



**FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8**

CERTIFICATION TEST REPORT

FOR

**Dual-Band 802.11 a/b/g/n Industrial Access Point with Integrated DOCSIS 3.0
Modem**

MODEL NUMBER: ZoneFlex7761-CM

**FCC ID: S9GZF7761CM
IC: 5912A-ZF7761CM**

REPORT NUMBER: 10U13475-2, Revision C

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NVLAP LAB CODE 200065-0

Revision History

| Rev. | Issue Date | Revisions | Revised By |
|------|------------|---|------------|
| -- | 02/24/11 | Initial Issue | F. Ibrahim |
| A | 02/25/11 | Revised EUT description | A. Zaffar |
| B | 03/02/11 | Revised power line conducted emissions data, added radiated emissions 30-1000 MHz data and revised Description of Test Setup section. | F. Ibrahim |
| C | 03/08/11 | Revised the test methodology description of the Peak Output Power, revised antenna gain description in Output Power Sections, and revised the limits statements in all Conducted Spurious sections. | F. Ibrahim |

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Ruckus Wireless
880 West Maude Ave., Suite 101
Sunnyvale, CA 94085, U.S.A

EUT DESCRIPTION: Dual-Band 802.11 a/b/g/n Industrial Access Point with Integrated DOCSIS 3.0 Modem

MODEL: ZoneFlex7761-CM

SERIAL NUMBER: C0C5200001BD

DATE TESTED: NOVEMBER 2, 2010 - MARCH 2, 2011

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

Compliance Certification Services, Inc. (CCS) 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 CCS 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 CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS 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 CCS By:



FRANK IBRAHIM
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:



WILLIAM ZHUANG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, 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.

CCS 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:

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

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 Dual-Band 802.11 a/b/g/n Industrial Access Point with Integrated DOCSIS 3.0 Modem.

The radio module is manufactured by Ruckus Wireless.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

| Frequency Range (MHz) | Mode | Output Power (dBm) | Output Power (mW) |
|--------------------------|--------------|-----------------------|----------------------|
| 2412 - 2462 | 802.11b | 26.19 | 415.91 |
| 2412 - 2462 | 802.11g | 26.13 | 410.20 |
| 2412 - 2462 | 802.11n HT20 | 29.96 | 990.83 |
| 2422 - 2452 | 802.11n HT40 | 29.94 | 986.28 |
| 5745 - 5825 | 802.11a | 25.69 | 370.68 |
| 5745 - 5805 | 802.11n HT20 | 27.34 | 542.00 |
| 5755 - 5795 | 802.11n HT40 | 27.54 | 567.54 |

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes MIMO dual-band antenna with a maximum peak gain of **5 dBi** in the 2.4 GHz band and a MIMO Omni antenna for only 5 GHz band with maximum peak gain of **5.5 dBi** in the 5 GHz bands.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was version 9.0.0.0.65 and the cable modem firmware was version V92004.

The RF conducted testing used Atheros Radio Test software which we call "ART". The version number is v0_5_b25ALL.

5.5. WORST-CASE CONFIGURATION AND MODE

For Radiated Emissions and Power line Conducted Emissions, the channel with the highest conducted output power was selected.

Worst-case data rates as provided by the manufacturer are:

For 11b mode: 1Mbps

For 11g mode: 6Mbps

For 11n HT20 (2.4 GHz band): MCS0

For 11n HT40 (2.4 GHz band): MCS0

For 11a mode: 6Mbps

For 11n HT20 (5.8 GHz band): MCS8

For 11n HT40 (5.8 GHz band): MCS8

For 2.4 GHz band and 5.8 GHz band, Peak Power Spectral Density was investigated for individual chains versus combiner, and it was determined that combiner is worst-case; therefore, all other measurements of PPSD in other channels and modes in the 2.4 GHz band and 5.8 GHz band were performed using a combiner.

For 2.4 GHz band and 5.8 GHz band, RF Conducted Spurious was investigated for individual chains versus combiner, and it was determined that the individual chains are worst-case; therefore, all other measurements of RF conducted spurious in other channels and modes in the 2.4 GHz band and 5.8 GHz band were performed on individual chains.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

| PERIPHERAL SUPPORT EQUIPMENT LIST | | | |
|-----------------------------------|--------------|------------------|---------------|
| Description | Manufacturer | Model | Serial Number |
| Laptop PC | IBM | 2366 | 78-BWY97 |
| AC/DC Adapter | IBM | 02K6665 | 1Z0Z0500ZF |
| POE | RUCKUS | NPE-5818 | 10A282617 |
| AC/DC Adapter | RUCKUS | PA1060-48 T1A125 | 1022 |
| USB Mouse | Microsoft | X09-13962 | N/A |
| AC/DC Adapter | RUCKUS | MPC-1200201 | 101 |

Note: AC/DC adapter MPC-1200201 was used to power the radio for radiated emissions 3-1000 MHz and power line conducted emissions tests.

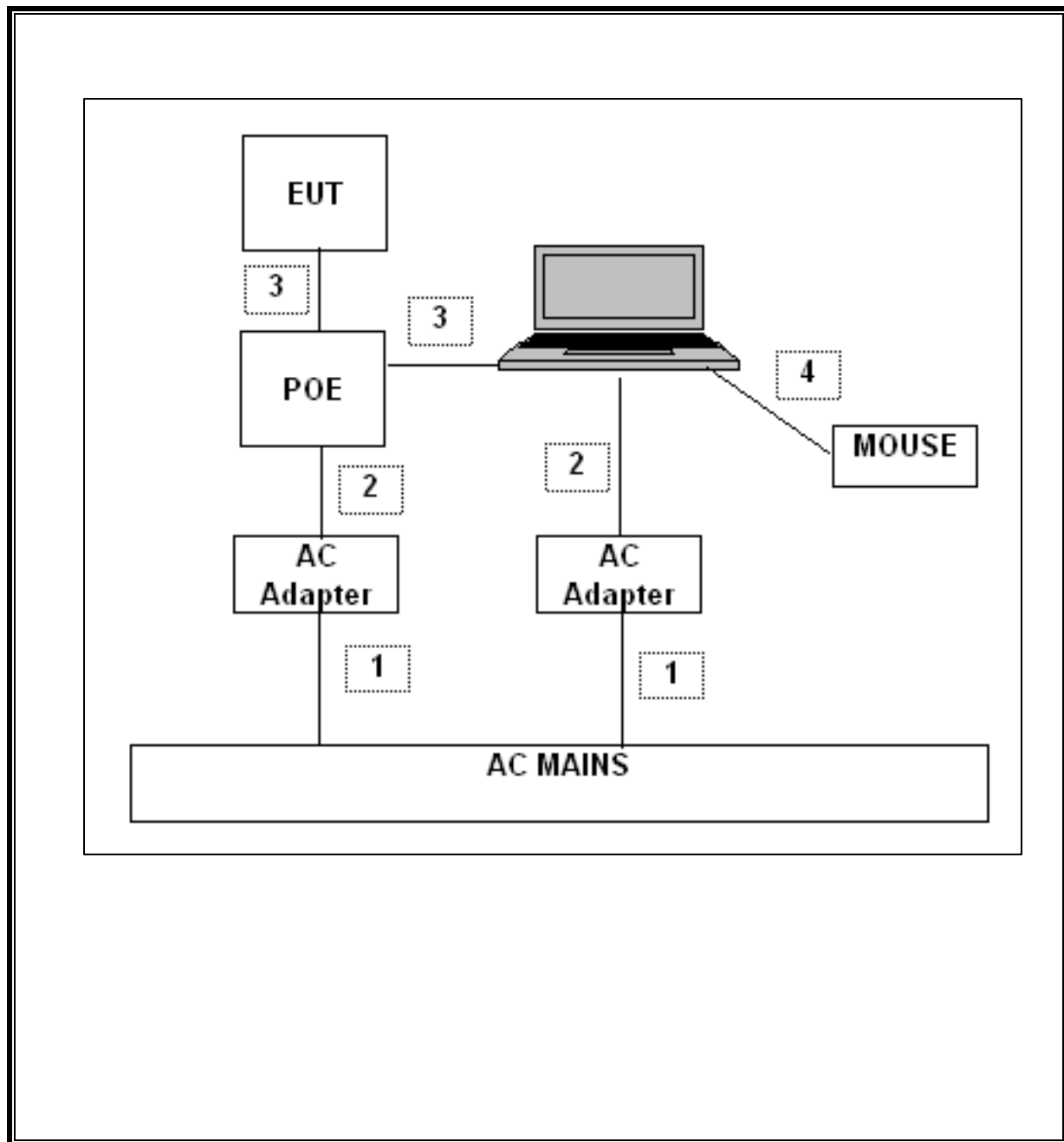
I/O CABLES

| I/O CABLE LIST | | | | | | |
|----------------|----------|----------------------|----------------|-------------|--------------|---------|
| Cable No. | Port | # of Identical Ports | Connector Type | Cable Type | Cable Length | Remarks |
| 1 | AC Input | 2 | AC | Un-Shielded | 1.5m | N/A |
| 2 | DC Input | 2 | DC | Un-Shielded | 1.8m | N/A |
| 3 | Ethernet | 2 | RJ45 | Un-Shielded | 1.5m | N/A |
| 4 | USB | 1 | USB | Un-Shielded | 1.5m | N/A |

TEST SETUP

The Access Point EUT is controlled externally with a laptop, via Ethernet.

SETUP DIAGRAM FOR RADIO 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 Due |
| Spectrum Analyzer, 44 GHz | Agilent / HP | E4446A | C01178 | 08/30/10 |
| Peak Power Meter | Boonton | 4541 | C01185 | 03/01/10 |
| Peak Power Sensor | Boonton | 57006 | C01203 | 02/24/10 |
| Antenna, Bilog, 2 GHz | Sunol Sciences | JB1 | C01011 | 07/12/11 |
| Preamplifier, 1300 MHz | Agilent / HP | 8447D | C00885 | 01/06/12 |
| Antenna, Horn, 18 GHz | EMCO | 3115 | C00945 | 06/29/11 |
| Preamplifier, 26.5 GHz | Agilent / HP | 8449B | C01052 | 07/14/11 |
| EMI Test Receiver, 30 MHz | R & S | ESHS 20 | N02396 | 05/06/11 |
| LISN, 30 MHz | FCC | LISN-50/250-25-2 | N02625 | 11/10/11 |
| LISN, 10 kHz ~ 30 MHz | Solar | 8012-50-R-24-BNC | N02481 | 11/10/11 |

7. ANTENNA PORT TEST RESULTS

7.1. 802.11b THREE CHAINS LEGACY MODE IN THE 2.4 GHz BAND

7.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

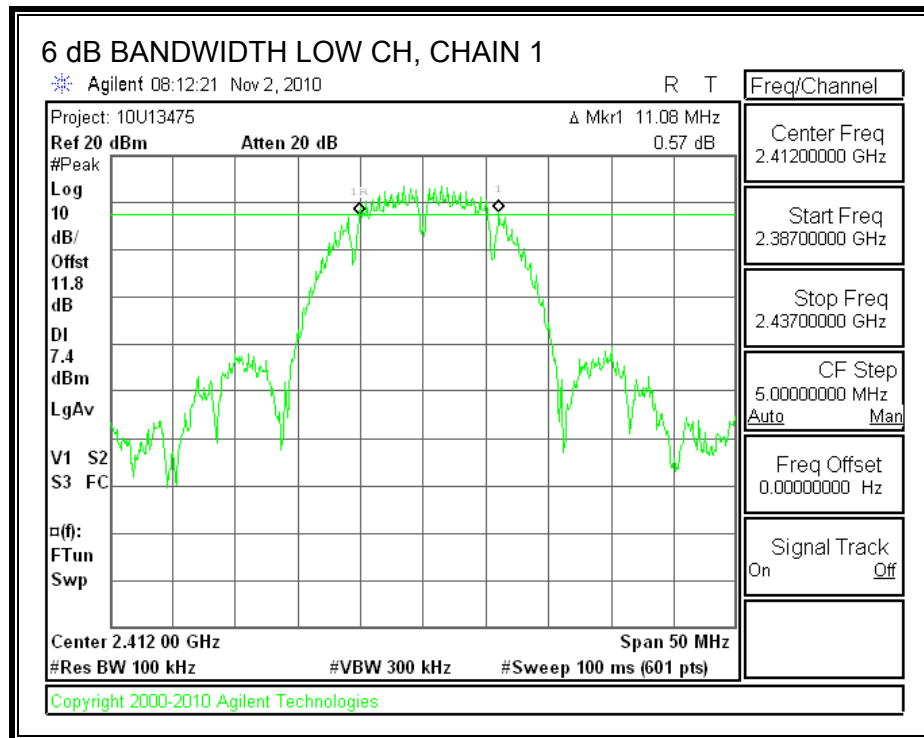
TEST PROCEDURE

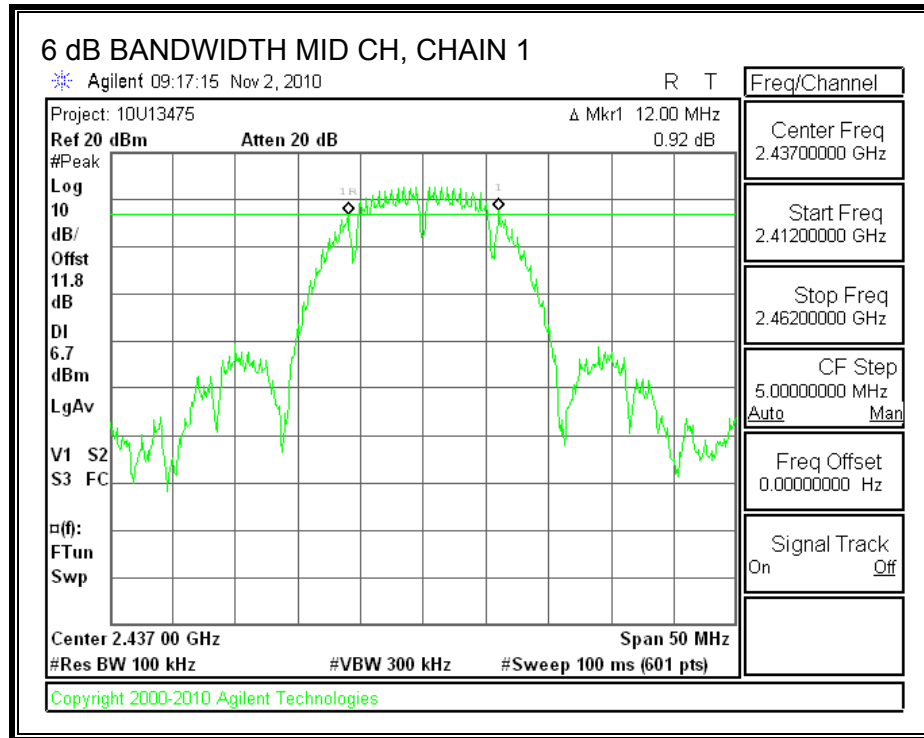
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

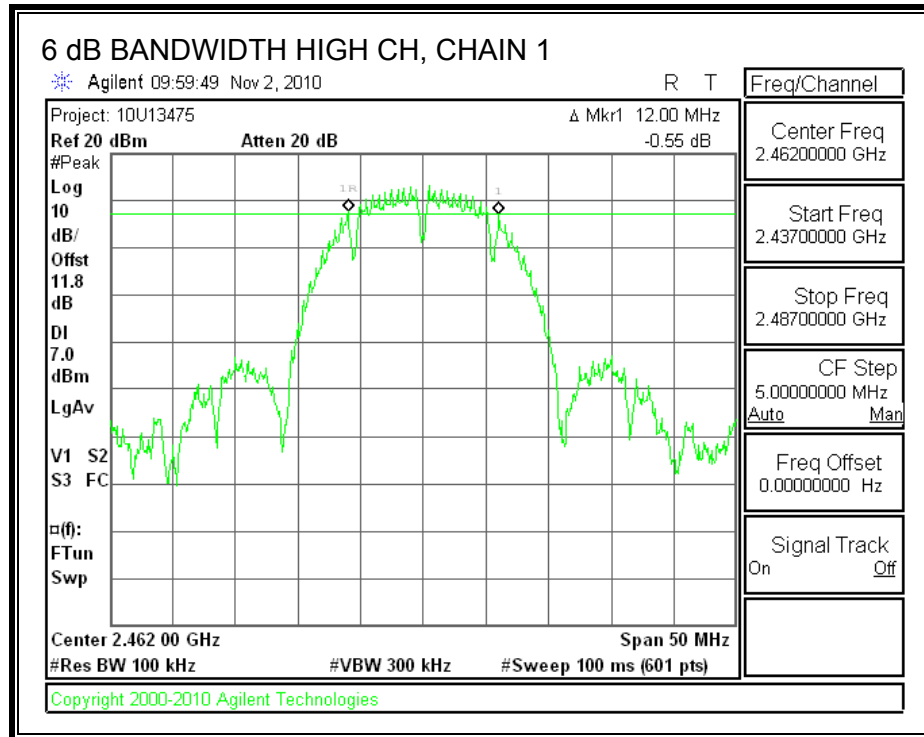
RESULTS

| Channel | Frequency (MHz) | Chain 1 6 dB BW (MHz) | Chain 2 6 dB BW (MHz) | Chain 3 6 dB BW (MHz) | Minimum Limit (MHz) |
|---------|--------------------|-----------------------------|-----------------------------|-----------------------------|------------------------|
| Low | 2412 | 11.08 | 11.08 | 12.00 | 0.5 |
| Middle | 2437 | 12.00 | 11.08 | 11.08 | 0.5 |
| High | 2462 | 12.00 | 11.08 | 11.08 | 0.5 |

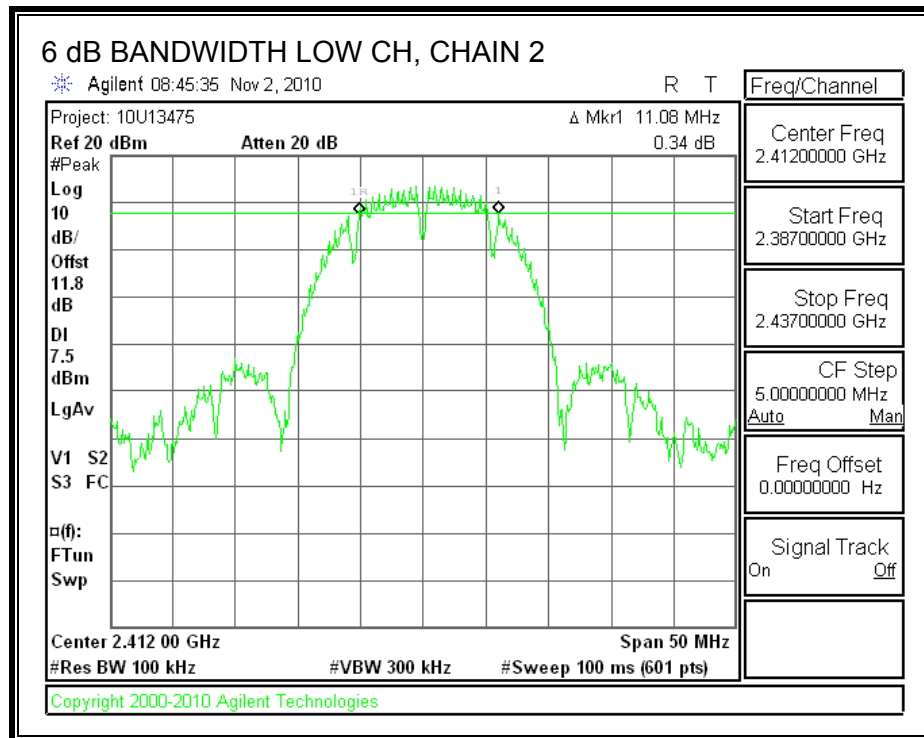
6 dB BANDWIDTH, CHAIN 1

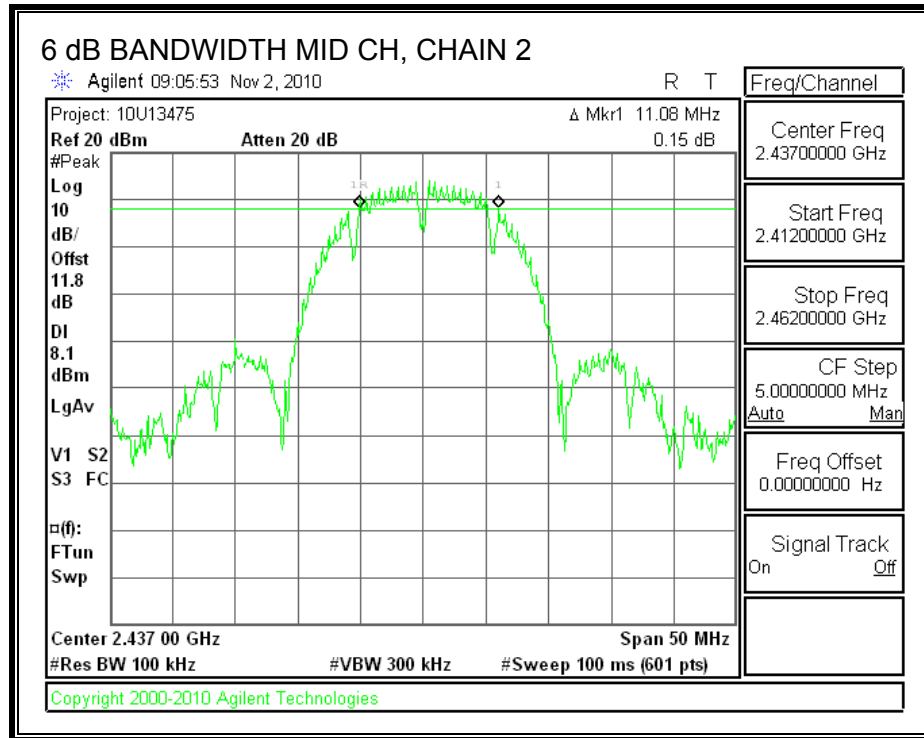


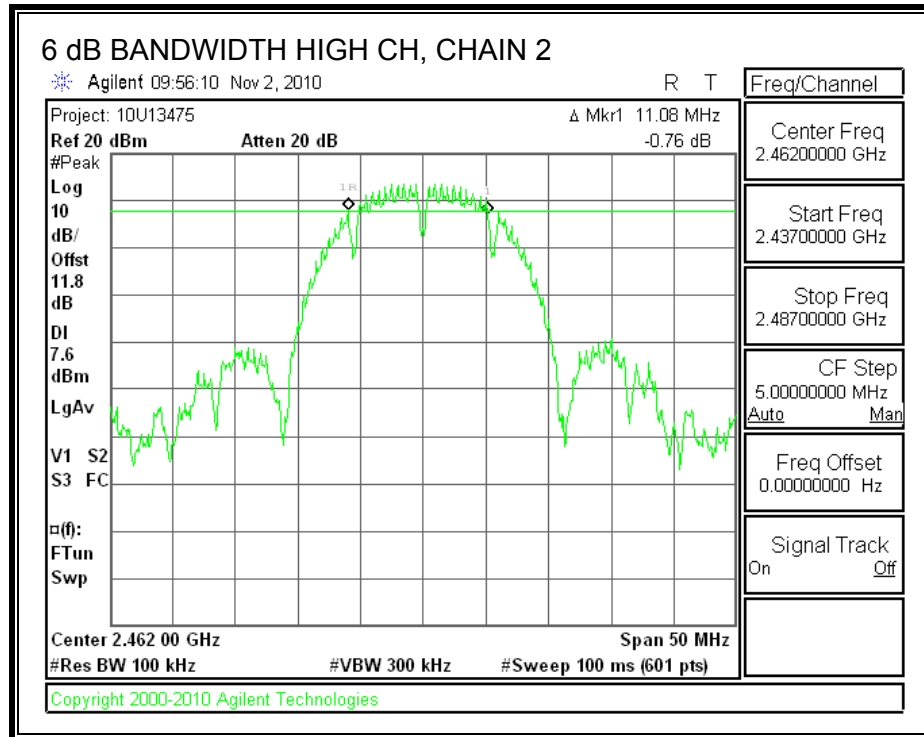




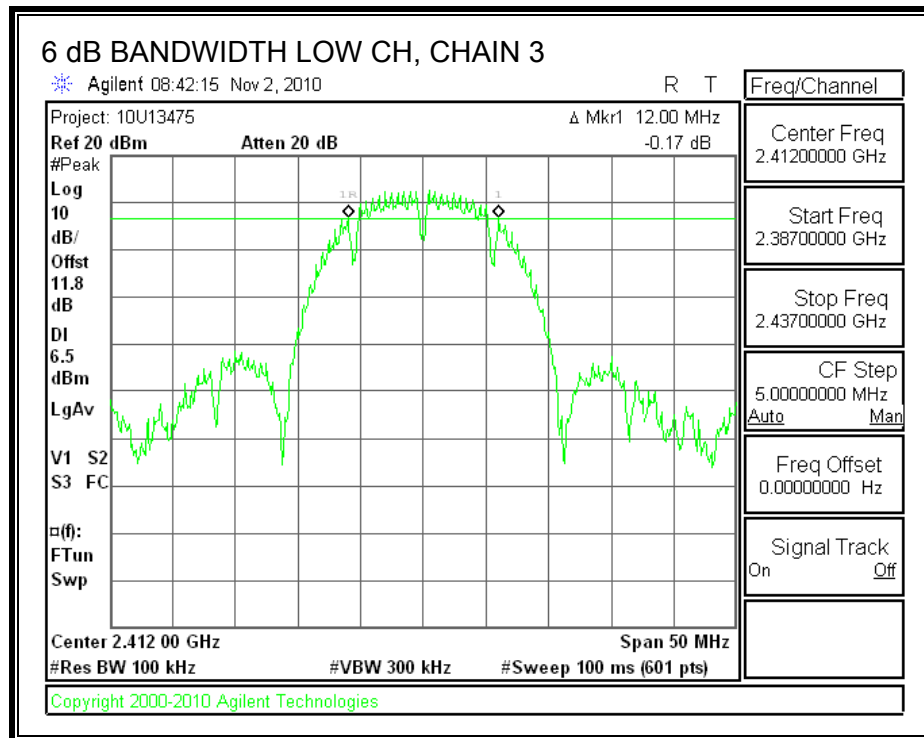
6 dB BANDWIDTH, CHAIN 2

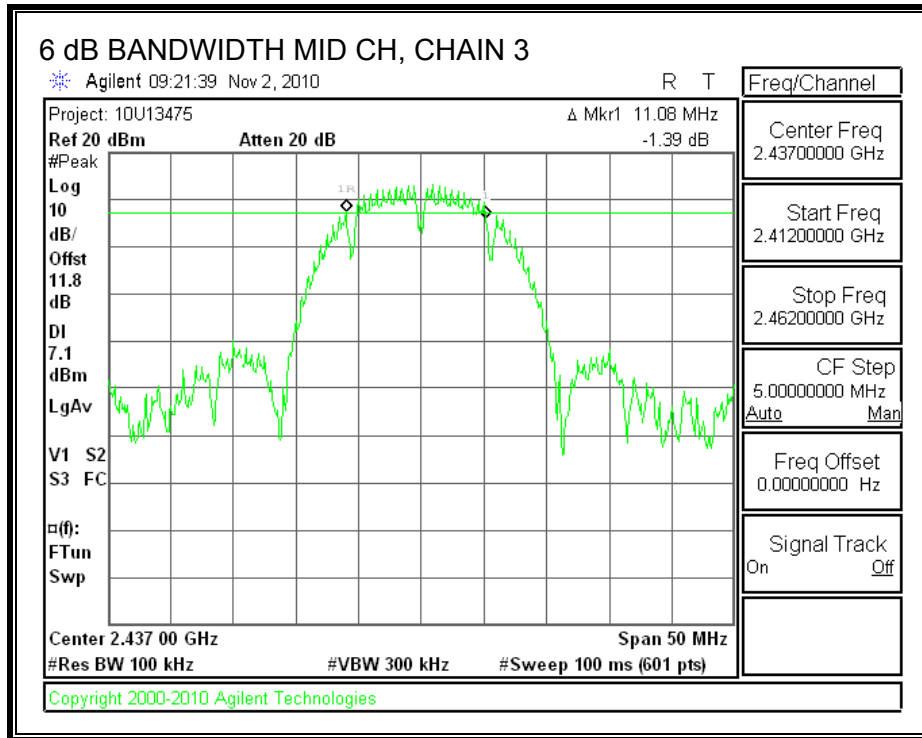


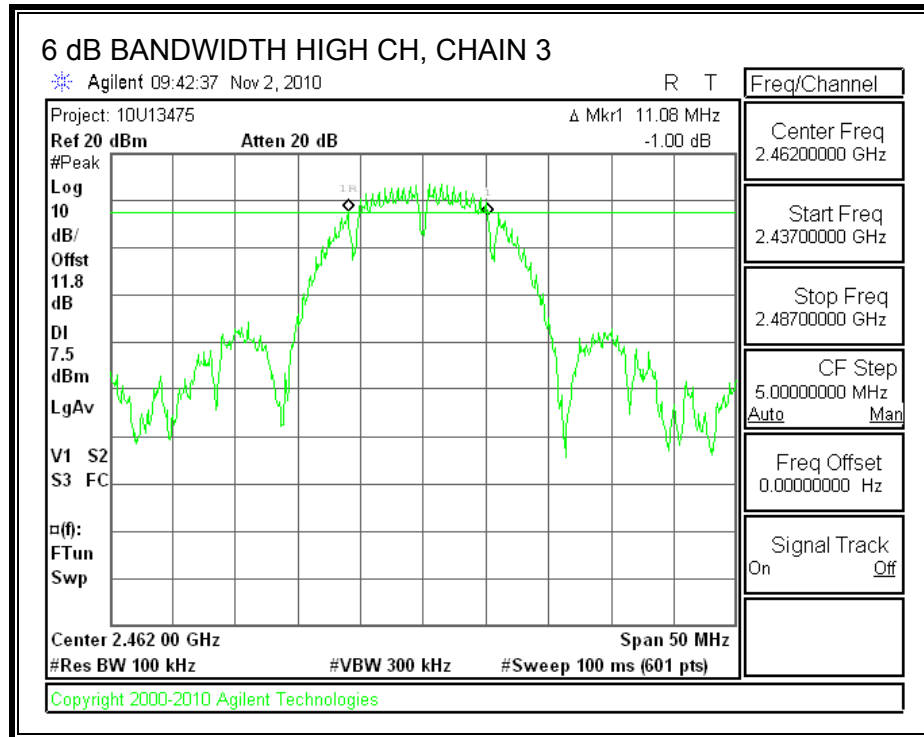




6 dB BANDWIDTH, CHAIN 3







7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

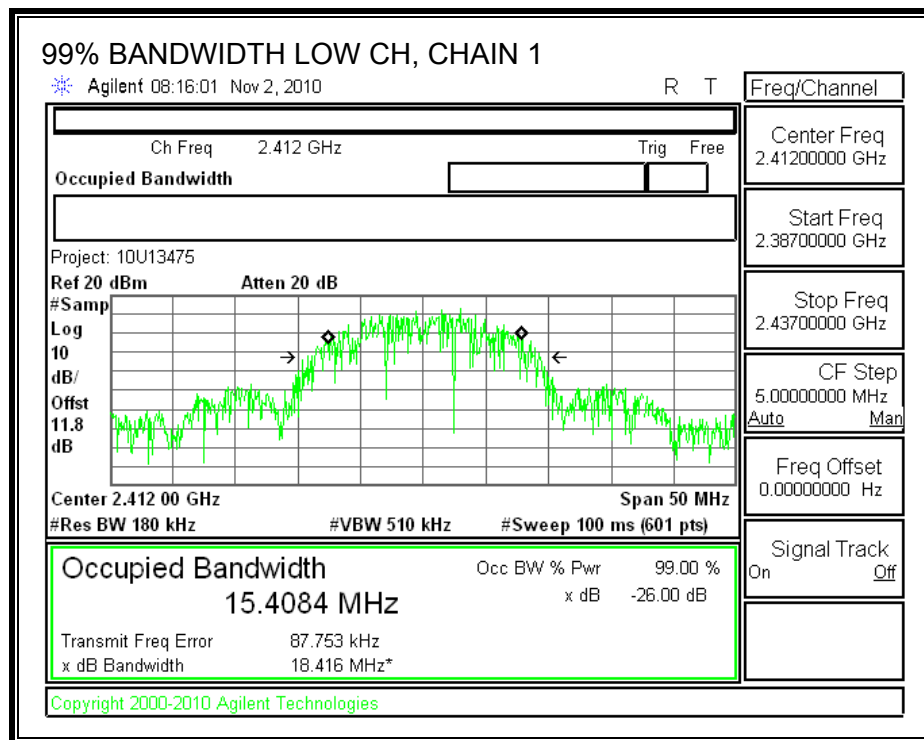
TEST PROCEDURE

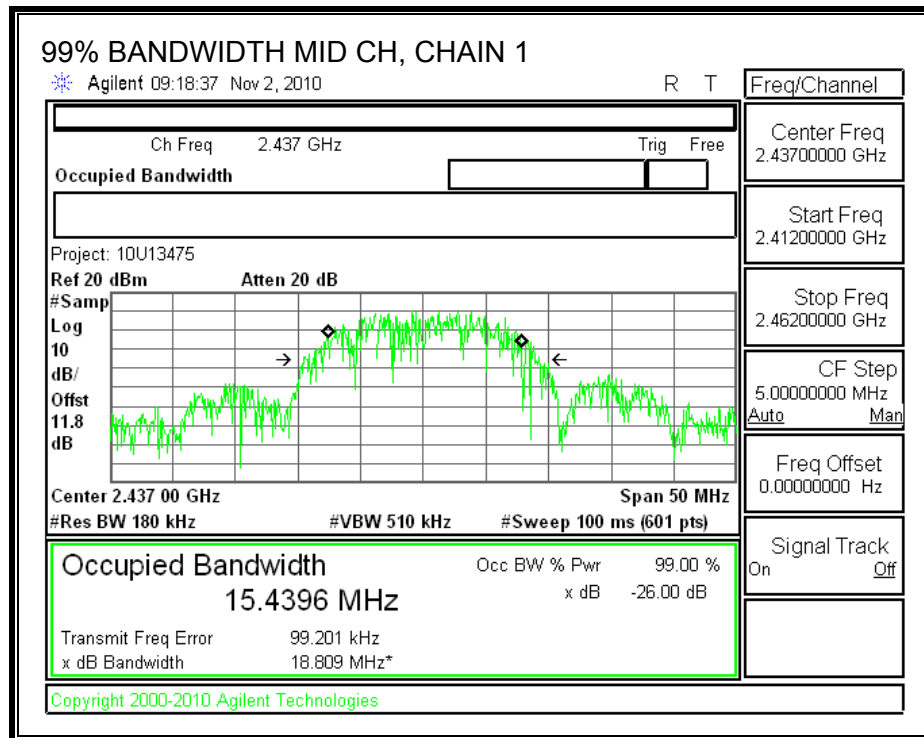
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

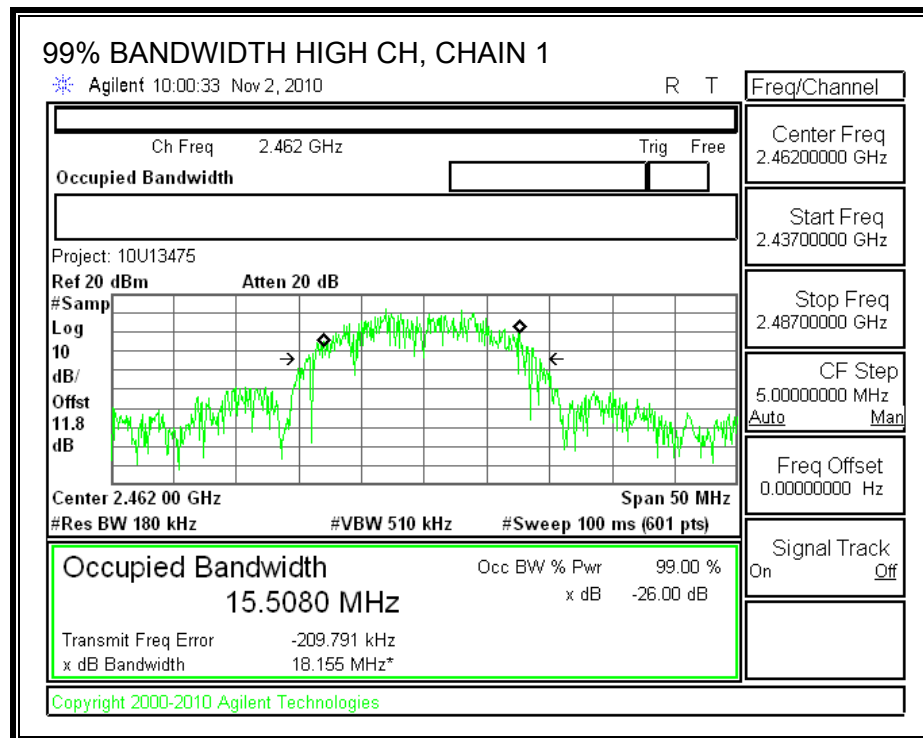
RESULTS

| Channel | Frequency (MHz) | Chain 1 99% Bandwidth (MHz) | Chain 2 99% Bandwidth (MHz) | Chain 3 99% Bandwidth (MHz) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Low | 2412 | 15.4084 | 15.2891 | 15.4185 |
| Middle | 2437 | 15.4396 | 15.4592 | 15.4351 |
| High | 2462 | 15.5080 | 15.5283 | 15.4383 |

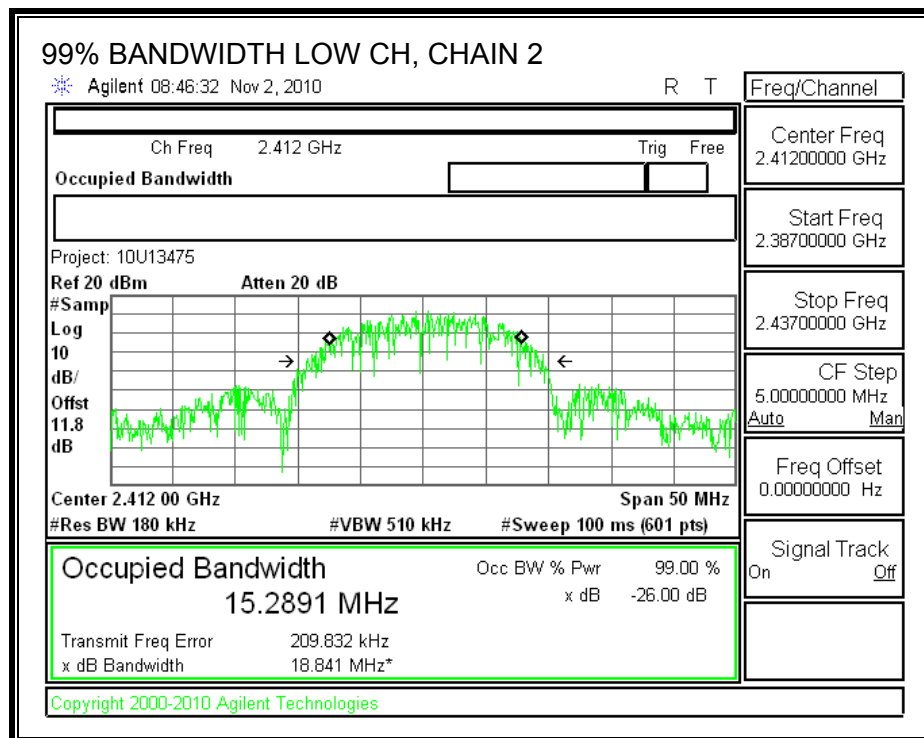
99% BANDWIDTH, CHAIN 1

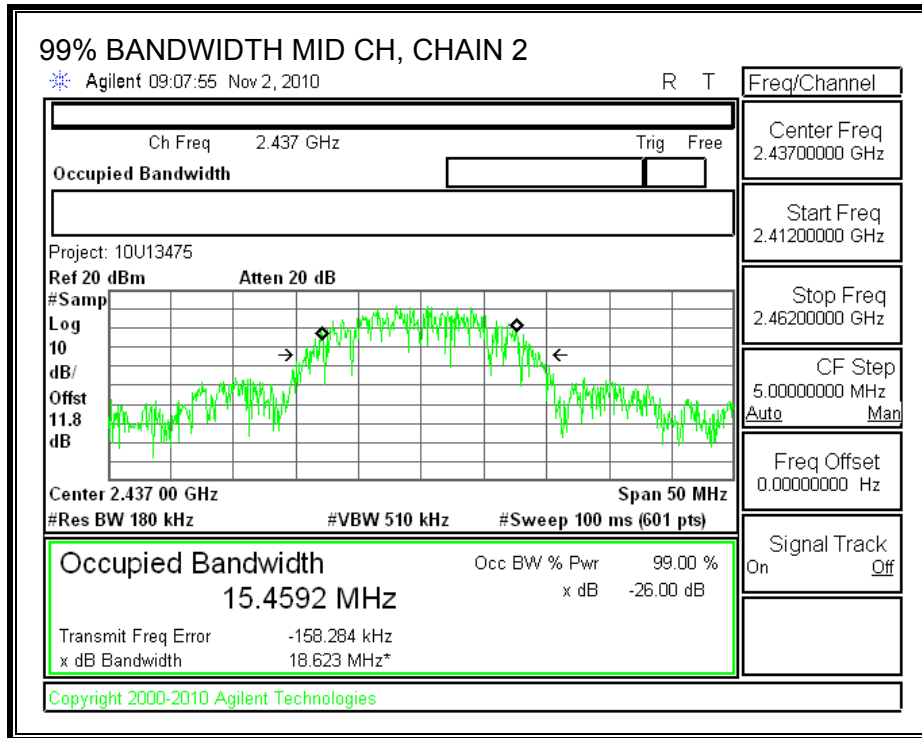


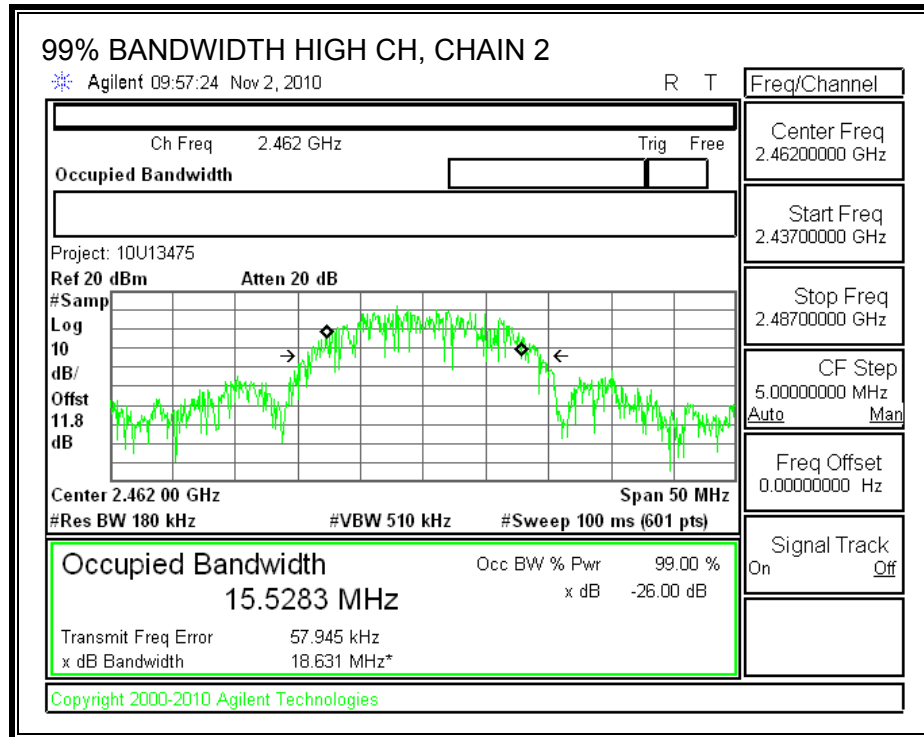




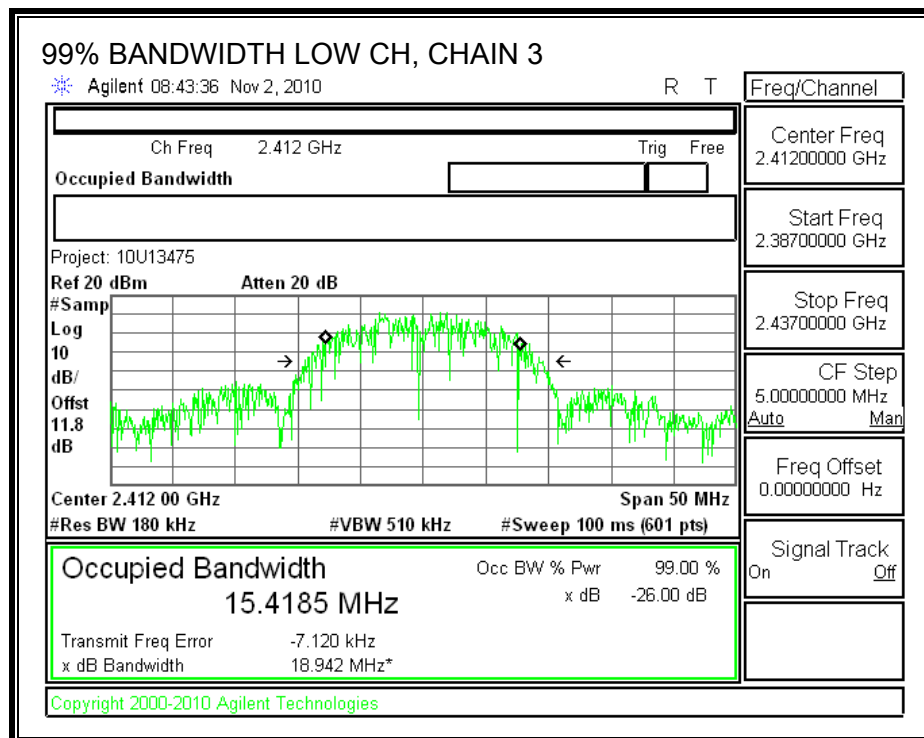
99% BANDWIDTH, CHAIN 2

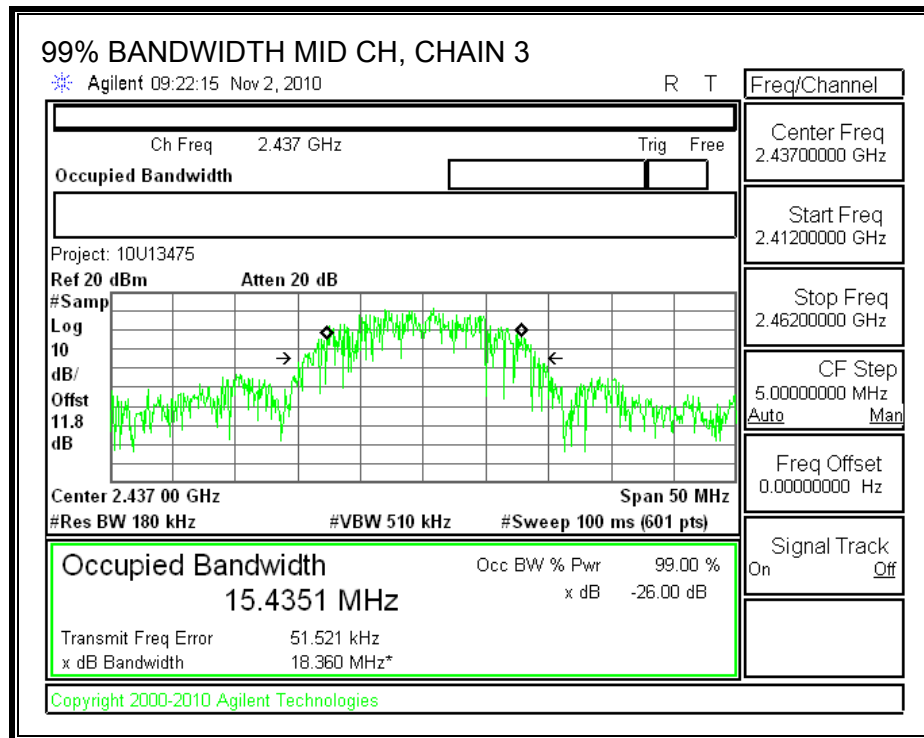


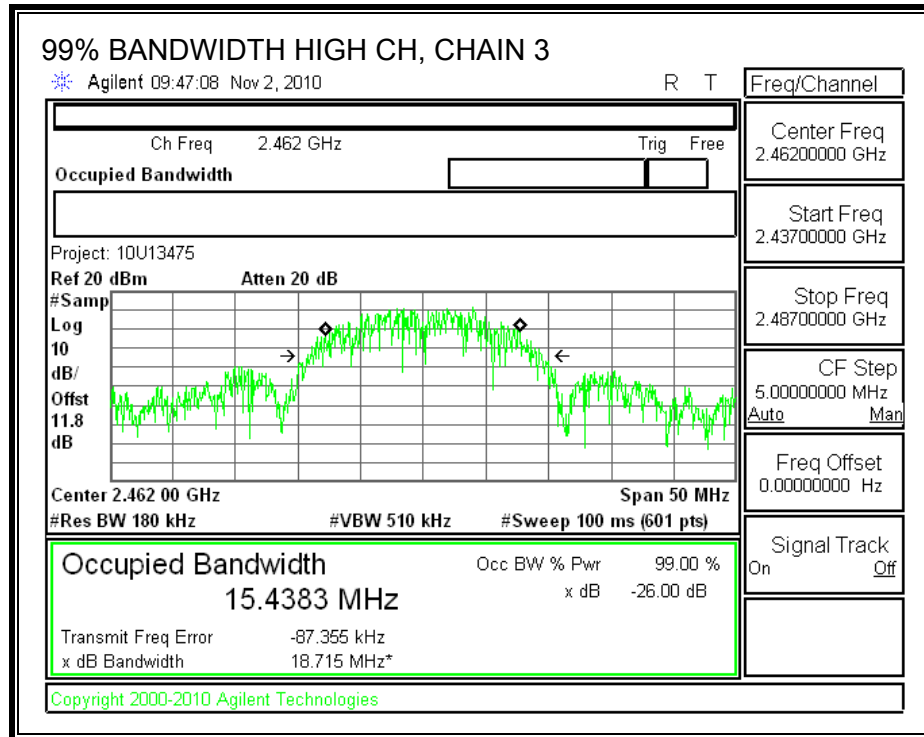




99% BANDWIDTH, CHAIN 3







7.1.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

| Antenna Gain (dBi) | 10 Log (# Tx Chains) (dB) | Effective Legacy Gain (dBi) |
|--------------------|---------------------------|-----------------------------|
| 5 | 4.77 | 9.77 |

The maximum effective legacy gain is 9.77 dBi; therefore the limit is 26.23 dBm.

TEST PROCEDURE

Peak power is measured using a wide bandwidth peak power meter.

RESULTS

| Channel | Frequency (MHz) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Chain 3 Power (dBm) | Attenuator + Cable Loss (dB) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|---------------------|---------------------|---------------------|------------------------------|-------------------|-------------|-------------|
| Low | 2412 | 9.81 | 9.69 | 8.98 | 10.80 | 25.08 | 26.23 | -1.15 |
| Mid | 2437 | 10.11 | 11.24 | 10.43 | 10.80 | 26.19 | 26.23 | -0.04 |
| High | 2462 | 6.42 | 6.96 | 6.89 | 10.80 | 22.33 | 26.23 | -3.90 |

7.1.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 10.8 dB (including 10 dB pad and 0.8 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency (MHz) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Chain 3 Power (dBm) | Total Power (dBm) |
|---------|--------------------|------------------------|------------------------|------------------------|----------------------|
| Low | 2412 | 17.79 | 17.63 | 17.21 | 22.32 |
| Middle | 2437 | 18.47 | 20.31 | 18.68 | 24.01 |
| High | 2462 | 14.65 | 15.05 | 15.12 | 19.72 |

7.1.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

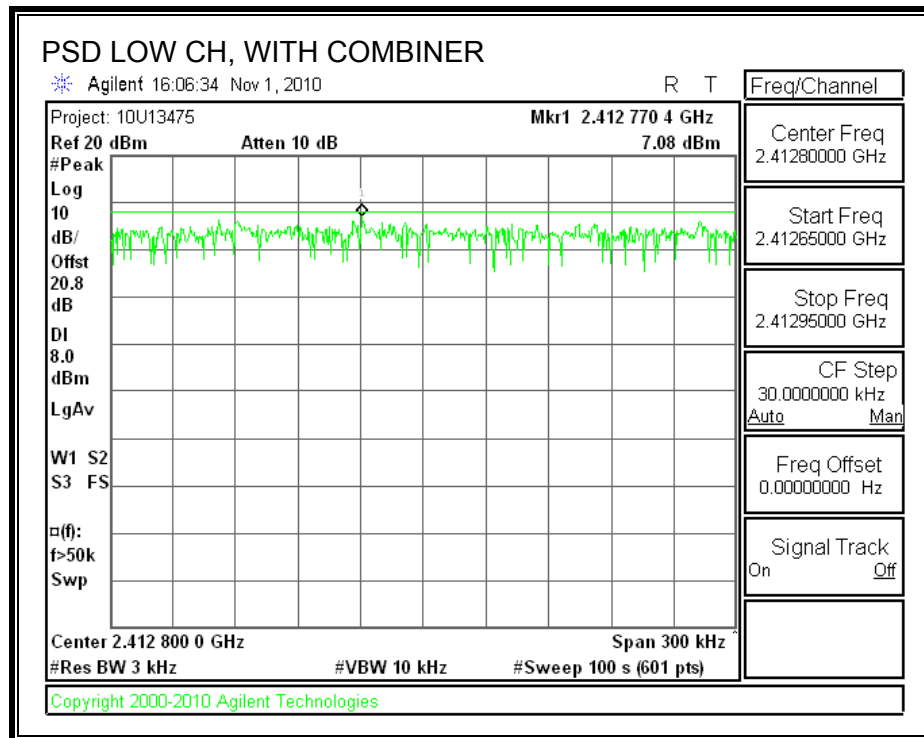
TEST PROCEDURE

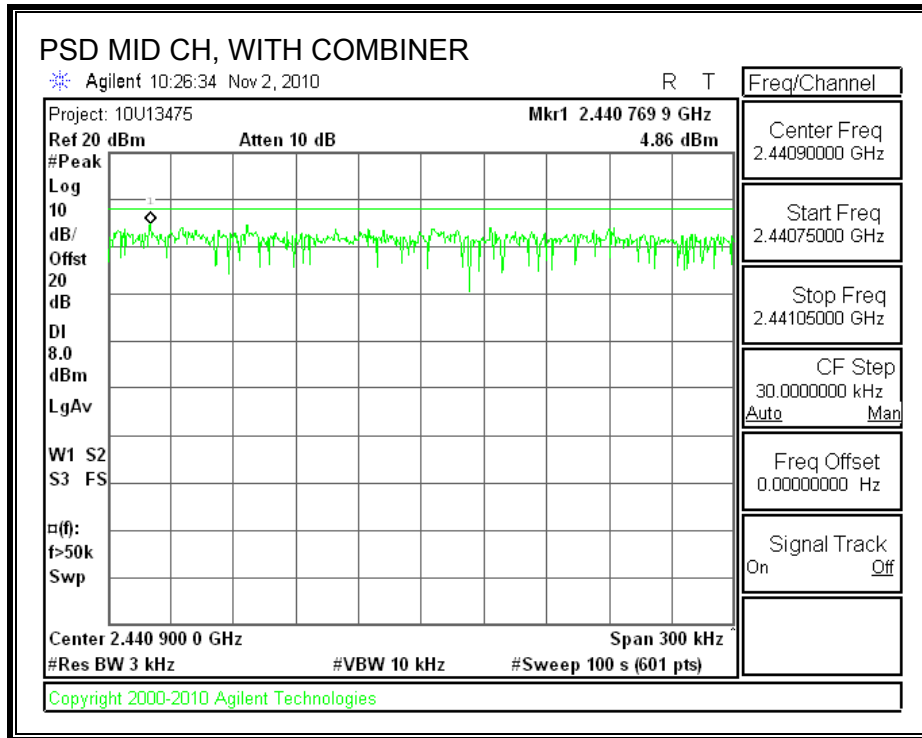
Output power was measured using a Peak Power Meter, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

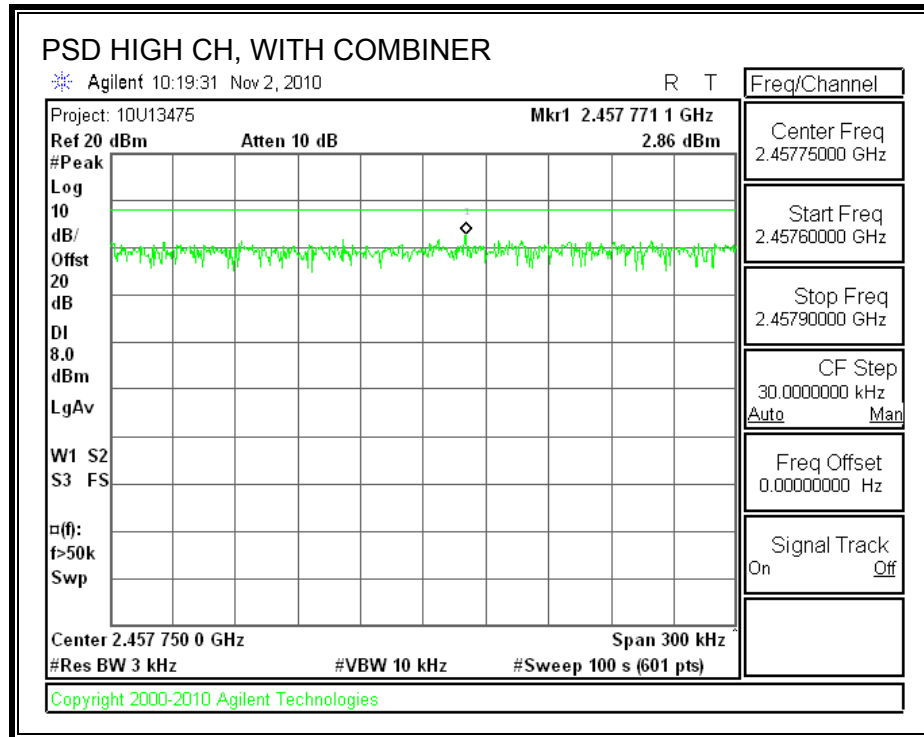
RESULTS

| Channel | Frequency (MHz) | PSD with Combiner (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|----------------------------|----------------|----------------|
| Low | 2412 | 7.08 | 8 | -0.92 |
| Middle | 2437 | 4.86 | 8 | -3.14 |
| High | 2462 | 2.86 | 8 | -5.14 |

POWER SPECTRAL DENSITY, WITH COMBINER







7.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of Peak Power using wideband power meter; therefore the required attenuation is 20 dB.

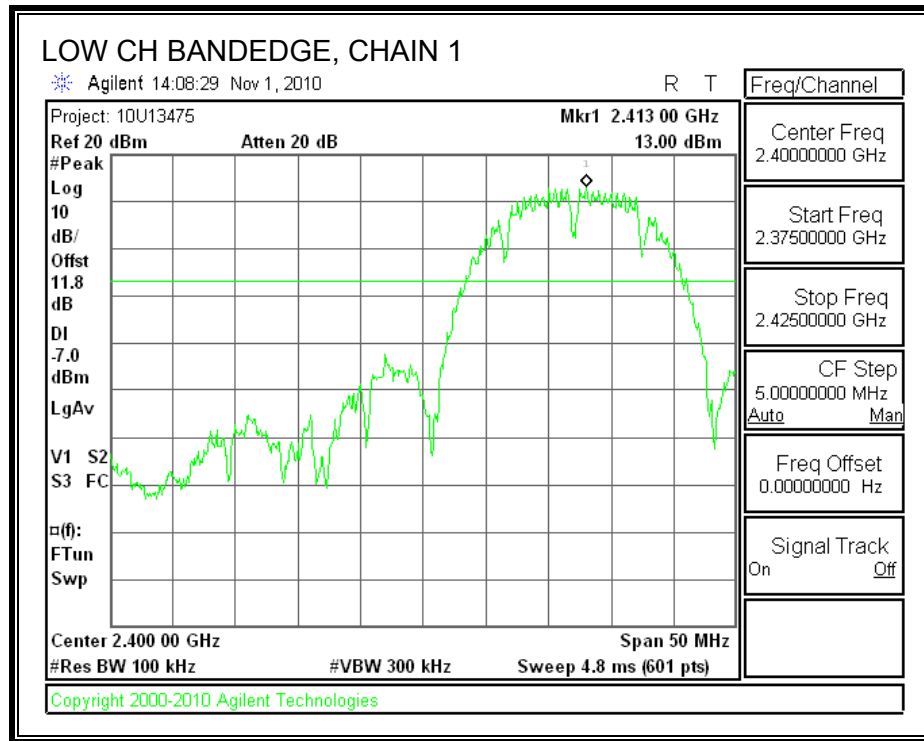
TEST PROCEDURE

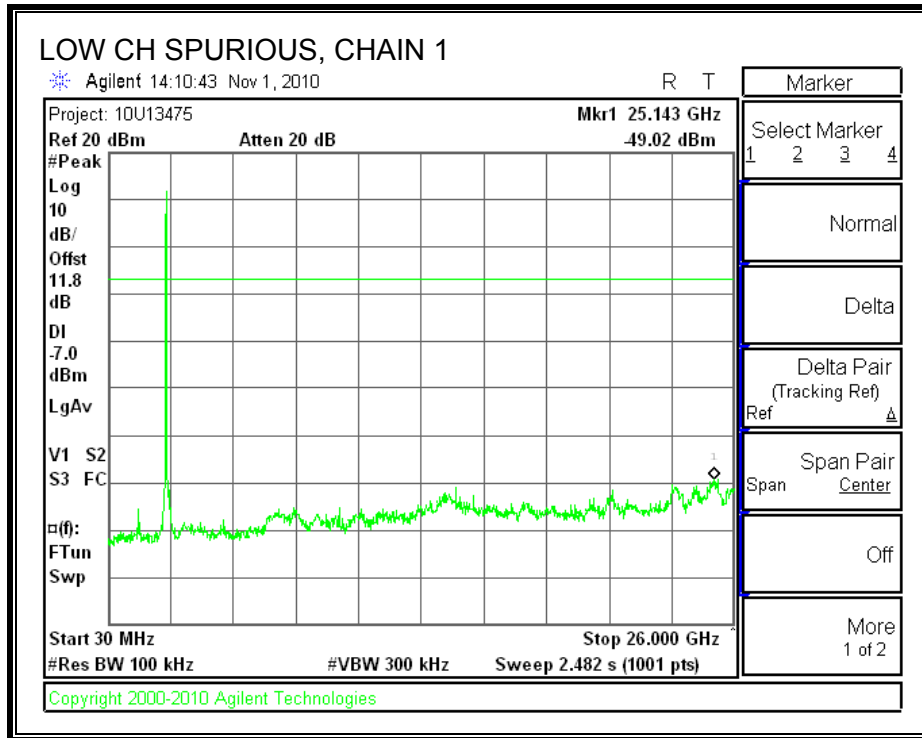
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

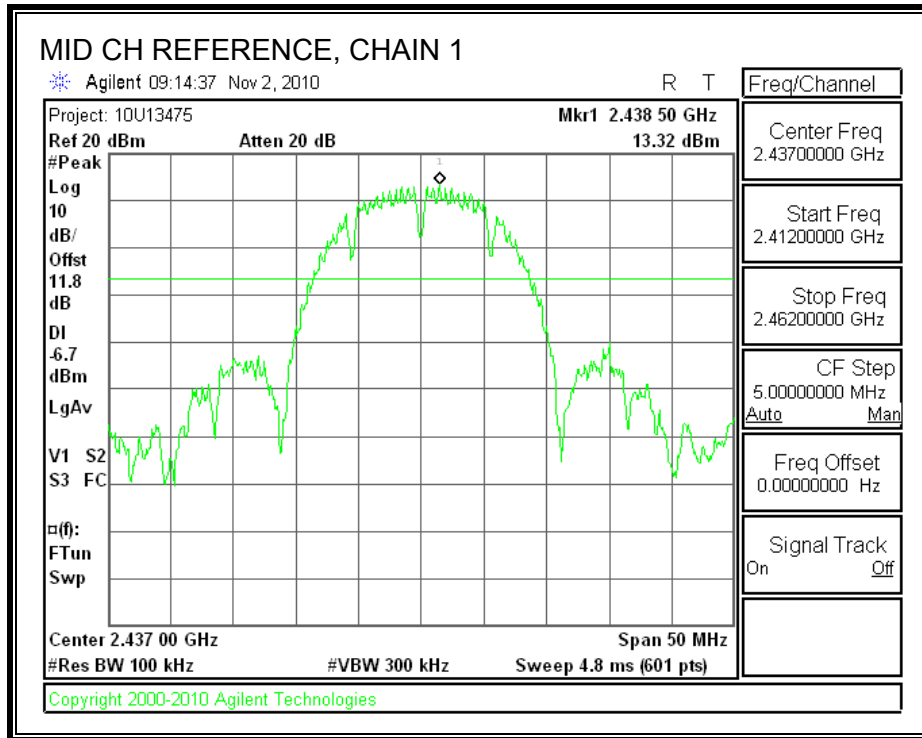
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

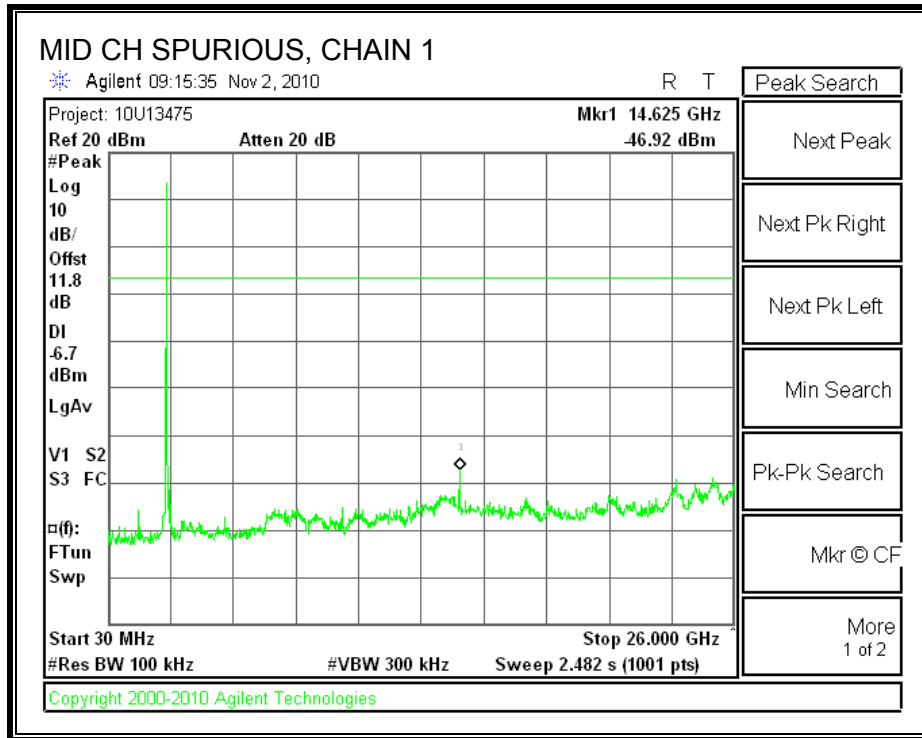
RESULTS

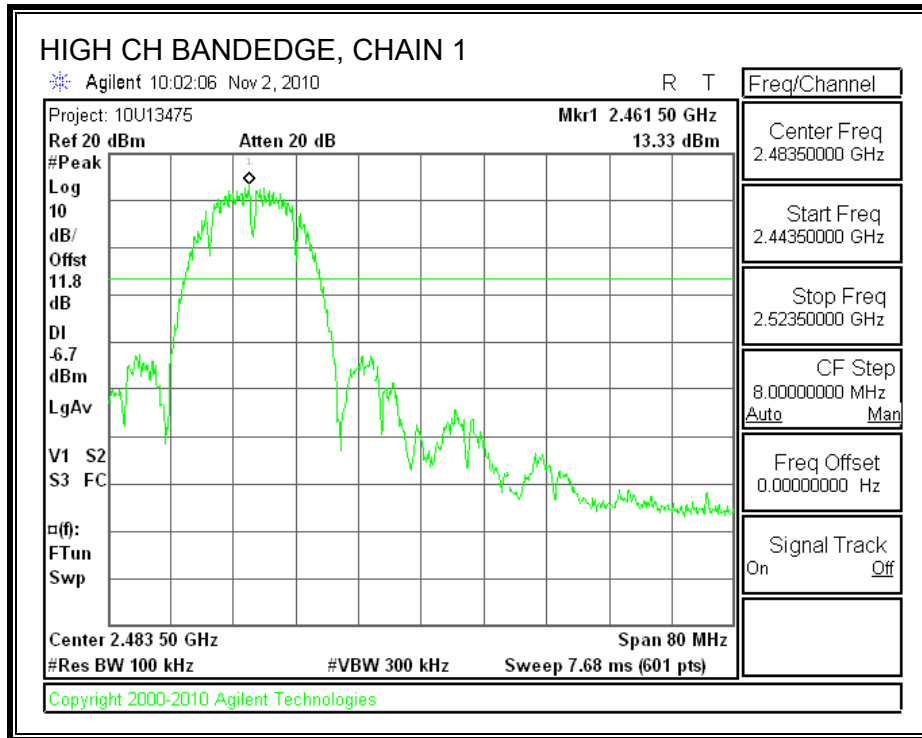
CHAIN 1 SPURIOUS EMISSIONS

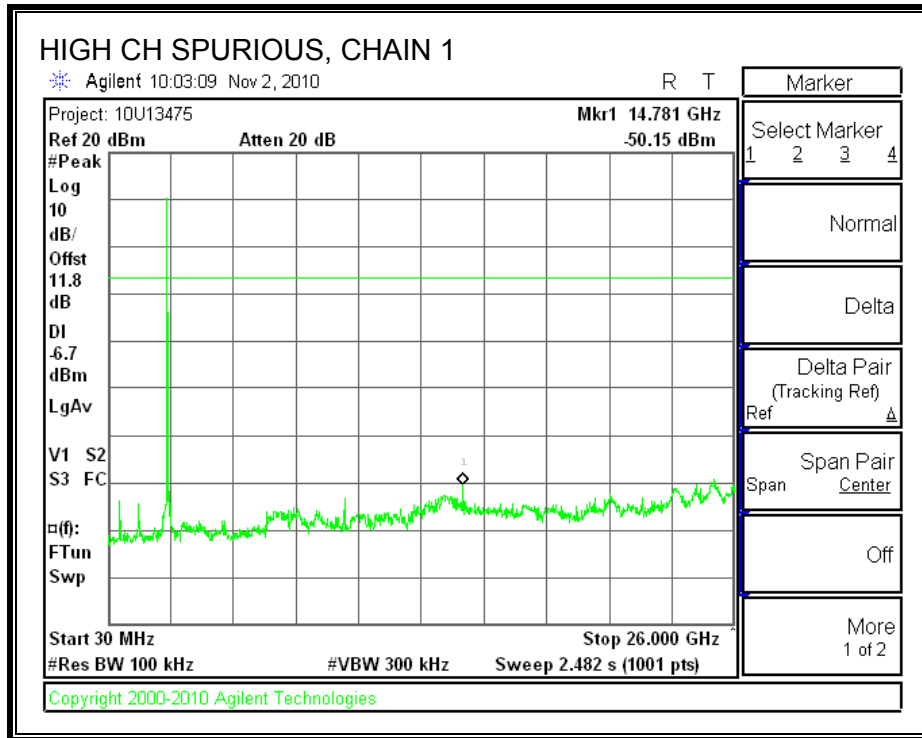




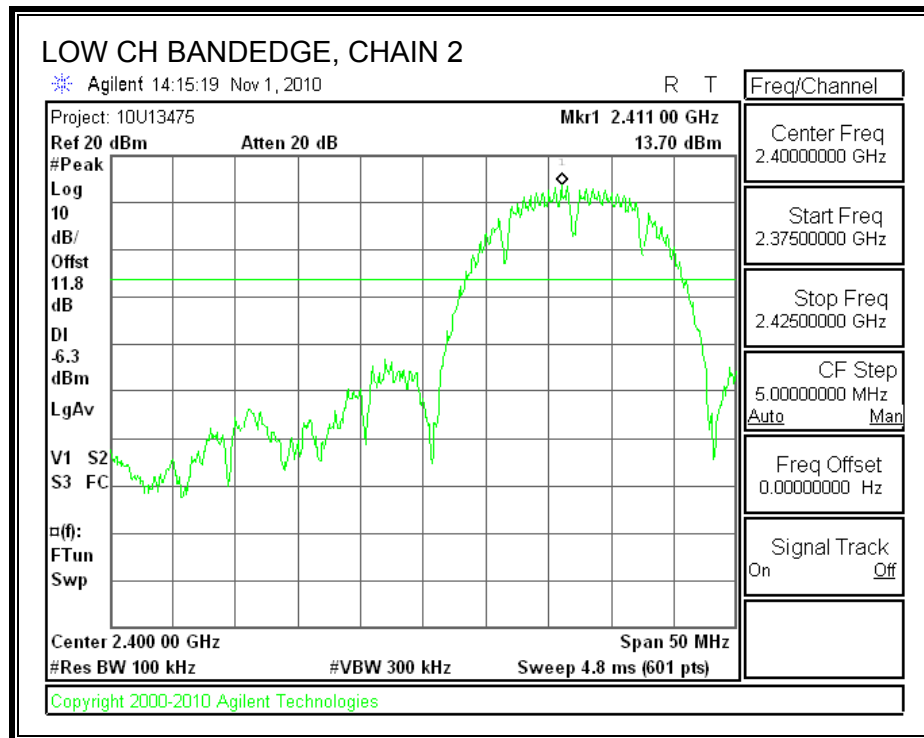


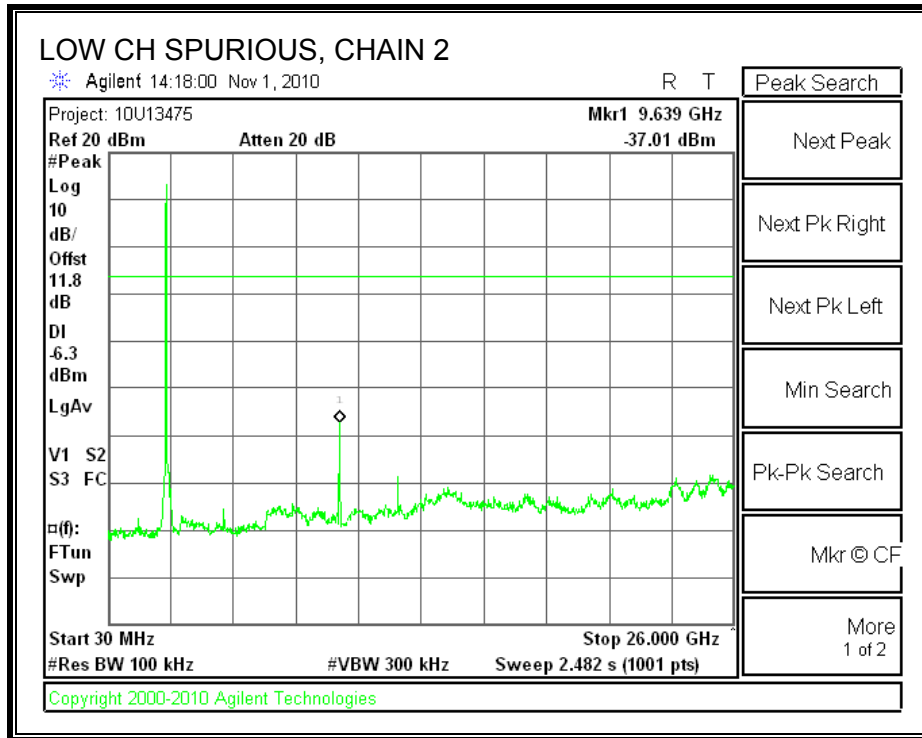


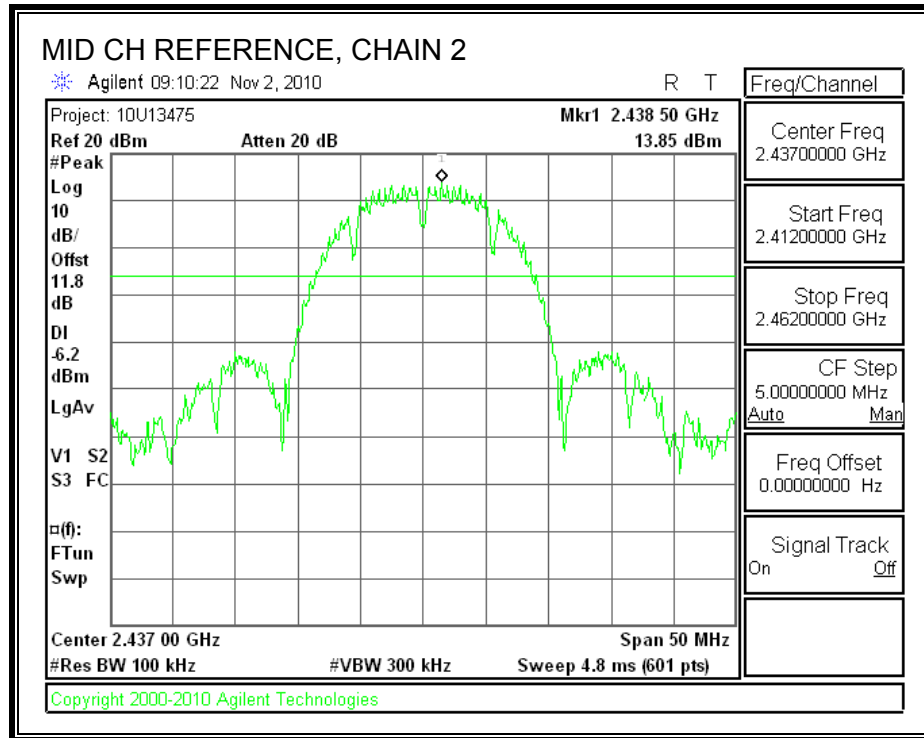


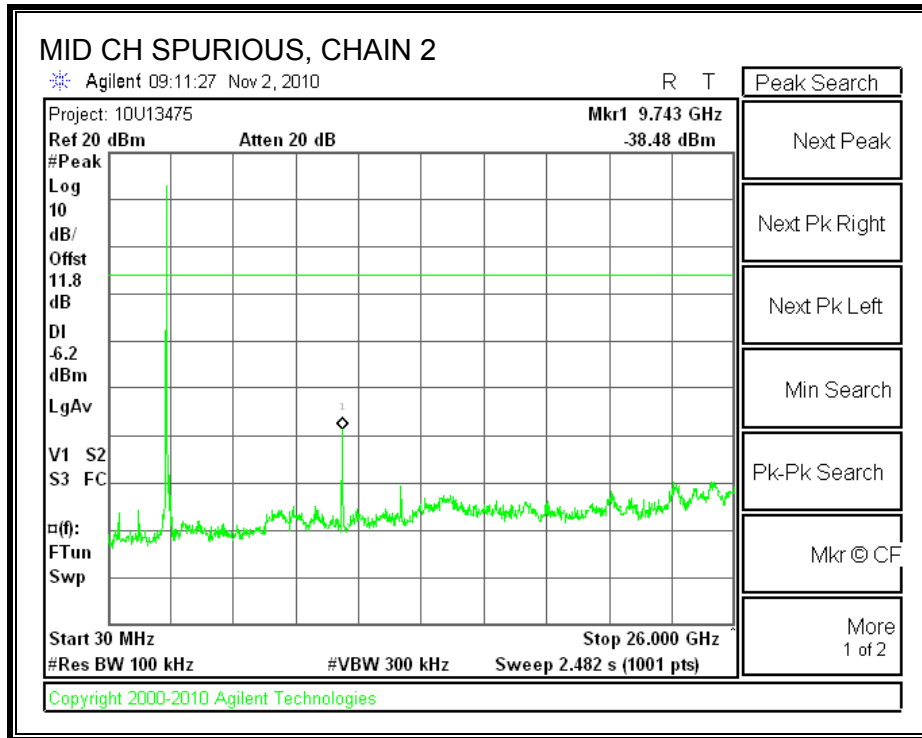


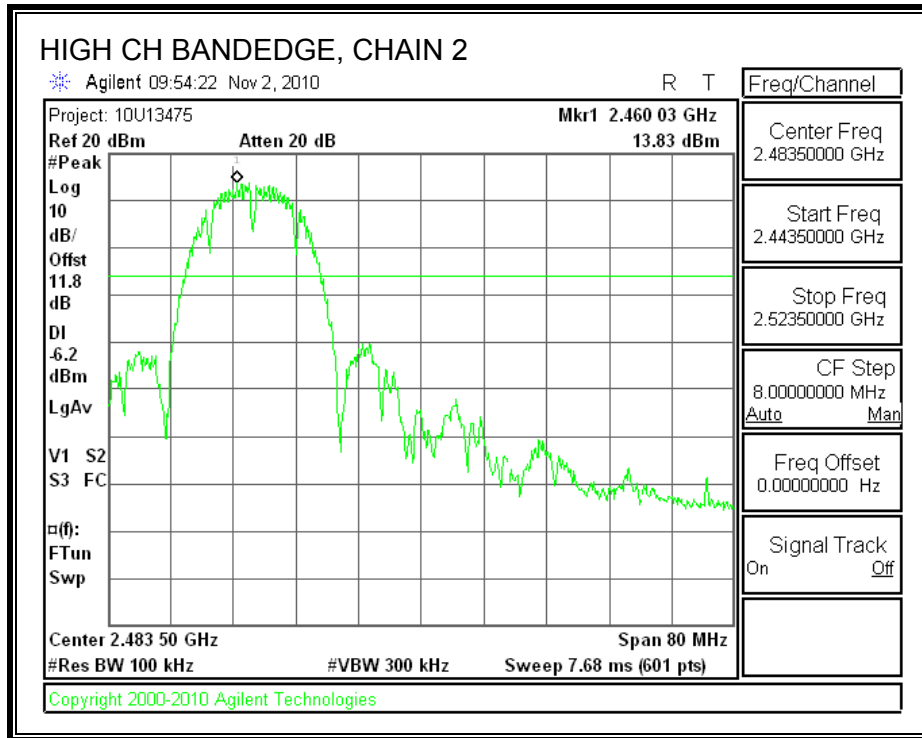
CHAIN 2 SPURIOUS EMISSIONS

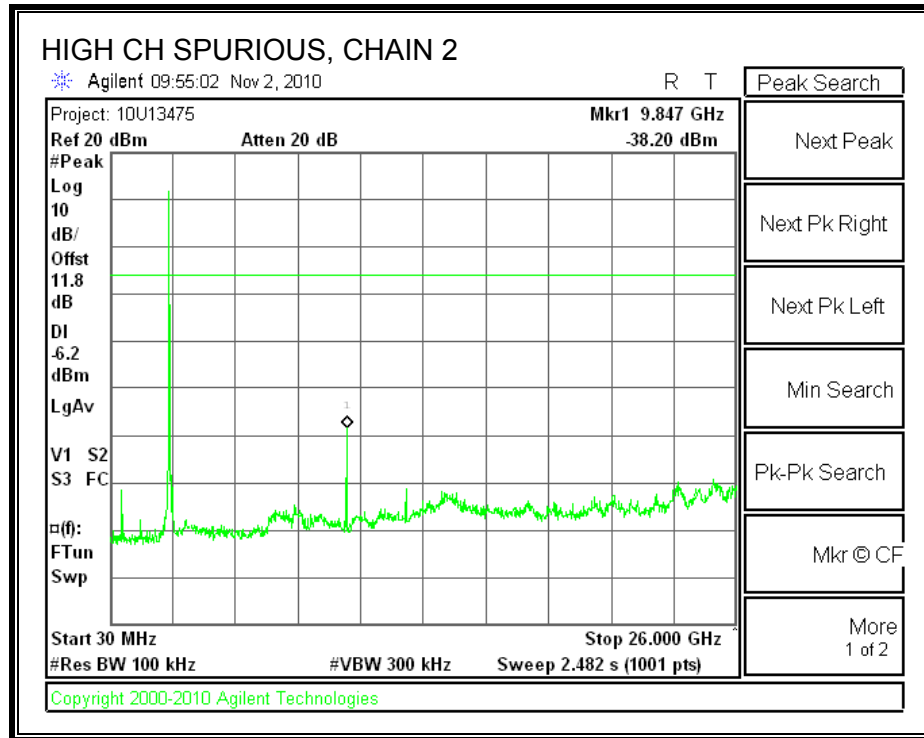




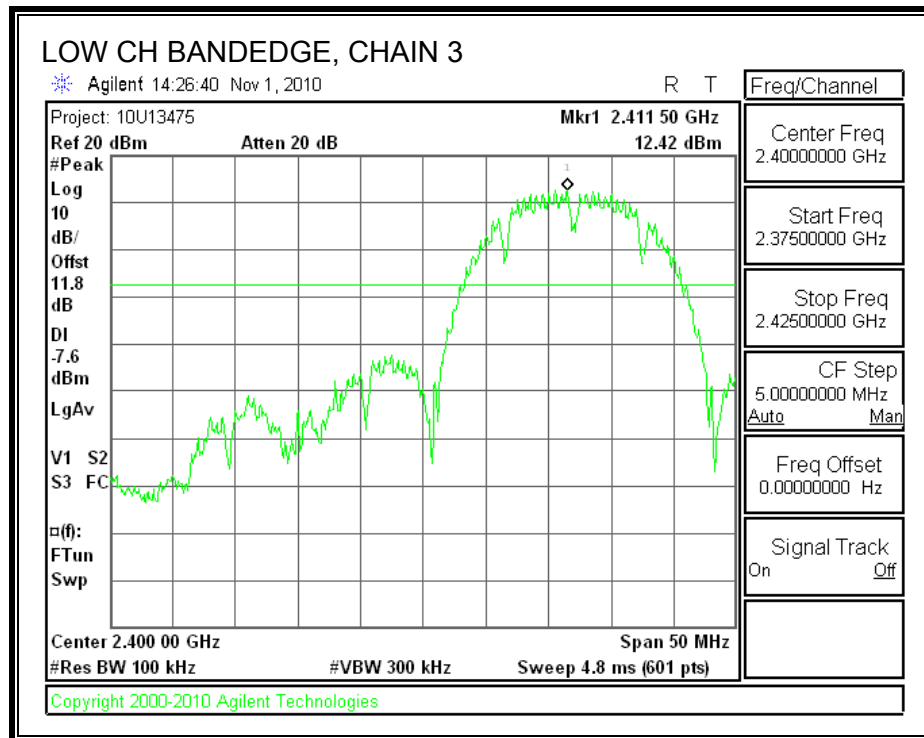


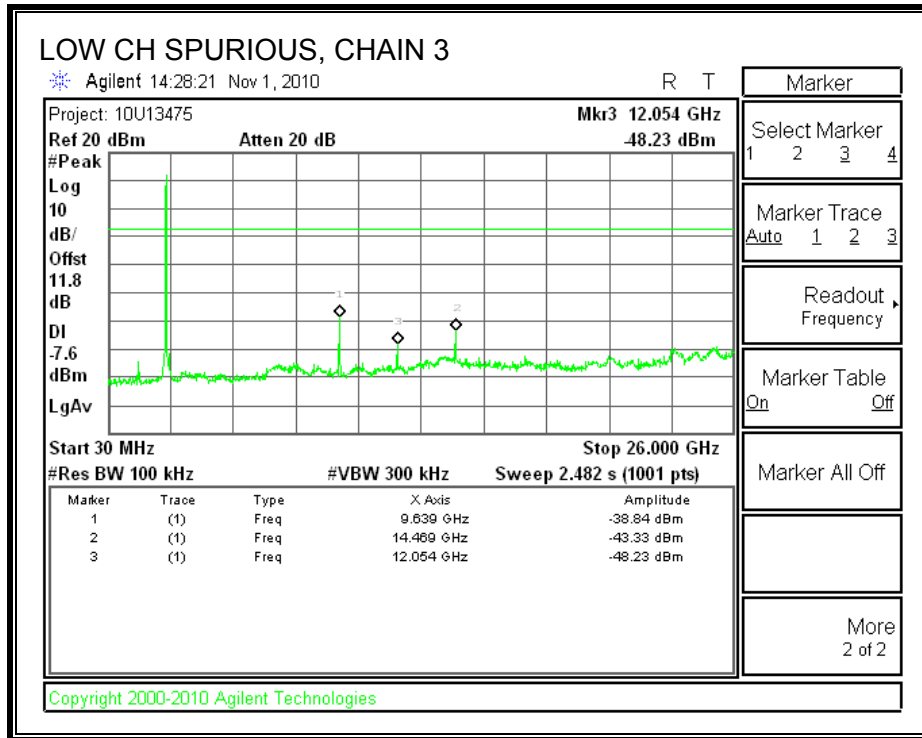


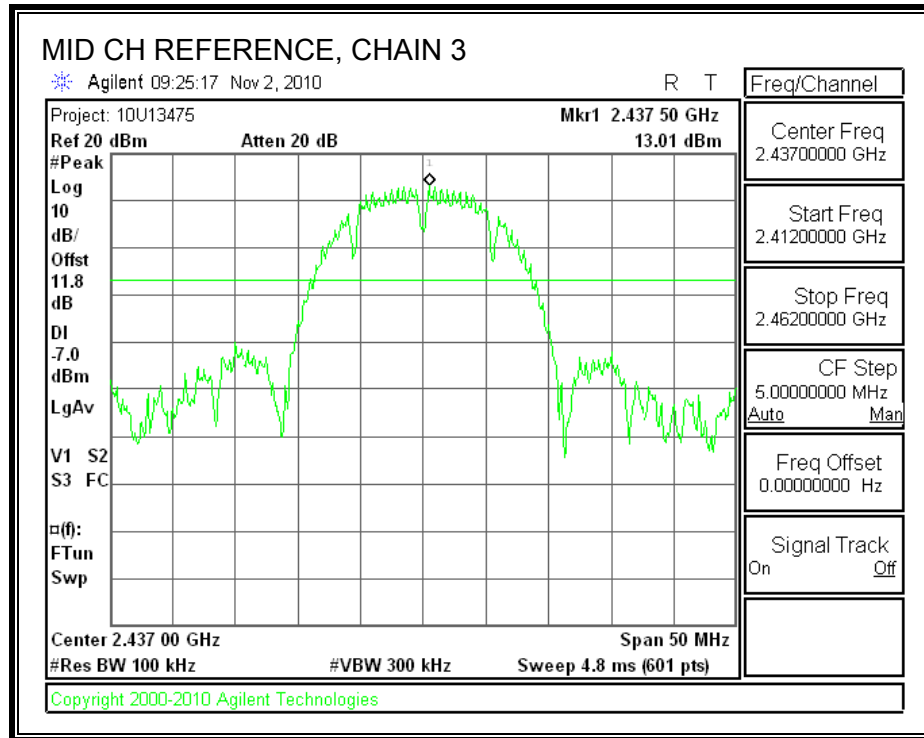


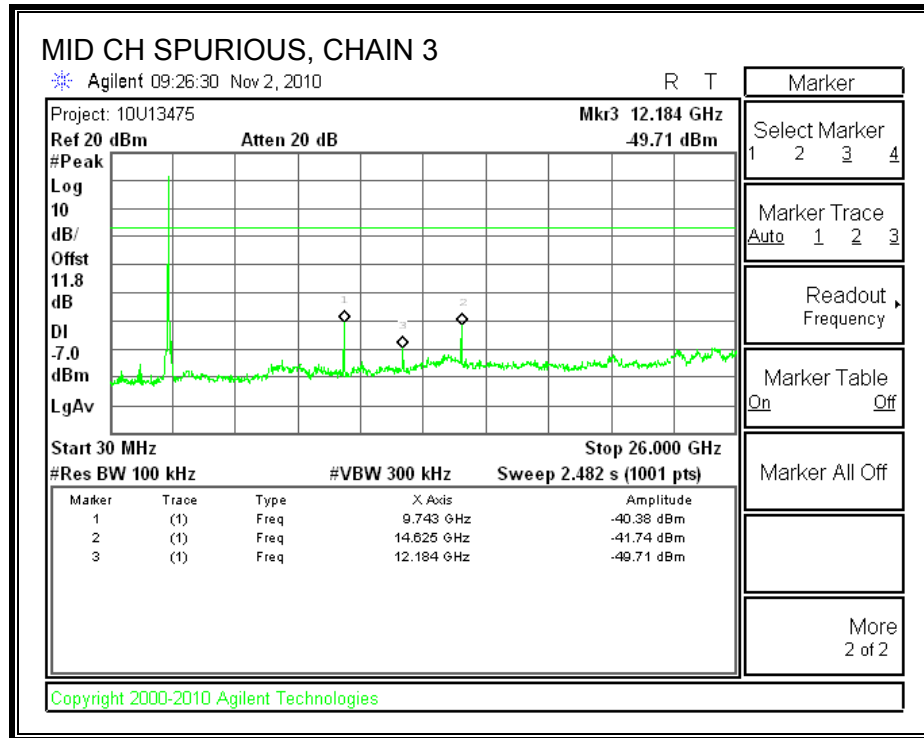


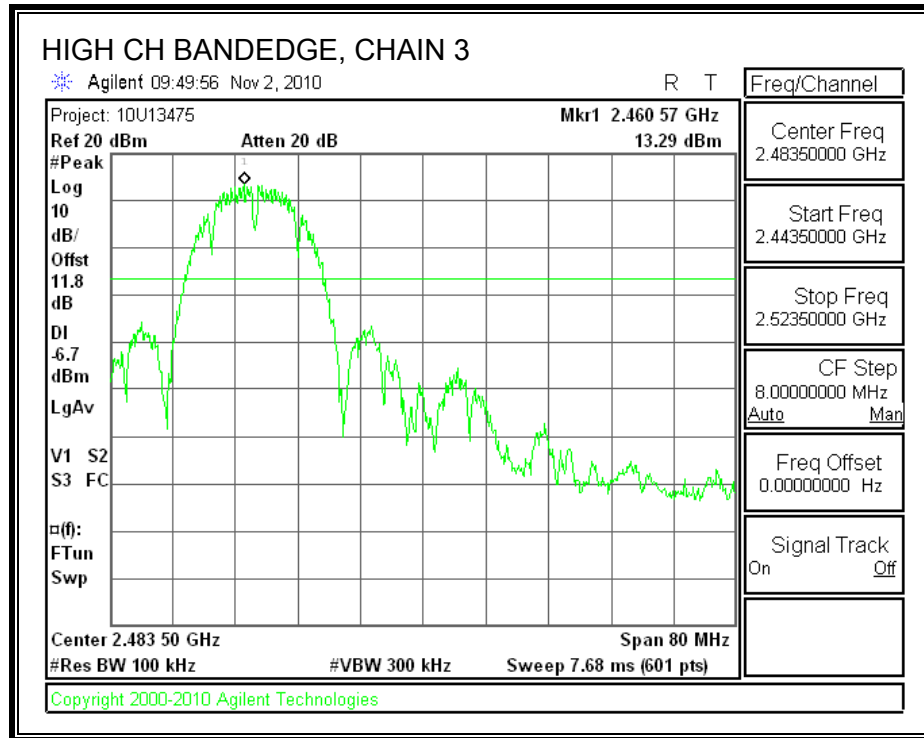
CHAIN 3 SPURIOUS EMISSIONS

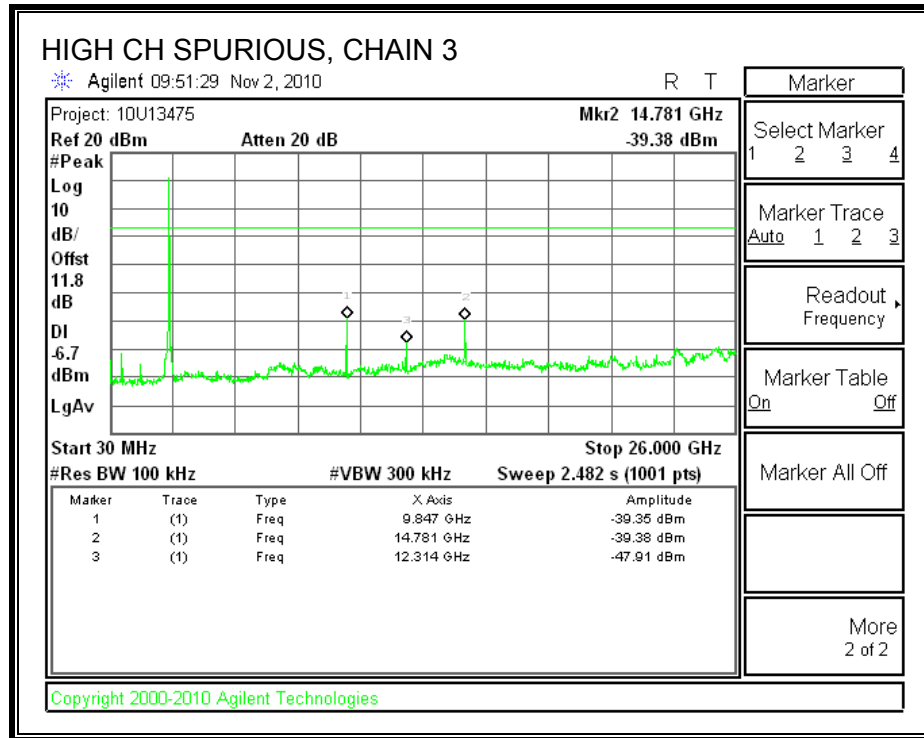












7.2. 802.11g THREE CHAINS LEGACY MODE IN THE 2.4 GHz BAND

7.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

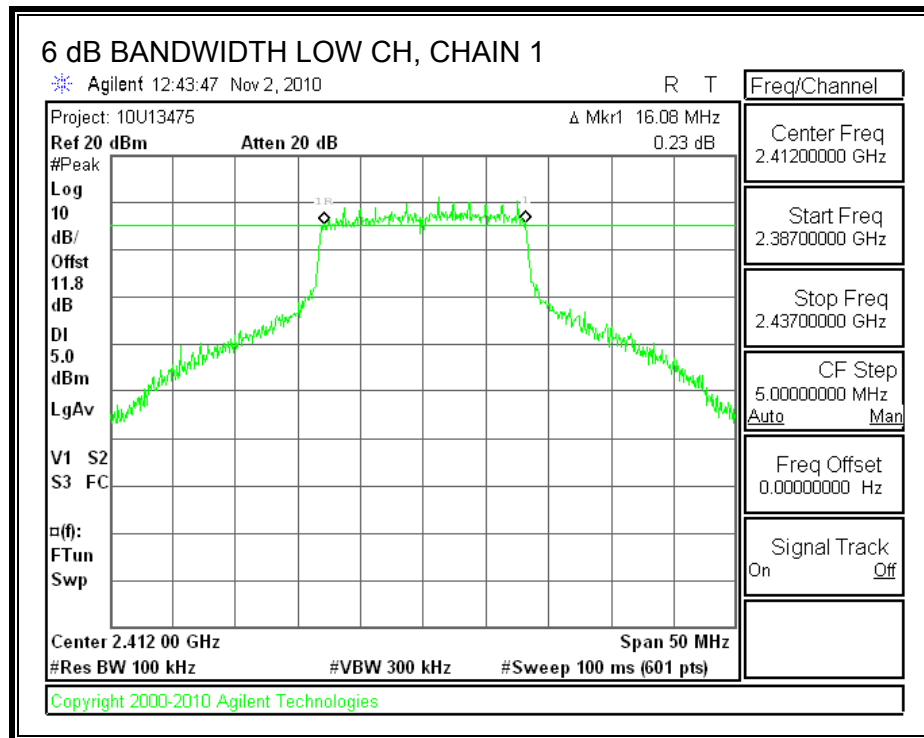
TEST PROCEDURE

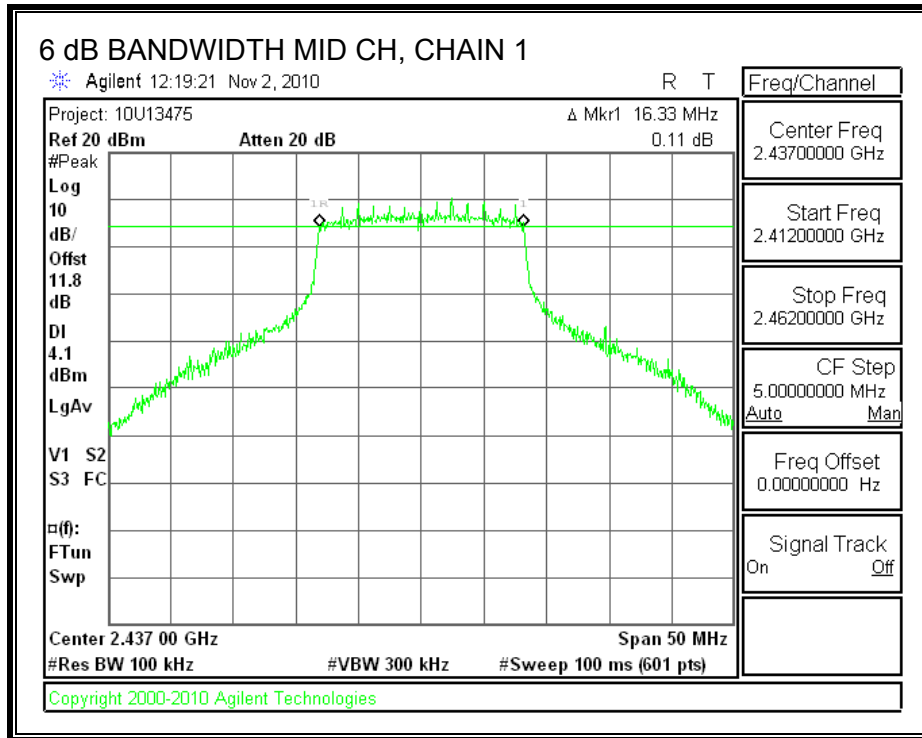
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

