



**FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8**

CERTIFICATION TEST REPORT

FOR

HANDHELD COMPUTING DEVICE

MODEL NUMBER: 1573

**FCC ID: C3K1573
IC: 3048A-1573**

REPORT NUMBER: 13U15414-14

ISSUE DATE: NOVEMBER 10, 2013

Prepared for
**MICROSOFT CORPORATION
ONE MICROSOFT WAY
REDMOND, WA 98052, U.S.A.**

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

NVLAP[®]

NVLAP LAB CODE 200065-0

Revision History

| Rev. | Issue Date | Revisions | Revised By |
|------|------------|---------------|------------|
| - | 11/10/13 | Initial Issue | T. LEE |

TABLE OF CONTENTS

| | |
|---|-----------|
| 1. ATTESTATION OF TEST RESULTS | 6 |
| 2. TEST METHODOLOGY | 7 |
| 3. FACILITIES AND ACCREDITATION | 7 |
| 4. CALIBRATION AND UNCERTAINTY | 7 |
| 4.1. <i>MEASURING INSTRUMENT CALIBRATION</i> | 7 |
| 4.2. <i>SAMPLE CALCULATION</i> | 7 |
| 4.3. <i>MEASUREMENT UNCERTAINTY</i> | 7 |
| 5. EQUIPMENT UNDER TEST | 8 |
| 5.1. <i>DESCRIPTION OF EUT</i> | 8 |
| 5.2. <i>MAXIMUM OUTPUT POWER</i> | 8 |
| 5.3. <i>DESCRIPTION OF AVAILABLE ANTENNAS</i> | 8 |
| 5.4. <i>SOFTWARE AND FIRMWARE</i> | 8 |
| 5.5. <i>WORST-CASE CONFIGURATION AND MODE</i> | 9 |
| 5.1. <i>DESCRIPTION OF TEST SETUP</i> | 10 |
| 6. TEST AND MEASUREMENT EQUIPMENT | 12 |
| 7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS | 13 |
| 7.1.1. <i>ON TIME AND DUTY CYCLE RESULTS</i> | 13 |
| 7.1.2. <i>MEASUREMENT METHOD FOR POWER AND PPSD</i> | 14 |
| 7.1.3. <i>MEASUREMENT METHOD FOR AVERAGE SPURIOUS EMISSIONS ABOVE 1 GHz</i> | 14 |
| 7.1.4. <i>DUTY CYCLE PLOTS</i> | 15 |
| 8. ANTENNA PORT TEST RESULTS | 21 |
| 8.1. <i>802.11a MODE IN THE 5.2 GHz BAND</i> | 21 |
| 8.1.1. <i>26 dB BANDWIDTH</i> | 21 |
| 8.1.2. <i>99% BANDWIDTH</i> | 25 |
| 8.1.3. <i>AVERAGE POWER</i> | 29 |
| 8.1.4. <i>OUTPUT POWER AND PPSD</i> | 30 |
| 8.1.5. <i>PEAK EXCURSION</i> | 35 |
| 8.2. <i>802.11n HT20 MODE IN THE 5.2 GHz BAND</i> | 36 |
| 8.2.1. <i>26 dB BANDWIDTH</i> | 36 |
| 8.2.2. <i>99% BANDWIDTH</i> | 40 |
| 8.2.3. <i>AVERAGE POWER</i> | 44 |
| 8.2.4. <i>OUTPUT POWER AND PPSD</i> | 45 |
| 8.2.5. <i>PEAK EXCURSION</i> | 50 |
| 8.3. <i>802.11n HT40 MODE IN THE 5.2 GHz BAND</i> | 51 |
| 8.3.1. <i>26 dB BANDWIDTH</i> | 51 |
| 8.3.2. <i>99% BANDWIDTH</i> | 54 |

| | |
|---|------------|
| 8.3.3. AVERAGE POWER | 57 |
| 8.3.4. OUTPUT POWER AND PPSD | 58 |
| 8.3.5. PEAK EXCURSION | 62 |
| 8.4. 802.11a MODE IN THE 5.3 GHz BAND | 63 |
| 8.4.1. 26 dB BANDWIDTH | 63 |
| 8.4.2. 99% BANDWIDTH | 67 |
| 8.4.3. AVERAGE POWER | 71 |
| 8.4.4. OUTPUT POWER AND PPSD | 72 |
| 8.4.5. PEAK EXCURSION | 77 |
| 8.5. 802.11n HT20 MODE IN THE 5.3 GHz BAND | 78 |
| 8.5.1. 26 dB BANDWIDTH | 78 |
| 8.5.2. 99% BANDWIDTH | 82 |
| 8.5.3. AVERAGE POWER | 86 |
| 8.5.4. OUTPUT POWER AND PPSD | 87 |
| 8.5.5. PEAK EXCURSION | 92 |
| 8.6. 802.11n HT40 MODE IN THE 5.3 GHz BAND | 93 |
| 8.6.1. 26 dB BANDWIDTH | 93 |
| 8.6.2. 99% BANDWIDTH | 96 |
| 8.6.3. AVERAGE POWER | 99 |
| 8.6.4. OUTPUT POWER AND PPSD | 100 |
| 8.6.5. PEAK EXCURSION | 104 |
| 8.7. 802.11a MODE IN THE 5.6 GHz BAND | 105 |
| 8.7.1. 26 dB BANDWIDTH | 105 |
| 8.7.2. 99% BANDWIDTH | 109 |
| 8.7.3. AVERAGE POWER | 113 |
| 8.7.4. OUTPUT POWER AND PPSD | 114 |
| 8.7.5. PEAK EXCURSION | 119 |
| 8.8. 802.11n HT20 MODE IN THE 5.6 GHz BAND | 120 |
| 8.8.1. 26 dB BANDWIDTH | 120 |
| 8.8.2. 99% BANDWIDTH | 124 |
| 8.8.3. AVERAGE POWER | 128 |
| 8.8.4. OUTPUT POWER AND PPSD | 129 |
| 8.8.5. PEAK EXCURSION | 134 |
| 8.9. 802.11n HT40 MODE IN THE 5.6 GHz BAND | 136 |
| 8.9.1. 26 dB BANDWIDTH | 136 |
| 8.9.2. 99% BANDWIDTH | 140 |
| 8.9.3. AVERAGE POWER | 144 |
| 8.9.4. OUTPUT POWER AND PPSD | 145 |
| 8.9.5. PEAK EXCURSION | 150 |
| 9. RADIATED TEST RESULTS | 152 |
| 9.1. LIMITS AND PROCEDURE | 152 |
| 9.2. TRANSMITTER ABOVE 1 GHz | 153 |
| 9.3. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND | 153 |
| 9.4. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND | 161 |
| 9.5. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND | 169 |
| 9.6. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND | 175 |

| | |
|--|------------|
| 9.7. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND..... | 183 |
| 9.8. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.3 GHz BAND..... | 191 |
| 9.9. TX ABOVE 1 GHz 802.11a MODE IN THE 5.6 GHz BAND | 197 |
| 9.10. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.6 GHz BAND | 206 |
| 9.11. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.6 GHz BAND | 215 |
| 9.12. WORST-CASE BELOW 1 GHz | 224 |
| 10. AC POWER LINE CONDUCTED EMISSIONS | 227 |
| 11. DYNAMIC FREQUENCY SELECTION | 232 |
| 11.1. OVERVIEW..... | 232 |
| 11.1.1. LIMITS | 232 |
| 11.1.2. TEST AND MEASUREMENT SYSTEM | 235 |
| 11.1.3. SETUP OF EUT | 238 |
| 11.1.4. DESCRIPTION OF EUT..... | 239 |
| 11.2. RESULTS FOR 20 MHz BANDWIDTH..... | 241 |
| 11.2.1. TEST CHANNEL..... | 241 |
| 11.2.2. RADAR WAVEFORM AND TRAFFIC | 241 |
| 11.2.3. OVERLAPPING CHANNEL TESTS | 243 |
| 11.2.4. MOVE AND CLOSING TIME..... | 243 |
| 11.3. RESULTS FOR 40 MHz BANDWIDTH..... | 248 |
| 11.3.1. TEST CHANNEL..... | 248 |
| 11.3.2. RADAR WAVEFORM AND TRAFFIC | 248 |
| 11.3.3. OVERLAPPING CHANNEL TESTS | 250 |
| 11.3.4. MOVE AND CLOSING TIME..... | 250 |
| 11.3.5. NON-OCCUPANCY PERIOD..... | 255 |
| 12. SETUP PHOTOS | 256 |

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: MICROSOFT CORPORATION
ONE MICROSOFT WAY
REDMOND, WA 98052, U.S.A.

EUT DESCRIPTION: HANDHELD COMPUTING DEVICE WITH WWAN, 802.11
A/B/G/N WLAN AND BLUETOOTH RADIOS

MODEL: 1573

SERIAL NUMBER: 001925433252

DATE TESTED: OCTOBER 23, 2013 – OCTOBER 28, 2013

| APPLICABLE STANDARDS | |
|---|--------------|
| STANDARD | TEST RESULTS |
| CFR 47 Part 15 Subpart E | Pass |
| INDUSTRY CANADA RSS-210 Issue 8 Annex 9 | Pass |
| INDUSTRY CANADA RSS-GEN Issue 3 | 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:



TIMOTHY LEE
WISE PROGRAM MANAGER
UL Verification Services Inc.

Tested By:



JOE VANG
EMC ENGINEER
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, ANSI C63.10-2009, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

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

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. 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 | 3.52 dB |
| Radiated Disturbance, 30 to 1000 MHz | 4.94 dB |

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a handheld computing device with WWAN, 802.11 a/b/g/n WLAN and Bluetooth radios.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

| Frequency Range (MHz) | Mode | Output Power (dBm) | Output Power (mW) |
|-----------------------|--------------|--------------------|-------------------|
| 5180 - 5240 | 802.11a | 13.94 | 24.77 |
| 5180 - 5240 | 802.11n HT20 | 13.84 | 24.21 |
| 5190 - 5230 | 802.11n HT40 | 11.11 | 12.91 |
| 5260 - 5320 | 802.11a | 14.07 | 25.53 |
| 5260 - 5320 | 802.11n HT20 | 13.93 | 24.72 |
| 5270 - 5310 | 802.11n HT40 | 14.95 | 31.26 |
| 5500 - 5700 | 802.11a | 14.68 | 29.38 |
| 5500 - 5700 | 802.11n HT20 | 14.51 | 28.25 |
| 5510 - 5670 | 802.11n HT40 | 11.64 | 14.59 |

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an PIFA antenna, with a maximum gain of 3.2 dBi and 3.9 dBi in the 5 GHz band.

5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Window RT 8.1 Preview Build 943

The test utility software used during testing was Laptool 189.1.0.9.0\ WIFI Tool.exe

5.5. WORST-CASE CONFIGURATION AND MODE

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

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.

Based on the baseline scan, the worst-case data rates were:

802.11a mode: 6 Mbps
802.11n HT20mode: MCS0
802.11n HT40mode: MCS0

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

Conducted measurement was conducted on Model 1572 under FCC ID C3K1572. Model 1572 are identical to Model 1573 except Model 1573 includes the WWAN radio.

5.1. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

| Support Equipment List | | | | |
|------------------------|--------------|----------|-----------------------|--------|
| Description | Manufacturer | Model | Serial Number | FCC ID |
| USB Ethernet Adaptor | CISCO | USB 300M | CU90MC02233 | DoC |
| Laptop | Lenovo | L420 | 7854CT0 | DoC |
| AC Adaptor (laptop) | Lenovo | 92P1156 | 111S92P1156ZDXN272091 | N/A |

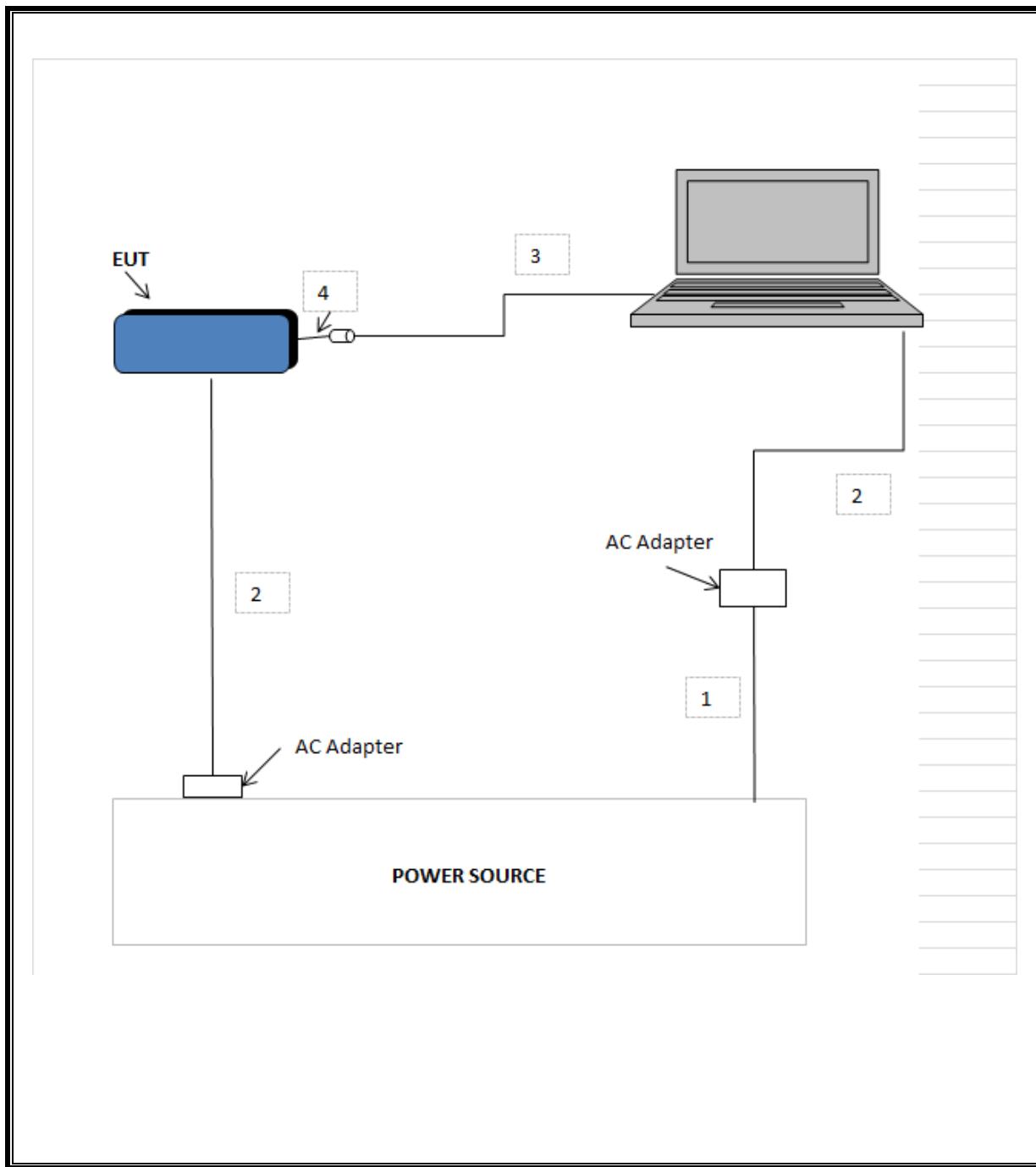
I/O CABLES

| I/O Cable List | | | | | | |
|----------------|----------|----------------------|----------------|------------|------------------|-------------------------|
| Cable No | Port | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks |
| 1 | AC | 1 | AC | Unshielded | 1.8 | AC adapter |
| 2 | USB | 1 | USB | Unshielded | 0.1 | USB to Ethernet adapter |
| 3 | DC | 1 | DC | Unshielded | 1.8 | |
| 4 | Ethernet | 1 | RJ 45 | Unshielded | 7.62 | Connects to USB adapter |

TEST SETUP

The EUT is a standalone wireless handheld computing device. Test software exercised the wireless module installed within the device under test.

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 | Asset | Cal Date | Cal Due |
| Preamplifier, 1300 MHz | Agilent / HP | 8447D | C00558 | 02/21/12 | 05/21/14 |
| Reject Filter, 2.4-2.5 GHz | Micro-Tronics | BRC13192 | N02683 | CNR | CNR |
| Antenna, Horn, 26.5 GHz | ARA | SWH-28 | C01015 | 04/23/12 | 04/23/14 |
| Preamplifier, 26.5 GHz | Agilent / HP | 8449B | C00749 | 10/21/12 | 10/21/13 |
| Bilog 30-1000MHz | Sunol | JB1 | C01011 | 02/07/12 | 03/28/14 |
| LISN, 30 MHz | FCC | LISN-50/250-25 | N02625 | 01/14/13 | 01/14/14 |
| Power meter | Agilent | N119A | T198 | 06/25/12 | 12/13/13 |
| Power Sensor | Agilent | E9323A | T397 | 06/26/12 | 04/02/14 |
| Spectrum Analyzer, 26 GHz | Agilent / HP | E4440A | C01176 | 10/21/12 | 12/13/13 |
| Spectrum Analyzer | Agilent | N9030A | F00128 | 2/22/2013 | 2/22/2014 |
| Horn Antenna, 1-18GHz | ETS Lindgren | 3117 | F00133 | 2/19/2013 | 2/19/2014 |
| Antenna, Biconolog, 30MHz | Sunol Sciences | JB3 | F00168 | 3/7/2013 | 3/7/2014 |
| Amplifier | Sonoma | 310 | F00008 | 11/6/2012 | 11/6/2013 |

7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

7.1.1. ON TIME AND DUTY CYCLE RESULTS

| Mode | ON Time B (msec) | Period (msec) | Duty Cycle x (linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/B Minimum VBW (kHz) |
|---------------------|------------------------|------------------|-----------------------------|----------------------|---|-----------------------------|
| 5.2 GHz Band | | | | | | |
| 11a | 1.626 | 1.632 | 0.996 | 99.6% | 0.02 | 0.613 |
| 11n HT20 | 0.284 | 0.289 | 0.984 | 98.4% | 0.07 | 3.466 |
| 11n HT40 | 0.299 | 0.305 | 0.983 | 98.3% | 0.08 | 3.284 |
| | | | | | | |
| 5.3 GHz Band | | | | | | |
| 11a | 1.626 | 1.632 | 0.996 | 99.6% | 0.02 | 0.613 |
| 11n HT20 | 0.285 | 0.289 | 0.985 | 98.5% | 0.07 | 3.461 |
| 11n HT40 | 0.299 | 0.304 | 0.984 | 98.4% | 0.07 | 3.287 |
| | | | | | | |
| 5.6 GHz Band | | | | | | |
| 11a | 1.626 | 1.632 | 0.996 | 99.6% | 0.02 | 0.613 |
| 11n HT20 | 0.284 | 0.289 | 0.983 | 98.3% | 0.08 | 3.465 |
| 11n HT40 | 0.300 | 0.304 | 0.987 | 98.7% | 0.06 | 3.294 |

7.1.2. MEASUREMENT METHOD FOR POWER AND PPSD

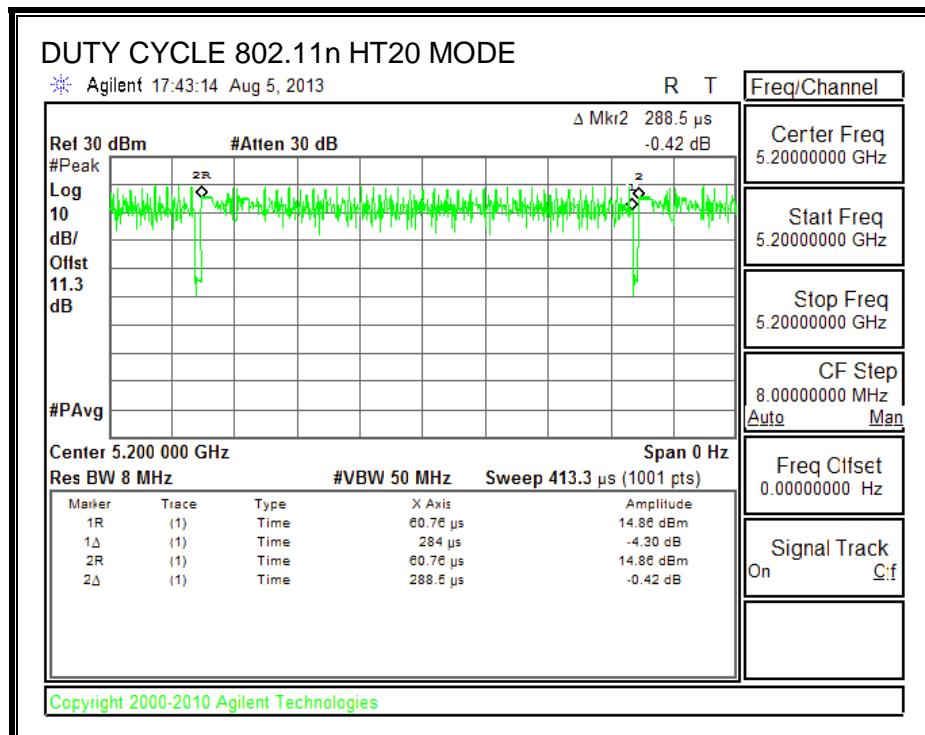
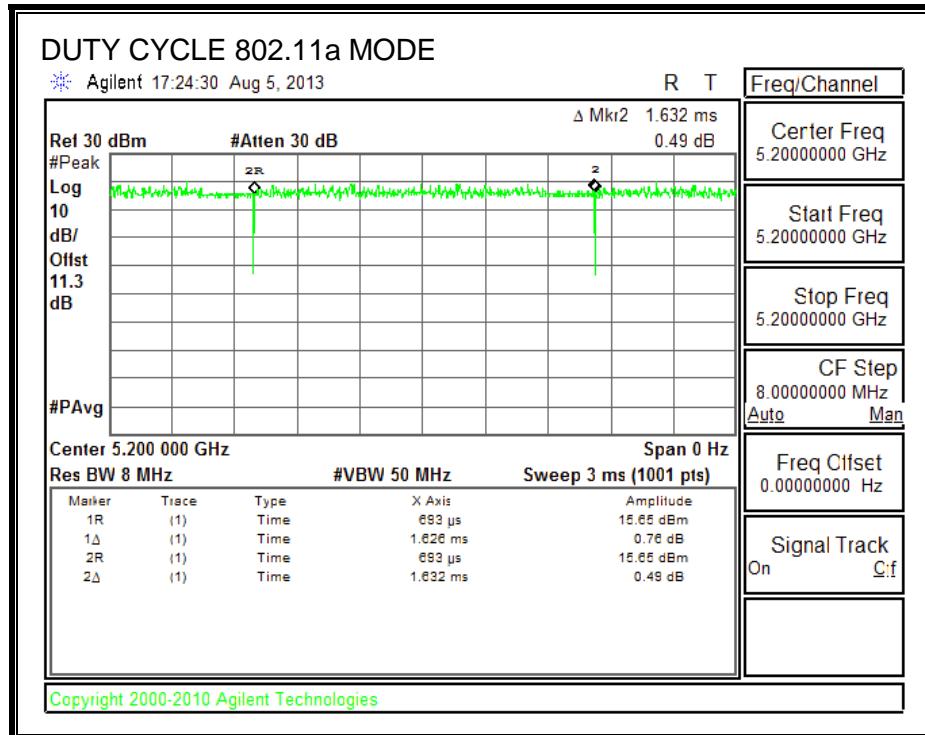
The Duty Cycle is greater than or equal to 98% therefore KDB 789033 Method SA-1 is used.

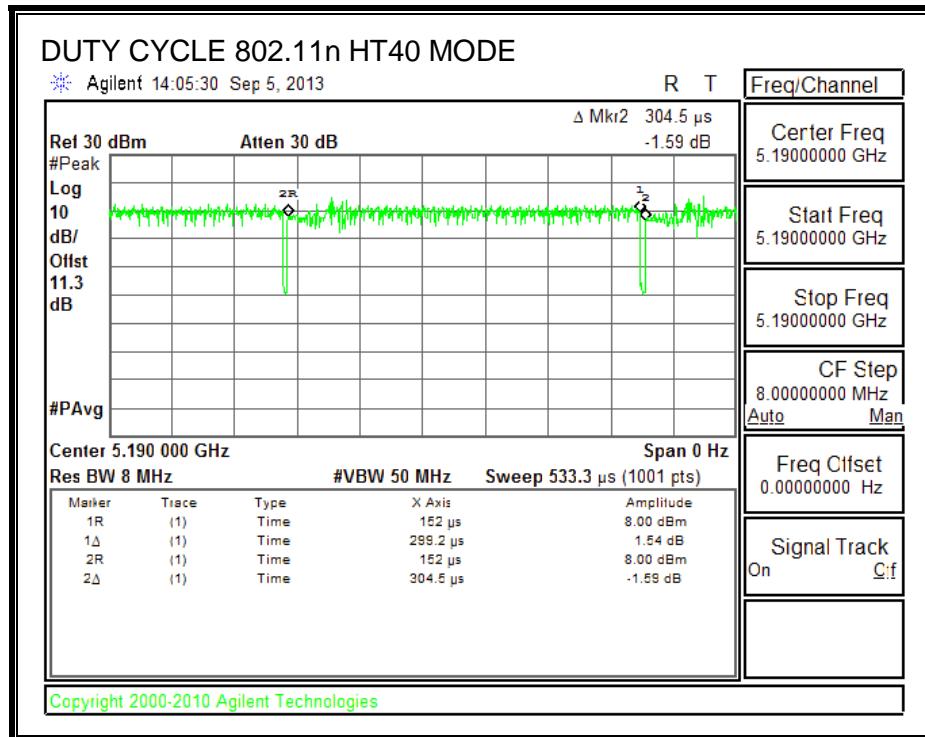
7.1.3. MEASUREMENT METHOD FOR AVERAGE SPURIOUS EMISSIONS ABOVE 1 GHz

The Duty Cycle is greater than or equal to 98%, KDB 789033 Method AD with Power RMS Averaging is used.

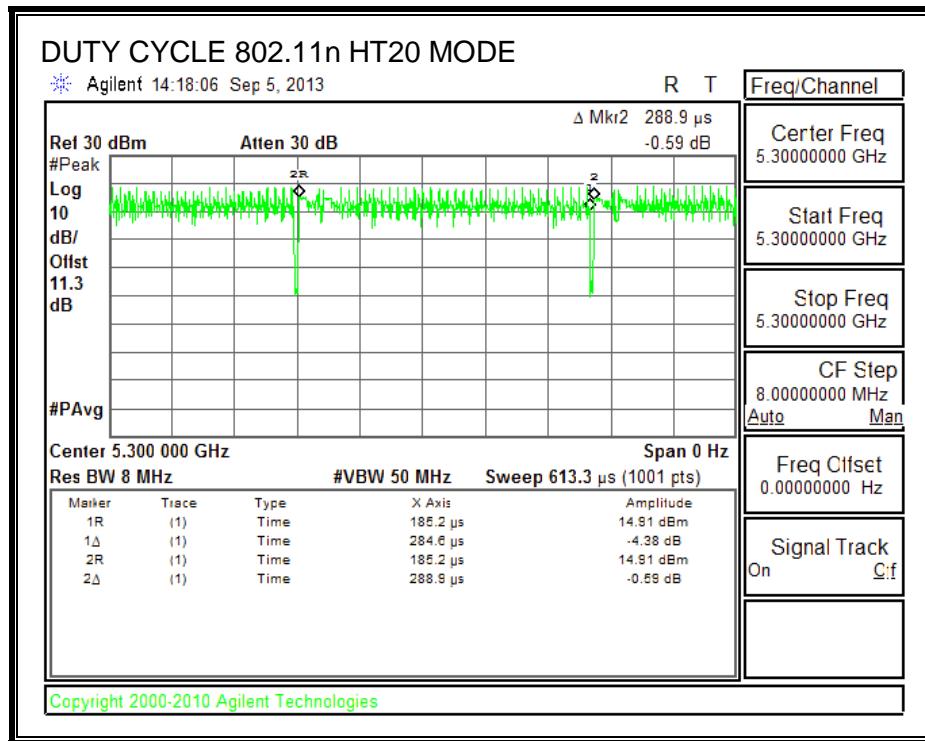
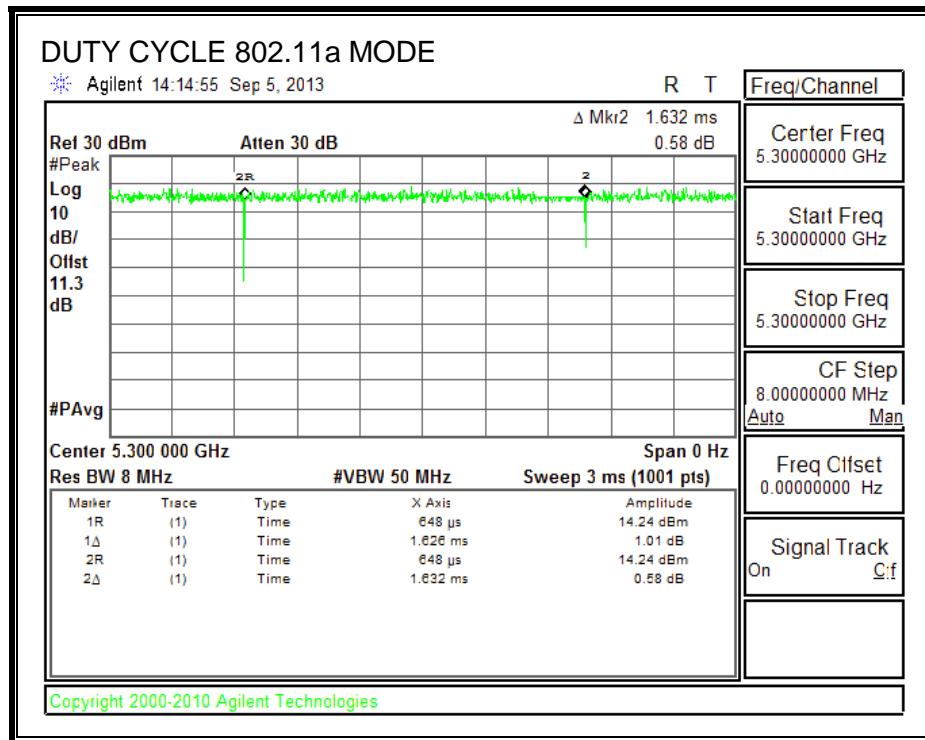
7.1.4. DUTY CYCLE PLOTS

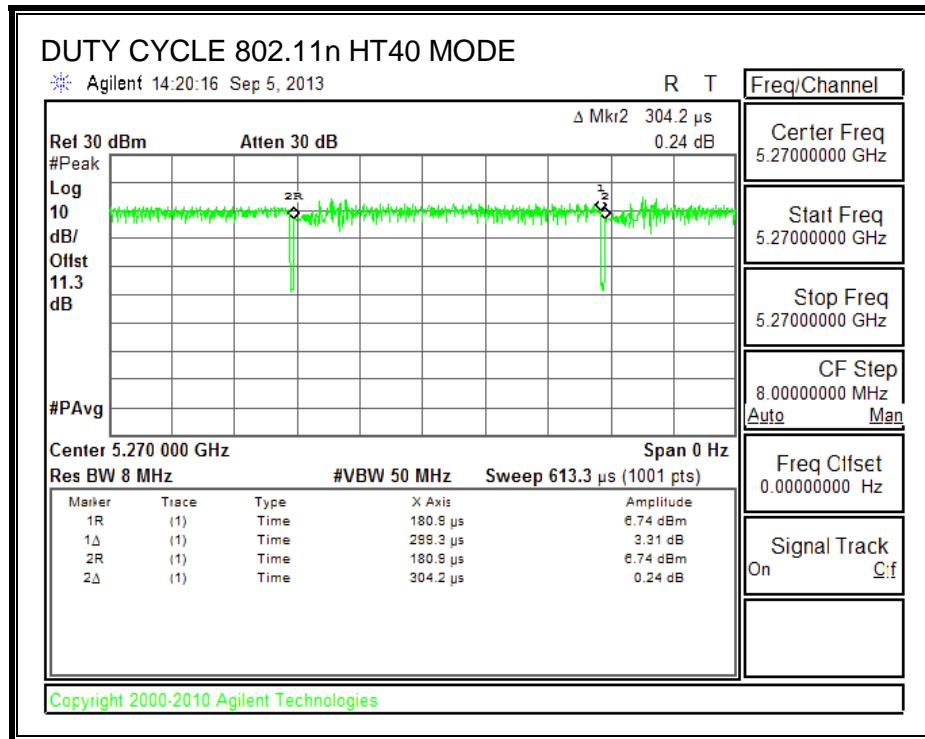
5.2 GHz BAND



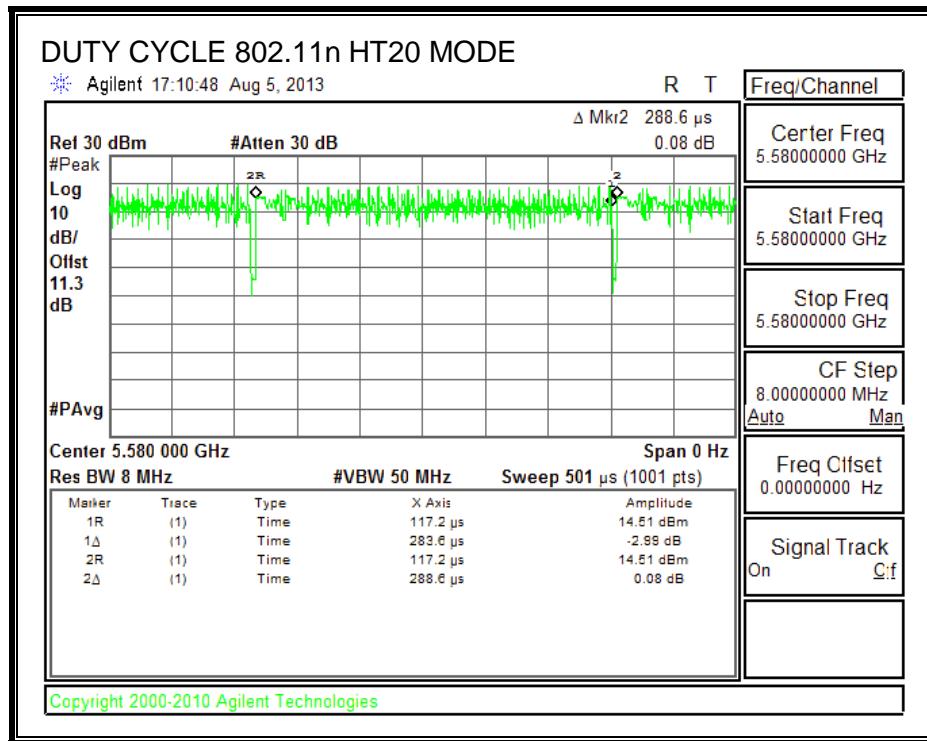
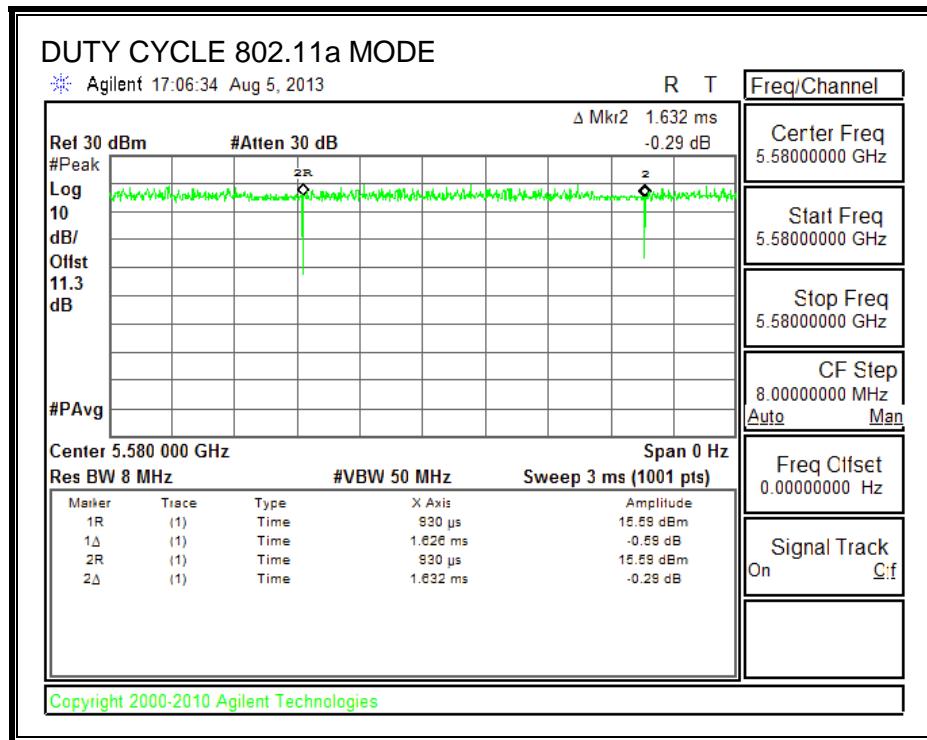


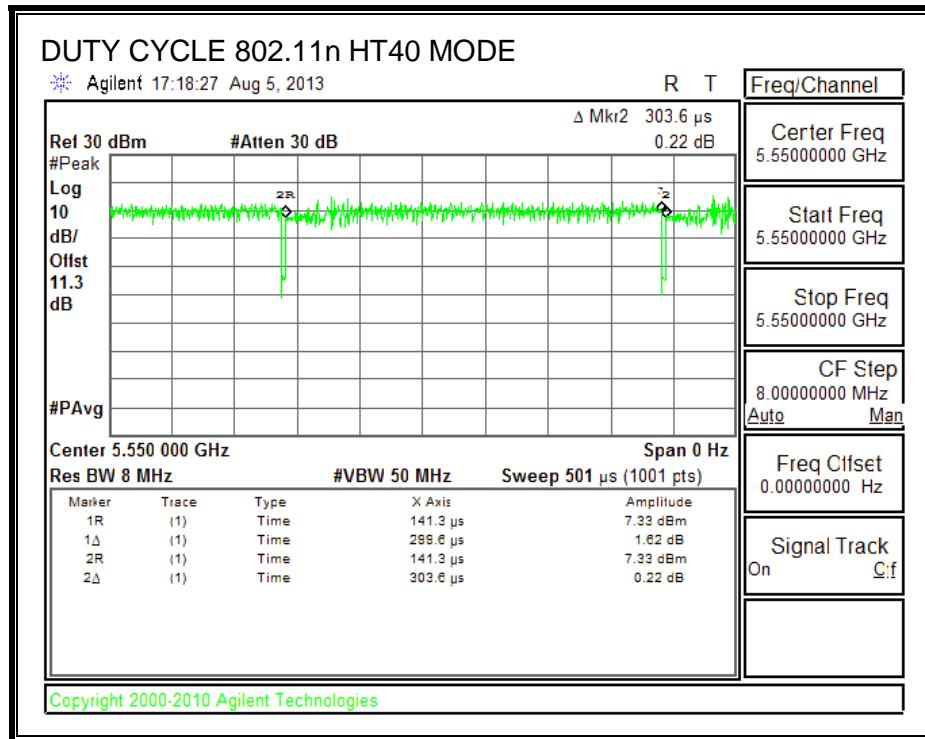
5.3 GHz BAND





5.6 GHz BAND





8. ANTENNA PORT TEST RESULTS

8.1. 802.11a MODE IN THE 5.2 GHz BAND

8.1.1. 26 dB BANDWIDTH

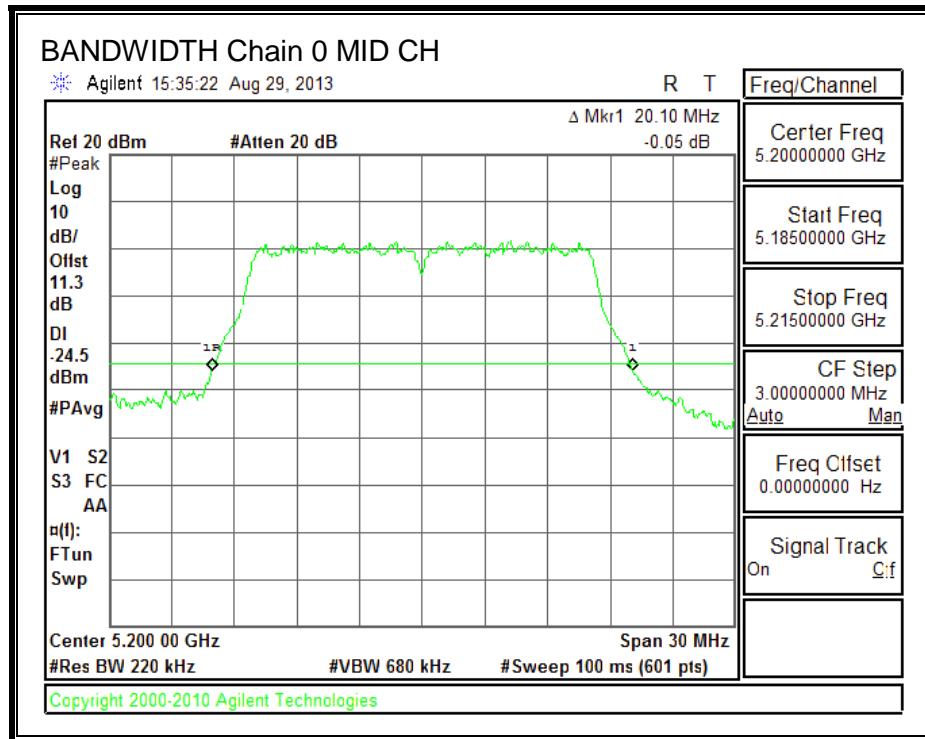
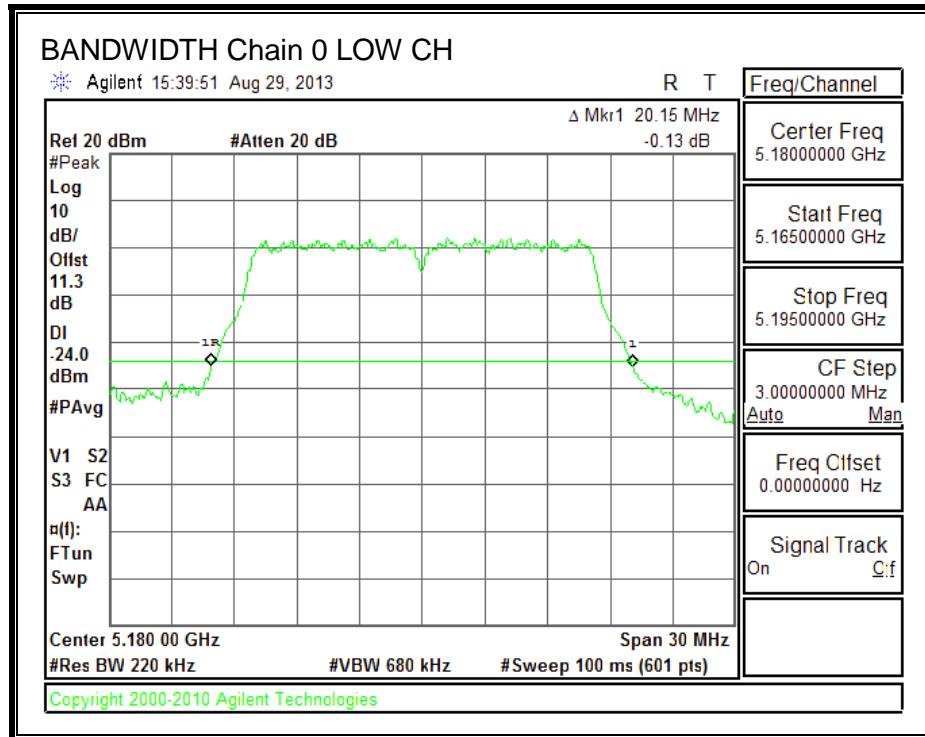
LIMITS

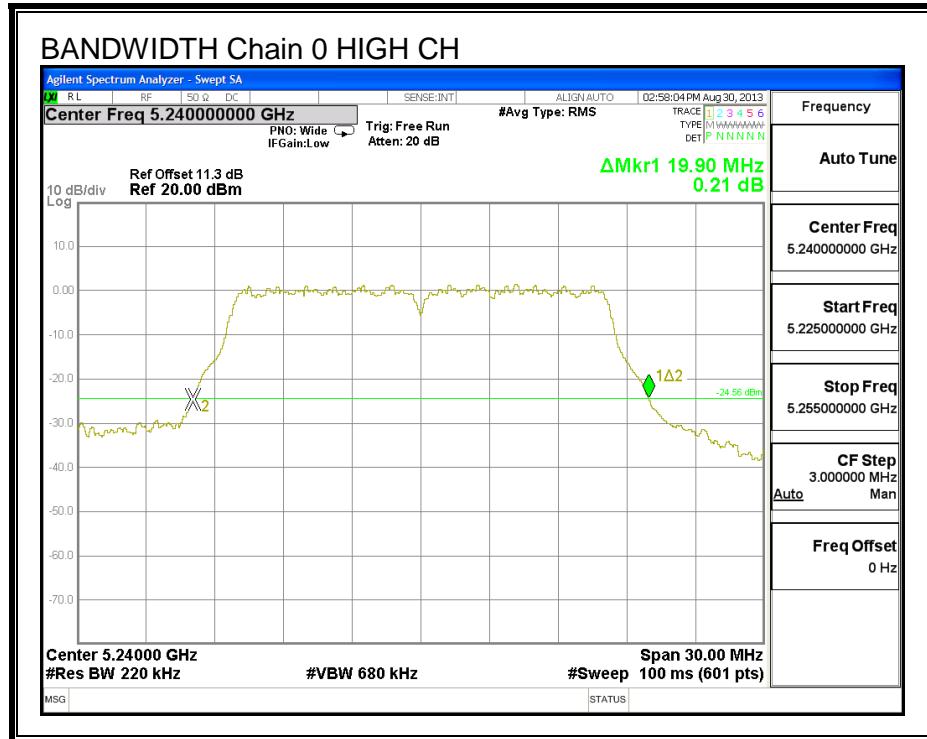
None; for reporting purposes only.

