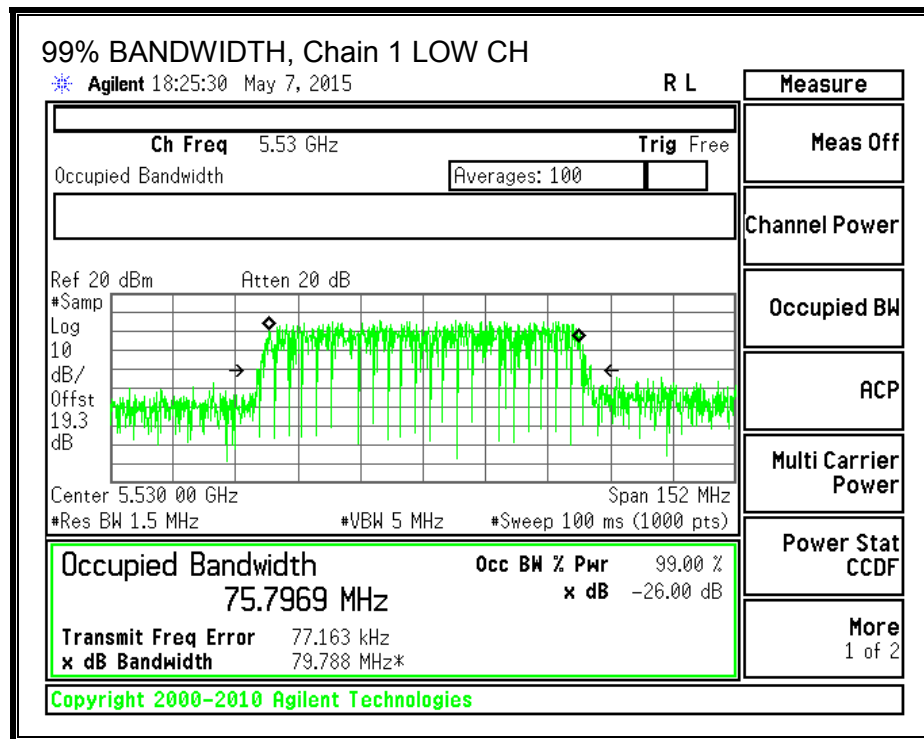
| Channel | Frequency<br>(MHz) | 99% BW<br>Chain 0<br>(MHz) | 99% BW<br>Chain 1<br>(MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low     | 5530               | 75.7944                    | 75.7969                    |
| Mid     | 5610               | 75.7409                    | 75.7736                    |
| High    | 5690               | 75.7756                    | 75.8309                    |