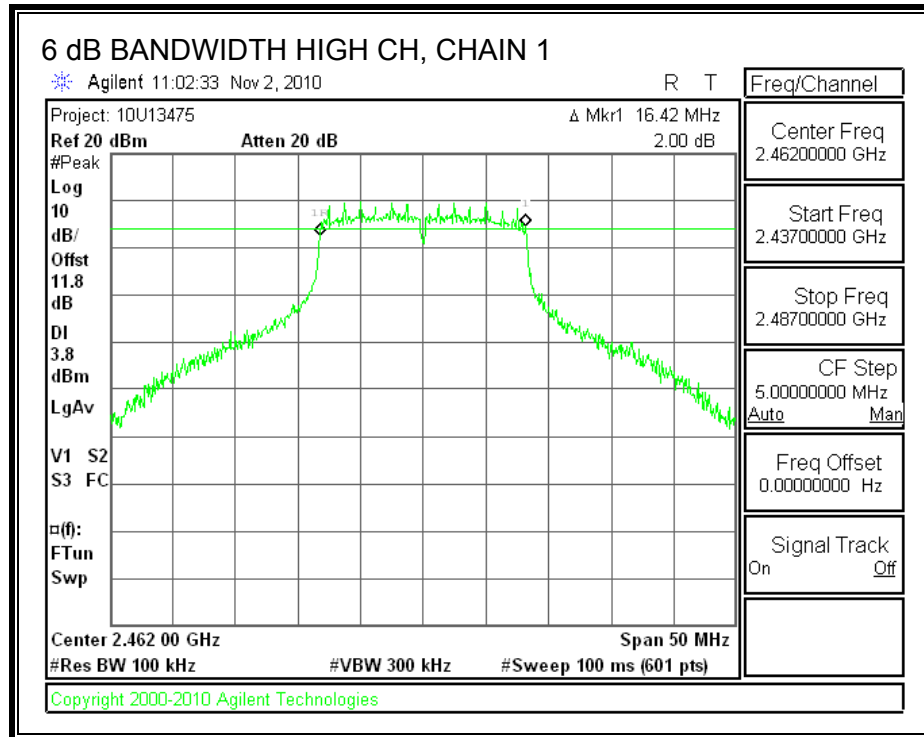
RESULTS

| Channel | Frequency (MHz) | Chain 1 6 dB BW (MHz) | Chain 2 6 dB BW (MHz) | Chain 3 6 dB BW (MHz) | Minimum Limit (MHz) |
|---------|--------------------|-----------------------------|-----------------------------|-----------------------------|------------------------|
| Low | 2412 | 16.08 | 16.08 | 16.42 | 0.5 |
| Middle | 2437 | 16.33 | 16.33 | 15.42 | 0.5 |
| High | 2462 | 16.42 | 16.42 | 16.33 | 0.5 |

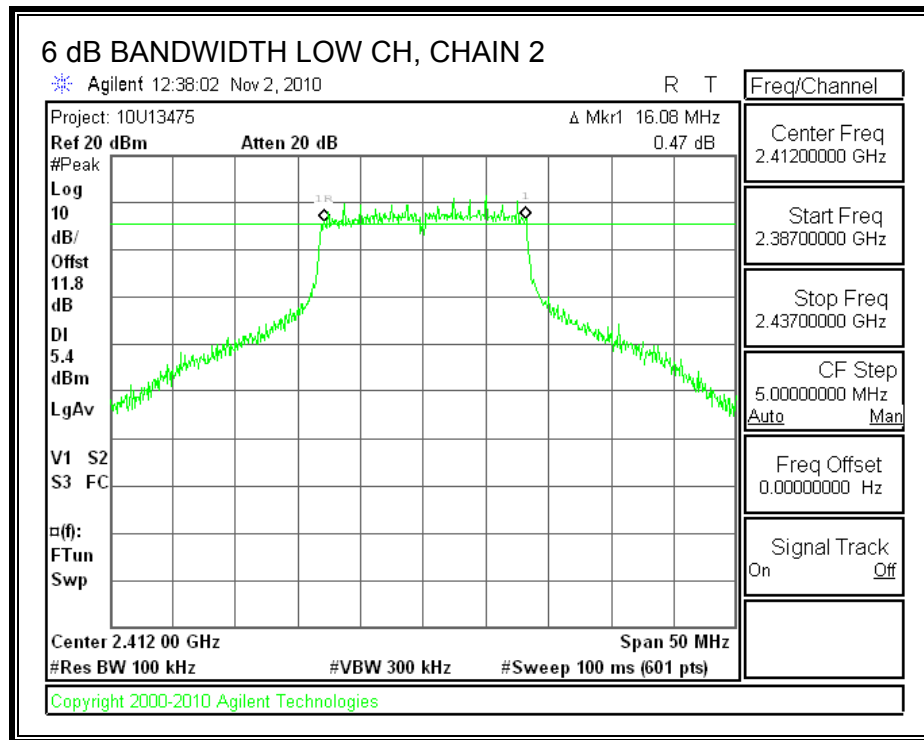
6 dB BANDWIDTH, CHAIN 1

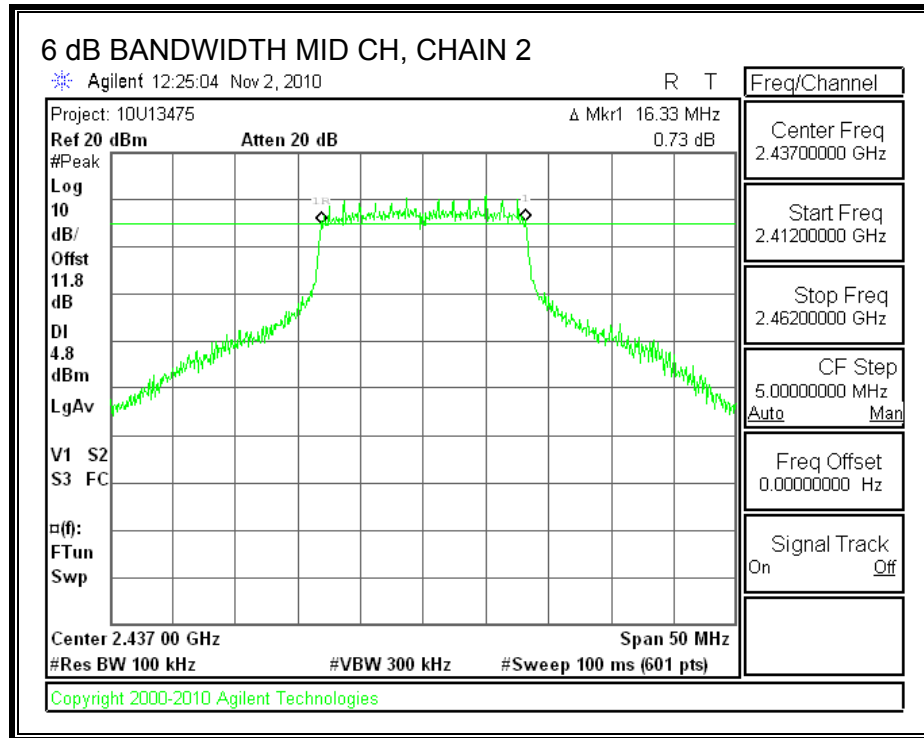


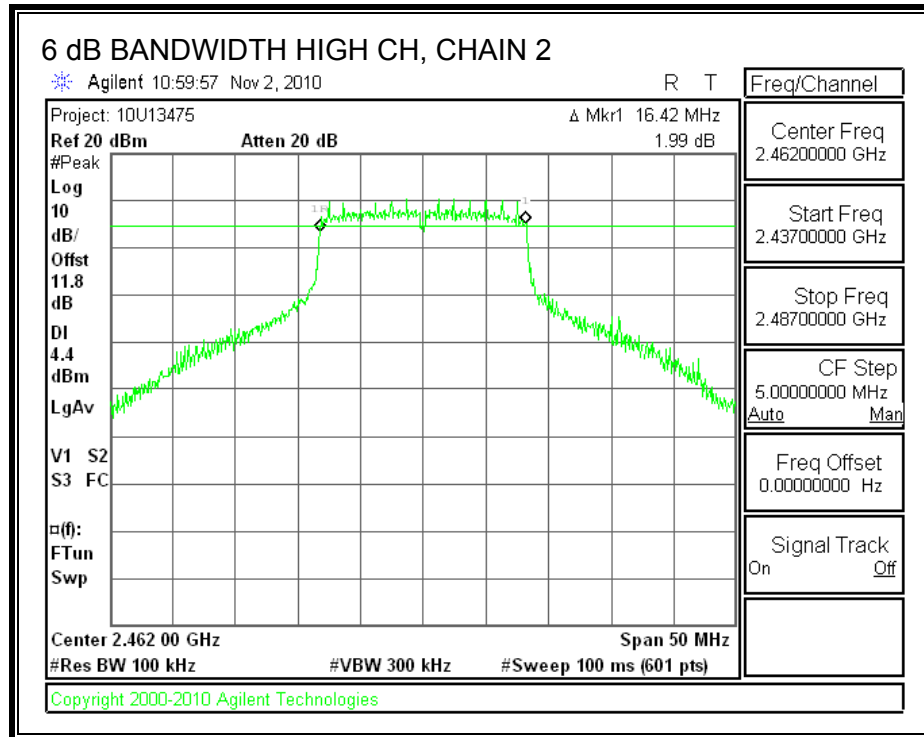




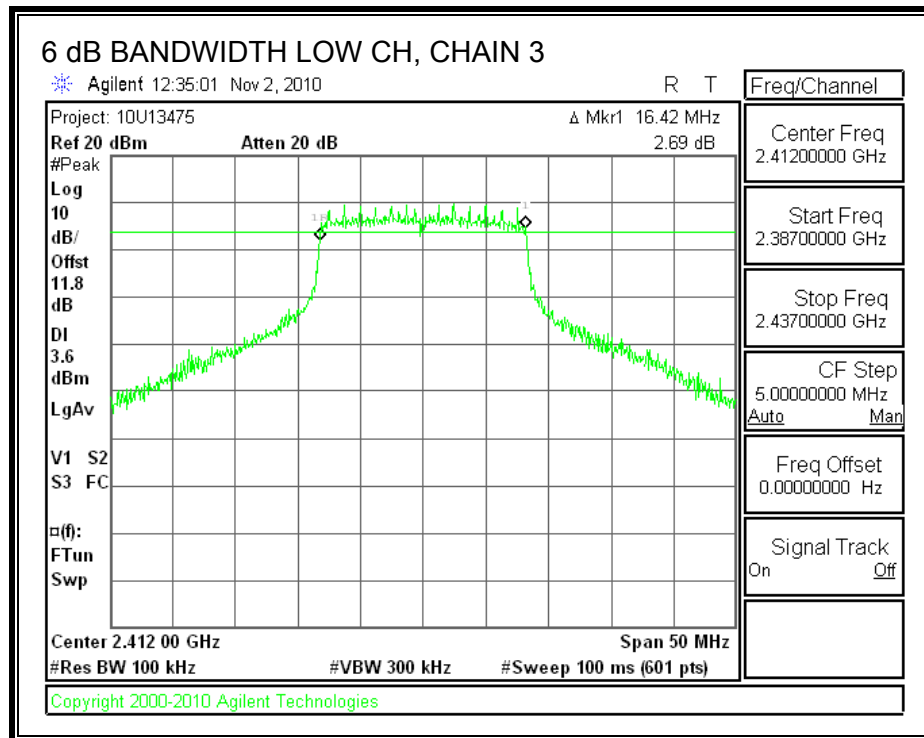
6 dB BANDWIDTH, CHAIN 2

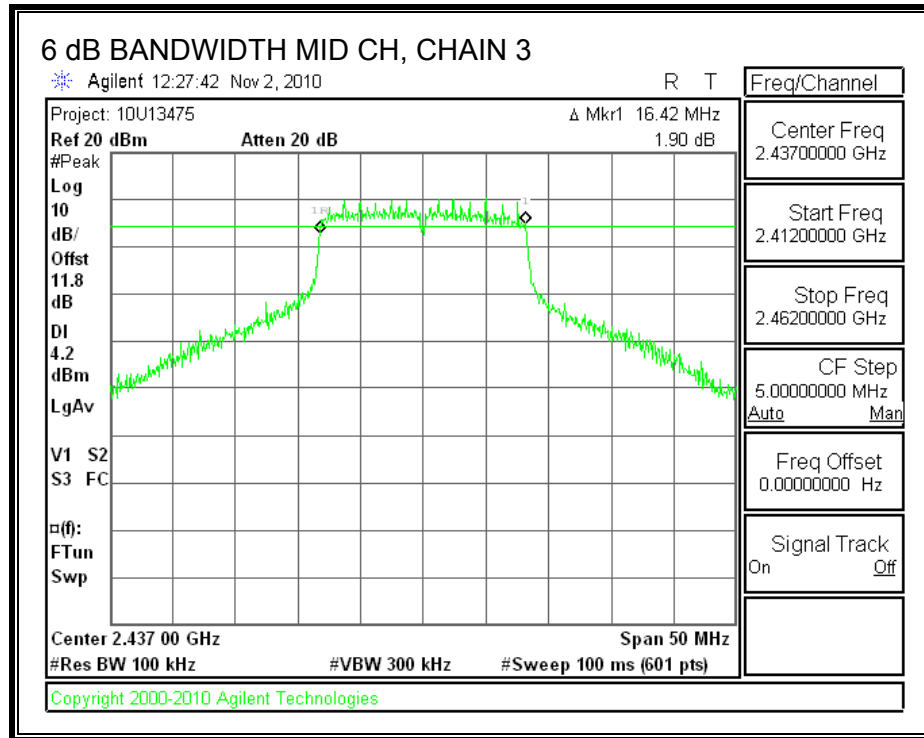


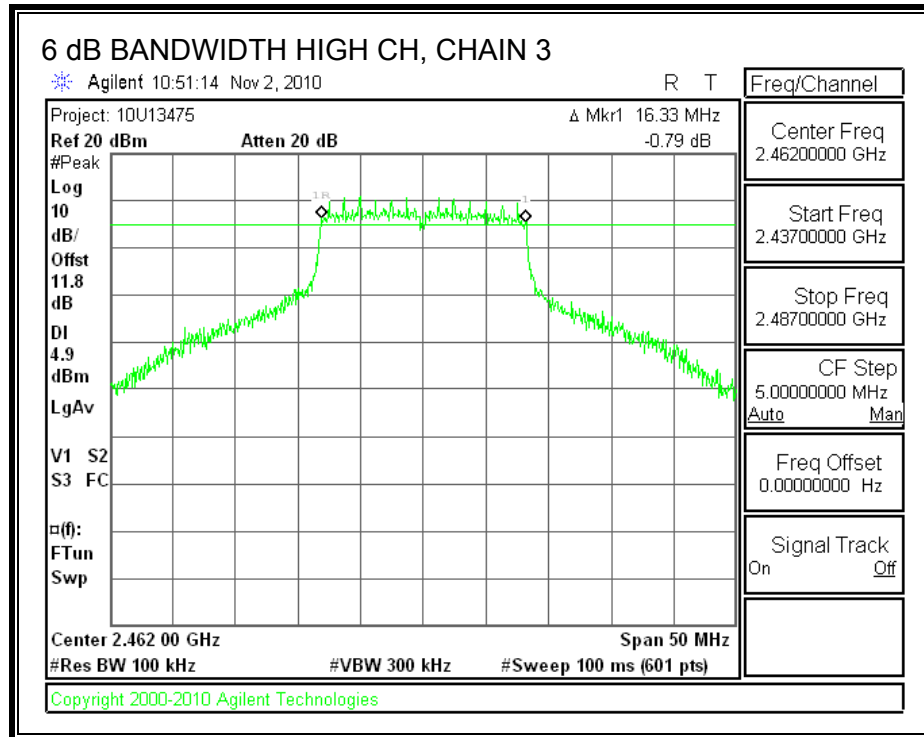




6 dB BANDWIDTH, CHAIN 3







7.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

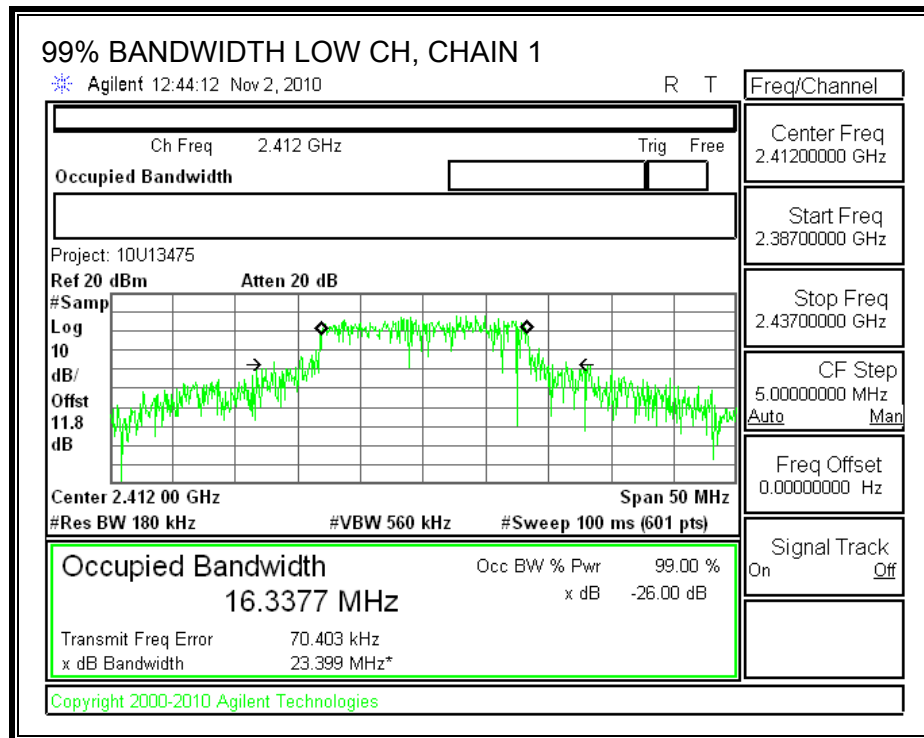
TEST PROCEDURE

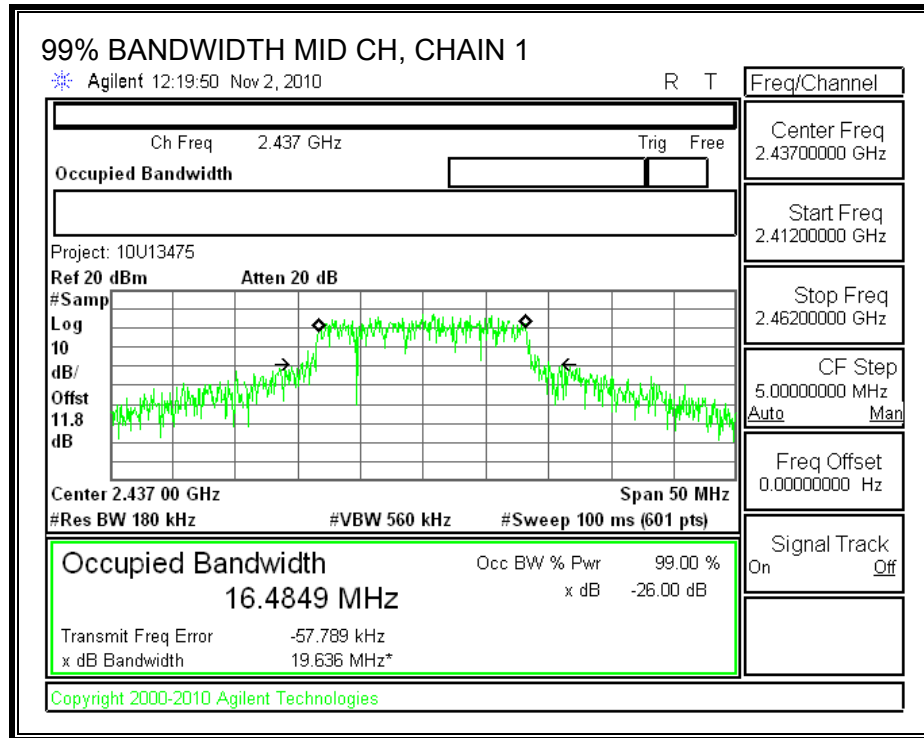
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

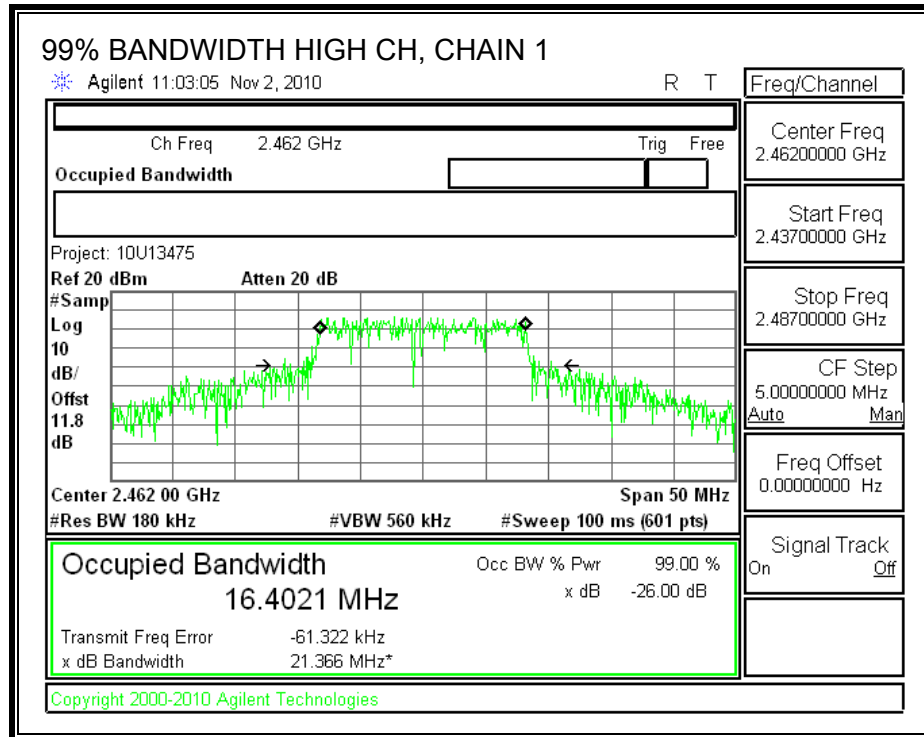
RESULTS

| Channel | Frequency (MHz) | Chain 1 99% Bandwidth (MHz) | Chain 2 99% Bandwidth (MHz) | Chain 3 99% Bandwidth (MHz) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Low | 2412 | 16.3377 | 16.3695 | 16.4462 |
| Middle | 2437 | 16.4849 | 16.4097 | 16.4073 |
| High | 2462 | 16.4021 | 16.4962 | 16.4529 |

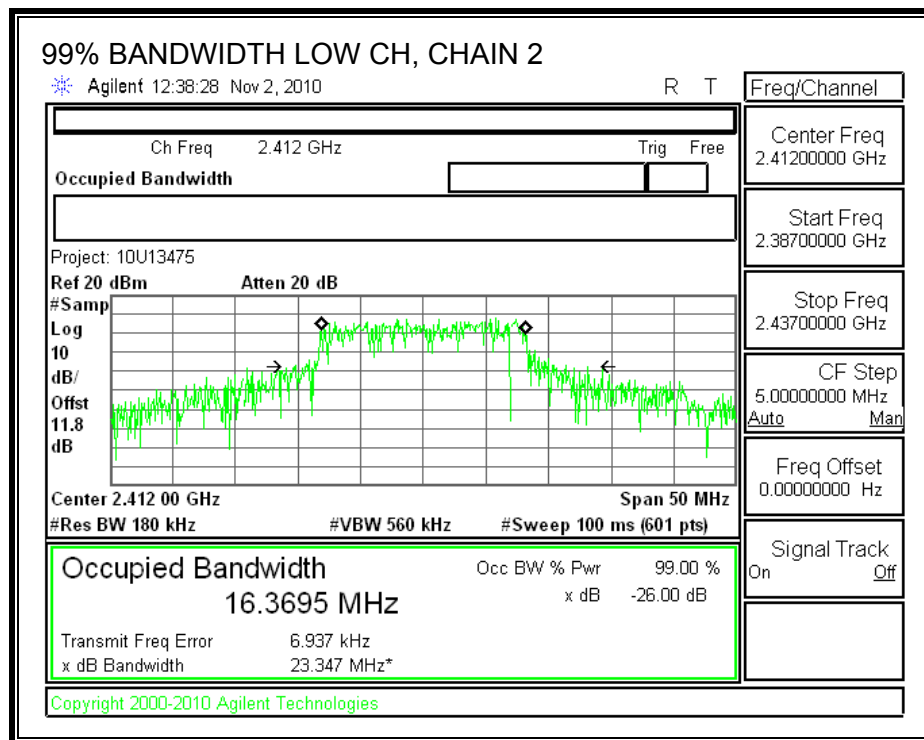
99% BANDWIDTH, CHAIN 1

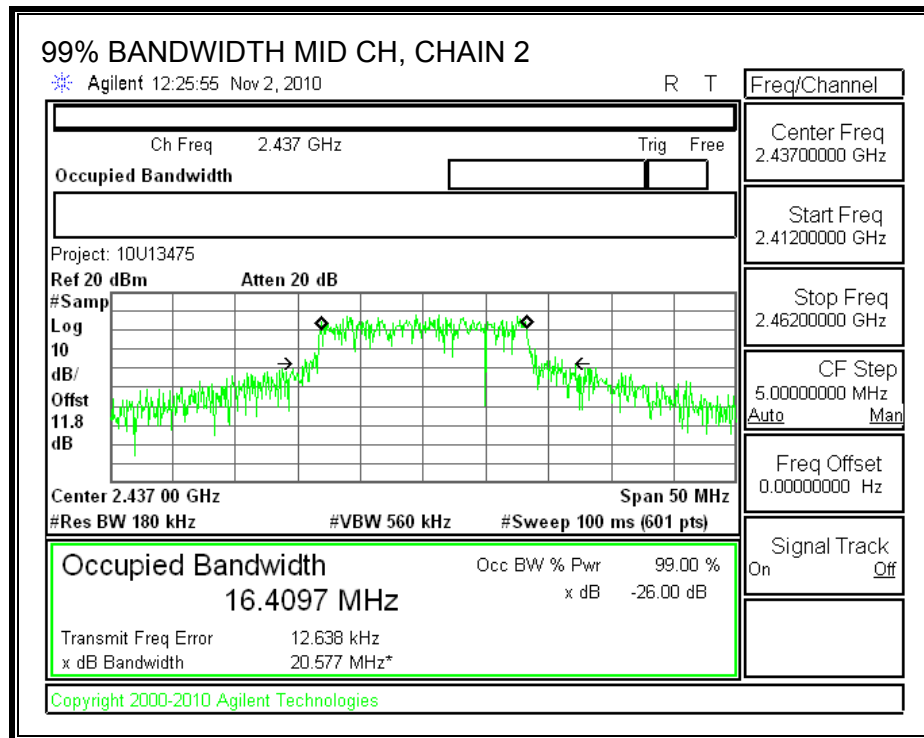


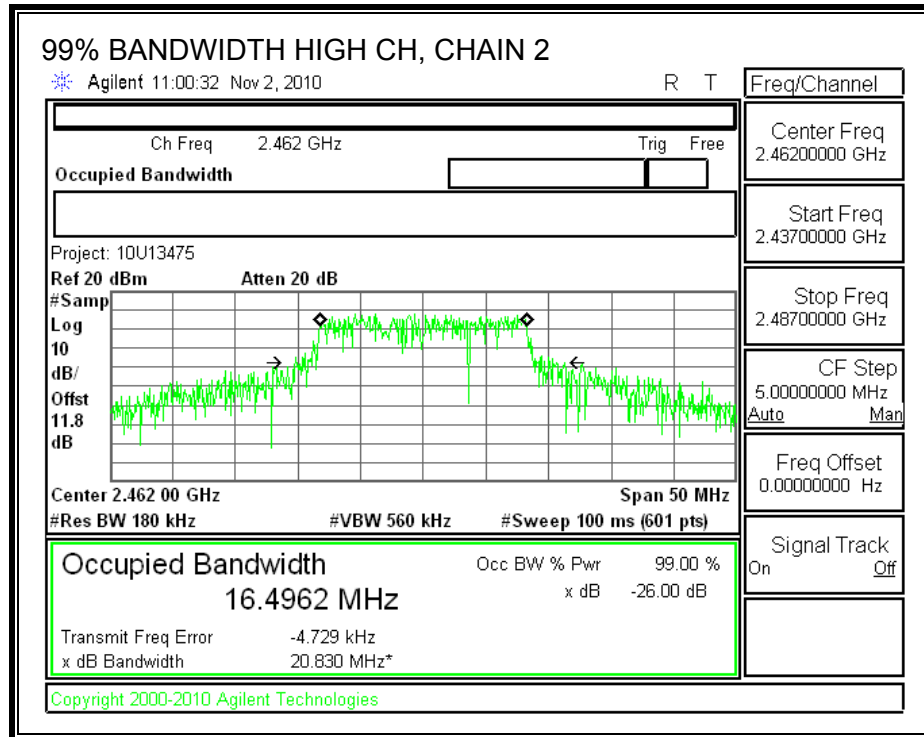




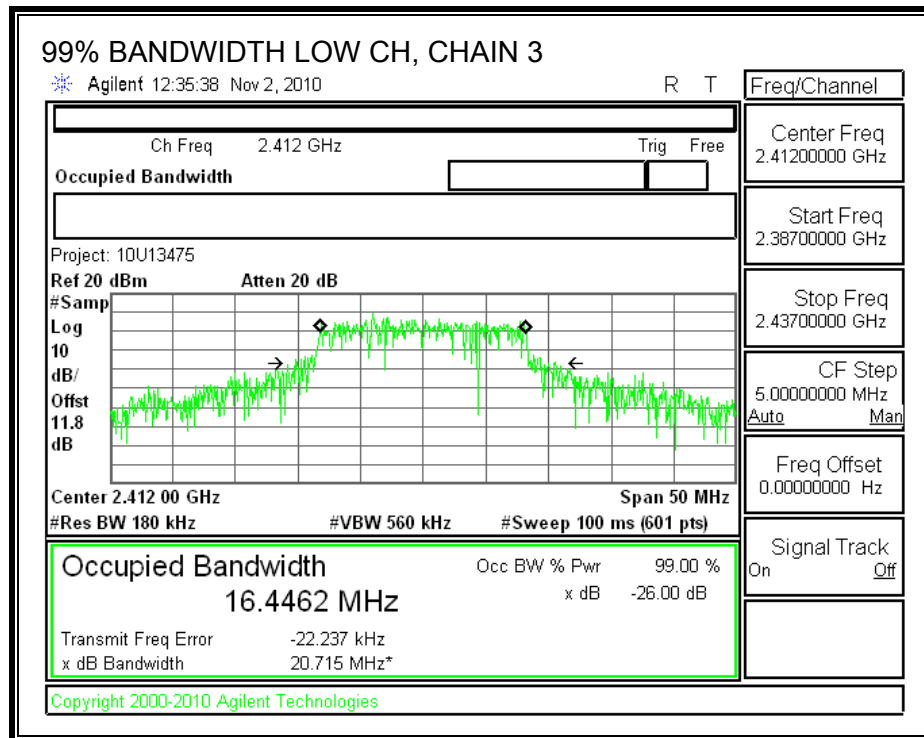
99% BANDWIDTH, CHAIN 2

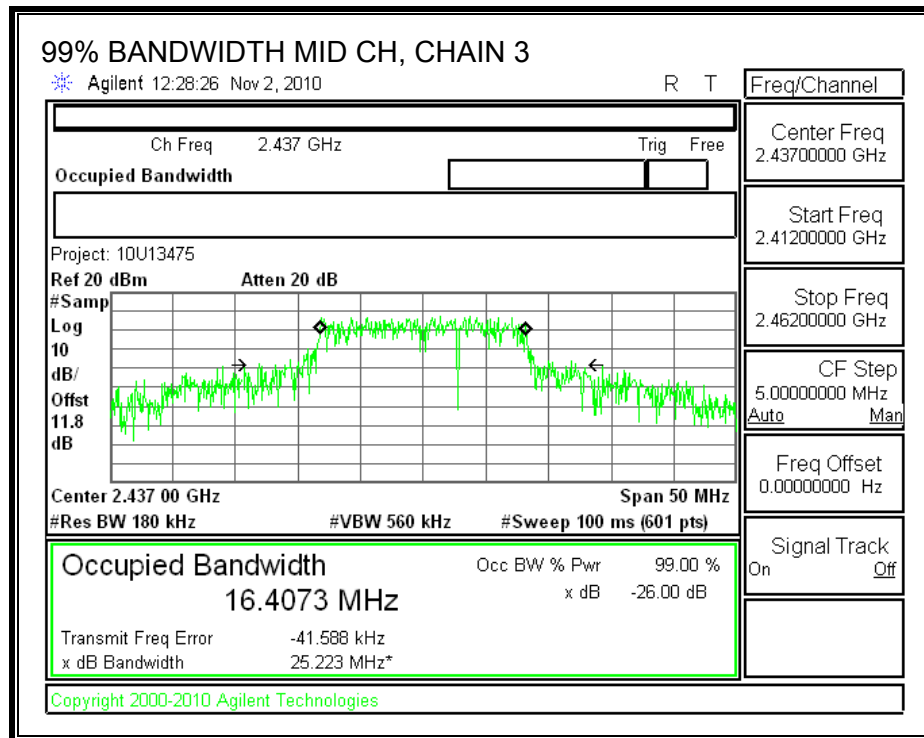


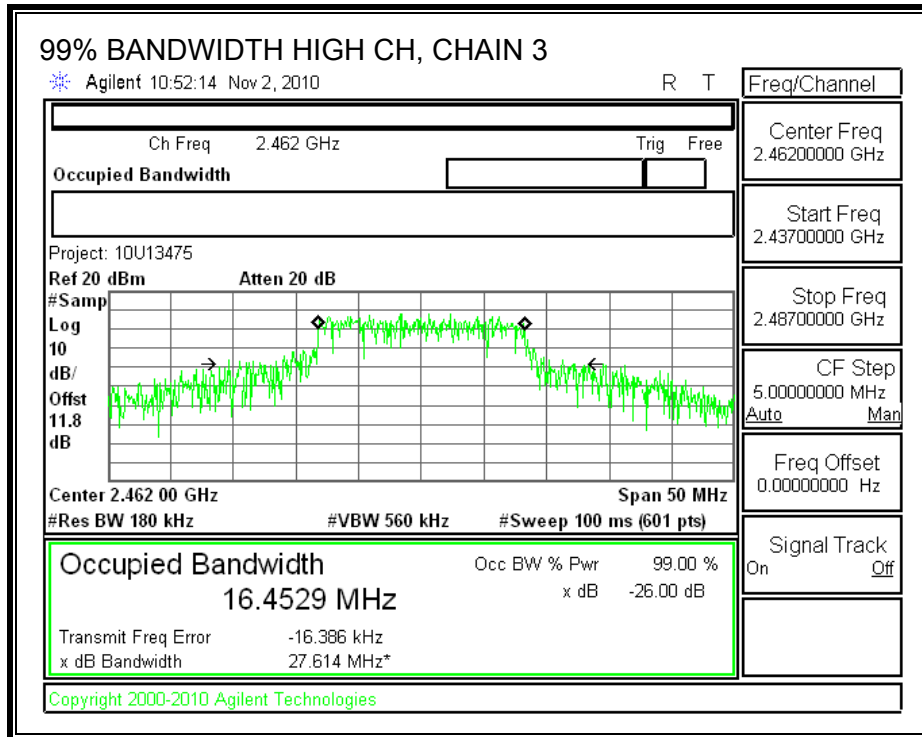




99% BANDWIDTH, CHAIN 3







7.2.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

| Antenna Gain (dBi) | 10 Log (# Tx Chains) (dB) | Effective Legacy Gain (dBi) |
|--------------------|---------------------------|-----------------------------|
| 5 | 4.77 | 9.77 |

The maximum effective legacy gain is 9.77 dBi; therefore the limit is 26.23 dBm.

TEST PROCEDURE

Peak power is measured using a wide bandwidth peak power meter.

RESULTS

| Channel | Frequency (MHz) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Chain 3 Power (dBm) | Attenuator + Cable Loss (dB) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|---------------------|---------------------|---------------------|------------------------------|-------------------|-------------|-------------|
| Low | 2412 | 10.22 | 11.07 | 10.21 | 10.80 | 26.09 | 26.23 | -0.14 |
| Mid | 2437 | 10.26 | 11.11 | 10.24 | 10.80 | 26.13 | 26.23 | -0.10 |
| High | 2462 | 9.88 | 9.96 | 8.92 | 10.80 | 25.18 | 26.23 | -1.05 |

7.2.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 10.8 dB (including 10 dB pad and 0.8 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency (MHz) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Chain 3 Power (dBm) | Total Power (dBm) |
|---------|--------------------|---------------------------|---------------------------|---------------------------|-------------------------|
| Low | 2412 | 11.75 | 12.72 | 11.45 | 16.78 |
| Middle | 2437 | 11.76 | 13.17 | 11.92 | 17.10 |
| High | 2462 | 11.27 | 11.42 | 11.12 | 16.04 |

7.2.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

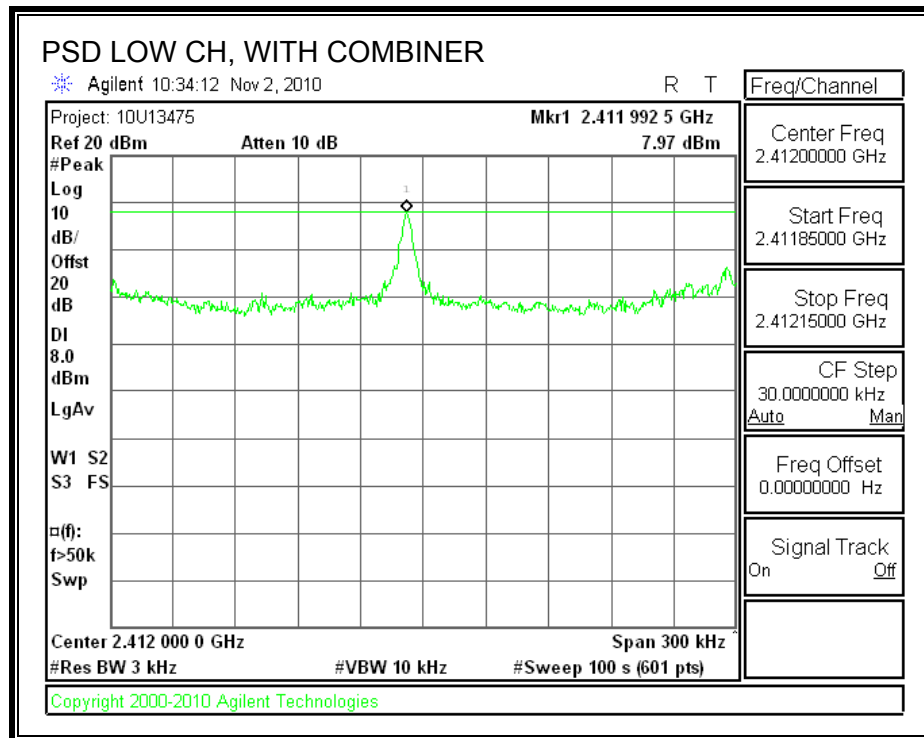
TEST PROCEDURE

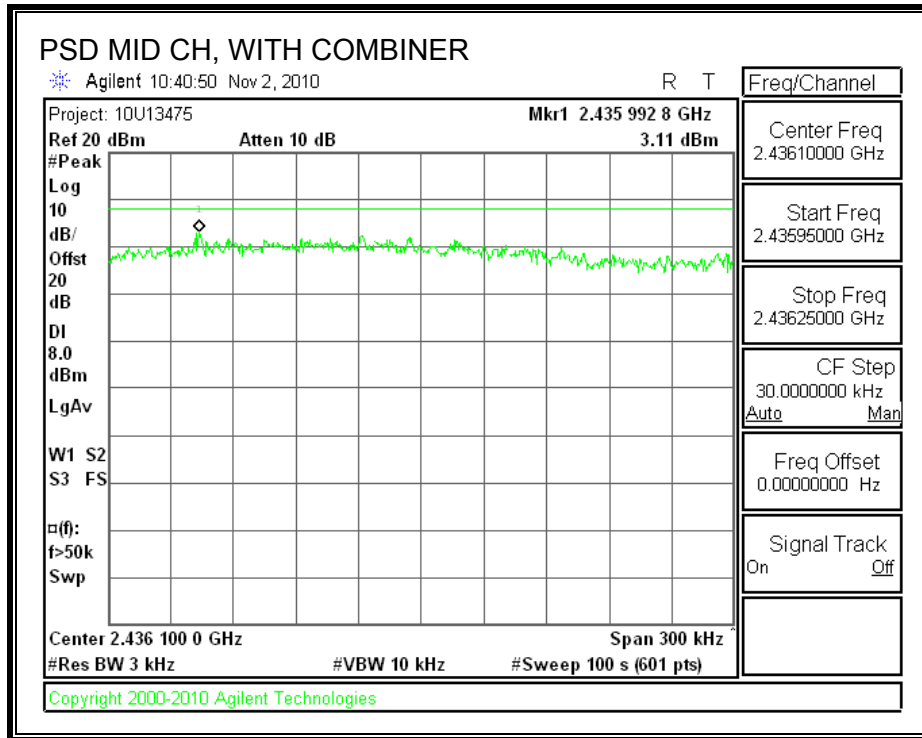
Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

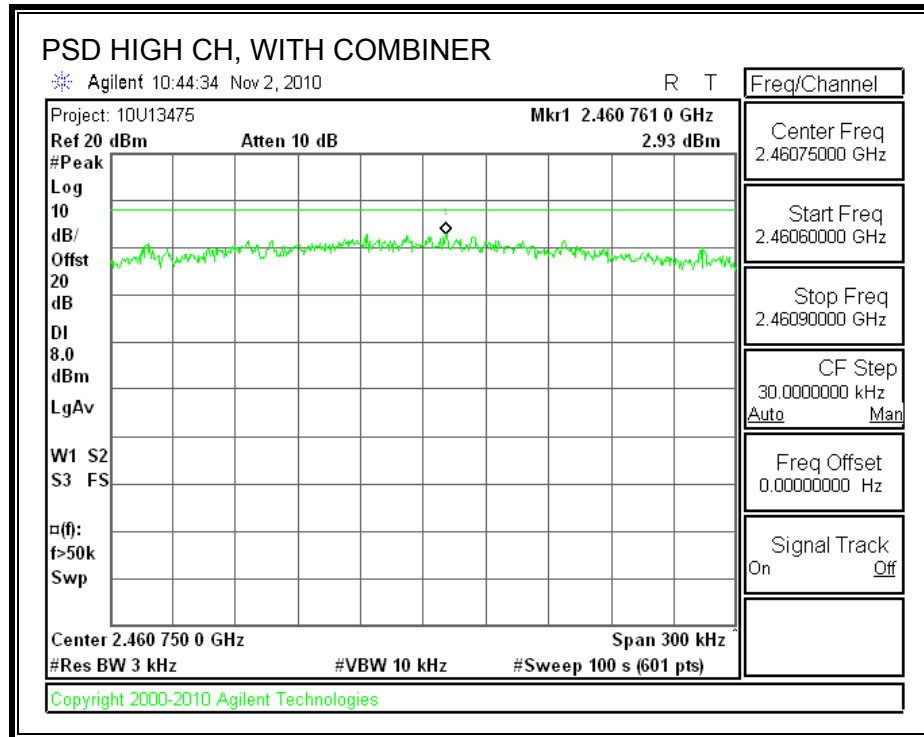
RESULTS

| Channel | Frequency (MHz) | PSD with Combiner (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|----------------------------|----------------|----------------|
| Low | 2412 | 7.97 | 8 | -0.03 |
| Middle | 2437 | 3.11 | 8 | -4.89 |
| High | 2462 | 2.93 | 8 | -5.07 |

POWER SPECTRAL DENSITY, WITH COMBINER







7.2.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of Peak Power using wideband power meter; therefore the required attenuation is 20 dB.

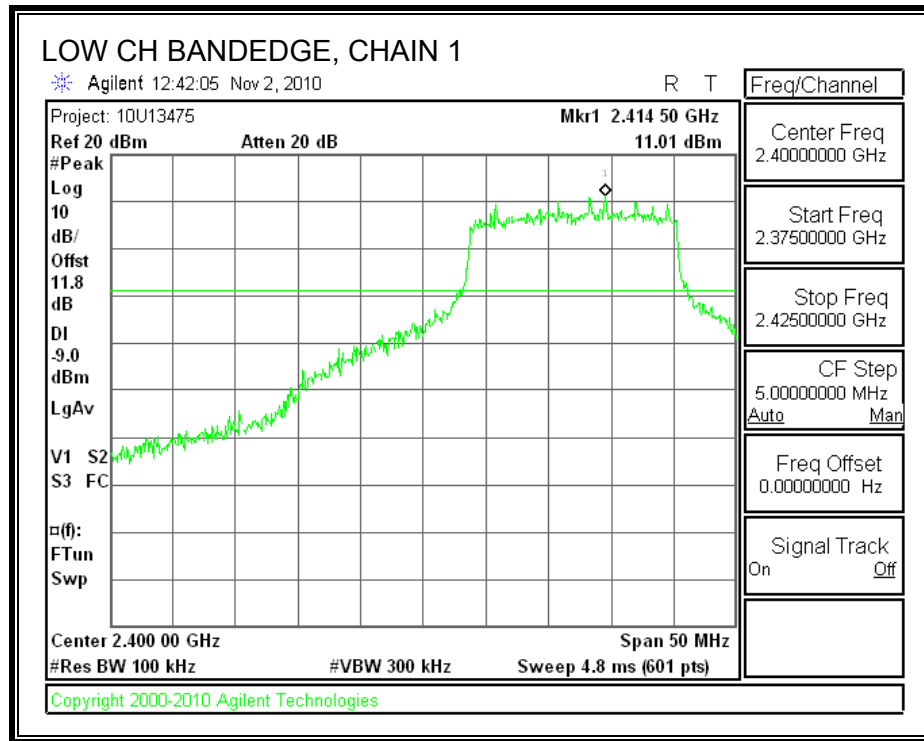
TEST PROCEDURE

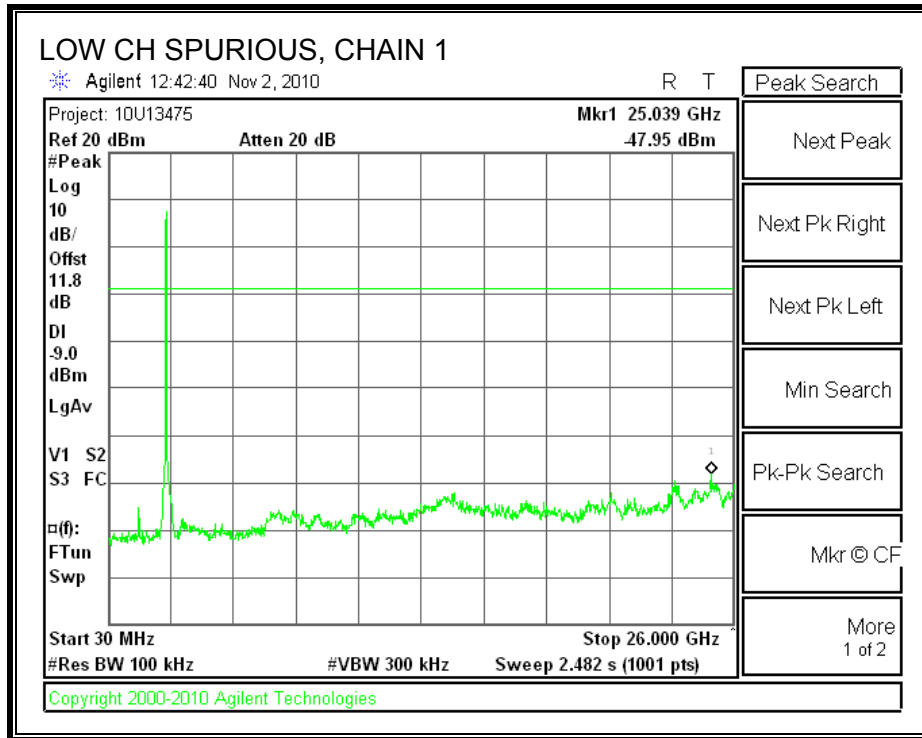
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

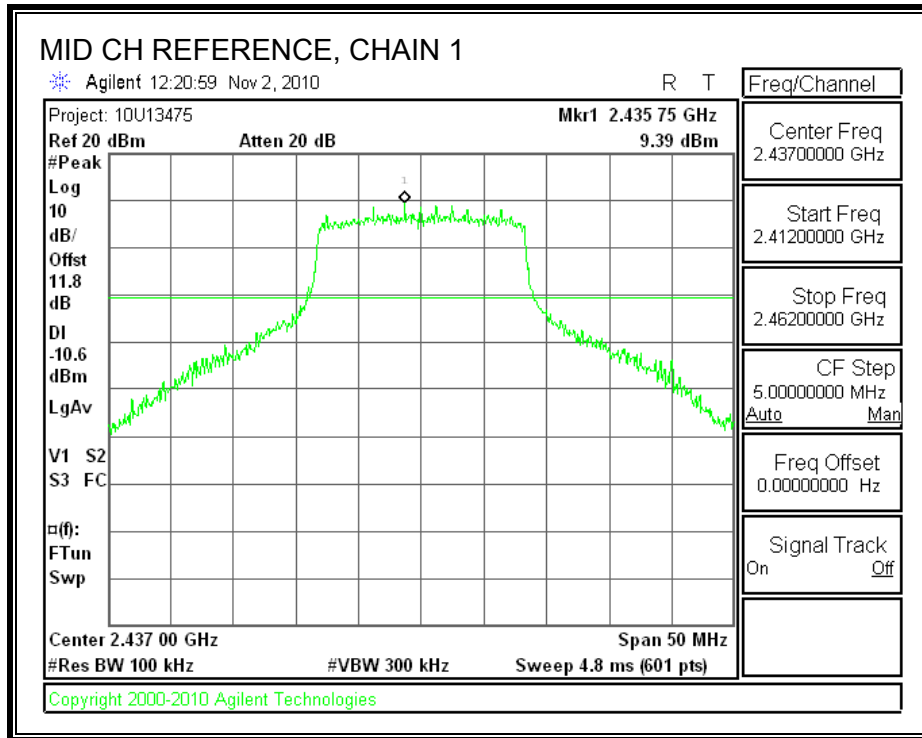
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

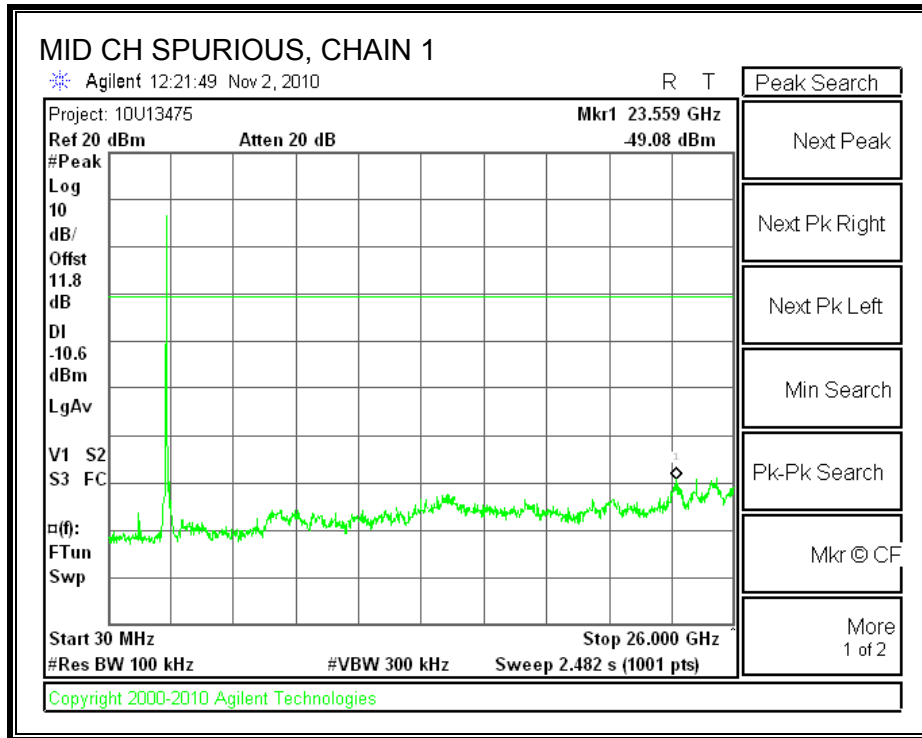
RESULTS

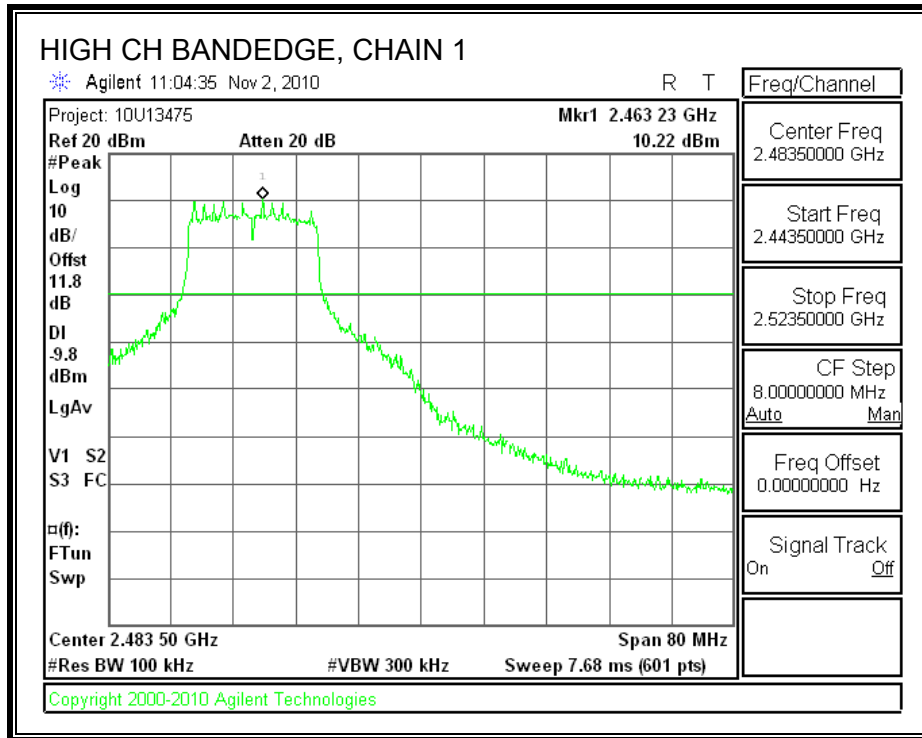
CHAIN 1 SPURIOUS EMISSIONS

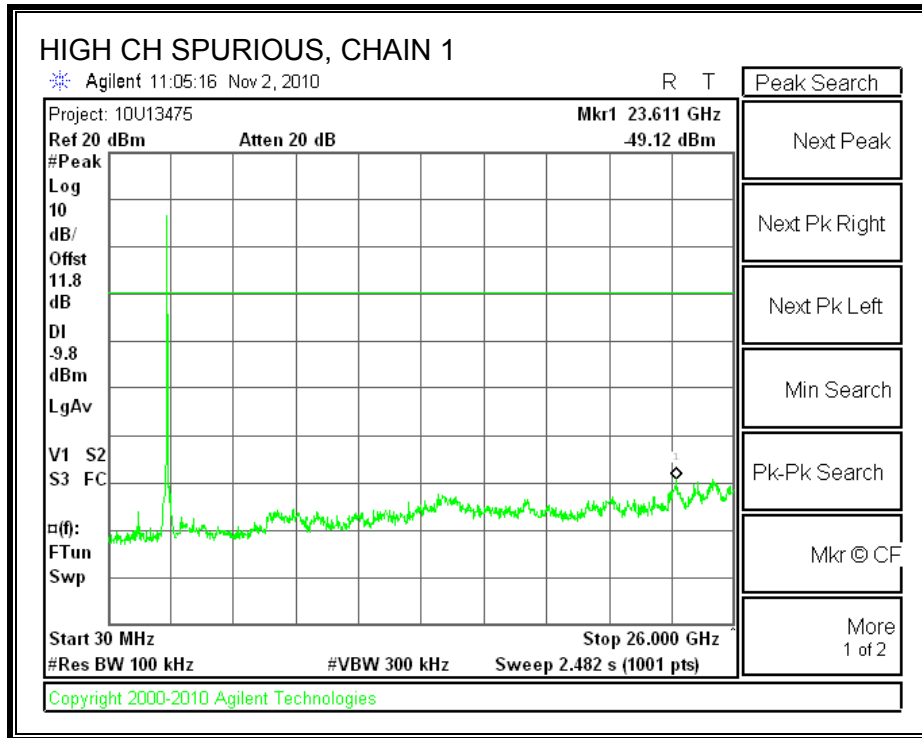




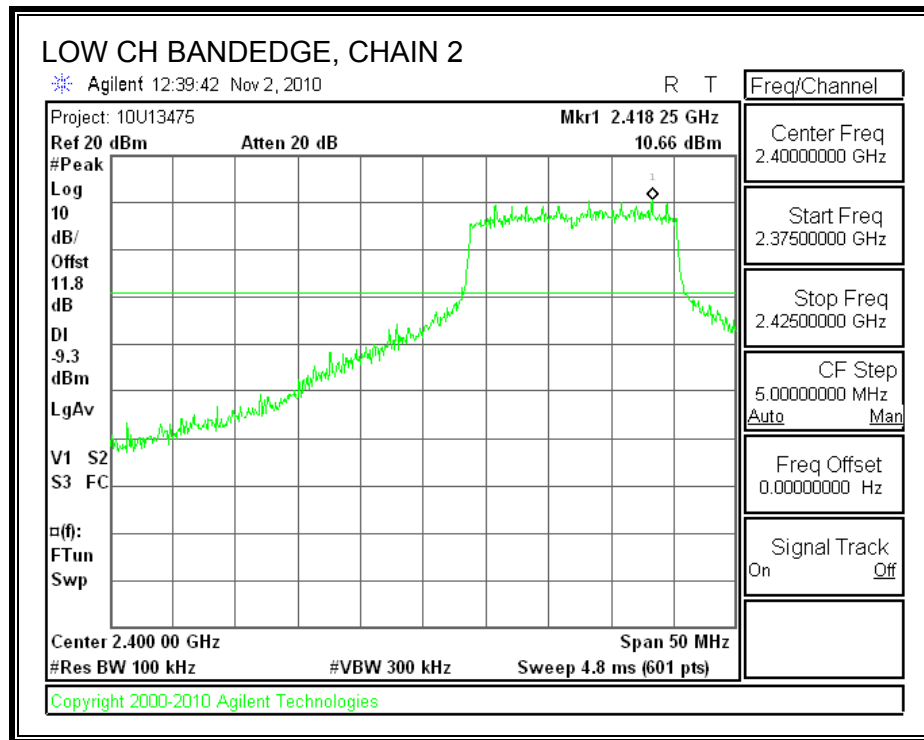


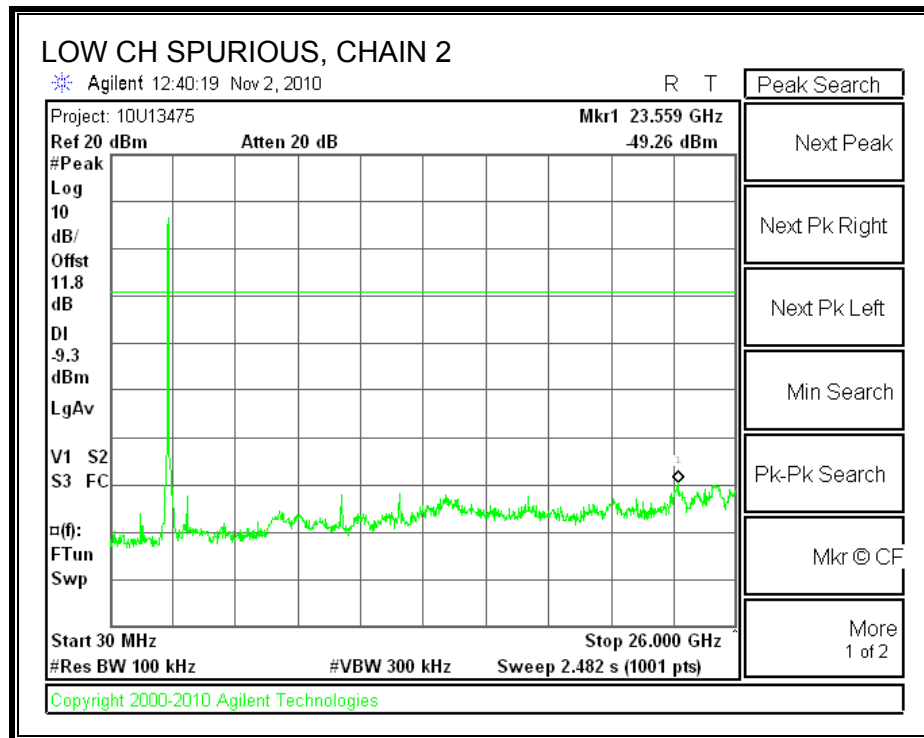


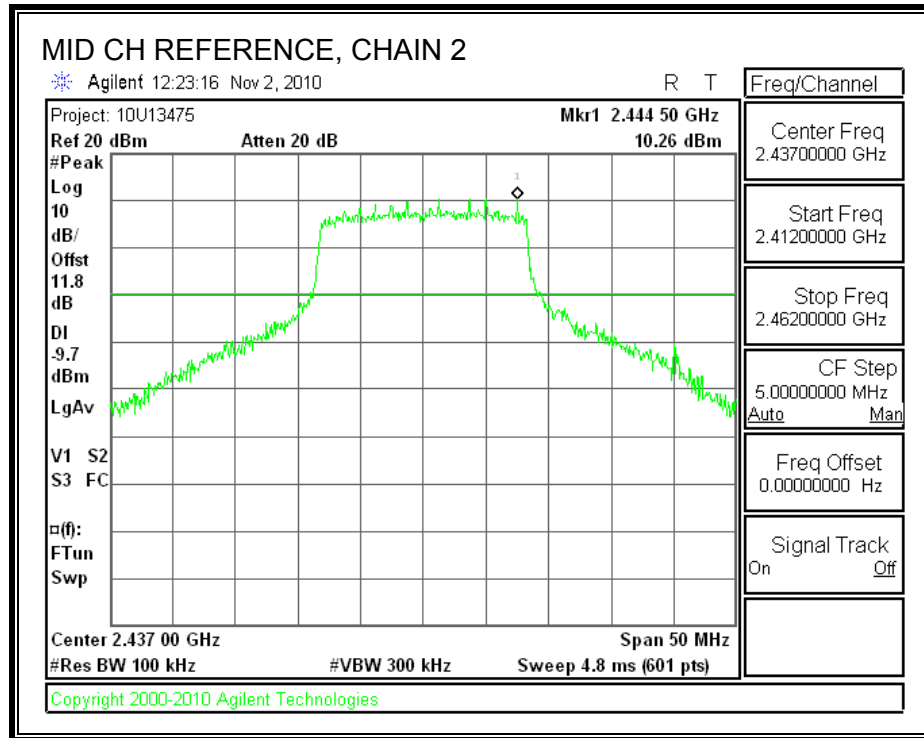


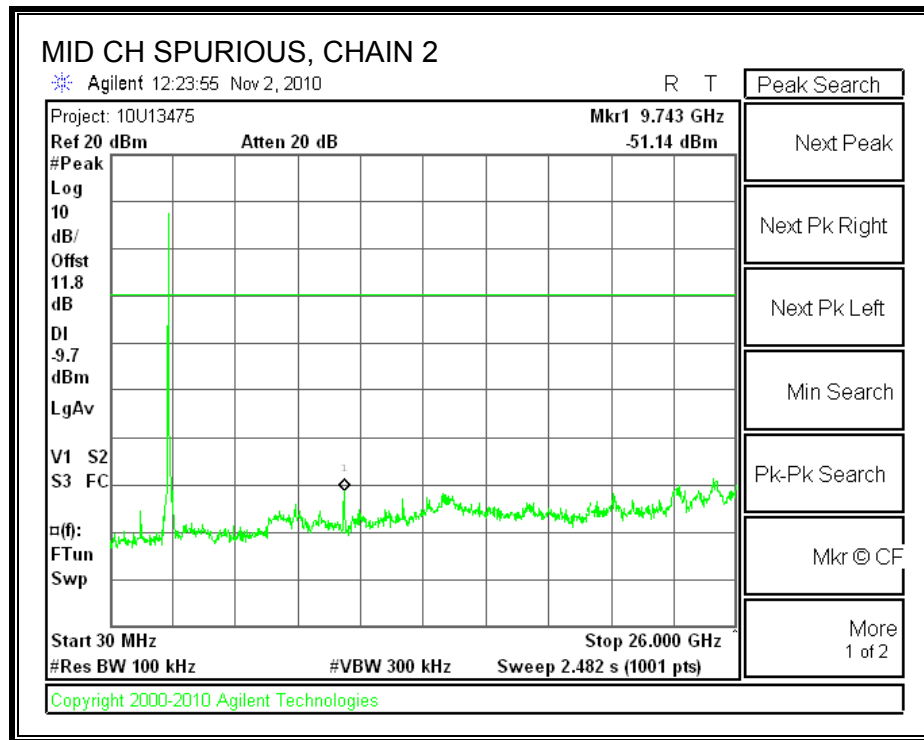


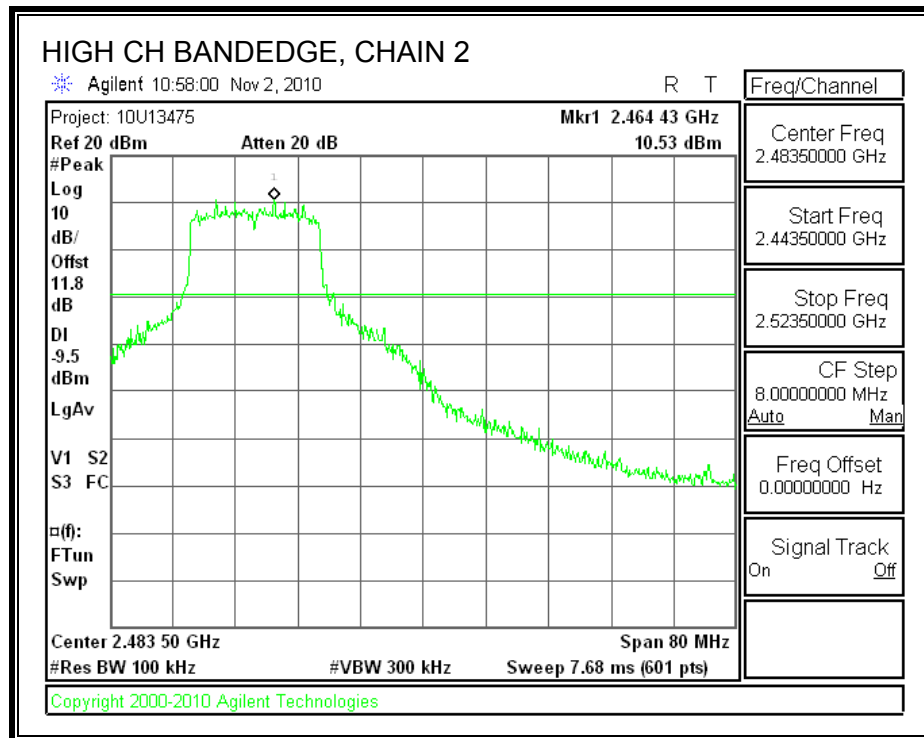
CHAIN 2 SPURIOUS EMISSIONS

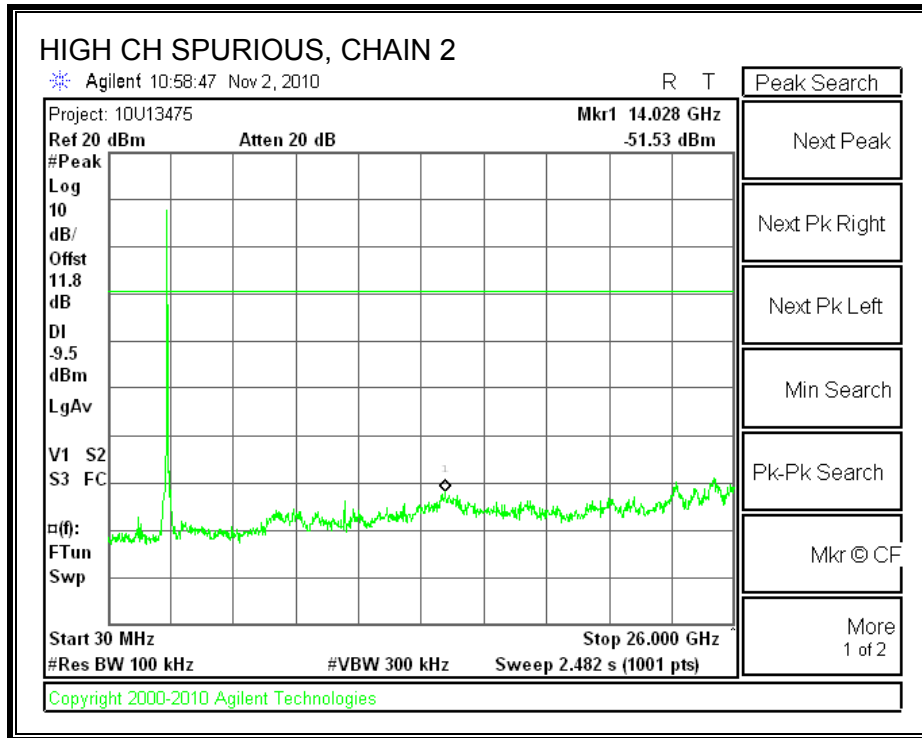




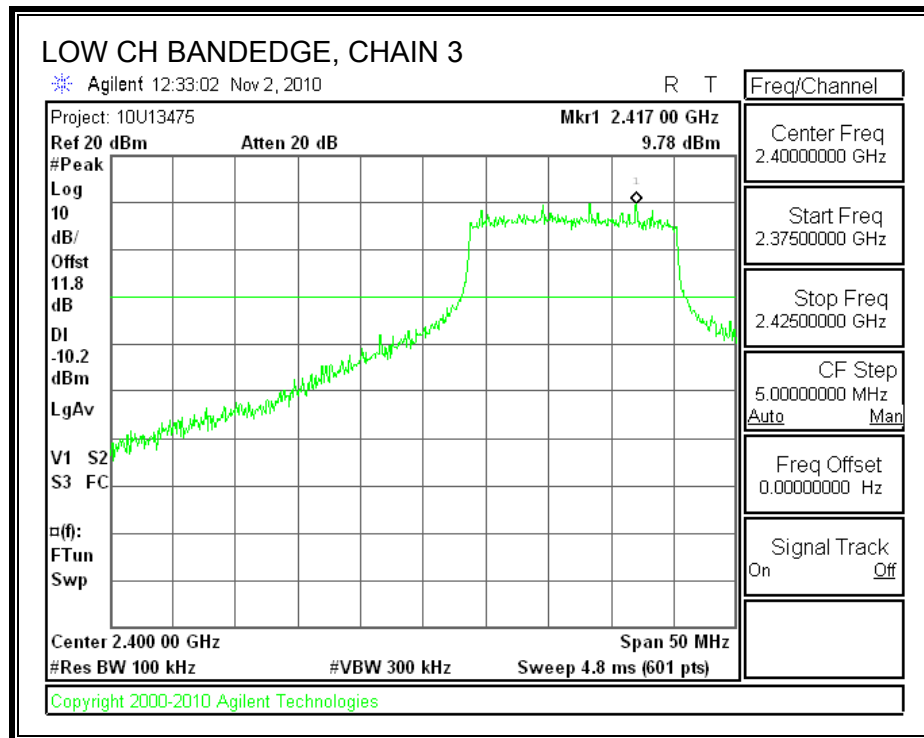


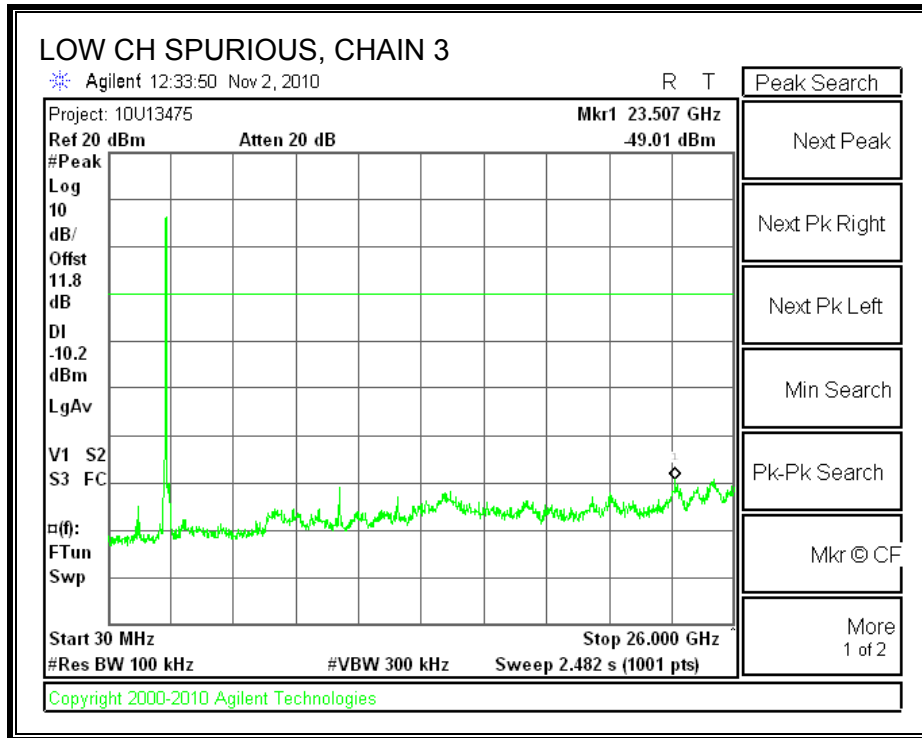




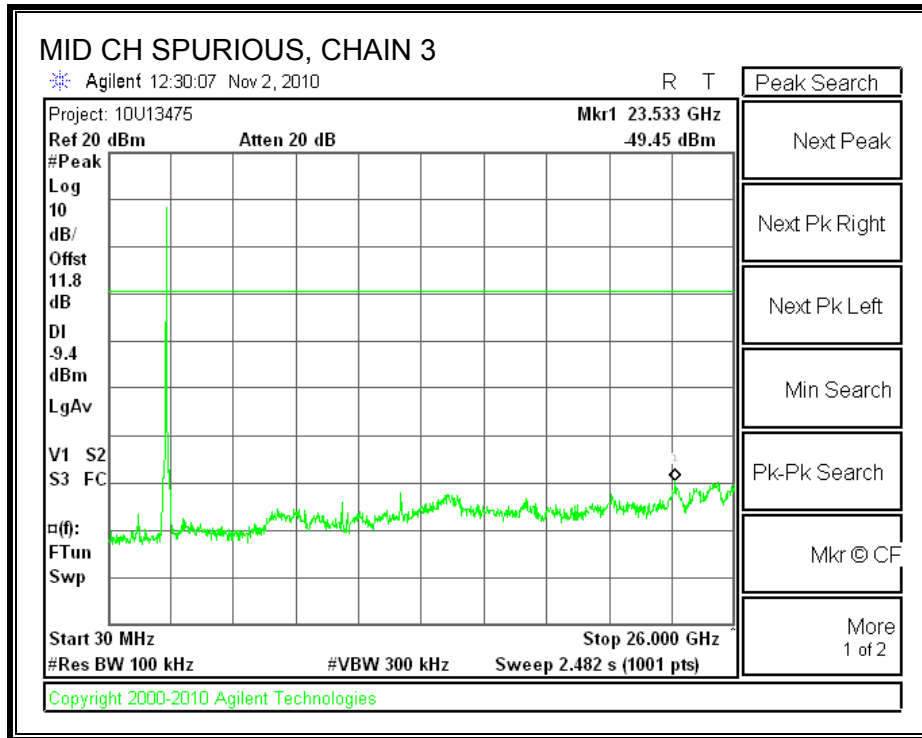


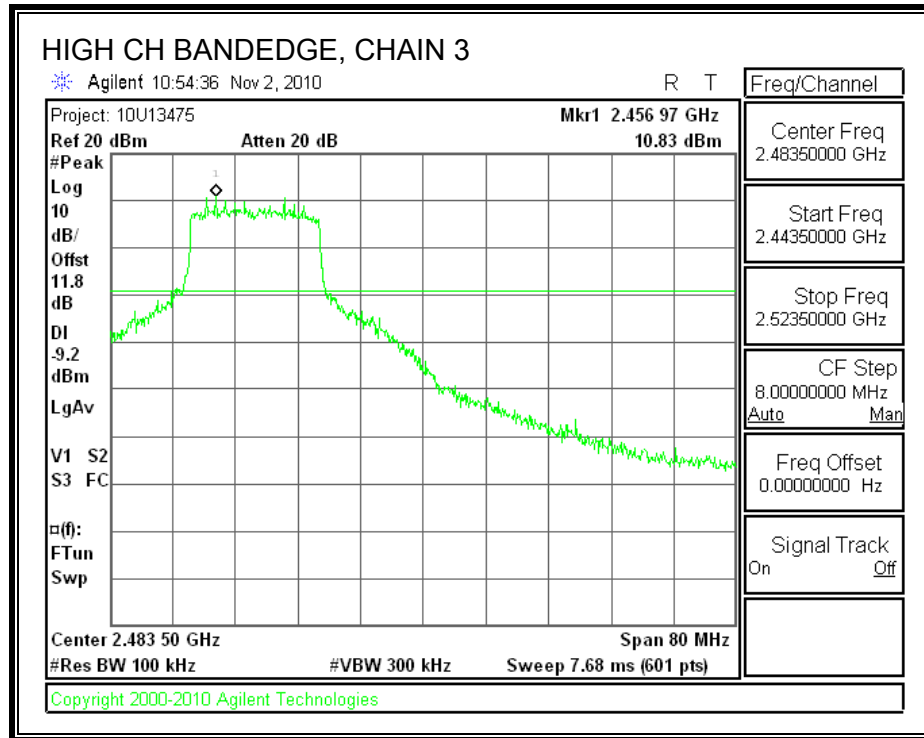
CHAIN 3 SPURIOUS EMISSIONS

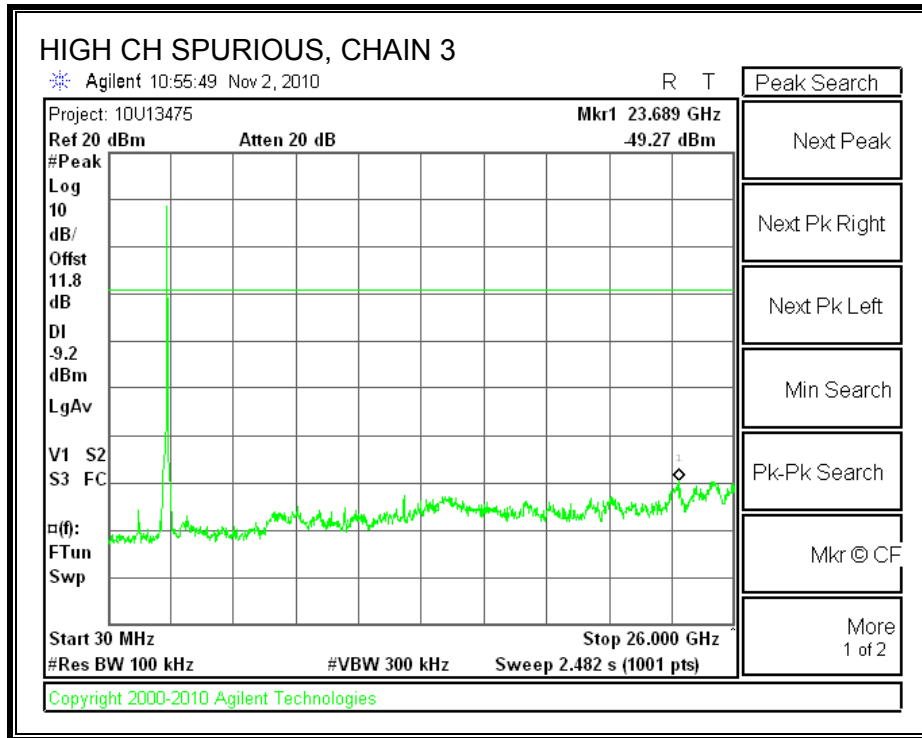












7.3. 802.11n THREE CHAINS HT20 MODE IN THE 2.4 GHz BAND

7.3.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

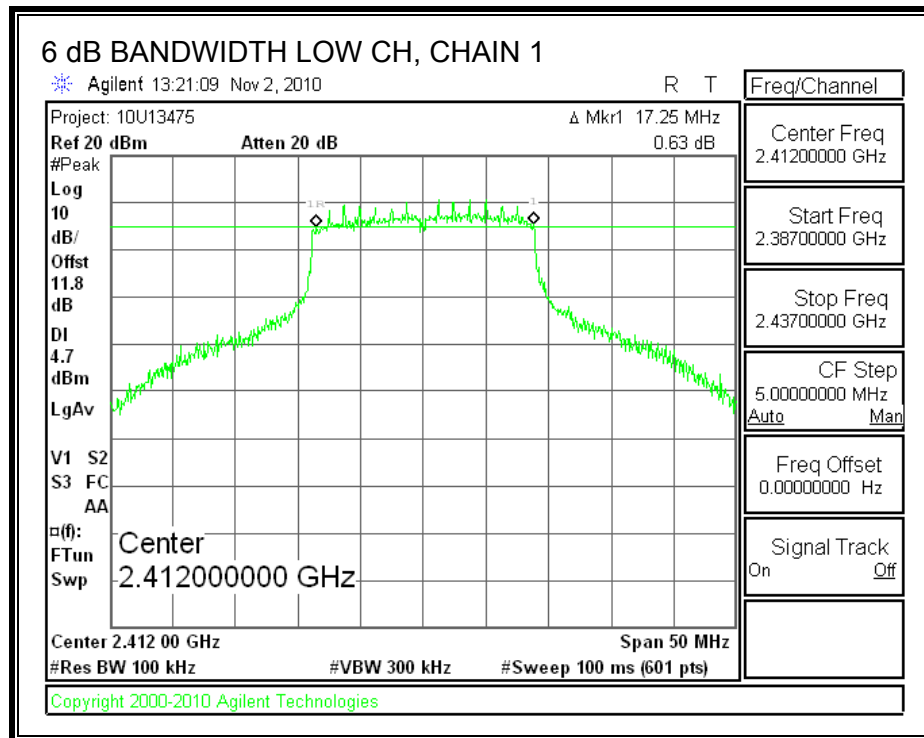
TEST PROCEDURE

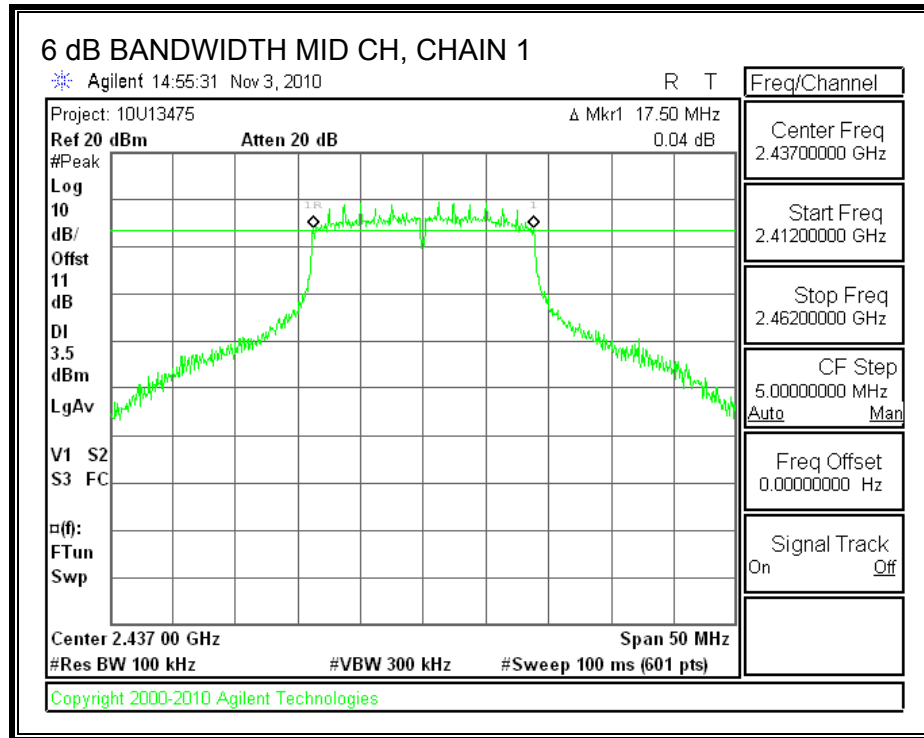
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