RESULTS

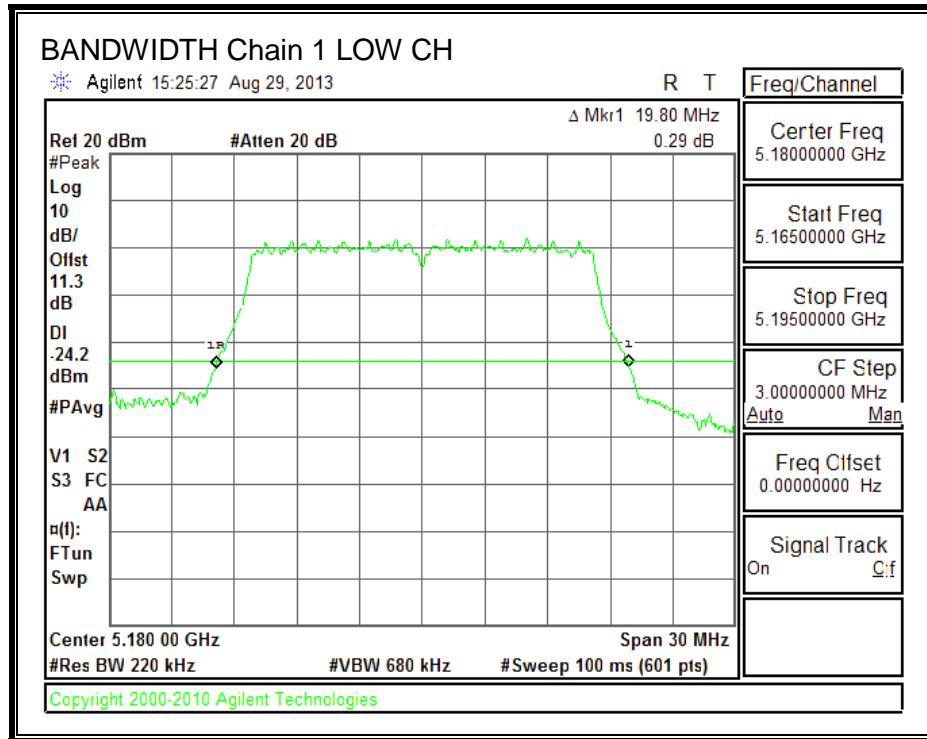
| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low | 5180 | 20.2 | 19.8 |
| Mid | 5200 | 20.1 | 19.9 |
| High | 5240 | 19.9 | 19.7 |

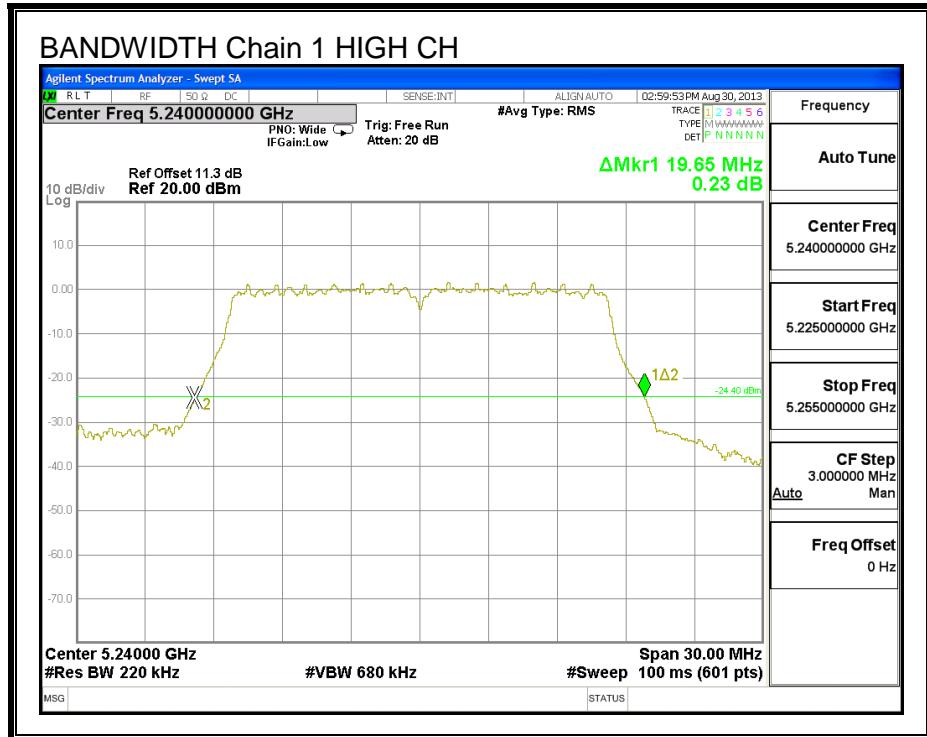
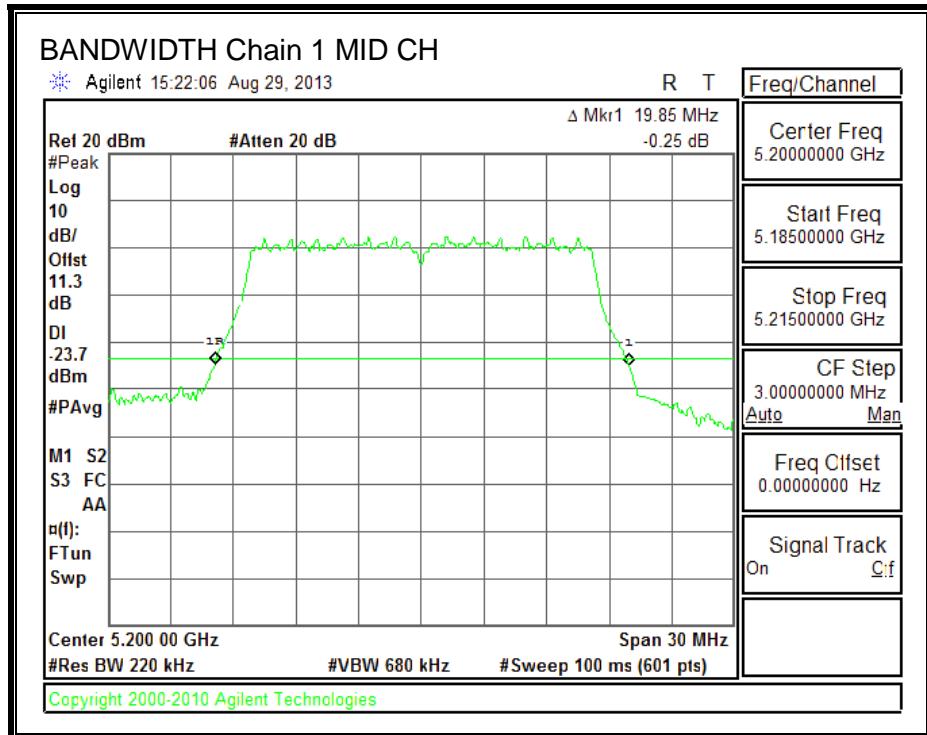
26 dB BANDWIDTH, Chain 0





26 dB BANDWIDTH, Chain 1





8.1.2. 99% BANDWIDTH

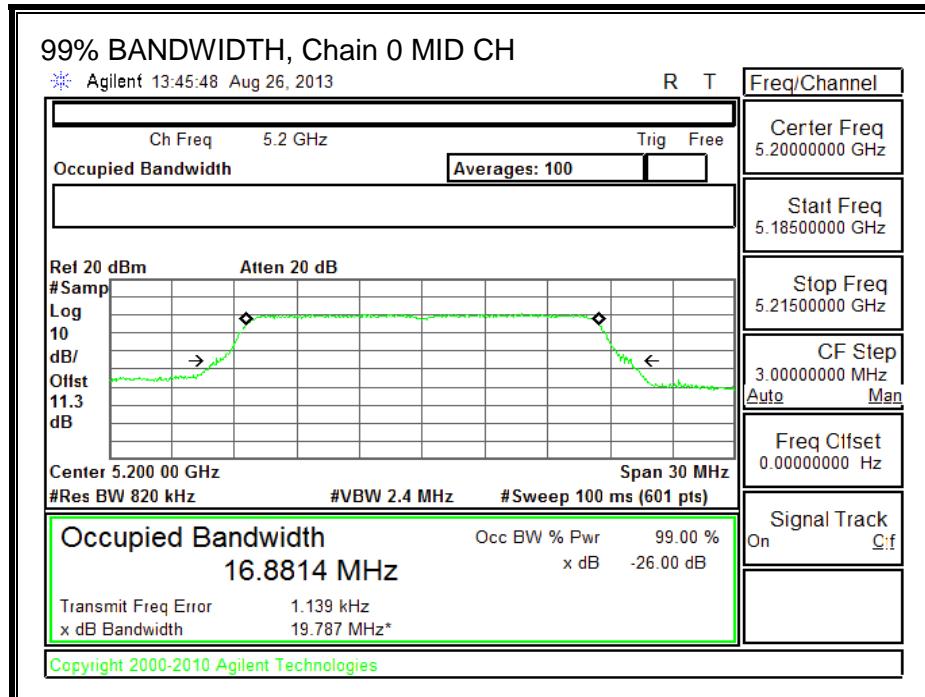
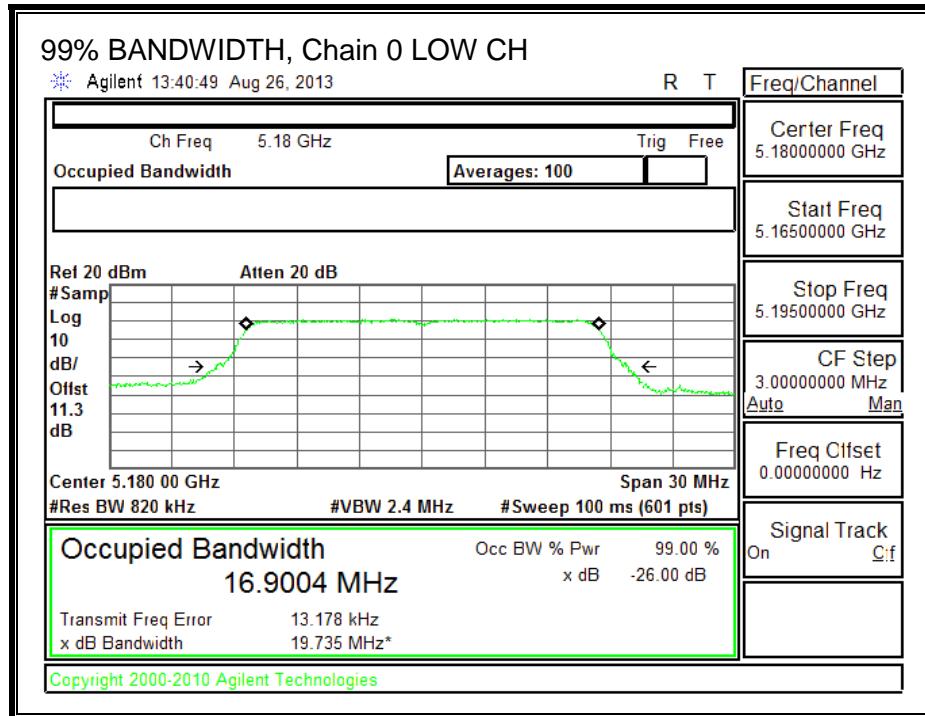
LIMITS

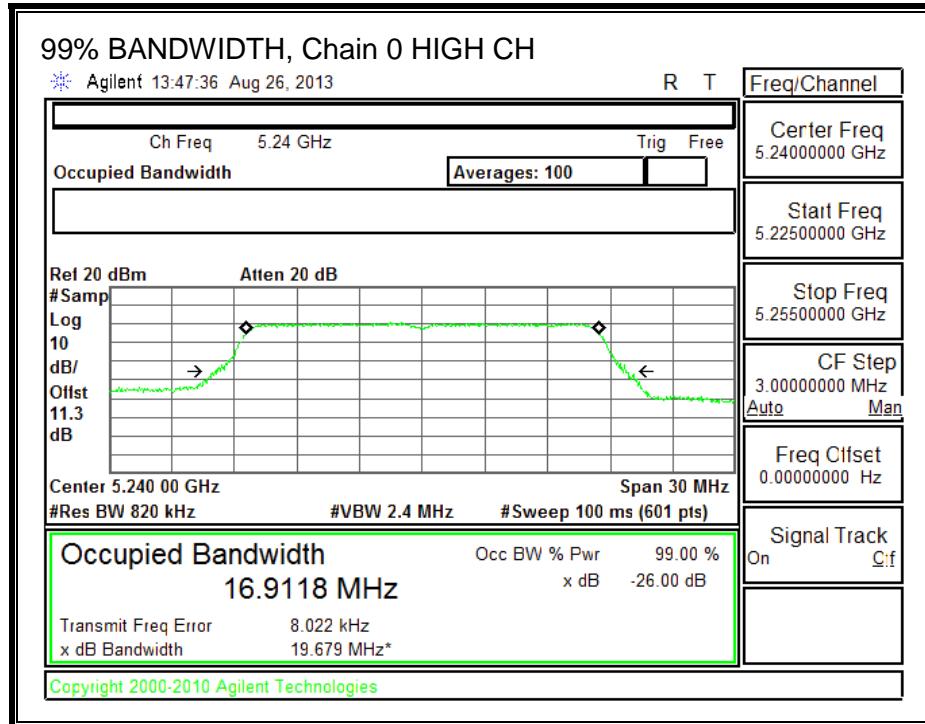
None; for reporting purposes only.

RESULTS

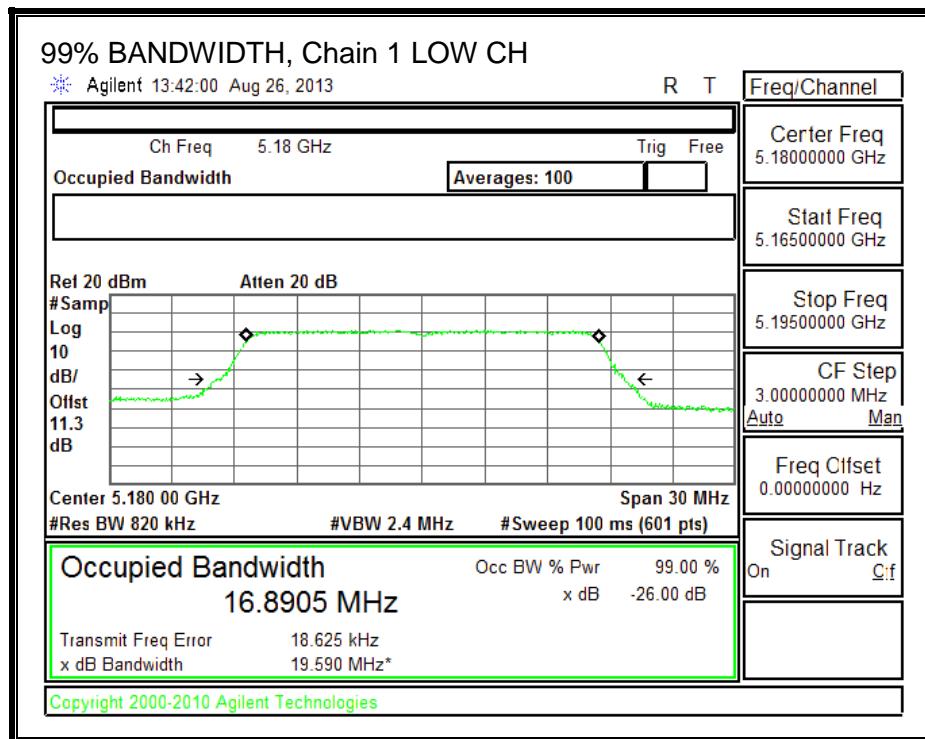
| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low | 5180 | 16.90 | 16.89 |
| Mid | 5200 | 16.88 | 16.86 |
| High | 5240 | 16.91 | 16.87 |

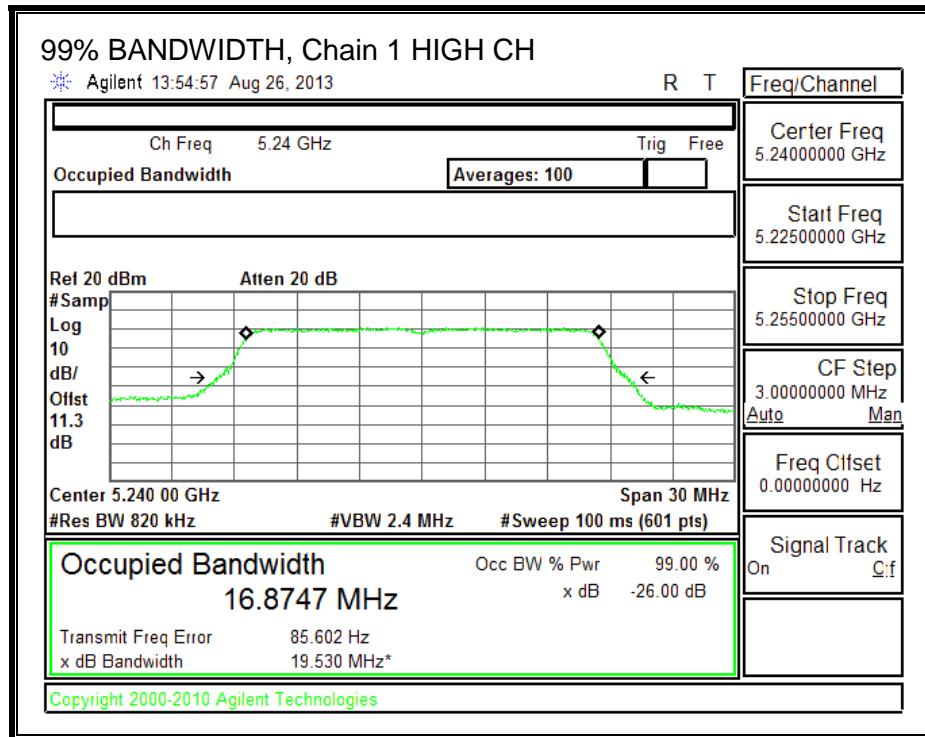
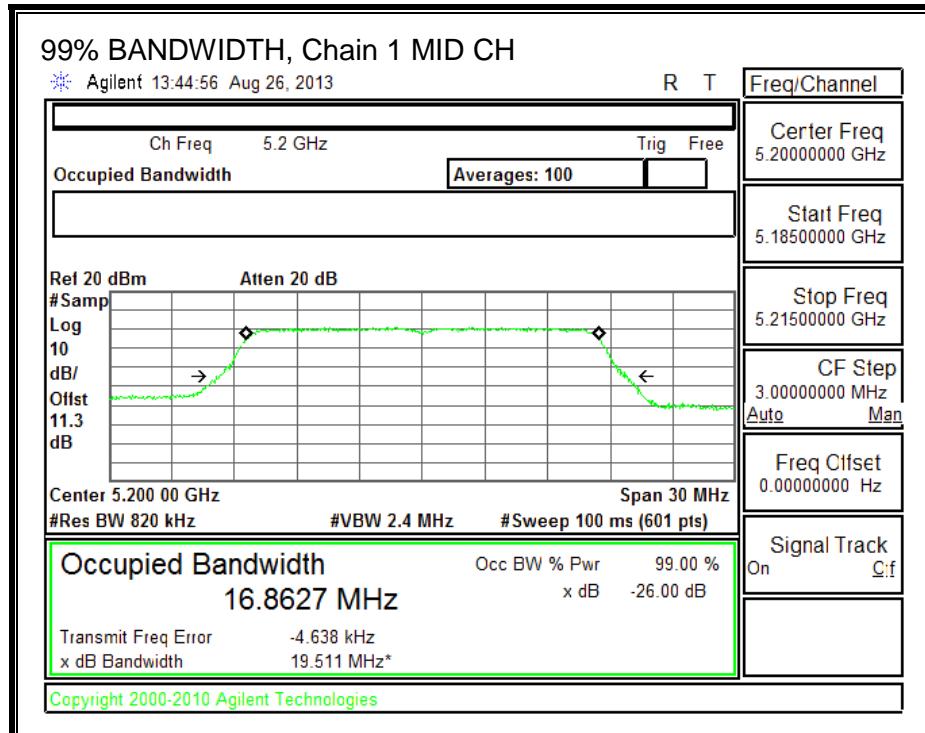
99% BANDWIDTH, Chain 0





99% BANDWIDTH, Chain 1





8.1.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.3 dB (including 10 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

| Channel | Frequency (MHz) | Chain 0 Power (dBm) | Chain 1 Power (dBm) | Total Power (dBm) |
|---------|--------------------|---------------------------|---------------------------|-------------------------|
| Low | 5180 | 9.61 | 10.05 | 12.85 |
| Mid | 5200 | 9.38 | 10.28 | 12.86 |
| High | 5240 | 9.39 | 10.27 | 12.86 |

8.1.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 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.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

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

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|-------------------------------------|-------------------------------------|---|
| 3.90 | 3.20 | 3.56 |

RESULTS

Bandwidth and Antenna Gain

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---------|--------------------|-----------------------------|---------------------------|------------------------------|
| Low | 5180 | 19.8 | 16.9 | 3.56 |
| Mid | 5200 | 19.9 | 16.9 | 3.56 |
| High | 5240 | 19.7 | 16.9 | 3.56 |

Limits

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC EIRP Limit (dBm) | Max IC Power (dBm) | Power Limit (dBm) | FCC PPSD Limit (dBm) | IC eirp PSD Limit (dBm) | PPSD Limit (dBm) |
|---------|--------------------|--------------------------------|------------------------------|-----------------------------|-------------------------|-------------------------------|-------------------------------------|------------------------|
| Low | 5180 | 16.97 | 22.28 | 18.72 | 16.97 | 4.00 | 10.00 | 4.00 |
| Mid | 5200 | 16.99 | 22.27 | 18.71 | 16.99 | 4.00 | 10.00 | 4.00 |
| High | 5240 | 16.94 | 22.27 | 18.71 | 16.94 | 4.00 | 10.00 | 4.00 |

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

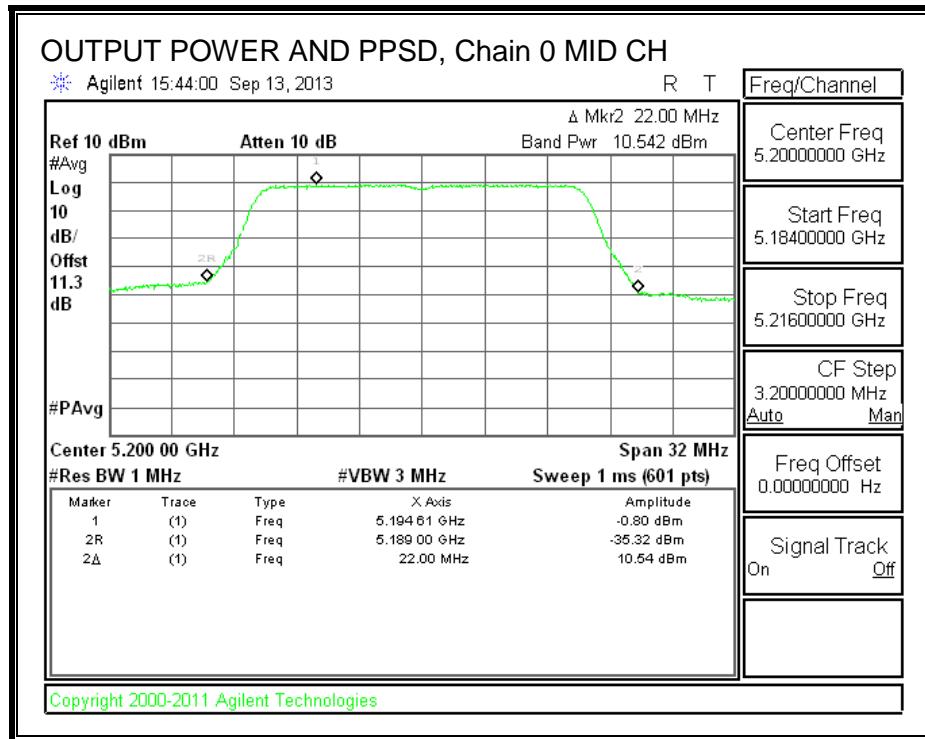
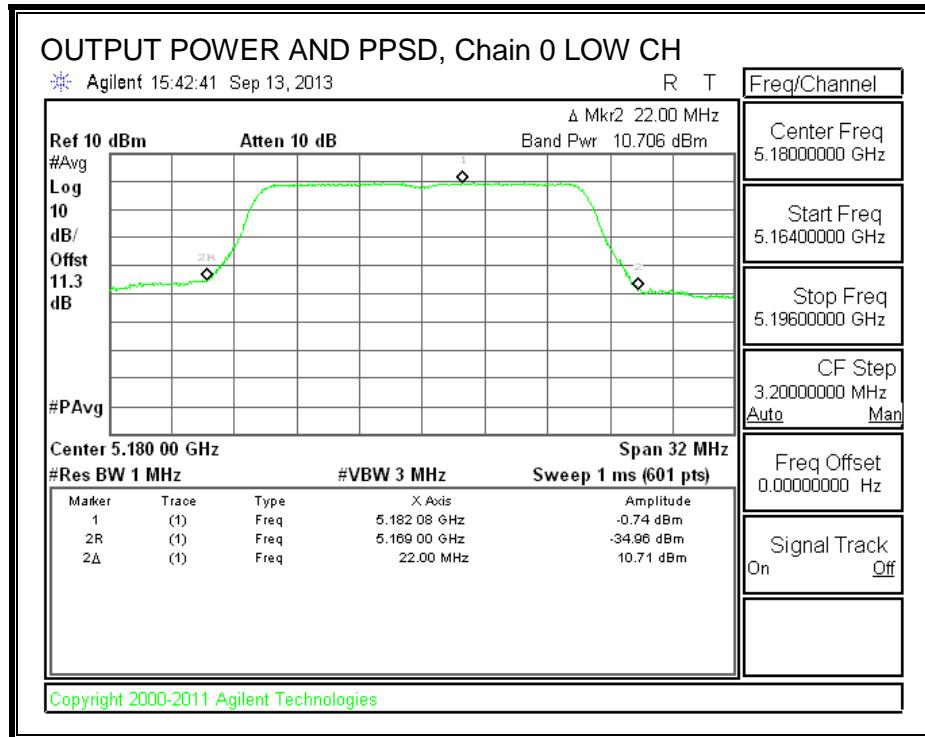
Output Power Results

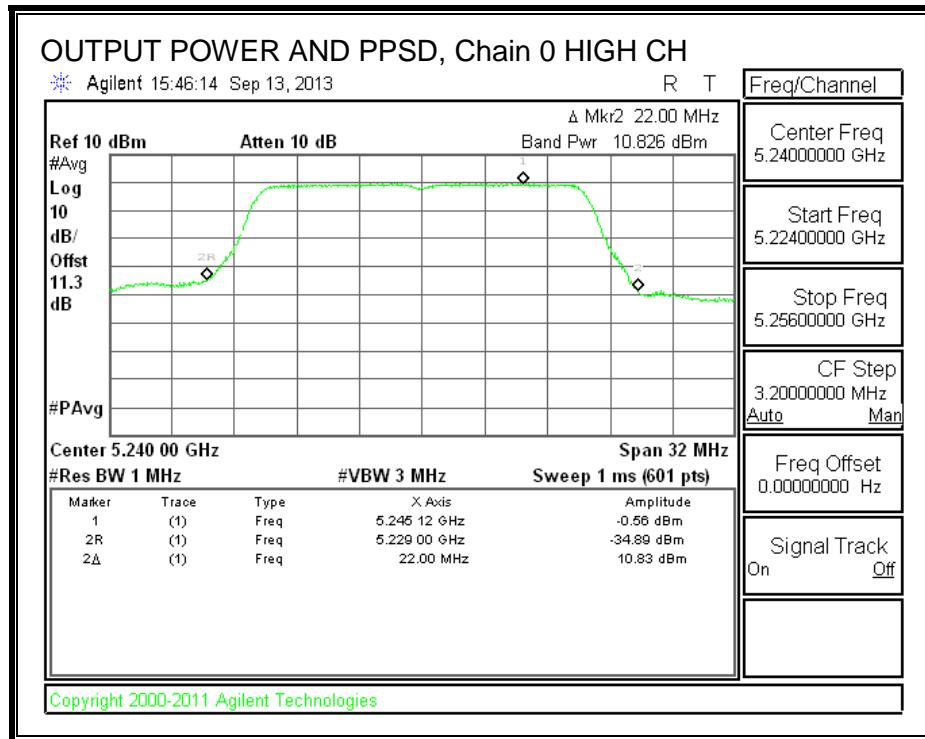
| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low | 5180 | 10.71 | 10.77 | 13.75 | 16.97 | -3.22 |
| Mid | 5200 | 10.54 | 10.94 | 13.76 | 16.99 | -3.23 |
| High | 5240 | 10.83 | 11.02 | 13.94 | 16.94 | -3.01 |

PPSD Results

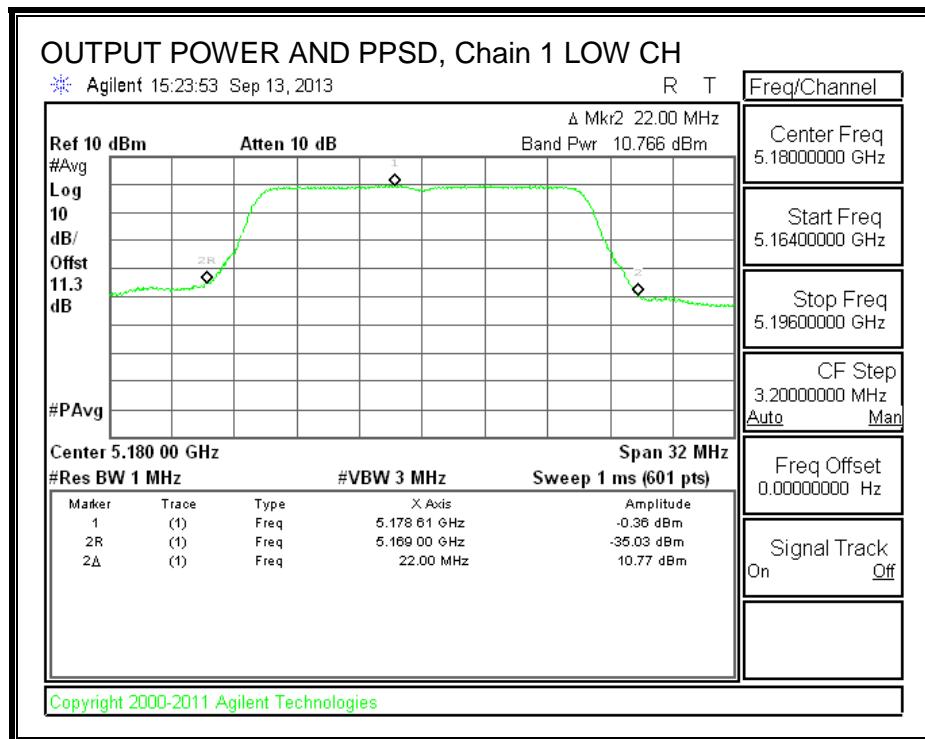
| Channel | Frequency (MHz) | Chain 0 Meas PPSD (dBm) | Chain 1 Meas PPSD (dBm) | Total Corr'd PPSD (dBm) | PPSD Limit (dBm) | PPSD Margin (dB) |
|---------|--------------------|----------------------------------|----------------------------------|----------------------------------|------------------------|------------------------|
| Low | 5180 | -0.74 | -0.36 | 2.46 | 4.00 | -1.54 |
| Mid | 5200 | -0.80 | -0.29 | 2.47 | 4.00 | -1.53 |
| High | 5240 | -0.56 | -0.14 | 2.67 | 4.00 | -1.33 |

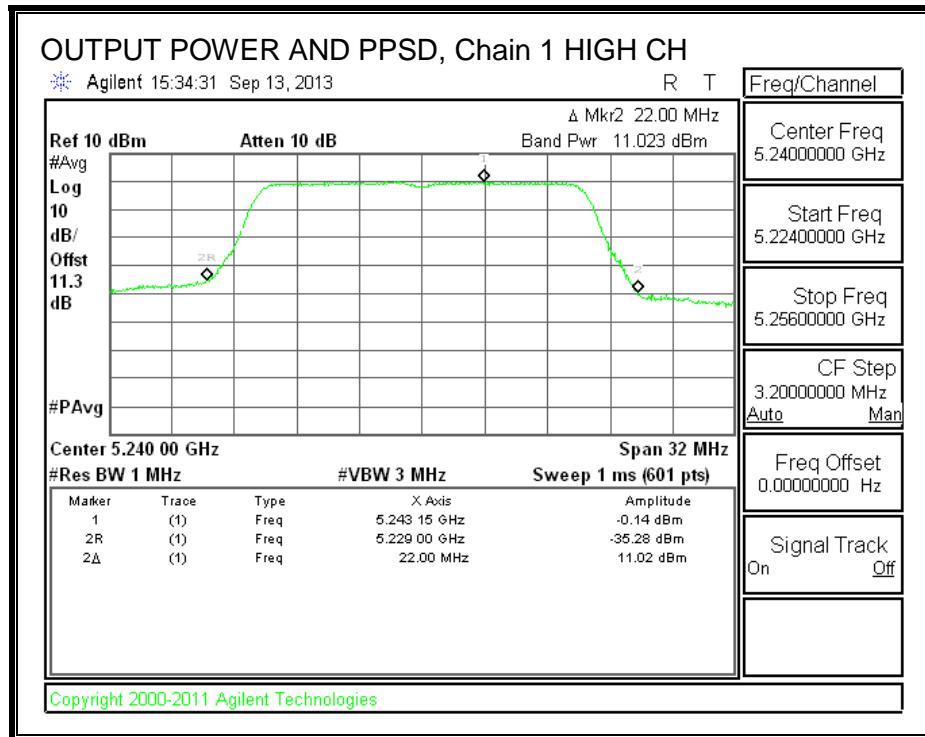
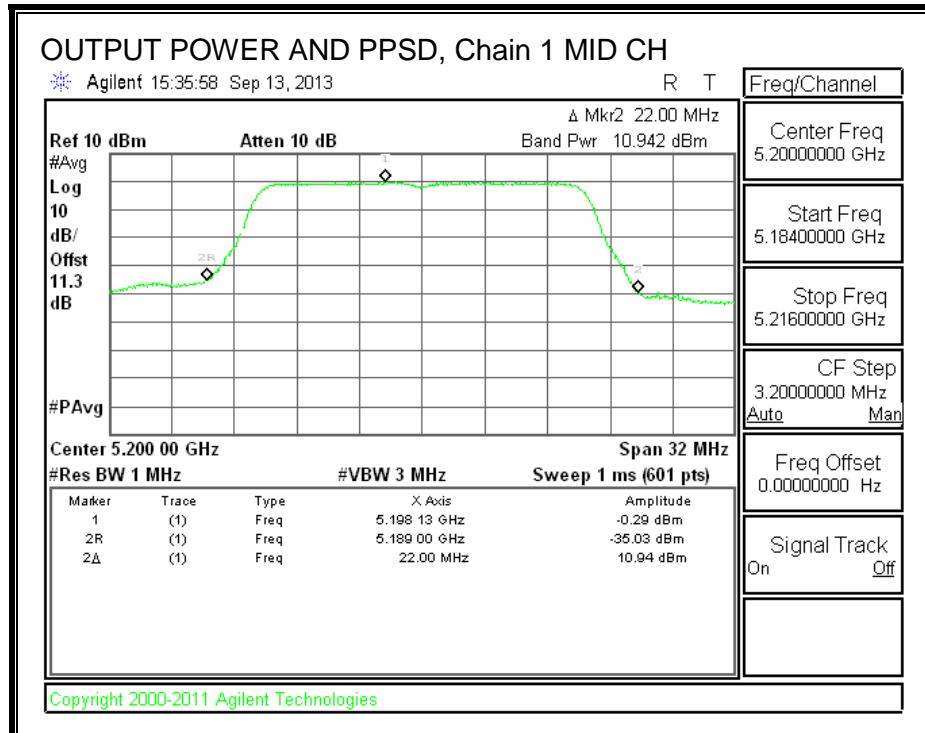
OUTPUT POWER AND PPSD, Chain 0





OUTPUT POWER AND PPSD, Chain 1





8.1.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

RESULTS

Refer to the results of 802.11n HT20 mode in the 5.6 GHz band.