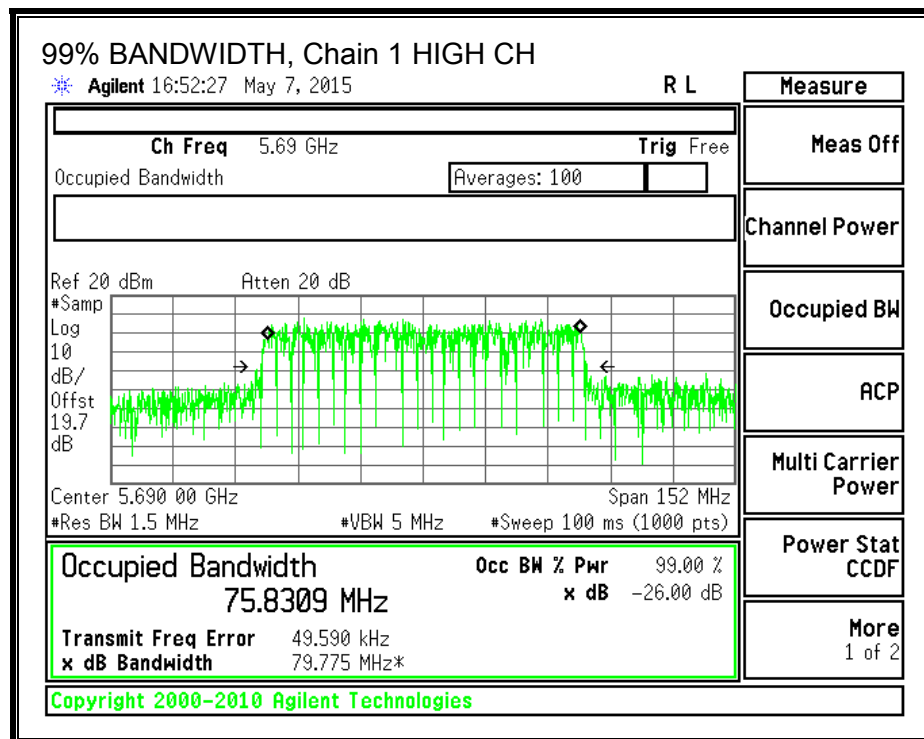
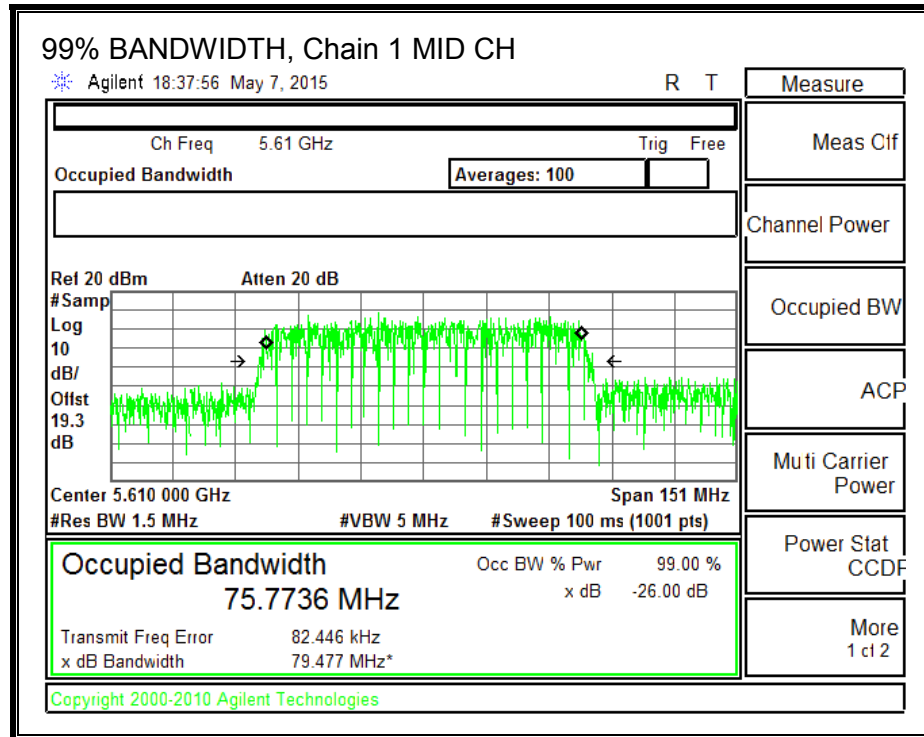
**99% BANDWIDTH, Chain 0**





**99% BANDWIDTH, Chain 1**







### 8.34.3. OUTPUT POWER AND PSD

#### LIMITS

FCC §15.407 (a) (2)

For the band 5.47–5.725 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<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Uncorrelated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|-----------------------------------------------------|
| 6.00                                | 6.00                                | 6.00                                                |

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

| Chain 0<br>Antenna<br>Gain<br>(dBi) | Chain 1<br>Antenna<br>Gain<br>(dBi) | Correlated Chains<br>Directional<br>Gain<br>(dBi) |
|-------------------------------------|-------------------------------------|---------------------------------------------------|
| 6.00                                | 6.00                                | 9.01                                              |

## RESULTS

### Bandwidth, Antenna Gain, and Limits

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5530               | 81.70                       | 6.00                                      | 9.01                                    | 24.00                   | 7.99                  |
| Mid     | 5610               | 81.20                       | 6.00                                      | 9.01                                    | 24.00                   | 7.99                  |