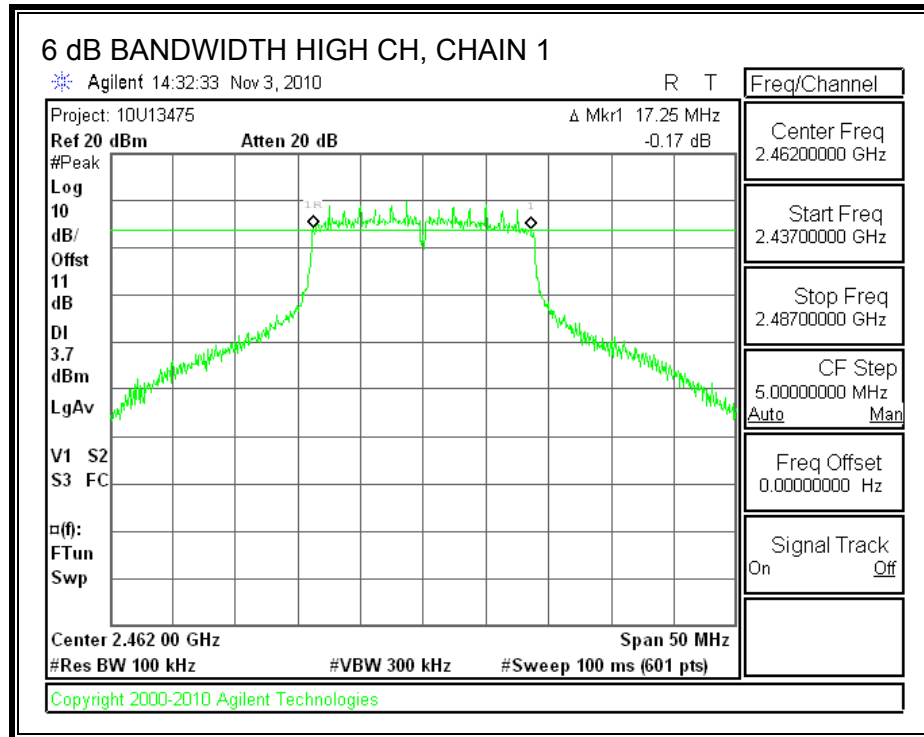
RESULTS

| Channel | Frequency (MHz) | Chain 1 6 dB BW (MHz) | Chain 2 6 dB BW (MHz) | Chain 3 6 dB BW (MHz) | Minimum Limit (MHz) |
|---------|--------------------|-----------------------------|-----------------------------|-----------------------------|------------------------|
| Low | 2412 | 17.25 | 16.92 | 17.58 | 0.5 |
| Middle | 2437 | 17.5 | 17.58 | 17.58 | 0.5 |
| High | 2462 | 17.25 | 17.58 | 17.33 | 0.5 |

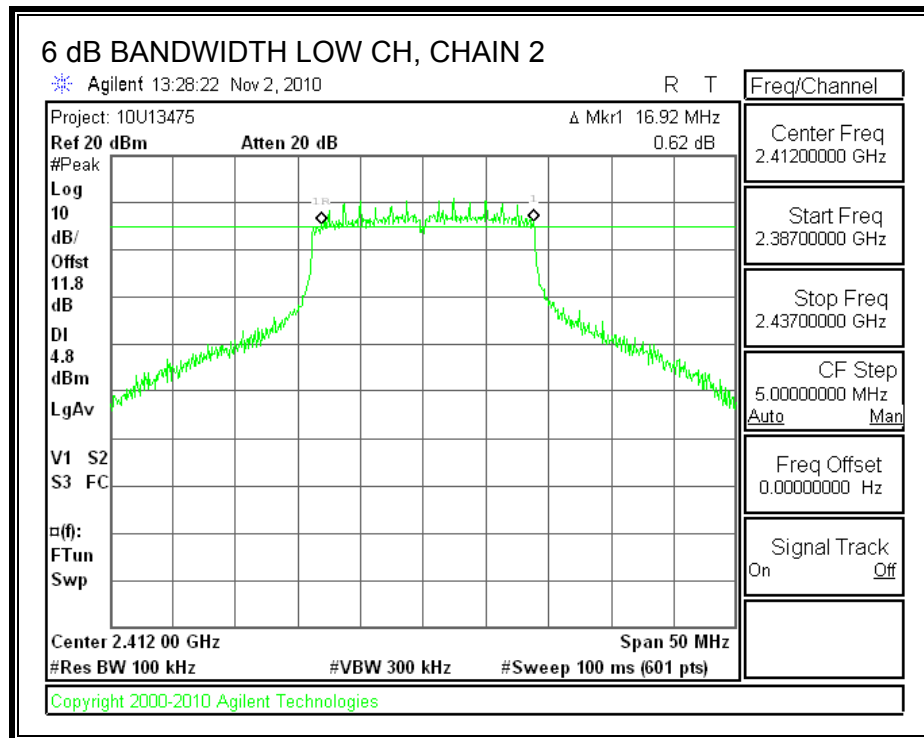
6 dB BANDWIDTH, CHAIN 1

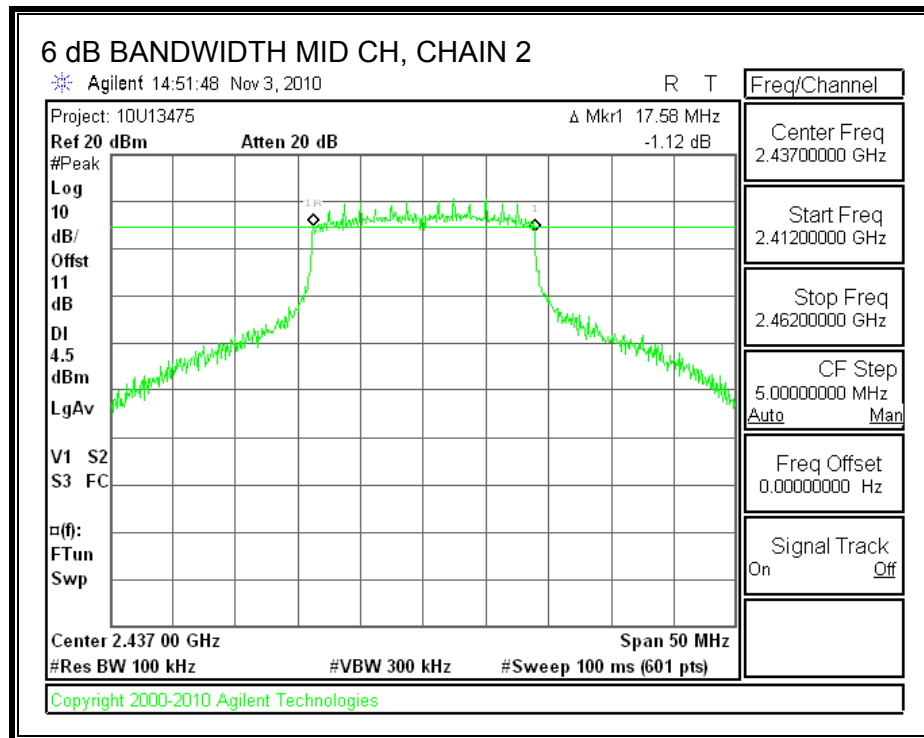


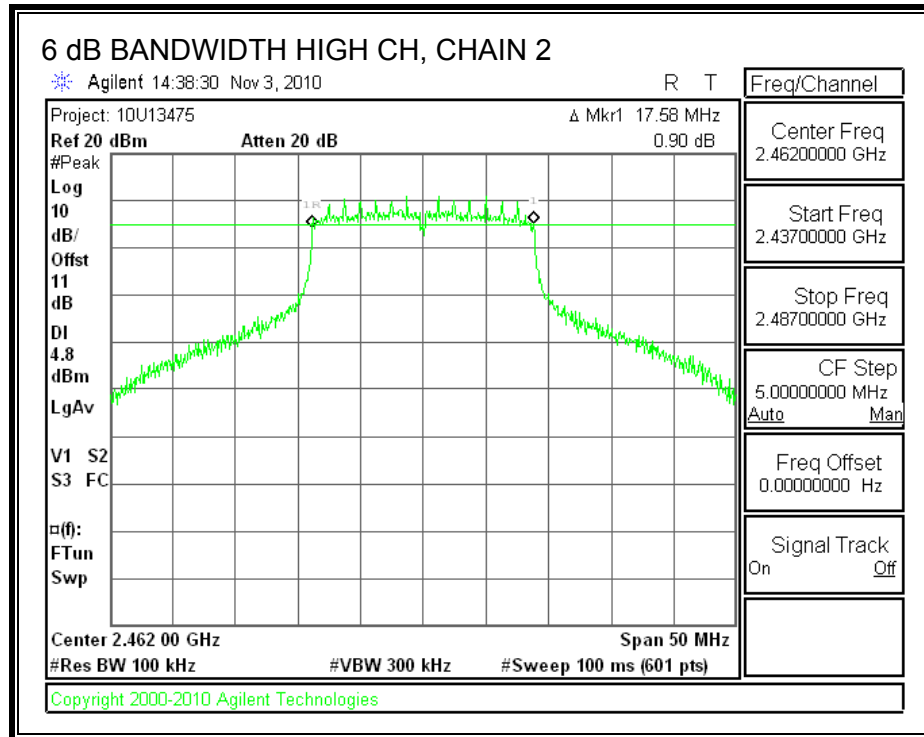




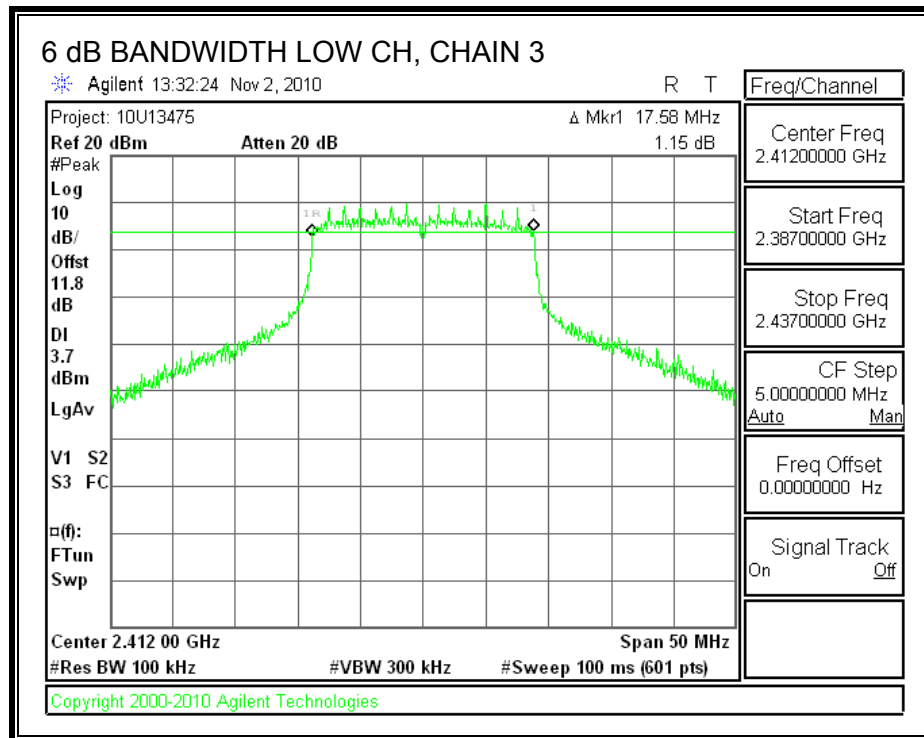
6 dB BANDWIDTH, CHAIN 2

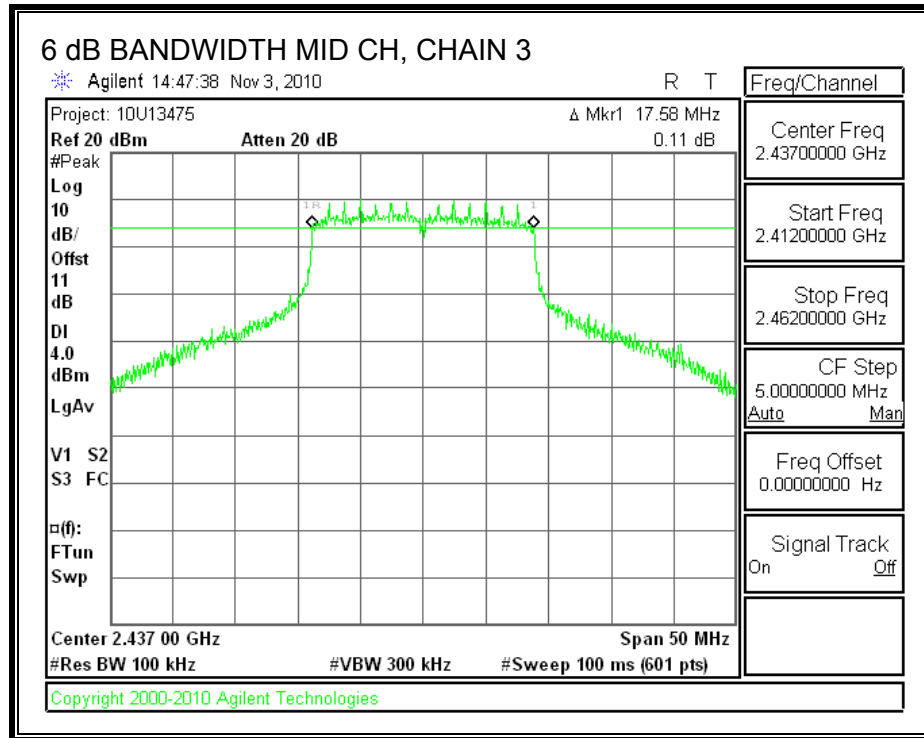


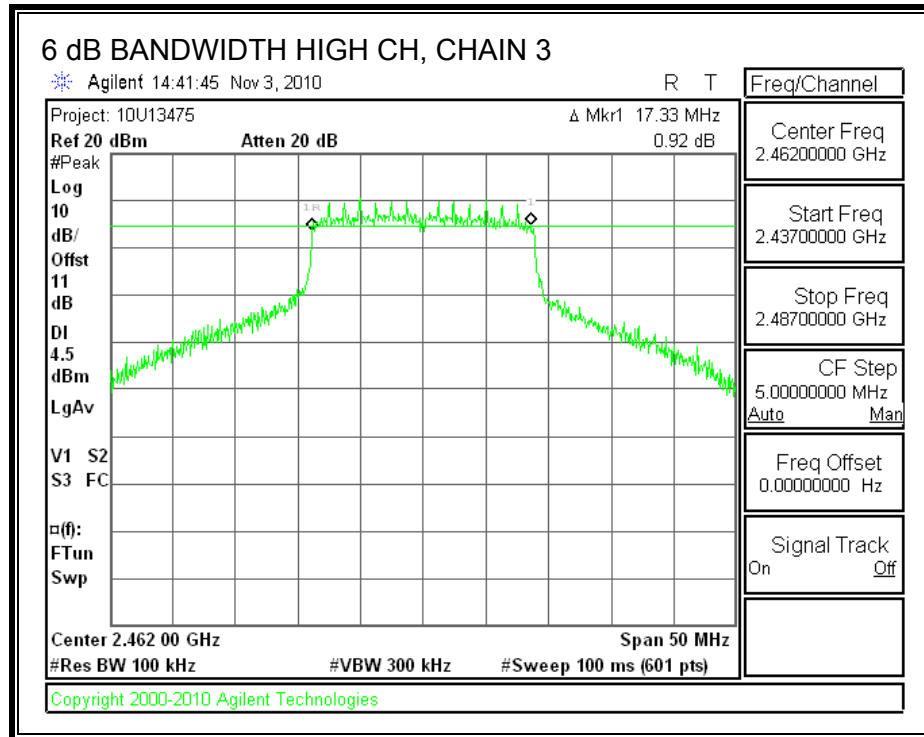




6 dB BANDWIDTH, CHAIN 3







7.3.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

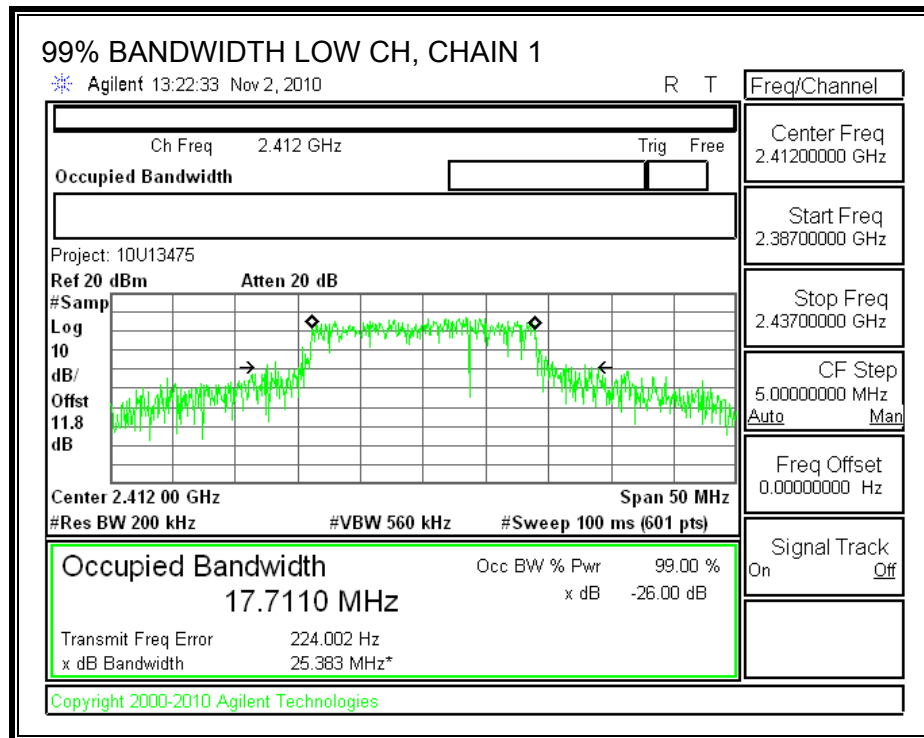
TEST PROCEDURE

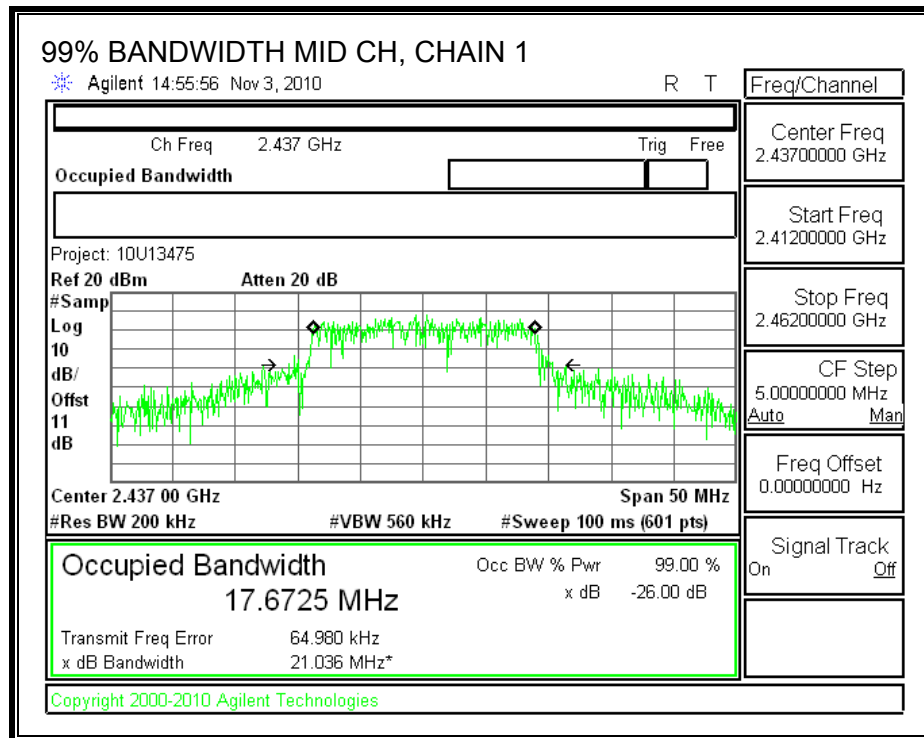
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

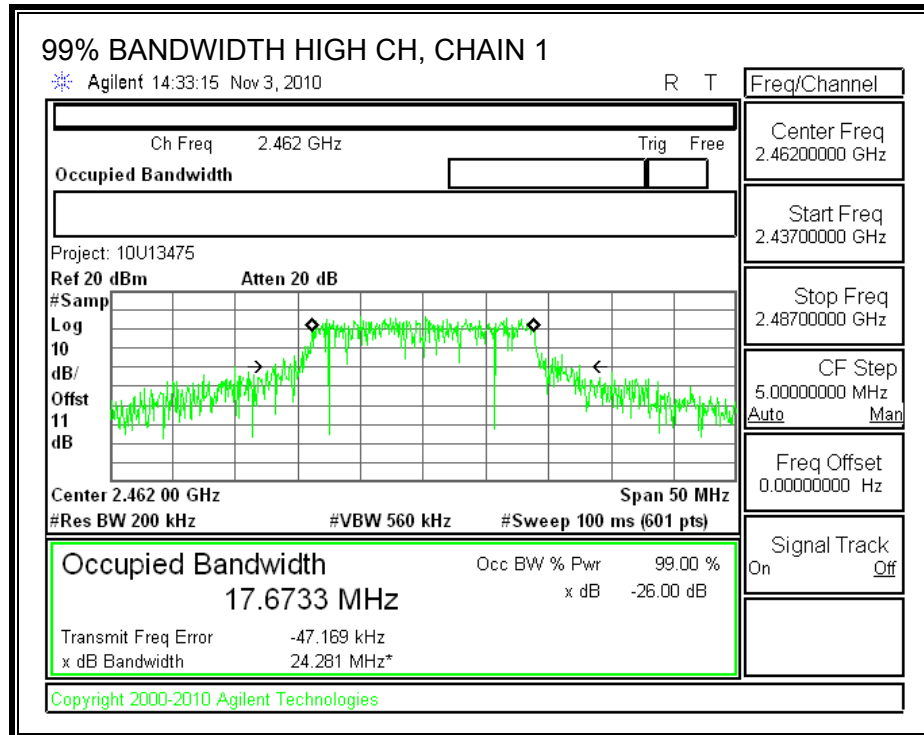
RESULTS

| Channel | Frequency (MHz) | Chain 1 99% Bandwidth (MHz) | Chain 2 99% Bandwidth (MHz) | Chain 3 99% Bandwidth (MHz) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Low | 2412 | 17.7110 | 17.7255 | 17.6800 |
| Middle | 2437 | 17.6725 | 17.7220 | 17.6812 |
| High | 2462 | 17.6733 | 17.6412 | 17.6240 |

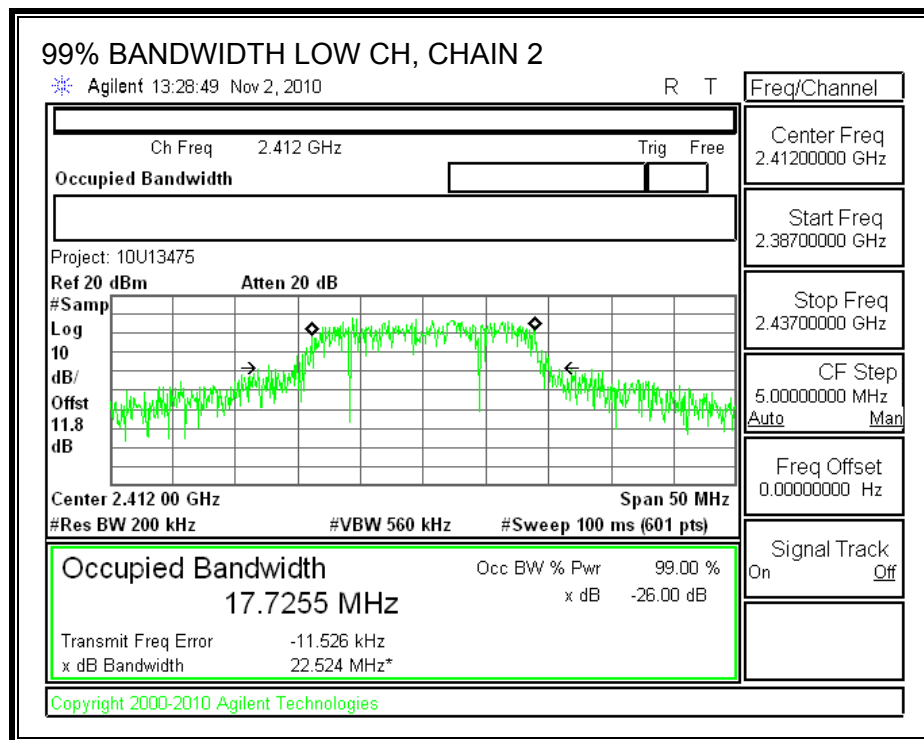
99% BANDWIDTH, CHAIN 1

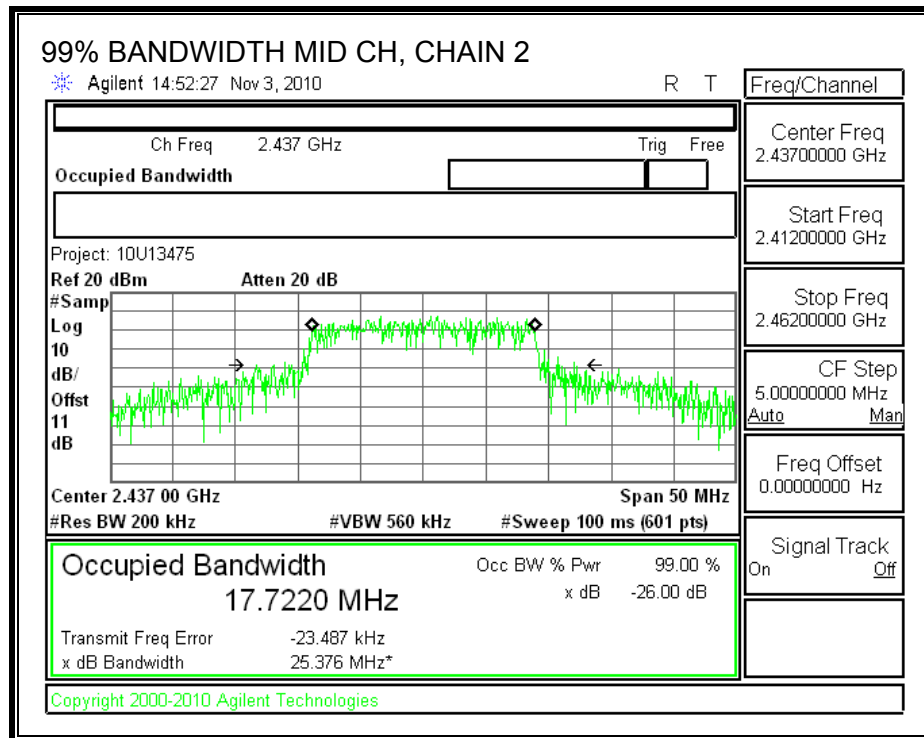


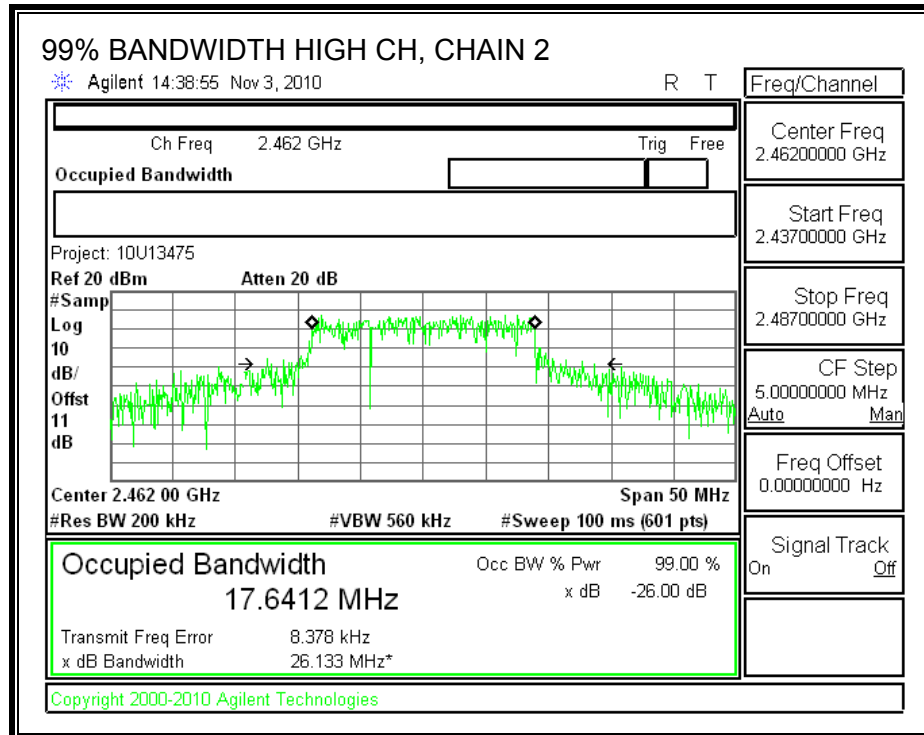




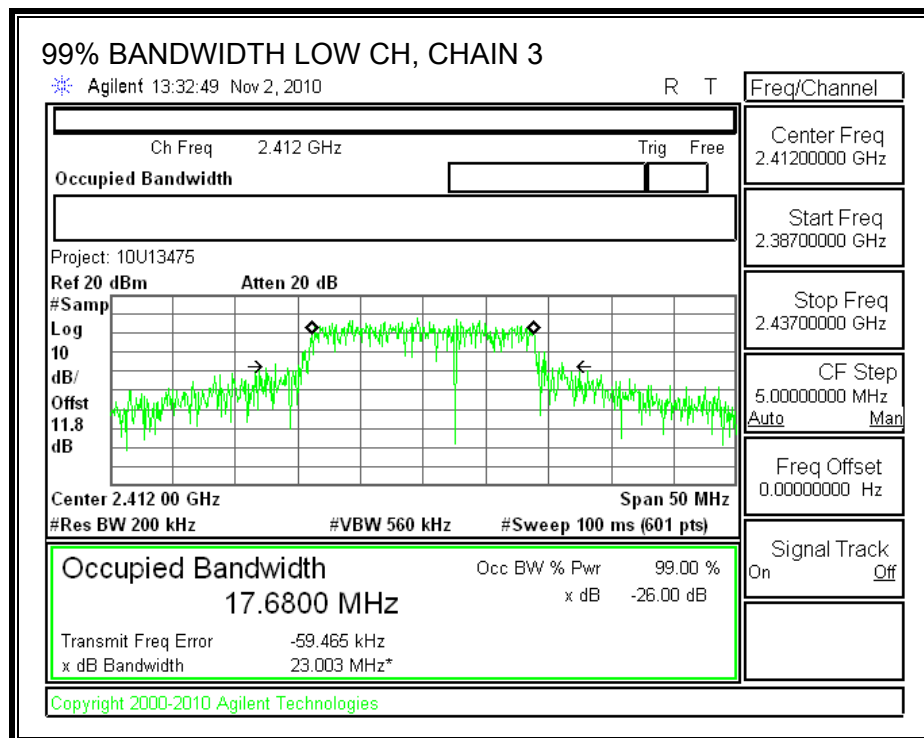
99% BANDWIDTH, CHAIN 2

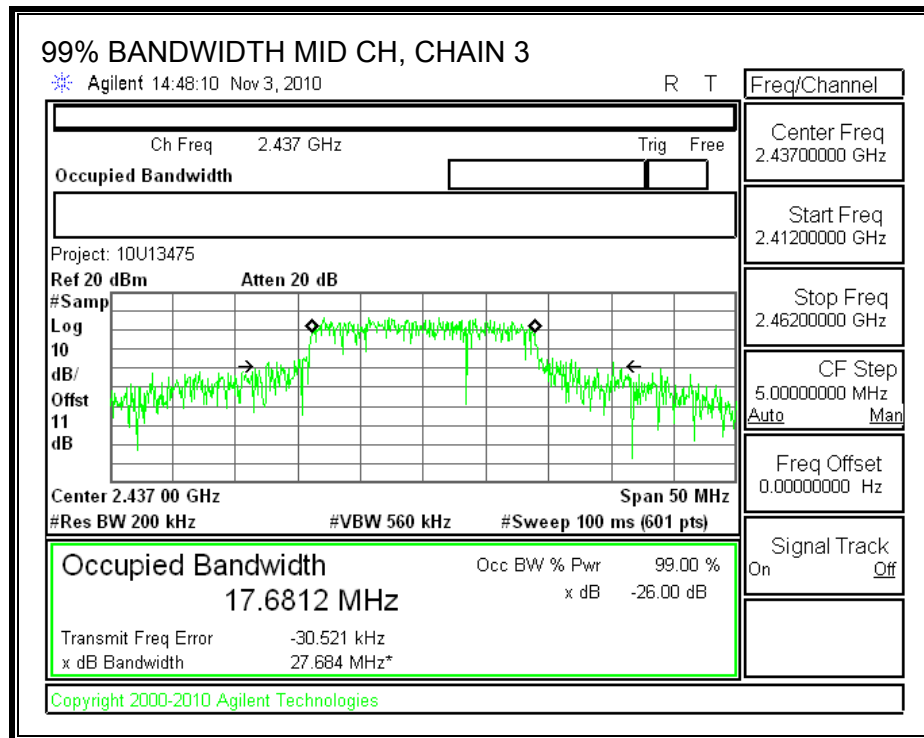


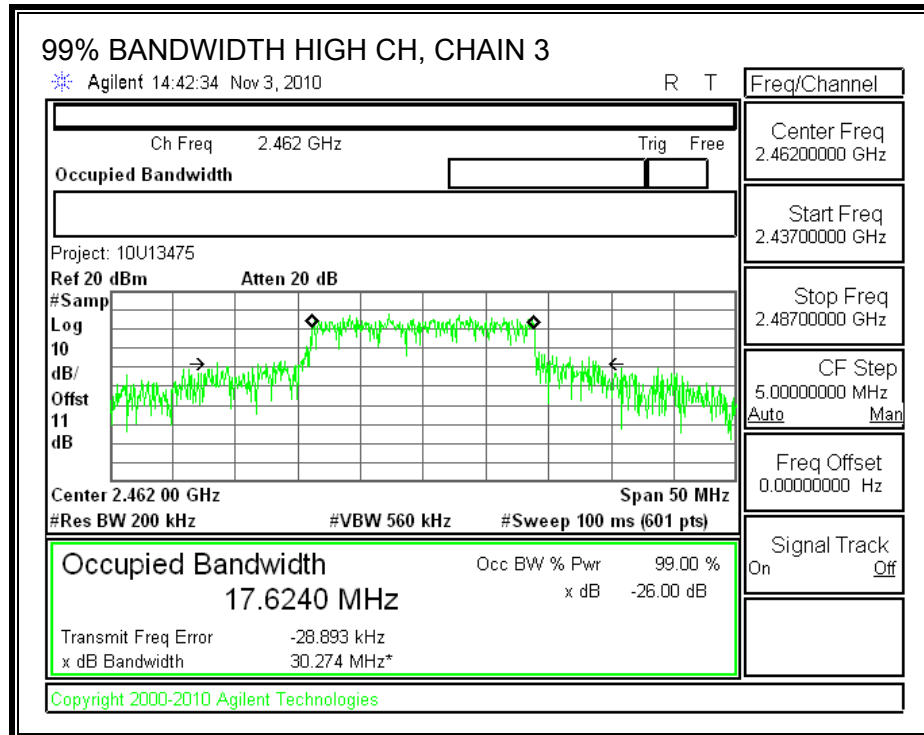




99% BANDWIDTH, CHAIN 3







7.3.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain of **5.0 dBi** is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

Peak power is measured using a wide bandwidth peak power meter.

RESULTS

| Channel | Frequency (MHz) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Chain 3 Power (dBm) | Attenuator + Cable Loss (dB) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|---------------------------|---------------------------|---------------------------|------------------------------------|-------------------------|----------------|----------------|
| Low | 2412 | 12.74 | 13.85 | 11.93 | 10.80 | 28.48 | 30.00 | -1.52 |
| Mid | 2437 | 13.84 | 15.61 | 13.38 | 10.80 | 29.96 | 30.00 | -0.04 |
| High | 2462 | 10.27 | 11.73 | 9.85 | 10.80 | 26.26 | 30.00 | -3.74 |

7.3.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 10.8 dB (including 10 dB pad and 0.8 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency (MHz) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Chain 3 Power (dBm) | Total Power (dBm) |
|---------|--------------------|------------------------|------------------------|------------------------|----------------------|
| Low | 2412 | 16.47 | 16.83 | 15.31 | 21.02 |
| Middle | 2437 | 17.47 | 19.41 | 17.64 | 23.04 |
| High | 2462 | 13.18 | 13.93 | 13.59 | 18.35 |

7.3.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

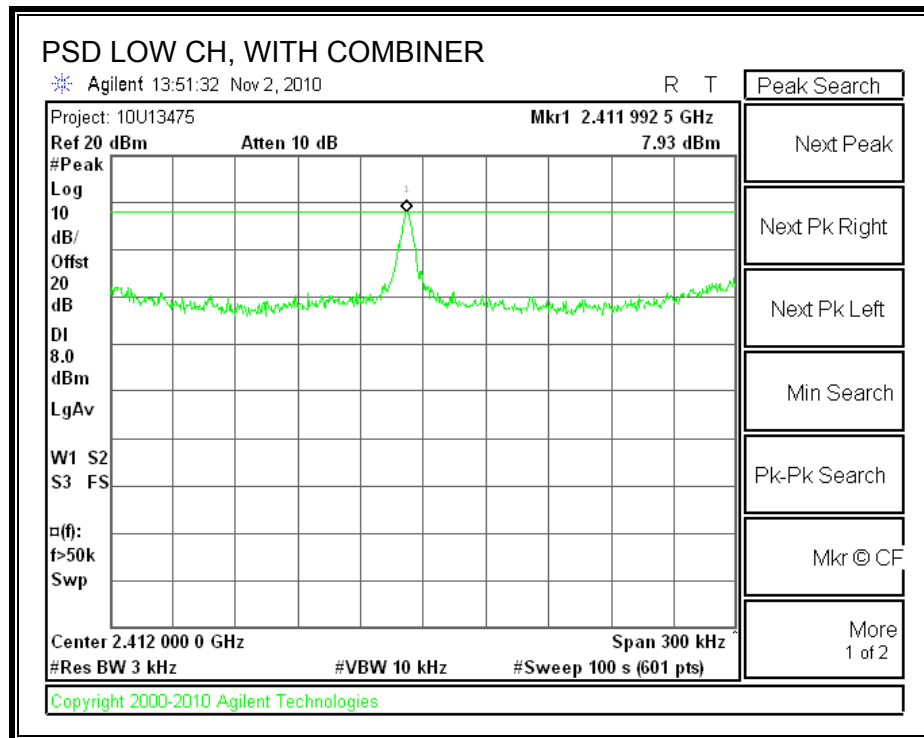
TEST PROCEDURE

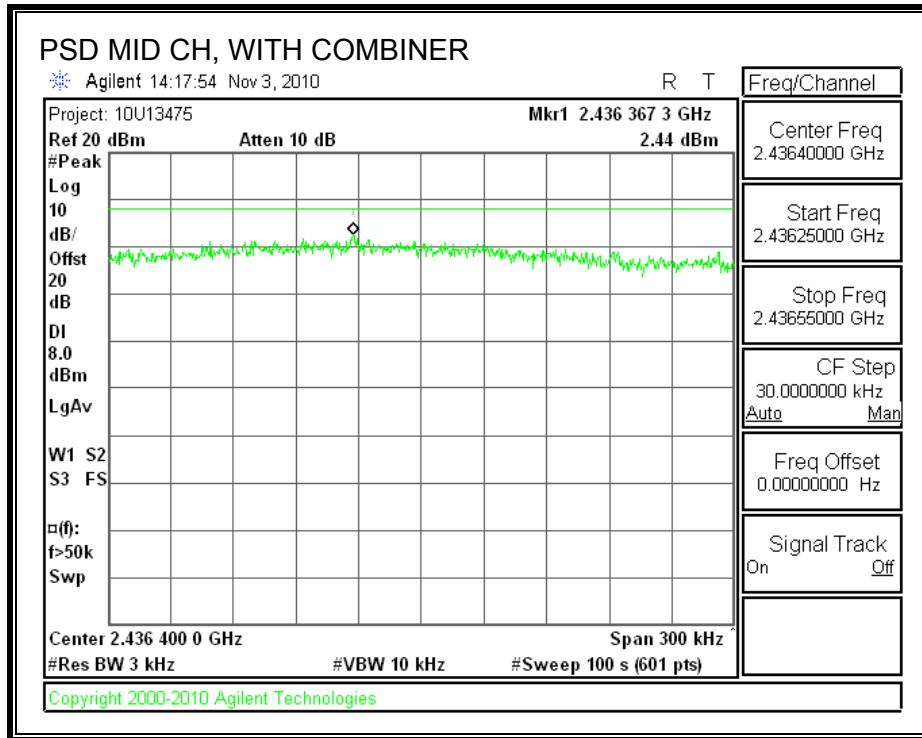
Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

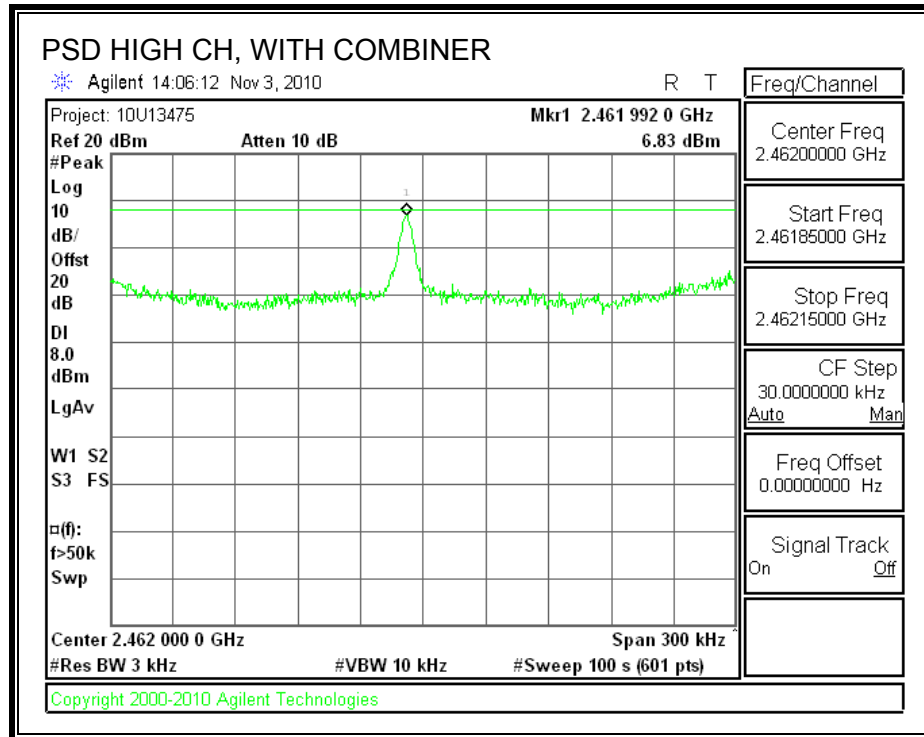
RESULTS

| Channel | Frequency (MHz) | PSD with Combiner (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|----------------------------|----------------|----------------|
| Low | 2412 | 7.93 | 8 | -0.07 |
| Middle | 2437 | 2.44 | 8 | -5.56 |
| High | 2462 | 6.83 | 8 | -1.17 |

POWER SPECTRAL DENSITY, WITH COMBINER







7.3.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of Peak Power using wideband power meter; therefore the required attenuation is 20 dB.

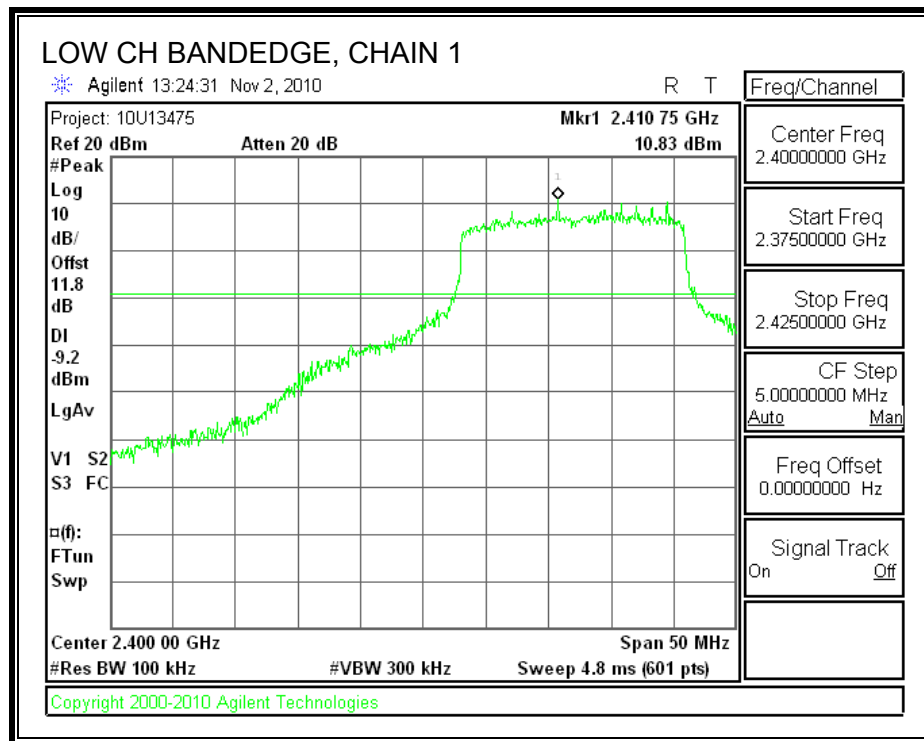
TEST PROCEDURE

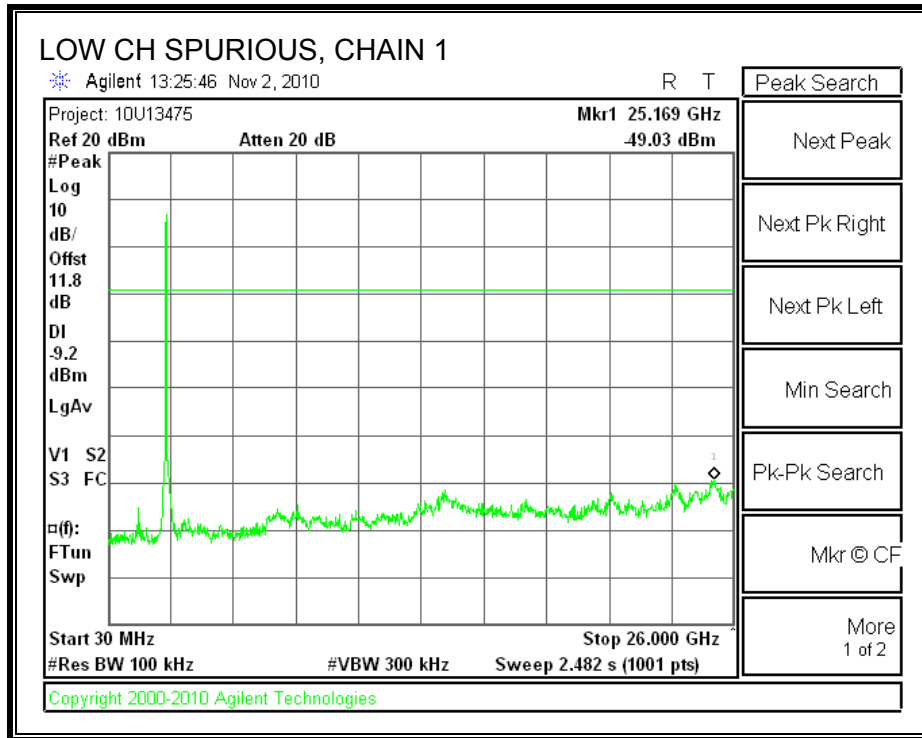
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

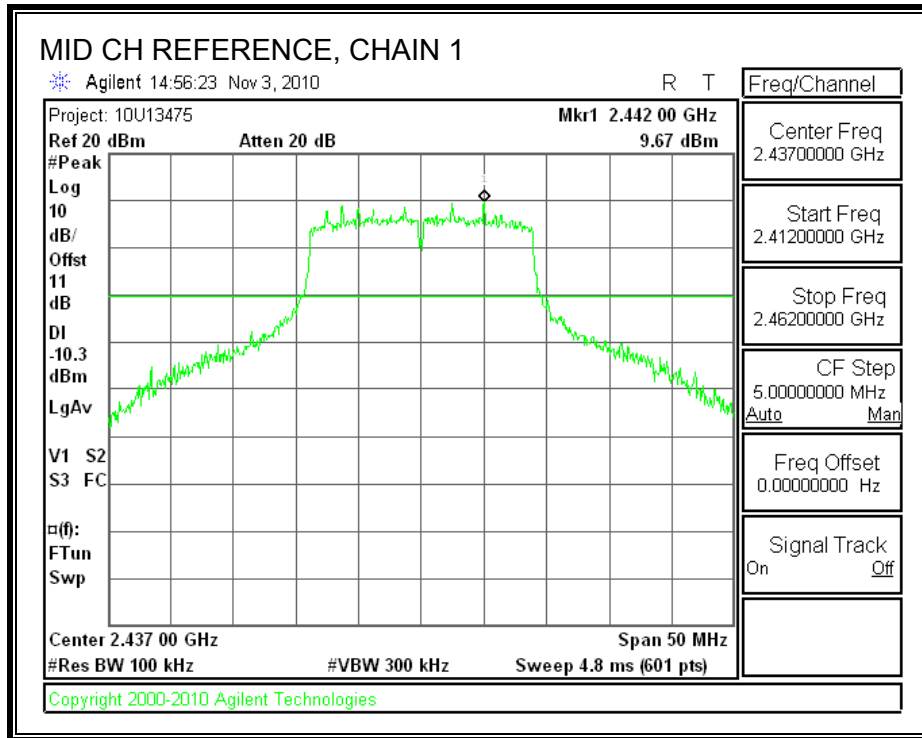
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

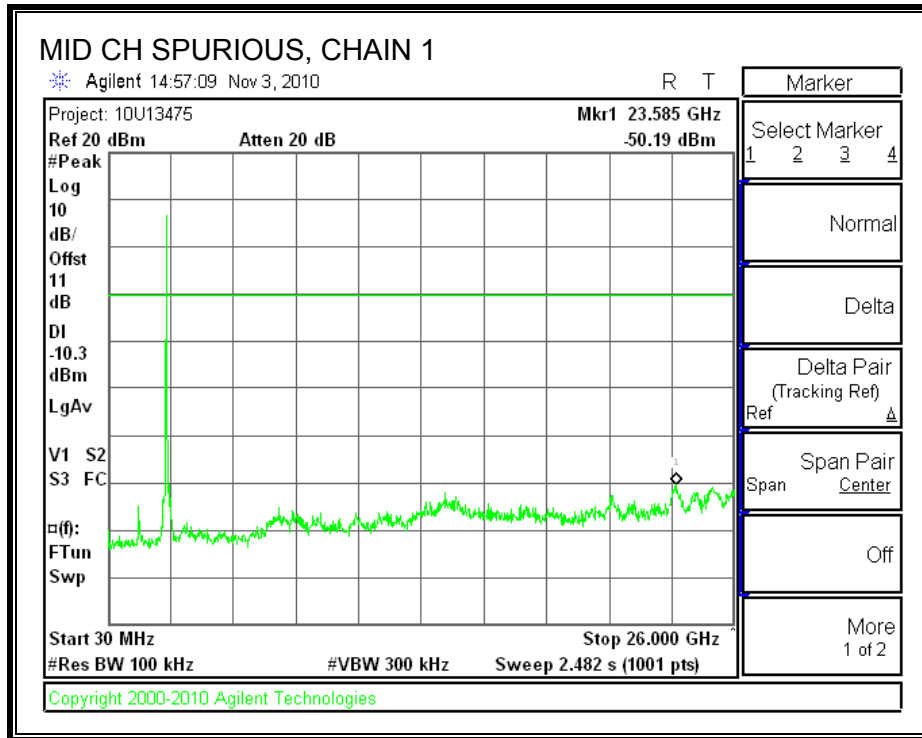
RESULTS

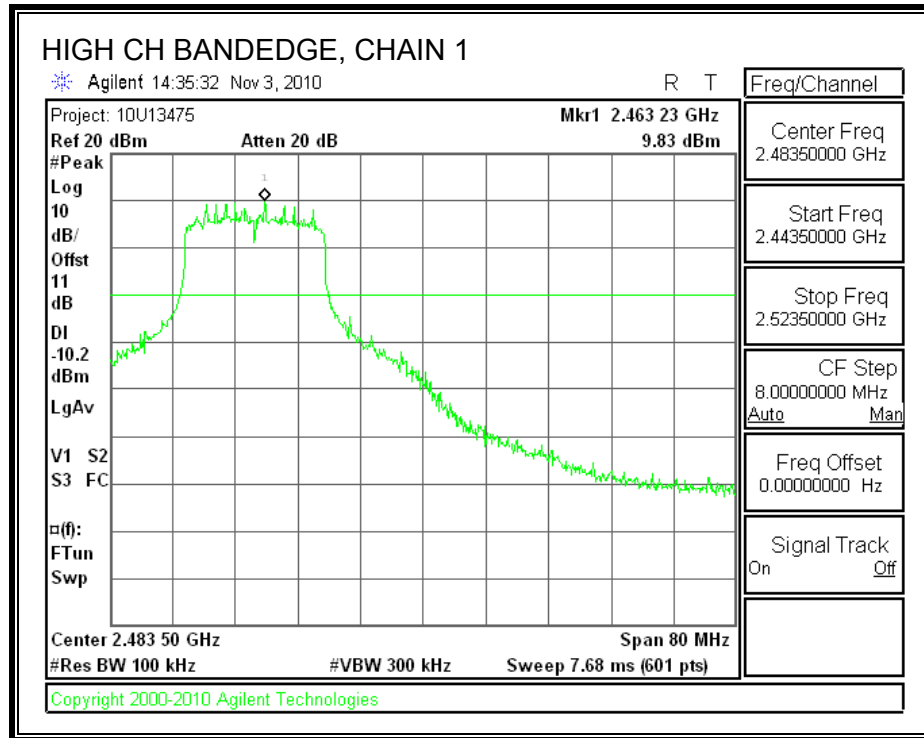
CHAIN 1 SPURIOUS EMISSIONS

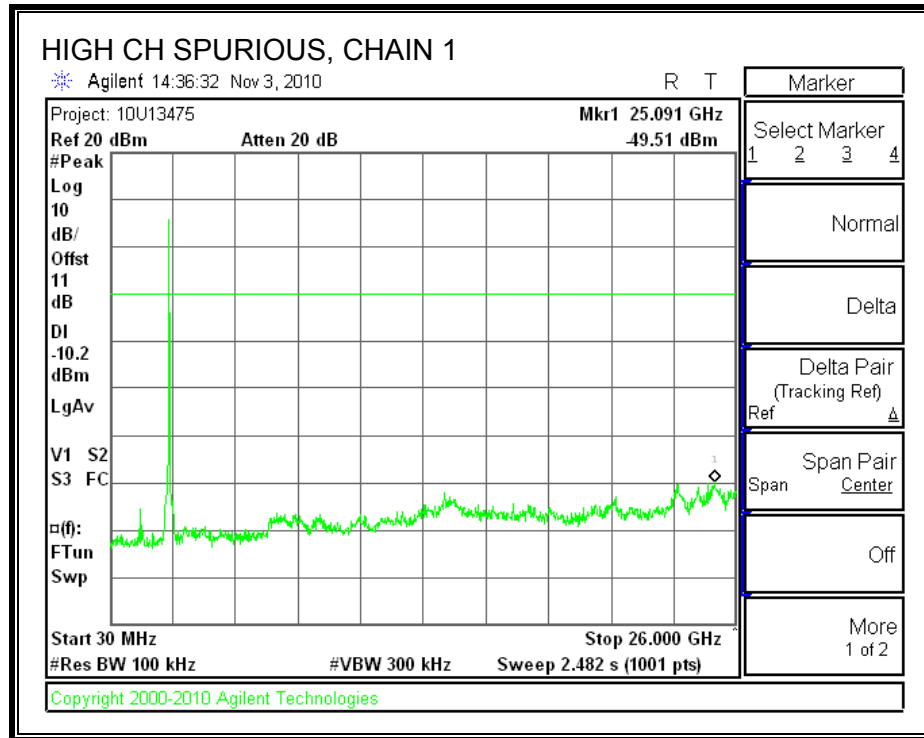




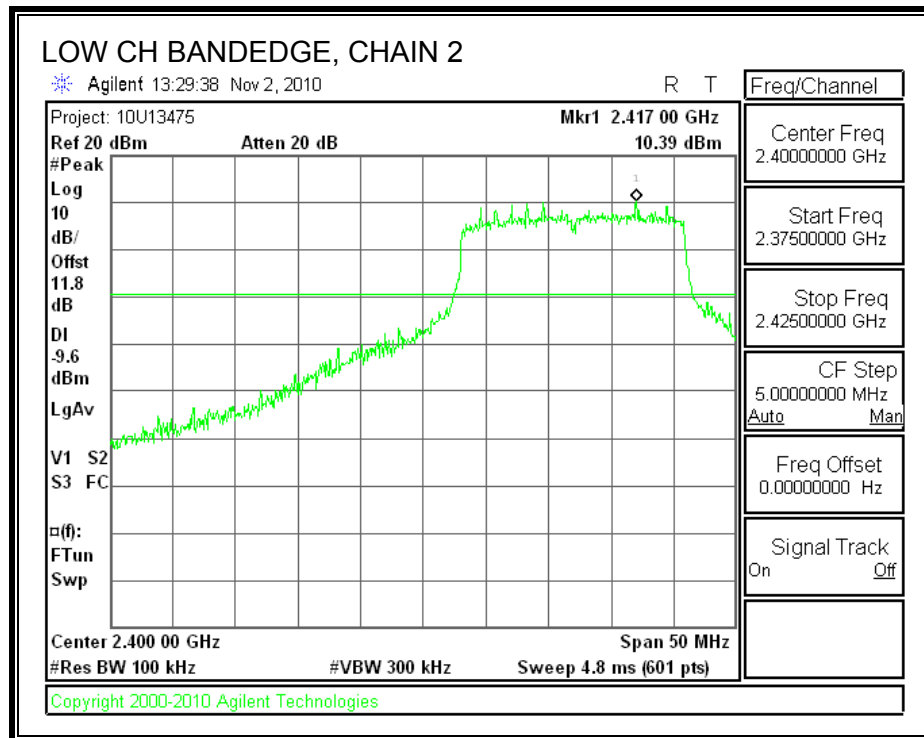


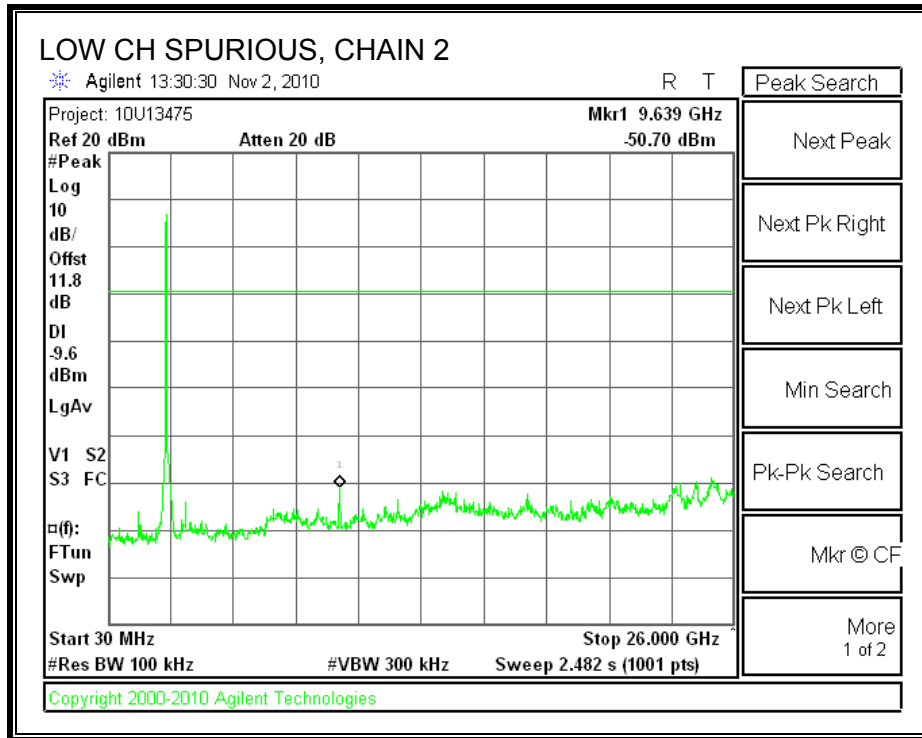


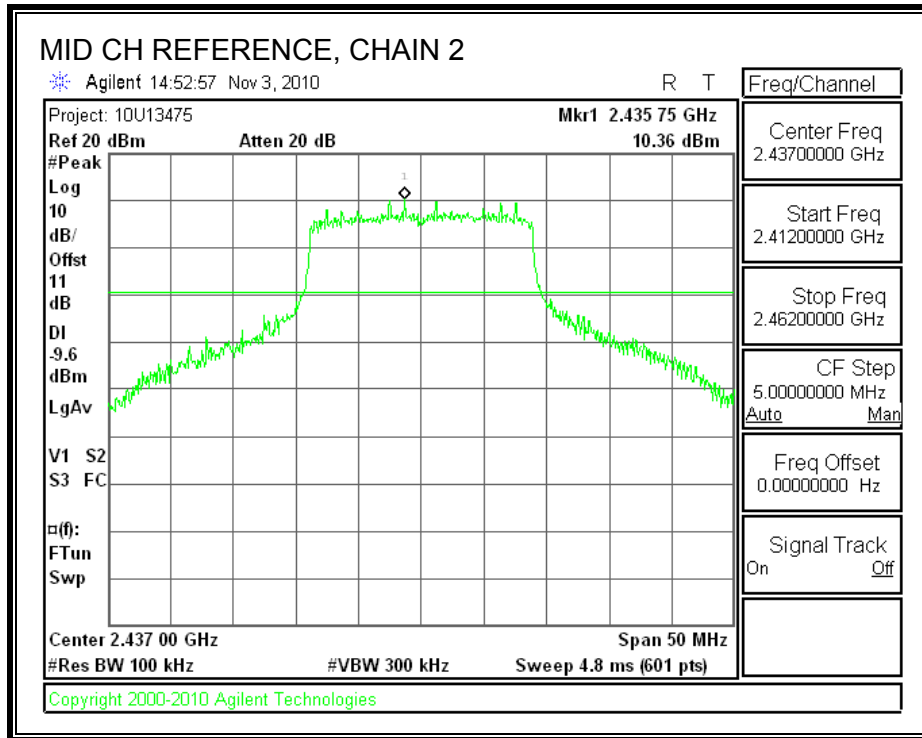


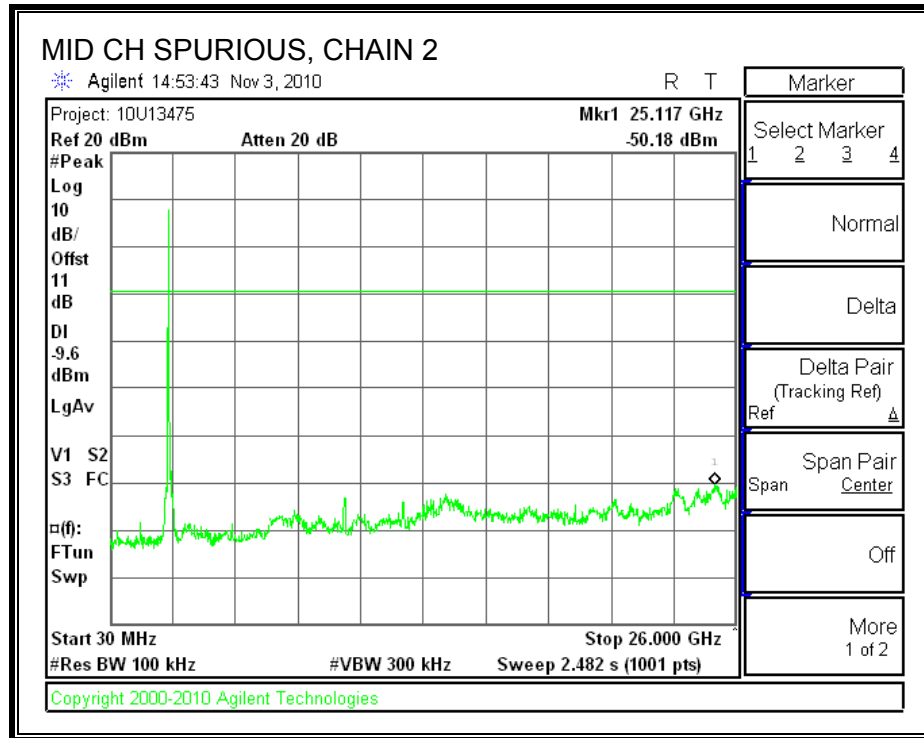


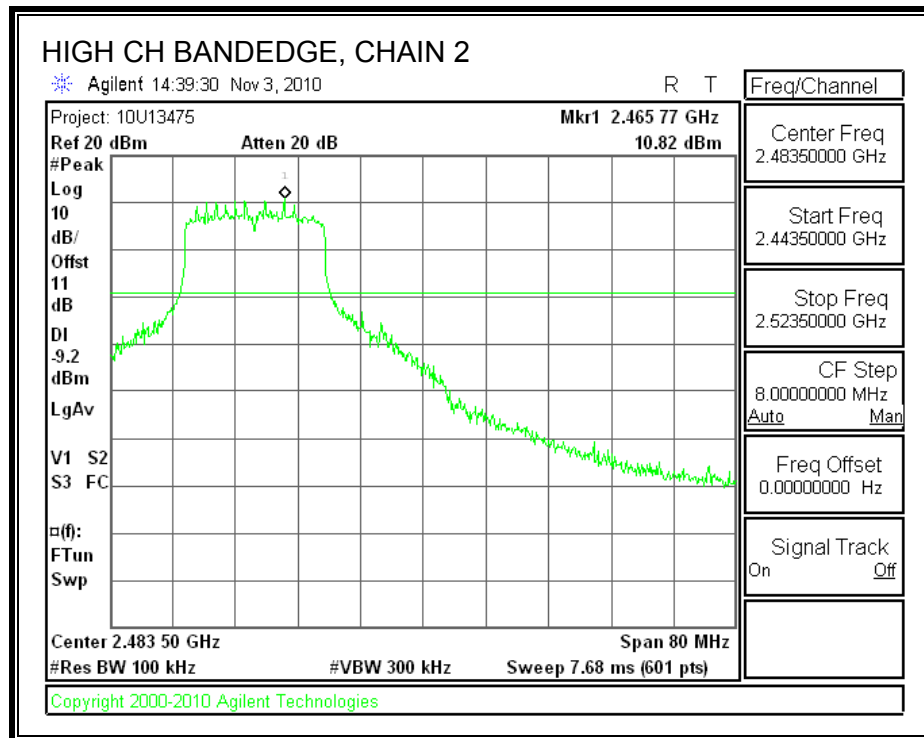
CHAIN 2 SPURIOUS EMISSIONS

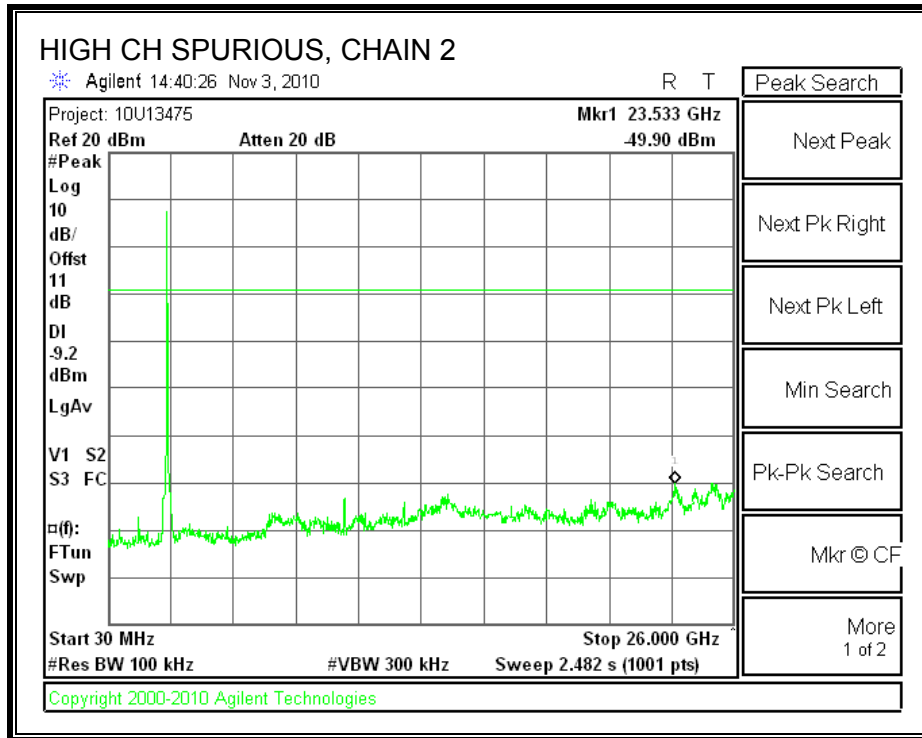




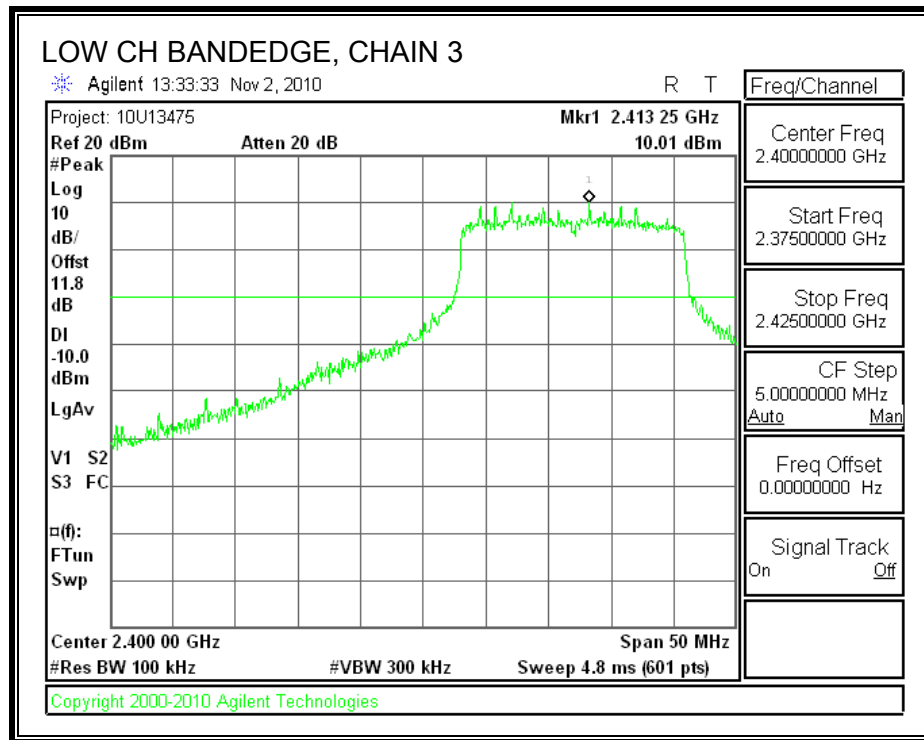


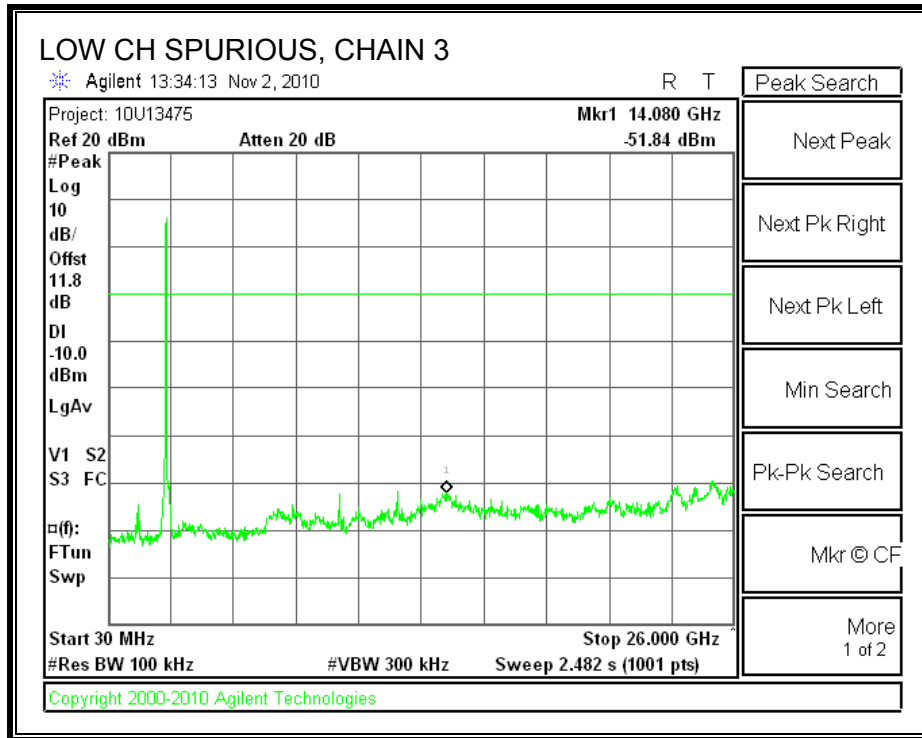


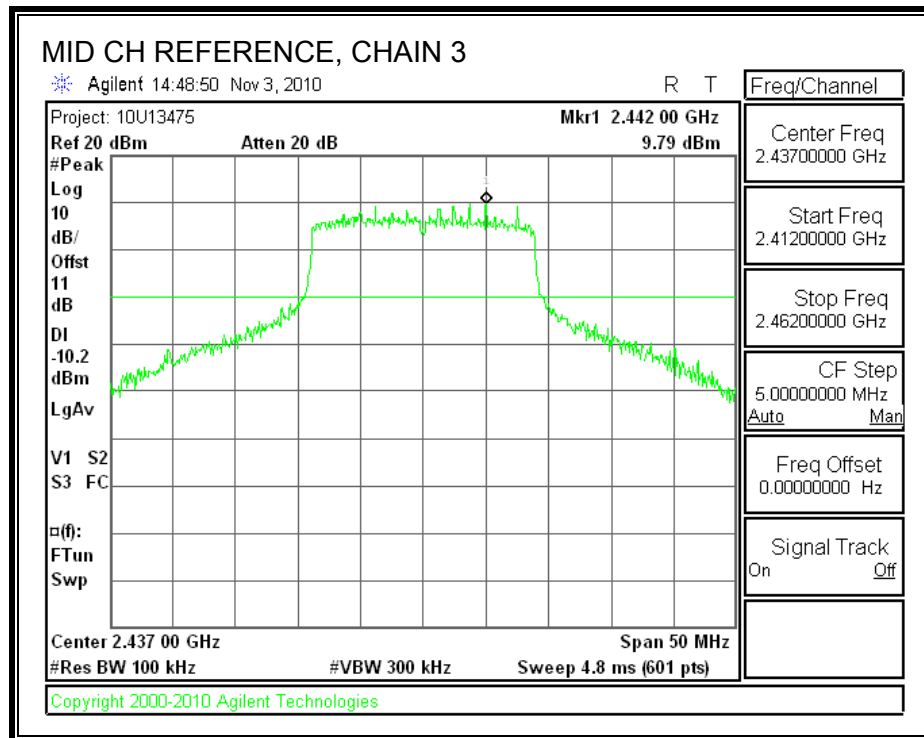


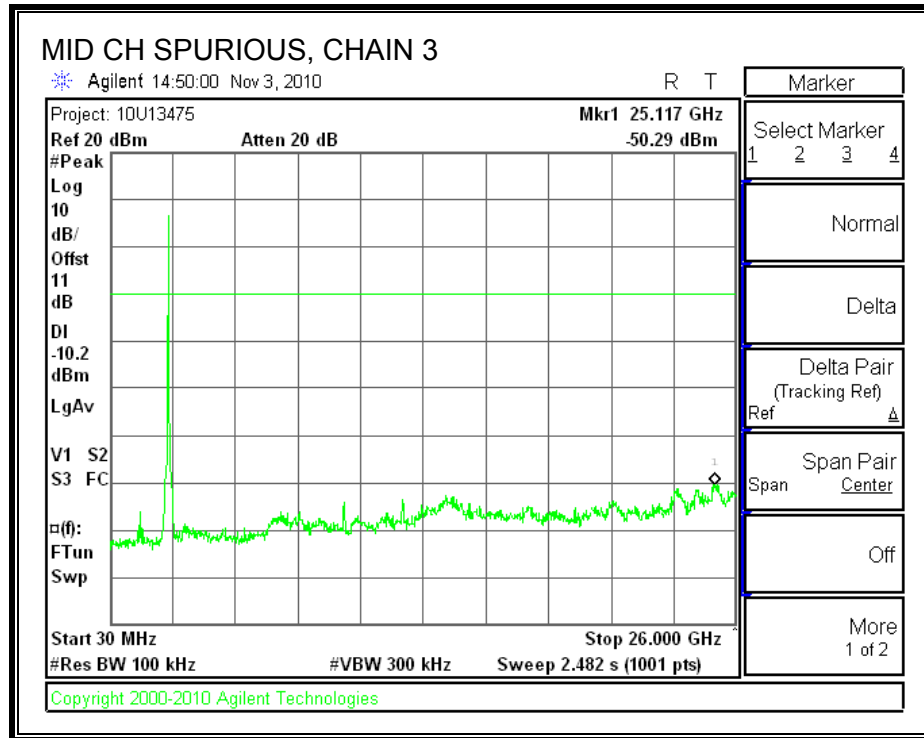


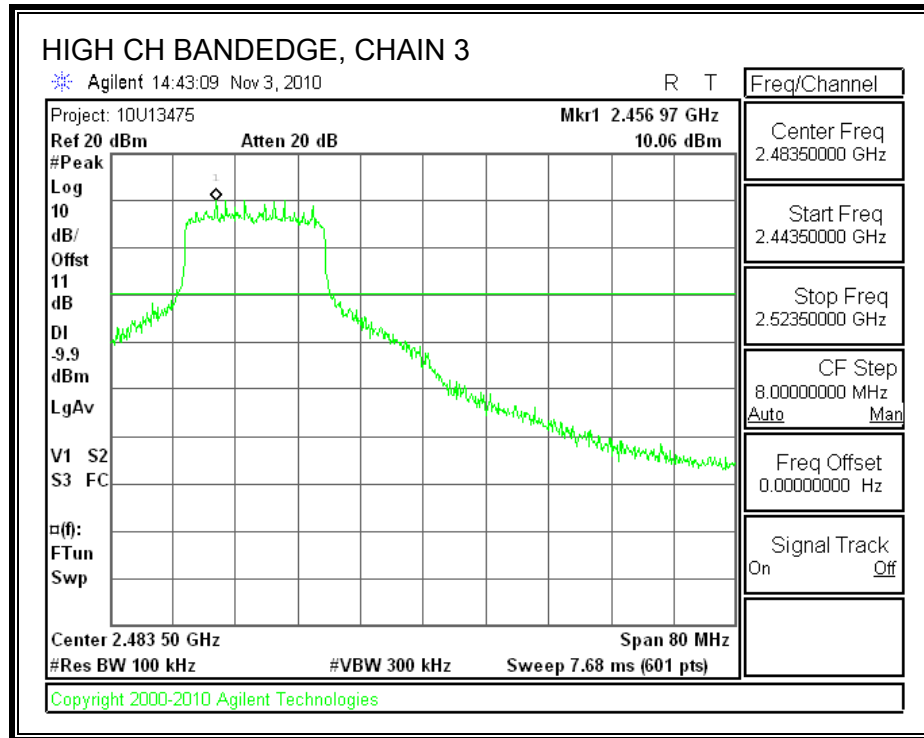
CHAIN 3 SPURIOUS EMISSIONS

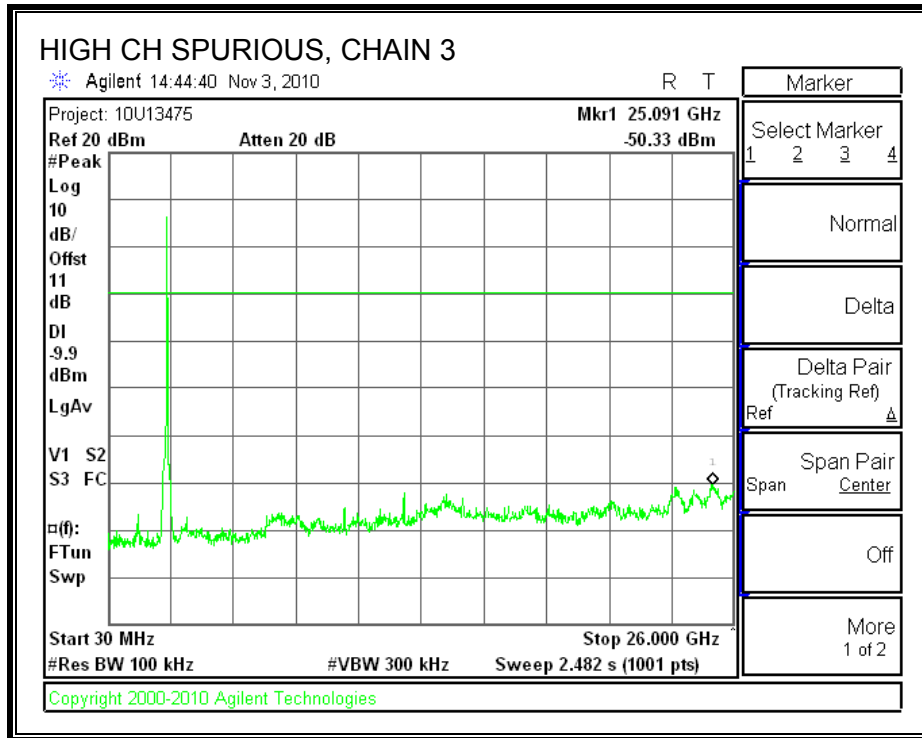












7.4. 802.11n THREE CHAINS HT40 MODE IN THE 2.4 GHz BAND

7.4.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

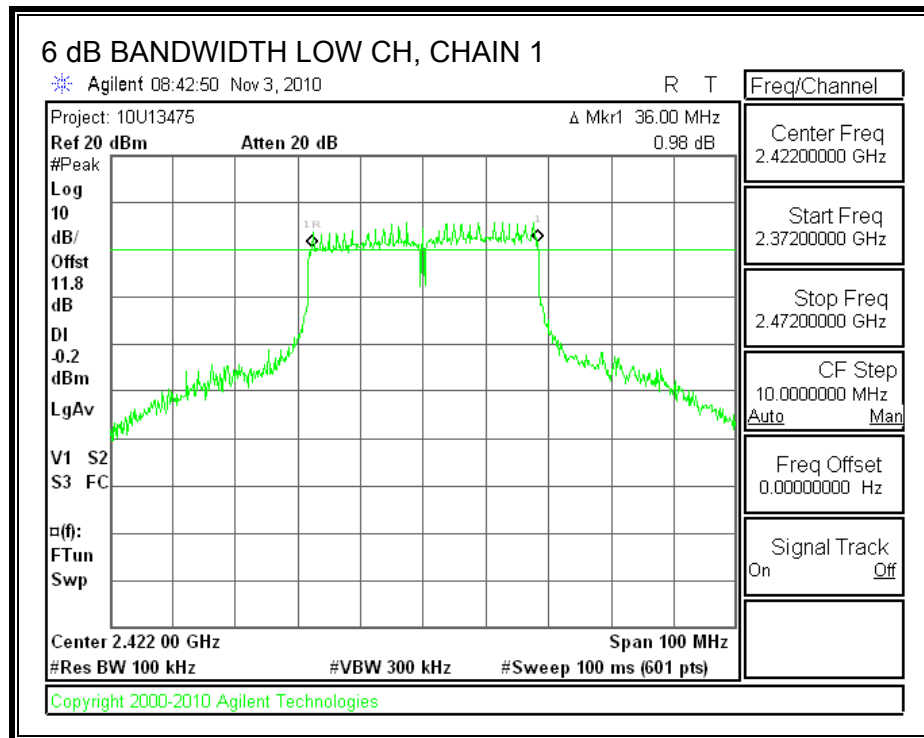
TEST PROCEDURE

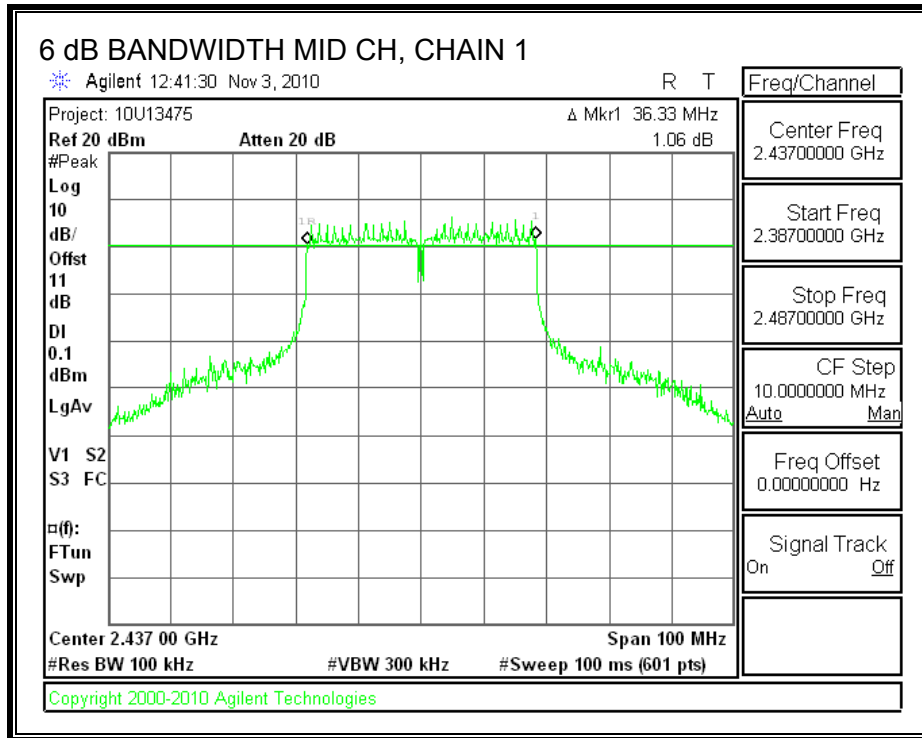
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