8.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

8.2.1. 26 dB BANDWIDTH

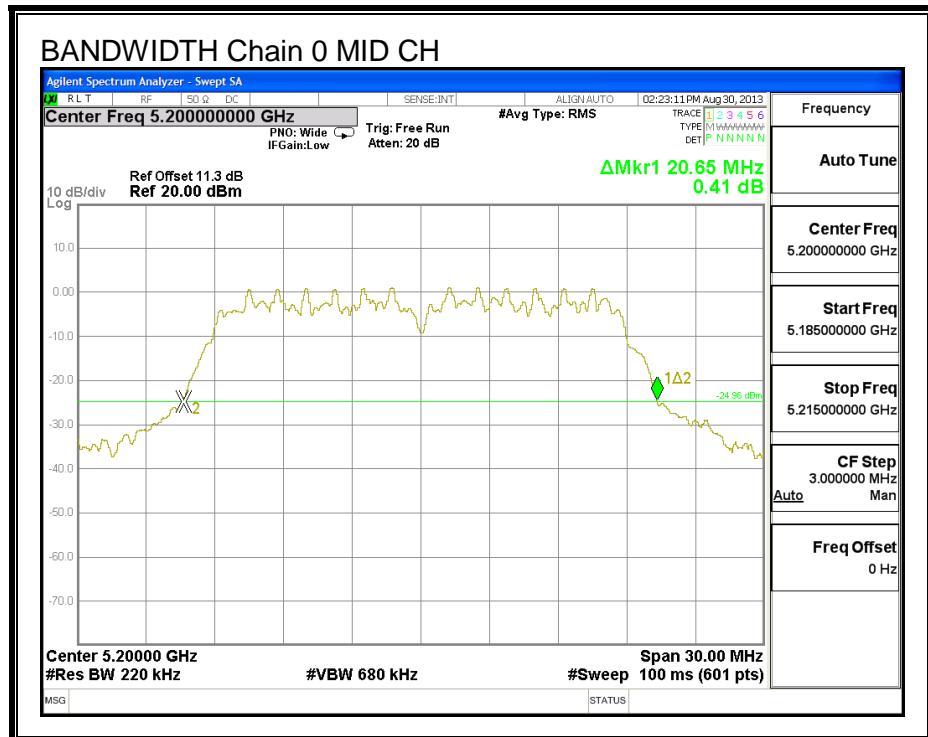
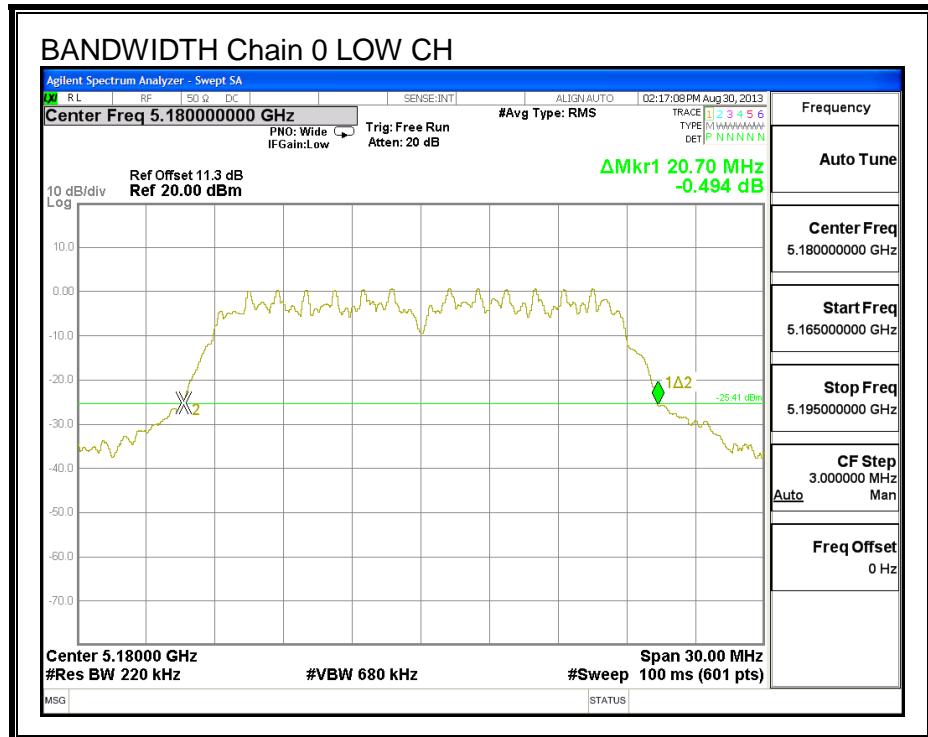
LIMITS

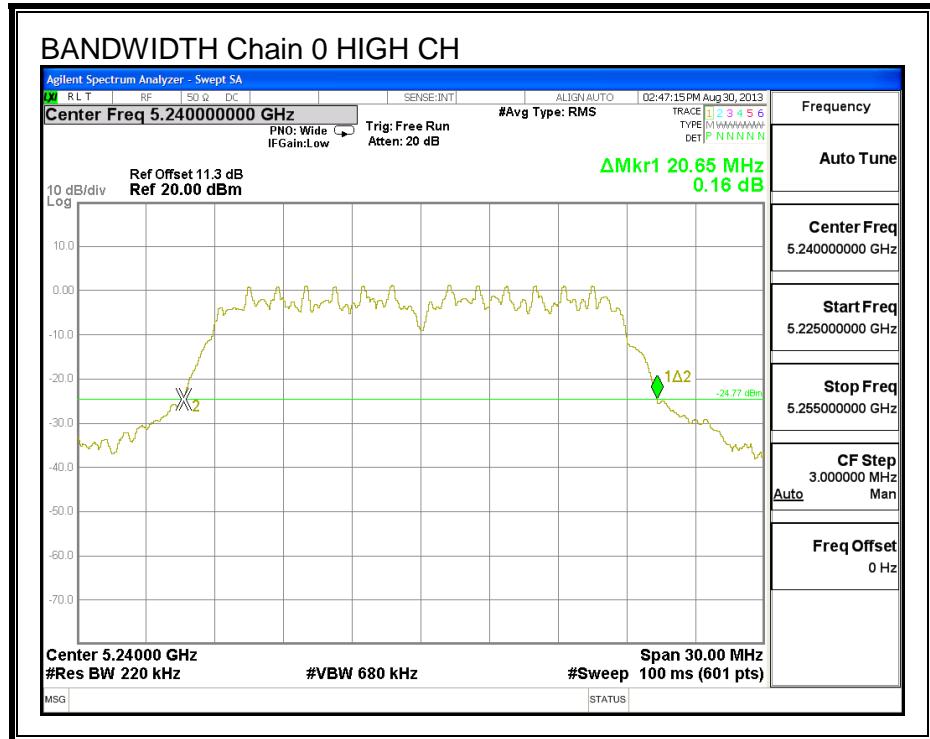
None; for reporting purposes only.

RESULTS

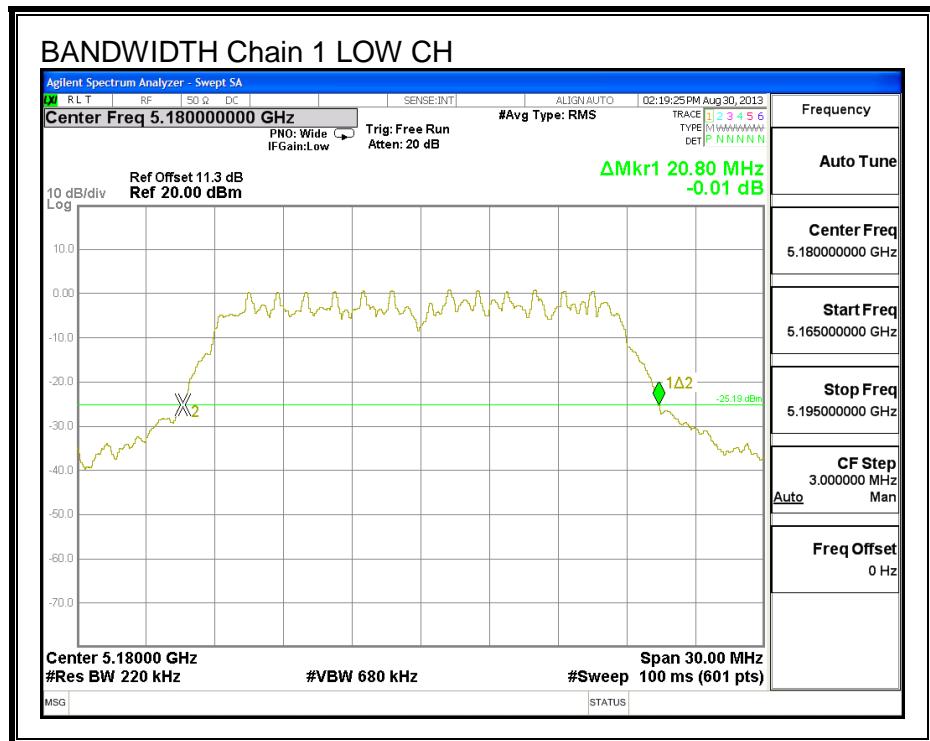
| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low | 5180 | 20.7 | 20.8 |
| Mid | 5200 | 20.7 | 20.8 |
| High | 5240 | 20.7 | 20.8 |

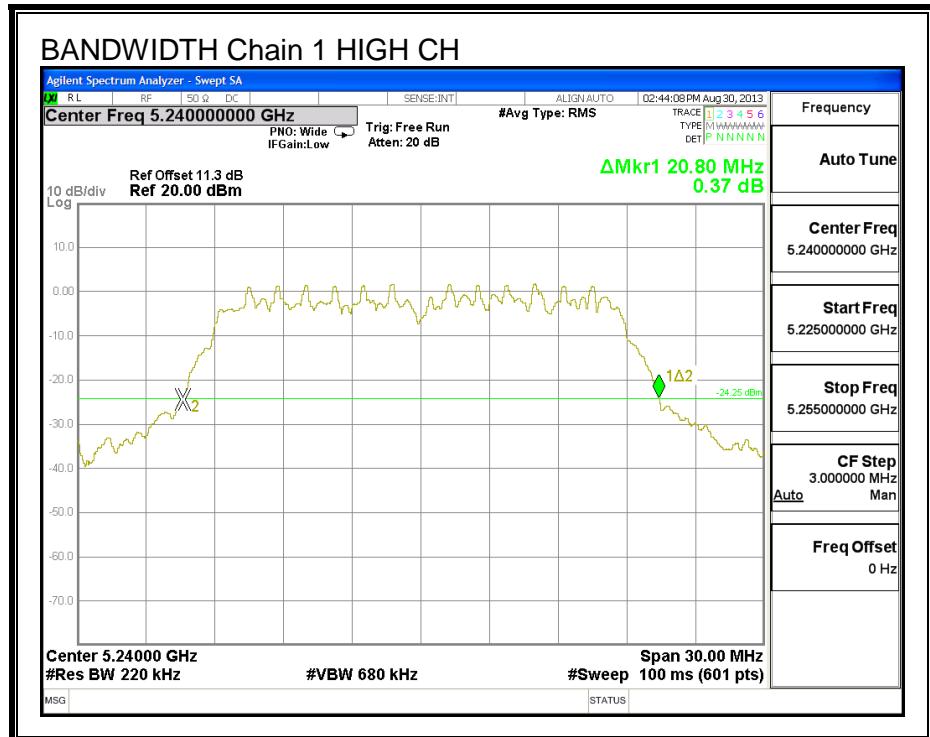
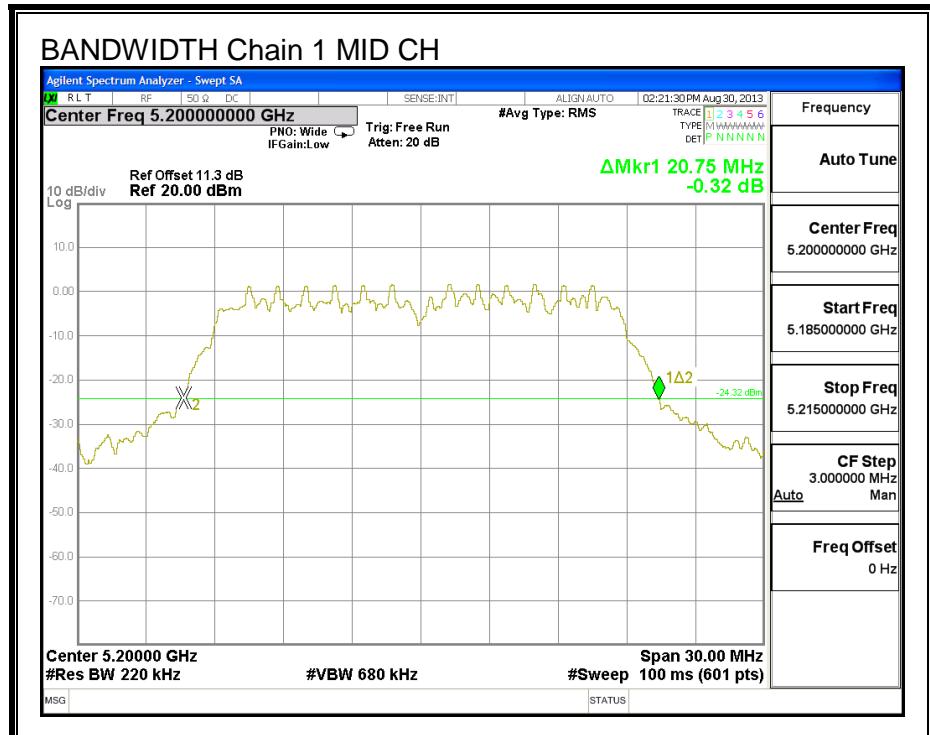
26 dB BANDWIDTH, Chain 0





26 dB BANDWIDTH, Chain 1





8.2.2. 99% BANDWIDTH

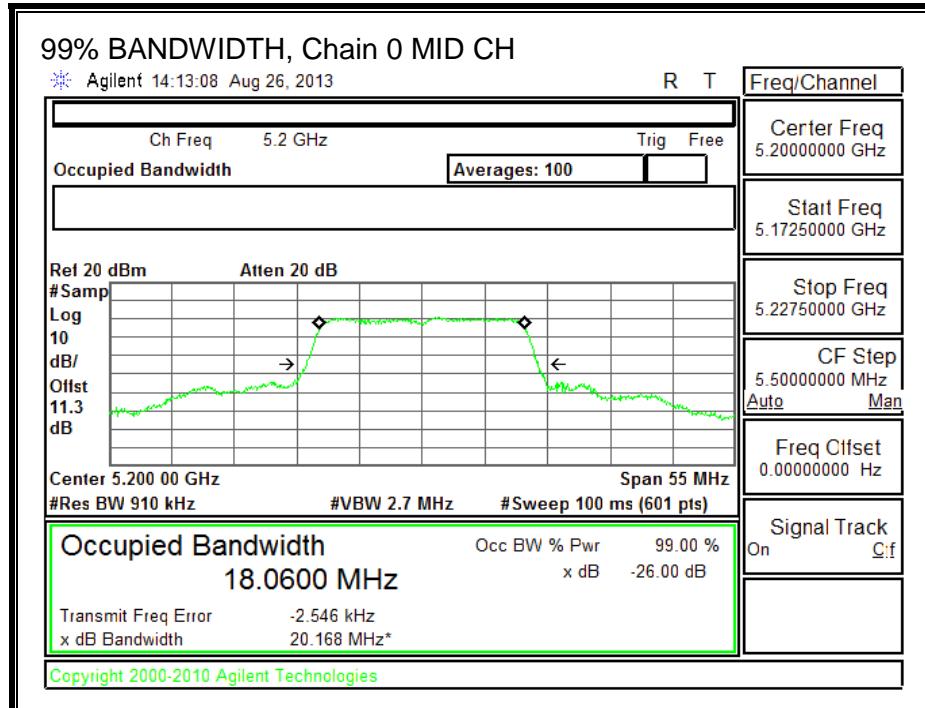
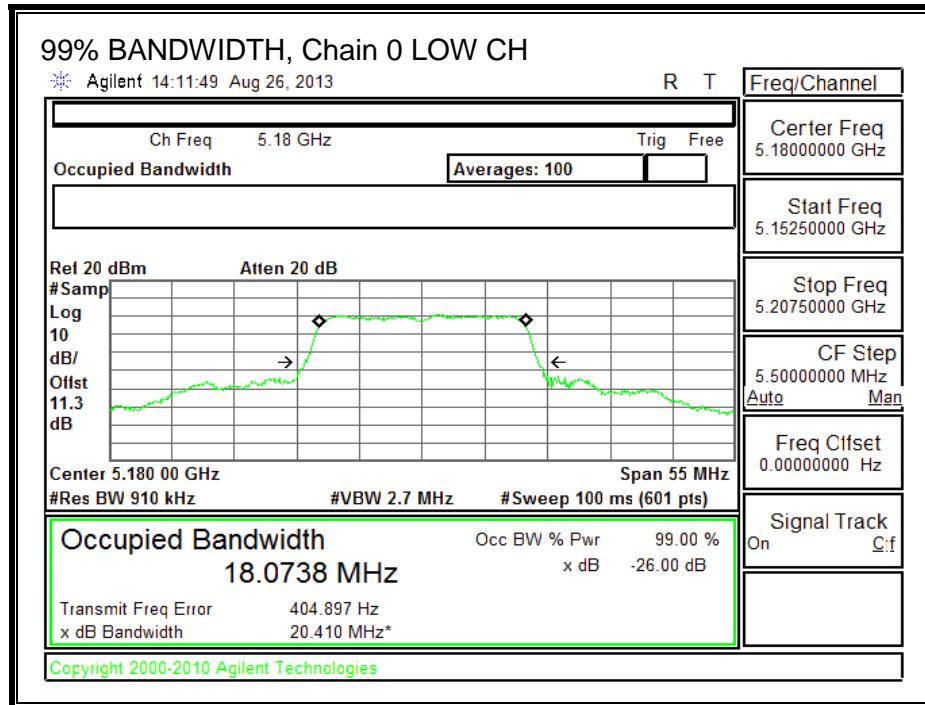
LIMITS

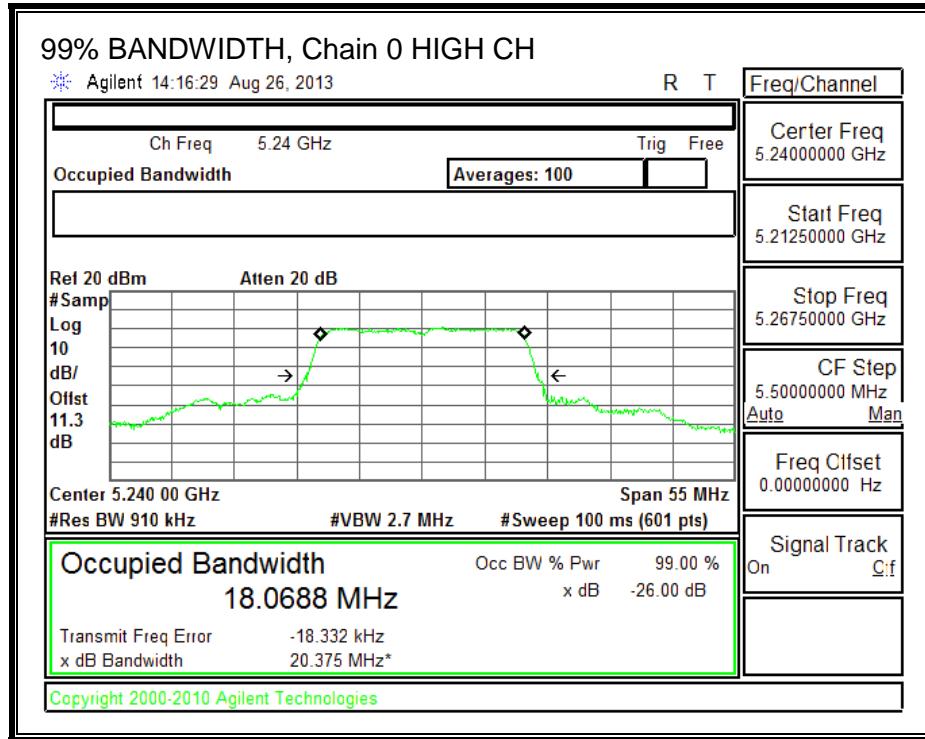
None; for reporting purposes only.

RESULTS

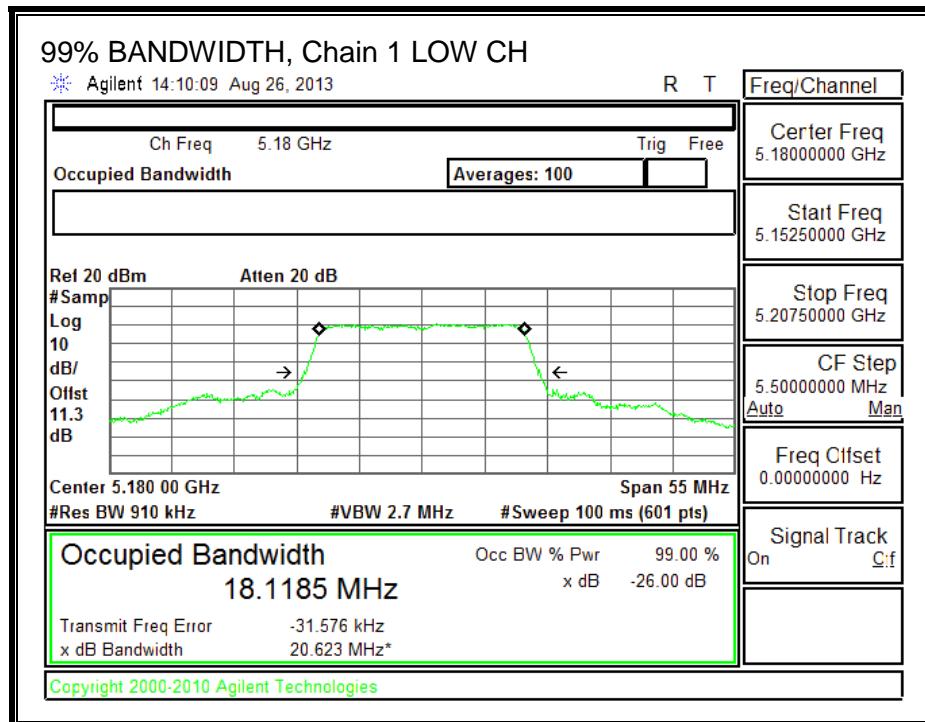
| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low | 5180 | 18.07 | 18.12 |
| Mid | 5200 | 18.06 | 18.09 |
| High | 5240 | 18.07 | 18.07 |

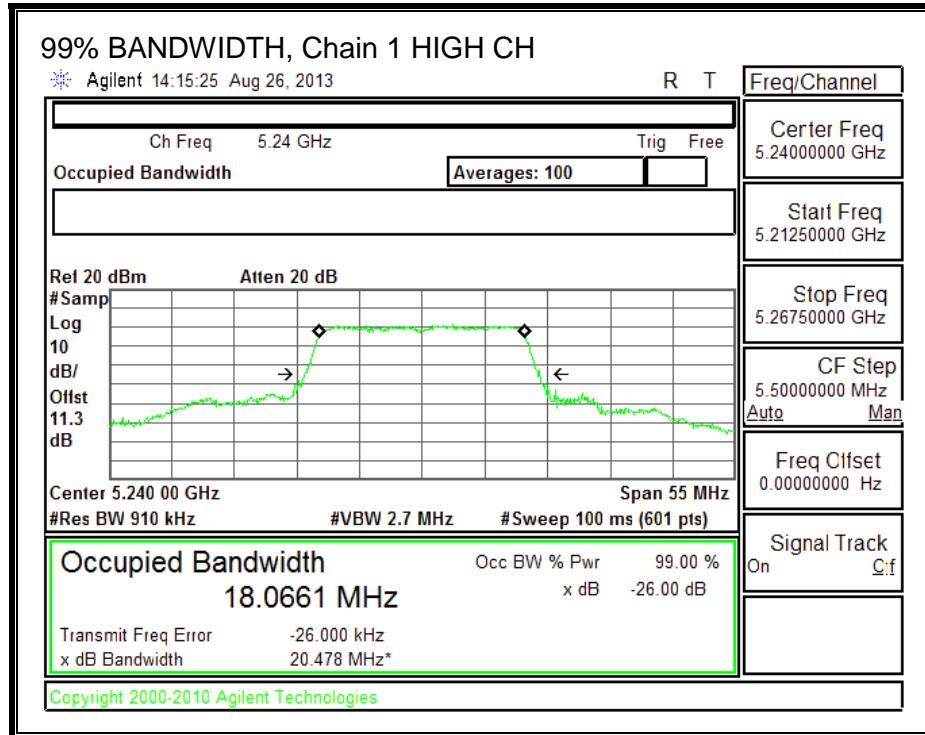
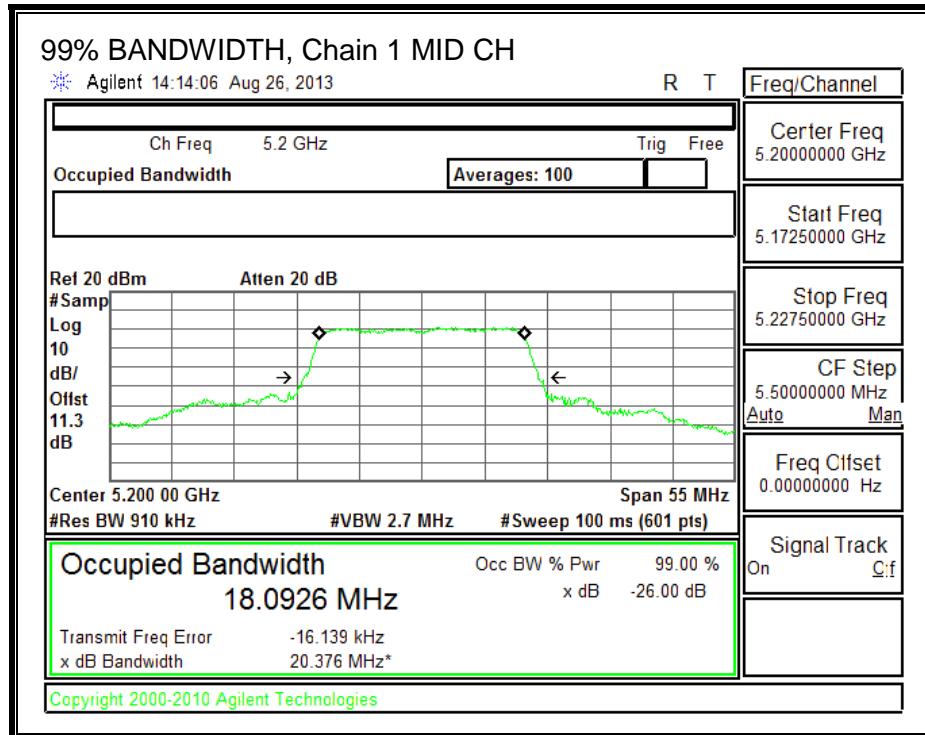
99% BANDWIDTH, Chain 0





99% BANDWIDTH, Chain 1





8.2.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.3 dB (including 10 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

| Channel | Frequency (MHz) | Chain 0 Power (dBm) | Chain 1 Power (dBm) | Total Power (dBm) |
|---------|--------------------|---------------------------|---------------------------|-------------------------|
| Low | 5180 | 9.41 | 10.08 | 12.77 |
| Mid | 5200 | 9.28 | 10.29 | 12.82 |
| High | 5240 | 9.38 | 10.31 | 12.88 |

8.2.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 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.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

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

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|-------------------------------------|-------------------------------------|---|
| 3.90 | 3.20 | 3.56 |

RESULTS

Bandwidth and Antenna Gain

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---------|--------------------|-----------------------------|---------------------------|------------------------------|
| Low | 5180 | 20.70 | 18.07 | 3.56 |
| Mid | 5200 | 20.65 | 18.06 | 3.56 |
| High | 5240 | 20.65 | 18.06 | 3.56 |

Limits

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC EIRP Limit (dBm) | Max IC Power (dBm) | Power Limit (dBm) | FCC PPSD Limit (dBm) | IC eirp PSD Limit (dBm) | PPSD Limit (dBm) |
|---------|--------------------|--------------------------------|------------------------------|-----------------------------|-------------------------|-------------------------------|-------------------------------------|------------------------|
| Low | 5180 | 17.00 | 22.57 | 19.01 | 17.00 | 4.00 | 10.00 | 4.00 |
| Mid | 5200 | 17.00 | 22.57 | 19.01 | 17.00 | 4.00 | 10.00 | 4.00 |
| High | 5240 | 17.00 | 22.57 | 19.01 | 17.00 | 4.00 | 10.00 | 4.00 |

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

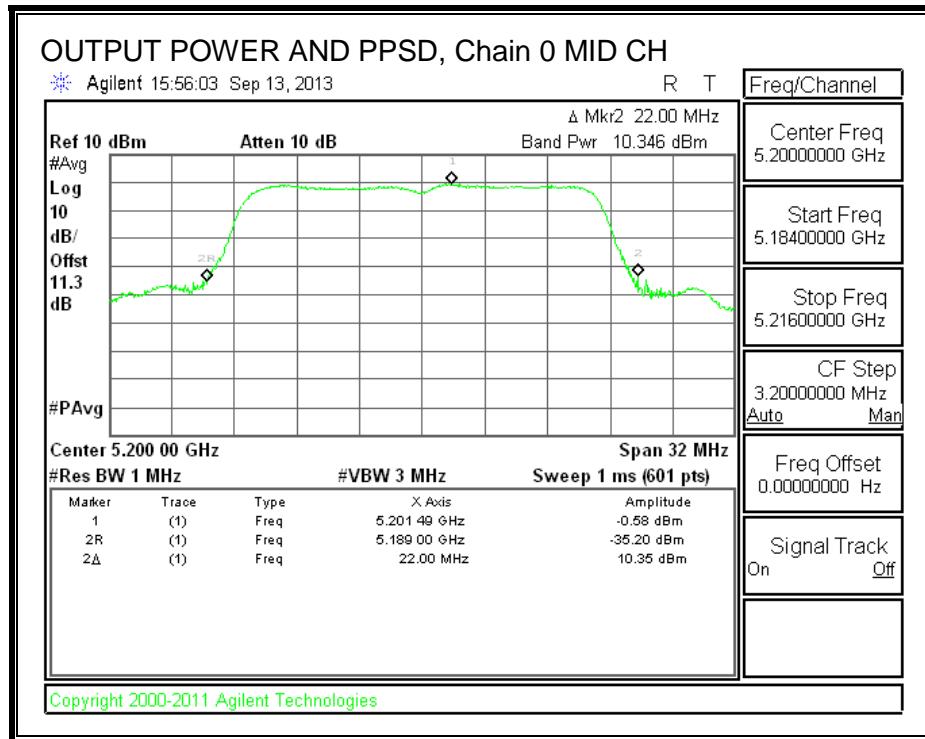
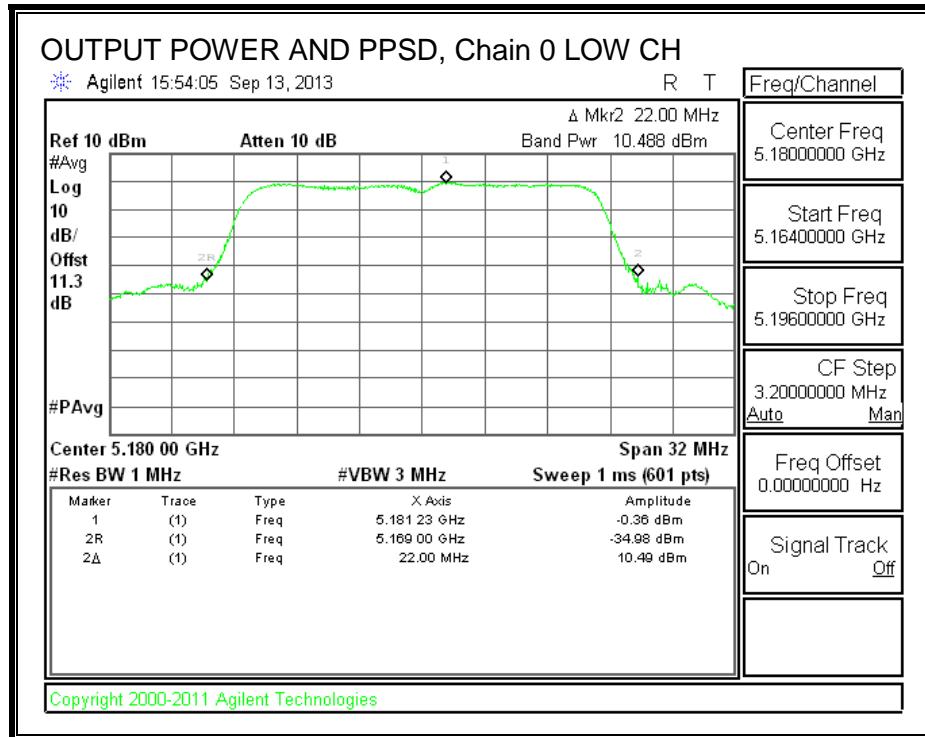
Output Power Results

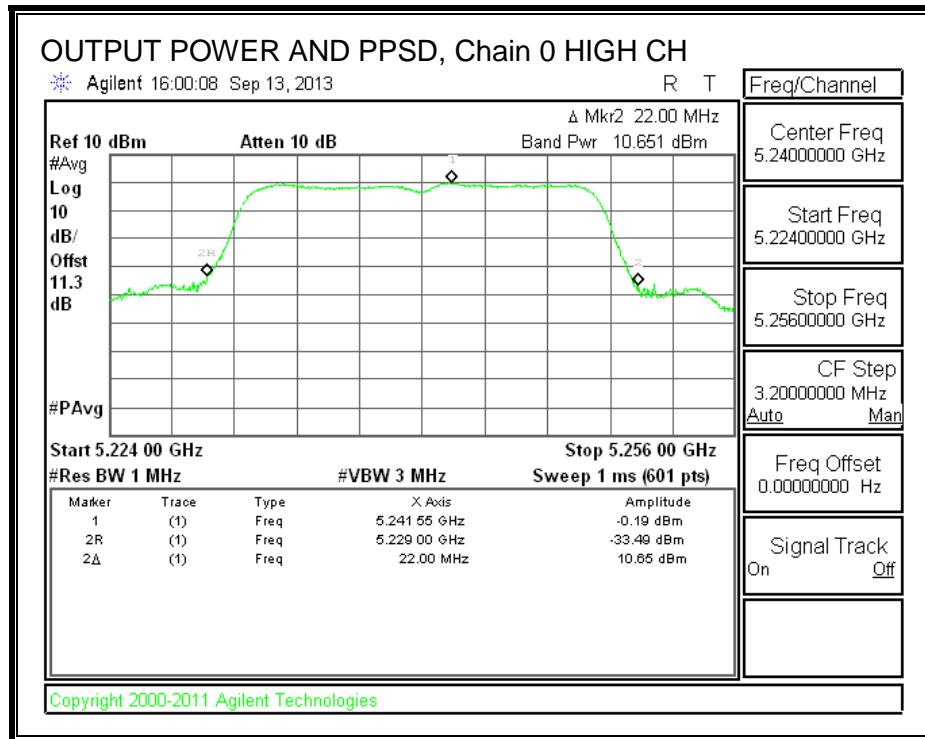
| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low | 5180 | 10.49 | 10.62 | 13.56 | 17.00 | -3.44 |
| Mid | 5200 | 10.35 | 10.82 | 13.60 | 17.00 | -3.40 |
| High | 5240 | 10.65 | 11.00 | 13.84 | 17.00 | -3.16 |

PPSD Results

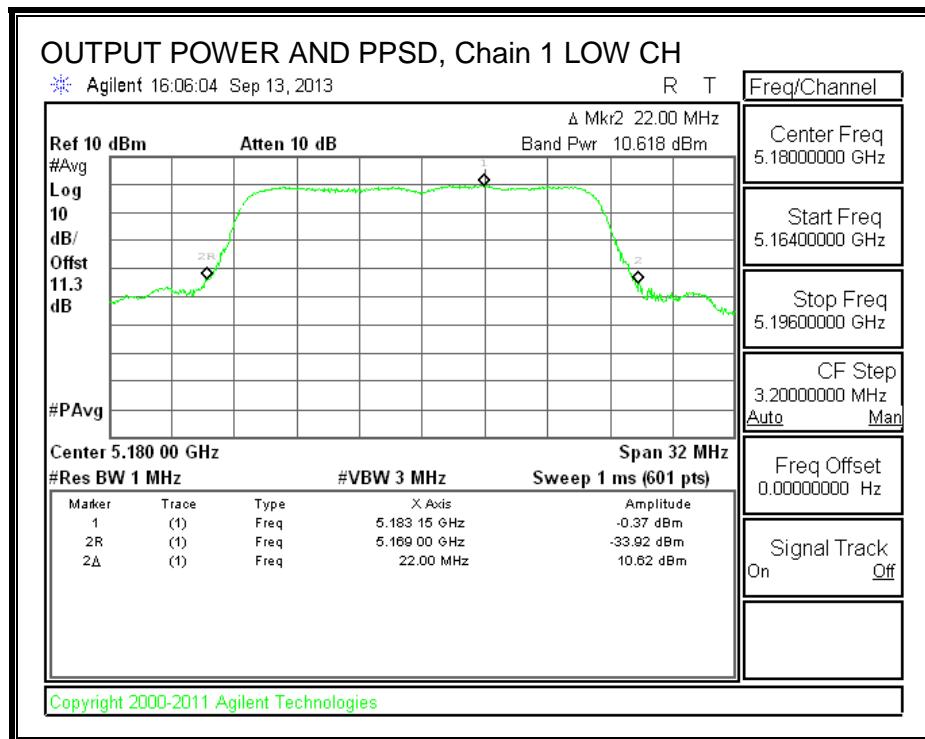
| Channel | Frequency (MHz) | Chain 0 Meas PPSD (dBm) | Chain 1 Meas PPSD (dBm) | Total Corr'd PPSD (dBm) | PPSD Limit (dBm) | PPSD Margin (dB) |
|---------|--------------------|----------------------------------|----------------------------------|----------------------------------|------------------------|------------------------|
| Low | 5180 | -0.36 | -0.37 | 2.65 | 4.00 | -1.35 |
| Mid | 5200 | -0.58 | -0.16 | 2.65 | 4.00 | -1.35 |
| High | 5240 | -0.19 | 0.27 | 3.06 | 4.00 | -0.94 |

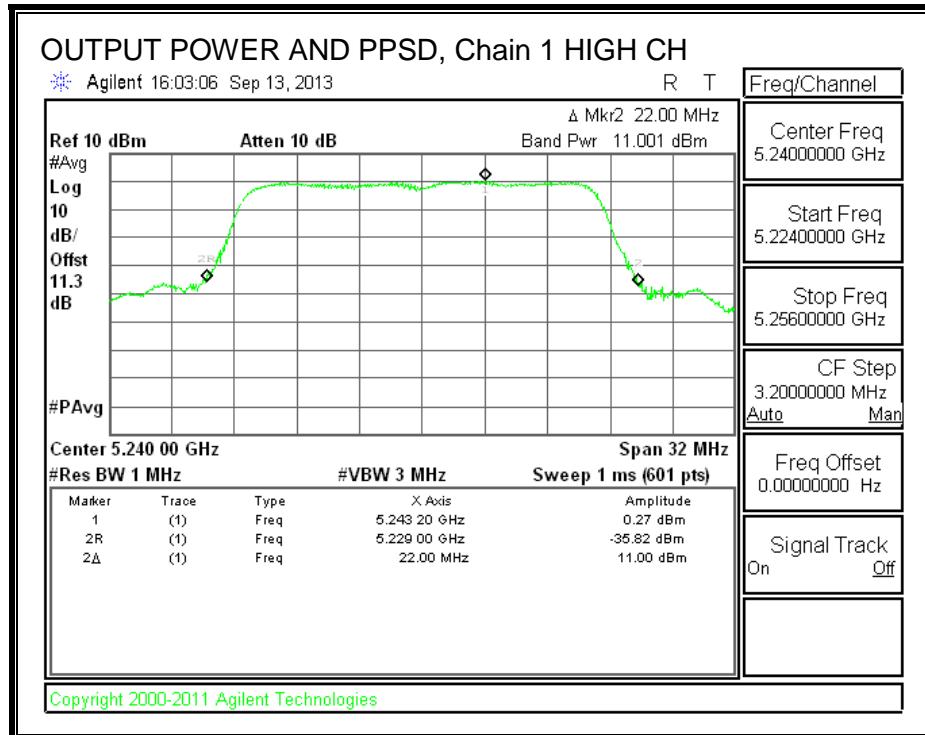
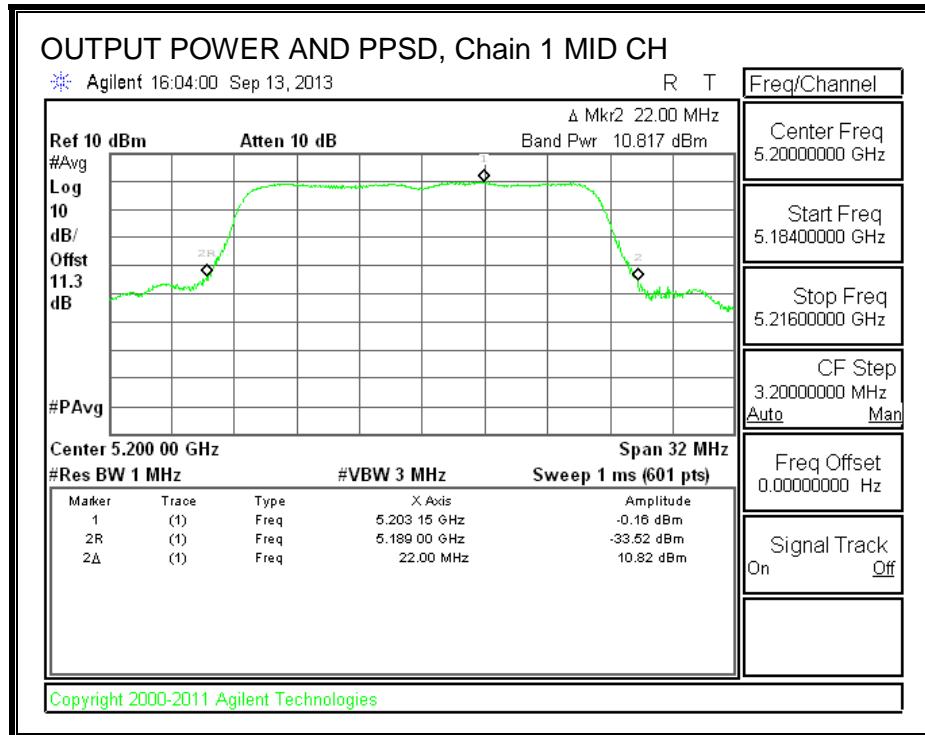
OUTPUT POWER AND PPSD, Chain 0





OUTPUT POWER AND PPSD, Chain 1





8.2.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

RESULTS

Refer to the results of 802.11n HT20 mode in the 5.6 GHz band.