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.19 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

### Output Power Results

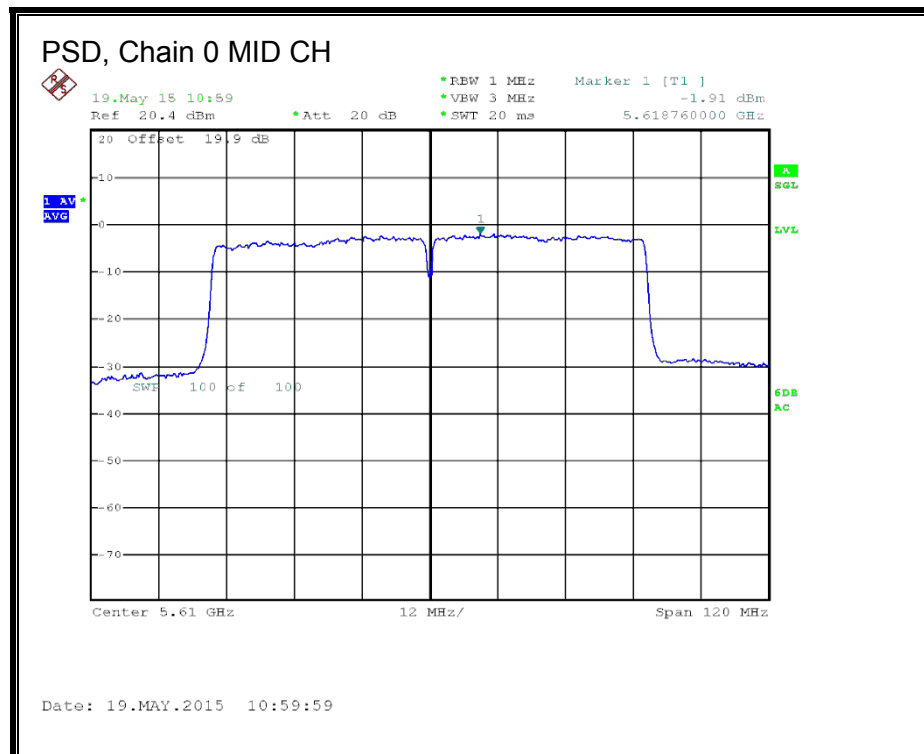
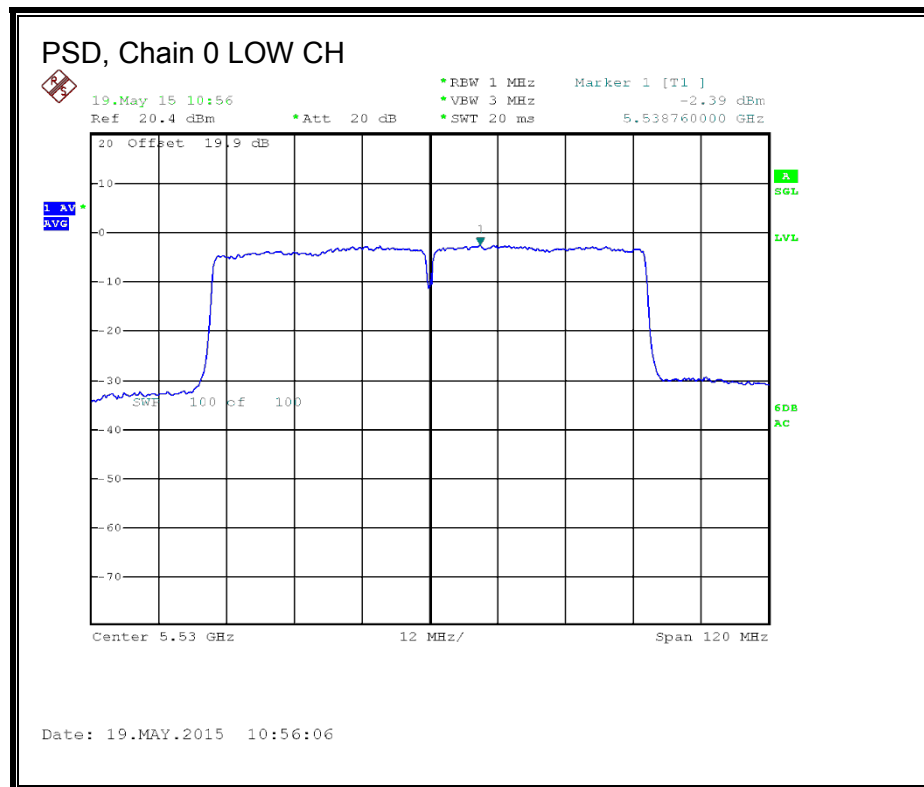
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5530               | 15.61                             | 15.38                             | 18.51                             | 24.00                   | -5.49                   |
| Mid     | 5610               | 19.01                             | 18.70                             | 21.87                             | 24.00                   | -2.13                   |