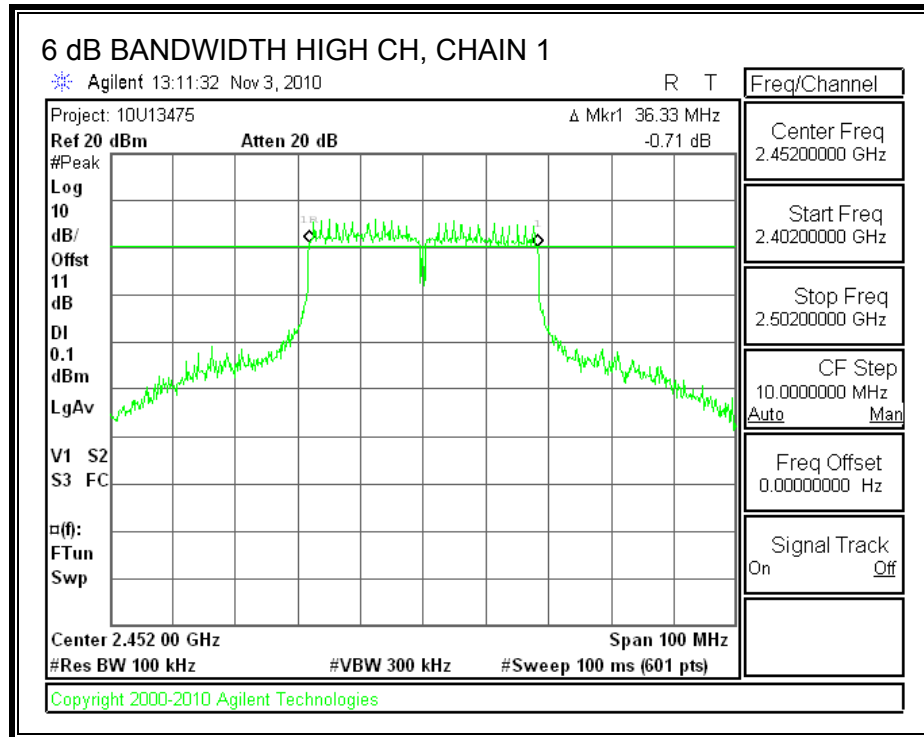
RESULTS

| Channel | Frequency (MHz) | Chain 1 6 dB BW (MHz) | Chain 2 6 dB BW (MHz) | Chain 3 6 dB BW (MHz) | Minimum Limit (MHz) |
|---------|--------------------|-----------------------------|-----------------------------|-----------------------------|------------------------|
| Low | 2422 | 36.00 | 35.83 | 35.83 | 0.5 |
| Middle | 2437 | 36.33 | 36.00 | 36.17 | 0.5 |
| High | 2452 | 36.33 | 36.33 | 36.50 | 0.5 |

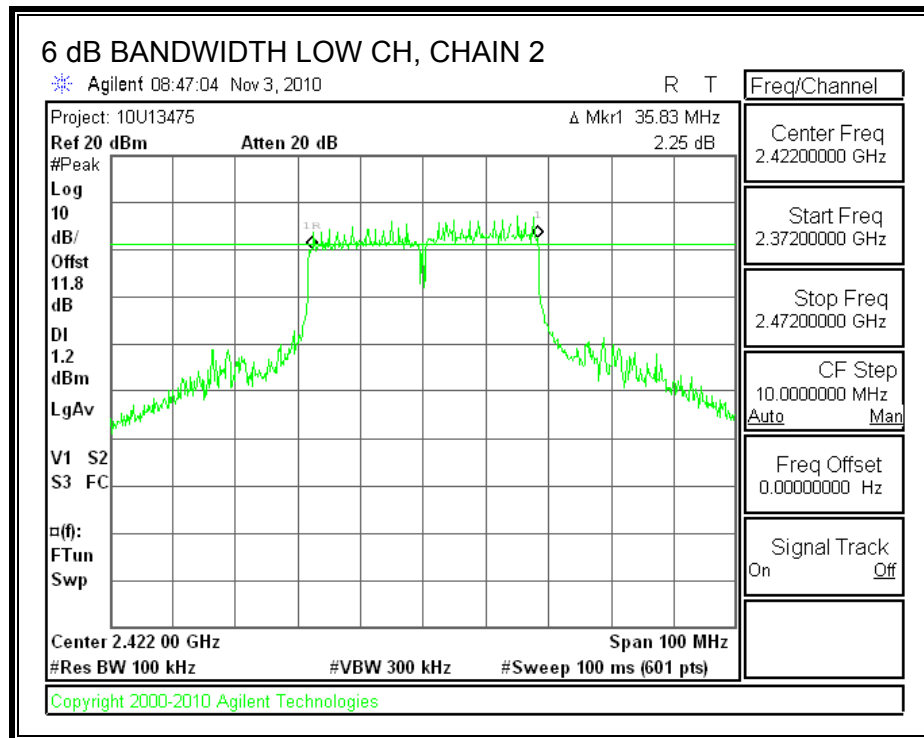
6 dB BANDWIDTH, CHAIN 1

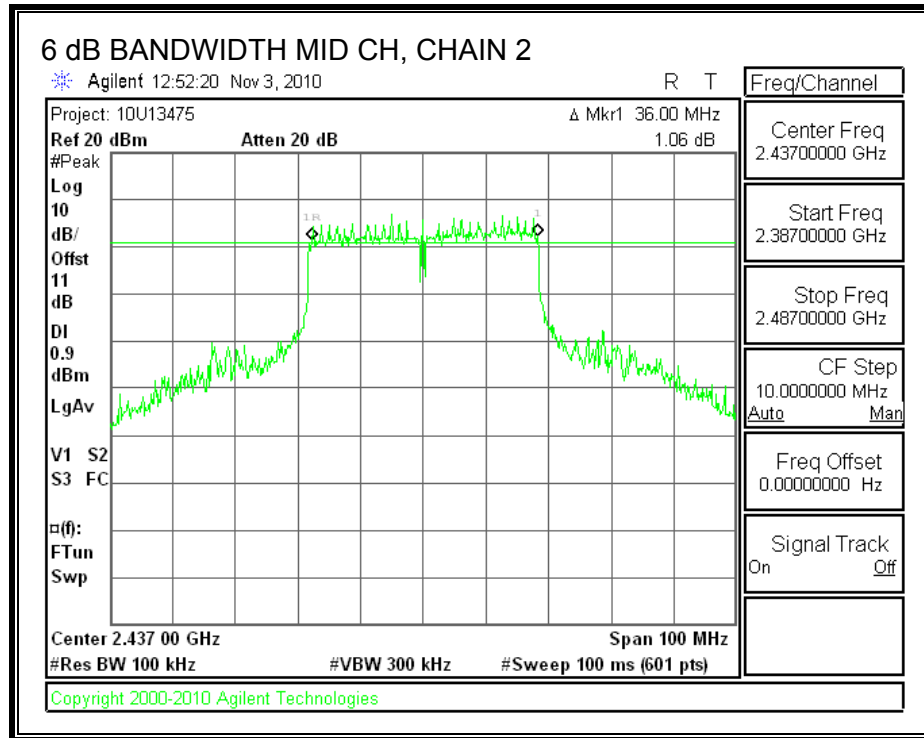


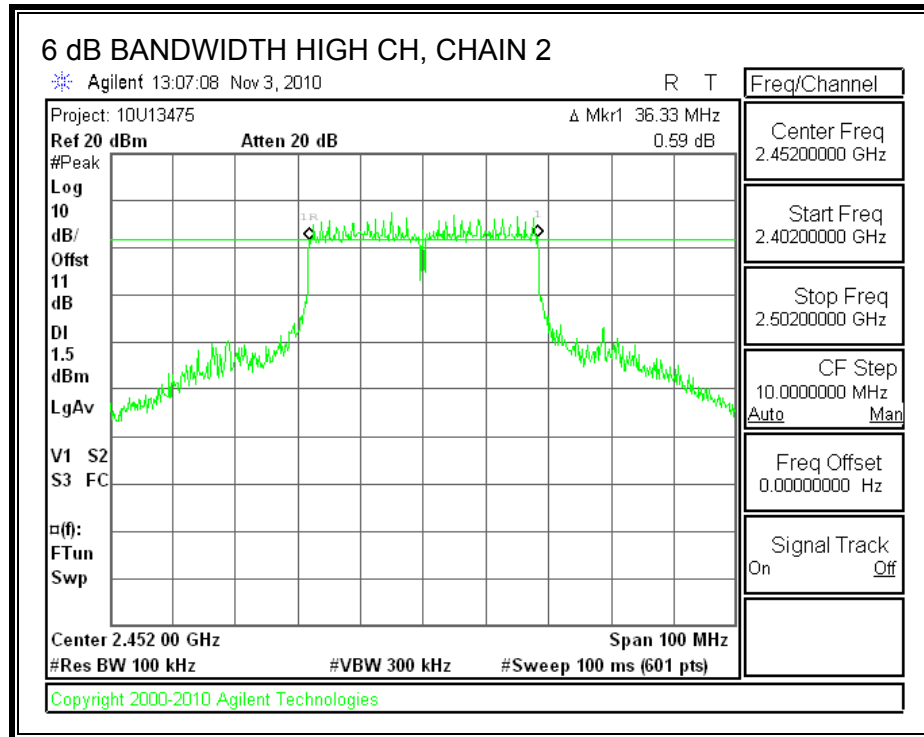




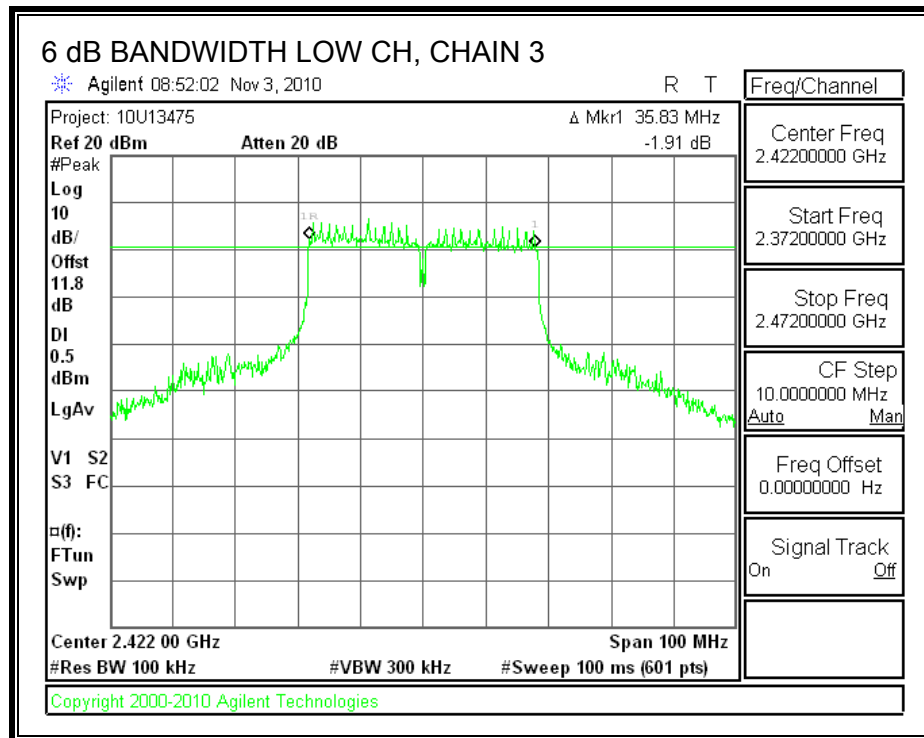
6 dB BANDWIDTH, CHAIN 2

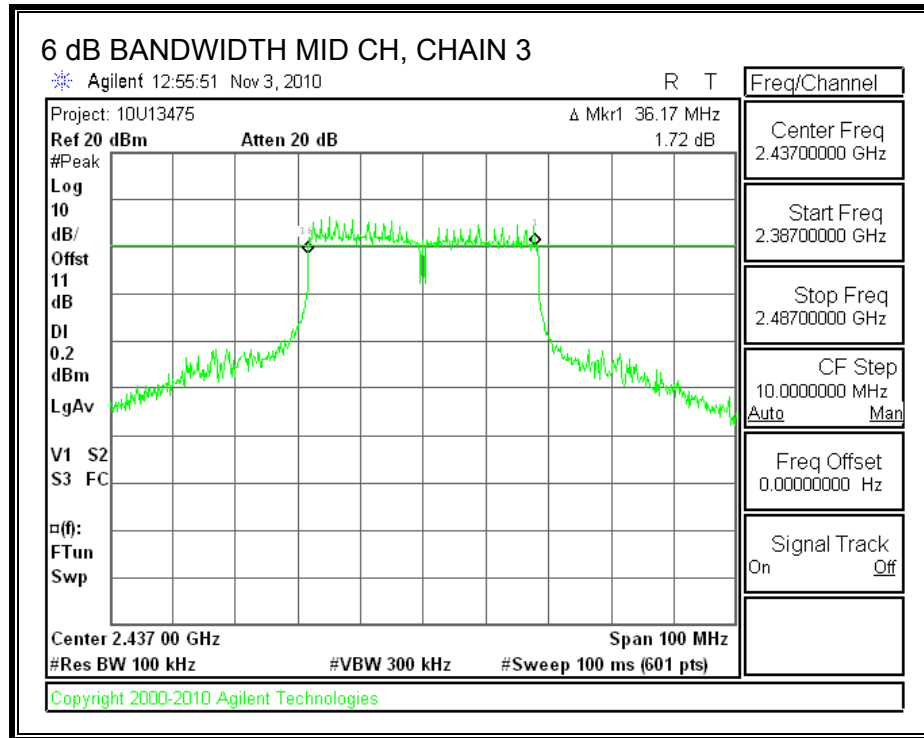


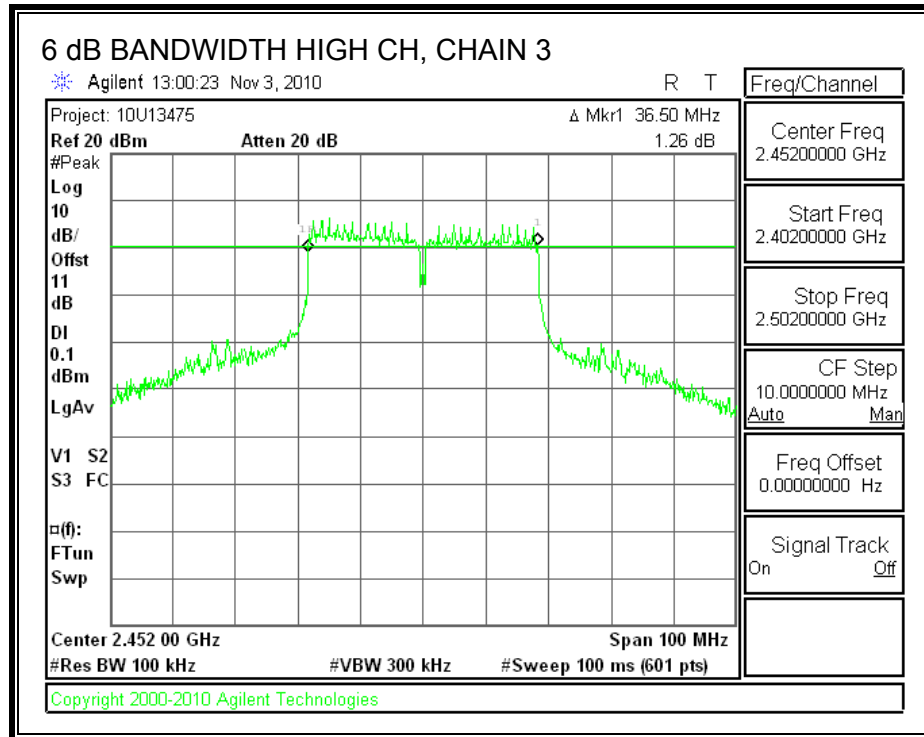




6 dB BANDWIDTH, CHAIN 3







7.4.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

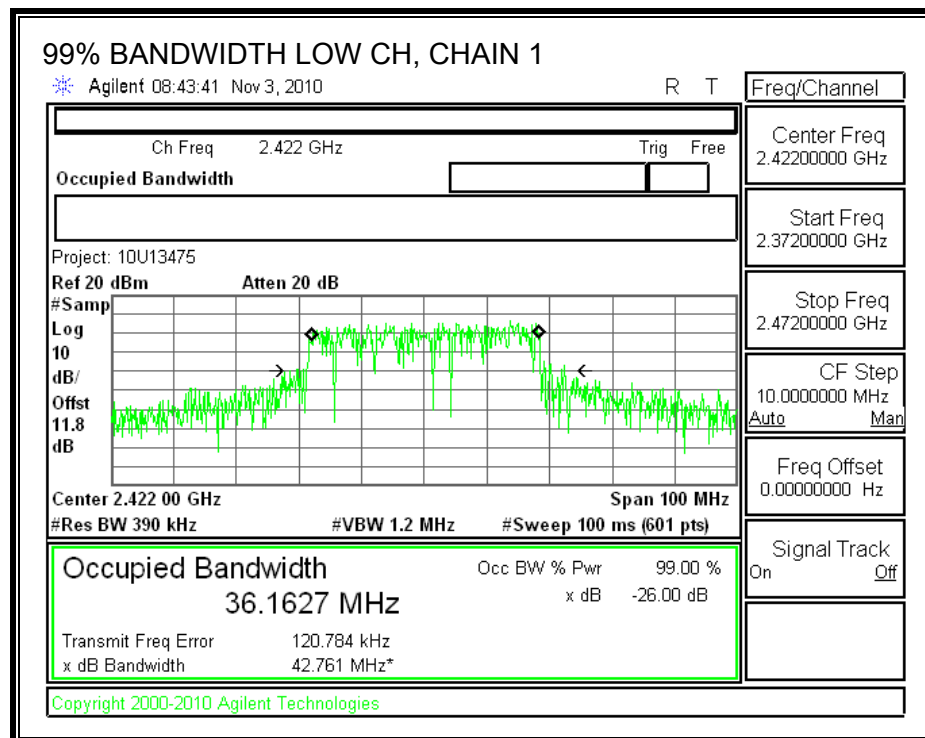
TEST PROCEDURE

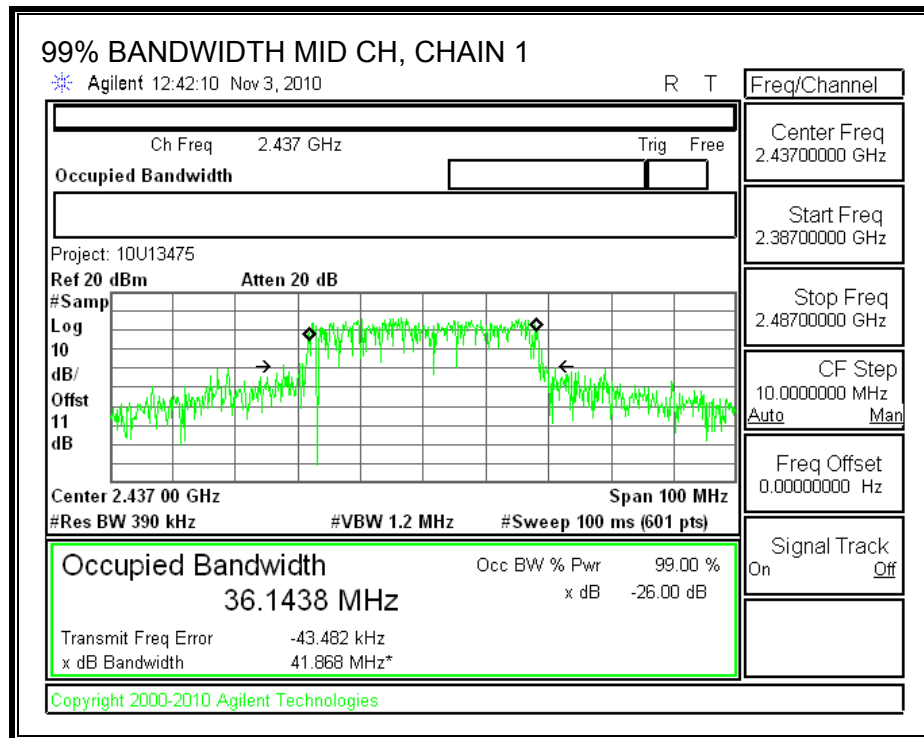
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

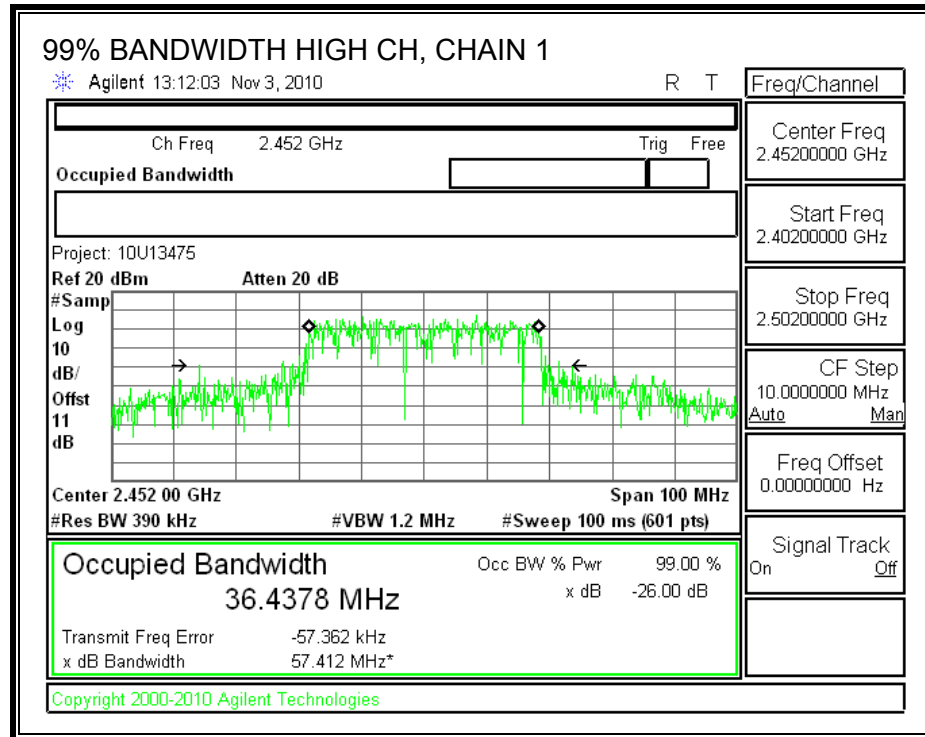
RESULTS

| Channel | Frequency (MHz) | Chain 1 99% Bandwidth (MHz) | Chain 2 99% Bandwidth (MHz) | Chain 3 99% Bandwidth (MHz) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Low | 2422 | 36.1627 | 36.1271 | 36.0053 |
| Middle | 2437 | 36.1438 | 36.1170 | 36.3176 |
| High | 2452 | 36.4378 | 36.2989 | 36.4360 |

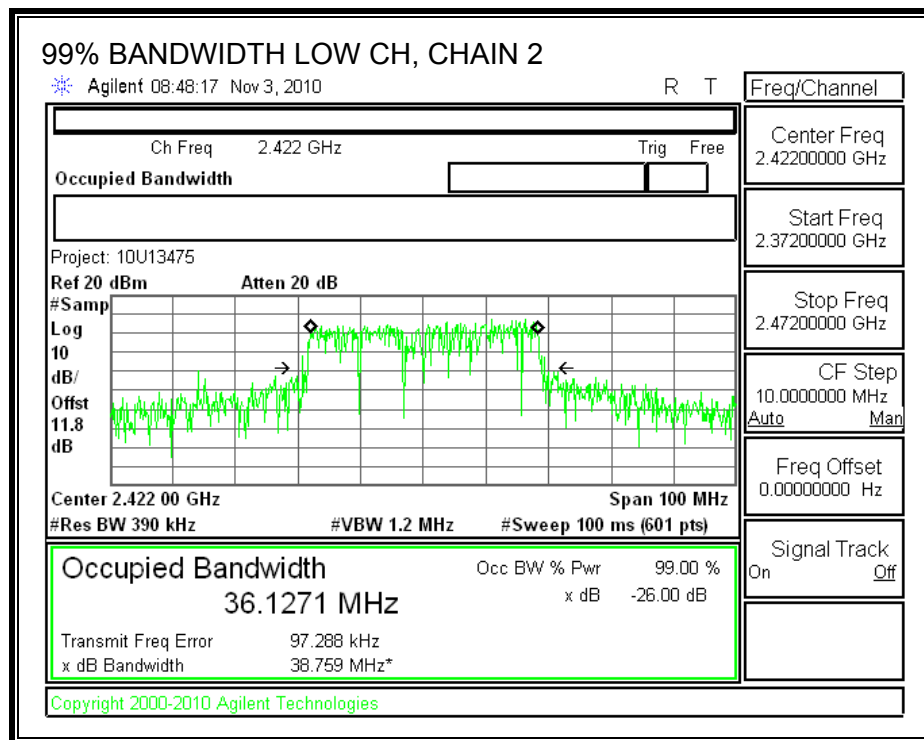
99% BANDWIDTH, CHAIN 1

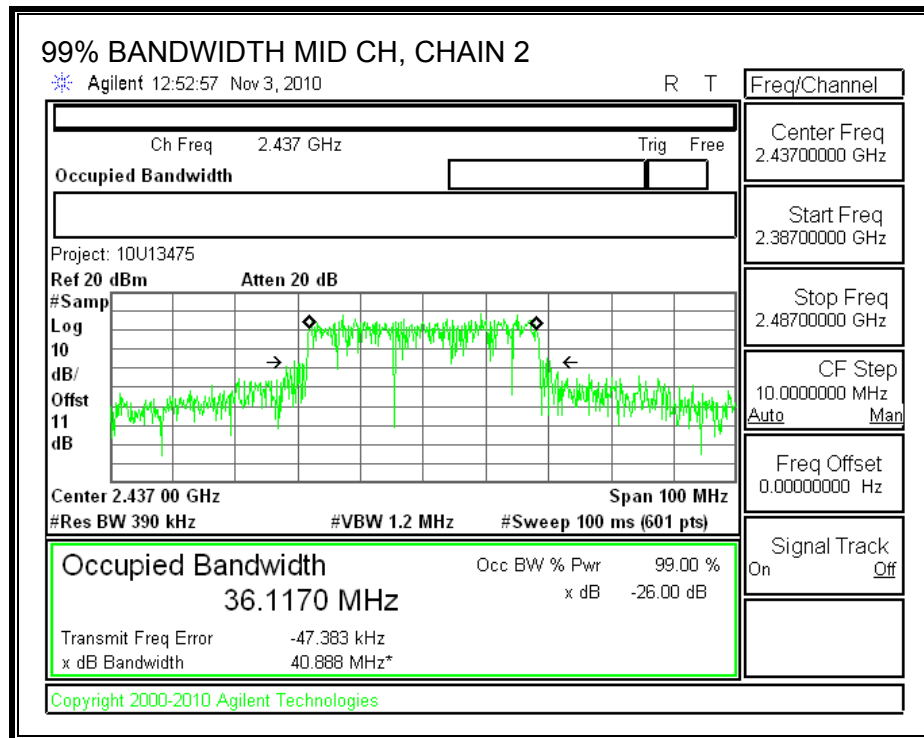


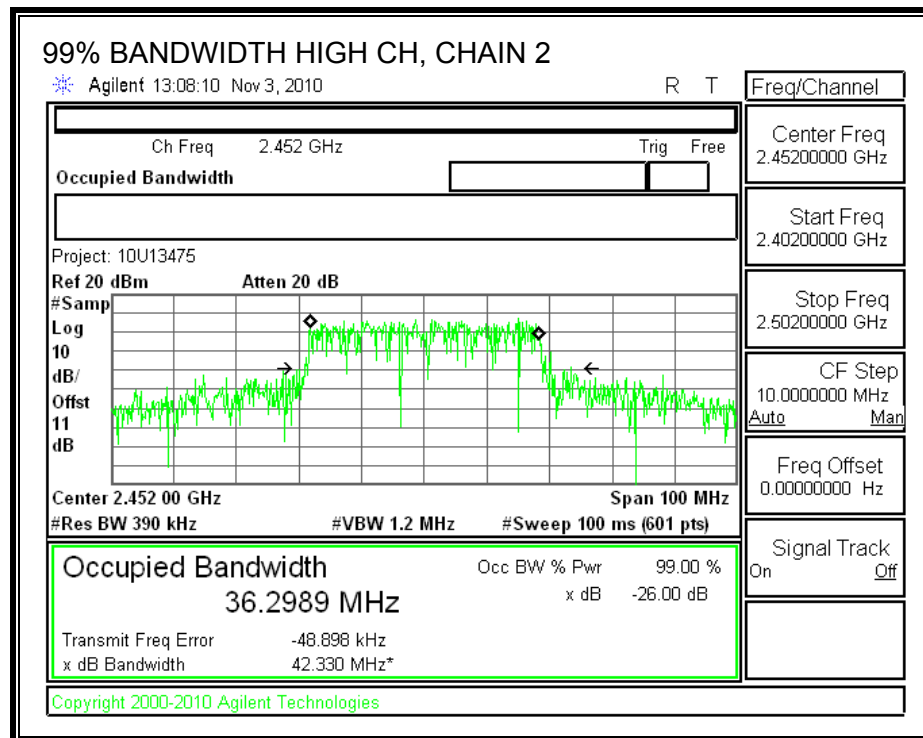




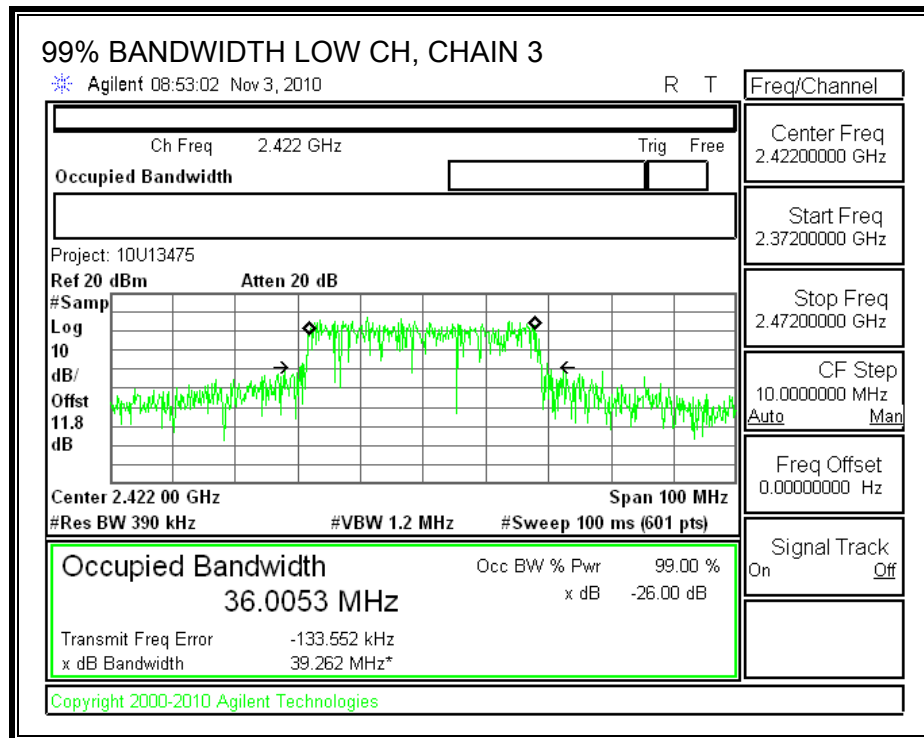
99% BANDWIDTH, CHAIN 2

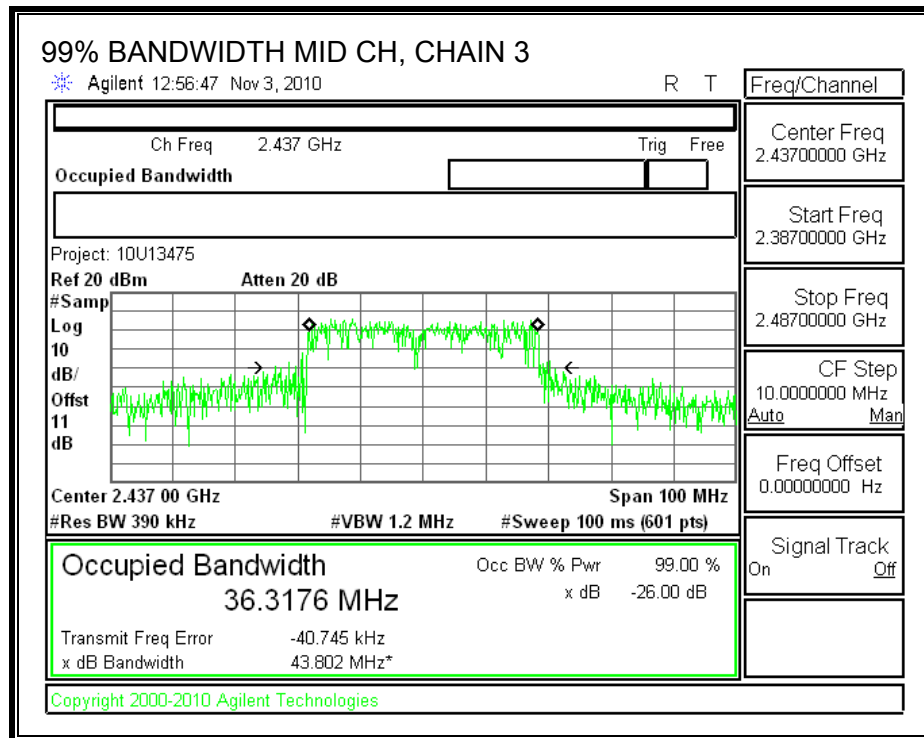


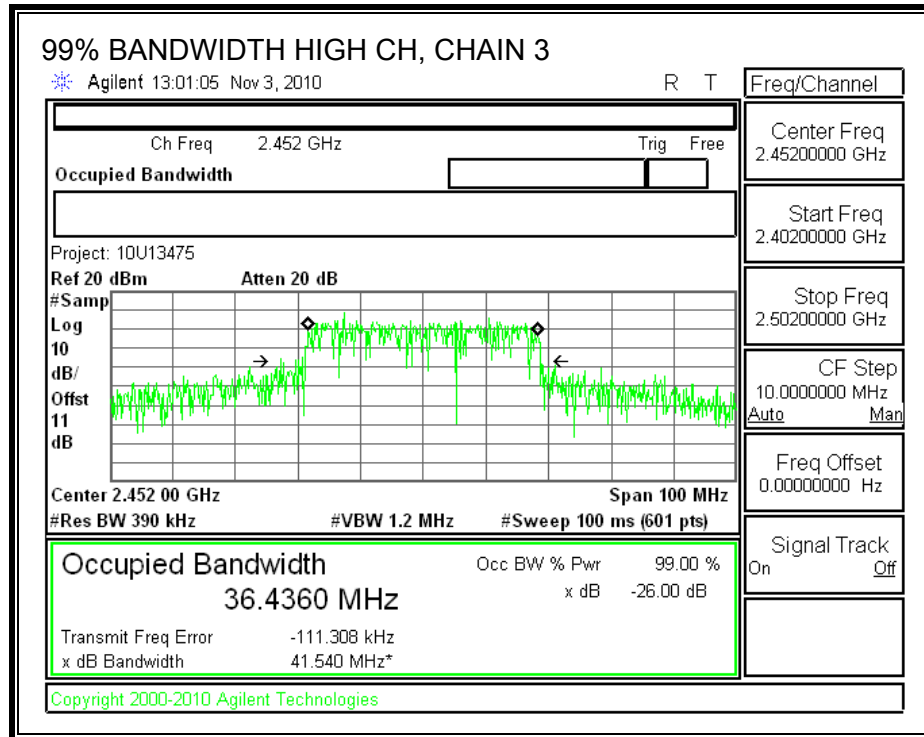




99% BANDWIDTH, CHAIN 3







7.4.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain of **5.0 dBi** is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

Peak power is measured using a wide bandwidth peak power meter.

RESULTS

| Channel | Frequency (MHz) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Chain 3 Power (dBm) | Attenuator + Cable Loss (dB) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|---------------------------|---------------------------|---------------------------|------------------------------------|-------------------------|----------------|----------------|
| Low | 2422 | 14.07 | 15.17 | 13.62 | 10.80 | 29.91 | 30.00 | -0.09 |
| Mid | 2437 | 13.85 | 15.47 | 13.54 | 10.80 | 29.94 | 30.00 | -0.06 |
| High | 2452 | 13.07 | 14.87 | 13.04 | 10.80 | 29.32 | 30.00 | -0.68 |

7.4.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 10.8 dB (including 10 dB pad and 0.8 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency (MHz) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Chain 3 Power (dBm) | Total Power (dBm) |
|---------|--------------------|------------------------|------------------------|------------------------|----------------------|
| Low | 2422 | 17.11 | 17.66 | 16.01 | 21.75 |
| Middle | 2437 | 15.36 | 17.09 | 15.34 | 20.78 |
| High | 2452 | 14.87 | 15.98 | 14.87 | 20.04 |

7.4.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

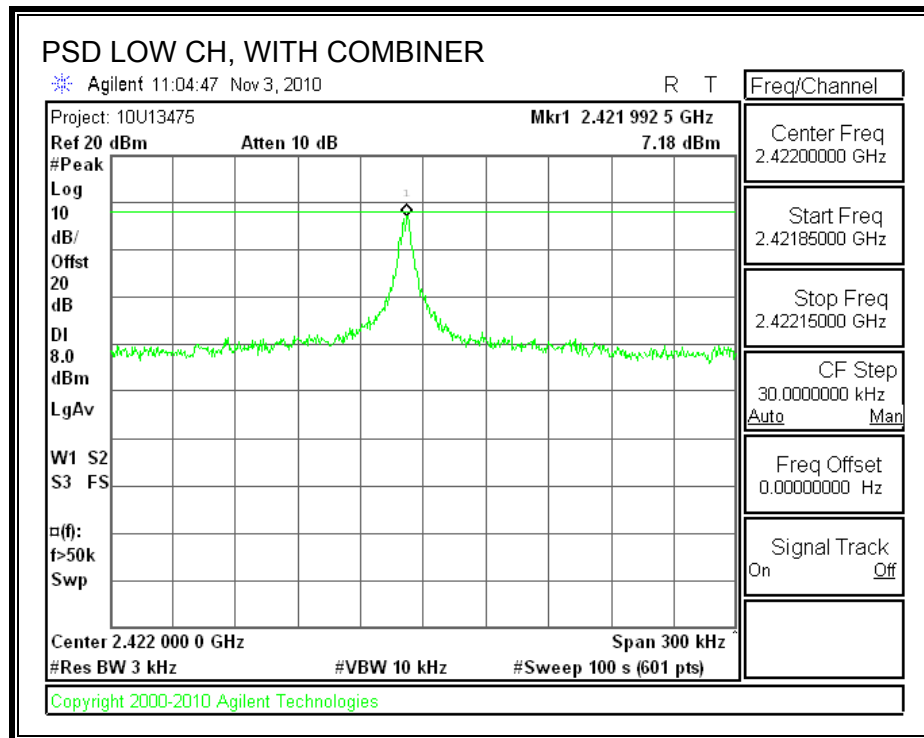
TEST PROCEDURE

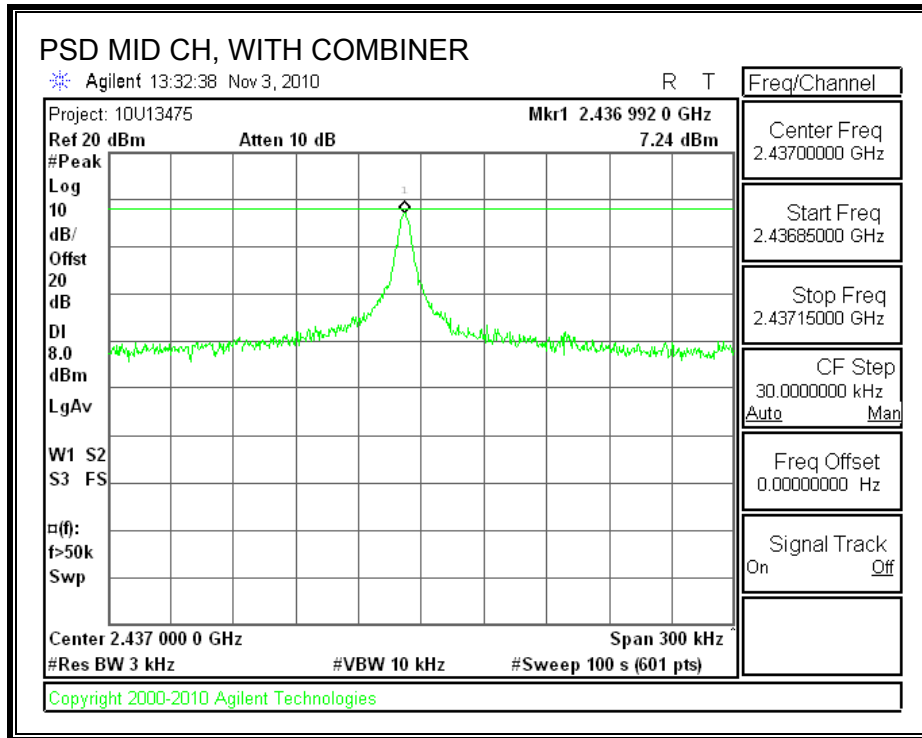
Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

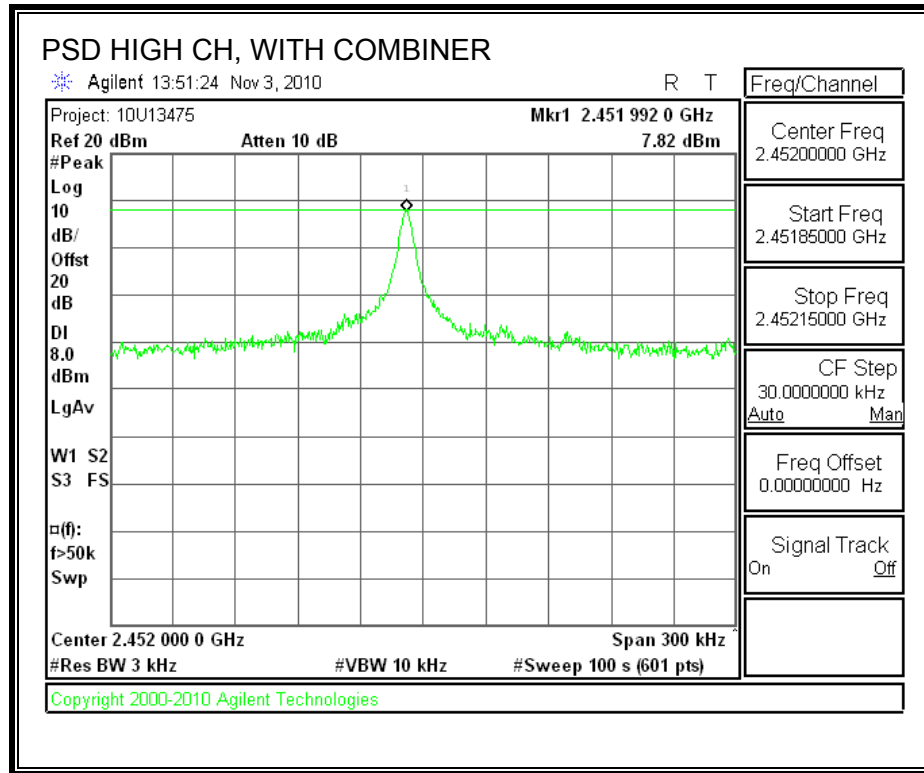
RESULTS

| Channel | Frequency (MHz) | PSD with Combiner (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|----------------------------|----------------|----------------|
| Low | 2422 | 7.18 | 8 | -0.82 |
| Middle | 2437 | 7.24 | 8 | -0.76 |
| High | 2452 | 7.82 | 8 | -0.18 |

POWER SPECTRAL DENSITY, WITH COMBINER







7.4.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of Peak Power using wideband power meter; therefore the required attenuation is 20 dB.

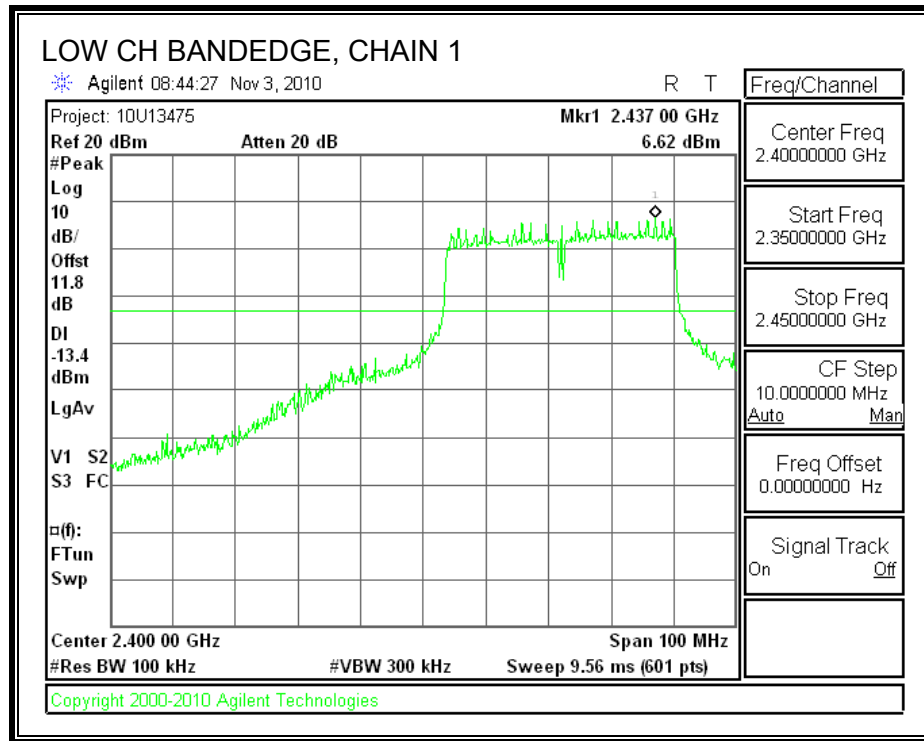
TEST PROCEDURE

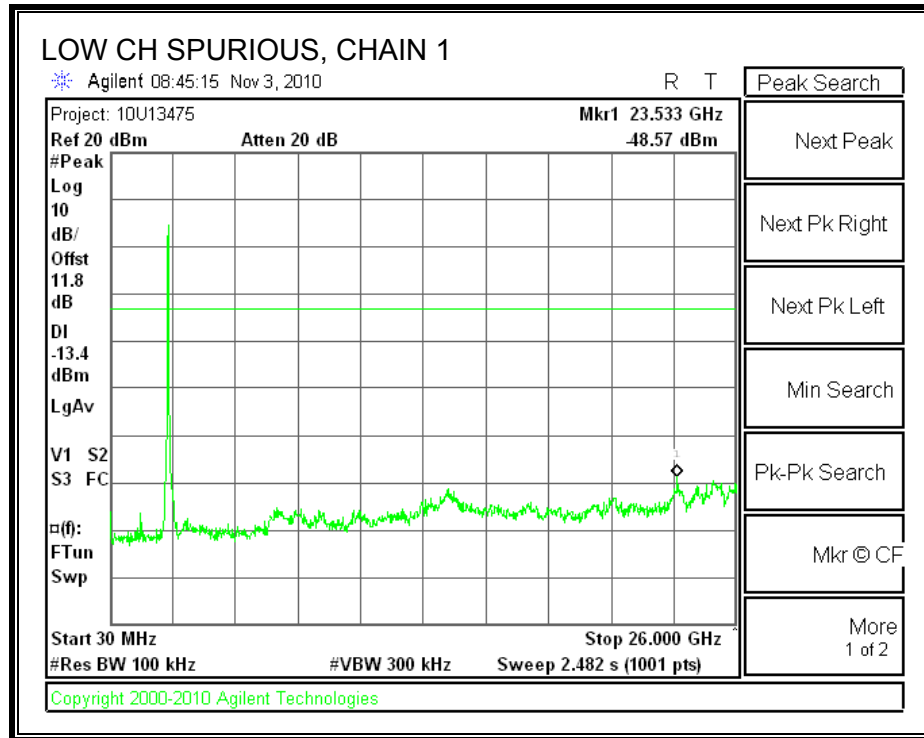
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

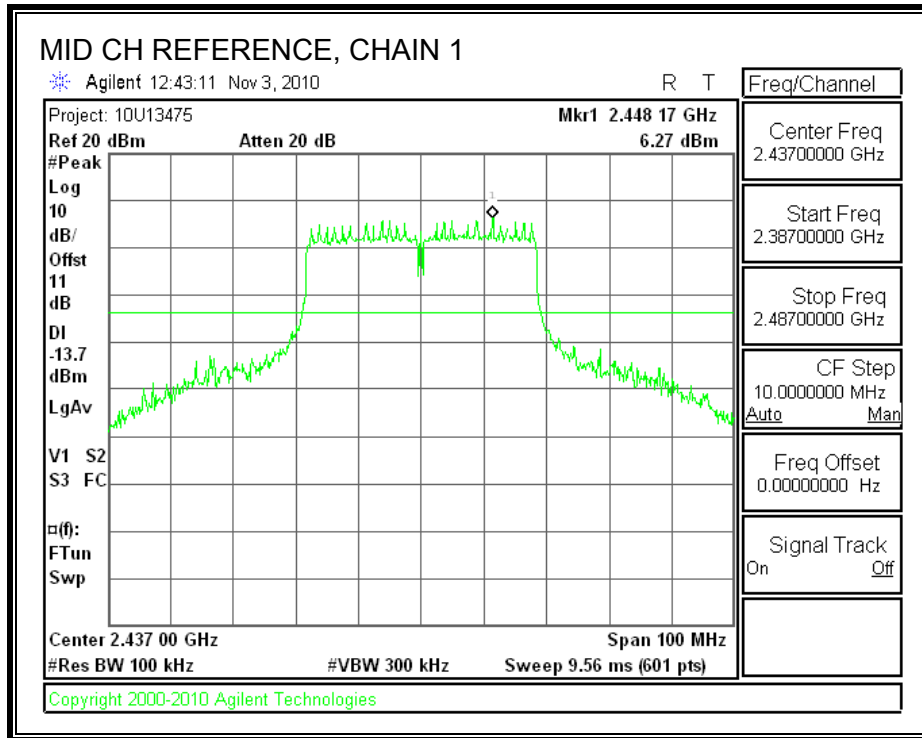
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

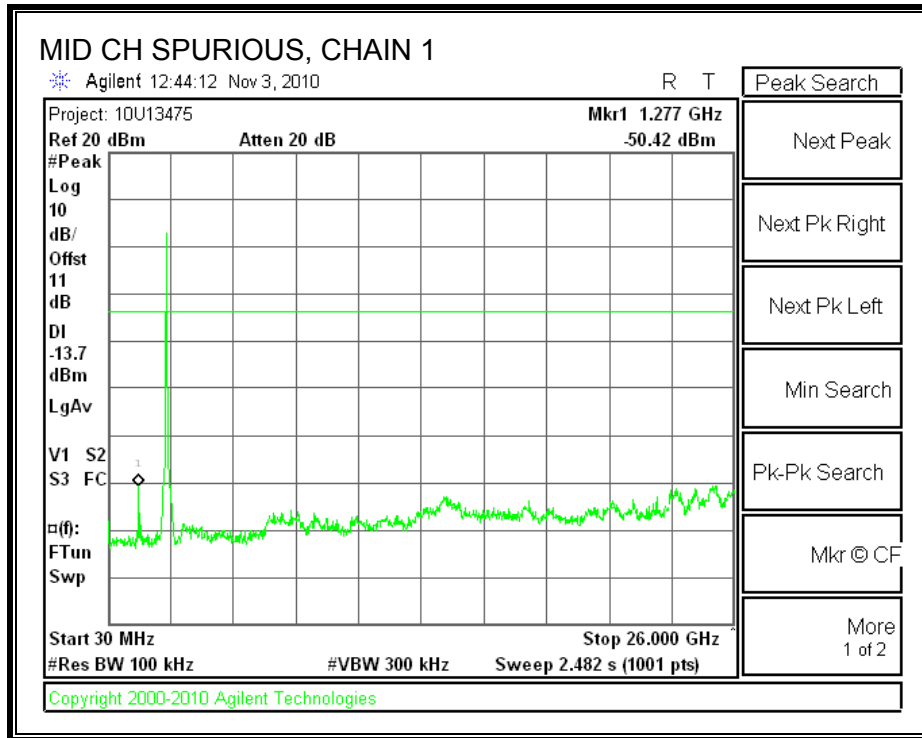
RESULTS

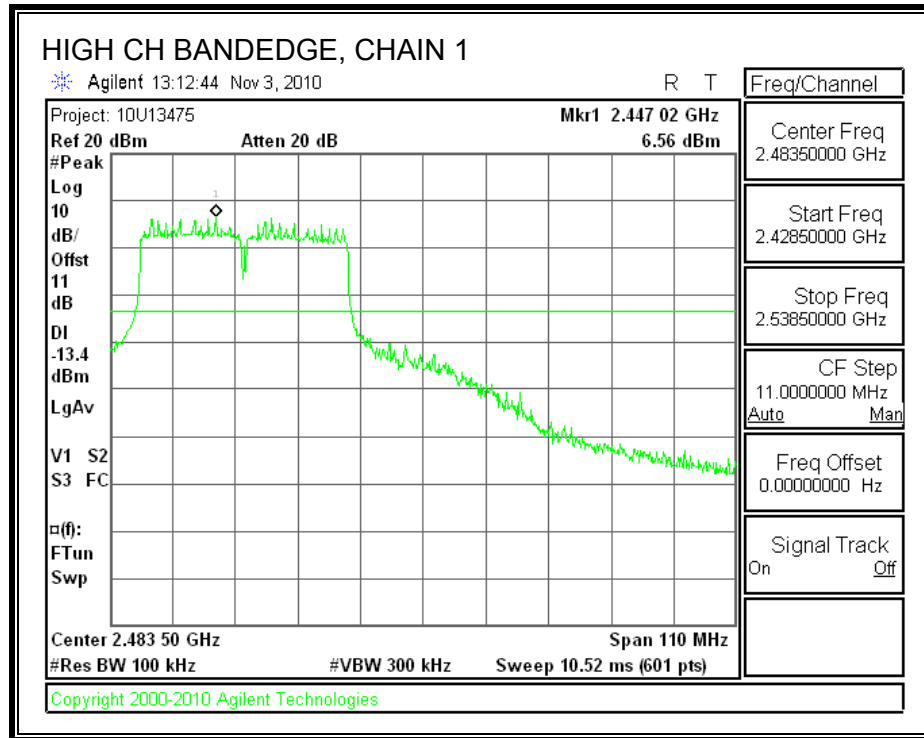
CHAIN 1 SPURIOUS EMISSIONS

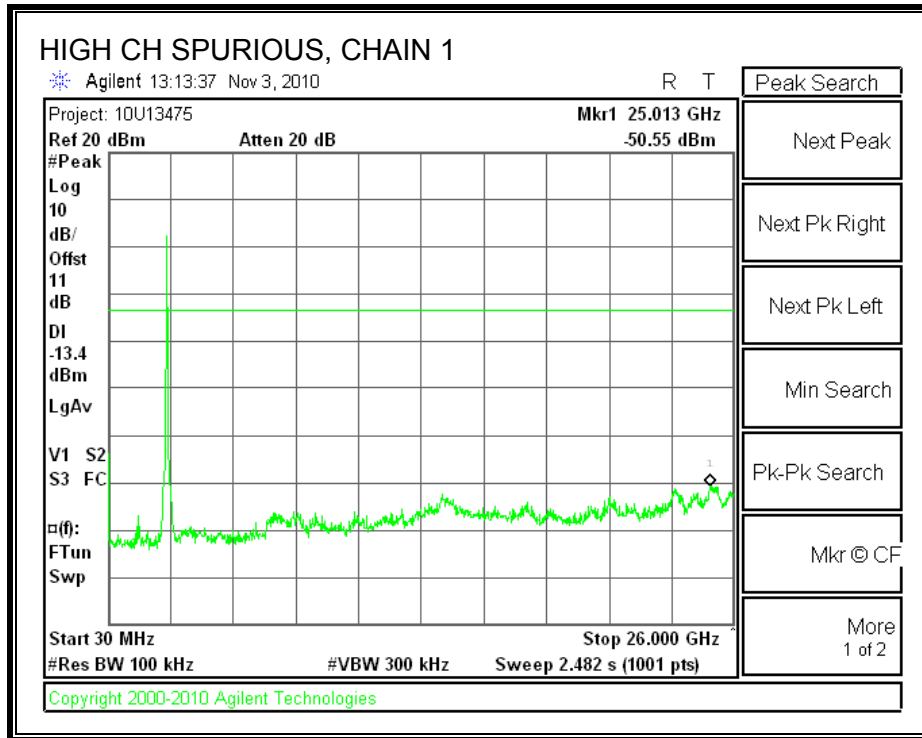




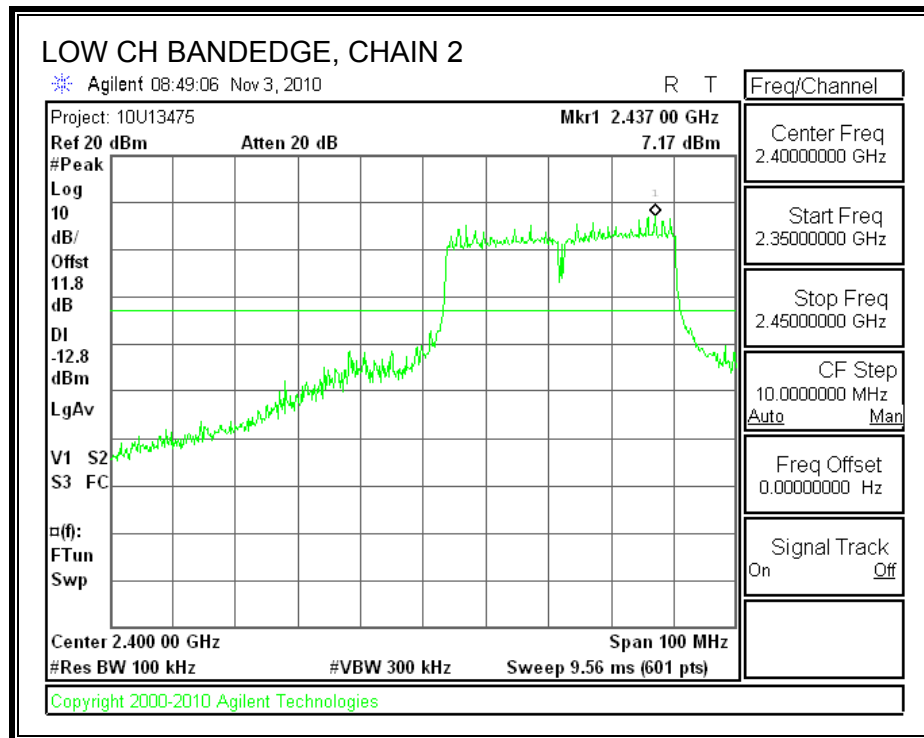


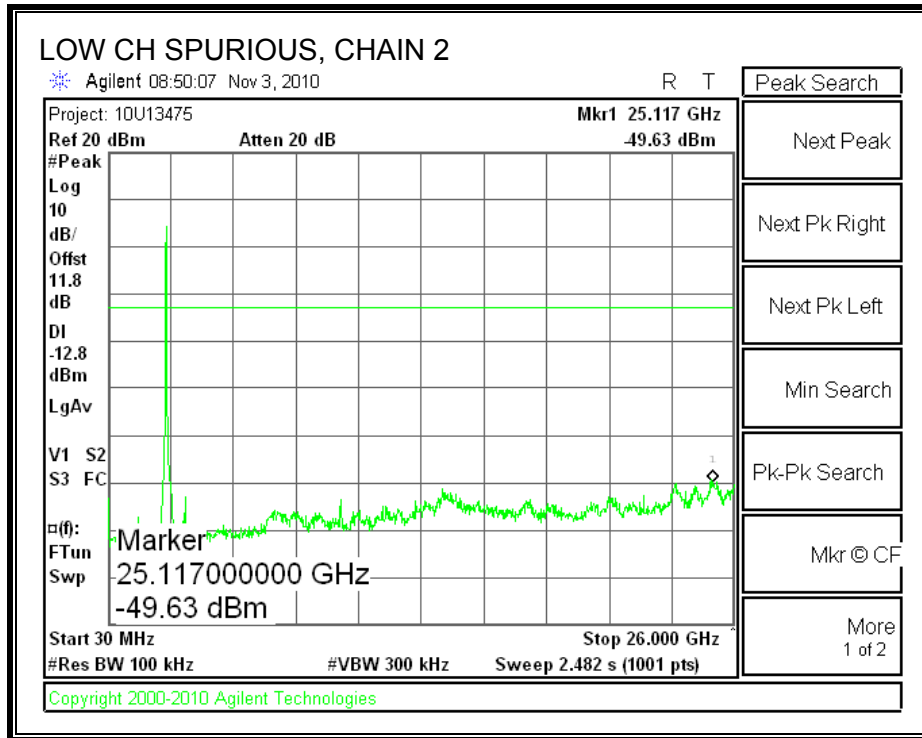


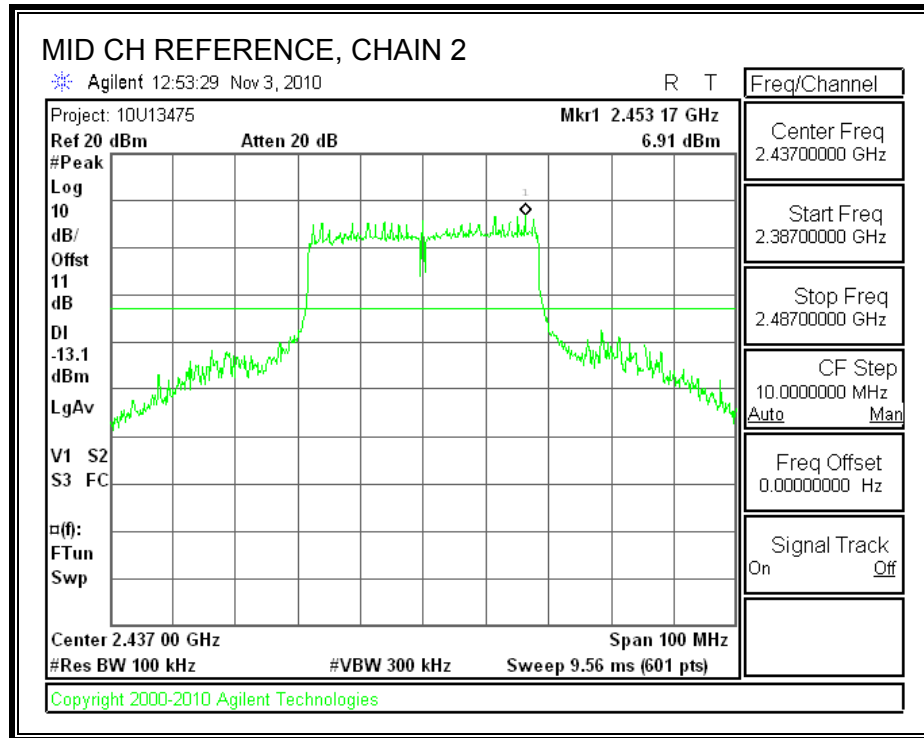


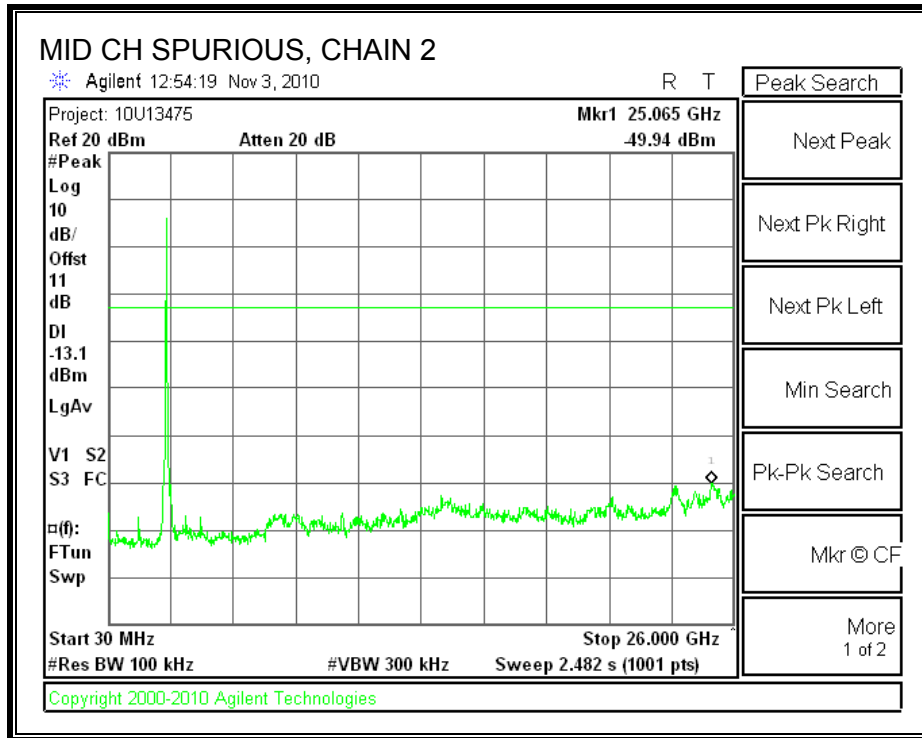


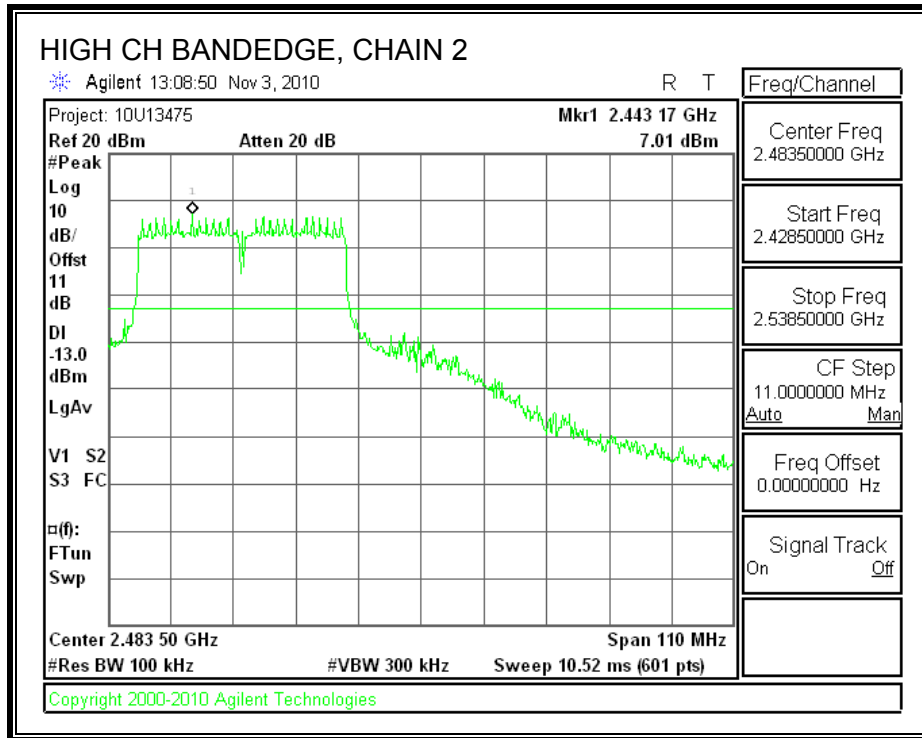
CHAIN 2 SPURIOUS EMISSIONS

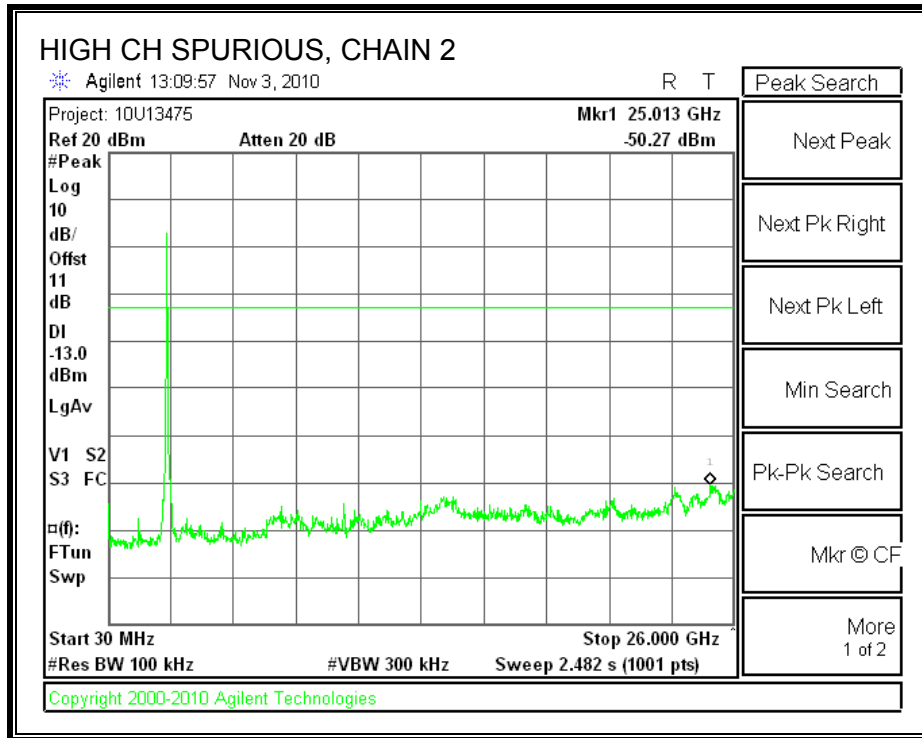




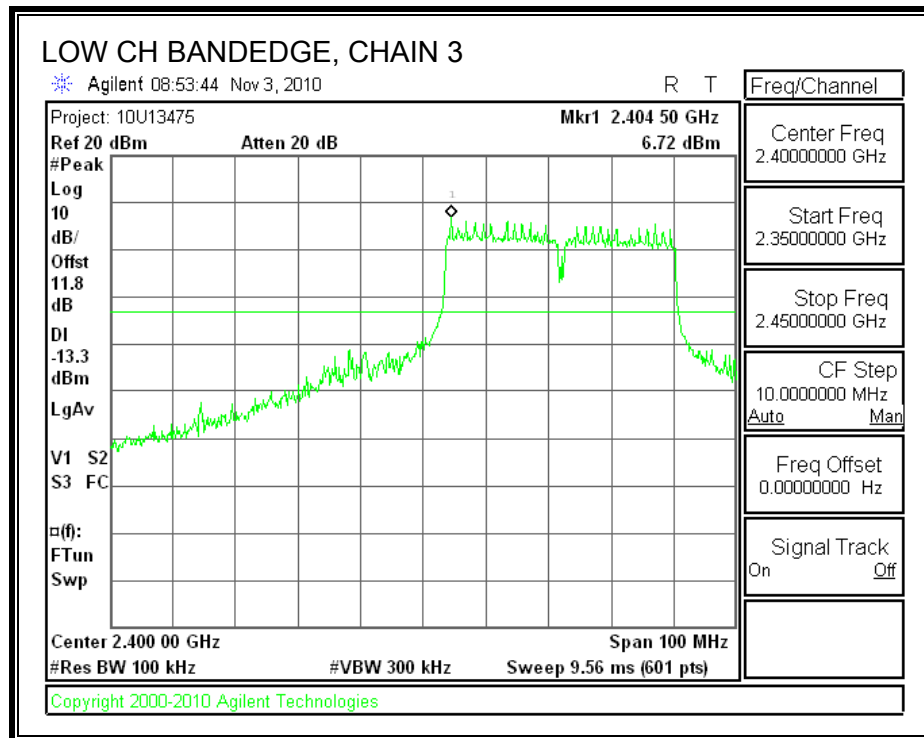


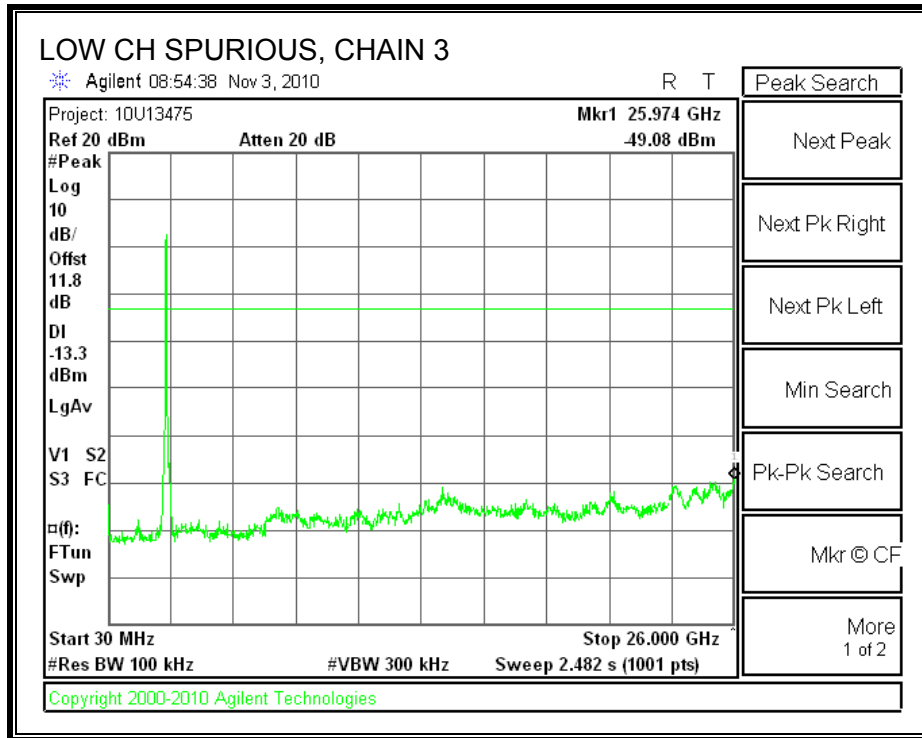


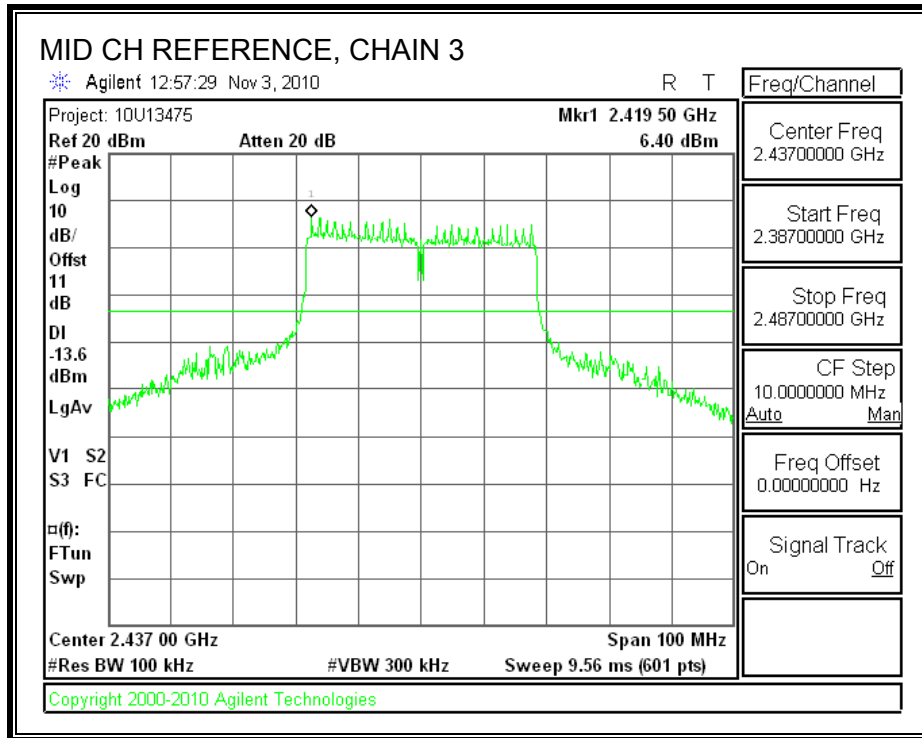


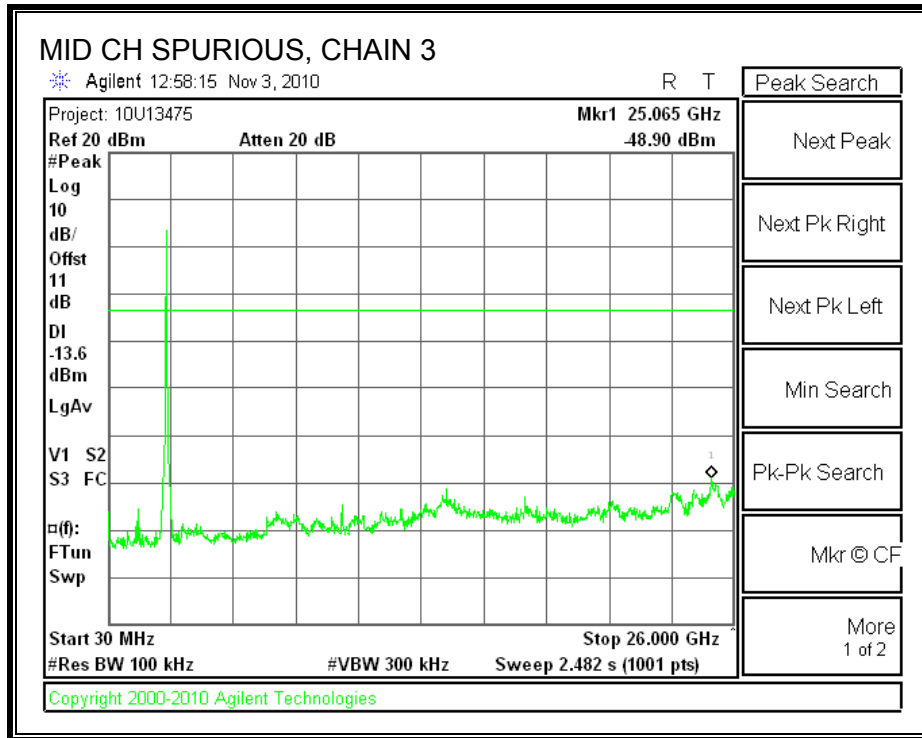


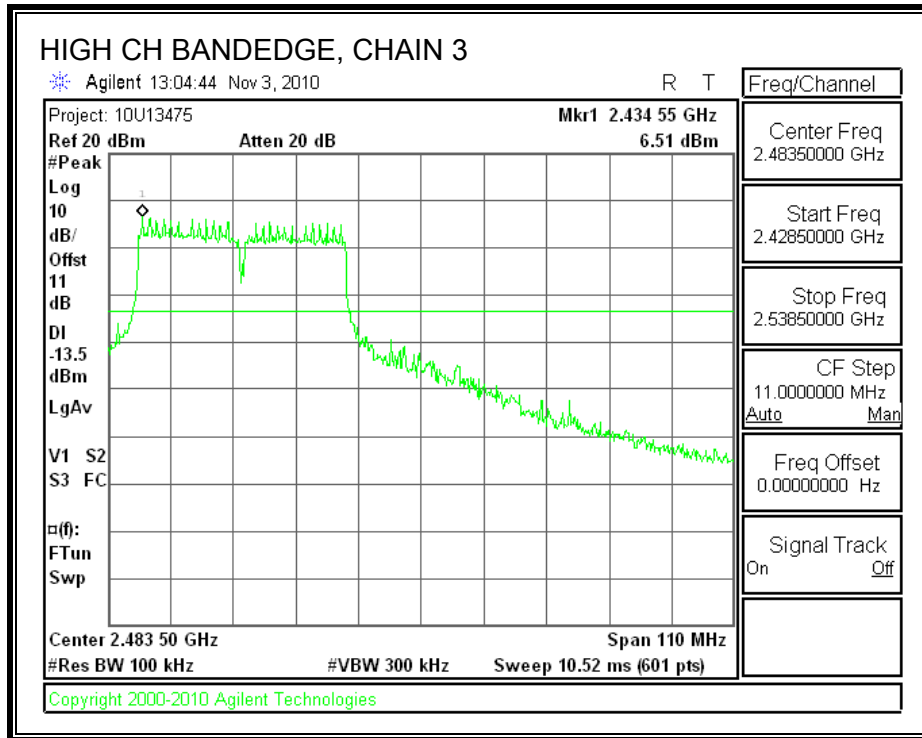
CHAIN 3 SPURIOUS EMISSIONS

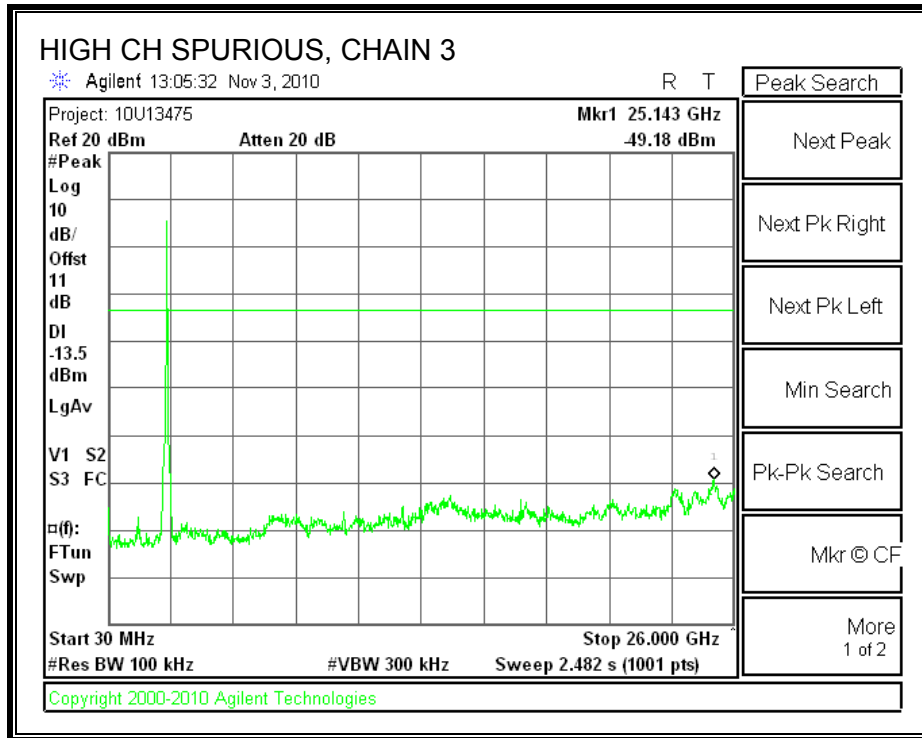












7.5. 802.11a THREE CHAINS MODE IN THE 5.8 GHz BAND

7.5.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

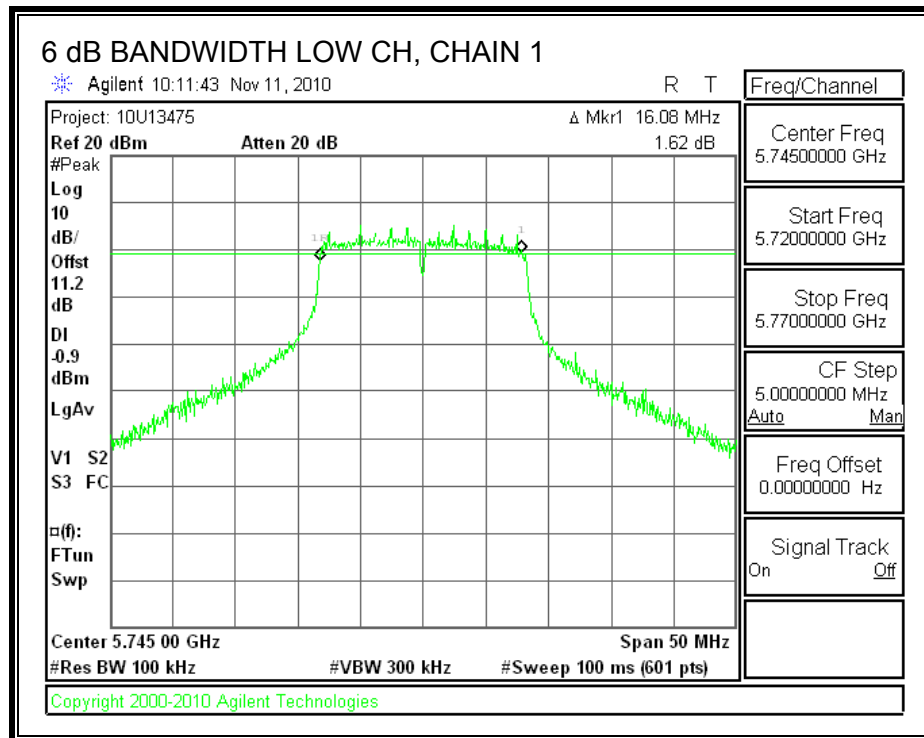
TEST PROCEDURE

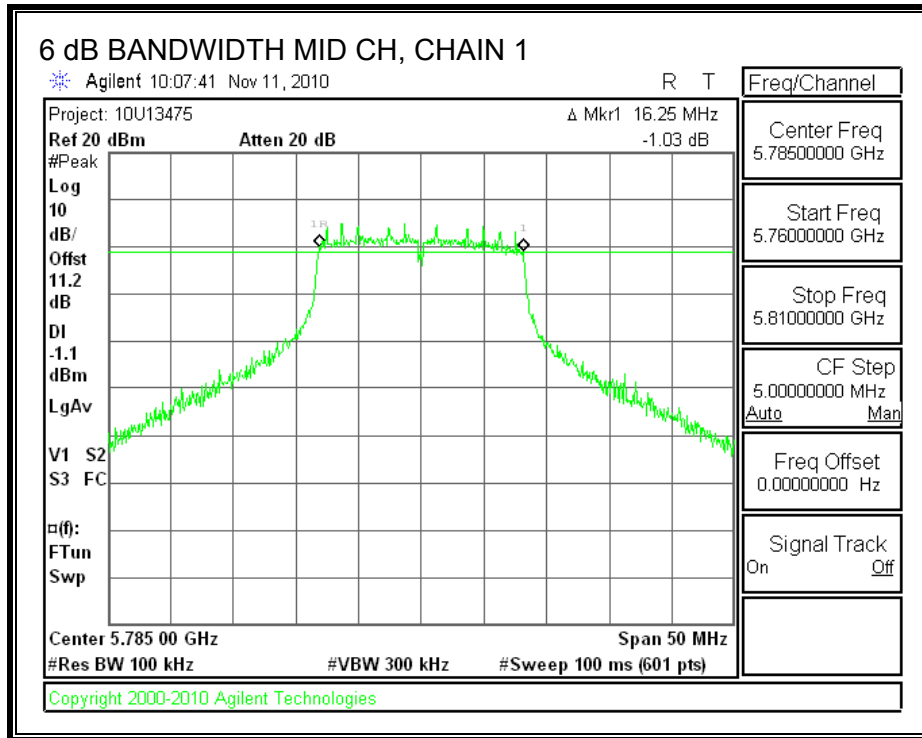
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

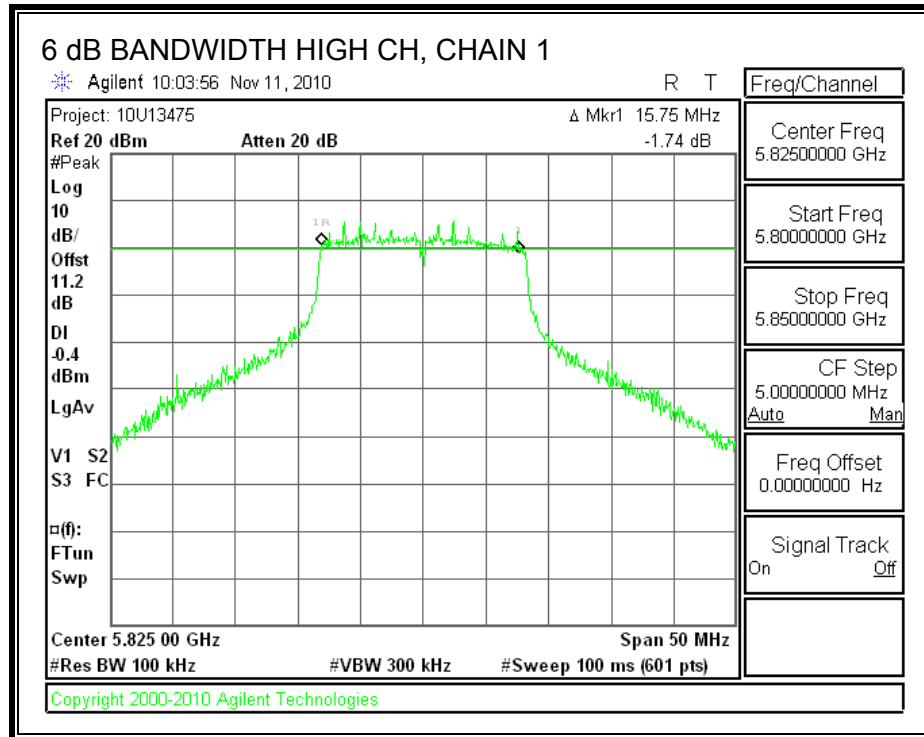
RESULTS

| Channel | Frequency (MHz) | Chain 1 6 dB BW (MHz) | Chain 2 6 dB BW (MHz) | Chain 3 6 dB BW (MHz) | Minimum Limit (MHz) |
|---------|--------------------|-----------------------------|-----------------------------|-----------------------------|------------------------|
| Low | 5745 | 16.08 | 16.33 | 16.42 | 0.5 |
| Middle | 5785 | 16.25 | 16.42 | 16.33 | 0.5 |
| High | 5825 | 15.75 | 16.33 | 16.33 | 0.5 |