8.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

8.3.1. 26 dB BANDWIDTH

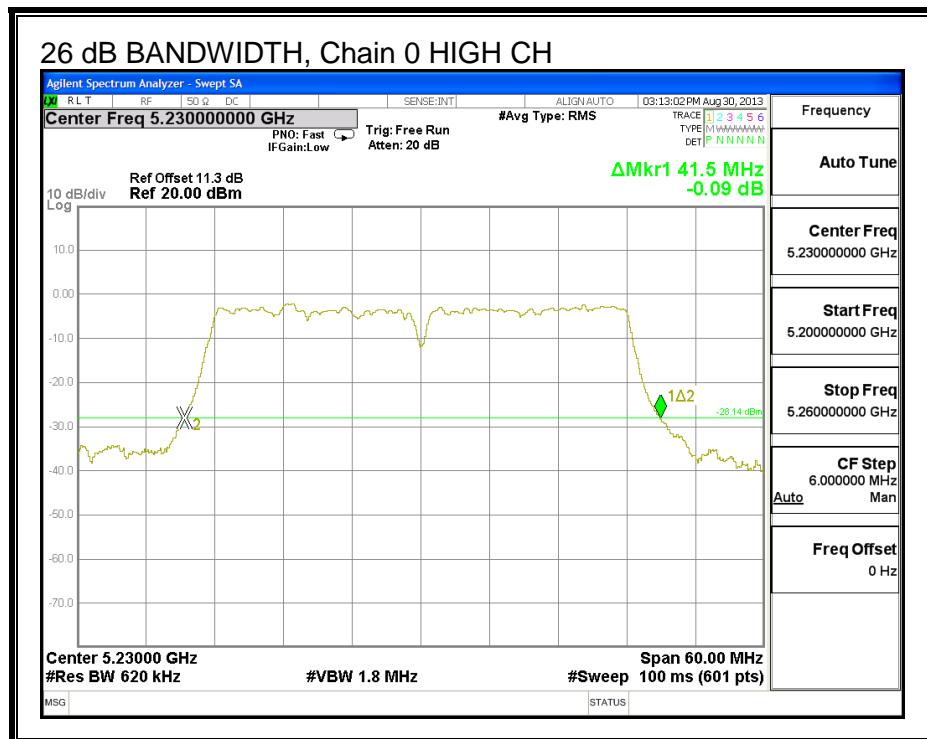
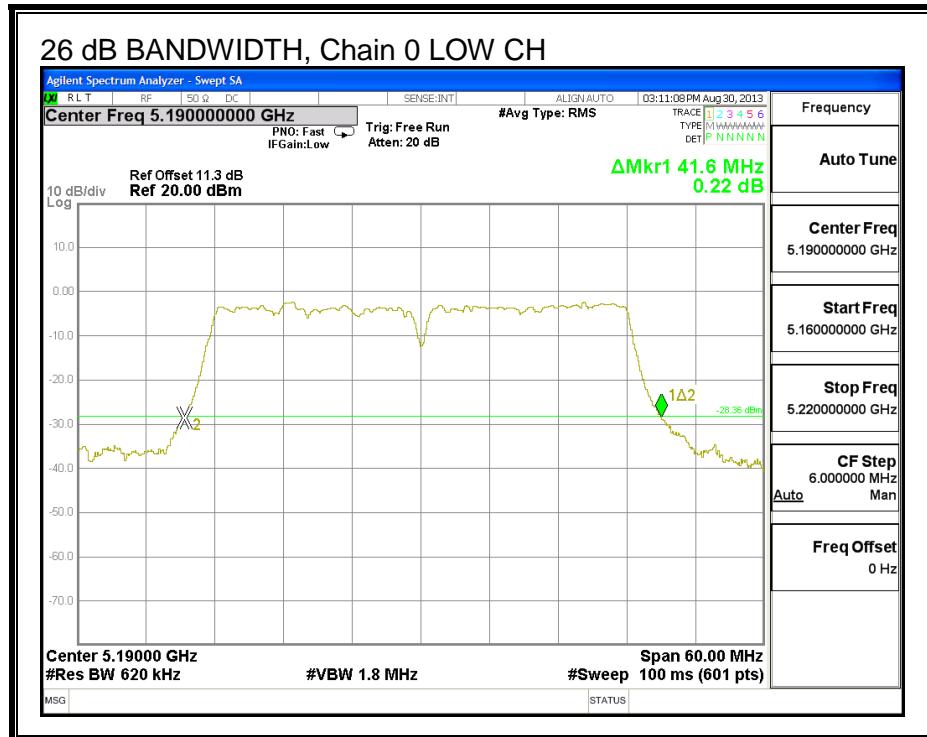
LIMITS

None; for reporting purposes only.

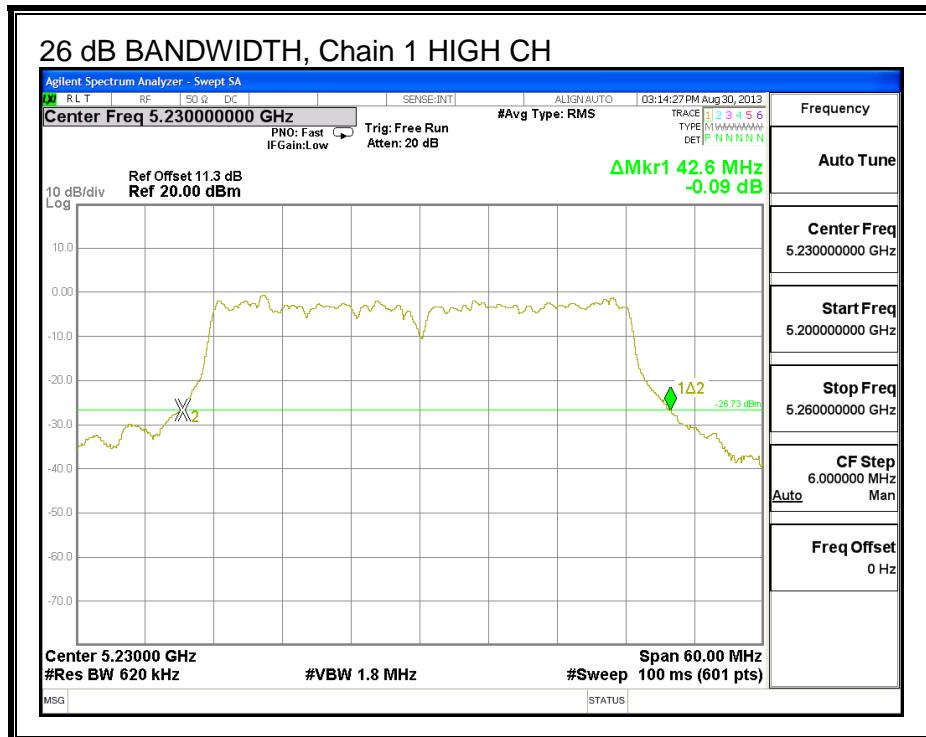
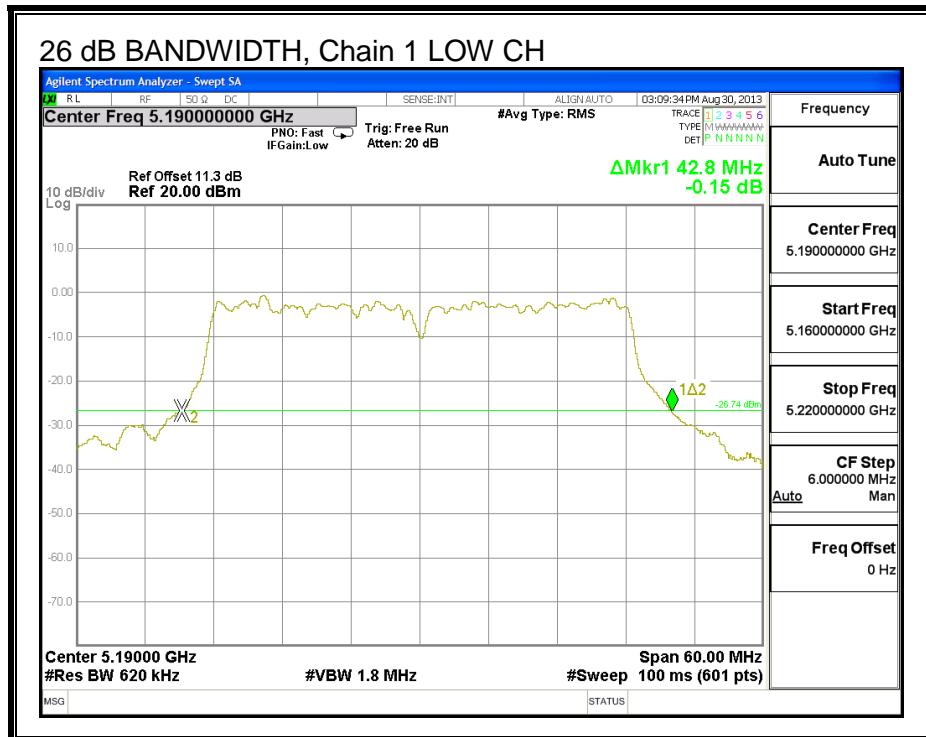
RESULTS

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low | 5190 | 41.6 | 42.8 |
| High | 5230 | 41.5 | 42.6 |

26 dB BANDWIDTH, Chain 0



26 dB BANDWIDTH, Chain 1



8.3.2. 99% BANDWIDTH

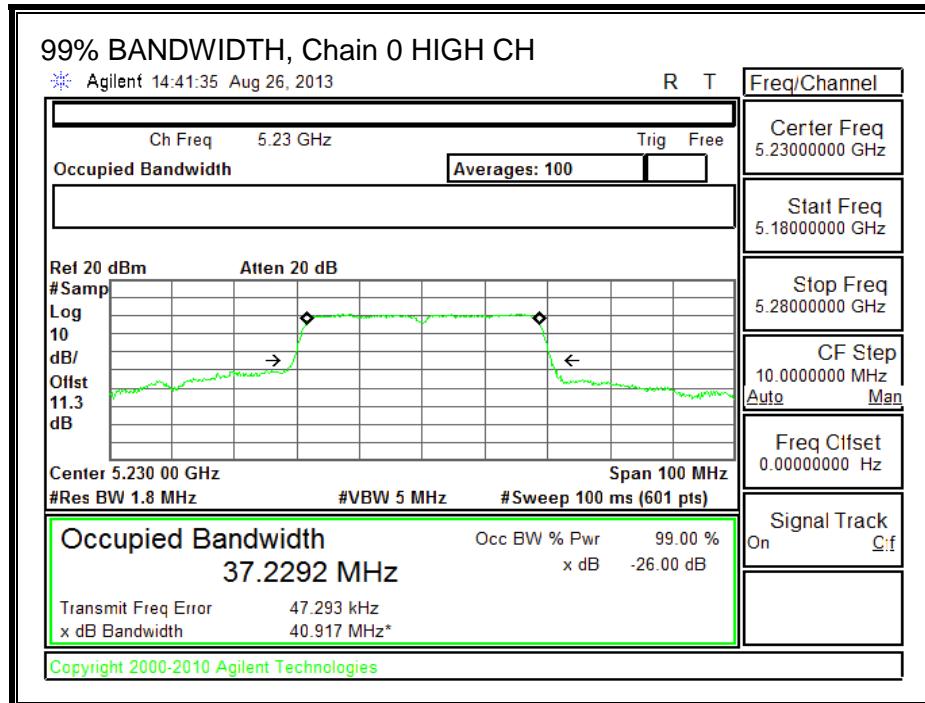
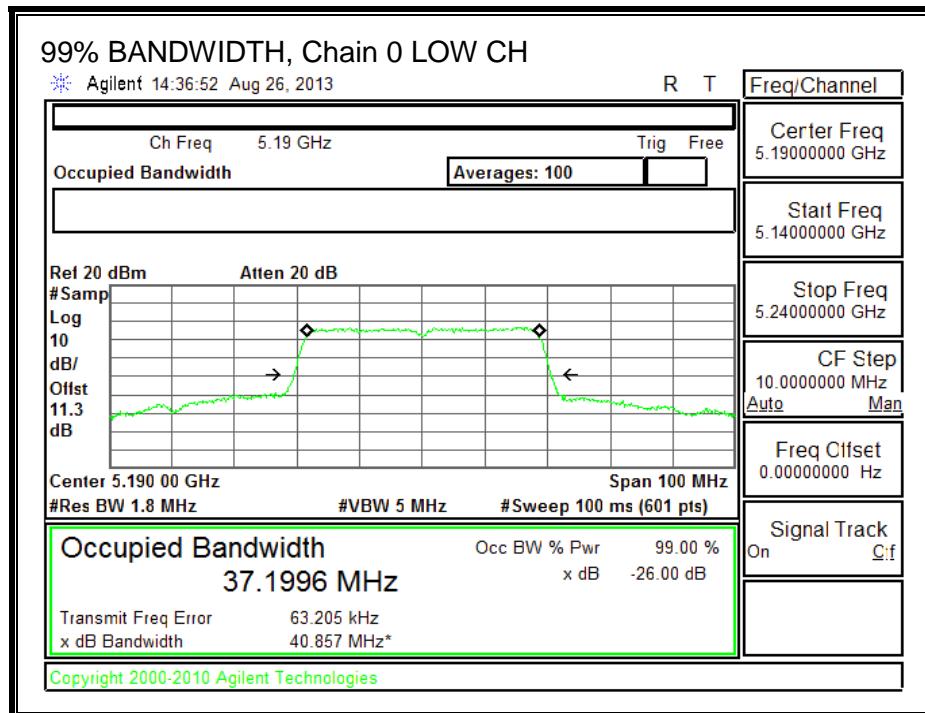
LIMITS

None; for reporting purposes only.

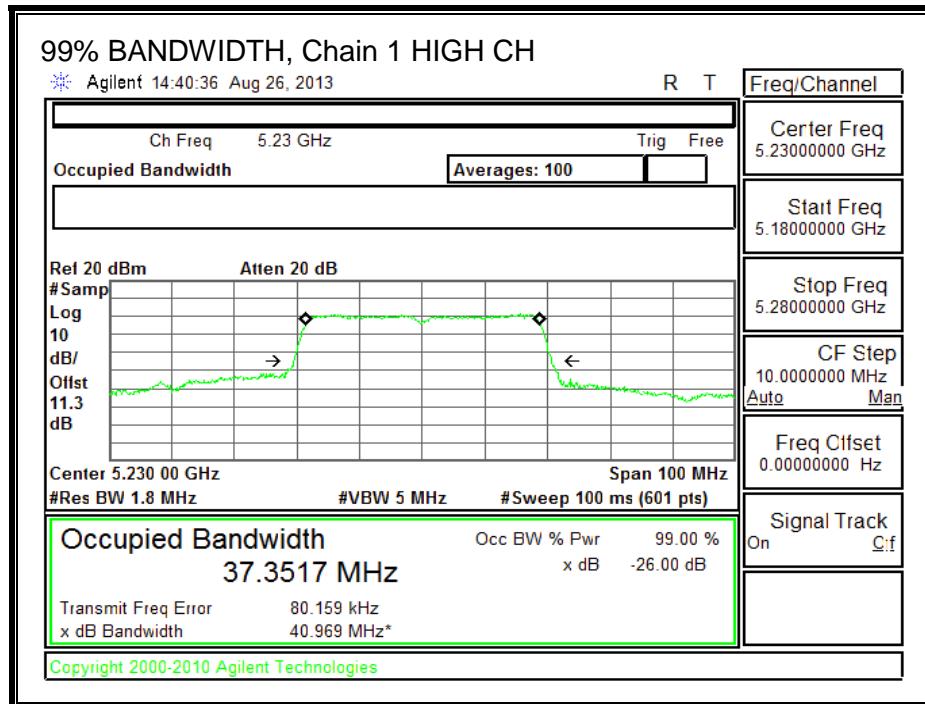
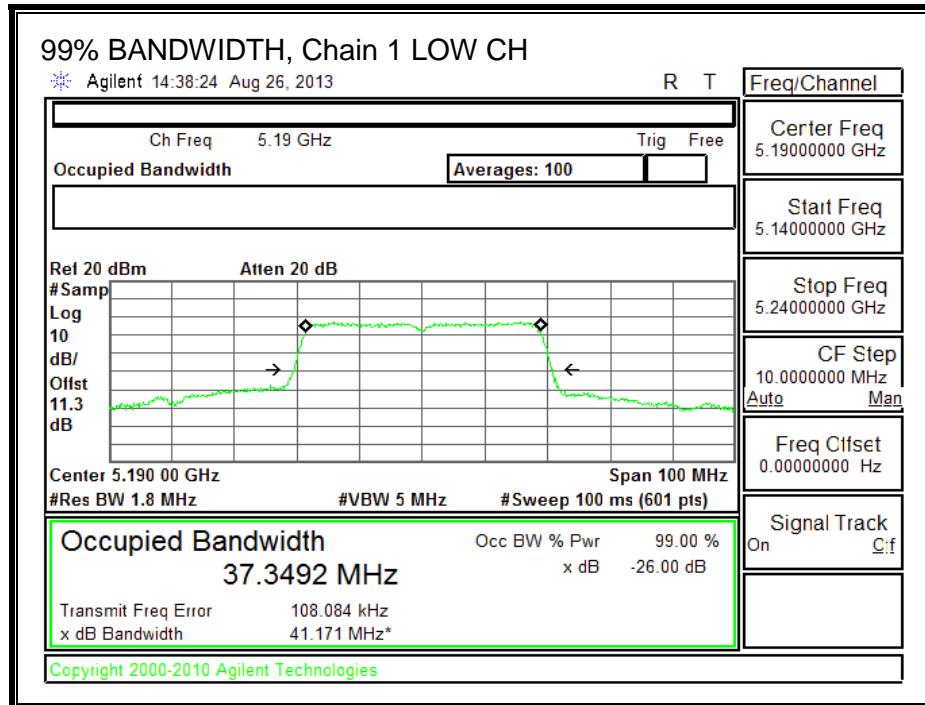
RESULTS

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low | 5180 | 37.20 | 37.35 |
| High | 5240 | 37.23 | 37.35 |

99% BANDWIDTH, Chain 0



99% BANDWIDTH, Chain 1



8.3.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.3 dB (including 10 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

| Channel | Frequency (MHz) | Chain 0 Power (dBm) | Chain 1 Power (dBm) | Total Power (dBm) |
|---------|--------------------|---------------------------|---------------------------|-------------------------|
| Low | 5190 | 7.63 | 8.15 | 10.91 |
| High | 5230 | 7.79 | 7.98 | 10.90 |

8.3.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 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.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

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

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|-------------------------------------|-------------------------------------|---|
| 3.90 | 3.20 | 3.56 |

RESULTS

Bandwidth and Antenna Gain

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---------|--------------------|-----------------------------|---------------------------|------------------------------|
| Low | 5190 | 41.60 | 37.19 | 3.56 |
| High | 5230 | 41.50 | 37.22 | 3.56 |

Limits

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC EIRP Limit (dBm) | Max IC Power (dBm) | Power Limit (dBm) | FCC PPSD Limit (dBm) | IC eirp PSD Limit (dBm) | PPSD Limit (dBm) |
|---------|--------------------|--------------------------------|------------------------------|-----------------------------|-------------------------|-------------------------------|-------------------------------------|------------------------|
| Low | 5190 | 17.00 | 23.00 | 19.44 | 17.00 | 4.00 | 10.00 | 4.00 |
| High | 5230 | 17.00 | 23.00 | 19.44 | 17.00 | 4.00 | 10.00 | 4.00 |

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

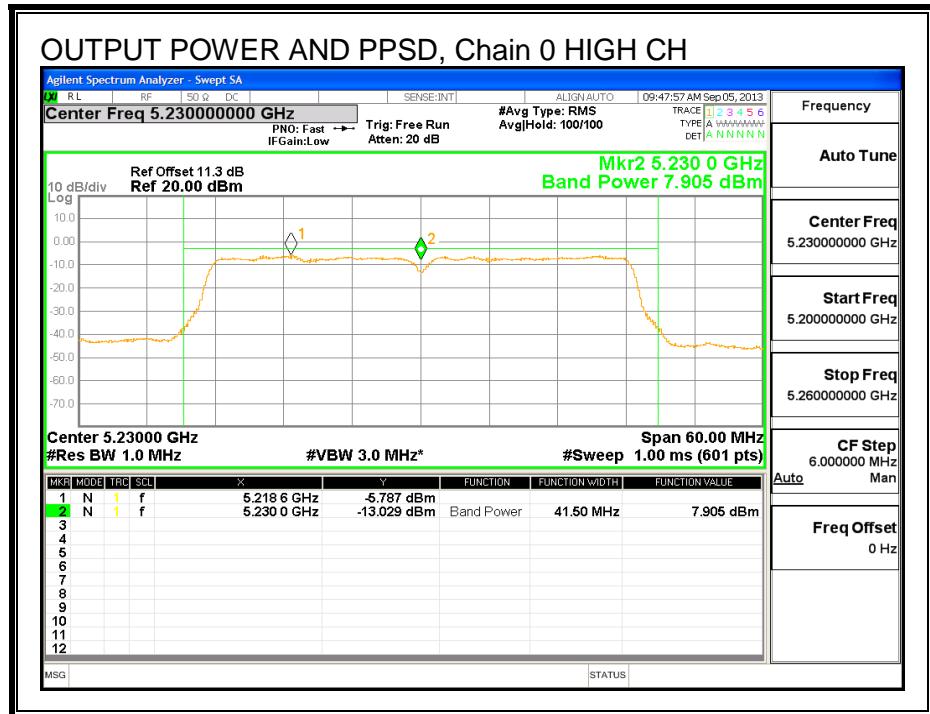
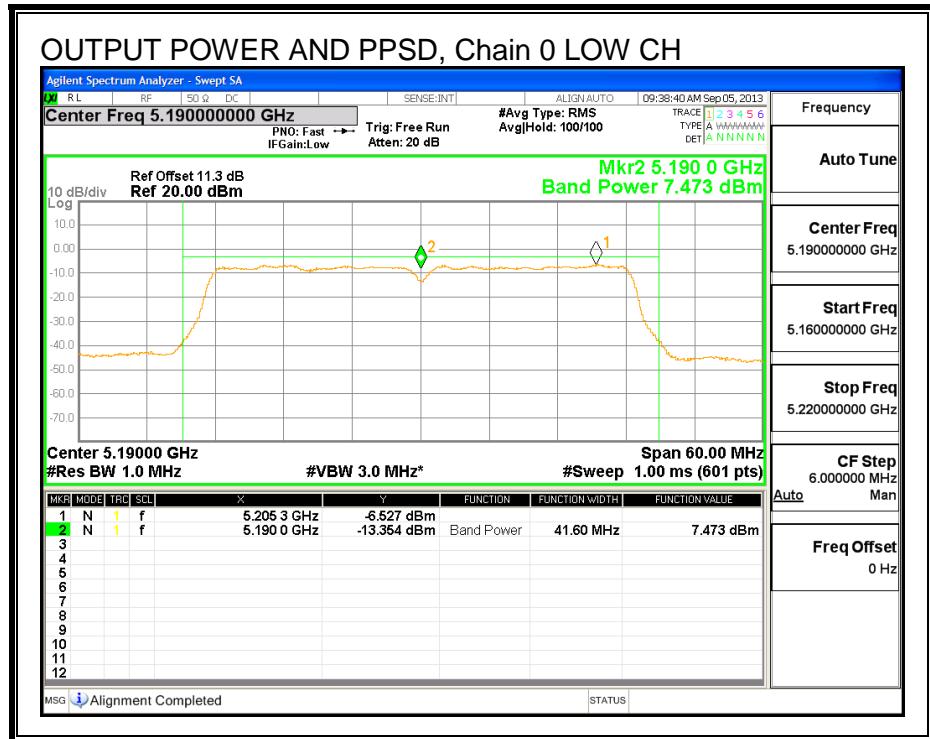
Output Power Results

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low | 5190 | 7.47 | 7.93 | 10.72 | 17.00 | -6.28 |
| High | 5230 | 7.91 | 8.28 | 11.11 | 17.00 | -5.89 |

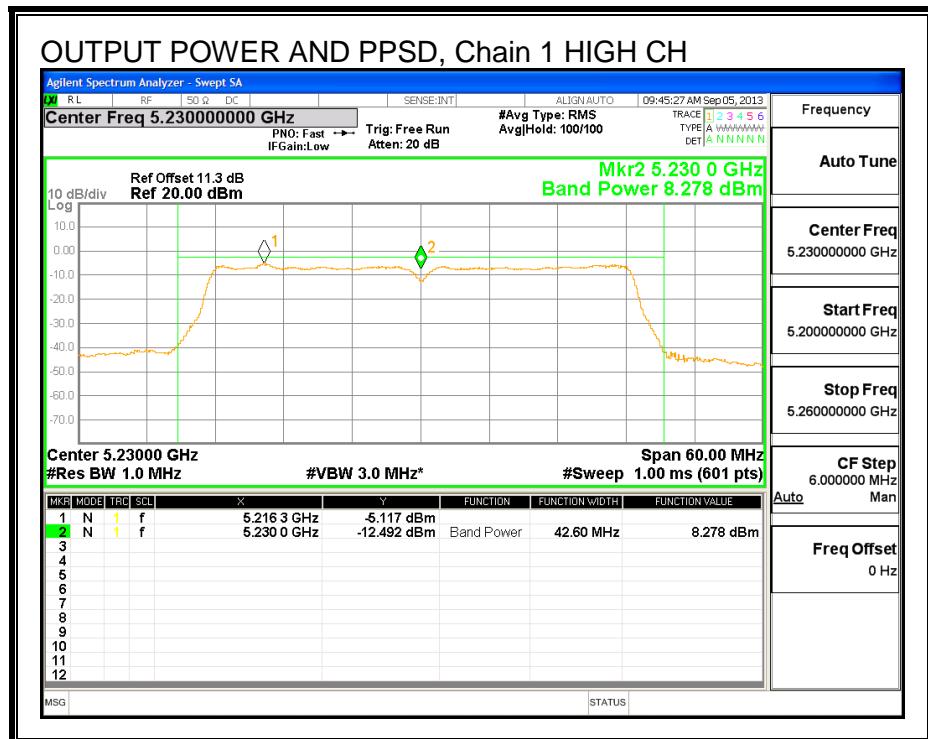
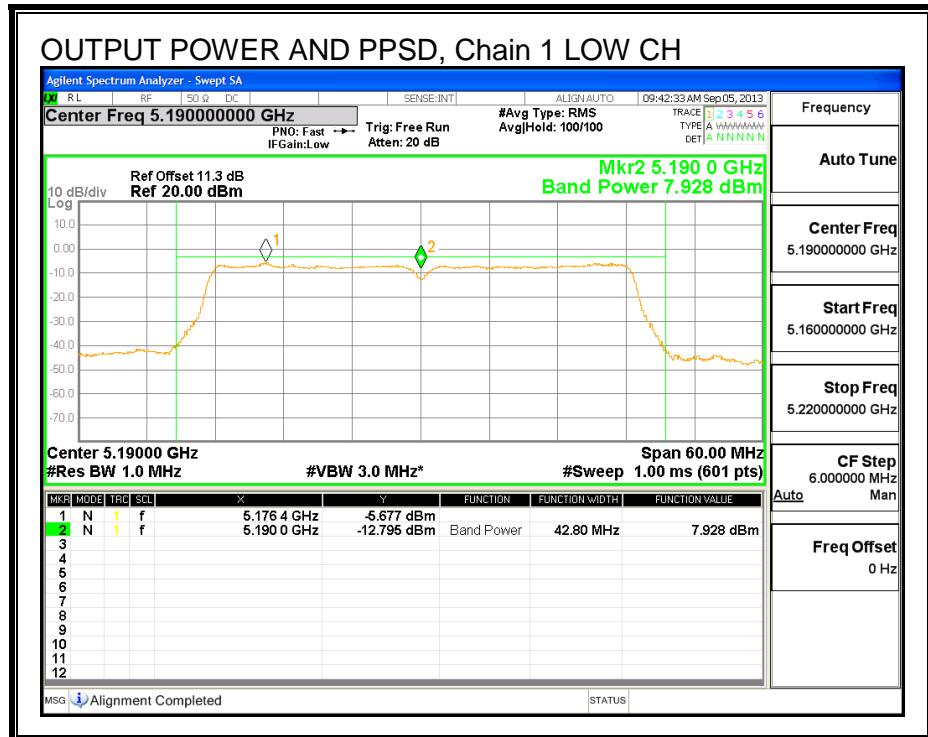
PPSD Results

| Channel | Frequency (MHz) | Chain 0 Meas PPSD (dBm) | Chain 1 Meas PPSD (dBm) | Total Corr'd PPSD (dBm) | PPSD Limit (dBm) | PPSD Margin (dB) |
|---------|--------------------|----------------------------------|----------------------------------|----------------------------------|------------------------|------------------------|
| Low | 5190 | -6.53 | -5.68 | -3.07 | 4.00 | -7.07 |
| High | 5230 | -5.79 | -5.12 | -2.43 | 4.00 | -6.43 |

OUTPUT POWER AND PPSD, Chain 0



OUTPUT POWER AND PPSD, Chain 1



8.3.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Refer to the results of 802.11n HT40 mode in the 5.6 GHz band.

8.4. 802.11a MODE IN THE 5.3 GHz BAND

8.4.1. 26 dB BANDWIDTH

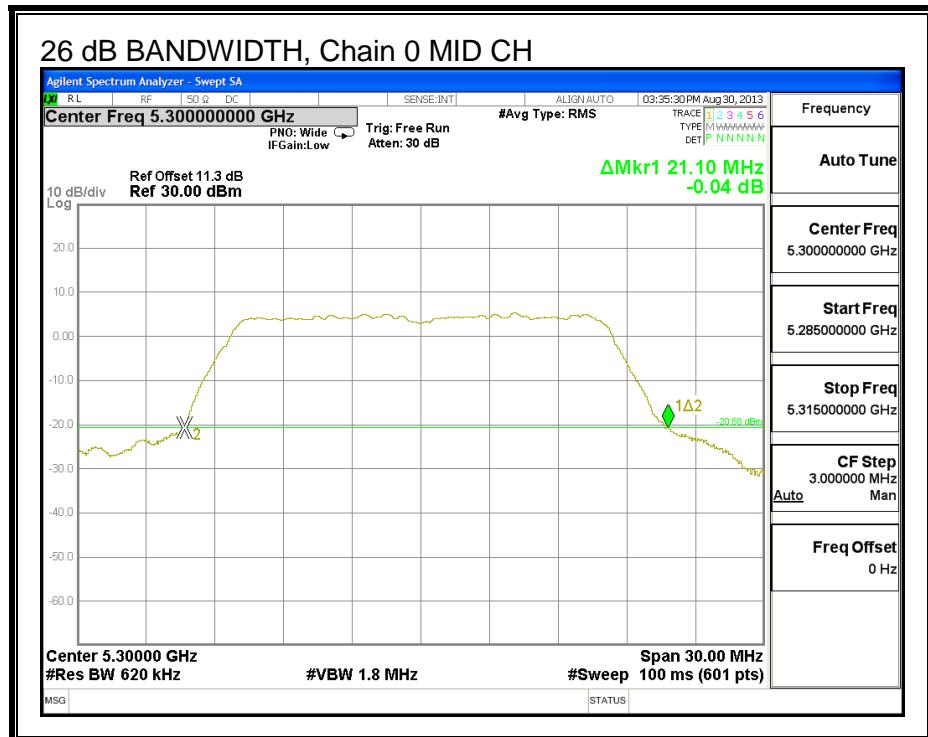
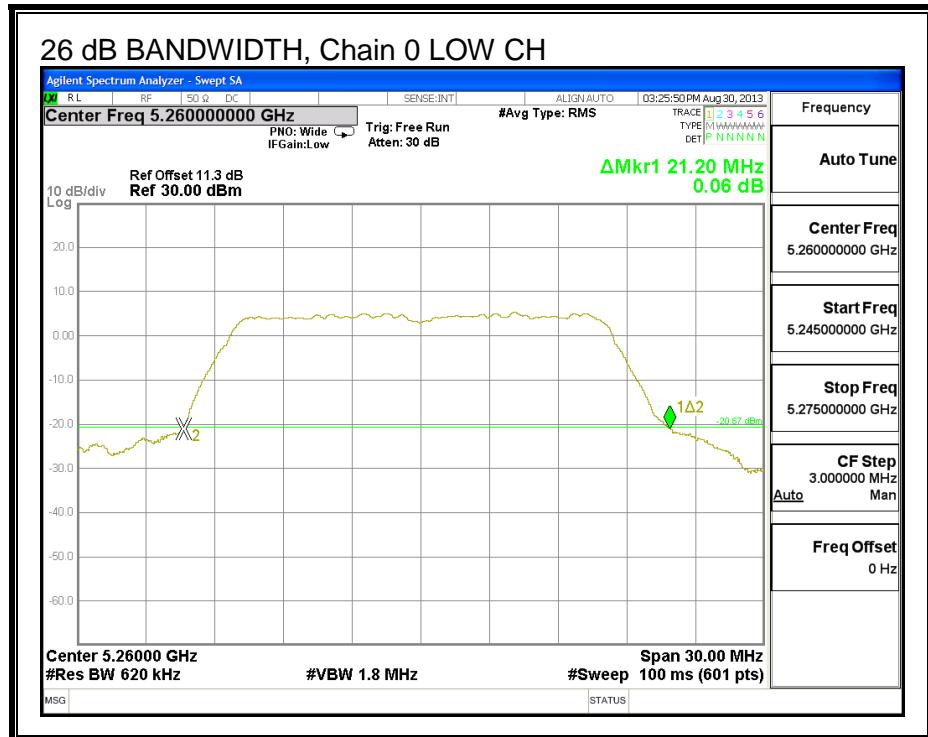
LIMITS

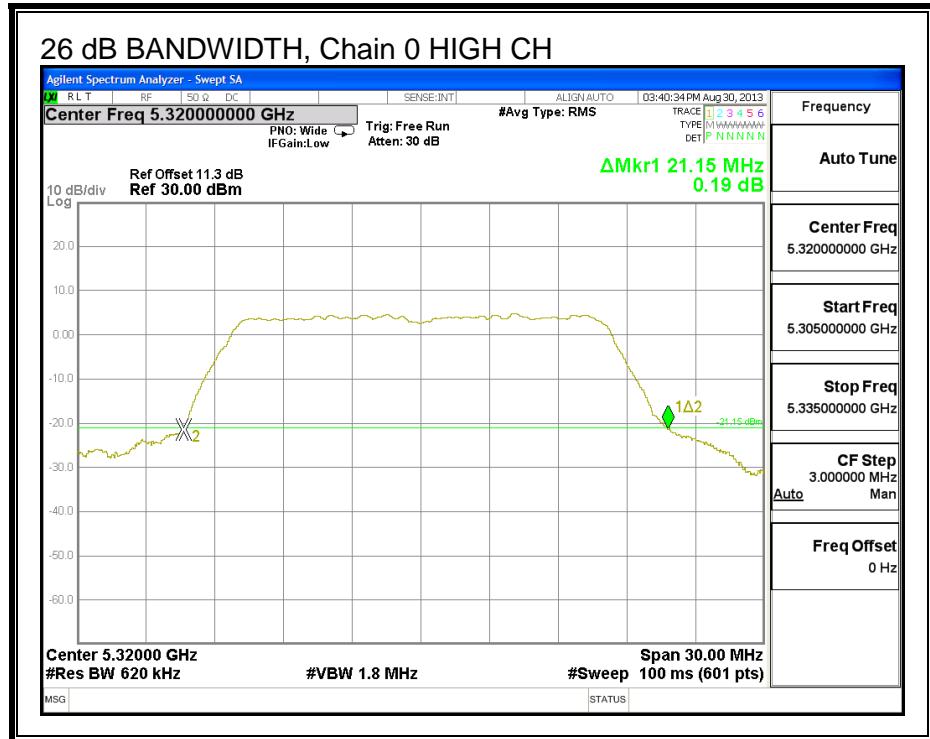
None; for reporting purposes only.