### PSD Results

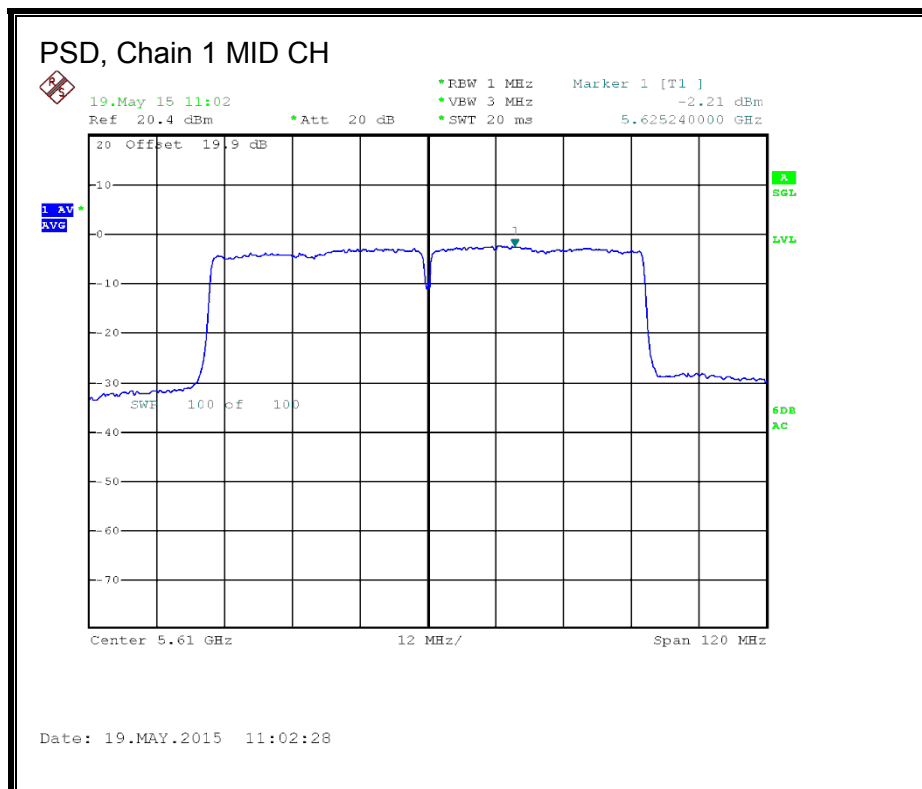
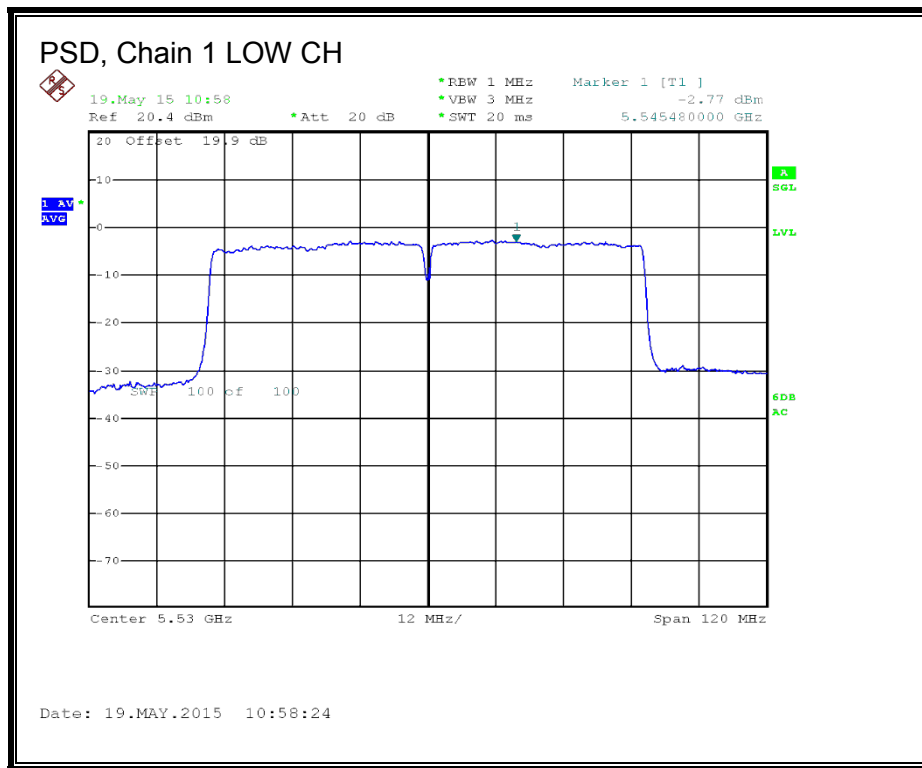
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5530               | -2.39                           | -2.77                           | 0.62                            | 7.99                  | -7.37                 |
| Mid     | 5610               | -1.91                           | -2.21                           | 1.14                            | 7.99                  | -6.85                 |