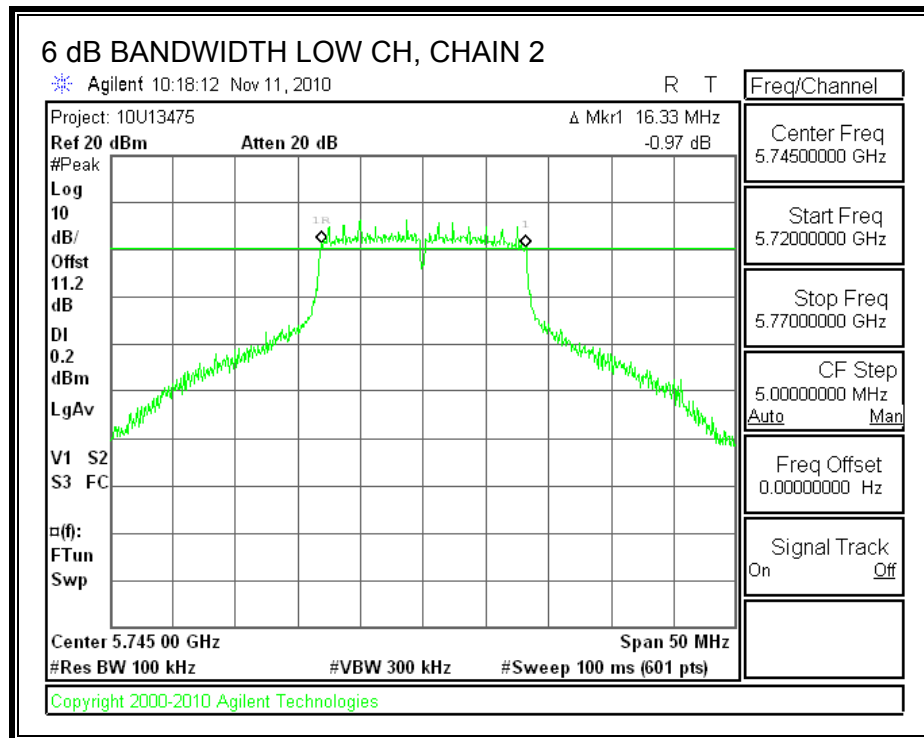
6 dB BANDWIDTH, CHAIN 1

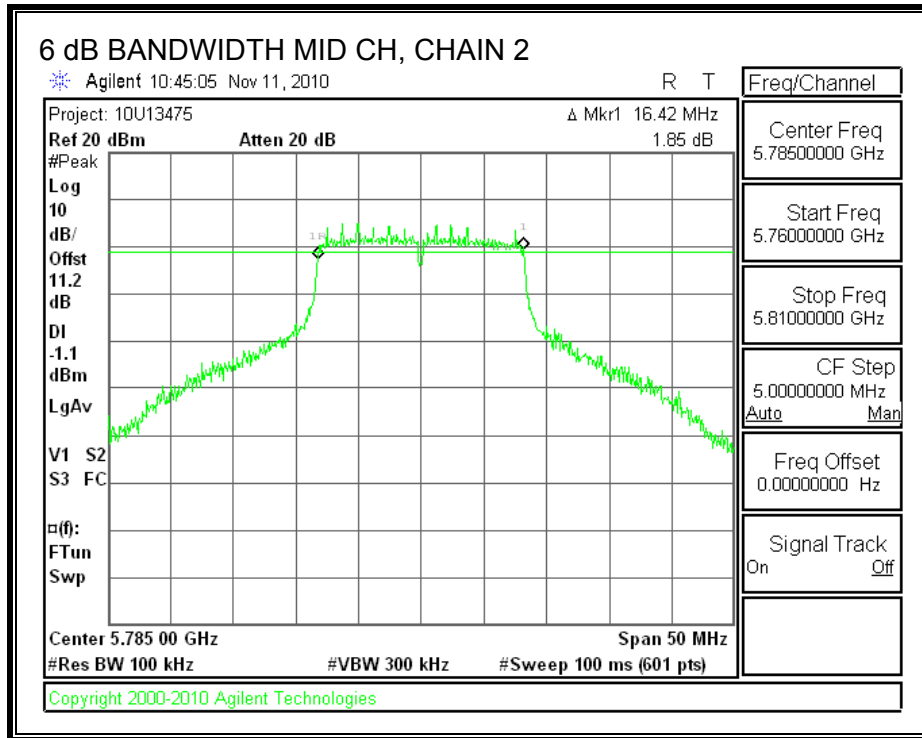


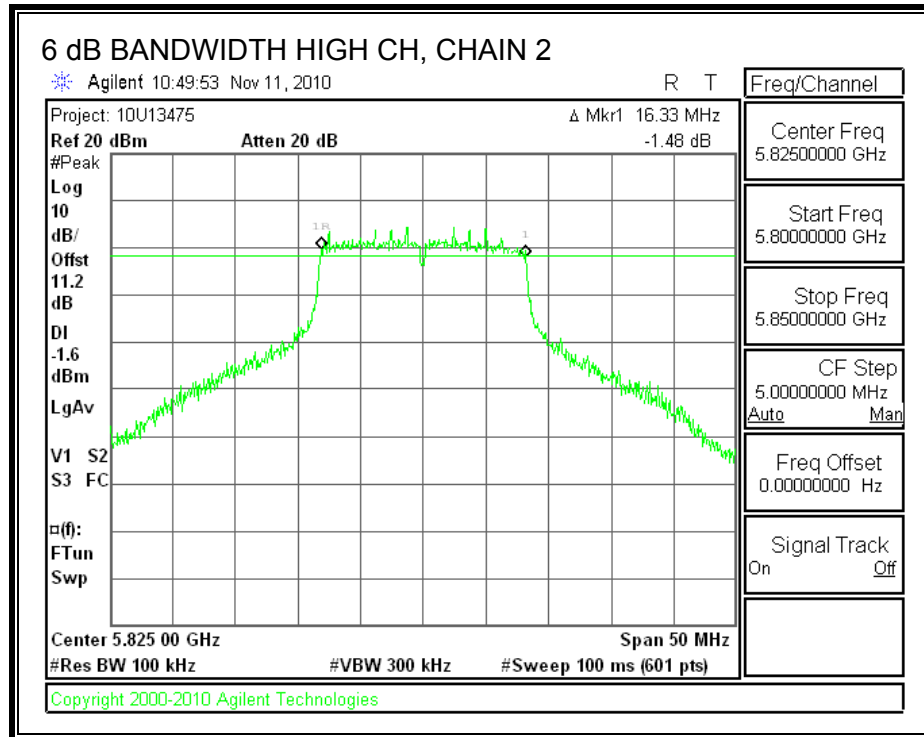




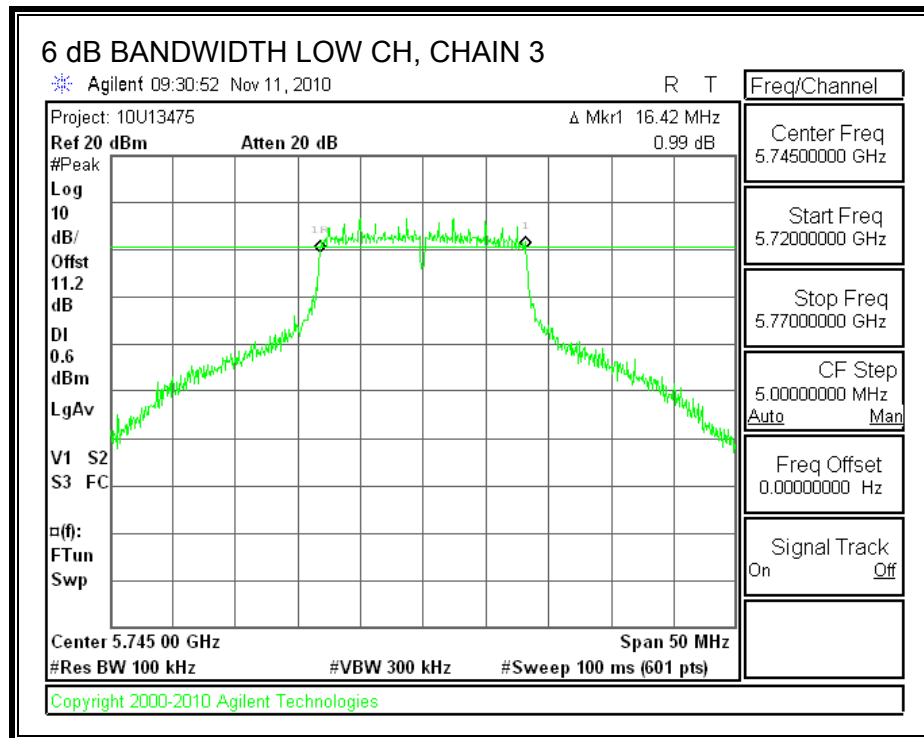
6 dB BANDWIDTH, CHAIN 2

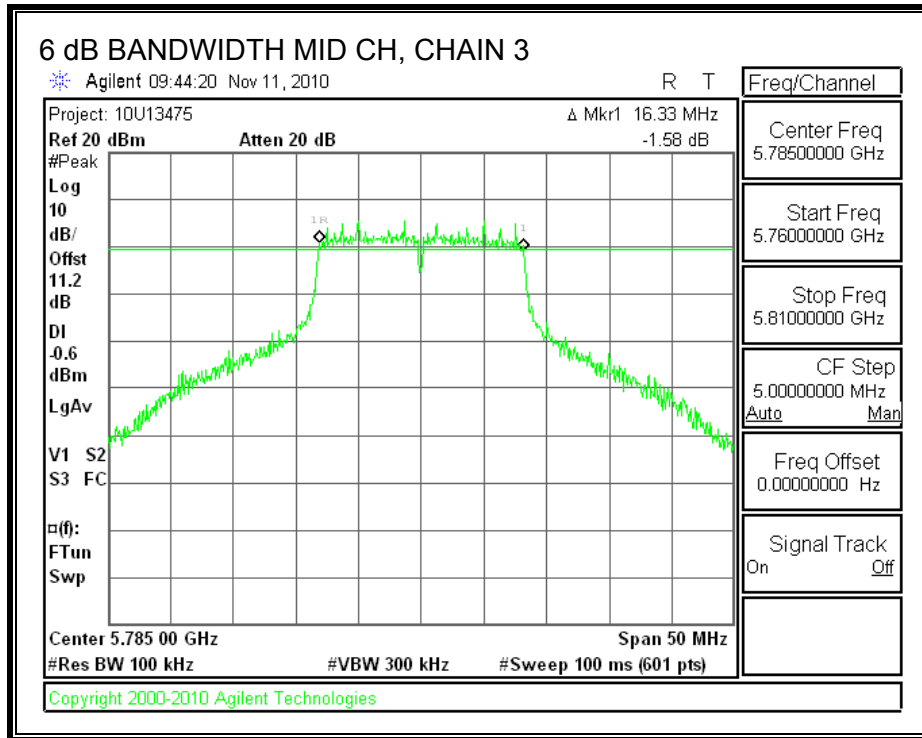


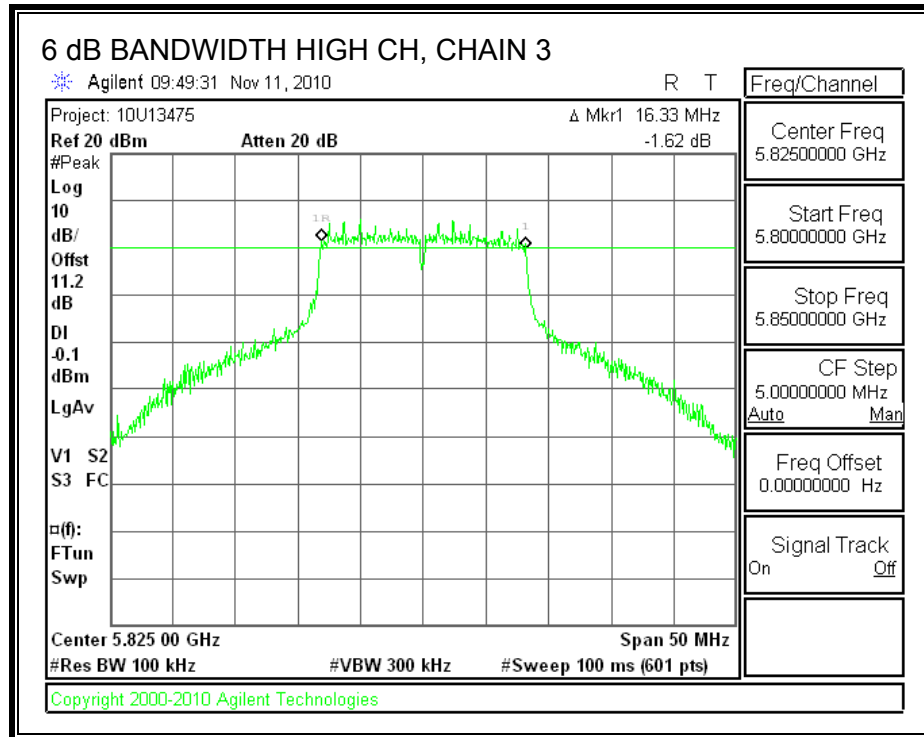




6 dB BANDWIDTH, CHAIN 3







7.5.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

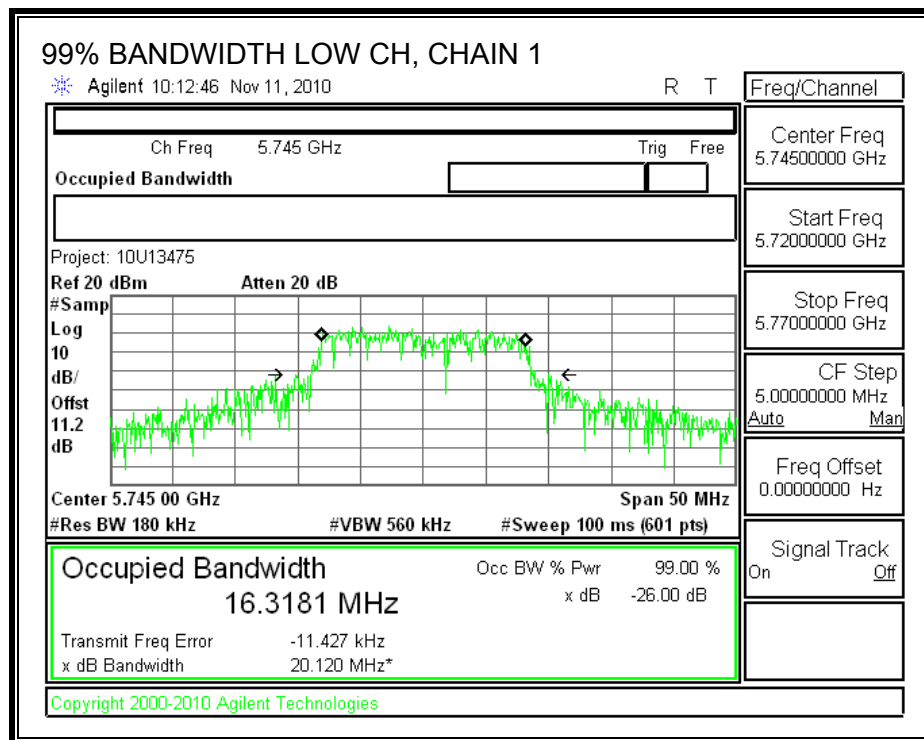
TEST PROCEDURE

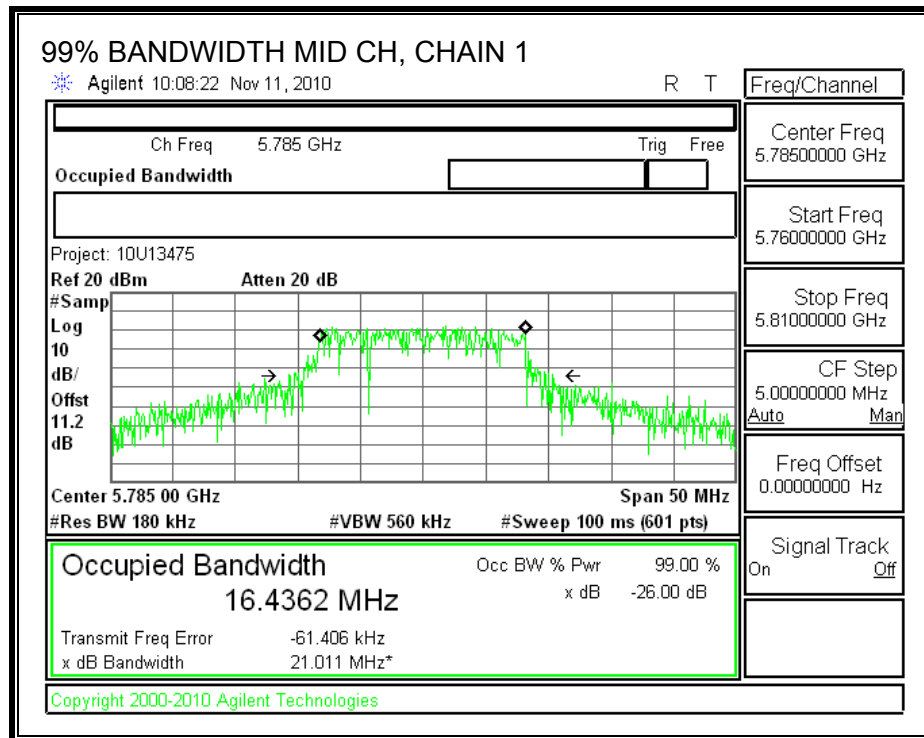
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

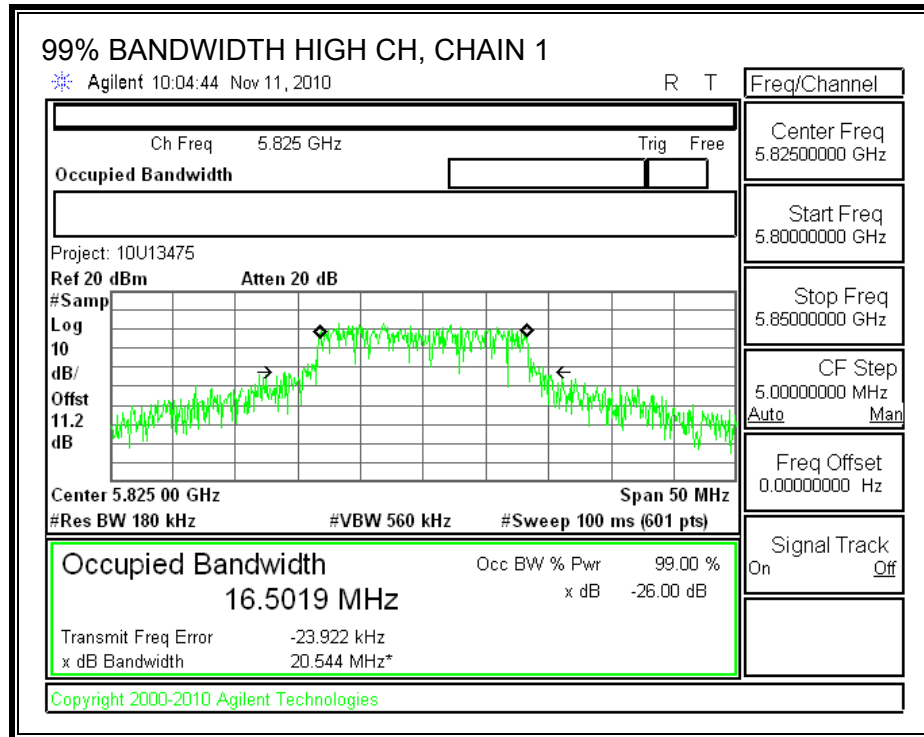
RESULTS

| Channel | Frequency (MHz) | Chain 1 99% Bandwidth (MHz) | Chain 2 99% Bandwidth (MHz) | Chain 3 99% Bandwidth (MHz) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Low | 5745 | 16.3181 | 16.4695 | 16.3717 |
| Middle | 5785 | 16.4362 | 16.4133 | 16.3957 |
| High | 5825 | 16.5019 | 16.4224 | 16.4502 |

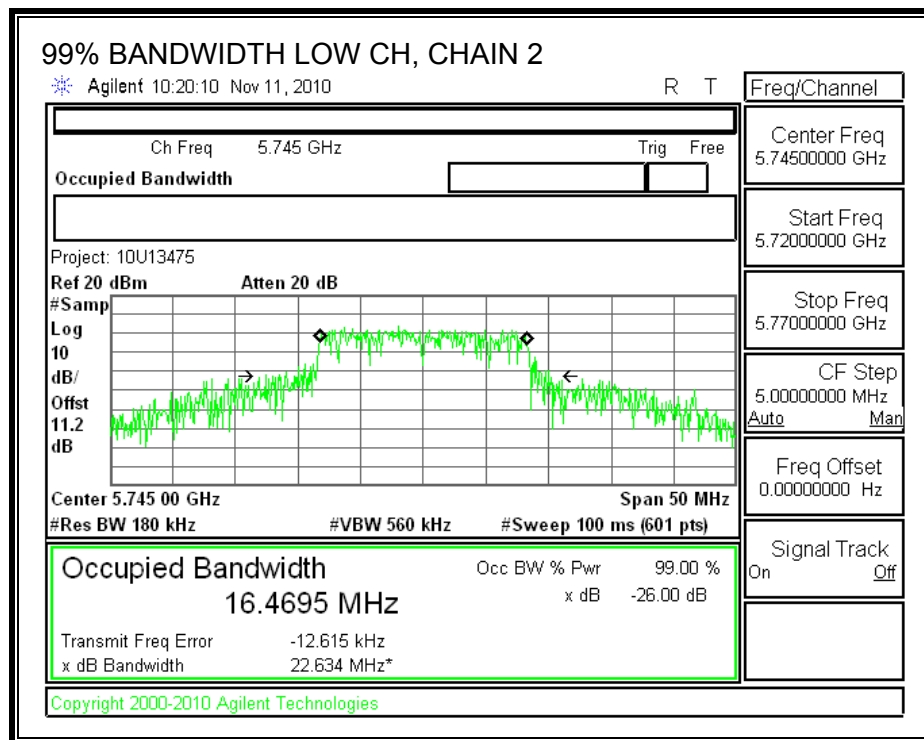
99% BANDWIDTH, CHAIN 1

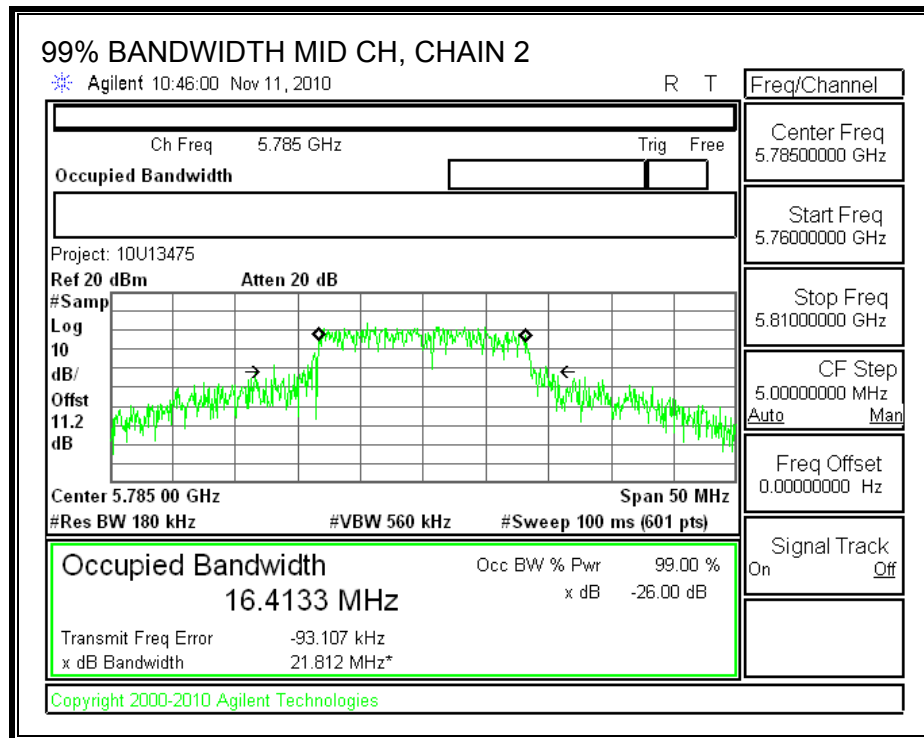


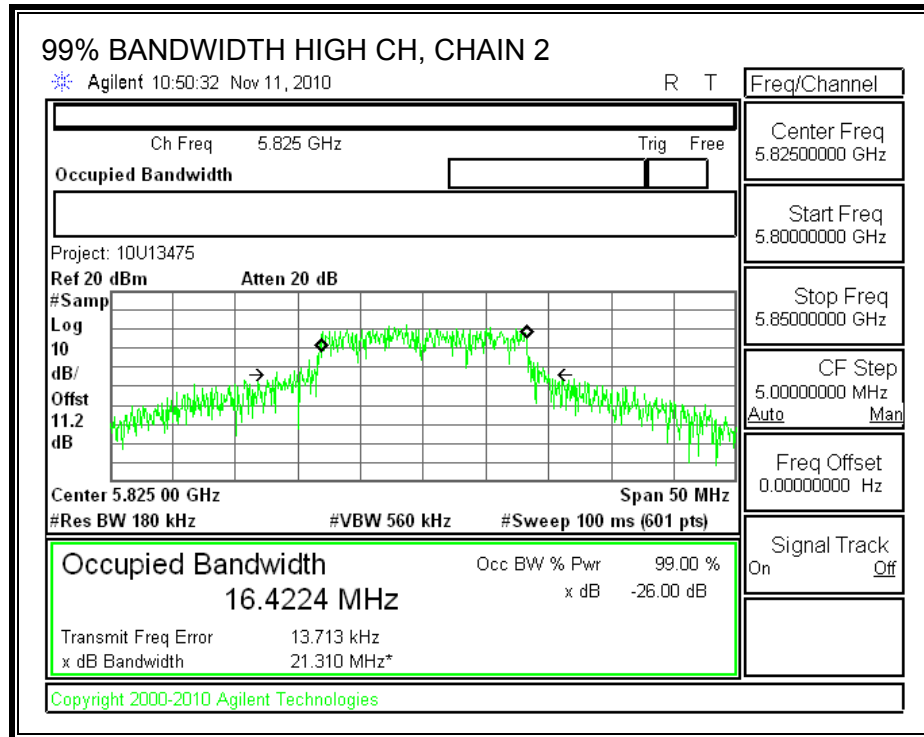




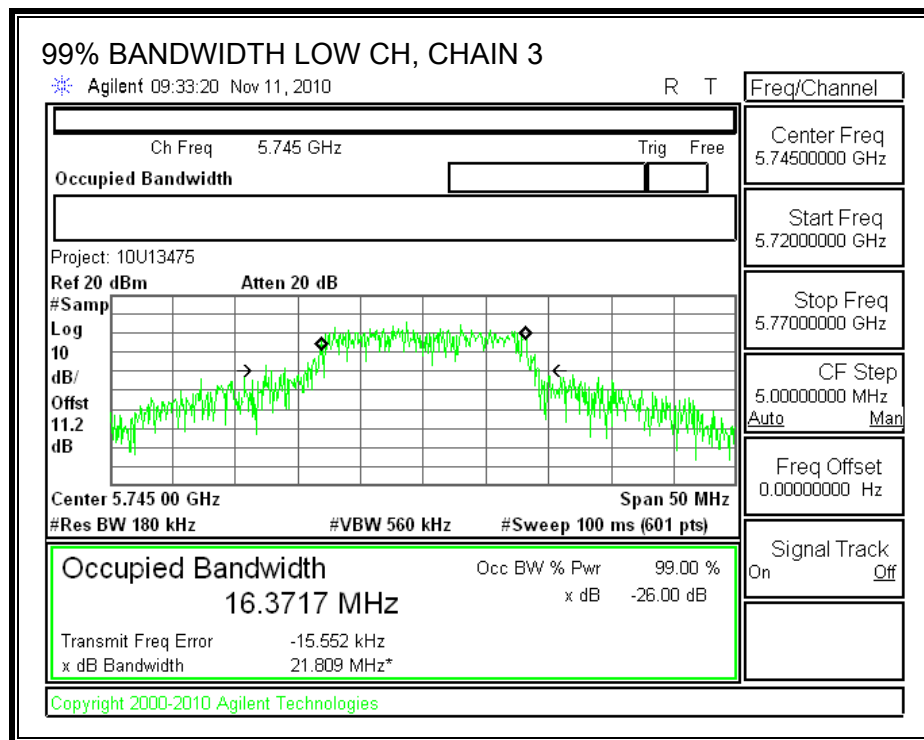
99% BANDWIDTH, CHAIN 2

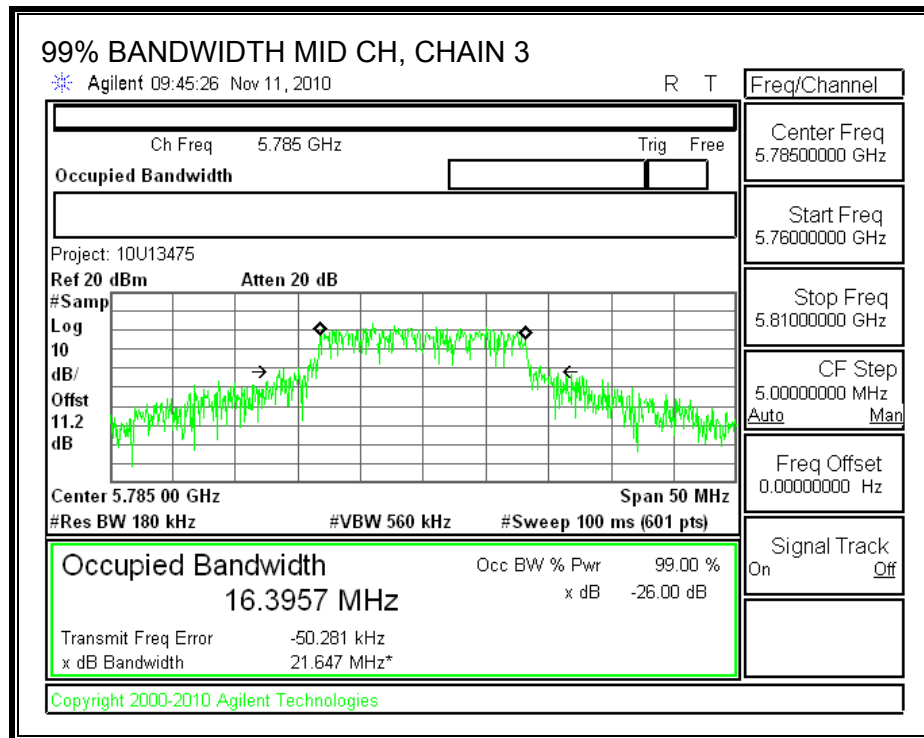


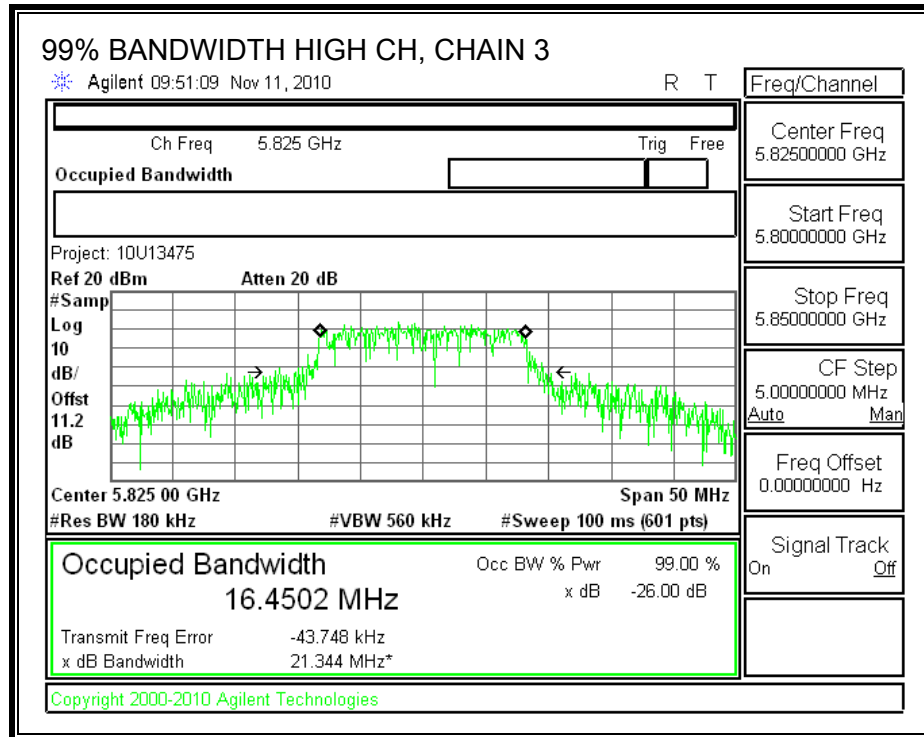




99% BANDWIDTH, CHAIN 3







7.5.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

| Antenna Gain (dBi) | 10 Log (# Tx Chains) (dB) | Effective Legacy Gain (dBi) |
|--------------------|---------------------------|-----------------------------|
| 5.5 | 4.77 | 10.27 |

The maximum effective legacy gain is 10.27 dBi; therefore the limit is 25.73 dBm.

TEST PROCEDURE

Peak power is measured using a wide bandwidth peak power meter.

RESULTS

| Channel | Frequency (MHz) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Chain 3 Power (dBm) | Attenuator + Cable Loss (dB) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|---------------------|---------------------|---------------------|------------------------------|-------------------|-------------|-------------|
| Low | 5745 | 10.12 | 9.54 | 9.48 | 11.20 | 25.69 | 25.73 | -0.04 |
| Mid | 5785 | 10.04 | 8.85 | 9.34 | 11.20 | 25.41 | 25.73 | -0.32 |
| High | 5825 | 9.66 | 8.47 | 9.41 | 11.20 | 25.18 | 25.73 | -0.55 |

7.5.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.2 dB (including 10 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency (MHz) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Chain 3 Power (dBm) | Total Power (dBm) |
|---------|-----------------|---------------------|---------------------|---------------------|-------------------|
| Low | 5745 | 13.64 | 13.18 | 13.44 | 18.20 |
| Middle | 5785 | 13.36 | 12.31 | 13.12 | 17.72 |
| High | 5825 | 13.51 | 11.55 | 13.21 | 17.61 |

7.5.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

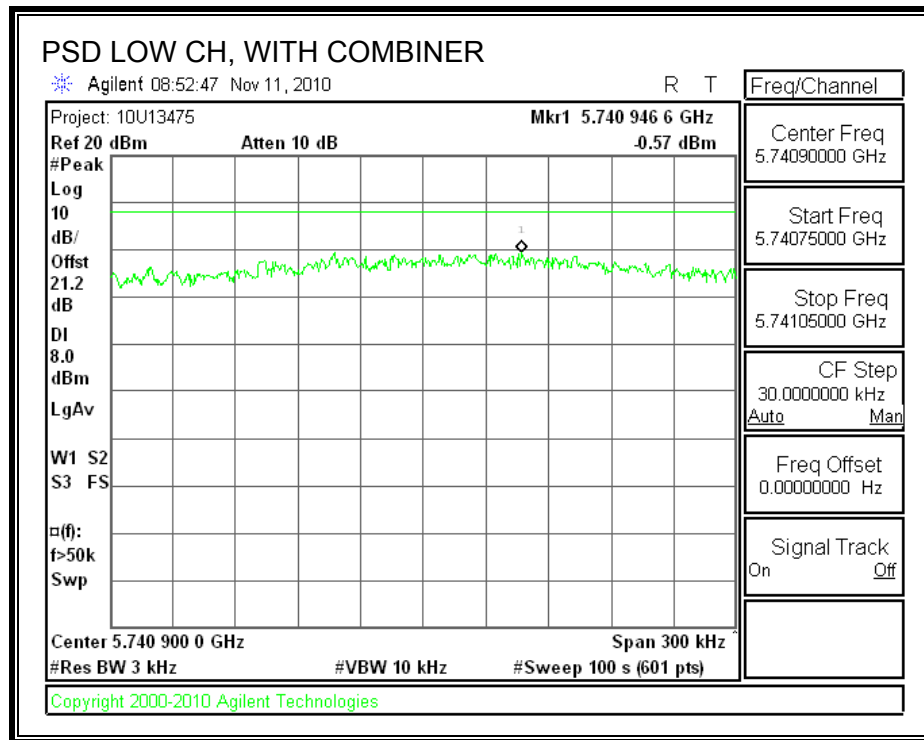
TEST PROCEDURE

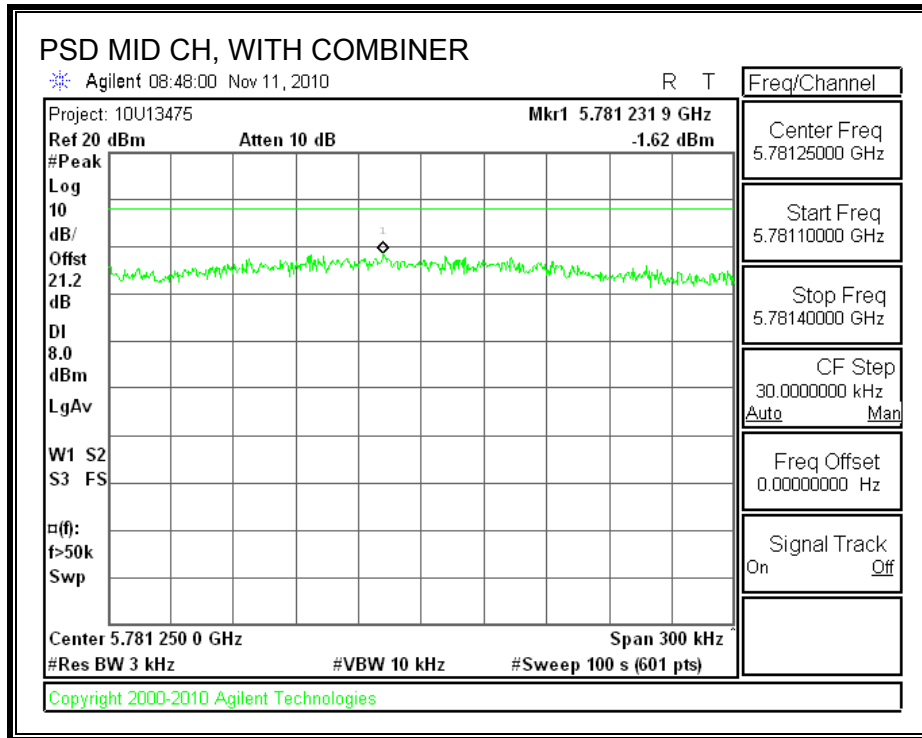
Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

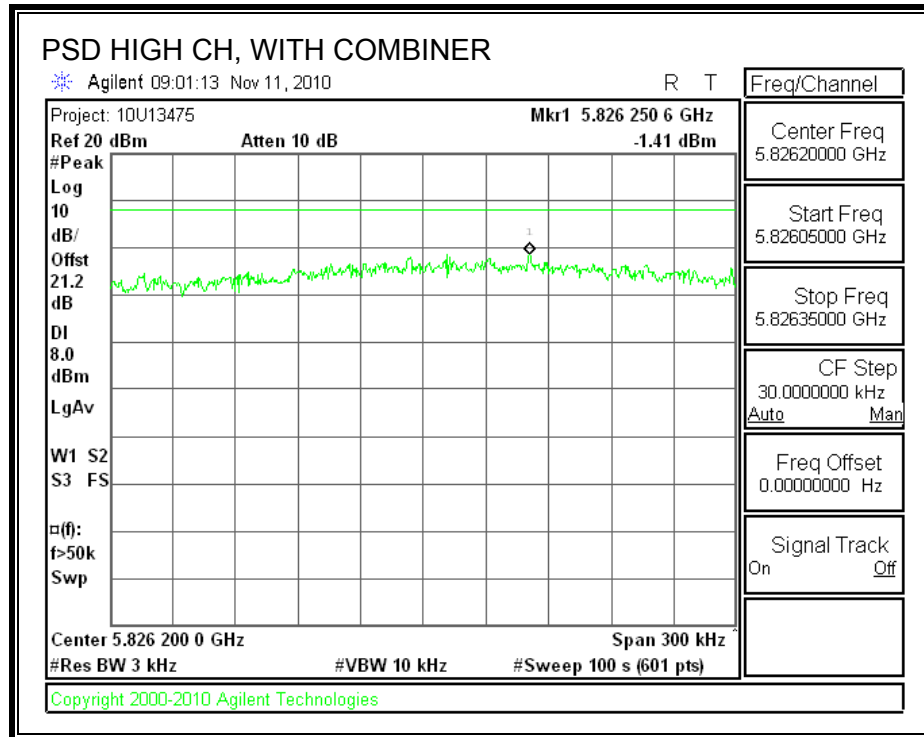
RESULTS:

| Channel | Frequency (MHz) | PSD with Combiner (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|----------------------------|----------------|----------------|
| Low | 5745 | -0.57 | 8 | -8.57 |
| Middle | 5785 | -1.62 | 8 | -9.62 |
| High | 5825 | -1.41 | 8 | -9.41 |

POWER SPECTRAL DENSITY, WITH COMBINER







7.5.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of Peak Power using wideband power meter; therefore the required attenuation is 20 dB.

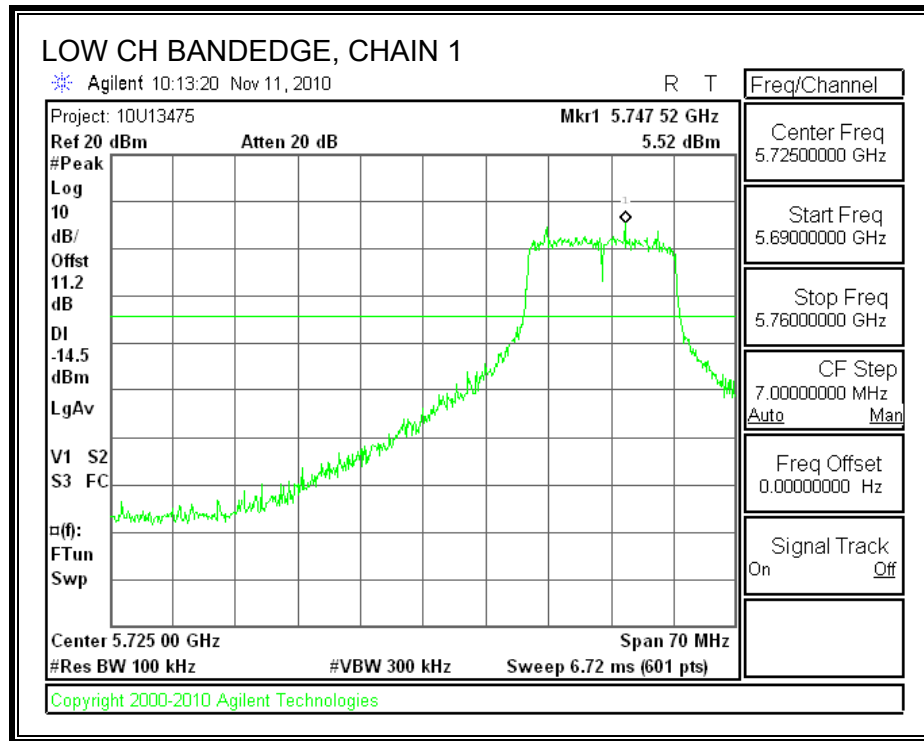
TEST PROCEDURE

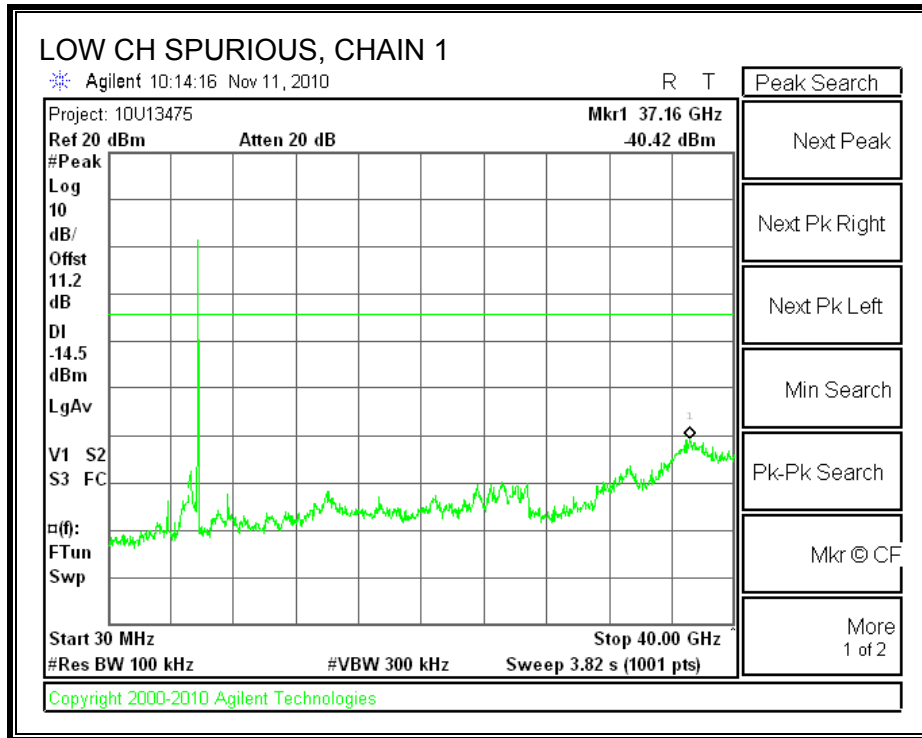
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

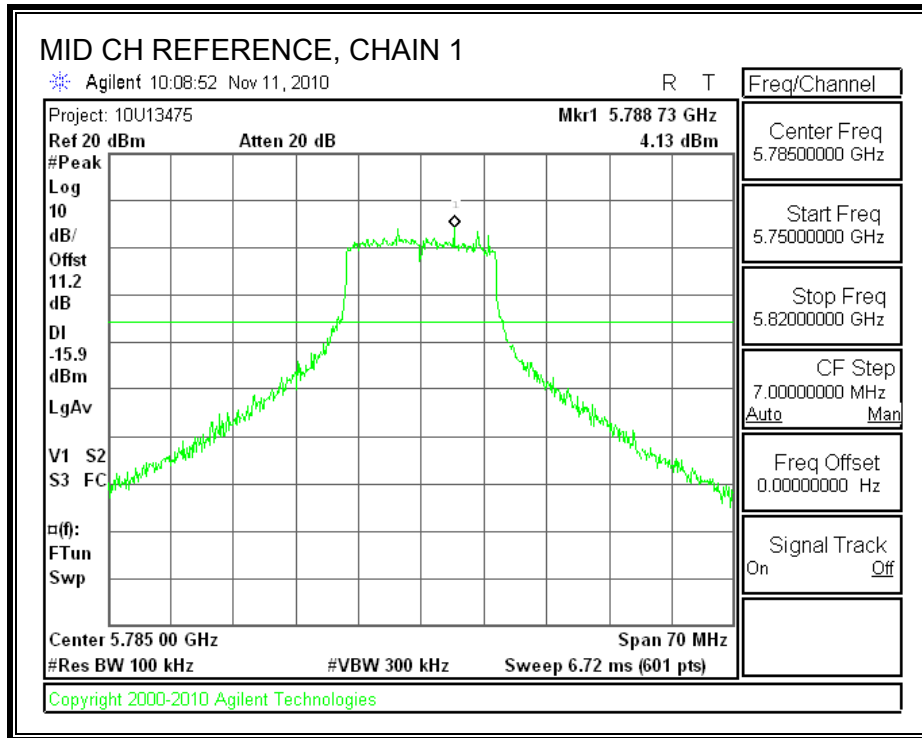
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

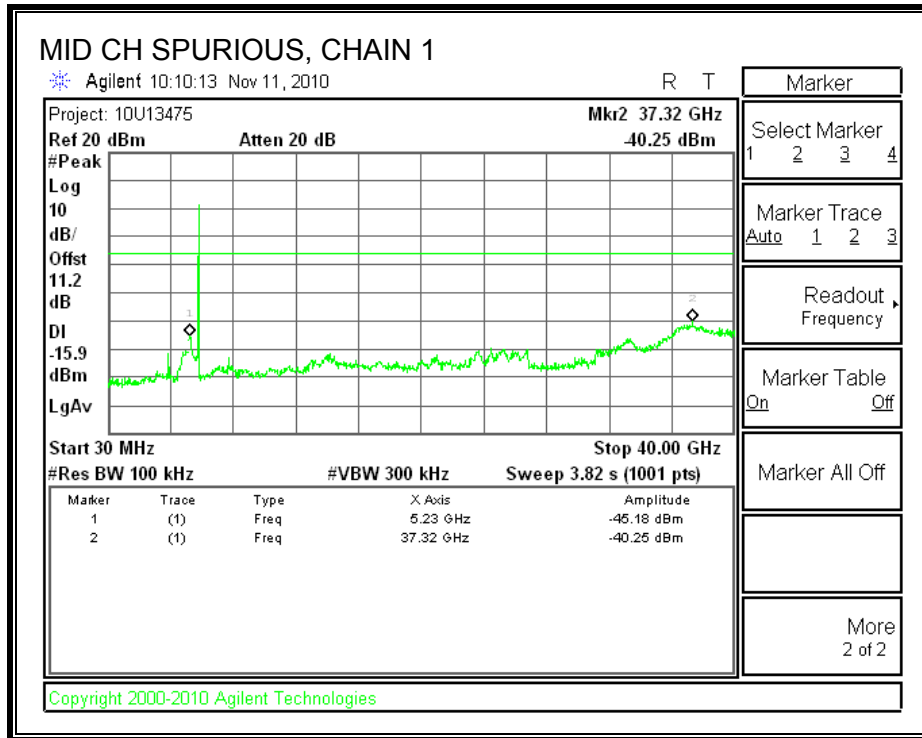
RESULTS

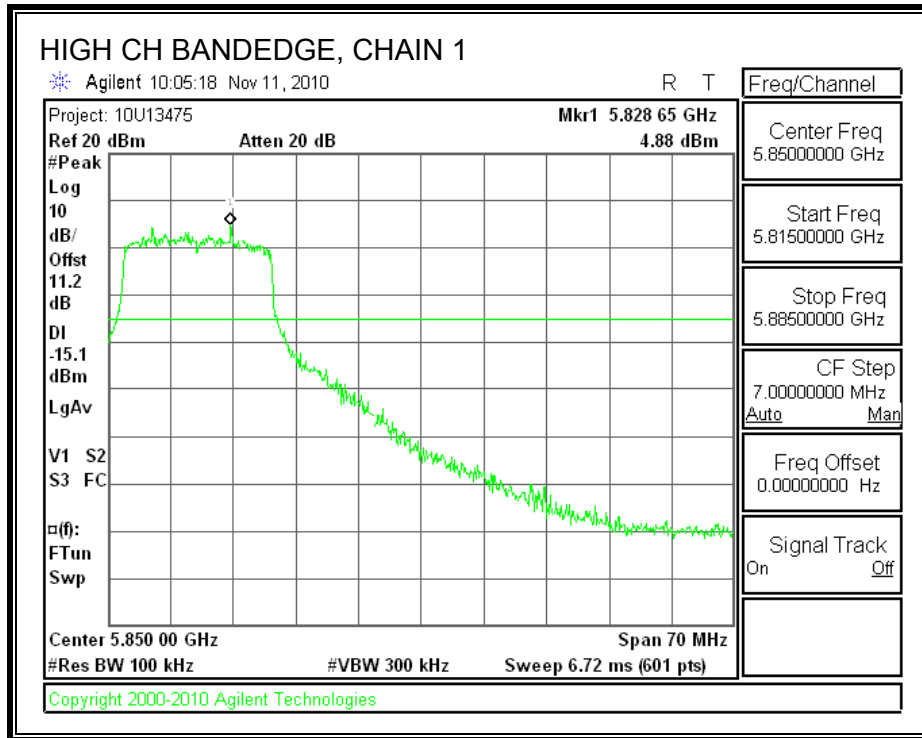
CHAIN 1 SPURIOUS EMISSIONS

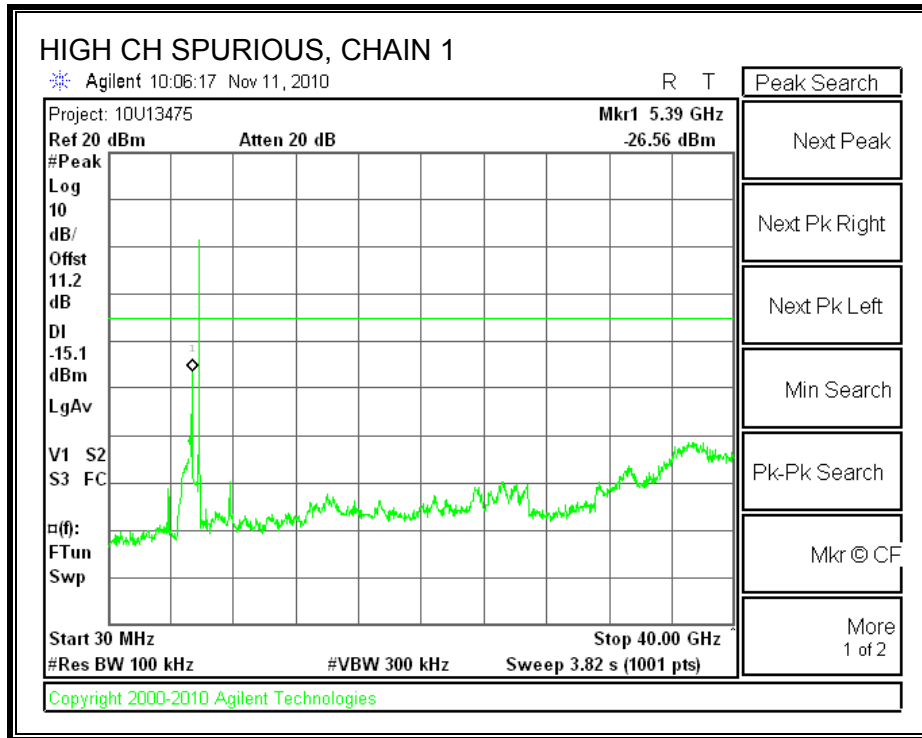




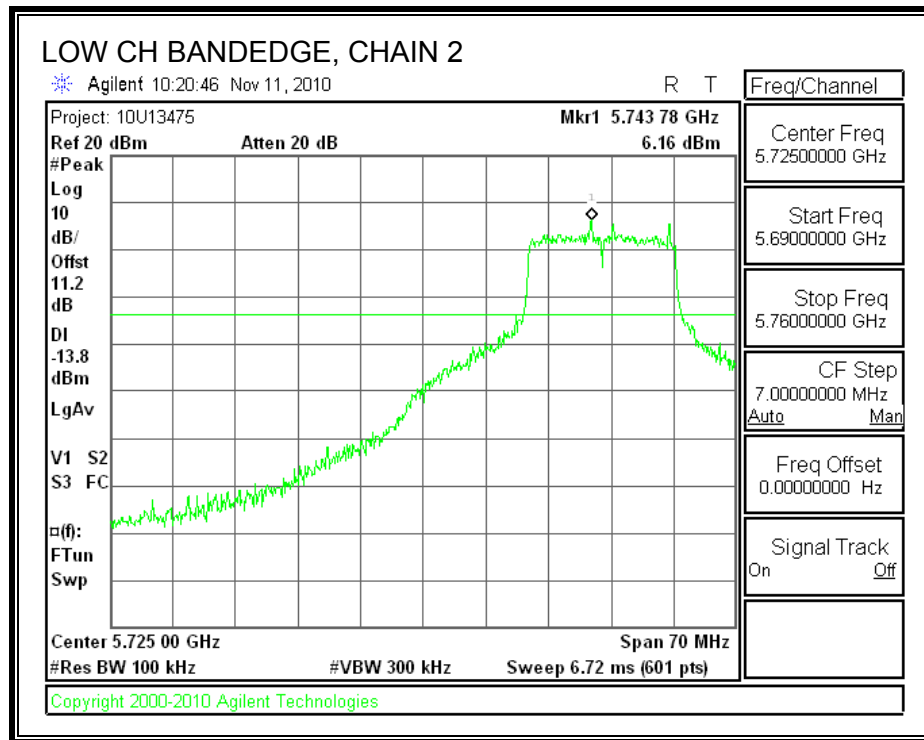


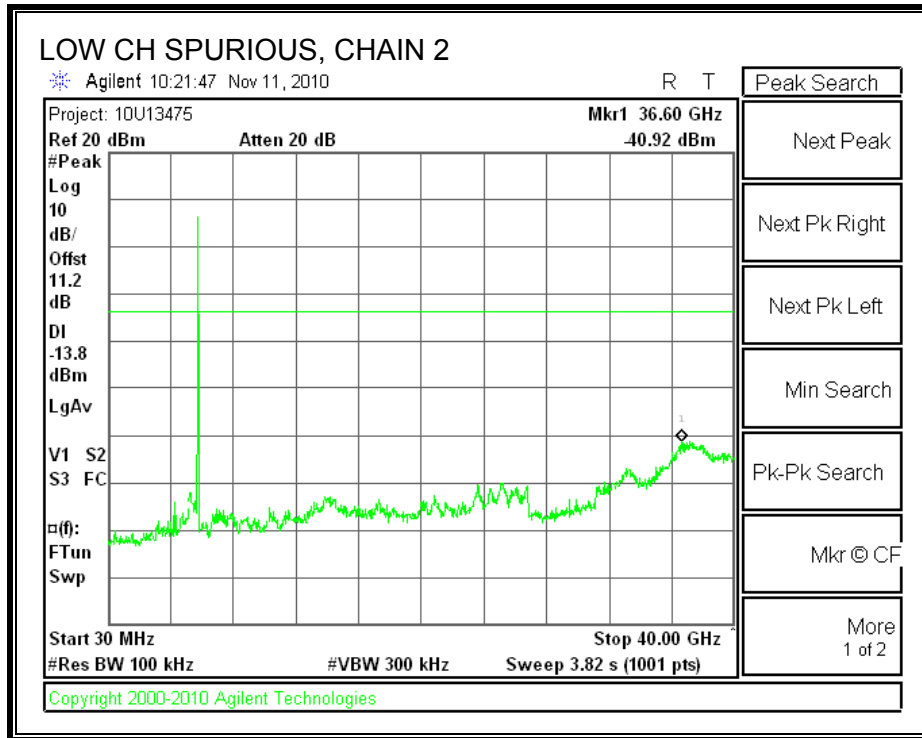


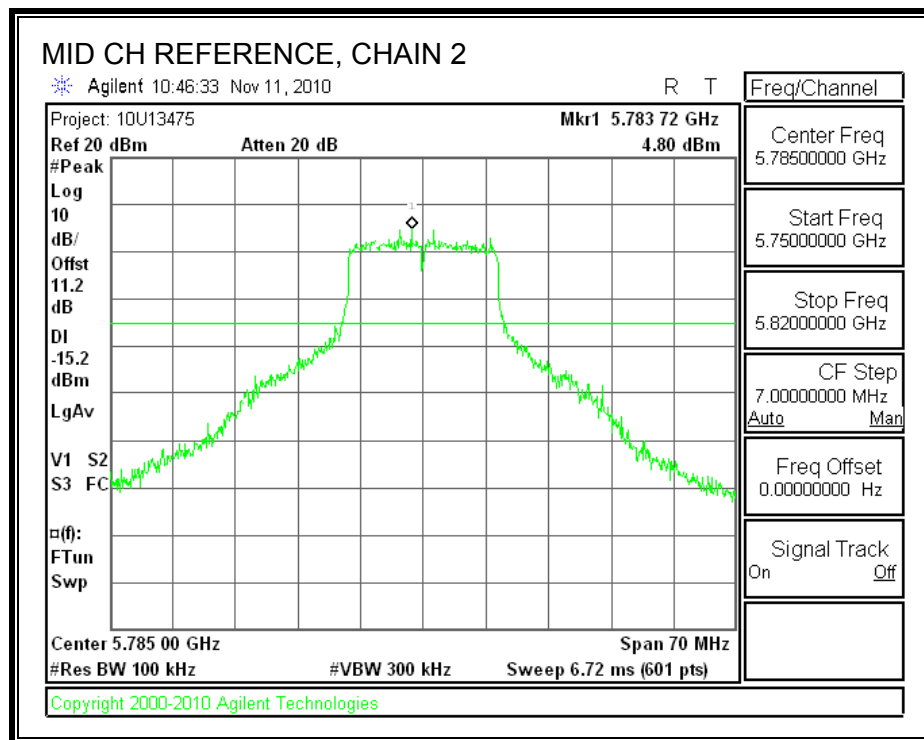


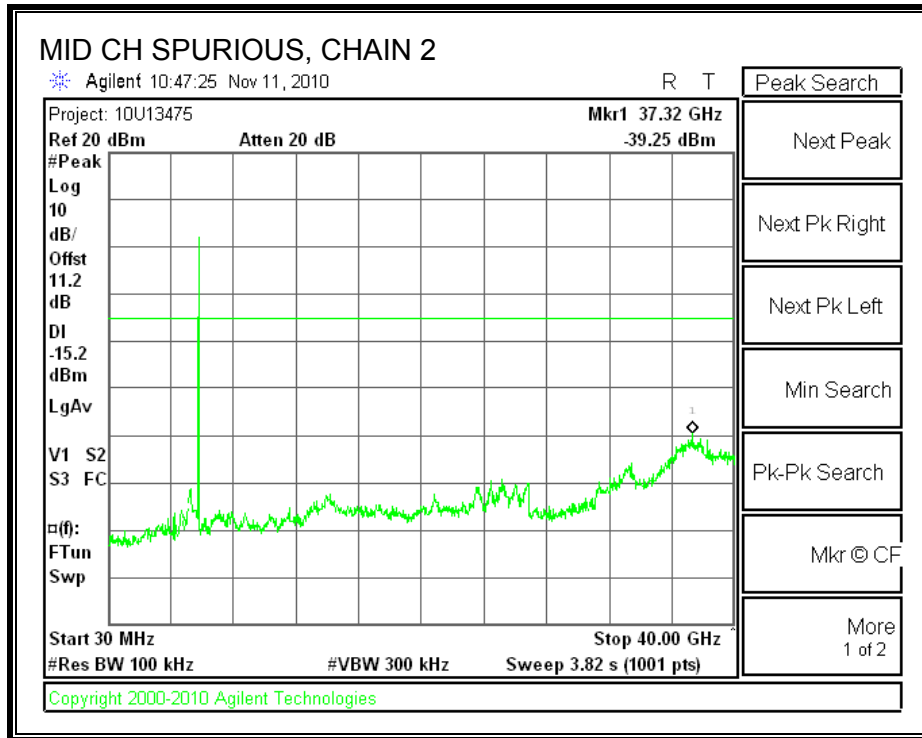


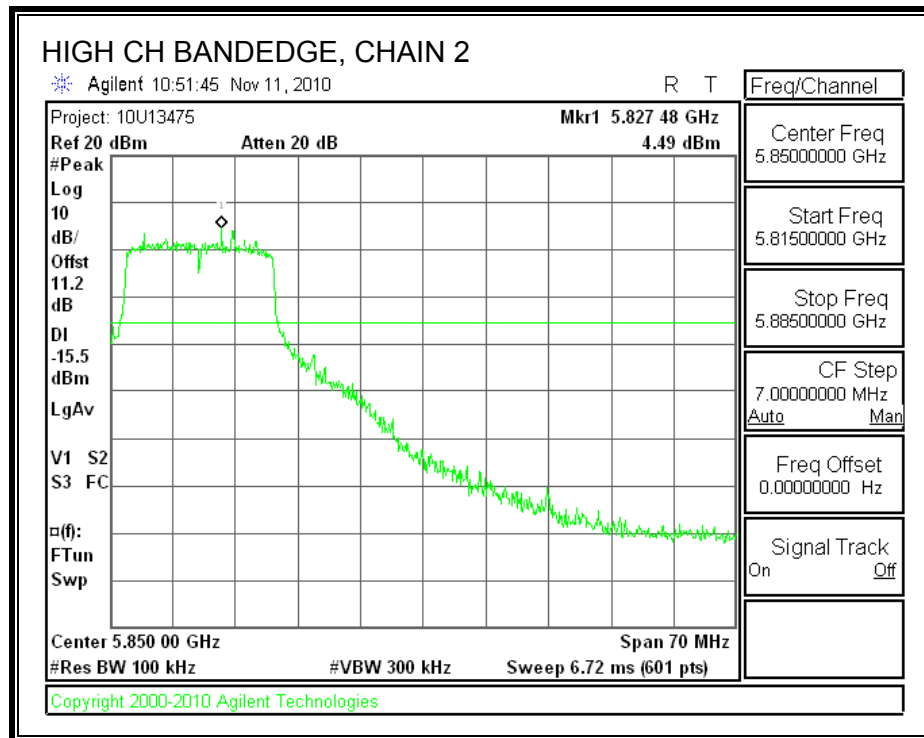
CHAIN 2 SPURIOUS EMISSIONS

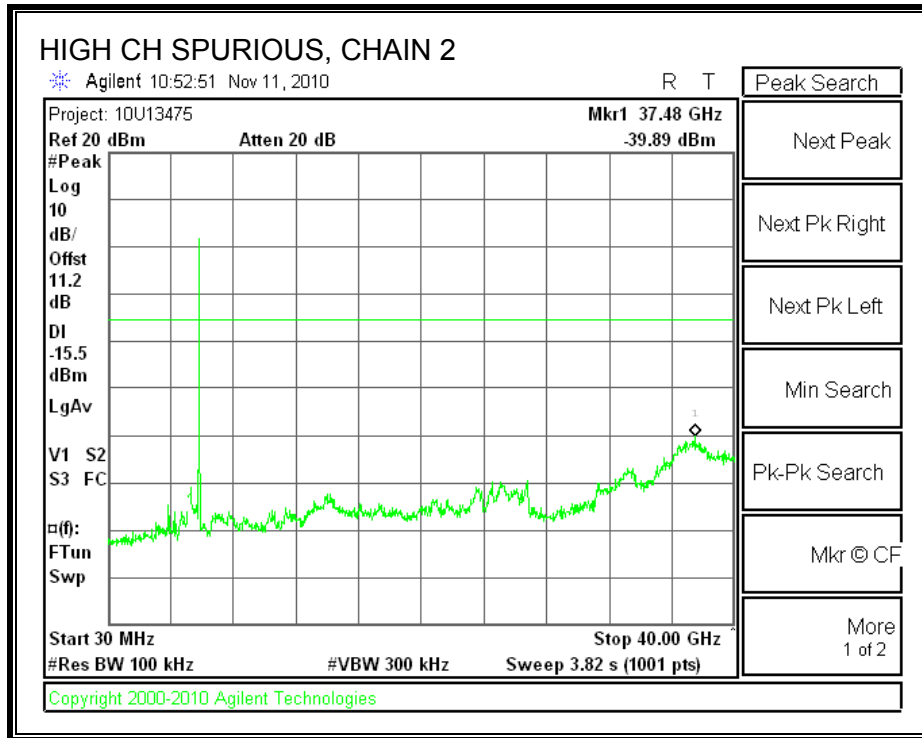




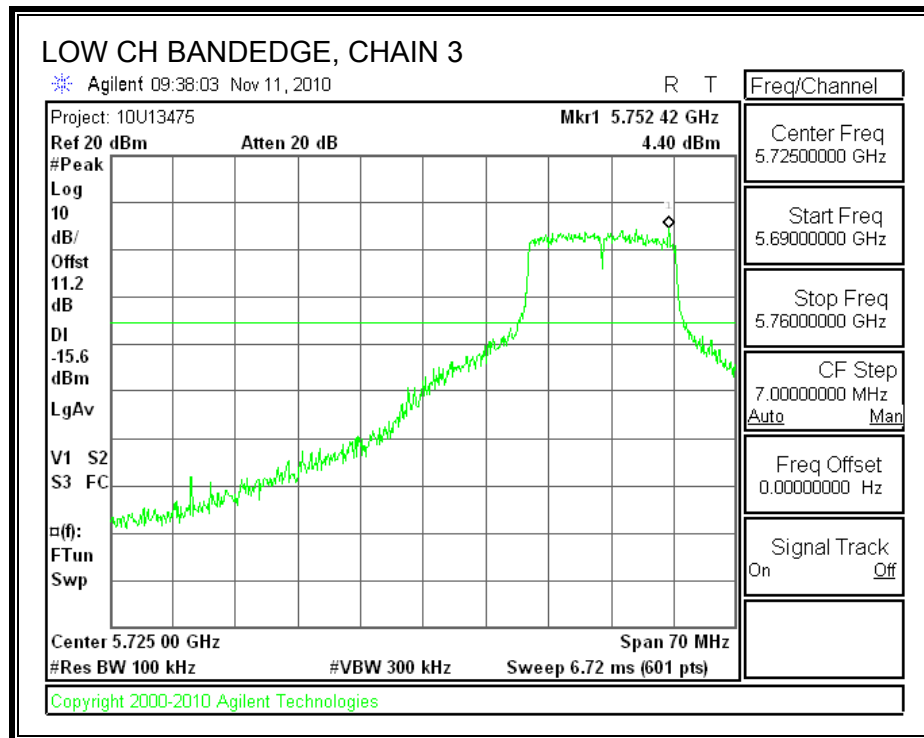


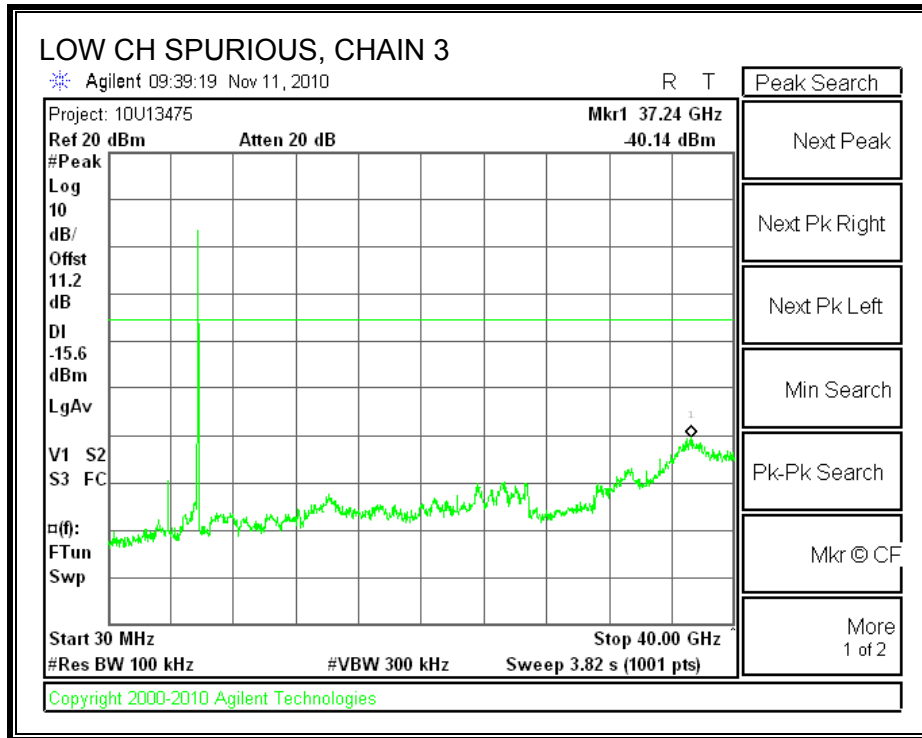


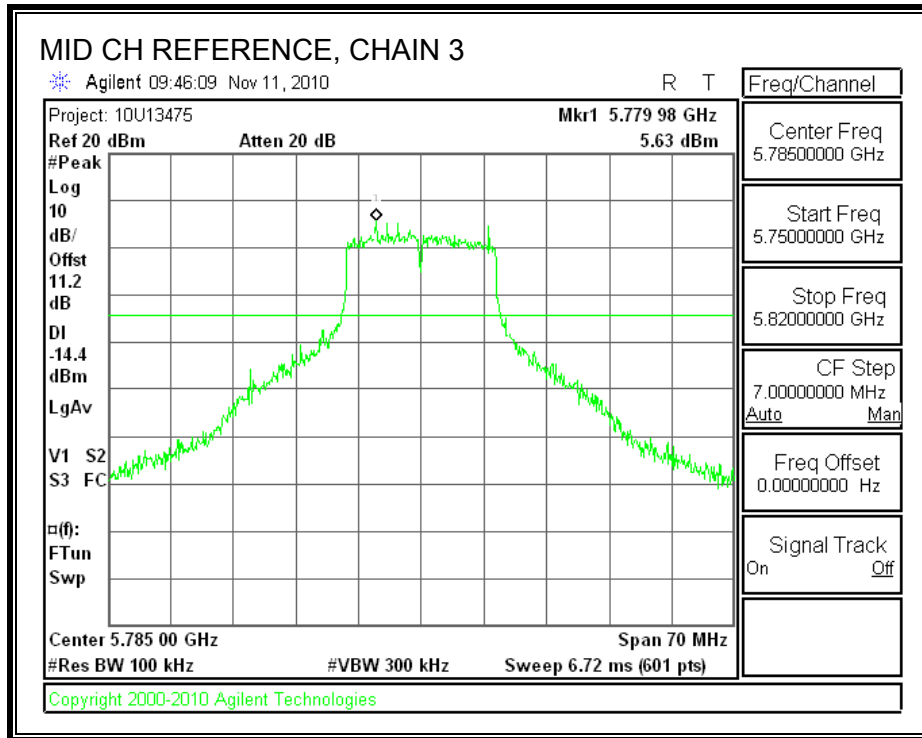


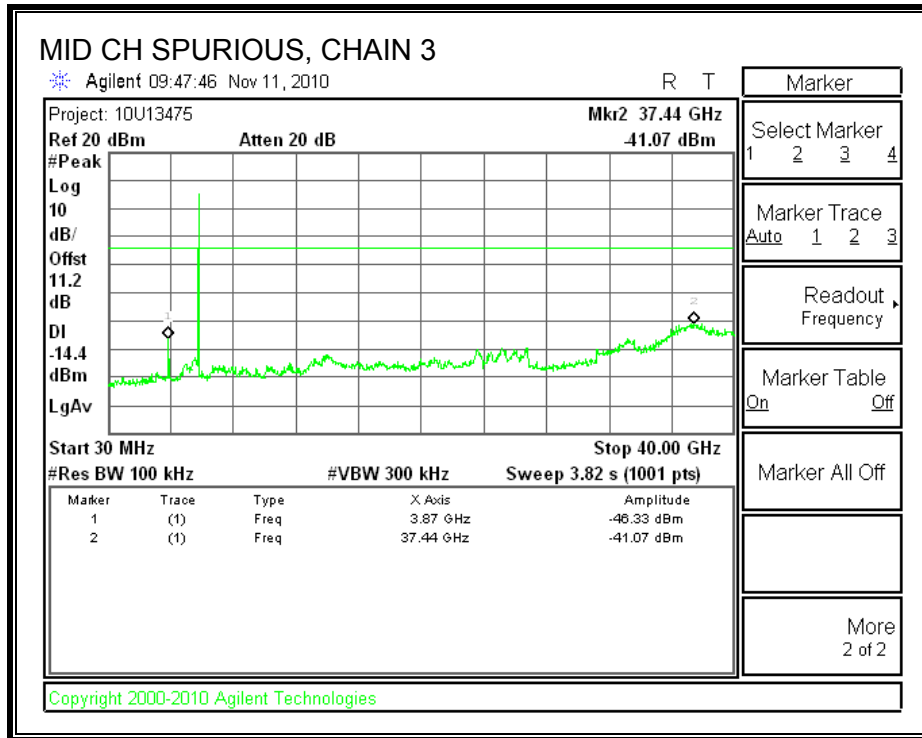


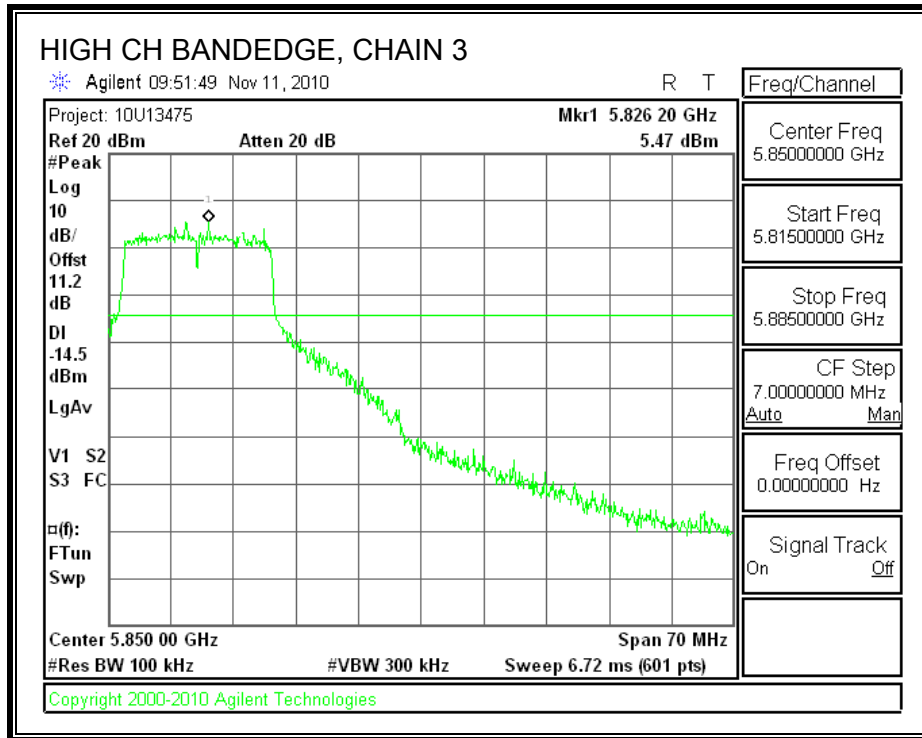
CHAIN 3 SPURIOUS EMISSIONS

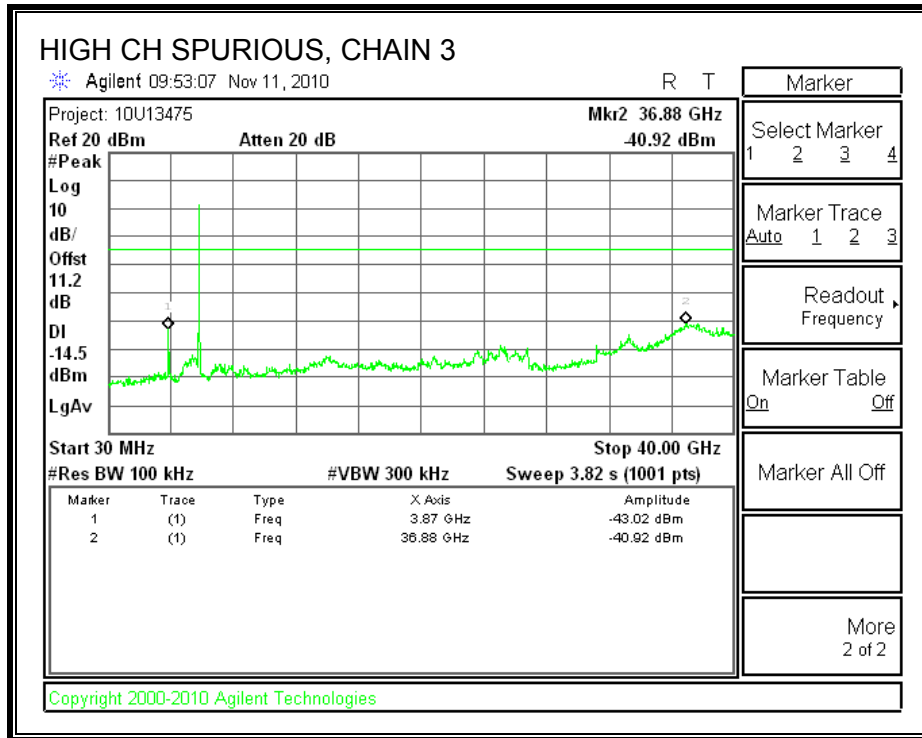












7.6. 802.11n THREE CHAINS HT20 MODE IN THE 5.8 GHz BAND

7.6.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

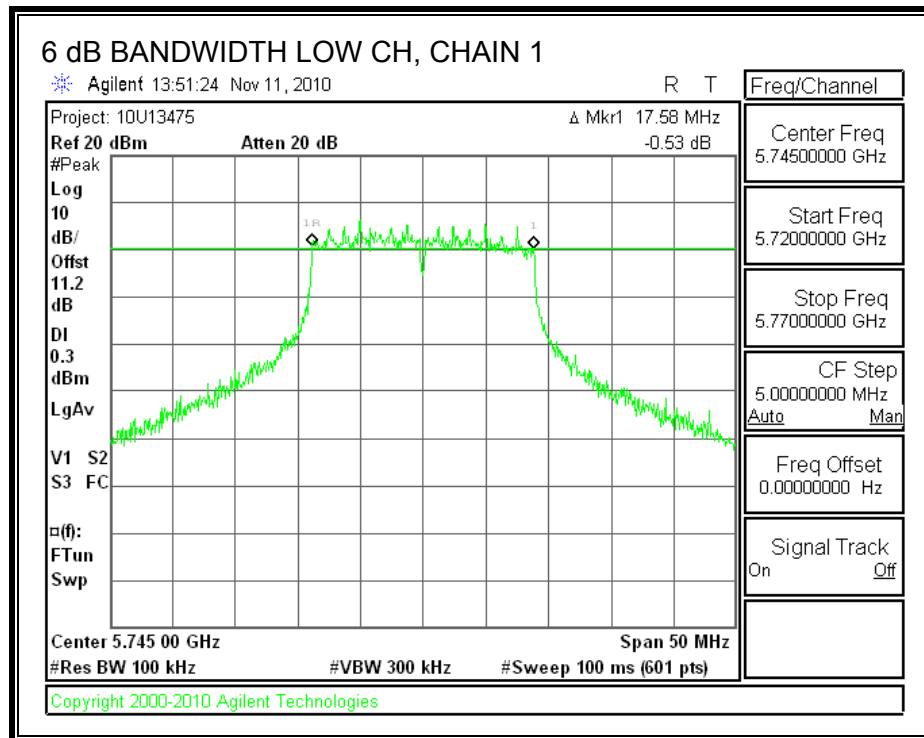
TEST PROCEDURE

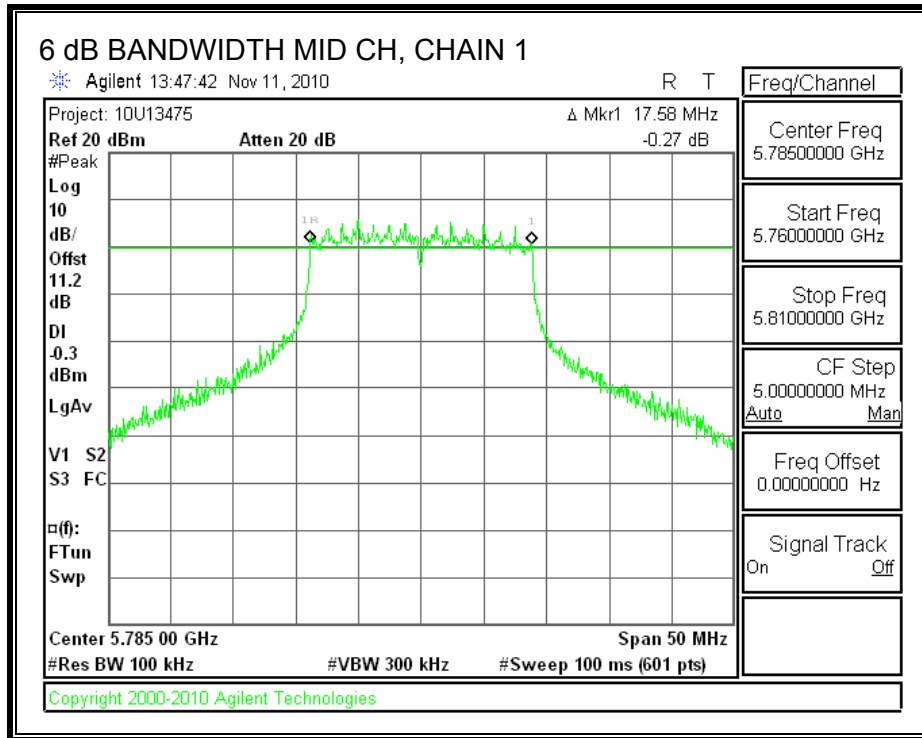
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

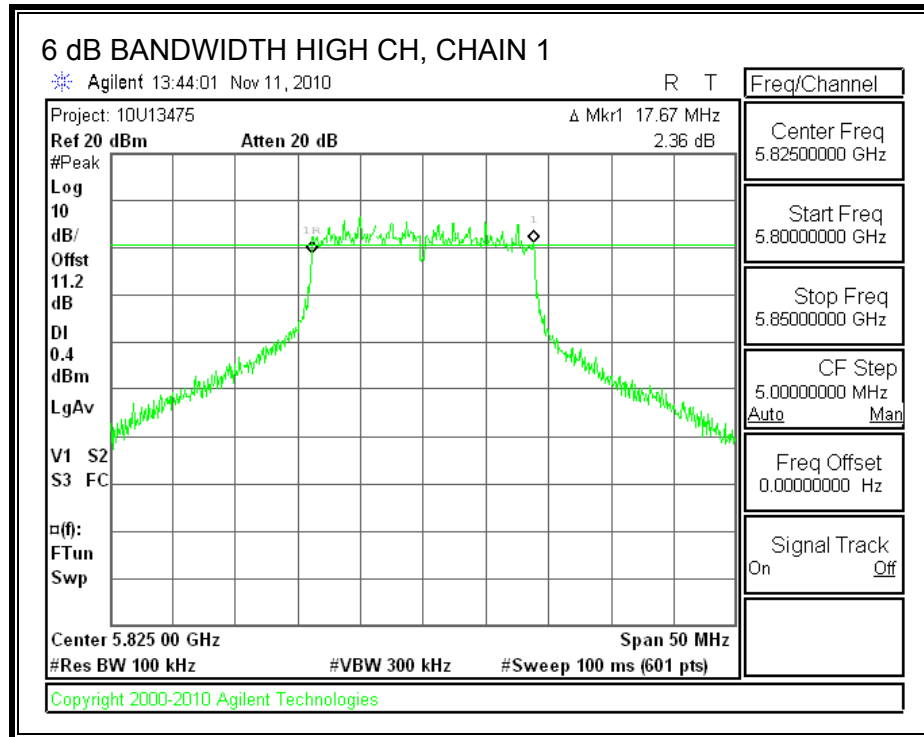
RESULTS

| Channel | Frequency (MHz) | Chain 1 6 dB BW (MHz) | Chain 2 6 dB BW (MHz) | Chain 3 6 dB BW (MHz) | Minimum Limit (MHz) |
|----------------|----------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------|
| Low | 5745 | 17.58 | 17.58 | 17.58 | 0.5 |
| Middle | 5785 | 17.58 | 17.58 | 17.67 | 0.5 |
| High | 5825 | 17.67 | 17.67 | 17.58 | 0.5 |