RESULTS

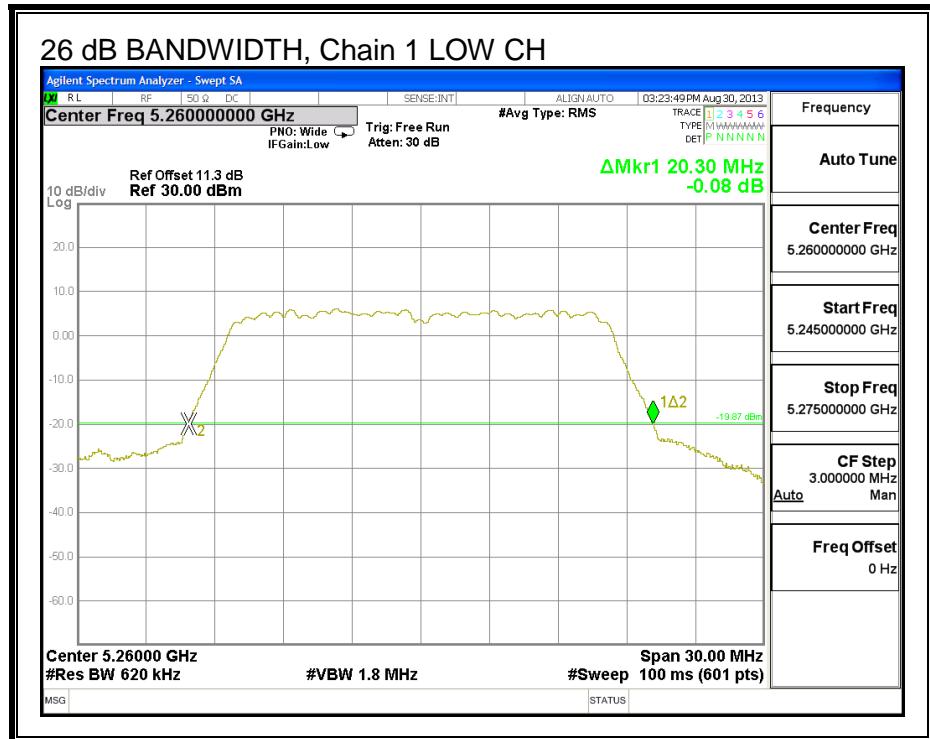
| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low | 5260 | 21.20 | 20.30 |
| Mid | 5300 | 21.10 | 20.30 |
| High | 5320 | 21.15 | 20.30 |

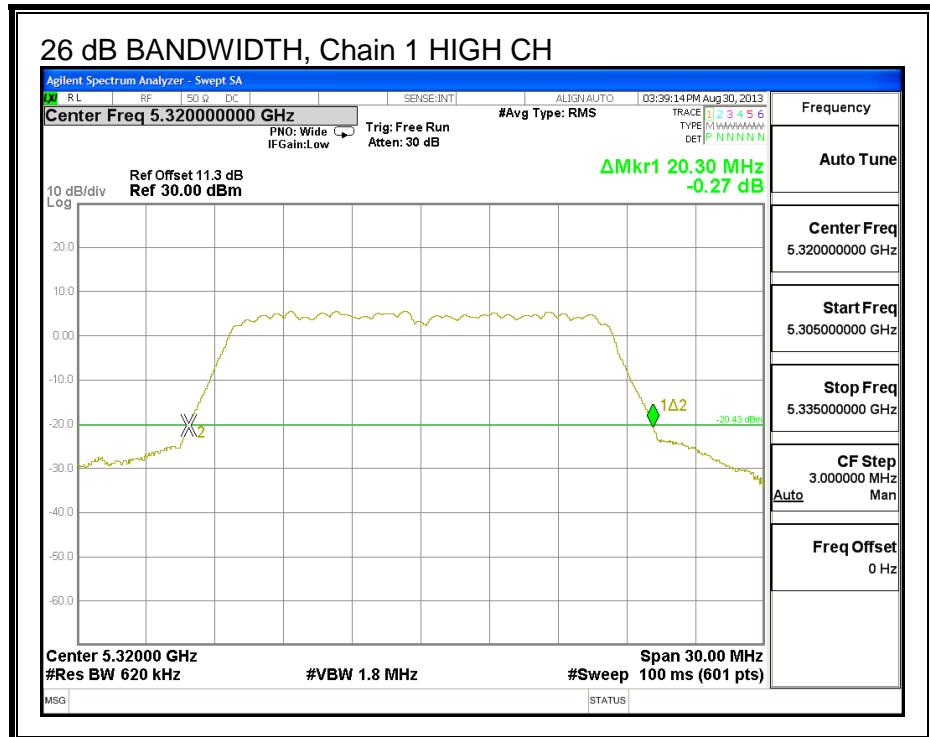
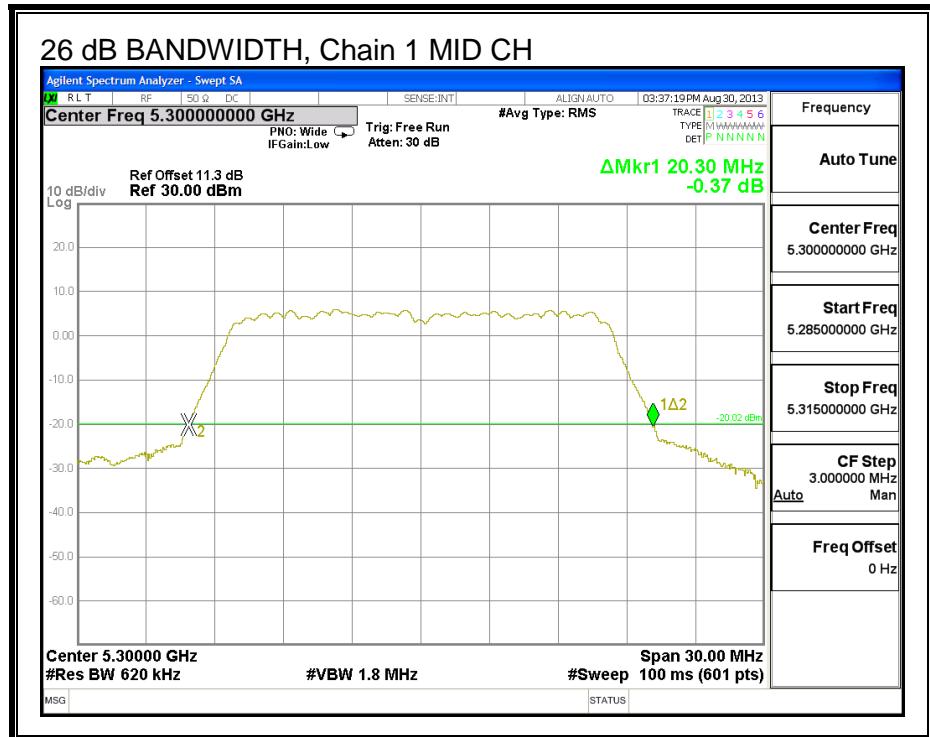
26 dB BANDWIDTH, Chain 0





26 dB BANDWIDTH, Chain 1





8.4.2. 99% BANDWIDTH

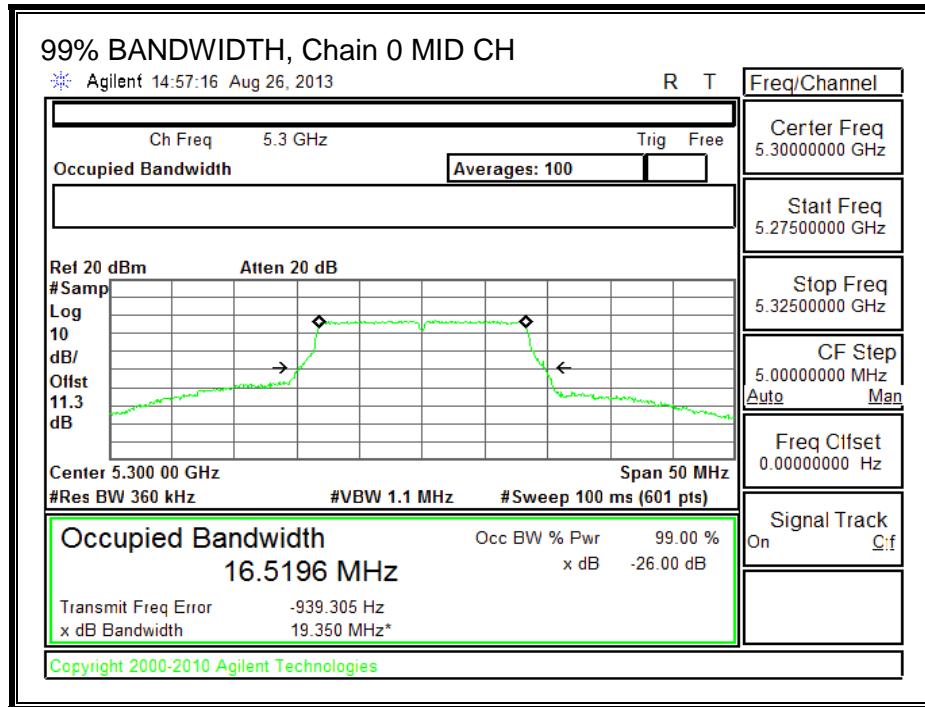
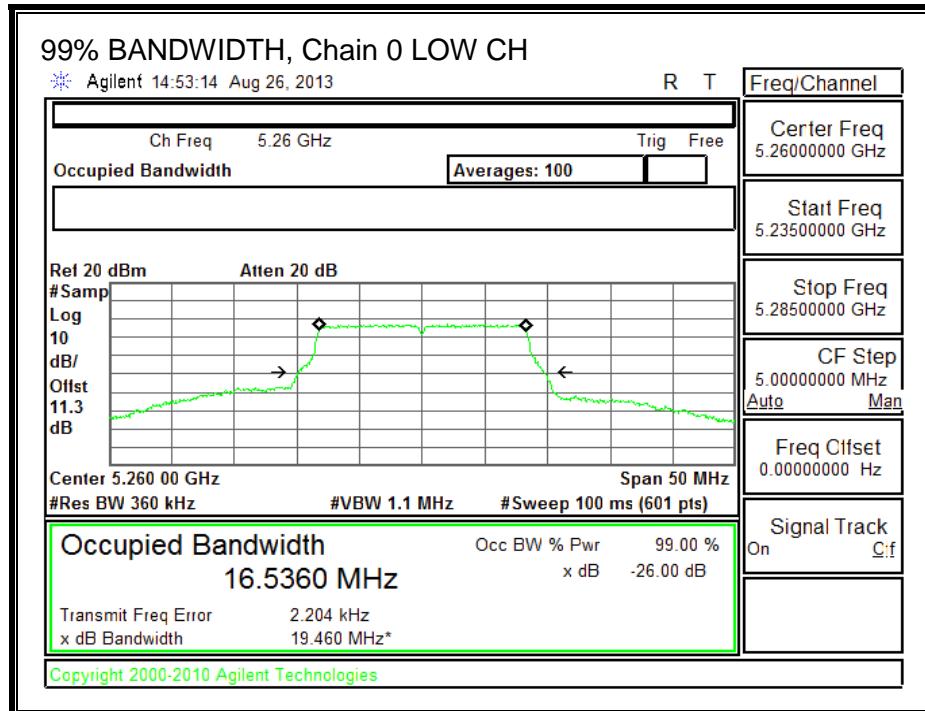
LIMITS

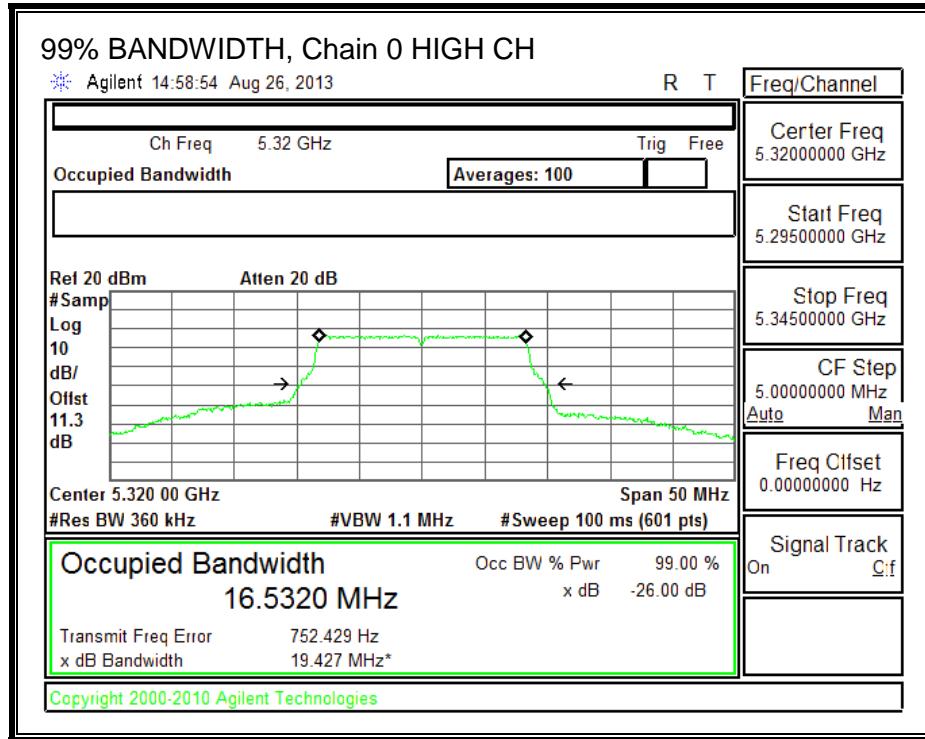
None; for reporting purposes only.

RESULTS

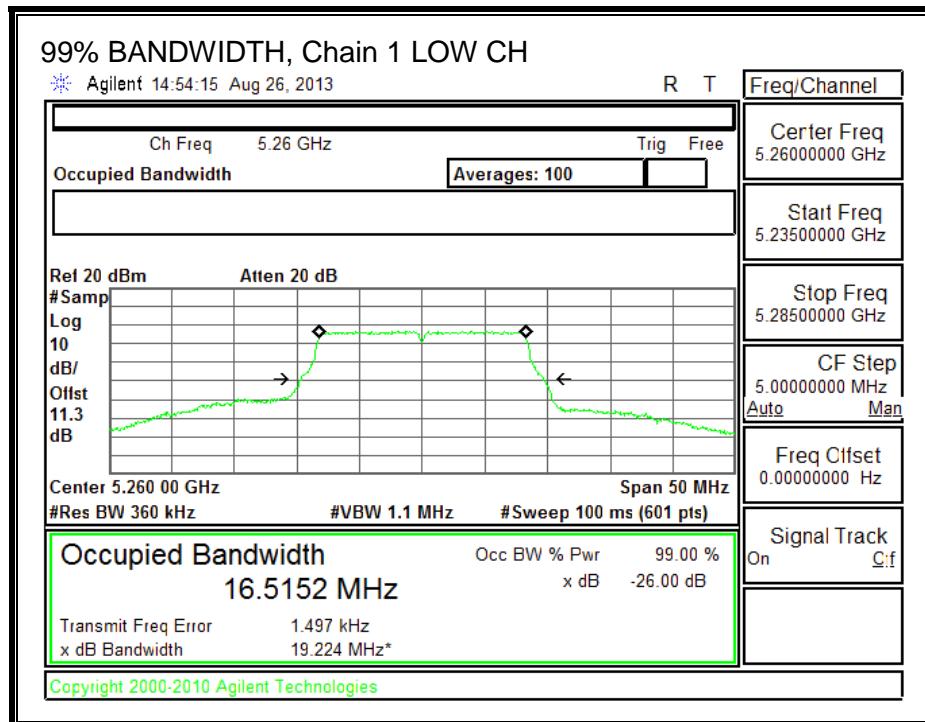
| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low | 5260 | 16.5360 | 16.5152 |
| Mid | 5300 | 16.5196 | 16.5270 |
| High | 5320 | 16.5320 | 16.5166 |

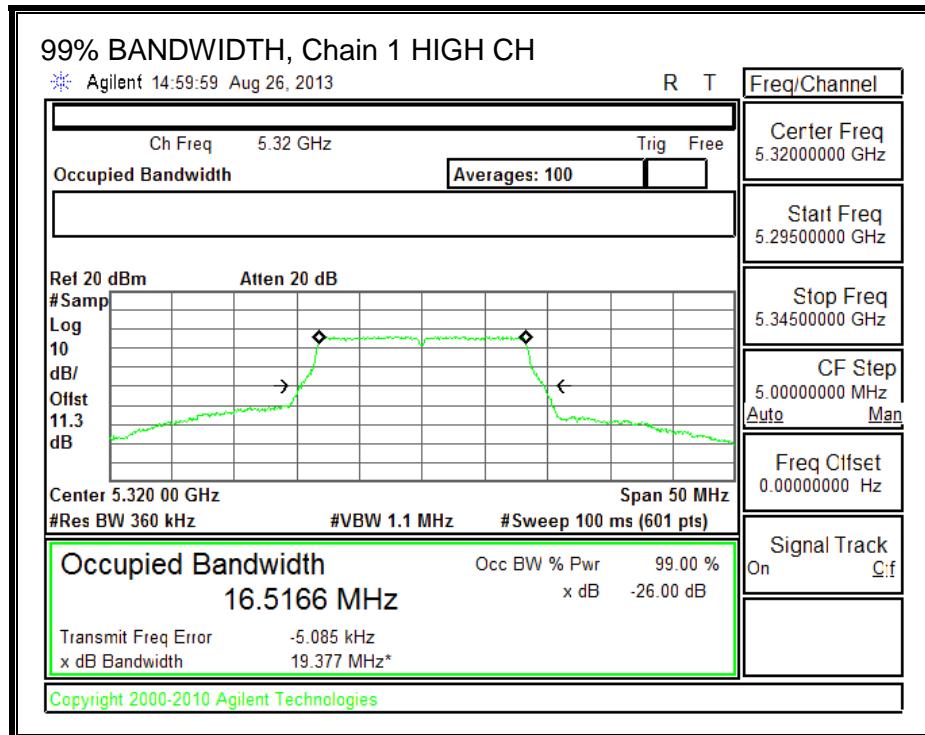
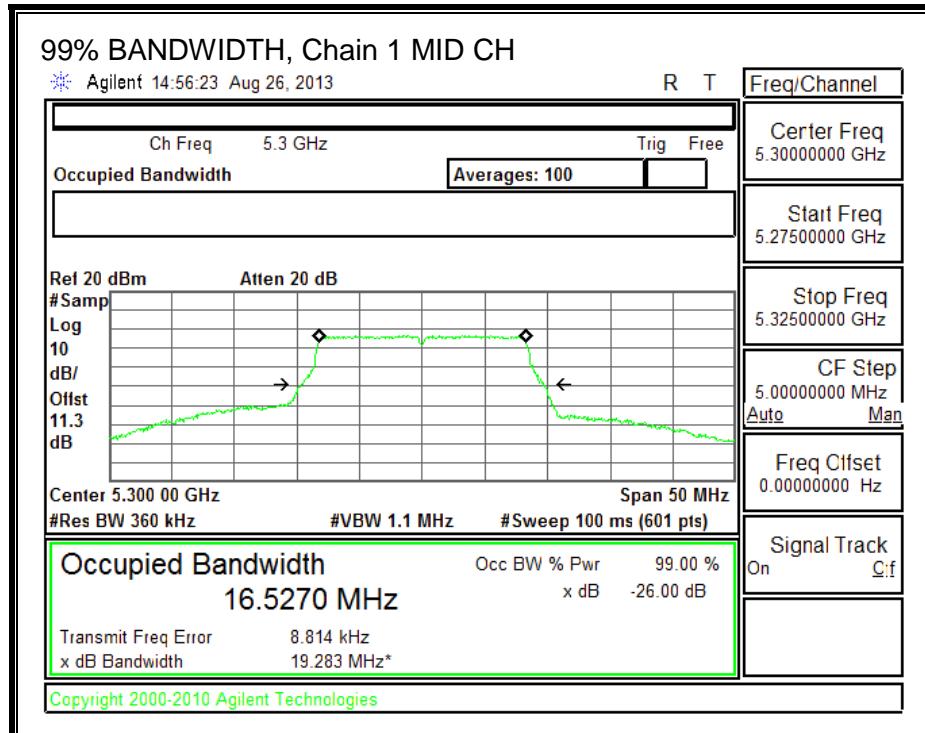
99% BANDWIDTH, Chain 0





99% BANDWIDTH, Chain 1





8.4.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.3 dB (including 10 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

| Channel | Frequency (MHz) | Chain 0 Power (dBm) | Chain 1 Power (dBm) | Total Power (dBm) |
|---------|--------------------|---------------------------|---------------------------|-------------------------|
| Low | 5260 | 10.21 | 10.05 | 13.14 |
| Mid | 5300 | 10.09 | 9.89 | 13.00 |
| High | 5320 | 9.80 | 9.57 | 12.70 |

8.4.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

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 peak 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.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

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

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|-------------------------------------|-------------------------------------|---|
| 3.90 | 3.20 | 3.56 |

RESULTS

Bandwidth and Antenna Gain

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---------|--------------------|-----------------------------|---------------------------|------------------------------|
| Low | 5260 | 20.3 | 16.5 | 3.56 |
| Mid | 5300 | 20.3 | 16.5 | 3.56 |
| High | 5320 | 20.3 | 16.5 | 3.56 |

Limits

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PPSD Limit (dBm) | IC PSD Limit (dBm) | PPSD Limit (dBm) |
|---------|--------------------|--------------------------------|-------------------------------|------------------------------|-------------------------|-------------------------------|-----------------------------|------------------------|
| Low | 5260 | 24.00 | 23.18 | 29.18 | 23.18 | 11.00 | 11.00 | 11.00 |
| Mid | 5300 | 24.00 | 23.18 | 29.18 | 23.18 | 11.00 | 11.00 | 11.00 |
| High | 5320 | 24.00 | 23.18 | 29.18 | 23.18 | 11.00 | 11.00 | 11.00 |

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

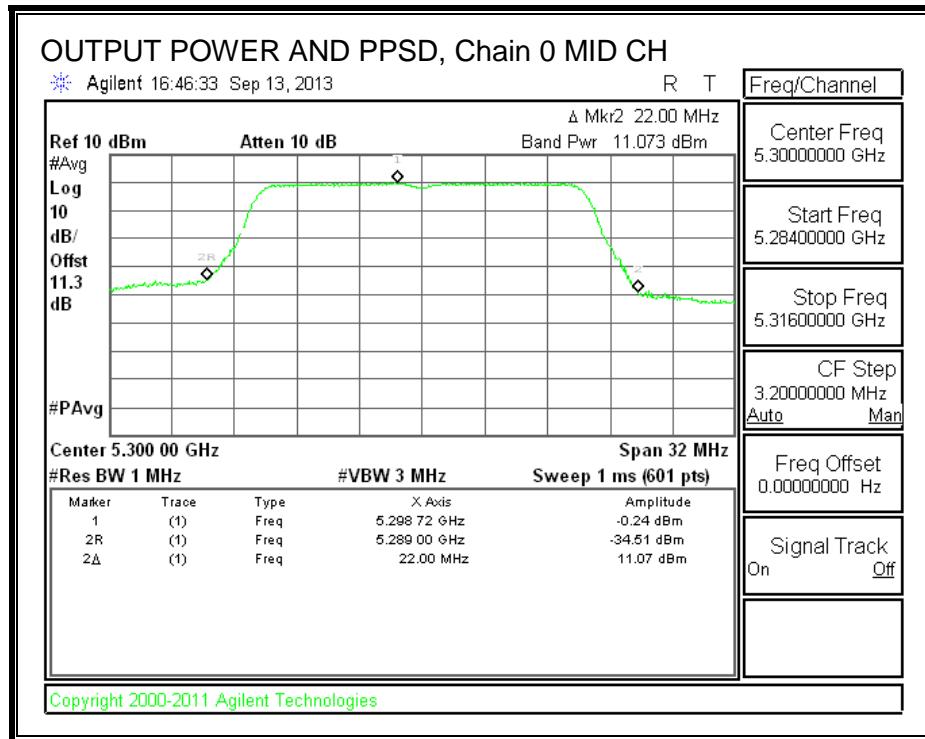
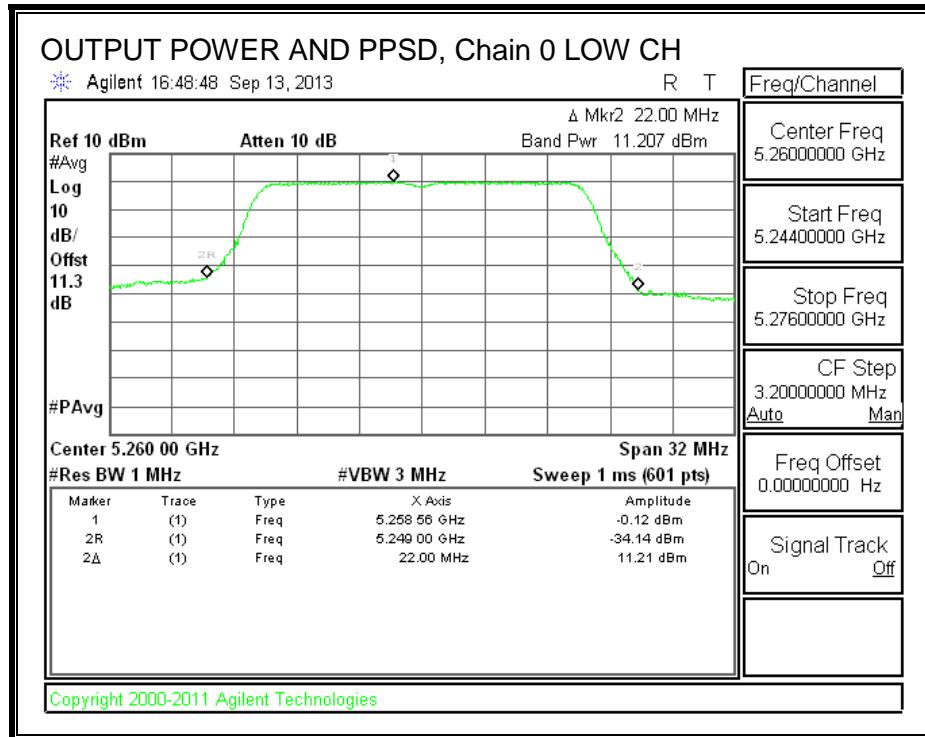
Output Power Results

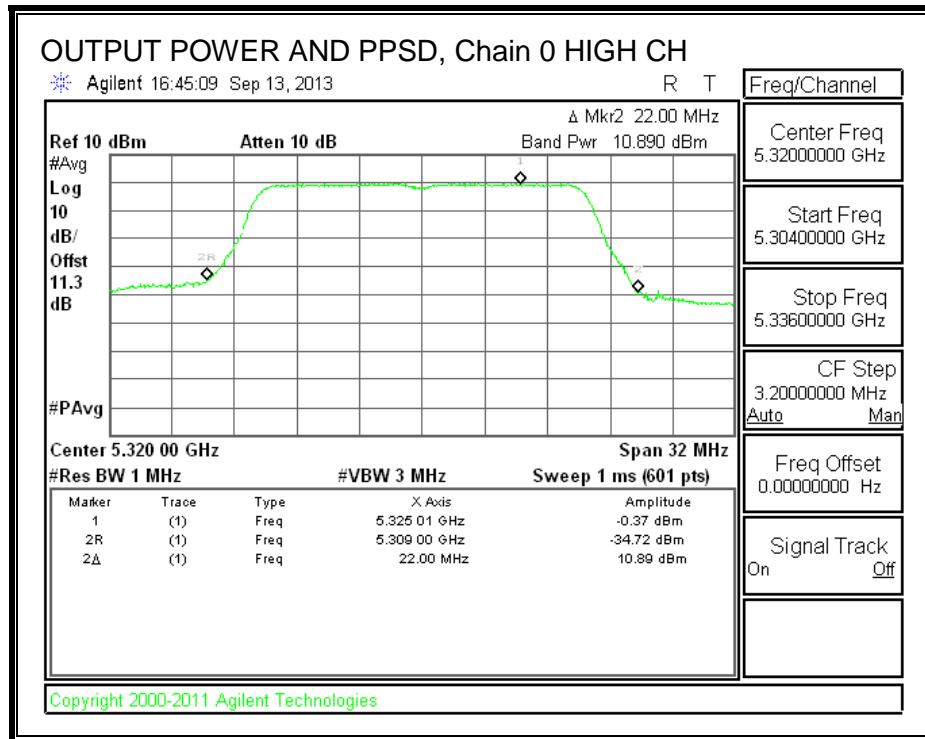
| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low | 5260 | 11.21 | 10.90 | 14.07 | 23.18 | -9.11 |
| Mid | 5300 | 11.07 | 10.77 | 13.93 | 23.18 | -9.24 |
| High | 5320 | 10.89 | 10.50 | 13.71 | 23.18 | -9.47 |

PPSD Results

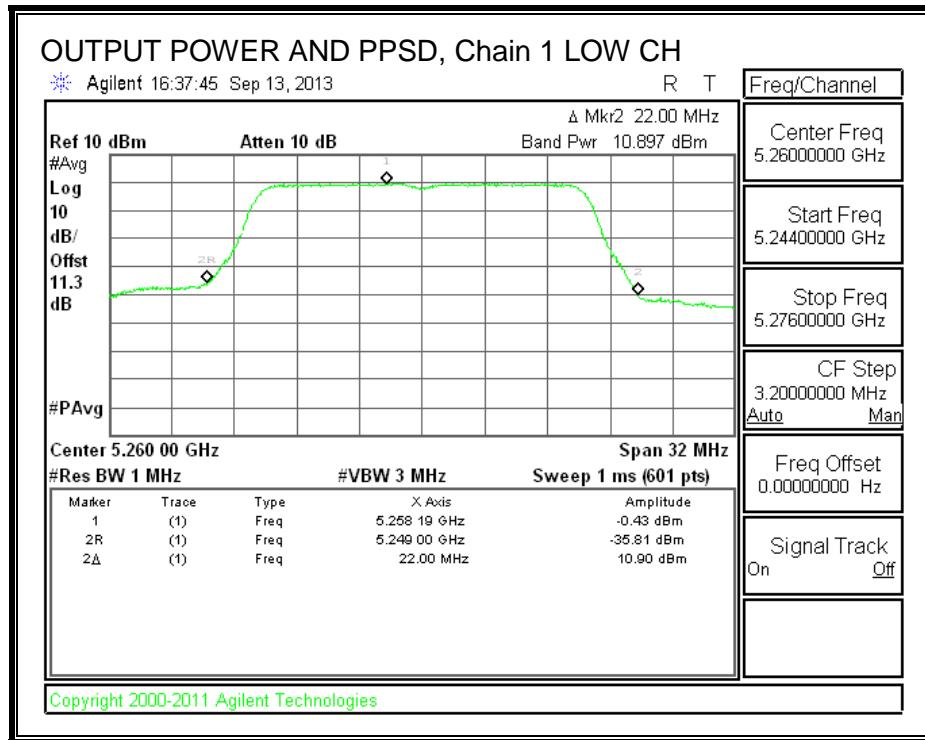
| Channel | Frequency (MHz) | Chain 0 Meas PPSD (dBm) | Chain 1 Meas PPSD (dBm) | Total Corr'd PPSD (dBm) | PPSD Limit (dBm) | PPSD Margin (dB) |
|---------|--------------------|----------------------------------|----------------------------------|----------------------------------|------------------------|------------------------|
| Low | 5260 | -0.12 | -0.43 | 2.74 | 11.00 | -8.26 |
| Mid | 5300 | -0.24 | -0.50 | 2.64 | 11.00 | -8.36 |
| High | 5320 | -0.37 | -0.65 | 2.50 | 11.00 | -8.50 |

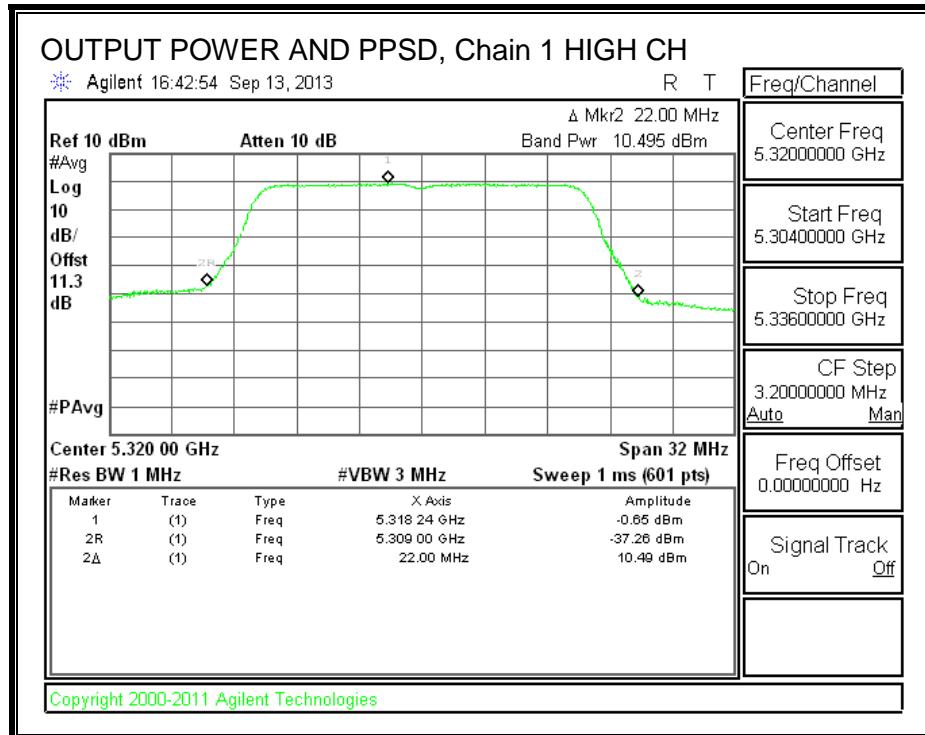
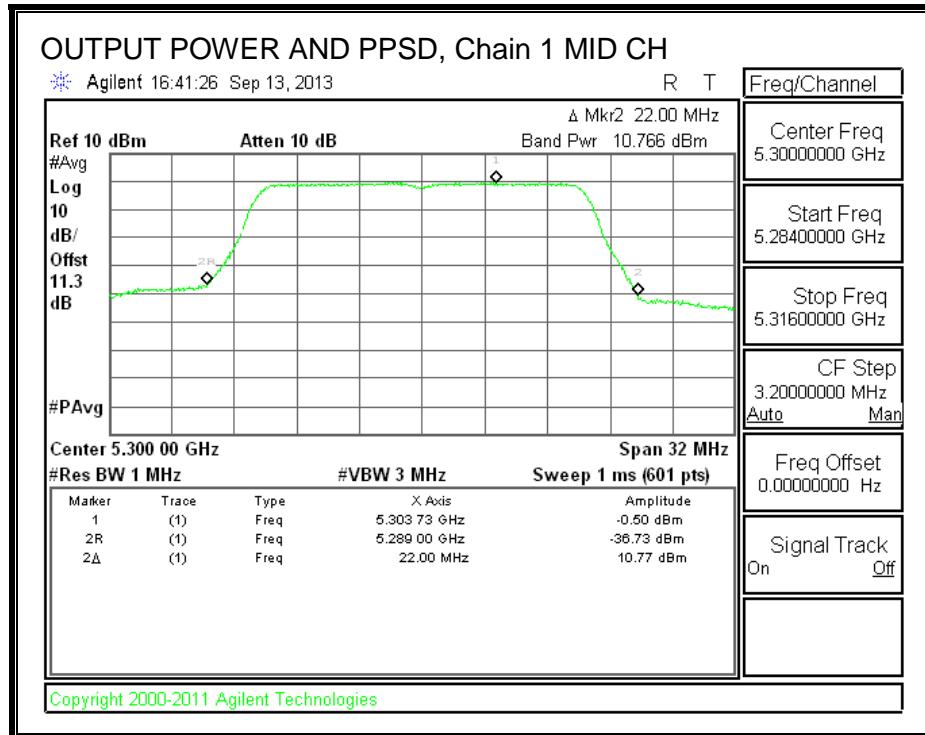
OUTPUT POWER AND PPSD, Chain 0





OUTPUT POWER AND PPSD, Chain 1





8.4.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Refer to the results of 802.11n HT20 mode in the 5.6 GHz band.

8.5. 802.11n HT20 MODE IN THE 5.3 GHz BAND

8.5.1. 26 dB BANDWIDTH

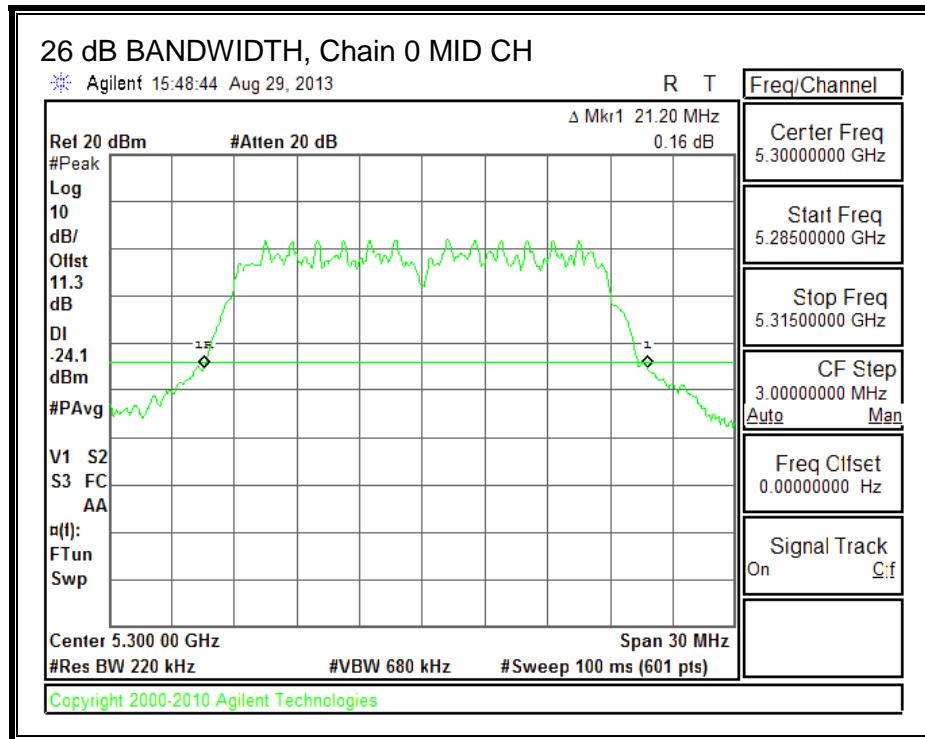
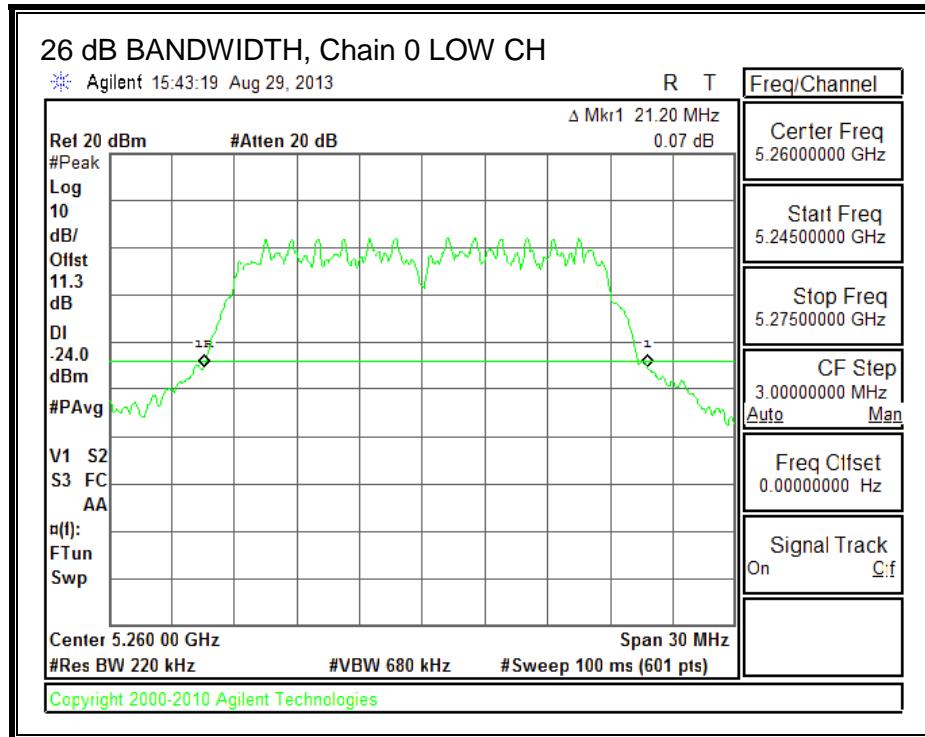
LIMITS

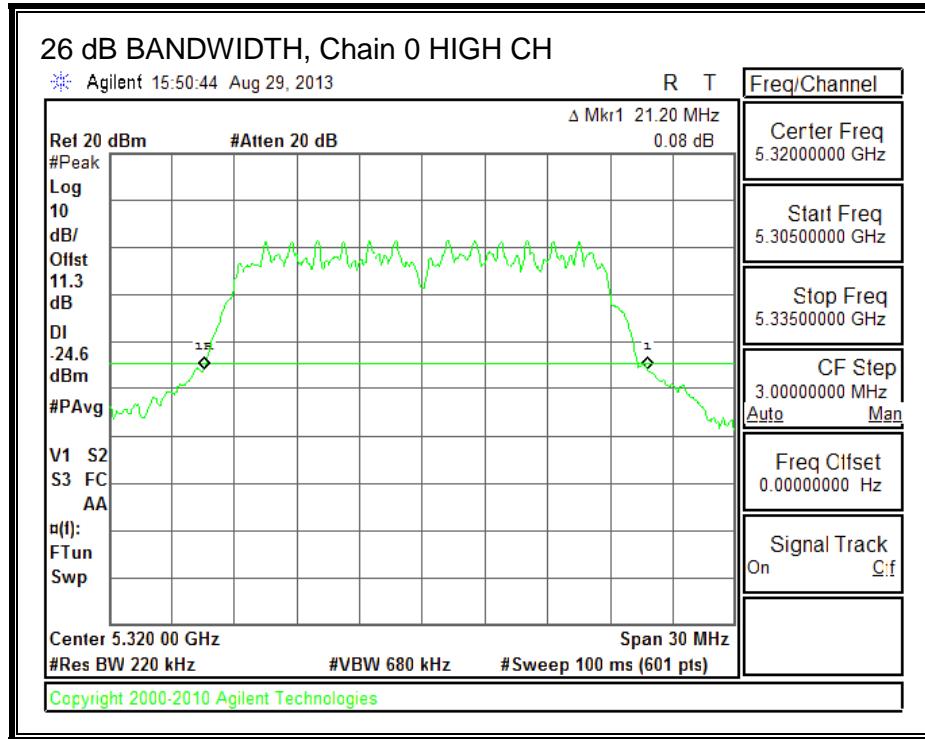
None; for reporting purposes only.