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

**PSD, Chain 0**



**PSD, Chain 1**



## **STRADDLE CHANNEL 138 RESULTS**

### **UNII-2C BAND**

#### **Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency<br>(MHz) | Min<br>26 dB<br>BW<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-----------------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| 138     | 5690               | 75.80                       | 6.00                                      | 9.01                                    | 24.00                   | 7.99                  |

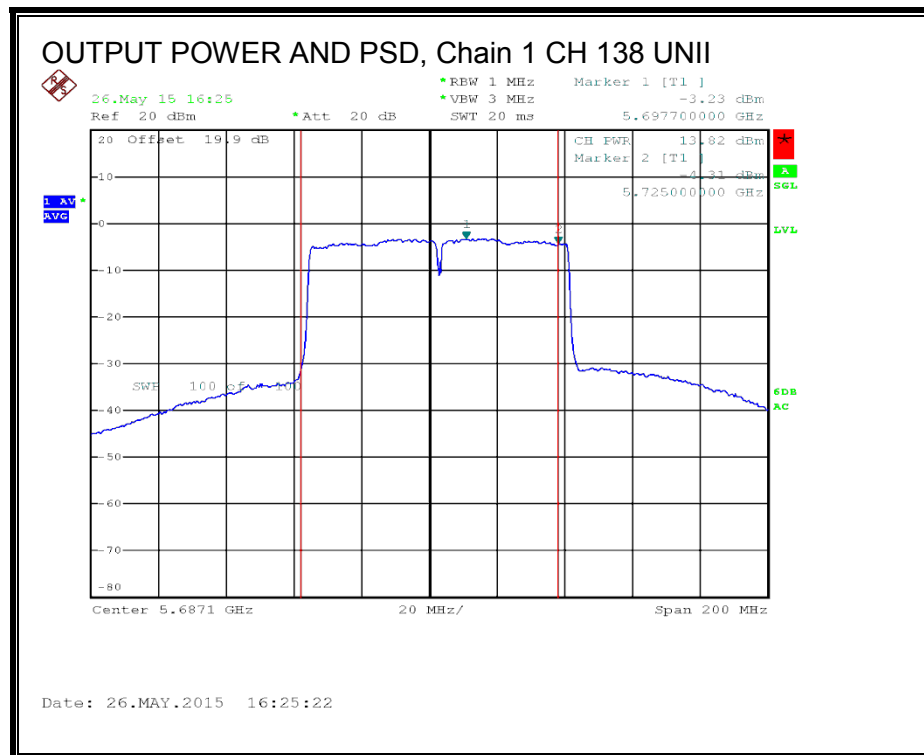
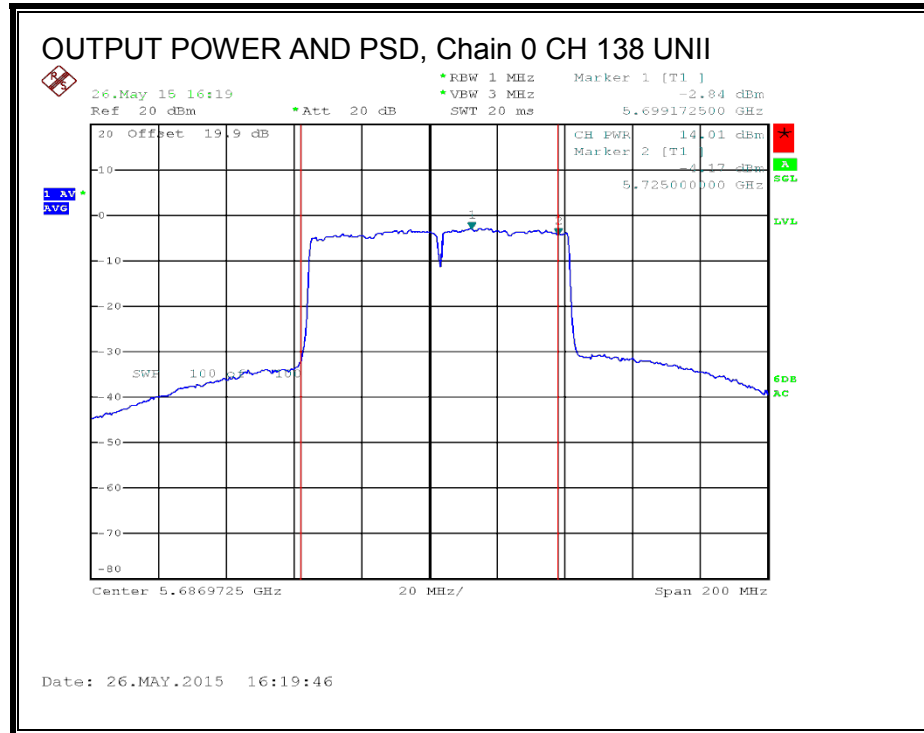
|                           |      |                                               |
|---------------------------|------|-----------------------------------------------|
| <b>Duty Cycle CF (dB)</b> | 0.18 | <b>Included in Calculations of Corr'd PSD</b> |
|---------------------------|------|-----------------------------------------------|

#### **Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| 138     | 5690               | 14.01                             | 13.82                             | 17.11                             | 24.00                   | -6.89                   |

#### **PSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| 138     | 5690               | -2.84                           | -3.23                           | 0.16                            | 7.99                  | -7.83                 |



**UNII-3 BAND**

**Antenna Gain and Limit**

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| 138     | 5690               | 4.70                                      | 7.71                                    | 30.00                   | 28.29                 |

|                           |      |                                                           |
|---------------------------|------|-----------------------------------------------------------|
| <b>Duty Cycle CF (dB)</b> | 0.18 | <b>Included in Calculations of Corr'd Power &amp; PSD</b> |
|---------------------------|------|-----------------------------------------------------------|

**Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Chain 1<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| 138     | 5690               | 0.51                              | 0.05                              | 3.48                              | 30.00                   | -26.52                  |

**PSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Chain 1<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| 138     | 5690               | -3.70                           | -4.08                           | -0.70                           | 28.29                 | -28.99                |