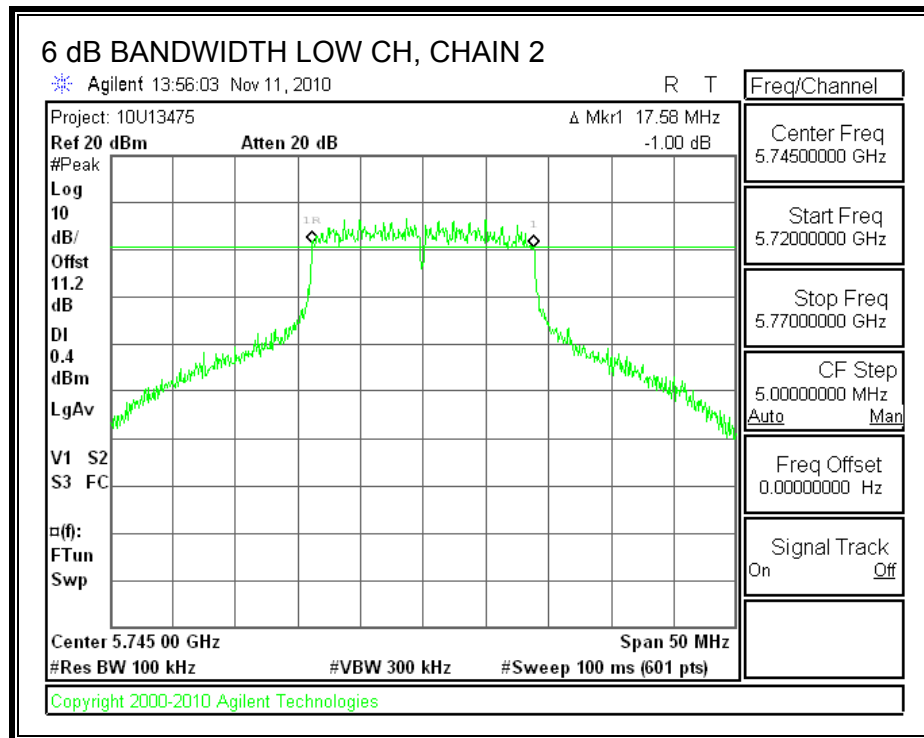
6 dB BANDWIDTH, CHAIN 1

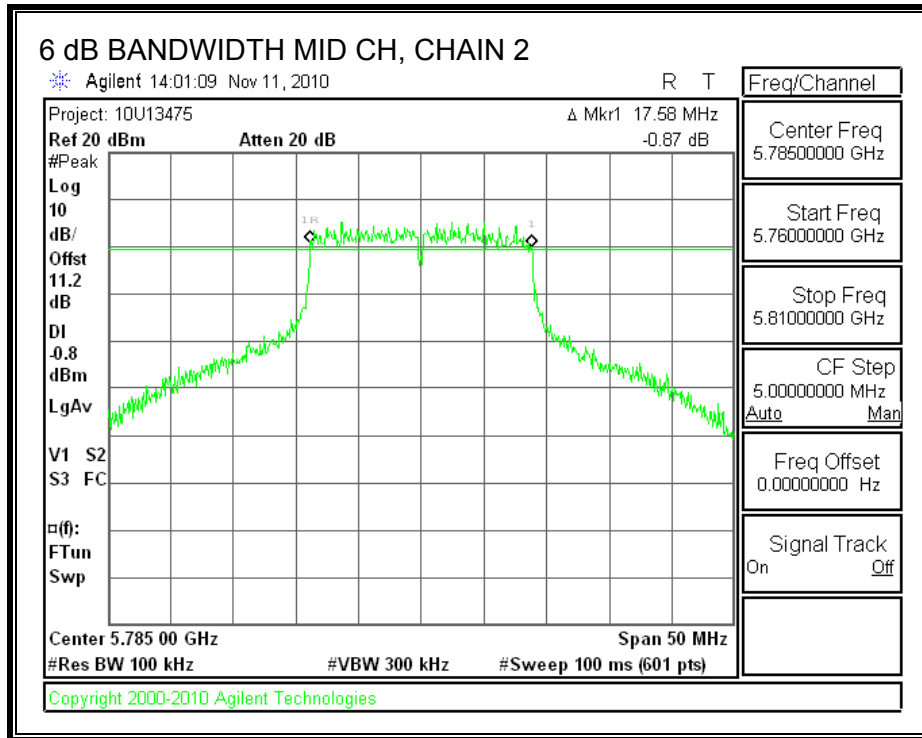


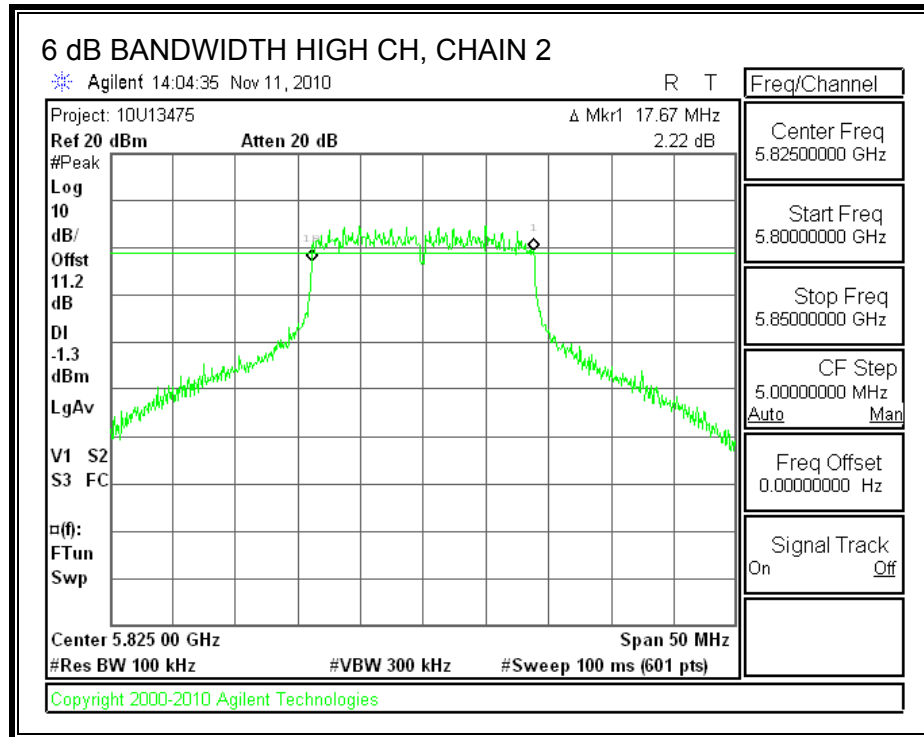




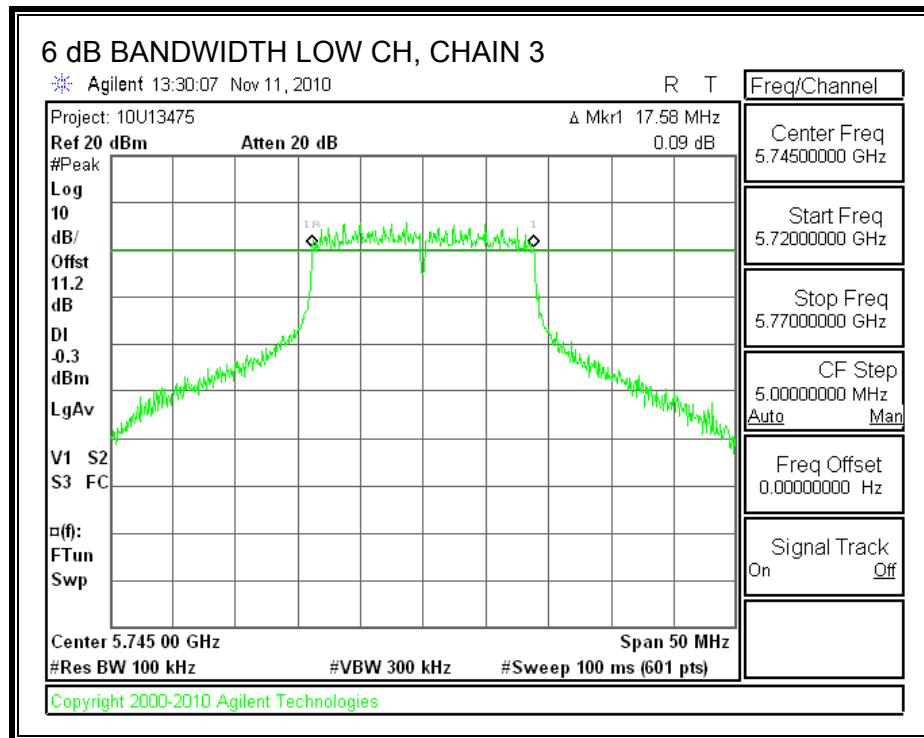
6 dB BANDWIDTH, CHAIN 2

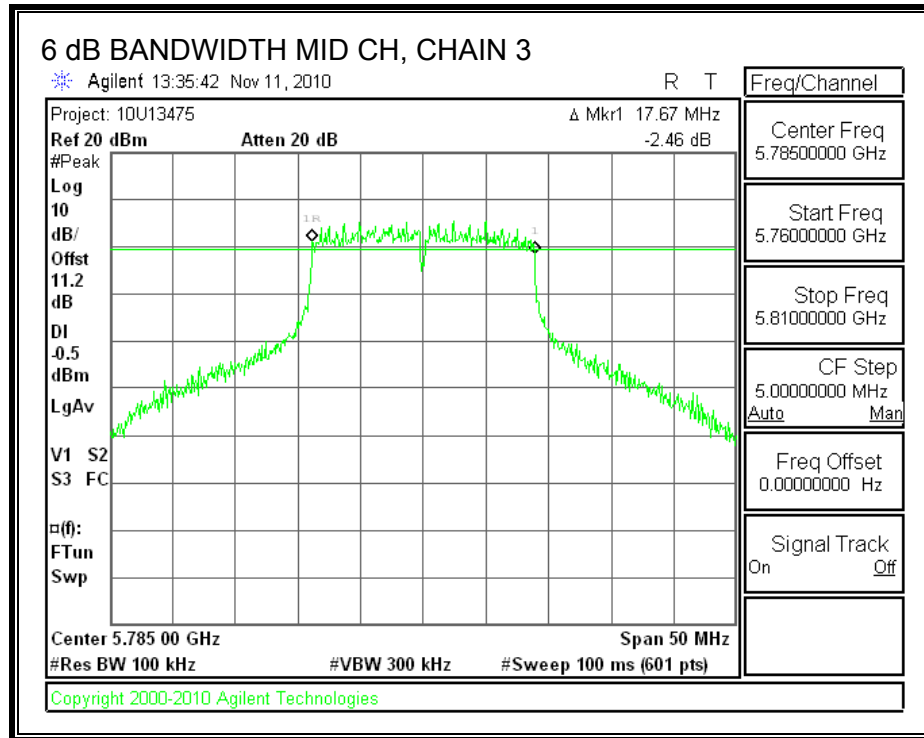


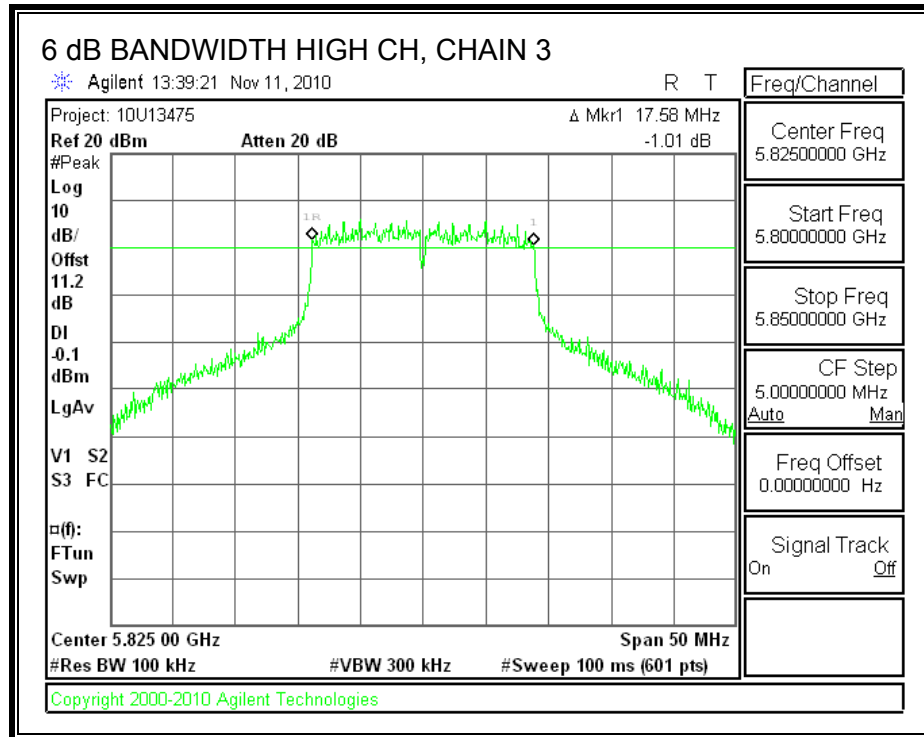




6 dB BANDWIDTH, CHAIN 3







7.6.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

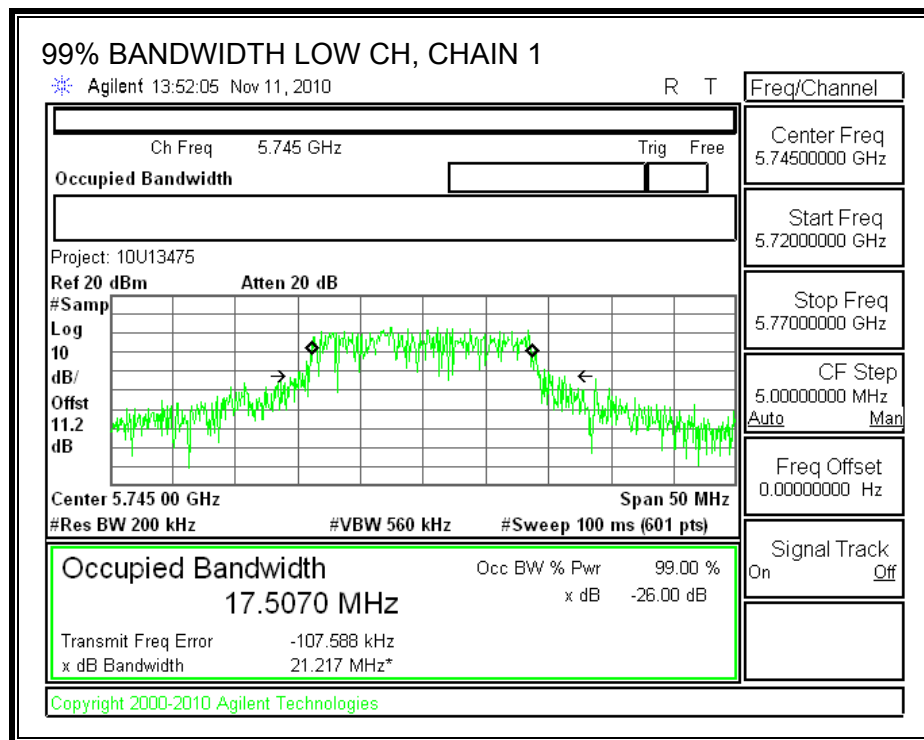
TEST PROCEDURE

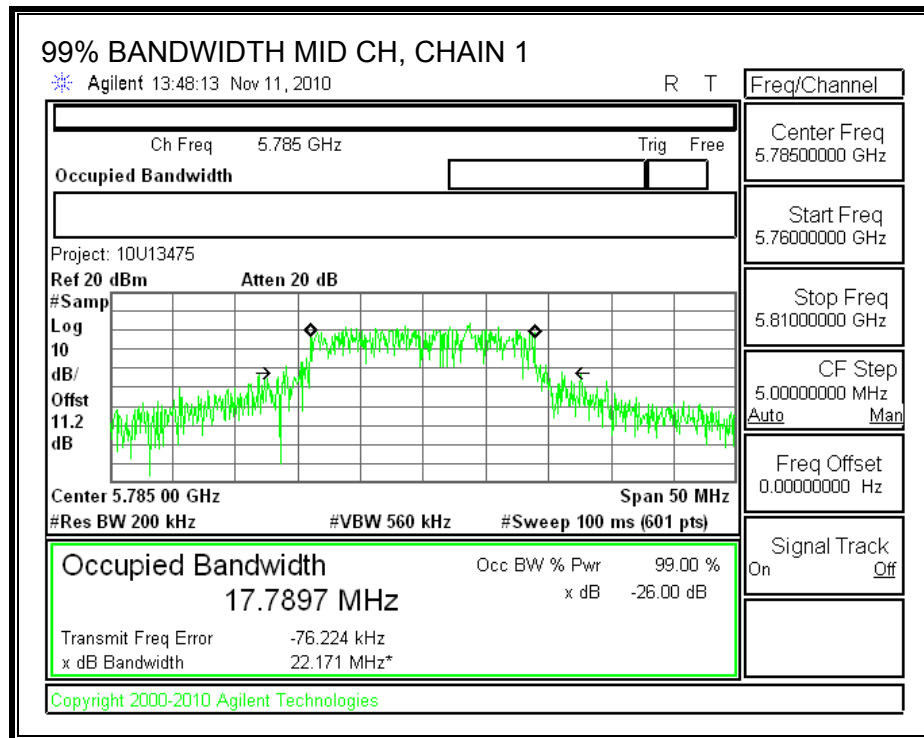
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

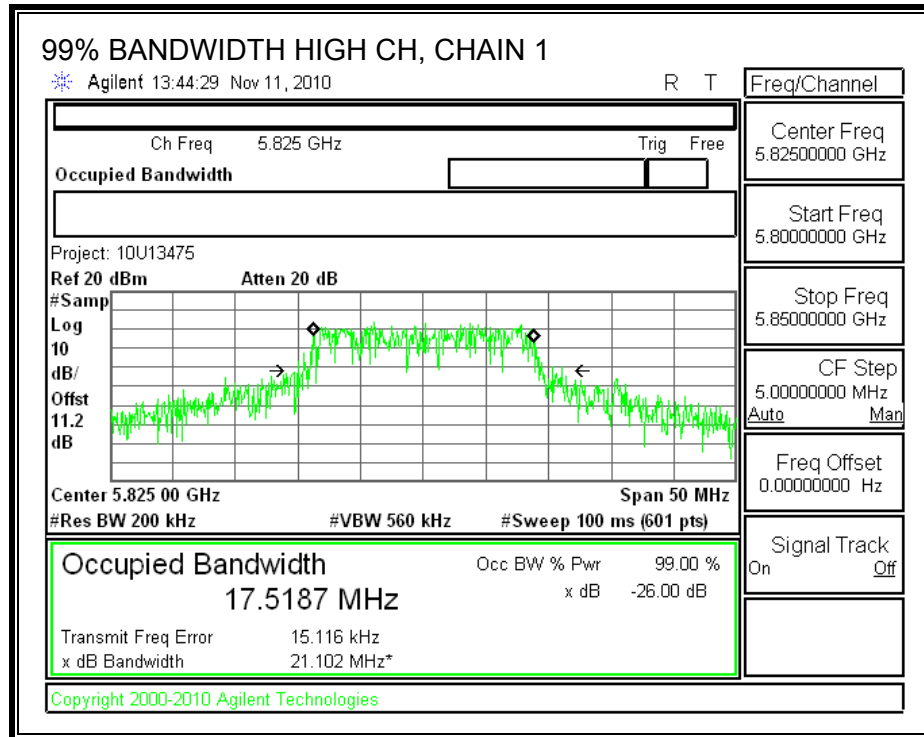
RESULTS

| Channel | Frequency (MHz) | Chain 1 99% Bandwidth (MHz) | Chain 2 99% Bandwidth (MHz) | Chain 3 99% Bandwidth (MHz) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Low | 5745 | 17.5070 | 17.7112 | 17.7850 |
| Middle | 5785 | 17.7897 | 17.7250 | 17.5264 |
| High | 5825 | 17.5187 | 17.5791 | 17.6576 |

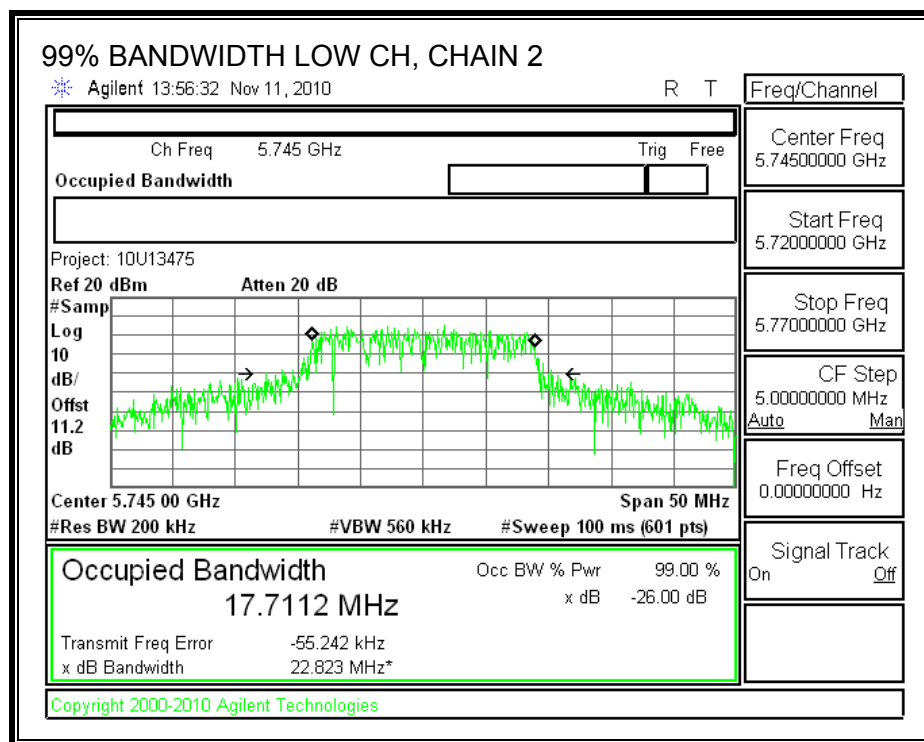
99% BANDWIDTH, CHAIN 1

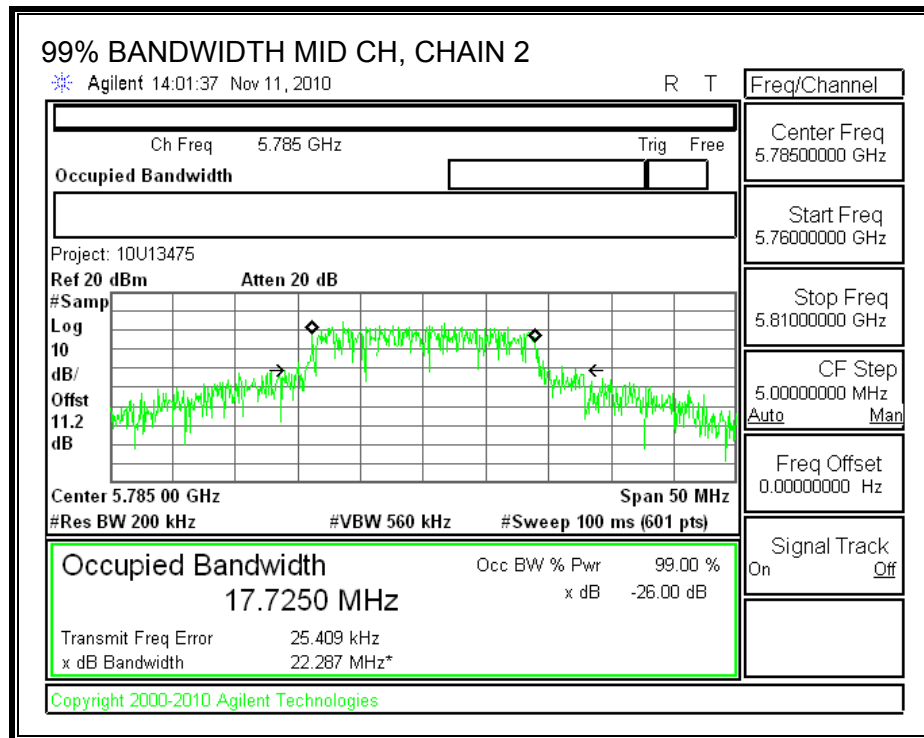


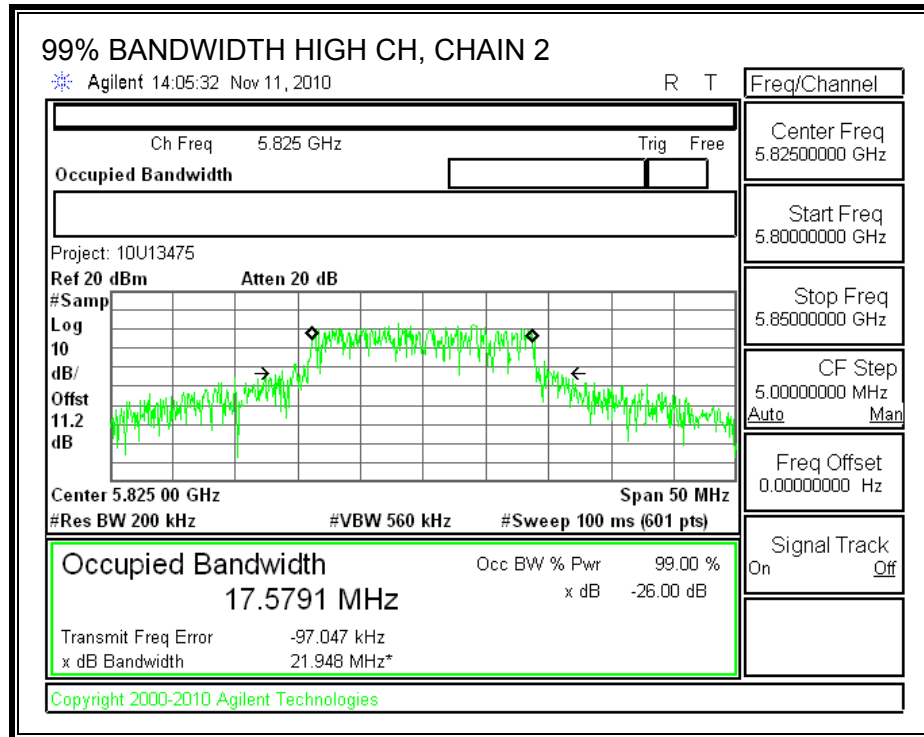




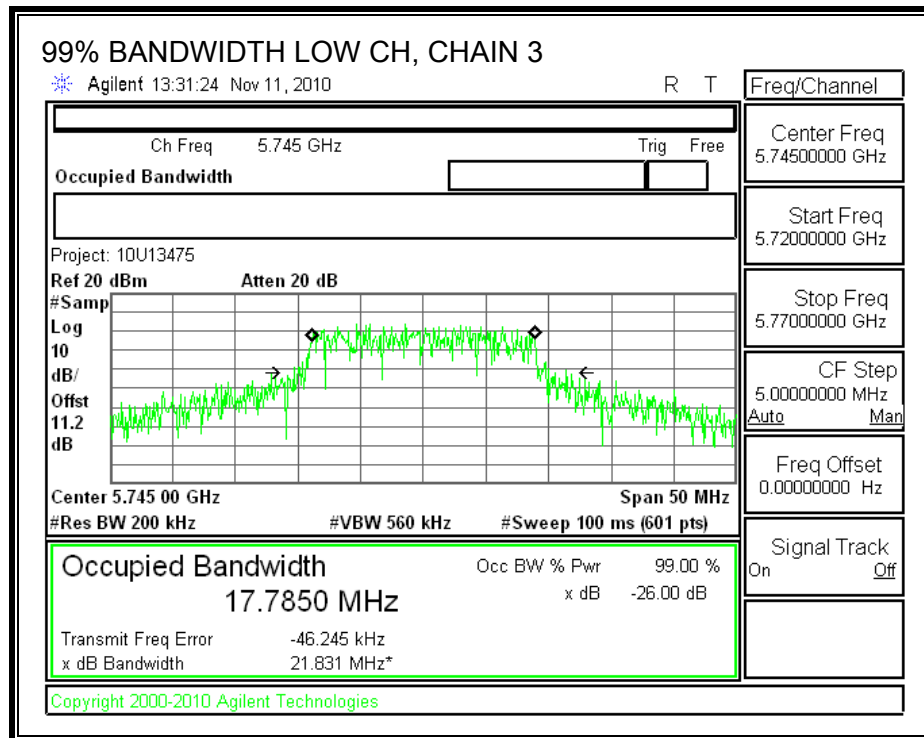
99% BANDWIDTH, CHAIN 2

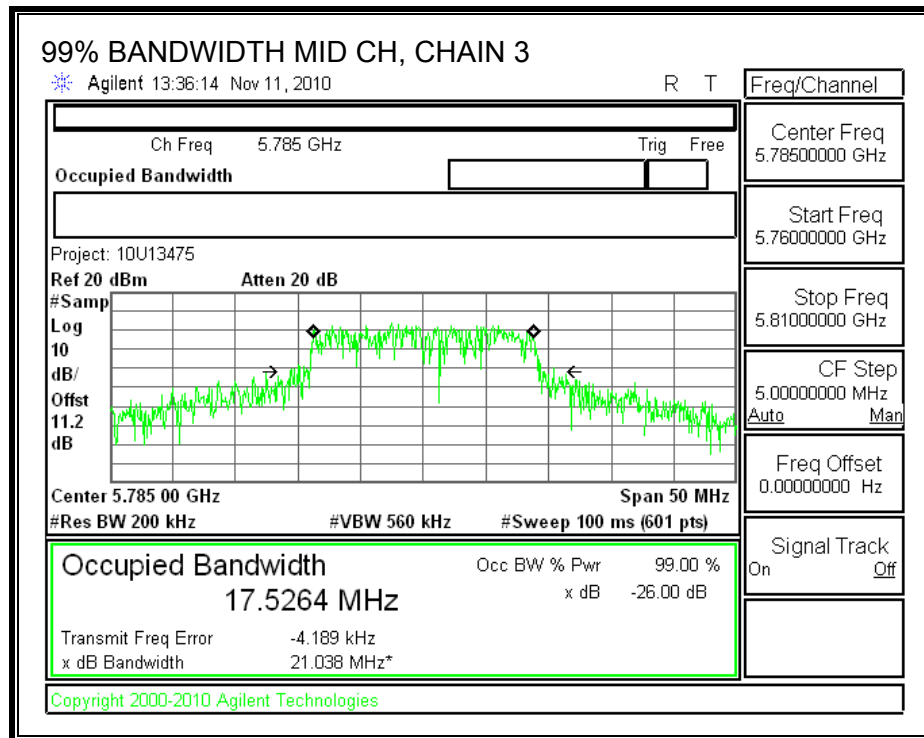


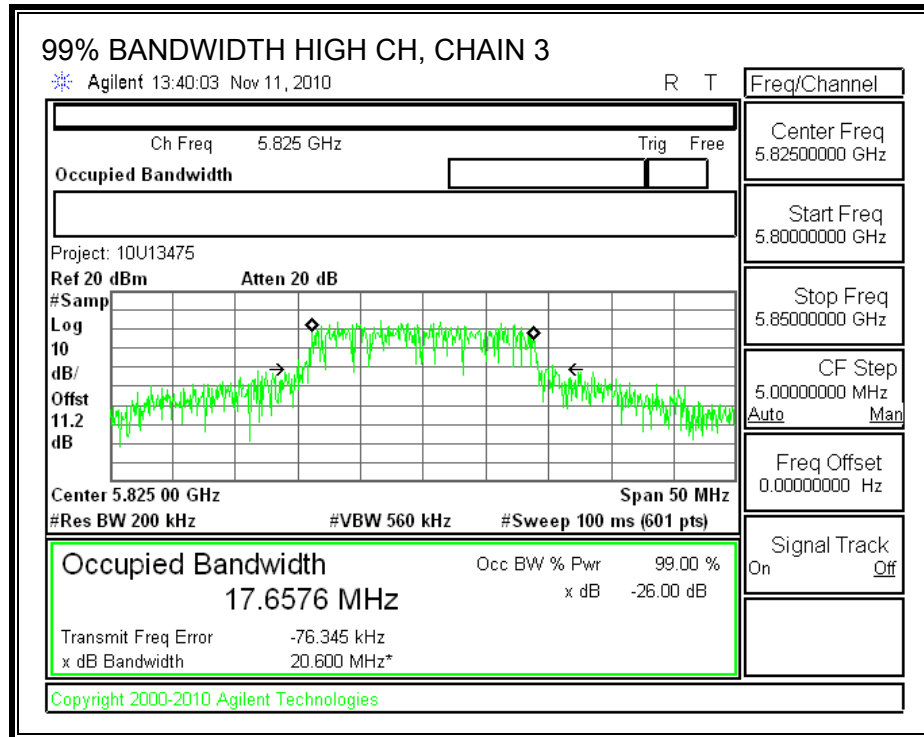




99% BANDWIDTH, CHAIN 3







7.6.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain (**5.5 dBi**) is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

Peak power is measured using a wide bandwidth peak power meter.

RESULTS

| Channel | Frequency (MHz) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Chain 3 Power (dBm) | Attenuator + Cable Loss (dB) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|---------------------------|---------------------------|---------------------------|------------------------------------|-------------------------|----------------|----------------|
| Low | 5745 | 11.34 | 11.69 | 11.05 | 11.20 | 27.34 | 30.00 | -2.66 |
| Mid | 5785 | 11.07 | 11.18 | 10.77 | 11.20 | 26.98 | 30.00 | -3.02 |
| High | 5825 | 10.95 | 11.96 | 10.88 | 11.20 | 27.26 | 30.00 | -2.74 |

7.6.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.2 dB (including 10 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency (MHz) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Chain 3 Power (dBm) | Total Power (dBm) |
|---------|--------------------|------------------------|------------------------|------------------------|----------------------|
| Low | 5745 | 15.26 | 16.45 | 15.86 | 20.65 |
| Middle | 5785 | 15.32 | 15.66 | 15.55 | 20.28 |
| High | 5825 | 15.67 | 17.38 | 15.98 | 21.18 |

7.6.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

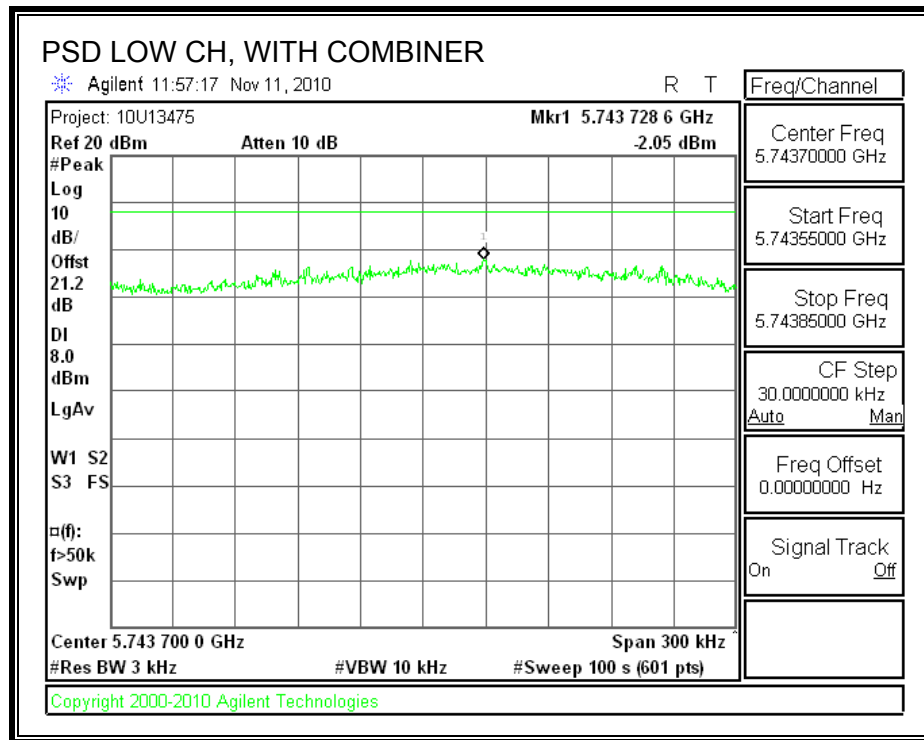
TEST PROCEDURE

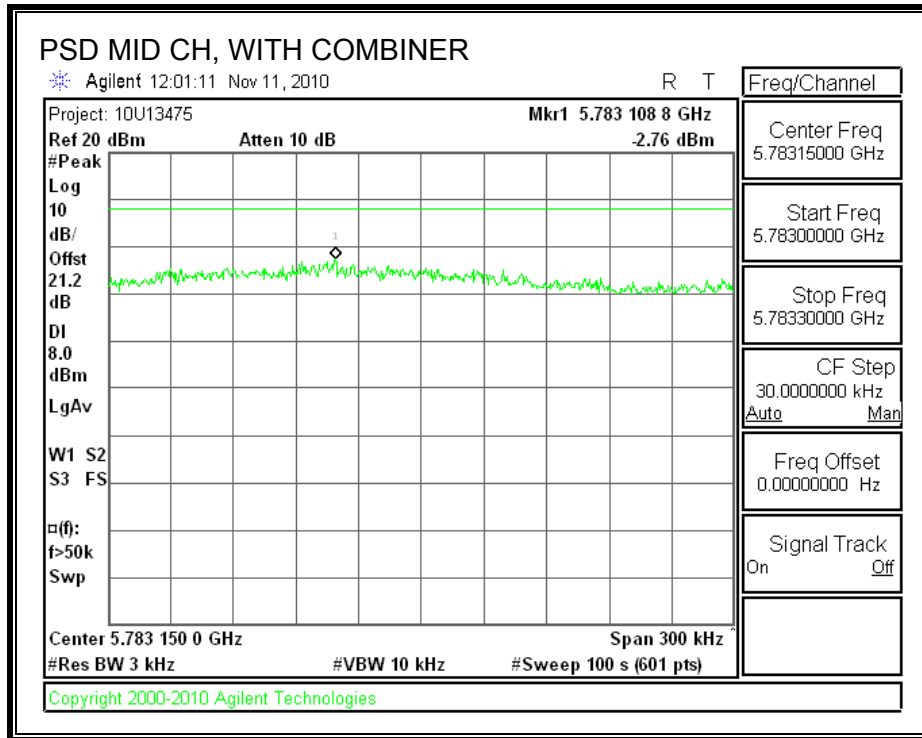
Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

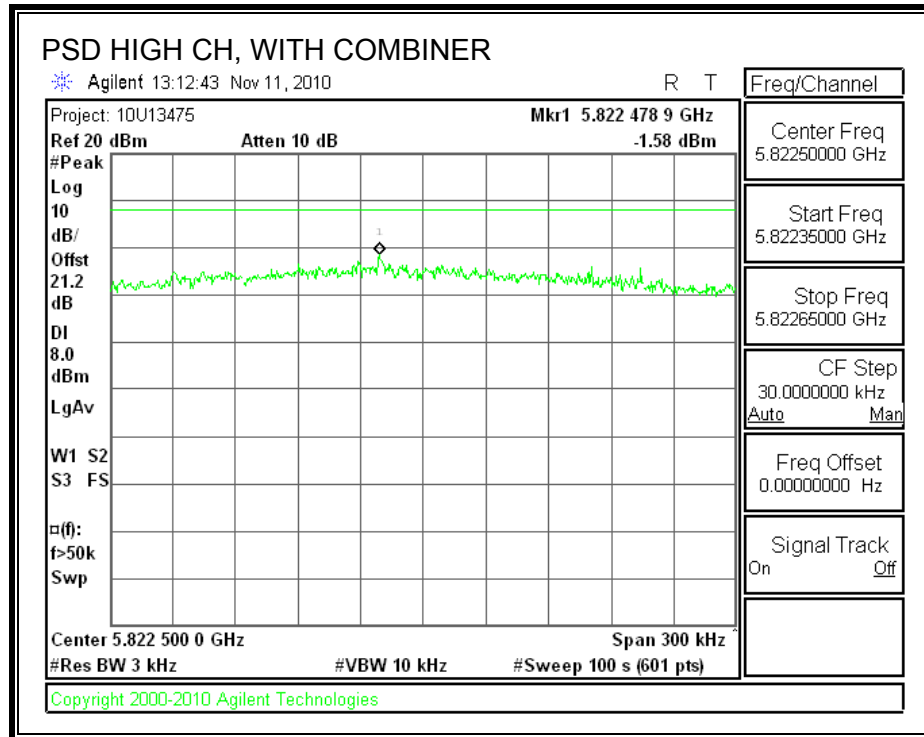
RESULTS:

| Channel | Frequency (MHz) | PSD with Combiner (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|----------------------------|----------------|----------------|
| Low | 5745 | -2.05 | 8 | -10.05 |
| Middle | 5785 | -2.76 | 8 | -10.76 |
| High | 5825 | -1.58 | 8 | -9.58 |

POWER SPECTRAL DENSITY, WITH COMBINER







7.6.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of Peak Power using wideband power meter; therefore the required attenuation is 20 dB.

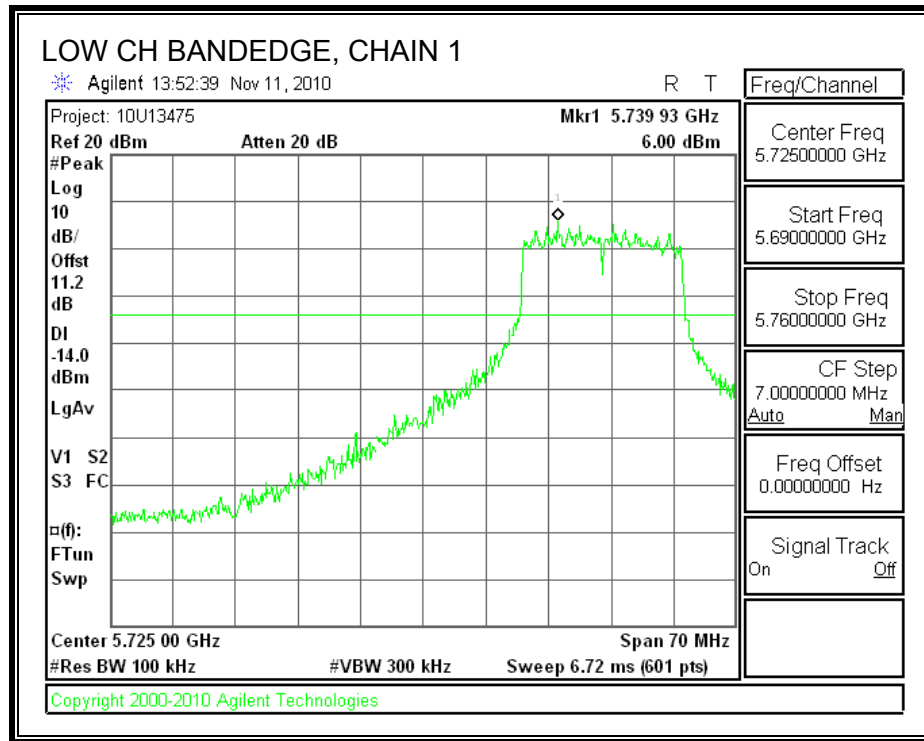
TEST PROCEDURE

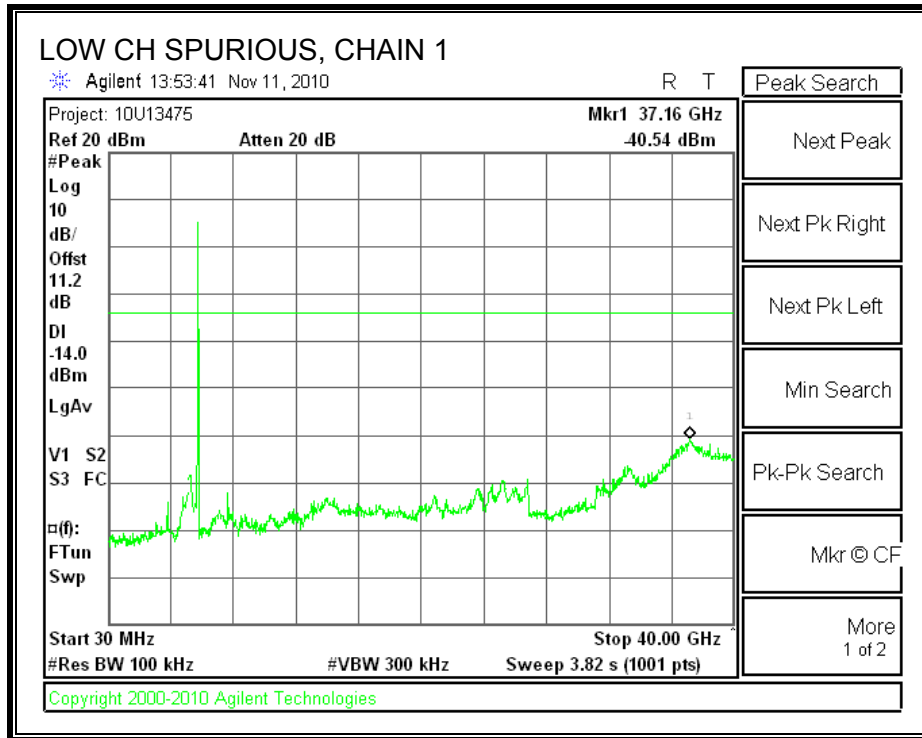
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

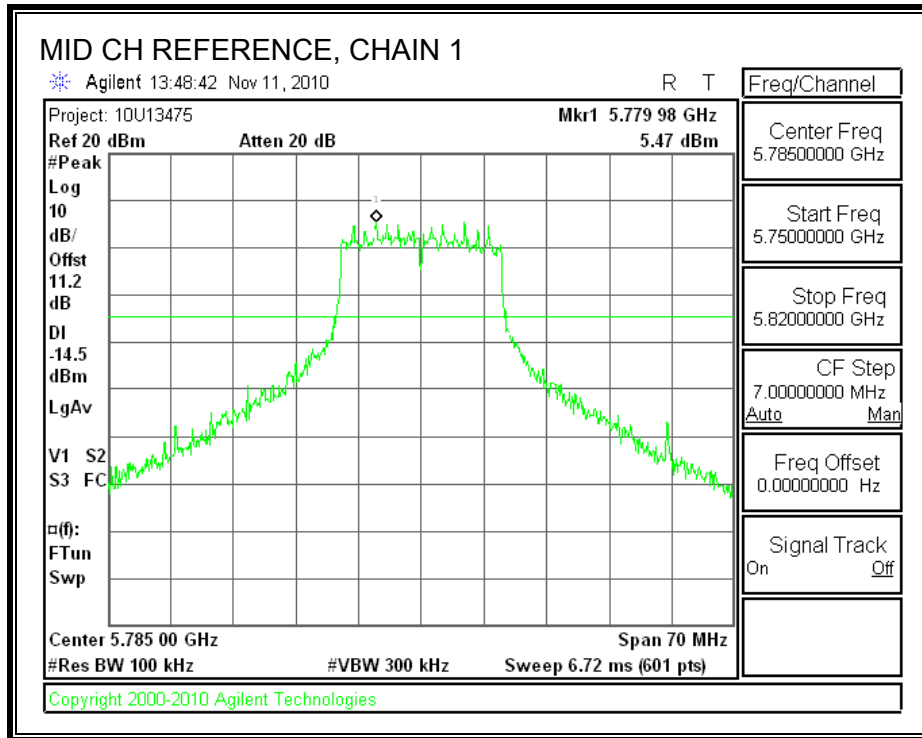
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

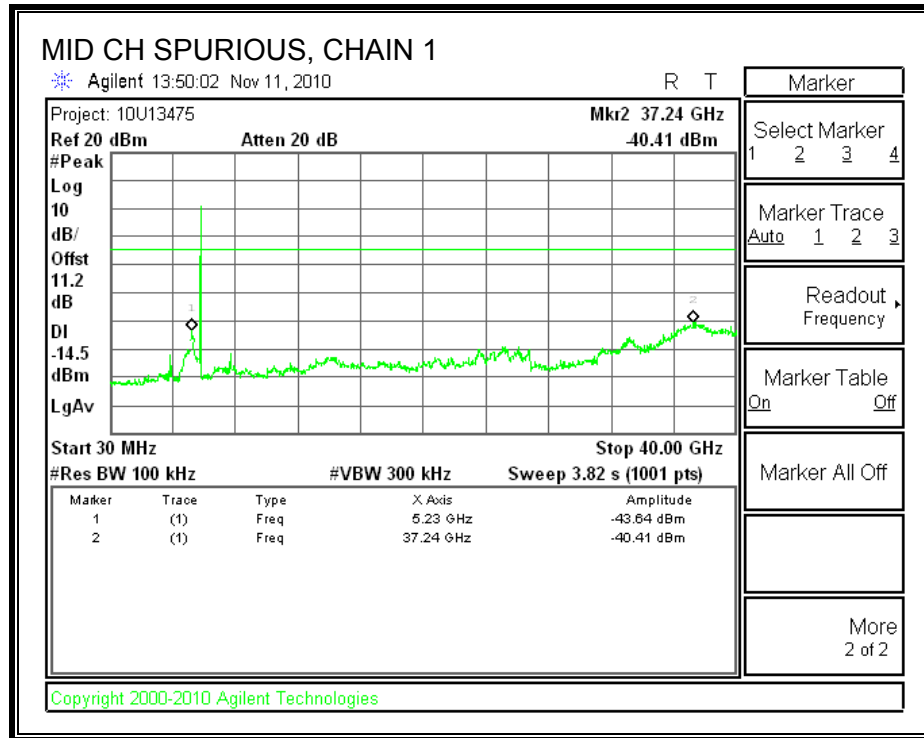
RESULTS

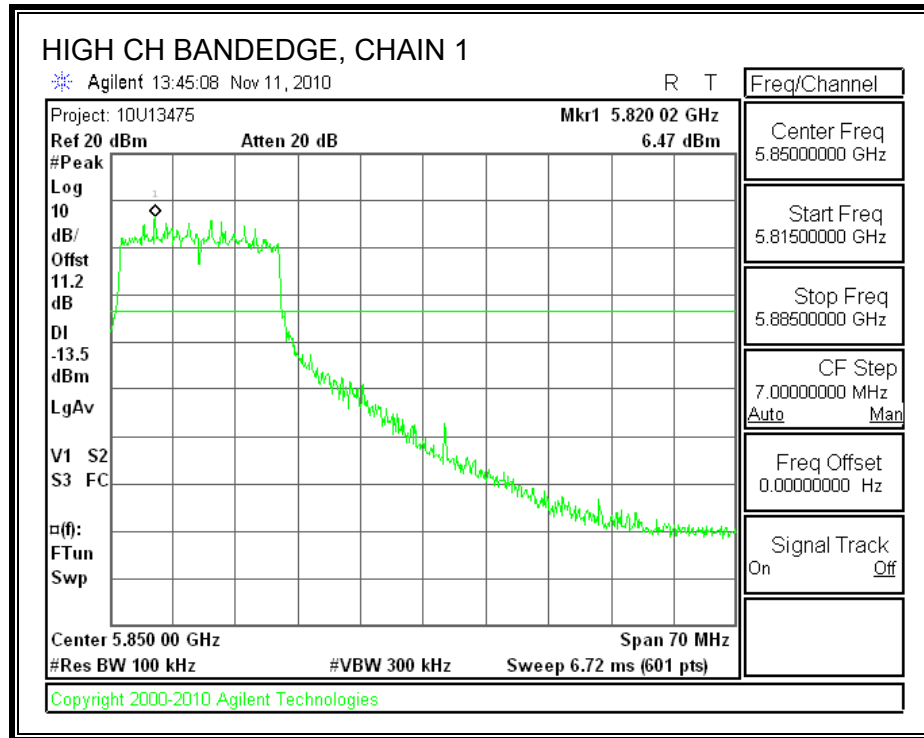
CHAIN 1 SPURIOUS EMISSIONS

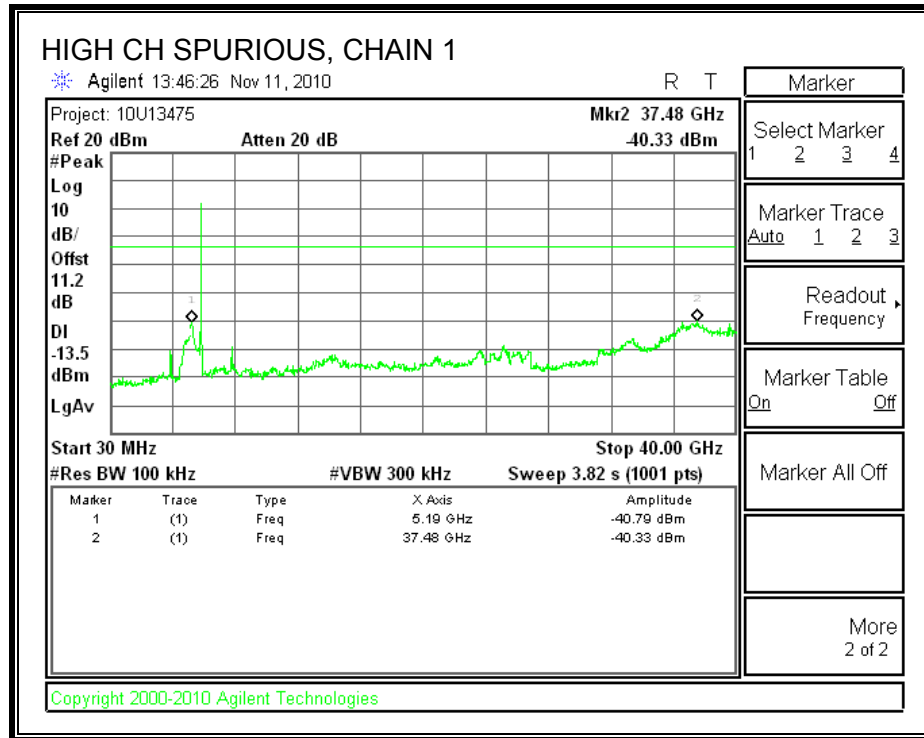




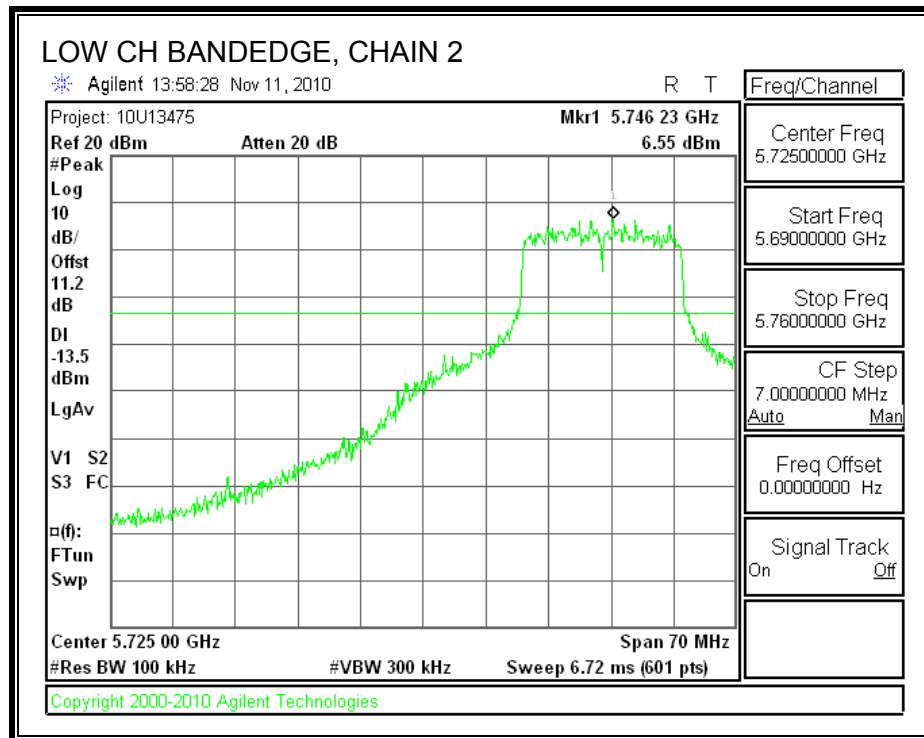


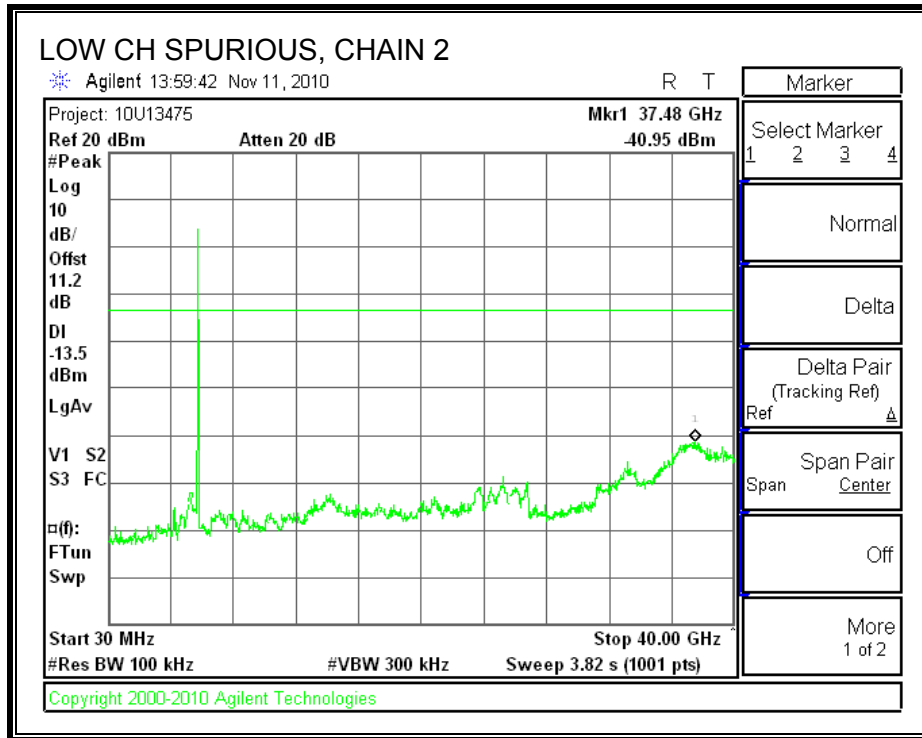


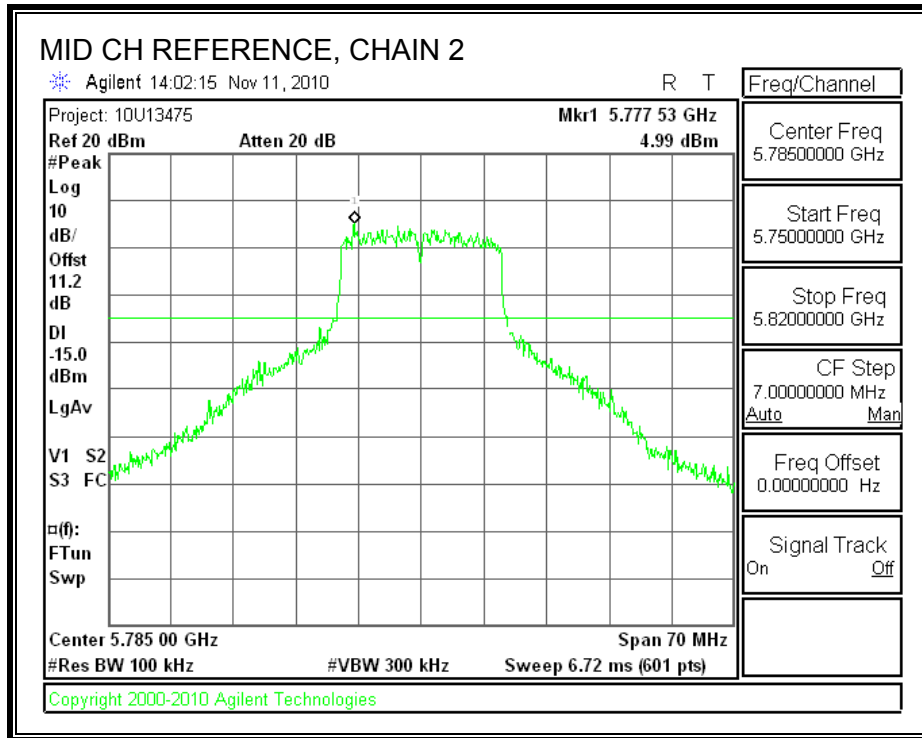


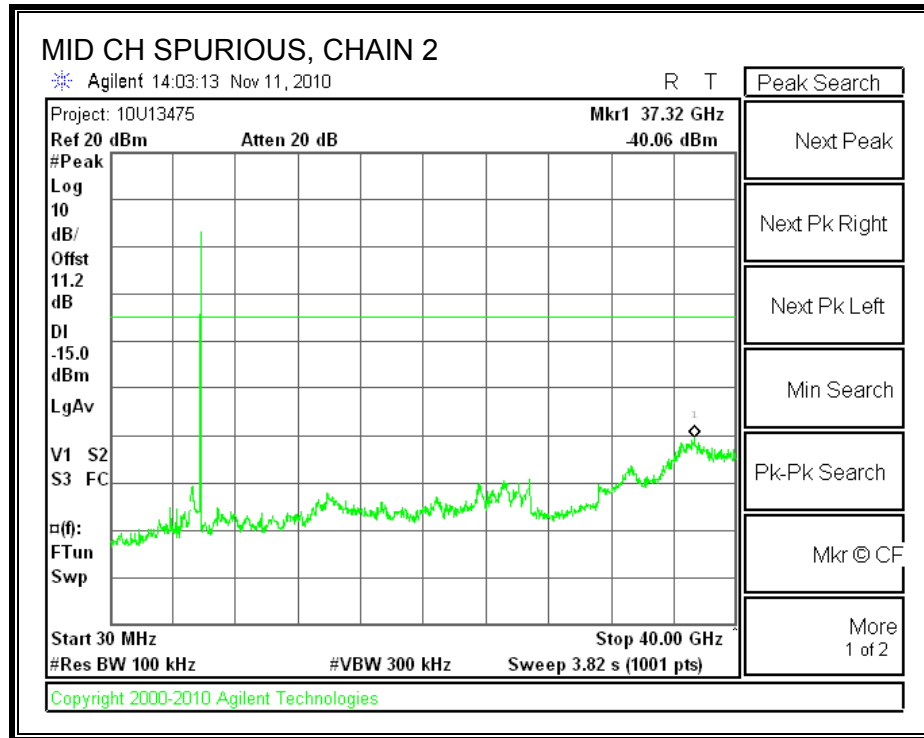


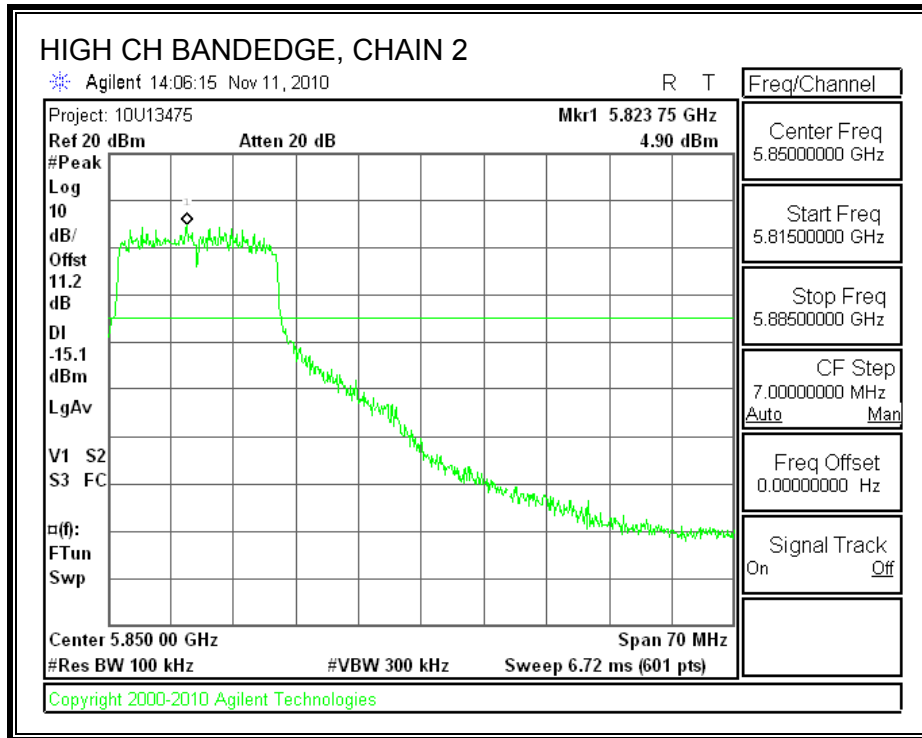
CHAIN 2 SPURIOUS EMISSIONS

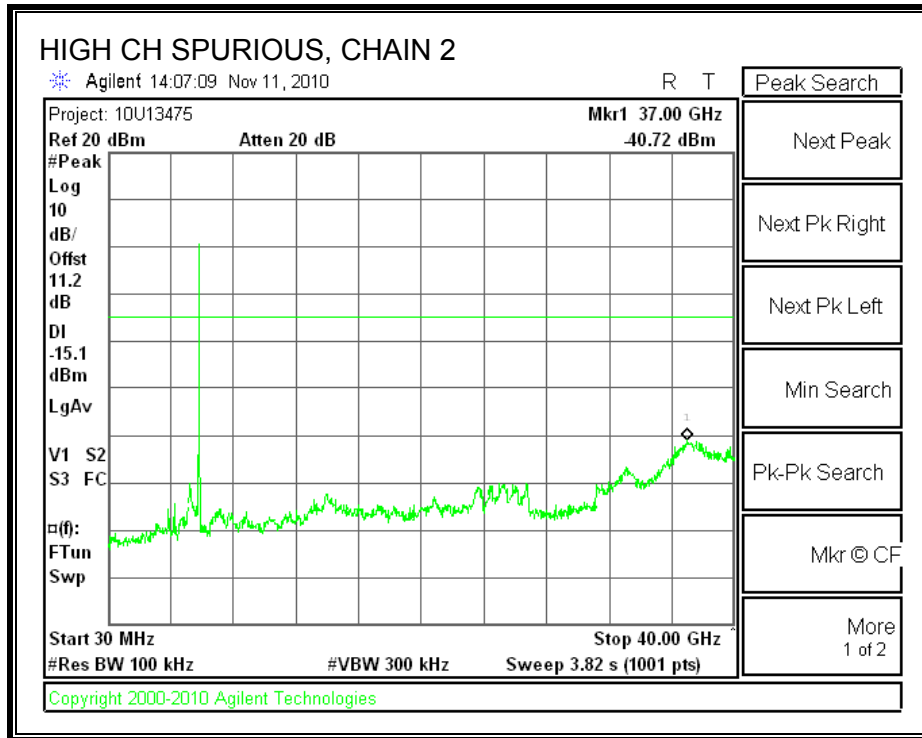




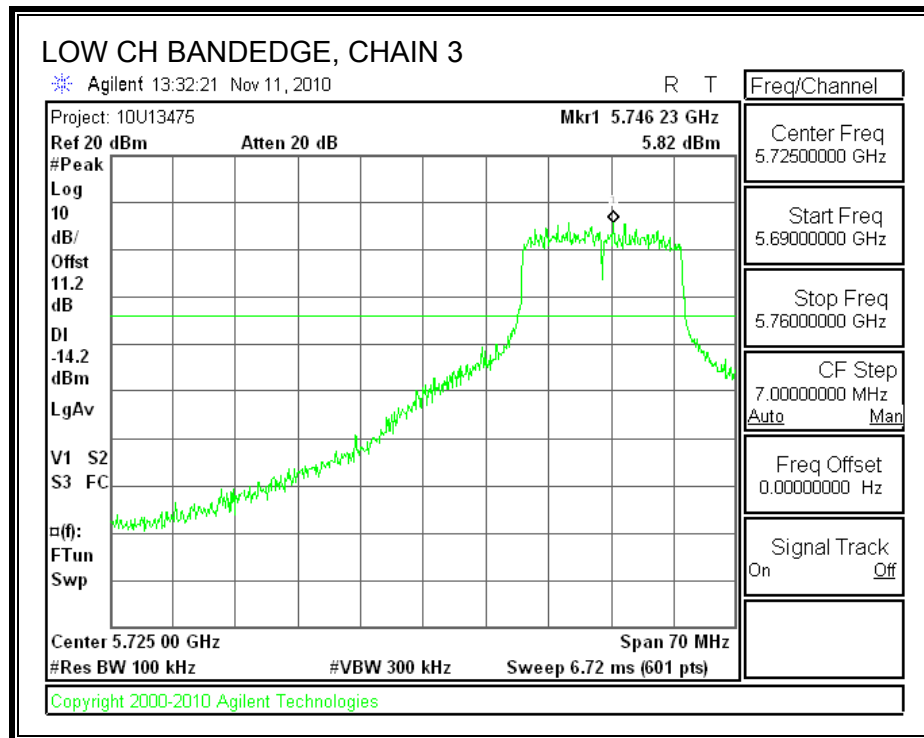


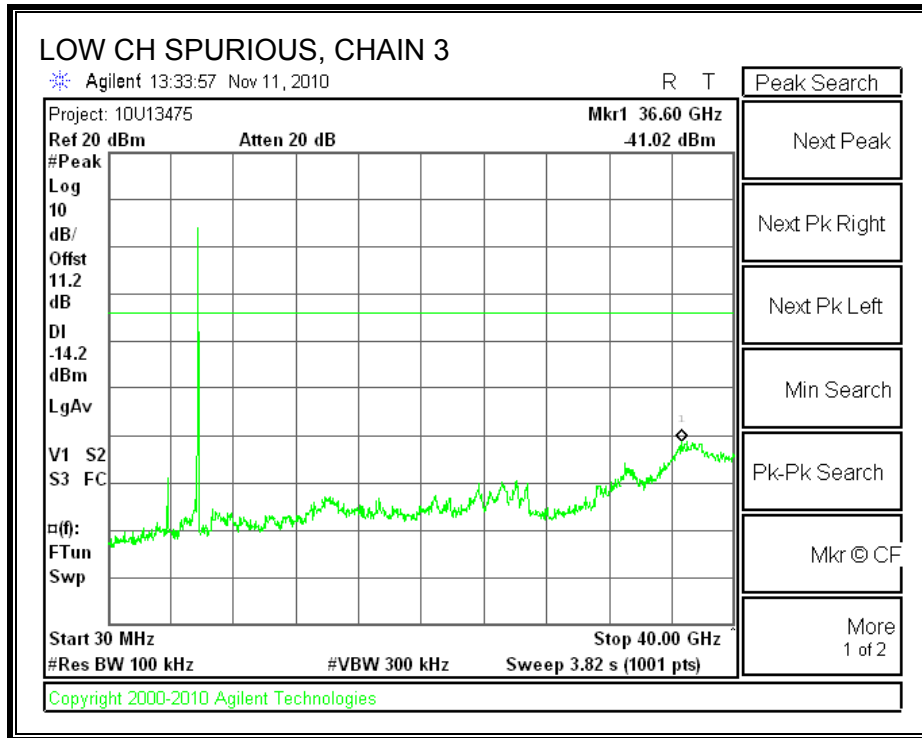


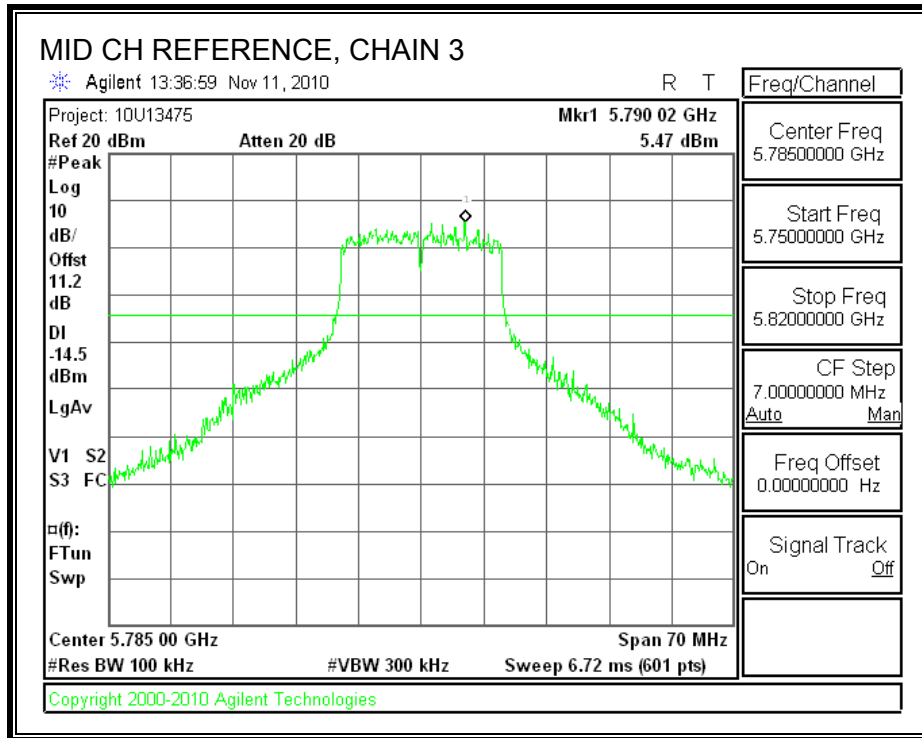


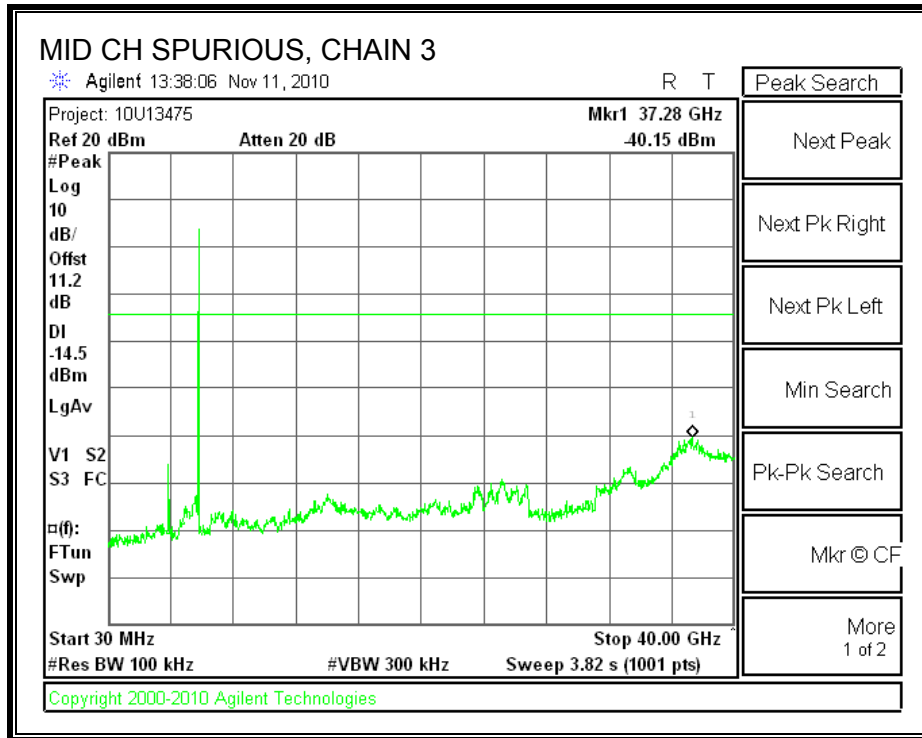


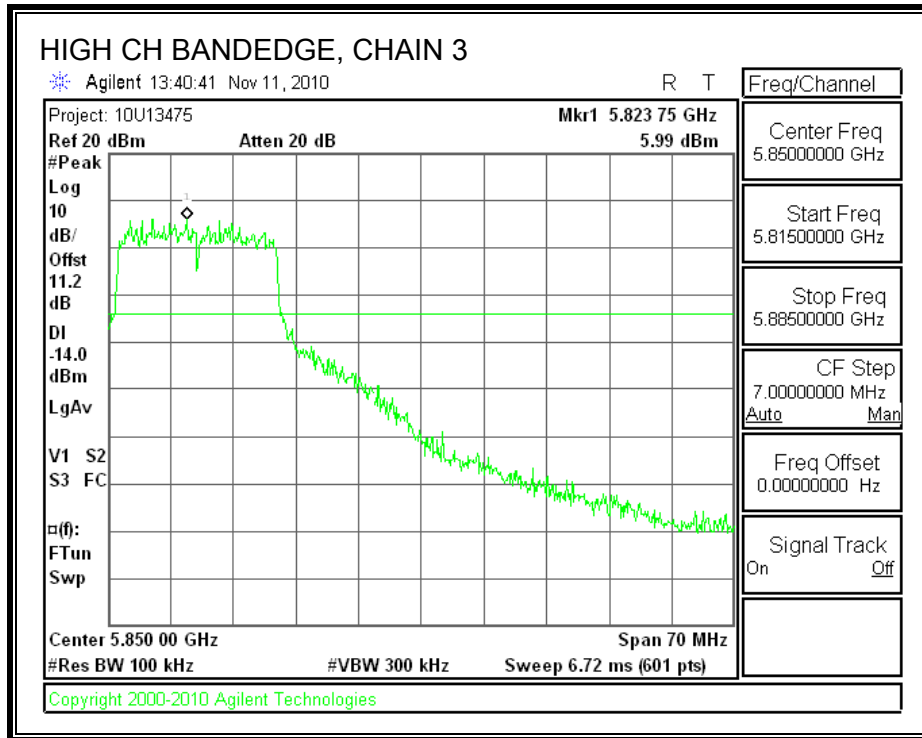
CHAIN 3 SPURIOUS EMISSIONS

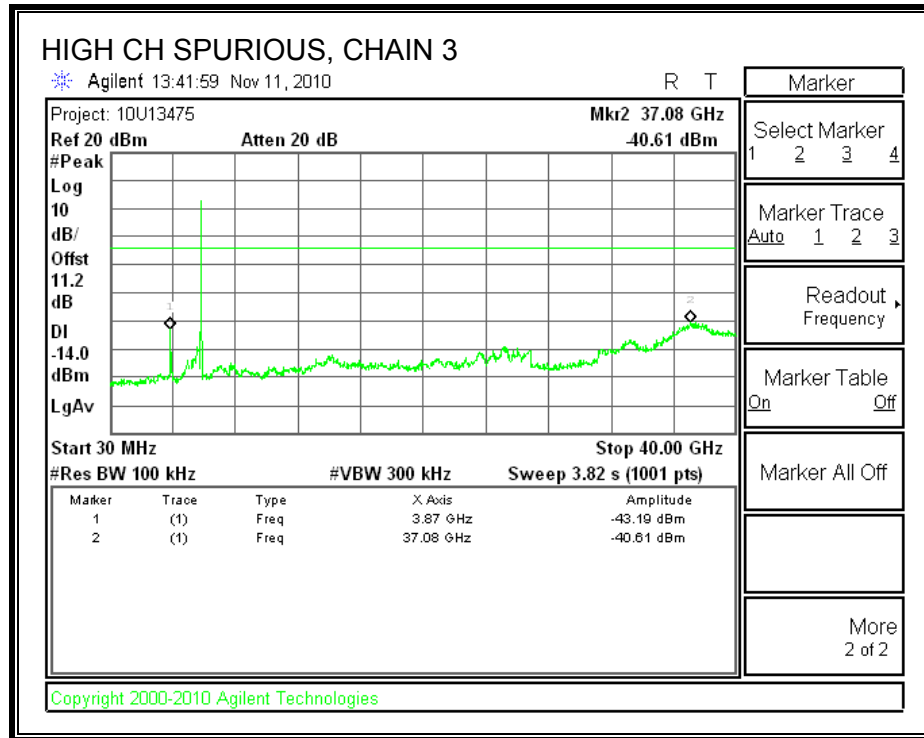












7.7. 802.11n THREE CHAINS HT40 MODE IN THE 5.8 GHz BAND

7.7.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

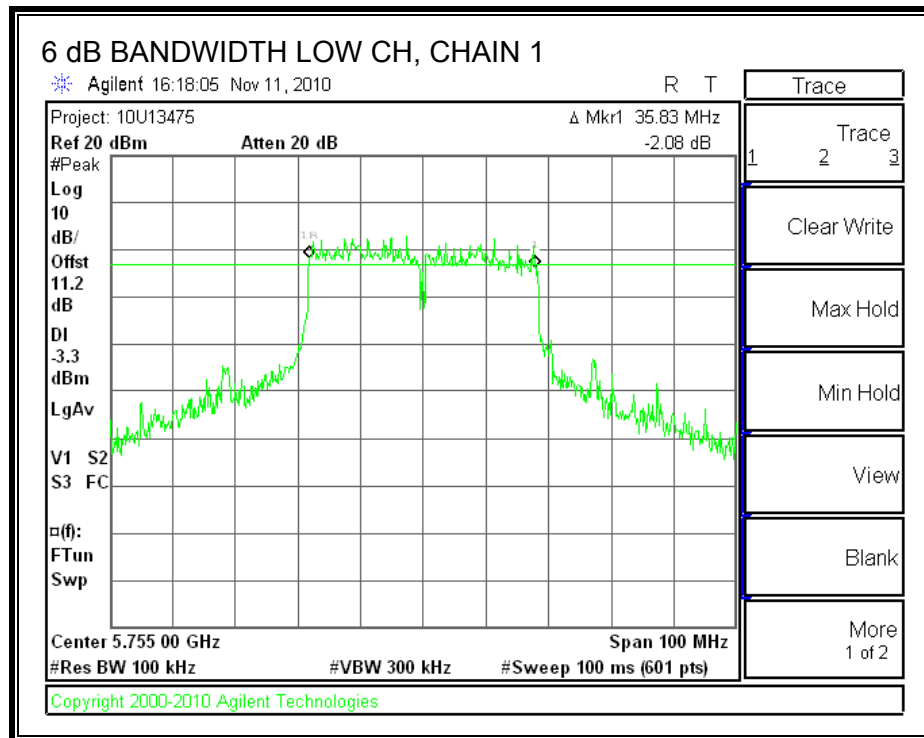
TEST PROCEDURE

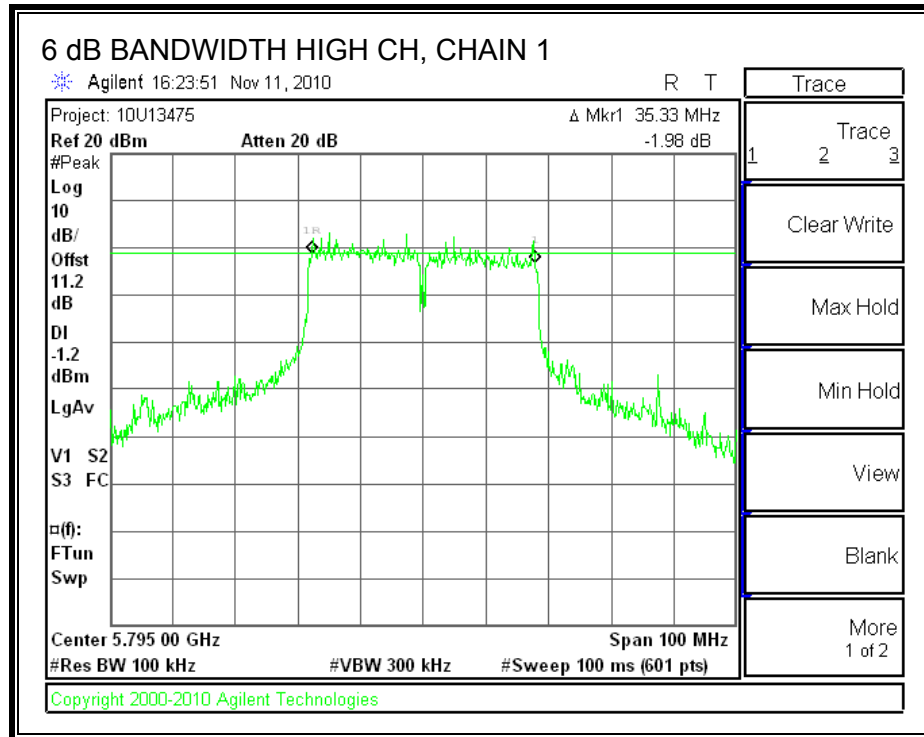
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

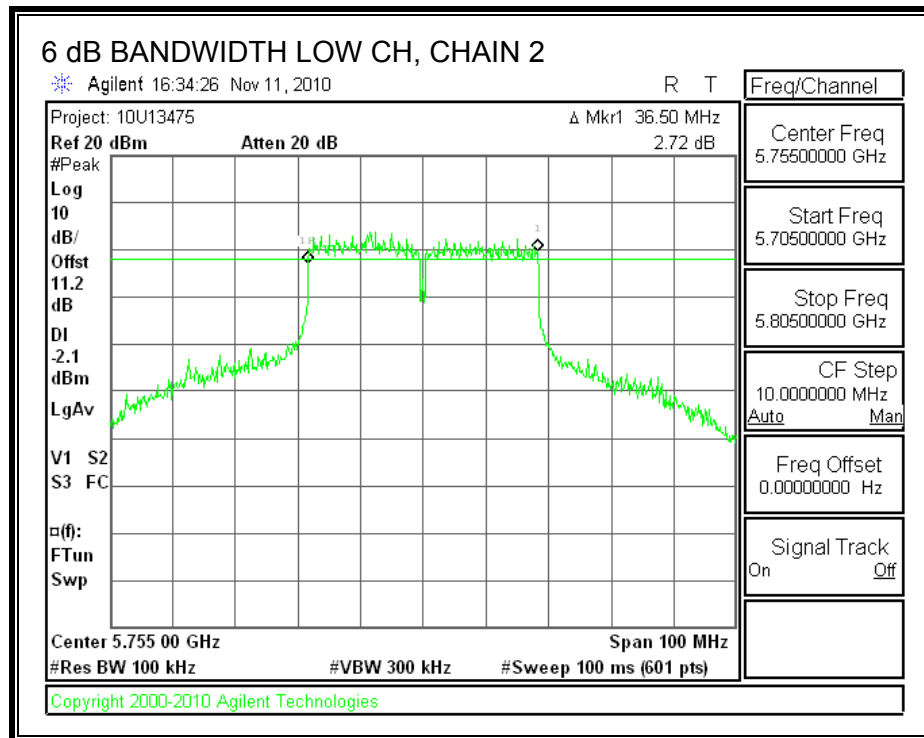
| Channel | Frequency (MHz) | Chain 1 6 dB BW (MHz) | Chain 2 6 dB BW (MHz) | Chain 3 6 dB BW (MHz) | Minimum Limit (MHz) |
|---------|--------------------|-----------------------------|-----------------------------|-----------------------------|------------------------|
| Low | 5755 | 35.83 | 36.5 | 36.5 | 0.5 |
| High | 5795 | 35.33 | 36.5 | 36.5 | 0.5 |

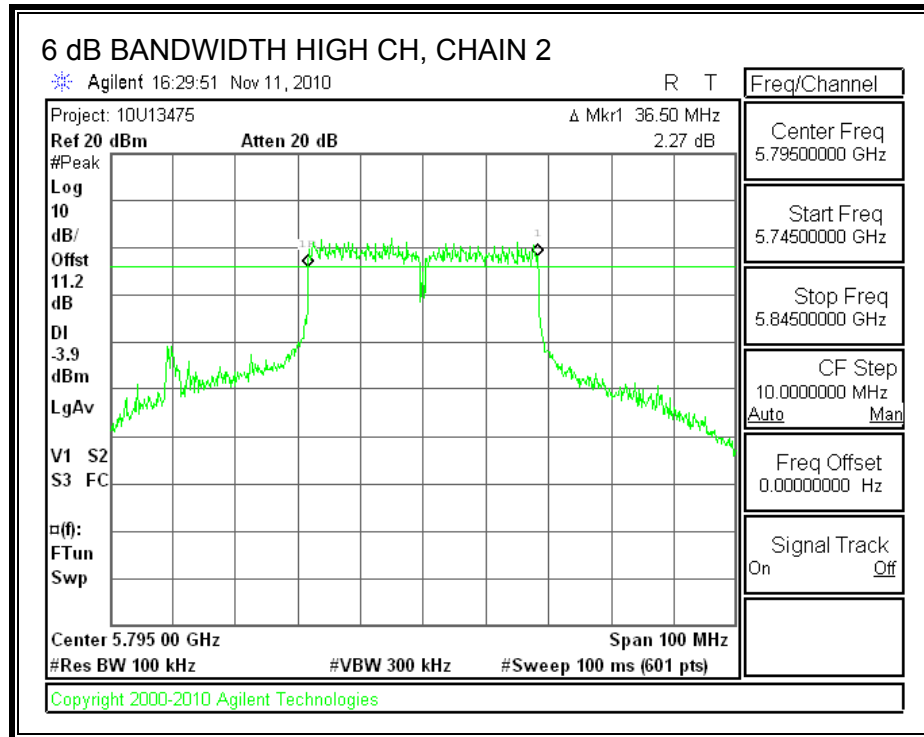
6 dB BANDWIDTH, CHAIN 1



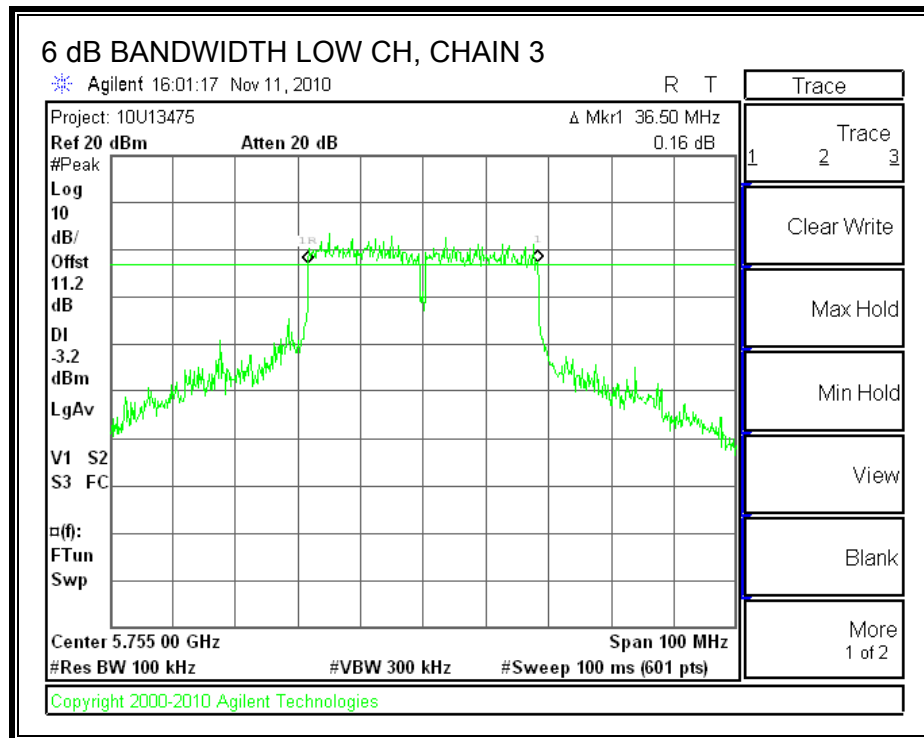


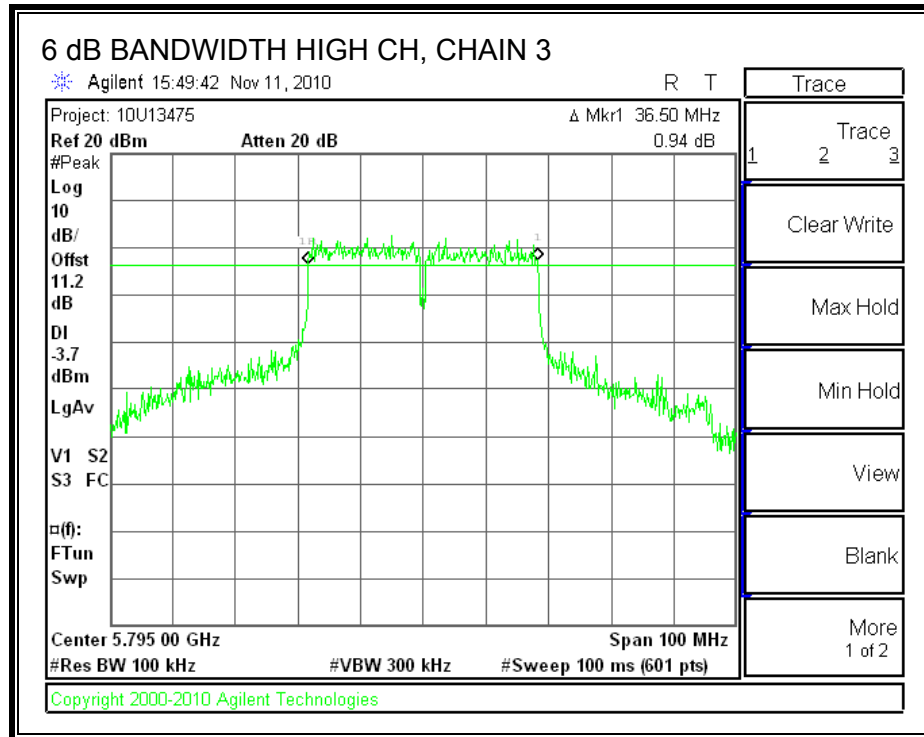
6 dB BANDWIDTH, CHAIN 2





6 dB BANDWIDTH, CHAIN 3





7.7.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

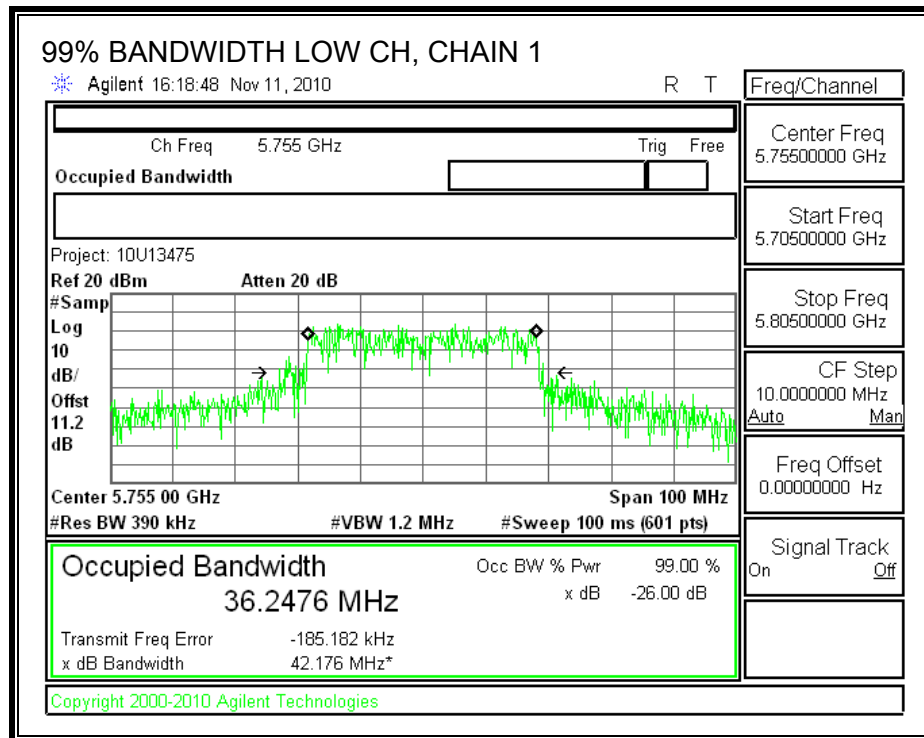
TEST PROCEDURE

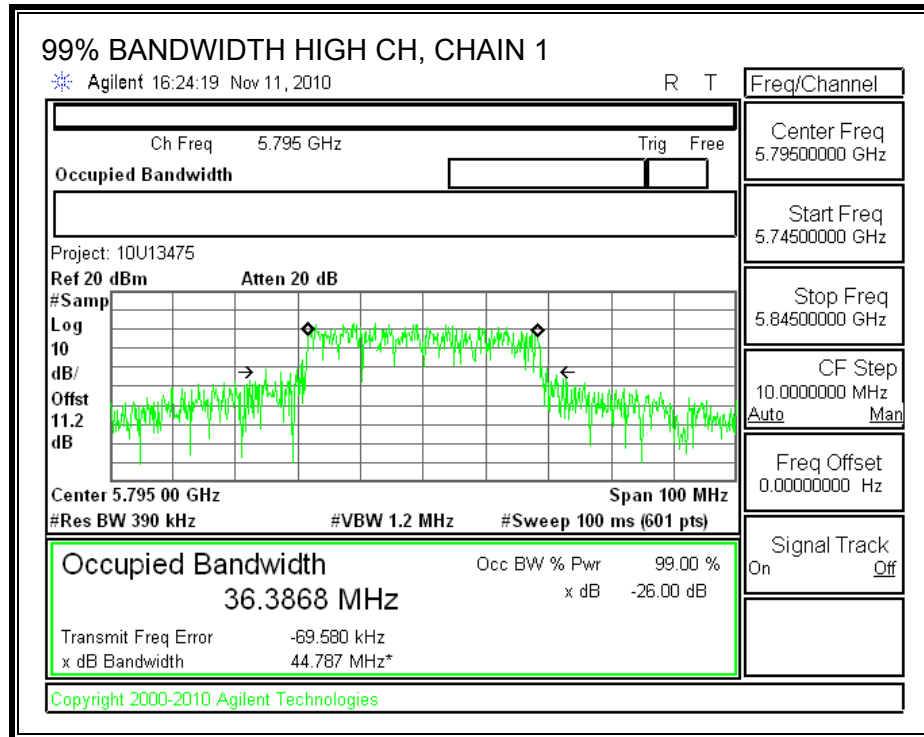
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

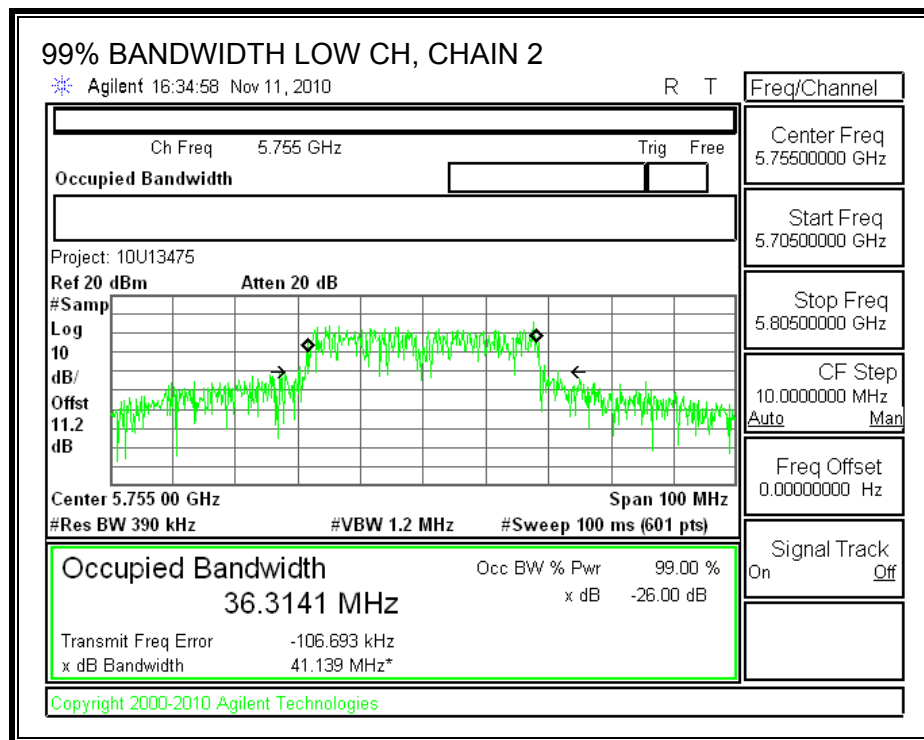
| Channel | Frequency (MHz) | Chain 1 99% Bandwidth (MHz) | Chain 2 99% Bandwidth (MHz) | Chain 3 99% Bandwidth (MHz) |
|---------|--------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Low | 5755 | 36.2476 | 36.3141 | 36.1327 |
| High | 5795 | 36.3868 | 36.4754 | 36.3284 |

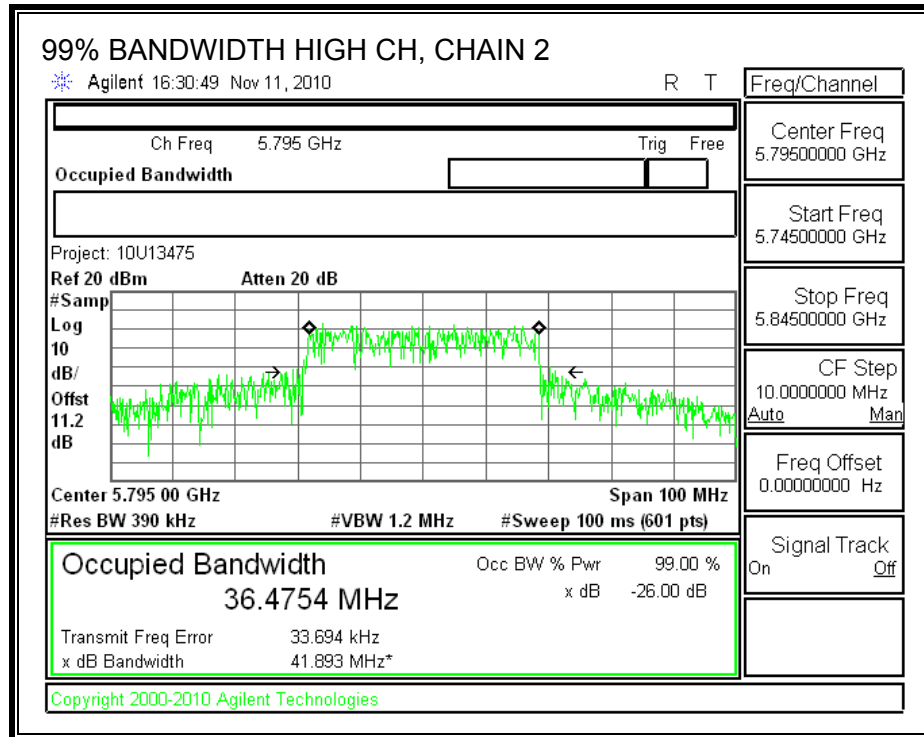
99% BANDWIDTH, CHAIN 1



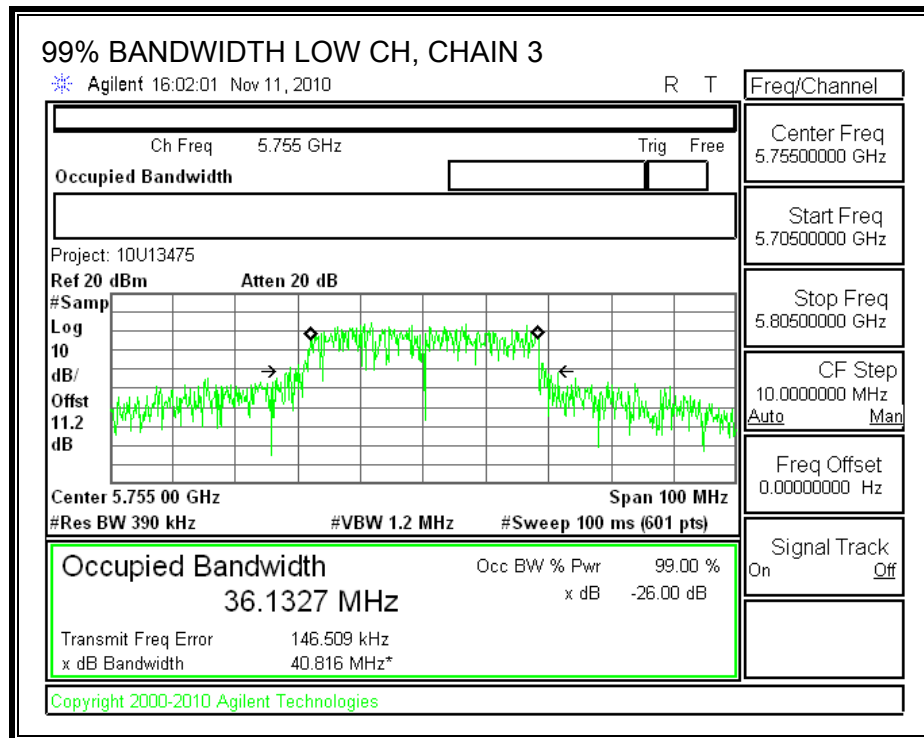


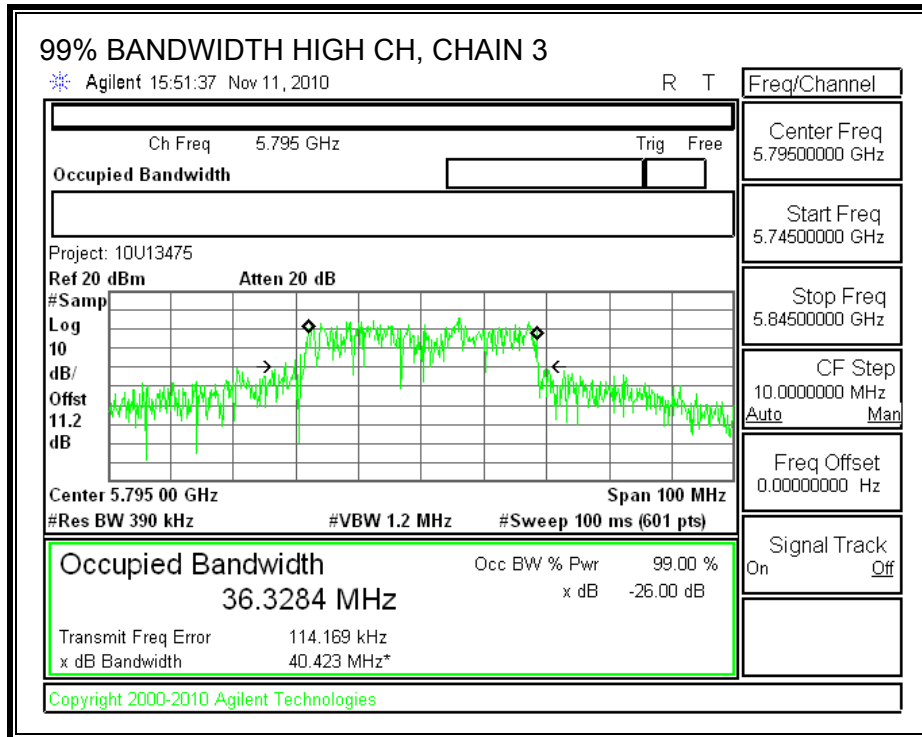
99% BANDWIDTH, CHAIN 2





99% BANDWIDTH, CHAIN 3





7.7.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain (**5.5 dBi**) is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

Peak power is measured using a wide bandwidth peak power meter.