RESULTS

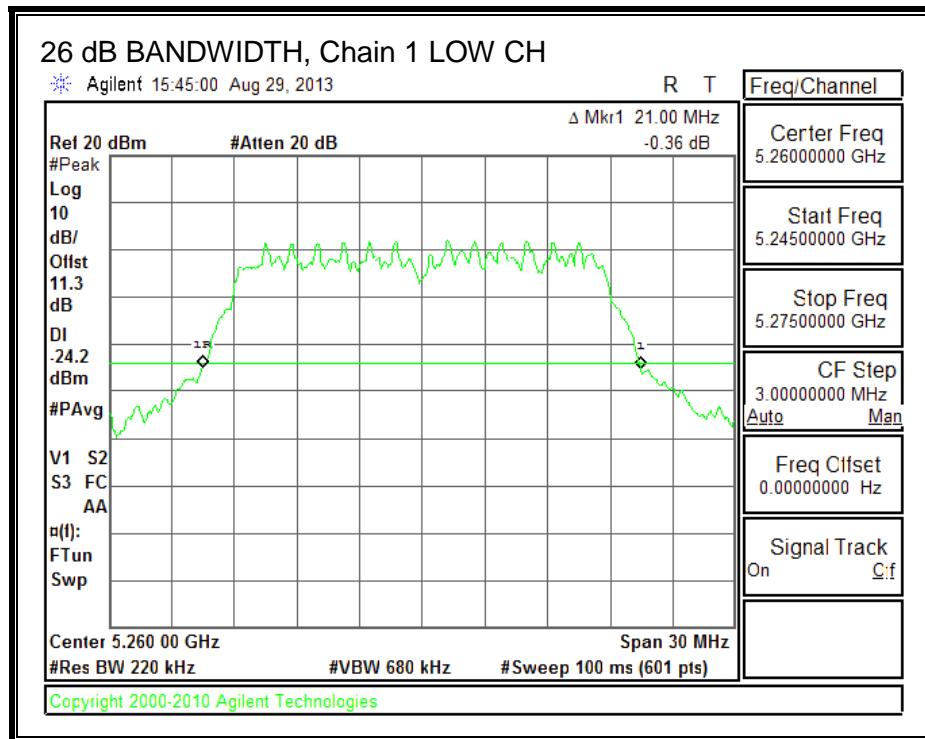
| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low | 5260 | 21.2 | 21.0 |
| Mid | 5300 | 21.2 | 21.0 |
| High | 5320 | 21.2 | 21.0 |

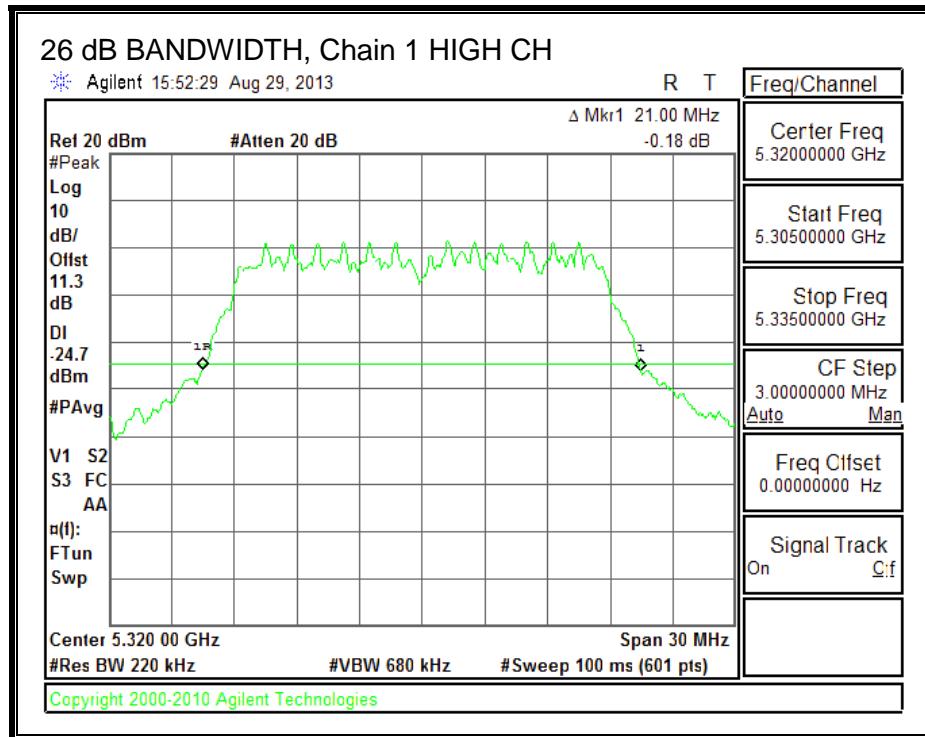
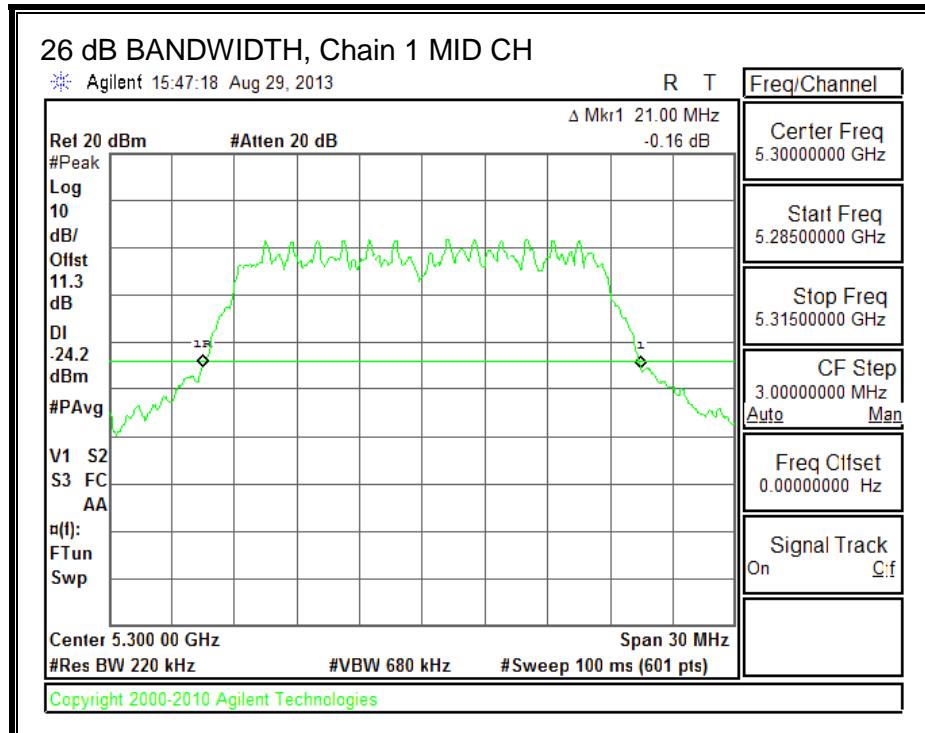
26 dB BANDWIDTH, Chain 0





26 dB BANDWIDTH, Chain 1





8.5.2. 99% BANDWIDTH

LIMITS

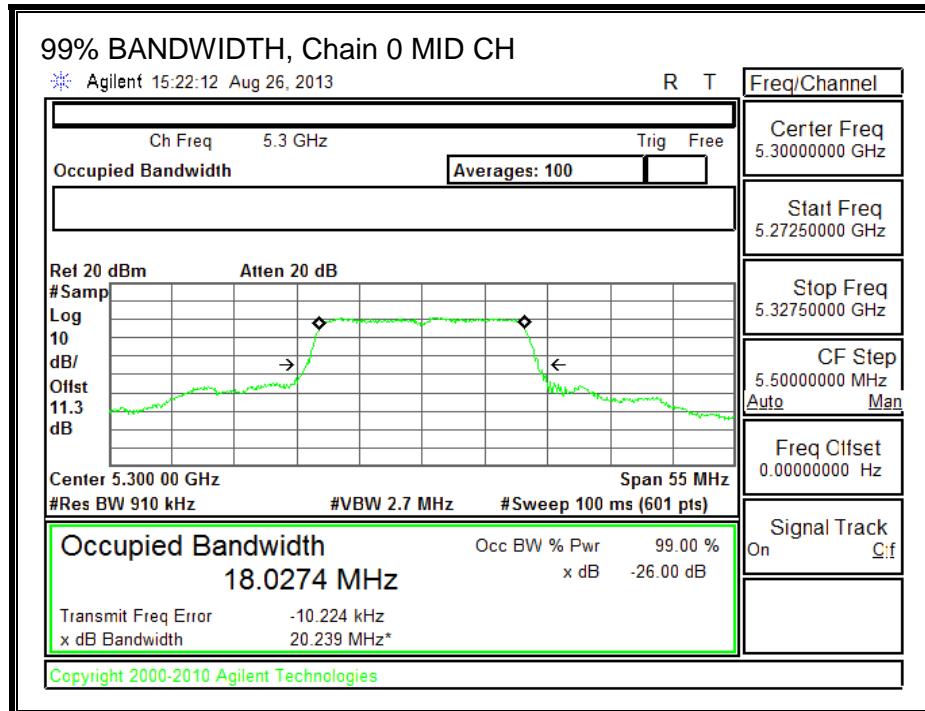
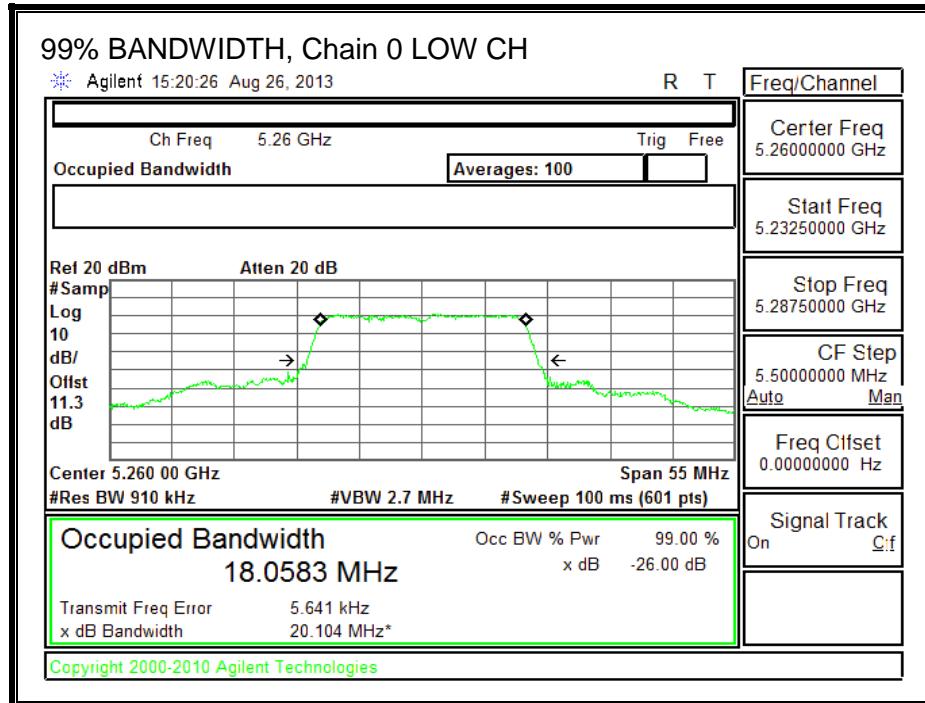
None; for reporting purposes only.

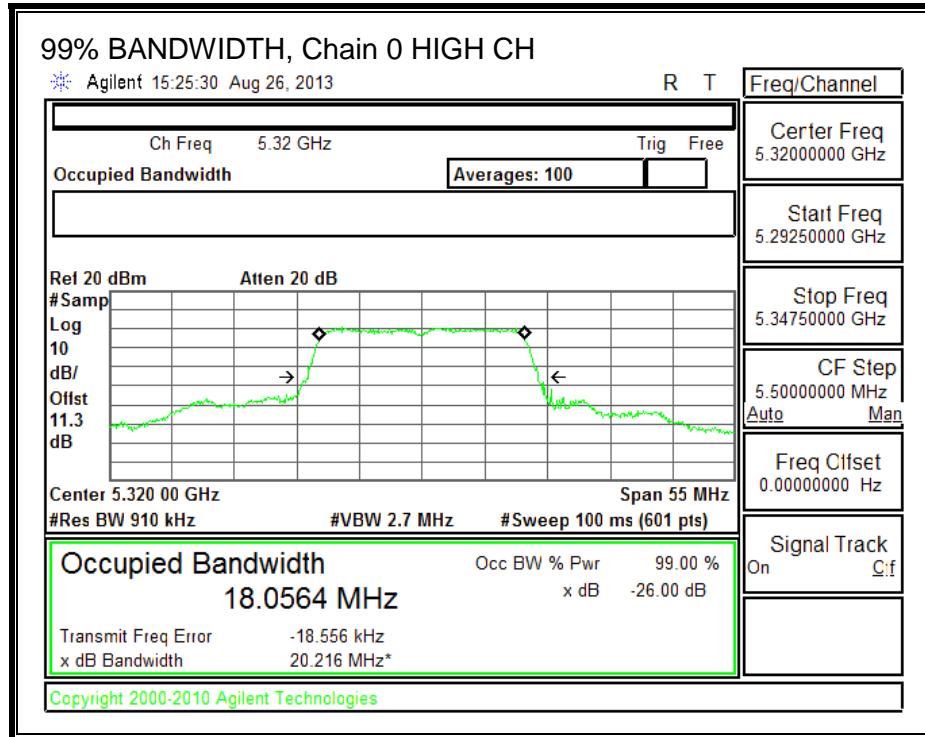
RESULTS

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low | 5260 | 18.06 | 18.05 |
| Mid | 5300 | 18.03 | 18.09 |
| High | 5320 | 18.06 | 18.08 |

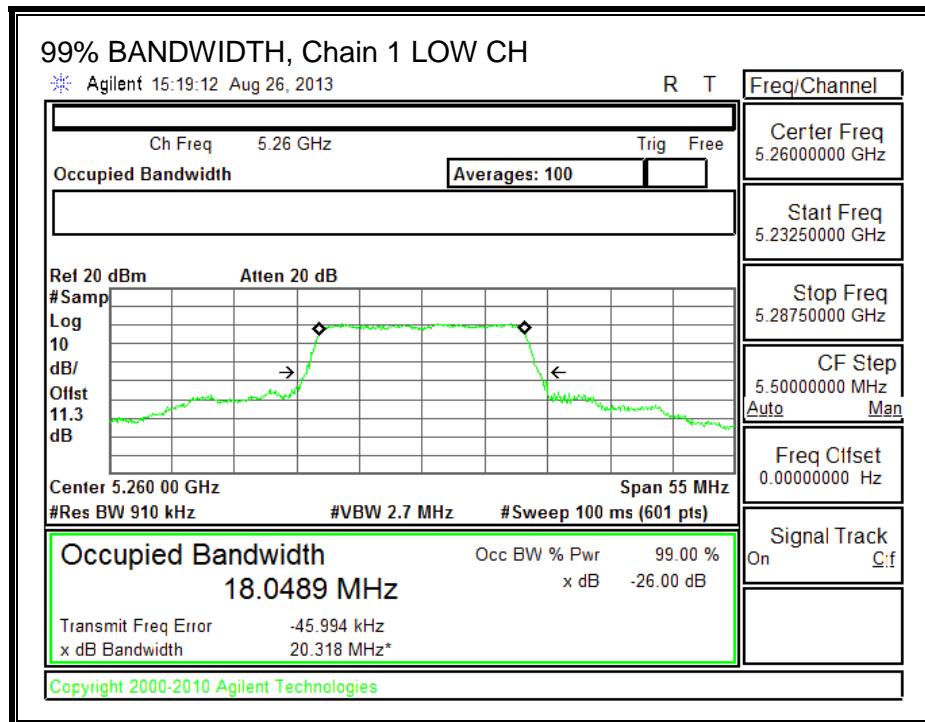
99% BANDWIDTH

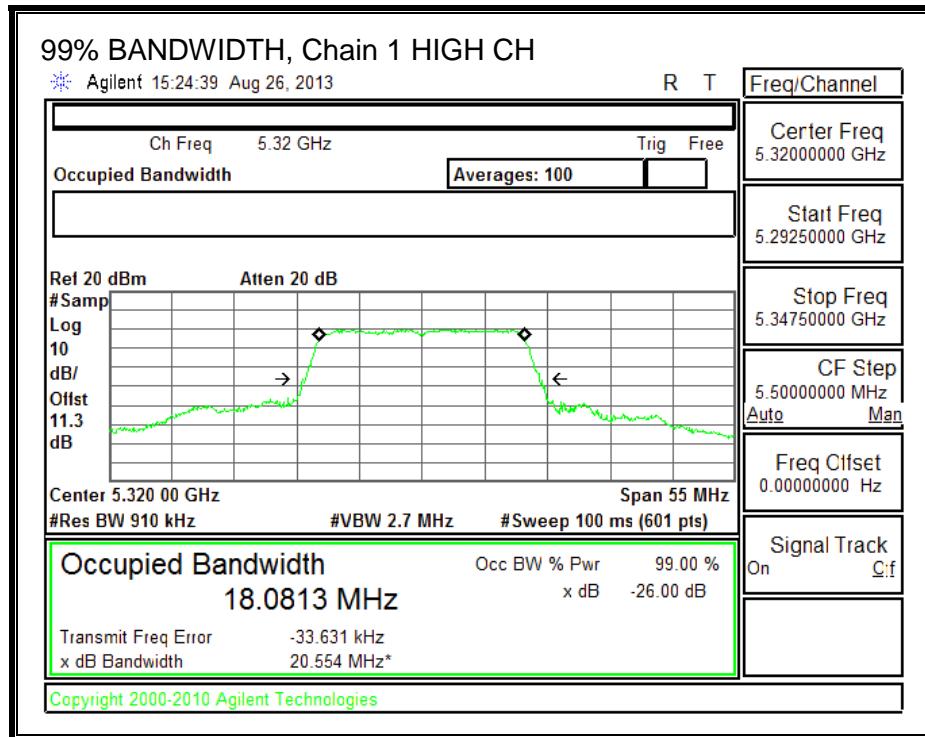
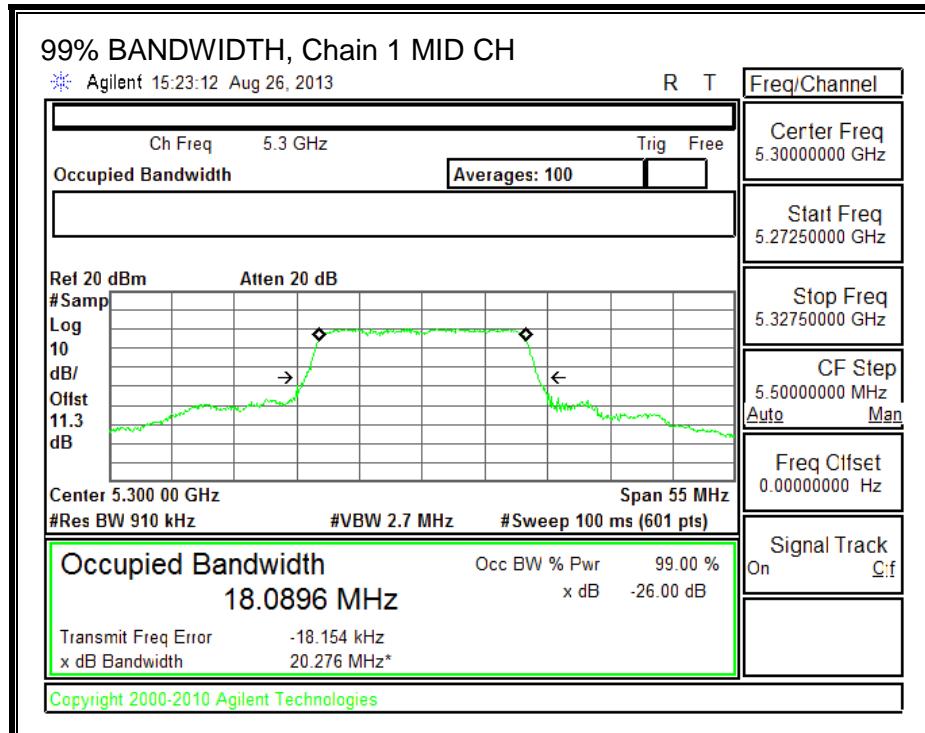
99% BANDWIDTH, Chain 0





99% BANDWIDTH, Chain 1





8.5.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.3 dB (including 10 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

| Channel | Frequency (MHz) | Chain 0 Power (dBm) | Chain 1 Power (dBm) | Total Power (dBm) |
|---------|--------------------|---------------------------|---------------------------|-------------------------|
| Low | 5260 | 10.18 | 10.04 | 13.12 |
| Mid | 5300 | 10.13 | 9.91 | 13.03 |
| High | 5320 | 9.81 | 9.60 | 12.72 |

8.5.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

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 peak 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.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

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

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|---|---|---|
| 3.90 | 3.20 | 3.56 |

RESULTS

Bandwidth and Antenna Gain

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---------|--------------------|-----------------------------|---------------------------|------------------------------|
| Low | 5260 | 21.0 | 16.5 | 3.56 |
| Mid | 5300 | 21.0 | 16.5 | 3.56 |
| High | 5320 | 21.0 | 15.6 | 3.56 |

Limits

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PPSD Limit (dBm) | IC PSD Limit (dBm) | PPSD Limit (dBm) |
|---------|--------------------|--------------------------------|-------------------------------|------------------------------|-------------------------|-------------------------------|-----------------------------|------------------------|
| Low | 5260 | 24.00 | 23.18 | 29.18 | 23.18 | 11.00 | 11.00 | 11.00 |
| Mid | 5300 | 24.00 | 23.18 | 29.18 | 23.18 | 11.00 | 11.00 | 11.00 |
| High | 5320 | 24.00 | 22.93 | 28.93 | 22.93 | 11.00 | 11.00 | 11.00 |

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

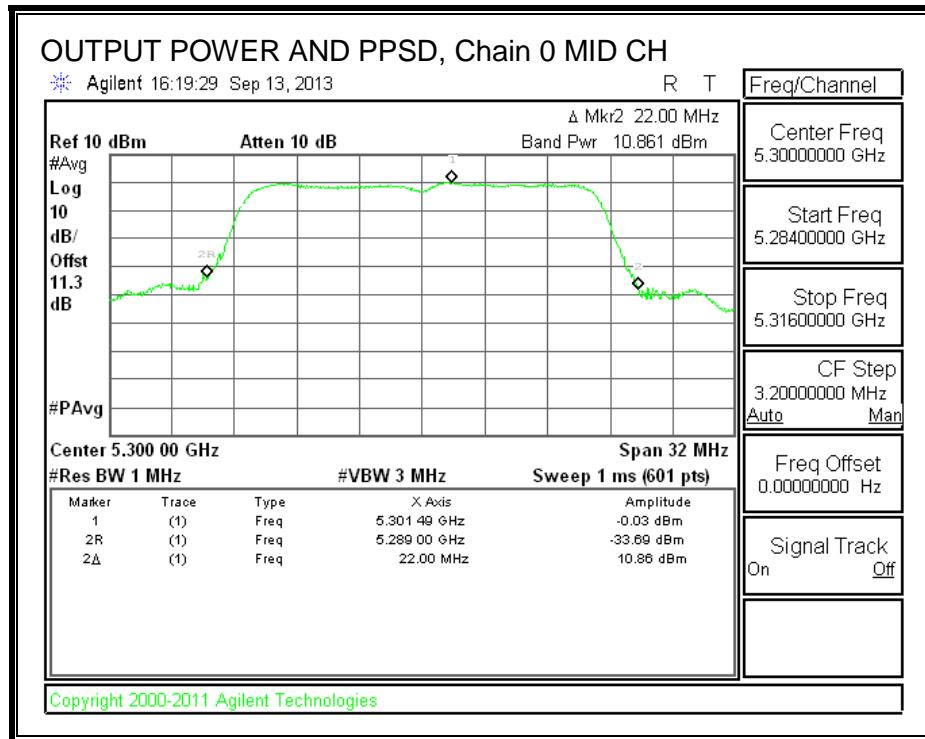
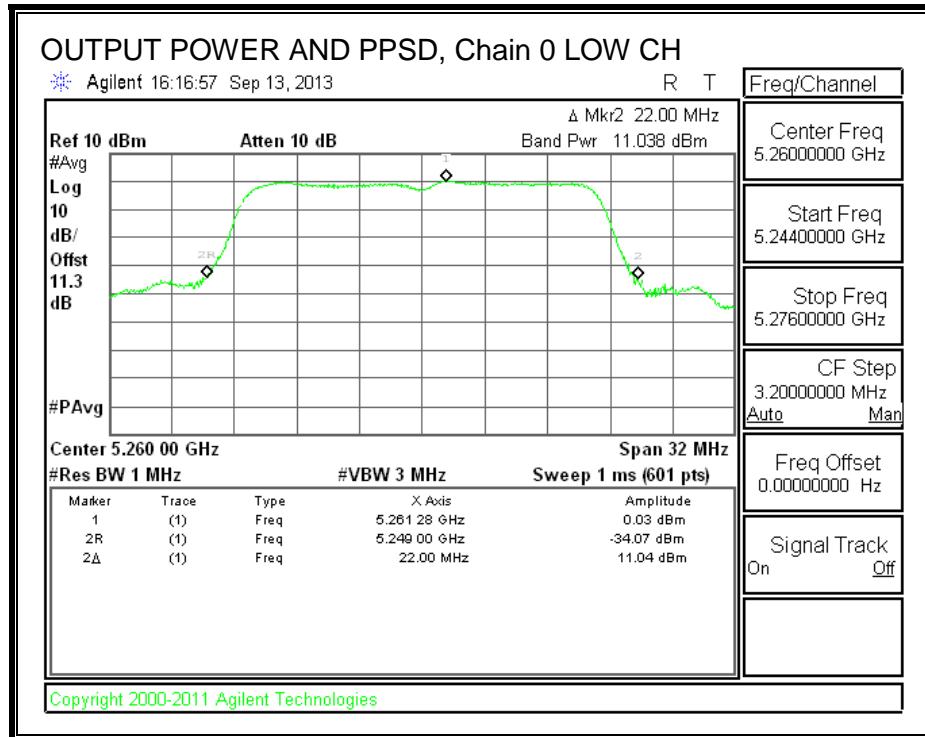
Output Power Results

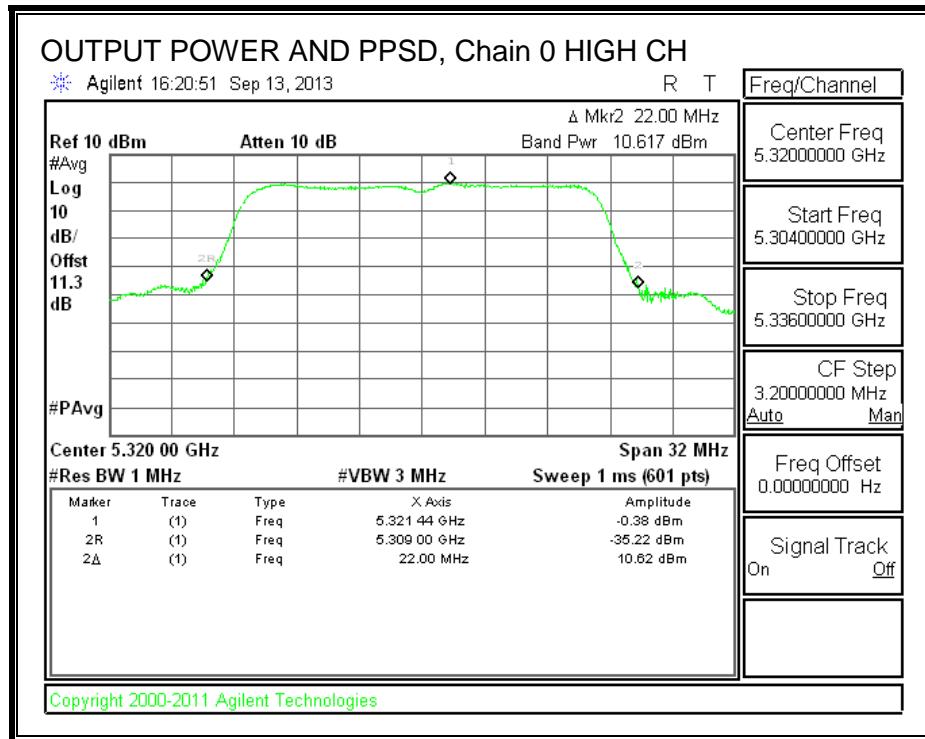
| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low | 5260 | 11.04 | 10.79 | 13.93 | 23.18 | -9.25 |
| Mid | 5300 | 10.86 | 10.65 | 13.77 | 23.18 | -9.41 |
| High | 5320 | 10.62 | 10.41 | 13.53 | 22.93 | -9.41 |

PPSD Results

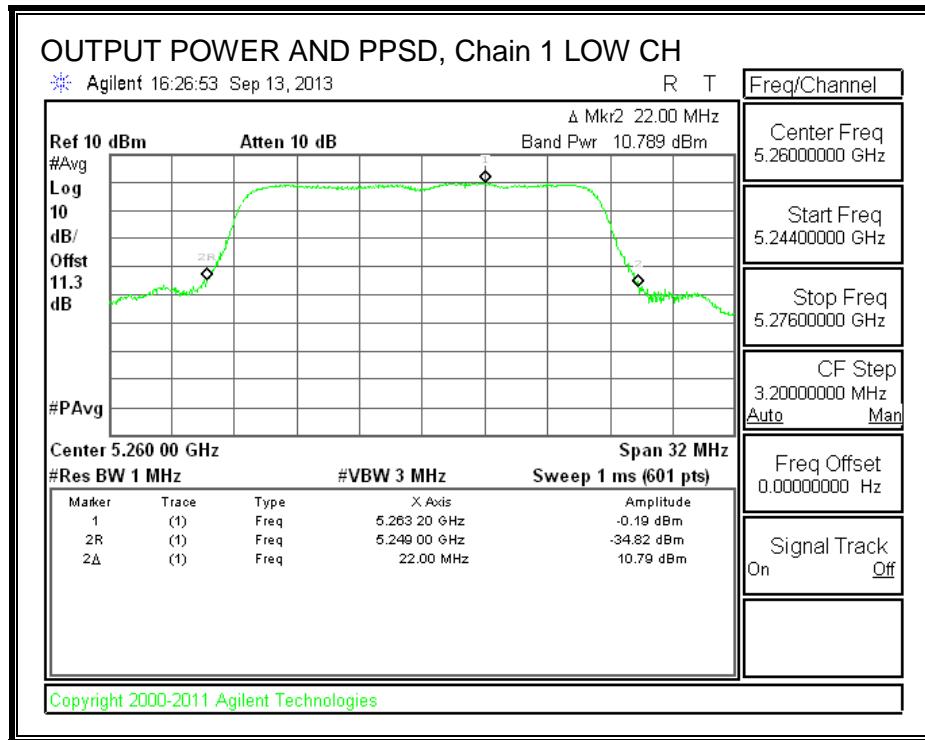
| Channel | Frequency (MHz) | Chain 0 Meas PPSD (dBm) | Chain 1 Meas PPSD (dBm) | Total Corr'd PPSD (dBm) | PPSD Limit (dBm) | PPSD Margin (dB) |
|---------|--------------------|----------------------------------|----------------------------------|----------------------------------|------------------------|------------------------|
| Low | 5260 | 0.03 | -0.190 | 2.93 | 11.00 | -8.07 |
| Mid | 5300 | -0.03 | -0.42 | 2.79 | 11.00 | -8.21 |
| High | 5320 | -0.38 | -0.57 | 2.54 | 11.00 | -8.46 |

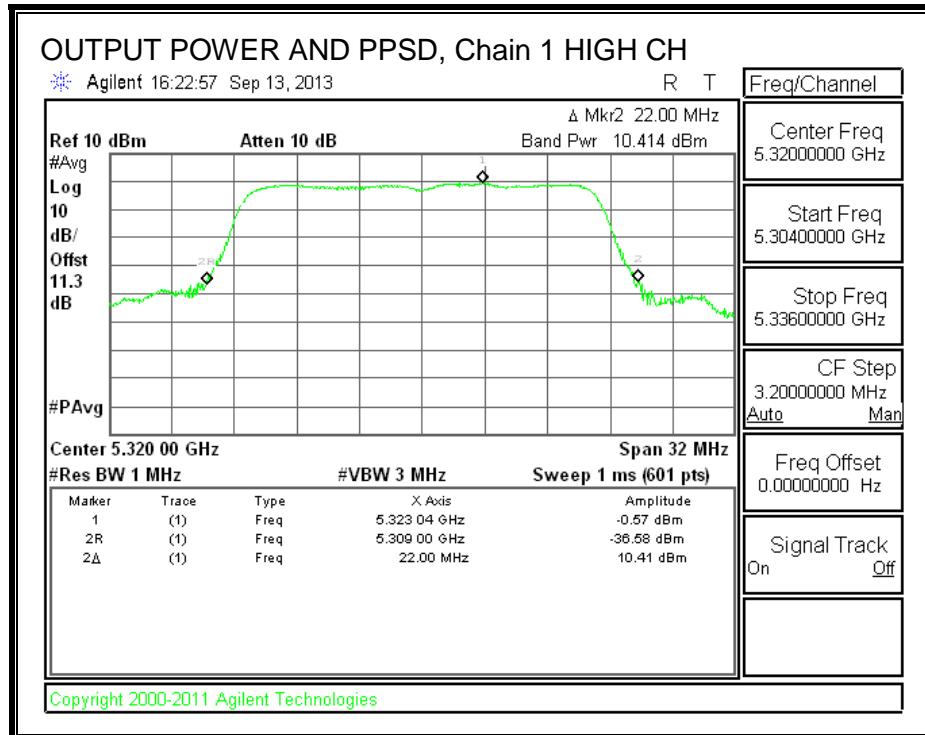
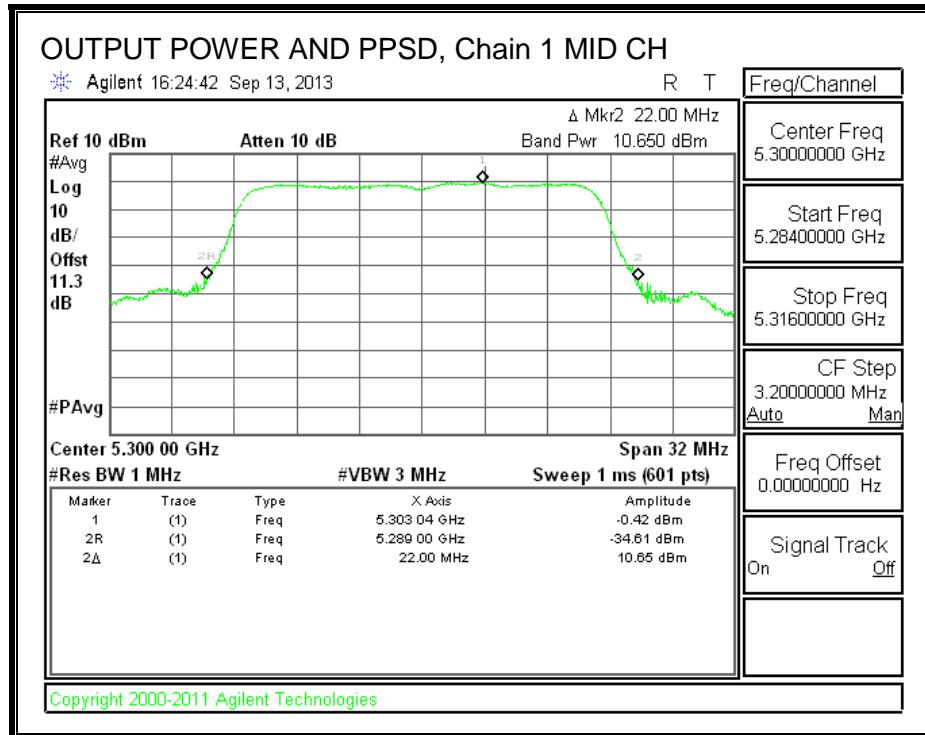
OUTPUT POWER AND PPSD, Chain 0





OUTPUT POWER AND PPSD, Chain 1





8.5.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Refer to the results of 802.11n HT20 mode in the 5.6 GHz band.

8.6. 802.11n HT40 MODE IN THE 5.3 GHz BAND

8.6.1. 26 dB BANDWIDTH

LIMITS

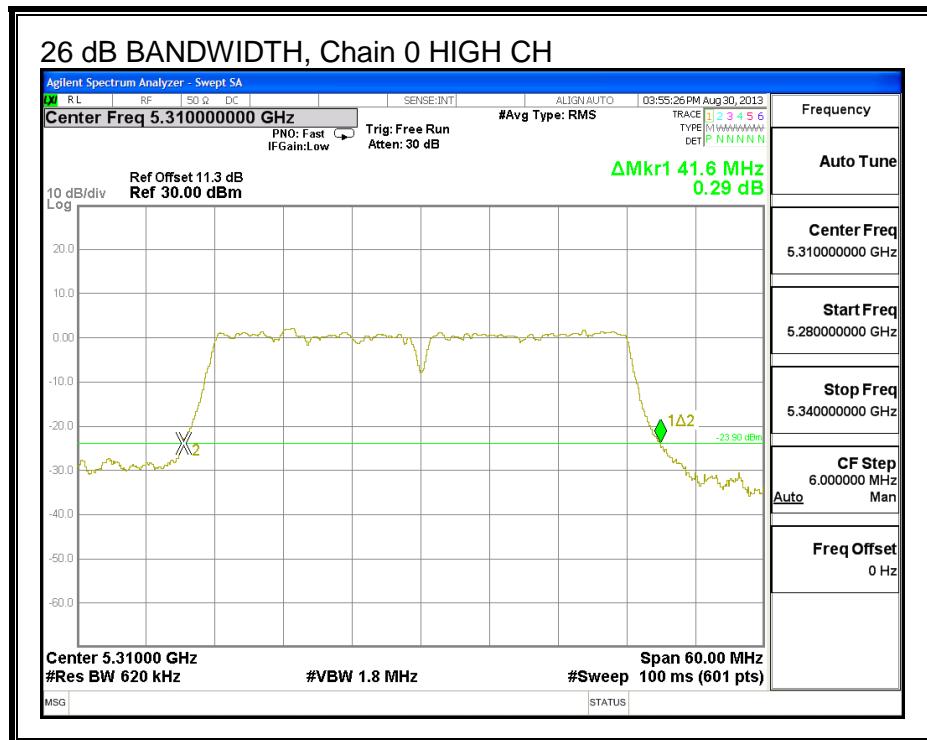
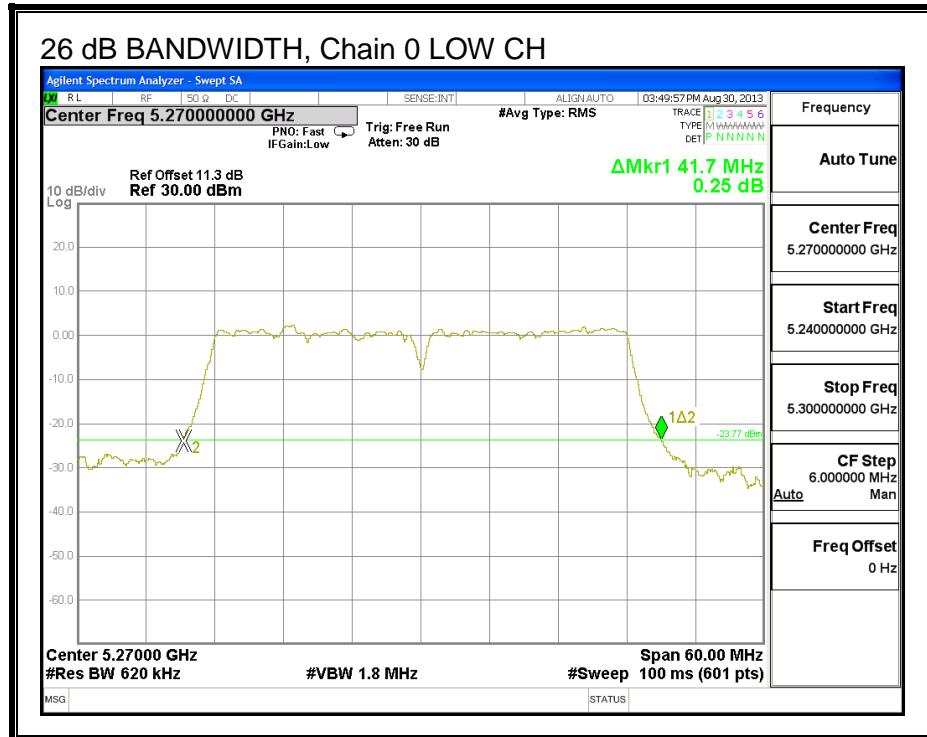
None; for reporting purposes only.

RESULTS

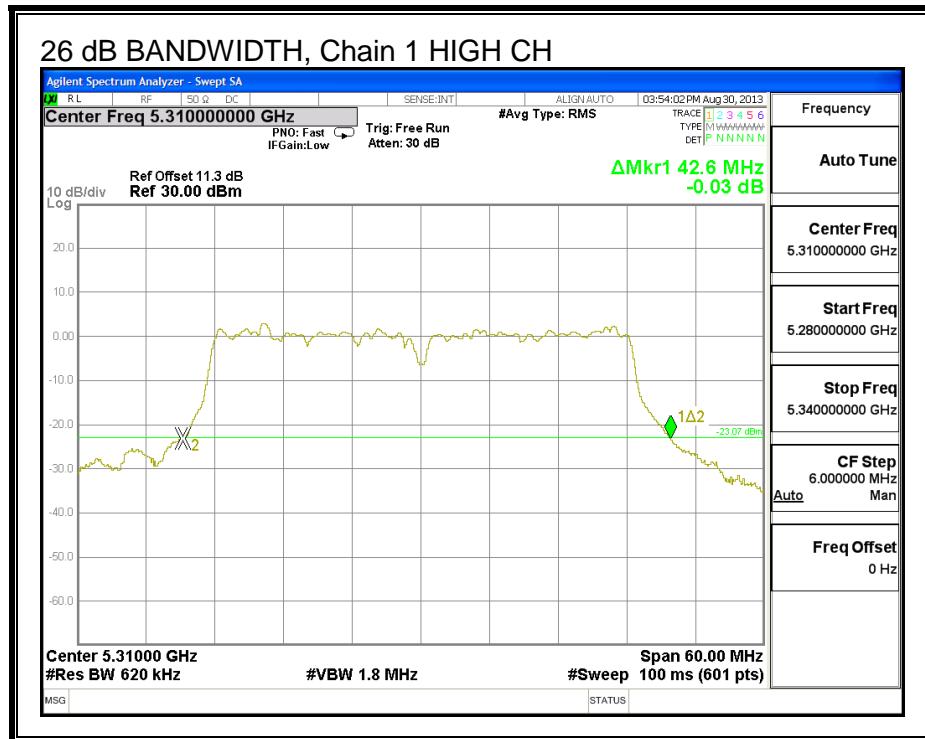
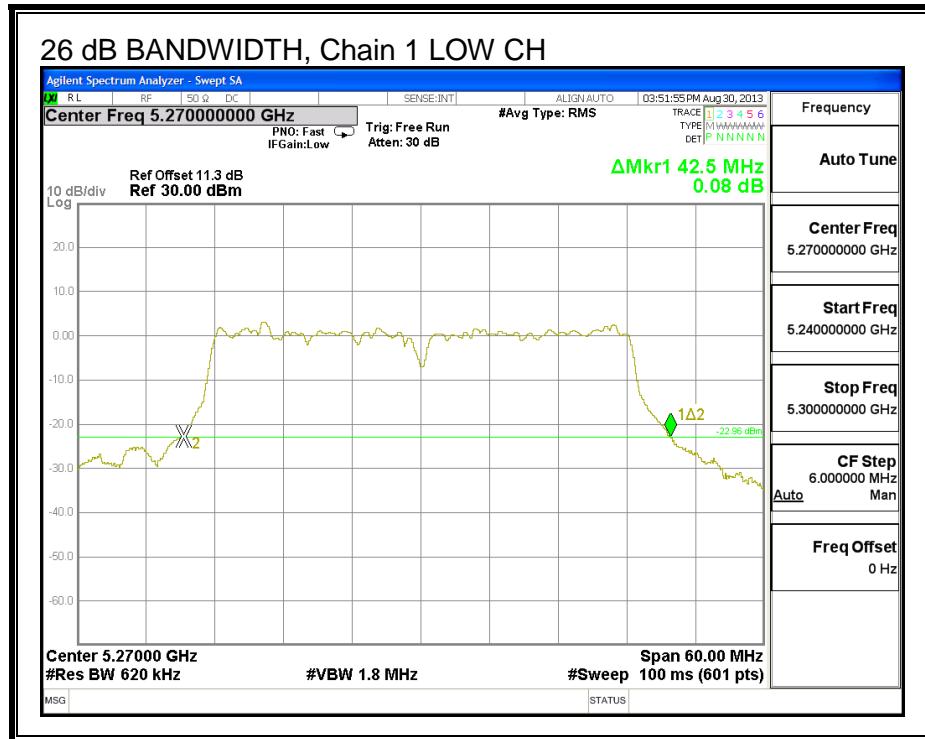
| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low | 5270 | 41.7 | 42.5 |
| High | 5310 | 41.6 | 42.6 |

26 dB BANDWIDTH

26 dB BANDWIDTH, Chain 0



26 dB BANDWIDTH, Chain 1



8.6.2. 99% BANDWIDTH

LIMITS

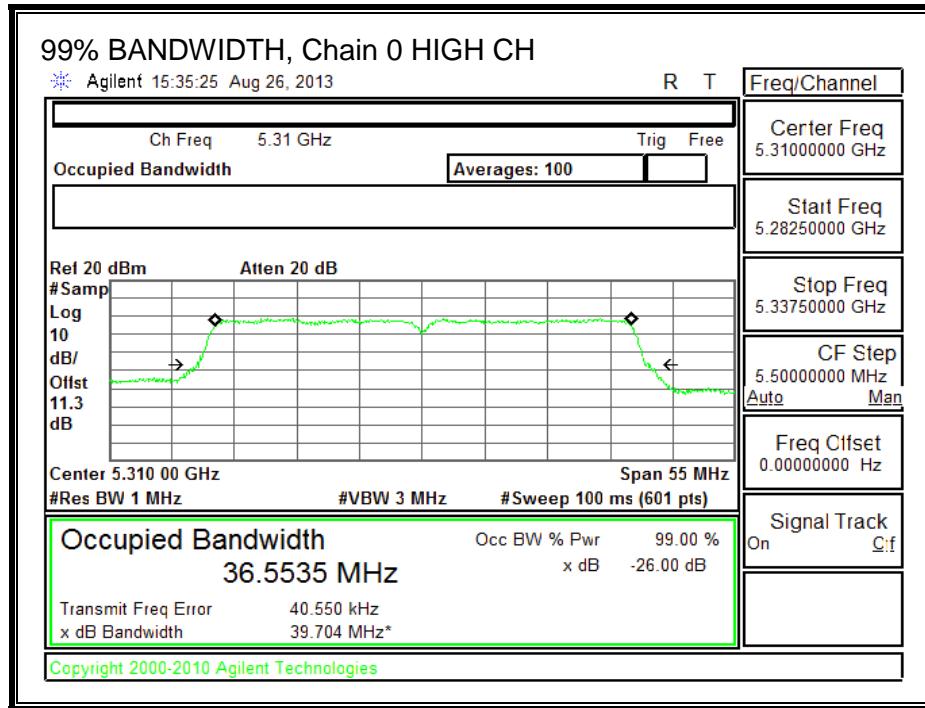
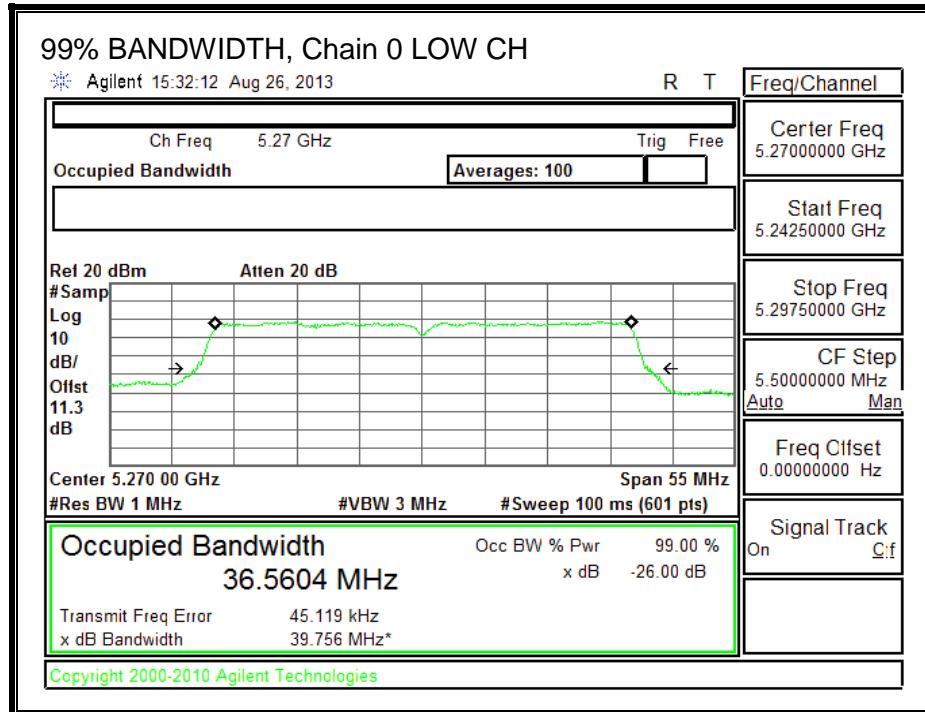
None; for reporting purposes only.

RESULTS

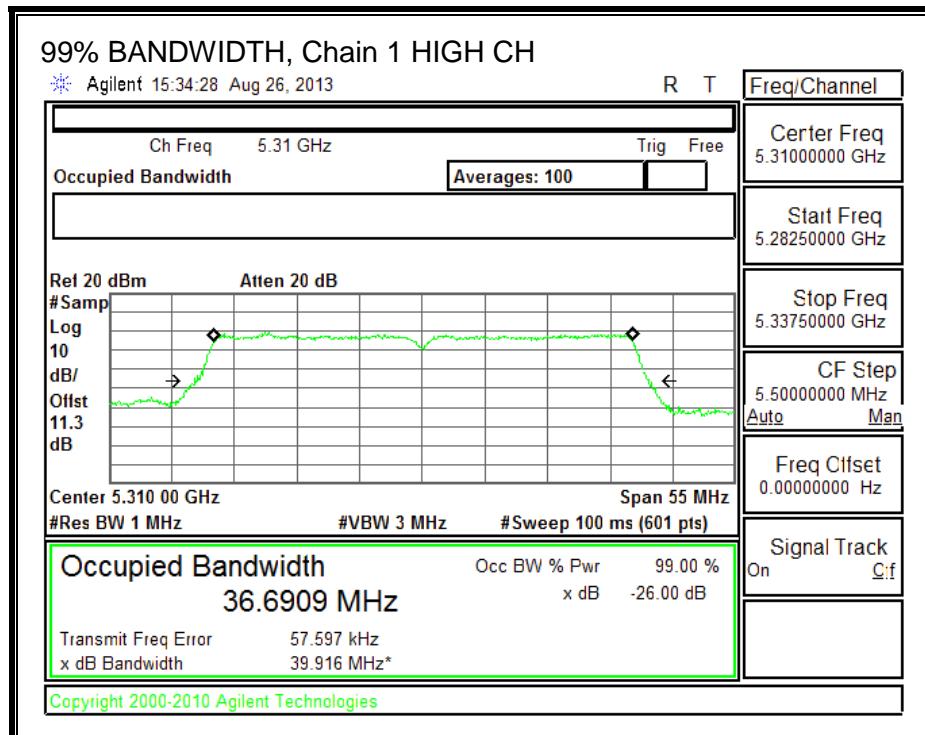
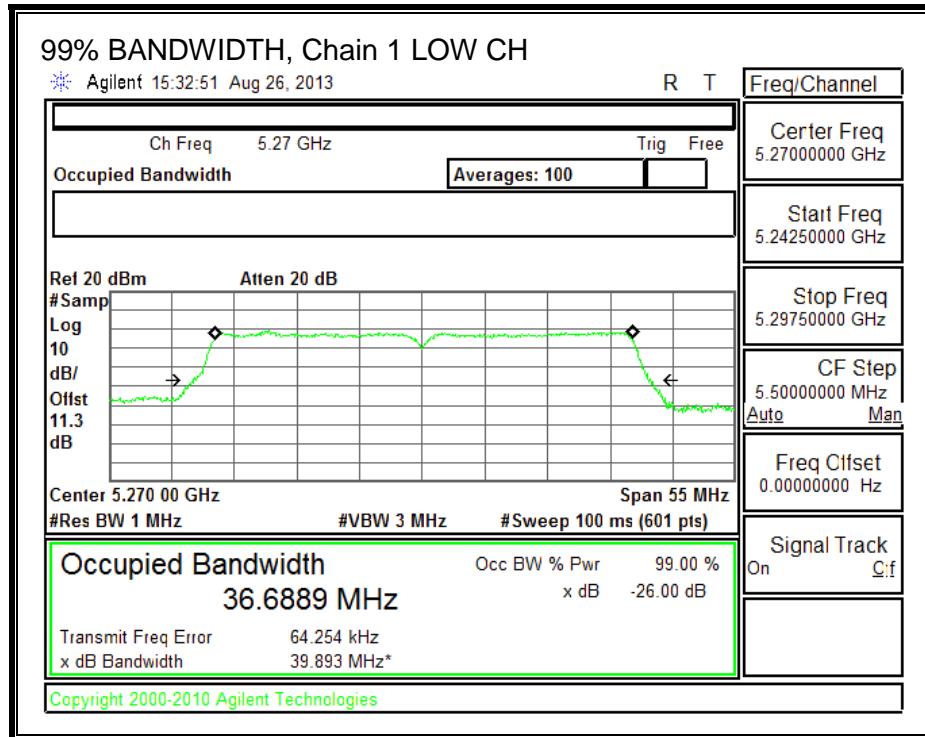
| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low | 5260 | 36.56 | 36.69 |
| High | 5320 | 36.55 | 36.69 |

99% BANDWIDTH

99% BANDWIDTH, Chain 0



99% BANDWIDTH, Chain 1



8.6.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.3 dB (including 10 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

| Channel | Frequency (MHz) | Chain 0 Power (dBm) | Chain 1 Power (dBm) | Total Power (dBm) |
|---------|--------------------|---------------------------|---------------------------|-------------------------|
| Low | 5270 | 11.65 | 11.32 | 14.50 |
| High | 5310 | 11.43 | 11.27 | 14.36 |

8.6.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

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 peak 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.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

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

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|-------------------------------------|-------------------------------------|---|
| 3.90 | 3.20 | 3.56 |

RESULTS

Bandwidth and Antenna Gain

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---------|--------------------|-----------------------------|---------------------------|------------------------------|
| Low | 5270 | 41.7 | 36.6 | 3.56 |
| High | 5310 | 41.6 | 36.6 | 3.56 |

Limits

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

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

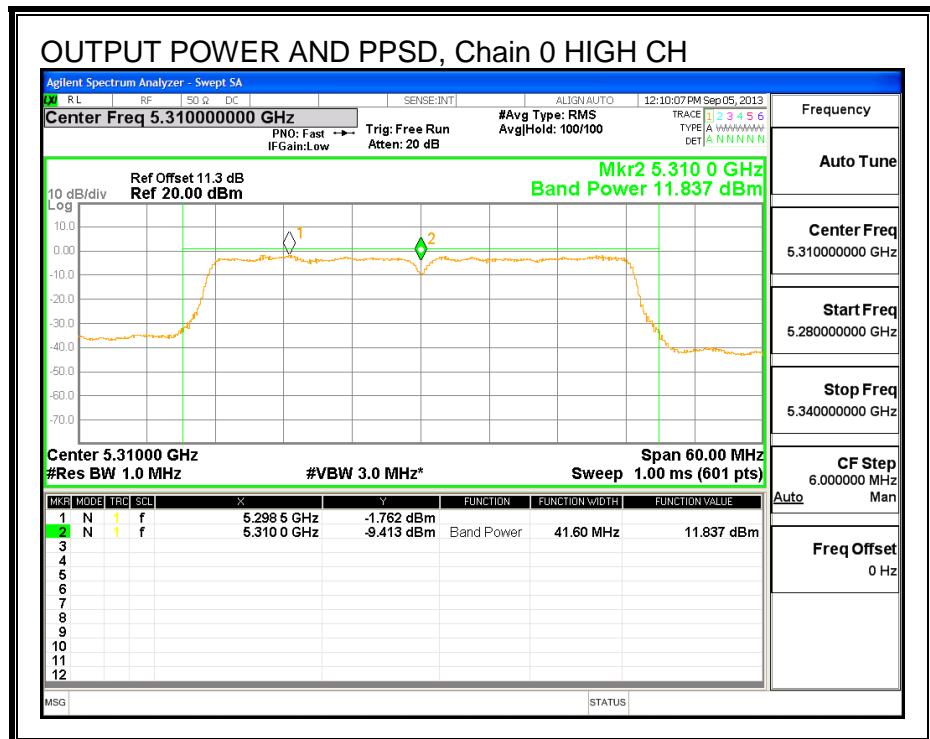
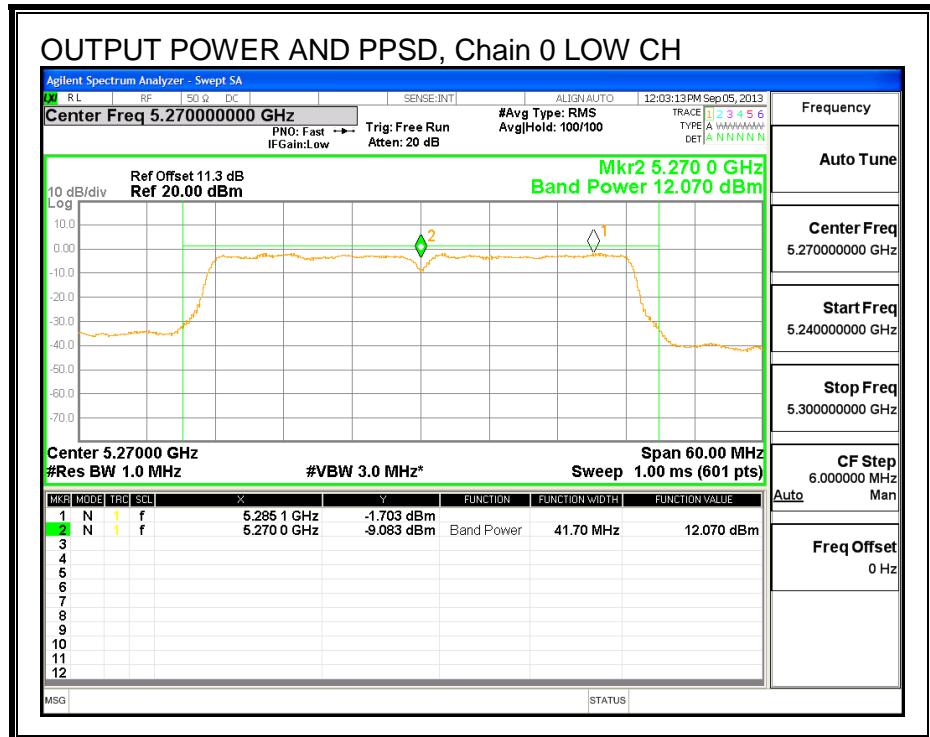
Output Power Results

| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low | 5270 | 12.07 | 11.80 | 14.95 | 24.00 | -9.05 |
| High | 5310 | 11.84 | 11.62 | 14.74 | 24.00 | -9.26 |

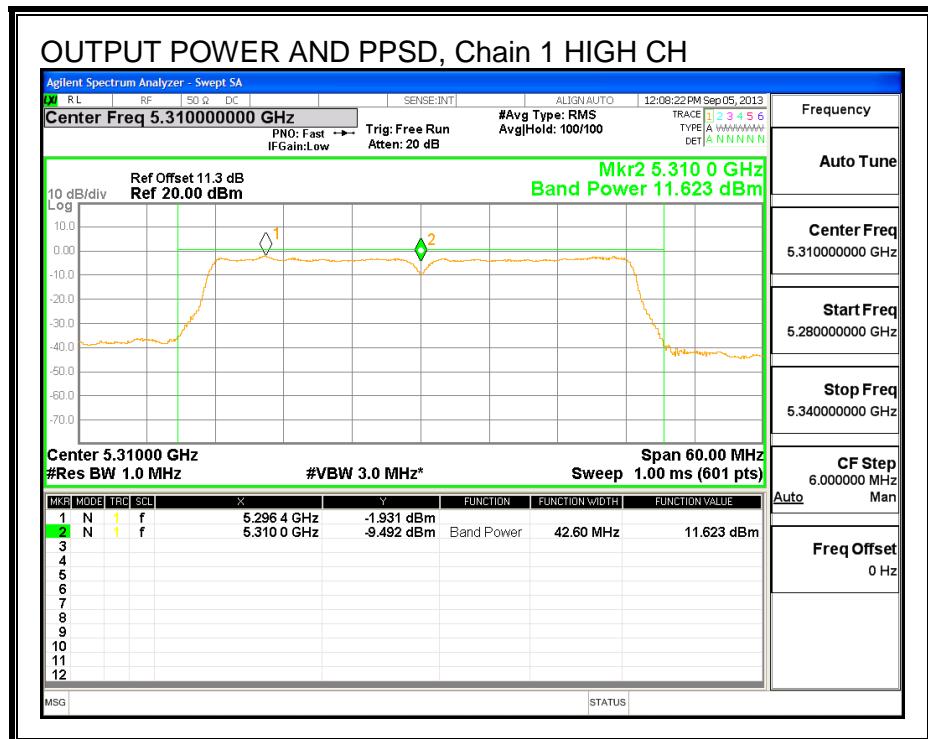
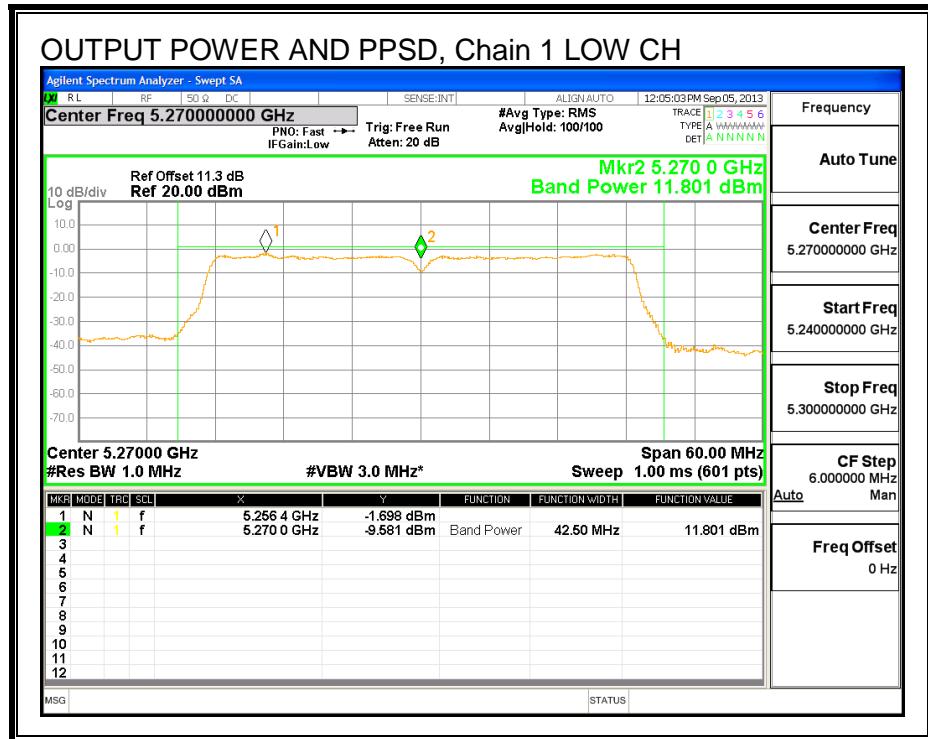
PPSD Results

| Channel | Frequency (MHz) | Chain 0 Meas PPSD (dBm) | Chain 1 Meas PPSD (dBm) | Total Corr'd PPSD (dBm) | PPSD Limit (dBm) | PPSD Margin (dB) |
|---------|--------------------|----------------------------------|----------------------------------|----------------------------------|------------------------|------------------------|
| Low | 5270 | -1.703 | -1.698 | 1.31 | 11.00 | -9.69 |
| High | 5310 | 1.762 | -1.931 | 3.31 | 11.00 | -7.69 |

OUTPUT POWER AND PPSD, Chain 0



OUTPUT POWER AND PPSD, Chain 1



8.6.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Refer to the results of 802.11n HT40 mode in the 5.6 GHz band.

8.7. 802.11a MODE IN THE 5.6 GHz BAND

8.7.1. 26 dB BANDWIDTH

LIMITS

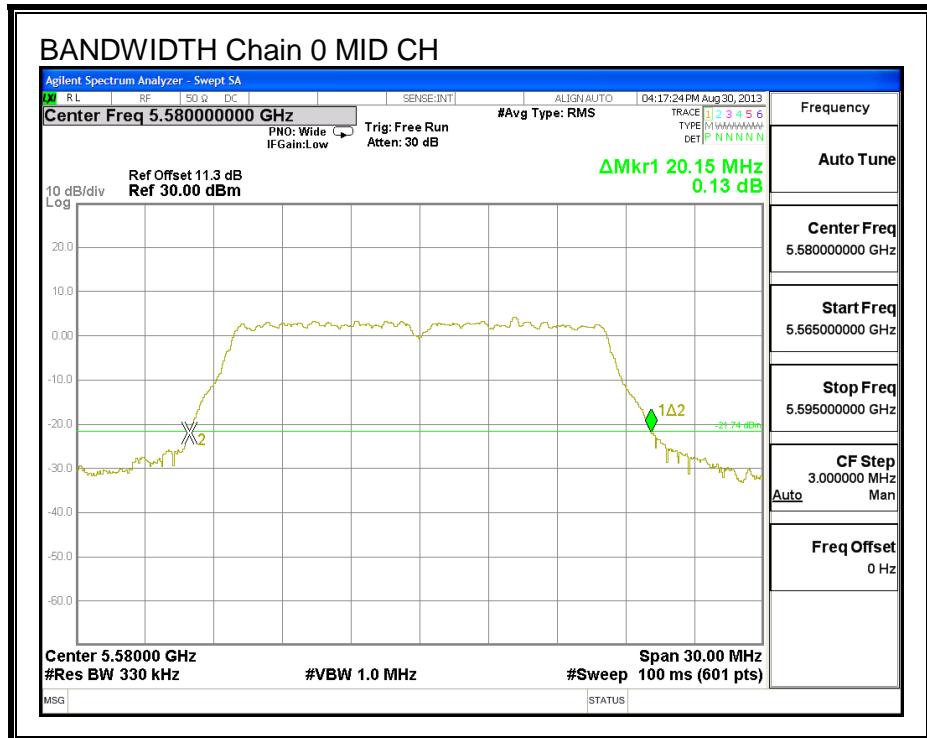
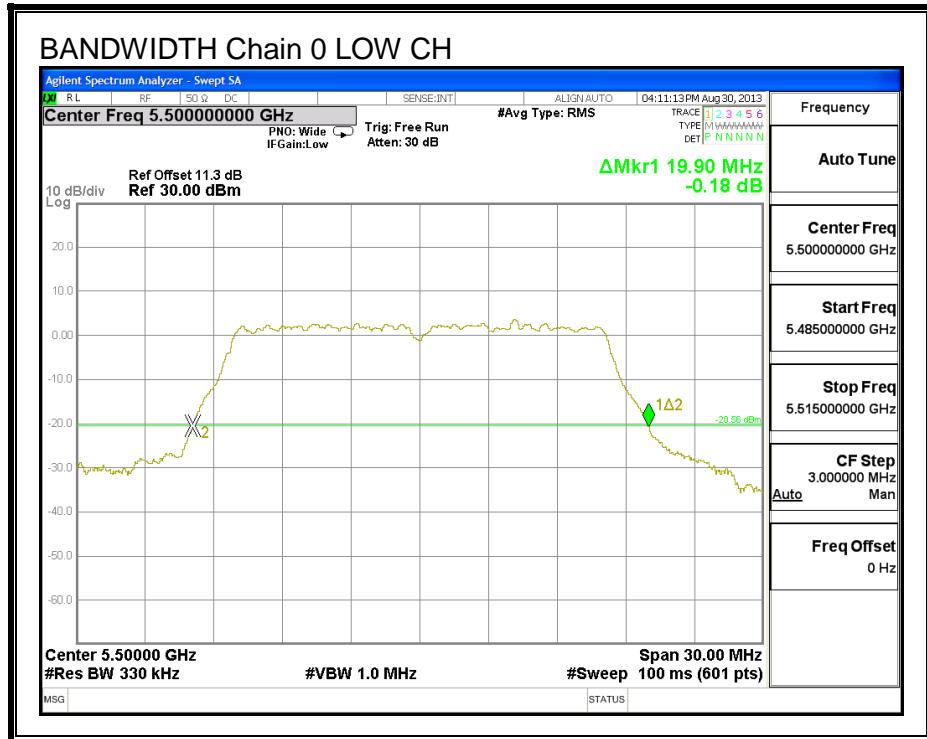
None; for reporting purposes only.

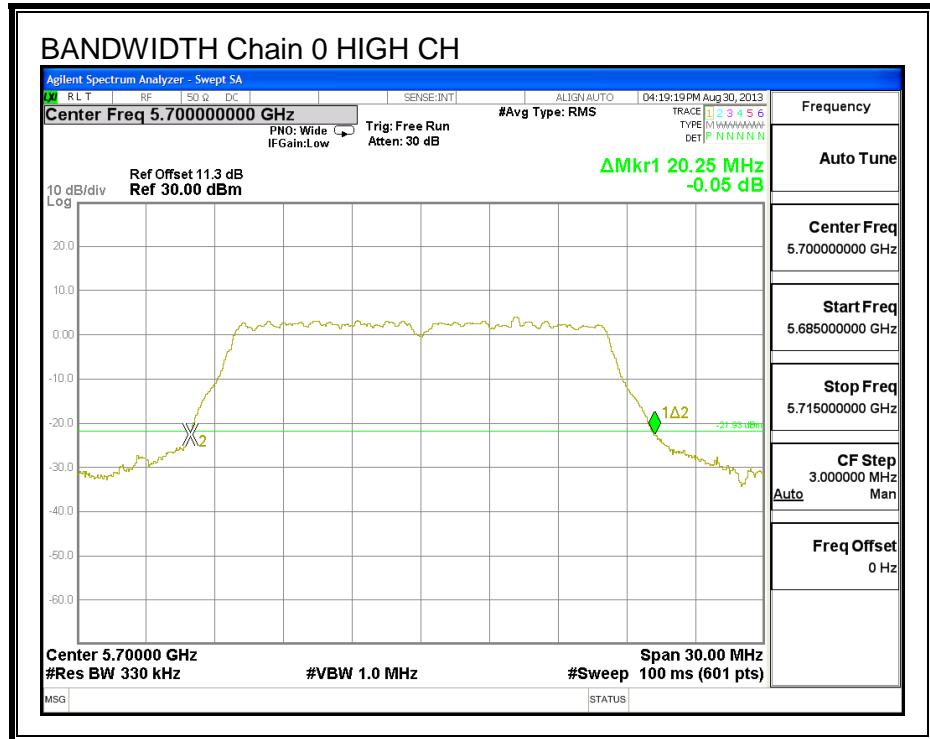
RESULTS

| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low | 5500 | 19.9 | 19.9 |
| Mid | 5580 | 20.2 | 19.9 |
| High | 5700 | 20.3 | 20.0 |

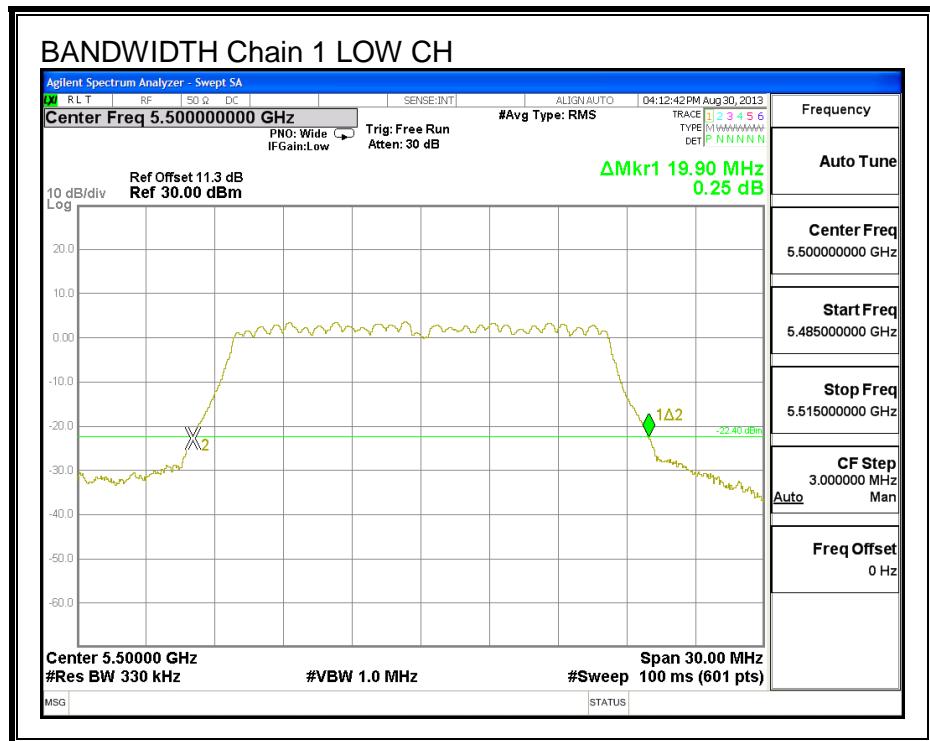
26 dB BANDWIDTH

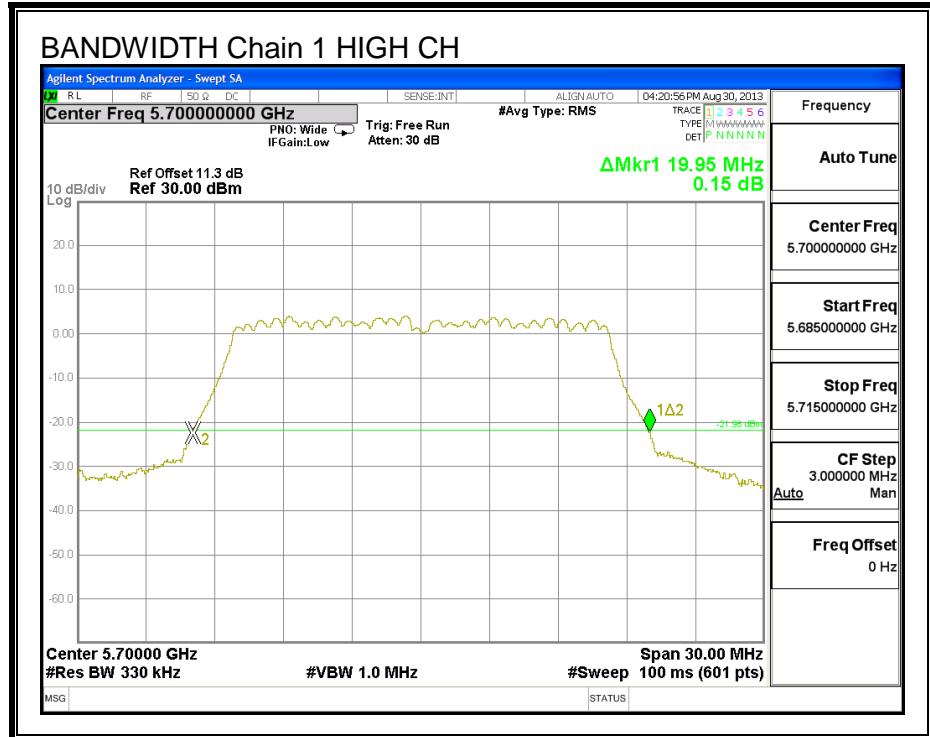
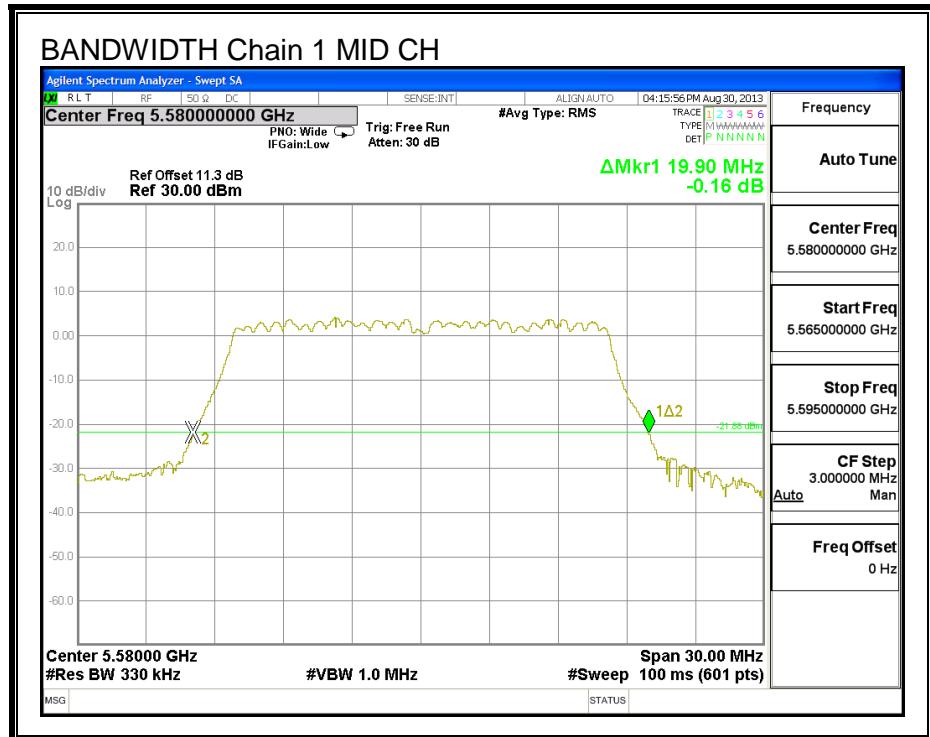
26 dB BANDWIDTH, Chain 0





26 dB BANDWIDTH, Chain 1





8.7.2. 99% BANDWIDTH

LIMITS

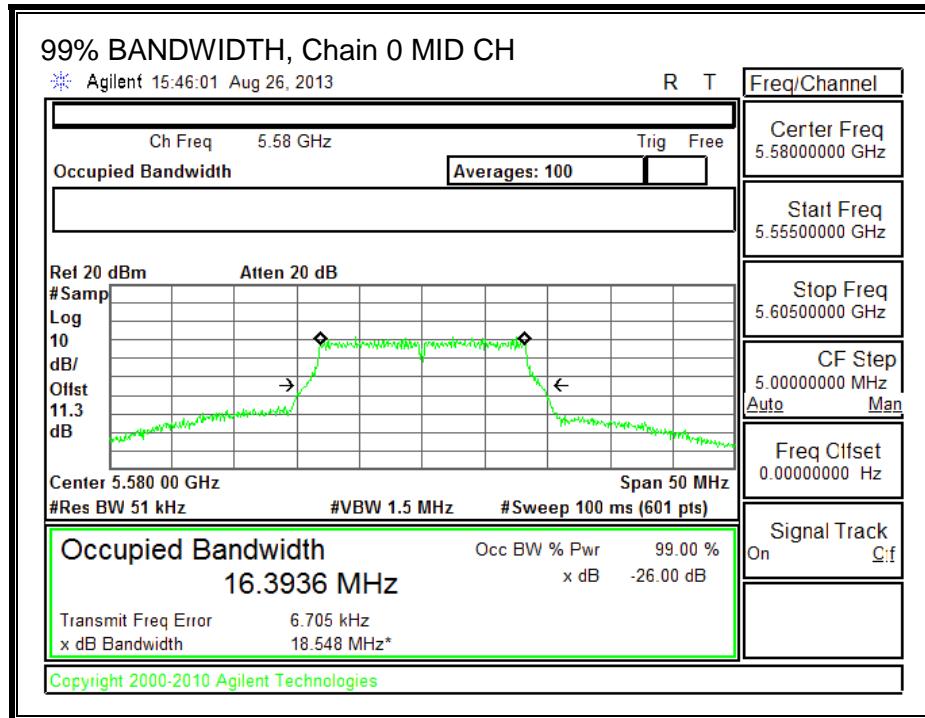
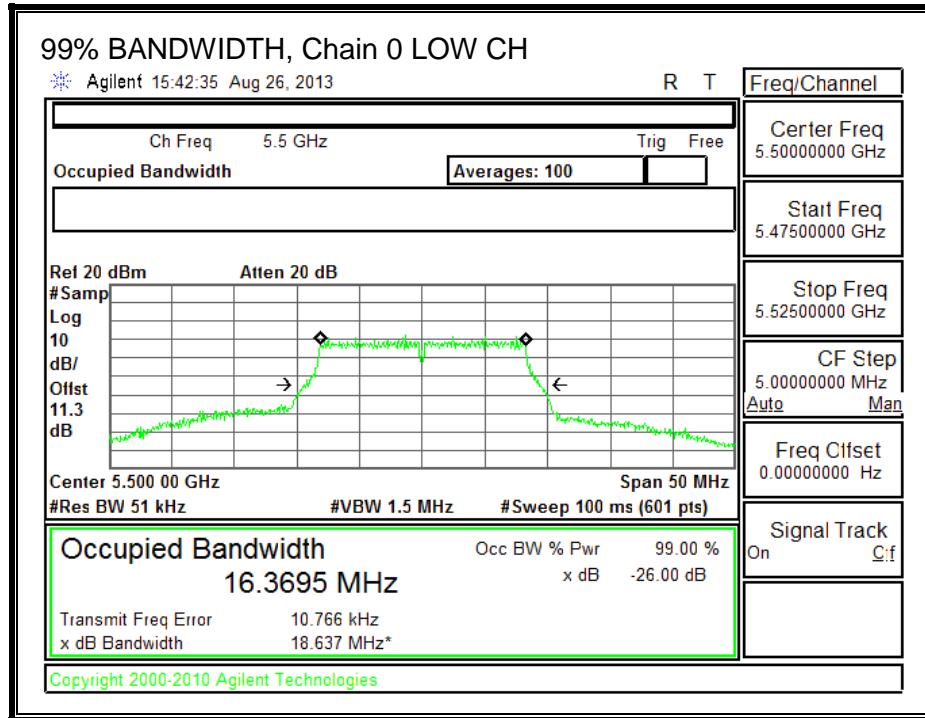
None; for reporting purposes only.