RESULTS

| Channel | Frequency (MHz) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Chain 3 Power (dBm) | Attenuator + Cable Loss (dB) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|---------------------------|---------------------------|---------------------------|------------------------------------|-------------------------|----------------|----------------|
| Low | 5755 | 11.58 | 11.77 | 11.34 | 11.20 | 27.54 | 30.00 | -2.46 |
| High | 5795 | 11.26 | 11.12 | 11.17 | 11.20 | 27.15 | 30.00 | -2.85 |

7.7.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.2 dB (including 10 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency (MHz) | Chain 1 Power (dBm) | Chain 2 Power (dBm) | Chain 3 Power (dBm) | Total Power (dBm) |
|---------|--------------------|------------------------|------------------------|------------------------|----------------------|
| Low | 5755 | 15.62 | 16.13 | 16.06 | 20.71 |
| High | 5795 | 15.78 | 15.16 | 15.97 | 20.42 |

7.7.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

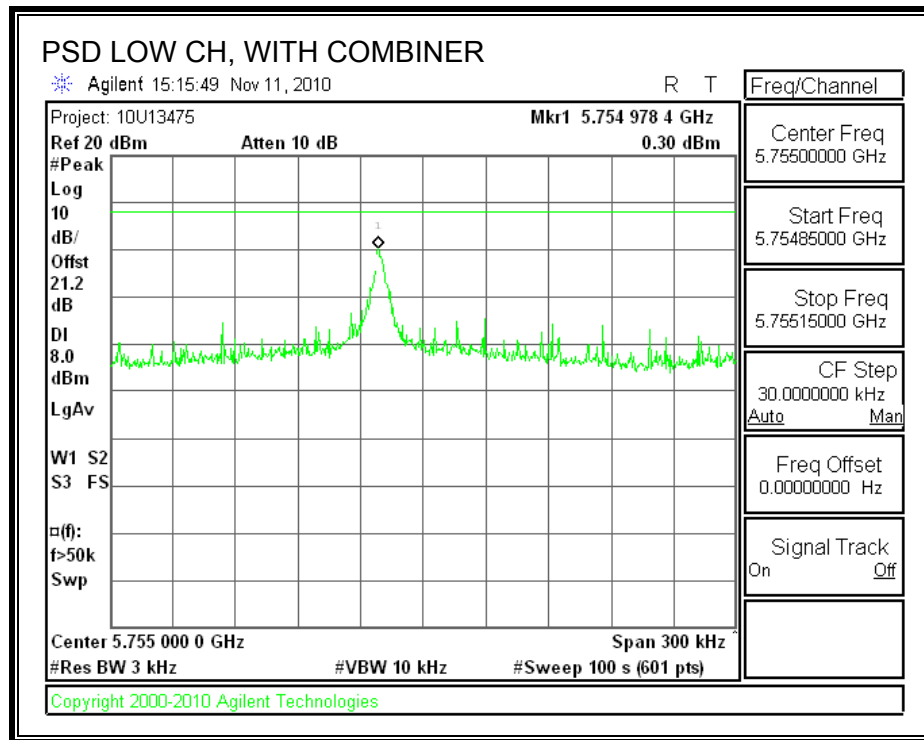
TEST PROCEDURE

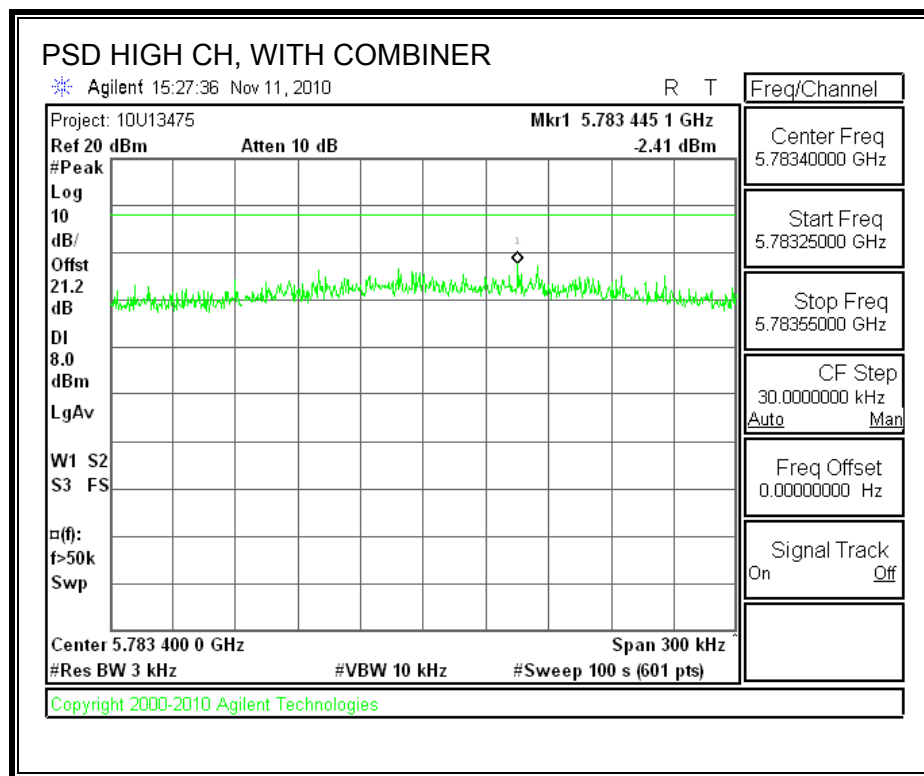
Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS:

| Channel | Frequency (MHz) | PSD with Combiner (dBm) | Limit (dBm) | Margin (dB) |
|---------|--------------------|----------------------------|----------------|----------------|
| Low | 5755 | 0.30 | 8 | -7.70 |
| High | 5795 | -2.41 | 8 | -10.41 |

POWER SPECTRAL DENSITY, WITH COMBINER





7.7.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of Peak Power using wideband power meter; therefore the required attenuation is 20 dB.

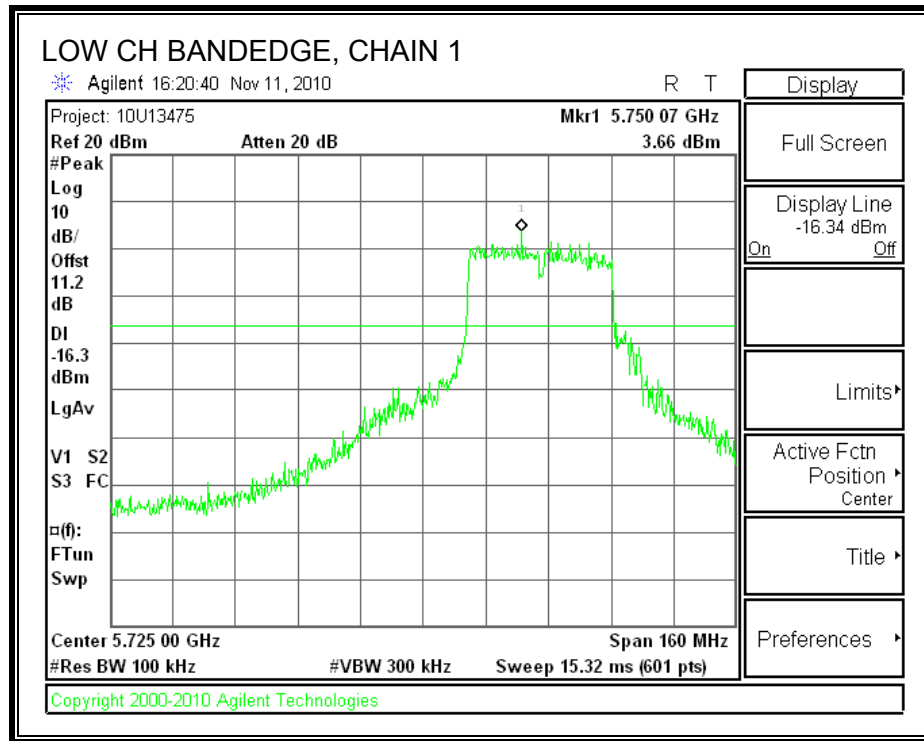
TEST PROCEDURE

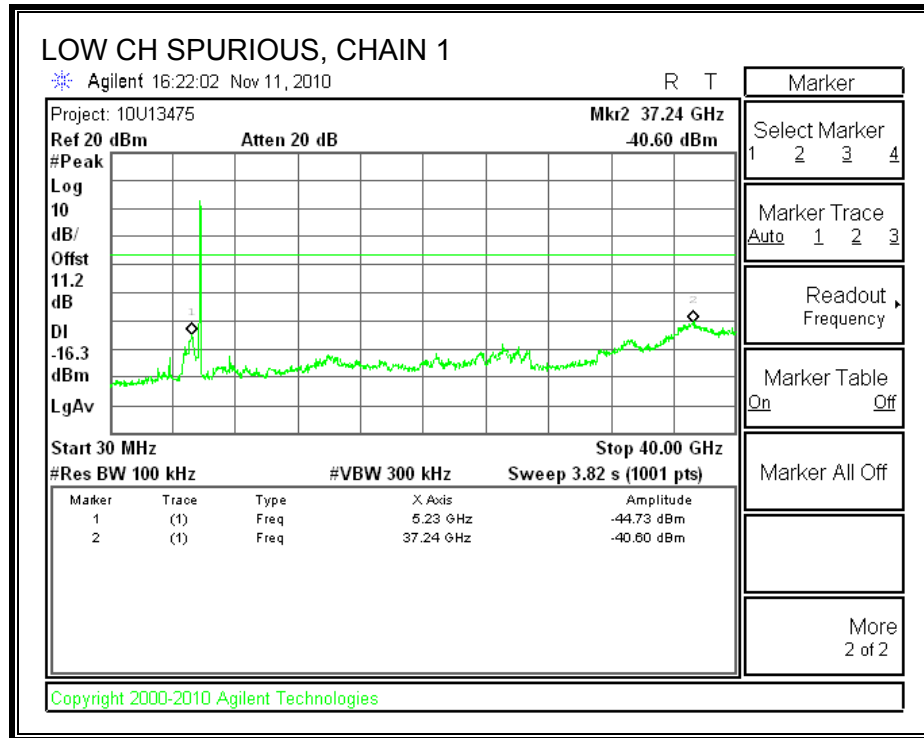
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

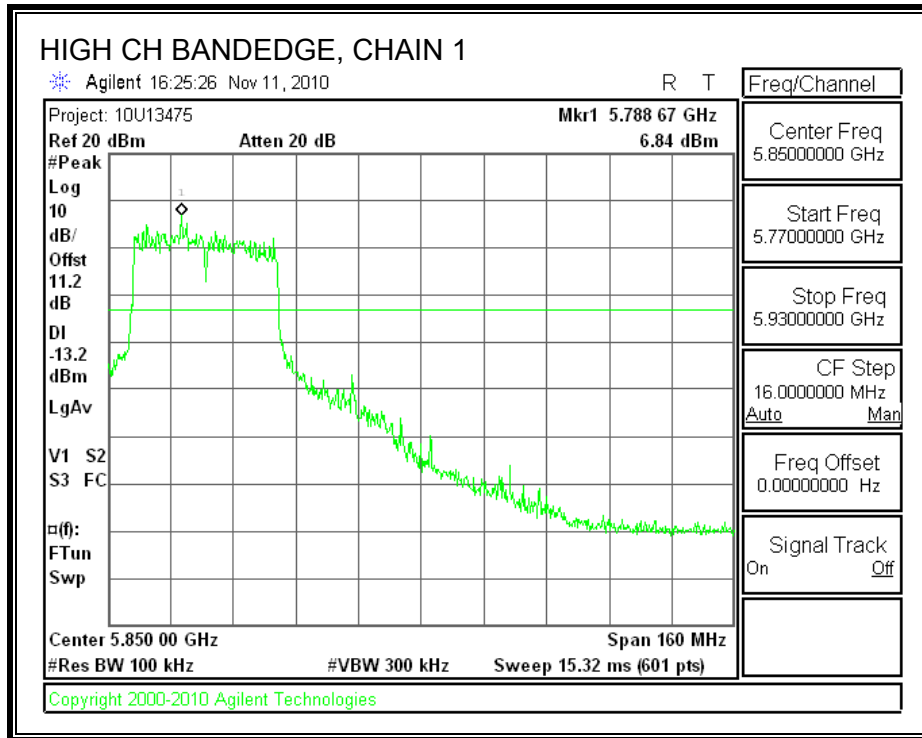
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

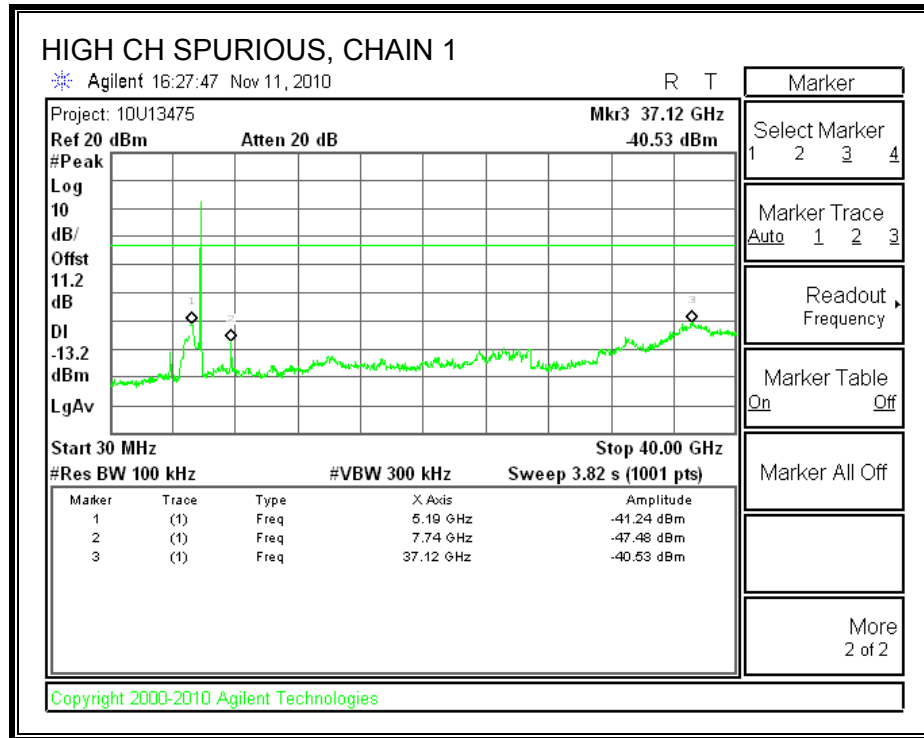
RESULTS

CHAIN 1 SPURIOUS EMISSIONS

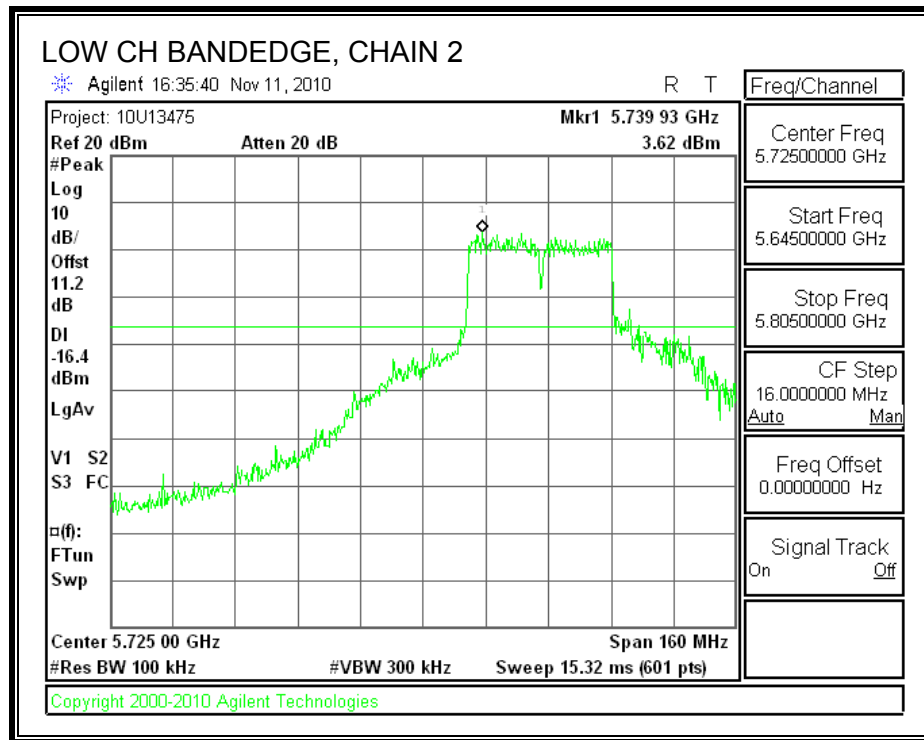


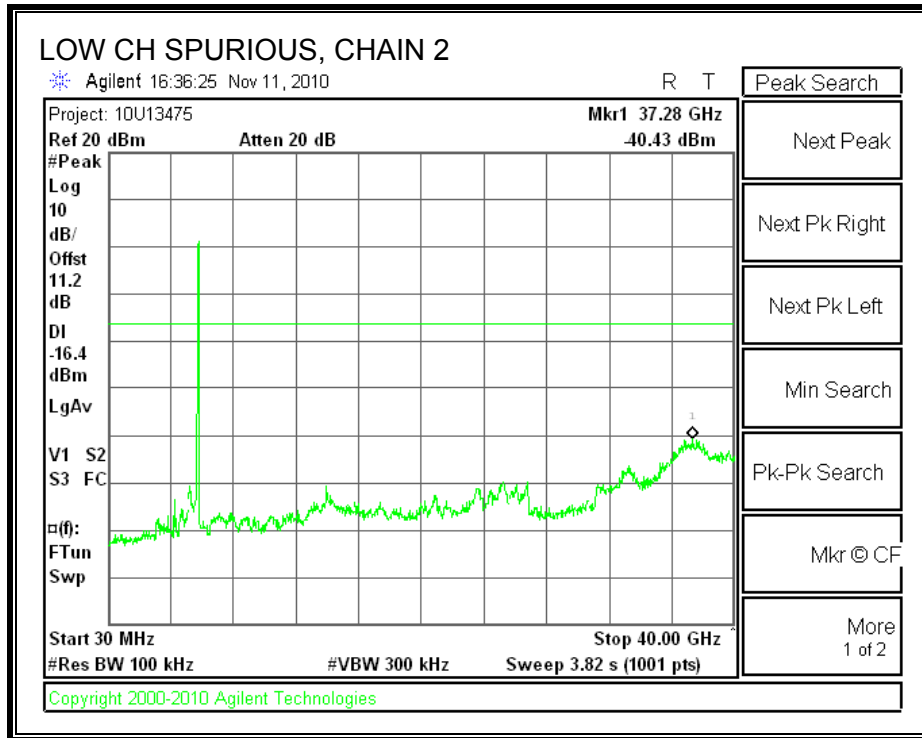


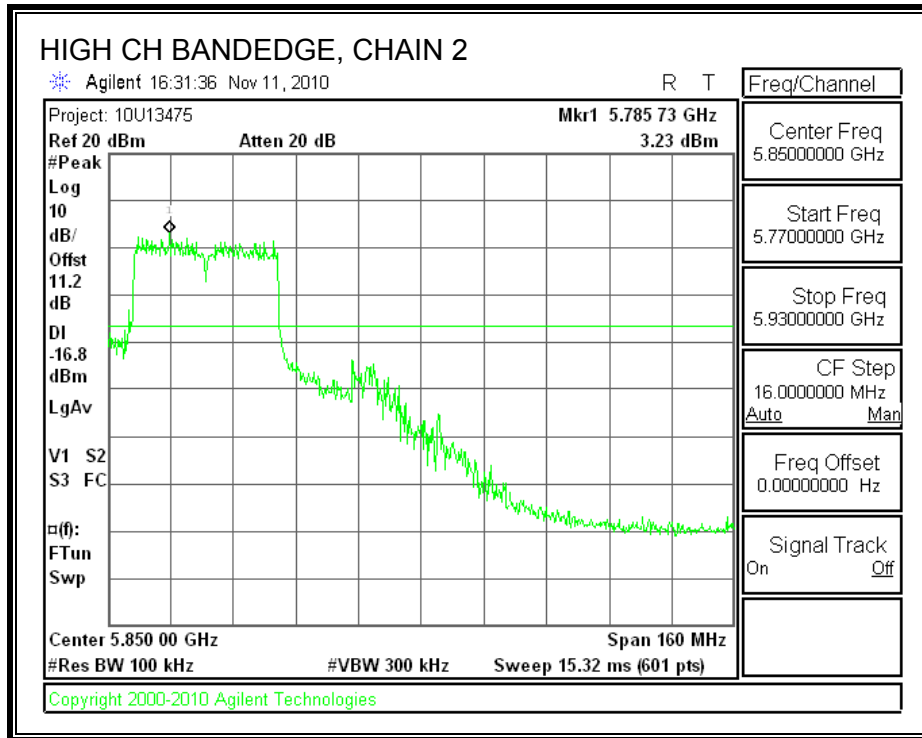


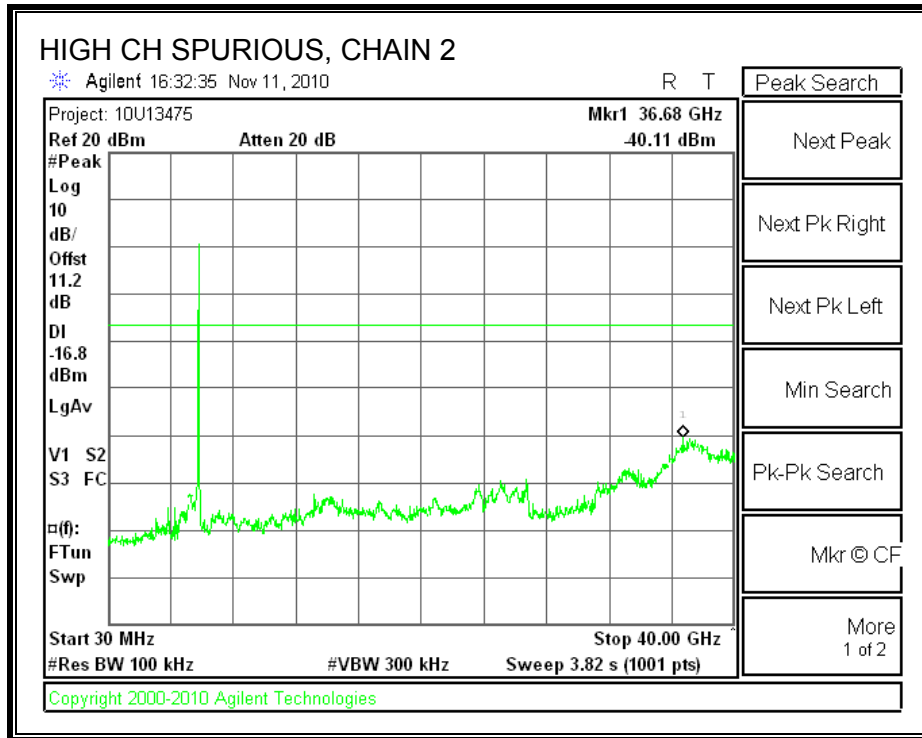


CHAIN 2 SPURIOUS EMISSIONS

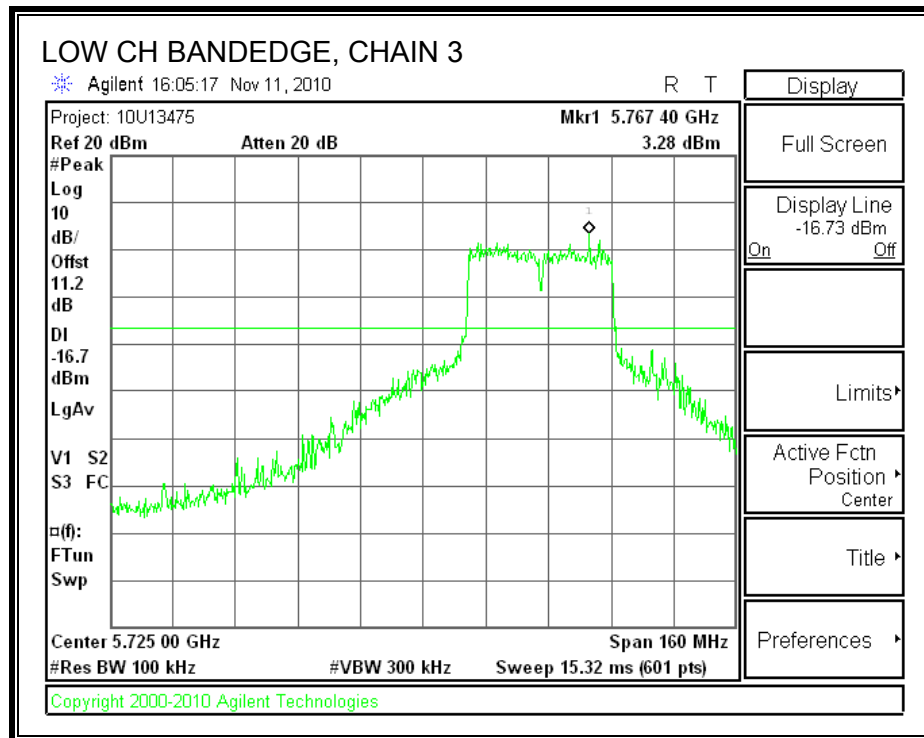


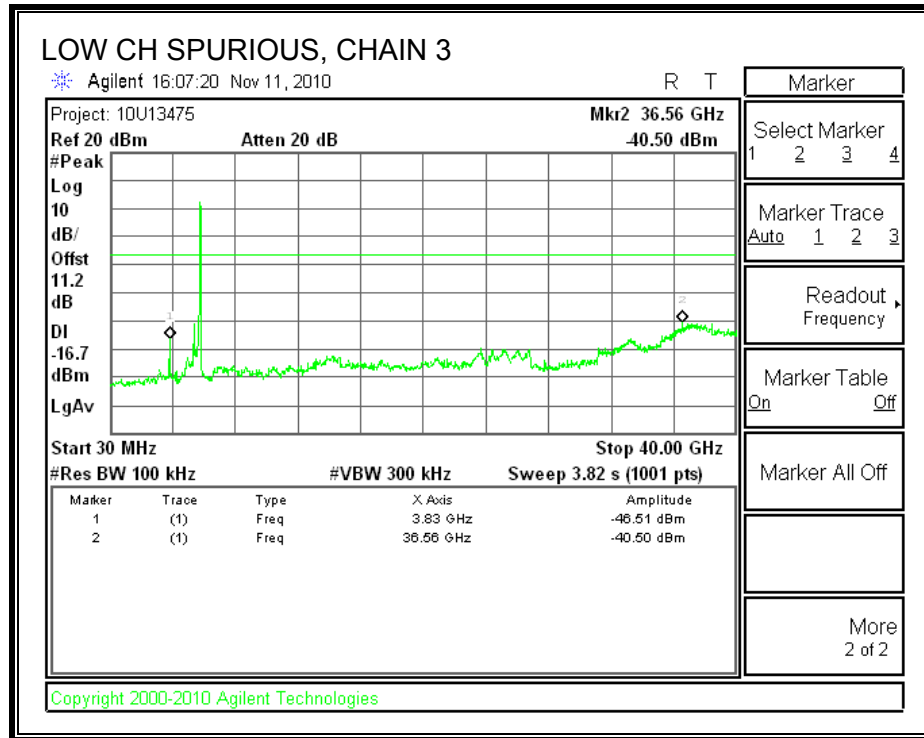


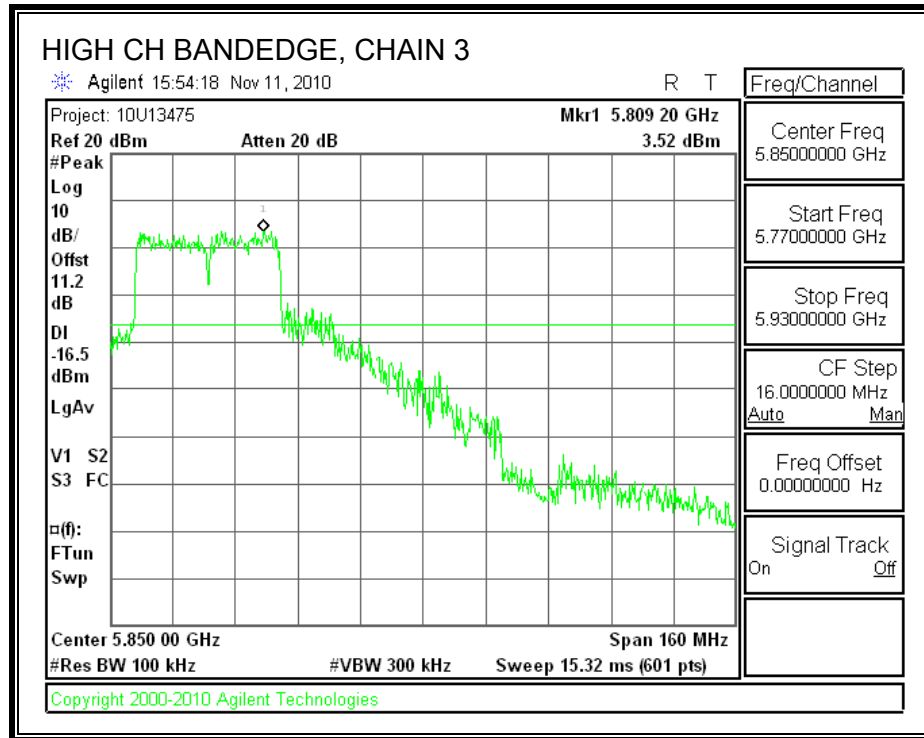


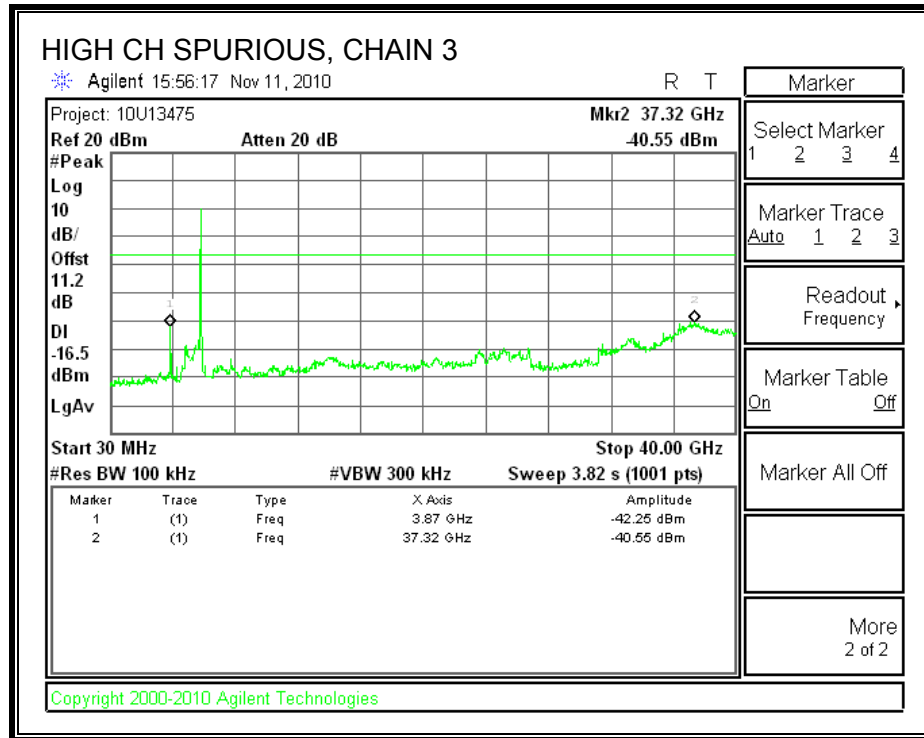


CHAIN 3 SPURIOUS EMISSIONS









7.8. RECEIVER CONDUCTED SPURIOUS EMISSIONS

LIMITS

IC RSS-GEN 7.2.3.1

Antenna Conducted Measurement: Receiver spurious emissions at any discrete frequency shall not exceed 2 nanowatts (-57 dBm) in the band 30-1000 MHz, or 5 nanowatts (-53 dBm) above 1 GHz.

TEST PROCEDURE

IC RSS-GEN 4.10, Conducted Method

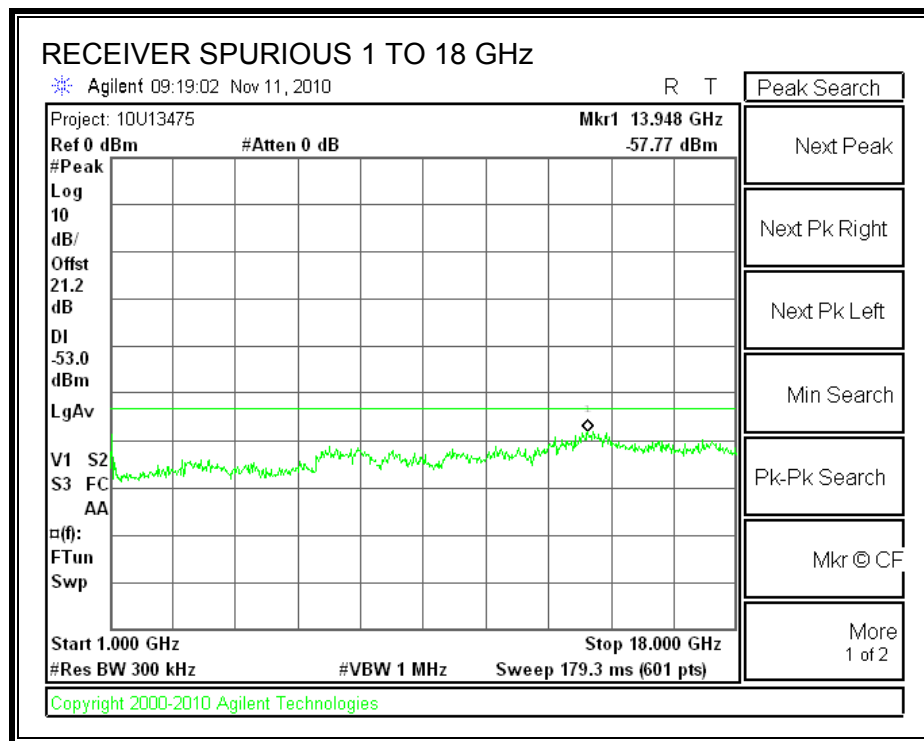
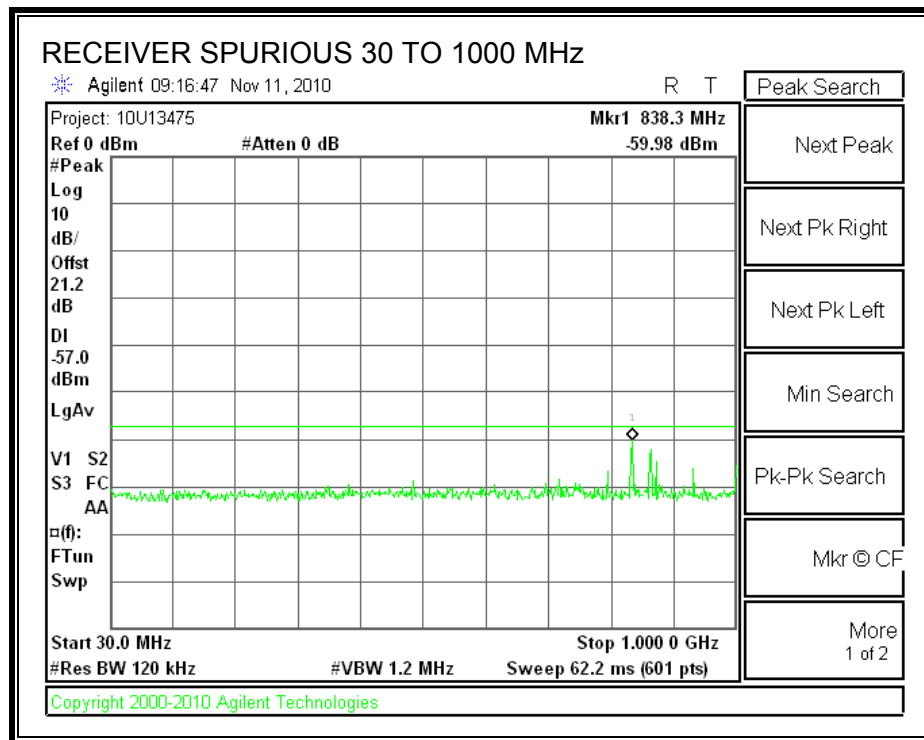
The receiver antenna port is connected to a spectrum analyzer.

The spectrum from 30 MHz to 8 GHz is investigated with the receiver set to the middle channel of the 2.4 GHz band.

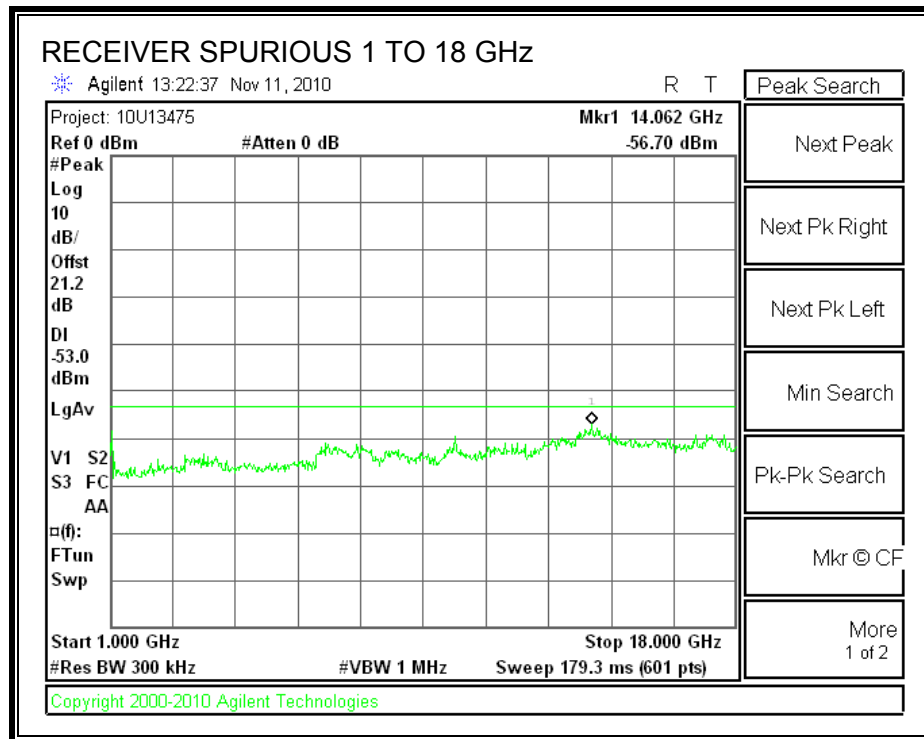
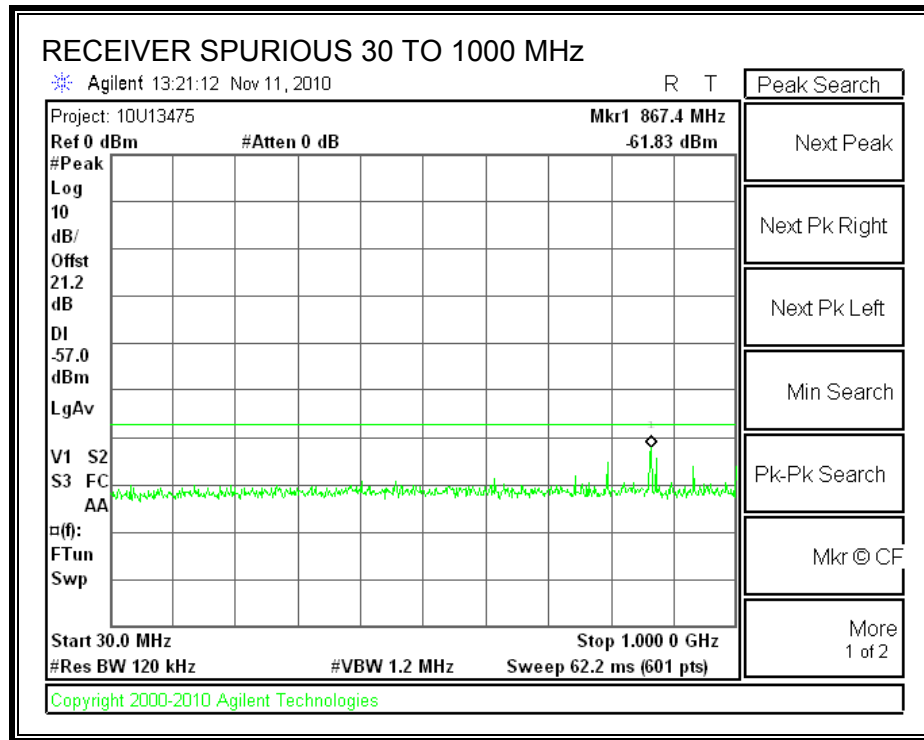
The spectrum from 30 MHz to 18 GHz is investigated with the receiver set to the middle channel of each 5 GHz band.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

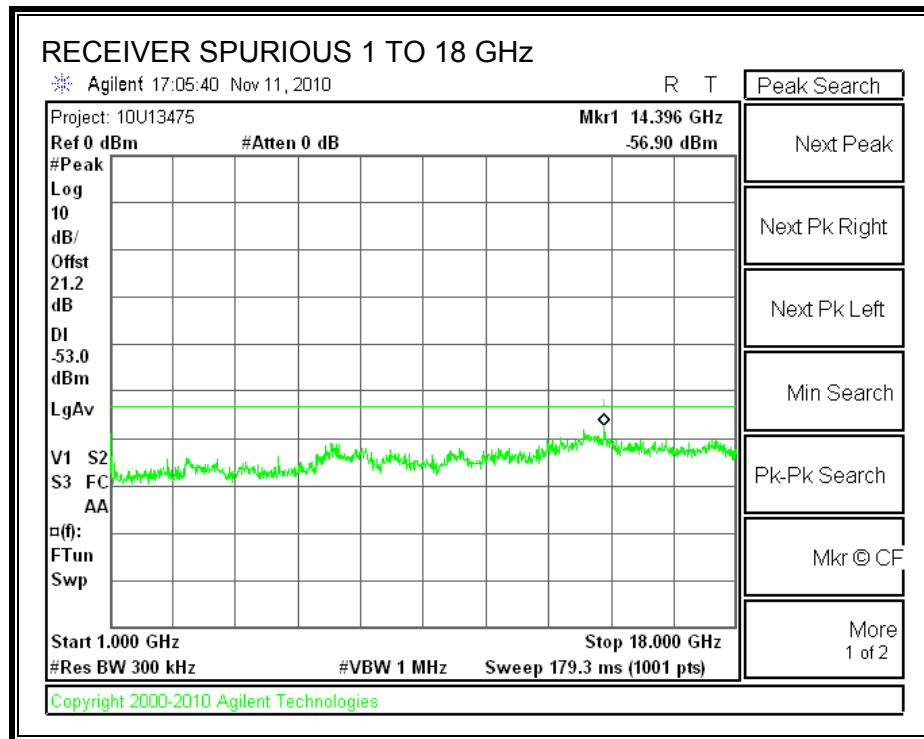
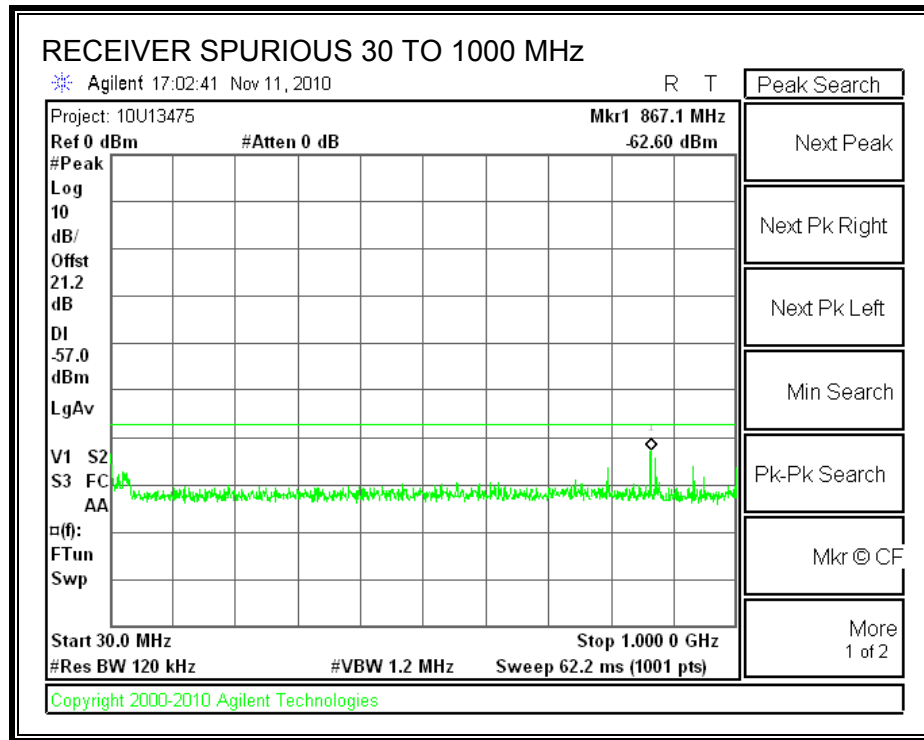
RECEIVER SPURIOUS EMISSIONS FOR 802.11a MODE IN THE 5.8 GHz BAND



RECEIVER SPURIOUS EMISSIONS FOR 802.11n HT20 MODE IN THE 5.8 GHz BAND



RECEIVER SPURIOUS EMISSIONS FOR 802.11n HT40 MODE IN THE 5.8 GHz BAND



8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

| Frequency Range (MHz) | Field Strength Limit (uV/m) at 3 m | Field Strength Limit (dBuV/m) at 3 m |
|-----------------------|------------------------------------|--------------------------------------|
| 30 - 88 | 100 | 40 |
| 88 - 216 | 150 | 43.5 |
| 216 - 960 | 200 | 46 |
| Above 960 | 500 | 54 |

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

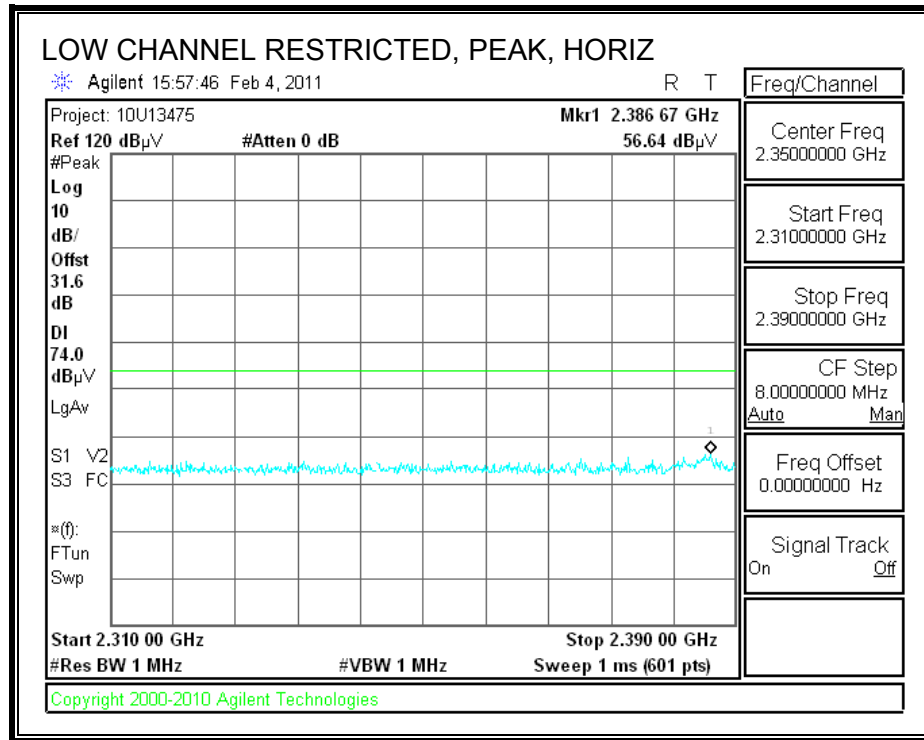
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

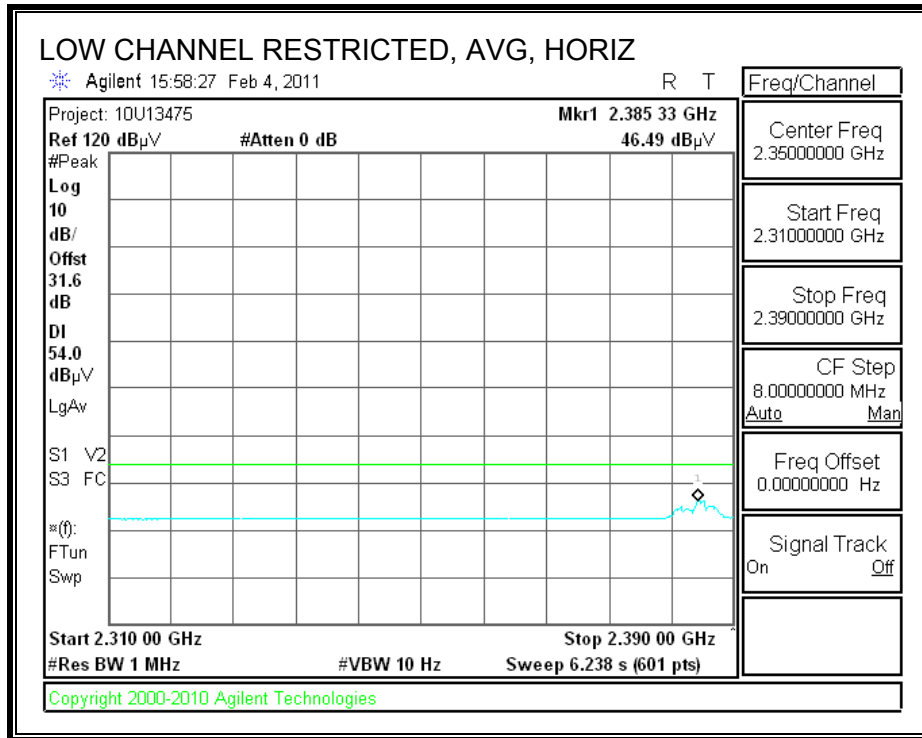
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

8.2. TRANSMITTER ABOVE 1 GHz

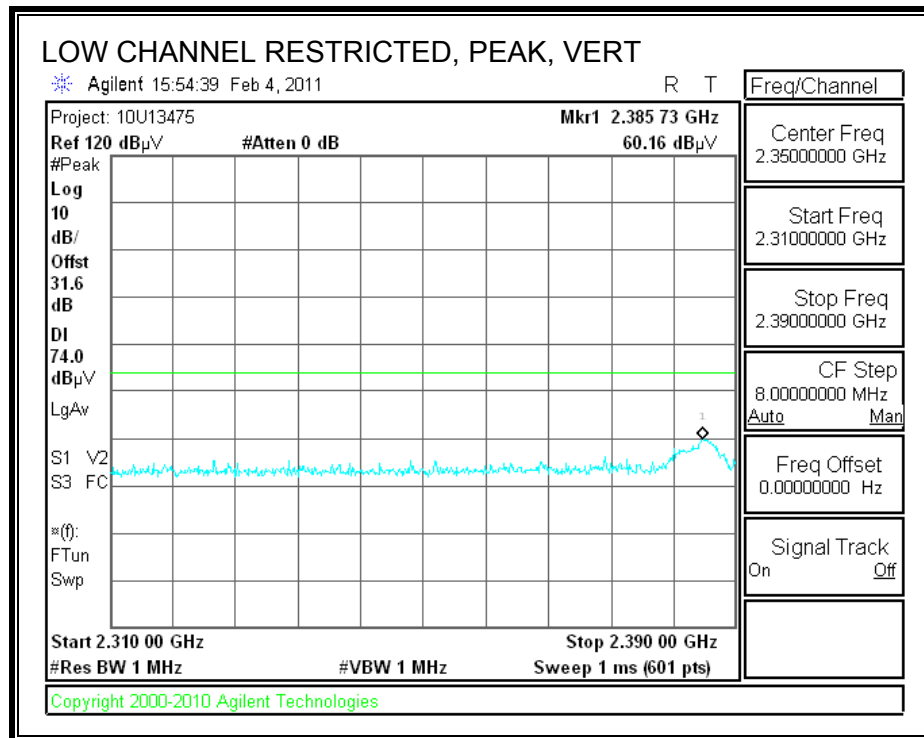
8.2.1. TX ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND

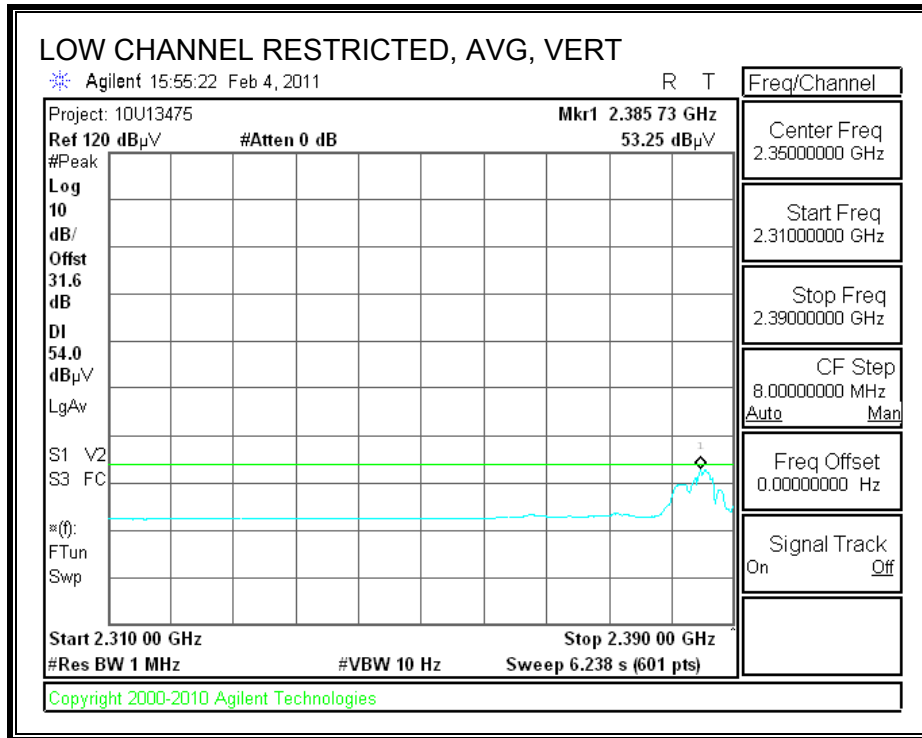
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



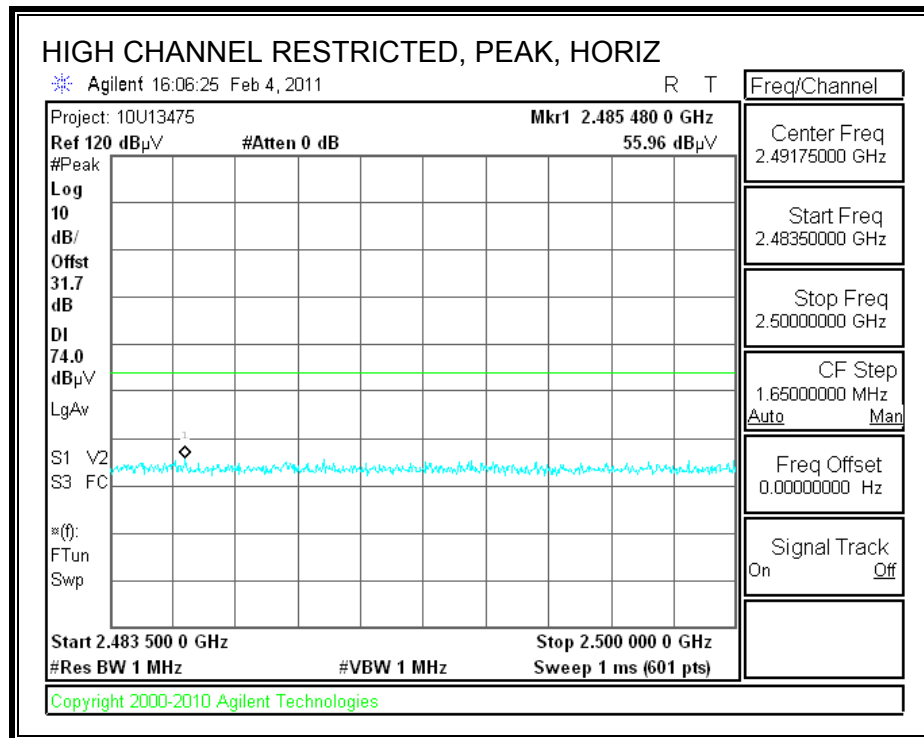


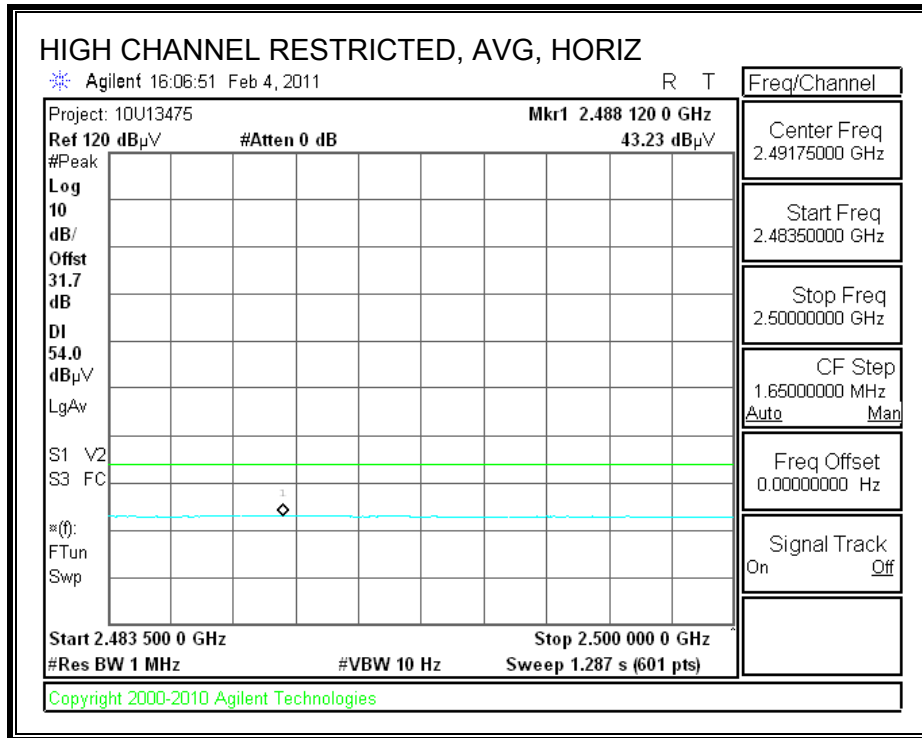
RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)



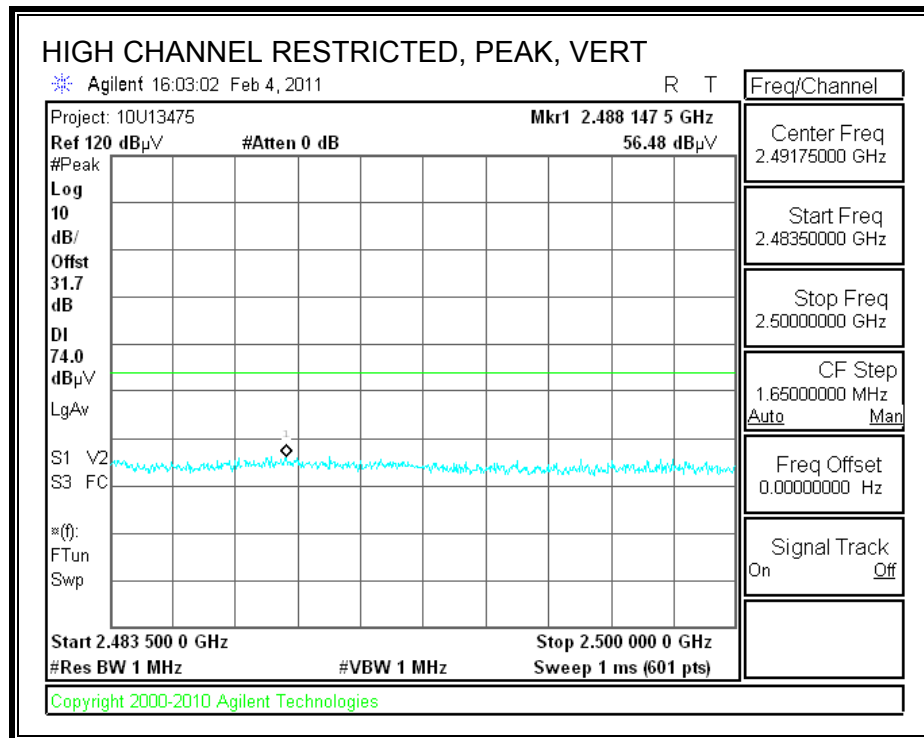


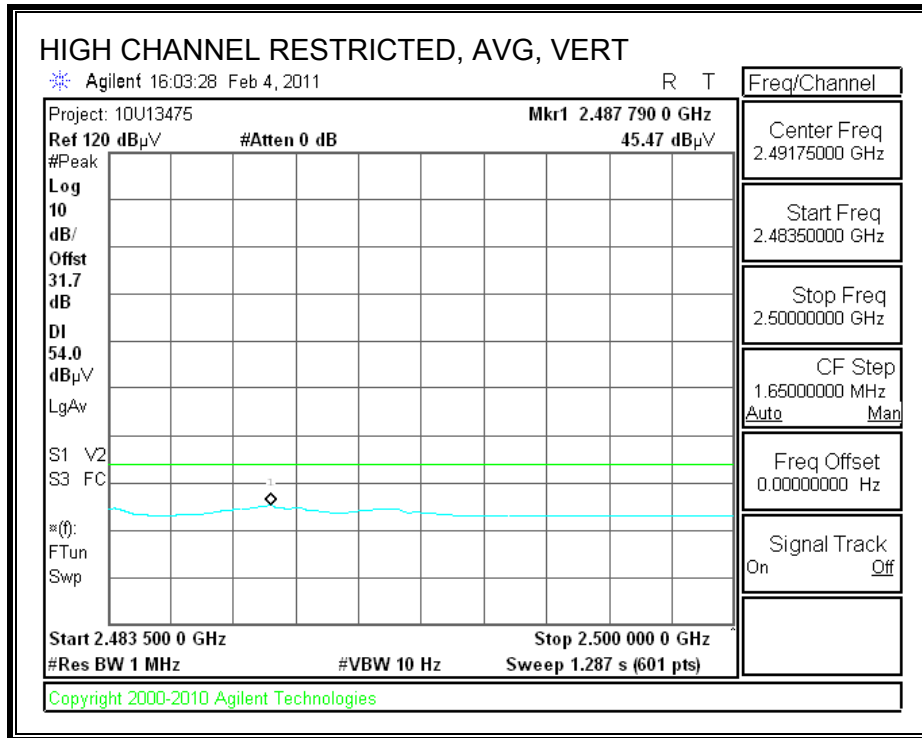
RESTRICTED BANEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 02/03/11
Project #: 10U13475
Company: Ruckus
Test Target: FCC 15.247
Mode Oper: Tx On, 2.4 GHz band, b Mode 1 Mbps

f Measurement Frequency Amp Preamp Gain Average Field Strength Limit
Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit
Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit
AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit
CL Cable Loss HPF High Pass Filter

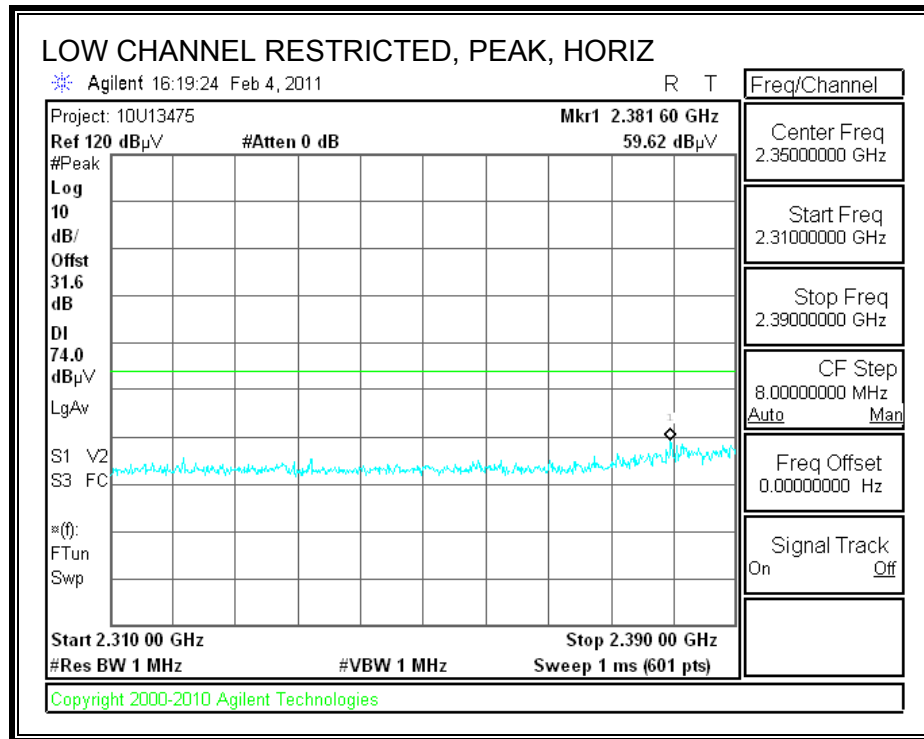
| f GHz | Dist (m) | Read dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Fitr dB | Corr. dBuV/m | Limit dBuV/m | Margin dB | Ant. Pol. V/H | Det. P/A/QP | Ant.High cm | Table Angle Degree | Notes |
|--------------------------|-------------|--------------|------------|----------|-----------|--------------|------------|-----------------|-----------------|--------------|------------------|----------------|----------------|-----------------------|-------|
| Mid Ch. 2437 MHz | | | | | | | | | | | | | | | |
| 4.874 | 3.0 | 44.5 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 48.9 | 74.0 | -25.1 | V | P | 100.0 | 249.0 | |
| 4.874 | 3.0 | 40.9 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 45.3 | 54.0 | -8.7 | V | A | 100.0 | 249.0 | |
| 4.874 | 3.0 | 48.6 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 52.9 | 74.0 | -21.1 | H | P | 99.0 | 271.0 | |
| 4.874 | 3.0 | 46.6 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 51.0 | 54.0 | -3.0 | H | A | 99.0 | 271.0 | |
| 7.311 | 3.0 | 35.1 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 44.4 | 74.0 | -29.7 | H | P | 140.0 | 33.0 | |
| 7.311 | 3.0 | 24.7 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 33.9 | 54.0 | -20.1 | H | A | 140.0 | 33.0 | |
| 7.311 | 3.0 | 35.3 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 44.6 | 74.0 | -29.4 | V | P | 151.0 | 59.0 | |
| 7.311 | 3.0 | 24.4 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 33.7 | 54.0 | -20.3 | V | A | 151.0 | 59.0 | |
| Low Ch. 2412 MHz | | | | | | | | | | | | | | | |
| 4.824 | 3.0 | 46.9 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 51.2 | 74.0 | -22.8 | H | P | 105.0 | 268.0 | |
| 4.824 | 3.0 | 44.2 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 48.5 | 54.0 | -5.5 | H | A | 105.0 | 268.0 | |
| 4.824 | 3.0 | 38.2 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 42.4 | 74.0 | -31.6 | V | P | 98.0 | 347.0 | |
| 4.824 | 3.0 | 31.5 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 35.8 | 54.0 | -18.2 | V | A | 98.0 | 347.0 | |
| High Ch. 2462 MHz | | | | | | | | | | | | | | | |
| 4.924 | 3.0 | 40.5 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 45.0 | 74.0 | -29.0 | H | P | 98.0 | 292.0 | |
| 4.924 | 3.0 | 35.7 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 40.1 | 54.0 | -13.9 | H | A | 98.0 | 292.0 | |
| 4.924 | 3.0 | 37.6 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 42.0 | 74.0 | -32.0 | V | P | 98.0 | 150.0 | |
| 4.924 | 3.0 | 29.3 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 33.7 | 54.0 | -20.3 | V | A | 98.0 | 150.0 | |
| 7.386 | 3.0 | 35.5 | 35.6 | 7.3 | -34.1 | 0.0 | 0.6 | 45.0 | 74.0 | -29.0 | V | P | 108.0 | 235.0 | |
| 7.386 | 3.0 | 23.3 | 35.6 | 7.3 | -34.1 | 0.0 | 0.6 | 32.7 | 54.0 | -21.3 | V | A | 108.0 | 235.0 | |
| 7.386 | 3.0 | 35.6 | 35.6 | 7.3 | -34.1 | 0.0 | 0.6 | 45.0 | 74.0 | -29.0 | H | P | 146.0 | 361.0 | |
| 7.386 | 3.0 | 23.6 | 35.6 | 7.3 | -34.1 | 0.0 | 0.6 | 33.1 | 54.0 | -20.9 | H | A | 146.0 | 361.0 | |

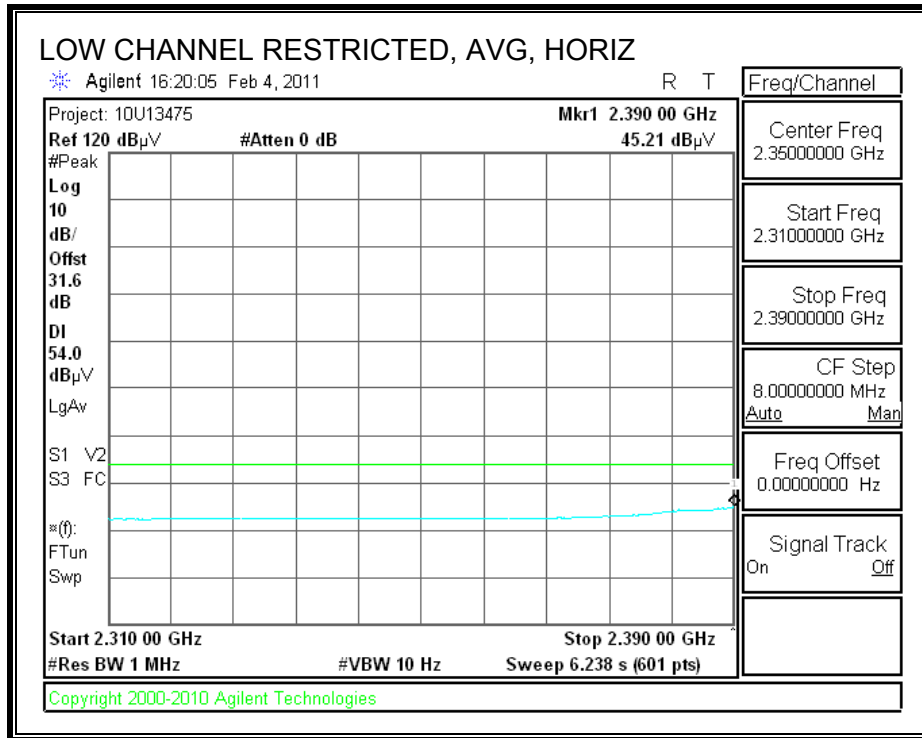
Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

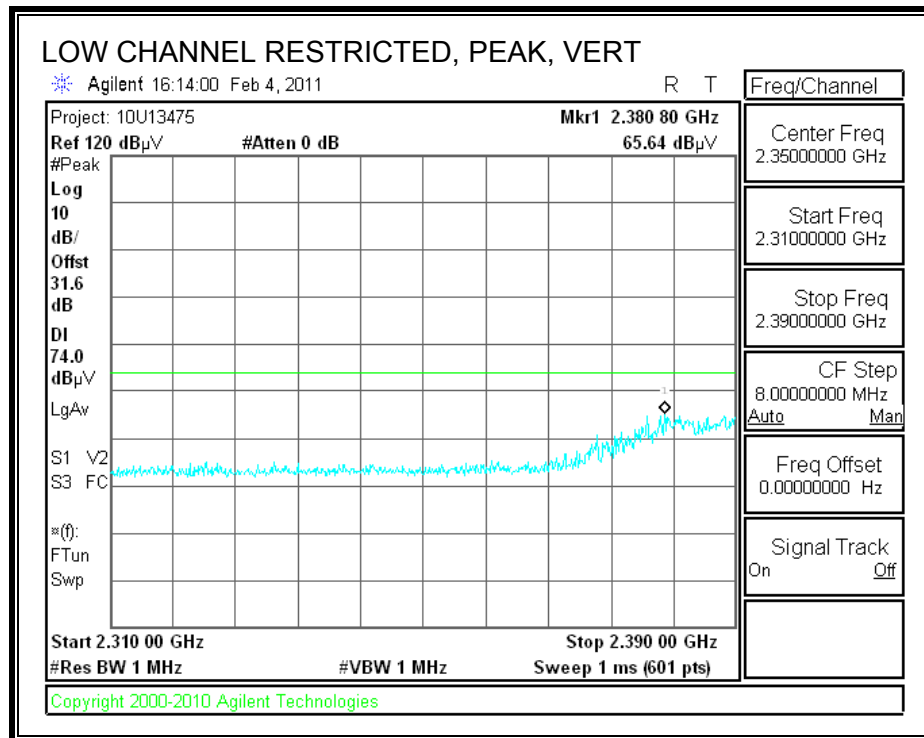
8.2.2. TX ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND

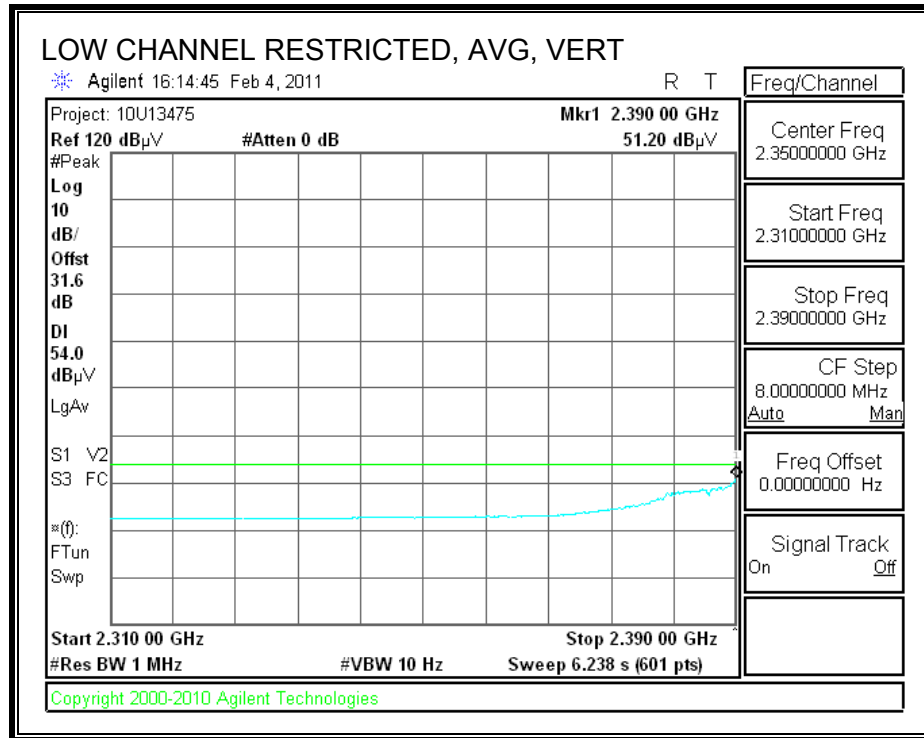
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



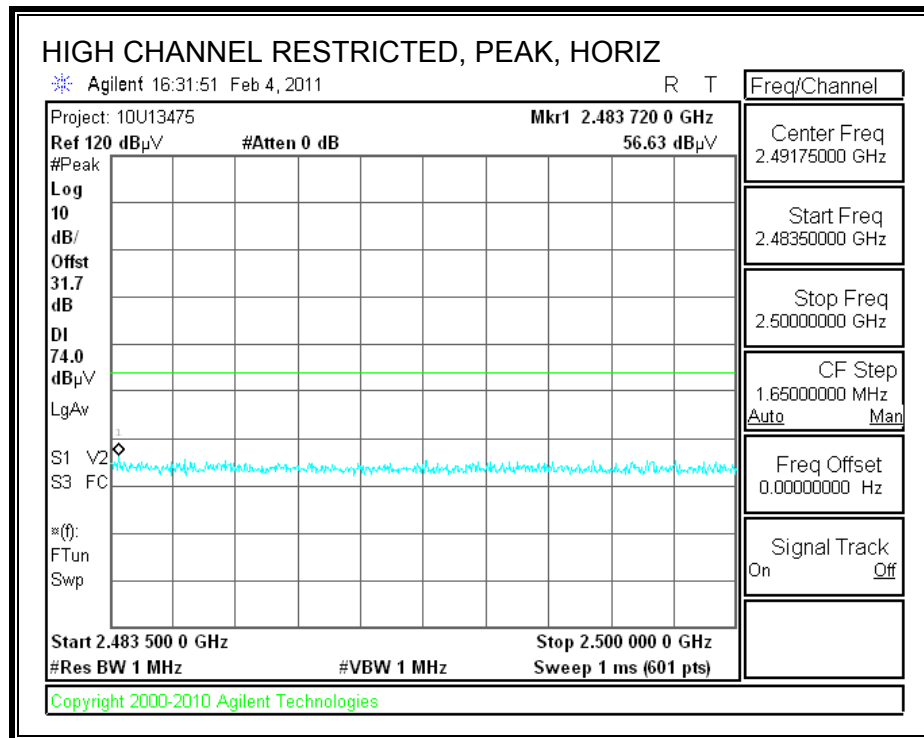


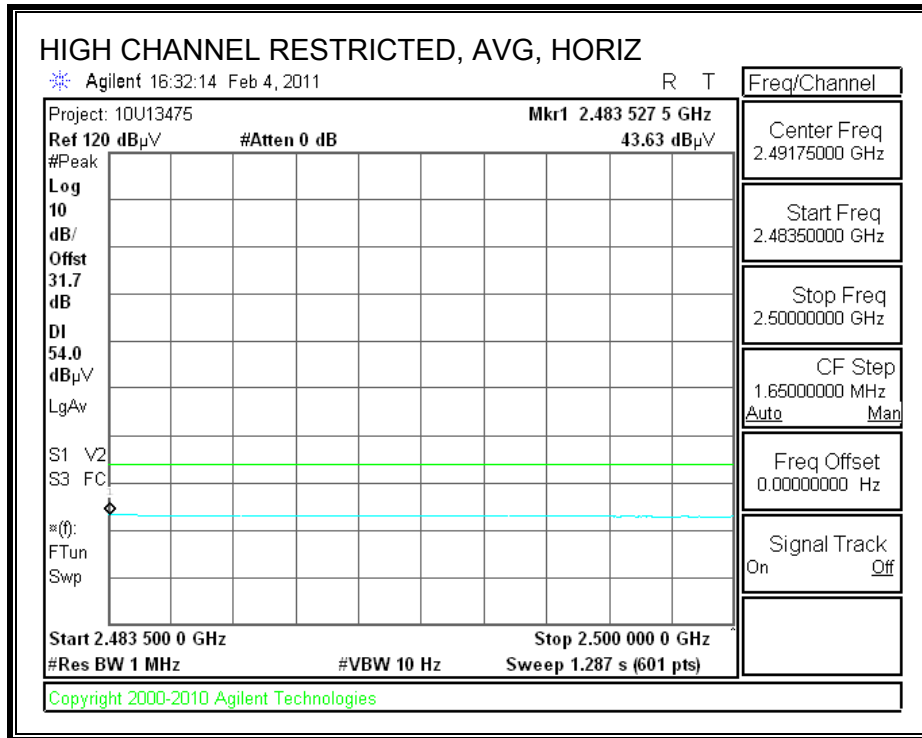
RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)



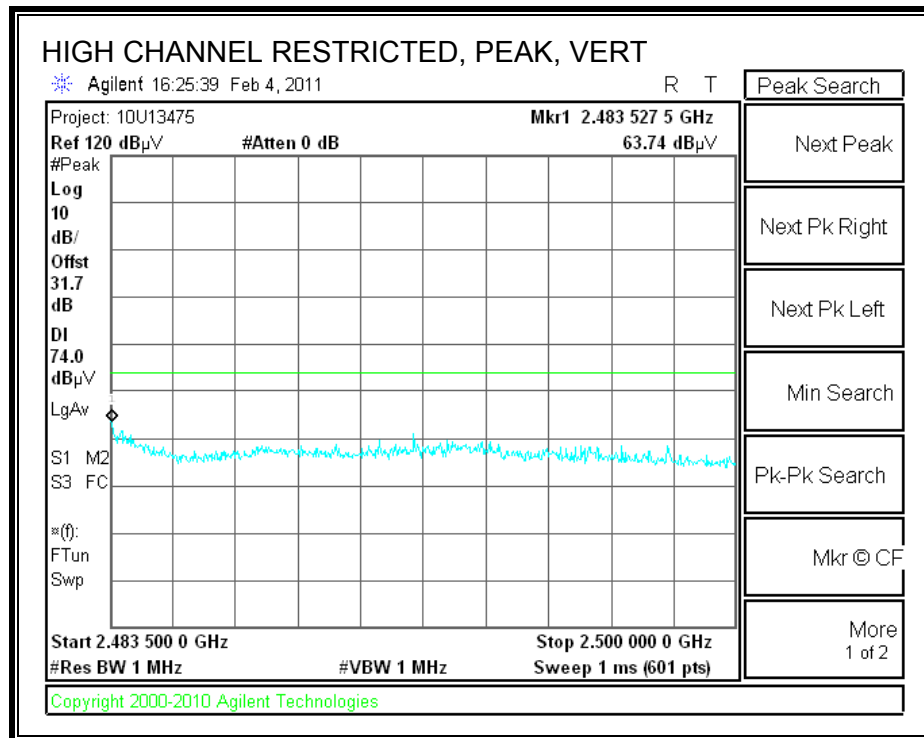


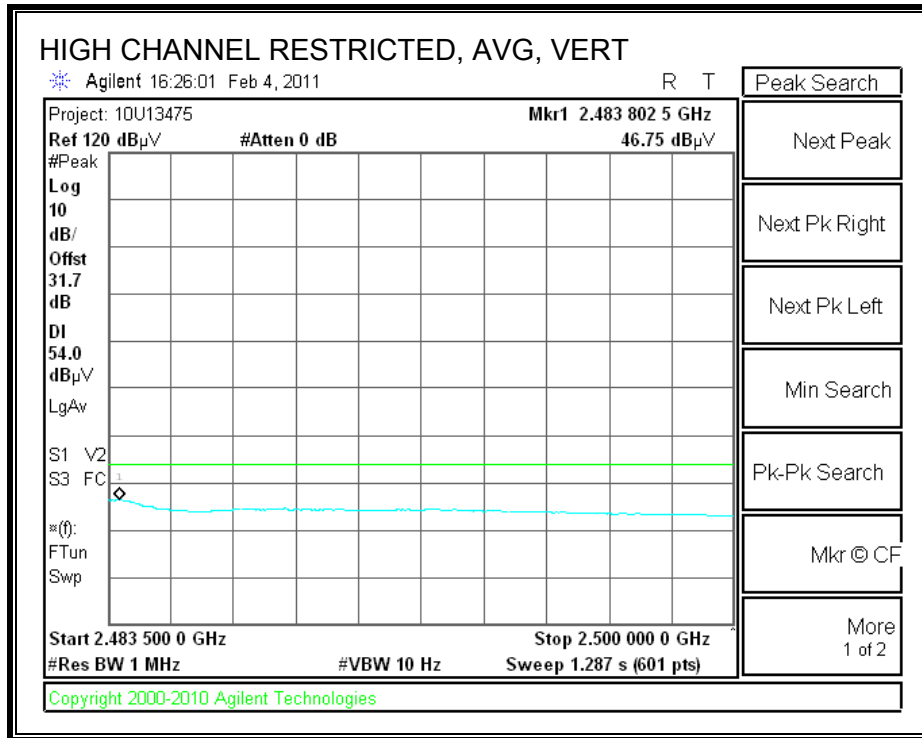
RESTRICTED BANEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 02/01/11
Project #: 10U13475
Company: Ruckus
Test Target: FCC 15.247
Mode Oper: Tx On, 2.4 GHz band, g Mode 6 Mbps

| | | | | |
|------|-----------------------|--------|--------------------------------|------------------------------|
| f | Measurement Frequency | Amp | Preamp Gain | Average Field Strength Limit |
| Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | Peak Field Strength Limit |
| Read | Analyzer Reading | Avg | Average Field Strength @ 3 m | Margin vs. Average Limit |
| AF | Antenna Factor | Peak | Calculated Peak Field Strength | Margin vs. Peak Limit |
| CL | Cable Loss | HPF | High Pass Filter | |