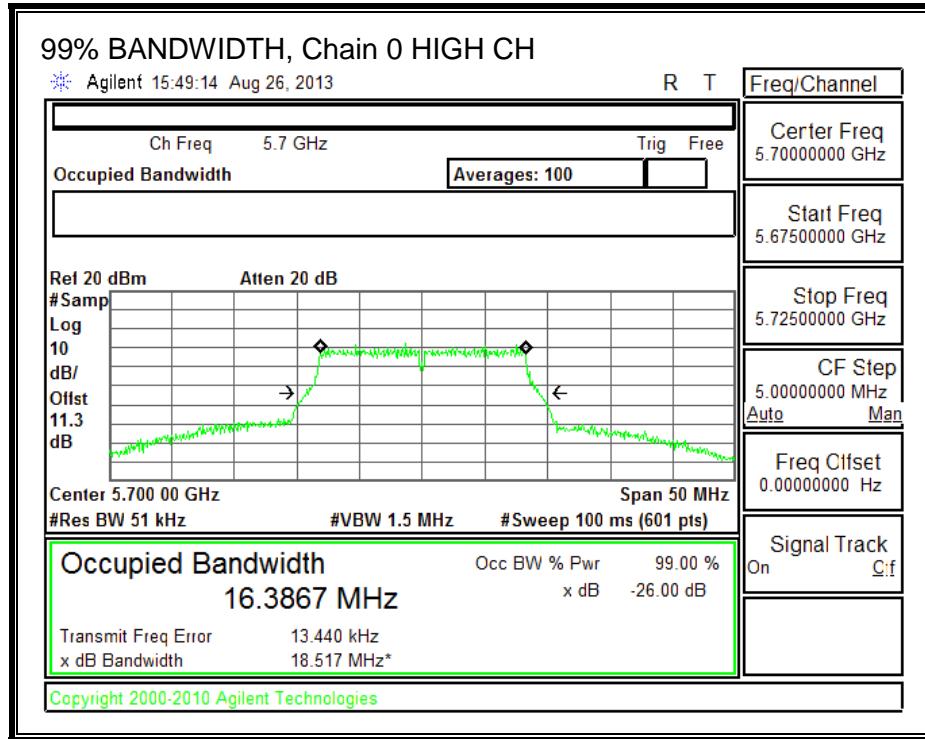
RESULTS

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low | 5500 | 16.37 | 16.38 |
| Mid | 5580 | 16.39 | 16.37 |
| High | 5700 | 16.39 | 16.38 |

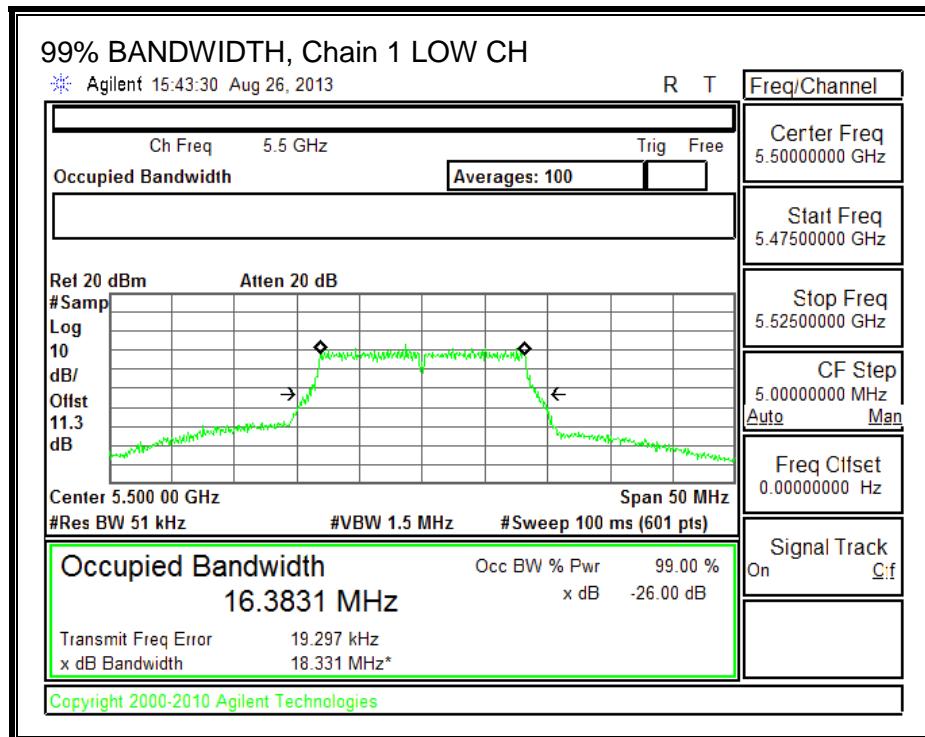
99% BANDWIDTH

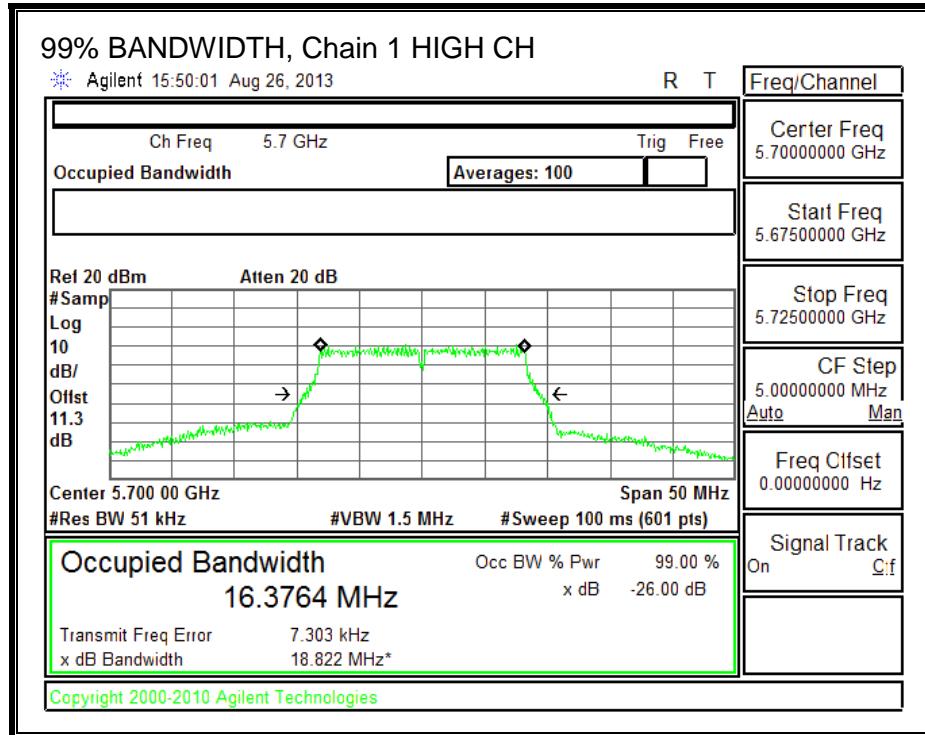
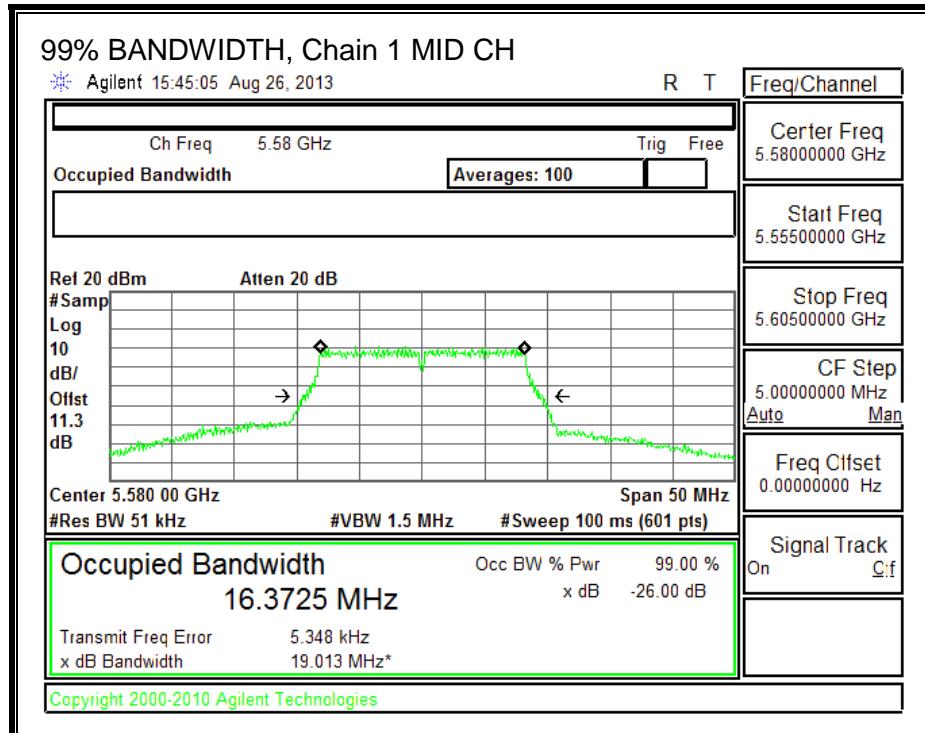
99% BANDWIDTH, Chain 0





99% BANDWIDTH, Chain 1





8.7.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.3 dB (including 10 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

| Channel | Frequency (MHz) | Chain 0 Power (dBm) | Chain 1 Power (dBm) | Total Power (dBm) |
|---------|--------------------|---------------------------|---------------------------|-------------------------|
| Low | 5500 | 10.02 | 11.03 | 13.56 |
| Mid | 5580 | 9.51 | 10.30 | 12.93 |
| High | 5700 | 9.20 | 10.70 | 13.02 |

8.7.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.5–5.7 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 peak 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.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

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

| Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) |
|-------------------------------------|-------------------------------------|---|
| 3.90 | 3.20 | 3.56 |

RESULTS

Bandwidth and Antenna Gain

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Min 99% BW (MHz) | Directional Gain (dBi) |
|---------|--------------------|-----------------------------|---------------------------|------------------------------|
| Low | 5500 | 19.9 | 16.36 | 3.56 |
| Mid | 5580 | 19.9 | 16.37 | 3.56 |
| High | 5700 | 20.0 | 16.37 | 3.56 |

Limits

| Channel | Frequency (MHz) | FCC Power Limit (dBm) | IC Power Limit (dBm) | IC EIRP Limit (dBm) | Power Limit (dBm) | FCC PPSD Limit (dBm) | IC PSD Limit (dBm) | PPSD Limit (dBm) |
|---------|--------------------|--------------------------------|-------------------------------|------------------------------|-------------------------|-------------------------------|-----------------------------|------------------------|
| Low | 5500 | 23.99 | 23.14 | 29.14 | 23.14 | 11.00 | 11.00 | 11.00 |
| Mid | 5580 | 23.99 | 23.14 | 29.14 | 23.14 | 11.00 | 11.00 | 11.00 |
| High | 5700 | 24.00 | 23.14 | 29.14 | 23.14 | 11.00 | 11.00 | 11.00 |

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

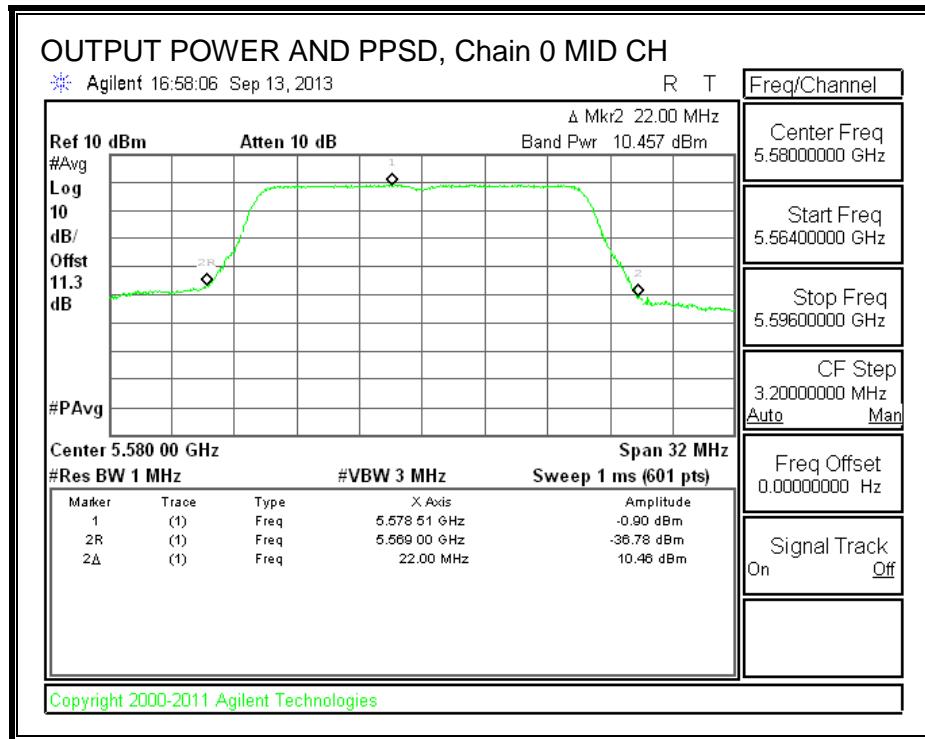
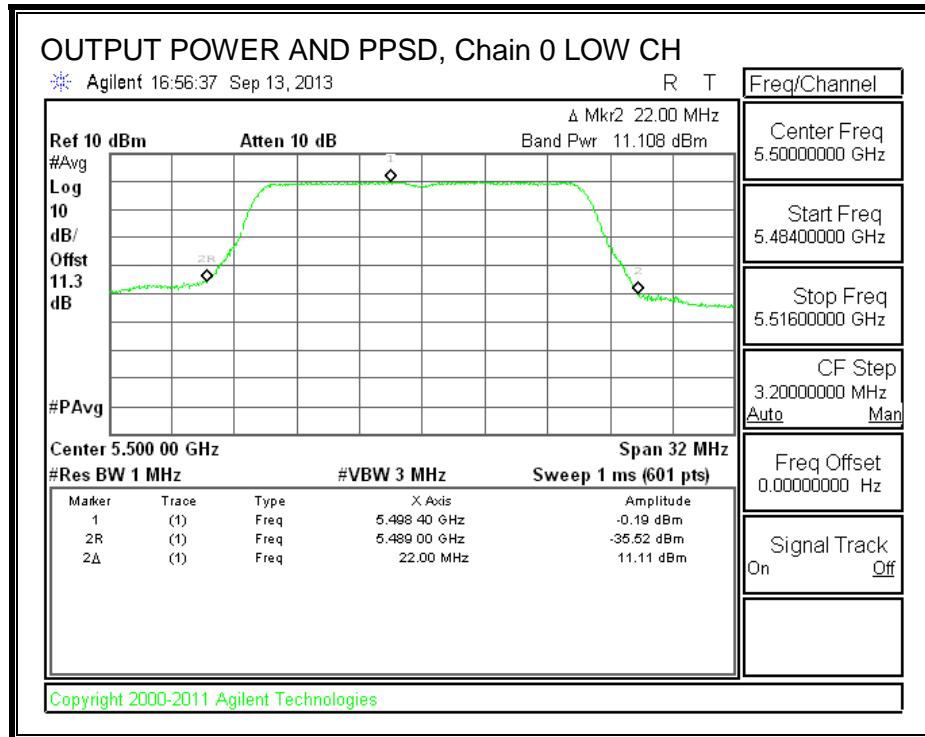
Output Power Results

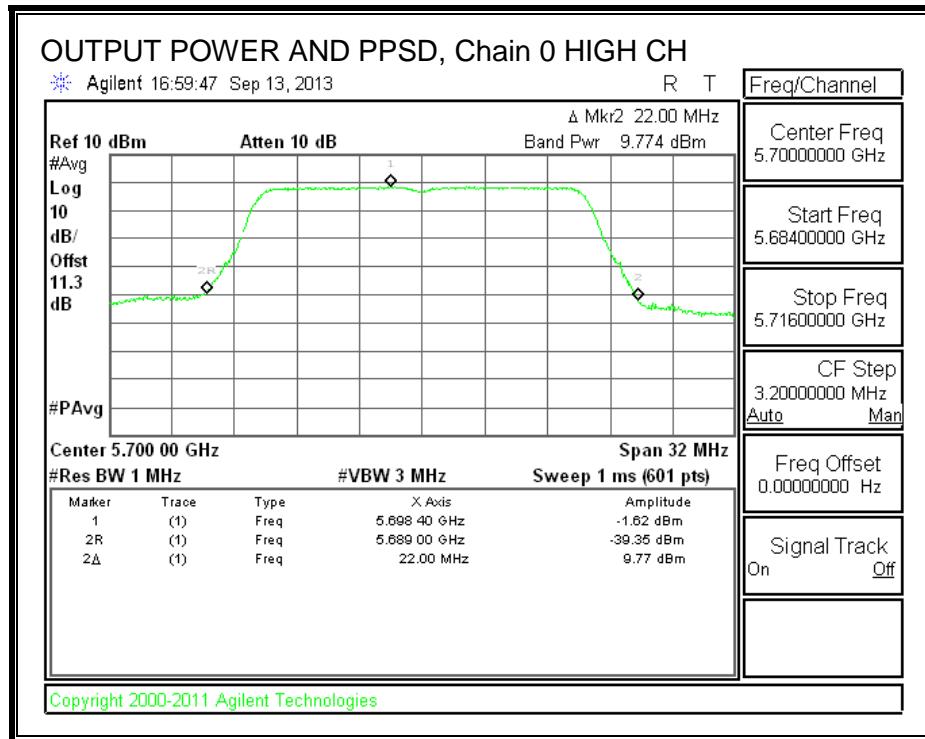
| Channel | Frequency (MHz) | Chain 0 Meas Power (dBm) | Chain 1 Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low | 5500 | 11.11 | 12.16 | 14.68 | 23.14 | -8.46 |
| Mid | 5580 | 10.46 | 11.34 | 13.93 | 23.14 | -9.21 |
| High | 5700 | 9.77 | 11.52 | 13.74 | 23.14 | -9.40 |

PPSD Results

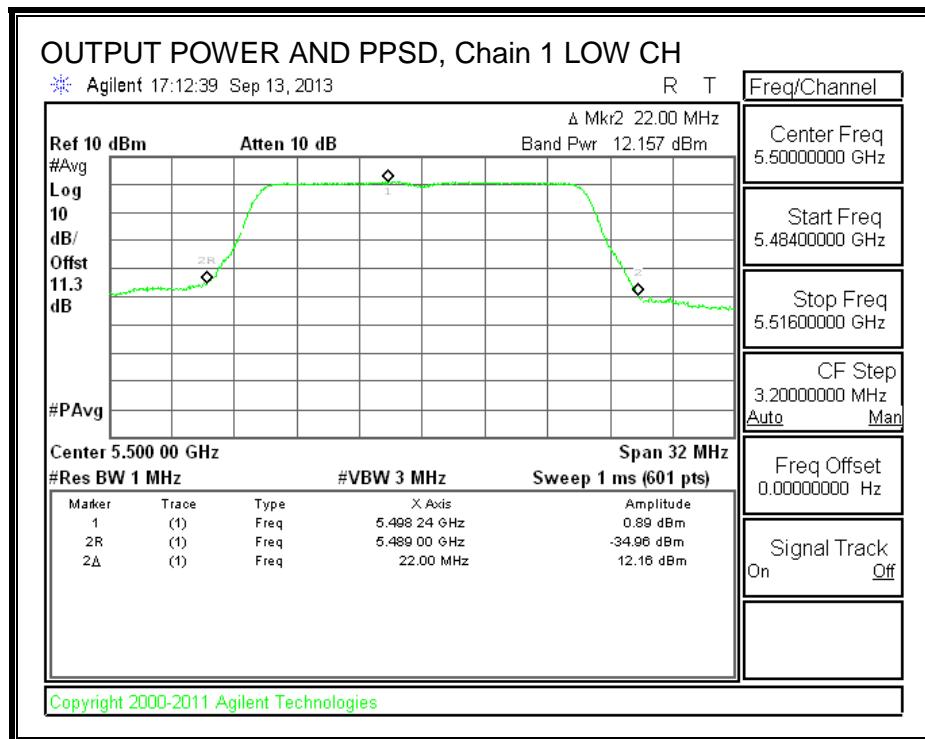
| Channel | Frequency (MHz) | Chain 0 Meas PPSD (dBm) | Chain 1 Meas PPSD (dBm) | Total Corr'd PPSD (dBm) | PPSD Limit (dBm) | PPSD Margin (dB) |
|---------|--------------------|----------------------------------|----------------------------------|----------------------------------|------------------------|------------------------|
| Low | 5500 | -0.19 | 0.89 | 3.39 | 11.00 | -7.61 |
| Mid | 5580 | -0.90 | 0.10 | 2.64 | 11.00 | -8.36 |
| High | 5700 | -1.62 | 0.19 | 2.39 | 11.00 | -8.61 |

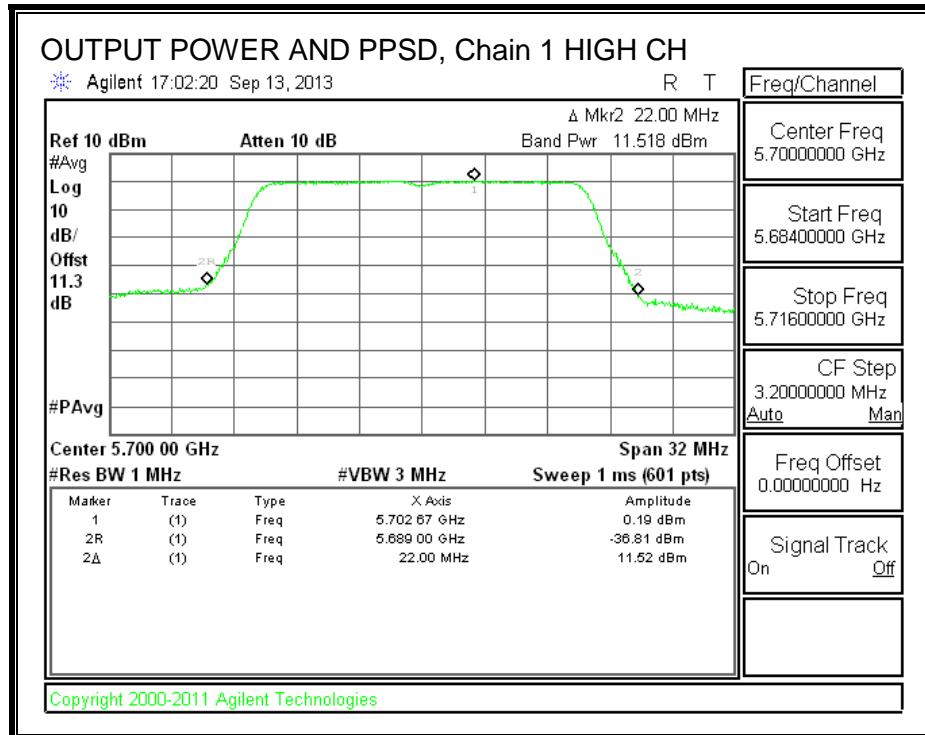
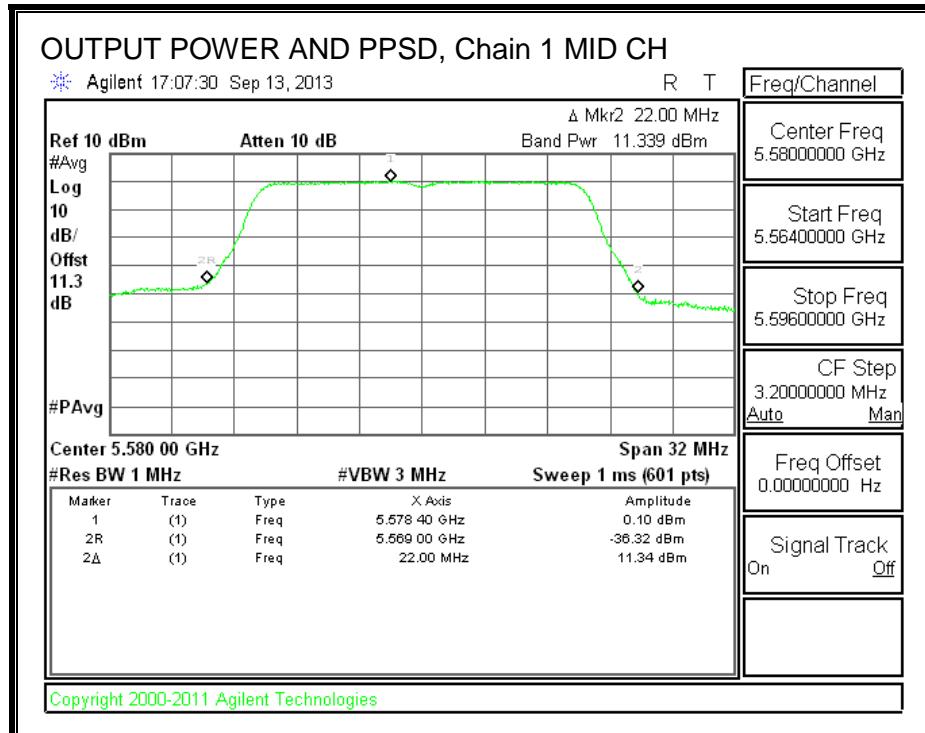
OUTPUT POWER AND PPSD, Chain 0





OUTPUT POWER AND PPSD, Chain 1





8.7.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Refer to the results of 802.11n HT20 mode in the 5.6 GHz band.

8.8. 802.11n HT20 MODE IN THE 5.6 GHz BAND

8.8.1. 26 dB BANDWIDTH

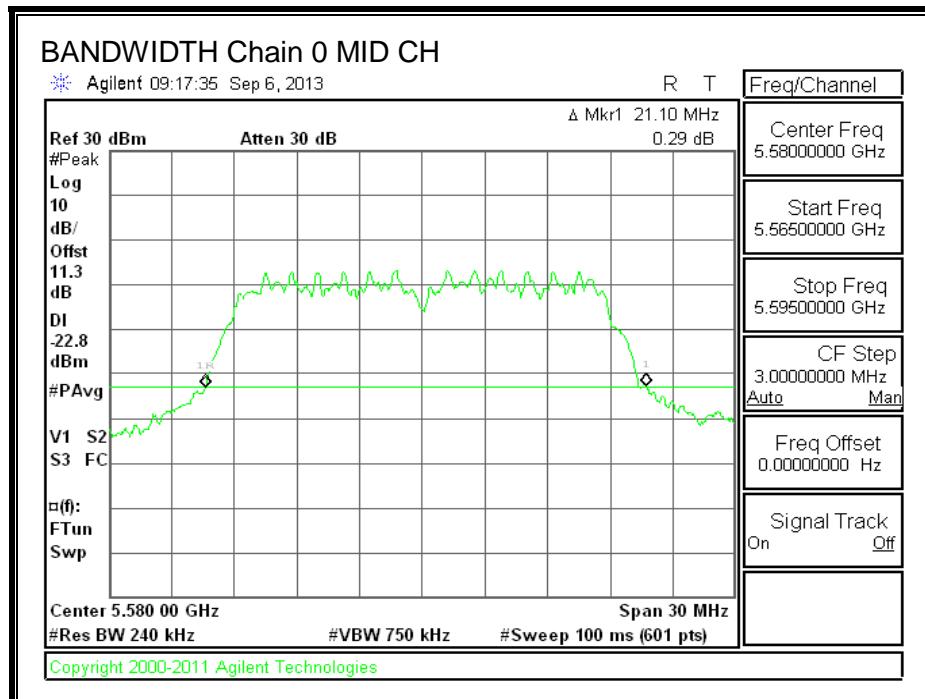
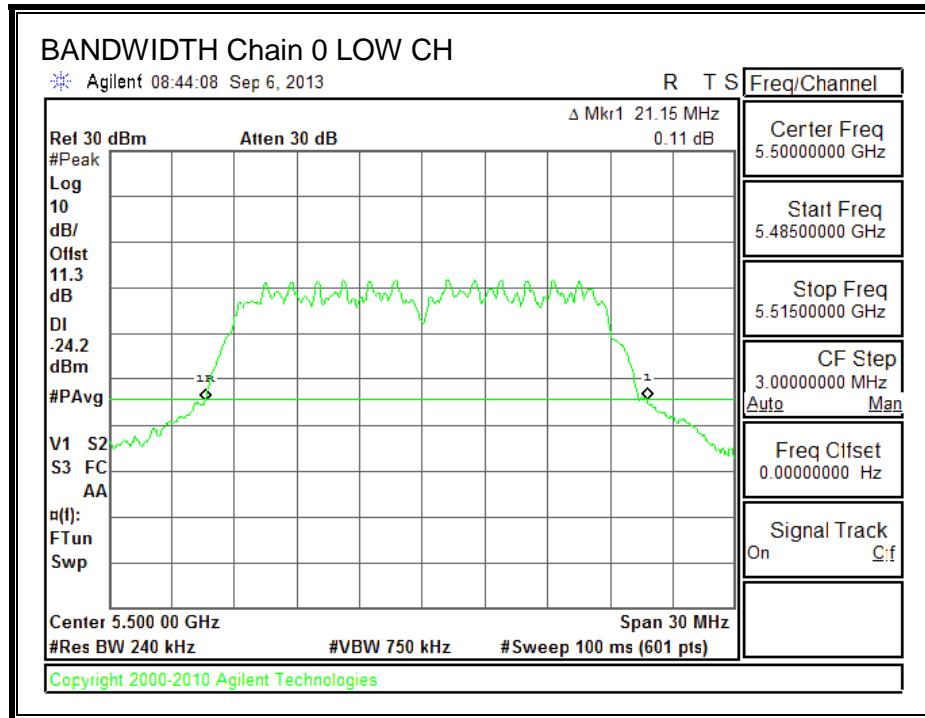
LIMITS

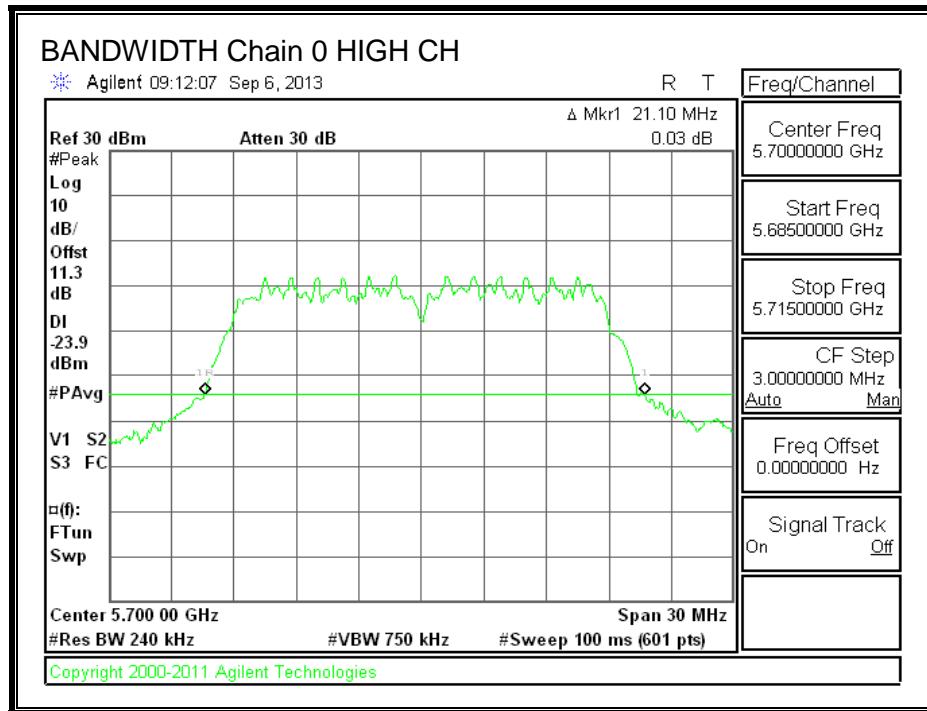
None; for reporting purposes only.

RESULTS

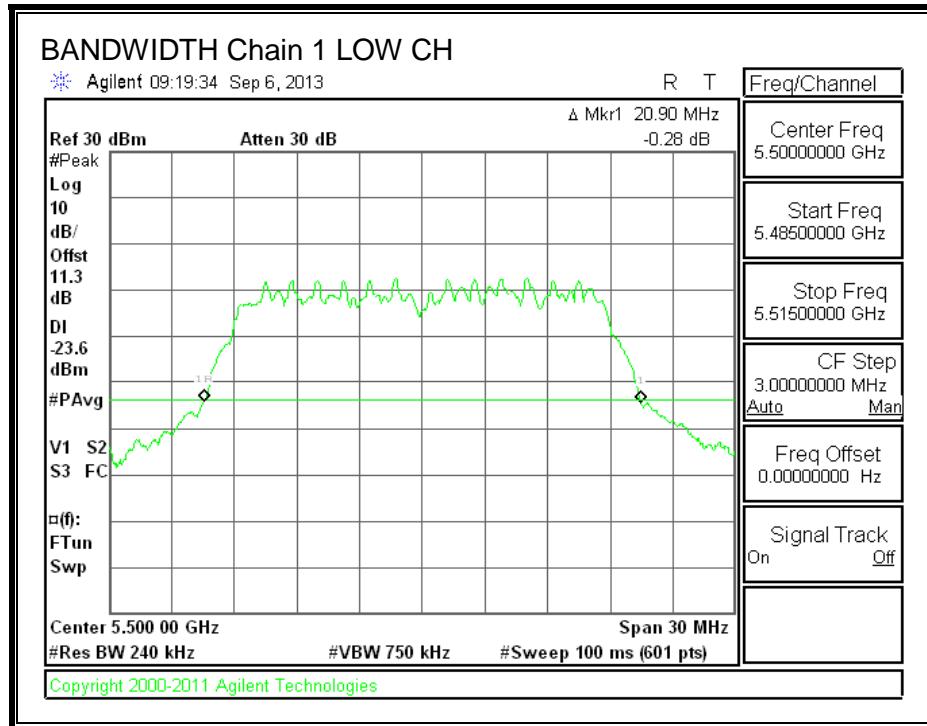
| Channel | Frequency (MHz) | 26 dB BW Chain 0 (MHz) | 26 dB BW Chain 1 (MHz) |
|---------|--------------------|------------------------------|------------------------------|
| Low | 5500 | 21.15 | 20.90 |
| Mid | 5580 | 21.10 | 20.90 |
| High | 5700 | 21.10 | 20.85 |

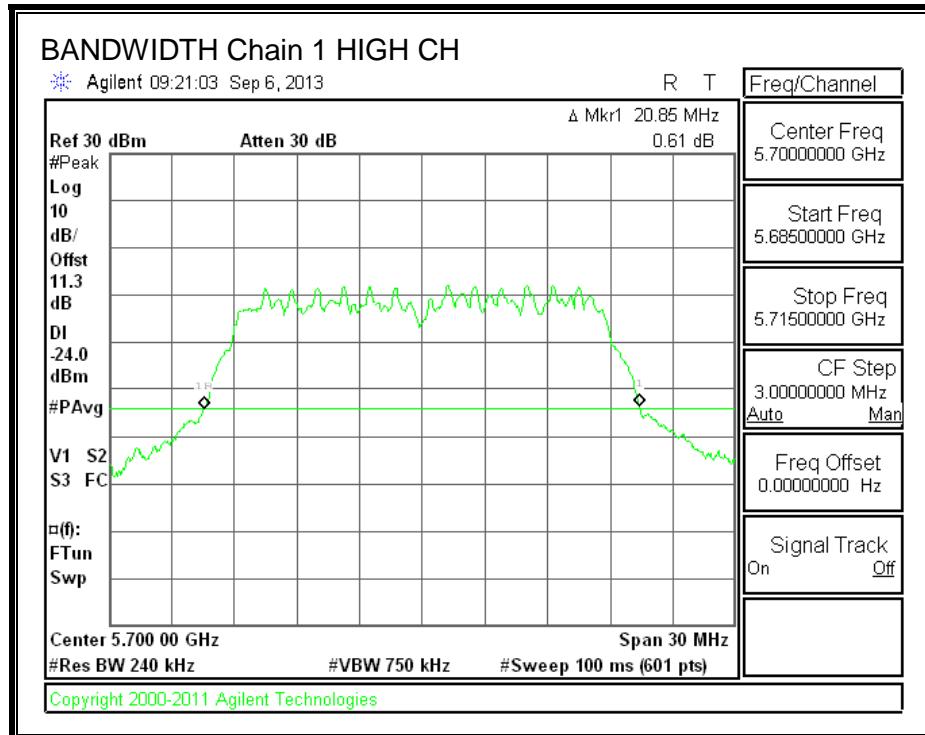
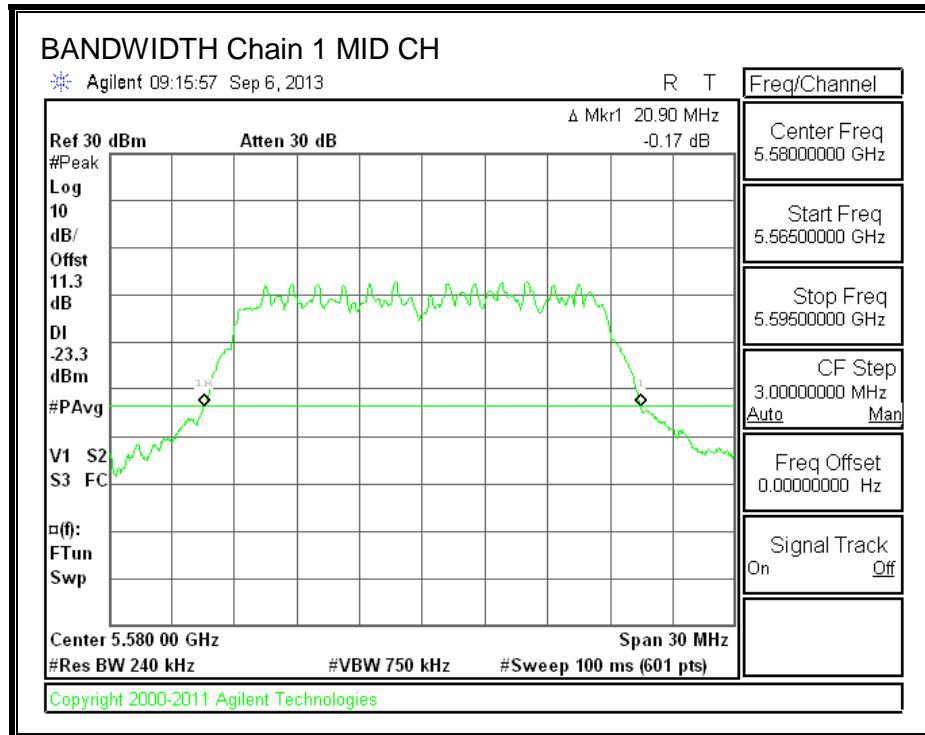
26 dB BANDWIDTH, Chain 0





26 dB BANDWIDTH, Chain 1





8.8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

| Channel | Frequency (MHz) | 99% BW Chain 0 (MHz) | 99% BW Chain 1 (MHz) |
|---------|--------------------|----------------------------|----------------------------|
| Low | 5500 | 17.600 | 17.609 |
| Mid | 5580 | 17.582 | 17.608 |
| High | 5700 | 17.576 | 17.612 |

99% BANDWIDTH

99% BANDWIDTH, Chain 0