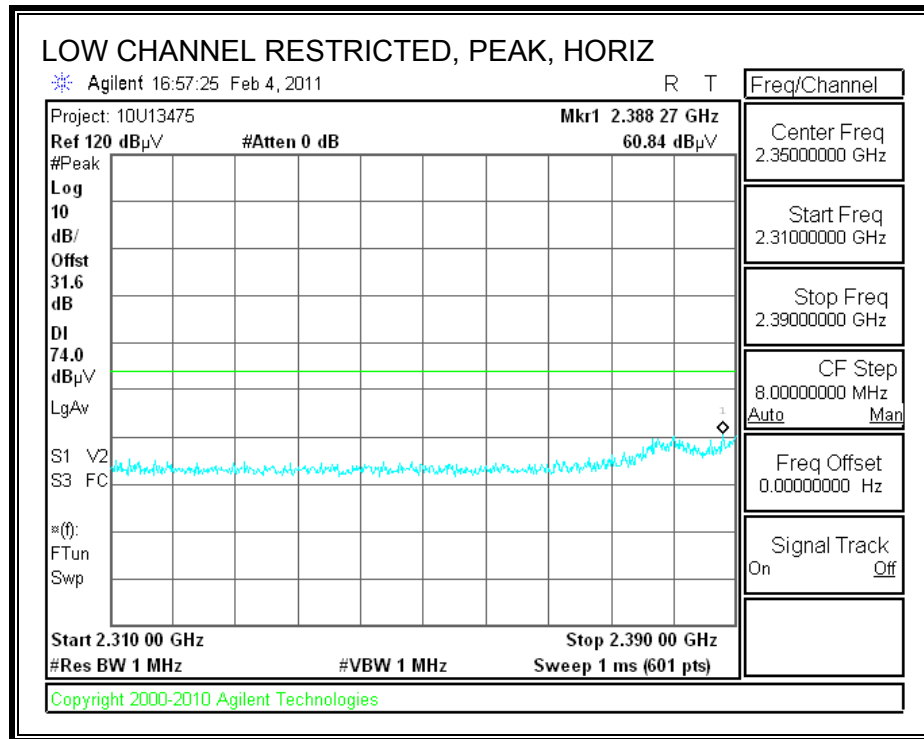
| f GHz | Dist (m) | Read dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Filtr dB | Corr. dBuV/m | Limit dBuV/m | Margin dB | Ant. Pol. V/H | Det. P/A/QP | Ant. High cm | Table Angle Degree | Notes |
|--------------------------|-------------|--------------|------------|----------|-----------|--------------|-------------|-----------------|-----------------|--------------|------------------|----------------|-----------------|-----------------------|-------|
| Low Ch. 2412 MHz | | | | | | | | | | | | | | | |
| 4.824 | 3.0 | 44.0 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 48.2 | 74.0 | -25.8 | H | P | 98.0 | 104.0 | |
| 4.824 | 3.0 | 30.5 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 34.7 | 54.0 | -19.3 | H | A | 98.0 | 104.0 | |
| 4.824 | 3.0 | 49.2 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 53.4 | 74.0 | -20.6 | V | P | 103.0 | 173.0 | |
| 4.824 | 3.0 | 34.2 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 38.5 | 54.0 | -15.5 | V | A | 103.0 | 173.0 | |
| Mid Ch. 2437 MHz | | | | | | | | | | | | | | | |
| 4.874 | 3.0 | 55.9 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 60.3 | 74.0 | -13.7 | V | P | 98.0 | 173.0 | |
| 4.874 | 3.0 | 42.1 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 46.4 | 54.0 | -7.6 | V | A | 98.0 | 173.0 | |
| 4.874 | 3.0 | 53.8 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 58.2 | 74.0 | -15.8 | H | P | 98.0 | 120.0 | |
| 4.874 | 3.0 | 39.1 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 43.4 | 54.0 | -10.6 | H | A | 98.0 | 120.0 | |
| 7.311 | 3.0 | 52.2 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 61.5 | 74.0 | -12.5 | H | P | 132.0 | 55.0 | |
| 7.311 | 3.0 | 30.4 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 39.6 | 54.0 | -14.4 | H | A | 132.0 | 55.0 | |
| 7.311 | 3.0 | 53.9 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 63.1 | 74.0 | -10.9 | V | P | 98.0 | 32.0 | |
| 7.311 | 3.0 | 30.3 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 39.5 | 54.0 | -14.5 | V | A | 98.0 | 32.0 | |
| High Ch. 2462 MHz | | | | | | | | | | | | | | | |
| 4.924 | 3.0 | 46.7 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 51.1 | 74.0 | -22.9 | V | P | 101.0 | 175.0 | |
| 4.924 | 3.0 | 32.7 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 37.1 | 54.0 | -16.9 | V | A | 101.0 | 175.0 | |
| 4.924 | 3.0 | 42.7 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 47.1 | 74.0 | -26.9 | H | P | 98.0 | 118.0 | |
| 4.924 | 3.0 | 28.8 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 33.3 | 54.0 | -20.8 | H | A | 98.0 | 118.0 | |
| 7.386 | 3.0 | 36.1 | 35.6 | 7.3 | -34.1 | 0.0 | 0.6 | 45.5 | 74.0 | -28.5 | H | P | 105.0 | 352.0 | |
| 7.386 | 3.0 | 23.5 | 35.6 | 7.3 | -34.1 | 0.0 | 0.6 | 33.0 | 54.0 | -21.0 | H | A | 105.0 | 352.0 | |
| 7.386 | 3.0 | 36.0 | 35.6 | 7.3 | -34.1 | 0.0 | 0.6 | 45.4 | 74.0 | -28.6 | V | P | 135.0 | 33.0 | |
| 7.386 | 3.0 | 23.5 | 35.6 | 7.3 | -34.1 | 0.0 | 0.6 | 33.0 | 54.0 | -21.1 | V | A | 135.0 | 33.0 | |

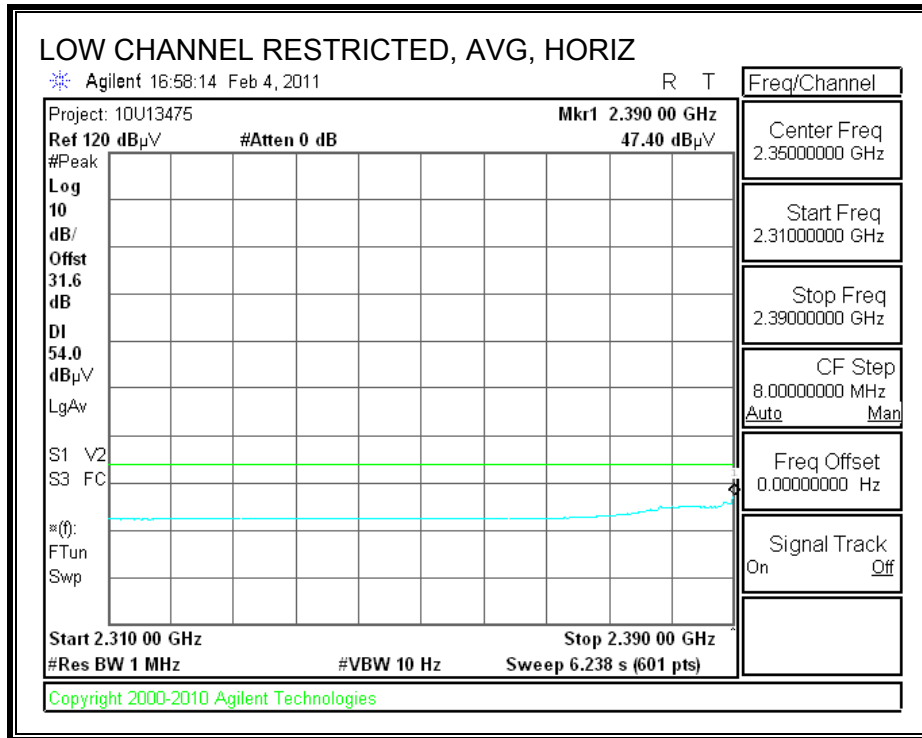
Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

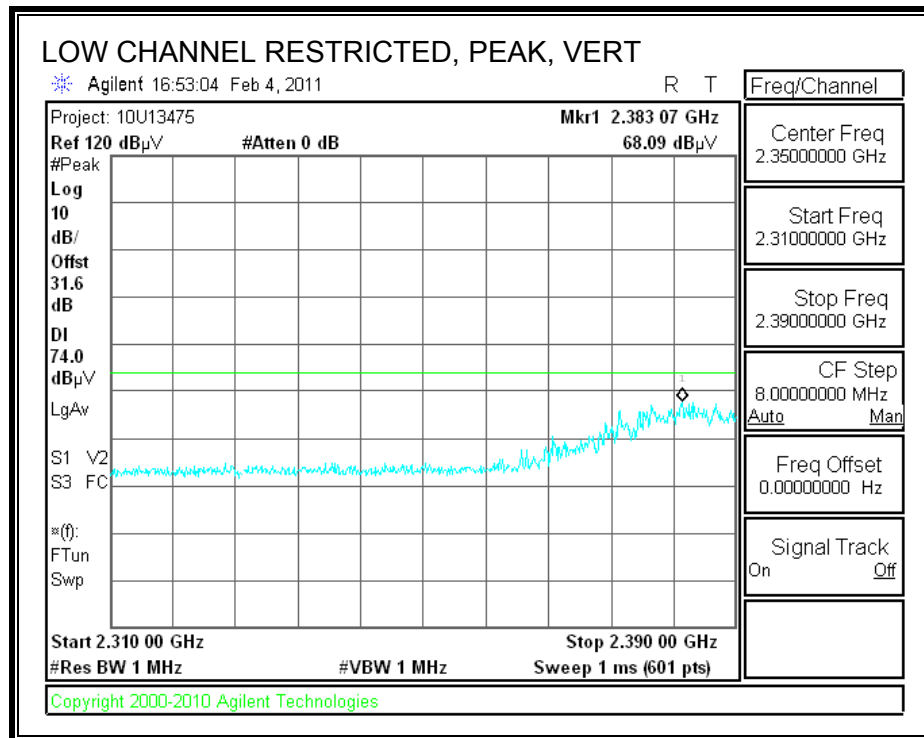
8.2.3. TX ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 2.4 GHz BAND

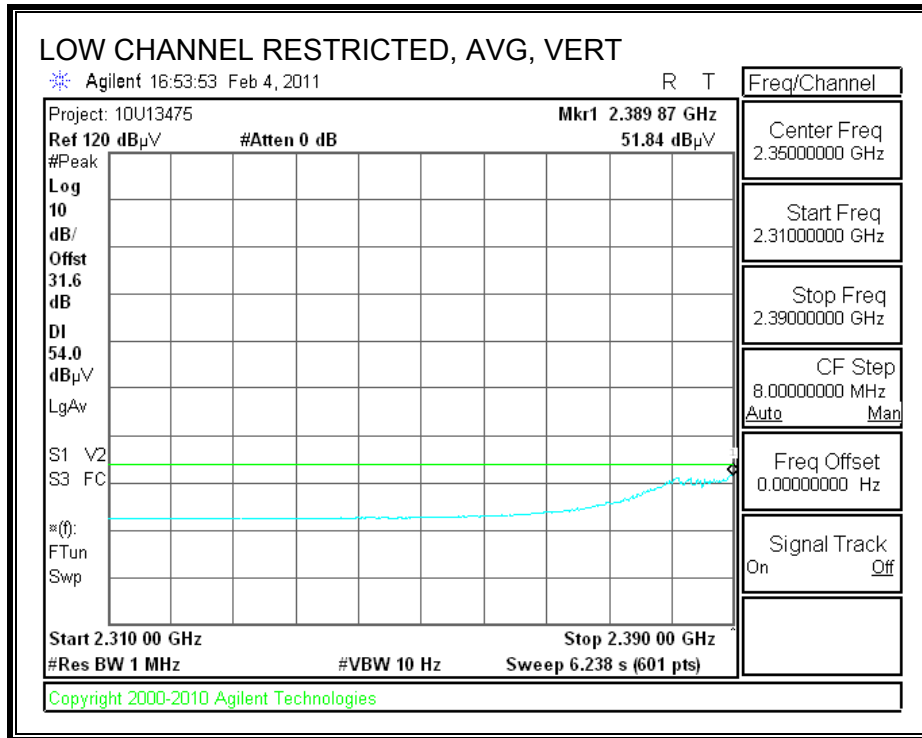
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



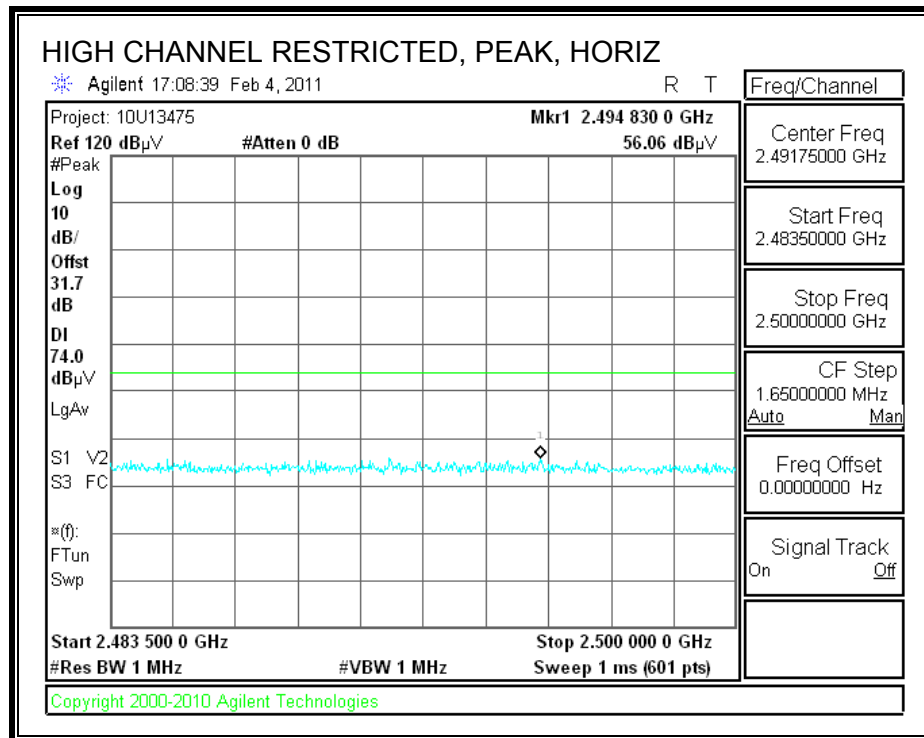


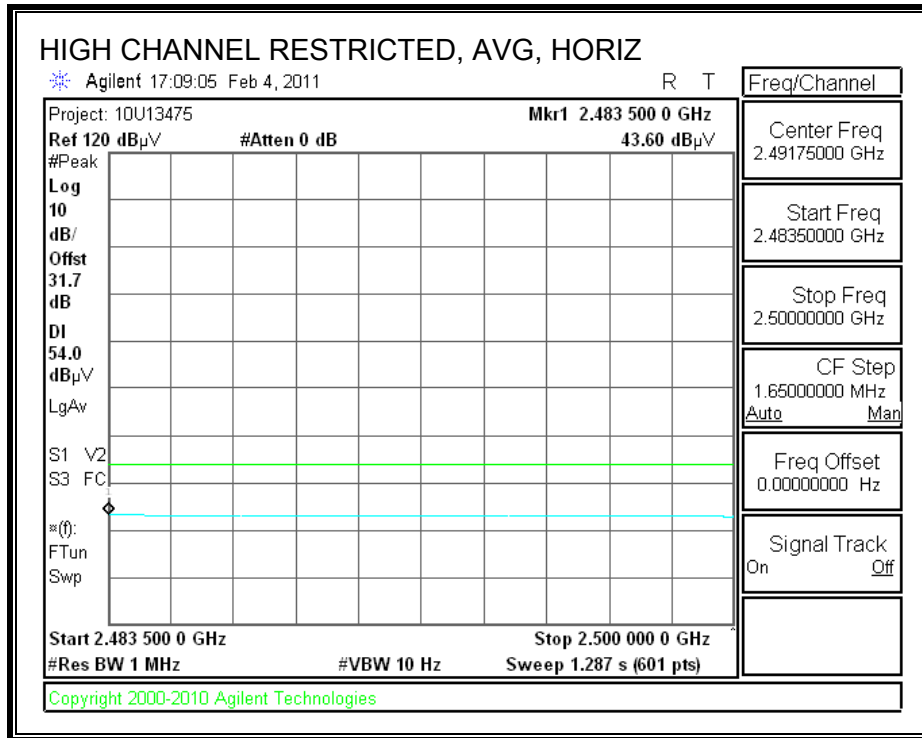
RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)



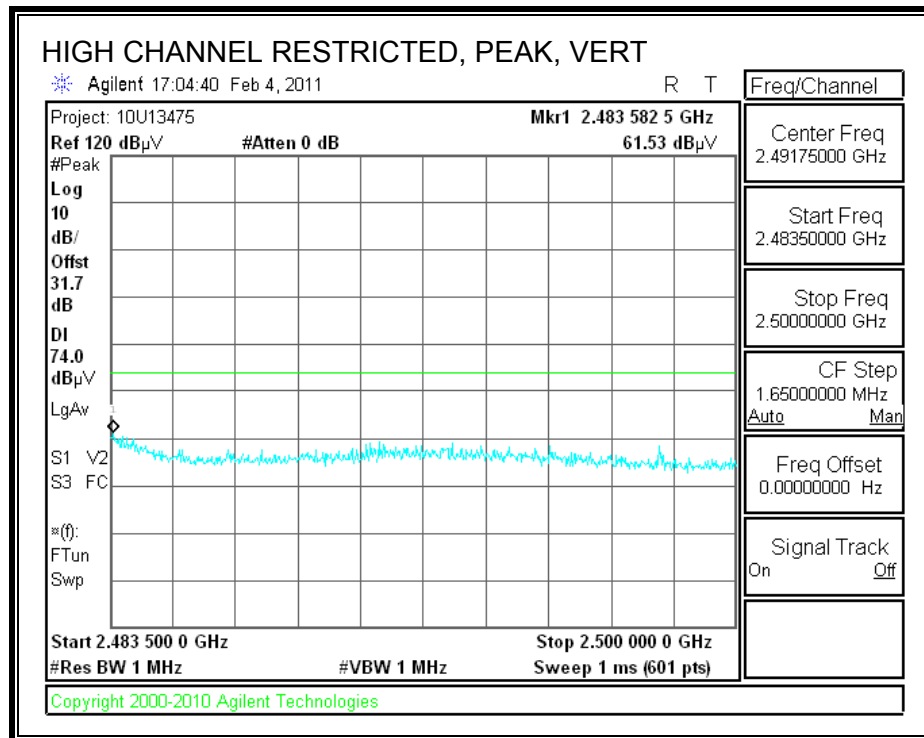


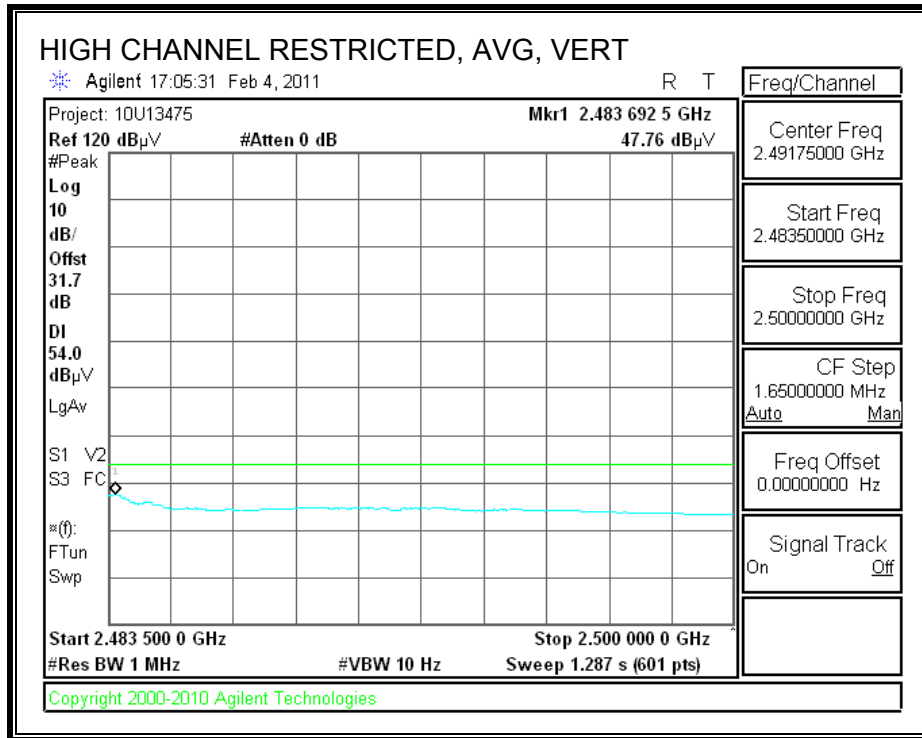
RESTRICTED BANEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 02/03/11
Project #: 10U13475
Company: Ruckus
Test Target: FCC 15.247
Mode Oper: Tx On, 2.4 GHz band, HT20 MCS0

f Measurement Frequency Amp Preamp Gain Average Field Strength Limit
Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit
Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit
AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit
CL Cable Loss HPF High Pass Filter

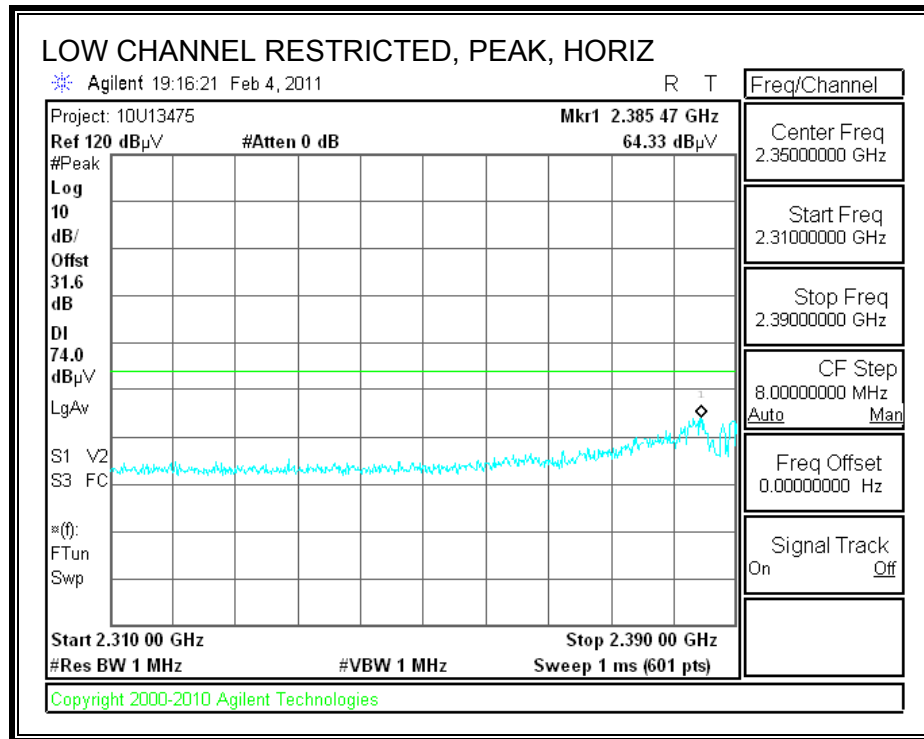
| f GHz | Dist (m) | Read dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Fitr dB | Corr. dBuV/m | Limit dBuV/m | Margin dB | Ant. Pol. V/H | Det. P/A/QP | Ant.High cm | Table Angle Degree | Notes |
|--------------------------|-------------|--------------|------------|----------|-----------|--------------|------------|-----------------|-----------------|--------------|------------------|----------------|----------------|-----------------------|-------|
| Low Ch. 2412 MHz | | | | | | | | | | | | | | | |
| 4.824 | 3.0 | 44.2 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 48.4 | 74.0 | -25.6 | H | P | 104.0 | 272.0 | |
| 4.824 | 3.0 | 30.6 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 34.8 | 54.0 | -19.2 | H | A | 104.0 | 272.0 | |
| 4.824 | 3.0 | 38.1 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 42.3 | 74.0 | -31.7 | V | P | 100.0 | 286.0 | |
| 4.824 | 3.0 | 26.1 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 30.4 | 54.0 | -23.6 | V | A | 100.0 | 286.0 | |
| Mid Ch. 2437 MHz | | | | | | | | | | | | | | | |
| 4.874 | 3.0 | 46.5 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 50.8 | 74.0 | -23.2 | H | P | 105.0 | 260.0 | |
| 4.874 | 3.0 | 33.9 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 38.2 | 54.0 | -15.8 | H | A | 105.0 | 260.0 | |
| 4.874 | 3.0 | 40.5 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 44.9 | 74.0 | -29.1 | V | P | 98.0 | 248.0 | |
| 4.874 | 3.0 | 27.9 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 32.2 | 54.0 | -21.8 | V | A | 98.0 | 248.0 | |
| 7.311 | 3.0 | 49.4 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 58.6 | 74.0 | -15.4 | V | P | 124.0 | 336.0 | |
| 7.311 | 3.0 | 25.6 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 34.9 | 54.0 | -19.1 | V | A | 124.0 | 336.0 | |
| 7.311 | 3.0 | 47.2 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 56.4 | 74.0 | -17.6 | H | P | 124.0 | 349.0 | |
| 7.311 | 3.0 | 25.3 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 34.6 | 54.0 | -19.4 | H | A | 124.0 | 349.0 | |
| High Ch. 2462 MHz | | | | | | | | | | | | | | | |
| 4.924 | 3.0 | 38.1 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 42.5 | 74.0 | -31.5 | H | P | 138.0 | 198.0 | |
| 4.924 | 3.0 | 26.4 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 30.8 | 54.0 | -23.2 | H | A | 138.0 | 198.0 | |
| 4.924 | 3.0 | 37.5 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 42.0 | 74.0 | -32.1 | V | P | 152.0 | 150.0 | |
| 4.924 | 3.0 | 24.8 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 29.2 | 54.0 | -24.8 | V | A | 152.0 | 150.0 | |
| 7.386 | 3.0 | 35.9 | 35.6 | 7.3 | -34.1 | 0.0 | 0.6 | 45.3 | 74.0 | -28.7 | V | P | 161.0 | 276.0 | |
| 7.386 | 3.0 | 23.4 | 35.6 | 7.3 | -34.1 | 0.0 | 0.6 | 32.8 | 54.0 | -21.2 | V | A | 161.0 | 276.0 | |
| 7.386 | 3.0 | 35.7 | 35.6 | 7.3 | -34.1 | 0.0 | 0.6 | 45.1 | 74.0 | -28.9 | H | P | 122.0 | 308.0 | |
| 7.386 | 3.0 | 23.4 | 35.6 | 7.3 | -34.1 | 0.0 | 0.6 | 32.8 | 54.0 | -21.2 | H | A | 122.0 | 308.0 | |

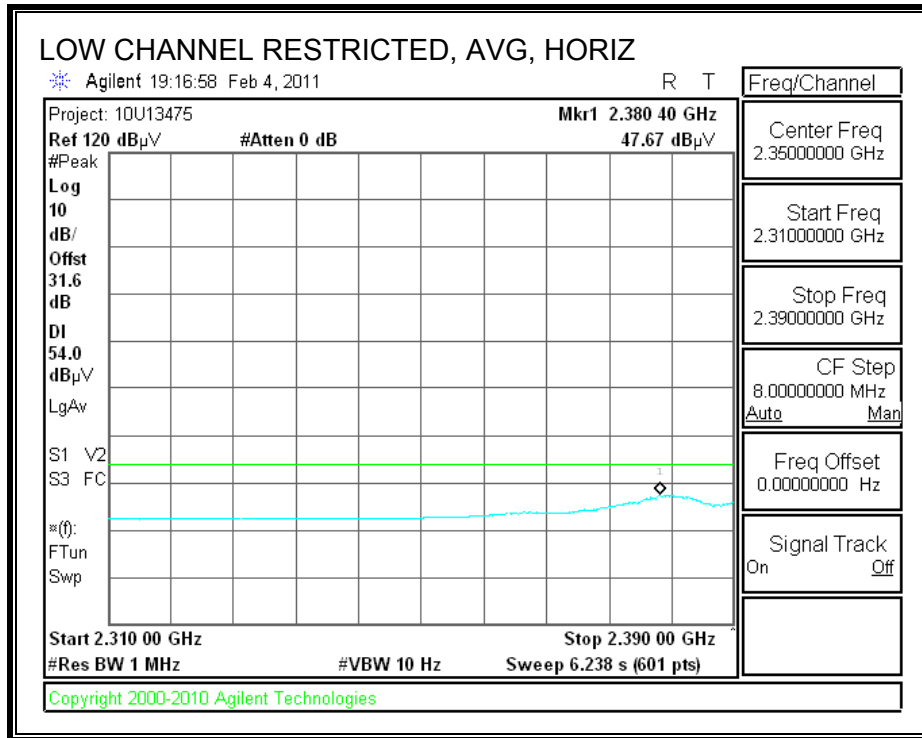
Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

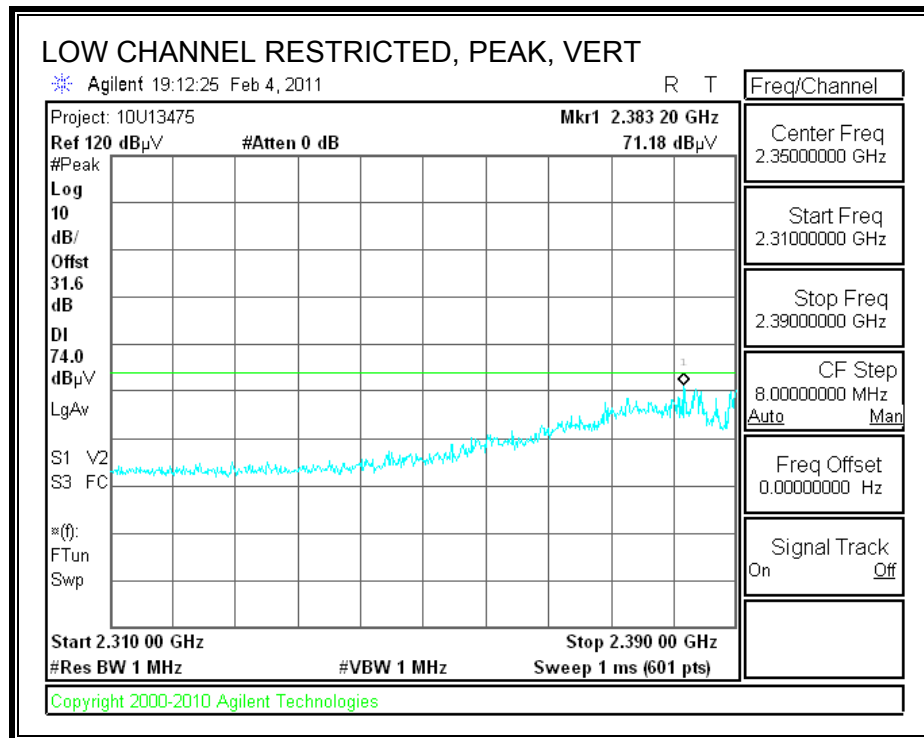
8.2.4. TX ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 2.4 GHz BAND

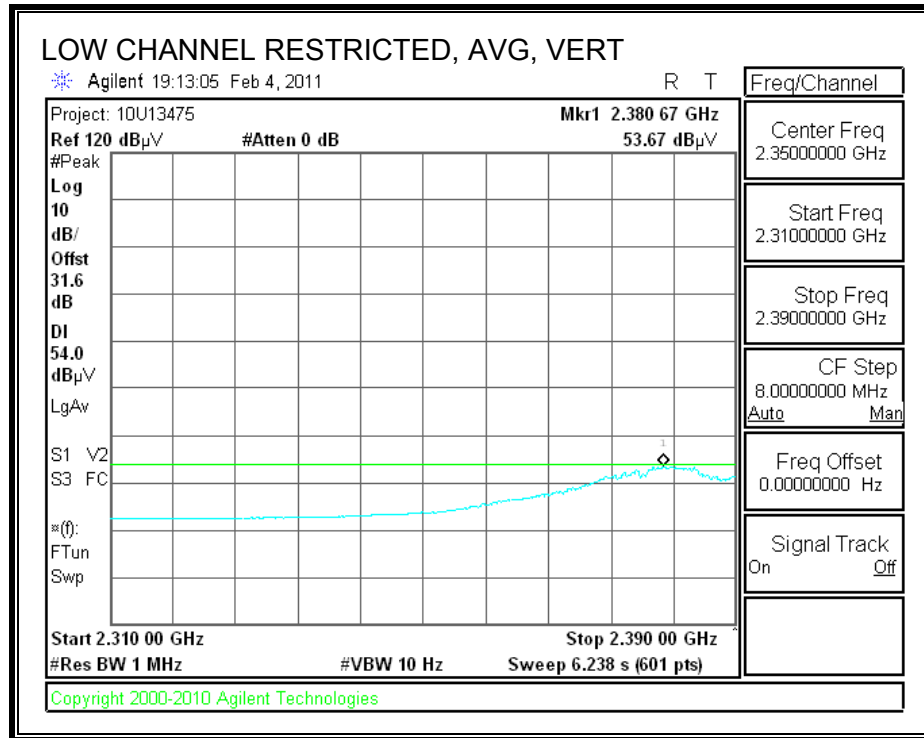
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



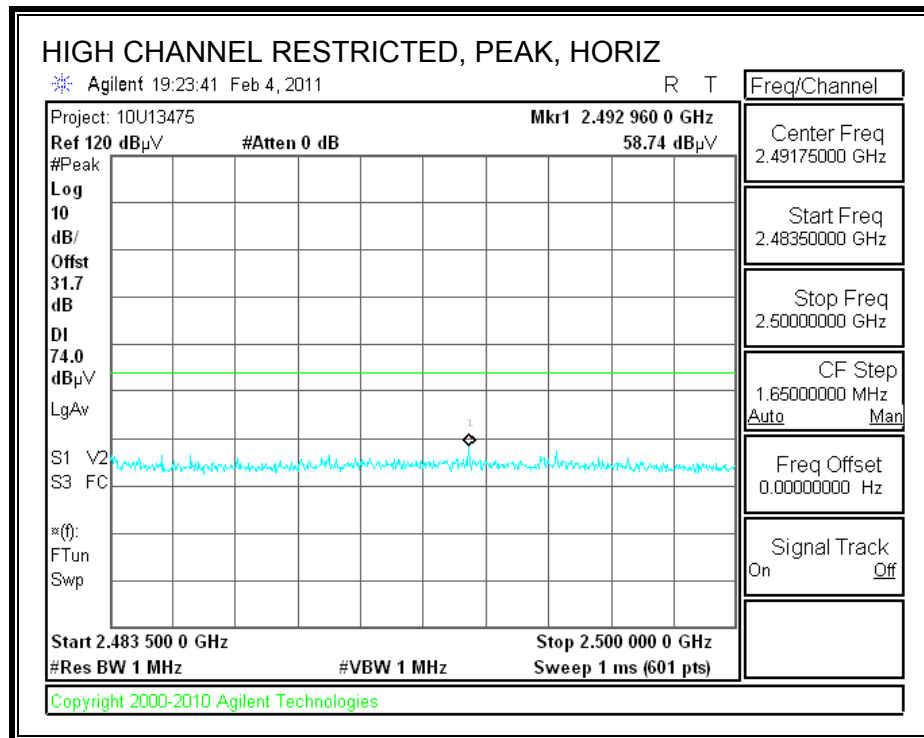


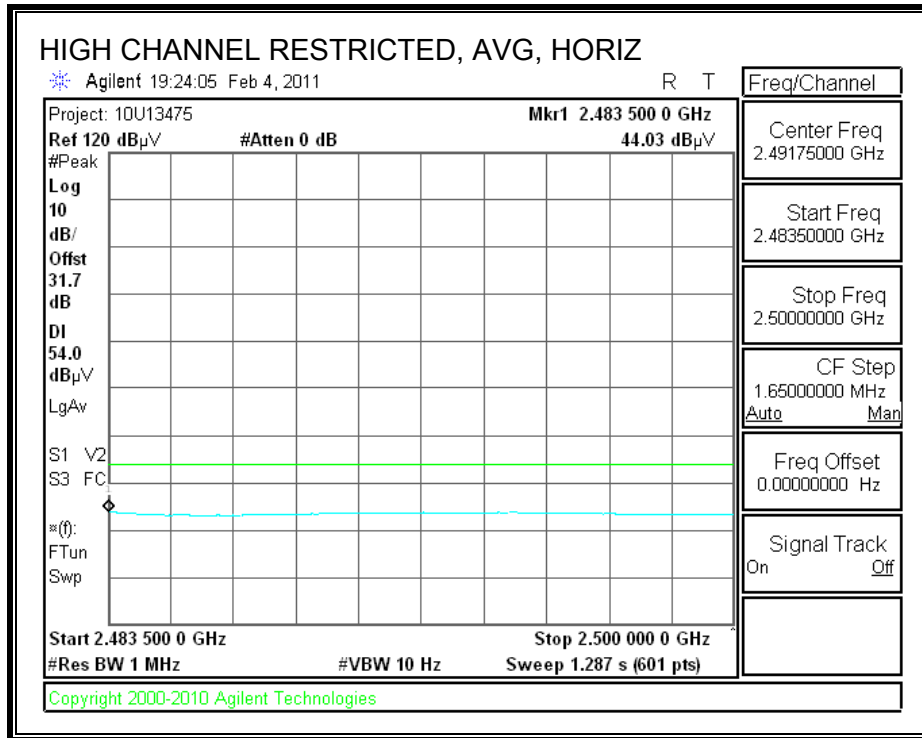
RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)



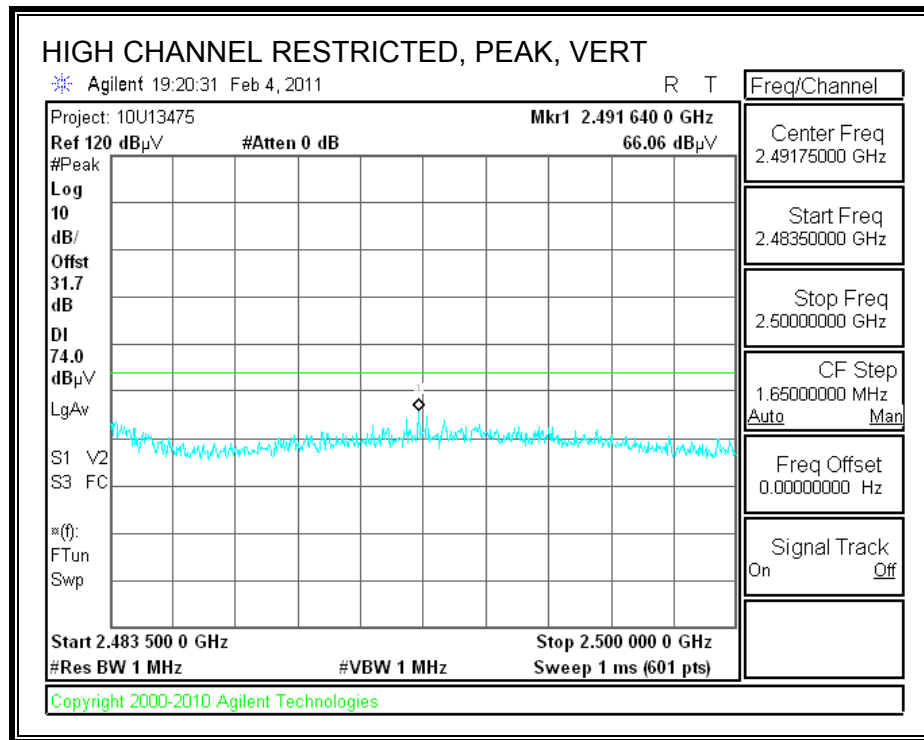


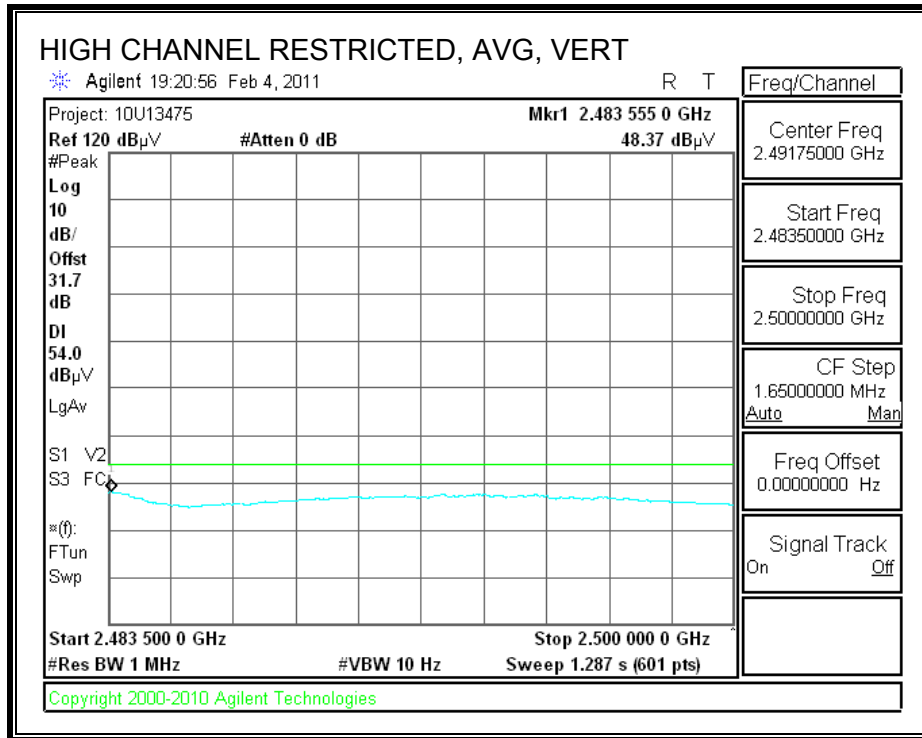
RESTRICTED BANEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 02/03/11
Project #: 10U13475
Company: Ruckus
Test Target: FCC 15.247
Mode Oper: Tx On, 2.4 GHz band, HT40 MCS0

f Measurement Frequency Amp Preamp Gain Average Field Strength Limit
Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit
Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit
AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit
CL Cable Loss HPF High Pass Filter

| f GHz | Dist (m) | Read dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Fitr dB | Corr. dBuV/m | Limit dBuV/m | Margin dB | Ant. Pol. V/H | Det. P/A/QP | Ant.High cm | Table Angle Degree | Notes |
|--------------------------|-------------|--------------|------------|----------|-----------|--------------|------------|-----------------|-----------------|--------------|------------------|----------------|----------------|-----------------------|-------|
| Low Ch. 2422 MHz | | | | | | | | | | | | | | | |
| 4.844 | 3.0 | 42.2 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 46.5 | 74.0 | -27.5 | H | P | 98.0 | 263.0 | |
| 4.844 | 3.0 | 29.7 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 33.9 | 54.0 | -20.1 | H | A | 98.0 | 263.0 | |
| 4.844 | 3.0 | 37.4 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 41.6 | 74.0 | -32.4 | V | P | 103.0 | 237.0 | |
| 4.844 | 3.0 | 24.3 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 28.6 | 54.0 | -25.4 | V | A | 103.0 | 237.0 | |
| 7.266 | 3.0 | 35.8 | 35.4 | 7.2 | -34.1 | 0.0 | 0.6 | 45.0 | 74.0 | -29.0 | V | P | 188.0 | 231.0 | |
| 7.266 | 3.0 | 23.0 | 35.4 | 7.2 | -34.1 | 0.0 | 0.6 | 32.2 | 54.0 | -21.8 | V | A | 188.0 | 231.0 | |
| 7.266 | 3.0 | 27.6 | 35.4 | 7.2 | -34.1 | 0.0 | 0.6 | 36.8 | 74.0 | -37.2 | H | P | 133.0 | 360.0 | |
| 7.266 | 3.0 | 14.6 | 35.4 | 7.2 | -34.1 | 0.0 | 0.6 | 23.8 | 54.0 | -30.2 | H | A | 133.0 | 360.0 | |
| Mid Ch. 2437 MHz | | | | | | | | | | | | | | | |
| 4.874 | 3.0 | 24.3 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 28.7 | 74.0 | -45.3 | H | P | 152.0 | 158.0 | |
| 4.874 | 3.0 | 12.1 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 16.4 | 54.0 | -37.6 | H | A | 152.0 | 158.0 | |
| 4.874 | 3.0 | 24.4 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 28.7 | 74.0 | -45.3 | V | P | 191.0 | 92.0 | |
| 4.874 | 3.0 | 12.1 | 32.7 | 5.8 | -34.8 | 0.0 | 0.6 | 16.4 | 54.0 | -37.6 | V | A | 191.0 | 92.0 | |
| 7.311 | 3.0 | 27.0 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 36.2 | 74.0 | -37.8 | V | P | 152.0 | 177.0 | |
| 7.311 | 3.0 | 14.6 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 23.8 | 54.0 | -30.2 | V | A | 152.0 | 177.0 | |
| 7.311 | 3.0 | 39.5 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 48.7 | 74.0 | -25.3 | H | P | 102.0 | 44.0 | |
| 7.311 | 3.0 | 23.3 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 32.5 | 54.0 | -21.5 | H | A | 102.0 | 44.0 | |
| High Ch. 2452 MHz | | | | | | | | | | | | | | | |
| 4.904 | 3.0 | 40.3 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 44.7 | 74.0 | -29.3 | H | P | 98.0 | 271.0 | |
| 4.904 | 3.0 | 27.0 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 31.4 | 54.0 | -22.6 | H | A | 98.0 | 271.0 | |
| 4.904 | 3.0 | 36.7 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 41.1 | 74.0 | -32.9 | V | P | 121.0 | 71.0 | |
| 4.904 | 3.0 | 24.6 | 32.7 | 5.9 | -34.8 | 0.0 | 0.6 | 29.0 | 54.0 | -25.0 | V | A | 121.0 | 71.0 | |
| 7.356 | 3.0 | 35.6 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 45.0 | 74.0 | -29.0 | V | P | 130.0 | 184.0 | |
| 7.356 | 3.0 | 23.5 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 32.9 | 54.0 | -21.2 | V | A | 130.0 | 184.0 | |
| 7.356 | 3.0 | 35.8 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 45.1 | 74.0 | -28.9 | H | P | 98.0 | 259.0 | |
| 7.356 | 3.0 | 23.5 | 35.5 | 7.3 | -34.1 | 0.0 | 0.6 | 32.8 | 54.0 | -21.2 | H | A | 98.0 | 259.0 | |

Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

8.2.5. TX ABOVE 1 GHz FOR 802.11a MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 02/04/11
Project #: 10U13475
Company: Ruckus
Test Target: FCC 15.247
Mode Oper: Tx On, 5.8 GHz band, a Mode

f Measurement Frequency Amp Preamp Gain Average Field Strength Limit
Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit
Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit
AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit
CL Cable Loss HPF High Pass Filter

| f GHz | Dist (m) | Read dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Fitr dB | Corr. dBuV/m | Limit dBuV/m | Margin dB | Ant. Pol. V/H | Det. P/A/QP | Ant.High cm | Table Angle Degree | Notes |
|--------------------------|-------------|--------------|------------|----------|-----------|--------------|------------|-----------------|-----------------|--------------|------------------|----------------|----------------|-----------------------|-------|
| Low Ch. 5745 MHz | | | | | | | | | | | | | | | |
| 11.490 | 3.0 | 48.6 | 38.0 | 9.5 | -32.5 | 0.0 | 0.7 | 64.3 | 74.0 | -9.7 | H | P | 128.0 | 192.0 | |
| 11.490 | 3.0 | 35.1 | 38.0 | 9.5 | -32.5 | 0.0 | 0.7 | 50.8 | 54.0 | -3.2 | H | A | 128.0 | 192.0 | |
| 11.490 | 3.0 | 47.5 | 38.0 | 9.5 | -32.5 | 0.0 | 0.7 | 63.2 | 74.0 | -10.8 | V | P | 112.0 | 197.0 | |
| 11.490 | 3.0 | 33.3 | 38.0 | 9.5 | -32.5 | 0.0 | 0.7 | 49.0 | 54.0 | -5.0 | V | A | 112.0 | 197.0 | |
| Mid Ch. 5785 MHz | | | | | | | | | | | | | | | |
| 11.570 | 3.0 | 47.9 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 63.7 | 74.0 | -10.3 | H | P | 131.0 | 167.0 | |
| 11.570 | 3.0 | 33.9 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 49.7 | 54.0 | -4.3 | H | A | 131.0 | 167.0 | |
| 11.570 | 3.0 | 47.2 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 63.0 | 74.0 | -11.0 | V | P | 114.0 | 200.0 | |
| 11.570 | 3.0 | 32.5 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 48.3 | 54.0 | -5.7 | V | A | 114.0 | 200.0 | |
| High Ch. 5825 MHz | | | | | | | | | | | | | | | |
| 11.650 | 3.0 | 49.0 | 38.2 | 9.6 | -32.5 | 0.0 | 0.7 | 64.9 | 74.0 | -9.1 | H | P | 129.0 | 164.0 | |
| 11.650 | 3.0 | 35.9 | 38.2 | 9.6 | -32.5 | 0.0 | 0.7 | 51.8 | 54.0 | -2.2 | H | A | 129.0 | 164.0 | |
| 11.650 | 3.0 | 47.5 | 38.2 | 9.6 | -32.5 | 0.0 | 0.7 | 63.4 | 74.0 | -10.6 | V | P | 140.0 | 200.0 | |
| 11.650 | 3.0 | 33.4 | 38.2 | 9.6 | -32.5 | 0.0 | 0.7 | 49.3 | 54.0 | -4.7 | V | A | 140.0 | 200.0 | |

Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

8.2.6. TX ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 02/04/11
Project #: 10U13475
Company: Ruckus
Test Target: FCC 15.247
Mode Oper: Tx On, 5.8 GHz band, HT20 MCS8

f Measurement Frequency Amp Preamp Gain Average Field Strength Limit
Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit
Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit
AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit
CL Cable Loss HPF High Pass Filter

| f GHz | Dist (m) | Read dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Fitr dB | Corr. dBuV/m | Limit dBuV/m | Margin dB | Ant. Pol. V/H | Det. P/A/QP | Ant.High cm | Table Angle Degree | Notes |
|--------------------------|-------------|--------------|------------|----------|-----------|--------------|------------|-----------------|-----------------|--------------|------------------|----------------|----------------|-----------------------|-------|
| Low Ch. 5745 MHz | | | | | | | | | | | | | | | |
| 11.490 | 3.0 | 46.6 | 38.0 | 9.5 | -32.5 | 0.0 | 0.7 | 62.3 | 74.0 | -11.7 | H | P | 155.0 | 177.0 | |
| 11.490 | 3.0 | 33.4 | 38.0 | 9.5 | -32.5 | 0.0 | 0.7 | 49.1 | 54.0 | -4.9 | H | A | 155.0 | 177.0 | |
| 11.490 | 3.0 | 46.5 | 38.0 | 9.5 | -32.5 | 0.0 | 0.7 | 62.2 | 74.0 | -11.8 | V | P | 109.0 | 199.0 | |
| 11.490 | 3.0 | 33.1 | 38.0 | 9.5 | -32.5 | 0.0 | 0.7 | 48.8 | 54.0 | -5.2 | V | A | 109.0 | 199.0 | |
| Mid Ch. 5785 MHz | | | | | | | | | | | | | | | |
| 11.570 | 3.0 | 41.9 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 57.7 | 74.0 | -16.3 | H | P | 98.0 | 169.0 | |
| 11.570 | 3.0 | 29.5 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 45.3 | 54.0 | -8.7 | H | A | 98.0 | 169.0 | |
| 11.570 | 3.0 | 39.2 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 55.0 | 74.0 | -19.0 | V | P | 98.0 | 199.0 | |
| 11.570 | 3.0 | 27.0 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 42.8 | 54.0 | -11.2 | V | A | 98.0 | 199.0 | |
| High Ch. 5825 MHz | | | | | | | | | | | | | | | |
| 11.650 | 3.0 | 48.3 | 38.2 | 9.6 | -32.5 | 0.0 | 0.7 | 64.2 | 74.0 | -9.8 | H | P | 145.0 | 193.0 | |
| 11.650 | 3.0 | 34.5 | 38.2 | 9.6 | -32.5 | 0.0 | 0.7 | 50.4 | 54.0 | -3.6 | H | A | 145.0 | 193.0 | |
| 11.650 | 3.0 | 41.8 | 38.2 | 9.6 | -32.5 | 0.0 | 0.7 | 57.7 | 74.0 | -16.3 | V | P | 98.0 | 201.0 | |
| 11.650 | 3.0 | 28.4 | 38.2 | 9.6 | -32.5 | 0.0 | 0.7 | 44.3 | 54.0 | -9.7 | V | A | 98.0 | 201.0 | |

Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

8.2.7. TX ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 02/04/11
Project #: 10U13475
Company: Ruckus
Test Target: FCC 15.247
Mode Oper: Tx On, 5.8 GHz band, HT40 MCS8

| | | | | |
|------|-----------------------|--------|--------------------------------|------------------------------|
| f | Measurement Frequency | Amp | Preamp Gain | Average Field Strength Limit |
| Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | Peak Field Strength Limit |
| Read | Analyzer Reading | Avg | Average Field Strength @ 3 m | Margin vs. Average Limit |
| AF | Antenna Factor | Peak | Calculated Peak Field Strength | Margin vs. Peak Limit |
| CL | Cable Loss | HPF | High Pass Filter | |

| f GHz | Dist (m) | Read dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Fitr dB | Corr. dBuV/m | Limit dBuV/m | Margin dB | Ant. Pol. V/H | Det. P/A/QP | Ant.High cm | Table Angle Degree | Notes |
|--------------------------|-------------|--------------|------------|----------|-----------|--------------|------------|-----------------|-----------------|--------------|------------------|----------------|----------------|-----------------------|-------|
| Low Ch. 5755 MHz | | | | | | | | | | | | | | | |
| 11.510 | 3.0 | 52.1 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 67.9 | 74.0 | -6.1 | H | P | 114.0 | 187.0 | |
| 11.510 | 3.0 | 31.9 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 47.6 | 54.0 | -6.4 | H | A | 114.0 | 187.0 | |
| 11.510 | 3.0 | 46.7 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 62.4 | 74.0 | -11.6 | V | P | 109.0 | 163.0 | |
| 11.510 | 3.0 | 27.7 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 43.5 | 54.0 | -10.5 | V | A | 109.0 | 163.0 | |
| High Ch. 5795 MHz | | | | | | | | | | | | | | | |
| 11.590 | 3.0 | 48.9 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 64.7 | 74.0 | -9.3 | H | P | 125.0 | 139.0 | |
| 11.590 | 3.0 | 27.6 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 43.4 | 54.0 | -10.6 | H | A | 125.0 | 139.0 | |
| 11.590 | 3.0 | 45.4 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 61.3 | 74.0 | -12.7 | V | P | 98.0 | 121.0 | |
| 11.590 | 3.0 | 26.7 | 38.1 | 9.5 | -32.5 | 0.0 | 0.7 | 42.5 | 54.0 | -11.5 | V | A | 98.0 | 121.0 | |

Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

8.3. RECEIVER ABOVE 1 GHz

8.3.1. RX ABOVE 1 GHz FOR 20 MHz BANDWIDTH IN THE 2.4 GHz BAND

| High Frequency Measurement | | | | | | | | | | | | | | | | |
|---|-------------|-----------------|-----------------------|------------|----------|------------------------|--------------|------------|----------------|---------------|------------------|-------------------|--------------|---------------|---|--|
| Compliance Certification Services, Fremont 5m Chamber | | | | | | | | | | | | | | | | |
| Company: Ruckus Wireless | | | | | | | | | | | | | | | | |
| Project #: 10U13475 | | | | | | | | | | | | | | | | |
| Date: 02/9/11 | | | | | | | | | | | | | | | | |
| Test Engineer: William Zhuang | | | | | | | | | | | | | | | | |
| Configuration: EUT with Support Peripherals Outside Chamber | | | | | | | | | | | | | | | | |
| Mode: Rx Mode, 20 MHz BW | | | | | | | | | | | | | | | | |
| Test Equipment: | | | | | | | | | | | | | | | | |
| Horn 1-18GHz | | | Pre-amplifier 1-26GHz | | | Pre-amplifier 26-40GHz | | | Horn > 18GHz | | | Limit | | | | |
| T60; S/N: 2238 @3m | | | T34 HP 8449B | | | | | | | | | RX RSS 210 | | | | |
| Hi Frequency Cables | | | | | | | | | | | | | | | | |
| 3' cable 22807700 | | | 12' cable 22807600 | | | 20' cable 22807500 | | | HPF | | | Reject Filter | | | Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz; VBW=10Hz | |
| 3' cable 22807700 | | | 12' cable 22807600 | | | 20' cable 22807500 | | | | | | | | | | |
| f GHz | Dist (m) | Read Pk dBuV | Read Avg. dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Filt dB | Peak dBuV/m | Avg dBuV/m | Pk Lim dBuV/m | Avg Lim dBuV/m | Pk Mar dB | Avg Mar dB | Notes (V/H) | |
| 1.000 | 3.0 | 50.7 | 45.5 | 24.5 | 2.4 | -38.3 | 0.0 | 0.0 | 39.3 | 34.0 | 74 | 54 | -34.7 | -20.0 | V | |
| 1.020 | 3.0 | 52.7 | 48.7 | 24.5 | 2.4 | -38.2 | 0.0 | 0.0 | 41.4 | 37.3 | 74 | 54 | -32.6 | -16.7 | V | |
| 1.250 | 3.0 | 49.8 | 45.0 | 25.3 | 2.7 | -37.9 | 0.0 | 0.0 | 39.9 | 35.1 | 74 | 54 | -34.1 | -18.9 | V | |
| 1.500 | 3.0 | 52.0 | 49.2 | 26.1 | 2.9 | -37.6 | 0.0 | 0.0 | 43.6 | 40.7 | 74 | 54 | -30.4 | -13.3 | V | |
| 1.625 | 3.0 | 49.0 | 44.7 | 26.6 | 3.1 | -37.4 | 0.0 | 0.0 | 41.2 | 36.9 | 74 | 54 | -32.8 | -17.1 | V | |
| 1.700 | 3.0 | 48.3 | 44.0 | 26.8 | 3.2 | -37.3 | 0.0 | 0.0 | 40.9 | 36.6 | 74 | 54 | -33.1 | -17.4 | V | |
| 1.750 | 3.0 | 49.9 | 46.2 | 27.0 | 3.2 | -37.2 | 0.0 | 0.0 | 42.8 | 39.2 | 74 | 54 | -31.2 | -14.8 | V | |
| 1.000 | 3.0 | 50.4 | 46.2 | 24.5 | 2.4 | -38.3 | 0.0 | 0.0 | 39.0 | 34.8 | 74 | 54 | -35.0 | -19.2 | H | |
| 1.020 | 3.0 | 53.1 | 49.3 | 24.5 | 2.4 | -38.2 | 0.0 | 0.0 | 41.8 | 38.0 | 74 | 54 | -32.2 | -16.0 | H | |
| 1.250 | 3.0 | 48.6 | 43.3 | 25.3 | 2.7 | -37.9 | 0.0 | 0.0 | 38.7 | 33.3 | 74 | 54 | -35.3 | -20.7 | H | |
| 1.500 | 3.0 | 47.1 | 40.8 | 26.1 | 2.9 | -37.6 | 0.0 | 0.0 | 38.6 | 32.3 | 74 | 54 | -35.4 | -21.7 | H | |
| 1.625 | 3.0 | 46.9 | 40.1 | 26.6 | 3.1 | -37.4 | 0.0 | 0.0 | 39.1 | 32.3 | 74 | 54 | -34.9 | -21.7 | H | |
| 1.700 | 3.0 | 46.0 | 38.9 | 26.8 | 3.2 | -37.3 | 0.0 | 0.0 | 38.6 | 31.6 | 74 | 54 | -35.4 | -22.4 | H | |
| 1.750 | 3.0 | 47.8 | 43.0 | 27.0 | 3.2 | -37.2 | 0.0 | 0.0 | 40.8 | 36.0 | 74 | 54 | -33.2 | -18.0 | H | |

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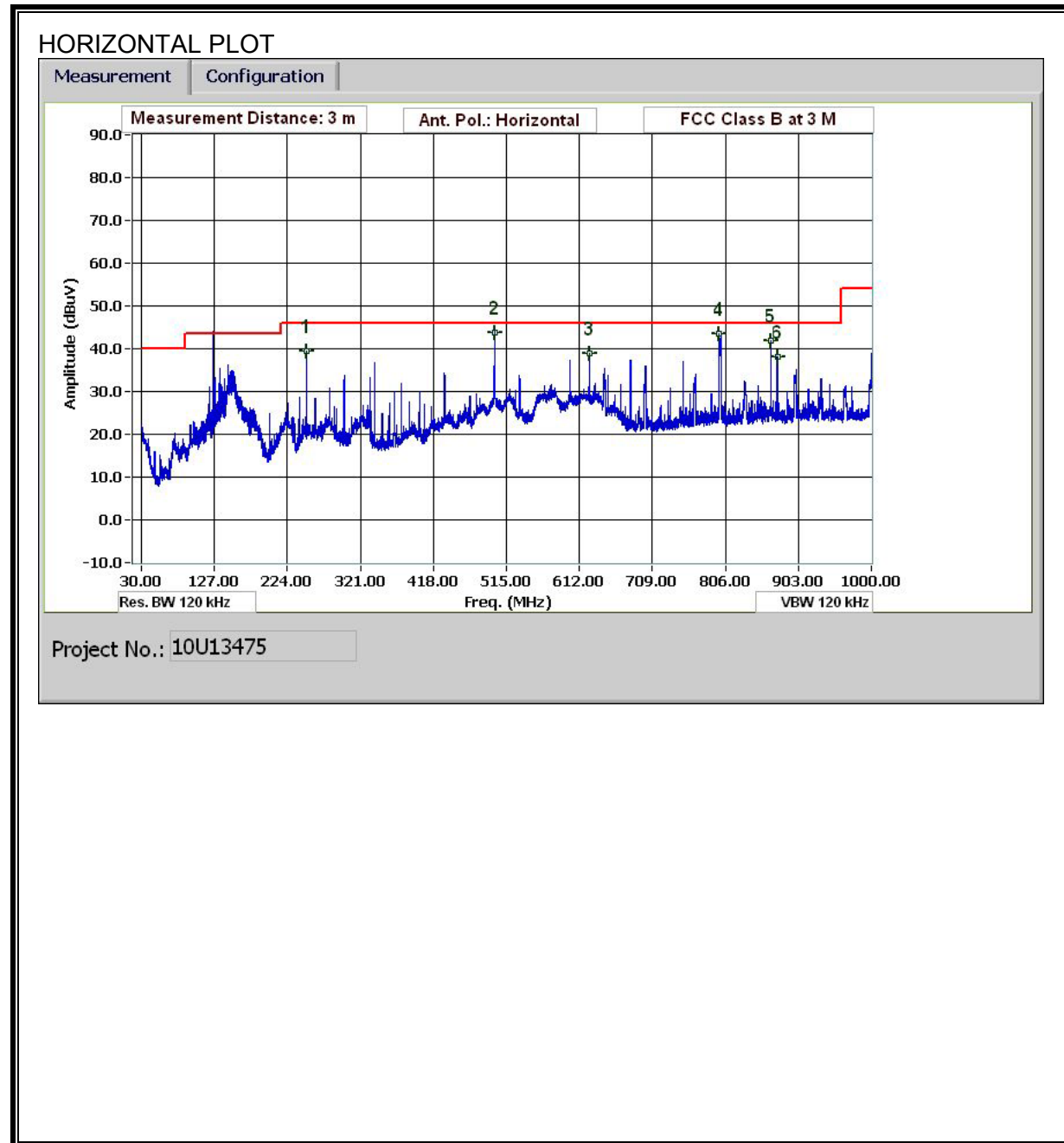
| | | | | | |
|------|-----------------------|--------|--------------------------------|---------|------------------------------|
| f | Measurement Frequency | Amp | Preamp Gain | Avg Lim | Average Field Strength Limit |
| Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | Pk Lim | Peak Field Strength Limit |
| Read | Analyzer Reading | Avg | Average Field Strength @ 3 m | Avg Mar | Margin vs. Average Limit |
| AF | Antenna Factor | Peak | Calculated Peak Field Strength | Pk Mar | Margin vs. Peak Limit |
| CL | Cable Loss | HPF | High Pass Filter | | |

8.3.2. RX ABOVE 1 GHz FOR 40 MHz BANDWIDTH IN THE 2.4 GHz BAND

| High Frequency Measurement | | | | | | | | | | | | | | | | |
|---|-----------------------|-----------------|-----------------------|------------|----------|------------------------|--------------------------------|------------|----------------|---------------|------------------|-------------------|------------------------------|---------------|--|--|
| Compliance Certification Services, Fremont 5m Chamber | | | | | | | | | | | | | | | | |
| Company: Ruckus Wireless | | | | | | | | | | | | | | | | |
| Project #: 10U13475 | | | | | | | | | | | | | | | | |
| Date: 02/9/11 | | | | | | | | | | | | | | | | |
| Test Engineer: William Zhuang | | | | | | | | | | | | | | | | |
| Configuration: EUT with Support Peripherals Outside Chamber | | | | | | | | | | | | | | | | |
| Mode: Rx Mode, 40 MHz BW | | | | | | | | | | | | | | | | |
| Test Equipment: | | | | | | | | | | | | | | | | |
| Horn 1-18GHz | | | Pre-amplifier 1-26GHz | | | Pre-amplifier 26-40GHz | | | Horn > 18GHz | | | Limit | | | | |
| T60; S/N: 2238 @3m | | | T34 HP 8449B | | | | | | | | | RX RSS 210 | | | | |
| Hi Frequency Cables | | | | | | | | | | | | | | | | |
| 3' cable 22807700 | | | 12' cable 22807600 | | | 20' cable 22807500 | | | HPF | | | Reject Filter | | | Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz | |
| 3' cable 22807700 | | | 12' cable 22807600 | | | 20' cable 22807500 | | | | | | | | | | |
| f GHz | Dist (m) | Read Pk dBuV | Read Avg. dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Filt dB | Peak dBuV/m | Avg dBuV/m | Pk Lim dBuV/m | Avg Lim dBuV/m | Pk Mar dB | Avg Mar dB | Notes (V/H) | |
| 1.020 | 3.0 | 53.6 | 50.0 | 24.5 | 2.4 | -38.2 | 0.0 | 0.0 | 42.3 | 38.7 | 74 | 54 | -31.7 | -15.3 | V | |
| 1.127 | 3.0 | 50.0 | 43.3 | 24.9 | 2.5 | -38.1 | 0.0 | 0.0 | 39.3 | 32.6 | 74 | 54 | -34.7 | -21.4 | V | |
| 1.250 | 3.0 | 49.1 | 44.1 | 25.3 | 2.7 | -37.9 | 0.0 | 0.0 | 39.2 | 34.2 | 74 | 54 | -34.8 | -19.8 | V | |
| 1.375 | 3.0 | 50.5 | 46.9 | 25.7 | 2.8 | -37.7 | 0.0 | 0.0 | 41.2 | 37.7 | 74 | 54 | -32.8 | -16.3 | V | |
| 1.500 | 3.0 | 51.6 | 48.2 | 26.1 | 2.9 | -37.6 | 0.0 | 0.0 | 43.1 | 39.7 | 74 | 54 | -30.9 | -14.3 | V | |
| 1.625 | 3.0 | 48.7 | 44.1 | 26.6 | 3.1 | -37.4 | 0.0 | 0.0 | 40.9 | 36.3 | 74 | 54 | -33.1 | -17.7 | V | |
| 1.750 | 3.0 | 50.6 | 46.4 | 27.0 | 3.2 | -37.2 | 0.0 | 0.0 | 43.6 | 39.4 | 74 | 54 | -30.4 | -14.6 | V | |
| 1.020 | 3.0 | 52.6 | 49.0 | 24.5 | 2.4 | -38.2 | 0.0 | 0.0 | 41.3 | 37.7 | 74 | 54 | -32.7 | -16.3 | H | |
| 1.127 | 3.0 | 49.7 | 44.9 | 24.9 | 2.5 | -38.1 | 0.0 | 0.0 | 39.0 | 34.2 | 74 | 54 | -35.0 | -19.8 | H | |
| 1.250 | 3.0 | 49.7 | 44.6 | 25.3 | 2.7 | -37.9 | 0.0 | 0.0 | 39.8 | 34.6 | 74 | 54 | -34.2 | -19.4 | H | |
| 1.375 | 3.0 | 48.0 | 42.3 | 25.7 | 2.8 | -37.7 | 0.0 | 0.0 | 38.8 | 33.1 | 74 | 54 | -35.2 | -20.9 | H | |
| 1.500 | 3.0 | 47.2 | 41.1 | 26.1 | 2.9 | -37.6 | 0.0 | 0.0 | 38.7 | 32.6 | 74 | 54 | -35.3 | -21.4 | H | |
| 1.625 | 3.0 | 47.6 | 40.9 | 26.6 | 3.1 | -37.4 | 0.0 | 0.0 | 39.8 | 33.1 | 74 | 54 | -34.2 | -20.9 | H | |
| 1.750 | 3.0 | 48.9 | 44.7 | 27.0 | 3.2 | -37.2 | 0.0 | 0.0 | 41.9 | 37.6 | 74 | 54 | -32.1 | -16.4 | H | |
| Rev. 07.22.09 | | | | | | | | | | | | | | | | |
| f | Measurement Frequency | | | | | Amp | Preamp Gain | | | | | Avg Lim | Average Field Strength Limit | | | |
| Dist | Distance to Antenna | | | | | D Corr | Distance Correct to 3 meters | | | | | Pk Lim | Peak Field Strength Limit | | | |
| Read | Analyzer Reading | | | | | Avg | Average Field Strength @ 3 m | | | | | Avg Mar | Margin vs. Average Limit | | | |
| AF | Antenna Factor | | | | | Peak | Calculated Peak Field Strength | | | | | Pk Mar | Margin vs. Peak Limit | | | |
| CL | Cable Loss | | | | | HPF | High Pass Filter | | | | | | | | | |

8.4. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



HORIZONTAL DATA

30-1000MHz Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 03/02/11
Project #: 10U13475
Company: Ruckus Wireless
Test Target: FCC-B
Mode Oper: Tx On, Worst Case

f Measurement Frequency Amp Preamp Gain Margin Margin vs. Limit
Dist Distance to Antenna D Corr Distance Correct to 3 meters
Read Analyzer Reading Filter Filter Insert Loss
AF Antenna Factor Corr. Calculated Field Strength
CL Cable Loss Limit Field Strength Limit

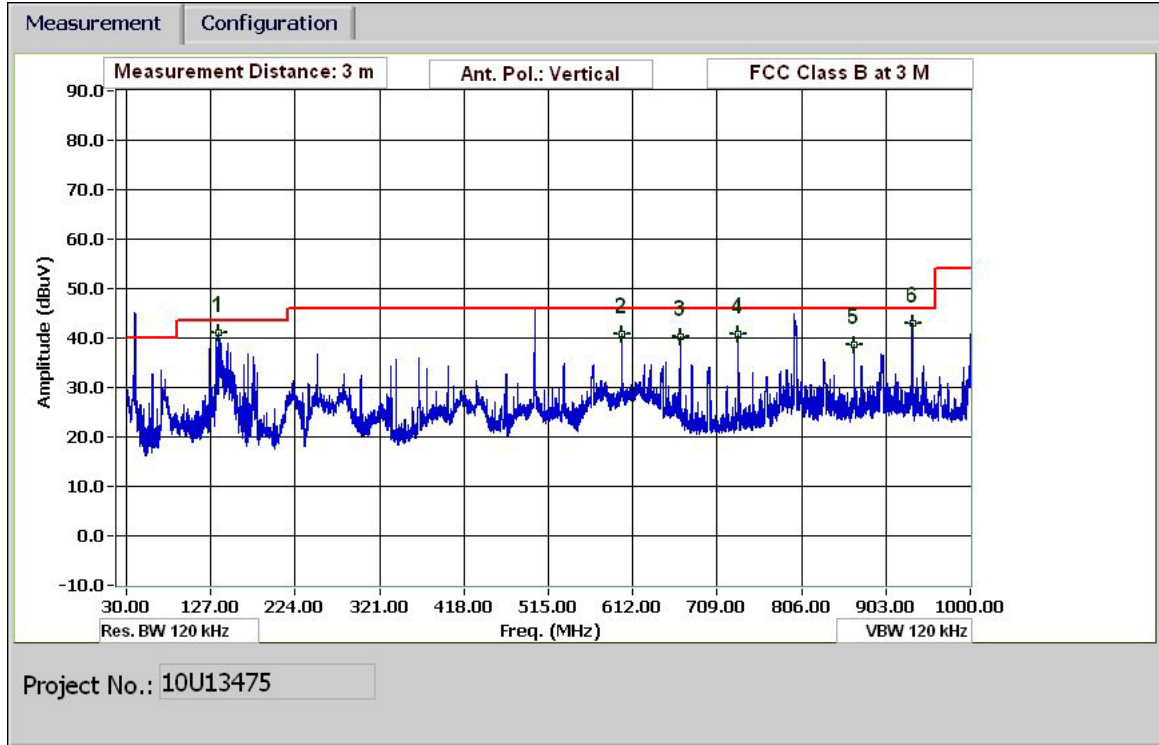
| f MHz | Dist (m) | Read dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Pad dB | Corr. dBuV/m | Limit dBuV/m | Margin dB | Ant. Pol. V/H | Det. P/A/QP | Ant. High cm | Table Angle Degree | Notes |
|------------|-------------|--------------|------------|----------|-----------|--------------|-----------|-----------------|-----------------|--------------|------------------|----------------|-----------------|-----------------------|-------|
| Horizontal | | | | | | | | | | | | | | | |
| 249.969 | 3.0 | 54.6 | 11.8 | 1.4 | 28.2 | 0.0 | 0.0 | 39.6 | 46.0 | -6.4 | H | P | 100.0 | 0 - 360 | |
| 499.939 | 3.0 | 53.0 | 16.7 | 2.0 | 27.8 | 0.0 | 0.0 | 43.9 | 46.0 | -2.1 | H | P | 100.0 | 0 - 360 | |
| 624.985 | 3.0 | 45.2 | 18.7 | 2.3 | 27.4 | 0.0 | 0.0 | 38.8 | 46.0 | -7.2 | H | P | 100.0 | 0 - 360 | |
| 798.152 | 3.0 | 47.3 | 20.9 | 2.6 | 27.4 | 0.0 | 0.0 | 43.4 | 46.0 | -2.6 | H | P | 100.0 | 0 - 360 | |
| 866.675 | 3.0 | 45.1 | 21.6 | 2.8 | 27.7 | 0.0 | 0.0 | 41.8 | 46.0 | -4.2 | H | P | 100.0 | 0 - 360 | |
| 874.955 | 3.0 | 41.4 | 21.6 | 2.8 | 27.7 | 0.0 | 0.0 | 38.1 | 46.0 | -7.9 | H | P | 100.0 | 0 - 360 | |

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Note: No other emissions were detected above the system noise floor.

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



Note: The signal over the 40 dBuV/m limit line below point 1 is not from the radio portion, this signal is covered under class A digital report.

VERTICAL DATA

30-1000MHz Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 03/02/11
Project #: 10U13475
Company: Ruckus Wireless
Test Target: FCC-B
Mode Oper: Tx On, Worst Case

f Measurement Frequency Amp Preamp Gain Margin Margin vs. Limit
Dist Distance to Antenna D Corr Distance Correct to 3 meters
Read Analyzer Reading Filter Filter Insert Loss
AF Antenna Factor Corr. Calculated Field Strength
CL Cable Loss Limit Field Strength Limit

| f MHz | Dist (m) | Read dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Pad dB | Corr. dBuV/m | Limit dBuV/m | Margin dB | Ant. Pol. V/H | Det. P/A/QP | Ant. High cm | Table Angle Degree | Notes |
|----------|-------------|--------------|------------|----------|-----------|--------------|-----------|-----------------|-----------------|--------------|------------------|----------------|-----------------|-----------------------|-------|
| Vertical | | | | | | | | | | | | | | | |
| 135.604 | 3.0 | 54.9 | 13.4 | 1.1 | 28.3 | 0.0 | 0.0 | 41.1 | 43.5 | -2.4 | V | P | 100.0 | 0 - 360 | |
| 600.024 | 3.0 | 47.7 | 18.4 | 2.2 | 27.5 | 0.0 | 0.0 | 40.9 | 46.0 | -5.1 | V | P | 100.0 | 0 - 360 | |
| 666.626 | 3.0 | 46.1 | 19.2 | 2.4 | 27.3 | 0.0 | 0.0 | 40.4 | 46.0 | -5.6 | V | P | 100.0 | 0 - 360 | |
| 733.349 | 3.0 | 45.4 | 20.0 | 2.5 | 27.3 | 0.0 | 0.0 | 40.7 | 46.0 | -5.3 | V | P | 100.0 | 0 - 360 | |
| 866.675 | 3.0 | 42.0 | 21.6 | 2.8 | 27.7 | 0.0 | 0.0 | 38.7 | 46.0 | -7.3 | V | P | 100.0 | 0 - 360 | |
| 933.277 | 3.0 | 46.0 | 22.1 | 2.9 | 27.8 | 0.0 | 0.0 | 43.1 | 46.0 | -2.9 | V | P | 100.0 | 0 - 360 | |

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Note: No other emissions were detected above the system noise floor.

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

| Frequency of Emission (MHz) | Conducted Limit (dBuV) | |
|-----------------------------|------------------------|-----------------------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 [*] | 56 to 46 [*] |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

^{*} Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

6 WORST EMISSIONS

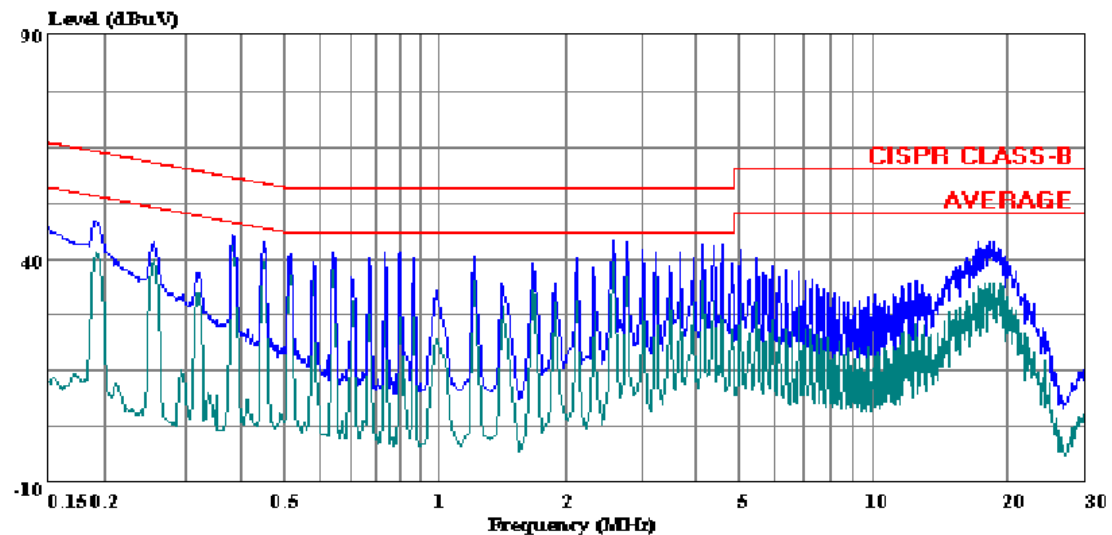
| CONDUCTED EMISSIONS DATA (115VAC 60Hz) | | | | | | | | | |
|--|-----------|-----------|-----------|-------|-------|-------|---------|---------|---------|
| Freq. | Reading | | | Closs | Limit | FCC_B | Margin | | Remark |
| (MHz) | PK (dBuV) | QP (dBuV) | AV (dBuV) | (dB) | QP | AV | QP (dB) | AV (dB) | L1 / L2 |
| 0.39 | 45.56 | -- | 43.98 | 0.00 | 58.17 | 48.17 | -12.61 | -4.19 | L1 |
| 0.45 | 43.56 | -- | 39.16 | 0.00 | 56.84 | 46.84 | -13.28 | -7.68 | L1 |
| 2.69 | 44.19 | -- | 39.28 | 0.00 | 56.00 | 46.00 | -11.81 | -6.72 | L1 |
| 0.39 | 44.38 | -- | 42.91 | 0.00 | 58.17 | 48.17 | -13.79 | -5.26 | L2 |
| 0.45 | 43.54 | -- | 35.69 | 0.00 | 56.89 | 46.89 | -13.35 | -11.20 | L2 |
| 2.69 | 43.37 | -- | 36.36 | 0.00 | 56.00 | 46.00 | -12.63 | -9.64 | L2 |
| 6 Worst Data | | | | | | | | | |

LINE 1 RESULTS



Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 7 File#: 10U13475.EMI Date: 03-02-2011 Time: 13:20:22

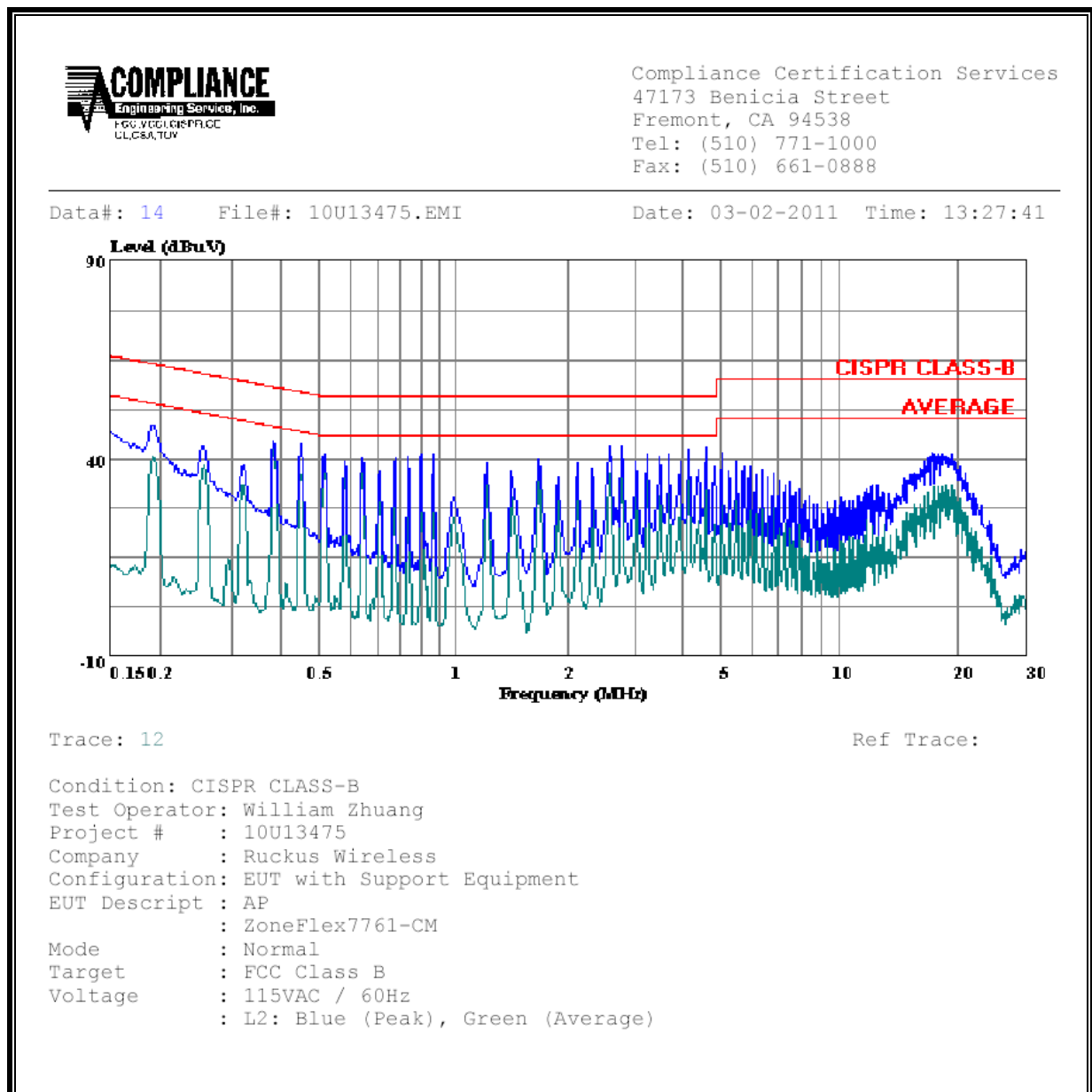


Trace: 5

Ref Trace:

Condition: CISPR CLASS-B
Test Operator: William Zhuang
Project # : 10U13475
Company : Ruckus Wireless
Configuration: EUT with Support Equipment
EUT Descript : AP
 : ZoneFlex7761-CM
Mode : Normal
Target : FCC Class B
Voltage : 115VAC / 60Hz
 : L1: Blue (Peak), Green (Average)

LINE 2 RESULTS



10. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm ²) | Averaging time (minutes) |
|---|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| (A) Limits for Occupational/Controlled Exposures | | | | |
| 0.3–3.0 | 614 | 1.63 | *(100) | 6 |
| 3.0–30 | 1842/f | 4.89/f | *(900/f ²) | 6 |
| 30–300 | 61.4 | 0.163 | 1.0 | 6 |
| 300–1500 | | | f/300 | 6 |
| 1500–100,000 | | | 5 | 6 |
| (B) Limits for General Population/Uncontrolled Exposure | | | | |
| 0.3–1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34–30 | 824/f | 2.19/f | *(180/f ²) | 30 |

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm ²) | Averaging time (minutes) |
|-----------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| 30–300 | 27.5 | 0.073 | 0.2 | 30 |
| 300–1500 | | | f/1500 | 30 |
| 1500–100,000 | | | 1.0 | 30 |

f = frequency in MHz

* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

Table 5
Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)

| 1 Frequency (MHz) | 2 Electric Field Strength; rms (V/m) | 3 Magnetic Field Strength; rms (A/m) | 4 Power Density (W/m ²) | 5 Averaging Time (min) |
|-------------------------|---|---|--|---------------------------------|
| 0.003–1 | 280 | 2.19 | | 6 |
| 1–10 | $280/f$ | $2.19/f$ | | 6 |
| 10–30 | 28 | $2.19/f$ | | 6 |
| 30–300 | 28 | 0.073 | 2* | 6 |
| 300–1 500 | $1.585f^{0.5}$ | $0.0042f^{0.5}$ | $f/150$ | 6 |
| 1 500–15 000 | 61.4 | 0.163 | 10 | 6 |
| 15 000–150 000 | 61.4 | 0.163 | 10 | $616\,000/f^{1.2}$ |
| 150 000–300 000 | $0.158f^{0.5}$ | $4.21 \times 10^{-4}f^{0.5}$ | $6.67 \times 10^{-5}f$ | $616\,000/f^{1.2}$ |

* Power density limit is applicable at frequencies greater than 100 MHz.

Notes: 1. Frequency, f , is in MHz.
2. A power density of 10 W/m² is equivalent to 1 mW/cm².
3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

EQUATIONS

Power density is given by:

$$S = \text{EIRP} / (4 * \pi * D^2)$$

where

S = Power density in W/m²

EIRP = Equivalent Isotropic Radiated Power in W

D = Separation distance in m

Power density in units of W/m² is converted to units of mW/cm² by dividing by 10.

Distance is given by:

$$D = \text{SQRT} (\text{EIRP} / (4 * \pi * S))$$

where

D = Separation distance in m

EIRP = Equivalent Isotropic Radiated Power in W

S = Power density in W/m²

For multiple colocated transmitters operating simultaneously in frequency bands where the limit is identical, the total power density is calculated using the total EIRP obtained by summing the Power * Gain product (in linear units) of each transmitter.

$$\text{Total EIRP} = (P_1 * G_1) + (P_2 * G_2) + \dots + (P_n * G_n)$$

where

P_x = Power of transmitter x

G_x = Numeric gain of antenna x

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm²

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m²

RESULTS

| Mode | Band | MPE Distance (cm) | Output Power (dBm) | Antenna Gain (dBi) | FCC Power Density (mW/cm^2) | IC Power Density (W/m^2) |
|------------|---------|-------------------------|--------------------------|--------------------------|-----------------------------------|--------------------------------|
| WLAN, 11b | 2.4 GHz | 20.0 | 26.19 | 9.77 | 0.78 | 7.84 |
| WLAN, 11g | 2.4 GHz | 20.0 | 26.13 | 9.77 | 0.77 | 7.73 |
| WLAN, HT20 | 2.4 GHz | 20.0 | 29.96 | 5.00 | 0.62 | 6.23 |
| WLAN, HT40 | 2.4 GHz | 20.0 | 29.94 | 5.00 | 0.62 | 6.20 |
| WLAN, 11a | 5.8 GHz | 20.0 | 25.69 | 10.27 | 0.78 | 7.84 |
| WLAN, HT20 | 5.8 GHz | 20.0 | 27.34 | 5.50 | 0.38 | 3.82 |
| WLAN, HT40 | 5.8 GHz | 20.0 | 27.54 | 5.50 | 0.40 | 4.00 |

Notes:

Antenna Gain for 11b, 11g and 11a is the combined antenna gain for all chains.
Antenna gain for HT20 and HT40 is the maximum antenna gain of all chains.
Output power is the combined output power for all chains.